NOVEMBER 1986 £1·10

Practical Wireless

The Radio Magazine

THE SONY AIR-7 MONITOR RECEIVER REVIEWED

Build the PW `TAW´ VLF/LF Converter

Build our LF Bands Active Antenna

Reg Ward & Co. Ltd.

1 Western Parade, West Street, Axminster, Devon, EX13 5NY.
Telephone: Axminster (0297) 34918

Yaesu

FT1	HF Transceiver	P.O.A.	(—)
FT980	HF Transceiver	1750.00	(—)
SP980	Speaker	110.00	(2.50)
FT757GX	HF Transceiver	969.00	(—)
FC757	Auto A.T.U.	349.00	(2.50)
FP757HD	Heavy Duty PSU	239.00	(2.50)
FP757GX	Switched Mode PSU	199.00	(2.50)
FT290	2m M/Mode Port/Transceiver	379.00	(—)
FT290	With Mutek front end fitted	409.00	(—)
MMB11	Mobile Bracket	37.50	(1.50)
NC11	Charger	10.50	(1.50)
CSC1	Carrying Case	6.50	(1.50)
YHA15	2m Helical	7.50	(1.50)
YHA44D	70cm ½wave	12.50	(1.50)
YM49	Speaker Mike	22.00	(1.50)
MMB15	Mobile Bracket	14.55	(1.50)
FT203R	NEW 2m H/Held/C/W FNB3	255.00	(—)
FT209R	NEW 2m H/Held/C/W FNB3	299.00	(—)
FT703R	70cm H/Held	289.00	(—)
FT709R	70cm H/Held	319.00	(—)
FT270R	2m 25W F.M.	399.00	(—)
FT270RH	2m 45W F.M.	469.00	(—)
FT2700R	2m/70cm/25W/25W	499.00	(—)
FRG 9600	60-905MHz Scanning RX	525.00	(—)
MMB10	Mobile Bracket	10.00	(1.50)
NC9C	Charger	10.35	(1.50)
PA3	Car Adaptor/Charger	20.50	(1.50)
FNB2	Spare Battery Pack	25.00	(1.50)
YM24A	Speaker Mike	27.00	(1.50)
FT726R	2m Base Station	999.00	(—)
430/726	70cm Module for above	349.00	(3.00)
FRG8800	HF Receiver	639.00	(—)
FRV8800	Convertor 118-175 for above	100.00	(2.00)
FRT7700RX	A.T.U.	59.00	(2.00)
MH1B8	Hand 600 8pin mic	20.00	(1.50)
MD1B8	Desk 600 8pin mic	79.00	(1.50)
MF1A3B	Boom mobile mic	25.00	(1.50)
YH77	Lightweight phones	19.50	(1.50)
YH55	Padded phones	19.95	(1.50)
YH1	L/weight Mobile H/set-Boom mic	19.00	(1.50)
SB1	PTT Switch Box 208/708	21.00	(1.50)
SB2	PTT Switch Box 290/790	18.00	(1.50)
SB10	PTT Switch Box 270/2700	21.00	(1.50)
FF501DX	Low Pass Filter	37.50	(1.50)
NEW			
FT767GX	HF TXCR	1550.00	(—)
FT727	2M/70CM H/H	425.00	(—)
FL7000	HF Linear	1600.00	(—)
FT290 MkII	Surer 290	429.00	(—)

Linear Amps

TOKYO HI POWER			
HL 160V	2m, 10W in, 160W out	244.52	(2.50)
HL 82V	2m, 10W in, 85W out	144.50	(2.50)
HL 110V	2m, 10W in, 110W out	249.00	(2.50)
HL 35V	2m, 3W in, 30W out	76.00	(2.50)
HL 30	2m, 3W in, 30W out	54.00	(2.50)
HL 20U	70cms, 3W in, 20W out	122.50	(2.50)
MICROWAVE MODULES			
MML144/30-LS	inc preamp (1/3 w i/p)	94.30	(2.50)
MML144/50-S	inc preamp, switchable	106.95	(2.50)
ML144/100-S	inc preamp (10w i/p)	149.95	(3.00)
MML144/100-HS	inc preamp (25w i/p)	159.95	(3.00)
MML144/100-LS	inc preamp (1/3w i/p)	169.95	(3.00)
MML144/200S	inc preamp (3/10/25 i/p)	334.65	(3.00)
MML432/30L	inc preamp (1/3w i/p)	169.05	(2.50)
MML432/50	inc preamp (10w i/p)	149.50	(2.50)
MML432/100	linear (10w i/p)	334.65	(3.00)
B.N.O.S.			
LPM 144-1-100	2m, 1W in, 100W out, preamp	197.50	(3.00)
LPM 144-3-100	2m, 3W in, 100W out, preamp	197.50	(3.00)
LPM 144-10-100	2m, 10W in, 100W out, preamp	175.00	(3.00)
LPM 144-25-160	2m, 25W in, 160W out, preamp	255.00	(3.00)
LPM 144-3-180	2m, 3W in, 180W out, preamp	295.00	(3.00)
LPM 144-10-180	2m, 10W in, 180W out, preamp	295.00	(3.00)
LP 144-3-50	2MN 50W out, preamp	125.00	(3.00)
LP 144-10-50	2M 10W in, preamp	125.00	(3.00)
LPM 432-1-50	70cm, 1W in, 50W out, preamp	235.00	(3.00)
LPM 432-3-50	70cm, 3W in, 50W out, preamp	235.00	(3.00)
LPM 432-10-50	70cm,.10W in, 50W out, preamp	195.00	(3.00)
LPM 432-10-100	70cm, 10W in, 100W out, preamp	335.00	(3.00)

SWR/PWR Meters

HANSEN			
FS50VP	50-150MHz 20/200 Interval PEP/SWR	106.70	(2.50)
FS300V	50-150MHz 20/200 PWR/SWR	53.50	(2.50)
FS300H	1.8-60MHz 20/200/10W	53.50	(2.50)
FS210	1.8-150MHz 20/200 Auto SWR	63.50	(2.50)
W720	140-430MHz 20/200W	41.50	(2.50)
WELZ			
SP10X	1.8-150MHz PWR/SWR	42.95	(2.50)
SP122	1.8-60MHz PWR/SWR/PEP	98.00	(2.50)
SP220	1.8-200MHz PWR/SWR/PEP	69.95	(2.50)
SP225	1.8-200MHz PWR/SWR/PEP	127.95	(2.50)
SP420	140-525MHz PWR/SWR/PEP	82.00	(2.50)
SP425	140-525MHz PWR/SWR/PEP	129.00	(2.50)
SP825	1.8-200-430-800-1240MHz	189.00	(2.50)
TOYO			
T430	144/432 120 W	52.50	(2.50)
T435	144/432 200 W	58.00	(2.50)

AERIALS BY:- JAYBEAM – MINIBEAM – HYGAIN – G. WHIP – TET – MET – TONNA

Icom Products

IC751	HF Transceiver	P.O.A.	(—)
IC745	HF Transceiver	P.O.A.	(—)
IC735	New HF Transceiver	P.O.A.	(—)
PS15	P.S. Unit	158.00	(4.50)
PS30	Systems p.s.u. 25A	343.85	(—)
SM6	Base microphone for 751/745	46.00	(2.00)
IC505	50MHz multi-mode portable	459.00	(—)
IC290D	2m 25w M/Mode	542.00	(—)
IC271E	2m 25w M/Mode Base Stn.	835.00	(—)
IC271H	100W version of above	1029.00	(—)
IC27E	25W FM mobile	399.00	(—)
IC28E	25W FM	325.00	(—)
IC47E	25w 70cm FM mobile	495.00	(—)
ICBU1	B/U Supply for 25/45/290	32.00	(2.00)
ICR71	General Coverage Receiver	825.00	(—)
IC02E	2m H/Held	299.00	(—)
IC2E	2m H/Held	225.00	(—)
ML1	2m 10w Linear	79.35	(2.50)
IC4E	70cm H/Held	285.00	(—)
IC04E	70cm handheld	299.00	(—)
BC35	Base Charger	70.15	(2.00)
HM9	Speaker mic	21.85	(2.00)
LC3	Carry Case	6.90	(2.00)
ICBP3	Std Battery Pack	29.00	(2.00)
BP5	High Power Battery Pack	60.95	(2.00)
CP1	Car Charging Lead	6.90	(2.00)
DC1	12v Adaptor	17.25	(2.00)
R7000	VHF/UHF Scanning Receiver	957.00	(—)
IC3200	2M/70cm Mobile Transceiver	556.00	(—)
IC12	23cm H/H	428.00	(—)
GC4	World Clock	39.00	(2.00)

Scanning Receivers

SMC8400	VHF/UHF Scanner	249.00	(3.00)
SX200	VHF/UHF Scanner	325.00	(3.00)
SX400	VHF/UHF Continuous Coverage	625.00	(3.00)
AOR2002	VHF/UHF Continuous Coverage	487.30	(3.00)

Mutek Products

SLNA 50	50MHz Switched preamp	49.50	(2.00)
SLNA 144s	144MHz Low noise switched preamp	41.95	(2.00)
SLNA 145sb	Preamp intended for 290	31.90	(2.00)
GLNA 432e	70cm Mast head preamp	159.90	(3.00)
RPCB 144ub	Front end FT221/225	84.90	(2.00)
RPCB 251ub	Front end IC251/211	89.90	(2.00)
BBBA 500u	20-500MHz Preamp	34.90	(2.00)
GFBA 144e	2m Mast head preamp	149.90	(2.50)
SBLA 144e	2m Mast head preamp	89.90	(3.00)
RPCB 271ub	Front end for IC271	94.90	(2.00)
TVHF 230c	2M-FM Transverter	299.90	(5.50)
LBPF 144v	Bandpass Filter	24.90	(2.00)
LBPF 432u	Bandpass Filter	24.90	(2.00)
TVVF 50c	6M Transverter	209.90	(3.00)
GLNA 433e	70cm Pre-amp	89.90	(3.00)
TVVF 144a	2M Transverter	249.90	(3.00)

Datong Products

PC1	Gen. Cov. Con.	137.40	(2.00)
VLF	Very low frequency conv.	34.90	(2.00)
FL2	Multi-mode audio filter	89.70	(2.00)
FL3	Audio filter for receivers	129.00	(2.00)
ASP/B	r.f. speech clipper for Trio	82.80	(2.00)
ASP/A	r.f. speech clipper for Yaesu	82.80	(2.00)
ASP	As above with 8 pin conn	89.70	(2.00)
D75	Manual RF speech clipper	56.35	(2.00)
D70	Morse Tutor	56.35	(2.00)
MK	Keyboard morse sender	137.40	(2.00)
RFA	RF switched pre-amp	36.00	(2.00)
AD270-MPU	Active dipole with mains p.s.u.	51.75	(2.00)
AD370-MPU	Active dipole with mains p.s.u.	69.00	(2.00)
MPU	Mains power unit	6.90	(2.00)
DC144/28	2m converter	39.67	(2.00)
PTS1	Tone squelch unit	46.00	(2.00)
ANF	Automatic notch filter	67.85	(2.00)
SRB2	Auto Woodpecker blanker	86.25	(2.00)

CW/RTTY Equipment

Tono 550	Reader	329.00	(3.00)
ICS/AEA	PK 64	239.00	(3.00
	PK 80	239.00	(3.00)
ICS/AEA			
PK64	Complete Packet Amtor/RHa etc.	239.00	(3.00)
PK80	Universal Packet TNC	239.00	(3.00)
BENCHER			
BY1	Squeeze Key, Black base	67.42	(2.50)
BY2	Squeeze Key, Chrome base	76.97	(2.50)
HI-MOUND MORSE KEYS			
HK703	Up down keyer	38.35	(2.00)
HK704	Up down keyer	26.35	(2.00)
HK706	Up down keyer	21.80	(2.00)
HK707	Up down keyer	20.15	(2.00)
HK710	Up down keyer	39.95	(2.50)
HK802	Up down solid brass	109.00	(2.50)
HK803	Up down solid brass	104.50	(2.50)
HK808	Up down keyer	39.95	(2.00)
MK703	Twin paddle keyer metal base	34.50	(2.00)
MK705	Twin paddle keyer marble base	32.78	(2.00)
MK706		30.48	(2.00)
KENPRO			
KP100	Squeeze CMOS 230/13.8v	109.25	(3.00)
KP200	Memory 4096 Multi Channel	234.55	(3.00)

Trio

TS940S	9 Band TX General Cov RX	1895.00	
TS930S	9 Band TX General Cov RX	1595.00	(—)
TS440	**NEW** 9 Band TX General Cov RX	998.00	(—)
TS830S	160-10m Transceiver 9 Bands	981.59	(—)
AT230	All Band ATU/Power Meter	185.90	(2.50)
SP230	External Speaker Unit	56.03	(—)
TS530SP	160m-10m Transceiver	849.82	(—)
TS430S	160m-10m Transceiver	876.68	(—)
PS430	Matching Power Supply	151.48	(3.50)
SP430	Matching Speaker	39.50	(2.50)
MB430	Mobile Mounting Bracket	14.78	(2.50)
FM430	FM Board for TS430	45.00	(2.50)
SP120	Base Station External Speaker	36.33	(2.50)
MC50	Dual Impedance Desk Microphone	43.10	(2.50)
MC35S	Fist Microphone 50K ohm IMP	20.33	(2.00)
LF30A	HF Low Pass Filter 1kW	30.18	(2.00)
TR9130	2M Multimode	593.64	(—)
TM201A	2M 25W mobile	322.68	(—)
TM401A	7cms FM 12W	392.82	(—)
TH21E	2M Mini-Handhelds	199.00	(—)
TH41E	70cm Mini-Handhelds	240.99	(—)
TM211E	2M FM Mobiles	444.60	(—)
TM411E	70cm FM Mobiles	498.00	(—)
TS711E	2M Base Stations	839.96	(—)
TS811E	70cm Base Stations	999.00	(—)
TR3600	70cm Handheld	353.48	(—)
TR2600	New 2M FM Synthesised Handheld	328.00	(—)
ST2	Base Stand	72.09	(—)
SC4	Soft Case	18.48	(2.00)
SMC25	Speaker Mike	21.55	(2.00)
PB25	Spare Battery Pack	35.11	(2.00)
MS1	Mobile Stand	41.88	(2.00)
R2000	Synthesiser 200KHz-30MHz Receiver	565.32	(—)
HS5	Deluxe Headphones	32.02	(2.00)
SP40	Mobile External Speaker	19.70	(—)
TL922	160/10M 2kW Linear	1359.00	(7.50)
TS780	2M/70cm M/M Transceiver	998.00	(5.50)
TS670	6, 10, 15, 40M 10W M/M Transceiver	843.66	(5.50)
TR9300	6M M/M Transceiver	575.16	(5.50)
TR751	**NEW** 2M 25W Multimode	580.70	(—)

Power Supplies

DRAE			BNOS		
4 amp	43.40	(2.50)	6 amp	69.00	(3.00)
6 amp	63.00	(3.00)	12 amp	115.00	(3.50)
12 amp	86.50	(3.50)	25 amp	169.00	(4.50)
24 amp	125.00	(4.50)	40 amp	345.00	(4.50)

SMC			
RU120406	4 amp Power Supply	14.95	(3.00)

Aerial Rotators

KR250	Light Duty	75.00	(3.00)
FU200	Light Duty	69.00	(2.50)
AR40	5 core Medium Duty	119.00	(2.50)
KR400	Med/H Duty	129.95	(3.00)
KR500	6 core Elevation	139.95	(3.00)
KR400RC	6 core Medium Duty	159.95	(3.00)
KR600RC	8 core Heavy Duty	209.00	(3.00)
HAM1V	8 core Heavier Duty	359.00	(4.50)
T2X	8 core Very Heavy Duty	419.00	(—)
KR5400	Elevation/Azimuth	245.00	(3.00)
KR5600	Elevation/Azimuth	357.00	(3.50)

Switches

SMCS 2U	2N 50239	18.95	(2.00)
SMCS 2N	2 way 'n' Skts	23.50	(2.00)
Welz	2 way SO239	30.75	(2.00)
Welz	2 way 'n' Skts	54.00	(2.00)
Drae	3 way SO239	15.40	(2.00)
Drae	3 way 'n' Skts	19.90	(2.00)
Kenpro KP21N	2 way Switch	27.00	(2.00)

Miscellaneous

DRAE	Wavemeter	27.50	(2.00)
T30	30W Dummy load	8.50	(2.00)
T100	100W Dummy load	38.00	(2.00)
T200	200W Dummy load	56.00	(2.00)
CT20A	20W Dummy Load PL259	16.25	(2.00)
CT20N	20W Dummy Load N. Plugs	25.95	(2.00)
CT530	100W Dummy Load (500WHmin)	82.00	(2.50)
DRAE	2m Pre-set A.T.U.	14.50	(2.00)
TOKYO HI-POWER			
HC200	10-80 HF Tuner	115.00	(2.50)
HC400	10-160 HF Tuner	199.00	(3.50)
CAP CO.			
AERIAL TUNERS			
SPC300D	1kW PEP	225.00	(6.00)
SPC3000D	3kW PEP	325.00	(6.00)

BARCLAYCARD VISA — Access

Instant credit available. Mail/Telephone order by cheque or credit card. Cheques cleared before goods despatched.

OPEN TUES.- SAT. 9.00-5.30 (CLOSED MONDAYS)

STOCK ITEMS USUALLY DESPATCHED WITHIN 48 HRS.

DELIVERY/INSURANCE PRICES IN BRACKETS

Appointed agent for

ICOM — FDK — AUTHORISED YAESU — APPROVED TRIO DEALER

Practical Wireless
The Radio Magazine

NOVEMBER 1986 VOL 62 NO. 11 ISSUE 956

THIS MONTH

THIS MONTH'S COVER

The Sony AIR-7 hand-held scanning receiver. See our review on page 30.

Regular Features

NEXT MONTH

MOSFET Voltmeter

Planning Difficulties

On sale November 13

Editorial and Advertisement Offices:
Practical Wireless
Enefco House
The Quay
Poole, Dorset BH15 1PP

☎ Poole (0202) 678558
Prestel 202671191

Editor Geoff Arnold T.Eng FSERT G3GSR
Assistant Editor Dick Ganderton C.Eng. MIERE G8VFH
Art Editor Steve Hunt
Technical Features Editor Elaine Richards G4LFM
Technical Projects Sub-Editor Richard Ayley G6AKG
Technical Artist Rob Mackie
Advertisement Manager Roger Hall G4TNT
Administration Manager Kathy Moore
Accounts Annette Martin

Name .....
Address .....
.....
Code .....
TICK YOUR SPECIAL INTEREST ☐ RECEIVERS ☐ VHF/UHF ☐ HF
I ENCLOSE £1 PLEASE SEND ME A COPY OF THE
LOWE CATALOGUE

LOWE SHOPS ARE TO BE FOUND IN

In Glasgow,
the shop manager is Sim, GM3SAN, the address, 4/5 Queen Margaret Road, off Queen Margaret Drive, Glasgow,
telephone 041-945 2626.

In the North East,
the shop manager is Hank, G3ASM, the address, 56 North Road, Darlington,
telephone 0325 486121.

In Cambridge,
the shop manager is Tony, G4NBS, the address, 162 High Street, Chesterton, Cambridge,
telephone 0223 311230.

In Cardiff,
the shop manager is Carl, GW0CAB, the address, c/o South Wales Carpets, Clifton Street, Cardiff,
telephone 0222 464154.

In London,
the shop manager is Andy, G4DHQ, the address, 223/225 Field End Road, Eastcote, Middlesex,
telephone 01-429 3256.

In Bournemouth,
the shop manager is Colin, G3XAS, the address, 27 Gillam Road, Northbourne, Bournemouth,
telephone 0202 577760.

Although not a shop, there is a source of good advice on the South Coast, John, G3JYG. His address is Abbotsley, 14 Grovelands Road, Hailsham, East Sussex. An evening or weekend call will put you in touch with him. His telephone number is 0323 848077.

LOWE ELECTRONICS SHOPS are open from 9.00 am to 5.30 pm, Tuesday to Friday and from 9.00 am to 5.00 pm on Saturday. Shop lunch hours vary and are timed to suit local conditions. For exact details please telephone the shop manager.

AR2002 receiver.

Frequency range of the AR2002 is from 25 to 550 and from 800 to 1300 MHz. Modes of operation are wide band FM, narrow band FM and AM. The receiver has 20 memories, memory scan and a search mode which checks frequencies between user designated limits.

The receiver has a push button keypad for easy frequency entry and operation.

A front panel knob allows the listener to quickly step up or down in either 5, 12.5 or 25 kHz steps from the frequency initially chosen.

The AR2002 has a front panel LED bar "S" meter.

There is a front panel 3.5 mm jack socket for headphone use.

A socket for the optional RS232 interface (RC PACK) is provided on the rear panel. The RC PACK consists of an 8 bit CPU with its own ROM and RAM and with your own computer acting as a dumb terminal many additional operating facilities become available. Of course, if you want to write your own programs using the RC PACK as an interface then "the sky's the limit".

AR2002 ..... **£487.30 inc VAT,** carriage £7.00
RC PACK ..... **£255.63 inc VAT,** carriage £7.00

data equipment.

CD600 . . . . . RTTY, CW, ASCII, TOR, AMTOR decoder, output for UHF television, monitor and printer, can also be used as morse tutor ..... **£215.14 inc VAT,** carriage £7.00

CD670 . . . . . A higher specification RTTY, CW, ASCII, TOR, AMTOR decoder complete with liquid crystal dot matric display, variable RTTY shift, normal/reverse mode switch, outputs for TV, monitor and printer and can also be used as morse tutor ..... **£327.77 inc VAT,** carriage £7.00

CD660 . . . . . Similar to the CD670 but without the built-in display ..... **£264.97 inc VAT,** carriage £7.00

DAIWA meters.

CN410M . . . 3.5 to 150 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors ..... **£61.72 inc VAT,** carriage £1.50

CN460M . . . 140 to 450 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors ..... **£65.40 inc VAT,** carriage £1.50

NS448 with remote head . . . 900 to 1300 MHz, forward 5/20 W, reflected 1.6/6.6 W, N type connections ..... **£86.60 inc VAT,** carriage £2.50

NS660P with switchable meter reading (average, normal PEP and hold PEP) and provision for optional remote head (U66V), 1.8 to 150 MHz, forward 15/150/1500 W, SO239 connectors ..... **£115.00 inc VAT,** carriage £2.50

U66V remote head, 140/525 MHz, max 300 W, N type connectors ..... **£55.27 inc VAT,** carriage £1.50

SC20 extension cable for U66V, approx 20 metres long **£29.21 inc VAT,** carriage £1.50

All advertised prices subject to exchange rate variation.

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 2817, 2430, 4057, 4995.

send £1 for complete mail order catalogue.

DCL explained.

TR751E and TM2550E.

Amateurs have for a long time joked about the day when the equipment would take over and there would be no need of them in the shack. This would suit many wives; gardening and painting the house would no longer be a female preserve. But do not worry, this day has not yet dawned. However, certain operations currently performed by the amateur can be done much quicker and whilst mobile, more safely by present day electronics. It used to be no problem finding a clear channel; that is not so today and to find one whilst driving is positively dangerous! And that's where the new DCL system unique to TRIO comes in.

As an inexpensive option, DCL (digital channel link) is available for the two metre TM2550E FM and the TR751E multi-mode mobile transceivers. What does DCL do? Let me explain.

Imagine you are operating mobile using one of the above new rigs, you are on FM and a friend, one of your regular contacts, is using a similar transceiver fitted with the DCL option. You have established contact on S20. The DCS codes in the two rigs match, a simple matter, the relevance I will explain later, DCL is activated on both rigs, you press the channel link button and within seconds both transceivers have QSYed to a new unoccupied channel. The QSO continues and has avoided the interminable "up one" etc and at no time has your attention been taken off the road.

What happened is simple. On pressing the channel link button your transceiver automatically moved to a user designated "base" frequency: In the UK usually S8 (145.200). If the channel was clear (the rig is looking for a channel with signals not above 0.2 uV for a period of 1.5 seconds), the rig adopts this as the new channel. Without human intervention your transceiver returned to S20, transmitted data identifying the new frequency and instructed the other rig to QSY. Within seconds both rigs are on a new clear channel. A series of three beeps sound to inform you that DCL is complete and your QSO can continue.

To avoid your string of data QSYing every DCL equipped rig within range and listening on S20, it is necessary for the two rigs to recognise each other and, more importantly, ignore the rest. This is simply arranged by a selective call system. The two operators involved knew one another, they always had a contact on their way into work and accordingly both rigs had the same prearranged DCS (digital code squelch) code activated. The system also works for larger nets. As long as the DCS codes match. The DCL system will find that clear channel and QSY each rig.

To answer your questions . . . if that base frequency, S8, had been occupied the rig would have checked the next eleven "S" channels above ie. S9, S10, S11 and so on until one falling within the signal level parameters had been found.

If S20 was in use when the transceiver returned then it would have waited until the channel became clear before transmitting the data.

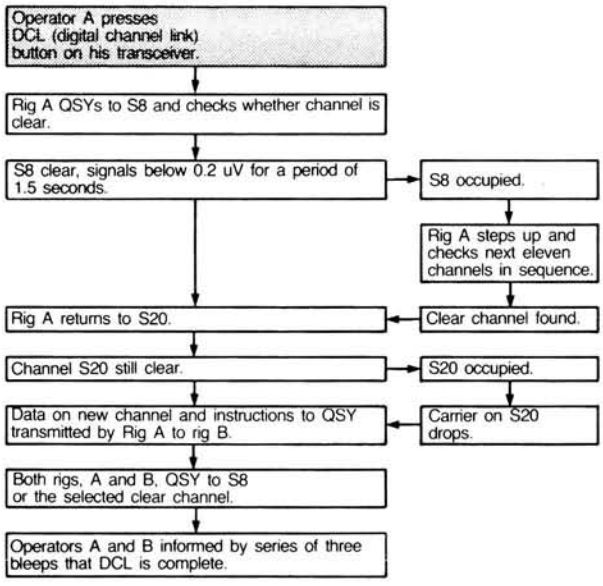
If no channels are free then the transceiver would continue to scan until either the reset button or press to talk switch restored the rig to the original channel.

In order that data is not lost when QSYing from a repeater, the rig has to be manually keyed in order to send the new clear channel data. On the new frequency both rigs revert automatically to simplex.

I have tried to explain the operation of the DCL system. You will soon be hearing bursts of data as people QSY safely, why not call in at a LOWE shop where we will be pleased to demonstrate the system.

DIGITAL CHANNEL LINK WHILST SIMPLEX

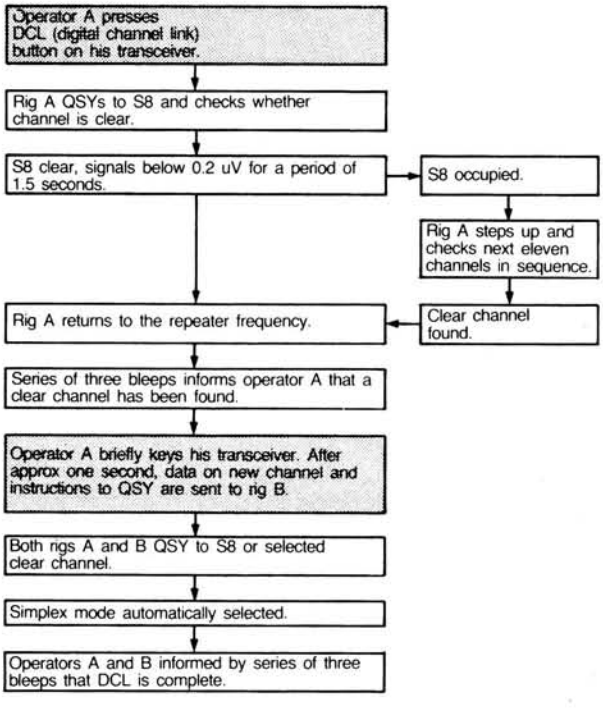
Contact established on, say, S20 between operator A and operator B. DCS codes match and DCL activated on both rigs.



The QSO continues on the new frequency

DIGITAL CHANNEL LINK WHEN QSYING FROM A REPEATER

Contact established on a repeater between operator A and operator B. DCS codes match and DCL is activated on both rigs.



QSO continues.
(DCL operates on most UK repeaters)

Now from AMCOMM – ARE Carriage Free Nationwide Mail Order . .

UHF MOBILE

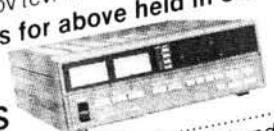
YAESU FT 770RH 70cm 25w FM high visibility display	435.00
YAESU FT 790R 70cms all mode	469.00
YAESU FT 2700RH 70cm/2m 25w each band full duplex	449.00
ICOM IC 490E all mode 70cms 10w/1w	529.00
ICOM 3200E 2m/70cm 25w each band	479.00
ICOM IC 47E 25w FM very small 9 memories	445.00

NEW FT767

HF EQUIPMENT

YAESU FT 767 1.8Mhz-430Mhz. All mode gen cov rcvr	POA
YAESU FT ONE gen cov tcvr	1999.00
YAESU FT 980 gen cov tcvr inc AM/FM	1750.00
YAESU FT 757GX gen cov tcvr inc AM/FM/Keyer	839.00
ICOM IC 751A gen cov tcvr inc AM/FM/Keyer	1299.00
ICOM IC 745 gen cov tcvr	925.00
ICOM 735 gen cov tcvr inc AM/FM	829.00

All accessories for above held in stock, leaflets available.



HF LINEAR AMPLIFIERS

YAESU FL 2100Z 160m to 10m	862.00
YAESU FL 7000 solid state integral PSU and ATU	POA
TOKYO HL 1K 1kw amplifier	829.00
TOKYO HL 1KGX new 1K linear	POA
TOKYO HL 2K new 2K linear	POA
TOKYO HL3K 3Kw new linear	POA
ICOM IC 2KL/LPS	1625.00

HANDHELD TRANSCEIVERS

FT 727 VHF UHF Hand held	POA
YAESU FT 203R with FBA 5 battery case	185.00
YAESU FT 203R with FNB 3 nicad 2.7w	215.00
YAESU FT 203R with FNB 4 nicad 3.7w out	219.00
YAESU FT 203R with FBA 5 battery case 1.8w	229.00
YAESU FT 209R with FBA 5 battery case	255.00
YAESU FT 209R with FNB 3 nicad 2.7w	260.00
YAESU FT 209R with FNB 3 nicad 3.7w	235.00
YAESU FT 209R with FNB 4 nicad 3.7w	265.00
YAESU FT 209RH with FBA 5 battery case	269.00
YAESU FT 209TH with FNB 3 nicad 3.7w	189.00
YAESU FT 209RH with FNB 4 nicad 5w	289.00
ICOM IC 2E synthesised 1.5w 2m	275.00
ICOM IC 02E keypad entry lcd display	289.00
ICOM IC 4E synthesised 1.5w 70cm	
ICOM IC 04E keypad entry lcd display 70cms	

FT 703R and FT 709R available same output spec as FT 203/209.

RECEIVERS

YAESU FRG 8800 gen cov 150Khz-30Mhz large display, keyboard entry/free tuning	540.00
ICOM IC R71 100 Hz to 30Mhz passband tuning/notch filter, variable tuning rate	729.(
YAESU FRV 8800 converter module 118-179 for FRG 8800 range extension	90.(
AOR 2002 UHF/VHF 25Mhz-550Mhz and 800Mhz-1300Mhz	425.0
YAESU FRG 9600 UHF/VHF Scanning receiver all mode 100 mem. Now up to 950MHz	429.0(
ICOM R7000 Scanning rcvr 25-2000Mhz 99 memories all mode	849.00
FDK ATC 720 airband rcvr handheld 720 channels	189.00
FDK RX 40 141-180Mhz handheld rcvr	159.00
JIL SX 400 UHF/VHF recvr inc PSU	598.00

RTTY/CW

TONO 5000E CW RTTY ASCII and AMTOR c/w 5" high res monitor — POA

Range of 50Mhz equipment both YAESU and ICOM in stock.

VHF MOBILE TRANSCEIVERS

YAESU FT 290R mob/port 2m all mode c/w nicads, chgr, case	369.00
YAESU FT 290R as above with Mutek	399.00
YAESU FT 270R 25w FM	315.00
YAESU FT 270RH 45w FM with fan	359.00
YAESU FT 2700RH 2m/70cms 25w each band full duplex	449.00
ICOM IC 290D 25w all mode	469.00
ICOM IC 27E 25w FM 9 mem	359.00
ICOM IC 27H 45w FM 9 mem	399.00
FDK M750XX 2m all mode 20w	449.00
FDK M725X 2m FM 25w	279.00

VHF BASE STATIONS

YAESU FT 726R/2M all 726 options available	899.00
ICOM 271E multi mode 25w 32 mem	779.00
ICOM IC 271E/H multi mode 100w	979.00

UHF BASE STATIONS

YAESU FT 726 70cms multimode — all 726 options	899.00
ICOM 471 E 25w multimode 70cms	889.00
ICOM 471 H high power multimode (75w) — 70cms	1099.00
ICOM 1271 E multimode 1240-1300Mhz	1099.00

CASH IN NOW, ON OUR HUGE BUYING POWER! ENORMOUS STOCKS
WHERE A GOOD DEAL MORE COSTS A GOOD DEAL LESS! E&OE

Plus a full range of MARINE/PMR Communication Equipment.

Carriage Free Nationwide Mail Order . . .

SUPER H.P. TERMS AND TRADE-IN SERVICE

AMCOMM – ARE

373 Uxbridge Road, London W3 9RN, Tel: 01-992 5765. Telex: 334312.

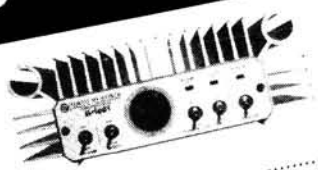
Showroom and Shop opening hours 9.30-5.00pm — Closed Mondays

PRICES CORRECT AT TIME OF GOING TO PRESS AND SUBJECT ONLY TO CURRENCY FLUCTUATION

VISA

Access — We welcome Access

Now from AMCOMM – ARE Carriage Free Nationwide Mail Order . .



VHF LINEAR AMPLIFIERS

TOKYO

HL160V 2m 10w in 160w out	239.00
HL82V 2m 10w in nom 85w, typ 100w out	139.00
HL 110V 2m 10w in 110w out	239.00
HL 35 2m Gaasfet preamp .5-5w in 35w out	75.00
HL 30V 2m .5-3w in 30w out	54.00
HL 20U 70cms .5-3w in 20w out	—
HL 30U 70cms Gaasfet preamp 2w in 30w out	120.00
HL 60U 70cms Gaasfet preamp 1-15w in 60w out	215.00
HL120U 70cms Gaasfet preamp 12w in 100w out	399.00
HRA 2 2m mast preamp, Gaasfet	—
HRA 7 70cms mast preamp, Gaasfet	—

BNOS

LPM 144-1-100 2m c/w preamp 1w for 100w out	197.50
LPM 144-10-100 2m c/w preamp 10w for 100w out	175.00
LPM 144-3-100 2m c/w preamp 3w for 100w out	197.50
LPM 144-25-160 2m c/w preamp 25w for 160w out	250.00
LPM 144-3-180 2m c/w preamp 3w for 180w out	290.00
LPM 144-10-180 2m c/w preamp 10w for 180w out	290.00
LP 144-3-50 2m c/w preamp 3w for 50w out	125.00
LP 144-10-50 2m c/w preamp 10w for 50w out	125.00
LPM 432-1-50 70cm c/w preamp 1w for 50w out	230.00
LPM 432-3-50 70cm c/w preamp 3w for 50w out	235.00
LPM 432-10-50 70cm c/w preamp 10w for 50w out	195.00
LPM 432-10-100 70cm c/w preamp 10w for 100w out	329.00

MICROWAVE MODULES range also available, call for details or literature on above.

ANTENNA COUPLERS

AMCOMM 9000 coax, random wire, tuned feeders 100w	89.00
CAPCO SPC 300C 1Kw antenna coupler	188.37
CAPCO SPC 3000C 3Kw antenna coupler	279.42
CAPCO SPC 300M 1Kw module only	103.09
CAPCO SPC 3000M 3Kw module only	132.18
TOKYO HC 200 8 band 200w pep with SWR/power meter	115.00
TOKYO HC 400 9 band 350w pep with SWR/power meter	199.00
TOKYO HC 2000 9 band 2Kw pep	399.00
WELZ AC 38 3.5-30Mhz 200w	85.00
ICOM AT 100 100w auto antenna coupler	345.00
ICOM AT 500 500w auto antenna coupler	475.00
YAESU FC 757GX auto antenna coupler	318.00
YAESU FRT 7700 receiver antenna tuner	49.85

HEIL ACCESSORIES

HEIL HC3 Mic element Yaesu/Trio	22.85
HEIL HC5 Mic element Icom SM5/6	25.40
HEIL HM5 Desk Mic (300Hx-3Khz) cardiod	59.00
HEIL MM5 handheld Mic with HC3	29.00
HEIL SS2 Speaker special comms spkr	59.00
HEIL EQ300 Mic Equaliser	65.00
HEIL BM10 lightweight headset/boom mic	65.00

POWER SUPPLIES

YAESU FP 757HD 20A	199.00
YAESU FP 757 GX 20A	169.00
YAESU FP 700 20A	175.00
BNOS 12/6amp	69.00
BNOS 12/12amp	115.00
BNOS 12/25amp	169.00
BNOS 12/40amp	340.00
BNOS professional range also available on request	POA
ICOM IC PS 35 switch mode	182.00
ICOM PS 15 20amp external	149.00
ICOM IC PS 55 20amp	185.00
ICOM IC2 KLPS to match IC2KL linear	349.00
ICOM IC PS 25 switch mode	106.00
SMC RS 12 4amp 5 amp peak	14.95
DRAE 4 amp	40.50
DRAE 6 amp	63.00
DRAE 12 amp	86.50
DRAE 24 amp	125.00

HI-MOUND MORSE KEYS

HK 702 manual with marble base	37.00
HK 704 manual	24.50
HK 705 manual	19.00
HK 706 manual	19.35
HK 707 manual	18.25
HK 708 manual solid brass	18.00
HK 802 manual solid brass	87.50
HK 803 manual solid brass	84.00
MK 701 single lever paddle	28.50
MK 702 single lever paddle	29.95
MK 703 twin paddle squeeze heavy base	32.50
MK 705 twin paddle squeeze marble base	28.50
KENPRO KP 100 squeeze paddle/Cmos keyer 230v/13.8v	89.00
KENPRO KP 200 squeeze paddle/keyer multi memory 4096 bit	179.00

FIND OUT WHY WE'RE FAST GAINING A REPUTATION FOR FIRST CLASS VALUE & TOP QUALITY SERVICE . . . Telex: 334312.

AMCOMM – ARE 373 Uxbridge Road, London W3 9RN, Tel: 01-992 5765

Where service and courtesy comes naturally . .

ORDER FORM

Please supply: I enclose payment for: £

by ☐ Cheque ☐ Barclaycard (Number) ☐ Access (Number)

Name Call Sign

Address Tel.

PW 11/86

ICOM

IC-751A, The New ICOM HF Flagship.

ICOM are proud to launch their new flagship. The IC-751 was good, the new IC-751A is even better, with a general coverage receiver from 100KHz-30MHz, it is a full featured all mode solid state transceiver that covers all the WARC bands. The IC-751A has an excellent 105dB dynamic range and features pass band tuning, a 9MHz notch filter, adjustable AGC, noise blanker, RIT and XIT. A receiver pre-amp provides additional sensitivity when required. On C.W. the electronic keyer is standard, QSK rated up to 40 w.p.m. The FL32A 9MHz/500Hz CW filter is fitted and CW sidetone on RX and TX modes. On SSB the new FL80 2.4KHz high shape factor filter is fitted.

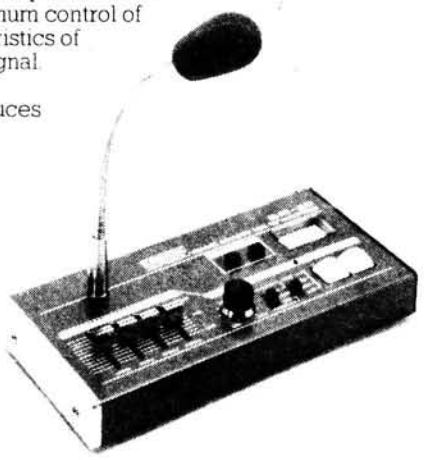
A high reliability transmitter full 100% duty cycle designed for SSB, CW, AM, FM, RTTY and AMTOR, with a high performance compressor for better audio clarity. With 32 memory channels and twin VFO's scanning of frequency and memories is possible from the transceiver or the HM36 supplied.

The IC-751A is supplied for 12 volt operation but can be used with either an internal or external A.C. power supply. It is fully compatible with ICOM auto units such as the IC-2KL linear amplifier and the AT500/100 antenna tuners.

Options available: PS35 internal AC power supply, PS15 external power supply, EX310 voice synthesizer, EX309 microprocessor interface connector, SM8 and SM10 desk mics, SP3 and SP7 external speakers and GC5 world clock.

The SM10 desk top microphone consists of an electret condenser microphone element with a compressor amplifier plus tunable equaliser for maximum control of the audio characteristics of your transmitted signal. The SM10 is highly sensitive and produces clean crisp audio.

SM10 Desk mic.



ICOM HF Filter selection guide:

Transceiver	Mode	Desired Filter Bandwidth	Optional 455KHz Filter Selection (1st Choice)	Optional 9MHz Filter Selection	Special Notes
IC-751A	CW	500Hz	FL-52A	FL-32*	Must remove FL-32 filter to install FL-63 or FL-33.
	CW	250Hz	FL-53A	FL-63	Signal loss with FL-63 is 4dB less than FL-32.
	AM	5.2KHz	–	FL-33	PBT control is not effective when FL-33 is selected.
IC-745	CW	500Hz	FL-52A	FL-45	Add FL-52A before adding FL-45.
	CW	250Hz	FL-53A	FL-54	Add FL-53A before adding FL-54.
	SSB	2.4KHz	FL-44A	–	High skirt selectivity SSB filter. Replaces standard ceramic filter.
IC-735	CW	500Hz	–	FL-32	
	CW	250Hz	–	FL-63	Signal loss with FL-63 is 4dB less than FL-32.

* FL-32 is factory installed in IC-751A.

British TELECOM Approved Dealer for Mobile Phone Division
Cellnet

ICOM

Total coverage..100kHz to 2GHz!

IC-R7000.

The R71E now has a team-mate – the IC-R7000. With these matching receivers it is now possible to tune from 100KHz-2GHz.*

The IC-R7000 covers Aircraft, Marine, FM Broadcast, Amateur Radio, Television and weather satellite bands. The IC-R7000 incorporates FM wide/FM narrow, AM, USB and LSB modes of operation with six tuning speeds:- 0.1, 1.0, 5, 10, 12.5, and 25KHz. *Frequency coverage 25-1000MHz and 1025-2000MHz (25-1000MHz and 1260-1300MHz guaranteed specification). With the IC-R7000 you have normal tuning capability with the front panel tuning knob or for quick tuning of a desired frequency by using the front panel key-pad. A total of 99 memory channels are available for storage of received frequencies and operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob or by direct keyboard entry.

These receivers are available seperately but together would make a superb listening station for the shortwave listener or licensed amateur.

A sophisticated scanning system provides instant access to specific frequency ranges. By depressing the Auto M switch, the IC-R7000 automatically memorises frequencies that are in use whilst in the scan mode and can be recalled later. The scanning speed is adjustable and the scanning system includes memory selected frequency ranges or priority channels. All functions including memory channel readout are clearly shown on a dual-colour fluorescent display with dimmer switch. Other features include dial-lock, noise blanker, S-meter and attenuator.

Options include: RC12 infra red controller, EX310 voice synthesizer, SP3 and SP7 external loudspeakers, HP1 headphones and the ICOM AH-7000 super wideband discone antenna.

