radio communication

August 1975

LONGLEAT MOBILE RALLY
29 June 1975

General view of the rally site in the grounds of Longleat House, left background. Another photograph and report on page 635. *Photo:* G8JDY

journal of the Radio Society of Great Britain

ALL OUR PRICES INCLUDE VAT AT CURRENT RATES

AMATEUR RADIO BULK BUYING GROUP

TELEPHONE NO: 01-669 6701 (9am to 7pm, 1pm Sat)

COMPONENTS FOR RADCOM DESIGNS

G3ZVC SSB TCVR (Sept. '74)
Complete kit with 8-pole filter, **£73.10** or with 6-pole filter (NOT recommended for HF band use), **£61.00.**
All parts also available separately—see details in our last month's advert or price list. Add-on units also available:
2m Preamplifier Kit with tailored bandpass and gain to suit G3ZVC Board. PCB size: 3·5" × 1·8". **Price £5.05.**
12V to 6V Regulator/1W Audio Amplifier Kit to power the G3ZVC Board from + 12 volt supply and provide increased audio output. PCB size: 3·5" × 1·8". **Price £7.65.**
2m V.F.O. Kit (by DJ5HD-VHF Communication, Edition 1/71).
This V.F.O. is of the mixer type, having VFO tuning 11 to 13MHz and a crystal oscillator of 62MHz. The 135-137MHz output is fed into the MD108 mixer stage on the G3ZVC board. It is designed for operation on 12V supply. **Kit price £36.50.**
VHF Communications Edn. 1/71 85p extra
Components for H.F. band preselector—ask for details.
G3TDZ 2m TX/RX (Jan. '73)
Kits available as follows:
RX—£21.20; TX—£10.50 (State Xtal frequency required). **MOD—£3.80** (transformer and board not available).
G3XGP Mini D.F.M. (Jun. '73)
Special price for complete kit with 1MHz clock modification—**£40.00** (Add 55p if hi-speed i.c.s. required for operation up to 30MHz).

IGNITION SUPPRESSION COMPONENTS

We have the widest range of suppressors available as follows:
Screened Plug Connectors (essential for VHF), straight or angled—**78p.** Plug in Distributor Suppressor—**55p.** 1µF Capacitor, available with normal push fit lucar connector, large lucar or fully insulated with wire connections, **28p.** 2µF, normal or large lucar connector, **45p.** 2·5µF Coax type, **£1.63.** 3µF Capacitor for Lucas ACR alternator, **£1.43.** 3A Chokes, **65p.** 7A Chokes, **£1.00.** Solid Copper Stranded Ignition Cable, **7p per ft.** Connectors, **18p for 6.**

70CMS MOBILE AERIALS

Exclusive to A.R.B.B.G.—a range of mobile aerials for 70cm band.
"¼λ whip"—roof-mounting stainless steel whip aerial having a gain of 3dB, **£6.10** (+ 50p carr.).
"Co-linear"—roof-mounting stainless steel whip sections with specially designed high-Q phase coil giving 5dB gain, **£12.75** (+ 50p carr.).
Both above aerials are nominally 50 ohms impedance.

JAYBEAM AERIALS

We generally have the full range of "Jaybeam" aerials in stock for both 50 & 75 ohms (state which required) at the following prices:

4M	4Y	£8.50	Mobile	HO	£2.31	Phasing	PHM/2C	£3.56
2M	5Y	£5.38		HM	£2.75	Harnesses	PMH2/2	£4.94
	8Y	£7.00		¼ Whip	£8.30		PMH2/70	£4.13
	10Y	£13.75	70CMS	D8	£11.25	MASTS, etc.	SPM	£7.00
	PBM14	£21.13		PBM18	£13.63		SVMK	£2.75
	5XY	£10.25		MBM46	£15.13	ROTATORS	Auto	£38.75
	8XY	£12.75		MBM68	£20.13		Multi	£43.75
	10XY	£17.63		12XY	£20.88		Cable	22p/yd
	D5	£9.90						
	D8	£13.13						
	XD	£7.19						
	UGP	£5.19						

Add CARRIAGE as follows: Harnesses, Halos & UGP, 50p. Rotators and all other aerials: To: UK Mainland only, £1.00. Isle of Wight, £1.50. N. Ireland, £2.00. Elsewhere, at cost.

SEMICONDUCTORS (INC SL600 & CMOS)

The following is a selection from our range of brand new semiconductors—all carrying full manufacturer's warranty:
BC213, 23p; BF224, 28p; BF245A, 69p; BF245C, 69p; LM309K, £2.16; LM380, £1.26; SL610, 611, 612, £2.20; SL613; £3.85; SL620, 621, £3.30; SL622, £8.30; SL623, £6.13; SL624, £3.10; SL630, £2.05; SL640, 641, £3.65; SN72741P, 49p; TIS88A, 36p; 2N3919, 39p; 2N3866, £1.08; 40673, 61p; CMOS 4000, 30p; 4001, 30p; 4002, 30p; 4009, 73p; 4011, 30p; 4012, 30p; 4013, 73p; 4016, 76p; 4017, £2.03; 4020, £2.27; 4023, 30p; 4027, £1.09; 4033, £3.23; 4042, £1.85; 4043, £1.81; 4050, 67p; 4055, £1.35; 4056, £1.69; 4069, 47p; 4510, £2.44, 4511, £2.63.
The above is a selection from our wide range—full details in our price list.

We are also agents for **Mini-Beam** HF aerials and **Microwave Modules** converters etc. Write for free Price List (SAE please). **All prices include VAT at current rates.** Please note that our minimum UK post and packing charge, except where indicated is 15p. Export orders welcome—write for export price list.

Cheques and P.O's should be crossed and made payable to "Amateur Radio Bulk Buying Group" or pay by **GIRO**—Account no. 31 523 4003.

ADMINISTRATION ADDRESS ONLY:
39 POUND STREET, CARSHALTON, SURREY

ALL MAIL ORDERS AND ENQUIRIES to:
20 THORNTON CRESCENT, OLD COULSDON, SURREY

Catronics

A DIGITAL FREQUENCY METER WITH BUILT IN PRESCALER

Enabling frequencies up to over 150MHz to be read directly. Using the new model DF.M4 from Catronics Ltd., it is now possible to measure frequencies on all bands from 160m to 2m without any range switching, input level control adjustment or other operation. Additionally a low frequency position may be switched to, enabling audio frequencies and I.F.s to be read directly. This is a 7-digit model with 4-speed time base having gate times of 10S, 1S, 100mS, and 10mS with built in automatic memory. The display is by long-life seven segment indicators giving a direct frequency reading in four ranges (2 for kHz and 2 for MHz) with automatically positioned decimal point. Power supply is a stablized 240V input unit, although operation from 12V battery supply (-ve earth) can be arranged.
The instrument is housed in an attractive two-tone metal cabinet approx. 9in × 3¼in × 6¼in.
Price **£120** (+ insured post—**£1.00**). Delivery—approx.—2-3 weeks.
Normal H.F. versions (40MHz max.) now in stock—5 digit model DFM2. **£80**; 7 digit model with i.c. memory **£95.**

OTHER CATRONICS PRODUCTS

150MHz PRESCALER for DFM extends the range of H.F. type DFM to read up to VHF PCB module, **£25** Boxed unit with mains PSU, **£37.50 (P. & P. 25p.).**
CRYSTAL CALIBRATOR PCB Module and Switch Assembly, **£8.90.** 9-20V Regulator Kit, **£1.50.** Complete boxed unit (with PP1 battery), **£12.50.**
REPEATER ACCESS TONE GENERATOR with auto repeat facility: Single tone version, **£5.50.** Two-tone (or 3) de luxe version, **£8.50.**
All Catronics products are available from "Amateur Radio Bulk Buying Group"

VHF COMMUNICATIONS

The following PCB's are available from stock in the U.K.:

Title	*Designation*	*Issue*	*Price*
2M SSB/FM TRANSCEIVER			
Transceive Board	DC6HL001	2/72	**£4.30**
Local Oscillator Module	DC6HL003	2/72	**£2.35**
FM I.F. Strip	DC6HL007	3/72	**£2.60**
25W 2M LINEAR AMPLIFIER	DC6HL009	2/72	**£2.87**
28/144MHz TRANSVERTER	DJ6ZZ001	4/69	**£3.90**
28/432MHz TRANSMIT CONV.	DJ6ZZ002	2/71	**£4.30**
SPEECH PROCESSOR	DJ4BG003	1/71	**£1.82**

Individual back issues of the magazine describing the above (and other) projects are available at 35p each (post free).

Magazine subscription rates are as follows:
1970, 1971—£2.45 per year, 1972, 1973, 1974—£2.85 per year, 1975—£3.20.
Plastic binder to hold 12 editions (3 volumes)—£1.35
SPECIAL OFFERS: Vols 1970-1971 with free binder—£8.15.
Vols 1972-1974 with free binder—£8.55.
Vols 1970-1975 with two binders—£17.00.

All above magazine prices are post free.

Orders and enquiries should be addressed to our UK representatives:

AMATEUR RADIO BULK BUYING GROUP
20 Thornton Crescent, Old Coulsdon, Surrey

radio communication

Volume 51 No 8 **August 1975** Price 40p

CONTENTS

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

ABC
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Contributions and all correspondence concerning the **content** of *Radio Communication* should be addressed to: The Editor, *Radio Communication*, 35 Doughty Street, London WC1N 2AE. Tel 01-837 8688. (**Circulation** queries should be addressed to: The Subscriptions Manager, **RSGB.**)

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

Advertising, other than Members' Ads, should be sent to the above address marked for the attention of Mr C. C. Lindsay. Tel 01-837 8688 (or 01-686 5839, advertising only).

The 2m Transverter TV502 is here
The TS520 system is complete

The TS520 System
TRIO have now completed the first stage of the total system concept for amateur radio equipment. With the TS520 and its associated accessories, the amateur radio operator can assemble a station to suit any or all requirements for his hobby enjoyment. All modes and all bands, fixed and mobile/portable are provided by the TS520 system.

SSB/CW Transceiver TS-520
A real "compact"; powerful, rugged and reliable. It has everything which otherwise is available only as an accessory at extra cost: built-in power supply for fixed-station use, transistorized DC/AC power converter for mobile operation, loudspeaker, fixed-channel provisions, VOX control, etc. And these are the TS-520's special features in short format:

Versatile Transmit- and Receive Operations—USB, LSB and CW on all radio amateur bands from 80m to 10m, and—with the aid of the 2m-Transverter TV-502—also on the VHF-band from 144 to 145·7MHz, as well as fixed frequency operation on four channels. The TS-520 also allows reception of WWV stations on 10MHz for dial calibration. By adding the External VFO-520 (optional) the TS-520 demonstrates utmost versatility: independent RX- and TX operation with different frequencies, transcieve operation with slightly variable RX frequency by means of the built-in RIT circuit (Receiver Incremental Tuning) plus fixed channel operation totalling nine different combinations.

Advanced Circuitry—With the exception of the transmitter driver and final stage which are equipped with blower-cooled vacuum valves of type 12BY7A and 2 x S2001 the TS-520 is fully transistorized. The semiconductor complement consists of 44 transistors, 18 FETs, 1 IC and 84 diodes. The reliability and stability of this circuit has been substantiated by numerous contests and during rugged mobile operation.

Outstanding Receive and Transmit Performance—The transmitter section of the TS-520 features separate driver, plate and final tuning, a 2-stage ALC circuit for local and DX operation, thus assuring undistorted clearly legible TX signals even after hours of continuous operation. Provision for linear amplifiers, such as ALC input, antenna relay switching output, etc., are available and ready for use. Dual-gate MOSFETs are employed in all critical receiver circuits to improve the input sensitivity, cross-modulation response and spurious rejection. An 8-pole SSB crystal filter in the IF amplifier provides exceptional selectivity and stability. An optional 500Hz CW filter is available as an accessory and can be installed at any time. The switch-selectable time constant of the AGC assures perfect reception of SSB and CW signals.

Precision-type VFO—a feature of all TRIO receivers, transmitters and receivers also contributes to the supreme performance of the TS-520. The VFO is fully encapsulated and is controlled by a meshedgear dial drive (reduction ratio 4:1). Dial accuracy is better than ±1kHz, frequency drift will not exceed ±100Hz per hour. Dial calibration is accomplished by means of a built-in 25kHz crystal marker oscillator.

Built-in Power Supplies—for fixed station use with 120/240 VAC 50-60Hz line voltage or for mobile operation with 12-13·8 VDC by means of the built-in DC/AC converter.

Loaded with Extra Features: threshold-type RF gain control; semi-break-in circuit with sidetone; VOX/PTT/MOX-control; RIT; TUNE switch; LED function indicators for RIT, VFO and FIX channel operation; WWV receive pushbutton; 4-position fixed channel selector switch; built-in 25kHz crystal marker oscillator; two-stage AGC; multi-function meter; terminals for optional accessories such as: 2m-Transverter TV-502, External VFO-520, External Speaker SP-520, linear amplifier, headphone, microphone and key.

Optional Accessories
External VFO-520
Developed exclusively for the TS-520, this external VFO fulfils the same functions as a separate transceiver due to its numerous cross-operation and split frequency features. Design and specs of the VFO-520 are identical to those of the TS-520's built-in VFO. It operates on oscillator frequencies between 4·9 and 5·5MHz. Remote control and power supply are furnished by the TS-520 by means of a special interconnecting cable. In conjunction with the transceiver the VFO-520 provides a total of nine different operating modes, including RX or TX operation with continuously tunable frequencies and fixed-channel operation.

2 m Transverter TV-502
This new addition to the TS-520 accessory line extends the transceiver's scope of application to include the 2m-VHF range which is becoming more popular every day. The TV-502 transverts the 10m-band to 144-145·7MHz for SSB and CW operation. By installing an optional 39MHz crystal, the TV-502 will also cover the range between 145·0 and 146·0MHz, thus making the entire 2m band available for the shortwave radio amateur. The unit features preselector tuning on the antenna side and IF tuning by means of a multi-gang capacitor, utilizing the TS-520's ALC meter for tuning control. The TV-502's transmitter is controlled by the ALC voltage supplied by the transceiver and provides 10 watts RF output power. The highly sensitive receiver section responds to input signals of less than 0·3μV. Like the TS-520, this transverter can also be used for fixed or mobile stations, operating either from 120/240 VAC, 50-60Hz line voltage, or 12-13·8 VDC supplied by a car battery.

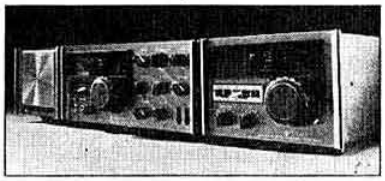
External Speaker SP-520
Styled to match the TS-520 accessory line, this 5in-speaker will greatly improve the readibility of RX signals, especially in DX operation. Voice coil impedance is 8 ohms, frequency response from 100 to 5,000Hz.

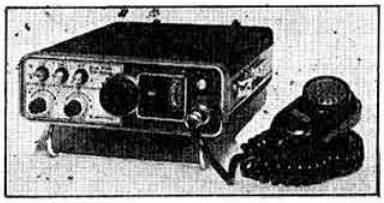
CW Crystal Filter YG-3395 C (not shown)
8-pole crystal filter for CW operation with 500Hz bandwidth at −6dB and 1·5kHz at −60dB, respectively.

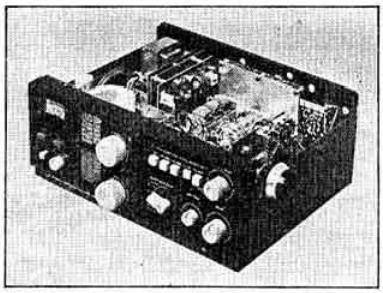
Sole Importers
Lowe Electronics
Cavendish Road
Matlock Derbyshire
Tel: Matlock 2817/2430

TRIO

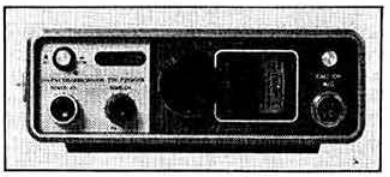
LOWE ELECTRONICS

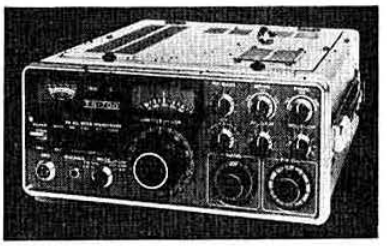


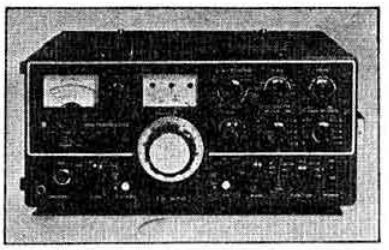




TRIO
IS NOW AVAILABLE IN THE SOUTH EAST







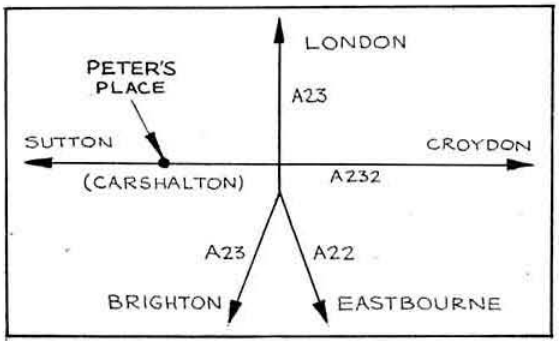
NEW LOWE ELECTRONICS BRANCH NOW OPEN

Over the last year, there has been a growing demand from the South London area, for a Lowe Electronics branch to be sited there. The price of petrol, and the general increase in the cost of motoring has made it difficult for the average radio amateur to justify a long journey taken just to see the latest amateur radio equipment. We have done what we could to help by making appearances at the major rallies and attending club evenings to demonstrate and talk about equipment but we were aware that there was a need for a permanent home south of the river.

We are delighted, therefore, to announce the opening of a new Lowe Electronics branch in Carshalton. This will be operated by Peter Burton G3ZPB who will be stocking and selling the complete range of Trio equipment together with all the other popular Lowe Electronics lines.

Those of you who know Peter will be aware of his courtesy, kindness and reputation for fair dealing. Those of you who have not yet had the pleasure of meeting him, should rush down to Carshalton and press money into his hand in exchange for numerous goodies.

The office is on the main A232 Sutton Road, just past Carshalton Ponds on the other side of the road.



HEAD OFFICE — **119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m to 9 p.m.**

BRANCH OFFICES — 39 Pound Street, Carshalton, Surrey. Tel. 01-669 6822
Soho House, 362-4 Soho Road, Handsworth, Birmingham Tel. 021-554 0708

AGENTS — Alan GW3YSA. 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809
John G3JYG. 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071
Sim GM3SAN. 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

OPENING HOURS: 9-5.30 TUESDAY TO SATURDAY INCLUSIVE

73 from BILL G3UBO/VE8DP, ALAN G3MME, JOHN G3PCY/5N2AAC, IAN G3ZYC

LOWE ELECTRONICS

BELCOM AMR-104H

The AMR-104H is an all new FM receiver from Nihon Dengyo, makers of the Liner 2 SSB transceiver. It offers 8 channel scanning facilities in either the 2 metre amateur band or the 150-170MHz marine band. Small enough to fit anywhere in a car, boat or at home, it incorporates an AC power supply as well as operating from 12V dc (negative earth). Fully automatic or manual scanning with individual channel lockout facilities. Exceptional selectivity due to use of triple filters. Dual gate FET RF amplifier and mixer for excellent sensitivity and front end selectivity.

AMR-104H SPECIFICATION

Frequency Range	144–146MHz (Amateur)
No. of Channels	8
Selectivity	15kHz
1st I.F.	10·7MHz
2nd I.F.	455kHz
Sensitivity	0·5μV 15dB quieting
AF Output	1W into 8 ohm (built in loudspeaker)
ANT Impedance	50 ohm
Semiconductors	2 Dual gate FET, 2 I.C., 27 transistors, 31 diodes.
Size	$6\frac{1}{4}'' \times 2\frac{1}{4}'' \times 8\frac{1}{2}''$
Weight	$3\frac{1}{2}$lbs
Accessories Supplied	AC Power Cord, DC Power Cord, Mobile Mounting, Bracket.

FEATURES

- ★ AUTOMATIC OR MANUAL SCANNING
- ★ 8 CHANNEL OPERATION
- ★ 240V AC/12V DC NEGATIVE EARTH
- ★ DOUBLE CONVERSION
- ★ TRIPLE FILTERING FOR OUTSTANDING SELECTIVITY
- ★ BUILT IN LOUDSPEAKER
- ★ SMALL SIZE
- ★ LIGHT WEIGHT
- ★ CHANNEL SKIP FACILITY
- ★ REVERSE POLARITY PROTECTION
- ★ ADJUSTABLE CHANNEL HOLD TIME

PRICES (Ex-VAT) AMR-104 AMATEUR, FITTED 3 CHANS, £65; AMR-104 MARINE, FITTED 8 CHANS, £86.

NEC CQ-110

- Operating modes:
  AM-SSB-CW-FSK-RTTY
  with all built-in X-tal filters included
- Frequency stability:
  better than 100Hz after 30 minutes
- Readout accuracy:
  100Hz through built-in frequency counter
- Transmitter input power:
  300 Watt PEP
- Antenna impedance:
  50-100 ohms

- Carrier suppression:
  50 dB
- Transmitter output power:
  between 180 and 110s watt according to frequency
- Digital semiconductor-
  frequency counter
- High sensitivity
  with very good cross modulation stability
- Power supply:
  with built-in power supply for 110/220/235 volt AC
  or 13.5 volt DC
- Receiver sensitivity:
  0.3uV for 10dB S/N
- Modern 2 stage AGC prevents cross modulation
- Selectivity: 2.4kHz at 6dB (SSB)
  4.2kHz at 60dB (SSB)
  0.5kHz at 6dB (CW)
  1.1kHz at 60dB (CW)

DF 2 GX ©

CAMPIONE ELECTRONICA

NEC CQ-110

- Frequency ranges: 1.5– 2.0MHz–160m
  3.5– 4.0MHz– 80m
  7.0– 7.5MHz– 40m
  14.0–14.5MHz– 20m
  21.0–21.5MHz– 15m
  27.0–27.5MHz– 11m
  28.0–28.5MHz– 10m A
  28.5–29.0MHz– 10m B
  29.0–30.0MHz– 10m C
  15.0–15.5MHz WWV/JJY (receive only)
- Weight: 18kg (39½ lb)
- Dimensions: 330 × 153 × 322 mm
  (13″ × 6″ × 12½″)

Developed by one of the largest European specialists in microwave techniques: The QC-110 from NEC. It is obvious that only one of the largest firms of its kind in the world could develop a piece of equipment so technically perfect. The QC-110 has a superhetrodyne receiver utilizing mixing frequency of 9MHz, which gives exceptional resistance to cross modulation. Everything has been thought of in this transceiver, even a fan which cools the entire piece of equipment, including the operating components. A built-in DC supply allows portable/mobile operation. A microphone is included as well as a complete instruction manual. The CQ-110 is guaranteed unconditionally for 6 months.

Exclusive Distributor for Europe (except UK):

CAMPIONE ELECTRONICA
ELCA SAS

Corso Italia, 14—CH-6911 Campione

Tel. 091 (Lugano) 68 95 55 (Suisse)

Telex: CH 73639 ELCA

ELCA SAS

THE 5th DIMENSION

DF 2 GX ©

Communications problems do not distinguish between transceivers. Thus the ICOM concept responds to the necessity of concentrating on the essential: not more expensive but better. As a rule, transceivers of the top international class are measured in four dimensions: design, sensitivity, cross-modulation safety and price. With ICOM a fifth dimension results from the interface of owner and set: image.

ICOM®

ICOM — it's a pleasure to own it

EXCLUSIVE DISTRIBUTORS IN EUROPE (EXCEPT UK)

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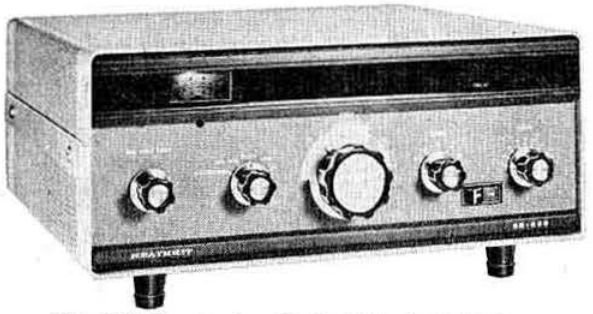
Introducing the new Heathkit amateur range. The most advanced approach yet.

SB–104 80–10M Transceiver.
All solid-state, broad-banded tuned, digital read-out.



SB–230 Conduction Cooled Triode 1kW Linear.

SB– 644 Remote VFO.

The new Heathkit amateur range is the culmination of more than three years' development and research.

To give you the most advanced approach yet to amateur radio.

Featuring all solid-state design, digital read-out, very high standard of performance and real operating convenience.

The new Heathkit range is also totally broad-banded. So you can say goodbye to time consuming preselector, load and tune controls.

Write now for a free leaflet and technical specifications.

Amateur Radio Section,
Heath (Gloucester) Limited, Bristol Road,
Gloucester GL2 6EE.
Tel: Gloucester (0452) 29451.

HEATH
Schlumberger

PAUL
G3VJF

THANET

INOUE FOR

AT LAST! THE IC-201 IS HERE!!

PRICE £300 + VAT (at the time of going to press and providing the pound doesn't go too far down the drain!)

—Well very nearly anyway. The first supplies for sale will arrive in the middle of this month—but unfortunately these are all sold! However, we will have deliveries each month from now on and there are still a few available from the September quota. We have had a couple of samples for testing for the past two months and are very pleased with them. We feel that the 201 lives up to our expectations of a multi-mode from INOUE. The only snag which might worry the odd few percent is that it DOES NOT HAVE AM!

Compare these features with other multi-mode rigs:

- **Centre-Zero** meter on FM
- **Narrow filter** on FM for 25kHz channel spacing
- Good, well-limited FM
- 600kHz shift of Tx. using **Duplex** for working repeaters
- **Automatic** tone-burst introduced on **Duplex**
- 4 Crystal positions for net and repeater frequencies
- **Two-speed gearbox** giving easy rapid tuning
- **Vox.** Fully adjustable (works on FM if you really want it)
- **CW** side-tone
- Full **break-in** on CW (separate VOX delay controls for CW and SSB)
- **RF gain control** by adjusting the coupling of two helical filters
- **Excellent noise blanker**
- **R.I.T.**
- **Mic gain** control on front panel
- **Dial-readout to 1kHz**—accurate to 2kHz or better

ACCESSORIES: microphone, DC power cord with plug, spare fuses, plug for CW key.

Specification

Transistors	53
FET	16
IC	10
Diodes	66
Frequency Range	144-146MHz
Weight	5·4kg

Dial accuracy	(−10°C to 60°C) ± 2kHz
Modes SSB (usb or lsb), CW and FM	
Ant. Impedance	50ohms
Operating Voltage	DC 13·8v ± 15% AC 230v
Size 111mm × 230mm × 260mm deep	

Transmitter

Power Output	A3J 10W pep A1, F3 10W
Carrier Suppression (SSB)	> 40dB
Unwanted sideband suppn.	> 40dB
Spurious radiation	−60dB
Deviation FM set to	4·5kHz
Mic. Impedance	500ohm
Operation	PTT or VOX

Receiver

I.F. Frequencies A3J, A1	10·7MHz
F3	10·7MHz and 455kHz
Sensitivity A3J, A1	0·5μV for 10dB S + N/N
	FM 0·4 μV for 20dB quieting
Squelch sensitivity (FM)	−8dB (μV) or less
Bandwidth SSB, CW	±1·2kHz −6dB points ±2·4kHz −60dB points
FM	±8kHz −6dB ±15kHz −60dB
Audio output	2W
Speaker	8ohms

These details are accurate to the best of our knowledge at the time of going to press, but there could be variations.

FREE SECURICOR DELIVERY ON ALL TRANSCEIVERS

BARCLAYCARD

THANET ELECTRONICS

NOTE OUR NEW ADDRESS DURING EXTENSIONS TO OUR WHITSTABLE PREMISES

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34 Cliff Avenue, Herne Bay, Kent CT6 6LZ **Tel. (02273) 63846**

ELECTRONICS

DAVE G8ELP

VHF AND UHF

WHAT'S THIS!

A CALL BUTTON on the IC-22A!—after all we have said about our tone-bursts being AUTOMATIC and only inserted on repeater channels! Have no fear, you don't have to press that button with your third hand to work a repeater, while holding the mike, and driving the car, and anything else you might be trying to do as well. The button is not connected internally—but of course you could employ it to do something else, such as opening the garage door or ejecting unwanted passengers—or anything. At **£125 + VAT** for the version with 8 channels or **£115** if you only want 5 it is still one of the best rigs you can get for either simplex or repeater working.

5 channel version: 145·00, S20, S21, S22, S23	**£115**
8 channel version: above plus S24 and 2 repeaters of plus 3 repeaters	**£125**

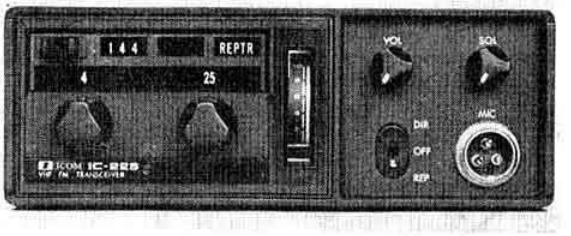
See the June and July adverts or contact us for specifications.

IC-3PA matching power supply with overload protection for using the IC range of mobiles as base stations—**£35 + VAT.**

GOING ON THE CONTINENT WITH A RECIPROCAL LICENCE? If so, and if you have an INOUE rig, then phone and we can arrange to lend you the crystals, against a deposit, for the continental repeaters. This service is subject to stocks and very preferential rates will be given to customers of ours, our agents, or our appointed stockists.

IC-225

The ultimate in mobile rigs with 80 channel operation as it stands plus the availability of extra channels if required, or full VFO coverage on transmit and receive when used with the PL-V1 (or a home brew 12MHz VFO. Automatic 600kHz Tx frequency drop and introduction of a tone burst when switched to REP give full UK repeater coverage without needing extra crystals. Tx power 10W, Rx sensitivity 0·4μV for 20dB quieting. Spurious response and radiation better than −60dB. Superb audio ailoring and clipping. £195.00 + VAT.



CRAYFORD ELECTRONICS. We are pleased to introduce Roger and Bryon of Crayford Electronics as our full agents for INOUE equipment. This means that they will now be able to offer you the full THANET service should you find it more convenient to visit them than to drive out to the sticks. After the middle of the month they, Peter in Barnsley and Terry in London will be able to demonstrate the IC-201 by appointment.

