

January 1978 communication

journal of the Radio Society of Great Britain

1977 ANNUAL GENERAL MEETING

(Report on page 59)

Lord Wallace, RSGB President, presenting awards at the AGM

Top, I to r: Bristol Trophy to representatives of Swansea ARS; Houston-Fergus Trophy awarded to G. J. Kellaway, G3RTE, and E. C. Hodson, G3XTJ, (one of the recipients was out of camera view on left).

Centre, I to r: 1930 Committee Cup to D. R. Vizard, G3UKS; Whitworth Trophy to D. J. Andrews, G3MXJ; Worthey-Talbot Trophy to J. W. Hard-

Bottom, I tor: Gravesend Trophy to a representative of Glenrothes & D ARC; Metcalfe Trophy to R. Treacher, BRS32525; Edgware Trophy to representatives of Bracknell ARS.

Photographs by P. Jones G3YLV

















ALL OUR PRICES INCLUDE VAT AT CURRENT RATES

AMATEUR RADIO

TELEPHONE NO: 01-699 6700 (9am to 6pm, 1pm Sat)

COMPONENTS FOR THE MULTIMODE 1600 TRANSCEIVER (Oct/Nov Rad Com)

Special price for complete kit, £215.00.
Receive only kit also available, £191.00.
PCB. £10.50: OC1246AX, £31.50; less carrier xtals, £27.50; XF9-E, £32.80;
XF9-M, £25.50; 8545kHz, Xtal. £3.00; 400ns delay line, £1.50; MD108, £7.65; RS12V Relay, £2.25; Toroid 30p.

MiniKit 1 (containing all the above) £152.00.
MiniKit 2 (semiconductors) £54.50 or £29.85 (receive only)

MiniKit 3 (R's and C's) £19.55.

THE G3ZVC SSB TRANSCEIVER

PCB, £2.55. Toroid, 30p. MD108 Ring Mixer, £7.65. OC1246 AX Filter, £31.50 or YF-90F Filter, £22.50 (Not recommended for HF Band use in this project).

MiniKit 1 (containing all the above), £42.35 or £33.40. MiniKit 2 (semiconductors) £32.60 MiniKit 3 £5.25.

SPECIAL PRICE FOR COMPLETE KIT, 278-30 or £69.95.
Also available—but not included in kits: Reprint of article (September 1974), 15p plus SAE, 25Ω Loudspeakers—2½, 23.10 or 5° C3.20. Metal Cabinet, £2.27. Min. 50Ω coavial connectors—PCB mount socket, 58p and plug, £1.14.

ADD-ON KITS FOR ABOVE UNITS

2m Preamplifler Kit with tailored bandpass and gain to suit, PCB size: 3.5" × 1.8". Price £5.20.

12V to 6V Regulator/1W Audio Amplifier Kit to power the G3ZVC Board from +12 volt supply and provide increased audio output. PCB size: 3.5" × 1.8". Price

20.90. 2m VFO Kit (by DJ5HD-VHF Communications, Edition 1/71). This VFO is of the mixer type, having VFO tuning 11 to 13MHz and a crystal oscillator of 62MHz. Kit price 239.00. VHF Communications Edn. 1/71, £1.00 extra. Components for HF Preselector Unit also available—write for details.

G3TDZ 2m AM TX/RX (Jan '73)

PCBs: RX, £2.20 TX, £1.00 3 gang × 17pF, £3.67 Drive Drum, 34p C.D. Spindle, 36p Cord Spring, 8p 4mm coil Formers, 6p each or 55p for 10; Cores, 6p each or 55p for 10; Ferrite Beads, 3p each; Trimmers: 10pF, 20p 35pF, 40p Filler, 55p 2! Loudspeaker, £3.10 Crystals: (72 05, 0 3, 0 35, 0 4, 0 625, 0 65, 9MHz) £2.80.

Minikit 2, (Semiconductors), Rx. £5.30 : Tx. £3.85. MOD £1.90.
Minikit 3, (Rs & Cs), Rx. £3.65; Tx. 70p; MOD, £2.00.
Special price for complete kits, Rx. £23.20; Tx. £9.40; MOD, £3.85.
(Modulator kits do not include PCB or transformers).

Also available, but not included in kits: Reprint of article (Jan 73), 35p plus large SAF

G3XGP MINI D.F.M. (Jun '73)

PCBs: I/P Amp. £1.70 Display, £1.90 Clock: 1MHz, £1.80. Minitron, £1.80. Led, 29p Transformer, £2.00 Switch, 55p, Knob, 45p 10 turn pot. 1kΩ, £3.60 1MHz

Crystal, £4.05 35pF trimmer, 40p.
MinIKit 1 (Containing the above), £23.55.

MiniKit 2 (semiconductors), £15.85 (Add 50p if 30MHz ic's required—DM7490 & 74HOO)

MiniKit 3 (Rs. & Cs), £2.95.

Special price for complete kit (1MHz Clock version), £41.75 (+ 50p for 30MHz ic's)

Also available, but not included in kits:

Reprint of article (June 73) 20p plus SAE; Metal cabinet, £6.85; 74196, £1.62.

G3PLX RTTY VIDEO DISPLAY UNIT

Set of printed circuit boards £14.85, Veroboards also available at £4.30 each. Set of l.c.s including programmed 74188s, £56.15; 2513, £8.50; AY5-1013, £6.25; 2102-1 £2.85; SN74188, £4.00 each or ready programmed £8.80 per pair. 7MHz Xtal;

Other components for main boards, £3.50. Flashing Cursor kit, £7.70, Diode Matrix kit, £11.50.

NOTE regarding PROM program: The PCB's and programmed PROM's supplied by us make use of a slightly different program sequence resulting in different pin connections to those published in the 'Rad Com' article. Whilst constructors buying PROM's and PCB's from us will have no difficulty, those producing their own PCB's or having PROM's programmed elsewhere should note this important difference. A detailed modification sheet is available with the PCB's.

OTHER RADCOM PROJECTS

Digital Frequency Counter and Timer by G3MFJ/G3KEP-March '76, 7400, 19p. 7473, 40p; 7475, 56p; 7490, 58p; 74121, 43p; 74196, £1.62, MC10116, 72p; 5V reg. £1.90; LED, 29p; 2N706, 22p; Toggle switch, 86p; 9V mains transformer,

Stereocode Processor by G6CJ-Sept. '75. Complete kit, £16.95.

40 WATT 2m P.A. KIT

A kit for building a 40 watt r.f. power amplifier for boosting the output of 10-watt F.M. mobile transmitters. Automatic solid-state T/R switching is incorporated. Design as published in September 1976 edition of "Electronics Today International." Complete klt—£19.25 pius 65p post.

NEW PLASTIC IC's from PLESSEY

New low cost version of the famous SL600 series communication ic's are now available. The plastic versions, designated SL1600 series, are in DIL8 or DIL14 packaging according to type

	Me	rtal	Plastic	
R.F. Amplifier	SL610C	€2.45	SL1610	£1.82
R.F. Amplifier	SL611C	£2.45	SL1611	£1.82
R.F. Amplifier	SL612C	£2.45	SL1612	£1.82
Limiting Amp.	SL613C	€4.23	SL1613	£2.13
VOGAD	SL620C	£3.72	DOS TOTO AND A	
AGC Generator	SL621C	£3.72	SL1621	€2.45
AF/VOGAD/Sidetone	SL622C	€9.15		
AM/AGC/SSB	SL623C	£6.75	SL1623	£2.75
Multimode Eet.	SL624C	£3.43	85.000,000,000	
A.F. Amplifler	SL630C	£2.33		
Double Bal. Mod.	SL640C	€4.10	SL1640	€2.13
Receive Mixer	SL641C	€4.10	-	-

IGNITION SUPPRESSION COM-PONENTS

We have the widest range of suppressors available as follows: Screened plug connectors (essential for VHF), straight or angled—£1.20, Plug in Distributor Suppressor—55.5.1 μ F Capacitor, available with normal push fit lucar connector, large lucar or fully insulated with wire connections. 49p, 2μ F, normal or large lucar connector, 52p, 0.5μ F Coax type, £1.97, 3μ F Capacitor for Lucas ACR alternator, £1.30, 3A Chokes, 71p, 7A Chokes, £1.00. Solid Copper stranded ignition cable. 10p per ft. Connectors, 8p each. Distributor screening can, £1.52.

FDITOR

A. W. Hutchinson

Editorial assistant

Mrs M. J. Collins

Draughtsman

D. E. Cole

Secretary

Mrs J. D. Brown

Contributions (including Members' Ads) and all correspondence concerning the content of Radio Communication should be addressed to:

The Editor, RSGB, 88 Broomfield Road, Chelmsford, Essex CM11SS

Tel 0245 84938

Office hours: 0830-1630

Correspondence concerning the distribution of the journal and all other Society matters should be addressed to:

RSGB Headquarters, 35 Doughty St, London WC1N 2AE

Tel 01-837 8688

ADVERTISING

Advertising, other than Members' Ads, should be sent to:

Mr C. C. Lindsay, 2 Leyburn Gardens, Croydon, Surrey CR0 5NL

Tel 01-686 5839

EDITORIAL PANEL

J. P. Hawker, G3VA R. F. Stevens, G2BVN



January 1978

Volume 54 No 1

CONTENTS

- 21 A message from the Society's new President
- 22 OTC. Council election results
- 24 An experimental self-tutor for morse code using the SN74S387 prom—M. R. Irving, G3ZHY
- 30 A simple rf admittance bridge—G. Garside, G3MYT/VE3
- 31 New product—Usijet signal injector
- 32 12V to 18V converter for the Pye Bantam-A. Brown, G3TXD
- 34 Equipment review— Yaesu Musen FT301—T. G. Giles, BSc, AMIEE, G4CDY
- 37 SWL news-Bob Treacher, BRS32525
- 38 Starting on Oscar-P. J. A. Gowen, G3IOR
- 42 Technical topics—Pat Hawker, G3VA

Supplement-Index to Volume 53

- 48 4-2-70-Graham Knight, GM8FFX
- 51 RSGB National VHF Convention
- 52 Microwaves-Dain Evans, G3RPE
- 54 The month on the air-John Allaway, G3FKM
- 58 Propagation predictions. Propagation study
- 59 1977 AGM report
- 60 "Raynet-Radio Amateurs' Emergency Network"
- 61 Raynet—P. Balestrini, G3BPT Mobile rallies calendar
- 62 General rules for RSGB vhf/uhf/shf contests 1978
- 63 General rules for RSGB hf contests 1978
 Code letters for use in RSGB contests
 Code of practice for RSGB vhf/uhf contest operation
- 64 General rules for RSGB hf receiving contests 1978 General rules for RSGB vhf/uhf receiving contests 1978 Contest news
- 65 Contests calendar
- 66 Club news
- 72 Members' ads

Radio Communication is published by The Radio Society of Great Britain as its official journal on the first Thursday of each month and is sent free and post paid to all members of the Society



20,432 copies per issue average circulation in 1976

Closing date for contributions unless otherwise notified: 4th of month preceding month of publication

© RADIO SOCIETY OF GREAT BRITAIN 1978



WATERS & STANTON

TELEPHONE HOCKLEY (03 704) 6835 (2 LINES)

Great Value... Great Performancel THE 2 METRE FM TWINS



OUARTZ-16

Now £149.75 inc. VAT! (fitted 7 channels)



IN STOCK NOW

HP DEPOSIT £30

THE MOST ECONOMICAL ...

25 channel capability, 144-145MHz with 12 watts output-automatic tone-burst-true "R" and "S" channel dial readings-2 priority channels-remote vfo/synthesizer socket-microphone, power cord, mobile mount, fuses, plugs, etc. and English manual plus 12 months guarantee. Channels fitted:

S0, S20, R3, R4, R5, R6, R7. Additional channels S21, S22 and S23 available at appealal price of £7.50 inc. VAT (6 xtals). No wonder more people are turning to the Quartz 16 as the no-nonsense, functional and economical transceiver. Buy now at these special ex-factory prices.



NEW MULTI-800D 25 WATTS!

2m FM Synthesized Transceiver



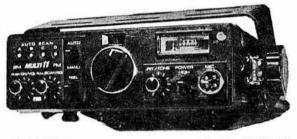
The Mutti-800D covers all channels from 144-148MHz in SkHz intervals and there is no guessing what frequency you are transmitting or receiving on. Many views have been voiced as to the good and bad points of digital displays, but let's face it, with digital readout there is only one display that is not ambiguous—readout of the true transmit and receive frequencies. The 800D overcomes all criticisms levelled at other models by giving true readout. Thus on S20 TX/RX indicates 145.500. Flip to the repeater mode and R7 reads receive 145.775 changing to 145.175 on transmit (makes sense doesn't it!) For reverse repeater operation simply flip the mode switch to reverse repeater and you are listening on the input channel with the display changing to 145.175. No cranking of dials with the 800D.

> £239 including VAT . Remote Display £15. DELIVERY END OF JANUARY



MULTI - II

23 CHANNEL & 4 AUTOSCAN 12 WATTS & THE HOTTEST RX



IN STOCK NOW

HP DEPOSIT £39

This is it, the hottest little rig around. No hidden extras or add-on units. Auto-scan This is it, the hottest little rig around. No hidden extras or add-on units. Auto-scan is included for safer driving and a two-stage RF amplifier for superb weak signal reception. Its features are endless, tx monitoring, centre zero meter, RIT tuning, automatic tone-burst, wide/narrow filters, high/low power, APC, all necessary accessories and a 12 months guarantee. Act now and avoid price increases. 4 page brochure available. Channels fitted SQ, S20, R3, R4, R5, R6, R7. Additional channels S21, S22, S23 available at special price of £7.50 inc. VAT (6 xtals). £191 50 inc VAT (fitted 7 channels)



70 cm FM! MULTIU-II OF COURSE

NOW £219 inc. VAT (fitted 2 channels) or £249 fitted 10 channels



Now's the chance to join the fun on 70cms. With the ever growing number of 70cms repeaters coming on the air, it makes sense to consider 70cms as the ideal mobile band. Good strong signals (aided of course by the U-11 hot front end and 12 watts output!) no QRM and a lot of new friends to meet. The U-11 has lead the way from the start and is now regarded as THE rig for 70cms. We can supply the U-11 fitted with any of the following channels: RB0, RB2, RB4, RB6, RB10, RB14, SU8, SU16, SU18, SU20 at £5.90 per channel.

ELECTRONICS

TELEX 897406

FAST MAIL ORDER SERVICE





Multi-2700 Mk II **DUAL VFO CONTROL**

MULTI-2700-THE COMPLETE STATION

The FDK Multi-2700 is a front-line all-mode transceiver that incorporates every conceivable feature to ensure maximum enjoyment. In fact, apart from a mains plug and an aerial, there is little else we can sell the owner of a Multi-2700. All in all it is ar unbeatable transceiver at an unbeatable price

ALL MODES-ALL OCCASIONS

All modes are provided AM FM SSB and CW. For SSB operation VOX is included and for CW, fast break-in is provided with completely adjustable side tone. The 2700 can be used at home with its internal 230v AC PSU or taken out to the local high spot and run from 12v DC. This really has to be the QSO machine that you will never tire of.

BEAUTIFUL TO OPERATE-BEAUTIFUL TO HEAR

The transmitted audio quality of the 2700 is second to none. Its crisp, clear, quality eflects the manufacturer's knowledge that a clean signal sells more products! The Optimised 16-9MHz 8-pole crystal filter gives clean SSB signals and good selectivity. On FM, direct modulation of the VCO gives smooth but penetrating audio. Typical power output is 16 watts but the flip of a switch and you have 1 watt on all modes. (An nternal adjustment permits the power to be adjusted from approx 1 watt to 6 watts for driving linears or transverters.) The Multi-2700 has a built-in receiver RF pre-ampno problems here with a deaf receiver.

DUAL VFO CONTROL

Until you have handled the Multi-2700 you cannot appreciate the advantages of dual vio control. The conventional analogue VFO with its dual speed silky smooth feel, permits accurate tuning on all modes with 1kHz readout. It also covers a complete 1MHz segment at a time resulting in minimum band switching. The flip of a switch and you have full synthesized control of your transceiver. The bright LED display allows the transceiver to be immediately set to any 2 metre channel. A VXO control ensures the synthesizer can be used equally well on SSB, CW or FM. The versatility of dual vio control is quite amazing. For example: use the analogue vio at the SSB end



of the band and the synthesizer on the FM channels; set the synthesizer to the "sked" frequency and continue normal operation on the analogue VFO; set analogue VFO to DX frequency whilst continuing normal tuning of the adjacent frequencies on the analogue VFO—the combinations are endless. Repeater shifts are completely taken care of. The Multi-2700 has +/- 600kHz shifts and 1-6MHz for 70cms operation

IN STOCK NOW

ITS VERSATILITY IS ENDLESS

Inter-continental contacts are possible via OSCAR. Press the OSCAR button on the front panel and you bring in the 28MHz downlink receiver converter to enable true transceive operation through the satellite. An audio SPEECH PROCESSOR can be switched in to permit extra punch, the amount of compression being adjustable to suit the operator. RIT operates on all modes and both vto's. A NOISE BLANKER is included for really excellent suppression of ignition pulses. The receiver section covers 143 to 149MHz (Tx covers 144-146MHz + 1-6MHz shift only). Apart from the 2 existing repeater offsets one further shift may be programmed. AGC control is continuously variable, as is the VOX DELAY and ANT-VOX etc. All pre-set controls are easily reached through the top hatch of the transceiver. Separate centre zero and tx S-meters are provided. We could go on but if you have read this far perhaps it is time you sent off for the 4-page brochure giving full details of this beautiful transceiver at a really competitive price. £489 inc VAT and Securicor delivery.

TM56B AMATEUR VHF MONITOR RECEIVER

DEC 918



A PLEASURE TO OWN

Tune into the exciting world of amateur radio with this advanced monitor receiver Listen to your local amateur radio stations both fixed and mobile, direct or through the your local repeaters. From the comfort of your fireside chair, using the built-in 230 volt. AC power supply, this receiver will open up the whole new world of VHF Amateur Radio for you. Alternatively the necessary hardware supplied enables you to power the TM56B from your car radio battery for true mobile operation.

GREAT VALUE

Little wonder that the first two shipments of these beautifully engineered receivers were sold out within weeks of the advertisements appearing. We really are amazed at their superb performance at such a low price.

SOUND DESIGN

The design is well and truly tried and tested, and the circuitry is almost identical to the receiver section of the FDK mobile transceivers. Both sensitivity and selectivity leave nothing to be desired and the auto-scan enables the popular calling channels to be continually monitored for activity.

NO HIDDEN EXTRAS

The receiver is supplied complete with all leads, circuit diagram, crystals for channels S0, 20, 21, 22, 23, R3, 4, 5, 6, and 7 plus space for a further 6 channels, making 16 in all. An additional matching desk top aerial is also available at £2.50 extra.

£85 including delivery and VAT.

EK-121 DE-LUXE

ECONOMIC ELECTRONIC KEYER



ONLY £29.95 INC. VAT

Beautifully built, featuring plug-in circuit board. At this price you have a real bargain.

MOBILE SAFETY MICROPHONE



Clips on lapel, sun vizor. safety belt etc. Weighs 5 grams and complete with gear lever Tx/Rx control box-keep both hands on the wheel in future! Matches most transceivers except IC240.

> ONLY £19.95 INC. VAT

MAIL ORDER & HEAD OFFICE: HOCKLEY AUDIO, 31 SPA ROAD, HOCKLEY. ESSEX. TEL. 03-704 6835 (2 lines) CARRIAGE AT COST



AGENTS-G3XTX J.R. Electronics, 196 Collier Row Lane, Romford, Essex. Tel. Romford (0708) 68956.

G30QT Bredhurst Electronics, Willowbrook, School Lane, Bunbury, Cheshire. Tel. Bunbury (0629) 260708 GM3GRX Eric Simpson, 6 Drossle Road, Falkirk, Stirlingshire, Tel. 0324-24428

MONDAY TO SATURDAY 9 A.M. TO 5.30 P.M. EARLY CLOSING WEDNESDAY



1978—and here's THE BIG ONES! MLA-2500, 160-10 metres, 2000 Watts PEP

DenTron



Send 25p for complete colour catalogue of all DENTRON products

The new MLA-2500 is a linear amplifier beyond compromise. Dentron amateur radio products have always been strikingly individual. This is the result, not of a compulsion to be different, but of dedication to excellence in American craftsmanship. This dedication now extends to one of the world's finest high performance military amateur amplifiers. Luxury styling combined with rugged construction, however, would not be fully appreciated without an exceptional power source. The heart of the MLA-2500 is a heavy-duty, self contained power supply for 230 volt or 110 volt operation. Compare the MLA-2500. It has the lowest profile of any high performance amplifier in the world. Its modular construction makes it unique and

Orders now being accepted for Feb. delivery.

no wonder it is outselling all its competitors in the USA. Two years ago we considered another manufacturer's 2KW amplifier but dismissed it because of its high

Features 160-10 metres
2000 + watts PEP/1000 watts D.C. continuous variable forced air cooling 2 × EIMAC 8875 tubes—built in true reading RF watts meter 40 watts drive for 1KW D.C. metring of plate volts/current and grid current size 5\frac{3}^2H × 14^2W × 14^2D Weight 47lbs. 19\frac{1}{2}^2 rack mounting kit available.

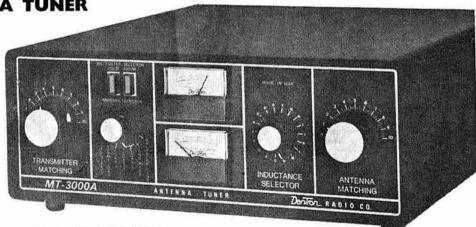
cost, large size and lack of features. Having looked at the Dentron, MLA-2500 we

now know we made the right decision then!

MT-3000A TUNER

3kW 160-10m

PROVISIONAL
PRICE
£235 inc. VAT



OTHER MODELS:-MT-2000A SUPER 10-160AT JR MONITOR

The MT-3000A is a capsulized solution to many aerial matching problems. It incorporates 4 unique features to give you the most versatile antenna tuner ever built. First as a rugged antenna tuner, the MT-3000A easily handles a full 3KW pep. It has continuous tuning from 18-30MHz without gaps. It matches anything and everything between 160 and 10 metres. Secondly, the MT-3000A has built-in dual watt metres—one to read forward power and the other to read reflected power.

Thirdly, It has a built-in 50 ohm dummy load for proper exciter adjustment. Fourthly, it has a built-in antenna switch selecting: "tune or by-pass"—"coax 1, 2 or 3"—"long wire"—"bialanced line". The compact size of the MT-3000A (5)" × 14" × 14") matches it to the MLA 2500 and represents the most comprehensive and rugged tuner ever produced for the amateur market.

UK Agents

WATERS & STANTON ELECTRONICS, 31 SPA ROAD, HOCKLEY, ESSEX EXPORT ENQUIRIES WELCOME Telephone 03704 (Hockley) 6835 Telex: 897406



FRG7 DIGITAL £180

LEE ELECTRONICS LTD

ESTABLISHED FOR MORE THAN TWO DECADES

01-723 5521 CLOSED THURSDAYS

G8.IVL

400 EDGWARE ROAD, PADDINGTON, W.2

LONDON'S LARGEST STOCKISTS OF YAESU ANTENNA
SPECIALISTS STANDARD ICOM BANTEX
JAYBEAM REVCO MATO ATLAS ETC

FRG-7-DIGITAL DISPLAY

YAESU MUSEN PRICES FREE DELIVERY WITHIN U.K.

FT301 T/RX 1-8-30. 100W 12V	- 4
FT301D Digital Readout '301	1
FV301 External VFO	
FP301 PSU/speaker	
FT200B T/RX 3-5-30	
FP200B AC PSU/speaker	
FRG7 RX·5-30 cont. AC/DC	

£485	FRG7 Digital	£180
£585	FT221R 2m, "All mode"	£339
£62	FT227 10W, 400ch mobile,	
£79	digital	P.O.A.
£54	FT223 T/RX 2m. FM 23 ch.12	V £139.50
£145	FR101D DeLuxe 'S' BC, FM	E390
ALL +	VAT 121 % EXCEPT MONI	TOR SC

FR101SD Digital Readout 'S'	£387
FR101DD Digital readout 'D'	£480
FT101E Transcelver	£429
FL101 T.X. 1·8-30MHz 230V	£325
FL2100B Linear 1-2kW PIP	£248
FT101EE T/RX 1-8-30 AC/DC	£408
E, CLOCK, COUNTER, WAT	TMETE

C500J 500MHz Counter 10 PI	PM £155
C601 Dig. Display 101 & 401	£110
YO301 Monitor scope	£123.50
YO100 Monitor 2 tone asc	£118.00
SIG80R T/RX. 2m.FM 80× 25k	Hz
12V	£195

ALL + VAT 12} % EXCEPT MONITOR SCOPE, CLOCK, COUNTER, WATTMETER, + 8%

MICROWAVE MODULES DESPATCHED TO ANY PART OF THE WORLD POST FREE

miono ii Air mor	
MMT144/28 Transverter	£79
MMT432/28, Transverter	£97
MMT432/285 with Oscar shift	£119
MMT432/144, Transverter	£133
MMT432/144R with 1.6MHz shift	£151
MMP 12/3 Power supply 12V, 3A	gacen K
stabilized	£50

79	FREQUENCY COUNTERS	
97	MMD 050, 50MHz counter	£62
19	MMD 050/500MHz counter	£79
33	Divide by 10 prescaler, 500p.	£25
51	E 6 31 105	
	VARACTORS	
E50	MMV 1296, 23cm varactor	£33

PART OF THE WO	KLD I
CONVERTERS	
MCC70, 4m converter	£18
MCC70/LO, 4m converter	£20
MCC144, 2m converter	£18
MCC144/LO 2m converter	£20
MCC432, 70cm converter	£24
ON FREQUENCY COUNT	ERS. A

21	FF	(EE			
ATV	435/	51 converter	9		£24
MC	C129	6 converter 2	8 or 144	MHzIF	£28
All	2m	converters	can b	e supp	lled
with	IF o	utputs of 2-	4-12-14	-18-28M	Hz.
70cr	n mo	odels with II	Foutpu	ts of 28	-14-
18-	or 14	4MHz.			

ALL MICROWAVE MODELS SUBJECT TO VAT IN U.K. 8% ON FREQUENCY COUNTERS, ALL OTHER MODELS 121/2%

A.S.P MOBILE AND BASE STATION ANTENNAS

Asp201, Iw 2m mobile	£3.25
Asp2009, § 3dB 2m mobile	£5.95
Asp829 w 3dB 2m mobile	£7.60
Asp677	£13.50

STANDARD RANGE			
All above	prices + V/		
Asp cutter clip less cable	£3.85		
Asp magnetic mount	£8.95		
Asp no hole boot mount	£3.70		
Asp393 iw 3dB 2m mobil	e £17		

	Asp E462 70cm 3dB mobile	£7,23
	Asp E667 70cm 5dB mobile	£16.90
	Asp A659 UK 70cm 5dB, base	antenna
		£15.45
A	T at 8% carriage free	

Special offer A.S.P. A680 U.K. 6dB 144/148MHz Co-linear Power handling 350w. Length approx. 12ft. List £51 special offer £41.50

COM RANGE	
IC215 2m 8ch	£132.40
C215 2m 10ch (fitted 6 re-	
peaters plus 4 simplex)	£144
IC202 2m SSB	£152.90
IC22A 10W Mobile	£145
IC240 10W Mobile	£159.10
IC245E 10W FM/SSB	£352
IC211E 10W FM/SSB	£470

All transceivers + 1919/VAT

C146 2m H/held
C860 10W Mobile
C828 10W Mobile
KYOCUTO DIGITAL II
10W mobile 400CH Tx/rx

J-BEAM ANTENNAS

ALL MODELS IN STOCK

£130	Multi 11-2m mobile		£184
£159	Multi 2700 Fm/ssb. Tx/rx		£435
	HELICAL ANTENNAS		
	2m with 13 NC	£3.85	each
£235	2m with ph 259	£3.85	each
	2m for IC215,		
	Trio 2200 Gx, standard C1	46A	£3.25
	All + post 25p. + 121%	VAT.	

F.D.K. RANGE

ICOM ACCESSO	RIES
Extals S21 or S22	£4.50 pr.
ER Case 202/215	£6.67
Mobile Bracket 202	2/215 £10.23
Helical Antenna	£3.25, p & p 25p

J.V.L. 6dB CO-LINEAR

DC grounded, low angle radiation pattern, fully adjustable for max gain and min SWR £29.00 + £1.50 p & p All above items + VAT 121%

SPECIAL OFFER. Constant current Ni-Cad chargers. Adjustable charge rate for AA or C type Ni-Cads. Ideal for [C202/215, C146A, Trio, etc. Price £8.35 + 8% VAT. p & p 50p.



SUPER-SCAN

Manufactured for us, and designed exclusively for use with the IC240. Note these star features \star Scans 40 channels in 25Kc/s steps. \star Locks out unwanted occupied channels \star Adjustable scan rate \star Adjustable phase period \star Manual mode feature \star Automatic \pm 600 kHZ shift of TX frequency when repeater mode is selected \star Large six digit display shows frequency to 5 k/cs \star Display always shows frequency in use including TX frequency when PTT is operated. \star Call for demonstration.

Price £69.00 +121% VAT

EXPORT ENQUIRIES WELCOMED

CLOSED FOR STOCKTAKING 3.1.78 TO 18.1.78 INCLUSIVE



South Midlands

WE WISH YOU ALL A

ESU MUSEN 2-YEAR GUARANTEE "24-HOUR" SECURICOR SERVICE



THE ROLLS-ROYCE OF TRANSCEIVERS

ARE YOU: OPERATIONAL ON HE OR VHF, ACTIVELY LOOK-ING FOR AN HE TRANSCEIVER, OR WAITING UNTIL THE RIGHT ONE-THE ONE WITH EVERYTHING, AT A REASON-ABLE PRICE ARRIVES? HAVE YOU EVER SAT BACK AND DRAFTED OUT THE SPECIFICATIONS OF YOUR DREAM MACHINE?

10-80. No lets have 160 as well, reception of WWV would be a nice addition.

SSB and CW are a necessity, AM for top band, FSK for RTTY, how about FM (with receiver squelch) for a 10m net and for use with a transvertor.

Digital read out, of course, (to a 100Hz) for accuracy but an analogue system to say, 1KHz would give one a "feel" of position in the

Digital fead out, of course, (to a rounz) for according but an analogue system of say, first a would give one a feet of positions and, we are only dreaming, let's have both.

Mains or battery? Both, two power supplies and the transceiver? Messy! The power supplies must be built in.

Sensitive receiver, with a switchable attenuator (just in case), crystal filters for CW, SSB, AM—how about a tuneable IF system with overlapping filters for continuously variable selectivity. A deep note filter, and an audio peak filter, to complete our specifications. RF speech processing, VOX, noise blanker, transmitter output level, and microphone gain as front panel controls. How about disabling the PA if we require a low level output only.

Tune up is always a problem, a button that with a single push gives full power transmission for 10 seconds is an interesting solution.

A clarifler of some sort is necessary, a potentiometer with zero in the centre? An on/off switch at one end or how about two switches to bring into operation a desired shift on Tx and/or Rx.

For CW, how about the latest in technology—a Curtis memory keyer actually built into the equipment.

Its got to be clean, of course, RF derived feedback and to eliminate out of band spurii, what about a phase locked loop VFO—gidea? Why not then build in a memory that will hold any transmit, receive, or a transceive frequency and recall it in a moment.

STOP DREAMING OF TOMORROW'S TRANSCEIVER TODAY, IT IS HERE! THE FT901. FROM YAESU THROUGH SMC; THE PEOPLE YOU CAN TRUST.

THE HF MOBILE YOU CAN 'TRIUMPH'ANTLY FIT TO YOUR ROLLS OR MIN!!



With insight into the needs of HF mobile in '78 Yaesu offer the FT7, in stock in Totton around the end of this month. This is a 10-80m transceiver, VFO controlled (to 1KHz accuracy) and with that useful crystal control facility. Selectable sidebands, CW, crystal calibrator, clarifier and an advanced noise blanker are some of the features packed into a cabinet only a few inches high, but through careful design the front panel remains remarkably uncluttered. Designed for a linear 10W output consuming only a few amps it eliminates; 30A cables from the passenger compartment and the cooling problems of a massive heat sink. Need more power for a difficult contact? Flick in a FL11U(a 200W PIP linear) installed in any suitable place in your car.

THE FT227R NEW FROM YAESU IS WITH SMC NOW

The new FT227R uses a "single knob" tuned digital synthesizer employing a photoelectric sensor for an optical coupled system which eliminates both noisy, unreliable rotary switches, and crystal banks. Full coverage of 2 metres in 5 kHz divisions with a ±600 kHz shift plus a memory feature which permits recall of any entered frequency or particular offset.

Bright, large, digital readout gives unequivocal readout of the frequency in use. The receiver offers 0.3 µV (for 20dB S + N/N) sensitivity into a ±6 kHz (at 6dB) bandwidth whilst maintaining a remarkable immunity to overload and image problems. The 20W. DC input transmitter features Hi/low power outputs, AFP, tone burst on repeaters and an out of band inhibition trip, etc



FT227B

FOR NEW 23 PAGE STOCK LIST, YAESU CATALOGUE, ETC. (A4) S.A.E. OR 30p STAMPS

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON SOUTHAMPTON SO4 4DN Hours of business: 9-5.30; 9-12.30 Saturday



Head Office, Showrooms
Cables: Aerial Southampton
Telex: 477351 SMCOMM G

EVENINGS - AGENTS - ALL QTHR

Head Office, Showrooms G3ZUL Stourbridge (03843) 5917 Brian Kennedy Cables: Aerial Southampton GMBDOX B. of Allan (078683) 3223 Ian McKechnie-Telex: 477351 SMCOMM G GW3TMP Pontybodkin (035287) 846 Howarth Jones Tel: Totton (04216) 7333 (3 lines) GI3WWY Tandragee (0763) 840656 Mervyn Andersor 840656 Mervyn Anderson

Communications Ltd

HAPPY NEW YEAR

2m FM? NO NEED FOR INCOMPLETE COMPARISONS—WE HAVE THE RANGE

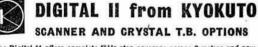
THE NEW FM 2015R FROM KYOKUTO



EX STOCK ONLY £245 + VAT

The 2015 transceives across 144-146 (Rx to 149) MHz in 5 KHz steps tuned by coaxial switch stopped at 0 and 9.

A major feature is the 4 channel RAM memory (with an internal Ni Cad back up) which may be programmed direct from the front panel by simply dialling in a frequency, no screw drivers, no soldering irons, no fuss. Frequencies can be recalled from the memory instantly or they may be scanned in either of two modes: searching for a vacant or an occupied channel. 5 split (including + and - 600 KHz) for repeater or transverter (even triplevertor) use. Multipurpose tone burst, RIT (centre off with 'click'), modular constructions, centre zero meter, accessory socket, mounting bracket, microphone etc, are all provided. The sensitive receiver is varicap tuned by the DC level of the P.L.L. IF's of 16-9 MHz and 455KHz provide high image rejection and good shape factor 2:1 at 70dB (12KHz BW). In the transmitter, modulation is applied directly to the V.C.O. (for the ultimate in fidelity), auto power control and varicap tuning keeps power output constant at band edges and spuril way down.



The Digital 11 offers complete 5kHz step coverage across 2 metres and now with the Scanner 33, 25kHz channels from 145MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 10 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs.

Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (rx to 149MHz) from a tiny 6½ x 2° x 7½°. Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.



DIGITAL II, £235; CRYSTAL TB, £10; SCANNER, £49.50 ALL PRICES EXCLUDE VAT (121%)

For strong handling, and low noise the R.F. mixer, first I.F. (18-9MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (±8kHz at -648 ±15kHz at -708B). Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 circuit block construction (for serviceability and screening). Selective calling socket.

ANTENNA? FOR THE RANGE-FOR THE STOCK-SMC OF COURSE

JAYBEAM 70(4m), 144(2m)	,432(70) (Carr. about £1) VAT 1	21%			RANGE (Carr. extra) VA	T 121%	
D5/2m 5 over 5 slot feed £12.10 D8/2m over 8 slot feed £16.20 SXY/2m 5 ele. crossed £14.20 SXY/2m 8 ele. crossed £17.70 IOXY/2m 10 ele. crossed £23.40 SY/2m 5 ele. yagi £6.85 SY/2m 6 ele. yagi £8.80 IOY/2m 10 ele. long yagi £18.95 I4Y/2m 14 ele. long yagi £24.25 Q4/2m 4 ele. yagi £14.50 Q6/2m 6 ele. quad £19.30	PBM10/2m 10 ele. Para PBM14/2m 14 ele. Para D8/70 8 over 8 slot feed PBM18/70 18 ele. Para MBM48/70 45 ele. Multi MBM88/70 88 ele. Multi 12XY/70 12 ele. crossed 4Y/4m ele. yagi PMH/70 2 way harness PMH2/2 C Circ. phasing PMH2/2m 2 way harness	£22.55 £27.70 £13.45 £16.50 £19.25 £25.75 £26.40 £11.25 £5.25 £4.50 £6.05			£19.60 P500W P.I.P. Cu/T	ele. £11 ele. £14 ele. £14 ele. £11 ele. £11 ele. £11 Vert. £1	04.50 08.00 49.00 79.00 62.00 09.50 72.40 84.00
BANTEX VHF WHIPS (Car 85 § 145MHz	701170MHz Trunk Lip Mount Magnetic Base Mount Stan'd b. unwanted deduct	£4.00 £5.75 £9.05 £0.50		MOSLEY TRI-BAY TA333 ele. 200W R.M.S MUSTANG 3 ele	£21.75 braid c/w 75' feed ND BEAMS (Carriage £3.50) V £85.00 TA322 ele. 300W. A £108.00 MUSTANG 2 ele. 1k REGLASS QUAD (Carriage	AT 12}% .M £5 .W £8 £2-£9) VAT 12	
CABLES RF FEEDERS (Car		£8.00			£119.00 GQ4E4 element £178.00 CK1Q1 ele. Conv. ki	it <i>E</i> E	58.00 56.00
UR57 75 ohm Heavy 42p yd 75 ohm Flat Twin 10p yd	UR39 75 ohm Medium T3278 75 ohm Distribution UR43 50 ohm Solid Cent UR76 50 ohm Strand Cent.	24p yd 20p yd 15p yd 33p yd		Tribander 10-20m (+ LF) Multimobile 10/20 (+ MM) Flexiwhip 10, (+ FF) Basemount † hole mount		·· ·· 4	E5.25 E5.25 E5.25 E2.00
LOOKING F	OR A MAST? THI	EN TRY	THE	PEOPLE WHO K	NOW-AND CARE		
TELOMASTS	HAMTOWERS			TELETOWERS	VERSATOWER	s	
10' telescope heavily galvanised steel mast supplied with guy rings	Galvanised lattice 10' s	ections.	Carria	ige and rigging (RK) extra	(Illustrated right, Also	see below.)	
etc. or c/w full rigging kit.	Free standing with climbin	g steps.	42'	£121.00 (RK £28)	Standard P40	£212.00	
Carriage £2-£7 ex-stock VAT 8%	Carriage £3-£20 ex-stock 8	% VAT	57'	£174.00 (RK £28)	Standard P60	£252.00	
30' £25.00 or £43.85 c/w rigging 40' £32.50 or £56.85 c/w rigging	30° c/w base grillage £192.3	35	79	£224.50 (RK £49)	Heavy Duty P40	€286.00	
50' £42.00 or £74.50 c/w rigging	40° c/w base grillage.	P.O.A	101	£303.50 (RK £76)	Heavy Duty P60	£333.00	-
Telescopic (20' sections) with full tilti post allows easy cheap installation of for line drawing and above right for ty	ten without resort to concrete. I	Full scale effic	cient pro	duction offers you a wide ran	ow unit weight and superior de- ge of towers at a minimum cos ECTION OF STATION AC	t. See far righ	t



S.M.C. (Jack Tweedy) LTD Roger Baines, G3YBO 79 Chatsworth Rd, Chesterfield, Derby

Chstrfld (0246) 34982 9-5 Tues-Sat

NORTHERN (LEEDS) BRANCH The Chambers, No. 3 The Parade

North Lane, Headingley, Leeds Tel: Leeds (0539) 782326 Open 9-5pm Tues-Saturday 9-8pm Thurs. S.M.C. (Jack Tweedy) LTD Jack Tweedy, G3ZY Ham Shack, Roughton Lane,

Woodhall Spa, Lincs Wdhl Spa, (0526)52793 9-5 Tues-Sat (+ appt)





SOUTH MIDLANDS COMMUNICATIONS LTD.

OSBORNE ROAD, TOTTON SOUTHAMPTON, SO4 4DN

Cables: Aerial Southampton Tel: Totton (04216) 7333 (3 lines)

LEEDS, CHESTERFIELD, WOODHALL SPA. AGENTS GM. GW. GI etc.

HANSEN PEP & RMS WATTMETERS (P & P 85p)



Flat 50-150MHz. SWR $\pm 3\%$ (to 3 : 1) Power 20 & 200W FSD ($\pm 10\%$) 6½ \times 24 \times 4½* £22.50 + 8% VAT ES302M FS602M including PEP scale £33.00 + 8% VAT



QUARTZ CRYSTALS (P & P 20n)-Low Price. FT75(B), FR101(S), FT200(B), FT301(S), FT221(R) FT220, MS2, MR2, Converter £2.20 each (+121%) FT2F, FT2FB, FT2 Auto, FT224, FT223, KP202 Multi 11, TR2200(G), C146A £3.75 pair (+121%)





Car or mast head mounting. Typically 12dB gain. Bandpass characteristics. Handles 30W RF. 12V operation. SO239 sockets 5½" × 2½". RB-145 £22.50 (+12½%) Post free.



BOOM MICROPHONE "HEADSET"

600 ohms magnetic lightweight boom mic Ideal for mobile or contests etc.

fi cat mee aut bu	0.00				
MD35 complete					. £14.75
Microphone only		200	*10.	20.2	£9.75
Footswitch only				**	£5.95



LEADER WATTMETERS

LDM885 Through line (illustrated) (P&p £0.75) 1·8-54MHz.20-200-1000 W FSD ... £41.50 + 8% (p & p £0.75)

LPM880 Absorption 1-8-500MHz. 5-20-120 W FSD £64.00 + 8% (p & p £0.95)



TRANSISTOR DIP OSCILLATOR LDM815

1.5-250MHz on fundamentals battery c/w earphone and 6 plug in colls 2kHz modulation .. £38.50 (+8%) 1-15MHz. Crystal facility. .. Post free LIMBTO

Antenna impedance meter 1-8-150MHz 0-1kohm direct reading c/w load .. £38.50 (+8%) Post free



COAX SLIDE SWITCHES

Up to : 1kW, 1-5 GHz, 0-3dB less, 1-2 : 1 VSWR, Up to : 1kW, 1-5 GHz, 0:308 less, 1:2: 1 VSWM, 50dB isolation, 50 ohm "N" or "PL" fittings. ExStock P. & P. 30p (VAT + 8%)
TW2510 1 in 2 out nickel SO239. £5.40
TW5150 1 in 5 out nickel SO239. £9.35
TWS220 2 in 4 out nickel SO239. £9.35

SWR METER WITH POWER INDICATIONS



SWR25 Twin meter SWR25 Up to 160 MHz. Calibrated to 3 : 1 SWR SO239

£10.00 (+ VAT 8%) (p&p 40p)

ANTEX (KURANISHI) COAX SWITCHES (p & p 20p)



1:05:1 VSWR, 0:2dB loss, 40dB isolation, 200W handling all 150MHz

KSWI 3 SO239 sockets (+8% VAT) £7.70 KSWIA 2 SO239, 1 PL259 plug (+8% VAT) £8.20

FM BOOSTER T203

88-108MHz low noise pre amp. Fitted flying leads (car plugs) up to 20dB gain. 12 Volts with LED indicator 11 × 31 × 21 T203 £7.75 (+121%) (P & P free)

CUSHCRAFT Colinear (illustrated right) EX STOCK

RINGO RANGER: -6dB gain over ½ ground plane. Uses 3x¾ in phase and 1/8Å stub. Ultra low angle radiation. Extremely low wt.

ARX450 432MHz RINGO RANGER £21.50 (+12½%) (Post £0.65)

ARX2 144MHz RINGO RANGER £21.50 (+12½%) (Post £0.65)

HANSEN REMOTE RF HEAD WATTMETERS

Separate Directional Coupler 3" \times 2½" \times 1½" and illuminated indicator 5" \times 2½" \times 1½" c/w brackets etc. Power 20 & 200W RSD (\pm 10%) SWR to 3:1 (±3%) FS711/V ideal for mobile £23.50 (+8% VAT)

CRYSTAL FILTERS (P & P free VAT 121%)



Wide range: small selection below. YF30F350 350Hz F*101 CW6pl YF30H350 350Hz F*101 CW 8pl YF30F12 12KHz F*101 FM 6 pl YF90F2-4 2-4KHz SSB 6pl

£16.20 £19.85

111 TRA BAL 2000



Ferrite Balun 3-30MHz 50/75 ohm 9ozs Body 62" Long × 11" diams. Rated to 2000W PIP. SO239 socket UBI 1:1 £9.00 +121% (P & P 40p)

MFJ ANTENNA TUNERS



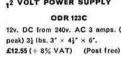
10-160m, 200W, 12 postn. Inductor 16010 2 variables SO239's 3½" × 3½" 4" SOLD OUT (+ VAT)£29.50 16010ST 3 variables SO239's & Binding posts POST FREE (+VAT) £49.50

LEADER ANTENNA COUPLER



3-5-30MHz. 50/75 coax (SWR < 5) and single wire (10-250 ohms) feed transformed to 50 ohm. Wattmeter 20 4 250W FSD, SSB 500W PIP. £72 + 121% VAT (Post free)

12 VOLT POWER SUPPLY



ODR 123C 12v. DC from 240v. AC 3 amps. (5A peak) 31 lbs. 3" × 41" × 6".

COAX RELAYS



12v DC 50 ohms. Silver plated. 4 weeks. P. & P. 30p (VAT + 8%) Power crosstalk (at 500 MHz)

50W 35dB Cable entry 300W 40dB BNC sockets £9.50 CX120 CX230 CX600N 600W 40dB N sockets £21 50

MICROWAVE MODULES POST FREE (WORLDWIDE) TRANSVERTERS-10W



utput sensitive etc. Full converter & counter range stocked SAE) £79.00 (+121%) MMT432/28 £119.00 (121%)

MMT432/144 double conversion £151.00 (+121%) MORSE KEYS FROM HI MOUND

AMPERE

HK707 (illustrated left) (P & P 60p)

Hand key 0.5Kg Ex stock £7.90 (+121%) BK100 (P & P 60p) Mechanical Semi Auto Bug key £12.15 (+12½%) HK808 (P & P 80p)

Hand key marble plinth (1.1Kg) £25.15 (+121%) 2 or 70. Superb RF sensing and dc bias arrange-

ments for all modes. C/w mounting bracket 12V dc 10W drive 2.5" x 5.2" x 7.5".(8.5") (+ VAT at 121%), free delivery



APB82A 145MHz 80W out APB57A 432MHz 45W out APB87A 432MHz 80W out £102.15 £102.15

HY GAIN Vertical (Illustrated right) 18AVT/WB-10-80m-wide band, 50 ohm, 1kW. Self supporting, 25' trapped 10, roof or ground mounted, low radiation angle, vertical. 18AVT/WB, £72.40 + 121% (+£1.15 BRS Delivery). FULL HY GAIN, HF RANGE IN STOCK.

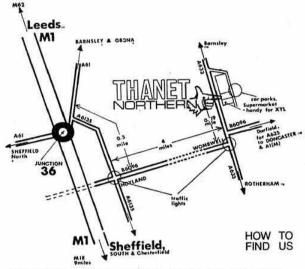
PETE, G4DYG-PETER, G3TPX

TWANET NORTHERN



64 HIGH STREET, WOMBWELL, BARNSLEY, SOUTH YORKS.





We are conveniently located close to the M1, and not far from the M18 and M62 Motorways. Ample free and unrestricted parking at rear of shop.

- ★ ICOM
- ★ AREA DISTRIBUTORS OF N.E.C. EQUIPMENT
- YAESU MUSEN DEALERS
- ★ WESTERN ELECTRONICS PRODUCTS
- ★ S.B.E. DISTRIBUTORS
- ★ STOCKISTS OF: Microwave Modules Products S.E.M. Products QM70 Products Polar Electronic Developments Jaybeam, ASP, Revco and Hygain aerials.
- ★ PLUS WIDE RANGE OF COM-PONENTS AND ACCESSORIES

A SELECTION OF OUR PRICES (Including VAT and Carriage)

Yaesu FRG7	£159.75	Osker SWR 200	£37.00	Icom IC240	£179.00
Yaesu FT101E	£453.66	Osker SWR 300	£41.50	Icom IC215(8 CHS.)	£149.00
Yaesu FT221R	£325.00	Osker SPC-2B	£14.50	Icom IC202	£162.00
N.E.C. CQ110E	£682.08	Osker SPC-07a	£18.75	Icom IC245	£398.00
N.E.C. CQ301	£803.70	(all three for £71.00)		Icom IC211	£527.00
Western DX33	£76.00 (carriage extra on this)	Western PM2000	£44.00	Emoto 103LBX	£71.00

- ★ We will be pleased to quote for any item(s) against your enquiry.
- ★ We try to maintain adequate stocks of most advertised items, but reserve the right to supply to order if necessary.
- ★ We will open evenings and Sundays (by appointment) for sales.

OTHERWISE OPEN DAILY MONDAY TO SATURDAY 10 a.m.-6 p.m.

(closed all day WEDNESDAY)





TELEPHONE BARNSLEY 756229 TELEX 54151 24 Hour Ansaphone Service Public Payphone Available

64 HIGH STREET, WOMBWELL, BARNSLEY, SOUTH YORKSHIRE





THE IC-240 IS NOW £179 INC. VAT*

*Prices marked thus have been reduced because of an extremely favourable rate of exchange at the time of purchase.

Sorry to have to bore you with even more comparison lists, but we have had so many phone calls that we felt that we should at least give you one more to compare with the rest! We still think, though, that the best way to choose a rig is to ask the owner of one for his opinion. Remember that ease of use and after sales service are probably the most important parameters.

Try this one:-

11.00	FT-227R	TR-7500	IC-240
Mean number of clicks required to QSY	100*	10	6
Need to remember to press extra button for all odd channels	YES	NO	NO
Channel spacing (normal use requires 25kHz)	5kHz	25kHz	25kHz
Instant reverse repeat on all repeater channels without re-tuning	NO	YES	YES
instant reverse repeat on an repeater channels without re-turning	NO	150	IES
Ability to remain on frequency last used when set is switched off	2	100102	777720 ACK
then on again	?	YES	YES
Position of tone burst switch	REAR	FRONT	NONE
r solicit of total barst striker		1110111	(Automatic
			select)
Position of low power switch	REAR	FRONT	FRONT
Supplied with all those channels in the FM portion of the band			
which are used 98% of the time?	YES	YES	YES
Scanner available to cover all 40 FM channels plus	. 20		
	110	NO	VEO
electronic tuning outside this range	NO	NO	YES
Can be arranged to have the most frequently used channels next to one another	NO	NO	YES
Price (seems to vary a bit)	180/189	225	179
* or 50 if you confine yourself to the band	200000000000000000000000000000000000000	10.00	227
or so if you contains you are to contain to contain the contains and the c			
† our guess, but it may be nearer to 99-5%			

So there you are folks—the decision is up to you, but if you do buy ICOM from us we will guarantee you the best after sales service we can possibly give.

give.
All data is correct to the best of our knowledge and is collected from adverts and other enquiries.

DON'T FORGET THE PORTABLE TWINS IC-215 3w FM 8ch £149* IC-202 3w SSB £162*

Both provide the best in portables in their field, with crisp, clear modulation, a healthy 3 Watts of output, large sensible batteries and an excellent receiver. Both are used by many as base stations, with, or without, a linear. An economical way of getting a very good signal in the airl

Introducing "SLIM JIM" SJ2

144-146MHz-High efficiency 2 metre omni-directional vertical

An omni-directional 2 metre aerial developed by T & T from a design by F. C. Judd (G2BCX). Derived from the "J" the SJ2 is a free space aerial with better than 50% greater efficiency than conventional ground plane types due to the very low angle radiation field. The aerial is slim and compact (58 inches long) and as there are no radials it is unobtrusive and has low wind resistance. Supplied complete with mast clamp. £15.50 inc. VAT (carriage 70p).

FOR DETAILS LEAVE YOUR NAME AND ADDRESS OR CALLSIGN ON OUR ANSAFONE (02273 63850) DURING THE EVENING WHEN CALLS ARE CHEAP

HP TERMS NOW AVAILABLE

YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM



THANET ELECTRONICS

143 Reculver Road, Beltinge, Herne Bay, Kent (02273 63859)





FOR UP-TO-DATE TECHNOLOGY IN 1978 THE LEADERS IN SYNTHESIZED TRANSCEIVERS

a ő

YOU CAN HAVE THE IC-211E £529

Giving you FM/CW/USB/LSB, all produced from the amazing ICOM synthesizer and patent LSI chip. Frequency read out is to the nearest 100Hz and it is amazingly stable and accurate. You can use the two frequency stores as separate VFOs or for any repeater shift required. The trequency stores as separate VPOs or for any repeater shift required. The tone burst is automatic, of course, and reverse repeat is available at the flick of a switch. Add a keypad (we will give you the circuit to make your own or you will be able to buy one shortly) and find a new facility which is quite impossible with old fashioned rigs. The original waiting list has now been dealt with and you can now have one from stock.

SIZE: 141 (H) × 240 (W) × 264 (D) mm



AND THE IC-245E £396

This truly amazing little box gets you mobile on FM, USB or (if you really think it a good idea) CW! The synthesizer is the same as the IC-211E and can be tuned to the nearest 100Hz, again with amazing accuracy. Of course such a versatile little box will often be used as a base station and facilities such as keypad operation can be added. They are now ex-stock—but only just!

SIZE: 90 (H) × 155 (W) × 235 (D) mm



AGENTS (PHONE FIRST-All evenings only except Norfolk and Burnley)

London-Terry G8BAM (01-556 Scotland-lan GM8DOX (07868

Norfolk-Ted G3FEW (05088 632) Wales-Tony GW3FKO (0222 Burnley-(0282 38481) Midlands-Tony G8AVH (021 329 North West-Gordon G3LEQ (Knutsford (0565) 4040)

FOR ALL MAIL ORDERS AND SALES DURING BUSINESS HOURS

THANET ELECTRONICS HERNE BAY, KENT (02273 63859)

WOMBWELL, THANET NORTHERN. YORKS. (0226-756229)

BUT NOT THE IC-701 (YET) £1 $K\pm5\%$

Because there is only one in the country at the moment—as far as we know—and it's here at Herne Bay being put through its paces! This is going to be the HF rig to beat them all and is going to be bought by the man who wants the best. These are some of the features which you get with the BASIC rig: There is a full synthesizer with digital read-out to the nearest 100Hz to amazing accuracy. This has two frequency stores which enable you to store a frequency in one while tuning the band with the other—yes, you CAN even look at, and tune, another band while waiting for the juicy Dx to finish his QSO and then switch straight back to his frequency, or alternatively you can work split frequency either way round providing they are in the same band. There is an RF speech processor built-in, of course, AND a CW filter, pass-band tuning to help cut down the QRM, VOX, semi break-in CW, self-cancelling RIT. AGC and a noise blanker. There is no PA tuning and loading to do—just find your man, press the button and talk. (Think of the extra contacts you would make if you didn't have to waste precious time tuning up!) The PA is solid state and will run 100 watts of R.F. out all day continuously. (How many vaive rigs will do that?). A quiet little fan discretely comes on if it gets a bit hot. There is PA protection, of course, for the man who is incapable of providing it with a proper aerial (though this is sacrilege with a set like this). A double balance schotky diode mixer is used for both transmit and receive and, just to finish the perfection, ICOM have decided to supply an electret desk microphone with each set. Of course it will run from either 12v DC or the mains, and an external mains PSU is included. This makes it compact and light for use when mobile. For the keen top band man that bit of the spectrum is covered also. The extras to come will be things like a key-pad to key in any frequency, any band, and a few spare memories. We have had great fun testing our Demo model and have received extremely complementary reports few other locals



Western

TRY "SEVENTY" in "SEVENTY EIGHT"

with the

Western 70TV 432MHz TRANSVERTER



this will be the new pacesetter!

We have designed and built the 70TV up to a high standard. Not down to a price! Don't buy a 70TV if you're looking for a cheap unit.

BUT if you want to hear signals that some others can't . . . the 70TV is the answer!

- ★ Fully stabilised AC and DC PSU
 - ★ Full 10W. R.M.S. output
 - * Double conversion to minimise spurious outputs
 - ★ Noise figure 2-5dB typical
 - ★ Built-in 28MHz attenuator 30:1
 - ★ Built-in relays
 - ★ Matches Yaesu styling
 - * Withstands infinity mismatch
 - ★ All units aligned on Hewlett-Packard Spectrum Analyser
 - ★ Can be driven by most 28MHz Transceivers

Ex-Stock Now-ONLY £178.87 VAT

*ALL MODES (YES-EVEN FM) on ALL HF BANDS and 70

WITH YOUR Western 70TV and the NEW

FT901pm from

The **FT-901DM** provides unique features far ahead of any other transceiver of its kind on the market today.





PRICE £842.63 Inc. VAT

- Variable-bandwidth IF passband tuning. Not "IF shift", this feature superimposes two filters upon each other, then tunes one to make the bandwidth as wide or narrow as desired.
- * Rejection tuning for elimination of particular interfering signal.
- Audio Peak Frequency tuning provides a narrow audio peak with steep skirts for single-signal CW reception.
- * Built-in Curtis 8043 IC electronic keyer.
- * PLL frequency derivation. Digital plus analogue readout.
- Unique memory circuitry allows storage of a frequency with recall for instant control of transmit, receive, or transceive frequency.
- VOX, semi break-in CW with sidetone, 25KHz calibrator, advanced noise blanker, RF speech processor, receiver 20dB RF attenuator, and TX/RX clariflers are built-in.
- Rugged 6146B final tubes. Toroidal output circuitry and RF negative feedback for maximum reliability and purity of emissions.
- * Plug-in printed circuit boards for ease of maintenance.
- TUNE button provides 10 seconds of "key down" condition, then automatic return to receive for protection of final tubes.
- All band (160 through 10 meters plus WWV/JJY receive) and all mode (LSB, USB, CW, FSK, AM and FM) coverage.
- Choice of supply voltages of 100/110/117/200/220/234 VAC or 13 8 VDC with no external power supply required.
- Diecast front panel and heavy-duty steel case for maximum protection from shock or vibration damage while travelling.

0

Electronic/ (UH) Ltd

GET "PEP" ped UP on 2 METRES for the NEW YEAR with **WESTERN'S NEW PM200**

WESTERN—the firm who gave you the PM2000—the first direct PEP reading HF wattmeter-now proudly present the PM2001 ... the first direct PEP reading VHF wattmeter!



- Direct measurement of SSB PEP output from 50 to 150MHz.
- RMS power measurement for AM, FM or CW.
- Forward or reflected power readings at the flick of a switch.
- Full-scale ranges from 5 to 200 watts (RMS or PEP).
- Accurate to within 7%.
- No calibration dials to set.
- Large, clear, easy-to-read meter scales.
- Can be left "in-line" at all times.
- Styled to match the WESTERN PM2000 HF PEP meter.

These superb instruments are now available ex-stock at £52.92 inc. VAT

CHRISTMAS PRESENT MONEY TO SPEND? TRY THESE . . . OSKER SWR-200 OSKER SWR-300

All the facilities of the long-established and well-known Osker SWR-200, but now with optional add-on couplers for accurate (10%) power and SWR measurements in the 2 metre and 70 centimetre bands. Basic instrument for HF-add couplers for VHF and/or UHF. Couplers not useable without basic

| | SWR-300 | SPC-2B | SPC-07A |
|----------------------|------------------------|-------------|-----------|
| Freq. range (MHz) | 3.5-30 | 144-148 | 420-450 |
| Power ranges (W) | 0-20; 0-200;
0-2000 | 0-20; 0-200 | 0-2; 0-20 |
| Accuracy | ±15% FS | ±10% FS | ±10% FS |
| Impedance (Ω) | 50 | 50 | 50 |
| PRICES (Inc. VAT, ca | arriage free) | | |
| SWR300 | | | €43.20 |
| SPC-2B | | | £15.12 |
| SPC-07A | | | £19.98 |
| | OR ALL THREE | FOR £75.00 | |

Almost too well-known to need description. Power and SWR measurement 3.5 to 150MHz. Accuracy ±15% FS; 50 or 75 ohm; ranges to

PRICE: £38.88 inc. VAT, carriage free.

ACCESSORY CORNER

| Yaesu YH-55 phones | £9.00 |
|-----------------------------------|--------|
| Yaesu QTR-24 World clock | £14.62 |
| Yaesu YD-846 hand microphone | |
| (50k) | £9.00 |
| Shure 526T desk microphone | £33.69 |
| Vibroplex "Original" Standard key | £38.81 |
| Katsumi CW101 Audio CW filter | £15.75 |

PAYMENT:

Cash or cheque, ACCESS (Mastercharge), VISA (Barclaycard), GIRO TRANSFER (A/c 288 6154), DINERS CLUB; HP and Credit Sale arranged

* * * SEND SAE FOR CURRENT SECOND HAND/SPECIAL OFFER LISTS * * *

Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquirles)

FAIRFIELD ESTATE LOUTH, LINCS, LN11 0JH

Tel. Louth (0507) 4955/6

Our Agents
Southern: Alan Paxton, G4BIZ, Chandlers Ford, Hants
(04215) 65015
Scotland: Alan Cameron, GM3OGJ, Alloa (0259) 214653
N. Ireland: Les Lyske, Gl3CDF, Newtownards (0247)
812449

Opening hours: LOUTH: 9-12; 1-5 pm Mon-Frl. By Appointment Sat 9-12. LEICESTER: May's HI-Fi, Churchgate (Tel: 0533-58662) Mon-Sat 9-6 pm; closed Thur.





YAESU proudly announces a new synthesised 2m FM transceiver FT-227R



The world famous Yaesu state-of-the-art technique has brought computer theory into VHF communications.

what are the frequency splits for repeaters? Don't worry! Yaesu has computerized it. In addition to a conventional \pm 600kHz split, any transmitter offset frequency is memorized with a touch of a push-button.

What was my last frequency channel? Don't check! A touch of a push-button will bring you back to the memorized channel instantly.

system to select each channel in 10kHz steps and the channel may be offset 5kHz higher with a touch of a push-button. Thus 800 fully synthesized channels are provided with one knob and no rotary switches to get oxidized and noisy.

When will the FT-227R be available? NOW!

Many, many other features such as automatic encoder-decoder for tone guarded squelch (TGS) (optional). Tone burst accessed repeater operation, automatic final protection, busy channel indicator, high-low out-put selection, diseast front panel, and famous Yaesu quality throughout!

And all at a most attractive price. See your dealer today for an informative catalogue.

Amateur Electronics, 508-514 Alum Rock Road Alum Rock, Birmingham B8 3HX South Midlands Communications Ltd. S.M. House, Osborne Road, Totton, Near Southampton, Hampshire SO4 4DN

Western Electronics (UK) Ltd., Fairfield Estate, Louth, Lincolnshire LN11 0JH

YAESU proudly announces 1980's RADIO TODAY: The FT-901DM HF Transceiver





The Ham's dream-to have the best-is now reality.

Advanced receiver features include rejection tuning, dual-filter variable-bandwidth IF passband tuning, and audio peak frequency tuning for sharp CW reception. Unparalleled receiver selectivity is yours.

Built-in Curtis 8043 IC Keyer! Provides reliable operation and superb immunity from RF interference.

Famous Yaesu quality workmanship throughout. Toroidal output circuitry and RF negative feedback for maximum reliability and purity of emissions. Rugged GE 6146B final tubes.

Memory circuitry allows you to store a frequency, then recall it with the push of a button for control of transmit, receive, or transceive frequency. Digital plus analog frequency readout. PLL frequency derivation.

VOX, calibrator, noise blanker, RF speech processor, and 20dB attenuator are all built in, not expensive accessories.

Modern computer-type plug-in circuit boards for quick servicing and clean layout.

The FT-901DM will be available soon. See your dealer for a color brochure on the FT-901DM and other Yaesu products.

Amateur Electronics, 508-514 Alum Rock Road Alum Rock, Birmingham B8 3HX South Midlands Communications Ltd. S.M. House, Osborne Road, Totton, Near Southampton, Hampshire SO4 4DN Western Electronics (UK) Ltd., Fairfield Estate, Louth, Lincolnshire LN11 0JH

LOWE ELECTRONICS LTD

PRICE LIST JANUARY 1978

| | | Carriage | P | | Carriag |
|---|----------------|----------|--|-----------------|------------------|
| TRIO EQUIPMENT | £ | £ | | £ | £ |
| TS820 160-10m HF transceiver 200W PEP | 645.00 | 3.00 | CO1303G Station monitor scope (as CO1303D but fitted in line | | |
| VF0820 External VFO | | 3.00 | | 129.60 | 3.00 |
| DG1 Digital readout to 100Hz + + + + + + + + + + + + + + + + + + + | 127.00 | 3.00 | CO1303D Single trace dc to 5MHz, Ideal small service scope | 108.00 | 3.00 |
| DS1A 12V DC inverter | 40.00
36.00 | 0.86 | DM800 Dip resonance meter | 48.60 | 0.86 |
| YG88C CW filter 8 pole | | 0.28 | 1454W 545W 66W54WV | | |
| SP520 Matching speaker 8 ohm | 19.00 | 0.86 | JAPAN RADIO COMPANY | | |
| YG88C CW filter 8 pole SP520 Matching speaker 8 ohm TV502 2m transverter all solid state | 178.00 | 3.00 | NRD505 Professional communications receiver c/w matching
speaker | 1800.00 | 3.00 |
| DK520 Conversion Kit-allows use of DG5 with TS520 | 12.00 | 0.40 | | | |
| TS520S 1-8-28MHz SSB transceiver 200W PEP | | 3.00 | CRYSTALS | | |
| DS1A 12V DC inverter | | 0.86 | We stock FM channels SO, S10 to S25, S32 (145.80) and all | | |
| VFO520S Remote VFO | | 3.00 | current repeater and reverse repeater channels for the | | |
| SP520 Matching speaker | 19.00 | 0.86 | equipment we sell. | 2012/06 | 72512 |
| DG5 Digital display 40MHz frequency counter | | 3.00 | Price per single crystal | 2.40 | 0.15 |
| YG3395C CW filter | 36.00 | 0.40 | Price per pair | 4.80 | for |
| | 920000000 | 222 | Special offer on crystals for TR2200GX, TR7200, TR3200 and | 42.00 | any |
| R599D 160M10m all mode Rx, CW/USB/LSB/AM/FM | 403.00 | 3.00 | TR8300 ONLY. 3 pairs for £10.00 | 10.00 | qty. |
| TS599S De luxe HF Tx-80-10m CW/USB/LSB/AM | 383.00 | 3.00 | 100kHz marker crystal | 3.37 | 0.15 |
| S599 Matching speaker 8 ohm | 18.00 | 0.86 | | | |
| CC29A 2m converter for R599 for internal fitting | 20.00 | 0.28 | KF430 | | |
| NEW TRANSFORM & CHILDREN STREET, THE TOTAL PROPERTY OF | | | 70cm 10W transceiver, fitted 9 channels. Auto TB. The ulti- | | 12223 |
| TS700G 2m transceiver. CW/USB/LSB/FM/AM 240V AC/ | | | mate mighty midget | 180.00 | 3.00 |
| 12 DC ., | 426.00 | 3.00 | The Appropriate s | | |
| VOX3 Matching VOX unit (free with TS700G) | 19.00 | 1.06 | NIHON DENGYO | 10000000000 | Same |
| SP70 Matching speaker | 18.00 | 0.86 | Liner 430 70cm SSB transcelver—Get ready for OSCAR 8! | 290.25 | 3.00 |
| TS700S 2m all mode digital readout transceiver. Simply the | | | R115E Regulated psu for Liner 430 | 31.50 | 3.00 |
| best | 542.00 | 3.00 | Belcom 70A 70cm 10W fixed/mobile transceiver, 430-440MHz. | | |
| VFO700S External VFO | 83.00 | 3.00 | CW/USB/LSB/FM/AM | t.b.a. | |
| VFO700S External VFO | 13.00 | 0.86 | | | |
| TR7010 2m SSB/CW mobile transceiver 10W output | 189.00 | 3.00 | RTTY VIDEO DISPLAY | | |
| PS5 Matching AC power unit/digital clock | | 3.00 | *TD960 Send/receive RTTY & Computer Terminal display unit | 351.00 | 3.00 |
| Spare 2 pole power plug | 0.25 | 0.15 | *DM 170A RTTY terminal unit | 129.60 | 3.00 |
| FR7200G 10W FM mobile fitted 10 channels, auto toneburst, et- | c 189.00 | 3.00 | | | |
| VFO30G Matching VFO with repeater shift | 92.00 | 3.00 | VHF AMATEUR RECEIVERS | | |
| PS5 Matching AC power unit/digital clock | 58.00 | 3.00 | NR56 Tunable crystal 2m FM receiver, 144-146MHz | 54.00 | 0.86 |
| PS5 Matching AC power unit/digital clock *TR7400A 2m FM 30W mobile transceiver 800 channels | 329.00 | 3.00 | ASV1515 VHF FM monitor receiver less crystals. Mains/ | 9500000 | Name of the last |
| TR7500 2m FM 10W transceiver. PLL with all FM channels, | | | battery. Self-contained | 39.60 | 0.86 |
| programmed 144-146MHz | 225.00 | 3.00 | AMR217B Scanner with 8 crystals. The best and most | | |
| TR2200GX 2m FM handy transceiver c/w battery charger, | | 0.00 | popular, Mains/battery | 106.87 | 1.06 |
| microphone, carrying case, fitted 3 channels | 139.00 | 3.00 | Seiwa MS2 Scanner less crystals. 4 channel pocket scanner | 67.50 | 0.67 |
| TR2200GX 2m FM handy transceiver c/w battery charger, | 100.00 | 0.00 | Selwa MR2 Monitor less crystals, 12 channel pocket receiver | 63.00 | 0.67 |
| microphone, carrying case, fitted 12 channels | 169.00 | 3.00 | Crystals for the above-each | 2.40 | 0.15 |
| RA1 Helical rubber antenna | 6.30 | 0.15 | | | |
| MB1A Matching mobile mount (also fits TG2200/G) | 9.70 | 0.67 | MICROWAVE MODULES EQUIPMENT | | |
| Spare nower lead | | 0.15 | MICROWAVE MODULES EQUIPMENT | 20.25 | |
| Spare power lead | 9.72 | 0.36 | MMC70 4m converte | 22.50 | |
| VB2200GX 10W mobile PA with SWR protection. All leads | | 0.00 | | 27.00 | |
| supplied | 45 00 | 0.86 | MMC432/28 70cm converter
MMC432/144 70cm converter
MMC1296/28 23cm converter | | AII |
| Spare whip for RT2200GX. (Also available for 2200/2200G) | 1.90 | 0.15 | MMC432/144 70cm converter | | micro- |
| TR8300 70cm FM mobile 10W transceiver fitted 4 channels | | 3.00 | MMC1296/28 23cm converter | | wave |
| TR3200 70cm FM handy transceiver fitted 3 channels | 182.00 | 3.00 | MMC1296/144 23cm converter | | |
| MRIA Matching mobile mount | 9.70 | 0.67 | MMC1296/28 23cm converter MMC1296/24 23cm converter MMV1296 244 23cm converter MMV1996 23cm tripler MMD050 50MHz counter MMD500 P50MHz prescaler | | module
post |
| MB1A Matching mobile mount | 1.25 | 0.15 | MMD500P 500MHz prescaler | | post |
| Spare power lead | 9.72 | 0.15 | MMD500P 500MHz prescaler | | para |
| VB3200 10W PA with RX pre-amp. Same case size as TR3200 | 95.62 | 3.00 | MMD050,5000 500MHz counter | 85.32
133.28 | |
| R300 General coverage receiver 170kHz-30MHz. B/S for broad- | 33.02 | 0.00 | | 169.88 | |
| cast bands | 184.50 | 3.00 | | 88.87 | |
| HS5 Communications headphones, tailored response | | 0.67 | MMT144/28 2m transverter | 00.87 | |
| Spare ac lead | 1.25 | 0.15 | EII TEDE | | |
| *TL922 HF linear amplifier: 160-10m/2kW PEP input. 2x 3-500Z | | 0.10 | FILTERS | | |
| | 697.00 | 3.00 | Trio LF30A Low pass filter 1kW rating, 32MHz cut off, 90dB | 47.00 | 0.00 |
| tubes
HC2 World time clock. 24 hour time zone clock. Invaluable aid | | | stop band | 17.00 | 0.67 |
| MC10 Hand migrophone 50k impedance false available in | 15.50 | 0.67 | Trio BPF2A 2m band pass filter-144-146MHz. 50W. rms. | 07.00 | 0.03 |
| MC10 Hand microphone. 50k impedance (also available in 500 ohm) | 9.00 | 0.28 | 100W P.E.P | 27.00
13.72 | 0.67 |
| | 9.00 | 0.28 | Shinwa 1110 2m band pass filter—144-146MHz | | |
| MC50 De luxe desk microphone dual impedance. PTT locking | 04.00 | 0.00 | Shinwa 1005 2m low pass filter—146MHz cut off | 11.48 | 0.67 |
| bar | 24.00 | 0.86 | Shinwa 1140 28MHz transverter filter—28-30MHz band pass. | 13.72 | 0.67 |
| F30A HF low pass filter 1kW. 90dB stop band rejection | 17.00 | 0.67 | Shinwa 1005 HF low pass filter—32MHz cut off | 10.80 | 0.67 |
| BPF2A 2m band pass filter 144-146MHz 50W rms 100W PEP | 27.75 | 0.67 | | | |
| HS5 Communications headphones, tailored response | 22.00 | 0.67 | HF MOBILE ANTENNAS | | |
| PS6 Power supply. Matching PSU/speaker for TR7500 | 57.00 | 3.00 | 'G' whip tribander helical 20/15/10 | 19.68 | 1.06 |
| *AT200 1 8 to 30MHz antenna tuner | 86.00 | 3.00 | G' whip multimobile 20 15 10 | 23.08 | 1.06 |
| TD10 00011 0000000 | | | 'LF coils for the above] | 5.90 | 1.06 |
| TRIO OSCILLOSCOPES | 1000000 | | whips Specify whether tribander or | 5.90 | 0.66 |
| CS1570 Dual trace dc to 30MHz* | 464.40 | 3.00 | Telescopic whips for multimobile | 5.90 | 0.66 |
| CS1560A Dual trace dc to 15MHz* | 324.00 | 3.00 | the above | 2.25 | 0.66 |
| <u> </u> | | 3.00 | HIE GOOVE | | 0.66 |
| | | 3.00 | Base mounts for all IC! white | | |
| The price includes two matching full bandwidth × 10 probes | | 3.00 | Base mounts for all 'G' whips | 3.37 | |
| | | 3.00 | Base mounts for all 'G' whips Extendared 40in booster *New items in stock | 3.37
9.56 | 1.05 |

LOWE ELECTRONICS LTD

| | | | | | | | F | rice inc | |
|---|--|--|--|--|--|--|------------------------------------|---|--|
| | | | | | | | | VAT | Carriage
£ |
| /HF/UHF 'J' BE | | | | | | | | | |
| Y/2M 5 element ya | | 1.5 | ** | 7.1 | •• | * * | 7.7 | 7.70 | 3.00 |
| Y/2M 8 element ya
0Y/2M 10 element | gı | | | 4.0 | ** | *** | 26.60 | 21.31 | 3.00 |
| BM14/2M 14 eleme | | beam | | 700 | | 550 | 7.7 | 31.16 | 3.00 |
| XY/2M 5 element of | | | | | | | | | 3.00 |
| XY/2M 8 element of | | | | 1000 | | 6.00 | 10.0 | 19.91 | 3.00 |
| 0XY/2M 10 elemen | | | | | | +.+ | ** | 26.32 | 3.00 |
| 04/2M 4 element qu | | | | ** | 4.4 | | | 16.31 | 3.00 |
| 26/2M 6 element qu | | | * 4 | | | | | 21.71 | 3.00 |
| 05/2M 5 over 5 slot | | | 71.5 | ** | *** | | | 13.61
18.22 | 3.00 |
| 08/2M 8 over 8 slot
IGP/2M Unipole gr | | | 200 | 900 | 2.6.6 | | | | 3.00 |
| IBM48/70cm Multi | beam | and | | | | ** | | 7.03
21.65 | 3.00 |
| ABM88/70cm Multi | beam | | | | | * * * | | 28.96 | 3.00 |
| 2XY/70cm 12 elem | | | agi | | 16.6 | 3.30 | 10.00 | 29.70 | 3.00 |
| ASin 2m whip | 2.5 | | | ++ | | +.+ | 4.0 | 13.05 | 3.00 |
| 5/2m Colinear | 2.5 | | | 400 | | ++ | 16.6 | 30.93 | 3.00* |
| 8/70cm Colinear | | | 1.0 | | | | * 0 | 39.37 | 3.00* |
| 015/1296 23cm ante | nna | - * | ** | 9.91 | 9.5 | 3.5 | ** | 23.06 | 3.00 |
| | | | | | | | | * By | BRS |
| HASING HARN | | 0 01 | | | | | | 27225 | 2.11 |
| MH/2C For 2m cir | | | | | 1.4 | + 2 | | 5.06 | 0.28 |
| MH2/70 For 70cm | | | | | | * * | 2.5 | 5.90 | 0.28 |
| MH4/70 For 70cm | 11 | 11 | 4.4 | * * | | | | 12.26 | 0.28 |
| DE ROTATORS | 3 | | | | | | | | |
| | | (1) | 590 | 900 | Sex | 414 | (4/4) | | 3.00 |
| R40 (5 core cable
D44 (8 core cable
lam-2 (8 core cable | required | 1) | | 7.7 | ** | | | 106.87 | 3.00 |
| lam-2 (8 core cable | e require | d) | 491 | | 200 | | | 145.12 | 3.00 |
| AK ANTENNA | S | | | | | | | | |
| -8XL 80m dipole | | ng | 6000 | 200 | 1000 | 900 | 2000 | 12.15 | 0.86 |
| L-48DXN 80/40m | trap dipe | ole. L | | | | kW P. | E.P. | 25.43 | 1.06 |
| fidy VN 80m to 10r | n trap di | pole. | Leng | th 23 | m. 1-5k | W P.E | | 40,50 | 1.16 |
| istener III SWL ar | | | | | | | 0000 | 25.43 | 0.86 |
| istener I SWL ant | enna. Lo | aded | wire | anter | nna. Or | nly 5m | | 9.54 | 0.66 |
| ID-26A Extendable | dipole. | Tuna | ible fr | om a | рргох 7 | ucm te | 4m | 6.75 | 0.44 |
| Y-GAIN ANTER | INAS- | HE | | | | | | | |
| | | | | | | | | | |
| H2Mk3 2 element | yagi for | 70-15 | and 1 | 0m. 1 | | | | 117.56 | 3.00 |
| H2Mk3 2 element y
H3Jnr 3 element y | yagi for 2 | 70-15 | and 1 | 0m. 1 | 00W P. | E.P. | | 121.50 | 3.00 |
| H2Mk3 2 element
H3Jnr 3 element y
H3Mk3 3 element | yagi for
ragi for 2
yagi for 1 | 70·15
20·15
20·15 | and 1
and 1
and 1 | 0m. 1
0m. 60
10m. 1 | OOW P. | E.P. | 120 | 121.50 | 3.00 |
| H2Mk3 2 element
H3Jnr 3 element y
H3Mk3 3 element
H6DXX 6 element | yagi for
ragi for 2
yagi for
total 20 | 70-15
20-15
20-15
15 ar | and 1
and 1
and 1
and 1 | 0m. 1
0m. 6
10m. 1 | NOW P. | E.P. | 100 | 121.50
167.62
201.37 | 3.00
3.00
3.00* |
| TH2Mk3 2 element y
TH3Jnr 3 element y
TH3Mk3 3 element
TH6DXX 6 element | yagi for
ragi for 2
yagi for
total 20 | 70-15
20-15
20-15
15 ar | and 1
and 1
and 1
and 1 | 0m. 1
0m. 6
10m. 1 | NOW P. | E.P. | 100 | 121.50
167.62
201.37
182.25 | 3.00
3.00
3.00*
3.00 |
| FH2Mk3 2 element
FH3Jnr 3 element y
FH3Mk3 3 element
FH6DXX 6 element
Hyquad 2 element c | yagi for
ragi for 2
yagi for 1
total 20
quad. 8-5 | 70-15
20-15
20-15
15 ar
idB g | and 1
and 1
and 1
and 10
ain or | 0m. 1
0m. 6
10m. 1
n | NOW P. | E.P. | 100 | 121.50
167.62
201.37 | 3.00
3.00
3.00*
3.00 |
| H2Mk3 2 element
H3Jhr 3 element y
H3Mk3 3 element
H6DXX 6 element
lyquad 2 element o
HY-GAIN ANTEN | yagi for 2
yagi for 2
yagi for 1
total 20
juad. 8-5 | 70-15
20-15
20-15
15 ar
dB g | and 1
and 1
and 1
and 10
ain or | 0m. 1
0m. 6
10m. 1
n 20-1 | 00W P.
kW
5-10m | E.P. | 100 | 121.50
167.62
201.37
182.25
* By | 3.00
3.00
3.00*
3.00
BRS |
| TH2Mk3 2 element y TH3Jhr 3 element y TH3Mk3 3 element y TH6DXX 6 element tyquad 2 element o TH6DX ANTEN TH6DX ANT | yagi for 2
yagi for 2
yagi for 1
total 20
quad. 8-5 | 70-15
20-15
20-15
15 ar
idB g | and 1
and 1
and 1
and 10
ain or
ertic | 0m. 6
0m. 6
0m. 1
n
n 20 1 | 5-10m | E.P. | | 121.50
167.62
201.37
182.25
* By | 3.00
3.00
3.00*
3.00*
3.00
BRS |
| H2Mk3 2 element
H3Jhr 3 element y
H3Mk3 3 element
H6DXX 6 element
lyquad 2 element o
H7-GAIN ANTEN
2AVQ Trapped ver
4AVQ/WB Trapped | yagi for
ragi for 2
yagi for
total 20
quad. 8-5
NNAS
rtical sel
ed vertical | 70-15
20-15
20-15
15 ar
idB g
HF v | and 1
and 10
and 10
and 10
ain or
ertic
poort
f-sup | 0m. 1
0m. 6
10m. 1
n 20 1
als
for 20
port f | 5-10m | E.P. |
 | 121.50
167.62
201.37
182.25
* By
39.93
57.19 | 3.00
3.00
3.00*
3.00
BRS |
| H2Mk3 2 element
H3Jhr 3 element y
H3Mk3 3 element
H6DXX 6 element
lyquad 2 element o
HY-GAIN ANTEN
2AVQ Trapped ver
4AVQ/WB Trappe | yagi for
ragi for 2
yagi for
total 20
quad. 8-5
NNAS
rtical sel
ed vertical | 70-15
20-15
20-15
15 ar
idB g
HF v | and 1
and 10
and 10
and 10
ain or
ertic
poort
f-sup | 0m. 1
0m. 6
10m. 1
n 20 1
als
for 20
port f | 5-10m | E.P. |
 | 121.50
167.62
201.37
182.25
* By | 3.00
3.00
3.00*
3.00*
3.00
BRS |
| H2Mk3 2 element H3Mk3 4 element H3Mk3 4 element H6DXX 6 element Iyquad 2 element IY-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped BAVT/WB Trapp | yagi for
ragi for 2
yagi for
total 20-
quad. 8-5
NNAS—
rtical sel
ed vertical
d vertical | 70-15
20-15
20-15
15 ar
idB g
HF v | and 1
and 10
and 10
and 10
ain or
ertic
poort
f-sup | 0m. 1
0m. 6
10m. 1
n 20 1
als
for 20
port f | 5-10m | E.P. |
 | 121.50
167.62
201.37
182.25
* By
39.93
57.19 | 3.00
3.00
3.00*
3.00
BRS |
| IHZMK3 2 element y IH3MK3 3 element y IH3MK3 3 element y IH3MK3 3 element of the selement of t | yagi for 2 yagi for 2 yagi for 1 total 20 yad. 8-5 NNAS—rtical select vertical divertical whip c/v | 70-15
20-15
20-15
15 ar
idB g
HF v
II-sugal sel | and 1
and 1
and 1
and 10
and 10
ain or
ertic
port
f-sup
f-sup | om. 6
0m. 6
10m. 1
n 20-1
als
for 20
port f | 5-10m
15.10m
or 40.20 | E.P.