The IC-R71E is a general coverage receiver 100KHz-30MHz featuring direct keyboard frequency entry and infra-red remote controller (optional). SSB, AM, CW, RTTY and FM (optional) modes of operation. With 32 programmable memory channels, twin VFO's scanning systems, selectable AGC, noise blanker, pass band tuning and a deep notch filter. Keyboard frequencies can be selected by pushing the digit keys in sequence of frequency. The frequency is altered without changing the main tuning control. Options include: EX257 FM unit, RC11 infra-red controller, CK70 D.C. adaptor for 12 volt operation, CW filter options and a high stability crystal filter, SP3 and SP7 external loudspeakers, EX310 voice synthesizer, HP1 headphones.

Computer Control These receivers can be connected to a computer terminal via a suitable interface.
JT602 Serial Interface for IC-R7000.
JT603 Parallel Interface for IC-R71E (IC-R7000).
The ICOM IC-R71E requires the IC-EX309 interface connector.

IC-R71E.

TWO FOR THE ROAD.

IC-28E 2m. FM mini-mobile.

This new 2 metre band transceiver is just 140mm (W) x 50mm (H) x 133mm (D) and will fit nearly anywhere in your vehicle or shack. Power output is 25 watts or 5 watts low power and is supplied complete with an internal loudspeaker.

The large front panel LCD readout is designed for wide angle viewing with an automatic dimmer circuit to control the back lighting of the display for day or night operation.

The front layout is very simple, all the controls are easy to select making mobile operation safe. The IC-28E contains 21 memory channels with duplex and memory skip functions. All memories and frequencies can be scanned by using the HM-15 microphone provided. Also available is the IC-28H with the same features but with a 45 watt output power.

Options include IC-PS45 13.8v 8A power supply, SP8 and SP10 external speakers, HS15 flexible mobile microphone and PTT switchbox.

Rx Range 138-174 MHz.

IC-290D/490E Mobiles

These SSB, CW, FM transceivers are ideal for mobile or base station operation. The IC-290D for 2 metres produces 25 watts/5 watts low power. The IC-490E for 70 centimetres produces 10 watts/1 watt low power. Both transceivers have a range of operating features, these include 5 memory channels, dual V.F.O.'s and a priority channel to automatically check your most used frequency. Squelch on FM and SSB to allow silent scanning whilst searching for signals, slow or fast AGC for SSB and CW and a noise blanker to suppress pulse type QRM. Sidetone is provided on CW.

Memory and full or programmable band scan with internal switches to stop on busy or empty channels. Programmable offsets are included for odd frequency splits.

Options include: IC-PS45 13.8v 8A power supply, IC-BU1 memory back up battery unit, IC-SP8 and SP10 mobile speakers.

British TELECOM Approved Dealer for Mobile Phone Division

Cellnet

ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet

ICOM

IC-3200E Dual-band

If you are a newly licensed or just undecided about which band to first operate, then the ICOM IC-3200E is just the answer. This is a dual-band (144-146/430-440MHz) F.M. transceiver ideally suited for the mobile operator. The IC-3200E has a built in duplexer and can operate on one antenna for both VHF and UHF, and with 25 watts of output power on both bands (the low power can be adjusted from 1 to 10 watts) you can never be far from a contact whether simplex or 2m/70cm repeater.
The IC-3200E employs a function key for low priority operations to simplify the front panel and a new LCD display which is easy to read in bright sunlight. 10 memory channels will show operating frequencies simplex or duplex, and four scanning systems memory, band, program and priority scan.

IC-271 & 471 Multimode Base stations

ICOM can introduce you to a whole new world via the world-communication satellite OSCAR. Did you know that you can Tx to OSCAR on the 430-440 MHz IC-471 and Rx on the 2m IC-271.
By making simple modifications, you can track the VFO's of the Rx and Tx either normally or reverse. This is unique to these ICOM rigs and therefore very useful for OSCAR 10 communications. Digital A.F.C. can also be provided for UOSAT etc. This will give automatic tracking of the receiver with digital readout of the doppler shift. The easy modifications needed to give you this unique communications opportunity are published in the December '84 issue of OSCAR NEWS. Back issues of OSCAR NEWS can be obtained from AMSAT (UK), LONDON E12 5EQ.
This range includes the IC-271E-10W, IC-271E-25W, 271H-100W and the 70cm versions IC-471E-25W and 471H-75W r.f. output. The 271E has an optional switchable front-end pre-amp. The 271H can use the pre-amp AG-25, with the 471E and 471H using the AG35 mast-head pre-amp. Other options include internal switch-mode PSU's: the 271E and 471E use the PS25 and the 271H and 471H use the PS35.

Telephone us free-of-charge on:

HELPLINE 0800-521145.

Mon-Fri 09.00-13.00 and 1400-17.30

This is strictly a helpline for obtaining information about or ordering ICOM equipment. We regret this service cannot be used by dealers or for repair enquiries and parts orders. Thank you

You can get what you want just by picking up the telephone. Our mail order department offers you free same day despatch whenever possible, instant credit, interest free H.P., Barclaycard and Access facility, 24 hour answerphone service.

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet Electronics

Sea Street, Herne Bay, Kent CT6 8LD
Tel: (0227) 363859.
Dept. PW

Brenda
G4VXL

A.R.E. Communications Ltd.

38 BRIDGE STREET,
EARLESTOWN,
NEWTON-LE-WILLOWS,
MERSEYSIDE WA12 9BA.
TEL: 09252-29881

Bernie
G4AOG

BRENDA'S MAKING AN OFFER YOU CAN'T REFUSE..!!!

DURING OCTOBER AND NOVEMBER BRENDA & BERNIE WILL GUARANTEE TO OFFER YOU THE BEST POSSIBLE PART-EXCHANGE DEAL AGAINST THE FABULOUS YAESU FT767 ALL BAND TRANSCEIVER OR ANY OTHER OF THE NEW YAESU RIGS.

REMEMBER WE WILL HAVE A VAST STOCK OF EQUIPMENT AT THE LEICESTER SHOW INCLUDING ALL THE WELL-KNOWN MAKES. OUR POLICY IS THAT WE WON'T BE BEATEN ON PRICE.

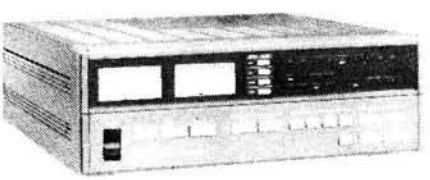
SO SHOP AROUND AND THEN CONTACT US AND WE WILL ENDEAVOUR TO BEAT ANY GENUINE OFFER.

FIRST AGAIN WITH THE NEW MODELS

NEW FT290
WITH CLIP ON NICAD PACK

YAESU FT727G
DUAL BAND
HANDHELD
TRANSCEIVER

144-146MHz
430-440MHz
Up to 5W on each band
Built-in VOX
C.A.T. Interface



YAESU FL7000

The long awaited Solid State HF Linear with Built-in Automatic A.T.U. is about to arrive from YAESU
500 Watts P.E.P. from a 100 Watt drive Built-in Antenna Switching

YAESU FT767GX

HF General Coverage Transceiver, 100 Watts out, with VHF and UHF options plus 6 Metres Auto ATU, Built-in Power Supply.

Phone 09252-29881 for all mail order – Access & Barclaycard accepted

Trade enquiries welcome
All prices include VAT and are correct as we go to press

Opening hours: Monday-Saturday
10am-5pm

STAR £10 LETTER

Novice Licence?

Regarding the letter from Tony Taylor VK4FOX in September *PW*, his argument and what appears to be a crusade for a novice licence in the UK holds about as much water as a bucket with no bottom in it.

He asks who has done any research and where is the proof to verify that a novice licence is not feasible or indeed wanted by novices in the UK. For the purpose of debate, let us class CB operators and s.w.l.s (I am both) as novices. Who has done any research? I have!

I have carried out a survey by telephone of over 500 CB operators and s.w.l.s in the UK (and I have the British Telecom bills to prove it) with the following results:

Do you consider there is a need for a novice licence in the UK other than the Class B? Yes—13%. No—87%.

Do you consider the RAE content too difficult (based on test questions)? Yes—6%. No—94%.

If you failed the exam at your first attempt would you resit it? Yes—97%. No—3%.

If you were a Class B licence-holder, would you consider a Morse test of 20 w.p.m. too difficult? Yes—29%. No—71%.

How many hours a week do you study for the RAE? 1 to 5 hours—8%. 5 to 10 hours—31%. 10 to 15 hours—50%. More than 15 hours—11%.

I think you will agree on this evidence that the UK novice is more than happy with the way things are, and takes his or her RAE very seriously indeed. The present RAE system does not require changing—what is required is a change in attitude of some people who intend taking the exam. Why is it one hears some novices moaning about the fact that they find the study and having to attend the RAE course too much trouble. It's not too much trouble finding their way to the local disco at night.

The plain truth is that they want something for nothing as usual. If they want to operate on the amateur bands, let them get their priorities right—either they study for the exam as it is, or they stay as CB operators and s.w.l.s.

Peter K. Davies
Rhyl, Clwyd

LAUGH WITH BARTHES

VOX or SOX?

Whilst listening to the 'phone section of "eighty" the other day, after a couple of hours on the key, I forgot I had left the VOX switch in when I changed to s.s.b. Now as I am a hay fever sufferer, I let out two rather loud sneezes, which sent the rig into transmit, to which some joker replied "Bless you". I can tell you now, I nearly fell off my stool!

A. P. Dyson G0BXT
Bradford, West Yorks

PW COMMENT

EMC on the Move

THE PROBLEMS OF TVI and BCI have been very much in the news of late, both in *PW* and elsewhere, and generally it's the amateur radio operator who's been getting all the stick. The problems are more often referred to under the "umbrella" term of e.m.c. (electromagnetic compatibility), which is just a technical way of saying that any piece of electronic or radio equipment ought to be designed in such a way that it can be used near another piece of such equipment without **either** of them suffering undue interference from the other.

In the case of TVI, sight usually seems to be lost of the mutual compatibility aspect. How often, when a radio amateur is being hammered by his neighbours for blotting out their regular quota of *Coronation Street, Wogan, News at Ten* or whatever, is mention made of the diabolical interference their TV sets are causing to his short wave reception. Lucky is the radio enthusiast nowadays who is not plagued with those rasping buzzes of timebase harmonic radiation every 15·625kHz throughout much of the h.f. spectrum. When did you last hear of a householder being told by the RIS, in the interests of good neighbour relations, to stop using his TV until steps had been taken to reduce its spurious radiation?

As I suppose I've just proved, when radio amateurs talk about e.m.c., it's the fixed station that comes to mind first. Indeed, some amateurs go mobile simply to get away from the problems of TVI at the home QTH. First of all, of course, they have to get rid of the noise from the ignition system, the dynamo or alternator, wiper and heater motors, voltage regulators, etc., but with perseverance and lots of *L*s and *C*s, this can be overcome. Life is getting more complicated, however.

Modern cars are becoming more and more reliant on electronics, from simple delay circuits for wipers and courtesy lights, to engine management systems designed to give maximum fuel economy under all driving conditions, and now anti-skid braking systems incorporating electronic servos. It's usually no more than a source of amusement if keying up the rig in the car causes the windscreen washers or wipers to come mysteriously to life, but rather more serious if the engine throttle setting changes, either up or down. As for the possibility of affecting the brakes, well I'd rather not think about that!

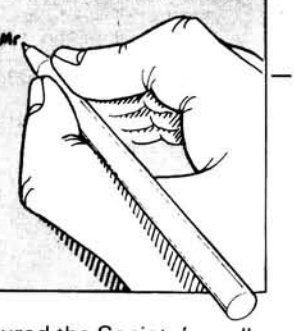
Vehicle manufacturers do carry out tests to check on the immunity of their on-board electronic systems to radio interference, but I understand that these are limited to the range of frequencies and powers used by p.m.r. (private mobile radio) transmitters, and due to the lack of suitable instruments, do not as yet include cellular radio. The use of amateur band transmitters has not been considered.

So what are the risks? Obviously the higher the power of the transmitter, the more likely it is to cause trouble–linears of a hundred watts and above are seemingly out. Good installation practice for the rig, with well filtered and screened power leads, goes without saying. If you are contemplating buying a new car, contact the manufacturer's technical department, tell them that you plan to install an amateur radio transmitter, and ask what information and advice they can give you. All you may get will be details of the frequencies and powers or field strengths that their tests have proved to be safe. Ask, too, what functions of the car are likely to be adversely affected by r.f. fields, and what may happen to them. Good engineering practice dictates that electronically-assisted functions should "fail safe", leaving the basic electrical, mechanical or hydraulic operation as a back-up. How long will it be, though, before totally electronic systems take over, and what will the back-up be then?

Geoff Arnold

Send your letter to the Editorial Offices in Poole, the address is on our Contents page. Writer of the Star Letter each month will receive a voucher worth £10, to spend on items from our PCB or Book Services, or on *PW* back numbers, binders, reprints or computer program cassettes. And there's a £5 voucher for every other letter published.

Letters must be original, and not duplicated to other magazines. We reserve the right to edit or shorten any letter. Brief letters may be filed via our Prestel Mailbox number 202671191. The views expressed in letters are not necessarily those of *Practical Wireless*.



RSGB

Following Peter Crosland's letter (and others in recent issues of *PW*), you asked for readers' views of the RSGB. As a long-time active member (25 years next February) I would like to express my view of the situation.

Yes, the staff at HQ *is* overloaded and has been for many years, at first in totally inadequate premises in London and latterly in somewhat better accommodation in Potter's Bar. These facts I can vouch for, first-hand, and I have every admiration for the way in which the staff handle the enormous workload which comes in every day via the telephone and postbox. They are administering a "million-pound business" on behalf of members *and* coping with Government departments at national and international level—something of a juggling act! Under this kind of pressure it is not at all surprising that some mistakes or delays occur. These *are* frustrating to the ordinary member, but looking at it dispassionately, the range of services offered is extraordinarily wide and diverse.

It is just too easy, as G3DRN pointed out, for the critics to carp and criticise without coming up with any sensible, concrete solutions to the problems. What lies behind the HQ effort is a countless number of volunteer hours to support the very professional efforts of HQ staff. If every member "donated" an hour a week to actively supporting Society activities *directly* instead of criticising, then the scene would look different, though coordination might be difficult!

I, for one, consider that I've always had good value for money from my membership and would willingly pay, say £25 a year for my membership, if it ensured the Society's well-being. Added to the £12.50 licence fee, less than a pound a week (equivalent to one pint of ale or 15 cigarettes a week, or the hire of a videotape for two evenings!) to enjoy the freedom and privileges of amateur radio is surely a very small price to pay? Peter has hit the nail on the head—the Society *does* need its members' support, and not just in the form of extra cash.

Mike Dixon G3PFR
Warrington, Cheshire

BOOKSHELF . . . *available from book stockists*

RADIO AND TELEVISION SERVICING 1985–86 MODELS.

Edited by R. N. Wainwright, T.Eng (CEI), FSERT
Published by Macdonald & Co (Publishers) Ltd.
795 pages, 162 x 232mm (Hardback). Price £25.00
ISBN 0 356 12359 6

This book, like its predecessors, has a thoroughbred lineage and continues in the vein of supplying first class service data on all the large manufacturers' domestic electronic equipment. The book provides essential service information on colour and monochrome televisions in addition to radio and audio equipment. It contains a quick reference guide to most current models, plus fault-finding charts, adjustment procedures and manufacturers' recommended modifications. This publication is a must for anyone in the business of repairing or servicing domestic electronic equipment.

OUR SERVICES

QUERIES

Although we will always try to help readers having difficulties with a *Practical Wireless* project, we cannot offer advice on modifications to our designs, nor on commercial radio, TV or electronic equipment. Please address your letters to the **Editor, "Practical Wireless", Enefco House, The Quay, Poole, Dorset BH15 1PP,** giving a clear description of the problem and enclosing a stamped self-addressed envelope. Only one project per letter please. We cannot deal with technical queries over the telephone.

COMPONENTS, KITS AND PCB'S

Components for our projects are usually available from advertisers. For more difficult items, a source will be suggested in the article. **Kits** for some of our more recent projects are available from **CPL Electronics,** 8 Southdean Close, Hemlington, Middlesbrough, Cleveland TS8 9HE. Tel: 0642 591157. The **printed circuit boards** are available from our new **PCB SERVICE**. For details see p50.

CONSTRUCTION RATING

Each constructional project is given a rating, to guide readers as to its complexity:

Beginner
A project that can be tackled by a beginner who is able to identify components and handle a soldering iron fairly competently.

Intermediate
A fair degree of experience in building electronic or radio projects is assumed, but only basic test equipment is needed to complete any tests and adjustments.

Advanced
A project likely to appeal to an experienced constructor, and often requiring access to workshop facilities and test equipment for construction, testing and alignment. Definitely not recommended for a beginner to tackle on his own.

BACK NUMBERS AND BINDERS

Limited stocks of some recent issues of *PW* are available at £1.25 each, including post and packing to addresses at home and overseas (by surface mail).

Binders are available (Price £5.50 to UK addresses, £5.75 overseas, including post and packing) each accommodating one volume of *PW*. Please state the year and volume number for which the binder is required.

Send your orders to **Post Sales Department, "Practical Wireless', Enefco House, The Quay, Poole, Dorset BH15 1PP. All prices include VAT where appropriate.**

Please make cheques, postal orders, etc., payable to Practical Wireless. Access, Mastercard, Eurocard and Visa accepted.

SUBSCRIPTIONS

Subscriptions are available at £13 per annum to UK addresses and £15 overseas, from **"Practical Wireless" Subscription Department Competition House, Farndon Road, Market Harborough, Leicestershire LE16 9NR. Tel: (0858) 34567.** Airmail rates for overseas subscriptions can be quoted on request.

Jamboree Stations

The Torbay ARS will be running three Jamboree On The Air stations on the 18th and 19th October. These will be GB0TBS, GB0HVS and GB4IFS. They are looking forward to contacting as many other Jamboree and non-Jamboree stations as possible.

RSARS

The Royal Signals ARS and Royal Air Force ARS will be at the Welsh Amateur Radio Convention in Blackwood on October 5, also at the Bridgend Radio Rally on November 9. They will be pleased to see Service and Ex-Service people at the stand to renew old friendships or make new ones.

GB2AC - GGDA

Virgin Atlantic QSL Card

This QSL card was sent to all amateur stations who made contact with the special event station GB2AC during the final and successful stages of the Atlantic speed record attempt.

GB2AC was operated by members of the Wimbledon & District ARS. The card shows ***Virgin Atlantic Challenger II*** leaving Lowestoft on her first sea trial with full tanks.

As only a small number of cards were printed, if you received one—hang on to it, it could be valuable!

Can You Help?

Philip Taylor is looking for complete circuit information wanted on the Lowther A10F audio amplifier. Or he would like to contact the owner of an original example. If you can help please write to ***Philip Taylor, 14 Willow Walk, Canewdon, Rochford, Essex SS4 3QH.***

Can anyone supply information on the John Scott Taggart S.T. superhet radio says Mr E. Rowe. Any information would be appreciated. Mr Rowe can be contacted at ***11 Thirstone Drive, Irby, Wirral, Merseyside L61 4XR.***

GB3RSS Reborn

The West Yorkshire Scout Radio Group has used the callsign GB3RSS during Jamboree On The Air since the event started in 1985. Now, as you can't have special event calls with the figure 3 and three letters they will be using GB2RSS.

They would like to thank all those Scouts and radio amateurs who have helped GB3RSS, whether in person, or on the air.

Why not join them and make the new callsign as popular as the old one.

MAXPAK

No it's not a drinks firm, it stands for Midlands AX.25 Packet Radio Group. Based in Wolverhampton, it is a group of radio amateurs who are currently "on the air" using AX.25 link level 2 packet protocol data.

They are looking to assist people who may be thinking of acquiring or building a terminal node controller as well as helping to bring packet radio "out of the closet". For more information contact ***Andy G1DIL. Tel: Wolverhampton 743164.***

Rally Dates

12 October 1986

Carmarthen ARS will be holding their rally at St Peters Civic Hall, Nott Square, Carmarthen. Doors open 10.30am and the rally closes at 5pm. There will be talk-in on S22, free parking and refreshments available. Admission is £1. Further details can be obtained from: ***B. Dowling GW3GUE. Tel: 0267 83460.***

19 October 1986

The South Bristol ARC are holding their second rally in the Hartcliffe Youth and Community Centre, Hareclive Road, South Bristol.

The doors open at 10am and the rally closes at 5pm—an hour more than last year. The usual trade stands will be there along with refreshments and bar (at competitive prices), a special event station and talk-in on S22. Admission is 50p. More details from ***Len Baker G4RZY. Tel: 0272 834282.***

1 November 1986

The sixth North Devon Radio Rally is to be held in Bradworthy Memorial Hall (near Holsworthy) from 10.30am to 5pm. There will be a bring and buy, etc, and talk-in on S22. For more details contact ***G8MXI QTHR.***

9 November 1986

Bridgend & District ARS are holding their rally at the Recreation & Leisure Centre, Angel Street, Bridgend. Doors open at 10.30 (10am for the disabled). Talk-in will be on S22 and there is free parking, bring and buy and a special event station. More details from ***GW1OUP. Tel: 0656 723508.***

25 January 1987

The Oldham ARC will be holding its second mobile rally at a new venue. This will be the Queen Elizabeth Hall, Civic Centre, Oldham. All the usual attractions will be featured at the larger venue.

Doors open at 11am and talk-in will be available from 9am. More details from ***Kathy Catlow G4ZEP. Tel: 061 624 7354.***

7 March 1987

The Tyneside ARS in association with The Newcastle Breweries Ltd, is holding the Blue Star Rally at the North east Exhibition Centre, High Gosforth Park.

Doors open at 11am and the rally closes at 5pm. There will be the usual trade exhibitors, Morse tests, bring and buy stall, free car parking and a licensed bar and refreshments. For further details contact: ***G6VEG QTHR or tel: 091 286 6908; G0DZG QTHR or tel: 091 274 2840 or G4KOT on 091 234 1148*** (after working hours please).

8 March 1987

The second Wythall RC Rally will be held at Wythall Park, Silver Street, Wythall. The rally opens at 12 noon and there will be trade and club stands, Eddystone Radio component clearout, bring and buy, bar and snacks and plenty of free parking. Admission is 50p, but OAPs and accompanied children are free. More details from ***Chris G0EYO. Tel: 021 430 7267.***

15 March 1987

The 1987 Belle Vue rally has been announced following the success of the 1986 event.

RSGB Morse tests will be available, there will be a bring and buy as well as the usual standard of trade exhibits.

More details can be obtained from the Exhibition manager ***P. L. Denton G6CGF. Tel: 051 630 5790.***

British Rail ARS AGM

November 1 is the 20th Annual General Meeting of British Rail Amateur Radio Society. It will be held in Stanier House, Birmingham, starting at 1300.

Then on the weekend of November 8 and 9, there is the FIRAC Contest. Readers should note ***only FIRAC members may take part.*** The usual restricted FIRAC frequencies will be used.

Three Counties Award

The award can be gained at one or both of two levels, h.f. (for contacts on frequencies below 144MHz) and v.h.f./u.h.f. (for contacts above 144MHz). All contacts must be made from the main address of the applicant, but any band or mode (except repeaters) will be accepted. The award will be endorsed for any single band and/or mode if appropriate and required.

For the Basic Award you must work or hear 10 stations in Surrey, 10 in West Sussex, 10 in Hampshire plus 2 on the Isle of Wight. The county borders are defined on an OS map. There are three upgrades available, these are gained by working or hearing 10 additional Surrey stations for the Surrey upgrade, 10 additional West Sussex stations for the West Sussex upgrade and 10 additional Hampshire stations and 2 Isle of Wight stations for the Hampshire upgrade. Stations may not be duplicated.

The award costs £1 for UK applicants, payable to Three Counties ARC and logs should be countersigned by two licensed amateurs.

More details from ***TCARC Awards Manager, c/o D. Hughes G4PDR, 3 Clandon Court, Farnborough, Hants.***

Special Event Stations

GB6SW

During October this callsign is being used to celebrate the 50th year of the Cannock Chase ARS. Operation will be on most bands and will be supplemented by GB1GCC and GB8GCC. All special event callsigns are derivations of the club's own calls.

Special QSL cards will be sent for all contacts and the Cannock Chase Award is available for this event. For further details contact ***G1AZQ or G0BXN, both QTHR.***

GB4WAB

First used back in April to start the Worked All Britain award scheme, the station is going back on air during November to give a further opportunity to obtain the award.

Further details and an active members' list is available from ***G1AZQ or G0BXN, both QTHR.***

New Morse Journal

Since 1983, two Dutch radio amateurs, Rinus Hellemons PA0BFN and Dick Kraayveld PA3ALM have published a quarterly journal, *Morsum Magnificat,* for Morse enthusiasts.

Contributions have been written by amateur and professional Morse telegraphers, young and old, from around the world, but as the journal appears in Dutch, its circulation has been very limited.

In 1985, an experimental "one-off" English version was published to "test the ground" for a wider audience. Now, Tony Smith G4FAI had joined the team as English Language Editor. A new English version of *Morsum Magnificat* will shortly be available by post, worldwide.

Its aim is to publish material about Morse, past and present, not normally found to any extent in popular magazines. It will include history, illustrations, anecdotes and adventures in both wire and wireless telegraphy.

UK subscription for a year (4 issues) is £6, postpaid from ***G4FAI, 1 Tash Place, London N11 1PA.*** Cheques should be made payable to Morsum Magnificat. For other information, including overseas rates, send an s.a.e. to G4FAI or tel: 01-368 4788.

A New Radio Club

Colin Topping GM6HGW is interested in starting a radio society in the St Andrews and North East Fife area. Anyone interested in joining the group should contact him at "Luinga Mhor", 17 Mt. Melville Crescent, Strathkinness, Fife KY16 9XS.

BAEC

The British Amateur Electronics Club have sent us the July BAEC Newsletter. It looks an interesting read for those interested in electronics. There are all kinds of articles for both the beginner and more advanced constructor alike.

If you would like more details, I'm sure a s.a.e. to ***Mr C. Bogod, "Dickens", 26 Forrest Road, Penarth, South Glamorgan,*** will bring the necessary information.

RAE Courses

Canterbury: The City & Guilds 765 Radio Amateurs' Examination commenced Oct 6. The classes run from 1830 to 2030 most Mondays. Details from Derek Buckley G4OQD at the Canterbury College of Technology, Department of Information and Electrotechnology.

Knottingley: There is an RAE class being held at the Knottingley High School, West Yorkshire. The course tutor is A. E. Ashby G3HCW, 22 Rossiter Drive, Knottingley, West Yorkshire WF11 0EX, for more details.

Loughborough: The course started September 16 for 26 weeks, 6–7pm is Morse, 7–9pm is Theory and Regulations. More details from Loughborough Technical College, Department of Electrical Engineering and Computing, Radmoor, Loughborough. Tel: 0509 215831.

Manchester: The course tutor is Jim Brett G6EBR at Hulton High School, Longshaw Drive, Little Hulton, Worsley, Manchester. More details from Jim on 0942 883729.

Rhondda: The enrolment for this course was the 1st week of September, but if the course is not full, more prospective students may apply after this date. The course is held at the Rhondda College of Further Education. More details from the college on 0443 432187.

10-UK Defunct

Due to various business and personal changes of circumstances, the organisers of 10-UK have been forced to give up any involvement in the now defunct organisation. On investigation, it has been found that an amount of £230.17 remains as a balance of the 10-UK funds.

Provided that no objections are received on or before 1 January 1987 it is proposed that the above sum less any expenses (postage, etc.) will be donated to the RAIBC. If there are any objections kindly advise G3LWM as soon as possible.

Radio Newcastle Open Day

BBC RADIO NEWCASTLE

BBC Radio Newcastle will be inviting the public to view their new studios during an open day on Sunday October 12. The purpose-built broadcasting centre is at Fenham (near the city centre), and next year BBC television will move in when the TV studios are completed.

As an added attraction, the Tyneside ARS will operate a special event station from the newsroom using GB2FBC.

Obituary

George Day G4FQB

George died on July 3 aged 74. He came to amateur radio late in life, however, he had been interested in radio ever since he was in the Cub Scouts. He joined the Royal Navy in 1927 and achieved the rank of Lieutenant. George had suffered from total blindness since 1966, but this did not deter him from using some of the latest radio equipment with aids developed by local amateurs. He was always eager to master new technologies and with the help of others, operated a Vic 20 with an integrated speech synthesiser which he used for word processing, developing programs and preparing Morse tapes. George was never short of good ideas and in 1986 published an article in *PW* showing how a Braille machine could be used to draw circuit diagrams.

His first love was c.w. and he will be best remembered for his magnificent effort in training others. He helped over 70 students to pass the Morse test with no failures since 1977. His method of hard work interspersed with coffee, supplied by his wife, Bobbie, and tales of bygone days could not be faulted and will be a lasting tribute to his determination to help others.

I worked with George and Bobbie in the preparation of his article and enjoyed every minute spent in their company. Best wishes go to his widow from all those who had the good fortune to work with him.

New Engineering Details

Radio Lancashire: They have opened a new v.h.f./f.m. transmitter at Winter Hill, 6km north east of Bolton, broadcasting on 103·9MHz.

The new transmitter supplements Radio Lancashire's other v.h.f./f.m. broadcasts from the Hameldon Hill transmitter which changed frequency from 96·4MHz to 95·5MHz and from the Lancaster transmitter which changed frequency from 103·3MHz to 104·5MHz.

Radio Lancashire's medium wave broadcasts on 855kHz in E. Lancs and 1557kHz in N. Lancs remain unchanged.

Radio Cambridgeshire: changed the frequency used at its Peterborough v.h.f./f.m. transmitting station from 103·9MHz to 95·7MHz. Now listeners at home should use an outside horizontal antenna. Note Radio Cambridgeshire's other v.h.f./f.m. and medium wave frequencies will stay the same for the present time.

Dartford Tunnel: The BBC has installed an experimental transmission system along the southbound carriageway of the Dartford Tunnel, part of the M25 London orbital motorway network, to enable motorists to pick-up BBC v.h.f./f.m. radio signals whilst still in the tunnel. The signals are transmitted on a special "radiating" cable which runs the length of the tunnel, and allows travellers to receive the broadcasts without interruption as they drive through the tunnel.

The cable carries Radio 1/2 on 89·1MHz, Radio 3 on 91·3MHz, R4 on 93·5MHz, Radio London on 94·9MHz and Radio Kent on 96·7MHz, the same frequencies used by the local transmitter, and therefore no re-tuning is necessary. The northbound tunnel is currently unequipped, but hopefully that will change in 1987.

Sandale: The frequencies used to broadcast BBC Radio 4 and BBC Radio Scotland from the Sandale transmitter in North Cumbria will be transposed. Radio 4 will be on 92·5MHz and Radio Scotland on 94·7MHz, the latter also carries the programmes of Radio Solway at certain times. The frequencies of Radio 1/2 on 88·1MHz and Radio 3 on 90·3MHz remain unchanged.

Radio Nottingham: They have changed the frequency used at its Colwick Park v.h.f./f.m. radio transmitting station from 95·4MHz to 103·8MHz. At home, an outside horizontal antenna is recommended. Note that the medium wave frequencies will not change.

Kendal: The BBC has changed the frequencies used for the national v.h.f./f.m. radio services at the Kendal relay transmitting station. The frequencies affected are:

Radio 1/2	from 88·7 to 89·0MHz
Radio 3	from 90·7 to 91·2MHz
Radio 4	from 93.1 to 93·4MHz

BBC Local Radio Cumbria/Furness is not affected by the changes.

Winter Hill: The BBC has built a new v.h.f./f.m. transmitting station at Winter Hill, Lancashire, to bring good reception to Preston, Chorley, parts of Blackburn and the surrounding rural areas. The new station, located at the existing television transmitter site 6km north-east of Bolton, will broadcast Radio 1/2 on 88·6MHz, Radio 3 on 90·8MHz and Radio 4 on 93·0MHz.

Lambourn: A new television relay for Lambourn, Berkshire, has been built at Gas House Hill, Lambourn, to the north-east of the town centre.

The channels to be used are:

Channel 52	Channel 4
Channel 55	BBC1 South
Channel 59	TVS
Channel 62	BBC2

Viewers will need vertical group C/D antennas.

Lochinver: A new television relay transmitting station should be bringing good reception to Lochinver and Baddidarach, Sutherland, Highland Region.

The channels to be used at Lochinver are:

Channel 40	BBC1 Scotland
Channel 43	ITV Grampian
Channel 46	BBC2
Channel 50	IBA Channel 4

Viewers will need vertical group B antennas.

Llanelli: On Wednesday August 20, weather conditions permitting, a new antenna system should have been installed at the Llanelli relay station in Dyfed.

There will be no change to the channels used at Llanelli, which are:

Channel 39	BBC1 Wales
Channel 45	BBC2
Channel 49	ITV HTV Wales
Channel 67	Sianel 4 Cymru

Viewers will need vertical Group E antennas.

Sorn: A new television relay transmitting station, should be bringing good reception to more than 300 people living in Sorn and parts of the surrounding rural area.

The relay has been built at Sorn, 22km east of Ayr, Strathclyde Region.

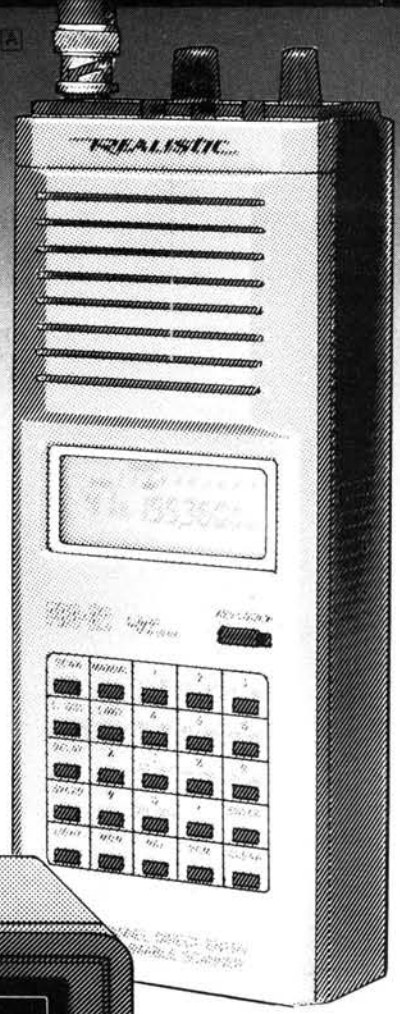
The channels used at Sorn are:

Channel 40	BBC1 Scotland
Channel 43	ITV Grampian
Channel 46	BBC2
Channel 50	IBA Channel 4

Viewers will need vertical Group B antennas.

Tune into Realistic® Programmable Scanners ...The Obvious Choice.

Our Best - 200 Channels With Direct Keyboard Access



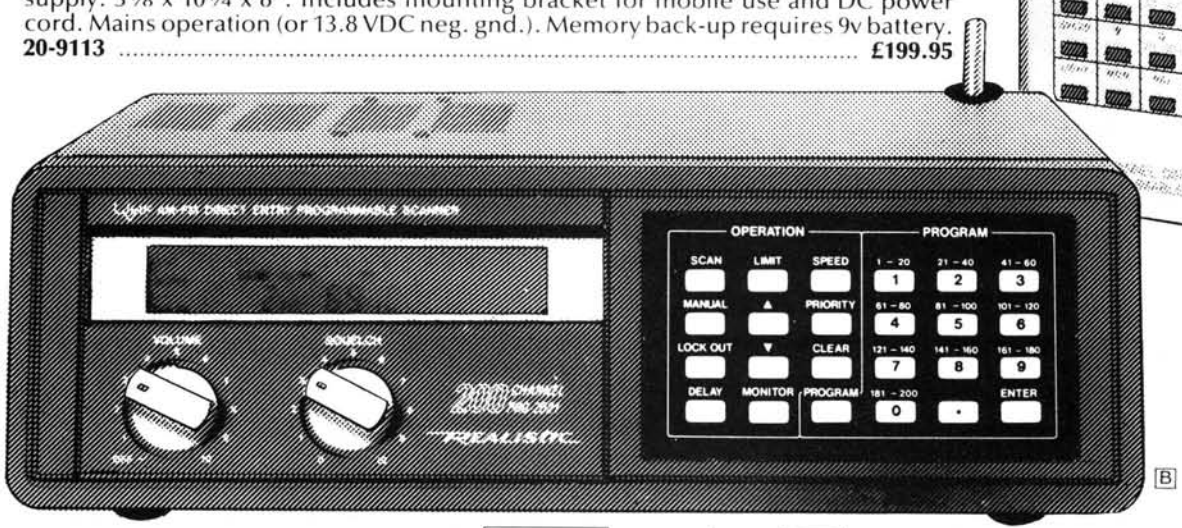
A **Realistic PRO-32.** You'll catch all the action with this full-featured, microprocessor-controlled scanner with extended frequency coverage - all in a hand-held size. Scan up to 200 channels in 10 selectable bands or search a selected frequency range for new channels. Scan any of the following bands: VHF-Lo 68-88 MHz, VHF AIR 108-136 MHz, VHF HI 138-174 MHz, UHF Lo 380-470 MHz and UHF HI 470-512 MHz. Two scan and search speeds. Two-second scan delay, selectable for each channel. Keyboard-lock switch prevents accidental changes. Large LCD display shows channels and frequencies being scanned, monitored or programmed, plus status of channels. Priority function monitors your favourite frequency while listening to others. Squelch control, built-in speaker, earphone jack. With flexible antenna and jack for long-range external antenna. 7½ x 2 15/16 x 1 13/16". Requires 6 "AA" batteries or AC or DC adapter. Memory back-up requires 3 silver-oxide batteries.

20-9133 ..... **£239.95**

Full-Featured 200-Channel For Home/Mobile Use

B **Realistic PRO-2021.** Superior performance from the very latest in solid-state technology. Features direct keyboard entry, search and scan in two speeds, two-second scan delay so you don't miss return calls, priority function will automatically switch to the priority channel when a call is received on it and individual lock-outs for temporarily bypassing channels. Scan up to 200 channels in these bands: VHF-Lo 68-88 MHz, VHF AIR 108-136 MHz, VHF HI 138-174 MHz, UHF Lo 380-470 MHz and UHF HI 470-512 MHz. Easy-to-read LCD channel/frequency display with electroluminescent back lighting, squelch control and built-in speaker, telescoping antenna. Jacks for external speaker, external antenna, tape recorder and DC power supply. 3⅛ x 10¼ x 8". Includes mounting bracket for mobile use and DC power cord. Mains operation (or 13.8 VDC neg. gnd.). Memory back-up requires 9v battery.

20-9113 ..... **£199.95**



Tandy®

Tunes You In To A World Of Better Listening

Over 300 Tandy Stores And Dealerships Nationwide.
See Yellow Pages For Address Of Store Nearest You

Tandy Corporation (Branch UK), Tandy Centre, Leamore Lane, Bloxwich, Walsall, West Midlands. WS2 7PS

Digital Morse Processor

Invotron has introduced a digital Morse processor, DMP1, which interfaces between the Morse key and transmitter so that it becomes possible to send perfect Morse with a conventional key.

The DMP1 decodes the input from the key, stores it in an 8K static RAM before outputting it as a continuous stream of perfect Morse. The integral store enables a message to be stored and repeated at will as often as required by pushing the RUN button.

In the "correcting" mode the output speed is set by the user to be very slightly slower than the average input speed. In the "repeat" mode the output speed can be raised or lowered irrespective of the initial input speed.

It can also be used as a trainer enabling high speeds to be generated from low input speeds for receiving practice. When sending, the indicators help the beginner to improve dot and dash durations and inter-letter spacings.

Further details are available from ***Invotron Ltd., Brookfield Avenue, Blackrock, Co. Dublin, Eire. Tel: Dublin 884993.***

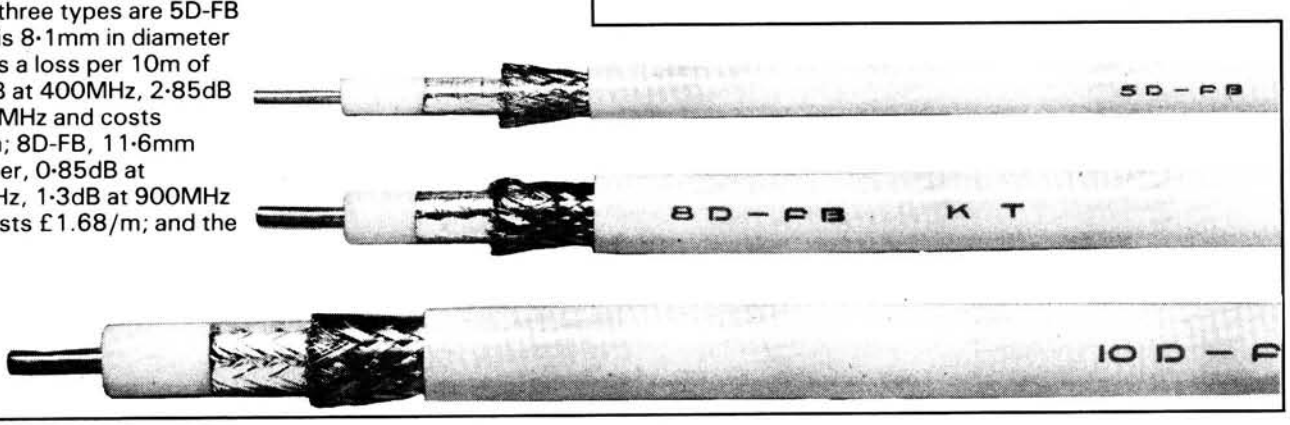
Coaxial Cable

Telecomms are now importing a new range of Japanese made 50Ω ultra-low-loss coaxial cable.

The cable is double screened with a white outer sheath and is claimed to be much more flexible with lower losses than cable such as the popular H100.

The three types are 5D-FB which is 8·1mm in diameter and has a loss per 10m of 1·21dB at 400MHz, 2·85dB at 900MHz and costs 72p/m; 8D-FB, 11·6mm diameter, 0·85dB at 400MHz, 1·3dB at 900MHz and costs £1.68/m; and the 10D-FB, 13·7mm diameter, 0·68dB at 400MHz, 1·05dB at 900MHz and costs £2.52/m.

For full details contact ***Telecomms, 189 London Road, North End, Portsmouth, Hants. PO2 9AE. Tel: (0705) 698113.***



Safety

Safety in the home and shack is a problem which is becoming a worry to many people.

Geefor Enterprises, run by Martyn Bolt G4SUI, can supply you with a compact, in-line residual current circuit breaker (r.c.c.b.) to take a 13A plug complete with test and reset buttons.

The price is £29.95 inc. post and packing direct from ***Geefor Enterprises, 112 Leeds Road, Mirfield, West Yorkshire WF14 0JE. Tel: (0924) 495916.***

High-Power Variable Capacitors

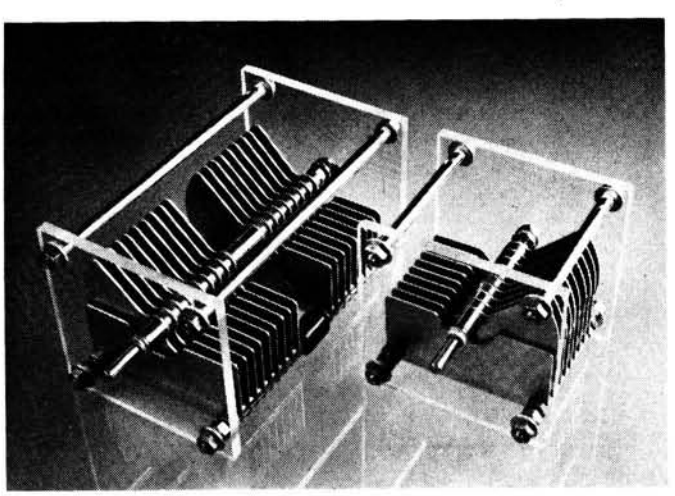
Two models of high-power variable capacitors, both British made, are available from Telecomms.

