radio communication

June 1972

Journal of the Radio Society of Great Britain

NEW from RSGB

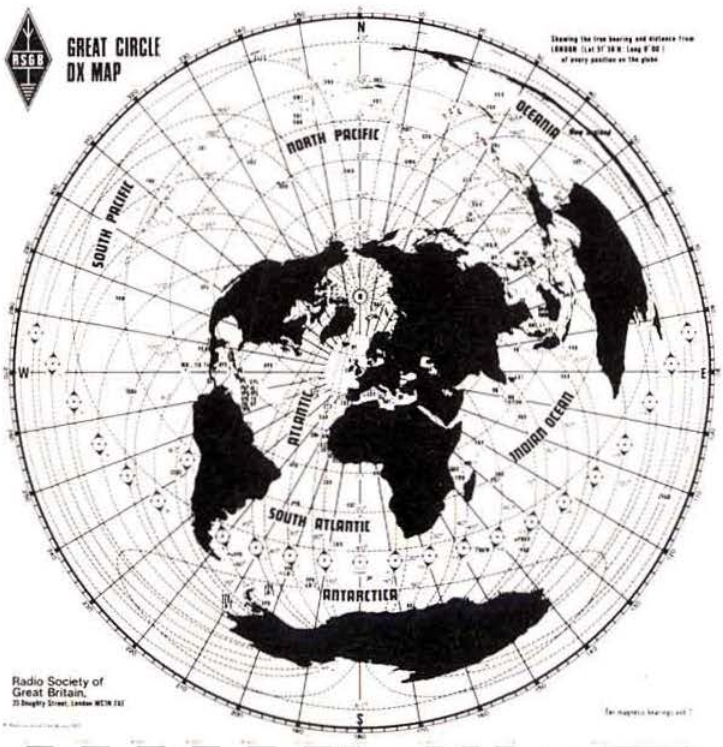
GREAT CIRCLE DX MAP

Designed and drawn by D. E. Cole

An invaluable aid to all long-distance communications, showing the true bearing and distance from London of any position on the globe, country prefixes and local times. Supplied with a free copy of the latest RSGB Countries List of world-wide prefixes.

Size: 25in by 30in **Price:** 65p post paid

From: RSGB, 35 Doughty Street, London WC1N 2AE



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Volume 48 No 6 Price 30p

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OUR WESTERN YAESU MUSEN MAIN DISTRIBUTOR

When you buy YAESU from their U.K. main distributor you get the best engineering standards in the world and superb performance too. All items carry the YAESU 12 months guarantee. We also do free labour on warranty claims, and carry an excellent stock of spares. Remember, we were FIRST to offer YAESU on the UK market and FIRST to give you SECURICOR 24-hour delivery; a standard of service which cannot be surpassed.

SHE's A LITTLE BEAUTY! The FT-75 that is! A 10-80m. SSB TRANSCEIVER for ONLY £80 (carriage paid)

FT-75

FP-75

This latest addition to the ever expanding YAESU range is a real winner! Having tested it we can say the receiver side is very good and output power was not less than 15w. *R.M.S.* on any band. Operation could not be easier! You simply select the band, press the channel button and talk!

SPECIFICATION:

Receiver: Sensitivity : 0·5μV for 10 dB. S/S + N.
Selectivity: 2·3kHz (—6 dB.), 4·5kHz (—60 dB.).
Audio o/p: 1·8w.

Transmitter: Modes: SSB or CW. Power: 20w. p.e.p.
Carrier suppression: better than —40 dB. at 1,000 Hz.
Unwanted sideband: better than —40 dB.
Response: ±3 dB., 40-2,700 hHz.

General: VXO swing: 3·5 MHz, 3 kHz; 7 MHz, 6 kHz; 14 MHz, 3kHz; 21 MHz, 20 kHz; 28 MHz, 12 kHz.
Size: 210w. × 80h. × 300d. m.m. Weight: 3·8 kg.

Current drain:	AC	DC
Standby	50w	1·4 amp.
Heaters on	50w	3·5 amp.
Transmit	80w	5·5 amp.

Microphone included and 4 crystals (1 on 80, 40, 15 and 10m.)

You are welcome to test the FT-75 at Totton

AND HERE's THE NEW 2m. FT-2 AUTO SCANNING TRANSCEIVER £129.00

The receiver automatically scans the 8 channels and will indicate on which one there is a signal.

Power output: DX, 10w. Local, 1w.

Frequency Coverage: 144-146 MHz.

Weight: 4·2 kg.

Size: 210w × 95h × 270d m.m.

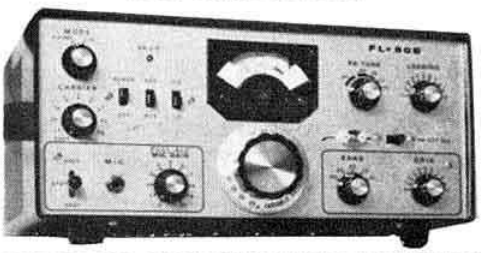
Mode: F3.

Power requirements: AC, 100, 110, 117, 200, 220, 234V DC, 13·5.

(available shortly)

NEW IN THE U.K. (Can be seen at Totton)

FL-50 TRANSMITTER



FR-50 RECEIVER

FV-50 VFO

THE FR-50B AMATEUR BANDS RECEIVER AT ONLY £52.00

The FR50B low-cost YAESU amateur bands receiver covers 3·5-3·8 MHz, 7·0-7·5 MHz, 14·0-14·5 MHz, 21·0-21·5 MHz and 28·0-29·2 MHz. Sensitivity: CW/SSB, less than 0·5 μV for 10 dB S/S + N. AM, less than 1μV for 10 dB S/S + N. Selectivity: ± 5kHz, — 50 dB, ± 1·8 kHz, —6 dB. Image ratio; better than —50dB. Speaker is built-in.

THE FL-50 SSB-CW TRANSMITTER £21.00

The FL-50B Transmitter operates on SSB/AM and CW. Power input is 50w. p.e.p. 80-10m. Carrier suppression, unwanted sideband and spurious radiation are all —40 dB. The unit is VXO controlled or will transceive with the FR-50. With the FV-50, VFO control is possible.

THE FV-50B REMOTE VFO for FT-75 or FL-50, £26

USED EQUIPMENT

KW2000A, v. good	£160	Swan 270, v. good	£170	Heath SB101, cw, SB6000	£160	Hammarlund HX50	£90
KW Atlanta, mint	£160	Swan 509, vfo, mint	£45	Heath HP13,	£25	Hammarlund HQ170A	£73
KW201, v. good	£75	Sommerkamp FL200B.	£80	Heath HDP21A	£10	Hammarlund SP600	£75
KW202, excellent	£110	Lafayette HA600	£35				

ELECTRONICS (UK) LTD

THE SUPERB FT-101 (Ex-Stock) (with 160m., £15 extra).

Deposit **£24** followed by monthly payments as follows: 3 at **£21**, 9 at **£20** or 5 at **£15**, 13 at **£14** or 6 at **£12**, 18 at **£11** or 14 at **£10**, 16 at **£9** or 9 at **£8**, 27 at **£8**

The FT-101 is a 260w. p.e.p. SSB/AM/CW transceiver with an amazingly sensitive receiver. You'll hear signals which are inaudible on many other equipments. It comes complete with speaker and microphone, AC and DC P.S.U.s built-in. There's nothing to touch it for value!

MATCHING FL-2100 LINEAR (Ex-Stock)

The FL-2100 is designed to match the FT-101 and runs 1200w. p.e.p. If it's a linear you require for some other exciter, compare the FL-2100 with 2 fans, AC and HV safety interlock and fully screened input circuitry. You'll not find better value

PRICE REDUCTION!

NOW ONLY £79.50

YC-305 30MHz FREQ. COUNTER

Since YAESU have reduced the price of the YC-305 we are pleased to pass this on to our customers.

This compact digital frequency counter which is equally suitable for laboratory, industrial or amateur applications has the following specifications: Compact design by advanced IC technique to count wide frequency range 5Hz-30MHz. Dual range system provides 8 digit measurement with MHz and kHz indicators. 240V. AC/12V. DC dual power pack built-in; accuracy ± time base stability + 1 count, gate time 1 m.s. or 1 second; input Z 1MΩ, low 56Ω; input capacity — less 20pF; max. i/p)) v0-0 less than 10 sec. 20V. p-p continuous; time base frequency 1000kHz crystal controlled; stability 0·0005 per cent at 25°C, 0·0025 at 40°C. Dimensions 8¼ × 3¼ × 10½", Weight 8 lbs.

YAESU PRICES. CARRIAGE PAID BY SECURICOR. MANUFACTURERS 1 YEAR GUARANTEE.

FT101 fitted 160m	£255.00	FR400DX receiver	£120.00	AM filter FR400	£7.50	YC-305 Frequency counter	£79.50
FT101 transceiver	£240.00	FR400S DX Receiver, 160-2m.	£160.00	FT560 Transceiver	£195.00	FT2F 2m transceiver	£84.00
FV101 Remote VFO	£38.00	FL400 Transmitter	£140.00	FV400S remote VFO	£38.00	FP2AC AC PSU for FT2F	£25.00
FL2100 Linear Amplifier	£135.00	SP400 speaker	£10.00	FT401 Transceiver	£215.00	FP2AC/B AC supply with batteries	£34.00
SP101 Speaker for FT101	£10.00	FL2000B Linear amplifier	£135.00	FV401 Remote VFO	£38.00	Crystals for FT2F	£1.60
Fan FT101	£8.00	FM Unit for FR400	£7.50	SP401 Speaker	£10.00	FP50DX Low pass filter	£6.60
FT200 Transceiver	£134.00	FC2 2m. converter	£12.00	FL2500 Linear amplifier	£118.00	Mobile mount FT101	£5.00
FP200 AC supply for FT200	£38.00	FC6 6m converter	£12.00	YD846 Hand microphone	£5.00	CW filter FT101, FT401, FT560	£15.00
DC200 PSU for FT200	£45.00	CW filter FR400	£12.50	YD844 table microphone	£12.00		
FV200 Remote VFO for FT200	£38.00						

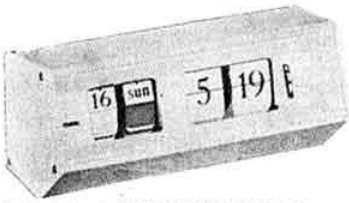
NEW VHF POWER AMPLIFIERS/TRANSVERTOR

The **FMB-20C.** This is a 240V AC mains operated amplifier switchable from linear to non-linear operation for SSB/AM/FM. The drive required is 1W/10W for 50W/90W output (approx.). This unit also provides 12V DC to enable your 12V FM transceiver to be mains operated. It features IC regulation of the DC output. Price: **£105.00.**

The **FMB-2F.** This is a 12V DC operated FM amplifier giving nominally 90W output for 10W input. Price: **£86.00.**

The **TA10-CN** is a 144 to 432MHz transvertor. On the transmitter side your 144MHz transmitter frequency is tripled to give 432MHz +. For receive, 288MHz is mixed with 432MHz to provide output at 144MHz. Power required is 11·6-16V. Price: **£77.63.**

PRICE REDUCTIONS ON CASLON CLOCKS!



The finest digital clock available

The CASLON 601

Features: 24hr. 220V. AC 50c. Built-in diffused light. Noiseless operation. Superb styling. Easy-to-read digital face indicates date, day of the week, hour and minute. 5 second intervals marked on rotating wheel. Different colour for each day of the week.

Price: NOW ONLY **£14.95**

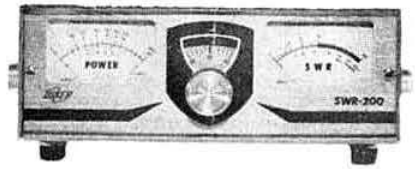
CASLON model 222, 24hr clock, now ONLY **£7.50**
Trade enquiries invited.

Midlands Agent: ANDY MARTIN, G3UDR, Shipston-on-Stour 61839 after 6 p.m. who has most Yaesu gear in stock for demonstration.

Hours of business: Monday-Friday, 9–5.30 p.m. Saturday, 9–12.30 p.m.

CATALOGUE. You ought not to be without your copy listing towers, masts, antennas, rotators, Yaesu equipment and a host of other items. Send 15p only (no s.a.e.)

OSKER POWER METER



DO YOU KNOW YOUR POWER OUTPUT?

(No! You're not the only one!)

Then **YOU** need the **OSKER POWER METER**

Features: Switchable for 52 or 75 ohm systems. Each instrument is individually calibrated. Four ranges: 0–2, 0–20, 0–200 and 0–2kW., 3–200MHz. Excellent styling. Price: **£18.50**

OSBORNE ROAD, TOTTON, SOUTHAMPTON, SO4 4DN, ENGLAND.
TEL.: TOTTON 4930 and 2785. CABLES: 'AERIAL, SOUTHAMPTON'

SB Separates

HEATHKIT
Schlumberger

The famous Heathkit "DX Maxi-Rig"..."303," "401" & "200"

Heathkit SB-303

- **27 transistors, 1 IC on 8 plug-in circuit boards**
- **Receives USB, LSB, AM, CW & RTTY, 80-10 meters**
- **15 MHz reception**

Advanced design. Dual Gate MOSFET front end provides greater dynamic range with low distortion . . . gives you the sensitivity you need to copy weak signals without danger of overloading on very strong ones. RF Attenuator adjusts for optimum signal handling capability.

All solid-state circuitry employing the latest in techniques and devices delivers instant warmup, 100 Hz stability in 10 minutes and superior tracking. The exclusive Heath solid-state LMO with 1 kHz dial readout is factory assembled and aligned.

Compare the performance features. The new "303" offers as standard the features and versatility required for today's operations, yet most other receivers offer only endless (and costly) options. The new "303" gives complete SSB/CW transceive compatibility with the famous "400" or "401". Three position AGC (off, fast & slow). New 25 kHz and 100 kHz crystal calibrator lets you spot the new subbands quickly, easily, without interpolation and error.

New construction techniques. Point-to-point wiring has been virtually eliminated with the use of wiring harnesses. All eight circuit boards plug-in . . . and the special extender boards supplied enable you to bring a board out of the compact chassis to check readings while the "303" is operating.

Compare the specs. What really counts in any receiver is solid all-around performance under varying conditions . . . and the "303" has the specs to deliver. Sensitivity . . . less than a *quarter of a microvolt for 10 dB S+N/N!* Selectivity . . . 2.1 kHz on SSB. Image Rejection: 60 dB or more. IF Rejection: 50 dB or more. Compare the "303" against the competition.

Kit SB-303, 21 lbs. **£175·00** Carriage 90p

SBA-301-1, optional 3.75 kHz AM crystal filter, 1 lb.

SBA-301-2, optional 400 Hz CW crystal filter, 1 lb.

Kit SB-600, 8 ohm speaker, 7 lbs.

SB-303 SPECIFICATIONS: Frequency Range (MHz): 3.5 to 4.0, 7.0 to 7.3, 14.0 to 14.5, 15.0 to 15.3, 21.0 to 21.5, 28.0 to 30. **Intermediate Frequency** (IF): 3.395 MHz. **Frequency Stability:** Less than 100 Hz drift per hour after 10 minutes warmup under normal ambient conditions. Less than 100 Hz drift for ±10% line voltage variation. **Frequency Selection:** Built-in Linear Master Oscillator. **Modes of Operation:** SSB, CW, AM, RTTY. **Sensitivity:** Less than 0.25 uV for 10 dB S+N/N for SSB operation. **Overall Gain:** Less than 1.5 uV input for 0.5 audio output (single tone SSB). **AGC Characteristics:** Blocking — Greater than 3.0 V CW/SSB/RTTY. Dynamic Range — Greater than 150 dB CW/SSB. RF Attenuator: Variable 0-40 dB nominal. **Selectivity:** SSB — 2.1 kHz @ 6 dB down, 5.0 kHz maximum at 60 dB down (crystal filter supplied). CW — 400 Hz at 6 dB down, 2.0 kHz maximum at 60 dB down (crystal filter available as an accessory). AM — 3.75 kHz at 6 dB down, 10 kHz maximum at 60 dB down (crystal filter available as an accessory). RTTY — 2.1 kHz at 6 dB down, 5.0 kHz maximum at 60 dB down (uses SSB crystal filter). Image rejection: 60 dB or better. **IF Rejection:** 3.395 — greater than 55 dB. 8.595 — greater than 50 dB. **Spurious Response:** All below 1 uV equivalent signal input. **Temperature Ranges:** 10°C to 50°C ambient. **Dial Accuracy:** Electrical — Within 400 Hz after calibration at nearest 100 kHz or 25 kHz point. Visual — Within 200 Hz. **Calibration:** Every 100 kHz or 25 kHz. **Dial Accuracy:** No more than 50 Hz. **Antenna Input Impedance:** 50 ohm nominal unbalanced. **Audio Response:** SSB — 350 to 2450 Hz nominal at 6 dB. CW (with accessory filter) — 800 to 1200 Hz nominal at 6 dB. AM (with accessory filter) — 200 to 3500 Hz nominal at 6 dB. RTTY — 1840 to 3940 Hz nominal at 6 dB. **Audio Output Impedance:** Speaker — 3 ohm. Headphones — Low impedance. **Audio Output Power:** 4 watts at less than 10% distortion. **Muting:** Open external ground at Mute socket. **Power Requirements:** 120/240 VAC, 40 watts max. **Front Panel Controls:** Main tuning dial; function switch; mode switch; band switch; AGC switch; converter switch; AF gain/power on-off; RF gain/speaker disable; preselector; RF Attenuator. **Circuit Board Controls:** IF/Audio — Bias adjust; meter zero; meter full scale. Power Supply/BFO — +15 V adjust; 100 kHz adjust; RTTY — Wide shift; narrow shift; CW shift. **Connections:** Rear Panel — Phones; HF antenna; VHF antenna #1, VHF antenna #2; mute; anti-vox; speaker; HFO out; LMO out; VFO out; CW shift; four spare sockets; 3-wire line cord socket; accessory socket, VHF Converter, +15 VDC @ 25 mA, switched. RTTY Keyboard. **Cabinet Dimensions:** 12¼" W x 6⅝" H x 13" D. **Overall Dimensions** (with knobs & feet installed): 12¼" W x 7⅛" H x 14" D.

Heathkit SB-Series Communication Speaker

Fixed-station "speaker" facilities in handsome SB-series styling. Complete your SB-Series station with this complementary communications speaker. The SB-600 provides 8 ohm impedance to match audio output of Heathkit SB-Series and HW-Series equipment. Audio response 300 to 3000 Hz for optimum reproduction. And for Heathkit Transceiver owners, it provides mounting enclosure for the "remote" HP-23A power supply. Cabinet size is identical to SB-610, SB-620, etc. . . . 10" W x 6½" H x 10½" D.

Kit SB-600, 7 lbs. **£10·50** Carriage 40p

RC 06/72

HEATHKIT
Schlumberger

SB Separates

SB-620 "Scanalyzer" permits monitoring large segments of spectrum... makes it easy to spot openings. Narrow sweep widths of 10 & 50 kHz permit single signal analysis. Operates with virtually all receiver IF's.
Kit SB-620, 15 lbs. **£73·00** Carriage 70p

SB-610 signal monitor
accurately displays transmitted AM, CW, RTTY & SSB signals 160 thru 6 meters, 15-1000 watts. Displays signal envelope, AF & RF trapezoid patterns; 2-tone test oscillator built-in.
Kit SB-610, 14 lbs. **£47·50** Carriage 50p

Heathkit® SB-401 SSB Transmitter

Covers 80-10 meters; USB, LSB & CW. Single front panel switch selects transceive or independent operation of "401" and 300-series receiver. Usable with any receiver when optional SBA-401-1 crystal group is installed. Built-in 120/240 VAC power supply.

Kit SB-401, 36 lbs. **£190·00** Carriage £1·00
SBA-401-1, crystal pack, 1 lb.

SB-401 SPECIFICATIONS — Emission: SSB (upper or lower sideband) and CW. **Power input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohm — less than 2:1 SWR. **Frequency range:** (MHz) 3.5—4.0; 7.0—7.5; 14.0—14.5; 21.0—21.5; 28.0—28.5; 28.5—29.0; 29.0—29.5; 29.5—30.0. **Frequency stability:** Less than 100 Hz per hr. after 20 min. warmup. **Carrier suppression:** 55 dB below peak output. **Unwanted sideband suppression:** 55 dB @ 1 kHz. **Intermodulation distortion:** 30 dB below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **CW sidetone:** 1000 Hz. **ALC characteristics:** 10 dB or greater @ 0.2 mA final grid current. **Noise level:** 40 dB below rated carrier. **Visual dial accuracy:** Within 200 Hz (all bands). **Electrical dial accuracy:** Within 400 Hz after calibration at nearest 100 kHz point (all bands). **Backlash:** Less than 50 Hz. **Oscillator feedthrough or mixer products:** 55 dB below rated output (except 3910 kHz crossover which is 45 dB). **Harmonic radiation:** 35 dB below rated output. **Audio input:** High impedance microphone or phone patch. **Audio frequency response:** 350-2450 Hz ±3 dB. **Power requirements:** 80 watts STBY, 260 watts key down @ 120/240 V AC, 50/60 Hz. **Dimensions:** 14⅞" W x 6⅝" H x 13⅜" D.

Heathkit SB-200 1 kW amplifier

Provides 1200 W PEP SSB input, 1000 W CW. Built-in solid-state power supply with circuit breaker protection. Metering for SWR, grid current, plate current, relative power, plate voltage. ALC output. Shielded, fan-cooled amplifier compartment. Pre-tuned cathode input circuit for maximum efficiency and low distortion.

Kit SB-200, 50 lbs. **£127·50** Carriage £1·00

SB-200 SPECIFICATIONS — Band coverage: 80, 40, 20, 15 & 10 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** 30 dB or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 mA grid current, 0-1000 mA plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572B/T-160-L (in parallel). **Power requirements:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). **Cabinet size:** 14⅞" W x 6⅝" H x 13⅜" D.

HEATH (Gloucester) Ltd., Gloucester GL2 6EE

While the Yaesu Musen FRdx400 receiver is just about the best you can get in the Amateur Band line, the price of £160 is beyond a lot of pockets, so to cater for the lower-priced field, we very proudly introduce the Yaesu Musen FR-50B at a very incredible £52. In spite of this rock-bottom price, the FR-50B is a very good Amateur Band receiver indeed and provides a high degree of sensitivity, selectivity and stability.

Basically, it is a double conversion receiver covering 80 to 10m with a VFO for the first oscillator and a crystal controlled second oscillator. Being double conversion (5173·9kHz and 455kHz) explains the incredibly good image rejection figure of better than 50dB.

When it comes to sensitivity, the 6BZ6 r.f. amplifier ensures 0·5 microvolt for 10dB S/N ratio.

Selectivity is achieved by two ceramic transducer filter elements which give a nose bandwidth of 3·6kHz at 6dB and a skirt band width of 10kHz at 50dB. These figures are extremely good for equipment in this price class (even for equipment costing much more!). A high order of stability is achieved by a stabilized transistor VFO and VFO buffer amplifier. Other niceties of design are:

1. 100kHz calibrator circuitry built in and only needs 100kHz crystal plugging in.
2. Built-in speaker.
3. Tuneable BFO.
4. I.F. trap in r.f. circuit.
5. Nice geared drive to the VFO—50kHz per turn of the tuning knob, readout to better than 1kHz. This is the same drive as on the well known earlier (and much more expensive) FR-100B.
6. Triode first mixer for low noise.
7. "S" meter fitted.
8. Noise limiter fitted.
9. Gold bonded 1S1007 for AM detection.
10. Product detector (6BE6) for SSB/CW.
11. Built-in muting and monitor circuit for use with companion FL-50B transmitter.

Frequency range:	80m	3·5— 3·8MHz	15m	21·0—21·5
	40m	7·0— 7·5	10m	28·0—29·2
	20m	14·0—14·5	WWV	10·0—10·5
Sensitivity:	Better than ½ microvolt for 10bB S/N ratio in the SSB mode.			
Selectivity:	3·6kHz —6dB 10kHz —50dB.			
Image rejection:	50dB or more.			
Audio:	1·5W 4/600 ohm output. Built-in speaker.			
Power:	240 v.a.c.			
Size:	13" wide, 6" high, 10½" deep.			
Weight:	17½ lb.			
Controls:	BFO, monitor agc slow/fast/off, noise limited on/off, calibrator on/off, mode switch, AF gain, RF gain band switch, main tuning, preselector, zero set (for calibration), "S" meter zero (on rear panel).			

Valves:	12AT7	Crystal calibrator	6BA6	2nd IF amp.
	6BZ6	r.f. amp.	6BA6	3rd IF amp.
	12AT7	first mixer	1S1007	Am detector
	2SC373	VFO	6BE6	Product detector
	2SC372	VFO buffer	1S1941	Noise limiter
	6CB6	1st IF amp./2nd mixer	6BA6	BFO
	2SC372	2nd oscillator	6BM8	Audio

LOWE ELECTRONICS, 119 Cavendish Road, Matlock, Derbyshire, DE4 3HE. Tel: Matlock 2817/2430

Hours: Tuesday to Saturday 9-5.30 (closed for lunch 1-2 and all day Monday).

Service and Sales: A good range of our equipment is available (evenings and weekends only) at the following: John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel: Ringmer 812071. Sim GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel: 041-771 0364. Alan GW3YSA, 35 Pen y Waun, Efail Isaf, Nr. Pontypridd, Glam. Tel: Newton Llantwit 3809.

Service only (evenings and weekends): Dave Dryden G3BKQ, 205 Main Street, Thornton, Leics. Peter Ward G3XWX, 47 Radstock Avenue, Ward End, Birmingham, B36 8HD.

RADIO SOCIETY OF GREAT BRITAIN

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FOUNDED 1913
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MEMBER SOCIETY,
INTERNATIONAL AMATEUR RADIO UNION

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Region 10.—South Wales	D. M. Thomas, GW3RWX, 88 Cefn Graig, Rhiwbina, Cardiff CF4 6JZ.
Region 11.—North Wales	P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinlle, Llandwrog, Caernarvon.
Region 12.—North-East Scotland	A. J. Oliphant, GM3SFH, 17 Rockwell Crescent, Thurso, Caithness.
Region 13.—South-East Scotland	V. W. Stewart, GM3OWU, 9 Juniper Avenue, Juniper Green, Midlothian EH14 5EG.
Region 14.—West Scotland	M. A. Comrie, GM3YRK, 57 Dungoyne Drive, Bearsden, Glasgow.
Region 15.—Northern Ireland	J. Thompson, GI3ILV, "Albany", Newry Road, Armagh, N Ireland.
Region 16.—East Anglia	D. F. Beattie, G3OZF, "Mayerin", The Common, East Hanningfield, Essex.
Region 17.—Southern	L. N. G. Hawkyard, G3ZKR, 100 Shirley High Street, Southampton, Hants.

HONORARY OFFICERS

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Certificates Manager (vhf)	Jack Hum, G5UM, 27 Ingarsby Lane, Houghton-on-the-Hill, Leicester LE7 9JJ.
Intruder Watch Organizer	C. J. Thomas, G3PSM, 65 Charlton Drive, High Green, Sheffield S30 4PA.
QSL Bureau Manager	A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent, BR2 7NH.
Recorded Lecture Library Curator	G. Milne, G3UMI, 23 Linacre Road, Eccleshall, Staffordshire.
Slow Morse Practice Transmissions Organizer	M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.
Society Historian	L. E. Newnham, G6NZ, 17 Washington Road, Emsworth, Hants.
Trophies Manager	P. Carey, G3UXH, 99 Bell's Lane, Hoo St Werbugh, Rochester, Kent.
VHF Manager	G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23.

QTC AMATEUR RADIO NEWS

Oscar 6

Reprints of an article by George Jacobs, W3ASK, entitled *Getting ready for Oscar 6* are available from RSGB Headquarters. The reprint contains the basic information concerning the satellite and the best methods of making use of the on-board repeater facilities. Also available is a booklet containing a reprint of four articles by W. Browning, G2AOX, under the title of *Keeping track of Oscar*. These articles contain complete information on orbit prediction for satellites of the Oscar type. The two pieces of literature should together give an answer to nearly all the points concerning the next satellite carrying amateur radio equipment. Requests for a copy of each reprint, with a remittance of 10p in stamps, should be addressed to the Editor, *Radio Communication*, 35 Doughty Street, London WC1N 2AE, marked *Space reprints*.

After the launch of the satellite, orbit predictions will be available from the RSGB and a further announcement will be made regarding these and the method of reporting signals heard and stations contacted through Oscar 6.

Readers are asked to note that G2AOX cannot deal with enquiries from members.

* * *

NASA has advised AMSAT that the Oscar 6 launch has been rescheduled. Following the cancellation of the ITOS-C launch, the Oscar 6 equipment will be taken into orbit on the NIMBUS-E launch which is scheduled for November 1972. The planned orbit will be polar and sun-synchronous with the following parameters:

600 nautical miles (690 statute miles) circular.

108min period.

99·9° inclination.

13¼ orbits per day; 27° longitude increment per orbit, (passes repeat at the same time on a three-day cycle). Noon ascending mode, midnight descending node, local time.

The NIMBUS-E orbit will be about 230 statute miles lower than the previous planned orbit and this should produce signals 2·5dB stronger at closest approach for a directly overhead pass. The map range will be 2,178 statute miles instead of 2,450 miles expected with ITOS-C.

Latest information may be obtained by listening on the AMSAT nets at 1800gmt on 14,280kHz or 1900gmt on 21,280kHz on the second and fourth Sundays in each month, W3ZM will be net control on behalf of AMSAT.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at 31 March 1972:

Class A	14,152	Class B/M	618
Class B	3,255	Television	226
Class A/M	2,702		

Establishment and use of amateur radio equipment in stationary and moving vehicles

The following note, issued by the MPT, clarifying the requirements and provisions relating to establishment and use of amateur radio equipment in moving vehicles and moveable vehicles when stationary should be associated with your Amateur (Sound) Licence: At "the main address", "the temporary premises", "the alternative premises", and "the temporary location" (see clause 1(1)(*a*)) the Station may be established and used in a stationary vehicle. In those circumstances the Licensee may utilise the vehicle battery to supply power to the Station and/or temporarily affix the aerial to the vehicle. This Licence does not authorise the establishment *OR* use of the Station in a moving vehicle (see clause 1(2)(*a*)). If the Licensee does not hold an Amateur (Sound Mobile) Licence he must ensure that if he transports a Station in a moving vehicle (eg to a temporary location) the Station (including a handportable Station) is rendered incapable of use while being transported. Acceptable means of doing this for portable apparatus would be to remove the battery. For apparatus operated from a separate power supply (eg the vehicle battery) the connecting leads should be removed and kept quite separate from the remainder of the apparatus.

RSGB Dinner Club

The next meeting of the RSGB Dinner Club will be at the Kingsley Hotel, Bloomsbury Way, London WC1, on Friday 30 June 1972 at 7.30 for 8pm. The Kingsley Hotel is a few minutes' walk from Holborn tube station and there is ample car parking space in the vicinity. The cost of the dinner is £1.70 and bookings accompanied by a remittance may be sent to Mrs Rosemary Talbot at RSGB headquarters. Please note that bookings must close 24 hours before the dinner.

All RSGB members are welcome to this informal occasion and a particular invitation is extended to overseas amateurs who may be visiting London.

New GB2RS news reader

John Adams, G8FNL, is the latest addition to the team of GB2RS news readers. Located at Weston-super-Mare he transmits at 1030 on 144·337MHz, beaming towards South Wales.

IARU Region 1

The Israel Amateur Radio Club is the 38th society to join the Region 1 division which now includes the major national societies of Europe and Africa. The correspondent of the Israel ARC for overseas matters is R. Kline, 4X4NJ, 23 Shlome Ben-Yosef Street, Ashdod, Israel.

Visiting the Olympic Games?

To simplify the procedure for obtaining German short term licences during the Olympic Games, visiting foreign radio amateurs may simply show their home licence at the office

of the local telecommunication authorities (OPD) in Munich or Kiel. Between 1 June and 30 September 1972 visitor licences will be granted there free of charge, and the assigned calls are of the type G3GVV/DL. The Oberpostdirektion (OPD) offices are: OPD München, Dienststelle 25-1, Arnulfstrasse 60, München; and OPD Kiel, Dienststelle 25/26-2, Stresemannplatz, Kiel, F.R. of Germany. Office hours are 0800-1200 and 1400-1600 Mondays to Fridays.

During the Games radio amateurs of the Munich VFDB will run a special event station in the building of the OPD, which will be open for operation by visiting radio amateurs.

RAE, May 1973, South Norfolk and North Suffolk

For members resident in the area above, there are several evening institutes where courses for the May 1973 RAE may be held, subject to sufficient support.

As the result of the Ministry of Education decisions last year, not all evening institutes can provide facilities, but Mr W. J. Green, G3FBA, Zone C Council member, has a list of the authorities where such facilities may be possible, and he will be glad to provide the information to anyone who may be interested. Obviously, if there is sufficient demand, say, from a group who could combine in a particular area, there is more chance of success. Mr Green's address is 29 Oaklands, Old Buckenham, Attleborough, telephone New Buckenham 486; and he will try to co-ordinate the applications.

UK FM Group (London)

The main aims of the group, which was formed in London on 20 January 1972, are:

(a) Furtherance of fm operation in the vhf/uhf spectrum;
(b) Orderly growth of fm in the UK;
(c) Standardization of channels and transmissions;
(d) Co-ordinated policy with respect to repeaters;
(e) Liaison with other fm groups and the RSGB;
(f) Organization of meetings, lectures and club projects.

Further details and application forms are available from the secretary, K. H. Kanalz, G5AGX, Flat 6, Marzena Court, Whitton Dene, Hounslow, Middlesex.

Can you help?

The home of BRS27870 was burgled on 17 April 1972 and among the property stolen was a Heathkit GR78 which has a non-standard output stage using AC141 and AC142 in block heat sinks. Any information to Walton Police, tel: Walton-on-Thames 21314.

Paul Marie Grojean, F1BWG, Lycee 62, Lievin, France, aged 17, would like to correspond with a British amateur, OM or YL.

North-West Amateur Radio Convention

You are reminded that bookings for this event close on 12 June. Booking forms were inserted in the May issue of *Radio Communication*.

Electrical safety

The British Standards Institution has recently published BS 415:1972 dealing with safety requirements for mains-operated household sound and vision equipment. All BSI documents are available from their publications section at 101 Pentonville Road, London, N1.

Simultaneously, BSI published a report by the electrical adviser to the Home Office on household electrical fatalities in 1970. The number of fatalities in that year was 48, below the average of recent years. It is perhaps not the number of accidents, but the causes that attract attention. The use of mains-operated equipment in bathrooms continues to take its yearly toll and it is quite incredible that such apparatus should be used in those surroundings with little regard for safety and possible accident. In seven cases the victims were working on apparatus that had not been disconnected from the mains, and in a further eight the main cause was loose or broken conductors in the plugs.

Is your equipment electrically safe and do you adopt sensible precautions when working on electrical equipment? **Death is permanent!**

"VHF Communications"

Readers will have noted the special offer comprising the complete set of issues for 1969, 1970 and 1971 for £4.30. The publishers have now produced a composite index for volumes 1, 2 and 3 of *VHF Communications* and which is supplied with these issues. *VHF Communications* can be ordered direct from the publishers (UKW Berichte, 8520 Erlangen, Gleiwitzer Str. 45, German Federal Republic) or from their UK representative, Microwave Modules Ltd, 4 Newling Way, Worthing, Sussex.

Another Racal ARC junk sale

The next junk sale run by the Racal Amateur Radio Club will take place at St Sebastians Hall, Nine Mile Ride, Crowthorne, Berkshire, on Saturday 17 June 1972. Doors open at 1400 and close at 1700 or when sold out. As in previous events, junk will range from electronic assemblies and materials, old test gear and counters down to individual components. Everything on offer is sold "as seen" with no guarantee; this is reflected in the prices! Individual amateurs and members of radio clubs are invited. Refreshments will again be provided. Plenty of parking space is available in Wokingham Road or in the Hall compound but please do not park in Nine Mile Road or Honey Hill.

Looking ahead

10 June—Purley & D RC at Caterham Carnival.
25 June-1 July—Echelford ARS "At Home" (GB3HCW), Hanworth Carnival, Hanworth Airpark, Middx.
30 June—RSGB Dinner Club, Kingsley Hotel, London WC1.
26-27 August—Harlow & DARS at Harlow Town Show, Town Park, Harlow.
23-24 September—NW Amateur Radio Convention; University of Lancaster.

