February 1980

radio communication

journal of the Radio Society of Great Britain

WARC 79

A meeting of Committee 5 of the conference

TRIO IN SOUTH LONDON
CATRONICS FOR TRIO
TRADE UP TO TRIO AT CATRONICS

R1000

COMMUNICATIONS RECEIVER

R1000 Brief Specification

Frequency Range:	200KHz–30MHz
Modes:	AM, USB, LSB, CW
Sensitivity:	<2MHz: 5μV >2MHz: 0.5μV for 10dB S+N/N on SSB
Digital Readout:	to 1KHz
Clock:	Quartz controlled
Price:	**£298.00**

THE CENTRE FOR

TS770

ALL MODE 2M+70CM

TS770 Brief Specification

Frequency Range:	144–146MHz 430–440MHz
Mode:	SSB (USB, LSB), CW, FM
RF Output Power:	10 watts Only for FM: 10W (Hi)/Approx. 1W (LOW)
Sensitivity:	SSB/CW 0·5μV for 10dB (S+N)/N FM 1μV for 30dB (S+N)/N
20dB quieting (FM):	Less than 0·4μV
Price:	**£690**

Catronics

The message we are trying to say is that Catronics Ltd is an authorised Trio dealer with the full service and spares organisation backed by Lowe Electronics Ltd

COME TO

SECOND HAND EQUIPMENT

We always have a selection of used equipment in stock, currently as follows:

TR2200GX	**£115**
SWAN 500	**£270**
KDK FM144-105A	**£110**
TR2200G	**£100**

TR2400

2m SYNTHESIZED PORTABLE

TR2400 Brief Specification

Frequency Range:	144–148MHz
Mode:	FM
RF Output Power:	1.5 Watts min.
Sensitivity:	1.0μV for 30dB S/N
Display:	LCD
Memories:	10 built in
Scanning:	Auto in 5KHz steps
Price:	**£235**

AMATEUR RADIO

TS180S

THE NEWEST HF TRANSCEIVER

TS180S Brief Specification

Frequency range:	160m to 10m Amateur Bands
Mode:	CW, USB, LSB, FSK
RF Input Power SSB:	200 watts PEP
CW:	160 watts DC
FSK:	100 watts DC
RX sensitivity:	10dB S/N at 0·25μV
Power requirements:	Max. 20A at 13·8V DC
Price:	**£712.00**
or	**£825** with dig. freq. cont.

APPROVED TRIO DEALER

BARCLAYCARD VISA

We are 300 yards from Wallington Railway Station (London Bridge or Victoria). Frequent buses from Croydon and Sutton. Three large car parks within 100 yards. **Hire purchase facilities available on all equipment. Credit cards accepted.** Mail orders—normally dealt with on day of receipt. Securicor delivery arranged. All prices include VAT.

Access

CATRONICS LTD, DEPT T2, COMMUNICATIONS HOUSE,
20 WALLINGTON SQUARE, WALLINGTON, SURREY SM6 8RG. Tel: 01-669 6700.
Shop/showroom open Monday–Friday: 9.00–5.30, closed for lunch: 12.45–1.45. Saturdays: 9.00–1.00.

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WATERS & STANTON ELECTRONICS

Factory Prices REDUCED!

FDK MULTI-700E

£195 inc VAT

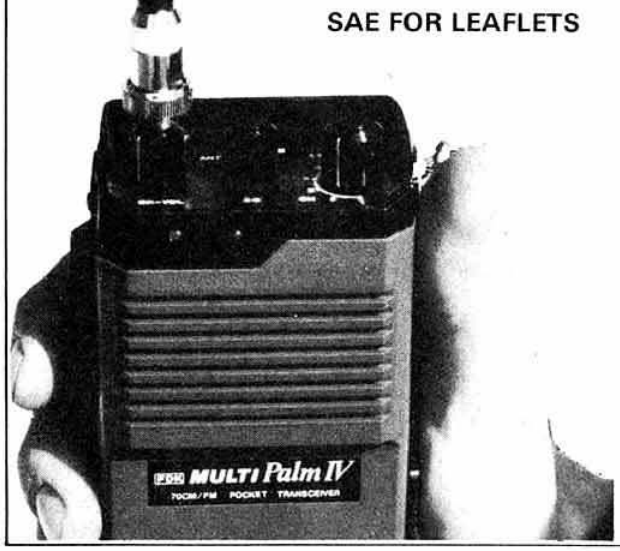
HOLD IT!

FDK 2m & 70cms

HAND-HELDS
1 WATT, 6 ch

PALM II (144MHz) **£99**
PALM IV (432MHz) **£159**

Prices include ni-cads, AC chargers, Xtal tone-burst and carrying strap. Leather cases **£5.75.** S20/SU20 fitted. Extra channels **£3.00**



SAE FOR LEAFLETS

TUNES IN 25kHz and 12½kHz CHANNELS. 1–25 WATTS OUTPUT VARIABLE. INSTANT REVERSE REPEATER OPERATION. INCLUDES MICROPHONE, MOBILE MOUNTING BRACKET AND DC LEADS.

HURRY WHILST STOCKS LAST.

STOP PRESS!

Mobile safety mics back in stock complete with boom and gear lever switching boxes. State transceiver model when ordering. **£20.95** inc. VAT.

WATERS & STANTON ELECTRONICS

TRIO

APPROVED TRIO DEALER

COMING SOON

TR9000 2m all mode £365 approx.

ALL PRICES INCLUDE 15% VAT

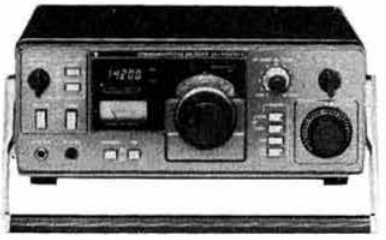
TRIO TS120V £408
TS120S £495

SOLID STATE RIG RELIABLE AT LAST

Up until now there has been a natural reluctance to accept solid state HF rigs as anything but a second rig or mobile unit with dubious reliability of the PA devices. Now at last the new TS120 series gives you 80-10 metre coverage at either 10 watts output or 100 watts output. Digital readout and variable selectivity are just two features that put them in a class above any other solid state rig we know of (apart from the TS180S) – even those costing nearly £1,000. The TS120 will put to shame many of the older valve PA designs and can confidently be regarded as a good reliable base or mobile station – and no tune-up means instant QSY from band to band at the flick of a switch.

TRIO TS520SE £485 inc VAT **NEW LOW PRICE UNBEATABLE**

For the operator that wants an HF transceiver on a budget this surely must be the answer. 160-10 metres (full coverage) with built-in speech processor and the fine Trio engineering that now has become a legend amongst amateurs around the World. The price is really competitive and from tests we have carried out we must say that if you are looking for a 100 watts output base station the TS520SE should be top of your list for value for money. A pair of fan cooled 6146B's ensures high efficiency and good linearity. There's no longer a 12 volt facility but for mobile work it's a little big these days – for base station use it's unbeatable at this price.



NEW **TRIO R1000 £298 inc VAT**

At last the Trio R1000 has been announced – a real purpose-built receiver for the serious short wave listener. 200kHz to 30MHz in 30 bands. This receiver has many features that are not available on other models and, of course, has the technical backing of the world's largest manufacturers of amateur communications equipment. Features include: 1kHz digital readout and separate analogue dial, large high quality speaker, digital 12 hour clock – AM and PM, three separate filters for razor sharp selectivity, noise blanker (try finding this on any other receiver!), automatic preselector tuning via the 1MHz band switch, three-stage attenuator, dimmer control, tone control, timer circuit, and all this in a diminutive package measuring $12\frac{3}{4} \times 4\frac{1}{4} \times 8\frac{7}{8}$ in. Trio have now solved the problem of choosing a receiver – there is no choice – it's got to be Trio!

KING OF THE PORTABLES

TRIO TR2300 £199

The TR2300 is a remarkable package which combines all the advantages of a portable station with those of a mobile transceiver. In many ways it's the ideal "starter rig" in amateur radio. Full band coverage from 144 146MHz in 80 × 25kHz channels plus 600kHz repeater shift and 1750Hz automatic tone-burst complete its versatility.
The dial is directly calibrated in frequency and has illumination for night use. The transmitter is exceptionally clean with an output power in excess of 1 watt. Receiver sensitivity is every bit as good as the best mobile rigs and either internal batteries or an external DC source may be used. Fits easily into a suitcase or on the corner of a desk and makes a really compact mobile rig. Price includes carrying case, shoulder strap, battery charger, external DC cord and, of course, the Waters & Stanton 12 month warranty. An absolute bargain – we even sell them to our staff!

NEW

TRIO

TR2400 £210 inc VAT

The new TR2400 really does eclipse all other hand-helds in its sheer technology. There's no other model that can approach its performance. The large LCD readout has low current drain and the 1·5 watts output is a good compromise between effective communication and reasonable battery drain. 10 memories, automatic scanning, instant reverse repeater operation, 16 key touch-tone encoder, 144-148MHz etc etc . . . all adds up to the new leader in hand-helds . . . the Trio TR2400. Get your Barclaycard or Access cards ready for this one . . . half its fascination is operating it – the other half is owning it.

Waters & Stanton

TWO SUPER POWER HOUSES . . . IMPORTED DIRECT BY US

IN STOCK NOW!
DenTron
MLA 2500
160–10m 2kW PEP
£695 inc. VAT
and delivery

Send 25p for complete DenTron HF Catalogue

* 1kW DC continuous
* ALC circuit
* 3 speed cooling
* Military specifications
* 234v/117v AC
* 2 of EIMAC 8875 tubes
* R.F. Wattmeter (incl. p&p)
* Size 5¼" × 14" × 14"
* Weight 47lb.
* Ideal for SSTV/RTTY
* 3rd order down 30dB +
* 40 watts drive for 1kW

160–10m ATU's also in stock

144 MHz!
NAGAI
2200 LINEAR
£429
inc. VAT
(Securicor £4.50)

Sae for colour brochure

* 240v AC
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* Receiver pre-amp
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* 500W PEP input
* 400W FM/CW input
* Fan cooled
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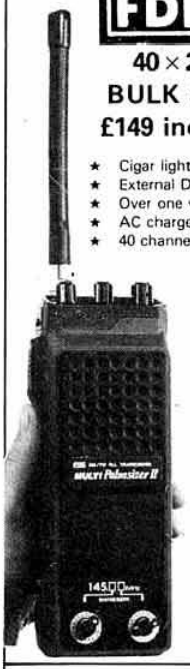
* Covers 144–146MHz



FDK **PALMSIZER**

40 × 25kHz Channels 145–146MHz
BULK SHIPMENT AT SUPER PRICE!
£149 inc. VAT buys this.....

* Cigar lighter plug
* External DC cord
* Over one watt output
* AC charger included
* 40 channel capability
* Simplex or ±600kHz switch
* BNC aerial socket
* Flexible whip supplied
* Xtal controlled tone-burst
* Ni-cad battery pack supplied

OR PALM II & IV

The Palm II and IV offer truly amazing value for money in the field of hand-held transceivers. Certainly they are the most compact units currently available and fit easily into the pocket. The built-in condenser microphones make for a really superior quality of audio that would do credit to many base stations. Accessories such as ni-cads, AC chargers and helical whips are all included in the basic price and additional channels will cost you a mere £3. Repeater operation is fully catered for with the built-in crystal controlled tone-burst and both the 2 metre and 70cms models have plus and minus repeater shifts. Don't miss these amazing prices–just think, you can have both 2 metre and 70cms hand-helds for less than £260 inc. VAT–can't be bad!

DenTron GLA-1000

(IN STOCK NOW)
10–80m 1200W LINEAR
LOW COST, SMALL SIZE, BUT . . .
. . . BIG VOICE DELIVERY FREE IN UK **£295 inc VAT**

This beautiful HF linear covers 80 to 10 metres and has its own built-in 117/234V power supply. Its diminutive size means less table space needed but without sacrificing power capability. Weighing in at just 24 pounds it measures only H.5⅛" × W.11" × D.11" with room to spare inside. An almost silent fan ensures cool running whilst the little power house generates 1200 watts input on SSB or 1kW DC for CW. RF drive required is approx. 80 watts and the amplifier can be instantly switched in or out of circuit. Comprehensive metering monitors HF volts, PA current and output RF voltage. Altogether a linear we can thoroughly recommend at a price you can afford–just £295 delivered.

YAESU
FT101Z £575
FT101ZD £659

PRICES INCLUDE FREE DELIVERY & INSURANCE

HUGE DISCOUNT! 2B2M
2m SSB/CW PORTABLE

Fitted 144·2–144·6MHz £135

WATERS & STANTON ELECTRONICS

SALES & SERVICE

We try to keep a very wide selection of all that's good in amateur radio. Occasionally new products are added and others deleted – usually when they become obsolete or technically unsatisfactory. As radio amateurs ourselves we're a pretty fussy bunch so you can buy with confidence from us. Our policy has always been to despatch goods the same day if possible. Our recent move of premises has caused a few delays but we are now back to normal and our new mail order warehouse is simply bulging with goods ready to be despatched anywhere in the UK. New stock control methods and full-time packing staff means a better deal for you the customer. And remember, as one of the largest amateur retailers in the UK, we have a reputation and after-sales back-up service second to none. Simply send us your cheque or quote your Barclaycard or Access number for immediate despatch.

TRIO

TS820S 160-10m transceiver 200w digital	£832.00 (3.75)
TS820 160-10m less digital	£710.00 (3.75)
SP820 External speaker	£39.00 (1.50)
TS520SE 160-10m transceiver 200w	£485.00 (3.75)
SP520 External speaker	£18.00 (1.25)
VFO520S External VFO	£103.00 (3.75)
TS120S 80-10m Solid state 200w	£495.00 (3.75)
TS120V 80-10m Solid state 10w	£408.00 (3.75)
PS20 AC PSU (TS120V)	£52.00 (3.75)
PS30 AC PSU (TS 120S & TS 180S	£98.00 (3.75)
MB100 Mobile mount	£17.00 (0.75)
AT200 1-8-30MHz ATU	£95.00 (1.50)
MC50 Desk microphone (Super!)	£27.50 (1.50)
MC30S Noise cancelling hand mic.	£13.30 (0.50)
TR9000 2m all mode transceiver	t.b.a.
TR7625 2m FM mobile 25w 80ch.	£273.00 (3.75)
TR2300 2m FM portable 80ch.	£199.00 (3.75)
MB2 Mobile mount (2300)	£18.90 (1.00)
TS180s 160-10m solid state transceiver	£825.00 (3.75)
TR3200 70cm portable 3 ch. fitted	£140.00 (3.75)

YAESU

FRG-7 General coverage receiver	£214.00 (N/C)
FRG-7000 Digital readout receiver	£375.00 (N/C)
FT101Z Transceiver	£575.00 (N/C)
FT101ZD Transceiver	£659.00 (N/C)

ICOM (special prices on some models)

IC215E 2mFM 3 watt 12 chs	£162.00 (N/C)
IC202S 2m SSB 3 watt portable	£199.00 (N/C)
IC240 2m 22 ch's 10 watts	£193.00 (N/C)
IC280E 2m FM 80 ch's 10 watts	£250.00 (N/C)
IC211E 2m All mode transceiver	£549.00 (N/C)

MICROWAVE MODULES (NEW PRICES)

MMT 432/28-S transverter	£136.75 (N/C)
MMT 432/144-R transverter	£173.50 (N/C)
MMT 144/28 transverter	£90.75 (N/C)
MMC 144/28-30 converter	£21.85 (N/C)
MMC 144/28 LO converter	£24.15 (N/C)
MMC 70/28 converter	£21.85 (N/C)
MMC 70/28 LO converter	£24.15 (N/C)
MMC 432/28 S converter	£29.90 (N/C)
MMC 432/144 S converter	£29.90 (N/C)
MMC 1296/144 or 28 converter	£32.00 (N/C)
MMC 28/144 10m up converter	£20.70 (N/C)
MMD 050/500mHz counter	£69.00 (N/C)
MMA 144 2m pre-amp	£14.90 (N/C)
MMD 500P 500mHz pre-scaler	£23.00 (N/C)
MMV 1296 varactor tripler	£34.50 (N/C)
MML 144/100w linear amplifier	£142.50 (N/C)
MML 432/100w linear amplifier	£228.00 (N/C)
MML 144/25w	£48.30 (N/C)
MML 432/50w	£113.75 (N/C)

SEM

2m converters	£23.00 (N/C)
70cms converters 144 IF	£23.00 (N/C)
2m pre-amp	£14.95 (N/C)
2m auto switching pre-amp	£19.50 (N/C)
70 cms auto switching pre-amp	£22.63 (N/C)
2m PA3 pre-amp	£8.00 (N/C)
70cm PA3 pre-amp	£10.00 (N/C)
2m 48 watt linear/pre-amp	£66.70 (0.95)

All pre-amps fitted SO239 sockets

HF auto pre-amp 2-40mHz	£16.68 (N/C)
HF pre-amp 2-40mHz	£11.73 (N/C)
HF Z-MATCH ATU 80-10m	£45.00 (1.00)

VHF MONITOR Rx's

TM56B 12v/240 AC auto scan 10 ch's	£106.00 (N/C)
TM56B Marine model	£115.00 (N/C)
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Extra xtals	£2.45 (N/C)

FDK (New PII price!)

Multi 3000 2m All mode	£495.00 (N/C)
Multi 800D 2m 25 watts	£289.00 (N/C)
Multi 700E 2m 25 watts	£229.00 (N/C)
Multi Palm II 2m hand-held special package	£99.95 (N/C)
M-11/Q16 xtals £5.00 Palm II xtals £3.00	
Multi-Palmsizer 2m synthesised 40 channel hand-held	£149.00 (N/C)
Palm IV 70cms	£159.00 (N/C)

DENTRON

MLA 2500 160-10m 2Kw linear	£699.00 (N/C)
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MT2000A 3Kw 160-10m tuner	£180.00 (N/C)
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JR Monitor 160-10m tuner 300w	£59.95 (N/C)
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AR

AR240 Synthesised hand-portable	£168.00 (N/C)

MIZUHO (NEW LOW PRICE!)

2m SSB 1 watt portable	£135.00 (N/C)
Extra xtals	£3.00

NAIGAI (NEW LOW PRICE!)

2200 2m 500w PIP linear	£429.00 (N/C)

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AM802G Compressor - 3 outputs	£59.95 (N/C)
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201 - 2m ¼ wave	£3.50 (1.00)
2009 - 2m 5/8th wave	£9.25 (1.00)
677 - 2m 5/8th wave deluxe	£14.95 (1.00)
462-70cms colinear	£8.25 (1.00)
667 - 70cms colinear deluxe	£17.95 (1.00)
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HQ-1 20-15-10m mini-quad	£96.50 (2.50)
C4 20-15-10m vertical	£48.50 (2.00)
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Mosley 2Kw version	£129.00 (2.00)
TA32 600 watts 20-15-10m	£81.00 (2.00)
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All prices include VAT at 15%

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Hy-gain 18 AVT/WB 80-10m	£87.00 (2.25)
Mosley TD3JR 20-15-10m dipole	£31.00 (1.00)
Mosley RD5 SWL ham dipole	£36.30 (1.00)
EL-40X 80-40 Mini dipole	£39.50 (1.00)
HF5 5 band vertical	£41.50 (1.00)

VHF ANTENNAS (JAYBEAM)

4Y/4M 4el yagi	£17.20 (2.00)
C5/2M 5db colinear	£40.00 (2.00)
5Y/2M 5el yagi	£10.25 (1.50)
8Y/2M 8el yagi	£13.25 (1.50)
10Y/2M 10el yagi	£28.40 (2.00)
PBM10/2M 10el parabeam	£33.60 (2.00)
PBM14/2M 14el parabeam	£40.80 (2.50)
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8XY/2M X'd 8 element	£25.80 (2.00)
10XY/2M X'd 10 element	£34.30 (2.00)
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D5/2M 5 over 5	£18.30 (1.50)
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C8/70cm 8db colinear	£45.40 (2.50)
D8/70cm 8 over 8	£20.45 (2.00)
PBM18/70 18 el parabeam	£24.75 (2.00)
MBM/48 70 el Multibeam	£28.20 (2.00)
MBM88/70 88 el Multibeam	£37.50 (2.00)
8XY/70 8 el X'd yagi	£31.05 (1.50)
12XY/70 12 el X'd yagi	£38.50 (2.00)
D15/1296 15 over 15	£30.95 (1.50)

ACCESSORIES

9502 rotator	£55.80 (1.75)
KR400 rotator	£105.80 (2.00)
AR40 rotator	£54.50 (1.50)
Stolle 2030 rotator	£55.00 (1.50)
Stolle 2010 rotator	£50.00 (1.50)
Stolle 2050	£39.95 (1.50)
SWL ATU	£16.50 (0.75)
Shure 444 microphone	£27.50 (0.75)
Shure 201 microphone	£11.75 (0.75)
Shure 526T microphone Type II	£36.35 (0.75)
Hand morse key	£9.70 (0.50)
MM202S Safety microphone	£20.95 (0.50)
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TB 3 ele 2kW Beam	£155.00 (2.00)
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SAE for details.	

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G3VJF

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Tried — Tested and Popular . . .

THE LEADER BASE STATION

IC-211E

Fast becoming one of the most popular base station rigs because of its superb performance and advanced technology, the IC-211E leads the field in 2M base stations. With a full synthesizer which employs state of the art technology it provides all you want for full coverage on FM USB, LSB or CW on 2 metres with that extra bit of quality for which ICOM are so renowned, plus the chance to use the latest digital technology and even drive it from your home computer if you wish!
Less VAT = £477.39 With VAT = £549

THE MOBILES

IC-255E 25 WATT FM!

- ★ 25 watt output (1 watt low power).
- ★ 5 memories. ★ 2 VFOs.
- ★ Built-in scanner (with optional mic for scan control from the mic). Can scan the whole band, a selected portion, or just the memories.
- ★ Normal and reverse repeat – 600kHz shift built-in plus another user programmable shift, from the front panel (for 70cm transverting?).
- ★ Size 64 × 185 × 223mm.

PRICE £255 INC VAT

IC-240
NOW £193 inc.

The IC-240 is the ideal mobile rig for most people. Apart from the fact that it is quite a lot cheaper than most, it is, in fact, more suitable than many to use in the car while driving (and let's face it, it is under those conditions that most mobiles are used). It can be operated with ease without taking your eyes off the road and provides up to 22 channels (which is more than you are likely to need). Being synthesized, of course, there are no crystals to buy for extra channels. Full repeat, reverse repeat and automatic tone burst plus a low power facility are selectable from the front panel. By adding a 'Superscan' at a later date you can obtain full scanning facilities over the whole band at a VERY competitive price.

The IC-240 is a superbly built and very reliable piece of equipment as witnessed by the many thousands in use. All Icom equipment is built to a very high standard and the IC-240 is no exception. It has an excellently sensitive receiver and a very clean transmitter and will give you hours of headache-free pleasurable use – so why not get one now before the price goes up again!
240 Alone Less VAT = £167.91 With VAT = £193.00

IC-280E
NOW £250 inc.

★ **WITH SCANNER £260**

As usual, ICOM have kept ahead with technology and have produced their revolutionary new IC-280E which uses a microprocessor to produce frequencies throughout the 2m band at the ideal 25kHz spacing required today. The IC-280 has the ideal advantage of being separable into two parts for easy mounting into today's cars which so often forget to leave space for a rig. The removable front panel, with all controls, is only 3" deep and will fit in any convenient spot – in the glove pocket, on the dash or even on the sun visor! The main part of the set can be mounted anywhere within 4 feet – or even further in many cases – under the passenger's seat is quite handy! Display is of frequency on an LED readout and there are three memories for your favourite channels. These are not cleared when the set is switched off as long as it is left connected to the car battery.
Less VAT = £217.39 With VAT = £250

AGENTS (PHONE FIRST – All evenings and weekends only, except Barnsley and Burnley)
Scotland – Jack GM8GEC (031-665 2420)
Wales – Tony GW3FKO (0222 702982) **Burnley** – (0282 38481) **Midlands** – Tony G8AVH (021-329 2305)
North West – Gordon G3LEQ (Knutsford (0565) 4040) **Yorkshire** – Peter G3TPX (022678 2517 Evenings) (0226 5031 Day)

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THE MOBILE OF CHOICE FROM THE WORLD FAMOUS

ICOM STABLE — THE IC-255E

25 Watts—5 Memories—Scanning—600kHz AND User Selectable Repeater Shift—Full Coverage in 5kHz or 25kHz Steps

We have had a poke around one of these little beauties and are certain that ICOM, yet again, have come up with a winner. As you can see it has the expected smart ICOM appearance. Features include:-

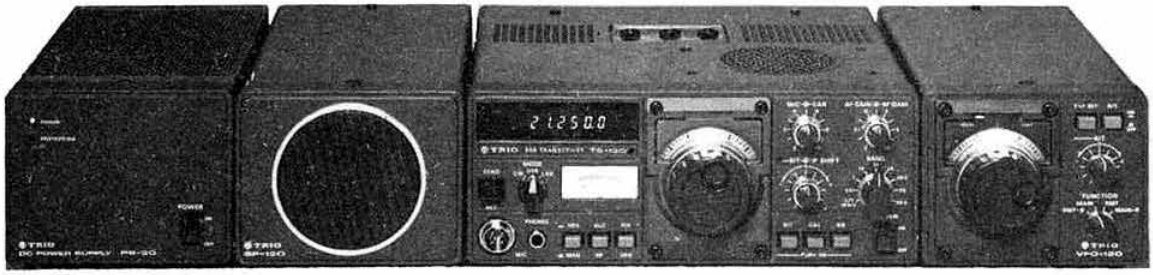
- ★ Crystal controlled Tone Burst
- ★ Full band coverage—extendable to 148MHz if required
- ★ Four digit LED display
- ★ 25 Watts output or 1W low power
- ★ A superb receiver using grounded gate FET front end
- ★ Scanning over a user programmable range
- ★ Memory scan
- ★ Stop on empty or busy channels
- ★ Tuning in 25kHz or 5kHz steps
- ★ 5 Memories—retained while the power is connected to the rig
- ★ Built-in 600kHz Repeater Shift
- ★ Alternative programmable shift
- ★ Reverse Repeater facilities
- ★ RIT (±3kHz) for those off channel stations
- ★ Scan control from the microphone (an optional mic available shortly)
- ★ Good loud audio
- ★ Optically coupled tuning between control knob and CPU
- ★ Multiway 24 pin socket on back for touchpad, computer, or external control (note the current RM3 cannot be used but a new version is to be introduced)
- ★ Rugged modular PA (Guaranteed of course!)
- ★ Mobile mount which can be padlocked

At £255 including VAT these are such value for money that demand may exceed supply for a while—but they are worth waiting for! (Delivery is free of course by Registered First Class Letter Post.)

FROM **THANET** OF COURSE

LOWE ELECTRONICS Ltd

TS-120—The system approach by TRIO



What do we mean by the "System Approach"? Well, take the TS120V at **£408**, including V.A.T. and you have the finest 20W PEP mobile HF transceiver you could buy. Consider the single conversion, PLL derived, top performance transceiver; the passband tuning; the digital readout; the noise blanker; the superb engineering; THEN maybe add the matching mains PSU for home use: PS20 **£52**, including V.A.T.: and you have an equally great fixed station; OR maybe add the extra VFO, or the external speaker and the 100 Watt ATU: SP120 **£25.50**, including V.A.T.; AT120 **£69**, including V.A.T.: OR maybe take a look at the new TS120S at **£495**, including V.A.T. **What's the TS120S?**

It's a compact, up to 200 watts PEP input, all solid-state HF transceiver with such standard features as built-in digital readout, IF shift, new PLL technology . . . and requires no tuning!

Exciting and perfect for car or ham shack use! But, there's more to say about the TS-120S! This unique all solid-state HF, SSB/CW transceiver produces a hefty signal and also offers a lot of other great features in a very attractive, compact package.

FEATURES:

All solid-state with wideband RF amplifier stages. No final dipping or loading, no transmit drive peaking, and no receive preselector tuning! *Just dial your frequency and operate!*

Five bands, plus WWV. Transmits and receives on 80/75, 40, 20, 15, and all of 10 meters . . . and receives WWV on 15MHz.

200 watts PEP (160 watts DC) input on 80-15 meters, 160 watts PEP (140 watts DC) input on 10 meters. LSB, USB, and CW.

Digital frequency display (standard). 100-Hz resolution. Six digits. Special green fluorescent tubes eliminate viewing fatigue. Analog subdial, too, for backup display.

IF shift (passband tuning), to remove adjacent-frequency interference and sideband splatter.

Advanced PLL circuit, which eliminates need for heterodyne crystal element for each band. PLL lock frequency, CAL marker signal, and counter clock circuit use single reference frequency crystal. Simplifies circuitry, improves overall stability. Also improves transmit and receive spurious characteristics.

Attractive, compact design. Measures only $3\frac{1}{2}$" high × $9\frac{1}{4}$" wide × $13\frac{1}{2}$" long, and weighs only 4·9 kg (11·7 lbs.) A perfect size for convenient mobile operation and rugged enough for either mobile or portable use. Also has all the desired features for optimum ham-shack operation at home.

Noise blanker. You'll wonder where the ignition noise went.

See the big little TS-120S rig and matching accessories (VFO-120 remote VFO, SP-120 external speaker, PS-30 AC power supply, MB-100 mobile mounting bracket, AT-120 antenna tuner and YK-88C CW Filter) at the centre for Amateur Radio—

LOWE ELECTRONICS in MATLOCK.

Or—send for full details right now.

TL120 200W PEP linear now in stock **£158** inc VAT.

TRIO + LOWE = SATISFACTION

LOWE ELECTRONICS Ltd

R-1000

THIS RECEIVER IS SO ADVANCED THAT IT MAKES ANYTHING ELSE IN ITS PRICE RANGE COMPLETELY OBSOLETE

AND—IT'LL COST YOU ONLY ABOUT £12.50 A MONTH IF YOU USE OUR CREDIT CARD SCHEME

The new R-1000 is going to turn the general coverage receiver world upside down since it combines professional performance with a really attractive price, thanks to Trio's commitment to using advanced technology to simplify operation rather than make complex gimmickry.

The R-1000 uses an advanced PLL system in an up-conversion scheme to a high (48MHz) first IF to remove any possibility of image responses. The receiver covers the entire frequency range from below 200kHz right up to 30MHz in 30 bands, each 1MHz wide. The bands are selected, not by ambiguous knob twiddling as in receivers using the Wadley loop but by a 30 position band switch which controls the PLL system.

The band switch also electronically selects the appropriate band pass filter network in the RF stages of the receiver so there are no "preselector" or "antenna trim" controls to twiddle—simply set the band switch to the range required—that's it!

A highly stable VFO tunes each 1MHz range and its linear, back lit scale makes readout easy. However, in addition to this dial, Trio have also provided 5 digit true frequency digital readout so as to guarantee spot on accuracy on any frequency. As a further feature, the digital display can also be switched to read time, this being derived from a quartz standard. Marvellous for accurate log keeping. The display uses high intensity readout units which can be dimmed for use in low light conditions.

As for what else is inside this superb instrument—selectivity is catered for by three custom made IF filters; a 12kHz wide AM filter; 6kHz narrow AM filter; and a new 2·7kHz SSB filter with a shape factor of better than 1:2 6:60dB. Selectable sidebands are available at the touch of a switch.

For the first time in a mid-price receiver, a true noise blanker is provided to remove pulse type ignition noise.

To minimise front end overload, a step RF attenuator is included which gives 0-60dB attenuation in four steps.

All the rear panel connectors are recessed on a sloping panel so that you can stand the receiver either on its back, or pushed hard against a wall when used in conventional shelf mounting. The antenna inputs allow the use of either a high impedance wire aerial or a 50ohm balanced input so that the proverbial long lump of wire will work really well with the R-1000.

How big? 300mm wide × 115mm high × 218mm deep
How heavy? 5·5Kg (about 12lb)
How much? **£298** inc VAT.
How soon? Get thi' name down now. Demand will outstrip supply.

The basic features of the R-1000 do not tell the full story, because you cannot explain the superb "feel" of the receiver until you can handle it in the flesh. So, the advice is to see it soon at Lowe Electronics in Matlock.

TRIO

DON'T BE FOOLED!

Not all dealers sell Trio products . . . and not all dealers who sell Trio products are authorised Trio dealers.

By buying your Trio equipment from an authorised dealer, you can be confident that you have the support of the Trio service and backup organisation stretching all the way through your distributor right back to the factory.

Only an authorised dealer can give you the service, spares and advice that you may need, and only an authorised dealer can allow you to take advantage of the regular meetings between the distributor and Trio factory personnel at which there is a constant exchange of information and advice.

The official Trio organisation in the United Kingdom is as follows:

SOLE IMPORTER AND DISTRIBUTOR
Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire. Telephone No. Matlock (0629) 2817 or 2430

AUTHORISED DEALERS

Yorkshire: Leeds Amateur Radio, 27 Cookridge Street, LEEDS LE2 3AG. Telephone No. 0532 452657
Birmingham: Ward Electronics, Soho House, 362-364 Soho Road, BIRMINGHAM B21 9QL. Telephone No. 021 554 0708
South London: Communications House, 20 Wallington Square, WALLINGTON SM6 8RG. Telephone No. 01-669 6700
North London: Radio Shack Ltd, 188 Broadhurst Gardens, LONDON NW6 3AY. Telephone No. 01-624 7174
Lancashire: Stephens-James Ltd, 47 Warrington Road, LEIGH. Telephone No. 0942 676790
Wales: M.R.S. Communications Ltd, 74 Park Road, Whitchurch, CARDIFF. Telephone No. Cardiff 616936
Essex: Waters & Stanton Electronics Ltd, 18-20 Main Road, Hockley, ESSEX. Telephone No. 03704 6835
Sussex: Bredhurst Electronics, The High Street, Handcross, W. SUSSEX. Telephone No. 0444 400786

Other firms offering Trio products are not officially authorised Trio dealers and Trio equipment purchased from these companies is not backed by the Trio service and spares organisation in the U.K.

LOWE ELECTRONICS Ltd

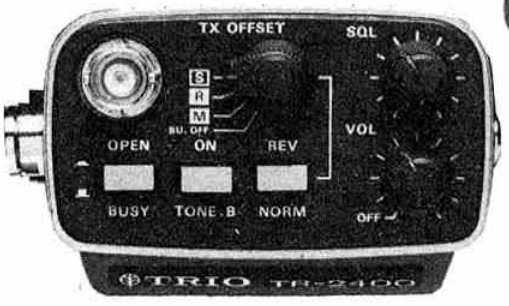
NEW! TR2400

The TR2400 is a futuristic 2 metre FM handheld transceiver incorporating a large LCD 144/146 frequency display, 400 channel operation from 144–146MHz, 10 memory channels and a host of frequency control systems (including scanning) all designed around a microcomputer. The sophisticated design makes the TR2400 the ideal handheld to meet all repeater or simplex operation for the 2 metre man.

FEATURES

1. **Large LCD digital frequency readout.** Clearly readable even in direct sunlight, with back illumination for night use. Virtually no current drain (unlike LED displays) so display stays on all the time. Shows RX and TX frequencies and memory channels. Also included in display are indicators for "an air", "memory recall", "battery status" and "lamp".
2. **Frequency control functions.** Keyboard entry of any frequency from 144–146MHz in 5kHz increments. Up/down manual scanning from 144 to 146 in single or fast continuous 5kHz steps.
3. **10 memories** (retained by battery backup), one of which can be used as a non-standard repeater shift. Automatic scanning of all ten memory channels is provided, and scanning can be for a busy channel or the next free channel.
4. **Full repeater operation** and also instant reverse repeater operation at the touch of a switch.
5. **Provision for external mic and speaker.**
6. **Lock switches** are provided to prevent misoperation of the keyboard and also to disable the press to talk switch.
7. **Power output** of over 1·5 Watts to a BNC aerial connector (flexible whip supplied as standard).
8. **Superb mechanical design** in the Trio tradition of top engineering, based on a die cast frame for real drop proof performance.

The TR2400 is the best available; would you expect less than the best from Trio?



£210.45
including VAT AND including Nicads, charger and helical whip

JUST CHECK THE PRICE AGAINST COMPETITORS, BUT DON'T FORGET TO INCLUDE THEIR ACCESSORIES AND VAT. YOU MAY BE SURPRISED.

CHECK OUT OUR CREDIT CARD, THE INSTANT WAY TO A NEW RIG

LOWE ELECTRONICS Ltd

TRIO TRIO TR-2300

2 METRE SYNTHESIZER PORTABLE

TR2300—the most popular 2 metre transceiver on the market, and rightly so. The TR2300 combines everything that the amateur needs for every aspect of his hobby including portable work using the internal battery pack, mobile using the transceiver in a mobile mount to show the easy to read back illuminated directly calibrated dial, and the convenient external aerial socket and 12 volt power lead or even at home using any 12 volt 1 amp dc supply.

If you need more transmitter power, the matching VB2300 ten watt amplifier easily tucks away in the car and complements the outstanding receiver in the 2300

The TR2300 is fully synthesized and operates over the whole 2 metre band 144-146MHz. Repeater (and reverse repeater if requested) operation is standard fitting as is an automatic tone burst. Just ask around or listen on the air to find out why almost everyone uses the TR2300.

TR2300 £199.00 inc. V.A.T. (includes rig, microphone, carrying case, shoulder strap, Ni-cad charger, telescopic whip, external power lead, battery carriers and comprehensive handbook.)

Ni-cad batteries **£10.35** inc. V.A.T.
VB2300 amplifier **£56.00** inc. V.A.T.

Everyone is talking about the new Lowe credit card scheme, following its introduction at Leicester. This is the new, easy way to have the rig you wanted right away and avoid any future price rises. How does it work? You simply agree to pay a fixed amount each month and you then get instant purchasing power of 24 times the payment. For example, a payment of £20 gives you £480 of credit, more than enough to buy that TSI20V, aerial and accessories. No fuss and no hefty deposits needed. A further advantage is that as the payments continue, your credit is automatically extended to allow further purchases. Why not send for full details right away and join the growing numbers who hold the Lowe blue card—the way to have tomorrow's equipment today. A major advance to your purchasing power.

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For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Ballieston, Nr. Glasgow. 041-771 0364.

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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 ¼ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork 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 directions.

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.

AMATEUR ELECTRONICS UK

source for YAESU MUSEN

H

THIS MONTH WE AGAIN SHOW A SELECTION FROM THE INCOMPARABLE YAESU RANGE, BUT THIS IS BY NO MEANS THE FULL STORY AND ONLY THE LATEST CATALOGUE CAN GIVE YOU THAT.
WHY NOT TAKE ADVANTAGE OF OUR OFFER BELOW AND GET YOUR OWN COPY TOGETHER WITH THE LATEST YAESU RELEASES INCLUDING THE FABULOUS NEW ALL SOLID STATE FT107M HF BAND TRANSCEIVER —NOW IN STOCK!

G

A FT-202R ultra-compact 2m FM hand-held. Weighs less than a pound, comes in like a ton of bricks!

B FT-901DM Competition Grade all-band HF Transceiver—strictly for that class of operator who will insist on the best and *only* the best!

C What would the aspiring SWL do without the sturdy FRG-7? Used in thousands throughout the world and giving better performance than many a more expensive set.

D FT-227R Memorizer 2m mobile. Sophisticated electronics coupled with the usual Yaesu high quality construction makes this the best scanning rig on the market.

E FT-225RD 2m all-mode base station. Whatever the options you'll never find a finer VHF rig and its new low price makes it the best buy on the market.

F Dedicated SWL's PLEASE NOTE. When you invest in that receiver to end all receivers don't cut corners on cost and regret it at your leisure. With the famous FRG-7000 General Coverage Receiver you find the very best in electronics together with superb mechanical construction in a *non-miniature* set that does justice to your station and yet is lightweight enough for complete portability.

G Here's the brand-new FT-207R which is selling like wildfire simply because it's the best synthesized 2m hand-held on the market. Anyway what else would you expect from something with the YAESU label on it?

H What can be said about the superb FT-101ZD HF Transceiver? Apart from the fact that it is really excellent value for money there are features which leave many other makers products standing. Don't take our word for it, however, just listen on the bands!

THE ABOVE IS ONLY PART OF THE YAESU STORY—FOR FULL DETAILS OF ALL THE MODELS 36p IN STAMPS WILL BRING YOU THE LATEST GLOSSY CATALOGUE OF THE FULL PRODUCT RANGE TOGETHER WITH OUR CREDIT VOUCHER FOR £3.60—A 10-1 WINNING OFFER!

AND WHAT ELSE IS AT AMATEUR ELECTRONICS?

The short answer is 'PLENTY' but the full reply is a very lengthy one indeed these days. Quite apart from the host of accessories and ancillary units stocked we import the superb SWAN range as per our recent advertisements and carry ATLAS equipment and latterly the full ICOM range. Add to these the superb new STANDARD RADIO models and you'll soon see that a visit could be well worth while. If you can't make it of course then we shall be pleased to send you all the information you require by return of post.

ATTENTION BARGAIN HUNTERS! A large SAE will bring you our latest used equipment list and our special offers on discontinued new gear and new demonstration models.

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)

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AMATEUR RADIO

ALL UNDER

FT-207R

TR-2400

Here is the only shop in London where *all* the leading makes of Amateur Radio Equipment can be seen and tried under the same roof. In our three years here we have become one of the UK's leading retailers of YAESU and ICOM. Now we are pleased to announce that we have secured regular supplies of TRIO (including all the back-up facilities of spares and servicing that may be needed) so that amateurs in London can have a *competitive* source of supply for this leading brand. Finally, we are marking STANDARD'S come-back to the UK market by stocking their two superb new mobile transceivers of advanced specification and performance.

FT-207R— Yaesu's latest hand-held – microprocessor-controlled, synthesized, with four memories, 2·5W output, LED frequency display, etc.

TR-2400— Trio's answer to the FT-207R, with ten memories, LCD read-out etc. Each has so much to offer. Try them both and see which is right for you.

FT-901DM— Yaesu's top-of-the-range transceiver covering top band to 10, plus a full range of ancillary equipment to build *your* station exactly as *you* want it . . . or try the Trio equivalent in the 820 range.

FT-901DM

ALSO IN STOCK

TRIO'S new TS-180S all solid-state HF transceiver with wide-band tuning . . . and YAESU's answer, namely the 107 range . . . and, of course, the well-established ICOM IC-701.

R-1000

R-1000— This TRIO receiver is a new and exciting piece of equipment offering excellent specifications and exceptional facilities to the discerning amateur and shortwave listener. We have been able to secure large shipments of this receiver and, in consequence, are able to offer this at **£289** inc VAT.

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ONE ROOF

THE ICOM TWINS . . .

Following the success of the ever-popular IC-240 here is the latest ICOM 2m synthesized mobile transceiver, the sophisticated IC-255E with 25W output, five memories, two VFO's, scanner, normal and reverse repeater. Also available its twin, the IC-260E with additional SSB facility.

IC-255E

. . . THE STANDARD TWINS

C-8800

Two new high-performance mobiles from STANDARD, the C-7800 and C-8800. The C-7800 is the first sensibly priced 70cm FM mobile to give full 10MHz coverage in 25kc steps with MHz step-button to cut tuning time. Among other features are tuning from mic or front panel—Su20 available on push-button—two repeater offsets at 1·6MHz and 4·6MHz—digital readout—five memories—two-speed scan. The C-8800 is the matching unit with the same features covering the 2m band in 5kc or 25kc steps.

Whether you're looking for a major item of equipment or just some accessories . . . new or secondhand . . . whether you're buying, selling or just browsing . . . Brenda and Bernie invite you to phone or call in to discuss that new rig you've been promising yourself. Try it out in the shop . . . compare it with the others in its class, because that way you'll know that what you're investing in really is right for you. So, come to the shop where they care . . . and have a cup of Brenda's coffee too!

2 NORTHFIELD ROAD, EALING, LONDON W13 9SY. Tel: 01-579 5311

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KYOKUTO DENSHI COMPANY LIMITED

NEW

2025

2m SYNTHESIZED TRANSCEIVER

- ★ **Custom design micro control**
- ★ **25kHz *and* 12·5kHz steps!!**
- ★ **'Instant QSY', 10X rate button**
- ★ **25 Watts of reliable RF output**
- ★ **Band scan between any limits**
- ★ **10 write-in memory channels**
- ★ **Memory scanning with hold**
- ★ **Standard ±600kHz or any split**

The KDK FM2025E is a 12V DC two-metre FM transceiver suitable for mobile or base station use. Although packed with more features than any previous model, operation has been made even easier, by the use of a 'custom built' microprocessor controller.

A digital frequency synthesizer provides full band coverage in 12·5kHz or 25kHz steps selectable by a slide switch. 'Single knob' frequency selection is provided by an optically coupled encoder (30 PPR) plus a dialling speed switch that increases the tuning steps tenfold to facilitate the selection of widely spaced frequencies.

An electronic memory, with on board Ni-Cd back up, provides 10 simplex (plus standard ±600kHz shift) and/or 5 semi duplex channels for the ten slot, two group store. This makes the 2025 as easy to use mobile as a crystal controlled transceiver. One memory slot is semi-dedicated to 'priority' use, and is programmable even when the 2025 transceiver is controlled by the dial.

The 2025 embodies the best non-lockout scanner available. It seeks occupied or empty channels and a flick switch hold facility enables immediate transmission on a desired frequency. The scanner functions on both memory channels and across any selected portion of the band, scan limits are defined by two of the memory channels.

Dual gate UHF MOSFETS are used in the RF and mixer to provide superior intermodulation characteristics with high sensitivity. This performance is maintained over the band by automatic varicap electronic tuning.

A monolythic crystal filter in the first IF and a commercial quality 15-pole ceramic filter in the second IF provides extremely sharp selectivity. The adoption of the latest one-chip multifunction IC for all the second conversion circuitry enhances receiver performance and reliability.

The single conversion transmitter uses a balanced mixer and a VCO on the signal frequency (directly modulated for superb FM) and hybrid power module to produce 25W (or 3W) RF output. The PA is impervious to breakdowns under infinite VSWR and produces with an LPF a substantially spurious free signal.

All necessary control function instructions are programmed into the microprocessor itself. By re-arranging a diode matrix, the lower frequency transceive limit, the high frequency receive limit and the high frequency transmit limit may be altered to allow for changes of band plan or location after purchase of the transceiver.

Switchable auto-tone-burst, RF attenuator, squelch, microphone, microphone clip, power lead, mounting bracket, handbook are, of course, part of the package.

Call your dealer today for further details.

£250 inc. VAT at 15% (£217.39 + VAT) **SEE ONE TODAY!**

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Twelve years of continuous development has produced a range of over 50 models, all of which conform to the current B.S.S., requiring *minimum* designed wind speeds of 85mph and up to 117mph.

Before purchasing a Tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for an installation. *It would be incorrect to nominate a specific headload as this is dependent upon load distribution, geographical location and siting.*

Available between heights of 25–120ft post, base plate, wall, fixed base or mobile on high-speed trailers.

Price of towers are for the complete package – tower sections, mounts, telescopic and luffing gear, guys, head unit and winches.
AS APPROPRIATE FOR ANY PARTICULAR MODEL

The sample of prices exclude VAT and delivery

STANDARD 13M20 SERIES				*HEAVY DUTY 16M20 SERIES*			
Post Mounting 13M20				*Post Mounting* 16M20			
P25	25'	Tower	£202.00				
P40	40'	Tower	£276.75	P40	40'	Tower	£416.20
P60	60'	Tower	£335.90	P60	60'	Tower	£472.50
Fixed Base 13M20				*Fixed Base* 16M20			
FB25	25'	Tower	£150.20				
FB40	40'	Tower	£224.40	FB40	40'	Tower	£333.80
FB60	60'	Tower	£284.10	FB60	60'	Tower	£390.10
Socket Types 13M20				*Socket Types* 16M20			
SP25	25'	Tower	£234.90				
SP40	40'	Tower	£309.20	SP40	40'	Tower	£461.50
SP60	60'	Tower	£368.90	SP60	60'	Tower	£517.60
Base plate 13M20				*Base plate* 16M20			
BP25	25'	Tower	£236.10				
BP40	40'	Tower	£309.55	BP40	40'	Tower	£433.40
BP60	60'	Tower	£368.80	BP60	60'	Tower	£489.70
Wall Mounting 13M20				*Wall Mounting* 16M20			
W25	25'	Tower	£162.70				
W40	40'	Tower	£236.90	W40	40'	Tower	£340.80
W60	60'	Tower	£296.60	W60	60'	Tower	£392.50

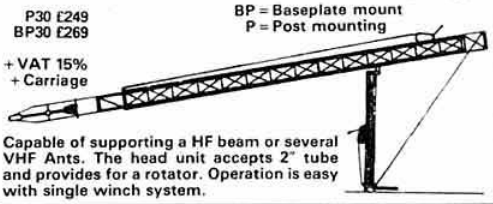
80-85-100-120' and MOBILES PRICES ON APPLICATION

NEW '30ft': 10ft SECTIONS

P30 £249
BP30 £269

+VAT 15%
+Carriage

BP = Baseplate mount
P = Post mounting



Capable of supporting a HF beam or several VHF Ants. The head unit accepts 2" tube and provides for a rotator. Operation is easy with single winch system.