The Nevada TC-250 is an air-spaced 13–250pF model with a breakdown voltage of 7·8kV. Size is 101 × 105 × 88mm, it weighs 620g and costs £15.61 plus VAT.

The Nevada TC-500 is a two-gang 13–250pF model with a similar electrical specification to the TC-250. The size is 101 × 105 × 165mm, weight is 1·13kg and the price is £19.50 plus VAT.

Both units are available in kit form at a lower price if required and are ideal for a.t.u.s. Perspex end plates 6mm thick are used, capable of withstanding extremely high voltages and having excellent r.f. properties. Versions with ceramic end plates are also available for commercial broadcast use.

Full details from ***Telecomms, 189 London Road, North End, Portsmouth, Hants. PO2 9AE. Tel: (0705) 698113.***



Following his successful series in 1985, Terry Weatherley G3WDI provides some up-to-date information for newcomers

Weather Satellite Update

These two photographs are two consecutive passes of NOAA-9

I have had a number of requests from readers for up-to-date information about weather satellites and this article should help newcomers to the hobby. The "old hands" will know this information from their own sources.

Weather satellites are certainly in the news these days. Viewers of BBC2 programmes last Christmas will have seen the weather satellites included as a demonstration in one of the Royal Institution Christmas Lectures. Readers of *Practical Wireless* will have recognised the Timestep interface being used to display the picture via a BBC computer (of course). This system was described in my last article (Sept –Dec 1985 *PW*).

Recently there have been two new Russian launches and there have been more problems with NOAA-8. A new NOAA is scheduled for launch in the spring, but more about that later.

A question I have been asked about the lunch-time NOAA-9 pass is, "why are the pictures so poor, is there something wrong with it?" There is nothing wrong with NOAA-9 and the poor visible light picture is a seasonal effect caused by the winter illumination of the northern hemisphere. By the time the satellite is on its near overhead pass in "our" early afternoon it is already dusk further into Europe. This causes the picture to be severely under-illuminated on the right-hand side, while the left-hand side tends to be over-illuminated. This of course only affects the visible light picture, the infra-red picture does not illustrate this effect. While this winter effect is annoying, since it makes identifying land masses extremely difficult, it does actually help in establishing the direction of travel of the Russian satellites. If a picture is displayed with the brighter part on the right then it is upside-down and the satellite is travelling in the opposite direction to that which was expected.

Another "winter effect" caused me a moment's concern since I had a call asking "why is NOAA-9 visible channel sending peak white?" I turned on my receiver and sure enough it was. An anxious wait for the next orbit only to find it was sending a normal picture again. Just north of the UK it started to send peak white again. Careful examination of the displayed picture just prior to peak white showed there to be no cloud detail at all just a complete black picture. Then the penny dropped. NOAA-9's visible channel switches to a second infra-red channel during "spacecraft night". Night is detected by the spacecraft when it sees no detail in its visible sensor. This will depend on the height of the cloud cover on the earth below the spacecraft and the spacecraft will detect "night" at different times on each orbit and vary from day to day.

Users of framestore display units will find that the daytime infra-red picture gives an excellent picture during the summer. The fjords of Norway show up particularly well. The state of the ice in the Gulf of Bosthnia is another feature showing changes from day to day.

Meteor 3-1

The Russian Meteor launch in the autumn of 1985 was noteworthy for two reasons. First, because it was the first launch of a new series of Meteors —Meteor 3-1—and secondly because it was initially in a much higher orbit. The initial parameters were given as:

Period	110·3min
Apogee Height	1263km
Perigee Height	1235km
Inclination	82·5°

The satellite started transmitting pictures immediately on 137·4MHz with good picture quality although the signal strength was down but this was to be expected with a higher orbit. By the time I got around to listening for this satellite on November 12 it was no longer transmitting and it was assumed to have failed. However, on November 28, a satellite was reported transmitting on 137·4MHz, this turned out to be Met 3-1. The orbital period had decreased and the picture coverage was less so it appears that the satellite changed orbit. A set of elements for Met 3-1 is given in the tables.

A recent article about the Meteor satellites suggested that it is the Soviet custom to mass produce a satellite series and then keep them "on the shelf" as it were until each is needed to replace a spacecraft that has come to the end of its useful life. With the Meteor series this end point is usually preceded by a complete loss of sync pulses at one edge of the picture. When this situation occurs we see that approximately 25 per cent of the effective scan of the satellite is obscured by the sync pulses. This loss of sync was noticed before Meteor 2-12 stopped transmitting and has been noticed on Meteor 2-10.

On December 26 another Meteor in the Meteor 2 series was launched, it is designated Meteor 2-13. This Meteor is at present transmitting on 137·3MHz. The orbit was a typical Meteor 2 one:

Period	104·09min
Apogee Height	962km
Perigee Height	939km
Inclination	82·54°

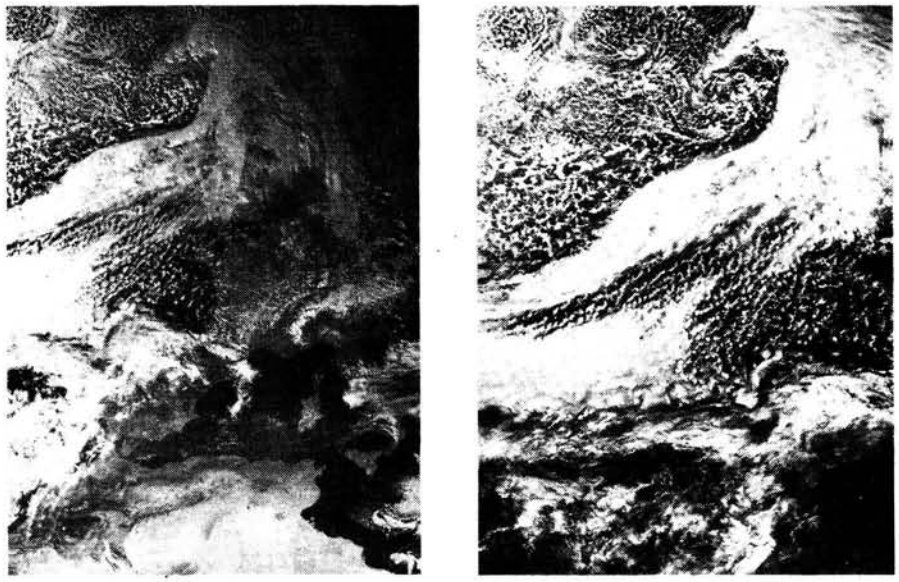
After what appeared to be a successful recovery NOAA-8 has finally failed. This satellite had a short but eventful life. The primary oscillator went intermittent and the spacecraft could not be reliably controlled and was switched off. Because the oscillator was only intermittent the back-up oscillator did not cut-in. When the oscillator failed

completely the back-up oscillator did switch on, and the spacecraft was put back into service. NOAA-6 (see note at the end of the article) which had been re-activated again was kept on unless its orbit brought it into conflict with NOAA-8. On occasions this led to some interesting effects. The two satellites would follow each other and since they were on the same frequency the "satellite" appeared to be in range for over 30 minutes at a time. The fact that it was two satellites on the same frequency could of course be easily deduced from the pictures. NOAA-8 did not last however as the back-up oscillator soon failed and the spacecraft tumbled uncontrollably until it was reported to have broken up just before the end of 1985.

The photographs illustrating this "Update" show a pair of NOAA-9 passes on 4 January 1986. It shows a lot of snow over western Europe together with snow on the Alps. The other two pictures are from NOAA-9 and Met 2-13 taken on 20 January 1986. The passes of the two satellites were within an hour of each other and it is interesting to compare the two satellite systems. The NOAA picture is from the visible channel and shows good land/sea differences. The "winter's day effect" is also fairly evident with the left of the picture being darker than the right-hand side. The Met 2-13 picture is 120 lines per minute with the numerous sync pulses down the left-hand side and, what is reported to be, binary telemetry down the right-hand side. The picture shows extremely fine cloud detail but does not show much coast line. Careful examination of the original print leads to the identification of a bit of the North African coast near to Gibraltar. The picture does not show the "winter" effect and the spacecraft system would seem to be able to increase the gain to compensate for low light levels. My thanks to Les Currington for these pictures.

I received reports on February 9 that Met 2-13 was behaving erratically. On some orbits it exhibited the classic Meteor "loss of sync" syndrome, on others it did not switch on until over the Med—and then the picture was poor—and on others it seemed to behave normally.

Dave Cawley (Wickhambrook) using a Timestep scanner reported what sounded like an PAT signal on 137·560MHz around mid-day. This signal gave a pattern of black and white pixels on a framestore. It would appear that this signal is an f.m. one from the UK satellite Ariel-6 and has been reported from time to time.



Two photographs of the same area from NOAA-9 and MET 2-13 on 20 Jan 1986

Meteosat-2 continues to perform well but the pictures are a bit flat. Another illustration is the GOES picture of hurricane Elani relayed by Meteosat. The other two pictures are both from NOAA-9 and show the high over the UK—which gave the unseasonable weather in late 1985—together with snow showers giving us on the east coast an "early" white winter.

A New Meteosat

A new Meteosat was scheduled for launch by ESA this year, but recent troubles might affect this.

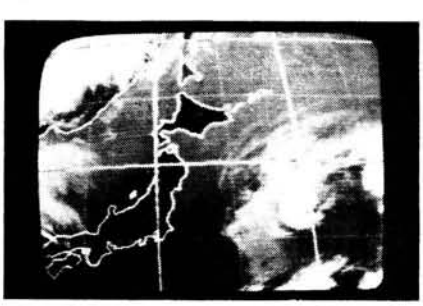
A recently produced piece of software for the BBC-B is, I think, destined to be a must for satellite enthusiasts. It is called Satfoot. This software comes from Jim Millar via AMSAT-UK. It shows at a glance where any of 10 satellites are at any given time. The screen display shows a Mercator map of the world with either the Greenwich Meridian as the centre or the 180° longitude line which is suitable for Australasia. On the map are plotted the satellites together with their area of coverage—the satellite footprint. It follows that if one's QTH is within the "footprint" then one can receive the satellite. The program can be run in either real time or accelerated mode (approximately 16 times as fast as real time). Days, times, etc., can be set up to inspect conditions. A status line gives the satellites' details.

In use I found using all 10 satellites confusing—there were satellite circles everywhere. It is possible, however, to turn satellites on or off under keyboard control. This facility I found invaluable. It is interesting, although a bit unnerving at first, to watch the footprint distortion as the satellite approaches the poles. This distortion is because of the Mercator map projection. One of the "satellites" is the sun. The footprint shows the terminator (the line between light and dark), and this helps decide whether the weather satellite will give a useful visible light readout or not. The footprint also enables the user to decide the area of the earth being viewed by the satellite (invaluable for the Meteors). This piece of software is available now from AMSAT-UK and is in cassette or disk format. Disk orders should state 40 or 80 track.

It is sometimes difficult for the casual listener to get up-to-date predictions for NOAA-9 and NOAA-6. Predictions can be obtained from the *RIG*, the newsletter of the Remote Imaging Group. A group all serious weather satellite enthusiasts should become members of.

Timestep Electronics operate a Prestel compatible Bulletin Board on 0440 820002.

Recently announced has been the start of an answerphone service by the



This shows Japan received from the GMS satellite in Australia

A NOAA-9 framestore

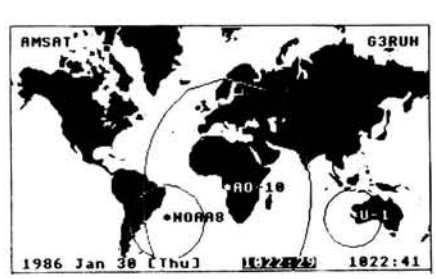


Illustration from SATFOOT

A winter pass from NOAA-9

Hurricane Elani

Snow showers in the East from NOAA-9

recently set-up UK Weatherwatch. This service will give up-to-date information about the NOAA satellites together with orbital predictions for the next few days. The service is available Monday to Friday from 1715 to 0845 and all day Saturday and Sunday. The telephone number is 0256 83448.

Service Availability

This service is NOT available outside these times. While these services are invaluable they do not provide Keplerian Elements needed by some computer programs. These can be obtained from a "space" source namely UOSAT-1 or UOSAT-2. Both these satellites transmit these elements as part of their regular bulletin transmissions. This information, which can be displayed using a computer or an MM2001 (suitable for fast readers only), is very up-to-date and is usually changed weekly. If you do use this service a note to the University of Surrey would be appreciated and might ensure that weather data is carried regularly.

Subscribers or satellite visual observers who receive the Earth Satellite Research Unit's weekly newsletter *Space* will receive news of recent launches together with initial element sets, this is a useful source of new data. It covers the launch of ALL satellites and is primarily for visual observers.

NOAA-9 is still awaiting launch, problems with the rocket launchers and the loss of a new GOES satellite are adding to US problems.

There was a launch of a new Meteor —Meteor 2-14—transmitting on 137·300. The element set for Orbit 14 is:

Epoch	148·39571945
Acc	0·0000002
Inclination	82·5398
RAAN	53·2102
Eccentricity	0·0013132
Arg of Perigree	261·8534
Mean Anomoly	98·1061
Mean Motion	13·83730792
Rev No	14

Meteor 3-1

Epoch 1986	178·91005800
Decay	0·00000615
Inclination	82·5384
RAAN	28·9625
Eccentricity	0·0014363
Arg of Perigree	170·5090
Mean Anomoly	189·6346
Mean Motion	13·83735661

Meteor 2-14

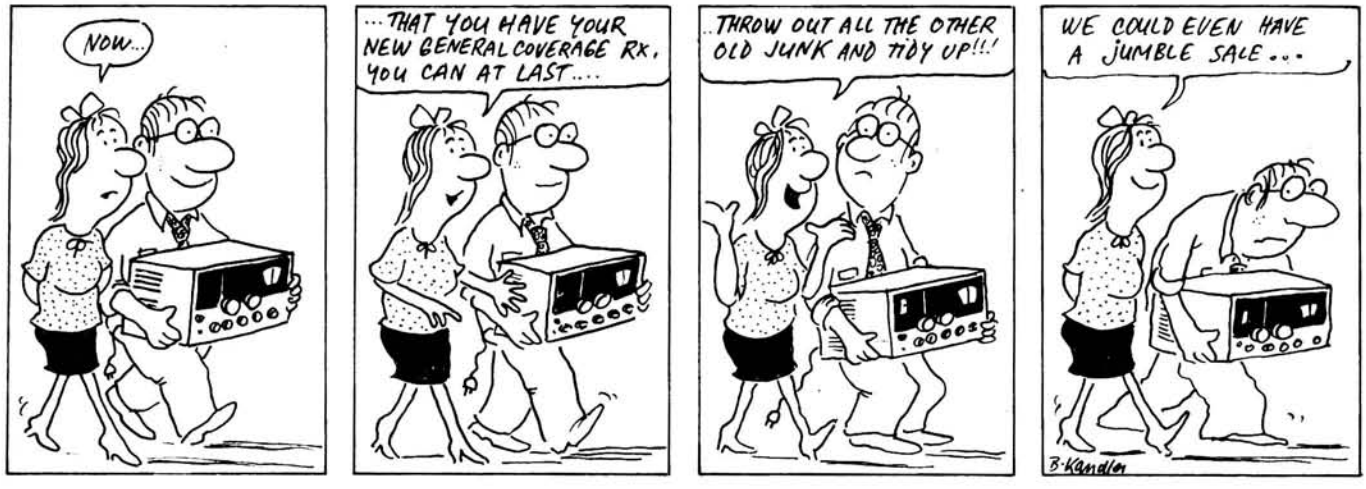
Epoch 1986	151·21569928
Decay	0·00009016
Inclination	82·5387
RAAN	50·9686
Eccentricity	0·0013304
Arg of Perigree	253·4773
Mean Anomoly	106·1733
Mean Motion	13·83745967

More Reading

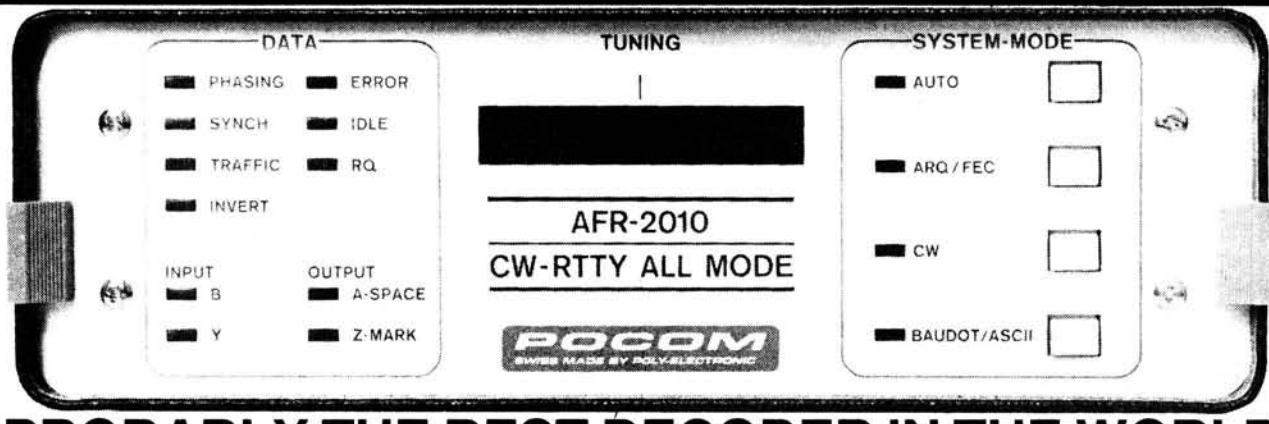
One thing readers may find interesting, I received the American publication *Communication Satellites* by Larry Van Horn recently. This 216 page book, to quote the publisher, "represents the most exhaustive reference documenting the space program and its radio support ever written." It has chapters on the different satellites in orbit including the geostationaries and has an excellent chapter on weather satellites. It also contains a frequency list telling what can be heard and where. This list goes from 7·050MHz (OSCAR-9 beacon) to a USAF ground station on 563 300MHz!

Finally, NOAA-6 has a problem! At the time of writing this last paragraph (June 22), NOAA-6 is in trouble. It seems that the oscillator has gone unstable and it is not possible to "lock" the picture on a FAX or framestore. The picture information and sync pulses are still "in there" so let's hope that the ground command station can retrieve the satellite soon. ***PW***

BENNY



COME AND TRY THE POCOM RANGE FOR YOURSELF ON STAND 37 AT THE LEICESTER SHOW



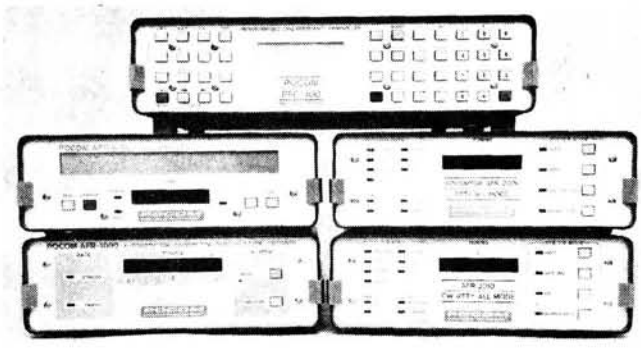
PROBABLY THE BEST DECODER IN THE WORLD

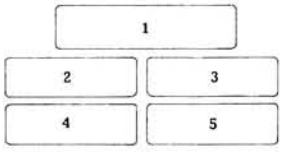
In its standard form the **POCOM 2010** is extremely versatile and capable of decoding most signals, yet it costs just **£781.** However, specialist users may want to be able to decode some of the more unusual transmissions that are around, so for them a range of expansion boards are available. These just plug straight into the **2010** and turn it into what must be the most versatile decoder on the market (the boards marked YES are fitted as standard).

	AFR-2010
RTTY Baudot CCITT No. 1 Standard 45/50/57/75/100/150/200 Baud	OPTION
RTTY Baudot CCITT No. 2 Standard 45/50/57/75/100/150/200 Baud	YES
RTTY Baudot CCITT No. 1 Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot CCITT No. 2 Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot CCITT No. 1 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot CCITT No. 2 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY 8 Channel 200 Baud Press Service (SID, KNA, etc.)	YES
NEW RTTY CODE 8 Channel 200 (300 Baud) Press Service (DPA, VWD, etc.)	OPTION
RTTY ASCII CCITT No. 5 Standard 110/150/200/300 Baud	YES
RTTY ASCII CCITT No. 5 Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot Synchron-Printer, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot Mode 32, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Autospec, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
MORSE (CW) 15-250 Characters Per Minute (CPM)	YES
TOR (SITOR/SPECTOR/AMTOR, ARQ-FEC according to CCIR 476-2), 100 Baud	YES
ARQ Multi Channel (Time Div. Multiplex, Moore) 2 Sub-channels 86, 96, 100 Baud	OPTION
ARQ Multi Channel (Time Div. Multiplex, Moore) 4 Sub-channels 172, 192, 200 Baud	OPTION
ARQ Multi Channel (TDM) Mode PLEX 2 Sub-channels 86, 96, 100 Baud	OPTION
ARQ Multi Channel (TDM) Mode PLEX 4 Sub-channels 172, 192, 200 Baud	OPTION
ARQ One Channel Standard 48, 64, 72, 85, 96 Baud	OPTION
FEC System with 7 BIT Code according to CCITT No. 3, 96, 100, 192, 200 Baud	OPTION
FEC System with 7 BIT Code Self Checking (Convulgenter Code) 30-250 Baud	OPTION
FEC System with 7 BIT Code according to CCITT No. 3, 30-250 Baud	OPTION
BIT ANALYSE (Analysis of received BIT format)	OPTION
AUTO SPEED-CHECK Baud Rate Indication 30-250 Baud with 1/1000 Baud Accuracy	YES

The price of individual expansion units is available on request and a fully expanded AFR 2010, capable of decoding virtually any transmission in any mode, costs about £1500.

INTRODUCING THE REST OF THE POCOM FAMILY





1 — PFC 100
2 — AFR 8000
3 — AFR 2000
4 — AFR 1000
5 — AFR 2010

POCOM decoders are manufactured in Switzerland by the Poly-Electronic company who are known throughout the world for the quality of their products. The **2010** is the flagship of their range and this is the one that we would recommend to professional and commercial users — it covers everything! The **AFR 8000** is similar to the **2010** (it uses the same software) but it has the added feature of a built-in LCD display which makes it ideal for mobile or marine use where a video monitor is not really practicable, although a video option available. The **AFR 2000** is again similar to the **2010** but in its standard form it is supplied without CW capability. A CW expansion board is available as an option. The **AFR 1000** is a budget priced ASCII, ARQ/FEC (SITOR/SPECTOR/AMTOR) and CW decoder which has many of the features of the **2010** but which is not upgradeable. Although it is not a decoder, it is worth mentioning that we can also supply the **POCOM PFC 100,** a versatile frequency controller for radios such as the NRD 515 and the ICOM R70/71.

Whether you are a professional user or a dedicated listener there is a **POCOM** decoder for you and, although the top of the range model costs about **£1500,** prices start from as little as **£395.** They may not be the cheapest on the market, but they are certainly the best! For more details send s.a.e. (at least 8"×6") for a free booklet which gives the full specifications of the entire **POCOM** range of decoders.

This ad cannot really do justice to these marvellous pieces of equipment, so next time you are in the area, come in and try them for yourself – you will be convinced.

FULL RANGE OF TRIO PRODUCTS STOCKED
We are also stockists of DAIWA—MET ANTENNAS—MUTEK—WOOD & DOUGLAS—TASCO TELEREADERS—MICROWAVE MODULES—ICS AMTOR—AEA PRODUCTS—DRAE

Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Telephone: Stourbridge (0384) 390063/371228.
Telex: 337675 TELPES G

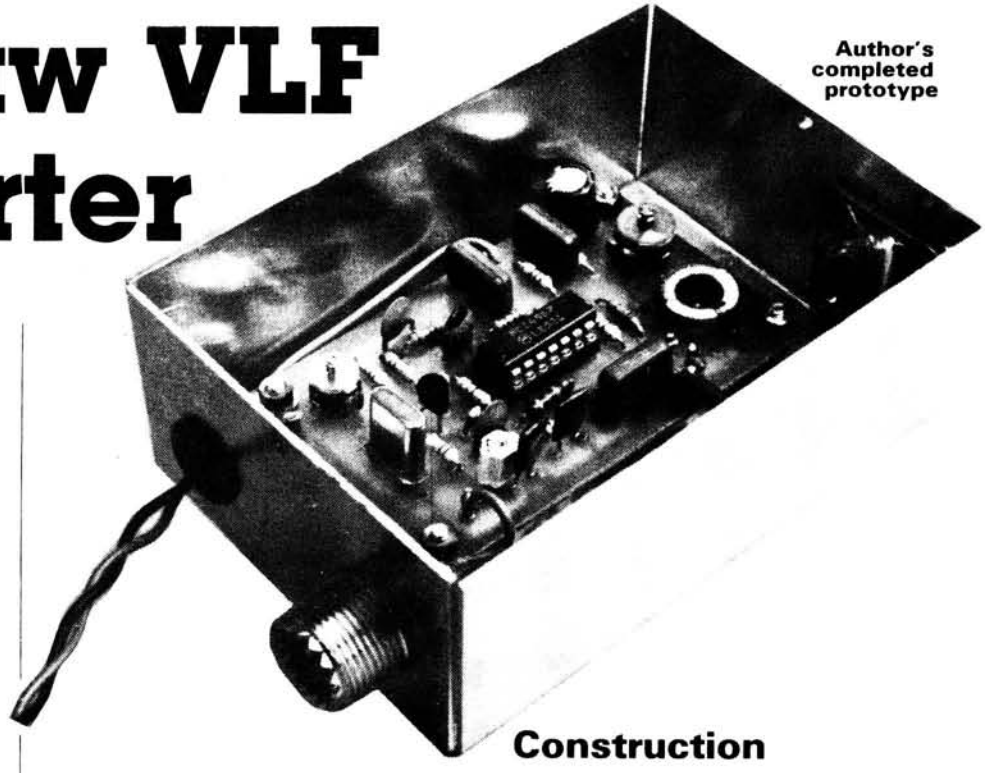
VISA

Instant finance available subject to status. Written details on request.

Access

Following the development of software for the Sinclair Spectrum which enables decoding of both weather facsimile and the MSF clock on 60kHz, Mike Rowe G8JVL decided to design a simple v.l.f. converter to fill the gap in the coverage of his h.f. receiver.

The Taw VLF Converter



Author's completed prototype

Circuit Description

As shown in Fig. 1 the heart of the circuit is a double balanced mixer (d.b.m.) which offers advantages over a simple single-ended type. Signals at the intermediate frequency (i.f.) are effectively suppressed. No problems have been encountered with the prototypes with i.f. breakthrough. The output transformer is a centre tapped winding on a T50-6 toroid tuned to the chosen i.f. by C11. A low impedance link winding couples the i.f. to the antenna input of the h.f. receiver which is used as a tuneable i.f. The input at v.l.f. is not tuned but passes through a low-pass filter to attenuate any h.f. signals and prevent overloading of the receiver's front end, also to help to eliminate i.f. breakthrough.

The crystal oscillator is an untuned Colpitts type. The output is taken from the collector and capacitively coupled to the d.b.m. via C7. The crystal is set on frequency by C1. The i.f. is the crystal frequency plus the signal frequency. The choice of crystal is up to the constructor but should be in the region of 10–20MHz 30pF parallel resonance. The p.c.b. is designed to accommodate both HC6U and HC18/25 types. It is advisable to use a 10MHz crystal or at least a crystal frequency which has a whole number of megahertz. This will save on the mental arithmetic when working out where you are in frequency on your h.f. receiver. For i.f.s below 15MHz C11 should be 60pF; above 15MHz 25pF is sufficient.

Construction

It is suggested that the i.f. transformer is wound first using approximately 1m of 36s.w.g. enamelled copper wire. Start by winding 20 turns on the core. At the 20th turn hold the core tightly and fold back a loop of wire approximately 15mm long, then twist the loop together to form the centre tap. Continue winding on the core in the same direction for a further 20 turns. A dab of Superglue at each end will prevent

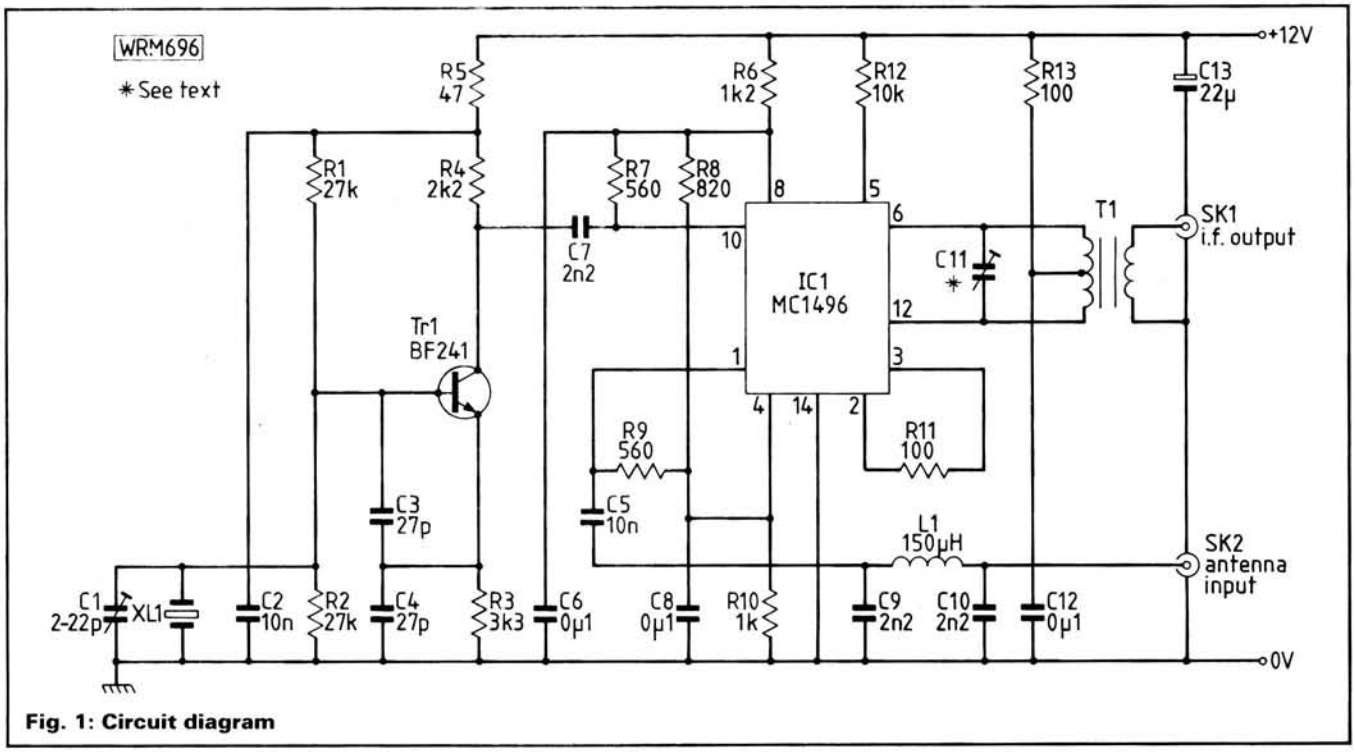


Fig. 1: Circuit diagram

the coils from unwinding. Next wind the secondary coil on the opposite side of the core as shown in Fig. 4. The secondary winding consists of 8 turns of the same gauge wire with its ends secured with Superglue. Lay T1 aside for the moment to allow the glue to dry.

Now insert the i.c. holder and the resistors, followed by the fixed capacitors. Finally fit Tr1, C1, C11, XL1 and the completed i.f. transformer T1. One point of note is all the enamel on the leads from T1 must be removed to ensure good solder joints to the p.c.b. Check the completed p.c.b. for any solder bridges or dry joints. Do not fit IC1 at this stage.

Adjustment

Set C1 and C11 in mid position. Connect 12V to the power pin preferably via a current limited supply. Check the oscillator is working either by connecting a frequency counter or a receiver to pin 10 of the i.c. socket. Trimming capacitor C1 is used to adjust the frequency of XL1. Switch off the power and fit IC1 into its socket taking care to ensure correct orientation. At this stage the converter is ready for boxing up, the prototype was housed in a small aluminium project box with its input and output terminated in SO239 sockets. The power lead enters the case through a small hole lined with a rubber grommet.

Testing

Connect a receiver to the i.f. output of the converter and about 10m of wire to the converter input. Then tune to a known low frequency signal, BBC Radio 4 is on 200kHz. With a 10MHz crystal, Radio 4 should appear at 10·2MHz on your receiver. If it appears slightly off-tune then adjust C1 accordingly. Next tune C11 for maximum S-meter reading.

For any receiver to work well it needs an efficient antenna, and an efficient earth system too at low frequencies, so before you start listen-

32 ▶

SHOPPING LIST

Resistors

¼W 5% Carbon film

47Ω	1	R5
100Ω	2	R11,13
560Ω	2	R7,9
820Ω	1	R8
1kΩ	1	R10
1·2kΩ	1	R6
2·2kΩ	1	R4
3·3kΩ	1	R3
10kΩ	1	R12
27kΩ	2	R1,2

Capacitors

Miniature ceramic

2·2nF	1	C7
10nF	2	C2,5

Miniature ceramic plate

27pF	2	C3,4

Miniature Mylar

2·2nF	2	C9,10

Polyester

0·1µF	3	C6,8,12

Miniature foil trimmers

2-22pF	1	C1
2-22pF	1	C11*

Electrolytics 25V radial

22µF	1	C13

Semiconductors

Transistors

BF241	1	TR1

Integrated Circuits

MC1496	1	IC1

Miscellaneous

XL1 HC18U 10MHz (1); T50-6 r.f. toroid (1); 150µH 7BS series inductor (1); SO239 sockets (2); 14-pin d.i.l. socket(1); aluminium case 100 x 70 x 40mm (1); p.c.b. (1); 36s.w.g. enamelled copper wire; 100mm miniature coaxial cable; Veropins (4); 6BA x 15mm screws (4); 6BA nuts (4); 6BA pillars (4); connecting wire.

* See text

How Much? & How Difficult? £10 Intermediate

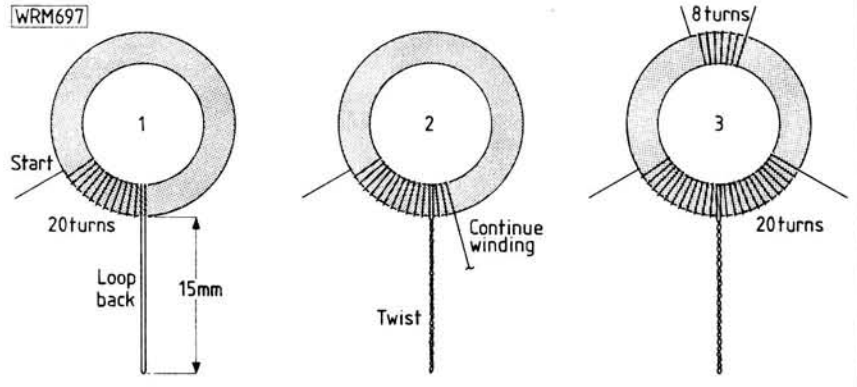


Fig. 4: Transformer construction

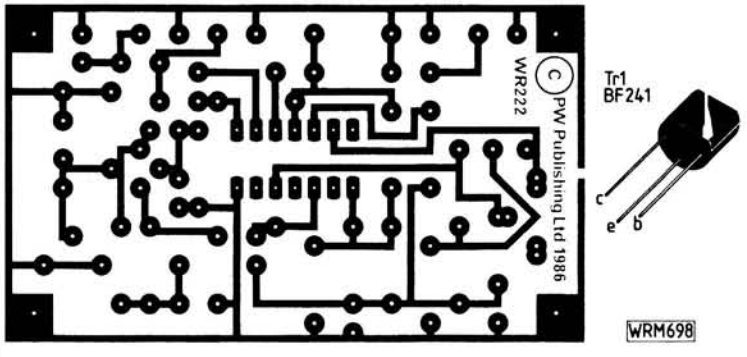


Fig. 2: Full-size p.c.b. track pattern

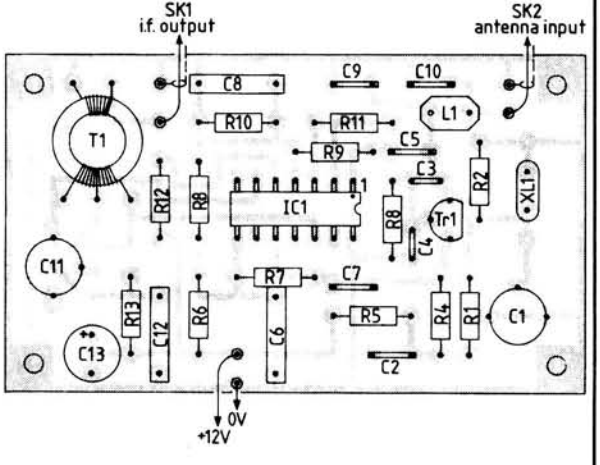


Fig. 3: Component layout

PW REVIEW

Over the past few years, we have become used to the sort of synthesised medium and short wave broadcast receiver as typified by the Sony ICF-2001 or the Uniden CR-2021. Also to v.h.f./u.h.f. scanning receivers, which have undergone a meteoric rise in facilities and frequency coverage, so that some now extend well past the gigahertz mark. Now comes a completely new class of receiver, combining into one small, hand-held, battery-powered unit many of the facilities of these two types. Geoff Arnold reports on his impressions of this new set, the Sony AIR-7.

The AIR-7 is manufactured in four versions having different frequency coverage to suit requirements and government regulations in various parts of the world. That imported into the UK is the version known as Type 1, covering the following bands and modulation types:

AM: 150–2194kHz, covering the long and medium wave broadcast bands (a.m. only).

FM: 76–108MHz, covering v.h.f. Band II, with useful overlap into the continental European broadcast band at the bottom end (wideband f.m. only).

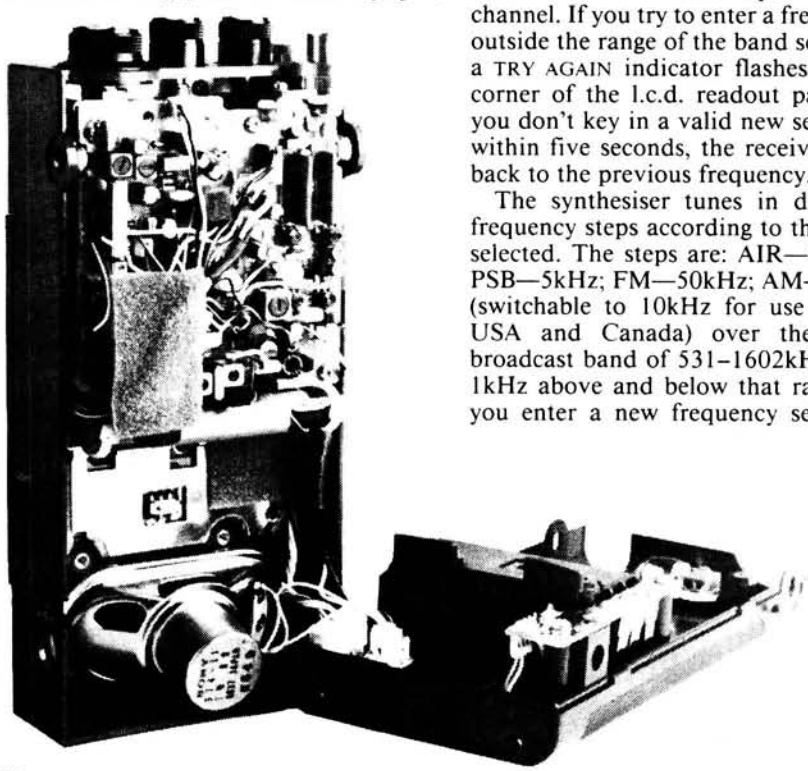
AIR: 108–136MHz, covering v.h.f. Airband (a.m. only).

PSB: 144–174MHz, covering the 2m Amateur band, the v.h.f. Marine band, and some public service bands (narrowband f.m. only).

As regular readers will know, my first test of any piece of radio equipment is to find out whether I can operate it in its basic mode without having to open the instruction book. If I can't do that, despite my forty-odd years of radio operating as both a profession and a hobby, then I feel that the layout, labelling and functions of the controls are going to cause problems for the less experienced users, even with the instructions open at their side. I am pleased to be able to report that the AIR-7 passed this test with flying colours, and was a joy to use right from the moment of switch-on.

To tune to a station of known frequency, you must first select the band by means of the selector switch on the top panel. Next, press the DIRECT button to indicate to the receiver that you are about to enter a frequency, key in the frequency by means of the push-buttons, and finally press the ENTER button to retune the set to your chosen channel. If you try to enter a frequency outside the range of the band selected, a TRY AGAIN indicator flashes in the corner of the l.c.d. readout panel. If you don't key in a valid new selection within five seconds, the receiver goes back to the previous frequency.

The synthesiser tunes in differing frequency steps according to the band selected. The steps are: AIR—25kHz; PSB—5kHz; FM—50kHz; AM—9kHz (switchable to 10kHz for use in the USA and Canada) over the m.w. broadcast band of 531–1602kHz, and 1kHz above and below that range. If you enter a new frequency selection which does not correspond to one of the steps, the AIR-7 tunes to the next step below the one you asked for. You can tune manually up or down from any starting frequency by means of the SCAN+ and SCAN- buttons, either one step at a time or continuously. Or, by the appropriate setting of the all-mode SQUELCH control, you can make the receiver tune automatically through the band until a strong enough station is received. The SQUELCH control has an AUTO setting as well as the usual manual range of adjustment.



You can program into memory up to ten frequencies in each of the four bands, and recall them simply by pressing one of the keypad buttons 0-9. On the AIR and PSB bands, you can also scan any or all of the memories for an active channel. A built-in DELAY function holds the receiver on channel for two seconds after the incoming carrier disappears, to give time for the other station to reply, but the delay can be switched off for any channels at will.

The final feature of the memory scanning set-up is a priority function. Any one of the ten channels in the AIR and PSB bands can be designated as the priority channel, and the receiver will automatically tune to that channel every three seconds to check whether a signal is present or not, even while another station is being received.

The l.c.d. readout, which can be back-lit, indicates the band and frequency selected, the current status of delay and priority functions for each memory channel, and the TRY AGAIN instruction mentioned earlier.

A built-in ferrite bar antenna is provided for the AM band, and a short helical whip plugs into the BNC socket on the top panel for reception on other

bands. The helical can be replaced by suitable external antennas for improved results. A separate socket is provided for connection of an external wire or whip antenna for the AM band.

A wide range of power sources can be used to drive the AIR-7. These can be internal dry batteries (4 × R6 or Size AA); an internal rechargeable battery pack; a 12V or 24V car battery (using the appropriate battery adaptor cord); an external dry battery pack; an a.c. mains adaptor. When an external power source is used, the internal batteries must remain installed in order to back up the built-in microcomputer memories.

Results

As mentioned earlier, the AIR-7 is very easy to use. The memory functions are not quite self-evident, but are readily understood from the operating instructions leaflet. The leaflet is helpful and written for the most part in good colloquial English.

On-air testing revealed good sensitivity and adequate selectivity on all bands. At the time that we had the receiver on review, the rebuilding of our screened test-room following office relocation was not quite complete, which limited severely the lab-tests we could carry out, especially on the AM band with its internal ferrite bar antenna. A quick run through on the bench showed sensitivities on the other bands of around 2μV e.m.f. for 20dB signal-to-noise ratio on FM, and 1·25μV and 0·5μV e.m.f. respectively for 12dB SINAD on the AIR and PSB bands. The operating instructions warn of internally-generated spurii at 109·875, 166·17 and 167·08MHz, and at 455kHz. The only other "nasty" of note which I came across was when a "rock-crushing" 2m signal from a local amateur appeared also (weakly) in the marine v.h.f. band above 156MHz. Apart from being able to confirm in the lab that the fault was with the receiver, and not with the amateur's transmitter, I was not able to pursue this one further.