AGENTS

(by telephoned appointment, evenings and weekends only)

NORTH
Peter Avill, G3TPX,
7 Moorland Crescent,
MAPPLEWELL, Barnsley. Yorks
Tel: DARTON (022678) 2517

LONDON
Terry Barnett, G8BAM,
7 Cochrane Court,
Leyton Grange,
LONDON E10 Tel: 01-556 9366

SOUTH-EAST
Crayford Electronics
32 Iron Mill Lane,
CRAYFORD, Kent.
Crayford (03225) 24625

APPOINTED STOCKISTS

Lee Electronics
400 Edgware Road,
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D. P. Hobbs Ltd.,
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YAESU from S.M.C. Why? YAESU IT'S THE BEST S.M.C. HAS THE

EXPERIENCE— We have been importing Yaesu direct for many years. Test equipment costing over £7,000.00 under the personal control of Chris Webster in our NEW improved service department, over £2,000.00 of spares (in the improbable case you need them), all equipment thoroughly checked before despatch and Yaesu sets sent free by Securicor for the non-caller. We also have the largest stocks of masts and antennas, in fact over 500 ex-stock.

24 HOURS SERVICE. Barclay or Access Card. Just phone in quoting your number, we despatch the same day if humanly possible by whatever means you wish including SECURICOR (free for most Yaesu and secondhand equipment) and at cost for other items if under 5 ft long and less than 45lb weight.

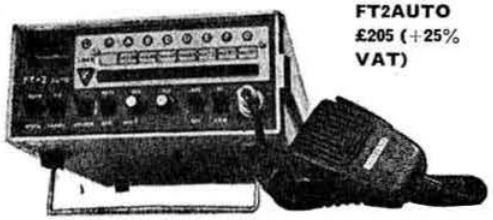
FT101, FT201, THE NEW FT200B, FT401(B), FR101, FL101, FL2100, FL2000, FT501

Besides the VHF featured this month, all the above and more Yaesu EX-STOCK. Write for Specifications and our FREE 16-page stock/price list.

NEW FROM SMC THE FT620B

The FT620B features full 1kHz resolution VFO coverage across 50–54MHz in 8 ranges, SSB (selectable), AM or CW (build your own FM modulator) 4 crystal controlled channels in each band segment, receiver offset clarifier, noise blanker, built-in AC and 12V DC power supplies, mic supplied. The exceedingly low level of spurious emissions and the 50MHz output makes this unit highly suitable for use as a drive source transverting to 4, 2 or 70cms, and/or parametrically up converting to 70 or 23. For use on 70cms. We are pleased to announce that, one day, the Microwave Modules transverter will be available for use with a 50MHz or 28MHz I.F., **£62.00.**

FT620B £205 (+ 25% VAT)



FT2AUTO £205 (+25% VAT)

The FT2AUTO is a unique concept in 2 metres **FM** transceivers. The "Auto scan" circuit monitors in turn each of the 8 channels every ½ second automatically locks upon receipt of a signal. Push buttons, enable elimination of an undesired or occupied channels, on Auto mode, or selection of that frequency on manual mode. A priority circuit may be activated to check your local net or **RAEN** frequency every two seconds. To transmit on a channel being received a momentary pressing of the P.T.T. locks the transmitter to the receiver.

Separate TX and RX crystals allows duplex operation, switchable tone burst, quelch, built-in mains and 12v. p.s.u. and microphone provided.

The Sigmasizer series offers either 200 or 80 (10 or 25kHz increments) channels on two metres, 600kHz offset on two preset channels (Sig 200) or an offset oscillator (Sig R) give ready access to repeaters when used in conjunction with the built-in tone burst. A further channel may be programmed for instant selection of local Net or RAEN frequencies. Automatic final protection, 10W of R.F. and a generous 2W of audio (for mobile use) drawing only 2·2A from 12v. D.C. on transmit. The unit may be run as a base station with the FP2AC regulated power supply (and battery charger).

FP2AC £38

SIGMASIZER 80R £190 (+25% VAT)

The FT224 solid state transceiver is the advanced replacement for the FT-2FB and features 1 or 10W output with a 24 channel flexibility (including a priority channel) all in one small package. Built in tone burst (for repeater actuation) automatic high VSWR and reverse power line protection, centre zero or "S" meter on receive, power output indicator on transmit and of course, squelch. The wireless comes complete with built in speaker, mobile mounting bracket and P.T.T. dynamic microphone.

SMC models (as with our new Autos) come fitted with 145·00, 145·5 and 145·55MHz.

FT224 £130 (+25% VAT)

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PLEASE NOTE—THESE PRICES *DO NOT* INCLUDE VAT (25% or 8%)

Terms: Cash with order, or credit card holders just 'phone in for, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £150.00. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared, or normal H.P. at competitive rates is available.

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Communications Ltd

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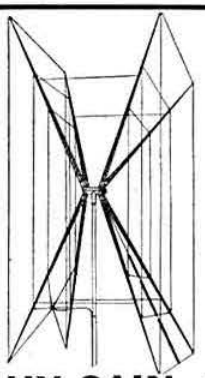

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GEM-QUAD

for 10, 15 & 20m.

- ★ Weighs only 21lb
- ★ Withstands 100 mph winds
- ★ Forward gain up to 8dB
- ★ Balun included
- ★ Converts to 3 or 4 element quad
- ★ Fibreglass tri-dectic spreaders
- ★ Front/back ratio 25dB
- ★ Low angle radiation

VERSATOWERS

Carriage paid, England & Wales

Illustrated right. Tiltover Telescopic post mounted ex-stock. The tilting action allows ease of maintenance and changes of antennas. The relatively low weight eases installation problems. From: **£172.25** (+ 8% VAT)

ALIMASTS

Carriage paid, England & Wales

A/Alloy Telescopic 1·5, 2, 3 metre sections, 6-21 metres from **£11.60** for 6m to **£38.00** for 21m. (+ 8% VAT)

TELOMASTS

(England & Wales, carriage £1.50) (+ 8% VAT)

Galvanized steel Telescopic 10ft. section with or without rigging.

30ft.—**£15.00** 40ft.—**£20.00** 50ft.—**£25.00**

With rigging kits:

30ft.—**£29.00** 40ft.—**£39.00** 50ft.—**£49.00**

HAMTOWERS

(Carriage extra)

Galvanized lattice 10ft. sections 30ft. height with climbing steps on one face. From: **£105.50** (+ 8% VAT)

HY GAIN, THE BEST RANGE, FROM THE USA (Carriage paid) (25% VAT)

HY TOWER	10-80m Vertical Radiator	£132.00	TH2 Mk III	10-20m. 3 element	£69.00	DB1015A	10–15m. 3 ele	£76.00
18V	10-80m. Loaded Vertical	£18.00	TH3 Jnr.	10-20m. 3 element	£74.00	DB24B	20m 3 ele. 40m. 2 ele.	£142.00
12AVQ	10-20m. Trapped Vertical	£25.50	TH3 Mk III	10-20m. 3 element	£99.90	402BA	40m 2 element	£121.00
14AVQ	10-40m. Trapped Vertical	£36.00	TH6DXX	10-20m. 6 element total	£119.00	204BA	20m 4 element	£96.00
18AVT	10-80m. Trapped Vertical	£52.00	HY QUAD	10-20m. 3 element	£99.00	203BA	20m 3 element	£80.00
BN86	1 : 1 Balun	£9.50	LA1	Lightning arrestor (gas)	£17.50	153BA	15m 3 element	£44.00
562 (CDE)	Rotary bearing	£3.50	LA2	Lightning arrestor (spark)	£3.00	103BA	10m 3 element	£35.00

S.M.C. TRAP DIPOLES (Carriage paid) (25% VAT)

Trap dipole 10-80m .. .. .. **£16.85** Type HP (1kW pep) .. .. .. **£18.75** Type P Portable **£19.50**

JAYBEAM (Carriage extra) FOR 70, 144 or 432MHz (25% VAT)

FOUR METRES		TWO METRES		TWO METRES		70 CENTIMETRES	
4Y/4M 4 element	£7.75	5XY/2M 5 ele crossed	£9.40	5Y/2M 5 element Yagi	£4.90	D8/70 8 over 8 slot	£10.30
PMH2/4 2 way harness	£6.00	8XY/2M 8 ele crossed	£11.70	8Y/2M 8 element Yagi	£6.40	PBM18/70 18 ele Parabeam	£12.50
BEARINGS		10XY/2M 10 ele crossed	£16.15	10Y/2M 10 ele Long yagi	£12.60	MBM46/70 46 ele Multibeam	£13.90
RZ100 Alignment bearing	£7.98	D5/2M 5 over 5 slot	£9.00	14Y/2M 14 ele Long yagi	£16.25	MBM68/70 68 ele Multibeam	£18.50
COUPLERS		D8/2M 8 over 8 slot	£12.00	PMH2/2M 2 way harness	£4.50	PMM2/70 2 way Harness	£3.75
JBL15/592" Jointing sleeve	£2.50	PBM14/2M 14 ele Parabeam	£19.20	PMH/2C Circular phasing	£3.25	PMH4/70 4 way Harness	£7.80

CDE ROTATORS

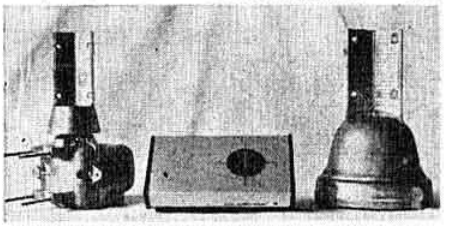
EX STOCK (IN TOTTON) FOR FAST DELIVERY (25% VAT)

THE NEW CONTROL UNIT FOR THE CD44 AND HAM 2

Carriage (B.R.S.) Free. Securicor delivery 60p extra

ALL ROTATORS SUPPLIED COMPLETE WITH APPROPRIATE CONTROL BOX AND INSTRUCTIONS

AR30 for Stereo and small VHF beams	£25.00
AR40 for Medium VHF Small HF beams	£30.00
AR33 de luxe Control version of AR40	£36.75
CD44 Arrays up to 2½ sq. ft. of wind area	£60.00
Ham II Arrays up to 7½ sq. ft. of wind area	£90.00
Con Cable 5 way for AR30/AR40 (8% VAT) at	18p/m
Con Cable 8 way for CD44/HAM II (8% VAT) at	26p/m



THE NEW SILENT CONTROL UNIT WITH AN AR30 and 40

K.W. EQUIPMENT (carriage extra) (+ VAT)

KW103 SWR/PWR meter	£16.00	Dummy Load 75/50 ohm	£12.00	KW160 Topband ATU ..	N.A.	KW108 Monitorscope	£85.00
KW107 SUPERMATCH	£63.00	Antenna switch, 3 way	£6.00	KW EZ match 10/80m ATU	£22.00	KW109 QRO ATU	£78.00

MOSLEY TRI BAND (10-15-20m) BEAMS (carriage £1.75) (+ 25% VAT)

TA33 Jnr E 3 ele 200W RMS	£53.00	TA32 Jnr E 2 ele 300W AM	£37.00	Mustang 3 ele 2kW PIP	£70.00	Mustang 2 ele 1kW AM	£56.00

BANTEX FIBREGLASS, STAINLESS STEEL VHF/UHF MOBILE ANTENNAS (Carriage 75p) (+ 25% VAT)

B5 ⅝Wave 144MHz,	£5.00	**B5U** ⅝Wave 432MHz	£5.00	Magnetic Base Mount,	£7.50	Note: deduct 50p from price of aerial if standard base not required	
BGA ¼Wave 144MHz	£6.60	**70¼** ¼Wave 70MHz	£3.00	Trunk Lip Mount	£5.10		

GWHIPS, The British Mobile HF Antenna Range (Carriage 75p) (+ 25% VAT)

Tribander 10, 15, 20	£13.53	LF40, 80 or 160m	£4.51	Flexiwhip, 10m with base	£10.45	F15, 20, 40, or 160	£4.67
Multimobile 10, 15, 20	£15.73	MM40, 80 or 160m	£4.51	Basemounts	£1.81	Telescopic whips for coils	£1.22

R.F. CABLES (Carriage up to 20m, 40p; over, 50p; less for lighter cables) (NB VAT 8% ONLY)

50 ohm RG8U/UR67 ..	33p/m	75 ohm UR39	25p/m	75 ohm Flat twin ..	6p/m	75 ohm BICC 2378 ..	22p/m
75 ohm UR57	33p/m	75 ohm Economy ..	10p/m	300 ohm Ribbon	6p/m	50 ohm UR43/UR76 ..	15p/m

COAX PLUGS (p and p extra) (plus VAT)

PL259 **48p**; PL259A **56p**; UHF Angle **90p**; S0239 **35p**; UHF back to back **75p**; BNC plugs **44p**; N plugs **83p**

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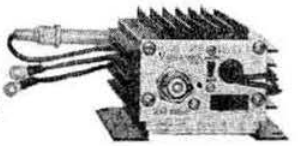
RF sensing, switchable drop out time SSB, AM, FM, CW, 12VDC 10W drive, 801 100W, 901 150W
RFA-10-100-HBX (801) .. **£75**
RFA-10-150-HBX (901) .. **£95**
(+25% VAT



LOW PRICE SWR/POWER METER (p. &p. 37p)

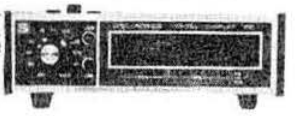
The SWR 10 ex stock in Totton. Freq. 3·5-144MHz (SWR only to 432) Up to 1kW.
Reflectometer, single meter, accuracy quoted ±10% **£6.30**

SWR 10

READOUT UNIT FOR FT-101 ETC. DD1 Ex stock in Totton

Digital readout to ± 100Hz for your FT-101 (B), FT-401 (B), etc. 21 IC's 76 diodes provide a most worthwhile accessory.

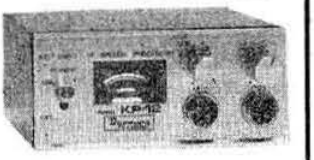
£110 Carriage paid



RF SPEECH PROCESSOR KP12

Audio to audio, via 10·7MHz, mains powered, illuminated meter, FT-101, FT2 plugs suitable all phone modes superb on FM.

EX STOCK IN TOTTON
£44 p & p 40p (+25% VAT)



NEW LOW PRICE CRYSTAL FILTERS (p& p 37p, VAT 25%)

Individually supplied with ± 6dB, (25dB,) 60dB bandwidths, ripple factor and insertion loss.

9MHz			10·7MHz		
YF90M600	600Hz	**£13.00**	YF107M600	600Hz	**£13.00**
YF90F2.4	2·4kHz	**£11.00**	YF107M2.4	2·4kHz	**£12.00**
YF90F12	12kHz	**£13.00**	YF107M12	12kHz	**£12.00**
Carrier crystals HC18/U each	.. .. ..	**£1.50**	Carrier crystals HC18/U each	.. .. ..	**£1.50**

◀ THE HANDHELD—THE KP202

Supplied with six of the most useful channels (S0, S20, S22, R5, R6 and R7), (save £25). Two watts of RF, and ½ watt of audio make this, with its immunity to image problems, and I.F. breakthrough, undoubtedly the best buy today with performance to rival many mobile installations. Fitted 6 channels for only **£75.**

THE KP202 is supplied complete with telescopic whip, leather handle/whip case, and "F" type coax connector.

Accessories include internal tone burst unit **(£5.50)**, flexible stubby helical antenna **(£4.25)**, leather case **(£3.75)**, spare F connectors **(25p)**, spare telescopic whips **(£1.70)**, F to UHF adaptors **(95p)**, set of 10 ni cads **(£8.50)**, battery charger (base master) **(£8.80)**, spare battery hods, etc, etc. +25% VAT (Ni Cads 8% only).

"NO FM GROUP MEMBER SHOULD BE SEEN AT A MEETING WITHOUT ONE." ('8 HCL)

LOW PRICE QUARTZ CRYSTALS (INSURED P & P 37p. VAT 25%)

FT2F (52MHz Rx, 6MHz Tx), **£3.50** pair, **£2** each
144 (·15, ·25, ·36, ·40, ·48, ·60R, ·70, ·80R)
145 (·08, ·09, ·68R, ·90)
Simplex
S0, S16, S20, S21, S22, S23, S24
Duplex
R0, R2, R3, R4, R5, R6, R7, R8
Inverse Repeater
IR0R, IR2R, IR4R, IR5R, IR6T, IR8T
FT220 Channel crystals **£2.20** each
8 (·00, ·125, ·150, ·175, ·225, ·250, ·275, ·50, ·575)
Multi 7/8 Trio 2200, £3.50 pair, **£2** each
R5, R6

FT2FB (14MHz Rx, 18MHz Tx), **£3.50** pair, **£2** each
144 (·15, ·20, ·30, ·36, ·40, ·50, ·60)
145 (·09, ·32, ·44T, ·51, ·84, ·90)
Simplex
S0, S16, S20, S21, S22, S23, S24
Duplex
R0, R2, R3, R4, R5, R6
Inverse Repeater
IR0R, IR2R, IR5R, IR6R
C146A & C826MB, £3.50 pair, **£2** each
S20, S21, S22T, S23, S24
FT200, £2.20 each
10A, 10C, 10D

Special Offer (for MORSE MEN)
145.125T 12MHz HC25/U, only **£1**
SUB STANDARDS
100kHz HC13/U, **£2.50**; 1MHz HC6/U, **£4.50**
8MHz HC25/U, **£2** each
144.48, S20, S21, S23, S24
12MHZ HC6/U **(£2.20)** HC25/U **(£2)**
144·48, S0, S20, S21, S22, S23
C430 ONLY **£3.50** pair
433 (·10, ·15, ·20)
Pye Pocket Phones
433·20 **£4.50** pair
CONVERTOR CRYSTALS, £2 each
38·666 (2m), 42·00 (4m), 50·5MHz (70cm)

MAGNUM TWO TRANSVERTER (Electronic Developments). Uses H.F. Transceivers P.S.U. and ½ watt on 28MHz for up to 100w output. Supplied completed with relays and 11-pin plug for instant operation. Microwave Modules receiver converter. **£88.00**

BELCOM LINER TWO. 12v DC for 10w P.E.P. on Two. Coverage of 240kHz in 24, 10kHz. VXO channels. Preamp for Liner II, **£3.75**, R115 PSU, **£21**, Liner II .. .. (+25%) **£145.00**

SOMMER GENERATORS—MOST MODELS IN STOCK AT TOTTON, ALL 230V AC (8% VAT)
GA123M5 1,000W, **£135** GA203M5 1,600W, T.O.S. GA303M5 2,400W, **£215** GA403M5 3,200W, **£320**

MICROWAVE MODULES (all 28-30MHz i.f., others to order) p & p 30p (+25% VAT)

70MHz Converter	**£15.20**	144MHz Converter	**£15.20**	144MHz Pre amp 2 outs	**£9.00**
70MHz Converter +LO	**£16.30**	144MHz Converter +LO	**£16.30**	432MHz Converter	**£18.10**
432MHz Transverter	**£62.00**				
1,296MHz Converter	**£24.00**				

SECONDHAND PRICE LIST—PHONE 04216 4930 FOR LATEST (+25% VAT)

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FOR ALL ENQUIRIES *PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE*

ATTRACTIVE CREDIT TERMS!

With the falling £1 and rising prices credit is even more attractive. Below are a few examples. If you are thinking of purchasing equipment on credit terms then drop us a line or telephone for further details.

	DEPOSIT	12 MONTHS	18 MONTHS	24 MONTHS
FT101B	£137.50	£26.58	£18.94	£15.13
FR101D	£137.50	£26.58	£18.94	£15.13
QR666	£54.50	£10.44	£7.44	£5.94
KENKP202	£34.62	£6.59	£4.75	£3.84
TH3	£41.85	£8.22	£5.91	£4.76
LINER-2	£61.25	£11.60	£8.27	£6.60

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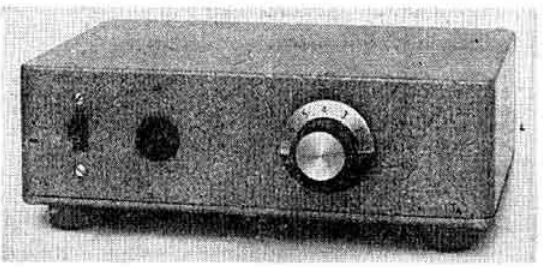

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EDITOR
A. W. Hutchinson

CURRENT COMMENT

Economy measures

The introduction of lighter-weight paper on a regular basis with this issue allows us to make two immediate economies in (a) the production and (b) the postage costs of *Radio Communication*. The paper itself, being cheaper than the previous grade used, will reduce the annual cost of paper by about £1,550. Being lighter it will also allow us to reduce postage costs by about £1,650 per year.

In order to achieve the latter economy it will, however, be necessary to adjust the number of pages in each issue to obtain the maximum return on postal charges. Commencing this month alternate issues will consist of 64 pages which, when despatched, will weigh just under 4oz (currently 8p 2nd class postage), while the other issues will have 96 or 80 pages of 4 to 6oz (currently 9½p 2nd class postage).

In order to achieve a better balance of content in the smaller issues, it will be necessary to reduce the length of regular features, and omit some altogether, but this will be balanced by more space being available for them in larger issues. At the same time the larger issues will allow us to reduce the substantial backlog of technical articles awaiting publication at present.

A. W. Hutchinson
Editor

CQ de RSGB

QSL Bureau

Holders of reciprocal licences should note that the system whereby their cards were handled by one sub-manager, whatever the prefix, has now ended. Their envelopes have been transferred to the sub-manager handling the particular prefix and, in future, envelopes should be sent to him and not to G3DRN. All UK amateurs who operate outside their own British Isles prefix area should send envelopes to the GD, GI, GM or GW sub-manager as appropriate. Until the prefix difficulty can be resolved, GC cards will continue to be handled by G3DRN, so anyone operating in GC on a temporary basis or as a G5+three-letter call should continue to send cards to him.

Because of the large number of unclaimed QSL cards being held by the sub-managers of the series G4BAA-G4BZZ and GW, members are advised that any cards in those series remaining unclaimed at the end of August will be destroyed. These cards can be collected by forwarding stamped self-addressed envelopes of adequate size to: R. F. Rawlings, 74 The Lindens, Fieldway, New Addington, Surrey CR0 9EL, for G4BAA-G4BZZ; and J. L. Reid, 28 Waterson Road, Gabalfa, Cardiff, for GW.

QTC AMATEUR RADIO NEWS

Storno Viscount circuit diagrams

The diagrams giving the circuit information necessary for the conversions described in the article "Conversion of Storno Viscount vhf radiotelephones for amateur service" in the April 1974 issue of *Radio Communication* have been reprinted to meet the continuing demand for them.

The 10-page set will now cost 50p, including postage and packing, and can be obtained direct from the editor at RSGB headquarters.

Barnsley repeater operational

The Barnsley repeater GB3NA is now operational, although on an experimental basis at present on most evenings and throughout much of each weekend, on Channel R3, access tone 1,750Hz, vertically polarized. First indications show good results and it is hoped that the repeater will soon be operating fully automatically on a continuous basis. Further information obtainable from A. J. Oakley, G8IWA.

"Old Timers" International QSO week

Arrangements have been made between RAOTA and the Netherlands old-timers association for an international old-timers activity week. This will commence with an exchange of greetings between G2DX, president of RAOTA, and PA0NP, president of the Netherlands association, on 3·6MHz at 0930gmt on 6 October, and will be closed by the presidents at the same time and on the same frequency on 10 October.

The event will not be a competition; but is intended to renew old friendships and promote new ones. Operations will be confined to 80 and 40m, and both ssb (lsb) and cw will be used. The opening will be followed by a controlled net with PA0DK and G2PT having the lists of stations on channel. SSB stations should use 3·6 to 3·7MHz and 7·06 to 7·07MHz calling "CQ Old Timers Club", particularly on the hour and half-hour between 0800 and 1100gmt and between 1800 and 2100gmt daily. It is hoped that old-timers in other countries will participate.

Stolen equipment

A KW2000A transceiver, serial number A499, was stolen from the University College Radio Room in the Central Collegiate Building, Gordon Street, London WC1H 0AH, between 12 and 16 June. The ac power unit was not stolen, the interconnecting cable being cut, and it is rare for such equipment to be offered without a power supply. Any information should go to Ian Smith, secretary of the UCL Radio Society, at the above address.

Names and addresses

Would the member living in or near Chapeltown, Sheffield, who sent postal orders in payment of his subscription please let the subscription manager know his name and address.

It would assist the Society administration if members would notify changes of address on a **post card**, and not by letter or as part of other correspondence.

RAE COURSES 1975-6

Aberdeen. Aberdeen Technical College. The Aberdeen ARS is hoping to run a course at the college, but at least 12 students are required. Intending students are asked to contact S. Sutherland, GM4BKV, 67 Greenfern Road, Aberdeen AB2 6TP.

Barry. College of Further Education, Colcot Road, Barry. Commence 16 September (theory) and 18 September (morse and practical). Enrolment: afternoons and evenings up to 8 pm, 8-10 September. Fee: £8; reduced to £5 for students under 18 years of age.

Bath. City of Bath Technical College, Avon St, Bath. Tutor, P. A. Bubb, G3UWJ. Enrolment 11-12 September. Details from the college.

Brentwood. Brentwood Evening Institute, Shenfield School, Essex. Tutor, T. E. Downing, G3MXH. Thursdays, 7.30-9.30pm. Details from the institute, tel 0277 216722, or G3MXH, tel 0277 226503.

Bristol. Brunel Technical College, Ashley Down, Bristol. Tutor, P. J. Brouder, G3ZJH. Mondays, 6.45-9.15pm, commencing 15 September. Provided there is sufficient support, an additional evening course on morse will be run for amateurs who have passed the written examination. Details from G3ZJH, tel Bristol 41241, ext 64.

Chesterfield. Chesterfield College of Technology, Infirmary Road, Chesterfield S41 7NG. Details from J. A. Gascoigne, course organizer, radio and television.

Colchester. North-east Essex Technical College, Sheepen Road, Colchester, Essex CO3 3LL. Details from D. Mason, Electrical Engineering Department at the college, tel Colchester 70271 ext 66.

Doncaster. Doncaster College of Technology, Waterdale, Doncaster DN1 3EX. Thursdays, 7-9pm. Details from the Department of Engineering.

Dudley. Dudley Technical College. Tuesdays and Wednesdays, 6.30-8.30pm; enrolment 9/10 September. Details from Department of Engineering & Science.

Farnborough, Hants. North and West Farnborough Further Education Centre, Cove School, St John's Road, Farnborough. Tutor, J. Hardy, G3KND. First class commences 7.30pm Thursday 2 October. A morse class will also commence at 7.30pm Monday 29 September at Oak Farm School, Farnborough.

Ilford. County High School for Girls, Gants Hill, Ilford. Wednesdays 7-8.30pm, commencing 24 September. Enrolment 8-11 September. Fee: £4.50 over 18, £2.25 under 18.

Liverpool. Riversdale College of Technology, Riversdale Road, Liverpool L19 3QR. Mondays and Thursdays, 7-9.30pm, commencing 15 September. Enrolment 8-10 and 15 September. Details from A. C. Hayward, Department of Electronic & Radio Engineering.

Morden. Merton Technical College, London Road, Morden Park, Morden, Surrey. Wednesdays, 7-9.30 pm, commencing 17 September. Enrolment 2-4 pm, 6-8 pm, 8-10 September. Details from C. E. Travers at the college.

Northampton. Weston Favell Upper School, Booth Lane South, Northampton. Tutor, B. Hayes, G3JBU. Commences 24 September for 26 weeks. Enrolment 8-12 September. Fee £5. Details from G3JBU, tel 43020 after office hours.

Slough. Langley College of Further Education, c/o Education Offices, 48 High St, Slough, Berks SL1 1EN. This new college is under construction in Station Road, Slough, and is due to open in September; courses will continue at Slough College of Technology until the end of the autumn term. Fridays: 5-6.30pm, operating procedure with college station on the air (optional); 6.30-8pm, morse (optional); 8-9.30pm, theory. If numbers permit, two classes will be formed, one to take the RAE in May 1976 and the other in December 1976.

The college also runs an advanced radio amateurs class for those who have passed the RAE, Fridays 6.30-9.30pm. Full laboratory facilities available. Students can take the examination for the college certificate in Advanced Amateur Radio Communication. Morse class can be arranged for Class B licensees.

Details and syllabus from E. C. Langley, G3FVC, at the above address.

Swinton (Manchester). Moorside High School, East Lancashire Road, Swinton. Thursday evenings commencing 25 September. Details from G8BFP, tel 061-794 3706.

Wigan. Mesnes High School, Parsons Walk, Wigan. Tutor, T. Austin, G3RCA. Enrolment 6.30-8.30pm 1 September. First class 7-9pm Monday 22 September. A second night to suit students will be arranged. Fee for one night for three terms each of 10 weeks is £5.10.

A small transistorized power amplifier for 2m

by W. H. BOND, G3XGP*

FOLLOWING the success of a small homebrew transistorized transmitter with a reasonably clean output on 2m, it was natural to try and produce a power amplifier for use on poor sites or with poor aerials. This power amplifier requires an rf input of about 1W, and running from a 12V supply will put between 12 and 15W into the aerial. It runs in Class C, there are no in-band spurii, and harmonics when correctly adjusted are better than 45dB down. The unit is easy to construct and set up, tolerates a poor vswr without self-destruction, and does not go into self-oscillation; its expensive transistors are thus not placed at risk.

The amplifier depends for its success on a series of power transistors, the TRW4176 B, C, D, capable of running quite high power at 144MHz. These are of overlay construction and in a very simple circuit give good gain; transistor details are given in the appendix. In this circuit their stability is exceptional, and the supply voltage may be increased to 30V on nbfm with very considerable increase in power, although very good heat sinking is required at these higher power levels. At lower levels of output they appear to be very difficult to destroy and have an appeal to those wishing to experiment inexpensively.

The circuit is shown in Fig 1. The exciter output is fed into TR1 by C13 and C14, which with L1, C2 and the input capacitance of TR1 tune the stage. The driver and output stage follow the same pattern; RFCs 3, 6 and 9 are lossy loads for the collectors, L2 and L3 with their associated fixed and variable capacitors tune the stages and RFCs 5 and 8 tie the bases down to earth potential. Safety diodes between base and emitter are not required. The output is an L-pi tank circuit: a single tuned output proved to be a very ineffective suppressor of spurii and harmonics. Two tuned circuits are essential and there is no significant reduction in output when they are employed.

Construction (Figs 2 and 3)

One of the difficulties facing any intending constructor is that of obtaining the parts used in the prototype. This unit emerged from the junk-box using parts obtained at the various mobile rallies and from other sources, so that two circuit boards have been designed and approved. Both boards use the same transistors, chokes and fixed capacitors, but one provides for Radiospares mica compression trimmers, and the second for Oxley air-spaced capacitors, and because the exact value of the latter type of capacitor may not be to hand, provision is made for fixed capacitors (Cx, y, z, of about 22pF) to be placed in parallel. There is little difference in the behaviour of the two designs, but the one using air-spaced capacitors is a little more efficient. A third board was made up using ceramic capacitors, but these proved to be lossy, and although small and neat should only be used if space is at a premium; details can be provided by the author on request.