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

SMC

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333

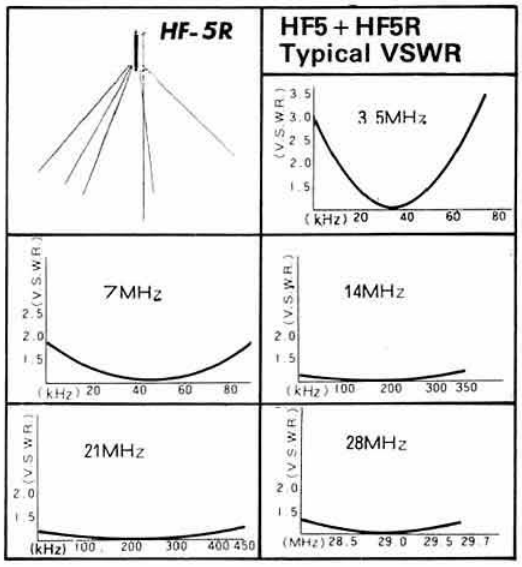
SMC-HS

FIVE BAND VERTICAL ANTENNA

Only 15' 9" high (4.8m) and around 1⅝" in diameter (4.2cm). This remarkable new antenna operates on 80, 40, 20, 15, and 10 metres. Power handling of 500W PEP on 10, 15 and 20m and 200W PEP on 40 and 80m, within its 1.5:1 V.S.W.R. bandwidth.

The SMCHF5 weighs only 6lb 6ozs (2.9kg) and is suitable for mounting at ground level on a good earth post (with or without radials) or in an elevated position with wire radials or better still the HF5R.

THE SMCHF5R Radial kit, with power handling capabilities of 150W PEP weighing only 4lbs (1.8kg) is the perfect answer to restricted locations, consisting as it does of five solid rods of similar length 6' 6"–7' 3" (2.05–2.2m) sloping at 45° to the antenna.



SMCHF5V and SMCHF5R are available from reputable amateur radio dealers throughout Britain.

SMCHF5V £35.00 + 15% VAT, £40.25 Ex-works
SMCHF5R £23.35 + 15% VAT, £26.85 Ex-works

Securicor delivery (£3 irrespective of quantity) is offered direct from SMC HQ and branches.

Check out our exciting new range of mobile and VHF colinear antennas today.

SOUTH MIDLANDS COMMUNICATIONS LTD

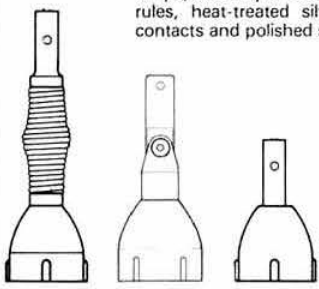
OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333 (3 lines)

ASCOT

VHF MOBILE ANTENNAS HIGH-GAIN: FIVE-EIGHTS

Manufactured in the UK, designed to withstand extremes of weather by using; fine stainless steel whips, A100 nylon bases, chrome-plated brass ferrules, heat-treated silver-plated beryllium copper contacts and polished stainless steel shock springs.



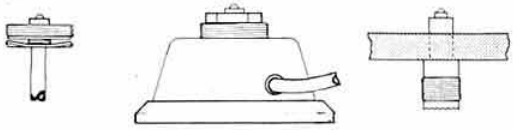
- ★ 130-175MHz
- ★ 3dB Gain
- ★ 5MHz Band
- ★ 1·5:1 max. SWR
- ★ 100W Rated
- ★ 50 ohm nom.

NB. Complete aerial consists of base plus whip plus mount. Accessories optional.

Sprung (341) £6.65 or **Swivel (330) £4.45** or **Standard (440) £3.50** plus **Whip (057) 127cm stainless £1.95**

CHOOSE THE MOUNT BASE CONNECTORS (All fit the above)

(Magnetic Mount and Assembly c/w 4·5m coax)



STANDARD (085) £2.80 or **MAGNETIC (092) £8.95** or **FIBRE-GLASS (095) N.A.**

ADD AN ACCESSORY (if required)

MOUNTS & COVERS

universal type fitting the standard cable assembly

Blank-off (031) £0.80 and **Boot-lip (093) £2.90** or **Gutter clip (089) £4.75**

Ascot antennas are available from reputable amateur radio dealers throughout Britain.
Mail order (£1.00 complete antennas or £0.50 for accessories) is offered direct from SMC HQ and Branches.
Further details and illustrated leaflet on the full range of ¼λ and ½λ antennas are available.
NB. All prices exclude VAT at 15%

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333

HANSEN

PEP & LEVEL RESPONSE IN-LINE WATTMETERS

The FS700 series are flat frequency response, peak envelope power and R.M.S. in-line wattmeters with many novel features. The most notable being the 'power independent' SWR scale—no forward power calibration knob, just a direct reading SWR scale.
Get into the Hansen habit today.

Specifications	FS700H	FS700V
Freq. Range	1·8-60MHz	50-150MHz
Power FSD	15,150, 1·5kW	15,150W
V.S.W.R.	1:1 to 4:1 and 1:1 to 20:1	
Accuracy	±7% of FSD	
Impedance	50-52 Ohms	
Connectors	SO239	
Power	240 Volts AC 50Hz	
Weight	3·3lbs (1·5Kgs)	
Size overall	8" × 4" × 5½" (205 × 100 × 140mm)	
Size Meter	2" × 3¾" (51 × 97mm)	
Time Const.	PEP follow 4 seconds	
	PEP Hold 600 seconds	
	FS700H or FS700V	**£68.00**

FS500

PEAK READING WATTMETER
Power RMS and PEP ±7% FSD
SWR Measurement 1-5:1
Size 8" ×4" × 5½"

FS500H	1·8-60MHz	20, 200 & 2kW	**£59.00**
FS500V	50-150MHz	20 & 200W	**£59.00**

FS60*

PEAK READING WATTMETER
Power RMS & PEP ±10% FSD
SWR measurements 1-3:1 ±3%
SIZE 6¼", 2¾", 4¼"

FS601MP	1·8-30MHz	20 & 200W	**£40.00**
FS601MO	1·8-30MHz	200 & 2kW	**£40.00**
FS602M	50-150MHz	20 & 200W	**£40.00**
FS603M	430-440MHz	5 & 20W	**£40.00**

Hansen Wattmeters are available from reputable amateur radio dealers throughout Britain.

Mail order service (£0.75 post and packing) is offered direct from SMC or any branch.

The range encompasses level response wattmeters and remote indicator types. Please contact your stockist for further details.

NB. All prices exclude VAT at 15%

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333

South Midlands

YAESU MUSEN UK DISTRIBUTOR

FT107M

FT107M NEW SOLID STATE TRANSCEIVER

All solid state transceiver. 160-10M (+ WWV Rx and 2 Aux). 12V DC. SSB, CW, FSK and AM. 240W PIP. The fan cooled (thermostatically controlled) no tune "broad band" power amplifier delivers 75% power output into 3:1 VSWR. Analogue and digital readout to 100Hz. Sensitive and with excellent dynamic range (hard driven schottky diode ring mixer). Continuous variable bandwidth 300Hz to 2·4kHz plus optional "basics" of 350/600Hz and 6kHz. Full equipment includes: audio peak/notch filter, full metering including SWR, RF speech processor, advanced noise blanker, semi break-in with side tone, VOX, clarifier on Tx, Rx, or both, 20dB attenuator etc. The optional memory system provides 12 stored channels (with fine tuning), and offers scanning from the microphone. The store employs DMS—digital memory shift—to allow tuning, via a photo interrupter of any of the memorised frequencies (equivalent to 13 VFOs!!).

FT107M Transceiver	£660.00	FV107 Ext. VFO	£80.00	FTV107 Transverter frame	£96.50	YM34 Mic. desk	T.B.A.
MEM/DMS Memory	£87.00	FC107 Antenna Tuner	£92.50	430-440 70cm module	£158.50	YM35 Mic. hand. scan	T.B.A.
FP107E AC PSU Extnl.	£92.50	SP107 External speaker	£24.00	144-148 2m module	£68.50	YM36 Mic. noise cancel	T.B.A.
FP107 int. AC PSU	T.B.A.	FTV107(2) Transverter	£181.50	50-54 6m module	£68.50	YM37 Mic. Hand	T.B.A.

FT901DM

FT901DM THE SUPERB PERFORMER

160-10m (+ WWV Rx), 12 and 234V (PSU Built-in). SSB, AM, CW, FSK and FM (Tx & Rx), 180W. PIP, 80W FI. Analogue 1kHz and Digital to 100Hz. Sensitive, ¼μV with AGC controlled Mosfet RF, to push pull FET RF, Balance active mixer, push pull IF amp, to crystal filter then noise blanker. Continuously variable selectivity 300Hz to 2·4kHz and fixed 600Hz, 2·4kHz, 6kHz and 12kHz (at 6dB). 80dB cross mod rejection, 90dB desensitisation immunity (at 20kHz off at 14MHz). Audio Peak and separate notch tuning. Negative RF feedback on 6146B output stage (– 31dB 3rd order). RF processor, VOX, Curtis electronic keyer, tune button (10sec on full power), PLL VFO with memory for any Tx, Rx or Tx/Rx frequency, Modular plug-in construction, permability tuning (for new band allocations) 25kHz calibrator, 20dB switchable attenuator, sidetone, clarifier and an advanced noise blanker are all features of the FT901.

FT901DM Transceiver	£800.00	YVM-1 Video Monitor	£125.00	FTV901 Transverter	£245.00	FC901 Antenna Tuner	£115.00
FT901D Transceiver	£710.00	YO901 Monitorscope	£240.00	430-440 70cm module	£160.00	FL2100Z Linear Amp.	£355.00
FT901DE Transceiver	£700.00	YO901P YO901 with pan	£280.00	50-54 6m module	£60.00	FV901DM Synth. Ext. VFO	£215.00
YR901 Morse/TTY read	£395.00	PAN KIT Mod kit	£47.00	70-74 4m module	£75.00	SP901 External speaker	£24.00

FT101ZD

FT101ZD PERFORMANCE AND ECONOMY

A hybrid HF transceiver. 160-10M (+ WWV Rx + Aux). 234V AC and 12V DC (inbuilt inverter option). SSB, CW and AM. 180W PIP from a pair of 6146B with negative feedback. Analogue and "mode sensitive" digital readout to 100Hz. Continuously variable IF bandwidth 300Hz-2·4kHz plus optional "basic fixed" of 350/600Hz. Full equipment includes:— adjustable level RF processor, advanced adjustable level noise blanker, front panel adjustable VOX, semi break-in with side tone, 0-10-20dB attenuator, switchable AGC, Slow/fast/off, clarifier (RIT) selectable on Tx, Rx or both etc., etc.
The FT101ZD is compatable with nearly all the FT901 accessories listed above—morse reader and video display, monitor scope with panadaptor, 3 band transverter, ATU, linears, speakers, and a choice of synthesized or conventional (NEW FV101Z) external VFOs.

FT101ZD Transceiver Digital	£575.00	FT101Z Transceiver Analogue	£500.00	Count Analogue/Dig. kit	£80.00	DC-DC 12V inverter kit	£30.00

FT7B & YC7B

FT7B MOBILE AND BASE

A compact all solid state HF transceiver. 80-10M. (full 2MHz coverage of 10 with optional crystals). USB-LSB CW-AM. 100W PIP (A3j and A1), 25W (A3). VFO control with clear analogue scale to 1kHz, plus an optional digital readout unit that can be conveniently sited above the transceiver, on the dash or steering column. The front panel remains remarkably uncluttered for a transceiver boasting a; crystal calibrator, vox, clarifier, side tone, and an excellent audio peak filter for CW. A mosfet RF stage for sensitivity, and a schottky diode ring mixer for dynamic range provides a level of receivers performance that outclasses "competitive" (?) transceivers. Supplied complete with mobile bracket, microphones, leads, plugs, etc. The FT7B provides the economic answer to world wide communications from home or from the car.

FT7B Transceiver	£375.00	YC7B Digital Readout	£60.00	FP12 12V 12A PSU	£67.00	YD148 Desk Mic.	£18.50

YC500J £168.50
500MHz 10p.p.m.

YC500S £237.00
500MHz 1p.p.m.

YC500E £306.50
500MHz 0.02p.p.m.

YH55 £8.75
Padded Phones

QTR25D £22.50
World Time Clock

FP12 £67.50
12Amp 12V PSU

FP4 £35.00
4Amp 12V PSU

YP150 £58.50
Wattmeter/Load

PRICES EXCLUDE VAT (15%) BUT INCLUDE DELIVERY—SECURICOR/POST IN THE UK

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A	G3ZUL	Brian	Stourbridge	(03843) 5917
G	GI3KDR	John	Bangor	(0247) 55162
E	GM8GEC	Jack	Edinburgh	(031665) 2420
N	GI3WWY	Mervyn	Tandragee	(0762) 840656
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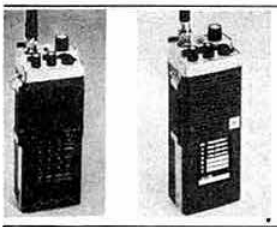
S	GW4GSW	Alan	Swansea	(0792) 24140

Communications Ltd

WITH THE TWO-YEAR GUARANTEE

YAESU



FT207R–FT202R HANDHELDS

The FT207R is a microprocessor controlled synthesized handheld that offers 12·5kHz channel steps!! 4 memory channels are provided and these may, as can the whole band, be scanned. Any one of the memories can be used as a priority channel. Simply operate as normal on any frequency, designate one of the memories as priority, and every few seconds, for a few milliseconds, the set will check occupancy of the channel. All frequency entry is by the keyboard (which includes touch tone). The readout displays frequencies (to 100Hz), memory channel number and 'P'. Switches are provided for keyboard lock (prevents accidental operation) and display 'time-out'. A 600kHz shift, and any programmable split, is available, both of course plus and minus. Memory back-up is provided but can be switched off for long-term storage. 2.5W + 200mW outputs and a whole host of accessories complete the brief specification of this exciting transceiver.
The FT202R is an economical 6 channel handheld physically similar to the FT207R.

FT207R Transceiver	£173.04	NC-9C Small charger	£6.50	YM24 Speaker/mic	£14.50	FT202R Transceiver	£103.50
NC-1A Slide-in charger	£16.50	NBP-9 Nicad pack spare	£14.50	FLC1 Heavy duty case	TBA	NC-1 AC charger '202	£16.50
NC-2 Charger eliminator	£34.50	FBA-1 Pack/charger adaptor	TBA	AA Nicads, each	£0.87	PA-1 12V PSU'202	£16.50

CPU2500 MICROPROCESSOR CONTROLLED

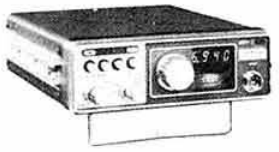
The CPU2500 family are 2 metre FM transceivers available in 25W or 10W output form with keyboard or standard push tune microphones. CPU stands for Central Processing Unit and it is this microprocessor that governs the synthesizer functions. Frequency control is possible either by rotating the main tuning knob (optically coupled), by using the up/down push buttons on the front panel, by using the up/down buttons on the microphone or by tapping in the data on the keyboard microphone. Plus and minus 600kHz repeater shift and any split (up to 4MHz) can be programmed in. Four memory channels with back-up are provided and these may be scanned, as can the whole band, the scanner stopping at the first vacant or occupied channel. The SMC stepper (St) provides 25kHz steps between 145·146MHz (and entry of 5kHz direct from the keyboard) rather than the 10kHz (+5 up) synthesizer steps only, when it is switched into circuit.

CPU2500R 25W standard	£292	CPU2500RKS 10W key mic	£292	CPU2500RK 25W key mic	£308	CPU2500RS 10W standard	£272
CPU2500St 25W c/w stepper	£319	CPU2500RKSSt 10W key, stepper	£319	CPU2500RKSt 25W key, stepper	£335	CPU2500RSSt 10W c/w stepper	£279

FT225RD MULTIMODE 2 METRES

144·146·148MHz. USB, LSB, AM, FM, CW (semi-break-in with side tone). Smooth dual speed VFO control and 11 (×4) crystal channels. Simplex and (auto tone burst) repeater, 600kHz and auxiliary shifts both up and down. Single signal mix, with phase locked conversion oscillator, for spurious free output. Mains 234·100V 50/60Hz and 12V DC for world wide portability. Excellent selectivity, SSB 2.4kHz with 1.75: 1 SF, FM 12kHz at −6dB. High sensitivity with modern MOSFET RF stage. Good strong signal handling by careful gain distribution, mixer and crystal filter design. High power output 10W AM, 1·25W CW and FM, SSB 25W + + with great reliability and low IMD's. Mode sensitive digital readout to 100Hz and easy to service superior plug in board construction. Front panel controls for: SSB mic gain, FM power, squelch, 'Vox/Mox sensitivity, noise blanker, AGC, readout brightness, meter functions (S/centre plus relative power) etc etc. Digital and Analogue versions and memory option.

FT225RD Transceiver	£485.00	FT225R Transceiver	£445.00	MEM memory option	£85.00	COUNT Counter R/RD	£50.00



FT227 SYNTHESIZED AND MOBILE

The FT227s are 10W output 2 metre transceivers whose receiver performance—sensitivity and immunity to overload has become the standard against which others are compared. They use a signal knob (photo interrupter) to control the synthesizer, which basically turns in 10kHz steps with a 5kHz 'fill in' oscillator.
FT227RXS is an FT227R fitted with SMC's scanner. This maintains all the normal features of the 227 but the neat internal installation provides automatic tuning from 145 to 146 in 25kHz steps. When finding an occupied frequency the scanner pauses for about seven seconds and if not held will move on. A flick of the P.P.T. will lock out one (or all) unwanted channels next scan around.

FT227RBXSt is an FT227RB fitted with SMC's stepper. A four channel memory is provided in this model and tuning may also be accomplished by push buttons on the microphone. A single push moves the transceiver 25kHz, hold the button down for ½ second and it scans the band until a station is found.

FT227RXS Transceiver	£252.17	FR227RBSt Transceiver	£247.83	FP4 12V 4A PSU	£35.00	YD148 Desk mic	£18.50

YD844 £19.50
Desk Microphone

YD148 £18.50
Desk Microphone

YM21 £12.00
Noise cancl. Mic

YE17 £12.00
Push tune mic

YM846 £7.50
Hand microphone

YM2500 £22.00
Keyboard mic

FSP1
Mobile speaker

FF501 £17.50
Low pass filter

PRICES EXCLUDE VAT (15%) BUT INCLUDE DELIVERY—SECURICOR/POST IN THE UK

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9 5; Mon Wed & Fri Sat.

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Jack Tweedy, G3ZY
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South Midlands

SMC FOR ALL YOUR ACCESSORIES

ASCOT ANTENNAS VHF MOBILE (Carriage £0.95) + VAT 15%

340	¼λ	Standard Base	£2.10	085	¼ & ⅝	Cable Assembly	£2.80
310	¼λ	Swivel Base	£3.50	085L	¼ & ⅝	Fibreglass Mount	£3.00
344	¼λ	Sprung Base	£5.55	092	¼ & ⅝	Magnetic Mount	£8.95
440	⅝λ 2m	Standard Base	£3.50	084	¼λ	Cable Assembly	£4.15
330	⅝λ 2m	Swivel Base	£4.45	088	¼λ	Cowl Mount	£4.95
341	⅝λ 2m	Sprung Base	£6.65	091	¼λ	Magnetic Mount	£9.80
350	¼λ 2m	Fine Tune Base	£7.15	089		Gutter Mount	£4.75
351	¼λ 2m	Sprung 350 Base	£8.25	093		Boot mount	£2.90
057		127cm Tapered Whip	£1.95	031		Blank off ¼λ & ⅝λ	£0.80
056		63cm Parallel Whip	£0.95	044		Blank off ¼λ	£0.45

BANTEX VHF MOBILE ANTENNAS (Carriage £0.90) + VAT 15%

42SS	¼λ 4m	Stainless whip	£1.75	B5U	⅝λ	70cm whip	£2.10
40GF	¼λ 4m	Glass whip	£3.55	UCL	¼ & ½	70cm Colinear	£6.45
20SS	¼λ 2m	Stainless whip	£1.50	UDL	⅝ & ½	70cm Colinear	£11.95
18GF	¼λ 2m	Glass whip	£2.80	BM		Standard base ½"	£1.65
B5	⅝λ 2m	Glass whip	£7.75	BC		Claw base	£3.50
BGASS	¼λ 2m	Stainless whip	£8.60	BD		Trunk lip base	£5.50
BGAGF	¼λ 2m	Glass whip	£9.10	BMM		Magnetic base	£10.95

SMC–HS (Carriage Extra, call for quote) + VAT 15%

SMC15SE	¼λ	15m 1.72m	£11.00	GDX2		Discone 50-580MHz	£39.50
SMC10SE	¼λ	10m 1.72m	£11.00	GDX1		Discone 80-480MHz	£37.50
SMC2NE	⅝λ	2m 1.30m	T B A	VHFL		Rx Discone 65-520MHz	£15.00
SMC78F	¼λ	2m 1.75m	£10.00	LT606		Log Per. 50-500MHz	£75.95
SMC78B	¼λ	2m 1.72m	£11.00	VS-BNC		Helical 145MHz BNC	£3.85
SMC258	⅝ + ⅝	70cm 0.94m	£10.00	145PL		Helical 145MHz PL259	£3.00
RG4M		Cable Assembly	£3.00	156PL		Helical 156MHz PL259	£4.35
GSS		Gutter clip	£5.00	GPV-5		Colinear 145MHz 6.5dB	£21.74

JAYBEAM VHF FIXED ANTS (P&P extra, phone quote) + VAT 15%

4Y/4M	4 element yagi		£14.95	5XY/2M		5 element crossed	£18.00
PMH2/4M	2 way harness		£10.60	8XY/2M		8 element crossed	£22.50
D15/23	15 over 15 slot		£26.90	10XY/2M		10 element crossed	£29.80
UGP/2M	Ground Plane		£8.15	PMH2/C		Circular harness	£5.90
C5/2M	Vert Colinear		£34.80	PMH2/2M		2 way harness	£7.80
5Y/2M	5 element yagi		£8.90	PMH4/2M		4 way harness	£18.70
8Y/2M	8 element yagi		£11.50	C8/70		Vert. Colinear	£39.50
10Y/2M	10 ele long yagi		£24.70	D8/70		8 over 8, slot fed	£17.80
14Y/2M	14 ele long yagi		£31.50	PBM18/70		18 ele. Parabeam	£21.50
PBM10/2M	10 ele Parabeam		£29.20	MBM48/70		48 ele. Multibeam	£24.50
PBM14/2M	14 ele Parabeam		£35.50	MBM88/70		88 ele. Multibeam	£32.60
Q4/2M	4 element quad		£18.70	8XY/70		8 element crossed	£27.00
Q6/2M	6 element quad		£24.80	12XY/2M		12 element crossed	£33.50
D5/2M	5 over 5, slot fed		£15.90	PMH2/70		2 way harness	£6.75
D8/2M	8 over 8, slot fed		£21.60	PMH4/70		4 way harness	£14.30

G-WHIP HF MOBILE ANTENNAS (Carriage £0.95) + VAT 15%

TRIBANDER	10-20M Slide		£21.50	FLEXIWHIP		10M Mast	£15.00
LFCOIL	40/80/160M	each	£5.70	FF		15/20/40/80/160M each	£5.70
LFWHIP	Telescopic		£2.90	GW BASE		Standard base	£3.90
MULTIMOBILE	10-20M Auto		£25.00	35BASE		Heavy Duty base	£5.00
MMCOIL	40/80/160M	each	£5.70	TA		35 to G-Whip	£0.80
MMWHIP	Telescopic		£2.90	EXTENDAROD		Extension	£10.00

GEM QUAD FIBREGLASS 10-20M (Carriage £4-£11) + VAT 15%

GQ2E	2 Element quad	£124.00	GQ4E	4 Element quad	£249.00
GQ3E	3 Element quad	£187.00	GQCK11	Element Conversion kit	£63.00

MOSLEY TRI-BAND BEAMS (Carriage £4-£9) + VAT 15%

TA32	2 ele. 200W RMS	£70.00	MUSTANG2	2 ele. 1KW RMS	£95.00
TA33	3 ele. 200W RMS	£105.00	MUSTANG3	3 ele. 1KW RMS	£130.00

SMC TRAPPED DIPOLES 10-80M. (Post £0.75) + VAT 15%

S500	Standard – 14 SWG	£26.50	P500	Portable – Cu/Terylene		
HP1K	High Power – 14 SWG	£29.00		braid, c/w 75ft feeder		£32.50

WIRE & BRAIDS (Post and Packing extra) + VAT 15%

7/029H	Cu Hard Drawn	yd	£0.15	14 SWG	Cu Hard Drawn	yd	£0.13
7/036H	Cu Hard Drawn	yd	£0.18	BRAID	Cu/Terylene, ¼"	yd	£0.14
7/044H	Cu Hard Drawn	yd	£0.24	7/029S	Cu Soft Drawn	yd	£0.13

AERIAL INSULATORS (Post Extra) + VAT 15%

SMCP1	3" Polyprop. ribbed		£0.37	EGG1	1½" Egg porcelain		£0.33
SMCP2	8½" polyprop. ribbed		£1.85	Commercial duty			POA

WIGHTRAPS AERIAL TRAPS (Post £0.40) + VAT 15%

WTS	Standard – White	£5.85	WHTB	"Space Saver", 3·5MHz	
WTHP	High Power – Blue	£8.25		resonance, for 1·8MHz	£7.50

BALUNS 3-30MHz (Post £0.50) + VAT 15%

BN86	1:1, "U" bolt mount		£13.50	W2AU1	1:1, c/w spark gap		£9.50
HIQ	1:1, "Hang up" Type		£8.70	W2AU4	4:1, c/w spark gap		£9.50

LIGHTNING ARRESTORS COAXIAL (Post £0.30) + VAT 15%

SM566	Spark, SO239/PL259		£2.55	NSK7S	Gas, SO239/SO239		£7.50
SM567	Spark, SO239/SO239		£2.55	LA1	Gas, Bulkhead		£39.50

CABLES RF FEEDERS (Carriage extra) + VAT 15%

RG58U	50Ω 0·2" Stranded	yd	£0.18	307EP	75Ω "Economy"	yd	£0.12
UR43	50Ω 0·2" Solid	yd	£0.17	UR70	75Ω 0·225" Stranded	yd	£0.18
UR76	50Ω 0·2" Stranded	yd	£0.17	UR39	75Ω 0·306" Medium	yd	£0.27
UR67	50Ω 0·405" Heavy	yd	£0.42	UR57	75Ω 0·405" Heavy	yd	£0.45
RG213	50Ω 0·405" Heavy	yd	£0.42	302	75Ω Flat twin	yd	£0.11
306	300Ω Ribbon	yd	£0.12	3X21	240Ω Oval twin	yd	£0.08

COAX PLUGS UHF (Post and Packing £0.20) + VAT 15%

PL259	Standard UHF plug		£0.48	SO239	Free angle UR43		£0.88
UG175/U	Reducer UR43		£0.12	PL258	Back-back, female		£0.79
UG176/U	Reducer UR70		£0.12	PL274	Back-back, chassis		£0.93
PL259R	"Reduced" plug		£0.58	PL258M	Back-back, male		£1.20
PL259SL	"Solderless" UR67		£0.55	M359	Angle (1m + 1m)		£0.93
PL259SS	"Solderless" UR43		£0.55	M358AF	"T" (3 females)		£1.48
PL259P	Push-on plug		£0.69	M358	"T" (2 fem. 1 male)		£1.20
PL259E	Elbow plug UR43		£0.83	M458	4-way (3 fem. 1 male)		£1.85
PL259PM	Panel mount PL259		£0.93		SO239/Car + phono		£0.60
SO239F	4 hole socket		£0.42		SO239/2·5mm Jack		£0.69
SO239T	2 hole socket		£0.42		SO239/3·5mm Jack		£0.69
SO239N1	Socket "nut" inside		£0.51	255/U	SO239/BNC male		£1.53
SO239NO	Socket "nut" out		£0.51	273/U	SO239/BNC fem.		£1.53

COAX PLUGS BNC (Post £0.20) + VAT 15%

UG88	Plug, Stnd UR43		£0.54	UG491	Double male		£0.93
UG959	Plug, Large UR67		£2.66	UG274	"T" 2 female, 1 male		£1.44
UG291	Socket, 4 hole stnd.		£0.56		"T" 3 female		£1.74
UG1094	Socket, Nut fixing		£0.56	UG306	Elbow adaptor		£1.62
UG89	Socket, Free, UR43		£0.72	255/U	BNC male/SO239		£1.53
UG914	Double female		£0.93	273/U	BNC female/PL259		£1.53

MASTING (Carriage extra) + VAT 15% (N.B. Max 20', Max BRS 13')

1¼" od	Aluminium 16g	ft	£0.42	2"	Al. Thick wall 1⅝"		£1.05
1½" od	Aluminium 16g	ft	£0.46	2"	Steel Galv. 1⅝"		£0.82

MAST BANDS & PLATES (Carriage £0.40) + VAT 15%

SMP3	3 hole guy plate 2"		£0.85	SMB43	3 hook band		£1.15
SMP4	4 hole guy plate 2"		£1.55	SMB151	4 hook band 2"		£1.65

ROPES—WIRES (Post and Packing extra) + VAT 15%

3mm	HT steel, 0·63T.	yd	£0.18	X150	Rustproof, ⅛" D.	490'	£16.30
4mm	HT steel 1·5T	yd	£0.24	7X18g	Galvanised	100'	£4.40

ROPES—TERYLENE (Post and Packing extra) + VAT 15%

¼"	BS150 lbs (circ.)	yd	£0.07	¼"	BS1250 lbs (circ.)	yd	£0.14
⅜"	BS650 lbs (circ.)	yd	£0.10	1"	BS2450 lbs (circ.)	yd	£0.27

CABLE GRIPS (Post and Packing £0.30) + VAT 15%

⅛"	Bulldog, galv.		£0.19	HD9	Plated brass line clamp for		
¼"	Bulldog, galv.		£0.16		copper wire		£0.44

SHACKLES (Post and packing £0.30) + VAT 15% N.B. Pin sizes given.

¼"	D galvanised		£0.24	⅜"	D galvanised		£0.33
⅝"	D galvanised		£0.28	½"	D galvanised		£0.42

THIMBLES (Post and packing £0.20) + VAT 15%

F1235	1¼" Nylon, for terylene		£0.14	1½"	Galv. for steel		£0.13
F985	1¼" Nylon, for terylene		£0.16	1½"	Galv. for steel		£0.15

RIGGING SCREWS TURNBUCKLES (P&P £0.30) + VAT 15%

	4" × ⅛" pressed		£0.75		6" × ⅜"		£2.85
TPR933	4½" × ⅛"		£1.65		Miscellaneous		P.O.A.

GUY STAKES (Carriage £1.00) + VAT 15%

GS18	18" Angle galv.		£2.55	GS36	36" "T" section, Heavy		
GS27	27" "T" galvanised		£3.75		Duty, Galvanised		£7.75

STAND OFF BRACKETS (P&P £1.75, Sec. £2.80) + VAT 15%

W12	12" bracket	pair	£6.50	W21	21" bracket	pair	£9.50
W18	18" bracket	pair	£8.75	W24	24" bracket	pair	£11.50
W18HD	18" Heavy Duty	pair	£11.75	W24HD	24" Heavy Duty	pair	£14.25

RAWLBOLTS (Post and packing £0.40) + VAT 15%

6mm	¼" rawlbolt		£0.24	10mm	⅜" rawlbolt		£0.42
D2	⅛" rawlbolt		£0.29	5mm	⅛" rawlbolt		£1.45

MAST TO BOOM CLAMPS (Post and Packing £0.70) + VAT 15%

SMC53	1·2" mast, 1" boom		£1.10	JBL73	1·2" mast, 1¼" boom H.D.		£1.50
SMC63	1·2" mast, 1·1¼" boom		£1.25	CP1	2" × 2", 6" × 6" plate		£2.30

MISCELLANEOUS HARDWARE (P&P extra) + VAT 15%

SMC59/15	2" mast sleeve 15" long		£4.20	MBP	Mast Base Plate 2"		£3.40
SH2	Snap hook 2½"		£0.68	ER4	Earth rod 4' c/w clamp		£4.25
MC1	Mast cap cast alloy 2"		£1.85	UB2	U bolts 2" × ⅜"		£0.32

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105BA	10m.	5 element yagi	18.5'LE	24'B	£92.00
153BA	15m.	3 element yagi	23.0'LE	12'B	£62.75
155BA	15m.	5 element yagi	24.5'LE	26'B	£117.50
203BA	20m.	3 element yagi	35.0'LE	16'B	£117.50
204BA	20m.	4 element yagi	36.5'LE	26'B	£155.00
205BA	20m.	5 element yagi	36.5'LE	34'B	£205.00
402BA	40m.	2 element yagi	43.0'LE	16'B	£158.00
DB 10–15A	10–15m.	3 element yagi	23.0'LE	13'B	£116.00
TH2MK3	10–20m.	2 element yagi	27.3'LE	6'B	£109.75
TH3JNR	10–20m.	3 ele 600W yagi	24.2'LE	12'B	£113.50
TH3MK3	10–20m.	3 element yagi	27.0'LE	14'B	£157.00
TH6DXX	10–20m.	6 element (total)	31.1'LE	24'B	£205.00
HY QUAD	10–20m.	2 element quad	13.5'TR	8'B	£169.00

12AVQ	10–20m.	Trapped vertical	14'H £37.50
14AVQ/WB	10–40m.	Trapped vertical	18'H £52.50
18AVT/WB	10–80m.	Trapped vertical	25'H £76.00
14RMQ		Roof kit for 12, 14 & 18	£19.50
18V	10–80m.	Loaded vertical	19'H £37.50
18HT	10–80m.	Hy Tower "stubbed"	50'H £225.00
BN86	3–30MHz Balun ferrite 1:1 with U bolt		£13.50
LA1	Lightning arrestor gas filled, bulkhead mount		£27.35
LA2	Lightning arrestor spark discharge, In line 239		£3.45
415	Bumper strap, stainless steel band c/w base		£10.80
499	Body mount, hemispherical chromed (3½" dia.)		£10.80
511	Spring, heavy duty chrome plated (4½ 3lbs)		£8.85
417	Spring, medium duty chrome plated (4½" 2lbs)		£8.20

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If you have been searching for an all solid state HF transceiver with a "broad band" output that will deliver 75 per cent of maximum power into a 3:1 load, then look no further than this top of the line Yaesu. The FT107M covers 160-10M (plus) and is fully equipped with: variable IF bandwidth, audio peak/notch filter, RF speech processor, variable threshold noise blanker, full metering—including SWR, and boasts a schottky diode ring mixer for excellent receiver dynamic range. The all new memory system provides 12 stored channels (with fine tuning), scanning from the optional microphone and the exclusive DMS—digital memory shift. This system using a photo interruptor (with fine tuning) to control the 100Hz synthesizer thus providing any offset up to 500kHz—from the memory channel.

A full list of accessories is available to complement the FT107M. The illustration below shows (reading from left to right): the SP107P speaker/phone patch (normal speaker SP107 available); the FTV107R two band transverter (two from 432, 145 or 50MHz); the FT107, itself, the FV107 remote VFO (with 5 crystal channels); the FC107 antenna coupler with twin VSWR/power meters, and the FP107E AC psu with speaker.

Not illustrated is the FP107 slide-in AC PSU, or the microphone range. (YM34 desk—YM35 hand c/w scanning control—YM36 noise cancelling—YM37 hand).

For further details of this exciting new system, please contact any authorised sales outlets for a free colour brochure. Or better still, see it for yourself, try one out today!!!

- ★ 160-10 meters plus WWV plus 2 auxilliary bands
- ★ USB-LSB-CWW-CWN-FSK-AM operation
- ★ All solid state, including final amplifier
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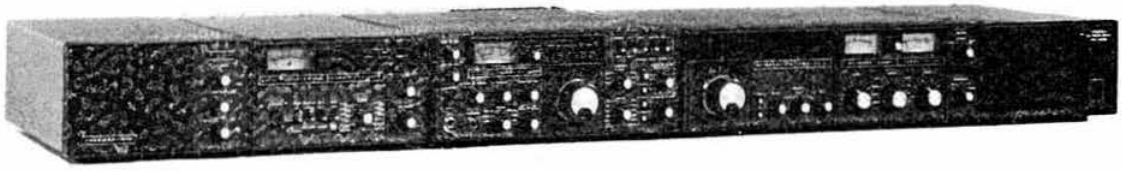

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RSGB NEWS BULLETIN SCHEDULE

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3,640kHz. Mode: SSB			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3,650kHz. Mode: SSB			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH	1000
N Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Frequency: 3,660kHz. Mode: SSB			
Central Scotland	GM3TCW	*(Vacancy)*	1130
Frequency: 7,047·5kHz. Mode: AM			
UK	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: SSB. Horizontal polarization			
SW from Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	*(Vacancy)*	1000
NW from Manchester	G3SMT	G4IAL	1000
NNW from Cleveland	G8LIC	G8FTZ	1000
W from Carlisle	G8DVD	G3VIJ	1030
SE from Lincoln	G8OFQ	*(Vacancy)*	1030
SW from London	G3FZL	G3IIR/G3VAG	1030
S from Aberdeen	GM8GHV	GM3ZBE	1030
W from Bristol	G4CJZ	G3ZWY	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21 FM). Vertical polarization			
Jersey	GJ8KNV	GJ4ICD	0930
Cornwall	G2ABC	G3NPB	0930
Hampshire, north	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FSG	0930
Leeds	G3SPX	G3PSM	0930
Co Down	GI3WEM	*(Vacancy)*	0930
Edinburgh	GM4EHO	GM8PKQ	0930
E Cornwall/S Devon	G3ZYY	*(Vacancy)*	1000
Londonderry	GI2DHB	*(Vacancy)*	1000
London	G3FZL	G3IIR/G3VAG	1000
Birmingham	G3PWJ	G3BA	1000
Lincolnshire	G8OFQ	*(Vacancy)*	1000
Tyneside	G4FUT	*(Vacancy)*	1000
Glasgow	GM8PSM	GM3UCI	1000
Elgin	GM8LHE	*(Vacancy)*	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY	1030
Manchester	G3LEQ	G3JWK	1030

THE 1979 AGM

The following is a brief report of the fifty-third AGM of the RSGB which took place at the Institution of Electrical Engineers, London, on 8 December 1979. It is primarily intended for those members who were unable to attend the meeting. It is an informal account in advance of the publication of the official minutes of the meeting, and not a formal record of the event.

In the presence of 109 members, the President, John Bazley, G3HCT, took the chair, and opened the meeting. With him on the platform were Peter Balestrini, G3BPT, President-elect; Dain Evans, G3RPE, immediate past-President; David Cornish, G3COR, honorary treasurer, and David Evans, G3OUF, general manager/secretary.

Formal agenda items

The meeting approved the minutes of the fifty-second AGM, and then considered the accounts for the year ended 30 June 1979 and the reports of the Council and the auditors thereon.

The President announced the names of the members elected to serve on Council for three years from 1 January 1980. The meeting confirmed the appointments of Mr G. R. Jessop, G6JP, and Mr W. F. McGonigle, GI3GXP (who had been returned unopposed)—both of whom were over 70 years of age.

It was resolved to reappoint Messrs Edward Moore & Sons as auditors of the Society, and Council was authorized to fix their remuneration for the ensuing year.

Founders' Trophy

Council had unanimously agreed to award this trophy, presented annually for services to the Society, to Cyril Parsons, GW8NP. Before presenting the trophy to GW8NP, the President said of him:

"He represented Region 10 for many years before being elected to Council in 1971. Four years later he established two records, by becoming the first holder of a Welsh callsign to become President and by holding his Presidential Installation outside London.

"He was chairman of the Finance & Staff Committee in 1976, during which year one of the most important decisions affecting the future of our Society was taken—the installation of the IBM32. In 1976, following the previous year's loss of £13,000, it was a bold and courageous step, requiring patience and tenacity to obtain Council approval. In 1979 we can now see how wise that decision was."

Honorary vice-president

The President announced that Council had appointed Brian Rix, G2DQU, an honorary vice-president in recognition of the assistance he had given in the publicity sphere for amateur radio during the year. On a number of occasions he had been interviewed on radio and television for his views and for details of his interest in amateur radio. In particular the Society was grateful for the time he had given in guiding and introducing the "Open Door" programme which featured amateur radio.

Unfortunately G2DQU was unable to be present at the AGM to receive the parchment confirming his appointment.

Honorary member

In announcing that it was the unanimous wish of Council that Roy Stevens, G2BVN, be made an honorary member of the RSGB, the President said:

"1937 saw the issue of a callsign that was destined to become extremely well known, not only within our Society but world wide—I refer of course to Roy Stevens, G2BVN.

"Steve served on Council for 18 years—he was chairman of Technical & Publications Committee for 12 years, served on Finance & Staff Committee, IARU Working Group, Telecomms Liaison Committee and, during the 'sixties, for a period on the Scientific Studies Committee.

The President, John Bazley, G3HCT, addressing the AGM. With him on the platform are (l to r) Dain Evans, G3RPE; Peter Balestrini, G3BPT, and David Evans, G3OUF

"It is mainly due to Steve that the close links that the Society now enjoys with the Home Office were formed in the late 'sixties, following which he was asked to join the UK delegation to the 1971 Space Conference to advise on matters affecting the amateur service.

"He was elected President in 1966, and in that year also attended the IARU Region 1 Conference in Yugoslavia where he was elected vice-chairman of Region 1. At the 1969 Region 1 Conference in Brussels, Steve was elected IARU Region 1 secretary, a post he has held ever since.

"Steve, I am sure you will realize, has been fully committed in Geneva, since 24 September until this week, with WARC 79. Had the conference ended on time he would have been here today to have given us a personal report on the conference and to receive this, the highest award that the Society can offer."

Informal session

Before opening the informal session, the President gave the following brief review of the Society's activities during 1979. He said:

"The achievements within the Society during 1979, as in previous years, have been due not only to our permanent staff—and the demands on them have been greater than ever—but also to the large number of volunteers who serve on the various committees providing technical and administrative expertise at very little cost to the Society. I would like to take this opportunity on behalf of all our members to thank those of you who have contributed to the running of the Society during the past 12 months. I would like to emphasize the following:

1. The trend in membership applications is very encouraging, even in the current financial climate—this year showing the largest annual growth in the Society's history.
2. The improvement in material and exhibits available from headquarters for clubs and affiliated societies holding exhibitions, conventions etc.
3. The changes in the GB2RS schedules and the wider range of news that is now included in the bulletins.
4. The positive steps taken by the Technical & Publications Committee, following my appeal at my installation in January, for articles describing the construction of simple equipment.
5. The financial controls that have been introduced under the guidance of our honorary treasurer, David Cornish.

"This month, unfortunately, we see the retirement from Council of two members whose advice and wisdom we have taken for granted over the past few years, I refer of course to Steve, G2BVN, and Cyril, GW8NP. We will miss them both.

"Finally may I thank you all for your support during the past 12 months and wish you all a very happy Christmas and successful 1980."

Marconi Medal 1979

Council had recommended to the Marconi Company that the 1979 award be made to Mr M. H. Walters, G3JVL, and Mr J. Watts, of the Marconi Company, was present at the meeting and made the award to G3JVL.

Mr Walters has for very many years taken a leading role in the technical development of amateur radio, being an electronics engineer who brings all his professional skills to amateur radio, and demonstrates that the technical standards of amateur radio need in no way be inferior to professional standards. He is prepared to use his professional skills to develop "safe" techniques by which amateurs with limited facilities can operate at a much higher technical level than they could otherwise expect to do.

Mr J. Watts presenting the Marconi Medal 1979 to Mr M. H. Walters, G3JVL, (left)

The development of the high-gain quad-yagi antenna for use at lower microwave frequencies is an excellent example of his skills. This has transformed operating at these frequencies by making reasonable antenna gains a practical proposition for ordinary amateurs. While antennas have always been one of his prime interests, his most recent work has led to the development of the simple transverter for narrow-band single sideband and cw operating at 10GHz.

From the floor

G2RX asked about the possibility of propagation information being transmitted on standard frequency broadcasts in the UK, similar to the WWV broadcasts in the USA. Additionally, he suggested a net frequency for those interested in propagation matters. G3FZL replied that the suggestion had been discussed recently and been greeted with much enthusiasm. It seemed worthwhile for the Society to pursue the idea with the appropriate authority. Another technical possibility was to arrange for beacons to transmit propagation information.

G8FRB asked why the 144MHz Open Contest and the SSB Field Day took place on the same day. G3FZL, for the VHF Contests Committee, and G3MXJ, for the HF Contests Committee, both gave answers, saying that the reason for the duplication lay primarily in historical agreements with other European societies. The President reminded the meeting that the societies did not select dates for contests at random, most dates were agreed at international level.

G2MI asked about the intention of the Society to publicise the voluntary intercepters featured in the recent BBC 2 documentary "The Secret Listeners". He also asked about the RSGB's collection of old equipment and that at the National Amateur Radio Museum on the Isle of Wight. He was concerned about its future; some of it being irreplacable, and some unique. The President said that the Society had a video tape of "The Secret Listeners" and it was understood that a book was being written covering the whole subject. The Society's honorary treasurer said that the historical equipment had been discussed in Council several times during the past year. He had

made some contacts who had offered sound advice, and this had led the Society to approach the Science Museum for further advice. A trained archivist seemed to be the correct approach, coupled with the possibility of forming a trust and arranging a permanent home for such equipment.

G3IEE said he had his own collection of historical equipment and appreciated some of the many problems involved, and welcomed the honorary treasurer's comments regarding the formation of a trust. **G6NZ** and **G2UV** also spoke on this subject.

G3YMK thanked all those responsible for providing information on the World Administrative Radio Conference, and asked if there was any news of the possibility of a 50MHz band in Region 1. G3OUF said that a resolution which would have allowed administrations in Region 1 to allocate up to a 200kHz wide band around 50MHz had been discussed but was not passed by the conference. The UK administration had supported this resolution and the Society hoped that this augured well for the future.

G8MCV said that most members had appreciated the publicity on tv this year, but commented that the recent "Shoestring" programme had portrayed a somewhat different picture of amateur radio.

G3IEE complained about the Home Office licence renewal system, which was quite inadequate for reciprocal licensing. G3OUF said it appeared that the Home Office accounting branch was separate from the licensing section, but the Home Office licensing section were able to issue a letter, on request, stating that the recipient held a valid UK licence. This had assisted amateurs in obtaining reciprocal licences.

G4EAN said that a member had asked why erp was used to measure power in a low power contest, as input power was easier to measure. G3MXJ said that this rule applied only in the low power contest, and was the method used by many European societies.

G3MEK thanked the many committee members who put in much voluntary effort, and asked for their names to be published in *Radio Communication* more often. The November 1979 issue had been the first in which he had seen them and those of the various chairmen. He also asked about the activity of the Observation Service. Dr Evans said that after committee members had been approved by Council, normally at its first meeting in the year, a list was published shortly afterwards (*In 1979, in the May issue*—Ed). In reply to the second question the President said that David Pratt, G3KEP, was the best person to speak about the Observation Service, but in his absence said there were now approximately 14 observers. The object of the service was to draw amateurs' attention to any activity not in accordance with the licence well before further action was taken by the authorities. It was intended to be a service to amateurs, not a policing system.

G3SJE asked about the possibility of a novice band, and the President replied that the Society had formed a working group and was looking at the possibility.

Finally **G3RPE** reported that the four new London repeaters had become operational at 10am on that morning 8 December.

The President closed the meeting at 4.40pm.

QTC

amateur radio news

Executive Vice-President for 1980

At its meeting on 12 January 1980, Council unanimously elected Mr B. O'Brien, G2AMV, as executive vice-President of the RSGB for 1980.

Council member vacancy

Mr C. J. Thomas regretfully resigned from Council on 31 December 1979 because of pressure of business commitments.

To fill the resulting casual vacancy, Council has co-opted Mr K. A. M. Fisher, G3WSN, as a Council member for the rest of 1980.

QSL Bureau—G4HAA-HZZ series

Mr G. Thompson, G8KLI, has resigned the position of sub-manager for the G4HAA-HZZ series due to ill-health. The new sub-manager for this series is Mr R. Staples, G4HGI, 3 Willow Close, Lymm, Cheshire WA13 9DL.