Sound Quality

The received sound quality and volume (maker's figures 400mW into the internal 70 × 35mm elliptical speaker) were very acceptable. The receiver can be held up to the ear for listening in noisy surroundings, but be sure to press the KEY PROTECT button to disable the keypad before you do. Otherwise, you will find that you have unwittingly pressed a button with your head, and the receiver will have shot off to some other channel, to your great frustration!

The AIR-7 measures approximately 90 × 179 × 50mm overall (excluding the helical antenna) and weighs around

The top-panel controls are tightly packed, but laid out to give good access for adjustment

600g including batteries, shoulder-strap and helical antenna. An earpiece for personal listening is also included in the supplied accessories.

I was impressed with the performance and facilities of this receiver whilst we had it on review. It would be nice if the AM band could be extended to cover the short-wave broadcast bands, but then I suppose we'd be after an s.s.b. capability, too. Just never satisfied, that's our trouble!

Price

The AIR-7 is available from advertisers in *PW* at around £250 including VAT. Apart from its great appeal to s.w.l.s, it would make an excellent auxiliary receiver for yachtsmen, covering as it does the long, medium and v.h.f. broadcast bands, plus the air and marine v.h.f. bands. ***PW***

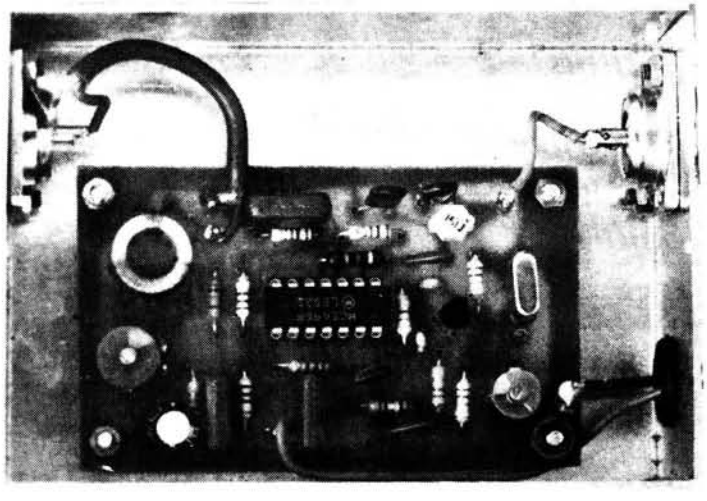
---

ing for some of the signals listed in Table 1 you would be well advised to provide both. Unfortunately the lower that one goes in frequency, the more inefficient an antenna and earth system becomes. A compromise will have to be struck; a random length of wire over 10m long will provide adequate results at 16kHz when used in conjunction with an efficient earth system. For most situations the earth may be several feet of old metal water pipe driven in to the ground and periodically moistened. If you live in a very dry area then you may have to lay an earth mat from a 1m square of chicken wire or similar, which may be laid on or just below the surface of the ground.

The converter is now ready for use. At the author's home in southern England the 60kHz MSF time signal from Rugby was received at 59+20dB using a Trio TS-430S as a tuneable i.f.

Licence

Although there are no restrictions on listening to standard time transmissions such as those listed in Table 1, there are restrictions on the reception of weatherfax signals, for which a special licence is required. For details see Weather Watch-1, *PW* April 1986. ***PW***



Internal view of the prototype converter

Table 1.

Country of Origin	Call	Freq. kHz	Data
Canada (Halifax)	CFH	122·5	FAX
Czechoslovakia	OMA	50	Time
Czechoslovakia	OLT21	100·95	FAX
France (Paris)	FYA31	131·8	FAX
France	FTA91	91·15	Time
Germany FDR	DCF77	77·5	Time
Sweden (Karlsborg)	SAY2	119·85	FAX
Switzerland	HBG	75	Time
United Kingdom	MSF	60	Time
USSR (Moscow)	RBU	66·67	Time
USSR (Arctic coast)	-	227	FAX

All weatherfax transmissions have a frequency shift of 150Hz.

Signals around 10kHz form part of the world-wide navigation system called Omega.

dressler

★ WE'LL SEE YOU AT THE LEICESTER SHOW ★

ALL SONY UK SUPPLIED

AS REVIEWED IN THIS ISSUE –

SONY AIR 7

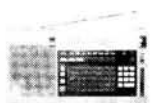
PORTABLE-AM-FM
144-174MHz
108-136MHz
150KHz-2194KHz

£249

SONY ICF 200ID

£325

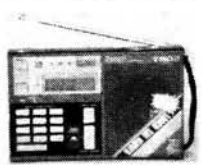
76-108 MHz
116-136 AIRBAND
160KHz-29995MHz
FM - AM - SSB 32 MEMORIES
INC PSU



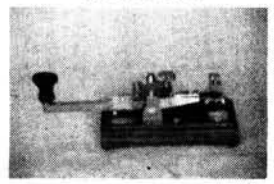
SONY ICF 7600D

£149

76-108MHz
162kHz-29995MHz
MEMORIES, FM, AM, SSB.



SWEDISH BRASS MORSE KEY



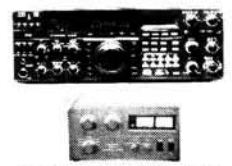
£65

NEW
YAESU FT767
FULL HF GENERAL COVERAGE TRANSCEIVER
+ 6M-2M+70cm
£TBA

ICOM R7000 25MHZ-2000MHZ

£959 INC ARA500

TRIO KENWOOD TS940S INC AUTO ATU



£1925 ALSO AVAILABLE
TL922 LINEAR INC TUBES £1225

TRIO KENWOOD TS780
70cm-2 metres

£950

TRIO KENWOOD TR751E

£550

TRIO KENWOOD TS440 HF INC AUTO ATU

£1,050

TRIO KENWOOD TR2550

£400

FRG 8800

POA

FRG 9600 £475

ACTIVE ANTENNAS

dressler – ara 30 – active antenna

200 kHz . . . 40 MHz

Professional electronic circuitry with very wide dynamic range. Meets professional demands both in electronics and mechanical ruggedness. 120 cm long glass fibre rod. Circuit is built into waterproof 2,5 mm thick aluminium tube. Ideal for commercial and swl-receiving systems. £117. See Review in August Issue p.15

DRESSLER ARA 500 ACTIVE ANTENNA

50MHz to 1300MHz
Gain 17dB Typical

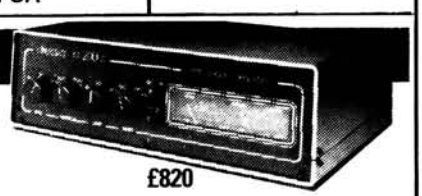
TECHNICAL SPECIFICATIONS FOR ARA 500

Gain	17dB Typical (14-17dB)
Frequency Range	50-1300MHz
Noise Figure	1dB at 50-180MHz 1.5dB below 300MHz 2.0dB below 350MHz 2.7dB below 400MHz 3.0dB below 500MHz 3.8dB below 650MHz

£120.00

Operation is possible up to 1300MHz with gain of 10dB
Noise 4-6dB
Intercept Point 3rd Order: +18dbm at Input
Post £2.50 or Securicor £6.00 extra

LINEARS



D200	2 MTR 500W SSB	£820
D200S	2 MTR 750W SSB	£965
D70	70 CMS 550W SSB	£999

PRE-AMPS – NEW MODELS

MODEL	FREQ.	NOISE	GAIN	POWER	PRICE
EVV1296S	1.25-1.3GHz	0.7-0.9	16-19dB	100W	£169
EVV1296C	1.25-1.3GHz	0.9-1.2	16-18dB	100W	£144
EVV1296	1.25-1.3GHz	1.9-2.1	14-17dB	100W	£120
EVV700	430-440MHz	0.5-0.9	15-18dB	500W PEP	£108
EVV2000FB	144-146	0.6-0.9	16-18dB	1000KW PEP	£108
EVV200FB	144-146	0.6-0.9	16-18dB	700W PEP	£99
EVV2000GAAS	144-146	0.6-0.8	16-18dB	1KW PEP	£108
EVV200GAAS	144-146	0.6-1	16-18dB	700W PEP	£99
EV2GAAS	144-146	0.6-0.9	15-18dB	100W PEP	£72
VV INTERFACE FOR ABOVE PRE-AMPS					£25

RECEIVE PRE-AMPS

MODEL	FREQUENCY	NOISE	GAIN	PRICE
EWPA 560	50-600-1GHz		16.5dB-1dB	£79
IP3 order	+18dBM			
ERPA 1296	1.25-1.30	0.8	17-18dB	£86
ERPA 435	430-440	0.5	15-18dB	£79
ERPA 144	144-146	0.7	16-18dB	£79

OPEN: MON – SAT 9AM – 5.30PM
INTEREST FREE HP FACILITIES AVAILABLE ON MANY ITEMS
PROMPT MAIL ORDER

Access
BARCLAYCARD VISA

191 FRANCIS ROAD
LEYTON · E10
TEL. 01-558 0854 / 01-556 1415
TELEX 8953609 LEXTON G

dressler

Electrical Safety— The Shocking Truth Part 3

Roger Alban GW3SPA BSc(Hon) C.Eng MIEE, concludes his series

The simplest form of power distribution that you are likely to encounter is the ring-main circuit which is shown in Fig. 3.1(a), where an unlimited number of socket outlets can be provided. The IEE Wiring Regulations stipulate that the maximum floor area served by the ring main should not exceed 100m². It is unlikely that the average radio shack area will exceed this! The over-current protection device must not exceed a rating of 30 or 32A. The rating of the protective over-current m.c.b. feeding the ring-main should be less than 20A to ensure that it operates before any other protective device that has been installed in the supply feed to the radio shack. The nearest preferred value to a 20A m.c.b. is a MK Sentry 15A m.c.b. (No. 5915), or a Crabtree Starbreaker 16A m.c.b. (No. 610/16). The Wiring Regulations stipulate that a 2·5mm² copper conductor of either rubber or pvc insulation should be used to connect the 13A sockets in the form of a ring. The most popular cable available from your local wholesaler is the 2·5mm² grey coloured pvc covered twin and earth. Both live ends of the cable are connected into the m.c.b. inside the radio shack consumer box. The neutral conductors are connected into the common neutral block found inside the consumer unit. It may be advisable to provide more than one ring main within the radio shack if you should decide to split up the supply distribution into essential and non-essential supplies.

Radial System

An alternative way of distributing the power around the radio shack is by using a radial system as shown in Fig. 3.1(b). Again, the Wiring Regulations permit you to use 2·5mm² pvc covered twin and earth. An unlimited number of socket outlets can be used on each spur. However, the over-current protective device must not exceed 20A per spur. Each spur, according to the regulations, must not supply a floor area greater than 20m². This system of power distribution provides the flexibility to split up the load into individual spurs which can feed different types of equipment. For example, the main station transmitter equipment can be fed on one spur, while the test equipment is fed by another. Any other station equipment such as the 144MHz rig can be fed by a third spur.

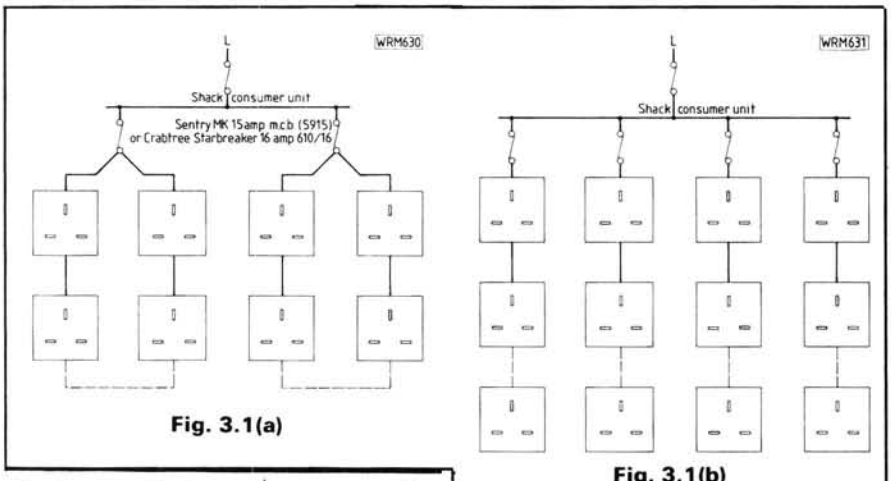


Fig. 3.1(a)

Fig. 3.1(b)

From practical experience, you will find that you will never have too many 13A sockets. When planning the layout of the supply distribution always provide more 13A sockets than you think you will require. The size of the over-current protective device can be reduced to 5A when supplying small electronic equipment such as test equipment and low power transmitting equipment. It is also wise to remember that when determining the size of the consumer unit to use, allow space for a small number of spare m.c.b. modules. This will provide you with the flexibility later to expand the supply distribution. The gaps left by the absence of the spare m.c.b. modules can be covered by a small blanking plate supplied by the manufacturer.

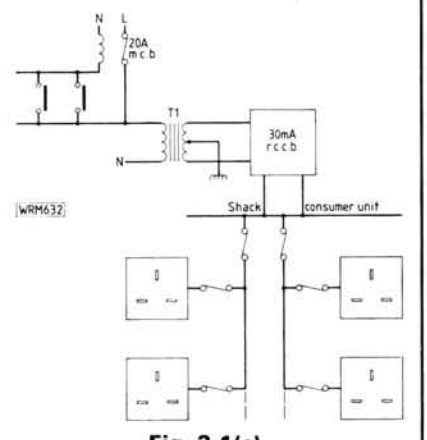


Fig. 3.1(c)

Isolated Supply

Both the power distribution systems described rely on being fed directly from the Supply Authority. This will result in one leg of the supply (the neutral) being at or near earth potential, while the other leg of the supply (the live) will be at full mains potential, viz 240V. To reduce the chances of receiving a fatal electric shock, the mains potential on the live conductor can be reduced by using an isolation transformer as shown in the circuit diagram Fig. 3.1(c). The isolating transformer T1 must have a centre tapped secondary winding. The size of the transformer will depend upon the supply requirements for the radio shack. The transformer can be supplied contained within a protective metal box for either floor or wall mounting. The size of the m.c.b. with the shunt trip will be determined by the size of the isolating transformer being used. Remember that the size of the m.c.b. must be able to protect the transformer from accidental damage should the secondary winding become short circuited. The secondary of the transformer should be fed to the 30mA r.c.c.b. which can also be wall mounted if required.

The m.c.b.s within the consumer unit should now all be double-pole devices as the supply potential for each leg of the shack supply will be 110V above earth potential. The author has not been able to find a manufacturer of a 13A switched socket which uses a double-pole switch. The switched 13A socket that you can readily purchase across the counter contains a single-pole switch. Therefore, it is recommended that a radial power distribution system should be used with individual double-pole m.c.b.s being connected to each 13A unswitched socket. The m.c.b. and socket can be

housed in metal trunking which can be fixed between the back of the work-top and wall. The isolating transformer will also assist to prevent r.f. energy generated within the radio shack from finding its way back into the house via the internal wiring

Earthing Arrangements

The earth connection provided within the radio shack is not only important from the point of view of safety, but also from the earthing on the radio frequency side. The earth connection provided by the local Supply Authority cannot always be guaranteed as a perfect or local earth. It is therefore advisable that a separate earth connection should be made locally in close proximity to the radio shack. Your local electrical wholesaler will be able to provide over-the-counter suitable earthing rods. To obtain a reasonably good local earth it will be necessary to join together a number of 1·2m by 16mm² rods as shown in Fig. 3.2. Before driving the rods into the ground ensure that the rods are not likely to damage any hidden drains or buried cables.

Kango supply an attachment for their automatic hammer which will make the job easier and will not damage the threaded end of the rods. The Kango hammer and attachment can be hired on a daily basis from your local plant hire company. Coupling pieces can also be purchased for joining rods end to end. A special pointed piece can also be purchased which can be screwed onto the front end of the first earth rod to assist its movement into the ground. It is wise to attempt to drive as many rods end to end into the ground as possible to achieve a good earth. One may be misled to believe that one rod hammered into wet soil will provide a good earth. The author found that one rod produced an earth resistance of 16Ω when measured on a special piece of test equipment borrowed from a friend.

Another special attachment is available which can be screwed onto the end of the last earth rod to terminate the earth wire. It is recommended that the earth wire should be not less than 10mm² stranded copper wire covered with green pvc insulation. The end of the wire should either be connected to the centre tap of the isolating transformer secondary or to the earth terminal provided within the radio shack consumer unit. From the consumer unit other earth connections can be made to the various pieces of transmitting and receiving equipment.

From the point of view of providing a good antenna system, it would be beneficial to connect a counterpoise wire to the earth wire connection on the top of the earth rod and spread the counterpoise wire around the garden attached to the boundary walls. Another important point is to remember to cover the joint between the earth rod and copper wire with grease to protect it against corrosion. To add further protection cover the greased joint with Denso or similar tape.

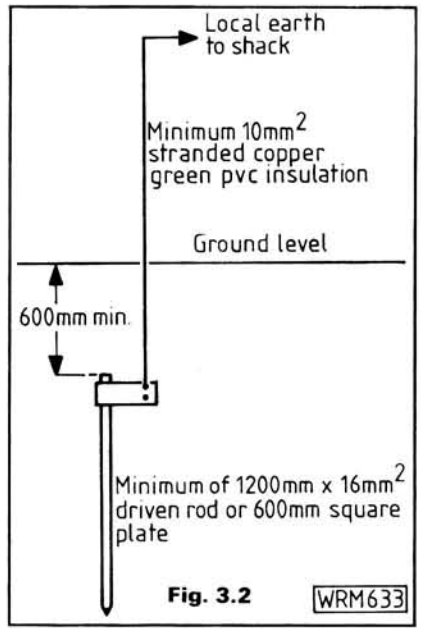


Fig. 3.2

High Voltage Power Supplies

The r.c.c.b. provides protection against earth leakage currents between either live or neutral conductor and earth. It will not provide protection against earth leakage which might occur on the secondary side of high voltage power supplies. A large amount of amateur transmitting equipment contains power supplies for feeding the radio frequency power amplifier at voltages in excess of 1kV. Some of these power supplies are also capable of delivering high current at high voltage and could prove fatal if someone came into contact with the high voltage conductor. A system is available to guard against leakage currents between the live conductor and earth as shown in Fig. 3.3(a). It is assumed that there is some high voltage generator HV, of large output current capacity I, that feeds the load L. It is not practical, or for that matter, wise to let the load float with no connection to earth. This would be risky if a fault developed, for example, on the secondary side of the high voltage transformer T1. The smoothing capacitors must be connected on the left-hand side of the high speed relay contact S1, to ensure that the high voltage is removed when the contact of the high speed relay is open. If between the negative terminal of the high voltage generator and earth a small impedance Z is inserted, then any current which should happen to flow between the live side of the power supply and earth will pass through the small impedance Z.

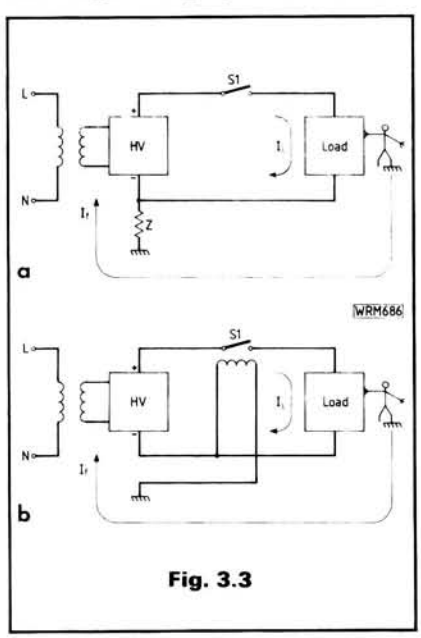


Fig. 3.3

If Z is made to be a sensing coil, Fig. 3.3(b), it will detect the earth leakage current I_f and open the high speed contact S1. It is possible to cannibalise an existing 15mA r.c.c.b. to build this protective circuit. Only one winding of the earth leakage sensing winding need be used with the high speed switch contact placed in the positive high voltage lead of the power supply. It is also wise to check that the final constructed circuit actually works. Carefully connect a resistor of suitable value between the positive side of the power supply and earth to draw a fault current of 20mA and demonstrate that the safety device trip mechanism of the modified r.c.c.b. operates and removes the high voltage supply from the load or supply terminals. It will also be necessary to connect a 1000pF capacitor across the small impedance Z to bypass any radio frequencies.

Conclusions

Whenever working in the radio shack always exercise extreme care when using mains operated equipment. Familiarity breeds contempt. It has in the past been suggested that the use of r.c.c.b. safety devices can create a false sense of security for the individual being protected and can therefore indirectly cause accidents to occur through carelessness. So, whenever using electrical equipment irrespective of the protective devices used, always exercise extreme care.

When servicing live equipment always ensure that metal jewellery such as rings and watch straps are removed before inserting the hands inside the equipment. Wherever practicable only use one hand to service live equipment. The hobby of amateur radio has a good track record as far as safety is concerned. Let us all hope that the introduction of safety devices into the radio shack power distribution system will assist in the protection of the individual against receiving a serious electrical shock and at the same time will also protect the electrical equipment from being damaged as a result of an electrical malfunction. Again, let us all hope that the safety track record for the hobby continues. ***PW***

144MHz QRP Contest

by Neill Taylor G4HLX

Results

Certificate Winners

Overall Winners	Bug Bashers Contest Group	GW5NF/P
Runners-up	Warrington Contest Group	GW3CKR/P
3rd & Leading English station	North Buxton Radio Club	G1HSZ/P
Leading Single Operator	Roger Dyke	GW4NVA/P
Runner-up Single Operator	I. E. Davies	G3IZD/P
3rd Placed Single Operator	Chris Partington	G0CLP/P
Leading Fixed Station	Mick Cuckoo	G6ECM
Leading Scottish Station	Ayr ARG "A" Team	GM4PPT/P
Leading Irish Station	Wicklow Contest Group	EI2GF/P

A blazing hot June 15 attracted QRP operators to the hilltops for the fourth *Practical Wireless* 144MHz QRP Contest. Of the 158 entries received, 124 were from portable stations. In addition to these, there were many other stations active, both portable and at home, as the event has become a QRP "activity day" to those less interested in the competitive aspect.

Hat Trick

They've done it again! For the third consecutive year, the winners cup goes to the Bug Bashers Contest Group, this time using the callsign GW5NF/P, from a site 425m a.s.l. near Monmouth in Gwent (IO81). The group, which comprises GW5NF, GW4FCV, GW4JKV, GW4TTU, G4VXE and G8TFI, managed to increase their score compared with previous years, although their lead has been reduced, in close second place being the Warrington Contest Group, operating as GW3CKR/P at a popular site near Wrexham (Clwyd).

Sixty of the entries were from single operator stations; the leading score amongst these is that of Roger Dyke GW4NVA/P, who was sited near Wrexham, too. Roger was also the leader in this category back in 1984. Several other single operator stations are not far behind him, the closest being I. E. Davies G3IZD/P, in the Lake District.

On the English side of the border, competition was fierce near the top of the results table, with 7 English stations in the first ten positions (compared with only 3 in 1985). The leaders, in 3rd place overall, are the North Buxton Radio Club G1HSZ/P, operating near their home town. In Scotland, the leaders, for the second year running, are the Ayr Amateur Radio Group GM4PPT/P near Creetown in Dumphries and Galloway. Of the EI/GI entries, the leaders are the Wicklow Contest Group EI2GF/P near Wicklow on the east coast of Eire.

The leading fixed station is that of single operator Mick Cuckoo G6ECM, at Herne Bay in Kent, a mere 45m a.s.l.

Congratulations to all these certificate winners, and to the leading stations in each of the 32 locator squares from which entries were received (see table); these also receive a certificate. Positions of all 158 entrants are to be found in the table—for a more detailed results list, send a large s.a.e. to the *Practical Wireless* offices. If you sent an envelope with your entry, you'll be getting the list soon. The details of the leading 10 multi- and single-operator stations are shown here.

One listener log was received, from Michael Toms RS31967, who heard 97 stations in 17 squares. The adjudicator is also grateful to those who sent in check logs: G6DZH, G2HIF/P and GW4ZKI/P.

Activity

As usual, all corners of the British Isles seemed to have had stations active, but this year with more activity in the less common parts, rewarding those contestors who searched carefully for new squares. For example, GM1JWJ/P comment that "our day's highlight was working G6EBH/MM who was enjoying a day's fishing off Flamborough Head when he wasn't sorting out the pile of stations trying to work him". Certainly many entrants worked this maritime station for the rare JO04 square.

Another unusual one was G0AEA in IN69 square. G0CRW/P was amongst several who "thought this locator was incorrect as that square appears to be in the Channel". A more detailed map was needed—the location is actually the Scilly Isles.

It was good this year to note increased activity in Eire. On the continent, too, there

Leading Multi-operator Stations

Pos.	Name	Callsign	Score	QSOs	Squares	Location	Antenna	a.s.l. (m)	TX/RX
1	Bug Bashers Contest Group	GW5NF/P	17 240	431	40	IO81NV	4 x 13Y	425	FT-225RD
2	Warrington Contest Group	GW3CKR/P	16 613	449	37	IO82KW	2 x 17Y	365	FT-726R
3	North Buxton Radio Club	G1HSZ/P	11 458	337	34	IO93AF	2 x 9Y	565	FT-726R
4	Triple B Contest Group	G4WET/P	10 758	326	33	IO92CA	2 x 14Y	305	IC-271E
5	North Wakefield Radio Club	G4NOK/P	8712	264	33	IO93FM	2 x 17Y	150	FT-290R
6	SNAFU Contest Group	G1SVH/P	8512	258	33	JO00BT	17Y	220	TR-9130
7	D. Mercer & R. Noden	G4YST/P	8435	241	35	JO00DR	14Y	155	FT-225RD
8	Guildford & District RC	GW6GS/P	8350	334	25	IO81LT	2 x 17Y	565	IC-271
9	Robin Hoods Men & Marion	G6YEP/P	8122	262	31	IO93EC	14Y	365	IC-271E
10	Top o' Th' Hill Contest Group	G0EVV/P	7712	241	32	IO83WT	19Y	520	TR-9000

Leading Single Operator Stations

Pos.	Name	Callsign	Score	QSOs	Squares	Location	Antenna	a.s.l. (m)	TX/RX
14	Roger Dyke	GW4NVA/P	6858	254	27	IO83JA	17Y	560	FT-225
19	I. E. Davies	G3IZD/P	6006	231	26	IO84KG	2 x 9Y	320	FDK-750E
20	Chris Partington	G0CLP/P	5952	248	24	IO84IG	8Y	619	TR-7010
22	D. John Bryan	G4VRY/P	5566	242	23	IO94MJ	17Y	410	IC-26E
29	W. A. Bingham	G4WUS/P	3696	168	22	IO94NJ	6Q	410	C-58
31	David C. Warburton	G6LKB/P	3612	172	21	IO84JB	13Y	20	FT-290R
33	Tim Raven	GW4ARI/P	3250	176	20	IO81KR	2 x 8Y	490	IC-202S
34	Adrian Jordan	G1GLJ/P	3363	177	19	IO91CL	12Z	275	FT-290R
35	Mike Smith	G6YZR/P	3332	167	21	IO93FB	12Z	315	FT-290R
38	Terry Matthews	G1SUC/P	3302	127	26	IO95AG	2 x 9Y	420	FT-290R

were more stations active, although conditions prevented their signals from reaching far into the UK. G0DKN/PA/P was operating close to the Dutch/Belgian/German border, and found that "practically every non-G station I worked wanted to know which contest I was in".

Within mainland Britain, one of the more interesting locations was that of G6LKB/P, who "operated the station from the battlements of the ancient castle on Piel Island" near Barrow-in-Furness, Cumbria.

Too Much Sun?

One complaint was common to many of the entries: **sunburn**! "The sunburn hurt on Monday"—G6LKB/P; "two operators are now suffering from very sunburnt arms, the third was wise and wore a long sleeved shirt"—GM1JWJ/P; "I was sunburnt before I had finished erecting the antenna"—G0DKN/PA/P; "I was compared to a boiled lobster on Monday"—GI1JUS/P.

Many welcomed the "perfect" (G4WUS/P), "fabulous" (GM4PGV/P) or "magnificent" (G4WET/P) weather: "very enjoyable day, relaxing in the sun"—G3WOR/P; "a good turn-out (of club members) probably due partly to the weather"—G4TTT/P; "weather the best we have experienced on Firle Beacon (which we have renamed Foul Beacon but this time it did not live up to its nickname)"—G1SVH/P. Others, however, found it did not always help the radio operating: "I'm afraid that sunbathing came before operating"—GM0BOA/P; "just right for taking in the sun and swatting flies, which slows down the score"—G0BNC/P; "most enjoyable contest spoiled only by the sight of the beautiful weather outside. I was unable to resist a couple of 'gardening' breaks"—G8VEL.

Since weather of this type has, in many parts of the UK, been enjoyed in each of the four QRP contests so far held, some entrants are impressed by our apparent command of the elements. "As usual you picked the right weekend" say G6ORM/P; "I don't know how you do it"—G4WET/P. "Perhaps you could select 2 weeks during 1987 for our holidays"—G4YTC/P. That may be a tall order, but we'll try to comply with the request from GM4PGV/P: "please order same WX for next time".

The "cooling breeze" noted by G8CXH/P and others was a little more intense in some areas: "wind was very strong . . . some time was spent re-guying the antenna and chasing the log book around" at G4VFG/P. "Strong wind from the south—mast poles now bent"—G0EVV/P.

Conditions

Unfortunately our ability to choose the right weather doesn't seem to extend to propagation conditions. The contrast is illustrated by a remark from GM4PGV/P: "conditions so poor we closed down 59 minutes early and sunbathed". Reports of conditions vary widely: "deplorable"—GM4PGV/P (IO75), "disappointing"—G4TTT/P (IO92), "very much up and down"—EI3GG/P (IO65), "about average"—G0AZT/P (IO90), "somewhat better than last year"—G4NDH/P (IO83), "well above average"—G4WUS/P (IO94), "excellent"—G6ORM/P (IO82).

Clearly, assessing propagation is a subjective matter, but despite the enthusiasm of some, there were no exceptional openings. "Having watched the barometer and weather charts all week", say GI1JUS/P, "we had hoped for a nice tropo lift, but this was not to be."

There were, however, a few highlights for some stations: "the contact that sent everybody jumping with joy was with HB9SHD/P (JN37) who was speaking in Italian to a station in Italy . . . both were 59"—G0AZT/P (IO90). Several other stations managed to work this DX station, too. For some, things improved towards the end of the eight hours; at G4YST/P, "in the last hour, suddenly France came alive with some much needed squares". For others, it all happened too late: "just after the contest finished, Murphy's Law struck again, and we got a good tropo lift, hearing the Y41B beacon (in central E. Germany) so strong that I mistook it for GB3ANG at first"—GM6FPX/P.

Leading Stations in each Locator Square

Square	Name	Callsign	No. entrants in square
IN89	D. C. W. Hewitt	GJ8ZRE/M	1
IO51	Charles Coughlan	EI5FK/P	1
IO52	John Desmond	EI4CPB/P	1
IO61	Bob Thompson & Al Bolton	EI2VZB/P	1
IO62	Wicklow Contest Group	EI2GF/P	1
IO63	Michael Behan & others	EI3CWB/P	1
IO65	Gerry Elliott	EI3GG/P	1
IO70	Bideford Bay Radio Club	G6XYB/P	3
IO71	Gower Peninsula Contest Group	GW8TVX/P	3
IO72	John Murphy	EI4FO/P	1
IO74	Ayr ARG "A" Team	GM4PPT/P	3
IO75	Christine M. Brown	GM4WEW/P	3
IO76	The Big Ben Contest Group	GM6FPX/P	2
IO80	Neil Underwood & Martyn Wright	G4LDR/P	7
IO81	Bug Bashers Contest Group	GW5NF/P	10
IO82	Warrington Contest Group	GW3CKR/P	10
IO83	Top o' Th' Hill Contest Group	G0EVV/P	13
IO84	I. E. Davies	G3IZD/P	5
IO85	Quentin Campbell	G4OEU/P	2
IO86	Steve Keay & Mike Clark	GM1DSK/P	6
IO87	Allan G. Duncan	GM4ZUK/P	1
IO90	Peter Thompson & Glyn Rolf	G8DDY/P	8
IO91	Roger Stansfield & others	G3UAX/P	20
IO92	Triple B Contest Group	G4WET/P	14
IO93	North Buxton Radio Club	G1HSZ/P	12
IO94	D. John Bryan	G4VRY/P	4
IO95	Terry Matthews	G1SUC/P	2
JO00	SNAFU Contest Group	G1SVH/P	6
JO01	Mick Cuckoo	G6ECM	11
JO02	Cambridge & District ARC	G8EVY/A	2
JO03	P. Empringham	G6GZS	2
JO30	Andy McClelland	G0DKN/PA/P	1

Operating

"The standard of operating seemed very high, as in previous years", say G8CXH/P and many others. EI2GF/P was pleased to find "friendly operators". However, there are a few grumbles about operating procedures. The most serious, as usual, was that "stations forgot to state that they were /P", as G0AZT/P notes. G4NDH/P thought that "several portable stations seem to treat signing /P as an optional extra". This comes out very clearly in the logs, and substantial points have been deducted due to logging errors.

Another disturbing feature is the number of duplicate contacts made, which go unnoticed during the contest itself. G1SVH/P, for example, "cannot understand why we had 7 duplicates". G6DZH says "I suspect a large number of logs are checked on computers, and the skill of checklogging is being buried under the attitude of 'work them all, the machine will sort them out' ". Unmarked duplicates (or triplicates in a few cases) found in the logs have been another cause of loss of points. By the way, it helps the adjudicator if known duplicate contacts are left in the log but clearly marked—removing them altogether from the log submitted is less helpful. The keeping of a checklog to eliminate duplicates when they occur is to be encouraged—this can be kept up-to-date during the contest even at high QSO rates, as evidenced by the logs of the leading stations, most of which are relatively free from duplicates.

Amongst other grumbles received are these: "still one or two stations that seem to gabble, and initial reports had to be repeated"—G1DXY/P; "stations not moving off frequency after making contact"—G4YST/P; and "very disappointed with the almost total lack of c.w. in the contest"—GM4PGV/P. This last comment is echoed by others, including G4WET/P where "the Morse key served a purely decorative function".

Quite a few entrants don't seem to have bothered reading the rules carefully before sending in their entries, as important covering information is omitted from some. In particular the list of squares worked, and the requirement to highlight the first contact in each square, have been neglected by some, causing the adjudicator unwelcome extra work. In a few cases of serious transgressions, a 5 per cent score reduction has been imposed as a penalty.

Turn Those Beams!

Operating from locations well away from the centre of activity undoubtedly has its problems (this is why we reward the leading station in each locator square with a certificate, even if there are only 1 or 2 entrants in the square). Although activat-

ing a less-common square means you are a popular station to contact, there is the difficulty of letting other stations know you are there to be found, particularly when conditions are poor. This leads operators in these parts to believe that no-one ever beams in their direction.

"It would be instructive", say GM6FPX/P "for some of the southern G stations to come to GM and try their luck they would see how difficult our task is - trying to penetrate a wall of QRM of Gs and also a stupid reluctance of people to beam north" "Why oh why won't G stations beam north?", asks GM4PGV/P, "I lost count of the number of times Gs beamed at me for a swift oh, now you are 5/7 OM' then disappeared as the beam went back to south." The contrary view comes from stations in the south, for example G4YTC/P (IO70): "we seem to spend the whole contest working off the back of the various antennas that all point north"

So, apparently G stations never beam north, never beam south, and it will come as no surprise to find they never beam west either. "the G stations never pointed their beams to EI and it was a struggle to attract their attention" EI4FO/P. If these allegations are all true it's a wonder that any contacts were made at all.

Too Many Antennas?

There are some competitors who believe that there should be a restriction on antenna array size as well as on transmitter power output. G0AEX/P is one who would like to see a separate "limited section". It seemed to me", he says, "that the people who were highly equipped and with a large group of operators had an extreme advantage over the average ham with fairly basic equipment and maybe only one or two friends". G6DZH has a similar view: "the contest seems to have lost its way a little with too much of the multi-Yagi arrays (this is not QRP e.r.p. for sure)".

G4YGX/P, however, has this to say: "although it would be nice to think that a restriction to one antenna would improve the 'little guys' chances, it could then lead to claims of unfair advantage by height a.s.l. or the number of elements or the height of the mast etc. etc.". Indeed any dividing line chosen would be bound to be arbitrary, and to favour some entrants more than others, so is unlikely to be more just than the present situation.

One of the attractions of QRP is that any improvements made to the station is rewarding; it would be a shame to remove the incentive for these improvements. In point of fact it seems that only one group this year has used more than 2 Yagis (they happened to be the overall winners, of course), so the proposal of a single antenna restriction probably wouldn't alter the results a great deal—there's more to a successful station than huge antenna arrays.

Anyway, the various comments received will be carefully assessed before formulating the 1987 rules. If any other entrants or potential entrants have views on the subject, these would be gratefully received—please write direct to G4HLX.

Trials and Tribulations

Setting up and running a portable station is rarely without its problems. this year those reported have ranged from flies to apparent armed attack. Here is a selection.

At G4WBM/P, "in trying to untangle the guys I accidentally pulled the mast out of the ground. The sight of me with a 9m mast and 3m antenna wobbling around like a Scotsman tossing the caber amused a picnicking couple". G1GLJ/P advises "never to use felt-tip pens for logging—at a stage of panic hearing a DX station I spilt a drink all over the log and all my valuable information just started to fade away into the paper". Troubles at G1AGM/P started before they reached their site, when the "engine seized up" in their transport; "after a further 32km trip for an alternative, at the site our antenna system failed".

One of the more serious incidents was during setting up station at G1DXY/P, where G1IQN's 7-year old son Benjamin "decided to mimic his elders and help to put the guy pegs into the ground . . only he forgot to take his fingers out of the way as he was bashing at the peg. Result—one broken bone, a large gash and a lot of blood", now healing thanks to High Wycombe General Hospital.

Amongst the less serious problems were these: "had trouble with cattle trying to eat the coaxial cable"—G6PBW/P. "Car filled up with some very interesting flies and insects"—G1GVA/P. "The east was over the wrong side of the hill"—G0BNC/P. G1GLJ/P found it hard to concentrate when "a group of young girls with stereo player and very little clothing turned up for a sunbathing session . . . I must choose a more remote site next year".

The hazards of a remote site were felt by GW4ZKI/P, who, after abandoning attempts to carry their small generator up their chosen Welsh mountain, decided to use a battery-powered transceiver as an alternative. Having got everything set up it was discovered that one small item had been left in the car 600m below—the adaptor enabling the feeder to connect to the rig!

Military activity caused a stir in some places. GI1JUS/P were "buzzed by an army Lynx helicopter about 30m above the station", but the most dramatic story comes from G6IEK/P. Having arrived on site on the Saturday and erected and tested the station, "I decided to erect my pup tent at approximately 9pm. While in the process of doing so, the sound of nearby automatic machine gun fire opened up, and explosions with vivid red flashes . . . we dived behind the car. An army patrol passed shortly after and assured us that only blanks were being used. All the same it was very disconcerting.

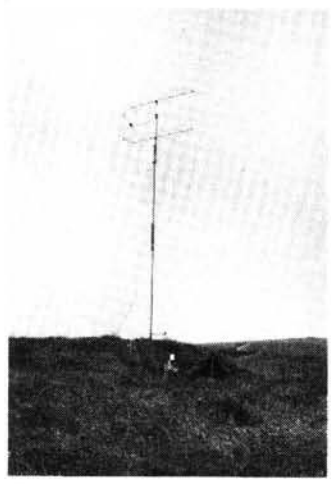
Practical Wireless 144MHz QRP Contest 1986

Pos.	Callsign	Points
1	GW5NF/P	17 240
2	GW3CKR/P	16 613
3	G1HSZ/P	11 458
4	G4WET/P	10 758
5	G4NOK/P	8712
6	G1SVH/P	8514
7	G4YST/P	8435
8	GW6GS/P	8350
9	G6YEP/P	8122
10	G0EVV/P	7712
11	G4LDR/P	7425
12	GM4PPT/P	7254
13	G4NDH/P	7134
14	GW4NVA/P	6858
15	GW6GW/P	6750
16	G3BRS/P	6356
17	G3UAX/P	6250
18	G4SKA/P	6214
19	G3IZD/P	6006
20	G0CLP/P	5952
21	G1ORC/P	5876
22	G4VRY/P	5566
23	G1LVY/P	5160
24	G3BPK/P	4966
25	G6VWH/P	4788
26	G8DDY/P	4032
27	G8CXH/P	3960
28	G4PTI/P	3784
29	G4WUS/P	3696
30	G1NUS/P	3654
31	G6LKB/P	3612
32	G1TRS/P	3610
33	GW4ARI/P	3520
34	G1GLJ/P	3363
35	G6YZR/P	3332
36	G4MDP/P	3330
37	EI2GF/P	3328
38	G1SUC/P	3302
39	G6ECM	3120
40	G0AOZ/P	3078
41	GW8TVX/P	2970
42	G1JME/P	2816
43	G3FJE/P	2800
44	G1SAS/P	2793
45	G1DXY/P	2793
46	GI1JUS/P	2730
47	G1GVA/P	2717
48	G8DVK/P	2610
49	G6WBP	2512
50	G6ORM/P	2499
51	G8EVY/A	2432
52	G1ONE/P	2430
53	GW1IVS/P	2423
54	G3WOR/P	2400
55	G3RSC/P	2394
56	G1AGM/P	2329
57	G4SKM	2250
58	G6XYB/P	2244
59	GW1SSQ/P	2190
60	G0BWD/P	2160
61	G0AEX/P	2160
62	G4LXS/P	2070
63	G4OEU/P	1995
64	GM6FPX/P	1965
65	G4TTT/P	1932
66	G4YGX/P	1911
67	GM0ELP/P	1887
68	G0AOJ/A	1872
69	G1CPP/P	1860
70	G0CRW/P	1830
71	G4CW/A	1818
72	G3GHN	1785
73	G1GNC	1760
74	G4NVM/P	1740
75	G0ELA/P	1708
76	G4WBM/P	1665
77	G0BAI/P	1663
78	G6GZS	1659
79	G0AZT/P	1632
80	G6IEK/P	1620
81	G4RSE/P	1616
82	G1GFZ/P	1615
83	GM4ZUK/P	1530
84	G4YYE	1501
85	G6XYI/P	1500
86	EI3CWB/P	1480
87	GM1DSK/P	1440
88	G4WNF	1428
89	GM4WEW/P	1422
90	G6CSY/P	1414

GALLERY

EI2VZB/P Knockadorn Head, Co. Cork

GM6FPX/P Ben Lomond



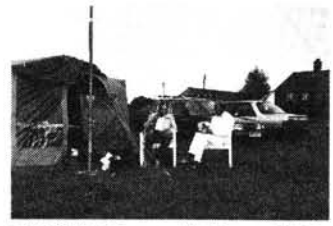
G1RPA/P Bostal Hill, Bo Peep, Alciston, E. Sussex

G0EVV/P Bouldsworth Hill, near Burnley, Lancs.

G4WET/P Broadway Hill, Heref. & Worcs.