Audio-frequency unit for rtty transmission

by Dr A. GSCHWINDT, HA5WH*

THIS article introduces a unit which is suitable for use with a.m. and ssb transmitters as an af driver.

Basic considerations

The unit being described generates audio frequency signals lying in the passband of an a.m. or ssb transmitter. The variation of the audio frequency is according to the level of the output signal of the teleprinter.

The simplest method is on-off keying of two independent oscillators, running with a frequency difference of f hertz, where f is the frequency shift (850 or 170Hz). This simple solution to the problem results in very poor switching properties with out-of-band radiation coming from the switching transients.

To eliminate these transients, the circuit shown in Fig 1 is used. The afsk generator contains two oscillators, one of which is frequency modulated, and both oscillators have a working frequency of about 400kHz. The frequency modulation is of true analogue type. The pulses from the teleprinter drive the pulse shaping and level matching unit, the output of which is connected to the frequency modulator.

The frequency difference of the two oscillators in the stop condition is equal to the stop audio frequency signal. When the start level comes from the teleprinter the frequency will be altered. For example, in the case of 850Hz shift the modulated oscillator alters its frequency from 400 to 400·85kHz. Thus the variation of the frequency copies the shape of the formed pulses. The frequency modulated signal is then transferred to audio frequency by a mixer stage.

Any frequency instability present in the oscillators will affect the signal from the mixer, and at the receiving end the instability will appear as a shift of the transmitter frequency. To avoid this effect it is necessary to ensure that the performance of the oscillators is similar. In practice this is the working principle of the "beating type" audio frequency generator. If the same elements are used in the frequency determining circuits of the two oscillators then these will have similar properties insofar as the variation is concerned.

Variation of the frequency of the unmodulated oscillator will enable the optimum working audio frequency for the passband of the transmitter to be determined. The frequency shift is determined by the amplitude of the pulses at the output of the pulse shaping stage.

Alternation of the start-stop frequencies may be carried out in one of two ways; the down mixing frequency can be shifted above modulated oscillator or the pulses coming from the teleprinter may have their polarity inverted. The latter method has been chosen for use in this unit.

Circuit description

The complete circuit, which was built on a printed board, is shown in Fig 2, and the various sections are examined in detail.

Pulse shaping

The contacts of the teleprinter control a 9V supply which may be obtained from the 18V stabilized supply by the use of a 9V voltage reference diode. In the author's prototype the required 9V were obtained from a battery located in the teleprinter. The contacts of the teleprinter relays switch the battery voltage on or off and at the same time TR1 or TR2 will be switched on or off. S1 selects the polarity of the transmission, ie inverted or normal. In the normal mode only TR2 is working, but when the pulses are changed by S1, TR1 and TR2 will work together in cascade arrangement.

Frequency modulation is produced by a varicap diode, D1. Between TR2 and this diode is an integrating circuit which gives a lower rise and fall time for the pulses. This eliminates the unnecessary very fast variation of the pulses which may cause signal splattering in the rf channel.

The shift control is in the collector circuit of TR2. Only two shifts are applied, ie 850 and 170Hz. Alteration of the shift (by S2) causes variation of the dc level at the input of the modulator, which results in a frequency shift for the stop signal. To eliminate this problem a second varicap diode (D3) is used; this modifies the frequency of the second oscillator (TR6) in such a way that the stop signal will remain at the same frequency. If necessary it should be possible to keep the frequency lying between the middle of the shifted frequency limits at the same figure.

Oscillators

The two oscillators both use the Clapp circuit and have the same elements in their frequency determining circuits.

* Budapesti Muszaki Egyetem, Garami erno ter 3, Budapest 11, Hungary.

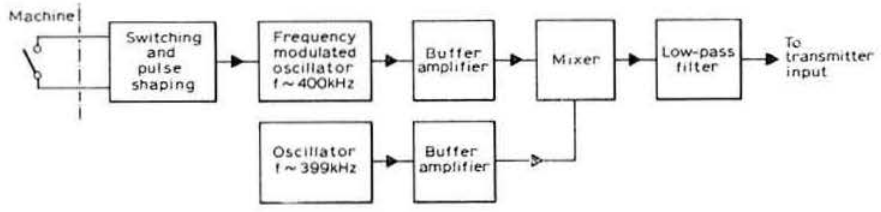

Fig 1. Block diagram of the audio frequency unit for rtty transmission

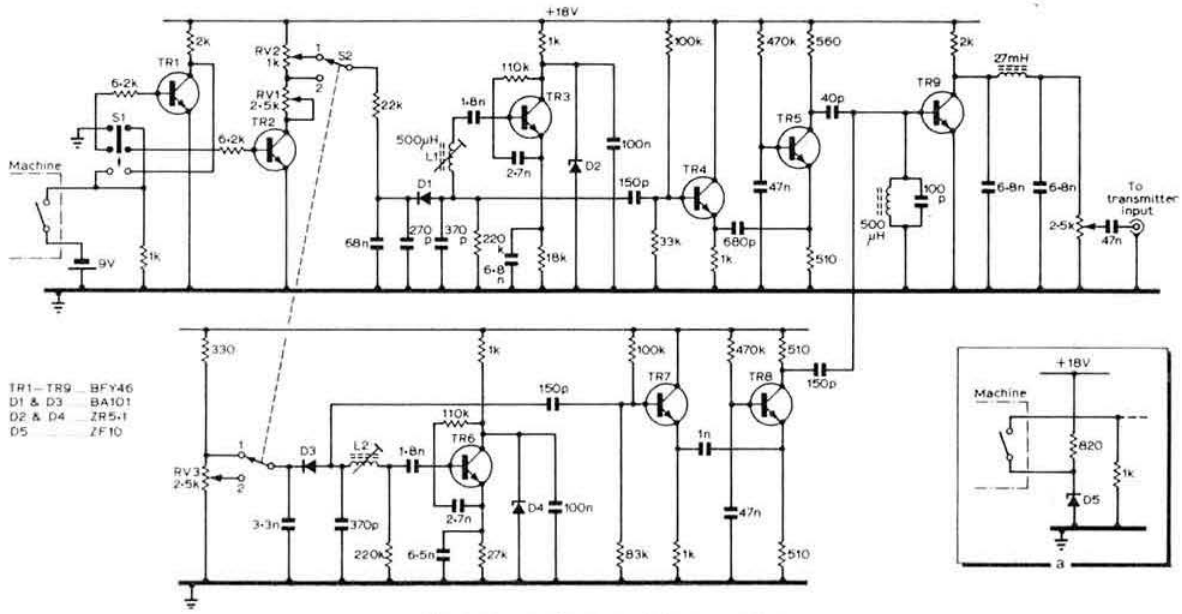

Fig 2. Circuit diagram of the generator

To eliminate the tendency for self-synchronization, which will give a distorted sinusoidal output signal, very good isolation between the two oscillators is necessary. The two independent zener diodes help to eliminate the coupling produced by the common supply source.

Buffer stages

Two emitter followers (TR4 and TR7) drive the common base amplifiers. The buffer stages have the same circuit arrangement and the use of two stages provides better isolation between the oscillators.

Mixer

The two rf signals are applied to the base of TR9. The amplitude ratio of the two signals must be large enough to keep the output of distortion at low levels. For example, the voltage from TR8 is about 20 times higher than the voltage from TR5. It will be noted that the values of the respective coupling capacitors are 40pF and 150pF respectively.

The output of TR9 is connected to a low-pass filter to suppress the high frequency components. The output af level is about 150mV$_{eff}$, which is sufficient for most transmitters.

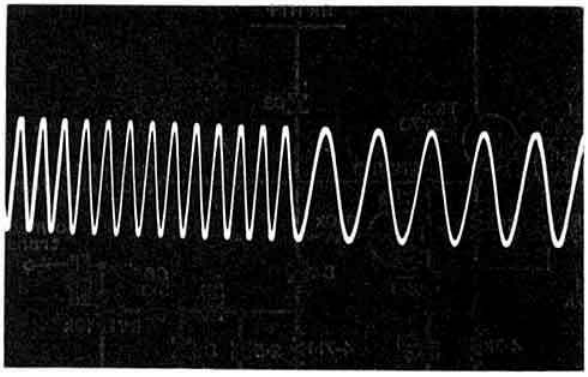

Fig 3. This shows frequency variation from 1 to 1·8kHz

Alignment

To prepare the unit for operation the following steps are necessary:

(1) With the switch S1 on the second position, obtain the 850Hz shift by measurement of the output signal and adjustment of the control RV1. If the input connectors are shorted and S1 is switched on and off it will be possible to measure the start and stop frequencies. With S2 on the first position it will be possible in a similar manner to obtain by adjustment of RV1 a shift of exactly 170Hz.

(2) To eliminate the audio stop frequency shift proceed as follows: First, place the audio stop frequency (for example) on about 3kHz by adjustment of the core of L2. The frequency of TR6 must always be lower than that of TR3. Measure the audio output frequency, which should be 2·8kHz. If this represents the stop signal then the start signal is 2·97kHz. With S2 on the second position, adjustment of RV3 will produce a 2·8kHz signal; S1 is in position also to produce this frequency.

It will be seen that by this method the stop signal frequency will stay the same at both 170Hz and 850Hz shifts, and by the adjustment of the core of L2 the stop signal frequency could be translated down to 1kHz or so.

Fig 3 shows the process of frequency variation from 1·85kHz. It will be seen that the frequency moves smoothly from one figure to the other without any transient.

Electronic switching in amateur radio equipment

by D. A. TONG, BSc, PhD, G8ENN*

(Part 2)

Audio frequency switching

There are many methods available for gating low-frequency and low-level signals. One of the simplest and best is to use a field effect transistor as a voltage controlled resistor. An N-channel junction-gate fet, if its gate is connected to its source or left unconnected, behaves as a linear resistor of around 100Ω or less to signals with amplitudes less than the pinch-off voltage (usually a few volts). On the other hand, if its gate is taken sufficiently negative relative to the source, the fet becomes a resistor of many tens of megohms. The unique feature of FETs used in this way, however, is that they are bi-directional with respect to current flow between source and drain, and also that there is little interaction between the gating signal and the gated signal. This enables silent (ie clickless) switching to be obtained very conveniently. Fig 12 shows the simplicity of a fet gate. R2 may be almost any value up to many megohms since negligible current is taken by the gate. By varying V_{cc} the circuit can also be used as a voltage controlled attenuator.

An N-channel device is convenient for use with a positive chassis and a P-channel fet with a negative chassis. This is a little unfortunate because P-channel FETs are relatively scarcer. Typical devices are the Motorola 2N5460 (P-channel) and the 2N5457 (N-channel). Further flexibility is afforded through the use of P-channel insulated gate FETs of the enhancement type. These are currently available at very low prices as "unmarked untested" but are perfectly suitable for audio switching, or rf switching for that matter. In this case the gate needs to be more negative relative to the source than a certain threshold voltage (several volts) before the source-to-drain path is able to conduct. This is shown in Fig 13. Again it is unfortunate that devices with this polarity are more suited to a positive chassis. It is a pity that N-channel enhancement MOSFETs are not readily available.

Needless to say, if a number of signal sources are to be switched at will to a given point, for example, inputs to an audio amplifier from, say, a.m., fm, and ssb detectors and maybe also from a microphone preamplifier, a fet would be used for each channel with all their drains connected together across R3.

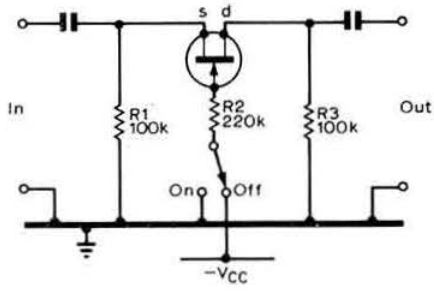

Fig 12. Basic audio gate using a junction-gate fet

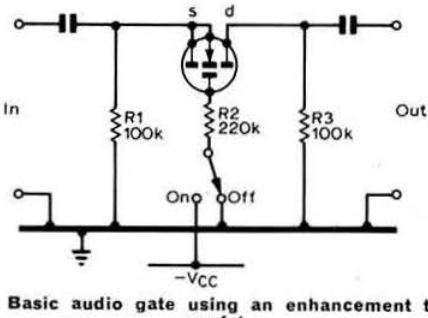

Fig 13. Basic audio gate using an enhancement type of mosfet

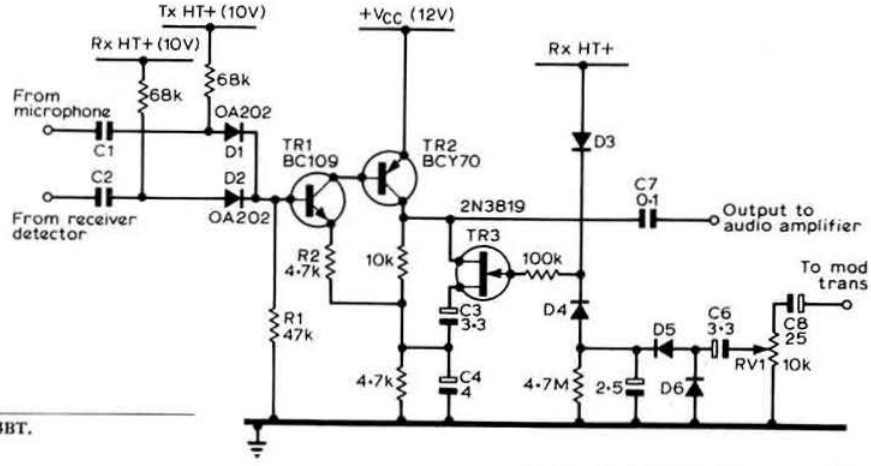

Fig 14. Compressor amplifier circuit which illustrates the use of silicon junction diodes as audio gates, and also the use of a junction-gate fet as a voltage controlled resistor

* 11 Moor Park Avenue Leeds, LS6 4BT.

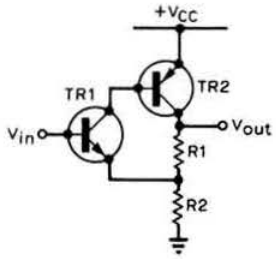

Fig 15. Basic negative feedback non-inverting amplifier used in the circuit of Fig 14

While possibly the best audio gates, FETS are certainly not the cheapest, and this distinction is probably reserved for the humble diode. Often, however, the performance of a diode gate is perfectly suitable for the job. A good example is the diode squelch gate used by Pye in the ubiquitous Pye Cambridge. An example of diode gating which has been used by the author is shown in Fig 14. The circuit also exemplifies the use of an N-channel junction fet as a voltage-controlled resistor.

The circuit is that of an audio preamplifier and speech compressor and its function is to amplify a microphone signal on transmit and the receiver output on receive. The choice of input signal is determined by whichever diode, D1 or D2, is forward biased, the other being then reverse biased. In turn this depends on whether the transmitter or receiver ht is energized. TR1 and TR2 are connected in a very useful non-inverting amplifier configuration which deserves to be more widely used and which is probably worth a slight digression. Basically the circuit is that shown in Fig 15 and if one regards TR1 as an emitter follower the voltage across R2 will be $V_{in} - 0{\cdot}5$ and since nearly the same current flows through R2 as through R1 the total voltage across R1 + R2 will be given by

$$V_{out} = (V_{in} - 0{\cdot}5) \,.\, (R1 + R2)/R2.$$

Thus the quiescent output voltage is easily calculated and of course the gain is just (R1 + R2)/R2. The gain to ac may be made different to this if necessary by bypassing either or both of R1 or R2 with capacitors such as C3 or C4 in Fig 14. Thus when TR3 in Fig 14 is a high resistance, the gain is large, but when TR3 is a low resistance the ac gain is close to unity.

Bias for TR3 comes from a voltage doubler rectifier, D5 and D6, which monitors the ac voltage across the modulation transformer. In the receive mode, the compression action is disabled by applying the receiver ht to D3 and thereby making TR3 a high resistance. Diode D4 stops the receiver ht from charging the time constant capacitor (2·5μF). The compression threshold is altered both by RV1 and by the quiescent output voltage at TR2 collector, which is in turn determined by R1.

When R2 in Fig 15 is bypassed by a capacitor, its discharge and charge time constants should be equal in order to avoid a partial rectification effect. This is the function of R2 in Fig 14. The gain expression is almost unaffected. One point concerning this type of amplifier circuit is that decoupling is often unnecessary for the supply to the pnp emitter. This is because the voltage gain of the amplifier is normally much lower than the potential open-loop gain of the pair of transistors so that the output voltage and gain are relatively independent of transistor parameters and operating conditions. The bias supply to the base of TR1 does of course need to be decoupled from later stages in the amplifier chain.

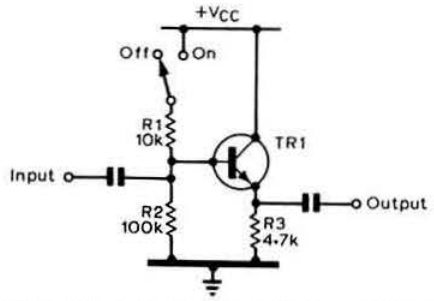

Fig 16. The use of an emitter follower as an audio (or rf) gate

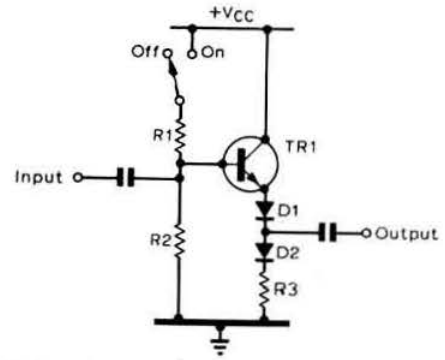

Fig 17. Emitter-follower gate with improved off-attenuation and reduced loading of the output load when the gate is off

Another useful gating circuit is an emitter follower as shown in Fig 16. When the gate is off, signals less than about 0·5V will not pass to the output except via the small base-to-emitter junction capacitance. Attenuation may be further improved by adding diode D1 as in Fig 17. The diode can be chosen to have far lower junction capacitance than the base-emitter capacitance of TR1. A further diode, D2, enables the output of the gate to be completely isolated from any loading at all for signals at the output of less than

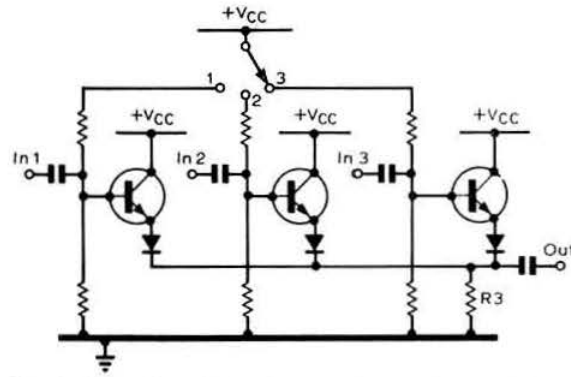

Fig 18. Several emitter-follower gates can be used with a common load resistor in which case the off-attenuation is increased for large input signals compared with the single gate

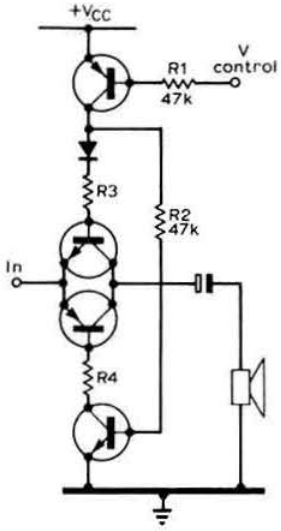

Fig 19. Loudspeaker gating circuit with control input referred to V_{cc}

0·5V. Several gates of this type can use the same load resistor R3 as in Fig 18. Here the voltage across R3 is always high and the off transistors have their base-emitter junctions well and truly reverse-biased so that much higher signal levels can be blocked. The diodes may not be necessary at audio frequencies but are often useful at radio frequencies.

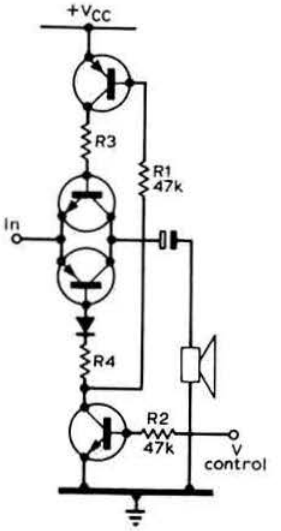

Fig 20. Loudspeaker gating circuit with control signal referred to chassis potential

The switching of appreciable audio power using solid-state techniques is more difficult. The main problem is that loudspeaker impedances are usually low and comparable with the dynamic impedance of the more common semiconductor switching elements such as diodes and FETs. A circuit suitable for disconnecting a loudspeaker, for example, from a complementary audio output stage when that stage is also used as a modulator for a transmitter has already been described by the author [2] and the circuit is repeated in Fig 19. With the circuit connected as shown the control voltage must go to a voltage more than half a volt more

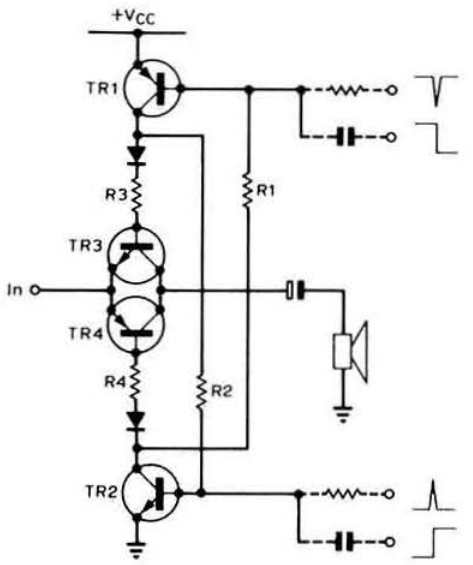

Fig 21. Latching version of the basic loudspeaker gate

negative than V_{cc} to connect the loudspeaker. If on the other hand R1 and R2 have their functions reversed, the circuit needs a control voltage going more than about half a volt more positive than the chassis to connect the loudspeaker (Fig 20). A further variant is shown in Fig 21 and has bistable, or "latching", properties. Once either TR1 or TR2 is momentarily made to conduct, the gate remains conducting until the supply voltage is momentarily interrupted. As indicated by the dotted components, the triggering can be obtained in any of several ways.

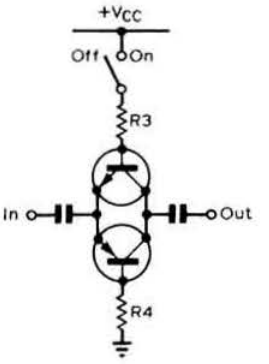

Fig 22. Form of the loudspeaker gate which is useful when the input is capacitatively coupled and which is also suitable for low-level signals

These gate circuits will of course operate with low power signals as well and the input can if desired be capacitatively coupled, in which case TR1 and TR2 are not required and the circuit reduces to that shown in Fig 22. When the circuits are used to drive a loudspeaker, R3 and R4 determine the peak currents which can flow through the gate and hence the peak audio power transmitted. Typical values might be 1kΩ for a 12V supply and a 500mW output stage.

To be continued

More modifications to the KW2000

by M. A. HALL, G3USC*

SOME years ago, an article in *Radio Communication* by G3BA outlined some simple modifications to the KW2000 transceiver in order to increase the bass response of the received and transmitted signal. The author fully agrees with G3BA that these modifications are well worth while and suggests additional ones, assuming that one does not mind drilling two extra holes in the front panel.

The modifications, in increasing order of complexity, are:

(1) Incorporation of a variable rf drive control.
(2) Transistorizing the vfo.
(3) Improving the dynamic balance of the balanced modulator. (This also necessitates re-designed audio input stages and minor alterations to the vox circuitry.)
(4) Inclusion of a simple sideband clipper and filter.

RF drive control

The author never did like the idea of varying the rf drive to the pa by simply adjusting the microphone control. Although the cathode of the driver (6CH6) was decoupled by a very small capacitor (10pF), which gave less negative feedback and therefore greater gain at high frequencies—the author found that in this transceiver the microphone gain control had to be advanced considerably for 15 and 10m operation. This could have meant that the balanced modulator or transmitter mixing stages were being over-driven on the higher frequency bands—with consequent distortion; and conversely, under-driven on the lower frequency bands—so giving a higher relative carrier level.

Several attempts to vary the gain of V7 by variable current feedback resulted in instability of this stage, even though this is the method used in several well-known designs. A fet with variable gate bias was also tried in the cathode circuit of V7 in an attempt to keep connecting leads carrying rf really short. Although this method worked well on the lower frequencies, the 6CH6 was still barely stable on 10m. The final arrangement adopted, which was completely successful, is shown in Fig 1. The 6CH6 is changed for an EF183 and variable gain is provided by varying its cathode bias and therefore its gm. As long as the leads of the cathode decoupling capacitor are kept short, no instability should occur Although not so much drive power is available as before, there is still plenty to push the 6146 into grid current when using the method of pa neutralization recommended by KW.

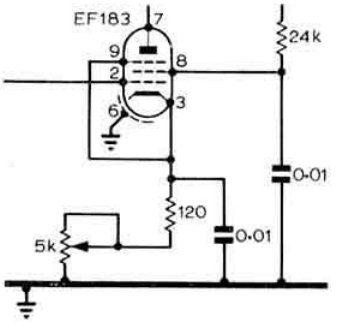

Fig 1. RF drive control

The vfo

For static operation this modification is probably unnecessary. It does, however, remove most of the warm-up drift. When used mobile under conditions where the battery voltage can vary by as much as 25 per cent, the situation is very different. Variations of V11 heater voltage will affect the vfo frequency, as will minute variations of the stabilized +150V rail. This rail feeds the irt diode which is connected directly across the vfo tuned circuit.

When travelling under stop-start conditions in London's traffic, it was found to be very difficult indeed to resolve a station without continued "tweeking". Operators trying to copy the transmitted signal also had the same trouble. The complete cure was to transistorize the vfo and to feed both this and the irt diode from a well-stabilized low-voltage supply. The new circuit, which was borrowed from the *ARRL Handbook* is given in Fig 2.

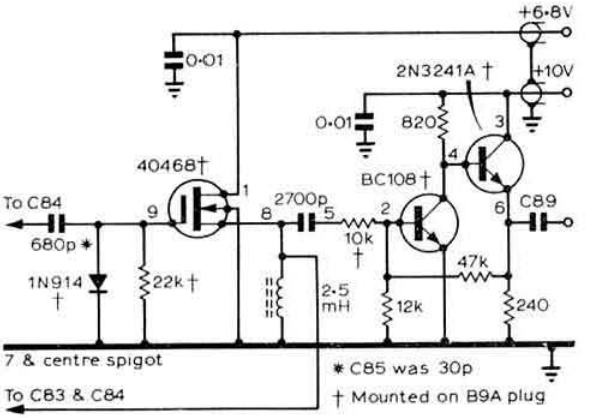

Fig 2. VFO

Removal of the vfo box is straightforward. The author took the opportunity of replacing the slow-motion drive at the same time—the original had become rather notchy. After unsoldering all connections, the front panel must be partly detached from the chassis by removing the securing nuts from controls which go through both the chassis and front panel. The three variable capacitor drive spindles must also be removed and then the vfo box can be withdrawn complete with slow-motion drive. All components concerned with dc feeds to V11 are removed from the box and the circuit re-wired accordingly. C85 is removed and replaced by a 680pF

* "Morwenna", Bridgerule, nr Holsworthy, Devon.

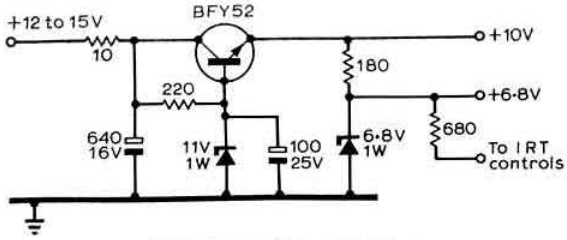

Fig 3. Low voltage regulator

component in order to provide a time constant suitable for the correct operation of the 1N914. R54 within the box and R62 without, both 47kΩ, are shorted and the irt controls both fed directly from the +6·8V rail via a 680Ω resistor. Components marked with a dagger in Fig 2 are conveniently mounted on a B9A plug; the pin connections used by the author are indicated. The low voltage regulator shown in Fig 3 is mounted on a small tag-strip bolted to the underside of the vfo box; it supplies both the vfo and the sideband low-pass filter. Re-alignment will now be necessary owing to a slight change in the irt diode voltage.

Balanced modulator and speech amplifier

When two-tone testing the transmitter in its original form, it was noticed that there was considerable carrier leak-through which was preventing a clear, stationary crt display from being obtained. On checking the static balance of the balanced modulator, the carrier rejection was found to be satisfactory. What seemed to be the trouble was that the diodes D1 and D2 were not properly matched over their whole characteristic, leading to a state of imbalance when audio was applied. The modification to be described, which may be thought rather academic and not essential to intelligible communication, gives a really clean display. The problems and expense of testing dozens of diodes in order to find two that were well enough matched were dispensed with by using a proven textbook design, namely—a low μ twin triode.

In Fig 4 the ECC81 is replaced by an ECC82 or better still by a 6067 or M8136 which are the special quality versions in which the two halves are better matched. Push-pull audio drive is supplied by V1(b) which is now a phase-splitter, the series resistor (11kΩ) is included to present approximately the same impedance to each grid of the balanced modulator. Provided that close tolerance components are used in the balanced modulator and phase-splitter and attention is given to wiring symmetry, no problems should arise.

Extra gain now required from the speech amplifier is provided by V1(a) and a small transistor amplifier mounted beside the microphone input socket; the circuit is shown in Fig 5. This circuit requires a supply of about 10V which is conveniently provided by the cathode of the audio output valve V17 via decoupling components. The microphone input socket is replaced by a five-pin type which is arranged to connect power to the transistor amplifier when the microphone is plugged in. A high level input is also included to enable auxiliary audio equipment to be connected without attenuator pads.

The level of tone fed into the balanced modulator when the transceiver is switched to TUNE is set by R8, now 560kΩ, to represent the normal peak audio level. This level is arranged to be 6dB below the overload point of the balanced modulator and can therefore act as a reference level to facilitate calibration of the microphone gain control. The procedure for setting up would simply be a matter of tuning up the transmitter into a dummy load in the normal way and finally noting the deflection of the output on a crt. The microphone gain control should then be set so that speech peaks cause the same deflection.

Having completed the balanced modulator changes, it was found that correct operation of the vox circuitry necessitated using the vox gain control RV111 nearly flat out. Unfortunately, doing this meant that V21 was being over-driven and severely overloading V1(a). In the original circuit, V1(b) acts as a buffer amplifier and isolates the vox amplifier from V1(a). The following steps show how the vox amplifier gain may be increased and the loading effects of V21 reduced:

(1) Remove link between the slider of RV111 and V21 pin 2 and insert a 1MΩ resistor.
(2) Connect a 1kΩ resistor across R108 (2·7kΩ).
(3) Change R105 (3·3MΩ) for 1MΩ.
(4) Connect a 1N914 diode, anode to earth, in place of R103 (100kΩ).

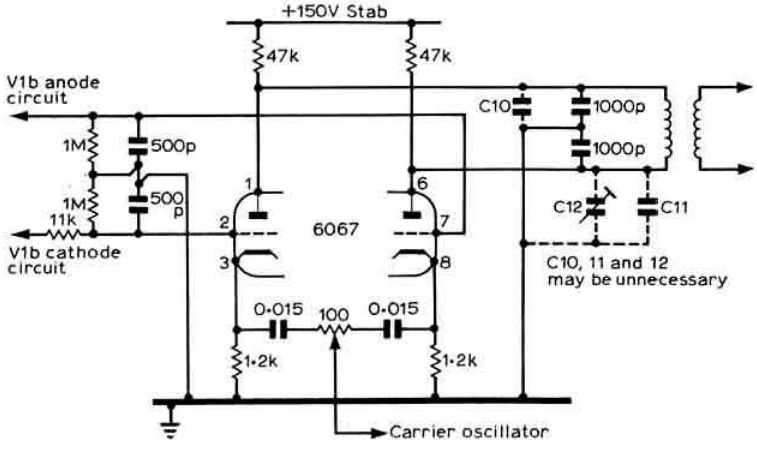

Fig 4. Balanced modulator

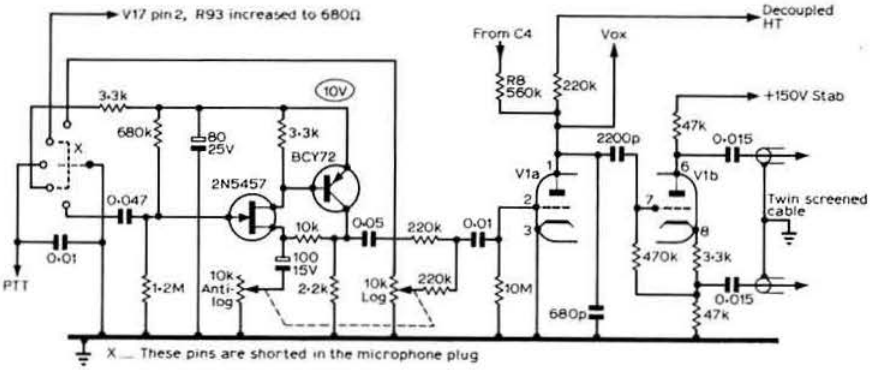

Fig 5. Speech amplifier

Sideband clipper and filter

This unit provides up to 15dB of clipping and it will be noted that only low-pass filtering has been included. On-air reports indicate an increase in signal strength of about 1½ S-points with little or no in-band or out-of-band intermodulation products. The author fully expected to have to use yet another bandpass sideband filter, but luckily it turned out that results did not justify the extra expense.

The circuitry consists of an amplifier (Fig 6) comprising two transistors connected as a single high input impedance device. At low gain settings this amplifier does in fact introduce a slight loss since the normal output from the mechanical filter is in excess of the clipping voltage of the 1N914 diodes. This loss plus the slight loss of the filter is made good by replacing the first and second transmitter mixers, ECC81s, by ECC85s. No other change will be found to be necessary except, of course, to the heater wiring of these valves. Pin 9 of an ECC85 is an inter-section screen and must be earthed.

The filter (Fig 7) is a conventional active low-pass type and has a very low order of ripple; it has a cut-off frequency of 460kHz. It would have been possible to use a four-element filter which gave the same attentuation to harmonics. However, since the diodes give a fairly hard squaring action when driven to 15dB of clipping, it was thought that a five-element type would create smaller overshoots and thus lower the distortion and lessen the risk of overloading the pa. At small amounts of clipping the action is fairly soft and, indeed,

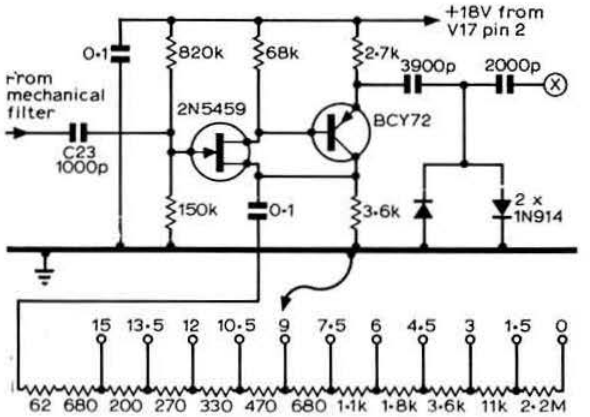

Fig 6. Sideband clipper

with none at all a small amount of compression takes place due to the gradual slope of the diodes. Power for the amplifier is again derived from the cathode of the ECL82, and for the filter from the vfo supply regulator. It is important that the leads to the front panel switch from the amplifier have a low capacity to earth, otherwise an increase in gain will result. Ordinary coaxial cable was found to be quite unsuitable, but the type used for car radio aerials or even just hook-up wire is satisfactory. The filter components should be of 5 per cent tolerance or better if it is to have the correct response.

Conclusions

It will be apparent that the modifications described are fairly involved and there will be those who will not wish to delve too deeply into their transceiver for fear of either causing damage or of reducing its second-hand value. The author would be the first to accept that the latter reason for not tampering is very valid. When buying a piece of second-hand equipment and one is told that such and such has been modified, there is a great possibility that something else has been breathed on also, and perhaps the vendor did not really know what he was doing anyway! It is, therefore, important that these suggestions be followed only by those who have had practical experience of rf circuitry and ssb equipment. The KW2000 is an excellent little transceiver and the author would hate to feel that he had been the cause of unnecessary meddling by inexperienced soldering irons.