"A 25kHz step synthesizer with half-channel facilities for 145–146MHz"—errata

The author of this article, published in the October 1979 issue of *Radio Communication*, has informed us of the following errors which appeared in it:

1. C63 is missing from the circuit (Fig 4) and should be connected between the junction of R61, R62, R63 and earth.
2. C64 in the components list should be 47μF.
3. R11, 12 etc in the components list should be 4·7kΩ.
4. The caption of Fig 1 should read "Voltage controlled oscillator".

Stolen equipment

Trio 2200GX, chassis number 540030, six channels fitted, stolen in Salford in November 1979. Reward offered for information leading to recovery. Information to B. Lewis, G8NHN, 10 Filey Road, St Annes-on-Sea, Lancs FY8 3EZ.

KDK FM2016E 144MHz transceiver, serial number E1100, stolen in Bexley on 13 December. Information to T. Goodchild, G8NTB, 50 Longmead Drive, Sidcup, Kent.

WARC 79

by R. F. STEVENS, G2BVN

The largest telecommunications conference yet held finished its work on 6 December 1979. The story of 74 days of meetings, many lasting from 9am until past midnight, is probably of little interest to the average member. However, some basic facts should be put on record.

Duration of WARC: 24 September–6 December 1979.
2,000 delegates/observers from 142 countries and 30 international organizations; 894 plenary meetings or meetings of committees and working groups, plus many smaller meetings.

The frequency allocation table now covers 9kHz to 400GHz, to which there are 487 footnotes.

Committee 5 [frequency allocation] and its seven working groups considered 12,832 proposals for alteration to the frequency table.

The new Radio Regulations comprise 1,150 pages and come into effect on 1 January 1982.

Of the new hf bands at 10·1, 18·068 and 24·890MHz, the latter two are subject to the transfer procedures and availability will be delayed beyond 1982. This applies to all services, not only amateur.

The IARU WARC team was present during the entire conference, and its members attended every meeting at which amateur radio matters might be discussed.

The IARU WARC team comprised: R. L. Baldwin, W1RU; T. R. Clarkson, ZL2AZ; N. B. Eaton, VE3CJ; E. Godsmark, G5CO; B. A. Johnson, WA6IDN; S. Morimoto, JA1NET*; W. Nietyksza, SP5FM; D. Rankin, 9V1RH*; P. Seidemann, YV5BPG*; A. Shaio, HK3DEU*; C. L. Smith, W0BWJ; R. F. Stevens, G2BVN, and D. Sumner. K1ZZ.
(* Indicates attendance for part of conference)

In addition there were 154 radio amateurs serving on delegations; a small number of them were present specifically as advisers on amateur radio matters.

Conference comment

Considering the political undertones, the response of WARC to the amateur service was gratifying. Support from the Arab group of countries was most welcome, but continual hostility was encountered from France, Japan, Kenya and Nigeria. Norway was outstanding in support of the amateur service.

The frequency above which administrations may issue licences without a cw test is now 30MHz. This was a decision of particular importance.

A disappointment was the failure by six votes to obtain reference to a 50MHz allocation in Region 1.

A strong resolution was adopted with the intention of removing broadcast stations from 7 to 7·1MHz.

Red Cross emergency communications shall be conducted outside amateur bands. A proposal to allocate specific segments of hf amateur bands for use during natural disasters was replaced by a general resolution on the subject.

There are now amateur satellite segments in bands between 7MHz and 240GHz.

A simplified procedure was adopted for the registration of amateur satellites.

There was no support to allocate a definition and frequencies to a personal radio service (cb). This will therefore be a matter for national administrations.

In view of the complexity and probable cost of the 1979 Radio Regulations, it is intended to compile a booklet which will contain all the items relevant to the amateur service.

* * * * * * *

The author would like to take this opportunity of thanking Mr D. E. Baptiste and members of the UK WARC delegation for their co-operation and understanding during a difficult and tiring conference. □

The UK delegation at a plenary meeting. Right to left: Messrs J. L. Bantock, D. E. Baptiste, W. H. Bellchambers, M. Goddard and R. J. Dunn. At rear: Dr F. Horner and Mr S. G. Hicks

Frequency swept reception

by I. J. DILWORTH, PhD, G3WRT*

Introduction

It must be an experience common to many radio amateurs situated in rural areas to spend many (accumulated) hours tuning around bands such as 432MHz and, possibly, 144MHz looking for signs of life. Listening on the ssb and rtty calling channels can be a frustrating and time-consuming activity, for even with today's high standards of frequency measurement it appears that many stations call (and listen) a few kilohertz off the specified calling channels. With the high selectivity employed in today's communication receivers, it becomes necessary to tune around such designated channels, and this can be boring as well as time consuming.

The author suspects that many vhf and uhf enthusiasts are usually engaged in building and testing equipment when time permits; their activity on the air consisting simply of leaving the receiver tuned to the calling channel and reverting to the controls if signals of interest are heard. Therefore it seemed a good idea to automatically sweep the receiver local oscillator a few kilohertz around the channel of interest in order that any signals present in the frequency sweep would be heard.

Method

Most ssb transceivers have an incremental receiver tuning (irt) facility which consists of a variable dc voltage applied to a variable capacitance diode which controls the oscillator frequency. By electronically generating this voltage, one can arrange to repetitively sweep the full range of the irt control; this usually amounts to approximately ±5kHz, which is adequate for this application. Alternatively one can employ an external variable frequency oscillator, fed via the external vfo input, and sweep the frequency of this. All that is required is a symmetrical-waveform sawtooth voltage ramp of reasonable linearity and of variable speed. The latter is important since it would be of little use to sweep the vfo so fast that the recovered audio cannot be detected unless a panoramic display (as described later) is required.

There are many ways of generating a suitable repetitive ramped voltage. In this application an 8038 precision waveform generator (IC1) is employed which provides an exceptionally linear voltage ramp[1]. In fact the device simultaneously produces square, sine and triangular waveforms from three separate outputs.

An appropriate circuit configuration is shown in Fig 1. The triangular output waveform from pin 3 of IC1 is fed to an operational amplifier with variable gain and incorporating a dc level shift. The sweep repetition speed is controlled by RV2, the linearity of the waveform is preset by RV1, the sweep width controls the peak to peak output voltage swing from IC2 and is set by RV3; RV4 controls the resting dc level at the output of

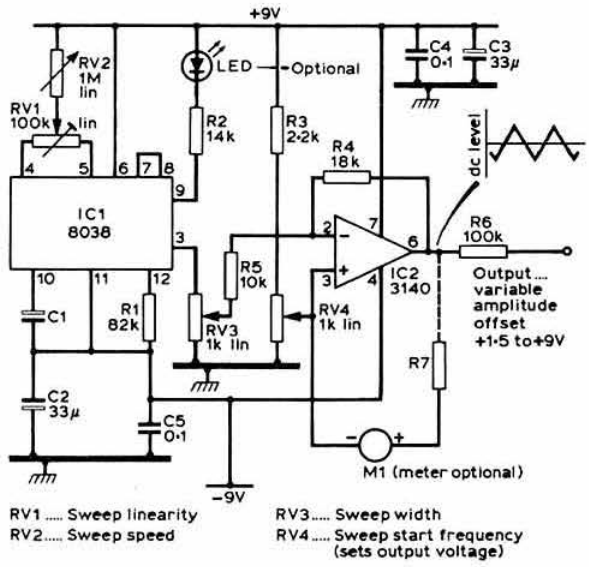

Fig 1. Voltage ramp generator

IC2 and hence varies the mean dc level at the output. If RV3 wiper is set to zero potential, RV4 control can be used as a manual tuning control. A centre-zero meter (M1) can be used to indicate the amplitude and monitor the dc sweeping output voltage at pin 6 of IC2. In addition, the square wave output pin 9 of IC1 can be used to indicate each half cycle of the sweep by means of D1 (led) which will be turned on during the negative half cycle of the waveform and off during the other 180°. The output amplitude of IC1 is dependent on the balanced supply rails: for a ±9V supply this corresponded to ~ ±3V with the ic used in testing. The operational amplifier (IC2) is used to level shift and amplify the ramped input (Fig 2), RV3 being used to set the input amplitude to IC2 and hence the output swing. For example, using the irt control on a TS520 the required voltage swing lies between approximately +3 and +5·5V.

Suitable voltage-controlled oscillators

If a larger voltage sweep is required than that provided by the irt control, the amplitude of the output ramp may be increased, although care must be taken to ensure that the tuning varactor employed in the transceiver is not forward biased or that its maximum reverse rating is exceeded. As an alternative to using the transceiver vfo, one may employ a separate voltage-controlled oscillator. The author owns a TS520 which uses a

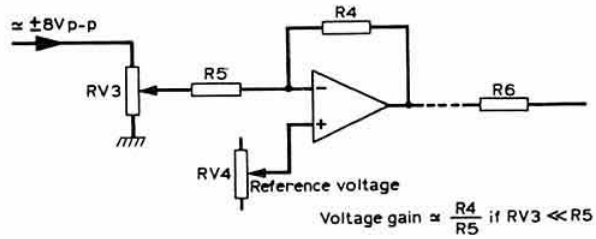

Fig 2. Amplification of the ramped input

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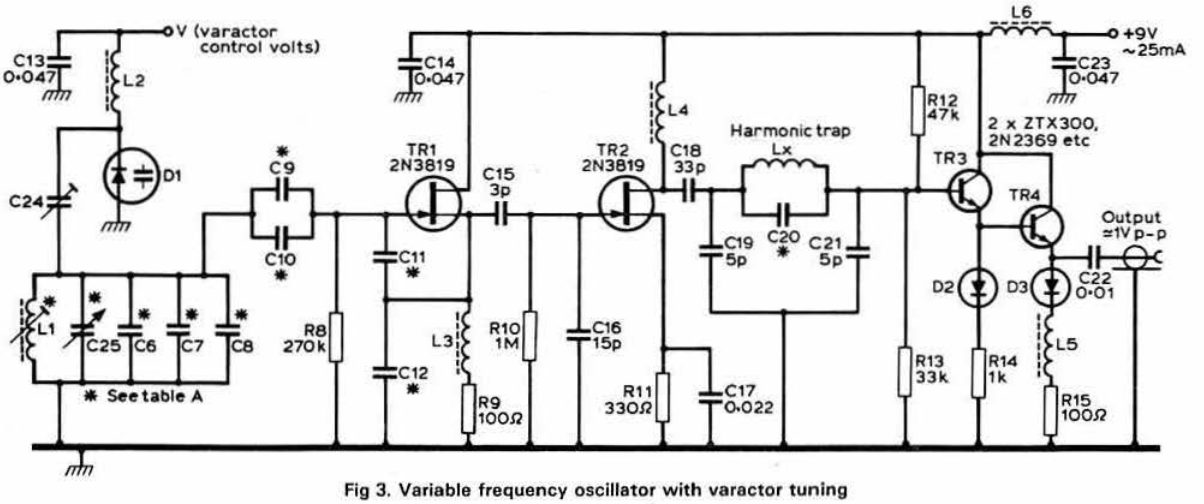

Fig 3. Variable frequency oscillator with varactor tuning

4·9–5·5MHz vfo. A (more or less) duplicate oscillator and output circuit to that provided with the transceiver was constructed, and a varactor type BB102 (D1) connected as shown in Fig 3. In order to make the idea more general, the circuit values were also calculated for Yaesu equipment such as the FT101 and FT401 which use vfo tuning 8·7–9·2MHz (TS700 8·2–9·2MHz) see Table C. Using the arrangement shown in Fig 3 the maximum sweep range for the 5MHz vfo is ±75kHz, and at 9MHz it is ±130kHz; Table B (Fig 3) summarizes experimental measurements.

Panoramic reception

Relatively large frequency sweeps are not useful for audibly monitoring band activity, primarily because if the receiver employs narrow i.f. filters then the sweep rate in kilohertz/second of the vco must be sufficiently slow as not to distort any signals present, ie the larger the range of sweep the slower the sweep rate. It is relatively easy to show that the following relationship applies for a frequency swept system where df/dt is the sweep speed.

$$\frac{df}{dt} \leq \frac{f^2}{Q^2}$$

f is the centre frequency of interest and Q is the "Q" factor of the primary resonance in the system. For example, if the i.f. crystal filter has a 3dB bandwidth of~4kHz and is centred on 4MHz (ie approximately TS520)

$$\frac{df}{dt} \leq \frac{(4\times10^6)^2}{\left(\frac{4\times10^6}{4\times10^7}\right)^2} = 1{\cdot}6\times10^7$$

let df, ie sweep width, be 100kHz

$$dt \geq \frac{10^5}{1{\cdot}6\times10^7} \geq 6{\cdot}25\times10^{-3} \leq 160\text{Hz}$$

let df be 200kHz

$$dt \geq \frac{2\times10^5}{1{\cdot}6\times10^7} \geq 0{\cdot}0125 \leq 80\text{Hz}$$

This implies that the maximum timebase frequency for a 100kHz sweep must be 160Hz , and for a 200kHz sweep width 80Hz. If one wanted to display the whole of a 2MHz wide band, say 144MHz, then the maximum sweep frequency would

Components list

R1	82kΩ	**C1**	1–25μF (4·7μF used in prototype) tantalum
R2	14kΩ		
R3	2·2kΩ		
R4	18kΩ	**C2, 3**	33μF
R5	10kΩ	**C4, 5, 30**	0·1μF
R6	100kΩ	**C6–12, 20**	see Table A
R7	to suit meter	**C13, 14, 23**	0·047μF
R8	270kΩ	**C15**	3pF
R9, 15	100Ω	**C16**	15pF
R10	1MΩ	**C17**	0·022μF
R11	330Ω	**C18**	33pF
R12	47kΩ	**C19, 21**	5pF
R13	33kΩ	**C22, 26, 29**	0·01μF
R14	1kΩ	**C24**	0–20pF preset variable
R16	51Ω		
R17	560Ω	**C25**	0–50pF airspaced variable
RV1	100kΩ preset linear	**C27, 28**	0–10pF
RV2	1MΩ linear	**L1**	see Table A
RV3, 4	1kΩ linear	**L2–6**	1mH rfc (Maplin Electronics)
IC1	8038 (RS)	**L7**	14t on a neosid E3 former for 10·7MHz
IC2	3140 (RS) or 741	**TR1, 2**	2N3819
IC3-8	Plessey 521A	**TR3, 4**	ZTX300, 2N2369 etc
D1	BB103/4 varactor diode (Maplin Electronics)	**LED**	optional
D2, 3	IN916 or equivalent		

Table A. Values for tuned circuit components

Freq (MHz)	C6	C7	C8	C9	C10	C11	C12	C20	C25	L1 μH	Lx μH
5–5·5	33 (poly)	47 (poly)	47 (sm)	22 (sm)	47 (poly)	150 (poly)	150 (poly)	10	25	33	22
8·7–9.2	—	47	—	—	47	82	82	8	15	16	10

sm = silver mica; poly = polystyrene; "—" capacitor not required. Capacitor values in picofarads.

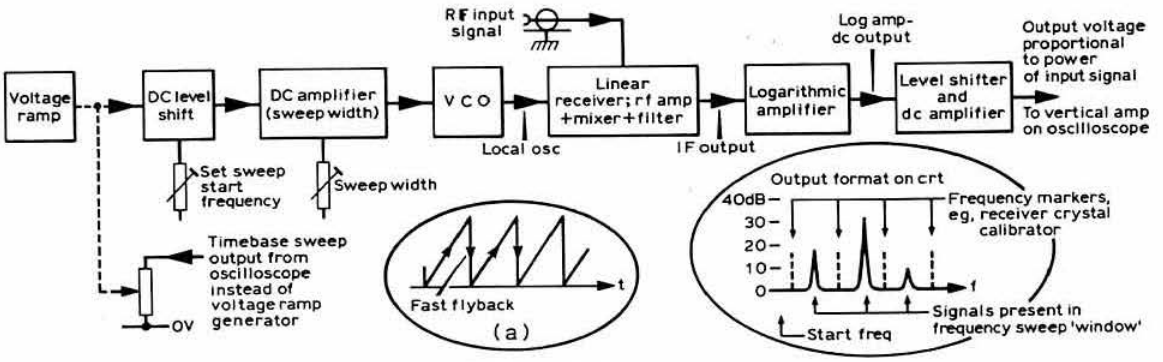

Fig 4. Panoramic display receiver

Table B. Variation of frequency with applied volts on vco

Frequency	5·25MHz			9MHz		
Value of C24 (pF)	30	30	50	20	20	30
Applied voltage	0 ±2	+2 ±9	+2 ±9	0 ±2	+2 ±9	+2 ±9
Frequency change (kHz)	135	147	270	100	130	270

be 8Hz, which would produce a pronounced flicker on a conventional oscilloscope.

To avoid low timebase speeds the i.f. bandwidth can be widened; the price to be paid for this is reduced resolution.

A suitable arrangement for a panoramic receiver is shown in Fig 4. The first point to note is that an asymmetric voltage ramp with a fast reset is required for the vco, since sweeping the vco with a sawtooth would produce a double image, ie the waveform required is shown in Fig 4(a). This type of waveform is usually available from the external timebase output on oscilloscopes. However, the crucial part of the system is the dynamic range and the response time of the detector. In superheterodyne receivers, the dynamic range of the i.f. stages is usually relatively small. The agc is arranged to confine signals to the linear portion of the i.f. stage characteristics.

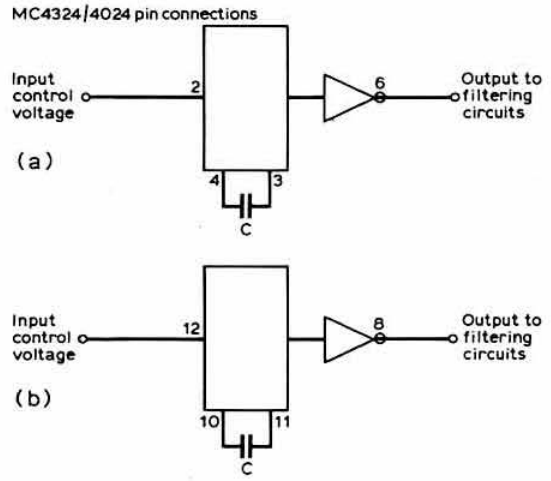

Fig 6. MC4324/4024 pin connections. The frequency range of the multivibrator is controlled by the value of an external capacitor (C). The following equations may be used to define its value:

$$C = \frac{500\mu F}{f_{max}} \text{ or } C = \frac{100pF}{f_{min}} \text{ where f is in hertz}$$

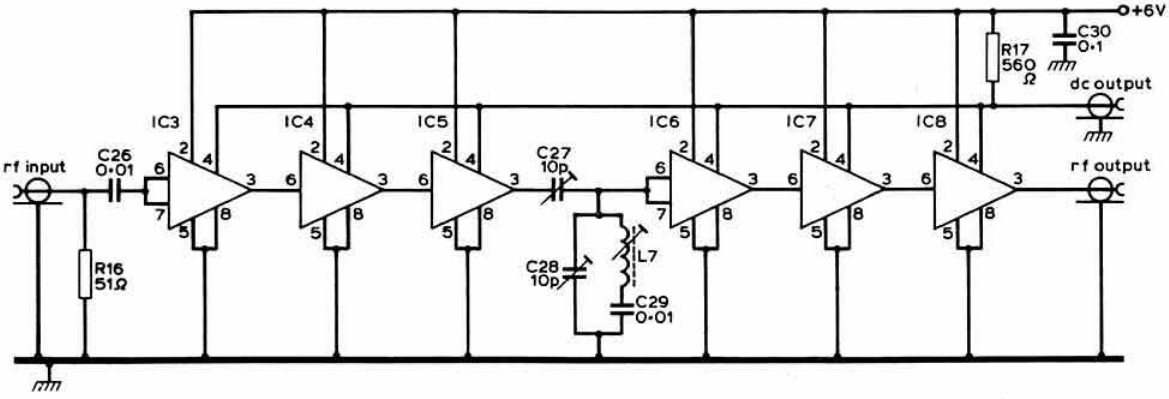

Fig 5. Log amplifier. Each ic must be decoupled with at least 0·01μF

This agc voltage may be used to display the output amplitude of the incoming signal. However, this necessarily has a small bandwidth and hence large response time, typically > 0·1s and, therefore, a very slow frequency sweep speed is required. Another disadvantage of using the agc for the vertical (ie amplitude) deflection is that it is not usually truly logarithmic. A logarithmic display is most useful for panoramic displays since one is primarily interested in decibels. Consider a signal variation from S1 to S9+20dB; using 6dB/S-point, this corresponds to a range of 68dB or a voltage ratio of 25:1. Assuming a 1V peak to peak output from the i.f. amplifier for S9, the input signal is ≃ 0·4mV.

Most amateur receivers cannot cope with this variation of input without employing agc to avoid cross modulation, blocking and distortion. What is required is a logarithmic amplifier which produces a dc output voltage proportional to the input signal power over a dynamic range of, say, ≥ 80dB; such an amplifier is shown in Fig 5. This is a successive saturation type of logarithmic amplifier, each stage saturating per 10dB of input. The amplifer shown exhibits a 60dB dynamic range; further amplifiers may be added, each contributing 10dB[2]. The tuned circuit after the third stage limits the noise fed into the following stages [2].

Table C

Equipment	VFO frequency range
Trio TS520	4·9-5·5MHz
Trio TS820	5·0-5·5MHz
Trio TS700	8·2-9·2MHz
Yaesu FT101	8·7-9·2MHz
Yaesu FT401	8·7-9·2MHz

A suitable wide-range voltage-controlled oscillator can be produced using a Motorola MC4324/4024 integrated circuit. This device contains two voltage-controlled multivibrators and will typically work up to a frequency of 30MHz. Full data is available in [3]. The pin connections and equations used to define the upper and lower (voltage-controlled) frequency limits are shown in Fig 6. This vco produces relatively sharp edge transitions, particularly at low frequencies, and therefore requires good harmonic filtering.

References

[1] Intersil data catalogue.
[2] Plessey Semiconductors integrated circuit data book.
[3] Motorola MTTL data book. □

RSGB QSL BUREAU SUB-MANAGERS

(At 1 January 1980)

G2:	C. H. Adams, RS10906, 4 Park Gate Gardens, East Sheen, London SW14 8BQ.
G3 and G4 two-letter calls, G5 calls:	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G6 calls, G8 two-letter calls:	F. J. T. Harris, G4IEY, 4 Merestones Drive, The Park, Cheltenham GL50 2SS.
G3AAA-DZZ:	C. A. Bradbury, BRS1066, 13 Salisbury Avenue, Cheltenham GL51 5BT.
G3EAA-HZZ:	S. L. Newport, G4DEV, 101 Elibank Road, Eltham, London SE9 1QJ.
G3IAA-KZZ:	P. Lumb, G3IRM, 14 Linton Gardens, Bury St Edmunds, Suffolk IP33 2DZ.
G3LAA-NZZ:	P. Farquhar, G4FYA, 89 Esplanade, Fleetwood, Lancs FY7 8BQ.
G3OAA-PZZ:	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex CM1 2TT.
G3RAA-TZZ:	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G3UAA-VZZ:	M. J. Newton, G3UKW, 53 Derwent Avenue, Garforth, Leeds LS25 1HN.
G3WAA-XZZ:	F. G. Rylands, G2VF, 39 Parkside Avenue, Millbrook, Southampton, Hants SO1 9AF.
G3YAA-ZZZ:	I. Batley, G8TKU, 3 Folldon Avenue, Fulwell, Sunderland, Tyne & Wear.
G4AAA-AZZ:	C. Johnson, BRS31379, 118 Harvest Road, Smethwick, Warley, West Midlands B67 6NG.
G4BAA-BZZ:	R. F. Rawlings, G3WBV, 74 The Lindens, Fieldway, New Addington, Surrey CR0 9EL.
G4CAA-CZZ:	P. Jobson, G3HLF, 41 The Avenue, Gravesend, Kent DA11 0NA.
G4DAA-DZZ:	D. Buckley, G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent BR5 1PX.
G4EAA-EZZ:	P. C. Barry, G8OPA, 32 Rutland Avenue, Sidcup, Kent DA15 9DZ.
G4FAA-FZZ:	Mrs A. R. Burchmore, G8LXK, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
G4GAA-GZZ:	L. Craven, G4EQI, "Grass Moor", Radford Road, Alvechurch, Birmingham B48 7DT.
G4HAA-HZZ:	R. Staples, G4HGI, 3 Willow Close, Lymm, Cheshire WA13 9DL.
G4IAA-IZZ:	R. W. Mander, G4DYY, 11 Heath Lane, West Bromwich, West Midlands.
G4JAA-JZZ:	K. Baker, G3WTV, 16 Woodfield Road, Radlett, Herts WD7 8JD.
G4KAA-KZZ:	K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW.
G8AAA-CZZ:	F. J. T. Harris, G4IEY, 4 Merestones Drive, The Park, Cheltenham GL50 2SS.
G8DAA-OZZ:	I. Batley, G8TKU, 3 Folldon Avenue, Fulwell, Sunderland, Tyne & Wear.
G8PAA-RZZ:	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G8SAA-SZZ:	K. Baker, G3WTV, 16 Woodfield Road, Radlett, Herts.
G8TAA-TZZ:	K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW.
G8UAA-VZZ:	C. Lennox, G8NVP, 65 Westover Road, Bramley, Leeds 13, West Yorkshire.
GB:	C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs BL8 3HL.
GD:	W. P. Waid, GD3GQX, 1 Mount William, Summer Hill, Douglas, Isle of Man.
GI:	R. P. Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP.
GJ:	H. J. Chater, GJ2LU, 106 Rouge Baullion, St Helier, Jersey, CI.
GM2, 3, 4, 5, 6 and 8 two-letter calls; GM5 three-letter calls; GM8 three-letter calls:	D. R. Macadie, GM6MD, 11 Marchmont Road, Ayr KA7 2SB.
GM3 three-letter calls:	J. Johnston, GM3LYY, "The Dolphins", Montgomerie Drive, Fairlie, Ayrshire.
GM4 three-letter calls:	J. Sey, GM8MJ, 34 Penilee Terrace, Glasgow G52 4BS.
GU:	W. E. Butt, GU2FZC, "Meo Voto", Green Lanes, St Peter Port, Guernsey, CI.
GW:	J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff CF4 2SS.
BRS and A numbers:	D. Borne, G4CYW, "Roughways", Chub Tor, Yelverton, Devon PL20 6HY.

The "ultimate" keyer (Mk2)—with auto intercharacter spacing

by C. I. B. TRUSSON, MSc, CEng, MIEE, G3RVM*

Introduction

In his original article, "The 'ultimate' keyer?", *Radio Communication* May 1977, the author dared to describe the keyer as "ultimate" in that it provided a comprehensive range of features, including battery operation and iambic mode, for a relatively low circuit complexity and cost.

In this article he describes a Mk2 version of the keyer which provides a very beneficial additional feature, namely, automatic intercharacter spacing. The Mk2 keyer is based on his original design and utilizes just three additional cmos ics. With its additional feature, it can still, therefore, claim to be of relatively low circuit complexity.

The Mk2 keyer is aimed at assisting those operators who currently send cw with either lilting, erratic or insufficient intercharacter spacing when using conventional electronic keyers. Listening on the amateur bands, it is obvious that many fall into one or other of the above categories and would therefore benefit from using this new design. The author has experienced a considerable improvement in his own cw since he started to use the Mk2 keyer. In fact, the standard of his cw is now virtually as good as can be obtained using a keyboard keyer but without the high complexity, high cost, and the need for a fair degree of typing skill.

Features

The Mk2 keyer provides all the features of the original design with the addition of auto intercharacter spacing. A summary of its salient features is:

- Low circuit complexity for the facilities provided.
- Battery operated, using cmos ics.
- Iambic squeeze (or single-paddle) operation.
- Dot store which is edge-triggered for correct iambic operation. (On other keyers it is not possible to squeeze an "A" without getting an "R"!)
- Gated multivibrator which ensures that the first element of a character is always of the correct length.
- Transistor output stage which avoids the contact bounce and power dissipation of a relay (a relay can still of course be used if necessary).
- Side-tone output available, if required.
- Auto intercharacter spacing.

Auto intercharacter spacing

The author's original keyer, as with most other electronic keyers, assists only in sending the individual morse characters. Thus, provided the operator keeps his paddle movements for each dot/dash element within a character slightly phase advanced with respect to the element being sent, each character will be perfectly timed. But the keyer does not assist in timing

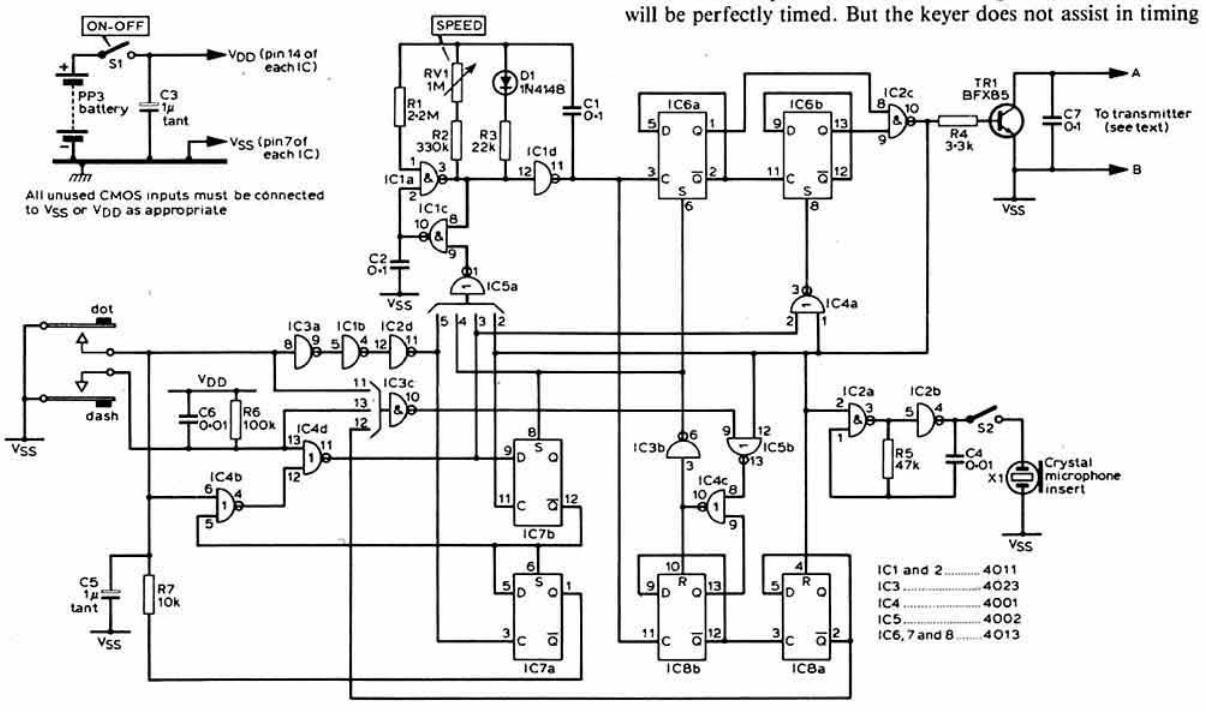

Fig 1. Circuit diagram

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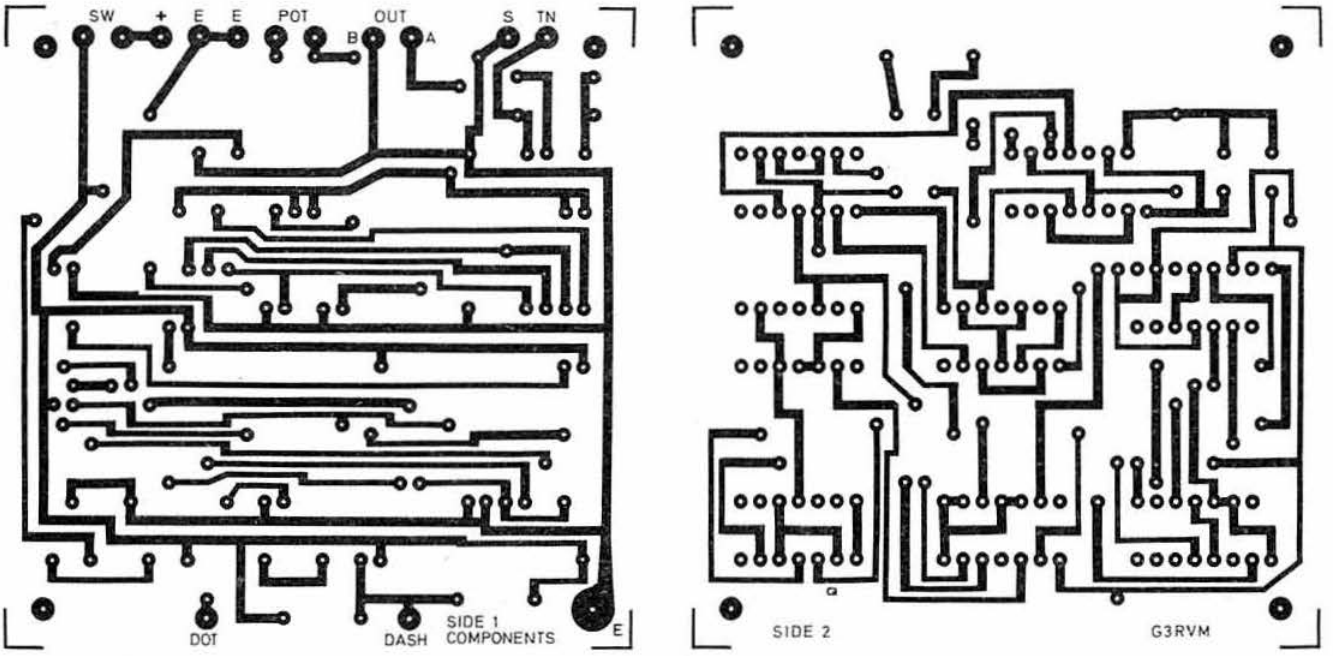

Fig 2. ((a) left) pcb, component side; ((b) right) pcb, reverse side

the intercharacter spaces which are determined by the operator. It is errors in the timing of the intercharacter spaces which can make the cw produced by the use of an electronic keyer sound so imperfect. These errors can manifest themselves as a pronounced lilt, erratic spacing or a tendency to run characters together with very little spacing. In mild cases the quality of the cw suffers, and in extreme cases its readability can be very seriously degraded.

To overcome the problems described above, the author has incorporated additional logic in the Mk2 keyer which prevents an operator commencing a new character until after the correct intercharacter space of three dot mark periods has elapsed following completion of the previous character. Thus, provided the operator maintains his paddle movements slightly phase advanced both during the sending of characters and at the start of characters, correct cw characters with correct intercharacter spacing is assured. The interword spacing is relatively non-critical in achieving good cw and is still determined by the operator.

Circuit description

The circuit diagram of the complete Mk2 keyer is shown in Fig 1. Most of the logic circuitry is similar to that of the original design, so the description of its operation (given in the original article) will not be repeated here. However, the operation of the new logic which provides the auto intercharacter spacing, and some circuit improvements which have been implemented, will be described.

The logic elements which achieve the auto intercharacter spacing are IC3c, IC3b, IC4c, IC5b, IC8a and IC8b. Initially, prior to operating the keyer or after any intercharacter space, the Q outputs of IC8b and ICba are at logic "0" and logic "1" respectively. IC3c is therefore at "1" causing IC5b to be "0", IC4c "0", IC3b "0", and IC8b to be held reset.

The logic remains in the above state until the paddle is operated to start a new character. The first element of the new character causes IC2c to go to "1" which resets IC8a. Thus, at the start of any character IC8b and IC8a go to the state "0" "0", and they remain in this state until the end of the character.

The logic detects that a character has been completed by the fact that at the end of the space following the last element of the character, IC2c will have gone to "0" and neither paddle switch (nor the dot store) will be active. IC3c, therefore, goes to "0", IC5b to "1", IC4c to "0", and IC3b to "1". The reset input to IC8b is therefore removed, so on the clock-edge at the end of the element space IC8b clocks to "1". This ensures that IC4c remains at "0" and IC3c at "1", which causes IC6a to be held set and prevents any cw element from being erroneously started by the operator. On the next clock-edge IC6a is still held set, and again a cw character cannot be started by the operator. However, as a result of this clock-edge IC8b and IC8a clock back to their initial state "0" "1". IC3b, therefore, returns to "0" and the set input to IC6a is removed. So, on the next-clock edge, the third one following the end of the last element of the previous character, the keyer is again ready to accept an input from the paddle switches. Thus this logic ensures that the operator can only start a new character after the correct intercharacter space has elapsed. A set input has been provided on the iambic store, IC7b, to ensure that the dot store, IC7a, can always be set during the intercharacter space.

Original circuit improvements

Originally each of the two gates which formed the side-tone oscillator and each of the two gates which formed the main clock oscillator were in different ic packages. As a result a few people who constructed the original keyer found that, because of mismatch in transfer characteristics between the two gates, one or other of these oscillators failed to oscillate. In the Mk2 keyer both gates forming each of the oscillators are in the same ic package. This ensures that their characteristics are matched and the oscillators will always start.

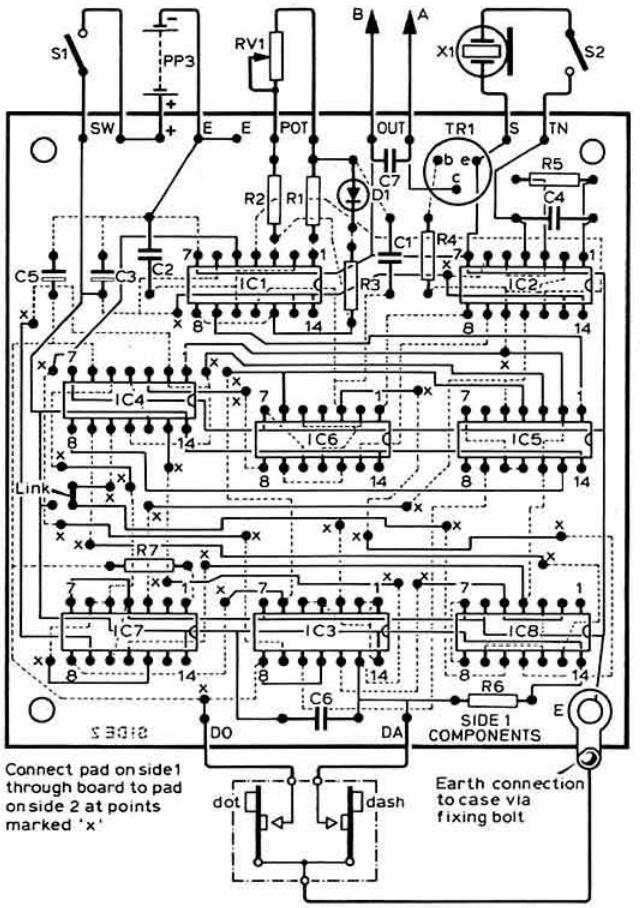

Fig 3. Component layout of Fig 2(a)

Gates IC1b and IC2d have been added to speed up the 10ms edge when the dot paddle is released, and avoid any possibility of incorrect clocking of the dot store IC7a.

The pull-up resistor and capacitor which were originally required on the dot paddle switch are redundant when the dot store is incorporated and are therefore omitted. A diode originally in series with speed potentiometer was unnecessary and has also been removed.

Keyer construction

The keyer electronics can be constructed either in the same box as the paddle; in a separate box; or, providing the screening is adequate, inside the transmitter. The author's keyer was laboriously constructed on Veroboard, with point-to-point wiring between the components, and mounted inside his paddle box.

To simplify the task of constructing the keyer and reduce the possibility of making wiring errors the author has now laid out a small 3·25in square double-sided pcb; Fig 2(a) illustrates the component side, and Fig 2(b) the opposite side. He has obtained a quotation for the professional manufacture of the pcb, but unfortunately the photography, tooling and prototype charges make the exercise prohibitive unless the quantities required are high. The additional cost for plated-through holes makes this

Components list

R1	2·2MΩ	CR25	**C1, 2**	0·1μF MKH poly B32561
R2	330kΩ	UPM033	**C3, 5**	1μF tantalum B45134
R3	22kΩ		**C4, 6**	0·01μF MKH poly B32561
R4	3·3kΩ		**C7**	0·1μF ceramic flat tubular B37449
R5	47kΩ		**TR1**	BFX85
R6	100kΩ		**X1**	Crystal insert
R7	10kΩ	lin pot P20	**D1**	1N4148
RV1	1MΩ		**S1, 2**	Miniature toggle S7101
IC1, 2	4011		**Battery**	PP3
IC3	4023		**Battery connector**	Dual type AL for PP3
IC4	4001		**Knob**	EV18A
IC5	4002			
IC6, 7, 8	4013			

With the exception of the battery and the crystal insert, all are available from Electrovalue Ltd, 28 St Jude's Road, Englefield Green, Egham, Surrey. Tel: Egham 3603

option completely out of the question, so, where component leads are used to connect from one side of the board to the other, these will need to be soldered top and bottom. Also, where through-connections are required without using a component lead, a piece of wire will need to be inserted and soldered on each side.

In view of the costs referred to above, the author intends to defer proceeding with pcb manufacture until he knows whether the quantities required are going to be sufficient. Therefore, anyone requiring a pcb, is asked to send him a cheque for £6, plus an sae larger than 3·25in square, within a month of publication of this article. If there is sufficient response, pcbs ordered will be sent within about two months. Alternatively, if there is insufficient response, cheques will be returned within one month.

A list of suitable components, mostly available from Electrovalue, is given. There is nothing sacrosanct about them, it just seemed convenient that they should be obtainable from one source, and they are also mechanically suitable for mounting on the pcb. Orders can be placed by telephone using Barclaycard/Access, or by cheque with order.

Interfacing the keyer to the transmitter

With the BFX85 output transistor the keyer is capable of driving a transmitter with an open-circuit voltage of up to 60V and will sink up to 100mA. Thus the keyer should drive most transmitters with no problem. However, if a greater voltage rating is required a higher voltage transistor could be substituted, and if greater current is required a Darlington pair of output transistors could be used. Alternatively a reed relay could be used, as described in the original article.

The output from the keyer must be correctly connected according to the voltage polarity of the transmitter to be keyed. If the open-circuit voltage of the transmitter is positive, simply connect the Vss ground of the keyer, output (B) to the transmitter ground, and connect (A) to the key input of the transmitter. If the voltage is negative, as on the author's FT101E, then connect (A) to the transmitter ground and (B) to the key input, but because the keyer case is now live with respect to the transmitter earth, this interface should only be used when the open-circuit voltage is low; say, less then 30V.

The rf decoupling capacitor, C7, may be required, particularly in the negative voltage case where the keyer and transmitter chassis are not directly connected. This capacitor is not included on the pcb, but can easily be added across the output pads. □

A transmission keyboard for the G3ZHY morse tutor

by G. ROYLE, G4FAS*

FOR those already familiar with keyboard layout, through vdu operation, typing etc, the growing interest in morse keyboards should have great appeal, and it was while building the G3ZHY morse tutor [1] that the author realized that the selector switches could be directly addressed through a diode matrix. Figs 1 and 2 show the only changes required to add a keyboard and transmitter keying relay, and these changes will not affect the normal operation of the tutor.

Fig 1 shows the changes to the address generator. The common 1kΩ pull-up resistor on switches V1–V6 is replaced by individual 6·8kΩ resistors, so that when the selector switches

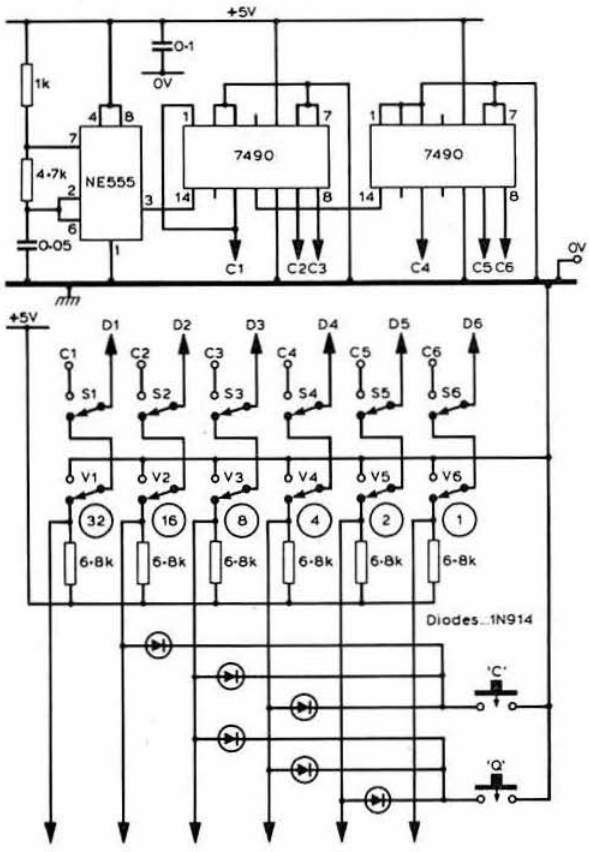

Fig 1. Modified address generator

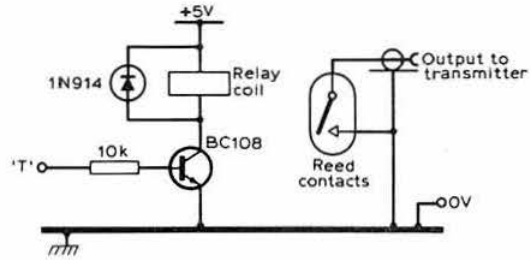

Fig 2. Keying relay to tutor interface

are preset to 111111 the keyboard and matrix effectively control the selector switches.

When all keyboard switches are open D1 to D6 are high (5V = 1), and when a key is depressed the appropriate tutor selector switches are, in effect, thrown from value 1 to 0. The matrix groups for letters C and Q are shown in Fig 1. In [1] Table 1 states that C = character No 35 in the memory; therefore the diodes are arranged to present the binary address 100011 (= 35) and so on.

No doubt the random access/tutor facility could be dispensed with by removing the NE555 and the 7490s from the address generator, together with the associated switches, considerably reducing the cost of a keyboard-only project. However, the author's unit is based on the original tutor and is used for recording, in cassette form, the special requirements of each student. The keyboard also enables high quality plain language morse code to be sent, simulating the Post Office test if required. Fig 2 shows the keying relay to tutor interface.

A word of warning about keyboards. Not all keyboards have "push to make" contact arrangements, so if choosing commercial surplus be sure of this point, or at least be prepared to make appropriate modifications.

The author thanks Malcolm Irving, G3ZHY, for producing the basic tutor and the article, and John Rees, G4EIJ, for designing and supplying the tutor pcb.

Reference

[1] "An experimental self-tutor for morse code using the SN74S387 prom" by M. R. Irving, G3ZHY. *Radio Communication* January 1978. □

*56 Branksome Drive, Cheadle, Cheshire SK8 3AJ.

The G8IPQ automonitor (Mk2)

by A. R. C. BADCOCK, G8IPQ*

Introduction

Many designs describing different methods of adding channel scanning to a transceiver have been published, and the circuits offer various levels of sophistication. However, they all have one drawback in common for the average station; the designs are often over-complex and do not present a cost-effective solution to a station that may only have need of more humble monitoring facilities.

There are many areas of operation where a simple automonitor would be an asset. Then why not a multiscan system? Two examples of where these more complex systems fall down are:

1. In a large metropolitan area, where all channels can be continually occupied; this causes the operator to be dazzled by rows of flashing lights or irritated by "lock-up".
2. In a rural area, where contacts are usually encountered on S20 or via the local repeater, making a complex system redundant.

The author suggests that a simple "priority channel" monitor would provide a practical alternative.

A simple alternative

The occasion often arises where it would be useful to monitor a priority channel simultaneously with the currently selected channel. For example, to be able to use a channel and keep an ear on S20; to be able to monitor the local net channel, or to monitor the emergency frequency for Raynet use. Features required are:

(a) to scan the priority channel using a simple switching arrangement;
(b) to check the priority channel for 100–500ms every 7 to 10s with a variable duty cycle;
(c) to "lock on" when a priority signal is detected, and to alternate then between the channels for a preset time;
(d) to have the extension facility of sounding an alarm and lighting an indicator for a set time;
(e) to return to the scan mode at the end of the "priority lock";
(f) to be simple to construct, compact and cheap, using "out of the junk-box" spares.

