

The SHORT WAVE Magazine

VOL. XXXV

JULY 1977

NUMBER 5

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 bandsread 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 μ V for AM and 0.5 μ 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 JULY 1977

	Price incl. VAT £	Carr. £		Price incl. VAT £	Carr. £
TRIO EQUIPMENT					
TS820 HF transceiver	625.00	3.00	Price per single crystal	2.40	.15
VF820 external VFO	108.00	3.00	Price per pair	4.80	.15
DG1 digital readout	126.00	3.00	100 kHz crystal markers	3.37	.15
DS1 12V inverter	40.50	.70	VHF MARINE RECEIVERS		
YG88 CW filter	36.00	.25	SR-9 tunable/crystal monitor	58.50	.70
TS520 transceiver 12v. dc/240v. ac	432.00	3.00	*NEW* AMR217B scanner with 8 crystals ...		
SP520 matching loudspeaker	18.00	.70	Seiwa MR-2 monitor less crystals	63.00	.57
VF0520 external VFO	72.00	3.00	Seiwa MS-2 scanner less crystals	67.50	.75
TV502 matching 2m. transverter	171.00	3.00	Crystals for the above—each	2.70	.15
CW520 CW filter	36.00	.25	VHF AMATEUR RECEIVERS		
TS700G 2m. all mode transceiver*	392.62	3.00	NR-56 tunable/crystal 2m. FM receiver	54.00	.70
VOX-3 matching VOX unit (free with TS700G)	19.80	.85	Seiwa MR-2 less crystals	63.00	.57
TR7200G 10W car transceiver with 10-channels*	175.00	3.00	Seiwa MS-2 scanner less crystals	67.50	.57
VF030G remote VFO with repeater shift	90.00	3.00	*NEW* AMR217B scanner with 8 channels ...		
PS5 mains power supply/digital clock	58.50	3.00	Crystals for the above—each	2.40	.15
TR7400A 25W digital FM transceiver	299.25	3.00	CATRONICS PRODUCTS		
TR2200GX 2m. hand portable. Fitted 3 channels	130.50	3.00	DFM 5V 180 MHz digital counter	135.00	3.00
Fitted 12 channels	160.00	3.00	500 MHz prescaler above	27.00	.25
VB2200GX 10W amplifier	45.00	.70	MICROWAVE MODULES EQUIPMENT		
Ni-cad battery pack	9.72	.36	MMC70 4m. converter	20.25	} All Micro- wave modules post paid
RA1 helical antenna	6.30	.15	MMC144/28 LO 2m. converter	22.50	
R599D receiver	369.00	3.00	MMC432/28 70cm. converter	24.75	
S599 matching loudspeaker	17.00	.70	MMC432/144 70cm. converter	24.75	
TS99S de-luxe transmitter	369.00	3.00	MMC1296/28 23cm. converter	28.12	
SP599 (to match early JR599)	10.00	.70	MMC1296/144 23cm. converter	28.12	
R300 general coverage receiver	184.50	3.00	MMV432 70cm. tripler	19.80	
TR7010 2m. SSB transceiver*	175.00	3.00	MMV1296 23cm. tripler	33.75	
PS5 mains power supply/digital clock	58.50	3.00	MMD050 50 MHz counter	66.96	
HC-2 ham clock	13.50	.55	MMD500P 500MHz prescaler	27.00	
MC10 hand microphone	9.00	.25	MMD050/500MHz counter	85.32	
MC50 table microphone	23.00	.70	MMT432/28 70 cm. transverter	109.12	
LF30A low pass filter	15.75	.57	MMT432/144 70 cm. transverter	149.62	
BPF2A 2m. band pass filter	27.00	.57	MTI44/28 2m. transverter	88.87	
TR3200 70cm. handy transceiver	171.00	3.00	FILTERS		
Ni-cad battery pack	9.72	.36	Trio LT30A low pass filter	13.50	.57
MB1 mobile mounting bracket for TR2200GX/TR7200G/TR3200	9.45	.56	Trio BPF2A 2m. band pass filter	27.00	.57
NIHON DENGYO					
Belcom 70A. FM, SSB, CW, AM for 70 cm. to be announced			Shinwa 1110 2m. band pass filter	13.72	.57
Liner 430 70cm. SSB transceiver	290.25	3.00	Shinwa 1006 2m. low pass filter	11.48	.57
R115E regulated psu for Liner 430	31.50	3.00	Shinwa 1140 28 MHz transverter filter	13.72	.57
RECENT PRODUCTS					
KF-430 10W 70 cm. mobile fitted 9 channels	180.00	3.00	Shinwa 1005 H.F. low pass filter	10.80	.57
UNIDEN EQUIPMENT					
2020 HF transceiver	495.00	3.00	VHF/UHF "J" BEAMS		
8010 external VFO	106.87	3.00	5Y/2M	6.97	3.00
8120 matching speaker	31.50	.70	8Y/2M	9.11	3.00
2030 2m. mobile 10W FM			10Y/2M	19.35	3.00
fitted 1 channel	140.62	3.00	PBM14/2M	28.35	3.00
fitted 3 channels	148.50	3.00	5XY/2M	14.51	3.00
fitted 5 channels	156.37	3.00	8XY/2M	18.11	3.00
fitted 8 channels	167.62	3.00	10XY/2M	23.96	3.00
fitted 11 channels	178.87	3.00	Q4/2M	14.85	3.00
RTTY VIDEO DISPLAY					
TD224 display unit	209.25	3.00	Q6/2M	19.80	3.00
DM170 terminal unit with UHF mod.	105.30	3.00	D5/2M	12.37	3.00
UHF mod. battery powered	16.87	.25	D8/2M	16.59	3.00
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.					
PHASING HARNESSSES					
PMH2/C for 2m. circular polarisation					
PMH2/70 for 70cm.					
PMH4/70 for 70cm.					

LOWE ELECTRONICS LTD

	Price incl. VAT £	Carr. £		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			
Extendarod 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			
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					
I2AVQ	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. $\frac{3}{8}$ 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. $\frac{3}{8}$ whip	11-81	3-00			
Daiwa MA-41 2m. $\frac{1}{4}$ 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	Up to 20m. 80p above 20m. £1.00	
8 core rotator cable	-32				
12 core rotator cable	-25				
UR43 50 ohm coaxial cable	-15				
UR67 50 ohm coaxial cable	-38				
RG8AU 50 ohm coaxial cable	-38				
Twin feeder 300 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 C1 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			
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	110-16	-85			
Up to 1kW FSD					
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, 6EW6 each90	-25			
6GK6 (RCA)	2-70	-25			
6JS6C, 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

Multi-colour LED
mode indication
panel

Digital readout
available as option. 6
digit indication from
sum of VFO +
carrier frequencies
with 100Hz
resolution. Memory
switch retains initial
dial setting for
reference

Highly sensitive RX
with dual gate
mosfet RF and buffer
stages gives SSB
sensitivity of 0.25 μ V
for 10dB S/N

200 W PEP input
TX with RF negative
feedback between
driver and PA for low
intermod products.
Amplified ALC for
superb speech
quality

Five function
metering for
complete station
monitoring

IF shift system
allows operator to
move IF bandpass
without retuning
main dial. Beats the
nearby QRM and
matches bandwidth
to signal

AF signal shaper
improves received
signal by automatic
response limiting in
SSB and CW modes

FSK operation with
switchable 170Hz or
850Hz shift.
Automatic TX power
regulation system for
continuous operation

RF speech processor
with fully variable,
metered compression
level

Precision dial drive
with direct
unambiguous
readout system. No
need to add together
two dial readings

All band operation
160-10m (10m in
4 bands) plus
auxiliary band and
15MHz WWV

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 transmitter; 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**

**DRAKE****Radio Shack Ltd**

STILL THE BEST VALUE & PERFORMANCE IN A TRANSCEIVER



£475 inc. VAT

THE NEW DRAKE TR-4CW

With 500Hz Crystal Filter included

While operating CW you may receive with either the 2.1 KHz or the 500Hz Crystal Filter—They are front panel selectable!

The Drake TR-4CW is a product of years of transceiver experience and design improvements. The resulting performance makes it one of the finest transceivers available. Its operating handiness is not only evident in circuit design, but also in packaging. Compact and lightweight, it is ideal for mobile use, portable excursions, and vacations. USB, LSB, CW or AM operation is at your finger tips with 300 watts P.E.P. of communications power.

INCLUDED FEATURES :

- 300 Watts PEP input on SSB, 260 watts input on CW.
- Complete Amateur Band Coverage; 80 through 15 metre bands complete and 28.5-29.1 MHz of 10 metres. Rest of 10 metre band obtained with accessory crystals.
- Separate Sideband Filters; separate USB and LSB filters eliminate oscillator shifting and insure long term carrier vs filter alignment.
- Nominal 1.7; 1 Filter Shape Factor; These filters stand among the industry's finest with 6 dB, bandwidth of 2.1 kHz (chosen to slice thru QRM), 60 dB bandwidth of only 3.6 kHz and 100 dB ultimate rejection.
- Provision for Highly Effective Accessory Noise Blanker.
- Heavy Irridited Cadmium Plated Chassis.
- CW Side Tone Oscillator for monitoring your CW transmission.
- Finish; scratch resistant epoxy paint.
- Crystal Calibrator built-in.
- VFO Indicator Light eliminates confusion of which main tuning knob controls the frequency when using an RV-4C remote VFO.
- Automatic CW Transmit Receive Switching sometimes called "semi" break-in.
- Full AGC with Drake dual time constant system confines a 60 dB signal change to a 3 dB audio change.
- Effective Transmitting AGC insures clean SSB output.
- Solid State Permeability Tuned VFO for low drift and accurate 1 kHz divisions on all bands. New easy to read dual concentric dials.
- VOX or PTT for use on AM or SSB.
- Receiver S-Meter automatically switches to indicate transmitting AGC on transit.
- Transmitter Plate Ammeter indicates Relative RF Output by depressing load control shaft.
- Adjustable Pi-Network output circuit.

SAE for details please

DRAKE ★ SALES ★ SERVICE
SECURICOR ★ BRS ★ ACCESS ★ BARCLAYCARD

RADIO SHACK LTD. 188 BROADHURST GARDENS
LONDON, NW6 3AY

OPEN 5 DAYS 9-5. CLOSED 1-2 p.m.
SATURDAY 9-12.30 p.m.
Giro Account No.: 588 7151

Just around the corner from West Hampstead Underground Station
Telephone: 01-624 7174 Cables: Radio Shack, London N.W.6
Telex: 23718



WATERS &

Telephone: HOCKLEY (03704) 6835 2 lines



JUBILEE CASH BONANZA £150 TO BE WON!

Here's a great chance to make a big saving with your next FDK purchase. Yes its true, you can save up to £100 on each item you purchase. This offer applies to every transceiver, receiver, vfo and power supply manufactured by FDK for the UK market, and purchased between 1st July and 31st October by UK customers. With every FDK item mentioned you will find in the carton a Jubilee Cash Bonanza card. Simply write your full name and address on the back of the card and return to us to enter this exciting draw. As well as first prize of £100, second and third prizes of £30 and £20 will also be awarded. The draw will take place on 31st October at the ARRA exhibition in Leicester. The winners will be notified in writing and the results published in our advertisement immediately after the draw.



FOR 70cms FM MULTI-UII



9 channels fitted £249

70cms. fm has opened up a completely new era in fm mobile operation. If you haven't yet tried it then send an SAE for full details of the transceiver that everyone is using. 70cms. FM—the place to meet a lot of nice people!



FOR 2M FM THE MULTI-II



7 channels fitted £209

This top selling FM transceiver has the finest front end on the market. Add to this its 4 channel auto-scan facility, punchy 12 watts output and a host of other features, and you have today's most advanced 2 metre fm mobile. SAE for leaflet.



ACCESSORIES

- AC PSU with switched voltage outputs, 4 amps capacity and short circuit protected £00.00
- Sound box for fitting beneath M11 for deflecting sound forward... .. £00.00
- Desk top aerial fits most monitor receivers and transceivers £00.00
- M11 VFO. Full frequency coverage of 2m. with repeater shift £00.00
- Mobile mounting brackets (one supplied with each transceiver) £00.00
- DC power leads £00.00



MULTI-2700 Mk. II

A complete station inc. vox, toneburst, OSCAR rx., variable power control, speech processor, 900 kHz and 1.6 MHz repeater shift, dual vfo, 15 watts output. SAE for leaflet.



£489 inc. carriage



XTALS

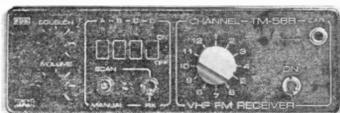
- U-II reverse repeat pair £00.00
- M-II S21/22/23 sets. 6 £00.00
- M-II repeat input each £00.00
- TM56B repeat sets. 5 £00.00
- M-II S24 pair £00.00
- 1.6 MHz 2700 shift each £00.00

NOTE: All the above crystals are high stability FDK types. Specials to order.



TM56-B VHF MONITOR

A complete 230v./12v. VHF FM monitor receiver. 12 fixed channels and 4 auto-scan. 10 channels supplied. Amazing performance at an amazing price.



10 channels fitted £84



QUARTZ-16

This is the 2 metre FM transceiver for the man who wants a functional transceiver without any frills. Supplied complete with 10 channels, tone burst and all accessories no other transceiver can match its price.



10 channels fitted £169

STANTON ELECTRONICS

Telex: 897406

**A SHOP FULL OF HAM RADIO
BUT MOST OF
OUR STOCK LEAVES BY THE
BACK DOOR !**

Most of our stock leaves by the back door. That's because our reputation for fast, efficient and above all, helpful mail order service is second to none. Some people even send us open cheques ! That's how good our reputation is. But it occurred to us that although you may never visit us you might like to see inside our premises. The photo on the right shows a small corner of our showroom at Hockley, part of purpose built modern premises with a large customer car park. So now you know that when you place your order by post or telephone, you are dealing with one of the UK's largest ham radio outlets. Since 1972 we have been serving the amateur and short wave listener. Our success rests on your trust and satisfaction . . . we intend to keep it that way.



31 SPA ROAD, HOCKLEY, ESSEX.

JUST PART OF OUR EXTENSIVE STOCKS

MICROWAVE MODULES

MMC 2m. conv. IF 2.4-4.6 28-30	£20.25	(36p)
MMC 70 MHz conv. 28-30	£22.50	(36p)
MMMC 70 MHz conv. 28-30 + local osc.	£22.50	(36p)
MMC 2m. conv. 28-30 + local osc.	£24.75	(36p)
MMC 70cm. conv. 28-30 or 144-146	£22.50	(36p)
MMC 1296/144 or 28-30	£28.12	(36p)
MMDO 50 50 MHz counter	£66.95	(36p)
MMD 500P 500 MHz pre-scaler	£27.00	(36p)
MMT 432/28 70cm. transverter	£109.00	(36p)
MMT 432/144 2m. transverter	£149.62	(36p)
MMT 144/28 2m. transverter	£88.87	(36p)

NIHON DENGYO

Lineer-2 Mk. II 2m. ssb tcvr. 12v. DC	£184.50	(£2.50)
Lineer-30 70m. tcvr. 12v. DC	£296.25	(£2.50)
LA-106 2m. 100W. linear	£200.25	(£2.50)
R115E reg. p.s.u. for liner-2 and 430	£31.50	(£2.50)

SOLID STATE MODULES

2m. or 4m. Europa transverter 200W pip	£109.15	(n.c.)
2 or 4m. converters IF 2.4/4.6/28-30	£18.00	(n.c.)
70cm. converter IF 144-146	£18.00	(n.c.)
2m. boxed pre-amp	£8.72	(n.c.)
PA3 2m. miniature pre-amp board	£6.27	(n.c.)

WATERS

Stable tone-burst modules 1750Hz	£3.93	(25p)
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POLAR ELECTRONIC DEVELOPMENTS

Magnum 2m. transverter	£151.90	(£1.50)
Wavemeter 65-230 MHz	£19.00	(50p)
432 MHz linear 230v. AC	£151.90	(£1.00)
Magnum 2m. linear 230v. AC	£151.90	(£1.50)
2 & 4 converters 28-30	£18.00	(36p)
70cm. converters 28-30 IF	£19.50	(36p)
1296 MHz converters	£14.00	(36p)
Cobra 70cm. transverter	£86.00	(75p)
Solid state amplifier	£49.50	(50p)

VHF ANTENNAS BY JAYBEAM

4Y/4M 4 element yagi	£11.45	(£1.75)
5Y/2M element yagi	£6.96	(£1.00)
8Y/2M 8 element yagi	£9.10	(£1.00)
10Y/2M 10 element yagi	£19.35	(£1.50)
PBM10/2M 10 ele. parabeam	£23.00	(£1.50)
PBM14/2M 14 ele. parabeam	£28.35	(£1.75)
5XY/2M 5 ele. crossed yagi	£14.50	(£1.25)
8XY/2M 8 ele. crossed yagi	£18.10	(£1.50)
10XY/2M 10 ele. crossed yagi	£23.95	(£1.75)
Q4/2M 4 ele. quad	£14.85	(£1.50)
Q6/2M 6 ele. quad	£19.80	(£1.75)
D5/2M 5 ele. slot fed	£12.35	(£1.25)
D8/2M 8 ele. slot fed	£16.55	(£1.50)
XD/2M crossed dipoles	£6.40	(£1.00)
UGP/2M ground plane vertical	£6.95	(£1.00)
HO/2M Mobile halo head only	£3.55	(50p)
HM/2M Mobile halo with mast	£3.09	(£2.75)
PMH/2C 2 way phasing harness circular polarisation	£4.60	(75p)

NEW

C5 2m. Co-linear 5db	£28.00	(£2.00)
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FT221R

FT101E (EE-EX)—ex stock. New service manual £12

The FT-101E a complete mains or 12v. DC station contained in a compact 30 lb. package, 260W. P.I.P. of SSB (with in-built R.F. speech processor) 180W, CW and 80W, of AM 10 to 150m. (incl. 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 filter installed is of a high order. Linear and transmitter provisions are made with sockets for : relay contacts, ALC output, all internal HT supplies, low level RF heater links and switches, etc., etc.

The FT221R complete 2m. station ex-stock

The FT221R. The multimode USB, LSB, AM, FM, CW (with semi-break in and side tone), 2m. transceiver offering the choice of phase locked VFO or 44 crystal channels, simplex or repeater (600Hz up and down shifts), with unique "double push" auto tone burst, mains or 12v. (3A) operation, excellent selectivity SSB 2.4 kHz (1.7 : 5.F.) or FM 12 kHz. Front panel adjustable VOX and mic gain, a calibrator (1 MHz \pm 10), 1 kHz readout and linearity, sensitive squelch, clarifier with IRT and IRT with ITT (makes F.S.K. easy), switchable "S" and centre zero tuning meter, noise blanker, serviceable plug in boards all contained in 11 $\frac{1}{2}$ " (14") x 5" x 11 $\frac{1}{2}$ ", 22 lb. rigid package. 600 kHz and possible 1.6 MHz shifts over 4 MHz.

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Available round mid July for about £75

The FT101E complete HF station



FT101E

The FRG7 general coverage receiver—ex stock

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley triple mix drift cancelling loop for continuous, spin tuned, inclusive coverage of 0.5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

The receiver is sensitive (0.5uV for 10dB, S + NN (SSB)) and stable (within 500Hz for any 30 minutes after warm up) with AM, SSB and CW modes catered for, A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered but should the supply fail, or portable operation be required, 8 dry cells are automatically switched in.



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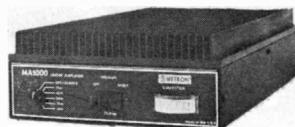
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To pack an entirely modular construction, 10-80m., digital readout transceiver in a box 28" x 12-3" is remarkable enough, but with a 0-2uV sensitivity and 100V. output from transistors with the boost of:—stability better than 20Hz hour, from an electronically tuned (biased Toggle switches with no other moving parts) 100Hz step digital synthesiser, good Rx front end filtering, Tx TXI proofing, unwanted sideband at -60dB, carrier at -50dB, RIT clarifier (+50Hz), inbuilt SWR bridge, semi break in CW with sidetones, etc., etc. is unbelievable.

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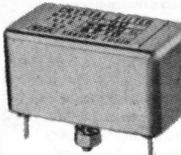
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FINEST WORLD WIDE VALUE

FRG7 Synthesised General Coverage Communications Receiver.



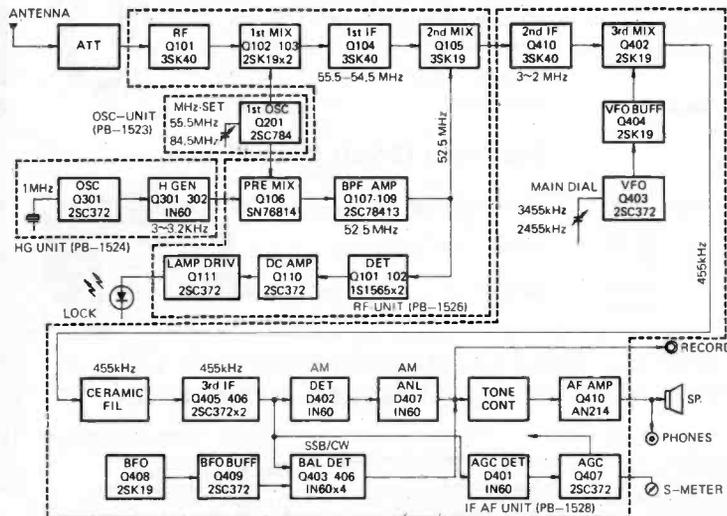
The FRG7 is a solid state mains and 12v. receiver offering continuous coverage 0.5-30 MHz with specifications unparalleled in its price range.