G4YGX/P Clent Hills, West Midlands

GW1NGA/P near Carmarthen, Dyfed



G6KIE/P Cheverells Farm, Tatsfield, Surrey

GM4PGV/P near Dalry, Ayrshire

GM1RED/P East Lomond Hill, Fife

GM1JWJ/P White Caterthun, Angus

G6ORM/P Clent Hills, West Midlands

Pos.	Callsign	Points
91	G1NDV/P	1400
92	G0ABS/P	1378
93	EI2VZB/P	1360
94	EI4FO/P	1357
95	G6PBW/P	1312
96	G4WBR	1296
97	GW4YCT/P	1285
98	G6JMN/P	1274
99	G6ZBL/P	1215
100	G6ZIM/P	1200
101	G6SBR/P	1173
102	G6ARC/P	1162
103	GW4NAV/P	1155
104	G1RPA/P	1155
105	G0AXC/P	1152
106	G4YTC/P	1152
107	GM1RED/P	1136
108	G1JDP/P	1106
109	G1IZB	1102
110	GM4SOY/P	1080
111	GM4PGV/P	1054
112	GW3POM/P	1035
113	G0BNC/P	1001
114	G0FCA/P	990
115	GM1CYB/P	980
116	GW1NGA/P	942
117	G4VRC/P	888
118	G1KOR	882
119	G6KIE/P	858
120	EI5FK/P	850
121	G6RAU	840
122	GM4YWU/P	812
123	G1BBY/P	784
124	G2BRS	780
125	G4XQW	770
126	GI4KKK/P	756
127	G1EZS	754
128	G3BXF	744
129	G3SVC/P	742
130	G3MAE/P	728
131	G6SDQ/P	715
132	G4SSD/P	700
133	GM1JWJ/P	672
134	G1SVS/P	663
135	G1DWQ	660
136	G4VFG/P	600
137	G0AAM	594
138	G1EHF	550
139	G1CRH/P	546
140	EI3GG/P	528
141	G4UPA	495
142	EI4CPB/P	476
143	G6NLZ	462
144	G1OSE	451
145	G1KVY/P	451
146	GM1JPJ/P	420
147	G0DKN/PA/P	392
148	G8VEL	360
149	G0EZL	352
150	G6PFN	334
151	GJ8ZRE/M	330
152	GM0BOA/P	234
153	GW1RWG	184
154	G2DHV	150
155	G6RZZ	140
156	G1BRC	140
157	G4OED	110
158	G1GGZ/P	100

Conclusion

Despite these and many other problems, entrants are keen to say how they enjoyed the event. "I had a great day", says GW1SSQ/P, "most enjoyable contest" says GW4YCT/P and many others, even though "lugging a car battery and associated gear up a hill at some unearthly hour on Sunday morning is what it's all about"—G4VFG/P.

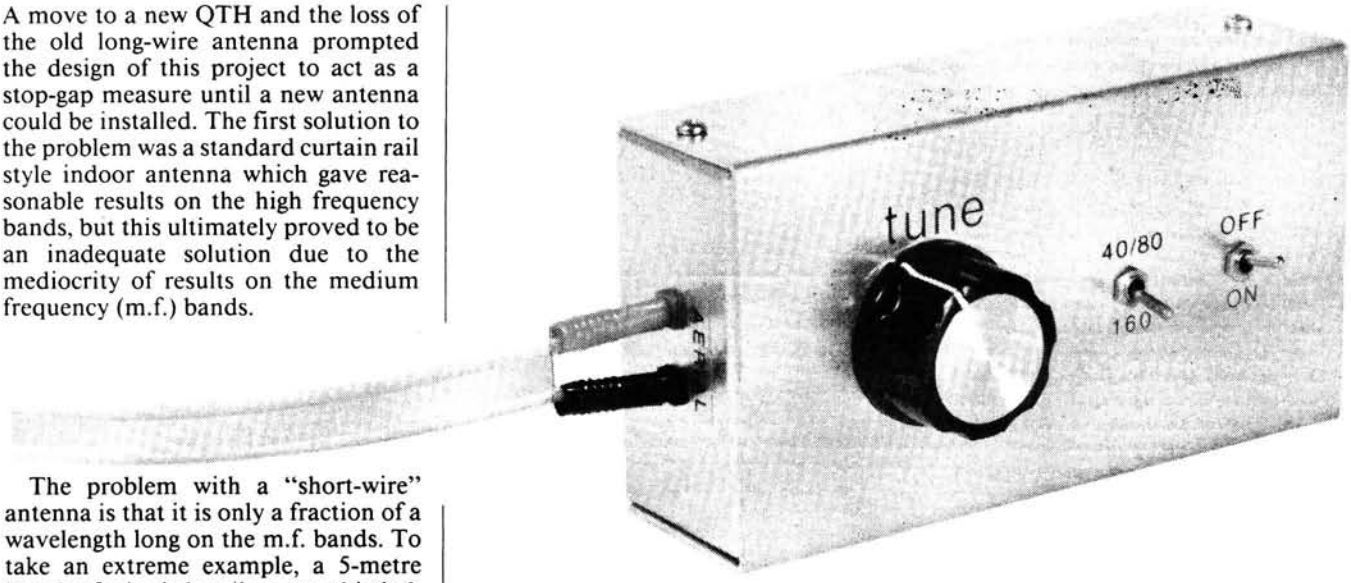
There is, of course, the usual demand for a repeat event next year. The date for the fifth *PW* QRP contest will be **Sunday 21st June 1987, 0900–1700 GMT.** Look out for the rules in *Practical Wireless*.

Finally, thanks to all those stations who came on the air for the contest, and sent in entries, checklog and comments. Good luck to all who take part next year, and let's hope for some interesting propagation conditions. ***PW***

Active Antenna

Short of antenna space? Try this active antenna from Robert Penfold.

A move to a new QTH and the loss of the old long-wire antenna prompted the design of this project to act as a stop-gap measure until a new antenna could be installed. The first solution to the problem was a standard curtain rail style indoor antenna which gave reasonable results on the high frequency bands, but this ultimately proved to be an inadequate solution due to the mediocrity of results on the medium frequency (m.f.) bands.



The problem with a "short-wire" antenna is that it is only a fraction of a wavelength long on the m.f. bands. To take an extreme example, a 5-metre length of wire is less than one thirtieth of a wavelength when used for reception on the 1·8MHz (160m) amateur band. Apart from the reduced signal pickup that this produces, it also results in the antenna having a high output impedance. Most short wave receivers have a low input impedance, and the antenna, like any high impedance signal source when fed into a low input impedance, produces only a low voltage level due to loading effects. The antenna is effectively a voltage source in series with a resistor, the latter having a value equal to the output impedance of the antenna. This resistor forms a potential divider in conjunction with the input impedance of the receiver, as shown in Fig. 1. If the antenna has an output impedance of 1000Ω and the input impedance of the receiver is 50Ω, this would result in the signal voltage from the antenna being reduced by a factor of 21 when connected to the receiver (1000 + 50 = 1050. 1050 ÷ 50 = 21).

Although only given as a mathematical example these figures are not unreasonable.

Active Antenna

One way of overcoming the impedance matching problem is to use an antenna tuning unit or some other passive matching device. However, the impedance step-down is achieved at the expense of a loss in signal voltage, and the signal fed to the receiver is still likely to be less than the unloaded output voltage of the antenna. Antenna tuning units are generally most beneficial when used with medium and long antennas.

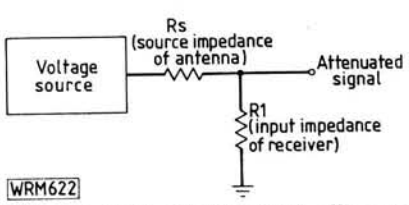


Fig. 1: The theoretical diagram showing the effective voltage source the antenna represents to a receiver

A better solution is to use a so-called "active" antenna which is really just a passive antenna of some kind feeding into a wideband pre-amplifier. There are several types of active antenna but the most basic type consists of a wideband amplifier fed from a simple wire antenna a few metres long. The main purpose of the amplifier is to provide an impedance match without introducing any large drop in signal amplitude, but in most cases the amplifier also provides a certain amount of voltage amplification.

Tuned Lines

The unit described here can be used in this way, and will provide good results on any of the short wave bands. However, if the m.f. bands are the main ones of interest it is possible to obtain improved results using a tuned antenna in place of the simple wire type. The antenna used in this case is a tuned line. Readers may be familiar with tuned lines in v.h.f. and (more commonly) u.h.f. circuits where they can be used to replace ordinary r.f. transformers. In v.h.f. and u.h.f. circuits the lines are normally just pieces of p.c.b. track. This is made possible by the short wavelengths involved. For a low frequency tuned line, 300Ω balanced feeder probably represents the most convenient basis for the antenna. The arrangement used is shown in Fig. 2. The first point to note is that one end of the balanced feeder line is shorted together and the signal is extracted from the two conductors at the opposite end of the line. It is not necessary for the antenna to be one quarter of a wavelength long since a tuning capacitor can be used to effectively lengthen the antenna and resonate it at the appropriate frequency. In practice there is bound to be a certain amount of stray capacitance to contend with, and cutting the antenna short and using a variable capacitor to peak performance on the desired band is the most practical way of doing things. A few experiments showed that 5 metres of 300Ω balanced feeder could be made to operate effectively on the 7, 3·5 and 1·8MHz bands with the aid of a suitable tuning capacitance.

Selectivity

The antenna could be regarded as a single-turn tuned circuit, and like an ordinary tuned circuit it has a high output impedance. Accordingly, good results cannot be expected if the antenna is coupled direct to a receiver, and the use of a buffer amplifier is just as important as when using a "short wire" antenna.

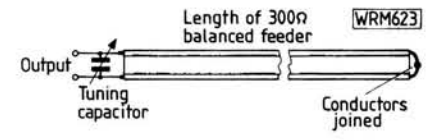


Fig. 2: Simplified view of a tuned line

There are three main advantages in using the tuned line antenna rather than a simple wire type. One is merely that the tuned line system seems to give a significantly higher signal level than a simple wire antenna of similar length. Secondly, the antenna is effectively an additional tuned circuit in the r.f. circuits of the receiver, and the extra r.f. selectivity it provides helps to combat spurious responses. Last but by no means least, it gives less of a problem with cross-modulation. This is a common problem with active antennas since the antenna element picks up signals over a wide bandwidth, and some of the signals are inevitably quite strong. This plethora of signals can easily result in overloading of the pre-amplifier and strong cross-modulation. With its narrower bandwidth a tuned antenna is less likely to be troubled by strong out-of-band signals.

Circuit Operation

The circuit diagram of the active antenna appears in Fig. 3. The tuning capacitor C3, together with 5 metres of 300Ω ribbon feeder gives an approximate frequency coverage of 3·2 to 7·5MHz, this means that in addition to covering the 7·0MHz and 3·5MHz amateur bands it also gives coverage of the 7·1MHz, 6MHz, 5MHz and 4MHz broadcast bands. Switch S1 is used to connect extra capacitance C2 in parallel with C3, together they bring the antenna to resonance at approximately 1·8MHz, C3 will tune the antenna anywhere within the frequency limits of the amateur Top Band. If the unit is used with a simple wire antenna C2, S1 and C3 should be omitted.

Transistors Tr1 and Tr2 form a cascode amplifier with Tr1 acting as a common source stage and Tr2 operating in the common base mode. Resistor R1 is the gate bias resistor for Tr1, and being a j.f.e.t. it provides a suitable high impedance. Inductor L1 is the collector load for Tr2, this is damped by R3 in order to avoid instability. Transistor Tr3 is a common emitter buffer stage which gives the circuit a low output impedance so that it can drive the low input impedance of a receiver efficiently. Capacitor C6 provides d.c. blocking at the output, and this is essential as the input of the receiver is likely to connect to the primary of an r.f. transformer. Without C6 there would be a very low resistance from the emitter of Tr3 to earth if the unit was connected to the receiver, and Tr3 would be destroyed.

The current consumption of the circuit is about 9 milliamps. This can be supplied by a small 9 volt battery such as a 6–F22 (PP3) type. If the unit is to be permanently installed in an inaccessible position, it may be more practical to build a well smoothed battery eliminator, but the mains transformer should not be mounted close to L1.

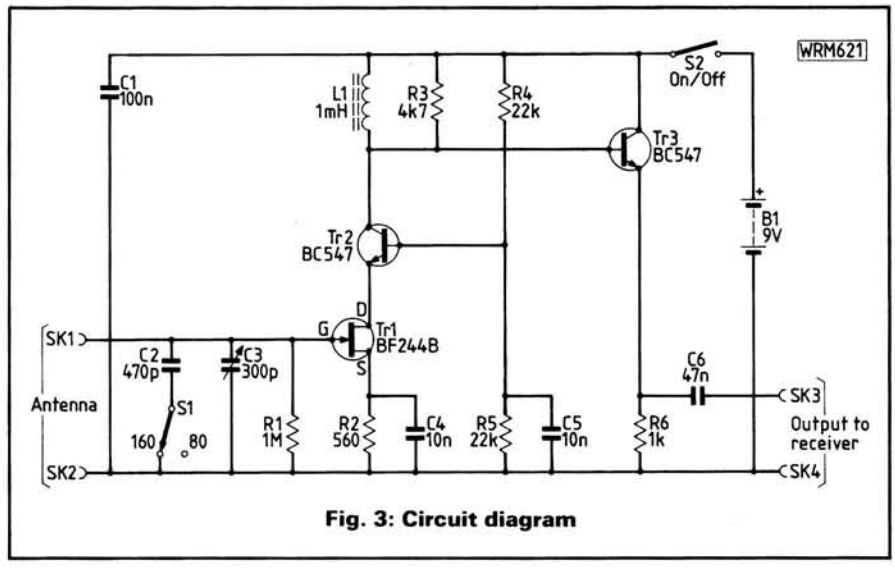


Fig. 3: Circuit diagram

Construction

Details of the printed circuit board are given in Fig. 4. Construction of the board is extremely straightforward, and the only likely cause of problems is Tr1. The BF244B has two completely different encapsulations and leadout configurations. The component layout diagram assumes that the normal (TO92) version is used, but leadout details for the alternative type are included in Fig. 4.

If a small 9 volt battery is to be used as a power source the unit will fit comfortably into an aluminium box measuring 70 × 133 × 38mm, but a larger type will almost certainly prove to be necessary if another form of power source is used. The internal layout is not critical, but it is advisable to site C3 and S1 fairly close together as C2 is wired directly between these two components and not on the p.c.b.

The antenna just consists of 5 metres of 300Ω balanced feeder with a short length of insulation stripped from the wire at both ends of the cable. The two wires are bent round and soldered together at one end, while the wires at the other end are fitted with 2mm plugs. The latter plug into SK1 and SK2, which should consequently be mounted close together on the case (about 10mm apart).

In Use

The antenna can be installed permanently by fixing it around a curtain rail, or whatever, or you can use it by simply rolling out the antenna wire when the unit is needed, and rolling it up again after each session. It is not essential to have the wire perfectly straight, and even a right-angled bend will not seriously impair its performance. The antenna has directional properties, with maximum pickup at right angles to the antenna wire. However, bends in the wire reduce the directivity of the antenna. Height is an advantage for practically any antenna, but good results have been obtained just by laying the antenna wire along the floor of a ground floor room.

SHOPPING LIST

Resistors

¼W 5% Carbon film

560Ω	1	R2
1kΩ	1	R6
4·7kΩ	1	R3
22kΩ	2	R4,5
1MΩ	1	R1

Capacitors

Ceramic

470pF	1	C2
100nF	1	C1

Polyester

10nF	2	C4,5
47nF	1	C6

Variable solid dielectric

300pF(1)	1	C3

Semiconductors

BF244B(2)	1	Tr1
BC547	2	Tr2,3

Inductors

1mH(2)	1	L1

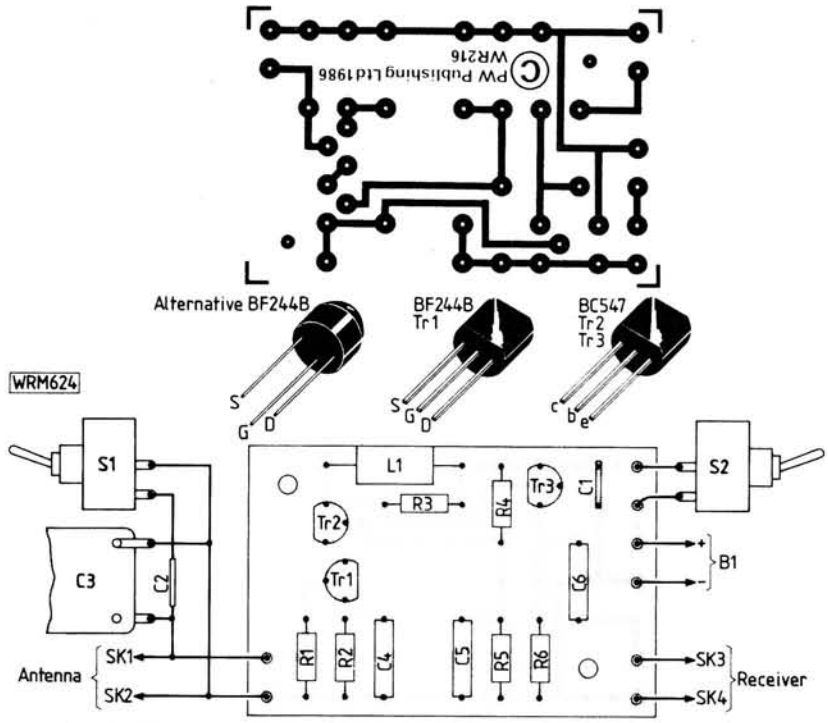
Miscellaneous

SPST sub-miniature toggle switch (2); 2mm sockets (4); 2mm plugs (4); aluminium box 70 × 133 × 38mm; control knob; battery lead with connectors; 5 metres of 300Ω balanced feeder; p.c.b.; connecting wire.

(1) Maplin Electronic Supplies Ltd., P.O. Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702 554155.

(2) Cricklewood Electronics Ltd., 40 Cricklewood Broadway, London NW2 3ET. Tel: 01-450

Fig. 4: Full-size p.c.b. track pattern, component layout and wiring diagram for the active antenna ▶



Sockets SK3 and SK4 connect to the antenna and earth sockets (respectively) of the receiver. It is not essential to use coaxial cable here, but it is advisable to keep this cable reasonably short, say no more than about one metre or so. With everything connected up it is just a matter of switching on and adjusting C3 for maximum signal, making sure that S1 is set to the correct position for the band in use. The bandwidth of the antenna is fairly wide, but tuning to a signal of constant strength and adjusting C3 should produce a peak in signal strength.

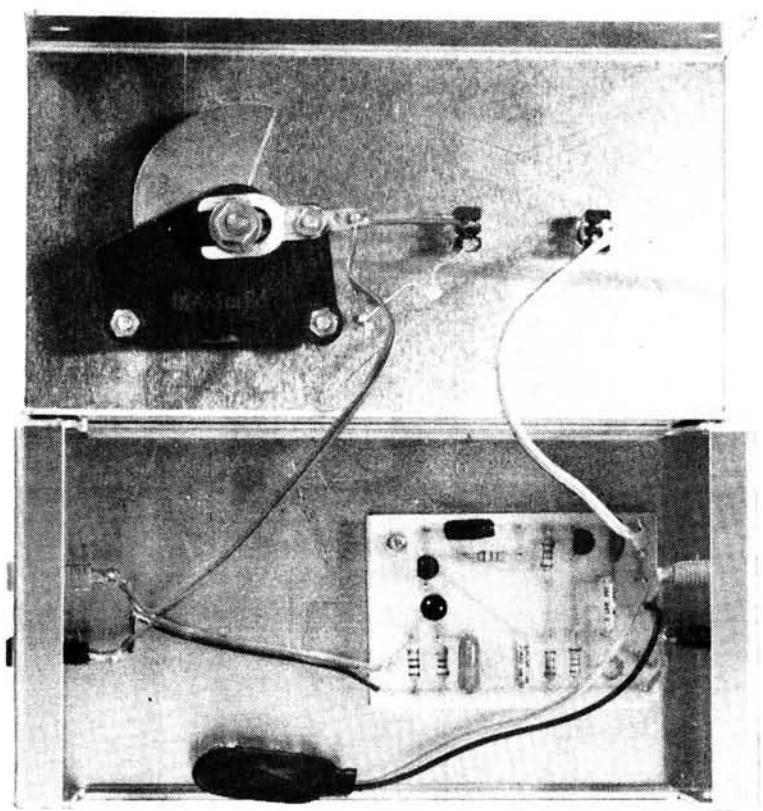
There is plenty of scope for experimentation, and if a long antenna can be accommodated it might give better results, but a lower value tuning capacitor would be required. Of course, making the antenna longer reduces the maximum frequency at which it can be brought to resonance. Although the unit was not designed with the h.f. bands in mind, by using a shorter antenna it should be possible to produce a compact but efficient antenna for one or more of the h.f. bands. Using about 2 metres of feeder gives good results on 21MHz and 14MHz.

If the unit is used with a simple wire antenna it is important that it is not over 6 metres long, as a longer antenna would overload the pre-amplifier for most of the time.

Results with the antenna and a Trio QR666 receiver have been encouraging, and W/VK stations on 3·5MHz, for example, are received at least as well as when using a 20-metre long-wire antenna at a height of about 6 metres. ***PW***

How Much? & How Difficult?
£15
Beginner

Internal view of the author's prototype of the active antenna ▶



R. WITHERS COMMUNICATIONS LTD

Manufacturers, importers and suppliers of world famous communications products

584 HAGLEY ROAD WEST OLDBURY, WARLEY, BIRMINGHAM B68 0BS

021-421 8201/2/3. CELLNET 0860 323056. PRESTEL MBX 214218216 FAX 0215614074

Amateur Radio. Business Radio. Radio Telephones. Sales. Service Accessories and antenna systems.

ICOM YAESU

THE TECHNICALLY ORIENTATED RADIO COMMUNICATIONS SPECIALISTS.

...STOP...PRESS...

RWC Ltd have now been appointed distributors for the new Bearcat-Uniden range of shortwave and VHF-UHF scanning receivers. Please contact us for further information.

Please add £2.50 p&p for accessories, £3 for psu's, £5 for transceivers, Send £1.00 for Raycom catalogue (refundable) or send a large S.A.E. for latest used list and information.

FULL RANGE OF KENPRO HANDHELDS IN STOCK

YAESU

Full Range Stocked

		RWC Price
CSC10	Carrying Case	8.75
CSC11	Carrying Case	9.75
CSC1A	FT290R Mk1 Carrying Case	5.99
FAS14R	Remote ant switch (FC757AT)	79.50
FBA5	Empty battery pack	8.75
FC700	ATU power meter/dummy load	145.00
FC757AT	Automatic ATU inc WARC bands	329.00
FIF232C	RS232 Cat interface	69.00
FIF65a	Computer interface for Apple II	58.50
FL2100Z	HF 1.2KW linear 1.8-30 MHZ	POA
FL7000	500W PEP all band solid state L1	POA
FNB2	10.8V ncad pack for FT208/708	24.50
FNB3	Nicad for FT203/9/703/9R/RH	38.00
FNB4	Nicad pack for FT209RH etc	43.00
FP700	20A power supply	189.00
FP757GX	Switched mode power supply	159.00
FP757HD	Heavy duty power unit	225.00
FRA7700	Active antenna for FRG7700/8800	47.50
FRG8800	All band RX	625.00
FRG9600/MK2-RWC	60-950 All-mode scanning RX	499.00
FRT7700	Receiver ATU for FRG7700/8800	55.00
FRV8800	VHF converter	95.00
FT203R-FBA5	2mtr H/H 1.5W	219.00
FT203R-FNB3	2mtr H/H 2.5W	245.00
FT203R-FNB4	2mtr H/H 3.5W	249.00
FT209RH-FBA5	2mtr H/H C/W empty b/case	269.00
FT209RH-FNB3	2mtr handheld 3.7W	299.00
FT209RH-FNB4	2mtr handheld 5W	309.00
FT23/FNB10	New 2mtr TRX	POA
FT2700RH	V-UHF 25W transceiver	399.00
FT270R	VHF 25W transceiver	POA
FT270RH	45W 25W transceiver	349.00
FT290R	2mtr multimode	349.00
FT290R/Mk2	multimode 2mtr transceiver	POA
FT690R	6mtr multimode transceiver	299.00
FT703R-FBA5	70cm H/H 1.5W	249.00
FT703R-FNB3	70cm H/H 2.5W	279.00
FT703R-FNB4	70cm H/H 3.5W	285.00
FT709R-FBA5	70cm H/H 1.8W	275.00
FT709R-FNB3	70cm H/H 3W	299.00
FT709R-FNB4	70cm H/H 4W	319.00
FT726 6M	6mtr module for 726	POA
FT726 70cm	70cm module 726	POA
FT726 HF	HF module for 726	POA
FT726 SAT	Oscar/Sat unit for FT726	125.00
FT726R/MHB1B8	Multimode/Band base station (2mt)	949.00
FT727R	Dual Band 5W handheld TRX	POA
FT73/FNB10	New 70cm TRX	POA
FT757GX MK2-RWC	All band all mode 100W TXR	949.00
FT767 6M	6M unit for FT767	POA
FT767 70cm	70cm unit for 767	POA
FT767GX	New all mode all band HF/VHF/UHF	1495.00
FT790R	70cm multimode transceiver 2W	399.00
FT980	Gen coverage + Ham band transceiver	1739.00
LOG BOOK	YAESU amateur radio log book	2.00
MD1B8	Base station desk microphone	75.00
MH12A2B	Speaker mic for FT203/9/703/9	19.50
MH1B8	Fist/mobile mic for FT757 etc	19.50
MMB11	Mobile bracket/mount for FT290R	35.00
PA3	Mobile DC unit for FT208, 209 etc	19.50
PA4C	AC power unit for FRG9600	15.00
QTR24D	World zone clock	37.50
SB1	Switch unit	19.75
SB10	Switch box for mobiles	19.50
SB2	Switch unit for YH1	17.50
SB3	Switch unit	18.50
SP55	External loudspeaker	17.50
VS1	Voice Synthesizer for FT270/2700	25.00
YH1	Headset/boom mic for SB1/2/3	18.50
YH2	Headset/mic for FT203/209 etc	18.50
YH55	Mono headphones	18.50
YH77	Lightweight mono headphones	18.50
YHA15	Helical antenna for FT290R	6.99
YM24A	Speaker mic for FT208/708	25.50
YM49	Speaker mic for FT290R	21.00
	Prices subject to change without prior notice	E&OE

ICOM

Full Range Stocked

AH7000	25-1300 MHz TX base ant 50-144-432-129	79.00
BC35E	Desk-top charger for all nicads	69.50
BP3	Standard Nicad pack 8.4V	28.50
BP4	Empty battery box for cells 6X	8.95
BP5	High capacity quick charge 10.8V nicad	59.50
DC1	12V mobile regulator pack (2E)	16.95
EX243	Curtis keyer unit for IC735/745	55.50
EX257	FM unit for ICR71	39.50
EX310	Speech synthesizer unit for 271/7000/E	41.50
FL63	250Hz RTTY/CW filter	49.00
HP1	Mono headphones	34.50
HS10	Headset and boom mic for use with HS10	20.50
HS10SB	Switch box assy for HS10 boom mic	19.50
IC-2KLPS	Power unit for IC2KL	399.00
IC-AHI	3.5-30 MHZ mobile antenna	189.00
IC-AH2A	Mobile HF ant tuner	499.00
IC-AH2B	Mobile whip and mount for AH2	179.00
IC-AT100	100W auto ATU	329.00
IC-AT150	Matching automatic ATU for IC735	349.00
IC-AT500	500W automatic ATU	499.00
IC-CPI	Mobile charging lead c/lighter	6.50
IC-HM9	Speaker mic assy	20.50
IC-PS30	Power supply unit 25A continuous	339.00
IC-UT 16	Voice synthesizer for IC27 series	28.50
IC02E	2 mtr LCD keyboard 2W transceiver	289.00
IC120	1W 1296 MHZ mobile (40MHZ cov)	575.00
IC271E	2 mtr all mode 25W base station	829.00
IC271H	High power 100W version of IC271E	999.00
IC27E	25W 2 mtr FM mobile 9 memories	379.00
IC27H	45W version of IC27E	419.00
IC28E	25W 138-174MHz (144-146 TX) mobile TR	349.00
IC28H	45W mobile version of 28E	379.00
IC290D	25W version of IC290E	539.00
IC2E	2 mtr handheld thumbwheel 2W	185.00
IC2KL	1KW PEP linear auto band switching	1250.00
IC3200E	Dual band 25W transceiver	545.00
IC471E	UHF multimode base station 32 mem	915.00
IC471H	75W version of IC471E	1099.00
IC4E	70cm thumbwheel Handheld 2W	279.00
IC505	3/10W 50MHZ SSB(FM) transceiver	449.00
IC735	New all mode all band transceiver	925.00
IC745E	All band SSB/AM/CW gen cov TX-RX 16 mem	799.00
IC751E	All band all mode transceiver 32 mem	1450.00
IC04E	70cm LCD keyboard entry handheld 2W	285.00
ICR7000E	25-1300MHz all mode scanning receiver	925.00
ICR71	All band short wave receiver 32 mem	799.00
LC11/14	Leatherette case assy for IC02/4E	8.99
LC1/2/3	Leatherette case for IC2/4/E	6.50
PS15	External power supply 20A	145.00
PS20	External PSU with loudspeaker 20A	199.00
PS25	Internal PSU for IC271E	99.00
PS35	IC751/IC271H 20A switch mode PSU	185.00
PS55	Matching power supply unit for IC735	179.00
SM6	Desk top microphone	42.50
SM8	Dual impedence 2-way base mic	79.00

CARRIAGE/POST FREE OVER £500.00

SAE FOR LATEST ICOM LEAFLETS, NEW MODELS EXPECTED

RWC TOP 100

ADONIS	AM303G	Base *n FM SSB m'phone	39.95
ADONIS	AM503G	Base stn FM SSB comp. mic	52.50
AKD	WA1	120-450MHZ wavemeter c/w ant	24.95
ALINCO	ALM-203R	c/w 30W amp	249.00
ALINCO	ALM-203E	2 mtr H/H transceiver 3.5W	239.00
ALINCO	EDH-25	DC/DC 12V converter	13.50
ALINCO	EMS-20	Speaker MIC for ALM203	18.50
ALINCO	ESC-3	Leatherette case and strap	14.50
AOI-MIC	DM300	600 OHM replacement microphone	6.50
AOI-MIC	DM301N	600 OHM replacement noise can MIC	7.50
ARM-ANT	TRAV-JIM	Travelling Jim portable 2 mtr ANT	7.99
CRITON	LS88B	6 OHM replacement ext loudspeaker	6.60
DAIWA	SA450M	2 way 2.5KW coax switch 0-900MHZ	17.50
FDK	FDK 725X	2 mtr 25W FM mobile transceiver	269.00
FDK	FDK	2 mtr multimode transceiver 750XX	499.00
GAMMA	2MTR S-JIM	Gamma twin slim Jim type ant	12.50
GAMMA	3-5A PSU	3-5 AMP power supply unit	19.50
Hi-mound	HK703	Straight key	29.25
Hi-mound	HK704	Straight key	19.25
Hi-mound	HK706	Straight key	16.65
Hi-mound	HK707	Straight key	15.50
Hi-mound	HK808	Deluxe straight key	49.95
Hi-mound	MK703	Squeeze key c/w base	28.95
Hi-mound	MK705	Squeeze key	25.65
Hi-mound	MK706	Squeeze key	23.50
Hi-Q	Hi-Q coil	2X coil formers/insulators (pat-pend)	7.50
HOXIN	70N2DX	Dual band 6/8 + 3X 5/8 mobile	25.90
HOXIN	70N2M	144/432 dual band 1/2W + 2 × 5/8 mobile	22.85
HOXIN	70N2V	Dual b/base ant. 3.6" long	39.00
HOXIN	HS-358	430MHZ tripple 5/8 6.3dB	33.78
HOXIN	HS-770	144/432 duplexer 50W 30dB isolation	19.55
HOXIN	HS-78F	2 mtr 7/8 fold over 4.5dB	16.95
HOXIN	HS-88F	2 mtr 8/8 fold over 5.2dB	16.95
HOXIN	SMC15SE	15 mtr 130W PEP mobile ant. 1.72M long	21.50
ICS	**AMT-2**	**AMTOR/RTTY/CW/ASCII terminal unit**	**245.00**
ICS	RM-1	L-cost AMTOR/RTTY/CW/ASCII modem	69.00
Jaybeam	8XY-2M	2 mtr 8E crossed ant	41.50
Jaybeam	LR1-2M	2 mtr omni-directional colinear	39.00
Jaybeam	LW10-2M	2mtr 10 element YAGI	27.25
Jaybeam	MBM48	70cm 48E antenna	40.75
Jaybeam	Q4-2M	2 mtr 4 element quad	33.95

FULL RANGE OF JAYBEAM + TONNA ANTENNAS IN STOCK

			RWC Price
MuTek	BBBA 500u	20-500MHZ low noise wide band preamp	34.90
MuTek	SLNA 144s	2 mtr low noise RF switched preamp	33.95
MuTek	SLNA 145sb	Optimised preamplifier for for FT290R	39.00
MuTek	TVVF50c	High performance 2M-6M transverter	189.90
RAYCOM	**Series II**	**12A PSU**	**49.00**
RAYCOM	7.1MHZ TRAP	7.1 MHZ traps c/w instructions	8.95
RCA	6146B	PA valve	12.85
REVCO	2044/5	Nest of dipoles w/band ant 26-500 MHZ	69.00
REVCO	Revcone	Wide band discone ant 30-500MHZ	29.95
SUN-ANT	KG208 SE10	10 mtr loaded 1/4W tilt-over	12.50
SUN-ANT	KG309 SE2	5/8 mtr tilt-over ant	14.50
SUN-ANT	SO239/ CGM	Cast/chrome SO239 gutter mount assy. c/w cable	9.75

RAYCOM MOD KITS

Raycom	757	FT757GX fast tuning mod kit improves VFO tuning	29.50
Raycom	FBX-RWC MOD	LC7136-7 10 mtr FM mod kit kit c/w ins. (Built & Tested)	23.50
Raycom		As above but kit of parts only	17.50
Raycom	LCL/DNT MOD (inc post)	LCL/DNT 10FM mod kit	14.95
NEW STORNO COM 713 55 Channel Mod Kit to 2M inc. RPTR Shift, xtals + circuit instructions			29.00
NEW 2m 30W linear amp kit – parts only			29.50
Complete kit with case, heatsink, etc			39.50

RAYCOM ANTENNAS

Raycom	1/1 G5RV	Full size G5RV m/band ant	14.95
Raycom	1/2 G5RV	1/2 size G5RV m/band ant	13.95
Raycom	1/4 wave 25	145MHZ 1/4 wave PL259 fitting	2.99
Raycom	**GP900**	**3db 800-1000MHZ colinear c/w BNC**	**19.50**
Raycom	**HBD**	**Highband dipole assembly**	**8.50**
Raycom	**2M HB9CV Inc. Post**		**9.98**
Raycom	**70cm HB9CV Inc. Post**		**7.98**
Raycom	5/8 whip	145MHZ 5/8 spring type s/steel whip	3.75
Raycom	SO239-MAG	Magnetic mount SO239 c/w cable PL259	9.50
Raycom	Swivel-mag	Swivel base mag-base c/w cable PL259	9.25
Raycom	Trap-dipole	7.1MHZ trap dipole com. kit	29.95

– RAYCOM POWER SUPPLIES –

13.8V 12A (8A continuous)	52.50
13.8V 8A (6A continuous)	49.50

— RAYCOM RF POWER AMPS —

Raycom	V15L-145	2mtr 15W linear amp. 1-3W input	49.50
Raycom	V25F-145	2mtr 15W linear amp. 1-3W i/p	48.50
Raycom	V35L-145	2mtr 35W linear amp. 1-3W input	59.50
Raycom	V45F-145	2mtr 45W FM amp. 1-3W input	62.50

— SCANNING RECEIVERS —

YAESU FRG-9600 MKII very latest mod. gives improved 'S' METER on RX and extended coverage up to 950MHz

FRG9600/MK2-RW 60-950 All mode scanning RX	469.00
BEARCAT 100 VHF/UHF Handheld (early model)	199.00
REGENCY MX8000/AOR2002	429.00
REGENCY HX2000 VHF/UHF Handheld	259.00
NEW BEARCAT DX1000 10KHz-30MHz SW RECEIVER. 10 MEMORIES. ALL MODE INC FM. ALSO SCANNING	**£329.00**
NEW BEARCAT 100XL H/H SCANNER. 66-88MHz, 118-136MHz (AIR BAND), 136-174MHz, 406-512MHz. C/W NICADS, CHARGER + LEATHERETTE CASE	**£219**
NEW BEARCAT 175XL DESK TOP SCANNING RECEIVER. 16 MEMORIES. SAME COVERAGE AS 100XL C/W AC ADAPTER	**£209**

Please call in or 'phone for latest Bearcat information.

TONNA — Full Range in Stock

TONNA	20089N	144MHZ 9 element port. antenna N	29.80
TONNA	20199	144/435 9+ 19 element Oscar ant	36.50
TONNA	20419	432MHZ 19 element	36.50
TONNA	20422	435MHZ 21 element ATV	41.11
TONNA	20624	1296 23 element ant	27.95
TONNA	20609N	144MHZ 9 ele. fixed ant. N	27.78
TONNA	20813N	144MHZ 13 ele. port. ant	41.40
TONNA	20817N	144MHZ 17 ele. fixed ant N	55.38
TONNA	20818N	144MHZ 9 ele. crossed antenna N	52.00

SPECIAL OFFERS

ARM-ANT	Multi P-6	Multi-polarization P/ant 140-800MHZ complete	36.00
Kopek	AR1002	50g loading 3-core auto-rotator	38.50
Raycom	discone	60-600MHZ	27.50
DNT	M40FM	modified 10FM	49.50
DNT	M40FM	unmodified CB27/81	29.50
ALINCO	**ALR206E**	**25W mobile**	**249.00**
ICS	**AMT2**	**AMTOR/RTTY CW Terminal**	**169.00**

Tel: 021 421 8201 (24hr answerphone)

Telex: 334303 G TXAGWM

Access BARCLAYCARD VISA AMERICAN EXPRESS DINERS CLUB INTERNATIONAL RWC Credit Card Fast Mail Order

Getting Started... The Practical Way

In Part 4 of this series Rob Mannion GM3XFD describes how to build an r.f. amplifier to increase the sensitivity of the converter described in Part 3, and introduces you to radio signal propagation.

When using the converter on 3·5MHz you will certainly notice how busy the band is during the evenings! On the other hand, if you listen during the day, you may wonder if the converter is actually working. This is partly due to the variable nature of the reflecting layers in the ionosphere—the upper atmosphere which encircles the earth—and partly the simple design of the converter itself.

During the day the ionospheric layers responsible for the long-distance reception on this band are not so effective as at night. However on higher frequencies other layers work to our advantage. It is this variable nature which, when combined with the challenge of communicating world-wide with simple equipment, that provides much of the enjoyment of amateur radio.

Propagation Studies

The study of propagation itself can become a lifetime interest, as is shown by the examples of Ron Ham and other dedicated researchers, both professional and amateur. You may not wish to immerse yourself in such study, but a little time spent browsing through your library is not wasted, and a little curiosity can, in the end, be most rewarding.

Who, for instance, cannot be thrilled by hearing the "pings"—the brief bursts of very long distance reception—on Band II as the signals are reflected off of meteor trails. It is a fascinating party trick to demonstrate to anyone who will venture out into the dark with you. Armed with a portable v.h.f. radio, tuned to a normally quiet spot on the dial, occasional short bursts of foreign stations will be heard. These are signals being reflected from the brief ionised meteor trail. On an active meteor night, when as many as a thousand meteor trails per hour can be seen from the ground, most of Europe can be logged. The ARRL even publish a "Meteor Timetable" in their *Electronics Data Book*. An interest like this can lead you on and on—to research and learn.

RF Amplifier

Although unable to defeat ionospheric propagation effects during the day, when they are against us on 3·5MHz, we can increase the sensitivity of the converter. This will improve the strength of incoming weaker signals and increase selectivity somewhat. To achieve this we add an r.f. amplifier in front of the converter.

Once again the useful 40673 f.e.t is used and the circuit is shown in Fig. 4.1. The amplifier itself is relatively simple, but capable of good results. As most of the components, except the f.e.t., should be available from your junk box, the cost should be very low.

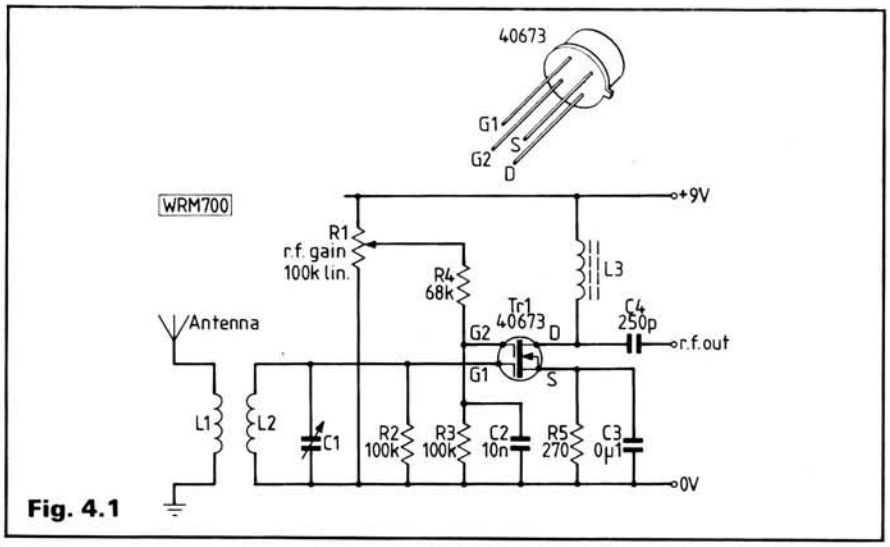


Fig. 4.1

Construction

Construction and operation of the amplifier is very simple. By re-using a variable tuning capacitor from a scrap valved radio or older transistorised portable, it is possible to arrange the tuning to suit your needs.

Some older s.w. mains sets had tuning capacitors of 500pF (0·0005µF), making tuning on the higher frequencies somewhat critical, but this will now be to your advantage. Once in circuit, with the amplifier operating, the tuning control is rotated until the signal level peaks. The effect of the amplifier can be very marked, and the peak signal points, where the signal is strongest, will be fairly sharply defined. However, having already wound the coil yourself with the aid of the dipper, you will have an idea where each band is to be found on the dial.

The amplifier unit can be built directly onto a copper-clad board with an access hole for the variable capacitor spindle. The board then forms the tuning dial and acts as the lid of a suitable wooden box. If you have an older tuning capacitor with feet, it could stand on a wooden baseboard and the copper-clad board then forms the front panel, with the components on the back.

Do not be ashamed of "bread-board" circuits—they can be an effective way of experimenting. I have found that the untidy "lash-up" worked first time, whereas the tidy job didn't!

Pin-board Construction

Before leaving bread-board construction one very simple and effective method should be mentioned. This is the "pin-board" system—cheap, effective and very easy to follow. All that is needed is a dozen or so pine floor boarding off-cuts and some heavy-duty brass drawing pins.

This system is ideal for the absolute beginner as well as experienced constructors in a hurry. I have found that with the circuit diagram drawn out on the clean floorboard, or on paper laid over the board, that an eight year old

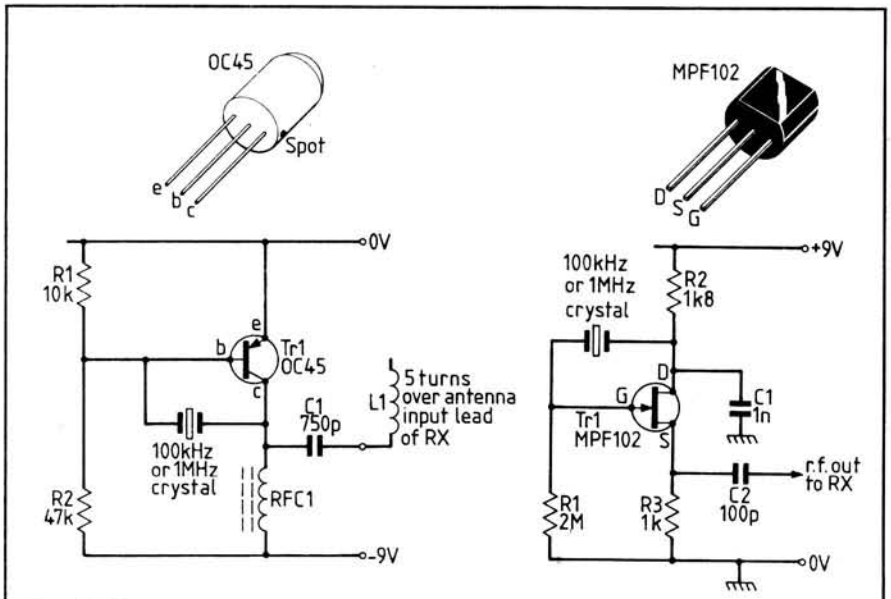


Fig. 4.2

enthusiast can follow the circuit and wire it up, making the connections under the drawing pins. With a piece of hardboard for the front panel, the system is crude—but it does work well, lending itself to class instruction. You can solder to the pins as you gain experience, and most people do away with the paper circuit diagram overlay.