The circuit (Fig 1)

The circuit uses three readily available and cheap cmos quad NOR ics type 4001. The optional alarm extension employs a further 4001. Gates IC1a and IC1b form an astable oscillator that has a variable duty cycle set by RV1 which alters the time constant of the circuit in a particular part of the cycle. The values chosen give a period of about 7 to 10s, and the duty cycle is set to give positive pulses about 500ms long (this is altered to suit individual rigs). Pulses pass through IC2a to IC2b. IC1c and IC1d form a Schmitt trigger which provides a definite switching trigger from the squelch line (sq). The circuit requires "1" for squelch closed and "0" for squelch open. When the squelch opens, a zero is applied via the Schmitt to IC2b, and when there is a zero from the astable via IC2a the output goes high. This is inverted by IC2c to apply a zero to the monostable circuit of IC3a and IC3b. The monostable supplies a 7s output high state which locks IC2a to zero out. This results in the priority channel being held. If the squelch closes during this

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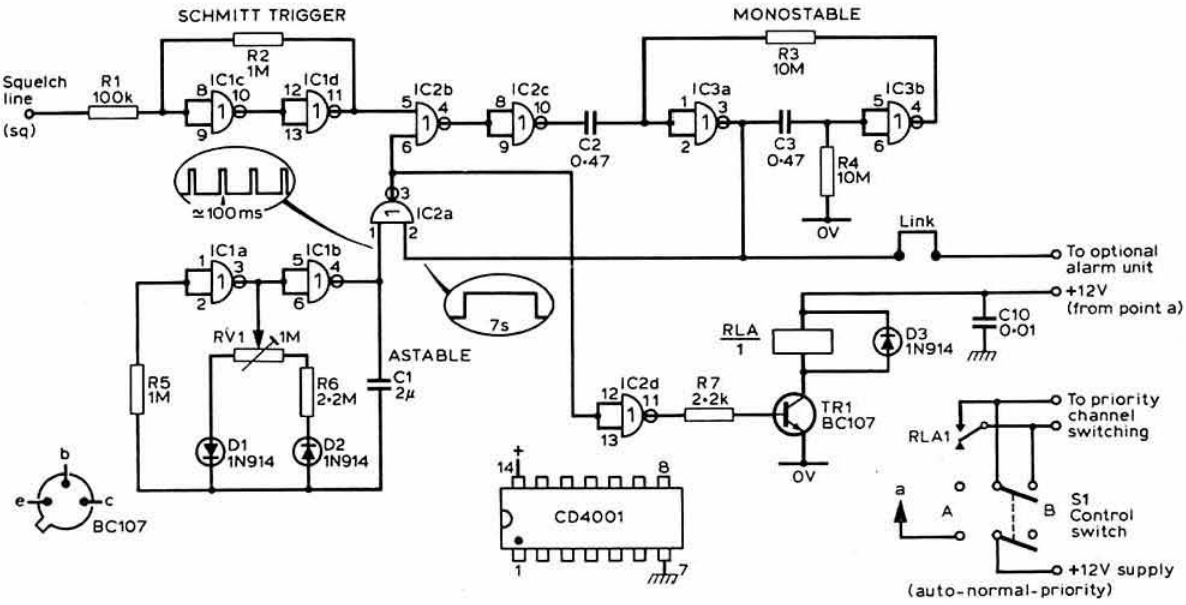

Fig 1. Scanner, logic and switching circuit

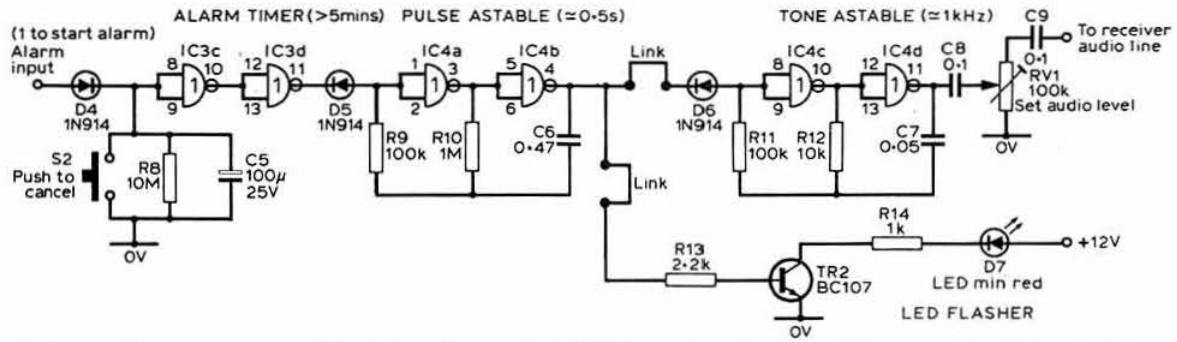

Fig 2. Optional alarm circuit. Notes: (1) link for options required; (2) R14 may be reduced to 470Ω (minimum) for brighter led if current available; (3) logic levels—1 = +V, 0 + 0V

time the monostable is reset and the normal scan will continue. At the end of the monostable pulse IC2a is released and the circuit allows the return to the established channel until the next scan pulse. The output of IC2a is inverted and drives a transistor that will switch the relay RLA whose contacts select the priority changeover. However, where all electronic switching of the correct polarity and voltages is used, TR1 could switch directly without the relay. The circuit is powered from the receiver supply, and hence only scans the receiver crystal oscillators—so that one cannot transmit accidently on the wrong channel.

The unit is operated from a small double-pole three-position miniature switch added to a convenient location on the rig. In the centre position the conventional rig functions operate. In position A the scan unit operates, and in position B the rig is "locked" to the priority channel manually.

Alarm extension

For a base station which may be monitoring the channels, an alarm facility could prove useful, eg for Raynet. An alarm unit may be made by using a fourth quad NOR ic.

The alarm (Fig 2) consists of two coupled astable oscillators (IC4ab/IC4cd). The first astable has a 0·5s period which drives a 1kHz oscillator into a series of bleeps. This lasts for a fixed period determined by gates IC3c and d. This alarm continues to sound, irrespective of priority channel releasing, until the alarm period ceases. Also, a flashing led could be incorporated via TR2.

Components list

R1, 9, 11	100kΩ	**C1**	2μF p/s/s
R2, 5, 10	1MΩ	**C2, 3, 6**	0·47μF p/s/s
R3, 4, 8	10MΩ	**C4, 10**	0·01μF p/s/s
R6	2·2MΩ	**C5**	100μF e
R7, 13	2·2kΩ	**C8, 9**	0·1μF p/s/s
R12	10kΩ	**C7**	0·05μF p/s/s
R14	1kΩ	(All rated for at least 25V)	
(All ⅛ or ¼W subminiature 5%)		p/s/s = polyester, slab type, or similar e = electrolytic miniature 25V	
RV1	1MΩ	**D1-6**	1N914
RV2	100kΩ	**D7**	Miniature red led
(Both skeleton preset)		**IC1, 2, 3, 4**	4001
TR1, 2	BC 107		
S1	Subminiature dp/dt centre-off toggle		
S2	Miniature push-to-make		
RLA	Miniature 12V reed		
Misc	Veroboard, terminal pins, four 14-pin dil sockets, mounting pillars		

Construction

The construction is straightforward—Veroboard may be successfully employed. Layout is uncritical and will depend on individual space factors. Actual interfacing with equipment and switching will depend on individual rigs and logic levels. Nevertheless the circuit should provide a good starting basis for experimentation and adaption to suit individual needs.

Conclusion

The components are readily available is most junk boxes, and the circuit should be straightforward to get working. The monitor has now been working successfully in the author's equipment for several months, and he has found that it provides a very useful facility without being over-sophisticated. In any case, it should present keen constructors with some fun in the making. □

technical topics

Pat Hawker, G3VA

For many amateurs the interference radiated from nearby colour television receivers continues to represent a considerable handicap to weak-signal operation. The prospect of a further, significantly more powerful, source of interference from millions of consumer equipments is thus something of which we should take careful note—and, if possible, join with other sufferers in trying to persuade manufacturers and authorities to mitigate the worst effects.

Microwave oven interference

The current cause for concern is the rapidly increasing number of crude, high-power transmitters that are going into homes in the form of microwave ovens. While these have attracted some opposition from those who suggest they may represent a biological hazard on account of microwave radiation (*TT* November 1979) the evidence for this is rather weak, and the ovens have been cautiously cleared on safety grounds by most consumer organizations, provided that they are used carefully.

Much less attention has been taken of the strong complaint made last year by Sir Bernard Lovell, that microwave ovens are already seriously interfering with the observation of weak, extra-terrestrial signals by radio astronomers. Three scientists at Jodrell Bank have now written to *Nature* (Vol 282, 6 December 1979, pp594–6) reporting detailed investigations made to show the extent to which typical ovens are capable of interfering with reception on bands allotted for radio astronomy (1·4, 1·66, 2·7 and 5GHz) and stressing that their results should be viewed with concern by those responsible for communication systems using frequencies anywhere between about 1 and 6GHz (other people have indicated that the problem may extend over a considerably wider frequency spectrum when the oven is located nearby). They complain that although this question was first raised in 1969, no action was taken throughout the following decade to introduce firm limits on the amount of permissible out-of-band spurious radiation from these devices.

Ovens are, of course, permitted to operate on the designated ism (industrial, scientific, medical) frequency of 2·45±0·05GHz and generally use magnetrons capable of producing 1 to 2kW of microwave power, operating from rectified but unsmoothed ac mains (ie the old "rac" system). Power is generated for about half of each supply cycle, and the magnetron usually drives a load that is deliberately disturbed by a rotating metal paddle "with the consequence that both the instantaneous frequency and the power are a function of time". Modulation sidebands thus give rise to out-of-band emissions, and there is a high harmonic content. It has been shown at Jodrell Bank that significant unpolarized microwave power is radiated over an extremely wide range of frequencies:

"The primary source of leakage of radiation is from seals around the door, which fail to confine the microwave radiation to the inside of the oven. These seals are non-contacting and seem to consist of a resonant, quarter-wavelength choke nominally tuned to 2,450MHz, followed by microwave absorbing material. The seals are sufficiently effective at 2·45GHz to satisfy the UK safety regulations, but they fail to give adequate out-of-band suppression to prevent possible interference with other services authorized to operate within the 1-6GHz frequency band".

Detailed results are given, in the letter, of tests on two new domestic ovens and on a larger commercial model that had been in use for 10 years and was coated with deposits of grease and grime. Calculations are presented suggesting that the out-of-band radiation, when received on a −63dB sidelobe of a large radiotelescope, could cause interference at distances of up to about 0·5km at 5GHz, up to 3·5km at 1·4GHz, up to 8km at 4·945GHz (ie near second harmonic) and up to 25–27km at 2·695 and 2·745GHz, although the authors admit that, in practice, these distances would often be reduced by attenuation due to walls, buildings etc.

It has also been suggested elsewhere that spurious and harmonic emission from ovens could prove the major source of potential interference to the reception of direct-broadcast television satellites in the band 11·7–12·5GHz.

Work by the RSGB Propagation Studies Committee has shown that many (possibly all) of the curious sweeper and creeper signals on about 27MHz that we reported in *TT* in January 1978 appear, after all, to be "man made" and could come from the spurious emissions of industrial rf devices (although not all those who have investigated sweepers accept this view, and the professional research papers in which the phenomena were first reported have apparently never been challenged). But if they *are* man made then their source is often located many thousands of miles away from the receiver.

The prospect of millions more high-power, self-excited, rac transmitters radiating over an extremely wide band of frequencies and made unstable by revolving paddles is not one to be dismissed lightly!

Power meter with solar cell

Some years ago Dick Halls, G3EIW, developed and described a useful general-purpose power meter/dummy load (*ART6*, pp322-3) which measures the voltage developed across a high-wattage non-inductive resistor used as a dummy load. This design is suitable for use up to 144MHz and transmitter output powers up to 200W, with an accuracy of the order of 10 per cent. This approach probably remains the most satisfactory low-cost technique for all-round purposes.

However, a novel idea is described by James Kennedy, W7MID, in the form of "a simple, accurate rf wattmeter" (*QST* November 1979 pp40–1): Fig 1. This uses a silicon solar cell in conjunction with two small pilot lamps, a 1mA fsd meter and low-wattage resistors. As described it is intended for use in measuring rf outputs up to a modest 5W, but there seems no reason why the technique of using a solar cell as a power sensor should not be extended to higher powers. The unit can be calibrated by using dc; when checked by ARRL at frequencies between 3·5 and 28MHz it is stated to have proved surprisingly accurate for its low cost. Since the load need not be unduly reactive, it is probable that such a unit, if made carefully, would function satisfactorily at 144MHz where the 5W power range would cover many of the small transceivers.

In effect, two small pilot bulbs form part of a 50Ω dummy load, and are mounted (in a lightproof enclosure) a fixed distance (about 3in) from the face of the solar cell. When the

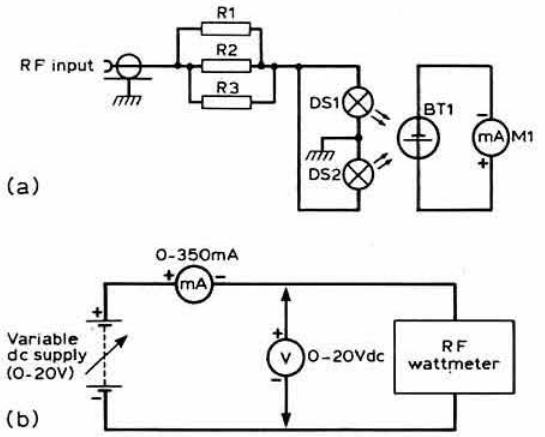

Fig 1. Details of simple rf wattmeter together with method of calibrating it from dc. BT1 is the solar cell (IR Experimenter or similar). DS1,2 are the pilot bulbs. M1 is a 1mA fsd meter. R1,2,3 are 100Ω, 2W carbon resistors

bulbs light, the cell generates a dc output which is measured by the meter. The unit can be calibrated from a dc supply, since the pilot bulbs can be expected to respond similarly to rf or dc. To exclude external light, W7MID mounts his meter in a 5 by 4 by 3in aluminium box. The solar cell is an IR Experimenter type or equivalent; pilot bulbs are specified as US No 47, which are standard 6-9V, 0·15A bayonet-type bulbs. The calibrated scale is not likely to be linear, but rather to be compressed towards the full-scale-deflection end, with maximum sensitivity at fairly low output, provided this is above a minimum threshold.

Safety and heavy-current supplies

From Peter Taylor, H44PT (G8BCG), in the Solomon Islands, comes a timely reminder that a low-voltage, high-current power supply can represent a safety hazard that may easily be overlooked. Whereas all amateurs would treat a 1,000V supply with circumspection, some would not give a second thought to the dangers that lurk in a 12V 100A supply.

These can, for instance, stem from the energy stored in the very-large-value capacitors (eg up to 100,000μF–0·1 *farad*—in the G3JKV design in *Radio Communication* November 1979, p1029). Such components are often high-grade ex-computer capacitors and can store and discharge a significant amount of energy almost instantaneously. H44PT writes: "Consider what happens when a small screwdriver is dropped or placed across the terminals of such a capacitor. The result may well be no screwdriver and a lot of flying molten metal. How many amateurs wear eye protection when working on such psus?"

Again, car batteries are often used as a source of high current: safe enough in a well-ventilated area, most of us would think. But H44PT warns: *remember the energy!* "Think of what could happen to a finger as a wedding ring melts or rapidly heats up due to coming into contact across a supply capable of delivering hundreds of amperes. In the professional field, in such circumstances, nobody would dream of wearing a ring, watch or other metallic jewellery—yet how many amateurs would even think of taking off a wedding ring when connecting up those hefty cables to a high-power solid-state power amplifier?"

General purpose power supply

Fig 2 shows a useful, general-purpose power supply described by Doug DeMaw, W1FB, and Bob Shriner, WA0UZO, as part of their "basic amateur radio" series in *QST*. It provides a regulated output adjustable from 2 to 18V at up to 0·7A. Although the circuit is quite standard, it forms the sort of unit which most people would be happy to have around the shack. If a mains transformer with 12·6V secondary is not available, the junk box may well provide an older component with two 6·3V windings that can be connected in series.

A rather more unusual approach is taken by George Wilson, W1OLP (*Ham Radio* December 1979) to the design of a variable, high-voltage psu that can be adjusted to provide any potential between 50 to 500V dc: Fig 3. No information is given on the extent to which the output voltage varies under load or on the output current rating, since the unit was developed for the uncritical (but useful) bench application of "reforming" old electrolytic capacitors that have become excessively leaky. In this application the output is limited by an external resistor to about 5mA.

The novelty is in the use of an ac voltage regulator based on a bilateral trigger and triac similar to the arrangement often used in light dimmers and universal motor controls. This varies the voltage applied to the *primary* of the mains transformer. Note that the bilateral trigger, triac and 400V dc capacitors in the primary circuit of W1OLP's design are intended for 110V ac mains, and with 240V mains it would be essential to fit components of suitable ac rating.

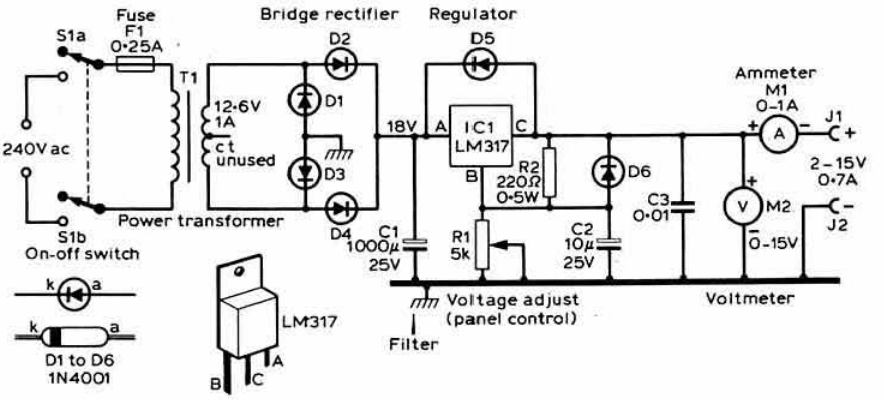

Fig 2. General-purpose 2-15V, 0·7A (max) regulated power supply. R1 is 5kΩ linear carbon pot. Miniature meters are used

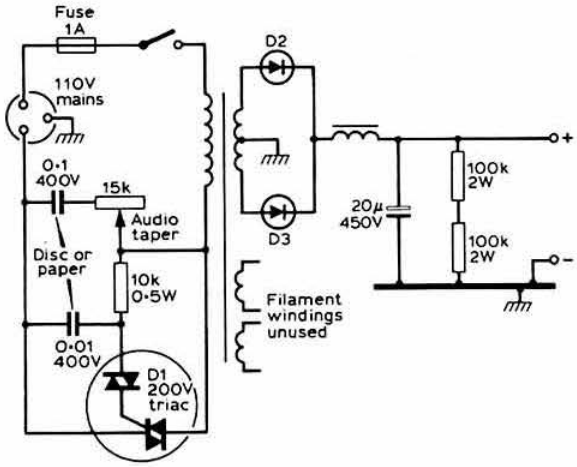

Fig 3. Variable 50–500V work-bench power supply unit. Note that components in primary circuit are rated for 110V ac mains and must be up-rated for 240V supplies

Electrolytics can be reformed through a 100kΩ (2W) resistor by setting the psu to provide an output voltage equivalent to the capacitor's rated value, and then leaving the capacitor in circuit until very little voltage drop can be measured across the 100kΩ series resistor.

Hellschreibers rediscovered

Around about 1942, before the wartime development of rtty, I watched, with fascination, a machine printing out radio messages in letters on paper tape at about 25wpm. This was by-means of the relatively little-known Hellschreiber system, named after its inventor, Dr Rudolf Hell, and the German word for "writer". This form of machine telegraphy was developed in the 'thirties and put into service for the distribution of press messages, and in the second world war by the Wehrmacht which used portable "Feldfernschreiber" machines. It was suitable for line or radio circuits and, unlike rtty, did not require any special modulator or demodulator circuits. I remember being so impressed that I retained for many years a small piece of the printed tape, imagining that the system would come into general use in the post-war period.

The subsequent development of the faster rtty system meant that, in practice, the Hell system never became popular, although it did achieve considerable use for press traffic for some years before virtually disappearing from the professional scene. A few years ago, however, a small group of Dutch and German amateurs (and at least one British station) managed to locate and restore a number of the old Hellschreiber machines, and their rhythmic *prrt, prrt* began to be heard again on 3·5MHz. Since it is debatable whether the amateur licence covers this mode of transmission, it seemed unwise at the time to write too much about what was going on, although a series of articles did appear in the Dutch *Electron*.

Now, however, Hans Ever, PA0CX (DJ0SA), has published an English-language description of the system and of the activities of this enthusiastic group (*Ham Radio* December 1979, pp28–32). This article underlines that this electronically simple but mechanically elegant system has very significant advantages, for amateur machine-telegraphy, over conventional rtty, especially in its much higher resistance to channel interference. The received text is never subject to the printing out of wrong characters; instead very bad interference causes the correct character to appear mutilated. In effect Hellschreiber is an unencoded/analogue/digital system rather than the coded digital system of rtty. (Yes, I know that received wisdom is that coded techniques are superior to analogue systems, but this ignores the fact that while unencoded systems degrade gradually in the presence of interference, coded digital systems are virtually either "go" or "no-go".)

As PA0CX puts it, with rtty a single rf spike of interference will often result in the printing out of a character that has no resemblance whatsoever to the character transmitted; whereas in such circumstances the Hell system prints the correct letter together with the received interference. This means that the operator can use the superior "pattern recognition" abilities of the human brain to sort out the Hellschreiber message, just as a cw operator or ssb operator can often do, while the rtty operator has to depend on language-redundancy to read a message containing the wrong characters. Furthermore, Hell is a synchronous system with no "start up" errors. In other words, here is a form of automatic machine-telegraphy which possesses the same advantages as human decoding of cw when compared with microprocessor decoding (*TT* June 1979) plus the additional advantage that the human operator does not have to make an instant decision (as in cw) on letters smothered by interference.

The Dutch group has not been content just to bring back into service a number of museum-piece machines. They have shown that very compact modern machines can, for example, be built using small electric motors with solid-state speed regulation, and with good ferrite-resonators to pick the Hell signals out of "overwhelming" interference. PA0WV has even shown that microprocessors can be put to very good use in the system, not for decoding, but in order to make possible "moving line" character displays on vdus and oscilloscopes, and so eliminate the need for paper tape except when a permanent record is to be made of the incoming message. A Hell vdu display *includes* the interference spikes and so maintains the remarkable resistance of the system to heavy interference. PA0WV has also developed a clock-plus-matrix system that fits under a small keyboard, enabling the operator to produce all characters in virtual silence. Completely home-made Hell terminals, though clearly not easy to implement, have been shown to be possible.

The printers operate from standard audio output. The transmitting "encoder" is arranged to key a cw transmitter (break-in operation is possible). The duty cycle of a Hell transmission is lower than for either cw or fsk. Basically the system is an ingenious form of character facsimile or crude "seven-line" slow-scan television. At the receiver, "scanning" is normally mechanical by means of a fast-turning inked wormshaft. To print a sloping line, the incoming signal actuates an electromagnet that pushes the paper tape against the worm; all characters are "printed" as a form of seven-line sloping matrix of short and longer lines. The transmitter encoder is based on a revolving drum that produces a series of appropriate pulses when any keyboard character is depressed. The encoding drum needs to revolve in synchronism with the wormshaft at the receiver (one turn of the drum equalling several turns of the wormshaft). However, as the "images" or printed characters appear twice across the tape, the only effect of faulty synchronization is that one set of the characters gradually crawls or drifts off the tape to be replaced by the second line of characters, so that the message can still be read. Printing rate is

2·5 characters per second, or roughly 25wpm, appreciably slower than rtty but a speed which is more than adequate for most amateur communication, although some people would regard the absence of a page-printer as a disadvantage.

Because there are unlikely to be many old Hellschreiber machines lying around, it is doubtful whether this ingenious and potentially very useful system will ever be taken up outside the existing small group of enthusiasts, unless somebody comes up with detailed designs of mechanical or electronic versions suitable for home construction; but clearly this could be a rewarding field for experimentation. The Dutch group is convinced it represents a truly fantastic system for amateurs.

Silicones and electrical contacts

The use of silicone grease to improve thermal conductivity between power transistors and their heatsinks, and the use of silicone aerosols as a moisture repellant has become common practice. Malcolm Pritchard, G3VNQ, however, recently noted a letter in *Plastics and Rubber Weekly* from Dr J. C. Harrison, head of the materials branch of the Post Office purchasing executive, that has made him wonder whether it is always wise to spray silicones around. Dr Harrison wrote:

"Silicones are materials occurring in a wide range of types (oils, rubbers, resins, etc) and with a wide spread of industrial use. It is unfortunate that the occurrence of creeping silicone oil film, or the presence of silicone oil vapour, can seriously disturb unsealed electrical contacts.

"Decomposition of the silicone by heat or arcing results in the formation of tenacious insulating films of silica. These films cause contacts to develop high resistance and eventually become open circuit.

"This phenomenon has been known for many years in electrical engineering circles but is not so well known in the wider plastics world.

"Contact failures have been experienced in PO exchanges due to the use of silicone-containing floor polish, microswitches in telephones due to silicone mould release sprays on the body moulding, reed relays due to contamination of production machinery with silicone grease, and switching equipment in customers' premises caused by the adjacent installation of photocopiers containing silicone oil.

"The amount of silicone that can cause trouble in a sealed or semi-sealed item like a microswitch is vanishingly small.

"The presence of only a handful of items containing silicone fluid could wreak havoc in electro-mechanical equipment."

The letter was written to draw attention to the problems involved in a suggestion that silicones should be used increasingly in plastics moulding, and Dr Harrison urged anyone thinking of adopting this suggestion to consult PO Specification M230 "before adopting what otherwise looks like a good idea".

Debate on the G4COM alignment aid

The question of modifications to an established and successful design is always a difficult one. Over the years, since the publication of G4COM's most useful article on a vhf alignment aid (*Radio Communication* January 1976) a number of additional suggestions have appeared in *TT* and elsewhere, and these finally provoked a rather strong comment from G4COM (*TT* September 1979, p832) on LA8AK's ideas outlined in *TT* May 1979, p424).

Jan Martin Noeding, LA8AK, feels, however, that some further comment is needed as he, in turn, remains unconvinced by some of the points mentioned by G4COM. Without wishing to get drawn into this debate, it is only fair to indicate where he disagrees with G4COM. He writes:

"G4COM recalls that he needed to reverse-bias TR2, but surely all that is necessary is simply to ensure cut-off of this transistor. Because the original design used a less-than-ideal multivibrator, whose output swing is less than the battery voltage, he requires extra components. The output from my cmos multivibrator (Fig 6 of the May *TT*) comes much closer to the ideal, and this means that a simpler approach can be used. This can be readily shown by using an oscilloscope on the original circuit, although it can be modified by adding a diode and resistor."

LA8AK also takes up again the question of the band-limiting factor of the original C1 (0·1μF) capacitor, noting that: "in accordance to the law for the nature of white noise, the level will not be constant when the bandwidth is reduced; thus band-limiting components may cause fluctuations to be read which do not exist in practice" (LA8AK provides a graph to illustrate this point).

Low-spurii 144MHz transmitter

In *Break-in* (June 1979), K. Marston, ZL2AJW, outlines a 144MHz fet/bipolar solid-state nbfm transmitter which evolved after finding that conventional multi-stage bipolar designs tend to produce a hair-raising number of large spikes of spurii when checked on a spectrum analyser.

ZL2AJW is convinced that the answer is to use a multiplier-chain based on fets with double-tuned circuits: Fig 4. He finds

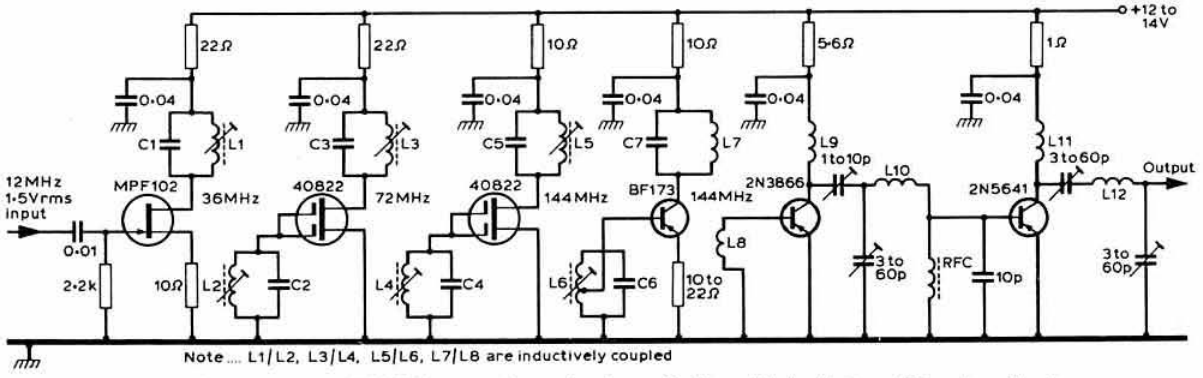

Fig 4. ZL2AJW's low-spurii 144MHz transmitter using fet multipliers with double-tuned interstage circuits

this provides a "clean" signal (all spurii at least 55dB down on carrier when viewed on a spectrum analyser with 50MHz sweep). The transmitter provides 3·75W output from an under-run 2N5641 (12W capstan type.) Alignment was carried out using an absorption frequency meter, and no difficulties were experienced. ZL2AJW suggests that the main points to watch are:

(1) Keep the drive to each stage just enough to drive the next stage.

(2) If any instability is found in the driver or output stages a 10pF capacitor from base to the nearest earth point will help; if it persists fit one from collector to earth.

He gives the following details for tuned circuits: L1 8t, C1 33pF; L2 8t, C2 33pF; L3 4t, C3 33pF; L4 4t, C4 33pF; L5 2½t, C5 10pF; L6 2½t, C6 10pF; L7 2½t, C7 10pF; L8 1t link over cold end of L7. L9 to L12 (all 20swg tinned copper on $\frac{1}{16}$in diameter with turns spaced to avoid touching): L9 5½t, L10 3t; L11 3t; and L12 5t. RFC 3t enam on ferrite bead. Spacing between L1-2, L3-4, L5-6 should be ¼in. Screening between stages helps eliminate unwanted feedthrough and/or feedback. Note that ZL2AJW does not specify the variable-cored inductors but it is assumed that these are of standard type.

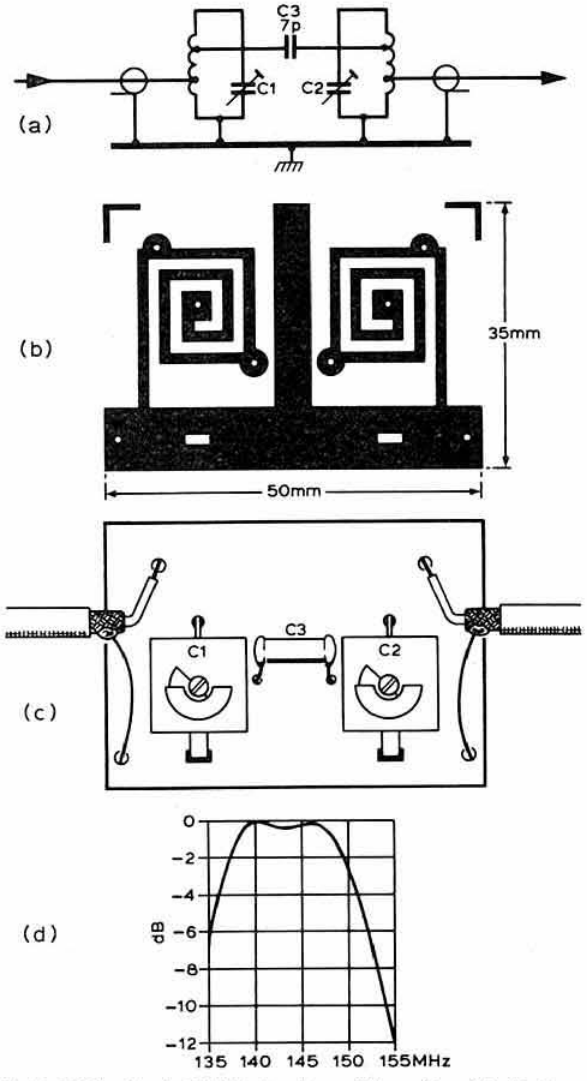

Fig 5. I4SN's simple 144MHz bandpass filter with printed inductors, suitable for transmitters up to about 15W output

Simple 144MHz bandpass filter

As indicated in the previous item, not all solid-state 144MHz transmitters can be considered free from spurii; and although it is better to minimize these in the early stages of the transmitter, this can involve major modifications to packaged equipment. An alternative method of cleaning up the signal is to pass the output through a bandpass filter. In *Radio Revista* (subsequently reprinted in the Dutch *Electron*), M. Micelini, I4SN, has described a simple bandpass filter based on printed inductors. This passes signals over the band of about 140-146MHz but provides reasonably useful attenuation to spurii outside this range (although bandpass filters at vhf cannot be expected to provide the type of ultimate rejection possible at hf). Details are shown in Fig 5, and maximum power handling capability is put at about 15W. The trimmers are described as Tronsor 3-15pF.

AF sine wave generator

A simple form of af sine wave generator is described by J-L Castex in *Radio-REF* (October 1979, pp794-800). He notes that conventional sine wave af generators tend to have inconvenient features; for example the Wien oscillator depends on its agc or stabilization; the Bridged-T type of oscillator requires precisely matched values of resistance and capacitance; and so on. His solution is to use a very simple square-wave generator such as a multivibrator, and then to pass the output through a lowpass filter designed with a critical frequency roughly half that of the multivibrator.

Fig 6(a) shows an example of this technique, with a cmos

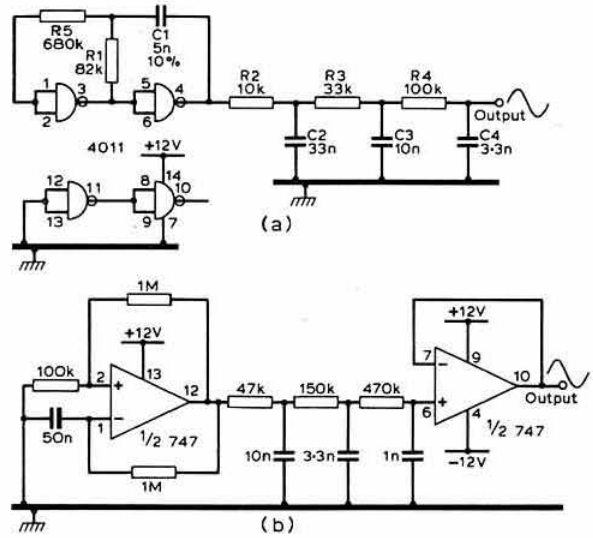

Fig 6. Two examples of the simple af sine wave generators described in *Radio-REF*. A multivibrator square-wave generator is followed by a lowpass filter having a critical frequency roughly half that of the multivibrator, resulting in sine wave output with distortion of only about three per cent

generator having a frequency of 1,020Hz, followed by a third-order lowpass filter with a critical frequency of 500Hz. This results in a sine wave output of 1,020Hz, 1V peak-to-peak and with a distortion of only about 3 per cent. Fig 6(b) is another version, using a 747 dual op-amp and providing 500Hz sine wave output at 4V p-p, again with about 3 per cent distortion.

The *Radio-REF* article provides detailed mathematical and tabulated information on the design of this type of sine wave oscillator, but it is felt that the general principles should be clear from this brief summary and the two circuit examples.

Band reject tvi filter

Frank Harrison, G3XII, recently found that his tv receiver was suffering tvi from his 28MHz transmissions; not surprising since his 28MHz beam is only a few feet away from the tv antenna/feeder. The various standard remedies—Faraday loop, highpass filter in tv feeder, braidbreaker, single-rejection trap in centre conductor of the coaxial tv feeder—produced some improvement but none of them completely cured the interference.

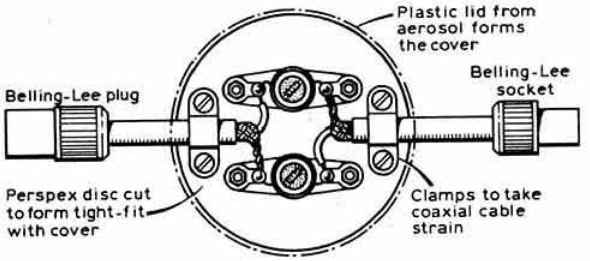

Fig 7. G3XII's band-reject tvi filter. The 1/4in coil formers have solder tags at each mounting screw, and the inductors consist of 10t of 30 (or 32) swg enam wire, slug tuned and with 27pF mica capacitors

However, G3XII then tried an idea which he has not seen in print. He made up *two* parallel tuned rejector circuits on 1/4in Aladdin formers. These were pretuned to 28·7MHz and electrically inserted in the tv coaxial feeder; one in the centre conductor, the other in the outer braid: Fig 7. There was no loss of picture quality (G3XII is in Preston, Lancs, about 20 miles from the tv transmitters at Winter Hill, near Bolton) and the interference cleared up completely. He feels that his technique might prove equally effective on other bands (with the possibility of having more than one filter connected in series to cover several bands) particularly as construction and alignment proved so straightforward.

La Radiogoniometrie Sportive

A miniature keyed 3·5MHz "transmitter" which can be used as a signal source for testing and adjusting receivers and antennas, but which also provides a miniature transmitter for df "fox-hunt" events, is described by Hubert Pellet, F1DYF (*Radio-REF* October 1979, p804) and stemming initially from LA7MO: Fig 8.

The ttl ic (SN7400) functions as oscillator, driver and keyer, with a 2N3053 bipolar transistor as "power amplifier". Total power consumption is stated as about 0·9W from 12V. The unit can be put on a small pcb, etc, and enclosed in a metal box (eg Eddystone 7134P). The arrangement might also prove useful to drive a low-cost vmos fet power amplifier to provide rather more output.

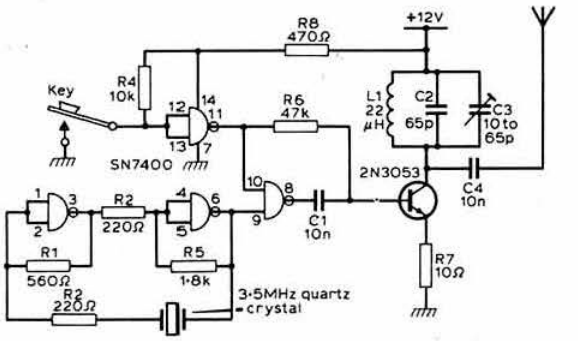

Fig 8. Miniature 3·5MHz cw transmitter for test purposes or for df events

Charging nicads quickly

A combination of constant-voltage and constant-current charging techniques has been adopted by Bill Bretz, WA6TBC (*Ham Radio* December 1979, pp66-8) to provide rather more rapid charging than usual of 200mAh, 12V nicad batteries. His basic arrangement (Fig 9) is designed to charge at 75mA until the battery is fairly fully charged, and then to reduce current to a trickle. It is stated that it is possible in this way to recharge completely a dead battery in about four hours, and that the battery can then be left permanently connected without damage. To set the shut-off point, connect a 270Ω, 2W resistor across the charge terminals, and adjust the potentiometer for 15·5V across the resistor.

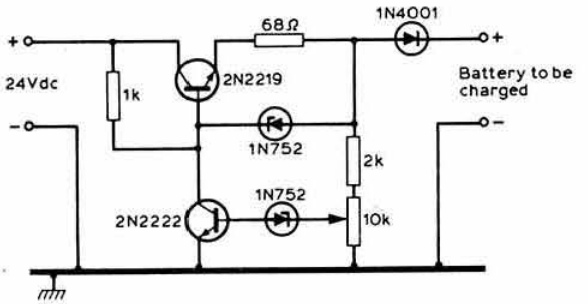

Fig 9. Regulator for charging 200mAh, 12V nicad batteries at about 75mA by combining constant-voltage, constant-current techniques. This would normally be used with suitable mains transformer and bridge rectifier/reservoir capacitor

Constant-voltage lead-acid charger

To avoid cell-damage, constant-current charging is customarily used for nicad batteries, but there is still a requirement for the faster constant-voltage approach when car or motorcycle batteries are used with solid-state equipment away from the vehicle. Writing from Yale University, Jospeh Mack, ex-VK2BME, sends details (from memory) of a novel charger circuit which he came across some 10 years ago in that much-missed, beautifully-idiosyncratic Tasmanian publication *EEB* ("Electronics Experimenters Bulletin"): Fig 10. The zener diode and scr (thyristor) are fed raw dc, and at the appropriate time in each half-cycle the zener voltage exceeds the gate-cathode trigger voltage and turns the scr on, switching the raw dc supply across the battery. Later in the half-cycle the scr turns off when

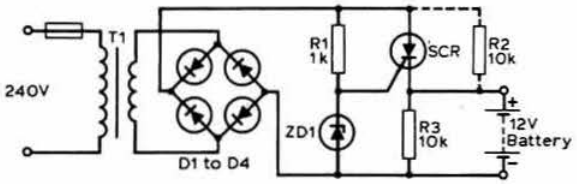

Fig 10. Constant-voltage charger for 12V lead-acid batteries (pulsed output). T1 12·6Vrms; ZD1 14·4V, 400mW; 0·5W resistors; R1 to adjust output voltage select between 500–1,500Ω; ratings of diodes, scr to match required output

the output falls below its minimum holding current. Because of the sharp rise time, the transformer can be expected to "ping" rather than hum. Average charging rate tends to be set by transformer losses at about 2A. Terminal output voltage can be varied over a range of about 1V by changing the value of R1 from about 14·4V to about 13·4V (VK2BME makes Vout about 13·5V, which means that the charger is off for most of the time). R2 (optional) provides leakage current for the battery to avoid a burst of pinging every 5min or so. The main advantage of the arrangement is that it provides an output matched to the low-impedance of a lead-acid battery while using a small transformer that operates continuously.

Hammer-finish paint

Ernest Sumption, G3DQL, referring to the November *TT* item on diy spray painting, feels that members may be interested in hammer-finish paint as an alternative. He has used this approach for many years and finds that is gives excellent results.

The brand he uses is "Finnegans Hammerite" made by Finnegans Speciality Paints Ltd (Eltringham Works, Prudhoe, Northumberland) which may be available at local motor accessory shops. Instructions for use are given on the tin, where it is also stated that the firm will supply a comprehensive information sheet on receipt of a stamped addressed envelope.

G3DQL writes: "I roughen aluminium with sandpaper or wire-wool before brushing on a thick coat. The paint drys in about 15min. It is particularly useful for refurbishing rusty old cabinets, since little preparation is needed except to remove the loose rust and scale. No undercoat is required.

"The main advantage of this paint is that it requires no skill to use yet covers minor surface defects very well; the makers claim that it resists seawater and abuse and can stand heat up to 300°F (150°C). A slight disadvantage is in fixing transfer symbols to the hammer finish when this is used on front panels; however, I found that using two coats of the paint gave a smoother finish, making it easier to fix the transfers."

Long delay echoes—more theories

From time to time over the past decade, reference has been made in *TT* to the curious mystery of the echo signals—sometimes delayed by many seconds from the original transmission—that have been reported over a period of 50 years, mostly on hf but with at least one reliable report as high as 1,296MHz. These long-delay echo (lde) signals were undoubtedly heard (and occasionally recorded) in the period 1927–39, but only rarely in recent years. In 1973, at Cavendish Laboratory, Peter Duffett-Smith, G3XJE, checked half-a-million automatic transmissions but not a single lde was recorded. Various theories have been put forward (including a less-than-likely ufo theory!) to account for these phenomena, but so far all have failed to satisfy impartial observers. There is also evidence that at least some of the reports were the result of deliberate hoaxes by amateurs; similarly there remains the possibility that some may result from a form of *deja vu* brain mechanism, convincing a listener that he has heard an echo that in fact does not exist outside his own brain. There are the well-known "round-the-world" hf echoes, and also "echoes" resulting from broadcast overseas relays running independent tapes slightly out-of-sync with the home station on an adjacent frequency.

Yet always one comes up against reports and recollections that just cannot be explained away, even by the most sceptical. For example, *TT* (November 1975) included what, at least to me, were two entirely convincing reports from G3ZTK and G4CEM relating to photographic and undulator *recordings* of echoes from the early period.

Professor Martin Harrison, G3USF, has drawn my attention to a long, carefully researched paper by D. B. Muldrew (Communications Research Centre of the Canadian Department of Communications) "Generation of Long-Delay Echoes" *Journal of Geophysical Research*, 1 September 1979, pp5199–215. This opens with a detailed historical survey, including many references to observations made by both amateurs and professionals, and then puts forward three models to account for different categories of lde. Very briefly these are:

(1) Signals below 4MHz becoming entrapped in magnetic field-aligned ionization ducts which, he suggests, could account for echoes delayed by up to about 0·4s, but reported as delays of about a second.

(2) The effect of two separate transmissions interacting non-linearly in the ionosphere or magnetosphere; if the wave vector and frequency of the forced oscillation at the difference frequency of the two signals should satisfy the dispersion relation for electrostatic waves, such a wave would propagate and could grow in amplitude due to wave-particle interaction. At a later time it could interact with the signal from the second transmitter, and in some circumstances might be heard on a receiver tuned to the frequency of the original transmission. D. B. Muldrew believes this could account for delays of up to about 6s. It postulates that one of the transmissions may be continuous unmodulated carrier.

(3) This is a similar mechanism to (2) but involving a magnetospheric ionization duct and might account for delays of tens of seconds. Normally this might be expected to make a voice transmission echo unintelligible, but there could be occasions when this would not be the case.

The mechanisms suggested by D. B. Muldrew are clearly complex and would be difficult to prove experimentally. I must admit that I rather like the suggestion that ldes could result from the non-linearity in the ionosphere (the old "Luxembourg effect") which in recent years has been attracting increasing interest. It becomes ever clearer that the effect of high-power transmitters causing an increase of electron temperature in the ionospheric layers can have many important implications.

This might also be a clue to explaining the difference between pre-war and post-war reports of ldes. Could it be that the vast increase in high-power broadcast, television and radar transmitters during the period 1939–1950, all raising the electron temperature of the ionosphere, in some way invalidated the "natural conditions" that gave rise to echoes? In other words, have ldes become virtually extinct on hf because of layer pollution? Ecologists please note. □

oscar news

Phase 3 satellite up-date

The launch of the AMSAT Phase 3 satellite is now planned for 1700utc on 30 May 1980 with the LO-2 launch with the Firewheel satellite from French Guiana.

AMSAT-DL has shipped the magnet control and spin system to Washington, and K9LF personally delivered a superbly-machined launch attachment fitting to the AMSAT AGM and presented it to W3GEY. VE3IHT has come up with the four brackets for the spring, while K4CAV approaches completion of the final launch attach parts.

All antennas are now tested on the range to give a smooth pattern from the spinning satellite. The front element of the end-of-the-arm two-element Yagi is now tilted forwards at some 30° to form the 144MHz downlink, and the high-gain 435MHz uplink receiving antenna now consists of three $\lambda/2$ dipoles spaced $\lambda/4$ over the shell centre some $5\lambda/8$ away. The 145MHz antenna gives 9dBi gain; the 435MHz 11dBi gain for the apogee system on top of the spacecraft. The omni-directional antennas for the perigee link consist of a $\lambda/4$ whip for 145MHz, and a sleeved dipole for 435MHz giving good patterns with no deep null off the back, as planned.

The computer, the DJ4ZC design, further developed by W2FPY, with its RCA CDP1802 cosmac and 32k bytes of cmos memory of W1HDX design, is working well.

WB5MPU reports the sponsoring of 4,158 solar cells, and 39 battery cells, eg enough for Phase 3A and gently approaching enough for Phase 3B later.

The band plan is evolved, giving a general communications band of 124kHz width, with cw planned from 145·838 to 145·880MHz, mixed mode from 145·880 to 145·920MHz and ssb from 145·920 to 145·962MHz. At each end of the band, special service channels will be placed at specific separations from the beacons of 17kHz, each 4kHz, eg L1 will be 17kHz from the 145·810MHz beacon on 145·827MHz, L2 on 145·831MHz, L3 on 145·835MHz zero-doppler. At the other end, H1 will be 17kHz from the 145·990MHz beacon to give a basic 145·973MHz channel, H2 will be at 145·969MHz, H3 145·965MHz, and H4 at 145·961MHz. These will be kept for selected special services, eg L3 for NTS formal cw record traffic net and/or international equivalent, with W1XX as co-ordinator. L2 is for data exchange, with WA2LQQ co-ordinating this; H1 is for cw/rtty bulletins. L1 is a scientific research channel into phenomena and techniques (NIDM), H2 is for scheduled school, university and college demonstrations and other fully co-ordinated educational objectives, organized by WB1EYI. The H3 channel is the general bulletin channel, for full-period employment by bulletin stations in all the world's major languages, to give information and news emanating from IARU, ARRL, AMSAT, RSGB and all societies and groups who desire to assist in the medium, and who are asked to co-ordinate with G3IOR, who is preparing a share plan according to optimum satellite position and audience coverage around the world. Finally, the H4 channel will be used as an AMSAT calling and net frequency for all the satellite-oriented AMSAT groups to participate in together.