0.15.10
0.20.15 |
 | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45 | 3.00
3.00
3.00*
3.00
BRS
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 5 element lyquad 2 element c IY-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trappe 8AVT/WB Trappe (HF MOBILE W) lantex B5/GF 2m 1 agnetic mount for | yagi for 2 yagi for 2 yagi for 1 total 20 yad. 8-5 NNAS—rtical select vertical divertical whip c/v r all Ban | 70-15
20-15
20-15
15 ar
idB g
HF v
II-sujal sel
al sel
w sin
tex w | and 10 an | om. 1
om. 6
om. 1
n 20-1
als
for 20
port f | 5-10m
15.10m
0 15.10m
0 10.20
0 0 10.40 | E.P.
0.15.10
0.20.15 |
m
.10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40 | 3.00
3.00
3.00*
3.00
BRS
3.00
3.00
3.00
3.00
0.66 |
| H2Mk3 2 element y H3Mk3 3 element y H3Mk3 3 element y H3Mk3 3 element dispusable element con the second sec | yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS rtical seled vertical d vertical HIPS r all Ban collinear | 70-15
20-15
20-15
15 ar
idB g
HF v
II-sujal sel
al sel
w sin
tex w | and 1
and 1
and 1
and 1
and 1
and 1
rertic
port
f-sup
f-sup
gle he
hips
er 1 w | om. 1
0m. 6
10m. 1
n 20-1
als
for 20
port for
ole ba | 5-10m
15.10m
0 40.20
0 0 80.40
hip with | E.P.
0.15.10
0.20.15
unt | | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62 | 3.00
3.00
3.00*
3.00*
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element y H3Mk3 3 element y H3Mk3 3 element y H3Mk3 3 element dispusable element con the second sec | yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS rtical seled vertical d vertical HIPS r all Ban collinear | 70-15
20-15
20-15
15 ar
idB g
HF v
II-sujal sel
al sel
w sin
tex w | and 1
and 1
and 1
and 1
and 1
and 1
rertic
port
f-sup
f-sup
gle he
hips
er 1 w | om. 1
0m. 6
10m. 1
n 20-1
als
for 20
port for
ole ba | 5-10m
15.10m
0 40.20
0 0 80.40
hip with | E.P.
0.15.10
0.20.15
unt | | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53 | 3.00
3.00
3.00*
3.00
3.00
3.00
3.00
3.00 |
| IH2Mk3 2 element; IH3Mk3 3 element; IH3Mk3 3 element; IH3Mk3 6 element IH3Quad 2 element AY-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 1 HF MOBILE WI Bantex B5/GF 2m 1 Bantex B5/GF 2m 2 Bantex B5/GF 2m 2 Bantex B5/GF 2m 3 Bantex B5/GF | yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS rtical seled vertical d vertical whip c/ r all Ban collinear silinear m whip | 70-15
20-15
20-15
15 ar
idB g
HF v
II-sup
al sel
il sel
w sin
tex w | and 1
and 10
and 10
ain or
ertic
port
f-sup
f-sup
gle hips
er 1 w | om. 1
om. 6
om. 5
om. 1
n 20-1
als
for 20
port f
port fo | 5-10m
15.10m
0r 40.20
or 80.40
hip wit | E.P.
0.15.10
0.20.15
unt |
m
.10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62 | 3.00
3.00
3.00*
3.00*
3.00
3.00
3.00
3.0 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H6DXX 6 element dyuad 2 element c 2AVQ Trapped ve- 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 1Agnetic mount for tantex BS/GF 2m 1 1Agnetic mount for tantex BUG, 2m c 1 | yagi for agi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—rtical seld vertical devertical devertical devertical devertical total point of the self per all Bancolinear membro wave gi | 70-15
20-15
20-15
15 ar
idB g
HF v
II-sup
al sel
al sel
w sin
tex w
1 ove | and 1
and 1
and 1
and 10
ain or
ertic
port
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup
f-sup | om. 1
om. 6
lom. 1
n 20-1
als
for 20
port for
port for
ole bar | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with with with with | E.P.
0.15.10
0.20.15
unt |
m
.10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05 | 3.00
3.00
3.00*
3.00
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element ity-GAIN ANTEN 2AVQ Trapped ve- 4AVQ/WB Trapped AVT/WB Trappe VHF MOBILE WI lantex B5/GF 2m 1 agnetic mount for lantex UCL, 70cm lantex BUG, 2m 0 17 Beam TAS1 in 2 land cable 1 and cable 1 and cable 1 | yagi for agi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—rrical seld vertical seld vertical divertical divertical for all Ban colinear m whip wave gri | 70-15
20-15
20-15
15 ar
idB g
HF v
III-sup
al sel
w sin
tex w | and 1
and 1
and 1
and 10
ain of
ertic
port
f-sup
f-sup
gle he
hips
er 1 w | om. 1
om. 6
lom. 1
n 20-1
als
for 20
port for
port for
ole bar | 5-10m
15.10m
0r 40.20
or 80.40
hip wit | 1
0.15.10
0.20.15
unt | m
.10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05 | 3.00
3.00
3.00*
3.00
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element idyuad 2 element c AVGAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Tr | yagi for agi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—rtical select vertical select vertical deleter vertical select vertical deleter vertical select vertical sel | 770-15
20-15
20-15
15 ar
dB g
HF v
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
li-sup
lal sel
lal sel
la s | and 1
and 1
and 1
and 10
and 10
ain of
ertic
port
f-sup
f-sup
gle ha
hips
er 1 w
 | om. 1
0m. 6
10m. 1
n 20 1
als
for 20
port f
port fo | 5-10m
15.10m
or 40.20
or 80.40
hip with | E.P.
0.15.10
0.20.15
unt
th base |
m
.10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81 | 3.00
3.00
3.00*
3.00
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DkX 6 element fivquad 2 element of L2AVO Trapped was L2AVO Trapped was L3AVO Trapped | yagi for agi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 VNAS—rtical seld vertical seld vertical seld vertical seld man collinear millnear m whip wave gi | 70-15 20-15 20-15 15 ar idB g HF v II-supplied by W sin tex w | and 1 and 1 and 1 d 10 d 10 derric f-sup f | iom. 6.600m. 1 als for 20 port | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1
0.15.10
0.20.15
unt
th base | | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28 | 3.00
3.00
3.00*
3.00
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element igyada 2 element c 2AVQ Trapped ve 4AVQ/WB Trapped SAVT/WB Trappe SAVT/WB Trappe GAVE Trapped ve 4AVQ/WB Trappe GAVE Trapped ve 4AVQ/WB Trappe GAVE Trapped GAV | yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS Trical seld vertical ded vertical ded vertical seld vertical seld vertical manual for all Bancollinear millinear mil | 70-15 20-15 20-15 15 arr 15 arr 16dB g HF v II-supplied sell W sin tex w | and 1 and 10 and | iom. 6.600m. 1 als for 20 port | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1
0.15.10
0.20.15
unt
th base
base | | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50 | 3.00
3.00*
3.00*
3.00
BRS
3.00
3.00
3.00
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element individual 2 element of L4F-GAIN ANTER L4VQ/WB Trappe L4VQ/ | yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—trical select vertical se | 70·15 20·15 20·15 15 ar idB g HF v (If-supplied self-self-self-self-self-self-self-self- | and 1 and 1 d 10n ain of 1 ertic pport f-sup f-sup moun moun ps www. | iom. 6 on. 1 on. 20 1 on. 20 1 on. 20 1 on. 6 on | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1
0.15.10
0.20.15
unt
th base
base | m10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50
5.00 | 3.00
3.00
3.00*
3.00
3.00
3.00
3.00
3.00 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H6DXX 6 element dyquad 2 element of H7-GAIN ANTER 2AVQ Trapped ver 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 1Asgnetic mount for lantex BUG, 2m co 1J Beam TAS\$in 2 and cable included the service of the servi | yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—trical select vertical se | 70·15 20·15 20·15 15 ar idB g HF v (If-supplied self-self-self-self-self-self-self-self- | and 1 and 1 d 10n ain of 1 ertic pport f-sup f-sup moun moun ps www. | iom. 6 on. 1 on. 20 1 on. 20 1 on. 20 1 on. 6 on | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1
0.15.10
0.20.15
unt
th base | m10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50 | 3.00
3.00
3.00
3.00
3.00
3.00
3.00
3.00 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H6DXX 6 element dyquad 2 element of H7-GAIN ANTER 2AVQ Trapped ver 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 1Asgnetic mount for lantex BUG, 2m co 1J Beam TAS\$in 2 and cable included the service of the servi | yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—trical select vertical se | 70·15 20·15 20·15 15 ar idB g HF v (If-supplied self-self-self-self-self-self-self-self- | and 1 and 1 d 10n ain of 1 ertic pport f-sup f-sup moun moun ps www. | iom. 6 on. 1 on. 20 1 on. 20 1 on. 20 1 on. 6 on | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1 | | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50
13.50 | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element ityquad 2 element c AY-GAIN ANTEN 2AVO Trapped ve 4AVO/WB Trapped AXV/WB Trapped Intervent of the service of the service Intervent of the service of | yagi for agi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—trical seld of vertical seld of vertical seld of vertical seld vertical seld of vertical seld vertical se | 70-15 70-15 20-15 20-15 15 ar 15 ar 16B g HF v If-sup If | and 1 and 1 d 10n ain of 1 ertic pport f-sup f-sup moun moun ps www. | iom. 6 on. 6 on. 6 on. 6 on. 6 on. 6 on. 1 on. 20 1 on. 20 1 on. 20 1 on. 20 1 on. 6 | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1 | m10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50
5.00
13.50 | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element idyquad 2 element of IY-GAIN ANTER 2AVQ Trapped ver 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 1AU INTERNATION INT | yagi for ragi for 2 yagi for 2 ya | 70-15 70-15 20-15 15 ar idB g HF v li-sup li | and 1 and 1 d 10n ain of ertic pport f-sup f-sup moun moun ps www. | iom. 6 on. 6 on. 6 on. 6 on. 6 on. 6 on. 1 on. 20 1 on. 20 1 on. 20 1 on. 20 1 on. 6 | 5-10m
15.10m
or 40.20
or 80.40
hip with with with with with | 1 | m10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50
13.50 | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Mr3 element; H3Mr3 element ty H3Mk3 3 element ty H3Mk3 element to L4Y-GAIN ANTEN L2AVO Trapped ve L4AVO/WB Trappe L4AVO/WB | yagi for agi for 2 yagi for 2 yagi for 2 yagi for 2 yagi for 2 total 20 quad. 8-5 INAS I | 70-15 70-15 0-15 15-17 15-17 15-17 16-18 1 | and 1 and 11 d 10 d ain or ertic oport f-sup hips gle hi hips gr \(\frac{1}{2} \) moun ps t wave comp | iom. 6 10 m. | DOW P. kW -15.10m -15.10m -15.10m -16.20 -18.40 -18 | 10.15.10
0.20.15
0.20.15
10
10
10
10
10
10
10
10
10
10
10
10
10 | m
10m | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50
5.00
13.50 | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H6DXX 6 element idyuad 2 element c AV-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB T | yagi for ragi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 INAS | 70-15 70-15 70-15 70-15 15 ar idB g HF v idB | and 1 and 11 d 10n ain of ertic f-support f-sup gle hhips gr 1 w moun ps www comp | iom. 6 10 m. | DOW P. kW 5-10m 15.10m 15.10m 40.2(2) 60 as 80.40 hip with live with live p | 10.15.10
0.15.10
0.20.15
10
10
10
10
10
10
10
10
10
10
10
10
10 | | 121.50
167.62
201.37
182.25
* By
39.93
57.19
81.45
8.16
10.40
9.62
29.53
13.05
8.44
2.81
16.28
18.50
5.00
13.50 | 3.00
3.00
3.00
3.00
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H3Dk3 6 element iyuad 2 element 2AVQ Trapped ve 4AVQ/WB Trappe AVT/WB Trappe VHF M0BILE WI lantex B5/GF 2m 1 Aggnetic mount for lantex UCL. 70cm v lantex BUG, 2m 2 Delwa MA41, 2m 1 and cable outer clamp, Acce com UDL collinear tevco—base only fe levco—whip and c RAK 2 2m whip and CABLE (prices pe core rotator cable | yaqi for yaqi for 2 yaqi for 2 yaqi for 2 yaqi for 1 total 20 quad. 8-5 NNAS—rtical seled vertical seled vertical detection of the selection o | 70-15 70-15 70-15 70-15 15 ar idB g HF v ili-sup ils sel ils | and 1 and 11 d 10n ain or ertic port f-sup f-sup f-sup f-sup f-sup f-sup comp | iom. 1 om. 6 om. 1 om. 6 om. 1 om. 6 | DOW P. kW 5-10m 15.10m 40.20 4 | 1.0.15.10
0.15.10
0.20.15
hip, cl | | 121.50 167.62 201.37 182.25 * By 39.93 57.19 81.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 5.10 0.13.50 Price inc | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H3DK3 6 element igyada 2 element igyada 2 element 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trapped 8AVT/WB Trapped 8AVT/WB Trapped 1 antex B5/GF 2m 1 1 agnetic mount for 1 antex BUG, 2m co 2 | yagi for yagi for zagi for z yagi z yagi for z yagi z yagi for z yagi for z yagi for z yagi | 70-15 70-15 70-15 70-15 15 ar idB g HF v II-sulp II-sulp II sel | and 1 and 11 dd 10n ain ol ain ol erertic pport I-sup l-sup | iom. 1 om. 6 | DOW P. kW 15.10m 16.10m 16. | E.P | | 121.50 125.02 1201.37 182.25 | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H6DXX 6 element idyada 2 element c 14Y-GAIN ANTEN 2AVQ Trapped ve- 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe 15 Element C 15 Element C 16 Element C 16 Element C 16 Element C 17 Element C 18 El | yagi for ragi for 2 yagi for 2 yagi for 2 yagi for 1 yagi for 1 total 20 quad. 8-5 INAS | 70-15 20-15-20 20-15- | and 1 and 11 and 11 and 11 d 10 d 10 nertic port f-sup gle h hips gr \(\frac{1}{2} \) wave comp MM 2, B 100 cable. | Om. 6 Om. 1 Om. 1 Om. 6 | 5-10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 16.15.10m 17.10m 18.10m | E.P | m | 121.50 201.37 182.25 * By 182.25 * By 39.93 31.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 \$ | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Jnr 3 element; H3Jnr 3 element; H3Jr 3 element; H3Dr 3 element; H6DX 6 element AY-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trappe | yagi for yagi for zagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 yaga for 1 total 20 yaga for 2 yaga for | 70-15 20-15 20-15 15 arrived B g HF v II-sup | and 1 and 11 and 11 d 10 nertic pport f-sup pl-sup gle h hips gle h hips www. comp | iom. 1 om. 6 | 5-10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 16.10m 16. | E.P | | 121.50 125.02 1201.37 182.25 | 3.00 3.00* 3.00 3.00 3.00 BRS 3.00 3.00 3.00 3.00 3.00 0.66 3.00 3.00 |
| H2MK3 2 element; H3MK3 3 element; H3MK3 3 element; H3MK3 3 element; H6DXX 6 element ityquad 2 element c EXP-GAIN ANTER 2AVQ Trapped ve- 4AVQ/WB Trapped 8AVT/WB Trappe 9AVT/WB Trappe 9AV | yaqi for raqi for 2 yaqi for 2 yaqi for 2 yaqi for 1 total 20 quad. 8-5 INAS | 70-15 20-15 20-15 15 arrived by the self-self-self-self-self-self-self-self- | and 1 | iom. 6 of office of the control of t | 5-10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 16.15.10m 17.10m 17.10m 18.10m | E.P | m10m amp e frice £ 20 32 25 15 338 | 121.50 201.37 182.25 * By 182.25 * By 39.93 31.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 \$ | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2MK3 2 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element ity-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trappe 8AVT/WB Trappe 1 antex B5/GF 2m 1 antex B5/GF 2m 1 antex B5/GF 2m 1 antex BUQ. To mantex UCL. To minute with the second with | yaqi for yaqi for zaqi for 2 yaqi for 2 yaqi for 2 yaqi for 1 total 20 quad. 8-5 NNAS—rtical seled vertical sel | 70-15 20-15 | and 1 and 1 and 10 and | iom. 6000000000000000000000000000000000000 | DOW P. kW 5-10m 15.10m 15.10m or 40.20 80.40 kwith with with with with with with with | E.P | | 121.50 201.37 182.25 * By 182.25 * By 39.93 31.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 \$ | 3.00 3.00* 3.00 3.00 3.00 BRS 3.00 3.00 3.00 3.00 3.00 0.66 3.00 3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H3Dk3 6 element iyuad 2 element ay-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trappe 8AVT/WB Trappe 8AVT/WB Trappe Santex B5/GF 2m ½ dagnetic mount for santex BUG, 2m co santex BUG, 2m co santex BUG, 2m co santex BUG, 2m co com UDL colinear and cable cutter clamp. Acce com UDL colinear evco—base only fe tevco—whip and c RAK ½ 2m whip and c CABLE (prices pe core rotator cable | yaqi for yaqi for zaqi for 2 yaqi for 2 yaqi for 2 yaqi for 1 total 20 quad. 8-5 NNAS—rtical seled vertical sel | 70-15 20-15 | and 1 and 1 and 10 and | iom. 6000000000000000000000000000000000000 | 5-10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 15.10m 16.15.10m 17.10m 17.10m 18.10m | E.P | | 121.50 201.37 182.25 * By 182.25 * By 39.93 31.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 \$ | 3.00 3.00* 3.00 3.00 3.00 BRS 3.00 3.00 3.00 3.00 3.00 0.66 3.00 3.00 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element ityuad 2 element cate 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trapped 8AVT | yagi for ragi for 2 yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—rical selected vertical selecte | 70-15 count. 70-15 in the second seco | and 1 and 10 an | iom. 6 iom. 6 iom. 6 iom. 6 iom. 1 iom. 1 | DOW P. kW 15-10m 15- | E.P | m10m | 121.50 201.37 182.25 * By 182.25 * By 39.93 31.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 \$ | 3.00 3.00* 3.00 3.00 3.00 BRS 3.00 3.00 3.00 3.00 3.00 0.66 3.00 3.00 |
| H2Mk3 2 element; H3Jm7 3 element; H3Jm7 3 element; H3Dk3 6 element; H3Dk3 6 element; IY-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trappe AVT/WB Trappe FMF M0BILE WI lantex B5/GF 2m 1/2 lagnetic mount for lantex UCL. 70cm in lantex UCL. 70cm in lantex UGL. 70cm in lantex UG | yagi for ragi for 2 yagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS—rical selected vertical selecte | 70-15 count. 70-15 in the second seco | and 1 and 10 an | iom. 6 iom. 6 iom. 6 iom. 6 iom. 1 iom. 1 | DOW P. kW 15-10m 15- | E.P | m10m | 121.50 121.50 8.44 2.81 16.28 18.50 13.50 13.50 Price int VAT £ | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element iyuad 2 element c 4Y-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trapped 9AVT/WB | yagi for yagi for zagi for 2 yagi for 2 yagi for 2 yagi for 1 total 20 quad. 8-5 NNAS— ritical select vertical select vertic | 70-15 200-15 70-16 200-15 70-16 70-1 | and 1 and 10 an | iom. 6 iom. 6 iom. 6 iom. 6 iom. 1 iom. 1 | DOW P. kW 15-10m 15-10m 15-10m 15-10m 15-10m 15-10m 15-10m 16-10m 17-10m 18-10m 18- | PP 0 | m10m | 121,50 121,50 120,137 182,25 182,25 182,25 183,39,33 18,15 18,16 10,40 9,62 229,53 13,05 13,05 13,50 1 | 3.00
3.00
3.00
3.00
3.00
3.00
3.00
3.00 |
| H2Mk3 2 element; H3Jnr 3 element; H3Jnr 3 element; H3DrX 6 element H3DrX 6 element H3DrX 6 element L3P-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped AVT/WB Trappe MF M0BILE WI Jantex B5/GF 2m 1 Jagnetic mount for Jantex UCL, 70cm Jantex BUG, 2m mount for Jantex BUG, 2m moun | yadi for yadi for cagi for 2 yagi for 2 yadi for 2 yadi for 1 total 20 yadi for 1 total 20 yadi for 2 yadi for | 70-15 200 | and 1 | iom. 6 dom. 6 do | DOW P. kW 15-10m 15-10m 15-10m 15-10m 15-10m 15-10m 15-10m 16-10m 17-10m 18-10m 18- | P | | 121.50 121.50 182.25 By 39.93 14.45 8.16 10.40 9.62 29.53 13.05 8.44 2.81 16.28 18.50 0.90 13.50 Please Add VAT £ 0.90 0.90 0.90 0.70 | 3.00
3.00*
3.00*
3.00
3.00
3.00
3.00
3.0 |
| H2Mk3 2 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H3Mk3 3 element; H6DXX 6 element iyuad 2 element c 4Y-GAIN ANTEN 2AVQ Trapped ve 4AVQ/WB Trapped 8AVT/WB Trapped 9AVT/WB | yagi for yagi for zagi for zag | 70-15 200 | and 1 | iom. 6.000 m. 6.000 m. 6.000 m. 6.000 m. 6.000 m. 10.00 m | DOW P. kW 5-10m 115.10m 115.10m or 40.22 80.40 sise moor with hip with 1 HAM- 200MHz 6EW6 | P | | 121,50 121,50 120,137 182,25 182,25 182,25 183,39,33 18,15 18,16 10,40 9,62 229,53 13,05 13,05 13,50 1 | 3.00
3.00
3.00
3.00
3.00
3.00
3.00
3.00 |

| | | | | | | | | | rice inc | |
|-----------------|--------|---------|----------|-------|-------------------------------------|--------|-----------|--------|----------|------------|
| | | | | | | | | | VAT | Carriage |
| | | | | | | | | | £ | £ |
| DAIWA ACC | | | | | | | | | | |
| CL-22 Aeral tu | ner u | nit. 1- | 8-30MH | Z | | | 0.000,000 | | 13.50 | 0.66 |
| CSW-216 AT | J wi | th bu | ilt-in : | SWF | meter | . 80n | 1-10m | 500 | | |
| P.E.P. | | ** | | | | | | | 103.50 | 3.00 |
| CL-65 ATU 80- | | | | | | 22.0 | 0.000 | 1.5 | 54.00 | 3.00 |
| AT-400X Stepp | | | | | | -+ | | ** | 41.04 | 0.86 |
| SWX-777 De | luxe | SWE | power | me | ter wit | h 'cr | oss (| ver' | | |
| | 100 | 2.4 | ***** | 29.50 | 0.000 | ** | 0.00 | 400 | 110.16 | 1.06 |
| SW-410 SWR/ | | | | | | | | | 48.60 | 0.86 |
| SW-110 SWR p | | mete | 1-8-150 | MH | . Two p | ower | range | s 0-20 | | |
| and 0-200W | 1 | 100.5 | Lee: | *** | 1.454 | *** | 200 | 299 | 25.92 | 0.86 |
| ACCESSORI | | | | | | | | | | |
| Trio HS5 Com | | ation | o boad | hon | 0.0 | 220 | 022 | 2020 | 22,00 | 0.67 |
| Trico Low imp | | | | | | | | | 4.68 | 0.67 |
| Maeden Acces | | | | | | * * 1 | ** | ** | 2.52 | 0.87 |
| Morse keys HK | | | ers | | | | ** | | 8.10 | 0.28 |
| | | | | | | ** | | | 8.10 | 0.67 |
| EK150 Katsum | | NOT THE | | | the Contract of the Contract of the | | i, Bu | It-in | CA 75 | |
| | | | | | | * * | ** | | 60.75 | 0.67 |
| EK1024 Electron | | | | | | | . 12 | 1.1 | 118.12 | 0.67 |
| Trico MC10 H | | | phone. | Ava | ilable i | n 50 | K oh | n or | | |
| 500 ohm imp | | | | | ** | ** | * * | | 9.00 | 0.28 |
| Trico MC50 Du | | | | | | | | | 25.00 | 0.86 |
| RW151D Kura | | watt | meter, | dum | my loa | d 0-5 | -25-1 | -W0 | | |
| | ** | | | ** | ** | | ** | | 75.60 | 0.86 |
| EW1 Wave me t | | | | | | 2.4 | 933 | | | 1.06 |
| DL20 20W dum | | | | 4.0 | (+) | * * * | 3.8 | | 3.67 | 0.24 |
| Trio HC2 Ham | | | | 4.4 | 4.4 | | | | 15.50 | 1.06 |
| Hansen SWR3 | | | | | | | | | | 0.67 |
| Hansen SWR2 | | | | | | | 16.4 | 60 | 10.80 | 0.67 |
| FS301 Through | line | watt : | neter 3 | 5 to | 30MHz | | | | 32.40 | 0.86 |
| Hy-Gain C1 Ce | ntre (| dipole | insula | tor | | | | | 3.82 | 0.44 |
| Hy-Gain BN86 | Balur | 1. 2kV | P.E.P | . 3-3 | OMHZ | | 10.0 | 880 | 13.33 | 0.67 |
| PUBLICATIO | NS | | | | | | | | | |
| | | | 200 | 200 | 3390 | (0.00) | 1000 | 600 | 50n inc | I. postage |
| Full catalogue | | 100 | - 520 | | | | 31 | | | postage |
| i un catalogue | | 4.9 | *** | 14 | ems in | | 1.0 | 1.4 | SOP IOI | postage |

PLEASE ADDRESS ALL MAIL ORDERS TO MATLOCK

LOWE ELECTRONICS LTD

HEAD OFFICE AND SERVICE DEPARTMENT 119 CAVENDISH RD., MATLOCK, DERBYSHIRE

> Telephone: 9 a.m. to 9 p.m. Matlock (0629) 2817 or 2430 Telex: 377482 Lowlec G

Southern Sales Peter, G3ZPB, Communications House, 20 Wallington Square, Wallington, Surrey. Tel. 01-669 6700.

Midland Sales Peter, G3XWX, Soho House, 362-364 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708.

Northern Sales Tom, G4DVZ, 27 Cookridge Street, Leeds. Tel. 0532 452657.

In addition to the above shops which are open from 9 to 5.30 Tuesday to Saturday (Wallington shop closed Saturday afternoon) we have part-time agents who are available at evenings and weekends.

John, G3JYG 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071.

Sim, GM3SAN 19 Ellismuir Road, Baillieston, Nr. Glasgow.

Tel. 041-771 0364.

Alan, GW3YSA 35 Pen Y Waun, Efail Isaf, Nr. Pontypridd, Glamorgan. Tel. Newtown Llantwit 3809.

As well as being stocked by our shops and part-time agents, the complete TRIO range is on display at and available from the following dealers:

North London: Radio Shack Ltd Lancashire: Stephen-James Ltd

This price list is not complete as we are constantly adding new products to our range—like the TL922 2kW linera and the TRIO AT-200 antenna tuner. Why not send 50p in stamps and request our short form catalogue and up-to-date new products list.



Radio Shack Ltd

PRICE LIST, JANUARY 1978 (prices include VAT)

| RAKE RECEIVERS AND ACCESSO 4C Receiver-SSB, AM, SW, RTTY | £495.00
£40.50 | G6-144A 2m Colinear for base station use
RM-80S 80m High power resonator | £51.75
£19.00 | AAC Language courses for use with the
AAC-4000 trainer above. Courses are |
|--|---|---|-------------------|--|
| | £40.50 | 4BVT 10-40m Vertical
QD-1 Quick disconnect | £75.15
£10.23 | available in French/German/Russian/
Spanish / Italian / Portuguese / English. |
| | £40.50 | 5105 Top section only of QD-1 above | £7.88 | There are 4 parts to a full course. |
| | £40.50 | HLM Trunk-lip mount with coax | £12.87 | Parts 1, 2, 3 (each part) £3 |
| | £40.50 | | | Part 4 £4 |
| NB Noise Blanker for R-4C | £54.00 | HY-GAIN ANTENNAS | C207 00 | |
| S-4 Matching spkr. for R-4C/T-4XC/TR- | | 18HT 6-80m Vertical Tower | £207.00
£39.94 | ASTATIC MICROPHONES |
| 4CW | £24.75 | 12AVQ 10-20m Trapped Vertical | £56.19 | T-UG9-D104 "Golden Eagle" gold-plated |
| 6-4 Freq. synthesizer for R-4C/T-4XC/ | 2022/23 | 18AVT/WB 10-80m Trapped Vertical | £81.45 | transistorised £6 |
| SPR-4 | £216.00 | 18V 10-80m Vertical | £29.81 | T-UPG-D104 "Silver Eagle" gold-plated |
| t To mod. FS-4 for use with SPR-4 | £7.44 | LC80Q 80m loading coil for 14AVQ/WB | £18.00 | transistorised D104 £4 |
| PR-4 Receiver-general purpose | £495.00 | 14RMQ Roof-mounting kit for 14AVQ/WB | £20.93 | UG8-D104 The famous Crystal D104 £3 |
| L-4 Loop antenna for SPR-4 only | £23.62
£58.50 | TH6DXX 6 element beam for 10/15/20 | £201.38 | T-UG9-D104 Transistorised amplified |
| NB Noise blanker for SPR-4 | £16.88 | TH3MK33 element beam for 10/15/20 | £167.63 | D104 grip-t-t £4 |
| CC-4 100kHz calbrator for SPR-4 | | TH3JR3 element beam for 10/15/20 | £121.50 | T-UP9-D104 Transistorised amplified Ptt. |
| A-4 Transceive adaptor for SPR-4/
T-4XC | £27.00 | TH2MK33 element beam for 10/15/20 | £117.56 | grey or black |
| Power Cord for SPR-4 | £4.05 | HY-QUAD 2 element quad for 10/15/20 | £182.25 | 400 Dynamic Hand Microphone "Buckeye" £ |
| ystal kits for SPR-4 | | DB10-15A 10 and 15m beam | £117.00 | 565 M6 Hand microphone FET amplified |
| mateur bands kit | £24.75 | 204BA 4 element 20m beam | £151.31 | "Mariner" £3 |
| me & Freq. kit | £20.05 | 203BA 3 element 20m beam | £125.94 | D104-M Hand microphone D104. FET |
| ARS kit | £20.05 | 153BA 3 element 15m beam | £67.22 | amplified. 4-wire £2 |
| eletype Commercial kit | £17.10 | 103BA 3 element 10m beam | £54.56
£168.19 | D104-M6 Hand-microphone D104, FET |
| eronautical kit | £28.80 | 402BA 2 element 40m beam | £168.19
£9.28 | amplified.6-wire £2 |
| arinekit | £45.00 | 511 Heavy duty spring | £11.59 | 555 4-wire Hand microphone, noise-can- |
| opical Bands kit | £12.38 | 499 Flush body mount
417 De luxe spring | £8.83 | celling."trucker" £2 |
| Y-4 Teletype adaptor for SPR-4 | | | £4.50 | 557 6-wire Hand microphone. noise-can- |
| SR-2 Digital Receiver | £2250.0 | LA-1 Lightning arrestor | £22.84 | celling "trucker" £2 |
| SR-1 Receiver-general purpose | £149.50 | LA-2 In-line lightning arrestor | £3.71 | 531 Hand microphone, mobile. High Z £ |
| S-1 Headphones for SSR-1 | | BN-86 Ferrite balun | £14.06 | 539 Hand microphone, mobile. Noise-can- |
| RAKE TRANSCEIVERS & ACCESS | | TE-7-01 Antenna Noise Bridge | £23.76 | celling £ |
| R-4CW Transceiver-SSB, CW, with r.i.t. | | TE 7-02 Antenna Noise Bridge | £29.70 | 1104C Desk microphone. FET amplified £3 |
| -PNB Plug-in Noise Blanker | £72.00 | | | The concentration of the contration of the contr |
| C-4 115/240V PSU for TR-4CW/T-4XC | | CDR ROTATORS | 000.04 | TEN-TEC |
| C-4 12V PSU for TR-4CW/T-4XC/R-4C | | AR-20 | £38.81 | 509 Argonaut. 5w SSB/CW Transceiver. |
| MK-3 Mobile mounting kit | | AR-22L | £48.38
£46.13 | 3-5-30MHz £28 |
| V-4C Remote VFO for TR-4CW | | AR-30 | | 540 Triton 1V. 200w SSB/CW Tcvr. 3-5-
30MHz |
| F-1 Crystal control for TR-4CW | | AR-40 | £53.44
£106.88 | 30MHz £55
544 Triton 1V. 200w SSB/CW Tcvr. Dig. |
| V-3 144-432MHz FM Transceiver | | | £145.13 | 3-5-30MHz £69 |
| S-3 AC Power supply | £69.75 | | £88.44 | 3-5-30MHz |
| MK-3 Remote Trunk kit | £54.00 | | £241.88 | 405 Linear Amplifier, 100w3-5-30MHz £12 |
| RAKE TRANSMITTER & ACCES | £495.00 | | ALT1.00 | 210/E 115/230V AC. 13V DC. psu for |
| 4XC Transmitter-SSB | | ATLAS | (Albertan) | Argonaut.(1A) £2 |
| 4B Linear Amplier and Power supply | £742.50
£90.00 | 210X 10 80m SSB Transceiver | £444.38 | 251/E 115/230V AC. 13V DC. psu for |
| N-4 Antenna Match Network | £184.50 | 215X 15 160m SSB Transceiver | £444.38 | Argonaut/405(9A) £7 |
| N-2000 Antenna Match Network | | 220-CS Console and AC Power supply | £118.12 | 262G/E 115/230V AC. 13 V DC. psu for |
| RAKE ADDITIONAL ACCESSORI | | 200-PS AC Power supply | £74.25 | Tritons (1BA) £12 |
| /-4 RF Wattmeter 2-30MHz | | DMK De luxe mobile mount | £36.00 | 212 Crystal, 29-0-29-5MHz for Tritons £ |
| V-4 RF wattmeter 20-200MHz | | DCC DC cable | £8.45 | 213 Crystal, 29-5-30 0MHz for Tritons £ |
| V42LP Low pass filter 100w | | MBK Mobile bracket kit | £4.38 | 240 Converter 160m for Tritons £8 |
| V3300LP Low pass filter 2kw | | MT-1 Mobile antenna match transformer | £18.00
£40.50 | 241 Crystal oscillator for Tritons £2 |
| 5-500 Receiver protector | | PC-120 Plug-in noise blnaker | | 242 Remote VFO for Tritons £13 |
| 72 Hand Microphone | | 10X Crystal oscillator | £42.75
£180.00 | 245 CW filter for Tritons £2 |
| | | DD-6B Digital dial | £180.00
£36.00 | 249 Noise blanker for Tritons £2 |
| CS-4 Remote control Antenna switch | | VX-5 VOX accessory | £6.75 | 276 Crystal calibrator for Century/21 £2 |
| A-10 10 watt sm Amplifier | | DL-200 Dummy load | 20.13 | KR-1A Paddle assembly, dual £2 |
| | | BARLOW-WADLEY | | KR-5A Single paddle keyer, 6-14V DC £3 |
| Fixed frequency crystals Spare operating manuals | ************************************** | XCR-30 General coverage receiver | £149.85 | KR-50 Ultramatic keyer, dual paddle, 117V |
| USTLER MOBILE ANTENNAS | | XCR-30 General coverage receiver with FM | September 1 | AC/6-14V DC £9 |
| | £13.84 | unit | £170.00 | VOCUMENTAL DESCRIPTION OF THE PROPERTY OF THE |
| [BANG BEN] 하라 되었습니다 | | ELECTRA | | NYE KEYS |
| M-1 Bumper Mount | | 210 BEARCAT. FM search & scanning | | Model 312-001 £ |
| | | receiver with digital readout. Freq. | | Model 312-002 £ |
| | | coverage: 32-50MHz; 146-174MHz; 416- | | Model 312-003 £ |
| M-10 10m Resonator | 200000000000000000000000000000000000000 | 512MHz | £270.00 | Model 312-004 £ |
| M-20 20m Resonator | | (A.) (A.) (A.) (A.) (A.) (A.) (A.) (A.) | -,0001100004 | MODEL 322-001 |
| M-40 40m Resonator | | CALLETTI | C40 00 | Model 322-002 with oscillator £1 |
| M-80 80 m Resonator | | GP8V 2m Groun plane 4 radials | £13.90 | PRESTE |
| F-22m # whip | £9.00 | ESSE 8U 2m 1 whip, standard mount | £12.00 | PRESTEL MC-20 Field strength mater LIHE/VHE/FM £21 |
| CL Discone. VHF/UHV. 40-700MHz. with | | 2m whip. gutter mounting | £12.00 | MC-20 Field strength meter UHF/VHF/FM £21 |
| 50 coax | 000 to | PHILIPS | | |
| CX Discone. VHF/UHF 40-700NHz. | £13.84 | AAC-4000 Language-trainer, comprising | | PLEASE SEND LARGE SAE FOR BROCH |
| G-1442m Colinear | £25.25 | cassette-Recorder and headphone with | | |
| GT-1442m Colinear with mount | £36.00 | mic attached | £129.60 | TRIO-ENTIRE RANGE IN STOCK |
| 이 말이프레스 보다 보다 되었다면 하나 있으니다. | | | 0.000000000 | ACCEC |
| BARCLAYCARD | DR | AKE * SALES | * | SERVICE ACCES |
| | | ACK LTD. | | ROADHURST GARDENS, |

Giro Account No. 588 7151 Telephone: 01-624 7174 Cables: Radio Shack, London, NW6. Telex: 23718

| DIODES/ZENERS | | | s | OCKET | S/BRIDGES | 3 | TRANSISTORS, LEDS, etc. | | | | | |
|---------------|--------|-------|-------------|----------------|--------------|---------------|-------------------------|-------------------------|-----------|----------------|-------|--|
| 1N914 | 100 | | | 8-pin | pcb | .25 ww | .45 | | IPN | (Plastic .1 | | |
| 1N4005 | 600v | | | 14-pin | pcb | .25 ww | .40 | | NP | | .15 | |
| 1N4007 | 1000 | 1 | A .15 | 16-pin | pcb | .25 ww | .40 | | NP | | .10 | |
| 1N4148 | 75v | | | 18-pin | pcb | .25 ww | .75 | 2N3054 N | IPN | | .35 | |
| 1N753A | 6.2 | | | 22-pin | pcb | .45 ww | 1.25 | | IPN 15 | A 60v | .50 | |
| 1N758A | 10 | | | 24-pin | pcb | .35 ww | 1.10 | | | rlington | .35 | |
| 1N759A | 12 | | | 28-pin | pcb | .35 ww | 1.45 | LED Green, I | | | .15 | |
| | | | | | | | 1,25 | | | | | |
| 1N4733 | 5.1 | | | 40-pin | pcb | | | | | high com-anod | | |
| 1N5243 | 13 | | | Molex | pins .01 | To-3 Socket: | .45 | | seg com- | | 1.50 | |
| 1N5244B | | | | 2 Amp | Bridge | 100-prv | 1.20 | FND 359 F | led 7 seg | com-cathode | 1.25 | |
| 1N5245B | 15 | z | .25 | \$20,000 kills | p Bridge | 200-prv | 1.95 | | | | | |
| C MC | 00 | Т — | | 237411 | Dinoge | | r L - | -1 | | | _ | |
| 4000 | .15 | 7400 | .15 | 7473 | .25 | 74176 | 1.25 | | .55 | 74\$133 | .45 | |
| 4001 | .20 | 7401 | .15 | 7474 | .35 | 74180 | .85 | 74H101 | .75 | 745140 | .75 | |
| 4002 | .20 | 7402 | .20 | 7475 | .35 | 74181 | 2.25 | | .75 | 745151 | .35 | |
| 4004 | 3.95 | 7403 | .20 | 7476 | .30 | 74182 | .95 | | .95 | 74S153 | .35 | |
| 4006 | 1.20 | 7404 | .15 | 7480 | .55 | 74190 | 1.75 | ///////// | | 745157 | .80 | |
| 4007 | .35 | 7405 | .25 | 7481 | .75 | 74191 | 1.35 | 74L00 | .35 | 74S158 | .35 | |
| | | | | | | | | | | | | |
| 4008 | .95 | 7406 | .35 | 7483 | .95 | 74192 | 1.65 | 74L02 | .35 | 745194 | 1.05 | |
| 4009 | .30 | 7407 | .55 | 7485 | ,95 | 74193 | .85 | 74L03 | .30 | 745257 (8123 | .25 | |
| 4010 | .45 | 7408 | .25 | 7486 | .30 | 74194 | 1.25 | 74L04 | .35 | | | |
| 4011 | .20 | 7409 | .15 | 7489 | 1.35 | 74195 | .95 | 74L10 | .35 | 74LS00 | .35 | |
| 4012 | .20 | 7410 | .10 | 7490 | .55 | 74196 | 1.25 | 74L20 | .35 | 74LS01 | .35 | |
| 4013 | .40 | 7411 | .25 | 7491 | .95 | 74197 | 1.25 | 74L30 | .45 | 74LS02 | .35 | |
| 4014 | 1.10 | 7411 | | 7492 | .95 | 74198 | 2.35 | | .95 | 74LS04 | .35 | |
| | | | .30 | | | | | | | | | |
| 4015 | .95 | 7413 | .45 | 7493 | .40 | 74221 | 1.00 | | .45 | 74LS05 | .45 | |
| 4016 | .35 | 7414 | 1.10 | 7494 | 1.25 | 74367 | .85 | 74L55 | .65 | 74LS08 | .35 | |
| 4017 | 1.10 | 7416 | .25 | 7495 | .60 | | | 74L72 | .45 | 74LS09 | .35 | |
| 4018 | 1.10 | 7417 | .40 | 7496 | .80 | 75108A | .35 | 74L73 | .40 | 74LS10 | .35 | |
| 4019 | .60 | 7420 | .15 | 74100 | 1.85 | 75110 | .35 | 74L74 | .45 | 74LS11 | .35 | |
| 4020 | .85 | 7426 | .30 | 74107 | .35 | 75491 | .50 | 74L75 | .55 | 74LS20 | .35 | |
| | | | | | | | | 74L93 | .55 | 74LS21 | .25 | |
| 4021 | 1.35 | 7427 | .45 | 74121 | .35 | 75492 | .50 | | | | | |
| 4022 | .95 | 7430 | .15 | 74122 | .55 | 200000 | 1900 | 74L123 | .55 | 74LS22 | .25 | |
| 4023 | .25 | 7432 | .30 | 74123 | .55 | 74H00 | .25 | 2000000000 | | 74LS32 | .40 | |
| 4024 | .75 | 7437 | .35 | 74125 | .45 | 74H01 | .25 | 74500 | .55 | 74LS37 | .35 | |
| 4025 | .35 | 7438 | .35 | 74126 | .35 | 74H04 | .25 | 74502 | .55 | 74LS40 | .45 | |
| 4026 | 1.95 | 7440 | .25 | 74132 | 1.35 | 74H05 | .25 | 74503 | .30 | 74LS42 | 1.10 | |
| 4027 | .50 | 7441 | 1.15 | 74141 | 1.00 | 74H08 | .35 | 74504 | .35 | 74LS51 | .50 | |
| 4028 | .95 | 7442 | .45 | 74150 | .85 | 74H10 | .35 | 74505 | .35 | 74LS74 | .65 | |
| | | | | | | | | | | | | |
| 4030 | .35 | 7443 | .85 | 74151 | .75 | 74H11 | .25 | 74508 | .35 | 74LS86 | .65 | |
| 4033 | 1.50 | 7444 | .45 | 74153 | .95 | 74H15 | .30 | 74510 | .35 | 74LS90 | .95 | |
| 4034 | 2.45 | 7445 | .65 | 74154 | 1.05 | 74H20 | .30 | 74S11 | .35 | 74LS93 | .95 | |
| 4035 | 1.25 | 7446 | .95 | 74156 | .95 | 74H21 | .25 | 74\$20 | .35 | 74LS107 | .85 | |
| 4040 | 1.35 | 7447 | .95 | 74157 | .65 | 74H22 | .40 | 74\$40 | .25 | 74LS123 | 1.00 | |
| 4041 | .69 | 7448 | .70 | 74161 | .85 | 74H30 | .25 | 74\$50 | .25 | 74LS151 | .95 | |
| 4042 | .95 | 7450 | .25 | 74163 | .95 | 74H40 | .25 | 74S51 | .45 | 74LS153 | 1.20 | |
| 4043 | .95 | 7451 | .25 | 74164 | .60 | 74H50 | .25 | 74564 | .25 | 74LS157 | .85 | |
| 4044 | .95 | 7453 | .20 | 74165 | 1.50 | 74H51 | .25 | 74574 | .40 | 74LS164 | 1.90 | |
| 4046 | 1.75 | 7454 | | 74166 | 1.35 | 74H52 | .15 | 745112 | .90 | 74LS367 | .85 | |
| | | | .25 | | | | | | | | | |
| 4049 | .70 | 7460 | .40 | 74175 | .80 | 74H53J | .25 | 74S114 1 | .30 | 74LS368 | .85 | |
| 4050 | .50 | 7470 | .45 | | | 74H55 | .25 | | | | | |
| 4066 | .95 | 7472 | .40 | | | | | | | | | |
| 4069 | .40 | | | | | INCADO | DECLI | ATORC | | | | |
| 4071
4081 | .70 | | 8266 | .35 | | 20K5 (7905) | | ATORS, etc.
LM340T24 | .95 | LM723 | .50 | |
| 4082 | .45 | | MCT2 | .95 | | | 1.65 | LM340K12 | 2.15 | LM725 | 1.75 | |
| | 0.07 | | 8038 | 3.95 | | | 1.65 | LM340K15 | 1.25 | LM739 | 1.50 | |
| 0000 | SERIE | e l | LM201 | .75 | | | 1.65 | LM340K18 | 1.25 | LM741(8 | | |
| 9301 | SERIE | .85 | LM301 | .25 | | | 1.65 | LM340K24 | .95 | LM747 | 1.10 | |
| 9309 | | .35 | LM308 (Mil | | LM3 | | .95 | LM373 | | | | |
| | | | | | | | | | 2.95 | LM1307 | 1.25 | |
| 9322 | | .85 | LM309H | .65 | | (34075) | .95 | LM380 | .95 | LM1458 | .95 | |
| 95H03 | | .55 | LM309K (3 | 40K-5) .85 | 15(5)25(25) | | 1.00 | LM709 (8,14 PIN | v) .25 | LM3900 | .50 | |
| 9601 | | .75 | LM310 | 1.15 | 0.770.000.75 | | 1.00 | LM711 | .45 | LM75451 | .65 | |
| 9602 | | .50 | LM311D (A | | LM3 | 40T18 | 1.00 | | | NE555 | .50 | |
| MEMO | RY CLO | CKS | LM318 (M | ini) .65 | | | | | | NE556
NE565 | .95 | |
| | | 3.00 | 1,2222 | | | | | | | | | |
| 745188 (| 0223) | | INT | ECDAT | בט ה | יווויזסוי | 1 21 | INLIMITE | n | NE566 | 1.75 | |
| 1702A | | 6.95 | 11/1 | LUNAI | ט עו | INCUI | J L | MEHMHE | U | NE567 | 1.35 | |
| MM5314 | | 3.00 | | | | | | | | | _ | |
| MM5316 | | 3.50 | | | | | 2.0 | | | | | |
| 2102-1 | | 1.75 | 7889 | Clairemont | Mesa BI | vd., San Die | ego, CA | 92111 U.S.A | | 2000 | 0.000 | |
| 2102L-1 | | 1.95 | | | N | o Minimum | Contract Contract No. | | | SPEC | IAL | |
| TR 1602 | R/ | | (140)24(10) | | | | | | | DISCO | UNTS | |
| TMS 6 | | 6.05 | All pric | es in U.S. d | ollars. P | lease add po | stage t | o cover method | of | Total Order | Dedi | |
| | | 6.95 | | | | | | ped air no char | | \$35 - \$99 | | |
| 8080AD | | 15.00 | | | | | | | ac. | \$100 - \$30 | | |
| | | 1.50 | | | | | | in U.S. dollars, | | | | |
| BT13 | | 1.50 | All IC's | Prime/Guar | anteed | All orders s | hipped | same day receiv | ed. | \$301 - \$10 | | |
| 8T23 | | | 711 103 | I I IIIIC COU | ditteca. | THE OF GOIS S | | | | | | |
| | | 2.00 | Phone (714) | | | | DOMESTIC: | SS/AMERICAN E | | \$1000 - Up | 209 | |

AGENT



ATLAS SOLE STANDING AGENT



PLUS-

· YAESU

YOUR KEENEST BUY FOR YAESU MUSEN!



AS DIRECT **IMPORTERS** WE OFFER YOU...

THIS IS THE FABULOUS FT-227R

designed for the man who prefers true frequency read-out rather than CB type channel identification - after all it's the frequency you put in your Log OM!

VAESU

- 1. LOWEST PRICES
- 2. LARGEST RANGE
- 3. HIGHEST STOCKS
- TOP AFTER-SALES SERVICE
- BEST DEMONSTRATION FACILITIES

MANY THOUSANDS OF AMATEURS AND SWL's HAVE FOUND IT PAYS TO DEAL DIRECT WITH THE IMPORTER WHEN IT COMES TO PURCHASING

TODAY'S SOPHISTICATED AMATEUR GEAR—NOT ONLY DO THEY GAIN BY HAVING THE AFTER-SALES BACK UP THAT ONLY A MAIN AGENT CAN

PROVIDE BUT THEY ALSO OFTEN SAVE A SUBSTANTIAL AMOUNT ON THEIR PURCHASE!

£2.50 FOR 25 PENCE!! 25 pence brings the latest Yaesu catalogue with our Credit Voucher for £2.50. A couple of stamps obtains the FT-227R, SWAN or ATLAS leaflets or our used equipment list.

HOW TO REACH US (EASY PRIVATE PARKING ON OUR 70ft. FORECOURT)

FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within 1 mile turn right a Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left lork into Alum Rock Road. We are located one mile from this point.

FROM NORTH, Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds, veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding direc-

FROM THE WEST AND SOUTH/WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at Junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

Hours: 9.30-5.30 Continuous including Saturdays—Early closing Wednesday, 1 p.m.

BRANCH: AMATEUR ELECTRONICS, UK—COASTAL, CLIFTONVILLE, KENT. KEN McINNES, G3FTE, THANET (0843) 291297. 9 a.m.-10.30 p.m. BRANCH: AMATEUR ELECTRONICS UK—SCOTLAND. 287 MAIN STREET,

WISHAW, LANARKSHIRE. GORDON McCALLUM, GM3UCI.

TELEPHONE WISHAW 71382. (EVENINGS CARLUKE 70914)
WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON 422232.

508-514 ALUM ROCK ROAD 2007

RMINGHAM

G3FIK

AGENT:

COUNCIL

President D. S. Evans, PhD, BSc, FIM, G3RPE **Immediate Past-President** Lord Wallace of Coslany

Honorary Treasurer P. F. D. Cornish, FCA, G3COR

Telecommunications Liaison Officer R. F. Stevens, G2BVN

Ordinary members E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM

P. Balestrini, TEng(CIE), MITE, G3BPT J. Bazley, G3HCT

T. P. Douglas, MBE, AMIEE, G3BA

C. H. Parsons, GW8NP

R. F. Stevens, G2BVN

G. M. C. Stone, CEng, FIEE, FIERE, G3FZL C. J. Thomas, G3PSM

Zonal members Zone A. B. O'Brien, G2AMV Zone B. J. Anthony, G3KQF Zone C. D. J. Andrews, G3MXJ Zone D. W. A. Scarr, G2WS, MA, FBIS Zone E. D. M. Thomas, GW3RWX Zone F. W. F. McGonigle, GI3GXP Zone G. A. M. Allan, GM3ZBE

REGIONAL REPRESENTATIVES

Region 1-W. M. Furness, G3SMM Region 2—R. C. Andreang, G4CMT Region 3—H. S. Pinchin, G3VPE Region 4-T. Darn, G3FGY Region 5-P. F. Chilcott, G4BBA Region 6-F. S. G. Rose, G2DRT Region 6—F. S. G. Rose, GZDRT Region 7—N. A. Smith, G3HFO Region 8—D. N. T. Williams, G3MDO Region 9—H. W. Leonard, G4UZ Region 10—R. G. Barrett, GW8HEZ Region 12—F. H. Hudson, GW3IEQ Region 12—F. Hall, GM8EZX Region 13-A. B. Givens, GM3YOR Region 14—I. McKechnie, GM8DOX Region 15—H. J. Campbell, GI8FOK Region 16—R. E. G. Kendall, G8BNE Region 17—L. Hawkyard, G5HD Region 18—P. J. Fay, G3AKG Region 19—(Post vacant) Region 20—G. Mather, G3GKA

HONORARY OFFICERS

Awards managers hf-C. R. Emary, G5GH vhf-Jack Hum, G5UM

Emergency communications manager P. Balestrini, G3BPT

Intruder Watch organizer S. A. G. Cook, G5XB

Microwave manager D. S. Evans, G3RPE

QSL Bureau manager Mr E. G. Allen, G3DRN

Slow morse organizer M. A. C. MacBrayne, G3KGU

Taped lecture library curator S. W. Coursey, G3JJC

Trophies manager P. A. Miles, G3KDB

VHF manager: I. F. White, G3SEK

Correspondence to RRs and honorary officers should be addressed directly to them (QTHR).

RADIO SOCIETY OF GREAT BRITAIN

35 Doughty Street, London WC1N 2AE

Telephone 01-837 8688

Founded 1913 Incorporated 1926 Member society, International Amateur Radio Union

PATRON: HRH The Prince Philip, Duke of Edinburgh, KG

The national society representing all UK radio amateurs

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained

GENERAL MANAGER AND SECRETARY

EDITOR

D. A. Evans, G3OUF

A. W. Hutchinson

A message from the Society's new President



In accepting the great honour of becoming the 44th President of the Society, I am very conscious of both the responsibility and the opportunity this office brings with it. Our previous President set a standard of service to the Society which on the one hand will be difficult to emulate but on the other hand by its success has made the task of his successor easier.

There still remains much to be done. The Society fundamentally is in good shape, and one would like to see continued Lord Wallace's philosophy of making it more responsive to the needs of the members who, we must never forget, are the Society. On the international side, much of our efforts will continue to be devoted to preparing for WARC 79. The IARU Region 1 conference in Hungary in April will add to the already extensive preparations made.

Amateurs are a privileged group. They themselves can recognize that they justify these privileges by their contributions to the art of radio and to a reduction in the barriers between nations. However, it is important that we continue our efforts to ensure that those outside the hobby who are less well qualified to judge these contributions can also fully appreciate the special training and experience of amateurs which sets them apart from other operators of communication equipment. Every amateur has a role to play in this direction.

To all members and staff of the Society, I extend my wishes for a happy and successful year.

Dain Evans, G3RPE



amateur radio news

Delays to "Radio Communication"

As a result of production problems at the printers, the November and December issues of the journal were delivered a week late and posted on 9 November and 8 December respectively. Unfortunately these production problems have become worse and this issue of the journal has also been seriously delayed.

However, from the March issue printing of the journal is being undertaken by another printer and a different process, and it is expected that these delays will then cease.

Another source of delay in *receipt* of the journal by members is that due to the vagaries of the postal service, but some members appear not to be aware that this is one over which the Society has no control. Under the Periodical Publishers Association contract with the Post Office, by which means the journal is despatched, *all copies are posted on the same day*. From then onwards delivery is entirely in the hands of the Post Office and, as the journal is posted as 2nd Class mail, it receives the low order of priority which that class has. This can result in delivery being spread over several days depending on the speed at which it is handled between the Post Offices of despatch and delivery.

In the majority of cases delivery is made on the third or fourth working day after posting, but there are usually a few members who get their copies later without any logical reason. Invariably among the latter are a number who miss out on Members' Ads bargains and consequently feel aggrieved. This is understandable, but it should also be understood that resulting complaints should be laid at the door of the Post Office, starting with the office of delivery, and not at the RSGB.

Membership cards

Members of the RSGB in the British Isles are reminded that a new membership card will be issued on receipt of their subscription. The membership card has two main functions: to act as a receipt for the subscription; and to provide proof of membership so that the member's discount on books may be claimed on purchases from RSGB HQ and RSGB bookstalls at rallies, etc.

On average, a membership card is sent within 10 days of receipt of a subscription, but as they are printed in batches of about 1,000 there may be a delay of up to three or four weeks in some cases. If a membership card is not received within four weeks, please enquire if the subscription has been received. However, if payment is made by banker's order, despatch of the membership card may be delayed by up to eight weeks because the Society has to wait for lists from the bank to check that payment has been received. Nevertheless, as a membership card is valid for the member's discount up to three months after the renewal date, these delays should cause no problems.

As a result of program modifications to the data processor, members having BFPO addresses will in future also have membership cards issued to them.

COUNCIL ELECTION RESULTS

The result of the ballot to fill the two vacancies on Council from 1 January 1978 was as follows:

| E. J. Allaway, GSFKM | 1,837 | votes |
|--|-------|-------|
| R. Bellerby, G3ZYE | 374 | |
| A. M. Cameron, GM3OGJ | 363 | |
| T. P. Douglas, G3BA | 1,272 | |
| R. W. Fisher, G3PWJ | 191 | |
| G. I. Knight, GM8FFX | 639 | ** |
| D. M. Manley, G3OWF | 368 | |
| D. M. Pratt, G3KEP | 592 | ** |
| D. S. Smith, G4DAX | 414 | |
| Total number of votes accepted | | 2,976 |
| Late votes not accepted | | 514 |
| (Many of the late votes were post-marked 21 were not delivered until after the closing date of | | |

Spoilt votes 20
Messrs E. J. Allaway, G3FKM, and T. P. Douglas, G3BA,

Messrs E. J. Allaway, G3FKM, and T. P. Douglas, G3BA, were accordingly elected to serve on Council for the three years 1978–80.

Special event stations

E I Allaman COEVIA

Authorization for special event stations will be re-introduced on 1 January 1978, and for a trial period of one year the Home Office will:

- (a) accept requests that have been submitted through the Society; and
- (b) authorize these stations by a formal notice of amendment that will be issued without charge.

Applications for a notice must reach the Home Office at least 14 days in advance of the effective date and therefore the information should be sent to the Society at least one month before the intended commencement of operation. A large number of requests have already been received following the announcement in the November issue of Radio Communication.

The RSGB expects to receive the co-operation of individuals and groups so that the new simplified procedure can be effective.

OSL Bureau

Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD, has been appointed sub-manager for the callsign series G8PAA onwards. Mr and Mrs A. J. Mathews, G6QM, will continue to handle G8 calls up to G8OZZ.

4U1ITU

A room in the ITU headquarters building at Geneva, hitherto used for storage and as an office, is to be converted into a satellite ground terminal station. This will be used for demonstrations of the amateur satellite service to the many visitors to the ITU and to delegates attending international conferences. Items of equipment for the new station have been generously provided by Microwave Modules (of Liverpool) including a transverter, converter and counter. With the approach of WARC 79, stations such as 4U1ITU fulfil a valuable purpose, and the IARC is appreciative of the help of Microwave Modules in the person of its director, Richard Porter.

Switzerland

The callsign block HB9PAA - HB9PZZ is now being used for vhf licences in Switzerland.

Use of glassfibre

A timely warning is contained in a recent issue of the LERC ARC Bulletin (W6LS) by W6DDB. This points out that the catalyst added to glassfibre resin to accelerate hardening is usually mekp (methyl ethyl ketone peroxide) which can completely destroy eyesight. Once mekp commences to destroy eye tissue there is no known way to stop the process. When using glassfibre resin and its additives protective glasses should be worn. An adequate supply of clean water should be on hand with which to wash out the eyes within four seconds if an accident occurs. MEKP is also used in other products, such as some liquid casting plastics.

ORM

The latest figures from the Japan Amateur Radio League reveal that there are now 465,000 licensed radio amateurs in Japan.

More convictions

At Leicester Magistrates' Court on 28 November, the following were found guilty of committing offences in connection with offences under section 1 of the Wireless Telegraphy Act, 1949:

Graham Wale, who was fined £300 plus £25 costs; Alexander Sagar, fined £250 plus £25 costs; and Geoffrey Noon, fined £250 plus £25 costs.

Office of Fair Trading action

The Director-General of Fair Trading has started proceedings in the Brentford County Court, for alleged refusal to give satisfactory assurances, against Mr John William Pound, who was or purported to be a director of AVC (Advisory Services) Ltd, and Mr Barry George Harry Took, who until he resigned in 1976 was a director of the company. AVC (Advisory Services) Ltd, which went into liquidation in May 1976, was a mail order supplier and dealer in audio, hi-fi and radio equipment and traded as "City Audio".

Part 3 of the Fair Trading Act 1973 provides that where it appears that a company has persisted in a course of conduct detrimental to the interests of consumers and has disregarded its obligations under the criminal or civil law, the Director-General can seek written assurance that the course of conduct will cease. The Director-General may also seek personal assurances from directors and other company officers who appear to have consented to or connived at the company's conduct. Such assurances are binding on the directors and officers in relation to any other company in which they hold office and any other business carried on by them in the future.

If assurances are refused, the Director-General can seek from a court orders forbidding the continuation of such conduct. Breach of an order amounts to contempt of court and lays the offender open to a fine or, in the case of an individual, imprisonment.

In the present case the Director-General alleges that he has been unable to obtain satisfactory assurances from the companies or the officers named in the proceedings. The assurances were sought because complaints from consumers who did not receive the goods they ordered, or refunds of the deposits they had sent, appeared to the Director-General to constitute persistent breach of civil law obligations.

RSGB AMATEUR RADIO EXHIBITION

Alexandra Palace, London N22 5 and 6 May 1978

The Society will once again be organizing this, the amateur radio event of the year, to provide something of interest to all radio amateurs.

Full details will be published later, and all enquiries should be addressed to Les Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants; or via RSGB headquarters.

Rotarian net

The Rotarians of Amateur Radio net will, in future, commence at 9am every Sunday throughout the year, as this appears to be more convenient to the regular operators. Frequency: 3.692MHz \pm QRM.

The transatlantic net at 1200gmt every Sunday is being transferred to 21.400MHz, owing to greater reliability with the increased sun-spot activity.

Liverpool University ARS dinner

Liverpool University ARS intends to hold a dinner in the spring this year to which all past-members are invited. The secretary, GW4FJH, would be grateful if all ex-G3OUL members would let him know if they will be able to attend, so that arrangements can be made and the address list revised. Write to him c/o Students' Union, 2 Bedford St North, Liverpool 7.

REGION 19 REPRESENTATIVE

Valid nominations for this appointment have been received in respect of:

Mr J. N. Bolton, G4DGK. Nominated by: S. A. Richards, G8LGX; A. G. Smith, G3WPD; P. R. Wilby, G3YRU; R. Macduff, G4AWB; K. P. Kearns, G8LYV.

Mr R. J. Broadbent, G3AAJ. Nominated by: W. E. F. Corsham, G2UV; R. J. Eckersley, G4FTJ; J. Hooper, G3PCA; H. Thompson, G3AMF; R. Glover, G8IUC.

Mr D. P. S. Wright, G4FBW. Nominated by: F. Taylor, G4DUO; S. G. Collyer, G3PZK; H. J. Stanley, G3YFF; R. A. McCowatt, G3WPK; I. T. Kirby, G4CVL.

Corporate members residing in Region 19 (Greater London north of the Thames, and Hertfordshire) are invited to vote for one of these candidates by sending a postcard in the following form addressed to: The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE, to arrive not later than 14 February 1978.

| peing a fully paid up corporate member of the RSGB resident in
Region 19, wish to record my vote in favour of |
|--|
| Mr |
| as representative for Region 19 |
| Signed |
| Callsign or BRS number |
| Address |

An experimental self-tutor for morse code using the SN74S387 prom

by M. R. IRVING, G3ZHY*

Introduction

Despite numerous technological advances made in recent years, morse code still remains a popular method of communication with radio amateurs. This is probably due, in part, to the fact that the code can be used with relative success when other forms of communication fail due to poor band conditions. Morse code is of course a language, although it is not "spoken" in the true sense of the word. Nevertheless, being a language, a considerable amount of thoughtful and dedicated study is necessary if fluency is to be attained.

Learning morse code usually occurs in a series of discrete steps. Initially, it is necessary to become familiar with the sound of individual characters, and this is normally achieved by committing to memory, for example, the letter A as dit-dah etc. Once this first step has been mastered, short groups of characters or words may be attempted, albeit at relatively slow speed. As proficiency develops, speed is gradually increased with additional letters, numerals and punctuation characters included in the text.

Progress tends to be erratic; in a series of jumps rather than in a smooth progression. Furthermore it is necessary to attempt to read code at a slightly faster rate than one is currently able to, ie achieve less than 100 per cent correct copy, if progress at increased speed is to be made. This aspect of learning morse, if not appreciated, is most discouraging to the beginner and is, perhaps, one of the reasons why so many amateurs opt for Class B licences, or operate Class A telephony-only once the morse test has been passed.

With the assistance and encouragement of a good teacher, learning morse need not be a traumatic experience; indeed, it can be an enjoyable and rewarding one. In this respect the RSGB slow morse practice transmissions have, for many years, assisted many aspiring radio amateurs through their morse tests. Unfortunately no two individuals progress at the same rate, and the ideal teacher would need to provide tailor-made exercises for each student. This is of course not practical unless the ratio of students to teacher is low.

In the experimental unit to be described, an attempt has been made to simulate certain aspects of this "ideal" teacher. The unit is not designed to send plain language. However, by various combinations of switch settings on the control panel it is possible to select any specific letter, numeral, or punctuation character that is stored in the unit's

*22 Wheatley Way, Chalfont St Peter, Bucks. SL9 0JE.

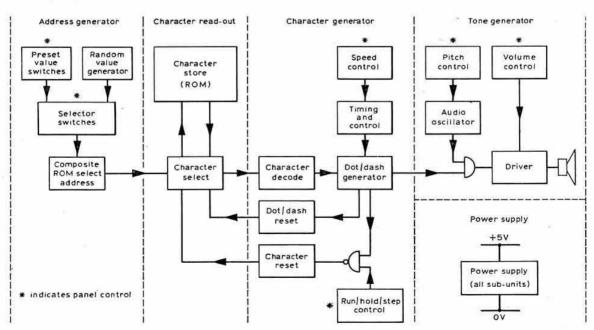


Fig 1. Functional block diagram

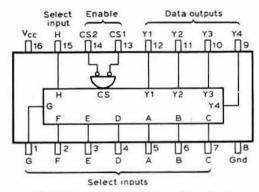


Fig 2. Type SN74S387 package (top view)

pre-programmed read only memory (prom). Groups of characters from the character repertoire may also be selected, eg letters only, numerals only, punctuation and numerals only, etc, and these characters may be sent in random sequence. Finally, the speed, pitch and loudness of the code can be varied by further panel controls, thereby allowing a "lesson" to be tailored to the exact requirements of the individual student.

General description

Fig 1 shows a functional block diagram for the complete unit. At first sight the circuitry may seem to be complicated. However, as with most electronic equipment, it can be broken down logically into a number of simpler sub-units. In this respect the self-tutor comprises five sub-units: address generator character read-out, character generator, tone generator and power supply. Each of these sub-units is discussed separately and will, in conjunction with the functional block diagram, provide an overall understanding of the unit's operation.

The SN74S387 prom

The SN74S387 integrated circuit is a 1,024-bit customprogrammable read only memory (rom). The memory is organized as 256 × 4-bit words, each word being accessed by specifying an appropriate 8-bit binary address. Full decoding and read-out of information is performed on the chip. Two over-riding chip select inputs are provided which, when either one or both are high, cause all outputs from the rom to be high.

At manufacture time all the 1,024 bit positions in the memory are set to a high level logic output (ie binary value 1). The customer supplies programming information in the form of a truth table showing the required logic levels at each of the 1,024 bit locations. Using this data the supplier will "burn in" the chip to the customer specification by open-circuiting metal links within the chip where a low logic-level output is required. Once a low-level output (0) is programmed into the rom it is irreversible; however, bit locations with a value of 1 can be changed to a 0 value by resubjecting the device to the programming process.

Fig 2 gives details of the SN74S387 rom package. Although the basic cost of the SN74S387 is relatively high (when the once-off programming charge is included), performing the same task using discrete components could not be achieved

Table 1. Layout of character store

| 5250443169441 | Character | ROM | | | ontent | |
|--|-----------|------------|------|--|--------|------|
| Character | No | address | +0 | +1 | +2 | +3 |
| 0 | 0 | 0 | 0101 | 0101 | 0111 | 0000 |
| 1 | 2 | 4 8 | 1001 | 0101 | 0111 | 0000 |
| 2 | 3 | 12 | 1010 | 1001 | 0111 | 0000 |
| 1 2 3 4 5 6 7 7 8 9 — — — — ? / CTKBKS | 4 | 16 | 1010 | 1010 | 0111 | 0000 |
| 5 | 5 | 20 | 1010 | 1010 | 1011 | 0000 |
| 6 | 6 | 24 | 0110 | 1010 | 1011 | 0000 |
| 7 | 7 | 28 | 0101 | 1010 | 1011 | 0000 |
| 8 | | 32 | 0101 | 0110 | 1011 | 0000 |
| 9 | 9 | 36 | 0101 | 0101 | 1011 | 0000 |
| _ | 10 | 40 | 1100 | 0000 | 0000 | 0000 |
| _ | 11 | 44 | 1100 | 0000 | 0000 | 0000 |
| _ | 12 | 48 | 1100 | 0000 | 0000 | 0000 |
| - | 13
14 | 52
56 | 1100 | 0000 | 0000 | 0000 |
| = | 15 | 60 | 1100 | 0000 | 0000 | 0000 |
| - | 16 | 64 | 1001 | 1001 | 1001 | 1100 |
| | 17 | 68 | 0101 | 1010 | 0101 | 1100 |
| ? | 18 | 72 | 1010 | 1010 | 1010 | 1100 |
| 1 | 19 | 76 | 0110 | 1001 | 1011 | 0000 |
| CT | 20 | 80 | 0110 | 0110 | 0111 | 0000 |
| ВК | 21 | 84 | 0110 | 1010 | 0111 | 0000 |
| AS | 22 | 88 | 1001 | 1010 | 1011 | 0000 |
| AR
VA | 23 | 92 | 1001 | 1010
1001
1001
0101
0111 | 1011 | 0000 |
| VA | 24 | 96 | 1010 | 1001 | 1001 | 1100 |
| KN | 25 | 100 | 0110 | 0101 | 1011 | 0000 |
| N P | 26
27 | 104
108 | 0110 | 0111 | 0000 | 0000 |
| France | 28 | 112 | 1010 | 1011 | 1010 | 1010 |
| ciase | 29 | 116 | 1010 | 0000 | 0000 | 0000 |
| R R R R R R R R R R R R R R R R R R R | 30 | 120 | 1100 | 0000 | 0000 | 0000 |
| _ | 31 | 124 | 1100 | 0000 | 0000 | 0000 |
| - | 32 | 128 | 1100 | 0000 | 0000 | 0000 |
| A | 33 | 132 | 1001 | 1100 | 0000 | 0000 |
| В | 34 | 136 | 0110 | 1010 | 1100 | 0000 |
| С | 35 | 140 | 0110 | 0110 | 1100 | 0000 |
| D | 36 | 144 | 0110 | 1011 | 0000 | 0000 |
| E | 37 | 148 | 1011 | 0000 | 0000 | 0000 |
| F . | 38 | 152 | 1010 | 0110 | 1100 | 0000 |
| G
U | 39
40 | 156
160 | 0101 | 1011 | 1100 | 0000 |
| 2 | 41 | 164 | 1010 | 1100 | 0000 | 0000 |
| à | 42 | 168 | 1001 | | 1100 | 0000 |
| K | 43 | 172 | | 0111 | | 0000 |
| L | 44 | 176 | 0110 | 1010 | 0000 | 0000 |
| M | 45 | 180 | 0101 | 1100 | 0000 | 0000 |
| N | 46 | 184 | 0101 | 1100 | 0000 | 0000 |
| 0 | 47 | 188 | 0101 | 0111 | 0000 | 0000 |
| P | 48 | 192 | 1001 | 0110 | 1100 | 0000 |
| Q | 49 | 196 | 0101 | 1001 | 1100 | 0000 |
| K | 50
51 | 200
204 | 1001 | 1011 | 0000 | 0000 |
| 5 | 52 | 208 | 1010 | 1011 | 0000 | 0000 |
| ù | 53 | 212 | 1010 | 0111 | 0000 | 0000 |
| v | 54 | 216 | 1010 | 1001 | 1100 | 0000 |
| W | 55 | 220 | 1010 | 0111 | 1100 | 0000 |
| × | 56 | 224 | 0110 | 1001 | 1100 | 0000 |
| Y | 57 | 228 | 0110 | 0101 | 1100 | 0000 |
| Z | 58 | 232 | 0101 | 1010 | 1100 | 0000 |
| - | 59 | 236 | 1100 | $ \begin{array}{ccccccccccccccccccccccccccccccccc$ | 0000 | 0000 |
| - | 60 | 240 | 1100 | 0000 | 0000 | 0000 |
| _ | 61 | 244 | 1100 | 0000 | 0000 | 0000 |
| - J K L M Z O P Q R S T U > ♥ X Y N | 62 | 248 | 1100 | 0000 | 0000 | 0000 |
| _ | 63 | 252 | 1100 | 0000 | 0000 | 0000 |
| | | | | | | |

at the same cost, and certainly not in the same physical space. The basic cost is £5.33; the programming charge £2, and the burning-in charge 35p. This gives a total cost for one-off of £7.68 plus VAT, but if the device is ordered as programmed in the article from Texas Instruments, Manton Lane, Bedford, quoting Program No ZHY001, no programming charge would apply.