The coils are no problem, the variable capacitors making up for variation in gauge and dimensions (see, however, the note in "Setting up" below). The transistors should be those specified; their equivalents may exist but they have not been sought. The fixed capacitors used in the prototypes were Erie Ceramicons. Similar fixed capacitors are manufactured by Mullard, but space is available on the board for larger substitutes. One complete essential for continuous operation is that adequate heat sinking is provided: power output varies with the transistors, as does their efficiency. One of the units runs 36W through the final at 12V so that the minimum heat sink is a die-cast box of 6 by 4 by 2in, and if higher powers are to be attempted (and these transistors do justify experiment) a much larger heat sink, even to the extent of using water cooling, is required.

Setting up

Using either of the recommended circuit boards, the author has failed to make this circuit oscillate with any settings of the capacitors. Without an rf input, current consumption is no more than 100μA with good transistors. Some of these devices do leak without any real detriment to their rf behaviour, especially the TRW4176C, but the maximum current seen through the unit should be no more than 10mA without rf input. Before power is applied, of course, the unit should have been loaded with a screened 50–75Ω dummy load with a power and swr meter in series, together with an

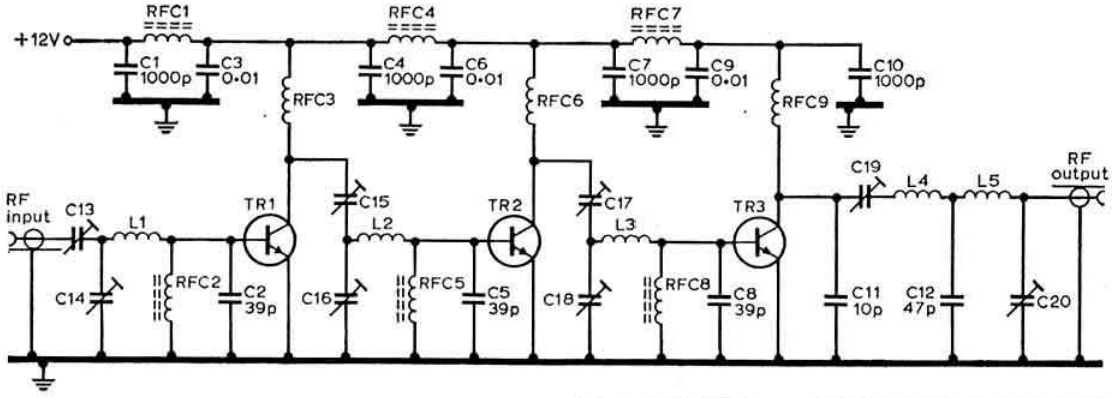


Fig 1. Circuit diagram of the amplifier

* 23 Chantry Road, Moseley, Birmingham B13 8DL.

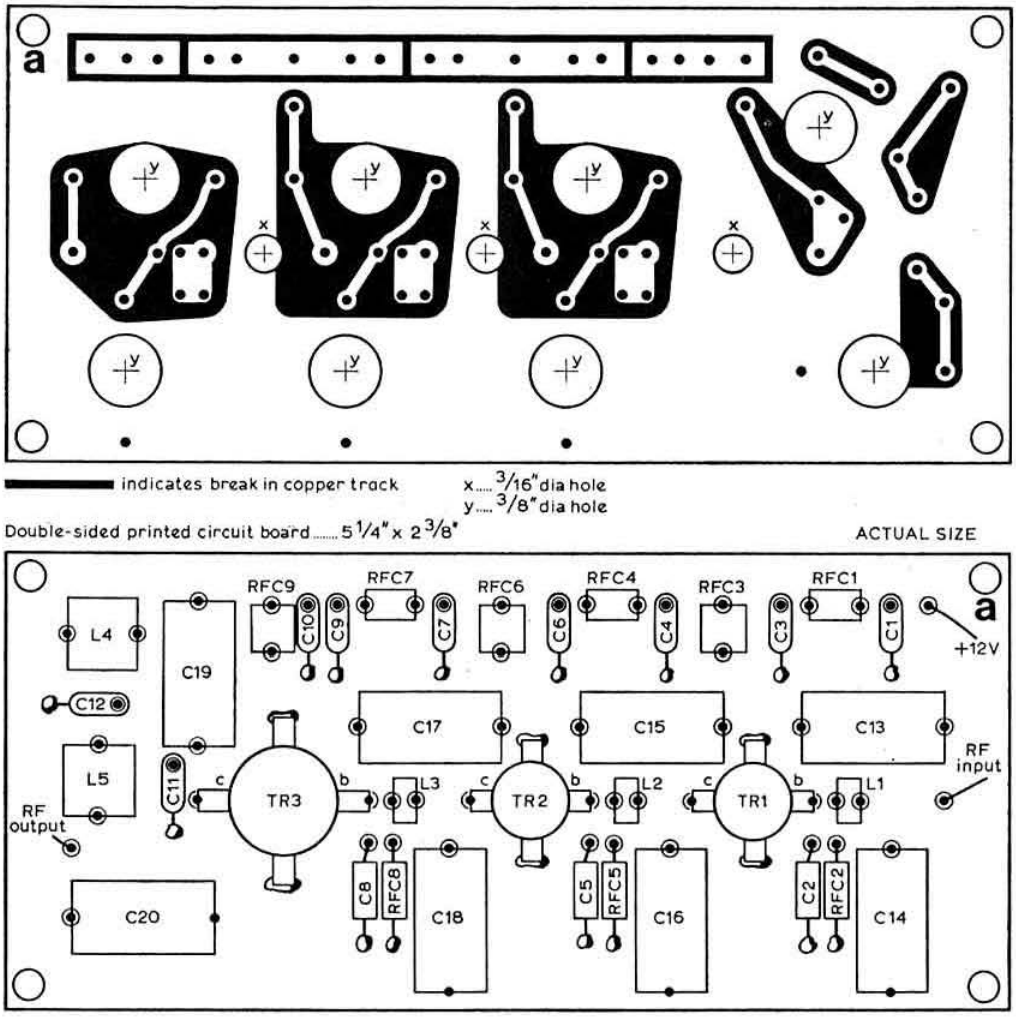


Fig 2. Circuit board for use with Radiospares mica compression capacitors

ammeter in the power supply, and all capacitors should have been set at half value. This being done apply 12V to the unit; if more than 100μA flow, look for solder bridges or a poor transistor, and scrub the board with an old toothbrush, for many is the time that the latter has solved an invisible problem. If all is well, apply a few hundred milliwatts of rf to the input, adjust the input- and driver-stage capacitors until an output appears and then immediately adjust the output capacitors C19 and C20 for maximum output into the dummy load. Now return to the input; adjustment of C13 is broad, but the setting of C14 is critical and it should be adjusted for a rise in both current consumption and output. C15 is also fairly sharp, but C16, 17 and C18 are broader in their setting. Now retune C19 and C20 for maximum output and minimum vswr. Next increase the rf input to the maximum intended, which should be about 1·0W at 12V, and readjust the capacitors, for they are all sensitive to the power level at which the associated transistor is running. Finally, there is some value in exploring adjustment of the tuning of L1, 2 and 3, coupled

Components list

Cx, Cy, Cz	15–33pF ceramic, added if Oxley capacitors too small
C1, 4, 7, 10	1,000pF ceramic, Ceramicon or Mullard equivalent
C2, 5, 8	39pF Erie Ceramicons or equivalent Mullard
C3, 6, 9	0·01μF ceramic, Ceramicon or Mullard
C11	10pF ceramic, Ceramicon or Mullard
C12	47pF ceramic, Ceramicon or Mullard
C13, 14, 15, 16, 17, 18	5–40pF Radiospares mica compression trimmers or Oxley air-spaced variable 2–20pF with Cx, Cy, Cz added in parallel, each 22pF
C19, 20	0–40pF Radiospares mica compression-trimmers, or 3–30pF air-spaced variable
TR1, 2, 3	TRW PT 4176, B, C, D respectively
RFC 1, 2, 4, 5, 7, 8	FX 1115 beads with 2½t 22swg enam
RFC 3, 6, 9	5t 20swg enam close wound on ¼in drill shaft
L1, 2, 3	2t 20swg wound on ¼in drill shaft, separated 1/16in, ¼in long
L4, 5	3t 16swg wound on 5/16in drill shaft, separated 1/16in
Circuit board	Double-sided copperclad 1/16in
Die-cast box	Eddystone 6½ by 4¾ by 2in or equivalent

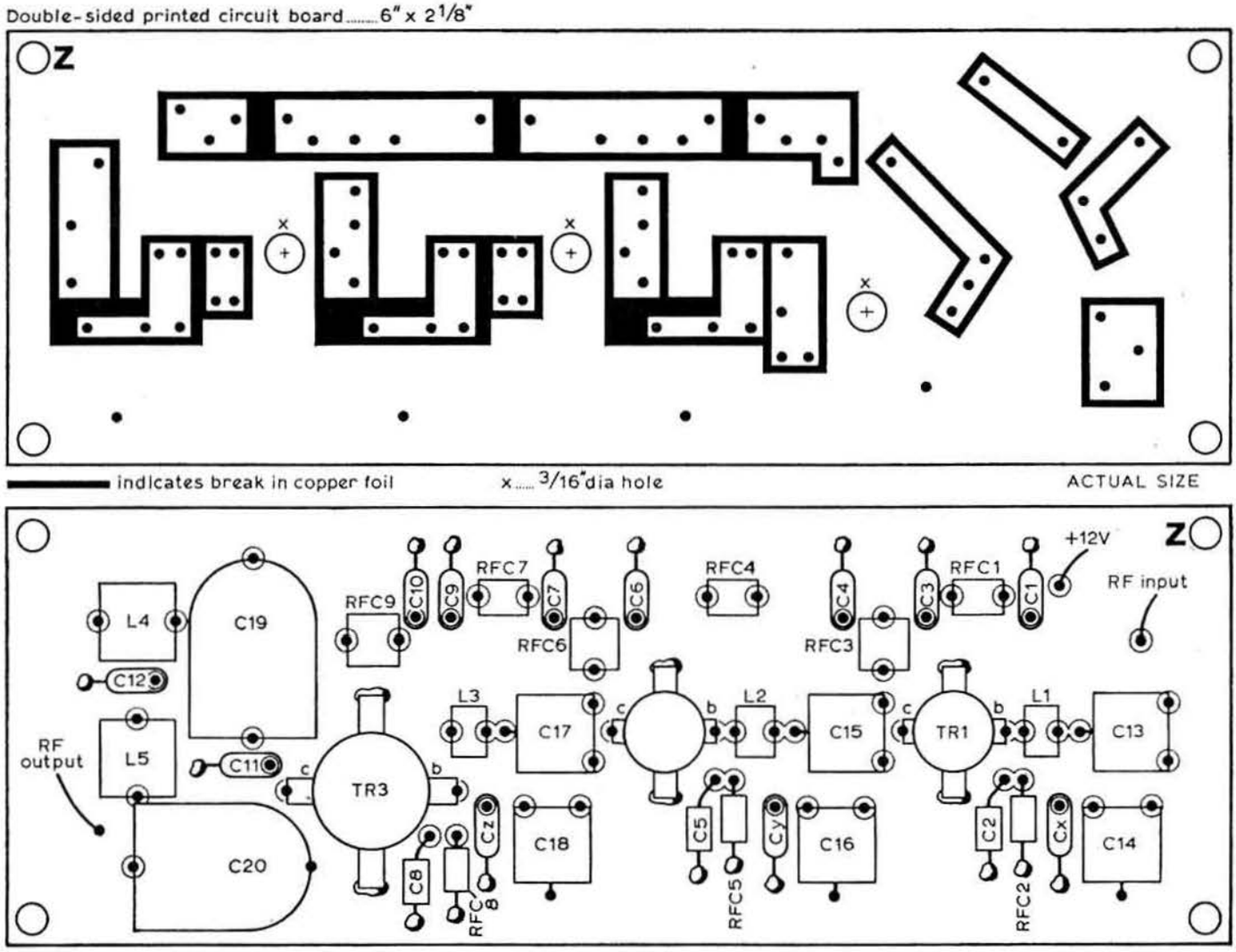


Fig 3. Circuit board for use with Oxley capacitors

with readjustment of their associated capacitors, for maximum output and minimum current consumption of the board.

The unit may now be put on the air after the final check of using an absorption wavemeter to ensure that no significant spurii or harmonics are present in the output, for with careful adjustment of the output capacitors these should be more than 45dB down. These levels of unwanted radiation are the minimum acceptable and an output filter should always be employed, for example those recommended in Chapter 18 of *Radio Communication Handbook*.

Conclusion

This is a simple, practical, easily-made and set-up power amplifier for 2m, with an acceptable minimum of spurii and harmonics. For those not requiring full output the output circuit can be connected to either of the two preceding stages, with outputs of 5 and 10W respectively. Any form of the circuit appears to be docile, with no tendency to self-oscillation, and at the low power levels discussed appears to come to no harm if run into an unmatched load. It is intended as an amplifier to follow a nbfm exciter (it is of course non-linear and unsuitable for ssb) but could be amplitude modulated with 10W of audio applied to the driver and power stage on 12V supply to avoid exceeding V_{ce} max.

The printed circuit board, the components and transistors, or a complete kit may be obtained from Ambit International, 37 High Street, Brentwood, Essex CM14 4RH.

The author would like to acknowledge the help of G8CYK in evolving this circuit.

Appendix

The TRW4176 series were originally intended to form a four-stage amplifier, the final stage running two transistors in parallel or push-pull. When properly driven, a minimum of 20W at 84MHz from 12·5V could be expected. They were selected devices with the following characteristics.

Absolute maximum ratings

PT 4176	B	C	D
V_{cbo} (V)	60	75	60
V_{ceo} (V)	40	50	40
V_{ebo} (V)	3·0	3·0	4·0
I_c (A)	0·75	2·0	6·0
T_j (°C)	−65 to +200	as B	as B
$P_{tot\ diss}$ (W)	10	25	60
Power gain, minimum	8·0	6·0	4·5dB at 88MHz
DC current gain, min/max	20/80	15/120	20/120

These figures suggest that audio modulation limits the power supply to 12·5V, and that for other modes of transmission a 30V supply is permissible. □

An aerial splitter unit

by W. BLANCHARD, G3JKV*

THERE are some occasions when it would be useful to have a way of using the same aerial for a number of receivers without either losing sensitivity or creating interaction between the receivers. This unit splits an aerial as many times as desired, at least in the case of reception. It provides the ability to use a single long-wire aerial with more than one receiver, without any danger of noticeable loss of signal or oscillator interaction, and it is also probably the simplest unit possible from a constructional point of view, with no need of alignment of any kind.

The basic problem is to present the aerial, whatever it is, with a constant high impedance over the frequency bands to be covered, and to feed the signals out at the other end at a constant low impedance through as many outlets as necessary. There must be no coupling at all between these outlets.

If it is specified that the unit must cover all frequencies from, say, 150kHz to 30MHz, and that there are to be no controls of any sort, the use of tuned circuits is immediately eliminated, but fortunately gain is probably not required in any case. This specification leads us directly to the emitter-follower and cathode-follower types of circuit, which have high input impedance, low output impedance, no voltage gain (actually a very slight loss) and a reasonably high power gain, which is exactly what is required. However, if one were actually to build straightforward emitter-follower circuits as the author originally did, couple them up to the aerial at one end and the receivers at the other, it would be found that the results were far worse than merely paralleling the aerial into both receivers. Radios 1, 2, 3 and 4 would be heard simultaneously and at all frequencies up to and above 30MHz, all mixed up with fax, teletype and ssb, etc, a beautiful case of intermodulation.

The cause is not difficult to find. Due to the fact that there is no tuning incorporated, every signal up to 30MHz and probably beyond is reaching the transistor. Some of them are extremely powerful, particularly around 7MHz at night, adding up to a total of not the odd microvolt or so, but *volts* of rf. A valve voltmeter with a flat response up to 200MHz quite often reads 5V or more when attached to the end of the author's 130ft wire, and this is where the real problem lies. It must be remembered that a normal receiver has considerable selectivity in front of the first transistor or valve, so it only has to deal with the odd millivolt at most—unless one lives next to a commercial transmitter. The problem is how to deal with both microvolts and volts simultaneously without losing the microvolts or mixing them up with the volts; in fact, a classic problem of achieving a high dynamic range.

Practical experiments with a wide range of transistors showed that there was little hope of making them do the job, and another factor which turned up during these tests removed them from consideration altogether. It so happened that at the time there was quite a bit of thunderstorm activity and, although there were no thunderstorms overhead, a fair number of transistors were destroyed. As soon as the aerial was connected to a wideband oscilloscope, the reason was quite clear: the nearer flashes of lightning were producing pulses of over 100V!

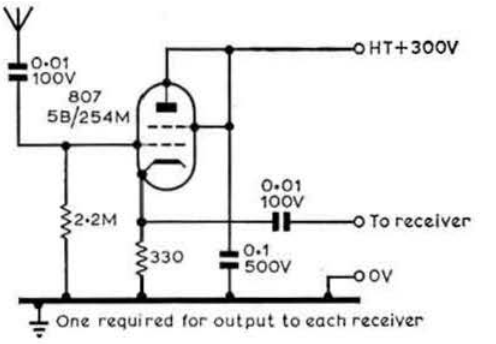


Fig 1. Circuit diagram of the unit

Valves were therefore tried next, the first being an E180F. The grid voltage/anode current curve for this valve showed that it could only be expected to be linear over a range of 1V or so, but it was considered that this might be enough if the aerial input were slightly attenuated. This was true enough during the day, but at night over 30dB attenuation was required before all the cross-modulation products disappeared (along with most of the weaker signals). Finally, a note in *Technical Topics* showed the way. It pointed out that the old 807 had proved itself better than all the usual valves and transistors at handling very large signals in a linear fashion. Examination of the grid/anode characteristic showed that it could be expected to stay linear over a range of several volts on its grid without requiring very high voltages on the anode. This turned out to be true in practice. Fears about the noise it might introduce on weak signals at 30MHz were laid to rest after a few trials, and thus the final configuration adopted used a 5B/254M (miniature 807 to those who have never used valves!) in a straightforward triode-connected cathode-follower circuit (Fig 1).

Further experiments confirmed what the valve characteristic curves had suggested—the triode connection was the best, with an anode current of about 50mA at 300V. Marginally better results were obtained by running the valve "flat out" in its tetrode configuration with 600V on the anode and 300V on the screen grid, but it seemed uneconomical to build a rather large power supply just for an aerial coupler, and in any case the difference was so slight that it would never be noticed in normal use.

Some practical points are worth mentioning:

1. The same number of cathode followers as outputs are required. The aerial is simply connected in parallel to them all. (The grid leak resistor may be made as large as 10MΩ if five or six outputs are required.)

2. The output impedance is about 150Ω but, provided several hundred feet of cable are not going to be used, the unit will match ordinary 75Ω cable without noticeable loss.

3. Most receivers of the older types will go into cross-modulation long before this coupler will. Due to the low

(Continued on page 619)

* The Trundel, Tower Hill, Dorking, Surrey.

A compact medium-powered linear amplifier

by H. TONKS, G3JFL*

ALTHOUGH the author is a believer in low power, he does accept that there are times when a relative increase in power is necessary to help in working dx on 80 and 20m. For this purpose a medium-powered linear capable of 300W p.e.p. output has been constructed, using low-cost components and of compact dimensions.

Amplifier section (Fig 1)

Three PL509/40GK6s are driven in a grounded-grid configuration with nearly a thousand volts on their anodes and are cooled by a cheap mains fan (obtained from a mobile-rally stall for 12½p!) The g1 bias voltage is obtained from the heater supply transformer secondary, this giving 25V negative on "standby" and approximately 3V negative when the amplifier is "on". Bias is set with RV1 to 150mA (50mA each valve) standing current. The 1mA meter is shunted to read 750mA fsd. The power unit is quite capable of supplying this current at 950V ht.

Drive level will vary from band to band, with 40W being required on 80m for full power out, but no trouble driving the linear will be experienced on any band if a normal transmitter or transceiver capable of up to 100W p.e.p. is used. However, due to the internal capacitance of the pa valves and an adverse tank circuit L/C ratio, the output on 10m is somewhat reduced.

Power supply (tripler)

The 950V ht is obtained from a Radiospares isolating transformer, the 240V out being tripled by using five tv type electrolytic capacitors and only three diodes—the large capacitance of C3, C4, C5, C6 and C7 produces the 950V ht. Note that C7 has a slightly higher working voltage (350V). It should also be noticed that no surge-limiting resistor has been used. There are two reasons for this:

(a) The impedance of the secondary winding is sufficient itself;

(b) Any voltage drop across a surge limiter is of course trebled, and this would not help the ht regulation, which is quite good considering the current that can be drawn.

Surge limiters should of course be used with full-wave or bridge rectifiers.

Power supply (conventional)

A bridge rectifier can be used if a mains transformer can be obtained with a secondary rating of, say, 650V 750mA, measuring about 4in square and which fits into the chassis. The smoothing capacitor required would be about 80μF 1,000V.

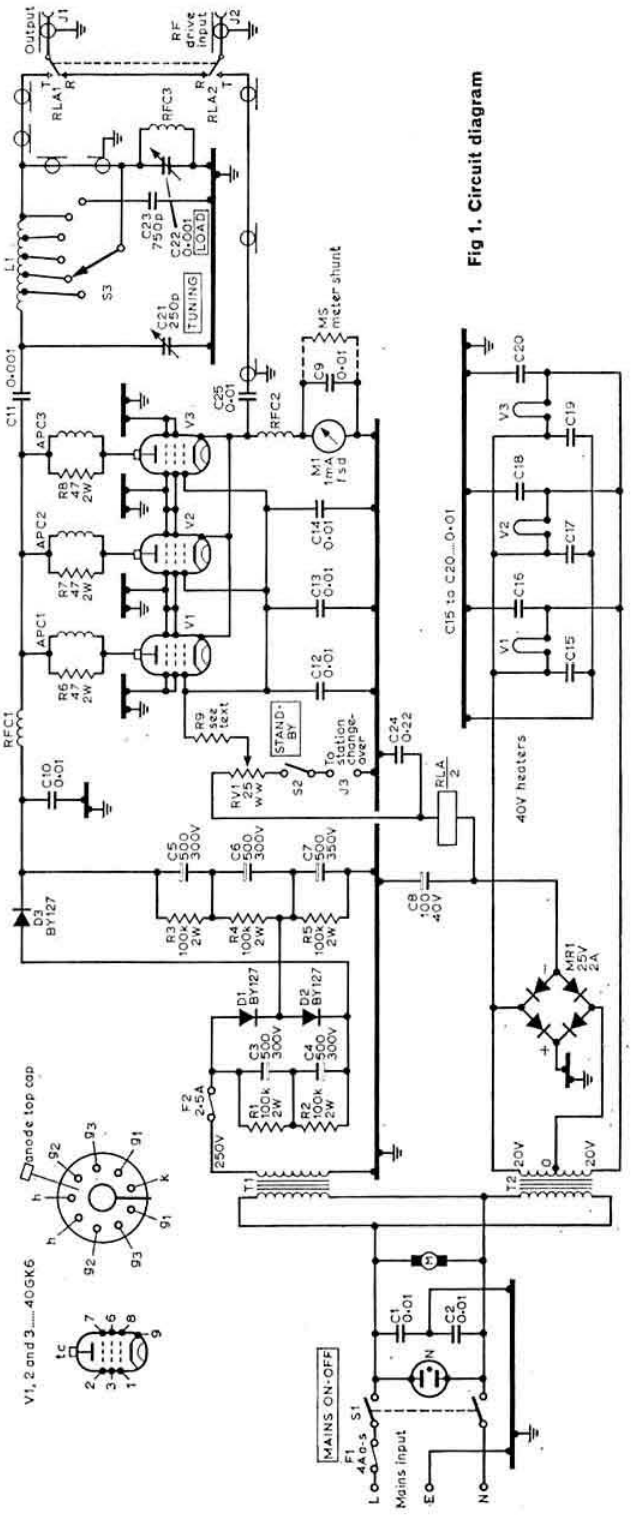


Fig 1. Circuit diagram

* 72 Hillingford Avenue, Great Barr, Birmingham 43.

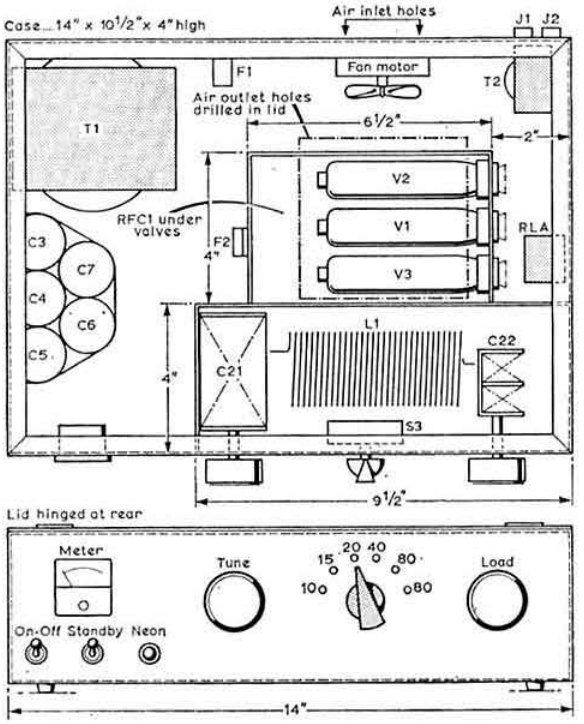


Fig 2. Layout details

Components list

C1, 2, 10, 25	0·01μF 1·4kV	**RV1**	25Ω wire-wound 3W
C3, 4, 5, 6, 7	500μF 350V dc	**MS**	Meter shunt 0·1Ω (for meter to read 750mA)
C8	1,000μF 40V dc	**RFC1**	Wound on 5in by ⅜in former, with 22swg enam. Four sections of 16t, 24t, 28t, 41t in one length
C9	0·01μF 500V dc	**RFC2**	1mH heavy duty
C11	0·001μF 5kV	**RFC3**	2·5mH heavy duty
C12, 13, 14, 15, 16, 17, 18, 19, 20	0·01μF 250V dc	**APC1, 2, 3**	6t of 20swg enam. wound on R6, 7, 8
C21	250pF tuning capacitor, transmitting type	**L1**	30t of 14swg, 2in dia tapped at 2½, 3½, 5, 7, 12t, 4in long
C22	0·001μF, good-quality broadcast type	**T1**	Mains isolating transformer 250/250, 375VA
C23	750pF 500V dc	**T2**	20–0–20V 2A heater transformer (Radiospares)
C24	0·22μF 250V dc	**RLA**	DPCO relay 12V dc 90Ω heavy duty (Radiospares)
All capacitors are ceramic, except tuning and smoothing		**J1, 2**	Belling Lee or SO239
V1, 2, 3	PL509/40GK6	**J3**	2-pin 2A (or similar)
N	Mains neon	**F1**	4A anti-surge and holder
MR1	25V 2A bridge rectifier	**F2**	2·5A and holder
D1, 2, 3	BY127	**M1**	1mA fsd
S1	DPST		
S2	SPST		
S3	SP 6-way heavy-duty ceramic transmitting type		
M	Mains fan (3½in blades)		
R1, 2, 3, 4, 5	100kΩ 2W carbon		
R6, 7, 8	47Ω 2W carbon		
R9	4·3kΩ 1W carbon (see text)		

Circuit notes

R9 will provide a certain amount of self-bias (a form of alc). Maximum drive will be obtained when this resistor is shorted out, or alternatively R9 can be made a preset alc control (provided the control is of at least 1W rating).

The only surplus components used by the author were C21 and S3, both removed from a TU 5B unit, but constructors can use any good-quality 250pF capacitor and six-way ceramic switch which they may have to hand.

As RFC1 is located near the pa valves, it is better wound on a *ceramic* former.

The value of meter shunt MS was found by experiment to be about 0·1Ω. When calibrating, it is advisable to use lt batteries, together with a load, which are in series with a meter of known value (say, 1A). S2 is a single-pole switch, fitted to enable an operator to operate through the linear while the heaters and ht remain on in a standby position. RFC2 (1mH) must be capable of passing the three pa valves' cathode current, about 800mA.

Because RLA switches both input and output circuits, it was removed from its 14-pin plug and bolted onto the chassis, thereby enabling the screened rf cables to be kept short and well earthed right up to the relay itself.

Layout and construction (Figs 2 and 3)

As can be seen, the pa compartment is well screened, with a gap on one side of the valve aperture to allow air to escape from the top and bottom. The three valves lie horizontally,

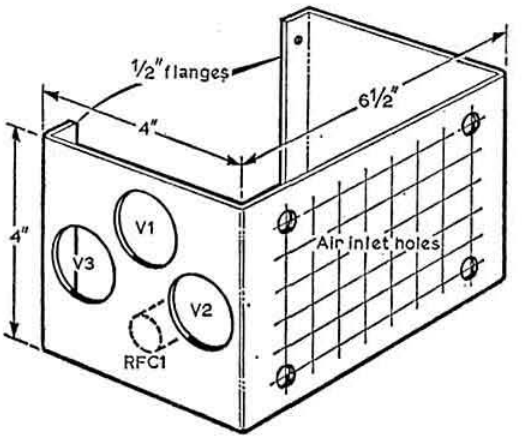


Fig 3. The valve compartment

with the ht feed choke RFC1 underneath them. The cabinet and lid must have ventilating holes drilled above and below the valve aperture, and it was also found necessary to drill holes behind the fan (or blower) to enable cold air to enter. T1 had its metal screening sides removed before fitting into the chassis.

Construction is made easier if the pa valve screen and

(Continued on page 619)

The author was awarded the 1962 VHF Committee Cup for this equipment in the home-constructed equipment competition at this year's VHF Convention.

A crystal-controlled solid-state source for 10GHz

by G. D. LEAN, BSc, ARCS, CEng, MIEE, G3WJG*

THE source to be described uses very compact solid-state units and can deliver 3mW at a frequency of 10GHz. Its primary use is for a shf receiver local oscillator, although it could be used as a low-power transmitter or frequency marker.

System description

The system comprises two basic units and a final two-cavity filter (see Photo 1). The oscillator and initial multipliers are housed in a small Eddystone box measuring 2¼ by 4¼ by 1¼in. This unit delivers about 40mW at 2·6GHz to a final waveguide quadrupler having an output at 10GHz of 3mW.

* 54 Blacketts Wood Drive, Chorley Wood, Herts WD3 5QH.

The 2·6GHz unit uses as its primary source a small 145MHz transmitter adapted from a design by R. Hey, G3TDZ.[1] The transistors used in the original design have been replaced by types more suitable for the lower power output and the modulator components have been omitted. The circuit diagram is shown in Fig 2 (with minor changes from the original design) and the circuit board and layout are shown in Fig 3. The circuit functions very well and has been chosen because little trouble has been experienced by those who have made up the unit. A kit is also available from Ambit International.