It is calculated that some 800W erp (eg 8W of rf to a 20dBi gain antenna, or 80W to a 10dBi gain antenna, preferably circularly polarized) will be needed to access the satellite at apogee. Complex az-el mechanisms will not be necessary, as the new spacecraft will be well within the beamwidth for many hours at a time, normally high enough to permit a ground-mounted antenna to be employed. A normal 145MHz receiver, equipped with a 10-15dB gain antenna as a fixed beam, will be adequate for reception of the downlink. Further improvements are being made on the receiver front-end to give an improved noise factor, so even lower power uplinks may eventually prove to be feasible.

Phase 3 will be launched into a highly elliptical 17·5° inclination orbit initially, and some 21-24 days later a single-shot apogee kick-motor will be fired that will place the spacecraft, to be called AMSAT Oscar 9, into a 57° inclination, 656min, 1,500km perigee, 35,786km apogee orbit, with the apogee

(Continued on page 161)

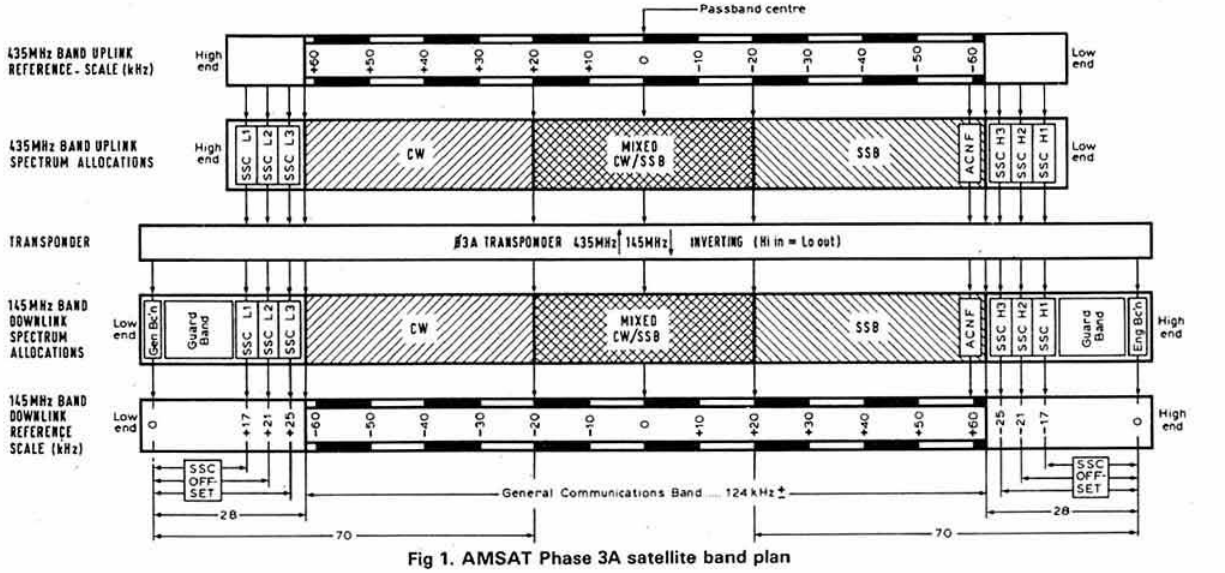

Fig 1. AMSAT Phase 3A satellite band plan

microwaves

Charles Suckling, G3WDG *

A 1N26 mixer for 24GHz

This mixer is constructed out of WG20 and can be built using a vertical bench drill and hand tools only, no lathe work being necessary. Constructional details are shown in Fig 1. The writer's prototype measures only 1·5in long, including a home-made flange.

First, square off the end of the waveguide, by marking out with a right angle, and filing to the marks. A 0BA hole is then drilled and tapped 0·25in from the squared-off end. The tapping should be commenced using a tapered tap, changing over to a plug tap when the tapered tap comes up against the opposite wall. Assemble a 0BA nut on a 0BA screw, the latter preferably cadmium plated or sufficiently dirty so as not to take solder readily. Screw this a short distance into the waveguide and tighten up the nut against the waveguide wall. Using a hot-plate or small flame to provide heat, solder the nut in place. When cool, remove the screw and drill out the nut and waveguide wall underneath the nut using a 5·7mm drill. Drill and tap the nut 6BA through one of its faces, and remove the burr on the inside using the 5·7mm drill.

Drill with an 8BA tapping drill through the centre of the narrow wall of the waveguide, 0·25in from the end, continuing through the opposite wall. Open up one of the holes to 8BA clearance, and tap the other 8BA. Assemble a 0·5in 8BA brass screw through the clearance hole and screw tightly into the opposite wall. Using the 5·7mm drill inserted through the 0BA nut, make a mark on the 8BA screw. Remove the screw and, using a small needle file, make a 0·090in-wide slot in the screw, centred on the marked point, to half-way through its diameter.

Next, prepare the centre conductor for the 1N26 in the following way. Remove the centre connecting piece from a cable-mounting bnc socket, saw off the end remote from the metal fingers, and file to length (0·235in). *Carefully* squeeze the fingers inwards at a point roughly half-way down their length, using the wire-cutting edges of a pair of pliers, so that an opposite pair of fingers are nearly touching. The connecting piece should then be a good push fit on the centre pin of the 1N26. An alternative connecting piece which does not require such modification can be one of the contacts from the high-quality ptfe type of transistor holder.

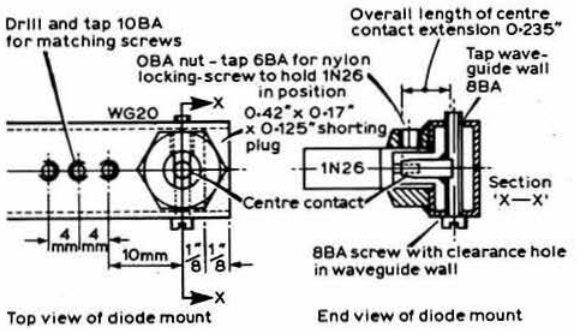

Fig 1. A 1N26 mixer for 24GHz

Wrap one layer of Sellotape around the bottom half of the 1N26, to insulate it when it is in operation, and push the modified centre connector onto the pin of the diode, making sure that it is fully home. Reinsert the 8BA screw into the waveguide, tightening until the filed slot is uppermost. Insert the 1N26 diode into the 0BA nut, pushing in until the centre connector engages into the filed slot in the 8BA screw. The end of the outer casing of the diode should then be approximately level with the inside wall of the waveguide. Using as large a soldering iron as will fit, quickly solder the centre contact to the 8BA screw, using a minimum of solder. Ensure that not too large a blob of solder remains on the joint. As soon as the solder solidifies, remove the diode to reduce the chance of damage, and check that the layer of Sellotape has not been damaged.

The shorting plug is then made by sawing out a piece of 0·125in brass sheet and carefully filing to size. Constant checking of the dimensions with a micrometer during filing will ensure accuracy. The last few thousandths of an inch are best removed by rubbing the plug on emery-paper, or wet and dry paper, laid on a flat surface. The plug is then pressed into the end of the waveguide with the aid of a vice. Finally, drill and tap the 10BA holes for the matching screws, and remove burrs with a file.

The setting-up of the unit is straightforward; the matching screws simply being adjusted for maximum diode current (measured between the body of the diode and the waveguide). The screws can be retained in their optimum positions with lock-nuts. Permanent connection to the body of the diode can be made by soldering a wire to the top of the body, but a safer method would be to use a spring clip, or a small collar fitted with a locking screw, to which a wire could be soldered beforehand. This would avoid the risk of overheating the diode.

A dish feed for 24GHz

In order to combat water vapour absorption losses, long distance contacts on 24GHz will require high gain dishes in order to be successful. Small horns can be used for short-distance contacts, of course, and the design of these will be covered in a later article.

The writer has constructed a 24GHz version of the popular G4ALN 10GHz feed (*Microwaves* October 1976). The dimensions of the 24GHz feed are shown in Fig 2 (a). The method used to construct the feed was as follows. A piece of WG20 of sufficient length to reach the focus of the dish was taken, and its ends squared off by filing. The positions of the slots were marked out using vernier calipers and a right angle, and the slots filed out with a needle file. Repeated checking of the dimensions of the slots during filing ensured accuracy, most attention being paid to the length of the slots.

The end disc was made from 0·036in-thick brass sheet. A 0·5in square piece of this was cut out and soldered to a 0BA brass washer. Using the washer as a guide, the corners were filed off until the piece of brass was the same size as the 0BA washer. A small amount of further filing was then sufficient to reach the final size. The brass disc was then unsoldered from the washer, deburred, and the solder filed off.

*31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

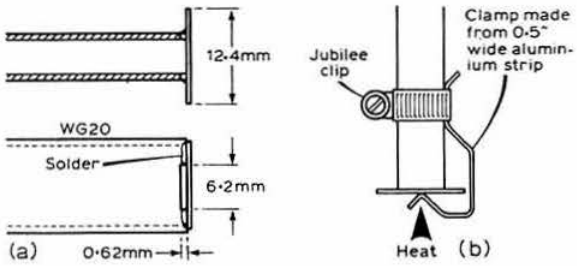

Fig 2. (a) Constructional details of the 24GHz dish feed. (b) The clamping arrangement used to hold the end disc in place during soldering

The assembly of the disc on the waveguide required special care to ensure accurate alignment. The clamping arrangement shown in Fig 2 (b) was used to hold the disc firmly against the end of the waveguide. The disc was then moved around until it was centrally located, as indicated by measurement with vernier calipers. With the clamp still in place, the disc was soldered to the waveguide above a small gas flame, with the waveguide held vertically. Even though a minimum of solder was used some solder flowed into the slots, and this was removed after soldering by cutting it away with a scalpel blade, followed by the insertion of the end of a junior hacksaw blade into the slots (after removing one of the pins from the hacksaw blade).

The assembly was completed by sliding a $\frac{1}{8}$in-thick brass plate, with a 0·25 by 0·5in slot filed in its centre, on to the waveguide. This plate is for bolting to the dish to hold the feed in place. A home-made WG20 flange was then soldered on to the end of the waveguide. The assembly was held in the dish, and the feed slid backwards and forwards to find the point of maximum gain by listening to a remote signal source. The brass plate was then soldered in position, using a right angle to ensure that the plate was perpendicular to the waveguide in both planes.

Using this feed in the writer's 0·35f/d 4ft dish, approximately 0·5dB of sun noise was seen, which is consistent with the calculated performance, based on a measured 18dB receiver noise figure, indicating very good performance of the antenna. In view of its simplicity and relative ease of construction, this feed is certainly to be recommended for almost any dish.

A matched load for 24GHz

In the conventional type of receiver, where the local oscillator power is injected into the receiver via a directional coupler, it is necessary to terminate the fourth port of the coupler with a matched load. This ensures that the Gunn oscillator is presented with a good match, thus giving smooth tuning, and little variation in power output with tuning.

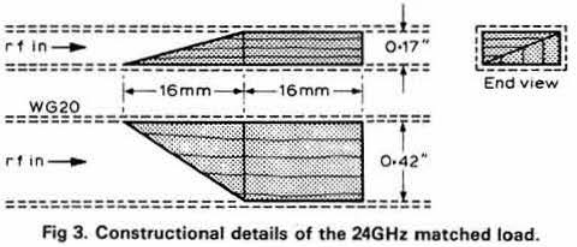

Fig 3. Constructional details of the 24GHz matched load.

Wooden loads for 10GHz are described in the *VHF-UHF Manual* (p8.19), and these loads are capable of remarkably good performance. G4CNV has extended their use to 24GHz, and his design is shown in Fig 3. Its performance has been checked using a slotted line, and indicates an swr of less than 1·07:1 across the 24GHz band. The following points appear to be important in the construction of the load:

(i) the length of the matching section is not critical, but should not be less than λ_g (15·3mm at 24·125GHz);

(ii) the length of the absorbing section should also not be less than λ_g, but is otherwise not critical;

(iii) the absorbing section should be a snug fit in the waveguide;

(iv) hardwoods are to be preferred as the absorbing material, as they are easier to work than softwoods, and there is less danger of breaking off the tip of the load.

The performance of the load is easily checked by moving a metal plate backwards and forwards just behind the load. No change in diode current in the receiver indicates that the load is absorbing all the power incident on it.

Dubus handbook

The publishers of the *Dubus* magazine have now produced a technical manual entitled *VHF-UHF Dubus Technik*. This is a compilation of all the important articles which have appeared in *Dubus* in recent years, together with much additional data. The book is over 400 pages long, and contains a large amount of useful microwave information. The seven chapter headings are: Propagation and calculations; Antennas and arrays; Receivers and preamplifiers; Transmitters and oscillators; Transverters; Measuring devices; and Accessories. The book is available from Bob McHenry, G3NSM, 13 Chalfont Road, Oxford, and enquiries to him should be accompanied by an sae. □

Oscar news

(Continued from page 159)

initially at some 25°N. It will progress by some 0·08° daily further north to a maximum of 57°, then proceed south at the same rate, to be over the equator in 1985, then down to 57°S in 1988. By this time Phase 3B should be long aloft in the northern hemisphere. Donations of cells and increased AMSAT membership will fund this possibility.

Further detailed information and update on the Phase 3 progress may be obtained by calling into or listening to the following AMSAT nets, which also carry news on the existing Oscar 7 and 8 satellites, sdx news, and AMSAT membership information.

Day	Time	Frequency (MHz)	Net	Net control
Sun	1015am	3·780	AMSAT-UK	G3RWL
Sun	1100utc	14·280	JAMSAT	JA1ANG
Sun	1800utc		AMSAT	WA3NAN
Sun	1900utc	21·280		WA3NAN
Wed	0100utc	3·850	E Coast	WA3NAN
Wed	0200utc		Mid-Cont	W0CY
Wed	0300utc		W Coast	W6CG
Mon	1300utc	3·555	JAMSAT	JA1ANG
Sat	1000utc	14·280	AMSAT-Eu	PA0DLO, G3IOR, SM0DZL
Sat	1100utc	14·280	AMSAT-Africa	ZS1BI

Numerous other nets meet on a local basis on 144MHz, ssb, fm, etc. □

Pat Gowen, G3IOR

4-2-70

Graham Knight, GM8FFX*

New London repeaters on the air

At 0925gmt on Saturday 8 December 1979 the repeater station GB3LO was permanently closed down. A short time later at 1000gmt the new London vhf repeater system became operational for the first time. Four new repeaters: GB3NL in Enfield on R7; GB3SL in Crystal Palace on R2; GB3EL at Havering in Essex on R0, and GB3WL in Uxbridge on R1, make up this new repeater system which is intended to provide a choice of frequencies to mobile and portable stations in the Greater London area. There is planned overlapping coverage for the Central London area, and in Greater London at least two repeaters should give coverage in most areas.

The RSGB again wishes to stress that all fm voice-modulated repeaters have been licensed for the express purpose of aiding communication between and to mobile and portable stations. Fixed stations wishing to work a mobile or portable station heard on the repeater are asked to move to a simplex frequency as soon as is practicable.

Considerable effort has gone into the introduction of the new system, and it is expected that further engineering changes will be made to improve upon the initial coverage areas. The four London repeaters all use similar logic control systems, with standard IARU Region 1 tone access of 1,750Hz only being required to switch on the repeater transmitter. Once operational, only carrier reaccess is required for continued operation; there are no time-outs on these four new repeaters, and a T-tone indicates that the next station may transmit.

Propagation Studies Committee plea

Last month's *4-2-70* carried details in the late news section of the surprise opening which occurred during the last few days of November. This late-in-the-year dx opening was due to a temperature inversion which extended all over England and large sections of mainland Europe. The weather centre at Manchester reported that this was the largest system of its kind since 1968, and it covered southern Germany, Spain, France, Belgium and Holland. UK meteorological observers recorded that very high temperatures between 18° and 19°C were recorded at 1,100 to 2,000ft, while at ground level the temperatures were only 11° to 12°C, with barometric pressures of 970 and 1,017 millibars respectively. This inversion resulted in 144 and 432MHz signals being ducted all over Europe.

GB3EM, the Emley Moor beacon, on 432·910MHz, which is again operational from near the top of the television station tower, faded out for many operators during the lift conditions due to its antennas being above the signal-reflecting layers.

Another interesting point regarding this inversion was that the warm air detected above 1,000ft had come from North Africa and the western Mediterranean and brought with it fine white Sahara sand dust which was deposited in fine layers on Lancashire and Cheshire. The Propagation Studies Committee asks all operators who took part in this opening to forward reports to the committee at RSGB headquarters. It would greatly assist the committee members in this special study if operators could send in logs which list time, date, band, mode and, most important of all, the QTH locators.

Repeater operation during lifts

The large-scale weather-induced lift in conditions at the end of the year gave many of the recently-licensed G8T and G8U stations their first opportunity to work real dx. Jack Hum, G5UM, wrote to *4-2-70* to say that most of the new operators conducted themselves very well during the openings, but he was surprised to hear some stations calling "CQ DX" through repeaters. This prompted G5UM to request that once again it be emphasized in *Radio Communication* that QSL cards received as a result of such through-repeater contacts are not valid for any RSGB awards. He made the point that people have a perfect right to use their QSL cards as they please, but adds that operators should remember that it is the repeater which was the two-way link, not the PA0 or ON station to whom they were talking via the repeater. Your scribe confesses to being slightly amused to hear a G8 station on GB3CF saying "will the mobiles keep off to let the dx through". Perhaps GM8FFX and G5UM had separately monitored the same QSOs. As has already been mentioned in connection with the new London repeaters, repeaters are primarily licensed to assist mobile and portable stations, who should always be given priority over fixed station usage.

Norwegian vhf activity

Jan Martin Noeding, LA8AK, who is known to readers of these pages for his work with the Norwegian beacons, has moved location from ES square to a new home in DS80b. His new QTH is an excellent location for vhf, with a clear take-off in all directions, and since he is more than 50km from his old location he is starting all over again collecting the necessary QSL cards for the various vhf awards. He is looking forward to working many of the operators he contacted from the old location, and he will be keeping a special look-out for UK stations during auroral openings on 144 and 432MHz. The ES square in Kristiansands has never been very easy to work, but LA8AK reports that LA8IE and LA6VC are also now active there, and that LA7RP is active from DT locator square.

New beacon on 144MHz

Chris Tran, GM3WOJ, in Dumfries, reported that Dave Oldridge, VE1EI, in Nova Scotia, now has a high-power beacon operational on 144·9025MHz. Special permission has been obtained from the Canadian authorities to run 600W output to a 19-el Cush Craft Yagi antenna which is permanently beamed on Europe. The keying mode is A1, and its operation will be similar to that used at ZB2VHF. If it is not on the air, VE1EI is in the shack and listening or operating near 144·200MHz.

The August 1979 schedules between Canada and the G4DGU expedition to the Isles of Scilly gave encouraging results, as previously reported in these pages. This powerful beacon beaming towards Europe will enable further transatlantic tests to be made and perhaps lead to the first meteor scatter contact on 144MHz across the Atlantic. Dave Oldridge is keen to keep schedules with high-power European operators, and any station hearing the beacon can telephone 0101-902-477-1283 and perhaps make vhf history.

Chris Tran, GM3WOJ, will be keeping a special listening watch on 144·9025MHz during the Quadrantids meteor shower, and he is ready to telephone Canada the minute any

*PO Box 49, Aberdeen AB9 8JA

signals are heard from across the water. VE1EI has a very good vhf site six miles south of Halifax, Nova Scotia, and, as GM3WOJ remarked, if anybody can bridge the Atlantic on 144MHz it will be VE1EI—he is always such an outstanding signal on both the 28 and 50MHz bands.

Patience rewarded

In the November issue of *Radio Communication* we recorded the patience with which Trevor Brook, G3WBQ, of Woodhill in Surrey, had been monitoring the frequency range 40 to 60MHz looking for openings to South Africa. All G3WBQ's time spent beaming south finally led to him hearing stations from South and South-West Africa during the early evening at times usually associated with transequatorial openings. The ZS6PW beacon was heard as strongly as S7, and ZS3E, ZS3AK and ZS6ANZ were all logged calling CQ on the 50MHz band—ZS3E was S5 on ssb while he was trying to work DK1PZ crossband to 28MHz.

No crossband contacts have been managed so far, but G3WBQ has been pleased that all his beaming to the south has resulted in him hearing amateur ZS signals on 50MHz. Openings to North and South America are recorded elsewhere in this issue, and these have been up to or exceeded almost everyone's expectations—few, however, would have forecast that openings to South Africa would have been possible while the east to west path was open on an almost daily basis. G3WBQ also notes that on three separate days, at around 0900gmt, Australian television signals on 46·25MHz have peaked at more than S9. G3WBQ uses a Nuvistor and valve converter for the 40–70MHz range, and he finds that this design beats the more modern fet devices for avoiding cross-modulation from local adjacent frequency television stations while he is searching for the long haul dx.

First eme on 144MHz from South Africa

Gary Howarth, ZS6ASO, in Kempton Park, wrote recently to *4-2-70* saying he was putting together the first 144MHz moonbounce station in South Africa. The first historic eme contact took place on 28 November 1979 at 2137gmt on 144·035MHz, when ZS6ASO worked K1WHS on cw, with full reports being exchanged both ways. This contact has subsequently been repeated, and ZS6ASO feels he will be able to establish regular contacts with the USA on 144MHz eme. At present the elevation control of the moonbounce antenna is being done by hand, but it is hoped to have a full control system operational in the near future. Operation is restricted to just two hours weekly after midnight on Wednesday nights, but it is possible that other ZS stations will follow ZS6ASO's example and become active with moonbounce systems.

MUF experiments at Cheltenham

Since early November a group of amateurs at G3SSO has been monitoring the upward movement of the maximum usable frequency on the North Atlantic path. Television video signals on 55MHz (the North American Ch A2) were frequently heard during the period 10 to 14 December 1979, at good signal strengths, between 1200gmt and 1630gmt. Between 11 and 14 December at least two separate television sound channels were present on 59·75MHz. One signal was identified as being the Canadian CTV Network, and probably came from the Nova Scotia or New Brunswick areas. Another television signal was positively identified as coming from station WLBZ in Bangor, Maine. This USA television signal was received for two hours, often at strengths up to S9, between 1245gmt and 1445gmt. During the same period television video was noted on 61·25MHz (North American Ch A3), while French television sound on 54·4MHz was audible at Cheltenham via backscatter from the west.

Tests between G3SSO and VE1AVX in Nova Scotia during these periods of extremely high mufs did not result in any 70MHz signals being heard across the Atlantic. One of the operators at Cheltenham conducting these experiments was G8KG, who is of course well known for his articles on solar activity. The tests have provided G8KG with more information for a study he has been making linking the short-term mean solar flux with minimal openings of the North Atlantic path at different frequencies during times of low magnetic activity. Observations at G8KG over a number of years suggest that a 90 sfu figure is required for the muf to reach 28MHz, and this year's observations suggest that a figure of 160 sfu is needed for the path to be open on 50MHz. Careful observation during November and December showed that a figure of 240 sfu is required for the North Atlantic path to be open on 60MHz, and G8KG believes that for the path to be open on 70MHz requires a short term mean flux of 400 sfu or more.

Conditions on 50MHz recorded at Cheltenham fell off during the above peaks in solar activity, but during one test with VE1AVX his signals were stronger on 52MHz than on his usual frequency of 50·1MHz. It now seems that the chance of a 50 to 70MHz transatlantic crossband contact has passed by, and the opportunity will not present itself for another 11 or perhaps 22 years.

University fm net

Ian Mant, G8AVJ, in Liverpool, is a student of the Open University taking the science foundation course, and he wonders if there are any other students in north-west England who would be interested in forming an fm net. Your scribe has already eavesdropped on some yl operators in the Wirral discussing their school homework; perhaps soon there will also be a simplex net of Open University students comparing notes on their studies. Operators in the north-west interested in establishing a 144MHz simplex fm net should contact G8AVJ at 28 Welbourne Road, Childwall, Liverpool L16 6AJ.

RSGB 4-2-70 Award

Many enquiries are being received about the requirements for the recently introduced RSGB 4-2-70 Awards. There are four categories for each of the three 4-2-70 vhf bands. The titles of the awards indicate the number of QTH locator squares and the number of countries required to attain the award. The 20/4

CONTRIBUTOR WANTED

After three years as contributor of *4-2-70*, Graham Knight is being compelled by business pressures to retire from this commitment, which he has undertaken with skill and unfailing dedication.

Applications are invited from active vhf operators who feel they may be able to succeed GM8FFX in reporting the many operating facets of the vhf spectrum, and who have the time and writing skill to devote many hours every month to filling four or five pages with news and comment. Applications should be addressed to: The Editor, RSGB, 88 Broomfield Road, Chelmsford CM1 1SS.

RSGB NATIONAL VHF CONVENTION

Organized by the RSGB VHF Committee

The Winning Post and Whitton School, Whitton, Twickenham, Middx

Saturday 8 March 1980

- **One-day exhibition and lecture programme**
- **Saturday evening dance and buffet supper**
- **Specialized trade exhibition with emphasis on help to home-constructors**
- **Exhibition by specialist groups**
- **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) Main reception in the Winning Post Exhibition and trade show in the Winning Post and Whitton School
1200	Pub lunch available in the Winning Post. Other pubs located within one mile, or bring a packed lunch
1400	Convention address by Peter Balestrini, G3BPT, RSGB President
1430	Lectures begin in Whitton School

Lecture programme

Stream A—General

1430	"WARC 1979" by RSGB
1530	"Microprocessors and amateur programs", Graham Knight, GM8FFX, and A. Simpson, GM8NCM
1630	"VHF contests forum", Roger Taylor, G4BEL, and members of the VHF Contests Committee

Stream B—Advanced communications techniques

1430	"Moonbounce—latest techniques", Peter Blair, G3LTF
1530	"How to work more dx", Ian White, G3SEK
1630	"Oscar Phase 3", Ron Broadbent, G3AAJ, and members of AMSAT UK

Stream C—Microwaves

1430	"Building and operating equipment for 24GHz", Charles Suckling, G3WDG
1530	"10GHz narrow-band techniques", John Ganaway, G3YGF
1630	"Constructing and testing microwave antennas", Mike Walters, G3JVL

1730	Lecture session ends. Raffle draw in Whitton School

RSGB NATIONAL VHF CONVENTION

SOCIAL EVENING PROGRAMME

1930	Social evening begins. Dancing to the popular Second Foundation Modern Dance Band
2100	Presentation of awards
Midnight	Convention ends

How to get to the Winning Post

By car

The Winning Post is on the northern side of the A316, Chertsey Road at Whitton, Twickenham, Middlesex. Ordnance Survey Map 170 ngr 140½ 730½. As the A316 is a dual carriageway with few turning points, approach the main entrance of the Winning Post from the west end of the A316—it terminates at the junction of the A316 and A305—or enter via a minor road passing Whitton Station to the rear of the Winning Post. Ample parking space is available at the Winning Post or in some adjacent roads, but *not* in Chertsey Road or at Whitton School.

By public transport

Train to Whitton Station from Waterloo (Southern Region), approximately 20min. Five minutes' walk from station to the Winning Post. No 203 bus passes Whitton Station. No 202 bus from Richmond.

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.

APPLICATION FOR TICKETS

RSGB NATIONAL VHF CONVENTION
8 March 1980

Please supply tickets as under:	**Cost**	**Number**	**Total cost**
Convention only	£1.00		
Convention only (under 18)	£0.50		
Evening only	£3.50		
Convention and evening	£4.50		

I enclose cheque/postal order for £.....

Name .....

Address .....

.....

Send application and remittance to: Mike Dormer, G3DAH, 43 Mickleburgh Avenue, Herne Bay, Kent

Make cheques payable to Radio Society of Great Britain.

Early application will be greatly appreciated

award for 70MHz, for example, indicates that the award can be claimed by operators with the QSL cards to prove that they have had two-way communication with stations in 20 different QTH squares and in four countries on the 70MHz band. The titles of the awards are as follows: 70MHz 20/4, 70MHz 25/6, 70MHz 30/8, 70MHz 35/10, 144MHz 40/10, 144MHz 60/15, 144MHz 80/18, 144MHz 100/20, 432MHz 30/6, 432MHz 40/10, 432MHz 50/13, 432MHz 60/15.

All contacts must be made after 31 December 1978, and claim forms are obtainable on receipt of an sae from the RSGB vhf awards manager, Jack Hum, G5UM, 27 Ingarsby Lane, Houghton on the Hill, Leicester.

Squares—a parlour game!

A most interesting letter has been received from a former contributor of the vhf section of the Society's journal. Bill Scarr, G2WS, writes "As I read *4-2-70* month by month, I find more and more references to the new game of working 'squares'. This new parlour game apparently appeals to newcomers to vhf and uhf operation, and I imagine to many others who regard amateur radio as a new pastime to be compared with the collecting of engine numbers and cigarette cards.

"For the more thoughtful and purposeful amateur it must inevitably represent the reduction of the radio art to an all-time low and an entirely artificial and meaningless pursuit. Chopping up the map into meaningless and arbitrary sections and then trying to put signals into them is utterly unscientific and does nothing whatever to advance our knowledge of radio or to enhance its value or interest. On the other hand, contacts with persons of other nationalities, cultures and languages is inevitably a stimulating and inspiring pursuit calculated to bring home to us in a vivid manner the wonder of the power of radio communication.

"Readers of *4-2-70* should remember that amateur transmitting is not just another parlour game—it is the finest hobby in the world—it is at best an opportunity to promote international friendship and goodwill, and a chance, for those who have the intelligence to take it, of contributing to the greatest scientific development of modern times."

Do other readers share the views expressed by G2WS? Future *4-2-70* pages will record any reader reaction to G2WS's interesting letter. A bumper mailbag at PO Box 49, Aberdeen, is expected next month.

Supreme Awards for G6XM and G2AMV

There will be widespread satisfaction at the news that Bill James, G6XM, has earned Supreme Award No 29; a deserving crown to much pioneer work on the vhf frequencies. Indeed, the callsign G6XM frequently figures in the pre-war vhf reports. G6XM's Supreme was collected as a result of achieving 1·3GHz Senior Award No 18 plus two Senior Awards for 144MHz and 432MHz.

Just as G6XM is an old-timer with many years on the air behind him, so G4HAO is a comparatively new operator. He has attained a 144MHz Standard Award and wonders whether at the age of 17 he is the youngest operator to obtain an award?

Well-known vhf operator and RSGB Council member Basil O'Brien, G2AMV, has had 144 and 70MHz Senior Awards for some time, and he concentrated on 432MHz in the last few months of 1979 as he only needed three more countries to obtain his 432MHz Senior and a Supreme Award. He was so anxious to attain the award before the end of 1979 that he had fitted an auto-alarm system to a receiver tuned to the Crowborough beacon, which rang a bell when conditions were above average. Arrangements were also made with fellow Council member Jack Anthony, G3KQF, for G2AMV to receive a telephone warning of good conditions on 432MHz. This arrangement finally paid dividends during the large-scale lift at the end of November, when G3KQF rang to tell Basil that the 432MHz band was full of European stations and that the required three countries were being received strongly at Derby. G2AMV managed to work five stations in Holland and two in Germany. A comparison between the signal strengths of these same stations received in Derby and at the Wirral revealed that there was a 25dB loss, due no doubt to the extra distance involved and to the southern tip of the Pennines. Fortunately G2AMV has received the required QSL cards since the opening and he is now the proud possessor of a well-earned Supreme Award.

Moonbounce activity

Richard Newstead, G3CWI, reported that he, G8OCJ, G4EZN and G4FIL have been hard at work constructing a moonbounce antenna system. The antenna is a home-made 30ft dish made up of 12 steel lattice ribs covered in wire netting and mounted on a 16ft tower. The antenna system has been set up in a village called Banningham, near Aylsham in Norfolk, and care has been taken to ensure low losses by using FHJ5 coaxial cable. On receive, a preamplifier using a GAT5 type gasfet transistor has been constructed, and tests indicate that the noise figure is better than 1dB. Several stations have already been heard, including W1JR, WB5LUA, W6ABN, SM6CKU and DL7YCA—a K2RIW type amplifier is under construction. The group has covered a lot of ground, and must be congratulated on hearing moonbounce signals on the system within nine weeks of ordering steel to construct the antenna.

Bob Atkins, G8EKB/W1, is at present operating on eme from the station of W1YU at Yale University. He is attached to the Department of Engineering and Applied Science at Yale, and he has already passed his Advanced Class FCC exams and is therefore able to operate the club station on moonbounce. The Yale array consists of 16 8-el Yagis made to the N6NB design which appeared in the April 1977 issue of *QST*. Each antenna is only 4ft 10in long and, with a stacking distance of just 3ft 7in, produces a working eme array which is less than 12 by 12ft in size. Sun noise measurements indicate that the gain is close to 24dBi. The antennas are fed by a four-way splitter following the design published in the RSGB *VHF/UHF Manual*. The transmitter at W1YU is a Trio TS700 and a Microwave Modules transverter driving a home-built 2C39 amplifier which drives a K2RIW type pa biased to Class C for maximum efficiency—over 600W output has been measured on a Bird watt-meter. Another visitor from England, G8VR, has assisted greatly with the building of the array, and he has also been doing some eme operating and has worked G3WDG.

Stuart Jones, GW3XYW, has worked the first American station from Wales on 432MHz eme. GW3XYW uses a homebrew receiver and transmitter, a Microwave Modules converter with a Lunar preamplifier, and a K2RIW amplifier. His antenna is a 20ft dish with a double dipole feed to the G3LTF design, with the azimuth and elevation being controlled remotely. GW3XYW has recently worked K3NSS, YU2RGC, SM3AKW, G3WDG, ON4DY, F9FT, I2COR, I8CVS and ZE5JJ.

Charles Suckling, G3WDG, near Northampton, managed to have 105 moonbounce QSOs with 44 different stations in 1979, and he achieved the first G to USSR, G to YU and G to ON on 432MHz eme. In all, 17 countries and 10 US states have been

worked, and a Worked All Continents Award was achieved on 29 May following a QSO with VK5MC. Although G3WDG is very proud to have contacted stations in all continents on 432MHz, he does admit that it is no longer as much of an achievement as it was when G3LTF attained his WAC Award. In fact VE7BBG worked all the continents in one day during the last moonbounce contest. G3WDG was pleased to work old friends G8EKB and G8VR at the Yale University station, and another microwave enthusiast in the shape of Mike Walters, G3JVL, who was operating the eme station at W1JR.

Douglas Parker, G4DZU, in Leeds, took advantage of a break in the winter weather to completely change his moonbounce antenna system. With the assistance of G4CMV, G5CSZ and G8HDR he took down the old antennas and replaced them with four 19-el Cush Craft "boomer" antenna Yagis fed with very high quality Andrew coaxial cable. First contact with the new antenna was with VE7BQH in North Vancouver, who also uses Cush Craft, but he has a 160-el array made up from eight 20-el colinears.

50MHz still wide open

The 50MHz band continued to be wide open during the month of December, and VE1AVX had crossband QSOs with UK operators on every day from mid-October. Some of the 50MHz signals were extremely strong for hours at a time. KV4FZ, KP4EOR and W4UWH/KV4 were all received at S9 on simple end-fed wire antennas and, in fact, GM8MJV heard KV4FZ at S9 using just a 144MHz beam to feed his 50MHz converter. KV4FZ was heard to remark that he had already worked crossband to DL, SM, G and GM, and he was looking for a GI and a GW and bemoaning the fact that there seemed to be low activity from Northern Ireland and Wales. John Baker, GW3MHW, is certainly active from near Aberystwyth, despite a typing error in December's late news section which gave his prefix as GM. Another very active station in Wales is GW4HBZ in Denbigh, who reports tremendous signals from W4UWH/KV4, who was still audible through a 50dB attenuator and who was running just 100W to a dipole! ZB2VHF was audible in Wales via back scatter, and the best dx for GW4HBZ was XE1FE in Mexico City. Jack Braithwaite, G3PWK, in Ely, Cambridgeshire, has been taking a special interest in 50MHz activity, as he operated from ZB2BC between 1968 and 1970 and established the first ZB to ZE and ZS contacts on 50MHz as well as a crossband to G3JVL. Jack has been monitoring the ZS6PW beacon and participating in the SM1RK 50MHz information net on 28·885MHz.

Harold Rose, G8NWF, is of course unable to participate in working the stations crossband by transmitting on 28MHz, but nevertheless he has enjoyed listening to the 50MHz band using a Hammarlund SP600 receiver which tunes up to 54MHz. G8NWF put up a dipole antenna 30ft agl and has been logging and recording stations on 50MHz as easily, he says, as shelling peas. He has often listened to Harry Wilson, EI2W, working strings of stations direct on 50MHz, but G8NWF reported that signals from EI2W are weak in the Isle of Wight, probably because they are not being received direct but by back-scatter. The FY7THF beacon in French Guiana was audible for more than one hour at S9 at the beginning of December, and this beacon on 50·035MHz is proving to be a most useful guide to propagation conditions on the Atlantic path.

Al Slater, G3FXB, has been working the 50MHz stations crossband on a daily basis since the band opened up in October. During the last few months G3FXB has worked stations in 44 of the American states, including California, Arizona, Washington and Texas. Caribbean stations have included HC, KG4, KP4, KV4 and XE, and Al reported hearing strong signals from South American stations who were working each other on 50MHz but were not listening for crossband contacts. Brian Bower, G3COJ, is another operator who has been hearing HC and JX stations working each other but not listening for European operators on 28MHz. G3COJ was also interested to hear Columbian fm repeaters on 50·075 and 50·125MHz. G3COJ's best dx have been crossband contacts with WB9HHW (Wisconsin), W5VY, W6XJ, K6ODV, and gotaways were K7ICW in Nevada and W7CI in Arizona. G3COJ was especially pleased to work VE1AI/1 on Sable Island for an all-time new country on any band.

John Branegan, GM4IHJ, of Saline in Fife, has been continuing the propagation experiments detailed in December's *4-2-70*, and exchanging notes on solar activity with Ed Tilton, W1HDQ, the former vhf editor of *QST* and well known to RSGB members for his lectures and articles. A crossband contact with W1HDQ was GM4IHJ's 50th 50MHz QSO in 1979. He also reported the strong signals from KV4FZ, KG4EU and XE1FE which were copied by many other operators, but GM4IHJ also logged HC1JX and JA1PAG/PZ in Surinam.

Jim Foster, K7ZFG, of Klamath Falls, Oregon, kindly wrote to *4-2-70* to say how pleased he was with the coverage 50MHz has been getting in *Radio Communication*. He is up to 46 states worked and has been enjoying the ever-increasing activity on the band. Many stations in Japan have been worked, and recent dx on 50MHz includes Haiti, Netherland Antilles, Guam, Hawaii and Okinawa. Jim operates an Icom IC502 transceiver running 3W output.

Another overseas reader who is pleased with the 50MHz coverage in *4-2-70* is Peter Bacon, VS6BF, who has been buying up equipment like mad, and paid just £450 for an IC701. Using it with a transverter for 50MHz he has worked lots of Pacific and Japanese dx stations. One contact was with H44PT (who also holds the callsign G8BCG) and during their QSO VS6BF arranged to ship a 5-el beam to H44HIR, who is establishing a beacon on 50·005MHz. A beacon on the Solomon Islands will be a great help to stations in the East studying transequatorial propagation. VS6BF (home call G3ZSS) is well known to *Radio Communication* readers as the author of the article on automatic keyers—a design which has been incorporated in a number of beacon stations.

Television dx on 432MHz

Ian Waters, G8ADE, of Stow-cum-Quy in Cambridgeshire, took advantage of the recent lifts to check the 432MHz band for dx television reception. Several amateur television test cards were received, including G3VZV, G4IMO, G8BWC, ON4PO, PA0ERW, PA3AKL and PE1AYR. He reports that at one time three separate test cards were being received on the same frequency, but each picture could be resolved satisfactorily by setting the angle of the beam to minimize the co-channel interference.

G3PTU, at High Flatts, was another television enthusiast who caught the big opening on 432MHz. He managed to exchange fast-scan 625-line pictures with DC6CF, DF7KX and PE1AYR—his best-ever dx. Peter Dick, GM4DTH, in Edinburgh, a keen tv operator, did not manage to work any Continental dx but did receive an unidentified test card while he was beaming towards Scandinavia. He is hoping to be fully operational in the near future. □

the month on the air

John Allaway, G3FKM *

FULL details of amateur radio's gains at WARC 1979 have been given elsewhere in *Radio Communication*. Taking into account the pressures from other services and the requirements of the developing countries we have been fortunate indeed to gain access to an exclusive sector of 1·8MHz and three entirely new bands. The writer, being a veteran dx enthusiast, is particularly pleased at the prospect of having frequencies near 10MHz available for use during the sunspot minima, as at those times 14MHz is not open for long-distance working for considerable periods—especially during winter. This band could well be the first of the new trio to be made available to us, and the problem of suitable band planning must be a matter of some urgency with ony 50kHz to share out.

G4GLM reports that his callsign has been used by a pirate on 7 and 14MHz.

G4EQI has passed along the information that GW3CVY has been using a TS820 and a TS120 for sstv, and that between 23 March and the beginning of December 1979 he received 76 stations—16 from the USA. Perhaps not unusual—except that solar power was being used by all concerned!

DX news

I0DUD is believed to have permission to operate from Vatican City as HV0SJ on Saturdays and Sundays between 0600 and 0900, and again from 1430 to 1730. Frequencies where he may be found are around 14,220, 14,235, 21,285 and 28,590kHz, and some 7 and 3·5MHz activity may also take place. QSLs for contacts should be sent to his home QTH.

EA7FY and EA7LL have been working in Equatorial Guinea on the installation of a television station and have been on the air as 3C1AC. 6O4LS is ON4LS, but is believed to be on a ship in harbour in Somalia, and therefore contacts would not count for award purposes.

A9XBS should now be home in England and sending out QSL cards—his home call is G4GOH. A9XBD is no longer in Bahrain, but is in US Samoa where he identifies as KS6GS—WA3HUP still acts as his QSL manager.

Len Kaufer, KG6SW, has been using his call since 1971 but from 1 January 1980 he became KH0AC. His previous QSL manager, W7OM, has sent out over 30,000 cards, and the job has now been taken over by K7ZA. It would appear that KH0 will be used as the prefix for all Saipan (ie Northern Mariana) stations from now on.

XT3AA was formerly second operator of XT2AW but now has his own callsign. 4N0MP is a special call in honour of the 125th anniversary of the birth of Michael Pupin, a Yugoslav/American who was professor at Columbia University and who invented the coils which bear his name.

TZ4AQS is PE1AQS, who will be working in Mali for some time. His operating frequencies are 21,270–21,280kHz from 1800 for 45min, and then 14,210kHz after 2000 for about 1·5h. A new station should soon be active on Amsterdam Is with the call FB8ZO.

JW7FD will be in Svalbard until June 1980. It is hoped that a two-element array for 7MHz and 3·5MHz will be added to the triband beam being used on the higher frequencies. Favourite frequencies seem to include the regions of 14,205 at 1200 and 2100, and 21,260kHz from 1730. JX9WT is on Jan Mayen and may be found on 14,223kHz after midnight. A net which often contains JX9WT, JW7FD, JW5IJ and others is managed by LA7JO on 14,207kHz at 2100 on Tuesdays and Wednesdays.

A7XA is being heard around 28,560–28,630kHz most days from 1100. He also uses 21,350 and 14,240kHz when 28MHz is not open. DF4NW/A7 is found on 28,050 and 28,560kHz around 1200. A7XAH seems to stay on 14MHz in the area 14,220–14,305kHz and is active at any time between 0400 and 2000. A7XD was previously EP2LI. 4W2AA has been off the air since March 1979, but I2YO may be in Yemen this month and be on the air as 4W1AA. He is not a practised dx operator, and probably a list type of operation will have to take place. If this activity does not take place other Italian amateurs may try to visit Yemen in May or June.

Robin, VK6LK, on ssb on 3,677kHz daily between 1500 and 2200, is looking for UK contacts—he is known to have made some already.

News from overseas

After reading the September *MOTA*, Ken Abbott, 5N0AKD, wrote to update and correct the information given about Nigerian callsigns. At the end of October the number of licensed amateurs had risen to 23 and they were as follows: 5N0AKD, 5N0AAJ, 5N0DOG, 5N0AAM, 5N0RBB, 5N0APA, 5N0MBM, 5N0UDB, 5N0LAA, 5N0AAS, 5N0SID, 5N0OBA, 5N0HAS, 5N0NAS, 5N0EWK, 5N1AAE, 5N4BPC, 5N4ROF, 5N5AOM, 5N8TH, 5N9GM, 5N9GD and 5N9SA. Unfortunately "QTH Corner" listed 5N0AGD as resident at PO Box 390—which is Ken's own address! 5N0AKD is on the air most evenings, and keeps a regular schedule with G3JMH on Sundays at 0800, between 21,360 and 21,380kHz, and he would be happy to give a contact with any UK station at that time.

Expeditions

Iris and Lloyd Colvin finished their stay on St Vincent on 9 December after making over 9,000 contacts as VP2SAX. They entered the ARRL 160m Contest and also the CQ WW DX Contest (cw section). In the latter they competed with K1XA and K1TO who operated using the callsign VP2SX, and there was some confusion! From St Vincent Iris and Lloyd were moving to St Lucia for a month or so and should have been heard with a J6 call. All QSLs go to the YASME Foundation.

W1WY reports that W2BBK will be on the air from St Maarten as W2BBK/PJ7 from 10 to 24 March. He will be found on both cw and ssb on 14, 21 and 28MHz.

PY1MAG is expected to be PY0MAG from Trindade Is for a two-month spell starting about now. Operating frequencies have been listed as 1,805 (listening on 1,826, 1,885 and 1,905kHz for replies), 3,505, 7,005, 14,040, 21,020, 28,020 and 50,110kHz. Listening frequencies will be announced as required.

Two rumours concerning possible activity from Heard Is and

*10 Knightlow Road, Birmingham B17 8QB.

G4BWP (l) with W1YNE at Coventry, Rhode Island. W1YNE is active on rtty and will be pleased to confirm rtty QSOs. *Photo: N1NA*

In N1NA's shack at S Attleborough, Mass. (L to r) G4GIR, N1NA and G4BWP. *Photo: N1NA*

China have been noted. The first says that the supply ship which is due to visit Heard Is sometime between the end of this month and April will have a scientific crew, which may include an amateur, on board. The second, and rather less likely to be true, is that ZL1ADI and ZL1AMO "have been invited to conduct a dxpedition-type operation from China in the near future". Unfortunately, according to *DX'press*, a telephone call to ZL1AMO revealed the fact that he knows nothing about having received an official invitation to China or permission to operate!

According to the *Long Island DX Bulletin* the authorization for the San Felix Is expedition, CE0XEA, has been received but it may now be April before the expedition takes place.

At the time of writing, C5ABK had not been able to visit Guinea Bissau as planned, but this may well take place this month. D4CBS/J5 was on the air briefly but had to return home and hopes to be back soon.

Welcome

The following overseas amateurs joined the Society during November: EI4AZ, EI7BA, EI7CZ, EI8BP, EI9AC, K7JTG, LA3SG, N4OW, N7AST, OZ1AAX, SV1IR, SV1IV, VE6BDG, VE6FY, VK2VQS, VK2YEV, VK2ZQC, VK4ZBW, VP8QG, W0YBV, ZL2BJR, ZR1AZ, ZS6AFO, 5Z4YM, E. Swart (ZS), V. Degiorgio (9H), C. Babe (EI), and M. Jones, W. Nangle, E. Gallup and L. Doyle (W).

QRP

The G-QRP Club has arranged several special weekends throughout 1980 and the first covers 1 and 2 March. This is for cw users, and each day is to be split up as follows: 0900–1000, 14,060kHz; 1000–1100, 21,060kHz; 1100–1200, 7,030kHz; 1200–1300, 28,060kHz; 1300–1400, 14,060kHz; 1400–1500, 3,560kHz; 1500–1600, 7,030kHz; 1600–1730, 28,060kHz; 1730–2000, 21,060kHz; 2000–2100, 3,560kHz; and 2100–2300, 14,060kHz. Other cw activity weekends will take place on 2–3 August and 3–4 November. There will be a special weekend devoted to ssb operation on 12–13 May, and details will be given later. The G-QRP Club maintains regular nets on Sundays from 1100 to 1230 on 7,030kHz, and from 1400 to 1500 on 3,560kHz (both cw), as well as from 1600 to 1700 on 7,090kHz ssb.

