

The SHORT WAVE Magazine

VOL. XXXV

JUNE 1977

NUMBER 4

TRIO R-300

Eavesdrop on the world



LISTEN TO THE WORLD

Short wave radio is by far the fastest and most convenient type of communications for spreading the news about what is going on in the world. And for this reason TRIO's R300 is the right rig for those who'd like to listen to a live report of the Indianapolis Grand Prix, to Radio Peking or to follow the progress of an Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for most journalists, engineers and technical representatives working abroad. They all want a reliable and sturdy multiband receiver for home use and travel, a receiver working from mains voltage or batteries. And just such a receiver is TRIO's new R-300

Six Wavebands—LW (170-410 kHz), BC (525-1250 kHz), 4 x SW (160-10m). The four shortwave bands continuously cover the frequency range from 1.25—30 MHz with separate calibration for the commercial (75—11m.) and radio amateur bands (80—10m.) of the large drum-type main tuning bandspread dials.

Outstanding Input Sensitivity—The dual-gate MOSFET front end assures excellent cross-modulation and spurious characteristics, as well as high input sensitivity. Between 18 and 30 MHz the R-300 operates as a double superhet, giving sensitivity of $1\mu\text{V}$ for AM and $0.5\mu\text{V}$ for SSB. For full details, contact the sole importers of the TRIO range.

R300 £184.50 inc. VAT

Sole Importers; LOWE ELECTRONICS
Cavendish Road, Matlock, Derbyshire
Tel.: Matlock 2817 or 2430

LOWE ELECTRONICS LTD

PRICE LIST JUNE 1977

	Price incl. VAT £	Carr. £	Price incl. VAT £	Carr. £
TRIO EQUIPMENT				
TS820 HF transceiver	625.00	3.00		
VF820 external VFO	108.00	3.00		
DGI digital readout	126.00	3.00		
DS1 12V inverter	40.50	.70		
YG88 CW filter	36.00	.25		
TS520 transceiver 12v. dc/240v. ac	432.00	3.00		
SP520 matching loudspeaker	18.00	.70		
VF0520 external VFO	72.00	3.00		
TV502 matching 2m. transverter ...	171.00	3.00		
CW520 CW filter	36.00	.25		
TS700G 2m. all mode transceiver*	392.62	3.00		
VOX-3 matching VOX unit (free with TS700G)	19.80	.85		
TR7200G 10W car transceiver with 10-channels*		3.00		
*on offer at	175.00			
VF030G remote VFO with repeater shift ...	90.00	3.00		
PS5 mains power supply/digital clock ...	58.50	3.00		
TR7400A 25W digital FM transceiver ...	299.25	3.00		
TR2200GX 2m. hand portable. Fitted 3 channels	130.50	3.00		
Fitted 12 channels	160.00	3.00		
VB2200GX 10W amplifier	45.00	.70		
Ni-cad battery pack	9.72	.36		
RA1 helical antenna	6.30	.15		
R599D receiver	369.00	3.00		
S599 matching loudspeaker	17.00	.70		
TS99S de-luxe transmitter	369.00	3.00		
SP599 (to match early JR599)	10.00	.70		
R300 general coverage receiver	184.50	3.00		
TR7010 2m. SSB transceiver*		3.00		
*on offer at	175.00			
PS5 mains power supply/digital clock ...	58.50	3.00		
HC-2 ham clock	13.50	.55		
MC10 hand microphone	9.00	.25		
MC50 table microphone	23.00	.70		
LF30A low pass filter	15.75	.57		
BPF2A 2m. band pass filter	27.00	.57		
TR3200 70cm. handy transceiver	171.00	3.00		
Ni-cad battery pack	9.72	.36		
MBI mobile mounting bracket for				
TR2200GX/TR7200G/TR3200	9.45	.56		
NIHON DENGYO				
Belcom 70A. FM, SSB, CW, AM for 70 cm. to be announced				
Liner 430 70cm. SSB transceiver	290.25	3.00		
RI15E regulated psu for Liner 430	31.50	3.00		
RECENT PRODUCTS				
KF-430 10W 70 cm. mobile fitted 9 channels ...	180.00	3.00		
UNIDEN EQUIPMENT				
2020 HF transceiver	495.00	3.00		
8010 external VFO	106.87	3.00		
8120 matching speaker	31.50	.70		
2030 2m. mobile 10W FM				
fitted 1 channel	140.62	3.00		
fitted 3 channels	148.50	3.00		
fitted 5 channels	156.37	3.00		
fitted 8 channels	167.62	3.00		
fitted 11 channels	178.87	3.00		
RTTY VIDEO DISPLAY				
TD224 display unit	209.25	3.00		
DM170 terminal unit with UHF mod.	105.30	3.00		
UHF mod. battery powered	16.87	.25		
CRYSTALS				
We stock FM channels S0, S16 to S24, S32 (145-80) and all current repeater and reverse repeater channels for the equipment we sell.				
VHF MARINE RECEIVERS				
SR-9 tunable/crystal monitor	58.50	.70		
NEW AMR217B scanner with 8 crystals ...	106.87	.85		
Seiwa MR-2 monitor less crystals	63.00	.57		
Seiwa MS-2 scanner less crystals	67.50	.75		
Crystals for the above—each	2.70	.15		
VHF AMATEUR RECEIVERS				
NR-56 tunable/crystal 2m. FM receiver ...	54.00	.70		
Seiwa MR-2 less crystals	63.00	.57		
Seiwa MS-2 scanner less crystals	67.50	.57		
NEW AMR217B scanner with 8 channels ...	106.87	.85		
Crystals for the above—each	2.40	.15		
CATRONICS PRODUCTS				
DFM 5V 180 MHz digital counter	135.00	3.00		
500 MHz prescaler above	27.00	.25		
MICROWAVE MODULES EQUIPMENT				
MMC70 4m. converter	20.25			
MMC144/28 LO 2m. converter	22.50			
MMC432/28 70cm. converter	24.75			
MMC432/144 70cm. converter	24.75			
MMC1296/28 23cm. converter	28.12			
MMC1296/144 23cm. converter	28.12			
MMV432 70cm. tripler	19.80			
MMV1296 23cm. tripler	33.75			
MMD050 50 MHz counter	66.96			
MMD500P 500MHz prescaler	27.00			
MMD050/5000 500MHz counter	85.32			
MMT432/28 70 cm. transverter	109.12			
MMT432/144 70 cm. transverter	149.62			
MT144/28 2m. transverter	88.87			
FILTERS				
Trio LT30A low pass filter	13.50	.57		
Trio BPF2A 2m. band pass filter	27.00	.57		
Shinwa 1110 2m. band pass filter	13.72	.57		
Shinwa 1006 2m. low pass filter	11.48	.57		
Shinwa 1140 28 MHz transverter filter ...	13.72	.57		
Shinwa 1005 H.F. low pass filter	10.80	.57		
VHF/UHF "J" BEAMS				
5Y/2M	6.97	3.00		
8Y/2M	9.11	3.00		
10Y/2M	19.35	3.00		
PBM14/2M	28.35	3.00		
5XY/2M	14.51	3.00		
8XY/2M	18.11	3.00		
10XY/2M	23.96	3.00		
Q4/2M	14.85	3.00		
Q6/2M	19.80	3.00		
D5/2M	12.37	3.00		
D8/2M	16.59	3.00		
XD/2M	8.94	3.00		
UGP/2M	6.41	3.00		
MBM48/70cm	19.68	3.00		
MBM88/70cm.	26.32	3.00		
I2XY/70cm	27.00	3.00		
2m. Colinear C5/2m	28.12	3.00		
PHASING HARNESSSES				
PMH/2C for 2m. circular polarisation ...	4.61	.57		
PMH2/70 for 70cm.	5.34	.57		
PMH4/70 for 70cm.	11.13	.57		

All
Micro-
wave
modules
post
paid

LOWE ELECTRONICS LTD

	Price incl. VAT £	Carr. £
H.F. MOBILE ANTENNAS		
'G' Whip tribander helical	18-11	1-00
'G' Whip multimobile	21-37	1-00
L.F. coils for the above whips	5-48	.55
Telescopic whips for the above	2-08	.55
Base mount for all 'G' whips	2-47	.55
Extendard 40' booster	9-22	1-00

RAK ANTENNAS		
A-8XL 80m. dipole	12-15	.70
AL-48DXN 80/40m. trap dipole	25-43	.85
Midy VN 80m. to 10m. trap dipole	40-50	1-00
Listener III SWL antenna	25-43	.70
Listener I SWL antenna	9-45	.55
HD-26A extendable dipole	6-75	.36

	Price incl. VAT £	Carr. £
HY-GAIN ANTENNAS		
HIF. Beams		
TH2Mk3	105-75	3-00
TH3Jnr	108-00	3-00
TH3Mk3	154-12	3-00
TH6DXX (carriage by B.R.S.)	185-06	3-00
Hyquad 2 element	170-77	3-00

H.F. Verticals		
12AVQ	36-63	3-00
14AVQ/WB	51-97	3-00
18AVT/WB	72-45	3-00

V.H.F. MOBILE WHIPS		
Bantex B5/GF 2m. 1/2 whip	8-16	3-00
Magnetic mount	10-40	.55
Bantex UCL 70cm. colinear	9-62	3-00
Bantex BUG 2m. colinear	29-53	3-00
'J' Beam TAS 2m. 1/2 whip	11-81	3-00
Daiwa MA-41 2m. 1/2 wave gutter mounting	8-44	.70
Gutter clamp. Accepts most whips	2-81	.57

C.D.E. ROTATORS		
AR40	48-09	3-00
CD44	100-12	3-00
Ham-2	133-87	3-00

CABLE (prices per metre)		
5 core rotator cable	.20	} Please add VAT at 8% to cable prices
8 core rotator cable	.32	
12 core rotator cable	.25	
UR43 50 ohm coaxial cable	.15	
UR67 50 ohm coaxial cable	.38	
RGBAU 50 ohm coaxial cable	.38	
Twin feeder 300 ohm	.08	
Twin feeder 75 ohm	.08	
Twin feeder 75 ohm heavy duty	.22	

ACCESSORIES		
Morse keys	8-10	.57
Katsumi Keyers EK150	60-75	.55
Low impedance padded headsets	4-68	.57
Trio MC10 hand microphone	9-00	.25
Trio MC50 dual impedance table microphone	23-00	.70
Kuranishi wattmeter/dummy load RW151D	75-60	.70
Trio Ham clock HC-2	13-50	.85
Microphone plugs 4 pin	.67	.15
Microphone sockets 4 pin	.67	.15
Maiden accessory speakers	2-52	.25
PL259 plugs	.51	.15
Reducers for PL259 plugs	.17	.15
SO239 sockets	.51	.15
PL259 in-line connectors	.82	.15
PL259 angle connectors	1-03	.15
Hu-Gain CI centre dipole insulator	3-82	.36
Hu-Gain BN86 balun	13-33	.57

DAIWA ACCESSORIES		
CL-22 SWL ATU	13-50	.55
CSW-216 ATU with built in SWR meter	103-50	3-00
CL-666 high power ATU	175-50	3-00
CL-65 ATU	54-00	3-00

	Price incl. VAT £	Carr. £
AT-400X stepped attenuator	41-04	.70
CS-201 coax switch (SO239 sockets)	11-25	.36
CS-201N coax switch (N type sockets)	15-76	.36

SWR/POWER METERS		
Daiwa		
SWX-777 In line power/swr meter. 1-8-30 MHz Up to 1kW FSD	110-16	.85
SW410 In line power/swr. meter. 140-450 MHz. Up to 120W FSD	48-60	.70
SW110 In line power/swr. meter. 1-8-150 MHz. Up to 200W FSD	25-92	.70

Hansen		
PM2000 In line peak reading power meter. 3-5-30 MHz. Up to 2kW FSD	48-60	.70
FS301 In line power/swr. meter. 1-5-30 MHz Up to 1kW FSD	32-00	.70
FS302 In line power/swr. meter. 50-150 MHz. Up to 200W FSD	32-00	.70
SWR-3 In line single meter SWR bridge. 1-8-150 MHz	9-50	.57
SWR-25 In line twin meter SWR bridge. 3-5-150 MHz	10-80	.57

VALVES		
6AH6, 6CB6A, 6CL6, 6U8A, 6BM8, 12BY7A, 6EV6 each	.90	.25
6GK6 (RCA)	2-70	.25
6J56C, 6KD6 per matched pair	6-03	.36
6LQ6 per matched pair	7-02	.36
6146B/S2001 each	6-30	.36

**PLEASE ADDRESS ALL MAIL ORDERS TO MATLOCK
LOWE ELECTRONICS LTD**

HEAD OFFICE AND SERVICE DEPARTMENT
119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE
DE4 3HE

Telephone: 9 a.m. to 9 p.m. Matlock (0629) 2817 or 2430
Telex: 377482 Lowelec, Matlock

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

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

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

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

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

Sim, GM3SAN 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041 771 0364.

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

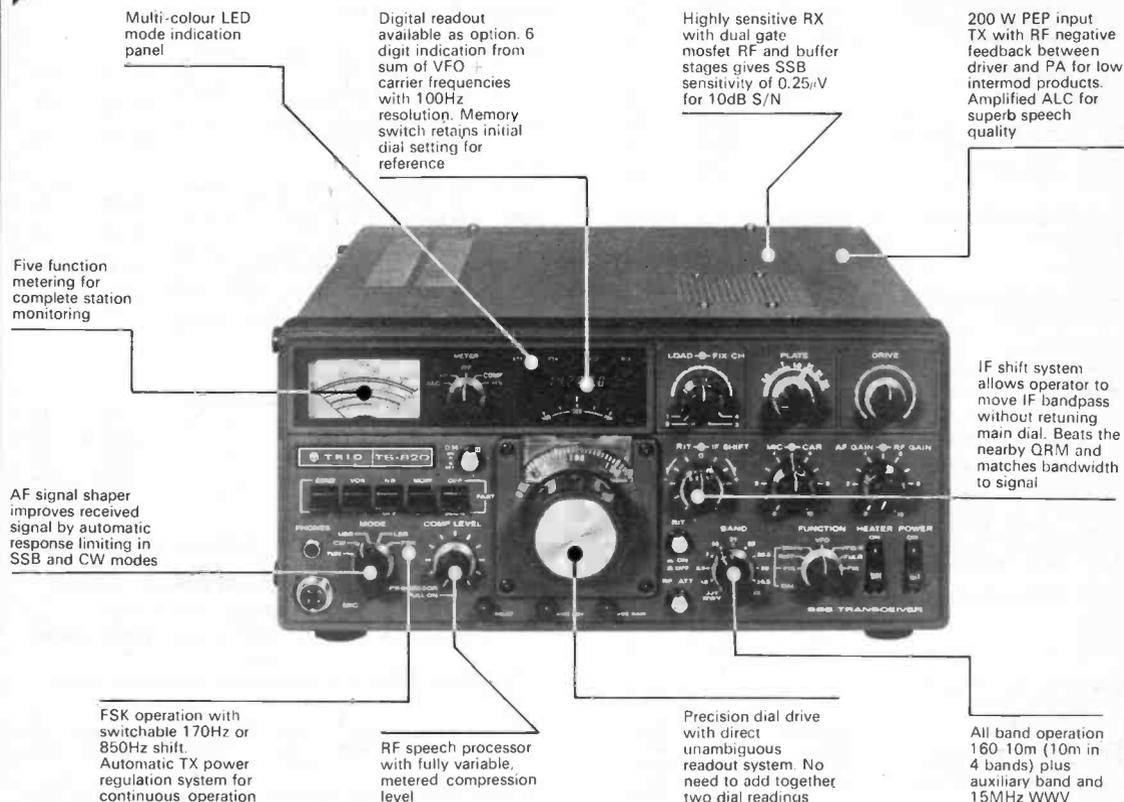
So, wherever you are, we have a branch or part-time agent not too far away. At Matlock, the branches, or our agents you will see can try out the very best in new and secondhand HF or VHF equipment, together with every conceivable aid or accessory for the complete station.

With new products coming along all the time, it is difficult to keep a price list up to date. If you send 50p, you will receive all current brochures, catalogues, prices and the antenna booklet that everyone is talking about.

NEW

The DXpert

An all-new big brother for the TS520
TS820 from TRIO



The all new TS820 from Trio completes their HF transceiver range. This is the top-of-the-line transceiver which offers a significant advance in design and construction over all others. This is the "DXpert" from Trio.

- Full transceiver operation on all amateur bands from 160-10 metres (28-30MHz) on SSB, CW and RTTY; optional 2 metre transverter; optional external VFO for full split Tx/Rx operation.
- Outstanding performance on both transmitter and receiver due to fully balanced mixing combined with latest PLL techniques.
- First class frequency stability and large signal handling characteristics.
- All new precision dial drive mechanism with unambiguous mechanical readout. Optional digital frequency readout with memory facility.
- Fixed station or mobile operation with a complete line of matched system accessories for building the best possible complete station.
- RF speech processor with fully metered adjustable compression is built-in.



SP-520 TS-820 VFO-820 TV-502

- IF pass band tuning allows the IF to be tuned across a signal without resetting the main dial.
- Five function metering system together with LED monitoring of all important functions gives unparalleled operator control.

This brief advertisement can only touch upon the main details of the TS820. You have to handle it to appreciate its performance. See it soon at your local branch of Lowe Electronics.

Sole Importers
LOWE ELECTRONICS
Cavendish Road
Matlock Derbyshire
Tel: Matlock 2817/2430

 **TRIO**

FOR 144MHz ALL MODE OPERATION ... THE QUALITY TRANSVERTER FROM THE PEOPLE WHO KNOW!

As you may already know, we are now manufacturing a 144 MHz all mode solid-state linear transverter, MMT144/28 as pictured below.

This 144 MHz unit is fully compatible with any 28 MHz drive source and provides 10 watts continuous power output from power transistors capable of withstanding severe mismatch.

An internal aerial changeover relay of the PIN diode type is incorporated which has a through-loss of less than 0.2 dB. The combination of a low distortion balanced transmit mixer incorporating protected dual gate MOSFETS, to produce a spurious-free linear signal and a low noise receive converter, makes the unit ideal for all modes of transmission at 144 MHz, particularly where a high degree of stability, linearity and sensitivity are of prime importance.

The use of high Q circuitry throughout ensures an extremely good spurious rejection and selectivity.

The unit is housed in a highly durable black diecast case and all circuitry is constructed on high quality glass-fibre printed circuit board. The high power linear amplifier stages are housed in a separate internal compartment, thus ensuring excellent electrical and thermal stability. If you have an H.F. Bands rig and you're thinking of moving onto 2 metres, the MMT144/28 must be the transverter for **YOU**.



SPECIFICATION

Frequency range : 144-146 MHz
Input modes : SSB, FM, AM or CW
Input frequency range : 28-30 MHz
DC power requirements : 12 volts nominal
Current consumption : 2.2 Amps peak

Power output : 10 watts continuous rating

Drive requirements at 28 MHz : 500 mW or 5 mW

Relative 146 MHz output : -65 dB

Other spurious outputs : -65 dB

Receive converter gain : 30 dB

Receive converter noise figure : Better than 2.5 dB

Power connector : 5 pin DIN

RF input/output connectors : 50 ohm BNC

Size : 187 x 120 x 53 mm.

Weight : 800 g

Price : £88.88 inc. VAT

Any further information on this product and others from our extensive range may be obtained by contacting our sales department, who will be only too pleased to help.

Incidentally, we are now on telex. Should you require any information urgently, our number appears below.

MICROWAVE MODULES LIMITED
BROOKFIELD DRIVE, AINTREE, LIVERPOOL
L9 7AN **TEL.: 051 523 4011**
TELEX: 628608 MICRO G.



YAESU MUSEN

FINEST VALUE IN THE WORLD

FRG7 Synthesised General Coverage Communications Receiver.



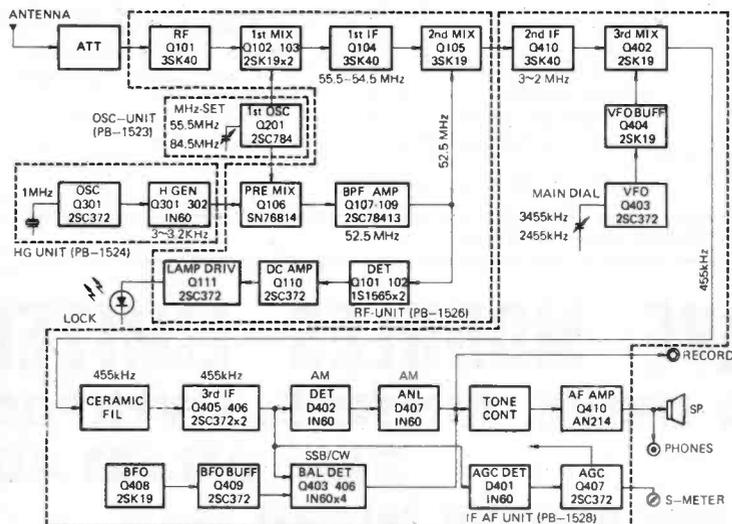
The FRG7 is a solid state mains and 12v. receiver offering continuous coverage 0.5-30 MHz with specifications unparalleled in its price range.

Its advanced circuitry provides superb performance either as a standby receiver or for SWL's (Broadcast and Amateur Bands alike)

The use of a Wadley loop (using the same VHF oscillator to mix up, then after pre-mixing with a stable crystal source down again (this cancelling all drift from the variable oscillator)). It provides equivalent performance to 30 crystal controlled converters feeding a low IF, but without the image problems of such an arrangement.