The 'TDZ transmitter is housed in one half of the Eddystone box, which has a brass screen along its centre to separate the 145MHz transmitter from the multiplier stages. The output at 145MHz should be greater than 1W.

The first varactor multiplying stage uses a BXY35 as a tripler (Fig 4). The 145MHz signal is fed via a capacitor tap through a series-resonant circuit to the varactor. The second harmonic is tuned out by the idler circuit comprising L9 and C15. The third harmonic is fed to the bandpass filter consisting of L10, C16, C17 and L11, C18. The output can be monitored at a miniature coaxial socket mounted at this point. The impedance is about 50Ω, and 600mW is easily obtainable.

The next multiplying stage consists of a BXY38D used as a high-order multiplier. The sixth harmonic of the input frequency is selected by the bandpass two-section filter and approximately 40mW at 2·6GHz is obtained.

The final multiplier, a BXY40D varactor, is mounted in WG16 and the input at 2·6GHz is fed to a λ/4 line at this frequency. The second harmonic idler consists of another λ/4 line, on the side opposite the input, tuned to 5·2GHz. The tuning of each line is accomplished by adjusting the spacing between the end of the line and the diode mounting block, thus altering the effective series capacitance. A sliding short-circuit block mounted behind the diode forms a cavity for the final frequency and matching screws are used to give maximum output.

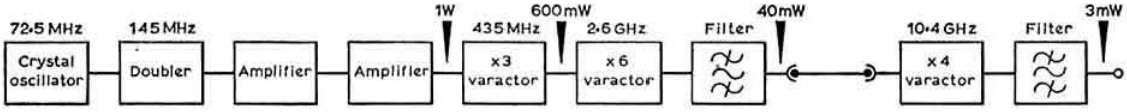


Fig 1. Block diagram of 10GHz source

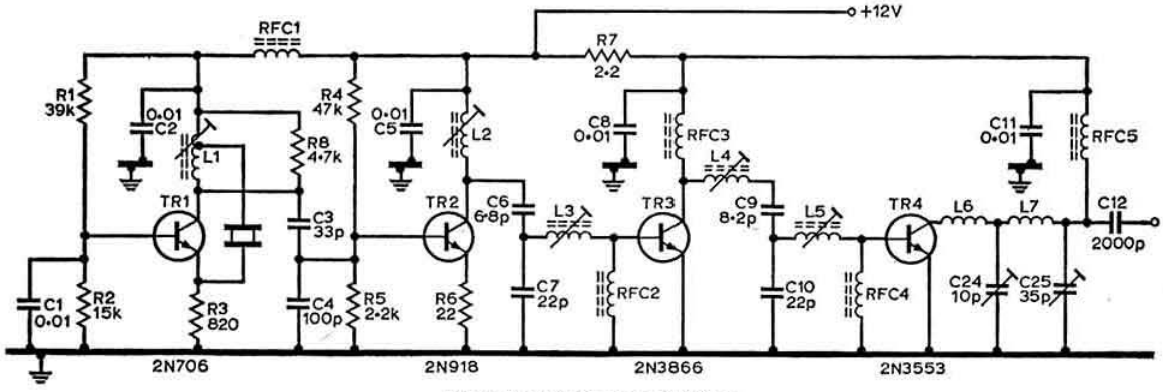


Fig 2. Circuit diagram of driver

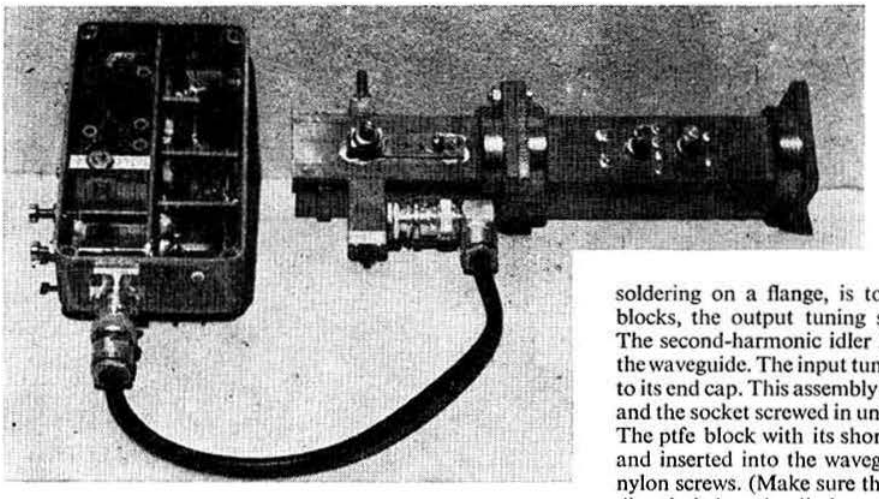


Photo 1. General view of 10GHz source

Construction

The 'TDZ transmitter is constructed on a 1in wide piece of double-sided copper-clad glass fibre board with screens of thin copper or brass sheet used between each transistor stage. Full constructional and alignment details are given in [1]. It is assumed that constructors will not undertake to build this shf source as their first project, and will have sufficient experience in uhf techniques to undertake the difficult alignment of the multiplier stages.

The layout and construction of the multiplier stages in the 2·6GHz unit are shown in Figs 5 and 6. The brass dividing screen, filter rods and varactor mounting block are first assembled and soldered up as a sub-unit. This is then bolted into the box and the trimmers fitted. The 435MHz varactor is bolted in position and finally the resistors and coils are soldered in. The 2·6GHz varactor is not inserted until testing is ready to commence.

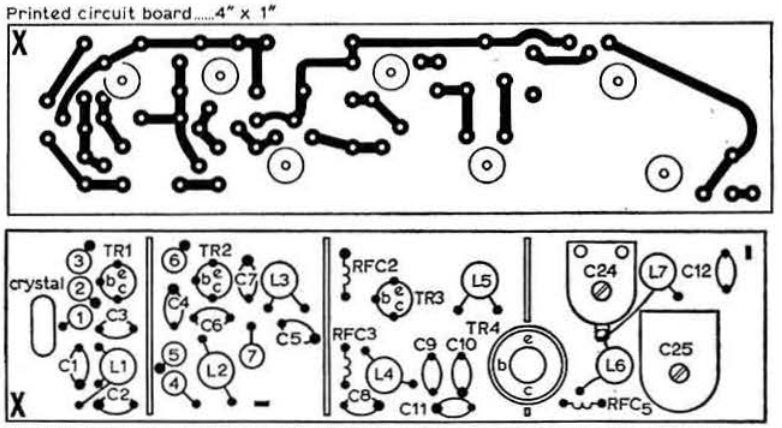
The final quadrupler construction is shown in Figs 7 and 8. All parts shown are made from brass except the varactor mounting block and diode holder which are made from ptfe and copper respectively. The method of assembly, after soldering on a flange, is to solder on the two tuning-line blocks, the output tuning screw and diode support strip. The second-harmonic idler line is then inserted from inside the waveguide. The input tuning line is assembled and soldered to its end cap. This assembly is then bolted onto the line block and the socket screwed in until it makes contact with the line. The ptfe block with its short line and end caps is assembled and inserted into the waveguide where it is secured by two nylon screws. (Make sure the flat portion of the short line is directly below the diode mounting hole in the support strip which has been previously soldered to the guide.) The sliding cavity block is then inserted into the waveguide. The diode is inserted during the testing and alignment.

Components list

R1	39kΩ
R2	15kΩ
R3	820Ω
R4	47kΩ
R5	2·2kΩ
R6	22Ω
R7	2·2Ω
R8	4·7Ω
R9	10kΩ
C1, 2, 5, 8, 11	0·01μF
C3	33pF
C4	100pF
C6	6·8pF
C7, 10	22pF
C9	8·2pF
C12	2,000pF
C13	4–25pF
C14	1–15pF
C15, 16, 18, 20, 22	1–10pF
C17	2pF
C19	1,000pF
C21	2–15pF
C23	6BA bolt (see text)
C24	10pF
C25	35pF
D1	BXY35
D2	BXY38D
TR1	2N706 (2N708) etc
TR2	2N918
TR3	2N3866
TR4	2N3553
L1	5t 22swg tapped 1t from "cold" end
L2	4t 22swg
L3	2t 20swg
L4	11t 26swg
L5	2t 22swg
L6	10t 26swg
L7	12t 26swg
L8	6t 22swg
L9	3t }
L10	2t } 18swg
L11	2t }
L12	2t 18swg tapped ¼t from earth
L13	1¼t 18swg

All coils wound on ¼in dia formers, those of L1-L5 having cores

RFC1, 2, 3, 4	3t 28swg on ferrite bead



R8 (fitted across L1) and RFC4 (TR4 base to emitter) are fitted on underside of printed circuit board

Fig 3. Driver pcb layout and etching pattern

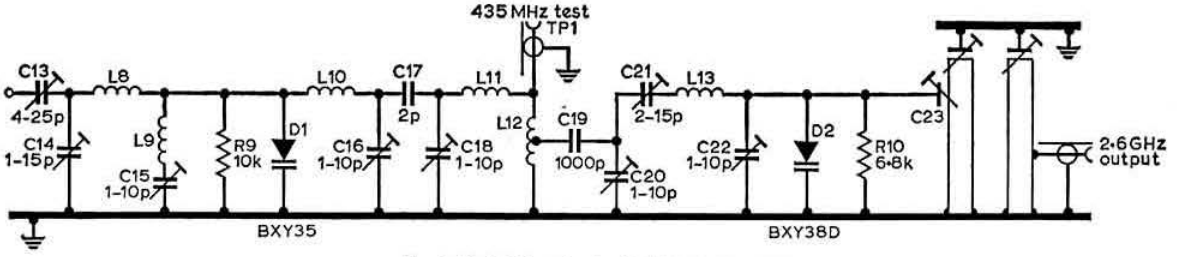


Fig 4. Multiplier chain, 145MHz to 2·6GHz

Testing and alignment

The alignment of this unit is not an easy task for amateurs, and, if at all possible, it is recommended that constructors should have access to the following equipment during the alignment procedure:

Spectrum analyser (Hewlett-Packard 8555A)
Tracking preselector (Hewlett-Packard 8445A)
Bandpass filter 10·3 to 10·4GHz. See [2]
Variable attenuator in WG16, 10dB
Waveguide 16/N adaptor

While it is not impossible to align the source without these items, constructors are strongly advised to try to get their units tested using the above or similar equipment.

However, for those who are really "out in the cold", a tuning method is also described which will enable the unit to give adequate power output in the 10GHz band. The author has deliberately chosen 2m and 70cm as intermediate multiplier frequencies in order that simple measuring equipment will be available to those who have no access to professional equipment. The following equipment is required:

Power measuring equipment, 1W at 2m and 600mW at 70cm
Diode detector to measure 50mW at 2·6GHz
Calibrated high-Q cavity or filter at 2·6GHz ±50MHz
10GHz waveguide filter (see previous equipment list)
Waveguide attenuator and crystal detector

Alignment using a spectrum analyser

The driver and 70cm tripler

Tune up the 2m transmitter, starting at the oscillator and working towards the pa. The output should be coupled via a length of coaxial cable directly into the analyser input attenuator, with the multipliers left unconnected. Ensure that at least 1W output is available and that signals other than 2m and harmonics are more than 65dB down; see Photo 2.

Connect the transmitter via a stout lead to the 70cm tripler and unsolder L12 from the miniature coaxial socket. Connect this socket to the analyser and tune C13, 14, 15, 16 and 18 for best output at 433MHz, which should be

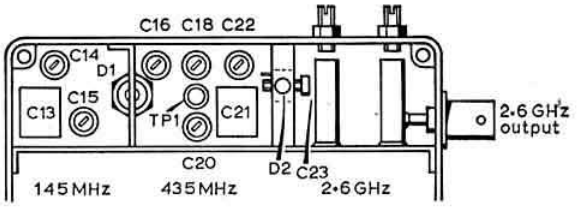
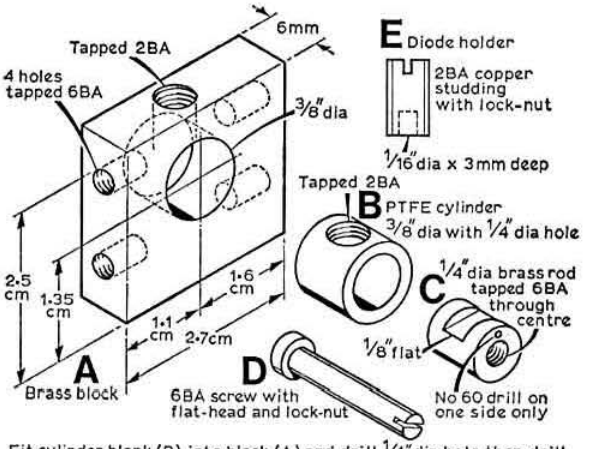
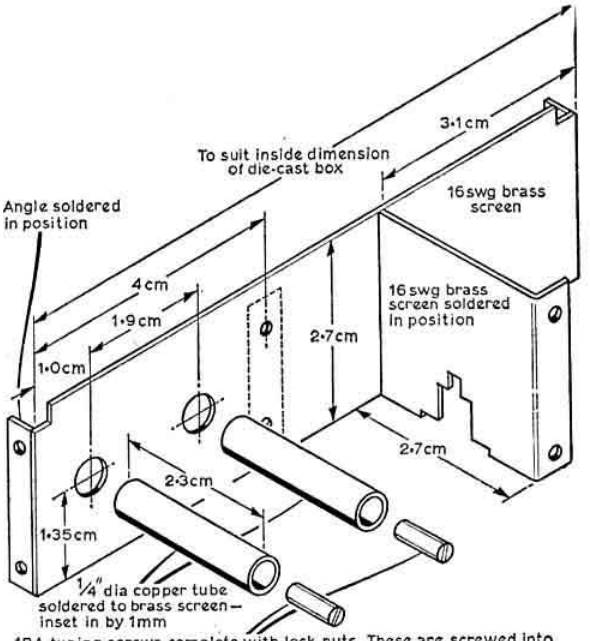


Fig 5. Layout of multiplier stages



Fit cylinder blank (B) into block (A) and drill 1/4" dia hole then drill and tap 2BA. Press in brass rod (C) and finally solder length of wire into the No 60 drill hole.



4BA tuning screws complete with lock-nuts. These are screwed into 4BA tapped holes in die-cast screening box opposite the ends of the filter bars. Ensure that the screws can pass into the tube without touching the side-walls.

Fig 6. Construction of multiplier stages

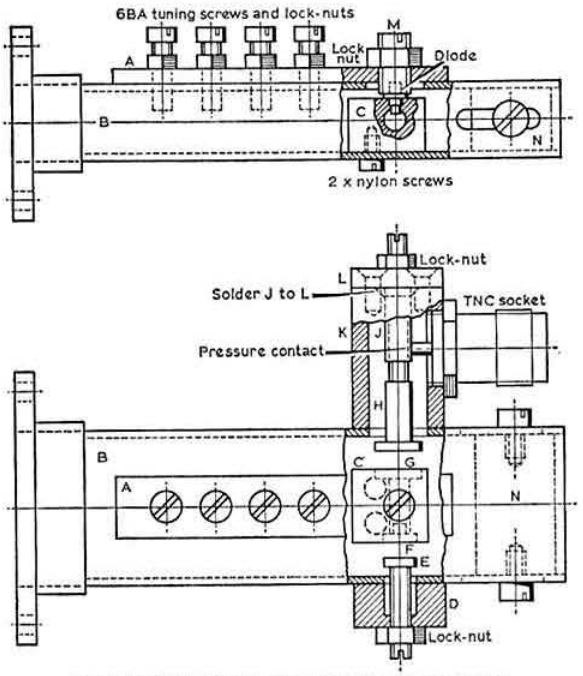


Fig 7. Layout of 2·6GHz input varactor multiplier

about 600mW. Notice C15 should be adjusted to minimize the signal at 290MHz. The output should resemble that shown in Photo 3. Note that components other than 435MHz and harmonics are well attenuated. Reconnect L12 and insert the BXY38D varactor diode with its copper screw holder into the circuit. As the diode has to dissipate over 500mW it is essential that it makes good thermal contact with its holder screw, and a dab of "Thermpath" grease helps, although this is not essential.

Tuning the ×6 multiplier

Connect the analyser to the output and adjust the filter tuning screws to give maximum output on 2·615GHz. Tune C20 and C21 for maximum output along with the idler C22. Note the output and then alter C23 and again repeat all the tuning on this stage. Continue with this process until the maximum output is obtained, then *slightly* adjust all controls starting from the crystal oscillator for maximum clean output, which should be over 30mW at 2·615GHz.

Check that the output is fairly clean and contains only frequencies which are direct harmonics of the crystal frequency. All unwanted harmonics should be at a low level. Vary the voltage on the source from 10 to 14V and check that the output does not break up. See Photo 4, which shows the effect at 433MHz of mistuning only the ×3 multiplier.

Now connect the final quadrupler to the 2·6GHz source via a short length of 50Ω cable. This cable should be used only for this purpose and must not be altered in length or otherwise from now on. Connect the quadrupler to the

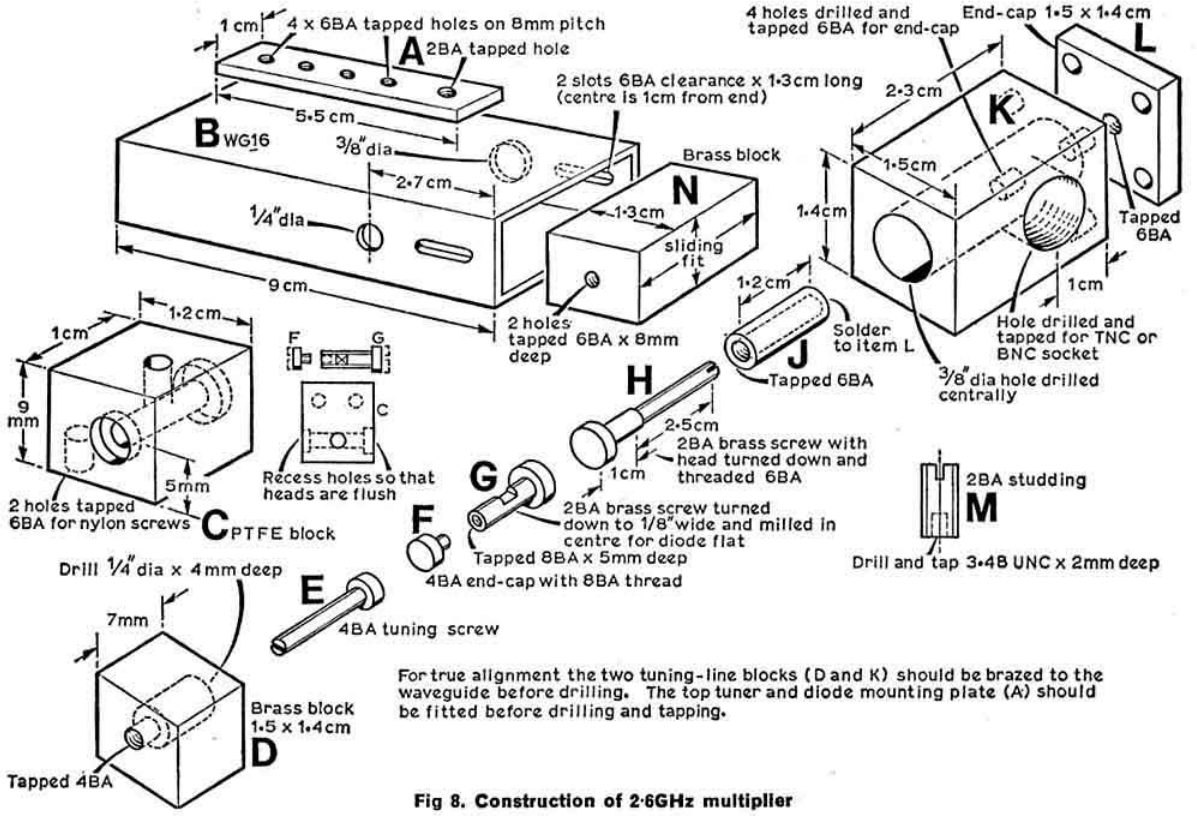


Fig 8. Construction of 2·6GHz multiplier

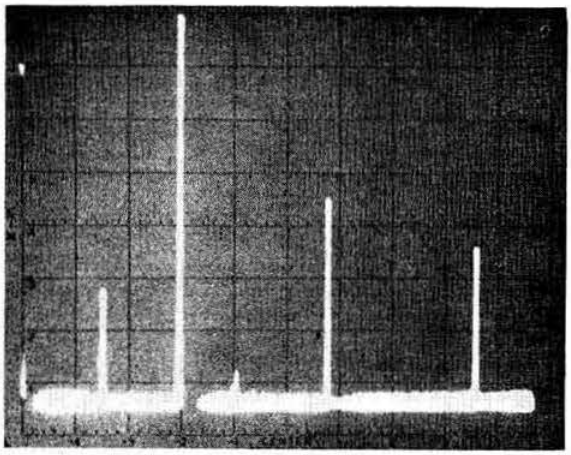


Photo 2. Output spectrum of G3TDZ transmitter, 0–500MHz at 50MHz/cm

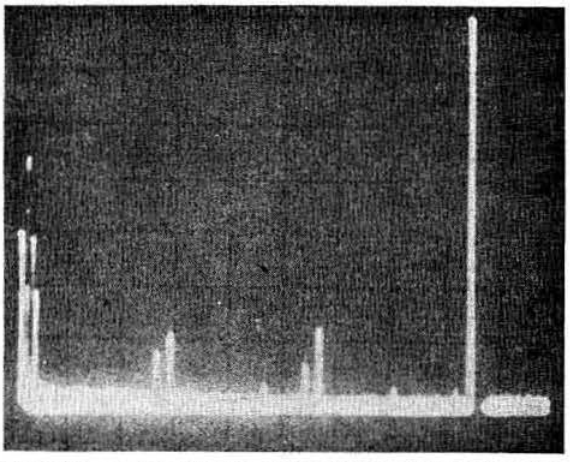


Photo 3. Spectrum at 435MHz test point, 0–500MHz at 50MHz/cm

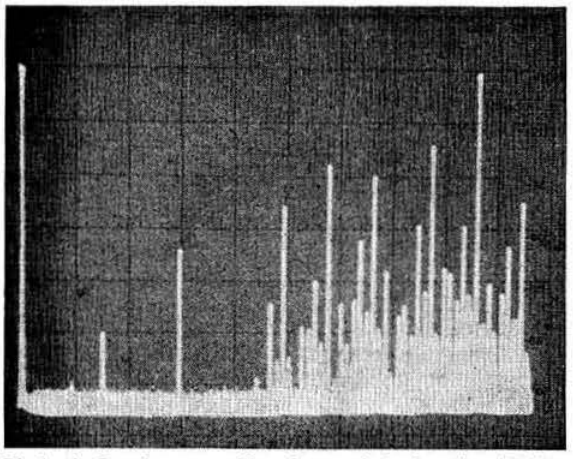


Photo 4. Spectrum resulting from mis-tuning the 435MHz tripler, 0–500MHz at 50MHz/cm

analyser via a waveguide attenuator of about 10dB and a waveguide coaxial adaptor. The attenuator is only used as a means of giving the quadrupler a good match at the final frequency. Alternatively, an isolator on 10·4GHz could be used but this is unlikely to be easily available. First modify the BXY40D diode as described in the next section and insert it in its copper screw holder.

Pencilling the diode

In order to provide the bias resistor for the final varactor without introducing losses due to external connection, the diode insulating surface must be made slightly conductive.

First, measure the diode backward resistance using a very low current source. It should be found to be very high ($> 100M\Omega$).

Next, shave off some graphite lead from a hard pencil with the aid of a razor blade and form a small heap of powder on a clean surface. Using tweezers, roll the diode ceramic body in the lead and rub the powder well into the corners round the metal seals using a matchstick.

Measure the reverse resistance, which should now be very low, around 100Ω or less. Using a cloth with carbon tetrachloride or other cleansing solvent, rub the surface of the diode, removing some of the lead. Re-measure the reverse resistance and keep rubbing off the lead until the resistance increases to around $10k\Omega$. This point is quite difficult to find, as one usually rubs too much away, the resistance then increasing to $100k\Omega$. However, the above process takes only a few minutes and it is essential if the best efficiency is to be achieved from the diode. Although this process sounds rather crude, the author has used it several times and obtained a stable and repeatable performance.

Tuning the final quadrupler

First, tune the input line for maximum output at 10·44GHz and then adjust the idler line again for maximum output. These two controls have a good deal of interaction and therefore several combinations need to be tried before the full maximum output can be achieved.

Next, adjust the sliding short circuit for maximum output and finally insert a tuning screw into one of the threads in the diode holder strip. The tuning screw should be tried in each hole. A second screw can then be tried in the remaining holes with some success, and possibly a third. Each tuning adustment has, unfortunately, a secondary effect on the previous one and so it will be necessary to repeat the process several times until the absolute maximum output can be obtained. This should be about 2 to 3mW from the quadrupler.

Connect the waveguide filter in place of the attenuator and check that the output with the filter tuned is reasonably clean, with no other harmonics at any significant level. Expand the analyser trace to give 10kHz/division and examine the fm noise on the signal, which should be >65dB down at 10kHz bandwidth. Adjust the oscillator coil and doubler in the 2·6GHz source for best results consistent with the circuit not pulling the crystal off frequency.

Finally, with the aid of a frequency counter loosely coupled to the 145MHz output coil, check that the frequency is 145·0000MHz ±1kHz. Adjust the oscillator coil as above until this is so. Remember that 1kHz error at 145MHz means that the final frequency will be in error by 72kHz. If the error is 20kHz and the source is used in a narrow-band receiver tuning 2MHz, it may well end up missing the band altogether!

Alignment using simple equipment

The constructor is first advised to read through the previous paragraphs on alignment to get the idea of the method involved. The alignment up to and including 70cm can be achieved using any available test equipment, and a contact with a local amateur on 435MHz (or 432 using another crystal) will soon show that a clean signal is available. The author has used a similar low-power transmitter as a 70cm talkback which worked more than adequately during a microwave contest.

A high-Q break or filter is essential for the alignment of the 2·615GHz section. A suitable design is shown in [3] complete with dimensions which are easily changed for 2·6GHz. This design requires no setting up, providing the measurements are accurately followed, and is of sufficient bandwidth to perform satisfactorily. A diode detector and dc amplifier can then be used after the filter for the alignment of the lines and matching circuits of the $\times 6$ multiplier. At 10·4GHz, a filter can be made to the design given in [2].

The previous procedure is then followed for the final quadrupler alignment except that the filter is used during the alignment, and a diode detector and dc amplifier is used as the power detector. (A dc amplifier will be necessary as it is unlikely that sufficient power will be obtained before alignment to produce a deflection on even a sensitive micro-ammeter connected directly to the diode.)

If 2-3mW is produced at 10·4GHz it is unlikely that the varactor multipliers are operating wrongly. As can be seen from Photo 4, any break-up of the signal is accompanied by a loss in output at the correct frequency. A kick on the detector meter followed by a sudden drop in power while adjustment is in progress indicates that break-up has occurred.

Conclusion

The aligned source can now be used instead of a Gunn diode oscillator in any previously-built equipment as either the receiver local oscillator or low-power transmitter. With a 72·5MHz crystal the 10GHz band frequency will be 10·440 GHz which is the local-oscillator frequency required when tuning 10·368 to 10·370GHz with an i.f. of 70 to 72MHz. An i.f. of 69 to 71MHz will give a 1MHz error margin for stations aiming at 10·368GHz.

The crystal frequency required for use as a transmitter is 72·000MHz. Modulation can be applied to the crystal oscillator by connecting a varicap diode via a 2pF capacitor between earth and the collector of TR1. If the diode is now fed with 1V of audio via a 100kΩ resistor, sufficient deviation at 10GHz will result even for wide-band operation! The transmitter frequency could also be tuned by a varicap diode in a similar manner, using a dc voltage.

The unit can also be made to work at around 8GHz by tuning the final varactor cavity to the third harmonic of the 2·6GHz source instead of the fourth. Much better efficiencies will result and the final 8GHz frequency could then be used to triple to 24GHz.

References

[1] "The G3TDZ portable 2m transmitter, mk4," J. R. Hey, G3TDZ, *Radio Communication* January 1973.

[2] 3cm filters designed by G8APP, *Radio Communication* August 1973, p560.

[3] *VHF-UHF Manual*, 2nd ed, G. R. Jessop, G6JP, RSGB. □

An aerial splitter unit

(*Continued from page 611*)

output impedance, which means that some of the out-of-band signals are not going to be attenuated as much as they were before, this problem may become more obvious. A good test is to attenuate the cathode-follower *output* and see if the problem clears up. If not, the coupler itself is being overloaded.

4. Again, because of the constant low-impedance output, it may be found that the aerial tuning unit works better than it used to at certain frequencies.

5. For the same reason, it may appear that the coupler is actually giving gain at some frequencies if the signal strength is compared with that obtained without the coupler. It cannot actually do this, of course.

6. The frequency response of a single coupler is flat to well over 40MHz, but it will fall slightly if a number are coupled in parallel due to the added capacitance. □

A compact medium-powered linear amplifier

(*Continued from page 613*)

sides are made from one piece of aluminium, and then the valve bases fitted, together with decoupling capacitors, RFC2, etc. This sub-unit can then be bolted to the main chassis after completion, together with the pa screening compartment and necessary components. The cabinet was constructed of one piece of aluminium 5in wide and 35in long, bent into a "U" shape, 10½ by 14 by 10½in, with a front panel of 14in; ½in flanges are then bent top and bottom. The smoothing capacitors are held in the cabinet by a strap, after first being insulated by polythene sheet (except C7).

Operating notes

With the pa valves operating in a grounded-grid configuration and plenty of decoupling, no instability has been noticed, and the amplifier is easy to load, as follows. With a dummy load switched in, the pa should be driven to about half-scale deflection (375mA) on the input current meter. With C22 at maximum value, C21 should be resonated, and then loading should be carried out in the usual way with C22.

The author uses a Yaesu FT200 transceiver for drive, keeping the output well down. The microphone is a Shure 444. Reports on the air have been very good and it is felt that there is no need to employ the use of a speech processor, with the risk of distortion, flat-topping, intermodulation trouble etc. This precaution also reduces the duty cycle and increases the life of the line-output valves used in many modern transceivers. A microphone with a rising response, normal alc and a linear should produce a signal with enough punch and clarity to be heard through QRM.

Comparative reports received after switching R9 in and out have been interesting, varying from "no difference" to "a great improvement in talk power", but at the moment R9 is left shorted out.