In the days of the "Lisle Street" shops in London I managed to buy some baseboard valve-holders. Pressed into service with the pin-board method it was possible to build—in front of an appreciative schoolboy audience—a two-valve transmitter in less than an hour. The evening was rounded off with a c.w. conversation with another station in Germany.

Frequency Measurement

It is a definite advantage to know the approximate frequency that you are tuned to. There are many ways of achieving this and some are cheaper than others. An accurate direct-reading frequency meter is not cheap, and an old BC221 heterodyne frequency meter is only a little cheaper. However, it is not a difficult task to build your own. An excellent example can be found in the January 1986 issue of *Practical Wireless*. This provides markers at 20, 40, 50, 100, 200, 250, 500 and 1000kHz.

A simpler marker unit, which can be built in an evening in either of two versions, is shown in Fig. 4.2. That using the f.e.t. type MPF102 is preferred, but if you've got an OC44 or OC45 in your junk box, you could use that instead. Suitable 100kHz and 1MHz crystals are available from *PW* advertisers such as P. R. Golledge.

Such a marker is very basic, but used in conjuntion with your dipper, or other carefully calibrated oscillator, it can be extremely useful. Many transistorised oscillators are extremely stable under room conditions and stability at low frequencies is not very difficult to attain. With care it is possible to construct a variable frequency oscillator (v.f.o.) and calibrate it so that you are able to obtain comparisons throughout a 100kHz bandwidth. The unit described in the January 86 *PW* is ideal for this purpose and you will then be able to measure accurately to within a kilohertz or so.

Valves

Although only a passing reference has been made to the use of valves, they have not been forgotten. Valves are plentiful—and cheap. They are more rugged than many people believe and if you are using an older valved receiver it is very simple to fit a frequency marker (see Fig. 4.3) inside the cabinet on the chassis. As the power required is low it can be conveniently supplied from the receiver itself.

The relatively modern B7G and B9A types, such as the EF91 and EF183 are still very common and easily obtained. Most receivers that you will come across on junk stalls and at jumble sales will use this form of miniature

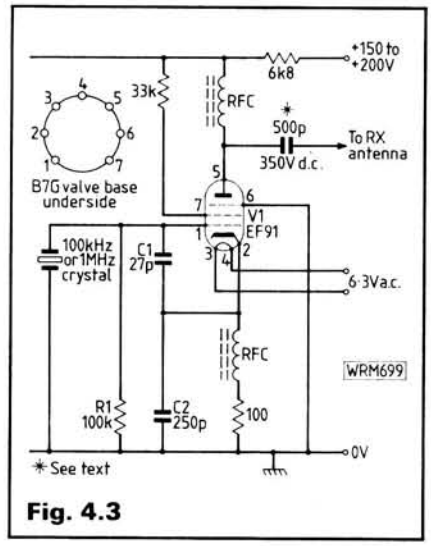


Fig. 4.3

valve. Even if you cannot manage to repair a fault, the power supply and chassis can still be extremely useful.

Nowadays you will have to look very closely at any older mains valve set before considering re-using the transformer. During the long working life of these sets the heat generated inside the cabinet may have damaged the transformer's insulation. If the transformer looks as if it has got very hot, driblets of wax visible for example, avoid using it and carefully unwind the wire instead.

Do not be discouraged from using valves because of the power supply problem. One of the very rugged rotary converters, with suitable smoothing components, can form an excellent, but relatively inefficient, power supply. Providing 230V d.c. at some 30W from a 12V d.c. input they are virtually immune to overload and do not mind being occasionally abused. Provided that you acoustically screen the converter it can be a useful and safe alternative power supply, totally isolated from the mains.

Bargains

By following my advice, and carefully reading all the smaller advertisements in the magazine, you will often find some real bargains. One advertiser regularly offers transformers for valve equipment at reasonable prices. Alternatively, if you can visit London, a rewarding morning can be spent in Edgware Road. Here you will find radio shops with a tremendous amount of "difficult-to-find" material at reasonable prices. There are many such shops in the Edgware Road, but unfortunately the days are long gone when Tottenham Court Road and Lisle Street were full of such shops. Today, with few exceptions, most offer high quality imported audio and video products.

A visit to the Edgware Road can be combined with one to The Modern Book Company just a short distance away in Praed Street. Although they do not deal in secondhand books, they do stock an amazing variety of technical publications. You could save yourself a great deal of postage during your visit!

Practical Enjoyment

From the very beginning of this series the approach has tried to be thoroughly practical. You have been advised to collect, save, strip and learn whilst building equipment in an economical way. Fortunately, learning in this way is a subconscious and automatic process. In fact it can actually add very much to the enjoyment of the hobby as you gradually realise your understanding is growing.

In Part 5:
Simple Modifications

County Armagh

Armagh & Dungannon District ARC: J. A. Murphy (Armagh 522153). Meets 2nd Tuesdays, 8pm above the Wine Market, Lonsdale, Armagh. Oct 11—Radio Rally at Armagh Cricket Club.

Avon

City of Bristol RSGB Group: Colin Hollister G4SQQ (Bristol 508451). Meets 4th Mondays, 7.30pm in the small lecture theatre, Queens Buildings, UoB, Clifton. Oct 27—Satellite TV.

South Bristol ARC: Len Baker G4RZY (Whitchurch 834282). Meets Wednesdays, 7.30pm in Whitchurch Folkhouse, East Dundry Road, Whitchurch. Oct 15—Final Preparations for Bristol Rally; 19th—Bristol Radio Rally; 22nd—Rally Debriefing/VHF Activity; Nov 5—Club Firework Night.

Bedfordshire

Dunstable Down RC: Philip Morris G6EES (Dunstable 607623). Meets Fridays, 8pm in Room 3, Chews House, 77 High Street South, Dunstable. Oct 10—Badge Engraving Service by G3WLM; 24th—Talk on Radio Test Gear; 31st—Visit to RAF Croughton.

Buckinghamshire

Amateur Radio & Electronics Group: Dave McQue G4NJU (Milton Keynes 78277). Meets Tuesdays, 7.30pm in the Green Grass Social Club, Watling Street, Fenny Stratford, Milton Keynes.

Chiltern ARC: Ron Ray G3NCL (High Wycombe 712020). Meets 2nd and 4th Wednesdays, 8pm in Sir William Ramsey School, Science Block, Rose Avenue, Hazelmere, High Wycombe. Oct 22—10m Conversions.

Milton Keynes & District ARS: Dave White G3ZPA (Milton Keynes 501310). Meets 2nd Mondays, 7.30pm in the Meeting Place, Hodge Lea, North Milton Keynes. Oct 13—AGM; Nov 10—Junk Sale.

Cambridgeshire

Cambridge & District ARC: Brian Davy G4TRO (Cambridge 353664). Meets Fridays, 7.30pm in the Visual Aids Room, Coleridge CC, Radegund Road, Cambridge. Oct 10—Junk Sale; 17th—Junk Sale; 24th—RAYNET Communications by G4BAO; 31st—Informal; Nov 7—Design & Construction of a 3-element Triband Beam by G3KBR.

Cambridge University Wireless Society: Chris Forshaw G6VMA, St John's College. Meets alternate Mondays in Seminar Room 2/3, Trinity Hall. Next meetings Oct 27 and Nov 10.

Cheshire

South Cheshire ARS: Chris Wiseman G1PUV (Kidsgrove 73185). Meets 2nd and 4th Mondays, 8pm in the Crewe LMR Sports Club, Goddard Street, Crewe. Oct 13—AGM; Nov 10—Railway Working by P. Johnson.

Chester & District ARS: Dave Hicks G6IFA (Chester 336639). Meets 2nd, 3rd, 4th and 5th Tuesdays, 8pm in the Chester RUFC, Hare Lane, Vicars Cross, Chester. Oct 14—Quiz with Ellesmere Port RS at Chester; 21st—Avionics by G1LML; 28th—Basically Speaking by G4FJQ; Nov 3—Quiz with Ellesmere Port RS at Ellesmere Port; Nov 11 Amateur Radio on a Shoestring by G3RJV.

Warrington ARC: Paul Forster GOCBN (Warrington 814005). Meets Tuesdays, 7.30pm in the Grappenhall CC, Bellhouse Lane, Warrington. Oct 14—Spectrum Analysis by G3OGQ; 21st—VHF NFD and Other Contests by G4HGI; Nov 4—Open Forum.

CLUB SECRETARIES, PLEASE NOTE

After our December 1986 issue, the format of *Club News* will be changing. Full details will be announced next month, but meantime keep the information coming to **Elaine Richards G4LFM.**

CLUB NEWS

Clywd

Rhyl & District ARC: Melfyn Allington GW1AKT (Nantglyn 469). Meets 1st and 3rd Mondays, 7.30pm in the Mona Hotel, Market Street, Rhyl. Oct 20—Junk Sale; Nov 3—Activity Night.

Cumbria

Eden Valley RS: Alison Telford G4XPO, 2 Station Road, Culgaith, Penrith. Meets 3rd Thursdays, 7.30pm in the Ulswater Centre, Penrith. Oct 16—QRP and Construction by G3RJV.

Derbyshire

Glossop & District RG: Geoff Sims G4GNQ, 85 Surrey Street, Glossop. Meets last Thursdays, 8pm in the Nags Head, Charlestown Road, Glossop. Oct 30—Natter Night.

Nunsfield House CA ARG: John Robson G4PZY (Derby 767994). Meets Fridays, 7.45pm in Room 7, Nunsfield House, Boulton Lane, Alvaston. Oct 10—Junk Sale; 17th—Telephones by Adrian & Adrian; 24th—Equipment Demo by Lowe Electronics; 31st—Hoppers Choppers; Nov 7—Blowing Hot & Cold by Ken Smith.

Tor ARS: Clive W. Rawlins G1SDY (Matlock 3503). Meets alternate Tuesdays, 7.30pm in Jackson Tor House, Matlock. Oct 14—Visit to RAYNET Matlock; 28th—A Light-hearted Look at Broadcasting by Paul Leighton of the BBC; Nov 11—Display of Historic Military Radios.

Devon

North Devon RC: Charles Searle G4LST (Torrington 23764). Meets 1st Wednesdays, 7.30pm in the Micro Centre, The Strand, Barnstaple.

Exmouth ARC: Hugh Edwards G4RUT (Exmouth 273157). Meets alternate Wednesdays, 7.30pm in the 6th Exmouth Scout Hut, Marpool Hill, Exmouth. Oct 22—Natter Night; Nov 5—Construction Competition.

Plymouth Polytechnic ARS: D. C. Derham G3TCP, c/o Students Union, Plymouth Polytechnic, Drake Circus, Plymouth. Meets Wednesday afternoons in the Science Block, top floor. Oct 26—DF Hunt on 144MHz.

Dorset

Poole RAS: Phil Dykes G4XYX, 68 Egmont Road, Poole. Meets last Fridays, 7.30pm in Commander House, Constitution Hill Road, Poole. Oct 31—Metal Bashing at Home by G4XGM.

Dumfries & Galloway

Maxwelltown ARC: Trig Rodgers GM4NNC, 5 Elder Avenue, Lincluden, Dumfries. Meets 1st and 3rd Wednesdays, 8pm in the Tam O'Shanter Inn, Dumfries. Oct 15—AGM.

Dyfed

Aberporth RAC: GW0DDR (Llechryd 274). Meets Wednesdays, 7pm in Building 17, Royal Aircraft Establishment's Airfield, Blagnannerch, Aberporth.

Essex

Braintree & District ARS: Mrs Ann King (Braintree 28714). Meets 1st and 3rd Mondays, 7.30pm in the Braintree CC, Victoria Street, Braintree. Oct 20—Construction Contest; Nov 3—Second Junk & Jewels Sale.

Colchester RA: F. R. Howe G3FIJ (Colchester 851189). Meets 1st and 3rd Thursdays, 7.30pm in the Colchester Institute, Sheepden Road, Colchester. Oct 16—Spy Sets by G3EUR; 30th—Construction of Aerials for VHF and UHF by G4TZM; Nov 6—The IARU by G0CCI.

Loughton & District ARS: Dave Thorpe G4FKI, 44 Townfield Road, Flitwick. Meets alternate Fridays, 7pm in Loughton Hall, Rectory Lane, Loughton. Oct 10—Informal; 24th—144MHz DF Hunt; Nov 7—Informal.

Fife

Glenrothes & District ARC: Kenneth M. Riddoch GM3ZSP, Garland Cottage, South Road, Cupar. Meets Wednesdays and 3rd Sundays, 7.30pm in Provosts Land, Leslie. Oct 19—AGM.

Glamorgan

Rhondda ARS: John Howells GW4BUZ (Tonypandy 432542). Meets Thursdays, 7.30pm in the NUM Club, Tonypandy. Oct 16—SWR and All That by John Case.

Swansea ARS: R. Williams GW4HSH (Swansea 404422). Meets 1st and 3rd Thursdays, 7.30pm in Lecture Room N, Applied Sciences Building, Swansea University.

Gloucestershire

Cheltenham ARA: Tim Kirby G4VXE (Cheltenham 36723). Meets 1st and 3rd Fridays, 7.30pm in the Stanton Room, Charlton Kings Library, Cheltenham. Oct 17—G3IEE talks on his Wartime Equipment Collection; Nov 7—Junk Sale.

Cirencester & District ARC: G. R. Hayter G0AZD (Cirencester 5015). Meets alternate Thursdays, 8pm in the Phoenix Centre, Cirencester. Next meetings are Oct 23; Nov 6.
Stroud ARS: P. R. Gainey G0DZM, Prencott, Harley Wood, Nailsworth, Stroud. Meets in Nelson School, Stratford Road, Stroud. Next meetings Oct 15; 29th; Nov 12.

Grampian

Aberdeen ARS: Don Travis GM4GXD (Pitcapple 251). Fridays, 7.30pm at 35 Thistle Lane, Aberdeen. Oct 10—40th Anniversary Cheese & Wine Evening; 17th—Microwave demo; 24th—40 Years of Amateur Radio by Members; 31st—40 Years Halloween Night; Nov 7—40th AGM.

Greater Manchester

South Manchester RC: D. Barber (061-973 0395). Meets Mondays and Fridays, 8pm in the Sale Moor CC, Norris Road, Sale. Oct 10th—Six Metre Update 2 by G4HON; 17th—Cryogenics by G3VIW; 24th—Mystery Talk; 31st—Pumpkin Hunter's DF.
Stockport RS: Mel Betts G4FFW (061-224 7880). Meets 2nd and 4th Wednesdays, 8pm in the Magnet Inn, Wellington Road, Stockport. Oct 15—Natter Night; 22nd—Shocks and Socks by G4SSN; Nov 12—G3FYE Lecture by G3LX.

Gwent

Abergavenny & Nevill Hall ARC: J. B. Davies GW4XQH (Abergavenny 4655). Meets Thursdays, 7.30pm in Pen-Y-Fal Hospital, above Male Ward 2. Oct 16—Meteor scatter by G4ASR.

Gwynedd

Merion ARS: Brian Viney GW4KDP, 10 Heol Meirion, Barmouth. Meets 1st Thursdays, 7.30pm in the Dolserau Hall Hotel, Dolgellau. Nov 6—Remote Controlled Aircraft by GW4KDP.

Hampshire

Andover RAC: Mike Adams G0AMO (Andover 51593). Meets 1st and 3rd Wednesdays, 8pm in the Wolversdene Club, Love Lane, Andover. Oct 15—Counterpoise Design; Nov 5—Fireworks in the Shack by G4THW.
Basingstoke ARC: Dave Burleigh G4WIZ (Tadley 5185). Meets 1st Mondays, 7.30pm in the Forest Rings CC, Sycamore Way, Winklebury, Basingstoke. Nov 3—Constructors Competition.
Fareham & District ARC: Alan Chester (Fareham 288139). Meets Wednesdays, 7.30pm in the Porchester CC, Westlands Grove, Porchester. Oct 15—Natter Night; 22nd Lecture; 29th—Natter Night; Nov 5—RFI versus EMC by Alan; 12th—Natter Night.
Horndean & District ARC: Dan Bernard G4RLE, 36 Guildford Road, Fratton, Portsmouth. Meets 1st Thursdays, 8pm in Marchiston Hall, London Road, Horndean. Nov 6—Metal Detection.
Itchen Valley RC: M. E. Cheeseman G1IPQ (Southampton 736784). Meets alternate Fridays, 7.30pm in The Scout Hut, Brickfield Lane, Chandler's Ford, Eastleigh. Oct 10—Dave Chater-Lea of the Repeater Group.
Three Counties ARC: Keith Tupman G0BTU (Petersfield 66489). Meets alternate Wednesdays, 8pm in The Railway Hotel, Liphook. Oct 15—OSCAR Operation by G3RWL; 29th—On Air Night; Nov 12—HF Mobile Antennas by G3NDI.
Winchester ARC: Gordon Crittell G4ZNO (Southampton 772191). Meets 3rd Saturdays, 7.30pm in The Log Cabin, Stockbridge Road, Winchester. Oct 17—Film Evening.

Hereford & Worcester

Bromsgrove ARS: Bob Stacey (Bromsgrove 33959). Meets 2nd and 4th Tuesdays, 8pm in the Aston Field WMC, Stoke Road, Bromsgrove. Oct 10—Marine Radio by Mic McConville.
Hereford ARS: F. E. G. Cox, 35 Thompson Place, Hereford. Meets 1st and 3rd Fridays, 8pm in the County Council CD HQ, Gaol Street, Hereford. Oct 17—Informal; Nov 7—Annual Junk Sale.
Worcester & District ARC: Derek Batchelor G4RBD (Worcester 641733). Meets 1st and 3rd Mondays, 8pm in the Odd Fellows Hall, New Street, Worcester. Oct 20—Informal; Nov 3—Club Night.

Hertfordshire

Borehamwood & Elstree ARS: Tony G0DDJ (01-207 3809). Meets 2nd Mondays, 7.30pm in The Organ Hall Club, Bairstow Close, Borehamwood. Oct 13—QRP Demo and Lecture by G3JPJ.
Stevenage & District ARS: Peter Daly G6EDA (Stevenage 724991). Meets 1st and 3rd Tuesdays in Sitec Ltd, Ridgemond Park, Telford Avenue, Stevenage. Oct 21—Lundy Islands DXpedition by G5LP; Nov 4—Organising Stevenage 40 Year Festival.
Welwyn Hatfield ARC: Dave Fairbanks G0AII (Welwyn Garden 326138). Meets 1st and 3rd Mondays, 8pm in Knightsfield Scout HQ, Welwyn Garden City. Oct 20—Film/Video Show; Nov 3—80m c.w. QRP Rig Construction by G3BYG.

Humberside

Grimsby ARS: George Smith G4EBK (Grimsby 887720). Meets Thursdays, 7pm in the Cromwell SC, Cromwell Road, Grimsby. Oct 16—Grand Junk Sale.
Hull & District RS: David Potter G0DMP, 102 Normandy Avenue, Beverley. Meets Fridays, 8pm in the West Park RC, Walton Street, Hull. Oct 10—DF Hunt at Peter Pan Park, 1900GMT; 17th—Social Evening; 24th—Technical Video by G4VSP; 31st—Preparation for Autumn Used Equipment Sale; Nov 2—Autumn Used Equipment Sale.

Isle of Man

Isle of Man ARS: Anthea Matthewman GD4GWQ (Douglas 22295). Meets Mondays, 8pm in the Howstrake Hotel, Onchan; Tuesdays in the Peverill Court Hotel, Ramsey; Thursdays in the Tynwald Inn, St Johns; Fridays in the Perwick Bay Hotel, Port St Mary.

Kent

Biggin Hill ARC: Bob Senft G0AMP (Farnborough 57848). Meets 3rd Tuesdays, 7.30pm in Downe Village Hall, High Street, Downe. Oct 21—Antenna Demonstration.
Darenth Valley RS: L. F. W. Thomas (Swanley 63368). Meets last Wednesdays, 8pm in the Crockenhill Village Hall, Swanley. Nov 12—Satellites in Space Video.
Edenbridge ARS: J. Grevatt (East Grinstead 24748). Meets 2nd Wednesdays in the Scout Hut, High Street, Edenbridge. Nov 12—Junk Sale.
East Kent ARS: A. G. Stone G4UPJ, 86a Joy Lane, Whitstable. Meets 1st and 3rd Thursdays, 7.30pm in Herne Bay YC, The Cabin, Kings Road, Herne Bay.
S.E. Kent YMCA ARC: John Dobson (Dover 211638). Meets Wednesdays, 7.45pm in the Dover YMCA, Godwynehurst, Leyburne Road, Dover. Oct 15—Natter Night; 22nd—Top Band Foxhunt; 29th—Natter Night.
Maidstone ARS: Paul Martin G0BUW (Maidstone 30544). Meets Fridays, 7.30pm in the YMCA Sports Centre, Melrose Close, Cripple Street, Maidstone. Oct 10—Natter Night and RAE; 17th—Junk Sale; 24th—Natter Night and RAE; 31st—Construction of Valve 29MHz 100W Amp; Nov 7—Natter Night and RAE.

Lancashire

Bolton & District ARS: Kevin Prince G4TQL (Bolton 55092). Meets Wednesdays, 8pm in the Horwich Leisure Centre, Victoria Road, Horwich, Nr Bolton.
Bury RS: Miss C. J. Ashworth G1PKO (061-764 5018). Meets Tuesdays, 8pm in the Mosses Y&CC, Cecil Street, Bury. Oct 14—Construction Competition.
Central Lancashire ARC: G. W. Humphrey G1GEM (Leyland 423621). Meets 1st and 3rd Mondays, 8pm in the Priory Club, Leyland. Nov 3—Noggin and Natter; 5th—Trip to Red Rose Radio.
Fylde ARS: H. Fenton G8GG (Lytham St Annes 725717). Meets 1st and 3rd Tuesdays, 7.30pm in the Kite Club, Blackpool Airport. Oct 21—Informal with Morse Class; Nov 4—Equipment Sale.
East Lancs ARC: Stuart Westall G6LXU (Accrington 887385). Meets 1st and last Tuesdays, 7.30pm in the Conservative Club, Cliffe Street, Rushton. Oct 28—Informal; Nov 4—Home Construction Contest.
Oldham ARC: Kath Catlow G4ZEP (061-624 7354). Meets Thursdays, 8.30pm in the Moorside Conservative Club, Ripponden Road, Moorside, Oldham. Oct 16—Clandestine Radio by G3LEQ; 18/19th—GB4TMR Scout Jamboree; 23rd—Evening on the Air.
Wigan & District ARC: Jim Cooke G6TYB (Wigan 214969). Meets Wednesdays, 7.30pm in St Judes Club, Poolstock Lane, Wigan.
Wigan-Douglas Valley ARS: Dave Snape G4GWG (Wigan 211397). Meets Thursdays, 8pm in the Standish CC, School Lane, Standish. Oct 16—JOTA Discussion; 30th—Getting Started on 10GHz by G8SIG; Nov 6—Surplus Equipment Sale.

Lincolnshire

Sleaford & District ARC: Dave Beilby G2HHK (Sleaford 304454). Meets 3rd Sundays, 7.45pm in Hale Magna Village Hall, Great Magna. Oct 26—Satellite Working by G4CUO.
Stamford & District ARS: David Bradberry G4OZM (Stamford 54433). Meets 2nd and 4th Wednesdays in the Scotgate Cellar Bar, Stamford.

London

Acton, Brentford & Chiswick ARC: W. G. Dyer G3GEH, 188 Gunnersbury Avenue, Acton, London. Meets 3rd Tuesdays, 7.30pm in the Chiswick Town Hall, High Road, Chiswick, London W4. Oct 21—Members' Holiday Activities.
Southgate ARC: D. C. Elson G4YLL (Waltham Cross 30051). Meets 2nd Thursdays, 7.30pm in the Holy Trinity Church Hall, Green Lanes, Winchmore Hill N21. Oct 9—DBS and ATV Lecture; 23rd—Informal Evening.
Wimbledon & District ARS: George Cripps G3DWW (01-540 2180). Meets 2nd and last Fridays, 7.30pm in the St John Ambulance HQ, 124 Kingston Road, London SW19.

Oct 10—AGM; 31st—Surplus Equipment Sale.

Merseyside

Wirral ARS: R. E. Bridson G3VEB, 14 Zig Zag Road, Wallasey. Meets 1st and 3rd Wednesdays, 7.45pm in the Club HQ, Ivy Farm, Arrowe Park Road, Birkenhead. Oct 15—Chairman's Night; Nov 5—Receiving Techniques by G3EWZ.

Middlesex

Edgware & District RS: John Cobley G4RMD (Hatfield 64342). Meets 2nd and 4th Thursdays, 8pm in the Watling CC, 145 Orange Hill Road, Burnt Oak, Edgware. Oct 9—Syntony by G4HFL; 23rd—Club History by G3MNO; Nov 13—Lecture by G3RDG.

Thorn EMI (Feltham) ARC: Dave Austen G1EHF (Ashford 251622). Meets alternate Tuesdays in the Thorn EMI S&SC, Mono Lane, Feltham. Oct 21—Natter Night at 5.30pm.

Northamptonshire

Nene Valley RC: M. P. Bayles G6UWS (Wellingborough 71189). Meets Wednesdays, 8pm in the Prince of Wales, Well Street, Finedon. Oct 15—Informal Evening; 22nd—Doomsday Book by Mrs J. Cox; 29th—Informal Evening.

Nottinghamshire

ARC of Nottingham: Ian Miller G4JAE (Nottingham 232604). Meets Thursdays, 7.30pm in the Sherwood CC, Woodthorpe House, Mansfield Road, Nottingham. Oct 9—23cm Night; 16th—Microwave Talk; 23rd, 30th & Nov 6—Activity Nights; 13th-Cellular Radio.

Worksop ARS: Carole Gee G4ZUN (Worksop 486614). Meets 2nd and 4th Tuesdays, 7.30pm in the Woodhouse Inn, Woodend, Rhodesia, Worksop. Oct 21—AGM; Nov 11—Video Night.

Shropshire

Salop ARS: Simon Price G0EIY (Shrewsbury 67799). Meets Thursdays, 8pm in the Olde Bucks Head, Frankwell, Shrewsbury. Oct 9—AGM; 16th—Natter Night; 23rd—Spread Spectrum Communications; 30th—Natter Night; Nov 6—PAL Television Systems by G1TFQ; 13th—Club Station on the Air.

Somerset

Taunton & District ARC: A. Moxon G8ZSP (Taunton 78903). For details of venue contact club secretary.

Yeovil ARC: Eric Godfrey G3GC (Yeovil 75533). Meets Thursdays, 7.30pm in the Recreation Centre, Chilton Grove, Yeovil. Oct 9—Briefing for GB4OYC by G4JBH; 16th—Answers to Questions on h.f. Propagation by G3MYM; 23rd—The W8JK Antenna by G3MYM: 30th—Natter Night; Nov 6—Great Circle Calculations by G3MYM.

Staffordshire

Burton upon Trent & District RS: Mick Cotton G4HBY (Burton upon Trent 33958). Meets Wednesdays at the Stapenhill Institute.

Strathclyde

Ayr ARG: R. D. Harkness (Ayr 42313). Meets alternate Fridays, 7.30pm in the Community Leisure Centre, 24 Wellington Square, Ayr. Oct 17—Safety in the Shack by GM3CTG; 31st—At Home to Visitors; Nov 14—In the Workshop by GM3KJF.

Mid-Lanark ARS: David Williams GM1SSA (Holytown 732403). Meets Fridays, 7.30pm in the Wrangholm Hall, Jerviston Street, New Stevenston, Motherwell.

West of Scotland ARS: Allan Buchan (041-959 4786). Meets Fridays, 7.30pm at 154 Ingram Street, Glasgow. Oct 10—Falklands/Antarctica; 17th—Chat Night; 24th—QSL Buro by GM3ITN; 31st—Chat Night; Nov 7—Arrow Electronics GM0AAJ.

Suffolk

Felixstowe & District ARS: Paul Whiting G4YQC (Ipswich 642595). Meets alternate Mondays, 8pm in the Feathers, Walton High Street, Felixstowe. Oct 16—Visit to East Anglian Daily Times; 20th—Testing and Troubleshooting by G4SYG; Nov 3—Social.

Ipswich RC: Jack Tootill G4IFF (Ipswich 44047). Meets 2nd and last Wednesdays, 8pm in the Rose & Crown Club Room, 77 Norwich Road, Ipswich. Nov 12—Surplus Equipment Sale.

Surrey

308 RC: Bob Chalker G1JRR (01-391 0788). Meets Tuesdays, 8pm in The Coach House, Church Hill Road, Surbiton. Oct 28—Junk Sale, 7.30pm start.

Dorking & District RS: J. Greenwell G3AEZ (Newdigate 77236). Meets 2nd and 4th Tuesdays, 8pm in the Star & Garter Hotel, Dorking and Ashcombe School, Dorking. Oct 14—Informal in Star & Garter; 28th—RAYNET; Nov 11—Informal in S & G.

Surrey Radio Contact Club: J. L. Simpkins (01-657 0454). Meets 1st and 3rd Mondays, 8pm in The Waldrons, TS Terra Nova, South Croydon.

Sutton & Cheam RS: Geoff G4FKA (Epsom 21349). Meets 3rd Fridays, 7.30pm in the Downs LT Club, Holland Avenue, Cheam. Oct 17—Junk Sale; Nov 3—Natter Night.

Thames Valley ARTS: John Pegler G3ENI (East Horsley 4279). Meets 1st Tuesdays, 8pm in the Thames Ditton Library, Watts Road, Giggshill, Thames Ditton.

Sussex

Crawley ARC: David Hill G4IQM (Crawley 882641). Meets 2nd and 4th Wednesdays, 8pm in the United Reform Church, Ifield Drive, Ifield. Oct 26—Microwave Modules Visit; Nov 12—Junk Sale at TS Cossack, London Road.

Eastbourne E & ARC: Richard Peirce G1BRC (Eastbourne 29913). Meets Sundays, 7.30pm at the Archery Youth Centre, Seaside Road, Eastbourne.

Hastings E&RC: Dave Shirley G4NVQ (Hastings 420608). Meets 3rd Wednesdays, 7.45pm in the West Hill CC, Croft Road, Hastings, and on Fridays, 8pm in the Club House, Downey Close, St. Leonards-on-Sea. Oct 15—Junk Auction.

Southdown ARS: R. Wilson G1BAB (Eastbourne 890234). Meets 1st Monday, 7.30pm in Chaseley Home, Southcliff, Eastbourne, and Tuesdays and Fridays in the Wealdon Council Offices, Vicarage Field. Hailsham. Nov 3—Microwaves by G4PRJ.

Worthing & District ARC: Roy Jones G4SWH, POB 599, Worthing. Meets Wednesdays, 7.30pm in Lancing Parish Hall, South Street, Lancing. Oct 15—Ragchew evening; 22nd—SSTV; 29th—Ragchew Evening.

Tyneside

Sunderland ARS: Nigel Marston G0ASM (091-528 8079). Meets Mondays and Thursdays, 7pm in The Brewery, Westbourne Road, Sunderland.

Warwickshire

Atherstone ARC: Roy Fuller G6YQU (Nuneaton 370600). Meets 2nd and 4th Mondays, 7.30pm in the Physics Lab, Atherstone Upper School, Long Street, Atherstone.

Stratford upon Avon & District ARC: David Boocock G8OVC (S-u-A 750584). Meets 2nd and 4th Mondays, 7.30pm in the Baptist Church, Payton Street, S-u-A. Oct 13—How Safe is Your Shack?; 27th—Film; Nov 10—Converting Commercial Equipment.

Mid-Warwicks ARS: Stan Hobbs G6XRI (Kenilworth 53099). Meets 2nd and 4th Tuesdays, 8pm at 61 Emscote Road, Warwick. Oct 14—Film Night at Warwick School; 28th—Technical Topics; Nov 11—Junk Sale.

West Midlands

Coventry ARS: Robin Tew G4JDO (Coventry 73999). Meets Fridays, 8pm in Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Oct 10—Night on the Air; 17th—DIY Forum; 22nd—Visit; 24th—Night on the Air; 31st—Construction Competition.

Midland ARS: Tom Brady G8GAZ (021-357 1924). Meets every week night in Unit 5, Henstead House, Henstead Street, Birmingham 5. Oct 21—AGM.

Mirfield RC: Mrs. K. F. Field, c/o Club Address. Meets Mondays, Tuesdays, Wednesdays and Thursdays, 7pm in the Mirfield CC, Yockleton Road, Lea Village, Birmingham.

Willenhall & District ARS: John Phillips G4UPF (Wombourne 782076). Meets Wednesdays, 8pm in the Cross Keys, Lucknow Road, Willenhall.

Wolverhampton ARS: Keith Jenkinson G1OIA (Wolverhampton 24870). Meets Tuesdays, 8pm in the Wolverhampton Electricity S&SC, St Marks Road, Chapel Ash, Wolverhampton. Oct 14—The Skin Effect Discussed; 21st—RTTY by G8VXY; 26th—DF Hunt; 28th—Night on the Air; Nov 4—Members Slide & Film Show; 11th—Power Transistors Discussed.

Yorkshire

Halifax & District ARS: D. L. Moss G0DLM (Halifax 202306). Meets 3rd Tuesdays, 7.30pm in the Running Man, Pellon Lane, Halifax. Oct 21—Morse by G4SON.

Keighley ARS: Kathy Conlon G1IGH (Bradford 496222). Meets last Tuesdays, 8pm in the Victoria Hotel, Keighley. Oct 14—Informal Meeting; 28th—Junk Sale; Nov 11—Informal Meeting.

Maltby ARS: Ian Able G3ZHI (Rotherham 814911). Meets Fridays, 7pm in the Church Building, Church Lane, Maltby. Oct 10—Ex-War Dept RX & Aligning Them by G1GAQ; 17th—Cheese & Home-Brew Wine Party; 24th—Scanning RX—What's to be Heard by G3ZHI; 31st—Amateur Radio—The Early Days by G3BW.

Otley ARS: Howard Davey G0CLD (Otley 464213). Meets Tuesdays, 8pm in the RAOB Club, Westgate, Otley.

Pontefract & District ARS: Colin Mills G0AAO (Pontefract 43101). Meets Thursdays, 8pm in the Carleton CC, Pontefract. Oct 9—Visit by Goole ATS for ATV Demo; 16th—RAYNET Junk Sale; 23rd—Informal; 30th—Committee Meeting; Nov 6—AMTOR by G1BLT; 13th—On the Air

Night from South Kirkby Town Council HQ.

Sheffield ARS: Peter Day G3PHO (Sheffield 681216). Meets 1st and 2nd Mondays, Firth Park Pavilion. Oct 13—AGM; 22nd—RAE & RAYNET; Nov 2—Annual Construction Competition.

Spen Valley ARS: Ian Jones G4MLW (Heckmondwike 409739). Meets Thursdays, 8pm in the Old Bank WMC, Mirfield. Oct 16—Sea Cadet Corps Communications by G4SCC; Nov 6—Steam Engines by G3YPC.

Todmorden & District ARS: Val Mitchell G1GZB (Todmorden 7572). Meets 1st and 3rd Mondays, 8pm in the Queen Hotel, Todmorden. Oct 20—D. Simpson of Ant Products.

Wakefield & District RS: Walter Parkin G8PBE (Wakefield 378727). Meets alternate Tuesdays, 8pm in the Ossett CC, Prospect Road, Ossett. Oct 14—WRS Members on the Air Competition; 21st—Home Constructon Display; 28th—Bonfire Party; Nov 4—Talk by G4JKH; 11th—Radio Theory by G3WWF.

News of future events to **Elaine Richards G4LFM**, *Practical Wireless*, **Enefco House, The Quay, Poole, Dorset BH15 1PP**, marked "Club News", please.

North Wakefield RC: S. Thompson G4RCH (Morley 536633). Meets Thursdays, 8pm in the White Horse, Fall Lane, East Ardsley. Oct 16—Photo Night; 23rd—DX Chasing by G4RCG; 30th—Monthly Meeting; Nov 6—Talk by Jack G4OOC; 13th—On the Air.

White Rose ARS: Steve Clack G4YEK (Harrogate 884481). Meets Wednesdays, 8pm in the Moortown RUFC, Moss Valley, King Lane, Leeds. Oct 15—The TDZ Portable Transceiver by G3TDZ; 22nd—Natter Night; 29th—Microwaves for Beginners by G3PYB.

SWAP SPOT

Got a camera, want a receiver? Got a v.h.f. rig, want some h.f. gear to go with your new G-zero? In fact, have you got anything to trade radio-wise?

If so, why not advertise it FREE here. Send details, including what equipment you're looking for, to "SWAP SPOT", *Practical Wireless*, Enefco House, The Quay, Poole, Dorset BH15 1PP, for inclusion in the first available issues of the magazine.

A FEW SIMPLE RULES: Your ad. should follow the format of those appearing below, it must be typed or written in block letters; it must be not more than 40 words long including name and address/telephone number. Swaps only—no items for sale—and one of the items MUST be radio related. Adverts for ILLEGAL CB equipment will not be accepted.

The appropriate licence must be held by anyone installing or operating a radio transmitter.

Have Trio 9R-59DS h.f. communications receiver, built-in a.t.u., mechanical filter, signal meter and socket for use in-line with a transmitter. Would exchange for early type scanner in working order. Mike, 25 Moss Lane, Burcough, Lancs L40 4AS. Tel: 0704 892088. *B742*

Have Class D wavemeter, meters, valves, switches and stamp lists. Would exchange for s.s.b. adapter Grundig (Satellit); 3D views, camera, quality cassettes, fun holiday. Would exchange for w.h.y.? 25 Glenmore Road, Birkenhead, Cheshire L43. *B747*

Have Yaesu FT-290, Realistic PRO2003 scanner, CWR600, c.w./RTTY reader, MM144/100S 144MHz 100W linear, Saisho TCR500S portable/mains TV stereo radio cassette. Total new £1,028. Would exchange for all-band h.f. transceiver, e.g. FT-102, IC-740, FT-902DM or w.h.y. Chris. Tel: 02407 5036. *B749*

Have 128K Sinclair Spectrum Interface joystick and a few good games, five months old. Cost £250. Unwanted executive toy. Would exchange for FT-290 or equivalent. Mark. Tel: 01-621 5106 (day) or 01-850 3520 (evenings). *B750*

Have complete camera, processing outfits, including Olympus OM40, ON 30 cameras with flash, winder, lenses, etc., plus darkroom, enlarger, p/tank, chemicals, lots more. Two months old, cost £820. Would exchange for good all band h.f. transceiver, w.h.y.? Chris. Tel: 02407 5036. *B752*

Thanet Electronics/Retail.

Everything you need for your shack is available from Thanet Electronics' retail shop. Andy G6MRI is on hand with new and secondhand stock from ICOM plus Yaesu, Trio, MET, Tono, Jaybeam, Welz, Drae, BNOS and many more. RSGB publications also available, if Andy can't help, you've got a problem. Why not call in, we are on the corner of Stanley Road and Kings Road, Herne Bay, Kent and open 9 – 5.30 mon-sat, lunch is 1-2.15, ½-day closing thursday afternoons open 9-1.00. BCNU.

Credit facilities available, plus VISA & ACCESS accepted.

Thanet Electronics Ltd. ICOM The World System

2 Stanley Road, Herne Bay, Kent CT6 6SH. Tel: 0227 369464.

£500 of Electronic Equipment to be WON in the new Cirkit catalogue.

★ £8 worth discount vouchers
★ 164 pages featuring over 3,000 products.
★ Many new products, plus all the old favourites
★ £500 worth of electronic equipment and components to be won in our catalogue competition.
★ On sale at your newsagent from 16th October, or direct from the address below.

Access VISA

Cirkit Distribution Ltd

Park Lane, Broxbourne, Herts, EN10 7NQ Tel: (0992) 444111. Tlx: 22478

RST

MAIL ORDER CO.
Langrex Supplies Ltd.,
Climax House,
159 Fallsbrook Road,
Streatham, SW16 6ED.

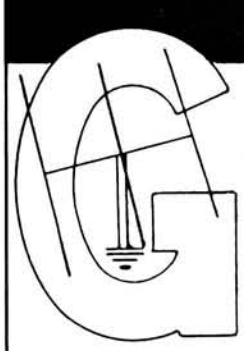
SPECIAL EXPRESS MAIL ORDER SERVICE

	£ p								
AZ31	2.75	EM81	2.50	PL509	6.00	6AK5	5.99	6KD6	8.00
CL33	4.00	EM87	2.50	PL519	6.00	6AL5	1.50	6L6G	3.00
DY86/7	1.50	EN91	6.50	PL802	6.00	6AM6	6.02	6L6GC	5.75
DY802	1.50	EY51	2.75	PY33	2.50	6AN5	4.75	6L7	2.50
E88CC	10.33	EY86	1.75	PY81	1.50	6AN8A	3.50	6LQ6	7.50
E180F	12.05	EY88	1.75	PY82	1.50	6AQ5	3.25	6Q7	3.75
E810F	35.48	EY500A	3.00	PY83	1.25	6AR5	25.00	6RHH8/6KN8	10.00
EABC80	1.25	EZ80	1.50	PY88	2.00	6AS6	8.66	6SA7	3.00
EB91	1.50	EZ81	1.50	PY500A	4.00	6AS7G	8.75	6SC7	2.75
EBF80	1.50	GY501	300	PY800	1.50	6AT6	1.25	6SJ7	3.25
EBF89	1.50	GZ32	4.00	PY801	1.50	6AU5GT	5.00	6SK7	3.50
EC91	8.00	GZ33	4.75	QQV02-6	38.00	6AU6	2.50	6SL7GT	3.00
ECC33	4.50	GZ34	4.00	QQV03-10	26.25	6AW8A	3.75	6SN7GT	3.00
ECC35	4.50	GZ37	4.75	QQV03-20A	48.38	6B7	3.25	6SS7	2.75
ECC81	1.75	KT61	5.00	QQV06-40A	46.00	6B8	3.25	6SG7M	2.50
ECC82	1.75	KT66	15.00	QV03-12	6.80	6BA6	1.50	6U8A	2.25
ECC83	1.75	KT77 GOLD	12.00	R18	3.00	6BA7	5.00	6V6GT	4.25
ECC85	1.75	KT88 LION	20.00	R19	9.24	6BE6	1.50	6X4	3.00
ECC88	3.50	N78	15.00	SP41	6.00	6BH6	2.50	6X5GT	1.75
ECC91	8.93	OA2	3.25	SP61	4.00	6BJ6	2.25	12AX7	1.75
ECF80	1.50	OB2	4.35	U19	13.75	6BN6	2.00	12BA6	2.50
ECH35	3.00	OC3	2.50	U25	2.50	6BQ7A	3.50	12BE6	2.50
ECH42	3.50	OD3	2.50	U26	2.50	6BR7	6.00	12BY7A	3.00
ECH81	3.00	PC86	2.50	U37	12.00	6BR8A	3.50	12E1	20.00
ECL80	1.50	PC88	2.50	UABC80	1.25	6BS7	6.00	12HG7	4.50
ECL82	1.50	PC92	1.75	UBF89	1.50	6BW6	6.00	30FL1/2	1.38
ECL83	3.00	PC97	1.75	UCH42	2.50	6BW7	1.50	30P4	2.50
ECL86	1.75	PC900	1.75	UCH81	2.50	6BZ6	2.75	30P19	2.50
EF37A	5.00	PCF80	2.00	UCL82	1.75	6C4	1.25	30PL13	1.80
EF39	2.75	PCF82	1.50	UCL83	2.75	6C6	3.50	30PL14	1.80
EF41	3.50	PCF86	2.50	UF89	2.00	6CB6A	2.50	572B	55.00
EF42	4.50	PCF801	2.50	UL41	5.00	6CD6GA	5.00	805	45.00
EF50	2.50	PCF802	2.50	UL84	1.75	6CL6	3.75	807	3.75
EF54	5.00	PCF805	1.70	UY41	2.25	6CH6	13.00	811A	18.33
EF55	3.50	PCF808	1.70	UY85	2.25	6CW4	8.00	812A	42.00
EF80	1.75	PCH200	3.00	VR105/30	2.50	6D6	3.50	813	65.00
EF86	3.50	PCL82	2.00	VR150/30	2.50	6DQ5	6.50	866A	35.00
EF91	2.95	PCL83	3.00	Z759	25.00	6DQ6B	4.75	872A	20.00
EF92	6.37	PCL84	2.00	Z803U	25.00	6EA8	3.00	931A	18.50
EF183	2.00	PCL85	2.50	2D21	3.25	6EH5	1.85	2050	7.50
EF184	2.00	PCL86	2.50	3B28	50.00	6F6	3.00	5763	4.50
EH90	1.75	PCL805	2.50	4CX250B	58.00	6Gk6	2.75	5814A	4.00
EL32	2.50	PD500	6.00	5R4GY	5.50	6H6	3.00	5842	12.00
EL33	4.00	PFL200	2.50	5U4G	3.00	6HS6	3.77	6080	14.00
EL34	4.00	PL36	2.50	5V4G	2.50	6J5	4.50	6146A	12.00
EL36	2.50	PL81	1.75	5Y3GT	2.50	6J6	8.93	6146B	12.00
ELL80	19.00	PL82	1.50	5Z3	4.00	6J7	4.75	6550	8.00
EL81	5.25	PL83	2.50	5Z4GT	2.50	6JB6A	6.50	6883B	12.50
EL84	2.25	PL84	2.00	6/30L2	1.75	6JE6C	7.50	6973	7.50
EL86	2.75	PL504	2.50	6AB7	3.00	6JS6C	6.00	7025	3.00
EL91	7.39	PL508	5.50	6AH6	5.00	6K6GT	2.75	7027A	8.00
EL95	2.00					6K7	3.00	7360	10.00
EL360	18.50					6K8	3.00	7586	15.00
								7587	23.00

Open daily to callers: Mon-Fri 9 a.m.-5p.m.
Valves, Tubes and Transistors – Closed Saturday
Terms C.W.O. only, allow 7 days for delivery. Tel. 01-677 2424/7.
Prices excluding VAT add 15% — Quotations for any types not listed S.A.E. — Post and packing 50p per order — Telex 946708

Prices correct when going to press

USED AMATEUR EQUIPMENT?