The signal path starts with the choice of 3 antenna connectors : for 1-6-30 MHz, a 50/75 ohm feed (to a SO239 (UHF) coax socket and a binding post) and for 0.5-1.6 MHz (medium wave) a separate high impedance binding post. A 3 position 0-40dB switchable attenuator aids reception of very strong signals and reduces adjacent channel interference. The low noise MOSFET RF amplifier provides a SSB sensitivity of 0.25 μ V (for 10dB N+ S/N at 10.5 MHz) and is sharply tuned by a well calibrated "pre-selector" capacitor with 4 band switched coils. Its output is low pass filtered ($f_c = 35$ MHz) removing VHF image problems from the following mixer. This comprises a pair of JFETs, driven by the "MHz set" 55.5-84.5 MHz, oscillator, which upconverts the signal to the band pass first IF to 55 MHz \pm 500 kHz where it is MOSFET amplified. The second IF of 2-3 MHz is produced by a FET mixer by heterodyning with the synthesiser derived 52.5 MHz signal. A 1 MHz crystal oscillator and diode harmonic generator produces a 3-32 MHz comb spectrum. This, with the first heterodyne oscillator (MHz set) is fed to a dual balanced i.c. pre-mixer. The output is expurgated by a multiple stage selective amplifier producing the 52.5 MHz second oscillator. A small fraction of this is rectified, DC amplified and lights the "lock" LED (saving power) when the MHz oscillator is locked. The 2-3 MHz signal is MOSFET amplified and fed to the third mixer (a JFET whose input and output are tuned by capacitors ganged to the main tuning control) where it is heterodyned to the final IF by the main VFO which covers a 1 MHz range (2.455-3.455), is clearly calibrated, to 5 kHz (or better), well buffered, and highly stable. The third (455 kHz) IF starts with the ceramic selectivity element and is followed by two stages of bipolar (the first in the

signal path) amplification before the choice of detectors; twin diodes for AM, or a 4 diode product detector, with well buffered switched frequency (for selectable sidebands) B.F.O. A diode rectifies, a fraction of the output from the final IFT, this is boosted to drive the illuminated "S" meter and automatically gain control the MOSFET amplifier in the RF, second and third IF stages, reducing fading and distortion. Immediately following the demodulator is an automatic noise limiter, highly effective in suppressing pulse type interference on AM signals, and a three position "tone" switch a (high, low or band pass) audio filter, reducing the bandwidth to that required. A transformerless AF amplifier ; delivers a generous 2W to the internal 5" x 3", or external speaker, drives a phone jack, and a "volume" independent output for tape recorder. The receiver is, mains (234VAC), external (12v. DC) or internal dry cell powered, the most economic source being automatically chosen. This is reduced to a stable regulated 10v. (or 9v. for oscillator and the harmonic generator). A dial lamp switch is provided to conserve power on battery operation.



YAESU MUSEN

FR-101 SOLID STATE RECEIVER



FR-101DD

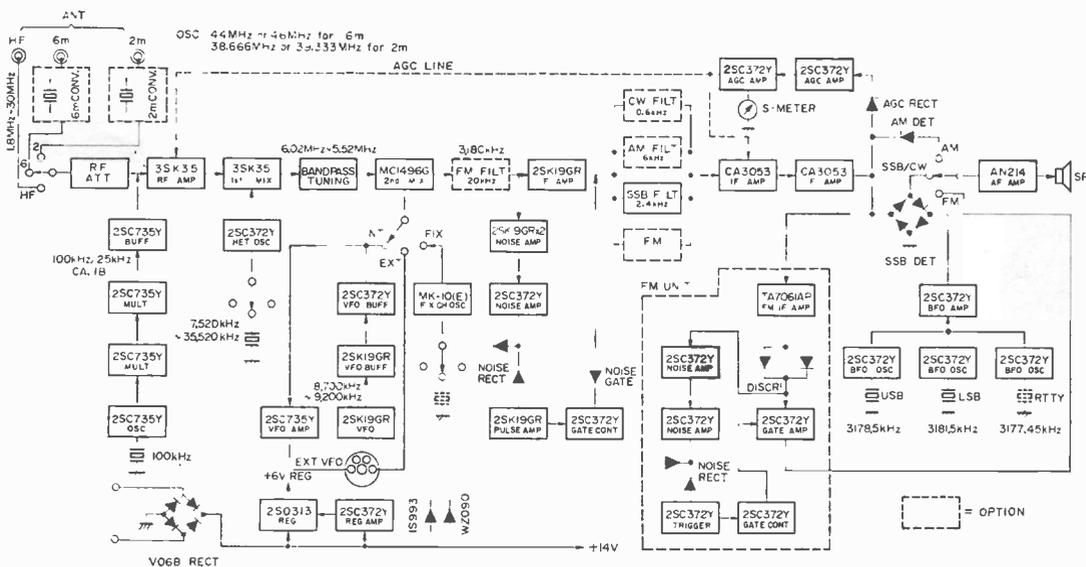
The FR-101D(D) is a wide coverage communications receiver (Mains and 12v.) for amateur and SW. BC. use. Four switched crystal filters provide optimum bandwidths for A.M., SSB, FM, CW, and RTTY. The receiver accepts external VFO control from the FL-101 or the FT-101E transceiver. It is constructed using plug in boards, has an adjustable noise blanker and fixed channel crystal control operation facilities LED's indicate VFO and clarifier (± 5 kHz) status and 100/25 kHz switchable crystal calibrator is standard.

FR101DD the digital de luxe;
 other equally superb versions:
 FR101D de luxe with all extras less digital readout.
 FR101DS digital standard.
 FR101S standard non digital version.

COVERAGE (metres)
 30(+)/500 kHz Segments
 160, 80, 40, 20, 15, 10, 4, 2
 60, 31, 25, 19, 16, 13, 11, CB
 4 Bands around 4, 5, 8, 25 MHz
 AGC Threshold $1\mu\text{V}$ Attack
 3 or 4 m.S. Release .5 or 2 S
 AF Output 2W (10% D)

SENSITIVITY (at 14 MHz)
 CW 0.2 μV 10dB N+S/N
 SSB 0.3 μV 10dB N+S/N
 AM 1 μV 10dB N+S/N
 FM 1 μV 12dB SINAD
 Stability 100Hz/30 mins.
 Linearity 1kHz. Backlash 50Hz.
 image -60dB

SELECTIVITY (at 6dB)
 CW 600Hz (2.5 : 1)
 SSB 2.4kHz (1.67 : 1)
 AM 6kHz (2 : 1)
 FM 20kHz (2.25 : 1)
 12 FET 20 BIP 33 DIO 4 IC's
 6 Tubes. 5 BIP 88 DIO. 23 IC's
 13"W x 6(7") H x 1 1/2 (14") D



OUR AGENTS

Amateur Electronics,
 508-514 Alum Rock Road
 Alum Rock,
 Birmingham B8 3HX

South Midlands Communications Ltd.
 S.M. House, Osborne Road,
 Totton,
 Southampton, Hampshire SO4 4DN

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



South Midlands

TOTTON (HANTS) NO. 1 DERBYSHIRE

YAESU 2 YEAR GUARANTEE ONLY FROM SMC

S.M.C.'s guarantee. Confidence in Yaesu quality, is until further notice, extended to 2 years, covering both labour and free components (excluding valves, semi conductors and carriage).

FREE SECURICOR '24 HOUR' B SERVICE

For Yaesu items over £55
Over £5 post free.

THE LARGEST RANGE EX-STOCK IN THE UK, FROM SMC

FT101E, EE or EX from S.M.C. for SERVICE

The FT101E a complete mains or 12v. DC station contained in a compact 30 lb. package, 260W., PIP of SSB (with in-built RF speech processor) 180W, CW and 80W. or AM 10 to 160m. (inc. 10 MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100 kHz calibrator, $\pm 5k$ clarifier (with separate on/off switch), etc., etc.

The VFO is stable and linear (readout to 1 kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for: tune up, AM and for CW operation, whose performance with the semi break-in keying, with side tone, and the optional 600 Hz filter installed is of high order. Linear and transverter provisions are made with sockets for: relay contacts, ALC output, all internal HT supplies, low level RF, heater links and switches, etc., etc.



FT200 from S.M.C. for VALUE !!

FT200B £249 + VAT

FP200B £54 + VAT

The FT200B. The "Best Buy"—260W. PIP (A3), A1) 75W (A3), 80 to 10m. (28.5–29 MHz, 3 other crystals optional) Sensitive and selective 2.3 kHz at 6 dB (1.75 : ISF). Solid state, stable, linear (readout to 1 kHz), gear driven VFO. 100 kHz calibrator. VOX/PPT, clarifier (± 5 kHz). Semi break in CW with sidetone, etc., etc. The pre mix oscillator system used, yields: low spurious outputs on transmit, and the good signal handling and low noise capability of a single conversion superhet (whilst retaining a 9 MHz IF with high image rejection) and single range VFO stability.



SPECIAL YAESU — S.M.C. BARGAIN : SIGMASIZER 80R £195 + VAT

THE VERSATILE ONE—SIGMASIZER 80R

The Sigmasizer 80R offers 80 (25 kHz increments) channels on 2m. The received frequency is always indicated on the dial, either transceive (simplex) or for repeaters, the transmitter is automatically shifted down 600Hz. When the receiver is tuned to repeater input channel, the transmitter is automatically shifted upwards thus offering full, simplex, normal repeater or inverse repeater. The built-in tone burst functions only in repeater mode. A further channel may be programmed for instant selection of a local net or RAEN frequency. Automatic final protection, 10W or RF and a generous 2W of audio are available from the unit which draws only 2.2A on 12v. DC.



SIG80R

V.H.F. PORTABLES

KP202 TRANCEIVER

6 channel 144 MHz handheld fully crystallized up

The handheld KP202 with its 2W of RF and $\frac{1}{2}$ W of audio immunity to image and IF break-through, offers performance to rival all walkie-talkies and many mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle/whip case and F type plug. Accessories include automatic (R channels only) crystal tone burst £10.00, flexi stubby antenna (£5.80), leather case (£4.90), base charger KCP2s (£11.75), set of 10 ni-cads (£8.50), F to UHF adaptors (£1.65), F plugs, spare whips, spare hods, etc.

SIX CHANNELS fitted S20 and S22 and any 4 of SO, S21, S23, S24, R3, R4, R5, R6, R7
ONLY £109.50 (+ VAT).

NEW SEIWA RECEIVERS

Seiwa MR2 and MS2

This tiny yet well engineered sensitive Rx is ideal for the SWL, XYL or as a monitor Rx. The MR2 has 12 switched channels, (2 or 4 metre models are available). The MS2 automatically scans 4 channels on 2m.

All are double conversion, with 12kHz bandwidth, automatic squelch, good audio output and will fit into your top pocket, or on a belt (with optional case). Complete with ni cads, mains charger, speaker, earpiece, aerial Wt. 7 ozs. Size : 122 x 69 x 33 mm. Price only MR2 £53 + VAT, MR2 (4m.) £53 + VAT, MS2 £62 + VAT, leather case £1.90. Crystals £2 + VAT.



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VERSATOWERS COPIED BUT UNEQUALLED ARE ALSO CHEAPER THAN THEIR COMPETITORS THANKS TO LARGE SCALE PRODUCTION SAVINGS. NEW EXTRA HEAVY DUTY MODELS are now available for the discerning user.

Sample prices : W40, £170.50 ; P40, £121.50 ; HDP40, £286.50 ; P60, £252.00, HDP60, £333.00. Also guyed masts 50ft. height for only £42 or £74.50 with complete comprehensive rigging kit. All plus carriage and VAT.

THE VERSATOWER (illustrated right) Price increases have been kept to a minimum. Contact SMC (HQ) for technical advice regarding models, installation, etc. We have commercial manufacturing experience in antennas and masts over 19 years which we gladly use for the benefit of amateurs and commercial applications

CUSHCRAFT VHF OMNI (Carriage 95p) VAT 12½%

RINGO RANGER ARX 6dB gain (over ¼) ultra low angle radiation, excellent 50 ohm match uses 3 x ¼ in phase and ¼ stub, 145 MHz version approx. 9' 6" (¾ lbs.) 432 MHz approx. 3' 6" (illustrated).
ARX2 Ringo Ranger ARX450 Ringo Ranger 432 MHz ... £21.50
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PL259 Standard UHF plug UHF fixed reducer ... 48p
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3mm. HT steel ... yd. 13p X150 Rustproof 150m. £10.85
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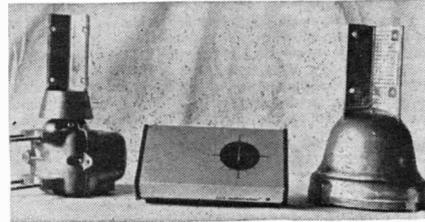
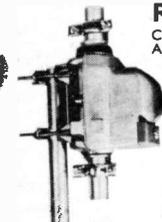
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**PRODUCE THE LATEST IN FM MOBILES
10 WATTS 22 CHANNELS (15 ALREADY WIRED)
AND YOU NEED NEVER BUY ANOTHER CRYSTAL!!**



introductory
price **STILL**
£198 inc. VAT.

The IC-240 is the start of a revolution in 2 metre transceivers. It has all the advantages of the highly popular IC-22A, with its easily selected 22 Channel capability, but does it all with a phase locked synthesised system. Hence you can programme it for all 22 channels *WITHOUT HAVING TO BUY ANY CRYSTALS*. Channels are hand wired using diodes according to clearly described instructions. We supply the UK version with 15 channels already wired in, these being 10 simplex and 5 repeater. Thus there are 7 more frequencies for you to programme at your own whim—ideal for RAYNET and local net use. You can programme for any of the 80 channels at 25 kHz spacing between 144 and 146 MHz.

Duplex (for repeater use) operates by shifting the RECEIVE frequency. This means that by switching to SIMPLEX when using repeater channel you will automatically be listening on the INPUT channel of the repeater without having to wire in special "Reverse Repeater" channels.

The main advantage over other more expensive synthesised rigs is that by not having some 400 selectable channels, at 5 kHz spacing (most of which are redundant as they don't fit into the UK 25 kHz channel spacing system), you are relieved of multiple knob twiddling to change from one popular channel to another. 22 channels are ample for UK national simplex, repeater and local net channels and these are selected by one knob which is easier, quicker and safer than "trying to open a combination safe while driving."

As an optional extra, a built-in scanning system will be available which will scan all 22 channels.

The IC-240 has the same excellent FM performance as the well known and highly popular IC-22A. Consider these points which all contribute to providing optimum communication either direct or through the ever-growing number of repeaters in the UK :

- * Low noise dual-gate mosfet in the front end of the receiver.
- * 5-section helical filter after the front end to provide high rejection of unwanted out-of-band signals.
- * Dual conversion with IFs of 10.7 MHz and 455 kHz for excellent image rejection and selectivity, with filters at each IF frequency.
- * Narrow filter giving high rejection of adjacent channel signals 25 kHz away.
- * Hard IF limiting using an IC.
- * A sensitive, temperature compensated, adjustable squelch circuit with front panel indicator to show when the squelch is open should the gain control be turned back to please the XYL.
- * 1.5 Watts of audio from its built-in speaker giving ample volume for copy on the move.
- * Line voltages are filtered and regulated for reduction of interference from the dynamo or alternator.
- * A full 10W output from a sturdy PA transistor.
- * Built-in 1750Hz tune burst for repeater use.
- * Automatic PA protection.

The channels already programmed are :

SIMPLEX S0, S16, S17, S18, S19, S20, S21, S22, S23, S24

REPEATER R3, R4, R5, R6, R7.

Accessories supplied with the rig :

- Microphone
- Quick release mobile mounting bracket
- Fixing screws
- Spare Fuse
- DC power cord



**FOR UK ENQUIRIES
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Leave your callsign on our
Ansafone (02273) 63850 during
the evening for more details
of ICOM equipment.




IC215 HANDY FM PORTABLE 15 channels 3 watts

Fitted with 7 channels (S20, S22, R3, R4, R5, R6, R7,) £162.00 INC. VAT

(There are still a few left with the special introductory offer of 12 channels fitted for the same price)

ICOM are pleased to introduce their first FM portable and a careful look at the features will soon show how popular it's going to be. You can use it ANYWHERE. Change vehicles, use it in the shack or take it for a walk to the local high spot and you have the high quality FM communication, for which ICOM are so famous available all the time. The batteries are larger than those of its competitors, thus giving considerably longer life. The 3 watt output and high sensitivity receiver makes it a useful main station set, where it can be operated from an external power supply and a good antenna system. Thus the IC-215 can be a good starting point for the man who has just obtained his licence and wants to get on the air without having to spend too much money.

LOOK AT THE MAIN FEATURES :

Aluminium Die-cast Frame The IC-215 chassis and main frame are integrated into an aluminium die-casting rendering it light but resistant to vibration or shock when carried.

15 Channels The unit incorporates 15 channels to select from : 12 by the main channel selector and a further 3 by the function switch. All crystals are plug-in-type HC-25/U and are the same as the crystals used in the popular IC-22A. Being fundamental crystals, they are tunable over a reasonably wide range and a separate trimmer is supplied for each crystal making accurate frequency adjustment possible. This is very important for optimum results with minimum interference.

Dual Power Mode The output power can be switched to 3W on HI for long distance work or 0.5W on LOW for short distance contacts or working a nearby repeater. Battery consumption is minimised in the LOW power mode.

Dial Illumination The dial can be illuminated to facilitate night operation. This is controlled by a selector switch on the front panel.

Power Pilot Lamp If the power voltage falls below the required value a red LED power indicator goes out as an indication that the batteries are almost exhausted or the external power is inadequate.

External Power and Antenna Sockets Sockets for external power and antenna are provided on the rear. The antenna socket takes a standard PL259 plug.

Whip Antenna A fully collapsible antenna is built into the top of the rig. This can be unscrewed and removed to provide a screw socket for a flexible helical antenna. We have had an Antenna Specialist flexible antenna specially made and tuned to suit the IC-215.

Meter The meter indicates receive signal strength during reception and relative output level during transmission.

Squelch A sensitive squelch control is fitted rendering the set silent when no signal is being received.

External Speaker Jack An external jack is fitted to the front panel for a larger speaker or an earpiece. The internal speaker is muted when this is used.

Discriminator Meter Jack By removing a rubber grommet on the side of the transceiver a jack socket is available for connection of a 50 microamp centre-zero meter. This is very useful when tuning extra receive crystals.

Tone Burst A 1750Hz tone burst is fitted for opening UK repeaters.

Shoulder Belt A shoulder belt is supplied and is fixed to clips on the top of the rig. There is also a microphone hook. The side panels of the set itself are covered in leather simulated vinyl.

Excellent FM Audio Tailoring and Clipping This feature, already well known from the excellent quality produced by the IC-22A, ensures clear optimum talk power without over deviation. This makes the IC-215 a far better rig for use with repeaters and gives an optimum range, for the power used, on simplex contacts.

ACCESSORIES INCLUDED :

Dynamic microphone	External Speaker plug
Microphone Case	Discriminator socket plug
Shoulder strap	Earphone
Power supply plug	9 x Dry cells type C (U11)
Comprehensive English handbook	

OPTIONAL EXTRAS :

IC-3PS Power supply which doubles as a holder for the IC-20L linear and supplies power for both the 215 and the linear.
 IC-20L 10 watt linear amplifier
 IC-SM2 Desk type condenser microphone with built-in amplifier.
 Ni-Cad Batteries.
 Charger for charging the Ni-Cads in situ
 Helical stub antenna.

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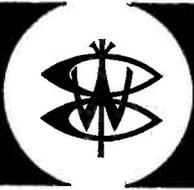
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Electronics (UK) Ltd

MEET THE NEW EMOTATOR FAMILY

Posing for you (left to right) are :

103LBX—for lighter HF and medium to large VHF arrays.

502CXX—the really new boy for medium HF and larger VHF/UHF arrays.

1102MXX — for the largest tribanders and monobanders.



ALSO . . . the powerful **1103MXX** (not shown)—a geared down 1102—greater torque, slower rotation for the really big stuff . . .

. . . . AND TO MAKE THEM EASIER TO LIVE WITH



MB300

MAST BEARING

The best answer to your rotary mast problems. Robust, ball-bearing fitted unit with stainless hardware. Complete with 4 lugs for guying rotary masts up to 62mm. dia.—or can be bolted to flat tower plate as an alignment bearing.

I213 BRACKET

A unique 3-piece mounting bracket for fixing your rotor to a mast or for exact centring of antenna stub masts. All stainless hardware—takes masts from 40 to 62mm. dia.—fits 502CXX and 1102/1103MXX rotors. Standard as top bracket on 502CXX.



I211 BRACKET available for mast-top mounting of 103LBX, same as top bracket (see photo).

450 FLEXIBLE COUPLER

Fits between 103LBX and tower mounting plate or mast bracket (I211) to compensate for slight misalignment between rotor mounting and upper alignment bearing.

Rotor "floats" in the 450 and thus allows the upper stub mast to align within bearing, to avoid excessive wear and possible rotor damage.



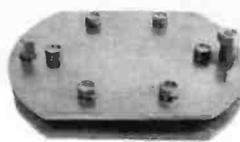
PRICES

103LBX	...	£78.75
502CXX	...	£111.38
1102MXX	...	£163.13
1103MXX	...	£168.75
450	...	£5.63
451	...	£10.69
I213	...	£14.06
I211	...	£8.44
MB300	...	£14.06

All include carriage/VAT

451 FLEXIBLE COUPLER

Fits between tower mounting plate or mast bracket (I213) to provide same facility as 450 flexible coupler—but to fit 502CXX or 1102/1103MXX type rotors. A worth-while adjunct to your system to avoid wear and tear through slight bearing misalignment.



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THE RIG YOU HAVE BEEN ASKING FOR!

2 METRE FM MOBILE

- ★ 25 CHANNELS (10 Fitted)
- ★ OVER 10 WATTS OUTPUT
- ★ AUTOMATIC TONE-BURST
- NEW ★ DUAL CONVERSION RECEIVER
- ★ 10.7 MHz CRYSTAL IF FILTER
- NEW ★ CHANNELS FITTED INDICATOR
- ★ REMOTE VFO SOCKET
- NEW ★ CENTRE ZERO/S-METER
- ★ 2 PRIORITY CHANNELS

The Quartz-16 is yet another new model to leave the production line of the fast expanding range of FDK products. Continuous liaison with our factory in Japan enables us to bring to you the very latest in price competitive technology. This is the rig many of you have asked for. Advanced design ensures high performance from this straightforward, functional 2 metre FM transceiver based on the tried and tested Multi-11 chassis. Yet despite its unquestionable high performance, this transceiver has a down-to-earth price tag! A mere £169 inclusive of VAT.