Character store

Although the basic organization of the rom is 256 × 4-bit words, each morse character is stored in four words or 16 bits. The rom is, therefore, artificially organized into a 64 × 16-bit array, each element of the array containing a single morse *character*; eg letter, numeral or punctuation symbol.

Each 16-bit character is further sub-divided into 8 × 2-bit segments. Segments are encoded with a binary value of "10" to represent a dot, and "01" to represent a dash. Additionally, a segment with a value of "11" is used to represent a pause or rest, while "00" represents a reset signal. These two latter values are used to provide inter-segment spacing and character termination respectively. Table 1 gives details of how each morse character has been encoded within the rom. Note that every character terminates with a rest and reset segment in that sequence.

The function of the individual sub-units is described in the following paragraphs: namely, to generate a rom access address, read out the appropriate character segment by segment, and produce the correctly sequenced audio tones for the given morse character.

Address generator

As previously mentioned, up to 64 characters may be stored in the rom and these are numbered 0-63 for reference purposes. To access a given character it is necessary to specify the appropriate "address". The function of the address generator is to build a 6-bit binary value (address) which can be used to access the required stored character in the rom. For example, the 6-bit binary address 110001 would access character number 49, or the letter Q.

In order to provide the facility to select specific characters or random characters from the rom, the make-up of the 6-bit binary address is governed by a combination of fixed and random logic. The control panel contains six pairs of switches, called selector and value switches; each pair of selector and

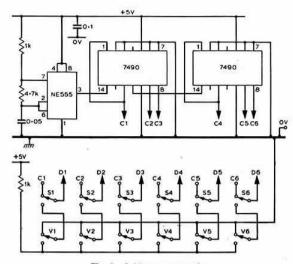
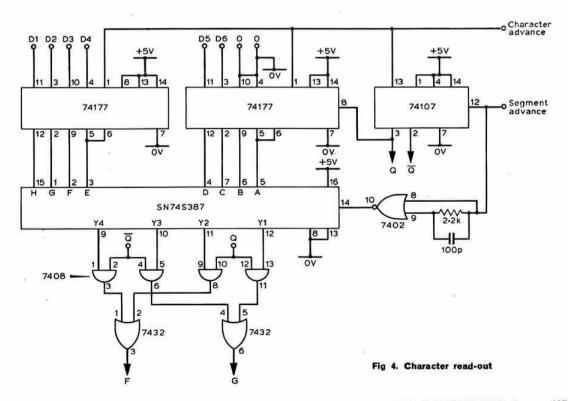


Fig 3. Address generator

value switches being associated with a corresponding bit in the 6-bit binary address.

When, for example, the first selector switch is in the down position the value (0 or 1) as specified by the first value switch is inserted into the first bit position of the 6-bit address being generated. Similarly, other bit positions in the address



may be preset to a value of 0 or 1 as indicated on the corresponding value switches. When all six selector switches are in the down position, the access address is totally specified by the six value switches.

When a selector switch is in the *up* position, the corresponding value switch is ignored. Instead the bit value is taken from the corresponding bit position of a free-running 6-bit binary counter, and is therefore set to a value of 0 or 1 according to the content of the counter at that instant of time. In this way bit positions in the address may, in effect, be set randomly.

By varying the settings of the selector and value switches the select address may be composed of all preset values, all random values, or any combination of fixed and random values. It is therefore possible to select characters from the store by direct reference to their number, or in varying degrees of randomness through to completely random sequence.

Fig 3 shows the circuit diagram of the address generator. An NE555 timer integrated circuit provides a free-running oscillator, the output of which is fed into two SN7490 counters connected in cascade; this, in effect, provides an 8-bit binary counter. Only six bits from the counter are utilized for the purpose of random bit generation, and these are connected to the selector switches together with the fixed values read off the value switches. The composite 6-bit address appears at the poles of the selector switches. The frequency of the NE555 oscillator is approximately 3kHz, although this frequency is in no way critical. Provided the

frequency is considerably higher than the frequency of the character generator timing and control oscillator (described later), random bit values will effectively be generated for inclusion in the address generation process.

Character read-out

Reference to Fig 4 will show that the character read-out sub-unit consists essentially of an 8-bit binary counter, the outputs of which are used as the data select inputs for the rom. The 8-bit counter is made up of two SN74177 presettable 4-bit counters connected in cascade. At the commencement of each character read-out cycle the content of the 8-bit counter is preset by loading the 6-bit value presented by the address generator into the six most significant positions, and by loading 0 values into the least significant bit positions of the address. In this manner an 8-bit rom select address is formed, the value of which is divisible by four. Remember, that although the intrinsic rom organization is 256 × 4-bit words, each morse character occupies four words in the rom, ie 16 bits.

The initial setting of the counter enables the first word (two segments) of a character to be accessed for decoding. Thereafter, pulses fed from the character generator cause the 8-bit counter to be incremented, thus indexing through the remaining segments of the character.

Since each 4-bit word of the rom contains two character segments, it is necessary to separate the segments and present them in turn to the character generator. This is accomplished by passing the rom outputs through an exclusive-or gating

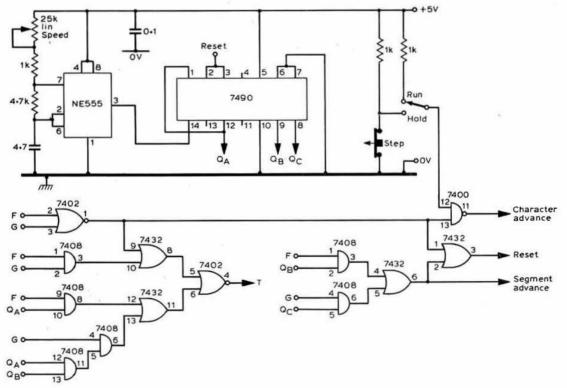


Fig 5. Character generator

system. The outputs, F and G, from the character read-out sub-unit are passed on to the character generator for decoding.

Character generator

The function of the character generator is to decode character segments, presented to it by the character read-out subunit, and produce the appropriate waveforms necessary to drive the tone generator. Fig 5 shows the circuit diagram of the character generator.

A master timing oscillator controls the cycle speed of the self-tutor. Because of the requirement to provide variable speed an NE555 timer ic has again been chosen; this being a very convenient method of generating a variable-frequency free-running oscillator with the minimum number of external discrete components. The output of the oscillator is fed into an SN7490 4-bit binary counter which is used to measure the duration of the dot, dash and pause intervals.

When a character segment with a binary value of 10 is presented to the character generator, the tone generator is turned off as soon as the counter contains a value of 1; ie after a duration of one unit of time. As soon as the counter increments to a value of 2 the counter is reset and a pulse sent to the character read-out module to fetch the next character segment. A waveform to generate a dot followed by one space interval is thus produced.

When a character segment with a binary value of 01 is encountered, the tone generator is turned off as soon as the counter contains a value of 3; ie after three units of time. One unit of time later, when the counter contains a value of 4, the counter is reset and the next segment is fetched from the character read-out module. A dash followed by one space interval is produced in this way.

A character segment of binary value 11 causes the tone generator to be switched off immediately and this state remains until the counter is reset when it contains a value of 2. Rest periods of two units of time can thus be obtained which, when added to the one unit of time space occurring after the last dot or dash of a character, gives an intercharacter gap of three units of time.

The special character segment with a binary value of 00 is used to signal the end of a character. It immediately turns

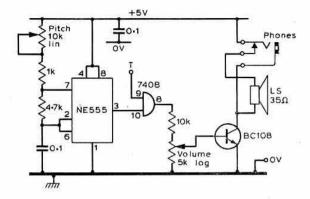


Fig 6. Tone generator

the tone generator off, resets the counter to zero, and sends a pulse to the character read-out module instructing it to load a new address for the next character.

The next character will only be initiated if the RUN/HOLD switch on the control panel is in the RUN position. If it is in the HOLD position the entire unit will cycle in a muted condition until either the RUN condition is reselected or the STEP push-button switch is momentarily depressed when the next single character will be accessed. Single characters may be selected in this way until normal free-running operation is desired.

Referring back to Fig 4 it will be seen that special precautions are necessary to ensure that the rom is disabled—ie its outputs F and G are held high—while a new segment is being fetched from the character read-out module. A short positive-going pulse is derived from the trailing edge of the segment advance signal and this is applied to one of the rom chip select inputs, thereby over-riding the normal rom outputs. The duration of the blanking pulse is timed to ensure that the switching of the rom outputs is completed before new F and G outputs are passed to the character generator.

Table 2. Integrated circuit pin connections

| Type | | | | | | | | Pin n | umbe | ers | | | | | | | Descrip- | | | |
|-----------------|------------|-------------|------------|-------|-----|-----|-----|-------|------|-----|----|-----|-----|-----|------|-----------------|---------------------------------------|-----------|------|-----|
| HELD CONE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | tion | ~ | | |
| SN7400 | 1A | 1B | 1Y | 2A | 2B | 2Y | Gnd | 3Y | 3A | 3B | 4Y | 4A | 4B | Vcc | - | - | 4 × 2-
input
NAND | \exists | _ | 1>- |
| SN7402 | 1Y | 1A | 1B | 2Y | 2A | 2B | Gnd | 3A | 3B | 3Y | 4A | 4B | 4Y | Vcc | | () | 4 × 2-
input NOR | NAN | D | NOR |
| SN7408 | 1A | 1B | 14 | 2A | 2B | 2Y | Gnd | 3Y | ЗА | 3B | 4Y | 4A | 4B | Vcc | - | - | 4 × 2-
input AND | 1 | | 1> |
| SN7432 | 1A | 1B | 1Y | 2A | 2B | 2Y | Gnd | 3Y | 3A | 3B | 4Y | 4A | 4B | Vcc | - | - | 4 × 2- | AND | Ĝ | OR |
| S N7490 | В | R01 | R02 | - | Vcc | R91 | R92 | Qc | Qb | Gnd | Qd | Qa | - | A | | _ | Binary | | | |
| S N74107 | 1J | 1Q | 10 | 1K | 2Q | 2Q | Gnd | 2J | 2CK | 2CL | 2K | 1CK | 1CL | Vcc | 0.23 | | 2 × JK
flip flop | | | |
| SN74177 | Load | Qc | C | A | Qa | CK2 | Gnd | CK1 | Qb | В | D | Qd | CL | Vcc | - | - | Preset-
table
binary
counter | | LM3 | оэк |
| SN74S387 | G | F | E | D | Α | В | С | Gnd | Y4 | Y3 | Y2 | Y1 | CS1 | CS2 | Н | Vcc | | (1 2 | View | |
| NE555
LM309K | Gnd
I/p | trig
O/p | O/p
Gnd | reset | CV | Thr | Dis | Vcc | - | æ | - | 333 | - | - | | - | Timer
5V regu-
lator | 3/ | | |

Tone generator

Fig 6 shows the circuit diagram of the tone generator. It consists of a free-running audio oscillator, the frequency of which may be varied by panel control over the range 1,000Hz \pm 300Hz. The output from the oscillator is fed to one input of a 2-input AND gate, and when the other input to the gate is supplied with the appropriate switching waveform from the character generator a dot or dash audio signal is passed to the loudspeaker driver circuitry.

The output from the AND gate is resistor-coupled to the volume control which in turn feeds the switching signal to the BC108 driver transistor. A 35 Ω loudspeaker forms the normal collector load for the BC108; however, a facility is provided for external phones to be connected via a frontpanel jack socket. When using phones the internally-mounted loudspeaker is automatically disconnected.

Power supply

The complete unit draws approximately 350mA of current, and this can be readily provided by the power supply shown in Fig 7. This basic power supply has been used in other equipment built by the author and has proved reliable in operation.

Provision is made for mains/battery operation, although circuit components may be excluded if only one option is required. It should be noted that under battery operation the supply is applied to the input of the bridge rectifier, and therefore incorrect battery polarity is impossible.

Mains input is fed via a dpdt switch to the primary winding of a low-cost filament transformer of suitable current rating. The output from the transformer, or the battery input, is switched via another dpdt switch to a full-wave bridge rectifier and then to a LM309K voltage regulator. A reservoir capacitor of $2200\mu F$ is used on the input side of the regulator, while final smoothing is effected by a $750\mu F$ capacitor on the output side of the regulator. Throughout the unit $0.1\mu F$ disc ceramic capacitors are fitted to decouple the power supply line to ground; this suppresses unwanted voltage transients which would otherwise cause unreliable circuit operation.

The LM309K will perform its regulation function with input voltages in the range 7-25V. It is, however, essential to use a low-impedance bridge rectifier with the filament transformer specified, in order to minimize the voltage drop across the rectifier which would otherwise cause the input voltage to the LM309K to fall below the minimum 7V required. If 12V battery operation is intended a suitable series dropping resistor may be included in the battery supply line to reduce the power dissipation within the regulator itself.

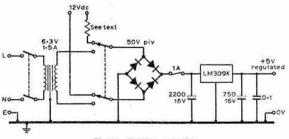


Fig 7. Power supply

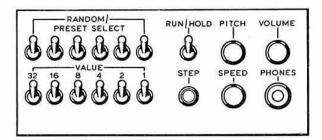


Fig 8. Front panel layout

Construction

The cabinet for the complete unit is constructed from two pieces of 16swg aluminium. The main chassis is U-shaped, with \$\frac{3}{2}\$ in flanges all round, and measures 10 by 10 by 3in. A slightly oversize U-shaped chassis, without flanges, forms the lid and this may be secured to the base flange of the main chassis by captive nuts or self-tapping screws. The front apron of the main chassis is bent backwards through some 15° to provide better visibility and operation of the panel controls. Fig 8 shows the layout of the front-panel controls.

The electronics of the unit, with the exception of the power supply components and front-panel controls, are all mounted on a single Vero dil breadboard with external wire strappings for component interconnection. A custom-built printed circuit board would have simplified construction and provided a neater finished project; however, the expense of a one-off pcb could not be justified. Table 2 gives details of the pin connections of all Ics used throughout the self-tutor.

To keep the front-panel dimensions to a minimum, the loudspeaker is mounted on the base of the main chassis. Groups of holes are drilled along each side of the lid to permit the egress of sound, and also to allow dissipation of heat generated within the unit.

Bibliography

- The TTL Data Book for Design Engineers, Texas Instruments Ltd.
- [2] Supplement to The Data Book for Design Engineers, Texas Instruments Ltd.
- [3] How to use Integrated Circuit Logic Elements, Jack W. Streater, Foulsham-Sams.

The "Radio Communication Handbook" costs the earth!

Actually, we must confess that it is "dirt" cheap when one considers the amount of information packed into its 816 large-format pages. For less than the price of a simple station accessory one gets a superb reference library in two handy volumes, created by radio amateurs to help you get the best out of your hobby. Happy digging!

Volume 1 464 + xvi pages Volume 2 324 + xii pages £9.36 inc p&p £8.12 inc p&p

A simple rf admittance bridge

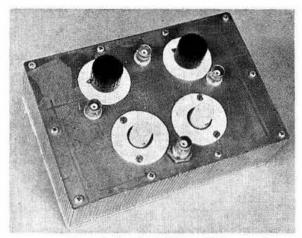
by G. GARSIDE, G3MYT/VE3*

In previous articles describing the use of the Smith Chart [1, 2], most of the examples assumed the existence of an initial "input" of measured data. It is the purpose of this article to describe an easily-constructed unit which is capable of making the necessary measurements, at least over the hf range. The author's prototype is reasonably accurate up to 30MHz (an opinion based on the degree of consistent agreement with other instruments) and is usable with care in interpretation up to 70MHz. Beyond 70MHz, residual stray capacitance associated mainly with the potentiometer casings makes it difficult to obtain reliable results.

The circuit, Fig 1, is simple in the extreme, and the results will largely depend on the quality of the components employed, and the degree of constructional care taken during assembly. It is essential that the layout be as symmetrical as possible, and that vhf wiring techniques are used. (Copper straps \{\frac{1}{2}\] in wide for ground connections, for example). Carbon potentiometers are mandatory; wirewound units are quite useless, of course.

The prototype uses relatively small variable capacitors, the range being extended either by the addition of fixed capacitors (wired inside coaxial plugs) or by external variables (the unit is far less sensitive to asymmetries occurring *outside* the screening box).

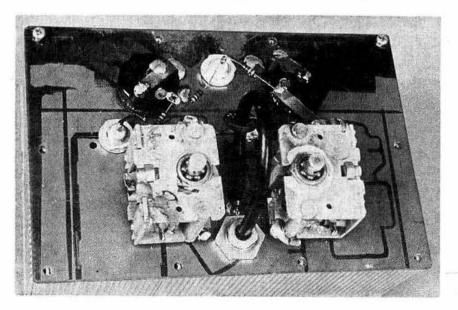
Fig 2 indicates the method of use; a convenient signal in the author's case is the low-level transverter drive output of the



External view of admittance bridge

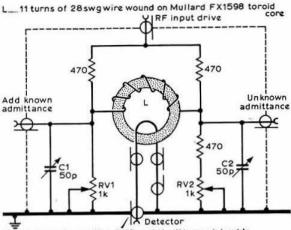
ssb transmitter, when the latter is fed from a two-tone test signal. A few volts maximum of the frequency of interest are then available to energize the bridge. The detector used is an Eddystone EC10, used with a low setting of the rf gain control and age and bfo "off". (The convenience of a.m.-mode reception conferred by the use of the two-tone signal will be appreciated by owners of 28MHz, say, receivers of comparable drift characteristics.) Internal and external photographs of the bridge (before calibration) shown opposite, were supplied by Chris Brown, to whom thanks are due.

As an indication of constructional quality, it should be possible to achieve a balance with the bridge such that the detecting-receiver's rf gain may be advanced sufficiently for its front-end noise to be dominantly heard. (If an antenna is on test, for external signals to be copied via the bridge.) The bridge can be calibrated, and a feeling for its operation



Internal view of admittance bridge

*21 Albion Crescent, Bramalea' Ontario L6T 1L3, Canada.



Through-panel mounting BNC socket with coaxial cable Faraday-screened loop with the outer screen grounded only at the panel socket

Fig 1. Circuit of admittance bridge

Operation

- (i) Set C1 to mid-capacity; set RV1 to full resistance.
- (ii) Use RV2 and C2 to balance bridge strays (minimum signal in detector).
- (iii) Apply unknown admittance and re-balance using RV1, C1 and external additional admittance(s) if necessary.

obtained, by measuring various known combinations of R, C and L. (The measurement of inductance is normally achieved by treating it as a negative capacitance—in practice, additional capacitance is used on the "unknown" side of the bridge to achieve balance; the reactance of such a capacitor at the frequency of interest is then numerically equal to the inductive reactance actually present.)

The instrument as described is inherently an admittance bridge, and generates data in the form of parallel combinations of R-C or R-L—the minor inconvenience of having to think in terms of conductance, susceptance, millimhos etc being, in the author's opinion, offset by the facility of having all bridge terminals available on coaxial connectors, with outers grounded.

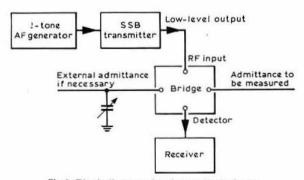


Fig 2. Block diagram showing method of use

Operation

Set frequency of rf source and detector receiver to that required for the measurement and adjust bridge for minimum receiver signal.

References

- "The Smith Chart", L. A. Moxon, BSc, CEng, MIEE, G6XN. Radio Communication January 1977, p22.
- [2] "More on the Smith Chart", G. Garside, MSc, MA, CPhil, CEng, MIEE, MIERE, FRAS, G3MYT/VE3. Radio Communication.

NEW PRODUCT

Usijet signal injector

Alcon Instruments announces the Chinaglia Usijet universal signal injector. This device is a small pocket-sized unit designed as a pen-shaped signal probe capable of providing a suitable test signal wherever it might be needed. Initially it is intended for use in fault-finding and alignment checking in the radio and television areas but it has application over a wide field, including audio and communications markets.

The Usijet incorporates a blocking oscillator as the main signal generator, giving a basic 500kHz signal which is modulated at 1kHz for identification and demodulation check purposes. Because of the waveform used the equipment produces harmonics detectable right up to 500MHz; very useful in many servicing applications. Power consumption is 25mA from an internal 1-5V battery to give a 20V peak-to-peak output at the probe tip.

In use the equipment case is merely connected via a flylead to the earth line of the item under test and the probe tip applied to the point at which the signal is required. The Usijet can be used in "live" test conditions and the probe can cope with circuit voltages of up to 500V dc.

The price, complete with earthing lead and instructions, is £11.55 inc VAT. Further information can be obtained from Alcon Instruments Ltd, 19 Mulberry Walk, London SW3. Tel 01-352 1897.



12V to 18V converter for the Pye Bantam

by A. BROWN, G3TXD*

THE author recently decided to use a Pye Bantam mobile with a view to adding an rf power stage at a later date. Although the Bantam uses internal dry cells (or nicads for those who can afford them) it was decided to run the equipment from the car battery. The Bantam requires an 18V positive earth supply at about 300mA depending on the output power obtained, most vehicles on the other hand are now 12V negative earth. Some form of isolating converter was obviously necessary and the following describes such a converter, capable of being used with both positive and negative earth 12V systems. The unit was designed to be fairly robust electrically as is necessary with a piece of mobile equipment likely to suffer some abuse.

Circuit description

The unit comprises a self-oscillating inverter, running at about 10kHz, followed by a series regulator. This particular type of inverter was chosen because of its simplicity and low component count; although relatively unsophisticated it is reliable and achieves good efficiency. The type of regulator used allows the minimum voltage drop across the series transistor which lowers the unit's power dissipation whilst allowing it to operate on a battery supply of 11V.

Inverter

At switch on, TR1 begins to conduct, being fed with base current initially via R1. As collector current begins to flow, base current is produced by the feedback voltage appearing across L3a, driving TR1 into saturation. TR2 base emitter is reverse biased by the voltage appearing across L3b. The collector current and the flux in the transformer core steadily increase until the core reaches saturation, when an increase in collector current produces proportionately less of an increase in flux.

In an attempt to maintain the original rate of flux change

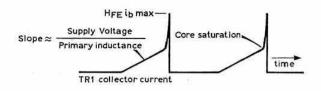




Fig 2. Diagrammatic waveforms (no load)

the collector current increases more rapidly until a point is reached where the base current can no longer support it and TR1 begins to come out of saturation. The transformer field begins to collapse, reversing the sense of the voltages on the windings, thereby reversing the feedback voltages on the bases of TR1 and TR2. TR1 is driven off and TR2 is driven into saturation. The cycle then begins again, this time with TR2 in the conducting state. The collector and base current waveforms are shown in Fig 2.

Regulator

After rectification and filtering the secondary voltage is applied to the regulator comprising TR3, TR4 and TR6. The voltage reference is D6 and this is compared with a sample of the output voltage at the base emitter of TR6.

| | Compo | nents lis | t |
|-----------|---------------------------------|-------------|------------------------------|
| C1, 4 | 330μF 25V, Al elec-
trolytic | R1
R2, 3 | 1·5kΩ
100Ω |
| C2, 3 | 2-2µF 100V, polycar-
bonate | R4
R5 | 22kΩ
470Ω 0·5W, 5%, |
| D1 | IN5400 | R6, 9 | 1·2kΩ carbon |
| D2, 3 | IN4002 | R7, 8 | 10kΩ |
| D4 | IN4148 | R10 | 330Ω |
| D5 | BZY88C12 | R11 | 2·2kΩ |
| D6 | BZY88C6V2 | | |
| L1 | 44T + 44T)
bifilar | R12 | 10kΩ 0·5W, 2% metal
oxide |
| L2 | 24T + 24T
bifilar 28swg | R13 | 8·2kΩ 0·5W, 5%, carbon |
| L3 | 4T + 4T | RV1 | 5kΩ pcb mounting |
| | bifilar) | FS1 | 1A, 11 in glass with |
| TR1, 2, 3 | 2N3055 | | in-line holder |
| TR4 | BFX30 | Ti | 35mm ferrite pot core |
| TR5, 6 | BCY71 | | Mullard FX2242 |

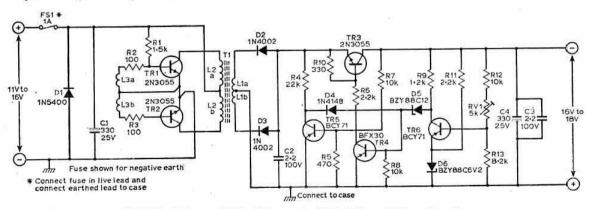


Fig 1. Circuit diagram 12V to 18V converter (R6 is 1-2k, not 2-2k as shown)

^{* 68} Lynton Avenue, Collier Row, Romford, Essex.

Table 1. Test results on prototype

Line and load regulation (for input change
11V to 15·6V, load change 0 to 350mA)

Output ripple (Input 12·6V load 350mA)

Overall efficiency (Input 12·6V load 350mA)

Maximum input current during overload (Fig 4)

Short circuit input current (Fig 4)

380mA

Should, for example, the output voltage tend to increase, the base of TR6 would become more negative with respect to the reference voltage on the emitter. TR6 would tend to conduct more heavily and the current flowing through R9 into the base of TR4 would be diverted into the collector of TR6. Reducing the base current of TR4 reduces its collector current which in turn is the base current of TR3. TR3 collector current would therefore reduce, lowering the output voltage. Hence the system adjusts the output voltage so as to keep the base of TR6 at a constant potential.

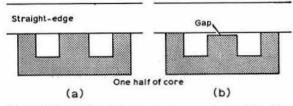


Fig 3. Distinguishing between an ungapped core (a) and a gapped core (b)

TR5 plays no part in the regulation process but is required at switch on. At this time the output voltage is zero and therefore no base current would flow into TR4, TR3 would remain off and the power supply would not start up. However, the output voltage is sensed by TR5 and, whenever it is below about 12V, TR5 turns off, allowing current to flow into TR4 base via R4. As the output rises above 12V TR5 conducts, reverse biasing D4, and the regulator functions normally. (This technique was described in *Technical Topics* some time ago.)

Transformer

The transformer is wound on a 35mm ferrite pot core. The type used was a Mullard FX2242 (choice was, to some extent, limited by availability at the time of building) but virtually any 35mm ungapped core will give satisfactory results as the power level is quite low. With this size of core there is also plenty of space available on the bobbin, an

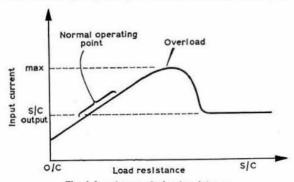


Fig. 4. Input current v load resistance

advantage for those not quite so adept at winding small transformers. Whether a core is gapped or not is easily ascertained by laying a straight edge across each core half-face as in Fig 3. The windings should be placed on the bobbin in the order: primary, feedback, secondary; and, although insulation between windings is not strictly necessary, it may be found helpful to tape each winding when winding the transformer.

Power transistors

TR1, TR2 and TR3 are TO3 style 2N3055 transistors. They are very much under-run but allow the power supply to stand any amount of abuse even though, for several reasons, no current limit circuit exists on the regulator. TR1 and TR2 need not be mounted on a heatsink; TR3 should be mounted on a small heatsink (approximately 3in²) to take into account worst-case conditions, although it normally runs virtually cold. In the prototype all three transistors were mounted directly on to the circuit board.

Construction

The construction of the unit is not critical although the 18V regulated output terminals, together with the filter capacitors C3 and C4, should be mounted at the opposite end of the box to the inverter circuit—simply to avoid unnecessary coupling. A logical layout, following through from the input terminals at one end of the box to the output terminals at the other end, will ensure perfectly satisfactory noise performance. The prototype was constructed on a Paxolin wiring board, complete with transformer and power transistors, and secured as a unit inside a diecast box. The fuse was mounted externally in an in-line holder.

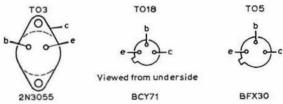


Fig 5. Transistor connections

When wiring in the transformer, there can be confusion (unless coloured markers are used) as to which end of a winding is the start and which is the finish. If the primary and secondary are connected up permanently, but the feedback winding start and finish are temporarily wired in, it is possible to reverse the feedback connections to determine the correct phase. The connection which allows oscillation can then be made permanent.

Output voltage is set by R13 and was designed to be adjustable over the range 16V to 18V. When installing the supply, either the positive or negative input (depending on vehicle polarity), and the positive output, must be connected to the power supply case to avoid coupling inverter noise into equipment via earth returns.

The results of a brief set of tests, made on the prototype, are given in Table 1.

The unit is currently in use and has withstood the usual overloads and short circuits that occur during mobile experimentation without any apparent damage. The circuit is straightforward and reliable and no difficulty should be experienced in getting the unit to perform satisfactorily, provided that reasonable care is taken in the construction.

EQUIPMENT REVIEW

Yaesu Musen FT301

by T. G. GILES, BSc, AMIEE, G4CDY*



Introduction

The Yaesu Musen FT101 is probably the most popular amateur band transceiver ever built. It was one of the first complete stations in one package containing ac and 12V dc power supplies and its method of construction, using computor-type plug-in cards, has given it a good reputation for reliability and ease of servicing.

The all solid-state FT301 series is a natural development from the hybrid FT101 but, in addition to removing the driver and pa valves, many other features and improvements in performance have been included. The ac power supply is now in a separate unit and, because the pa is wide-band, the large tuning and loading capacitors have been removed. The FT301, therefore, weighs only half as much as the FT101 and is much smaller. This probably makes the unit easier to install in modern family cars where it can be powered directly by the car battery.

The transceiver is at present available in three forms—the FT301, which has a 100W output; the FT301S, which does not have the big pa and produces 10W; and the FT301D, which is a digital readout version of the 100W unit. The prices excluding VAT are £510, £355 and £599 respectively. The FT301 used for the review was a 100W unit, with an analogue readout, kindly loaned by Messrs Western Electronics (UK) Ltd, Fairfield Estate, Louth, Lincs LN11 0JH.

Description

The transceiver is built in a cabinet with a carrying handle on one side. The unit is of modular construction using printed circuit boards with edge connectors but with phonotype coaxial plugs for rf leads. The vfo is built in a separate screened box and is operated by the usual Yaesu Musen combination of a gear box and an epicyclic slow-motion drive. The tuning is very smooth and free from play or backlash and is calibrated in kilohertz steps using a combination of a rotating cylinder calibrated every 50kHz and a disc marked in kilohertz steps coaxial with the tuning knob.

The preselector is a permeability type operated through a slow motion drive with a small cursor to show the band selected. The other controls are well spaced and, despite the small size of the front panel, are easy to operate. The vox gain has been brought out to the front panel and in the fully counter clockwise position brings the transmitter on continuously for tuning or when the ptt or break-in cw is not in use. The clarifier, marker, noise blanker, rf processor and age speed can be selected by means of a row of levertype switches. There are two indicator lights to show transmit and clarifier operation.

A feature which is new on this equipment is a "reject control" which will tune a sharp notch across the receiver passband and is very useful for removing heterodyne or other interference. The filter also has a slight peak response, useful for reducing the bandwidth on cw signals (there was no cw filter fitted to the FT301 reviewed). The whole operation of the reject control is similar to that of the phasing control on the HRO, a very useful facility.

The noise blanker consists of a wide band amplifier fed directly from the receiver mixer, a detector, pulse amplifier and a noise gate in the main i.f. amplifier. The rf processor built in the transmitter i.f. comprises an amplifier and clipper followed by a second ssb filter to remove the distortion products generated by the clipper. The clarifier can be switched so that it is operative on transmit and receive thus making it easy to call a dx station a few kHz from his channel. An illuminated meter indicates receive signal strength and the collector current of the output transistors on transmit.

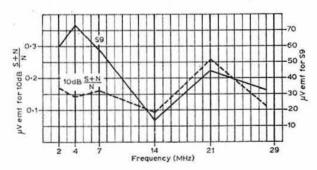


Fig 1. Receiver sensitivity and input for S9 on S-meter

^{* 54} The Mount, Coulsdon, Surrey.

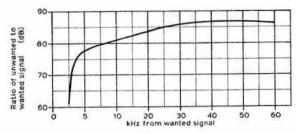


Fig. 2 Blocking response

The FT301 is single conversion on transmit and receive and uses a 9MHz i.f. The 5-5-5MHz vfo is premixed with the relevant crystal to produce the conversion frequency for each band. This means that there is no crystal required for the 3-5MHz band. In the opinion of the reviewer the most important requirement for ensuring good signal handling in any receiver is to keep the gain before the i.f. selectivity as low as possible. Yaesu Musen engineers have done this by including a separate roofing filter directly after the dual gate mosfet mixer. The gain control rf amplifier is another dual-gate mosfet.

The transmitter mixer is a double-balanced type using an MC1496G integrated circuit. The basic transceiver produces 10W from a pair of \$10-12 devices in push-pull. This is boosted to 100W by a separate amplifier which is bolted to the rear panel of the transceiver. This pa uses a pair of \$2535s in push-pull, both amplifiers are wide band with 50Ω outputs. This type of amplifier is prone to generate harmonics and so there is a double section low-pass filter for each band. The pa transistors are protected against damage when connected to a badly matched antenna by means of an automatic vswr detection and shutdown circuit. This control circuit is progressive and will allow operation into a vswr of up to 3:1, but with reduced power input.

Measurements

Receiver sensitivity was measured by connecting a signal generator to the antenna input and adjusting its level until a 10dB signal plus noise-to-noise ratio was obtained on a wide band af voltmeter connected to the phones socket. Fig 1 shows the sensitivity on each band and also the input required to produce an S9 reading on the S-meter. The test showed that, like most modern receivers, the FT301 is extremely sensitive and that its performance would be limited by noise picked up by the antenna.

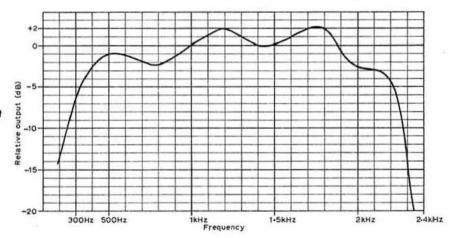
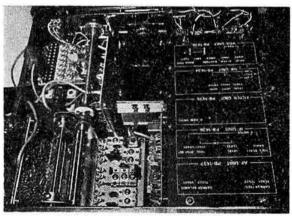


Fig 3. Overall af response of transmitter



Top view of FT301 with cover removed

Early transistor receivers had a very bad reputation for blocking and cross modulation, but tests made on the FT301 showed that it has extremely good signal handling characteristics and is certainly the best amateur receiver ever measured by the reviewer. This may seem a strange compliment, but the performance of this receiver is as good if not better than many valve receivers. Blocking performance (shown in Fig 2) was tested by putting a signal in on 7-1MHz adjusted to give a signal plus noise-to-noise ratio of 20dB, and introducing an interfering signal at a level which degrades this ratio by 6dB. A simple intermodulation test was also carried out, by putting two signals into the receiver spaced at 10kHz and 20kHz from the frequency to which the receiver is tuned. The level of these interfering signals was increased until the product appearing in the receiver passband had a signal plus noise-to-noise ratio of 20dB, when it was found that the interfering signal needed to be 70dB above a single on tune signal, a very good figure.

Tests were made of image, i.f. rejection and frequency

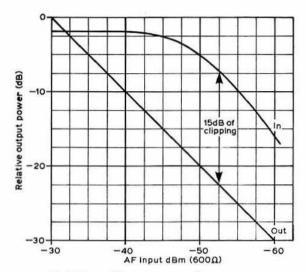


Fig 4. Transmitter processor performance

stability, and they were all found to be better than the manufacturer's specifications, shown in Table 1. No measurements were made of i.f. selectivity because the only practical way of doing this test is with the filter removed from circuit. However, the figures given in Table 1 would appear to be realistic. On testing, the rejection filter produced a rejection of 27dB and a peak of 6dB, both measured on a signal at the centre of the passband.

Transmitter power input and output were measured into

Table 1. Technical details

| - | | | |
|------|--------|--------|--|
| Fron | uency | Fano | |
| | ment 2 | . atti | |

Emission: Power input:

Carrier suppression:
Sideband suppression:
Transmitter frequency
response:
Spurius radiation:
Distortion products:
Frequency stability:

Antenna output impedance : Sensitivity : Image ratio :

I.F. interference: Selectivity:

Audio output:
Output impedance:
Power requirement:
Power consumption:

Size: Weight: 1-8MHz to 28MHz (WWV/JJY—receive only) lsb, usb, cw, a.m., fsk ssb 200W p.e.p. cw 200W a.m., fsk 50W (Slightly lower on 28 and 1-8MHz bands) better than 40dB

better than 50dB

 $\begin{array}{l} 300\text{Hz} - 2,700\text{Hz} - 6d\text{B} \\ \text{less than} - 40d\text{B} \\ \text{better than} - 31d\text{B} \\ \text{less than} 100\text{Hz} \text{ drift in any } 30\text{min} \\ 50\Omega \text{ unbalanced} \\ 0.25\mu\text{V at s:n} 10d\text{B} \\ 1.9 - 21.0\text{MHz}, \text{better than } 60d\text{B} \\ 28\text{MHz}, \text{better than } 50d\text{B} \\ \text{better than} - 70d\text{B} \\ \text{ssb} \, 2.4\text{kHz} \text{ at } - 6d\text{B} \\ 4.0\text{kHz} \text{ at } - 6d\text{B} \\ \text{cw, fsk} \, 0.6 \text{ kHz} \text{ at } - 6d\text{B} \\ \text{cw, fsk} \, 0.6 \text{ kHz} \text{ at } - 6d\text{B} \\ \end{array}$

a.m. 1·2kHz at -60dBa.m. 6kHz at -6dB12kHz at -60dB3W at 10 per cent thd 4Ω dc 13·5V negative earth transmitter (max) 280W (21 A)

receiver 12W (1·1A) 280(w) by 125(h) by 370(d) mm 9kg approximately

Table 2. Output power and spurii measured into 50Ω load

| Test
frequency | | Input C | | fficiency
(%) | Spuril (approximate fre- | | | |
|-------------------|---------|---------|-----|------------------|---|--|--|--|
| | | (W) | (W) | 1707 | to output) | | | |
| | 1.9MHz | 156 | 65 | 41.6 | 3·8MHz -55dB | | | |
| | 3-6MHz | 189 | 81 | 42.8 | 7-2MHz -58dB | | | |
| | 7·2MHz | 176 | 97 | 54-9 | 12·5MHz -50dB, 14·4MHz
-50dB | | | |
| | 14·2MHz | 239 | 100 | 41-8 | 5-6MHz -38dB, 18MHz
-51dB, 28MHz -48dB | | | |
| | 21·2MHz | 189 | 82 | 43 | 14MHz 40dB, 28MHz
35dB | | | |
| | 28-7MHz | 214 | 92 | 46-7 | 19MHz -44dB | | | |
| | | | | | | | | |

a 50Ω load, and a check of any significant spurious outputs was made with a spectrum analyser. The results are shown in Table 2. The power figures are slightly lower than the specification because they were made with a 12·6V supply (typical car battery not under charge), but they are 10-20 per cent higher when the FP301 mains supply is used. The carrier and other sideband were -35dB and -50dB relative to the wanted sideband.

A two-tone audio signal was applied to the microphone socket and a spectrum analyser was used to check the distortion products. At 10W they were -32dB and at 80W they were -25dB relative to each tone. These are both excellent figures for a transistor pa particularly as the test shows up distortion in the microphone amplifier and transmitter modulator. It was impractical to do any tests with mismatched loads because of the powers involved. However, the pa survived with the antenna connector both open and short circuit when operating at 13.5V and maximum drive.

The automatic vswr shut-down circuit made tuning an external atu rather confusing because as the vswr improved the output power started to rise. Consequently the reflected power shown on an external reflectometer remained substantially constant until the perfect match was obtained. It is recommended, therefore, that both forward and reverse powers are monitored simultaneously so that the confusion does not arise.

Audio response with the rf processor switch out is shown in Fig 3. Fig 4 shows the performance of the rf processor, which would appear to give a 15dB improvement in mean output power.

Conclusions

The FT301 was air tested over a period of several months, including contest conditions, and all reports received and comments by operators were entirely complimentary. The reviewer has found that a simple test of the signal handling of a receiver is to see if it will pick out any amateur signals on the 7MHz band after dark. The FT301 passed this test easily with no problems of signal handling experienced, thus bearing out the measurement results.

The transceiver is very compact and, because it has no pa tuning or loading controls, would make an excellent mobile rig. When used with the FT301 power supply, the new features, like the rejection filter and rf processor, would make it an excellent home station. On the other hand, the FT301S, the 10W version, would probably appeal to many vhf/uhf enthusiasts, when used with suitable transverters, or somebody who fancied building their own pa.

swl news

Bob Treacher, BRS32525

A happy New Year!

Following the announcement in December's SWL News that as a result of the increased size of Radio Communication more space had been allocated to swLs, we have pleasure in unveiling the first of a regular monthly feature for the swl fraternity. It will retain its past format, including yearly and all-time heard tables, plus news, views and comments from listeners up and down the country, and news from abroad as and when it is received. Black and white photographs of listeners' shacks are always welcome. Let us hope that this feature continues to prosper-and remember . . . it is your column, so keep your news and views flowing.

1978 countries table

Here we are again at the beginning of a new year. With it comes the customary start of the 1978 hf countries heard table. Over the past few years this has proved a very popular facet of SWL News, with many listeners taking part to see if they can be unofficial top listener of the year. The rules for the 1978 table are exactly the same as in previous years, but for those who are new to the RSGB, I will take this opportunity of setting out the very basic rules. The table relates to the total number of countries (not prefixes) heard on each band from 1 January to 31 December 1978. Simply keep a list by your rig and when a new country is heard add it to the list. Use the RSGB countries list only. Starting total is 100. Let your scribe have the totals for each band, a grand total and an indication of the mode. Initially, a list of equipment in use will be given but this will be omitted after a while as it eats up valuable space. There, in a nutshell, are the rules. The all-time list will also appear at intervals and the starting total for this list is 500.

Noel Phelps is studying for the RAE in May, and if he is successful he cannot foresee working 1.8MHz as his location does not provide enough space for an effective transmitting antenna system. Now that 28MHz is showing signs of remaining open for an indefinite period, it is suggested that a list of 28MHz beacons and their QRGs be published. Noel offers 3B8MS (28,190), 5B4CY (28,220), A9XC (28,242.5), VP9BA (28,235) and N4RD (28,207.5), and he remarks that the last time he heard N4RD, in Florida, it was flashing the recommendation "Use 28 now"! The sector between 28,100 and 28,200MHz is well worth monitoring for cw signals, as Central and South American stations appear to use this portion of the band, particularly to avoid the QRM from the USA in the bottom 100kHz of the band. Best dx this time for Noel—KX6LA on 7,003kHz at 0650.

Dave Brooks, BRS38356, signed on for the RAE course at a college in Loughborough but, apparently because of the lack of interest shown, the course has now been cancelled, much to Dave's annoyance. However, he is now going to try and enter a big score in the next all-time countries list. Dave Lloyd, BRS37790, has just started an RAE course in Bath;

• 392 Rochester Way, Eltham, London SE9 6LH.

his listening activities have been thwarted by a few receiver problems but he hopes to have things back to normal fairly soon.

1978 crystal ball

With the smoothed sunspot numbers for the early part of 1978 around 40, we can hope that as the year proceeds the numbers will rise much higher to give good dx propagation from northern Europe. Conditions during the closing months of 1977 certainly tended to suggest that much better conditions are not far away.

The success of the Jubilee Contest in 1977 has prompted the HF Contests Committee to include a new contest in 1978. It will occupy the period selected for last year's event. Hopefully, a suitable trophy will be requisitioned to give the swis even more incentive to enter their section.

News and comment

At the time of writing this piece, dxpeditions were the main talking point around the bands. George, VE3FXT, was involved in a mini-African expedition visiting TZ, 7P8 and S8 on his way to being the first to activate a new DXCC country, H5. Several American amateurs had been activating Juan Fernandez Is (CE0Z) and a group of PYs had Fernando de Noronha activated.

The 1977 table is not published in this issue but comments have been received as follows. John Holmes, BRS38934, reports hearing his first W6 and his first Eu dx on 1.8MHz in the shape of several DLs. However, 7MHz bc QRM restricts serious listening on that band. John is currently experimenting with G3XAP's sloping antenna.

Finally: please send all comments and news to your scribe at his home QTH to reach him by 26 January for the March issue and by 2 March for the April issue.

obituaries

The Society records with regret the deaths of:

Mr C. Crisp, G3ELJ

Charlie Crisp, who died on 28 October 1977 aged 77, was an ex-Marconi operator 1st Class, and a very keen cw man with friends world-wide.

Mr S. W. Rowden, GM6SR

Sid Rowden died on 27 October 1977 at the age of 89. He was first licensed in 1925 and did much pioneer work on the 5m band before the last war. He was a well-known phone operator on the vhf bands in the Edinburgh area.

Mr T. H. Streeter, G5CM

Tom Streeter died on 22 October 1977 aged 67. He had held a transmitting licence since 1929, and for many years pre-war worked QRP cw dx using a hand generator. He was also active on the 5m band before the war and, although hampered by illness, he latterly enjoyed the 2m band. He was an honorary member of the Chichester Radio Club.

Mr J. Wadman, G2GK

Frank Wadman, who died on 14 November 1977, was one of the Society's oldest members. He was a tounder-member of Torbay ARS in 1946, and in pre-war days of the Thames Valley ARS. He was also a member of RS ARS and RAOTA.

We have also been advised of the deaths of:

Mr T. Almond, G2FST;

Mr L. Fox, G2BDR, on 3 October 1977; Mr P. F. Hughes, G3IZH;

Mr N. L. Stephens, GW8NQ; Mr R. Taylor, W1QCO, of Boston, England, on 21 November 1977.

Starting on Oscar some common problems

by P. J. A. GOWEN, G3IOR*

OF the many hundreds of queries that AMSAT-UK has received in the past three years, the majority fall into a number of specific categories, particularly those from operators seeking advice on operational problems when attempting to hear their signals through the satellite's transponders. When the basic necessities relating to the standards required of the uplink transmitters, the downlink receiver, the nature of the antennas and the tracking of the spacecraft have been dealt with, a few other problems become evident in attempting to maintain effective communications through the satellites over the entirety of those sections of the orbits within range.

Assume that one is in possession of a set of orbits [1] and has the means of converting these to the position and times that Oscar is within range [2], [3], [4], [5], which will be a section of every orbit between equator crossings of 120°W (around 0430 ut) and 38°W (around 2300 ut) for all parts of the UK. Also assume that one possesses the basic equipment necessary, eg a 10W transmitter covering 145-850 to 146-000 MHz, a 29MHz receiver with coverage from 29:400 to 29-550MHz for Oscar 6 and Oscar 7 Mode A operation, and/or a transmitter of some 10W covering 432-125 to 432·175MHz with a receiver in the 145·925 to 145·975MHz spectrum for Mode B operation [6]. Ideally, one also has beam antennas at all frequency ranges, with both azimuth and elevation command, although this is not necessary for most of the time. However, the chances are that the amateur is either an hf operator with good antennas for 29MHz but a simple array on 145MHz, or a vhf enthusiast with excellent antennas on the 145MHz and 432MHz bands, but with a hastily erected dipole for 28MHz coverage of the downlink. Whatever the case, one is still in a position to make good use of the satellites, on the proviso that the basic needs are observed and the fundamental requirements put together.

Over 70 per cent of the problems that have been encountered by beginners on the Oscar 7 "A" or Oscar 6 "2 to 10" modes can be attributed to deficiencies in the receiving system. Users should realize that while they are putting several watts from a high-gain antenna to a good receiver in the satellite, in a relatively noise-free environment, Oscar is putting very few watts from a simple dipole back to them through attenuating ionospheric layers to a receiving system which also captures lots of man-made electrical noise. On Mode B this is not really a problem as the average user will have a high-gain receiving antenna, many wavelengths high, with many decibels of gain in the direction of the satellite

• 17 Heath Crescent, Hellesdon, Norwich, Norfolk.

and considerable attenuation to the surrounding noise off the main lobe, all going into a high-gain and low-noise converter. This is not the case on the "2 to 10" modes, as not only is the antenna much lower in gain, and lower in its effective height above ground in terms of wavelengths, but the signal is also being captured by an inferior receiver. The average 28MHz receiver has a poor signal: noise ratio, and even good receivers are rarely successful in the 29-5MHz portion.

Peaking and tuning the mixer and rf stages of a receiver at 29-5MHz will help to a large degree but, ideally, a converter or preamplifier is necessary for effective reception [7], [8]. A gain of some 25dB with a noise factor below 2-5dB should be aimed at, and a simple mosfet will improve reception beyond belief! Many people have reported a radical improvement resulting from this simple step—to quote one recent letter: "Until I added a preamp I had heard only five stations on Oscar in three months but tonight I heard 27 in 15 minutes, including my own for the first time!"

A further problem with the true beginner is the 29MHz antenna, limiting the downlink observation. The average vhf user probably has a long Yagi, possibly without elevation, for the 145MHz uplink, and has a very effective path to the satellite at low angles, eg when the spacecraft is at the horizon and up to some 15° elevation. When the path to the Oscar is above this the lobes are minimized and the input signal will reduce with elevation. If a station is merely employing a low simple dipole for downlink reception, the downlink on 29·5MHz will not be heard until the spacecraft is at an elevation of some 20-25°, due to the low-angle limitations of the receiving antenna.

Thus, neither the station's nor other signals will be heard from Oscar when accessing it. However Oscar will be heard when the station is not providing sufficient uplink power to

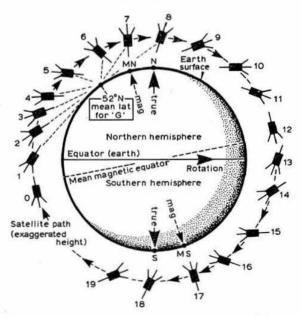


Fig 1. Representation of Oscar orbit showing position of antennas relative to earth

activate it, giving the erroneous impression of insufficient uplink power. This is obviously not the case, as many QSOs have been made using less than 100mW erp, and signals of 10W erp (1W of power to a beam of 10dB gain) are quite easy to copy when the satellite is not overloaded by stations who are attempting to use higher powers to overcome their receiving limitations!

There are two ways out of this apparent dilemma. If one is restricted to a high-angle receiving antenna such as a low dipole or turnstile, the answer is to utilize a similar uplink antenna, such as a turnstile for 144MHz mounted above a wire netting mesh, to give an optimum signal into Oscar which can be heard at the same time by the receiving system when the satellite is at high angles. Such a system, limited to the higher elevations, will inhibit the maximum dx potential of Oscar, but will give adequate OSOs up to a range of over 3,000 miles ground-range distance. The second method is to erect a receiving antenna that will couple with the satellite when it is close to the horizon at maximum range, and try to effect some gain at the same time. HF stations may already be equipped with beams or quads to effect this, but vhf stations may need to put effort into this area. If large beams are not possible, even ground planes and sloping dipoles will be of considerable value and enable the user to access the low-angle lobes.

Ideally, an Oscar station will have steerable beams in azimuth and elevation, for both uplinks and downlinks, with cross-polarization as well. But this is something to work towards and not vital to run-of-the-mill Oscar communication. Suitable references to further reading on the important matter of antennas can be found under [9], [10] and [11].

When the first step has been overcome, the next problem usually encountered is the difficulty of access when heavy loading from the many high-powered European users depresses the satellite's alc system. Then the only passes to be used with any degree of success are those either during quiet daytime orbits, when the satellite is out of range of the high-powered users, or when an unexpected mode switch has occurred without their knowledge. There is no answer to this other than constant and repetitive education of those who create the high power which extinguishes the signal. It has been said so many times before that if everyone ran 10W erp, let alone the 80-100W erp maximum, everybody would have perfect communication—but a single station running 10kW erp (and many can be back-calculated as exceeding even this ridiculous power) takes more power from a fixed alc-controlled power budget than a thousand of the QRP stations, and leaves them with virtually nothing.

Following the stabilization of Oscar 7, soon after launch, another communication problem became evident. This was termed "the weak in the south phenomenon" ("Weak in the north" for Australasia). Early work by AMSAT-UK members showed that the problem was due to the permalloy magnets in Oscar 7 being in line on the long-axis with the 29MHz downlink dipole, thus, apparently, giving an "end-on" effect when Oscar 7 was coming up from the south-west on near overhead orbits, producing minimum coupling to the receiving antenna on 29·5MHz regardless of its polarization [12]. Later work confirmed this effect, which was also affecting other areas under similar relative pole positions [13], [14]. Oscar 6 did not suffer from this, as its 29MHz downlink dipole was at 90° to its permalloy magnets—although deep fades occur for short periods during a pass, they are not

sustained and related to the near overhead passes on one complete half of the orbit as they are on Oscar 7.

Fig 1 shows the relative positioning of the satellite to the earth during the course of a complete orbit. The magnets, hence the 29MHz dipole, will always point to the earth's magnetic poles and, with the dip angle of earth's magnetic field taken into account, will produce an end-on dipole effect to stations in line with the satellite path and the pole at latitudes of 40° to 55° north and south, producing a weak-in-the-south or weak-in-the-north effect respectively.

Although the 145MHz uplink is accessing the satellite perfectly, neither the associated downlink nor the beacon, nor indeed any other station, can be heard satisfactorily until the satellite has passed from overhead to the north (or to the south in the case of southern hemisphere stations). Stations to the south of the spacecraft can hear both themselves and the European stations with ease and, often, initially think that there must be a dire shortage of good receivers, antennas or ears in the northern latitudes. At the same time, stations to the east and west of the path can hear the satellite quite well, as the 28MHz dipole is side-on to them. To the affected stations, once Oscar has passed the overhead point, the antenna is progressively seen more on the flat, and the signal continues to improve until it disappears below the user's horizon. Remember that Oscar tends to be pointing vertically down at the far NNW horizon over the magnetic pole zone and, hence, horizontally-polarized beams will be at a disadvantage to vertically-polarized antennas, but a simple vertical dipole, reserved for working the Ws, VEs, KL7s and others at the far horizons on evening orbits, will produce a considerable advantage.

As shown in Fig 1, the satellite comes "into view" at (1), but its dipole antenna is "end-on" to the observer at 50-55°N (England). As the satellite rises, the dip angle of the field ensures that this position relative to the UK stations is maintained, through (2), (3), (4) and (5). Once overhead (6) the dipole is beginning to be seen more off the side and signal strengths will improve through (7) and (8) until los occurs at the far horizon. A similar effect is to be found on orbits coming up from the north in Australia where (13), (14) and (15) are end-on couplings, and signals rise as the satellite passes overhead to the south at (16).

The only conditions under which this can change will be if a severe magnetic disturbance occurs, when both the dipangle of the earth's field will change and the stability of the

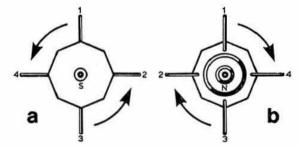


Fig 2. Oscar 7 as seen from axis, with canted turnstile, and with 28MHz downlink linear dipole end on (minimum coupling). End view, arriving and leaving with observer in line. (a) As seen for upcoming overhead orbits in northern hemisphere at 45-55° N. (b) As seen in southern hemisphere on descending overhead orbits at aos up to tca at 45-55° C.

satellite is disturbed, producing a change in the gyroscope rotation of Oscar 7 as well [15]. The effect, of signals markedly stronger in the south from the UK coupled with scintillation at the auroral zone, will indicate the likelihood of an imminent Dellinger fade-out followed by an aurora [16].

One further problem is likely to be encountered, that of cross-polarization fade-out. The earlier Oscars, and Oscar 6, employed monopole or dipole antennas. With a plane-polarized antenna for the downlink, regular roll-pattern fade-outs could be expected [17], and even if the plane of the user's antenna was parallel to that of the Oscar antenna, this would still occur due to Faraday rotation caused by the passage of the signal through the E and F layers of the ionosphere. Users were encouraged to employ crossed-polarized or circularly-polarized antennas if possible, where all but end-on antenna couplings could produce a signal path [12], [13], [14].

Oscar 7, on the other hand, although still using a dipole for the 29MHz downlink, employs a canted turnstile for both uplink and downlink on Mode B (432:145MHz) and for the 145MHz Mode A uplink and the 435·1MHz beacon. By this means much of the loss of signal during rotation and changes of attitude to the user has been overcome, and even stations with plane-polarized antennas experience considerable freedom from the QSB periods compared with Oscar 6.

Prior to the launch of Oscar 7 AMSAT published a table of recommendations for the aspect of circular polarization for the satellite, in order to make maximum use of the new facility and to ensure that users with circular polarizations were not using the incorrect thread, eg lhcp when the requirement was rhcp, and vice-versa. (This can cause a loss of up to -35dB.) The recommendations are as follows:

System

2-10 uplink 2-10 downlink 70-2 uplink 70-2 downlink 435·1MHz beacon 2,304·1MHz beacon Polarization in N hemisphere Left-hand circular Linear Right-hand circular Right-hand circular Left-hand circular

Right-hand circular

Polarization in S hemisphere Right-hand circular Linear Left-hand circular Left-hand circular Right-hand circular

Antenna shielded from

The last system gives the clue as to the actual orientation of the satellite within the earth's field, as the quadrofiliar antenna for the 2,304MHz beacon is on the "top" of the satellite, eg the opposite end from the turnstile sloped toward the "lower" \(\lambda/4\) of the 28MHz dipole. Thus, when Oscar 7 approaches from the SSE, the canted turnstile is sloping away and pure axial left-hand circular polarization is obtained. Fig 1 shows that this will be maintained up to the highest point of the orbit, after which the turnstile is seen progressively more side-on, approaching north. Unfortunately, as already pointed out, the part of the orbit best suited for circular polarization is also the worst part for downlink audibility, hence the user will not be aware that he is effecting good input on Mode A "2-10".

With orbits to the west and east, the satellite is oriented with the side of the turnstile facing the user's antenna and, with the 29MHz dipole side-on, giving the best signal downlink, mainly horizontal, until it approaches vertical as the satellite nears the auroral zone in the north. The uplink path now has either a plane vertical or horizontal preference, dictated partly by Faraday rotation produced by the signal

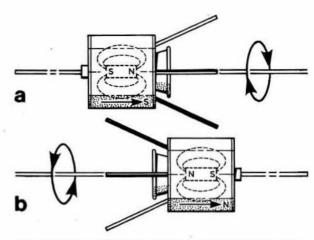


Fig 3. Oscar 7, showing opposite aspects of internal permalloy magnets positions relative to the antenna positions and direction of rotation and field

passing through the ionospheric layers, and by the preference of the particular attitude of the canted turnstile toward the user's antenna.

Past evidence has shown that there is invariably a plane polarization optimum for Oscar 7 [18], [19], although not as marked as Oscar 6 with its single monopole antenna [17].

As the four tape-antennas forming the canted turnstile are black on one side and bright on the other, the spacecraft rotates about its long axis due to the pressure of light, normally at a rate of about one complete revolution every few minutes, although this will slow down in times of severe geo-magnetic storms to spin up again to the former rate once the disturbance is over [15]. This roll pattern, coupled with the attitude of the satellite to the observer and the Faraday rotation, adds up to polarization preferences, and the user is recommended to be prepared to switch to alternatives according to the format dictated. With the helix, dual circular polarization is impossible but, with a pair wound in opposite directions, alternatives may be switched in. With cross-polarized Yagis, such as the nX/Y range, a simple switching is possible to give horizontal or vertical, rhcp or lhcp, or, with a slightly more complex arrangement, all four forms [20].

On Mode B the canted turnstile is used for both uplink and downlink, both having the same polarization preference in phase. As with the Mode A uplink, on overhead ascending orbits the canted turnstile will be seen at the axis, giving rhcp until the satellite is overhead and then changing to a linear preference on a roll pattern, to become slightly more inclined to lhcp just before los. Descending orbits, although not seen quite on axis as the magnetic pole is not now in line, will be seen on high-angle pass aos as with a marginal linear preference, subtending to a marginal rhcp when the satellite has passed overhead towards SSW. Most passes to the side of the station at maximum elevations of up to 30° will invariably show a display roll of vertical to horizontal maxima.

Conclusion

Although circularly-polarized antennas will produce an enhanced degree of freedom from the worst fade-outs, they are sharing their power over all vectors, and can be -3dB down

on the optimum plane polarization at any one time, according to the preference dictated by the position, attitude and roll of the satellite. However, a reversal of circular polarization can produce far greater loss. An ideal station should possess fine tracking, with sufficient elements to give 80-100W erp, polarization selection of vertical, horizontal, rhcp, and lhcp, and antenna elevation capability. With this, it should be possible theoretically to access the satellite for an orbit's entirety, except for those periods when a needed linear element on the spacecraft is end-on. (For this one would need an antenna that can see round corners, and this has yet to be developed!) On the other hand, one can do pretty well with simple fixed turnstiles most of the time [11].

The Phase 3 satellite will probably be equipped with a pair of elements acting as a two-element beam on each corner of the tri-star configuration, eg three two-element beams, each at 120°, giving over 10dB of gain, plus a quadrofiliar. Both these antennas will give strategic advantages for circular polarization and should be seen at the axis for virtually all the orbit time. The quadrofiliar will give a gain of some 5dB smooth out off-axis to 0dB while maintaining its circular polarization. So, it looks as if circular polarization is here to stay for some time yet!

References and bibliography

[1] Orbits for the spacecraft are available from GB2RS bulletins, the BARTG rtty bulletin, Ceefax, Oracle, Viewdata, and the AMSAT-UK nets on 3-780MHz at 1015am and 144-280MHz 7.30pm on Sundays, and on 14-280MHz at 1000ut on Saturdays and 1730ut on Sundays. The AMSAT Orbital Calendar is available from W6PAJ or via G3AAJ for \$5 or £3 with large foolscap sase, or at a reduced rate of \$2.50 or £1.50 for AMSAT members (free to life members).

[2] "Keeping Track of Oscar" by Bill Browning, G2AOX. A booklet of articles from Radio Communication, available from the editor on receipt of an sase, size 7½ by 10in minimum. [3] "Oscar look-up table for the UK" by A. L. Bailey, G3WPO, Radio Communication March 1973. Available as an AMSAT-UK photocopy from the librarian, G8K ME, for 6p plus sase.

[4] A satellite plotter designed specifically for your location, giving real time positioning, azimuth and elevation angle,

accurate aos and los times and range limits, is available for \$6 (plus \$1 for overlay) from W2GFF, QTHR. This comes ready for use with complete instructions, and is highly recommended. [5] An "Oscarlator" is available to UK enthusiasts from ARRL for \$2. It gives sufficient accuracy for all but the most detailed work.

[6] The Oscar 7 satellite normally operates on a daily changing basis of 145-29MHz and 432-145MHz operation. Note that future satellites will employ the 435-438MHz section of the band to conform to the space allocated to the amateur satellite service. [7] The circuit of a suitable preamplifier for 29-5MHz using a single mosfet, by G3HAZ, is shown in *Radio Communication*, October 1977.

[8] A commercially made model using a vhf fet followed by two bipolars is available as a board construction for £6.30 inc p&p, or £8.80 boxed and switched (less 15 per cent discount to AMSAT members), from Hamgear Electronics, 2 Cromwell Road, Norwich NR7 8XH.

[9] Oscar News No 11, p16. Az-el system at G3IOR, photograph. [10] Oscar News No 3, pp4-6. Oscar elevation graph, az-el system, and sloping dipoles.

[11] Oscar News No 1, p3. Crossed dipoles for uplink and downlink, and coaxial vertical for the 144-28MHz downlink.

[12] Oscar News No 12, pp15,16,17. The Oscar 7 weak-in-the-south phenomenon.

[13] AMSAT Newsletter Vol 7 No. 1, June 1976. Letter from VK5ZAD.

[14] AMSAT Newsletter Vol 7 No 2, September 1976. Letter from G3IOR.

[15] CQ-DL No 2, 1976. "Oscar 7—Auswertung der Teletype-Telemetrie", pp36-39. DL3SK.

[16] Oscar News No 12, p6; No 15, p3; also AMSAT Newsletter Vol 8 No 1, March 1976, part of G31OR letter.

[17] Oscar News No 8, December 1974, pp6,7. Graphed roll-patterns by G3IOR and G3PEJ.

[18] Oscar News No 11, June 1975, p15. Graphed roll-patterns by G3IOR.

[19] Oscar News No 12, September 1975, p18. Polarization roll graph by G3IOR.

[20] Oscar News No 5, July 1974, pp8,9,10,11. "Antennas for Oscar" by G3IOR.

Photocopies of past issues of Oscar News can be obtained for 3p per page (three pages for one IRC) from the AMSAT-UK librarian, G8KME, QTHR.

The presentation of the COM-SAT ground terminal station to Scouts at Washington. Left to right: Irving J. Feist, chairman, World Scout Committee; Len Jarrett, HB9AMS, director of administration, World Scout Bureau; F. Battle, vice-president, COMSAT; standing behind is Perry Klein, W3PK, president of AMSAT. The operator is Joe Kasser, G3ZCZ/W3, of the COMSAT technical staff and editor of the AMSAT Newsletter



technical topics

Pat Hawker, G3VA

N article which came my way recently argued plausibly A Narticle which came in the state of the that modern research engineers cannot usefully refer to the events of the past because they are working in successively new worlds and are faced with decisions that have no worthwhile equivalents in history. Uumph, personally I could not disagree more. I believe that anyone interested in developing new equipment can and does benefit enormously by studying ideas that surfaced originally 30, 40, 50, 60 or more years ago-but looking at them afresh in the light of current materials, semiconductors, etc. Really original discoveries are few and far between; but many promising ideas come before their time and stay buried and frustrated in the pages of old journals, until at last suddenly everything clicks into place. Transistor-like amplification was reported more than 20 years before Shockley et al; magnetic recording was outlined by Poulsen in the 1890s; ssb used by Carson in 1915; stereo records made by Blumlein in the late 'twenties; synchronous space satellites proposed for communications by Arthur Clarke in 1945; digital pcm patented by Alec Reeves in the 'thirties . . . and so on, and so on. Of course this is not to belittle, in any way, those engineers who finally produced the hardware for these "historic" ideas, but to remind us that much that is worthwhile may still await final development. It is no coincidence that this TT includes items on ideas that date from 1922, from 1927, from 1945 and from 1959 and yet (I hope) cannot be described as "old hat".

Sweepers, creepers and sporadic-E

Professor Martin Harrison, G3USF, recently set me on the track of a strange propagation phenomenon that was first reported some 20 years ago, yet has apparently remained virtually uninvestigated until some recent study at the University of Calcutta (aided by a number of amateur observers including VU2KX and VU2SA). There is already some reason to believe that this phenomenon is almost certainly connected with the sun, may be associated with the beginning of the still little understood sporadic-E openings, and could thus be of practical use as well as scientific interest in predicting such openings.

The phenomenon consists of a form of "atmospherics" that sweep rapidly (or sometimes much more slowly) through a band of frequencies. They are heard most often between 23 and 28MHz but on occasions as low as 2MHz and as high as 150MHz. They were given the name "sweepers" by two Americans in 1958: see, for example, N. C. Gerson and W. H. Gossard, J Atmos Terr Phys, 17, 1959, pp 82-4. They had discovered that many "atmospherics" of a form categorized by listeners as "clicks, tweeks, hisses and swishes" are not just a single "crash" but sweep through a finite frequency band, mostly shifting from high to low frequency, although exceptionally from low to high. This discovery was made at Palo Alto, California, and the sweepers were studied by using a combination of 60 rf comb filters, each

having a bandwidth of about 8kHz, allowing a receiver to look simultaneously, but separately, at about 0.5MHz bandwidth. They noted a considerable variation in the rates at which the "signals" sweep through the spectrum. Their 1959 paper speculated that the sun was in some way connected with these sweepers and noted that "many give the impression of being Type 1 or Type 111 solar bursts".

But this strange discovery, comparable in some ways to the vlf phenomenon of "whistlers", seems to have attracted little attention. The only other published report appears to be of observations made in Calcutta and New Delhi from December 1974 to February 1975 and described in: "Sweeper activity in the hf and vhf bands in relation to magnetospheric phenomena" by A. K. Sen and S. K. Trehan (J Inst Electron & Telecommun Eng (India), Vol 23, No 1, January 1977, pp19-21). This paper again notes that these atmospherics or "interference" are in the form of a radio signal sweeping from high to low frequencies or sometimes in the reverse order; but it also notes that the signal is modulated in amplitude by repetitive pulse waveforms, and that it may originate in the exosphere (ie beyond the F2 layer between around 400 to 1,000 miles above the earth). The Indian observers have found sweepers as high as 150MHz but seldom below 20-25MHz. At midday as many as 5 to 20 sweepers per minute have been heard; the number increasing with receiver sensitivity, indicating that many are weak signals although their strength tends to increase rapidly during the sweep. The observers' technique was apparently to use two conventional narrow-band communication receivers tuned from 1 to 4MHz apart (typically representing up to 1 or 2s difference in receiving the same sweeper).

Since it is well known that sporadic-E conditions occur far more often in India than the UK (in India they are almost a daily phenomenon I believe) it seems possible that considerably fewer sweepers are likely to be heard in the UK than in India and rather less than in northern California. However G3USF (before seeing either the Indian or American papers except in abstract) reported sweepers in the following terms:

"Over the years I have often observed a curious phenomenon at 28MHz. Quite a number of other operators have asked me what it is, and one has told me that he has also heard it at 144MHz. It may occur below 28MHz but on that I have no information.

"It takes the form of a noise rather like a rough, highly unstable oscillator running quite quickly up and down the band. It is not an rf heater. Indeed, I do not think it has an rf origin. The geographical spread of the stations reporting it indicates that it is neither local nor regional in its origin.

"In my own experience this phenomenon is almost always, if not invariably, associated with the beginning of a sporadic-E opening, though it is not encountered with all Es openings. It is accompanied by a particularly high level of atmospherics. I have come to think that it may be in some way related to the mechanism of Es formation which has yet to be conclusively elucidated, but this is only speculation and I have not heard of a fully informed explanation.

"I was reminded of all this by coming across an abstract (of the Indian paper). I know about whistlers of course but I have never heard of sweepers, but it occurs to me that this is what I may have been hearing . . ."

Having now seen the earlier papers, I have little doubt that G3USF's "unstable oscillator" is a form of sweeper, though, since they have presumably been heard on only one receiver at a time, it occurs to me that perhaps these are only the slower moving sweepers (ie what might be called creepers) and that investigation might show that many of the accompanying atmospherics that G3USF reports are also sweepers.

It may be remembered that the very first suggestion that the 28MHz hiss phenomenon was caused by radiation from the sun appeared in this journal as the result of observations by Dennis Heightman, G6DH, in 1936—one of the key discoveries in the history of radioastronomy. It may seem strange that frequent sweepers have received so little attention for so many years. Of course they may prove just a source of unwanted noise and interference, but fairly clearly from G3USF's observations they could prove an extremely important clue to unravelling the mechanism of sporadic-E.

Gain of Yagi arrays

It is well known that many amateurs nourish an exaggerated view of the forward power gain they achieve with multielement Yagi arrays on hf, vhf and uhf. This optimism is partly because it is much easier to achieve (and measure) high front-to-back ratios than forward power gain. In general terms, G6XN has shown how difficult it is to realize much more than 6dB from a single hf Yagi. The "antenna gain contests" popular in the USA and New Zealand suggest that 16-17dB represents very good going on 432MHz, which is probably the amateur band on which the highest gains are likely to be achieved with Yagi arrays. Above 1GHz, where very many elements can be used without the array becoming too massive, it seems to be extremely difficult to realize very high gains, even by carefully duplicating a "proven" design, and the parabolic reflector tends to reign supreme.

At the heart of the problem are the many variables that affect the gain of a Yagi array: element lengths, rod diameters, element spacing, etc. Despite the 50-year history of the Yagi, one suspects that the vast majority of the more successful designs continue to be based as much on pragmatic "trial and error" as upon precise design formulas.

However, a recent publication of the US Department of Commerce and National Bureau of Standards (Yagi Antenna Design by Peter P. Viezbicke) provides very detailed information in about 20 or so pages, based on experimental measurements made on 400MHz at a model antenna range while optimizing designs. The information, presented largely in graphical form, shows very vividly the effect of different antenna parameters on realizable gain. For example, it shows the extra gain that can be achieved by optimizing the lengths of the different directors, rather than making them all of uniform length; it also shows just what extra gain can be achieved by stacking two elements, or from a two-over-two array. In fact it shows: (a) the effect of reflector spacing on the gain of a dipole; (b) effect of different equal-length directors, their spacing and number on realizable gain; (c) effect of different diameters and lengths of directors on realizable gain; (d) effect of the size of a supporting boom on the optimum length of parasitic elements; (e) effect of spacing and stacking of antennas on gain; (f) measured radiation patterns of different Yagi configurations.

In very general terms, the highest gain reported for a single boom structure is 14.2dB for a 15-element array $(4.2\lambda \text{ long})$, reflector spaced at 0.2λ , 13 graduated directors): see Table 1. When stacking two arrays, the author shows that the extra achievable gain is reduced at close spacing due to high

Table 1 — Optimized lengths of parasitic elements for Yagi antennas of six different lengths

| | Lengt | h of Yag | i in way | velengti | 15 | |
|-------------------------|----------|-----------|-------------|----------|---------|-------|
| | 0.4 | 0.8 | 1.20 | 2.2 | 3.2 | 4.2 |
| Length of | | | | | | |
| reflector (A) | 0.482 | 0.482 | 0.482 | 0.482 | 0.482 | 0.475 |
| Length of directors (A) | | | | 242,044 | | |
| 1st | 0.424 | 0.428 | 0.428 | 0.432 | 0.428 | 0.424 |
| 2nd | | 0.424 | 0.420 | 0.415 | 0.420 | 0.424 |
| 3rd | - | 0.428 | 0.420 | 0.407 | 0.407 | 0.420 |
| 4th | - | | 0.428 | 0.398 | 0.398 | 0.407 |
| 5th | - | _ | - | 0.390 | 0.394 | 0.403 |
| 6th | - | _ | _ | 0.390 | 0.390 | 0.398 |
| 7th | - | | - | 0.390 | 0.386 | 0.394 |
| 8th | - | - | - | 0.390 | 0.386 | 0.390 |
| 9th | - | _ | - | 0.398 | 0.386 | 0.390 |
| 10th | | _ | _ | 0.407 | 0.386 | 0.390 |
| 11th | _ | _ | _ | - | 0.386 | 0.390 |
| 12th | | - | _ | _ | 0.386 | 0.390 |
| 13th | | _ | _ | | 0.386 | 0.390 |
| 14th | | _ | | _ | 0-386 | |
| 15th | 27,63 | _ | _ | _ | 0-386 | _ |
| Spacing (dir- | | | 7.7 | | 0545550 | |
| ectors) in A | 0.20 | 0.20 | 0.25 | 0.20 | 0.20 | 0.308 |
| Gain (ref dipo | le) | | (A) (A) (A) | 2647731 | 70773 | 2000 |
| in dB | 7-1 | 9.2 | 10.2 | 12:25 | 13-4 | 14.2 |
| Element diamet | er 0.008 | 5A. Refle | | | | |

element. Measurements at 400MHz.

(Due to P. P. Viezbicke)

mutual impedance effects: with two 7-element arrays a maximum of about 2.5 dB can be achieved with 1.6λ spacing; with two 15-element arrays it was also possible to achieve the extra 2.5 dB but the spacing needed to be 2λ . The use of four arrays, in correctly phased two-over-two systems, can increase the realizable gain by about 5.2 dB (one using 7-element units yielded a gain of 14.2 dB; one with 15-element optimized units achieved 19.6 dB, the highest gain measured during these experiments).

Since one British uhf tv antenna (Antiference XG21), consisting of a single-boom, multi-structure array, claims 21dB gain on Band 5, it is interesting to speculate what could be achieved with a two-over-two stack of these: possibly 25dB or so, which would be a truly remarkable figure for Yagi-type structures. Similarly it would be very interesting to know the maximum gain that might be achieved in practice by using a 432MHz rhombic. On 1·3GHz some 25dB has been realized in antenna contests using a homemade 7ft diameter dish.

My thanks to an IBA colleague, Paul Gardiner, a tv/dx enthusiast, for bringing this illuminating NBS report to my notice. It certainly provides useful design information as well as food for thought.

Up-date on a.m. and dsbsc reception

On a number of occasions, particularly when discussing direct-conversion receivers, I have tended to fall into the customary trap of suggesting that a synchronous (product) detector cannot be used satisfactorily to receive a.m. or dsbsc signals unless either (1) one sideband (and a.m. carrier) is filtered out in the receiver (losing the potential advantage of having two sidebands); or (2) there is accurate phase coherence of the injected carrier (requiring a phase-locked oscillator).

Actually, as anyone with a modern communication receiver (whether direct-conversion or superhet) can readily prove for themselves, it is quite possible to receive a.m.

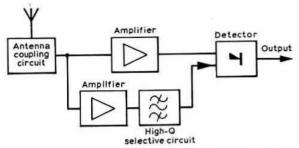


Fig 1. Robinson's original (1922) carrier-reinforcement proposals

and dsbsc signals with free-running LC oscillators provided these are of good stability. Similarly, you can receive dsbsc transmissions on an ordinary envelope detector plus bfo, even though many articles and books have told you the opposite. In both cases just tune the bfo or signal to zero beat.

The secret of this apparent flying in the face of theory lies in the neglected "exalted carrier detection" technique which, in effect, gives you a form of phase-coherent synchronous detection without phase locking the oscillator. Exalted carrier detection is applicable also to nbfm.

There is of course nothing new about exalted carrier demodulation, although it is possible that only recently have LC oscillators without any form of afc become stable enough to make the system attractive. In his history of homodyne and synchrodyne reception, Professor D. G. Tucker (Journal of Brit IRE, April 1954) notes that the advantages of carriereinforcement were appreciated even earlier than the first announcement of the homodyne: in March 1922, E. Y. Robinson applied for a patent for a system in which the carrier of the incoming (a.m.) signal is filtered out in a path separate from the main signal path and amplified in a high-Q regenerative tuned amplifier before being recombined with the original input signal which has been amplified in a less selective (low-Q) tuned amplifier: Fig 1.