I Buy, Sell & Exchange!

SELLING? Is your Used Equipment in First Class Condition? Want the VERY BEST CASH PRICE, with the least hassle and no waiting months for your ads to appear??

BUYING?? Whether looking for the largest or smallest item in Amateur Radio, you can save money by buying from our stock of TOP QUALITY USED AMATEUR EQUIPMENT!!

For the Deal You've been Looking for, Phone Dave, G4TNY
ON HORNCHURCH (04024) 57722 or Send SAE for List.
(Personal callers by appointment only please) MONDAY TO SATURDAY, 9 am to 7 pm

G4TNY AMATEUR RADIO

MAIL ORDER — **132, Albany Road, Hornchurch, Essex RM12 4AQ** — **PART EXCHANGE**

ON THE AIR

AMATEUR BANDS

Reports to: John Fell G0API, 14 Rectory Avenue, Corfe Mullen, Wimborne, Dorset BH21 3EZ

by John Fell G0API

For those of us in the Northern hemisphere and interested in the v.h.f. and u.h.f. amateur bands now is the beginning of the autumnal "tropo" season. With the shortening days, and some warming effects from the Sun's rays, the months of October and November more often than not produce some of the best DX available.

What actually constitutes DX is totally subjective and can be influenced by many factors including your site, its proximity to natural obstacles, such as hills, mountains, position above sea level, antenna height, size, gain and so on. In the final analysis you must build up a mental "profile" of your station and its normal capabilities in order to readily recognise what are loosely known as "lift conditions". This capability appreciation will also be invaluable when you eventually upgrade your equipment.

A method that I use and highly recommend when evaluating a site is to first listen carefully over a period of several days—the longer the better—and log all regularly observed radio sources. Within Europe, in particular, the presence of many fixed power and beam heading beacons and repeaters will ensure a reasonable geographical distribution. Note carefully the "average" signal levels and, with an eye to newspaper and TV weather forecasts (BBC1 6.30p.m. highly recommended), attempt to relate the passage of weather systems and their effects on the known signal sources.

Any obvious enhancement will provide you with a ready guide to the intensity and probable area of any subsequent activity on the amateur bands. Do not be surprised if the enhancement occurs over discrete distances—a repeater at 100km may increse in level by several S-points, but sources beyond reduce below the norm. Conversely and obviously of more interest the "short path" signals will reduce and stations located at 500–1000km will dominate. Such occurrences during tropo openings are the result of signal ducting created by temperature boundaries within the Troposphere—the depth of such ducts dictating the maximum wavelength and lowest frequencies that can be propagated.

Best periods to look for this form of enhancement occur with stationary or slow moving decaying high pressure systems with, at this time of year, foggy weather providing a very good clue. Old hands at tropo DX chasing will tell you that they can smell the DX!

However, even armed with this basic knowledge for the transmitting station all can come to nought if you do not make the most of it and let's face it we all (I hope) deep down enjoy the thrill of abnormal contacts. Arm yourself with as much readily available data as you can. Detailed beacon and repeater lists can be obtained from the RSGB and will be of great assistance—just because a beacon is located in northern LA and beams east does not mean you will never hear it—you probably won't but it's a very good feeling to jot down some odd c.w. characters, refer to the listings and realise it could be your best yet DX.

I often hear stations engaged in long QSOs (rag chews) during lifts—nothing essentially wrong here—but when the same stations bemoan the lack of DX this must point to a basic lack of understanding. Make the most of it while it lasts, call CQ (but check the frequency is clear first) and do provide location details, beam heading, etc. Nothing infuriates people more than hearing "CQDX" and no indication of the station's location—yes you can refer to the callbook, but good propagation periods should be utilised to the full at the time, they won't wait for you, and a little more thought will assist everyone.

Once again be prepared for a "pile up" many of which may be from well outside your own country—pick out an anchor point such as the prefix and ask for the GM4 . . . only to repeat. Call for specific countries, counties or whatever but make yourself clear, above all else be polite—there will always be the odd "not so DX" to you or QRP call. Remember everyone has to start somewhere, we *all* make mistakes and your bad operating procedures can be emulated by the newcomer as well as the good—it's all about self-tuition. Send me your logs folks!

OK, enough of that and on to some actual happenings on the bands. 14MHz seems to predominate in this month's postbag with many correspondants referring to the high levels of QRM/QRN but you soldier on! **Michael Sargeant** of Bolton, Lancs, uses a Racal RA17 MK II RX with a Datong active antenna, and logged several interesting stations including JA6NAC, TF1PS, ZS6AON and FY5YE in French Guiana. **Roy Deg,** Stoke-on-Trent, heard activity from the US Virgin Isles, CE3ESS in Chile working VK2AVA via long path, a personal first and LZ1DP/G3IOR (so that's where you went for your hols, Pat) in QSO with GB3RAF at Cranwell—this and more from a DX300 plus long wire and a.t.u. combination.

A well detailed station breakdown and log from **Angela Sitton BRS88639,** Stevenage, indicates a high level of s.w.l. activity going on, with herself and OM taking the RAE very soon. An end-fed wire and HR 10b pulled in many interesting stations including V2PAB/P/4U, UN Syria, DX9HT on the Philippines, YB5DDS, Indonesia, EJ5EP, Saltee Isle DXpedition (QSL via ON5KL) and KP2AH at St Croix, on the Virgin Isles, who was working a fellow naval officer W4CDK/REG.1/MM. Newcomer s.w.l. **Ian McLuckie** of Darvel, Ayrshire, used his Trio 9R59DS plus G5RV to log several countries including BY, LZ and YV.

On 21MHz Angela Sitton managed K6IRF, W7GN and VE1NG together with plenty of 28MHz band activity which included PY7ZZ, OX3JZ at 59, both heard on July 12, with July 21 bringing WB2KQE.

Phil Dykes G4XYX, Poole, Dorset, needs no introduction and once again proves that 28MHz is not dead! The 2-element quad and a maximum of 10W p.e.p. produced s.s.b. QSOs with amongst others, C30BAN (QSL via F6HWH), OH0RJ (described as a local!), OY3OZ (QSL via OZ1GTY), UA6ADC and ZB2AZ. Via E back scatter G4XBP in Manchester and ON5SD.

My own log shows 28MHz/50MHz cross-band contacts with DK3SR (EJ67F) and EA3BTZ in Barcelona, both on 19 July.

In band contacts on 50MHz, using a 5-element NBS Yagi, *PW* Meon Transverter + 10W p.a. include many G stations (G8FG remarked that it was his second QSO on 50MHz in nearly 40 years!) together with LA6QBA/P (JP61BJ), ZB2BL (using the p.a. of the ZB2VHF beacon), EA1MO (using 1W to a 2-element Yagi at 5m a.g.l.) and CT1WW (WB36B) who was equally strong on 70MHz during mid June.

This year's v.h.f. NFD provided activity up to 2·3GHz and I was pleased to observe and work several stations on the highest band. As proof that radio amateurs are, indeed quite mad, I constructed, in conjunction with fellow members of the Flight Refuelling ARS Nick Foot G4WHO and Richard Ayley G6AKG, a 2C39 cavity mixer p.a., stripline RX mixer, Varactor diode 1 to 2GHz doubler and parabolic dish horn feed—all during the 6 days prior to this contest. The first QSO occurred at approximately 0130 between G4WHO/P and G4CVI, a path of some 50km. It was raining at the time, the mode used was f.m., supplied via a pair of IC4E u.h.f. handhelds feeding the EXTERNAL MOD. input of a rather upmarket synthesised signal generator which was in turn multiplied up via a somewhat tortuous route to 2·320GHz. With no r.f. stage and a feeder which was in part UR67, we were pleased to give G4CVI 59+ reports!

Before closing for this month a letter from Andy Porter 5Z4EV Nairobi, corrects his PO Box details which should be 30465 or alternatively QSL via G0BZW. Andy is keen to "give out" as many 5Z4 QSLs as possible before leaving during the next 12 months.

Logs and Reports to arrive with your columnist by October 24 please

RTTY

Reports: as for VHF Bands, but please keep separate.

by Ron Ham BRS15744

Entries were slightly up on last year for the 1986 Spring VHF/UHF RTTY Contest, organised by the British Amateur Radio Teleprinter Group. They have awarded the Ealing Shield to the Worthing & District Amateur Radio Club G3WOR/P and the Southall Shield to Chris Le Tissier GU4YMV, the leading stations in the portable multi-operator and the fixed single operator sections, respectively.

The runners-up in the two sections were the Luton VHF Group G4LOO and Verdegem Helmut ON1BWX/A. Certificates also go to Eric Alderweireldt ON1UI/A and Pembroke & District ARC GW2OP for leading the fixed multi-operator section; Norman Henbury BRS28198, who leads the field of s.w.l.s on the 144 and 432MHz bands and Pam Rose G4STO for an RTTY QSO on 1296MHz. Our congratulations to all. Not forgetting the leading single operators, 9H1EL and ON4UN, in the spring h.f. event, LZ1KDP and LZ2KIM who took first and second places in the multi-operator section and ONL-250 and OH1-100 in the s.w.l. section.

Do you remember readers that if you cannot compete in a contest, BARTG are always pleased to receive your logs of stations copied during events. These, officially known as check-logs, greatly assist their preparation of the final results.

I am pleased to say that the Amateur Radio and Computer Club, formed in the Solent area just over a year ago, now has 180 members ranging from Malta to Scotland. They are publishing an informative bi-monthly journal *AMRAC User* costing £1 or free to members. AMRAC membership is £5 per annum and details are available from Phil Bridges G6DLJ, 9 Hollydene Villas, Southampton Road, Hythe, Hants SO4 5HU.

"During the past 6 months, AX.25 packet radio has taken off in the Solent area with very high levels of activity on 144.675MHz," wrote **Trevor Tugwell G6TJT** from Fareham on August 8. He added, "The group is currently awaiting a licence for a packet repeater, GB3HP, which will hopefully be sited in the Winchester area and should provide good coverage of Hampshire".

During an opening to South America and the West Indies on July 29, **Roy Jones G4SWH** from Worthing copied RTTY signals from FM5WU (Martinique), HC5CG and HC5JB (Ecuador), HI8A (Dominican Republic), PP8II (Brazil), PY1FO (Rio) and VP2MO (Monserrat). "Quite a few stations came booming in through QRM and QSB between 2000 and 2120GMT," wrote Roy. He uses an FT-102, G4MH mini-beam, Sinclair Spectrum computer with G4IDE RTTY program and an ST5C terminal unit for his RTTY activities.

"Datawatch observations this month have not been on the scale of the previous two, but 50 prefixes have been read, covering most continents, though in nothing like the volume and variety which characterised the early summer period," wrote **Len Fennelow G4ODH** from Wisbech. Len copied RTTY signals, on 14MHz, from JA1s working stations in F8, IK, ON5, SM7 and UZ3 and he logged a QSO between SM7 and 9M2. The bulk of the data action this time was on 14MHz, where Len chalked up 18 countries using AMTOR and 46 on RTTY. I copied 23 on RTTY. Details of countries logged in the data modes, between July 15 and August 14, can be seen in Figs. 1 and 2. During the Sporadic-E disturbances on July 19 and August 10, I logged strong RTTY signals, on 28MHz, from OZ2BRP and OZ2CJ.

Country (Prefix)	Band (MHz) 3·5	7	14
Austria (OE)			X
Canada (VE)			X
Chile (CE)			X
England (G)	X		X
Finland (OH)			X
France (F, FE)		X	X
Germany (DF,DJ,DL)	X	X	X
Italy (I,IK,IT)			X
Kuwait (9K)			X
Netherlands (PA)			X
N. Ireland (GI)			X
Poland (SP)			X
S. Africa (ZS4-6)			X
Spain (EA)		X	X
Sweden (SM)			X
Switzerland (HB)		X	X
Venezuela (YV)			X
West Malaysia (9M2)			X

▲ **Fig. 1: AMTOR**

Fig. 2: RTTY ▶

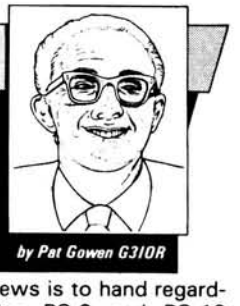
Country (Prefix)	Band (MHz) 3·5	7	14	21	28
Austria (OE)			X		
Balearic Is (EA6)			X	X	
Belgium (ON)			X		
Brazil (PY)			X		
Bulgaria (LZ)			X		
Canada (VE)			X		
Canary Is (EA8)			X		
Ceuta & Melilla (EA9)			X		
Cyprus (5B)			X		
Czechoslovakia (OK)			X		X
Denmark (OZ)			X		X
Eire (EI)			X		
England (G)	X		X		
Estonia (UR1)			X		
Finland (OH)			X		
France (F,FE)	X	X	X	X	
Germany (DF,DJ,DL)	X	X	X		
Greece (SV)			X		
Hungary (HA)			X		
Israel (4X,4Z)			X		
Italy (I,IK,IT)		X	X	X	
Japan (JA,JR)			X		
Lebanon (OD)			X		
Luxembourg (LX)			X		
Morocco (CN)			X		
Netherlands (PA)	X		X		
N. Ireland (GI)			X		
Norway (LA)			X		
Oman (A4X)			X		
Poland (SP)			X	X	
Portugal (CT)			X		
Rumania (YO)			X		
S. Africa (ZS4-6)			X		
Sardinia (IS)			X		
Scotland (GM)			X		
Sicily (IT9)			X		
Spain (EA)		X	X		
Sweden (SM)	X		X	X	
Switzerland (HB)		X	X		
Tanzania (5H)			X		
Turkey (TA)			X		
Ukraine (UT)			X		
USA (W,N)			X		
USSR (UA,UB,UZ)			X		
Yugoslavia (YU)			X		

Don't forget the Autumn VHF RTTY Contest, due to take place on 144MHz between 1800GMT on October 18 and 1200GMT on the 19th. Entries and check-logs from licensed amateurs and s.w.l.s will be welcomed by the BARTG Contest Manager, Peter Adams G6LZB, 464 Whippendell Road, Watford, Herts WD1 7PT. An s.a.e. to Peter will get detailed information about the event.

My thanks to Len, Roy and **Geoffrey Powell** (Tamworth) for their logs and snippets of information which I know helps others.

SPACE & SATELLITES

Reports to: Pat Gowen G3IOR, 17 Heath Crescent, Hellesdon, Norwich, Norfolk NR6 6XD.



by Pat Gowen G3IOR

Current Satellite News

This month we shall again place the emphasis and main content on the new JAS-1 satellite, now in orbit and known as either FUJI or JAPAN-OSCAR-12, JO-12 for short. Let it just be said that the current RS-5 and RS-7 satellites both came back into full time transponder and ROBOT operation following the long period of eclipse, and that OSCAR-10 continues to show further symptoms of loss of memory, with consequent interrupted operations, but that DJ4ZC is working hard for most of the time to reload the function programs to try to keep the satellite operational.

No vital further news is to hand regarding the forthcoming RS-9 and RS-10 spacecraft, and we still await the completion of ISKRA-4.

W5LFL leaves NASA

Dr. Owen Garriott W5LFL, after completing 1650 hours of space flight and operating the very first amateur band "ham-in-space" mission, has resigned from the Astronaut Corps because he wishes to be a consultant rather than have to wait the three or more years until he was able to orbit again.

For the crew radio amateurs, this now leaves only Dr. Tony England W0ORE and Dr. John David Bartoe W4NYZ in the Astronaut Corps, and Dr. Ron Parise WA4SIR, who is not in the Astronaut Corps. It may be quite a number of years before non-pilot personnel are permitted to fly on the Shuttle missions. Thus, as previously thought, we may have a long wait before we see any shuttle amateur radio activity again, expecially as the SAREX operations are normally phased to the scientific missions such as the Spacelab ventures.

On the other hand, it is quite possible

that the USSR may well come up with some similar activity in the not-too-distant future, as a number of the Russian Cosmonauts are known to be amateurs. As the 29MHz band is a likely candidate and the USSR does not have f.m. on this band, the recently heard testing of a transceiver via Es on 29·300MHz s.s.b. may well have a bearing on this. The conversations were entirely in the Russian language, and the word "MIR" was mentioned many times. A special 144MHz f.m. transceiver is now under construction between UK3KP in Moscow and HG5BME at the Technical University of Budapest intended for manned MIR operation when consultations are complete.

Satellite QRP

Many satellite listeners and operators have reported weak signals from the orbiters over the course of the summer months, and sustained periods of deep fading also. In many cases this has been due to the attenuation of the strong distributed "E" layer that has been present in daylight hours, and the fact that all satellite signals have to pass this ionised layer en route to earth. Sporadic-E is a severe attenuator, can completely block signals for short periods, and cause severe flutter. In other words, what is good for terrestrial communications is bad for satellites, and vice-versa.

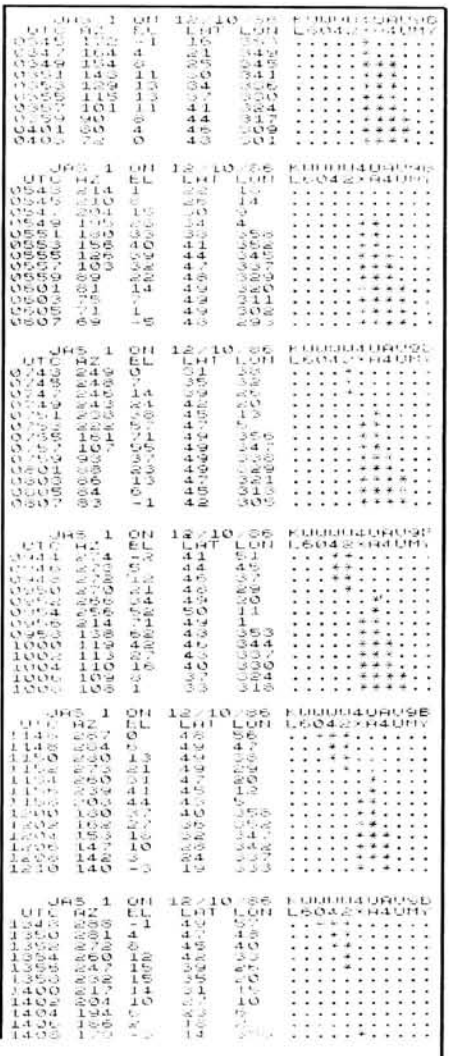
Another problem on the RS satellites is the relatively slow rotation (as the RS satellites are not magnetically or gravitationally stabilised). It means that cross polarisation to one's receiving antenna, to the layer striation itself, and also null lobes persisting from the antenna for long periods, can give sustained fading. This seems to be particularly noticeable from RS-7. We must also remember that the batteries are not at their best, and this is particularly so with RS-5 which in fact is noticeably depressed by the users of unnecessarily high powers, due to battery limitations and not just the a.l.c. system.

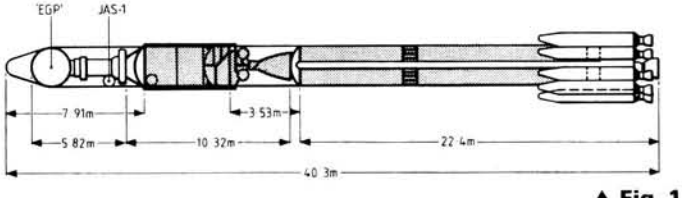
UoSAT-2 (OSCAR-11) has been noticeably weak at times, too, but this is due to quite a different reason. The v.h.f. transmitter is designed so that the d.c. power consumption is directly related to the voltage on the nominal 14V battery voltage, and thus protects the satellite system automatically when the voltage falls toward a 12V value when affected by eclipse. Under these conditions the telemetry shows that the transmitter current falls from some 95 to 62mA, thus producing a corresponding drop in r.f. power out from some 435mW down to 250mW. Although this is less than 3dB, it can cause a noticeably impaired signal-to-noise ratio if the signal is not strong to begin with. A 3dB change to a local terrestrial f.m. signal would never be noticed, but if an e.m.e. operator lost 3dB it would mean the difference between solid QSOs and no QSOs whatsoever.

JO-12

After a series of small postponements due to typhoons at the launch site, the H-1 rocket (Fig. 1) carrying JAS-1, the Geodetic laser reflector ball (called the "EGP"), and some Swedish magnetic flywheel scientific experiments in the second stage, was successfully launched at 2045UTC on Tuesday 14 August 1986.

The full launch network went into opera-





▲ **Fig. 1: H-1 Rocket payload**

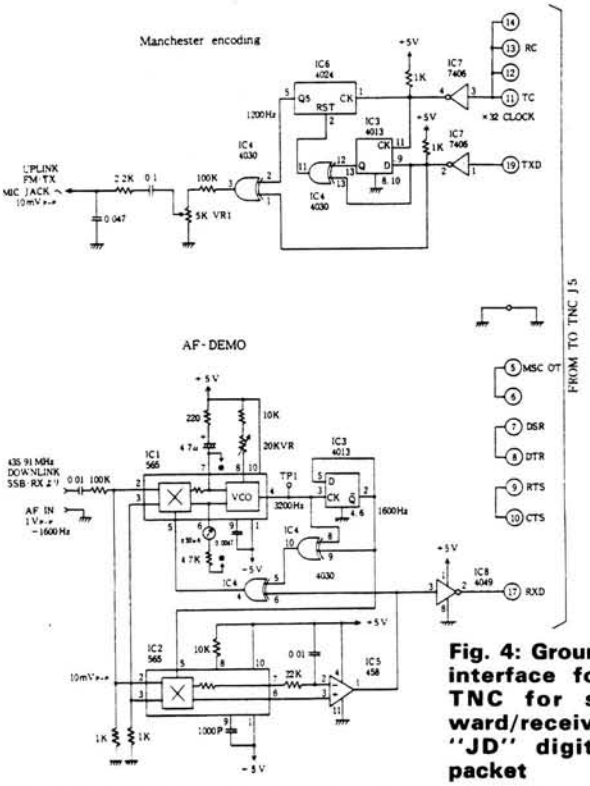


Fig. 4: Ground station interface for AX-25 TNC for store/forward/receive JAS-1 "JD" digital mode packet

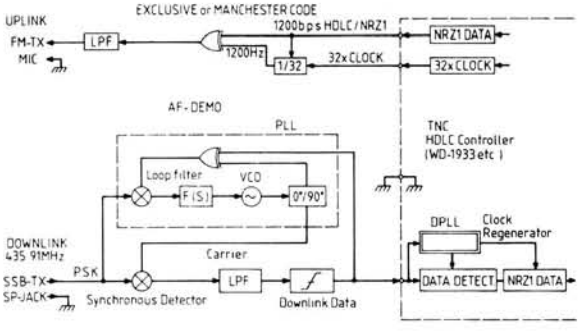


Fig. 2 (top): JAS-1 pass schedule
Fig. 3 (above): Schematic for AX-25 TNC interface to JAS-1
Fig. 5 (below): Screen dump from JAS-1 "JD" mode packet

```
Hello JQ1HXT de JAS-1
Your last access was on 86/10/11 at 0622 UTC

No.  Date     From     To       Subject                    Lines
114  10/11    AMSAT    ALL      PACKET IN ETHIOPIA           8
115  10/11    N7FDA    JQ1HXT   TNC-3 now available         24
116  10/11    GM4IHJ   ALL      Meteor Scatter today        31
119  10/12    AMSAT    ALL      ALINS FOR PHASE-3C          70
122  10/12    9M2CR    ALL      AMTOR - AX.25 gateway       57
123  10/12    F8ZS     ALL      ARSENE update               19
127  10/12    JR1FIG   JQ1HXT   More on Level-3/4 PAD       38

Command (Read/Write/Help/Search/Cancel) ?

Read 114

Posted: Oct. 11, 1986  07:32 UTC
From:   AMSAT
To:     ALL
Subj:   PACKET IN ETHIOPIA

AMSAT has found a considerable amount of interest in
experimenting with packet radio communications systems in
Ethiopia. We thus might be fielding a team of volunteers to
set up some pilot demonstrations/projects, based on amateur
protocols. Pilot projects would involve communications
between refugee feeding centers, health projects, etc. If
anybody out there would be willing to donate 2-4 weeks
sometime early next year, please send us a note.

Command (Read/Write/Help/Search/Cancel) ?
```

tion, with AMSAT-UK providing a minute by minute commentary of events on 3·782MHz, and from AMSAT via WA2LQQ on 14·282MHz. JA1ANG covered the countdown and launch from the Tanakashima launch site in southern Japan. Separation and burn periods were all successfully confirmed as we awaited ejection of the satellite over Chile. Exactly at the separation time of 2147UTC, CE3GA monitored and replayed the first 20 w.p.m. 435·797MHz nominal c.w. telemetry. Apart from a slightly elevated temperature of 37°C, all was well. The S.9 telemetry was then relayed by G3YJO from the University of Surrey back-up command station as it came into range at 2205UTC, then by JR1SWB in Tokyo when it reached his range at 2243:33, who copied:

"HI HI 123 144 163 164 269 269 227 257 343 342 342 342 401 403 400 400 520 527 500 500" (see last month's column for decoding the values). The Doppler shift is very large at 435MHz, and on a close to overhead pass will come in almost 8kHz higher than the true 435·797MHz frequency, and go out some 8kHz lower.

The transponder came on early for testing, but was unfortunately used at high power by the usual indiscriminate stations. This at least proved that the system was functioning to full satisfaction. NK6K, on a scheduled test, found that even only 1W to his 18-element RHCP Yagi gave a transponded signal louder than that of the beacon!

The period for the new OSCAR is 115·82 minutes, the increment 29·28 degrees west per orbit, and the inclination 50 degrees. For those wishing to make a tracker as for the RS satellites in the January *PW*, the same base map can be used with a modified overlay that uniformly curves from 0 degrees at the equator, passes through the 50 degree north latitude line to the east of the pole, and terminates at the far equator line at 194·64 degrees west. This should then be divided and graduated into 58 equal divisions, numbered accordingly with the minute past the equator crossing marks, and you have a means of tracking the new satellite.

For those who wish to have a try, Fig. 2 gives all the passes over the UK for Sunday 12 October, by when you should have your issue to hand and a day free. It is a computer print-out from the GM4IHJ "jsat" Spectrum program. The column reads UTC (GMT) time, satellite azimuth from the UK, satellite elevation, the latitude and longitude of the sub satellite point, and then a star under the call areas which also have the satellite in range. A tour of the 435·800–435·900MHz u.s.b. downlink will give you some of the best DX ever heard on the 435MHz band!

The close orbiting ball "EGP" Object 86–61A can be seen by the naked eye at magnitude +3 to +9 against a dark clear sky, and was seen to initially emanate a series of three bright flashes in a second, a brief lull, then three more. The magnetic flywheel experiment can be heard on 136·112MHz n.b.f.m. as a carrier from Object 86-61C, the rocket 2nd stage itself (also visible at magnitude 3·5 to 4, but stable).

Now on to our information on using JO-12 in the digital mode as a store and forward packet radio mail box.

JAS-1 Packets

Up to now we dealt with the normal analogue mode, that is to say normal through satellite c.w., s.s.b., etc. contacts in the same time slot. Here is the information on the digital mode, the "store and forward" facilities using the latest packet radio mode, followed by a suitable modem description.

Conventional packet radio is an error free digital communications system that may be used by anyone with a terminal node controller (TNC) with the AX.25 internationally accepted protocol, with one's existing transmitter and receiver, and using one's home computer as a dumb terminal. Information sent in bursts or "packets", is received by the station with which one is in QSO, is acknowledged and checksummed before the following packet is sent out. In time, it is always possible to effect perfect QSOs even in heavy QRM, as it can use the spaces in between the bursts of the QRM signal. Some stations are set up as "mailboxes" where it is possible to leave messages for other contacting stations, or to retrieve messages left for one's own station. It is also possible to route messages for one station via another, e.g. by G3LDI sending his intended message for ZL1AOX via NK6K, and to him via W3TMZ, as the QSO content can be dealt with directly or held in the memory store of the other station's mailboxes for immediate re-routing, or holding until the path is suitable and contact established.

For some time experiments have been carried out by a limited number of stations using limited spare memory on the Uo-SAT-2 OSCAR-11 as a "store and forward" facility. The outgoing message may be loaded into the satellite memory by G3YJO at the University of Surrey, and read out again when the satellite comes into range of NK6K in California, and examples of the effectiveness of such tests were shown in our column at the head of page 75 of the May 1985 *Practical Wireless*.

As stations may have automatic computer run systems effecting equipment activation at the computerised known pass times, with automatic azimuth and elevation controlled antennas, the message intended may be addressed by callsign to the recipient which, plus any general messages, can be either read at the time of reception or dumped into the receiving station's computer memory and re-stored ready for reading at any convenient time.

We know that the satellite pass over the UK will be followed by one over New Zealand within the hour, and in half a day the whole world will have mutually "seen" passes, so a "flying mailbox" with error free messages is an enormous advantage to the amateur of today, not only in competing with the poor propagation paths and the QRM of high power intruders, but in passing complex information (such as Keplerian elements of the satellites themselves) where a single mistake can be critical.

All that is needed to effect these space-age communications with your existing TNC is an easy-to-build interface as shown in the block-schematic circuitry of Fig. 3 and the full circuit of Fig. 4.

The block diagram, Fig. 3, is the modem loop, and shows how the uplink signal is sent to the TNC through the HDLC controller, from which the NRZ1 gets its data as well as the 32x clock, when the two signals are added in an exclusive OR gate and produces Manchester Code data. The downlink signal is made up of inverted phase shift keying (p.s.k.) and coherent carrier which go to the a.f. demodulator, thence to the TNC and HDLC controller. The clock is regnerated by the digital phase lock loop (d.p.l.l.) and then goes to a digital data detector, then to a NRZ1 data circuit. One output of the d.p.l.l. is combined with the data from the data detector and is processed in the HDLC controller module.

In the full circuit, Fig. 4, the downlink p.s.k. is regenerated in the a.f. demodulator circuit, which was first built by JA1TUR to copy the OSCAR-10 p.s.k. telemetry, giving an excellent signal to-noise ratio. The a.f. demodulator uses a p.l.l. 565, digital flip-flop 4013, and an exclusive OR gate chip type 4030. The v.c.o. output frequency is divided by 2. The 90 degree phase shift is sent to two places, one to recreate the coherent carrier from the p.s.k., and the other to an exclusive OR gate to IC1, where again the phase comparison is performed. Integrated circuits IC1, IC3 and IC4 form the p.l.l. circuit with its output shifted by 90 degrees to produce the coherent carrier. The downlink signal is received in the s.s.b. mode, and the downlink p.s.k. mixer, IC2, a 565 phase comparator is used. The mixed signal output is sent to a R/C low pass filter through an op amp to the TNC input.

The uplink and 32x clock signals from the TNC controller are generated at 1200 bauds from the HDLC/NRZ1 at a 50 per cent duty cycle. The HDLC/NRZ1, 1200 bauds, and the 1/32 (1200Hz) carrier is sent to IC4 and combined to form the Manchester encoded data. The Manchester coded signal is sent through a low pass filter and then sent as f.m. modulation by the station transmitter.

Circuit Assembly

A "sandwich" method of construction is recommended for the modem and the TNC. The power supply must not exceed 5V or damage to the TNC can result. The transceiver p.t.t. will be run by the TNC itself, so no switching problems are likely. Be sure to ground all unused c.m.o.s. pins, and the modem with the TNC, as there is no earth connection for J5 of the TNC.

Alignment

1. Referring to the Manchester Code book, connect a frequency counter or an oscilloscope to IC4 pin 2, which should indicate 1200Hz.

2. For the TNC, adjust the output of IC4 4030 at VR1 for a 10mV peak-to-peak signal at the mic input jack.

3. For the a.f. demodulator, without any signal input, check the p.l.l. i.c. v.c.o. at test point 1 (TP1 on the diagram) which should read about 3200Hz pulses.

4. The audio output from the s.s.b. downlink (435MHz) receiver should be adjusted to give 1V peak-to-peak. The receiver itself should be tuned to the centre of the downlink signal, giving about 1600Hz, when the dial should be finely adjusted so that the TNC is receiving packets. Place a centre reading 50μA meter in series with a 4·7kΩ resistor between pins 6 and 7 of IC1, which will act like a f.m. deviation meter, swinging back and forth until the p.l.l. locks when it will stop at or near centre. In this condition, a frequency counter on TP1 will read approximately 3200Hz. The p.l.l. range is only some 200Hz, so the receiver tuning or the r.i.t. knob will have to be adjusted to keep the p.l.l. in lock.

As this circuit is still being refined, some updates to improve the effectivity may be given at a later date.

Operation

As the software for the store-and-forward system has yet to be written at the time this column is being prepared, the full Mode "JD" system may not be fully operational until after you read this. For this reason no precise encoding details are available now, but here are some general details to help you use the system.

First, two or more stations can use the satellite at the same real time. For stations within mutual range, the "JD" mode can be used in the same way as a normal analogue transponder, that is by communicating mutually at the same time, only via the written word in "packets" of content. The use of the system as a "digipeater" is not recommended.

Secondly, for over-the-horizon packets the message must be loaded into the memory of the mailbox, which has 1 megabyte available, and retrieved at the destination by "downloading" that which was inserted, simply by accessing the stored on-board memory, and calling up the labelled message. The other station can then use the option to reply by uplinking a message for you, plus any other outgoing QTCs that he or she may have.

All of the messages within the capacity of the memory, which is sufficent for ample QSOs, are stored and software controlled. Announcements and messages from the JARL and JAMSAT command, such as the operational schedule, the data, access information and the Keplerian element set will also be held for general retrieval. In addition to text, the AX.25 protocol will allow you to upload and download pictures and circuits, on the proviso that you have the necessary software with your computer terminal.

In practice, the normal packet operation access should be followed, and when you have achieved this a "connect" will come up on your screen. With wideband f.m. and four uplinks to choose from, you should have no problem in connecting.

The lone downlink could be a little more problematical, as it will be at 1200 bauds in p.c.m. p.s.k. mode, receiveable on l.s.b. or s.s.b., with the sidebands located 3kHz from the zero beat frequency.

The reason for using p.s.k. instead of f.s.k. is that only the phase of the carrier is changed to encode the data. Data *0* is 0 degrees shift, Data *1* is 180 degrees. The bandwidth is much narrower, hence the signal-to-noise ratio is far superior, giving a good low signal level performance from the 3 watts available (the reason p.s.k. was used for the OSCAR-10 telemetry downlink). Even so, a good high gain antenna is recommended, preferably with a low noise (GaAsf.e.t.) pre-amplifier at the masthead, as readable packet-mode requires a better signal than that for other modes. The changing frequency phase comes out as a non-return-to-zero on the NRZ1, as when data *0* is sent there is a change from *0* to *1* or from *1* to *0*, but when data *1* is sent, no change occurs.

As said before, the Doppler shift is quite high at 435MHz, but the tuning meter should help you to keep within the 200Hz modem bandwidth. If, as may be possible for a time, no QSOs should be evidenced, then try listening to the beacon and copying the telemetry to gain experience. Merely tune in the downlink signal, and gently move your tuning dial until the p.s.k. phase is locked up. With the TNC on monitor and in frame dump mode, it will indicate when a packet was transmitted.

Logs and Reports to arrive with your columnist by October 24 please

To speak in the terminology employed using the TAPR & AEA TNC, turn MON (the monitor) on, MALL on, MFROM call, TRACE $FFFF, and in this way your packets will be dumped to the computer. If no packets are there to be read, try typing in DISP in your TNC, and listen to the tones coming back which should be the same as the downlink. If they are not, you must tune the uplink a little closer to match, carefully noting the dial position. If this fails, then check your station and antennas, although it is possible that multipathing due to tropospheric and ionospheric effects, or the proximity of nearby buildings could be the problem.

If you still have problems, then:

1. Check the RX audio output level to the modem.
2. Check the input power level.
3. Ensure that the speaker is connected to the modem.
4. Be sure that the receiving level and the pre-amp are working to the TNC.
5. Check that your home computer used is operating correctly.
6. See that your computer and your downlink receiver are not too close, as the computer can generate harmonics that can impair downlink reception.

If this all fails, then get a colleague to make a good quality tape recording of the downlink for you, and run it into the TNC, which, if it works, will tell you that the problem exists between the antenna and the modem, such as insufficient antenna

Satellite	Salyut 7	MIR	NOAA 6	NOAA 9
Internat Design	82-033A	86-17A	79-57A	84-123A
Object Number	13138	16609	11416	15427
Epoch	86 188·82966191	86 188·86123847	86 169·30686033	86 102·22947524
Inclination	51·6238°	51·6184°	98·5039°	98·9959°
RAAN	128·5685°	128·7524°	184·6926°	90·7952°
Eccentricity	0·0003905	0·0026314	0·0013173	0·0014696
Arg of Perigee	26·0413°	308·0698°	72·5953°	255·7319°
Mean Anomaly	334·0336°	51·7801°	287·6669°	104·2220°
Mean Motion (r.p.d.)	15·78327406	15·70874641	14·2492898	14·11425471
Decay Rate (r/d²)	$5·024^{e-5}$	$1·8761^{e-4}$	$1·31^{e-6}$	$7·6^{e-7}$
Epoch Rev (Orbit No)	24302	2178	36392	7258
Beacon Freq (MHz)	20·008	121·750	APT 137·5 DSB 136·77	APT 137·62 DSB 137·77

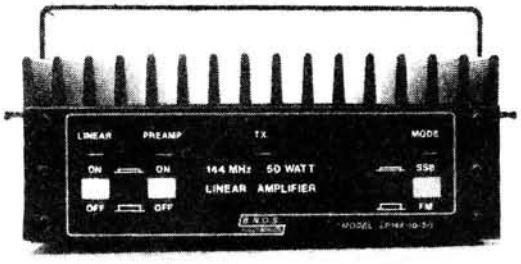
Satellite	OSCAR 9	OSCAR 10	OSCAR 11	RS 1	RS 5	RS 7	JO-12
Internat Design	81-100B	83-58B	84-21B	78-100A	81-120C	81-120EA	86-61A
Object Number	12888	14129	14781	11084	12999	13001	——
Epoch	86 181·46863097	86 175·06611598	86 169·27700980	86 178·55266733	86 178·27355601	86 179·184631764	86 225·39646194
Inclination	97·6526°	26·5768°	98·1477°	82·5471°	82·9579°	82·9614°°	50·0082°
RAAN	183·7941°	73·3463°	236·2208°	21·5389°	101·1656°	94·2517°°	251·4714°
Eccentricity	0·0003321	0·6020768	0·0013249	0·0012790	0·0010970	0·002132	0·0011644
Arg of Perigee	46·5724°	121·6291°	154·1335°	335·9996°	24·4278°	303·9319°°	221·0709°
Mean Anomaly	313·5809°	310·7626°	206·0522°	4·0999°	335·7286°	55·9775°°	142·0484°
Mean Motion (r.p.d.)	15·28513980	2·05855963	14·62055409	11·96696555	12·05063736	12·086993811	12·44378049
Decay Rate (r/d²)	$1·038^{e-05}$	$-1·7^{e-7}$	$6·9^{e-7}$	$8·0^{e-8}$	$4·0^{e-08}$	4^{e-8}	$3·9^{e-6}$
Epoch Rev (Orbit No)	26299	2277	12252	33507	19908	199798	7
Beacon Freq (MHz)	145·825	145·810	145·826	29·401	29·452	29·5012	435·795/ 435·910

Satellite	Meteor 2/9	Meteor 2/10	Meteor 2/11	Meteor 2/12	Meteor 2/13	Meteor 2/14	Meteor 3/1
Internat Design	82-116A	83-109A	84-72A	85-13A	85-119A	86-39A	85-100A
Object Number	13718	14452	15099	15516	16408	16735	16191
Epoch	86 188·60536131	86 188·26568715	86 188·91715261	86 188·82758358	86 182·83062593	86 184·83938339	86 188·85852602
Inclination	81·2458°	81·1640°	82·5301°	82·5363°	82·5360°	82·5365°	82·5484°
RAAN	253·3138°	291·1036°	141·3492°	79·8697°	359·5952°	24·2503°	276·1158°
Eccentricity	0·0056275	0·0094657	0·0014208	0·0015050	0·0017680	0·0014745	0·0020782
Arg of Perigee	176·4829°	314·8843°	17·5644°	251·9986°	93·4673°	153·5993°	106·6084°
Mean Anomaly	183·6750°	44·4687°	342·6003°	107·9560°	266·8510°	206·5918°	253·7211°
Mean Motion (r.p.d.)	14·12894559	14·21658564	13·83478152	13·83916307	13·83983839	13·83738124	13·16943383
Decay Rate (r/d²)	$5·0^{e-8}$	$6·0^{e-8}$	$6·0^{e-8}$	$2·2^{e-7}$	$6·0^{e-8}$	$1·31^{e-6}$	$5·0^{e-8}$
Epoch Rev (Orbit No)	18366	13965	10143	7231	2597	518	3373
Beacon Freq (MHz)	APT 137·3				WEFAX 137·4	137·3MHz	WEFAX 137·85

LITTLE AND LARGE

Little in Size — Large in Output

The New 'LP' Series



2m Mobile 50W Linear from B.N.O.S.