In 1977 you might be forgiven for thinking that such a low price means a sacrifice in performance and facilities. It is therefore all the more pleasing to confirm that after exhaustive tests and comparison with other rigs there is only one rig better than the Quartz-16—the Multi-11—and we import both of them!

IN STOCK NOW



10 CHANNELS FITTED

£169 inc. VAT

Full descriptive literature is available on the Quartz-16 but here are a few of its main features. 23 channels plus 2 additional priority positions, quartz crystal control for very low spurious transmitter output (and we supply 20 crystals inclusive in the purchase price), dual conversion receiver with 10.7 MHz crystal filter and 455 kHz ceramic filter, 3 watts of received audio, combined S-meter and centre-zero meter, remote vfo socket and of course the transceiver comes with a complete set of accessories including quick release mobile bracket, microphone, DC cable, desk stand, plugs, fuses and English Manual. And last but by no means least you have the combined backing of FDK/WSE to ensure an efficient back-up service and stock of spares in the unlikely event that you may need them.

SOME MAY MATCH ITS PERFORMANCE—NONE CAN MATCH ITS PRICE!



FOR 70cms FM
MULTI-U11



IN STOCK NOW £249 inc. VAT

Every few years a rig is produced that becomes the standard by which all others are judged. The FDK-U11 is such a rig. It stands above all others whether you compare its performance or facilities. Its beautiful lines and superb construction yet diminutive size have made it a winner. Little wonder that the "U-11" has outsold all other 70 cms. rigs put together. 70 cms. is a challenging band full of new call signs and S9+ contacts from the numerous repeaters dotted around the country. Undoubtedly 70 cms. is the action-packed band of the 80's but make sure you choose a rig man enough for the job! The FDK U-11 is one—the only One!



FOR 2M FM
THE MULTI-11



Fitted 7 Channels + Autoscan + Toneburst £209 inc. VAT
Special Offer: S21, 22 and 23 £10 inc. VAT if ordered at the same time as Multi-11.

This is the ultimate in 2 metre FM performance. The autoscan facility means safer driving and more qso's. It doesn't scan every channel, just the 4 priority ones, this prevents it locking on to the local repeater or beacon. The receiver sensitivity is better than any other model because of the built-in, RF pre-amp. Additional features such as receiver IRT, tx monitor switch, vfo socket, 13 watts output of clean RF, good receiver selectivity and superb audio quality all add up to the finest buy in 2 metre FM today. When a rig meets commercial specifications it has to be good!

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MULTI-2700 THE FAST SELLING 2 METRE RIG MULTIMODE WITH 'OSCAR' FACILITY USB/LSB/FM_N/FM_w/CW/AM/'OSCAR'



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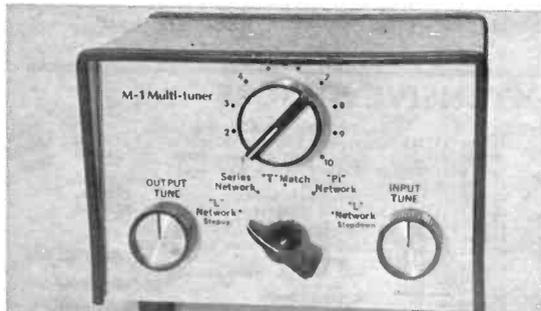


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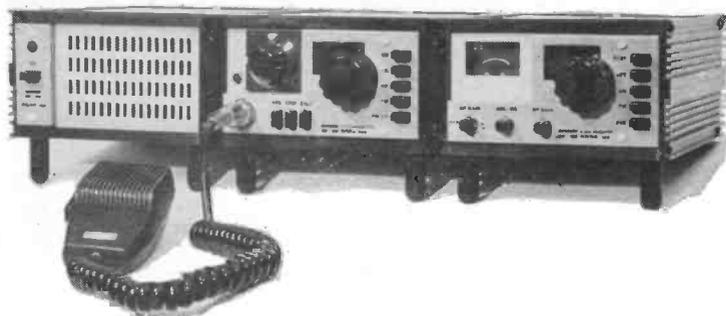
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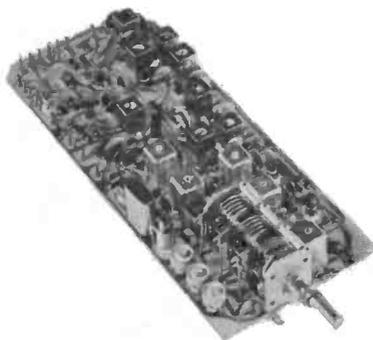
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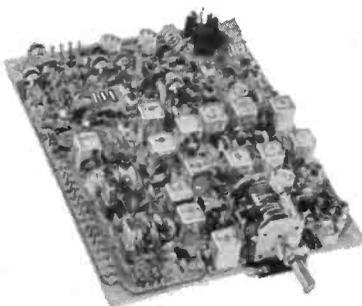
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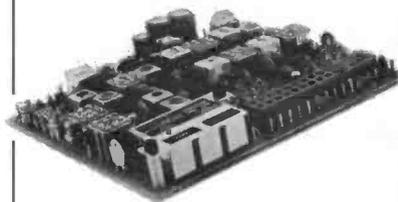
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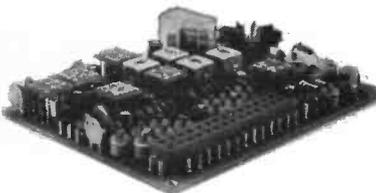
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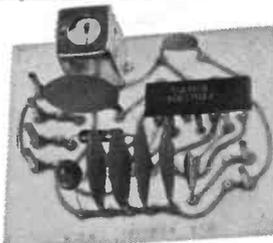
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(GB3SWM)

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Editor: PAUL ESSERY, G3KFE/G3SWM

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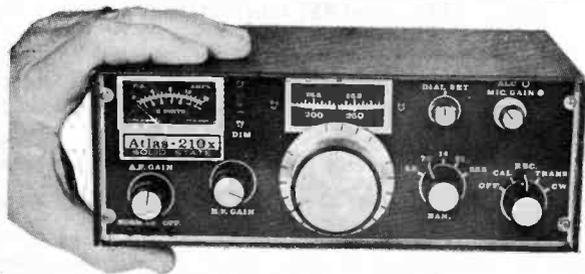


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EDITORIAL

Jubilee

Within a few days of this reaching you, amateurs in the U.K. will be, in their own personal way, celebrating the Silver Jubilee of Her Majesty Queen Elizabeth II by their use of the GE callsign between June 4 and 12; we hope everyone who is on the air and working a station outside U.K. will take the opportunity to use the GE prefix.

The unique brand of personal leadership she and her Consort, the Duke of Edinburgh, have evolved has brought them significantly nearer the man-in-the-street than any other monarch in the recorded history of these islands, and through a traumatic quarter-century of change in our life-style.

Likewise, in our hobby, we have seen equally great change; from a world in which Russian amateurs could not work those of the Western World save by stealth; from a phone section in which, on any band, one could only work the S9 locals through the heterodyne whistles; from a world in which British radio amateurs had virtually no commercial equipment market; from a savagely restrictive licence structure— from all these things we have been delivered in 1977. Nonetheless, our daily lives are plagued with violence, largely a backlash of the fall in moral standards in both public and private life, and there is room for grave doubt as to the future of the basic freedom of our country.

However, it is to be hoped that politicians, regardless of party can be persuaded to follow the good example set by the Royal Family. Long may their reign continue.

Ed Stacey
/ *G3KFE*

COMMUNICATION and DX NEWS

THERE will be, among the "regulars", some noting that mentions have not been taken in here and there; and unfortunately it must be admitted that last month the charge was true. It was, sad to say, a simple matter of mathematics, in that we generated a couple of columns-worth of surplus. As this piece is, from the practical point of view, the finale to the month's efforts, it has a space allocated to it, and a requirement that it be so contrived as to fit nicely into its slot. If we mis-cue, in the way of an overshoot, there just isn't time to do "another circuit and landing" and the only thing to do is to swing the axe.

The Bands

One looks at them all, one by one, and wonders—where is the DX? Not dead, but most definitely taking a rest while the sun grows a few spots! The evening before this was started for instance, we had a receiver running around the CW end of Twenty and the band was full of noise, with just the odd disturbed area where some minor DX was causing some W's signals to be copiable, among them at least one well over the S9; and not far away this evening, we have one Italian signal at well over the nine, and with the most grotesque bug-key Morse one has heard for a long time, with the dashes at fives and the dots at around 55 w.p.m. However, as this paragraph continues, he gets his come-uppance by way of a comeback with both the dots and the dashes at above forty, beautifully spaced and controlled! But, while this episode cheers the scene it doesn't show much sign of DX after dinner which is what the poor old working amateur wants—DX in working hours just isn't any good! All this being said, we do scent a trend for a slight increase in the amount of traffic being carried on 21 MHz to the relief of the lower band, and of course if you have the courage to dig, you can find long-distance contacts on 7 MHz at reasonable hours, while for the night-owls there is

something to be said for Eighty. As it always has been, the morning session is the best in general terms, although rather too late for those who have to brave a shop-floor starting-hour to get much benefit.

What's Gone

TT8SM has been noted, from Lake Chad, crystal controlled around 14237 kHz, doing a couple of days and then indicating a return visit to the bands a few days later.

4Z4TT had moved from VR8 (Tuvalu) and should be showing around the time this is being written from Tonga; No need to bust a blood-vessel though as we have it that he will be probably staying for some weeks. Another one there is no need to panic over is Marion Is. as the new operator of ZS2MI is hoping to have the weather-station situation sewn up so as to leave a bit of spare time for contacts—ZS6AGV, Gordon, this is, and he will be noted often to have ZS5PG feeding the contacts with him on ZS2MI in regular order. The favoured spot, or so we understand will be the general area 14220-14225 kHz.

Now for the Clanger of the Year—the recent operation of WA7VVU from Wake Is. was conducted from the dockside moorings, no one having indicated to Del what the proper way to do this was and he not being particularly DX-orientated. However, the cards going out for the contacts will be clearly marked as from aboard the ship, and the chances are good for Del to be able to go to Wake again and do the exercise the "proper" way, as the container-ship on which he is the R.O. calls at Wake about three times a year.

Another one to appear was Pitcairn, where W6YO showed up for 24 hours of CW operation—but the word seems to be that there was quite a lot of rag-chewing during the operating; some of the 'chasers getting quite steamed up about it—which sound to me like hard luck, as if the DX wants to have a ragchew he is quite entitled

E. P. Essery, G3KFE

to do so!

The Pipeline

Seems at this writing to be rather like the Ekofisk well—well bunged up with mud! However, rumours there are of a VU signal from Laccadives, and we understand a mid-October date is projected for the Kermadec operation by five ZL's, who will of necessity be there for a fortnight, while the ship goes on to its terminus and turns round to pick 'em up on the return run.

Top Band

The first letter with a mention of the band this time is from G2HKU (Sheppey) who seems to have been quite active, with SSB to DL7HZ, OH2BQL, PAØHIP, PAØPN and YU2HDE and CW for OLØCFI, YU3TJA, OL9CCL, GM3TMK, OK2KOD, OL5ATZ, OL3CTE, OK1DCF, HB9CM/P, and HB9KC.

Now to G2NJ (Peterborough) who stuck to the key; Nick mentions G4CQF near St. Albans who was using an input of 97 milliwatts for a QSO which lasted 45 minutes around the evening-meal time; G3IOI of Wickford was another QRP contact with a nice way of obtaining his drive—a frequency-meter into a single transistor output stage. In addition there was a lunch-time contact from PAØINA who was operating from *chez* PAØPN while the latter was ill; signals 579 both ways around noon.

Now we have one of the mammoth W1BB "Bulletins" to pick over; Stew mentions the difference in noise level between his Boston city QTH and the farm QTH at which he spends a couple of months each summer. W1BB is of the opinion that noise is rapidly becoming the limiting factor on what can be done and compares his summer situation on the farm—summer static against winter QRM. For himself, this season has been pretty good for W1BB, who worked 66 countries this last winter as against 63 the previous one. Another point of interest in the W1BB Bulletin is the persistent rumours of Russian

activity on the band as being likely in the near future.

Still with the W1BB Bulletin, and skimming through it, we noted one of the more hilarious moments: VE3EK, it would seem, was aware that his International truck silencer was specially organised to filter out the higher-frequency put-put noise, from which he reasoned that maybe a vehicle silencer might help with getting rid of Loran signals. Round to a freindly local trader and borrowed a selection of different silencers, put phones at one end and listened through the other, sorting out finally one that knocked out the Loran best. Found it rather uncomfortable though, with one ear at the silencer end, phones on floor, and leaning sideways. The experiment went QRT when he over-balanced and fell on the deck, clouting his head on the silencer and the floor in the process!

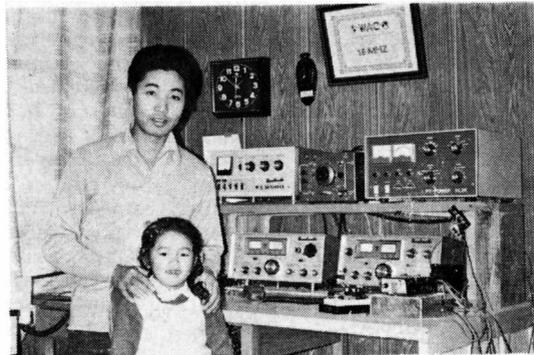
If anyone has noted the absence of Snowy, VK3MR from Top Band and everywhere else, W1BB has the up-to-date news; it seems the problem is heart trouble and VK3MR has to take it easy for a while; let's hope he will soon be back at full power again. Another who has been rather less noticeable than previously on Top Band is ZE7JX, although his problem was lightning—a direct hit *twice* wiped out his inverted-vee and the 275-foot Windom aerials which simply *disappeared*—not so much as a little ball of metal found to remember it by. The vertical escaped, although at one point the coaxial cable was damaged; but a splice was soon to put that right. Like so many others, ZE7JX has been quite surprised at the effectiveness of short, loaded, verticals on Top Band, when given an adequacy of radials and properly fed.

Eighty

Another place where there aren't many reports but DX can be found by those with the will to look for it.

G4EDG (Newton Abbot) seems to have concentrated on 7 MHz, but he did spend a little time on 3.5 MHz, where CW yielded DF4GV/HBØ, EA8BF, OD5EX and U6ØA, while SSB managed to get to VP2SAG, DK5XN/OHØ, HV3SJ, and VP8OW.

On to G3CED/G3VFA, who



The neat 160-metre station of Kuniy Togashi JA7NI, Akita, Japan (with YL Jr. Op!). This was the top Japanese station in the 1976 CQ/160 test.

seems to have confined his eighty-metre activities to working G4EVO and F9UO on sked, with a single contact to G4EYE at Dovercourt, using two watts to an end-fed wire.

Also in Broadstairs is G4EVO, who paid a little more attention to the band with his QRP CW—G3CED and G4EVO seem to be having a little private QRP war of results with almost identical systems and powers. ON4IE was a little upset when he discovered G4EVO was at five watts input while he himself was running 300 watts! For the rest, it was largely a matter of covering most of U.K. and nearer Europe at the sort of times when G4EVO was operating, which explains why he also went up to the higher bands.

At the time of writing, GM3CFS (East Mey, Caithness) was still being hit by the gale-force winds, and also suffering from much "quack-quack" from the fishbone and oil rigs in the CW bit of Eighty; but Jim was not deterred (much!) and carried on to work C31MN, EA8BF, UA9CM, KV4JY, VEXEOH and VP9HP.

Another operator on Eighty with QRP is G2HKU; this month Ted has made no mention of the stations worked, but confined himself solely to the comment that he never ceases to be amazed at the performance of the little Ten-Tec PM2B. As he says, there is nothing he can hear on his two "big" receivers—the KW2000 and the 888—which isn't audible on the Ten-Tec as well. As for the transmitter, no comment is needed, as we all know how well and how far these QRP rigs can radiate.

QRP is also the theme at G2NJ, and particularly around the noon time. Among the stations worked on Eighty Nick picks out G3KZR with 480 milliwatts, G2CP with 800 milliwatts, G8SI down at Fareham with one watt, G3OSJ of Glastonbury with two watts, and GW2FWA/P out with the HW8 and a whip, and F5DM near Paris with two watts; Nick used his HW8 for all these contacts. On a different tack, the term "flea-power" has inspired G3OSJ to draw a special QRP QSL card using this as the theme—a flea sitting at the rig with phones on and anxious look while tuning the rig, and the caption "Watts" not up to scratch? Flea-power—we'll tickle the transmitter."

Forty

GM3CFS seems to have stuck to CW, and the bottom of the band, where he found HC1LT, VP9HP, PT2UF, PY5AAR, PY6AVY, PY9VO, N7XX in Washington, U5ØSP, YV5EYX, ZL2UV, ZL3VW and ZS5A.

7 MHz for G3CED was a matter of two or three contacts round Europe to pass the time away when there wasn't much doing on the HF bands; so we see a quickie with a French station, another with a DK, and a long ragchew with DL1CN for nearly an hour—since they both have been on the air since the days of spark and arc, we can guess the hour was spent in reminiscence.

G4EVO also covered the Europeans, and we noted one very meaningful *blank* entry in the log—where G4EVO heard the elusive

DX prefix but try as he would over the next seven minutes the rest of the call remained buried under the rumpus.

The log of G4EDG indicates that the VK/ZL path in the mornings has not been so good as last year, although the W6 and W7 stations were there for the taking. To work the following, all the CW stops were pulled out in the receiver, and the MFJ filter also in circuit as well, pulled to its maximum selectivity: CM2HB, CN8AD, CR3AGD, HV3SJ, JA2CG, JA4BCW, JA4FGS, K7UR, K6KII, KV4CI, OH9TH/SU, PY1NEW, PY1FB, PY4BUT, TA1ZB, TF5TP, UI8ACP, UA0AG, UA0SGJ, VP9HP, VK3MR, VK5FH, VS5MC, W6ASH, W0RCS (Kansas), ZS1HF, ZS1XR, ZL2VS, 4Z4KX and 5B4CD.

G3ZGC/MM reports from Esso Scotia again, this time near ZS, after a pleasant leave. A group of his buddies decided to see just how well a 7 MHz sked could be kept in the morning period. G4EMM (I.o.W.), G4EXY (Newbury), and GW3EMZ (Milford Haven) and G3ZGC/NN were the participants, and the time 0645z. The sked was 100% solid until just north of the Equator, and it was noticeable that when the contact was at good strength in one direction it was invariably weak in the other! Others worked on Forty included G4AYO, from about 500 miles seaward of the Angolan coast, and "G4GA" was a Gotaway from Walvis Bay—so he should have been too; that must have made old Joe want to come back and haunt the offender!

A new reporter to this piece is G4CLN (Ashby-de-la-Zouch) who has been pretty well QRT for a couple of years but recently put up 190 feet of wire with a Top Band end in view, and the revival of enthusiasm resulted in the aerial being tuned up on other bands. Forty yielded country number 106 in the shape of 7X0BI, an event which could only help to preserve the keenness.

Odd Items

We have already mentioned the SEANET Convention, but since then we have a letter from HS1WR which gives all the vital details. One point does seem important, and that

is that visitors must not take any radio gear into Thailand without the prior approval of the Royal Thai Government; apart from the possibility of it being confiscated, the Radio Society of Thailand itself specifically asks that no-one brings any gear in. For those thinking of a stopover for longer than the convention, HS1WR mentions the Loy Krathong (Festival of Lights) on November 6, and the Elephant Round-up at Surin on November 20, and the reservation form provides for those who wish to see such items. Reservations should go to RAST, P.O. Box 2008, Bangkok, Thailand.

Early warning of a contest—the TOPS CW Contest over December 3-4. All the details can be obtained from Peter Lumb, G3IRM, 14 Linton Gardens, Bury St. Edmunds, Suffolk IP33 2DZ, which is also the address for Logs. We also have a note of the winners of the 1976 affair, of whom G4BUE was the winner and SP8ECV the runner-up—our congratulations to both.

From PY1RO we have a note of the Trans-Equatorial Tests on Top Band. Throughout June, monitor from 0000 to 0030z, and extend into July or stay up later if conditions seem to indicate these. The usual frequencies apply, Europeans around 1825 kHz, South America on 1800 to 1808 kHz; other DX to use whichever area is appropriate in terms of their location, save that there will be ZS stations listening around 1965-1970 kHz.

A rather off-putting coincidence hit G3FWI just recently; he was signing with a KP4 station when he was called by I2FWI, or so he thought; however, when he went back to I2FWI and pointed out that he was G3FWI there was a stunned silence—until it was realised that the QSO in fact included G2FWI, G3FWI and I2FWI!

Vale

We have, with great regret, to write of the death of G5LO, of Oxford, on April 20, just two days after the death of his mother; she was 98, G5LO 75. Howard was confined to a wheelchair after an accident in his teens with a motorcycle, but that did not stop his interest in Amateur Radio which dated back to his hearing the opening of the Wembley Exhibition by

King George V in 1924 from a radio at the hospital bedside. Howard was also a long-time member of RAIBC and Oxford club, and did much to encourage newcomers to the hobby.

"CDXN" deadlines for the next three months:—

July issue—June 3rd
August issue—June 30th
September issue—August 4th
Please be sure to note these dates!

Twenty

Your scribe has not been all that able to listen round on 14 MHz this month, but he did enough to note just how variable conditions were this month.

For G2HKU it was all CW, giving VK3BZ, ZL4NH, ZL2ANV/MM, KV4AA, YV4AHU, VK2BJL, VK3MR, YV5DEK and ZP5AC.

G4DJY (St. Annes) normally seems to run around 100 watts to a Joystick in the VW mode; but lately he has been known to go over to SSB or to change to another band. Twenty CW showed with 5V7AR, VP9HT, VP2MAQ, ZS4MG, VO1AW, VE5DX, PY1NEW, another VP2MAW contact, while the SSB was used for the ARRL Contest, in which reams of W's were worked in all call areas, but not so much in the way of multipliers.