Ex-G Radio Club

Readers will share your scribe's pleasure at the news that Reg Cherrill, W3HQO, has been elected president emeritus of the club. As W7IYW (who is president) writes in the *Ex-G Radio Club Bulletin:* "The club has existed and prospered since its inception, largely as a result of the unselfish efforts of Reg, and of course has become increasingly demanding as we have grown from a half dozen overseas domiciled 'Britishers' to the sizeable and highly respected organization that we are today." Reg is also general secretary and treasurer of the club and, for good measure, editor of its bulletin! For those who do not know about the Ex-G Club, it is for amateurs who were born (or whose parents were born or naturalized) in the UK and domiciled abroad. It meets on the air for world-wide members on 14,346kHz at 1900 on Sundays, for Canadians on 14,155kHz at 1630 on Sundays, and for the Pacific area on 14,346kHz at 0500 on Saturdays. There is also a family net on 21,410kHz at 1230 daily.

Amateur Prefix-Country-Zone List

Apologies to Geoff Watts and all concerned for the incorrect information concerning the cost of this useful publication—the UK price is 50p and not 40p as given in December 1979 *MOTA*.

Contests

The ARRL International DX Contest

0000 16 February to 2400 17 February (cw)
0000 1 March to 2400 2 March (phone)

As briefly mentioned last month, this ARRL contest has undergone a great deal of change and now allows dx to dx contacts as well as the more conventional dx to USA/Canada type. There are now single-operator single- and multi-band sections as well as multi-operator single- and multi-transmitter. A new category for QRP operators (with a power input of 10W or less) has been devised. Exchanges consist of RS/T plus a three-digit number indicating the transmitter input power (for dx entrants) and RS/T plus state or province for USA and Canadian entrants. DX entrants earn three points for each complete contact with W/VE, and two with other non-W/VE stations. Contacts with one's own country count only for multiplier credit. The multiplier is now the total number of DXCC countries worked on each band. Scoring is total QSO points

QTH CORNER

G5DDS	Tadeusz Peter, SP6CPM, ul. Rosenbergow 38/40, PL-51-616 Wroclaw, Poland.
G5DDY	Andrzej Kaleta, SP6GVU, Wesola 39/30, PL-50-521 Wroclaw, Poland.
J3ABV, J6LOO	YASME Foundation, PO Box 2025, Castro Valley, Calif, 94546, USA.
JW7FD	via LA5NM, M. Bjerrang, Box 210, 9401 Harstad, Norway.
JX9WT	via LA9WT, J. Fadnes, Eikhaugen 12-D, 5260 Indre Arna, Norway.
K6LPL/KH5	via WA6YQW, P. J. Gould, 1542 Beacon Av, Anaheim, Cal, 92802, USA.
WA2FIJ/KH5	via WA2FIJ, J. Koblein, 8 King Arthurs Court, Saint James, NY, 11780, USA.
W8NMK/KH0	via K4AVU, P. G. Marsha, 3551 Lakeland Drive, Columbia, SC, 29204, USA.
TL0BQ	via I8KDB, G. Nucciotti, V Fracazana 31, 80127 Napoli, Italy.
TZ4AQS	via ON6BC, J. Denecker, 66 Sartlaan, B-8400 Oostende, WV, Belgium.
VP1KS	via DL1KS, K. Sauer, M-Praetoriusstr 14, 6534 Stromburg, W Germany.
VP2SA, VP2SX	via AB1U, R. J. Casey, 85 Hacienda Cir, Plantsville, Conn, 06479, USA.
YB0X/9	via JA1UT, Y. Hayashi, 4-20-2 Nishi-Gotanda, Shinagawa, Tokyo, Japan.
ZD8AI	via N3WM, W. Mellema, 13229 Old Hanover Rd, Reisterstown, Md, 21136, USA.
3C1AC	via EA7FY, M. M. Cabre, Estacion TVE, Valencina, Seville, Spain.
8Q7AL, 8Q7AM	via SM3CXS, Berghemsvagen 11, S-86300 Sundsbruk, Sweden.

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

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multiplied by the sum of DXCC countries worked on each band. Logs should show date, time, bands, calls and exchanges, and those with more than 500 QSOs must include "dupe" sheets. They must be postmarked no later than 2 April. Photocopies of the entry/cover sheet are available from G3FKM (sase please). Entries should be sent to: ARRL DX Contest, 225 Main Street, Newington, Ct, 06111, USA.

The Bermuda Amateur Radio Contest

0001 15 March to 2400 16 March

3·5MHz to 28MHz. Only 36 hours of operation allowed; off periods must be clearly logged and each must be of not less than three consecutive hours. *All stations must be single-operator only and must be operated from their own private residence or property.* Winners of the last five contests will be eligible for area awards only. Phone and cw may be used but no cross-mode contacts may be made, and it should be noted that no phone contacts between VE/W and the UK should be made on 7MHz. Contest exchanges from Britain should be made with stations in Bermuda, Canada and the USA only (although stations in W Germany will also be taking part again) and should consist of RS/T plus county (UK), state (USA), province (Canada), or parish (Bermuda). Each contact counts five points, and a station may be worked on either cw or ssb on each band for credit. The multiplier for UK entrants is the number of different VP9 stations worked on each band added together.

Top scorer in each state, province or county, will receive an award, but the leading stations in Canada, the USA, W Germany and the UK will be invited to Bermuda to receive their trophies at the Bermuda society's annual dinner in October. For this purpose round-trip transportation and accommodation will be provided.

All dates and times in logs must be in gmt, and duplicates must be checked and not counted for credit. Contestants must sign a declaration that they have complied with the rules and terms of their licences, and each log page must be clearly marked with the entrant's name and address. Logs must reach the Contest Committee, Radio Society of Bermuda, PO Box 275, Hamilton 5, Bermuda, no later than 30 June.

WAB Contest

0900–2100 30 March (HF phone)

This is the first 1980 WAB contest and full details may be obtained from R. L. Senter, G4BFY, 27 Station Road, Thurnby, Leicester LE7 9PW (sase please).

Apologies to QRP enthusiasts for the failure to include results of the **QRP section** of the **1978 CQ WW DX Phone** contest in November *MOTA*. There were 31 entries, and the all band section was won by VP9AD with 582,255 points. UK scores were G3FTQ (59,796), GM3RFR (28,325) and G4BUE (1,980).

Awards

Five-Band Worked All Zones

With effect from 1 March 1980 the original "two-plateau" system for this award will be reinstated. It differs from the original in that the first award will become available when 150 zones have been confirmed (not 100 as before). Either a regular or a single-band WAZ must be held by all applicants for the five-band certificate. Those who had applied for the 100-zone certificate and who have not received their money back will be sent the 150-zone certificate later at no further cost.

The Diplome de L'Union Francais

This award requires contacts with stations in countries on the DUF list. They must have been made since 1 April 1946, and four different classes of the award are issued—DUF I for confirmed contacts with five countries in at least three different continents, DUF II with eight countries in four continents, DUF III with 10 countries in five continents, and DUF IV for 16 countries in six continents. The "Austral Lands Continent" (FB8W, FB8X, FB8Y and FB8Z) may be used in place of a missing WAC continent. A list of contacts, certified by the awards manager of a national society (in the case of RSGB this is now G3KDB), should be sent to Edmond Dubois, F9IL, Aubencheul-au-Bac, 59 Aubigny-au-Bac, France. The fee for each class, if applied for separately, is five ircs. However, if application is made for more than one section it is as follows: DUF I + DUF II = seven ircs, DUF I + DUF II + DUF III = eight ircs, and all four parts 10 ircs.

The Polska Award

For contacting Polish Wojewodztwo (Provinces) on or since 1 June 1975. Three classes: I for contacting 20, II for 35, and III for 49. Contacts must be confirmed by QSL unless they were all made during the SP DX Contest in the same year. Province abbreviations in each prefix area are as follows: (SP1) KO, SL and SZ; (SP2) BY, GD, EL, TO and WL; (SP3) GO, KL, KN, LE, PI, PO and ZG; (SP4) BK, LO, OL and SU; (SP5) CI, OS, PL, SE and WA; (SP6) JG, LG, OP, WB and WR; (SP7) KI, LD, PT, RA, SI, SK and TG; (SP8) BP, CH, KS, LU, PR, RZ and ZA; and (SP9) BB, CZ, KA, KR, NS and TA. Certified list plus 10 ircs should be sent to: PZK Awards Manager, Postbox 320, Warsaw 1, Poland.

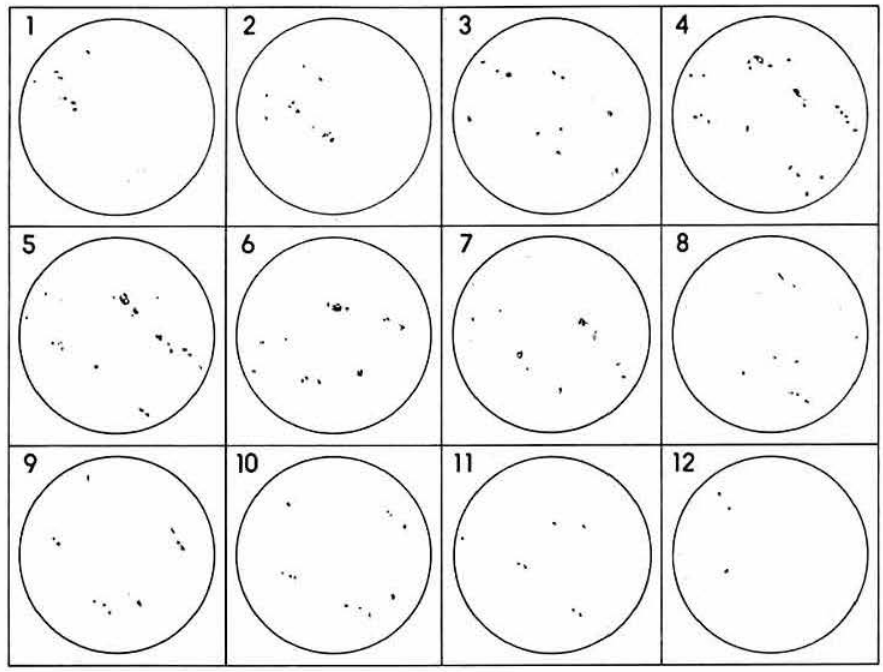
The Diplome des Provinces Francaises (DPF)

Requires confirmed contact with 16 French provinces since 1 January 1951. Contacts must have been all cw or all phone, and a certified list plus six ircs should be sent to A. Morpain, F3ZU, Villa Herval, 8 Av Fragonard, 06 Cannes, France.

VISUAL SUNSPOT RECORDS

The sunspots shown here were recorded by Dr Arthur C. Gee, G2UK, on the dates shown below. They cover a period of intense sunspot activity which may well have been the maximum of Solar Cycle 21. Over the period the 28MHz band produced excellent dx facilities, but the 29MHz Oscar beacons were sometimes inaudible.

1. 31 October 1979
2. 2 November 1979
3. 6 November 1979
4. 10 November 1979
5. 11 November 1979
6. 12 November 1979
7. 13 November 1979
8. 16 November 1979
9. 18 November 1979
10. 19 November 1979
11. 24 November 1979
12. 28 November 1979



HM The King of Spain Trophy

2000 26 April to 2000 27 April

Contacts on any mode with Spanish stations on all bands 1·8 to 28MHz and also 144, 432 and 1,296MHz. Each contact counts one point. One QSO per station on each band on each mode may be made, and band/mode changes may not be made at less than 15min intervals. Send RS/T plus serial number (from 001), and Spanish stations will give RS/T plus a letter indicating their province. Final score is total QSOs "multiplied by the number of provinces obtained for band". Stations in Calella count as extra multipliers. Submit logs before 1 June (enclosing two ircs) to Agrupacio Radioafinionats Calella, Apartado 181, Calella, Barcelona, Spain. Stations who make 50 or more QSOs will receive a commemorative award, and listeners may do this by logging 150 QSOs. The over-all winner of the contest will be invited to spend eight days in Calella during August in order to receive his trophy, and there will be special trophies for the first three places among the Spanish and international entrants.

"CQ" awards

October *CQ* magazine says that the original intention to issue certificates at certain stages of progress towards the new 5 Band WAZ Award has had to be modified, and that the certificate will now only be issued when all 200 zones on five bands have been confirmed. The first five amateurs to achieve this will receive plaques. The magazine apologizes to those who have already applied for the intermediate certificate, and says that money submitted will be held towards the cost of the full award, or returned if so desired. ON4UN is to be congratulated on being the first winner of the award—200 zones worked and confirmed in less than a year!

Congratulations are also due to Richard Thurlow, G3WW, who has just received his CQ DX Award on sstv—only the third to be issued throughout the world to date.

Jersey Amateur Radio Convention

The 1980 convention is scheduled to take place on the weekend of 28 and 29 June, and is a fine opportunity to take a pleasant holiday as well as to meet Jersey amateurs and many French amateur radio visitors. More information can be obtained from Geoff, GJ4ICD, QTHR, or via Box 100, Jersey. Telephone enquiries should contact 0534 26788.

Around the bands

First of all, apologies to G8KG for two errors which your scribe built into his report in last month's *MOTA*. In the third sentence, "250 sfu" should have read "200 sfu", and in the fifth sentence of the second paragraph "three-month peak" should have read "three-month mean".

Thanks to G8KG for the following summary of conditions and sunspot activity: "In the event, the provisional Zurich sunspot number for November turned out to be 185, so that the three-month mean centred on October was, as forecast last month, well clear of the highest value for Cycle 18 (187 as compared with 177). It looks as if the provisional number for December will be about 170, but several months of data will be needed before it is clear whether the trend is now upwards or downwards.

The final solar flux figures show the high peak on 10 November reduced from 383 to 375 afu, which is still a very high value. During the following month the daily flux did not reach such high values but was in the region of 240 sfu from 8 to 15 December, during which time the geomagnetic A index was low. During this period the muf for the N Atlantic path in the early afternoon, as evidenced by the reception of tv audio and video transmissions, reached at least 61·25MHz.

In retrospect, the autumn of 1979 may well prove to have been a memorable period for hf band conditions, through the fortuitous coincidence of the seasonal peak in the northern

hemisphere with high mean solar activity and a period of generally stable magnetic conditions (average A index below 10)."

The following kindly provided information from which this part of *MOTA* was prepared: G2s AMV, CDT and HKU, G4QK, G5s JL and MP, G3s GIQ, GVV, IMW, KSH, LOL and LPS, GM3LYY, G4s EDV, EHQ and GXL, GW4ELI and RSs 17567, 38934 and 42876.

Calls listed in italics were those of stations using cw.

1·8MHz. **0100** *K1PBW, UK2LAQ.* **0600** *W5, W9.* **0700** *HR.*

3·5MHz. **0200** DL2RY/YV6, 3V8AA. **0400** HC8GI, TL0BQ, 5T5CQ. **0500** 4U1UN. **0600** D4CBS, HH2MC, KP2A, VE8RR, W6NLZ, N7RK. **0700** *KL7PJ,* G2ACK/VP2M, W1, 2, 4, 6, 7, 8 and 9, XE, ZL1, 3 and 4. **0800** *J6LOO,* TG9GI, ZL2BT, ZL4, 8P6LD. **1000** W2. **1400** W6NLZ. **1500** YC2BMI. **1600** VE7s CC, IX, SZ, W6NLZ, W7RM. **2000** JA. **2100** CN8AK (QSL to WA3HUP), VP2MCK. **2200** *JA,* JWs 5IJ, 9WT. VE1AI/1 (Sable), 4X4QA. **2300** C5AAG, PY7ZZ.

7MHz. **0000** *HS1ABD, VP1WT, VP2SAX.* **0200** *UL7BBE.* **0600** *EL1V, KL7s PJ, TK, PJ2CC, XE2GCA, ZD8TC, ZL.* **0800** *VE7, W7, ZL.* **0900** *JH1GRG,* ZL4BC. **1500** *JA2CG, KG6JAR, VE6TM, VK6HD, W6TBZ, W7IGE.* **1600** *FK8KAA, KL7AF, UA0BCO, K7UR, VK6GU, 9M2AR.* **1900** *VK3MR.* **2200** *ZD8TC.* **2300** *JA9BE.*

14MHz. **0000** EP2TY, TL0BQ, ZS2MI, 3C1AC. **0800** FK8DH. **0900** D4CBS/J5, VP5BD, *VY1AL.* **1100** 9N1MM. **1600** FB8ZO. **1700** OK3TAB/D2A. **1800** KH6BB. **2000** VP2SAX. **2100** J6LOO, TJ1JC, TZ4AQS. **2200** HZ1TC. **2300** HS1WR.

21MHz. **0000** HH5CB, LU, PY, ZP. **0800** JA, VK, ZL. **0900** D4CBS/J5, *U0Y,* VK, ZL, 5N8TAG. **1000** C5ABV, HM1UI, J3AAF, JA, VK, VP8RY, VU, ZL. **1100** A4XIK, AP2AL. **1300** *KC4USN.* **1400** J6LOO. **1700** TN8AJ, ZL1BIL. **1800** AH8A, KH6JEB, TZ4AQS, ZF2AG. **1900** A7XA, FR7ZN, VQ9PC. **2000** KH6AKW, KX6PW, *N7CW/VP2A.* **2100** J6LOO.

28MHz. **0700** *HZ1HZ.* **0800** JA. **0900** FK8CC, JA, JY1KAI, KG6DX, *SU1IM,* 5N4FB, 9N1MM. **1000** AP2SA, N4HX/TT8, VS6s, WH2ABB, 4S7RS. **1100** A7XA, EA9GD, OH3TU/OH0, UA9, VK2, VK5, VU, 9G1WA. **1200** A9XCV, C5AK, *CE4ON, W1BIH/PJ2.* **1400** TL0BQ. **1500** *CT2QH,* W5NUT/PJ8, VP5WJR, W6, W7. **1600** AH8A, J3AAG, KL7, VP2M, 2S, 2V, 5N0DOG. **1700** OX3RE, VE6, VE7, ZL2AQF. **1800** *KH6,* VP2AZE, ZK1DR. **1900** C6ACY, *KL7,* VP1KS. **2000** *KL7.* **2100** HH2BM, LU, PY.

As usual, many thanks to all those who have written in with information, and also to the authors of the following news sources: *DX'press* **(PA0TO),** *CQ Magazine* **(W1WY),** the *Ex-G Radio Club Magazine* **(W3HQO),** *DX Bulletin* **(K1TN),** the *Long Island DX Bulletin* **(W4UL/W2IYX),** *DX News Sheet* **(Geoff Watts),** and *Long Skip* **(VE3FRA).**

All items for the **April** issue to reach G3FKM no later than **7 March** please, and for **May** by **1 April.**

HF propagation study

Predicted hpf + luf in megahertz for February 1980

	00	02	04	06	08	10	12	14	16	18	20	22
Suva (s)	2000	2000	2000	2100	2600	3900	4600	4100	3100	2300	2000	1900
Wellington (s)	2000	1900	1900	2200	3900	3700	3900	3200	2900	2100	1700	1700
Osaka	1810	1810	1811	2312	4013	4212	2810	2209	1808	1708	1508	1609
Hong Kong	1309	1011	1312	3114	4516	5214	4511	3407	2604	2004	1605	1307
Sydney (s)	1313	1015	1317	3119	4218	3815	3510	3605	3002	2303	1607	1310
Moscow	1103	1002	1102	1904	3706	4407	4407	4404	3802	2402	1703	1303
Bangkok	1408	1310	1312	3515	5016	5616	5513	5008	3904	2504	1805	1506
Singapore	1508	1410	1313	3715	5017	5616	5213	4907	4303	2602	2004	1606
New Delhi	1503	1405	1308	3711	5013	5213	5011	4406	3403	2303	2003	1603
Perth	1711	1614	1417	3820	4121	4020	3715	3408	3403	2903	2205	1808
Teheran	1705	1702	1403	3806	5209	5510	4909	5304	4403	2902	2203	1803
Colombo	1704	1707	1411	3814	5216	5416	5114	5009	4104	3103	2204	1804
Bahrain	1803	1804	1505	3708	5511	5212	5111	5207	4902	3402	2303	2003
Cyprus	1703	1603	1403	2905	5008	5310	5009	5106	4604	3403	2403	1903
Aden	2104	1905	1807	3710	5614	5615	5214	5410	4905	3804	2904	2304
Seychelles	2400	1900	1800	3800	4800	4800	5000	4800	4500	3900	3000	2400
Mauritius	2200	1900	1800	3500	4800	4900	4900	4900	4500	3900	3100	2500
Nairobi	2403	2103	1905	3409	5413	4914	5013	5310	5206	4204	3203	2603
Malta	1403	1402	1202	1604	3807	4508	4208	4207	3905	3104	2203	1803
Salisbury	2603	2303	1905	3010	4714	4916	5215	5412	5009	4405	3403	2903
Cape Town	2700	2300	1900	2000	4200	4600	4800	4800	4500	4500	3700	3100
Lagos	2904	2603	2103	2006	5411	6113	5314	5413	5211	4708	3806	3404
Suva (l)	2900	2700	2100	2000	2800	3200	3100	2700	2500	2900	3000	2900
Gibraltar	1500	1300	1200	1102	2504	3705	3705	3705	3404	3002	2100	1700
Ascension	2904	2603	2203	1907	4412	6114	5416	5316	5215	4709	3804	3404
Wellington (l)	2800	2500	2300	1900	2800	2500	2000	1500	1800	2500	3000	3000
Dakar	2900	2600	2200	1900	4400	6100	5500	5500	5200	4700	3800	3400
Las Palmas	2303	2103	1902	1703	3105	5107	5109	5009	4808	4206	3303	2703
Falklands	2806	2504	2305	1908	2812	3918	4422	4723	4922	4718	3813	3209
Rio de Janeiro	2806	2504	2304	1907	3111	4815	5219	4919	4918	4714	3810	3308
Buenos Aires	2805	2504	2304	1905	2908	4214	4719	4920	4919	4716	3812	3208
Sydney (l)	2714	2413	2211	1807	2306	2911	2318	2122	1824	2022	2819	3116
Lima	2700	2400	2200	1900	2100	2300	5100	5500	5200	4700	3900	3100
Barbados	2603	2402	2102	1802	2103	3207	5512	5514	5214	4712	3908	3105
Bogota	2500	2300	2000	1800	1900	2300	4800	5500	5200	4700	3900	3000
Jamaica	2300	2100	1800	1700	1700	2300	4200	5400	5100	4700	3800	2800
Bermuda	2400	2100	1800	1700	1700	2600	5000	5400	5100	4700	3900	2800
New York	2206	1806	1606	1606	1606	1909	3811	5013	5013	4411	3409	2607
Mexico	2200	1800	1600	1600	1600	1800	2300	4700	5000	4400	3400	2600
Montreal	2209	1808	1608	1608	1509	1811	3813	4814	4914	4312	3310	2509
Denver	2100	1700	1500	1400	1600	1700	1800	3500	4700	4000	3100	2300
Los Angeles	2100	1700	1500	1400	1600	1600	1600	2500	4400	3900	2900	2200
Vancouver	2000	1700	1500	1700	1900	1800	2100	2000	3000	3300	2200	2100
Iceland	1308	1008	1008	1007	1607	2908	3509	3509	3309	2508	1608	1308
Honolulu	2000	1700	1600	1800	2100	1700	1600	1300	1200	2600	2100	2100
Fairbanks	2000	1700	1700	1900	2100	2200	2300	2400	2300	2600	2100	2100

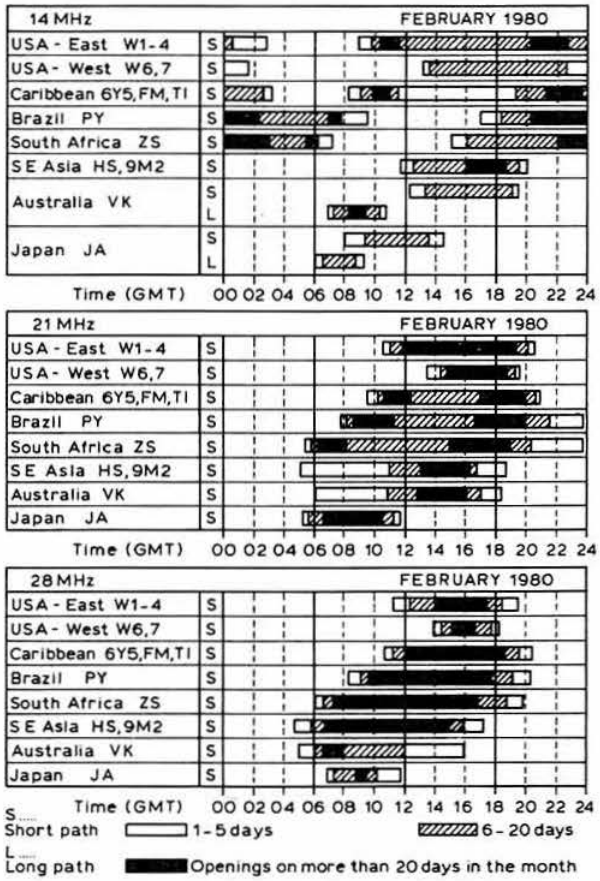
First two digits are hpf, last two luf. LUF 00 indicates data not available.

Propagation predictions

The end of winter approaches during February in the ionosphere. Days lengthen slowly and, especially towards the end of the month, the **14—28MHz** bands will remain open longer than in previous months. All continents will be heard on **28** and **21MHz,** even if sometimes only briefly.

The improving spring-time conditions will be noticed most on **14MHz** during the latter half of the night, when conditions will be noticeably better than in previous months. However, only in April will this band revert to being the main night-time dx band.

Conditions on **7** and **3·5MHz** will change little from those of the previous month. USA traffic will probably be possible from a few hours before midnight on **7MHz,** and on **3·5MHz** from about three to four hours before sunrise until dawn.



swl news

Bob Treacher, BRS32525 *

FIRST, apologies for the non-appearance in January, and second, your scribe would like to wish all readers a happy and prosperous New Year. Dave Borne, G4CYW, our QSL manager, also wishes me to pass on his regards.

3·5MHz cw slp

Details of yet another slp organized by Dave Whitaker, BRS25429. Seven logs were received from those who set their alarms for 0600. Conditions do not seem to have been very favourable. Only 22 countries were heard during the two-hour period. EA8 and east coast Ws being the best dx logged. On the whole a disappointing test but Dave hoped for a bumper response to the 14MHz cw event. The 1·8MHz ssb event in early November did not produce any logs. Even your scribe listened during that one but failed to copy even one station.

PACC 1980

Your scribe has received details of the 1980 Dutch Contest, which has changed weekends. It is now to be held between 1400 9 February and 1700 10 February 1980; all bands, 1·8 -28MHz, ssb and cw. Each QSO logged is worth one point, multiplied by the PA provinces: GR, FR, DR, OV, GD, UT, YP, NH, ZH, ZL, NB and LB. Logs to PA0DIN by 30 March. In the 1979 event BRS15822 was third overall in the world from 33 entries.

Mysterious signals

Bob Dales, G4DFH, forwarded a page from his local newspaper reporting radio signals received by a Bridlington man. British scientists in West Germany have failed to identify the signals, which are in a mixture of tongues. The tape transcripts were fed through a computer and subjected to digitalization which eliminated the background noise. BBC Television has taken an interest and is to screen a series on unexplained phenomena early in the year. One will be devoted to electronic voice phenomena, and these recordings will be featured. Unfortunately, your scribe has no details of the frequencies on which these signals were heard.

CQ WW SSB Contest

This event certainly threw all six bands into total chaos. An astounding amount of dx was available, and from reports everyone seemed to manage something new. The 28MHz band was in prime condition and was open from 0600-2200. Much good dx was available below 28·5MHz from the Caribbean, mainly VP2KC, VP2E, VP5WJR, 4C1AE and 4B7J (both emanate from XE). Possibly the best dx reported during the event was AH8A at around 1830. Although the other bands provided good stations for many, the most staggering activity appeared on 1·8MHz. More than 30 countries were represented. Pride of place here must go to the amazingly strong signal from VP2KC as early as 2130. All the nearer Russian republics were heard, plus OK1MGW, HB0 and OH2BP/OH0—a new one for many. DK9WB/LX was also a good signal, and there were reports of Spaniards on the band using their EE prefix. At certain times the bands sounded just like 14MHz on a normal afternoon! Many large scores must have been recorded—perhaps *CQ* might even include an swl section one of these years.

*79 Granby Road, Eltham, London SE9 1EH.

1979 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	201	222	253	119	103	32	930	ssb
BRS35943/GM	182	207	236	121	113	21	880	ssb
BRS25901	176	210	246	98	86	17	833	ssb
ARS8841	157	176	244	85	91	11	764	ssb/cw
RS41426	161	163	145	87	104	28	688	ssb/cw
A9191	82	116	162	65	51	9	485	ssb
BRS40293	90	75	136	51	42	7	401	ssb
ARS41386/GJ	76	127	120	48	20	2	393	ssb
BRS40634	92	125	107	15	12	0	351	ssb
BRS20185	90	82	115	36	23	1	347	ssb
BRS34740	86	94	81	33	38	7	339	ssb
BRS40814	68	70	113	47	29	2	329	ssb
BRS41333	77	106	56	19	44	2	304	ssb
BRS39161	59	78	126	18	19	2	302	ssb
A9107	97	43	88	29	33	2	292	ssb
ARS42604	66	92	67	33	20	6	284	ssb
BRS41136	74	75	79	27	17	0	272	ssb
ARS39784	77	57	83	26	23	2	268	ssb
BRS35121	23	47	113	24	38	7	252	ssb
ARS41554/GM	40	73	67	31	34	4	252	ssb
BRS18529	32	52	111	4	33	16	248	ssb
BRS40292/GU	45	61	76	26	33	2	243	ssb
BRS40705	74	64	58	26	15	1	238	ssb
BRS40634	18	96	89	8	5	0	216	ssb
ARS40745/GM	26	40	94	19	22	0	201	ssb/cw
RS27421	0	41	102	24	21	1	189	ssb
ARS40133	28	31	34	7	14	0	114	ssb

1980 countries table

A fresh table will appear as soon as sufficient entries are received. For those newer members who may wonder what this entails, the rules are fairly easy to follow. The table reflects the number of countries (not prefixes) on the *RSGB Countries List* (available from RSGB HQ for 28p) heard on each band 1·8 to 28MHz between 1 January and 31 December 1980. Simply keep a list by the receiver and note each new country heard on each band. The starting score is 150. Let your scribe have *the totals only* (not a list) for each band, total them and indicate the mode used. The all-time list will continue to appear. Those who have participated in the 1979 table could keep these figures as a starting platform to the 500 needed to enter the all-time table.

The bands since CQ WW . . .

The big talking point at the end of 1979 was the well-organized dxpedition to 8Z4 by a large group of JY operators. Using 8Z4A, the group's signals were very good on all five bands, and many report hearing them from 3·7 to 28MHz.

3C0AB did eventually materialize, and 3C1AC was also heard on 21·295MHz; QSL for this one to EA7FY, PO Box 8035, Seville, Spain. Rodrigues Is was activated (3B9RS) but was only reported on 28MHz. Also reported on 28MHz around 1000 were FK8CR, FO8CK, WD6CID/KH2, KG6SW, YJ8NGR, ZK1DR (and also at 1800) and 3D2BH.

Quite a good amount of African dx was available. VE3HRS/TZ2 was heard, also N4HX/TT8 (QSL via ON5NT). TZ was aired, courtesy of TZ4AQS (QSL via ON6BC); this station is reported to be in TZ for two years.

(Continued on page 174)

sstv scene

P. Burnett, G4BLL*

The Japanese copy 400 scan converter board still continues to command world-wide interest, with letters of enquiry received from as far afield as Canada, USA and New Zealand. The availability of the board in this country is still something of an unknown quantity—G3OQD advises that the most reliable source of supply at this time is probably OH5RM who is having boards manufactured in Finland and will supply foreign amateurs. OH5RM expects the cost to be approximately the equivalent of US$40 per board, which includes a silk-screen component identification. Anyone interested in obtaining a board from this source should write direct to Jouko Nurma, OH5RM, Otontie 4, 46860 Anjalankoski, Finland, including an addressed envelope and sufficient ircs to cover airmail postage. Jo will then advise the exact price of the board, postage required and expected delivery date. It should be made clear that this is on a strictly non-profit basis—it is simply one dedicated amateur helping fellow amateurs. Do not delay in getting your letters off, as the sooner OH5RM is made aware of the demand the easier it will be for him to plan requirements.

G3OQD forwarded circuit details of his light-pen design for the Robot 400 which he hopes to submit for publication in the very near future. It involves very little modification to the 400 pcb itself, most of the circuitry being contained on a separate pcb which may be mounted internally or externally to the Robot 400. It is possible to select three different line widths corresponding to one, two or three pixels. The light sensing element is a Motorola photo-transistor type MRD3056 (or, alternatively, an MRD300). If the new board is mounted externally to the Robot 400 it may be necessary to feed the signal leads from the scan-converter via a buffer; G3OQD suggests a 7417 would be suitable.

Congratulations to G3WW who has been awarded *CQ* DX Certificate No 3 for sstv. Only two other amateurs world-wide have achieved this distinction: certificate No 1 went to W8YEH, and No 2 to G3IAD. G3WW has also received "Master Scanner Awards" from *Amateur Television Magazine* A5—certificate No 1 for five sstv QSOs on each of five bands, and six sstv QSOs on each of six bands. He is only two QSLs short of those required for a further claim—25 two-way sstv QSOs on 28MHz.

Readers who watched the recent "Best Sellers" series *"Ike"* on domestic tv may be interested to know that the writer and executive producer of the series was Mel Shavelson, W6VLH, of Los Angeles, California, who is also famous for his excellent sstv on 28MHz, where he can often be seen eating his breakfast at home!

A very interesting letter from Grant Dixon, G8CGK, informs *SSTV scene* that he is now running a Triton computer (ETI, November 1978) with two programs for sstv keyboards. Grant would be pleased to hear from any other sstv enthusiasts using this particular design. *SSTV scene* would also be pleased to hear from anyone using computer control for sstv—brief details of type of computer, memory size, programs etc would be of interest.

Richard Thurlow, G3WW, probably the most active British sstv operator

*21 South Cross Road, Cowcliff, Huddersfield, Yorkshire.

Grant Dixon, G8CGK. His home-built WB9LVI converter is shown on the top shelf next to the fast-scan tv monitor

Mark Scott, ARS40918, is interested in obtaining a P7 tube sstv monitor, either commercial or home-built. His address is Melford, Lymden Lane, Ticehurst, East Sussex TN5 7JD.

Please note the new address for correspondence given below—hopefully your sstv contributor will be in residence by the time this appears in print. *SSTV scene* would like to wish a rather belated, happy and successful New Year to all sstv enthusiasts. □

SWL news

(Continued from page 173)

TL8 was also activated by I0MPO, KA1BQ and KA1BOH using TL0BQ. Unfortunately their proposed trip into TN8 did not materialize because a licence was not issued to them. C21 was activated by P29JS and was reported on 14MHz, but conditions on 21 and 28MHz were not favourable. We now await the N2KK trip around West Africa with interest, and also it is hoped that the Palmyra/Kingman Reef trip took place in early January.

The operator at LU3ZY left the station in November, but another operator should be at the station by now.

Other news

Chris McMahon, BRS40634, reported an unusual heard QSO. A2CBW called CQ, and A22BX replied. It seems that A2CBW was unaware of his country's change of prefix and the QSO ended with both stations using their A22 prefixes.

Mark Mullins, ARS42604, wrote to your scribe for the first time; he uses a Trio R300 receiver and he enclosed an interesting list of stations heard. Steve Casey, A9107, passed the May 1979 RAE but is not taking out a licence until he has passed the morse test. Ian Marquis, RS41426, has been catching up on his missing European countries to boost his countries score.

Ken Sketheway, BRS20185, recently put up an HF5 five-band trapped vertical which gives a better performance on 7-28MHz than his previous system, an AD-170, in the roof space. Ken has received the IARU Region 1 Award—Class II, and was awaiting confirmation from one more country to claim DXLCA.

Finale

Copy for the April issue should reach your scribe by 23 February. □

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Clock time	Callsign	MHz	Mode	Town
Sundays				
0900	G3WNR	1·975	A1/A3J	South Shields, T & W
		144·225	A1/A3J	
		145·250	F2/F3	
0915	G3LEQ	slant polarized to west-north-west		Knutsford, Cheshire
		1·950	A2/A3	
		29·250	F2/F3	
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3OHM/A	144·180	A1/A3J	Birmingham
1100	G2FXA	1·910	A1/A3/A3J	Stockton-on-Tees
1100	G3XJJ	3·535	A1/A3J	Northampton
1130	G3BLS	1·960	A1/A3	Osney, Oxford
1200	G3HVI	144·750*	A2/A3	Stoke-on-Trent, Staffs
1800	G3WNR	144·725*	F2/F3	South Shields, T & W
1815	G4DVZ	1·915	A1/A3J	Leeds, Yorks
		144·250	A1/A3J	
		145·250	F2/F3	
1815	G3LEQ	slant polarized to west-north-west		Knutsford, Cheshire
		1·950	A2/A3	
1830	GM4HIG	3·550	A1/A3J	Aberdeen
1900	GW3WSU	145·800 to north-east	F2	Barry, S Glam
1930	G3LDW	144·160*	A1/A3J	Halesowen
2030	G3ZDW	144·220 horizontal, omni-direct	A1/A3J	Swinderby, Lincs
2100	G4EWK	144·850 to south-west	F2	Burton-on-Trent, Staffs
Mondays				
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1300	G3VHE	3·525	A1	Swindon, Wilts
1330	G3VHE	145·350*	F2	Swindon, Wilts
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen Lancs
	G4CGT	145·525	F2	
1830	GM4HIG	144·250	F2/F3	Aberdeen
		horizontal to south-west		
		145·550* vertical	F2/F3	
1900	G3VHE	145·350*	F2	Swindon, Wilts
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs
1900	G4BNV	144·250 horizontal east/west	A1/A3J	Ottery St Mary, Devon
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	GI3SXG	144·100	A1/A3J	Newtownards, Co Down
2000	GM4ELV	3·570		Arrochar, Strathclyde
2030	G3ASR	1·875	A1/A3J	Harrow, Middlesex
		144·175* vertical	A1/A3J (lsb)	
Tuesdays				
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G4CWN	144·100	A1/A3J	Stoke-on-Trent, Staffs
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	G4RS	3·565	A1/A3J	Catterick, N Yorks
		144·250 to NNE	A1/A3J	
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	G3ZYY	145·550 vertical to east	F2/F3	Saltash, Cornwall
2030	G3IRM	1·975	A1/A3	Bury St Edmunds, Suffolk
2030	G4FFC	144·390 horizontal to south	A1/A3J	Pertenhall, Beds
2030	G3OHM/A	144·180	A1/A3J	Birmingham
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2100	G4EWK	144·850 to south-west	F2	Burton-on-Trent, Staffs
2200	G3AWL	144·110 to south	A1/A3J	Easington, Co Durham
Wednesdays				
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	GW3WSU	145·800 to north-east	F2	Barry, S Glam
1900	G2ABC	145·250	F2/F3	Truro, Cornwall
1900	G3ULY	1·826	A1/A3J	Culgaith, Cumbria
	G4EXD			
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	G3ZYY	145·550 vertical to east	F2/F3	Saltash, Cornwall
2000	G3SWP	144·180*	A2/A3J	Doncaster, S Yorks
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2100	G3HVI	144·750*	A2/A3	Stoke-on-Trent, Staffs
Thursdays				
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	G4BNA	3·590	A1	Swindon, Wilts
1900	G3BLS	1·960	A1/A3	Osney, Oxford
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs
1900	G4RS	3·565	A1/A3J	Catterick, N Yorks
		144·250 to NNE	A1/A3J	
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	G3ZYY	145·550 vertical to east	F2/F3	Saltash, Cornwall
1930†	G3ASR	1·875	A1/A3J	Harrow, Middlesex
		144·175* vertical	A1/A3J (lsb)	
2000	G2ACZ	1·808	A1	Mablethorpe, Lincs
2030	G3ZDW	144·220 horizontal, omni-direct	A1/A3J	Swinderby, Lincs
2100	G4EWK	144·850 to south-west	F2	Burton-on-Trent, Staffs
Fridays				
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G4CRI	3·525	A1	Helston, Cornwall
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	G4FIM	145·550	F2/F3	Leeds, Yorks
2000	G3WQK	144·750	F2	Hailsham, Sussex
2030	G3ZDW	144·220 horizontal, omni-direct	A1/A3J	Swinderby, Lincs
2200	G3AWL	144·110 to south	A1/A3J	Easington, Co Durham
Saturdays				
0915	G3LEQ	144·250	A1/A3J	Knutsford, Cheshire
		145·250	F2/F3	
		slant polarized to west-north-west		
		1·950	A2/A3	
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	

* Omni-directional
†First and third Thursday in each month

your opinion

AMATEUR BANDS ONLY!
The Editor
Radio Communication
Sir—My receiver (Star 700A), in common with many other receivers and transceivers, has sockets for extra crystals to extend the coverage. The spectrum between 3·5MHz and 21·5MHz, for example, could be covered in 36,500kHz slices with 18 crystals (upper and lower channels). Admittedly three of these are already provided, but 15 crystals still represents quite an outlay. As an alternative, I have acquired for £5 a decidedly secondhand signal generator. The output of this plugged straight into four crystal sockets in parallel (these are switched with the preselector in my receiver) works very well. So I can now receive MSF and calibrate my gdo, and I am fully prepared for any further frequency allocations that may come our way. But that is all: outside the amateur bands there is simply nothing worth listening to on short wave!

J. B. Roscoe, G4QK

HF ANTENNAS
The Editor
Radio Communication
Sir—Two points occurred to me when I read the letter on hf antennas from M. Pharaoh, G3LCH, published in your October issue.
1. If your correspondent cannot put up his three-element beam due to the geography of the garden he is probably limited to a wire antenna of some sort, so why not make one? Amateur radio would never have reached its present standing if the earlier fraternity had given up every time a wanted device was not available in complete form from a shop.
2. G3LCH mentions using a "long wire". The adjective "long" in this case is relative to wavelength and has nothing to do with a piece of string. At 14MHz a wavelength is about 66ft, and adopting the accepted multiplication by three to justify use of the adjective "long", it is implied that G3LCH has an available run of at least 200ft for his antenna, in which case he is quite well placed for putting up something effective of wire construction. There are several usefully relevant books advertised by RSGB Publications!

N. H. Sedgwick, G8WV

TVI
The Editor
Radio Communication
Sir—Reading through back issues of *Radio Communication* I came across letters concerning tvi. I also suffered with tvi when operating 14, 21 and 28MHz using an FT101E. The usual remedies of ferrite rings, etc, were tried with no success. Further tests showed rf seemed to be getting into the mains, so I called the GPO round but we came to no conclusion.

Afterwards I looked into the pa compartment of the FT101E and checked the rf by-pass capacitors. These had been connected with 0·5in-long leads, which I resoldered right up to the body of the capacitor on the chassis.

I can now operate my long wire on these bands with no interference to our own tv set. The interference officer came back and was pleased when I told him I had cured it and showed him that no harmonics were present using a wavemeter. He told me that if the neighbours were still experiencing tvi, to tell them to call him in to look at their receiving equipment. My transmitter had now passed the "test" and the fault was elsewhere.

Bill Kitchen, G4GHB

YOUNG AMATEURS NET
The Editor
Radio Communication
Sir—I am an amateur of little experience, and being only 16 I find it very hard to integrate with older members, so I think it would be a good idea for young amateurs like myself to have a net on 144MHz. We could discuss problems and amateur radio in general, as young amateurs would probably talk more freely to people of their own age. So would anyone who is interested and under 19 please contact me.

Frequency of the net to be decided, dependent on response and equipment available. When responding, please state equipment and frequency availability.

Duncan Piper, G8SZM
104 Swan Bank, Penn,
Wolverhampton WV4 5PZ

AMENITIES AT LEICESTER
The Editor
Radio Communication
Sir—On 8 November 1979, together with members of the RSGB City of Bristol Group, I visited the ARRA Exhibition at Leicester. We all enjoyed the visit, the new equipment displayed, the junk stands, and meeting dealers and friends, but the facilities for our comfort were appalling.

Why is it that people who spend so much money at Leicester have to tolerate, each year, such lack of amenities? Do we change our personalities when we visit this exhibition, and become satisfied with third-rate eating facilities, nowhere to sit down in the hall, a small crowded bar, a cinema without suitable films and raffles that did not keep to time.

To be constructive. Give us a good restaurant, we will be glad to spend money on a decent meal (better than sandwiches standing up), provide a few tables and chairs for those who bring their own food, and provide a larger bar.

A number of our members said they would not go again if this state of affairs continued, and indeed some did not go because they "knew it would be the same again".

So come on, you traders, never mind the 10 per cent, let us have reasonable amenities at your annual showpiece.

Ron Foot, G4BKU

obituaries

The Society records with regret the deaths of the following radio amateurs:

Mr W. K. Beazley, G3RTX
Bill Beazley, who died on 20 October 1979, was a long-standing member of Preston ARS where he had held office as secretary and treasurer. He was active on 144 and 3·5MHz until the time of his death.

Mr E. W. L. Brownjohn, G8AJ
Eric Brownjohn died on 14 November 1979, aged 71. He was first licensed in the early 'thirties and was active until his death. His finely equipped station covered the hf bands, 144 and 1,296MHz, and he was an early worker on 56 and 28MHz.

Mr F. Burke, GW3YLZ
Frank Burke, who died on 15 December 1979 aged 70, was a member of the RSGB and Conway Valley ARS. He was active on the CVARS 1·8MHz Sunday net for many years, and he operated on the vhf and hf bands. He assisted many newcomers to the hobby by giving cw tuition.

Mr R. Royle, G2WJ
Ralph Royle died on 26 November 1979, aged 74. First licensed in 1922, he took part in the early transatlantic tests on 200m, and held a special licence which permitted him to use up to 1kW input on 90-200, 41-46, 32-34, 23 and 5m. Although partly disabled in later life, he continued to operate on both the hf and vhf bands until shortly before his death.

In 1952 Ralph and his son, G3NOX, transmitted some of the first amateur television signals on the 436MHz band, following the original tests by the Post Office to determine whether amateur television could be transmitted in this shared band without interference to other users. From the time he was first licensed Ralph had always shown interest in the newest techniques and took part in many tests, including some specially authorized amateur television relay experiments in 1970 when his pictures were transmitted to the British Amateur TV Convention in Cambridge.

Mr Royle was one of the team responsible for the *T & R Bulletin* and Society administration in the early years, but is especially remembered for his part in the Radio Conference in Paris in 1925, when the IARU was founded.

Mr M. Trotter, G8PIE
Mike Trotter died on 1 October 1979. He was a member of Thames Valley ARTS.

We have also been advised of the deaths of:

Mr E. Hughes, RS41354;
Mr S. Whitehouse, G3OHN, in May 1979.

contest news

National Field Day 1980 rules

The HF Contests Committee wishes to thank those groups who sent comments and suggestions regarding the rules for this contest. Most groups were satisfied, hence no change.

1. The general rules for RSGB hf contests, published in the January 1980 issue of *Radio Communication,* will apply.

2. **Applications.** Each group intending to compete must submit an application on form HFC 10/80 to Mr D. Thom, G3NKS, 37 Whittington Road, Cheltenham, Glos GL51 6DB, not later than 23 April 1980. Supplies of forms can be obtained from RSGB HQ, or direct from G3NKS on receipt of an sae.

3. **When.** From 1700gmt Saturday 7 June to 1700gmt Sunday 8 June 1980.

4. **Eligible entrants.** Any group of RSGB members within the prefix zones, G, GD, GI, GJ, GM, GU and GW. NFD is a multi-operator contest.

5. **Operation** must be from a portable station not located in a permanent building and not using a mains supply. No equipment or antennas may be installed on the site prior to 24 hours before the start of the contest. This does not apply to the storage of equipment.

6. **Mode.** CW(A1) only, in the 1·8, 3·5, 7, 14, 21 and 28MHz bands.

7. **Sections.**
   (a) Open section. The station shall consist of a transceiver (or transmitter and receiver) with an additional receiver if desired, which may only be used for monitoring purposes. There is no restriction on the number or type of antennas, but the maximum height above ground must not exceed 60ft (18·5m).
   (b) Restricted section. The station shall consist of a transceiver (or transmitter and receiver) with one antenna which must be a single element such as a dipole, vertical, long wire, inverted-V, etc, having not more than two elevated support points, and not exceeding 35ft (11·5m) above ground at its highest point.
   Both sections. Standby equipment may be at hand but not powered or connected in any way simultaneously with the main equipment. The presence on the site of additional amplifiers or modified commercial equipment capable of excess power, may result in the entry being disallowed.