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 (fc = 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 misset. 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. LEDs indicate VFO and clarifier (± 5 kHz) status and 100/25 kHz switchable crystal calibrator is standard.

- FR101D De Luxe, all options.
- FR101DD Digital De Luxe.
- FR101S Standard Version.
- FR101SD Digital Standard.

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

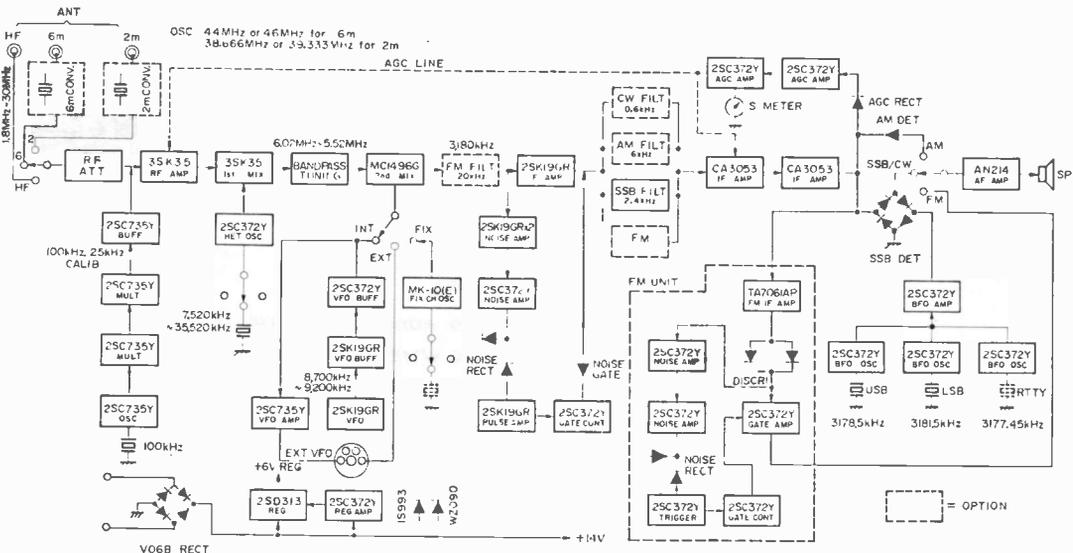
SENSITIVITY (at 14 MHz)
 CW 0.2 μ V 10dB N+S/N
 SSB 0.3 μ V 10dB N+S/N
 AM 1 μ V 10dB N+S/N
 FM 1 μ V 12dB SINAD

SELECTIVITY (at 6dB)
 CW 600Hz (2.5 : 1)
 SSB 2.4kHz (1.67 : 1)
 AM 6kHz (2 : 1)
 FM 20kHz (2.25 : 1)

AGC Threshold 1 μ V Attack
 3 or 4 m.S. Release .5 or 2 S
 AF Output 2W (10% D)

Stability 100Hz/30 mins.
 Linearity 1kHz. Backlash 50Hz.
 Image -60dB

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 11½ (14") D



OUR AGENTS

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 Birmingham B8 3HX

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- IC-215** The new 15 channel 3 watt portable from ICOM. This is a sturdy little set ideal for use with repeaters—see last month's RADCOM for further details. This set is becoming very popular. Fitted with 12 channels for £162 inc. VAT and delivery.
- IC-202** The popular SSB 3 watt portable which is sweeping the market. The VXO gives continuous coverage over the ranges 144.0 to 144.2 and 144.2 to 144.4 MHz. The coverage can be extended with extra crystals. See the August 76 copy of Radcom for a review. £172 inc. VAT and delivery.
- IC-211E** The most attractive multimode 2 metre rig on the market or use on SSB, CW or FM. There are two fully synthesised VFOs which are tuned with a single knob—a feature of the patent ICOM "LSI" synthesiser. Features include repeater, reverse repeater, VOX, automatic RIT, digital frequency display to the nearest 100Hz, two rate and electrically lockable tuning and mains or battery operation. Send for more details on this aristocratic 2m. rig. £529 inc. VAT.
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- IC-3PA** The companion mains power supply for the IC-22A, IC-240, IC-225 or IC-30A. This supply has built in electronic protection which is far faster than any fuse and incorporates an extra forward facing speaker. There is a bracket supplied to hold ICOM transceivers. £58 inc. VAT.
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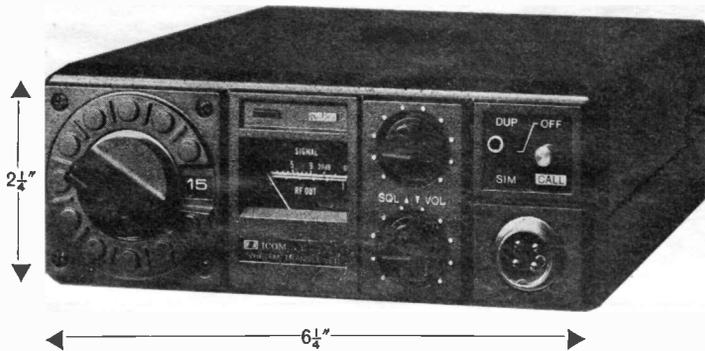
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COULD YOU DO BETTER . . .



THAN BUY AN IC-240 (22 CHANNELS) FOR £198?

In our opinion the IC-240 is by far the best value for money in two metre FM mobile rigs on the market—and judging by the huge world wide demand for these rigs we are not alone in our thoughts. It is not a "flash newcomer" to be scorned but a solidly built, well designed piece of equipment using up to date techniques. The purveyors of another rig of high repute boast its cleanliness of transmitted signal and excellence of receiver design by saying that two of them are being used as a repeater. True, this is a good test which many could not pass and the repeater in question works very well with its associated cavity filters. However, did YOU know that another repeater at the other end of the country has been operating for some time using what amounts to two IC-240s WITHOUT any cavity filters. What's more, plans are afoot to use ONE such rig as the whole repeater. As you know repeaters operate with 600 kHz spacing in this country. However, tests with two 240s showed that they could operate at the site of the repeater, without desensitisation, without filters, down to 100 kHz spacing between the transmitter and the receiver. How about that Mr. W.?

Apart from just having a very clean signal the IC-240 has many other advantages over its competitors. For instance, the optimum choice of mic, mic amp and modulator characteristics gives a clear, well clipped signal that is hard to beat—no more woolly signals that are hard to read on the move. Care and attention has gone into the receiver front end, mixer and discriminator design providing an extremely sensitive receiver which up to now has always been quite a bit better than the advertised spec. Oh yes—we have an expensive signal generator too, but its the IC-240 we are selling and that too has a built-in synthesiser. In fact it is this

very point which puts it way above the rest.

As supplied your IC-240 will be wired for 15 channels which are selected by a single knob and displayed on a dial plate which is easy to read. There are 22 channel positions on the switch and you can easily programme the remaining positions for the extra channels YOU would like at any of the 80 x 25 kHz channels in the two metre band WITHOUT HAVING TO BUY EXPENSIVE CRYSTALS AND WAIT FOR THEM TO BE AVAILABLE. What's more by using 8 switches and diodes and some wire you can make yourself a "VFO" to plug into the socket on the rear to select any of these 80 channels externally. If you are a wizard at logic, or just good at copying other people's circuits, the IC-240 is an ideal set for adding a scanner or a key pad frequency selector.

Add to these advantages the ability to listen on repeater input channels at the flick of a switch, the rugged PA with variable VSWR protection (oh yes, this one works in the wet also), and a built-in tone burst which is wired for automatic operation when you buy the set from us and you will see that the IC-240 is by no means just another rig. It is a rugged, reliable top quality product designed and built by the company who have a respected name in VHF—ICOM.

By the way, to help you with the sums, if you bought a crystal controlled set fitted with 10 channels for about £175 and then set about crystallising up the remaining 12 channels this could cost you another £60.—Then you would want 5 reverse repeater Rx crystals at £12.50 and . . . Oh dear! you won't be able to get the same coverage anyway as there aren't enough crystal sockets —IT WILL HAVE TO BE A 240!



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Midland and North West distributors for the XCR30 unique crystal controlled receiver. This receiver is designed to provide precision frequency tuning over the full short wave spectrum up to 30 MHz with exceptional frequency stability for both AM and SSB. Separate tuned whip antenna.

£145.00 inc. VAT
£145.00 FM Receiver with FM band 87-5 to 101 MHz.
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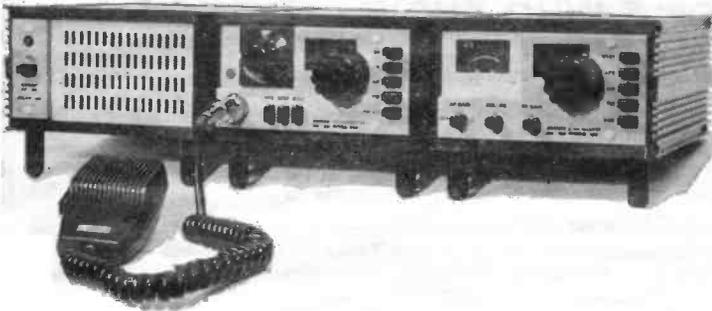
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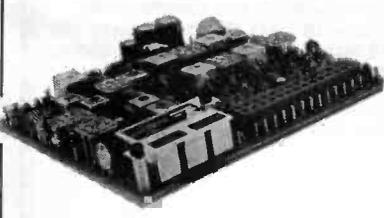
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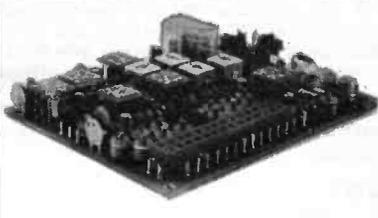
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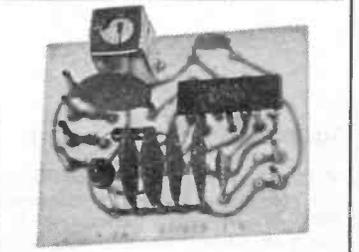
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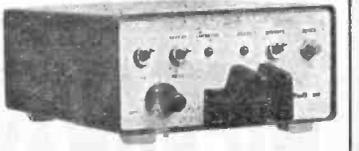
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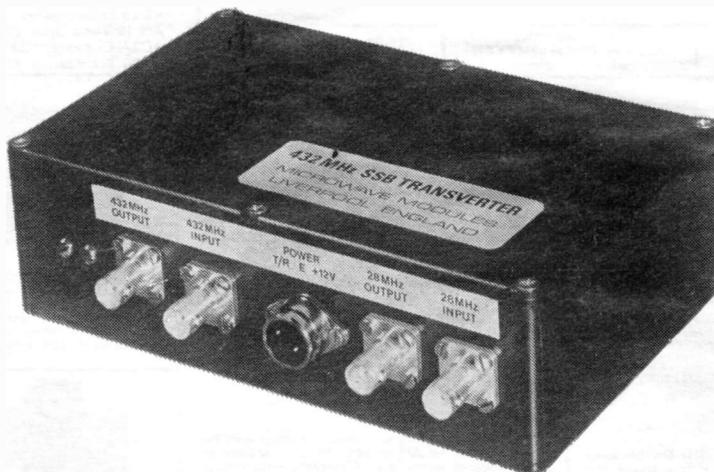
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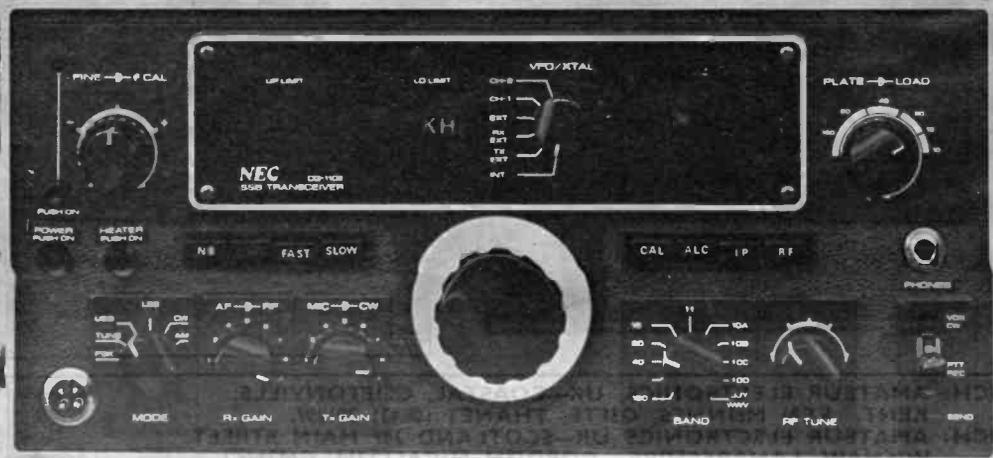
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Editor: PAUL ESSERY, G3KFE/G3SWM

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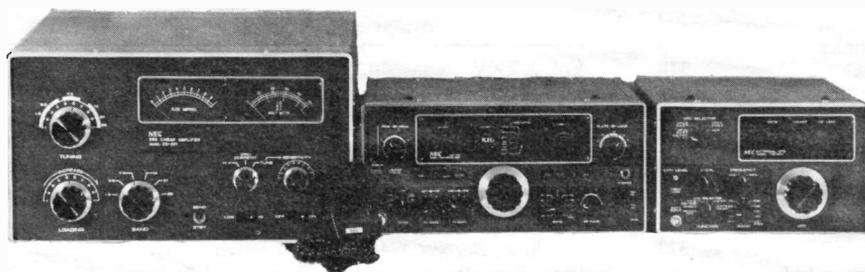
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EDITORIAL

Pollution

Those readers who live in the catchment area of the "Southern Evening Echo" will no doubt have seen the paragraph in the May 11 issue on "Radio Hams get Cold Shoulder", which essentially is a report of the buffoonery of a Fareham borough councillor, Mrs. Rosemary Pockley, who seems bent on demonstrating the truth of the old adage that empty vessels make the most noise.

Luckily, a reader saw fit to send us a copy, and so we wrote a "Letter to the Editor" setting out the correct picture, for the record; we have no idea at the time of writing as to whether this letter was in fact published, so some feedback from readers would be appreciated.

Readers of SHORT WAVE MAGAZINE may take it as certain that we will be only too pleased to write rude letters to any newspaper which "gets it wrong" if a copy of the offending material is sent, *pronto*, to Welwyn with a note of the date, page number and the name of the paper. Whatever we amateurs may think of a facet of our our hobby in terms of pollution, we must never let anyone get away with suggesting that Amateur Radio generally is a pollution of the atmosphere.

John

G3KFE

VHF BANDS

NORMAN FITCH, G3FPK

VHFCC Awards

SOMEHOW the callsign of Ian Harwood, winner of VHF Century Club certificate no. 281, was omitted from last month's copy; it is G8LHT. The new printing of the certificates has been received and it is hoped to have the backlog cleared by the time this appears.

The 23rd VHFCC award for 70 cm. goes to Paul Davies, G8HBQ, from Leeds who estimates that he had only a 50% return on QSL's sent via the bureau. From October 1973, the gear comprised a crystal controlled QQV02-6 PA Tx modulated by a pair of 6AQ5's, best DX being G8AGU/P in Devon and GM8AGU/P in Dumfries. SSB was used from February 1976 derived from a Yaesu FT-201/Modular Electronics transverter giving 10 watts PEP. A 45-ele. *Multibeam* at 42 ft. is the current aerial. Paul is experimenting with quad loop *Yagis* now and has finished a 2C39A amplifier giving 45 watts RF output.

Two metre award no. 282 goes to Chris Baker, G8JGK, from Chelmsford in Essex, who was first licensed in August 1974. Chris started off with a *Microwave Modules*, 5 watts AM Tx, reception being by a converter into a Yaesu FR-50B. with a *halo* at 20ft. The present station comprises a *Heath* HW-100 transceiver, solid state 25 watts transverter, *Datong* RF clipper and *Shure* 444 microphone. For local contacts, an *Icom* IC-22A is used, also to monitor distant repeaters to check conditions. The aerials are an 8-ele. *Yagi* at 32ft. and a ground plane. Future plans include taking the Morse test and then having a crack at the 2m. CW contest.

Award no. 283 for 2m. goes to Derek Wrightson, G3BTO, from Tadley in Hampshire, and is endorsed

for all CW contacts, something of a rarity these days. Derek was licensed in 1947 but did not get going on VHF until June 1974. For the first two years, the Tx ran 10 watts using four crystal frequencies. The RF output is 6 watts, now used to drive a *QM70* amplifier to 25 watts output. The three aerials used have been an 8-ele. *Yagi* home made from a broad band, Band 3 TV aerial, a 10-ele. long *Yagi* and a 6-ele. *Quad*. Aerial height is 12m., the site being 80m. a.s.l. in a saucer-like depression —the only good take-off being SE to SW. The Rx comprises a *Sentinel* converter feeding a *BC-342-N*. G3BTO has 10 countries confirmed with another three worked.

Satellite News

The telemetry from *Oscar 6* at the beginning of June suggests that at least five battery cells have now "gone." If any more use is to be made of *O-6*, it is essential that the least possible power be aimed at it. Accordingly, since most of the abusers are in central and southern Europe, the Surrey Telecommand station will only switch it on for the last two orbits within range on Mondays, Thursdays and Saturdays and then only if the TLM on channel 3A shows the battery voltage to be satisfactory.

Readers having the luxury of a *Teletext* decoder in their TV set, may have noticed that up-to-date orbit information is now transmitted by BBC's *Ceefax* on BB2, page 268. The University of Surrey now has its computer facility directly linked with the BBC's *Ceefax* department at Wood Lane. Anyone with opinions about the service might care to contact John Fleming at the BBC Television Centre, Wood Lane, London, W12 7RJ.

Oscar 7 continues to work well and on June 5 its *Codestore* was sending "AMSAT sends greetings to the United Kingdom on the occasion of the Queen's Jubilee. 73 HI, HI de Oscar 7. HI, HI." A new Mode "A" station is PZ1AP on CW, downlink QRG being 29.475-29.482 MHz. On Mode "B" there is CN8CK on about 145.952 MHz and ELØAA/MM on CW. The planned -/MM operation by G4CJG mentioned last month will not be possible after all.

Solar Studies

Mention last month of WIHDQ's solar studies prompted G8MFP (Warks.) to write that he, G3NAP, G3WCQ and G8MDI are members of the Coventry and Warwickshire Astronomical Society. Amongst other things, they are studying the outburst of solar energy against the outbreak of visual and radio *Aurorae*. Automatic pen recordings of solar noise at 450 MHz from 1100-1300 daily are made. If the pen recorder shows a large upwards swing, experience has shown that a visual or radio *Aurora* may occur within 24 to 40 hours. When this happens, G8MFP alerts other 2m. operators on FM, via GB3BM and on SSB. Readers wishing to assist in the collection of data should contact C. J. Reed, G8MFP, "Ashlea," London Road, Stretton-on-Dunsmore, Rugby, Warks. for details.

Technical Notes

If you want to really wrinkle out the weaker signals, very sensitive, low noise receiving systems are essential. Very often, such systems have a poor dynamic range, cross modulation and de-sensitization being prevalent.

Much of the Japanese equipment in use in Europe has reasonable dynamic range but tends to be rather "deaf." The addition of an external preamplifier often creates more problems than it solves. Glen Ross, G8MWR, found the need for a preamplifier for his *Trio* TS-700 but ran into cross modulation problems when his very near neighbour, G8KYH, came on. However, Glen has now replaced the RF amplifier by the *Signetics* SD-306 device and he is impressed with the results. The makers claim 20 dB gain at 200 MHz with a noise figure of 1.5 dB maximum and a 50 dB a.g.c. characteristic. In practice, G8MWR has found that it needed a 500 millivolt signal across 50 ohms to produce 1% cross modulation. To achieve the 50 dB gain control, an 8 volt swing on Gate 2 is needed so Glen used the inverted output from a 741 op-amp to obtain this. (As the SD-306 is a P-Channel device, the gain is at *maximum* with 8 volts on G2.)

G8MWR promises a further piece on this improvement to the *TS-700*. Meantime, he reckons it has both

solved his problems with the strongest local stations and has made the receiver more sensitive than the original TS-700 plus preamplifier.

DX Notes

“Con Hunter, EI9V, operated -P on 144 MHz from UL40b at a 1500ft. a.s.l. site, 7½ km. southwest of Castletown Bere, county Cork on May 28.” Thus reports Colin Squires, G3XCS (Cornwall) who was lucky enough to be one of the ten stations Con managed to work in over six hours. Next day Con moved to WL01a near Youghal, Co. Cork, where he played to a wider audience. EI9V plans to operate from WL square for three weeks in July, possibly activating UL and UM squares as well during the period.

Those seeking Isle of Man contacts on 2m. should listen for GD8MKC from July 22 through August 6. This is principally a holiday trip by G3THC, G8AAT and G8GHZ, members of the Milton Keynes and District Radio Society. Equipment will comprise a Linear 2, IC-22 and 8-ele. Yagi with operation the evenings of July 24, 26 and 28, August 2 and 4 and perhaps on the 31st in the QRP contest.

All through August, Ian Harwood, G8LHT, plans to operate on 2m. in Scotland, starting in Dumfries and Galloway, via Fife to Grampian Region, with ZR square activity. towards the end of the month. At the end of August/beginning of September, Caithness and YS square, plus Sutherland in YR in Highland Region, ending up with operation from YQ and YP. 10 watts and an 8-ele. Yagi, possibly supplemented by a small amplifier.

From August 1 through 15, four Swedish amateurs will be signing SK6JF/OY in WW square, running 250 watts.