G4CCQ (Tunbridge Wells) has returned to the fold with a new aerial; CW is noted as having managed JR6RRD, VU2YK, AP2P, 5Z4NI, JH6IMI, 9M2FK, A9XBC, U60A, VS6AF, K9PNT/DU2, 4Z10TD, OH2BDA/OH0, KH6IJ, JA8AA, VK2CX, JG1HND and lots of Asian Russians.

Nice to hear from G3NOF again, after a lay-off for several months; first the beam started to play up and had to be taken down, then the linear played up; add to that replacing all the coaxial cable and a dose of 'flu, and you have several months of non-operation! However, Don re-appeared on April 22, and since then has found 14 MHz very patchy and with a high noise level. A few VK/ZL contacts in the mornings were followed by KL7's! around 1600z the West Coast W's and the Far East have been heard. Contacts were as usual all SSB, and

cluded VU2BEJ, VU2HI, YS1GMV, and East Coast W's.

G4EAN (Nottingham) continues to struggle for time to operate; this month he has tried getting up a little earlier, but has been rather put-off by a cold shack, not to mention that his 18AVT won't load on three bands; however some time has been spent on getting the /M installation going albeit Ian reckons the /M whip is not as good as the TH3 at sixty feet! On the matter of QSO shortage, G4EAN has booked himself a period of leave to coincide with the GE prefix period, and he intends to see just how much he can do with it!

G4CLN started the career of his new Top Band aerial by a QSO with PY2ELZ on Twenty, followed by ZL3GQ, CT4WT, UB5WE OK2BBB, and OF1AA all before setting off to work on a Saturday morning.

GM3CFS keyed with HC1BU, HI8MOG, HP1SI, JA8UI/PZ, KP4CLB, VP9GD, WB6FPE/SJ (who said "QSL via KP4USN"), XE1RV, 8P6AK, 8P6DW and 9Y4VU.

G4EDG says he gave Twenty a blast as the result of its being open after TV hours. The result, apparently on CW—Steve does not make it quite clear—included K7SS, KH6CF, VU2WP, WB70MW, VE4TC, W6EZM, VS5MC, FY7YE, JA1BWD, UA0LAU, XE1QW, JA7PL, 5Z4NI, JA8AA, JA8AYN and YV4AKK.

On to G3ZGC/MM, who kept a sked with G4EMM and G3LLK! it seems to have been very successful with the FT-75, and many other stations have joined in, from ZD7, ZS1JJ, ZS6 and a few G's.

0830z on May 2 saw G3FWI come down from the shack in disgust, after spending thirty minutes trying to work VP2LS—Bill reckons the noise of the pack chasing him sounded rather like a cross between the opening of the gates of hell and *music-concrete*! G3FWI was first licensed back in 1949, and operated from the present QTH for the past twenty years, originally on CW but over the past year SSB on 14 MHz using an FT401, and various other rigs, at the moment to a 14 MHz dipole. During the last month this has yielded contacts with ZL3LV, JAOAXV, IC8FHF.

VP9HT, a couple of "firsts" on the trot with HI8XBH, and TF3HP, plus putting these two together for their own respective "firsts," SV1IZ, KV4AA on CW, PY7APS/1, LU7DEZ, and a most disappointing Gotaway in the form of 7H1CT, who obviously heard G3FWI as he came back with "Thanks for the call the G3, but I only want to work non-Europeans." VR3AK was heard, but again the wolf-pack assembled and the dipole was just not able to cut through to DU6EBB, DU9FB, 5B4DG and ZD8AB that morning either, although it did produce a consolation-prize in the form of a nice long contact with VE1AYB. Then followed PY1PY whose father went to PY from Manchester back in 1927, a WB3 in Maryland, and the usual crop of Europeans and Russians.

G3RCA next, from Wigan, all SSB and 14 MHz. Before mentioning a few of Tom's QSO's, we should possibly mention some of his other news; for example that the current shortage of 9X5 is due to the authorities jacking up the licence fee level to the equivalent of one thousand U.S. dollars! On the VR1 situation, VR1X says he is the one-and-only at the moment since the departure of VR1AA and VR1AP/4Z4TT, as VR1AF and VR1AG are at the moment on leave but due back in a couple of months. The morning sessions seem to have been good, with KS6FO, KX6BU, FK8CP, ST2SA, 5W1AP, 5W1AT, HM0U, VR8N, 5W1AU, ZK1DR, VR1X; lunctimes showed with YB2AK/3, VE7DIY/SU, VR4DH, KG6JFK, WA5EVX/KG6, KA6KJ, and afternoon/evening ones included such as FH0BKKZ, FR7AE, FR7AT, SU1MA, ZF1GC, VS5MC, UG6LQ, YN1WB, FL8FF, ZS3B, CN8MB, PJ3BW, KG4SC, VP8PJ, 9L1GA, VP5BIL, 5Z400, 3A2HB, SV1FT for Crete, ZK1DR, VP2LL and A4XGY as samples.

G3CED/G3VFA stuck to their QRP CW plus Joystick combination, with very few exceptions such as the odd contact with G4EVO. The CW worked all over Europe with two watts input, and out to UA9CES, UK6HAA, UW6DM, CT4HW, UM8MAD and lots of small fry.

Turning to G4EVO we find G2HLU(!), most of Europe, EA7TH,

UA9ADY, U60A.

21-28 MHz

Both bands have been open and "giving" always providing one can find the time to operate during the openings. G3NOF found skip to be short, but with some Far Eastern openings on Fifteen, and a few W's and South Americans in the early evening—QSO's with KP4CLB, WB4KSJ, 9V1SV, not to mention 28 MHz QSO's with G's assorted and a solitary Italian.

Our chief ten-metre watcher is G2ADZ (Chessington); Bill says that he listened every day during April, and on ten of those drew a blank. Of the remaining twenty, all produced QSO's outside the U.K., and fifteen produced long-distance contacts. For example ZS6AL, ZE3JJ, ZE3JO, ZD8DO, CN8AD, ZS6BQT, ZS6TZ, 9J2BO, ZD8TM, PY1BOA, 4X4GD, ZS1GK, LU3EX, 5Z4LW, LU6EF, A9XBC, 9J2WR, 9J2JR, LU6DGA, LU6KDX and a Gotaway in 5Z4JE. All these were CW contacts, and Bill says that often the Europeans are to be heard until quite late in the evenings.

G3VFA found UW6DM, UK9ADT and UK6AAE, plus a long rag-chew with IC8HGZ on Capri on a "dead" band; one feels that 21 MHz is a better band for QRP DX chasing than many, even of the QRP chaps, would believe.

G4EVO looked at both bands, raising an OK on Ten, and UK4WAR plus YO3CR on Fifteen.

Tables

These have not been omitted for perverseness on our part, but rather lack of entries. One would think most of those who intend to have a go will by now have accumulated a few contacts on Top Band or Ten (or, better, both), so we are calling for entries to appear in this piece next month. If there aren't enough, we'll have to think of something else, and drop the 1977 Ladder.

Finale

We are back at the bottom of the lists again, for another month; for next time the deadline will be June 3, addressed as usual to CDXN, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

ELECTRONIC KEYSER

A. V. KENYON, GW4DOO

A QUICK listen around the CW portions of the amateur bands will find the majority of QSO's being made with the use of some sort of keyer. Although the author can send quite comfortably at 20 w.p.m. on the old brass pounder it was found to become very tiring on the arm when operating for long periods in contests or when spending hours calling that much wanted DX station. Some form of electronic keyer was therefore deemed to be necessary, and a working circuit was evolved which has now been in use for several months without any problems. Even with all components purchased from new the total cost should not exceed about £6 which is considered to be very reasonable when compared with the price of commercial keyers.

The circuit will work with either a "squeeze" type paddle or the standard type "side-swiper" and, with the components shown, operate up to a speed of 30 w.p.m. Simply by altering the values of the timing components of the free running multivibrator the circuit will work up to about 100 w.p.m., but since very few people can read or send at such a speed the values chosen are considered to be quite adequate for the majority of users.

Circuit Operation

Although circuit operation is quite complex a simple explanation is as follows; it should be remembered that a logical 0 is equal to 0v. and a logical 1 is equal to a positive voltage.

With either paddle pressed a logical 0 is applied to one of the inputs of gate G3 which then gives a logical 1 on its output. This switches VT3 on which then completes the path to earth for VT2 emitter. The multivibrator then starts switching at a rate dependent upon the setting of VR1, which is the speed control; the two outputs from the multivibrator are taken via the shaping components C3, R6 and C4, R7 respectively to drive gates G1 and G2. A positive going pulse is produced which has a sufficiently sharp leading edge to clock the flip flops FF1 and FF2. Dot size pulses are also present on the top input of gate G7.

With the dot paddle depressed a 0 appears on the input to gate G6 which then gives a 1 on the K input of the flip flop FF2. By flip flop action this 1 is passed to Q of FF2 putting a 1 on the other input of gate G7; G7 now has dot size pulses on all of its inputs thus giving a 0 on its output. This 0 is passed to G8 input giving a 0 on its output and thus a 1 on G9 output which then switches the driver transistor VT4 to operate the relay RLA1 or the keying transistor VT5.

When the paddle is made for a dash a 0 appears on G4 input and therefore a 1 on the J input of FF2. Upon

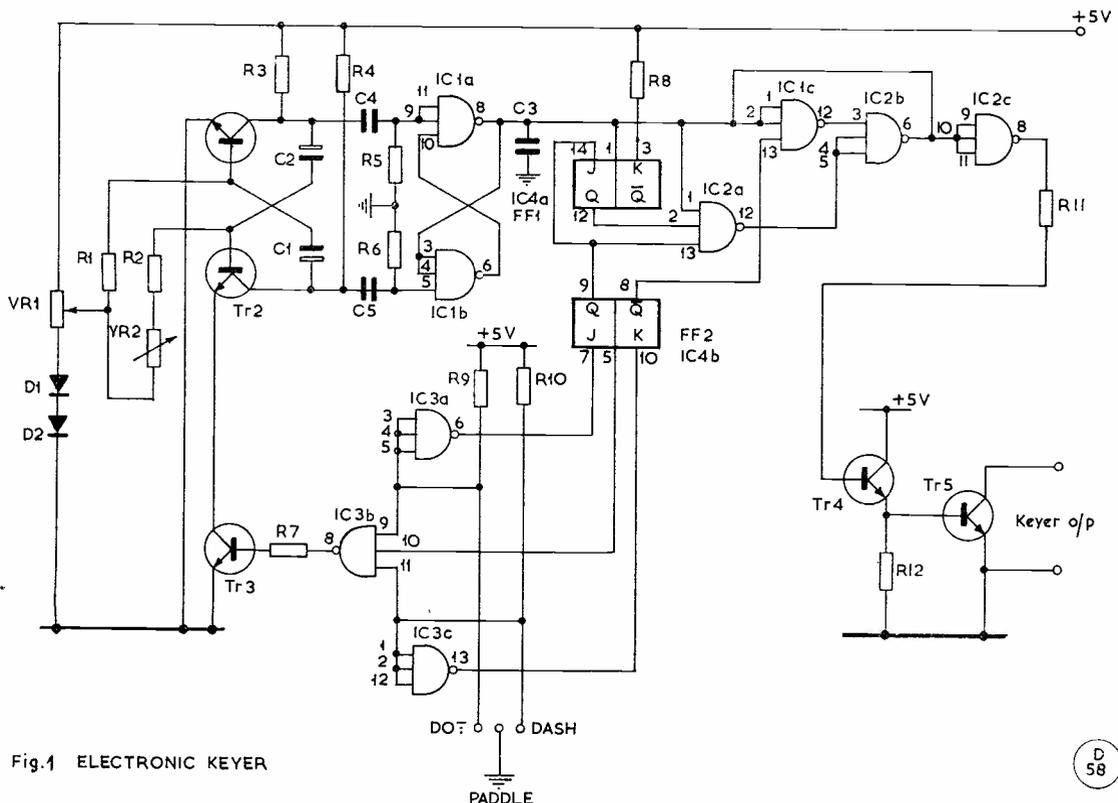


Fig.1 ELECTRONIC KEYSER

the arrival of the next clock pulse this 1 is passed to Q and a 0 appears at Q and thus on the lower input of G7 preventing the passage of dot size pulses to the output.

The 1 at Q of FF2 is passed via FF1 to G5 which then produces dash size pulses at G8 input operating the output stage as before.

Although the above explanation is very simplified it is hoped that those constructors who wish to explore the thinking behind the circuit will be able to do so from these basics.

The output stages shown in Figures 1 or 3 are optional depending upon the transmitter being keyed. Although

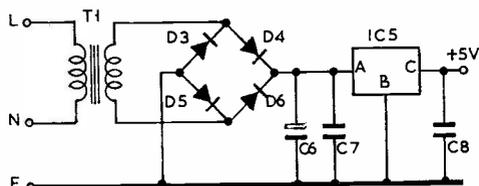


Fig. 2 Electronic Keyer Power Supply

D 59

reed relays can operate at very high speeds they have a disadvantage as to the amount of voltage and current they will switch. The author's transmitter is an old Heathkit DX-40 in which cathode keying is employed. The open circuit voltage across the key contacts was measured to be over 80v. and this was considered to be too high a voltage to be keyed by a reed relay so therefore a keying transistor was used. Any npn transistor can be used provided it has a Vceo of at least 100v. It should be noted that when a transistor is used in this stage the collector should always be positive with respect to its emitter. In the author's transmitter the keying

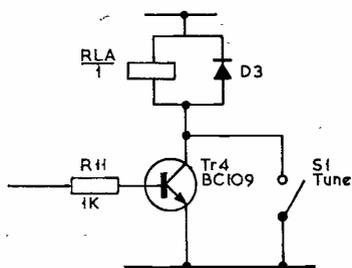


Fig. 3

D 24

that it is fully regulated, since the maximum allowable working voltage for the IC's is just over 5v. and any surges or spikes will damage the IC's beyond repair; initially it was intended to run the unit from a battery supply but the current consumption was measured and found to be 50mA.

The gates used are triple input nand gates of which three are contained in a 7410 package; therefore three such packages are required. The two flip flops are contained in a 7473 package; all four IC's are very cheap and easily obtainable. The three transistors shown in the multivibrator can be virtually any small silicon npn transistor.

Layout is not critical and can be constructed in any way the builder desires. The dot-dash ratio control, VR2, may either be on the front panel of the keyer or a preset on the circuit board, although having the control on the front panel allows the operator to adjust the ratio when sending at different speeds. Once the circuit has been completed it should be carefully checked for wiring errors and if all is well connect the keyer to the transmitter ensuring that if a keying transistor is used it is connected correctly since it will only key one way round. For those of you who are used to a keyer of this type there should be no difficulty when adjusting the dot-dash ratio; for those who have never used a keyer the easiest way to set the ratio is to connect an ohmmeter across the output and set the speed control to around 20 w.p.m. When the dash paddle is depressed the meter reading should be full scale whereas when the dot paddle is depressed the meter should stay around half scale deflection.

COMPONENTS LIST

Electronic Keyer

- | | |
|-------------------|--|
| R1 = 1K | D1, D2, |
| R2 = 1.5K | D3, D4, |
| R3 = 150 ohm | D5, D6 = 1N4002 |
| R4 = 150 ohm | TR1, |
| R5 = 4.7K | TR2, |
| R6 = 4.7K | TR3 = BC109 or similar |
| R7 = 270 ohm | NPN transistor |
| R8 = 1K | TR4 = BF337 |
| R9 = 1K | TR5 = BU206 or similar |
| R10 = 1K | NPN transistor |
| R11 = 1K | with Vceo greater |
| R12 = 220 ohm | than the voltage |
| C1 = 30µF | to be keyed |
| C2 = 30µF | IC1, |
| C3 = 0.01µF | IC2, |
| C4 = 0.002µF | IC3 = 7410 |
| C5 = 0.002µF | IC4 = 7473 |
| C6 = 2000µF, 12vw | IC5 = MVR-5V (obtainable from "Radiospares") |
| C7 = 0.22µF | T1 = 12v. 150mA. secondary transformer |
| C8 = 0.47µF | |
| VR1 = 10K | |
| VR2 = 1K | |

line was the positive side but in some of the newer transceivers it will be found that the keying line will be negative with respect to earth; in this case the earth should be connected to the collector and the keying line to the emitter. It is best to leave the collector and emitter connections floating so that the keyer can be used with any transmitter.

The power supply shown in Fig. 2 will provide a regulated 5v. supply for the keyer, using a "Radiospares" IC Regulator. If any other supply is used it is important

In the article by G4DHF on a Forty-watt Linear Amplifier for Two Metres, on pages 88 and 89 of the April issue, the value of C3 was omitted; C3 should be 47pF and, as the picture on p.89 shows, a mica type for preference.

Errata

A 21 MHz ATTIC ARRAY FOR THE SHORT WAVE LISTENER

E. J. WILLIAMS, B.Sc.

THE short wave listener has no easy task when he attempts to assess the effects of any changes he makes to his aerial system, whether these be adjustments to an existing aerial or the complete replacement of one system by another. The main factor causing the difficulty is the rapid fluctuations in propagation conditions which occur on the HF bands, so that any comparison involving a separation in time between observations is unreliable. On occasion, when fading of signals is very rapid even a gap of a second or less may make the comparison void.

During the past few months the writer has replaced his previous aerial, a long wire of random length in the attic of his bungalow, with a W8JK-type array (also in the attic) for reception in the 21 MHz band, and carried out numerous measurements and adjustments to peak its performance. This article describes these activities and the methods employed to assess improvements, if any, at various stages of the exercise.

For some weeks before the change was made records had been kept of the signal strengths of ZS6CR who was running a regular schedule with a number of stations in the writer's locality. Also noted were the reports given to the South African by the various G's and a clear impression obtained of the difference in performance of the attic long wire and the variety of beams in use elsewhere. It should be mentioned that a long wire outdoors at about the same height as the attic aerial produced no noticeable improvement. The aim, let it be stated at this point, was not so much to make an S-meter reading of '7' into a 'nine', but rather to raise a weak (in the noise) signal up out of the noise so that it would be R5 instead of R2. A pre-amplifier could do the former easily, but not the latter. The aerial noise (thermal agitation, cosmic etc.) was audible on the receiver, and peaked up when the ATU was adjusted, so that a pre-amplifier would have amplified this as well as the desired signal and also added some noise of its own.

The W8JK is a fixed array which was popular back in the 1930's. It consists of two parallel half-wave elements in a horizontal plane, connected 180° out of phase, and usually spaced an eighth to ¼-wavelength; it is bi-directional, maximum gain being along a line joining the centres of the two elements. The problem with a W8JK has always been connecting it to the receiver, or transmitter, without serious mismatching. The spacing for greatest gain is ¼-wavelength, but the radiation resistance at the centre of each element is then, according to the aerial manuals, only 8 ohms. At ¼-wave spacing the resistance is around 30 ohms. The stated gains are 4½dB at ¼-wave, and 3dB at ½-wave spacing.

In the writer's attic anything much greater than ¼-wave spacing (about 5' 9" at 21 MHz) was impossible and it was obvious from the start that the sloping roof etc., would make it necessary to bend the ends of the elements; if this has to be done the arrangement should be symmetrical otherwise the electrical centre of the element may not coincide with the physical centre.

It was decided to connect the elements 180° out of phase by using quarter wavelengths (usually known as quarter-wave transformers) of 75 ohm flat twin lead as should in Fig. 1.

The formula relating the input and output impedances with the characteristic impedance (Z_0) of a ¼-wave transformer is

$$Z_0 = \sqrt{Z_{in} \cdot Z_{out}}$$

so if $Z_0 = 75$ ohms and $Z_{in} = 8$ ohms, then $Z_{out} = 700$ ohms approx. Thus, at the junction (AB) of the transformers where they are in parallel we have $Z = 350$ ohms.

The length of the half-wave elements is given by the formula $468/f$ feet, which comes to 22ft. for the centre of the 21 MHz band, while the length of the quarter-wave transformers is given by $246V/f$, where V is the velocity factor, which results from the lower rate of travel of electromagnetic fields through a material dielectric than in free space; for solid polythene this is given in the tables at 0.71 for 75 ohm flat lead. Thus, for 21.2 MHz the length of the transformer works out at 99 inches.

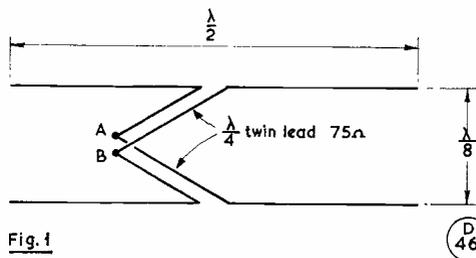


Fig. 1

The problem now was to convey the signal from AB, where the impedance is 350 ohms balanced to the receiver input which is "50 ohms nominal" unbalanced. A 4-to-1 Balun seemed to be the obvious answer here, producing 87.5 ohms unbalanced, and an ATU would complete the task.

Small Baluns are on the market for the purpose of connecting coaxial cables to the balanced input of some FM broadcast receivers, but it is unlikely that these will be effective at 21 MHz, so a coaxial type was constructed. This is shown in Fig. 2. The ¼-wave length of cable ($492V/f$ feet) can be formed into a coil: the inner of this cable is connected at one end to A and the other to B. The braids at the two ends of the cable are soldered together and also to the braid of the 75-ohm onward transmission line; the inner of this line is connected to A. At the input of the Balun the ¼-wave cable and the onward transmission line are in series across AB and therefore each sees 175 ohms. A ¼-wave cable produces the same impedance at output as at input, so at the output end of the Balun we have again two impedances of 175 ohms but this time they are in parallel between A and the braid, giving 87.5 ohms. Moreover, whereas at the input to the Balun the RF currents at A and B were 180° out of phase, the ¼-wave delay imposed on that at B by its journey *via* the cable puts it in phase when it reaches A.