A detailed article "Exalted-carrier amplitude- and phasemodulation reception" by Murray G. Crosby (Proc IRE, September 1945, pp581-589 plus appendices) shows how such techniques were applied (Fig 2) to the long-distance hf commercial point-to-point circuits operated by RCA, including those with diversity facilities for which they were claimed to be particularly effective. The paper highlighted the advantages of exalted carrier demodulation in reducing the destructive effects of selective fading on double sideband systems and provided "the equivalent of an increase in the selectivity of the receiver".

Readers may need to be reminded that the communication effectiveness of dsbsc is potentially greater than that of ssb and it is a fallacy to believe that because an ssb signal takes up less bandwidth you can pack more ssb than dsbsc stations into an unchannelized amateur band (J. P. Costas "Poisson, Shannon and the Radio Amateur" Proc IRE, December 1959). Several items in Wireless World, eg letter in December 1977 issue, have emphasized that one can effectively use two mirror-imaged sidebands to reject adjacent channel interference, though nobody wants to know.

Using exalted-carrier techniques

I was reminded of exalted-carrier detection by an article by Phil Howell, ZL3RH ("Reception of dsbsc transmission" *Break-in*, July 1977) who was kind enough to note a piece I wrote in *Wireless World* (October 1976) to try to persuade the Home Office to reconsider the ban they had then imposed on the use of dsbsc (as indeed they did and under the current licence anyone can use dsbsc on any band).

ZL3RH notes that the idea that dsbsc cannot be satisfactorily received on a conventional a.m. receiver with adequate bfo "is simply a fallacy which arose in the past from consideration of an over-simplified mathematical model". He continues: "It is true that if a transmitter is deeply modulated with a sustained pure tone, and the carrier is subsequently suppressed, then, if it is not restored at the receiver with phase coherence, periodic demodulation, distortion and frequency modulation occur. However, in practice, because the rapid and quasi-random phase shifts in a speech waveform does not continue long enough, these evil effects will not occur. Furthermore, re-introduction of a carrier at a much greater amplitude than it originally possessed lessens still more the tendency to these effects."

ZL3RH explains that a simple test is to use a stable vfo at signal frequency (eg LM or BC221 frequency meter). "Tune in a weak, preferably distant and noisy a.m. signal

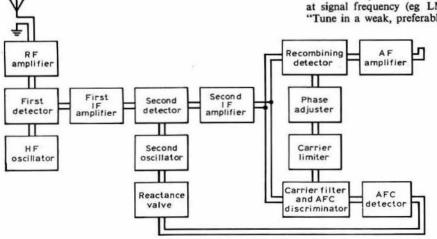


Fig 2. HF receiver described by Crosby (1945) for exalted carrier reception of a.m. and phasemodulated signals using afc and phase adjustment techniques

which you would rate as having a readability of 3 or 4. Turn on the tunable oscillator and set it to zero beat with the carrier; increase the oscillator output (or increase the coupling between it and the receiver) until age action reduces the audio volume by several S-points; then finally wind-up the audio gain to restore the level of the signal," he writes. It will then be found that the phenomenon of detector capture suppresses the weak, fading incoming carrier and the sidebands now beat with the crisp, locally-generated carrier. Provided it really is zero beat, the detected signal should sound crisper and cleaner, with significantly better signal-to-noise ratio.

ZL3RH describes how a.m. signals received in this way are often boosted from QSA2-3 to QSA4-5, a very worthwhile improvement; but he adds an important word of warning: "Remember you are not going to be able to improve a signal which is already QSA5 by tricks of this sort."

It was perhaps this lack of immediately obvious improvement on other than very weak signals or those distorted and impaired by selective fading that resulted in relatively little interest in developing further the Badessa reciprocating detector (ART5, TT June 1972). This detector synthesized a coherent reference carrier from the incoming signal: it was described as "a superb weak-signal demodulator for dsb/ssb/a.m./cw". There was no bfo, and the system represented a practical application of carrier-reinforcement techniques.

Similarly, little work appears to have been done in exploiting the use of exalted-carrier techniques for the demodulation of phase-modulated nbfm signals; though such an approach was shown to be possible, in the 1945 paper by Crosby, if the phase of the reference signal is changed by 90° or 270°.

Several readers have pointed out in the past that one can receive a stable nbfm transmission on a receiver designed for ssb reception by treating the signal as though it were an ssb transmission.

ZL3RH ends his article by suggesting that there is room for a programme of serious investigation in this field. Like many others he seems to have stumbled on to the phenomenon of detector capture more or less by accident. Indeed I remember my own interest being aroused over 40 years ago by noting that with care I could receive a.m. phone on an 0-v-1 receiver rather better with the detector oscillating than with the regeneration set just below threshold (fortunately I had few neighbouring swLs!).

It is widely recognized today that there are significant advantages in using synchronous demodulation, but little attention seems to have been given to its simplest form with exalted carrier, or its use for nbfm, or the recognition that two sidebands are often better than one and that dsbsc is not just an intermediate step between a.m. and ssb but a system that offers much to the amateur experimenter!

Direct conversion with MD108

Dick Rollema, PAOSE, in *Ham Radio* (November 1977) describes in detail a five-band direct-conversion receiver and adds, for good measure, some interesting ideas on design philosophy for dc receivers. For instance, he rejects the two-phase demodulator even though it provides a single-sideband solution, on the ground that "this entirely spoils the main attraction—simplicity—of the dc receiver".

He also rejects the commonly used mosfet demodulator on the grounds that its quadratic characteristic also produces

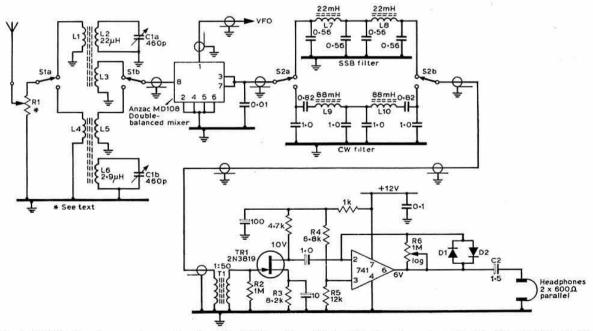


Fig 3. PAOSE's direct-conversion receiver for 1·8 to 21MHz with multiple-vfo/buffer stages (not shown). Pin numbers on 741 refer to round (TO-5) package. R3 is selected for dc drain voltage on TR1 of 10V. R1 is typically carbon pot of about 500Ω. The signal-tuned circuits can be wound on ferrite or, preferably, powdered-iron toroids, L2 covering 1·8 and 3·5MHz, L6 covering 7-21MHz. A simpler vfo might be based on a band-switched Franklin oscillator (*TT* November 1977). PAOSE's receiver is fully described in *Ham Radio* (November 1977)

detection of a.m. signals (surprisingly he rejects exalted-carrier detection of a.m. as not an elegant solution). He similarly finds excessive a.m. detection when using the SL640 type of balanced mixer. His preferred solution (Fig. 3) is to use the Anzac MD108 double-balanced Schottky diode ring mixer which he finds far more sensitive than the homebrew balanced mixers he has tried. He notes that the MD108, although specified for 5-500MHz, will perform well on 1.8 and 3.5MHz. The MD108 and some other packaged mixers may seem a rather expensive approach for a low-cost receiver but the figures given by PA0SE do seem to justify their use, as it provides good sensitivity without any rf stage: it is only on 28MHz and possibly 21MHz that an rf stage would give any worthwhile improvement, assuming that a good receiving antenna is used.

PAOSE departs from "simplicity", however, in his oscillator. To overcome the problems of frequency-conscious components (see TT November 1977) he uses five separate oscillators in conjunction with a five-gang tuning capacitor, diode switching the different oscillators into a common two-transistor buffer amplifier. This multiple-vfo is hardly a technique that will appeal to a newcomer seeking an effective but simply-built receiver, and it is here that one does feel that a switchable Franklin plus buffer might provide a simpler yet effective solution. Fig 3 shows the PAOSE design with the exception of the vfo/buffer section.

More on luminous hazards

In the September TT attention was drawn to a note by ZL1VP on possible radiation hazards presented by the luminous paint used on the meters of certain wartime equipment. It was pointed out that luminous meters were at one time available in the UK surplus market (I bought several) though it was not known whether these presented a hazard of the same order as the ZC1 meters.

As a result of that note I have received a most informative letter from Dr Tony Wrixon of the National Radiological Protection Board at Harwell, Didcot, Oxon. He writes:

"The practice of using radioactive materials to luminize dials and other articles originated at the time of Mme Curie. Until the late 'fifties radium-226 (which was extracted from natural sources) was the only suitable radioactive material. Radium-226 has a number of undesirable properties: it is highly radiotoxic if taken into the body and it emits penetrating beta and gamma rays which can cause external radiation exposure.

"Since the 1950s 'fifties radioactive isotopes have been produced artificially, permitting radium-226 to be replaced by the less radiotoxic isotopes, tritium and promethium-147. More recently the use of radioluminous paints has decreased and the modern method of illuminating dials is by means of gaseous tritium light sources. These are sealed glass ampoules coated internally with a phosphor and containing tritium in the form of its gas. They are intrinsically safer than radioluminous paints because the radioactive material is completely sealed and, unlike radium-226, it emits negligible external radiation when contained within a device.

"Originally, low levels of radiation exposure such as might result from the use of radioluminous instruments were not considered as entailing any risks. When many of the early workers in the radium-luminizing industry developed cancers because of very poor radiation hygiene and the relatively high levels of radiation dose, national authorities were prompted to take some appropriate protective action. Only much later, during the late 'fifties, was the cautious assumption adopted that any level of radiation may entail some risk. Radiological protection standards which would result in relatively low levels of exposure were not considered necessary until recent times. For example, the international radiological protection standard for radioluminous timepieces, the first standard of its kind, was published as recently as 1967.

"Radioluminous paints were used extensively on military equipment during the 1939-45 war. Afterwards many radioluminous instruments were sold off as surplus and some found their way to the public. Nowadays, any surplus radioluminous instrument is required to undergo radiological assessment before being released for sale by the forces.

"The National Radiological Protection Board, which has a statutory responsibility to provide advice on matters of radiological protection, has encountered various pieces of radioluminous military surplus equipment. These include compasses, artificial horizons and other meters. Although some of these would not comply with modern radiological protection standards, we have seldom seen any which could be described as positively dangerous.

"I certainly agree with the comments made by ZL1VP. The principal problems arise from direct access to the radioluminous paint. First of all, removal of the glass face from a meter will substantially increase the external radiation dose rate. Secondly, paint can become flaky with age and might inadvertently be taken into the body. If access to dials with radioluminous paint is absolutely necessary for repair and maintenance, direct contact with the paint should be avoided.

"Finally should any readers be particularly concerned about instruments which they own, the Board would be glad to provide further advice or assistance."

Capacitance meter suggestions

TT (January 1977) included details of two direct-reading capacitance meters originally described in Television and using the well-known 555 timer integrated circuit. Brian Castle, G4DYF, built the 0-10µF unit and has put forward some suggestions which may prove useful to other readers. He writes:

"I find the unit requires some decoupling across the ic terminals 1 to 4 and 8 since without this I obtain erratic readings and hand-capacitance effects, even though I have adopted the Veroboard layout as given in the original Television article. After adding the decoupling, using 47nF capacitors, the results are excellent. After calibration using a one per cent silvered-mica 180pF capacitor which was to hand, the unit then gave sensible readings at 4.7pF on the lowest range and $2.2\mu F$ on the highest range \times 2. In fact I can see that soon I shall not be able to do without this useful gadget.

"Incidentally, I have avoided purchasing a 50µA meter for this project by using a 741 op-amp ic to amplify the meter current sufficiently to deflect a 200µA meter, but without providing a separate negative voltage rail. I found that the gain of the 741 is almost independent of the supply voltages until they fall to about 1.3V positive and negative with respect to zero. I have used the 9V battery positive as the positive potential, the battery negative potential and the regulated 5.8V rail as the 'zero' potential for the op-amp.

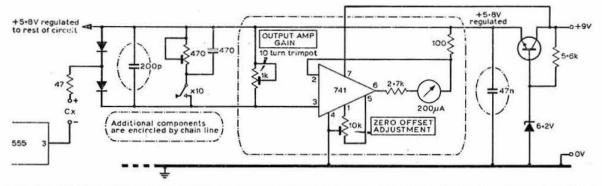


Fig 4. G4DYF's suggestions for using an op-amp with grossly asymmetrical power supply to permit the use of a less sensitive meter in the direct- reading capacitance meter described in January 1977 TT

The 555 produces, via the OA47 diodes, potentials which are always positive with respect to this 5.8V line, and the resultant current is amplified: see Fig 4.

"It may not be widely known that op-amps can often be used in this way with grossly asymmetrical supply lines."

As a final comment, G4DYF mentions that he has found a 200µF capacitor across the 741 input to be necessary; otherwise the readings were low on the high capacitance ranges, presumably due to the 741 not responding so well to de with a deep ripple as produced when the ic is running at 10 or 100Hz. The op-amp modification is shown in Fig 6 and G4DYF indicates that this circuit was derived from one in Electronics Today International (April 1977).

A 15V dc-dc converter

Even though, as G4DYF notes above, it is possible to use op-amps without having a supply line balanced to zero, it is very useful to have some means of providing a balanced supply when only a conventional power unit is available. Old Man, No 9, 1977 reprints from Radio-REF an article by J. Planchamp, F5HV, describing a dc-dc converter that provides such a facility: Fig 5.

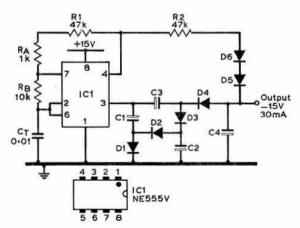


Fig 5. A voltage-tracking dc-dc converter by F5HV to provide balanced supplies for use with op-amps etc. Regulation between 0 and 30mA is stated to be of the order of one per cent

Here again the ubiquitous 555 timer ic forms the basis of the unit, being used as a relaxation-type oscillator. The converter is claimed to provide a negative supply rail of -15V when powered from a +15V rail, with a regulation of about one per cent for current loads of between 0 and 30mA. The oscillator frequency is determined by RA, RB and CT. The output from the 555 is used to feed a voltage-doubler rectifier formed by the diodes D1 to D4 in conjunction with C1 to C4. Components R1, R2, D5 and D6 stabilize the output potential by "voltage tracking" the input voltage. By using a linear $100k\Omega$ potentiometer in place of R1, R2 it is possible to vary the output voltage in applications not requiring a symmetrical supply.

Unfortunately the article does not indicate a recommended value for the electrolytic capacitors C1 to C4 or any diode types. The illustrations, however, suggest that C1 to C3 are identical 35V electrolytic capacitors while C4 would appear to be of appreciably larger value, but provided sufficient capacitance is used the actual values would not be critical, and almost any silicon diodes could be used.

TVI filtering

Steve Cherry, G3SJK, is not at all happy at G3BID's suggestion (TT August 1977) that one needs to worry whether a tvi filter looks into a matched load at harmonic frequencies: in fact he points out that it would be a disadvantage to have a matched condition: "The last thing one wants is the antenna and feeder matched at the harmonic frequencies, since that is the sure way of transferring harmonic energy that has got through the filter to the antenna. In fact filters work by creating a large mismatch at frequencies beyond cut-off frequency. The termination will have most effect at pass frequencies, some effect on the roll-off and practically no effect in the stop-band."

There are, as G3SJK agrees, some circumstances where G3BID's suggestion of using a balanced form of filter might reduce the radiation of harmonics; the main possibility is where poor screening of the transmitter and leakage from the enclosure results in there being rf on the outer of the feeder cable going into the tvi filter. It should also be stressed that none of these remarks invalidate the earlier suggestion in TT of the potential advantages of using an absorptive tvi filter in order to overcome the effects of mismatching at harmonic frequencies at the output of the transmitter into a tvi filter.

4-2-70

Graham Knight, GM8FFX*

New 144MHz transequatorial record

Edgar Muller, YV5ZZ, of Caracas, Venezuela, set a new world record for transequatorial contacts by working over 5,000km to LU1DAU in Argentina on 29 October. YV5ZZ and the LU stations thought conditions would be good when they noticed signals from Oscar 7 in Mode B when the satellite was below the horizon. Edgar went on 50·105MHz and heard LU1DAU working a station in Costa Rica. After exchanging 5 and 9 plus reports they changed frequency to 145·9MHz and established contact at 0230gmt. Signals on 144MHz peaked 589, and after completing the QSO with LU1DAU, YV5ZZ also worked LU7DJZ on cw. Both Argentinian stations were worked a short time later on ssb with 5 and 7 reports being exchanged.

Transequatorial propagation usually takes place between points up to 2,500 miles north and south of the equator. YV5ZZ is at Boca de Uchire 10°N 65°W, while LUIDAU is at La Plata 35°S 57°W. YV5ZZ had further transequatorial contacts on 7 and 8 November with LU3AAT in Buenos Aires and has been heard on different days in November by LU3EMH and LU7FA at Arteaga, Santa Fe. Both Edgar and LU3AAT were using Trio TS700 transceivers with 250W amplifiers. The antennas at both stations were 10-plus-10-element Yagis. Edgar did not notice much difference between vertical and horizontal polarization and he found that, although the 144MHz signals were weaker than those on 50MHz, the fading was less pronounced on the higher band.

Edgar Muller is, of course, well known for his moonbounce activities, and formerly held the German callsign DL3GD. He is to be congratulated on his achievements and to be thanked for his many telephone calls and letters which ensured that this report came direct and is authentic—unlike the TU to PY contact which was reported in good faith on GB2RS but which later proved to be incorrect.

Double burst ms experiments by G3CCH

Johnny Stace, G3CCH, is well known to all ms operators. His total number of completed ms contacts now exceeds 200—with many more contacts in the log which were only partly completed. During experiments he has noticed that 20 per cent of all signals received by ms arrive at the receiver in two parts. A short initial burst is often followed by a short period of silence, which sometimes lasts for a few milliseconds but can be up to 2s. After this short gap the burst continues, often at much greater signal strengths. For several years he has made notes in his log of all such double burst signals, and finds that it happens on all stations irrespective of whether the meteors involved are "shower", "minor shower" or just sporadic meteors.

With the aid of six Swedish operators, tests were carried out to establish whether all the stations heard the same double bursts. Transmissions of one hour were made by

• PO Box 49, Aberdeen, AB9 8JA.

G3CCH and all the reports from Sweden showed that at times one station could hear a signal as double while another station farther away would receive it as a single continuous burst. At times there would only be a short ping at one station while another would copy several seconds of signals. G3CCH has subsequently found that if he could combine the results of all six stations, who were spread over many hundreds of square miles, he would still only hear the familiar bursts and pings—but with the gaps within one burst filled in.

Similar results have been noted at G3CCH when there have been several stations all calling at the same time (yes—there can be pile-ups and even tail-enders on ms). Stations located close to one another each start to be heard at around the same time, while stations farther away can be heard via a burst starting well ahead of the others.

Johnny Stace's earlier experiments with height diversity reception were detailed in the June 4-2-70, and taking these into account along with his latest "double burst" experiments he concludes that there is an optimum design for ms antennas. Best results will be obtained using antennas with a large vertical aperture but of a design which includes the lowest possible angle above the horizon to assist the really long-haul dx.

G3CCH has recently had a spell of illness which prevented him participating fully in the Orionids, and we wish him well. It is no surprise to know he is thinking of new experiments to conduct with the SM3BIU/SM5CUI gang; these will be to find new ways of making greater use of the limited burst time available by utilizing even higher speed cw.

Meteor scatter on 276 metres

G3POI recently made an ms appearance on medium wave by popping up for a 5min burst on 276m during a BBC World Radio Club programme. The BBC had visited his QTH at Sevenoaks in Kent shortly after Clive had worked the Faroes and Aland Island by ms, and recorded an interview during which he explained the fascinations of contacting far-away stations on vhf by ms. This programme is broadcast throughout the world and often carries items of interest to vhf operators.

Meteor scatter listener

Mike Allmark of Leeds has been making a special effort to get new countries confirmed by reporting to stations on reception of their meteor scatter and sporadic-E signals. Reports to stations using these special propagation modes are most useful to the operators concerned, and Mike's hard work has been rewarded with many QSL cards which would make some transmitting amateurs quite envious. Recent QSLs received by Mike Allmark include CT1WW, OE5MZL, DB5NA/OH0, OH5NW, HG5KDQ, I4AMD and IT9TAI. Mike also reports hearing SP2DX and GM4CXP working each other on cw during the recent Orionids meteor shower.

Lannion beacon FX3VHF

After the conclusion of this year's transatlantic tests on 50·1MHz, the antennas on the FX3VHF beacon at Lannion were repositioned to fire south. Since the change took place on 24 September some Rhodesian amateurs report hearing the beacon on a number of different days. The best of these was on 27 October when Ray Cracknell, ZE2JV, in Salisbury, copied the beacon from 1455 until 1512gmt, at strengths

which varied between S2 and S6. Peter Cutler, G3DAO, in Chichester, has also been monitoring FX3VHF and reports hearing it almost every day. Peter makes the interesting point that on 26 October there was a sudden magnetic storm commencement on the sun's disc at 2300gmt, but whether this connects with the reception of the Lannion beacon by ZE2JV is a matter for further consideration.

G3DAO says it would be nice to get even a small section in the 50MHz band to conduct propagation experiments. The authorities have no doubt read page 384 of the Annan Committee Report, which states that "some frequencies in Band 1 might well be available for services other than broadcasting". This gives us hope of an allocation after the close down of 405-line television around 1982. G3DAO and F9LT are both endeavouring to correlate sunspot data, magnetic activity and solar flares, with any abnormal conditions on the vhf bands.

Faeroe Islands expedition

Those well-known expeditionaires GM3YOR and GM3OLK are planning a trip to the Faeroe Islands (OY) and Iceland (TF) during the period 17 July to 5 August 1978. The Glenrothes lads have made very successful vhf contacts on previous expeditions to Northern Ireland, the Outer Hebrides and, of course, last year's trip to Shetland. The possibility of ms contacts to Iceland will intrigue a great many vhf operators.

As a result of an earlier mention in *Radio Communication* the Glenrothes group has now heard from two members interested in joining the expedition. Anyone else interested in participating in this venture should contact GM3YOR, QTHR.

Auroral reports

The auroral season continues with many events taking place. In last month's 4-2-70 13 auroral openings were noted in a single 38-day period. This ratio of one to three has continued, with 26 auroral events in the 77-day period between 11 September and 27 November. For those keeping auroral calendars the most recent events took place on 4, 5, 8, 11, 14, 18, 19, 25, 27, 28, 29 and 30 October and on 7, 11, 12, 13, 14, 15, 25, 26 and 27 November. Many of these events are repeats, for example, 14 November is 27 days after the 18 October event, which itself was a repeat of an event on 21 September.

As last month's 4-2-70 explained, there is no guarantee of repeats, but keeping an auroral calendar does help one to keep on the lookout at the most likely times. The ability of amateurs to record, and often predict auroral events has been attracting the attention of non-radio scientific observers—two universities and representatives from the British Astronomical Association have been in touch with 4-2-70 in the last few weeks, and the BAA have 40 observers who will now be linked to the RSGB auroral warning system.

The last major event, which coincided with a bright visual display, took place on the evening of 27 October, but the first radio phase started at 1437gmt. GM4COK in Edinburgh worked SM1BSA in Gotland Island (JR22e) at 1451gmt and continued to work many LA and SM stations until 1620gmt. A second phase started at 2224gmt and lasted until 0310gmt; best dx for GM4COK in this opening was OH0NB in Aland Island, in JU50f QTH square. The event of 14 November started early at 1424 and continued until 1728gmt, with a second phase between 2300 and 0030gmt. During this event

GM stations were able to work LA, SM, DL and OZ stations. Some of the other events were weak, and during this type of event even the GM stations can only work each other.

Peter Blair, G3LTF, was flying home from America on 7 November when he was invited "up front" by the captain to see the radio equipment. Peter asked if communications were often disrupted by aurora and the captain said, "You mean one of those over there". They were nearly home, at 64°N and 13°W, and sure enough there, to the north, was a visual auroral display. A subsequent telephone checkout with GM8FFX confirmed that a radio event had taken place that night at midnight.

FM calling frequency

A plea from G8KLV in the November 4-2-70, to remind operators that S20 is a calling frequency, has met with an enthusiastic response. It seems that a considerable number of fm operators dislike the all-too-common practice of staying on the calling frequency once a QSO has been established. Some of the repeater group newsletters have taken up the cry, none better than the Central Scotland FM Group Newsletter in which GM3SNO is quoted as saying, "S20 seems to be getting used as a chat channel again, remember to QSY off it after establishing contact, even if you think you are in a remote area with no-one listening. There are many stations with excellent receiving installations who may hear you monopolizing the calling frequency."

Illegal vhf operation

Robert Elwyn Thomas pleaded guilty at Corwen magistrates' court to using a transmitter without a licence on Denbigh Moors. The solicitor for the Home Office alleged that Thomas had used a transmitter, fitted in his car, to jam the GB3MP repeater by transmitting various messages, music and obscenities. The magistrates fined him, and found him liable for the witnesses' expenses together with half the Home Office's costs.

At Bury magistrates' court on 21 November, Howard John Payne of Radcliffe, Manchester, and Thomas Boardman of Farnworth, pleaded guilty to three summonses of using radio transmitting equipment contrary to Section 1 of the Wireless Telegraphy Act 1949. They were each fined £25 on each charge and £20 costs, a total of £95 each. Some equipment was also confiscated.

Frank Gatenby, John Davies and Ian Walsh, all from the Manchester area, have pleaded guilty to charges under Section 1 of the Wireless Telegraphy Act 1949 and have been bailed to appear for sentencing at Ashton-under-Lyne court. In this case the Home Office solicitor alleged that the callsigns G8NIN, G4FJD and G8NIW were pirated, and the equipment used included a TS700 and a rotary 14-element beam.

No one has yet been apprehended for gaining access to the GB3RF repeater by means other than a 1,750Hz tone. No damage was done—the repeater was merely switched off.

Awards

Special mention this month of Eric Neal, G8GP, of South London, whose night-by-night assiduity on 70MHz brought him Senior No 36 and by virtue of his holding 144MHz and 432MHz Seniors already, qualified him for Gold Leaf Supreme Award No 19—the third top award to be issued this year. It took Eric less than nine months from making his first 70MHz contact to getting the last QSL card for the

award. Awards manager Jack Hum, G5UM, notices the OSL cards come in much quicker on 70MHz.

Jack Hum has had to deal with shipping orders for awards; detailed below are the 20 other awards issued in October. It is interesting to note that more than half are in the more difficult Senior Award category.

70MHz Senior Transmitting: No 34, G3CO; No 35 G3NPI. 144MHz Senior Transmitting: No 114, G4FDX/P; No 115, G4BBA; No 116, GW8HVP/G4FJK; No 117, G18HXY; No 118, G(GC, GM)6UW/P.

432MHz Senior Transmitting: No 39, GI8HXY; No 40, G8GML; No 41, G8HBQ; No 42, G4GED.

432MHz Transmitting: No 125, G3CO; No 126, G4FDX/P; No 127, G4FDX; No 128, G8IFT; No 129, G8ITS.

144MHz Transmitting: No 506, G4FDX/P; No 507, G4FDX; No 508, G4BBA; No 509, G8IFT.

REAL DX 1977 FINAL PLACINGS

70MHz 144MHz 432MHz G3DAH—GM3ZBE 670km GW4CQT—UW6MA 3,100km GD8EXI—OE3HJW 1,560km

The "Real DX" section provoked many letters last year with a great many changes taking place in that time. It is interesting to note that two of the three entries show new European records set by British stations. The 1978 box will be extended to record separately best dx via moonbounce, meteor scatter, tropo, etc. This should make the "Real DX 1978" section more interesting and more competitive—send details of your dx contacts to PO Box 49, Aberdeen.

Television records

Lawrence Woolf, GJ8AAZ, worked G8GON/P in Devon on two-way 625-line television. The pictures were good quality at both ends, and Lawrence also switched off the camera and changed to his ttl/diode rom callsign caption generator. GJ8AAZ thinks this is the first 432MHz G-GJ fast-scan television contact.

Ray Mohamed, G4EGC, in Sheffield, wonders if his October 1975 fast-scan contact with DK3NZ/TV in QTH locator square FM44e constitutes a record. The contact was established on standard wideband, 625-line, 432MHz, with 150W input at the Sheffield end. Can anyone better the distance of 835km covered by this contact?

Indoor antennas

Do not despair about working dx if you are unable to put up a tower in your garden. Dave Storr, G8GXP, in Wakefield, shows dx can be worked on 144MHz even with low power and a loft antenna. On 18 October he worked more than 100 Continental stations, including such dx as OE3HJW in HH square and even SP9AGI/P9 in QTH locator JJ.

Earlier in the year G8GXP worked IT9, HG, II, LZ, OE, OK and YU via sporadic-E, all with the same indoor antenna. Dave is now setting skeds for the coming ms season and hopes to report soon on further indoor successes.

The grapevine

The RSGB repeater status list in December 4-2-70 should, of course, have shown the Buxton R4 repeater GB3HH as operational . . . GB3ED the Edinburgh RB14 repeater is now operational and working well . . . the antennas and

APPLICATION FOR TICKETS

RSGB NATIONAL VHF CONVENTION 25 February 1978

| Please s | upply tickets as under | | | | | Cost | Number | Total cost |
|-------------|------------------------|------------|--------|-------|-------|---------|----------------|-------------------------|
| | Convention only | •• | | • • | | £1.00 | | |
| | Convention only (u | nder 18) | | | | £0.50 | | |
| | Evening only | | | | | £3.00 | | |
| | Convention and eve | ning | •• | | ٠. | £3.50 | | |
| | Name | | | | | | ostal order fo | r£ |
| | Address | | | | | | | |
| | | | | | | | | |
| Send applic | ation form and remitta | ince to: I | Mike I | Dorme | r, G3 | DAH, 43 | Mickleburgh | Avenue, Herne Bay, Kent |

feeders at GB3GN are now in position and awaiting some rf . . . during the 2 December aurora PAOOOS worked LB1N(FT12c), SM5BEI(JU72c) and best of all OH1TY in LU33 square . . . further auroral openings on 3 and 4 December . . . UP2BBC now worked by several German stations on 432MHz . . . high activity during the December RSGB 144MHz contest with G3AWZ in Somerset and G4BWG in London outstanding signals at Aberdeen during most of the event.

National VHF Convention 1978

Geoff Stone, G3FZL, has done a great job in organizing all the different aspects of this year's National VHF Convention. CU there.

Finally

Thanks for all the letters. Please send your news and views for publication to PO Box 49, Aberdeen AB9 8JA.

RSGB NATIONAL VHF CONVENTION

Organized by the RSGB VHF Committee

The Winning Post, Whitton, Twickenham, Middx Saturday 25 February 1978

- One-day exhibition and lecture programme
- Saturday evening disco, dance and buffet supper
- Specialized trade exhibition with emphasis on help to home-constructors
- Comprehensive lecture programme on vhf, uhf and microwave subjects
- Bring and buy
- Home-constructed equipment exhibition

PROGRAMME

1100 Convention opens (open to exhibitors from 0900)

1400 Keynote address by Dain Evans, G3RPE, RSGB President

1430 Lectures begin in Whitton School

Lecture programme

- "High-power solid-state amplifiers for uhf" by Paul Widger, G8AGU
- "Loop-quad Yagi antennas" by Mike Walters, G3JVL
- "Meteor scatter basics, and advanced procedures" by Ian White, G3SEK, and Clive Penna, G3POI
- VHF contests forum conducted by VHF Contests Committee
- Microwave stream organized by Dain Evans, G3RPE

Plus other items being arranged—details next month

1730

Lecture session ends

1930 Social evening begins. Dancing to a four-piece band; disco; buffet supper

Midnight Convention ends.

TICKETS: See facing page

How to get there

By car

The Winning Post Hotel is on the northern side of the A316, Chertsey Road, at Whitton, Twickenham, Middlesex. Ordnance Survey Map 170 NGR 1401 7031. As the A316 is a dual carriageway with few turning points, approach the main entrance of the hotel from the west end of A316-it terminates at the junction of A316 and A305-or enter via a minor road passing Whitton Station to back of hotel. Ample parking space is available at the hotel or in some adjacent roads, but not in the Chertsey Road or at Whitton School.

By public transport Train to Whitton Station from Waterloo (Southern Region), approximately 20 minutes. 5 minutes' walk from station to hotel. No 203 bus passes Whitton Station.

As parking space tends to fill up with so many people attending the convention, pool your travel arrangements and save petrol or come by public transport-the train service is very good.

microwaves

Dain Evans. G3RPE*

Cavity locking of Gunn oscillators

Since G8DEK directed the attention of visitors at the last Winchester round table to the possibility of stabilizing Gunn oscillators by locking them on to ordinary wavemeters (as noted in last month's Microwaves), a number of people have followed this up with enthusiasm and not a little success. In his system, G3KSU simply fitted a wavemeter close to the oscillator with the output being fed to the external circuitry via an isolator. The wavemeter, the Q of which is believed to be in the region of 200, produced a dip about 2dB deep and 30MHz wide. When the Gunn oscillator was tuned about half-way down the lf side of the dip, three things happened: the oscillator locked on to the wavemeter; the oscillator would remain locked even when the wavemeter was tuned over ± 15 MHz, and the noise bandwidth of the Gunn oscillator was sufficiently reduced so that narrow-band signals, which were previously unintelligible in a 3kHz i.f. bandwidth (!), became perfectly readable when the wavemeter was brought into action.

The stability of the oscillator will obviously depend on the Q of the wavemeter employed. G3KSU is currently investigating specimens having Qs of 2,000 and 5,000. The frequency range of stabilization also depends on the amount of power that one is prepared to lose. G8DIC, who has also been experimenting with this technique, found that his system stabilized over a 5MHz range with only a 0.5dB loss.

The locking process depends on the power reflected by the wavemeter at resonance being in the appropriate phase. G8DEK's original suggestion was to use a phase shifter to ensure this. G3JVL reports that if the position of the wavemeter is such that it is difficult to lock the oscillator, then fitting a "tuning" screw anywhere between the wavemeter and the oscillator usually provides enough phase shift to allow locking.

This topic was again discussed at the round table held on 13 November when further details were given of the successful results that had been obtained. This meeting will be reported in the near future but in the meantime preliminary details of one approach are given so that people can start to experiment.

In the technique shown in Fig 1, the cavity is fitted to the rear of the oscillator. The length of guide between the Gunn diode and the cavity is made $\lambda_g/4$ (or presumably any odd number of quarter guide wavelengths). A suitable cavity uses the TE111 mode for which the dimensions are given by the relationship:

$$\frac{\int_{0.000}^{2} d^{3}}{10,000} = 3.2 + 2.22 \frac{D^{2}}{L^{2}} \qquad \dots (1)$$

where f is in gigahertz, D and L in millimetres.

To minimize the risk of the cavity operating on the wrong mode, it is recommended that the value of f²D²/10,000 should be between 7.5 and 11 (2). The corresponding values

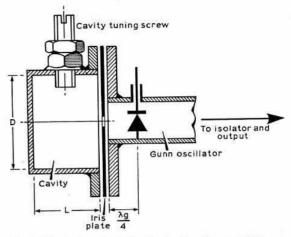


Fig 1. The design of cavities for locking Gunn oscillators

for L, which must be calculated precisely from (1), will then lie between 0.5D and 0.7D.

Care must be taken in the construction of the cavity in order to maintain its Q. Professionally they are usually made from a low-expansion alloy such as Invar which subsequently is plated with gold, for example, to reduce its skin resistance to an acceptably low value. A practical alternative for amateurs is copper, the only disadvantage of which is that the resonant frequency of the cavity will vary with its temperature. To produce a high-Q cavity (and the unloaded Q may easily be 10,000), as much as possible of the material used should be copper, ie the cavity itself, the tuning screw and the iris plate. The inside surfaces of the cavity should be polished, and the amount of solder used inside the cavity should be kept to a minimum.

As an example of the design of a cavity, consider one of maximum frequency 10.6GHz, which will tune into the amateur allocation. Substituting this frequency in (2) produces preferred values for D of 26 to 33mm. A convenient source of copper tube within this size range is the standard water pipe, which has an inside diameter of 26.5mm. Substituting this value for D in equation (1) produces the value for L equal to 18.1mm. A 2BA or similar screw inserted parallel to the E-plane will tune the cavity over a few hundred megahertz.

It is suggested that the size of the iris coupling the oscillator to the cavity be such that the output of the oscillator is reduced by a maximum of about a third (ie about 2dB) as they are tuned together.

The writer will be pleased to hear of people's experience with this technique.

Operating news

Harold Meerza, BRS34348, heard G3ZIV (N Yorkshire) working G3VPK in an ssb 1,296MHz contact during the October openings. Despite G3ZIV being the most northerly station that Harold has heard from his Chatham location, signals were still S5. Apparently G3ZIV's station is a mere 8m asl. On the previous evening, G3ZIV worked G8AUS in Devon when conditions were way up on 432MHz but not so much on 1,296MHz—GB3AND was only just above the

^{• 4} Upper Sales, Chaulden, Hemel Hempstead, Herts HP1 2AJ.

noise. By contrast on the following night conditions were reversed—less good on 432MHz but well up on 1,296MHz. Harold speculates that perhaps openings are being missed on 1,296MHz because they do not coincide with those on 432MHz, which is an argument for judging band conditions on what they actually are rather than what one presumes them to be. G3ZIV apparently can now generate about IW of ssb on 2,304MHz and is busy constructing power amplifiers.

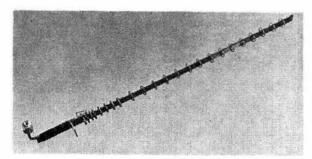
A letter from DL7QY (Berlin) notes that during the same tropo openings in October he worked the following stations on 1,296MHz: DJ3ENA (EH); HB9RG (EH); DJ5BV (DK); G3VPK (AL); G3LQR (AM); DJ6BUA (EK); DJ8QL (EJ); PA0TGA (CL) and PA0AGO (DM). On 2,304MHz he worked DJ3ENA (EH) at a distance of 638km; DK2DPX (EK); OK1KIR/P (GK); DJ6BUA (EK) and DJ8QL (EJ). A test with G3LQR was unsuccessful. DL7QY considered that conditions were also very good on 10GHz but no one seemed to have equipment operational.

As was reported in the October column, G3BNL and G8ADC have been making regular 2·3GHz contacts over the 30km non-optical path from their homes in Bushey and Cardington. The same path is now being worked on schedule three times a week on 3,456MHz with signals S5. G3BNL is using 300mW to a short backfire antenna, with G8ADC using 30mW to a dish 4ft in diameter fitted with a log-periodic feed.

A loop-Yagi antenna for 10GHz

It tends to be difficult to scale conventional Yagi antennas to higher frequencies because of unpredictable factors such as end effects of the elements and the influence of the diameter of booms. However, the success G3JVL had in scaling his 1,296MHz design of loop-Yagi (which is given in the third edition of the RSGB VHF-UHF Manual, p8.48; also in Radio Communication January 1975, p24) both down in frequency to 432MHz and upwards to 2,304MHz, led him to question just how far he could push this scaling procedure.

The answer is shown in the photo: this scaled 10GHz version uses elements about ½in in diameter formed from brass strip 0.004in thick and 0.020in wide. These are glued to a fibre-glass support strip, rather than to a boom which would have scaled to a mere ½in diameter. This strip reduces the design frequency by a small percentage. The only other difference that had to be made was in the form of the balun, because "scaled" coaxial cable 0.017in in diameter was unavailable at the time of construction.



A loop-Yagi for 10GHz which works perfectly. Its overall length is 10in

Careful measurements of the polar diagram show that the performance of the 10GHz version is virtually indistinguishable from its big brothers. So if anyone wants a 10GHz antenna having a 20dB gain which will fit inside a tube about $\frac{3}{2}$ in diameter and 10in long . . .

UK microwave beacons

The following is a list of microwave beacons which currently are operational. A sad omission from this list is GB3IOW, the I0GHz beacon on the Isle of Wight. This had operated continuously since it was first installed in April 1975 but failed at the end of November due to antenna troubles resulting from a combination of corroded guys and 100mph winds. It will be out of action for two or three months, during which time it is hoped to build a more potent beacon.

| Beacon | MHz | QTH | Erp W | Antenna | M asl | Keying |
|---------------|----------|-------|-------|------------|-------|--------|
| GB3AND | 1,296.87 | ZL63b | 50 | Slot omni | 85 | F1 |
| GB3DD | 1,296-89 | ZL08e | 2 | HB9CV | 263 | F1 |
| GB3WRN | 1,296.91 | YM28g | 2 | 6-el stack | 407 | F1 |
| GB3UOS | 3,456 | ZN42c | 4 | Figure 8 | 400 | F2 |
| GB3LBH | 10,100 | AL31c | 1.5 | Slot omni | 45 | F2, F3 |
| GB3ALD | 10,100 | YJ30h | 1 | Sectorial | 90 | F2 |

GB3LBH, the London 10GHz beacon, continues to operate successfully, It is one of the few beacons (perhaps the only one) which transmits speech. The 1min transmission is repeated every 10min and is produced by a closed-loop tape player which so far has operated about 34,000 times without even a hiccup. In the near future it is planned to transmit data test signals which will enable the variation of error rate with propagation conditions to be measured. It is proposed to transmit "real" data which will describe conditions at the beacon at a later date. The other 10GHz beacon, GB3ALD, also continues to work well. It holds the current beacon dx record at this frequency, the 195km distance from Alderney in the Channel Is to Race Hill near Brighton.

Beacons for which licences have been received but which are not operational are GB3MLE, 1,296·93MHz on Emley Moor; GB3LDN on 1,297·5 and 2,304·05MHz on Shooters Hill, London; and GB3GEC on 2,304·1 and 10,150MHz at Borehamwood, Herts.

Proposed new beacons known to be in the pipeline include GB3EDN on 1,296·990MHz which will be sited in Edinburgh, and GB3CMS on 10GHz which will be established 8km south of Aberdeen.

10GHz tv

The design of a video modulator/psu for klystrons of the 2K25/723A/B type by GW6JGA is given in the 100th edition of the BATC journal CQ TV, published in November 1977.

A change

It is with mixed feelings that the writer pens his last *Microwaves*. To have produced 87 columns since October 1970 is a good enough reason for stepping down, but the increasing pressure of other commitments makes it even more appropriate to do so at this particular time. Taking over will be Charles Suckling, G3WDG, who already will be well known to many microwave enthusiasts. The compiler of a column relies very heavily on his correspondents, and the best encouragement that G3WDG can be given would be lots of technical information and operating news addressed to him at: Physical Chemistry Laboratory, Oxford University, South Parks Road, Oxford OXI 3QZ.

the month on the air

John Allaway, G3FKM*

ONCE again we have a new year with us, and the writer would like to wish all readers every success and happiness. As in MOTA for January 1977 he would like to mention the fact that this column depends to a very large extent on reader participation. How about making a new year resolution to supply G3FKM with more information?

January is also the right time to draw readers' attention to the:

IARU REGION 1 HF BAND PLAN

| Band
3·5–3·6MHz | 1 1524 127 | Type of emission cw [2] |
|--|-----------------------|---------------------------------|
| 3·6MHz
3·6–3·8MHz | $\pm 20 \mathrm{kHz}$ | rtty [1]
cw and phone [2, 3] |
| 7-7·04MHz
7·04MHz
7·04-7·1MHz | $\pm 5 \text{kHz}$ | rtty [1]
cw and phone |
| 14-14·1MHz
14·09MHz
14·1-14·35MHz | $\pm10k\text{Hz}$ | rtty [1]
cw and phone |
| 21-21·15MHz
21·1MHz
21·15-21·45MHz | $\pm 20 \text{kHz}$ | cw
rtty [1]
cw and phone |
| 28-28-2MHz
28-1MHz
28-2-29-7MHz | $\pm 50 kHz$ | cw
rtty [1]
cw and phone |

Note

[1] For rtty, recommended section of operation shared with cw. [2] 3,500 to 3,510 and 3,790 to 3,800kHz reserved for inter-continental working.

[3] 3,635 to 3,650kHz is used by USSR stations for inter-continental working.

[4] For sstv, recommended operating frequencies are: 3,735, 7,040, 14,230, 21,340, 28,670—all ±5kHz.

[5] For beacons, 28-2-28-250MHz is recommended.

[6] For the downlink of amateur satellites, 29·4–29·550MHz is recommended.

It is worth mentioning that these are recommendations only and that we in Britain are not compelled to follow them. However, they are sensible and help to keep our hf bands in some kind of order!

Your scribe would be very grateful to anyone who can supply any information concerning the last few contacts made by AC3PT—especially the last one he made before being closed down.

News from overseas

Ian Forse, G4DHA, radio officer on mv Tugela, plying between S Africa and Seychelles, is now active on all bands 1.8 to 28MHz, cw and ssb, with the callsign ZS5IB/MM. His QSL manager is Colin Squires, G3XCS, 5 Frith Rd, Saltash, Cornwall.

Bill Stevens, ZD7SD, his wife Sybil, ZD7SS, and G3JMH have kept regular schedules for some time. Bill and Sybil have never left St Helena—a 47-square-mile volcanic

• 10 Knightlow Road Birmingham B17 8QB.

area with a total population of 5,000. Their shack overlooks Jamestown and is about 800ft asl with a clear take-off in every direction, and their equipment consists of an FT101E, a two-element quad at 50ft, and a dipole at 40ft. Bill has numerous trophies, cups and certificates, presented to him from various countries for his radio work, and as he is also in touch with the air-sea rescue services in the area he has taken part in many yacht rescues. Bill is a member of RSGB and enjoys contacting UK stations.

The DX Club of Puerto Rico is active again, and its new officers are David Novoa, KP4AM, president; Alicia Rodriguez, KP4CL, vice-president; Luis de la Vega, KP4WI, secretary/treasurer; and directors KP4RK, KP4RF and KP4CLB. The club has a hospitality committee to welcome visitors, and also issues the All Puerto Rico and 8x8x8 Awards. Further information is available from PO Box 1061, San Juan, Puerto Rico, 00902, USA.

DX news

BV2A has been fairly active recently on his crystal-controlled cw frequency of 14,025kHz, and using his other call as BV2B on 14,218kHz on ssb. He seems to prefer calls about IkHz lower when he is using ssb. CR9AJ is believed to have a regular schedule with Portugal at 0800 on 14,160kHz. Torres has also been worked on 7,085kHz (both cw and ssb) around 1800. Jim Smith, P29JS, has started to organize a net on 14,250kHz commencing at 0700 each morning. Readers who would like a contact with Bhutan might listen to the SE Asia Net on 14,320kHz as A51PN is sometimes one of those taking part.

It is reported that SM0AGD operated for a very short time from Iraq recently. He used the callsign SM0AGD/YI, made 18 contacts, and was closely supervised by Iraqi officials throughout.

SM6CSB has been active from Guinea Bissau as 3C1X. He is expected to be there until the end of 1977 and may have left by the time this is being read.

FH0OM has been worked on his crystal frequency of 14,177kHz at around 1600. After a short period at home in Djibouti (where he has the callsign J28AC) he will return to Mayotte. His wife is also licensed as FH0YL and J28AH.

There seems to be some activity from Qatar. Both A7YXX and A7XZZ have been reported, but it is not known whether they are genuine. The former is said to be DC9NV.

Grenadan stations began to use their new J3 prefixes on 1 November and it seems that they may now be identified by replacing the VP2G in their calls with J3—eg VP2GAJ is now J3AJ.

WD9FCC/VQ9 and WA6OXZ/VQ9 are located at Diego Garcia and expect to be there until July 1978.

Al Fox, who recently operated for a short time as FH0FX, will be due in St Helena in mid-January. From there he hopes to go on to Brazil and then to the Lesser Antilles.

3D2RM will be in Fiji for about a year. He comes from the USA and his home callsign is W0NDS.

WA6QFO/3D6 (Box 295, Secunda, Tvl, Rep of S Africa) often joins the YL SSB Net on 14,333kHz after 2100 on Fridays.

According to the New Zealand Herald (via ZL1AXM) the party which operated from the Kermadec Is recently had an extremely rough return journey to New Zealand. Their 37ft yacht encountered 50-knot winds and waves 25ft high. In all some 12,000 contacts had been made from Raoul Is.



Colin Richards (right)—well known as 9M2CR, 9M2CR/SM5, GW3JET, AP2CR, AP2CR/E Pakistan, 9V1CR, S21CR and 5A2CR!

"VY0C" and "3V8P" both appear to be pirates. In each case their stated QSL manager has no knowledge of them. The station recently using the callsign XF4JJ also seems to be a doubtful one as the expedition to Revilla Gigedo which had been planned and publicized was in fact cancelled.

Top band news

Ian McGarrigle, G8EYU, has kindly supplied an up-to-date list of coastal stations on 1·8MHz. They are as follows: Wick (1,827kHz), Niton (1,834kHz), Lands End and Cullercoats (1,841kHz), North Foreland and Oban (1,848kHz), Stonehaven (1,856kHz), Humber (1,869kHz), Niton and Anglesey (1,925kHz). Hearing them may give some indication of propagation conditions—and it must be remembered that under no circumstances whatsoever should any interference be caused to them by amateur stations.

W1BB's 160 Meter DX Bulletin dated 1 November 1977 reminds top band enthusiasts that the first 10min of each hour when the band is open for dx working now replaces the former first-timer's organized tests. Experienced operators are asked to call "CQ FT" during this period and to listen very carefully for replies. It seems that stations in Hawaii have now been given permission to use the 1,800 to 1,810kHz part of the band from 4pm to 8am local time—they were previously confined to the 1,995—2,000kHz area. Stew once again asks for co-operation in keeping the "dx window" clear of interference during band openings. The area involved is 1,825 to 1,830kHz.

This band has undoubtedly been the star turn during the period under review. Several UK stations report working Japan, and the following Japanese stations have all been logged between 2100 and 2215: JA1CUW, JA2GQO, JA3AA, JA3AHQ, JA3BDB, JA3ONB, JA5DQH, JA6WGE, JA7AO and JA0SX. At times they have been good signals, and readers are reminded that the Japanese allocation on 160m extends only from 1,907.5 to 1,912.5kHz (cw only). During the time the band is likely to be open it would be greatly appreciated if UK phone stations could try to avoid this area. Although the best opening seems to be at sunrise time in Japan, tests are now being made at our sunrisethis is long path and would represent a very long distance. GD4BEG has supplied sunrise times for JA3 which will be as follows: 7 January 2201, 14 January 2203, 21 January 2158 and 28 January 2154. Openings occur up to one hour before and after these times with JA3s seeming to come through first, JA6s last. GD4BEG also reports a contact with ZS4PB on 27 November and wonders whether this could be the first 160m contact between the UK and South Africa?

Ex-VS9 callsigns

Two more former VS9s have identified themselves—Mike Watling, G3PCW, (15 Fifth Avenue, Catterick Garrison, N Yorks) was VS9AMW during the summer of 1965. He believes that he QSLd 100 per cent and has no cards left, but is willing to oblige with written confirmation to those in his logs who still need one. Dave Morris, who was VS9ADK between 1961 and 1963, still has his logs and a few cards—he may be reached at 7 Rosslyn Rd, Vicars Cross, Chester CH3 5HR.

Dxpeditions

A group of amateurs from the Radio and Electronics Society of India, including VU2TN, VU2AID, VU2IJ and perhaps VU2CJ or VU2YK, is awaiting permission to visit the Laccadive Is.

There is a possibility that several operators from Midway Is may visit Kure Is (KH6) this spring—most likely in April.

WOUO and WAOTUW will be visiting Jamaica during this month and will stay for at least a week, commencing 31 January. They will operate on all bands 1.8 to 28MHz and will use their own calls /6Y5, or WA9FXJ/6Y5 (which is another call held by WAOTUW).

K5CO is back in the USA, but there is a possibility that he may return to Africa at a later date. He says that he has clearance to operate from Benin (TY) and is hopeful that he could also obtain authorization in Mali (TZ).

The group which previously operated from Minami Torishima as KAIS is thinking of making a return visit to the island during March.

Welcome

The following overseas amateurs joined the Society during November: C5ABK, EI1CY, EI3AX, EI4AN, FM7WW, I4CZS, I4KSV, JJ1UMY, OZ2GF and WD4ICV.

OSL via W3HNK

Long Skip has published a list of stations for whom Joe Arcure acts as QSL manager. His address is PO Box 73, Edgemont, Pa, 19028, USA. The stations are:

CN8BG, CQ6LF, CR6KT, CR6LF, CR7GJ, CT1s BT, FL, MZ, RM, TZ, UA, UD, UE, ZW, CT2AK, CT2JAM, CT2SH, CT3AF, CT6UA, CT7RM, CT7UA, CX3BR, DA2DX, DA2DX/HB, DA2DX/HB0, DA2DX/LX, EA8GZ, EA8JJ, EL2BI, EL2CB, EL2EN, EL2F, EL2EU, EL2EV, EL2X, EP2DX, EP2KB, EP2RL, EQ2DX, F0AZC, FG0AFC/FS7, FL8KP, FY7AX, GW3DJZ, HC8GI, HH2V, HH2WF, HI8MOG, HI8XRG, HM1EJ, J28AI, JA11VB, JA6BEE, JY9DX, KG6JCZ, KH6GI, KP4DIW, KR6HR, KV4EN, KV4EY, LX1BW, OD5CS, OD5JJ, ON8UH, OX5AP, OX5AU, OY3H, OY5NS, OY7BD, OY7JD, OY9LV, PA0COE, PA0HVM, PJ8AR, PY1CZL, PY1DBE, PY1MO, PY1PY, PY4AKL, PZ1CF, P29BS, SM5BUT, SM0CER, SP9PT, SU1IM, SU1MI, SV0WC, SV0WEE (1970–1972), SV0WUU, SV0WXX (1971), TG8DX, TG9DX, T12UCC, TR8LE, UA3FF, UC2BF, UM8FM, UW0MF, VE1BFV (Sable Is), VK9BS, VP2s ABA, EEG, EY, KAA, KAB, KK, LAO, LDI VDQ, VY, VP8HA, VP8LC, VP8OD, VS6AI, VS6DD, WA5UKR/YV5, WA5VKJ/HB0, WA5VKJ/LX, XP1AA, XW8EO, XW8FN, XW8GV, YA1VKJ, YS1ESH, YS1GDD, YS1GMV, YS1JMV, YS1GMV, YS1, SWU, 5YD,

ZS3CJ, ZS3R, 4S7DA, 4W1GM, 4X4RD, 4X4UH, 4Z4PG, 5A3TX, 5A5TR, 5U7AG, 5Z4PI, 5Z4PP, 8P6BU, 8P6FU, 8P6FV, 8P6IJ, 9C9DX, 9G1JN, 9G1SM, 9H4L, 9J2AB, 9J2US, 9J2YL, 9K2DC and 9L1JT. A grand total of 170!

Contests

The CQ WW DX 160 Contest

2200 27 January to 1600 29 January.

CW only. Exchanges consist of RST and serial QSO number (from 001). Contacts with own country count two points, with other countries five points, and with the USA and Canada 10 points. The multiplier is one for each USA state, Canadian province and DXCC country worked. Note that stations outside W and VE only count as states or provinces not the countries of the USA and Canada as well. Logs must be mailed before 28 February to: CQ 160 Contest, 14 Vanderventer Avenue, Port Washington, LI, NY, 11050, USA. G3FKM has a small supply of log and summary sheets.

In the 1977 event UK scores were as follows:

| G3UBR 87,250 points | GW3GWX | 8,820 points |
|----------------------------|---------------|--------------|
| GI6YM 40,324 points | G4BUO | 7,362 points |
| G4EOK 25,534 points | G3XWZ | 5,850 points |
| GM3ZSP 16,866 points | GU4EON | 4,690 points |
| G3YMC 15,246 points | G3JFF | 1,932 points |

In the multi-operator section G3VMW/A scored 90,780 points, GM3IGW/A 67,650, G3KMI 25,344, and G4BTJ 15,944. Congratulations to the winners of certificates (printed in bold type).

G8DI has pointed out that the listing of his call in the results of the 1976 CQ WW DX Contest (phone section) was in error. It was a duplication of his cw entry details.

The 1978 French Contest

0000 28 January to 2400 29 January (cw). 0000 25 February to 2400 26 February (phone).

1.8 to 28MHz (French stations are restricted to 1,826kHz on cw only). Work stations in France and French overseas departments and territories. Single-operator entrants may only take part for 36 hours. The same station may be worked on each band, and exchanges should consist of RS/T plus serial contact number (from 001). French stations will also send two figures to indicate their department. Contacts with stations on the same continent are worth three points, and on other continents 10 points. The multiplier is the total of French departments (maximum 95), overseas departments and territories worked on each band added together, and the final score is total QSO points multiplied by this. Send logs to: REF Traffic Manager, Michel Menetrier, F5IN, 2 Square Trudaine, 75009 Paris, France.

The 1978 ARRL International DX Competition

0000 4 February to 2359 5 February and 0000 4 March to 2359 5 March (phone).

0000 18 February to 2359 19 February and 0000 18 March to 2359 19 March (cw). Single-operator (1) all band, (2) high band (14, 21 and 28MHz), and (3) low band (1-8, 3-5 and 7MHz) classes. Multi-operator and multi-transmitter sections also. Entrants should send RS/T followed by a figure indicating the transmitter input power. W/VE stations will send report plus state or province. Stations may be worked on each band. The final score is the total QSO points multiplied by the total of USA states and Canadian

QTH CORNER

| ATYXX | via DC9NV, W. Rass, Hauptstr 22, D-8552 Hoechstadt Aisch, W Germany. |
|--------------|---|
| AP2MQ | via JA3CMD, T. Nakanishi, PO Box 15, Uzumasa, |
| T 19 | Kyoto 616, Japan. |
| C5AT | Thure Jansson, OH2BFJ, Bergstrask, SF-02400
Kirkkonummi, Finland. |
| CEOZE 1 | Dr A. Regal, N4WW, 5301 Jessamine Lane, Orlando, |
| CEOZM S | Fla, 32809, USA. |
| JT1AN | via W7PHO, W. H. Bennett, 18549 Normandy Terrace,
SW, Seattle, Wash, 98166, USA. |
| KZ0DX | via QSL Bureau, PO Box 407, Balboa, Panama Canal |
| | Zone. |
| P29HV | VK3HV, W. G. Francis, 31 Donald St, Morwell, Vic, 3840, Australia. |
| P29KL | via SM5AWO, G. Karisson, Trollbeksveg 47, S-13500 |
| | Tyreso, Sweden. |
| PY0BXC | F. Souto Maior, Rua Almeida Belo 241, Apt 302,
Olinda, PE. 53000 Brazil. |
| TA1IB | Ismail Bayer, Agneshogsgatan 31-E, S-59100 Motala, Sweden. |
| TA2FK | Ferdi Kinacav, Rassnasvagen 17-D, S-59100 Motala, Sweden. |
| TK7GAS | via FG7XA, J. Sahal, PO Box 444, 97164 Pointre-a-
Pitre, Guadeloupe. |
| TT8HV | G. C. Fogg, WB5OOE, Box 626, Allen, Texas, 75002, USA. |
| VP1UR | Buzz Jehle, 6960 Bunker Hill Road, New Orleans, La, 70127, USA. |
| VR4AS | W. A. Stark, PO Box 10, Kira Kira, Solomon Is. |
| ex-VS9AR | H. Rylands, TU2EF, BP 21017, Abidjan, Ivory Coast. |
| ZD9GG | via ZS1Z, F. Ferucci, Box 341, Paarl, 7620, CP, Rep |
| | of S Africa. |
| 3C1X | via SM6PF, N. Strom, Warenbergsg 14, S-52100
Falkoping, Sweden. |
| | rainupiliu, aweuelli. |

RSGB QSL Bureau, G3DRN, 30 Bodnant Gardens, London SW20 0UD.

K. Schmidt, PO Box 205, Dar-es-Salaam, Tanzania.

5H3KS

provinces worked on each band added together. Each QSO counts three points. (Only the 48 contiguous USA states count). Logs and summary sheets must reach ARRL, 225 Main St, Newington, Conn, 06111, USA, no later than 17 April. Log sheets (100 contacts per sheet) and summary sheets are available from G3FKM (sase please).

Results of the DL AGCW Summer QRP Contest 1977 show G3DNF with 11,228 points, GM3OXX 6,810, GW8PG 6,358, G3UYM 5,595 and G3NEO 2,976. G3NEO and GM3OXX were top scorers on 1-8 and 14MHz respectively. There were 57 entrants in the QRP section. The 1978 Winter Contest will take place on 21/22 January and the Summer Contest on 15/16 July—rules are unchanged. In future the summer event will take place always on the third complete weekend in July.

Results of the 1977 CQ WW 160 DX Contest have been received and UK scores were as follows:

| | Cin | -1 | |
|---|-----|--------|--------|
| | Sin | gre-op | erator |
| _ | | - | |

| G3UBR (op G4BCH) | 87,250 points | GW3GWX | 8,820 points |
|----------------------|----------------|-----------------|---------------|
| GI6YM | 40,324 points | G4BUO | 7,362 points |
| G4EOK | 25,534 points | G3XWZ | 5,850 points |
| GM3ZSP | 16,866 points | GU4EON | 4,690 points |
| G3YMC | 15,246 points | G3JFF | 1,932 points |
| Congratulations to G | 3UBR who was v | world fourth-to | p score being |
| made by KV4FZ (270, | 648 points). | | |
| | Multi anara | to- | |

G3VMW/A 90,780 points G3KMI 25,344 points GM3IGW/A 67,650 points G4BTJ 15,944 points G3VMW was world second, and GM3IGW/A world fifth in this section.

Awards

The Oman Award

This award is issued by the Royal Omani ARS. Amateurs must have proof of having worked A4X stations on the following bands since 1 November 1972: 3.5MHz (2). 7MHz (1), 14MHz (3), 21MHz (3) and 28MHz (2)-a total of 11. OSOs via Oscar count as for 28MHz. Any mode may be used but the same station may count only once for each band. Applications and confirmations should be sent to: The Awards Manager, ROARS, Post Box 981, Muscat, Sultanate of Oman. There is no charge.

The WALA Award

For contacts with Norwegian stations since I January 1950. Applicants from outside OH/OZ/LA and SM must produce evidence of having contacted 20 different LA/LB stations-at last six of whom must have been located north of the Arctic Circle (this must be clearly indicated on the OSLs). Contacts may have been on cw, phone, or mixed, but not cross-band, and minimum reports required are RST 338 or RS 33. Contacts with JW and JX count as being north of the Arctic Circle. Certified list plus 10 IRCs should be sent to: NRRL Award Manager, Hans E. Kinck, LA4YF, N-3800 Bo 1 Telemark, Norway. (The list should show date, time, callsigns, signal reports, and locations of stations worked.)

The Ex-G Certificate

New rules now apply to this award because of the club's greatly enlarged membership, and the sponsors say that the new certificate is far superior to the older version. Requirements are as follows: (1) For non-members of the Ex-G Radio Club-confirmed contacts with eight members in the USA (not more than two from any one call area) plus four in Canada, and four elsewhere. (2) For members-10, six, and six respectively are required. A certified list of confirmations, signed by two amateurs or a club secretary, accompanied by eight IRCs (non-American) should be sent to: Don Rayner, W3CTR, Awards Manager, 416 Burkhart St, Johnstown, Pa, 15906, USA. European applicants should send their applications to: Lt Cdr H. Cunningham, 235 Station Rd, West Moors, Dorset BH22 0HZ. Please note that all contacts must have been with current 1977 members and that previous contacts do not count. Listeners may also apply.

The Radio Club Paraguayo has provided a list of awards which may be obtained by sending a certified list of QSLs held (signed by G5GH) plus five IRCs to: RCP Award Manager, PO Box 512, Asuncion, Paraguay. Note that all contacts must have been made since 15 May 1952.

All Mediterranean Countries (AMCA)—for 20, 30 or 41 countries from the following: A2, A5, AC3, C31, CP, HB, HB0, HV, JT, LX, OE, TL, TT, TZ, UC, UD, UG, UH, UI, UJ, UL, UM, UO, XT, XW, YA, ZE, ZP, 3D6, 4U1, 5U7, 5X5, 7P8, 7Q7, M1, 9J2, 9N, 9U, 9X.

Tropics of Cancer and Capricorn Award (TCCA)—for 12, 20 or 28 countries from S2, BV, China, EA9(Sahara), KH6, A4, A6, SU, TZ, C6, VU, XE, XZ, 5A, 5T5, 5U7, 7X, 7Z, A2, CE, C9, LU, PY, VK, ZP, ZS, ZS3, 5R8.

All Zone 11 Prefixes (AZ11P)-for 12, 19 or 30 prefixes in CQ Zone 11. These consist of ZP1 to ZP9, PY1 to PY0, and special prefixes in Brazil and Paraguay

The Diploma Sud-America (DSA)-for contacts with countries in ITU zones 12, 13, 14, 15, 16 and 73 as follows: 18 countries in five zones, 25 in six, and 33 in six ITU zones.

The Diploma Paraguay-for contacts with five ZP stations.

Worked All ZP (WAZP)-for contact with all nine ZP call areas. Certificado Radio Club Paraguayo—for contacts with 15 ZP stations. The ZP 100, ZP 150 and ZP 200 awards are given for contacts with 100, 150 and 200 ZPs.

The ZP3 Award-for contact with two ZP3 stations.

The Diploma Departamentos del Paraguay-for contact with 12, 16 or 20 departments.

Note that a ZP contact is obligatory when applying for the AMCA, TCCA, and DSA. Awards may also be applied for by listeners.

The Andalucia Award

For contacting stations in Andalucia (EA7) since 1 January 1974. European applicants must have worked 20 in Seville. six each in Malaga, Cordoba and Grenada, four each in Cadiz and Huelva, and two each in Jaen, Almeria plus two EA9s in Ceuta and Melilla. Any mode/bands. Log data, certified by a national society, should be sent with 10 IRCs to: Delegacion URE, Award Manager, Box 479, Sevilla, Spain. The award is available on a heard basis for listeners.

A number of attractive Japanese awards are available including the following:

Worked All Japan (WAJA)

For confirmed contact with all 47 JA prefectures.

All Japan Districts (AJD)

For confirmed contact with all JA districts, JA1-JA0.

Heard All Continents (HAC)

Specially for listeners who have all continents confirmed.

Asian DX Award (ADXA)

For confirmed contact with at least 30 Asian countries (as per DXCC list) including Japan.

Japan Century Cities (JCC)

For confirmed contact with 100, 200, 300, 400, 500 or 600 Japanese cities.

Worked All Cities Award (WACA)

For contact with all cities.

All awards cost eight IRCs, and certified lists of QSLs held should be sent to: Awards Manager, Japan Amateur Radio League, PO Box 377, Tokyo Central, Japan. Note that all contacts must have been made since 30 July 1952. Each award is available to listeners as well as transmitting amateurs.

Band reports

The most interesting band seems to have been 1.8MHz during the past month. Typical winter conditions have resulted in late opening of 14 and 21 MHz, and 28 MHz has been very poor. However, the occasional "CQ" call is still worthwhile!

Your scribe would like to thank the following for supplying information used in this section: G2WS; G5JL; G6GH; G2s CDT, DHV and HKU; G3s AAM and GVV; GM3IAA; G3KSH; GM3LYY; G3s CWI, RCA and ZFC; GD4BEG; G4s EHQ, ETN and EZT; GI4GDV; G8MFS; SP3AGE; and BRSs 17567, 31301, 33915 and 36928.

Stations listed in italics were using cw, the others ssb.

1.8MHz. 0000 4U1ITU. 0200 VE1AXT, WA2SPL. 0300 EP2SV, W1-W4, YV10B, ZE7JX. 0600 EA8HQ, W3AJS/HC2, K1PBW, K6SE, VE7UZ, W1BB/1, W5TO, W9DR, ZF1CD, ZF2AW. 0700 PY1RO, W9MAL, XE1AN (QSL to W5GJ). 2100 (see text) EA8CR, VK6HD, ZC4IO. 2200 ISOLYN (1, 803kHz)

3-5MHz. 0000 EA9FE, TF5KP, W1-W4, W5, W8. 0100 CN8CW. 0200 EA9FL, PJ2AAX. 0500 OA4VR. 0700 ZL4AV. 1900 OE6DK/YK. 2100 CT3AB, JA1KXY, JA4CIB, ST2SA, VP2MSA, W1, W2. 2200 CN8CW, JA6BSM, 5H3KG, 7X5AS, 8P6GN. 2300 VP2s LCT,

7MHz.0600 CE2JK, EL2ET HC2SL, PJ8JM, W6-W7.0700 KH6WGG,

VK, W6-W7. 0800 CP8DLS, W6-W7, XE2NL, ZL. 14MHz. 0000 KC4AAC. 0800 JT1KAA, KL7, VK9NI, VK9RH, VP8PJ, ZL1YL/K. 0900 JA, JT1BK, KC6MJ, VK, VS6, ZL2LA (ex-G3PHO). 1000 VE3JQA/SU (QSL to VE1RU), TT8HV, VK, ZL.

1300 CEOZE, VK0KH. 1400 XE1AK, LI2B/YI (raft "Tigris"), ZL2HE. 1500 HZ1SH, VS5XU. 1600 FB8ZL, J28AP, J28BA, TR8BA, 3B8BJ. 1700 FB8WE, FR7BE, KH6BB, W7, ZS2MI. 1800 FP8DX, HH2MC (QSL to WA4AKU), PY7BXC/0, W7, VE7, ZL3GG. 2000 VE3HRS/ TZ6, VP8PM, WD9FCC/VQ9, 3C1X. 2100 HR6SWA, VK. 2200 ZD8TM.

21 MHz. 0900 C5AT, JA, KG6JIH, WB7TKB/SU, VS6EJ, ZL. 1100 EA6, S79DF, VS6BB, ZL. 1200 A9XCE, VK9RY, W. 1400 HK0CLS, TK7GAS, VE3FXT/S8, 3C1X. 1500 CR3BS, H5IND, W6, W7. 1600 PY7BXC/0, W, ZP. 1700 F08EX, VP1, W, XE. 1800 W6, WA7FEQ. 1900 KC4AAC.

1900 KC4AAC.
28MHz. 0800 TU2FH, 9M2BY. 0900 VK6TU, VU2KT. 1000 A2, HI,
LU, VK5WO, 5B4. 1100 EA8, SU1CR, TA1ZB, 3D6, 7P8, 9G1. 1200
FM7, VP2MUU, ZD7PV, 6W8, 8P6. 1300 CE, HK0AQ, KP4DSZ,
KV4AD. 1400 FG7, J28BD, KP4, NARD, OA, TK7GAS, VP8s LP, PC,
WA3TAG, ZP, 5T5ZR. 1500 CT2BB (QSL to W1EP), FM7. VP1AJ,
VP8s NO, PE, W1-W5, W0, ZS3. 1600 CX5RV, WD4LGE, YV5ACM/4.
1700 K0IMO.

Once again, many thanks to all correspondents, and also to the authors of the following for items extracted: CQ Magazine (W1WY), the Ex-G Radio Club Magazine (W3HQO), DX News Sheet (Geoff Watts), RSZ Newsletter (9J2KL), Long Skip (VE1AL/3), the West Coast DX Bulletin [WA6AUD] and DX'press [PA0TO].

Please send all items for March issue to reach G3FKM no later than 3 February.

Propagation predictions

| 14 MHz | | | J | ANUARY | 1978 |
|---------------------|---|---------------|--------|--------|------|
| USA-East W1-4 | S | 1 1 | 102 | man. | 100 |
| USA - West W5,7 | S | 1 1 | | Z | 如: |
| Caribbean 6Y5,FM,TI | S | 1 1 | DEA | === | 40 |
| Brazil PY | s | \Rightarrow | | | /A |
| South Africa ZS | S | | | C 1/// | 1116 |
| SE Asia HS,9M2 | S | 1 1 | 1 1700 | | 1 |
| Australia VK | S | | 1000 | 2 40 | |
| Japan JA | s | 1 1 | | 11 | |

Time (GMT) 00 02 04 06 08 10 12 14 16 18 20 22 24

| 21 MHz | | | | | JANU | ARY 1 | 978 | 3 |
|---------------------|---|---|---|------------|-------|-------------|-----|-----|
| USA-East W1-4 | s | 1 | 1 | | (5) P | E AD | - 1 | |
| USA-West W6,7 | s | 1 | 1 | 1 1 | | E I | 1 | 1 |
| Caribbean 6Y5,FM,TI | s | - | 1 | 1 10 | NA. | 144 | - | |
| Brazil PY | S | 1 | 1 | E | VAVE. | | 1 | - 1 |
| South Africa ZS | S | 1 | 1 | [Karana | OR ST | | 1 | 1 |
| S E Asia HS,9M2 | S | 1 | 1 | 1 1// | 3 | | - | - 1 |
| Australia VK | s | - | 1 | 1000 | 21 | 1 | - 1 | 1 |
| Japan JA | s | 1 | 1 | P ! | | 1 | - ! | 1 |

Time (GMT) 00 02 04 06 08 10 12 14 16 18 20 22 24

| 28MHz | | JANUARY 1978 | | | | | |
|---------------------|---|--------------|--------------|--|--|--|--|
| USA-East W1-4 | s | 1 1 | | | | | |
| Carlbbean 6Y5,FM,TI | s | 1 1 | | | | | |
| Brazil PY | S | 1 1 | : Canadana : | | | | |
| South Africa ZS | s | 1 1 | | | | | |
| SE Asia HS,9M2 | S | 1 1 | | | | | |
| Australia VK | s | 1 1 | | | | | |

Time (GMT) 00 02 04 06 08 10 12 14 16 18 20 22 24

Short path 1-5days 222222 6-20 days
L..... 6-20 days in the month

Conditions in January will differ little from those forecast for the previous month. Towards the end of the month hf bands will remain open a little longer than up to now. It is again pointed out that all times are given in gmt; this is done to facilitate conversion into local time of various dx countries such as east and west USA, Asia and Australia.

These propagation predictions have been published by the RSGB for the last 11 years, and by the Polish Amateur Radio Society PZK since 1972.

HF PROPAGATION STUDY

The maximum usable frequency (muf) for a given path at a given hour, varies from day to day. The highest probable frequency (hpf) is derived from statistical analysis of the daily muf values and is that value exceeded on three days of the month. Likewise, the optimum working frequency (owf or fot) is the value exceeded on 27 days.

HPF, muf and fot thus relate only to the probability (0-1, 0-5, 0-9 respectively) of a sky-wave path existing—there is no inference that signals will be workable. For amateur purposes it is found that bands between hpf and half hpf provide the best communications.

The prediction tables show the hpf in megahertz times 10, at twohourly intervals of gmt, on a number of different routes to/from the UK.

Predicted HPFs (MHz x 10) for January 1978

| GMT= | 00 | 02 | 04 | 06 | 08 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Aden | 152 | 143 | 122 | 187 | 335 | 360 | 333 | 317 | 261 | 187 | 155 | 148 | 152 |
| Ascension | 180 | 172 | 149 | 129 | 238 | 332 | 338 | 315 | 308 | 266 | 208 | 188 | 180 |
| Bahrain | 138 | 139 | 116 | 186 | 331 | 348 | 327 | 293 | 230 | 174 | 135 | 135 | 138 |
| Bangkok | 115 | 121 | 100 | 163 | 304 | 327 | 279 | 256 | 187 | 133 | 111 | 112 | 115 |
| Barbados | 150 | 141 | 128 | 125 | 121 | 178 | 322 | 331 | 318 | 290 | 215 | 169 | 150 |
| Bermuda | 129 | 128 | 115 | 119 | 110 | 122 | 284 | 329 | 329 | 290 | 200 | 152 | 129 |
| Bogota | 141 | 138 | 124 | 126 | 117 | 140 | 303 | 329 | 321 | 290 | 216 | 164 | 141 |
| Buenos Aires | 168 | 164 | 145 | 128 | 149 | 250 | 304 | 317 | 314 | 281 | 209 | 181 | 163 |
| Cape Town | 182 | 169 | 144 | 135 | 289 | 323 | 340 | 318 | 301 | 229 | 199 | 183 | 182 |
| Colombo | 125 | 135 | 112 | 190 | 329 | 342 | 326 | 293 | 221 | 161 | 129 | 129 | 125 |
| Cyprus | 130 | 130 | 112 | 147 | 300 | 326 | 310 | 293 | 238 | 168 | 133 | 128 | 130 |
| Dakar | 180 | 172 | 149 | 129 | 238 | 332 | 338 | 315 | 308 | 266 | 208 | 188 | 180 |
| Denver | 125 | 117 | 110 | 108 | 108 | 103 | 112 | 208 | 298 | 242 | 162 | 129 | 125 |
| Fairbanks | 125 | 121 | 126 | 121 | 125 | 150 | 141 | 138 | 149 | 152 | 134 | 131 | 125 |
| Falklands | 169 | 164 | 147 | 128 | 176 | 251 | 285 | 318 | 314 | 275 | 208 | 182 | 169 |
| Gibraltar | 101 | 97 | 88 | 82 | 143 | 223 | 228 | 221 | 205 | 152 | 119 | 103 | 101 |
| Hong Kong | 102 | 103 | 89 | 133 | 286 | 241 | 197 | 161 | 136 | 122 | 108 | 107 | 102 |
| Honolulu | 125 | 119 | 120 | 120 | 124 | 125 | 130 | 128 | 116 | 167 | 133 | 130 | 125 |
| Iceland | 82 | 84 | 78 | 70 | 70 | 169 | 227 | 227 | 197 | 124 | 88 | 86 | 82 |
| Jamaica | 130 | 126 | 115 | 119 | 110 | 139 | 257 | 328 | 328 | 288 | 200 | 152 | 130 |
| Lagos | 181 | 172 | 148 | 131 | 286 | 343 | 341 | 315 | 304 | 249 | 185 | 188 | 181 |
| Las Palmas | 148 | 143 | 126 | 112 | 168 | 300 | 312 | 298 | 289 | 233 | 180 | 155 | 148 |
| Lima | 155 | 149 | 133 | 126 | 126 | 141 | 321 | 329 | 319 | 289 | 213 | 173 | 155 |
| Los Angeles | 125 | 117 | 120 | 115 | 112 | 121 | 120 | 136 | 265 | 229 | 149 | 128 | 125 |
| Maita | 114 | 112 | 100 | 98 | 215 | 270 | 262 | 256 | 219 | 149 | 121 | 112 | 114 |
| Mauritius | 159 | 144 | 129 | 177 | 323 | 356 | 335 | 317 | 274 | 194 | 167 | 155 | 159 |
| Mexico | 125 | 121 | 106 | 110 | 102 | 145 | 152 | 281 | 321 | 265 | 173 | 136 | 125 |
| Moscow | 92 | 88 | 86 | 86 | 213 | 268 | 270 | 241 | 185 | 117 | 97 | 93 | 92 |
| Nairobi | 168 | 145 | 130 | 152 | 328 | 341 | 336 | 317 | 281 | 205 | 174 | 164 | 168 |
| New Delhi | 120 | 129 | 103 | 180 | 315 | 317 | 277 | 216 | 164 | 130 | 112 | 119 | 120 |
| New York | 125 | 125 | 115 | 110 | 101 | 103 | 227 | 309 | 323 | 267 | 178 | 136 | 125 |
| Osaka | 110 | 119 | 100 | 107 | 223 | 182 | 135 | 120 | 119 | 115 | 108 | 115 | 110 |
| Perth | 130 | 134 | 111 | 190 | 329 | 309 | 238 | 230 | 218 | 158 | 125 | 128 | 130 |
| Rio de Janeiro | 169 | 164 | 147 | 128 | 161 | 305 | 315 | 317 | 314 | 279 | 209 | 182 | 169 |
| Salisbury | 173 | 163 | 139 | 153 | 289 | 329 | 340 | 319 | 290 | 215 | 187 | 174 | 173 |
| Sevchelles | 155 | 121 | 117 | 177 | 309 | 318 | 335 | 318 | 263 | 192 | 163 | 153 | 155 |
| Singapore | 120 | 129 | 103 | 180 | 315 | 331 | 321 | 276 | 200 | 141 | 112 | 119 | 120 |
| Suva (s) | 124 | 124 | 114 | 117 | 135 | 225 | 237 | 196 | 144 | 121 | 122 | 131 | 124 |
| Suva (I) | 182 | 174 | 152 | 131 | 244 | 230 | 221 | 180 | 162 | 196 | 210 | 192 | 182 |
| Sydney (s) | 102 | 103 | 89 | 133 | 286 | 238 | 229 | 229 | 166 | 122 | 108 | 107 | 102 |
| Sydney (I) | 157 | 150 | 134 | 126 | 130 | 225 | 191 | 174 | 149 | 173 | 204 | 174 | 157 |
| Teheran | 131 | 135 | 110 | 190 | 329 | 342 | 323 | 284 | 213 | 154 | 129 | 129 | 131 |
| Vancouver | 125 | 117 | 116 | 120 | 110 | 105 | 111 | 114 | 180 | 186 | 136 | 130 | 125 |
| Wellington (s) | 111 | 117 | 98 | 111 | 200 | 229 | 239 | 213 | 143 | 115 | 110 | 117 | 111 |
| Weilington (I) | 171 | 168 | 148 | 129 | 183 | 201 | 176 | 164 | 155 | 188 | 205 | 186 | 171 |
| weinington (i) | .,, | 100 | 140 | 129 | 103 | 201 | 170 | 104 | 190 | 100 | 205 | 100 | 1/1 |

Bands recommended are those between hpf and half hpf.