Assembly of the sideband clipper and filter presents some difficulty as there is not much spare space. The author built his bird's-nest-fashion on two pieces of 16g wire soldered between the centre spigots of V3 and V4. No doubt this unit could be constructed as an outboard device but it would have to be driven from a source or compound emitter follower within the transceiver.

A few words of caution might be in order. The main power unit delivers a positive earthed dc supply for relay operation. It is, therefore, necessary to reverse MRs 13 and 14 and Cs 7 and 8 if a negative earthed supply is to be obtained. The author's car has a negative earth system, but if a positive earthed supply has to be used, reversal of electrolytics and the use of complementary transistors will be necessary in the relevant circuits. The low-pass filter should be made as compact as possible to prevent stray capacitance from affecting its characteristics. In certain installations it may be necessary to include rf filtering at the speech amplifier

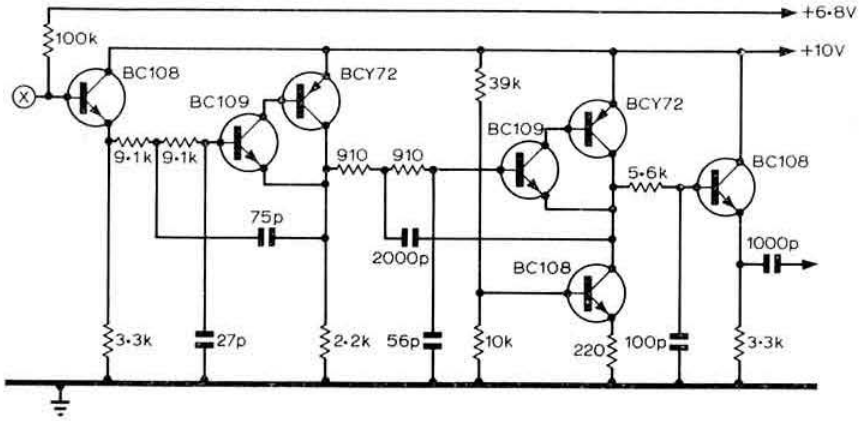

Fig 7. Sideband filter

input; this can take the usual form of series R and parallel C as in the original circuit or simply a small capacitor from gate to source of the fet. Attention must be paid to the balance of the valve heater voltages as they are wired in a series-parallel arrangement. The now reduced load on the +150V rail means that R96 could be increased in value to reduce the overall load; the author uses 3kΩ. It will be seen that some coupling and decoupling capacitors have old type values and some have new, the exact value is not of course necessary, the equivalents will do. The author is unaware of the exact differences between the different models of the KW2000, except that the A and B have greater output power, and it is probable that these modifications could apply to all of them.

EQUIPMENT REVIEW

Samson ETM-3 squeeze keyer

by PAT HAWKER, G3VA

WHEN an opportunity arose to review the ETM-3 squeeze keyer (made in West Germany and available in the UK from Spacemark Ltd, 14 Piccadilly, Manchester, price £24.75), it was recognized that any judgement on keys and keyers must inevitably be subjective rather than objective. A key that suits one operator may be virtually useless to another. So rather than attempt to measure or test its electrical or mechanical performance (and the ETM-3 performs in full accord with the manufacturer's claims) some account would be given of how one individual—the reviewer—reacted to using this keyer. This was to prove no easy task, and a review that was intended to be completed in a few weeks has stretched over many months.

What the reviewer hoped to do was to answer two questions: (1) Is twin-paddle, iambic-mode, squeeze keying an advance on conventional single paddle keys? (2) Does the ETM-3 represent good value for money? He must confess, at this point, that no entirely satisfactory answers have proved possible. Even now, after many, many hours of practice and some 50 on-air contacts with the keyer, he remains a little uncertain. This is no reflection on the keyer itself, which has shown all the virtues that one can expect from a design created with care and expertise. Rather it is simply that he found that, as far as he is concerned, to operate the keyer in the full "squeeze mode" represents a challenge not to be dismissed lightly, certainly not by those of us who, as the years roll by, have retained perhaps more enthusiasm than mental and manual dexterity.

Until the ETM-3 arrived (very well packed) the reviewer had read about but never tried squeeze keying; for 25 years the key at G3VA has been a Junker straight key, apart from

occasional use of semi-automatic bug keys and very slight experience with single-paddle el-bugs. So clearly he was putting the ETM-3 to a harder test than would the operator who has fully graduated on el-bugs. And it should be pointed out that the ETM-3 *can* be operated exactly as if it were a single paddle unit, although this throws away the advantages of single squeezes for many letters.

On a straight key all symbols are of course made manually and the "shape" of every dit and dah depends entirely upon the operator; some 82 contact closures are needed to send the alphabet. The semi-auto key replaces multiple dits with a single timed closure, and the shape and spacing of the dits is taken care of automatically; an alphabet needs 66 contact closures. The el-bug replaces multiple dits and multiple dahs with single closures and can include self-completing and character-spacing "memory"; the alphabet now represents 55 closures.

With the ETM-3 we enter the world of "iambic-mode" operation; those who remember the rules of metrical scansion will grasp that this means that when the paddles are squeezed together, the keyer produces a series of interspersed dits and dahs, short-long, short-long, short-long all accurately spaced and completed. Because there are two paddles, it is possible to do more than this: if the paddles are closed in the reverse sequence out comes dah-dits, long-short etc; one paddle alone gives a series of dits; the other alone a series of dahs. So we have four combinations: dits, dahs, dit-dahs, dah-dits all with correctly timed spaces and cross-overs. And we are now down to 45 contact closures per alphabet, compared with 82 for the straight key. Furthermore, such useful symbols as AR, VA, CT can all be made with what amounts to a single squeeze; CQ with two simple squeezes.

So it is easy to come to the conclusion that, theoretically, iambic-mode squeeze keying does represent a very real and useful advance on earlier types of keyers and keys. Having decided this, one must add a rider. In automatic keying one reduces the number of contact closures (and so makes possible higher speeds) at the cost of introducing the well-known form of timing error which results in jibberish, with the machine trying to take over from the flustered operator.

John Piggott, G2PT, in an excellent survey article (*RSGB Bulletin* May 1956) pointed out the curious problem that the operator's mind must be ahead of his hand movements since "it is fairly certain that there is no individual nerve signal for each transmit movement of the key"—in other words, the times involved in morse are less than human reaction times. In acquiring a new form of keying it is clearly necessary to be prepared to put in many hours of practice, to program the brain so-to-speak.

The reviewer's original questions have thus resolved themselves down to: taking for granted sufficient practice to ensure that by and large the letters come out (perfectly shaped), will the overall number of errors compare well with straight sending? He prepared test groups of 20 and 25 five-letter random code groups. With the Junker key (a straight key he can fully recommend, and available in the UK from Spacemark) these groups could be sent at 20 to 25 wpm with rare errors. As a target, he decided he would be more than satisfied if (as a learner) he could send, say, 20 groups at comparable speeds on the ETM-3 without making an average of more than one error. This was in line with his feeling that many operators who can be heard sending pleasant code on el-bugs nevertheless have to (or should) insert corrections rather too often.

It would be satisfying to report coming through this self-imposed test with flying colours. At one stage, early on, it was discovered that some faults were being introduced by mistiming the *preceding* letter; with the original ETM-3 keyer, if a dah is held too long it may complete perfectly but the *following* letter may be affected. With the help of Spacemark and the German designers this fault was explained and has since been cured. But after very many hours of practice, the reviewer finds his error rate still at the fringe of the target. Other operators, especially those graduating from el-bugs, may find they can take to the keyer much more readily; the reviewer can report only that he is still not satisfied with the error rate achieved in practice.

If you are prepared and able to accept and overcome this challenge, then the ETM-3 is clearly a worth-while acquisition, even if, for the young amateur, a luxury.

The keyer

The keyer uses a single variable timing oscillator with four Sprague integrated circuits to count-down and provide an accurate constant-ratio of two dits to every dah, with the setting of a single speed control. Side-tone is provided. The keying relay (suitable for grid-block type keying and not for heavy currents) is a near silent reed relay—a tremendous advantage for operating or practising when others are in the room. The standard ETM-3 has relay contacts rated at 400V *or* 1A maximum (switching up to a maximum of 30W); also available are the ETM-3s with changeover contacts (0·5A, 250V, max 10W) or for heavy-duty keying the ETM-3z with make-break contacts (3A, 1000V, max 50W). There is thus choice of contact rating, plus contact protection with an inbuilt surge resistor in the keying line. It has built-in mains supply (no provision for battery operation). Keying paddles are well made and can be individually adjusted for gap and tension.

Minor criticisms: The speed control covers a range of about 6wpm to a claimed 60wpm, this results in significant speed changes for a small movement of the control knob—the reviewer suspects most users would prefer finer control, possibly with a switched range. The speed knob would be easier to adjust while sending if located on the other side of the paddles, and since it is also the on-off switch one cannot leave it adjusted to a preferred speed.

To sum up: The keyer does what it is claimed to do, does it well and will give enormous pleasure to anyone who is really prepared to adjust their brain-hand program. But it could be frustrating to the operator who believes that an advanced electronic keyer will dispense with the need for skill!

Though even if you decide against full squeeze-keying, there is nothing to stop you using the ETM-3 as a conventional electronic keyer—and a good one at that.

ETM-3b

This review is based on the original ETM-3 model. Early this year a modified circuit, known as ETM-3b, was introduced, using additional transistor circuitry to eliminate the problem, mentioned above, that it is possible to "fool" the keyer occasionally by mistiming the preceding letter. This modification should certainly ease the problem of mastering the use of the keyer. A sidetone amplifier, suitable for the ETM-3 and the single-paddle ETM-2 is marketed for those who do not want to use phones.

EQUIPMENT REVIEW

A 5·2MHz crystal filter for ssb

by P. J. HORWOOD, G3FRB

FOLLOWING the review of the SEI filter type QC1246AX in the April issue, the manufacturers, Salford Electrical Instruments Ltd, submitted one of their 5·2MHz range of filters for review. This was a type QC1246AA having a centre frequency of 5·2MHz and costing £15.80.

The filter is housed in an hermetically-sealed nitrogen-filled can and will meet normal Services bump, shock and vibration specification. The glass-metal terminations and the 6BA mounting studs are on a 0·1in grid, convenient for printed circuitry.

Typical carrier frequencies for a 6dB bandwidth of approximately 300Hz to 3,000Hz are:

For usb working—5,198·15kHz
For lsb working—5,201·52kHz

These will place the carrier >20dB down for usb and <20dB for lsb. A properly adjusted balanced modulator should suppress the carrier by at least 40dB in addition to that provided by the filter. Before choosing a carrier crystal remember that subsequent frequency translation for addition of vfo and band-change will invert the sideband each time the oscillator frequency is above the signal applied to the mixer.

Conclusions

High-grade filters such as those of SEI manufacture are expensive but confer much improved speech quality and better unwanted sideband suppression, and can be relied on to meet their published specification.

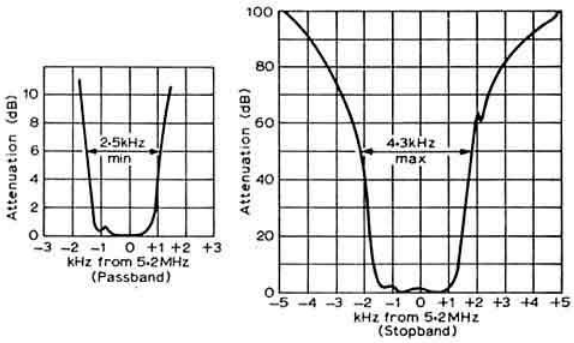

Fig 1. Measured responses

Specification and test results

	Specification	Measured (rel to centre f)
Passband (—6dB)	> 2·5kHz	+ 1·22 / —1·55 } 2·77kHz
Stopband (—50dB)	< 4·3kHz	+ 1·95 / —2·27 } 4·22kHz
Insertion loss	< 3dB	1·2dB
Passband ripple	< 3dB	1dB
Spurious responses	None	
Termination impedance	500Ω in parallel with 30pF	
Operating temperature range	— 40 to + 85°C.	
Dimensions	Length: 1·42in (36mm); Width 1·05in (27mm); Height 0·75in (19mm).	
Weight	1·25oz (36gm approx).	

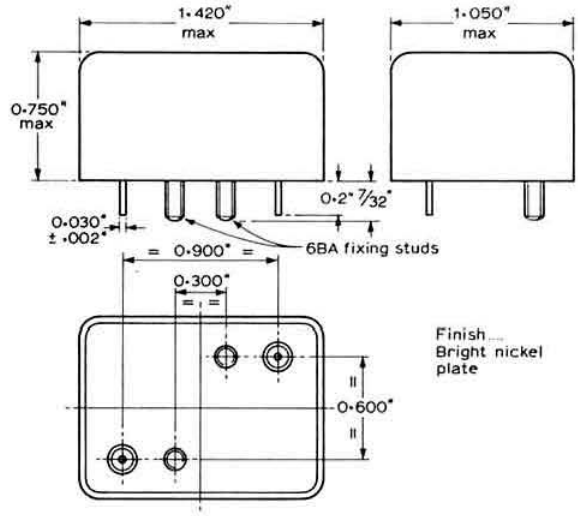

Fig 2. Outline drawing

New equipment

J Beam aerial Type 2XD

With the launch of Oscar 6 expected during November it is opportune that J Beam Engineering Ltd announce the availability of their Type 2XD aerial for 144MHz. This is basically a crossed dipole, fed in quadrature by means of a coaxial harness which not only feeds the two units on 90° phase shift but also matches the two dipoles to 75Ω. The polar diagram is circular and the performance is 3dB down on a dipole in any one direction.

However, this type of aerial produces a circular polarized pattern in the vertical plane which is ideal for the tracking of satellites during overhead or near passes. A number of commercial installations designed for weather satellite reception employ this type of aerial which obviates, in many cases, the need for an azimuth/elevation tracking procedure.

The 2XD turnstile is available from J Beam Engineering Ltd, Rothersthorpe Crescent, Northampton, at a cost of £4.20.

MICROWAVES—1,000MHz and up....

by DAIN EVANS, G3RPE*

The June Microwave Contest

The microwave activity planned for this month is the contest on 24–25 June. This covers 23cm and up, and details may be found in the January and April issues of *Radio Communication*. The main change from previous years is that it is now extended to 24h, and this should allow plenty of time to work everybody, including those with recalcitrant equipment, with perhaps the advantage of better propagation conditions on the Saturday evening.

An important feature of this RSGB contest is that one-way contacts score: this means that people equipped only with receivers can take part and contribute. Although 70cm will be used for talk-back, contacts on this band do not score, which leaves the field clear for microwave activity.

For these reasons, this contest is the most important in the microwave calendar, with perhaps more stations operating from better sites than at any other time. So that people new to the bands may plan their operations to best advantage, please make a special effort to let me have details of sites including NGR, and the bands to be worked, as soon as possible. This information will be circulated, and will be broadcast by GB2RS on 18 June.

The April microwave tests

The microwave tests held on the weekend 29–30 April, this time for 3cm and 15mm, were again dogged by high winds and rain which severely inhibited activity. Nevertheless several intrepid operators went out and made 3cm contacts. G8AZU and G3ZGO operated from Walbury Hill near Newbury, and G8APP with G3THQ from Woodcote. G8APP exchanged signals with both stations over the 33km path. G5FK operated a fixed station at Wembley, and had a full contact with G3ZGO. This was noteworthy in that, with a path length of 81km, this is probably the longest 3cm contact from a fixed station yet achieved in the UK, and was done with a receiver put together only the day before.

As far as is known, there was no activity on 15mm, although during recent weeks G8DEK and G3WDG have had contacts up to 5km, presumably making a UK record in the process.

The VHF Convention 1972

The 1972 Convention was a resounding success all round. Much fine microwave equipment was displayed: indeed, had some 9cm equipment been shown, all the microwave bands from 23cm to 15mm would have been represented. Particularly useful was the exhibition of pieces recently described in *Radio Communication*: it is always valuable to see in the flesh things one has only visualized from print.

The band best represented was 3cm, which reflects the continuing growth of interest. This was shown also by the amount of waveguide parts sold during the day, at a rough guess sufficient for 25 transceivers. Much of the equipment shown was "second generation", beginning to show a higher degree of engineering as well as more advanced techniques. Typical of the latter was a Gunn diode transmitter injection-locked onto a crystal-controlled source (G8APP), and a working 3cm tv link which is probably the first time that the band has been used in this way (G3ZGO).

Another feature was the appearance for the first time of 15mm equipment. Several examples were shown, including a complete transceiver using a 10GHz Gunn oscillator followed by a diode multiplier/mixer. As with other microwave equipment, much was in the "bare-bones" state, which sometimes can be more interesting than when it is all sealed up in shiny boxes.

The other bands were not neglected. One may pick out the first pieces of 6cm equipment to be displayed at the convention, a klystron mount and dish feed (G3WJG) . . . a 1,152/2,304MHz varactor multiplier (G3WMS) . . . a simple 70/23cm tripler which can produce up to 2W from five 1N914 diodes (G8AZM) . . . a 4ft skeleton dish (G3OAD) . . . and a 23cm long Yagi (G8AZM, this column, August 1971).

Microwaves were also represented on the lecture programme. A talk by Trevor Jones, G3OAD, covered pulse techniques in such a way that others will surely find irresistable the exploration of this attractive but neglected mode of operation.

The J. Fraser Shepherd Award

The first award, which is intended to mark an exceptional contribution to microwaves, was presented at the convention to Heath Rees, G3HWR. Heath has for many years played an important but perhaps not overt part in the development of the bands at higher frequencies. As a member and later chairman of VHF Contests Committee, he "invented" VHF NFD in a form which, it might be added, included all the microwave bands. He has always been deeply concerned with band planning, and was responsible for the band plans from 13cm to 3cm subsequently adopted as the standard for IARU Region 1: currently he is working on the planning of possible amateur bands above 30GHz. He is a member of the Technical and Publications Committee.

During recent years Heath has channelled much of his practical interest into the club station G5FK. Indeed much of the pioneering work done on the microwave bands under this callsign has been simply by G3HWR in disguise.

New faces

Another bonus from the convention is that one gets to hear of newcomers to microwaves. From GM3FYB, himself raising an interest in 3cm, it was learned that GM8BKE and GM3OXX have already had contacts on this band. This is the first news of activity north of Wolverhampton.

Another newcomer to 3cm is Peter Finch, G3PST, who would like to meet others in the Harlow area with a similar interest. He can be found at 21 Priory Court, Harlow.

It is worth mentioning again that it is one of the more important functions of this column to put isolated microwave enthusiasts in touch with their nearest neighbours. Would anyone in this position please let me have details so that the information can be circulated.

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TECHNICAL TOPICS

by PAT HAWKER, G3VA

ONE of the lessons that the amateur learns over the years is that in radio communications it is often easy to obtain quite acceptable results, but the *n*th degree of efficiency and effectiveness can require far more thought, expertise, patience and low cunning. This often poses a very real problem in deciding just when it is, and when it is not, worth breaking with conventional practice in order to strain after something a little better.

Perhaps nowhere can this be seen more clearly than in the question of receiver detectors and demodulators. For years and years, after the classic regenerative detector had largely faded away, the simple diode envelope detector reigned supreme. Then with the coming of widespread ssb the advantages of the product detector, which basically is a simple non-phase-coherent form of synchronous detector, became apparent even though it is really only at low signal/noise ratios that it scores theoretically over the simple diode. Recently, with the rapidly increasing interest in amateur nbfm, we have been seeing a long series of ideas and variations on many types of fm discriminators. Here the advantage over using an envelope detector as a slope detector is very real and represents a firm encouragement to action.

More recently, with the availability of integrated circuits suitable for phase-lock-loop applications, the age of the multi-mode phase-coherent synchronous detector may well be dawning. But are there still other forms of detection which have so far failed to make an impact? Later on, ZE3JJ encourages us tc dig up a 1946 idea that might well be worth further investigation. But first we look at a novel form of bfo-less synchronous detection: the reciprocating detector.

The reciprocating detector

It is well known that product detection of ssb speech requires only that the bfo or injection oscillator be set within about 50 or 100Hz of the original carrier frequency. But for a.m. and dsb modes, the synchronous detector needs to have an injected carrier virtually phase coherent with the original. This can be achieved only by locking the two oscillators together in some way, or by regenerating the carrier (or a synchronizing carrier) from the incoming signal, either filtering out what is left of the carrier and using this, or synthesizing it in some way from the available sidebands. It was shown by Dr John Costas, W2CRR, that a fully-suppressed dsb signal contains all the information needed to synthesize a reference signal, and several accounts have been given in *TT* of various techniques used or under investigation (eg *TT* July 1970).

A novel detector along these general lines has been described by R. S. Badessa of Damon Corporation (IEEE International Conference on Communications, Montreal, June 1971); initially he developed it at MIT around 1965. The conference paper describes the principles of the system and gives information on a dsb/ssb/am/cw detector which can be fitted to standard communications receivers having a final i.f. between about 50kHz and 500kHz.

The abstract of this paper (*A communications detector with a signal-synthesized reference*) reads: "A detector in which the reference is derived from the incoming signal by a form of waveform synthesis utilizing positive feedback is capable of demodulating a variety of types of transmission including single sideband and double sideband (carrier-less) waves. With single sideband transmissions the system permits the detection of weak signals without the problem of stray pickup from a reference oscillator (ie bfo), and displays an inherent rate-of-change limiting action against impulse-type noise. With double sideband waves (with or without carrier) it makes full use of the sideband energy in the two halves of the signal spectrum, and maintains its effectiveness against impulse-type interference. With any type of a.m. transmission having correlated upper and lower sidebands it removes much of the distortion associated with selective fading."

In this paper the author acknowledged help from Stirling Olberg, W1SNN. Now, in *Ham Radio* March 1972, W1SNN provides a down-to-earth description of his experiences with a reciprocating detector fitted to a Drake R4A receiver (final i.f. 50kHz), with particular reference to ssb/cw reception (one cannot help feeling that the system might also have much to offer for hf or vhf dsbsc reception).

The Badessa reciprocating detector, although by no means as complex as some fully-synchronous detectors (and it might be made much less so with the aid of a single purpose-designed integrated circuit), is still a good deal more demanding in circuitry than a conventional product detector. So it is refreshing to find that W1SNN does not attempt to oversell the benefits it will bring. In fact he says bluntly: "When the detector installation adjustment is complete you can compare signals by simply flipping switches (ie to put the original detectors back into circuit). At first very little difference will be noted."

But he goes on to show how its particular properties can be used most effectively in combating pulse interference such as Loran, in minimizing the effects of selective fading on a.m., and as a superb detector for weak cw signals since it produces its own beat signal proportional to the average signal level—thus overcoming the bfo hiss problem.

The associated diagrams (Fig 1) drawn from these two articles, will give some idea of the practical implementation of a reciprocating detector—but anyone seriously wanting to work on one would be well advised to refer to the Badessa and Olberg papers.

Briefly, the i.f. signal goes to a diode which forms a signal current source fed to an electronic bi-directional switch: the two outputs from the switch go to a differential amplifier and from there to a narrowband i.f. filter and to a low-pass filter. The i.f. filter should have bandwidth of about 500Hz and is coupled to a phase-splitter which feeds the signal back to the inputs of the bi-directional switch: this signal is the reference signal (phase-coherent bfo); audio is taken out through the low-pass filter: W1SNN uses an MC1433G ic as a differential audio amplifier.

In the practical circuit it should be noted that two transistors combine the functions of phase splitter and synchronous switch. The filter bandwidth of 500Hz results in a

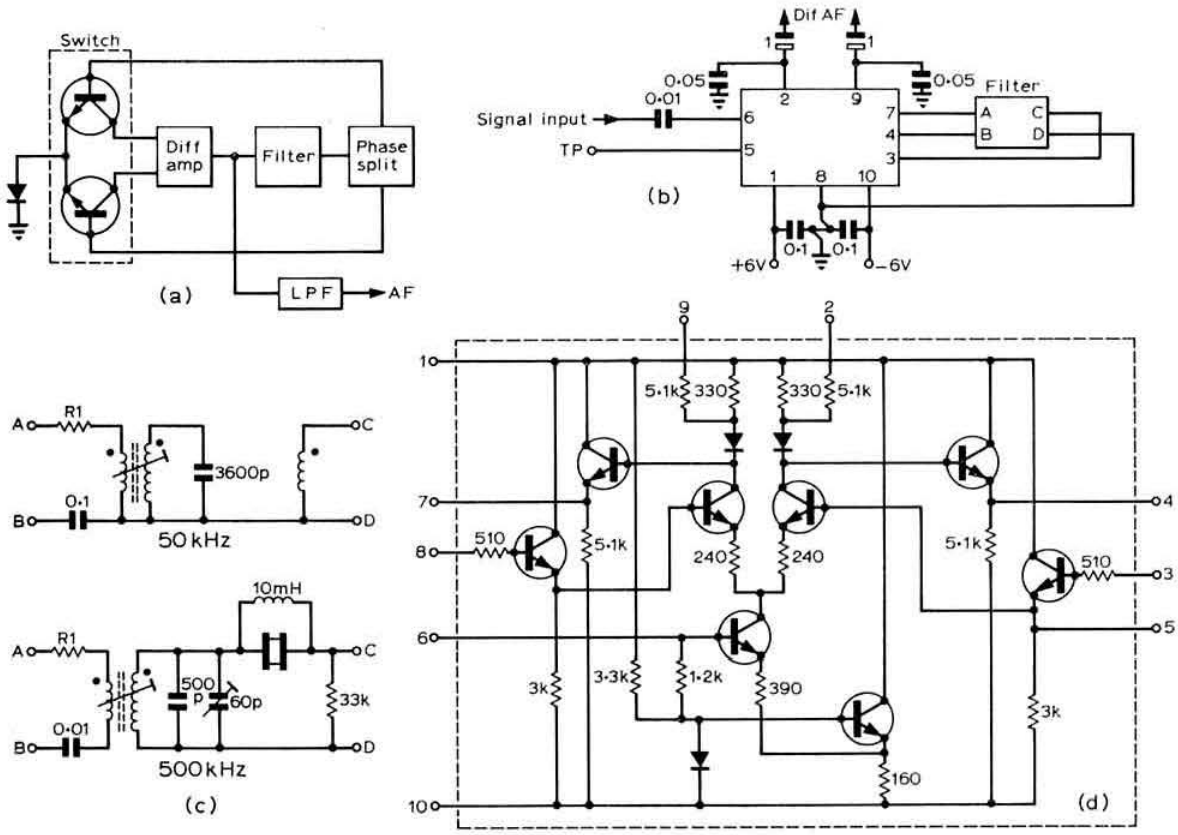

Fig 1. The reciprocating detector. (a) Basic block diagram; (b) interconnections between elements; (c) typical filters for 50 and 500kHz. R1 governs synchronous bandwidth and should be adjusted as required, but not less than 360Ω. For 50kHz transformer, primary is 5 turns; intermediate is 109 turns; secondary is 43 turns on ferroxcube pot and bobbin core (IBIICA250 3B7), note that sense of connections is important; (d) basic reciprocating detector unit, all transistors 2N3415, switching diodes 1N252

fully synchronous bandwidth of about 150Hz, but where true synchronous operation is of secondary importance (eg ssb/cw) a narrower filter bandwidth is permissible. With signals of very low signal/noise ratio the synchronous bandwidth is reduced and so the receiver requires more careful tuning.

W1SNN considers that sideband operators will appreciate the fact that a reciprocating detector tends to subdue adjacent channel signals, the effects of excessive flat-topping by other amateurs, and lightning static. Impulse noise, including static and Loran, can be virtually eliminated when the detector is used in conjunction with a noise blanker; this is because the detector has a finite lag in producing a reference signal, so the incoming pulse encounters a momentary reference-starved condition, resulting in limiting action on fast changing pulses.

A fairly high input signal level should be presented to the detector, which will cope with up to 3V peak. Both papers recommend that the detector should be connected into an existing receiver in such a way as to include the ability to make an immediate comparison with the conventional detectors.

Altogether a fascinating project for the experimentally inclined.

The bfo-less audio-modulated detector

References in recent *TT*s to the superiority of carrier-keyed A2 or F2 signals over A1—at least when it comes to copying traffic over a long period—struck a responsive chord in the memory of Ivan Wood, ZE3JJ. As a result, he draws attention to two almost forgotten and long-neglected articles that appeared in *QST* in July and August 1946. D. A. Griffin, W2AOE, and L. C. Waller, W2BRO, described a cw-reception technique called "audio-modulated detection" (amd) and, sub-titled "an improved method for the reception of cw signals". The authors presented both the basic principles and a practical adapter which allowed the system to be used with almost any of the standard communications receivers of the period, most of which included a 6H6 double-diode detector/agc valve. No bfo at intermediate frequency was used, but instead a local square-wave audio tone signal was injected in such a way as to unbalance or squelch the i.f. signal rectified by one of two back-to-back diodes. Fig 2 is the basic double-gate amd detector.

An impressive list of advantages were claimed for amd, including:

(1) 200 : 1 s/n ratio (with audio filter) achieved on 0·6μV signal at 4·6MHz on SX28 receiver, compared with 8 : 1 using normal bfo system.

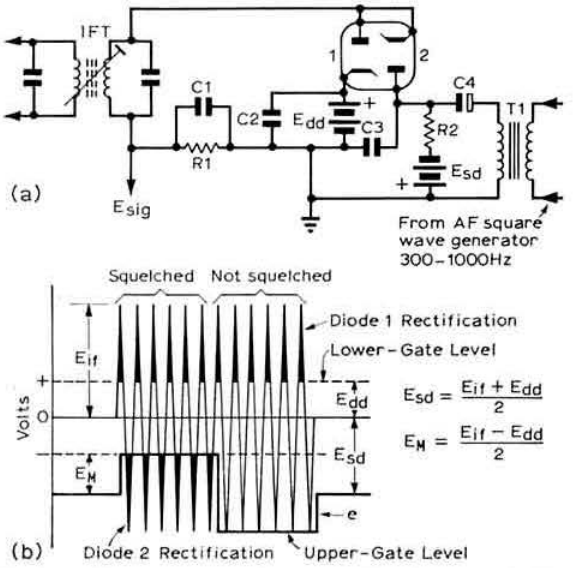

Fig 2. (a) Basic arrangement of a double-gate amd. (b) The portion of the signal represented by E_{if} less E'_{dd} is fully modulated by the peak a.f. modulating voltage (E_m). E'_{dd} is the detector threshold level (lower gate); E_{sd} is squelch-diode dc delay bias; E_{dd} is detector-diode dc delay bias (equals E_{dd}) and e is squelch diode instantaneous delay bias

(2) Constant af tone output on all signals, permitting use of highly selective af filters even with some degree of local oscillator drift.

(3) Tone signal could be selected and varied.

(4) Automatic noise reduction on noise peaks and minimizing of sustained noise having small peak values.

(5) Signal limiting at any desired level, giving an effective cw agc over a 100,000 : 1 input signal range.

(6) Capable of modulating weak and strong signals alike, overcoming the requirement that ideally a bfo needs different output levels for different signals.

(7) Provided true single-signal reception, since no form of heterodyne or af image was involved.

(8) Easily used with existing envelope detector receivers.

And here again, one of the basic reasons given for the development of amd included the statement: "Numerous tests have shown conclusively that a tone rich in harmonics is much better for long periods of steady copying."

It should be noted that this system, like the alternative arrangement of using a Schmitt trigger in conjunction with a conventional detector and local audio oscillator, provides the listener with a locally generated tone signal rather than a heterodyne of the actual incoming carrier. A possible problem, which seems to have called for fairly careful adjustment, was leakage of the local tone signal in the absence of an incoming signal, appearing as a back-wave on keying. The system could be gated on both maximum and minimum incoming signals.

The adapter used a 6SL7GT as a variable phase-shift tone oscillator; 6J5GT as adjustable clipper to produce the square waves; 6V6GT as output/selective amplifier; 5Y3GT plus VR150 power supply; and the original 6H6 to provide the detector diodes.

The second article concluded: "The numerous advantages of amd, as compared with the bfo method of reception, were covered in the previous article . . . the authors feel that going back to the bfo would be analogous to hooking up old Dobbin to a high carriage complete with black silk tassels."

But it was "old Dobbin" rather than amd that remained the standard detector until the product detector came along. The *QST* articles made no noticeable impact—though we have an idea that some British amateurs may have given amd a trial. If so it would be interesting to have their comments. Semiconductor techniques would make it very simple to implement a modern amd adaptor (for example, note the simple square wave ic generator described later). It may have been because amateur operating is not really the same as traffic handling—it could be that amd never really worked as well as the authors suggested. But it seems to have been a novel and interesting idea, and it would be nice to know if it deserved to be so widely ignored!

Modified ratio detector

Simon Rundle, G8DMN, provides the circuit for a modified ratio detector suitable for use at about 455kHz for the reception of 144MHz nbfm signals. Its advantage over the conventional radio detector is that it makes use of two single-tuned, transistor-type i.f. transformers instead of the more usual special tertiary-wound 10·7MHz transformers: Fig 3.

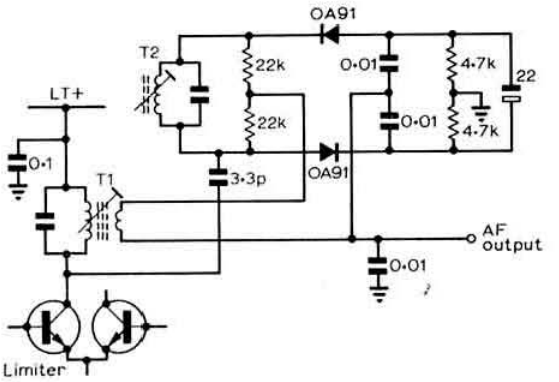

Fig 3. Nbfm ratio detector for use about 455kHz. T1 and T2 are transistor interstage i.f. transformers with 250pF tuning for 470kHz (add 20pF for 455kHz)

It uses capacitive coupling instead of the more usual inductive coupling between the two tuned circuits. The 3·3pF capacitor should not be increased in value since it provides the required 90° phase difference between the tuned circuits. The second (quadrature) tuned circuit is resistively centre-tapped.

In his prototype, G8DMN uses two long-tail-pair integrated circuits to amplify and limit the i.f. input to the ratio detector; on an average 144MHz fm signal the audio output is about 20mV rms.

Alignment is straightforward: tune T1 for maximum dc potential across the 22μF electrolytic capacitor using a clear medium-strength signal; then adjust T2 for zero dc voltage at the output. A final "tweak" on a weak fm signal is advisable.

G8DMN considers that, despite its simplicity, the results are a great improvement on slope detection.

Experiments with multiband loop aerials

S. M. de Wet, ZS6AKA, recently sent along some most interesting notes on a series of experiments he carried out during the South African summer in the investigation of multiband loop-type wire aerials. He points out that the large "loop" configuration is consistently omitted from the standard engineering textbooks (possibly, he believes, because the mathematical analysis of practical harmonic loops would present a particularly sticky problem).

As noted on several occasions in *TT*, loop aerials made from a λ-length of wire (as in the standard quad) have some interesting properties, for example, the "G2PL Special" which emerged from operating a quad-on-its-back on the ground. ZS6AKA has taken this type of approach further in order to investigate loops suitable for multiband operation, in his firm belief that simple aerials can often prove surprisingly useful.