8. **Scoring.** Points will be scored as follows:
   (a) Fixed stations in Europe (including the British Isles).... 2 points
   (b) Fixed stations outside Europe..... 3 points
   (c) Portable and mobile stations in Europe (including the British Isles)..... 4 points
   (d) Portable and mobile stations outside Europe..... 6 points
   The contacts on 1·8MHz and 28MHz should be scored as above and the totals multiplied by two to obtain the claimed score.

9. **Group contacts.** Points must not be claimed for contacts made by a competing station with members of its own group.

10. **Entries.** These are to be in accordance with General Rule 6, with the following exceptions:
   (a) The normal cover sheet will not be used. Special cover and summary sheets will be sent to the person responsible for the entry.
   (b) Points must be totalled separately for each band.
   (c) Logs must be sent to the RSGB HF Contests Committee, c/o Mr M. Harrington, 123 Clensham Lane, Sutton, Surrey SM1 2ND, postmarked not later than 23 June 1980.
   Entries sent direct to RSGB headquarters will not be accepted.

11. **Trophies.**
   (a) The National Field Day Trophy to the group in the Open section having the highest checked score.
   (b) The Bristol Trophy to the group in the Restricted section having the highest checked score.
   (c) The Gravesend Trophy to the group having the second highest checked score, in the section with the largest number of entries.
   (d) The Scottish NFD Trophy to the Scottish group having the highest checked score.
   (e) The Frank Hoosen Trophy to the group having the highest checked score on the 14MHz band.
   (f) Certificates of merit to the groups in the Open section with the highest checked scores on the 1·8, 3·5, 7, 14, 21 and 28MHz bands.
   (g) Certificates of merit to the groups in the Restricted section with the highest checked scores on the 1·8, 3·5, 7, 14, 21 and 28MHz bands.

12. **Check logs.** While overseas stations are not eligible to enter NFD, check logs are very welcome. A certificate will be awarded to the overseas station in each continent whose check log shows the most points contributed to competitors.

13. **Inspections.** All stations are subject to inspection by nominated representatives of the HF Contests Committee. The inspector's brief will be to ensure that the rules and spirit of the contest are being observed. Should the inspector be unable to locate the site due to inadequate or incorrect information given on the application form, the entry will be disallowed. In the event of a last-minute change of site, it is the responsibility of the members of the group to make suitable arrangements for the inspector to find the new site.

Low Power Contest 1980 rules

1. **Aim of contest.** To encourage QRP operation.

2. **Eligible entrants.** Single-operator stations only. British Isles entrants must be members of the RSGB.

3. **When.** Sunday 13 April 1980. Entrants are permitted to operate for a total of eight hours between 0700 and 1700gmt in two periods of their own choice, with a break of at least one hour between periods. The start and finish of each period is to be shown in the entrant's logs.

4. **Sections**
   (a) British Isles section.
   (b) Overseas section including EI.

5. **Frequencies.** 3·5 and 7MHz cw only.

6. **Contest call and exchange.** CQ QRP. RST and serial number starting at 001, plus the entrant's power group; eg 559001/3W.

7. **Scoring**
   (a) All entrants will claim points for each completed contact in relation to the power group used to make the contact, ie:

1W or less	3W maximum	5W maximum
100 points	50 points	25 points

   (Entrants may use different power inputs during the contest, but the power used for each completed contact must be shown in the log.)
   (b) Bonus. All entrants may claim extra points for contacts with other low power stations, by adding the points for the power group as received during the contest exchange. Thus an entrant running 1W contacting a station running 3W may claim 100 + 50 points for the contact. No bonus may be claimed for contacts with non-QRP stations.
   (c) Overseas entrants may only claim points (and bonus) for contacts with UK stations.

8. **Logs.** Log sheets to be headed: date/time gmt; callsign of station worked; RST and serial number sent; RST and number received; power group received; power group sent; and claimed score for contact. Separate logs are required for each band.

9. **Declaration.** Each entry must be accompanied by the following declaration: "I declare that my station was operated in accordance with the rules of the contest, and in accordance with the terms of my licence." The declaration must be signed and dated.

10. **Address for logs.** RSGB HF Contests Committee, c/o Mr D. Lawley, G4BUO, 24 Glen View, Gravesend, Kent DA12 1LP.

11. **Closing date for logs.** Logs must be posted no later than 5 May 1980.

12. **Awards.** The 1930 Committee Cup will be awarded to the winner of the UK section. The winner of the Overseas section and the entrants placed second and third in each section, will receive certificates.

13. **Dispute.** In the case of any dispute, the ruling of the Council of the RSGB shall be final.

SSB Field Day 1979 results

The September SSB FD attracted 40 entrants, with 10 of these being in the new restricted section. In addition, there were other UK portables active who did not send in logs for checking. Conditions appeared to be variable, with good openings on 14 and 21MHz and quite long periods of fairly slow going. The weather could have been better and most groups suffered from a belt of heavy rain that passed over the UK during the Saturday night and Sunday morning. Despite this, most groups seemed to enjoy the event, particularly the first-timers in the restricted section.

The Guernsey Group, GU3HFN/P, pulled off the double of winning the NFD Shield in the June contest and the new Northumbria Trophy for the highest score in SSB FD. The win was achieved by a combination of fast QSOs on 14 and 21MHz coupled with a record number of countries worked. The final multiplier of 136 gave the group a substantial points margin over the runner-up, Lichfield, G3WAS/P, which also had a high country multiplier. In third place was the donator of the new trophy, the Northumbria Group, G4AAX/P, which had a greater number of contacts than Lichfield but worked less countries. Included in the

Open Section results are three groups which originally entered the Restricted Section but, as they used beam antennas, were ineligible for restricted entry. Also included in this section are several entrants who failed to give any details of the equipment or antennas used. While these entries may have been intended for the Restricted Section, the committee felt unable to accept them in that section without the essential details.

The Restricted Section was well received and a number of groups have asked that it be retained as a regular feature of SSB FD. Most entrants in the section found the going slow in comparison with the same section in NFD, but felt the use of one simple antenna a great advantage to smaller groups in saving erection time and effort while still allowing them to be competitive with other groups. Without the advantage of beam antennas on the hf bands, the technique for obtaining a good score seems to have been to spread the operating time between the various bands and not to concentrate on the hf bands as was the pattern for the Open Section.

The Restricted Section winner, the RAF Scampton Group, G3RKW/P, had an impressive total of contacts and countries obtained from the 3, 5, 7, 14 and 21MHz bands, with a checked score of more than double that of Lincoln, G3IXH/P, the runner-up. The Swansea Group, GW5ZL/P, came third, some 14,000 points behind Lincoln, which was probably due to its minimal activity on the lf bands.

There were few comments from competitors, except that some entrants in both sections complained about the clash of dates with the vhf open event and the need to split personnel and gear between the two contests. While the committee is fully aware of these difficulties, the dates and timings of the two contests are governed by the need to harmonize with other IARU Region 1 societies.

The committee was very disappointed about the lack of attention paid by entrants to the rules of the contest—while the standard of logs was good with few unmarked duplicates, there was a substantial number of entries that failed to include separate band logs, country lists, details of equipment and antennas used, calls of operators and other relevant information. Some groups scored their logs using the NFD system, without a country multiplier, one group used a system all of its own, and two did not trouble to score their logs, asking the committee to do this for them as they were confused about the multiplier. As over 50 per cent of the entries were in default in one way or another, the adjudicators referred the matter to the committee, but after careful consideration it was decided to accept them in this instance, even though this resulted in much additional work by the adjudicators in checking and rescoring the logs. This additional work is the reason why the results were not published in 1979 as originally intended. Entrants to future SSB FDs and all RSGB contests, are asked to comply fully with the published rules—failure to do so may well result in the entry not being accepted.

By the time this report is published, the Guernsey Group will already have been presented with the Northumbria Trophy, at the RSGB AGM. Certificates for other leading stations will be mailed within the next few weeks.

G6LX

OPEN SECTION

Posn	Callsign	Group	No of QSOs per band					Total
			3·5	7	14	21	28	Points
1	GU3HFN/P	Guernsey	19	14	578	729	35	769,230
2	G3WAS/P	Lichfield	91	41	295	546	24	498,475
3	G4AAX/P	Northumbria	93	42	283	671	12	417,078
4	G3RAC/P	Racal	78	21	237	691	18	358,893
5	G6CW/P	Nottinghamshire	169	52	223	385	55	343,040
6	GW3EOP/P	BSC Port Talbot	62	93	382	508	4	341,202
7	GM6UC/P	Berwick	118	10	147	223	9	309,672
8	G3VGG/P	Bromsgrove	99	54	261	578	9	297,425
9	G3GRS/P	Gravesend	98	169	181	374	21	259,667
10	G4ATV/P*		88	99	132	448	23	242,730
11	G3SFG/P	Southgate	150	113	200	171	—	233,146
12	G3FJE/P	Shefford	202	105	160	417	33	220,081
13	G4BRA/P	Bracknell	85	60	268	502	21	206,519
14	G3RCV/P	Cray Valley	169	29	199	297	16	203,346
15	G3WSC/P	Crawley	146	103	85	367	19	192,382
16	G4CFI/P	Ipswich	143	136	85	249	20	157,225
17	G3XEP/P	White Rose	37	25	126	325	21	142,050
18	G5BK/P	Cheltenham	192	89	150	266	6	120,750
19	G4HRS/P	Horsham	152	132	129	369	24	112,665
20	G3OHM/P*		108	43	86	182	31	74,339
21	G3AHD/P	Liverpool	42	128	115	165	3	57,611
22	G3ASR/P	Edgware	70	109	91	50	2	22,368
23	G3GHN/P	Clifton	196	182	30	20	4	21,072
24	GM4AAF/P	Kingsway	108	121	101	8	19	17,493
25	G3ZPR/P	Poole	79	—	101	169	6	13,501
26	GM4DKL/P	Easter Ross	113	50	67	11	—	12,672
27	GW2FOS/P	Wirral	34	137	136	—	—	11,220
28	G4CXP/P	Kidderminster	110	16	58	16	2	9,520
29	G4FBS/P*		51	49	36	13	—	4,810
30	G4EID/P	Ainsdale	64	64	68	35	8	2,551

*Club details not given on entry.

RESTRICTED SECTION

Posn	Callsign	Group	No of QSOs per band					Total
			3·5	7	14	21	28	Points
1	G3RKW/P	RAF Scampton	167	167	182	184	6	112,665
2	G3IXH/P	Lincoln	118	47	93	87	—	47,430
3	GW5ZL/P	Swansea	—	2	74	196	15	33,120
4	G3AMW/P	Hull	185	87	77	191	—	19,440
5	G3LRS/P	Leicester	109	114	107	33	3	17,892
6	G4BVY/P	Malvern Hills	153	110	51	8	4	16,942
7	GM4HEL/P	Helensburgh	17	52	242	5	—	13,372
8	GM3ZRC/P	Greenock	52	62	117	15	3	11,546
9	G4FUR/P	Coulsdon	20	61	44	21	—	6,125
10	G4CDD/P	Denby Vale	48	59	37	—	—	4,179

144MHz CW Contest November 1979 results

Conditions were very poor, and a total entry of 22 stations was slightly lower than in 1978 when there were 24 entries. The contest was arranged to coincide with the last eight hours of the IARU Region 1 Marconi Memorial 24h event which ran from 1600 on the Saturday to 1600 on the Sunday. The error in the published rules, specifying 5 November instead of 4 November, is regretted, and it is thought that this may have contributed to the smaller entry.

In general the new timing of this contest was well liked. West Country stations found the going rather hard, and several comments were made asking for beams to be turned west more often. However, the Gloucester ARS worked stations without pause, and there seemed to be plenty of activity. Bracknell ARS suggested that something be done to line up the contest with the IARU Region 1 event, or that some other way of making the contest more popular be found. There was some demand for another cw only contest later in the year, which the VHF Contests Committee has noted, and which may be discussed at the RSGB National VHF Convention in March.

The winners of the two sections will be awarded certificates.

G3FZL

SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3BDQ	1,284	102	AK04f	DK5AI/A	675
2	G3NNG	988	103	ZL23f	DK0EA/P	785
3	G3XVF/A	578	55	AM01j	F8OP	615
4	G3TZU/A	480	46	ZO69h	F8OP	708
5	G3XBY	385	47	ZM52j	DF1JC	570
6	G4GGV	303	41	ZL37g	DK1WU	540
7	G5UM	274	40	ZM35b	F8OP	502
8	GM3ZXE/P	257	25	YQ24g	G3NVO	598
9	G4AGQ	144	28	ZL66b	F6KCP	372
10	G3TUX	40	12	ZL65a	ON5UN	330
11	G3ILO	15	7	YL29g	G3ZUL	80

MULTI-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3LCH/P	707	85	AL66f	F6BUL/P	630
2	G3NVO	656	68	ZL44j	DK0BN/P	658
3	GW4GMO/P	576	74	YL05j	DJ9UX	689
4	G6HH/P	503	67	AK03d	F8CS/P	503
5	GM3WOJ	353	29	XP48e	G3BDQ	590
6	G4AYM/P	336	55	YL08d	F6CTW	509
7	G3AHD/A	187	31	YN46g	G3LCH/P	376
8	G4BRA/A	152	34	ZL47f	ON4YZ	376
9	G3WAO	97	19	YK07j	F8OP	348
10	G3CMH	68	16	YK07c	F8OP	336

Mid-Thames RDFC Treble Night Event

The Mid-Thames RDFC marked the end of the 1979 season in its usual manner by holding the annual three-transmitter event. A record 18 teams competed for the trophy awarded to the first team to locate all three of the hidden stations, located on OS Sheet No 175, "Reading & Windsor" map.

Station "A", manned by Graham Taylor, G3MDC, and Peter Bradley, G3UJO, was situated in dense woods near Stokenchurch, while station "B", with Paul Halls, G4CKW, and David Pickering, was in a large wood at High Wycombe. The latter's crew was delighted to see several teams climbing a tall tree in which there was a tree house, and from which a dummy antenna was strung. Station "C", in the hands of Chris Marsden, G3XSO, and David Lewis, was placed next to a huge household refuse dump near Gerrards Cross, and was the most carefully concealed of the three transmitters. This site proved to be the most difficult to find and, while access was very easy from the "right way", several teams chose to struggle in the darkness through thousands of tons of dustbin contents and mud.

The contest was not too difficult for the more expert competitors, as

was demonstrated by the winner, Roger Parsons, who located all the stations in 2h 21min, finishing at 2221. All teams found at least one station.

When the contest terminated, at midnight, all competitors went to the home of the organizer for refreshments, and prizes were awarded to the first three teams. The organizer thanks all transmitter crews and competitors for their kind support, and the following companies for contributing prizes, catering supplies, earth spikes, batteries and antenna wire, etc: Chepping Motors Ltd; T&L Gage (Transport) Ltd; Marconi Company Ltd; National Tyre Service Ltd; Norths Garage (Lane End); and Sol Cafe Ltd.

T. C. Gage

Posn	Competitor	Club
1	Roger Parsons	Burton-on-Trent
2	Brian Bristow	Mid-Thames
3	Mike Hawkins	Colchester
4	Peter Lisle	Mid-Thames
5	Ian Butson	Colchester
6	Paul Tyler	Mid-Thames
7	Chris Wells	Mid-Thames
8	David Holland	South Manchester
9	Bill North	Mid-Thames
10	Bob Vickers	Stratford
11	Chris Plummer	Mid-Thames
12	Derek Newman	Rugby
13	Eric Mollart	Mid-Thames
14	George Whenham	Coventry
15	Andy Horton	Mid-Thames
16	Bob Dewberry	Mid-Thames
17	Bill Petchey	Dartford Heath
18	Tom Kitson	Visitor

Region 1 (RSGB) VHF Contest 1979 results

The contest produced more Region 1 entries than ever before, with 92 stations on G4IEQ/P's 144MHz log sheets. The 70MHz band proved very disappointing, with only nine operators in the region using it, and 432MHz usage differed little from last year. The 1·3GHz band got under way at last, with several scores recorded for the first time. Liverpool & D RS and GD2HDZ remained unshakable at the top of their sections, but the much larger number of single-operator entries was gratefully received—many thanks to all for taking the trouble to send them in. There were fewer Section 3 entries than last year, although these were appreciated, and it was nice to get one 70MHz only entry. *G2CUZ*

Section	Ht Mult	70 MHz ×3	144 MHz	432 MHz ×4	1·3 GHz 1pt/km	Total	Region 1 QSOs 70	144	432	1·3
1. Multi-operator										
Liverpool & D	1·8	–	1,477	1,604	1,608	4,689	–	44	20	4
Chester	1·8	–	2,286	1,537	–	3,823	–	77	27	–
Bury	1·0	870	1,798	966	–	3,634	9	38	21	–
Westmorland	1·0	–	841	760	845	2,446	–	27	10	2
Ainsdale	2·0	864	702	816	–	2,382	9	28	16	–
S Manchester	2·0	172	662	504	–	1,338	4	39	16	–
G4HAO/A	2·0	–	614	–	–	614	–	42	–	–
2. Single-operator										
GD2HDZ	1·8	305	–	1,383	1,587	3,275	4	–	13	3
G4IEQ/P	1·8	–	2,036	–	–	2,036	–	92	–	–
G8GTP	1·8	–	305	692	491	1,488	–	19	13	5
G8HCK/P	1·0	–	1,357	–	–	1,357	–	45	–	–
G4EIV/P	1·1	99	584	371	–	1,054	5	31	12	–
G3EKP	1·2	317	420	–	–	737	9	25	–	–
G8GYO	1·8	–	651	–	–	651	–	20	–	–
G8RHI	1·1	–	326	–	–	326	–	22	–	–
G4APJ/P	1·0	–	261	–	–	261	–	17	–	–
3. Outside region										
G8NQP	2·0	–	476	–	–	476	–	14	–	–
GM3YOR	2·0	427	–	–	–	427	6	–	–	–
G8KAX	2·0	–	200	–	–	200	–	6	–	–

Cray Valley SWL Contest results

There were 20 entrants from the British Isles and Europe. Conditions were fair to average, with occasional good dx heard on 21 and 28MHz. Keith Kerr averaged 45 contacts per hour over 18 hours. The entry for the multi-operator section was again disappointing.

In general the standard of entry was high, and hopefully the 1980 contest will attract more entrants. G4DFI thanks everyone who submitted logs for this contest, making it a worthwhile event.

Contests calendar

9–10 February	First 1·8MHz *(Rules in January issue)*
9–10 February	PACC *(Rules in January issue)*
10–16 February	BATC Activity Week and Television *(Rules in December 1979 issue)*
16–17 February	ARRL DX CW *(Rules in February issue)*
23–24 February	7MHz CW *(Rules in June and July 1979 issues)*
23–24 February	REF Phone *(Rules in January issue)*
1–2 March	144/432MHz and SWL *(Rules in January issue)*
1–2 March	ARRL DX Phone *(Rules in February issue)*
8–9 March	Commonwealth *(Rules in December 1979 issue)*
15–16 March	Bermuda *(Rules in February issue)*
22–24 March	BARTG Spring RTTY *(Rules in December 1979 issue)*
29–30 March	CQ WW WPX SSB
30 March	WAB (First)
12 April	1,296MHz Trophy
13 April	Low Power *(Rules in February issue)*
13 April	432MHz Trophy and SWL
26–27 April	HM The King of Spain Trophy *(Rules in February issue)*
3–4 May	144/432/1,296MHz and SWL
4 May	Regional Round-up
24–25 May	CQ WW WPX CW
25 May	144MHz Low Power
1 June	70MHz and SWL
7–8 June	NFD *(Rules in February issue)*
28–29 June	Summer 1·8MHz
5–6 July	VHF NFD
20 July	3·5MHz Field Day
3 August	144MHz QRP and SWL
11–12 August	Meteor Scatter
16 August	10th SARTG WW RTTY
17 August	70MHz Trophy and SWL
6–7 September	SSB Field Day
6–7 September	144MHz Trophy and SWL
4–5 October	432/1,296/2,304MHz and SWL
12 October	21/28MHz
19 October	21MHz CW
19 October	70MHz Fixed
November–December	432/1,296MHz Cumulative
2 November	144MHz CW
8–9 November	Second 1·8MHz
7 December	144MHz Fixed

CW SECTION SINGLE-OPERATOR

Station	QSOs	Country multiplier	Total
P. Griggs, BRS39097*	382	144	55,008
J. Ruff, GI-14596*	314	104	32,656

PHONE SECTION SINGLE-OPERATOR

Station	QSOs	Country multiplier	Total
K. Kerr, BRS35943*	813	316	256,908
P. Tittensor, A8808*	816	256	208,896
D. Whitaker, BRS25429	529	260	137,540
A. Osborne, BRS35917	363	160	58,080
I. Lepage, BRS40292*	324	140	45,360
D. Stewart, BRS40293	321	139	44,619
E. Bartunek, OE1 109976*	335	133	44,555
R. Akhurst, BRS25209	285	126	35,910
G. Starkie, ARS42101	373	91	33,943
M. Mullins, ARS42604	279	109	30,411
M. Phillips, BRS41483	279	107	29,746
F. Bowles, ARS41554	234	110	25,740
Y. Jean-Jacques, ONL383*	285	103	18,025
A. Oakley, RS39673	188	86	15,980
R. Evans, ARS40133	111	69	7,659
J. Doughty, BRS40705	105	57	5,985

MULTI-OPERATORS

Station	QSOs	Country multiplier	Total
Dumfries & Galloway R&EC*	402	222	89,244
York Sea Cadets*	84	26	2,184

*Certificate winners

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of the 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* mailing label addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 75p (stamps not accepted) for every 40 words or part thereof. They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

Closing dates in 1980 for issues in brackets: **29 February (April), 28 March (May), 25 April (June), 23 May (July), 20 June (August), 18 July (September), 29 August (October), 26 September (November), 24 October (December), 21 November (January), 19 December (February).**

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified 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.

Advertisements for 27MHz equipment will not be accepted.

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS.

Do not post to RSGB HQ or Advertising Representative

FOR SALE

KW dummy load, 1kW, 52Ω impedance. *Wanted:* noise blanker for Drake TR4C. G4HQQ, QTHR. Tel Guildford 71344, after 6pm or weekends.

Heathkit IO-18U oscilloscope, £60. Datong speech clipper, £25. Hamgear PM-1XA calibrator, £15. FDK TM56B vhf fm rx, mains/12V, 12 xtals, £55. Prefer buyer collects. G4FKC, QTHR.

KW201 rx, Q-multiplier, late models, mint, manuals, £150 ono; cash sale. VFO FB50B for FT75, FL50, mint, manual, £30. Key Electronics 2½W cw tx, transistor, new, unused, circuits, £16. Buyer collects. *Wanted:* FL50B, mint cond, manual. G3FK, QTHR. Tel 07257 436.

Eddystone 840 gen cov rx, new valves, realigned, manual, £50. G3BHT, QTHR. Tel 021-308 4764.

Heath SB200, perfect example, manual, £275. Drake R4A, 160 xtal, spares, be ready for new bands, £200. Honda generator, 24V 22A, lp gas, £75. Two Redifon GR270 fm tx/rxs, wkg 2m, boot mount, controls, cables, manual, £30 ea. GM3BQA, QTHR. Tel 0620 2519.

Microwave Modules MMC432/144, £15. SEM 28MHz preamp, £10. SEM 144MHz preamp, £10. SEM 1·800MHz converter, i.f. 14MHz, £15. Buyers collect. K. Brown, Canterbury Road, Morden, Surrey. Tel 01-648 0028, after 6pm.

AR88LF rx, vgc, with S meter, case, handbook, £50. Heathkit DX40U tx, vfo, in good cond, £25. *Wanted:* Sony ICF5900W rx, in reasonable cond. G8RDE, QTHR. Tel 01-310 7355, after 7pm.

Trio 2200GX, 10W amplifier VB2200GX, VFO30G, comp with new nicads, xtals for 16ch, case, mic, etc, all mint cond, £150. G4HLT. Tel Mike, Beaconsfield 6094.

FLDX400, FRDX400, mint cond, little used, £330. TR7200G, fitted three repeater, four simplex channels, mobile mounting bracket, £120. Heathkit HW7 tx/rx, little used, £35. Buyer collects. G3ITH, QTHR. Tel Kingswinford 3879.

Sinclair DM235 digital multimeter, three months guarantee, slight use, £39. Query BRS38688. H. Hina, 24 Parkway, Stevenage, Herts.

Icom 202 ssb/cw tx/rx, 144·0–144·6 and 144·8–145MHz, surplus to requirements, £115. G2BS, QTHR (SW Durham). Tel 0833 37814.

Trio remote VFO700S, mint cond, £70, incl carr, ono. G3MWV, QTHR. Tel 0263 512872.

Two 813s with bases, £6 ea. LG300 cabinet, £2. 10V 5A trans, for 813, £3. All collect or carr extra. G3RB, QTHR. Tel Whitley Bay 530504.

Versatower SP60, Autobrake Loughing, electric hoist winches, spare cables, AR22 rotator, TA33Jr, 2Q6, cables, coaxial, £550. G3MTX, QTHR.

FT101E, immac cond, spare finals, driver, cw filter, manual, workshop manual, £450. GM3UCH, 460 Main Street, Stenhousemuir, Larbert. Tel Larbert (03245) 3205.

TS700S, preamp BF981, 16W, British and American repeater offsets, 144–148MHz, recently calibrated, £430 ono. TR8300, 70cm, fm, 12W, all UK repeaters, SU8, S20, S22, R70, R76, R78–80, R84 and 435MHz (for German repeaters), TP491 preamp, £250. Possible delivery to southern England. G8NCT. Tel 0398 23306.

Atlas 210X, £350. G-whip, 10, 15, 20, 80, £18. KDK 2m FM2015R, £200. TS700A all mode 2m tx/rx, £220. RA1 rx, Heathkit, £30. G3XMA, QTHR. Tel 0203 69673.

Creed 7E teleprinter, 20mA loop interface, £25 ono. 7400, 50p for ten. Min leds, 9p ea. Two 0·5in led clock modules, £7.50 ea. SAE for small items please. G. Heath, 103 Pollards Oak Road, Oxted, Surrey. Tel Oxted 4503.

FT101E, latest model, front panel processor control, 250Hz cw filter, mint, £475. G-whip, multimobile, with all LF coils, vgc, £30. 1kW rf capacitors, many kV, most values, new, £1 ea. 1N4148, 3p. SASE please. G3NSJ, QTHR. Tel Bognor (02433) 23625, evenings.

"Radio Communication", 1978, 1974; *Practical Wireless*, 1974–8; *SWM*, 1975–7; £2 per year. Buyers please collect. *Amateur Radio Awards*. G8KLI, QTHR, Tel 021-445 3260.

23cm converter preamp, £20. Quad loop Yagi, £10. Transistor camera, 625 lines, £30. Valve camera, 405 lines, £15. *Wanted:* HQ1 mini quad. Buyer collects. G3RZD, QTHR.

Drake TR4C, AC4 psu, MS4 spkr, 34 PNB noise blanker, all of 10m, plus switchable 10m preamp, 200W p.e.p. out, £395. Going Drake separates. Buyer test and collect N London. G4EYV, QTHR. Tel 01-455 1652.

Trio TR7500 2m fm mobile tx/rx, all accessories, box, etc, vgc, only six months old, comp with magnetic mount, 5λ/8 whip, £200. G4HDI, QTHR. Tel 048483 7656.

Liner 2, in very good cond, PA3 preamp fitted, only mod, £95. *Wanted:* buy or borrow manual for Telequipment type D31 oscilloscope. GW8EQJ, QTHR. Tel 0244 671994.

Tektronix type 575 transistor curve tracer, £50 ono. Storno Viscount, £5. *Wanted:* Heathkit HW17A a.m. tx/rx, or HW30, any cond considered. D. Canham, 82 Rugby Road, Binley Woods, Nr Coventry CV3 2AX. Tel Wolston 543409, after 6pm weekdays.

Yaesu FRDX400, 2m 4m conv, fm and a.m. filters, £120. PF1 Pocketfone tx and rx, nicads, xtals for SU8, RB10, RRB10, £30. G3ILO, 49 Rosebery Road, Dursley, Glos GL11 4PT.

KLM PA160, 144MHz, linear, 160W, solid-state, works from 12V battery, £150. G3ZPB tx/rx board, *Radio Communication* October 1977, comp with XF9-B filter, oscillator board mod, £150 ono. DC6NR 432MHz ssb transverter, needs tuning, offers. G4HTO, QTHR. Tel 06234 3008.

Yaesu psu, FP4, 13·8V, 4A dc stabilized, new August 1979, perfect, cost £38, accept £25, incl post. G8CN, 40 Oole Road, Cleethorpes, Lincs. Tel 67881.

Trio JR310 rx, narrow filter fitted, £80 ono. Storno Viscount, fitted S20, requires some tlc, £25. G8POC, QTHR. Tel Oxford (0865) 50400.

Revco mag mount, stainless λ/4, new, used once, £8. Mag mount, make unknown, rectangular base, λ/4, smart appearance, £5. Roller coaster, unused, silver plated 2in coil, comp with adjusting mechanism, £5. Sony ICF55, vhf, med wave, short waves 1·6–4·5MHz, 4·5–12MHz, mint cond, £40. Pye Micron car radio, 6 by 4 by 1¼in, mint, £10. Low pass filter, for hf bands, £3. Pye PMR 65W fm tx/rx, chassis form, 12V, 8ch, five fitted, S0, S20–22, R3, toneburst, mic, all plug-in modules, £125. Pair 13¾ × 8 hi-fi spkrs, plus four tweeters, cross-over, worth £25, brand new, in box, £8. Labgear converter, med wave to 160m, £5. All gear 100 per cent good. G3VCJ, QTHR. Tel 042 43 4726.

FT227R, scan, repeater shift, auto toneburst, as new cond, mount, handbook, leads, orig packing, £220. G3GFM, QTHR. Tel 0372 54813.

Magnum Two transverter, fan, £85. Holdings tx/rx, nbfm conveter for FT101, £30. New RAK 80/40m trap dipole, £20. Microwave Modules 144MHz converter, 18–20MHz i.f., £10. Microwave Modules 432MHz converter, 18–20MHz i.f., £10. G3WHK, QTHR. Tel 01-330 5795, after 6pm.

TS120V, immac, h/b 14V psu, £360 ono. Liner 2, £85. Datong clipper, new, in die-cast box, £16. MM 70cm converter, 28–30 i.f., £16. 2m 40W fm amp, less relays and psu, £17. GM3WOJ, QTHR.

70cm at the flick of a switch, QM70 Couger, 2m to 70cm, £40 ono. G4BXO, NOT QTHR. Tel 0604 44629.

Trio 2300, 2m, 80ch, synthesized, hand/portable, incl nicads, helical antenna, all in mint cond, incl orig packing, hardly used, cost £220 August '79, selling for £185. G8OSC. Tel 01-858 2510, Monday-Friday after 6pm.

FDK Palm 2, £80. Dentron JR monitor atu, £40. CSC pocket dfm, £40. Trio 2m bandpass filter, £18. EK-9X elect keyer, £10. SML swr meter, £8. Barker, G4HPS, 11 Dipton Gardens, Tunstall Estate, Sunderland SR3 1AN. Tel 226883, after 6pm.

80-10m linear, pair 4CX250Bs, £95. Magnum Six rf speech processor, £45. Dentron W-2 wattmeter, 160-10m, 2kW fs, £49. 160-10m h/b tx, vfo, 6146B pa, full QSK, £45. ETM2 keyer, £15. G3XVF. Tel Norwich 56782.

Exchange: SSM Europa 10/2m transverter, good cond; for best hf rx offered; or sell, £50. G3SQM, QTHR. Tel Hambleden (049 166) 443.

Pair of 2m 14-el Parabeams, one homebrew, comp with bracing bars, phasing harness, ideal for a contest group, £45 ono. G4INL, G8LZP QTHR. Tel 0242 513368, weekends only.

FT101E, cw filter, as new; FL2100B, same cond; G-whip, all bands; comp; £700. Prefer not split. Buyer to inspect and collect Merseyside area. G3SEY, QTHR. Tel 051-733 7910.

AR88D, revalved, re-aligned, fitted discriminator, exc order, £60. TW2 nuvistor converter, mains, spare new nuvistor, £10. Pye a.m./fm base tx, 25W, 10ch, adapted from Vanguard, 12V operation, 10 repeater/simplex channels, £20. Pye Cambridge, fm, 3ch, fitted various repeater channels, vgc, £40. B2 tx/rx, comp, case, coils, xtals, key, h/phones, museum piece, £50. WS17 tx/rx, virtually new, antennas, key, mic, h/phones, four batteries, £25. Collins TCS rx, power pack, spkr, £20. Arranged collection/carr at cost. G8BSR. Tel Telford 460096.

Marconi 220MHz sig gen, TF995, £110, carr extra. Mosfet 40673, five for £2, post paid. UHF power amplifier, pair of 4X150s, £30, carr extra. Over 175 silicon transistors, good mix, various types, £25, post paid. G8APV, QTHR. Tel 01-732 8319.

Eight 12ft bamboos, suitable for quad spreaders, £20. Buyer collects. G4DXW, QTHR. Tel 0733 232211.

FT101, 160m, cw filter, fan, spare pa valves, used less than 10h receive, half-hour transmit, as new, £300. Tel East Horsley (Surrey) 4805, weekdays: or Godalming 29757, evenings.

"Radio Communication", 1973-8; *Wireless World*, 1975-8; offers. Shack clearance, sae list. G3TOI. Glenfield, Bury Road, Basingstoke, Hants.

Toneburst, precision miniature 1,750Hz 0·1 per cent tuning fork resonators, £1, plus sae or 15p postage. Simple suggested circuit, only requires 741, few resistors and three diodes. G3OHW, QTHR.

Pye F460 uhf base stn, modern unit in mint cond, wkg perfectly on 70cm, 11 pairs repeater and simplex xtals, comp with tulip mic, handbooks, £120 ono. G3VAG. Tel 01-771 1946.

Going QRT: TS700G; FT202R; 5400G; db 'scope; high power units for 70cm, 2m; PF1s; PF70s; FDK scanner; C5 colinear; 5/8 ASP; 10-el; vhf repeater; fm 40W o/p Viceroy; send sae for list. G4BBS, c/o 38 Oldbury Road, Hartshill, Nuneaton, Warks.

KW202, KW204, vox fitted, immac, fb pair, £380. G4FXI, QTHR. Tel Aylesbury 21542.

GEM quad antenna, as new, £100. FDK Multi 7 2m tx/rx, xtals, £120. 2m/70cm transverter, new, unused, £40. KW108 monitorscope, new, unused, £70. HQ1 minibeam, breaking for spares, offers? D. Andrew, G4GZH. Tel Great Missenden 3460.

Liner 2, *SWM* mod front end, £95. Datong up-converter, UC1, £80. MMC 432/144 converter, £15. C. Gregory, 21 Back Lane, Chellaston, Derby. Tel 701516.

NAG 144, 2m linear amp, 250W o/p, all orig packing available, £360. Revco 2m s/s whip, plus mag base, £10. Prefer buyers collect, but will deliver over a reasonable distance. G8BWR, QTHR. Tel 0926 498388.

"Practical Wireless" vols, January '62-December '78, take the lot at £1 per vol, plus £2 for '79 vol; plus free circuits and gifts; must collect. *Wanted:* punched cards or paper copies of same, for Mullard high-speed valve tester. G3XLC, QTHR. Tel 0782 311811.

SR9 2m fm rx, vfo tunes 144/146MHz, have fitted xtals for R0/7, S21/23 incl, £50. NR56 rx, same as above but fitted xtals for S16/20 incl, 145, 145·100, 145·150, 145·175, 144·800, 144·480MHz, £50. Buyer collects. K. Brown. Tel Kim, 01-648 0028.

TS700, unmarked, unmodified, £275. FRG7, as above, £130. FT101E, as above, 813 × 2 five-band linear, £525. Pye 70cm base stn tx, xtals RB6, RB14, 48-el, Yagi, £40. G3OXV, QTHR. Tel Daventry 2265.

IF/AF board, spkr, 10·7MHz/455kHz i.f., 10·7MHz xtal filter, fm, £14. Electroniques slow-motion dial, 6 by 4in, £3.50. 470Ω 25W resistors, bolt to chassis, £1 ea. G4GHB, QTHR.

TS700G, 2m multimode, fitted preamp, vgc, in orig packing, boxed, Trio vox unit, £350 ono. All parts for 2m linear. 4CX250C base, blower, etc, £30 ono. G8PVZ, QTHR (Sutton, Surrey). Tel 01-643 5960, after 7pm please.

Marconi TF801D/1 sig gen, 10-470MHz, in vgc, comp with handbook, £95. Buyer collects or carr extra. G4AOA, QTHR. Tel 0332 880610.

Pye Cambridge, converted 6ch, fm, xtalled two repeater, four simplex, handbook, fb beginner's 2m rig, almost indestructible. *Wanted:* HRO coils; FT75. J. T. Simpson, 19 Hollinside Close, Whickham, Newcastle Upon Tyne. Tel 882995.

FR50B, marker xtal, no mods, as new, in orig box and packing. Beardsley, 30 Highfield Avenue, Headington, Oxford. Tel 0865 62783, weekends.

FT202R, S20-22, S24, R5, R7, nicads, NC1 charger, PA1 dc adapter, £105. G4BOX, QTHR. Tel 01-644 4157.

Liner 2 2m ssb tx/rx, preamp, mobile mount, £90; or each for HW8 QRP tx/rx, or good hf band rx. G3RVX, QTHR. Tel Bath (0225) 859195.

Pye ptt mic, £3.50. Transistor, type Denco IFT14, IFT13, one of ea, 50p ea. KW204 manual and circuit, £1. 5U4G valve, new, 20p. 455kHz HC6U xtal, £1.50. G4GHB, QTHR.

AR88D rx, S-meter, £50. New, unused, Collins mechanical filter, type F455, FB21, 5W2, £12. Xtal frequency marker, 100kHz marks, £2. Multiband a.m. G5RV tx, power supply, 3·5-28MHz, 6146 pa, neat, £12. 2m Jaybeam ground plane antenna, type UGP/2M, £4. Quad boomless spider, Orr design, £3. Minimitter top band mobile rx, type TR7, built-in Q-multiplier, £12. Absorption wavemeter, Raymart band checker, 3·5-35MHz, £3. W8JK antenna, 20, 15, 10m, 4·5dB gain, £3. Dynamic mic, push-to-talk switches, £2. 2m standing wave bridge, £10. *Wanted:* Heathkit HW101. D. Doyle, 4 Wricklemarsh Road, London SE3 0NF. Tel 01-856 7478, evenings.

Solartron CD1212 24MHz dual trace 'scope, CX1252 plug-in, good wkg order, comp with manual, £85 ono. G8DFZ, QTHR. Tel Otley (Yorks) (0943) 463083.

AR88D, vgc, £50. 'Scope, EMI W7, high gain, dual trace and wide band plug-ins, all wkg, free, taker must collect. J. Morrison, G3OIS, 25 Reed-End, Therfield, Royston, Herts SG8 9RL. Tel Kelshall 378.

Yaesu FRG7 communications rx, as new, manual, orig packing, fine tuner, no mods, £140 ono. Tel Southampton (0703) 782521.

Telequipment 'scope, D53A, laboratory type, 25MHz, vgc, £220. G4BLZ, QTHR. Tel Lee-on-Solent 550721.

TS820, cw filter, mic, service manual, £600; VFO820, £50; all in exc cond, used very little. G5CMX, 13 Southcote Way, Penn, Bucks HP10 8JG. Tel 049 481 3956, 7-9pm.

2nd i.f. transformer for Eddystone 680X, in sealed bag, £3. Electroniques QP166 amateur converter, xtal filter, psu with Eddystone 898 in cabinet, £22. Cossor crts, 89D, 89Z, offers. *Wanted:* R216 rx. Cooper, 11 Radical Ride, Wokingham, Berks. Tel 0734 734312.

TR2300, still under warranty, VB2300 matching 10W pa, helical antenna, nicad batteries, charger, telescopic whip, case, carrying straps, offers around £230. May consider separating. G4IRN (Manchester). Tel 061-865 0456.

Trio TS510/PS510, in orig packing, £200; KW dummy load, £10; KW vswr meter, £10; KW low-pass filter, known frequency response, £10; Copal digital clock, £5; all as new cond; or the lot, £225. G4ALQ. Tel Ashford (Middx) 44440.

NAG 144XL 500W linear amp, immac cond, £400 ono. TS700S, year old, exc, offers £450-500; matching vfo, £80. SP820 spkr/filter unit, £30. Prefer buyer inspects and collects. G8NDF, QTHR. Tel 0977 85274, after 7pm.

Going 2m ssb?: Liner 2, preamp, 144·100-144·410, vgc, £115 ono; IC202, nicads, charger, hardly used, £155 ono; parting with beloved companions because new rig for Christmas present. G8MKW, QTHR (Warks). Tel Martin, 0564 22301, evenings; or 0789 5690, days.

IC701, psu, as new, three months old; FT221R, good as new; NAG linear, very good; what offers? FRG7000 rx, exc cond, £275. G4GKD. Tel 0793 850056, after 6.30pm.

FDK Multi 2700, 2m, all mode, fair cond, £375, or offers. 14-el Parabeam, £19 ono. Can deliver. G8RHI, QTHR. Tel 0254 53883.

Computer, MK14, improved keyboard, revised monitor, i/o device, tape interface, *PE* vdu, uhf modulator, extra data/programs, wkg, in wooden case, will deliver 50 mile radius, £100. G8JXC, QTHR. Tel Stoke-on-Trent 535379.

7200G, mobile, fitted six repeater, eight simplex channels, good cond, VFO30G 144-146MHz unit, six months old, £190. Jaybeam, 5XY Yagi, as new, £8. G8ROR, QTHR. Tel Matlock (0629) 56473, after 5pm weekdays or all day weekends.

Mains tx, 500VA 240/415 primary, 2X, 55V, 60V, £12. Mullard 10·7 gig tx/rx, £8. WG38 90° bends, offers. 1MHz B7 xtal, £3. Or swop for hf or 2m antenna. G3KPW, QTHR. Tel 0474 62051.

Pocket scanners, 4ch, 12ch, manual, £50 ono ea. FT2F, 5ch, £78 ono. Creed 75s, full spec, works maintained, choice of three, £99 ono. G3LZN, QTHR.

Jaybeam, 2m Yagi 8Y/2M, unused, £5. 10m beam, folded dipole, £5. Stolle rotator, 2010, unused, £35. Woden swinging choke, PCS12, 5/25H, unused, £3. Dow key coaxial relay, £2. Raytheon RK-4D22, with base, £3. Collect or carr extra. GM3ATB, QTHR. Tel 041-647 6178.

Linears: 2m Belcom LA106, 200W p.e.p. input, £200; Sota EDL432P, 70cm, £100. G3WHK. Tel 01-330 5795, after 6pm.

Trio Lafayette 600A communication rx, 150kHZ-30MHz, 240V or 12V, good cond, £60 ono. Phone or call. Bray, 21 Victoria Road, Shoreham-by-Sea, Sussex. Tel Shoreham-by-Sea 3706.

IC202, 144-144·4, 144·8-145, as new, in orig packing, £130 ono. Trio 2200G, R0, R3-8, S17, S19-22, good cond, £100 ono. 16-el Tonna, good cond, £20 ono. Stolle auto rotator, £20 ono. G8GQP, QTHR. Tel 021-453 6778.

FT227R 2m tx/rx, as new, £190. Microwave Modules 144/28 transverter, as new, £75 ono. Reason for sale, just bought multimode rig. Please phone. G8SVS, Tel Les, Dewsbury (0924) 452303.

IC215, fm, portable, 15ch, nicads, charger, case, £160. Tel Blackpool 592856; or Barnsley 81279.

Liner 2, xtals for cov up to 145·10MHz, five ranges, clean o/p, preamp, manual, one owner, £100; G8JHX, QTHR. Tel 01-399 6353.

Antenna rotator AR22, handles 150lb antenna, control unit, 100ft cable, good cond, £20, plus carr. Two 813s, new, £6 ea. G2DPA, QTHR (Yorks). Tel Beverley 882673.

QM70, 28 to 144 transverter, modified, preamp on receive, transmit power 0·5W, drive required 10W, attenuator in transverter, comp with circuit, booklet, offers. G8GHU, QTHR.

Drake TR4-CW tx/rx, ac psu, matching spkr, Shure 444 mic thrown in, all in mint cond, £490. Tel Hereford (0432) 65092, evenings.

KW2000B, ac psu, mic, lpf, manual, vgc, buyer collects/inspects, £200 ono. Dubery, G4EZR, QTHR (Kent). Tel Orpington 30124.

TS510, in wkg order, needs some attention, hence price, £140; or will part exch for 4m transverter or 18AVQ, or w.h.y.? GW4HBK, QTHR (Blackwood).

Atlanta tx/rx, o/b vfo, £250. Advance PM12 psu, 30/50V dc at 10A, £15. Eddystone 840C gen cov rx, £50. Marconi sig gen, TF801/A, 10-310MHz, £35. Transformer, sec 25-0-25 at 26·3A, offers. Clarks hi-lo pneumatic telescopic mast, 14-70ft, £275 ono. G2DAF rx, unfinished, offers. Buyer collects. G3UXH, QTHR. Tel Medway 250562.

Icom 245E 2m multimode mobile/base stn, exc cond, only nine months old, £335. Icom RM3 remote control microprocessor touch pad, for use with Icom 701, 211E or 245E, mint cond, £80. Microwave Modules 144/28MHz transverter, mint, £70. Sinclair MK14 microprocessor kit, £25. RSGB handbooks, *Elector* and ETI magazines, sae list. G8PWY, 23 Hawthorne Avenue, Great Sankey, Warrington, Cheshire. Tel Penketh 6166, after 6pm.

Trio 7010; 4-el quad; Yaesu 844 desk mic; all mint; the lot, £175. G8TRI. Tel 051-677 0632, after 5pm.

Xtals for TR2200, etc, channels R1-4, R6, S16, S23, £3 per pair; R7 receive input, £1.50. 2m Antec helical whip, rubber duckie, BNC base, £3. G3JEQ, QTHR (Surrey). Tel Bookham 52459.

RAE home-study course, British National Radio School, owner passed first time, £16. Tel 0926 54152.

FT227R, 14 months old, unmodded, £185 ono. HC1400, 30/5W out, one month old, used little, £180 ono. FDK Multi 7, 10/1W, fm, 2m, 9ch fitted, £95 ono. *Wanted:* Land Rover swb. G8GMU, QTHR. Tel 0203 611101, after 6pm.

Eddystone 1990R/1 rx, 25-235MHz, a.m., fm, ssb, all options, fb cond, offers over £800. Icom IC215, all extras, mobile mount, nicads, etc, as new, £150. Icom IC240, as new, £180. Icom IC280E, as new, £225. Icom IC202S, as new, £170. FRG7 Mk2, £135. Trio JR310, as new, in orig box, used once, £90. Yaesu FT2F, three rptr, one simplex, £80. Pye W15U, F460, offers. Lafayette HE30 rx, £35. Two Creed teleprinters, 7/ERP, wkg cond, £25. G8KZH, QTHR. Tel 021-550 9324.

Storno CQP512, marine, hand-held, xtal ch6, ch13, ch16, comp with leather case, nicad cells, workshop manual, Heathkit 12V 10W pa, good cond, £100. *Wanted:* 6-el Wilson duo-band beam, or Hy-Gain TH6DXX. GI8LCF, QTHR.

HW32A 20m tx/rx, comp with mic, h/b dc power supply, £70; ac power supply, HP13, £35; Yaesu UD844 desk mic, £12; top band h/b transverter, £25; all ono. GW4DJW. Tel 035 287 877, evenings.

MR2G Seiwa 2m rx, 12 xtals, £70; SR9 search 2m rx, six xtals, vfo, £50; both as new. AW43 89 crt, new. 405 line spg Creed 75, rx only, offers. Other rtty gear and much more must go. Tel Abingdon 20005.

Trio 95RDS rx, following mods: Kokusai 10CK filter, side band xtals; xtal calibrator; xtal controlled hf band front-end converter; genuine bargain, superb performance, £50. The filter and xtals alone must be worth £20. G3XRM, QTHR. Tel 0724 845436.

Electronic keyer, professionally built, £8. Bauer paddle, £8. Sentinel 2m converter, 26·8MHz i.f., £5. AEC twin power/swr meter, £6. Philips 4407 stereo recorder, £50. Joystick vfa, £4. Joystick 500 atu, £12. G3SFV, QTHR. Tel Market Harborough 64827.

Sony, world zone model CRF-220 22-band rx, a.m./fm/ssb/cw, lw/mw/sw1, (SW2-SW19) 87·5-108MHz, instruction book, service manual, mint cond, £250 ono. *Wanted:* good precision key, cw filter for FT101E, FV101B. Tel Worthing (0903) 41109.