G3CHN mentioned that Gérard Le Falchier, F1COF, will be in Portugal for the first three weeks of August, till the 22nd, with a TS-700 and 9-ele. aerial in VC square. However, he plans to visit CT1WW (WB63b) who will soon have one kilowatt available to his four 5-ele. Yagis. Fingers crossed for a nice Sporadic E opening!

Two difficult QTH squares are XH and YG in western France.

Alain Puillandre, F1CRP, will be operating from both during a trip there for a couple of weeks up to mid-August. A TS-700 with 160 watts amplifier and 16-ele. Yagi should enable him to put out a good signal and Alain will be listening for British stations. Main operation will be from Friday afternoon till Monday afternoon.

Beacon News

In a recent contact with F5ZA, Henri told your scribe that the 6m. beacon at Lannion on 50.1 MHz has been operating since May 26, beaming towards central America. The aerial is a five-over-five Yagi situated between the upper and lower platforms on the water tower. The SWR is not too good and they are looking for another site for this beacon in the Brest region. The callsign is FX3VHF.

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G8FUF	1	80	176	257
G3POI	—	—	178	178
G3JXN	18	53	69	140
G4BWW	—	25	110	135
GM4CXP	—	21	110	131
G3CHN	—	—	131	131
G3COJ	15	50	64	129
G8HVV	—	33	93	126
G3OHC	3	28	95	126
G3FPK	—	—	125	125
G4BAH	—	32	92	124
G8GML	2	37	76	115
9H1CD	—	5	110	115
G4CDF	—	—	109	109
G3XCS	—	18	88	106
G4DKX	3	25	68	96
G2AXI	1	36	59	96
G4FCD	—	22	73	95
G8BKR	1	9	81	91
G8IWA	—	17	74	91
G8HHI	—	15	75	90
G8GII	—	22	63	85
G6UW	—	—	85	85
GD2HDZ	9	24	50	83
G8EOP	8	36	38	82
G3FIJ	—	25	57	82
GJ8AAZ	—	15	55	70

G4DEZ	—	—	69	69
G8HAF	—	—	69	69
G3BW	—	21	47	68
G8JJR	—	—	68	68
G4FBK	—	5	60	65
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
G8IFT	5	16	35	56
G8LHT	—	—	55	55
G8ITS	—	7	47	54
OZ9IY	—	—	53	53
GD3YEO	—	—	52	52
G8JEF	—	—	44	44
G4EYL	—	—	41	41
G4ERX	—	1	39	40
G8LLG	—	1	38	39
G8JAH	—	1	35	36
G8KSS	—	—	34	34
G4CIK/A	—	1	23	24
G8JAJ	—	—	24	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's.

The 2m. Lannion beacon, FX3THF (YI13d) on 144.905 MHz is frequently stronger at G3FPK than the Redruth beacon, GB3CTC. The Department 28 beacon, FXØTHF (AI46h) is still on 144.74 MHz but it is understood that a new QRG of 144.845 MHz has been suggested.

The Gibraltar 2m. beacon on 144.145 MHz now pauses after each identification. Operator Jim Bruzon, ZB2BL, will thus be able to make QSO's via ZB2VHF when E's propagation occurs.

Sporadic E

On May 27, there was considerable Sporadic E propagation at VHF. At G3FPK, the West German beacon, DLØIGI, on 28.195 MHz was extremely strong in the afternoon. The 4m. band was full of east European stations. The phenomena produced contacts in the 2m.

band over parts of the continent, but no useful opening was recorded in the British Isles. GW4CQT mentioned a couple of seconds from an IW9 (?) around lunchtime but frantic CW calls thereafter drew a blank. DK1KO (FN12g) heard LZ1AB (LC27d) and a northern German station is said to have worked a UB5 in RI square. There seems to be some doubt concerning the authenticity of a contact between SM3AKW (IW30e) and YO2IS (KF17e). G4BWG reports hearing a couple of Italian stations during a five minute period between 1630 and 1700 GMT on June 4 but Steve reckons it was too short for any QSO's.

Meteor Scatter

During the *Aquarids* shower at the beginning of May, Dave Price, GW4CQT, worked CT1WW on SSB on the 5th, getting a RS47 report. There was one 23 second burst at S8 from the CT1. On the 7th, Dave worked OK1BMW (HK72b) and on the 21st, he went out portable to XM square to work SM7FJE (GQ56h) to give Bo another new one.

As this is being written, the *Arietids* shower is in progress so reports from MS enthusiasts would be welcomed for the August column.

Seventy Centimetres

In the 432 MHz Open Contest on May 15 activity was good and conditions average or a little below. Most stations noted occasional lifts but with a lot of deep fading. Some of the portables appeared on 2m. before the scheduled end of the event as they had worked all they could hear. G3OHC was on for four hours and had 46 contacts but did not hear G4ASR/P from The Lizard. Graham was out portable on Barr Beacon (ZM31j) using a *Yaesu* FT-101B and *QM70* transverter with an 18-ele. *Parabeam*. Best DX was G8AGU/P in Devon.

John Pilags, G8HHI (Hants.) Managed ten new 1977 counties during the contest his best DX being GW8ITZ/P (YN75f); and G3PMH/P clocked up 138 QSO's.

The persistent high pressure system in the latter half of May eventually produced some good UHF conditions. On the evening of the 23rd. LA3EQ and LA6HL, both in CS

square, told your conductor that they were watching superb UHF TV pictures from Wales. G3DAH reported that OZ2UHF (EP) was S8-9 for days at Herne Bay. Ted Morton, G4CDC (Scunthorpe), worked in EN, EQ, FN and GR squares but suffered from the very loud radar interference every 8 seconds, from the north-east. G3DAH carried out some tests with continentals and reckons the source was in ER square.

During his stint in Cornwall in May, David Butler, G4ASR, con-

tacted 19 counties and 6 countries from XJ square and promises a detailed account with photos later on.

Two Metres

The excellent conditions earlier in the month had gone by the last weekend when the 144 MHz Portable Contest took place. G3DAH thought that conditions were a little above average and concluded 73 QSO's in 8 hours at an average of 9.68 points per contact. Ray Elliott, G4ERX (Essex) enjoyed the month.

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	54	12	18	4	117
GD2HDZ	14	3	39	10	31	7	104
G8GML	—	—	56	12	27	8	103
G4ECQ	23	3	61	14	—	—	101
G3FIJ	27	2	45	9	15	2	110
G8HJQ	—	—	56	14	21	8	99
G2AXI	18	2	37	9	20	2	88
G8BKR	—	—	55	10	16	3	84
G4FCD	2	1	62	12	3	1	81
G8HHI	—	—	45	11	20	4	80
G3FPK	—	—	64	14	—	—	78
GM4CXP	13	2	44	13	4	1	77
G4FOR	—	—	57	11	7	2	77
G4BYP	—	—	45	10	16	6	77
G4FBK	—	—	52	10	12	1	75
G4CMV	—	—	62	12	—	—	74
G4DKX	7	1	37	9	13	4	71
G8GII	—	—	31	5	28	6	70
G4DEZ	—	—	57	12	—	—	69
G8JHX	—	—	52	11	—	—	63
G8LHT	—	—	51	9	—	—	60
G8MKW	—	—	46	10	—	—	56
G8KSS	—	—	46	10	—	—	56
G4ERX	—	—	43	10	1	1	55
G8JJR	—	—	47	8	—	—	55
G8ITS	—	—	41	8	14	1	54
G8HAF	—	—	40	7	—	—	47
G4AEZ	2	1	24	6	12	1	46
G8KKX	—	—	36	6	—	—	42
G4FKI	—	—	12	1	4	1	18

He noticed a widely dispersed duct to the north in the May 16-18 period during which he worked LA6HL (CS08c). Incidentally, Johannes must have worked scores of British stations as he seemed to be the only Norwegian on 2m. at the time. Ray, who does not normally copy the GB3NEE beacon, says it was strongest when he went QRT at 0200 on the 17th. FXØTHF is always just above the noise during flat conditions, by contrast.

During the IARU Region 1 Contest on May 8, G3OHC worked some F's and ON's in AK, BK, BL and CK squares. On the 24th Graham managed exchanges with DK5LA (EO29) and OZ's in EO, EP and EQ. He found plenty of activity in the Portable affair with conditions from the West Midlands quite good on the Saturday with several GI's and GM's worked. G4ASR/P (XJ05h) notched up 180 contest contacts and managed 40 counties and 13 countries from Cornwall.

Julian Moss, G8ILO (Lancaster) was out -P/ for the contest using his IC-202 with 25 watts amplifier and a 6-over-6 beam. He concluded 315 QSO's worth 2300-plus points. Not too much continental activity as there was no European event at the time. Ken Osborne, G8KSS (Bristol) got his AM across to two French portables in AK square in the IARU Contest and also worked ON6AT/A (BK18f). During the later lift period, he worked F1ENH/P and F1DSQ/P both in AK on the 19th, and on the 22nd, PAØWGL (DN72a). On the 24th, several OZ's in EP and EQ were heard and OZ10F (EQ78b) was worked.

Martin Green, G8MKW (Warks.), is a newcomer to these pages and writes that he is enjoying 2m. SSB with a *Liner 2* modified to cover up to 144.416 MHz and a 10-ele. *Yagi* on a chimney stack. The 1977 score of ten countries included DJ, LA, ON, PA and OZ3UN (GQ71c) worked on May 24. Martin's QTH is 250ft. a.s.l. with a reasonably clear take off in most directions.

Bob Henderson, G3ZEM, with G3YUV, G3XXQ, G8NES and an *s.w.l.* operated as GM3ZEM/P from Borders during the Portable event. Access to their first choice of site was too steep so they abandoned the climb. Their Volkswagen could not get up to the second site so they



Henry Souchet, 9H1CD, of whom a little mention has been made of late in these columns!

eventually ended up at the third choice in YP49f. They did not start till 1715 then aerial troubles kept them off for two hours. Later on generator failure lost them another four hours. Even so, they managed 242 QSO's, heard lots of meteor "pings" and had a "hairy tropo." contact with SP5KN in KM square. DL, ON, OZ, PA and a couple of SM's were worked but activity was disappointing due to the lack of any European contest.

It seems that GW8BHH/P operating from Beacon Hill, Powys, must be winners of the Portable event with 7154 points from 686 QSO's. About 100 continentals in the 600 kms. range were worked and in one or two short bursts of ducting, some QSO's of 900 kms. were achieved in otherwise patchy conditions. During a contact with LA6HL, Johannes reminded your scribe that on the first Tuesday of each month there is the Scandanavian Activity Contest on 2m. from 1800-2400 GMT so it would be well worth while turning your beams towards LA, OZ and SM on July 5, August 2, etc.

Television

Lawrence Woolf, GJ8AAZ, from St. Brelade, writes that they are having some success with 625 lines TV on 70 cms. On May 21, he and GJ8EZA received pictures from F1ANH and F3YX coinciding with a Rally at Mont Saint-Michel

(Dept. 50) which included a lot of TV activity. On May 28, GJ8EZA exchanged pictures with F1CFD in St. Malo (Dept. 35) for probably the first Channel Islands to France TV QSO. Lawrence received the pictures from Michel, who was only running 4 watts output. To date, GJ8AAZ's video has only been seen in Jersey but he expects better results when he has a bit more power available.

Final Miscellany

G4FRX would like to work Northumberland, Cleveland and Durham, EI, GI, GJ and GU in his quest for his 60 counties and more countries. Skeds are sought with stations able to work into London. QTH is John Nelson, 13 Sulgrave Road, London W6 7AD (01-602 5855). G8HUY has moved from Ripon to Cambridgeshire. He listened on the mobile all way down to A1 using an HB9CV aerial and heard GB3VHF all the way. John says he had worked two countries from Waterbeach before the furniture arrived!

Deadlines

That's it for another interesting month. All your contributions for the next issue by July 7 and for the following month, August 4 to:— "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., ALC 9EQ. 73 de G3FPK.

A VERSATILE CABINET SYSTEM FOR HOME-BUILT EQUIPMENT

P. BURNETT, G4BL

THE objective of any self-respecting home constructor should be to achieve a professional end product not only in technical performance but also in the final appearance of any piece of home constructed gear.

This writer has tried several approaches in an effort to achieve professional appearance, from the "easy way out" in purchasing a ready made cabinet—usual drawback being that it is rarely possible to find one correct size—starting with a large sheet of aluminium and attempting to bend to shape between blocks of wood, etc.

The cabinet system described here was finally evolved and exhibits the following advantages:

- (a) No bending required.
- (b) Adaptable to any size.
- (c) Minimum of cutting and sawing.
- (d) Flat sheets of metal only required.
- (e) No jigs required.
- (f) Easy access to the interior of the completed cabinet, front, rear, top and bottom panels easily removable.
- (g) Easy to achieve a modern professional appearance.

If one is careful to plan all the measurements first, taking into account metal thicknesses for example, then it is possible to go along to your local sheet metal working shop and get all parts cut to size, there remaining only the drilling, tapping and de-burring operations.

Fig. 1 shows the general assembly to which the front, rear, top and bottom panels are attached. No overall sizes are given as this will obviously depend upon individual requirements, however, suggested metal gauges and hole sizes are given as a guide.

From Fig. 1 and the photograph of some finished pieces of equipment the general idea is really self explanatory, however, the following brief notes may be helpful in achieving the best appearance:

- (1) Prepare all aluminium panels by rubbing with fine wire-wool to remove the shine.
- (2) Assemble the two side panels to the four cross-members as shown in Fig. 1. Ensure that the assembly is square.
- (3) Spray the side panels with primer (better adhesion will result if treated with a aluminium etchant first to remove surface oxidization). Spray final coat or an undercoat if desired. Use masking tape to avoid spraying paint onto the cross-pieces.
- (4) The position of the cross-pieces should be set so that the top and bottom panels when fitted are flush with the top and bottom edges of the side panels.
- (5) Use counter-sunk raised head chrome screws to secure the front panel.
- (6) Use plastic feet fitted to the bottom panel to raise the cabinet off the bench.
- (7) Make the size of the top and bottom panels such that they overlap the front panel by approx. $\frac{1}{4}$ " so that their front edges are in line with the rear edge of the side panel cut-outs. Alternatively, additional pieces of trim may be used, as shown in the photograph, to enhance the appearance, in which case the front edges of the top and bottom panels will now sit behind the front panel.

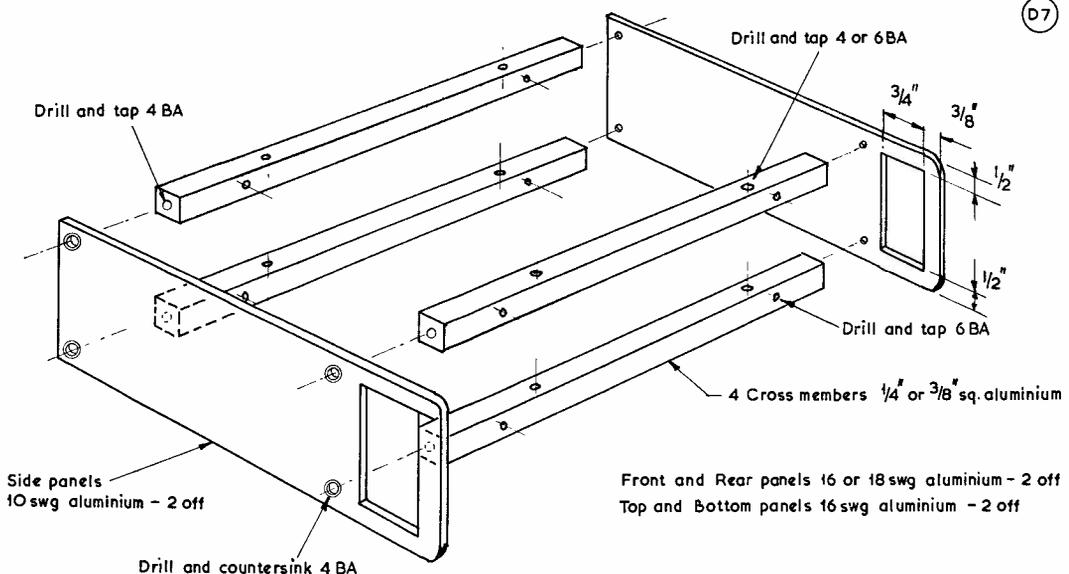


Fig. 1

- (8) Drills all holes prior to painting.
- (9) A higher gloss finish may be achieved on the *final* coat of paint by rubbing with a proprietary brand of car polish.
- (10) Use transfers, rub-on lettering or stencils to "legend"

the front and rear panels. The whole panel may then be sprayed with a coat of clear varnish.

It is hoped this little article illustrates just how easy and simple it is to achieve the professional touch; the main tools required are patience and care!



Shows two pieces of home constructed equipment using the described Cabinet System. The top one is a SSTV fast/slow converter and shows how front and rear trims may be fitted to enhance the appearance. The bottom piece of equipment is a fully variable "digital readout" power supply with current limiting and short-circuit protection.

FM — SOME BASIC PRINCIPLES, PART I

by "DEVIATOR"

ALTHOUGH FM has been around for a long time there are many newcomers who may not be informed of the finer points of transmitting and receiving good FM.

This series of articles is designed to cover transmission, reception and any other points which may be of interest. Feedback on topics *you* want covered will be welcomed.

Frequency and Phase Modulation

"Frequency and phase modulation are the same thing. Well, almost." How often does one hear that remark on the air? If they are almost the same thing how do they differ? Why do people who use phase modulation sometimes have "toppy" audio? Why do the professionals seem to prefer phase modulation?

To answer these questions it is easiest to go back to the fundamental definition of frequency. Do you remem-

ber the rotating coil in a magnetic field that perhaps introduced you to AC for the R.A.E.? Such a coil produces one cycle of output voltage for each cycle of field change, which occurs in one rotation in the elementary generator. Thus one cycle of AC corresponds to a 360° rotation.

We specify the frequency as the number of cycles occurring in one second. Thus a steady frequency corresponds to a constant rate of revolution, *i.e.* a constant rate of increase of angle of rotation. Hence to produce a change of frequency we must produce a change in the rate of angular rotation; this implies that we must add an angle which constantly increases with time.

Phase modulators

A phase modulator is a circuit block which will alter the phase of an RF carrier in sympathy with a modulating signal. On its own it cannot produce a phase change which continually increases with time, and thus cannot produce a steady change of frequency. Hence if it is desired that a steady modulating voltage should produce a steady frequency change, as in FM, the modulating voltage must be integrated prior to application to the

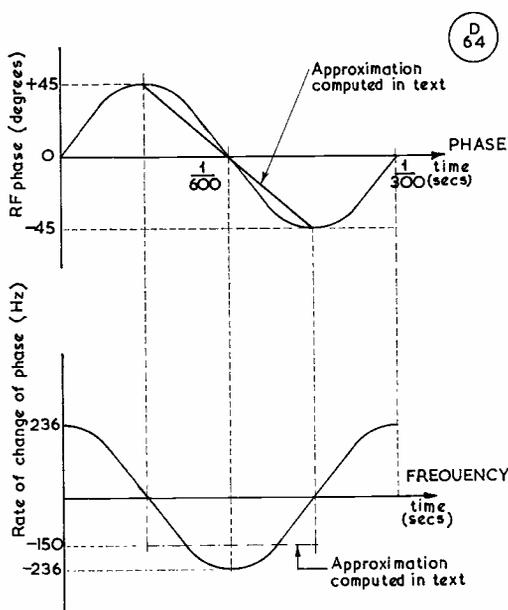


Fig. 1 Worked Example relating Phase to Frequency

phase modulator. Without such an integrator the basic phase modulator will behave as follows.:-

Suppose that a sine wave modulating signal is of such an amplitude to produce a sinusoidal phase deviation of, say, 20° peak to peak. Thus if the modulation frequency is one kilohertz, there will be a certain maximum rate of change of phase, and hence a certain maximum frequency deviation. Now suppose the modulation frequency is doubled, whilst keeping the amplitude unaltered: the phase excursion remains 20° peak to peak but the time interval in which the excursion occurs is halved. Hence the rate of change of phase, and therefore the maximum frequency deviation, is doubled.

This gives a rising frequency response, at +6dB per octave, and of course the "toppy" sound. The integrator must have a complimentary -6 dB per octave response and gives an overall flat response to the system. A suitable integrator is a low-pass RC filter operating above its cut-off frequency.

Basic Limitations of Phase Modulation

Practical phase modulator circuits can shift phase by differing maximum amounts, typically $\pm 45^\circ$ for a single varicap diode or $\pm 90^\circ$ for a bridge circuit. Supposing that a 300 Hz signal is fed to a single diode modulator: then, as illustrated in Fig. 1, the maximum rate of change of phase can be worked out as approximately 90° per half cycle time, $1/600$ second. Thus the maximum frequency deviation can be worked out as $600 \times 90^\circ$ per second, equal to $150 \times 360^\circ$ per second, *i.e.* 150 Hz. More accurate analysis, allowing for the sinusoidal shape of the modulating waveform, gives the maximum deviation as ± 236 Hz.

But the maximum deviation for 25 kHz channels is ± 5 kHz, so that the phase modulated signal must be multiplied in frequency by at least 22 times to exceed ± 5 kHz. In practice, however, the $\pm 45^\circ$ is not a hard limit but one set by acceptable linearity. Hence for output on 144 MHz an eighteen-times multiplier and 8 MHz crystals would suffice.

To obtain 5 kHz deviation at a higher modulation frequency than 300 Hz is proportionately easier, as the required phase deviation decreases. This little sum shows why low frequency crystals and long multiplier chains can be found in phase modulated FM transmitters.