ZS6AKA notes that a good insight into the impedance behaviour of aerials can be gained by considering them as a special kind of transmission line. The classical cases of transmission lines are: (*a*) terminated in their characteristic impedance; (*b*) end open-circuited; (*c*) end short-circuited. In Fig 4 (*a*) and (*b*) he shows the open- and short-circuited cases; the dotted lines indicate the transmission line being "opened" so that it begins to radiate: X indicates a physical spot on the line. It can be seen that if *f* is the lowest frequency then the impedance in the open-circuited condition is low for

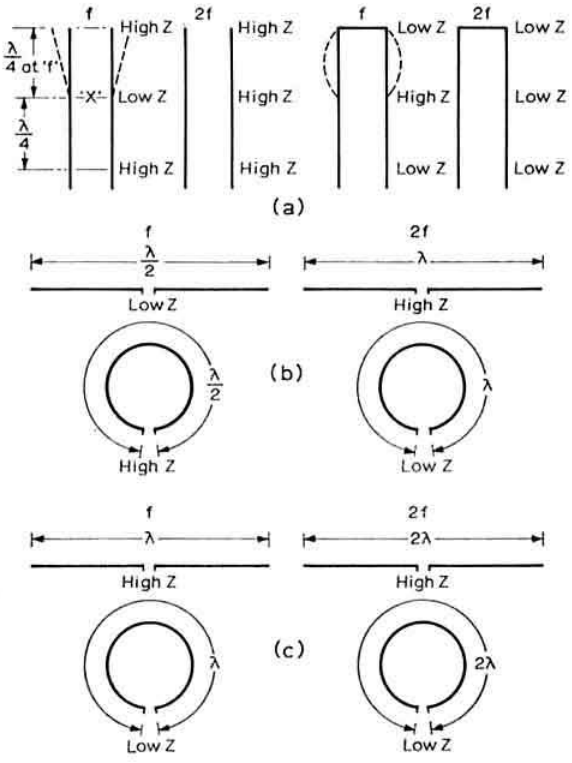

Fig 4. Principles of harmonic loop aerials with low-impedance feed point. (a) transmission line analogues; (b) half-wave on fundamental results in mixed impedances; (c) full-wave gives low-Z on fundamental and harmonics

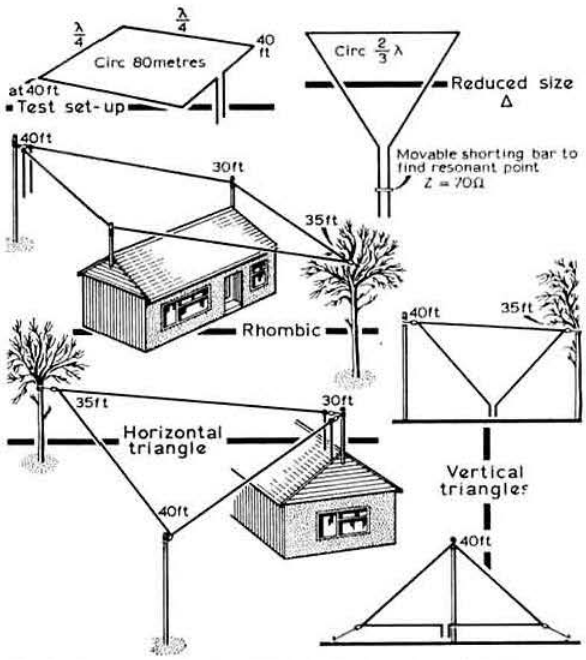

Fig 5. Some of the configurations tried by ZS6AKA. No unbalanced transmitter line currents detected with either twin or coaxial feeder

odd harmonics and high for even harmonics; the opposite applies for the short-circuited line.

If one starts with an aerial one-wavelength long or one-wavelength circumference at *f*, then the input impedance will be high for all harmonics in the case of the open aerial, and the impedance would be low for all harmonics of *f* in the case of the loop: see Fig 4(*c*). ZS6AKA considers that a high input impedance is awkward to handle, but that the low input impedance loop can be useful in a number of cases.

As with an open line aerial (for similar practical heights), the loop will give all-round radiation, mostly upwards, for the lower frequencies, but breaks up into a series of lobes when operated at higher frequencies. Fig 5 shows some of the practical configurations tried by ZS6AKA. The measuring instruments were crude but the 1λ loop test set up showed an input impedance of about 100Ω at 3·5MHz increasing to about 200Ω at 28MHz, though the 28MHz impedance proved difficult to measure.

Some other general observations were: (1) the loop tuned much more broadly than a dipole; (2) the voltages along the loop were much lower than a dipole; (3) although the loop requires a minimum of three supports, the extra support was usually easy to find in practice—the best results were obtained with the loop horizontal, but it did not greatly affect results with the loop horizontally slanted or even vertical; (4) when the input is balanced, the furthest mid-point may be earthed; (5) when the loop is fashioned in rhombic shape it does in fact become a rhombic directional aerial at the higher frequencies with a low input impedance; (6) if the shape of the loop is changed from circular to square, triangle, rectangle and the like, the radiation resistance decreases as the enclosed area decreases—this

means that a shape may easily be found which has an input impedance of 50Ω; (7) and finally ZS6AKA notes that there are many shapes and mounting configurations which remain to be explored.

ZS6AKA (c/o Racal-SMD Electronics (Pty) Ltd, PO Box 60, Irene, Transvaal, South Africa) would be interested to hear from anybody who has better measuring equipment and is able to provide accurate figures for radiation resistance etc at various frequencies. He believes it would also be useful if someone could measure actual field patterns.

While a number of these configurations (for instance, the vertical triangular loop) are becoming quite widely known and used, it seems pretty clear that there is still useful experimental work to be done in collating and refining the principles and practice of wire loop aerials. ZS6AKA is to be congratulated on giving us all a useful shove in this direction.

Scan tuning with the Pulsemaker II

E. Bennett, G3ZJO, has come up with a useful application of the Pulsemaker II pulse generator circuit described by G8EHH in the April *TT*. He uses this simple circuit to scan automatically the 144MHz band on his varicap-tuned Pye Cambridge equipment. He reports that the component values shown in Fig 6 are suitable for use with the Pye Cambridge conversion described by G8ENN in the January issue of *Radio Communication* but could easily be modified to provide any required scan range and for negative or positive earth systems.

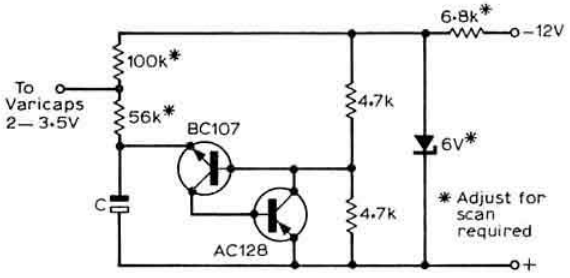

Fig 6. Band-scanning unit by G3ZJO using G8EHH's pulse generator circuit

The scan time can be varied by adjustment of C; a 100μF capacitor giving about 12s and 500μF about 2min. G3ZJO considers 12s fine for fixed operation, but prefers 1min/scan (C 300μF) for mobile to make it easier to distinguish between a signal and a noise pulse. The simplicity of this arrangement means that it can be assembled as a very small unit suitable for incorporation in a receiver, even when very little space is available.

The use of such an automatic band-scanner means that when activity is low it is possible to continue working in the shack or concentrate on your driving until the scanner indicates the appearance of a signal on the band.

Dick Biddulph, G8DPS, notes that the complementary pair of transistors in the G8EHH pulse generator appears to be acting as a discrete form of PUT (programmable unijunction transistor). This is so, and in fact this particular way of using complementary pairs as a substitute for a silicon controlled rectifier (thyristor) was pointed out many years ago in *TT* and in several editions of *Amateur Radio Techniques*.

On a related topic, G8DPS appeals for base diagrams of semiconductors to be included with circuit diagrams as he finds himself sometimes spending hours searching for this information. In this connection a useful "Semiconductor lead-out identichart" was presented with the May 1972 issue of *Practical Electronics*. While there are now so many semiconductor type numbers that no one source can really hope to be all-embracing, checks made so far do seem to indicate that the *PE* chart is useful to have around.

Wide-range square-wave generator

At the time the a.m. detector (see earlier) was described, square-wave audio sources involved some complications: today a single ic, such as the RCA CA3002, can be used. In *QST* (December 1971), Larry Nickel, K3VKC, describes a little unit which by simple selection of a single capacitor can provide a square-wave output of several volts peak-to-peak from a speed sufficiently slow to be easily demonstrated on light blinkers (C1 about 10μF for 1Hz) right up to about 200kHz with C1 about 12pF: see Fig 7.

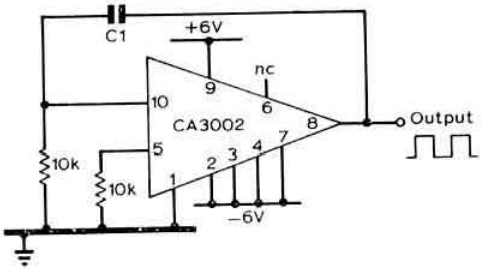

Fig 7. Simple integrated-circuit square-wave generator; frequency depends on value of C (see text)

Battery warning system

In *Radio-REF* (April 1972), A. Jungbluth, F6APU, describes an automatic battery indicator system (originated by F1SA) and intended to show when the voltage of a battery has fallen below some reference value. He points out that many transistorized receivers and transmitters use batteries which remain suitable for operating the equipment properly only while they deliver an on-load potential above some critical value. For example, this might well be 10V from a 12V battery. It is thus useful for the operator to be given an automatic visual warning when the supply volts drop below this value.

Fig 8 shows the system advocated. The small zener diode provides the reference, being chosen to represent approximately the end-point voltage. When the battery potential drops below the zener voltage, TR2 is switched "on" and the

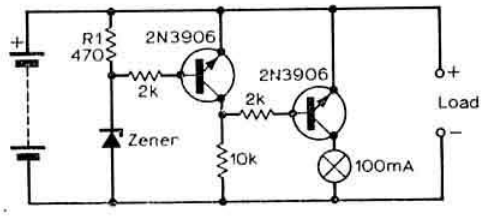

Fig 8. Automatic battery "end-point" warning system

small 100mA pilot bulb lights. Normally, with the lamp "off" the extra load on the battery is about 5mA. By selection of the zener and the bulb voltage (which should be about the same as the zener voltage), the system is suitable for operation from about 6V to 18V.

Gate dipper/absorption meter

Fig 9 shows a gate-dipper given in *QTC*, No. 2, 1972 (reprinted from *OZ*, December 1971); this allows a 1mA fsd meter to be used instead of the more normal (but more expensive) microammeter. When used with switch S2 "open" the instrument functions as an absorption meter, giving meter indication of pick-up from a local transmitter/oscillator. The fet can be almost any of the usual devices such as TIS34, 2N3819, 2N5485, MPF102 or MPF106; similarly the OC72 is only one of many devices which would be suitable as the dc amplifier. The original unit had five plug-in coils covering 3·5 to 220MHz.

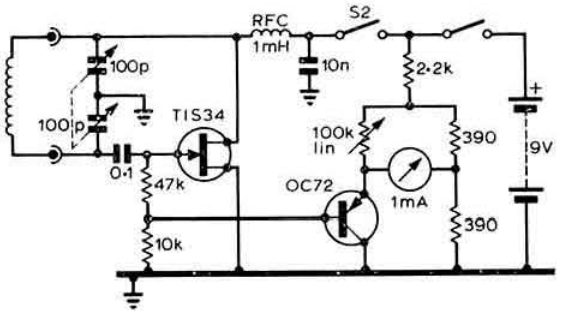

Fig 9. GDO cum absorption meter. Coil data as given in *QTC*: 3·5-8MHz, 60 turns, 0·3mm; 8-18MHz 30 turns, 0·5mm; 18-35MHz, 10 turns, 0·5mm; 35-80MHz, 5 turns, 1mm; 80-220MHz, 1 turn, 3mm. All wound on 16mm formers, length 50mm

Digital pen probe

In drawing attention to a useful-looking digital pen probe described by Terje Bolstad, LA4HK in *Amator Radio* (Nr 3, 1972). I am acutely aware that the text is, not unnaturally, in Norwegian. So my understanding of the article is limited pretty nearly to the diagrams. But it is felt that those readers most likely to be interested in a probe for checking the logic state of digital circuits based on ttl devices will be able to grasp most of what they need from Fig 10.

The instrument uses only an SN7404N "hex inverter", SN7474N "dual D flip-flop", three TIL209 light emitting diodes and five resistors. The "works" are built into a stubby probe, from which emerge two leads with clips to bring in 5V from the circuits under test and with the three LEDS mounted on the side of the probe in a readily visible position.

Basically the probe will indicate the state of positive logic (2·4 to 5V); logic 0 (0 to 0·4V); and negative logic.

For many years a useful device for checking analogue circuits has been the multivibrator pen signal injector. It is on the cards that digital pen probes will be found to have an equally important role as we increasingly enter the world of digital electronics.

Here and there

Harold Chadwick, G8ON, mentions that the ZS6BT "double quad loop" was pre-empted by G5AAD, who

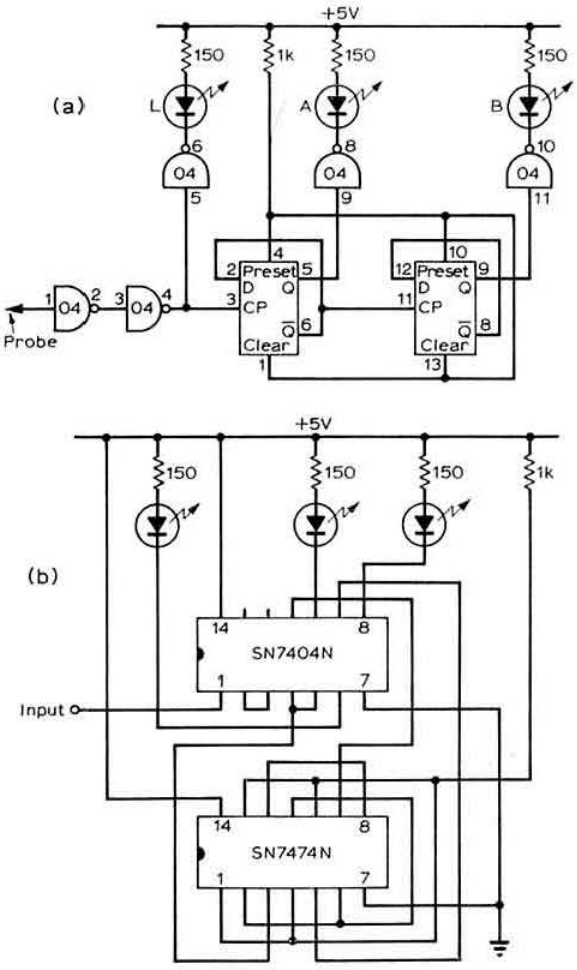

Fig 10. The "logic pen-probe" described in *Amator Radio* by LA4HK, using two integrated circuits and light-emitting diodes

erected a similar arrangement for 3·5MHz as a "double-G8ON"; he also mentions that G3NBP did a lot of work on a full loop version.

A. R. Rumbelow, G3KKC, is puzzled that G3BY advocates using the audio-gain control in an ssb transmitter as a drive control; as one brought-up on G2DAF's articles he considers this the opposite to what he had regarded as correct—and asks the question "Is it not possible on a basic design point such as this for people to agree?" I suspect the answer is "no" and that this is not necessarily a bad thing—definitive engineering is so often moribund engineering!

G8DFT notes that the flexible aerial tuning unit (*TT* March) reprinted from the Swedish journal *QTC* was in fact featured in some editions of ARRL's *Radio Amateurs Handbook*. None the less useful for that—but we like to try and keep the "credits" straight, though this is sometimes virtually impossible! As G8ON says, there is not much new under the sun—and one hesitates to guess just how many million circuit diagrams have been published in electronics journals in the past 70 years!

FOUR METRES AND DOWN

by JACK HUM, G5UM*

The 18th VHF/UHF Convention

Present perfect, future conditional

YOU needed only to count the number of newer G8E—and G8F—diamonds displayed at the "Winning Post" on 22 April to convince you that the metre-wave world is an expanding one. The crush at the exhibition, the afternoon lectures and the evening dinner was further proof. Right at the end of what was almost a 12-hour session for some, VHF Manager Geoff Stone, G3FZL, gave the figures that showed this to have been the biggest and best annual VHF/UHF Convention ever to be held in these islands; 437 members signed in and 219 people sat down to the dinner, compared with 350 and 130 last year. At this rate of expansion there was, he said, a good case for running a two-day event in 1973, the RSGB's Diamond Jubilee Year, and he had booked the "Winning Post" already for 7 April 1973.

It was indeed the present perfect, the best convention ever. But in spite of the anticipated euphoria of next year, there were portents of less cheer, signs which in the long term were not favourable on a world-wide basis to the enjoyment of amateur radio as we know it at present. These were pointed out by four of the speakers that day, either explicitly or implicitly.

Opening the afternoon lecture session, G3FZL described some of the current problems which the Society's VHF Committee is tackling: eg VHFNFD and the need for thorough pre-testing of gear before the event to obviate creating a nuisance value to other participants, making sure that behaviour on the air and on the site is impeccable so that a shining public image is sustained; repeater beacons, of potential value to mobile men and Raynet but less so for discussion-type QSOs—an application has been made to the MPT for a licence for a controlled experiment to be conducted; and the 70cm band and the need to replan it for video, beacons and even satellites, which would involve discussions between RSGB, BATC and MPT.

"The basic problem," said G3FZL in conclusion, "is that a population on the vhf/uhf bands increasing at a rate of 10 per cent per annum means that we have got to learn to live with one another under more crowded conditions. More discipline and self-restraint will help us all to derive maximum enjoyment from the metre wavelengths in spite of the increasing population."

* * *

Geoff Stone had mentioned one type of pressure on vhf/uhf: Roy Stevens, G2BVN, who was the next speaker, described another, the international pressure so much in evidence at the Geneva Space Conference which he attended last year. He told how many of the delegates to the conference exhibited preconceived prejudices against amateur radio; in some of the newer, smaller or less stable states amateur radio was even regarded as having subversive possibilities. Even in certain European countries, national societies had failed to liaise adequately with their licensing authorities. We in the UK were fortunate in having a sympathetic licensing authority and close ties with it by our national society.

Roy Stevens disclosed that the UK delegation to Geneva was the only one to have a radio amateur in its team. "We of RSGB wish to thank the MPT for making this possible."

In conclusion, particularly apropos space communications, 'BVN reminded members that AMSAT, as the only moving force in the amateur satellite realm, deserved the attention of clubs and groups here. "Secretaries might consider joining AMSAT," he concluded.

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Third man to take the platform was G3BA; his subject, "Operating techniques on vhf/uhf".

"The professional operator is trained. The amateur learns by picking up what he hears. The commercial operator passes the maximum information in the minimum of time. The amateur passes the minimum of information in the maximum of time. He *contacts* rather than *communicates*. How refreshing it is when you run across someone who can actually talk to you."

Intentionally controversial as well as commonsensical, G3BA went on to demolish some of the fatuities which are perpetrated on the air, perpetuated unfortunately by newly-licensed operators who overhear them and then absorb them as the done thing.

Other points from the G3BA thesis: ten words is a long over. Remember the finger on the button: use them! Expeditions: publicise well in advance, give precise info on times, sites and frequencies and stick to them. Repeaters: Used during the LX-pedition, they seemed to the G3BA/G3BHT team exhilarating at first, but palled after a while: every QSO via repeater was identical. Modes: G3BA shared the *FMD* belief that there shoud be more intermode communication, but there might be a case for planning 2m by modes instead of by region.

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Teabreak time, and the floor-to-ceiling partition slid into place to divide the convention area for the two lecture streams; standing room whether you went to the Ron Ham dissertation on how the earth's atmosphere affects vhf radio (some beautiful 3D solar models and some startling BRS15744 recordings of metre-wave dx), or whether you remained in the other lecture hall to hear G3OOU and G3OAD offer two solutions to the problem of that 1kW erp from the next block: build yourself a really good receiver with such a high dynamic range that it will really "sort 'em out" (G3OOU), or get away from it all and generate some erp on the microwaves by trying pulse (G3OAD).

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If anyone at Whitton still harboured illusions that metre-wave amateur radio is a backyard affair lacking in the wider

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horizons (and few would have done so after hearing G3FZL, G2BVN and G3BA), they would have lost them by the time Mr D. E. Baptiste, head of the MPT's Radio Regulatory Division, sat down at the end of his speech that evening. His toast "The Society" gave him the opportunity to describe what life is really like at a big international telecommunications conference. As G2BVN had done that afternoon, he emphasized the dangers that arose at such conferences from the presence of delegates suspicious of or hostile to amateur radio, and the urgent need to impress their nations *well in advance of the next conference* of the true value of amateur radio. There are in the ITU no fewer than 141 nations, one state one vote, the largest (even though they may pay larger contributions) on the same footing as the smallest.

Other points from Mr Baptiste's address:

Frequency allocations. The MPT, heavily involved in work on frequency allocations, relies very much on advisers such as Dr R. L. Smith-Rose (present that night, and a former president of the RSGB), and G6NZ, to whom he paid special respects for the work he did on the Frequency Advisory Committee, his place now taken by G3BZG. The presence of an RSGB representative permits amateur requirements to be made known directly to the big national users of frequencies.

Talk-through repeater beacons. The MPT does not like them for a number of good technical reasons. For many people a repeater can be more of a bane than a blessing. "Even so, the RSGB request for an experiment to be conducted has won us over, and a licence will shortly be issued for this to be performed under controlled conditions".

Space Conference: The value of having an amateur delegate on the spot was demonstrated at Geneva when G2BVN invited Mr Baptiste to meet the Australian delegate to learn at first hand about the Oscar 6 proposals. Personal contact like this was immensely more effective than writing letters.

Then . . . "Amateur radio prevents people from being sectarian. It adds to the sum of human knowledge. Because of its spread all over the world it works as a human laboratory, and the information it generates is exchanged, publicized and utilized. Make something of it in a purposive way! Amateur radio shines out like a beacon in a population which doesn't seem to have much to interest it in a drop-out world. **You're better than you know.**"

Replying to "The Society", President Tim Hughes, G3GVV, thanked Mr Baptiste for the interest he took in the RSGB, and went on to say that as he travelled around the country he was often asked "What is the Society?" and there was no difficulty in telling them. But he emphasized that the individual member is the Society. "What are *you* doing for it? Do you send in a report to *FMD*? Do you send in a contest log when you know you have no chance of a good placing?" Many of us said "Hear, hear" to that! And many—all, surely—of us agreed with the G3GVV closing remarks that nowhere in the sphere of amateur radio is the warm spirit of the movement more in evidence than in that house of many mansions, vhf.

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To round off the formal part of the evening, " . . . something completely new," announced Geoff Stone, "the Fraser Shepherd Prize from the will of the late GM3EGW, awarded annually for contributions in the field of microwaves." A surprised Heath Rees, G3HWR, was called up to be the first recipient.

And now . . .

The Scottish VHF Convention

From Jim Stirling, GM3UWX, comes the news that this year's Scottish VHF Convention will take place on Sunday 1 October, concurrently with the Region 14 ORM at the Shawlands Hotel, Shawlands Square, Glasgow S1. The convention, to be organized by the West of Scotland Amateur Radio Society, will be in the tradition of similar past GM events as something not to be missed.

Note the date now and watch *FMD* for further information and how to obtain tickets.

For the 1962 VHF Committee Cup, G3YOA with a unique camera steering device, and G5AHK and G8ATK with a transceiver apiece shared "best constructor" and gave the judges a tough task before finally deciding on the G5AHK exhibit.

And lastly four lucky number dinner ticket prizes were drawn instead of the customary one: G6HD and G3YAS each received a magazine subscription, while lucky G8DGR pocketed a Burns FT2 converter. First prize, the J Beam for 432MHz, went to VK7ZAZ of Hobart, so look south on 70cm, you Melbourners!

Just another way of talking

A couple of months back we offered a few thoughts on how to extend a vhf station's range by using telegraphy. Because these may have sharpened Class B men's desire to master the morse code we followed them up last month by dwelling on the mental processes required to do just this.

Let us recognize that to large numbers of Class B operators whose activities on 2m and down keep them fully engaged, learning morse has no priority at all. But to many others it *does* have a priority unhappily inhibited by a psychological block that seems to stand in the way of learning it. Dispose of this frustration and you open the way towards familiarizing yourself with what is after all nothing more than another way of talking.

Frustration No 1: "Morse is impersonal". *Answer*: only a moderate skill at receiving it is required to be able to identify even without hearing their callsigns any one of the dozen or more telegraphists busy most nights at the bottom end of 2m. Subtle variations in their keying and the phrases they use are their "voices".

Frustration No 2: "You have to write it all down". *Answer*: only if you want to. If you prefer, sit back and make brief notes just as with phone.

Frustration No 3: "It's so slow compared with phone". *Answer*: try equipping yourself with full break-in (easier than with phone: no audio feedback when you are co-channel) and then use the standard abbreviations. Rid yourself of long winded A3 habits such as "Now I will pass it back to you Ethelred" instead of just "AR BK".

These are probably among the more important frustrations felt by the embryo telegraphist. Others will come to mind. The great thing to remember with A1 is that you get better at it all the time. Tentatively, deliberately at first, working up within a month or two to the stage where it becomes a natural means of communication, you develop

within a year or two into a key-talker nearly as good as the professionals.

Why only "nearly", why not "really"? Because few, even, of the top amateur telegraphists make full use of all the morse code symbols which are available. They send WONT and CANT which are quite different words from WON'T and CAN'T. The simple apostrophe WG-barred is barred allright.

Other punctuation signs which help make sense of language sent in morse go unused, maybe not from choice, maybe because of a fear that the man at the other end does not know them and will fail to come back with that magic R SOLID COPY OM.

But all this is a bit "A-level". For the man still at "O-level" the thing to remember is that talking proficiently through the morse key is one of the few arts remaining for the amateur radio operator to perform. To be able to perform it well confers a special sense of achievement which you CANT know if you WONT try!

Translate every symbol you see, eg motor car numbers, into the morse code, we suggested last month, and this has prompted G3NHE of Sheffield to endorse the idea as something he found useful when he was learning the code 14 years ago. "I also spent hours listening to commercial morse at speeds just beyond my capability," adds Martin Dann, emphasizing also that *keeping at it* is more important than the actual method of learning; spasmodic practice is not much use.

G4AXS, Peter Wilberforce of Canterbury, confirms the importance of continuity. Three local members, G3LCK, G3MLO and G4OG, earned his permanent gratitude by giving him morse sessions three evenings a week for a solid 2½ months, backing up his own efforts with morse code gramophone records. These he began to anticipate, so his wife popped the pick-up on the player at random points so he would not know what was coming next. His determined enthusiasm to "get fourteens under the belt" was demonstrated by his taking morse code to work! He put a lot of the stuff on cassette tapes, ". . . and used these during the day in between patients (I'm a dental surgeon), finding this method of practice particularly helpful".

Having committed the morse characters to memory, G3ZJO, Ed Bennett of Northants, took the sounds around with him, as G4AXS above. He recorded a mass of 5-letter groups on to tape and played them back at home or in the car via a cheap battery tape player with a continuously variable speed. The secret of success was to adjust the playback to a speed just above the no-effort level. "Get to know the code so that it comes as second nature and no more effort than listening to speech or music," advises 'ZJO, precisely capping the point we made that there is no need to write the stuff down: it is just another way of talking.

Spots and zones

Last month's comment that 145MHz is a calling channel for mobiles and should not be clobbered by powerful fixed stations has brought a chorus of agreement, admixed with some candid comments about "fixeds" who have had 145MHz crystals for years and apparently believe they hold some pre-emptive right to stay there.

Such is the flexibility of the 2m bandplan that its capability to absorb special spots for special circumstances is undoubted. One of the "specials" of course is 145. Another is 145·41 for sideband. You could even say with truth that the beacon band at the top and the cw band at the bottom, while making small inroads into the zones which were agreed years and years ago, are today accepted as a normal part of the progressive development of 2m: each is a particular chunk of frequency set aside for a particular service.

Likewise 145. As one of our mobileer correspondents puts it: "Crystals, and even more, 25pF ceramic frequency shifters, are cheap. So would those stuck on 145 remember it is a calling channel and not a QSO frequency?"

"Although 145 is the international mobile calling frequency, it is well when motoring in the Greater London area to check 144·48 (the national fm calling channel) and 144·8, which is the London fm calling channel," reminds Nigel Williams, G8CPS.

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With fuel gauge reading zero, Mick O'Donnell, G8CCV/M, pulled hastily into a filling station to replenish, the while maintaining QSO with G8FNF in Watford. To the surprise of all in the vicinity "G8CCV Mobile" boomed forth from the 50W piped music and public address system serving the station. "Other mobile men, be warned!" says Mick.

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Picking up last month's enquiry about self-tuning mobile rigs to enable operators to keep both hands free for driving, G3WW tells us that the new Yaesu FT-2 auto 2m transceiver will put any one of your frequencies on to any one of another's. But he has doubts about its use for split frequency working, which is important if 145 is to be kept clear for calls and not contacts. G3ZJO has come up with a contribution on the same subject, for which space must be reserved later.

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Some heat has radiated as the result of the suggestion to open a window between 145·85 and 145·95 to let the GI, GM and GD signals through. People even believed the bandplan had been altered. Not so. This is only *a recommendation*. What is certain is that the operator in the populous Humber-Mersey axis who moves frequency when hearing the northerners peeping through will give his locals and incidentally himself the best chance to work them.

Into Europe (and back)

When an opening occurs more PA stations seem to pop up than any others from the Continent. One obvious reason for this is that we in the UK are geographically close to them. Another is that there are lots of them on vhf/uhf. If you happen to be motoring in the Netherlands you will find it possible to work them on 2m in continuous sequence—and no "lift" needed.

This is how it was with G8AGP when a few weeks ago his reciprocal callsign PA9RC properly stirred the enthusiasm of the indigenous "Zeros", even though many of them well below sea level hardly enjoyed line of site propagation to Dennis Bird's halo.

The halo atop a foreign-registered car attracted the attention of the police on the seafront at Scheveningen, but there were smiles all round when the reciprocal licence was shown. Just as well to have it at the ready if you intend to be radioactive on the Continent this summer, mobileers.

Another surprise at The Hague was to be talked in to a Hobbies Exhibition where PA0VRZ/A was in operation.

Even more of a surprise for Mr and Mrs Bird on arriving at the exhibition was to find themselves being interviewed on amateur tv by PA0AO on the other side of the city.

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Less pleasant thoughts remained in the recollection of another Continental traveller, G8AWR, when he returned to Worcester after a visit to Germany. He was dismayed at the deterioration in 2m operating standards there since his previous visit in 1968, solely due to the use of the new talk-through repeaters. His view is widely shared, he says, by German amateurs who used 2m before the advent of repeaters. In the Heidelberg area, for example, most QSOs are now via the repeater (even local ones).

In passing on this information, G3ZUL, Brian Kennedy of Droitwich, makes the point that it is not the technology which is at fault but, as with the vfo, the way it is used.

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More first-hand info on the value (or otherwise) of repeaters should be forthcoming later this year from A7811 of Ripon. Keith Hunter (he is 16) takes along a Sentinel converter plus UR1A and 2m aerial when his parents go caravan touring. Soon they will be en route for DL with a list of the German repeater beacons in the dossier.

Expeditionaries

There should be 400W of p.e.p. from the Isle of Man during the RSGB 2m ssb contest in August when GM3ZBE and GM8FFX will be operating portable there both in the contest and for the following week.

Until 6 July GW8FTA/P will set up station in the Monmouth or Brecon hills, usually at the 2,000ft level, between 0900 and 1700gmt at week-ends, and on week-nights whenever circumstances (and weather) permit. Frequency: 144·338MHz, and reports from BRS and A-men beyond the 50km mark will be welcomed and QSLd by return if sae is sent. Acting as QSL manager is Paul Austin, A7417, who will handle correspondence relating to this expedition at 26 Cwrt Glas, Croesyceiliog, Cwmbran, Mon.

Another item of GM-expeditionary news: Jim Stirling, GM3UWX/M, carries a 75W transmitter and an 8-el in the car, and is aiming for the highest hills where four wheels will continue to grip. He asks cw ops south of the border to turn beams north and search the bottom end of 2m for his telegraphy. He also runs fm from the car.

Yet another: Shetland is dx to everybody on the mainland. Look for GM4AZQ/P throughout August on 145MHz. He will be holidaying there, a 1,000-mile trip from home base in Horsham. He says he will be fixed receive also on 145, but there is time to get a continuous system going before the trip, which will be needed if the GM zone is to be searched. With 8-el on the treeless tops of Shetland, the dx should be workable, especially if a key is fitted too. All QSLs answered on receipt of an sae to the G8CKL QTH in the *Callbook*.

Pencil-sharp beams from microwave dishes mean that random tuning and searching are not on. It helps to know when and where other microwave stations will be, so that your rf may be shone upon them. Tell GB2RS *now* where you will be located during the 24–25 June microwave contest. Already G3ZEZ and G3PQR have told *FMD* where *they* will be: look for them on 23cm in the Cambridge area.

Mike Adcock says he will put G8CMU/P on 2m in Huntingdonshire with 30W and an 8-el any Sunday morning on request; which means, write him (QTHR) for skeds with sae.

And the Manchester University expedition across the border . . . callsigns will be GM3VUM/P on cw and GM8FUM/P on 400W p.e.p. sideband into a 10-el. They hope to have the special callsign GB2UM again. *Locations:* 25–26 June, Stirlingshire; 28–29 June, Island of Islay, Argyllshire; 2–3 July, Isle of Jura, Argyllshire; 4–6 July in Clackmannanshire, days in between travelling, when mobile callsigns may be in use. *Times:* 0730–0930bst and 1900–2400, plus. *Modes:* telegraphy on 144·05 for first 15min, then phone on 145·9 tuning the band, for next 15min. Third 15min 145·41 two-way phone (call them 5–10kHz off). Last 15min phone 145·9 tuning the band. *Schedules* will be accepted for any sites in any modes on the dates given above. Send sae to Roger Mortimer, G3ZNS, University of Manchester Amateur Radio Society, University Union, Oxford Road, Manchester 13. *Other bands:* if 4m and 70cm equipment becomes available skeds will be accepted for these bands too, with *ad hoc* operation there outside the main 2m activity.

Skedspots

Often advocated in *FMD* is: Transfer nets from 2m to 70cm. The Dunstable Downs Radio Club are doing just that. Their 145·05 spot became so crowded that they sought a new one. It is 432·64MHz and already 10 members are equipped for it. They welcome calls from stations outside DDRC any night—and this of course in addition to their Wednesday night video sessions on 70cm.

Every Saturday at 2000gmt on 144·06MHz there is a link between G3WSN of Chelmsford and PA9LY (known as G3TMQ when he is in G-land). If you want the Netherlands and can work cw, latch on to this one.

Regarding cw, G3WSN offers the reminder that the German codenight is Tuesday. He roped in DARC telegraphy award No 17 from five QSOs with DL stations at 10 points each.

With the Hereford club's regular evening sessions from nearby hills well under way, it is possible to collect this comparatively rare county on 2m, 4m and 70cm. Look for G3YDD/P every fourth Friday of the month. Or to fix a sked on any of these bands *at any time* send an sae to Stuart Jesson, hon sec, at 181 King's Acre Road, Hereford.

Evenings on the hills also for Alan Williams, G3KSU, who activates 4m every Sunday morning from the highest points on the Isle of Wight, which is Hampshire in case you want it on 4m (many do). He welcomes 4m schedules: sae to him at 11 Grange Ave, Ryde.

Every morning at 7am clock time, G8BYV in Norfolk to G8BAV in Derby on 70cm. "It's hard going at times but would be 100 per cent on cw, so I'm working up .ie morse to try to become G4BYV," says John Tye.

25 YEARS BACK

"Mr S. E. Martingell, G2MV, of Old Coulsdon, Surrey, an experienced worker on the band, is to be congratulated on obtaining the top score of 119 points . . . he used three aerials, a 4-element rotary beam ten feet high, a bi-square beam 42 feet high, and a three-half-wave aerial at the same height. The transmitter used 807s in the final stage"

—Report of Five Metre Contest, *RSGB Bulletin*, June 1947.

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

A NUMBER of dx enthusiasts were most fortunate to be present on the evening of 7 May when they were privileged to see a programme of colour slides (accompanied by a recorded commentary in impeccable English) which had been made by the OH-DXpedition Foundation (OH2s BH, BW, KK, MM, NB and OH0NI) and which set out the stories of the OJ0DX, ZA5Z, 3C1EG and 3C0AN expeditions. The event was presided over by Martin, OH2BH, who took part in each of the trips. Those present were impressed by the great deal of hard work, persistence in the face of official lack of co-operation, physical hardship and even personal danger which had been faced by the expeditioners. Your scribe feels certain that all readers would wish to join him in thanking this intrepid group of Finnish friends for their efforts which have given such pleasure to so many.

DX news

The Pacific International DX Net meets every Sunday at 1600 on 14,300kHz and is controlled by 9V1QJ. Another net—the Africaner group—meets daily at 1830 on 21,360kHz and often contains stations in the rarer African countries. Those working for the Arabian Knights certificate will be interested to learn that a new Arabian Knights net now meets on Mondays at 1900 on 14,290kHz, on Thursdays at 1500 on 21,355kHz, and on Fridays at 1730 on 14,190kHz.