The linear has been in use now for over one year, with the original components still working well. □

TECHNICAL TOPICS

by PAT HAWKER, G3VA

USUALLY it is no compliment to call someone pragmatic, with its overtones of dogmatism, officiousness and pedantry. Yet it is at the same time the doctrine that estimates assertions by their relevance to practical experience—and that surely is a safeguard against ideas based on over-simplification of theory. In practical radio communications we could usually do with more rather than less pragmatism, at least in its meaning that we should take notice of what actually *happens*.

The classic myth is the belief that a low swr always means a "good" aerial and a high one always a "bad" aerial. Walter Maxwell, W2DU, has beautifully illustrated the fallacy of this by pointing out that it is often possible to *lower* the swr on coaxial cable used to feed a grounded vertical (monopole) by *reducing* the number of radials and thus increasing ground losses; this loss resistance then adds to the rather low feed-point impedance, resulting in a better match but poorer results!

Another myth that appears frequently in print is the notion that there are certain optimum heights for horizontally-polarized dipole aerials; ie more low-angle radiation when the wire is an exact multiple of a $\frac{1}{2}\lambda$ high. A slightly more sophisticated version recognizes that "true earth" is often several feet below the surface but still advocates the exact electrical $\frac{1}{2}\lambda$ height. If you have ever been tempted by this theory to lower an aerial—forget it and stick to the pragmatic idea of the higher the better. By and large you will get better results at any distance; and if you doubt my word for this re-read G6XN's excellent articles on "Gains and losses in hf aerials" (*Radio Communication* December 1973, January 1974). *Sloping* aerials of course are another matter.

The very low aerial

What may turn out to be yet another version of this theory—the lower the better—seems to be rapidly gaining ground among military communicators. There is of course a solid basis for the idea that a very low dipole, a few feet above ground, radiates mostly at a very high angle of radiation and can thus be used effectively in the 50 to 200-mile range. An aerial between 7 and 20ft high can be very useful and can often be superior to whip aerials for medium distance working from sites among trees and buildings. For portable operation it is much easier to carry supports for a low dipole than a high one; as G6XN has shown convincingly you can, if you want to, also get good low-angle radiation from such an aerial by making use of ground slope. So far so good, but increasingly one finds writers going even further and making a positive virtue out of necessity and claiming that low aerials will give you *better* results in the 50–200-mile range than a higher dipole, ignoring the fact that a low aerial is likely to waste more power in heating up the ground (dielectric losses) or from absorption generally.

A recent article by Ross Bell of Collins Radio (*Telecommunications*, March 1975) along these lines, and advocating dipoles of less than 0·35λ above ground, has been brought to my notice by R. Skelton, 6Y5SR. However, it includes a rather interesting form of balun and tunable coupling technique: Fig 1. The tuning components consist of a series capacitor (phasing reactance), a shunt capacitor, and a shunt inductor made from a two-wire line shorted at the base (ground), and with the inductance varied in steps by adjusting the length of the line by shorting switches across it. The inductance is fine-tuned using the shunt capacitor. Typically the aerial is 20ft above ground and is intended for operation throughout the range of 2 to 15 or even 30MHz. In military operation the coupler is fully automatically tuned to any frequency in a matter of seconds. But I would still like to know if it really gives better results than a similar aerial at say 30 or 40ft!

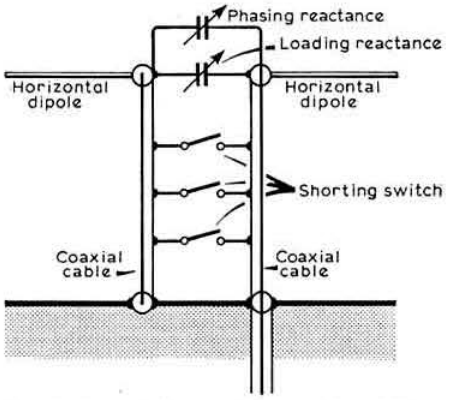


Fig 1. Low horizontal dipole with an outline of the coupler which is used to provide automatic frequency tuning throughout the hf band. The shorting switches in effect vary the inductance provided in the balun; the inductance is fine-tuned using the shunt capacitor. Typically the coupler efficiency is about 50 per cent at 2MHz and 80 per cent at 4MHz. Collins Radio have a 3kW coupler of this type, tuning any frequency in the 2 to 30MHz band in a matter of seconds

A low trapped aerial

But one useful outcome of this present interest in very low aerials is that it shows that, *when necessary*, acceptable results can be achieved with hf aerials only a few feet above deck (sometimes even when laid along dry earth).

For example, S. Beauchamp, G3SYD, wonders whether the idea shown in Fig 2 may be of interest to others who, like himself, have insufficient space to erect a full-sized aerial or a local authority refusal of permission to put up *any* aerial in the garden. Basically it is half a trapped dipole, with the radiator running along the side of the house only 6ft from the ground and only 3ft from the 7ft-high garden wall. It cannot be seen from the road. Without any atu it provides acceptable results on 3·5, 7 and 21MHz, with an swr of no more than 3:1 on 14 and 28MHz.

The requirements include a very good earth stake (G3SYD

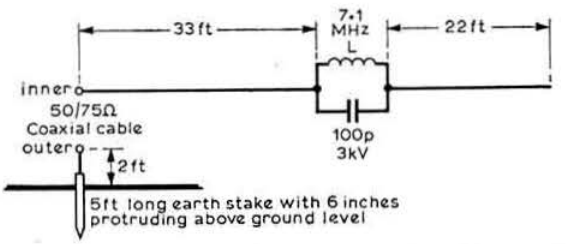


Fig 2. G3SYD's "invisible" aerial about 6ft from the ground and running alongside a 7ft garden wall gives him a 3·5 to 30MHz capability

uses a 5ft length of ½in copper pipe) and a 7·1MHz trap made from 12 turns of 16swg wire on a 1½in former (wire-diameter spaced) and tuned with a 100pF 3kV wkg capacitor, about 56ft of 28/0·0076 plastic-covered wire (or 14 swg hard drawn copper wire). Feeder length should of course not be critical, though G3SYD mentions that he avoids equal ¼λ lengths. The trap coil is weather-proofed with polyurethane varnish (well coated) and the connections between the aerial wire and the trap coil are made with connectors from "chocolate strip" connectors.

I would suggest that if anything other than QRP is used with these very low aerials, some thought should be given to ensuring that nobody gets rf burns off the wires, and that there is the usual rf choke as part of the pi-coupler to ensure that even under fault conditions no ht can possibly reach the aerial.

Incidentally, in *QST* (May 1975) Don Walters, WA8FCA, points out that inexpensive high-voltage capacitors for aerial traps can be made very simply from short lengths of coaxial cable which can then conveniently be bent around the inductor. He suggests that, for example, RG58/U cable will handle all the voltage likely to be encountered at operating powers up to about 100W.

Changing polarization

With the present mixture of vertically- and horizontally-polarized aerials for vhf fixed and mobile operation, the question of polarization coupling loss (ie the loss that occurs when receiving vertically polarized signals on a horizontally polarized aerial and vice versa) can loom very large. Mike Cooper, GW8JOJ, in some experiments with GW8GPX over a distance of 10 miles on 144MHz using a 10-element transmitting aerial and a dipole receiving aerial, measured an average coupling loss of 17dB with losses sometimes being as high as 30dB. These figures are in line with those found in vhf and uhf television practice.

So, he wondered, how should he mount his domestic beam? On 144MHz, horizontal polarization has the edge for dx operation, but vertical polarization is customary for mobiles and repeaters. The possibility of 45° slant polarization presents the problem that some stations may slant the other way. Circular polarization is attractive, though involving a 3dB power loss when received with linear polarization. His solution is shown in Fig 3 and consists of the ability to rotate his Yagi beam through 90°. The boom is held to the mast by two plates supporting three roller bearings. The boom is held horizontally by the tension of a spring. By pulling a cord at the base of the mast the boom is pulled against the spring to the vertical plane and the cord tied at the base of the mast to hold it in this position. Stops are fitted to ensure 90° rotation. Exit polarization coupling loss.

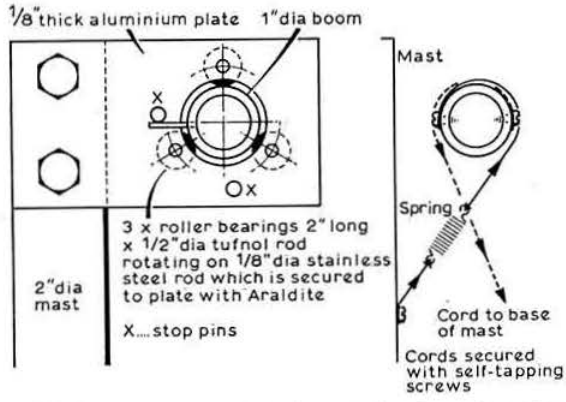


Fig 3. GW8JOJ avoids polarization coupling losses by swinging his 144MHz beam aerial through 90° to give him vertical or horizontal polarization

High-frequency indicator with LED

The use of a light-emitting diode as a low-cost indicator is noted in a short item by F. Maters, PA0FMY, (*Electron*, May 1975): Fig 4. Again, this looks a useful little gimmick to have around.

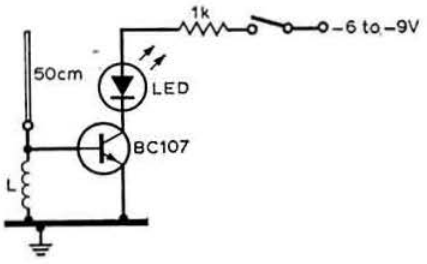


Fig 4. Simple high-frequency indicator by PA0FMY using an LED as indicator

Ground planes—pros and cons

Recently out of interest we counted up the totals of the various types of aerials reported in use by stations contacted on 14MHz over a few weeks and found that the ground plane emerged as a clear winner; twice as many stations gave it as their aerial as gave "dipole", and many more than most other types. Even if one counted the W3DZZ trap dipole and other variants as dipoles, the difference became less pronounced, but nevertheless the ground plane still led the field.

The reason is probably the mechanical simplicity of the ground plane and its suitability for use in limited space. One also suspects that there is a widespread belief that a vertical aerial results in low-angle radiation (a belief that can be justified only in conditions of good earth conductivity).

This brings us to a report from Ted Burgis, G6FB, who has carried out over a fairly long period on 14 and 21MHz a comparison between a dipole 22ft high and a conventional four-radial ground plane with the feed-point also about 22ft above ground.

He finds: (1) the dipole always gives an S-point advantage in the broad directions of its lobes, though the ground plane scores off the ends of the dipole; (2) the swr on the dipole changes after rain and it is possible (by assuming that wet grassy earth is a good conductor) to estimate fairly well the electrical height of the dipole by reference to the standard feed-point resistance versus height curves in the handbooks. Very little variation of the swr occurs with the ground plane.

This has led G6FB to question the efficiency of the four-radial system and he wonders if it would be better to use more, noting that up to 120 ground radials are used by the BBC and IBA for medium-wave operation. While it is true that the four-radial system is of limited efficiency, I suspect that on 14MHz and above it would not make a very significant difference to add radials to a raised ground plane, although certainly the creation of really good earth mats is important on the lower frequency bands and where using several verticals to form an array.

The very strong signals from East European stations using ground-plane aerials also suggest that in many cases they radiate a good deal of the energy at high angles.

12 to 24V inverters—another approach

As a result of the note on G8ADP's 12 to 24V inverter (*TT*, June 1975) several comments have been received, with two readers—Trevor Beamond, G3VLF, and Mike Collingwood, G3WKV—both suggesting, as a result of experience, that an even simpler and potentially more efficient approach is to use a voltage doubler in conjunction with a normal 12V transformer winding.

G3VLF uses this with the drive circuit, protected by diodes, originally suggested by Roy Hartkopf in *Electronics* (reprinted in *TT*, November 1970 as "improved dc/dc converter") as shown in Fig 5. He notes the following: (1) Only two diodes plus smoothing are all that need to be added to a basic converter; (2) The diodes clip any high voltage spikes which may be generated by leakage inductance in the transformer so that the choice of transformer is widened greatly (an audio-output type can be used); (3) the transistors do not over-dissipate even if oscillation ceases, and they are also switched off better with the drive circuit shown. The feedback winding can also drive external equipment as long as it is floating.

G3WKV points out that the voltage-doubler arrangement can be added to almost any existing inverter, merely by the addition of two diodes and a large-value capacitor, with no feedback resistors to absorb power. He has used this system successfully on a modified Hudson a.m. transmitter to supply the transistor modulator. As the Hudson has an unusually low frequency inverter, a rather large smoothing capacitor was needed (1,000μF, 30V) but smaller-value capacitors could be used with normal frequency inverters.

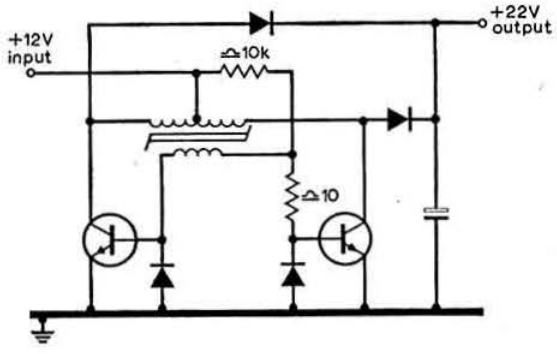


Fig 5. G3VLF uses this inverter to provide 22V output from 12V supplies. The diode-protected drive arrangement was described in *TT* in November 1970

Transformerless inverter

Barry Priestley, G3JGO, recalls that a design in *Electronics* (21 March, 1966) provided 72V dc from an input of 24V dc without using *any* transformers. The principle is to chop the dc and then to feed the pulsed signal into a voltage multiplier in a flexible arrangement: the basic outline but not the square-wave generator is shown in Fig 6. The input transistor is turned "on" at the same time as all other are "off".

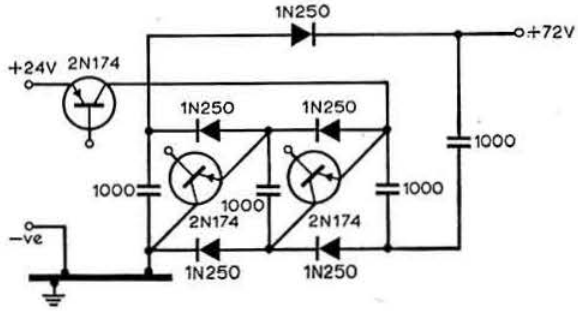


Fig 6. Voltage multiplier arrangement used with a switched-mode transformerless dc inverter (driven by square-wave generator)

Audio agc on an RA17L

There is still a great deal of useful work to be done in the area of more effective signal processing in receivers, including the up-dating of the many now ageing but still high-grade receivers that are increasingly becoming available to amateurs as professional users re-equip with all-solid-state models. One possibility, for example, is the addition of audio-derived agc to models designed basically for a.m. reception.

Douglas E. Taylor, BRS31770, has a Racal RA17L receiver which he uses for both ssb and a.m. reception, obtaining better audio quality by taking advantage of the availability of the 100kHz i.f. output socket to utilize phase-lock loop demodulation techniques.

He is also, however, now very successfully using the Plessey SL621C ic audio agc generator in a way that indicates how such devices can be used without having to make major modifications to the receiver: Fig 7. He writes:

"If an audio signal is taken from the loudspeaker socket and fed at suitable level into an SL621C, it matters not if the signal derived from the receiver's envelope detector is intelligible a.m. or unintelligible ssb *without* carrier reinsertion; in either case the ic will provide an appropriate dc output. A 741 operational amplifier ic can be made to invert and amplify this dc signal, which can then be fed into the receiver's agc line via a suitable diode. The point at which this audio-derived agc overrides the receiver's normal agc is controlled by the audio volume control, which in my case had become redundant since the actual audio output comes from the new pll demodulator and amplifier.

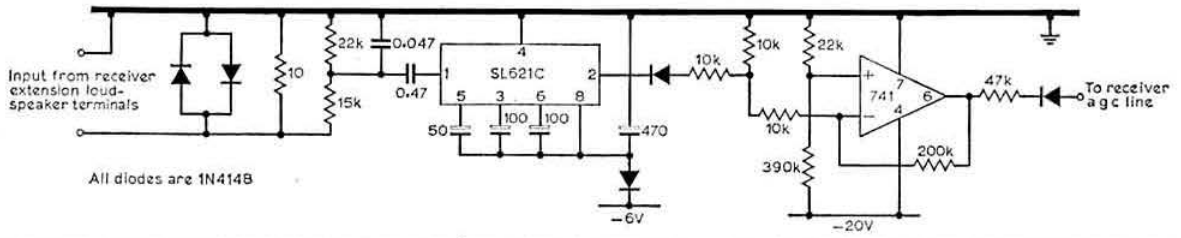


Fig 7. Arrangement used by BRS31770 to provide audio-derived agc for a.m. and ssb reception on RA17L receiver in conjunction with 100kHz phase-lock loop demodulation

"The receiver can now be used in the agc mode when listening to either ssb or a.m. An advantage when listening to a.m. is that the effects of selective fading are further reduced, since although the pll demodulates such signals, receiver overload is greatly reduced since signal level can be held at any predetermined level. One can tell by looking at the S-meter when the system detects that only sideband(s) are present and treats the signal as dsb with reduced or no carrier."

Solid-state/valve transmitter interface

Mike Small, G4DVI, has sent along details of the arrangement he uses to interface an ssb exciter module based on the Plessey SL600 series of integrated circuits with the valve linear amplifier driver in his hf transceiver which has a 6146B output stage. This has been air-tried on 3·5 and 14MHz but G4DVI believes it would work equally well on other bands up to 28MHz.

The interface problem is to increase the 50mV or so of rf output from the ssb module to about 1 to 3V to drive the 12BY7A while using only a 6V "ht" rail and avoiding the use of any tuned circuits. The solution proved to be to use a SL611C as a wideband rf amplifier giving some 26dB gain and feeding this output to a 2N2218 medium-power rf transistor in the cathode of the 12BY7A: see Fig 8. The valve and the transistor are located in separate boxes joined by about 1ft of coaxial cable.

R3, in conjunction with the two 1kΩ resistors feeding the base of the 2N2218, defines the valve current. R4 determines the total gain of the valve/transistor pair. R1 and R2 set the 12BY7A grid 1 slightly positive, giving a collector voltage for the transistor of about 8V positive. The negative feedback provided by R4 ensures stage linearity.

The following notes will be found helpful in maintaining stability:

(1) R_S is essential as the output impedance of the SL611 is negative at some frequencies.

(2) The input admittance of the device is also negative at some frequencies; this can be dealt with by a 1kΩ shunt across the input.

(3) Avoid common earth impedances between input and output circuits of the SL611C.

(4) Do *not* use a driver valve having a suppressor grid internally connected to its cathode (eg EL84).

TVI and the brain

At the recent Montreux TV Symposium an interesting paper by T. Dvorak (ex-OK1DE) and P. de Bruyne of the Swiss Institute of High Frequency Electronics at Zurich on "Brainwave response to broadcast and television interference" presented some preliminary results of work being carried out on measuring the electrical brainwave responses to various degrees of impulsive interference at low repetition rates. One point that has already emerged clearly is that a viewer or listener who has not been forewarned to look out for interference just does not notice this at levels at which a forewarned observer readily detects it. I suppose the moral is not to go round your neighbours asking them to tell you if you are causing tvi! □

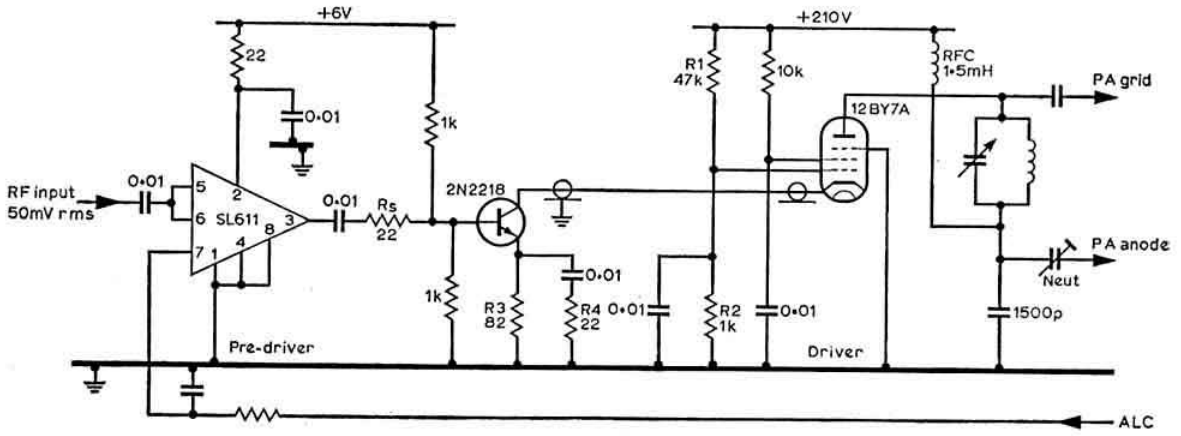


Fig 8. G4DVI uses this interface arrangement between an ic ssb exciter and the 12BY7A driver valve in an hf ssb transceiver

Sporadic-E observations in 1974

by R. A. HAM, FRAS, BRS15744*

UNDER normal atmospheric conditions, the regular stations within the range 30 to 100MHz are easily identifiable, and the inter-station frequencies are normally quiet. However, when sporadic-E is present a variety of Continental radio signals may be heard throughout this entire range. At the author's observatory the early warning of sporadic-E is the appearance of television sync pulses from a Russian transmitter on 49·75MHz. This signal is also usually the last one to fade away at the end. A 50MHz dipole feeding an Eddystone vhf communications receiver is ideal for observing the additional signals which can be heard throughout the lifetime of sporadic-E.

The 1974 incidence of sporadic-E began early during the evening of 17 April and ended 122 days later around midday on 16 August. During this period sporadic-E reflections were observed on 37 days, compared with 71 days in 1973.

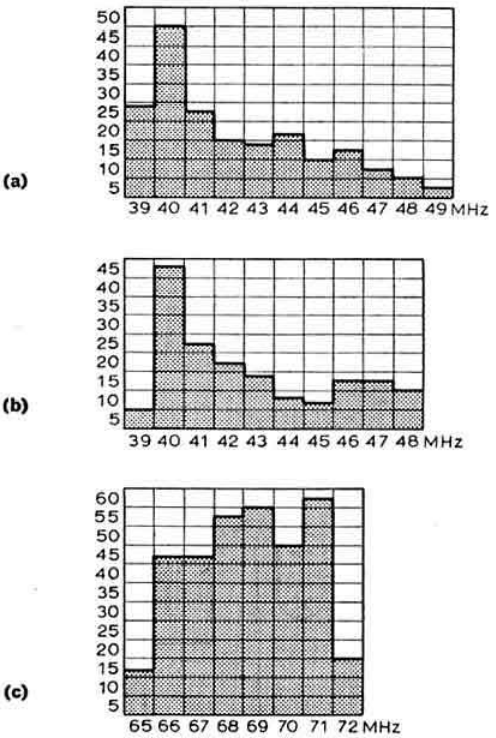


Fig 1. (a) European radiotelephony stations heard vs frequency. (b) Electronic devices heard. (c) FM stations heard

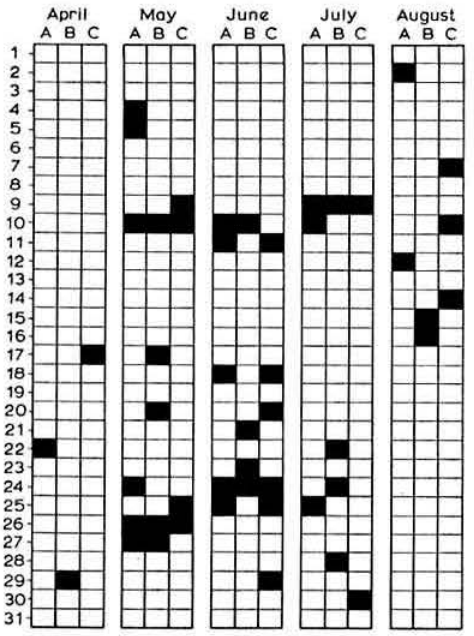


Fig 2. Incidence of sporadic-E during 1974

The signals heard can be classified into the following three groups:

European radiotelephone stations

These two-way radiotelephone signals are obvious to the observer without his knowing the language being used. Fig 1(a) shows the distribution of these radiotelephone signals heard by the author during the 1974 period.

Electronic devices

This is the general term used to describe the host of buzzes, tones, teleprinters and various beacons which appear between 39 and 50MHz when the E region is disturbed. Fig 1(b) illustrates the radio-frequency distribution of these signals which were heard by the author during 1974.

Continental broadcast stations

On 18 of the 37 days the influence of sporadic-E was extended to 73MHz and the signals from many East European fm broadcast stations were reflected towards the United Kingdom. Fig 1(c) shows the radio-frequency distribution, and the number of times that these signals were heard via sporadic-E. These broadcast signals are normally very strong in the UK while the sporadic-E is present, but are subject to deep and sharp fading shortly before the start and the finish of the event.

The 18 days when sporadic-E influenced the frequency range of 65-73MHz are listed below, and the figures in parentheses are the number of days that this range was affected during the 1973 period.

April	17	(0)
May	5, 9, 10, 20, 24, 25, 29	(2)
June	10, 11, 23, 24, 25, 29	(13)
July	9, 30	(5)
August	10, 12	(9)

* Faraday, Greyfriars, Storrington, Sussex.

The author's observations were made at approximately 0800, 1230 and 1830gmt, and the sporadic-E events recorded during these daily observations are indicated by the filled squares in Fig 2 headed A, B and C respectively.

A most spectacular sporadic-E event occurred on 9 July. From early morning until mid-evening the radio frequencies from 20 to 90MHz were disrupted, and at times the influence of sporadic-E extended to 150MHz. For most of the day approximately 45 fm broadcast stations from Eastern Europe and Russia could be heard between 65 and 75MHz, and during the afternoon very strong broadcast signals from Poland and Finland were heard between 90 and 100MHz. It was a unique experience to hear one broadcast signal fade and another take its place as the E region changed its structure and its direction of influence on the radio signals in the 4 and 6m bands.

The author would like to thank Igor Hajek of the Lancaster University language department for listening to tapes and identifying the following list of countries from which broadcast stations were recorded during several sporadic-E events:

Bulgaria	Poland
Czechoslovakia	Romania
Estonia	Spain
Finland	Sweden
Hungary	USSR
Italy	Yugoslavia
Norway	

This list will give a general idea of the distance that a radio transmission can travel when it is being deflected by this sporadic ionization within the Heaviside layer of the earth's upper atmosphere. □

Encapsulating oscillators in clear cast resin

by M. N. CORBETT, G4BIY*

MOST readers will have seen the attractive ornaments made from clear cast resin, and some may have already experimented with this rather fascinating material. By a simple chemical process it is possible to cast almost anything in what looks like a glass block. A similar but opaque material is used in the construction of eht trays for colour tv circuits so its insulating properties must be good. Even a good transistor or fet oscillator is very subject to mechanical disturbance when the output is multiplied up to 2m, and any measure which reduces this problem seems worthwhile.

A trial device

As this article is more concerned with casting, no circuits are given as most constructors will have their own well-tried designs. The test oscillator was based on the G3PDM Vackar circuit from *Amateur Radio Techniques*. This was built on a pcb measuring about 1¼in by 2¼in. No mechanical fixing of components was required, thus construction was quick and easy. The prototype unit was brought onto the correct frequency and carefully tested, allowing for the fact that stability would not be particularly good at that stage. As the coil would later be completely embedded in the resin no core was used, and thus the final frequency was left slightly high so that there would be a margin for external padding and, if required, a temperature-compensating capacitor.

Casting

A rectangular mould was used, this being obtained from the shop supplying the resin. For the circuit chosen, four lead-outs were required: supply, earth, output and tuning capacitor, which had to be external along with the padder. For best results only a small amount of external padding was used, the larger capacitance being included within the casting. Stout wires were brought out at the top and these formed firm connecting points when the resin set.

The resin was activated by a hardener, the quantities for the mix being given in the manufacturer's instructions. The oscillator was placed in the mould while still working, and the mix poured in to ¼in above the highest component. It is interesting to note that the unit continued to function during this process and that the frequency did not shift as much as expected. In most cases initial hardening takes between one and three days, by which time it is normally possible to remove the unit from the mould, but complete hardening takes up to two weeks.

Results

The test oscillator was brought onto the correct frequency and subsequent tapping of the resin block did not affect the note received on 2m. A sudden draught had no effect either. The two remaining causes of drift were short-term warm-up of the transistor junction on switch-on and any mechanical disturbance of the tuning capacitor. If a good component is used and mounted on a stout metal plate then this can be kept to a low level. A flexible coupler to the drive mechanism is also desirable. Junction-temperature changes can be kept to a minimum by running the transistor with as low a supply voltage as possible. Finally, experiments can be made with the external padding to include a small amount of temperature compensation.

There can obviously be many variations on this theme. Better stability might be achieved by using varicap control, which would also be ideal for tuning a receiver unit from a remote point or forming the basis of an fm transmitter. As the oscillator units are cheap and easy to produce, it is a good idea to make two identical ones so there is a spare available in case of failure.

The technique could also be applied to aerial traps, loading coils and any other application where a weatherproof assembly is required. Once used by the radio amateur, clear cast resin will surely find a permanent place in the shack.

Clear cast resin is made by Isopon Inter Chemicals and is available from hobbies shops. For further information contact Isopon, Duxon's Turn, Maylands Avenue, Hemel Hempstead, Herts. □

* Ivy Cottage, Barham Green, Ipswich, Suffolk IP6 0QQ

FOUR-TWO-SEVENTY

by MARTIN DANN, G3NHE*

DX news

Peter Cutler, G3DAO, has received a QSL card from LZ1AB, confirming his sporadic-E contact with the Bulgarian station on 1 June last. During the same opening LZ1AB also worked G4BPY, G3NSM, F8IR, F6DTE, F2YT, F8NS, F1BMB and F9XG.

From a portable location near his home in Alford, Aberdeenshire, Iain Petrie, GM8BRM, worked his first Norwegian stations during a lift on 27 May, when he had QSOs with no fewer than 18 LAs direct, and five via repeaters. All contacts were on fm using an IC225 and a ground plane aerial 4ft above the ground.

During one of several useful tropo openings on 432MHz recently, G4AHH of Towcester found that the 120mW output from his 70cm driver was sufficient to raise a couple of PA0s, good contacts resulting.

A very loud signal just above 432MHz at around 2015gmt on 10 June turned out to be PA0SSB just concluding a successful e-m-e contact with VE7BBG. Regretfully, the writer cannot claim to have heard both sides of that QSO.

During the RSGB Microwave Field Day, 21/22 June, conditions on 70cm lifted nicely late on Saturday evening, and early Sunday morning. Tipped-off by G3LQR, who was at one time hearing three Danish and one Swedish beacons on 70cm, the writer noted good signals from a beacon he had not heard of previously, OZ6MBA on 432·45MHz. The beacon faded out around 0830gmt, although G3LQR reported hearing it for much longer.