The velocity factor for 75-ohm coax with solid polythene dielectric is given as 0.66, which makes a half-wavelength at 21.2 MHz to be 186 inches.

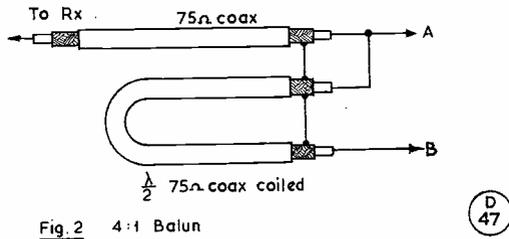


Fig. 2 4:1 Balun

Fig. 3 therefore shows the proposed layout of the system. The initial installation had the two $\frac{1}{2}$ -wave elements running *E-W* for maximum gain *N-S*. This was about 25° off Pretoria, where our test signal source was located, but the structure of the attic prevented any closer approach to the correct direction. No 75-ohm twin lead was readily available and to avoid a delay in starting on the project it was decided to use flat twin lighting cable; on short lengths the loss was not likely to be increased significantly and it was hoped that differences in characteristic impedance and velocity factor would be slight.

Initial tests were encouraging and a second array at right-angles to the first was set up; a co-axial switch was inserted just ahead of the ATU so that quick changes were possible. The directional properties showed up readily and there were indications that the ZS6 signals were improved in readability. A disturbing feature, however, was that the two arrays were not tuning up at the same settings on the ATU and a general impression was formed that the *E-W* reception was not as good as *N-S*.

Possible causes were considered—the *E-W* array had one of its elements running over the top of a water tank—the wire used for the elements was not the same (7/22 with only a thin covering for the *N-S*, 28/30 with a thick plastic covering for the *E-W*)—the coaxial cable used was from odd lengths, some of it on hand since 1950—there might have been a mistake in the measurements—the electricity conduits in the attic and the metal gutters around the bungalow might be exerting some influence, etc. It was decided that for a thorough check a resonance indicating device was required and accordingly the Heathkit solid state dip-meter (HD-1250) was constructed and also the antennascopes, described in *SHORT WAVE MAGAZINE*, September 1976, to use in conjunction with it for impedance measurements. The $50\mu\text{A}$ range on a VOM was used as the meter in the antennascopes.

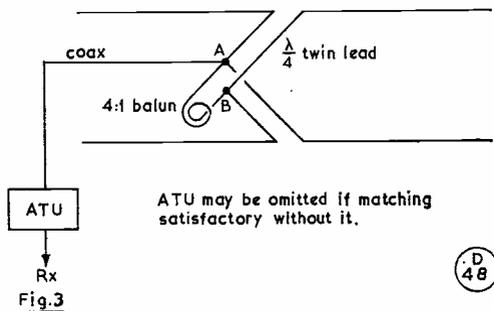


Fig. 3

The electrical lengths of the $\frac{1}{4}$ -wave transformers, the $\frac{1}{2}$ -wave cable in the Balun and the $\frac{1}{2}$ -wave elements were all checked. The correct length for a $\frac{1}{4}$ -wave of lighting lead was found to be 86 inches at 21.2 MHz, giving a velocity factor of 0.6; this would not affect the phasing as that it determined by the reverse connections of the transformers to their respective elements as shown in Fig. 1, but it would produce a different impedance at AB, including a reactive component. That, however, would ultimately be taken care of by the ATU and so it was considered unlikely that this error would have had any great effect on performance, but it was nevertheless corrected; it was also found, using the antennascopes, and further checking with a noise bridge (*SHORT WAVE MAGAZINE*, August 1975), that the characteristic impedance of the twin lighting lead was somewhat over 100 ohms.

A $\frac{1}{2}$ -wave length of the 75-ohm coaxial cable used in the Balun was found to be rather shorter than that calculated—about 180 inches.

The most serious errors were found in the $\frac{1}{2}$ -wave elements of the *E-W* array and these almost certainly accounted for the discrepancies between the performances of the two arrays: both elements were resonating below 20 MHz. It was at first thought that the dielectric constant of the thick plastic covering might be responsible as the *N-S* array was only slightly off resonance with the same length of wire, but further tests with the same elements out-of-doors showed that their resonant frequency was not greatly in error. It seemed therefore that the aberrations were due to the proximity of the various structures in the attic and a new set of elements were cut from 16 s.w.g. enamelled copper wire and arranged at a minimum distance of 4 inches from beams, rafters, chimney stacks etc., throughout their length. The direction was also modified so that they ran straight along the two arms of the L-shaped attic and not slightly askew as before. This meant that they were both well off the "line of fire" to ZS6. It was found difficult to get adequate coupling between the elements and the dip-meter without adding a two-turn coil at the centre of the element; this in itself would produce an error of unknown size. To overcome this trouble a twin lead was cut to a $\frac{1}{2}$ -wavelength at 21.2 MHz and connected to the centre of the element being checked, the dip-meter being coupled to the far end of the lead: this made the task easy.

The dip-meter and the coil which coupled it to the lead were both fixed to a piece of board to maintain a constant degree of coupling, and the $\frac{1}{2}$ -wave included the coil; dipole centre T-pieces (*Home Radio* Cat. No. AA35) were used at the centres of the elements and all feeders, and the $\frac{1}{2}$ -wave test lead fitted with soldering tags for easy connection to the screw terminals on the T-piece. The tags were in position on all the leads when quarter or $\frac{1}{2}$ -wavelengths were measured. Other devices can of course be used for the centres of the elements, such as Belling-Lee twin feeder plugs and sockets (L733/P and /J). It should be noted that in view of the low radiation resistance of the elements it is essential that all connections at their centres be low resistance.

At all important stages in the adjustment the frequency of the dip-meter was checked with the receiver to ensure it was in the band. When connected to an aerial element as described above, quite a strong signal

was radiated in the attic, sufficient in fact to put the S-meter needle on the receiver on to the peg; heavy loading of the receiver input will give rise to spurious responses and care must be taken in these circumstances to ensure that the signal heard is the genuine one.

It is, perhaps, worth noting that if the element is resonant a little too low in frequency and there is a fear of cutting off too much, bending the last inch or so of the aerial back along itself will raise the frequency of resonance, as also will zigzagging at the ends of the elements, but this should be done equally at both ends.

In the course of making the alterations it was decided to make the length of cable from the Balun output to the ATU (via the coaxial switch) an exact quarter-wave to facilitate impedance measurements (any multiple of $\frac{1}{4}$ -wave would be satisfactory). Using the Cambridge Noise Bridge the impedance at this point was measured at around 50 ohms. Calculating back through the various quarter and $\frac{1}{2}$ -wave sections, this gives 14 ohms for the resistance at the centre of the elements. It is interesting to note that had 75-ohm twin lead been used for the $\frac{1}{2}$ -wave transformers then the impedance at AB would have been 200 ohms and a Balun made of 50 coax would have been ideal.

Initial tests with the arrays after their overhaul showed that the ATU had to be adjusted to minimum inductance and capacity for best results. Using the dip-meter at a suitable distance as a signal source, the S-meter reading was checked with and without the ATU and found to be the same in both cases, so the ATU was removed.

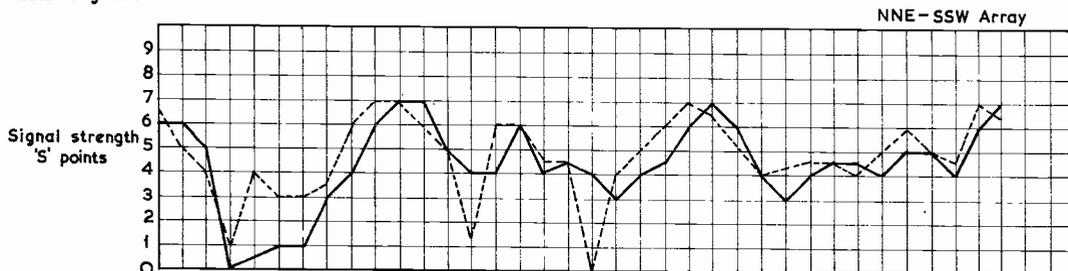
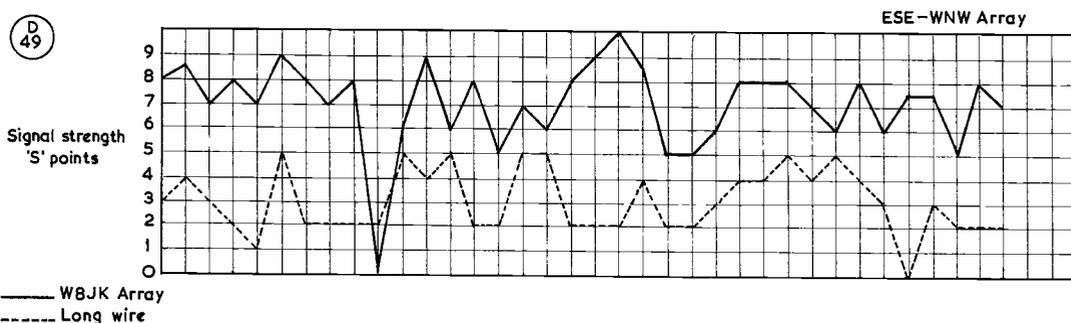
One of the first impressions gained in the initial session of listening on the new set-up was the unusually large number of signals pushing the S-meter needle beyond the '9' mark. Past experience had shown that sudden changes in conditions occur on this band of frequencies and it could well be that the sunspot number had taken a long-awaited upsurge. The ZS6CR schedule was un-

helpful: not only was his part of South Africa now well off the axes of both arrays, but also his signals persisted in being around the S6 to 7 mark, and what was required was a low-level signal to check readability.

The SB-303 receiver has three switchable aerial input sockets, two of these being intended to accept the outputs of VHF converters, but with the exception of a series filter at IF across the normal HF input, all three sockets have the same input characteristics. The W8JK arrays, including their own coaxial switch were connected to the HF socket, and it was decided to connect a vertical aerial in the loft to Socket 2 via its own ATU, and a long wire through another ATU to the remaining socket; the long wire was set up to be as far from the arrays as possible and about half of it was outdoors at the same height of about 15 feet. No particular attention was given to the provision of ground wires, but the receiver is earthed via the third wire of the electricity supply and the surrounding gardens at the time of the tests were very wet.

Using a VOM connected across the output of the SB-303, the dip-meter as a steady signal source and the RF attenuator control to vary the signal strength, S-meter readings were taken with AGC on, and then VOM decibel readings on the same signal but with AGC off. In this way a rough relationship was established between the S-units and decibels. S9 came to 45dB above the threshold of audibility and it was therefore decided to make one "amended S-unit" equal to 5dB and it is to these amended units that reference is made below.

Attention has already been drawn to the difficulties caused by fading of signals and it was necessary to be on guard against being misled by momentary peaking of signals, especially when comparing horizontal and vertical aerials, as there is little synchronisation of fading on these two components of polarisation. From the moment of switching on there was no doubt of the general superior performance of the two beams. In the directions

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of maximum gain the signals on the beams were often three S-units—sometimes more—better than on either of the other aeriels, and even along the bisectors of the beam birections, i.e. 45° off, the gain was at least one S-unit. It must, of course, be borne in mind that the long-wire and the vertical have their radiation patterns (or should one call it reception pattern?); in free space the latter should have a circular pattern, but there are firm indications that it is not so in the writer's attic. Thus the apparent good performance of one aerial in a particular direction may in fact be due to the bad performance of the comparison aerial in that direction; but in no direction have the beams been out-performed by either of the others except momentarily during severe fading conditions. The poorest aerial has been the vertical, largely due to its liability to pick up noise, especially from colour TV sets. Such interference can put the S-meter up to S7 when it is entirely inaudible on the W8JK's and only about S3 on the long-wire which has a short vertical section.

Examples of the performance on weak signals, for which the whole project was undertaken, are WIHWL SSB RS 52 on beam, VE1AUQ CW RST529 on beam, but both stations completely inaudible on either long-wire or vertical and ZS6BYL SSB RS54 on beam, RS 32 on long-wire, RS 11 on vertical (and ZS6 is 40° off the beam's direction). Other comparisons of reception on the W8JK's and the long-wire are given in the accompanying table.

It is not often that intruders into an amateur band are welcome, but a rather rough continuous hiss which often appears at about 21.3 MHz provided a useful test source. With the array switch set to the *ESE-WNW* W8JK, the receiver input was switched at about 2-second intervals to-and-fro between the array and the long-wire over a period of 2 or 3 minutes and the S-meter reading at each switching recorded. The results are shown in the graph. A similar test between the other array and the long wire was carried out, but it should be mentioned that due to the inopportune appearance of some local interference there was a delay of 30 minutes before this second test could be carried out and the two graphs for the long-wire suggest there was a slight improvement in conditions during that period. The average reading for the first W8JK was S7 against S4 for the long-wire, and for the second W8JK S4 against S5.5. Readers may make their own assessment of the bearing of the intruder!

Summing up, the two arrays are a marked improvement over the long-wire, but there appears to be a falling off of 5 to 10 decibels between the directions of maximum gain and 45° off those directions. This still gives signals slightly stronger than with the long-wire, but whereas in the optimum directions and for some 30° to 35° on either side the attic arrays offer a serious challenge to many a low-level outdoor Yagi, this may not be so over the remaining sectors.

Unfortunately in the writer's case the geography of the attic results in three of the four best directions lying down the middle of the South Atlantic, across the spaces of the Indian Ocean and over Northern Siberia! The remaining lobe embraces U.S.A. and Canada which is not exactly the most likely place to find rare call-signs. Perhaps someone else may have better luck.

NOTES ON THE USE OF METERS

1. Always use the loosest possible coupling to a dip-meter to avoid frequency pulling, and if a precise reading is required check the frequency by tuning in the dip-meter signal on a calibrated receiver.
2. To find the velocity factor (V.F.) of a cable, connect at one end of it a one-turn coil just large enough for coupling to the dip-meter coil; leave the other end open circuit; couple to the meter and tune for a dip. At the frequency indicated on the meter scale the cable is $\frac{1}{4}$ -wave long. The V.F. is likely to be between 0.6 and 0.85 so an idea of the frequency range in which to search for the dip can be obtained from the formula

$$\frac{1}{4}\text{-wave (ft)} = \frac{246V}{f}$$

Once the exact frequency has been obtained on the dip-meter the same formula can be used to obtain the exact value of the V.F. and further use of the formula will enable $\frac{1}{4}$ -wave lengths of cable to be cut for any desired frequency, and these can, of course, be checked by the dip-meter.

To measure the frequency for which a length of cable is a $\frac{1}{2}$ -wave long, the far end must be short circuited.

3. To use the antenoscope to measure the characteristic impedance of a cable, connect a short length of the cable (8 to 10 feet) to it. At the other end of the cable connect a resistor of known value in the 40 to 70 ohm range. Set dip-meter or other source of RF drive to a frequency near to that for which the cable is a $\frac{1}{4}$ -wave. Adjust the antenoscope control and the dip-meter frequency control alternately for minimum reading on antenoscope meter until zero is obtained. The length of cable is then acting as a $\frac{1}{4}$ -wave transformer and with Z_{out} given by the antenoscope reading and Z_{in} the 40 to 60 ohm resistor, Z_o can be calculated. If the value of Z_o is likely to be higher than, say, 150 ohms, it may be convenient to use a somewhat higher value resistor at the cable end.

The same principle can be used with a noise bridge.

STATION	DEGREES OFF ARRAY AXIS	ARRAY S	LONG-WIRE S
4Z4UH	0	7	3
ZC4IO	0	6	3
D4CBC	5	8	5
EL8F	5	8	3
VP8PL	5	5	2
WB4TLU	5	8	4
A9XBD	15	9+5dB	8
SZ4LW	20	6	3
KC4AN	20	4	2
KZ5UH	30	7	4
PJ3IDP	35	5	2
VU2DK	35	9	7
9M2DQ	40	8	7
ZS6FD	45	5	4

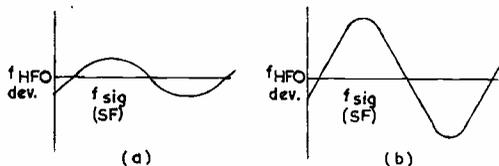
The formula for resonance in a tuned circuit is:—

$$f_o = \frac{1}{2\pi\sqrt{LC}}$$

It will be seen that f_o varies as the square root of a change of either L or C (inductance or capacity); but we are only concerned with changing C. To tune from 2 to 4 MHz we need to change C by a ratio of 4:1; C will have a minimum capacitance made up of trimmer capacitance plus circuit strays. Suppose we say this minimum is 50 pF: C must then be able to change to 200 pF, so the variable section of the ganged capacitors will have a maximum capacitance of 150 pF (assuming that its own minimum capacitance is zero, which of course it is not). If we were to manufacture the HFO section to change by a ratio of only 1.8² so that tracking is maintained we should be in trouble on the other wavebands. If the next is 4 to 8 MHz, the HFO must tune from 4.5 to 8.5 MHz, which is a ratio of 1.89:1, as compared with the previous waveband 1.8:1. We must therefore be able to switch in our tracking correction with the wave-change switch.

Given that we cannot alter the variable capacitor mechanically, there are two ways in which we can vary the ratio of the capacitance swing:—

- (a) We can place a fixed capacitor in series with it. This will slightly reduce its minimum capacity, which is low anyway, but will reduce the maximum capacity by a much greater degree since the fixed capacity will be more comparable to the variable capacity in value and thus have greater effect on the total capacity in circuit.



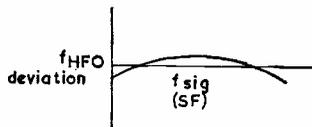
(a) Shows 3 point tracking when IF is low compared with SF
 (b) Shows 3 point tracking when IF approaches SF min

Fig. 5

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- (b) We can increase the minimum capacity across the circuit by tightening up the trimmer, and the minimum to maximum circuit capacity ratio will then be reduced because the minimum will be a greater proportion of the total capacity.

Both methods have the disadvantage that they modify the rate of change more at one end than at the other, but since they do it at different ends of the scale, a combination of both methods provides a workable compromise. Thus, an HFO tuned circuit normally includes higher minimum capacitance plus a fixed capacitor limiting maximum capacitance. This method produces what is known as "three point tracking," which means that signal circuits and HFO can be com-



2 point tracking when HFO capacitance change ratio is very little different from RF capacitance

Fig. 6

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pletely accurately tuned in relation to each other at three spot frequencies in the tuning range. The deviation from total accuracy between these points depends on the relationship between IF and signal frequencies; the higher the IF, the greater the disparity between the capacitance change required for signal and HFO tuning in any particular waveband, and therefore the greater the deviation from ideal tracking between the cross-over points, see Fig. 5. The amount of deviation from accurate tuning in practice determines the selectivity that can be used in the RF signal stages. These cannot be made so selective that they are attenuating the signals at the maximum tracking deviation points; this problem seldom arises in single superhets tuning HF bands, but it can on MF sets, and on double superhets on the HF bands. On single superhets covering HF bands the higher wavebands commonly use no series tracking capacitance as the IF becomes low in relation to the SF, and then two point tracking results, see Fig. 6.

It will be noted from Figs. 5 and 6 that the tracking error is split either side of ideal tracking by arranging for the upper and lower cross-over points to fall a little way inside the band limits. This is particularly important in the case of two point tracking; if the cross-over points were set at the band edges all the error would be on one side of the ideal straight line, and maximum deviation from ideal would thus be doubled.

It is normal practice for the HFO always to operate on the frequency above SF rather than below; if this were not the case all the SF tuned circuits would need to be tracked to the HFO and there would be several circuits instead of one to track. Reversing the HFO frequency relative to SF reverses the sidebands of the received signal, and this is important in the cases of SSB and FSK reception. If the HFO is above SF and the modulation causes the SF to decrease frequency, then the difference between HFO and SF² (which is the IF frequency) increases. If the HFO is below SF and the modulation causes SF to decrease frequency, then the difference between HFO and SF decreases. Image signals therefore always have sidebands reversed from normal signals. Amateurs transmitting SSB signals do not need upper and lower sideband filters to change from one mode to another; all they need is a facility to switch one of the various HFO's in the frequency conversion chain following the sideband filter to the opposite side of the filter, so reversing the sideband *en route*.

to be continued

A SIMPLE TONE-MODULATOR FOR A GDO

E. CHICKEN, B.Sc., M.Sc., C.Eng., F.I.E.R.E., M.I.E.R.E., G3BIK

THE grid or transistor dip-oscillator is an invaluable aid both to the radio experimenter and professional engineer, in that it can be used:—

- (a) to determine the resonant frequency of an L.C. tuned circuit,
- (b) to indicate the presence and approximate frequency of radiated radio-frequency at its fundamental and/or harmonics (useful when checking transmitter output or multiplier stages in transmitter or receiver oscillator circuits),
- (c) as a modulation monitor for radiated RF,
- (d) as a signal generator for the tuning and adjustment of receivers or converters.

In the latter role, the dip-oscillator is particularly helpful, for example, when modifying ex-service radio equipment, where the presence of a strong signal at the required frequency greatly simplifies the peaking of RF amplifier, mixer, and crystal oscillator circuits. However, to be really effective for receiver work, the dip-oscillator should be able to radiate a tone-modulated signal, yet not many of the commercially available oscillators have such a facility.

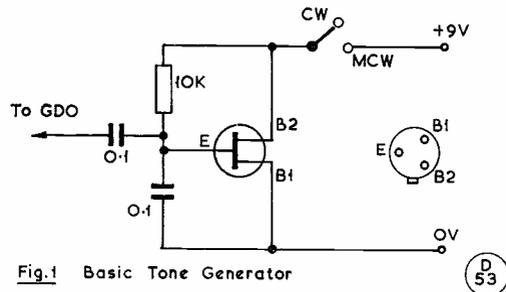


Fig. 1 Basic Tone Generator

The simple tone generator described here can effectively amplitude-modulate most dip-oscillators by superimposing an audio tone of approximately 1 kHz onto the battery supply line; in particular, the diagrams show how it can very conveniently be mounted and wired into the well known "Tradiper" commercially built dip-oscillator. In that example, the modulating tone is coupled *via* a capacitor onto the centre tag of the "sensitivity" control, which is a potentiometer by which the battery supply voltage to the oscillator can be varied.