Advantages of Phase Modulation

In spite of requiring integrators and chains of multipliers phase modulation is popular amongst commercial rigs. Why should this be? That question has in fact already been answered. As the amount of phase modulation is limited no steady change of frequency can be produced. Hence component drift in the modulator will not affect frequency setting accuracy.

As the modulation is applied after generation of the carrier frequency, crystal characteristics do not affect the deviation produced. Consequently deviation will be independent of channel, and for most practical circuits will be constant across the channels in an amateur band.

Summary

Phase modulators, with audio integration, can be used to generate FM; for particular modulators there are certain minimum frequency multiplications that must be used. The next article will deal with processing the audio to apply to the frequency modulator.

to be continued

ASPECTS OF RADIO COMMUNICATIONS RECEIVERS, PART III

N. H. SEDGWICK, G8WV

Frequency Mixing and Intermodulation Products

WE made reference to "frequency changing" in *Part I*. The purist would object to this term although it describes the resultant effect. The mixer does not change the signal frequency but generates other frequencies which carry the modulation of all the applied frequencies at its output; it is the IF selectivity which selects the required one of several outputs or rejects the others. The outputs which are present at the mixer anode are:—

- (a) Signal frequency (modulated)
- (b) HFO frequency (unmodulated)
- (c) An image signal (modulated)
- (d) Sum and difference frequencies of all possible combinations of the above (modulated)

A mixer is a modulator and works by reason of the fact that it is non-linear. Because it is non-linear it has a tendency to generate harmonics of the various signal frequencies within itself; it can also give rise to intermodulation products known as IP's. In the past IP's have tended to be classed as "too difficult," but modern receivers now specify IP figures in their leading particulars, and one should beware the manufacturer who does not do so.

A strong signal within the bandwidth of the RF tuned stages, but not separated from HFO by the IF, may act as a second HFO beating with signals separated from it either above or below by the intermediate frequency and so producing an output from the mixer at IF. Signals so produced are called IP's. They are often recognised as such because they carry on them the modulation of both signals which originated them; IP's also arise as a result of harmonics of very strong signals which appear on the mixer input because the mixer distorts and so generates harmonics. It is quite easy to find out how a receiver is behaving in respect of IP's: all one has to do is to disable the normal HFO and see if anything comes out of the receiver. Measurements are made by injecting two signal generators into the aerial terminal and relating the IP outputs in terms of dB to the signals which cause them. Obviously, front-end selectivity and linearity have strong bearings on performance. If the first RF stage is not linear it will act as a mixer and be prone to IP's as it has little selectivity in front of it. IP's then come out at SF and are passed to the mixer for conversion to IF. More usually the RF stages have limited dynamic signal range, so that a strong signal drives them into non-linear operation by overloading; RF stages therefore require long grid-base valves. Transistor RF stages have been very vulnerable to IP's due to overloading, but modern communications receivers are now much better in this respect. AGC (automatic gain control) is not helpful in eliminating IP's because it backs off stage gain as signals become

strong, but is derived from the detector and can only detect the presence of strong signals out of normal tuning by reason of the IP arriving at the detector. In other words, the AGC can only produce a control voltage when the damage is actually occurring and requires the damage to continue in order that it may maintain the voltage.

One series of receivers has an AGC circuit which operates from the RF stages alone, and this responds to very strong signals in the RF pass-band which is wide-band, so backing off the RF gain. This is the designer's answer to the IP problem—to increase the dynamic range of the front end by putting in attenuation whenever a big signal appears at the input; however one commonly loses the wanted signal even though no IP interference has actually arisen, simply because a big signal has appeared on a frequency in the RF pass-band where it does no damage. The design philosophy says it is better to reduce gain and lose your wanted weak signal than run the risk of having it cut up by an IP. The end product is the same in either case—one cannot receive the signal one wants, so why pay for the extra circuitry? This is a Big Signal Service philosophy, but the amateur is in the weak signal business!

The best protection against IP's is good front-end linearity and good front-end selectivity. At this point we may perhaps again sum up by saying:—

- (a) Protection against IP's requires good front-end selectivity, but—
- (b) Good front-end selectivity requires accurate HFO tracking, but—
- (c) Accurate HFO tracking requires an IF which is low, relative to the SF range being tuned, and—
- (d) Low IF requires good front-end selectivity to reduce image response.

So it all comes back to the fact that the RF stages have a major effect on receiver performance and design, and there is far more to them than the average technician seems to think. Coming back to mixers, it has already been said that they are inherently noisy devices. There is an optimum signal and HFO voltage which produces the best signal/noise ratio, but since the signal can vary so vastly in amplitude a very broad compromise must be adopted. The HFO voltage amplitude must always exceed the signal amplitude; if it does not the signal will over-modulate the HFO voltage and amplitude distortion of the resultant IF signal modulation will result. Since the IF modulation is the resultant of all modulations on both of the mixed signals, any noise or hum on the HFO output will appear on the IF modulation. The HFO must therefore be a very clean oscillator. If the modulation system of the signal being received requires very good frequency stability, the HFO must match this because its frequency stability will be reflected in the IF stability; if suppressed carrier SSB is being used, for example, any frequency change of the HFO will be directly transferred to the audio output. Suppose the HFO is operating on 10 MHz and has a stability of ± 1 part in 10^6 . 10 MHz is 10^7 Hz, so such stability could give a frequency variation of 100 Hz at the audio output. A 1 kHz tone transmitted could thus be interpreted as 0.9 or 1.1 kHz, which has downgraded the frequency stability to ± 1 part in 10^4 !

Development of Receivers

There is little scope left for improving signal/noise and selectivity performance of good quality communications receivers, for the ultimate has probably been reached. Research and development has turned its attention to front-end performance with particular reference to dynamic range and linearity, frequency setting and stability, and operational facility. Such things have proved very expensive and dual diversity receivers used on fixed point-to-point HF telegraphy circuits can cost up to £15,000 each. The professional requirement for very good frequency stability has led to use of synthesisers to replace HFO's, so that the communications receiver which suits the amateur is no longer also the choice of the professional HF communicator, as it was twenty years ago. Until very recently the divergence led to two purpose-tailored classes of receivers, i.e.:—

(a) *Synthesised receivers* for professional point-to-point working, and

(b) *Search receivers* retaining dial and knob tuning (and hence the self-excited HFO) for amateur, marine, and general monitoring service.

Category (a) branched off to become highly specialised, in small scale production, and very expensive; Category (b) remained limited in frequency setting accuracy and stability because of the necessity for continuous tuning in a fashion that was easy for the operator, and the quantity of production and cost remained in line with previous experience.

Synthesisers fall into three classes as follows:—

(a) *Direct Synthesis* where a reference oscillator of extremely high stability is used with multiplying and dividing circuitry and triple mixers to produce the final frequency required, probably in 1, 10, or 100 Hz steps. Because the output is directly produced from the reference standard the system is "fail safe." That is to say, a failure in the system will remove the output signal and it will not produce an unwanted frequency. However, since the device is a mass of mixers, noise and spurs, signal levels are poor—generally about 60dB below signal output, which makes them unsuitable for directly driving broadband transmitting amplifiers, and degrades performance if used directly in place of the HFO on a receiver.

(b) *Phased Locked Loop Synthesisers*. These use a self-excited oscillator locked to the reference standard in some way, and are thus as clean of noise as the oscillator can be made. However, if the lock fails, the oscillator will jump to its natural frequency, so they are not "fail safe."

Due to the phase locking arrangement there may be a degree of phase change in the output which could be annoying if the modulation system in use requires phase coherence. In that case additional circuitry can be used to compare reference standard phase with output phase changes, and to cut output and give an alarm if these become excessive. Such refinement adds to the cost, but makes it "fail safe."

(c) *Digital Synthesisers* utilise a self-excited oscillator and count the number of hertz in a measured time determined by pulses derived from the reference oscillator. If these are too few or too many, a correction is applied to the self-excited oscillator. In this way short term stability

between corrections can be quite poor when long term stability averages out to be very high.

All of these types of synthesiser use a series of multiway rotary switches for setting frequency, one switch to each digit. They are based on the philosophy that one knows the frequency to be used (either receiving or transmitting) and one sets the synthesiser to that frequency, and that is that. They are not readily adaptable operationally to searching a band of frequencies.

In the case when a synthesiser acts as the HFO in a receiver it needs to be set above the required signal frequency by the amount of the IF. The operator can do the arithmetic or the synthesiser may use a Frequency Offset Unit (FOSU) which allows the synthesiser controls to be set to the signal frequency and automatically displaces the output frequency by the amount of the IF; this is indeed an expensive luxury when one considers that in a professional receiving station the receiver is probably used on only a few frequencies allocated to a particular service, and the arithmetic only needs to be done once and recorded on a card for future reference.

Fairly recently there has been a breakthrough by *Racal* which enables a synthesised receiver to be used and handled as a conventional search receiver. This is the RA-1772 receiver which has the normal tuning knob, but which in fact switches a synthesiser in 10 Hz steps so smoothly that by casual listening the receiver appears to be tuning continuously. These receivers have been widely adopted by professional users of the HF spectrum in this country, so that their production is economical, although probably out of the price bracket of most amateur enthusiasts. Where this degree of sophistication is not required the amateur is still likely to choose the cheaper alternative of a conventional HFO.

Improvement Options for the Amateur

The amateur who has a reasonably good commercial communications receiver will be well advised not to pull it about unless he has the necessary range of test equipment that will enable him to measure what he is doing. The effectiveness of the front-end can easily be checked by disabling the HFO; this should remove all signals. If broadly tuned signals can still be heard with the aerial connected they are IP's arising from non-linear operation or overloading of the front end. A check should be made of the voltages (particularly cathode bias in valve sets) in the front-end with the aerial disconnected. If these are right the trouble is overloading by strong signals and the best way to improve it is to improve the front-end selectivity; this can be done by inserting band-pass filters adjusted to pass just the width of an amateur band in the coaxial input circuit to the receiver. One can have one filter for each amateur band of interest, and plug them into circuit as required; these will keep very big out-of-band signals from causing front-end overload. Signals within the amateur bands are seldom strong enough to drive the front-end into non-linearity.

Attention should be paid to the cleanliness of the HFO output, hum decoupling checked, and suspect condensers changed. Hum voltage on the HFO supplies can cause 100 Hz FM as well as AM, all of which is transferred to the signal to which the receiver is tuned.

Finally, in a complicated receiver like a double superhet, check internal screens occasionally for loose screws, corroded edges, etc. Spurious signals can arise from poor screening between circuits.

As receivers become more and more complicated the problem of spurious signals becomes of greater importance as the complex circuitry presents greater opportunity for them to be generated in the receiver itself. The communicator, amateur or professional, has enough difficulty competing with real signals that jam his signals he tries to read. It should be a very high priority to investigate and eradicate spurious signals which arise from design of the receiver.

Concluded

Correction

Referring to *Part II* of this article (p. 222, June issue), the last "plus" sign at the end of the formula finishing the third paragraph should have been an "equals" sign.



One of the "Oryx" range of miniature low-voltage soldering irons available from Greenwood Electronics of Reading.

MEASUREMENT OF THE GATE-SOURCE CUT-OFF VOLTAGE OF A JUNCTION FET

A NEAT WAY OF RESOLVING A DIFFICULTY

R. W. MICKLEWRIGHT, G3MYM

THE gate-source cut-off voltage of a junction FET is the value of gate voltage at which the drain current has just reached so low a value that for all practical purposes the transistor can be said to be cut off, and is therefore an important FET characteristic.

On the face of it this would appear to be an easy characteristic to measure. All one would have to do is to increase the gate voltage until the drain current has just fallen to the cut-off value and then read off the value of gate voltage. In practice, however, it is not so easy. There are two difficulties. The first is in determining exactly when the drain current has reached the cut-off value, as this depends on convention and on the sensitivity of the drain current meter. The second difficulty lies in determining the exact gate voltage at which the drain current just reaches the cut-off value, because for any voltage in excess of cut-off the drain current will be practically the same.

To avoid these difficulties the writer uses another approach based on the formula

$$I_d = I_{dss} \times \left[1 - \frac{V_g}{V_c} \right]^2$$

where I_d is the drain current

I_{dss} is the drain current at zero gate voltage

V_g is the gate voltage

V_c is the gate-source cut-off voltage.

This formula only applies when the FET is being operated in the pinch-off region (the normal mode) and gives, to a good approximation, drain current as a function of gate voltage. Transposing the formula gives

$$\frac{V_g}{V_c} = 1 - \sqrt{\frac{I_d}{I_{dss}}}$$

which shows that a particular fraction of I_{dss} corresponds to a particular fraction of gate-source cut-off voltage.

The fraction used by the writer is

$$I_d = \frac{I_{dss}}{4} \text{ which corresponds to a gate voltage of } \frac{V_c}{2}$$

The method used to determine the gate-source cut-off voltage is therefore as follows:

1. Measure I_{dss}
2. Increase the gate voltage until the drain current falls to $\frac{I_{dss}}{4}$.
3. Read off the corresponding value of gate voltage, then double it to give the gate-source cut-off voltage.

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IMPROVING THE EDDYSTONE 888A RECEIVER

H. E. WHATLEY, G2BY

MANY of these fine receivers still hold a place on the operating-tables of Radio Amateurs, particularly with Old Timers who knew them when they first appeared in the early "fifties."

In the writer's case the performance of his 888A compares very favourably with the receiving half of his FT-101B, with the bonus of a quiet background and without the need of an attenuator, even on the noisy 40 metre band.

The main difference between the 888A and the 888 version of this receiver lies in the provision of a product detector; the IF variable selectivity control is fitted as standard in both types.

The LC filter is located between the double-diode rectifier and the audio output stage, and can be switched in or out manually from the front panel.

The bandwidth of this filter at 1000 Hz is 80 Hz at 6 dB down. While the filter is very effective, its weakness lies in its tendency to "ring," particularly when any local static appears. Also under certain receiving conditions a fixed bandwidth of 80 Hz is often too narrow. Operation of the variable selectivity control in these circumstances affects only the skirt-width.

With the advent of the MFJ four-stage active filter obtainable in kit-form, the writer decided to build one of these into a small die-cast box measuring $4\frac{1}{2} \times 2\frac{3}{8} \times 1\frac{1}{2}$ " for use out-board of the Rx. The active filter has three switched band-widths at 180, 110 and 80 Hz, and was found very effective and far superior to the built-in LC filter, although care has to be taken to avoid overloading the input.

The unit was battery-operated from a PP3 battery secured to the underside of the die-cast box lid. The switch for this, and the slide-switch for selecting the bandwidth being mounted on one long side of the box.

From the results obtained it was decided that ideally the filter should be built into the receiver to take the place of the existing LC filter. For the screening aspect it was decided that the filter should remain in its die-cast box, and to avoid battery maintenance, be energised from the receiver power supply; this would also avoid the need for a switch on the filter unit.

A suitable position for the filter box was found to be on the top and to the rear of the cover over the main

tuning gang. Here it was secured with two 6BA screws put through from the underside of the cover. The next consideration was the question of wiring.

It was decided to use the existing LC filter switch located on the front panel, and since it was only two-way, to connect it to the filter box so that in the "up" position the active filter was by-passed, and in the "down" position the filter was brought into circuit; the appropriate bandwidth being pre-selected by the slide-switch on the filter box.

With the receiver placed face downwards on its handling brackets and the main casing removed, the audio filter switch was located and fortunately found to be the most accessible of all the front panel switches.

The rear view and existing wiring on this switch is as shown in Fig. 1. Fig. 2 shows the modification to the wiring to incorporate the filter. The purple and green twisted leads from the LC filter were detached from the switch and tied-off.

The question of power supply to the filter was easily solved, as it was found by experiment, in the writer's case, that a 36K ohm 2 watt resistor connected between the main 275 volt positive rail and the unit gave around 16 volts—falling nicely within the recommended range of 6 to 30 volts—see Fig. 2.

The small 100 μ F capacitor shown serves to provide, in conjunction with the resistor, a short time-delay to reduce "shock" when switching-on. The combination also assists smoothing. Incorporation of the active filter in the receiver between the rectifier and output stage works very well indeed, and has the advantage that the enhanced selectivity performance is available on the speaker and not solely on headphones as when used out-board.

To connect the filter to the panel switch and power supply, miniature plastic covered screened leads were used, passing out of the die-cast box through small rubber grommets and down through the chassis *via* an existing

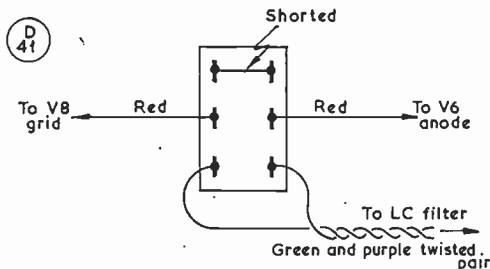


Fig. 1 Audio filter switch (rear view) before mod.

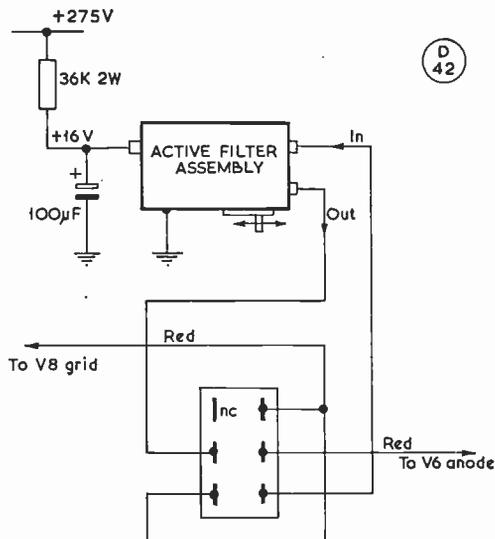


Fig. 2 Audio filter switch (rear view) after mod.

aperture situated between the first IF transformer and the casing of the LC filter.

Since the front panel switch only switches the active filter in or out of circuit, it is necessary to raise the lid of the receiver to set the slide-switch to the required pass-band.

This is no problem in the writer's case, as he has found the 110 Hz switch position to be generally satisfactory when reading CW under QRM conditions.

It is of some advantage to leave the built-in Variable Selectivity Control setting at "half-way" when using the

active filter as this provides a measure of adjustment of the bandwidth.

Unfortunately there is no room at the rear of the 888A front panel for a slide or rotary switch to be easily mounted for band changing. A switch could be mounted externally, for example, on the front face of the speaker plinth, but this would involve wiring external to the receiver, and might introduce "hum" problems.

Owners of the 888 or 888A receiver will find fitting the active filter to be a worth-while modification.

THE OTHER MAN'S STATION — G2FIX

OUR subject this time is Bert Newman, of Wilton, near Salisbury, and he will be known to many for the regularity with which he joins the R.A.F. group net on 3.71 MHz. All valves, this station, but still a good contender in the DX stakes if necessary. In the foreground is an "open-plan" version of the G2DAF receiver and the exciter is also the G2DAF design. The Linear is in the rack, comprising a brace of 813's in passive grid, with the power supplies below it.

The centre table handles the "modern stuff," the FT101, and the latest toy which is the FT221R. Outside, on the top of the tower, is a Quad and the two-metre beam.

G2FIX's start came around 1937, when he first received the AA licence; he then joined the R.A.F.V.R.—1938—and all his service time through the War was spent on signals work, and in March 1945 came demob., followed by the issue of G2FIX in March 1946.

Over the years since then the interest has been kept up, as Hon. Sec. of the Salisbury club and operating, D/F, and, outside radio, ballroom dancing and campanology to avoid any risk of staleness!



AERIAL TUNING SYSTEM FOR THE SWL

E. SQUANCE, T.D., B.Sc., Ph.D.

THE aerial systems available to the writer were limited by virtue of the real-estate, with the maximum span some 66 feet. Into this space two dipoles were fitted, 7 and 14 MHz, orientated East-West. To receive any other band, some form of matching to the JR-500S receiver was considered necessary.

A suitable design was put together from two of the notes in "Amateur Radio Techniques," Fifth Edition, by G3VA. The basic circuit diagram is shown in Fig. 1, and consists of two switchable aerial inputs, an attenuator and four different possible matching networks.

In an earlier version an RF pre-amp. was included, but for various reasons this was later removed and built into the receiver.

C1 and C2, both 365 pF Jackson; R1 and R2, a 10K ganged linear-law pot; L1 made of 20 s.w.g. wire, enamelled, on a former 5in. long by 1½in. diameter; S1 a DPDT switch, S2 three-pole four-way, S3 one pole twelve way; case and knobs to suit; three TV sockets (or SO239 or whatever, to suit the station standards); and a plastics front panel, which is most important to ensure isolation of the capacitors from each other and earth. (*Editorial Note:* If a metal panel is desired, then means must be provided to provide isolation, by way of insulating mountings and suitable insulating shaft-couplers.)

Fig. 3 shows the general layout employed; the coil was a ready-wound one having taps at 2, 7, and then every 12 turns from the start, giving 11 taps in all. The capacitors were salvaged from old radios but any 365 or 500 pF would suit.

For convenience, the aerial sockets were placed on the side of the case; the front panel was covered with a piece of stiff card with *Letraset* markings for neatness, see Fig. 4, the card being held on with *Evostick* and varnished over for cleanliness.