It is reported that the Canadian DX Association has sent a beam to Sao Thomé for use by CR5SP and CR5XX—the former is due to return to Portugal in the near future. CR5AJ is still crystal controlled on 14,000, 14,013, 14,026, 14,040, 14,065 and 14,080kHz and is to be heard between 1900 and 2400.

Readers will be sorry to hear of the death of Bob Stark, W5OLG, who kept over 500 schedules with VR6TC and to whom many European stations owe the pleasure of a Pitcairn contact.

TJ1AW is now back in the USA and there is a possibility that his next overseas assignment may be in Burma. Those who remember Bob Lane, G5AAM, will be interested to know that Bob is now in Thailand and on the air with the callsign HS2AGP.

"KS4BA" and "FP0BS" are known to be pirates. The latter is reputed to listen around the 40m band and choose the loudest signal and then use the callsign of this station as his QSL manager!

A51TY has been reported regularly on 14,195kHz at around 1700 on Mondays and Fridays. SU1MI, Moona, daughter of SU1IM, has been heard on 14,030kHz at 0300. KH6EDY (Kure Is) seems to be active again and has been noted in Pandora's Box Net on 14,278kHz at 0600.MP4TDM has a regular schedule with GW3AHN at 1900 every Friday on 14,260kHz, and YJ8BL contacts W6NJU at 0600 on Sundays on 14,240kHz.

A number of unusual prefixes have been recorded recently. DX0PAR was a special station commemorating the battle for Bataan during the second world war and QSLs should be sent via the Phillipine bureau. WM2GK celebrated the 75th anniversary of transatlantic radio tests. WJ4AFZ operated from the Norfolk (Va) Azalea Festival. KD6USA was in honour of US Armed Forces Day. Special callsigns connected with the Apollo 16 mission were WG3SFC (from the Goddard Space Centre) and WP6JPL from the JPL HQ. WJ4ULY will be on the air on 4 July from Kentucky and is a special Independence Day call. CE6EW has been heard using XQ6EW as an alternative callsign.

A special amateur radio station will be on the air from Lisbon International Fair during the period 9 to 23 June. Its callsign will be CT1FIL and it celebrates the 400th anniversary of the writing of "Os Lusiadas" by the famous Portuguese poet Luis Camoes and also the 50th anniversary of the first air crossing of the South Atlantic by Gago Coutinho and Sacadura Cabral. Special QSLs will be sent out.

KE4ITU and possibly also KE3, KE7, KE9 and KE0ITU, may also have been on the air to celebrate World Telecommunication Day in mid-May. U4L was a special Lenin Memorial Day operation by the Ulyanowski club station UK4LAA.

No new licences have been issued in Saudi Arabia during the past eight years and the only legitimate stations at present are HZ1AB (the club station of the USA Military Trade Mission), HZ1TYQ (Vic Crawford who works for ARAMCO), HZ1HZ (Ahmed Zaida, a minister in the government), and 7Z3AB, Henry Folkerts, who also works for ARAMCO. The last genuine expedition to the 8Z5/8Z4 areas was carried out by HZ1TYQ, and calls like HZ1GM, 8Z4AB and 7Z3AC are pirates.

The ARRL DX Advisory Committee is said to be looking into the possibility of deleting some of the "countries" listed for DXCC purposes which consist of small uninhabited reefs. A decision is expected soon and at the time of writing a proposed expedition to Minerva Reef was being postponed until this was available.

Alan Foster, GM3OXA, who was in Mauritius during 1964–7 as VQ8AX, will be back there in June and will be on the air with his 3B8AX call. He offers to arrange and keep schedules with UK stations on 14, 21 or 28MHz during his three-year stay. Equipment will consist of an FTDX560 and beam at 50ft, and Alan offers hospitality to any visiting amateur who would like to contact him through C.E.D. (Tels) Dept, HMS Mauritius, Vacoas, Mauritius.

Top Band news

The annual transequatorial tests organized by PY1DVG will be run during the period 0000 to 0030 each day between 1 and 30 June. European stations call CQ for the first five and then alternate five minute spells in the 1,825–1,835kHz

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segment, and stations in the southern hemisphere call between 1,800 and 1,807kHz in the intervals. Please send reports of contacts to PY1DVG, PO Box 51, ZC-00 Rio de Janeiro, Brazil, (and a copy to your scribe!).

G3TR reports keeping 30 schedules with ZL3RB throughout March, at first between 0615 and 0650, but later around 1815. The latter time resulted in his signals being heard by ZL3RB and ZL3OX at RST339 on 20, 21, 22 and 30 March, and on the latter date G3TR heard ZL3RB at RST229 but unfortunately no contact was effected. One of the chief difficulties seems to have been interference from UK phone signals on the frequency being used by the ZLs.

G3XWZ is looking for GDX and Continental contacts on Sunday afternoons and operates in the 1,840–1,845kHz area. So far OK, HB9, and GD have been contacted with his KW160 and 50ft high dipole.

Arthur Berry, VK3CZ, confirms contacts with G2JL, G3TR, G3LIQ, OK1ATP and PA0PN during January and February. He heard DL9KR, G3SZA, G3WRF, EI8H and HB9NL during the same period.

PA0INA has confirmed (from 7Z3AB) that the "HZ1KE" who was worked on 160m earlier in the year was a pirate.

News from overseas

Allan Papworth, G3WUW, is working with Decca Hi-Fix equipment for Brunei Shell and will be spending the next year or so in Sarawak, Brunei and Sabah. He has applied for licences in all three countries and so far has been issued with the callsigns 9M8WUW and 9M6AB and his VS5 call is on its way. Allan reports that Adrian Slocombe, G3TJZ, is 9M8TJZ, is active on 14 and 21MHz mainly between 1000 and 1500, and hopes to replace his trap dipole with a beam in the near future. 9M6AB was on the air during April and May, and possibly part of June, using a KWM2 or FT101 and tri-band quad at 45ft, and QSLs may be sent to the address in *QTH Corner*. Allan is interested in obtaining a QSL manager. Other activity in the area includes VS5BY, who is in Seria and runs a KWM2 to a TA33Jr but is not very active, and 9M8RY who is with the Telecoms Dept at Limbang and who is often to be found on the SE Asia Net.

OK3BG supplies the information that JT0AE, Pavel Sneider (OK1IAI), will be in Ulan Bator for three years and prefers cw operation. He uses an electronic keyer and frequents 21MHz and 14MHz (especially 14,030kHz) daily from about 0630, except on Saturdays and Sundays. He naturally prefers OK contacts but over half his contacts during February were with the USA. On returning from leave in May Pavel intends to try 160m operation and ssb may be used later. There are about five active JT stations at the moment and they are mostly on 7MHz cw. All QSLs received by QSL manager OK1AQW will be answered via the bureaux unless return postage is enclosed.

Station 9M8TJZ, Lutong, Miri. (Photo: 9M8WUW)

Ross, G3DYY, is now in Sierra Leone and has the call 9L1GC. His call has been pirated on 80m and all contacts with 9L1GC before 21 April on that band were not with the genuine station.

The Christmas Is Radio Club, VK9XI, has a membership of approximately 50, including five licensed amateurs. The club house is on the top of a 600ft cliff overlooking the sea. and they have two transmitters which operate on all bands from 10 to 80m. The writer confirms the fact that they put out an excellent signal on the hf bands.

Keith Orchard, ZD8KO (G3TTC), has kindly supplied a list of current licensed ZD8s, of which there are 21. They are: ZD8s, AB, AR, BR, CS, CZ, D, DLG, ES, FM, JC, JK, JT, KO, MF, MG, MH, NC, OE, RR, TS and US. The most active of these are Dave, ZD8DLG (G3LXQ), Ron, ZD8RR, Trevor, ZD8TS (G3ZST), and Keith himself, and they cover 10 to 40m on cw and ssb. QSLs may be sent to the addresses in *QTH Corner*.

P. S. Attree, 8R1AF, is in Guyana with Cable & Wireless Ltd. He reports that local radio licences are available with little difficulty, but it is virtually impossible to import radio equipment into the country. It is, therefore, unlikely that the number of 8R1 amateurs will increase greatly as the existing ones obtained their gear under special conditions.

There is better news of the licensing situation in Cyprus. A letter received from ZC4RS says that the latest position was announced at the AGM of CARS which was held on 30 April. It seems that the proposals put forward for amateur licences by CARS have been accepted (with minor modifications) and that the legislation to put them into effect will be passed rapidly. There is a very good chance that 5B4 licences will be issued very soon; if there is any delay in making the new regulations into law the Government has intimated that previous 5B4 licence holders at least will be allowed to operate straight away. ZC4s CB, HP, JD, RS and UA will soon be leaving the island and Mike Hadjimichael, 5B4MH, has been elected President of CARS for the third successive year. The Akrotiri club station, ZC4AK, now has a new chairman (Bob Dilworth, formerly 9H1BP) and hopes to be much more active. ZC4RS, who is one of those leaving soon, is to be congratulated for the excellent work he did as secretary and Newsletter editor, the former post is now held by ZC4TE. ZC4MU, who specializes in writing poetry, is now treasurer!

Dxpeditions

One Australian and several USA operators are hoping to pay a visit to Minerva Reef during the last few days of May and early June. Dates given have indicated 31 May to 4 June, and two KWM2As, two 3OL1 linears and various extra equipment and aerials will be taken. QSLs will go via INDXA (K3RLY).

Long Skip suggests the possibility that Spratly Is may be put on the air through the good offices of INDXA sometime in August, and that plans are being made to activate Fanning Is, Brunei and Palmyra Is in the not too distant future.

QTH Corner

HS2AGF	via K4FPF, 7912 Pinelake Road, Columbia, SC, 29204, USA.
HS2AGP	via W2GHK (see ZF1SW).
HS3ACZ	via K0WIQ, 1700 Avenue-A, Dodge City, Kansas, 67801, USA.
HS3AGG	via W1YFZ, 766 Sagamore Ave, Portsmouth, NH, 03801, USA.
HS4AFN	via WA6GZZ, 4133 Stonecutter Way, North Highlands, Cal, 95660, USA.
HS4AFT	via W5WJQ, E. B. Halbach, RFD 1, Box L-692, Thibodaux, La, 70301, USA.
IM0CRW	via DK5JA, A. Kohten, Nansenstr. 3, 4152 Kempen, Germany.
JW2IK	via LA2IK, K. Roland, c/o Strengeslrud, Solberglivn, 90, Oslo 6, Norway.
JW7FD	via LA3UC, S. B. Maarnes, Skjerstadvn 4, 8000 Bodo, Norway.
W4IZ/KV4	via K4DSN, 6563 Sapphire Dr, Jacksonville, Fla, 32208, USA.
MP4TDM	via K1DRN, 265 Davis Rd, Bedford, Mass, 01730, USA.
SV0WXX	via W3HNK, Box 14, Norwood, Pa, 19074, USA.
VP1AW	PO Box 423, Belize, British Honduras.
VP2SN	via VE3BMV, Y. Z. Blanarovitch, PO Box 292, Don Mills, Ont, Canada.
VS9MZ	G3UKN, C. J. Hewitt, 32 Oxford Sq, RAF Locking, Weston-super-Mare, Somerset.
WG3SFC	via WA3NAN, Goddard SP Flight Ctre, NASA, Greenbelt, Md, 20770, USA.
WJ4AJF	via W4OPM, 2208 Dinwiddie Road, Virginia Beach, Va, 23455, USA.
WM4SFC	via K4BFT, Huntsville ARC, RFD 1—Box 213, Toney, Al, 35773, USA.
ZD8DLG	c/o BBC, Ascension Is, South Atlantic.
ZD8KO	c/o BBC, Ascension Is, South Atlantic.
ZD8TS	c/o BBC, Ascension Is, South Atlantic.
ZD8RR	c/o Cable & Wireless Ltd, Ascension Is, South Atlantic.
ZF1SW	via W2GHK, PO Box 7388, Newark, NJ, 07107, USA.
3A0CC	via W3CRE, 4811 Tallahassee Av, Rockville, Md, 20853, USA.
3A0GA	via DJ9ON, D. Messer, Redtenbacherstr. 23, 85 Nuernberg, Germany.
3B8CF	S. Mandary A1, Avenue de l'Avenir cite Kennedy, Quatre Bornes, Mauritius.
3B8CM	M. Palmyre, cite Joachim Forest Side, Mauritius.
3B8DC	P. Jeanne, 27 Av. des Manguiers, Quatre Bornes, Mauritius.
3B8DD	G. Rehaut, 15 Gabriel Froppier St, Beau Bassin, Mauritius.
5T5FP	Pierre Flambard, BP 42, Service 540, Nouadhibou, Mauritania.
8R1AF	P. S. Attree, c/o Cable & Wireless (WI) Ltd. PO Box 239, Georgetown, Guyana.
9M8TJZ	Adrian Slocombe, c/o Post Office, Lutong, Sarawak.
9M8WUW	Allan Papworth, Topo Dept, Brunei Shell Petroleum Company, Seria, Brunei.

RSGB QSL Bureau, Bromley, Kent, BR27NH.

There are rumours that a group of Chilean amateurs will visit the San Felix Is (CE0X) in early June.

The Imperial College RS, G5YC, will be visiting Andorra from 26 June to 6 July and will be on the air on all bands 10 to 80m on cw and ssb. Equipment will consist of an FT101, a quad, and a 50ft Telemast, and frequencies to be used will be 5kHz above the band edge on cw and 55kHz above on ssb. Last year's callsign was C31DZ but it is not certain that this will be reissued. QSLs go via G3ZOQ, 3 Egerton Road, Leyland, Preston, Lancs, PR5 1YB.

The newsletter of the Mauritius ARS says that the club hopes to organize a dxpedition to Agalega (3B6) sometime during the year. A Heath HW16 transceiver donated by the Southern California DX Club will be used—this works on 7, 14 and 21MHz and is crystal controlled. No ssb will be used because of the risk of damaging borrowed gear. 3B8CB (formerly W9WNV etc) says that he may start another world tour.

There may be activity from Aves Is (YV0) during late July or early August.

Expeditions

Ted, G3GKF; Alan, G3FTQ; Mike, G3TWJ; and Martin, G3XMW, intend to visit the Isle of Man between 22 June and 7 July. They have arranged for a site very high on the island with clear take-offs all round, and hope to be on the air continuously on all bands 160 to 2m. They are taking three hf transceivers and will have a quad for 10 and 20m, a V-beam for 80m, an inverted-V for 160m, and verticals/trap dipoles for 15 and 40m. All contacts will be QSLd.

G3s IKR, VPE and ZXO will be visiting north and north-west Scotland from 18 to 29 June and intend to operate on 160m cw and ssb during the late evenings as GM3VPE/P.

The University of Manchester ARS will be on the air from Stirlingshire on 25/26 June, from Isle of Islay on 28/29 June, from the Isle of Jura on 1/2/3 July, and from Clackmannanshire on 5/6/7 July, Their callsigns will probably be GB2UM and GM3VUM/P and the operating schedule as follows: 0630–1100 hf bands especially looking for VK/ZL, 1100–1300 7MHz, 1300–1800 3·5MHz (or hf depending on conditions), 1800–2400 1·8MHz (phone and cw for alternate hours).

Contests

The Argentina Contest

0000 3 June to 2400 4 June.

All bands, cw and phone categories. Exchange RS/T and QSO number—each LU contact is worth three points, other contacts one. The multiplier is the number of LU states and DXCC countries worked. Send separate log sheets for each band and include summary sheet before 31 July to RCA, LU DX Contest, PO Box 97, Buenos Aires, Argentina.

Massachusetts Amateur Radio Week

0001 11 June to 2400 17 June.

Stations outside the USA who contact two Massachusetts stations during this week receive a certificate signed by the state governor. Applications must reach William C. Holliday, WA1EZA, 22 Trudy Terrace, Canton, Mass, 02021, before 31 July. Please enclose a large sae.

Venezuela Contest

0000 1 July to 2400 2 July.

Phone only, all bands. Exchange RS plus serial QSO number. Contacts with YV count two points, with other American countries one. Multiplier is YV and USA call areas worked on each band added together. Any station outside the American continent who contacts at least five YVs and five other American countries may apply for a most attractive certificate. This is also available to listeners who log 50 stations in the contest. Applications accompanied by 10 IRCs or $1 must be posted before 1 August and sent to: RCV, Independence Contest, PO Box 2285, Caracas, Venezuela.

DXCC

Official Bulletin No 370 from ARRL announces the deletion of the Ryuku Is (KR6, KR8) from the ARRL Countries List in view of their retrocession to Japan on 15 May 1972. Contacts before that date may be claimed, but on and after then will count as for Japan.

May *QST* announces that a special pin is available to stations listed in the DXCC Honour Roll—it costs $1.

Band reports

The particularly good hf band conditions which existed in early April have now deteriorated and seem to have been due to abnormal solar activity. Many thanks to the following for supplying logs from which this section of *MOTA* was compiled: G2HKU, G3AAE, GC3EML, G3GVV, G3HB, GM3IAA, G3IFB, G3UKH, G3UYM, G3VBL, G5JL, G6GH, G8VG, BRS2098, BRS17567, BRS25901, BRS31301, A7548, A7785, A7850 and A7951.

Stations listed in italics were on cw, all others on ssb.

3·5MHz. 0400 VE3AUM, VO1FX. **0500** *9L1GC*. **0600** *ZL3FZ, ZL4IE*. **2100** OD5HB, OH1JN/OH0, VP8FL. **2200** C31FA, KP4AN.

Propagation Predictions

June, like May, July and August is a typical high summer month and very unfavourable for dx conditions, especially on 28MHz and 21MHz, as the daytime F2 MUFs are much lower than those of winter.

On favourable days only South Africa and South America will be heard on **28MHz.** On **21MHz** Africa and South America will be heard with certainty, and the east coast of North America only on days with above average F2 MUFs. Short skip conditions could possibly liven up both bands over distances of about 500–2,000km.

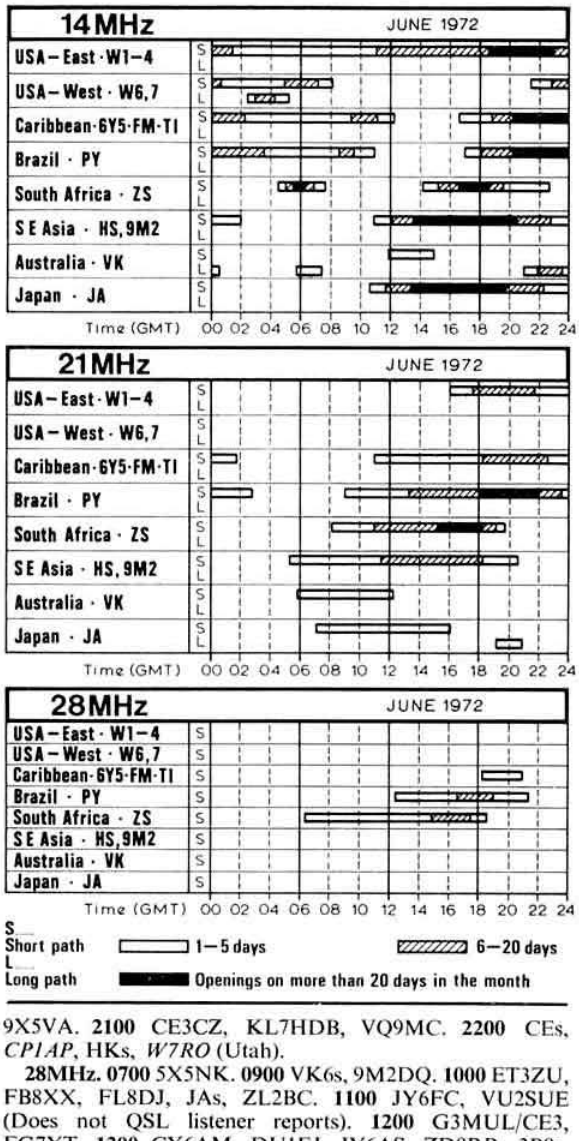
Again, **14MHz** will be the main carrier of dx traffic. Short summer nights allow the band to remain open all night on favourable days. Summer conditions also mean a possibility of traffic via the indirect path.

Special mention is made of the indirect path to western North America, Japan, Australia and South America, and under exceptional circumstances to South-East Asia and Central America. On favourable days contacts with Hawaii should be possible via the direct path between about 0530–0930gmt.

Daytime traffic on **7MHz** will be possible over distances of about 1,000km. Local traffic will be interrupted frequently by the dead zone, as the F2 MUFs often lie below 6MHz during the present phase of the sunspot cycle.

It will be possible to use **3·5MHz** for local traffic during night and day, and there will be no interruption by the dead zone. DX traffic on 7 and 3·5MHz will only be possible during the summer if the greatest part of the path lies in darkness and the level of atmospheric disturbances is below average.

The provisional sunspot number for April 1972 was 64·3 with solar activity fairly evenly distributed throughout the month. The predicted smoothed monthly sunspot numbers from the Swiss Federal Observatory for August, September and October are 47, 46 and 44 respectively.



7MHz. **0100** VP2SN (QSL via VE3BMV). **0200** *KP4UW*, *3A0GA*. **0300** *YV1AB*, *VP9BK*. **0400** *3V8ND*. **0600** *KH6GCY*, *LU9XAF*. **0700** VK3ZL, *VP2DAJ* (QSL via VE3BMV). **0900** *HW5UIT* (QSL to F90E). **1100** GC5AOV (F8TU on Sark). **2100** CR6TP, 5X5NK (QSL via DJ3JV), 5Z4KL. **2200** *EL2CB*, *OX3EN*, PYs, TR8VE, UA1ZFI (F. Josef Land). **2300** *EA9EO*.

14MHz. **0300** FG7TG, OA2BB. **0400** *OA4DX*, VP2GBI. **0500** KH6s, UK1ZFI, *ZK1AK*. **0600** *VK5XK/9* (Norfolk Is), *VK9MH*, YA3ZL. **0700** *W9IGW/CE0X*, JW8IL (Bear Is—QSL via W3HNK), KC4USN, KH6s, KL7s, KS4BH, KS6CY, *KX6EB*, UA1GZ/M (Vostok Base), *UK0KAA* (Wrangel Is), VP1ST, VR1AC, VR1W, VP2AR, YK1AA, ZD3S, *5W1AB*, *9L1GC* (QSL to G3DYY). **0800** KJ6BZ, KS6s, DV, EM, VK9LV, VKs, VP2LY (QSL via VE3BMV), WA2BAV/6W0. **0900** VK4AD/KS6, *VK8ZZ*, VK0RC, *5W1AK*. **1000** LA5YJ/JQ0 (Wint Is, nr Jan Mayen), VP8MM, *5T5CJ*. **1100** C21TL, ZD8RR. **1200** C31FA, **1400** DU1EN. **1500** SV0WMM (Crete). **1700** KR8BY (QSL via WA5UHR), 9K2PM. **1800** BV2AA. **1900** DU1FH, VKs, ZD7s, BB, SD, ZLs, 9L1RP, 9V1QJ. **2100** TR8VE, VK0RV, 4S7AB, WB2AQC/6W0, 7X2BOK. **2200** TU2DO, TY3ABF, TY6ATE, ZD3M, 3V8AR. **2300** VP2s AR, LU, MM, MW, 5N2AAE, 5VZGE.

21MHz. **0700** AP2TU, JAs, ZLs. **0800** *KX6AA*. **0900** *JD1YAA*, *OJ0SUF*, VQ9R. **1000** EL2DF (QSL via WA9ZAK), HM4GF, JAs, KC6BK, KX6EB, KX6KS, YJ8BH. **1100** FL8DA, HM1AQ, UK1ZFI, UQ5OC, YJ8GH, 9L1s EP, GP, 5N2AAU. **1200** KX6EB, VR4EE, VS6CY, VS6DO, YB0JC. **1300** DU7EG, KG6SW, VK9XK, VQ9NEW. **1400** FL8AH, TY7ABM (QSL via DL7JK), *9L1GC*, 9M2DW. **1500** CR8AK, *JX9TM*, VK9XK, ZD9BM, 9X5MS. **1600** HS2AGP, JW7FD, *OX3VJ*, VS9MZ, *5R8AP*. **1700** HS1AFP, *KS4DA*, *VQ9DJ*, ZP5AR, 4S7s AB, PB. **1800** *VP2SN*. **1900** *W9IGW/CE0X*, FY7AE, KL7CVK, W6/W7, ZD3D, 5H3MM. **2000** ET3JH, XQ6EZ (Chile), 9X5VA. **2100** CE3CZ, KL7HDB, VQ9MC. **2200** CEs, *CP1AP*, HKs, *W7RO* (Utah).

28MHz. **0700** 5X5NK. **0900** VK6s, 9M2DQ. **1000** ET3ZU, FB8XX, FL8DJ, JAs, ZL2BC. **1100** JY6FC, VU2SUE (Does not QSL listener reports). **1200** G3MUL/CE3, FG7XT. **1300** CX6AM, DU1EJ, JY6AS, ZD8RR, 3B8s, AW, CG, 9X5MS, 9Y4T. **1400** CP1FG, CR7AV, FG7TG, JY6RS, TT8MC, YB3AAY, ZD7BB, ZD8RR, *9V1DP*. **1500** CR3ND, *MP4BHM*, ZD9BM, ZP5KK, 8R1G, 9G1DM. **1600** K9KNW/CE0X, *HK1QQ*, ST2SA. **1700** HC3JL, VP8JE. **1800** *CO6JH*, ZP9AI. **2000** KZ5YY, TG9KJ.

Very many thanks to all correspondents and also to the following for items reproduced: **Long Skip** (*Nick Sawchuck*), **CARS Newsletter** (*ZC4RS*), the **West Coast DX Bulletin** (*WA6AUD*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX'press** (*PA0INA/PA0TO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6JR*), **QUAX** (*G3DME*), the **DXers Magazine** (*W4BPD*), and **NARS Newsletter** (*5N2ABG*).

Please send all items for **July** issue to **reach G3FKM not later** than **5 June,** and for **August** issue by 5 **July.**

COUNCIL PROCEEDINGS

A brief report of the Council meeting held at Society HQ on 10 April 1972

Present: *Mr R. J. Hughes (President, in the Chair), Dr E. J. Allaway, Messrs J. Bazley, W. J. Green, E. G. Ingram, G. R. Jessop, W. F. McGonigle, L. E. Newnham, C. H. Parsons, W. A. Scarr, R. F. Stevens, G. M. C. Stone, E. W. Yeomanson (members of Council)*, and *A. W. Hutchinson*, editor.

Apologies for absence had been received from Messrs J. Petty, B. D. A. Armstrong, A. W. Smith, and D. A. Findlay, general manager.

President's visits
The President reported on visits he had made to the Chelmsford and Mid-Sussex Clubs, both of which were very well attended meetings. He had also been guest of honour at the Sutton & Cheam Society's annual dinner.

Invitations had been received from REF to attend their meeting at Angers on 3 June, and from UBA for 6 May. Unfortunately it was not possible to attend the latter meeting but Council approved the President's attendance at the REF meeting.

Licence cost
Mr Stevens reported that the MPT's investigations into all licence costs had indicated that the cost of the amateur licence could probably be maintained, if and when the three-year licence was introduced.

GB2RS
It was reported that Mr J. Burns, G8FNL, was now reading the news bulletin and the first reports of reception in South Wales were good. Some further improvement might be achieved by the use of a better aerial.

Beacon GW3GW, Swansea
Mr Parsons understood that it was proposed to discontinue the 2m beacon and replace it with one of 70cm. The VHF Manager and Council generally felt that this was undesirable. Mr Parsons said that he felt if necessary the Society should make some financial contribution to avoid the closure of the 2m beacon.

It was agreed that the reported intention to use the present 2m transmitter with a mast-head varactor tripler was technically not acceptable and that a suitable transistor tripler/amplifier should be used.

Finance report
The Honorary Treasurer had prepared a two-sheet summary of the financial situation for the first eight months of the year up to February 1972. The results quoted are more favourable than had been forecast, in particular the subscriptions received were greater than expected.

Membership and affiliation
In the absence of the general manager, the actual details were not considered, other than to note that from the summary the total membership at the end of March was 16,937.
It was resolved:

(i) to accept reduced subscriptions from five members;
(ii) to waive the subscriptions of 13 members on the grounds of blindness or other disability;
(iii) to grant affiliation to the Nottingham High School Radio Society, University of East Anglia Radio and Electronics Club, Pioneer Radio Club (Edinburgh), Monmouth Amateur Radio Society (Home for Disabled Young Persons), Stowmarket District Amateur Radio Society, Harrogate and Knaresborough Radio Society.

The affiliation of the UK FM Group (London) was granted at the previous meeting of Council.

Official Regional Meetings
Council approved the holding of the Region 1 ORM at the North-West Amateur Radio Convention to which Messrs Stone and Stevens had been invited as lecturers. The general manager would write to Mr J. Petty asking him to attend on behalf of Council.

Council also approved the holding of a Region 14 ORM and confirmed that the President and Mr G. M. C. Stone would attend.

Meeting of Region 1 representatives
Council considered resolutions received from this meeting and resolved:

(i) there would be no change to the rules set out for vhf contests. Although it appeared to be rather severe, disqualification was in fact rarely applied, but the provision was needed to avoid unnecessary expense;
(ii) to refer to the editor the question of publishing addresses of Regional Representatives and QSL sub-managers in *Radio Communication*;
(iii) to refer to the VHF Committee the question of 2m band plan sub division of Scotland and Ulster;
(iv) to accept the views of the Certificates Manager that the issue of certificates without QSL evidence was open to so much abuse that it could not be justified.

IARU Region 1 Conference, Scheveningen 15–19 May 1972
Mr Stevens reported that there would be more than 80 delegates present and that 74 papers would be read. The RSGB had been asked to be proxy for several countries, but as we could only hold two proxy votes these would be for the East African and South African societies.

Council felt that it was unreasonable to add the additional work involved in attending the conference on the general manager at the present time and it was agreed that Mr E. G. Ingram be appointed a member of the Society's delegation.

Mullard Award
Mr Jessop reported on a meeting with Mullard Ltd on this and other matters.

The company expressed the view that the award should be for forward-looking technological work, with the emphasis on vhf/uhf/shf development, particularly in space communication, amateur uhf television, shf television and the development of vhf repeater links with a view to extending communication in an international sense. The value of the award would be £100 and it was hoped that the first award could be made in 1973 (RSGB Diamond Jubilee Year).

TVI Committee
A very considerable discussion of matters concerning this committee took place and the procedure to be adopted in the handling of manuscripts concerning tvi was agreed.

Committee minutes and recommendations
Council approved the minutes of the following committee meetings: Diamond Jubilee (18.2.72), Education (20.1.72), Finance & Staff (21.1.72 and 24.2.72), HF Contests (27.1.72), IARU Working Groups (28.1.72—recommendations approved), Membership & Representation (11.2.72). Mobile & Exhibition (11.1.72) and (15.2.72—recommendations A and B approved), MPT Liaison (20.1.72), Scientific Studies (31.1.72), Technical & Publications (25.1.72), TVI (11.11.71 and 17.12.71) (14.2.72—recommendations approved) (3.3.72—proposed change of title to Interference Committee approved), VHF (26.1.72), VHF Contests (3.3.72 and 2.3.72).

Scheme of representation
The revised draft of the scheme of representation which had been circulated was approved after discussion, and it was agreed to circulate it to Regional Representatives for guidance.

Repeaters
Messrs Stevens and Stone reported on their meeting with the MPT in connection with repeaters.

Marconi-Kemp 75th Anniversary—Barry
Mr Parsons notified Council that he and Mr Jessop had been invited to the official luncheon. Mr Scarr reported that he would be attending at his own expense and would be providing a 2m station for operation during the event.

Braille
Mr Yeomanson reported that the first chapters on principles, valves and semi-conductors, from the *Radio Communication Handbook*, would shortly be available in Braille.

YOUR OPINION

The Editor
Radio Communication
Sir—I write in support of the letters appearing in *Radio Communication* over recent months advocating the use of lower transmitting power.

Being a convinced QRP operator on cw, using 20W or less input I have worked into all corners of the earth, and have derived great satisfaction in doing so. Pig-headed though this attitude may seem I find it fascinating that one can span the world with so little power.

Under present conditions QRP working means that one does not make contacts in quantity; it does, however, require the development of considerable operating skill. I seldom if ever call "CQ", it is, in my opinion, already overdone. My experience has convinced me that more and better communication could be achieved if less power in general was used—combined with more listening.

The use of higher power has not improved operating skill or transmitting technique. In view of the amount of effort made in the early days to develop operating skill and to control the quality of transmission, it is a sad reflection to listen to the bedlam on the hf bands today, bad manners, bad notes, and the bands thick with key-clicks and a multitude of unspecified noises.

Perhaps we are lacking in faith. I recollect moving to a new QTH and stringing up 17ft of odd wire to a handy apple-tree. This temporary aerial loaded, I had a contact with a UA0- in Vladivostock,—a poor QSO but his first G and I have his card. This was in 1956 using an input of 17W.

Yours faithfully
E. J. L. Smart, G3KBN

The Editor
Radio Communication
Sir—With reference to the letter from G3YDX in the April issue, as an swl interested in cw I am very pleased to know Mr Stone. I can assure him that there are more of us about, as a glance at the contest entries and check log submissions in *Radio Communication* will prove.

I feel Mr Stone is jumping to the wrong conclusion. The Interference Committee of RSGB wishes to learn the proportion of licensed operators in built-up areas going on the air on the 14MHz band either on phone or cw during tv hours. I saw no mention of deciding the relative merits of either mode.

Mr Stone admits his own observations are inconclusive, so on what does he base his statement that, if swl reports show that ssb is less likely to cause tvi than cw, this would be completely false? As a cw man and an swl, I also would hate a false picture to emerge. I think we can rest assured that the Interference Committee has the sense to know just what can be learned from any swl reports it may receive, and I would like to take this opportunity of thanking the committee for offering SWLs a chance to help.

Yours faithfully,
F. Day, BRS30033

The Editor
Radio Communication
Sir—It is frequently alleged that manufacturers of radio equipment do not care what happens after the apparatus leaves the factory. In the case of KW Electronics we have found this to be far from true.

We operate a University broadcasting station on 998kHz for about nine hours a day and have been doing so for over a year. The transmitter is a converted Vanguard II and it has given good service. Unfortunately, one morning recently a cup of coffee was accidentally spilt into the pa compartment, which shut the transmitter down very rapidly! After cleaning out the mess, we found that about half a dozen high voltage capacitors and other bits and pieces needed replacing and that they were not available locally. We therefore rang KW and asked about replacements. Although the transmitter was nearly 10 years old they were able to supply us with replacements within three days, and what is more they made no charge for them.

Such service should not go unpublicized.

Yours faithfully,
J. Rabson,
technical manager, University Radio Essex

The Editor
Radio Communication
Sir—The additional information provided by Mr Faries, W6OOU, in his letter (April 1972) on the subject of the 14AVQ and verticals in general is most interesting. I am sure it will encourage more members to sample vertical polarization.

The advantage of increasing the number of radials is unquestionable and at G3OJV this is a job scheduled for the summer. However, there is one part of W6OOU's letter with which I cannot agree. That is—"Mr Waters' method of cutting a radial for minimum vswr is not necessary and not desired. It may cause an increase in the vswr on another band which is not noticed".

Many of us erect verticals because of lack of space for other types of aerials. In my experience the majority of amateurs fit only a small number of radials to their verticals, perhaps four or five being typical. The reason may be due to ignorance, lack of space, aesthetic considerations or pure laziness. In all cases the use of two or three quarter-wave radials with insulators will I am sure, be found superior to the same number of longer non-resonant ones. While swr readings do not necessarily prove efficiency I think that the swr curves together with on-the-air results published in my article in February speak for themselves.

Yours faithfully,
P. W. Waters, G3OJV

The Editor
Radio Communication
Sir—Many members of the Society will have experienced the same difficulties I have in obtaining some semi-conductors and integrated circuits, particularly the more specialized types such as rf power transistors and high speed logic devices.

To these members may I recommend the services offered by A. M. Lock and Co Ltd, 79 Union Street, Oldham, Lancs. This company stocks Motorola products in large quantities and is prepared to supply to amateurs in any quantity. Despatch is excellent.

I, for one, can testify to their services.

Yours faithfully,
P. Lumb, G3IRM

OBITUARIES

Major C. W. Andrews, MC, TD, G2TP
Clifford Andrews died on 22 April, aged 73. A pioneer of amateur radio, he obtained his callsign in the 'twenties and operated initially from Streatham. After moving to Dorking he continued to be very active on the hf bands and was a founder member of Dorking and District Radio Society.