For modulation purposes, that potentiometer acts also as a resistance across which the modulating voltage is developed, although sufficient depth of modulation may be obtained by coupling the output from the tone-generator, *via* its isolating capacitor, to the battery supply rail of the dip-oscillator. If the dip-oscillator does not have a sensitivity control in its supply line, the addition of a low value resistor (say 1 kilohm) between the battery and the supply rail would enhance the depth of modulation, *see* fig. 2. Whilst the tone generator is primarily intended to amplitude modulate a dip-oscillator, it does also impart some degree of frequency modulation, since

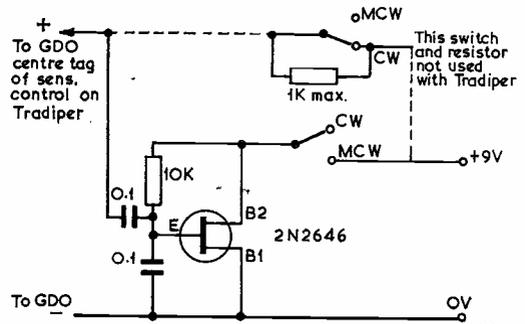


Fig. 2 Tone Modulator

the dipper is a free running oscillator the frequency of which is inherently influenced by variations in supply voltage.

This renders the modulated output even more useful, in that it can also be used with F.M. receivers.

Tone Generator

This is a unijunction transistor simply connected to operate as a relaxation type of resistance/capacitance oscillator, to produce a saw-tooth waveform at an audio frequency determined by the values of one capacitor and one resistor.

$$\text{Frequency approx.} = \frac{1}{CR} = \frac{1}{0.1 \times 10^{-6} \times 10 \times 10^3} = 1 \text{ kHz}$$

The basic oscillator consists of three components only i.e. one transistor, one capacitor, and one resistor.

Additional components are one output coupling capacitor and one miniature toggle switch. The switch allows the modulator to be switched off when not required. A double-pole type is specified, although only one of the poles is used for the "Tradiper" modification. The other may be required to switch a modulating resistor in and out of circuit for other types of dip-oscillator; the switch positions can be identified on the panel as CW and MCW, meaning continuous-wave and modulated continuous-wave respectively.

Whether or not the additional modulating resistor is required is most easily determined by listening to the

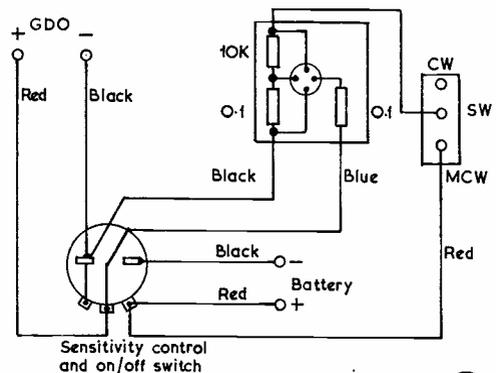


Fig. 3 Modulator added to Tradiper

modulated signal on a receiver. If the level of the audio tone is adequate without the resistor, omit both it and the second pole of the switch.

All of the components can be accommodated on a one-inch square piece of stripboard, to be conveniently mounted within the dip-oscillator housing. In the "Tradiper," it was mounted on the two terminals of the meter, care being taken to remove the copper strip from the stripboard in the vicinity of the mounting holes to avoid accidental electrical contact with the terminals. The toggle switch was located in a single hole on the

panel above the meter.

Results

The project was completed in less than one hour, at negligible cost; in transforming an elementary dip-oscillator into a modulated signal generator, this simple modulator has proved to be so useful in practice, particularly for aerial adjustments and on receiver modification and alignment, that one wonders how one managed without it.

Note that all components used are obtainable from *R.S. Components Ltd.*

A PHASE LOCK LOOP MORSE DECODER

AN EXPERIMENTAL CIRCUIT FOR MORSE RECEPTION

G. C. DOBBS, G3RJV

OVER the years there have been many circuits for aiding Morse reception, ranging from the simplicity of the "T5er" to complete processing units. This circuit is offered as a possible new line for investigation. From the start it must be said that the circuit will not be everyone's cup of tea, but within its limitations, it proves to be a useful little unit for a certain type of CW reception; it may require a little tailoring to suit individual needs, and does rely on the cheap availability of a particular integrated circuit. Perhaps this can be best explained with a simple "potted-history" leading up to my building of this circuit.

I had been attempting to build a FM IF strip using the LM565 phase lock loop IC for demodulation (perhaps more of that some other time). Much to my surprise, I found the cheapest source for this IC was a pack of four phase lock loop IC's sold by Tandy Stores for just over a pound. The 565 at under the usual price and three more IC's thrown in! My other three IC's included a LM567, which is described as a phase lock loop tone decoder; this IC, with its "bedfellows" the LM566, is frequently used for ultrasonic remote switching applications. I believe that the 566 is beloved of "Phone Phreaks" who use it to send whistles down telephone lines in the U.S.A. to gain free access!

The data on the 567 looked very interesting: it is a general purpose tone decoder which is designed to provide a saturated transistor switch to ground when an input signal is present within the passband. The makers claim a highly stable centre frequency, adjustable from 0.01 Hz to 500 kHz, high rejection of out-of-bandpass signals and noise, immunity to false signals and an adjustable bandwidth from 0-14%. This seemed to suggest possibilities for CW reception, so an experimental circuit was built up.

It may be useful, at this stage to briefly describe the basic action of a phase lock loop. Fig. 1 shows a very simple block diagram of the technique. It is really a form of automatic compensating feedback; the input signal and the output from a Voltage Controlled

Oscillator (VCO) are fed into a phase detector. This produces an output voltage dependent upon the difference between the input signal and the VCO. In most PLL's this voltage is used to change the frequency of the VCO until it locks onto the input signal. In the 567, the frequency of the VCO is controlled by a few external components and the VCO drives a phase detector which controls the centre frequency of the decoder. External components also control the bandwidth and the output delay.

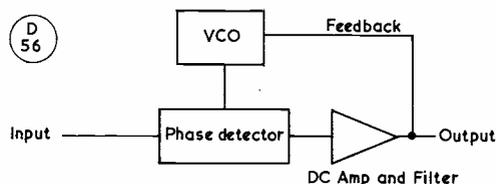


Fig. 1 basic Phase Lock Loop

Fig. 2 shows the final circuit, but just for a moment consider the section marked *PLL Tone Decoder*. This shows the basic circuit arrangement set to decode signals in the range approx. 500 to 1,000 Hz. The audio input is fed into pin 3. The R/C combination R5, C5, VR2, controls the bandpass frequency within the required range. When a signal is present at the required frequency, pin 8 goes to ground through a saturated transistor stage. In this circuit it has been arranged to switch on the LED. C6 determines the bandwidth through the loop filter. The 567 can detect a signal as low as 20mV within 14% of the set frequency, but C6 has to be a compromise between sensitivity and bandwidth; C7 controls the noise immunity through the output filter. Once again this is a compromise choice since a low value for C7 may cause unwanted signals to trigger the switch, and a high value has a charge time which slows down the circuit response. Already we are meeting restrictions for its application in CW work, but more of this later.

When this portion of the circuit is set up, it is possible to test it with the audio output from a receiver. Connect a couple of leads from the speaker between the input of C4 and ground. It should now be possible to get CW signals, whose audio frequency is within the bandpass to switch the LED on and off. VR2 controls the frequency of the signals which will light the LED. This is quite an amusing little circuit in itself! The triggering of the LED can be controlled by tuning signals to the correct fre-

quency, or by adjusting the control VR2 to match the CW tone. The LED should be seen to follow the keying of the signal.

It is now that the compromise values of C6 and C7 will be seen to limit the working of the circuit; with the values shown the selectivity of the decoder is in the order of 200 Hz or so, according to the manufacturers specifications. With C7 at 2.2 μ F the rejection characteristics are good, but the response time limits the circuit to signals with a keying speed of no more than about 20 w.p.m. This obviously limits the usefulness of the circuit, but C7 is open to individual experimentation. The bandwidth is such, that even on a crowded band, it should be possible to get the LED to respond to only one signal.

Amusing though it is, a light switching on and off in time to a CW signal is not what we are really hoping to achieve; the switching must be used to trigger an audio oscillator, so that the decoded CW can be heard. This is the function of the section of the circuit marked *Audio Oscillator* in Fig. 2.

The audio oscillator is required to give an output tone when the output on pin 8 of the 567 IC goes down to ground. The circuit used here is perhaps one of the simplest possible, based on a 7400 IC. IC 3a is used to gate a simple audio oscillator, IC 3b and IC 3c. The spare gate, IC 3d, is used to provide a drive for a small low impedance loudspeaker. When pin 12 of IC 3a goes to ground a tone of some 800 Hz should be heard in the speaker. The 6-volt supply used for the 7400 and the 567 is on the high side for a TTL IC so a diode D2 is put in series with the Vcc pin 14, to give a small voltage drop.

As the circuit now stands, a CW signal in the pass-band of the tone decoder should give an audio output which should follow the keying, within the limitations of the 567 response time; it is quite possible to use the circuit in the form described. The main receiver loudspeaker may be replaced with a resistor load, Rx and the output taken to C4 and ground. Although the LED is not really required for the operation of the circuit, it is better left in as a tuning guide to indicate that the decoder has locked onto the signal. I used the circuit in this form for some weeks, but found that weak signals or QSB

could cause the decoder to miss bits of information in the signal. The 567 appeared to work best with a reasonably constant level of signal, so the next thought was to drive it with a constant level audio amplifier.

This is shown in the portion of Fig. 2 marked *Constant Level Amplifier*. The circuit provides a form of audio AGC. This circuit provides an almost constant signal output for input changes in the range of about 30 dB. The circuit uses a 741 op. amp. and utilises variable feedback from the output at pin 6 to the inverting input at pin 2. A rectified sample of the output produces a proportional amount of negative feedback through TR1.

Audio AGC is worth thinking about as an idea in its own right. A simple form like this used at the output of a receiver can help to stop those earsplitting experiences often encountered on a crowded band. It can certainly help to save the eardrums when doing routine operating on 40m. and 80m. Naturally it is not much good for copying weak DX stations, since the loudest available signal will set the level.

Now the completed circuit has been outlined, a word about construction. I built my prototype onto a piece of 0.1" perforated board using holders for all the IC's. It is worth noting that three power sources are required for the full circuit. A single 6-volt source will supply both the 567 and 7400, but a dual 9-volt source is required for the 741 op. amp. This is the sort of circuit that is at its best when it can be switched in and out of operation to suit the conditions of the moment. I connected a single pole switch between C1 and C4, to short out the constant volume amplifier when not required; I also connected a similar shorting switch between C4 and the loudspeaker. This was a double-pole change over switch, so that the output from C4 could either go to the 567 IC or directly across the loudspeaker. With these switches, it is possible to use the whole circuit, the tone decoder and audio oscillator alone, the audio AGC of the constant volume amplifier alone, or just the loudspeaker.

What about results? Well—with a flexible in-out switching arrangement, the unit has been very useful. Its limitations with very weak signals and fast keyed

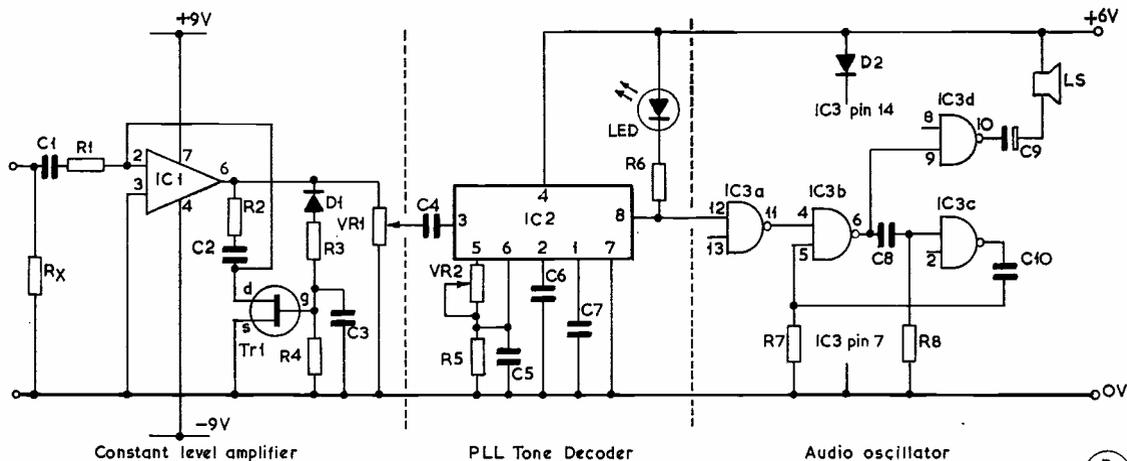


Fig.2 PHASE LOCK LOOP MORSE DECODER

signals obviously impose limitations, but the unit is very useful for normal CW working on the "messy" bands. For average CW QSO's on 80m. and 40m. it aids pleasant listening. If you want a decent CW QSO on these bands without adjacent channel rubbish, then this is a circuit worth considering. It is a real joy to listen to a clear CW note without any background sounds at all; because the note is produced by the 567 switching the tone oscillator, not even receiver background noise is present. Its a bit uncanny at first!

The cost of the unit is reasonable if use is made of the Tandy phase lock loop pack. The first practical step in the construction is therefore to find one of these assorted packs which contains a 567. The packs are encased in a plastic bubble, so it is quite simple to check through a few in the shop by shaking the pack and reading the IC markings to find a 567; the manager of my local branch even helped me do this, although I was looking for a 565 at the time. A pack will only contain one 567, but you will have the added advantage of three other PLL IC's to play with for less than the usual cost of one. If the pack also contains a 565, you have a good little

FM PLL IC as well. The 567 is 8-pin DIL and the 565 is 16-pin DIL.

It may be that this little article will prompt someone better versed in PLL techniques to produce a more sophisticated circuit with a faster response time.

TABLE OF VALUES

Phase Lock Loop Morse Decoder

C1 = 1 μ F Tant	R5 = 10K
C2 = 1 μ F Tant	R6 = 510 ohms
C3 = 1 μ F Tant	R7 = 22K
C4 = 0.1 μ F	R8 = 22K
C5 = 0.1 μ F	VR1 = 10K Lin.
C6 = 1 μ F Tant	VR2 = 5K Lin.
C7 = 2.2 μ F Tant	D1 = 1N914
C8 = 0.1 μ F	D2 = 1N914
C9 = 100 μ F 16v. Elect.	LED = General purpose
C10 = 1 μ F Tant	RedLED
Rx = Equal to Receiver output Imp.	TR1 = 2N3819
R1 = 560K	IC1 = 741C
R2 = 330K	IC2 = LM567
R3 = 100K	IC3 = SN7400
R4 = 1M	LS = 8-16 ohms

NEW QTH's

This space is for the publication of the addresses of holders of new call signs, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code. In the case of direct subscribers needing Change of Address, please state for card index adjustment. Address items for this space to: "New QTH Page," *SHORT WAVE MAGAZINE*, 34 HIGH STREET, WELWYN, HERTS., AL6 9EQ.

EI1CD, D. G. Fitzgibbon, 18 Gilford Park, Sandymount, Dublin 4.
 EI9DA, K. Daly, Granarogue, Carrickmacross P.O., Co. Monaghan. (Tel.: 042 61026.) (correction)
 EI0DA, V. Rafter, 6 Whitebeam Avenue, Ballymahon Road, Athlone, Co. Westmeath. (Tel.: 0902 4237.)
 G4FIO, C. U. Fisher, Tudor Cottage, 2-A Bycullah Road, Enfield, Middlesex EN2 8EE.
 G4FJU, B. Follows, 1 Avon Road, Bloxwich, Walsall, West Midlands WS3 1PA.
 G4FKN, L. A. S. Poole, 50 Warren Road, St. Ives, Huntingdon, Camb. PE17 4NW. (Tel.: St. Ives, Camb. 65308.)
 G4FNZ, D. J. Bannister, The Off License, 144 Wolverhampton Street, Darlaston, West Midlands WS10 8TX. (Tel.: 021 526 2571.)
 G4FOD, T. C. Yeomans, 15 Turner Road, Woodfield, Dursley, Glos.
 G4FPA, J. Shorthouse, 159 Marsland Road, Brooklands, Sale, Cheshire M33 3WE. (Tel.: 061-962 2769.)
 G4FPJ R. P. Rawle, MPS (ex-G8JER), 8 Derwent Close, off Shadewood Road, Macclesfield, Cheshire SK11 7XS.
 G4FPM E. G. Keeler, 18 Clyde Road, Worthing, West Sussex BN13 3LG.
 G4FQH, B. Nelmes (ex-G8KWZ), 17 Woodfield Road, Woodfield, Dursley, Glos. GQ11 6HB.
 G4FLK, Dr. J. F. Fraser (ex-G8IAH), 35 Carleton Road, Pontefract, West Yorkshire WF8 3ND.

GW4FQU, Dr. W. Jones (ex-GW8CWP), Rhandirmwyn, Bryn Dymchwl, Llandegai, Bangor, Gwynedd LL57 4LD. (Tel.: Bangor 4594.)
 G4FRG, B. L. Goddard (ex-G8JBR), 2 Greenfield Park, Portishead, Bristol BS20 8NQ. (Tel.: 0272 848140.)
 G4FSN, E. C. M. Walton (ex-G8LXD), 4 Oakfield Close, Horwich, Bolton BL6 6JR. (Tel.: 0204 691536.)
 G4FSW, F. V. Woodward, 18 Tewkesbury Road, Longford, Gloucester GL2 9DT. (Tel.: Glos. 25311.)
 G4FUP, N. Braeman, 9 Millfield, Southwater, Horsham, Sussex RH13 7HU.
 G4FVN, T. V. Wharton (ex-G8IPE), 79 Clavell Road, Liverpool L19 4TS.
 G5BTZ, Jean-Jacques Bernard (F6CWB), 179 Callington Road, Saltash, Cornwall. (pse QSL via F6CWB.)
 G8MCD, B. E. Akhurst, 41 Bedmond Road, Leverstock Green, Hemel Hempstead, Herts.
 G8MDI, Dr. R. J. Nash, 135 Farren Road, Wyken, Coventry CV2 5EH.
 G18MNA, S. J. Sherrard, OBE, Carmen, Cherry Hill, Rostrevor, Co. Down BT34 3BD. (Tel.: Rostrevor 714.)
 GM8MOI, C. G. Stirling, 1 New Edinburgh Road, Uddington, Strathclyde G71 6BT.
 G8MQS, A. Siemienioga, 25 Dover Street, Swindon, Wilts. SN1 3JP.
 G8MUZ, E. G. Cresney, C.Eng.M.I.C.E., F.I.P.H.E., 5 Heronsgate, Frinton-on-Sea, Essex CO13 9AW.

G8MZM, E. Fielding, The Hawthorns, 12 Moorland Avenue, Baglatsle, Rochdale OL11 5XS. (Tel.: Rochdale 40877.)
 G8MZO, C. J. Stagg, 1 Victoria Road, Haywards Heath, Sussex RH16 3LZ. (Tel.: Haywards Heath 52889.)
 G8NAK, R. G. Nilan, 15 Enfield Street, Beeston, Nottingham NG9 1DN. (Tel.: Nottingham 258448.)

CHANGE OF ADDRESS

G2DZ, A. B. G. Hall, Sundial Cottage, Westhorpe Lane, Byfield, Daventry, Northants.
 G3COQ, D. Oswald (ZD8DO), Two Boats Village, Ascension Island, South Atlantic Ocean.
 G3ILO, S. G. Spencer, 49 Rosebery Road, Dursley, Glos.
 G3JAO, G. E. Simonite, 72 Southfield Avenue, Preston, Paignton, S. Devon TQ3 1LQ. (Tel.: 0803 521298.)
 G3PCX, B. J. Dodge (ex-GM3PCX), 34 Downs Road, Penenden Heath, Maidstone, Kent ME14 2JN.
 G3RIR, N. Ackerley, 129 Margards Lane, Verwood, Wimbourne, Dorset.
 G3TFM, R. Scadden, 16 Clopton Court, Clopton Road, Stratford-on-Avon, Warks. CV37 6TP.
 G3UOU, J. W. Dudbridge, 24 Woodlands Green, Upton St. Leonards, Gloucester GL4 8BE.
 G3WMK, Standard Telephones and Cables Amateur Radio Club, c/o G. E. Simonite, 72 Southfield Avenue, Preston, Paignton, S. Devon TQ3 1LQ.
 G3WSA, D. J. S. Allen, Bellever, Carnmarth Cove, Carharrack, Redruth, Cornwall TR16 5SA.
 G3WVY, P. G. Beecroft, 12 Ifield Road, West Green, Crawley, West Sussex. (correction)
 G3WYF, C. W. Heigh, 156 The Stour, The Grange, Daventry, Northants. NN11 4PT. (correction)
 G13ZKT, T. E. Harding, 15 Rutherglen Park, Bangor, Co. Down BT19 1DX.
 G3ZYQ, A. L. Robinson, 112 First Avenue, Bush Hill Park, Enfield, Middlesex EN1 1BP.

VHF BANDS

NORMAN FITCH, G3FPK

VHFCC Awards

FOUR more readers have been elected to the VHF Century Club this month, all for 2m. operation. No. 278 goes to Roy Thomas, G8KKX, from Rushden in Northants. An interesting claim inasmuch as no G cards were listed in the eleven countries represented. Roy reveals he was "Shanghaied" as a National Service radar mechanic, taking the R.A.E. ten years later. After a further fourteen years, the radio bug bit again and he applied for his call. The next step is to take the Morse test. The station comprises a *Trio* TS-700 plus pre-amp, with an 8-ele. X-Y aerial at 20ft. The QTH is a "hole-in-the-ground" 200ft. a.s.l. but hemmed in on three sides by rising ground. Best DX so far the Isle of Capri.