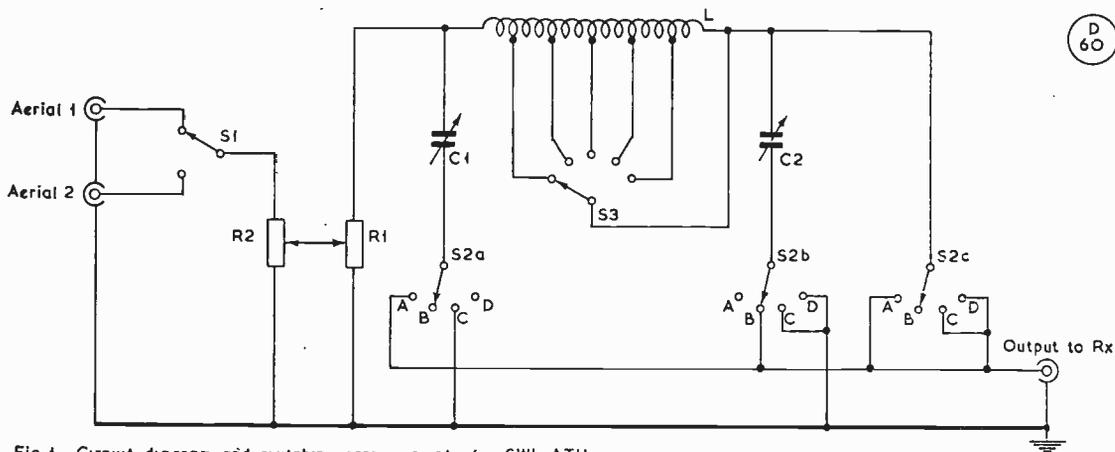


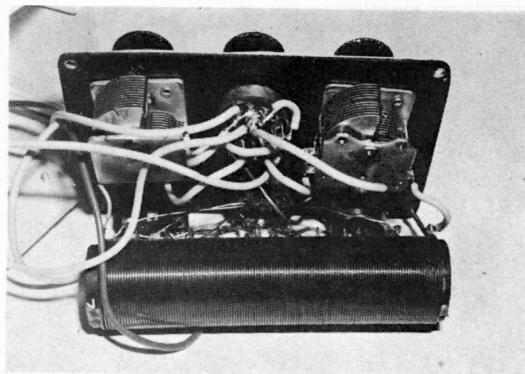
Fig. 1 Circuit diagram and switching arrangements for SWL ATU

The facilities provided are outlined in Fig. 2, being (1) Parallel tuned; (2) Series Tuned; (3) pi-tank; and (3) L-Network. The attenuator would appear to have some 40dB as judged by its effect on S-meter readings taken on very strong signals from locals.

The aerial-switching facility is useful for comparisons between different aerials or vertical/horizontal polarisation changes to check on variations in propagation.

Construction

All the components, including the coil were found in various old equipments to hand, and only the case knobs were purchased new. The parts-list is as follows:



Component layout behind Paxolin front panel.

The photographs show the inside and outside layout; they should be considered in conjunction with the circuit.

Conclusions

This ATU has been in service for several months and it has greatly improved the quality of both local and DX reception; if a relay were to be used, the box could be used with transceivers, although this has not been tried.

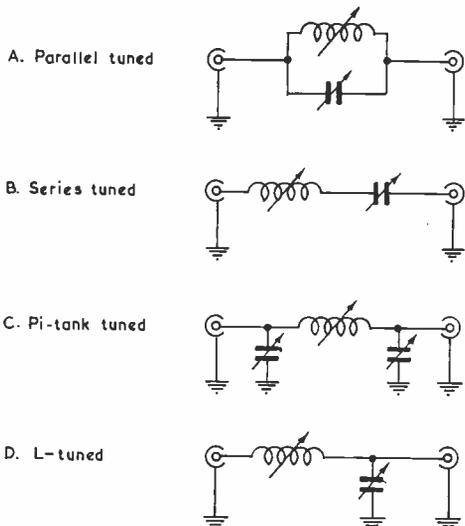


Fig. 2 Diagram of facilities offered by the ATU for aerial impedance matching

D 61

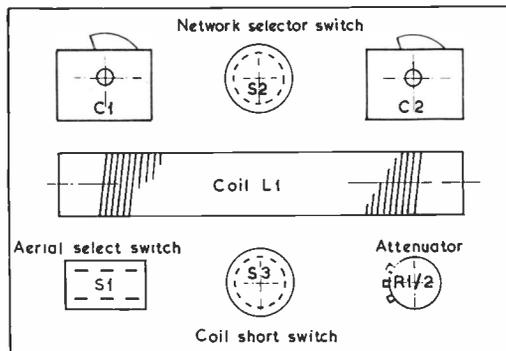
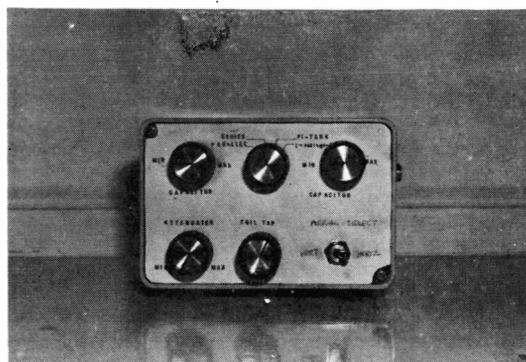


Fig.3. Layout of main components on Bakelite panel. Wiring omitted for clarity.

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Front panel layout of SWL Preselector Unit.

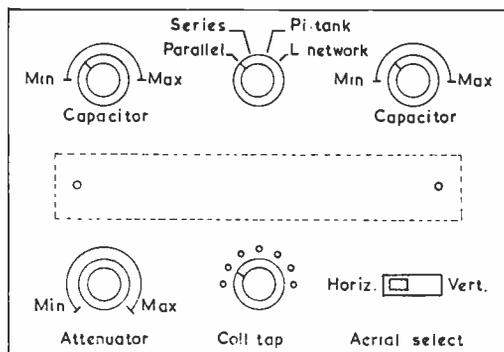
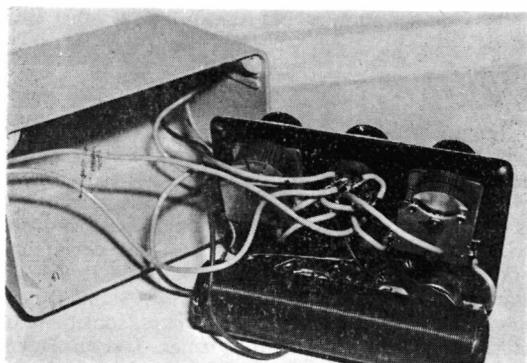


Fig.4 Suggested front panel layout, as used in the original model.

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View of rear of Paxolin panel, and interior of case with leads and aerial terminals.

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By *Justin Cooper*

WE have, over the past few months, talked about the receiver in general terms, and about the advantage the active SWL automatically gains when he gets his own call and transmitter. Perhaps the next thing to think about could well be the aerial system; so, let's try and grab a few facts—but if you want a big dose of theory you'll have to go to such books as the *ARRL "Antenna Book,"* and further progress after that is in the realms of high-technology, almost.

Firstly, there is nothing magical about a particular length of wire, or type of earthing, good/bad sites, and all the other mechanisms we call into play when our latest dream design doesn't work! They obey the Law of Common Sense, just like everything else. The fields induced in a transmitter aerial will in their turn induce currents in any conducting object—and if you can find a network which will effect a match between the object and your receiver, you've got yourself an aerial! So, lesson one is that you don't give up heart just because the neighbours or parents won't permit you to put a hundred-foot tower with a beam on top!

The "network" we just mentioned is of course the box usually called an Aerial Tuning Unit or ATU, and its nature will usually have to vary depending on what sort of aerial you are using. Most receiving types seem to use an end-fed "piece of wire" fed against an earth connection, and an ATU is all but essential in such a set-up because the impedance seen by the receiver in the absence of an ATU will almost certainly contain some reactance which, if not dealt with by the ATU, will detune the receiver front-end to a greater or lesser degree; which is why ATU's are often claimed to give a "gain" of two or three S-points. The gain is in fact a reduction of detuning losses.

Now, about our bit of wire: a simple rule is to get up as much as you can, as high as you can—but don't expect the same success with it with a transmitter when you get your "ticket" because you probably won't. One end of it is fed, along with an earth, either direct to the receiver, or, preferably as already discussed, through an ATU from which it feeds by coaxial cable to the input terminals of the receiver.

The only part of the system not so far mentioned is the earthing connection to the ATU or the receiver. A true earth connection is rather difficult with AC/DC receivers, which is why this particular economy circuit was very uncommon in valved communications receivers. Another point to be borne in mind is that the earth terminal of a mains power outlet is rarely, if ever, very satisfactory as a "signal" earth, although of course it is a good low-resistance path to ground (or should be!) for safety reasons; largely because of the assorted noises coupled into the receiver from nearby pieces of apparatus. The answer is to use a separate ground connection, and to take as much care as possible in the process. Recall that the earth is a mirror-image of the aerial, and it

won't take a lot of imagination to see that the currents are going to be noted over a fair amount of ground under the aerial. Knocking a spike a couple of feet into the deck to collect them up and feed them to the earth terminal of the receiver doesn't help one iota if the resistance of the ground is such that next to no current is going to reach the spike, and so the receiver; don't forget that the earth resistance just mentioned is effectively in series with the input resistance of the receiver, and it doesn't take a genius to figure out that, if the earth resistance and the receiver input resistance are equal (taking into account any transformation effected by the ATU) then only half the collected signal will appear at the aerial terminal; and it is a rare station that can show an earthing situation as good as this! So you have to make a start on improvements by improving the ability of earth currents to get back to your spike, by adding radials, as many as possible or, if the use of buried radials is not practical, then you need a "counterpoise" by way of a quarter-wave of wire with one end on the ATU earth terminal and the rest of the length strung out low but above ground, which means either just above head-high or dropped down low and "lost" in a convenient hedge. One counterpoise (or more) of quarter-wave length is required for each band. If the interest is in 14, 21 and 28 MHz, then the counterpoises can often be parked under the carpet of the shack floor at a pinch, although this last ploy may result in more noise problems, by way of picking-up from the house wiring.

And, of course, don't forget that improvements to the aerial/earth arrangements such as those we have discussed are, in general, cost-free, particularly if the wire can be obtained from an old transformer or other such source.

The Mail

The newcomers first. *P. White* seems to be our second reporter from *Wotton-under-Edge*—wonder if he and Mike Quintin have met up yet? Paul has moved from Bristol, and lost his HPX list in the process, although his countries list survived; but a more serious loss is the aerial. The one at Bristol had to come down, and another one at the new place is "not on," leading to something of the order of thirty feet of "aerial" under the carpet, and the thought that, perhaps, something of the nature of a /M whip might be better. It is certainly a thought, with the earthy connection to the coaxial feeder (i.e. the place where the /M whip would be grounded to the car in a normal /M installation) replaced by one radial for each band under the carpet, and the whole issue tuned-up "on the nose" with the GDO or (and) a noise bridge to find the correct overall length, or whatever the adjustment for frequency is, for various parts of each band. The actual bandwidth range will be proportionately narrower as one goes down in frequency, until on Top Band the useful bandwidth is about five

kHz. In order to overcome this difficulty one needs to have a "calibration chart" to show how the whip should be set for a particular frequency, although some improvement in "effective" bandwidth could be obtained by the use of a simple L or pi section ATU at the feedpoint or even at the receiver end if the coaxial cable feed run is kept short.

S. M. Phillips (Dukinfield) has a receiver which covers Top Band through to Ten, but which appears to lack a BFO as he uses front-end carrier injection to resolve signals. The favourite bands are 20 and 80 for SSB and 40 is the one for CW.

K. Linge (Willington) has a Skywood CX-203 fed by a Joystick, and says he would like something better but finds the £160 for an FRG-7 rather a lot even if you say it quickly!

After a lapse of 21 years, *W. Waterton (Catwick, Hull)* has returned to the fold; Walter recalls pleasant hours with DL2BJ, DL6AA and DJ4PE and wonders whether they are still about—your J.C. took a look in the latest Call Book and finds the latter two are still operational, but there is no record of the first-mentioned. However, all this is no guide, as the current call sign allocations may have changed with the years.

Dr. H. Squance (Bangor, Co. Down) has an old CR-100 which he has revamped into a quite successful receiver for the low bands, a JR-500S plus PA-10 pre-amp, and the receiving section of the FT-200 purchased very cheaply as the result of an advertisement in the local paper. On the aerial side there are dipoles for 7, 14 and 28 MHz, the first one of course also serving for 21 MHz, plus a Joystick and a home-brew ATU which can just about match anything to anything! On the question of prefixes, Dr. Squance noted a VU5BA who was only too clearly a pirate, and the writer is inclined to agree with that assessment.

Last time round we mentioned *D. W. Waddell* and his difficulty in managing his FRG-7 on 3.5 MHz. This brought forth a reply from *B. Shepherd (Staines)*, who finds that reception on Eighty is improved by turning the attenuator to "DX" and the Tone switch to "Narrow." On a different tack, SWL Shepherd looked closely at the HPX Rules, last published in November 1976, and feels they are too loose. For example, he says, what constitutes a "hearing" for the purposes of the Rules? One would have thought the statement quite explicit; to hear the station in question involves being quite sure that you have the right end of a QSO, and that you have the call sign of the station beyond doubt; but many readers set themselves harder definitions for their personal pleasure. As to the bit about "only recent claims" under the Ladder, it has over the years gradually been simplified down; in the absence of any indication to the contrary, a complete miss for two successive pieces followed by another blank and usually the person's entry is deleted—but there are times and circumstances when the rule is not pressed too hard. On the question of call signs, as we have said so many times before, if you think you have tripped over a phoney, or you have a "novel" prefix which you know is good, then as much detail as you can supply seems to be called for, to set against the other reports and so fill in the gaps. On a personal note, SWL Shepherd got his first "wireless" licence, for "experimental purposes," back in 1922.

Oddly enough, after answers to *D. W. Waddell's* problems on Eighty, the very next list is post-marked from *Herne Bay* and brings reader Waddell pretty close to the top of the 1977 Table.

Long-time readers who have copies going back to May 1974 will be able to root out something concerning *G. Thompson (Selly Oak, Birmingham)*. Since then, George has been attending two hospitals for diabetes and eye trouble, plus a couple of operations, but he still managed to find time for R.A.E., took the exam. orally, and now has G8KLI, a lot more friends, and a sick bank-balance! In addition, the shack now boasts a frequency meter, a Liner-2 and a Standard C828, not to mention a Multi-U11, and a home-brewed power supply.

HPX LADDER

(All-Time Post War)

SWL	PHONE ONLY	PREFIXES	SWL	PHONE ONLY	PREFIXES
K. Kyezor (Irchester)	1745		P. Barker (Sunderland)	926	
S. Foster (Lincoln)	1617		W. H. Smyth (Hartlepool)	861	
R. Shilvoek (Kingswinford)	1561		M. Rodgers (Harwood)	847	
R. Carter (Blackburn)	1489		B. T. Mackness (Dagenham)	823	
J. Fitzgerald (Gr. Missenden)	1447		S. Budd (Worthing)	817	
B. Hughes (Worcester)	1431		J. Aspinall (Leeds)	807	
M. J. Quinton (Wotton-u-Edge)	1337		L. Gibson (Barrow-in-Furness)	782	
P. C. Jane (East Looe)	1331		D. Taylor (Harborne)	749	
K. A. Whiteley (Castleford)	1330		P. Rooney (Liverpool)	737	
A. W. Nielson (Glasgow)	1245		M. Gibson (Barrow-in-Furness)	656	
M. Cuckoo (Herne Bay)	1214		S. T. Brown (Kippax)	615	
H. A. Londesborough (Swanland)	1188		S. M. Phillips (Dukinfield)	514	
J. H. Sparkes (Trowbridge)	1116				<i>CW ONLY</i>
M. C. P. Bennett (Datchet)	1117		N. A. Phelps (Devizes)	1295	
E. W. Robinson (Bury St. Edmunds)	1115		A. Glass (Plymouth)	1266	
G. Ridgway (Ardleigh)	1105		J. A. Londesborough (Swanland)	995	
Mrs. J. B. Jane (East Looe)	1053		A. F. Roberts (Kidderminster)	465	
H. M. Graham (Harefield)	969		P. L. Shakespeare (Foulness)	280	

Minimum starting score, 200 for CW, 500 for Phone. Listings in accordance with HPX Rules and only include recent claims.

J. Ollis (Durham Univ.) has been having troubles with the receiver—a short-circuit with the aid of an overlong fixing screw accounted for one, and the other was the result of using a Zener diode. The effect was to cause the second mixer to be very noisy, which suggests that the circuit used was such that the diode noise was fed into the input to the mixer. All diodes are able to develop noise—indeed, your J.C. has a home-brew aerial bridge in which the noise source is a Zener diode, and looking at the spectrum on a wide-range analyser—it is quite amazing not just how noisy the Zener diode is, but how high a frequency that noise goes up to—several hundred megahertz and, apparently, limited more by non-linearity of the amplifier which was not built for operation above 28 MHz!

J. W. Grice (Castleford) has a Trio 9R-59DS, fed by sixty feet of wire which runs up the wall and into the roof space; but he has an interference problem. One would think that an ATU and a good earth would help, and maybe taking the rest of the aerial out of the loft-space, as this is usually full of noise-bearing wires and pipes. To get an aerial outside if the local rules bar it, the best way is to resort to the G3KFE "invisible wire"

with plastic curtain rings for insulators. But, be warned—on at least one occasion G3KFE has had someone note the insulator, apparently hanging in mid-air, and go away to report sighting a flying saucer!

L. Gibson (*Barrow-in-Furness*) is selling-up to raise the wind for a new KW-202 receiver. On a different tack he wonders whether a trap dipole is the answer to his HF bands problem (14, 21 and 28 MHz) in a garden sixty feet long. Shouldn't be a problem as a 14 MHz half-wave comes in at about 33 feet long for the middle of the band. As to the use of traps and their losses, they should be OK *provided* they are properly cared for, although this is only matter of dropping the aerial regularly to check for the ingress of moisture and spider-webs. Losses there must be, clearly, but that they are **not** very significant is shown by the many top DX stations who use trap beams.

In his always-interesting notes, E. W. Robinson (*Bury St. Edmunds*) comments on the "NM3SI" queried time out by H. M. Graham; at the time in question there was a station NN3SI operating from the Smithsonian Institute at an exhibition of some sort.

P. Sharpe (*London W.2*) has added at ATU to his rig, which has brought signals up by around three S-points, and, of course, taken him down into previously unplumbed territory to the same extent, and made the Big Ones even bigger.

K. M. Rogers (*Lutterworth*) recently went to Weston-super-Mare and took his NR-56 receiver with him in the car, and enjoyed listening to all the repeaters on the way down; he now has some crystals for channel R3 on order, for the next trip in the northwards direction.

For some time now G. Ridgway (*Ardleigh*) has been threatening to send us in an All-Time Post War entry, and this month he has carried out his threat—all 1105 prefixes of them—he must have ended up with writer's cramp!

Several people have commented on the Pest on 14 MHz and other bands—one description was "that gas-engine noise." D. J. Newman (*Rotherham*) packed a complete letter on to one side of a postcard to the Editor on this topic, so perhaps we should set out the position. Essentially, there seems little or no doubt that the thing is an over-the-horizon radar. Several countries administrations have formally protested to the Soviets about the thing, and they have received a reply, which, in effect, says "We know we are causing interference but we are trying to keep on-the-air tests to a minimum." Judging by the number of frequencies on which it has shown up for short periods it is probable that it is frequency-agile and the noises we have heard are tests on various frequencies that may be used. To be fair, they are keeping the amount of the airtime down to a minimum to judge by the time it is about. And, of course, there can be little or no doubt that the U.S. have something similar up their sleeves to provide over-the-horizon surveillance. Both these countries are wise enough to know what we in this country seem to forget, which is that strength is the *only* defence when the chips are down for real. On to N. A. Phelps (*Devizes*) who this time answers a query your J.C. has had in mind for some time as to the status of 4M4OY heard during the CQ WW contest back last November; as reader Phelps has now got the card in, we can transfer him from the

question-mark file to the appropriate place in the J.C. list.

Mrs. S. Waterfall (*Chacewater*) comments that her Prefix list had been pinched by the dog—something which J.C. also suffers from with the family pooch, who pinches anything you can and then defies the world to get it back as his favourite game. By the time this comes to be read, Sue, in common with many others throughout the country will be anxiously awaiting the R.A.E. results. May we wish everyone in this position the best of luck.

Right at top of his list are R. Carter's (*Blackburn*) two doubtfuls—and "BASE" and "DG7RZ" both look to be bogus. Ben had thoughts of giving up the Table when he reached 1500 prefixes, but a second check of the master list showed he still has a matter of nine to go. Ben's method of listening round has something to commend it—he looks at all bands, in this order: 14, 21, 28, 7, 3-5, 1-8 MHz. Anything between 30 and 90 minutes are taken up in the afternoon, depending on the activity level, plus another half-hour session around 1900z on 14 MHz.

P. Rooney (*Worcester College, Oxford*) managed a little time on the FR-50B, but in about a month from the date of his letter Philip faces the "moment of truth" when the final examinations have to be dealt with. Afterwards there is a short break followed by six months in Chester, and then a short break before starting to earn a living—which is the time when all the earlier work pays off.

G. M. Parker (*Peaslake*) comes in at 241, heard with a Heath HR-10B receiver and some eight metres of wire with nothing yet to tune it with; however, there is some nice interesting DX in the list, so there is time yet for an ATU to be built.

A Good Question this time comes from K. Kyezor (*Irchester*) who was routing out some old pre-war QSL cards and found one which was from W6FUD in Nevada; which makes him ask whether Nevada was in fact part of W6 in those far-off days. Reference to the writer's 1939 and 1945 *ARRL Handbooks* fails to provide a clue—anyone with ideas?