Mr R. H. Bates, G3OJF
Dick Bates died on 1 April. Although he had a lifelong interest in radio, he did not become licensed until he moved to Newbury 14 years ago. Contracts with local amateurs encouraged him to join Newbury and District ARS and to sit for the RAE.

Mr G. Frampton
Graham Frampton, a swl, died in a road accident in Hampshire, aged 15. Along with friends, he founded the Courtmoor School Ham Radio Club.

Mr L. Holling, G3VMA
Lawrie Holling of Shipley, Yorkshire, died on 17 April after an illness of several weeks' duration. Being only partially sighted, amateur radio was his most absorbing hobby and it brought him many hundreds of friends.

Mr E. C. Wigzell, G8BMW
Ernie Wigzell of Stockport, who was very active on 2m, was a keen supporter of Stockport Radio Society and a founder member of the Northern Radio Societies Association.

We have also been advised of the death of:
Mr S. Nutt, G3OCR, ("Old Cock Robin"), of Southwick, Sussex, on26 April.

CONTEST NEWS

Summer Top Band Contest rules

1. The General Rules for RSGB HF Contests, published in the January 1972 issue of *Radio Communication* will apply.
2. **When.** 2100gmt Saturday 24 June to 0200gmt Sunday 25 June 1972.
3. **Eligible entrants.** The contest is open to licensed amateurs in all parts of the world. Multi-operator entries will be accepted. There will be two sections:
   (a) British Isles stations.
   (b) Overseas stations.
4. **Contacts.** CW (A1) only in the 1·8-2MHz band. County code letters, as published in the January 1972 issue of *Radio Communication*, must be sent after the report-serial number group by all British Isles stations. For example, for a contact from Surrey —579001 SY.
5. **Scoring.**
   (a) British Isles section—three points for each contact with a bonus of five points for each new county within the British Isles, and a bonus of five points for each new country outside the British Isles.
   (b) Overseas stations may only claim points for contacts with British Isles stations, and will score three points for each contact plus a bonus of five points for each new British Isles county worked.
6. **Logs.** Column (5) must be headed "County code letters received". The county code as sent must be added to the top of each log sheet. Entries must be addressed to: RSGB HF Contests Committee, c/o M. Harrington, 123 Clensham Lane, Sutton, Surrey.

RSGB 7MHz DX Contests 1972 rules

Radio amateurs and short-wave listeners throughout the world are invited to take part in the eleventh RSGB 7MHz Contests for single-operator stations. Suitable contest log and cover sheets for this and other RSGB contests may be obtained from: The General Manager, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE. UK members should enclose a large sae.

TRANSMITTING SECTION

1. The General Rules for RSGB HF Contests, published in the January 1972 issue of *Radio Communication*, will apply.
2. **When.**
   CW Contest. From 1800gmt Saturday 21 October 1972 to 1800gmt Sunday 22 October 1972.
   Phone Contest. From 1800gmt Saturday 4 November 1972 to 1800gmt Sunday 5 November 1972.
3. **Eligible entrants.** Licensed amateurs in all parts of the world. British Isles entrants must be members of the RSGB.
4. **Contacts.**
   CW Contest. CW (A1) only.
   Phone Contest. AM or SSB.
   Serial numbers must start at 001 for each contest.
5. **Scoring.** British Isles stations may not work each other for points.
   Overseas stations may only claim points for contacts with British Isles stations (G, GC, GD, GI, GM, GW).
   Each contact between a British Isles station and an overseas station will score as follows:

Location of overseas station	*Points*
Continent of Europe	5
Continent of North America	15
Continents of South America, Asia and Africa	25
Continent of Oceania	50

   Bonus points
   British Isles stations may claim a bonus of 20 points for the first contact with each country. For the purpose of scoring, the RSGB Countries List will apply with the exception that VE, VK, W/K, ZL and ZS call areas will each count as separate countries.
   Overseas stations may claim a bonus of 50 points for the first contact with each British Isles country-numerical prefix, ie G2, G3, G4, G5, G6, G8, GC2, GC3, GC4, GC5, GC6, GC8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GM2, GM3, GM4, GM5, GM6, GM8, GW2, GW3, GW4, GW5, GW6, GW8. Contacts with GB stations will not score bonus points.
6. **Entries** must be addressed to: The HF Contests Committee, c/o J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, Warwickshire, England. Logs must be posted to arrive not later than Friday 22 December 1972 for the cw contest and Monday 1 January 1973 for the phone contest. Logs must include a check list showing the call areas for which bonus points are claimed.
7. **Awards.** The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw contest. Certificates will be awarded to the continental leaders in both contests.

RECEIVING SECTION

These rules should be read in conjunction with the General Rules for RSGB HF Receiving Contests published in the January 1972 issue of *Radio Communication*.

1. **When.** As transmitting section
2. **Eligible entrants.** All short-wave listeners throughout the world. British Isles entrants must be members of the RSGB.
3. **Entries.** As transmitting section.
4. **Scoring.** British Isles entrants may only log overseas stations working British Isles stations during the contest. Overseas entrants may only log British Isles stations in contact with overseas stations in the contest.
   For British Isles entrants, each complete log entry of a contact between a station in the following continents and a station in the British Isles will score as indicated:

Location	*Points*
Continent of Europe	5
Continent of North America	15
Continents of South America, Asia and Africa	25
Continent of Oceania	50

   For Overseas entrants, each complete log entry of a contact between a British Isles station and any station in the contest will score as follows:

Location of Listener	*Points*
Continent of Europe	5
Continent of North America	15
Continents of South America, Asia and Africa	25
Continent of Oceania	50

   Bonus points. British Isles entrants may claim a bonus of 20 points for the first station logged in each country (see transmitting section).
   Overseas entrants may claim a bonus of 50 points for the first station logged in each British Isles country-numerical prefix (see transmitting section).
5. **Awards.** A certificate of merit will be awarded to the leading entrant in each of the British Isles countries and to the continental leaders outside the British Isles in each contest.

July 432MHz Contest rules

When: 0900-1700gmt 23 July 1972
All entries and check logs to: VHF Contests Committee, c/o 59 Harewood Road, Chelmsford, CM1 3DH.
The following General Rules will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11-24.

August 70MHz Contest rules

When: 0900-1700gmt, 13 August 1972.
All entries and checklogs to: VHF Contests Committee, c/o 14a Roman Way, Farnham, Surrey.
The following General Rules will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11-24.

144MHz SSB Contest rules

When: 0800-1200gmt, 20 August 1972
All entries and checklogs to: VHF Contests Committee, c/o 18 Eastbourne Ave, Acton, London, W3 6JN.
The following General Rules will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9c, 10a, 11-24.

March 144/432MHZ Open Contest results

This contest was very well supported, with 107 entries, even though the weather was bad; many stations reporting snow several inches deep. Most entrants thought conditions poor but there were several lifts, and QSOs of very good distance did take place on both bands. Both the first and third stations were single operator.

Most contestants thought the rules were agreeable, although a few people in the south-west did not like this type of contest. Only two swl logs were sent in and these will be credited towards the SWL Championship.

Check logs are gratefully acknowledged from: G2HH, G3XQD, G8DLL/P, G8ECT, G8FRS and G8FTK.

Posn	Callsign	County	144MHz QSOs	144MHz Points	432MHz QSOs	432MHz Points	Total Points
1	PA0EZ	—	18	71	63	2,136	2,297
2	G8BHH/P	HD	207	1,070	14	324	1,394
3	G8BBB	CE	140	799	24	444	1,243
4	G3NNG/P	BE	106	402	36	720	1,122
5	GW8ERP/P	DB	144	530	25	594	1,094
6	G3OXD/A	WR	171	536	33	540	1,076
7	G8APZ/P	HE	71	201	42	792	993
8	G8BQX/P	SX	181	573	18	288	861
9	GW8EQH	—	146	467	16	336	803
10	G8ELO/P	NR	101	319	22	396	715
11	G3GBU/P	SD	184	632	—	—	632
12	G3FEC/P	—	150	576	—	—	576
13	G3ZMD	BD	101	308	21	258	566
14	GD2HDZ	IM	28	354	5	198	552
15	G8BCL	YS	58	314	11	174	488
	G8BMP	SD	80	182	23	306	488
17	G8BCG	LE	61	123	26	360	483
18	G3NHE	YS	113	311	16	132	443
19	G8DGR/P	BE	—	—	24	426	426
20	G8DNK	YS	49	108	21	290	398
21	G8ERW	HF	86	138	23	246	384
22	G3XEP/P	YS	98	303	8	78	381
23	G8BXC/P	EX	106	332	2	24	356
24	G5UM	LR	17	73	17	282	355
	G4ABR/P	HD	85	331	2	24	355
26	G8ARM	LD	—	—	33	354	354
27	G3WAS/P	SD	146	346	—	—	346
28	G3UES/P	MX	121	199	20	132	331
29	G3SOU/P	HE	92	305	—	—	305
30	G3WCB/P	SY	144	304	—	—	304
31	G3YPD	SD	110	284	—	—	284
32	G8CCV	BE	60	272	—	—	272
33	G8CUT	EX	59	154	10	108	262
34	G3UHF	LE	77	191	8	60	251
35	G8EGO	YS	97	247	—	—	247
	G8CGE/P	—	86	247	—	—	247
37	G8CTT	KT	62	91	16	144	235
38	G3OUL	LE	89	233	—	—	233
39	G8FDW/P	HF	97	223	—	—	223
40	G8AMU	SY	86	138	8	84	222
41	G3ZMS	SX	69	185	4	36	221
42	G8DDW/P	SY	30	50	15	168	218
43	G8WY/A	LE	79	216	—	—	216
44	G3BW	CD	20	214	—	—	214
	G8EQQ	KT	100	214	—	—	214
46	GW8EQJ	FT	86	212	—	—	212
47	G3WHK	SY	128	206	—	—	206
48	G3KUE/P	LE	82	203	—	—	203
49	G3OHH	SD	37	201	—	—	201
	G8DTQ	SY	120	201	—	—	201
51	G8ETL/P	SX	72	200	—	—	200
52	G8FBL	SD	87	195	—	—	195
53	G8FOT	LE	73	144	5	42	186
54	G8AHK	SY	107	177	—	—	177
55	G3YPP/A	BD	83	175	—	—	175
56	G8ABI	WR	—	—	12	174	174
57	G8FRA/P	WK	62	170	—	—	170
58	G8FIH	GR	69	169	—	—	169
59	G3ZKC	LD	100	163	—	—	163
60	G8DXS	YS	50	128	5	30	158
61	G2WS	ST	37	93	8	60	153
	G3YED	—	67	153	—	—	153
63	G8DJF	BS	50	86	7	66	152
64	G4AJE	NR	46	149	—	—	149
65	G8BKR	GR	48	80	9	66	146
66	G8CUO	NM	72	144	—	—	144
67	G8AKT	BD	—	—	13	138	138
68	G8BXF	LE	46	137	—	—	137
69	G3LUU	YS	63	130	—	—	130
70	G8DOT	EX	55	127	—	—	127
71	G4APL	SY	95	121	—	—	121
72	G8EUC	KT	63	120	—	—	120
73	G8CGN	GR	26	46	10	72	118
74	G4ARN	NK	21	87	3	30	117
75	G8EIK	HF	47	113	—	—	113
76	G3YDY	EX	16	28	8	84	112
77	G3UCU	LD	78	108	—	—	108
78	G8FAT	SX	77	107	—	—	107
79	G4AGJ	LE	66	106	—	—	106
80	G4AEQ	LE	56	102	—	—	102
81	G8EBP	LD	77	101	—	—	101
82	G8DJT	YS	59	100	—	—	100
83	G3YVR	SX	53	97	—	—	97
84	GW8CMA	GN	40	93	—	—	93
85	G8FDL	—	51	89	—	—	89
86	G3XUS/A	SX	45	83	—	—	83
87	G4AGQ	YS	22	26	9	54	80
88	G8FQP	EX	54	76	—	—	76
89	G8BXJ	GR	45	75	—	—	75
90	G8EDG	SD	33	65	—	—	65
91	G8FBC	YS	42	63	—	—	63
	G3ZXK	MX	41	63	—	—	63
93	GW8DHP/P	MG	19	61	—	—	61
94	G8ADP/P	GR	—	—	8	60	60
95	G4AEZ	MX	48	58	—	—	58
96	GW8FTA/A	MH	29	48	—	—	48
97	G8DUA	LD	36	46	—	—	46
98	G8EVP	ST	21	43	—	—	43
99	G3ZXN	—	26	42	—	—	42
100	G2BJY	—	15	37	—	—	37
101	G8FCR	NM	20	36	—	—	36
102	G8FFI	HE	21	33	—	—	33
103	G8CEA	SY	25	29	—	—	29
104	G8LY	HE	16	28	—	—	28
105	G8BYK	LD	21	25	—	—	25
106	GM3ZVB/P	EL	12	20	—	—	20
107	G8BQR	HE	7	11	—	—	11
	BRS 28005	SX	105	437	—	—	437
	BRS 15822	LD	66	126	—	—	126

April 70MHz Contest results

Activity seemed to be very high for the contest, with a good number of portables possibly brought out by the warm sunny weather. While monitoring the band, only two stations using A3 were heard in the cw segment. The concensus of opinion was that conditions were slightly above average particularly on the east-west path.

FIXED STATIONS

Posn	Station	Cnty	Score	Pwr	ASL	Best DX	Km
1	G3OHH	SD	356	50W	1000	G3DAH	295
2	G3RLE	YS	221	50W	500	G4AOL/P	335
3	G3VPK	EX	220	50W	250	GM3WOJ/P	470
4	G3TDH	BD	199	40W	520	G3RLE	222
5	G3GVM	HE	158	50W	24	G3RLE	326
6	G5UM	LR	142	18W	560	G4AOL/P	180
	GD2HDZ	IM	142	40W	350	G3VPK	425
7	G3DOV	NK	132	25W	150	G3ONP/P	314
8	G6HD	KT	125	34W	67	G3RLE	288
9	G3EKP	LE	102	20W	800	GI4APW	275
10	G3RDQ	BS	88	3W*	730	G3RLE	245
11	G2CST	DY	82	40	650	G6HD	264
12	G3ZKE	LD	72	25	115	G3KSU/P	120
13	G2YS	HF	59	25	490	G3KSU/P	110
14	G3YQW	SX	58	15	400	G3KSU/P	95
15	G3HBG	SY	41	30	400	G3KSU/P	110
16	G2AVC	MX	37	25	0	G4AOL/P	70
	G3TBK/A	NM	37	20	51	G3ONP/P	190
17	G3SHY	NM	23	25	50	G3PEJ/P	125
18	G4AGQ	YS	12	18	200	G3PEJ/P	94
	G3XNS	SX	12	Ranger	—	G3KSU/P	—
	BRS 28005	SX	171	—	200	G4ADV/P	335

* Output power

PORTABLE STATIONS

Posn	Station	Cnty	Score	Pwr	ASL	Best DX	Km
1	GW4ABR/P	MG	336	40W	1600	GM4ALE/P	335
2	G3ONP/P	HD	329	24W	1583	G3PEJ/P	295
3	G3OBD/P	DT	247	15W	—	G3OHH	295
4	G3TDM/P	BS	245	15W	850	G4ADV/P	355
5	G4AOL/P	SX	236	25W	831	G3RLE	324
6	G3REI/P	SY	218	30W	750	G3JFO/P	250*
7	G3KSU/P	HE	196	10W	400	G3OHH	280
8	G4KF/P	EX	188	50W	387	G3RLE	280
9	G3VPF/P	DT	171	24W	777	G3VPK	255
10	G3PEJ/P	YS	167	24W	920	G3JHM/A	388
11	G3FZL/P	SY	166	10W	880	G3RLE	285
12	G3VCV/P	HN	165	25W	160	G3VPF/P	235
13	G3JFO/P	YS	129	30W	660	G3REI/P	290
14	G3KUE/P	LE	120	20W	900	GI3WEM	290
15	G3RCQ/P	EX	94	10W	350	G3VPF/P	240
16	G2WS/P	ST	76	15W	850	G3PEJ/P	350
17	G3ZLQ/P	HE	73	3W*	700	G3ONP/P	170
18	G4ADV/P	CL	72	10W*	600	G3TDM/P	360
19	GM4ALE/P	DF	70	20W	2320	GW4ABR/P	335
20	G3LMT/P	LN	33	3·5W*	540	G3HVI	130

* Output power

Check logs from G3YPS/M, G3WKH/P, G3WMR, G3ZRH, G3ZZA acknowledged.

80m Low Power Contest results

Although this event coincided with the WAB CW Contest it was well supported, with the leading stations making much the same numbers of contacts as in 1971. The WAB area code was accepted as being sufficient in cases where non-participants were not sending their location.

Alan Wybrow, G3JVJ, last year's runner-up, wins the event by a clear margin over the 1971 leader John Gould, G3JKY, and he will be presented with the 1930 Committee Cup in due course. Certificates of Merit will be sent to G3JKY and G3WXS/P.

G3JVJ's equipment was his well-tried TT11 transmitter drawing 6·5mA at 70V, accompanied by an 888A receiver, and driving an inverted-V dipole with its apex at 43ft. Many entrants used solid-state transmitters and the popular BFY50/51 devices were often featured.

Some competitors felt that they could have done without the WAB contest as the weak QRP stations tended to be swamped by the many higher powered stations taking part in it. "Suggest a points per mile basis for scoring,"—G3RZP.

Posn	Callsign	Points	Power (W)	QSOs
1	G3JVJ	4,450	0·45	45
2	G3JKY	3,950	0·45	41
3	G3WXS/P	3,800	0·50	38
4	G3RQZ/P	3,600	0·48	36
5	G3NEO	3,450	0·40	37
	G3WGV	3,450	0·5 & 1	39
7	G3RZP	3,000	0·45	31
8	G3HQT	2,750	0·50	31
9	G3XWZ	1,700	0·25	17
10	GM3SJX/P	1,300	0·50	13
11	G3XGY	850	0·40	9
12	G3HTI/P	385	1 & 5	15
13	G8PG	225	3	15
14	G3ZOH	197	5	41
15	G3NOM/P	115	5	23

Entry not accepted (multi-operator): G3OKA/P, claimed score 1000.

70MHz CW Contest results

With only 13 entries, and in conditions which never peaked above average at any time during the event, the 70MHz CW Contest cannot be described as being anything but disappointing. The afternoon proved particularly flat with so few stations active that it is doubtful if more than a four-hour event can be justified in future.

The winner's certificate goes to the UCNW team, GW3UCB/P, which with only one QSO more than the runner up, GW4ABR/P, gained a clear victory by a 35 point margin.

M.J.S.

Posn	Callsign	QSOs	Best dx	Points
1	GW3UCB/P	21	GM3WOJ/P	157
2	GW4ABR/P	20	G3KSU/A	126
3	G3OHH	20	G3AEX	114
4	G3RLE	14	G6HD	100
5	G6HD	19	G3RLE	88
6	G3YFM	23	G3RLE	78
7	G3OUF	19	G3RLE	70
8	G5DF	18	G3RLE	66
	G3WMR	14	G3RLE	66
10	G5UM	16	GW4ABR/P	62
11	G3KSU/A	10	G3OHH	39
12	G3ZKR	5	G6HD	13
13	G4AGQ	3	GW3UCB/P	7

Coventry DF Qualifying Event results

A cold, windy day did not deter 18 teams from starting in the first RSGB df qualifying event of the season, and the first of these events to be organized by the Coventry ARS. As signals from Station "A" were not heard at the start, an approximate bearing was given in accordance with Rule 4.

Station "B", G3SRS/P, operated by Bert and Cliff Simmonds of the Slade Radio Society, put in a strong signal and was soon run to earth some 4½ miles from the start beside a bridle-way between Binley Woods and Bretford. Mike Hawkins drove down one of the adjacent tracks but later retraced his steps to approach from another direction and was the first to locate the transmitter.

Station "A", G2ASF/P, was now heard as a strong signal, and Mike Hawkins was again first to find the transmitter hidden in a ditch between two sections of the Oxford Canal approximately 11½ miles SSE of the start. He managed to find a direct footpath to the site; many competitors took the long way round and ran for over a mile. In one minute no less than seven competitors arrived like a pack of hungry wolves.

Mike Hawkins and Brian Mahoney qualified for the National Final.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	M. Hawkins	Chelmsford	1517½	1419½
2	B. Mahoney	Rugby	1518	1420
3	R. Pearce-Boby	Oxford	1552½	1440
4	A. Symmonds	Oxford	1552½	1428
5	P. Tyler	Oxford	1553	1424
6	B. Bristow	Oxford	1553½	1436½
7	M. Gee	Oxford	1553½	1419
8	W. North	Chiltern	1553½	1434
9	I. Butson	Chelmsford	1554	1435
10	E. Mollart	Oxford	1611	1436
11	R. Vickers	Stratford	1452	1615
12	D. Newman	Rugby	1623	1507
13	T. Gage	Oxford	1624	1442
14	D. Holland	S. Manchester	1625	1437
15	P. Williams	Slade	1630	1503
16	R. North	Chiltern	—	1428½

Two competitors were unsuccessful in finding either transmitter.

Contests calendar

10–11 June—70MHz (Rules in April issue)
11 June—DF Qualifying Round—Chelmsford
24–25 June—Summer 1·8MHz (Rules in this issue)
25 June—DF Qualifying Round—South Manchester
24–25 June—Microwave Contest (Rules in April issue)
1–2 July—Venezuelan
1–2 July—144MHz (Rules in May issue)
8–9 July—SSB Field Day (Rules in March issue)
16 July—DF Qualifying Round—Salisbury
22–23 July—Colombian
23 July—432MHz (Rules in this issue)
30 July—DF Qualifying Round—Stratford
5–6 August—WAE CW
13 August—70MHz (Rules in this issue)
20 August—144MHz SSB (Rules in this issue)
2–3 September—VHF NFD (Rules in March issue)
2–3 September—IARU VHF (Rules in April issue)
3 September—DF Qualifying Round—Rugby
9–10 September—WAE Phone
10 September—80m Field Day
17 September—DF Final Round—Oxford
7–8 October—21/28MHz (Rules in May issue)
7–8 October—IARU UHF (Rules in April issue)
21–22 October—7MHz CW (Rules in this issue)
28–29 October—CQ WW DX Phone
4–5 November—7MHz Phone (Rules in this issue)
5 November—144/432MHz CW
11–12 November—Second 1·8MHz
25–26 November—CQ WW DX CW
November–December—70MHz Cumulative

MOBILE RALLY NEWS

Anglian Mobile Rally, 18 June
In addition to the list of attractions already published in the May issue of *Radio Communication* there will also be an RSGB bookstall, an RSGB enquiry and discussion desk and a Raynet desk. The bookstall will afford members an opportunity of buying RSGB publications and other items without having to pay the high postal charges prevailing at the present time. An RSGB Council member will also be in attendance to discuss problems.

Third Elvaston Castle Mobile Rally, 11 June
This rally takes place at Elvaston Castle County Park, five miles SE of Derby on the B5010 between the A6 and the A6005 and close to intersections 24 and 25 on the M1. Trade stands, demonstrations and

other usual attractions. Talk-in stations operational on 160m using the call G3EEO and on 2m using G3ZBI. Anyone bringing a caravan may make bookings for the caravan centre with Mrs E. Webb, Elvaston Caravan Park, Borrowash Rd, Elvaston, Derby. Tel: Derby 73735. Further details from Mrs V. Holt, 6 Maple Drive, Alvaston, Derby.

Derby Mobile Rally, 13 August
Organized by the Derby and District ARS, the rally takes place at Rykneld School, Bedford St, Derby. Attractions include trade-stands, band concert, junk sale, prize draw and children's events. Talk-in stations. Free parking and admission. Details from T. Darn, G3FGY, Sandham Lodge, Sandham Lane, Ripley, Derby. Tel: Ripley 2972.

Southdown ARS Mobile Rally, 22 July
The site for this rally is that of the Polegate Steam Engine Rally at Milton Gate, two miles west of Polegate cross-roads, eight miles east of Lewes on the A27. Talk-in station on 2m, 4m and 160m will probably have call GB2SS. Further information from E. F. Moore, G3JFM, 74 Wannock Ave, Lower Willingdon, Eastbourne, Sussex.

South Shields Mobile Rally, 2 July
The venue for this rally is Redwell County Secondary School, Prince Edward Road (B1300), South Shields. The site can be reached either from Seaburn along the A183 coast road, turning left at Marsden roundabout on to the B1300; or from the A1(M) via the A194 (M), then on to the A1055 and at the town boundary on to the B1300. Talk-in on 160 and 2m, trade stands, competitions, prize draw and refreshments. Further information from F. Harrison, G3SFL, 42 Woodlands Rd, Cleadon, Nr Sunderland.

Upton Mobile Rally, 16 July
Worcester and District ARC are organizing this rally at the Hill Secondary School, Upton-on-Severn, Worcs. Talk-in stations will be G8JC/A on 1,910Hz and G3GJL/A on 70·26MHz and 145MHz Other activities include fancy dress and sports for the children. Further details from G8ASO, QTHR. Tel: Worcester 29208.

Wessex Mobile Rally, 23 July
Organized by Wessex Amateur Radio Group, the rally will take place at Breamore House, Nr Fordingbridge, Hants. Talk-in on 160, 4 and 2m. Further details from G3YWG, QTHR.

Sheffield ARC Annual Picnic, 18 June
This will be held in the grounds of Riber Castle, Matlock, Derbyshire, starting at 12 noon. Talk-in on 160m and 2m. Details from G6VF, 134 Baslow Road, Totley, Sheffield.

Mobile Rallies Calendar

11 June	Third Elvaston Castle, Elvaston Castle Countryside Park, Nr Derby
17 June	Verulam ARC at Salisbury Hall, London Colney, Herts.
18 June	Anglian, at Suffolk Show Ground, Ipswich
18 June	Sheffield ARC annual picnic at Riber Castle Zoo, Matlock.
25 June	Bristol City & County RSGB Group, at Longleat, Warminster, Wilts.
25 June	GW2OP Bucket & Spade Party at Saundersfoot.
2 July	South Shields & DARC at Redwell County Secondary School, South Shields.
9 July	Cornish RAC at Truro Rugby Football Ground.
9 July	Exeter ARS informal mobile get-together, 2pm, Woodbury Castle, Woodbury, Nr Exeter.
16 July	Worcester & DARC, at Hill County Secondary School, Upton-on-Severn, Worcs.
16 July	Scarborough ARS at Burniston Road Barracks, Scarborough.
6 August	RSGB Woburn Abbey Rally
13 August	Torbay ARS at Newton Abbot Rugby Ground
13 August	Derby & DARS at Rykneld Schools, Bedford St, Derby
20 August	Saltash & DARC at Saltash Grammar School.
27 August	Preston ARS at Kimberley Barracks, Preston.
26-27 August	Stratford upon Avon RC and Mid-Warwickshire ARS combined in conjunction with National Town & County Festival, Royal Show Ground, Kenilworth, Warwicks.
24 September	Harlow & DARS.

Special Event Stations

Solihull, Warwickshire, 10 June
Solihull ARS will operate GB2SC simultaneously from two stations on 160–10m a.m./ssb/cw from 1100 to 1800gmt on the occasion of the Solihull Carnival.

Lichfield, Staffs, 10–24 June
The newly-formed Chad Radio Club is hoping to obtain GB3CRC for use on 80–10m and 2m to commemorate the 13th centenary of St Chad, patron saint of Lichfield.

Broughton Astley, Leics, 16–18 June
In co-operation with the Leicester Radio Society, Ted Hall, G3ZFQ, will operate GB3BA on 10, 15, 20 and 80m, in connection with Broughton Astley Village Gala. G8FVO/P and G8FJH/P will be on 2m.

Wolverhampton, Staffs, 17 June
In connection with the annual garden party of the Patshull Rehabilitation Centre, GB3PRC will be operational from 1430 to 1800 on 80, 40, 15 and 10 ssb. Operators will be G3SNY and G4ABS, and special QSL cards will be sent.

Chichester, Sussex, 1 July
Chichester & D ARS will operate two stations at the Chichester Gala; G3IOS/A on 2m a.m. and ssb, and G3PC/A on 3·5, 14 and 21MHz ssb.

Willenhall, Staffs, 3-14 July
During the above period a special station demonstrating the work of the school radio club will be in operation at the Willenhall Comprehensive School. Main operation will be on 7–9 July during the annual garden fete. Bands: 160m a.m., 80, 40, 20, 15, 10m ssb/cw; 2m a.m./nbfm. Talk-in to fete on 160/2m. Special QSL cards.

Manchester, 8 July
One of the main attractions at the gala day of Mather & Platt Ltd, Newton Heath, Manchester, will be the station operated by Manchester & D ARS, G3HOX. Operation will be on 160 to 10m (a.m. and ssb), 2m (a.m.), and 70cm (a.m.) and all contacts will receive a special QSL card.

The RSGB News Bulletin Service

The RSGB News Bulletin, callsign GB2RS, is broadcast every Sunday morning. This bulletin can be received on either vhf or hf, which gives almost complete coverage of the British Isles. It keeps radio amateurs up-to-date about happenings in the world of amateur radio and gives information on coming events, supplementing and bridging the gap between successive issues of *Radio Communication*.

SCHEDULE

Time	Frequency (MHz)	Location and coverage (hf) or beam heading (vhf) of station
0930	3·6	Bromley, Kent (SE England)
1000	3·6	Cheltenham (SW England)
	145·8	Aberdeen (NNW)
	145·095	Farnham, Surrey (NE)
1015	3·6	Belfast, (N. Ireland)
	145·8	Bangor, Co Down (N)
1030	3·6	Derby (N. Midlands)
	144·337	Weston-super-Mare (NW)
	145·8	Aberdeen (SW)
	145·89	Bishop Auckland (N)
	145·3	Sutton Coldfield (NW)
1045	145·89	Bishop Auckland (E)
	145·095	Farnham, Surrey (SW)
1100	3·6	Bridlington (NE England)
	3·6	Aberdeen (NE Scotland)
	144·3	Sutton Coldfield (SW)
1130	3·6	Motherwell (S Central Scotland)
	145·5	Bradford (NE)
1200	145·5	Bradford (SE)

CROSS-TALK

by G. SLAUGHTER, G3PAO*

Friends and neighbours

How many of us can really enjoy neighbourly friendship as it should be, when so often our hobby becomes a serious bone of contention, sometimes even involving whole families? Three cases out of 12 recently under investigation by the Interference Committee† suffered from this sad and unfortunate state of affairs, and not from technical inadequacy.

There is of course no easy remedy once the damage is done, and to refrain from operating is of no value either. One's primary objective should be to work one band at least and to be seen to be operating without causing interference (even if it is with only 1W across town). It will take patience and time, but eventually the breach, with near neighbours at least, may be sealed; enough perhaps to show what can be done on the amateur's own tv receiver with a filter and a bit more rf in the pipeline. It may then be possible to persuade a filter into the house next door and then perhaps further afield. One satisfied customer can lead to others.

One member's solution

A letter from a member mentions the importance of the public relations angle; the writer asks neighbours if he is causing interference (breakthrough), and keeps a "tvi suppression kit", comprising HPFs, braid filters, ferrite rings for use on mains leads, etc at the ready. He enlists the aid of another operator to work his station when investigating a trouble spot and estimates that in most cases about 30 minutes is needed to clear the problem. It should be clearly understood that only aids external to the tv set are offered and that the amateur in no way attempts to modify the receiver itself. (*This does not imply that the writer's approach is endorsed by the RSGB*).

At the transmitter end he continuously monitors his transmission with an old TRF tv set and uses a KW lpf plus an o/c ¼-wave coaxial stub tuned close to the Band 1 sound channel. He tells us not to forget the possibility of trouble from the swr bridge diodes and at the receiving end to check all coaxial plugs for correct make-off, and also to ensure that the tv set chassis is mains neutral.

The newcomer's approach

For the newly-licensed amateur, it must be confessed that after the hard slog of the RAE plus the testing determination of the cw hurdle to gain a full ticket, the temptation to chase big game with lots of beautiful new gear at every hour of the day and night for the first few weeks is generally irresistible and most succumb to it.

Let us be honest with ourselves. If the chap next door takes up golf, practices in **his** garden, and keeps breaking **our** greenhouse lights, and then declares it an act of God, it is most improbable that we will feel inclined to agree with him, even if his set of clubs has cost him something like £70. Suppose it is suggested to him that he reverts to putting, rather than muscle-powering 300yd drives. If he does not agree and says "It's my golf and my garden", then we are probably not on speaking terms any more. Is there a parallel here?

Until he is able to pronounce his own equipment and television receiver clear, a cautious approach both in frequency and talk power is well worth a trial by the newly-licensed amateur. Initially he could use sufficient audio drive so that only his most immediate neighbour is likely to be affected in a mild way and then start by putting this right.

Help and advice

Finally, remember that the RSGB Interference Committee is willing to help, ready to help and able to help, but . . . **do not cut the wicket to pieces before going in to bat!**

TVI problems should be sent to the Interference Committee, RSGB, 35 Doughty Street, London WC1N 2AE.

* 6 *Leggatts Wood Avenue, Watford, Herts.*

† *At its meeting on 10 April, the RSGB Council adopted a recommendation of the TVI Committee that it change its name to Interference Committee.*

RAYNET

by S. W. LAW, G3PAZ*

As the days draw out and the weather improves, the number and complexity of Raynet exercises increases, providing opportunities for the training of new members in the technique of message passing and handling and familiarizing all members with the special problems of the local terrain. There is also the possibility of creating a method of inter-group working with adjacent areas; a worthwhile consideration as an emergency could easily arise where such a facility would be of the utmost value. Do not become too self-contained in your operation; get to know the methods and set-up of your fellow groups and try to arrange an occasional inter-group meeting or exercise. This has already been proved to be most beneficial in some areas and much has been learned from the exchange of views and experience.

A golden opportunity will be the Raynet section of the RSGB Mobile Rally at Woburn in August, and we make no apology for again reminding our members of this and asking for volunteers in order that the load may be shared. May we remind you that procrastination is still the thief of time, so send in your offer of even that odd hour of assistance now and do not leave it to the mythical other fellow.

Portable operation

The MPT has now made it clear that operation from a temporary location may take place using a vehicle when stationary as a support for the aerial, as a station containing the apparatus, and using the power supply from the battery of the vehicle. It is to be understood that if the vehicle is in motion all supplies, even dry batteries in portable or hand-held equipment, must be disconnected or removed unless a current mobile licence is held by the owner.

This ruling will allow greater scope for many aspects of our activities, particularly in the field of rapid setting up for exercises or real emergencies and we welcome this clarification of the position.

Progress

It is always a pleasure to report on expansion and we hear that since the Raynet Committee meeting on 11 March up to the time these lines were written there have been no less than 70 new members registered. Moreover there is now a new group at Deeside in Flintshire which is composed of RAF personnel at Sealand—who better to cope with and understand the requirements of emergency service than these well-trained members of our forces? We welcome them in the knowledge that, duties permitting, this group will give a first-class account of itself at all times.

There is also the possibility of the formation of a new group in the mid-Warwickshire area. We hope to have more news later.

Wide or narrow

A great deal of work has been done by many members to sharpen the bandwidth of various commercial transceivers which we use, and some very good results have been achieved. However, to revert to the comments in our opening paragraph, might it not be a useful facility to have an optional wide-band setting available for monitoring adjacent frequencies used by neighbouring groups? We hardly need to make any suggestions as to method. Possibly something as simple as a switched resistor across an i.f. coil would suffice.

Annual social event

The Norfolk & North-East Suffolk Raynet Group will be holding its annual social event at Barford village hall (NGR TG 113077) on Sunday 25 June, starting at 11am. There will be talk-in facilities operational from 10am on both 160 and 2m.

The event is for all the family, and attractions will include a surplus gear sale, raffles, games and prizes for "junior ops", a "produce stall", junk sale, competition for the best Raynet mobile installation etc. Further details are available from G3HRK.

Honorary registrations secretary: **Mrs Jane Balestrini, "Merivale", Willow Walk, Culverstone, Gravesend, Kent.**

* 130 Alexandra Road, Croydon, Surrey, CR0 6EW.

CLUB NEWS

REGION 1 **RR B. O'Brien, G2AMV**

Ainsdale (ARC)—Members should contact N. Horrocks, G2CUZ, for details of meetings.

Blackburn (East Lancashire ARC)—First Thursday each month, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Secretary: W. E. Baxendale, G8FDG, "Juverna", 29 Westland Avenue, Darwen, Lancs.

Blackpool (B & Fylde ARS)—Mondays 8pm, Pontins Holiday Camp, Squires Gate. Morse tuition, 7.30pm.