The next three members all belong to the Doncaster College of Technology Amateur Radio Club. Bob Lane, G4AWU, from Bawtry in S. Yorkshire, receives no. 279. His station comprises a *Belcom* Liner-2 for SSB with a *Datong* RF speech processor and AM is achieved with a *Pye* base station using an *Eddystone* 888A with converter for reception. The aerial is a *Jaybeam* 10-ele. Parabeam.

Award no. 280 goes to Kevin McMahon, G8JJR, from Tickhill in S. Yorkshire, who also runs a *Liner-2* on SSB. Kevin runs AM, again using a *Pye* base station, the receiver being an *Eddystone* EC-10. His aerial is another *Jaybeam* product, a 6-ele. Quad. The most recently licensed member of the trio is Ian Harwood from Woodlands, Doncaster, to whom Certificate no. 281 has been issued. Ian has a *Liner-2* but also runs a *Yaesu* FT-101E transceiver with a solid state "Europa" transverter from *Solid State Modules*. His aerial is

Roy Thomas operating his station G8KKX from Rushden, Northants. On the left is the *Trio* TS-700 2m. transceiver; on the right the *Yaesu* FT-101, and remote VFO for when the G4 ticket is obtained.



a 4-ele. Quad.

G8JJR mentions that their club is a very popular one in S. Yorks., with the call G3UER. It is very well supported and many members have obtained their licences by attending its R.A.E. classes. Perhaps the secretary might like to send regular reports to the "Club Secretary" each month.

Iberian Notes

From Roger Thorn, G3CHN (Devon) comes news that, during the prolonged spell of high pressure over the Bay of Biscay in April, Gérard Le Falchier, F1COF (Brest) worked some 80 Spanish 2m. stations via four repeaters in the north and northwest of Spain. The output QRG's are: Vigo 145.500 MHz; Orense 145.575 MHz; Santander on RØ, 145.600 MHz and La Coruña on R2, 145.650 MHz. Gérard says that all the EA's seem to use vertical polarisation for all modes. He mentioned that EA1AM, EA1MZ and EA1QJ are all on SSB, but that EA1CR is QRT.

Sporadic E—Be Prepared

It would be surprising if, by the time this is read, there have not been reports of *E's* in Europe. It is understood that G4CZP (Lancs.) heard a few seconds transmission from afi IW2 station at 1745 on April 9. The nature of this event is such that other modes can be ruled out.

Propagation by *E's* can build up quite quickly and it is certainly very worth while to monitor the 10m. and 4m. bands, listening for short skip Europeans on 10m. and east European broadcast signals on 4m. Band 2 FM broadcast in the 88-108 MHz band is very useful to monitor as are the Spanish TV stations in Band 1. Peak times for

2m. *E's* would appear to be from around 0800 GMT in the mornings and from about 1730 GMT in the early evening. This is the one mode where one can work over incredible distances with one watt from a *handie-talkie*.

Alexandra Palace

For your scribe, the most interesting part of the RSGB's three day exhibition and convention held at the Alexandra Palace in North London was the series of lectures. Unfortunately, it was only possible to attend three sessions due to other commitments. It was a very great pleasure to meet Ed Tilton, W1HDQ, whose "World Above 50 Mc." column in "QST" has been running for decades. He gave a very interesting account of the amateurs' role in pioneering work and studies on the VHF bands and mentioned the cases where the amateurs' ideas and theories often conflicted with those of the experts of the day.

In a second, unscheduled talk on Sunday, Ed outlined the detailed study of the Sun he has commenced. Now that he has retired, he is able to make frequent observations of the Sun both in normal light and, by looking down into the star through a Hydrogen-*Alpha* filter, to correlate what is going on deeper down with what we see happening on the surface. In a brief paragraph here, it is quite impossible to cover the painstaking work W1HDQ is putting into this personal project, something he has always wanted to do.

One fascinating discovery of major interest to VHF addicts is a persistent occurrence of much increased sunspot activity following an eclipse of either the Sun or the Moon, when also the massive planet Jupiter is in

line with the Earth, Moon and Sun and with another massive planet, Saturn, 90° away. Even in "Quiet Sun" conditions, otherwise inexplicable upsurges in sunspot activity seem to occur, quite unrelated to any 27/28 day cycle. The results of this are the coming to life of a "dead" 15m. band and auroral events at VHF.

As with so many phenomena in physics, it is the rate of change of something which is spectacular in its results. Sunspots which remain the same shape and size for several days, suffering only slight changes, seem almost benign, producing little, if any, effect on propagation on Earth. By contrast, if a spot or group of spots should undergo very quick changes, it seems almost certain that this will be accompanied by considerable ionospheric disturbances.

Detailed recording of solar events is something likely not thought about by the majority of readers. Even a cheap telescope projecting the Sun's image onto a white screen will enable anyone to compile an ongoing record of sunspot activity. G8JJR reports using the pinhole camera technique to project the Sun's image—at nil cost.

The above is reported primarily to acknowledge W1HDQ's research but also to encourage others to consider following this path. This is just the real pioneering work an amateur can do at no cost to anyone and which could lead to a whole new understanding of propagation, of ultimate benefit to amateur and professional communicators at large.

Beacon News

GB3UOS has been operational since April 25 on 3456 MHz. Situated 4 kms. northwest of Sheffield, 400m. *a.s.l.* the Tx is one watt, omni-directional into a 10 dB gain slotted waveguide. Reception reports to G8AGN (*QTHR*). From Peter Burden, G3UBX, a request to mention that GB3WRN is now on from the Wrekin in south Shropshire on a QRG of 1296.91 MHz. This one is beaming north with about 2w. *e.r.p.* and all reports would be welcomed—but not QSL-ed! On 2m., the Lannon beacon on 144.905 MHz (Y113d) is now signing FX3THF.

The Alexandra Palace affair afforded an opportunity for your conductor to meet Serge Canivenc,

F8SH, and to discuss in detail, *Project VESNA*. Due to a misunderstanding, it seems that the 50 MHz aerial has been installed on the wrong platform of the water tower. Consequently, the 6m. beacon will not be operational as soon as had been planned, as it will have to be moved and tests carried out to ensure there is no interference with many other services.

The comments in the April column from Henry Souchet, 9H1CD, concerning the proposed 2m. beacon on the island of Malta, have elicited letters from two members of the Malta Amateur Radio League, Walter Gatt, 9H1DU, and Joseph Brincat, 9H1CG. Both state that members of the MARL are fully aware of the beacon proposal. 9H1DU wrote that all Maltese VHF enthusiasts were invited to discuss the idea and 9H1CG suggests that 9H1CD's views are not those of the majority of the VHF fraternity. Well, your scribe is certainly not getting drawn into any purely local arguments. The purpose of coverage of events far away is simply to record and acknowledge the achievements of those seeking to push VHF communication to the limits.

Satellite News

A fourth cell has failed in the battery of *Oscar 6* and the switch-off telemetry count on channel 3A is now 328. Surrey Telecommand is keeping 0.6 off most of the time now. On the DX front, I5TDJ will be operating MIC between 1000 GMT on June 18 and 1600 GMT on the 19th on all available orbits, modes "A" and "B." As Peter's "window" to the U.S.A. is very short, European stations are asked *not* to call on the more westerly passes. From Oman, A4XFW is now on Mode "B" and from Surinam, PZ1AP is on 29.48 MHz downlink. At the end of July/beginning of August, F6BEG plans operation from C31KZ in Andorra. Hopefully Gérard can be persuaded to operate direct for possible DX when the satellites are out of range? Jerry Goldsmith, G4CJG, plans some *-/MM* operation through the satellites on both modes, using crossed dipoles and 100 watts input.

Contests

Results:—From GB2RS News Ser-

vice was learnt that the Fixed section of the 144 MHz March "Open" was won by Vikki Menday, G8HCL with 3412 points from 464 QSO's. Runner up was G3UKC, The University of Kent ARC station, with 2869 point from 356 contacts, whilst Julian Niman, G8GAJ, scored 2684 points from his 328 QSO's. As expected, the Portable section was won by the GW8BHH team with 14649 points from 801 contacts. GW3UCB were second with 12585 points from 841 exchanges and GW3OXD came third with 12004 points from 759 QSO's. In this section, the first five places were taken by Welsh portables. First place in the Fixed section of the March 432 MHz "Open" went to G3VPK with G3XDY runner-up. The Portable half was won by G3UBX with G4BRA second.

Forthcoming attractions:—The 144 MHz Portable affair occurs at publication weekend, 1600-1600 GMT, May 28/29. The weekend June 18/19 is the Microwave event, 3.4-24 GHz (presumably 1600-1600 GMT as last year?) with the second leg of the 10 GHz *Cumulatives* on the 19th from 1100-2000 GMT. This year's VHF NFD is July 2/3 over the usual 1600-1600 GMT period. Again single band 2m. entries will not be accepted. Usual radial ring scoring on 70, 144 and 432 MHz and one point per kilometre on 1.3 GHz.

Twenty-three Centimetres

Glen Ross, G8MWR (Coventry) reports interesting test: with G8AIM on May 1, the latter operating on Cleve Hill, near Cheltenham. 2 watts of FM using a trough aerial produced good signals at G8MWR over the 42 mile path. On the way back, G8AIM/P stopped off at Broadway Hill, 35 miles away and put in an S9-plus-20 dB signal. After that, the rig was used mobile with the aerial on the passenger seat and this signal was copied as G8AIM/M descended into Broadway village. The intriguing point of this is that Glen copied nothing on 145.0 MHz! G8MWR reports the formation of the Coventry Microwave Group whose immediate goal is the 10 GHz, cross band repeater.

Arthur Bréese, GD2HDZ (Laxey) has made it 11 counties thanks to G3BW in Cumbria and John Tye,

G4BYV (Norfolk) reveals he is "... knee deep in brass drilling ..." trying to get going on 13 cm. SSB.

Seventy Centimetres

As if to underline recent poor conditions generally, G4BYV remarks that his 0600 GMT daily sked with G8BAV in Derby has produced the poorest conditions since they began four years ago. John Woodham, G8BKR (Bristol) managed an SSB contact with GD8EXI for a new country and QTH square and says he is always willing to arrange SSB skeds on the band, Wednesday, Thursday and Friday evenings.

On a more exotic note, Keith Naylor, G8FUF (Essex) plans to be indulging in *E-M-E* work with the G4FUF group by the end of the summer. All the gear is ready but mounting the sixteen, 20-ele. *Yagis* at least 10 metres up to clear surrounding obstacles is a bit of a problem! They are using copper tubing construction for the power splitters.

Finally, mention must be made of the 432 MHz Worked All Continents achieved by Peter Blair, G3LTF, a truly remarkable feat made possible by *E-M-E* contacts, of course. Who will do it on two metres from U.K.?

Two Metres

Just as this was being compiled, Bob Lane, G4AWU (S. Yorks.) told your conductor that he heard IØDLP (GB03f) calling "CQ" at 1140 GMT on 144.28 MHz during the IARU contest on May 8. G8CTV also heard this. The event was only of a few seconds duration and was probably *E's*, since a QRB of 1700 kms. would have been unlikely *via* any other mode under the prevailing conditions.

Richard Diamond, G4CVI, and John Regnault, G8FQO, took gear for 4m., 2m. and 70 cm. to Scotland for portable operation from various sites. They were in YP36e near Selkirk for the 2m. CW contest and Richard, using GM4CVI/P, made 54 QSO's. Later, they operated from the rare ZR QTH square on April 26 using GM8FQO/P from a site some 8 miles southwest of Peterhead. London area stations worked included G3JXN, G3OSS, G3POI, G4FCD and G3FPPK, all subject to considerable fading. They were operating from the GM8FFX

site during the fine *aurora* of May 2. In over 70 CW QSO's 14 countries and 28 squares were worked including an OH in LU square, with SP, DM, LA, OZ and SM's. Although no second phase was noted at G3FPPK up to 2300 GMT, there was one in Aberdeen from 2130 to 0230 GMT.

Derrick Dance, GM4CXP (Borders) reports the May 2 event commencing at 1630 lasting about three hours with G, GM, DL, EI, PA and ON worked. The QTF's were mainly between 070 and 090 degrees but the PA/ON stations peaked at 315°. Around 1915 GMT, GB3NEE was auroral peaking to the *southwest*. The second phase produced unworkable Scandinavians from 2150 until the small hours. At 1928

GMT, Derrick had a *tropo.* contact at RST 529 with LA6HL in CSO9g. He was audible for 10 mins. at some 400 miles with a cold east wind, rain and the pressure falling from 1012 mb. The same station was worked on CW the following evening in even worse conditions, his signals *peaking* when a rain shower occurred. On May 1, GM4CXP heard some auroral bursts on Radio Gdansk on 70.31 MHz sort of heralding the 27 day repeat of the April 6/7 event.

During the April 6/7 affair, Derrick worked two new countries and squares, UQ2IV (KQ36f) at 0045 GMT and at 0131, UP2BBC in LP07j. Both QTF's were 050°. Other countries worked included G, GD, LA, SM and the year's first

THREE BAND ANNUAL VHF TABLE

January to December 1977

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3OHC	26	3	48	10	17	4	108
G8HQJ	—	—	56	14	21	8	99
G3FIJ	26	2	44	9	15	2	98
G2AXI	18	2	37	9	20	2	88
G4ECQ	20	2	53	10	—	—	85
GD2HDZ	14	3	30	9	21	6	83
G8GML	—	—	52	8	14	4	78
GM4CXP	13	2	44	13	4	1	77
G4FOR	—	—	57	11	7	2	77
G4FCD	—	—	62	9	3	1	75
G8BKR	—	—	49	10	13	3	75
G3FPPK	—	—	62	13	—	—	75
G4CMV	—	—	62	12	—	—	74
G4DKX	7	1	37	9	13	4	71
G4BYP	—	—	43	9	13	6	71
G8GII	—	—	31	5	28	6	70
G8JHX	—	—	52	11	—	—	63
G8LHT	—	—	51	9	—	—	60
G4DEZ	—	—	49	9	—	—	58
G8JJR	—	—	47	8	—	—	55
G8ITS	—	—	38	6	9	1	54
G8KSS	—	—	42	8	—	—	50
G8HAF	—	—	40	7	—	—	47
G4AEZ	2	1	24	6	12	1	46
G8KXX	—	—	36	6	—	—	42
G4ERX	—	—	26	6	—	—	32
G4FKI	—	—	12	1	4	1	18

German, DK5LA (EO29h), QTF being 090°. In this event, GB3GI, GB3VHF, DLØPR, SK4MPI, LA4VHF beacons, plus some FM stations were heard aurorally. Finally, Derrick mentions another 15 minute *aurora* on April 8 when he only worked LA6HL at 1645 GMT.

In the south of England, the May 2 *aurora* produced about eight countries. G3FPK was alerted by a phone call from G2FKZ's wife at 1630 GMT, just as a meal was served. The event fizzled out at 1937, a most consistent signal throughout being EI6AS in Dublin (WN59c). All the British Isles signals peaked in London around 020° but OZ6OL and OZ1ABE were loudest at 340°.

Conditions during the CW Contest on April 24 were only average with no real DX. However, activity was

G8HHI	—	7	71	78
GJ8AAZ	—	15	55	70
G8HAF	—	—	69	69
G3BW	—	21	47	68
G8JJR	—	—	68	68
G4DEZ	—	—	66	66
G8KLN	—	1	62	63
G4CIK	—	—	62	62
G3KPU	—	—	60	60
G8JHX	—	—	60	60
G8KSP	—	—	60	60
G4AEZ	—	15	44	59
G8KKX	—	—	59	59
GW4FJK	—	—	57	57
G8LHT	—	—	55	55
OZ9IY	—	—	53	53
GD3YEO	—	—	52	52
G8ITS	—	3	44	47
G8JEF	—	—	44	44
G4EYL	—	—	41	41
G8LLG	—	1	38	39
G8JAH	—	1	35	36
G8KSS	—	—	31	31
G4CIK/A	—	1	23	24
G8JAJ	—	—	24	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" 23 cm.

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3JXN	18	53	69	140
G3COJ	15	50	64	129
GD2HDZ	9	24	50	83
G8EOP	8	36	38	82
G8IFT	5	16	35	56
G4DKX	3	25	68	96
G8FUF	1	80	176	257
G8GML	1	34	75	110
G2AXI	1	36	59	96
G8BKR	1	9	81	91
G3POI	—	—	177	177
G4BWG	—	23	110	133
G3CHN	—	—	131	131
GM4CXP	—	21	110	131
G8HVY	—	33	93	126
G3FPK	—	—	125	125
G4BAH	—	32	92	124
G3OHC	—	27	94	121
9H1CD	—	5	110	115
G4CDF	—	—	109	109
G3XCS	—	18	87	105
G4FCD	—	22	69	91
G8IWA	—	17	74	91
G8GII	—	22	63	85
G6UW	—	—	85	85
G3FIJ	—	25	57	82

high and G3POI (Kent) concluded 91 contacts. Clive, whose operating procedure is exemplary as is to be expected from an FOC member, thought there were a few terrible signals about and mentioned that some operators do not seem to understand the standard "Q" signals. At G3FPK, one station heard was sending virtually unreadable stuff and another seemed to be keying three carriers spaced a few hundred Hertz apart. It was also noticed that the keying from *Yaesu* FT-221's is very hard, resulting in bad key clicks. GM4CXP was only on for the first three hours making 10 contacts. Derrick's best DX was G3WSN (Essex) and QSB was very deep, resulting in many "half-QSO's."

Those looking for a GI contact should listen for GI8KIA who seems to be on quite a lot. Peter told your scribe he runs an FT-221 to an 80

watts amplifier with a 14-ele. *Parabeam* 50ft. a.g.l. His Carrickfergus site is at sea level. He often pops up on the SSB calling frequency and often answers "CQ" calls.

Four Metres

GM4CXP has modified an old *Magnum 2* for 4m. and now has 70 watts PEP output, plus CW available, into a 3-ele. *Yagi* at 24ft. During the May 1 *Aurora*, Derrick tried a crossband contact with DK2ZF who heard nothing of GM4CXP. During the Scottish trip, G4CVI said he only made one 4m. contact. GD2HDZ added 13 counties and a couple of countries to his 1977 score during the Open contest on April 3 and Peter Gamble, G4ECQ (Birmingham) appears to have followed suit.

DX-Peditions

Chris Rycroft, G3FES, reveals that the Cambridge University Wireless Society will be making its annual trip to Scotland from June 13 to 22. QRO operation on 2m. and 4m. CW/SSB is proposed, GM6UW/P and GM4CIK/P respectively, with medium power operation on 70 cm. under GM4CDF/P. Depending upon conditions, it is hoped to activate a few of the rarer QTH squares. This year they are going to try MS at up to 100 w.p.m. They will be on from 8 p.m. on 2m. plus 70 cm. or 4m., i.e. two bands, no waiting! Skeds can be arranged through Martin Philips, G4CIO, by telephone at work, after 2 p.m. on 01-253 0661, Ext. 18 or at home between 9 and 10 p.m. on 01-318 3050.

Ray Caws, G3BRL, advises he will be in the Isle of Skye, based on Borge in WR square from June 21 to July 5. He will take an IC-202 SSB transceiver and 10 watt amplifier and a TR-2200G for FM with a 2-ele. aerial. Times of operation variable.

Deadlines

All your notes, views, claims, photos, and moans for the July issue no later than June 2, and for the August column, by July 7 to:— "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for July issue: June 1)

THOSE of you among the regular readers of this piece will have noted that the deadline pattern has altered from that which has prevailed for so many years. May's editorial gave an indication of the problem, which is basically no more than our printer's desire to obtain better utilisation from his machines in order to cope with his ever-decreasing profit margins in real terms. So: this is being started well before the incoming deadline and will be dealt with as and when the letters arrive, so as to enable us to avoid passing on to you the full change.

The Reports

It seems only right this month that our first stop should be at **Derby**, where the Hon. Sec. for the past twenty-plus years has finally laid down the burden of that office, although he continues as Treasurer. In G2CVV's case, he not only continued as Hon. Sec. all those years, but fitted it in with membership of Council of RSGB, a year as President of that society in which he did more than his fair share of "showing the flag," and various other things beside, without ever, so far as this writer was aware, being other than the good Club Secretary that he was. His replacement, G4EYM, was, we suspect, not even born when G2CVV took up his task—but we wish her luck in following his footsteps. The June dates are allocated as to: June 1 for a Junk Sale, a talk on June 8, a night on the air on 15th, Films for 22nd, and to round off Technical Topics on June 29.

Next we come to **BATC**, the grouping of amateur television enthusiasts, both of the fast and slow scan persuasions; they have all sorts of things of interest to ATV enthusiasts, and all of the latter should be members without doubt. Details from the Hon. Sec.—see Panel.

A good idea for cutting the costs of distribution of Newsletters is mentioned by **Cheltenham RSGB**—in the Newsletter there is a list of members who are to receive newsletter copies for onward distribution, and against each of these the calls of those who are to receive their copies from each distributor. It splits the load, and would certainly save club funds a few shillings on postage. The gang, incidentally, get together at the Old Bakery, Chester Walk, Cheltenham, on the first Thursday of each month.

At **Peterborough** the Radio and Electronics Society foregather at the Scout Hut, Occupation Road, on June 17, for a final briefing on VHF NFD.

G3IGM has the floor at **Acton, Brentford & Chiswick** on June 21, and his subject will be the 144 MHz aerial tests he has been carrying out.

Now to **Cornish**, where they had an AGM on April 7, when the office of Hon. Sec. was bandied around—for the final victim's name and address, see Panel. The next calendar date is June 2, and on this date G3VWK will talk about "Marconi—Cornwall and the New World."

At **Verulam** the group get together on the second and fourth Thursdays of each month; the former date being an informal at Salisbury Hall, London Colney, while the

latter date is the main one, and is booked at the Market Hall, St. Albans.

It looks like June 22 for **Chiltern**, at 42 Castle Street, with parking at the rear. At the time of printing their Newsletter, it was not known for certain just what would happen on which night—but something was definitely going to happen! Just for the record, that Castle Street mentioned earlier in the paragraph is the one in High Wycombe.