Receiver Hunt

H. J. Bailey (*Penzance*) has been looking for a reasonable (and reasonably priced) short-wave receiver of the 9R-59 tribe or similar, but has to date not been having much luck, despite being in contact with G3NKE and the Cornish gang. If anyone has a decent receiver,

ANNUAL HPX LADDER

Starting date, January 1, 1977

SWL	PREFIXES	SWL	PREFIXES
D. W. Waddell (Herne Bay)	499	K. M. Rogers (Lutterworth)	295
P. L. Shakespeare (Foulness)	473	Mrs. S. Waterfall	
P. Sharpe (London W2)	426	(Chacewater)	277
S. W. Allsopp (Banbury)	382	P. Ramsay (Steventon)	270
A. R. Darby (London SE16)	341	G. M. Parker (Peaslake)	240
J. G. Ollis (Solihull)	332	G. A. Passmore (Pembroke)	217
M. Shaw (Huddersfield)	330	S. Hammond (Solihull)	211
Dr. H. Squance		K. Linge (Willington)	210
(Bangor, Co. Down)	326		

Starting score 200, in accordance with HPX Rules. All Prefixes to have been heard in 1977.

perhaps they would care to get in touch with SWL Bailey, at 11 Gurnick Road, Mounts Bay Parc, Newlyn, Penzance TR18 5DG. Incidentally, Harold has been around in the "wireless" game since as early as 1923 when he sat up for his first reception of America at 0300 on 200 metres.

Back to our lasts, and the next letter is from *H. M. Graham (Harefield)* who has been having a Grand Inquisition into his HPX Score, as a result of which he dropped a couple; but since then nine more new ones have been raked in so progress is maintained. Just about all the

HPX RULES

- (1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
- (2) The /M and /MM suffixes create a new series; thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
- (3) Where a suffix determines a *location* the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, e.g. VE1AED/P/SU, VE2UJ/P/SU, they are arbitrarily counted as SU1 and SU2 respectively, and the same holds good for similar callsigns.
- (4) When the prefix is changed both the old and the new may be counted; thus VQ4 and 5Z4 both count.
- (5) The object is to hear *prefixes* not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
- (6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate callsigns will not be credited, nor may any MARS stations be claimed.
- (7) G2, G3, G4, etc., all count separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, WB2, WC2, WN2, all count separately, even though they may be in the same street.
- (8) Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ, if possible to arrive before the SWL deadline for that particular month.
- (9) Failure to report for two consecutive listings, i.e. four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
- (10) Starting score 200. Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
- (11) Lists will be based on those shown in the current "Radio Amateur Prefix-Country-Zone List," published by Geoff. Watts (see Advertiser's Index in any recent issue of SHORT WAVE MAGAZINE).

HF bands have been covered, with three continents on Ten, lots of DX under the Europeans on 21 and 14 MHz, Forty does not commend itself to Maurice's ear, but Eighty is reserved for the other Graham pursuit, which is chasing new WAB areas.

J. Fitzgerald (Gt. Missenden) is another reader to comment on the gradual awakening of the bands as we have passed the sunspot minimum, but he has nonetheless been experimenting with 7 MHz; on this band a 7-metre vertical plus 20dB of attenuation seems to "run the pants off" the twenty-metre loop and anything up to 60dB of attenuation! John is also VHF/UHF orientated, and finds that those of his visitors who laugh at the home-brew 70cm. Yagi tend to stop laughing when they see the loggings made with it in use. And that's how it should be.

In enclosing his list, *S. Hammond (Solihull)* notes that it's not a straight addition to the earlier score, since the master list copy went missing. One gets the feeling that Stuart is just a tiny bit cross with himself for making himself so much extra work—and we guess he won't let it happen again!

HPX Rules

These are reprinted in this issue; from November 1976 is a long enough break between re-printings. It should answer most of the essential questions. There is no "rule book" or anything of that sort. This, essentially, answers the question posed by *M. Shaw (Huddersfield)*, and others. SWL Shaw has already an initial entry for the 1977 list, and heard them with either a SMC-73 receiver or a Hallicrafters S38B, either of which can be fed by 110 feet of wire tuned with a Joymatch ATU.

P. L. Shakespeare (Foulness) has gone on with the SSB list but has added an extra dimension by joining the CW Table—good for him! A couple of interesting questions are brought to light in his letter; the first in connection with the use of /1, /2, or /3 after a Maritime Mobile callsign. Those who follow the "politics" of the amateur radio world will know that there are three Regions drawn out on the world map; thus Region 2 is, roughly, the Western Hemisphere extended to include Hawaii. The other oddity was DM9BJM—no DM9's in the Call Book, but no mistake, either, as Peter "sat on him" for some 15 minutes, and the callsign was repeated umpteen times, making the copy certain. This inclines one to think it was some sort of special-event station or contest call.

Other Letters

Include those from: *J. H. Sparkes (Trowbridge)*; *S. Foster (Metheringham)*; *S. Bowen (Kippax)*; *R. Shilvoek (Kingswinford)*; *B. T. Mackness (Dagenham)*; *D. Taylor (Harborne)*; *M. C. P. Bennett (Slough)*; *A. W. Nielson (Glasgow)*; *M. Gibson (Barrow-in-Furness)*; *B. F. Hughes (Worcester)*; *K. A. Whiteley (Castleford)*; *S. Budd (Worthing)*; and *J. Aspinal (Leeds)*. Thank you all, and keep 'em rolling.

Deadline

This will be as usual 36 days before publication date, which looks by the Calendar to be July 21 to arrive; addressed to your scribe, "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ.

THE STORY OF A 160-METRE WAC AWARD

P. ASHTON, G3XAP

FOLLOWING an article by G3XAP (*Radio Communication*, Dec. '73), a large number of letters were received requesting information on aerials, receivers, etc. However, a surprisingly large number of readers have been more interested in the personal side of the project, e.g., the amount of time spent on the venture, the motivation and such human matters as the disappointments and pleasures that were experienced on the way. In the three years since the award was received, the author has slowly learned that most amateurs seem to be afraid of attempting to have a go themselves and this article therefore has a two-fold purpose. Firstly, to set out in non-technical terms how the award was actually achieved and the successes and failures that were encountered on the way and, secondly, to show that the award is within the reach of any amateur who is prepared to devote the time to such a project.

The Early Days

The G3XAP license was obtained in late 1967 and at that time the writer was restricted to AM/CW operation, using a "home-brew" transmitter—the design for which had been published by F. G. Rayer, G3OGR, in *SHORT WAVE MAGAZINE*. It was soon realised that contacts were easier to obtain on CW than AM with this power input and a love for the key soon developed. A 135ft. end fed wire aerial was erected and the G3XAP signal was very active on 160 metres. For a long time this was the only mode of operation and the number of countries worked on 160m. rose steadily to 14, where it suddenly stopped. Despite many hours of operation, no new countries were heard until early one Sunday morning when the W1BB/1 signal appeared in the G3XAP receiver for the first time. The initial reaction was sheer bewilderment—partly at the fact that a 160 metre signal from such a distance had been received—but mainly at the surprisingly high strength of Stew's signal. The author knew that DX was worked on 160 metres but had always assumed that signals would be very weak and would need "special" aerials and very high-grade receivers for their reception. An attempt was made to contact W1BB/1 but all that resulted was a request by several European stations to move the G3XAP signal off the DX portion of the band!! Thus G3XAP learned the hard way that a form of band planning was used on the bottom end of 160 metres.

Hearing W1BB/1 had a profound effect and many hours were spent listening for W stations and trying to work them, and during this period much valuable information was gained regarding likely times for W signals, details of band planning, operating technique, Morse speed for 160 metre DX-ing, etc. No DX contacts resulted, however, and G3XAP began to despair of ever making it across the pond on 160.

A change of QTH gave the opportunity to put up a new aerial, and as the new garden was considerably

larger than the old one, the new aerial was undoubtedly superior to that at the old site. Reports received indicated that the G3XAP signal had indeed improved considerably and attention was again turned towards the elusive DX. After several months of operation it became apparent that it was not possible even with the new aerial and G3XAP began to look to the HF bands for DX, and a KW Vanguard transmitter was acquired. This gave 50 watts of CW and AM on all bands, 160-10 metres, and with relatively simple aerials, DX was worked with ease—all continents being worked on 15 metres CW within a couple of weeks. (We were near a sunspot maximum at this time and DX communication at HF was far from difficult!). 100 countries were worked within two or three months, and for a time all was well. However, the contentment did not last for long—thoughts were continually being turned toward 160m. and by now the desire to work DX on that band had turned to near-obsession. It is now known that Amateur Radio must present a challenge to G3XAP or the enjoyment does not last long—perhaps he differs from most other amateurs in this respect!

Great Expectations

The author was now convinced that all that was needed to work 160 metre DX was the right aerial and was also of the opinion (later proven incorrect) that the G3XAP garden was not large enough to accommodate such a device. It was therefore decided to use a /A site and erect an aerial that could do the job. With the help of Lin, G3KFA and Norman, G3TAQ, and the co-operation of G3XAP's employers, a "monster" aerial was erected.

This consisted of a 300ft. vertical wire (five-eighths wavelength on 160), suspended from an eight foot diameter Met. balloon (Hydrogen filled)—this aerial being tuned against an earth system comprised of many thousands of feet of bonded steel girders which formed the shell of a very large factory building. Operation was to be from the top floor of this building—around 70ft. from ground level. Hence the aerial consisted of a 300ft. vertical mounted over an extremely large earth mat—the balloon being around 370ft. from ground level! A quick check with the receivers in use (a KW-77 and an Eddystone 888A) gave absolutely unbelievable results—DHJ (A German military station) was holding the "S" meter needles literally "on the pin," and every amateur station heard was well over S9! This check was carried out on a Saturday afternoon prior to using the aerial overnight Saturday/Sunday, and it was incredible to hear stations running around 10 watts of AM from as far afield as Lancashire and Devon coming into our receivers in Suffolk at S9+ in broad daylight!

During the late evening the transmitter was installed and the first hint of trouble was noted—namely the fact that fat blue sparks could be produced by holding the end of the aerial around three inches from our earth lead. At first we thought that we must have crossed a power line, but a check indicated that this was not the case. The S9+ amateur signals had now been replaced by S9+ static and the reason for this became only too clear: the air temperature had dropped to around 20°F and there was now a steady breeze blowing—this move-

ment of very dry air across the aerial was producing static, and the electronic noise thus produced was being detected by our receivers. Nevertheless, one or two of the stronger amateur stations could still be heard and they acted as a "go-between" from us to many inaudible stations and we were able to gather a large number of signal reports from all over the U.K. No station was receiving G3XAP/A at less than S9, and very many of them could not give accurate reports as our signal was holding their "S" meter needles "on the pin."

It was already apparent that owing to the unfortunate weather conditions, we would not be able to work any DX, but were hopeful that our signals might at least be heard on the other side of the Atlantic. The only DX heard during this night was a PY1 station, and we later learned from Stew (W1BB) that he had received no reports on our signals and he certainly hadn't heard them himself although he had heard and worked a few European stations.

At this point G3XAP was rather disillusioned to say the least, and was now ready to concede defeat and return to the HF bands. However, two occurrences gave fresh heart—firstly a letter from W1BB giving much information on 160 metre DX aeriels—and much encouragement. Secondly, a QSL for a 160 metre QSO with DL9KRA was received and this card bore the inscription "WAC 1.8 Mc/s." On receipt of this card a vow was made which at that time seemed all but impossible. This vow was that the G3XAP QSL card would one day bear the same inscription, and further that the necessary QSO's would be made from the home site and that the transmitter power input would never exceed the maximum permitted 10 watts.

"Back To School"

It was fully realised that the only way to succeed in this venture lay in the construction of an above average aerial. The difficulty was that the failures encountered so far made it quite obvious that the author's understanding of aeriels left much to be desired. A period of around two years was therefore spent in reading about aeriels, experimenting with them, making measurements on them and above all learning to understand them. Because aeriels for 160 metres tend to be rather large (a half wavelength is around 270ft.) the band used during this period was 40 metres—this band being chosen because it has many similarities to 160 metres, e.g., the inherent noise levels, the DX by darkness characteristic, etc. Considerable success was achieved on 40 metres, and much was learned about aeriels—especially compromise aeriels—and the author began to believe that the 160 metre WAC was possible after all.

One of the most interesting facts learned was that once an efficient aerial system had been achieved, power input became very much a secondary consideration. VK stations have been worked on 40 metres from G3XAP on several occasions with a transmitter input of 5-10 watts, and the Atlantic has been crossed on this band with power levels of around 2 watts input. Perhaps the most rewarding thing of all was working over 500 W/VE stations in a 48-hour CW contest on 40 metres using a directional aerial of G3XAP design. These stations were worked with 100 watts DC input during 19½ hours of actual operation.

Surprise, Surprise!!

During the winter of 1971/72 power was lost to the G3XAP shack for a period of about two months during rewiring of the house. During this period the station Tx/Rx was temporarily taken into the house and a temporary wire aerial erected. At 0429z one morning W1HGT was heard and a QSO resulted—a 449 report being received by G3XAP. A few minutes later K1PBW was worked, the report this time being 349. After many years of trying, a trans-Atlantic 160 metre QSO had been achieved using a temporary wire aerial!! Needless to say, feelings were rather mixed at this time. However, careful analysis of the aerial used for these contacts showed that part of the wire was vertical, and that this section was in the high current part of the aerial. This confirmed many of the results obtained during 40 metre tests with compromise aeriels.



The 1.8 MHz WAC Certificate.

Back To 160

After power was re-established in the shack, a compromise 60ft. vertical aerial with linear loading and a very large ground system was erected—40 metre work had shown that this aerial was capable of producing excellent results—provided that the earth system was a good one (the G3XAP earth at this time consisted of around 70 radials of various lengths, the longest four being full quarter waves, grid dipped in pairs to establish a resonant ground system). When the receiver was connected to this device, the impact was similar to that experienced with the 300ft. vertical mentioned earlier—the band was crawling with S9+ signals, and DHJ was holding the S-meter needle "on the pin." At around 4.30 the next morning a CQ DX call was put out from G3XAP and six W stations were worked one after the other with reports varying between 449 and 579. This was in January, and between then and April, some 24 W/VE stations were worked—the transmitter input power being 9 watts DC. The biggest thrill of all was working Stew, W1BB/1 whose continual encouragement had made the whole thing possible, and his QSL card will always hold a very special place in the G3XAP files.

Trans-Equatorial Tests

During June/July of that same year G3XAP participated in the trans-equatorial tests organised by EI9J and PY1DVG (now PY1RO). The result was quite astounding. Due to other pressures, G3XAP was unable to get on the air until the end of June, but the morning when he did make it was quite memorable. The alarm clock went off at 0030, the first CQ DX call was sent out at 0048, and from then on the log reads:—

0050 EL2CB his report 449 my report 339.
0105 EP2BQ his report 559 my report 569.
0118 PY1DVG his report 589 my report 579.
0125 Station closed down.

In other words the author put out one CQ DX call, worked three new continents and was back in bed one hour after the alarm went off! This meant that only VK or ZL was now required to complete the 1.8 MHz WAC which a few short years ago had looked like being beyond the resources and capabilities of the author. It was fully realised that a QSO with VK or ZL would be by far the most difficult part of the whole venture and that careful planning would be necessary in order to achieve success.

The Quest For VK

Prior to the winter period, the aerial was checked over and a few more radials were added—bringing the total number up to around the 90 mark. Work was also carried out into the efficiency of PA valves, and it was found that a 6146 with an HT of 450 volts was giving more output than the usual small PA valves (6CH6, 6BW6, 5763, etc.) with an HT of around 250 volts and about 35mA anode current. After some juggling around it was found possible to get about 6 watts output for a 9 watts input using a 450 volt HT and this arrangement was used for the tests. During November, December, January and February of the following winter CQ VK calls were put out from G3XAP practically every night during the period from 15 minutes before to 15 minutes after sunrise in Western Australia (VK6). (This sounds easy, but watch the effect on a long-suffering XYL when you disappear into the shack for 30 minutes during a New Year's Eve party!)

No QSO resulted and again there followed a period of some disillusionment. However, a QSL eventually arrived from a listener in VK6 (Peter Drew—WIA—L6021) who heard the G3XAP signals on Jan. 6th 1973



G3XAP and XYL.

at 2109—RST 449. This QSL made all the difference between "calling it a day" and carrying on with the venture and illustrates the fact that SWL's can be of very great assistance if they know who to send reports to and what information to give. Peter's card also gave comparisons between the G3XAP signal and the signals from two established 160 metre DX-ers, and in fact the G3XAP signals were equal in strength to one of them and stronger than the other. Needless to say, the information on this card gave great encouragement.

More Investigation

The whole of the summer of 1973 was spent in trying to get some directivity and gain into the G3XAP 160-metre aerial, and once again investigations were carried out on the HF bands. It is difficult to investigate directivity on 160 metres, but it is believed that some gain was actually achieved in the direction of VK6, and it was with some optimism that CQ VK calls were recommenced from G3XAP on November 1 of that year. It was decided that as VK3CZ was active on most mornings, the periods of activity should cover both the VK3 and VK6 sunrises, and so the G3XAP lost her husband for two 30 minute spells every evening—instead of just one as during the previous winter. (You should see an XYL's face when you disappear for two 30 minute spells during an Anniversary party!!) December 28 1973 was a very memorable day for the author, for it was on this day that VK6HD replied to the G3XAP CQ VK call and suddenly many years and many hundreds of hours of effort became worthwhile.

After The Success

The next year of operation saw the author attempting to repeat the 1.8 MHz WAC with a mere 4½ watts input but this attempt had to be abandoned owing to outside pressures, and the fact that there appeared to be little activity from Africa on 160 at that time. Europe, North and South America and Asia were worked with this low input power, but it would have been hardly fair to the G3XAP household to go through the "CQ VK" ritual for yet another year. Perhaps if Africa could have been added to the other four Continents it might have made more sense.

Final Word

There may be readers young and old alike who would also like to achieve a 1.8 MHz WAC, but feel that such a venture is beyond them—either in terms of resources or ability. They would do well to realise just how impossible this appeared to G3XAP at the start of the venture and how easy it would have been to have given up at several stages on the way. If it is advice or encouragement that they seek, the author will be more than willing to help—after all he has a debt to repay to Amateur Radio for the considerable pride and pleasure that this award has brought. Finally, it should be remembered that with any difficult task, the most important requirements is a real will to succeed, and if this will is present it will be strong enough to overcome any failures and disappointments that may be met on the way.

THE MONTH WITH THE CLUBS

By "*Club Secretary*"

BACK in the May Editorial, we gave some indication as to the revised deadlines which would have to take effect. In future there will be a "box" somewhere in the piece, giving the forward deadlines for future issues. These will have to be rather further ahead than has been the case before, in order to be certain that the printers receive copy in good time to ensure that the issues come out on time despite the increased usage of their presses.

However, as has always been the case, any material intended for "Clubs" which arrives too late to be taken in will be held back for the following month. It would be appreciated, therefore, if club scribes will take care to ensure we are given the following information: 1. Meeting dates, preferably in the form of "third Monday" or whatever; 2. The venue for each meeting during the month in question, with a particular note if the group are "away" on any particular date; 3. The name, address, and (preferably) telephone number of the Hon. Sec. for the Panel. Any other relevant detail can be included.

The Reports

Here, your scribe intends to start by breaking two of his own rules, by mentioning his own club first, and at that discussing an event which is now history. The May meeting at **Bishops Stortford** was a fascinating event; hearing blind amateur Terry Robinson, G3WUX giving a talk and demonstration of the methods and gadgets he uses to tune-up a transmitter, to test and fault-find. and to go about his daily work as an electronics development engineer alongside sighted colleagues. A suitably modified *Avo* had a source of light beneath the pointer, and over the normal case was fitted a scale marked in Braille, and a second pointer. As long as a light from the *Avo* was reaching the pointer above, a tone was heard; when the *Avo* needle reached the same setting as the upper needle, *i.e.* the correct desired reading. then the beam of light was broken and the tone ceased. The KW-204 transmitter G3WUX uses remains completely un-modified save for bringing out a pair of wires to enable a current reading to be taken. Once the transmitter was "on the nose" into the dummy load, Terry went on to produce the correct tuning of the little bit of wire used as an aerial, using his audio gadgets, and reading the frequency on his receiver dial using a calibrator to as close as a sighted operator would want. He keeps his log in Braille entirely, which seems acceptable to the authorities; but he also showed how he can draw a circuit for discussion with a sighted operator using the normal symbols. To most of those present the most surprising thing of all was the commonplace—a hot soldering-iron at the ready in case a problem arose. A humbling experience for everyone present.

Moving on from **Bishops Stortford** to **Cheltenham** RSGB, we see the Newsletter Editor having a tilt at the membership for not supporting a coach-trip to the Alexandra Palace Rally, it appearing that only four members were interested. One sees no real reason for worrying over this; clubs have their own corporate personality, and all are different. At **Stortford**, for example, a coach-trip to the Anglian Rally was over-booked for years—but you try and get 'em into a contest activity of *any* sort and see how much non-enthusiasm you generate—not just "can't be bothered" but downright objection to the idea. To revert to the **Cheltenham** meetings, the venue is the Old Bakery, Chester Walk, on the first Thursday in each month.

East Lancs. have no mention this time of their Hq. or programme dates, the Newsletter being well filled with other matters; so, if you want to join a club around the Blackburn area, contact the Hon. Sec. at the address in the Panel.

At **Verulam** we see the start of the busy season; the informals on the second Thursday in each month have changed over to Salisbury Hall, London Colney for the summer, and the "main" meeting is set for the fourth Thursday of each month, always, winter or summer, at the Market Hall, St. Peters Street, St. Albans. Again, vital questions like "who does what" at Field Day take up all the newsletter space, but the Hon. Sec. also wrote: the July 28 date is down for a talk on "Modern RF Circuitry and Construction" by G8DKK. Incidentally, it is understood that if you are going to the Salisbury Hall session, talk-in will be available on 145.6 MHz—and they also have a net on 28.5 MHz at 2100 on Tuesdays.