Comp stn; mint cond, KW2000B, 6146Bs in final; 2-el Gem quad, as new; 8kW trapped dipole; comp or will separate; offers. G3MMN, QTHR (Kent). Tel Ham Street 2277.

Icom IC22A, R3-7, S20-23, tx/rx 144·500MHz, fitted preamp, comp with mobile bracket, £140 ono. G4GFU, QTHR. Tel Maidstone 70725.

FT250/FP250 10-80m tx/rx, £275; FTV250 2m transverter, £150; mint. 18AVT/WB, 10-80m, vertical, £45; 4-el quad, £12; weatherproofed. AR30 rotator, £30. MM 2m converter, £15. 2m hi-Q filter, £3. 2m fm tx, homebrew xtal vfo, 10W, £15. G3ZIJ, QTHR. Tel 0632 403706.

Yaesu FT227R, mint cond, used little, in orig packing, £175. GM3LNE, QTHR. Tel 031-443 5097.

FT101E, as new cond, the lid has never been opened, happy to include distributor's check if required, £450 ono. Delivery by arrangement. G4HNJ, QTHR. Tel 020 123 5307.

RF power transistors, BLX15, two unused, in orig pack, full data, suitable 100W broad band linear, as in *Radio Communication Handbook*, £40. G4EJJ, QTHR. Tel Dronfield 412775.

MM 432/144 converter, £15. Antec 70cm colinear, £5. HC6U xtals, 8MHz and 44MHz, S20, S22, R6, £1 ea. 2m halo, £1.50. Pye U450L, £30. G4GUN, NOT QTHR. Tel Taunton 76273. Or c/o G4BNV, QTHR. Tel Ottery St Mary 3390.

Eddystone EA12 rx, absolutely immac, no mods, probably used less than 100h total, comp with orig packing, handbook, £175 ovno. Inglis, 48 North Gyle Road, Edinburgh EH12 8EP. Tel 031-339 1428.

Drake 2B rx, exc, manual, £80. H/B mains p/pack, suit HW101 or similar, rough but works ok, £10. Technical Associates bandpass filter module, switched six positions, 2·5kHz-40Hz, £10. G3CPM, NOT-QTHR. Tel Broadway (Worcs) 2753, evenings.

FT227R 2m memorizer, £200; 5-el 2m quad, £15; Cushcraft Ringo 2m omni ant, £10; 5/8 whip, mag mount, £12; pair 10m walkie-talkies, £25; 18ATV/WB, £40; 5μA 4in meter, £3; slow-motion drive, £1; 6-way coaxial switch, £3; rf coaxial switch, 26V, £3; rf ammeter, £1; swr bridge, £1; two Philips car radios, £5; headphones, £2; pair Wharfedale 8in spkrs, £8; all ono, plus carr. Coles, G4EGN, QTHR (Oxon). Tel 0869 40609.

HW17A, phase mod; 10-el Skybeam; back numbers *Radio Communication*, 1969-79, as one; Government surplus wireless equipment handbook; plus other various publications; no reasonable offers refused. Tel Roger, Waterlooville 54138, 6-7 evenings (except Tuesdays).

Collins tx/rx, 618S-1, 116 CR18/U xtals, in range 2,142-3,273MHz, five 6159 valves, £100. BC787B comm rx, US Army Hallicrafter S36A, £70. UHF rxs, IR112, 410MHz range, £7 ea. *Wanted:* manual for TA12B. Barnes, 6 Cross-a-Moor, Ulverston. Tel Ulverston 54466.

Racal RA117, full cov to 30MHz, in case, handbook, exc rx, £350 ono. Could deliver reasonable distance. G4EJJ, QTHR (Sheffield). Tel Dronfield 412775.

Hallicrafter S36A, £60. Command rx, R23/ARC5, Q5-er, £6. S band echo box, TS110AP, £10. UHF rxs, IR112, 400MHz band, £6, ea. Cathodeon glass enclosed antenna change-over relay, £7. Various transformers. 18AVT/WB, £40. Barnes. Tel Ulverston 54466.

Trio TS700G, R0, R3, R5, S20, £360; VOX3, £10; Datong UC1, £90; all immac, orig packing; the three, £450. *Wanted:* Trios, R1000, TR2400; Tandy TRS80 or video Genie; Macrotronics rtty interface; Datong AD170. G8IYK, 120 Birmingham Road, Redditch, Worcs. Tel 64885.

10GHz equipment, sae for list. New crt 154-0351 for Tektronix 536 'scope, £15. Spares for type 13A 'scope, incl tube, screen, valves, transformers, etc, £12. CT54 vvm, probe, dc-200MHz, £20. G8HHO, QTHR. Tel Biggleswade 315075.

Racal RA117 rx, 1·5-30MHz, £350. Racal MA79 exciter, 1·5-30MHz, £350. Racal RA218 ssb adapter, £50. Prefer not to separate but will consider offers. Tel Farnborough (0252) 512659.

TS120V, incl mic, £350. IC202, five ranges, £135. Nascom 1, built, £170 ono. 14-el Parabeam, £12. G8GMF, G8OBL QTHR. Tel 01-868 2159.

Trio TS510, exc cond, manuals, £230 ono. VFO5D ext vfo, £30. Comdel CSP11 speech processor, £35. G3SJH, 50 Christopher Road, Birmingham 29. Tel 021-472 8577.

SM0BUO slow-scan monitor, £20. Variac, £5. 8-el 2m beam, £5. 50ft Telomast, £35. 30MHz counter, £15. 600MHz prescaler, psu, £10. Two-tone test oscillator, psu, £10. FET voltmeter, £5. G3WXO, QTHR. Tel 0908 564419.

IC225 80ch 2m fm tx/rx, £190 ono. G3DNX, QTHR. Tel 061-480 9994.

TR2200G, S0, S18-24, 145·8, R5-7, nicads, charger, auto toneburst, vgc, £120. G3ZVC ssb board, comp minus ics, aluminium case, experimental design for comp tx/rx, £50. Prefer buyer inspects. G4CJO, 10 Winstanley Road, Stamshaw, Portsmouth, Hants PO2 8JR.

Marconi Atalanta rx, 200-250V ac power, professionally re-aligned to cover 15kHz-30MHz, £75 ono. G3CRR, QTHR. Tel 0245 321710, evenings.

Icom IC210, fm, 2m, fully vfo, 1-12W output, 12V or mains operation, many other facilities, good cond, £168 ono. Two Modular Electronics linears/pas, preamps, 40W and 25W versions, £28 ono ea. Heathkit HR1680 amateur bands rx, 12V or mains, good performer, very good cond, £88 ono. FTDX500, good cond, wkg well, £230 ono. Codar PR30 preselector, £5. Coaxial, lengths, UR57 and low loss, offers. G4IAN, QTHR.

Yaesu FT2FB tx/rx, 12ch, has a fault on transmit, ok on receive, hence price, £37.50, plus carr. G4FMO. Tel Ashby (05304) 3973.
IC245E 144-148MHz mobile/base stn, synthesized, dual vfos, digital display, remotely programmable, as new, £340 ono. ASP 5/8 2m mag mount, unused, £10. Going hf/transvert. G4FMD, QTHR. Tel Malcolm, Great Dunmow (0371) 3119.
KW2000 spares: preselector tuning condenser, £5; some valves. IFT1, IFT2 w/b couplers, £2 pair. Xtal 12,227·5kHz, 21·3-21·5MHz, £2. Early B40 valves, EF22, £1 ea. Boxed Westinghouse 807, £1. G3MBL, QTHR (N London). Tel 01-445 4321.
Bauer keying paddle unit, £7.50. DX60B tx, HG-10B vfo, handbooks, both mint, spares, £65. Drake R4 rx, 160-10, manual, spare set valves, extra xtals, exc cond, £130. Bath area. Tel Frome (0373) 4694.

WANTED

Suitcase-type sets, miniature tx/rxs, eg type A Mk3, Mk119, Mk122, Mk128A/B, Mk217, BP5/T5, AR11 and A3; incomp/damaged items welcome. Does anyone have two or more valves type 117L7? Letters only please. Taylor, G3UCT, c/o 31 Willow Walk, Culverstone, Gravesend, Kent.
Datong UC1 up-converter. Atlas 215, portable psu. Knife change-over switch. *For Sale:* Drake L4B 2kW linear amplifier, perfect, £640. G3TJY, QTHR. Tel 0202 622 142.
Manual for Pye a.m. W15 Westminster, buy or borrow to photocopy, postage refunded. Scrap unit for spares. Farman, GM3TWZ, c/o Medical Physics Dept, Raigmore Hospital, Inverness. Tel 0463 72 721, evenings.
Pye Bantam, a.m., hi-band preferred, with no mods. G8FQI, QTHR. Tel Goring-on-Thames 2090.
£25 offered for good CR100; faulty one considered as long as repairable and in good cond; later model preferred. G3EGC, QTHR. Tel 0204 51502.
HQ1 minibeam, must be fb cond. Suitable rotator, AR40, or w.h.y.? Details. Revill, G4GKZ, 101 Silkmore Lane, Stafford ST17 4JH.
AR88 tuning meter, 5mA, with zero deflection to right. G3JBA, QTHR. Tel Reading (0734) 23088.
Swan remote vfo, type 410C or 508; for specimen in vgc will pay £100. Furness, GM3RUI, QTHR. Tel 0224 741741.
Solartron Solarscope type CD711 operating manual and technical service data needed. Please write or phone. N. Hyde, 9 Gazzard Road, Winterbourne, Nr Bristol. Tel Nicholas, 0454 778745, evenings.
Old time QSL cards still needed by collector; pre-1940 dx, postally used, or any pre-1929 British cards welcome; I can offer more than non-amateur collectors or dealers, all postal costs refunded. G3BDQ, Whitefriars, Friar's Hill, Guestling, Hastings.
HF tx or tx/rx, suitable portable or mobile, QRP, QRO, any band, must be cheap. G4HFS, QTHR. Tel Paulerspury (032733) 314.
Marconi morse key, as *Wireless World* February 1947 p61, not type 365B, details. *For Sale:* Londex relays; Pye FM60 chassis for 2m, HC6U xtals. G8GI, QTHR. Tel Lincoln 682668.
Eddystone 770R, in good cond, price and details. L. D. Ireland, 16 Cathebedrow Road, Carnhell Green, Camborne, Cornwall TR14 0NA. Tel Praze 236.
HRO500; Collins 32V tx; 75A rx; Collins loudspkr; Heath 2m transverter; HW100; *ARRL Handbook;* 2m fm box; 19in rack panels; brackets; etc; p.e.p. meter; DET 12; 6GM6; 6AN5; 6AS7; *CQ; QST:* buy/exch. GW3MHW, Bontnewydd, Aberystwyth. Tel 097 421 608.
Datong morse tutor, for the Reading & D ARC. G8EZJ, QTHR. Tel Reading 476873.
Hallicrafters SX73-R-274/FRR, urgent, comp or any cond considered, for senior citizen swl, must be reasonable, cannot collect. SWL atu. Offers with details please, all replies answered. H. Spencer, Brynfryn House, Gors-Goch-Isaf, Lower Brynamman, W Glam, S Wales.
Hallicrafters S27 uhf rx aligning and operating instructions, circuit diagram, handbook, buy or borrow. G4BCJ, QTHR. Tel 01-478 5303.
Yaesu FV50B vfo. Write or phone. Jones, 63 Borrowdale Close, Carcroft, Doncaster, S Yorks DN6 8QT. Tel Doncaster (0302) 735480, after 6pm.
Replacement meter multimeter Avo, electronic type CT38. Switching transistors for Pye fm Vanguard, type ADZ11. 2nd i.f. and disc assy board, for Pye Vanguard FM25B/N/6. Command rxs, BC946 or R24, R25, BC455 or R27. GI3RNY, 13 Avonmore, Antrim Road, Ballymena BT42 2BJ.
2m fm rx. Handbooks for: HRO rx, 38 tx/rx, Hudson 4m tx/rx. G. Hodge, 26 Weston Avenue, Addlestone, Surrey KT15 1UW. Tel Weybridge 51918.
AR88D, in first class cond, good price paid, will collect or pay carr. G8MHE. Tel St Helens 25040.
"The Radio Handbook", Jones or ARRL before 1937. G4IMT, QTHR. Tel Chippenham 50707.
American antenna K40, speech processor, hand mic. G3FJQ. Tel 0704 24442.
Valves, for Cossor model 1049 Mk3 double-beam oscilloscope. Write or phone, G6XP, QTHR. Tel Hamble (042 122) 5242.
TH2; rotator to support same. 2m 6-el quad. GW3YTJ, QTHR. Tel 0633 63578, evenings.

Mobile rallies calendar

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

30 March—White Rose Rally, Lawnswood School, Leeds 16. Open 11am. Two talk-in stations, on 144MHz S22 and 432MHz SU20, and a 3·5MHz demonstration station. Plenty of car park space, with provision for coach parties. Details from G4DZI.
13 April—North Midlands Mobile Rally, Drayton Manor Park, Tamworth, Staffs, (on the A4091, well signposted, and within easy reach of M1, M5 and M6 motorways). Open 11.30am. Talk-in stations on 144 and 432MHz. Further details from G8BHE, tel 021-422 9787.
20 April—Southend & District Mobile Rally, Southend Airport Exhibition Centre, Aviation Way, Southend-on-Sea, Essex. Many attractions, licensed bar, refreshments, parking for 300 cars, aircraft museum, talk-in station, and bring and buy stall. Details from F. Thorogood, G8ORV, 30 Grange Gardens, Southend-on-Sea. Essex.
20 April—Welsh Amateur Mobile Rally, Barry Memorial Hall. Further details from K. B. Hodge, 16 Claude Road West, Barry, S Glam.
4 May—Spalding & District Amateur Radio Society Tulip-time Rally, Spalding Grammar School. Details from G. Parker, G4EMK, 33 Beech Avenue, Bourne, Lincs, tel 07782 2649.
25 May—Plymouth Radio Club Rally, Tamar Secondary School, Plymouth, Devon. Further details from G4GWJ, QTHR.
25 May—East Suffolk Wireless Revival, Foxhall, Nr Ipswich, Suffolk. All usual attractions, plus improvements, as well as transceiver clinic, antenna testing range, trade stands etc. Further details from Jack Tootill, G4IFF, QTHR.
1 June—Hull & D ARS Mobile Rally, Hull University. Would traders please contact G8EAH, QTHR, for details of discounts for advanced booking. Further details nearer the date.
1 June—Brighton Racecourse Amateur Radio Rally, Kemptown Racecourse, Brighton, Sussex. Further details from G8JFT, tel 0273 697682.
1 June—East Anglia Radio Amateurs Picnic, East Anglian Transport Museum, Nr Lowestoft. Further details from G3TWQ, QTHR.
8 June—Elvaston Castle Mobile Rally, Nunsfield House, Alveston, Derby. Further details from G4CTZ, tel Derby 71875.
15 June—RNARS Mobile Rally, HMS *Mercury*. 10am to 5pm. All usual trade stands and many attractions for the family. Further details from Wally, G4DIU, QTHR, tel 0705 479464.
13 July—Upton Mobile Rally, Upton-on-Severn, Worcs. Further details from G8NSL, QTHR, tel Worcester 620507.
13 July—Knowsley Park Mobile Rally and Convention, Knowsley Park, Liverpool. Further details from G3LEQ, tel 0565 4040.
20 July—Cornish RAC Mobile Rally, Truro, Cornwall. Further details from G8JML, tel Truro 78020.
3 August—RSGB National Mobile Rally, Woburn Abbey. Details from N. Miller, G3MVV.

Looking ahead

8 March—RSGB National VHF Convention, The Winning Post, Twickenham, Middx.
11 and 12 April—RSGB Lectures, "Amateur radio—making a start", Science Museum, London, at 3pm on the Friday, and 11am and 3pm on the Saturday.
27 April—South East Raynet Symposium, Crawley, Sussex.
27 April—Northern Radio Societies Association Radio & Electronics Exhibition, Belle Vue, Manchester.
9-10 May—RSGB National Amateur Radio Exhibition, Alexandra Palace, London.
20-22 June—The Great British Electronics Bazaar, Alexandra Palace, London.
28-29 June—Jersey Radio Convention. Details from GJ4ICD, tel 0534 26788.

MEMBER'S AD ORDER FORM

FOR SALE ☐ WANTED ☐ (Tick as appropriate)

- **See Members' Ads page for conditions of acceptance.**
- **Not more than 40 words, including name, address, etc, for 75p.**
- **Do not forget to include remittance and a *Radio Communication* mailing label.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current *RSGB Amateur Radio Call Book* is correct. BRS and A members will, of course, have to provide their name and address.

I enclose cheque/PO for .....
to cover the cost of this advertisement.

Signed .....

Date .....

RadioShack Ltd

DRAKE PRICES

(Inclusive of 15% VAT)

R-7	Receiver SSB/AM/CW/RTTY 0-30MHz	£833.75
TR-7	Transceiver 160-10m and 1·5-30MHz receive	£897.00
PS-7	Power supply for TR-7	£159.85
RV-7	Remote VFO for TR-7	£126.50
L-7	Linear160-10m 2kW	£747.50
MN-7	ATU/CSWR/RF Wattmeter 250 watts	£115.00
MN-2700	ATU/CWSR/RF Wattmeter 2kW	£184.00
SPR-4	Programmable Receiver	£460.00
TR-4CW	(RIT) Last version of the famous Transceiver	£496.80
AC-4	Power supply for the above TR-4CW	£109.25

Securicor delivery £3.50

DRAKE TR-7

Designed and made by R. L. Drake Co, in Ohio USA

for details send 15p stamps or 4 international reply coupons

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

BEARCAT 220 FB

£241.50 inc. VAT. Delivery by Securicor

FREQUENCY COVERAGE .....66 - 88 MHz FM; 118 - 136 MHz AM (Aircraft Band); 144 - 174 MHz FM; 420.45 - 512 MHz FM. This coverage includes the 70 cm; 2m; 4m FM AMATEUR BANDS. To programme this Receiver you simply punch in the frequencies you wish to monitor. To AUTOMATICALLY SEARCH MARINE FREQUENCIES YOU JUST PRESS ONE BUTTON. The Bearcat 220 FB will also AUTOMATICALLY SEARCH the entire AIRCRAFT BAND.
Power requirements: 240V AC/12v DC. Accessories included in the price are Mounting bracket and hardware, DC cord and telescoping antenna.

ACCESS ★ **SALES** ★ **SERVICE** **BARCLAYCARD**

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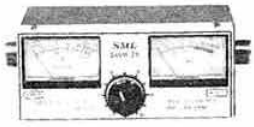
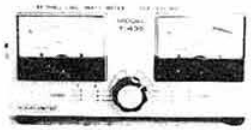
Lee Electronics Ltd

ACCESSORIES



SWR25: This ever-popular twin SWR and Power meter covers 3·5-150 MHz at **£10.50** plus VAT. P&P 50p.



T-435: VHF/UHF swr and power meter with 2/20/120 watt through line power measurement **£29.95** plus VAT. P&P 50p.

DL-30 Dummy load 25W DC-150 MHz **£5.50** plus VAT. P&P 25p.
T-80 80W Dummy load DC-500 MHz **£19.95** plus VAT. P&P 25p.
T-150 150W Dummy load DC-500 MHz **£28.50** plus VAT. P&P 25p.

CT-1 Coax Toggle 3 SO239's **£5.75** plus VAT. P&P 25p.
CT-2 Coax Toggle 2 SO239's 1 PL259 **£5.95** plus VAT. P&P 25p.

OSKER BLOCK RANGE

SWR200B swr/power meter covering 3-200 MHz 50/75 Ohm power range 3-30 MHz, 20/200/2kW, VHF 2/20/200 watt **£34.95** plus VAT. P&P 50p.

SWR300 swr/power meter 3-30 MHz (2m and 70cm with adaptors) power range 20/200/2kW with SPC-2B 20/200W at 2m with SPC07A 2/20W at 70cm. Respective prices **£39.95, £14.95, £18.95** plus VAT. P&P 50p.

SWRVVV meter body only, covers 144/432 MHz with adaptors SPC-2B and SPC 07A, **£19.95** plus VAT. P&P 30p. Adaptors as SWR300.

HI-MOULD KEYERS

HK707	Straight Up/Down keyer	**£8.75**
BK100	Semi auto mechanical bug	**£15.55**
HK702	Up/Down keyer on marble base	**£19.50**
MK702	Manipulator	**£19.50**
MK704	Squeeze paddle	**£12.50**
MK705	Squeeze paddle on marble base	**£19.50**

PLUS VAT. P&P 30p.

PX402 13·8V DC 3amp continuous 4amp max fully stabilized power supply with overload protection **£19.95** plus VAT. P&P 50p.

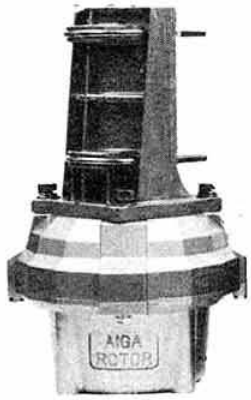
JVL MK2

Base VHF/UHF antennas. These antennas are made to very high standards from the finest quality anodised aluminium; collapsible and ideal for portable or fixed use. Power handling 350W:
JVL144 6dB gain 2m colinear **£32.00** plus VAT. P&P £1.50; **JVL433** 6dB gain 70cm colinear **£32.00** plus VAT. P&P £1.50.

POCKET MONITOR

This small receiver has 12 xtal-controlled channels. Fitted with 9—S0, S20, S22, S23, S24, R4, R5, R6 and R7, and comes complete with ni-cads, charger and carry case, etc.

£57.95 + 15% VAT
Extra channels available at **£2.50** + VAT



ART3000C

This rotator delivers the highest performance that can be expected of the standard size rotator. The unit has disc brakes to ensure excellent stopping and handles maximum load of 250kg/550lbs. **£79.95** + 15% VAT

ELECTRONIC KEYERS

EK-150

A semi- or fully-automatic squeeze keyer producing dots and dashes in the precise ratio required for perfect code. The speed is adjustable from 0-60wpm. Power inputs 110/240VAC or 9-14VDC. **£65** plus VAT.

MK-1024

As EK-150 but with four memories each capable of storing 256 bits making a total of 1,024 bits. This can be recalled separately or in sequence for one long message. **£117.50** plus VAT.

DATONG ELECTRONICS LIMITED

IMPROVE YOUR DX POTENTIAL!

Datong RF Speech Clippers add "punch" to your speech signal and help you get through where otherwise you wouldn't. Their low-distortion **R.F. clipping** technique helps in two ways.

Model A.S.P.

NEW

Firstly it allows your transmitter to radiate more useful average power and **secondly** it improves the intelligibility of your speech in difficult conditions.
The renowned fully automatic R.F. clipper **MODEL ASP** is now joined by a new manually operated R.F. clipper **MODEL D75.** This supersedes our original manually controlled unit, MODEL RFC, and offers the following additional features:

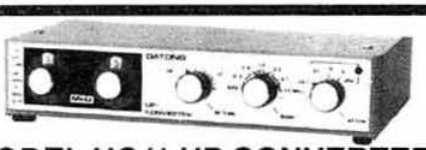
Model D75

- Input monitor LED – lights when clipping is betwen 0 and 20 dbs
- Power-on LED
- Low/High input impedance selector
- Stylish appearance to blend with any rig

Remember: all Datong R.F. clippers connect in series with your microphone. No internal connections are required. For R.F. clipping at minimal cost our MODEL RFC/M is still available. MODEL RFC/M is a fully assembled and tested R.F. clipper in PCB module form. You provide controls, case and power source.
Data sheets on all three R.F. clippers, including the new MODEL D75, are available on request.
Price: Model D.75 £49.00 plus Vat (£56.35 total). Model A.S.P. £69.00 plus VAT (£79.35 total).

MORSE TUTOR

Morse Tutor has a calibrated speed control **plus**, and this is vital, a separately adjustable delay between letters.
Start at, for example, 12 words per minute but with a two second delay and just reduce the delay as you improve. It delivers five character groups of letters, numbers, or both together. The sequence is random so the supply is unlimited!
All this plus portability, built-in loudspeaker, personal earpiece and key jack. Only £43.00 plus VAT (15%), inclusive price £49.45. Full data sheet free on request.

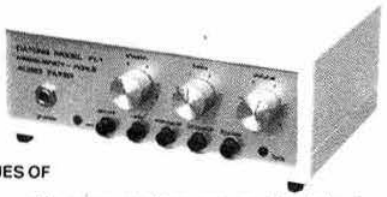


MODEL UC/1 UP CONVERTER

If you already own a good quality ten-metre or two-metre receiver or transceiver you are only £118 away from a really high performance general coverage receiver. Just add the magic ingredient, MODEL UC/1 from DATONG!
You get full coverage in thirty synthesised 1 MHz segments from 60kHz (Rugby MSF) to 30MHz, at high sensitivity and with all the facilities and high performance of your existing rig!
For good measure UC/1 also adds two-metre coverage to ten-metre receivers. Price: £119.00 plus VAT (£136.85 total).

MODEL FL1

Frequency
Agile
Audio
Filter



AS REVIEWED IN AUGUST ISSUES OF "QST" and "73"

A versatile add-on unit for communications receivers which helps to extract wanted signals from background interference. It connects in series with the loudspeaker or headphones. The effect is similar to "I.F. pass-band tuning" for SBB/ or RTTY reception, and bandwidth down to 20Hz (with limited a.f.c.) gives an amazing capability for pulling weak CW stations out of the QRM. Model FL1 is unique in being able to tune itself when notching out unwanted whistles.
Price: £59.00 plus VAT (£67.85 total).

MODEL AD170 ACTIVE ANTENNA

For sensitive reception right through from MSF at 60 kHz to Band 1 TV DX around 50 MHz, without the need for an antennae farm, MODEL AD170 has no adjustments and needs no external tuning units.
Although only three metres long, MODEL AD170 has the same directional properties as a full size dipole, even at 60 kHz.
Price: £33.00 plus VAT (£37.95 total). Special price complete with mains power unit: £37.00 plus VAT (£42.55 total).

NEW SHORT FORM CATALOGUE AVAILABLE FREE ON REQUEST (QUOTE REF. RC12)

ALL PRICES QUOTED INCLUDE POST & PACKING

If you wonder how our products blend into a station, October's Rad. Com. gives some nice examples, out of the 7 photographs of members shacks, 4 show Datong equipment in use – (three FL1's, two RFC's and a UC1)

DATONG ELECTRONICS LIMITED
Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Telephone: (0532) 552461

P.M. ELECTRONIC SERVICES

PROFESSIONAL

★ COMPLETE CRYSTAL SERVICE ★

AMATEUR

PRICES SHOWN EXCLUDE VAT; UK CUSTOMERS PLEASE ADD 15%

S18 AND S19 ARE NOW ADDED TO OUR STOCK RANGE

CRYSTAL FREQUENCY RANGE USE (TX or and HOLDER) / OUTPUT FREQUENCY	4MHz TX:HC6U	6MHz TX:HC25U	8MHz TX:HC6U	10MHz RX:HC6U	11MHz RX:HC6U	12MHz TX:HC25U	14MHz RX:HC25U	18MHz TX:HC25U	36MHz TX:HC6 & 25U	44MHz RX:HC6U	44MHz RX:HC25U	48MHz TX:HC6 & 25U	52MHz RX:HC25U	72MHz TX:HC25U
144.4 (433.2)	b	e	b	e	e	b	e	e	e	e	e	e	e	e
144.480	e	e	e	e	e	e	e	e	e	e	e	e	e	e
144.800	c	e	e	e	e	c	e	c	e	c	e	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.000/R0T	a	b	a	c	c	a	b	b	c	a	a	c	b	e
145.025/R1T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.050/R2T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.075/R3T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.100/R4T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.125/R5T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.150/R6T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.175/R7T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.200/R8T	a	b	a	e	e	a	e	b	e	a	e	e	b	e
145.300/S12	e	e	e	e	e	a	e	b	e	e	e	e	e	e
145.350/S14	e	e	c	e	e	c	c	c	e	c	c	e	e	e
145.400/S16	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.450/S18	a	e	a	e	e	a	b	b	e	a	a	e	e	e
145.475/S19	a	e	a	e	e	a	b	b	e	a	a	e	e	e
145.500/S20	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.525/S21	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.550/S22	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.575/S23	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.600/R0R	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.625/R1R	e	e	e	e	e	e	b	e	e	a	a	e	b	e
145.650/R2R	e	e	e	c	e	e	b	e	e	a	a	e	b	e
145.675/R3R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.700/R4R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.725/R5R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.750/R6R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.775/R7R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.800/R8R	a	b	a	c	c	a	b	a	e	a	a	e	c	e
145.950/S38	a	e	e	a	e	e	b	e	e	a	e	e	e	e

TWO METRE CRYSTAL RANGE

PRICES: (a) **£1.95**, (b) **£2.32**, (c) **£2.80**, (d) and (e) **£3.94. AVAILABILITY:** (a), (b), (c) and (d) stock items normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could supply from stock. **N.B.** Frequencies as listed above but in alternative holders and/or non stock loadings are available as per code (e).

ORDERING: When ordering please quote (1) Channel, (2) Crystal frequency, (3) Holder, (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

JAPANESE AND AMERICAN EQUIPMENTS

We can supply crystals for **YAESU** FT2F, FT2FB, FT2 Auto, FT224, most of the **ICOM** range and the **TRIO-KENWOOD** range. We can also supply from stock crystals for the **HEATHKIT** KW202 and HW17A.

CRYSTALS FOR THE BRITISH 70CM CHANNELS

Due to the much higher multiplication involved (3 times that on 2m) all our stock 70cm crystals are to much closer tolerances than our standard amateur range.

We are stocking the following channels: RB0 (434·60/433·00), RB2 (434·65/433·05), RB4 (434·70/433·10), RB6 (434·75/433·15), SU8 (433·20), RB10 (434·85/433·25), RB14 (434·95/433·35), SU18 (433·45) and SU20 (433·50) – TX and RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) and STORNO CQL/CQM 662 all at **£2.32.** For the U450L Base Station we have the TX crystals for all the above channels **£2.32.** The RX crystals for 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 **£3.94** to amateur spec or **£4.64** to same spec as stock items. Delivery approx. 4/6 weeks.

4m CRYSTALS FOR 70·26MHz – HC6/U

TX8·7825MHz and RX6·7466MHz or 29·7800MHz **£2.32**

10·245MHz "ALTERNATIVE" I.F. CRYSTALS-£2.32 For use in Pye and other equipment with 10·7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145·0MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS – HC6/U, HC13/U and HC25/U (Low loss) 16p each. **10p** P. & P. per order (P. & P. free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS – HC18/U

All at **£3.00**, 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).

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS

100kHz in HC13/U and 200kHz and 455kHz in HC6/U, **£2.95.**
1MHz and 5MHz in HC6/U and 10MHz and 10·7MHz in HC6/U and HC25/U, **£2.80** (£3.02).

ANZAC MD-108 DOUBLE BALANCED MIXER

5-500MHz supplied with full details for only **£5.95.**

CRYSTALS FOR PROFESSIONAL USE

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Also for commercial use, eg TV or computer crystals, etc, we can supply at very competitive prices. Please send S.A.E. for details or telephone between 4.30 7pm and ask for Mr Norcliffe.

EXPRESS SERVICE

Many types of made-to-order crystals are available on our "EXPRESS SERVICE" – with delivery of three days on our class "A" service. Telephone or Telex for details.

TERMS: CASH WITH ORDER – MAIL ORDER ONLY – S.A.E. WITH ALL ENQUIRIES – PRICES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED – OVERSEAS CHARGED AT COST.

CRYSTALS MANUFACTURED TO YOUR SPECIFIC REQUIREMENTS

Prices shown are for one off to our amateur specs; closer tolerances are available. Please send us details of your requirements.

A Low frequency fundamentals in HC13/U or HC6/U

Adj. tol. ±50ppm, Temp. tol. ±100ppm 0 to + 70°C

6·0 to 19·999kHz	**£28.12**	80 to 99·999kHz	**£7.30**
20 to 29·999kHz	**£17.75**	100 to 149·99kHz	**£6.68**
30 to 59·999kHz	**£15.51**	150 to 499·99kHz	**£6.20**
60 to 79·999kHz	**£12.41**	500 to 799·99kHz	**£7.30**

B High frequency fundamentals/overtones in HC6/U, HC18/U or HC25/U

Adj. tol. ±20ppm, Temp. tol. ±30ppm – 10 to + 60°C

†800 to 999·9kHz (fund)	**£9.50**	*25 to 30MHz (fund)	**£7.56**
*†1·0 to 1·499MHz (fund)	**£9.45**	*15 to 20·99MHz (3 O/T)	**£4.72**
*†1·5 to 2·599MHz (fund)	**£4.21**	*21 to 62·99MHz (3 O/T)	**£3.94**
*†2·6 to 20·99MHz (fund)	**£3.94**	*60 to 105MHz (5 O/T)	**£4.53**
*ø3·4 to 3·999MHz (fund)	**£5.43**	*105 to 125MHz (5 O/T)	**£7.09**
*ø4·0 to 5·999MHz (fund)	**£4.21**	125 to 180MHz (O/T)	**£6.48**
* 6·0 to 20·99MHz (fund)	**£3.94**	180 to 250MHz (O/T)	**£10.64**
* 21 to 24·99MHz (fund)	**£6.14**		

***Delivery** Normally 4/6 weeks (express available) – all other frequencies 6/8 weeks.
Holders – Low frequencies HC13/U or HC6/U dependent on frequency.
Mid and High frequencies are available in HC6/U, HC18/U or HC25/U unless marked † only available in HC6/U or ø only available in HC18/U and HC25/U.
HC17/U (replacement for FT243) and **HC33/U** (wire end HC6/U) available as per HC6/U above at **25p** extra on HC6/U price.
Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

2 ALEXANDER DRIVE, HESWALL, WIRRAL, MERSEYSIDE, L61 6XT

Tel: 051-342 4443. Cables: CRYSTAL, BIRKENHEAD. Telex: 627371

ICOM

IC215E 2mFM 3 watt 12 chs	£162.50 (N/C)
IC202S 2m SSB 3 watt portable	£199.00 (N/C)
IC240 2m 22 ch's 10 watts	£193.00 (N/C)
IC280E 2m FM 80 ch's 10 watts	£250.00 (N/C)
IC211E 2m All mode transceiver	£549.00 (N/C)

MICROWAVE MODULES (NEW PRICES)

MMT 432/28-S transverter	£136.75 (N/C)
MMT 432/144-R transverter	£173.50 (N/C)
MMT 144/28 transverter	£90.75 (N/C)
MMC 144/28-30 converter	£21.85 (N/C)
MMC 144/28 LO converter	£24.15 (N/C)
MMC 70/28 converter	£21.85 (N/C)
MMC 70/28 LO converter	£24.15 (N/C)
MMC 432/28 S converter	£29.90 (N/C)
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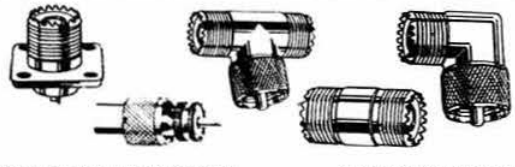

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2N4858A	45p	4520	70p	555	25p	1N4756 47v 1 watt	12p
2N5142	20p	4528	80p	709	30p	**Motorola 500mW Zeners**	
2N5246	30p	4531	70p	741	22p	2v7, 4v3 & 5v6 values ONLY	5p
2N5485	22p	4539	110p	944DC	40p	10 off any mix	40p
2N5495	24p	4543	90p	946DC	25p	**LED's**	
2N5551	10p	4555	78p			D303 red 6" wire end	25p
2N5838	120p	4556	77p			FLV102 Diffuse red	25p
40363	75p	4584	30p			MV5053 Large red	33p
40871	45p	**Voltage Regs**				MV5253 Large green	50p
40872	45p	723 (14 dil)	32p			MV5353 Large orange	55p
Opto devices		µA723	35p			OLG105 Green	20p
BPX29	130p	78N05 1A 5v	95p			**Op Amp Offer**	
OCP71	100p	**Bridge Rectifiers**				For **741** users we offer 10 off ML307 for £1.00.	
Thermistors		PW005 50v 6A	60p			The ML307 is a Fairchild device replacing pin for	
VA1034	13p	WO8 800v 1A	60p			pin the 741 but offering better performance.	
VA1040	14p	JO05 50v 10A	100p				

ORDERING: Merely state the devices you require. Please add 15% VAT to the total, and 30p postage and packing if the order totals less than £5.
PAYMENT: Cash/cheque/postal orders/Barclaycard/Visa/Access. For credit card orders merely state the card number and sign the order.
FREEPOST: The FREEPOST address means that provided you mark the envelope FREEPOST no stamp will be required. For urgent orders please mark the envelope FIRST CLASS.
DESPATCH: Normally by return of post with goods being sent FIRST CLASS. CMOS devices normally B Series.

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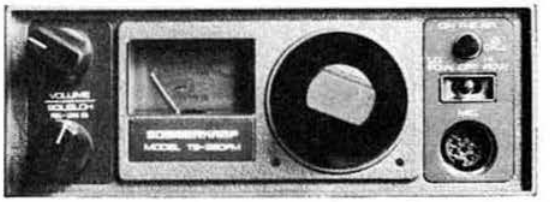

Just stop and think what it will cost you to buy the average 2 metre synthesized rig to replace your crystalled job? Then look at the cost of a 50 Watt Burner? Doesn't it make sense to grab one of our **TS280FM's at £203.55 all in!** And you can have a telephone handset for privacy in the car, or a selective tone mic. etc etc. And it's a rather nice shade of blue!

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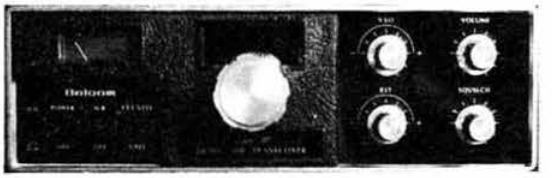


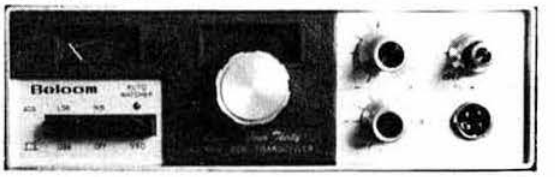
Both Liner 10 & 15 (21MHz version) at £167.90

LS707—Belcoms excellent 70cm all-mode now from stock at new low price **£495.00** includes VAT **and** carriage. Matching R707 Power supply also from stock at **£60**—all in.

SOMMERKAMP FT7B just arrived—your very best buy for this excellent HF set—**£415.**

TS802 SOMMERKAMP brand new 80 channel 2 Watt 2 metre handheld with built-in toneburst and repeater shift plus DIGITAL CHANNEL READOUT. Optional telephone handset for privacy on the bus! Robust aluminium case—**£172.50.**

FRG-7 ANALOGUE READOUT SOMMERKAMP £209.00 inc VAT.



LINER 430 70cm SSB MOBILES STILL EX-STOCK—£212.75 including VAT & delivery.

FT101ZD. If you are thinking about one of these excellent HF rigs think about FT277ZD SOMMERKAMP at **£661**—the price includes VAT/carr, and you get the microphone, CW filter and cooling fan **at no extra.** Discount if you collect.

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2N4427	1	10	12	175	£0.80
2N3553	2·5	9	28	175	£0.95
2N5913	2	7	12	470	£1.40
SD1127	4	12	12	175	£2.00 (1)
2N6080	4	12	12	175	£4.00
SD1143	12	10	12	220	£5.70
2N6081	15	6·3	12	175	£5.50
2N6082	25	5·7	12	175	£7.50
2N6084	40	4·5	12	175	£10.75
RF2127	70	6·6	12	175	£23.50 (2)
SD1019-5	100	6+	28	175	£18.00
2N5590	10	5·2	13	175	£4.70
2N5591	25	4·4	13	175	£6.80
SD1428	45	6·5	12	175	£12.45 (2)
2N5944	2	9	12	470	£5.40
2N5945	4	8	12	470	£7.50
SD1135	5	7·5	12	470	£5.25
SD1136	10	5·5	12	470	£6.40
2N5946	10	6	12	470	£9.50
SD1088	25	6·8	12	470	£16.45 (2)
SD1089	40	4·3	12	470	£19.50 (2)
SD1434	45	5·0	12	470	£22.50 (2)

NOTE (1) G.Emit. IC202/215 P.A. (2) Controlled "Q" Type

Low noise semiconductors

TRW TP393 2dB N/F at 500MHz T Pack **£2.00**
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Hewlett Packard Diodes. 5082 Series. 2800 H.Car. **90p** 2835 H.Car **70p**. 3080 Pin **70p**.

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FERRITES. Mullard. FX1115 Bead **4p**.
FX1898 6 hole **10p**. FX2049 2 hole trans **10p**.

50Ω BNC COLINE. Plug RG43 **58p**. S/H Sock **55p**.
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CAPACITORS. All ceramic. Min types.
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Disc 500V 1000pf **4p**. 200pf **4p**.
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Mc12013p 500MHz ÷ 10 I/C with ttl O/P 5V with instructions for use. **£10.50**.
Dual UHF FET E420 = 2 × E300 Ideal Mixer with data **£1.00**.
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Radiospares 100mm long S/Side 4 deg/w **96p**
Dau 4¾ × 2" S/Side 4·2deg/w **70p**
Extra 15p post over normal due to weight.

SEMICONDUCTORS. Surplus. All good. RCA 16142/2N5070 Ex Equip with Data. This is a 25W PEP HF 28V device. Only **£1.50**.
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ME202-25 for use with IC202/215 New price **£35**.
New PA2 Preamp BF900 Mosfet. The best at **£6.50**.
PM2-10 Amp 0·4W in for 10W 144MHz 13·8V 50Ω **£15**.
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PM70-4 Amp 0·4W for 4W 432MHz 13·8V 50 **£16.75**.
PM70-10 Amp 2·5W for 10W 432MHz 13·8V 50 **£16.75**.
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PA U2 432 preamp 13dB gain with N/F<2dB **£7.50**.
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Also available in single units

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Rear directivity may be electronically controlled to null QRM from the back without changing the Forward Pattern. Alternatively, Processor may be tuned for a Forward Null, to give Rear reception, and switched Beam reversal.
Normal Parasitic Beam operation on transmit or receive augmented by switching in the **Processor** when QRM occurs.
The system consists of an 8" × 8" × 3" Processor in the Shack, and a single coaxial cable to a 5" × 4½" × 2½" Antenna Unit wired to the modified Reflector Element of your 14, 21 and/or 28MHz Beam Antenna.
UK Prices: Processor £79. Antenna Unit £19. Both plus VAT. Carr. inc.
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UR39	75 ohm lower loss at 27p per M (post 3p per M)

300 ohm Twin ribbon at 10p per M (post 1½p per M)
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SPOT CASH PAID FOR GOOD USED AMATEUR AND MARINE RADIO EQUIPMENT—OR—YOUR EQUIPMENT SOLD AT YOUR PRICE ON SMALL COMMISSION—NO SALE—NO CHARGE.

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Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—6 weeks before 1st of issue month.
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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.

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QSL CARDS printed to your own specifications on white gloss cards. SAE to Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.

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D.I.Y. QSL CARDS, just add your own callsign etc. 50 for £1.70, 100 for £2.75 inc p&p. Send s.a.e. for sample. Also TVI Filters, UHF high pass £2.25 inc p&p. Lam Electronics, 47 Golden Miller Road, Cheltenham, Glos. 0242 43891.

TRANSCEIVERS, TX's, RX's, ANTENNAS. For bargain deals see Partridge Joystick advertisement this issue.

YAESU FRG-7, new condition, original packing/manual, £140, collect South London. Box 177, RSGB, 2 Leyburn Gardens, Croydon CR0 5NL.

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WANTED—PART TIME EMPLOYMENT for Radiotelephone service engineer in London Area. Assembly, wiring, test or service, RF analogue or digital. Box 179, RSGB, 2 Leyburn Gardens, Croydon CR0 5NL.

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A.C. ADAPTOR (Battery charger) 117 vac input, 4·5 vdc at 150 mA output. USA type mains plug to 2·5 mm jack plug. Brand new and boxed **£1.00** each.
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SCREWS. Pack of nuts, bolts, washers, tags, self taps etc. Mixed BA and metric. Sold by weight. **£2.00** per Kilo.
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WATCH STRAPS. Black stainless steel **50p** each. Black plastic **25p** each. Watch spring bars **10p** each. Discount for Quantity.
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RIBBON CABLE 19 way decimal coded, 4 metres for **£1.25.**
PYE TELECOM Yagi aerials. 4 element, very rugged construction, 71·1 MHz (Ideal for four metres). Brand new **£10.00** each.
DISGUISED MOBILE AERIALS (dustbin lids). Available in mid band and high band. Brand new **£5.00** each.
FERRANTI MICROSPOT CATHODE RAY TUBES Type 3H/1010. Suitable for Photographic Multi-Channel Recorder Systems. Fitted with a mounting collar and prism cemented to the faceplate, screen aluminised Phosphor P. The tubes are also fitted with mounting units type MU1053 and deflection coil type SC48A. Few only at **£55.00** each.

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Pye Westminster W15AM high band and low band available. Sets complete and in good condition but are less speakers, mikes, cradles and LT leads. (sets only) **£70.00** each.
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Pye Westminster W30AM low band, sets only no control gear, complete and in good condition. **£45.00** each.
Pye Westminster W30AM mid band, sets only good condition. **£35.00** each.
Pye Base Station F27 Low and High band, few only at **£75.00** each.
Pye Base Station F30AM Low and High band, with and without T/T. Prices from **£22.00** each.
Pye Cambridge AM10B (Boot Mount) low band, 12·5 kHz., sets only, no control gear, good condition, **£20.00** each.
Pye UHF Link U450L Base Station Tx **£15.00** Rx **£15.00** or **£25.00** for the two. Sold as seen.
Pye BC14 Battery Charger for PF1 (Pocketfone) batteries, will charge up to 12 Tx batteries and 12 Rx batteries at the same time. **£15.00** each.
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Pye Europa MF5U 3 channel UHF mobile good condition **£90.00.**
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Pye Olympic M212 UHF mobile, new condition, **£185.00.**
Pye Voltage Converter MF24PU 24v plug-in converter for Europa range of sets, to provide for 12 volt floating ground from 24 volt supply. **£15.00.**

PHILIPS 25" Monochrome Monitor, new condition with service manual. **£25.00,** carriage **£2.00.**
IC TEST CLIPS, clip over IC while still soldered to pcb or in socket. Gold plated pins, ideal for experimenters or service engineers. 28 pin DIL **£1.75.** 40 pin DIL **£2.00.** Or save by buying one of each for **£3.50.**
IC AUDIO AMP. PCB Output 2 watts into 3 ohm speaker. 12 volt DC supply. Size approx 5¼" × 1½" × 1" high, with integral heatsink, complete with circuits. **£2.00** each.
NICAD CHARGER CONVERTER PCB. (Low power inverter). Size 4" × 1¼" × 1" high. 12v dc supply. 60v dc output through pot on pcb for charging portable batteries from mobile supply. Only needs one BFY50/51/52 or similar transistor which can be mounted direct on the pcb pins on the board fitted with a star type heatsink (not supplied). **£2.00** each.
10·7 MHz SSB XTAL FILTERS (2·4kHz Bandwidth) Low imp. type. Carrier and unwanted sideband rejection min – 40dB (needs 10·69835 and 10·70165 xtals for USB/LSB. not supplied). Size approx 2" × 1" × 1". **£10.00** each.
LOW PASS FILTERS (Low imp. type). 2·9MHz small metal encapsulation. Size 1¼" × ¾" × ¾". **75p** each.
BSR AUTOCHANGE RECORD PLAYER DECKS with cue device. 33·45·78 rpm for 7", 10", 12" records. Fitted with SC12M Stereo Ceramic cartridge and styli. Brand new **£12.00** each.
XTALS FOR TV SYNC GEN. 20·25kHz for 405 line, B7G glass type. **£2.00** each.
RED LEDs (Min. type). 5 for **70p.**
VIDICON SCAN COILS (Transistor type, but no data) complete with vidicon base **£6.50** each. Brand new.
UR41 ATTENUATOR CABLE. Nominal 72 ohm, overall dia. approx. ¼", Att. per 100ft: 100MHz 218dB, 200MHz 316dB, 600MHz 449dB, 3000MHz 625dB. Ideal for Rx or Low power Tx fixed attenuators. Supplied with attenuation graph. 4 metres for **£1.00.**
HIGH QUALITY RELAYS. 4 pole C/O, 3A contacts, 12V DC coil, 150 ohm. Size approx. 1" × ¾" × 1¼", with plastic covers. **80p** each or 2 for **£1.50.**
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