The prolonged high pressure over the country during the latter part of June and early July brought the expected good conditions, especially up to the north-east. Loud signals from LA were to be heard on several evenings on 2m, and LA4P was active on 70cm. Graham Knight, GM8FFX, in Aberdeen, noted that LA3RP and LA3EQ were doing very well on ssb, and LA8OJ was a strong cw signal on 144·046 MHz. On Monday 30 June, using just 1W p.e.p. ssb, Graham worked G3LQR, PA0VV, DK1KO, DC1XC and DL0NY, all on 432MHz.

On the same evening G3NHE again heard good signals from the 70cm beacon OZ6MBA, and S9+ signals from OZ3GW and OZ6OV, as well as from several PA0s, although, strangely enough, signals from the south of England were down on normal. It was possible to work through the linear repeater PI3UHF quite easily, and at one time a five-way contact developed between PA0VTW, PA0EHL, G8EOP, G8BCL and G3NHE using the 432MHz input.

A sporadic-E opening occurred on the morning of 2 July, giving those lucky enough to be on the band some choice dx. At 1000gmt, Mike Naylor, G4CDF, of Scunthorpe (ZN37d), noticed that the tone of the Meldrum tv sound on 58·234 MHz was T6. At 1030gmt he heard LZ1BW in QSO on 2m cw, then LZ1AB calling CQ. A QSO resulted, 599 out and 589 in, followed at 1043 by YZ1EXY (KE13j), 539 out and 559 in. The opening then faded for a while, but built up again to give Mike a contact with HG3KGL/P (IG59d), signals being at the S8/9 level. No dx was heard other than on cw despite several CQs on ssb. Later, at 1300gmt, G4CDF heard the 2m ZB2VHF beacon at S9. Mike runs a home-built transverter with the full legal input on cw to an 8-el Yagi 30ft agl.

Beacons

GM4DGT (Alloa) reports peak signals of S3 from GB3SU, which he receives 90 per cent of the time. He has also heard the odd glimmer from the Sussex beacon which, considering the distance and the fact that the GB3SX rf is radiated by a halo, is very good going.

Details of the refurbished Sussex beacon are kindly supplied by G3FET who, together with G3DME, is responsible for its rejuvenation. It is located 1·5 miles south-west of Crowborough, Sussex, in AL71c, some 600ft asl with the halo mounted 50ft above ground. The transmitter runs 28W input on a nominal frequency of 70·685MHz (currently about 2kHz high) and the keying mode is A1. G3FET is not happy with what he feels has been criticism of the beacon service, pointing out that the aim has been to improve the coverage of GB3SX: this object has certainly been achieved.

G3OUF in his "70MHz and up" column in the *BARTG Newsletter* reports the possibility of two UK beacons radiating rtty test signals in the future. The first could be GB3SX on 4m which, after the callsign on cw, would send the callsign and QRA on rtty. The other beacon is GB3GEC, now operational again on 432·1MHz from Borehamwood, and following the callsign on fsk, the idea is for the beacon to send a short RY call, callsign, QRA, QTH and transmitter and aerial details on rtty. G3OUF points out that adding rtty keying to a beacon would not affect its normal function, but would add to the beacon's value by providing a 24h signal for the checking and setting-up of rtty equipment. It would also allow the study of vhf/uhf rtty reception over long paths, and make possible the investigation of the propagation of this mode by meteor scatter.

It is hoped that GB3VHF will be back on the air by the time this appears, after having been switched off for modifications. G3COJ explains that low-level spurii (50-60dB down) were being radiated either side of the main transmission, causing QRM to local stations. These took the form of broadcast signals from the 25m band, and the mechanism of their generation is a mystery. However, G3COJ is taking the opportunity to swap the 4MHz crystal for one on 72·075MHz, thus cutting out the long multiplier chain.

Further to comments about the frequency of the beacon DL0PR in June's *Four-Two-Seventy*, DL1FL (International Liaison Officer for DARC) sends us more information about future plans for this beacon. It is at present run by the Ionospheric Research Institute at Lindau/Harz but is expected to be transferred into the care of the Schleswig-Holstein district of DARC next year, after which the beacon will be moved to the new 144·9MHz allocation.

* 49 Windermere Court, North Anston, Sheffield S31 7GJ.

Seventy centimetres

Despite finding the level of activity poor on 70cm, G3BW of Whitehaven, Cumbria, is achieving good results on the band. Bill now has a 68-el Multibeam up at 42ft, and a Microwave Modules 432MHz transverter into a 2C39C driving a 4CX250B. He confirms the activity of GI3JLA on the band, having recently worked him.

We know of several skeds running on 70cm, although there are doubtless many more, about which we should be interested to hear. A nightly get-together between G3KMS (Bolton), GD2HDZ (Laxey) and G3BW takes place around the sideband channel at 1045pm. G3KMS also has a nightly sked at 11pm with G3JVL (Hayling Island), although this is primarily to set up a 23cm contact. Also with a view to transferring to the higher frequency are Monday evening skeds around 432·2MHz between G4BEL (Cambridge), G3DY (Peterborough) and G3NHE at 8pm; G4BEL and G3KAC (Bristol) at 8.30pm; G3KMS and G3KAC at 9.15pm, and between G3NHE and G3KAC at 1015pm. At 8.45pm on Mondays there is a long-running sked between G8FMK (Thame), using 1W output, and G3NHE, the frequency being 433·33MHz.

Little use has been noted of 432·3MHz as the ssb calling channel, and CQ calls on that frequency have brought no reply. Undoubtedly the second change of calling channel within a short time has caused some reluctance to move, and there could also be a tendency for everyone to wait for someone else to make the first move, but there should be few stations who find any difficulty in moving 100kHz up the band on either 70cm or 2m.

Four metres

The Cambridge University expedition station GM4CIK/P livened up 4m at the beginning of June, but in doing so brought a mild protest from GM4DGT of Alloa. Bill, happily recovered from the collapse of his mast—while he was up it—last December, finds it ironic that he had rarely heard any activity south of the border until beams were swung north for this expedition. He now finds that there are many workable G stations, and is thinking of mounting an expedition to England—to erect sign-posts indicating which direction is north!

GD2HDZ and GD4BEG, who so ably represent the Isle of Man on 70MHz, have now been joined by GD3UMW, who hopes soon to increase the low power he has been using to get him on the band.

Expeditions

The Brentwood School ARS will be active from the Lake District between 22 August and 1 September. They will use a Liner 2 and have the callsign G4EAG/P.

G3XDY, G3ZSS and G4CVI will be heading for Scotland where they hope to activate a number of counties between 31 August and 14 September, using ssb and cw on 4m, 2m and 70cm. The final itinerary will unfold as the trip progresses, but the starting point will be Selkirk. Operating frequencies and times will be 144·27MHz from 1800-2000bst; 432·3MHz from 2000-2130bst; 70·2MHz from 2130-2230bst, the callsigns being GM3XDY/P, GM3ZSS/P and GM4CVI/P respectively. Sked requests for 4m and 70cm only should be sent to G3XDY, QTHR.

The Oxford University Radio Society's summer dxpedition this year will be to Guernsey, from 28 August to 9 September, when 4m, 2m and 70cm cw and ssb will be used during the evenings. The callsign used will be GC3OUR/P, and sked requests (4m and 70cm only) can be sent to G4BIX, QTHR.

Awards

Supreme Award No 10 was earned by GD2HDZ when he submitted the necessary 6 + 60 cards for 70MHz Senior Award No 26. Congratulations are due to Arthur, whose own QSL card must have been included in so many claims for FMD Awards.

144MHz Transmitting: No 446 to G2BLA, No 447 to G8GAU and No 448 to G8JKX.

70MHz Senior Transmitting: No 25 to G3FIJ and No 26 to GD2HDZ (see above).

70MHz Receiving: a special welcome to the roll of FMD Award holders to BRS34348, Harold Meerza of Chatham, who secures certificate No 5 for a spell of concentrated listening during the April contest. Harold expresses his thanks to the transmitting members who helped him achieve an 84 per cent return rate on SAEs sent out.

432MHz Receiving: within weeks of the above, Harold Meerza turned in the necessary cards for award No 5, again through intelligent contest listening during the May event. This time his sae return was 75 per cent, and these two awards are an example to other listeners of what can be done by intelligent listening and QSLing during vhf contest events.

Microwaves: No 18 to GM8HEY/P for working GW4BRS/P on 18 May to establish a new UK record on 10GHz of 322km from Auchenmalg Bay in Wigtown to Porthgain in Pembroke, by super-refraction; No 19 to Ken Hutchinson, G(W)4ALN/P, for working GM(GD)3OXX/P on Snaefell from Llangollen over a path exceeding 150km, this also on 10GHz.

Miscellany

The departure of Joe Ludlow, GW3ZTH, who emigrated to South Africa in mid-July, does not mean that Joe will be giving up his interest in vhf, even though he will have to resort to the hf bands to keep in touch with his friends in the UK. Joe's valuable contributions to the vhf scene in this country will be missed, and we wish him well in his new life in South Africa. The UK distribution of the German vhf magazine *Dubus* has been taken over by GW3NJW, to whom any enquiries should now be addressed.

Home Office approval has been received for both the Barnsley (GB3NA) and the Birmingham (GB3BM) repeaters. It is understood that the Barnsley repeater is being tested in the beacon mode before being put into operation.

A small group of amateurs in the Newcastle area would like to hear from anyone interested in the formation of a repeater group for the Tyne and Wear area. The person to contact is Paul Bigwood, G3WYW, QTHR (tel Newcastle-on-Tyne 33351).

A note from the GW3UCB contest team of G4BRT, G4BRK, G8DMJ and G8HZV explains the unfamiliar voices modulating this station during the 144MHz Portable Contest; the aforementioned quartet were busy scoring points in their final year examinations!

That is all we have space for this month; the deadline for the September issue is immediate, and for the October issue items should reach G3NHE by 10 September. □

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

IN the June issue of *Radio Communication* the latest Region 1 Band Plan was published. At the Warsaw conference it was suggested that all member societies should draw members' attention to the recommendation that 3,500–3,510kHz (cw) and 3,790–3,800kHz (phone and cw) should be reserved for intercontinental working. These frequencies should not be used for local contacts when propagation is suitable for long-distance working.

It was also suggested that special note should be made of the preferred sstv operating frequencies 3,730–3,740kHz; 7,040–7,045kHz; 14,225–14,235kHz; 21,335–21,345kHz and 28,675–28,685kHz.

Observation of band plans, while not obligatory, is an indication of mature and skilled operating.

DX news

W4BRB has informed G2MI that he has logs for VP7BC (1974 CQ WPX Contest), and also access to the 6Y5BF logs for the same time. Anyone needing QSLs from either station should apply to Gene. F2QQ reports receipt of over 2,000 QSLs for FY7AA, FY0BHI and TK7YAA, and will QSL as soon as the logs for contacts since January are received. Contacts with VP2VL between 24 March and 18 May may be verified via W1GNC.

Fr Dave Reddy, CE0AE, alleges that contacts with stations using that callsign between 1966 and 1971 should not count for awards as his callsign was the only CE0AE issued by the Chilean authorities. His own QSLs are red and white and were sent out by WA3HUP, with the exception of a few for contacts made between 30 May 1970 and 26 March 1971 when he used some others with his signature "Dave".

9M2DQ's expected visit to the UK did not take place as Jim was too ill to make the trip. Enquiries may be directed to G6RC.

Norman Price, 9G1DY, is moving to Sierra Leone after 19 years in Ghana. He has plenty of 9G1DY QSLs and these may be obtained by contacting him at Barclays Bank of Sierra Leone, PO Box 12, Freetown, Sierra Leone. He hopes to have a 9L1 call soon.

ZL1AJU is reported to have had a VR7A licence for two years and says that he will visit the Central and Southern Line Is group if and when they are accepted for DXCC listing. VK2BKE, Lord Howe Is, has been reported at 0600 on 14,265kHz.

As mentioned in a previous *MOTA*, a net of VQ9s meets at 1100 on Sundays on 28,550kHz. UK callers are welcome. It seems that WA6HNQ/VQ9 is now using the callsign VQ9Z.

VU2ANI, on Andaman Is, has been active around 14,210kz at 1500 recently. AP2KS is operational on all bands 3·5 to 28MHz and prepared to keep schedules. W9CTY hopes to be on the air from Nepal during September. OE5CA/YK will be in Syria until September, and is often to be found on or near 14,295kHz between 1900 and 2100; he also uses 21,295kHz.

HC8GI is said to be listening for European signals on 14,338kHz most days from 1230. QSLs go via W3HNK.

Ev, K4VW/TI2BEV, will be ZF1VW again from 15 to 23 August and specially looking for European contacts; his wife ZF1YL will be with him. All QSLs go to W4MYA wef 1 June 1975. ZF1JE cards now go via WA3SZI.

UA1JJ/M has been heard on 7MHz cw and giving his QTH as Molodezknaya Base, Antarctica, in ITU Zone 69.

H31AC was HP1AC using the special prefix for the ITU contest. QSLs go to PO Box 9A-737, Panama 9A, Panama. Some YS stations used the HU prefix to celebrate the Miss World Contest. The prefix block C7A to C7Z has been allocated by ITU to the World Meteorological Association.

GC4CHY has returned to Guernsey from university on the mainland, and will now be active on 14MHz.

News from overseas

Leigh Smith, P29LS (G4CFK), has written from Port Moresby, Papua New Guinea, to report that the local amateur group P29MO (ex-G3VMO), P29EM, P29FV, P29BG, P29ZMJ and P29WB, entered the 1975 Australian Field Day using the callsign P29PNG/2 and came top of their category. Three stations were used, a Drake 4 series and linear plus 14AVQ aerial on 14MHz, an FT101B plus linear and 18AVT on 28 and 7MHz, and another FT101 with dipole for 21, 7 and 3·5MHz. Leigh says that interference from Japan causes problems when trying to contact Europe, but he hopes for assistance from an improved aerial soon. QSLs go to G4CHP.

Expeditions

WB2EZG will be in Monaco as 3A0GY from 8 to 20 September. Please QSL before 1 April 1976 to 1569 Richmond Rd, Staten Island, NY, 10304, USA.

OH5XT, OH5VS and OH5MJ will operate as OJ0MJ from Market Reef at the beginning of August (from 4, 5 or 6 August) for one week. CW and ssb will be used on all bands 1·8 to 28MHz; 144MHz may also be used. QSL to OH5MJ, Keskusk 14 B 24, 48100 Kotka 10, Finland.

GC2CNC will operate as VP2GEB from Grenada between 16 October and 7 November. QSL to his home QTH (23 Marett Court, Marett Rd, St Helier, Jersey).

Oxford University RS are due to be in Guernsey from 28 August to 9 September, and will be on 160m and vhf as GC3OUR/P.

Contests

The All Asian DX Contest

1000 23 August to 1600 24 August (cw section).
Rules as for the phone section (see June *MOTA*).

The DXOTC Marathon

0001 1 September 1975 to 2400 31 August 1976.
Telephony only, 3·5 to 28MHz. The rules are somewhat complicated and interested readers are advised to write to the Award Manager, IT9SEZ, Silvano Ameta, Via dei Nebrodi, 44-90144, Sicily, Italy, for a copy.

* 10 Knightlow Road, Birmingham B17 8QB.

John Axford, 9M2GV, in his shack at Malacca, West Malaysia. John uses a Swann 350 transceiver and has a 4-el quad at 75ft for 20m and a 3-el at 60ft for 15m. *G3WUW photograph*

Results of the **1974 CQ WW DX Contest** (cw section) are as follows:

SINGLE-OPERATOR

Callsign	Band	Points	Callsign	Band	Points	Callsign	Band	Points
G3FXB	All	798,814	G3MWZ	All	10,163	**GM3WRN**	14MHz	12,150
G3MXJ	,,	652,709	G3VLL	,,	9,150	G3UJG	,,	4,396
G3SXW	,,	263,514	G4DBW	,,	400	G5NK	,,	1,512
G3GRL/P	,,	213,490	**G2BOZ**	28MHz	3,655	**G3TXF**	7MHz	19,836
GC5AGA	,,	162,810	**G3RZI**	21MHz	90,240	**G3UKS**	3·5MHz	57,616
GI5YM	,,	162,324	**G3HCT**	14MHz	300,973	G3KWK	,,	50,700
GI3JEX	,,	108,405	G3KMO	,,	145,475	G3ESF	,,	42,351
GW3SYL	,,	105,504	G3KDB	,,	129,470	G4BUE	,,	25,380
G4ALG	,,	98,150	G3PVA	,,	51,980	**GM4AGG**	1·8MHz	11,118
G3ZQW	,,	54,120	G4BVH	,,	25,166	**GD4BEG**	,,	8,760
G2AJB	,,	40,377	G3JKY	,,	21,724	**GM3YOR/P**	,,	6,336
G3ZPK	,,	28,835	G8DI	,,	12,528	**GW3XNS**	,,	552
G3NAF	,,	19,006						

MULTI-OPERATOR, SINGLE TRANSMITTER

G3SSO	668,721	G4BTJ	171,304	**GM3ZRC**	77,085
G3GJL	195,360	G3NIS	146,028	**GW3UCB**	9,477

Congratulations to **G3HCT** who won the G2LB Memorial Trophy for top European score on 14MHz. **GM4AGG, GD4BEG** and **GM3YOR** were world second, fourth and sixth on 1·8MHz respectively.

Awards

The YZ-30 Award

For contacting 30 YZ stations between 2301 8 May and 2300 29 November 1975. Send certified list of log entries and three IRCs (before 21 January 1976) to: YZ-30 Award, PO Box 48, 11000 Beograd, Yugoslavia.

The Olympia Diploma

For contacting OE stations between 1 July and 31 December 1975. European applicants need QSOs with five (Class 1), or three (Class 2) Austrian stations, one of which must be an OE7. Send certified list and 14 IRCs to OE7JNI, Schubertstr 14, A-6020 Innsbruck, Austria. Listeners may apply.

The DIG Group Awards

The Worked German Large Cities, European Prefixes Award, Worked DIG Members, Worked DX-Stations, One Million Award, International Airport Award, and Two Modes Award are issued by the Diplom Interessen Gruppe (members must have some knowledge of the German language—further information from DL9XW). A leaflet giving details of these awards is obtainable from the secretary of DIG, Eberhard Warnecke, DJ8OT, 5620 Velbert 1, POB 10 12 44, Germany. Please include one irc and a gummed addressed label.

The Worked G-QRP-C Award

Awarded to anyone who has confirmed contact with at least 20 members of the G-QRP Club after 1 January 1975. Such members must have been using an input of not more than 5W at the time. Endorsements will be issued for each extra 20 members worked.

"ITU" callsigns

Many stations were active during the ITU contest, and *West Coast DX Bulletin* has provided a list to show the QSL addresses of the stations concerned. In each case the special prefix was followed by the "ITU" suffix:

KB1 – WA1RGW, KB2 – WB2YQH, KB3 – WA3MBQ, KC2 – K6SE, KC3 – W3CRE, KC5 – K5RLW, KD2 – WB2QYH, KD3 – WA3PZO, KD4 – W2GHK, KD6 – W6LS, KD8 – K8MFO, KD0 – K0SGJ, KE1 – W1DAL, KE6 – W6KG, KE8 – WA8TDY, KF9 – WB9BUV, KG2 – WA2DSA, KG5 – W5RTQ, KG9 – W9QWM, KH4 – K0CMF, KH6 – KH6BZF, KH9 – W9OHH, KI1 – WA1STN, KI2 – W2AJR, KI4 – K4YFQ, KJ2 – WA2NPP, KJ4 – W4WSF, KJ5 – W5TMN, KJ9 – K9UBF, KJ0 – WA0VDX, KK6 – WA9UCE, KL2 – WA2DSA, KL4 – K4ZA, KL5 – K5PFL, KL6 – W6DQX, KM3 – WA3KSQ, KM4 – WA4BKQ, KM9 – WB9LHI, KN6 – K6SDR, KP2 – W2ASR, KP8 – K8DYZ, KQ3 – W3AZD, KQ6 – WA6CPP, KR2 – WB2FLF, KR4 – K4ZCP, KR9 – K9UBF, KS1 – W1DHZ, KS2 – WA2UWA, KS7 – K7ABV, KS9 – WA9LZA, KT6 – WA6KZI, KT8 – WA8TDY, KU4 – K4DXO, KU9 – W9GC, KV2 – WB2NEB, KV8 – W8NR, KV0 – WA0KHF, KW5 – WA5WQF, KW8 – WA8TNJ, KX4 – W4QAW, KX5 – W5SBX, KX8 – W8GKM, KY1 – WB9CJS, KY2 – WB2FVO, KY6 – W6KYA, KY7 – W7GWU, KY9 – W9JUV, KZ3 – W3KT, KZ8 – W8BQV, WC1 – WA1RXC, WD2 – W2TUK, WD9 – K9YXW, WE2 – WB2JRX, WH9 – K9WEH, WI4 – WA4HPF, WI6 – WB6QBJ, WJ4 – W4ARL, WK8 – W8RSW, WL4 – K4KOB, WL6 – W6NLG, WL0 – W0HBH, WM2 – WA2AUB, WO1 – WA1POJ, WO5 – WA5ZNY, WP2 – WA2CCF, WQ2 – WB2GGM, WQ4 – WB4KZG, WQ6 – WA6PDE, WS4 – WB4SIJ, WS8 – W8LY, WT5 – WA5LES, WV3 – W3TRS, WV4 – W4IML, WV8 – W8BT, WW5 – WB5HOD, WW6 – W6KG, WW0 – WA0TLT, WX1 – W1MOJ, WX2 – WA2DSA, WX6 – WA6AUD, WX7 – WA7OBH, WX8 – W8VHY, WY1 – WA1QNF, WY4 – K4FOK, WY6 – WB6DXU, WZ3 – WB2EXK, WZ5 – W5KHP, WZ6 – K6VNX, WZ8 – K8LCU.

PP6 – PY6AM, PR2 – PY2AN, PR6 – PY6CO, PR0 – PY2DSE, PT7 – PY7AYE, PY2 – PY2ASA, XJ3 – VE3CDX, ZV5 – PY5YC, ZV7 – PY7NS, ZW8 – PY8EL, ZX2 – PY2DSQ, ZX6 – PY6TW, ZY4 – PY4AKR, ZY8 – PY8JO, ZZ6 – PY6SB, ZV0 – PT2JB.

Other special calls as follows: WH8TT – K8DAA, KM2USA – W2AJR, KU2SCF – W2AJR, WM2ARS – WA2CCF.

French international meeting of amateurs

At 10am on 15 August 1975 there will be a reception and meeting of radio amateurs on the top of Mont St Loup between Agde and Cap d'Agde on road D32E. Talk-in on 145·000MHz (a.m., fm or ssb) from 9.30am. WX fb assured. Further information from Alquie Marcel, Cité Bati Paume, Villa No 2, Route de Rochalongue, 34300 Agde.

Band reports

Apologies for the severe pruning of this section due to lack of space. Many thanks to the following for information supplied: Gs 2HKU, 3HB, 4RZ, 6GH, 3UYM, 4BTI, 4DFN; DA2WN; BRSs 17567, 17991, 35608; and As 7056, 8312, 8428, 8713 and 8752.

1·8MHz. 0000 *JY9FOC, PT9DM, W, VE, 4X4NJ.* **2300** *PY1RO.*
3·5MHz. 0000 CE, PY. **2200** ZS. **2300** ZE6JL, 9J2WR.
7MHz. 0000 *CE, FY7, YS.* **0300** *HK0AA.* **1900** *VK.* **2200** *OX, ST, VP2, ZS6, 5X5.* **2300** *A9, OA, 5Z4.*
14MHz. 0500 VE5-7, W6-7. **0700** KB6, VR1, ZK1, 3D2. **0800** FO8, *HM.* **0900** *FG7, JA.* **1100** VS9. **1300** *JT.* **1500** *JT, VS5.* **1600** *XW8.* **1700** JA, ZD7, *3B8.* **1800** HS. **1900** *VQ9.* **2000** *ZB2DF* (QSL to G3JZV). **2100** SU, VP2, YK. **2200** *CE0ZZ*, VK, VP2, W7. **2300** HK0AA, YB7, ZL.
28MHz. Many Europeans plus 5X5, VU, UK9, CE, PY, PZ, VP2, CN8, LU, YV, 5L2, 9Y4, HC, HK, TI, VE1, WA1 and W4 between 1400 and 2100.

Acknowledgements to all the publications listed last month. Please send all information for **September** issue to reach G3FKM by **4 August,** and for **October** by **10 September.** □

MICROWAVES ——— by DAIN EVANS, G3RPE*

Some regular contacts on 1·296GHz

G3WDG has sent in the following list of regular weekly contacts on 1·296GHz from the Bristol University station G3KAC. The signal strengths, given as report received/report sent, represent the average values over the last five months. Contacts with G3JVL and G3LQR are made directly on 1,296·2MHz, the others being made via 432·2MHz.

Mondays	Station	Location	Distance	Signals
2000	G3JVL	Hayling Is	134km	56/569
2030	G4BEL	Cambridge	211km	57/57
2115	G3KMS	Bolton	240km	569/439
2215	G3NHE	Sheffield	233km	549/229
Wednesdays				
2045	G3LQR	Suffolk	280km	449/449

The results of course are most striking, and are comparable with those obtained by G3JVL shown in the September 1974 column. They illustrate well the potential of this band when equipment of reasonable size is used—in the case of G3KAC the transmitter produces 40W of cw or ssb, the aerial is four 25-el quad-Yagis, and the receiver a G8ARM ring mixer (this column February 1971) fitted with 1N23WE diodes and preceded by two BFR90 preamplifiers.

On the other microwave bands

With the impressive amount of activity to be reported on 1·296GHz and 10GHz, the other microwave bands perhaps have suffered a little from the lack of publicity. So it is good to report that the less popular bands are beginning to be used, and hopefully the usual snowballing effect of activity will take place. News of any activity will of course be welcome.

G8AGN, who is based in Sheffield, has for some time been using simple wide-band equipment on 3·3GHz based on the "polaplexer" configuration. It employs a 726A klystron mounted on a length of circular waveguide constituted by a baked-bean can. He has worked G3PHO at 30km, G8DNF at 10km, and G3EEZ during the recent microwave contest. Other stations known to be active currently on this band are G4DRX (Chelmsford), G3WXI (Sheffield) and G3BNL (Bishop's Cleeve).

The 5·7GHz band has received little attention so far except from G3BNL and G3EEZ. However, G3WJG and G3THQ in the London area now have low-power wide-band equipment working, and probably two or three others will follow shortly.

The 2·3GHz band is a bit in the doldrums despite there being about 15 stations with equipment. This band has unfortunately adopted the "fixed-station" narrow-band philosophy of 1·296GHz (rather than the wide-band "portable" philosophy of the higher microwave bands), but not the idea of the relatively high-power equipment which now is proving so successful on 1·296GHz. As usual, the main problem seems to be the lack of precise design information rather than lack of interest, and perhaps the proposal of the Germans (DARC) at the recent IARU conference to sponsor this band will provide an effective stimulus.

The relatively new 24GHz band is also being neglected and only two stations (G3BNL and G3EEZ) are known to operate. The reason for this is not the difficulty in building the equipment—it is only slightly more so than the 10GHz equipment which many dozens of amateurs have been able to produce. Indeed, 10 stations produced equipment for the earlier 21GHz allocation. Presumably, the main obstruction is the restrictive licensing conditions imposed on this band only, in particular the need to obtain permission to operate at each and every site, which greatly impedes the testing and development of equipment as well as inhibiting what could be most useful experimental work.

A 2·304GHz signal source

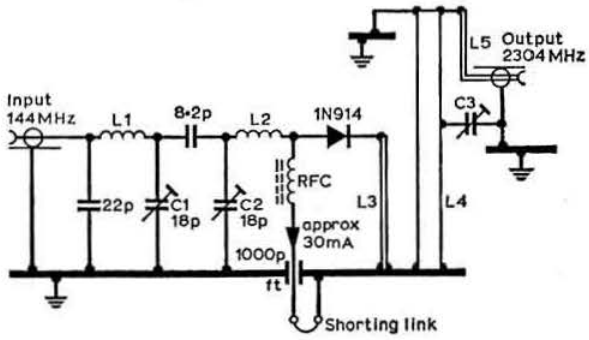


Fig 1. Circuit of a 144MHz/2·304GHz multiplier
L1: 4t 20swg enam copper ¼in id
L2: 5t 20swg enam copper ¼in id
C1, C2: 18pF tubular trimmer
RFC: 3t 22swg enam copper on ferrite bead
C3: 4BA screw in a nut soldered to pcb

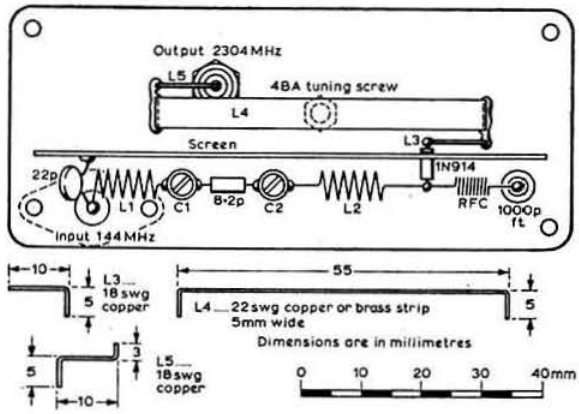


Fig 2. Layout of multiplier

G8ADP has supplied details of the 2·304GHz source he uses in setting up his equipment. The unit shown in Figs 1 and 2 is a ×16 multiplier which requires 300 to 500mW of 144MHz drive from an exciter such as the G8ARV design. The multiplier is built on a double-sided pcb which forms the lid of a standard 3·6 by 1·5 by 1·2in Eddystone die-cast box. It is aligned by applying the drive and tuning C1 and C2 to peak the diode current at about 30mA. The output line is tuned by the 4BA screw which constitutes C3. □

*4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

The sstv scene—summer 1975

by R. F. G. THURLOW, G3WW*

IT is estimated that approximately 150 radio amateurs in the UK holding Class A and B licences are now also permitted to transmit slow scan television in the 80, 40, 20, 15, 10 and 2m bands.† Basically, sstv is only the transmission and reception of audio tones between 1,200 and 2,300Hz on existing amateur equipment (a.m., fm or ssb), and displaying the received tones on a monitor, and it is hoped that this article may help to answer most of the questions frequently asked about it.