Worcester have their Rally to look forward to in July; the club meeting scheduled for the fourth has therefore been cancelled and replaced by a session on Saturday, July 9 preparing for the Rally on the following day—and the day after that again, namely July 11, is down for a club meeting at the Old Pheasant, New Street, Worcester. There will be no meeting on Saturday, July 16.

For **Milton Keynes**, July 11 will be the time when G3ZPA will be talking about SS/TV; their venue is the Lovat Hall, Silver Street, Newport Pagnell. On a different tack, one notes in the club Newsletter a very fine bit of axe-grinding by G8GHZ; and if memory serves aright, G8GHZ used, long before he got that ticket to be a keen SWL and contributor to the Justin Cooper column.

The home base of the **Harrow** chaps is at Roxeth Community centre, Scott Crescent, South Harrow, where they can be found on Friday evenings; in July there are two practical evenings, on 15th and 29th, and of course July 1 is not surprisingly given over to VHF NFD planning. That leaves July 8 for an Astronomical talk and 22nd for a talk on Repeater design.

Now to **South Manchester**, who continue the basic pattern of formals every Friday evening at Sale Moor Community Centre, Norris Road, Sale, and the Monday VHF session at the club shack, Greeba, Shady Lane,

Baguley. Looking to the Fridays, July 1 is down for the Hon. Sec. to talk about "Transistor Oscillators and Amplifiers" and on the 8th they have a "Special Mini D/F"—special in that they have arranged for the hidden station to be at a hostelry, and everyone is taking part. July 15 is down for an introduction to Modern Computers by G8KGN, and on the 22nd G4AOK will be holding forth on the subject of "An Advanced home-constructed HF receiver." Finally, there is July 29 which is the date set aside for Mr. Readman to talk about Feedback in the automatic control sense.

Surrey sent us their Newsletter with all the details for June; from it we can gather that they are to be found

July 1 is down for a talk "The Recording and Measuring of Sonic Booms," while on July 15 G8AKA will be helping the many local *Storno* owners to get them going by "showing them how." These two meetings are at the Dolphin Hotel, Holdenhurst Road, Bournemouth. As for the group's Rally, this is at a venue of exceptional interest to any older folk, namely the Tank Museum at Bovington Camp, Wareham, Dorset; July 10 the date for this one.

On Open Air Meeting it is for Southdown in July. It is down for the 4th, at Butt's Brow, 4 km. North-West of Eastbourne, but if the weather does its worst they will retire to prepared positions at the Chaseley

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.
 BISHOPS STORTFORD: H. Allison, G3XSE, 89 Birchanger Lane, Birchanger, nr. Bishops Stortford, Herts.
 BOURNEMOUTH (Wessex ARG): G. D. Cole, G4EMN, 6 St. Anthonys Road, Bournemouth (20027), Hants. BH2 6PD.
 BRISTOL (RSGB): B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead BS20 8NQ. (*Bristol 848140.*)
 CHELTENHAM (RSGB): G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34 785), Glos.
 CORNISH: H. F. Adcock, 1 Bowglas Close, Castle Road, Ludgvan, Penzance TR20 8HD. (*Cockwells 562.*)
 CRYSTAL PALACE: G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London SE19 2LD. (*01-653 4340.*)
 EAST LANCES.: E. A. Lomax, G4DGR, West End Post Office, Accrington (34012), BB5 4NQ.
 ECHELFORD: R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.
 EDGWARE: P. D. Ling, G4BZY, 42 Greencourt Avenue, Edgware, Middx. (*01-952 2495.*)
 G-QRP CLUB: Rev. G. C. Dobbs, G3RJY, 8 Redgates Court, Main Street, Calverton, Notts. (*Woodborough 3920.*)
 HARROW: M. A. Kipp, G4FBK, 43 Southdown Crescent, South Harrow, Middx. HA2 0QT. (*01-864 1412.*)
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).
 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 46708.*)
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogdan, Halifax (44329).
 NOTTINGHAM: M. C. Shaw, G4EKW, 50 White Road, Nottingham NG5 1JR.
 REIGATE: F. H. Mundy, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.

SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex BN20 9JG.
 SOUTHGATE: B. Oughton, G4AEZ, 48 Morley Hill, Enfield, Middx. (*01-366 7166.*)
 SOUTH MANCHESTER: W. L. Seddon, G3VIV, 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.*)
 SUSSEX REPEATER: C. M. Goadby, G8HVV, "Twin Firs, Hophurst Lane, Crawley Down, West Sussex RH10 4LJ.
 SUTTON & CHEAM: J. Korndorffer, G2DMR, 19 Park Road, Banstead, Surrey.
 THAMES VALLEY: R. J. Blasdel, G3ZNV, 92 Bridge Road, Chessington, Surrey KT9 2ET.
 TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.
 UK FM GROUP (London): R. G. Street, G3TJA, 3 White Hedges, St. Stephens Road, London W13.
 VERULAM: B. Pickford, G4DUS, "Netherwood," 130 The Drive, Rickmansworth.
 WAKEFIELD: I. R. Forth, G3WWF, 6 Eastfield Drive, Woodlesford, Leeds (825519), LS26 8SQ.
 WALSALL: K. Boucher, G8KML, 2 Emery Close, Walsall.
 WEST KENT: B. P. Castle, 6 Pinewood Avenue, Sevenoaks, Kent. (*0732 56708.*)
 WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey. (*051-638 2515.*)
 WOLVERHAMPTON: J. Cook, G8EDG, 75 Windmill Lane, Castlecroft, Wolverhampton WV3 8HN.
 WORCESTER: D. Cowden, G4DXE, 20 Constance Road, Worcester (53017), Worcs. WR3 7NF.
 WORTHING: P. J. Robinson, G8MSQ, 46 Hillview Road, Worthing, Sussex.
 YEOVIL: D. L. McLean G3NOF, 9 Cedar Grove, Yeovil, Somerset.
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

on the first and third Wednesday in each month, the venue being *T.S. Terra Nova*, 34 The Waldrons, Croydon; but we have to refer you to the Hon. Sec. for the latest in programme data—see Panel for his address.

'Way down West now, to Cornish; their mobile Rally is on July 17, so the meeting on July 7 will no doubt be largely covering the final arrangements. Once that is wrapped up, G2ABC will fill the evening out with his talk on Standard Frequency and Time signals. The Rally is on Truro R.F.C. ground, and will no doubt be well sign-posted.

Wessex is the name of the group covering Bournemouth; and Wessex has been on the rise in recent months.

Home, South Cliff, Eastbourne.

While he has as yet no firm details of the forthcoming programme, having only just been elected, the new Hon. Sec. of the West Kent club writes to give his address and telephone number—see Panel—so he can pass on the very latest in details of the coming events.

Over to Cray Valley, where the venue is at Eltham United Reformed Church Hall, 1 Court Road, London S.E.9; again we lack the vital data, so we must confine ourselves to saying that the general rule is to get together on the first and third Thursday evenings; doors open for a natter at 7.30 business at 8.00.

Looking onwards and northwards, we head through

the murk until we reach Neachells Cottage, Stockwell End, Tettenhall, Wolverhampton WV6 9PH. This is the Hq. of the **Wolverhampton** chaps and they are to be found there on any Monday evening. The July programme shows July 4 as a report on the ARRL Convention by G4DGM and G4BTE, followed by a Natternite on the 11th. A discussion on VHF D/F follows on the 18th, while on the 25th it is committee-meeting time.

Acton, Brentford & Chiswick come next, with VE6CBN/G4FVE talking about his first contact as a G—should be quite interesting.

The long-awaited change of Hq. address for the **Yeovil** chaps has materialised; they now are in Hut 101, Houndstone Camp, this being about three miles west of Yeovil and just off the A3088 road. Visitors are welcomed as always, and should enquire about their route when they reach the main gate.

A multi-coloured special in the Newsletter line comes in from **Crystal Palace**; but, believe it or not, the writer of it had so much to cover that he couldn't get the "gen" about the forthcoming meetings in. This being so, we must ask any prospective visitors to ring or write to the Hon. Sec. first to find out the form.

The question of a change of venue is very much in mind at **Wakefield**, so although we say the July dates are down for 5th and 19th, of which the latter is at Holmfirth House and the former at the old place in Ings Road, we agree with the Hon. Sec. when he says that if anyone is thinking of visiting or joining, they should get in touch with him for the very latest information on the venue.

G2DMR seems to have been shoved back into the hot seat at **Sutton & Cheam** as a result of the recent AGM; and it does seem that there was a great deal of thought given to the continuation of the informals when matters of a technical interest could be dealt with as the committee might find desirable—when a pleasant change from the usual welter of wind at an AGM when a subject like this is discussed, and the end result of which is usually that the poor old committee ends up with a totally impossible task. However, for the future goings-on we must refer you to the Hon. Sec.—see Panel.

Rather an interesting way of getting articles for the Newsletter is being tried at **Stourbridge** where they "spin a wheel" and the name drawn is required to write something for the Newsletter—although the Editor is not, of course, bound to use the material, it's a fair bet that in most cases he will rather than cudgel his brains yet more! The gang get together at Longlands School, Brook Street, Stourbridge on the third Monday in each month *except* August; and the informals are at the Shrubbery Cottage, Heath Lane, Oldswinford on the first Tuesday in each month.

The **UK FM Group London** next; the issue we have to hand at the time of writing is dated May 1977, but gives no details of their gatherings as far ahead as July, for which we must regretfully refer you to the Hon. Sec.

This group has one of the best-presented Newsletters around, and so it rather saddened your scribe to see that the Editor had done nothing to tidy up the advertisement comprising the entire last page; the "block" (apart from the heading which was pretty clearly a sheet of headed notepaper) appeared to have been done in alternate sections of felt-tip and ball-point pen and contained several errors—both Editor and advertiser would have been well served by a tidying-up operation before the page was run.

On now to **Reigate**; they have changed the method of presenting their Newsletter, at least for this issue, and the writer for one finds it a vast improvement both in readability as such, possibly owing to a change of type-writer, and in the general appearance which is maybe as a result of a different copying method. However, we don't find any reference to the Hq. address for the formal meeting on July 19, when G4CTE will be talking about GB3SN, although the informal on July 5 is given as at the "Marquis of Granby" in Redhill.

When one looks at the **Northern Heights** Newsletter, one often gets the feeling that the Hon. Editor is having to "fill space" which is a difficult old business at the

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

(For August issue—June 24th)

For September issue—July 29th

For October issue—August 26th

For November issue—September 30th

Please be sure to note these dates!

best of times. However in the current issue, he has a nice long saga to write up, covering a difference of opinion between himself (representing the group) and RSGB's General Secretary. So what, you may say? Just this—that it is the very first time in all the years your scribe has been covering this piece, that, having "had a go" the writer of the article *then goes out of his way to commend the good points* in his relationship with RSGB Hq. Meantime, they are to be found at the Peat Pitts Inn, Ogden, Halifax, on every Wednesday evening.

It looks like the first and third Fridays at **Hereford**, if we extrapolate from the dates covered in the Newsletter sheet to hand; and in addition they seem to have "outings" like the skittles match against the Worcester lads. For the very latest information, refer to the Hon. Sec.—see Panel.

Next an amalgamation: **Sussex Coast** and **North Sussex** have joined together to form a larger group called the **Sussex Repeater Group** who will take over responsibility for both repeaters, although the two constituent groups will, it seems, maintain some degree of autonomy—a good scheme, this, if properly organised initially,

which, it appears, is the case. For more details, contact the Hon. Sec.—see Panel.

To **Southgate** now; and in this case they have a nice new cover to the Newsletter and a name agreed in the club constitution; it tells us that the group have Hq. at the Scout Hut, Wilson Street, on the second Thursday in each month.

The **G-QRP** club, as its name implies, caters for and watches over the interests of those amateurs who get their entertainment out of doing things with ever lower power; and, in technical terms, the club Newsletter is probably consistently the best to reach us. Details can be obtained from the Hon. Sec. at the address in the Panel.

Wirral are based on the Sportscentre, Grange Road West, Birkenhead, the meetings being on the first and third Wednesdays in each month. On July 6 there is a Fox Hunt, the details of which were given out at the second June meeting. On July 20 is a Discussion Evening under the heading "Whither Amateur Radio?" Reverting to that Fox Hunt, if you want to meet the gang on that evening, one feels you should get in touch with the Hon. Sec.—see Panel—for the details of the starting-point and time.

Pressing on we come to **BARTG**, the group for the teleprinter operators which provides all sorts of interesting facilities; and at one time, when we used to see it regularly, their Newsletter was very good indeed. However, the current Hon. Sec., being a keen type, writes a separate letter to make sure we don't waste time looking for the information. At the time of writing the books show a membership as high as 550—so it must be good!

G4EKW has finally answered a question that has been bugging your scribe for years—what do the Nottingham chaps do on those nights labelled "Forum" in the syllabus? It seems these follow immediately on the committee sessions and are used for the committee to tell the troops just what they are up to. July 6 for this one according to **G4EKW**'s letter, but we suspect he has at least one of the month's dates mixed-up, so check that this one isn't in fact on the 7th. July 14 is down for a talk on Logic by **G3WFEV**, while 21st and 28th are still, at the time of writing, open as to subject.

If you know the "usual Hq." for the **City of Bristol (RSGB)**, then you know where to head for on Monday, July 25, when **G8FNR**, **G8GLQ**, and **G8KGGH** will be talking about Amateur Television; if you don't know the Hq. address, no doubt the Hon. Sec. would be pleased to tell you—see Panel for his address.

A New Club

A heading we always like to write; this one is at **Walsall** and they are at home on alternate Tuesdays at the "Hame-Maker Inn" Blue Lane, where their first meeting was addressed by **G3JFI**; the Editor reckons that if Jim was anything like on form they had a hilarious

evening! For the future the general arrangement will be to have a talk, films show or whatever once in each month, with the remainder being given over to informals.

Oddly enough, your scribe having penned that last paragraph mentioning **G3JFI**, the very next letter mentions "one of the gang" from all those years ago—the late **G5FA**, "Bill" Solder. **G3GC** in the **Edgware** Newsletter was pointing out how much help Bill and other gave him in first getting an AA permit and then a full "ticket." To deal with the meetings, the group foregather on July 14 (Informal) and 28th when **G8JBH** will be unravelling the mysteries of TTL Logic. It should be noted that there are *no meetings in August*. Hq. is the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.



Members of the R.A.E. class at Brasshouse Centre, Birmingham, have a practical demonstration from one of the lecturers, **G3KPT**, using equipment loaned by **G3NXC**.

York is the one with the odd routine—every Friday except the *third one*, at the United Services Club, 61 Micklegate, York. In addition the group will have a station at the Great Yorkshire Show over July 12-13-14.

Bishops Stortford have their place at the British Legion Club at the top of Windhill, while **Harlow's** Hq. is the old barn in First Avenue, unmistakable with the **G6UT** callsign plaque over the building; for details of either, contact the Hon. Sec. of Bishops Stortford at the address in the Panel.

Torbay have a busy month in July; the meeting for July 30 is a special lecture, while there is also an exhibition station running under **G3NJA/A** at Teignbridge Jubilee Trades Fair, Newton Abbot, over July 21-24. No doubt the weekly informals will continue too—Hq. is at Bath Lane (rear of 94 Belgrave Road), Torquay.

On to **Echelford** who have their place at The Hall, St. Martins Court, Kingston Crescent, Ashford, Middx. on the second Monday and the last Thursday of each month.

The title **Thames Valley** refers to a group whose Hq. is at Gigg's Hill Green Library, Gigg's Hill Green Road, Thames Ditton, Surrey, which defines their area of operation fairly well. They assemble on the first Tuesday in every month; most usually their scribe is ahead of us in that he gives the *August* doings—a ragchew which is a traditional once-a-year thing with this group.

Always mention "Short Wave Magazine" when writing to Advertisers — it helps you, helps them and helps us.

A Social Evening is also the layout for July 12 at **Newbury**; details of the venue and other aspects of the group can be obtained by getting in touch with the Hon. Sec.—see Panel.

Every Tuesday at eight, the **Worthing** locals get together at the Adult Education Centre, Union Place, Worthing; we do not have details of the goings on during July as their Newsletter doesn't go that far forward—but we do know that there will be *no meetings in August*.

Finale

Which is the moment when we come to the bottom of the pile. If—as we bet several have—you've missed the deadline which was given last month, hard luck and we are as sorry as you; but we propose to keep the "box" in the piece each month from now on and this should help matters considerably. The address, of course, is as always Club Secretary, **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, AL6 9EQ.

THE NEW QTH PAGE

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.

LETTER TO THE EDITOR

The Editor

Dear Sir,

It is now certain that the City and Guilds Subject No. 765—Radio Amateurs Examination—will be of the "multiple-choice" form (in which the candidate is asked to select the right one of alternatives given) in 1979, and from then on.

It must be realised that the object of this method of testing is to ease the position of those who find it difficult to answer the "classical" twenty-minute questions used in previous years, and experimental evidence from other courses which have used this method indicates that the possibility of "lucky" passes is in fact reduced rather than enhanced; thus the element of luck in meeting those questions which have been best revised or have been best understood at classes in a particular paper is to a large extent removed. Additionally, the test is more comprehensive and controls are built in to eliminate guesswork answers.

It would be of interest to hear from those taking R.A.E. courses elsewhere so as to compare notes and get some "feel" for the nature of the problems posed by a change in the syllabus and in the style of the examination.

Yours, etc., etc.,

F. A. Fear, G8CVR

P.S. It must be realised that any information the writer may have does not in any way imply that he speaks either for the City & Guilds, or D.E.S.

PHOTOGRAPHS ALWAYS WANTED

Readers are reminded that we are always glad to have good photographs of Amateur Radio interest for general illustration in **SHORT WAVE MAGAZINE**. Though colour prints can sometimes be satisfactorily reproduced black-and-white, we much prefer the latter in the original. Except that we cannot conveniently make use of photographs that are either very small or very large, size is not of great importance as this is in any case determined to our requirements in the block-making process. What is

important is that the picture should be clear and sharp with fully descriptive notes—and this description should *not* be written on the back of the print itself, but on a separate piece of paper lightly attached to the photograph. Payment is made for all pictures used, immediately on publication.

Send to: Editorial Dept., **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts. AL6 9EQ

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

THERE seems little doubt, despite the ups and downs in the short term, that the conditions are on the upswing; it has always been somewhat of a sawtooth waveform, with the steep side on the upward run followed by the slower fall away to the bottom. All we need to know now is how high is the cycle going to go, and when will the peak occur—one hopes it coincides with the spring or autumnal lift of that year.

On a different tack, one likes to make sure this piece is as up-to-date as it can be, and over the years the *West Coast DX Bulletin* and Geoff Watts *DXNS* have been a great help; it is all the more galling then, than in the first month in which we have pulled the deadline back to meet printing requirements (and have therefore a little box giving forward dates for three months ahead each time) that we come to the task this time quite certain that there is late news in the postal system and no way of getting at it until after CDXN has been completed and wafted away to "another place," wherein it will be processed like the peas in the can. Excuse us while we curse!

Top Band

Shamefully neglected, at least in the matter of reports; possibly everyone getting ready for the summer Transequatorials, or (more likely!) snowed under with gardening! G2HKU (Sheppey) says its not just a matter of having to support the XYL and two dogs, but the wildlife, on wings or legs, which has latched on to him for support, while reading between the lines we suspect that Ted's mower has been unwilling to be aroused from its winter sleep. On the band, SSB has been used to work PAØINA and PAØPN, while the CW managed it over to OL5AWG and OL8CGI.

G4FJU (Walsall) makes a first appearance—welcome aboard! Ben reckons that essentially the reason for the absence of entries for the Top Band/Ten-metre Ladder is the

lack of knowledge of the rules. So—a summary. The object is to work each of the counties or administrative areas in U.K. adding to that little lot the various islands or groups of islands. Work each for one point on SSB, for two points on CW, and three points on AM; thus a maximum of six points for a county. To give a bit more help to the AM chaps, they can work cross-mode to an SSB station, and in this last case both stations score two points, the SSB counting it in his AM score, the AM station in his SSB score; but no other cross-mode contacts. Total up your score as four columns: AM, SSB, CW and countries. The ten-metre effort to be exactly the same; and for both the objective is not so much to run a contest as to make quite sure that the bands are well enough occupied to make a good case for their retention for amateur use in WARC 1979. So—get on and make a suitable noise at other stations, or call CQ.

To return after this digression to G4FJU, he has eight watts of AM and nine of CW; four countries worked on AM out of a total of twelve countries, since the start was made back in September 1976, with what Ben describes as 135 feet of inverted-U aerial—we thought G2BJY had a monopoly of weird aerial shapes in Walsall! Question—how do you generate a U-shape out of 135 feet of wire? There sounds to be a saga of "How to get the best out of a poor spot" hidden beneath that simple single letter.

To add to the fun of the Top Band fair, we have it that G4ADM will be going to South-West Eire between July 9 and July 24; he proposes Top Band operations from 2100 clock each evening until the band peters out on him. Give him a shout—he didn't do much in the way of business from the Outer Hebrides last year because, he feels, no one knew he was going to be there. No modes started, but an attentive ear around the band should indicate

where how and what to the knowledgeable ones.

As for your scribe, the aerial is back up, and we are on as SWL on occasion; and since we removed the G3MWF gear, and various boaty bits out of the garage it is now physically possible to touch the quarter-built transverter; all we have to do now is to clear the workbench . .