Cray Valley have their place at Eltham United Reformed Church, 1 Court Road, London SE9; we do not, at the time of writing, have the full details, but we can say the dates are the first and third Thursday—formal and ragchew in that order.

South-East Kent (YMCA) have a keen new Hon. Sec. who is realist enough to wonder if he'll be as keen in a year's time; a good point, but of course as in so much of life the keenness gives the individual pleasure in the task, whereas the rest of the Club are more interested in the *reliability* of the chap when his personal path gets a bit rough and his enthusiasm for the moment is zero. However, to our business. June 1 sees preparations being made for a Jubilee station, for HF NFD, and Maidstone Rally, and on 5th there is the Maidstone Rally. June 6 is the Hawkinge Fete, Jubilee station, while NFD is on June 11-12. June 15 is an Open Evening at which they will probably be talking about the future programme and on June 22 preparation for VHF NFD takes over; this is rounded off by a Project Evening—nice and relaxing before VHF NFD. The Hq. is at the YMCA, Godwyn Road, Dover, and they are to be found there on Wednesday evenings.

June 13 is the **Southdown** date, at Chaseley Home, South Cliff, Eastbourne, for a talk on Radio Controlled Models. That gives them just enough time for completing the preparations for the visit of the Radio Club de Normandie over June 18/19. Looking forward a little further than usual, on July 4, the programmed event is "Barry's Bangers and Beer on Butt's Brow."

The **G-QRP Club** is the one for all those who like to play with QRP—and, indeed, one is a little inclined to say that it is also mandatory for those who like the activity of home-construction, as each issue of the News letter seems to be crammed with interesting bits and complete circuits, for QRP transmitters and aids to the winking-out of weak signals. For details, get in touch with the Hon. Sec.—as in the Panel. It is of interest to note that this group is one of the few "special-interest" groups to have a specifically SWL element.

The **Stourbridge** Newsletter seems to have a new Editor who is a little worried about being able to match the performance of his predecessor—he needn't worry if he keeps up his present standard. The group gets together at Longlands School, Brook Street on the third Monday in each month for the "proper" meeting; the informal one is at the Shrubbery Cottage, Heath Lane, Oldswinford on the first Tuesday of each month.

The **East Lincs.** crowd want to make sure we get the details right—it has been written in with felt-tip pen on the front cover to make *sure*. The first Thursday in each month, at Blackburn YMCA it is. An additional activity during June is a station and display at the Mellor Festival on 11th—an afternoon with the theme of "Communication."

A rather interesting activity went on at **Edinburgh** when the group played host to a set of American students, over here on a choral tour. It appears they hold GM5BFX, and both in London and Edinburgh they were able to "make it" back to the home school in W2. For more details on the club itself, contact the Hon. Sec. at the address in the Panel.

R.A.I.B.C. come next, and already it is interesting to note how the new Secretary/Editor has stamped himself and his personality on to the Newsletter; for a group comprised of the invalid and bedfast members this is the main interest, outside the net contacts. Incidentally, the nets are on a nominal 3750 kHz—but it is dependent on QRM, and so members often have to search for net-control G3WJT. If you should hear a member on the hunt for the RAIBC net and know their actual frequency it would be a kindly thought to home the searcher on to G3WJT. Tuesday at 1000, or 2 p.m. on Wednesday.

At **Southgate** the Newsletter occasionally tells us where they meet; but of one thing it is determined, and that is that their dates and doings will not be allowed to waste printspace. Thus, while we can tell you that Hq. is at the Scout Hut, Wilson Street, Winchmore Hill, and that that in turn is just off the Winchmore Hill Green, we can't tell you the date of the meeting or what they intend to do for which last information you must get in touch with the Hon. Sec.—see Panel.

UK FM Group (London) have a meeting at Grove Park Hotel, Chiswick, of which we have neither date nor details. Thus, if you want to join you will have to get in touch with the Hon. Sec. at the address in the Panel. On a different tack they have in their April issue a rather interesting article by a "Mr. M. Orpower, G2JGY," an

eminent gentleman in the art of scientific legpulling—but we wonder how many people are still trying to get one of these wonder devices! On a different tack altogether, the same issue remarks on the absence of GB3LO since March 17, but gives no indication that they were aware that the repeater was QRT due to an infringement of the licence. RSGB hold the licence—as they do all repeater licences—but the GB3LO machine is in the care of UK FM Group London, and so if there was a licence infringement proven, we hope they will toss the offender out and publish his name and the details. After all, the offender, whoever he was, was enough of a clown not to realise the harm he was doing to this club, and through them RSGB and through them the entire amateur radio fraternity in this country, if only in killing trust built up between amateurs and the authorities over the years. A sad affair.

Now to **Crystal Palace** we understand that the June meeting is to be on the topic of Aerial Design and Construction, although the Hon. Sec. is honest and says he doesn't know who he is going to ask to give the talk! However, on the third Saturday in the month, if you care to roll up to Emmanuel Church Hall, Barry Road, doubtless you will find out who has had his arm twisted!

The **Farnborough** Newsletter must be pretty fair, as somebody at the office nicked it for themselves! No matter though, this "small" society of some 53 members has its Hq. at the Railway Enthusiasts Hq. (the local sub-aqua group are also in the act), where they have a bar, and an aerial tower due to go up ere long. Hq. is off Hawley Lane in Farnborough on the second and fourth Wednesday in each month.

Sutton & Cheam alternate between Rays Social

Names and Addresses of Club Secretaries reporting in this issue:

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

- ACTON, BRENTFORD & CHISWICK:** W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB.
BARTG: J. P. G. Jones, GW31GG, Heywood, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed SA62 4LR.
BTAC: M. Cox, G8HUA, 13 Dane Close, Broughton, Brigg, South Humberside.
BISHOPS STORTFORD: H. Allison, G3XSE, 89 Birchanger Lane, Birchanger, nr. Bishops Stortford, Herts.
BOURNEMOUTH (Wessex ARG): G. D. Cole, G4EMN, St. Anthony's Road, Bournemouth BH2 6PD.
BRISTOL CITY (RSGB): B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, BS20 8NQ. (*Bristol 848140.*)
CHELTENHAM (RSGB): G. D. Lively, G3K1I, 26 Priors Road, Cheltenham (34785), Glos.
CHILTERN: N. C. Ambridge, G4FRL, 53 The Avenue, Chinnor, Oxon. OX9 4PE.
CORNISH: H. F. Adcock, 1 Bowglas Close, Castle Road, Penzance TR20 8HD.
CRAWLEY: G. C. Reid, G3OUX, 11 Coombe Close, Langley Green, Crawley RH11 7TP, West Sussex.
CRAY VALLEY: J. M. B. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.
CRYSTAL PALACE: G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London SE19 2LD. (*01-653 4340.*)
DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ.
EAST LANCs: E. A. Lomax, G4DGR/5N2ABG, West End Post Office, Accrington (34012), BB5 4NQ.
ECHELFORD: R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.
EDINBURGH: J. Martin, 22 Ross Gardens, Edinburgh, EH9 3BR. (*031-667 8707.*)
FARNBOROUGH: C. J. Beezley, G4FEA, 152 West Heath Road, Farnborough (49481), Hants GU14 8PL.
GUILDFORD: L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey.
MID-SUSSEX: R. Bellerby, G3ZYE, 104 High Street, Lindfield (3187), Haywards Heath, West Sussex.
MILTON KEYNES: D. Stimson, G3THC, 108 Cambridge Street, Wolverton, Milton Keynes (316730) MK12 5AH.
NEWBURY: M. Vasset, G8LTD, "Heatherlea," Adbury Holt, Newtown, Newbury RG15 9BN. (*0635 46078.*)
NORTHAMPTON: S. J. Purser, G8GHZ, 2 Dobson Close, Great Houghton, Northampton (61794).
PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.
RAIBC: H. Boutle, G2CLP, 14 Queens Drive, Bedford MK41 9BQ.
REIGATE: F. H. Mundy, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.
SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex BN20 9JG.
S. E. KENT YMCA: P. Wharton, G4DCV, 21 High Street, Dover, Kent CT16 1EB. (*0304 206230.*)
SOUTHGATE: B. Oughton, G4AEZ, 48 Morley Hill, Enfield. (*01-366 7166.*)
SOUTH MANCHESTER: W. L. Seddon, G3V1W, 12 Barwell Road, Sale, Cheshire M33 5FF. (*061-973 3355.*)
STOURBRIDGE: A. Dewsbury, G4CLX, 10 Rectory Road, Oldswinford, Stourbridge (3530), West Midlands.
SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon, CR2 8PB. (*01-657 3258.*)
SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey. (*01-644 4157.*)
SWINDON: A. D. Bettley, G8KWC, 17 Centurion Way, Stratton-St.-Margaret (2860), Swindon, Wilts. SN3 4BT.
TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.
UK FM GROUP (London): R. G. Street, G3TJA, 3 White Ledges, St. Stephens Road, London W13.
UK FM GROUP (Western): G. L. Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire, WA16 8BB.
VERULAM: B. Pickford, G4DUS, "Netherwood," 130 The Drive, Rickmansworth, Herts.
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

Club, London Road, North Cheam, and Sutton College of Liberal Arts, Cheam Road, Sutton; which one is to be used on June 16, when G8AAI is to come along and give his talk on Amateur Television is not certain to the writer, but he believes it to be the College. No, don't blame it on the Newsletter editor, he was fighting the problem of printing problems on the one hand, leading to a wish for the shortest possible issue, at a time when his news would have covered double the space.

There can be no doubt at all, **Bournemouth (Wessex)** are very much on the upsurge; the Hon. Sec. now has to ask us to request that any intending visitor give him a ring (G4EMN, Bournemouth 20027) so that he can get more chairs organised—the 45 normally put out have all been filled at the last few meetings at the Dolphin Hotel, Holdenhurst Road, Bournemouth. June 3 sees a talk on the GB3SN repeater at Four Marks, Alton, which is the nearest two-metre repeater; G8BIH and G8CKN are the speakers. The other meeting, on June 17 is down for the club's Auction and Junk Sale, and also for a progress report on the RAEN group being set up in the county.

It's been quite a while since last we heard from the **Guildford** group, apologises G3BHQ. June 10 is, not very surprisingly, last-minute preparations for NFD; and on June 24 comes the last chance to do the same office for VHF NFD. The site appears to be Ranmore Common, but as our copy is a bit "thin" at this area of the Newsletter, perhaps it would be best to check with the Hon. Sec. as to just where they will all be.

Milton Keynes have their session on June 13 at the Loyal Hall, Newport Pagnell, and the subject is a talk on Electro-Medical techniques; we can't give you the name of the Company, as two places quote two different names—whether Cambridge Medical Instruments or Gould Advance, their speakers are going to travel a long way so we hope they get good support.

At **Reigate** June 7 is the Natter session, and June 21 the main meeting at which the talk will be by G3HFO. For the first, the venue is the Marquis of Granby, Hooley Lane, while the talk is at the upstairs meeting room of the Constitutional Centre, Warwick Road, Redhill, Surrey.

At **York** they recently had an evening on which members displayed their home-brew gear, G4EMA had a whole table to himself—busy chap! They are now entering the "season" for special-event stations, one of which will be the Great Yorkshire Show at Harrogate in July. Each Friday evening (with the exception of the third one in each month) they may be found at the United Services Club, 61 Micklegate, York.

Echelford have just had an AGM and elected a new Newsletter Editor, who in his turn seems to be promising them that they will rue the day! However, his first try seems to this old scribe to be most acceptable. The group get together at St. Martins Court, Kingston Crescent, Ashford, Middx., on the second Monday and the last Thursday of each month.

It seems quite a while since we heard from **Crawley** but they still are doing quite nicely according to the "grapevine." However, a new Hon. Sec. has decided it is about time they reported, and he advises they are still at Trinity United Reformed Church Hall, Ifield Drive, Ifield, Crawley (they have had the same Hq. for as long

as your conductor can recall, which is longer than the time he has been writing this piece!) on June 22, when they will welcome as their speaker Commander Hatfield, who will be talking about Solar Spectroscopy.

Another new signature, appropriately enough writes on behalf of **Newbury**; he says that they are still getting the programme sorted out, but they are to be found on the second Tuesday of each month at Newbury College of Further Education, at 7 p.m.

Deadlines for "Clubs" for the next three months:—

For July issue—June 1st
 For August issue—June 24th
 For September issue—July 29th

Please be sure to note these dates!

South Manchester have their usual crowded programme; every Monday evening the VHF gang at the shack, "Greeba," Shady Lane, Baguley, Manchester, and Fridays at Sale Moor Community Centre, Norris Road, Sale. June 3 is down for G3SVW to talk about "Radio Communication in Antarctica—Sights and Sounds." As a follow-up, G8KUP has June 10, his subject being "Navigation"—he in turn is followed by G3JIS talking about "FETs and their uses," on June 17, while 24th should be of particular interest as J. Osler is talking about "Return to Amateur Radio, its problems and pleasures." And, to round it off, we hear the gang gained the award for the best Club stand at the Northern Radio Societies Convention.

UK FM Group (Western) is the new name for the club which used to be known as the Western FM group. They have an informal gathering at the Legh Arms, Knutsford, on June 2, with visitors and guests as welcome as ever.

Oddly enough June 2 is also on the calendar at **Mid-Sussex**, when G4DQS will be talking about "Topography." June 16 is down to G3GDU, who will be talking about "The Development of a Navigational Aid." That covers the activities of a Navigational Aid." That covers the activities at Marle Place Further Education Centre, but on June 30 they have their annual Windmills evening.

It is not very often that we hear from the **Oxford** chaps, but this month a sad note advises us of the death of their Vice-President Howard Long G5LO at the age of 75, only two days after that of his mother at the age of 98. Confined to a wheel-chair though he was for most of his life, he won a BEM for his wartime work of monitoring of German radio transmissions. Indeed a sad loss to the club, and to RAIBC of which he was a long-time member, and, not least, to those newcomers to the hobby to whom he gave such help and encouragement. G4BHR of the Oxford group passed on this information; his address appears in the Panel.

For all the details of the **Torbay** meetings we must refer you to the Hon. Sec.—see Panel—as we know that in addition to their monthly formal session they have informals each week at the Hq. in Bath Lane, rear of 94 Belgrave Road, Torquay. One of their many summer "special-activity" stations will be at the Teignbridge Newton Abbot District Jubilee Trades Fair over July 21-24 at Newton Abbot racecourse.

A dangerous precedent was set by the Hon. Sec. of **Swindon**; much as we appreciate the Hon. Sec.'s problems, we must say that we can't accept telephoned data for this piece save in the *most* exceptional circumstances! the risk of error in transcription is too great on the one hand, and our lines already hard-pressed at times into the bargain. However, the Swindon Hon. Sec. says the AGM is on June 8, and a Junk Sale on 22nd, both at the Coldharbour public house at Blunston which is five miles north of Swindon itself. In between, on June 15, they have a Barbecue evening at Savernake Forest—doubtless more details could be obtained from the Hon. Sec.—see Panel.

The Hon. Sec. of **BARTG** says that in the past year the total membership rose to no less than 502 members; but we would guess there are still some folk operating, as SWL or transmitting amateur, on RTTY who are still to be brought into the fold. Any such, dare we say, are making a grave error if they don't join the group and make use of the services it offers.

The **Surrey** group seem to foregather on the first Wednesday in each month, if past meetings are any guide, which would give June 1. The Hq. address is T. S. Terra Nova, 34 The Waldrons, Croydon; if you miss the formal already mentioned, you can also look them up at the alternate meeting on the third Wednesday.

At **Bishops Stortford** the form is to book the third Monday in each month, which gives Monday, June 20, at the British Legion Club, Windhill, Bishops Stortford.

The **Northampton** chaps have their Hq. place at the Spencer Dallington Community Centre, Tintern Avenue, which is off Gladstone Road; June 16 is down for D/F Hunting so if you intend to visit, perhaps it would be best to contact the Hon. Sec. to see if the start is from Hq.—see Panel.

City of Bristol (RSGB Group) write to advise of the activities for June. The meeting first—this is at the Small Lecture Theatre, Queens Building, University Walk, Clifton, Bristol 8, and timed for 7-9.30 on the last Monday in the month. Over June 4-11 they have a special Jubilee station set up at Wick, near Bristol covering 3.5 to 144 MHz. Then there is NFD, from Stockwood Lane, using G6YB over the weekend June 11-12, and, also on June 12, the Longleat Mobile Rally, for which they have a rather delightful whimsical poster. June 24 sees them operating another Jubilee station, this time from Portishead.

Closing

Which is where, once more, we say farewell for another month. The deadline will be June 1, addressed as ever to Club Secretary, **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts., AL6 9EQ.



The Third Alton Scout Troop at JOTA, 1977: G8BIH at the mic., G3WNI standing extreme left; G4FOY second from right, rear. Senior Scouts Peter and Paul flank G8BIH. The gear (supplied by G3WNI) was a KW-2000B and KW-1000 linear, with an antenna trap dipole. This was the Troop's first attempt—and a great success. They will all be there next October!

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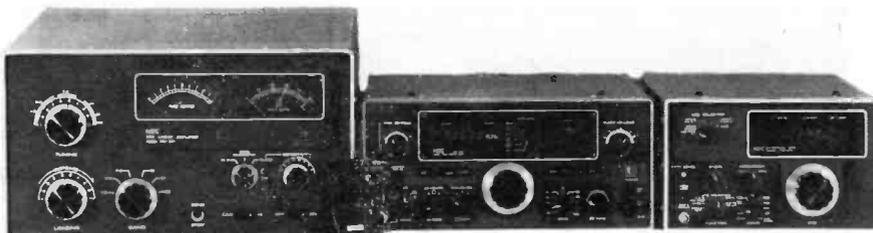
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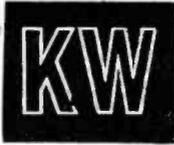
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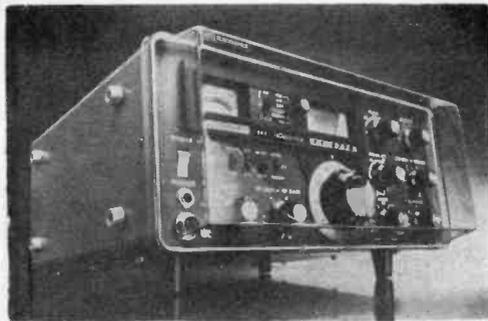
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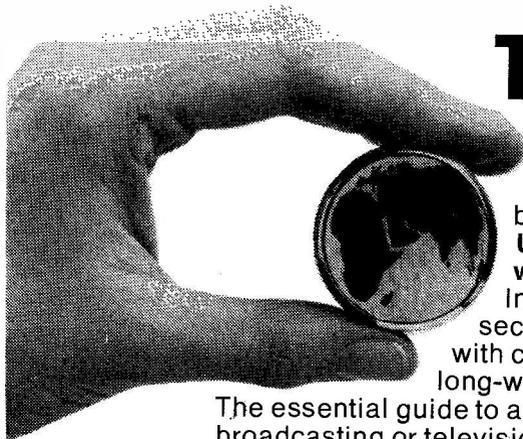
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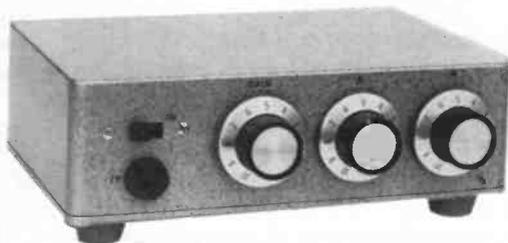
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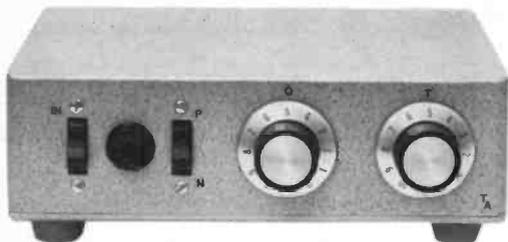
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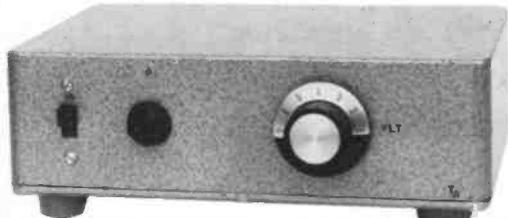
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144-41433-2 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
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145-300/S12 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-350/S14 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-400/S16 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-500/S20 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-525/S21 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-550/S22 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-575/S23 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
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145-650/R2R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-675/R3R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-700/R4R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-725/R5R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-750/R6R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-775/R7R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
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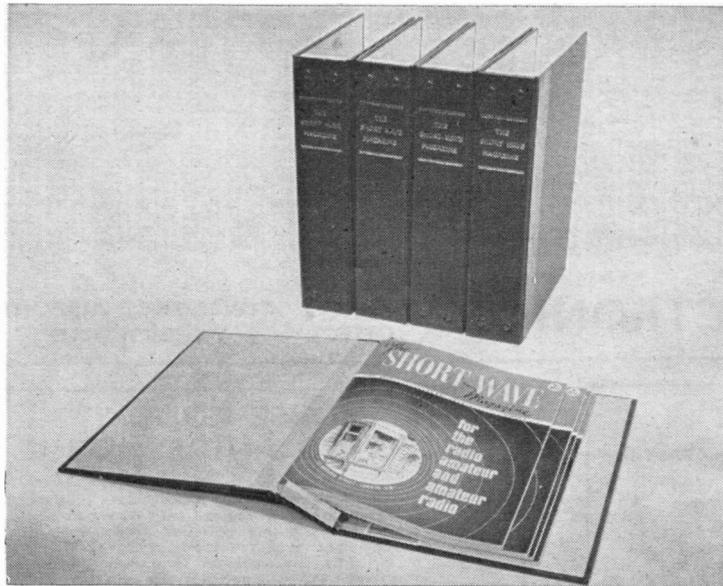
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