These prediction tables were first introduced in April 1976, and although it was hoped to be able to improve on the hpf factor for a number of routes, insufficient reports have been received to enable a meaningful alteration to be made. Our thanks go to those few who have, however, taken the time and made the effort to submit reports.

It is felt that these tables have proved useful in their present form, and it is our intention to continue with their publication. Reports would still be welcomed by G4AQI, QTHR.

The 1977 AGM

This brief report is primarily intended for those members unable to attend the AGM. It is an informal account in advance of the minutes of the meeting and is in no way a formal record of the occasion.

The 51st Annual General Meeting of the RSGB took place at the Institution of Electrical Engineers, London, on 2 December 1977. The meeting was opened at 6.30pm with over 160 members present. The President, Lord Wallace of Coslany, was in the chair, and with him on the platform were Dain Evans, G3RPE, president-elect; John Brown, G3DVV, hon treasurer; and George Jessop, G6JP, general manager. G6JP announced that the meeting must end and the building be vacated at 8.30pm.

Formal agenda items

Minutes of the 50th AGM. Mr Caws, G3BRL, said that he did not propose the adoption of the minutes of the 49th AGM as he was not present at the last AGM. Mr Jessop apologized for this error of identification, and Mr Caws replied that if he had been present he would have been pleased to propose them. The minutes of the 50th AGM were then approved.

The second item on the agenda, to adopt the accounts for the year ended 30 June 1977, was proposed by G6JJ and seconded by G3UMI. G3IIR asked for a breakdown of the cost of repeaters and this was supplied by G3DVV. G3IIR said he would like to see this information in the accounts in future. G3OWF raised questions concerning staff numbers and remuneration which were answered by G6JP. G3IIR questioned the reported loss on the Alexandra Palace Exhibition when in fact it contained other losses, including the Leicester exhibition; and he felt this should be shown in the accounts. G3DVV replied that the loss did include Leicester, but the profit on books sold was not easy to assess; he would consider the point about more details in future.

The question of the auditors' qualification of the accounts was then raised. Mr Wright, of the auditors, was present at the meeting, and he dealt with this and several other questions regarding the qualification. He explained the sampling system used in conducting the audit, and said that, as documents to clarify certain queries which this had raised could not be produced the auditors' report could not be unqualified. G3DVV said that all income had been correctly documented at the time received, but at the time of the audit the auditors could not satisfy themselves that this had been done. He went on to say that steps had been and were being taken to ensure that all the documents required would be available in future; a new accountant had been appointed and things should be better organized. G3TJA proposed that the motion to adopt the accounts be put, and G3NPF asked what the legal position would be if they were not accepted. G3DVV replied that the vote would be recorded in the minutes and the next item on the agenda would follow.

The proposal to adopt the accounts was then put to the meeting and the count showed 73 in favour and 71 against. G3OWF pointed out that he held 41 proxy votes. It was stated that proxy votes could only be included if a ballot of the members present was called. Considerable discussion then ensued, and G4APG supported by the requisite number of members called for a ballot. There being insufficient time to conduct a ballot at the meeting it was agreed that the proposal, subject to ballot, be again put to the meeting. This was done and votes recorded by a show of hands were: 82 in favour, 75 against with 13 abstentions. G6JP said that ballot papers would be sent to all members present who had signed the attendance book.

The next item on the agenda was the declaration of the Council election results (see page 22), and as there had been no nomination for the vacancy for Zone E it was proposed to co-opt Mr D. H. Adams, GW3VBP, as Council member for that zone.

After considerable discussion on the next agenda item, Council was authorized to fix the remuneration of the auditors for the ensuing year.

The President then announced that Arthur Milne, G2MI, had been elected an honorary member of the Society in recognition of his many years' service as QSL Bureau manager. The announcement was greeted with loud acclaim. G2MI and Mrs Milne were then invited to the platform where G2MI was presented with his honorary membership certificate and badge, and an FR101D receiver as a token of the Society's gratitude. Mrs Milne was also presented with a gold watch in recognition of her work for the QSL Bureau.



Arthur Milne with his new FR101D

By then it was 8.15pm and the President announced that the IEE had agreed to an extension of time until 8.50pm to allow time for the presentation of trophies and an informal discussion. Lord Wallace then concluded the formal meeting by making the following address:

"On taking office as President I said I did not wish to pose as a 'new broom'. Nevertheless it did become clear that closer links between the rank and file member and Doughty Street and Council were desirable and necessary. In other words we seemed to be able to communicate efficiently and readily to all parts of the world, but in the affairs of this great and rapidly growing Society we were not so good—with frequent acute ORM.

"For that reason the Presidential Working Party of Dain Evans, John Allaway and myself was put in hand. It has been a somewhat unusual set up. No long, wordy meetings and fat files, but a receiving point for the views and ideas of members and local societies. As a result a mass of useful information has been collected and sorted from which, very shortly in the coming year, positive recommendations will be put to Council. It is here that John Allaway and I pay tribute to Dain Evans' work in collating the information obtained which has appeared in summary form in Radio Communication. It is your Society; we asked for your voice—we got it! For the same reasons the Regional Representatives' Conference was convened after a lapse of time. The result was a positive and constructive exchange of views and the results are being considered by the M & R Committee on 10 December.

"It is essential in my opinion that this type of contact should not be neglected. It is a vital and important point of contact which needs to be further developed to strengthen our lines of communi-

"Effort has been made during the year to raise the image of the Society at public and official levels. I think success can be claimed. I hope local societies will do their best to publicise their activities in their local press.

"Changes will be taking place in the new year. David Evans takes over as general manager, and George Jessop will continue in service with the Society until the end of June as a consultant. George has served the Society well as Council member, general manager, and president over a period of years. In due course I have no doubt members will wish to mark his service, in the meantime on your behalf I express our gratitude.

"John Brown retires as treasurer. We thank him for his loyal and expert service. His successor is to be Mr P. F. D. Cornish, G3COR.
"The transfer of the editorial dept of Radio Communication has

"The transfer of the editorial dept of Radio Communication has given a little extra space at Doughty Street; even so, with the growth

of the Society, Doughty Street is bursting at the seams. At no distant future a headquarters adequate to meet modern needs must be found.

be found.
"May I thank all members for their support during my period of office. Presidential office in the RSGB is no joy-ride but it has been a useful and stimulating experience for a back-bench swl. Even SWLs can prove useful!"

Informal discussion

After the presentation of trophies, an informal discussion took place. In reply to written questions submitted by G3IIR, the general manager said that approximately 5,700 members (32%) were resident in Zone C; five meetings of the Membership & Representation Committee had been held during the year, three in London, one in Manchester, and one in Bournemouth; and that none of these meetings had been attended by the Council member for Zone C. G3IIR commented that he felt the Council member for Zone C chould retire and allow someone else to take over

should retire and allow someone else to take over.

The Zone C member, G3MXJ, expressed surprise that he had not received the courtesy of being told of the question beforehand. He said all meetings of the M & R Committee had been held on working days and that he had previously given notice that he could not attend on those days. This was probably why frequently there was not a quorum at meetings which only the retired and elderly attended. G3MXJ then listed the number of Council, regional and other meetings he had attended and the numerous clubs he had visited. He felt that this sort of activity was more important than attending inconclusive committee meetings, and that it was important that committee meetings be held on non-working days to encourage more younger members, not retired members, to take part. (Warm applause)

G30WF had submitted a written question asking for guidelines on expenditure on various Items, and asked that more information on these matters be published. The President said this would be considered but was dependent on space availability.

GM8FFX raised the subject of members, known by the Home Office to have broken the Wireless Telegraphy Act, being in positions of responsibility. G6JP replied that Council had taken steps in certain cases of which it had been officially notified.

G3ZYE felt that the present policy regarding published details of candidates standing for election to Council was unsatisfactory, and asked that Council consider the possibility of candidates putting forward their aims and views. The President replied that this would be considered.

A member who did not identify himself said that the Society had produced excellent technical articles and information in its journal, but it failed on administration and correspondence. Apart from this he felt the Society did a fine job (Anglayes)

he felt the Society did a fine job. (Applause)
G3PAQ spoke of the interference to repeaters, particularly the
jamming on 70cm which he claimed resulted from the announcement of the Home Office's intention not to licence further repeaters.
The chairman of the VHF Committee, G3BA, said there had been a
lot of sniping at the committee over repeaters but that the Repeater
Working Group had done a good job.

Several questions were asked regarding non-inclusion of items sent for GB2RS bulletins. G6JP replied that the selection of news was made on a general interest basis. What was omitted was club news of local interest only or information already published in the journal.

At this point time ran out, and G3AAE wound up the proceedings by thanking Lord Wallace for his conduct of a difficult meeting and for all his good work as President during the year. This was greeted with a standing oyation.

Raynet—Radio Amateurs' Emergency Network

The following is a paper presented by Mr P. Balestrini, G3BPT, the Society's emergency communications manager, at a symposium on major incident intervention held by the City of London police on 19 and 20 October 1977.

N introducing the Radio Amateurs' Emergency Network, one should perhaps commence by introducing the radio amateur. The radio amateur is to many people many things—a body of likeminded persons interested in the science and art of communication; a group of dedicated enthusiasts sitting up all night and making meaningless noises; and, regrettably, in some cases that group of persons which gets all the blame for any strange noises or disturbances on "the box".

Needless to say most of the radio amateurs in the UK are primarily interested in the science and art of communication, and many had long felt that there was a need for a national emergency service to cope with emergency communications under disaster conditions. Before any organization could be established, an emergency of magnitude occurred when, during the last few hours of January 1953, storm disaster struck the east coast. Post Office telephones, government wireless stations and utility services were out of action for days. Ignoring the terms of their licences, and in the best traditions of service to the community, radio amateurs placed their stations and communication experience at the disposal of the authorities. The North Sea floods, which brought death and destruction to the east coast of England on an unprecedented scale, led to the formation of the Radio Amateurs' Emergency Network, today universally known as Raynet.

Raynet has since grown to an organization of over 1,800 currently registered members, with over 70 groups in the UK and representation in the Channel Islands and Northern Ireland. Home Office approval was given for the formation of the organization under the terms of the amateur (sound) licence, and at the present time members are permitted to operate under emergency or exercise conditions at the request of the police, the British Red Cross Society, the St John Ambulance Brigade and county emergency planning officers.

The organization of Raynet is co-ordinated by a national committee appointed by the Council of the Radio Society of Great Britain. The committee appoints controllers who are responsible to it for local liaison with their respective user services. Direct liaison between the groups, the committee, senior user services and the Council of the RSGB, is organized by the RSGB emergency communications manager.

Members of Raynet have been called upon to provide communication assistance on numerous occasions, resulting in their presence during flood alert conditions and searches for missing children. Last summer members were involved in the fight against forest and heath fires, and many of them were on duty for several days—fortunately with the co-operation and understanding of their employers

Under a special dispensation recently granted by the Home Office, Raynet groups are allowed to be present on stand-by at county shows and similar events. Several groups, while in attendance at these shows, have been able to provide instant communication when urgent medical attention was required. On more than one occasion doctors called to incidents have confirmed that a life has been saved by the prompt relaying of the call for their assistance.

While long-haul communication facilities (including radio teleprinter) exist in the organization, it does not normally provide a national network because disasters in this country are normally parochial in nature. At the same time, however, groups can communicate on common channels and provide back-up facilities with neighbouring areas when required.

To achieve an efficient standard of service and operating capability, groups hold training nets to test and up-date radio coverage of their area. Regular exercises, both "in house" and in co-operation with user services, are held to practise message handling under simulated emergency conditions.

As a voluntary organization there is no membership fee, although many groups have a small annual subscription to cover administration costs, production of newsletters, etc. The radio equipment is generally the property of individual members. All Raynet members carry identification cards issued by the Raynet registration officer, and personal visible identification is provided by the Raynet armband (white and yellow with RAYNET in black letters). Vehicles are identified by means of the Raynet emblem window sticker and either a yellow sticker with the lettering Raynet in black, or a yellow disc carrying the words Raynet Emergency Radio.

In support of an incident, Raynet can provide mobile or handportable equipment for working either back to mobiles for onward relay to a base station, or direct to base equipment at incident headquarters or control, or any variant of the above. Area coverage can be provided by the use of the vhf and uhf repeater stations now becoming available.

While many groups have base stations, ready for emergency use, located in police stations, British Red Cross Society premises, etc., they are also capable of setting up field stations complete with portable antennas and emergency generators. Raynet does not have groups in every part of the country, however, but membership is increasing all the time.

As a professional communicator, the author realizes only too well that no matter how sophisticated a communication system may be, under disaster or emergency conditions it may fail or become overloaded. Under these conditions Raynet can provide that "extra channel", and cream off some of the additional traffic generated by the incident itself.

Special skills are required for communications personnel to be able to deal with disasters or emergencies, as events such as these happen without warning. Raynet members, in the best spirit of community service, voluntarily equip and train themselves to employ their communications expertise whenever required to do so.

Summing up

Raynet operates with the full authority of the Home Office.

Raynet services are available free to the user services.

Raynet services are not limited by any geographical or constitutional boundary.

Raynet members are dedicated to the provision of an efficient communication capability and are technically qualified in the maintenance of their own equipment.



Chairman's comment

Another year and another season, so once again the Raynet Committee chairman is guest writer for the column. In looking back over the year the committee was most impressed by the enthusiasm and progress made by groups in general and the new groups in particular. There are around 2,000 total registered members with over 70 groups.

We were very pleased to be invited to take part in the City of London Police Symposium on major disaster intervention, and particularly pleased with the interest and enquiries made by emer-

gency planning officers from as far away as Clwyd.

I have often been asked "Why bother?", (indeed this was the title of an excellent lecture given by Julian Maud at Lancaster earlier this year). I think that "we bother" because Raynet service is the best way that the radio amateur can be SEEN to be repaying the investment of valuable frequency space that various World Administrative Radio Conferences have made in the radio amateur. This view is shared by many of the European societies with particular reference to the vhf and uhf bands... and 1979 is not very far away! To quote from the Lancaster lecture: "It seems a great pity that in areas without a Raynet group it seems to take a major disaster to point out (to the emergency services as well as to radio amateurs) that extra communications are indispensable". Think of the Summerland fire on the Isle of Man. Think of the explosion and fire at Flixborough... There are now Raynet groups in the Isle of Man and in Lincolnshire.

We can all communicate, but communication as such is very different from message handling; Raynet is accepted as a professional body of communicators with professional standards. These standards are maintained by exercise and procedure quite different from the ordinary run-of-the-mill QSO and chat on the club channel. To again quote from the Lancaster lecture: "In many minds the question 'how can the radio amateur who appreciates the problems or realizes the potential hazards in his own areas serve his community or start a group?" Contact the RSGB emergency communications manager either at home or via RSGB headquarters; he will

"Merrivale", Willow Walk, Culverstone, Gravesend, Kent DA13 0QS.

advise on neighbouring groups or offer guidance and counsel on getting started.

May I ask all groups to use their influence on neighbouring areas, let us make 1978 Raynet Year... after all it is our 25th year. Recruitment is the committee message for the good of the community, the radio amateur, the RSGB and, most important, the preservation of frequency allocations.

Out and around

Regrettably a couple of discrepancies appeared in the last column, the callsign of the retiring group controller for central Norfolk should be G3PTB; and Alf Othen, G3FSZ, has been appointed sector controller, Surrey Raynet, and also group controller, Surrey (Airports) group. At the time of going to press two new appointments have just been confirmed: Peter Tucker, G4DWZ, group controller, North London; and John Simkin, G8IYS, group controller, Southeast London. Essex Raynet now have a permanent installation on 70'375 for exercise and emergency use only; this installation will have monthly tests.

Information from the groups includes various newsletters, which are always read with interest by the committee; time and postage expense excludes individual acknowledgements to all correspondents. Exercise reports received include: Exercise soundproof from Cheshire; Exercise Watersedge from Kent, and Exercise Polycross from Avon. Operational activity reported includes assistance to the county emergency officer, Avon, on the occasion of the royal visit on 8 August; and operational assistance to the BRCS at the occasion of the Holkham Fair in Norfolk (thank you G3HRK).

Cleveland Raynet have produced a technically-viable proposal for a portable vhf repeater which has the committee's backing. Further proposals are awaited from groups that are interested in uhf repeaters or uhf/vhf transponders/talkthrough systems (contact the emergency communications manager before proceeding). We are happy to report increasing activity in Scotland and are grateful to Alan Denniss, G3CNV, who regularly maintains contact as county controller, West Midlands, with the groups within his control area.

I would finally say thank you for the loyalty to and support of the system by the individual member, the controllers, and the Raynet Committee. We look forward to a steady growth in 1978, thereby extending our valuable service to the community. THANK YOU.

Mobile rallies calendar

| 19 March | White Rose Mobile Rally, Lawnswood School,
Leeds, Details from G4DZI. |
|-----------|---|
| 2 April | University College of Swansea RS Mobile Rally,
University College of Swansea. Details from
J. O. Morris, 1 Hadland Terrace, Norton, Swan-
sea SA3 5TT, tel Swansea (0792) 68675. |
| 14 May | East Suffolk Wireless Revival, near Ipswich. Details from G4EVN. |
| 21 May | Northern Mobile Rally, Victoria Park Hall,
Keighley, Details from G8DFZ. |
| 21 May | Welsh Amateur Mobile Rally, Barry Rugby
Football Club, Cemetery Lane, Barry, South
Glam. |
| 28 May | Hull & District ARS Mobile Rally, University of Hull, Cottingham Road. All the usual attractions. Details from sec G3WYW. |
| 10 June | Scottish Amateur Radio Mobile Rally, The Palace of Arts, Bellahoustoun Park, Glasgow. Details from GM4FDM. |
| 11 June | Elvaston Castle Mobile Rally. Details later. |
| 18 June | RNARS Mobile Rally, HMS Mercury, Petersfield,
Hants. Details from G4DIU, tel Havant 79464. |
| 25 June | Longleat Mobile Rally. Details from G4FRG. |
| 9 July | Upton Radio Rally. Details from M. Monro,
G8DLL, 127 Monarch Drive, Worcester. Tel
Worcester 423276. |
| 16 July | Hornsea ARS Mobile Rally, Hornsea School,
Hornsea, North Humberside. Details from
G8KFK. |
| 23 July | Cornish Mobile Rally, Truro. Details from G3NKE, tel Camborne 712419. |
| 20 August | Preston Mobile Rally. Details later. |

General rules for vhf/uhf/shf contests 1978

The rules governing all RSGB vhf/uhf/shf contests to be held in 1978 will be selected from the following general rules, which will be referred to by number. Supplementary rules will be added for the more complex events such as VHF NFD.

Please read these rules carefully.

Cover and summary sheets and up to 10 log sheets can be obtained from the contest adjudicator. If you are entering a contest it is only necessary to tick the bottom of the cover sheet (Form 427) and enclose an sae. All stationery is A4 size (30 by 21cm); envelopes which will hold flat sheets will carry far more than those which require the sheets to be folded. Larger quantities of log sheets may be purchased from RSGB Publications (Sales).

- 1 Date and time. See Individual contest details.
- 2 All entries must be sent to the adjudicator at the address given with the rules for the contest.
- 3 All operators must be members of the RSGB or have a membership application in progress.

4 Sections:

(a) There are two sections:

Section F —fixed stations; Section P —portable and temporary stations.

If less than 10 entries are received for either section, Rule 4b will apply instead. /A stations will be listed with portable stations, but may not enter portable contests run under Rule 4d.

- (b) All classes of stations with no separate sections.
- (c) Fixed stations only (excluding /A).
- (d) Portable stations only (excluding /A).

All equipment, including antennas, for portable and temporary stations must be installed on the site during the 24 hours preceding the contest, or during the contest itself. This does not apply to storage of equipment, or to its prior installation more than 1km away from the contest operating position.

Portable stations may be required to provide proof of permission

5 Locations

- (a) Entrants may not change the location of their stations during the contest.
- (b) Entrants may change the location of their stations during the contest on one occasion provided that only the highest scoring contact with a given station is claimed in the event of a repeat contact. Repeat contacts must be clearly marked as such in the contest log.

- (a) Contacts may be made on all permitted modes.
- (b) Entrants may transmit only A1 (cw) or F1 (fsk) and contact only other stations transmitting these modes.

7 Scoring system

(a) Contacts made between the distances shown in the table will score as indicated. Contacts on borders between

| mig migs sc | ore row. | | |
|-------------|----------|--------------|--------|
| Km | Points | Km | Points |
| 0-50 | 1 | 250-300 | 11 |
| 50-100 | 3 | 300-350 | 13 |
| 100-150 | 5 | 350-400 | 15 |
| 150-200 | 7 | 400-450 | 17 |
| 200_250 | 0 | and are rata | |

Note that, (i) all radial rings are 50km wide, (ii) all possible scores are odd numbers.

(b) Contacts will be scored at one point/kilometre.

8 Awards

In each section there will be an award to the highest scoring station. An award will also be made to the runner-up in each section in which there are 10 or more entries.

Additional awards will be made when appropriate.

9 Cross-band contacts

- (a) Cross-band contacts do not count for points.
- (b) Half points may be claimed by both stations for a cross-band contact if two-way communication cannot be established on the same band.

10 Repeat contacts

(a) Only one scoring contact may be made with a given station on each band covered by the contest (ie callsigns that are fixed, /A, /P or /M or the same set of equipment used under a different callsign all count as one station). If a station

that has moved location is contacted a second time, only the higher scoring contact may be claimed. Serial numbers start at 001 and advance by one for each contact.

(b) One contact may be made with a given station (as defined in 10a) during each activity period. Only three out of seven activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purpose of checking. To be eligible for an award, an entrant must take part in a minimum of three activity periods. Serial numbers start at 001 for each activity period and advance by one for each contact.

11 Contest exchange

The contest exchange shall consist of:

(a) Both callsigns;

(b) RS or RST report followed by serial number;

(c) Both QTH locator (the standard five-symbol location system) and OTH.

For stations operating within Great Britain the QTH must be given as a point identifiable on the Ordnance Survey Route Planning Map (Scale 1:625,000) or as a direction and distance up to 25km from such a point, to the nearest kilometre. For a station operating from outside Great Britain, the QTH must be readily

No points will be lost if an entrant is unable to obtain a serial number or complete location information from a station not taking part in the contest. But the receiving operator must obtain enough information to be able to calculate the claimed distance score.

12 Log keeping

Entrants must keep their own log records in accordance with licence requirements.

The logs for contest entries must be made out on current RSGB contest log sheets or if computer readout sheets are to be submitted these must be cut to A4 size format.

(a) Date/time (gmt);

(b) Callsign of station worked;

- (c) My report on his signals and serial number sent;
- (d) His report on my signals and serial number received;
- (e) QTH locator received; (f) QTH received:
- (g) Points claimed.

Note: In multiband contests serial numbers must start at 001 on each band used.

- 13 An entrant must operate within the terms of his/her licence.
- 14 An entrant may not engage in more than one contact con-
- 15 Stations using telephony in the recognized cw sub-bands 70·025-70·15MHz, 144·0-144·15MHz, 432·0-432·15MHz and 1,296·0-1,296-15MHz, or transmitting on beacon frequencies, are liable to disqualification. Entrants should observe the provisions of the IARU/RSGB band plans.
- 16 Stations that persistently overmodulate, radiate poor quality signals, or otherwise contravene the code of practice for vhf/uhf contest operation (see p63), are liable to disqualification or loss of points.
- 17 Special event callsigns (eg GB) may not be used.
- 18 Contacts made via a repeater or man-made satellite will not count for points.
- 19 Proof of contact may be required.

- (a) All entries must be accompanied by an RSGB VHF/ UHF contest cover sheet (Form 427) for each band used. The cover sheet must be correctly made out and the declaration signed. In multiband contests entrants must also complete a multiband summary sheet
- (b) All entries must be postmarked not more than 15 days after the end of the contest.
- (c) All entries become the property of the RSGB and will not be returned.
- (d) Gross errors in log keeping render the entrant liable to disqualification.
- 21 Failure to comply with any of the rules given for a particular contest may result in disqualification.
- The ruling of the Council of the RSGB shall be final in all cases of dispute

General rules for RSGB hf contests 1978

The general rules for all RSGB hf contests are given below. For each contest throughout the year a short supplementary set of rules will be published which must be read in conjunction with the general rules.

- 1. Entrants must operate in accordance with the terms of their licences.
- 2. Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Proof of contact may be required.
- 3. Unless otherwise stated, single-operator entries only will be accepted. A single-operator station is one manned by an individual operator who receives no assistance whatsoever in operating, log keeping or checking etc, from other persons during the contest period.
- 4. Only fully-paid-up members of the RSGB resident in G, GD, GI, GJ, GM, GU and GW may enter.
- 5. A contact consists of an exchange and acknowledgement of an RS report on telephony, or an RST report on telegraphy, and a three-fligure serial number starting with 001 and increasing by one for each successive contact throughout the contest, irrespective of the band or mode in use. Serial numbers, when sent, must be recorded from non-competing stations.
- Entries must be clearly written or typed on one side only of RSGB contest log sheets or international A4 size paper using blue or black ink.
 - (a) Separate log sheets must be used for each band.
- (b) Logs must be kept, and entries submitted, in gmt.

- (c) Each entry must include a cover sheet incorporating a signed declaration.
- (d) All entries become the property of the RSGB. In the event of any dispute the ruling of the Council of the RSGB shall be final.
- (e) All entries must be postmarked not later than 15 days following the contest. If acknowledgement of receipt is required. British Isles entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged.
- (f) Entries must be addressed to the adjudicator, whose address will appear in the supplementary rules for each contest, with the name of the contest marked in the top left-hand corner of the envelope.
- For scoring purposes, aeronautical mobile and maritime mobile stations will count only as the minimum score of the particular contest and not for any bonus or multiplier.
- Awards. (a) Awards are made at the discretion of the Council
 of the RSGB and may consist of trophies, plaques or certificates.
 Awards are, where possible, presented at the RSGB AGM following
 the contest.
- (b) The standard award format for contests is as follows: Some winners and section leaders will be the holders of particular trophies, and these will also receive a special certificate or plaque. Certificates of Merit will be awarded to the entrants placed first, second and third in each section of the contest, from (i) the British Isles and (ii) overseas.
- 9. Disqualification. Entrants may be disqualified for failure to observe the above rules or supplementary rules.

Code letters for use in RSGB contests

| County/Region | Letters | County/Region | Letters | County/Region | Letters | County/Region | Letters |
|---------------------|---------|----------------------|---------|------------------------|---------|---------------------------------------|---------|
| Alderney | ALD | Durham | DHM | Isles of Scilly | IOS | Salop | SLP |
| Antrim | ATM | Dyfed | DFD | Isle of Wight | IOW | Sark | SRK |
| Armagh | ARM | | | | ALTERNA | Shetland | SLD |
| Avon | AVN | Essex | ESX | Jersey | JER | Somerset | SOM |
| | | Local | 40// | | LCALOT | Staffordshire | SFD |
| | | Fermanagh | FMH | Kent | KNT | Strathclyde | SCD |
| Bedfordshire | BFD | Fife | FFE | Lancashire | LNH | Suffolk | SFK |
| Berkshire | BRK | 1110 | | Leicestershire | LEC | Surrey | SRY |
| Borders | BDS | 101.01 | CNIIA | Lincolnshire | LCN | East Sussex | SXE |
| Buckinghamshire | BKS | Mid Glamorgan | GNM | Greater London | LDN | West Sussex | SXW |
| | | South Glamorgan | GNS | | LDR | | |
| Cambridgeshire | CBE | West Glamorgan | GNW | Londonderry
Lothian | LTH | ********** | |
| Central | CTR | Gloucestershire | GLR | Louisi | LIN | Tayside | TYS |
| Cheshire | CHS | Grampian | GRN | Greater Manchester | MCH | Tyne & Wear | TWR |
| Cleveland | CVE | Guernsey | GUR | Merseyside | MSY | Tyrone | TYR |
| Clwyd | CWD | Gwent | GWT | Microcyolac | 11101 | | |
| Cornwall | CNL | Gwynedd | GDD | Norfolk | NOR | Warwickshire | WKS |
| Cumbria | CBA | | | Northamptonshire | NHM | Western Isles | WIL |
| Cumbria | ODA | Hampshire | HPH | Northumberland | NLD | West Midlands | WMD |
| | | Hereford & Worcester | HWR | Nottinghamshire | NOT | Wiltshire | WLT |
| Derbyshire | DYS | Hertfordshire | HFD | | | · · · · · · · · · · · · · · · · · · · | 2555504 |
| Devon | DVN | Highlands | HLD | Orkney | OKE | 1855 NA ESS DE UNE | |
| Dorset | DOR | Humberside | HBS | Oxfordshire | OFE | North Yorkshire | YSN |
| Down | DWN | | | | | South Yorkshire | YSS |
| Dumfries & Galloway | DGL | Isle of Man | IOM | Powys | PWS | West Yorkshire | YSW |

Code of practice for vhf/uhf contest operation

- Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.
- Take all possible steps to ensure that a site is not going to be used by some other group or club. If it is, come to an amicable agreement before the event. Groups are advised to select possible alternative sites.
- 3. All transmitters generate unwanted signals; it is the level of these signals that matters. In operation from a good site, levels of spurious radiation which may be acceptable from the home station may well be found excessive by nearby stations (up to 25 miles or even further).
- Similarly, all receivers are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality.

- Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.
- 5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur-band spurious radiations, including noise modulation, to a level of —90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.
- 6. Above all, be gentlemanly at all times. Be helpful and *Inform all stations* apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! If asked to close down by a Government or Post Office official, do so at once without objectionable behaviour. If the site owner requests your station to close down, accede to his request without hostility.

General rules for RSGB hf receiving contests

- All entrants operating from the British Isles must be fully-paid-up members of the RSGB.
- 2. Single-operator entries only will be accepted.
- To claim for points, a station may be logged once only on each band, whether fixed address, portable, mobile or alternative address.
- A receiving station log must show in columns: date/time, callsign
 of station heard, report and serial number sent by station heard,
 callsign of station worked, band in megahertz, bonus points,
 total points.
- Where two or more bands are in use, separate log sheets must be submitted for each band.
- In the column designated for "station worked", the same callsign may only appear once in every six contacts logged.
- 7. A cover sheet shall be submitted with a contest log as under transmitting section General Rule 6(c) except that the last sentence of the declaration shall read: "I certify that I do not hold a transmitting licence."
- The following rules from the transmitting section general rules also apply to receiving contests: 3, 6(d), 6(e), 6(f), 7, 8(a), 8(b),

General rules for listeners' vhf/uhf contests 1978

- The following rules from the general rules for vhf/uhf/shf contests published in this issue shall apply: 1, 2, 4b, 5a, 7a, 10a, 18, 20, 21 and 22.
- Listeners' contests are open to all non-licensed members of the RSGB. Only the entrant may operate the receiving station.
- Logs must show in columns: (a) date/time (gmt), (b) callsign of station heard, (c) my report on his signals, (d) report and serial number sent by station heard, (e) callsign of station being worked (f) location given by station heard, (g) points claimed.

On 144MHz the callsign in column (e) may occur only once in every 20 contacts logged. CQ and test calls do not count for points and should not be logged. If both sides of a QSO can be heard, both can be claimed for points.

The Hanson Trophy will be awarded to the entrant with the highest aggregate score in all the swi contests between 4 March and 3 September 1978.

contest news

UHF 432MHz-2-3GHz Contest results

Four members of the VHF Contests Committee entered this event and between them collected four of the seven certificates. No previous comparable successes can be claimed by the committee.

Over the last few years changes have been made to the rules which comply with the IARU format in an endeavour to satisfy UK entrants. The date and timing are both criticized. UHF and microwave enthusiasts are invited to attend the committee's "talk-in" at the VHF Convention in February. Comment on this and other contest matters are invited.

A number of operators chose to concentrate their efforts on one band; their decision proved rewarding. G4BEL concentrated on 1-3 and 2-3GHz and won both bands, defeating the portable club stations. Two winner's certificates are on the way and the RSGB 1-3GHz Trophy will be presented to him at the convention. G3NNG made a one-band entry, leading the 432MHz fixed section by a very substantial margin.

Other certificates go to G4BPO/P and GW3UBX/P (432MHz portable winner and runner-up respectively). G3VPK receives the runners-up certificates for both 432MHz and 1.3GHz fixed station section. G5HD

| | | 432MH | FIXED SE | CTION | | |
|-----------|------------------|------------|-----------|--------------|---------------------|------------|
| Posn | Callsign | Points | QSOs | QRA | Best dx | Km |
| 1 | G3NNG | 18,264 | 116 | ZL23 | PAONYM/P | 514 |
| 2 | G3VPK | 9,966 | 65 | AL14 | F1EBN/P | 369 |
| 3 | G3FZL | 6,740 | 54 | ZL50 | PAONYM/P | 407 |
| 4 | G3JMA | 5,980 | 74 | AL11 | PAOEZ | 355 |
| 5 | G4CQR | 5,137 | 73 | ZL49 | PAOEZ | 370 |
| 6 | G3OHM | 4,226 | 43 | ZM41 | G4EDY/P | 231 |
| 7 | G8AKT | 3,799 | 50 | ZM79 | F1EBN/P | 428 |
| 8 | G8HBQ | 3,699 | 35 | ZN13 | G4EEE/P . | 280 |
| 9 | G8AZA | 3,499 | 22 | ZO69 | PEOMAR/P | 388 |
| 10 | G3ZZJ | 3,432 | 36 | YN37 | G4BPO/P | 304 |
| 11 | G5UM | 2,321 | 30 | ZM35 | G3DAH | 180 |
| 12 | G8AYY | 1,951 | 22 | ZM41 | G4BPO/P | 205 |
| 13 | G3ZFP | 1,925 | 38 | ZL18 | G8HVY/P | 190
255 |
| 14 | G8BJG | 1,910 | 35 | AL41 | ONGAT/A | 255 |
| 16 | G8BXJ
G6XM | 1,306 | 17
15 | YL38
ZL22 | G3XGS | 180 |
| 17 | GSCOJ | 1,244 | 14 | ZL22
ZL37 | G3AUS
PA0EZ | 409 |
| 18 | G4AEZ | 1,171 | 5 | ZL30 | G4EEE/P | 95 |
| 10 | GAMEZ | | | SECTION | G4CCC/P | 95 |
| Posn | Callsian | Points | OSOs | QRA | Best dx | Km |
| 1 | G4BPO | 20.497 | 106 | AM67 | DC9VA | 521 |
| 2 | GW3UBX | 15,028 | 97 | YM44 | FIDBN/P | 378 |
| 3 | G4BRA | 14,116 | 120 | ZL26 | PAONYM/P | 473 |
| 4 | G4EEE | 11,623 | 84 | ZL53 | F1EBN/P | 502 |
| 5 | G3AKF | 8,750 | 82 | ZL59 | PAONYM/P | 500 |
| 6 | G4ALE | 4.965 | 69 | ZL60 | FIBJB | 338 |
| 7 | G8FMG | 4.287 | 60 | ZM78 | GREIS | 212 |
| 8 | GSEIK | 3,760 | 46 | ZL08 | ON6AT/A | 283 |
| 9 | GM8BJF | 2,266 | 12 | YP42 | G3NNG | 444 |
| 10 | G4BZD | 1,914 | 17 | ZN44 | G4EEE/P | 260 |
| 11 | G3SBV | 1,748 | 26 | ZL60 | G4BPO/P | 133 |
| | | | z FIXED S | | 0.0.0 | |
| Posn | Callsign | Points | QSOs | QRA | Best dx | Km |
| 1 | G4BEL | 2,704 | 24 | AM51 | PAONYM/P | 400 |
| 2 | G3VPK | 2,472 | 25 | AL14 | PAGEZ | 304 |
| 3 | G3JXN | 1,676 | 33 | ZL39 | ON6AT/A | 270 |
| 4 | G6XM | 1,153 | 14 | ZL22 | G3AUS | 180 |
| ' 5 | G3FZL | 1,047 | 21 | ZL50 | G6XM | 117 |
| 6 | G3JMA | 957 | 22 | AL11 | G3XDY/P | 90 |
| 7 | G3COJ | 879 | 18 | ZL37 | G3VPK | 100 |
| 8 | G8ACJ | 331 | 7 | ZL68 | G3ULT/P | 64 |
| 9 | GBAYY | 317 | 6 | ZM41 | G4BRK/P | 105 |
| 10 | G4AEZ | 278 | 8 | ZL30 | G4BRK/P | 65 |
| 11 | G3OHM | 246 | 5 | ZM41 | GW3ONP/P | 86 |
| 95 | U SERVICES | | | SECTION | 7180000000000000007 | 1922/01 |
| 1 | G3XDY | 2,591 | 21 | AM67 | GW3ONP/P | 304 |
| 2 | G3BRK | 2,352 | 35 | ZL26 | G3AUS | 226 |
| 3 | G4ALE | 2,057 | 34 | ZL60 | G3LQR | 149 |
| 4 | G3ULT | 2,013 | 25 | ZL59 | G3XDY/P | 198 |
| 5 | G3MOI | 1,943 | 23 | ZL53 | GW30NP/P | 179 |
| 6 | G3SBV | 1,251 | 25 | ZL60 | G3XDY/P | 133 |
| 7 | G4FEV | 1,233 | 21 | ZM78 | G3XDY/P | 172 |
| 9 | GW3ONP | 661
588 | 5
12 | YM44
ZL08 | G4BRK/P
G3VPK | 80 |
| 10 | GSEIK | 93 | 1 | YP42 | G3BW | 93 |
| | GM8BJF | | 2 | | G3HCW | 27 |
| 11 | G4BZD | 48
5 | 1 | ZN44
ZN63 | G3DBZ/P | 1 |
| 12 | ∫ G3XWZ
G3DBZ | 5 | - 1 | ZN63 | G3XWZ/P | 1 |
| | COURT | | MHz SECT | | GOVANTIL | (20) |
| Posn | Callsign | Points | QSOs | ORA | Best dx | Km |
| Posn
1 | G48EL | 196 | 2 | AM51 | G4ALE/P | 120 |
| 2 | G4ALE/P | 191 | 2 | ZL60 | G4BEL | 120 |
| 3 | G3XDY/P | 109 | 3 | AM67 | G4BEL | 67 |
| 4 | G3WOI/P | 98 | 1 | ZL53 | G4ALE/P | 98 |
| 100 | 301101/1 | 90 | | 2500 | | - |

144MHz CW Contest (November 1977) results

Conditions for this contest were extremely poor—described also as grim, flat, below flat and abysmal. One optimist thought them fair, although there was little evidence to support this. Some good QSOs were made, however, both G/DL and G/GM. Nevertheless, contestants enjoyed the event although no doubt due to poor conditions there were 29 entries compared with 39 last year.

Again the difference between the RSGB contest and the iARU Region 1 24-hour event was the subject of some comment. It was interesting to note a number of Continentals calling CQ towards this country on Sunday morning and afternoon with very few takers. However, on Saturday evening they had been less evident. Since it is difficult to justify a 24 hour cw contest in November, RSGB proposes to suggest a reduction to, say, eight hours at the IARU Region 1 Conference, and this, if adopted, could eliminate the incompatibility.

The winner will be awarded a certificate, as will the leading fixed station G3POI. Thanks are due to G2HH and G8LT for checklogs. G3FZL

| Posn | Callsign | Points | QSOs | Best dx | Km |
|------|----------|--------|------|---------|-----|
| 1 | GW3WOH/P | 595 | 74 | F6KBF | 536 |
| 2 | G3POI | 580 | 56 | DK6ASA | 746 |
| 3 | G3YYF/P | 464 | 64 | F6CJG/P | 570 |
| 4 | G3NNG | 394 | 69 | GM4DSZ | 604 |
| 5 | G3BDQ | 367 | 49 | DK0BN/P | 505 |
| 6 | G4DEZ | 304 | 56 | GM4DSZ | 609 |
| 7 | G4DZW | 275 | 50 | G4ERG | 325 |
| 8 | G3DAO | 267 | 37 | DKOVL | 695 |
| 9 | G3UKV | 261 | 43 | ONSAT/A | 465 |
| 10 | G3GNR | 234 | 30 | G3ERN | 330 |
| 11 | G3SPJ* | 228 | 54 | G3KKP | 288 |
| 12 | G4ATV | 208 | 38 | ON6AT/A | 351 |
| 13 | G3XTT | 193 | 43 | ON6AT/A | 335 |
| 14 | G2DMR | 165 | 45 | DK0BN/P | 670 |
| 15 | G5HD | 161 | 35 | F8BG | 380 |
| 16 | G4ERG | 149 | 19 | G4DZW | 360 |
| 17 | GSKV | 135 | 41 | F6EOQ | 360 |
| 18 | G2BLA | 129 | 35 | PAOWWM | 319 |
| 19 | G3UYM | 127 | 27 | ONGAT/A | 280 |
| 20 | G3SCZ | 121 | 39 | G4BYK | |
| 21 | G4FDX | 120 | 36 | ON6AT/A | 301 |
| 22 | GW3U00 | 118 | 22 | GM4COK | 294 |
| 23 | G3EJF/P | 102 | 18 | G3POI | |
| 24 | G4DLB/P | 101 | 21 | G4AEQ | 270 |
| 25 | G4BRK | 99 | 39 | ON6AT/A | 285 |
| 26 | G2WS | 96 | 20 | G4FXW | 236 |
| 27 | G3CMH | 85 | 19 | FEECI | 425 |
| 28 | G4GHS | 76 | 16 | G3SPJ | 329 |
| 29 | G3TMQ | 63 | 25 | G3TLK | 218 |

^{*} Using only 3W.

August 70MHz Fixed Contest results

Although conditions on the band were mainly reported as average. QSB seems to have been troublesome. As always, some stations worked everyone available, hours before the end and others thought the contest to be just the right length. General opinion was favourable and this was reflected in the level of activity with all G prefixes

Congratulations and certificates go to the winner, GU3HFN, who has a very notable lead, and to G3UKV, a newcomer to the band, in second place.

| Posn | Callsign | Points | QSOs | QTH | Pwr in | Ant | Best dx | Km |
|------|--------------|--------|------|------|---------|------|---------------|-----|
| 1 | GU3HFN | 535 | 47 | YJ48 | 180 | 4/4 | G3JYP | 550 |
| 2 | G3UKV | 381 | 55 | YM28 | 50 | 40 | GU3HFN | 370 |
| 3 | G3WCS | 371 | 47 | YN47 | 75 | 401 | GU3HFN | 429 |
| 4 | G3PYE | 320 | 58 | AM61 | 100 out | 4el | GI3RXV | 575 |
| 5 | G3UKC | 317 | 52 | AL56 | 100 | 5el | G3XCS | 380 |
| 6 | G3PFM | 312 | 54 | ZK21 | 45 | 5Q | G3JYP | 423 |
| 7 | G3ONP | 289 | 44 | YM40 | 40 | 4/4 | GU3HFN | 353 |
| 8 | G4DKX | 273 | 42 | AM56 | 100 out | 4 | GU3HFN | 410 |
| 9 | G3JYP | 268 | 28 | YO38 | 100 | 8Q | GU3HFN | 550 |
| 10 | (G4GJM | 214 | 54 | ZM79 | 120 | 4et | GM3OXK | 400 |
| 10 | (G3WHK | 214 | 52 | ZL49 | 200 | 4el | G3JFO/P | 320 |
| 12 | G3XBY | 213 | 41 | ZM52 | 110 out | Sel: | GU3HFN | 335 |
| 13 | G3SPJ | 206 | 51 | AL41 | 50 | 4el | G3JYP | 380 |
| 14 | G3RDQ | 203 | 37 | ZL63 | 130 out | 4el | G3JFO/P | 354 |
| 15 | G4ASR | 200 | 48 | AL22 | 100 | 6el | G3VVT | 350 |
| 16 | G8GP | 199 | 51 | ZL50 | 50 | 3el | G3JFO/P | 315 |
| 17 | G3LVP | 197 | 43 | AL33 | 50 | 4/4 | G3JFO/P | 326 |
| 18 | G4APL | 185 | 47 | ZL60 | 50 | 4el | G3JFO/P | 345 |
| 19 | G4AGK | 184 | 46 | ZL08 | 15 out | 4el | GM3OXK | 405 |
| 20 | G5RP | 183 | 37 | ZL34 | 50 | 4el | G3JYP | 332 |
| 21 | G6UW | 175 | 38 | AM61 | 50 | 4el | G3LDR/P | 355 |
| 22 | G3TAL | 161 | 27 | ZK14 | 5 out | 4el | G3JFO/P | 403 |
| 23 | G3BTO | 155 | 33 | ZL55 | 50 out | 4e1 | G3JFO/P | 330 |
| 24 | G3TWG | 146 | 38 | ZL37 | 18 | 4e1 | G3WCS | 265 |
| 25 | G5UM | 144 | 30 | ZM35 | 18 | 4el | G3JYP | 223 |
| 26 | G3RQZ | 143 | 43 | ZL50 | 50 out | 4e1 | G3JFO/P | 320 |
| 27 | G4EKB | 130 | 35 | ZLO7 | 15 out | 4el | G3JFO/P | 260 |
| 28 | G4CLB | 102 | 34 | ZL37 | 40 out | 4el | GU3HFN | 270 |
| 29 | G3VCT | 47 | 15 | ZL37 | 5 out | 4e1 | GU3HFN | 257 |
| 30 | G3KSU | 42 | 14 | ZK25 | 20 | Dip | G3PYE | 188 |
| 31 | G4AGQ | 37 | 13 | ZL66 | 6 | Dip | G4ASR | 103 |
| 32 | G3RYN | 17 | 7 | ZM35 | 14 | 3el | G3SPJ | - |

Check logs acknowledged from G3JFO/P, G3VPS/P and G4ERP/P.

70MHz CW Contest rules

1000 - 1500gmt 22 January 1978.

All entries and checklogs to: VHF Contests Committee, c/o Mr C. W. Suckling, G3WDG, 31 Oakwood Road, Chandlers Ford, Eastleigh, Hants S05 1LW.

The following general rules, published in this issue of Radio Communication, will apply: 1, 2, 3, 4a, 5a, 6b, 7a, 8, 9a, 10a, 11-22.

First 1-8MHz Contest 1978 rules

- 1 The general rules for RSGB hf contests, published in this issue of Radio Communication, will apply.
- 2 When. 2100gmt Saturday 11 February to 0200gmt Sunday 12 February 1978.
- 3 Eligible entrants. All radio amateurs licensed to use 1-8MHz. Single-operator stations only may enter.
- 4 Sections.
- (a) British Isles stations RSGB members only.
- (b) Overseas stations (including El).
- Contacts. CW (A1) only in the 1-8-2MHz band. County/region code letters, as published in this issue of Radio Communication, must be sent after the RST plus serial number group; eg, for a contact from Kent - 599001 KNT.
- Scoring.
- (a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county/region, and for the first contact with each new country outside the British Isles.
- (b) Overseas section. Three points for each contact with a station in the British Isles (not El), with a bonus of five points for the first contact with each new county/region.

 Logs. Column 5 to be headed "Code rcvd". Entries must be
- addressed to the RSGB HF Contests Committee, c/o C. A. P. Henderson, 76c The Avenue, Beckenham, Kent BR3 2ES.
- 8 Awards. (a) The Somerset Trophy will be awarded to the winning station, and certificates of merit will be sent to the second- and third-placed entrants. The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the Second 1-8MHz Contest 1977.
 - (b) A certificate of merit will be awarded to the highest-placed entrant whose 18th birthday falls on or after 13 February 1978. Entrants wishing to compete for this award should state their date of birth on the cover sheet, and write clearly "Under 18" at the TOP of the cover sheet. Entries will only be eligible for this award where operation has taken place under the entrant's own callsign, and from the "main address" as stated on the station licence.

VHF NFD

The 432MHz log from the Sutton & Cheam RS was lost in the post. A duplicate has been scrutinized with the result that G4CQR/P scored 1,049 points, 15th place. The club's overall placing was 11th. The Cornish ARC was unable to submit a summary sheet. G4CRC and G4DWB scored 1,246 aggregate, 36th place.

Contests calendar

70MHz CW (Rules in this issue) 22 January 11-12 February First 1-8MHz (Rules in this issue) 4-5 March 144/432MHz and SWL Commonwealth (Rules in November issue) 11-12 March 19 March 70MHz Open 1,296MHz Open 1 April 2 April 432MHz Open and SWL 9 April Low Power 22-23 April 144MHz CW 6-7 May 432/1,296/2,304MHz 7 May Region Round-up CW Region Round-up SSB 144MHz Portable 21 May 27-28 May HE NED 3-4 June 17-18 June Microwave 24-25 June Summer 1-8MHz VHF NFD and SWL 1-2 July 3.5MHz FD 16 July 144MHz QRP 30 July 13 August 70MHz Open and SWL 2-3 September SSB FD 144MHz Open and SWL 2-3 September October November 432MHz Cumulative 7-8 October

432/1,296/2,304MHz 14-15 October 21/28MHz 21-22 October 7MHz SSB 22 October 70MHz Fixed 4-5 November 7MHz CW 144MHz CW 4-5 November 11-12 November 2nd 1.8MHz

144MHz Fixed

3 December

club news

RSGB affiliated societies and clubs, and RSGB groups, are invited to submit items for inclusion in "Club News" to their regional representatives (not direct to the editor).

REGION 1—RR Wm. M. Furness, G3SMM, 16 Coniston Avenue, Sale, Cheshire M33 3GT. Ainsdale (AARC)—Thursdays fortnightly. 12 and 26 Jan, 9 and

23 Feb and 9 Mar. Ainsdale Scout Headquarters. For details please contact G2CUZ.

Blackburn (East Lancs ARC)-First Thursday in each month. 7.30pm. YMCA. Blackburn. Sec E. A. Lomax, G4DGR, West End PO, Accrington, Lancs

Blackpool (B&DARS)-First Monday in the month. Phone G5ND (Blackpool 64508) for details of venue.

Bolton (B&DARS)—Main meeting first Wednesday in each month. informal meeting third Wednesday in each month, 8pm. Bolton Recreation Club, Kensington Place, Bolton. Hon sec G4FSN (ex G8LXD).

Bolton (Edbro Radio Club)-New club! Details from the sec c/o Edbro Ltd, Lever Street, Bolton.

Bury (BRS)-Main meeting on the second Tuesday of the month. RAE classes and cw instruction every Tuesday as well as informal meetings of members. 10 Jan (RTTY today-G3VDB), 14 Feb (Understanding swr-G3RSM), intervening Tuesdays (Noggin and natter sessions with G3BRS on the air). Mosses Youth and Community Centre, Cecil Street, Bury. Sec E. Thirkell, G4FQE, tel Rochdale 32730.

Carlisle (C&DARS)-Mondays, 7.30pm. Currock House, Lediard Avenue, Currock, Carlisle. A very full programme of lectures and demonstrations has been arranged for the coming months. Full details from G8DVD.

Chester (C&DARS)-Tuesdays, 8pm, except for first Tuesday in the month. YMCA Chester. Further details from the ASR. G3PYU. Douglas (IoMARS)—Mondays fortnightly. "Keppel Creg-ny-Baa, Nr Onchan, Sec GD4FWQ, tel Douglas 22295. Hotel".

Eccles (E&DARC)—Tuesdays, 8.30pm. White Swan, Worsley Road. Swinton. Sec G4AEQ.

Lancaster University (UoLARS)-Wednesdays, 8pm. Furness College. Visitors are welcome, as are skeds on hf and 2m-club callsigns are G8DOU and G3ZBY. There are RAE and morse test classes. Enquiries to John Morris, G4ANB, Dept of Physics.

Leyland (LHARG)—Second Monday in each month. 7.30pm. "Rose & Crown", Ulnes Walton, Leyland, Details from G3XII.
Liverpool (L&DARS)—Tuesdays, 8pm. 17 Jan (visit of RR). Conservative Association Rooms, Church Road, Wavertree. Sec

Liverpool (North Liverpool RC)-For details of meetings please contact R. Porter, G3VXK, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD; tal 051-928 1610.

Liverpool University (UoLARS)—Meetings each lunchtime. Visitors from the Polytechnic and other colleges most welcome. Club shack, Reilly Building: Club active on Top to Two, G3OUL/ G8JUL. Ex-members, and others, interested in attending the Society's Dinner (probably in March 1978) please contact the sec. Geoff Plucknett, G4FKA, UoL, Guild of Undergraduates, 2 Bedford Street North, Liverpool L7 7BD.

Manchester (M&DARS)-Wednesdays, 7.30pm. 4 Jan ("Expedition to St. Pierre"), 11 Jan (Oscar 6), 18 Jan (Antennas), 8 Feb ("ICs" G8IYX), 22 Feb (Contest preparation). 203 Droylsden Road, Newton Heath, Manchester 10. Sec G8IYX. G3HOX is active on hf and vhf-"take a listen"

Manchester (South Manchester RC)—6 Jan (Review of club project-DF rx using ics-G3WFT), 13 Jan ("Digitally stabilized vfo" T. Winter, G4AOK), 20 Jan ("MSF controlled digital clock" B. Wainwright), 27 Jan ("Antenna instruments" M. Barnsley, G3HZM), 3 Feb ("Assembling a station" R. Parkinson, G3FNM), 10 Feb ("Test equipment" P. Torry, G3SMT), 17 Feb ("Fault finding" D. Holland, G3WFT), 24 Feb ("A transverter for 70MHz" G3SMM). Fridays, 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings

on Monday evenings, "Greeba", Shady Lane, Baguley. Other details from sec G3VIW, tel 061-973 3355.

Manchester University (MUARS)-Interested parties should

Manchester University (MDARS)—Interest parameter contact G4AOS, QTHR.

University of Manchester (UoM—IoS&TARS)—G3CXX is active on all hf bands and G8FOT on 2m and perhaps 23cm. Items for club/magazine/newsletter, or letters from intending members gratefully received by sec, c/o UMIST.

Ormskirk (OARC)—New club. Wednesdays at members' QTHs. For details contact G3SZV or sec Peter Kay, G4GCB, 24 Laurel Avenue, Burscough. Alternatively listen 145-000MHz fm/a.m. Wednesdays 1930-2030. Club interests: vhf/uhf, hf, rtty, contests, atv. North Western Repeater Group-Informal meetings on the third Thursday in each month, 8pm. "Globe Club", Willows Lane, Accrington, Lancs. Details from sec G3RXH.

Preston (PARS)-Thursdays fortnightly commencing 12 Jan. 8pm. "Windsor Castle" (private room), St Pauls Square, Preston. Sec G8KTM.

Salford (Dial House RS)-Wednesdays, 5.30-9.30pm. Dial House, 21 Chapel Street, Salford, Lancs. Net channel 145-25MHz fm-the club station G3WDH monitors this frequency every club night for any other station. Details from sec G8JCM, c/o M38 at above

Stockport (SRS)-Second and fourth Wednesdays in the month. 8pm. 11 Jan ("Airways" S. Aspinall, G3VSA). Blossoms Hotel, Buxton Road, Stockport. Note: Annual dinner and dance, Saturday 11 Feb. Sec G3FYE. New members and visitors always welcome. Thornton Cleveleys (TCARS)-First and third Wednesdays in each month, 8pm; morse practise from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to "Gardner's Arms"), Thornton. Details from sec A. Bullock, G8MKO, 26 Lancaster Avenue, Thornton Cleveleys, Blackpool,

UK FM Group (Western)-Informal meetings first Thursday of the month, 8.30pm. Legh Arms, Knutsford. Sec G3LEQ, tel Knutsford 4040.

Warrington (W&DARS)-Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Sec R. E. J. Staples, G3MMD, 3 Willow Close, Lymm, Cheshire, tel Lymm

Wigan (W&DARS)—First and third Wednesdays in each month. Poolstock Cricket Club, Keats Avenue, Poolstock. Sec A. Cunliffe, G4EII, 50 Langholm Road, Garswood, Wigan.

Winsford (Mid-Cheshire ARC)—Wednesdays. Technical Activities Centre, rear of Verdin Building, Verdin Comprehensive School, Grange Lane, Winsford. RAE class 7pm to 8pm. Morse class every third Wednesday. Net nights 160m Mondays, 8pm; 2m (fm) Tuesdays 8pm. Sec G8HAV.

Wirral (WARS)-First and third Wednesdays in each month 7.45pm. Sports and Recreation Centre, Grange Road West, Claughton, Birkenhead. Sec G3DLF.

RR1 extends every good wish for 1978 to all Society members in Region 1.

Region 3-RR H. S. Pinchin, G3VPE, 61 Cole Bank Road,

Hall Green, Birmingham B28 8EZ. Birmingham (Birmingham University RS)—Tuesdays during term, RAE classes fortnightly, 7pm. Students' Union. Sec G4CKK. Meetings followed by tour of real ale establishments. Club stations G3IUB and G8IUB.

Birmingham (Midland ARS)-10 Jan, 7 Feb, 7 Mar (Construction and club station), 7pm. Brasshouse Centre, off Broad Street, Birmingham. 17 Jan (New Year's resolutions), 21 Feb ("An evening with BASF" by James Williams), 8pm. Room 110, University of Aston, Gosta Green, Birmingham. Sec G8BHE.

Birmingham (Slade RS)—Alternate Fridays commencing 20 Jan, 8pm. The Committee Room, Church House, Erdington, Birmingham. Sec G4FGF.

Birmingham (South Birmingham RS)-Thursdays (HF night on the air), 7.30pm. Fridays (Construction and morse classes), 7.30pm. 11 Jan (Surplus sale), 1 Feb (Lecture by G4ELO), 1 Mar, 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY, Sec G8KPA

Bromsgrove (B&DARC)-13 Jan, 10 Feb, 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4GBE.

Burton-on-Trent (BonT&DARS)-Wednesdays, 7.30pm. Stapenhill Institute, Burton-on-Trent. G3ACR. New members welcome. Cannock Chase (CCARS)-First Thursday in each month (Business meeting), other Thursdays (HF and vhf club stations, natter-nites, morse classes, talks, etc), 9pm. Bridgtown Social Club, Walsall Road, Cannock. Sec G8MWE, Visitors welcome.

Coventry (CARS)-Fridays, 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec Dave Parker, 41 Brookdale Road, Nuneaton CV10 0BL

Coventry Technical College (CTCARS)-Mondays and Thursdays, 7pm. Winfray Annexe of the College, G8ISJ.

Coventry (University of Warwick ARS)-Wednesdays during term, talk-in on \$20, 7pm, Cryfield Farm, University of Warwick, Coventry, Vice-president G8MIA.

Hereford (HARS)—First and third Fridays in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. G4CNY.

Kidderminster (K&DARS)-18 Jan (Night on the air), 1 Feb (Film show), 15 Feb, 1 Mar, 8pm. Youth Centre, Bromsgrove Street, Kidderminster. Sec G4CTU.

Lichfield (LARS)-First Monday and third Tuesday in each month, 8pm. Swan Hotel. Tuesday meetings are natter-nites. New members and swis welcome. Sunday net noon, 21-150MHz. Sec Ted Bowen, RS33003, tel Tamworth 68756.

Lichfield (Chad RC)-Alternate Wednesdays commencing 18 Jan, 8pm. The Naval Club, Burton Old Road, Lichfield. Sec G4ESK. Mid-Warwickshire (MWARS)-First and third Mondays in each month, 8pm. 61 Emscote Road, Warwick. Sec G8CXL.

Redditch (RRC)-Second and fourth Thursdays in each month.

8pm. WRVS Centre, Salop Road, Redditch. G3EVT.

Shrewsbury (Salop ARS)-Thursdays, 7.30pm. The Albert Hotel, Smithfield Road, Shrewsbury, Sec G3VZG. New members welcome. Solihull (SARS)-17 Jan, 21 Feb, 3 Mar (Social outing), 7.30pm. The Manor House, High Street, Solihull. Sec G3PYR. Stoke-on-Trent (S-on-TARS)—Thursdays, 7.30pm. 2A Race-

course Road, Oakhill, Stoke-on-Trent. G4CWN.
Stoke-on-Trent (North Staffs ARS)—First and third Mondays in each month (Lectures, etc), other Mondays (Natter-nites, Raynet and club station G4BEM), 7,30pm, Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec G8CMR. New members welcome.

Stourbridge (StARS)—First Tuesday in each month (Informal), 9pm. "Shrubbery Cottage" public house, Heath Lane, Oldswinford, Stourbridge. 16 Jan (Annual construction contest), 6 Feb (Construction and morse evening), 20 Feb ("TV" by G3ZUL), 6 Mar (Construction and morse evening), 7.45pm. Longlands School, Brook Street, Stourbridge. Sec G4CLX.

Stratford-upon-Avon (S-upon-A&DARC)—Meetings will be arranged in Jan and Feb (dates to be decided) at the Youth Hostel, Alveston. Sec G4EXR, tel Stratford 5638, weekends only. New members welcome.

Sutton Coldfield (SCRS)-Second and fourth Mondays in each month, 7.30pm. Central Youth HQ, Clifton Road, Sutton Coldfield. Sec G8KRW

Tamworth (TARS)-Second and fourth Mondays in each month. Indoor Sports Centre, Corporation Street, Tamworth. New members

welcome. G4EUF. Telford (T&DARS)—Wednesdays, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8MXS, tel Much Wenlock 357.

Visitors welcome. Willenhall (W&DARS)—Alternate Wednesdays. Morse classes available at the end of each meeting. "The Three Crowns", Stafford

Street, Willenhall. G3YHN xyl. Wolverhampton (WARS)—Mondays, except last Monday in each month, 8pm. Neachells Cottage, Danescourt Road, Stockwell

End, Tettenhall, Wolverhampton WV9 9PH. Sec G8EDG.
Worcester (W&DARC)—9 Jan, 21 Jan (Annual dinner-see chairman), 6 Feb, 6 Mar, 8pm. The Old Pheasant, New Street, Worcester, Sec G3TQD.

REGION 4-RR T. Darn, G3FGY, Sandham Lane, Ripley,

Derby (DADARS)-Wednesdays, 7.30pm. Morse classes Tuesdays and Fridays, 7pm, when arranged. 119 Green Lane, Derby. Hon sec Mrs J. Shardlow, G3EYM.

Derby (NHARG)-Fridays, 7.30pm. Nunsfield House, Boulton

Lane, Alvaston, Derby. Hon sec Ian Cage, G4CTZ.

Grimsby (GARC)—First and third Thursdays of every month, 8pm. 5 Jan (Talk on pcbs by G3RGC), 2 Feb ("Antennas" by G3IYT), 16 Feb ("Contest operating/repeater working", speakers to be arranged), 2 Mar (Night df hunt). Alexandra Club, Cleethorpes. Hon sec Reg Scarlett, 1 St Martin's Crescent, Grimsby.

Leicester (LRS)-Mondays, 7.30pm. Club House, Gilross Estate Cottage, off Groby Road, Leicester. Raynet group meets on second Thursday of every month, County Hall, Glenfield.

Loughborough (LSARC)—Wednesdays during term time. Details from Loughborough Students' Amateur Radio Club, c/o Students' Union, Edward Herbert Building, Loughborough University, Ashby Road, Loughborough.

Mansfield (MARS)—First Friday of every month, 7.30pm. New Inn, Westgate, Mansfield.

Melton Mowbray (MMARS)—20 Jan (Talk about RSGB, and demonstration of video taping equipment, by Tom Darn, G3FGY), 17 Feb ("Radio control of models" by W. W. Storer, G6JQ), 7.30pm. St John "mbulance Hall, Ashfordby Hill, Melton Mowbray, Sec G3NVK.

Nottinglam (ARCON)-Thursdays, 7.30pm. 5 Jan (Forum). 12 Jan (Question time), 19 Jan (Activity night), 26 Jan (Talk and demonstration of equipment by Lowe Electronics). Sherwood Community Centre, Mansfield Road, Nottingham. Sec G4EKW.

Nottingham University (NURC)—Alternate Thursdays during term time. Contact Roger Dixon, G4BVY, c/o Students' Union. Scunthorpe (SARC)-Technical lectures, demonstrations, etc.

Tuesdays, 7.30pm; morse class approximately 9pm. RAE class, Thursdays, 7.30pm. The Shack, Grange Farm Hobbies Centre, Franklyn Crescent, Scunthorpe. Hon sec G8GIH, QTHR. Visitors welcome.

REGION 5—RR P. F. Chilcott, G4BBA, 258 Coneygree Road, Peterborough PE2 8LR.

Bedford (B&DARC)-Wednesdays, Ravensden. Chairman now Ron Watson, sec Martin Packer, G4FFC.

Cambridge (C&DARC)—Fridays, 7.30pm. New Shack! Air Training HQ, Newmarket Road. Sec G4BAO.

Cambridge (CUWS)-Tuesdays during term. Christ's College. Sec G4D7Y

Corby (CTCARG)—Mondays, 7.30pm. Corby Technical College. Clubhouse and GB3Cl in grounds.

Dunstable (DDRC)-Fridays, 8pm. Chews House, 77 High Street South. Sec G3HJF.

March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE. Northampton (NRC)—Thursdays, 8pm. Spencer Dallington Community Centre, Tintern Avenue, off Gladstone Road. Sec G8LHR.

Peterborough (GPARC)-26 Jan (AGM), 23 Feb (Films), 7.30pm. Southfields Junior School. Sec G4BBA, tel 65213.

Peterborough (PR&ES)-Third Friday each month, 7.30pm. Scout Hut, Occupation Road. Sec G3EEL.

Shefford (S&DARS)-Thursdays, 8pm. Church Hall, Sec G8HHO.

REGION 6-RR F. S. G. Rose, 84 Cock Lane, High Wycombe, Bucks HP13 7EA.

Banbury (BARS)—First Friday of each month, 7.30pm. The General Foods Sports and Social Club, Spriceball Park, Banbury. Sec S. L. Terry, G8OCT, tel Banbury 4769.

Bracknell (BARC)-Mondays, 8pm. Coopers Hill Centre (adjacent to station). Please contact sec G3YMC for meeting details.

Burnham Beeches (BBRC)-First Monday of each month, 8pm. Hedgerly Scout HQ. Sec Peter Flynn, tel Farnham Common 2609. High Wycombe (Chiltern ARC)—25 Jan (AGM). 8pm. 42 Castle Street, High Wycombe. All members please attend. 29 Jan (Hobbies day, Molins, Saunderton. Amateur radio on show). Sec G4FRL.

tel Kingston Blount 52006. Maidenhead (M&DARC)-Please contact sec for details of next

meeting.
Milton Keynes-For meeting details ring G3THC, tel Milton Keynes 316730.

Newbury (N&DARS)—First Monday in each month, 7.30pm. Newbury College of Further Education, Oxford Road, Newbury. Sec G4EEE

Oxford (O&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Civil Service Sports Club, Marston Road, Oxford. Sec G4BHR.

Oxford University (OURS)—Please contact sec M. Evans, G8LTE, Worcester College, Oxford, for meeting details.

Reading (RARC)—Please contact sec G4CCC for details of next

meeting.

RR6: Happy New Year, to all.

REGION 7-RR N. A. Smith, G3HFO, 7 The Byeways, Surbiton, Surrey KT5 8HT.

Addiscombe (AARC)—Tuesdays, 9pm, "Spreadeagle", Portland Road, Woodside. Sec G3SJX.

Ashford (Echelford ARS)—Second Monday and last Thursday of every month. 7.30 for 8pm. The Hall, St. Martin's Court, Kingston Crescent, Ashford, Middx. Sec G3TDR, tel Staines 56513.

Bexley Heath (North Kent RS)—Second and fourth Thursdays, 8pm. St. Mary's Institute, 2 North Cray Road, Bexley. Sec G4ARQ. Coulsdon (CATS)-Third Monday in each month, 7.30 for 8pm. 16 Jan (Tape and slide lecture "Expedition to St. Pierre and Miquelon Islands"). 1st Purley Scout Hall, Purley Park Road, Purley. Sec G8KDQ, tel 668 3963

Cray Valley (CVRS)-First and third Thursdays, 8pm. Christchurch Centre, High Street, Eltham, London SE9. Sec G3YWO.

cnurch Centre, High Street, Eitham, London SE9. Sec G3YWO.

Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month, 7.30 for 8pm. TS "Terra Nova", 34 The Waldrons, Croydon. Sec G3FWR, tel 01-657 3258.

Crystal Palace (CP&DRS)—Third Saturday in each month, 8pm.

21 Jan ("Basic Amateur Radio Techniques" by Graham Cluer, G4AVV). Emmanuel Church Hall, Barry Road, East Dulwich. Sec C3FT, tel 600 6940. G3FZL, tel 699 6940.

Guildford (G&DRS)-Second and fourth Fridays in each month. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.

Kingston (K&DARS)-Second Wednesday in each month, 8.15pm. 11 Jan (Surplus equipment sale). Berrylands Scouts and Guides HQ, Stirling Walk, Raeburn Avenue, Surbiton. Sec G4APG, tel 399 8113.

New Cross (Clifton ARS)-Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 42 Sutcliffe Road, Welling. Reigate (RATS)—First Tuesday in each month, 8pm (Natter nights). Marquis of Granby, Hooley Lane, Redhill. Third Tuesday in each month, 8pm. Constitutional Centre, Warwick Road, Redhill.

Sutton and Cheam (S&CRS)-Meetings at Sutton College of Liberal Arts, Cheam Road, Sutton and at Ray's Social Club, London Road, North Cheam. Details from sec G2DMR.

Thames Ditton (Thames Valley ARTS)—3 Jan (AGM), 7 Feb (Junk sale), 8pm. Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.

Wimbledon (W&DRAS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G3XTC, tel 01-644 3968.

REGION 8-RR D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent. Brighton (B&DRS)—8pm, prompt. Catholic Church Hall, Bristol Road, Brighton. Details from N. Hewitt, G8JFT.

Burgess Hill (Mid-Sussex ARS)—7.45pm. Marle Place, Burgess Hill. Details of future events from G3PEQ.

Canterbury (East Kent RS)—5 Jan (Grand junk sale), 2 Feb ("The electronics of physiotherapy" by G3ZZZ). Further details of future events from hon sec G8GHH, QTHR.

Chichester (C&DARC)—First Tuesday and third Thursday in each month, Lancastrian Boys School, Details from G4ETU, tel 0243 88069.

Crawley (CARC)-United Reform Church Hall, Ifield, Crawley. Details from G3MGL.

Dartford (DHDFC)-Second Friday in each month. Scout House, Broomfield, Dartford. Details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.

Dover (South East Kent YMCA ARC)—4 Jan (Project progress), 11 Jan ("Ham interference on cable tv" by G8LKS), 18 Jan ("CQ DX"), 25 Jan (Debate "G8s and the hf bands"), 1 Feb (Quiz SEKYMCAARC v EKRS), 8 Feb (Project progress), 15 Feb ("30 years of radio" by Tony Dukes), 22 Feb (Films and slides), 1 Mar ("Merits of QRP" by GBKEN).

Eastbourne (Southdown ARS)-9 Jan (Film show), 6 Feb (To be arranged). Further details from hon sec G8CVV, pro G3LFZ

Gravesend (GRSGBG)-Mondays, 7.30pm. The Windmill Tavern, Shrubbery Road, Gravesend.

Hastings (HERC)/(ITT(H)S&AC)—Details of future events of both units from G8DNO.

Horsham (HARC)-First Wednesday in each month. Civil Defence HQ, Moons Lane, Brighton Road, Horsham. Details of future events

Maidstone (MYMCAARS)-First and third Fridays in the month, 7.30pm; devoted to the beginner, RAE class and morse tuition. Alternate Fridays; a wide range of lectures and use of club shack. Melrose Close, Loose, Details from Harry Poppy G8KMX, tel Maidstone 61792.

Medway (MARTS)-Details of events and venue from G4EVY, 5

River Drive, Strood, Rochester, Kent.

Ramsgate (Kent Coast ARC)—Details of meetings from G4DTA, OTHR.

Tunbridge Wells (West Kent ARC)-Details of future events from new secretary, B. Castle G4DYF, 6 Pinewood Avenue, Sevenoaks

Worthing (W&DARC)-Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing. Details from P. J. Robinson G8MSQ Kent Repeater Group-Details of membership from G3XDV, 5 Lambs Walk, Whitstable, Kent.

Sussex Repeater Group-Information from G8HVV.

REGION 9-RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY.

Camborne (Cornish RAC)—First Thursday in each month, 7.30pm. 5 Jan ("Marconi 75th Anniversary Co-ordinated" by G3VWK), 2 Feb ("Let's control the volts" by G3XFL), 2 Mar (Quiz). SWE3 Clubroom, Pool, Camborne. Cornish net each weekday 10am on 3·715MHz, and on Sundays 11am on 3·692MHz. Details from G3NKE, tel Camborne 712419. Visitors always welcome at club meetings

Exeter (EARS)-Second Monday in each month, 7.30pm. Community Centre, St Davids Hill, Exeter. Details from G3HMY.

Newquay (N&DARS)—Alternate Wednesdays, 7.45pm. Treviglas School, Newquay. Details from G8GOR, tel Newquay 4168.

North Devon (NDRC)—Second Wednesday in each month at QTH of G4CG, fourth Wednesday at QTH of G2FKO. Full details from G4CG.

Plymouth (PRC)-First and third Tuesdays in each month. 7.30pm. Virginia House, Bretonside, Plymouth. Visitors most welcome. G4EJO.

Saltash (S&DARC)-First and third Fridays in each month, 7.30pm. 6 Jan ("Swiss amateur radio" by G5BSX). Burraton Toc-H Hall, Saltash. Sec G8LLR, tel Plymouth 771135.

Torbay (TARS)—Fridays, with special meeting on last Saturday of each month, 7.30pm. 28 Jan (Home construction night), 25 Feb (to be arranged). Rear of 94 Belgrave Road, Torquay. Torbay net weekdays 3.756-3.764MHz, Mondays to Fridays 10.30am, Saturdays 9.30am. Full details from G3UIQ, tel Newton Abbot 3025. Visitors to club meetings most welcome.

RR G4UZ and ARs G4CG, G3NKE and G3GDW, wish all in Region 9 a very happy New Year.

REGION 10-RR R. G. Barrett, GW8HEZ, 23 Carshalton Road, Beddau, Pontypridd, Glam.

Barry (BCoERS)—Thursdays, 8pm. Barry Rugby Football Club, Reservoir Road, Barry. Details from sec S. N. Lloyd Hughes, GW8NVN, 1 Min y Mor, Barry. Members wish to thank the past secretary, Dan Adams, GW3VBP, for his many years of support. Blackwood (BARS)-Fridays 7pm. 13 Jan (Slide show on activity in Canada, by GW4DWN/VE8). Oakdale Community Centre, Oakdale, Blackwood. Details from GW4BLE, 10 Llanthewy Road, Newport, Gwent.

Bridgend (Glamorgan VHF/UHF Group)-Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Details from sec GW4RDV.

Cardiff (CRSGB)—Second Monday each month, 7.30pm. 9 Jan ("Front Panels by Photo etch", by GW3RWX, plus constructors' trophy), 13 Feb (Film show). Pantmawr Inn, Pantmawr Estate, Cardiff, Details from sec GW3VOW, 9 Millrace Close, Lisvane, Cardiff. Merthyr (Hoover ARS)—Mondays, 7.30pm. Hoover Social Club, Pentrebach, Merthyr. Details from GW3RNC.

Newport (NARC)-Mondays, 7pm. Adult Educational Settlement,

Brynglas Road, Newport. Details from sec, GW8MER. Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.

Pontypool (PRSGBG)-Tuesdays, 7pm. Education Settlement,

Park Hill Road, Pontypool. Details from GW3JBH.

Port Talbot (British Steel Corporation ARS)—Thursdays,
7.30pm. BSC Sports and Social Club, Margam. Details from GW4ESV.

from G3NPF

Rhondda (RARS)-Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.

Sully (S&DSWC)-Mondays, fortnightly, 7pm. Sully Bowls and Social Club, 58 South Road, Sully. Details from sec GW8JHF. Swansea (SARC)-Tuesdays fortnightly, 8pm. The Commercial

Inn, Killay. Details from sec GW8CMA, QTHR.

Swansea (University College of Swansea RS)—Mondays,
7.30pm. Room 801, Applied Science Building. Details from sec J. Morris, 1 Hadland Terrace, West Cross, Swansea, tel 68675.

REGION 11-RR P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinile, Caernarvon LL54 5TW.

Rhyl (R&DARC)-It is regretted that this club has been closed until further notice.

Conway Valley (CVARC)—Second Thursday in each month, 7-45pm, 12 Jan (Hot pot supper). The Quarry Offices, Llandulas. In November a most interesting visit was made to the School of Engineering Science UCNW at the invitation of the UCNWARS. Bangor (UCNWARS)-Thursdays, 7.30pm. School of Engineering Science, Dean Street, Bangor. Events for the Spring term are being prepared.