SSTV signals can be found worldwide around the international sstv frequencies of 14·230, 21·340 and 28·680MHz; up to December 1974 W8YEK had had two-way sstv QSOs with 100 countries, and over 16 months G3IAD has worked 84 countries and 46 states in the USA. Some European sstv, mostly DL, has been seen around 7·060MHz, but usually it is to be seen in the evenings around 3·735 MHz. The UK Sunday net from about 0730gmt is on 3·735–3·740MHz, and the HB9 sstv net meets on 3·735MHz at 0930gmt on the first Saturday of each month. In the UK sstv signals may be received within 150 miles of London from 2000gmt daily on 144·280MHz (144·5MHz when the new band plan is implemented), and there is other activity northwards. SSTV may also be received via the Oscars.

Slow scan television by B. J. Arnold, MA, G3RHI, and the USA *Slow scan television handbook* by D. Miller and R. Taggart are required reading for all interested in sstv. They are obtainable from British Amateur Television Club, 64 Showell Lane, Penn, Wolverhampton, Staffs. Monitor designs and circuits appearing in these books have been used successfully, as have MK Products kits, and cameras, converters and fly-spot scanners have also been built. Commercially, the Venus SS2 monitor is now available in kit form; Robot Research Inc of San Diego, California, (with Collins standard of sstv equipment) sell a modification kit to add fast scanning of camera output, and video analysis of incoming and outgoing sstv signals to their monitors 70A and 70B; a Japanese "Hamvision" monitor and camera have recently appeared in the UK, and another Japanese monitor at about half the usual price is expected soon; while a Spacemark Mark 2 monitor is also expected to be ready in the near future.

An sstv electronic keyboard built and designed by W0LMD was demonstrated at Dayton, Ohio, in 1973, and after details were published in *CQ* (Sept 1974) Howard Waton, G3GGJ, constructed what is believed to be the first such keyboard in Europe—all parts except the pcb made by W8OZA were obtained in the UK.

The chief disadvantage of sstv compared with commercial television are the 120–128 lines only and the 7·5s it takes to complete the picture, by which time the top half has almost disappeared. To overcome that, converters have been designed, and four were demonstrated at the 1974 Dayton "Hamvention". Each used digital storage techniques to convert an incoming sstv signal into a constant-brightness display on a standard USA 525-line tv set, and that by WB9LVI was considered the most outstanding. Details were published in *QST* (March, May 1975). Such converters have rendered the monitor using a long-persistence tube almost obsolete. This obsolescence is timely as the supply of 5FP7s diminishes rapidly. Anyone offered tubes "similar to" or "just as good as" FP7s should make certain of the real length of persistency to cover the almost 8s required.

At Dayton this year, three-dimensional colour sstv was demonstrated from a tape on a large commercial tv set, while Robot demonstrated their new storage tube slow-to-fast scan and fast-to-slow scan monitor feeding a "frozen" sstv picture into any commercial set. "Moving" sstv is promised for next year's "Hamvention".

This brief survey omits many facets of sstv practice and operation, but anyone whose interest has been aroused will find it worthwhile to obtain or build a monitor and actually see what those 3kHz bandwidth signals convey.

* 2 Church St, Wimblington, March, Cambs.

† This permission *must* be obtained from the Home Office.

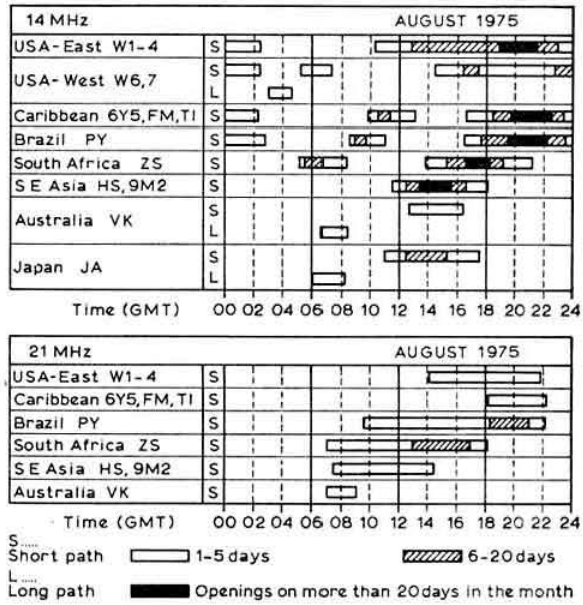
Propagation Predictions

Summertime conditions on the hf bands will continue during August, with practically no dx being possible on **28MHz,** but a certain amount of European short-skip on 28MHz and 21MHz will be made possible by sporadic-E. On **21MHz,** traffic with Africa and South America will be possible on days with above-average frequencies.

14MHz will remain the main dx band, although with summertime short-skip conditions, especially in the late afternoon and early evening, a certain amount of European QRM has to be expected, but there will be less interruption by the dead zone. With the approach of autumn, night-time conditions on this band towards the end of the month will be inferior compared with last month, and there will also be less possibility of dx via the indirect path because of seasonal changes. However, the path to South Africa will remain open longer on 14MHz towards the end of the month. Under favourable conditions traffic with KH6 will be possible on this band about 0630-0900gmt.

On **3·5** and **7MHz,** conditions will be the same as given for the previous months; 3·5MHz will be interrupted occasionally by the dead zone during the latter half of the night.

The provisional sunspot number for June 1975 from the Swiss Federal Observatory was 11·4 with solar activity concentrated into the last week of the month. On a number of days a zero figure was recorded. The predicted smoothed numbers for October, November and December are 6, 5 and 4 respectively.



INTERFERENCE

The principles agreed between the RSGB and the Post Office—and published in the May 1975 issue of *Radio Communication*—on the investigation of cases of interference continue to be the basis of agreement with the Directorate of Radio Technology of the Home Office.

Members are advised that instructions to close down while a case is dealt with are to be given *in writing* by the authorized officer and are operative from the day on which the instructions are first received, notwithstanding that they are given verbally. Members are asked to advise the Society if written confirmation is not forthcoming, so that the matter may be taken up on their behalf.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 22 April 1975

Present: Mr C. H. Parsons (*President, in the Chair*), Dr E. J. Allaway, Messrs R. J. Baker, P. Balestrini, J. O. Brown, R. W. Fisher, W. J. Green, L. E. Newnham, W. McGonigle, D. M. Pratt, W. A. Scarr, A. E. Smith, R. F. Stevens, D. M. Thomas and F. C. Ward (*members of Council*), G. M. C. Stone (*by invitation*), G. R. Jessop (*secretary and general manager*), A. W. Hutchinson (*editor*).

Apologies were received from Messrs J. Petty and D. Byrne.

Educational Visits Working Group

Mr Scarr reported that the first meeting of this group had been held and that the following proposals had been made:

(i) **Educational Visits Scheme**—terms of reference. To set up a permanent organization to arrange and supervise systematic visits to schools and colleges throughout the country for the giving of lectures, whereby interest in amateur radio will be stimulated among young people and new members recruited to the RSGB. The organization shall be known as the "RSGB Educational Visits Scheme"

(ii) **Pamphlet**—A suitably-descriptive pamphlet will be prepared for circulation to all regional and area representatives.

Financial Report

The Honorary Treasurer circulated an interim report for the first nine months of the current year. This showed a very serious deficit. The main causes were:

(i) Salaries: £3,074 over budget.
(ii) *Radio Communication*—£7,553 over budget.
(iii) Subscriptions—£6,754 below budget.

He commented that the salary situation was under control. The *Radio Communication* increase was partly due to the production of larger issues, and the VAT repayment could be set against this (as originally proposed when the increased size was agreed).

The subscription income was therefore the most serious factor. This was believed to be due to the failure to send out reminders for the September-December 1974 period, and after considerable discussion the general manager was instructed to remedy the situation before the next Council meeting.

Delivery of "Radio Communication"

The general manager reported that despite the considerable number of changes of address and corrections made since the beginning of the year, there was still a considerable volume of complaint from members who had not received *Radio Communication*. He believed that much of this trouble was due to reduced reliability of the postal delivery service.

Contacts had been made with the Post Office and willingness had been expressed to help resolve our problem, but to do this it was essential to provide suitable evidence. Of 300 copies that had gone astray in January and February, very few undelivered copies had been returned to headquarters.

The general manager undertook to record all complaints received for a month in order to establish if there was a pattern of poor service. However, he felt that the plain wrapper was unsatisfactory and suggested that a printed wrapper should be used to ensure that postal staff would be less likely to treat our journal as a "sales catalogue". This was agreed.

General manager's report

(i) **Repairs and maintenance.** The cost of the basement ceiling repairs was £234 and a further £60 had had to be expended in special cleaning.

(ii) **Staff and salaries:** Staff losses had taken place and the reduction in salaries effectively amounted to an approximate annual rate of £4,500. All staff were now Society employees: agency fees for the past nine months amounted to £1,476, but it was not expected that further expense of this type would be incurred during the next three months.

(iii) **Subscriptions**—The total income for January-March was £24,066, which was £540 over budget.

Additional Council meeting

It was decided to hold another Council meeting on 11 June 1975.

Membership and affiliation

It was resolved:

(i) to approve the applications for membership and accordingly elect 183 new members;
(ii) to accept reduced subscriptions from 50 members;
iii) to waive the subscriptions of 22 members on the grounds of blindness or other disability;
(iv) to approve life membership for three members.

Regional and area representatives

The general manager reported two late nominations for Region 6. It was agreed that a ballot for this region would have to be held.

Trophies manager

Council approved the appointment of Mr P. Miles, G3KDB, as the Society's trophies manager.

NFD—new Scottish trophy

Council appreciated the gesture of the Greenock & District ARC in offering a new trophy but regretted that no further trophies could be accepted; several other offers having reluctantly been rejected during the last few years in accordance with a previous Council decision.

Repeaters

A summary of the present situation had been circulated and another setting out the licence position was handed out at the meeting. Mr Stone reported on the repeater situation as he knew it, and the revisions to the band plans and the moving of 2m beacons to the middle of the band proposed at Warsaw.

Committee minutes

Council accepted the minutes of the following committee meetings: Raynet (11/7/75), Technical & Publications (4/2/75), Membership & Representation (10/2/75), Headquarters Location (13/2/75), Mobile & Exhibition (25/2/75), IARU (25/2/75 and 28/2/75), VHF Contests (30/1/75 and 27/2/75), Interference (28/2/75), VHF (12/3/75), Finance & Staff (13/2/75 and 13/3/75), Telecommunication Liaison (24/3/75).

Minutes of the 48th Annual General Meeting

The President reminded Council that the minutes of the 48th General Meeting having been circulated, it was necessary to approve them for publication. Council agreed that the minutes were satisfactory and authorized their publication.

OBITUARIES

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

Mr G. Esbjörnsson, SM2BZU

Gunnar Esbjörnsson died on 26 June, aged 33.

As an RSGB member, he had regular contacts with many amateurs in this country, and his voice was often to be heard reporting from the far north that "everything is fine and the sun is shining out of a perfectly blue sky".

Mr E. T. MacGowan, G3GAX

Ernest "Mac" MacGowan died on 10 June, aged 68. He had held a licence for about 25 years and was well-known to amateurs in Kent and Essex, mainly on top band and 2m. He had been blind for several years following an accident.

Mr H. Porter, G2YM
Harold Porter died on 27 March, followed shortly by his wife, Susan, who was also well-known in amateur circles. He was an active member of the Wolverhampton ARS, being president of that society from 1964 until 1968, when failing health forced his resignation, although he was active on the air for as long as possible subsequently.

Mr P. Rich, GW3KGD
Peter Rich died on 26 May, aged 42. Formerly VS1HZ while serving in the RAF, he later settled in Pembrokeshire and was active on the hf bands, and for the past two years on 2m ssb. A founder member of both the Pembroke and later the Haverfordwest radio clubs, his great character and tremendous sense of humour made him most popular on and off the air.

Mr S. Woolley, G8RQ
Sam Woolley, who died recently, was an active dx operator since pre-war days, although in the last few years he confined his activities to cw on 80 and 160m. He was a colourful character and very well known on the bands.

We have also been advised of the death of:
Mr V. M. di Napoli, WB2BBW/G5BAA.

The callsign of the late Mr R. McCreery, G3MWU, was inadvertently given as G3MWV in last month's "Obituaries". Our apologies to Mr D. G. Blake, G3MWV, for any inconvenience caused.

YOUR OPINION

The Editor
Radio Communication
Sir—I am secretary of our school's amateur radio society and I have recently tried to organize some entries to vhf contests. It has become very apparent to me, however, that we cannot compete with the slightest hope of a reasonable result. This is not due to any lack of enthusiasm, manpower, aerials or sites—it is the prohibitive cost of 2m ssb equipment. None of the six amateurs in the society can personally afford this type of rig, and the school itself cannot pay the large sum of money required. There is no doubt that amateur radio contests—vhf or hf—are now just a rich man's hobby.

Nobody would argue that 2m open, fixed and portable contests are effectively ssb ones, so I agree with the proposal that there should be several a.m./fm only vhf contests during the year. This would permit the schoolboy or student type of amateur, and his club, with crystal-controlled a.m. or fm and tunable receiver, to have at least enough chance to justify his making an effort to enter.

On a more general note, it seems that the 2m band is losing its old identity. It is now refreshing to work on top band where most people use home-made equipment, work cross-mode happily and do not just talk into an expensive plastic Japanese talk-box.

Simon Ruffle, G4EAG

The Editor
Radio Communication
Sir—There must be many articles, crosswords, cartoons, lecture subjects, etc that appear in local club newsletters which are worthy of a wider readership. May I, through your columns, suggest a scheme of article-swapping between club editors?

Any editor wishing to participate should send me his name, address and telephone number, together with a copy of his latest edition. I will prepare a rota, and post the whole collection of newsletters to another participant. He can then use any of the material to produce his next edition. He forwards the parcel, and so on, ending up back with me. On each subsequent circuit, each participant removes the old copy of his newsletter and inserts the new edition.

Provided that each club contributes *something* new, there would always be fresh ideas in the kitty. The cost? Just postage!

C. M. Eley, G8DNF/A
6 Barncliffe Drive,
Upper Fulwood,
Sheffield S10 4DE

The Editor
Radio Communication
Sir—Some time ago I underwent surgery for the removal of my larynx. This meant the complete loss of the normal voice, and a new way of talking had to be developed by injection of air into the oesophagus.

I believe that with practice this form of speech is quite acceptable over the air, and I am curious to know if any other amateurs have overcome this disability and got back on the air. It would certainly be encouraging to hear from anyone who has.

Harvey Collet, G3KI

The Editor
Radio Communication
Sir—Having admired the facilities of the Barlow Wadley portable receiver XCR30 for some time, and being impressed with the results on broadcast and amateur stations in Malta, I purchased one in London. It proved to be unusable in Wallington, Surrey; numerous spurious signals with very rough modulation appeared all over the tuning range. At first this defect was thought to be instability in the receiver and it was sent away for checking to one of the suppliers. They reported no problems and returned the receiver after realigning, but no difference was evident in Wallington.

Eventually it was discovered that the interference disappeared when BBC1 vhf transmissions on 45MHz closed down, and it became clear that the very strong signal from this station was getting into the circuitry and making the receiver unusable. The interference became less evident in Guildford and west thereof, but within range of Crystal Palace continued even in the middle of London.

The receiver is extremely well screened for a portable set and it became evident that one way to deal with the problem was to give more selectivity in advance of the first stage. This has now been very simply achieved by a preselector to which a separate aerial is attached, the rod aerial being kept fully retracted.

For those readers who do not wish to construct the preselector, a Hamgear Electronics DM2D has been tried with the Barlow Wadley and found to be perfectly adequate. In any case an extra bit of preamplification could be useful if the receiver were to be used in a ferro-concrete building, for instance, where signal pick-up could be effected by hanging the aerial out of the window and using the preselector before the receiver.

R. Clews, G3CDK

Special event stations

Greenwich Observatory Tercentenary, 2-16 August.
During August the Royal Greenwich Observatory at Herstmonceux Castle, Hailsham, East Sussex, will be celebrating 300 years of British astronomy. Licensed members of the staff will operate GB3OO for two weeks from 2 August during daylight hours on 80-10m and 2m. Talk-in on 80 and 2m. A special QSL card will be exchanged with all stations worked. Schedules and visitors will be most welcome. Enquiries to P. F. Cottrell, G4CLV, at the above address.

Town & Country Festival, Kenilworth, 23-25 August
GB3TCF will be operated by the Coventry, Rugby, Solihull, Stratford-upon-Avon and Mid-Warks clubs from the Royal Show Ground, Stoneleigh, near Kenilworth during this event.

Wycombe Show, 6 September
Chiltern ARC will operate G3CAR from the show on all bands 80-10m, ssb and cw. Details from A. C. Butler, G3FSN, tel 0494-24837.

Looking ahead

21 September—Southampton RSGB Group Convention.
28 September—2nd Welsh Amateur Radio Convention, Community College, Oakdale, Nr Blackwood, Gwent.
30 Oct-1 Nov—Amateur Radio Retailers Association Exhibition, Granby Halls, Leicester.
5 December—RSGB AGM, Royal Society of Arts, John Adam Street, Adelphi, London WC2.

CONTEST NEWS

April 1975 1·296GHz Open Contest results

Although the number of entries for this contest was good, more would have been welcome. Activity was high, with a lot of different callsigns on the logsheets. Calls for higher power levels and to continue 70cm talk-back have been made. Propagation was quoted as being poor to just above average, although some reasonable distances on the north-south path were worked. The winning station was a joint effort by G5HD and G3WDG at a 850ft asl site near Andover. G3JVL did very well from his 6ft asl QTH by working the best dx for this contest. Certificates will go to both stations.

G4CUT

Posn	Callsign	Score	QTH loc	Best dx	Km	Pwr	Aerial
1	G3WDG/P	1,612	ZL52C	G3KMS	261	60p	4 × LQ
2	G3JVL	1,559	ZK16F	G3RMS	332	10	4 × LQ
3	G4BEL	1,486	AM51B	G3JVL	192	60p	5ft dish
4	G3JQA/P	1,139	ZN61F	G4BEL	168	30	34-el
5	G3RMS	1,010	YN38A	G3JVL	332	15	32-el pb
6	G6XM	908	ZL22E	G3KMS	230	100	3·6ft dish
7	G4DDC/P	809	ZL18H	G3JVL	125	8	3ft dish
8	G4ALE/P	796	ZL77A	G4DDC/P	79	1·5	32-el pb
9	G4ALN	759	AL31C	G3WDG/P	126	5	LQ
10	G3RQZ/P	381	ZL60D	G3WDG/P	110	1	LQ
11	G8BAV	373	ZM03E	G4BEL	126	12	5·6ft dish
12	G3COJ	365	ZL37A	G3WDG/P	74	5	Colinear ?
13	G3NHE	353	ZN54B	G4BEL	150	8	34-el
14	G3HCW	250	ZN24C	G3JQA/P	80	5	25-el
15	G8CUI	225	ZN36H	G3JQA/P	82	10	LQ
16	G3NEO	207	ZN54B	G3JQA/P	53	10	23-el
17	G8EOP	205	ZN22C	G3NHE	45	40p	34-el pb
18	G8FMK	203	ZL26H	G4ALE/P	73	·4	14-el
19	G8HND	190	ZK15C	G3WDG/P	62	5	LQ
20	G3WHL	152	ZN35E	G3JQA/P	72	16	LQ
21	G8BXJ/P	129	YL47D	G3WDG/P	69	3	24-el
22	G3PHO	82	ZN53H	G3HCW	41	5	LQ
23	G3WJG	72	ZL28E	G4DDC/P	23	2	34-el
24	G8EPJ	47	ZK17H	G8HND	25	10	LQ

South Manchester DF Qualifying Round results

Ten teams assembled at the start, a layby on the A536 approximately three miles NE of Congleton, and this well-organized contest proved quite difficult. Good signals were received from both transmitters, and the majority of competitors chose the "B" transmitter first.

The "A" station G3FVA/P was operated by Dave Holland, G3WFT, from a ditch by the edge of a wood, about nine miles NW of the start. The use of a very long aerial with a "T" in along its length produced some very strange bearings which led competitors round in circles and, as neither transmitter had been located by 1600, an extension of the contest was announced.

The "B" station, operated by Rowland Parkinson, G3FNM, and Chris Scholefield, G8GDM, was situated on the steep slippery slopes of a hill overlooking Rudyard Lake, about seven miles from the start. The hillside was infested with small caves and very thick bushes, in one of which the transmitter was well hidden. The operators were surprised by the number of times competitors wandered up and down the hill with such cries as "Where the ---- are you?" Several teams went on the wrong side of the lake to a disused railway!

Messrs W. J. North and J. McBurney qualify for the final. Mr A. Butcher won the prize for "competitor from furthest afield". The South Manchester Club would like to thank the transmitter crews and all who attended, especially those who came from afar.

Posn	Name	Club	Time of arrival Station A	Station B
1	W. J. North	Chilterns	1626½	1503½
2	J. McBurney	South Manchester	1635	1506
3	T. C. Gage	Oxford	1639	1503
4	B. J. Mahony	Rugby	1448½	1642
5	R. P. Smith	South Manchester	—	1516
6	A. Leeming	Warrington	—	1516½
7	P. M. Williams	Slade	1518	—
8	G. Whenham	Coventry	—	1533½
9	A. W. Butcher	Chelmsford	—	1545
10	D. E. Newman	Rugby	—	1642½

Stratford-on-Avon DF Qualifying Round results

Sixteen teams assembled on Yarningdale Common for the start, many having travelled a considerable distance in spite of the present high cost of petrol. With this last point in mind, the contest had been designed to require less road travel than previous events held in the Warwickshire area. Perhaps as a result of this, both hidden transmitters were heard strongly at the start, and some competitors were misled into thinking that the stations must be close at hand, choosing rather unfavourable points from which to take their second bearings.

Station A, G3RPJ/P, was in fact 9km to the south, in parkland on the outskirts of Stratford-on-Avon. The map did not give any indication that the best method of approach was via a new housing development, and competitors chose a variety of approach routes mostly involving a long walk. The aerial system included a long wire fence, which also ran parallel to overhead telephone lines, and this made accurate bearings difficult to obtain. The operator was cheered at one stage to see two competitors take bearings and then run away along the line of the fence, but his pleasure was shortlived as almost at once two figures reappeared carrying rifles. Fortunately this was just a coincidence and not a recourse to desperate measures.

Transmitter B, G3ORI/P, was slightly more remote, being some 16·5km due east in a small but dense wood between a disused railway and the Grand Union Canal. This apparently "obvious" site proved more troublesome than expected, even to the transmitter crew. A small river ran through the middle of the wood, and the aerial system was arranged to straddle it. Unfortunately the depth of water and mud in the bed of the stream was deceptive, and a quantity was transferred to the inside of the operator's boots. The G3ORI transmitter was truly operated "barefoot" throughout the afternoon.

Messrs Tyler, Hawkins, Gage and North having already qualified to take part in the national final, by virtue of the dead-heat for sixth place Messrs Bristow, Butson and Newman now qualify (subject to confirmation). The contest was organized by Bob Vickers and Ian Cobbold who extend their thanks to Geoff Foster and G3OOQ for invaluable assistance in running the event.

Posn	Name	Club	Time of arrival Station A	Station B
1	P. Tyler	Oxford	1519	1420
2	B. M. Bristow	Oxford	1521	1432
3	M. P. Hawkins	Chelmsford	1442½	1528
4	T. C. Gage	Oxford	1541	1452
5	W. J. North	Chiltern	1541½	1451
6	I. R. Butson	Chelmsford	1542	1451½
	D. E. Newman	Rugby	1443	1542
8	G. A. Whenham	Coventry	1442	1553
9	B. J. Mahony	Rugby	1507	1605
10	C. D. McEwen	Chelmsford	1609	1456
11	A. Butcher	Chelmsford	1507½	1612
12	D. C. Holland	South Manchester	1630	1522½
	J. McBurney	South Manchester	1630	1522
14	A. J. Leeming	Warrington	—	1522½
15	G. J. Reason	Banbury	—	1604
16	P. Woollett	Dartford Heath	1606	—

DF Qualifying Round—Coventry

Date: 31 August 1975.
Map: OS Sheet 151 (Stratford-on-Avon) 1 : 50,000 series
Assembly: 1300bst for start at 1320bst.
Location: NGR 432617 layby on A425 approximately one mile east of Southam.

This event is being organized by the Coventry ARS and competitors requiring tea should notify Mr G. Whenham, Lavernock, Chapel Street, Bishops Itchington, Leamington Spa (tel 092-689 206), not later than 20 August.

Note This event is being run in conjunction with the Rugby Shield/Cup competition. The winner will receive the Rugby Cup and the highest placed Rugby RC member will receive the Rugby Shield.

South Manchester Triple DF Contest

Date: 17 August 1975.
Map: OS Sheet 109 (Manchester) 1 : 50,000 series.
Assembly: 1230bst for start at 1250bst.
Location: Layby on B5211 (on the left hand side if approaching from Stretford) NGR 781961.

No formal tea is being arranged but intending competitors are asked to notify Mr D. C. Holland, 7 Alcester Road, Sale, Cheshire M33 3GW (tel 061-962 2803).

80m Field Day 1975 rules

Members owning low-power portable 3·5MHz equipment are invited to take part in this contest. Generators and armies of operators are not allowed, so in this contest groups large and small start all square.

1. The general rules for RSGB hf contests, published in the January 1975 issue of *Radio Communication*, will apply.

2. When. 0900gmt to 1600gmt, Sunday 14 September 1975.

3. Eligible entrants. Multi-operator entries will be accepted. A maximum of two operators per station will be allowed.

4. Contacts. CW (A1) only in the 3·5-3·6MHz band. The location (place name) of the station must be sent. The WAB number is not sufficient.

5. Scoring. 15 points for contact with another portable or mobile station, five points for a contact with a fixed station.

6. Power. The maximum power input to the pa stage must not exceed 10W. The power for all parts of the station must be derived from dry batteries or accumulators; the practice of "float" charging is not permitted.

7. Trophy. The Houston-Fergus Trophy will be awarded to the winning station.

8. Logs. Record the exchange of RST and serial number commencing with 001. Column (5) should be headed "Location of station contacted".

9. Entries must be addressed to the RSGB HF Contests Committee, c/o A. M. Smith, 21 Hamsey Green Gardens, Warlingham, Surrey CR3 9RS.

Comments and suggestions regarding the rules and the future of this event are particularly requested.

1975 BARTG Contest results

The number of logs submitted was just less than last year, but the number of contacts made by the leading stations was very high. The major part of the inter-continental traffic was handled on 20m; 10m, and to a lesser extent 15m, were not usable for most of the time. European stations made most use of 40m and 80m.

Of the 86 entrants in the single-operator section, six were UK stations; G6JF, posn 36; G3ZWW, 54; G3RDG, 59; G3FRV, 65; GW8IGG, 82, and G8LT, 83. G3IIR was the only UK representative among the seven multi-operator entrants, while D. R. Hare, BRS27239, was the sole UK listener in the swl section of 10 entrants.

6th World RTTY Championship results

This year the championship was organized by the British Amateur Radio Teleprinter Group (BARTG), and the group nominated W3EKT as "World Champion of RTTY". Six contests were taken into account when arranging the final placings, which resulted in 257 transmitting entrants and 19 SWLs. Among the transmitters, UK stations were placed as follows: G3WMI, 66; G3ZWW, 92; G3RDG, 104; G6JF, 135; G3OUR, 137; GW3IGG, 156; G3YDR, 160; G8LT, 166; G3IIR, 171; and G2FKO, 248. UK SWLs were P. R. Winchester, BRS25676, No 6; D. R. Hare, BRS27239, No 7; and J. Whymark, BRS35211, No 11.

Contests calendar

9-10 August	—European DX Contest (CW)
10 August	—70MHz Portable (Rules in June issue)
23-24 August	—All Asian CW Contest
30-31 August	—SSA 50 Contest
31 August	—DF Qualifying—Coventry
6-7 September	—VHF NFD and SWL (Rules in March issue)
6-7 September	—IARU Region 1 VHF (Rules in May issue)
13-14 September	—European DX Contest (Phone)
14 September	—80m Field Day
21 September	—DF Final—Slade
5-6 October	—RSGB UHF Open and SWL (Rules in May issue)
12 October	—21-28MHz Telephony (Rules in May issue)
18-19 October	—7MHz CW (Rules in June issue)
25-26 October	—CQ WW DX Contest (Phone)
26 October	—70MHz Fixed (Rules in July issue)
1-2 November	—144 MHz Open
1-2 November	—7MHz Phone (Rules in June issue)
8-9 November	—2nd 1·8MHz
16 November	—432MHz Open
29-30 November	—CQ WW DX Contest (CW)
7 December	—144MHz Fixed

Longleat Mobile Rally

One of the stalls at the City of Bristol RSGB Group's mobile rally at Longleat on 29 June. The attendance was over 5,000, and in mid-afternoon 2,166 cars and 12 coaches were counted in addition to 50 tents and caravans. Displays were provided by the Post Office and Royal Signals Regiment, and societies represented included RSGB, RNARS, RAFARS, RAIBC and the British Red Cross. All raffle tickets were sold and the 128 prizes collected. The walking df hunt drew a large entry, and was won in 12 min. Visitors came from all parts of the British Isles, and overseas visitors included 9G1ILZ, HB9AZX, F6DCW, VK3YET, VK6ZFL, VE6ANO, WB2WOZ and ZD7PS. Twenty-seven dealers were present.

The organizer thanks all those without whose help the rally would not have been such a successful event, the Marquis of Bath for allowing it to take place in his grounds, and the dealers and visitors who supported it. *Photo:* G4AJD

Mobile rallies calendar

3 August —Woburn Rally, coach park, Woburn Estate. Details in July issue.

10 August—Bromsgrove Mobile Picnic, Avoncroft Building Museum. Free parking. Bring picnic meals. Talk-in on 160/80/2m. All the usual attractions. Details from J. K. Harvey, 22 Elm Grove, Bromsgrove B61 0EH. Tel 76941.

17 August—Derby & D ARS Rally, Rykneld School, Bedford Street, Derby. From 12 noon. Talk-in on 2m and top band. Admission and parking free. All the usual attractions, including a monster junk sale. Details from G3FGY, QTHR.

24 August—Torbay ARS Rally.

31 August—Preston ARS Mobile Rally, Walton-le-Dale County Secondary School, Brindle Road, Bamber Bridge (M6 Junction 29). From 11am to 5pm. Talk-in on 2m and top band. Trade stalls, bring and buy, refreshments, ample parking. Secretary G3ZXC, QTHR.

31 August—Pembroke & D RSGB Group "Bucket & Spade Party", Regency Hall, Saundersfoot. Talk-in on S20 fm and 144·30MHz ssb. The President of the RSGB, GW8NP, will attend, as will a member of the West Wales Repeater Group. Further information from GW4AKO QTHR.

21 Sept —Peterborough R & ES Mobile Rally, Walton School, Peterborough. Talk-in on 160m and 2m. Details from G8GNV, QTHR.