Bury (B & Rossendale RS)—13 June 8pm, George Hotel, Market Street, Bury (Talk by R. Lascelles, manager of Jodrell Bank, on radio astronomy). It is hoped to follow this up with a visit to the radio telescope. 11 July (Surplus equipment sale). Secretary: G3RSM, 13 Rhiwlas Drive, Bury BL9 9DD.

Carlisle (C & DARS)—Mondays 7.30pm, Currock House, Lediard Avenue, Currock. Secretary: A. R. Harper, 23 Roman Way, Stanwix.

Cheshire (Mid-Cheshire ARC)—Wednesdays, 7pm, Technical Activities Centre, Winsford Verdin Comprehensive School, Winsford. Morse 1900-2000bst—also on the air. Working on 160, 80 and 2m. 2000-2130bst main activity. Mondays, net nights on 160m at 1900bst. Tuesdays, 2m–same time. Details from G3JWK.

Chester (C & DARS)—Tuesdays, 8pm, except first Tuesday in month which is net night, YMCA, Chester. Details from G8AYW.

Douglas (IOM) (D & DARS)—Secretary GD3YUM will be pleased to hear from any member who intends to visit the island.

Eccles (E & DARC)—Tuesdays, 8pm, Bridgwater School, Worsley, Manchester. Club 2m net channel is 145·7MHz. Secretary: G4AEQ.

Lancaster University (UOLARS)—Continues with the task of organizing the convention scheduled for Sept–23/24. Prospective members should write to Phil Jones, Department of Environmental Sciences.

Leyland Hundred Amateur Radio Group—Second Monday each month, 7.30pm, "Rose and Crown", Ulnes, Walton, Leyland. Net night, Saturdays 1900bst on 145·8MHz. Details from F. Harrison, 78 Lancaster Lane, Leyland, Lancs.

Liverpool (L & DARS)—Thursdays, 8pm, Conservative Association Rooms, Church Road, Wavertree. Secretary: G3WCS.

Liverpool (North Liverpool RC)—Tuesdays, 8.30pm, informal meeting at the "Nags Head", Thornton, Crosby, Liverpool 23. Visitors always welcome. Secretary: G3XMG.

Liverpool University (ARS)—Holds informal meetings each lunchtime in the radio shack. Now in full operation is the society's "lid net" on 145·565MHz. Details from G4AXA, 234 Derby Road, Chesterfield, Derbyshire.

Manchester (M & DARS)—Wednesdays, 7.30pm, 203 Droylesden Road, Newton Heath, Manchester 10, including morse classes for G8s and SWLs. Secretary: G3IOA.

Manchester (South Manchester RC)—Fridays 8pm, Sale Moor Community Centre, Norris Road, Sale, Cheshire. VHF activity night is Monday with operation of G3UHF from the club shack, "Greeba", Shady Lane, Manchester 23 at 8pm. 9 June ("Transistorized ssb tx," by P. Stewart), 16 June ("Commercial mobile radio", by D. L. M. Williams (Pye)), 23 June (df practice), 25 June (RSGB df event, South Manchester), 30 June ("Slow scan tv", by K. Kalm, G3RTU/4Z41X). Visitors welcome on Mondays and Fridays. Secretary: G3WFT.

Manchester University (ARS)—G3VUM is active on all hf bands. The society continues with its programme of lectures, visits and tuition for the RAE and morse test. Details from G8BVF, G3ZNS or GM3YOK, University Union, Oxford Road, Manchester.

Preston (PARS)—8, 22 June, 6 July 7.30pm. Morse practice 7.30–main feature 8pm. Windsor Castle (private room), St Paul's Square, Preston. Secretary: G. Earnshaw, G3ZXC.

Stockport (SRS)—Second Wednesday of each month (discussion night); fourth Wednesday (lecture night) 8pm, Blossoms Hotel, Buxton Road, Stockport. Secretary: G8BCG.

Thornton Cleveleys (TCARS)—First and third Wednesdays of month, 8pm, St John Ambulance Brigade HQ, Fleetwood Road North, Thornton. Details from G3ZYE. 7 June (Questions and answers session), 21 June ("Transistors and things", by G3GED). The construction group meets every Monday in the project laboratory, Rossall School, Fleetwood. Numbers are limited so please book via G4APP.

Westmorland (WRS)—First Monday of month, New Allen Technical College. Secretary: E. P. Goonan jnr, "Longridge", Storth, nr Milnthorpe, Westmorland.

Wirral (WARS)—First and third Wednesdays of month, 7.45pm, Sports and Recreation Centre (Old Drill Hall), Grange Road West, Claughton, Birkenhead, Secretary: G3WSD.

Wirral (Wirral DX Association)—Last Thursday of month at members' homes. Secretary: M. Davidson, G3YSM, 43 Stuart Ave, Moreton, Wirral. Visitors welcome, please inform secretary beforehand.

REGION 2 **RR J. E. Agar, G8AZA**

Barnsley (B & DARC)—9 June (Ladies Night), 23 June (Visit or colour tv lecture), 7.30pm, King George Hotel, Peel St, Barnsley. AR, Peter Ackley, "Camelot", Greenside, Havercroft, Wakefield. *G3LRP, QTHR.*

Bradford (BRS)—6 June (NFD let's talk it over), 20 June (Surplus sale), 4 July (Visit to Rank-Leak-Wharfedale Ltd, Idle, Bradford), 7.30pm, HQ, 10 Southbrook Terr, Great Horton Road, Bradford 7. Hon sec, G3HJP, QTHR.

Fulford (York) (FARS)—Tuesdays, 7.30pm, Scout HQ, 31 George St, York. Hon sec, G5KC, QTHR.

Halifax (NHARS)—7 June, visit to Bairds of Shipley, 21 June (Ragchew), 7.45 pm, Peat Pitts Inn, Ogden. At the recent AGM the following were elected: chairman G3UGF; sec/treasurer, G3MDW; minute sec, G3UI; contest manager, G8BMI; committee, J. Sunderland, G3TQA, D. Pickard, G3USH, G8CHN.

Harrogate & Knaresborough (H & KRS)—12 June ("Transistors in theory & practice", by L. Gordon Parkin, G3UVY), 12 June ("Mobile marine", by R. J. Constantine, G3EUF/MM). Details: hon sec, R. Troughton, G8CRH, QTHR.

Hull (H & DARS)—Meets at the Clubroom, 592 Hessle Rd, Hull. Hon sec, Mrs. M. Longson, 4 Chester Rd, Hull.

North Riding (NRARG)—Meets at "Alma Inn", Alma Parade, Scarborough and "White House Hotel", Whitby on alternate fortnights. Details from the hon sec, J. E. Agar, G8AZA, QTHR.

Northumberland (Morpeth) (NRC)—"Northumbria Radio Club" meets 3 Wheatsheaf Yard, Morpeth. Details from G3XAI, QTHR.

Otley (ORS)—20 June, 8pm (Lecture on Isle of Man/P VHF outing during tt week with slides by G8BZY. Open night on 24 Oct, the object: a construction contest open to all. Details from D. G. Mott, G8BZY, 17 Newall Carr Rd, Otley.

Scarborough (SARS)—Meets Fridays, 7.30pm, Technical College, Scalby Rd, Scarborough. Details from hon sec, G3VAN, QTHR or pro, G8KU, QTHR.

South Shields (SS & DARC)—Fridays 8pm, Trinity House, Social Centre, Laygate, South Shields.

Spen Valley (SVARS)—15 June("What's new", by S. Marsden of West Riding Electronics), 22 June (Annual general meeting), HQ The Grammar School, High St, Heckmondwike.

Sunderland (SARS)—Meetings on first and third Tuesdays each month, 7pm at Sunderland Polytechnic, G3XID, QTHR.

Wakefield (WRS)—Meets alternate Tuesdays, 7.30pm at Wakefield Youth Centre, Ings Rd, Wakefield. Details from G8XVU, QTHR.

York (YARS)—Thursdays, 7.30pm at British Legion, 61 Micklegate, York. Hon sec, J. A. Rainbow, 14 Temple Rd, Bishopthorpe, York.

REGION 3 **RR R. W. Fisher, G3PWJ**

I would like to remind club secretaries that information for Club News should arrive at Kingswinford in good time for the information to be sent to London.

Birmingham (Midland ARS)—20 June, 7.30pm, The Birmingham & Midland Institute, Margaret Street, Birmingham 2. *G8BHE.*

(South)—7 June (Surplus equipment sale), 8pm, Hampstead House, Fairfax Road, West Heath, Birmingham 31.

Coventry (CARS)—2 June (Preparation for NFD), 9 June (Night on the air), 16 June (/A from Fed End, Nr Coventry), 23 June (Night on the air), 30 June (Open night), 8pm, City of Coventry Scout HQ, St Nicholas St, Radford Road.

Dudley (DARC)—6 June, 20 June 8pm, Central Library, St James's Road, Dudley, *G3PWJ.*

Hereford (HARS)—4 June (Exhibition station GB3HCF). Further details from Mr Jesson, 181 Kings Acre Road, Hereford.

Stourbridge (STARS)—6 June (Informal at "Shrubbery Cottage"), 19 June ("VHF", by Mr T. Douglas, G3BA), 8pm, Longlands School, Brook St.

Stratford (SuA & DARC)—16 June (AGM), 8pm, Halls Croft, Old Town, Stratford. *G3OOQ.*

Wolverhampton (WARS)—5 June, 19 June (Station visits), Neachells Cottage, Stockwell End, Tettenhall, Wolverhampton.

Worcester (W & DARC)—5 June, 17 June, 3 July, 8pm, The Crown Hotel, Broad Street, Worcester. *G8ASO* (Worc. 29208).

REGION 4 **RR T. Darn, G3FGY**

Will club secretaries please note that unless I get their copy before the end of the month (ie April for the June issue) it will arrive too late for publication.

Derby (DADARS)—7 June (Surplus sale), 14 June (Basic radio, part 5), 21 June (DF practice night), 28 June (Natter night (social evening)). Friday 7 July, summer dinner, dance and cabaret at the Regency Rooms, Ilkeston; tickets, £1.50, obtainable from G2CVV and G3FGY, are strictly limited so please apply early. All meetings take place at the society's clubroom at 7.30pm. There are also activity nights on Mondays at 7.30pm. The 1930 Net operates every Saturday evening at 1930 on 1,930MHz.

Derby (Nunsfield House Community Assn ARG)—9 June (Preparation for rally), 11 June (3rd Elvaston Castle Rally), 16 June (Open forum), 23 June (Surplus sale), 30 June ("The production of printed circuit boards", by G3ALA and G3WFU). Meetings commence at 7.30pm every Friday in Room 7, Nunsfield House, Boulton Lane, Alvaston.

Grimsby (GARS)—8 June (Visit to Belmont tv repeater station), 22 June, (DF hunt start from Weelsby Woods at 7pm), 6 July (Computing). All meetings are held at the Red Cross Rooms, Rowston St, Cleethorps, and commence at 8pm.

Mansfield (MARS)—First Friday in the month at The Westgate Hotel, Mansfield, 7.45pm. *G3XWZ.*

REGION 5 **RR P. J. Simpson, G3GGK**

Bedford (B & DARC)—8 June (Technical books review), 15 June ("Radio Monitoring service" by Ray Hounslow), 22 June (Construction techniques), 29 June ("SSB field day planning", by G3UQR), 6 July ("Transmission lines", by G2CLP), meetings 8pm, The Dolphin, Broadway, Bedford, Hon sec, John Bennett, G3FWA, 47 Ibett Close, Kempston, Beds.

Cambridge (C & DARC)—2 June (2m mobile), 9 June (Informal), 16 June (Equipment sale), 23 June (Informal), 30 June (SSB field day-preparations), 7 July (SSB field day-final check out), meetings 7.30pm at club hq, Corporation Yard, Victoria Rd, Cambridge. Hon sec, J. Hern, G3NAC at club hq.

Dunstable Downs (DDRC)—2 June ("TV sound" by Frank Nurse, G3RBI), 9 June (Between week), 11 June (2m df hunt, 145·05MHz, Map 147, commences 1400 clock time-call guard), 16 June (Fun night, Roger, G3WBC), 23 June (Between week), 30 June (Hi-fi on a budget, G3HEO and G8FAL), meetings 8pm, Chews House, 77 High Street South, Dunstable. Hon sec, C. G. Powell, G8BPK, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury, Bucks.

Ely (EARS)—Meetings alternate Thursdays, 7.30pm at Ely Adult Education Centre, St Mary's St, Ely. Hon sec, P. Brown, A6775, 59 Fieldside, Ely.

Luton (George Kent ARS)—No details. Contact hon sec, John Allen, G3DOT, 77 Rosslyn Cres, Luton, Beds.

March (M & DARS)—Tuesdays, 7.30pm, The Old Police hq, High St, March. Hon sec, K. C. Smith, G8BEN, 36 New Rd, Whittlesey, Peterborough, Northants.

Shefford (S & DRS)—1 June (Final preparations—NFD), 8 June ("Satellite antennas" by Frank Voyner), 15 June (NFD post mortem and junk sale), 22 June (Workshop techniques), meetings at Church Hall, Ampthill Rd, Shefford, Beds. Hon sec, A. Sullivan, G2DGF, 12 Glebe Rd, Letchworth, Herts.

Stevenage (S & DARS)—The agm was held on 6 April and the following officers were elected: Chairman, G3TIK; secretary, G3OVT; treasurer, G3KSS; committee, G3SJR, G3JXF, G3WKA and swl, M. Challis; 1 June (NFD preparations), 15 June (NFD inquest), 6 July ("Semi-conductors by G3TIK"), meetings in the Senior Staff Canteen, Hawker Siddeley Dynamics Ltd, Gunnels Wood Rd, Stevenage, Herts. Hon sec, F. Collett, G3OVT, 8 Silam Rd, Stevenage, Herts.

REGION 6 **RR L. W. Lewis, G8ML**

Cheltenham (RSGB group)—First Thursday of month, 8pm, Royal Crescent Hotel, Clarence Street, Cheltenham. G2FWA.

Chiltern (ARC)—The club now has the callsign G3CAR which will be given its first contest airing during NFD. Club meets in Ernest Turner's Works Canteen, High Wycombe. 13 June (informal meeting), 28 June lecture (subject to be notified). Details from hon sec: P. J. Perkins, G3OUV, Loakes House, Loakes Park, High Wycombe.

REGION 7 **RR R. S. Hewes, G3TDR**

Acton, Brentford & Chiswick (ABCRC)—20 June (General discussion on members' problems), 7.30pm, Chiswick Trades & Social Club, 66 High Road, Chiswick. Hon sec, W. G. Dyer, G3GEH, QTHR.

Addiscombe (AARC)—No information received. Club meets at Prince George's Hotel, High Street, Thornton Heath. Details from hon sec, c/o 32 Nursery Road, Thornton Heath, Surrey.

Ashford, Middlesex (Echelford ARC)—12 June (Surplus equipment sale), 29 June (Being arranged), 7.30pm, St Martin's Court, Kingston Crescent, Ashford, Middlesex. At the AGM J. Ellis, G2FNK, was re-elected chairman; J. Hall, treasurer; V. Higgs, G3WVJ, secretary; L. Storey, membership; D. Walmsley, G3HZL, contests; A. Holloway, G3VUQ, social; B. Coleman, G8AZU, technical; A. Wenham, G3ZXA, editor; B. Gale, G3UJE, pro & asr. *G3WVJ, QTHR.*

Barking (BR & ES)—8 June (Film show "Gemini—an end and beginning", "Light in Nature", "Microwave aerials and towers", "Telstar reception in USA"), 7.45pm. Gascoigne Recreation Centre, Gascoigne School, Morley Road, Barking, Essex. All visitors welcome. Hon sec H. Davidson G3FZP, QTHR.

Bexley Heath (North Kent RS)—8 June (Radio quiz), 22 June ("Low power operation" by G3JKY) 7.30pm, Congregational Church Hall, Chapel Road, Bexley Heath, Hon sec, Maurice Lee, G4BAL, QTHR.

Burnham Beeches (BBARC)—1 June (Being arranged), 15 June (Junk sale) 8pm, Hedgerley Scout Hut, Hedgerley, nr Slough, Bucks. All visitors welcome. New committee; chairman, Richard Keed, G8COT, secretary, Nina Appleby, G8ENX; treasurer, Neville Bateman, G3UUB. *G8ENX, QTHR.*

Cheshunt (CDRC)—No information received. Club meets at Methodist Church Hall, opp Theobald's Station, Cheshunt. Hon sec, K. S. Arnold, G3XNP, QTHR.

Chingford (Silverthorn RC)—Every Friday 7.30pm, Friday Hill House, Simmonds Lane, Chingford E4. Hon sec, A. P. Mitchell G3YJZ, QTHR.

Cray Valley (CVRS)—1 June ("VFOs for vhf" by I. R. Lever, G8CBS), 15 June (Natter nite), 8pm, Congregational Church Hall, Court Road, Eltham SE9. Hon sec, J. M. Tripp, G3YWO, QTHR.

Croydon (Surrey Radio Contact Club)—20 June (No details received), 7.30pm, "Swan & Sugarloaf", South Croydon. Hon sec, S. A. Morley, G3FWR, QTHR.

Crystal Palace (CP & DRC)—17 June ("Medical electronic equipment" by Eddie Boyd and John Townsend, G8CSC), 8pm, Emmanuel Church Hall, Barry Road, SE22. Hon sec, Geoff Stone, G3FZL, QTHR.

Dartford Heath (DF Club)—11 June (DF hunt RSGB qualifying event at Chelmsford), 25 June (DF hunt RSGB qualifying event at S Manchester). Further details from hon sec, Maureen Worbey, G3XVC, QTHR.

Ealing (E & DRS)—Every Tuesday, 7.30pm, Northfields Community Centre, Northcroft Road, W13. Details from hon sec, J. E. Alban, G3JEA, QTHR.

East London RSGB Group—Meets at Wanstead House, The Green, Wanstead E11. Chairman, Ron Ledgerton, G2ABC, QTHR.

Edgware (E & DRS)—12, 26 June (No details), 8pm, St George's Hall, 51 Flower Lane, Mill Hill, NW7, 18 June (2nd df hunt), 1 July (Exhibition at Burnt Oak public library). Hon sec, Alan Masson, G3PSP, QTHR.

Gravesend (GRS)—Wednesdays, 8pm, Northfleet Recreation Centre, Springhill Road, Northfleet, Kent. Details from A. J. Moules, 166 Darnley Road, Gravesend, Kent.

Greenford (GARS)—16, 30 June (No details received), 8pm, Greenford Community Centre, Oldfield Lane, Greenford. Hon sec. John Hedges, G3MMQ, QTHR.

Guildford (G & DRS)—9, 23 June (No details), 8pm, Model Engineering HQ, Stoke Park, Guildford, Surrey. New committee; chairman, F. Mathews, G8ACJ; secretary, P. Hopwood, G8CQM; treasurer, B. Horning, G8DTH; editor pro, B. Fullbrook, G2WAF & R. Dee, G3BJX, A. R. Moore. G8CQM, QTHR.

Hampton Court (Thames Valley ARTS)—7 June ("Tvi and other interference" by Joe Hill, G3JIP), 8pm, "The Three Pigeons", Portsmouth Road, Long Ditton, Surrey. Pro, Rob Muir, G3LHN, QTHR.

Harlow (DRS)—No information received. Club meets every Tuesday, 8pm, Mark Hall Barn, First Avenue, Harlow, Essex. Further details from hon sec, V. Heard, 106 Vicarage Road, Harlow, Essex.

Harrow (RSH)—2 June (Junk sale), 8pm, Harrow County School for Boys, Sheepcote Road, Harrow. Hon sec. Les Light, G3KDL, QTHR.

Havering (H & DARC)—No information received. Club meets at British Legion House, Western Road, Romford. Details from hon sec, S. J. Hobday, G3SKV, QTHR.

Hemel Hempstead (HH & DARS)—No information received. Club meets at Addmult Sports Club, Hemel Hempstead. Details from hon sec, A. J. Wakefield, 88 Heather Way, Hemel Hempstead, Herts.

Holloway (Grafton RS)—Mondays (RAE), Fridays (Morse and club), 7.30pm, Archway School Annexe, Whittington School, Highgate Hill, N19. Hon sec, Tom Coleman, G8EEI, QTHR.
Kingston (K & DARS)—No information received, club meets at "Penguin lounge", 37 Brighton Road, Surbiton. Hon sec, R. S. Babbs, 28 Grove Lane, Kingston, Surrey.
Loughton (L & DRS)—9, 23 June (No details), 8pm, Loughton Hall, Rectory Lane (Nr Debden station). Hon sec, David Bowers, 12 Theydon Park Road, Theydon Bois, Essex.
New Cross (Clifton ARS)—Meetings every Friday, 8pm, 225 New Cross Road, London SE14. Hon sec, R. A. Hinton, 38 Camilla Road, Bermondsey, SE18.
Northolt (BEAARS)—First Wednesday in the month, BEA Trident Club, Western Avenue, Northolt, Middlesex. (This club is open to non-BEA employees by invitation. Contact David Evans, G3OUF, tel Amersham 3257, for details).
Paddington (P & DRS)—Every Wednesday. Club meets at 8pm, Beauchamp Lodge, 2 Warwick Crescent, W2. Further details from Mike Pawley, G8AWV, QTHR.
Purley (P & DRS)—13 June (Natter nite), 27 June (Demonstration by G4AKG using transceiver to attempt a QSO with the committee camping on 1200ft mountain in the IOM, 80m ssb), 8pm, Lansdowne Hall, Lansdowne Road, Purley. Hon sec, Alan Frost, G3FTQ, QTHR.
Reigate (RATS)—First Wednesday (Club night), 8pm, "Nutley Hall", Nutley Lane, Reigate, third Wednesday (Ragchew), 8pm, "Marquis of Granby", Hoolley Lane, Redhill. New committee elected at AGM; chairman, P. Hovenden, G8ABC; secretary, F. Munday, G3XSX; treasurer, C. Saveker, G8AMU; contests, D. Thom, G3NKS & G3WUS, G3ZYX, G4ARO. *G3XSX*, 2 Conifer Close, Reigate, tel 43130.
Scouts (Baden Powell House ARC)—No information received. Club meets at Baden Powell House, Queensgate, South Kensington, SW7. Details from A. Watts, 312 Tudor Drive, Kingston.
Southall (UK FM Group London)—20 June (No details), 7.30 for 8pm, Scout Hut, Hayes Road, Southall, Middx. Information on this group from hon sec, Karl Kanalz, G5AGX, QTHR.
Southgate (SRC)—8 June (Lecture by Dunstable Downs Group on amateur tv; demonstrations of equipment, closed circuit tv, and video link between club's QTH and Alexandra Palace in operation). All visitors welcome. Pro, Steve White, G3ZVW, QTHR.
St Albans (Verulam ARC)—20 June ("Every Shack should have one" by H. E. Livermore, G3XEG), 7.30 for 8pm, St Alban's Town Hall, Herts. Hon sec, Hugh Young, G3YHY, QTHR.
Sutton & Cheam (SCRS)—20 June (NFD report, junk sale), 8pm, The Harrow Inn, High Street, Cheam, hon sec, Jack Korndorffer, G2DMR, QTHR.
Welwyn (mid-Herts ARC)—No information received. Club meets at Welwyn Civic Centre, Welwyn, Herts. Hon. sec, Peter Wilcocks, G8AIE, QTHR.
Wembley (GECARS)—Thursdays, 7pm, Sports Club, Preston Road, North Wembley. (This club is open to non-GEC employees by invitation, tel Dain Evans, G3RPE, at 01-904 1262 during business hours for details).
Wimbledon (W & DRS)—No information received. Club meets at St John's Hall, 124 Kingston Road, Wimbledon, SW19.
Woolwich—This society is being re-formed, contact B. C. Corper, G3ZOJ, QTHR, for details.

REGION 8 — RR D. N. T. Williams, G3MDO

Brighton (Brighton Technical College ARC)—Club meets on alternate Mondays. Details from hon sec: G2CMH, 35 Willington Way, Brighton.
Canterbury (East Kent RS)—15 June (Junk sale), 20 July ("IC of the month and printed circuits", by G3EMU), 20 August (Mobile rally). Monthly meetings at Westgate Hall, Canterbury. Alternate meetings in conjunction with UKC at Electronics Building. Further details of meetings from G3MDO, QTHR.
Crawley (CARC)—Monthly meetings held at Trinity Congregational Church Hall, Ifield, Crawley.
Eastbourne (Southdown ARS)—5 June (AGM), 3 July (Outdoor event). All meetings at Victoria Hotel, Latimer Road, Eastbourne.
Horsham (HARC)—6 June ("Aerials", by G3TR) at Guide HQ, Denne Road, Horsham. 20 June (informal) at Star Roffey.
Maidstone (MYMCAARS)—23 June ("The G3IAS keyer", by G3ORH). Meetings held every Friday at "Y" Sports Centre, the first and third Fridays being devoted primarily to the beginners.
Mid-Sussex (MSARS)—1 June ("Modulation", by G2IAV), 29 June (Windmills mobile evening). All meetings held at Marle Place, Leylands Road, Burgess Hill.
Thanet (TRS)—Meetings held every Friday at Hilderstone House, Broadstairs.
Tunbridge Wells (West Kent ARS)—16 and 30 June. Meetings held at Art Centre, Monson Road, Tunbridge Wells. Details from H. Richards, 17 Reynolds Lane, Tunbridge Wells.
Worthing (W & DARC)—Meetings held every Thursday, Rose Wilmot Youth Centre, Littlehampton Road, Worthing. Details of future events from G6KFH/T.

REGION 9 — RR H. W. Leonard, G4UZ

Bristol (City & County RSGB Group)—26 June ("160/2m project" by M. Allenden, G3LTZ of Swindon ARC), 7.30pm, Beckett Hall, St Thomas Street, Bristol 1. *G3ULJ*.
Bristol (BARC)—Tuesdays and Thursdays, 7.30pm, 41 Ducie Road, Bristol 5.
Bristol (University ARS)—Every Saturday, 2.30pm, Dept of Physics, Royal Fort, Tyndalls Park Road, Bristol 8. *G8ADP*.
Burnham on Sea (BoSRC)—Contact J. Robertson, G3ZOR, for details, tel 2333.
Cornish (CRAC)—First Thursday of month. 6 July "Vhf propagation" by G3XC and discussion on CRAC mobile rally), 7.30pm, SWEB Social centre, Pool, Camborne. New officers — president, G3XFL; chairman, G8DZE; sec, G3WKP.
Newquay Group (CRAC)—Fortnightly, 7.30pm, Treviglas School, Newquay. Dates from G3THT. A 2m project is under way. Further details of Cornish and Newquay groups from pro, G3NKE, QTHR, or phone Camborne 2419.
Exeter (EARS)—Every Tuesday, 13 June (Film), 7.30pm, Community Centre, St David's Hill, Exeter. Hon sec, A. W. Bawden, 232 Exwick Road, Exeter EX4 2BA.
North Devon (NDRC)—Second and Fourth Wednesdays of month, 14 June (Talk), 28 June (Ragchew), 7.30pm, "Grinnis", High Wall, Sticklepath, Barnstaple, RAE session, 7pm, each meeting. *G4CG*.
Plymouth (PRC)—First and third Tuesdays of month, 6 June (Open meeting), 7.30pm, Virginia House, Bretonside, Plymouth. Hon sec, S. E. Martin, 32 East Park Ave, Plymouth PL4 6PF.
Saltash (S & DARC)—First and third Fridays of month, 7.30pm, Burraton Toc H, Saltash. Hon sec, G4AJU, 302 St Peters Road, Plymouth PL5 3DU.
Taunton (T & DARS)—Fridays, 7.30pm, Jelalabad Barracks, The Mount, Taunton.
Torbay (TARS)—Every Tuesday and last Friday and Saturday of month, 24 June ("The locals on tape" by A. Heather and NFD inquest), 7.30pm, rear of 94 Belgrave Road, Torquay. Visitors always welcome. *G3NQD*.
Weston-super-Mare (WsMRS)—Second Friday of month. Contact G8FNL at WsM 29327 for details. G8FNL now reads RSGB news at 9.30 am on Sundays on 144·3MHz beaming NW and would like reports. Visitors and holidaymakers very welcome. *G3GNS*.
Yeovil (YARS)—Every Thursday, 7.30pm, Youth Centre, Park Lodge, The Park, Yeovil. *G3NOF*.

REGION 10 — RR D. M. Thomas, GW3RWX

Aberystwyth (University College of Wales Aberystwyth Radio & Electronics Society)—Miss Ruth Bury, secretary of the society will be pleased to hear from new students for the coming session, c/o Students Union, University College of Wales, Aberystwyth, Cards.
Barry (Barry College of Further Education ARS)—Thursdays 7pm during college terms, at Barry College of Further Education, Colcot Rd, Barry, Glam. *GW3VKL*. By the time this notice is in print, the ambitious Marconi-Kemp commemoration programme will be over. Those who require one of the special stamps issued by the Post Office to be franked actually on Flatholm Island should send to GW3VPB for application forms as soon as possible.
Cardiff (RSGB Group)—Monday 12 June 7.30pm. BBC Club, Llandaff, nr Cardiff. *GW3GHC*.
Cardiff (University College Cardiff ARS)—Student entrants for next session should communicate with the society secretary, c/o Students Union, Dumfries Place, Cardiff.
Glamorgan (Raynet Group)—Details available from GW3ZFG. Tel No: Cardiff 62411.
Haverfordwest (HARS)—Tuesdays, 7.30pm, HQ Rosemary Lane, Haverfordwest, Pembs. *GW3YBB*.
Oakdale (Blackwood ARC)—Fridays, 7.30pm, during school terms. Oakdale Community Centre, Oakdale, Mon. *GW3TUG*.
Pembroke (P & D RSGB Group)—Last Friday of each month, 7.30pm at the Defensible Barracks, Pembroke Dock, Pembs. GW2OP's Bucket & Spade Party at the Regency Hall, Saundersfoot, on Sunday 25 June. Further details from GW3LXI.
Pentrebach (Hoover ARC)—Mondays 7.30pm. Hoover Social Club, Hoover Works, Pentrebach, Nr Merthyr, Glam. Sec: Mr F. E. Tribe.

Rhondda (RARS)—Meets at Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. The annual social on 27 April was very successful and was attended by representatives of a number of Welsh clubs together with their ladies. *GW3PHH.*
Sully (S & D SWC)—Tuesdays, 7pm, The Annexe, Sully Bowls & Social Club, 59 South Rd, Sully, Glam. *GW3ZSV.*
Swansea Telephone Area (ARS)—Tuesdays 7.30pm. Telephone Engineering Centre, Gors Rd, Swansea. Sec: Mr D. E. Connor, 7 Glanmon Rd, Sketty, Swansea, Glam.

REGION 12 **RR A. J. Oliphant, GM3SFH**
Aberdeen (AARS)—Fridays, 7.30pm, 6 Blenheim Lane, Aberdeen. *GM3HGA,* telephone Aberdeen 33838.
Dundee (Kingsway Technical College ARC)—Wednesdays, 7pm prompt, Kingsway Technical College, Old Glams Road, Dundee.
Inverness (IRS)—Fortnightly on Fridays at 7.30pm. Next meeting 16 June. Cameron Highlander's Memorial Youth Club, Planefield Road, Inverness. Mr L. Bell, 114 Glenurquhart Road, Inverness.
Lhanbryde (MFARS)—Wednesdays, 7.45pm, St Andrew's School, nr Lhanbryde, Elgin, Morayshire. GM3UKG, telephone Clochan 225.
Queen's Own Cameron Highlanders Memorial Youth Club Radio Section—Tuesdays, 7.30pm, Planefield Road, Inverness. Section caters for all young people from 13 years interested in learning, and obtaining practice in, the elements of radio technique. Mr Bill Begg, 68 Tomnahurich St, Inverness.
Thurso (CARS)—Second Tuesday in each month, 7.30pm, Scapa House, Thurso, *GM3JUD.*

REGION 13 **RR V. W. Stewart, GM3OWU**
Berwick (BARS)—Last Sunday in each month, 3pm, Tweed View Hotel. Further details from C. H. Crook, G3YOG, 19 Hatters Lane, Berwick on Tweed or from the AR, G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.
Dunfermline (DRS)—Second Wednesday in each month 7.30pm, Abbot House, Dunfermline. Further details from G. Martin, GM3NVQ, 42 Rose Street, Dunfermline.
Edinburgh (LRS)—Second and fourth Thursdays, 7.30pm, 66 Hanover Street, Edinburgh. Further details from R. Manners, GM3VZL, 165 Mayfield Road, Edinburgh.
Glenrothes (GDARC)—First Sunday in each month, 7.30pm, Old Nursery Buildings, Leslie, Fife. Further details from K. Home, GM3YBQ, 14 Liss Way, Kirkcaldy.

REGION 16 **RR D. F. Beattie, G3OZF**
Chelmsford (CARS)—First Tuesday of the month, 7.30pm, at Marconi College, Arbour Lane, Springfield, Chelmsford. Details from G3VPK.
Colchester (NEETCARS)—Wednesdays, 7.30pm, North-East Essex Technical College, Sheepen Road, Colchester. Details from E. T. Jacobs, 26 Pondfield Road, Colchester.
Ipswich (IRC)—It is hoped to hold two meetings each month when possible at the new QTH—Handford House, corner of Handford Road/London Road, Ipswich, on the second and fourth Wednesdays of each month. 14 and 28 June. (Installation of club aerial). Details of meetings from G3YWM.
Norwich (NARC)—Every Wednesday, 7.45pm at Crome Community Centre, Telegraph Lane East, Norwich. At the AGM, held on 5 April, the new committee was elected, comprised of chairman—G3PNR; hon sec—G8BLD; treasurer—G8CKO; members—G8AUN, G2CDX, G4AUV. Details of meetings from G8BLD, The Rectory, Framingham Pigot, Norwich, Norfolk NOR 45W.
Southend (S & DRS)—Every other Thursday, 7.30pm, at The Flarepath Canteen, Southend Airport. Next meetings: 15 and 29 June. Details from G3AXN.

REGION 17 **RR L. N. G. Hawkyard, G3ZKR**
Basingstoke (BARC)—Meetings first and third Saturdays each month. (Except June) 17 June ("Field effect transistors" by W. B. Mansell, G2CPM. Chineham House, Popley, 7.30pm. *G3CBU.*
Harwell (AERE ARC)—Meetings on the third Tuesday of each month, also informal gatherings and junk sales every Friday lunch time, 7.30pm, Social club, AERE, Harwell, Berks. *G3NNG.*
Southampton (RSGB Group)—Saturday, 10 June, Lanchester Building, Southampton University. Every Wednesday evening at the clubroom, Kent Road. *G3ZKR,* tel 73378.
Swindon (SDARC)—7 June (Annual general meeting), 21 June (Mobile evening), Barbury Castle. Club meetings at Penhill Junior School, Swindon, 7.30pm.

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of 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 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

The closing date for each issue is the 4th 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.

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

See the current order form on the last page for further details.

FOR SALE

Cossor, 1035 oscilloscope, £18, 1320 sweep generator, £6, valve testers, Mullard, £30, AVO £3, AVO valve voltmeter, £6, radar tube tester, £4, continuity tester, £3, Taylor circuit analyser, £2, buyer coll. C. B. Fairbrass, 137 Louisville Rd, London SW17 8RN. Tel: 01-672 4651.

36in boat, excellent for radio control, £3, 5 channel selector for use with single channel equipment, £1, powerful reconditioned 12V motor for above boat, £2, the lot for £5, carr extra. N. Munns, 2 Field Lane, Letchworth, Herts, S46 3LE, Tel: Letchworth 5047.

Grundig yacht boy domestic rx, new, £30, or exch for working pr of army 88 walkie-talkies or modern sets or pr of Pye Cambridge /ms or sim radio telephones, transistor essential. Philip Jenkins, 30 Gainsborough Rd, North Finchley, London N12 8AG, 01-445 8722.

9R59D5 mint, choke smoothed ht, £40 ono + carr. Tokai TC99 walkie-talkie 28·5MHz, top 3in aerial missing but performs to spec, £8.50 plus carr. G3UCK, QTHR, Bingley (Yorks) 5096.

Property of the late G3VMA. Comp station, Garex 2m tx/rx, as new, £60, KW Vanguard, £25, Eddystone 504, £25, or comp £100 + aerials + speakers + psu + mic etc. Buyer coll. G3VMA/JO, QTHR, Shipley 56517 after 6pm.