RR11, GW3IEQ, wishes all members and their families in the region a happy and prosperous New Year.

REGION 12-RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.

Aberdeen (ARS)-Friday evenings. The Cowdray Club premises, 5 Fonthill Road, Aberdeen, Sec GM4BKV.

Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Kingsway Technical College. Sec GM4FLP. The AGM was 6.30pm. Kingsway Technical College. Sec GMFLP. The AGM was held on 16 November and the following offices were elected: chairman, GM4CUZ; secretary, GM4FLP; treasurer, GM4AQM; committee GM8BZX, GM2CPC; students' representatives, J. Winter and J. Lowden; NFD Committee, GM4FLP, GM4AGS, GM3ZXE, GM4BAG; VHF Committee, GM8BOW, GM4API, GM8BZX; social and publicity, GM4AGS, GM4BAG; catering, GM2CPC; QSL manager, D. Black; projects, GM4API.

Inverness (Technical College ARC)—Every second Wednesday, 6.45pm. Room C30. Sec W. Lee, 36 Old Mill Road, Inverness. The club is considering a quarterly newsletter to stimulate interest, and a VHF transmitter receiver project with a certificate of merit for the best effort. 70MHz equipment has been obtained, and the club members hope to be active on this band soon.

Lerwick (ARC)-Wednesday evenings. Annsbrae House. Sec

Moray Firth (MFARS)—Wednesdays, Elgin Technical College. Sec GM8LVG.

Perth (P&DARG)-Tuesdays, 7pm. Perth Technical College. Sec GM4DQJ. The first meeting of the club was in September with an attendance of 19. A winter programme is being arranged with talks, films, etc. The club station operates under the call GM4EAF.

Approximately 50,000 blank "Tayside" QSL cards are still available to residents in the Tayside area. Anyone interested in a supply should contact the Dundee club secretary, GM4FLP, as soon as possible.

REGION 13-RR A. B. Givens, GM3YOR, 41 Veronica Cres-

cent, Kirkcaldy, Fife, KY1 2LH.
Berwick upon Tweed (Border ARS)—First and third Fridays in each month, 7.30pm. Roxburgh Hotel, Berwick upon Tweed. Details from sec GM8IIO.

Punfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencreiff School, Maitland Street, Dunfermline. Details from sec GM3MGX, tel Limekilns 313.

Edinburgh (E&DARC)-Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from sec. GM8MJV, tel 031-663 2033. Edinburgh (Leith Nautical College ARC)-First and third Thursdays in each month, 7.30pm. Leith Nautical College, Milton Road East, Edinburgh 15.

Edinburgh (Lothians RS)—Second and fourth Thursdays in each month, 7.30pm. Adult Education Centre, Riddles Court, High Street, Edinburgh. Details from sec GM4BYF, tel 031-447 3201.

Glenrothes (G&DARC)—Third Sunday and every Wednesday in each month, 7.30pm. Old Nursery School, Provosts Land, Douglas Road, Leslie, Fife. Details from sec GM4BRM, 31 Church Street. Glenrothes.

It is also believed that clubs meet at Heriot Watt University, St Andrews University and Ferranti (Edinburgh), but no details are available.

REGION 14-RR I. L. McKechnie, 41 Westerlea Drive, Bridge of Allan

Ayr (AARG)—Every second Sunday evening commencing 8 Jan. 19 Feb (Film), 5 Mar (NFD). Community Centre, 24 commencing Wellington Square, Ayr. Details from sec GM3THI.

Greenock (G&DARC)-Tuesdays and Fridays, 7.30pm. 22 Inverkip Street, Greenock, Details from sec GM3LYI.

Motherwell (Mid-Lanark ARS)—6 Jan ("Oscar", GM8BKE), 20 Jan ("Napier, Gauss, Lechar", GM8ARV), 3 Feb ("Couplers", Mr D. Crone, IBA), 17 Feb ("FM, ssb", GM8EDL), 3 Mar (AGM and "Black Boxes", GM8EDX). Wrangholm Hall, Community Centre, Jerviston Street, Motherwell. Details from sec GM8FHK, tel Motherwell 66581.

Glasgow (West of Scotland ARC)—Fridays commencing 6 Jan, 7.30pm. 20 Jan ("VHF amps", GM3HBT), 17 Feb (Visit to Motorola), 2 Mar (GM5BKJ), 16 Mar (Phone Patch Live), 30 Mar. Details from sec GM4FDM.



Members and wives of the Radio Club de Normandie were guests of the Southdown ARS for a weekend last summer and are seen here with their hosts at Hurstmonceux Castle. Left to right: F3DH, F9CB, F3DI, F9NW, F5NK, F6BTP, F1XI, F6DEX, F6ESS, F1CZB, F1DZM, swl Roger, G3JYG, G3LFZ, G3MHF, G3RZC, G4CLV, G4EKX, G8DNO, G8KDS, G8KQN, G8KXJ, G8NFO, G8SC, G3POQ, G3TOE, G3ZFE, G3ZQB, G4BCO, G4BLS, G8BQX, G8KPE, swl Lewer, swl Jol-Christensen, swl Chapman

REGION 15-RR H. J. Campbell, 26 Kilcoole Park, Belfast BT14 8LB.

Ballymena (BRC)—Tuesdays, 8pm (RAE and morse classes), 86 Old Cullybackey Road Ballymena Fridays (club night) Sundays 3pm. (special projects). Sec GI8LSF.

Bangor (B&DARS)-First Friday in each month, 8pm. 6 Jan (SSTV), Feb (Army communications), Mar (Constructional competitions). Redcliffe Hotel Seacliff Road Bangor. Sec GI4AAM, 14 Manse Road Bangor.

Belfast (QUoBRC)—Tuesdays, 8pm. Queen's University Radio Club, 37 Fitzwilliam Street, Belfast.

Belfast (CoBYMCARC)-Saturday mornings in new premises, 4th Floor, YMCA, 12 Wellington Place, Belfast. Sec GI8MQR. New members welcome.

Belfast (BRSGBG)-Third Wednesday in each month, 8pm. 90 Belmont Road Belfast, Varied winter programme. Details from

Carrickfergus (CYMCARC)-Second Wednesday in each month, Spm. Carrickfergus YMCA. Sec GI4FUE. New members welcome.
Mid-Ulster RSGB Group—First Sunday in each month at QTH of GI4BAC. Always something interesting. Sec GI3WWY.
North Ulster (NURSGBG)—For details, contact GI3UHL, QTHR.

REGION 16-RR R. E. G. Kendall, G8BNE, "Wesley", Ranworth Road, Hemblington, Blofield, Norwich.

Bury St. Edmunds-New club! Second Monday of each month, 7.30pm. Details from J. Munro, 29 Angel Hill, Bury St. Edmunds.

Chelmsford (CARS)—First Tuesday in each month, 7.30pm.
(Future lectures will include "Moon-bounce" by P. Blair, G3LTF.) Marconi College, Arbour Lane, Chelmsford. Details from R. Brocks. 30 Rowan Drive, Heybridge, Maldon, The society held its AGM and junk sale in October, when 44 members attended and nine new members joined. Ron Ferguson, G4VF, retiring as president after 25 years, was presented with a silver tankard and life membership of the club. Roy Martyr, G3PMX, was elected the new president.

Colchester (CRA)—Wednesdays, 7.30pm. 114 Ipswich Road,
Colchester (above Candor Motors). Details from G3YAI.

Great Yarmouth (GYRS)—Last Thursday in each month, 67

Southdown Road, Great Yarmouth. Details from G3NHU.

Harlow (H&DRS)-Tuesdays 8pm. Mark Hall Barn, First Avenue, Harlow. Details from G3WUX.

Ipswich (IRC)-Wednesdays fortnightly. Ranelagh Road School,

Loughton (L&DRS)-Loughton Hall, Rectory Lane, Loughton.

Details of meetings from G8DZH, QTHR, tel 01-508 3434.

Lowestoft (L&DARC)—Fridays, 7.30pm. Morse class every Tues-

day. YMCA, Park Road, Lowestoft.

Martiesham (MRS)—First Wednesday in each month, 7.30pm. 1
Feb (Subject to be announced), 1 Mar ("RSGB representation" by G3MXJ). Details from M. Appleby, PO Research Centre, Martlesham, loswich.

Norwich (Norfolk ARC)-Wednesdays.

Norwich (U of East Anglia R&EC)-Details from P. Gowen,

Southend (S&DRS)—Fortnightly, 8pm. Church Hall, Sir Walter Rayleigh Drive, Rayleigh, Essex. Contact hon sec G3YOA, A. R. Adams, 9 Fairland Close, Rayleigh, Essex.

Vange (VARS)—Thursdays, 8pm. Youth Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17-RR L. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants.

Basingstoke (BARC)-First Saturday and third Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Sec G3CBU.

Basingstoke (UK FM Group Southern)-First Wednesday of each month. 1 Feb (Lecture tba). Chineham House, Popley, Basingstoke. Details from sec Mrs J. Payne tel Aldershot 26108.

Bournemouth (Wessex ARG)-First and third Fridays in each month, 7.30pm. The Dolphin Hotel (club room), Holdenhurst Road, Bournemouth. Sec G. Cole, G4EMN, tel Bournemouth 20027.
Chippenham (C&DARC)—Tuesdays, 7.30pm. Sheldon School,

Hardenhuish Lane, Chippenham, Sec G8BXG.



Ken Alford, G2DX, (I) with Mike Hearsey, G8ATK, and Douglas Johnson, G6DW (r) at a meeting of the Farnborough RS. G2DX was the first president of the society and during the meeting he was presented with a copy of the Blackwater Valley Award endorsed "In recognition of devotion to the amateur radio movement"

Fareham (F&DARC)—Wednesdays, 7.30pm. Porchester Community Centre, Room 9. Sec D. Thompson, tel Fareham 2799.

Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Sec G4FEA.

Guernsey (GARS)—Tuesdays and Fridays, 8pm. Details from sec GU8ITE, PO Box 100, St Peter Port, Guernsey. At the recent AGM. Richard Stockwell, GU8FBO, was elected the new president.

Horndean (H&DARC)-Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Sundays, 6.30pm. 21.40MHz. Sec

Jersey (JARS)—Sundays, 10.30am, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec Mary McTaggart, 19 Parade Road, St Helier.

Poole (PRAS)-Last Friday in each month, 7.30pm. Poole Tech-

nical College. Sec Graham Tizzard, tel Poole 4641 ext 34.
Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. G3CNO. Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre,

Wilton Road. Sec G3FIX. Southampton University (SUARC)—Tuesday evenings. Also

informal meetings every lunchtime in the clubroom, Old Union Building. Sec D. Price, G4BIX, Chemistry Dept. Southampton (SRSGBG)-First Monday in each month, Lan-

chester Building, Southampton University; Wednesdays, the club-room, Kent Road; both at 7.30pm. AR G4COM.

South Dorset (SDRS)-7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth, Details from G3YWG. Swindon (SD&ARC)—Alternate Wednesdays, 7.45pm. Clubroom above Coldharbour Public House, Blunsdon, just north of Swindon. Sec G8KWC

Winchester (WARC)-First and third Fridays in each month, 7.30pm. Antrim House, St Cross Road, Winchester. G4BKE.

REGION 18- P. J. Fay, 5 Harland Way, The Glebe, Washington, Tyne & Wear.

Durham (DUARS)-Alternate Wednesdays during term. Physics Dept, Durham University. All local amateurs are welcome to join. Talk-in by G4DUR on R5 or S20 before all meetings.

Easington (AR&EC)-Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good RAE pass record). ATV can be received on 625 lines. The club is now equipped with an hf transceiver as well as other gear, Sec G4COL

Great Lumley (AR&EC)-Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G8JLQ. Assistance with RAE and morse if required. Arrangements have now been made to hold a

bigger and better mobile rally in October 1978.

Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall,
Grange Road. Sec G3NWU, 73 Eamont Gardens, Hartlepool.

Middlesbrough (Post Office ARC)—All amateurs welcome, but first contact the sec Mr G. P. Gaunt, G8CDP.

Middlesbrough (Teesside Repeater Group)—Last Tuesday each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and SWLs invited but first contact sec Mrs Pauline Bland, G8MBK, 5 Belgrave Drive, Normanby, Middlesbrough, Cleveland, Morpeth (Northumbria RC)—Now meets Thursdays, British Legion premises, Gambois, near Blyth. Sec G4AVO.

Newcastle Upon Tyne (Tyne & Wear Repeater Group)—First Wednesday in each month. Arts Common Room, University of

Newcastle. Open to all amateurs and SWLs. John Thexton G3URE, has resigned, so the secretary is now Fred Signey, G4DOB, 264 Silver Lonnon, Newcastle Upon Tyne, NE5 2HJ, tel Newcastle 744444.

South Shields (SS&DRS)-Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue. Tyneside (TRS)—Mondays, 8pm. The Community Centre, Vine Street, Wallsend. Sec Alex Frazer, 35 Percy Street, Tynemouth.

Will local members having gear for sale please let RR18 know on a postcard, before the 20th of each month, for inclusion in the monthly "For Sale" list sent to all clubs in the region.

REGION 19-RR (Post vacant)

Acton, Brentford & Chiswick (ABCRC)—Third Tuesday in the month, 7.30pm. Chiswick Trade and Social Club, 66 High Road, Chiswick. Sec G3GEH, tel 01-922 3778.

Barking (BR&ES)—Mondays (Construction) Wednesdays (CCTV techniques), Thursdays (Informal). Morse classes Tuesdays, 7.30pm. Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex. Sec N. Dowsett, 44 St Anne's, Barking.

Cheshunt (CDRC)-New premises-Church Room, Church Lane, Wormley, Herts, Wednesday, 8pm.

Chingford (Silverton RC)-Fridays, 7.30pm. Friday Hill House,

Simmonds Lane, Chingford E4. Visitors very welcome. Sec G4AJA, tel 01-529 2282.

Ealing (EDARS)—Tuesdays, 8pm. Northfield Community Centre, Northcroft Road, London NW13. Newcomers and old-timers very welcome. Sec M. E. J. Cummings, G8KPN, tel 01-997 5947.

East London RSGB Group—Details from sec J. B. Bundock,

G4CJQ, tel 01-524 3169.



Officers of the recently-formed Kodak Amateur Radio Societ (G4FVJ) presenting a Silver Jubilee Crown to Corny Unruh, WA2EOQ, as a souvenir of his recent visit to the company. Corny is a member of a similar company-based radio society at Eastman Kodak, Rochester, NY.

The Kodak Amateur Radio Society was formed about two years ago, has about 15 members (all company employees), and is affiliated to the RSGB. Left to right: Ron Ray, G2TA, Phil Ellis, G4AEM, Angela Hornagold, G4CKQ, Walker, G3XYJ, and Corny Unruh, WA2EOQ

Edgware (E&DRS)-Second and fourth Thursdays in the month, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec G4BZY, tel 01-952 2495.

Harrow (RSH)—Fridays, 8-10pm. 6 Jan (Junk sale), 13 Jan (Film show), 20 Jan (AGM), 27 Jan (Informal). Roxeth Community Centre, Scott Crescent, West Harrow, Middx. For details of February meetings please contact sec G4FBK, tel 01-864 1412.

Havering (H&DARC)-Wednesdays, 8pm. British Legion Club.

Western Road, Romford.

Holloway (Grafton RS)—7.30pm. Holloway Institute, Archway Annexe, Highgate Hill, London N19. Sec G3ZKE.

Ilford RSGB Group-Thursdays, 8pm. 50 Mortlake Road, Ilford. Details from D. T. Sapworth, G3YMW.

Northolt (British Airways European Division ARS)-First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact G3OUF, tel Amersham 21573 for details. Civil Aviation Sunday net 1100-1200gmt on 3.68MHz, listen for G3NAF or G3BEA. Shelburne (SRC)-Wednesdays 7pm-9pm (Electronics for beginners); Thursdays, 7pm-9pm (Club evenings). Shelburne Youth Centre, Hornsey Road, London N4.

South Kensington (Baden Powell House Scout ARG)-Third Tuesday in each month, 8pm. Baden Powell House, Queensgate,

South Kensington.

Southgate (SRC)--Second Thursday in each month, 8pm. The Scout Hut, Wilson Street, Winchmore Hill Green, London N21. Sec

G4AEZ, tel 01-366 7166.

St. Albans (Verulam ARC)—Main meetings fourth Thursday in each month, 7.30pm for 8pm. 26 Jan ("Slow scan tv" by Keith Clarke, G3KRC), 23 Feb ("Vintage wireless" by A. R. Constable, chairman of the British Vintage Wireless Society). Market Hall, St. Albans. Informal meetings, second Thursday in each month. RAF Associa-tion Headquarters, Victoria Street, St. Albans. Hon sec G4DUS. Stevenage (S&DARS)—First and third Thursdays in the month. UK FM Group (London)—Second Tuesday in each month, 7.30pm for 8pm. Grove Park Hotel, junction Bolton/Spencer Roads, Grove Park, Chiswick.

REGION 20-RR G. Mather, G3GKA, 8 Hills Close, Keynsham,

Bath (B&DRG)-Tuesdays, 8.30pm. The Crypt, Ascension Church, 35a Claude Avenue, Oldfield Park, Bath. Sec N. S. Cridland, Flat 3, 30 Paragon, Bath BA1 5LY.

Bristol (BARC)-Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. Hon sec G8GFZ.

Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. Hon sec G8KUM. HF and vhf station all modes, occasional lectures and films. RAE and morse classes in progress.

New members welcome. Bristol (BRSGBG)-30 Jan (AGM), 7-9.30pm. Small Lecture Theatre, Queens Building, University Walk, Clifton, Bristol 8. Hon

sec G4FRG.

Bristol (North Bristol ARC)-Meetings Fridays, 7pm. RAE instruction Wednesdays, 7pm. Lockleaze Community Association, Romney Avenue, Lockleaze, Bristol BS7. Hon sec G8KSS, club

Cheltenham (CARA)—First Thursday and third Friday in each month, 8pm. 3 Jan (AGM). The Old Bakery, Chester Walk, Cheltenham. Hon sec G3KII.

Gloucester (GARS)—First and third Thursdays in the month, 7.30pm. 5 Jan ("QRP" by G4CLR), 2 Feb ("Two metres" by G4ClB), 6 April (A talk by G2HDU). Chequers Bridge Centre, Painswick Road, Gloucester. Hon sec G3MA.

Weston-super-Mare (WsMARS)-Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle.

Yate (Y&DARC)—First Saturday in each month, 8pm. G3RQN QTH. All welcome, including SWLs. Local chat channel S24, 145-6MHz, 2100 Wednesday and Saturday. Further info from G8LGC. Yeovil (YARS)-5 Jan ("Antenna fundamentals" by G3MYM), 12 Jan (Members' radio slides), 19 Jan ("Antennas for small garby G8MZI), 26 Jan ("Transmission line fundamentals" G3MYM), 9 Feb ("Radio quiz with a difference" by G3MYM), 16 Feb ("Microwaves, their use in telecommunications" by G4GHI), 7.30pm. Hut 101, Houndstone Camp (three miles west of Yeovil, off A3088). Hon sec G3NOF. Info at main gate, S20 fm talk-in.

Assistance is wanted for the RSGB stand and station at the Royal Bath and West Show, Shepton Mallet, 31 May to 3 June; please contact G4GHI or G8NOF.

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members Ads order form printed in alternate issues of Radio Communication. or on a postcard similarly laid out. Each must be accompanied by a recent Radio Communication wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque (stamps not accepted) for 75p for 40 words or less. Excess words must be paid for at the same rate of 75p for 40 words or less. They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

The closing date for each issue is the 1st of the preceding month, but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the Issue following receipt

will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classifled or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale. Advertisements may be edited or abbreviated as necessary.

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS.

Do not post to RSGB HQ or Advertising Representative.

FOR SALE

Eddystone 940 gen cov.rx, £100 ono cash. Prefer buyer collects. Microwave Modules 432MHz converter, 18-20MHz i.f., £12. Wanted: Bird 43 Thruline frequency elements, state power range, frequency and price. All letters answered, postage refunded. G8HHI, QTHR. Tel Yateley 871555.

Trio TS520, superb rig, few months old, comp, as new, £400 ono. G4FJB (G8EPE), QTHR. Tel 021-705 7158.

Hallicrafter's SX101, ssb, a.m., calibrator notch, dept, notch frequency, 1.8 to 30MHz amateur bands, manual, £50. Oscilloscope, Solartron CD513, £25. G4DZV, QTHR.

FT101 Mk1, 160m and 600Hz cw filter fitted, new pa and driver bottles, recently overhauled, £195. SSM Europa transverter, all leads, manual, for use FT101 etc, £45. G8IZM, QTHR. Tel Morecambe 415414.

Collins KWM-1, psu, £75. Mobile psu with 300W inverter for above, £35. G3KBH, QTHR.

Motorola 70-88MHz mobile fm 2-way transceivers, 30W rf power, 6/12V dc, some valves needed and xtals, less control boxes, maker's manual available on loan, six available, £40, or £7 ea, plus carr. G4DVH, QTHR. Tel St. Helens 53018.

Drake R4B, mint cond, £185 ono. Tel Littlehampton 6161 ext 55/56,

Xtals for ladder filter experiments etc: 8.950MHz HC18U, £1 ea, 4+ 75p ea, 10+ 60p ea; some 5-000MHz HC6U still available, £1 ea. Send sae with remittance and order to R. Bowell, 16 Margarite Way, Wickford, Essex SS12 0ER.

Yaesu FT200 and FP200, brand-new cond, all 10m xtals, £220. Philips millivoltmeter 1mV-300V dc, GM6010, £15. Noise gen TF987/1, requires new diode, £5. G4AQA, QTHR. Tel 0482 655856.

Pye Cambridge AM10B modified to 2m fm, fitted 144-48, S0, S20, S22, R7, RR7R, c/w hb control box, mic, toneburst, ready to use, £50. McEwen, G3VKQ, 625 Kenton Road, Harrow, Middx. Tel 01-204 8970, evenings.

TR2200GX, S0, S20 to S24, R6, R6R, nicads, charger, helical antenna, rig in exc cond, £120. GM8BKE. Tel 0501 30819, after 7 pm. FLDX400 tx, mic, never used, mint cond, £180. Tel Pritchard, Hereford 65092.

Mains oil-filled transformers 1,185V-0-1,185V, 360mA, £9. New vacuum, variable 1,000pF capacitors, £10. 250MHz +10 prescaler, £12. Transformer 450V-0-450V, 500V-0-500V, 250mA, Its, £4.50. Mains stabilized psu, meter, adjustable 9 to 18V dc, 3·5A, £15.50. SAE enquiries, carr extra. G4DFE, QTHR.

Barlow Wadley XCR30 portable communication rx, £80. Grundig TK248 stereo, reel-to-reel tape recorder, £50. Buyer collects. H. Bruce, 136 South Street, Andover, Hants SP10 2BS.

RTTY UT4 PCBs available, providing for uartifito's and XB6 clocks, double-sided 8 by 6 main board, psu board, drilled with printed legend, circuitry and description, £22 post paid. Ken Michaelson, G3RDG. 40 The Vale, London NW11 8SG. Tel 01-455 8831.

Icom IC210, fm, vfo, mains/batt, superb rig, £180 ono, or swap for fb QRO 2m linear or 70cm gear. WHY? Cambridge d/mount, 6ch. fm, £50 ono. R6 tx/rx xtals, HC6U 8/44MHz, £3 pair, G8BWR, Tel 0926 48388.

High power Marconi atu with balun, silver plated throughout, handles legal limit with ease, £25. G4BCO. Tel Hastings (0424)

FT221, pa, aux xtal for normal/rev rptr operation, immac, £260. Trio JR310 rx and spkr, £60. Shure 201 mic, £2.50. ARAC rx module 28-30MHz, £20. ASC11 keyboard, £10. Trans eht 1,125-0-1,125, £7. Trans 5V 7A ct for HTR 4-125, £2.50. PR 4-125 untested, £5, 4-400. £10. GM3XNE, QTHR. Tel 0294 67326.

Racal RA117E, mint, ssb unit, preselector synthesizer, psu, all in cabinet with case for 117E, handbook, sell £375 one, or exch tx/rx hf bands. MK sstv monitor, spare 5FP7, £50. B40D and ssb unit, mint, £50. Delivery possible. G3VUF. Tel 0670 2790.

Welmac 8ch tape punch, 15 ch/s, psu, £30. Hartley 13A 'scope, rebuilt timebase, £15. Keyboard, no electronics, £7. Mullard audio preamp module LP1184/2, £2.50. All with manuals. Wanted: Solartron CX1441 'scope, plug-in. G8ISI, QTHR. Tel Liphook (0428) 723168

HW8, psu, £90. FT75B, psu, £200. Both in good cond and carr incl. Sgt Short, 13 Signal Regiment, BFPO 40.

Drake R-4C, FS-4 frequency synthesizer, spkr. FKD TM56, vhf/ fm 2m rx, boot mount antenna, Hy-Gain 12AVQT, 10-80m vertical antenna. All good as new, best offer secures, will separate. Tel 01-790 2557 or 01-203 3635.

G-whip multi mobile ant coils for 80, 20, 15, comp with extend section and base mount, £22. Pye Ranger 4m tx/rx, xtals for 70·26 and 70.365, £15. Army 62 set, fair cond, comp with headphones and mic, £10. Labgear Topbander, good cond, £15. TW2 tx, 2m, 10W, comp with psu, £15. G4FB. Tel Seaford 894310.

KVG XF-9A filter, both sideband xtals, £18. Kokusai MF455-10K filter with 453.5 xtal, £11. G3AMF, QTHR. Tel 01-989 9224, evenings. KW Viceroy Mk3 tx, vgc, £70 ono. G3PJN, QTHR. Tel Chesterfield 6040, after 6pm.

HQ1 miniature hybrid quad 10-15-20, hardly used, £70. Homebrewed linear, (pair 813s), psu, spare valves, £60. G3JEP. Tel Exmouth (03952) 4863.

KW 2000A, vgc, £150. 2m JXK converter 28MHz i.f., £8. Three unused 813 valves (American), £9. Two 813 bases, new, £2. Wanted: FT221R. G3VHA, QTHR. Tel Bellbroughton 730484.

Yaesu FT75 c/w ac and dc psu, £185. Datong frequency agile audio filter FL1, £32. Both in exc cond. Wanted: 100W 2m linear amp. G3ZZS, 21 Woodford Road, Glenholt, Plymouth PL6 7HX. Tel

Two pairs Pye Pocketphones, xtalled 433-2MHz, using dry cells, one pair comp, one pair less half tx case, circuits, two pairs Pye rechargeable batts, £50 the lot, will split. Wanted: Portables,

mobiles for 98MHz fm. Tel John, Hengoed 813607.

Creed 7E, silence cover, base, £22. Tape tx, £12. Terminal unit TU5, comp PCBs, not boxed, £12. MBM46, £10. 5Y/2M, £3. 4Y/4M, £6. Buyer collects. Wanted: TA33JR HQ1, or similar. G3ZUL. Tel Stourbridge 5917.

Woden transformers, unused: DTM21, mains 0-10-200-240V; 500-450-0-450-500V, 250mA; 0-4-5V, 5A; two 6·3V-4-0-4-6·3V, 4A; DCS13 smoothing choke 12H, 250mA; PCS12 swinging choke 5/25H, 250/ 50mA, 2-8µF 1,000V; 1,000V meter; 500mA meter; switches, lamps, fuses, 5U4G, etc; all mounted in 12in by 6in by 12in case, £15 the lot. UMI modulation transformer, £3. Buyers collect. G3DTX, QTHR. Tel Little Chalfont 3108.

KW2000B, little used, mobile psu, £25. Datong speech processor made from board, own case and controls, works well, £19. G3OSZ, QTHR. Tel 051-648 4189.

Hilomast NK9 pneumatic mast, accessories, nine metres, brandnew, boxed, unused. Property of deceased amateur. Current retail price for mast alone, £231, will accept £180 ono. Buyer collects. Court. Tel 01-857 4758, after 7 pm.

Liner 2, 144-1-144-33, mic, mobile mount, manual, mains psu, £120. Trio VOX3 for TS700, £12. Wanted: TR2200 G or GX, C828M, C146A, MR2 rx. G3TCG, 6 Bramble Bank, Vigo Village, Meopham, Kent. Tel Fairseat 822043.

"Rad Com", vols 23 to 51, incl; SWM, 21 vols, five copies missing; 73 mag, May 1970 to Feb 1971; all vgc, 30p per vol, for the lot. Buyer collects or arranges. G4BC, QTHR.

Shack clearance many items: components, transformers, transistors, inductors, etc. Send sae for long list. G8CHE, QTHR.

House purchase forces sale. Brand-new FT101E, FRG7 and FDK Quartz 16, cartons still factory sealed and unopened, fully guaranteed. FT101E, £420. FRG7, £145. FDK Quartz 16, £150. Can arrange insured delivery. G3LNC, QTHR. Tel Dunstable (0582) 65114.

Codar CR70A, mint cond, one year old, recently aligned, £30. Buyer collects. Peter Jones, 5 Mere Avenue, Middleton, Manchester.

Pair Eimac 3-500z, new, boxed, £50 plus post. Tel 0403 72 2909.
New 6146 valves, in makers' boxes, £2 ea. Minimitter MR44/11, amateur bands, double conversion rx, £28. 18AVT/WB trap vertical,

£35. G3GHY, QTHR. Tel Southampton 846568.

FT101E, mint cond, under guarantee, four months mobile use, £410. Multimobile whip, all coils, top to ten, mint cond, £30. Going vhf mobile. G4DIU. Tel Havant 79464, after 7pm.

Amateur tv, comp stn: 4X150A tx, 150W I/p, vision and sound modulator, in Imhoff cabinet; Ikegami 625 camera, lens; Ikegami 91n monitor; prefer to sell complete, but will split. Buyer collects. Offers to G3ZUL, QTHR. Tel Stourbridge 5917.

HQ1 Minibeam, 10, 15, 20, £40. Buyer collects. G4FXS. Tel 021-458 3537, after 7pm.

HP-21 scientific calculator, as new, charger, carrying case, instructions, £42 ono. G3UYK, 6 Eling Close, Winchester, Hants. Tel Winchester 822204, day or 880819, evenings.

Winchester 822204, day or 880819, evenings.
Collins 75S3B, 32S3, KWM2A, 30L1, S16F2, 312B4; Drake T4XC, Magnum 6, late R4C, 4 NB filters, spkr, L4B. All mint cond. Offers. G3NNT. Tel 0695 422203.

Marconi TF867 sig gen 15kHz-30MHz, good cond, £25. DX100-U, mint, £40. Heathkit Mohican rx, £30. TF4288/1 valve voltmeter, £10. Buyers must collect, evenings or weekends. G35DK, QTHR. FT2F 12V 2m 10W tx/rx, auto xtal t/burst, R3 to R7, S0, 145-8, S20 S24, preamp, 600kHz shift rx, £110. IC22A 12V 2m 10W tx/rx, t/burst, 13ch, S0, S13, S20 to S24, R3 to R7, rev R3, £135. G8BPU, QTHR. Tel Bollington 73242.

Trio 9R-59DS rx, spkr, manual, perf cond, long wire, £50. R1155 rx, 200kHz-18·5MHz, mains psu, manual, spare set of valves, £10.

Tel Andrew Tickle, 051-722 4900, after 6pm.

IC240, as new, fitted reverse repeater and low power mods, £180. Wanted: FV101B and FL2100. Consider exch. G3GXQ, QTHR. Tel Leeds 641298.

Belcom Liner 2, good cond, 144·1-144·33MHz, £105 ono, or exch for Trio JR500SE/JR310 plus cash. Letters only please. G8LKR, OTHR.

FTDX500 tx/rx, 560W p.e.p., a.m./ssb/cw, spare valves, manual, £195. Or, including KW E-Zee match, SWR50A, 50Ω dummy load, W2AU 4:1 balun, £215. S. Williams, 7 Oddfellows Street, Scholes, Cleckheaton, West Yorks BD19 6NX (near M606/M62). Tel 0274 879615. after 5pm.

Liner 2, manual, etc, £100. Sentinel 2m converter 4-6MHz i.f., £7. Jordon Watts driver unit (LS), £5. 20mA, 6in dia cirscale meter, £5. 1kΩ, 0.7A rheostat, £1. All above, plus postage. BCC 2 and 4m base stns, a.m., £10 ea. Brenell STB2, fault on record, £30. Thirty 7in tape reels, £15. Cossor 1049 'scope, £5. Advance constant voltage transformer, 125W, 230V o/p, £5. Prefer buyer collects latter items. G3ZNW, QTHR. Tel 01-432 2556 (work), 01-397 8820 (home). IC20, S0, S20, R4, R5, R6, R7, £92 ono. Lowe monitor rx, S0, R6, R7,

£30 ono. G3LZN, QTHR.
FDK Multi 7 2m tx/rx, 10W autotone, must sell, £100 ono. 5/8 2m mag mount antenna, £12. G8NAE. Tel Keynsham 2859.

KW Vespa Mk2, psu, vgc, £75. G4CP, QTHR. Tel Bloxwich 76372. Tilt over tower, 30ft in three 10ft sections, buyer collects, £35 ono. G3TAZ, QTHR. Tel Luton 26995.

Heathkit SW 717 gen cov, exc cond, manual, £50 ono. Wanted: FR50B or similar rx, must be good on cw. G4FMK, 8 The Parkway, Canvey Island, Essex SS8 0AA. Tel Canvey Island 3805.

CR100, good wkg cond, £15 ono. AR10 28-30MHz double conversion rx module, in case with SEM 2m converter and audio amp, only two months old, £55 ono, or will split. G8NZS. Tel Rugby 815506, after 6pm.

New 7360s, in makers' packing (RCA), £4 ea. Pair TT21s, unused, £6. Pair TT21s, used but OK, £3. G4DZC, 53 Highfield Crescent, Portswood, Southampton.

Liner 2, preamp, ac psu, new mic, £105. G3WWH, QTHR. Tel Bayston Hill 3383.

FT101 10-160, spares incl pair inverter transistors, SJS6, fan, manual, etc, offers around £300. Wanted: scanning rx, covering aircraft 120-140MHz. Also Digitex frequency counter, Atlas 215X with ac psu, required urgently. G3IES, QTHR. Tel 0272 500742.

KW2000E, mains psu, all of ten metres, unmarked, no mods, brandnew pair matched 6146s, spare valves, manual, £265. G3PZF, QTHR. Tel St. Albans (0727) 57665. Double HROs, 19in horizontal rack cabinet, £6. Two synchro repeaters and radio compass indicator, £8. Polyquad Starmounts, manual, £5. HRO dial, £4. BC221, psu, manual, £17. AR88 manual, £1. Billey 100kHz xtal, £1.50. Large compass, £8. GM6MS, QTHR.

Modified WAC dx rx, comp with spare valves, batteries and coils, ranges mw and sw down to 30MHz. Also K model. Hayman. 66 New Road, Abbeywood, London SE2 0QG. Tel 01-310 7355, after 7pm.

HG6U xtals 8:066666, 8:075000; HC18U 18:000MHz, £1.50 ea. Denco IFT11/465CT, BF02/465, 50p ea. IN4001, ten for 20p. 2N3053, BC478, four for 30p. Cambridge driver and mod transform; 50p. Above items used. Kitchen. 18 Welch Road, Newton, Hyde, Cheshire SK14 4DJ.

Creed 7E/RP teleprinter/punch, no silencer, £20. 2F papertape reader, £10. Both carr extra. Vintage RCA-TV wobbulator, offers? Various chrome handles and audio filters, sae details. Wanted: 5-pin WW2 Belling Lee spigotted plugs and sockets. G3SBA, QTHR. Tel 05827 4815.

GEC 660 mobile, hb/a.m., mic, less xtals, rx faulty but all comp, 17 by 5 by 20mm, £25. Pye Bantam lb/fm, £15. GM8HQZ, QTHR. Tel 031-346 0591.

KW2000A, ac psu, £120. G3RVE, QTHR.

Choice IC22A, xtal toneburst, or C828M, toneburst, both as new, orig packing, R3, R4, R5, R6, R7, 145, S20, S21, S22, S23, S24, £140 ono. PF1 tx/rx, nicads, xtalled RU8, requires attention, £30. G3LXX, QTHR. Tel 0625 48526.

KW2000E tx/rx, ac psu, £245. CQP512 vhf highband 3ch fm handportable suitable for 2m, with nicad, £45. Wanted: MM 4m converter, 4-el 4m beam, or larger. MM 70cm/2m converter. 70cm Multibeam. KW E-Zee match. G3UGF, QTHR. Tel 0274 814218.

Yaesu FRG7, mint, £125. Pye fm/hb Bantam, £20. Creed 7E, recently overhauled, £20. Pye Cambridge international broadcast rx, wooden cabinet 12in spkr, 11 wavebands, £15. Buyers collect. Wanted: G2DAF rx, wkg order. Tel Kenilworth 54609.

"Television" colour tv with cabinet, needs some alignment, offers. BC221B with charts, £20. Radiovision Hambander rx, £5. Amateur bands rx, Electroniques front end, £10. TT21 a.m./cw tx, rough, £8. Property deceased amateur. Buyers collect. G3PSP, QTHR. Tel 01-950 6827.

FT221, late model, immac, preamp, £275 or offers. Datong FL1 audio filter, £35. Bauer keying paddle unit, unused, £5. G4FBK, OTHR. Tel 01-864 1412, after 6.30pm

60ft Hamtower, incl tubemount, all hardware, £80. FT101B, cw filter, mic, spare tubes etc, £320. FV101, £40. FL2100B, £180. All mint. TA compressor, £15. Shure 444, £14. New Heathkit HD-1410 iambic keyer, £30. Garrard 401 turntable, £16. Carr by arrangement. Further details Robson, GM3CFS. c/o Post Office, Reay,

Nr Thurso, Caithness.

Complete set ICs and displays (6 X FND507) Radcom May '76 counter, £10. Radio Amateurs' Handbook (1976), £4. 2m amp (QQVO7-50), psu, super job, £20 (collect only). 2m fm tx, 6ch, 8W out (spurious. > 70dB), £20. Trio 7010, immac, £120. MM432/28 converter, £15. QQVO7/50 (new), £5. QQVO3/20 (good), £2. QQVO3/10 (new), 50p. QQVO2/6 (new), £1. 4CX250B (good), £3. VHF/UHF Manual, £4. Amateur Radio Techniques, £2. Radio Data Reference Book, £2. G3ZYL. 20 Park Road, Bracknell. Tel Bracknell 22169, weekends.

S-meter, suitable AR88, r/h zero, 5mA, £4. 866A, brand-new, boxed, £2.50. Scorpio electronic ignition kit, £10. G3HBW 2m fet coverter kit, i.f. 4-6MHz, £8. Both new, in cartons. American headphones, high Z, brand-new, £7.50. All items plus postage. G3GUU, OTHR.

Liner 2, mint cond, unfitted preamp, boxed, manual, £105. SSM 9MHz xtal filter, ssb gen with homebrew mixers and vfo, giving QRP o/p on 2m, £20. White, 31 Astbury Avenue, Wallisdown, Poole, Dorset.

KW2000A dc psu, £25. Wanted: Manual or circuit diagram for sig gen, oscillator test No1, CT212, purchase or loan. G4DXO, 102 Woodland Avenue, Hove. Tel Brighton (0273) 561616.

Marconi Atalanta rx 16kHz-29MHz with rejector, handbooks, homebrew psu, £190 pair. QVO8-100, £15. G3ZON, QTHR. Tel 01-546 3447.

Sailing-yacht and car-seeking xyl demands sale of: FT277/FR101B, cooling fan, few hours use only, orig packing, manual, etc, mint, £349. Europa B 2m transverter, new, six hours use only, con-nectors for FT101, £70. 18AVT/WB, £40. 10XY 2m crossed Yagi with twin coaxial and 6-way polarization control box, £20 the lot. KW 5012 dummy load SO239 connection, £10. KW E-Zee match SO239 connection, £20. Morse records, £5. Going QRT. GW4DTV. 27 Abercomy Parc, Prestatyn, Clwyd. Tel Prestatyn 88358.

HRO, nine coils, three bandspread, psu, xtal, £25. Pye fixed station tx/rx, handbook, £17, G3USZ, QTHR. Tel Upminster 23699.

FRG7 rx 0.5 thru 30MHz, a.m., ssb, cw, stable phase locked loop system, tuning facilities, recording socket and cassette recorder included in price, still under guarantee, £130. Prefer buyer collects after inspection. G3BIA, QTHR. Tel 01-977 6705.

Liner 2, fitted preamp, clean signal, £110, G8KHI, QTHR. Tel Letch-

worth (04626) 4603, after 6pm.

KW2000A, spkr, ac psu, mic, manual, circuit, £145. KW1000 linear amp, £120. Hy-Gain TH3 3-el three band beam, £45. FT101E, mint, £365, Buyer inspects, tests and collects, G3JYJ, QTHR, Tel 01-764 2744, between 10am and 4pm.

AR88D and Eddystone 840C, both orig cond, £45 ea. R1155N with o/p and p/p, £15. Voltmeter Electronic CT54, £54. Racal counter timer SA550, £50. Wanted: R216, comp. McBride, 4 Little Fancy

Close, Plymouth. Tel 0752 775375.

Two valve amps, £4 ea. Various transformers, 50p ea. Garrard magazine tape deck, £9. Tape amp, £7. Wanted: Circuit or details for "Venner counter" TSA 3336, Collaro idler wheels, pick-up arm. D. A. Griggs, 5 Collingwood Avenue, Muswell Hill, London N10 3EH. Hudson FM208 with 145'0 xtals, transmit wkg, rx not functional on 2m, with circuit, £30 ono. Buyer collects. Tel 01-286 1833, 6pm to 8nm.

70cm 46-el Multibeam, £10. 4m 4-el Yagi, £6. Various 2m Yagis, apply for details. 70cm Microwave Modules converter, 28MHz i.f., £14. Pye Ledex unit. Wanted: HQ-1 Minibeam. G3XJS, QTHR. Tel

Holmer Green 2344.

KW2000E, ac psu, £245. KW107 antenna tuning system, £55. 12AVQ vertical 15, 20, 10, £15. KW lp filter, £10. Doram auto-key, £10. Shure 444 desk mic, £12. G3NUL, QTHR. Tel Newmarket 730181 (Sffk). 2m 40W valve tx, a.m./fm/cw, with psus, £35. 19in b/w tv, uhf, vgc £15. 25 × 50 prismatic binoculars with case, etc, hardly used, £25.

Mr Lonnon. Tel 025-681 298, evenings. Collins filter F455 FO5, £5. Kokusai filter MF455 30W, £10. Wanted: Original 75A2/3 manual. G3GBB, QTHR. Tel Bury St Edmunds 66496. Liner 2, property of late G8FGW, with preamp, mic, non-commercial mains psu, consider delivery up to 50 miles, £115. G3EUS, QTHR.

Tel Hitchin 33390, evenings. Creed tty equip: model 54 with cover, model 85 printing reperf with cover, model 6S6M auto sender with magnetic clutch; two GPO auto telex psus, five rolls tape, two rolls Class A paper, £47 the lot.

G8DEV, 15 Chapel Fields, Swinford, Leics LE17 6BS. FL50B plus FR50B fitted vox, good cond, £150. Trio 7010 ssb tx/rx, £140 ono. G4FJO, QTHR. Tel 04895 3664.

**E140 010. G4F30, G1F10. Tel 04033 300-.

**Katsumi EK9X electronic keyer, sidetone oscillator, £12. Sentinal 2m converter 28-30MHz i.f., £12. Eagle ac millivoltmeter, £15.

Wanted: 4CX300 tubes, urgent. G4CKL, QTHR. Tel 0623 23801.

Exch: Mosley Mustang beam, exc, very clean cond, 12 months external use; for decent compact 'scope with rf capability; might sell to reasonable offer. Wanted: 2m mw i.f. converter. G4ASP, QTHR. Tel Cleveleys 76814.

Trio TS700, £250. Wanted: Manual for Pye U450T. G3ZTR, QTHR.

Tel 0262 74337.

Atlas 180, £200 ono. Hustler mobile hf antenna 80m to 10m, £40. Stolle 2010 rotator, RZ100 ballrace, cable, £40. 2m halo, £1. 2m Hi-Q break, £4. Two axial fans, 115V, £1. G4CHD, QTHR. Tel Cheltenham 53178.

Trio 7010 2m ssb, £140. Icom IC215 2m fm, 14ch fitted, comp with nicads/charger, helical whip, six months guarantee, £150. G8AVH, 30 Bedford Drive, Sutton Coldfield, West Midlands. Tel 021-329 2305. Heathkit DX100, vgc, recently professionally serviced, £50. AR88LF rx, £40. Buyer collects. G3MLN, QTHR. Tel Chesterfield 3826.

TS700, vgc, £295. Liner 2 psu, £14. PCBs for p.e.p. meter, QST Dec '76, £1. Noise/gen, Rad Com Jan '76, £1.50. SD 306s, £1.85. G4DED, QTHR. Tel 086 75 2215.

Mosley Elan 10–15m, 3-el beam, one year old, £45. Hy-Gain 12-ACQ 10–20m vertical, £18. Technical Associates audio compressor, £12. Buyer collects. G3TTJ, 27 Oxendene, Warminster, Wilts. Tel Warminster 212779.

Pye Vanguard, incl cont box, mic, cables, S0 rx xtal, tx converted to fm, wkg well on 2m, £20. Buyer collects. Xtals: new HC6U, 8MHz R7 tx, £1.50; 72MHz tx, miniature S0 145-26, 145-4, S20 145-6, 145-7, £1 ea. Winters, 48 Stonor Road, Hall Green, Birmingham. Tel 021-

BCC69 4m tx/rx (tunable), ac psu, mic, xtal, antenna, comp station, £8.50. Transistor portable rx, lw/mw/sw, 1·5-22MHz, £8.50. 100/ 10kHz calibrator, xtal and ic, £1.75. Neat 160m ssb tx/rx with 12V psu, needs attention, £14.50. 4m xtals (sae list), 50p. G2HCV, QTHR. Tel 01-954 2960.

Technical Associates audio filter, 2·5kHz to 80Hz bandwidth, switched, £16.50. Homebrew linear, 3XPL509, professional case, fan, £10. Minimitter MC8 converter, 160–10m, mains or battery, 1·5 MHz i.f., £9. G4DIB, QTHR. Tel 01-467 9033.

Resistors 0.25W high stability, carbon film, full length axial leads. five each of thirty well-spaced values 4.7Ω to $2.7M\Omega$, surplus from bulk order, 150 brand-new resistors, £1. D. J. Thwaites, 15 Springhead Road, Kemsing, Sevenoaks, Kent.

FR50B 10-80m, handbook, £70. Burton, G4CZD, QTHR, Tel Gravesend 61252.

HQ1 Minibeam, little used, £55. RTTY Creed 7TR3, reperf, £15.

Codar AT5, mains psu, 12V dc psu, unmarked, £30. Homebrew ham-band rx, incorporating "Q-fiver", £15. Weston E772 multimeter, £10, G3VW, OTHR, Tel 01-205 1443.

Sommerkamp FR100B amateur bands rx, exc cond, £80 ono. Or exch for good Liner 2, cash adjustment of course. G3SFO, QTHR. Tel 0302 770345, evenings.

Lafayette HA800 amateur bands rx, fm discriminator, £68 ono. Microwave Modules 2m converter 28-30MHz i.f., £10. Codar hf preselector, £6. Braemar 4-track spool tape recorder, mic and tapes, £12 ono. G8IFT, QTHR. Tel 021-453 4748.

Trio TS700G, ch R3, S20, S21, S22 fitted, comp with VOX-3 unit, only seven months old, little used, £350. G4CCH, QTHR. Tel Scunthorpe

0724 68180, 9am-6pm, ask for Howard.
"RSGB Bulletin", calendar years 1951-55 incl, and 1962-7 incl; Radio Communication 1968-73 incl, unbound, good cond, what offers? Jermyn inverter, charges 24V battery from mains and, when mains supply fails, automatically provides 300W 240V 50Hz square wave, exc cond, in wkg order, £55. Buyers collect. Kingston upon Thames area. Tel 01-942 1230.

OS2 'scope, £14. MK Products rtty demodulator, new tones, £40. Wanted: Eddystone 770R, E-Zee match, Datong clipper. G4DAT,

QTHR. Tel Burnham (Bucks) 4749.

QTH: spacious double fronted house, corner position, full gas-fired central heating; comprising porch, hall, lounge with gas fire, dining room, breakfast room/study, four double bedrooms, bathroom/wc, fully fitted kitchen with extractor fan, cloakroom, garage, large wooden workshop/shack, space for caravan or boat; erected 40ft crank-up tower free, planning authorized, approx 240ft asl; price, £16,000 including fully fitted carpets throughout. G4HK,

QTHR. Tel 061-431 7787.

Yaesu FT75B 80-10m mobile tx/rx, dc psu, nine xtals fitted, £170.
75\(\Omega\) swr meter 50-500MHz, £12. Soligor 90-260mm zoom lens, £70.

G4CGE, QTHR. Tel 0296 89611, office hours.

KW Viceroy, manuals, £65. G2DAF tx, £30; rx, £20; both with 898 dials. Avo No7, leather case, £20. Sig gen TF144G, £10. PM14/2M Parabeam, £16. Auto trans 110/220/240, weighs 26lbs, £5. New AR88 RCA manual, £2. G2AQJ. Tel Salisbury 25929.

Six 4CX250B valves and uhf airflow bases, £8 ea. QQVO640A valves and ptfe bases, new, £6. Two 12V 5Ah nicads, £6 ea. 28V 20A stabilized psu, new, £20. G8BSR. Tel 0952 460096.

WANTED

Urgent. Back copies of Rad Com in good cond: Feb 1972, Oct 1974, Dec 1974, Feb 1975, Mar 1976, July 1976; your price paid. G4AZC. Oakcroft, Kingston Lane, East Preston, Nr Littlehampton, Sussex. Tel 090 62 73145.

Any information on Advance sig gen, type D1. GW4EVJ, QTHR. Tel Clydach 843948.

Circuit diagram (buy or borrow) of "Oscilloscope Miniature CT52". Also back numbers QST and 73 mag. Kelman, 61 The Fairway, Oadby, Leicester. Tel 708585.

BC620 or BC659, comp with psu PE117, GM3PIP, QTHR, Tel Mintlaw 2319.

Majestic eight valve vintage domestic radio rx C1938, mains standing model (American made). Valve voltmeter, please state type. Wartime "spy" suitcase type hf tx/rx, wkg. M. Colmer, 26

Beech Avenue, Brentwood, Essex.

Commercial portable vhf tx/rx, wkg or not on 2m but must be high band, Ultra Cub or similar unit. WHY? Please write giving details and price. G4ANW, 16 Chestnut Drive, Broadstairs, Kent CT10

Good price paid for Nems Clarke 1907 vhf rx manual or copy, or generous deposit paid for loan. Also manual for R-220 vhf rx, and valves 6688, 7077, 7868, 6DZ4. Fletcher. Tel Nottingham (0602)

397446, reverse charges.

Swansea University Club stn requires following items: two Creed 7E or similar teleprinters, three high band Pye Cambridges, and two bases and chimneys for 4CX250B valves. Contact secretary, J. O. Morris, 1 Hadland Terrace, Norton, Swansea SA3 5TT. Tel Swansea 68675.

Going ultra linear: tube with 1500W anode dissipation on 144MHz, prefer: 8877, 3CX1500A7, 3CX1000A7, 5CX1500A with base. All letters answered, no jokers please. Also 4CX250B vhf base. Fulda, G8IQL. Darwin College, UKC, Canterbury, Kent. Urgent: service documents, circuit diagram or any info for oscillator test No 1, CT212. Will copy, return and cover all expense. G4CYW, QTHR.

CW filter, MFJ or similar external use, no kits. Also mechanical

bug-key. G4AKX, QTHR.

Instruction manual or handbook for Taylor valve tester, model 45C, loan or sale. G3WJK, 102 Old Farm Avenue, Sidcup, Kent. National NC-120 rx, buy, beg, borrow manual or circuit for photo-

copy. Write M. G. Hayman, 66 New Road, Abbey Wood, London

SE2 0Q6. Tel 01-310 7355, after 7pm.

HQ1 Minibeam; AR30/AR40 rotator, comp, or similar; Class D wavemeter; all in wkg order. Details, price, can collect. G8MPN, 19 Princes Gardens, Codsall, Wolverhampton. Tel Codsall 3509. Datong UC/1 up-converter, must be unmodified. G3PEJ, QTHR. Tel 0723 70739.

S-meter for AR88D rx, good cond. Tel 01-749 3430.

B2 tx/rx, comp, first class cond, manual. Coleman, G5BH, QTHR. Tel 01-672 7592.

Tank capacitor from American TA12 WW11 tx, 360pf approx, urgently required. G3AMF, QTHR. Tel 01-989 9224, evenings.

Datong agile filter. Exch two c/b hand held dual channel superhet tx/rxs, 100mW o/p, 9V operation, mint cond, orig packing, suitable conversion 28MHz. G3UIE, QTHR. Tel 048 95 2108.

TX/RX 80/10m, 240V, mains, about £200. Delivered, Birming-ham. G3EJO, QTHR. Tel 021-373 1350.

Low band portable fm tx/rx (Ultra Cub, etc). Also, any handbooks for ex-army radio sets, i.e. 9, 11, 19, 22, etc. G8ALM, QTHR. Tel 01-539 5130.

Handbook for Hammerlund HQ145A rx, borrow or buy. GM8NGL. Tel 031-663 9071.

Telford Communications TC7 rx, wkg order. K. M. Brown, 165 Canterbury Road, Morden, Surrey SM4 6QG. Tel 01-648 0028, after 6pm.

KW107, Atlas, FT101, TS520, multiband vertical 70cm antenna, G-whip, all bands. G3LXX, QTHR. Tel 0625 48526.

G-whip mobile antenna, must be comp. G4EGB, QTHR.

Ex-RAF World War 2 British airborne radio, radar equipment, circuits, publications; especially indicator units having 6in and 3in crts, comp or suitable for refurbishing. Strong, 58 Napier Road,

Ashford, Middx. Tel Sunbury 87913. Codar AT5 tx, in good cond. G8NSJ. Tel Walsall 25380, evenings. Gen cov or amateur bands rx, Heathkit RA1 or similar. Details to Ellis, "Sundial Cottage", Brockhampton, Cheltenham, Glos. Tel Andoversford 523.

FP200, preferably grey. Keen, 112 Kirkleatham Lane, Redcar, Cleveland TS10 5DD. Tel 064 93 76945.

1966 or '7 ARRL Radio Amateurs' Handbook Vibroplex or similar bug-key, cheap B29 or similar rx. For sale: Photocopy handbook for

770R Mk2 rx, £1. G3AIO, QTHR. Tel Pembury 2836.

Cathode ray tube 3AFP1, manual for Heathkit OS-1 'scope.
G3ZKQ, QTHR. Tel 021-427 3088, evenings.

HF bands antenna, cw tx or QRP rig tx/rx and tuner; 80m resonator for 18AVT, linear amplifier, not wkg also considered. Tel George, 01-429 0173, after 6pm and weekends.

Triband hf beam, 30ft tower, rotator. For sale: Jason wobbulator, £7. Heterodyne frequency meter, £10. 30W hi-fi amp/preamp, £5. Creed 7P/5W parallel punch, £3. Stereo record playback tape amp, £10. Four-track tape deck, £10. G3SJX, QTHR. Tel 01-656 9054.

Downconverter for 2·16hz microwave, should have output on USH tv channel, new or used, commercial made unit preferred. Top

volues, type 813. G3TJW, QTHR. Tel Exeter 75051, after 6pm.

Two meters for the RAF T21, tx dated 1921; ammeter hot/wire, 0–10A, No 5110; milliammeter 0–100mA, No 1504; both metal shrouded, to fit 2½in dia holes; also any old equipment from 1920s. G3SYX, Firglen, Maltby-le-Marsh, Lincs

HQ1 Minibeam. Also Z-match or atu. G4DBV. Tel 021-427 1684. AR88D communications rx, required by enthusiastic student, must be in good wkg order. Correspondence via Robert Ferguson, GD4GNH. Moaney Moar House, Ronague Road, Ballasalla, Isle of Man.

Looking ahead

25 February-International VHF Convention, "Winning Post", Whitton, Middlesex.

2 April-NRSA Radio and Electronics Exhibition, Belle Vue, Manchester. Details from G8BCG or G4BVE.

5-6 May-RSGB Amateur Radio Exhibition, Alexandra Palace, London N22.

CB ELECTRONICS

G3LRB G3SMI

UNIT 3, 771 ORMSKIRK ROAD, PEMBERTON WIGAN WN5 8AT Phone Wigan (0942) 216567

THE BEST IN THE NORTH-WEST

The people with a wealth of technical experience and know-how relating to amateur radio techniques, requirements and servicing, who will always be pleased to advise and assist in all respects whether it be sales, service or information.

From M6 Junction 26 follow signs for Wigan A577. At first traffic lights (T junction) turn right towards Wigan. At next traffic lights you are there BUT turn left, then 10 yards turn right BY TELEPHONE KIOSK and shop is slightly to your right. Plenty of parking space. Distance from motorway

From Wigan follow A577 for Skelmersdale to traffic lights at Pemberton (Ye Olde White Swan Hotel on your left). Turn right then 10 yards and right again by telephone klosk. Distance from Wigan 2½ miles. Closed Wednesday

AT LIST PRICES YAESU ELECTRONIC DEVELOP-MENTS J. BEAM LTD. HY GAIN C.D.E. BELCOM

MICROWAVE MODULES ANTENNA SPECIALISTS S.C.S. LINEARS AND PREAMPS EMOTATOR ROTATORS

WESTERN ELECTRONICS F D.K

Part exchanges welcome H.P. and credit terms S.A.E. all enquiries

G. W. M. RADIO LTD.

ALL PRICES include VAT and Post/packing

SIGNAL GENERATORS, Oscillator Test No. 1, CT212, covers 85kc/s to 32Mc/s in 7 bands. AM-CW-FM Attenuator 1 Microvolt to 1 volt. AC Mains or 12V DC. Complete with leads, checked over and operable. Compact and well made, £27.50.

EXECUTIVE leather open-flat tool case, like brief case when closed. As new with keys, £12. PRECISION DC Voltmeters. 0-3, 0-50V, approximately 7" mirror scale. Polished wood box, excellent condition, £15.

BASE STATIONS, HI Band AM Cossor 25kc/s R109AD and T109. New condition. Callers only, £50.

RECEIVERS 62H. 19° rack mounting 14 valve Aircraft Channel Receiver. Factory reconditioned as new. Covers 100-150Mc/s crystal controlled but with suggested simple tunable conversion instructions. Power needed 250V DC 100 mA and 6-3V 4 amps. Very solidly built, £15.

AIR TRAFFIC CONTROL 10 watt A.M. Transmitter by G.E.C. also rack mounted and has AC, also rack mounted and has AC supply £15. THESE AND OTHER HEAVY ITEMS COST A LOT LESS IF COLLECTED—CARRIAGE IS VERY EXPENSIVE!

Manufacturers surplus major assemblies to make 430 Mc/s all-transistor Transmitter/ Receiver to operate from 12V DC. Two boards, pull out aerial and speaker. Uses 2N5915 output transistor (51 watts) and is F.M. One rig already in use as Repeater station, £18.50. Circuits and instructions (also available separately) 50p.

AIRLITE model 62 head and boom mike sets, £5.50.

WATTMETERS, Absorption AF No. 1 (CT44) 200 microwatts to 6 watts at 2.5 ohms to 20,000 ohms, £12,

BC221 FREQUENCY METERS. Complete with charts, less power supply. These are recently recalibrated, £20.

B44 Mk 3, 60 to 75 Mc/s xtal controlled AM, no battery lead or mike, £10. Last of the

VALVE VOLTMETERS CT208. Mains powered. 1-100v DC 1-5-150v AC. Complete probe and mains lead, £18. NOISE GENERATOR CT410. 15kc/c-160MHz, 8 minute timer, 5-25-100 ma Diode

Current, metered. Output impedance 10-2000 ohms, attenuator and power meter. AC mains powered, £14,

AKG Lightweight HEAD & MIKE SETS, model K58. Mike 2/300 ohms, headphones 75 ohms. Ideal for Mobile use and in excellent condition. £5.50.

Carriage charges are for England and Wales only.

Terms: Cash with order Early closing Wednesday G. W. M. RADIO LTD. 40-42 PORTLAND ROAD, WORTHING, SUSSEX Telephone 34897

ELECTRONIC SERVICES

N.B. NEW ADDRESS

2 ALEXANDER DRIVE, HESWALL, WIRRAL, MERSEYSIDE. L61 6XT

Tel: 051-342 4443 (4.30-7.00pm)
Cables: CRYSTAL, BIRKENHEAD. Telex: 627371

PRICES EXCLUDE VAT, WHICH SHOULD BE ADDED AT THE HIGHER RATE (12)성) FOR ITEMS MARKED (H) AND AT THE LOWER RATE (1%) FOR ITEMS MARKED (L)—OVERSEAS ORDERS (Inc. Eire and Channel Isles) NO VAT CHARGEABLE.

| 2M TX & RX CRYSTAL | |
|--------------------|--|
| | |

| CRYSTAL FREQUENCY RANGE USE(TX or RX) and HOLDER OUTPUT FREQUENCY | 4MHz-TX-HC8/U | 6MHz-TX-HC25/U | 8MHz-TX-HC6/U | 10MHz-RX-HC6/U | 11MHz-RX-HC6/U | 12MHz-TX-HC25/U | 14MHz-RX-HC25/U | 18MHz-TX-HC25/U | 36MHz-TX-HC6 & 25/U | 44MHz-RX-HC6/U | 44MHz-RX-HC25/U | 48MHz-TX-HC6 & 25/U | 52MHz-RX-HC25/U | 72MHz-TX-HC25/U |
|--|---------------|----------------|---------------|----------------|----------------|-----------------|-----------------|-----------------|---------------------|----------------|-----------------|---------------------|-----------------|-----------------|
| 144-030 | b | ь | ь | ь | ь | ь | ь | ь | ь | ь | b | ь | ь | b |
| 144-4/433-2 | a | b | 8 | ь | b | C | ь | c | b | ь | ь | ь | b | b |
| 144-480 | b | b | Ь | b | ь | b | b | ь | ь | ь | ь | b | b | ь |
| 144-800 | b | b | b | ь | b | b | ь | ь | b | ь | ь | b | b | ь |
| 144-850 | b | ь | ь | ь | ь | ь | ь | ь | ь | ь | ь | b | ь | ь |
| 145·000/SO | 8 | a | 8 | a | a | a | a | | | 8 | 8 | 8 | 8 | C |
| 145-050/R2T | 8 | a | | ь | ь | | ь | 8 | ь | ь | ь | ь | b | ь |
| 145-075/R3T | | 8 | 8 | b | ь | 8 | ь | 8 | ь | ь | ь | ь | ь | ь |
| 145-100/R4T | a | 8 | a | ь | ь | | ь | | P | ь | b | ь | ь | ь |
| 145-125/R5T | 8 | | | ь | ь | | ь | 8 | b | b | ь | ь | b | b |
| 145-150/R6T | 0 | 8 | | ь | ь | | ь | | ь | ь | ь | ь | ь | ь |
| 145-175/R7T | 8 | | a | ь | ь | a | ь | | ь | ь | b | ь | ь | ь |
| 145-200/R8T | 8 | 8 | a | b | ь | 8 | a | | ь | 8 | 8 | ь | | ь |
| 145·300/S12 | b | b | ь | b | ь | ь | ь | ь | ь | ь | ь | ь | ь | ь |
| 145-350/S14 | ь | b | C | Ь | ь | ь | ь | ь | ь | C | C | ь | ь | b |
| 145·400/S16 | ь | b | ь | b | ь | ь | ь | ь | b | b | b | ь | b | b |
| 145·500/S20 | 8 | a | 8 | | 8 | | a | 8 | | 8 | 8 | | | c |
| 145-525/S21 | 8 | | | 8 | C | | 8 | 8 | ь | | | ь | | ь |
| 145-550/S22 | | a | a | | C | n | a | 8 | ь | a | | ь | | b |
| 145-575/523 | 8 | 8 | a | a | C | 8 | a | | ь | . 8 | | ь | a | ь |
| 145·600/S24 | a | 8 | | | C | | a | | ь | | | ь | | ь |
| 145-650/R2R | b | b | ь | 8 | ь | ь | 8 | b | ь | | | ь | | ь |
| 145-675/R3R | ь | ь | ь | 8 | ь | ь | 8 | ь | b | | a | ь | | ь |
| 145-700/R4R | b | b | ь | | ь | ь | a | ь | ь | | | b | | ь |
| 145-725/R5R | b | b | b | a | b | ь | | ь | ь | 8 | 8 | b | a | b |
| 145-750/R6R | b | ь | b | | ь | ь | a | ь | ь | 8 | 8 | b | 8 | ь |
| 145-775/R7R | b | ь | ь | a | ь | b | 8 | ь | ь | a | 8 | ь | a | b |
| 145·800/R8R | a | 8 | 8 | a | a | 8 | 8 | | b | 8 | a | Ь | 8 | C |
| 145-95 | | Ь | a | 8 | ь | ь | b | ь | b | a | Ь | Ь | ь | b |

PRICES: (a) £2.36, (b) and (c) £2.90 + VAT (H).

AVAILABILITY: (a) and (c) stock Items, normally available by return (we have over 4,000 items in stock). (b) Four weeks normally but it is quite possible we could be able to supply from stock. N.B. Frequencies as listed above but in alternative holders and/or non-stock loads are available as per code (b).

ORDERING. All we require to know is (1) Output frequency. (2) Crystal frequency range. (3) The holder, and (4) Either the load capacitance (pfs) or equipment, it is not essential to give the exact frequency, though it would be of assistance to quote it if

JAPANESE AND AMERICAN EQUIPMENTS

With the ever increasing popularity of Japanese equipments we have further expanded our range of atock crystals. We can now supply for YAESU (FT2F, FT2FT, FT2 Auto, FT224), most of the ICOM range and the TRIO-KENWOOD range. We can also

supply from stock crystals for the HEATHKIT HW202 and HW17A.

YAESU FT221 CRYSTALS NOW IN STOCK, ALL AT £2.90 + VAT (H). All popular channels—For repeater use advise stal frequency required as earlier models have different shift xtals to later FT221R. We can also supply the crystal to give NORMAL.

"tune to RX" working cas FT221R for 70 cm we can supply the 1-6 MHz shift xtal for direct use with a MICROWAVE MODULES MMT432/144 which we can supply for £133.00 + VAT (H). SPECIAL OFFER I II ordered with transverter 70cm shift crystal

CRYSTALS FOR THE NEW BRITISH 70CM CHANNELS

We are stocking the following channels RB0 (434-69/432-00), RB2 (434-65/433-05), RB4 (434-67)(433-10), RB6 (434-75/433-15), SU8 (433-20), RB10 (434-65/432-25), RB10 (434-65/433-26), RB10 (434-65/433-65), RB10 (434-65/433-65/433-65), RB10 (434-65/433-65/433-65), RB10 (434-65/433-65/433-65), RB10 (434-65/433-65/433-65/433-65), RB10 (434-65/433-65/433-65/433-65/433-65/433-65), RB10 (434-65/433-65/433-65/433-65/433-65/ RX crystals for RB2, RB4, RB6, RB10, SU18 and SU20 for use in the U450L Base Station, together with the TX and RX crystals for the remaining SU channels (SU12-433-30-RTTY, SU16-433-40 and SU22-433-55) for all the above equipments are available at £2.90 plus VAT (H) delivery as per class (b) 2m items.

4m CRYSTALS FOR 70.26MHz-HC6/U

at £2.36 each + VAT (H) at £2.90 each + VAT (H)

10-245MHz "ALTERNATIVE" I.F. CRYSTALS-£2.36 + VAT (H). For use In PYE and other equipments with 10-7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145-0MHz. In HC6/U, HC18/IU and HC25/U.

CRYSTAL SOCKETS-HC6/U, HC13/U and HC25/U (Low loss) 16p each + VAT (H) + 10p P. & P. per order (P. & P. free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS-HC18/U

All at £3.00 + VAT (H). 38-6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70MHz (144/4), 71MHz (144/2), 95MHz (342/52), 96MHz (1,296/432 144), 101MHz (432/28). 101-50MHz (434/28), 105-6666MHz (1,296/28) and 116MHz (144/28).

CRYSTALS SPECIALLY MANUFACTURED FOR AMATEUR USE TO CUSTOMERS REQUIREMENTS

Now supplied to our new improved amateur specification (temp. tol. ±30ppm 0-60°C, adj. tol. ±30ppm) as follows: in HC8U 1:5-2MHz £3.95 + VAT (H) and HC6/U 2-105MHz agi, to: ±30ppm) as follows: in HC50 19-2MHz 23.39 + VAT (H) and HC50 24-103MHz and HC18/U and HC25/U 4-105MHz 23.09 + VAT (H). Delivery usually 4-5 weeks. Please give circuit conditions (i.e. load in pf etc.) when ordering. Fundamentals (1-5-21MHz) will be supplied to 30pf circuit conditions, and overtones (21-105MHz) to series resonant conditions unless otherwise specified. For details of closer tolerance crystals please send S.A.E.

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS—
100kHz in HC13/U, £2.95 + VAT (L).
1MHz and 5MHz in HC6/U and 10MHz and 10·7MHz in HC6/U and HC25/U, £2.90 + VAT (L)

BURNS ELECTRONICS

We are the Northern Appointed Agents for BURNS KITS etc. and can supply most of their products from stock.

MODULAR COMMUNICATIONS SYSTEMS

For the RTTY enthusiast we can recommend and supply the "MCS" range of prod-ucts. This includes terminal units. AFS keyers, magnet drivers for TTL interface. telegraph distortion measuring adaptor, RTTY audio processor, power units, etc. etc. For the CW man we have the "MCS" CW filter which gives three stages of active filtering. Please send S.A.E. for full details of the "MCS" range.

ANZAC MD-108 DOUBLE BALANCED MIXER 5-500MHz supplied with full details for only £5.95 plus VAT (L).

CRYSTALS FOR PROFESSIONAL USE

CRYSTALS TO COMMERCIAL SPECIFICATIONS

We can supply crystals to most commercial and Mil. specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30—7pm and ask for Mr. Norcliffe.

TERMS: CASH WITH ORDER-MAIL ORDER ONLY-S.A.E. WITH ALL ENQUIRIES—PRIGES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED—OVERSEAS CHARGED AT COST.

START THE NEW YEAR RIGHT

HIRE OR BUY VHF-UHF GEAR ICOM, FDK, MICROWAVE MODULES. PART EXCHANGE AND HP WELCOMED OUR RANGE OF USED EQUIPMENT CHANGES RAPIDLY.

SEND SAE FOR DETAILS

Example: IC240. BUY £185.00 HIRE £14 a month. HP deposit £39.60 and 12 monthly payments of .. £13.20

or 24 monthly payments of £6.60 **BOOTH HOLDINGS BATH**

(Incorporating Ham Hire and Rent-a-Rig) (Member of TAFA) 6 Golf Club Lane, Saltford, Bristol 712730. G3XOD, G3NXU after 7 pm Saltford 2402. G8DPH Windsor 51767 after 7 pm

NIXONS ELECTRONICS G3CLP

NICKEL CADMIUN RE-CHARGEABLE CELLS, 1-25V PER CELL 500 ma/hr. H.P.7 size, £1.40. 1.2 A/hr, 35 × 22mm, £1.25.2 A/hr, 33 × 33mm, £1.65. 3.5 A/hr, 57 × 32mm, £3.50. 7 A/hr, 90 × 32mm, £6.45. These cells can be made up into various voltage and current ranges, in sealed packs with or without built in charging unit. SAE giving DC voltage and current required for quote.

TRANSFORMERS 240V AC. primary. Size 11H × 12W × 11D, 6-0-6 V 1 amp. £2.00: 7-0-7V £2.25. XTAL CALIBRATOR 10 Hertz to 200 M/H in 10 kH steps, £9.95

DIRECT READING CAPACITANCE METER Size 2½ × 4½ × 2 inches. Battery operated press to read; 2pf to 10 mfd, £19.95.

ALUMINIUM OR TIN PLATE CHASSIS made to order; SAE giving size required

STEEL CABINETS For the home brewers, made to your size, steel or Alloy front panel. Fixed or loose mesh top, mesh back panel. Finished in Metallic Blue. Send SAE with drawing for quotation.

STABILIZED POWER SUPPLIES FOR FM RIGS 13-5 V up to 4 amps, £14.50 + £1.50 p & p. Also 13.5V up to 8 amps. SAE for price.

P & P orders up to £5.00 add 40p; over £5.00 free UK only. Overseas at cost.

497 SHEFFIELD ROAD, WHITTINGTON MOOR. CHESTERFIELD. S4I 8NB Phone 0246-450650.

William Munro (Invergordon) Limited

distributors for

NEC Amateur Radio Equipment





NEC

CQ110E Transceiver (Ex Stock) £645 plus VAT £80.63, Total £725.63 (Price includes Securicor Delivery)

Frequency Range

10m-15m-20m-40m-80m-160m and 11m and WWV 15MHz on receive only.

Mode

LSB-USB-CW-AM-FSK-FAX/SSTV

Power Requirements

100/110/117/200/220/234 Volts AC or 13.5 Volts DC

Input Power

280 watts PEP (240 watts on 28MHz)

Digital Readout—Separate Crystal Filters for each of LSB, USB, and CW. AC and DC power units are built in. Switched metering for "S" meter, Relative Output, Plate Current, and ALC for setting MIC Gain. The following accessories are supplied with the Transceiver-Microphone, DC Power Cable, AC Power Cable, 5 RCA Plugs, 2 Spare Fuses, 2 Jack Plugs, 2 Allen Keys and a 60 page instruction book. Built-in speaker with 3 watts output. A hybrid design utilising the best features of valves and semiconductors is used to give a high performance. 7 Valves—49 Transistors—19 FETs—128 Diodes—25 ICs. The use of the RCA low noise beam deflection valve (7360) as receiver mixer gives the CQ110E high sensitivity combined with remarkable crossmodulation characteristics.

CQ 301 2KW Linear Amplifier—10 to 160m with built-in power supply and 2 EIMAC 3-500Z Valves Ex-stock. £760 plus VAT £95, Total £855. (Price includes delivery)

We also stock Antennas and Accessories—Microwave Modules—Modular Communication Systems—Polar Electronic Developments—Antex Products Components etc.

Used Equipment We have several items in stock including Yaesu FT301D/FP301

NEC EQUIPMENT IS AVAILABLE FROM Thanet Northern, 64 High Street, Wombwell, Yorks. Tel: (0226) 756229 Cambrian Communications (Tony Blackmore), 2 Joseph Parry Close, Llandough, Penarth, S. Glam. CF6 1PL. Tel (0222) 702982



100 HIGH STREET, INVERGORDON, ROSS-SHIRE IV18 ODN.
Telephone 0349 852351 Telex 75265

HIRE PURCHASE

INSURANCE



STEPHENS-JAMES LTD-G3MCN

47 WARRINGTON ROAD, LEIGH, LANCS WN7 3EA TEL 0942-676790

Happy New Year

The Communications Centre of the North West

Whether it is HF-VHF-or UHF we have a range of equipment to suit your purpose. We can supply a wide range of equipment from most of the world's leading manufacturers. It would be impossible in this space to advertise all the specifications of a quarter of the equipment we can supply. Send us 25p in stamps or P.O and we will forward you all the information you require. If it is just a general enquiry please forward SASE. Our mail-order service is one of the finest in the country. All orders of equipment in stock are despatched the same day. Terms are C.W.O. but we are pleased to accept order on receipt of your ACCESS or BARCLAYCARD number. We ship to all parts of the world, and would be pleased to quote air or sea freight cost on orders from overseas. We can arrange HP terms with a deposit of 20% and the balance payable over 8, 12, 18, or 24 months. We have a wide range of secondhand equipment which changes daily so it is rather difficult to print a list but a quick telephone call will confirm what is available at that date. All secondhand equipment carries a three month guarantee. Carriage is extra on most items but we would be pleased to quote. Some of the carriers who promise to deliver in 24 hours often don't and they are not immune to the fact that people do drop cartons.

Our range covers all the requirements of up to date Amateur activities. Transmitters, Transceivers. Receivers. Linear Amolifiers. Antennas, Test equipment, etc and you can find on our shelves equipment, some imported direct, by ATLAS—BELCOM—COMTEK—CUSHCRAFT—DECCA—DRAKE—CALLETTI—G. WHIP—HY-GAIN—JAYBEAM—MICROWAVE MODULES—NOVEL—OMEGA—CDR—S.T.E.—SWAN—TECHNICAL ASSOCIATES—TRIO—YAESU, to name a few.

Our location is such that we can be easily reached from North, South, East or West. Situated on the A574 just off the A580 (East

Lancs Road). Turn at the GREYHOUND MOTEL and we are about 1 mile on your right. NO PARKING PROBLEMS AT ANY TIME. We are 51 miles from the M6 and 6 miles from the M62.

Shop hours are 9.30 to 5.30 Monday to Friday: 9.30 to 5pm on Saturday.

| TRIO | G. WHIP | SECONDHAND EQUIPMENT | |
|---|---|--|---------|
| TS820 HF Transceiver £645.00 | Complete range of HF Mobile Antennas | (In stock going to press) | |
| DG1 Digital read out option £127.00 | | Atlas 180 Transcelver | £280.00 |
| TS520 HF Transceiver £432.00 | CALLETTI | | £385.00 |
| TS520S HF Transceiver £489.00 | VHF Mobile Antenna Range | Barlow Wadley XCR30 Receiver £ | £115.00 |
| TS700S VHF Transceiver £542.00 | The modific Patterna Hango | Belcom Liner 2 Transceiver 4 | £120.00 |
| TR7500 VHF FM Transceiver £225.00 | JAYBEAM | Collins F455 FA05 CW Filter for 75S3B Rx | £65.00 |
| PS6 Power supply £57.00 | | Collins F455 FA150 RTTY Filter for | |
| TR7200 VHF Transceiver £189.00 | Complete VHF/UHF Mobile and Home Station | | £45.00 |
| PS5 PSU with clock £58.00 | Antenna Range. | | £100.00 |
| TR2200GX 3 channels £139.00 | hchartectasse | Drake R4C Receiver with 7 Broadcast | |
| TR2200GX 12 channels £169.00 | BANTEX | crystals | £400.00 |
| TR3200 70cm Transceiver £182.00 | VHF/UHF Mobile Antenna. | Drake R4C with 2 Filters & Noise Blanker # | £475.00 |
| TR8300 70cm Transceiver £227.00 | | | £16.00 |
| R300 General coverage receiver £184.00 | S.T.E. MILAN | | £225.00 |
| Crystals and accessories | Full sages of Baselines, Teacontition, Teacontilline | | £140.00 |
| | Full range of Receivers, Transmitters, Transceivers for 2 metres. AR10, 28-30MHz tunable I.F. £37.50. | | £65.00 |
| YAESU | 하다가 하다면 내내가 되었다. 그 아이들 하나 하는 것이 되었다. 그 아이들은 그는 사람들이 되었다. 그는 그는 그는 그는 그는 그를 가지 않는데 그는 그를 가지 않는데 그를 가지 되었다. 그를 가지 않는데 | | £325.00 |
| FRG7 General coverage receiver £162.00 | AD4 FM discriminator £5.00. Send SASE for full | | £95.00 |
| FR101D Receiver £399.37 | details. | | £15.00 |
| FR101D Digital Receiver £511.87 | | | £325.00 |
| SP101B Speaker £17.87 | MICROWAVE MODULES | | £185.00 |
| | Converters, Transverters, send SASE for full | | £15.00 |
| NOVEL New range. | details. | | £85.00 |
| SWR200B Switched 50-75 ohms SWR | | | £130.00 |
| Meter 3-200MHz 2000 watts HF 200 watts | Send SASE for full details of Rotators, antennas, | | £130.00 |
| | etc. | | £130.00 |
| VHF £36.26
SWR400B 50 ohms 144 and 432MHz 20 and | Good clean equipment wanted, Spot cash paid, If | | £395.00 |
| 010 | you have equipment surplus to your requirements | | £400.00 |
| PW120B dummy load wattmeter. 3-500MHz | we would be pleased to sell this on commission for | | £265.00 |
| | you. | | £85.00 |
| | | | £20.00 |
| Many other models. Send 9p stamp for details. | Part exchanges always welcome. | Heathkit HW202 Transceiver and AC psu | £85,00 |

R.T. & I. offer the finest selection of first-class new and fully overhauled second-hand communications and electronics equipment in the U.K.