21 Sept —North Ulster Group Rally, Castle Grounds, Antrim. Details from GI8AYZ, QTHR.

28 Sept —Harlow & D ARS Rally, Netteswell School, Harlow. Details from G8JXU, Mark Hall Barn, Harlow, Essex.

MEMBERS' ADS

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 50p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

The closing date for each issue is the 1st of the preceding month, but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

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

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.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

Post to: MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE

FOR SALE

Collins F455J-2.1 ssb mechanical filter with data, £12. Two Reslo miniature ribbon mics type RB with desk stands, new, £10 each. G3LLL rf clipper as new, £30. G3LWH, QTHR. Tel 02514 22374.

Selling to pay rates: station package deal: FT101B, KW107, Yaesu lp filter, Yaesu mobile whips, trap dipole, Telomast plus rigging, nearest £475 secures. G4CTB, QTHR. Tel Penryn 3240.

B44 MkII tr/tx. New and unmod, £5. Old HRO rx, tabletop, needs attention, with four coils, ps, £5. Buyers collect after 1820. G3KTN, QTHR.

KP12 RF clipper, £42. KW107 Supermatch, £50. Foster DF50B mic, £4. Shinwa lp (50Ω) filter, £6. Six PL509 tubes and bases, £3. Rees Mace Marine gen cov rx 50kHz–33MHz, eight ranges. Offers. G4CCZ, QTHR. Tel Ashford, Middx 59853 after 6pm.

Everett Edgecumbe 3kV electrostatic meter; RCA modulation transformer 900763 (PP 805 to 2 × 813); Premier transformer 2·5V 10A; Woden DT1 driver transformer; Woden 20H 60mA choke; Set 80 FT241A 20·0 to 27·9MHz; 50/55pF 25kV vacuum capacitors. BC453A Q5er; mains BC221AJ (modulated) with charts; Magslip 2½in transmitter AP6550 rx AP6549; Manuals for American test gear; 200 valves pre/post war 2V, 2·5V, 4V, 5V, 6·3V tx and rx types. SAE lists. *Wanted:* Labgear LG300 mod/pu. G6ZH, QTHR. 01-405 3434 ext 7679.

TH3Jr and AR22 rotator, £35. Buyer collects. G3GGK, QTHR. Tel Madingley 374, evenings.

KW2000 tx with ac psu, fb cond, £100. Tel Ashtead 74733 after 7pm. G2FSA, QTHR.

Collins ht transformers 1,200V 383mA primary 200–250V 50Hz, £6. Coaxial sockets UHF83/SO259, five for £1. Add a little for postage. G8ACF, QTHR. Tel Orford 328.

EA12 rx fb cond, £120. KW Viceroy, £45. Tiger 200 tx, £20. *Wanted:* KW 600 linear. G2QT, QTHR.

Eddystone S870 150kHz–18MHz simple gen cov rx WO with carrying case, £10. Murphy B40C Admiralty pattern 640kHz–30MHz vgc, £40 ono. Keith A. Oliver, Cagebrook Mill, Clehonger, Hereford, HR2 9TQ. Tel Madley 369 evenings.

Complete kit for linear amp inc pair 813s 2,250V power supply and LG300 cabinet with new front panel, £40. Buyer collects. Harmonic indicator Band 1 professional finish ideal for tvi, £10. Three Belling-Lee hp filters, £2 each. G3HVA. Tel Tadley 4445.

"Rad Comm" 1964 to present, £2 per year or £15 complete. Tel G3TRG, 021-558 2634.

KW202 rx plus spkr, £130. Prefer callers. Reason, going transceive when morse test passed. Poole, 50 Warren Road, St Ives, Huntingdon, Cambs PE17 4NW. Tel 0480 65308.

KW E-Zee match and filter, £15. Electronic keyer Dentsu Seiki DA1, £10. Two electronic keyers, £3 each. Trans CT750 125mA, £3. Trans CT350 500 1kV + 4V windings, £3.50. Trans CT500 + 4V windings, £3. Trans UM2, £2. G3ASL, QTHR.

FTDX 401—SP401—YD844 ssb-a.m.-cw immac cond, very little use and only seven months old. Best offer, sae with enquiries. Buyer collects. G4DXM ex G8HZH, QTHR. Tel Dudley 50718.

Nombrex 27 sig gen 150kHz–350MHz, transistorized, £2.50. Command rx 1·5MHz–3MHz, £4. 80 + 20m HRO bandspread coils, £5 pair. Carr extra. G3SPU, QTHR.

BCC 69 4m mobile tunable rx 70–70·8MHz tx xtal 70·3 plus 12V dc inverter and circuit, £15 ono. *Wanted:* Any basic computer books. G. Tompsett, 46 Manor Wood Road, Purley, Surrey CR2 4LE. Tel 01-660 5634 after 6pm.

Liner 2 vhf ssb tx/rx, mint cond, £130. Matching mains psu, £15. Duxbury, 01-727 7796.

G3ZVC tx/rx comp wkg, £55. Microwave Modules 432MHz converter, £15. Prop pitch motor, £12. G3PJK, QTHR. 061-643 2631.

Lafayette HA-800 amateur bands rx, two mech filters, noise limiter, xtal cal handbook, fb cond, £45 ono. Mosley swl trap dipole, £3.50. Crts 5FP7, VCR97, offers, carr extra. *Wanted:* Rotator, hf beam. G3TNB, QTHR. Tel Tadley 3421.

TVI filters for uhf tvs, £1.10. AR22R ae rotator and control box, £22. Dash Ranger tx on 2m with mic less xtal, £8.50. 432MHz ae preamp, £3. Sae enquiries. Carr extra. G4DFE, QTHR.

Comp station—FTDX401, 18AVT/WB swr meter, lp filter, matching spkr, electronic keyer, hand key, mic, coaxial cable and connectors. Exc cond, 2 yrs old. Spare driver, output tubes, manual, £300. Prefer one buyer. Going QRT. GW3ZWU, QTHR. Tel Lamphey 2174 (STD 064-683).

Strumech tower 40ft. Offers. G3RDW, QTHR. Tel 021-353 7427.

RTTY Creed 7E/RP teleprinter, £25. Also Creed 6S auto transmitter, £10. Both exc order. Del by arrangement. G3RDG, QTHR. Tel 01-455 8831.

Electronic organ spares, keyboard 61C-C, 72 oscillators, voice box, pre-amp, 30W pa, swell pedal, speaker, 5-tone bus-bar distribution unit, net-work. Offers, sae. GW3GOC, QTHR. Tel Abersoch 2186.

Codar CR70A gen cov rx, £18 ono. Carr extra. G8IFH, QTHR. Tel Hadlow Down 515 (East Sussex).

Microwave Modules a.m. tx, vgc. Xtals fitted 145·0, 145·35, 145·5, 145·8, £25. Matching G3TDZ rx complete, no birdies, very sensitive, £20. The two for £40. Reason for sale: gone fm. G4BKF, QTHR. 051-677 4134.

2m trnsvtr with 640 inc factory parallel lines and Sentinel convtr very well built, £8. Class D wavemeter 240V, £3. Trap dipole comp with heavy coaxial (buyer collect), £5. G3ZLH. Tel 0691-5730 (Oswestry, Salop).

Vintage radio and many vintage valves for disposal, would accept optical equipment in exchange (or why?). Buyer collects (London borough of Merton) C. D. Ward. 01-540 8461 after 1900.

Sanyo battery tape recorder MR212 3in spools, with mic, £5 inc p/p. Two unused 4CX250B, £2.50 each inc p/p. G3MA, QTHR.

Heath GR78 gen cov rx with product detector, bandspread, rechargeable battery, £50 offers. Murphy 2m a.m. tx model 821 with vxo 12V dc rx removed, £8. G4BRX, QTHR.

Pye Vanguard 6-channel model on 2m three xtals fitted, 25W of a.m. for £25, ono. G8HPE. Romford 45733.

KW Viceroy mk 2 tx with psu. Recent service by KW. Comp with handbook, circuits etc, £35. Carr extra. G4BPJ, QTHR.

KW2000E with ac psu. Little used. Checked KW, £290 delivered. FT2FB a.m./fm receive and 10 channels including SN/PI filled, £90. Braun 12V rx/tx 2m/70cm transverter ITT 1270, ½W out, £15. G4ALV, QTHR. Tel 01-460 3852.

Free 2m rx xtal (HC6/U) send sae for free sample and list of 2m rx xtals, eg 51·9MHz (145MHz rx), 60p. 51·8333 (144·8MHz rx), 35p. Suit Westminster, Cambridge etc. J. B. Hodgson, 234 Gillingham Road, Gillingham, Kent ME7 4QT.

TW Communicator 2m, wkg comp, £20. G8ABP 2m a.m. tx three xtal posns 3/20A final needs 24V dc supply for relays otherwise wkg, plus spare valves, £25 ono. G8BKR, QTHR. Tel Bristol (0272) 621498.

HW17A aligned Heath June, perf order and performance, £45. G5NN, QTHR. Tel Winslow 2498.

2m 8-over-8 slot-fed ae, £6. Stolle memomatic rotator with 18yd 4-core cable, £12. Kokusai MF455-1 mech filter, £5. G3MCL, QTHR. Tel 881060.

TTL ICs worth £45, including LED displays for 50MHz counter and many more holders free. Offers around £30 or sae for list. Cann, 14 Falmouth Road, Truro, Cornwall. Tel Truro 6025 evenings.

AR88LF with calibrator, spare valves, manual, £20. *Wanted:* Small gen cov rx, also paddle movement for h/b keyer. G4CRH, QTHR. Tel Chipping Norton 2724.

KW2000A, ac psu, manual, vgc, £140. G3ZEO, QTHR. Tel Chelmsford 71754.

CW lives. Keyer Ten-Tec KR5 single-paddle adjustable gaps 5–50wpm m/b reed relay 6–12V, £14 ono. *Wanted:* three-band 3-el beam or quad. G3RPC, QTHR.

Hudson FM208 2m tx/rx fitted preamp, £25 ono. G8JWI. Tel Hertford 53580 after 6pm.

Deluxe 2m mobile aerial, diamond stainless steel ⅝ vertical, boxed comp with gutter mounting, coaxial and instructions, detachable from car in seconds, no holes necessary, £11. Marconi TF390F sig gen, £12. Pye Vanguard working on 2m, £16. BC906D vhf freq meter (for licence regulations on 2m), £25. Six-channel Ledex motorized switch on mounting plate for Pye Vanguard or Cambridge, £2.50. Haseldine, 15 Wheeldon Way, Hulland Ward, Derbyshire DE6 3FZ.

F27 base tx, vgc, wkg 2m, five switched xtals, vfo posn, ptt/a.m./cw, gb keying, EL34s mod, £25. Xtals: 10XJ, 8·002, 8·03625, 8·06462, HC6/U, 8·012, 8·032, 8·058, 8·092, 8·107, 51·91666, £1 each. New 72·575 HC18/U, £1.50. G4BMM, QTHR. Tel 0582 35617.

FT2F xtals for 14 channels, tone burst, im bracket, £105. TW2 tx with psu/control unit, £15. 2m a.m. 10W tx built-in psu, £12. Class D wavemeter ac/psu, £5. Cossor 1045K scope with manual, £12. G3YNC, QTHR. Tel 01-521 3008.

Storno Viscount comp xtalled wkg on 145·5, £25. Xtal shift unit for Viscount, £5. 2-10m mosfet converter, £7. DJ5HD 135-137 vfo, £20. XF9A filter, £9. Eddystone dial, £7. G8EEM, QTHR. Tel 0532-688356.

FT101 exc cond, modified top band, recently overhauled by Western Electronics, comp mic leads, £280. Deliver 50 miles. G3JAF, QTHR. Tel Lymington 3232.

Property of late G8CIY. Eddystone S680X, £60. Storno com 19/25, £30. Storno base station, £25. 8Y2M J-Beam, £4. TF1041 vtvm, £15. TF1152 rf pwr meter, £15. TF925 wavemeter, £10. BC221, £15. Full list, sae. G3CBU, QTHR, or tel G8FMH Basingstoke 23979.

HW17A Heath 2m trans many spares, 12V supply, £50. Heath gdo £17. 2m fm board ½W out, £8. Home-made 2m converter 4–6MHz i.f., £4. Collett, 7 Saxon Rise, Earls Barton, Northampton. Tel 810085.

Europa-B 4m transverter, little used, immac, QRT on vhf, £65. GM3HBT, QTHR. Tel Larkhill 883306 (evenings after 6pm).

Xtals 38,666·6kHz HC18/U, £2.50. 100kHz xtal oscillator modules in sealed can but adjustable, 5V dc supply, £5. Zener diodes 5·1V, 5·6V, 80p/10. Small mains transformers 12–0–12V at 50mA, 50p. All tested and post paid. P. Smith, 49 Hucknall Avenue, Ashgate, Chesterfield, Derbys.

Midget KB radio mw/lw ac mains, £10. Transportable Sobell tv with fm radio, £15. Carr extra. SAE with enquiries. G8JDU, "Sunnyfields", Lighthouse Road, St Margarets Bay, Dover, Kent.

Storno Viscount, with mic and control box, xtals for S20, tx ok, rx bust, £8. Comdel CSP11 processor, £45. G3ZYN, QTHR. Lea Valley 712874.

0–5A thermocouple meter on desk stand, new cond, £10. G4CVZ, QTHR.

HRO, psu, spkr, nine coil packs, £30. MM 2m conv, 4–6MHz, £6.50. Hamgear PM2C preselector, £7. 8·060 xtal, 50p. Codar CR70A with preselector, £15. All ono. *Wanted:* FR50B new cond. Antel ⅝th 2m whip. G8JCG, "Cleves", Gringer Hill, Maidenhead. Tel 30185.

Europa 2m transverter, £70. Europa 4m transverter, £70. Lowe tune-up tone pulser, £3. Medco 52Ω lp filter, £5. Shure 201 mic, no lead, £2. Poulter, 279 Aragon Road, Morden, Surrey. Tel 01-337 0117.

Marconi TF801A/1 vhf/a.m. sig gen 10/310MHz, £45. Pye F60 hi-band fm base station, 50W, £50. Philips N1500/15 colour video cassette recorder, £325. Ultra Burndept Lion 25W mid-band a.m. mobile radiotelephone, £50. Eumig 8mm cine projector, £16 (P8). G3CON, QTHR. Tel Cheltenham 54357.

Cheap ssb rig. Homebrew mini 5 exciter, xtal vfo, 60W p.e.p. pa on 80m, £25. Garex 2m a.m. exciter and modulator, £10. 500V power pack plugs to both rigs, £5. Prefer buyer collects. GW4BDS, QTHR. Tel Llanelli 59422.

HC/6U xtal 1MHz, brand new, £2. Vanguard manual, new, £2.50 plus postage. *Wanted:* TCS rx by Collins or Air King; BC348, model, "R" "M" or "P", must be in orig and immac cond. Details, price, please. G3GUU, QTHR.

FT2 auto and Sommerkamp vfo to make rx tunable with a.m./fm reception. Fitted three channels. Offers invited. 5FP7A sstv monitor crt brand new, £8. Radar type equivalent but orange phosphor, brand new, £5. G8ACB, QTHR. Wombourne (090-77) 3037.

Huge quantity of surplus electronic components, valves, wire, meters, ferrite rings and coil formers, 500 + 500pF V/Cs, heavy duty PSUs, QY4400As, QY3125s, low-band tx/rx, Philips tape recorder, and much much more, very cheap, callers only. Saturdays 11am-6pm. 12a Bruce Grove, London N17.

KW202 rx and matching spkr, £110 ono. Trio MC50 dual imp desk mic 50kΩ 600Ω, £15.50. Trio "Ham" clock, £8.50. Buyer collects or carr extra. Codar PR40 preselector, £7 ono. G4BXF, QTHR. Tel 504-6157.

Liner 2 tx/rx, vgc, £120 ono. Microwave Modules 2m preamp, £6. Could deliver about 12 miles or carr extra. G4CIK (G8GXK), QTHR.

Medco 50Ω lpf, £3.50. Hansen swr (single) meter, £5. Stereo type phones, £2. All as new. Post paid. GM2HFV, QTHR.

Eddystone rx 830/7 in good cond, handbook, plinth and loudspeaker, £300 or offer. G4CG, QTHR.

Heathkit HW17/A, £32. Vanguard AM25T (6-chan-transistorized rx), £20 ono. 12-el 450MHz Yagi (commercial), £4. 6in crt with base, £30. Fixed vhf chan (multi) rx pcb, squelch, 2W af 24 stages, commercial, 10·7MHz i.f. less filter, £8. G8DEV, QTHR. Tel 0789 68554.

Swan 260 tx/rx, built-in mains/dc PSUs, £120. HW17A, dc psu, £40. BCC69 tx/rx on 4m, dc psu, £15. Homebuilt top-band tx, comp £15. Cossor rf sig/gen, £12. SP25 record deck, wooden case, £12. G3PLR, QTHR. Tel Markyate Park 328.

TA33 Jnr and balun 10/15/20m, £25. Mosley Commando a.m./ssb/cw tx 200W p.e.p. 10–80m, £80. Hallicrafters rx SX100 Mk2 d'conv calib: n'filter etc. 0·5 to 34MHz, £70. All open to offers, exchanges, etc. G3JGC, 64 Verity Crescent, Canford Heath, Poole, Dorset.

KW Atlanta, spare pa valves, £125. Cambridge single-channel AM10D crystalled 145·8MHz, £25. 18AVT/WB, £35. Heathkit RF1U sig gen, £15. Hansen swr, £4. *Wanted:* Gen cov rx CR70A, HRO, etc for beginner. GI4DOR (ex-GI8IDB) QTHR. Tel Belfast 610007 after 6pm.

Collins 75A-4 rx, three mechanical filters, slow-motion dial, black tube shields, mint, completely re-aligned, many new valves, £185 delivered. Now transceive here. Panoramic adaptor BC1031-A perfect, suits 455kHz rx i.f., £30 delivered. GD3TIU, QTHR. Marown 442 (STD 062485 442).

Microwave Modules 2m converter 28MHz i.f. with 116MHz output, as new, £14. G8HPA, QTHR.

Semi-det bungalow in green belt, open aspect, kitchen/dining room, lounge, 2 bedrooms (one with fitted wardrobe); half-tiled bathroom with coloured suite. Planning permission given. Well-stocked garden, vegetable plot. Tel Mirfield 496209. Brooke, 48 Slipper Lane, Mirfield, W Yorkshire.

Yaesu FT2F in vgc, with handbook, 1700 tone xtals for GB3PI 144·48, 144·60, 145·00 S22, room for more xtals. Good mobile rig, but no longer required by me, £70. Mike Marriott, G8JAL, Red Lion, Hockwold, Thetford, Norfolk. Tel Feltwell 391.

10/15/20 3-el Dexbeam, cond as brand new. *Wanted:* One pair selsyns/tcvr. NCX5 (Mk2)/FT200/or FT101 in good cond and at reasonable price. Also Trio rx 9R4DS, £25 offered. GM3CRY, QTHR. Tel 033-481 219.

12AVQ vertical 20–10m + 20m 52Ω coaxial, £15 ono. Microwave Modules 2m converter 4–6MHz i.f., £8. DC power supply for KW2000, £15 ono. Buyer inspects and collects. G4BZR, QTHR. Tel 0229-31439 after 6pm.

Pye Westminster W15AM 170MHz as new, £60 ono. Linear 80–10m 2 X 813 + 90% psu eg 2·5kV trans caps, £25. Ex-equip blowers 220V ac, £1.75. Brown, 6 Melton Stantonbury, Milton Keynes, MK14 6BH.

IC22 comp R5, 6, 7, S0, S20, S22, Rev PI. Cambridge AM10D mod fm four xtals incl GB3PI. Also Pye base station 40W not working. Offers to Hickson, G8JXW. Tel 0234 (Bedford) 781494.

KW2000A plus ac psu, includes manual, spare valves (inc pa) Shure mic rf indicator, swr meter, all vgc, plugs and leads etc, £140 ono. G4AMZ, QTHR. Tel 061-432 2985.

WANTED

FT200 or FT250 plus ac power supply or similar, why? G4DCQ/G8DCQ, QTHR.

TX 80m/10m with or without 160m, in good cond. G3ZCO. Tel Bridlington 78066.

Pre-1930 morse keys, PMG, spark or other type gear. Any cond. Write VK4SS, 35 Whynot Street, West End, Brisbane, Q.4101, Australia.

VK3LL needs to rent rural type cottage close by Aberdeen, Scotland, for 12 months. Must be able to erect TH6DX. Just xyl, no harmonics. Presently holding G4DRP. Contact Busch, 1 Attingham Close, Hemlington, TS8 9HS. Tel 0642-590269.

Olympic Z-match (500W) or similar. G3RRA, QTHR. Tel 0276-25040.

Eddystone 358X coils A, D, F or any spare units suitable rewinding. C. D. Gammon, 20 Belmont Drive, Bristol BS8 3UU. Tel Long Ashton 3398.

Enthusiastic licensed amateur or club to demonstrate the joys of amateur radio to a youth club. Contact Exit Youth Club, Blair Avenue, Glenrothes, Fife, Scotland. Tel Glenrothes 771248.

Mains transformer for Pye T30 a.m. base station. G8DHE, 41 Cranleigh Road, Worthing, Sussex. Tel 0903-201567.

Mosley Commando 11 transmitter. G3MBL, 244 Ballards Lane, London N12 0EP. Tel 01-445 4321.

Heathkit solid state mobile psu HP138. Top price purchase or short loan terms. Urgent. G3ENY, QTHR.

Urgent, bound volumes No 22 and No 23 of *Radio and Electronics Con.* Ring Southampton 882452 any time. G. Diaper, 45 Taunton Drive, Bitterne, Southampton.

Urgently required Cossor single-beam oscilloscope model 1045K, circuit diagram and manual, buy or loan. BRS34159, c/o GC3GS, QTHR.

Elan beam Akai tuner or tuner-amp 750 rx. 8 Heythrop Drive, Middlesbrough.

Eddystone EA12—must be perfect. Part exch 680X or sell. G8CKA.

KW EZ-match. G3AGF, QTHR. Tel 0242-54773.

"Transmission & Propagation" Vol 5 *Services Textbook of Radio* HMSO (out of print). Copy any cond required. GM3HAT, QTHR. Tel Aberdeen 36004.

HF 3-band Yagi, must be good cond. G3YAX, QTHR. Warrington 37138.

Eddystone EC10 (preferred with internal battery pack but others considered). Write with price and cond to David Shirley, "St Michael", North Down Road, Braunton, North Devon EX33 2EE. Tel (office hours) Barnstaple 4132.

Eddystone 730/4 rx, good cond essential. G3WEX, QTHR. Tel (Sutton Coldfield) 021-354 4265.

"Tape recorder servicing manual" by Hellyer, printed by George Newnes. Or data sheets, manuals for Grundig TK14, TK18, TK55. W. A. Yeomans, 13 Council Street, Walton, Peterborough, PE4 6AQ.

2m linear, valve or solid state, suitable 10W drive; also Pye FM10D dash-mount Cambridge low band, any cond for rebuild or good working set at reasonable price. Collection arranged or will pay carriage. Tel 037-42 71724 any time.

Student requires manual for Pye 6/2207V Ranger to buy or borrow. Also circuit for Canadian 58 set. Bridgland, 4 Selsfield Close, Eastbourne, Sussex, BN21 2QX. Tel 0323-28236.

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Versatower P40 or P60 galvanized, must be first-class cond. Good price paid. Also 1972 *ARRL Handbook*. G3GHB, QHTR. Tel Inkberrow 792582.

Dish, suitable for 1·296GHz and possibly 2·300GHz. The bigger the better. Also large-diameter Heliax coaxial or similar, and any c/o relays for high-power uhf work. Philip Coull, "Domel", Elham, Kent. Tel Elham 244 or Folkestone 57271.

Mains transformer for EMI WM3B waveform monitor 'scope. G3TKQ, QTHR. Tel Colchester 74917.

HF band tx/rx with built-in a.c. psu for /MM, part exchange or sell TR2200, mint cond, with nicads and xtals on 145·00, S20, S21, S22. G8AXB, QTHR.

KVG XF9B 2·4kHz xtal filter or similar type required. Also mobile fm tx/rx for 2m Pye Lynx camera for sstv and Creed 75 teleprinter. Details to G3RQY, 15 Tiercel Avenue, Norwich NR7 8JN, Norfolk. Tel Norwich (0603) 42967.

Xtals for Pye Ranger 70·26 tx and rx 8,782·5 and 6,746·66kHz. Reply G4AKQ, 18 Aden Terrace, Maidstone, Kent. All answered, Pse state price.

Operating manual and circuit diagram for FT100, for photocopying. Postage refunded. Tinline, 1 Gleneagle Close, Chapel Park, Newcastle-upon-Tyne, NE5 1SG. Tel 0632-679106.

Beam aerial, HQ-1, TA32 or similar. GI4BTG, 2 Ardeen Avenue, Newtonabbey, Co Antrim. Tel 023-122 3236.

Shure 444. Approx 40m RG8/U or similar. 50Ω dummy load 100W. QM70 solid state transverters 28/144 and 28/70. Heath coaxial switch. Price and cond to Pellett, Marlmead, Marlpits Lane, Ninfield, Sussex TN33 9LD.

Manual or information (circuit) required on Geloso a.m. tx. BRS35714, 16 Griffin Close, Eccleston, St Helens. Tel St Helens 33228.

Pye vhf equipment, must be complete. Any type of fixed, mobile or portable, working or not. State price, cond and quantity please. Also vhf aerials, beam or omni. G4BBS, QTHR. Ex G8CVD.

Eddystone 770U rx. First conversion xtals for G2DAF Mark 2 rx. GW5ZL, QTHR. Tel Swansea (0792) 22693.

HW7 QRP tx/rx or similar. Any cond considered. State cond and if circuit, psu and xtals are available. Also 7MHz HC6U or FT243 xtals. Harris, c/o 4 Rase Cottages, Market Rasen, Lincs.

Eddystone EC10 Mk1 or Mk2, must be in good cond. Phone G4AWT, after 6.30pm, Doncaster (0302) 55756, or write QTHR.

Amateur seeks accommodation or board and lodgings in London area, preferably west of centre, from 1 September. All offers considered. Also Ledex xtal changeover unit for Storno Viscount. T. N. Price, 17 Bremhill, Calne, Wiltshire SN11 9LD. Tel Calne (0249) 812047.

Line output transformer for Perdio portable tv. Arnfield, 29 Lapwing Lane, Brinnington, Stockport, Cheshire.

Any information on Murphy radio type TR821/25, especially circuit diagrams. Also manual for Cossor 1035 mk3 oscilloscope (no longer available from makers). V. Harper, 64 Cromford Way, New Malden, Surrey. Tel 01-942 1251.

SOS minimum 2-bed kit bathroom urgently needed yf and self now. Separate QTHs, g-floor flat or bungalow for rent. Can be part furn or empty. Surrey, Kent, Middx or why? Pse help. G2ANT, 7 Acorn Gardens, SE19.

Drake SPR4 or R4B/R4C rx and spkr: must be perfect and complete with manual. Sumner, 4 Cherrytree Avenue, Leicester Forest East, Leicester. Tel Kirby Muxloe (053727) 2608.

RAYNET

As an economy measure, Raynet news will appear in alternate issues in future.

The Leicestershire Raynet Group held its February exercise in co-operation with the National Coal Board. Raynet linked Desford Colliery with a mines rescue station, an ambulance station, the Leicester Royal Infirmary and the NCB headquarters at Coleorton Hall. Pictured at Desford Colliery are (left) John Sutton, G3YKP, and the group controller, Chris Haywood, G4CUK at the centre of operations. Twenty mobiles took part in a test of strength exercise for this newly-formed group

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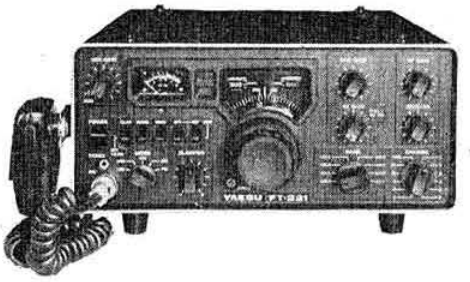

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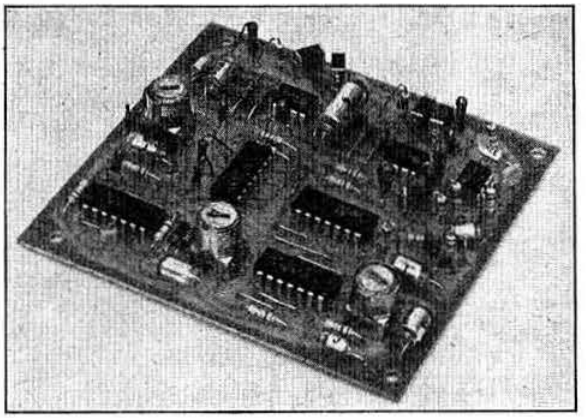

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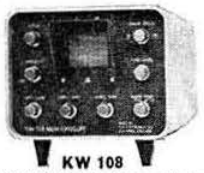

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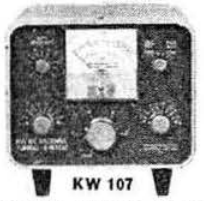

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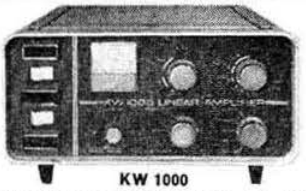

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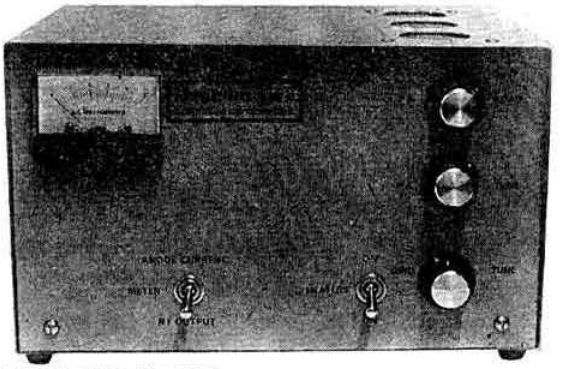

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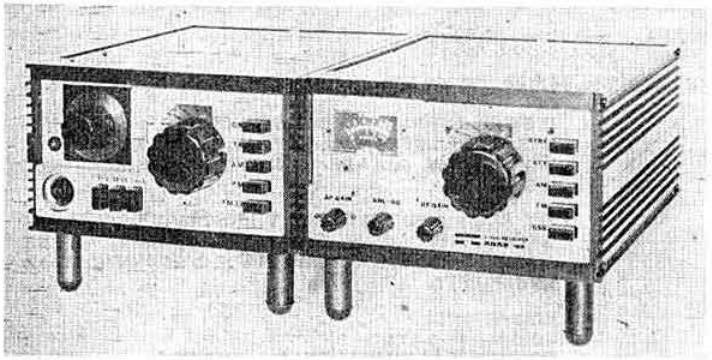

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W. F. J. Warner, Transport Manager, Dated 23 June 1975.

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Signed .....

Date .....

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