"CDXN" deadlines for the next three months:—

August issue—June 30th

September issue—August 4th

October issue—September 1st

Please be sure to note these dates!

Eighty

Our opener this time is G2NJ (Peterborough), and the first part of his note has little to do with DX. However, it *is* concerned with communications—the pair of pigeons, Romeo and Juliet, who alighted on the boat on which G14AEY is radio officer, and stayed there through some 80,000 miles of voyaging, being mentioned in the national daily papers, and in the BBC's Northern Ireland service. As G14AEY is off again on his travels, the birds are being cared for by a prominent pigeon-racing official, pending their sale, the proceeds of which will be devoted to the R.N.L.I. If any reader is interested or knows of someone who might be, will they please get in touch with Dewar Twist, Radio Officer, *M.S. Olgar Maersk*, A. P. Moller, KGS Nytorv 8, 1098 Copenhagen K, Denmark. On an entirely different front, Nick reckons the way to get lots of QSO's is to sign /M on CW, he having done just that up to London and back with G5NX doing the driving. The HW-8 has also been used from home, of course, despite the deep fading and high noise levels encountered during the noon-time

operating spells. Booked in were G2CP, G4DYF, G2BOP, G4CQK, G13ZXM, G3FMW, and G2NG around this time, and the highest input of the bunch was five watts.

Anyone who knows G3CED/G3VFA would scarcely think of him as a poet, and neither would anyone who knew him from his log comments, but some contacts on 28 MHz caused him to go down Memory Lane, to the thrill of QRP when he was first licensed as a G amateur.

DC mains with the wiring such that the positive leg sat 240 volts below earth discouraged any ideas of using mains power, so a breadboard crystal oscillator was lashed up using a two-volt dull-emitter valve of pre-war vintage, a filament accumulator, dry battery for grid-bias and another one for HT. G2SO was the first QSO (now well-known as ZE3JO), with a 599 report, and Ma1 suggested cutting the power to the LP2—eventually George got it down to 1½ volts on the anode and G2SO was still copying him 100%. Five watts input with that rig also raised the first W, no other than W2EQS. Speculating five shillings (real money in those days) was the way to get 800 volts, from a rotary converter; so that poor LP2 was really made to suffer, dishing out umpteen QSO's until it eventually turned purple and silence descended. A quick look in the box brought out a PM1HF bottle, and they were back in business. And, as George says, thirty years later, QRP is still a beautiful art despite the 1977 QRM which "in 1947 hadn't even been invented!" Reverting for a moment to the 28 MHz note, G3CED also had a little chuckle at the contact who gave him a report of superb speech quality—the mike was a seven-and-sixpenny crystal!

G4EVO also hails from Broadstairs and is another QRP fan; he has gradually spread his wings until now he seems to use Eighty just for the odd contact with the locals and the other QRP ops. who are about.

The time for 3.5 MHz DX is about two in the morning, complains G4DMN (Wirral), who finds it hard to either stay up that late or climb out of bed that early! However, there is a streak of determination in G4DMN and he did the deed; SSB contacts resulted with A9XBJ,



G3NEO holding a home-built VXO, with (left) the G2NJ Trophy presented by the G-QRP Club for the most outstanding QRP operation during 1975-76 and (centre) a smaller "keepsake" cup.

CP6EN, EL7F, HBØXAA, TF30F, ZL4HP, 7X3AH, 7XØBI, 9K2DR and 8P6GN.

GM3CFS (East Mey) reckons this has been his best month for a long time; 3.5 MHz CW made the grade to CE8AA (Punta Arenas), CN8AD, DL6FU/EL/MM off Casablanca, EL2FY, FG7AM, LU3EX, LU6DKX, PY2BW, TF3ST, UA9CM, UH8AI, UJ8AR, OA4EK, VO1HP, ZD8RR, and ZS6ZR.

We nearly missed out G4FJU and G2HKU; the former can screw his machinery up to eight watts of CW; AM so far has managed a QSO with ON6NA and his own locals, but the CW managed a total of 18 European countries outside these islands. As for G2HKU, he used QRP CW to work GW2HPG, a new licensee last autumn who has managed to get his father's old callsign.

Coming Shortly

Right now, both last and this week's copies of WCDXB. The Kingman Reef expedition, if it comes off will have been and gone by the time you can get to reading this; they hope for something of the order of 10,000 QSO's on all bands 1.8 to 30 MHz, which should mop up some of the demand!

If you want the Kermadec Is., now is the time to have patience; Marion, ZL1BKL and her team are still getting the odds and ends sorted out, and they hope to have some

sort of a firm plan by the end of July, the holding factors being, in general, Government departments who have to give answers—and we all know what it is like to have to get a decision out of a civil servant!

F6BBJ, Jacky, was hoping to have another run at the Glorioso-and-other-Red Sea spots, but the recent FL8 poll in favour of independence has made Jacky sit tight there in Afars and Issas for the moment as the Independence Day will be, we hear, before June is out—but after the dust has settled, F6BBJ is going for a run down the Red Sea for sure.

The proposals by some VU's for a Laccadives operation have been postponed, and the present understanding is that they will not be able to go until late September or October; but, again, the word is that the show is still on.

And, of course, nearer home, the Top Band Transequatorials could be giving some interest through into July for the dedicated ones!

Forty

Varies, as usual, between the sublime and the gorbimey; and the gentle rise in activity on the HF bands has of course tended to reduce the activity on 7 MHz. G4DMN (Wirral) commented that he listened and then decided that the right and proper thing to do was to go to the workbench and build an attenuator!

Up North, GM3CFS spent a fair time on the band, which yielded CW contacts with CM2VG, CN8CW, CO4VV, CO7AM, LU8AHW, OA4AHO, PY2GVV, UA9NN, VK5FH, VP2DD, WA5UKR/YV5, YV1TO, YV4AMG, ZL2QK, ZL3LM, ZL4FT, ZP5AO, and HI8XPT.

G2HKU used SSB for a contact with U5OSP, and the big rig for UA9AFU, UA9MCX, VK31M and VO1MZ on CW; but the QRP machine was not completely neglected, being used to key with YU2KYZ.

G3CED/G3VFA doesn't seem to have done much on this band; a few G's and a PA3AAI who sounds a mite fishy.

G4EVO found UF6EAB down at the bottom of the band, and his CW was for the rest just used for the odd G and DL contacts.

G3ZGC/MM wrote from Dubai in the Persian Gulf, whence he has been travelling from Cape Town. This time he has largely stuck to the HF Bands, but an interesting one on 7 MHz was S8AAF in Transkei who called him out of disbelief that a G signal could be so strong, before the exchange explained that Esso Scotia was for all practical purposes on Transkei's front door!

Now to G4EDG (Newton Abbot) continues his way along the 7 MHz trail, although he has been finding the early-mornings plagued with static crashes and Gotaways—the latter included VS9KT, HK0BKX, and a brace of FK8's. However Steve was somewhat appeased when he managed A9XBB, CX3AL, HI7JM, JA8UI/PZ, JW2CF, LU4KV, LU8ADK, LU5AMT, LU8DQ, PJ9EE, PY1MAG, PY6HL, PY1DPP, UK6GAA, UH8HCE, UM8MBX, UA0ABB, VK3MR, VP8PL (S. Orkneys), ZL4FT, ZL2UW, ZL3PT, ZS1XR, ZS6AKJ, and 5T5CJ; although he does not say what mode he used, we believe it was CW.

Twenty

Which is where G3NOF slips on to the stage to say his piece. Don reckoned conditions were erratic—sometimes poor, at others good. Much short skip was noted, but in the mornings there were openings into the Pacific sometimes and other:

West Coast W's, KL7's and VE6's; but not much VK/ZL stuff. G3NOF made SSB contacts to HB0XAA, HK5SJ, JY25DI, K0HAA (S. Dakota), KH6IJ, N6BS, VE7DIY/SU, VE8RCS, VE8YE, VK3AH, VP2AB, W6FR, W6HLH, W6HT, W7AHC (Idaho), W7GYG (Idaho), WA7VGM, WA7ZTL, and ZL2AM! the Gotaways included FO8DO, who was often heard around 14110 kHz, ZK1DR, and 5W1AU.

G4CCQ (Lamberhurst) has been trying-out a new aerial; it seems to favour Asiatic Russia and the JA's, but others worked were (CW), JG1HND, OH9TH/SU, U6OMNK, U6OKLN, EA9FH (Melilla Is.), U6OKNW, U6OBHD, U6OWLA, JA7FS, VK4ES, JA7OJW, JA9XE, JA3KM, W7VY, JA8UI/PZ, HC1LT, OD5LX, JA2IU, VE6KY, JA5PL, HI8LC, UK0KAC, JA6AA, JA7LMZ, UA0BAQ (Dixon Is.), KG4JS, JA5DKJ, VE7CNE, JA5CP, VK4ZB, JA4GOG, JI1CFB, AP2UR, and JH7ICS.

This time we have two lots of G4DJY (Blackpool) to cope with, as Peter's last one managed to go adrift a little. The G4DJY set-up is around the 100 watts mark into a Joystick, and during the past month it seems to have been pretty effective; with a couple of hundred contacts. We have to do a bit of sorting: all W call areas, all Continents, 9A1A (San Marino) and WB7BQN who was once G13EK.

On to G3RCA (Wigan) who also stuck to his twenty-metre last; but unlike G4DJY, kept to SSB. He also made better use of the time factor than most, varying his operating hours as much as he could. 9V1SW, 5V4AH, K9PNT/DU2, E2TW, SV1FT, VP1APC, HP1CY, A35TT, VP5EE, ZL3OG/C, 3D2GA, 5Z4QC, A35CR, 3D2DM, JY5MB, 9J2DX, UG6LQ, TF3OF, KG6JFO, YB8ACK, VK8DV, VP2AZB, TT8SM, CE4MT, KA2GG, CN8CW, VU2YK, A4XHB, UD6HDO, CE0AE, FO8DF, 9K2CM, ZD8RR, EL2EP, EL3A, EL1I, 3V8BZ, YS1AJE, FM7WE, TR8MG, 5H3JR, A4XFT, CR9AJ, 9M2CP, 5Z4OO, 9L1MD, CO2HZ, YN8ARC, HS1AKT, XF3B, VS5MC, VS5PM, 9G1JX, FO8EU, S79DF, VP1BG, YN1PJ, CE3FH, OA4BZ, HH2MC,

PJ2ARI, HM1KE, ZF2AA and KM6FC.

G4DMN found things very good, with the band remaining open to 0200 or 0300; indeed at 0100z VK's were being worked. The log includes A4XGY, A4XGZ, A4XHB, AP2KS, AP5HQ, CE2BJ, CO2FR, CO2HZ, CO2CP, HC4PP, HP1MU, HZ1AB, 4M1KE, JY2SHH, JY2SZH, JY2SYJ, JA's, JY6ZZ, KH6HII, OA4AZS, OA4BZ, OA4BJ, OD5EP, PZ1AN, PY's, TI2RPS, TR8MG, TU2EW/M, TU2GJ, U18AAAY, UK8BAJ, VP2LL, VP2KL, VP2GAO, VP2SAA, VP9, VK's, all W call areas, XE1QW, XE1UF, YN8ARC, ZD8RR, YN8DYC, YS's, ZL1BIL, 5T5CJ, 5U7AG, 9K2EP, 9K2EX, and WA6CIQ/9Q5.

Up North we go now, to GM3CFS, who traded callsigns on SSB with FO8EU, KH6's, KM6FC, JY25HH, and ZK1BA; but the trusty old bit of brass was reiled upon for C33BLU, EL2ET, EP's, FM7WV, G3ZGC/MM when the latter was off Mombasa, JA's, a fistful of KH6's, KL71OG, OA4AHA, PY4ZI, UK0BAA, UK0KAC, VP8PL, YV5TT, and 4Z1OTA.

Nothing in the nature of a mammoth list comes from G2HKU—he will only admit to working CW to UK9WBB and VK3MR.

Because he has been testing a new five-band ATU, G3CED/G3VFA has been more concerned about getting reports on all bands than in collecting DX for its own sake; thus his QRP and Joystick latched him on to an assortment of I variations, some short skip ones like GW3GWA for instance, and then he hurried off to another band.

The log from G4EVO shows a worthy gain in confidence and rolling up lots of European QSO's with his couple of watts; but whether the DX decided to shoot up to 21 MHz with the lifting of conditions, or whether G4EVO was just plain out-of-luck—either way, G4EVO had nothing rarer than an HB0 on Twenty this month.

G3ZGC/MM found 14 MHz CW to be of some interest; lots of Russians and JA's from around the Persian Gulf, with G3KP worked on May 5; additionally the daily sked with G3LLK of Newbury was maintained when G3LLK was away on holiday at Barton-on-Sea by Gus sitting on the front and operating

/M—not bad for a /M to /MM, when one recalls that G3ZGC/MM has only the FT-75 at his end.

21 MHz

Naturally enough, with the lift in conditions all around, there have been times when 21 MHz has been very good indeed, and the letters seem to reflect this situation.

For example, the flea-power at G3CED, when applied on this band, was giving UM8, UA9, UK9, UA6, and—a turn-up for the book, this GM3KLA up in Unst, the most Northerly station in the British Isles working the most easterly, and nice to know Bill is still around.

For some reason, G4EVO seems to have given the band a bit of a miss, but his few contacts managed to include UK9WAP, UA6, SM1FPE /4U, UL7IH, and the odd European, all of course at the five watt input level.

GM3CFS worked SM1FPE/4U in Sinai, LU7AOK, PY2BW, ZP5NW, 8P6GG and 9Y4FW, all CW.

The prize of the month for G4DMN was his 21 MHz contact with VK3OT at 2359z when the VK was just about the only signal on the band; others worked included VE5YA, CE3ALU, CE3BBW, CE4PM, CX, D4CBC, EA9FL, EA9FJ, HC5EE, HK3SH, HI8EJH, JA9BMP, JE3UZM, KZ5AL, KZ5VS, KZ5SVV, K5DG, LU's, OD5EP, ST2SA, STØRK, TR8LE, TR8JVC, UD6DKZ, VE2JL, VP8ML, VP8OL, VP8PC, VP8PL, W's, ZS's, ZD7PV, 6Y5RS, 7P8AC, 7P8AR, 7P8BC, 8P6ES/P, 8P6FX, 8P6GN, 5N2AAX, 5N2NAS.

G3NOF found conditions could be very good, with W's worked from 1300z right round to 2400z, Africans both mornings and evenings, nothing heard from the Far East, but the knowledge that others had been hearing the latter; SSB contacts were made with C31NG, HP2LT, KP4DIW, KZ5BA, KZ5FR, N4CN, TU2GA, assorted East Coast W's, WB2CJF/HZ1, ZS6AM, 5X5NK, 5Z4PG, 5Z5RG, 8P6CC/P, 9G1KK, 9J2WR, and 9X5TM.

Just three on G4EAN's list for this time—HBOXAA, WB3GPV, and 7P8BC—the result of one short spell of operating one Sunday afternoon. Another one who only paid

fleeting visits to the band was G4BHE, who made his sole 21 MHz QSO with HH2MC.

Ex-G2XC has, as usual, spend some 95% of his time listening on 21 MHz, and at that he has been somewhat limited by other tasks knocking a dent into the available operating hours. Nevertheless, Ted notes that since May 1 and to the date of his letter (May 28) he had heard some 73 countries outside Europe. One which Ted has his doubts about was HL5HD, heard in QSO with an OK who was pleading for a card; but a look in the Call Book shows no HL5's—anybody know whether this one is good or phoney? Interestingly enough, though Ted operates at various times of the day, he has found activity to be rather low until the evenings.

At G4EDG it has been practice this last few weeks to take a quick peek at 21 MHz after finishing on 7 MHz between, say, 2359z and 0100z, to find the band full of East Coast W's, and Caribbean stations, not to mention lots of Europeans. An annoying Gotaway was KG6JIA, who despite his S9 signal was wiped out by some local D-I-Y freak with an electric drill. However Steve made it to PJ2VD, WB3BKR/HK4, UM8FZ, UKØLAB, YBØACT, WA6EGZ/VQ9, JA's, EP2VW, P29JS, UG6GAF, PT7AC, 5Z4LW, 8P6GN, and VE7DRL/VP9.

Now Ten

Which is where we first begin to notice how space and time are both creeping up on us.

First off let's take a look at the report from SWL Whitaker on the June Ten-Metre Activity Day. It really seems to have taken off, possibly with the incentive of the prizes; some 460 G stations alone were on the band. It seems that North of Harrögate there was much QRN—one of the SWL's from Newcastle way reports QRN for 22½ hours out of the 24! The DX started to roll in after lunch, when several ZS's were on and D2AFW, but things started to get more interesting around 1730z when a brief opening to the Middle East occurred, followed by a swing round to Africa again; and at 1930z the band opened up to the South Americans. One of the

interesting things about the situation was the degree to which the skip was "selective" with stations down South hearing different stuff to those up North at the same time. The results showed G2ADZ as top CW operator, chased home by G2PT, while the SSB leader was G3OZF who was well ahead of runner-up G3UDR. The SWL's were almost all hiding behind the anonymity of Bureau numbers, but the winner was BRS 32525, followed by BRS 34348.

Oddly enough it is G2ADZ (Cheshington) next on the pile. Bill says that only on one day in the month was there a blank (May 18); of the others, 19 days produced real DX, for example CW with ZC4IO, CX2AQ, IC8HGZ (worked this one 'cos he's a rare one!). 9H1CH, many PP's and PY's, 6W8EX, 9J2BO, ZD8TM, ZD 8DO. 4U9ITU, EA6CL, UA9UOZ, UM8MBM, LU8AHW, CX4KJ, UA9CIT, GM4ENF(!), UA9XSE. CN8AD, UA9SEU, PJ2VD. YV1NX, EA9FH, and YV1NX; but the prize of 'em all was the hearing of the slow CW coming up out of the noise and turning into solid copy and a QSO with K4UCQ, at 2128z on May 28. In fact, since Bill started his reporting on Ten a few months ago, he has been able to work 50 countries, already.

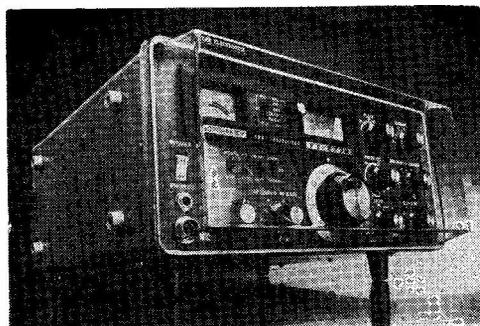
Snippets

Only a few here to be mentioned. Firstly, the G-QRP Club are sponsoring a Two-Way QRP Award; this requires that contacts be between stations both running less than five watts. The basic award will be for ten countries and stickers as endorsements for each additional ten countries. Already the first one has been won, by GM3OXX who made all his contacts on two watts. G3DNF and G8PG are getting near to qualifying, too.

A Silent Key to report now; G2HKU passes on the sad news of the death of G6FV of Teynham who will be sadly missed.

Finale

The deadline dates will appear in the box each month from now on. So make a note in your diaries *now*. Address as ever to CDXN, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ.



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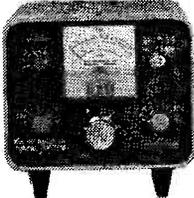
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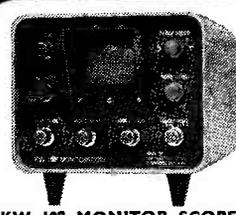
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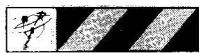
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144-030 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
144-433-2 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
144-480 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
144-800 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
144-850 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-000/SO ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-200/R8T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-300/S12 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-350/S14 ...	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
145-500/S20 ...	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
145-550/S22 ...	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
145-600/S24 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-650/R2R ...	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
145-700/R4R ...	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
145-750/R6R ...	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
145-800/R8R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-950/S38 ...	a	a	a	a	a	a	a	a	a	a	a	a	a

PRICES : (a) £2-36 (b) and (c) £2-90 + VAT (H).

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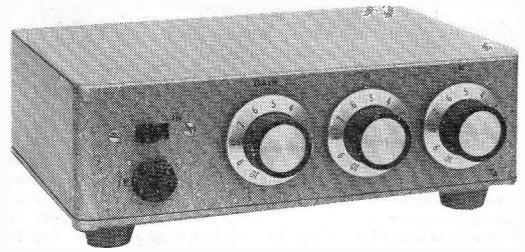
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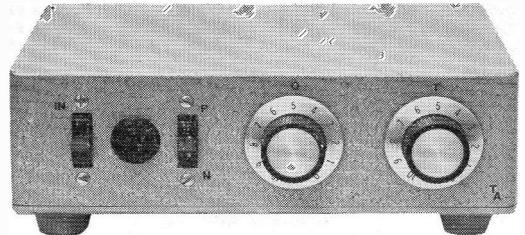
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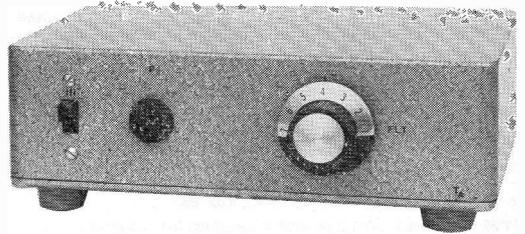
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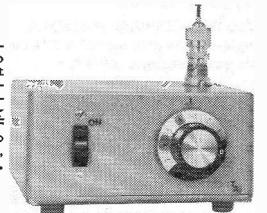
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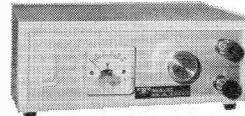
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