- Constantly changing stocks of a vast range of equipment. Cash or Hire Purchase terms easily arranged.
- Part exchanges welcomed.

 We are 'spot cash' buyers for almost all electronic equipment. Send S.A.E for our latest list of over 50 receivers and many other inter-

R.T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London E.11

Tel: 01-539 4986

SAMSON ETM-3C KEYERS

Professional-grade C-MOS keyers built for dependable Marine & Commercial use world-wide-Backed by Spacemark service.

Only 1 µA battery idling current! ETM-3C, £63.88

ETM-4C MEMORY KEYER-Has ETM-3C features plus 4 separate memories (2 combinable). Erase/Rewrite memories as often as desired. Send CQs etc. just by pressing a button!

JUNKER PRECISION HAND KEY, £29.75

BAUER SINGLE-PADDLE KEY UNIT, £10.85

88mH TOROIDS for rtty, cw, sstv, filters, 90p each

SSB 90° AUDIO PHASE SHIFT NETWORKS, octal based.

All prices postpaid and include 12;% VAT. Please send stamp with all

SPACEMARK LTD.

THORNFIELD HOUSE, DELAMER ROAD, ALTRINCHAM, CHESHIRE (Tel: 061-928 8458)

esting items.

TRANSMITTING EQUIPMENT SOLD ONLY TO LICENCED AMATEURS



Opposite South Harrow Tube and Bus Stations

SERVICES



194A Northolt Road South Harrow, Middx England, Tel: 01-864 1166

£39.90

YAESU MUSEN (ADD 121% VAT)

| FT301 T/Rx 1-8-30, 100W | £485.00 | FT223 T/Rx 2m. FM 23 chnl.
12v | £139.50 | YP150 Dummy load/watt-
meter | £44.00 | FTV250 Transverter 2m. 12/
230v. | £139.00 |
|---|------------------------------|--|--------------------|--|------------------|-------------------------------------|---------|
| FT301D Digital Readout | £585.00 | FR101DD Digital readout | £480.00 | FF50DX Low pass filter
QRT24 World time clock | £15.25
£13.00 | YD844 Desk microphone | £18.00 |
| FT301S 10W PEP '301
FV301 External VFO | £340.00
£62.00 | SP101B External speaker
FL101 Tx 1·8-30 MHz 230v | £15.50 | YD846 Hand mic | £7.50
£299.00 | YV500E 500 MHz 0.02 P.P.
M | £285.00 |
| FP301 PSU/Speaker
FP301D FP301 + Clock, | £79.00 | FL2100B Linear 1:2 KW PIP
FT101EE T/Rx 1:8-30 AC/DC | £248.00
£408.00 | FR101D De luxe "S" BC,
FM | £390.00 | P.P.M YC500J 500 MHz counter | £225.00 |
| FT200B T/Rx 3·5-30
FP200B AC PSU/Speaker | £125.00
£249.00
£54.00 | FV101B External VFO
YC601 Dig. Display 101 and | £62.75 | FR101SD Digital readout "S" | £387.00 | 10 PPM/
YV355D 220 MHz counter | £155.00 |
| FRG7 Rx 5-30 Cont. AC/DC
FT221/R T/Rx 2m, "All | £145.00 | 401 YC301 Monitor scope | £110.00
£123.50 | Scan
Sig 80R T/Rx, 2m, FM 80 × | £215.00 | AC/DC YC355 35 MHz counter AC/ | £139.00 |
| Mode." | £339.00 | YO100 Monitor 2 tone osc. | £118.00 | 25 kHz 12v | £220.00 | DG | £105.00 |

12AVQ 10-20m. vertical 2kW.

AR30 antenna rotator £44.40 AR40 antenna rotator £51.70 CD44 antenna rotator £106.85 £145.00 Ham II antenna rotator CD bearing £4.21 £46.50 Stolle 2010 antenna rotator .. Stolle 2030 antenna rotator

ROTATORS Inc. Carr. & VAT

Stolle alignment bearing ... BANTEX VHF WHIPS (Carriage 90p) VAT 12½% 701, 1 70 MHz fibreglass £4 00 1441. 1 145 FG or SS £3.50 B5 1 145 MHz FG .. BGA SS 2m. s/less steel ... £8.50 BSU 1 432 MHz .. UCL Mid loaded £8 00

14AVO 10-40m, vertical 2kW £55.60 18AVT/WB 10-80m, vertical 2kW £75.90 TH3 JNR 10-30m, yagi 600W. TH3 Mk3 10-20m, yagi 2kW £165.00 BN86 balun 2kW. £13.50

..

SMC MONITOR SCOPE

HY-GAIN ANTENNAS Inc. Carr. & VAT

£69+8% VAT

FRG-7 DIGITAL

£199+12½% VAT

£0.50 CRYSTAL FILTERS AND CRYSTALS £3.75 a pair (Carriage paid, VAT 121/2%)

£5.75

£8.50

| YAESU | OTHERS | TF30F350 | | F1101 | | £18.00 |
|--------------------------------------|---------------------------------|----------|--------|-------|---------|--------|
| FT2F, FT2FB, FT2 AUTO, FT224. | TR2200(GX). C146A C826MB. MS2. | YF30H350 | 350Hz | | CW 8pl | £20.75 |
| | | YF30F600 | 600Hz | FT101 | CW 6pl | £18-00 |
| FT223, (6, 12. 18 MHz Tx, 14, 44, 52 | MR2 (12 MHz Tx and inc. 44 MHz | YF30H12 | 12kHz | FT101 | FM 8pl | £20.75 |
| MHz Rx). | Rx). | YF90H600 | 600Hz | 9MHz | CW 8pl | £16:00 |
| SIMPLEX S (0, 12, 16, 19, 20-24), | SIMPLEX S (0, 20-24). | YF90F2-4 | 2.4kHz | 9MHz | SSB 6pl | £16.00 |
| DUPLEY B (0-0) and IB (0-0) T & B | DUPLEX R(3-7) at least. A large | YF90H12 | 12kHz | 9MHz | FM 8p1 | £18-00 |

FT200B, FT301(S). FT221(R). FT101-(EX), FT75(B). FR101(S) all £2.20 each. 666(2m), 42(4m), 50-5 (70cm).

Unwanted base deduct

YF107H600 10-7MHzCW 8pl selection of inverse receive crystals. 2·4kHz 10·7MHzSSB 8pl £16·00 12kHz 10·7MHzFM 8pl £18·00 YF107H2-4 CONVERTER CRYSTALS £2.20 38-Carrier crystals (9 or 10-7MHz) HC18/U ea. £2

MISCELLANEOUS - ALL CARRIAGE PAID

JD 110 Power, VSWR, Field Strength Moter £9.00 + 8% VAT SWR 50 SWR/Power true. Meters £11.50 + 8% VAT ODR 123 240 AC 12v. Power Supply 3 amps (5 amps Peak) £12.50 + 8% VAT

CO-AX Slider Switches TWS 120 1 in 2 out £5.50 + 8% VAT

1WS 150 1 in 5 out £11.75 + 8% VAT TWS 220 2 in 4 out £11.75 + 8% VAT Trap Dipoles 10-80 Meters 500

Watts PIP 14 swg £19.40 + 121% VAT 1 kw PIP 14 swg £22.30 + 12½% VAT HP facilities promptly available with up to 3 years to pay

* * Part Exchange welcome of unmodified Equipment *

FOR VISITORS TO LONDON

PLACE YOUR ORDER BY PHONE WE'LL DELIVER TO YOUR HOTEL OR MEET YOU ON DEPARTURE, AND ACCOM-PANY YOU TO THE LAND-ING OFFICER TO ARRANGE CARRIAGE OF YOUR PUR-CHASE.

POWER SUPPLIES SWR BRIDGES ETC., ETC., ETC.

Overhauls, Realignments and Repairs of most equipment under the care of G3JXC

Guaranteed delivery in 36 hours anywhere on UK mainland. Post Items excluded.

London-Phone before 2 p.m. we'll deliver same day.

good used Rigs and Receivers always in stock.

LENDARIG SERVICE

G3JXC G4FMF G4ENV

TLM Trunk lip mount

MB Magnetic base ...



Just telephone your card number or send your Cheque with Order



01 - 864 -1166



Decca-KW 103 Combined Swr/Rf Power Meter is an instrument for measuring a 50 ohm coaxial line feeding

an Aerial System or Dummy Load (1) Standing Wave Ratio. (2) RF Power with two ranges 0-100 & 0-1000W when used with a 50 ohm Dummy Load.



Decca-KW Linear Amplifier for SSB and CW 10-80 metres, 1200 watts p.e.p. input SSB, can be 'driven' by most 100 watt Transceivers and Transmitters. Employs a pair of T160L Tubes in grounded grid. Pi-section input and output circuits. Built-in 2:4Kv P.S.U.

NOTE: The well-known KW LOW PASS FILTER passing 3-30MHz is available from stock.





Decca-KW Dummy Load is air convection cooled and has been designed as a purely resistive 50 ohm load up to 30MHz. Power capability up to 1000W.



Decca-KW 107 Antenna Tuning System incorporates E-Z match, SWR/RF Power Meter, Dummy Load. Antenna switch. High power

version KW 109 is available.

Write or phone for catalogue. *Easy terms available on equipment over 12, 18 or 24 months



Decca-KW Balun Mk.II. The Decca-KW Balun is broadband -3 to 30MHz, rated up to 2KW p.e.p. 1:1 Ratio. 50 ohms 'un-balanced' feed to 'balanced' output. Waterproof moulded case. Suitable for dipole and Beam aerials.

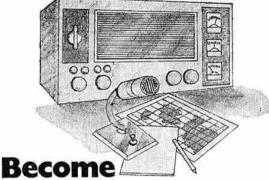
Other KW Favourites
KW E-Z match; KW
Traps (the original and
best) KW Trap
Dipoles; KW Antenna
Switch: Sincklets for Mo-Dipoles: KW Antenna Switch: Stockists for Hy-Gain beams and Verticles; CDR Rotators: Microphones etc. Kw spares are normally spares are normally stocked for a minimum of stocked for a minimum or five years after manu-facture of equipment. Write or 'phone for



Serving Radio Amateurs World-Wide

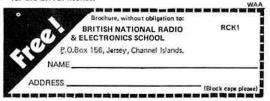
Amateur Radio Products

Cramptons Road, Otford, Sevenoaks, Kent Tel: Sevenoaks (0732) 50911



a radio

I earn how to become a radioamateur in contact with the whole world. We give skilled preparation for the G.P.O. licence.



Commercial Communications antenna specialists

ANTENNAS AND MOUNTING OPTIONS

ASP 201 1 wave 108-512MHz £2.58 ASP 629 | wave 130-174MHz 3dB gain £6.61 ASP 677 1 wave 130-174MHz 3dB gain ASPE 462 1 gain 420-440MHz 3db gain ASPE 667 colinear 420-440MHz, 5dB

£14.95 ASP 655 | wave 130-174MHz 3db gain, base station antenna £19.95 ASP 659UK colinear 420-440MHz 5dB gain, base station antenna

K220 Mag mount with cable, fits 629, K220A Mag mount with cable, fits 201, £7.19

K203 trunk lid mount, fits all ASP332 gutter mount, fits 629 £7.10 ASPR 332 gutter mount, fits 677, 667 K126 shock spring, fits 629 only £4.95

UR67 Coaxial cable, attn. 0.68dB/ 100MHz, 2-5dB/1000MHz per 10m, £0,50 per m. 5002 100MHz, 5:2dB/1000MHz per 10m, 100MHz, 5:2dB/1000MHz per 10m,

£0.15 per m. PTT Microphone with clip 3Ω Speaker in black/silver case £4.95 Add 125% VAT& 50p p + p each item

RUN YOUR MOBILE RIG AT HOME WITH OUR 13.8V d.c. stabilized psu, 31 amps.

13.8V d.c. stabilized psu, 6; amps

Add 121% VAT & £2.00 p&p

Wall brackets 12" stand off, p&p £1. Wall brackets 18" stand off, pap £1. Chimney bracket, 12", p&p £0.75. Lashing kit for above (state length). p&p £0.50 £1.00 Raw Bolts (", pap £0.50 per 5. £0.25

Guying rings 3 or 4 way, p&p £0.50 Guy wire per metre, p&p £0.50 per 10m

£0.12 Guy tensioners (claw strainers), p&p £0.50 Guying stakes, p&p £1.00 per 3 £1.00

11" Mast. p&p £2.00 any quantity 10' x 2' Mast. p&p £2.00 any quantity

£7.00 Terms: Cash with Order. Callers by appointment

17 Lancing Road, Luton, LU2 8JN Tel: (0582) 21884

Your Route to 70cm Repeater Operation

We are extremely happy to announce a new version of our 144MHz to 432MHz double conversion linear transverter, the MMT432/144R.

The MMT432/144R, based on its predecessor, features a 1-6MHz shift, specifically included for U.K. repeater operation.

The 1-6MHz shift is achieved by the inclusion of two separate local oscillators, (101MHz and 101Mhz), which produce two ranges at 70cms, (LOW RANGE: 432-434MHz, HIGH RANGE: 433-6-435-6Mhz), both for an IF of 144-146MHz. The switching of these ranges, which is accomplished by appropriate linking of the 5 pin DIN power plug, may be wired to allow standard repeater operation, reverse repeater operation etc.

Please note that a suitable toneburst signal must be generated by the 144MHz transceiver to allow repeater access.



FEATURES

- ★ 1-6MHz repeater facility or simplex
- ★ Highly stable regulator-controlled crystal oscillator stages
- Pin diode aerial changeover relay with less than 0.2dB through-loss
- ★ Extremely low noise receive converter

- ★ Built-in automatic RF vox with override facility
- ★ Separate internal PA compartment ensures excellent electrical and thermal stability
- Use of latest state of the art power amplifier transistors provides reliable 10 watts continuous power output

SPECIFICATION

Frequency coverage:

Selectable Offset:
Input frequency range:
Input modes:
Input drive for full output:
Power output:
Output impedance:
Relative 404/405.6MHz output:
Other spurious outputs:
Receive converter gain:

432-434MHz (low range) 433-6-435-6MHz (high range) 1-6MHz 144-146MHz SSB, FM, AM or CW 10watts nominal 10watts continuous rating 50 OHM Better than —65dB Better than —65dB 10dB typical

Receive converter noise figure:
First oscillator:
Second oscillator:
First if:
D.C. power requirements:
Current consumption:
RF connectors:
Power connector:
Size:
Weight:
Price:

3dB maximum
101MHz or 101-4MHz
116MHz
28MHz
28MHz
11-13-8 volts. 12-5 v nominal
2-1amps peak
50 OHM BNC sockets
5 pin din socket
187 × 120 × 53mm.
975g.
£151 + VAT. (£169.88 inc.VAT)

MICROWAVE MODULES LIMITED

BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN TELEPHONE: 051-523 4011. TELEX: 628608 MICRO G

GAREX (G3ZVI)

BRITISH MADE V.H.F. EQUIPMENT TWOMOBILE

FOURMOBILE

Companion units for 2 or 4 metres. They feature Tx, Rx and PSU for 12V DC input in a single unit 12 × 8 × 4'. Full coverage tunable AM/FM Rx with excellent V.F.O. stability even under mobile conditions. Professional grade sensitivity AND selectivity. Crystal controlled AM/FM Tx, with superbaudio quality. Based on popular R/T components for ease of servicing and ready availability of spares. Comprehensive handbook and low-cost after-sales service, Prices: Twomobile £135; Fourmobile £121.50 (inc. VAT).

THE PROPERTY OF THE PROPERTY O

We stock the popular NR56VF-1 2m Rx., with switched 144-146MHz V.F.O. and 11 xtal controlled channels, idea for fixed, portable or mobile use.
Built-in L.S., 12V DC operation, £54 inc. VAT. (xtals £2.50 each).
NOW WITH IMPROVED V.F.O.—EXCLUSIVE TO GAREX.

SR-9 Marine Band Rx (156-162MHz) similar to NR56 £59.40 (xtals £2.79).

An s.a.e. brings you full details of any of the above. Credit facilities available and part-exchanges welcome.

NEW COMPONENTS:

Relays 6v coil, 25A contacts, SP make 80p. 2P make 90p. GPO type 3000, 1Ω coil, pull-in current approx 200mA. 1M + 1B contacts, ideal for psu cut- out. 80p each, 5 + : 70p.

integrated circuits: 723 (TOS), 75p; SN78660, 75p; CD4001AE, 25p; NE555, 55p; 709 (TOS), 30p; 741 (DIL 8), 30p; 7410, 25p.

55p; 709 (1705), 30p; 741 (DIL 8), 30p; 7410, 25p.

Rectilinear pots multiturn, preset, p.c. mtg.

10, 20, 25, 100, 250, 500, 2·5k, 35p each, any 5 + : 25p

BNC 50ohm free sockets. 20p each; 12 for £1.45; 50 for £4.90.

Neons Panel mounting, type JH8, 8mm hole, 240V, red, amber or clear;

35p each, any 5 + ; 30p, 10 + : 27p.

Miniature, wire end 8p each, 10 + 6 ip, 100 + : 4p.

L.E.D's Panel mounting, type JH5, 6-5mm hole, red: 48p, green or amber; 72p Any 5 +, less 10%.

Logic probe type JH 320, £11.95. Resistor Kits. E12 series, 22Ω to 1M, 57 values, 5% carbon film, ¿W or ¿W Replenishments available (please state).

Starter pack, 5 each value (285)
Mixed pack, 5 each $\frac{1}{2}$ W + $\frac{1}{2}$ W (570) £5.40

Standard pack, 10 each (570) £5.40 £13.25

Giant pack, 25 each (1425)
PL259 UHF Plugs + reducer 68p each, 5 +: 60p.

PL239 UHF Plugs + reducer espeach, 5 + 1 egp.

S0239 UHF Socket panel mig. 559 each, 5 + 1 45p

NICAD RECHARGEABLES—physically equivalent to zinc-carbon types.

AAA(U16) £1.64; AA(U7) £1.15; C(U11) £3.15; D(U2) £4.94; PP3 £5.20.

ANY 5+1 less 10%; ANY 10+: less 20%.

Slide switches, min. DPDT 18p each; 5 + 1 14p. 2 pole 3 position 22p

each; 5 + :18p

Toggle switches, min, full range SP thro' to 4P C/O/ sae list.

GAREX FM detector conversion ready assembled with full fitting instruct tions. Tailor made, easy-fit design for AM Cambridge, replaces squelch board with minimum of other modifications, £5.40, Transistor Vanguard (AM25T) version with modified squelch circuit, £5.94.

FM/AM facility requires SPCO switch or relay.
CRYSTALS FOR 10 METRES: (HC2SU) 28.500MHz Tx plus 28.045 MHz fo
Rx (455KHz I.F.) make that "C.B." w/I legitimate £4.50 pair.

INTER SERIES ADAPTOR KIT. Super value, up to 40 different combinations of BNC, UHF, N, TNC & C series connectors, male and female. Complete in PVC wallet, £19.95.

We are stocklists of REVCO aerials for V.H.F.-Amateur, glider and P.M.R. band types available.

Authorised distributor for J. H. Associates Ltd., professional quality switches, indicators and special products. Lists available covering Revco & J. H. products.

EX-EQUIP. ITEMS (GUARANTEED)

Aerial relays (Pye), 12V coil, £1.30. 455kHz filters (50kHz ch. spacing) Hi or Lo impedance, £1. 455kHz AM IF strips ex Am25B, with cct. £1.35.

Mains transformers, multitap primaries 170-0-170V 90mA, 50V 50mA, 6-3V, 3-3A, 5V 2A (5-5 lb)

135-0-135V, 50mA, 6·3V, 3·3A Auto 0-100-110-150-200-230-240-250, 200VA £3.40 £3.65

HT chokes, 5H 80mA, 4H 240mA, 1.25H 350mA, 1.8H, 125mA Butterfly trimmers large $2 \times 17 \cdot 5pf$, $2 \times 10pf$ 85p 10·7 IFT (valve type) $2\frac{1}{2}^{\circ} \times \frac{1}{2}^{\circ}$ square double tuned 35p; 2 for 45p; 6 for 95p

Mobile PSU 12V DC input (floating for + or - E) transistor inverter 170, 220 or 380V DC at 180mA, output, fully smoothed, chassis section, self-contained, fully wired and tested, with circuit.

As above, but partly assembled (as cut out) complete with all components, circuit, finish-it-yourself

PRICES ARE INCLUSIVE OF UK POST AND PACKING AND VAT

Mail order only. Sole address for orders and enquiries

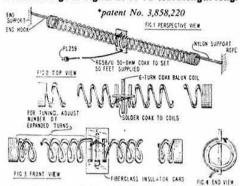
GAREX ELECTRONICS

7, NORVIC ROAD, MARSWORTH, TRING, HERTS HP23 4LS PHONE CHEDDINGTON (STD 0296) 668684

6.30pm-9pm AND WEEKENDS ONLY S.a.e. with all enquiries please. CONTROL CONTRO

a lot of antenna in a little space

new Slinky® dipole* with helical loading radiates a good signal at 1/10 wavelength long!



 This electrically small 80/75, 40, & 20 meter antenna operates at any length from 24 to 70 feet . no extra balun or transmatch needed . lengin from 24 to 70 feet * no extra balun or transmatch needed * portable-erects & stores in minutes * small enough to fit in attic or apartment * full legal power * low SWR over complete 80/75, 40, & 20 meter bands * much lower atmospheric noise pickup than a vertical and needs no radials * kit includes a pair of specially-made 4-inch dia. by 4-inch long colls, containing 335 feet of radiating conductor, balun, 50 ft. RG58/U coax, PL259 connector, nylon rope & instruction manual * now in use by US Dept. of State, US Army, radio schools, plus thousands of hams the world over of hams the world over

Money Back Guarantee

when returned within 2 weeks

TELETRON CPN Suite 700 Box 84, King's Park, N.Y. 11754, U.S.A.

COMPLETE KIT No. 80-40-20 (includes surface mail delivery) (for AIR delivery add £6)

Send international airmail reply coupon for additional information

2-METRE CRYSTALS £2.25 ea. All common channels for most

LARGE STOCKS of frequency standard, clock & MPU xtals, SAE

TBG-2 Tone Burst Generator £8.00. See previous ads. 455kHz CERAMIC FILTERS, various bandwidths £0.60, eg: CFU455E-tol. ± 1.5kHz, 6dB BW 15kHz, 40dB BW 30kHz. CFU455H-tol. ± 1kHz, 6dB BW 6kHz, 40dB BW 18kHz.

CRYSTAL FILTERS

9MHz SSB, 6dB BW 2-4kHz, 8 pole £17.00.
9MHz CW 6dB BW 500Hz, 6 pole £16.00.
9MHz FM, 6dB BW 12kHz, 8 pole £17.00.
9MHz By 12kHz, 8 pole £17.00.
10-7MHz 8 pole, 12:5 or 25kHz channel spacing £17.00.
21-4MHz 8 pole, 25kHz channel spacing £18.00.

Please add VAT at 12.5%, post free.

INTERFACE QUARTZ DEVICES LTD

29 Market St., Crewkerne, Somerset. Tel: (0460) 74433. Telex: 46283

ADVANCED TECHNOLOGY FOR THE DISCERNING AMATEUR

Our new Active Receiving Antenna, Model 170, was featured in detail in the December advertisement. A comprehensive data sheet is now available free on request.

Another new data sheet describes our Power Mains Units, Models MPU and MPU/1.

FREQUENCY-AGILE AUDIO FILTER MODEL FL1



A versatile bandpass or bandreject filter with fully variable bandwidth and centre frequency unique search/lock/track capability for automatic removal of heterodyne whistles. Improves reception of CW, RTTY, and SSB. Connects between receiver and loudspeaker.

R.F. SPEECH CLIPPER **MODEL RFC**



Processes speech as a SSB signal at 60kHz to Increase its ratio of average to peak levels without adding harmonic distortion. Improves talk power of SSB, FM, and AM transmitters without increasing the peak trans-mitted power. Connects between microphone and transmitter. (See articles by Dr. D. A. Tong, Wireless World Feb. 1975, 79-82 and Oct. 1976, 77-81).

UP-CONVERTER MODEL UC/1



Adds full receiving coverage from 90kHz to 30MHz to existing recelvers or transceivers tuning 28-29MHz or 144-145MHz. The full range is covered inthirty 1MHz wide synthesizer controlled segments. Also works as a twometre converter. Connects between receiver and antenna.

The descriptions above are brief. Please send for free copies of our data sheets and read the full story. Prices: UC/1 £105.00; FL1, £53.00; RFC/M, £21.50; RFC, £40.00 (with either Jap. 4-pin or stereo jack input connector). All plus VAT at 121%, prices include delivery within UK. A range of accessory leads is also available, full price list on request.

NEW PRODUCTS

MODEL AD170 A compact active receiving antenna covering 100 kHz to 70 MHz without tuning or matching units. Price £29.50 (£33.19 Inc. VAT)

MODELS MPU and MPU/I Mains power units for FL1. MODELS MPU and MPU/1 Main power units for FLI, UC/1 or AD170. MPU has integral 13A mains plug, MPU/1 has 18" mains lead. Price £5.50 (£6.19 inc. VAT) MODEL AD 170 PLUS MPU OR MPU/1. Package price

£33.00 (£37.13 inc. VAT)



DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE.

Tel: Pudsey (0532) 552461.

The shop with

AMATEUR RADIO EXCHANGE



Proprietors: Brenda Aptaker, Bernard Godfrey (G4AOG)

The shop on the corner with the warm welcome, the hot coffee, and the standing invitation to come and look over our extensive and constantly-changing stock of equipment, both new and secondhand. Buying or selling, come and see us first . . . you'll be glad you did.

WINTER LISTENING



FRG-7

finest the generalcoverage synthesised communications receiver on the market, now available in two versions.

DIGITAL at £223.00 inc VAT. ANALOGUE at £162 inc VAT Also available from us with special 2m converter and accessories, all for just an extra £17.00.

WINTER TRANSMITTING

FT227R

a new era in 2m transceivers. 400 fully synthesised channels, 5 kc spacing, memory button for recall of previous channel, ± 600 kc for Repeater or any other off-set on pushbutton, tone-burst, Hi-Lo power, sub-audio tone squelch, and many other features-All for just £189 inc. VAT



PHONE FOR DETAILS OF CURRENT STOCKS-NEW AND SECONDHAND-AND OPENING HOURS

EASY TERMS UP TO 3 YEARS



CREDIT SALES BY TELEPHONE



SECURICOR DELIVERY

2 NORTHFIELD ROAD, EALING, LONDON W13 9SY. Tel: 01-579 5311

THE AMATEUR RADIO SHOP

13, CHAPEL HILL, HUDDERSFIELD

TEL. 0484 20774

AGENTS FOR: YAESU, K.W., S.E.M., A.S.P., J.BEAM, F.D.K., ETC.



| SECOND HAND: | |
|--|----|
| COLLINS "S" LINE 75S3B, 32S3, 312B/4 INC. 12 | 8 |
| GEN. COVERAGE XTALS£110 | 00 |
| EDDYSTONE 880 GENERAL COVERAGE £30 | |
| EDDYSTONE 940 GENERAL COVERAGE £14 | 15 |
| EDDYSTONE FC10 mk. II GENERAL COVERAGE £8 | 30 |
| EDDYSTONE 750 GENERAL COVERAGE £7 | 0 |
| EDDYSTONE 840A GENERAL COVERAGE . £4 | 10 |
| RACAL RA17W/6 GENERAL COVERAGE £35 | 50 |
| RACAL RA17 mk II GENERAL COVERAGE £27 | 75 |
| FRG7 mk II DEMO GENERAL COVERAGE £15 | 50 |
| FRG7 mk 1 GENERAL COVERAGE £13 | 5 |
| FR101S, HAM BAND £25 | 60 |
| TRIO R300, GENERAL COVERAGE £11 | 0 |
| TRIO R599, HAM BAND £24 | 0 |
| FRDX 400, HAM BAND £17 | 5 |
| FRDX 500, HAM BAND £15 | 0 |
| HEATH SB303, HAM BAND £14 | 0 |
| TRIO JR310, HAM BAND £8 | 0 |
| KW77, HAM BAND £7 | 5 |
| HA500, HAM BAND | 0 |
| | |

| 2 METRE EQUIPMENT | |
|---------------------------|------|
| LINER II | £110 |
| IC201 | |
| TR2200GX | |
| DENSHI | £125 |
| IC2F | £65 |
| TRANSMITTERS ETC
SB101 | £175 |

NEW

AC-DC PSU STABILISED 12v OUT AT 2-5A . £16 NATIONAL PANASONIC DR48 Digital receiver £295 XTALS OVER 3,250 TO CLEAR AT 75p. FREQUENCY FROM 1MHz to 80MHz

KW VICEROY (NEEDS ATTENTION) £40

S.A.E. FOR LIST

For the best CWrig, get the Heathkit Catalogue.

HW-8 TRANSMITTER

DC Power Input: 3.5W (80 M), 3.0W (40 M) 3 OW (20M), 2.5W (15M) Frequency Control: Built in VEO Output Impedance: 50c unbalanced. Spurious & Harmonic Levels: 35dB or better. Off-set Frequency: Approx -750Hz, fixed on

DIRECT CONVERSION RECEIVER

Sensitivity: 0.2;// for readable signal, 1,// or less for 10dB S+N/N. Selectivity: Wide, —750Hz at —6dB, narrow —375Hz at —6dB. Audio Output Impedance: 1000c nominal. GENERAL

Frequency Coverage: 3.5 to 3.75 (80 M), 7 to 7.25 (40 M), 14 to 14 25 (20 M), 21 to 21 25 MHz (15 M) Frequency Stability: Less than 150 Hz/hr drift after 60 min warm up. Power Requirement: 12 to 16 V DC, 90 mA receive, 430 mA transmit. Dimensions: 9.25 mx 8 5 in x 4 25 in Net Weight: 41b

HD-1410

Keying Output, Positive Line to Ground: Maximum voltage open circuit or spikes, 300V, maximum current 200 mA. Keying Oulput, Negative Line to Ground: Maximum voltage open rout or spikes, 200 V, maximum current 10 mA Audio: Internal speaker or sack for optional hi-Z (at least 500 c.) be adoptiones. Sidetone

Adjustable from 500 to 1000 Hz. Internal Controls: Sidetone frequency, paddle tension, paddle travel. Rear Panel Connections: AC power cord. 12V power input, keyer out, headp receiver audio in, extension key Power Requirement: 120/240 V AC (= 10%), 60/50 Hz, 3.5 W or 10 to 14.5 V DC, negative ground, 150 mA Dimensions: Approx.3 m.x.5 inx.7.5 in

Net Weight: 3th

HW-8 ORP CW Transceiver for top performance at low cost. £116.39 inc postage.



HD-1410 Solid-state electronic code kever. £43.76 inc postage.

HWA-7-1 AC power supply. £14.52 inc postage. HD-1426

Field strength meter. £11.04 inc postage.



Send for your free Heathkit Catalogue!

To: Heath (Gloucester) Limited, Department RC18

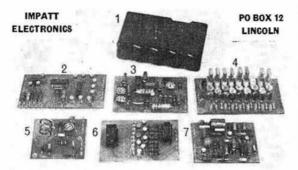
Bristol Road, Gloucester, GL2 6EE.

Please send a copy of the Heathkit Catalogue. Schlumberger I enclose 11p in stamps to cover postage only. The world's biggest producers

of electronic kits

Name Address

> There are Heathkit Electronics Centres at 233 Tottenham Court Road, London (01-636 7349) and at Bristol Road, Gloucester (Gloucester 29451).



LET ELECTRONICS DO THE WORK-NOT YOUR WRIST

With your rig scanning the channels YOU are free to build "gear" or work HE and you will not miss any activity! Whether starting from scratch or modifying your existing rig we can supply all the circuitry you require:

- BLACK ABS CASE—with finger grip and push switch, Ideal Mic housing Wavemeter, test Osc, etc. Size 9 -5 2cm, clip on lid. (New with makers inscription). £1.50
- MOS CHANNEL SCANNER-9 channels with transistor drivers and control circuitry, including squelch led. Coloured LED's indicate channels. 3-12 volt operation, size 9 5 cm. K-£7.50, MT-£9.50. (To drive item (4).)
- TONE BURST AND TIMEOUT INDICATOR-Stable and fully adjustable. Circuitry automatically routes time out tone to speaker and not modulator. (See SWM Nov 76: 6-12 volt. Size 5 = 7.7 cm, K—£6.90, MT—£8.90
- series or parallel mode crystals, 4-60 MHz. HC 25U sockets and 30pf trimmers fitted. Full data including oscillator configurations. Can be used on Transceivers via VFO socket. Size 9 *5cm, K—£12.90, MT—£14.90.

 ELECTRONIC AERIAL CHANGEOVER—for Two metres. Minimal insertion loss, incorporating transmit output level circuitry. Requires 10mA on transmit. 50-75 ohm up to 30 walts. Size 5 *5cm, K—£4.50. MT—£5.00.
- MOS SEVEN SEGMENT-adapter for item (2), gives a numbered channel display, and flashing colon indicates scanning. 3-12 Volt, size 8 × 5cm. K-£10.58. MT-£11.58.
- SENSITIVE SQUELCH AMP AND SWITCH-Simply connect to the discriminator output of NBFM receiver and use for muting etc. Compatible with items 2, 4, 6. Requires 9-12 volts. Size 6-5 × 5cm, K-£5.76. MT-£7.76.
- 8. 5 Watt AUDIO AMP & preamp, inc mute control, compatible with items (3) & (7). Reqs 12v. Size 5 = 7 cm. K.56.75 MT—£7.75.

 COMING SHORTLY: 9. Tired of tuning around the SSB/RTTY calling channels? If so then our new SWEEP UNIT is for you! For use on most Transceivers HF & VHF, and applied through the external VFO socket, this device will sweep around a chosen frequency .. a selected no of KHz. Basic K-£9
- 10. NEW-VFO For use use with HF-VHF rigs eg. TS820, 520, 700, FT101, 201 etc. PCB inc RIT, you supply tuning CAP, Box & dial drive. K £15.40 MT-£19.
- 11. NEW-LOGARITHMIC AMPLIFIER-60dB dynamic range up to 30MHz,
- for linear power measurement etc. K—£39. MT—£40. (RF o/p available).

 12. NEW—PANORAMIC ADAPTER—for use with most HF-VHF transceivers, very minor mods, "SEE" 2 or 80mts on a CRT with a true Log display. More detail soon
- 13. SATELLITE RX-10mts, no compromise SSB, tunable IF, RF, MIX, VFO. XTAL FIL. IF, AF, AGC, if demand is large enough we will produce-Let us know! PCB NO BOX OR VFO DRIVE. PRICE AROUND £70.
- ALL BOARDS SUPPLIED WITH DATA AND CIRCUITS (See Rad Comm Sept 77, pp680-683) Kits—"K" contain undrilled PCB & components; made d tested-"MT"ALL PRICES INCLUDE VAT POST AND PACKING. IMPATT ELECTRONICS, PO BOX 12, (19 Alexandra Terrace), LINCOLN, LNI IJF. (Mail orders only).

IT'S MORE SATISFYING TO BUILD IT!

HAPPY NEW YEAR!





300-4000 WATTS AC, 6-24 VOLTS DC

INCL. THE NEW E3500-115/230V AC & 12V DC

MICROWAVE COOKERY BOOK 22.25 Incl. Postage COOKERY BOOK

LEADING MAKES OF MICROWAVE OVENS FROM £199 inc. VAT

KEENEST PRICES INCLUDE UK DELIVERY Open Tues-Sat 10.30-1.30, 2.30-6.30 (Ansafone out of hours)

DUKES FARNCOMBE ST, FARNCOMBE, GODALMING (Tel 23279) SURREY

Can YOUR Antenna do all this?

A small selection from our huge file of testimonial letters on the JOYSTICK VARIABLE FREQUENCY ANTENNA (0.5-30-00MHz)

Carl V. Guest, Mount Vernon, Ohio, writes-"I set the Joystick antenna on the floor of my operating room which is at street level. On 40 meter CW I worked out to a distance of 700 miles in the afternoon."

"CQ" Magazine-"If you are high enough the antenna will operate (especially at 15-20) as well as the well-known 3-element beam with which we compared it. The tests were 'operational, not theoretical!'. We find that if we can hear 'em we can work 'em-and in most cases with a 100 watts input."

K6MDJ—"Early results are astounding. I've been using a trap dipole for 40-20-15. This JOYSTICK out-performs the dipole × 1

G3UGB-"Extremely good reports on 160 meters and 80 meters.

W5CJV-"Do I like the JOYSTICK? I guess so! I took five antenna down and now use the Joystick alone!

IN USE BY AMATEUR TRANSMITTING AND SWL STATIONS WORLD-WIDE AND IN GOVERNMENT COMMUNICATION.

SYSTEM 'A'

250w. p.e.p. OR for the SWL

£36.00

SYSTEM 'J'

500w p.e.p.

£42.60

PARTRIDGE SUPER PACKAGES

COMPLETE RADIO STATIONS FOR ANY LOCATION

All Package's feature the World Record Joystick Aerial (System 'A') with 8ft. feeder, all necessary cables, matching communication headphones. Deliv.
Securicor our risk. ASSEMBLED IN SECONDS! BIG CASH SAVINGS!

PACKAGE No. 1.

As above with R.300 RX. SAVE £17.281

£210.55

PACKAGE No. 2.

Is offered with the FRG7 RX. SAVE £12.21!

£195.00

PACKAGE No. 3.

New low priced package, featuring the all-solid state SMC 73 RX., with all the Partridge extras. SAVE £17.281

£154.86

RECEIVERS ONLY, inclusive deliv etc. R.300 £184.50 FRG7 £162.00 SMC 73 £128.81

Just telephone your card number-



BARCAYCARD phone 0843 62535 (or 62839 after office hours) or write for details, send 9d stamp



NOTE: All prices are those current at time of closing for press, inclusive of 121% VAT and carriage.

G3CED

G3VFA



Box 6, Partridge House, Prospect Rd., Broadstairs CTIO ILD (Callers by appointment)

SEM P.O. BOX 6, CASTLETOWN, ISLE OF MAN Tel. PORT ERIN (0624) 833714 NEW! SENTINEL V.H.F. TRANSMIT POWER AMPLIFIER AND RECEIVE PRE-AMPLIFIER

A new concept in add on units to improve 2 metre performance on transmit and receive. On transmit the Power Amplifier produces a power gain of 4, up to a maximum of 12 watts in, for 48 watts out. The circuit is suitable for all transmission modes. The receive pre-amplifier has the same performance as our Sentinel or Sentinel Auto. Supply voltage is 13.6 nominal (12-15V) 5mA on receive, up to 6 amps on transmit. Size: $6'' \times 2''$ front panel, $4\frac{1}{2}''$ deep. Sockets are SO239. **Price:** £53.00 + VAT - £59.62. Also available without the receive pre-amplifier at £44.00 + VAT = £49.50.

NEW! SENTINEL TOP BAND CONVERTER

Already very popular, Top Band (Marine Band) to 20 metre converter. 1-8MHz-2-3MHz in 14-14-5MHz out. Size: 2½" × 1½" × 3". Power 9-12V, 5mA. Price: £18.00 + VAT = £20.25.

NEW! THE SENTINEL AUTOMATIC 2 METRE PRE-AMPLIFIER

Contains an RF operated relay for connecting straight into your transceiving aerial co-ax. Performance: 1dB N.F., 18dB gain from selected FETs. Supply 12V nominal. Size: 1½" × 2½" × 4". Price: Belling Lee sockets £13.00 + VAT = £14.62. SO239 sockets £14.50 + VAT = £16.31. IN STOCK.

THE SENTINEL STANDARD 2 METRE PRE-AMPLIFIER Same circuit as the one above but without the RF switching. Price: £7.75 + VAT = £8.72. IN STOCK.

THE PAS

Size only about 1 cubic inch to fit inside your transceiver. N.F. 2dB., gain 18dB. Price: £5.57 + VAT = £6.27.

SENTINEL H.F. PRE-AMPLIFIER

These are wideband pre-amplifiers from 1-40MHz. N.F. 1dB., gain 15dB. Input and output impedances 50/75 ohms. Size: 21/ × $\frac{1}{4}$ " \times 3". Price: £7.00 + VAT = £7.87. IN STOCK.

SENTINEL H.F. PRE-AMPLIFIER with change over relay.

Same specification as above but including a change over relay for switching straight through. This can be operated by your transceiver for direct connection in your aerial co-ax. Price: £9.00 + VAT = £10.12. IN STOCK.

SEM "Z" MATCH

A compact and attractive A.T.U. 80-10 metres tested at 1kW into 50 ohms. Slow motion calibrated dials. Size only 8₹" × 4" × 7‡". SO239 and screw terminals for co-ax fed or wire aerials. Balanced or unbalanced. Price: £32.00 + VAT = £36.00. IN STOCK. SEM EUROPA C

ing the H.F. equipment between the Europa or your H.F. aerial. i.e. NO PLUG CHANGING.

- Receive converter-2dB N.F. 30dB gain with MOSFETS.
- Transmit converter 200MW drive for 200W input.

* Spurious output—80dB.
* Size only 9" × 4½" front panel, 4" deep.
Price only £100 + VAT = £112.50. IN STOCK. Complete to plug into Yaesu equipment.

Complete power supply for Europa £45.00 + VAT = £50.62. IN

For our Sentinel 2 metre and 70cm converters, see our previous adverts or send for full details. Our 70cm units cover 432-434 and 434-436MHz.

ALL OUR PRODUCTS CARRY A 12-MONTH GUARANTEE

To order: C.W.O. or credit card. We take credit card orders from anywhere in the world, just phone or send your card number for same day service. We welcome trade enquiries from anywhere in the world. Prices are post paid in Britain. If you require more detailed information or help do not hesitate to ring or write.

A CAREER IN RADIO

Start training today and make sure you are qualified to take advantage of the many opportunities open to the trained person. ICS can further your technical knowledge and provide the specialist training so essential to success.

There is a wide range of courses to choose from:

CITY & GUILDS CERTIFICATES

Telecommunications Technicians' Radio TV Electronics Technicians' Electrical Installations Technicians' Electrical Installation Work

Radio Amateurs MPT Radio Communications Cert.

EXAMINATION STUDENTS-GUARANTEED COACHING UNTIL SUCCESSFUL

TECHNICAL TRAINING

ICS offer a wide choice of nonexam courses designed to equip you for a better job in your particular branch of electronics including: Electronic Engineering & Maintenance

Computer Engineering/

Programming Radio, TV & Audio Engineering &

Electrical Engineering, Installations & Contracting

COLOUR TV SERVICING

Learn all the techniques you need to service Colour and Mono TV sets through new home study course approved by leading manufacturer

POST THIS COUPON OR TELEPHONE FOR ERFE PROSPECTUS

| CERLS SHOW |
|------------|
| |
| Age |
| |
| |
| |

Accredited by CACC

International Correspondence Schools. Dept 279R, Intertext House, LONDON

Member of ABCC SW8 4UJ or phone 01-622 9911 (all hours)

G4DSG

D. P. HOBBS LTD.

G3HEO

£33.75

The Component Specialists

tripler

"Yaesu" FRG7 general coverage Communication Receiver

QM70 432 & 434MHz Dual-Band Converter 28-30 QM70 28/144 Scorpion Transverter

£109.00 Cobra 2M/70 CMS FM. Transverter with Mic. Audio

£86.00 2 Metre Solid-State Linear Amp. £52.00

28/144 Solid-State Transverter 144/28 Converter £19.00

432/28 Converter £27.00 Microwave Modules 2 Metre Conver-

ters 2-4, 4-6, 28-30 MHz IF £20.25 MMC 144/28 LO 2 Metre Converter

MMC 70 4 Metre Converter any IF

MMC 432-70 CMS Converter any IF

MMC 1296-23cms Converter any IF £28.13 MMA 144, 2 Metre Pre-Amp £14.63

PART EXCHANGE WELCOME

MMT 432/28MHz Transverter £109.13 MT 432/144MHz Transverter £149.63 MMT 144/28MHz Transverter £88.88 MMV 1296/70 23cms Varactor

NR56 VF1. 2 Metre Monitor receiver £54.00

FDK Quartz 16 2 Metre transceiver fitted 10 channels £169.00

FDK Multi-11. 2 metre transceiver £209.00 23 channel FDK Multi-U11 23 channel 70cms

transceiver fitted 5 repeater and 4 simplex channels Auto-Scan on 433-5, 433-2, 433-4 and 433-45MHz £249.00

50K,OHM Push-to-Talk Microphones £5.25 Microwave Modules counters 50

50MHz Counter with Built-in 500MHz Pre-Scaler £85.32 500MHz Prescaler £27.00 Bantex 2 metre Mobile aerials

£7.14 **Bantex Magnetic Mounts** £10.40 Jaybeam aerials ALL in stock PRICES INCLUDE "VAT"

ACCESS OR BARCLAYCARD

II King Street, Luton, Beds. 20907



194a NORTHOLT ROAD, SOUTH HARROW, MIDDLESEX, ENGLAND

SST T-I RANDOM WIRE ANTENNA TUNER



GUARANTEE All SST products are guaranteed for 1 year

All band operation (160-10 metres) with any random length of wire, 200 watt output power capability-will work with virtually any transceiver. Ideal for portable or home operation. Great for flats and hotel rooms simply run a wire inside, or out of a window, or any place available. Toroid inductor for small size: $4\frac{1}{4}$ " \times $2\frac{3}{8}$ " \times 3". Built-in neon tune-up indicator. SO-239 connector. Attractive bronze finished enclosure.

only £23.40 including VAT and carriage



TELEPHONE 01-864 1166



ANNOUNCEMENT

HARRY COLLINS

of Waterbeach, Cambridge, telephone (0223) 860555

will be advertising in the near future all types of components, etc.

Anyone requiring pre-information or lists please contact the above.

RTTY BARGAIN

ONE ONLY-PLEASE PHONE TO SECURE HBR ELECTRONICS TD224 RTTY VIDEO DISPLAY UNIT NEW & UNUSED, ONLY £165 INC. VAT. (saving you £44)

AERO & GENERAL SUPPLIES

Nanalmo House, 32 Rufford Avenue, Bramcote, Nottingham, NG9 3JH Tel. (0602) 397588

JAMES & MARTIN ELECTRONICS LTD Staines Road, Feltham, Middx. PROTOTYPE AND PRODUCTION METALWORK

Specialists to the Electronics Industry. Panels, chassis and sheet metal details. Milling, turning, drilling. Machining in all metals and plastics. G3VVB.

Tel. 01-570 3127 Plant list on application. OS Ref TQ 113748

"Mosley"—the tested royards and proved Antennae ROPES

Send for HANDBOOK containing full details of Antennas and other technical information. 33 pages 50p. Refundable upon purchase of Antennas.

SOME ANTENNAS

| | JOINE AITTENNAG | |
|-----------|---|---------|
| Mustang | 3 Elements, 10, 15 and 20 metres | £108.00 |
| TA-33 Jr. | High Power Model incl. Balun | |
| | 3 Elements, 10, 15 and 20 metres | £98.50 |
| TA33 Jr. | 3 Elements, 10, 15 and 20 metres | £85.00 |
| TA32 Jr. | 2 Elements, 10, 15 and 20 metres | £58.50 |
| TA31 Jr. | Rotary dipole, 10, 15 and 20 metres | £36.00 |
| ELAN | 3 Elements, 10 and 15 metres | £69.50 |
| TD-2 | Trap Dipole 40 and 80 metres | £32.50 |
| TCD-2 | Trap Dipole 40 and 80 metres com | |
| | pressed | £39.50 |
| V-3 Jr. | Trap Vertical 10, 15 and 20 metres | £26.50 |
| Atlas | Trap Vertical 10, 15, 20 and 40 metres | |
| SWL ANT | ENNAS | |
| SWL-7 | Dipole 11, 13, 16, 19, 25, 31 and 49 | |
| | metres | £25.00 |
| RD-5 | Dipole 10, 15, 20, 40 and 80 metres | £25.00 |
| | | |
| Orbit | Vertical 11, 13, 16, 19, 25, 31 and 49 | |
| | metres | £43.00 |
| Pr | ices correct at time of going to press. | |
| | | |

MOSLEY **ELECTRONICS** LIMITED

196 Norwich Road. New Costessey Norwich, NR5 0EX **ENGLAND**

Administrative Address only

(All antennas available ex works carriage and VAT extra)

G8CQS

MODULAR ELECTRONICS

95 HIGH STREET, SELSEY, Nr. CHICHESTER, SUSSEX.

DISTRIBUTOR FOR THE PRODUCTS OF SOLID STATE SCIENTIFIC INC.

Telephone: Selsey (024-361) 2916

PM70-4 0-4w for 4w 10dB

| Type | Specific | cation I | Freque | ncy | Price
+VAT 8% |
|----------------|-------------------------|-----------|---------|------------|------------------|
| 2N4427 | 1w | 10dB | 12V | | 20.84 |
| 2N3866 | 1w | 10dB | 28V | 175MHz | €0.78 |
| 2N5913 | 2w | 7dB | 12V | 470MHz | £1.40 |
| 2N3553 | 2.5w | 9dB | 12V | 175MHz | €0.95 |
| 2N6080 | | 12dB | 12V | 175MHz | €4.00 |
| SD1143 | 10w | 10dB | 12V | 220MHz | £5.70 |
| 2N6081 | 15w | 6-3dB | 12V | 175MHz | £5.50 |
| 2N6082 | 25w | 6-2dB | 12V | 175MHz | £7.50 |
| 2N6083 | 30w | 5.7dB | 12V | 175MHz | €8.40 |
| 2N6084 | 40w | 4-5d | B12V | | £11.10 |
| RF2127 | 70w | 6-6dB | 12V | 175MHz | £23.50 |
| SD1019 | -5 100w | 6-0dB+ | 28V | 175MHz | £18.70 |
| 2N5590 | 10w | 5-2dB | 13-61 | √ 175MHz | €4.70 |
| 2N5591 | 25w | 4-4dB | 13 6 | / 175MHz | 08.82 |
| 2N5944 | 2w | 9dB | 12V | 470MHz | €5.40 |
| 2N5945 | 4w | 8dB | 12V | 470MHz | £7.60 |
| 2N5946 | 10w | 6dB | 12V | 470MHz | £9.50 |
| SD1136 | 10w | 5-5dB | 12V | 470MHz | €6.40 |
| SD1088 | 25w | 6-8dB | 12V | 470MHz | £16.45 |
| SD1089 | 40w | 4-3dB | | 470MHz | £19.50 |
| 2N5179 | Gen. pu | rpose arr | p. F.T. | =900MHz | €0.72 |
| 2N5031 | U.F.H. a | mp N.F. | 2.5 at | 500MHz | |
| | | | | TO72 | £2.15 |
| BFX89 l | J.H.F. an | np F.T. 1 | 100MH | IzTO72 | 90.90 |
| BFY90 I | J.H.F. an | np F.T. 1 | 000MH | IzTO72 | £1.00 |
| TRWSu | per Low | Noise "7 | r" Pac | k. (same B | FR90/91) |
| TP390 | 2.7dB | N.F. at | 450MH | łz | £1.50 |
| TP393 | 2 0dB | N.F. at | 500MH | łz | £2.00 |
| TP491 | 2 7dB
2 0dB
1 6dB | N.F. at | 500MH | łz | £3.10 |
| BFR90 | 3-2dB | N.F. at | 1250M | Hz | £3.50 |
| BFR91 | 2-5dB | N.F. at | 1250M | Hz | £4.00 |
| | | | | hancemen | |
| | EI 150 | D Moise | at 144 | MHz with | |
| Data. | 27 200 | | 00.000 | 1222 | £2.00 |
| Surplus | EQUIV. 2 | N5947 C | ATV | amp F.T. | 1200MHz |

Texas 3rd Generation MOSFET 3N204. Elect same 40673 with vastly better Noise Fig. Used in PA1. £1.20 + 8%. Small Signal Transistors. 8% VAT. 40673 65p, BFS28 90p. 2n2369 15p. BC107 12p. and at 8p + 12.5% BC149, CIL108 = Plas BC108. Dual VHF/UHF FET E420 (Dual E300) in-house No. Ideal for Mixers etc. With Data £1.00 + 8% 1N5139 varactor. 7pf (4v) 5w max. in. Wire-end 55p + 8%. Hp5082-3080 U.F.H. Pin diode 65p + 8%. Antenna Relays. Mag. Dev. 951-170-12V 50ohm good to 1296MHz RG43 cable entry. Still at £5.75 + 8% 33% inc expected soon.
HEATSINKS. Single sided. REDPOINT. VAT is +8%.
4Y1 45 deg C/W 4" × 2 36" £0.70.
6M1 2 6 deg C/W 6" × 3 69" £1.10.
Post 25p on heatsink ONLY. due weight.
COMPONENTS. VAT 12 5% unless marked.
DAU PTFE 7mm Trim C 1 5-9pf or 2-18pf 18p.
Mullard 7mm Trim C 1 -6pf 15p.
Surplus 10mm Trim C 2 5-25pf 8p.
TETFER PTFE (U.H.F.) 2-10pf only 25p.
CERAMIC 7mm Trim C 3 5-13pf 7p.
CLYDON MICA 10-60pf good RF power 15p.
RS. Mica 4-40pf good RF power 20p.
Min. RF Chokes. 0 22, 0 33, 0 68, 12, 20, 33 and 1000µh all at 12p ea + 12.5%.
FERRITES. Mullard. FX1115 1 hole 4p.
FX1898 6 hole 10p. FX2049 2 hole RF trans 10p all 8% VAT.

PLUGS AND SOCKETS, (Coline) all 8% VAT. BNC 50 ohm Plug 58p. BNC 1 hole Socket 55p. U.H.F. Socket Silver Plate SO239 49p. "N" Plug for \(\frac{1}{2} \) coax 50p.

INTEGRATED CIRCUITS. VAT at 8%.

Motorola MC12013 ÷ 10 prescaler with TTL out-

High gain stud mount 5w diss In-House Coded

put 5V supply with data/input amp CCT, £10.50. Mc1495L £1.75. MOS 4001 18p. CAPACITORS. 12.5% VAT. 1000pf disc, 200pf disc, 33pf disc, all 2.5p. Feedthr Solder 1000pf, 50pf, all 8p. U.H.F. Micadisc 33 and 22pf all 8p TRINISHED EQUIPMENT. VAT IS 12.5% on all.

2 METER RF AMPLIFIERS (in line) 13 8V supply.

Me.FM 15-1 for 2200G min 13w out

ME.FM 15-2 for 2200GX min 13w out

ME.FM 15-2 for 2200GX min 13w out

E35 +

ME.202-25 for ICOM 202/215 25w out ME. LIN 40. 40w out 9 to 13w in PA.1. Superpreamp 3N204 MOSFET \$5.50 +
2 METER RF POWER MODULES (tested) 13.8V. PM2-10 10w for 0 4w 13-5dB PM2-15 15w for 1 3w 10-5dB PM2-25 25w for 3 3w 8 5dB £16 + 70 Cm RF POWER MODULES (tested) 13 8V.

£16.75 + PM70-10 2 5w for 10w 6dB PM70-10a 1 6w for 10w 8dB £16.75 + £17.75 All power modules supplied for 50 ohm in/out with Changeover circuit details. PA-U1 70cm Preamp. 11dB with Nf 2-4dB £.50 + PA-U2 70cm Preamp. 12dB with Nf 2-0dB £7.50 + Size is 55mm square. Boxed BNC add £4.50 +

All 50 ohm in/out. As supplied to M.O.D.

FINISHED Prescaler + 10 Board. 30mv in at 432.

Max freq 500MHz + 5V - Ve earth supply £20 + 8%

Supplied boxed for Extra £5.00 + 8%.
CONVERTERS, FOR 70CM N.F. 2-5dB gain 30dB.

IF. 28 or 144MHz BNC in/out £21 + 12.5%.
Postage: 35p up to £20 value. Above £20 add £1.00 for post/insurance.

Minimum order £1.50 Min VAT free export £15. B/CARD or ACCESS over £10.

G2BSW REG. WARD & CO. LTD.

| K.W. | SHURE MICROPHONES |
|--|---|
| 103 VSWR Meter and combined Power Meter £15.00 | Model 444 £25.26 Model 201 £9.50
YAESU |
| 107 Combined E-Z March. | FT101E Transceiver £429.00 |
| VSWR and RF Power | FT200B Transcelver and |
| Indicator, Dummy Load | FP200 PSU £289.00 |
| and Antenna Switch for | Yaesu 301D all solid state |
| 3 outlets £85.00 | tcvr £599.00 |
| KW Dummy Load. 50Ω (en- | FR101 S Receiver £299.00 |
| cased with SO239) £19.50 | FR101 D Receiver £390.00 |
| Trap Dipole Co-axial | FT401B £365.00 |
| Feeder £26.00 | YD 844 Desk Mic £18.00 |
| 3-way Antenna Switches | YD 846 Hand Mic £7.50 |
| (for co-ax) £7.50 | YO100 Monitorscope £118.00 |
| (10100-207 11 11 11 11 | FT221 £339.00 |
| KW prices apply only to original stock, | New G/C Receiver FRG.7 £144.00 |
| as new stock is liable to Increases. | S.E.M. Z-match £28.00 |
| All above prices p | lus VAT at 121%. |

USED EQUIPMENT

KW201 Rx and handbook, complete with external Heathkit"Q" multiplier, £130.00

AGENTS FOR G2DYM ANTI-TV ANTENNAS, AND BALUNS

Valves for Yaesu, etc., 6BZ6, GU8, 6KD6, 12AX7A, 12BY7A, 12AU7, 6JS6C, 6146, 6HF5, 6LQ6, 6EA8, 6GK6, 6146B, 6KD5, RCA Valves for KW equipment, etc. Sentinel 2m Preamps and 2m convertors/Europa transverters, J Beams and Stolle rotators. 140' 14g ant. wire, insulators, 52 & 75 ohm co-ax, and UHF plugs, sockets and reducers, G-Whip mobile antenna, Wightraps, Mast couplers. Hy-Gain verticals, SWR 10 (Twinmeter), SWR/PWR Meters.

AMTRON KITS

TRADE INS WITH PLEASURE, OUR STOCK OF GOOD SECOND-HAND EQUIPMENT CHANGES DAILY—LET US KNOW YOUR REQUIREMENTS. Due to currency fluctuations price of imported equipment are liable to alteration. ADD 121% VAT to all prices except used equipment.

CARRIAGE EXTRA ON ALL ITEMS HP TERMS AVAILABLE

ACCESS/BARCLAYCARD AXMINSTER, DEVON EX13 5DP Telephone 33163

C&C electronics

10 West Park London SE9 4RQ

Telephone 01-852 9397



CRYSTALS

THE MADE TO ORDER CRYSTAL SPECIALISTS

| 1-OFF | CRY | STAL | PRICES | | | |
|----------------------------|--------|-------------|-------------|----------|--------|--|
| | Group | | | | Price | |
| Fundamentals | 1. | 0.030 to | 0-099MHz | 100ppm | £14.25 | |
| | 2. | 0-100 to | 0-369MHz | 100ppm | £9.75 | |
| | 3. | 0.370 to | 0-730MHz | 100ppm | £10.00 | |
| 190 | 4. | 0.731 to | 1-499MHz | 100ppm | €9.75 | |
| | 5. | 1.500 to | 1-999MHz | 30ppm | £3.45 | |
| | 6. | 2.000 to | 3-999MHz | 30ppm | £3.00 | |
| | 7. | 4.000 to | 20-999MHz | 30ppm | £2.85 | |
| | 8. | 21-000 to | 24-000MHz | 30ppm | £3.25 | |
| 3rd Overtones | 9. | 23-000 to | 54-999MHz | 30ppm | £2.85 | |
| 5th Overtones | 10. | 55-000 to | 104-999MHz | 30ppm | £2.95 | |
| | 11. | 105-000 to | 119-999MHz | 30ppm | £8.25 | |
| | 12. | 120.000 to | 130-000MHz | 10ppm | £12.00 | |
| 5th, 7th and 9th Overtones | 13. | 130-001 to | 216-000MHz | 10ppm | €20.00 | |
| Unless otherwise requested | fundam | entals will | be supplied | with 30p | F load | |

capacity and overtones for series resonance operation. HOLDERS 0-030 to 0-200 MHz HC13/U, 0-170 to 196-000MHz HC6/U. 4-000 to 216-000MHz HC18 or HC25/U. Prices on application for other holders.

DELIVERY Groups 1 to 4, 12 and 13-6 to 8 weeks. Groups 5 to 11-4 to 6 weeks. DISCOUNTS 5% mixed frequency discount for 5 or more crystals within any price group. For orders of same frequency and spec discounts start at 5 off in groups 1, 4, 12 and 13. In all other groups discounts start at 10 off. Special rates for bulk purchase schemes Incl free supply of xtals for UK repeaters.

CRYSTALS FOR POPULAR VHF TRANSCEIVERS

Crystals supplied in approx. 5 weeks to any stated frequency for the following VHF Tx's: Heathkit, Icom, Ken, Standard, Trio and Yaesu. Price £2.50 per crystal. LOW FREQUENCY STANDARDS (8% VAT) 100kHz in HC13/U, Price £2.95. 1000kHz in HC6/U. Price £2.80.

CRYSTAL SOCKETS HC6/U and HC25/U. Price 16p.

PRICES ARE EX VAT-MINIMUM ORDER CHARGE £2.00 PLEASE ADD 121% UNLESS OTHERWISE STATED

All prices include postage to UK and Irish addresses. Crystals supplied to any specification for industrial, mobile radio or marine use, etc. State equipment/ specification when enquiring. Please send sae with all enquiries.

BOOST YOUR POWER

By using the QM70 2 Metre Linear Amplifier **FEATURES**

● Up to 50 Watts output ● All Solid State design ● Accepts FM, AM, SSB, CW, SSTV etc. ● Built in RF sensing circuit ● Switchable Hang-time for SSB and CW operation . Straight through facility also fitted . Fits Into your 2 metre antenna line . SO239 RF input and output sockets . Neat compact construction Supplied complete with fused 12V DC Power cord £52.00

ALSO AVAILABLE FOR THE 2 METRE OPERATOR.

28/144MHz SOLID STATE TRANSVERTER.

All solid state circuitry employing high gain low spurii mixer configuration. Fully metered and LEDs to indicate tx/rx condition. Measuring 250mm × 125mm × 50mm attractively styled. 2W output (linear and clean). Built-in ant c/o relay. The grp man's delight or use it for driving a high power linear amp. Relay contacts already built in for switching external linear. Receive side employs a superb FET converter SO239 ant socket. Supplied complete with harness for your ssb transceiver. £60.00

SCORPION 28/144MHz HIGH POWER TRANSVERTER.

- Electronically stabilised DC line to both the local oscillator and receive converter.
- 116MHz crystal oscillator for spurious free reception and transmission.
- Receive converter 30dB gain: 3dB goise.
- Highly linearised transmit mixer.
- Inductive coupling in all transmit stages ensures a clean spurii free signal.
- QQV06-40A final power amplifier in a high Q circuit.
- Up to 100 watts p.e.p. output.
- Built in aerial change over relay
- All power and switching from your HF transceiver.
- Whatever mode your hf transceiver will supply will be faithfully transverted to transmit on the 2m band.
- PA current meter.
- Full output even at hand edges-OSCAR MEN PLEASE NOTE.
- Sturdy attractive construction.
- Superior ventilation gives no trouble with overheating.

TOKO coils: Ambit now holds over 200,000 in stock

£109.00

£1.95

£1.81 £0.75

FOR THE DISCERNING VHF LISTENER.

QM70 now produce what must be the most comprehensive range of VHF/UHF Receiving Converters available today. Listed below are examples from our range: 70/28MHz . . . £19.00 144/28MHz . . . £19.00

432/144MHz ...

EXTEND YOUR RANGE

For 70cms operation QM70 offer you the choice of two FM Transverters.

COBRA FM TRANSVERTER.

This unit is designed to be used in conjunction with a 2m fm transceiver to allow the operator access to the 70cm band in both simplex and repeater modes. The normal functions of the 2m transceiver are retained and 70cm operation may be achieved "at the flick of a switch." 70cm received signals are converted down in a linear manner to the 2m band. The 2m transmit signal is tripled in frequency to the 70cm band. Because the COBRA has its own built-in audio stages, frequency deviation on 70cm is pre-set from within the COBRA thus avoiding the necessity of any adjustments to the 2m transceiver.

FEATURES

- Switchable Built in Audio Amplifier and Limiter.
- Tone Burst adjustable in frequency, amplitude and duration, All Receive/Transmit/Switching accomplished by built-in RF Sensing.
- Controls include 2m/70cm Switch; Tone Burst On/Off Switch: Illuminated Relative RF Power Output Meter, Microphone Input/Output Sockets.
- Reverse Polarity Protected.
- Fused DC Line.
- Weight 1kg. Size = 105 × 60 × 230 (all dimensions in mm).
- 12V DC Nominal. (Negative Earth).

£86.00

COUGAR FM TRANSVERTER.

This unit is similar to the Cobra FM Transverter as detailed above but does not incorporate the Tone Burst Generator and Audio stages.

SSTV Monitor Cathode Ray Tubes-SAE for details

Agents: Peter Avill G3TPX, Darton 2517, Gordon Adams G3LEO, Knutsford 4040. (Both OTHR)

Amateur Electronics. Amateur Radio Exchange. Crayford Electronics. D P Hobbs.
Lee Electronics. Thanet Northern. Waters & Stanton.
All prices include VAT and UK Mainland carriage. All units guaranteed for 12

months. Large SAE for fully descriptive literature.



Severnside South, Bewdley, Worcestershire DY12 2DX. Bewdley 400070. Manufacturers and suppliers of VHF equipment to the Amateur and Professional user

AMBIT international—the radio component source

Listed here is a selection of popular components for the radio constructor/enthusiast. Our latest catalogue includes more Information on our AM/FM tuner modules—with all those hard-to-get blts, like coils, filters, trimmers etc.

| AM IFTs for 455/470kHz 1st, 2nd and 3rd | £0.30 |
|--|---|
| FM IFTs for 10·7MHz Also detectors | £0.3 |
| Ratio discriminator coils for 455kHz or 10·7MHz | £1.35 |
| Tunable chokes of 2, 3·5, 7, 11·8, 23, 36mH | £0.33 |
| S.18 molded VHF coils: 0.09, 0.12 and 0.18µH ex-stock | £0.33 |
| Special molded spiral formers with two slugs and can
Various RF and oscillator coils—see catalogue for details. | £0.25 |
| TOKO FILTERS: Low cost and high performance | |
| MFH41T/MFH7IT 4 or 7kHz Bandwidth, 455kHz mechanical | 100000000000000000000000000000000000000 |
| filters with matching transformers | £1.95 |
| CFT series ceramic filters for 455kHz 6 and 8kHz BW | £0.5 |
| 2kHz 6 element mechanical filter for 455kHz SSB Tx/Rx—'MFL' | £9.95 |
| FOIL trimmers—Mullard and Dau types | |
| 1-8pF, 3-30pF, 7-45pF in 7-5mm diameter: 18, 23 & 26p resp.
7-60pF 10mm diameter type | £0-26 |
| VARICAP DIODES-VHF and MF/HF wide range tuning dio | des |
| BA102—30p; BA121—30p; BB104—45p; MVAM2—£1·35
NEW MVAM125: 20 to 400pF with 25V bias available in sing
sets for multi stage tracking 90p each, 3 for £2·65. | les o |
| ICs for Radio: The best and most recent popular types: | |
| HA1197 AM system, though suitable for SSB and NBFM IFs. 80dB AGC, meter stable to use | £1-4 |

Please remember to include VAT (usually 12:5% except where marked *) and our flat rate 22p P&P charge. Catalogue 40p Inc. Please accompany enquiries with an SAE. Price list leaflets available FOC with an SAE.

2 Gresham Road, Brentwood, Essex, CM14 4HN Telephone (0277) 215029 after 3pm if possible-tnx.

BRICOM WILTSHIRE SN4 OLT

Proprietors B. D. Comer, S. J. Comer. 12 DRAYCOTT ROAD, CHISLEDON, SWINDON, WILTSHIRE SN4 0LT TEL. 740630.

NEW! NEW! NEW! NEW!

TE 7 Absorption Wattmeter. Continuous dissipation 15Watts, intermittent dissipation 25Watts. Frequency range 1MHz to 200MHz. Twin range 0-5, 2-25Watts. VSWR better than 1.2:1 @ 150MHz. Standard input 50ohms BNC, other input sockets to order. The robust, all metal construction, small size of 65 × 120 × 50mm and freedom from power supplies, makes this unit ideal for field

and freedom from power supplies, makes this unit ideal for field servicing, test lab, workshop etc. Cost: £26.62 Delivery 10 days.

TE 8 Direct Reading Capacitance Meter. Clear linear scale. Five ranges 1pf to 1µf. Internal battery operated. External power supply facility. Designed for quick simple measurement of capacitors. Resolution is 1 part in 100. Accuracy ±5%. Small size and robust construction make this unit ideal for goods inwards, in-line checking, in fact at any point where speed and efficiency are required. Cost: £32.00 Delivery 10 days.

| TX- | 5300 | BI-LINEAR AMPLIFIER | |
|--------|------|---------------------|-------------------------|
| (5.55) | | SOLID STATE | £235.00 |
| TX- | 5200 | BI-LINEAR AMPLIFIER | |
| 0.000 | | SOLID STATE | £162.25 |
| TX- | 100 | BI-LINEAR AMPLIFIER | |
| | | SOLID STATE | £118.94 |
| TX- | 75 | BI-LINEAR AMPLIFIER | Land Control of Control |
| 2000 | 1000 | SOLID STATE | £92.15 |
| TX- | -50 | BI-LINEAR AMPLIFIER | |
| | er: | SOLID STATE | £64.35 |
| 90 | ١. | BI-LINEAR AMPLIFIER | |
| | 30 | VALVE | £114.00 |
| 300 | A | BI-LINEAR AMPLIFIER | 0010.00 |
| | | VALVE | £210.00 |

PLEASE NOTE OUR CHANGE OF ADDRESS.

SAE with all enquiries please

Prices include V.A.T.

HA1137 FM IF system sim to 3089 with better mute

TBA651 Linear RF/IF gain block with AGC TBA120 FM detector block with gain

- TEMENOS LTD -

THIS YEAR WE ARE INTRODUCING A SERIES OF LOW COST, HIGH TECHNOLOGY KITS FOR THE AMATEUR RADIO ENTHUSIAST, AS WELL AS OFFERING A RANGE OF QUALITY COMPONENTS AND SUNDRY ITEMS. Let's begin by offering the ultimate in XTAL CALIBRATORS. The TEMENOS XTAL CALIBRATOR has outputs at 1Mhz, 100kHz, 50kHz and 25kHz which are audible above 150Mhz. It is battery operated (not supplied) with low power consumption and switchable internal FM modulation, making it ideal for many purposes. It comes in KIT FORM complete with an attractively printed and drilled case, PCB, all components and comprehensive instructions. IDEAL for the beginner or experienced constructor alike. INTRODUCTORY PRICE—£10.80 Inc. VAT. P&P—30p. S.A.E. for further details. VAT. P&P-30p. S.A.E. for further details.

VAT. P&P—30p. S.A.E. for further details.

COMPONENTS—8 PIN 741–20P. LM380 2w Audio amp—80p. NE555
Timer—40p. LM309K 5v 1A regulator—85p. 2N3055–45p.
1N4148–4p. 1N4004–7p. 1N4007–10p. POTS—25p. PRESETS—9P.
RESISTORS—1.5p. All prices include VAT.
"BARGAIN OF THE MONTH"—Large colour maps, size 58" ×
42"—either UK and NW Europe. Scale 1:1000,000 OR UK, NW Europe
and Scandinavia Scale 1:2000,000. These are highly recommended.
EXCELLENT VALUE @ 80p each, 2 for £1.50, including VAT.P&P—20p
on all orders under £2.00. C.W.O. All items carry money back guarantee if
not satisfactory. All orders to:

TEMENOS LTD., Dept. R.C., York House, Shariston Common, WAKEFIELD, WF4 1EJ West Yorkshire.

DX POOR?

Maybe your ANTENNA is FAULTY. Measure resonance and radiation resistance directly with an Antenna Noise Bridge. GET a STRONGER SIGNAL for

CLOBBERED? Now PUNCH THROUGH with a Speech Compressor. GET four times TALK POWER for only £8.60

WASTING POWER? Check your LINEAR fast with a Two Tone Oscillator. GET it RIGHT for only £7.40

QRM? Free DX from WHISTLES etc. with a Tunable Audio Notch Filter. DIG OUT the RARE ones for only £7.90

Each easy-assembly kit includes all parts, printed circuit, case etc., postage, money back assurance, so SEND off NOW.

CAMBRIDGE KITS 45 (RA) Old School Lane, Milton, Cambridge.

INDEX TO ADVERTISERS

| Aero & General Supplies 87 | Interface Quartz Devices Ltd 82 |
|----------------------------------|--------------------------------------|
| AJH Electronics Cover iv | International Correspondence |
| Amtest 91 | Schools 86 |
| Amateur Electronics 20 | James & Martin Ltd |
| Amateur Electronics 20 | James Or Martin Liu |
| Amateur Radio Bulk Buying Group | Johns Radio |
| Cover II | KW Amateur Hadio Products 80 |
| Amateur Radio Exchange 83 | Lee Electronics 5 |
| Amateur Radio Shop 84 | Lowe Electronics 16/17 |
| Ambit International | Microwave Modules Ltd 81 |
| Amcomm Services 79 & 87 | Modular Electronics 88 |
| B. Bamber 92 | Mosley Electronics Ltd 87 |
| Booth Holdings Bath | Wm. Munro (Invergordon) Ltd 77 |
| Dricem 90 | Nixons Electronics 76 |
| Bricom | Partridge Electronics Ltd 85 |
| British National Radio & Elec- | DM Floringia Continua Ltd |
| tronics School 80 | PM Electronic Services 76 |
| Cambridge Kits 90 | QM70 Electronics Ltd 89 |
| Catronics Ltd Cover ii | Radio Shack |
| CB Electronics | RT & I Electronics 78 |
| C & C Electronics 88 | SEM Electronics 86 |
| Chelsea College 91 | South Midlands |
| I. N. Cline 90 | Communication Ltd 6/8 |
| Harry Collins | Spacemark Ltd 78 |
| | Stephens-James Ltd |
| Commercial Communications 80 | Topological Indiana Liu |
| Datong Electronics | Temenos Ltd |
| Ashley Dukes 85 | Teletron Data Cpn |
| Garex Electronics 82 | Thanet Electronics 10/11 |
| G2DYM Aerials 90 | Thanet Northern 9 |
| GWM Radio Ltd 75 | UHF Developments 90 |
| Heath (Gloucester) Ltd 84 | Reg Ward & Co Ltd 88 |
| Home Office | Waters & Stanton Electronics 2/4 |
| D. P. Hobbs Ltd 86 | Western Electronics (UK) Ltd . 12/13 |
| Impatt Electronics | W. H. Westlake90 |
| Integrated Circuite Unlimited 10 | Yaesu Musen Co Ltd 14/15 |
| Integrated Circuits Unlimited 19 | Taesu Museri CO LIG 14/15 |
| | |

EMUSYTHIZER

A VHF Tx drive unit that will give 80 channels spaced 25KHz from 144 to 146MHz. The oscillator is in the 2 Metre band and you require no multiplier stages. Output is approx 250mW. With this system you do not have the problem of unwanted harmonics to filter out. An audio amp. is included and this will FM the oscillator direct. Channel selection is by 3 switches that indicate the frequency in use. The Unit is housed in an attractive case and requires a 12vdc supply. Write for further details. Price £80.00. p&p £2.00.

This popular VFO for 2 Metre FM is still available for 6, 8, 9, 12 or 18MHz. This will give full coverage of the band with an output of approx 2v. p-p into 50 ohms. It is varicap tuned by a potentiometer supplied and is housed in a die cast box. It is supplied in a polythene box that can be used as a thermal jacket. A separate diode is used to give FM or FSK facilities. 12vdc Neg. earth is required to power it. Stability is adequate for most Amateur application.

EMUPRESSOR The ideal companion for the VFO or any TX that needs audio for modulation. It is an AGC system giving minimum of distortion. A typical Unit tested gave a 6dB change of output for a 6dB change of input. This will give a reasonably constant output from your Mic. Fitted coax sockets in and out, requires 12vdc at 25mA to power it.

Price \$7.80. p&p 25p.

EMUMARKER This crystal calibrator will give you markers at 1MHz, 100KHz and either 25 or 10KHz. Outputs are from 3 coax sockets and it works from 9vdc at Emumarker 10 or 25 Price £11.00, p&p 25p

This Unit will convert your AMRx for good FM reception. A compact device containing limiters, discriminator, squelch, audio and output stages. Only one connection to main Rx, a small Cap. to the last IFT. via coax to the Unit. For those wishing to incorporate in an existing Rx, a PC version is available.

Price PC version £11.50. Boxed £13.50. p&p 25p.