3 carbon resistors to make 80Ω 300W, brand new, £2.50, 90W mod trnsfmr, £2, also PO keyswitches, relays, telephone dials. P. Heap, 198 Abbots Rd, Abbots Langley, Watford, Herts. Tel Kings Langley 63889.

KW2000 with ac psu, highest offer secures, G3ZNW, QTHR, Tel 01-432 2343 (office).

HW100 + associated eqpmnt + several other interesting items, too many to list, pse phone or send sae for dets. G3ZUO, QTHR. Tel Keynsham (02756) 5115.

Sentinel 2m cnvtr 4-6MHz i.f., £8. Electroniques 1FA/455/ssb mk2 i.f. strip, £6. Latest Texas mosfets, 3N201 with data, 75p ea. TIS88A, 30p ea: tunnel diodes, 1N3715, cut-off 3GHz, £1.50 ea. New xtals 35·000MHz, £1.25: Vast quantity of valves, comps being cleared cheap. Sae list. G8AMP, QTHR.

Microwaves, radio, computing. Imminent emigration forces shack clearance. Sae for comp list. G8AMC, 11 Rosewalk, Radlett, Herts, Tel: Radlett 4300.

Hammarlund HX50 160 to 10m exciter, £60. Francis and Lewis 40ft tower, £30. Oregon pine 36ft mast 2 by 2in with two sets steel guys, £10. Cowl gill, £5. G6VX, QTHR.

RSGB Bulletins 1960 to 1970, *SWM* 1963 to 1969, 60p per vol. Browns "Type F" hdphns, unused, £1.25. B/Lee L1416 mains fltr, £1.25. G3KZC, QTHR. Tel 0272 673026.

KW2000A, KW1000 linear, Shure 444 mic, TA33 lp fltr, ant switch, all in immac cond, used only few hours, £250, pref buyer coll. G3IRQ, QTHR, Tel Manningtree 2957.

Sinclair project 60 fm stereo tuner comp and as new in orig packing, £13.50 inc pp. G3ZLH, Bronheulog, Cottage Lane, St Martins, Oswestry, Salop.

Heathkit SB101 + ac supply, SB600 speaker, £160. SB610 scope, £35, both immac. G3RWQ, QTHR.

LG300, £25. PSU, £5. Modulator, £7.50. Z Match/swr, £7. CR300/2 re-aligned psu manual, £15. CR300/2 for spares, £4. Redifon R55rx, £5. Lowpass fltr, £2.50. Coll or buyer pay carr. G3YAA, QTHR.

Swan 350 with 230xc psu, 410 sep vfo, 22 selector switch, VX-1 vox unit, £150 the lot. Shure 444 mic, £6. Drake R4A with spkr, £95. Morse key type D, £2. G3FXA, Bude 2624.

813s, £1 post paid, also bases, top clips, rfcs, tu variable capacitors, coil former etc, all cheap. Xtals 100, 8015kHz, 50p. G3ZYW, QTHR, Tel 0225 23562 (evngs).

Heathkit HW-MA and hmbrw invertor, £60, tx has been modded to give improved modulation. Also Murphy 821 tx/rx, £5, tx wrkng on 2m, pref buyer inspt and coll. R. T. Payne, Flat 8, Bevere House, Bevere, Worcester, WR3 7EF.

Comp ssb station, FL200B tx, FR100B rx with all xtals and fm trap dipole mic key, lpf type FF30DX spare valves pas and relay, £150. GM3MTK, QTHR, Tel Findhorn 320.

Cable 12 core 1A, suit HAM-M, new, 17p yard. 75Ω unused coaxial 7/16in od, 15p yd, sae samples. M1-19467-A oscillator, mint, 2 807s, £5, see ad page 267 April. All carr pd. GD3TIU, QTHR, Tel Marown 442 or 062-485 442.

GEC brt 402E, £50. Tiger Olympic tx 120W a.m. cw, £15. 6HFs, £1 ea. Fltr XF9B + xtals, £12. G3SI0, 67 Beachwood Ave, Wallheath, Nr Brierley Hill, Staffs, Tel Kingswinford 5924.

KW2000B + ac psu, mint, £170. KW1000 linear, mint, £90. Genuine reason for sale. G3YBA, 182 Crimicar Lane, Sheffield S10 4EJ. Tel Sheffield 303408.

18mth old INOUE IC700 rx, tx + psu, vgc, in orig packing, £135. Fully metered QRO linear, 80-10m, vry well made, £35, or £160 the lot. Buyer insp and coll. G3WXO, QTHR. Tel Stony Stratford 3346.

HW30 2m tx/rx with mic and autotrnsfmr, £15. Top band tx with psu, £10. Modulator + psu for QRO tx, £8. PM11 preselector, £3. Carr extra. G3YQV, QTHR. Tel Brighton 735694.

Property of late G3BRJ: KW Vespa Mk 2, 6LQ6 pa, ac psu + mic, £85. Trio JR500S + spker, £45. G3SCW, QTHR.

Lafayette HA410 10m a.m. tx/rx, built-in psus + vfo and Heath twoer. Best offer or trade both for TW-2 communicator tx/rx. Stephens, 158 Ashford Road, Iver Heath, Bucks. Tel Iver 2060.

1938/69 *SWM*. 1950-64 *QST*. 1963-71 *Bulletin/Radio Communication*. Some *CQ* etc. Sae det. Offers. Wanted: valves EF173, EC71. G3ERB, QTHR. Tel 051-645 3367.

Wavemeter Class D, int psu, £5. WS1191, untidy, psu, charts, circ + notes, £10 ono. Both + carr. G3VSD, QTHR.

Pair of transistor Ranger txs, 4m, £5 ea. HRO comp with 4 bndsprd coilpacks and 7 gen cov + psu, £12. 20ft 2in diam dural pole, weight 8lbs. G8EEJ, 51 Ruskin Crescent, Crown Hill, Plymouth, Devon.

Wavemeter W1646, 18-87MHz ac power, new, £6. Valves: EF80, 5 for £1. Wanted: Old pattern 450kHz i.f. trnsfrmr with large ferrite slugs. Chimney for 4X150A. Parker, 133 Station Road, Cropston, Leics. LE7 7HH.

FR100B, FL-200B, vgc, £130. Pye 4m base stn, 3 xtal position, gd wrkng order, £15. Wanted: Collins F455Q-5 mech fltr. 32S-1 tx complete. G3MPN, 42 Browick Road, Wymondham, Norfolk. Tel Wymondham 3382.

QRO valves: 830B (3); 837 (2); 211 (2); PT5 (3); 811 (1), £1 ea post free. G3HT, 1 Bijou Close, Tiptree, Colchester, Essex.

Codar PR30 preselector with built-in psu, £5. Geloso vfo, 80-10m with dial etc, £4. Pa tank unit, 80-10m with 270pF tuning cap, both Eddystone, gd for 150W, £3.50 pair. G3XAC, QTHR. Tel Burnley (0282) 20993.

Weller dual-heat solder gun, comp with all accessories in own case, as new cond, £2. Edmondson, 6 Mount Avenue, Littleborough, Lancs.

Teleprinter 7B silence cover/base, £15, perf order. 2 8Bs 50 baud sync motors, £5. 2 6S auto txs, £10. TUs type FS/10 + FSY1, £8. Other rtty junk. Sae. G3IYG, 17 Prescot Road, Redhills, Exeter. Tel 78802.

Eddystone 740 gen cov rx with mtchng ls, £22 ono. Phillips, Phillips Garage, Wormley, Surrey. Tel Wormley 2104.

Ssb tx G2DAF, 10-160m, in gd wkng order with psu, rsnble. HRO coils, trnsfrmrs, chokes, condensers suit linear. Transmitting valves, new. Buyers coll. G2GK, QTHR.

Marconi CR100 rx, noise limiter, revalved but one, realigned + in gd cond, spares, hndbk + phones, £20 ono. TTC G3000 8Ω stereo phones, as new, £7 ono. Topham, 1200 Great Horton Road, Bradford 7, Yorks. Tel Bradford 73271.

Heath GR-78 solid-state rx, little used, £45 ono. TW valved 2m cnvrtr, 24-26MHz i.f., with psu, £5. New 3BPI CRT, £2. Used VCR97 CRT with base, £1. GM3SNO, QTHR. Tel Cupar 2682.

Class D No 2 wavemeter with all spares. G3YWX, QTHR.

1·2MHz Racal freq counter, £25 ono. Nagard 321 double beam, 30MHz scope, £75. Vibron electrometer, £5. Marconi TF1041C vv, £15. Solartron CO5235 10MHz scope, £20 ono. Maxey, Samaris, King Edward Road, South Woodham Ferrers, Chelmsford, Essex. Tel Millwood 8275.

Vhf 1392 rx, 95-156MHz not tested, £5. Will del 20 miles or post £2 extra. *Radio Television Engineers* reference book 1955 edition, £2.50. *ARRL Handbook* 42nd ed, £2.50. Wooller, 67 Royal Sussex Crescent, Eastbourne, Sussex.

HRO jnr with 2 bndsprd + 4 gen cov coilpacks, homebrew psu + operating instrctns, £10. Poxon, Kings College Hall, Champion Hill, London SE5. Tel 01-274 0883.

15W cw tx, 80/40/20m, £4. G5RV with steel masts, stanchions, phones, key, offers. G3VDG, QTHR. Tel Aldridge 51377.

Heathkit Mohican rx, £17.50. Eddystone 640, £15.50. Beulah Electronics video camera, transistorized, 405 lines, tuned channel 2, any offers? Rabjohns, Quarries Bungalow, Barley Lane, Exeter 74607.

Trio 9R95DS + Heath Q-mult, £35 both. Trio alone, £30. Thompson, 49 Widney Avenue, Selly Oak, Birmingham 29. Tel 021-427 4678.

2m fet cnvrtr, 28MHz i.f., noise figure 3dB, self-contained, reqs 9V supply, £6.80. G3OLB, QTHR. Tel Oldbury (Glos) 4559.

Drake 2C, calib, in top cond. £80. G3XOM, 60 North Cray Road, Bexley, Kent. Tel CY 22612.

Trio JR599S rx, £140 (custom special 2m). Trio spkr, £3. Swan 500C, psu, Vox + 508 vfo, £270 ono. Cambridge am, high band, £25 ono. LM14 freq meter + charts and psu, £20. G3VGH, QTHR, Tel York 769245

Eddystone 640 rx, vgc with spkr, £13. 1155 rx, bulit-in spkr + psu, £15. Downey, 19 Wellington Avenue, Chingford E4. Tel 529 0558.

Radio + tv valves, 5p ea. Transistors, 3p. Coils, capacitors, switches, meters, resistors, trnsfmrs. *Radio Communications, Wireless Worlds, Practical Wireless, Television*, and *Electronics*. State needs, sae pse. Defty, 119 Westmorland Rise, Peterlee, Co Durham. Tel 2062.

Eddystone 940, 3 yrs old in perf cond, £100. Goodfellow, Cherries Stevens Lane, Claygate, Esher, Surrey. Tel Esher 65391 or 65263.

Heathkit DX100K, £40. Beulah cctv, Cambra rf output, £40. Pye 723 4m base stn, £20. Pye hi-band boot mntng. Ranger, unmodded comp c-box + cables, £10. Photopia camera tripod, £10. Buyers coll. Smith, 33 Rippington Drive, Old Marston, Oxford.

Viceroy 3A full lattice fltr 6146B final gp cond, offers. G3RNM, QTHR. Tel Great Missenden 2642.

B40 with few spare valves + manual, £15. G4ALV, 24 Oaklands Road, Bromley, Kent. Tel 01-460 3852.

Trio JR500SE, as new, unmarked, £55. G3JPS, QTHR.

KW2000, ac psu, £120./M psu, £20. Hallicrafters S120A, £10. Mohican GC1U, £30. Carr extra, coll. Wanted: FR400SDX, 12AVQ, FT101 with 160m, /M aerial, EK9X keyer. G3DCS, QTHR.

Ferrograph series 4 prof tape recorder + hndbk, vgc, £36 or exch 3E triband beam, lin amp or gd 10-80m rx/tx. Why? G4ANY, 63 Church Road, Roby, Liverpool. Tel 051-489 9134.

KW2000A tx/rx, exc cond, fitted 6146Bs, comp with ac psu + Shure 202 mic, £130 ono. G3WZT, Kings Down, Church Road, Partridge Green, Horsham, Sussex. Tel Partridge Green 710565.

Yaesu Musen FTDX100 rx/tx, 120W p.e.p., absolutely perf cond comp with miniature homemade transistorized external vfo for /M wrkng, mtchng mic + suitable spkr, £165. G3KLF, 12 Aveland Road, Ketton, Rutland. Tel 078-089 512.

Self-contained top band cc tx, full bk, electronic t/r + mute, ptt mic, some xtals, £10. Psu, 1000V fixed 400V variable, 500 + mA, 4 × 6·3V, 5V, £10. Try coll/del. GM4QK, QTHR. Tel Strathaven 3332.

Trio JR500SE amateur band rx with 160m band + xtal calib, hndbk, perf cond, offers. G8ANU, QTHR. Tel Stafford 62533.

Sommerkamp FT250 240W tx/rx, exc perf, can be demonstrated, will del 100 mile radius, first rsnble offer. Toby, 13 Wood Lane, Isleworth, Middlesex. TW7EF.

AR88D rx, vgc, £39. TW Nuvistor cnvrtr, 28-20MHz i.f., £5. SCR522 2m tx with psu + several spare valves, £15. Buyer coll pse. GW8CGH, 30 Castle View, Caevatry, Bridgend, Glamorgan.

Mohican GC1U rx, comp with manual, as new, £25. KW77 ham band rx, exc cond, £70 with circ, hndbk. G8EEN, 77 Chichester Park, Westbury, Wilts.

Hygain 18AVT/WB vertical, £20. Lightweight joystick and joymatch, £10. Trio JR310 with mech fltr, £65. Nash, 8 Woodbury Road, Walthamstow E17 9SB. Tel 520 6279.

AR88LF S meter, hndbk, £25. 70cm transistor cnvrtr, £6. Pair vhf tx/rxs, £4. 4m tx, modulator, £6. Fet fm tuner/i.f., £8. Fm/a.m. radiogram chassis, £9. 2½in scope, wrkng, £3. 10·7MHz transistor i.f. strip, £1. Will haggle. G3ZGZ, 5 Summerville Avenue, Staining, nr Blackpool, Lancs. Tel Poulton 6159.

Eddystone 898 dial, £6. Eddystone 888A dial, slow motion drive etc, £9. 24in parobolic reflector, £6. CR100 coil box, ifts, tuning condenser, £8. Eddystone S meter, £6. R220 4m rx, £5. G3XLB, QTHR. Tel 051-36 71968.

PR30 preselector, £4. 12V transistor regulated psu with 2m, aerial relays etc, £4.50. Part-built psu (heavy duty) with three large meters etc, £7.50. Pye desk mic, £1.25. All items ono. Callers Mon, Wed or Fri evenings. Cooper, 11 Cyprus Terrace, Garforth, Leeds LS25 1AP.

Trio 9R-59DS with SP5D spkr, vry fine cond, £35 + carr or buyer coll. BRS32707, 99 Grantham Road, Sleaford, Lincs. Tel Sleaford 2283.

2m fet cnvrtr. Mosfet mixer, 2-4MHz i.f., new, £7.50. 12W amp, £4. G3ZTX, QTHR. Tel Slough 21086.

Rewired HRO with 9 coils, offers or exch. Also hundreds of valves from 807 down to acorns, many new and boxed, offers for lot. Untouched 1155. 20W guitar amp, offers or exch. Edwards, 28 Rook Grove, Willingham, Cambs. Tel Willingham 686.

Hf Geloso cnvrtr, 4-6MHz i.f. xtal calib + psu, £9. BC221 freq meter with charts, mains psu, £12. G3UBL, 7 Beamish Drive, Bushey Heath, Herts. Tel 01-950 3443.

Stereo tape recorder, Wearite deck ¼ track. Teak cab, preamps, relay cont, £20. Knight sig gen, as new, £5. 0·180-112MHz Mod KG650. G3KPW, 62 Prospect Place, Grays, Essex. Tel Grays Thurrock 3073 (daytime).

ARR5 vhf rx, airborne version Hallicrafters S36A, 27-145MHz a.m./fm, int psu, needs attn, £5. Q fiver, £2. All carr extra. Sae. G3ZCO, QTHR.

Eddystone 888A, vgc, £60. Pye Vanguard rx + tx on 145MHz, £25. Also R1392 vhf rx, £6 ono. Will del up to 30 miles. Harlow, 129 Stanton Road, Burton on Trent, Staffs. Tel Burton 3115.

14AVQ 4 band vertical, £5. Joystick + tuner, £5. Codar AT5 tx + mains psu, £15. Codar PR30 preamp, £4. G3ZZK, QTHR. Tel 01-476 4050.

Codar AT5 tx, £15. Ac psu, £8. Dc psu with control box, £9. Wanted in exch—high power walkie-talkies or /M Pye Cambridge. Jenkins,

30 Gainsborough Road, North Finchley, London N12 8AG. Tel 01-445 8722.

KW160 Mk 2, perf cond, no mods, £18 or exch Panda Cub or why. Wanted: Communication rx HRO. Eddystone, HE30, no mods, cash adjstmnt. G3FK, 4 Brownsea Avenue, Corfe Mullen, Wimborne, Dorset. Tel Broadstone 2631.

Numerous meters, flush square, 200, 500, 1000mA + others 100kHz, 3MHz xtals. Cheap. Sae list. G3LTN, 28 Astrop Road, Middleton Cheney, Banbury, Oxon.

EC10, £35. G-whip, 160m, £7. L-band rx, £7.50. Volkswagen 1300 1966, black, £420. Harley, 17 Desborough House, Amersham Hill, High Wycombe, Bucks. Tel High Wycombe (0494) 25069.

KW2000B with ac psu, perf cond, £160 ono. Can del rsnble dist. G3YYG, 10 Roseheath, Hemel Hempstead, Herts. Tel 57547 (after 6pm).

Lafayette HA350, really exc cond, spkr calib, £55 or best offer. Morse records, £2. Barker, 26 Elliott Drive, Inkersall, Chesterfield S43 3DP. Tel Staveley 2796.

HA350, calib, manual, mint, £50. HRO manual, new, £1. 1A rf meter, 100mA, £1 ea. RCA AR88 spkr in metal cab, £2.50. G2UZ, 2 Cliff Road Gardens, Leeds LS6 2EY.

TW4 communicator rough but rx ok, gd for overhaul but no circ. G3ADZ, QTHR. Tel Liss 3314.

Versatower, 2 sctn 40ft wall mntng, comp with all gear + 2 ele Elan and AR44 rotator, 1 yr old. Will cons splitting but pref comp sale. Buyer to dismantle + transport, £130 ono. G3KFB, 12 Hill Rise, Luton. Tel Luton 54549 (after 8pm).

KW2000, hb /M psu, +ve earth, modded for use with HW12, £10. G3VQL, QTHR. Tel 51733.

Top band tx, 10W plate by screen mod transistor vfo, self-contained psu, int aerial c/o, fully metered + relay cont, immac construction, no case, 75Ω lpf, £7.50 ono. G3MGW, QTHR. Tel Brightlingsea 2382.

KW2000 + psu, £75 ono. Eddystone 750, £25 ono. IC20 tx/rx, £70. PO 6ft 19in rack, £3. Mains blower for linear, £1.50. 2kV mains trnsfmr, 350mA, £5 ono. Wanted: QQVO2-6 valves. Allen, "Rosswan", Dimmocks Lane, Sarratt, Herts WD3 6AP. Tel Kings Langley 62438 (evenings).

7441 Nixie decoder/driver ICs, unmarked but tested ok, 6 for £2 post pd. GW3WVT, 40 High Park, Gwernaffield, Mold, Flintshire.

AR88D, gd cond, £25. Buyer coll. Scott, 40 Grafton Way, New Duston, Northampton.

Codar CR70A, 1 yr old, slightly scratched, £14. Solatron CT316 scope X, Y, Z inputs dc— 6MHz, £25. Manual for 62 Set, 50p. Letters only pse. Ellis, 13A Lower Edgeborough Road, Guildford, Surrey.

Drake TR4, remote vfo, ac-dc psus, noise blanker, spkr, perf cond, cost about £575 accept £350. Heathkit GR54 swl rx, new, £40. G3NMR, QTHR. Tel 01-550 0882.

Components: Mains trans, lots from 30p, most gd. Xtal 100/1000kHz, £1. TTC mic ptt, £2.50. Valves, 10p ea. Chokes 60mA, 50p. Meters 0·5mA, 1mA, 50p ea. Lots more—send for list, sae pse. Oliver, Northern Baptist College, Rusholme, Manchester 16.

Comp stn: DX100U, 160-10m, xtal mic, £30. HRO mx, no psu, all gc coils, PR30 preselector, £15. GM4NC, QTHR. Tel 031-334 5126 (after 6pm).

Ten-Tec tx/rx, 80-40m + 15, unused, cost £37 sell £25 ono. G2FRY, QTHR.

Immac prof built unused DX100 + SB10 with manuals, £70 ono or why. Collect only. Wanted: Newnes *Radio Television Servicing* 1959-60 + 1962-65 inclusive, fair price pd for clean comp vols. G8SP, QTHR. Tel Silchester 513.

WS No 19 Mk 3 tx/rx, unmodded, perf wkng order comp with headset, mic, aerial, variometer, 250V mains psu, 12V rotary psu + interconnecting leads, £12 ono. Buyer coll. G4AFA, The Hermitage, The Spital, Yarm, Yorks. Tel Eaglescliffe 780210.

34 issues *Sky & Telescope* mag, £6. Binders (4), 50p ea. *Plantetarium* Mag, 11 issues, £1.25p carr pd. Wanted: Heath SB640 vfo. Taylor, 8 Heythrop Drive, Middlesbrough.

Codar T28 rx, £12. Pye Reporter, low band, £3. Rose, 9 Repton Way, Walderslade, Chatham, Kent. Tel Meday 63707.

Trio 9R-59DS, as new (Oct 1971), £45 ono. Hunt, Flat 4, 57 Trumlands Road, St Marychurch, Torquay. Tel Torquay 36441.

Heathkit HW32A tx/rx, HP23E ac psu, GH12 push-to-talk mic, prof built and aligned, little used, fb cond. The lot, with manuals, £65. Buyer coll. Split sale cnsdrd. G3SCB, QTHR.

Eddystone 888, clean + stable, nearest offer £65. 2m cnvrtr, 27-29, two rf stages, double tuned coupling, fet mixer xtal for 28-30, £20 nearest. G8CBZ, QTHR.

/M psu for KW2000A 12V —ve or +ve, mint cond with circ + all cables, ready to use, £25. G3GJX, QTHR. Tel Guildford 60163.

Trio 9R59DE, as new, orig carton, fitted xtal calib + stab, any trial, £35. Advance type CV100A CVT, as new, input 190-260V, output 240V 100W, + makers instrctns, £5. Carr extra. GM3JHL, QTHR. Tel Fauldhouse 433.

Pye Ranger on 145MHz, fitted rf preamp, xtals, circ etc, £20. Morse key, heavy duty, £2. *Radio Communication* Nov 69 to Dec 1971 + binders. Homebrew experimental transistor Elbug, Mint *RSGB Handbook*. 1943 *ARRL Handbook*. GW3AQR, 32 Farrar Road, Bangor, Caernarvonshire.

FT150 tx/rx 160-10m immac, in daily use /M, £150. Mullard 7W stereo amps on one chassis with cnstrctn manual but less remote control box, £5—Parmeko trnsfrmrs. G3VYP, QTHR, Tel 021-747 2358.

HW12A psu, mic, loudspkr. Prof cnstrcted, exc cond, £60 ono. Class D wavemtr, £3. G3ZEO, QTHR, Tel Chelmsford 71754.

HA600A immac, £38, Hamgear pmll preslctr, £5. Leighton, Witches ride, Stock, Ingatestone, Essex, CM4 9QD, Tel Stock 406.

Hammarlund HQ170A rx, mint, one owner, £75 ono, 2/4m cnvrtr to mtch available. G3AET, QTHR. Tel 032-67 3556.

KW Vespa mk 2 inc psu 61q6 pa, immac cond, £90 G3VQL, QTHR. Tel Shrewsbury 51733.

Commercial ssb tx/rx, fully solid state rx covering 80m to 10m. 2 tt21 pas less psu, £38. Miniature 807 valves, 75p. G3NGK, D. C. Chapman, 64 Heath Road, Beaconsfield, Bucks, Tel Beaconsfield. 3109.

DX100u new pa valves, exc cond, £45 ono, cons del, Heathkit g/dip mtr as new, £10. G3RHD, QTHR, Tel Banbury 3285.

Trio 9R59d rx comp with mtchg spkr still in packing case unused, £36, Wanted: 2 marine band lf tx/rx Pye Dolphin or sim. G3CNV, QTHR, Tel 021-354 4369.

KW Valiant with KW mtchg psu S20 4m, b44 Mk2, cnvrtd with 4 el beam, £10. G3PFL, QTHR, Tel Henham 250.

Inoue ic700 transistor tx/rx, exc cond, £100. G3ZTX, QTHR, Tel Slough 21086.

Faulty BC348-r rx built in 250V ac psu and manual, offers. Dr D. J. Tivey, 48 Sunna Gdns, Sunbury-on-Thames, Middx.

2000B sep vfo, £25, Shure 444 mic, £7.50. Katsumi electronic key comp with monitor, £10, all items mint. G3WPX, QTHR, Tel High Wycombe 34143.

"Elmac" /M tx/rx, dc psu, 1·8-30MHz. G3JJJ, QTHR, Tel Windermere 2240 (evenings).

Yaesu FRdx400 super de luxe rx comp with cnvtrs, cond as new, 3/4 mths old, surplus to requirement, £132 carr pd. GI3GXP, QTHR, Tel 069-374 298.

Scope (needs mains trnsfmr) £5, LG300 200W tx + psus + spare, £13, valves £25, three speed twin track tape recorder, £10, or exch for cassette recorder or why? G3RFG, H. S. Brown, 36 Three Star Caravan Park, Lower Stondon, Beds, Tel 046-272 391, ext 406.

Microwaves 4m mosfet cnvtr i.f. 14-16MHz, £13. 4m/3el Yagi, £3. 2m/8el Yagi, £3, all items new and unused beams by J-Beams. Hand dynamic mic (Vitavox) 100k, £1, 10 el uhp aerial for Heathfield channels, £1. G. R. Thomas, 9 Highcroft Cres, Heathfield, Sussex, Tel 2454.

New trnsfmr 200/50V to 350V, 6·3V 4A, gv 4A, 2 at 5V, 3A, £2.50, modulation trnsfmr £1, quantity used valves, £1, *Radio Constructor* 1968, 7 1967, £1.50, ac measurements, Owen, 50p. H. H. Seymour, 25 Ryde Bldgs, Webb St, London SE1 4RX.

KW Viceroy and homebrew psu. HA350 with top band, both in gd cond, £105 or rsnble offers to sep, pref buyer coll. GW3XHJ, QTHR, Mines rescue stn, Brynmenyn, Bridgend, Glam, Tel Aberkenfig 389.

Perdio town and country with long medium and shipping band covering 80/160m, wkng but needs adjustment, offers to; Flegg, 43 Wayside Walk, Harrogate, Yorks, Tel 84105.

Hammarlund HQ110A 160-6m, exc cond, £55, 6 over 6/m beam, £4.50, 2m mosfet cnvtr, needs attntn, £6. (I.f. 28-30MHz). Stewart 37 Hawkeshead Lane, North Mymms, nr Hatfield, Herts, Tel South Mimms 2241.

Comp clearance KW2000 Heathkit Pawnee 2m tx/rx both ac/dc psu hndbks /M and fixed aerials, masts, keys, mics, Z match reflectomtr, wavemtr, testmtr, txtbks, everything to go on air, £220 ono, buyer coll. G3ABB, QTHR, Tel Rustington 3369.

KW Atlanta + psu and remote vfo and KW swr mtr, 50Ω type, best offer wins, rig is 1yr old with new pas fitted. G3SDM, QTHR.

Trio JR599 custom special and mtchg spkr, 9 bands 10-160 + 2m a.m. freq only, mint cond, £135 ono. L. D. Ireland, Carnhell Green, Camborne, Cornwall, Tel Praze 236.

19 set hpu, spares; b44; 2 × 38 set, spares, 2 × 58 set; cr45b also other eqpmnt. Write, phone Mr Wivell, "Greycote", Eleventrees, Keswick, Cumbs, Tel Keswick 72400.

WANTED

Vols 1, 2 + 3 *Ham Radio*. March 1966 + Feb 1971. *Practical Electronics*. *Short Wave Magazine* Sept 1971. Will pay postage etc. Roberts, 95 Bearwood Hill Road, Winshill, Burton on Trent, Staffs.

Small lathe, 2½in with accessories or other tools, exch for Labgear LG300 less modulator. Psu with variac. Labgear topbander Geloso G209 rx, atu, swr bridge + freq meter, all vgc. Will split. G3PCP, QTHR. Tel 051-928 0317 (after 7pm).

Buy or borrow hndbk and/or service sheet for Philips oscilloscope GM5655/02, all rsnble expenses pd. G3VJZ, QTHR. Tel Chelmsford 63758.

Urgently req for Raynet activity—gd 4m /M rig, must be reliable + ready to use. G3ADZ, QTHR. Tel Liss 3314.

2m Mosfet cnvrtr, i.f. between 4-26MHz, 12V dc —ve earth. For sale: lots surplus gear, *SWMs* + *Bulletins* etc. Pse write first. GW8CGH, 30 Castle View, Caevatry, Bridgend, Glam.

Wireless World Jan, Feb 1970. Several 1969, 1968 or comp years. G3OJE, QTHR. Tel 01-660 5717.

Colour tv crosshatch gnrtr etc. Will exch ssb solid state tx/rx (G3MUZ), 80, 20, 15, 10m, pa module req attntn. G4ZU minibeam. G3NXD, QTHR. Tel Wolverley 570.

Xtals: 4·0-4·055 or 2·0-2·027; 47·4 + 32MHz. G8FFP, 85 Pickering Road, Hull.

SX-28A, must be in exc cond, state price. Will cons Eddystone 750 or sim rx. Bennett, 206 Corsham Road, Whitley, nr Melksham, Wilts. Tel Melksham 3443.

Hndbk or circ for TW communicator two-mobile, buy or photostat. G8AUC, QTHR. Tel 01-979 6868.

Printed circ board design for G3UJP tunable i.f. with G3NOH adapted front end. GW8EIE, QTHR.

Large frame rucksack in gd cond, pse state price. All letters answered. G3UXH, 99 Bells Lane, Hoo St Werburgh, Rochester, Kent.

Hndbk or circ diag for Hallicrafters S120A rx, all expenses refunded. G3UIE, QTHR. Tel Locksheath 5647.

Australian enthusiast wants Osram DA30 valves. Contact VK6ZE ex G3GZE, 26 Charles Street, Midland, Western Australia 6056.

Buy or borrow any circ + layout dets for ssb rx sim to G3RKK not using Electroniques coils or info where to obtain coils for G3RKK rx. Lancashire, 1 Parkway, Crowthorne, Berks RG11 6ER. Tel Crowthorne 2712.

For young boy: impressive junk rx or tx/rx, about 0·6-10MHz, pref coll. Rayer, Reddings, Longdon Heath, Upton-on-Severn, Worcs. Tel Upton-on-Severn 2244.

Heathkit tower or sim, pse state cond + price. G3WNT, QTHR. Tel 021-445 1405.

Valve voltmeter Heathkit 11MΩ input etc. G3VWR, "Brumbles", Howgate Lane, Bembridge, Isle of Wight. Tel Newport 3611 (office).

Xtals in range 12·0000MHz to 12·0403MHz, pref HC6U or FT243. Buy or exch. G3NPF, QTHR. Tel Horsham 66290.

VHF sig gnrtr, 10-470MHz, eg TF1066 or sim. Oscilloscope 10MHz bandwidth, eg telequipment. G3TAA, QTHR, 01-850 5418.

Alignment details and circuit of Eddystone 750 to buy or borrow. R. M. Kent, 106 St Giles Avenue, Sleaford, Lincs.

Student amateur requires room near central London during July and August, preferably with a bit of sky over garden. G. Foster, Tizard Hall, Princes Gdns, London SW7.

Exchange info on modulated light communication. G3ZVT, QTHR.

Set of valves for W1191A wavemeter. Also key or equiv for ARP12 valve. All letters answered and will pay price asked. Mahon, 48 St Brendans Ave, Dublin 5.

CCT Green and Davis 2m nuvistor converter 1963, FT243 6450kHz, xtal, old American ham catalogues. G. Thompson, 49 Widney Ave, Selly Oak, B'ham 29, Tel 021-472 4678.

VCR139A tube, QQVO3-10 valve, Creed teleprinter 2m cnvtr and aerial, state price and cond. W. Edwards, 31 Marbles Way, Tadworth, Surrey, Tel Burgh Heath 56495.

Trnsfmr for CR100. GM3VBB, QTHR, Tel 031-449 3842.

Pye TCR3000 car radio, main chassis only. Must be comp but valves not reqd. All correspondence ansd. EI3AU, QTHR.

Rotator for TA33, one in need of attntn might be suitable. GW3XXB, QTHR, Tel Cardiff 613867.

HW17A with /M psu, must be gd cond. Coker, 6 Lower Collins Road, Totnes, Devon, Tel Totnes 2974.

Two marine band lf tx/rx Pye, Dolphin or sim. G3CNV, QTHR, Tel 021-354 4369.

Buy or borrow *Radio Communication* July and Aug 1971 ref 20MHz digital freq mtr, S. G. Edmondson, 6 Mount Ave, Littleborough, Lancs.

Honda gnrtr 800 or 1500 type gd cond. GW3YVC, 1 Lomond Cres, Cyncoed, Cardiff.

AR20 or AR22 rotator, 2m Pye Bantam. Leighton, Witches' Ride, Stock, Ingatestone, Essex CM4 9QD.

Manual, circ, beg borrow or steal any info on graph scope type 303c, will even cons buying. G8DDM, QTHR, Tel Penn 4483.

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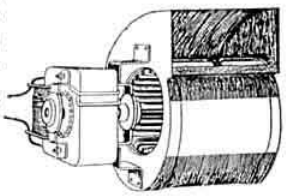

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MEMBER OF THE AMATEUR RADIO RETAILERS ASSOCIATION

As we go to press we are still in process of changing over to our new premises and we should like to express our apologies for any delays experienced by customers in dealing with correspondence due to this. Normally we give a prompt reply to postal enquiries but we trust that customers will bear with us for the next two or three weeks until we are reorganized in our new abode.

As previously advertised we carry extensive stocks of **YAESU MUSEN, KW** and **TRIO** equipment, all of which is available on demonstration in our showroom without obligation, and for our Southern customers can also be demonstrated at the home QTH by Jeff Harris, G3LWM, our Southern agent, whose address appears below.

We are pleased to announce two new items this month in the new new **TRIO TS-515 TRANSCEIVER** and the **SANSEI SE-406 MINI SWR METER**, both of which are available from stock, full details appearing below. This month we have a very large selection of used equipment, a selection of which we show below. Please note all items listed are priced to include carriage/postage, unless otherwise stated.

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EDDYSTONE 940 RECEIVER late model, mint .. £112.50
EDDYSTONE 940 RECEIVER with plinth speaker, excellent .. £110.00
SWAN CYGNET TRANSCEIVER absolutely as new .. £170.00
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TRIO 9R59DS RECEIVER a few weeks old only .. £47.50
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HEATH SB-610 MONITOR SCOPE truly mint .. £48.00
HEATH SB-610 MONITOR SCOPE unmarked .. £46.00
HEATH SB-101 TRANSCEIVER with **SB-600 SPEAKER/PSU** .. £35.00
HEATH SB-301 RECEIVER. Very good condition .. £62.50
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RACAL PRESELECTOR TYPE 1978 with manual .. £67.50
RACAL SSB ADAPTOR TYPE RA218 with manual .. £80.00

HAMMARLUND SP600 RECEIVER. Good general condition .. £85.00
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HEATH HM-2 SWR/POWER METER as above .. £15.00
HEATH MOHICAN RECEIVER with mains PSU factory built .. £42.50
HEATH MOHICAN RECEIVER unmarked and excellent .. £38.50
NEW FROM TRIO—the **TRIO TS-515 TRANSCEIVER.** The latest and improved version of the famous TS-510. New features including blower cooling. .. £235.00
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