An RF operated repeater Timer giving indication by LEDs. While the Green is showing you still have time, Red will indicate time up. This timer will automatically reset and start counting afresh if you make a brief transmission. A floxible lead is for the RF pick up and 12vdc at 30mA is required to power the Unit. Time is average 60 to 100 Secs. £10.50. p&p 25p. EMU CALL

A solid state Call sign generator programmed to your own Call and given from a speaker. Complete with mains PSU, Price £28.50. p&p 50p. Money back guarantee if not satisfied. Write for further details to:

I. N. CLINE (G3EMU) 15 Knight Ave, Canterbury, CT2 8PZ. Kent.

G2DYM ANTI-T.V.I. AERIALS

DO OVERCOME T.V.I. PROBLEMS FOR BOTH THE S.W.L. and TRANSMITTING AMATEUR

A 12\p 7" × 10" sae + 3 × 9p stamps bring you full details, aerial article and actual copies of test reports, genuine testimonials from satisfied customers with their addresses.

LAMBDA ANTENNA STUD FARM, WELLINGTON, SOMERSET. WHITEBALL

1978 OFFERS

REVCO 1 Wave Mobile Aerials. 68-200MHz. State Fx. £4.75 post 75p.
REVCO 5/8th Mobile Aerials. 144-146MHz. £8.10 post 90p.
REVCO MA200 MAGNETIC Base with 1 wave. £15.00 post 90p.
REVCO MA200 MAGNETIC Base with 5/8th. 144-146MHz. £19.00 post 90p.
SBE MODERN PTT MICROPHONES, Curly lead to fit Modern Rigs and Pye REWCD SOLDER SUCKERS. Professional type. £6.00 post 50p.

REVCO SOLDER SUCKERS. Professional type. £6.00 post 50p.

300ohm TWIN RIBBON Feeder. New line at 8p per m., post 11p per m.

40,000 Xtals in stock, tons of coax and other cables. SAE for lists.

W. H. WESTLAKE, G8MWW, CLAWTON, HOLSWORTHY, DEVON

Steve G8FMG UHF DEVELOPMENTS BEDFORD 3cms Equipment. Quality finished products. (see Dec. Rad-Com) WG16 (brass) £1.90 per ft. WG16 Square flanges £1.50 each. WG16 Round flanges £1.75 each, Locating rings £1.90 per set. Diodes 1N21C 20p, 1N23 50p, 1N23WE £4.50, others available. CXY11B 10mw £8.45, CXY11C 15mw £9.80, CXY19 150mw £36.65. Greenpar plugs and E8.45, CXY11C 15mW £9.80, CXY19 sockets available. PL259 45p each. Coax Cable. Atten per 100 ft.70cm UR67 (approx dB) 5.0 FHJ2-50A Andrews 2.5 LDF4-50 Andrews 1.6 post per m. £0.04 £0.12 23cm per m. £0.53 4.5 £1.65 £2.10 N Type plugs to suit FHJ2-50A £5, LDF4-50 £5.80.

All listed items are new and not surplus. Send SAE with enquiry, P&P 25p. CWO. Mall order. Callers by appointment. Allow approximately 3 weeks delivery.

> 6 WHITELODGE CLOSE, KEMPSTON, BEDFORD Tel 0234-852414 evenings and weekends

CLASSIFIED ADVERTISEMENTS

Private advertisements 15p per word, minimum £3.00. Private advertisements 15p per word, minimum £3.00. Trade advertisements 25p per word, minimum £5.00. Box Number 75p extra to wordage or minimum. Semi-display 1/12 page (1½" × 3") (35 × 76mm) £21.00. 1/16 page (½" × 3") (22 × 76mm) £15.00. Please write clearly. No responsibility accepted for errors. Latest date for acceptance—4th of preceding month. All classified advertisements must be prepaid. Copy and remittance to: C. C. LINDSAY, 2 Leyburn Gardens, Croydon CR0 5NL. Tel 01-686 5839. Members' Ads must be sent to the Editor at Chelmsford.

FOR SALE

G.I. AMATEUR SUPPLIES GI3ZIA for Trcvrs, Rx, Tx, Antennas, Mics, etc. Trade-in's welcome. Large stocks at 10 Church Street, Enniskillen, N. Ireland. Tel: (0365) 22955. QSL CARDS, LOGBOOKS. Samples 9p. Beauprint (G3OYI) Meltham

Road, Honley, Huddersfield.

QSL CARDS, printed to your own specification on white gloss cards.
Send SAE to Caswell Press, 11 Barons Way, Woodhatch, Reigate,

QSL and LISTENERS CARDS. We offer high quality cards, rapid turn-around and competitive prices. Try us! Sae for samples. G3VZF, 5 The Close, Radlett, Herts.

FT101 EXPERTS. Service and Sales. Holdings Ltd., 39/41 Mincing Lane, Blackburn. Tel. 59595/6. HEATHKIT SEPARATES SB303RX, SB401TX, excellent condition, with new manuals, spares, cables, CW filter, all Xtals. £295. G3VZJ, Reading 413891.

3cm TRANSCEIVERS (NOT 3M as Dec.). New Microwave Associates "Gunplexer", AF in, IF out, with horn, £81 inclusive; sae mfrs full technical details.G8APX, Salewheel House, Ribchester, PR3 3XU.

cal details.G8APX, Salewheel House, Ribchester, PR3 3XU. HB9CV & MOBILE ANTENNAS, high quality, low price glassfibre base colinears 70MHz, 145MHz, 432MHz. SAE details. Tel: Worcs (0905) 22704 evenings and weekends. AMTEST, 55 Vauxhall Street, Worcester, WR3 8PA. 2M VISCOUNT with crystal shift, S20 with controls, microphone, £39. Viscount crystals, spares, controls, connectors, sae. G8AKA, 2 Orchard Road, Mortimer, Reading 332582.

WANTED

X-Y CHART RECORDER REQUIRED BY Western Electronics (UK) Ltd., Louth, Lincs., LN11 0JH.

ACCOMMODATION

HOLIDAY COTTAGE TO LET, sleeps six, mid-Norfolk, available March onwards. Details: Yaxley, G3YHO, "Ashness", Swaffnam Road, Dereham, Norfolk.

RACAL MA197B SELECTOR-PROTECTOR, Power 100/250 AC. Range 1 M/c-30 M/cs in 6 bands. Used condition £35. With new metal case £15 extra. Carr. £10.

COMMUNICATIONS RECEIVER RACAL RA-117E, Frequency Range 1-30MHz in 30 Bands 1MHz wide. Effective Scale Length 145ft 6 in corresponds to 100KC/s. Power 100-125 or 200 250 a.c. Internal Speaker. Crystal Filter. Bandwidth 100Hz to 13kHz in six bands, with S-Meter. Two IF stages. Slow Motion BFO, uses 27 valves (BG7 and BG9). As new condition, with handbook and circuit (in metal louvred case) £300.00. (Carriage approx £10). All our sets are bought direct from the Govt. All are bench tested and checked in our own workshop before despatch, for full Calibration. Send SAE only for any enquiries Trade terms on quantities. Working demonstration on Ritty etc, in our works by appointment.

JOHNS RADIO 424 Bradford Rd, Batley, Yorks. Tel: 0924-478159 (9.30 am - 1 pm)

WAVEMETERS

TC101 0-8-500MHz ABSORPTION £36.95p TC101 v8-500MHz ABSORPTION £36.95p EDL 65-230MHz ABSORPTION £17.60p TE15 0-44-280MHz GDO, ABSORP £25 OTHER PRODUCTS AS OCT RAD COM pp 818 & 829 WE ARE NOW OM70 AGENTS, FULL RANGE. SAE DETAILS. TEL: WORCS (0905) 22704 7-9 pm AMTEST, 55 VAUXHALL ST, WORCESTER WR3 8PA

WIRELESS **TECHNICIANS**

There are a limited number of vacancies at the Hollowing Home Office Depots: Andover and Hannington Hants, Bridgend Mid Glamorgan, Guildford Surrey, Hinchingbrook Hunts, Lewes East Sussex and Romsley West Midlands for Wireless Technicians to assist with the installation and maintenance of VHF and UHF systems.

Applicants must be able to drive a car and be in possession of a current UK driving licence.

Salary

is £2,010 (at 17), £2,450 (at 21) and £2,905 (at 25) rising to £3,385, plus a 1976 pay supplement of £313.20 a year and a 1977 pay supplement of 5% of total earnings, subject to a minimum of £101.79 a year and a maximum of £208.80 a year.

A Secure Future

with a non-contributory pension scheme, good prospects of promotion and a generous leave allowance. There are opportunities for day release to gain higher qualifications.

Qualifications

Candidates, male or female, must hold a City and Guilds Intermediate Telecommunications Certificate or equivalent and have practical experience of maintenance and construction of VHF and UHF wireless equipment and a working knowledge of workshop techniques.

Applications from Registered Disabled Persons will be considered.

Interested?

Then write or telephone for further details and an application form: to Mr C B Constable, Directorate of Telecommunications, Horseferry House, Dean Ryle Street, London SW1 2AW, Telephone: 01-211 6420.



CHELSEA COLLEGE University of London **ELECTRONIC TECHNICIANS** GRADES 5 and 3

required for interesting work in Departments of Electronics and Pharmacy. Work includes electronics prototype design, development and construction and servicing and maintenance of electronic equipment. Salaries Grade 5 £3651-£4185 per annum inclusive of London Allowance and Grade 3 £3153-£3525 per annum inclusive. Further information and application forms from Mr. M. E. Cane (ET), Chelsea College, Pulton Place, London SW6 5PR.

FIELD & BENCH ENGINEER REQUIRED

for work on radio telephone equipment.

Phone 01-573 4541

B. BAMBER ELECTRONICS

DEPT RC. 5 STATION RD. LITTLEPORT, CAMBS, CB6 IOE TEL: ELY (0353) 860185 (TUESDAY-SATURDAY)

TERMS OF BUSINESS: CASH WITH ORDER, MINIMUM ORDER OF £2.00.

ALL PRICES NOW INCLUDE POST & PACKING (UK ONLY) EXPORT ENQUIRIES WELCOME CALLERS WELCOME by APPOINTMENT ONLY

Please enclose stamped addressed envelope with ALL Enquiries

PLEASE ADD VAT AS SHOWN

ALL BELOW-ADD 8% VAT

MAINS TRANSFORMERS. TYPE 60/2, Mains input 200-210-220-230-240-250V AC. Output 0-20-40-60V at 2A, in metal and plastic case

approx. 71 × 41 × 4, fully fused (ideal for PSU).

Sorry, sold out.

MAINS TRANSFORMERS, TYPE 15/300 240V input,

MAINS TRANSFORMERS, 1 TFE 18/30 4047 18/24

LARGE ELECTROLYTIC PACKS, Contain range of large electrolytic capacitors, low and high voltage types, over 40 pieces, £3.00 per pack (+ 121% VAT).

A RANGE OF DRAPER TOOLS FOR

THE ELECTRONICS ENTHUSIAST
MAINS TESTER SCREWDRIVERS 100 to 500V Standard size 50p. Large 70p. RADIO PLIERS 52" £1.60, 62" £1.80.

DIAGONAL SIDE CUTTERS 61" £1.90

SMALL SIDE CUTTERS LJ2 Standard £3.70, LJ7 (with wire holding device) £4.10.

MIDGET OPEN ENDED SPANNER SETS 0 + 1, 2 + 2, 3 + 5, 4 + 6, 6 + 8 BA sizes £2.85 set of 5, 4 + 4.5, 5 + 5.5, 4 + 6, 6 + 7, 8 + 9, 10 + 11 mm sizes

MINIATURE FILE SETS. Set of 6 £1.90. Set of 10 £3.25

TAP AND DIE SETS (18 piece) contain 1 each of 0, 2, 4, 6, 8, BA sizes in Dies, Plug Taps, Taper Taps + American type tap wrench, T type tap wrench, Die Holder. £11.60.

UNED COILS, 2 section coils, around 1MHz. with a black smart tuning knob, which moves an internal core to vary the inductance, many uses, easily rewound.

FULL RANGE OF BERNARDS/BABANI ELEC TRONICS BOOKS IN STOCK, S.A.E. FOR LIST

NEW FOR THE VHF CONSTRUCTOR. A range of tuned circuits on formers with slugs and screening cans. Frequencies quoted are approximate, and range can be greatly extended by using varying capacitors in parallel.

Type S († square, dumpy type)

Type SA 20 to 30MHz (when 33pf fitted in parallel) Type SD 135 to 175MHz (with link winding)

Type M (Min. 1' square types)

Type MA 19 to 28 MHz (when 33pf fitted in parallel)
Type MB 22 to 32MHz (when 33pf fitted in parallel) Type MC 25 to 35MHz (when 33pf fitted in parallel) Type MD 38 to 50 MHz (when 33pf fitted in parallel) Type ME 45 to 60MHz (when 33pf fitted in parallel) Type MF 100 to 200MHz (without slug) when 0 to 30pf

variable fitted in parallel) All the above colls available in packs of five only (same type) at 50p per pack of 5.

A NEW RANGE OF QUALITY BOXES & INSTRUMENT CASES.

Aluminium Boxes with lids. AB10 5½ × 4 × 1½ 60p

AB13 6 × 4 × 2 80p

AB14 7 × 5 × 21 £1.00 AB15 8 × 6 × 3 £1.30 AB16 10 × 7 × 3 £1.50

AB17 10 × 41 × 3 £1.30 AB25 6 × 4 × 3 £1.00

Vinyl Coated Instrument Cases. Blue Tops and White lower sections. Very smart

finish. WB1 5 × 21 × 21 60p

WB2 6 × 41 × 11 £1.10

WB3 8 × 5 × 2 £1.60 WB4 9 × 51 × 21 £1.80

WB5 11 × 61 × 3 £2.00

WB6 11 × 71 × 31 £2.25 WB7 12 × 61 × 51 £2.60 WB3538 × 51 × 31 £2.00

VIDICON SCAN COILS (Translator type, but no data) complete with vidicon base £6.56 each. Brand new.

ALL BELOW-ADD 8% VAT

PLASTIC PROJECT BOXES with screw on lids (in

Black ABS) with brass inserts. Type NB1 approx. 3" × 2½" × 1½" 40p each.

Type NB1 approx. 3' ×2' × 1'; 40p each.
Type NB2 approx. 4' × 2' × 1'; 50p each.
Type NB3 approx. 4' × 3' × 1'; 60p each.
QUARTZ-XTAL CONTROLLED CLOCKS, 9 to
12V DC at approx. 3mA required. Dial size approx. 2", depth of unit approx. 2", Not in cases, unit only, smart modern appearance, black face with white lettering, 12 hr, with second hand, and red hour and minute hands (Cost over £40 to produce) Sorry, sold

OSMOR REED RELAY COILS (for reed relays up to 1' dia, not supplied) 12V, 500ohm coll, 2 for 50p.

PERSPEX TUNER PANELS (for FM Band 3 tuners) marked 88-108 MHz and Channels 0-70, clear number rest blacked out, smart modern appearance, size approx. 81" × 11", 2 for 35p.

MIXED COMPONENT PACKS, containing resistors, capacitors, switches, pots, etc. All new, and hundreds of items, £2.00 per pack, while stocks last.

PROGRAMMERS (Magnetic devices) contain 9 microswitches (suitable for mains operation) with 9 rotating cams, all individually adjustable, ideal for switching disco lights, displays, etc., or industrial machine programming. (Need slow motion motor to drive came, not supplied.) Sorry, sold out.

PLUGS & SOCKETS

N-TYPE PLUGS 50ohm 60p each, 3 for £1.50.

Greenpar (GE30015) Chassis Lead Terminations (These are the units which boil on to the chassis, the lead is secured by screw cap, and the inner of the coax passes through the chassis). 30p each, 4 for £1.00.

PL259 Plugs (PTFE) Brand new, packed with reducers. 65p each.

SO239 Sockets (PTFE) Brand new, (4 hole fixing type)

QQVQ3/20A (ex equipment) £3.00. QQVO3/10 (ex equipment) 75p or 2 for £1.20.

6BH6 (ex equipment) 2 for 56p.
All the above valves are untested, except for heaters and no guarantee of percentage of emission is given. Sorry, no returns.

MULLARD 85A2 85V STABILISER VALVES (brand new) 70p each or 2 for £1.20. 6BW6 VALVES (BRAND NEW). 85p each or 2 for

SEMICONDUCTORS

PNP Audio Type TO5 Translators 12 for 25p. BFY51 Transistors, 4 for 60p BYX 38/300 Stud Rectifiers. 300V at 2.5A, 4 for 60p. BCY72 Transistors, 4 for 50p. BSX20. (VHF osc/mult.) 3 for 50p. BC108 (metal can) 4 for 50p. PBC 108 (plastic BC 108) 5 for 50p. BF152 (UHF amp/mixer) 3 for 50p. 2N3819 Fet. 3 for 50p.

BC148 NPN SILICON 4 for 50p. BC158 PNP SILICON 4 for 50p BAY31 Signal Diodes 10 for 35p.

BA121 Varicap Diodes, 4 for 50p. 741CG RCA OP-AMPS 4 for £1.00.

DIECAST BOXES. We still stock these, but owing to frequent price rises from our suppliers, and costly postal charges, it has been found impossible to publish up-to-date prices on these items. Please ring or write (with SAE), for latest mail-order prices.

AEI CS10B/R MICROWAVE DIODES: up to X-Band. max, noise figure 8.5dB at 9.375GHz. 80p each.

BARGAIN PACK OF LOW VOLTAGE ELECTRO-LYTIC CAPACITORS. Up to 50V working. Seatronic manufacture. Approx. 100 £1.50 per pack (+121% VAT).

ALL BELOW-ADD 8% YAT

RED LEDs (Min. type) 5 for 70p.

NEW PCBs For PYE LYNX TV-CAMERA.

STABILISER PANEL (AT26352) £3.00. VIDEO PCB (AG58314) £5.00.

BOX OF P. C. BOARDS, mixed PCBs, containing Transistors, I. C.s. Resistors, Capacitors, etc. Good breakdown value. Our selection £3.00 per box. SLIDER SWITCHES, 2 pole make and break, (or

can be used as 1 pole change-over by linking the two centre pins) 4 for 50p.

SMITHS CLOCK MOTORS, 200-250V 50Hz 2 watts, 1 Rev. every 2 mins., 3 hole fixing, & spindle, £1.00

SLOW MOTION MOTORS, 120V 50Hz 1RPM, Size approx. 2"dia., 1\frac{1}{2}" deep, with \frac{1}{2}" spindle, 60p each or 2

COMPUTER GRADE ELECTROLYTICS, Screw ter-minals, 20,000mfd at 45V (ex-equipment) 2 for £1.00.

SUB-MINIATURE ROTARY SWITCHES, 4 × 5 way make contacts, Size approx. § dia. 1 deep, 15 spindle,

UR41 ATTENUATION CABLE, Nominal 72oh overall dis. approx. 1", Att. per 100ft; 100MHz 218dB, 200MHz 318dB, 600MHz 449dB, 3000MHz 625dB, Idea for Rx or Low power Tx fixed attenuators. Supplied with attenuation graph. 4 metres for £1.00.
ALU-SOL ALUMINIUM SOLDER (made by multicore)

Solders Aluminium to Itself or Copper, Brass, Steel, Nickel or Tinplate, 16SWG with multicore flux, with instructions, approx, 1m coll 40p Pack.

SOLDER SUCKERS (Plunger Type)
Standard Model £5.50.

Skirted Model £6.00. Space Novyles 60n each.

MULTICORE SOLDER Size C1SAV18 Savbit, 18SWG 56p.

WELLER TCP2 and PU2D PSU. Temperature controlled soldering iron, with matching Power Supply Unit, containing sponge and spring stand. £30.66.

SPIRALUX Tools for the Electronic enthusiast ... SAE

HEAVY DUTY RELAYS, 24V DC operated (will work on 18V) 3 heavy duty make contacts (around 10A rating + 4 change over contacts + 1 break contact. New, complete with mounting bracket (ideal for switch-ing HT on Linears). Many uses for this high quality

ALL BELOW-ADD 124% VAT

VARICAP TUNERS Mullard Type ELC1043/05 Brand New,

TV plugs (metal type) 4 for 50p TV line connectors (back-to-back skt) 4 for 56p. 3 pin Din plugs, 4 for 50p. Din 3 pin Line Sockets, 15p each Din Sockets 5 pin, 270 deg. 4 for 50p.

Din Speaker Skts, 2 pin, 4 for 30p. RESISTOR PACKS, approx 300 pieces, 1 to 2 watt types mixed values, our selection £1.00pk

ELECTROLYTIC CAPACITORS

Dubillier Electrolytics, 50µF, 450V, 2 for 50p. Dubillier Electrolytics, 100µF, 275V, 2 for 50p. Plessey Electrolytics, 470µF, 63V, 3 for 50p. TCC Electrolytics, 1000µF, 30V, 3 for 60p.

Dublillier Electrolytics, 5000mfd at 35V, 50p each. Dubiller Electrolytics, 5000µF at 50V, 66p each.

ITT Electrolytics, 6800mfd at 25V, high grade, screw terminals, with mounting clips, 50p each.

A LARGE RANGE OF CAPACITORS AVAILABLE AT BARGAIN PRICES, SAE FOR LIST.

radio communication

Index to Volume 53—January to December 1977

| Month | Pages
1-84 | | onth | Pag | | Mon | | Page
657-7 | | Hughes, R. J., G3GVV (Chairman of Advisory Committee for | |
|---------------------|---------------|-----------|-----------------|-------------------|------------------|---------|-------------------|---------------|-------|--|-----|
| January
February | | Ma | ne
ne | 337-
417- | | Octo | | 737-8 | | RAE of the City & Guilds of London Institute) A new look for the Radio Amaleurs' Examination | 69 |
| March | 165-244 | Ju | | 497- | | | | 833-9 | | Hum, Jack, G5UM | 09 |
| April | 245-336 | | ugust | 577- | | | | 913-9 | | The vhf man's left hand | 95 |
| Ohim | 240 000 | | agust | 011 | 000 | Deci | 3111001 | 310 3 | | Hyde, N. G., CEng, MRAeS, MIERE, G2AIH | 33 |
| | | | | | | | | | _ | A low power 70MHz transmitter | 11 |
| | | | | | | | | | | Kasser, J., G3ZCZ/W3 | 11 |
| Autho | ors | | | | | | | | | A new era in amaleur radio | 36 |
| A | A D C | VAD | | | | | | | | McCann, A. G3AZI | 30 |
| Ashton, | A. P., G | XAP | and the same of | | | | | | 050 | Modifying the Yaesu FT221 for 1-6MHz shift for uhf repeater | |
| | XAP dire | | intenna | for th | te lowe | r frequ | encies | | 858 | working | co |
| | ., G3HC1 | | | | | | | | | McMillan, R. S., GM8JUY | 60 |
| | alignmen | | ake 4C | receiv | er | | • • | | 277 | Simple circuits for the beginner | 68 |
| | K., G3LT | | | | | | | | | | 00 |
| | ring for a | | | | | | . :: | | 194 | Martinez, J. P., G3PLX The G3PLX Mk 2 rtty video display unit 268, | 25 |
| | I. H., CEn | g, MIER | E, GBL | ET (je | ointly w | ith A. | J. Har | ries, | | | |
| and G | | | | | ARCHONOUS CHOICE | 040014 | COURSE MANAGEMENT | 400.00 | | | 60 |
| | tion of d | | | | | codes | or lati | tude | | Mills, G. L., BSc(Eng) (Hons), CEng, MIEE, MIERE, G3EDM | |
| and for | gitude us | ing scie | ntific c | alcula | tors | | | | 688 | The Heathkit SB-104 all-solid-state hf bands transceiver | E01 |
| Burnett, | P., G4BL | L | 117 | SHITTS IN 1914 O. | | | | | | (Equipment review) | 523 |
| | ing 120/1 | | | equipn | nent to | o tran | smit | and | | Moxon, L. A., BSc, CEng, MIEE, G6XN The Smith Chart | ~ |
| | 240/256-1 | | | | | | | • • | 193 | | 2 |
| | P. L. A., (| | | | | | 5 587 | 200 | | The "disappearing inductance" - a new trick and some better | |
| A mult | imode tra | nsceiver | using | SL160 | O ICs (| Parts | 1 and | 2) | 769, | beams (Parts 1 and 2) 284, | 354 |
| 2217 7617 74 | | | | | | | | | 854 | Phillips, R. O., G8CXJ | |
| Davies, I | V., G81BR | | | | | | | | | Propagation study for satellite links at 12GHz | 608 |
| An acti | ve audio | bandpas | s filter | | | | | | 30 | Pratt, D. M. G3KEP, (AROS honorary organizer) | |
| | ving with | | | MHZ | receiver | | | | 600 | The Amateur Radio Observation Service | 626 |
| Davies, | r., BSc, (| SW4AD | L | | | | | | | Rau, R. S. N., VU2CX | |
| CMOS | crystal-c | ontrolled | toneb | urst | | | | | 603 | Solid-state BC221 frequency meter (addendum) | 20 |
| Dilworth | I. J., BS | c, G3W | RT | | | | | | | Stevens, R. F., G2BVN Western PM-2000 power meter (Equipment review) | |
| A chan | nel scann | ing arra | ngeme | nt for | quartz | crystal | s | 680 | , 853 | Western PM-2000 power meter (Equipment review) | 3 |
| Elsley, E. | , G3YUQ | | | | | | | | | The Yaesu FRG7 receiver (Equipment review) (with G4CDY) | 19 |
| | SB1 Mk2 | | mple s | idebar | nd tran | smitte | er for | the | | Taylor, D. GM8ARV | |
| beginn | | | | | | | | | 518 | A television and ssb transmitter for 432MHz | 438 |
| Further | notes on | the DS | B1 Mk | 2 | | | | | 781 | Trusson, C. I. B., MSc, CEng, MIRE, G3RVM | |
| Entwisle, | G. V., G | 3MXT | | | | | | | | The "ultimate" keyer? | 358 |
| A third | method s | sb gene | rator | 100 | | - | | | 186 | Viney, K., G8KDC | |
| | ., G3RPE | | | | 277 | | | | | Secondary standards | 862 |
| Observ | ations on | the flys | watter | antenr | na | 1221 | 1000 | 112.37 | 596 | Wade, A. J., BSc, G4AJW | |
| Gare, C. | S., G3W | OS (joir | tly wit | h G3X | BY) | 17.7 | 2.2 | 7.7 | | Power supply and control circuits for a 4CX250B amplifier | 762 |
| | Hz transis | | | | | verter | Here | 100 | 106 | Wood, J. L., G3YQC | |
| | G., MSc | | | | | | | AS. | | Amateur television | 278 |
| G3MY | T/VE3 | | , | | , | | | | | Young, J., BRS33339 | |
| | n the Sm | ith Char | 1 | 1000 | | | | | 934 | Crystal calibrator and band-edge marker | 445 |
| | G4CDY | | | 2RVN |) | | • • | | 001 | | |
| The Ya | esu FRG7 | receive | r (Faul | nment | review | v١ | | | 198 | Clubs | |
| Hall, T | BSc, GM | SHRT | (Lqui | pinem | rionon | • / | • • | | 100 | Ciubs | |
| | ing the se | | of a re | hulle & | JPA | | | | 113 | ARC of Nottingham on Radio Trent | 26 |
| Ham R | A., FRAS | BRS1 | 5744 | Dunt 1 | mo | • • | * * | ** | 110 | Cardiff RSGB Group | 678 |
| Sporad | ic-E obse | rvatione | in 107 | 6 | | | | | 44 | | 104 |
| | ic-E obse | | | | •• | • • | • • | • • | 940 | Doram club discount scheme | 267 |
| | le, J. A., | | 111 131 | | • • | • • | | • • | 540 | East London RSGB Group | 761 |
| Some | v norimen | te with | hinh f | | ou lade | for or | ctal fi | Horn | | Exeter ARS re-activated | 105 |
| (Parts | experimen | its willi | mgn-p | equen | cy radu | ier cry | | | 607 | Ex-G Radio Club | 437 |
| | A. J. (joir | | CODE | T | Cipp | ni. | 2 | 8, 122, | 00/ | | 43 |
| | | | | | | | 1-12 | | | | 356 |
| | tion of di | | | | | coaes | or lati | tuae | 000 | New clubs 21, 185, 267, 304, | |
| Harrion F | gitude us | ing scie | nufic c | aicuial | ors | * * | * * | ** | 688 | Racal ARS | 761 |
| narvey, L |). F., G3) | BT UOI | ntiy wi | th Gav | WOS) | | | | *** | RAOTA reunion | |
| A TOWN | Iz transis | torizea | transn | nitirec | elve co | onverti | er | | 106 | Reigate ATS, G5LK | 21 |
| narvey, h | C., TEr | B(CEI) | MILLE, | GABE | or Con | itly wi | in G81 | DEI | | | 185 |
| | J. Harrie | | | AT | | | | | | | |
| | tion of di | | | | | codes | or lati | tude | | O | |
| and ion | gitude us | ing scie. | nuțic c | aiculat | ors | | | | 688 | Conferences, conventions, courses and | |
| neaton, i | R. V., G3 | JIS . | | 55765000 | E EVE | | | | | lectures | |
| Letterin | g of pane | is and r | neter n | novem | ents | • • | | | 861 | the state of the s | 200 |
| newes, F | . S., TEn | g(CEI), | FSER | i, G3T | DR | | | | | | 105 |
| | -state 1.8- | | receiv | er | 10.00 | ** | 18.67 | | 774 | BARTG Convention 1977 267, | |
| noagson | , J. B., G | SYKB | | | | | | | | | 948 |
| RIII . | what is | | .:: | | | 2.0 | | | 115 | | 474 |
| KIIY. | - beginne | rs' termi | inal un | n | 100 | ** | | ** | 202 | RAE 19, 266, 436, 595, 627, 698, 699, 761, | 933 |
| | | | | | | | | | | | |

| | | | 40000 | - | | | | | | | 0 1/ 1/ 00 0// 014// |
|--|--------|------------|-------------|---------|--------|---------|--------|-------|-------------|--------|---|
| "Recent Deve | | | | | | | | | | 357 | Cray Valley RS 8th SWL 305 |
| RSGB Interna | ationa | Radio | o Com | munic | cation | Exhi | bition | n an | ıd | 1000 | Cray Valley RS Queen's Jubilee 385 |
| Convention | | | 104 | , 184, | Supp | emen | t Apı | il is | sue, | | General rules for RSGB hf contests 1977 54 |
| RSGB Region | 1 Lec | ture | | • • | | | | | | 436 | General rules for RSGB hf receiving contests 55 |
| RSGB Region | | | | | | | | - 8 | | 716 | Grafton RS Top Band 315 |
| RTTY lecture | | | | | | | 4.0 | | | 267 | HF Championship 1976-7 807 |
| | | | | | | | | | 184, | | HF Championship 1977-8 964 |
| Satellite broad
Scottish Ama | tour D | adia C | `onuon | tion | | | 185, | | | | 1 - 0 - 1077 |
| | | | | | | | | | | | |
| SE Asia Conv | | | ** | | | 3.00 | | 0 | | | National Field Day 1977 142, 706 |
| South London | colle | ge cou | irses | | • • | 3.00 | | 37 | | 761 | Queen's Jubilee 314, 632 |
| SSTV Conver | ntion | | ** | 252 | * * | | | | 677, | | SSB Field Day 1976 56 |
| VHF Convent | on 19 | 78 | | | | | | 6 | | 696 | SSB Field Day 1977 314 |
| WARC 1979 | | | | | | | | _ 8 | | 363 | Verulam ARC 1976 315 |
| Welsh Amate | | | nventic | n | | | 15250 | 595, | 678. | 933 | Verulam ARC 1977 883 |
| TTCION AMIGUE | J | | | 200 | 55 | | | , | , | | 1·8MHz 1976 (2nd) 217 |
| | 1225 | | | | | | | | | | 1.8MHz 1977 (1st) 57, 470 |
| Contests | . df | (Rules | in italia | c) | | | | | | | |
| | D | | | | | | | | | | 1-8MHz 1977 (Summer) 384, 710 |
| Qualifying Eve | ent—C | helms | ford | | | | | | 547, | 807 | 1·8MHz 1977 (2nd) 807 |
| Qualifying Eve | ent-D | artford | d Heatl | h | | | 900 | | 315, | 634 | 3.5MHz Field Day 1977 472, 806 |
| Qualifying Eve | ent-H | ligh W | vcomb | e | | | | | 315, | 547 | 7MHz 1976 |
| Qualifying Eve
Qualifying Eve | ent-N | ledway | , | · | 15.51 | 774.52 | ** | | 384, | | 7MHz 1977 470, 547 |
| Qualifying Ev | not B | uahy a | nd Co | vontru | 700 | 327.0 | | | 385, | | |
| Qualifying Eve
Qualifying Eve | | uguy a | ilia Co | ventry | | | •• | | | | |
| Qualifying Eve | mt—S | alisbu | ıy | ** | • • | | • • | | 471, | | 21/28MHz Telephony 1977 472, 547 |
| Qualifying Eve | | | | | | | | | 633, | | |
| Qualifying Eve | ent—S | tratfor | d-upor | I-AVOI | n | | | | 547, | | |
| National Final | | • • | | | | | | 38 | | 883 | Contests, vhf/uhf (Rules in italic) |
| | ==W | 1337 | (Variation) | 100 | 100 | | | | | | |
| | | | | | | | | | | | BARTG Spring RTTY 58, 710 |
| Contests | . hf | (ove | rsea | S) (R | ules i | n itali | c) | | | | BARTG VHF RTTY (8th) 58 |
| | 1000 | | | | FFFE | 99 0700 | 165 | | | 2.2701 | BARTG VHF RTTY (9th) 710 |
| AGCW-DL | | | | | | | | | 3 | 956 | Code of practice for vhf/uhf contest operation 55 |
| All Asian DX | 1976 | | 334 | | | | | | | 876 | |
| All Asian DX | | | | | | | | | | 459 | |
| All Austria | | • | | | 3.5 | | | | | 875 | |
| | | | | | | | | 9. | | | Listeners' VHF/UHF Championship 1976 314 |
| ARRL DX 197 | | <u>-::</u> | | | • • | | A.90 | | | 48 | Microwave 470, 710 |
| ARRL Interna | | | | | • • | 0.00 | | 99 | | 48 | Region 1 (IARU) Co-ordinated VHF/UHF/SHF 1976 473 |
| ARRL 28MHz | | | *** | | | | 9.90 | 109 | 0 | 956 | Region 1 (IARU) Co-ordinated VHF/UHF/SHF 1977 315 |
| Rormuda | | | | | | | | | 302, | 956 | [12] [2] |
| Bornholm Isla | nd 80 | m | 30.54 | | | | | | | 623 | |
| Bornholm Isla | tot D | ,,, | • • | | • | | | | | 138 | UHF 432MHz-2·3GHz 710 |
| Common Mar | Ket D | | * * | 3131 | | ** | | | | | VHF NFD 1977 384, 470, 802 |
| LU WW DX | 9/0 | | | 2.5 | | | • • | | 2000 | 876 | 70MHz CW 57,314 |
| CO WW DX 1 | 977 | | 2.0 | | | | | | 702, | | 70MHz Fixed 1976 57 |
| CO WW DX | 60 | 200 | | | | | | - 9 | | 48 | 70MHz Fixed 1976 |
| CQ WW DX 1
CQ WW WP)
European DX | SSB | 10000 | 88 | 316 | 88 | 115 | | | | 210 | 70MHz Open (April 1977) 217, 635 |
| European DX | . 000 | | | | | | | | | 543 | 70MHz Open (April 1977) 217, 635 |
| | | | | | | | | | | 48 | 70MHz Open (August 1977) 468, 880 |
| French 1977 | | | | | • • | | | 13 | | | 144MHz CW (November 1976) 142 |
| | | | | | | | • • | 100 | | 301 | 144MHz CW (April 1977) 315, 547, 806 |
| Hungarian DX | (| | | | • • | 5.000 | *** | 100 | 0.00 | 875 | 144MHz CW (November 1977) 808 |
| IARU Radios | port | | | | | 2(*(*)) | A.00 | 20 | | 459 | 144MHz Fixed (December 1976) 218 |
| ITU World Te | lecom | munic | ations | | ** | | *** | | 302, | 382 | |
| OK DY 1076 | | | utions | | | | | | 459, | | 444444 6 200 004 |
| OK DX 1976
OK DX 1977 | | | 2.5 | 10.7 | 533 | 37.7 | 3.5 | | A 12 1 41 4 | | 144MHz Open 635, 881 |
| OK DX 1977 | | | • • | | • • | • • | | | • | 797 | 144MHz Open and Listeners' 1976 56 |
| PACC 19// | | | | | | | | - 1 | G.co | 797 | 144MHz Open and SWL 1977 57, 471 |
| QRP Winter | | | | | | | | | 48, | 459 | 144MHz Portable 384, 632 |
| QRP Summer | | | | | | | | 33 | : a : | 459 | 144MHz ORP |
| REF Le Mans | | | | | | 79.32 | 72121 | .00 | | 382 | 432MHz Cumulative 710 |
| Scandinavian | | ity 1076 | 3 | naven | 20.77 | | | - | 459, | | 432MHz Cumulative |
| Scandinavian | Activ | ty 107 | , | | | | | | | 623 | |
| CEANET WA | ACTIV | ity 19// | C) | | • • | 1000 | ** | | • • | | 432MHz Open and Listeners' 315, 634 |
| SEANET WW | DX | | * * | | * * | (3000) | | | | 544 | 432MHZ Winter Cumulatives 1976 217 |
| Spanish DX | ** | 0.00 | | | * * | 1.50 | ** | 33 | | 956 | 1:3GHz Open 315, 635 |
| SP DX | | 25.5 | 2550 | | *** | 3934 | 3000 | | renon | 138 | 10GHz Cumulative 377, 384 |
| SP DX
Ten Metre Ac | tivity | Day | 20.00 | | ** | // | | 301, | 304. | 544 | /A stations in vhf/uhf contests 217 |
| TOPS 1976 | | | | • • | | | | | | 459 | |
| TODO 4077 | | | 2.2 | 200 | 568 | | | | | 876 | |
| Trinidad & To | hann | 1et An | nivere | ary OS | O Pa | rtv | | | | 544 | Licensing and band plans |
| | | | | | | | • • | - 8 | | 381 | [|
| USSR | | | | | | | * * | 20 | | | Amateur bands in Europe and Africa 537 |
| VK/ZL/Ocean | | | * * | * * | | | | 13 | | 701 | Amateur bands in the UK 52 |
| WAB LF CW | | 19.9 | 9.00 | 9.0 | 9000 | 14.4 | | - 3 | 9 | 381 | |
| WAB LF Pho | ne | 179-(47) | 4.0 | | 4.7 | (0000) | 59.095 | | 381, | 702 | |
| WAB VHF | | 7.00 | | | 200 | *** | | | ele
ele | 381 | Data transmission |
| World Wide S | STV | 0.00 | (5)(5) | 1.0000 | (5)(5) | nasto | | | | 210 | Facts and figures 20, 105, 184, 267, 356, 436, 516, 594, 760 |
| World Wide \ | | 076 | 300 | 353 | 5.5 | | ** | | | 138 | IARU Region 1 hf band plan 46, 625 |
| | | | 5.00 | 2.2 | 225 | 2.5 | 577 | | | | Multiple beacons and other aspects of microwave band planning 370 |
| 1st Albatross | | | 3.5 | | | | | | 9 | 623 | Noth - de de 11 677 050 |
| 2nd Albatross | | | | | | | | 100 | 9 | 623 | D |
| 3.5MHz YU-D | X 1977 | 7 | | | | | | 6 | | 48 | |
| | 25% | | | | | | | | | | Repeaters 20, 296, 378, 594, 760, 949 |
| Contact | 4.5 | 1114 | 10 | o ie / | alle | | | | | | Special event stations |
| Contests | , mr | UN | , (Rule | s in it | alic) | | | | | | Transverting from 144 to 432MHz |
| Affiliated Soc | | | | | | | | | | 468 | |
| | | | | 22 | 30.5 | 4.4 | 1.50 | 7.5 | 1 | | 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - |
| Affiliated Soc | | | | M | 55 | 202 | 27 | | 87 | 964 | "Microwaves" technical items |
| Code letters f | | | GB co | ntests | | | * * | 00 | | 55 | |
| Commonweal | | | (a) | 4.4 | | | 200 | | E 2 | 805 | Filters, designs for 10GHz bandpass |
| Commonweal | h 197 | 8 | 20 | | 300 | | | | | 881 | Improved Gunn-mixer receivers 791 |
| | | | | | | | | | | | |

| Oscillatore Commercial Gunn | Checking | | | | 541 | Reviews, equipment |
|--|---|-------------------------------|---|--------------------------------------|---|--|
| Oscillators, Commercial Gunn | | | ** | | 695 | |
| OTS—the orbital test satellite
Pre-amplifiers for 1-3, 2-3, 3-4 and 5 | ECH2 | | | | 611
698 | Datong UC/1 up-converter, The (J. P. Martinez, G3PLX) 606 FDK Multi-U11 (addendum) |
| Reversing the polarity of supplies, | | | | | 795 | Heathkit SB-104 all solid-state hf bands transceiver, The (G. L. |
| Technical news | | | | | 305 | Mills, BSc (Eng) (Hons), CEng, MIEE, MIERE, G3EDM) 523 |
| Transceiver for 10GHz, A commer | cial Gunn | *** | ** | | 201 | Western PM-2000 power meter (R. F. Stevens, G2BVN) 33 |
| Travelling wave tube amplifiers | ** ** | ** | | | 873 | Yaesu FRG7 receiver (T. Giles, G4CDY, and R. F. Stevens, |
| | | | | | | G2BVN) 198 |
| Miscellany | | | | | | |
| | | | | | | Reviews, publications |
| Antenna and mast planning proble | ms | | | 184 | 677 | ARRI Ham Radio Operating Guide (T. P. Allen) 45 |
| Braille magazine project
Facsimile transmissions | ** | | • • | • • | 21
853 | Constructors' guides 45 |
| GB2RS news | | 1 | | 299 | 677 | Constructors' guides |
| Interference | ** ** | | | | 133 | Greenweld catalogue 768 |
| Interference Intruder Watch | | | | | 19 | International VHF-FM Guide (by J. Baldwin and K. Partridge) 529 |
| JOTA 1976 | | | | | 301 | |
| JOTA 1976 | 301, 1 | -ront co | ver D | ecen | 195 | Marshall's catalogue |
| Morse proficiency transmissions, I | RNARS | | | * * | 356 | Radio, TV & Audio Technical Reference Book 529 |
| North Bedfordshire VHF Group | | 22 | 6.60 | 12/01 | 677 | Solid state Design for the Radio Amateur |
| PA0AA
Personal insurances for members
RAC/Amateur Radio Group Schen | | * * | | | 357 | Solid state short wave receivers for beginners 43 |
| Personal insurances for members | (1000) | ** | | 356 | 594 | |
| Reactivated callsians | те | 33. | | ** | 185 | RSGB affairs |
| Reactivated callsigns | 200 | ** | | • • | 623 | |
| REF 10m Group
Repeaters 20, 105, 134, 185, 212, 2 | 67, 296, 378 | 454, 53 | 6, 594 | , 760 | 870 | Affiliated societies correspondence |
| | | | | 941 | 949 | AGM 1976 |
| Slow morse | 12/2/11 1/2/207 | 9.05 | 145080 | 1122 | 20 | Area Representative, Grampian 184, 594, 760, 933 Area Representative, Highlands |
| State opening of Parliament | | | ** | | 43
678 | |
| UK FM Group Legal Fund VAT, a snippet | | ** | •• | • • | | Circuit diagrams, Storno Viscount 516 |
| Visit of JARL president | | | | | 104 | Awards |
| Visit of JARL president YL amateurs | ** ** | 210 | 0, 437 | , 701, | 793 | Council 1977, election results |
| 75th anniversary of first two-way | v wireless | transn | nissio | n | | |
| between the USA and Europe | | ** | | ., | 933 | General manager, New |
| | | | | | | Council 1978, Election of |
| 1920 PM 200 Rd | | | | | | Magazine subscriptions, CQ and /3 |
| New equipment/produ | cts | | | | | Member references in data processor |
| Adcola Unit 333 | | | | | 941 | Members' Ads rate increase |
| Antenna, EL-40X | ** ** | | • • | | 363 | President, A message from the 19 |
| Ratteries El nower | ** ** | | | | 782 | President, A seasonal message from the 932 |
| Datteries, Li power | | | | | 124 | Presidential Installation 1977 |
| "Blob Board" prototype pcb | | ** | | | 283 | |
| "Blob Board" prototype pcb
Clipper for the FT200 |
ke 8020 A | | | | 863 | President's Working Party 1977 629, 961 |
| "Blob Board" prototype pcb Clipper for the FT200 Digital multimeter, Pocket-sized Flu Doram, Additions to the range | ike 8020A | | :: | | 863
447 | President 1978 760 |
| Adcola Unit 333 | | :: | | | 607 | Presidential Installation 1978 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | | • • | | 607
607 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | •• | | 607
607
782 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | ** | | 607
607
782
941 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | ** | | 607
607
782
941
522 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | ** | | 607
607
782
941
522
696
793 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | | | 607
607
782
941
522 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | | | 607
607
782
941
522
696
793 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives' Conference 889 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system | | •• | | | 607
607
782
941
522
696
793 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 |
| FET, High power rf VMP4
Filter, Mechanical MFL45501 | | •• | | | 607
607
782
941
522
696
793 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features | | | | | 607
607
782
941
522
696
793
121 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet | | 183, 265 | 5, 594, | 677, | 607
607
782
941
522
696
793
121 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi | 143 | 183, 265 | 5, 594,
7, 631,
144, |

 | 607
607
782
941
522
696
793
121
759
963
809 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene | 143 | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311, | 677,
808,
475,
631, | 607
607
782
941
522
696
793
121
759
963
809
963 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi | 143 | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311, | 677,
808,
475,
631, | 607
607
782
941
522
696
793
121
759
963
809
963 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene | 143 | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311, | 677,
808,
475,
631, | 607
607
782
941
522
696
793
121
759
963
809
963 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene | 143 | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311, | 677,
808,
475,
631, | 607
607
782
941
522
696
793
121
759
963
809
963 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 | 143
ssions
35, 466, 546 | 183, 265
311, 467 | 5, 594,
7, 631,
144,
311,
4, 800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
696
793
121
759
963
809
963 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amateur Radio Observation Service, AROS hon organizer) | 143
ssions
35, 466, 546 | 183, 265, 311, 467 | 3, 594,
7, 631,
144,
311,
4, 800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
696
793
121
759
963
809
963 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amaleur Radio Observation Service, AROS hon organizer) Radio Amaleurs' Examination, A new | 143
ssions
15, 466, 546 | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
696
793
121
759
963
809
963
961 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Light(ing) the risks 39 Lighting protection, Personal 292 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amateur Radio Observation Service, AROS hon organizer) Radio Amateurs' Examination, A new G3GVV, Chairman of Advisory C | 143
ssions
15, 466, 546
The (D. M. | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
6793
121
759
963
809
963
961 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Lightning protection, Personal 292 Radioactive meters 694 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amaleur Radio Observation Service, AROS hon organizer) Radio Amaleurs' Examination, A new G3GVV, Chairman of Advisory C City & Guilds of London Institute | 143
ssions
35, 466, 546
The (D. M. | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
696
793
121
759
963
809
963
961 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Light(e)ning the risks 39 Lightening protection, Personal 292 Radioactive meters 694 < |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amateur Radio Observation Service, AROS hon organizer) Radio Amateurs' Examination, A new G3GVV, Chairman of Advisory C | 143
ssions
35, 466, 546
The (D. M. | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
6793
121
759
963
809
963
961 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Lightning protection, Personal 292 Radioactive meters 694 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amaleur Radio Observation Service, AROS hon organizer) Radio Amaleurs' Examination, A new G3GVV, Chairman of Advisory C City & Guilds of London Institute VHF man's left hand, The (Jack Hun | 143
ssions
35, 466, 546
The (D. M. | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
696
793
121
759
963
809
963
961 | Presidential Installation 1978 932 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Light(ning protection, Personal 292 Radioactive meters 694 RF diathermy, Developments in 786 |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amaleur Radio Observation Service, AROS hon organizer) Radio Amaleurs' Examination, A new G3GVV, Chairman of Advisory C City & Guilds of London Institute | 143
ssions
35, 466, 546
The (D. M. | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
631,
879, | 607
607
782
941
522
696
793
121
759
963
809
963
961 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Light(e)ning the risks 39 Lightening protection, Personal 292 Radioactive meters 694 < |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 38 Non-technical articles Amaleur Radio Observation Service, AROS hon organizer) Radio Amaleurs' Examination, A new G3GVV, Chairman of Advisory C City & Guilds of London Institute VHF man's left hand, The (Jack Hun Oscar A new era In amaleur radio (J. Kassi | The (D. M. look for the committee) | 183, 265, 311, 467 | 5, 594,
7, 631,
144,
311,
800, | 677,
808,
475,
879, | 607
607
782
941
522
696
793
121
759
963
809
963
961 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 266, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 14 594, 760 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Lightning protection, Personal 292 Radioactive meters 694 RF diathermy, Developments in 786 Skin heating and hand-portable rigs 7the G3XAP directional |
| FET, High power of VMP4 Filter, Mechanical MFL45501 FT101 components Multimeter, Sinclair digital Multimeter, Tester 50k Transistors Valves and bases, Eimac Zartronix wiring system Non-regular features Current comment Raynet RSGB slow morse practise transmi SSTV scene Your opinion 64, 141, 308, 30 Non-technical articles Amaleur Radio Observation Service, AROS hon organizer) Radio Amaleurs' Examination, A new G3GVV, Chairman of Advisory C City & Guilds of London Institute VHF man's left hand, The (Jack Hun | The (D. M. look for the committee h., G5UM) | 183, 265, 311, 467,, 630, 704 | 5, 594,
7, 631,
144,
311,
1, 800, | 677,
808,
475,
631,
879, | 607
782
941
522
941
522
941
759
963
809
963
809
963
809
963
809
963
809
963
809
963
809
963
809
809
809
809
809
809
809
809
809
809 | Presidential Installation 1978 933 President's reception, The 932 QSL Bureau 367, 436, 721, 958 Radio Communication change of address 594, 677, 759 Regional Representative, Region 1 20, 184 Regional Representative, Region 6 265, 516 Regional Representative, Region 13 104, 266 Regional Representative, Region 19 853 Regional Representatives' Conference 889 Results for first six months of the financial year 184 RSGB Committees 1977 307 RSGB prices and members' discount 18 RSGB publications in Chelmsford 760 Subscriptions and membership cards 104, 516, 760, 853 Technical secretary vacancy 356 Safety (from "Technical topics") Cable rash, A case of 452 Capacitors, Dangerous 208 Electrical safety regulations 36 Light(e)ning the risks 39 Light(e)ning the risks 39 Light(e)ning the risk 694 RF diathermy, Developments in 786 |

| THE PARTY OF THE P | | OU IOU - A -U | | | | | |
|--|-------|---|-------------------------|--------------|-------|-------|-----|
| | 596 | Clipper/filter, Audio | * * | ** | | | 86 |
| Circuits for the beginner, Simple (R. S. McMillan, GM8JUY) | 684 | Coaxial connectors for gigahertz | | • • • | | | 12 |
| Converter, A 70MHz transistorized transmit/receive (D. F. | | Connectors, D-I-Y general purpose | | | | | |
| | 106 | Counter, Over-range indicator for G3MF | .1 | | | | |
| Crystal calibrator and band-edge marker (J. Young, BRS33339) | 445 | O | × . | 82 | | | |
| United the second of the secon | 445 | | | | | • • | |
| "Disappearing inductance", The—A new trick and some better | | DC fuse, Electronic | | • • | * * | | |
| beams, Parts 1 and 2 (L. A. Moxon, BSc, CEng, MIEE, | -223 | Demodulator, Russian direct-conversion | | • • | * * | 290, | |
| | , 364 | Dial marking stencil | | | | : | 37 |
| Distances from QTH Locator codes or latitude and longitude, | | DIL ICs, desoldering | | | | ! | 20 |
| Calculation of, using scientific calculators (J. H. Bowen, | | Dip-meter with led indicator | | | | | 94 |
| CEng, MIERE, G8DET; R. C. Harvey, TEng (CEI), MITE, | | Division factors and the CD4060 | | | | | |
| | 688 | Drift correcting technique, Eddystone | | | 10000 | *** | |
| G4BBR; and A. J. Harries) | | | | • • • | | | |
| | 277 | Dynamic range on vhf | 76.0 | • • | | •• | 00 |
| DSB1 Mk2, Further notes on the (E. Elsley, G3YUQ) | | Fault-finding probe, General purpose | 100 | 2.7 | | | |
| Filter, An active audio bandpass (N. Davies, G8IBR) | 30 | Ferrites and dust cores for vhf | 0.00 | | 18.00 | | |
| Frequency meter, Solid-state BC221 addendum (R. S. N. Rau, | | Filter, Absorptive tvi, with harmonic mo | nitor | | | 207, | 61 |
| VU2CX) | 20 | Filter, Hum notch | | | | | 3 |
| | 186 | Frequency standard/stabilizer, Droitwick | 1 | | 204. | 530, | 18 |
| HRO, Improving the selectivity of a rebuilt (T. Hall, BSc, GM3HBT) | | Harmonic mixing, Background to | | 88 | | | |
| | 110 | | *** | ** | 100 | | |
| Keyer, The "ultimate"? (C. I. B. Trusson, MSc, CEng, MIEE, | 250 | HF reception, Noise equalization for | • • | * * | • • | ••• | |
| | 358 | Homebrewer's "code", The | | | • • | ! | |
| Ladder crystal filters, Some experiments with high-frequency | | How good is good enough? | | | | | 3 |
| Parts 2-4 (J. A. Hardcastle, G3JIR) 28, 122 | , 687 | Incremental tuning on TR7200G | | | | | 44 |
| Lettering of panels and meter movements (R. V. Heaton, G3JIS) | 861 | Inverted-V and Chireix-Mesny | | | | ** | |
| Modifying the Yaesu FT221 for 1-6MHz shift for uhf repeater | | Keyer, Automatic | HATE | 12000 | | | 69 |
| working (A. McCann, G3AXI) | 604 | Vauca Clasternia anni sutametia | 254.5 | *** | | 293, | |
| | 304 | | | *(*) | | | |
| Modifying 120/128-line sstv equipment to transmit and receive | 102 | Keyer ideas, G3GJX | 72.5 | *(*) | 0.000 | ** | |
| | 193 | Keyer, Up-rating an electronic | 390 | 200 | * * * | 1 | |
| Power supply and control circuits for a 4CX250B amplifier | 22820 | Keying, Tape auto | | *** | (*)*: | 691, | |
| (A. J. Wade, BSc, G4AJW) | 762 | Keying wave-shape correction | | * * | | | |
| Propagation, Monitoring for auroral (P. K. Blair, G3LTF) | 194 | Ladder crystal filters | | | | | |
| Propagation study for satellite links at 12GHz (R. O. Phillips, | | I fall take a seed and formand | | 233 | | | 3 |
| | 608 | Logic probe, Extending the | • • | • • | | | 27 |
| | 000 | | • • | 3.5 | •• | | |
| Quartz crystals, A channel scanning arrangement for (I. J. | 000 | Matching without switching | | | •• | •• | |
| | 853 | Metering made easy | | | | : | |
| Receiver, A solid-state 1-8-3-5MHz (R. S. Hewes, TEng (CEI), | | Mini-beam, A "neutralized" VK2ABQ | | | | · · · | 120 |
| FSERT, G3TDR) | 774 | Mini-beam ideas | 4.4 | 9.75 | | | 120 |
| Receiver, After living with the G8IBR 144MHz (N. Davies, | | Mixed grill | | | | | 452 |
| G8IBR) | 600 | Mixer, Improved active | | | | | |
| | 202 | | | • • | | | |
| | 115 | Mixer, Quad-fet on 14MHz | | * * | • • | | |
| RTTY—what is it? (J. B. Hodgson, G3YKB) | 113 | Morse keys, Thoughts on | | #900 | | | 091 |
| RTTY video display unit, The G3PLX Mk2 (J. P. Martinez, | | Multivibrator, Quartz | 300 | 2.20 | 7.00 | : | 37 |
| G3PLX) 268 | 356 | Nicads, Revitalizing | 100.00 | *** | | | 3 |
| | 862 | Notes and tips | | *** | | | 86 |
| Smith Chart, The (L. A. Moxon, BSc, CEng, MIEE, G6XN) | 22 | Ohmmeter, Direct-reading | 133 | 237 | | | |
| Smith Chart, More on the (G. Garside, MSc, MA, CPhil, | | Ohmmeter, Discrete linear | 22 | 834 | | 205, | |
| CEng, MIEE, MIERE, FRAS, G3MYT/VE3) | 934 | | | •• | | | |
| Sporadic-E observations in 1976 (R. A. Ham, FRAS, BRS15744) | 44 | Oscillator, Franklin in solid-state | | ** | • • | | |
| Consider Conservations in 1970 (R. A. Ham, FRAS, DRO19744) | | Oscillator, Micropower cmos Wien-brid | 3e | | *** | ! | |
| Sporadic-E observations in 1977 (R. A. Ham, FRAS, BRS15744) | | Oscillators, Injection-locked | | | | : | |
| | 278 | Oscillators using 555 devices | | • • | | | |
| Television and ssb transmitter for 432MHz, A (D. Taylor, | | Paddle, Ambidextrous-APEK | | 2000 | 56.6 | 6 | 59(|
| GM8ARV) | 438 | Parametric up-converters | | | | | 78 |
| Toneburst, CMOS crystal-controlled (T. Davies, BSc, GW4ADL) | 603 | Plus or minus? | 1979 | 200 | • • | | |
| Transceiver, A multimode, using SL1600 ICs Parts 1 and 2 | | Power, Portable | | | | | |
| (P. L. A. Burton, G3ZPB) | 854 | | 200 | 8.00 | ** | 8 | RE |
| Transmitter, A low power 70MHz (N. G. Hyde, CEng, MRAeS, | 1000 | Power, Portable, and rapid charging | • • | 9.9 5 | 0.505 | | |
| MIERE, G2AIH) | 116 | Power sources and air-cells | 353 | 2.20 | | 5 | |
| Transmitter, The DSB1 Mk2, A simple sideband transmitter | | Power unit, Miniature mains | 79.00 | 111 | | | 94 |
| | E40 | Radials, Barbed wire | 20.00 | 521 | 2.2 | 5 | |
| for the beginner (E. Elsley, G3YUQ) | 518 | Receiver ideas, Some | 25.5 | | | 9 | |
| | | Receiver imd and crystal filters | | | | t | 533 |
| | | Receiver, Rotor O-v-2 | 2/3 | 0.5 | | | 299 |
| LINEAR STATE OF THE STATE OF TH | | | 50 | 85 | 35 | 8 | |
| "Technical topics" items | | | | 1700 | Dy a | | |
| 그는 중앙 가게 되었다면 하는 아이들이 가게 하면 하는 것 같아. | 707 | Regulator for car alternators, Electronic | • • | • • | | | |
| | 787 | Regulators, Using solid-state | • • | • • | | | |
| | 535 | Relays, Reducing power drain of | | | | | |
| Antenna, Loop 129, 376, | | Reverse-tvi, Burying? | 33 | *000 | ** | ••• | |
| | 944 | Speech processor for fm, Compact | 3000 | *** | 1908 | | 692 |
| Antenna round-up | | Speech processor switching | | | ** | | |
| | 786 | Squelch with a CA3089E receiver, Impro | vina | • • • | 399 | (| 94 |
| A - A Tt - O ADME WALL II | 615 | Squelch adaptor, G4CLP/VK6WA | | | | 9 | |
| | 292 | Superote | | 5.50 | | 290, | |
| A 11 CONTROL OF THE PROPERTY O | 610 | Sunspots | : | ** | | 9 | |
| - CANCELLE | 613 | Tailpiece (Double-balanced mixer packa | ge) | | 100 | | |
| ATV, Simple | 451 | Thank you, Mr Morse | • • | | | 9 | |
| Audio-derived agc and compression | 450 | Touch-keying: overcoming the problems | | | | 8 | |
| Audio filtering and processing | 867 | Transformers, High-power transmission | | 15 | | 1 | 128 |
| | 868 | Transmitters, with a difference, CW | | | | 8 | |
| "Bow-tie" beam, Duo-band | 38 | T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Outpo | 2420 | 10.0 | 1 | |
| | 129 | | | 4140 | | | |
| | | VFO, A gilded fet-Vackar | | **: | • • | | |
| | 205 | VFO, Temperature stabilization of | • • | | | **: | |
| Capacitance meters, Direct-reading | 35 | Video on transverters | | 100 | | 2 | |
| Capacitors, Predictable "gimmick" | 693 | Wartime portability |) * (*) | •0.00 | 1908 | 100 | 184 |
| Carrier frequencies and ssb | 616 | Wobbulator, Low-cost 455kHz | | • • • | | 2 | 206 |
| | | | | | | | |

PUBLICATIONS OBTAINABLE FROM RSGB

RSGB members can obtain a 10 per cent discount on the prices listed below (excluding Ham Radio Magazine and Ham Radio Horizons). To obtain the discount, deduct 10 per cent, calculated to the nearest penny, from the total value of the order (using the latest price list) and enclose a remittance for the balance. Also enclose an address label from a recent Radio Communication wrapper as proof of membership.

RSGB PUBLICATIONS

Technical books Amateur Radio Awards £2.15 Amateur Radio Techniques (5th edn) £3.55 Guide to Amateur Radio (16th edn) . £1.38 Morse Code for Radio Amateurs 540 £1.38 NBFM Manual OSCAR-Amateur Radio Satellites £4 20 RSGB Amateur Radio Call Book 1978 £3 21 RAE Questions and Answers £2.00 Radio Amateurs' Examination Manual (7th edn) £1.60 Radio Amateurs' Examination Revision Notes 860 Radio Communication Handbook 5th edn, Vol 1 £9.36 Radio Communication Handbook 5th edn, Vol 2 £8.12 Radio Data Reference Book (4th edn) £3.65 Service Valve and Semiconductor Equivalents 48p Teleprinter Handbook £8.89 Test Equipment for the Radio Amateur (2nd edn) £4.42 TVI Manual (Out of print) VHF/UHF Manual £6.82 World at their Fingertips (Paperback) £1.63 World at their Fingertips (De-luxe) £2.76 Log books Standard Log £1.34 Receiving Station Log £1.46 Mobile Mini-Log . £1.03 De-luxe Log £3.00 Maps, charts and lists Countries List/HF Awards List 25p Great Circle DX map (in tube) £1.29 Oscar map (in tube) 43p QTH Locator map Western Europe) (in tube) QTH Locator map Western Europe) (on card) £1.15 57p RSGB Amateur Radio Prefixes (World) map 66p UHF repeater planning map 40p **UK Beacon List** 19p **UK Repeater List** 19p IARU Region 1 Beacon List 19p Members' sundries Callsign lapel badge (5 weeks' delivery) £1.31 Lapel badge (RSGB or RAEN emblem, pin fitting) 51p Tie (Maroon or Blue) £1.96 Radio Communication Easibinder £3.00 Car window sticker (RAEN) (self-adhesive) 31p Members' headed notepaper (50 sheets) quarto 85p Members' headed notepaper (50 sheets) octavo 60p Radio Communication back issues (as available) 84p RSGB contest log sheets (100) 77p RSGB teeshirt (large, medium or small) £2.25

Prices include postage, packing, and VAT where applicable. For air mail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 9.30am and 5pm, Monday to Friday.

POSTAL TERMS: Cash with order. Stamps and book tokens cannot be accepted. Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Giro A/C No 533 5256.

All overseas orders: add £1 to cover insurance if required. Please write your name and address clearly on the order.

ORDER FROM:

OTHER PUBLICATIONS

| Antenna Book (13th edn) | American Radi | o Rela | ay Lea | igue | • | | |
|--|--|-------------------------------------|-----------------|---------|----|-----|--------|
| FM and Repeaters for the Radio Amateur Solid state Design for the Radio Amateur Hints and Kinks Radio Amateurs' Handbook 1978 (Paperback) Radio Amateurs' Handbook 1978 (Hardback) Einzil Single Sideband for the Radio Amateur Specialized Communication Techniques Understanding Amateur Radio Fasting Amateur Radio Radio Amateur Callbook Inc American Callbook (USA listings) 1978 Famerican Callbook (USA listings) 1978 Famerican Callbook (DX listings) 1978 Fasting Amateur Radio Fasting Amateur | | | - | - | | | £3.86 |
| Solid state Design for the Radio Amateur . £5.80 Hints and Kinks . £2.37 Radio Amateurs' Handbook 1978 (Paperback) £7.30 Radio Amateurs' Handbook 1978 (Hardback) £0.21 Ham Radio Operating Guide . £3.19 Single Sideband for the Radio Amateur . £3.52 Getting to know Oscar from the ground up £2.46 Specialized Communication Techniques £3.19 Understanding Amateur Radio . £3.65 VHF Manual . £3.74 Electronic Data Book . £3.20 Radio Amateur Callbook Inc American Callbook (USA listings) 1978 . £9.75 American Callbook (DX listings) 1978 . £9.98 World Atlas (Amateur radio prefixes) . £1.75 Radio Publications Inc Beam Antenna Handbook . £3.90 Better Short Wave Reception (3rd edn) . £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television . £2.20 Complete Handbook of Slow-scan TV . £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way . £1.02 Radio Amateur Operators Handbook . £1.11 | Course in Radio Funda | amentals | 8 | | | | £2.96 |
| Solid state Design for the Radio Amateur . £5.80 Hints and Kinks . £2.37 Radio Amateurs' Handbook 1978 (Paperback) £7.30 Radio Amateurs' Handbook 1978 (Hardback) £0.21 Ham Radio Operating Guide . £3.19 Single Sideband for the Radio Amateur . £3.52 Getting to know Oscar from the ground up £2.46 Specialized Communication Techniques £3.19 Understanding Amateur Radio . £3.65 VHF Manual . £3.74 Electronic Data Book . £3.20 Radio Amateur Callbook Inc American Callbook (USA listings) 1978 . £9.75 American Callbook (DX listings) 1978 . £9.98 World Atlas (Amateur radio prefixes) . £1.75 Radio Publications Inc Beam Antenna Handbook . £3.90 Better Short Wave Reception (3rd edn) . £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television . £2.20 Complete Handbook of Slow-scan TV . £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way . £1.02 Radio Amateur Operators Handbook . £1.11 | FM and Repeaters for t | the Radio | Amateur | г | | | £3.09 |
| Hints and Kinks | Solid state Design for | the Radio | Amateu | ir . | - | 8.0 | £5.80 |
| Radio Amateurs' Handbook 1978 (Hardback) £10.21 Ham Radio Operating Guide £3.19 Single Sideband for the Radio Amateur £3.52 Getting to know Oscar from the ground up £2.46 Specialized Communication Techniques £3.19 Understanding Amateur Radio £3.65 VHF Manual £3.74 Electronic Data Book £3.20 Radio Amateur Callbook Inc American Callbook (USA listings) 1978 £9.75 American Callbook (DX listings) 1978 £9.98 World_Atlas (Amateur radio prefixes) £1.75 Radio Publications Inc Beam Antenna Handbook £3.90 Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | | | | | | | £2.37 |
| Radio Amateurs' Handbook 1978 (Hardback) £10.21 Ham Radio Operating Guide £3.19 Single Sideband for the Radio Amateur £3.52 Getting to know Oscar from the ground up £2.46 Specialized Communication Techniques £3.19 Understanding Amateur Radio £3.65 VHF Manual £3.74 Electronic Data Book £3.20 Radio Amateur Callbook Inc American Callbook (USA listings) 1978 £9.75 American Callbook (DX listings) 1978 £9.98 World_Atlas (Amateur radio prefixes) £1.75 Radio Publications Inc Beam Antenna Handbook £3.90 Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Radio Amateurs' Hand | book 1978 | (Paperba | ack) | | | £7.30 |
| Ham Radio Operating Guide £3.19 Single Sideband for the Radio Amateur £3.52 Getting to know Oscar from the ground up £2.46 Specialized Communication Techniques £3.19 Understanding Amateur Radio £3.65 VHF Manual £3.74 Electronic Data Book £3.20 Radio Amateur Callbook Inc American Callbook (USA listings) 1978 £9.75 American Callbook (DX listings) 1978 £9.98 World Atlas (Amateur radio prefixes) £1.75 Radio Publications Inc Beam Antenna Handbook £3.90 Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Radio Amateurs' Hand | book 1978 | (Hardba | ck) | | | £i0.21 |
| Single Sideband for the Radio Amateur | | | | | - | 200 | £3.19 |
| Getting to know Oscar from the ground up £2.46 Specialized Communication Techniques £3.19 Understanding Amateur Radio £3.65 VHF Manual £3.74 Electronic Data Book £3.20 Radio Amateur Callbook Inc American Callbook (USA listings) 1978 £9.75 American Callbook (DX listings) 1978 £9.98 World_Atlas (Amateur radio prefixes) £1.75 Radio Publications Inc Beam Antenna Handbook £3.90 Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Single Sideband for th | e Radio A | mateur | | | | £3.52 |
| Specialized Communication Techniques | Getting to know Oscar | from the | ground i | up | | | £2.46 |
| VHF Manual £3.74 Electronic Data Book £3.20 Radio Amateur Callbook Inc | Specialized Communic | ation Tec | hniques | | | | £3.19 |
| Electronic Data Book | Understanding Amateu | ır Radio | | | | | £3.65 |
| Radio Amateur Callbook Inc American Callbook (USA listings) 1978 £9.75 American Callbook (DX listings) 1978 £9.98 World_Atlas (Amateur radio prefixes) £1.75 Radio Publications Inc Beam Antenna Handbook £3.90 Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | VHF Manual . | el . | 2 | | | | £3.74 |
| American Callbook (USA listings) 1978 £9.75 American Callbook (DX listings) 1978 £9.98 World_Atlas (Amateur radio prefixes) £1.75 Radio Publications Inc Beam Antenna Handbook £3.90 Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Electronic Data Book | | • | | • | ٠ | £3.20 |
| Beam Antenna Handbook | American Callbook (US
American Callbook (D) | SA listing
X listings | s) 1978
1978 | nc | | | £9.98 |
| Better Short Wave Reception (3rd edn) £3.42 Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Radio Publicat | tions I | nc | | | | |
| Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) £2.77 Miscellaneous £2.20 Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) £1.02 RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Beam Antenna Handbo | ook . | | | | | £3.90 |
| Cubical Quad Antennas £2.77 Simple, Low-cost Wire Antennas (Out of stock) £2.77 Miscellaneous £2.20 Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) £1.02 RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Better Short Wave Red | ception (3) | d edn) | | | | £3.42 |
| Simple, Low-cost Wire Antennas (Out of stock) Miscellaneous Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | | College Sept. College College Sept. | 101101101100 | | | | £2.77 |
| Amateur Television £2.20 Complete Handbook of Slow-scan TV £5.83 International VHF FM Guide (Out of stock) 8 RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Simple, Low-cost Wire | | | f stock | () | | |
| Complete Handbook of Slow-scan TV . £5.83 International VHF FM Guide (Out of stock) RTTY the Easy Way . £1.02 Radio Amateur Operators Handbook . £1.11 | Miscellaneous | | | | | | |
| International VHF FM Guide (Out of stock) RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Amateur Television | | 71 | 190 | - | | £2.20 |
| RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | Complete Handbook of | Slow-sca | in TV | | | 7. | £5.83 |
| RTTY the Easy Way £1.02 Radio Amateur Operators Handbook £1.11 | International VHF FM | Guide (O | it of stock | k) | | | |
| Times Times of the | | | | | ** | 19 | £1.02 |
| Radio Valve & Semiconductor Data £3.00 | Radio Amateur Operat | ors Hand | book | | | | £1.11 |
| | Radio Valve & Semicon | nductor D | ata . | | | | £3.00 |

MORSE INSTRUCTION AIDS

| G3HSC Rhythm Method of Morse T
Complete Course (two 3-speed Ip | | | 00 | 0.00 | |
|---|----|-----------|----|------|--------|
| record plus books) | | | | | £5.60† |
| Beginner's Course (one 3-speed I | рг | ecord and | on | e ep | |
| record plus book) | | | | | £4.12† |
| Beginner's Ip (0-15 wpm) plus book | | | | | £3.44† |
| Advanced lp (9-42 wpm) plus book | | | | | £3.44† |
| Three-speed simulated PO test 7in † Overseas orders: add £1,12. | ds | ep record | | | £1.15† |

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership) (Per annum) £9.25 Subscriptions for QST should be sent to RSGB, 35 Doughty Street, London WC1N 2AE.

Ham Radio Magazine (Per annum) (inc air delivery) £15.00
Ham Radio Horizons £6.50
Subscriptions and changes of address for Ham Radio
Magazine and Ham Radio Horizons should be sent to: Ham
Radio Magazine (UK), PO Box 63, Harrow, Middlesex
HA3 6HS.

J. H. ELECTRONICS

Proprietor: A. J. HIBBERD

(G8AQN)

Tel: RUGBY daytime 76473, evening 71066

Terms of Business Cash with order, Mail order only, or Callers by appointment. Handling Charge 40p

Minimum order £1.00.

Official orders accepted on a strict monthly basis.

S.A.E. with engulries Prices now include VAT

FULL MONEY-BACK GUARANTEE ON ALL ITEMS

"KENT" MODULES

PROFESSIONAL GRADE MODULES NOW AVAILABLE TO THE AMATEUR

10.7MHz NARROW BAND F.M. I.F. AMPLIFIER

PERFORMANCE

Sensitivity

- 4µV (EMF from a 50 ohm source) for 20db quieting

Selectivity A.F. Output 7 kHz @ 3db, ±25kHz @ 60db.

- 200mV p-p when input is above limiting threshold and modulated ±5kHz @ 1kHz.

75uS de-emphasis

Output 3db down @ 4kHz, 20db down @

8kHz (de-emphasis removed) Noise output to suit squelch circuit on

A.F. board

Supply D.C. - 9 to 15v @ 30mA (negative earth).

FEATURES

High sensitivity and selectivity.

On board crystal filter buffering for ease of interface.

Single Conversion.

Audio low pass filter to remove unwanted high frequency noise. 'S" meter and delayed AGC outputs

Small size only-97mm × 42mm.

PRICE £26.50. inc. VAT.

2 WATT AUDIO AMPLIFIER WITH SQUELCH

PERFORMANCE

Power Output -2 watts minimum into $4\Omega < 10\%$ distortion.

Sensitivity 75mV p-p @ 1kHz for full output.

200Hz to 15kHz. Bandwidth Squelch

noise operated, threshold adjustable over the range 0 to 20db s/n.

9 to 15 volts D.C. @ 7mA guiescent (neg. Supply

FEATURES

True noise operated squelch with adjustable threshold, no hysteresis

Will drive a wide range of speaker impedances, 4 to 1612. Thermal overload and short circuit output protection.

Rectified and filtered squelch output available for channel scanner

Small size only 52mm × 52mm.

PRICE £9.50 inc. VAT.

ALL MODELS FINISHED TO PROFESSIONAL STANDARDS AND FITTED WITH MOUNTING BUSHES.

PYE EUROPA MF5FM (12kHz channel spacing) receiver section boards, these are a complete FM receivers but less the RF amplifier (one FET)—volume control and channel switch, crystal holders fitted for only three channels but we will supply three sepa-rate to make to a six channel unit, ideal for 144MHz FM, although these are brand new boards they are sold as untested due to the fact we have no w checking them, complete with circuit for only £26.00 a cheap means of making a first class monitor receiver.

PYE FM CAMBRIDGE RF boards 88-108MHz new £6.00 each.

RHODE & SCHWARZ SIGNAL GENERATOR 300—1000MHz type No SDR BN41022 used con-dition working but low on output; £200.00 buyer to collect by arrangement.

RHODE & SCHWARZ Non Slotted Line BN3931 with indicating Amp. very good condition, £100.00.

RHODE & SCHWARZ Microwave Power Meter 0-3200MHz BN2412/50, £50.00

X-BAND signal generators CT314 19" rack mounting no gen. untested, £40.00 buyer to collect by arrange-ment.

TELEQUIPMENT SCOPE D33R fitted with one type "A" amp. and one type 33C. Good condition working needs slight attention, £70.00. MARCONI DOUBLE PULSE GENERATOR TF1400s untested £60.00 buyer to collect by arrangement.

RACAL 850 calibrator less leads, outside a bit rough, internally very good, working, £50.00

PYE 19" COLOUR STUDIO MONITOR R.B.G. input complete with dozens of spare P.C. boards, needs slight attention, bargain @ £90.00, buyer to collect by arrangement.

PYE UHF OFR (On Frequency Repeater) complete in cabinet, 25kHz channel spacing, as new condition, £250.00

FR-6/U FREQUENCY METER made by Lavoie Laboratories, 100-500MHz, very accurate to 1kHz. this is a 19" rack mounting unit in new condition with spare film scales and calibration charts; we are open to sensible offers.

VIDEO CAMERA Scan and Focus Coil Ass. transistor type takes standard 1" vidicon tube with centring magnets and tube clamp. No info., new £6.00; two for

TRIMMER CAPACITORS 10mm DIA. ceramic, 2-8pf, 3-10pf, 4-20pf, 10-40pf,

all 10p each. 7mm dia. ceramic, 3-9pf, 2.5-16pf, 7-35pf, all 10p each Tubular ceramic, 1-6pf solder in type, 8p each; 60p for 10

Mullard tubular ceramic 0.8-6.8pf bolt in type, 15p each. Ceramic miniature compression P.C. mount 10-40pf.

Plastic semi-airspaced 2-25pf 10mm dia., 6p each; 10 for 50p.

Oxley airspaced 9mm sq base 1-10pf and 1-15pf, 18p each; 2-30pf 20p each.

Erie teflon tubular trimmers "530 series" 0.25-1.5pf

4mm dia. × 11mm, 10p each.

JACKSON TETFER TRIMMER Cat. No 5640 9mm sq base, 40p each; also 8mm P.C. mount, 40p each. PLASTIC SEMI-AIRSPACED TRIMMER as used in

PYE Westminsters P.A. stages 10-60pf, 15p each. JACKSON BUTTERFLY TRIMMERS 17 + 17PF

1.2mm air gap Cat. No C713, 50p each; a few with 1" spindle, 65p each.

ELECTRONIQUES TUNING DIALS reduction 6-1 and 36-1, uses epicyclic drive, moulded clear plastic front, size 100mm × 160mm, supplied with two scales and two pointers, £6.00.

STEREO CAR CASSETTE player amplifier boards with two amp. ICs NEC-uPC 1001H2, some models with uPC 1025H, requires 12v D.C., 3½ watts per channel, removed from new equipment by manufacturer, size 120mm × 45mm, supplied with circuit, £2.25 each.

FM RADIO FRONT END TUNER Units 88-108MHz (remove three Cs and it tunes Air Band) and 2m, very high quality and stable unit with exceptional sensitivity FET RF amp. NPN mixer and separate osc. AFC. and AGC inputs, works from 9-15v D.C., with circuit; new and unused BARGAIN @ £3.30 each; two for £6.00.

Most Items still available as last month's advert.

59 WAVERLEY ROAD, THE KENT, RUGBY, WARWICKSHIRE