FREQUENCY RANGE: 144-148MHz
OUTPUT POWER: 50W RMS 0.5dB
POWER REQUIREMENTS: 13.8V dc. 5.5A 15%
PRE-AMP GAIN: TYPICALLY 12dB
RX NOISE FACTOR: BETTER THAN 1.5dB
CONNECTORS: BNC SOCKETS
OVERALL SIZE: 178×122×48mm

THE 3 WATT INPUT LP144-3-50 AND 10 WATT INPUT LP144-10-50 RETAIL FOR ONLY £125 INCLUDING VAT

ALSO *6M, 50MHz AMPLIFIERS*
LPM50-10-100 – **£195.00**
LP50-3-50 – **£135.00**
LP50-10-50 – **£135.00**

B.N.O.S. ELECTRONICS

- **ORDERS UNDER £10 PLEASE ADD £1 POST & PACKING**
- **POSTAGE FREE ON ORDERS OVER £10**
- **SECURICOR DELIVERY AVAILABLE AT £5.00 PER ORDER**

B.N.O.S. ELECTRONICS LTD. DEPT PW, MILL LANE, STEBBINGS, GT. DUNMOW, ESSEX CM6 3SL. TEL: (037186) 681

We are pleased to introduce a new range of antennas shown thus (N). The dipoles have been redesigned and now include a fully sealed 'N' socket supplied complete with 'N' plug for coaxial cable. Absolutely NO matching or tuning required. Also a new 1296MHz 55 element yagi. Send for details.

50MHz
5 element **£37.87(a)**

144MHz
4 element (N) **£24.84 (a)**
4 element crossed (N) **£31.46 (a)**
9 element fixed (N) **£27.78 (a)**
9 element portable (N) **£29.81 (a)**
9 element crossed (N) **£52.07 (a)**
13 element portable (N) **£41.40 (a)**
17 element fixed (N) **£55.38 (a)**

ANTENNES TONNA (F9FT)

435MHz
9 element (N) **£25.76 (a)**
19 element (N) **£30.91 (a)**
19 element crossed **£36.01 (a)**
21 element 432MHz (N) **£40.11 (a)**
21 element ATV (N) **£40.11 (a)**

144/435MHz
9 & 19 element Oscar **£36.01 (a)**

1296MHz or 1269MHz Oscar Uplink
23 element **£27.72 (b)**
4 × 23 element – power splitter – stacking frame **£150.00 (a)**
55 element **£44.75 (a)**

POWER SPLITTERS – STACKING FRAMES
PORTABLE ALUMINIUM TELESCOPIC MASTS

PLEASE ADD CARRIAGE AS SHOWN (a) £4.00. (b) £2.20. ALL PRICES INCLUDE VAT AT 15%
ACCESS – VISA – Just telephone your card number for immediate despatch.
FOR FULL SPECIFICATIONS SEND 40p FOR CATALOGUE
Callers welcome, but by telephone appointment only please.
Goods by return.
RANDAM ELECTRONICS (P)
12 Conduit Road, Abingdon, Oxon OX14 1DB. Tel: (0235) 23080 (24 hours)

Books for radio amateurs
FDK
YAESU
AERIAL ACCESSORIES AND MASTS
THE 'HAM SHACK'
ELLIOTT ELECTRONICS
for the Radio Enthusiast
MICROWAVE MODULES
APPOINTED DISTRIBUTOR
JAYBEAM AMATEUR ANTENNAS

RIGS, ANTENNAS, SWR BRIDGES, POWER SUPPLIES, TEST GEAR, COMPONENTS, MORSE KEYS, COAXIAL CABLES, ROTATORS, MICS, PLUGS AND SOCKETS, SWITCHES
Call us on (0533) 553293
OR COME AND LOOK AROUND AT
26/28 Braunstone Gate, Leicester

See you at the Leicester Show.

QSL

QUARTZ CRYSTALS

QuartSLab MARKETING LTD
P.O. Box 19 Erith Kent DA8 1LH
Telephone: 01-318 4419
24Hr Ansafone:
Dartford (0322) 330830
Telex: 8813271 GECOMS – G
(Attention QUARTSLAB)

ALL PRICES ARE EX VAT PLEASE ADD 15%
An SAE with all enquiries please

STOCK CRYSTALS

CRYSTALS FOR 2 METRES
HC25 £2.15 **FOR ONE CRYSTAL**, £1.96 **WHEN 2 OR MORE PURCHASED**
HC6 £2.15 **FOR ONE CRYSTAL**, £2.05 **WHEN 2 OR MORE PURCHASED**

TX CRYSTALS	RX CRYSTALS		IN STOCK
HC6/U 4 & 8 MHz 30PF	44MHz SERIES RES	R0 to R7	S11, S20-S23
HC25/U 12MHz 30 & 40PF	44MHz SERIES RES		S8-S23, S32
HC25/U 18MHz 25 & 20PF	14/15 MHz 20 & 30PF		
HC25	SCANNER XTLS (NOT SR9)		

4 METRE CRYSTALS FOR 70.26 IN HC6/U AT £2.40 each
TX 6.78250 RX 29.78000
70CM CRYSTALS £5.00/pr or £2.50 each
For Pye PF1 PF2 & PF70 series Wood & Douglas and FDK MULTI U11 SUB (433.2) SU20 R80 RB2 RB4 RB5 RB6 RB10 RB11 RB13 RB14 RB15. ALSO for MULTI U11 ONLY SU16 SU18
CONVERTER CRYSTALS IN HC18/U AT £2.85 each.
22.000, 38.666, 42.000, 96.000, 101.000, 101.500, 105.666, 116.000
FREQUENCY STANDARDS £2.75 each
HC6/U 1000kHz 3.50MHz 5.00MHz 10.000MHz 10.700MHz
HC18/U 1000kHz 7.00MHz 10.70MHz 48.00MHz 100.00MHz
Also HC6/U 455kHz £3.25 each.
TONEBURST, I.F. & MPU CRYSTALS IN HC18 £2.25 each
7.168MHz (For 1750 HZ Tone), 10.245 (for 10.7 I.F.)
3.2768 4.000 5.0688 10.2400 14.3180 15.00000
YAESU CRYSTALS for FT101's FT901 & etc £4.00 each
Many available ex stock (A list is available on request pse send S.A.E.)

Full list available on request, please send SAE

MADE TO ORDER CRYSTALS

FUNDAMENTALS FREQUENCY RANGE	PRICE
5 TO 50kHz	£21.00
50 TO 150kHz	£11.00
150 TO 500kHz	£7.80
500 TO 999kHz	£11.90
1 TO 1.5MHz	£10.75
1.5 TO 2.0 MHz	£5.10
2.0 TO 6.0MHz	£4.75
6 TO 21MHz	£4.55
21 TO 25MHz	£6.50

OVERTONES FREQUENCY RANGE	PRICE
3rd OVT 21.00 TO 65.00MHz	£4.55
5th OVT 60.00 TO 110.0MHz	£5.10
5th OVT 110.00 TO 125.0MHz	£7.40
7th OVT 125.00 TO 175.0MHz	£10.00

DELIVERY
2.0 TO 175.0MHz 2 to 3 weeks
5 TO 999.9kHz 6 to 8 weeks
1 TO 1.499MHz 3 to 4 weeks

Unless otherwise requested fundamentals will be supplied for 30pf load capacitance and overtones for series resonant operation.
HOLDERS: – PLEASE SPECIFY WHEN ORDERING – else HC25/U supplied for XTLS above 3MHz
HC13/U 6-200kHz HC6/U & HC33/U 170kHz-175MHz HC18/U & HC25/U 2-175MHz
DISCOUNTS: Price on application for 10 + units to same frequency/spec. or bulk purchases of mixed frequencies. We supply FREE xtals for use in UK repeaters.
COMMERCIAL CRYSTALS: available on fast delivery and at competitive prices. Please send for list stating interests.
EMERGENCY SERVICE: for XTALS 1 to 125MHz. Add the surcharge for each XTAL. Days refer to working days. 4 days + £12, 6 days + £7, 8 days + £5, 13 days + £3.
CRYSTALS SOCKETS HC25 £0.20 ea. HC6 £0.25 ea. MINIMUM ORDER CHARGE £1.50 unless ordered with crystals.
TERMS: Cash with order post inc. to UK & Ireland. Cheques & PO's to QSL LTD

gain, poor signal-to-noise ratio, off frequency effects, poor stability, or poor quality audio. (Many transceivers are good for voice audio frequencies, and a little audio tailoring to permit higher frequencies may help enormously).

Hints and Kinks

Try to use all of the available uplink channels, as if everyone employs the same channel, the QRM will reduce QSO possibilities.

Keep down your power, as alligator tactics will not overcome the logically powered stations, only producing mutual QRM.

When you use the mailbox, use a command message file such as READ WRITE, HELP, SEARCH or CANCEL, etc. to download messages for your station. The typical screen expected is shown in Fig. 5.

When you have the system running, you will have the ability to be able to send and receive word perfect messages to other JAS-1 "packeteers" the world over, with no problems due to ionospheric variables, all based on the now standard international AX.25 system that is already working so well on the h.f. and v.h.f. bands within the limitations of current conditions. JAS-1 is quite a breakthrough in communications, and another milestone in amateur radio.

VHF BANDS

Reports to: Ron Ham BRS15744, Faraday, Greyfriars, Storrington, West Sussex RH20 4HE.

by Ron Ham BRS15744

Radio signals, originating from distant stations and travelling well beyond their accepted range, have fascinated wireless enthusiasts ever since broadcasting began in the early 1920's. Over the years, the behaviour of radio waves has been studied in great detail, both under normal and anomalous conditions, and I am convinced that there is still a lot more to learn. We know that the sun and the earth's complex atmosphere are the natural enemies of consistent radio communications, they are seldom quiet and I believe that their random changes may still hold many surprises in the future.

This very much applies to Sporadic-E, especially when it suddenly extends to 144MHz for a short period. "On July 8, John Dunlop GM6LNM in Port Glasgow, heard or worked stations in HG, OE, OK, SP and YU from about 1930 to 2040GMT. His best DX was YU7MGK at 2080km," wrote **Lawrence Morgan GM0ATQ** from Greenock. He made the interesting point that John had to suddenly turn his beam north at 1945, to pick up signals from Hungary and Poland.

While on holiday in Cumbria on July 8, **Gordon Pheasant G4BPY**—using a Belcom LS-202 handheld, a 25W amplifier and an HB9CV antenna—worked HG5HDQ at 1846 and HG5MY at 1847, the latter giving him a 5/9 report. Gordon was situated about 265m a.s.l. in rather hilly countryside and his antenna was mounted on a converted music stand, on top of his caravan.

Solar

"In July we had one or two spurious auroral sightings, but of course in the UK it is too light to see auroral light in the north," wrote **Ron Livesey** from Glasgow on August 5. He is the auroral co-ordinator for the British Astronomical Association. "On the night of July 23/24 there was a brilliant display of noctilucent clouds seen all over Scotland," said Ron. He added that one of his contributors, Dr Roger Stapleton, at St Andrews Observatory reported radio aurora between 2240 and 2315GMT on July 25 with his antenna pointing 020 degrees true.

Karl Lewis in Saltash, told Ron that his magnetometer was unsettled on July 17, 21 and 31 and more so on days 26, 27 and 30. Ron's own instrument suggested activity on days 20, 22, 24 and 26. The Boulder Observatory, Colorado, reported "active" conditions on the 24th and "active to minor storm" on the 27th.

Ron also observed a small group of sunspots at the end of July (drawn by **Patrick Moore** in Selsey, Fig. 1) as it crossed the central meridian on August 2. No doubt these spots were responsible for the small bursts of radio noise which I recorded from the sun around 138MHz on July 26, 28, 30, August 1 and 8. In Johannesburg, **Bob Anderson's** group counted 7 sunspots on July 17, 5 on the 21st and 6, 7 and 9 respectively on the last three days of the month. "The spots have been very interesting during July and the first few days showed them to be around 28/30 degrees, heliographical latitude," said Bob.

At his observatory in Bristol, **Ted Waring** counted 6 spots on July 29, 2 on August 2 and 1 on the 6th. In Sevenoaks, **Cmdr Henry Hatfield** used his spectroheliioscope on 13 days between July 17 and August 8. He reports, "There were two spot groups during this period and neither very active. No flares or other active phenomena observed."

The July issue of *Solar News* reports that their own radio telescope—comprising a Corner Reflector antenna, Microwave Modules weather satellite converter, Yaesu FRG-7 receiver for i.f. amplification at 29MHz and a chart recorder—is now observing the sun around 137MHz. *Solar News* is available, at £5 p.a., from Bert Chapman, "Brindles", Mill Lane, Hooe, Battle, East Sussex TN33 9HT.

Es Disturbances

Some countries in eastern Europe use the frequency range 66–73MHz for their national f.m. broadcasting, and their signals usually come pounding in to the UK when a Sporadic-E disturbance is in progress. Such signals were received in the UK during the mornings of July 25 and August 4 and 14, middays on July 19, 24 and August 11 and the early evenings of July 21, August 5, 6, 9 and 12. The average number of these stations appearing during these events was around 15, with peaks of 40 and 69 recorded on August 4 by myself and **Harold Brodribb** in St Leonards-on-Sea, respectively. "Seventeen of these stations were exceptionally strong," said Harold.

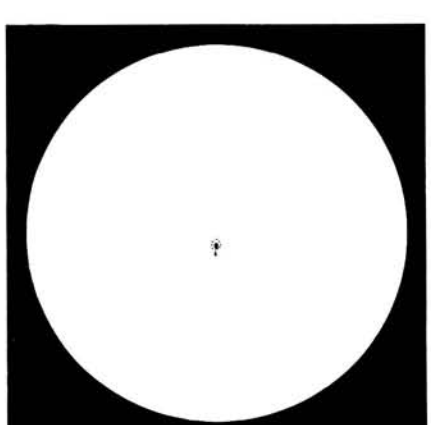


Fig. 1

The 50MHz Band

"On July 21 I received a phone call from Ray Cracknell G2AHU, telling me that the 50MHz band was open to the States!" wrote Gordon Pheasant G4BPY from Walsall. At 2024 and 2029 he worked K1JRW and WA1OUB using only 10W. Many a good QSO has resulted from an alarm call about band conditions, Gordon.

The 28MHz Band

"Interest and use of the 28MHz band seems to be high, however, it's a pity some operators only use the band when it's open—doesn't word go around quickly—and disappear again when it's flat," wrote **Jim Hicks G4XRU**. He is Editor of the Southern 10m f.m. Group's latest newsletter. Group activity night is Thursdays and Jim wants members and 28MHz enthusiasts alike to get on between 2000 and 2200. "Try to encourage continual use by regularly calling CQ on 29·600MHz," says Jim. Readers wishing to join the group can get information by sending an s.a.e. to Jim, at 33 Hayling Rise, Worthing, Sussex BN13 3AL.

Dave Lingard G0CLH in Birmingham —using an FT-560DX and vertical antenna—has worked 58 countries including, CX, PY, VU and ZS on 28MHz s.s.b. and heard another 20 world-wide. Apart from adding 16, mainly European, countries on 29MHz f.m. QRP Dave tended to listen a lot and reported hearing YV6CAX, a special event station and a couple of Ws working into southern England on July 5.

"Excellent opening to the Far-East during the afternoon of August 10," wrote **Len Fennelow G4ODH** from Wisbech. My Tono 550 copied c.w. signals from European and Scandinavian stations on July 18, 19, 23, 24, 25, August 4, 6, 9 and 10. Around 0100 on the 6th, signals from the German and Italian beacons DL0IGI and IY4M were pounding in at my QTH, as was the c.w. from several stations in G, GM, GW and I.

Among the countries worked from Hanworth by **Don Hodgkinson G0EZL**, between July 12 and August 10, were C30, HB0, I, IT9, OH0, OY, OZ, PD0, PT7, SM, SV1, T77, UA4, UZ1, ZB2, 3A and 4X4 on s.s.b. Don's most notable QSOs on 29MHz f.m. were C30DAE on August 5 and PY1FG on the 10th. "This was the first time I had heard a South-American station on 29MHz f.m. and delayed shock set in after I worked him at 1802GMT," remarked Don. He also heard, but could not raise, stations in CE, CN8, CU2, LU, PY, PZ, SV1, VE1 and 4Z4.

"I've spent most of my time on 28MHz, running up 86 QSOs since July 15," wrote Lawrence Morgan on August 13. He was delighted to work C30BAN on the 17th and to hear ZC4CZ on the 30th, both c.w.

Propagation Beacons

"This month is a lot more cheerful; PY2AMI cropped up twice and there is a new one, 4N3ZHK at JN76MC around 28·5MHz," wrote **Ted Owen** from Maldon. Like most contributors, he heard it on the days listed in Fig. 2. "This locator would make it about 40km east of Ljubljana," said Don Hodgkinson. He also logged PA0ETE for the first time on August 5 and PY2AMI on July 25, August 5 and 6. While in QSO with a station in Barcelona Don learnt that EA3JA, which he copied on July 20, is only on at weekends and holidays. For a mere 30 minutes from 1120 on August 12, Don heard, "QST DE EA2AMU LOC IN83MG K" on 28·255MHz.

"The 14MHz beacons have shown a very reliable pattern, including a number of occurrences of LU4AA," wrote Len Fenelow. He wondered why the signals from CT3B disappeared for 7 days in July having been solid copy on all the other days indicated on his chart, Fig. 3.

Gordon Pheasant, received signals from the 50MHz beacons in Cyprus 5B4CY on July 19 and 23, and Gibraltar ZB2VHF on July 19, 21, 23 and 25.

Each morning I copied consistent signals from the RSGB beacon GB3NHQ, Potters Bar, between July 15 and August 14. Len Fennelow found its signals watery on many evenings. In The Hague, **Chris van den Berg** received signals from the 144MHz beacons in Cornwall GB3CTC on July 27; France FX0THF on the 16th, August 3 and 5; and Wrotham GB3VHF almost daily throughout this period. Don Hodgkinson copied the beacons in Angus GB3ANG on July 26, 30, 31, August 1 and 2; FX3THF on most days between July 15 and August 11; and FX0THF, GB3CTC and GB3VHF every day. At 2144GMT on August 9, Don heard, "E CQ CQ GXGW PD0OZA PD0OZA PD0OZA PSE G K" on 144·989MHz. "It sounded just like an automatic beacon," said Don.

As usual, my thanks to Chris van den Berg, Len Fennelow, Henry Hatfield, Don Hodgkinson, Norman Hyde, **Bill Kelly** in Belfast, Lawrence Morgan, Ted Owen, **Fred Pallant G3RNM** in Storrington, Gordon Pheasant and Ted Waring for their beacon logs.

Fig. 5

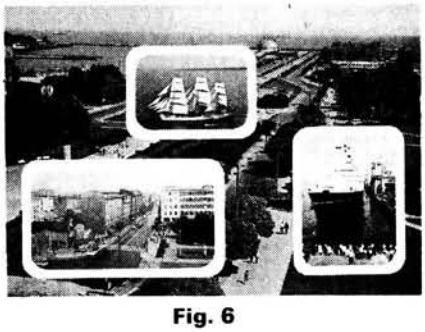


Fig. 6

Fig. 2: 28MHz beacons ▶

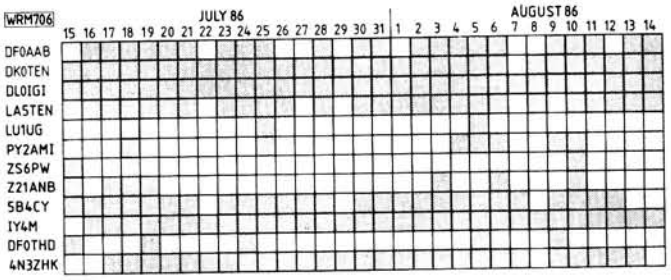


Fig. 3: 14MHz beacons ▶

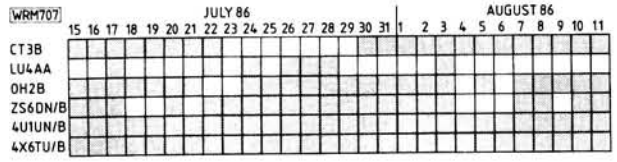
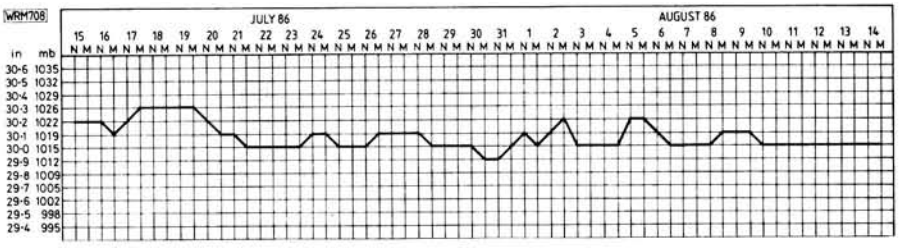


Fig. 4 ▼



Tropospheric

The atmospheric pressure, measured at my QTH, hovered between 30·0in and 30·1 from July 21 to August 14, except for about 24 hours at the end of July when it was 29·9 and a short period on the 18th when it was 30·3.

The slightly rounded pressure readings in Fig. 4 were taken from my barograph chart at noon and midnight each day. In Maldon, Ted Owen's barometer readings were similar to mine throughout the period.

Figures like these meant that v.h.f. conditions were generally up and Chris van den Berg often heard traffic through the 144MHz repeaters in Belgium ON0OV; France FZ2THF and Norfolk GB3NB.

Band II

My thanks to **Wojciech Zajac** in Krakow for the gen that a new Czechoslovakian station called Melodia should be on the air between 1455 and 2207GMT from August 1. The frequencies are 101·8MHz from Bratislava, 101·4MHz from Ostrava and 102·5MHz from Prague. No doubt we will hear these in the UK via Sporadic-E sometime.

Chris Wood obtained a useful book of radio and TV stations with such details as frequencies, transmitter sites and power, from IBA Engineering Information, 70 Brompton Road, London SW3 1EY. He is keen to hear from other Band II DXers in the north, so why not drop him a line at 38 Romney Avenue, Columbia, Washington, Co. Durham NE38 7EB.

In July, Chris added BBC Radios Derby and Leeds to his log. Ian Smith in Paisley received QSL cards from Hessischer Rundfunk, Fig. 5, and Radio Polonia, Fig. 6, in reply to his reception reports of May 11 and 16 respectively. In Glasgow Alexander Little, using a Vega 210 with its own rod antenna, has heard the various French, German and Spanish stations that appear in Band II during Sporadic-E openings. "On July 19, I counted around 30 Continentals and some were so strong that they blacked out our locals, Radio Forth and West Sound," said Alexander. He added, "I only identified a few because they appeared on the band, then faded away very quickly." This is typical of Sporadic-E propagation, because the signals are being reflected by random and moving clouds of ionised gas.

"On July 19, a nice mid-afternoon opening to Spain and the highlight was an English language station, identifying as Westward One Radio Network around 90MHz. I believe this to be an American Forces Network outlet, somewhere in EA-land," wrote **Phil Englehard** from Macclesfield. Phil had just settled down at 1755 on August 6 to listen to the Promenade Concert on Radio 3 (Holme Moss 91·5MHz) when pop music came up on the channel. He found another Spanish opening in progress and a Cadena SER station booming in with full stereo around 94·9MHz for long periods. Later at 1900, Phil found a Cadena SER outlet, carrying a national networked news programme *La SER informa* with time checks for mainland Spain and Islas Canarias, on about 88MHz. "There was much more up and down the band and conditions were still up at 1945. However, at my check, 2130, the band was normal again. Magic, this Sporadic-E!!" said Phil.

My thanks to Francis Heane in Bristol, for the gen that Red Dragon Radio from Cardiff and Newport have changed frequency from 96 to 97·4MHz and 104 to 103·2MHz respectively. County Sound (Guildford) has moved to 96·4MHz, Chiltern Radio (Bedford) to 96·9MHz and Mercia Sound (Coventry) to 97MHz.

Harold Brodribb received signals from the Belgian network at Egem, on 98·6 and 100·3MHz, on July 27 and August 3 and especially strong at 1500 on the 12th.

TELEVISION

Reports: as for VHF Bands, but please keep separate.

by Ron Ham BRS15744

In November 1936 the BBC began their high definition, 405-line, television service from London's Alexandra Palace. One of the surviving receivers from those early days, an HMV 901, can be seen alongside a similar set made by Ekco around 1947 in Fig. 2. They are in the vintage radio building at the Chalk Pits Museum, Amberley, Sussex. Look out for a play on October 27, BBC 2, called *The Fools on the Hill* to commemorate this eventful period.

Band I

Ian Smith in Paisley received a QSL card, Fig. 5, from DDR (CH. E4), thanking him for his report sent back in May.

"July was an excellent month for TVDXing with good strong signals on most days from the whole of Europe," writes **Mike Bennett** in Slough. His best DX came on the 12th, when he watched pictures in full colour from Iceland for over an hour.

Like the other DXers, listed in Fig. 1, the extensive log sent in by **Noel Smythe** in Penyrheol contained many references to test cards and pictures from Spain. This included the TVE logo (Fig. 6) which he received on July 19.

While parked at Hever Castle at 1745 on July 17, Plustron TVR5D produced cartoons from Italy RAI, a Russian news programme and, at times, a real jumble of signals throughout Band I.

I was not surprised to learn that **Wendy Evans** in London, **Simon Hamer** in New Radnor as well as **Tony and Edwina Mancini** in Belper reported seeing the Royal Wedding on July 23 from Spain's TVE 1. I spent the day at Burwash, East Sussex, and saw part of the wedding in a TVE programme, via Sporadic-E, on my Plustron using its telescopic antenna inside my car.

"You've got to be quick," wrote **Keith Chaplin** from Barrow-on-Soar. He logged the opening ident of Czechoslovakian Television (Fig. 4) followed by a YL announcer giving programme times, during a six minute burst of Sporadic-E which began at 0750 on the 23rd.

Wendy Evans received a test card from Gibraltar on Ch. E4 at 1002 on July 27. It had the letters GBC TV at the top of the card and Gibraltar at the bottom. She uses a Thomson TS 2502 PI receiver and would like to hear from other readers who also have this set, and is interested in finding out what kind of antennas and amplifiers they are using.

"I've watched more Spanish TV than Central," wrote **David Meredith** from Dudley. He logged pictures from TVE on 14 days during the month prior to August 11.

Also in July, **Len Eastman** in Bristol captured the TVR logo from Rumania (Fig. 7). The Mancinis caught the "opening up" signals from RUV, Iceland (Fig. 8) and I received pictures of Mr Gorbachev (Fig. 9), amid a bout of typical Sporadic-E fading.

Reference to Fig. 1 shows that television signals from 19 countries were positively identified by such captions as TB CCCP (Fig. 10) seen by **Major Rana Roy** and the East German test card (Fig. 11) received by Len Eastman.

TV DXers use all kinds of equipment whilst pursuing their hobby, and I am always pleased to hear about readers stations. **Ron Shaw** in Telford uses an upconverter, two home-brew dipoles and a 3-element Yagi for Band I, whereas **Philip Lancaster** from Ruislip checks the band with a Sony KV6000BE and its own rod antenna.

As usual your letter contained great detail and I found reports of regional transmissions from Norway—Bagn, Gamlem, Gulen, Hemnes, Kongsberg, Melhus and Steigen; Portugal—Lisbon and Porto; Spain—Andalucia, Madrid and Santiago; Yugoslavia—Beograd, Ljubljana and Zagreb.

Noel Smythe saw the caption +PTT SRG1 from Switzerland (Fig. 12). On other readers' lists were; ARD-ZDF, Bayern Studio, Bratislava, CST-1, DDK-1, DDR, DFF, DR, Grunten, Hirek, JRT, MTV, NRK, ORF-FS1, Praha, RAI, RTP, RS-KH, SRTV-1, Tallen, Telejurnal, Teleradio, TSSI, Teletexto, Televideo, TVP, TV1-Sverige and YLE-TV1. The popular news captions Akuelle Kamera, BPEMR, dt, HOBOCTN, Kveldnytt and Zpravt-Noveny were also seen along with a variety of programmes.

Tropospheric

With the atmospheric pressure being mainly 30·0in (1015mb) and above throughout this period, it was no surprise to learn of several, short-lived, tropospheric openings which ebbed and flowed with the fluctuating pressure. The Mancinis received test cards from Belgium, scribed BRT or RTBF-1 in Band III each day from July 27 to 31. They also received spasmodic, negative image pictures from Canal-Plus (France) on days 29 to 31. Wendy Evans logged test cards from Belgium on July 19 and Netherlands on July 27. Keith Chaplin received signals from Canal+ on Ch. F5, on July 16, 18 and 26.

Harold Brodribb received pictures from Belgium on July 13, 16, 26, August 8 and 9 and RTL Plus (Luxembourg) on July 30 and August 6, both in Band III. He also counted French stations on several spots in the u.h.f. band on July 16, 19, 30 and August 6.

Mike Bennett saw an unidentified test card on Ch. E8 at 1445 on the 30th. I received strong test cards from PTT-NED-1 (Netherlands) on July 16, 21, 30 and August 3.

During a routine check on the TV bands with my Plustron, this time at Sissinghurst Castle, at 1530 on August 1, I received strong, negative pictures from France on Ch. F5 and an unidentifiable signal around Ch. E11.

Because of a recent move, Wendy Evans has lost the control box for her Stolle Automatic rotator and she cannot find a replacement. So, if you can help write to Wendy at 43 Clyde Court, 1 Hampden Close, London NW1.

During tropospheric openings in India for a few days at the end of May and early June, Rana Roy saw a variety of signals. He watched the news in Urdu from Bhawalpur Relay transmitter of Pakistan TV in Band III on May 27; the news in English from Jalandhar TV on the 31st; programmes on current affairs, the next day's programme schedule and adverts from Pakistan TV on June 3; pictures in colour from Faisalabad (Ch. 6), Rawalpindi (Ch. 8) and Bhawalpur (Ch. 10) on the 4th; and a programme on Ramadan—a Muslim festival—Chs. 8 and 10 on the 5th.

In due course, Rana will be using an Antiference XG21 antenna with a Triax pre-amplifier for DXing on the u.h.f. band. He has also added a D-100 DX converter to his station.

SSTV

Lester Curno, seen with his gear in Fig. 13, reports that I1CEL is always active on SSTV and usually puts good quality pictures into his QTH in Bude. During his viewing around 14·230MHz on July 26, 27 and August 3, he received pictures from both sides of a QSO between DJ5UE and DL5GR, a CQ call from LZ1OW followed by Donald Duck and other characters, the caption G4RVC DE I1CEL and I2WQQ—a new callsign for Lester.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Austria	X		X	X		X	X		X	X	X	X	X
Czechoslovakia	X	X	X	X	X		X		X	X	X	X	X
Denmark	X						X		X				
East Germany	X			X			X		X				X
Finland	X		X	X				X			X		
Gibraltar					X								
Hungary	X		X	X			X		X	X			
Iceland	X				X		X		X				X
Italy	X	X	X	X	X	X	X		X		X	X	X
Norway	X	X	X	X	X	X	X	X	X	X		X	X
Poland				X		X	X		X	X		X	X
Portugal	X	X	X	X	X		X	X	X			X	X
Rumania				X			X						
Spain	X	X	X	X	X	X	X		X	X	X	X	X
Switzerland	X		X		X	X	X		X		X	X	X
Sweden	X	X	X	X	X	X	X	X	X		X	X	X
USSR	X	X	X	X	X	X	X	X	X	X		X	X
West Germany			X	X			X		X		X	X	
Yugoslavia	X		X	X		X	X	X	X	X		X	X

1 Mike Bennett
2 Harold Brodribb
3 Keith Chaplin
4 Len Eastman
5 Wendy Evans
6 Ron Ham
7 Simon Hamer
8 Philip Lancaster
9 Tony & Edwina Mancini
10 David Meredith
11 Lawrence Morgan
12 Ron Shaw
13 Noel Smythe

Logs and Reports to arrive with your columnist by October 24 please

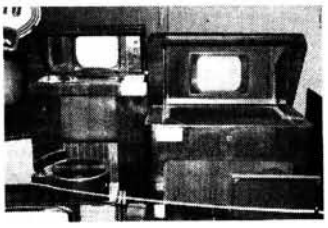


Fig. 2

Fig. 3

Fig. 4

Fig. 5

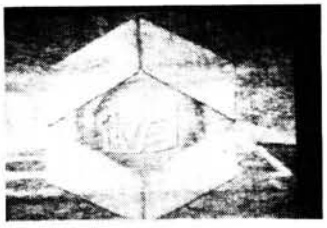


Fig. 6

Fig. 7

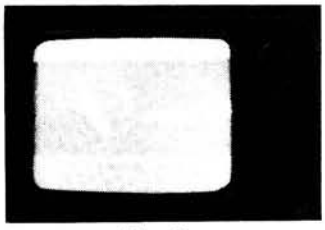


Fig. 8

Fig. 9

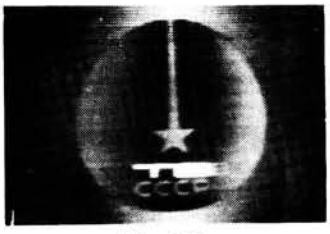


Fig. 10

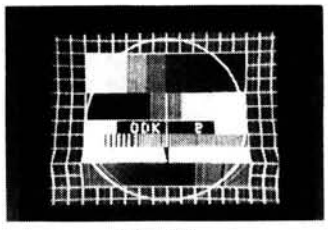


Fig. 11

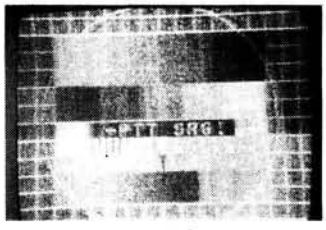


Fig. 12

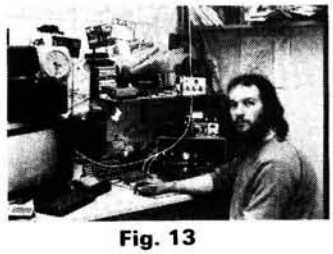


Fig. 13

MW BROADCAST BAND DX

Reports to: Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, W. Sussex RH20 4NS

by Brian Oddy G3FEX

As winter approaches, the hours of darkness gradually increase much to the delight of the m.w. DXer, who often spends a good deal of the night listening for the skywave signals from distant and unusual broadcast stations! Sometimes, however, this DXing activity can annoy other members of the household, who find themselves disturbed by sudden bursts of noice from the loudspeaker when they are trying to get some sleep. In the worst cases, occupants of nearby flats and houses can also be disturbed. It is important to remember that in the "dead of night" sounds travel clearly. So in your enthusiasm to hear the DX at night, **be sure to use a pair of headphones!**

Many types of headphone are available and it is essential to purchase a pair which will operate correctly with your receiver. Most modern headphones are pre-wired for either mono or stereo use and are of **low impedance** (about 8Ω)—if the receiver jack is not wired to accept stereo headphones only one earphone will be operative! Several types and sizes of jack plug exist, too—the instruction manual for your set should detail the impedance and plug type required.

Older valve receivers such as the RCA AR88, CR100, HRO, etc. require **high impedance** headphones (2000Ω or more) which may be difficult to obtain, but these sets will not operate satisfactorily with the low impedance type unless a small loudspeaker transformer is used to step down the impedance to 8Ω. Some transistor circuits also require high impedance headphones—for example, the little reflex receiver used by John Ratcliffe of Southport, Australia, which has become so popular, so do check to ensure they are the correct type!

Most receivers are designed so that the internal loudspeaker is cut off when the headphone jack plug is inserted. After a while, you will find DXing is even better when using headphones because they help to make those weaker signals more readable!

DX Report

(Note: All frequencies in kHz: Time UTC = GMT)

Transatlantic DX: It is difficult to describe exactly the feeling and excitement which is experienced by those who venture onto the m.w. band late at night and discover that they can actually hear signals from across the Atlantic Ocean for the first time! Once experienced, that feeling can quickly lead to further late nights in an attempt to hear more DX signals and in no time at all this new aspect of our hobby becomes a regular feature in their life!

It is not essential to use an elaborate receiving set-up to enjoy the pleasures of transatlantic DXing, although there is no doubt that a good loop antenna will help minimise the interference from some of the unwanted signals. Using a Selena B210 receiver plus a 20m wire antenna, **Alexander Little** of Glasgow experienced this feeling recently when he heard a station on 1610 broadcasting religious programmes at 0345, which proved to be the Caribbean Beacon, located in Anguilla! He then tuned lower down the band and on 930 had the thrill of hearing CJYQ in St. John's, Newfoundland, for the first time before going to bed! The next night he tried again and heard his first station from the USA—WHN of New York on 1050, with a commentary on an American football game at 0253, followed by a programme of Country and Western music. On 610 he found CKYQ in Grand Bank, Newfoundland, broadcasting a weather report for the Newfoundland area at 0315 and identified a weak signal from CKVO in Clarenville, Newfoundland, on 710 at 0346—no doubt the thrill of hearing these stations will be with him for a long time to come!

Another listener reporting on transatlantic DX for the first time is **John Sheridan** of Mapperley Village, Derbyshire. He has an RCA AR88 receiver and noted CKYQ on 610 as SINPO 44444 in his log at 0305! John says he has sent off for a Sooper Loop kit—see July '86 *PW*, page 32—so no doubt we shall be hearing of some impressive DX results when he has completed its construction!

Paul Logan has once again been checking the m.w. DX scene in Co. Fermanagh, N. Ireland, at night. It is interesting to note that signals from S. America were the first to be logged by Paul, with Brazil's Radio Globo in Sao Paulo (1100) and in Rio (1220), becoming audible around 0015. By 0035, the Caribbean Beacon 1610 was a good signal, too! The first indications that the band was opening to Canada and N. America were signals from CJYQ at 0135 on 930, followed by WMRE in Boston, USA on 1510 at 0150. Between 0230 and 0300 two of New York's stations, namely WQXR 1560 and WHN 1050 were noted along with WTOP broadcasting from Washington on 1500. Signals from Newfoundland's CKYQ 610 were good by 0235 and later those on 590 from VOCM in St. John's were logged at 0345. Also at this time, WCAU in Philadelphia, 1210 and WBAL in Baltimore, 1090 were well received from the USA. By 0400

Freq (kHz)	Station	ILR/ BBC	DXer 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
603	Invicta Sound	ILR								X		X							X	X	X
603	Radio Cornwall	BBC			X					X											
630	Radio Bedfordshire	BBC			X					X						X		X	X		X
657	Radio Cornwall	BBC								X											
666	Devonair Radio	ILR								X		X							X		
666	Radio York	BBC			X		X								X	X		X	X		
756	Radio Cumbria	BBC					X							X		X					
756	Radio Shropshire	BBC								X								X	X		X
774	Radio Kent	BBC		X															X		
774	Radio Leeds	BBC													X	X		X	X		
774	Severn Sound	ILR								X		X	X								X
792	Chiltern Radio	ILR					X												X		X
801	Radio Devon	BBC								X			X					X	X		
828	2CR	ILR																	X		
828	Radio WM	BBC														X					X
828	Radio Aire	ILR														X		X	X		
828	Chiltern Radio	ILR										X							X		X
837	Radio Leicester	BBC																	X		X
855	Radio Norfolk	BBC																	X		X
855	Radio Lancashire	BBC					X							X		X					
873	Radio Norfolk	BBC											X						X		
936	GWR	ILR								X											X
954	Devonair Radio	ILR	X		X		X														
954	Radio Wyvern	ILR					X			X								X	X		X
990	Radio Devon	BBC								X											
990	Beacon Radio	ILR														X		X	X		X
999	Radio Solent	BBC								X											
999	Red Rose Radio	ILR					X		X					X		X		X			
999	Radio Trent	ILR																	X		X
1026	Downtown Radio	ILR					X									X					
1026	Radio Jersey	BBC								X											
1026	Radio Cambridgeshire	BBC																	X		X
1035	Radio Sheffield	BBC													X						
1035	Radio Kent	BBC								X									X		
1035	Northsound Radio	ILR							X										X		
1035	West Sound	ILR					X														
1107	Moray Firth Radio	ILR					X												X		
1107	Radio Northampton	BBC													X				X		X
1116	Radio Derby	BBC													X			X	X		X
1116	Radio Guernsey	BBC								X		X									
1152	LCB	ILR								X		X							X		
1152	Radio Clyde	ILR			X		X		X											X	
1152	Metro Radio	ILR													X			X			
1152	BRMB Radio	ILR								X		X							X	X	X
1152	Piccadilly Radio	ILR														X				X	
1152	Radio Broadland	ILR								X		X			X				X		
1161	Radio Tay	ILR					X		X		X						X		X		
1161	Viking Radio	ILR														X		X	X		
1161	GWR	ILR								X											
1161	Radio Bedfordshire	BBC																	X		X
1170	Swansea Sound	ILR								X		X									
1170	Radio Tees	ILR													X	X			X		
1170	Radio Orwell	ILR																	X		
1170	Signal Radio	ILR						X								X		X	X		X
1242	Invicta Sound	ILR								X		X							X		
1251	Saxon Radio	ILR																	X		X
1260	GWR	ILR								X											
1260	Marcher Sound	ILR			X		X									X		X			
1260	Leicester Sound	ILR																	X		X
1278	Pennine Radio	ILR					X			X								X			X
1305	Red Dragon	ILR								X		X									X
1305	Radio Hallam	ILR													X				X		
1323	Radio Bristol	BBC								X											
1323	Southern Sound	ILR					X														
1332	Hereward Radio	ILR					X		X	X		X			X			X	X		X
1359	Essex Radio	ILR																	X		
1359	Radio Solent	BBC				X															
1359	Red Dragon	ILR								X		X					X				
1359	Mercia Sound	ILR								X								X	X		X
1368	Radio Lincolnshire	BBC								X					X				X		
1431	Essex Radio	ILR					X											X	X		
1431	Radio 210	ILR								X											
1449	Radio Cambridgeshire	BBC								X									X		X
1458	Radio London	BBC	X																	X	
1458	Radio WM	BBC	X							X									X		X
1458	Radio Manchester	BBC														X	X				
1458	Radio Newcastle	BBC													X				X		
1458	Radio Devon	BBC								X											
1458	Radio Cumbria	BBC			X		X									X					
1476	County Sound	ILR			X					X		X							X		X
1485	Radio Merseyside	BBC					X		X	X					X	X	X	X			X
1485	Radio Humberside	BBC													X				X		
1485	Radio Oxford	BBC								X											
1503	Radio Stoke-on-Trent	BBC					X			X						X		X	X		X
1521	Radio Mercury	ILR					X			X		X									

◀ Fig. 1

1 Alan Williams, Helston
2 Ron Pearce, Bungay
3 Bill Kelly, Belfast
4 Wyn Mainwaring, Cowes
5 Alexander Little, Glasgow
6 David Jones, Liverpool
7 Stuart Russell, Forfar
8 Graham Powell, Pontypridd
9 John Sheridan, Mapperley
10 Francis Hearne, Bristol
11 Philip Rambaut, Macclesfield
12 Michael Hill, Stockton-on-Tees
13 Chris Wood, Washington
14 Stan Jones, Southport
15 Rod Hamilton, Bathgate
16 Michael Sargeant, Bolton
17 Philip Hodgson, Stamford
18 Steven Woods, Bramcote Moor
19 Richard Wollerton, Nuneaton

stations from other areas of Canada became audible, first Quebec's CKLM 1570 and then CFDA in Victoriaville, 1380 followed by CJCH 920 in Halifax NS. When Radio Luxembourg signs off Paul has noticed that there are several Canadian and US stations on 1440 and urges other DXers to take a listen there around 0305–0340—he recently identified one as WMER of Westbrook. Me.

Paul uses a receiver which has a built-in ferrite rod antenna in the handle of the set, with no provision for an external antenna or earth. Various methods have been tried in an attempt to couple in his 10m wire antenna, which is erected in the loft in a NW & SE direction. The best method devised so far has been to wind a 15–20 turn coil around a small length of ferrite rod and attach the antenna to one end and an earth to the other and then bring this coil near to the handle of the set. By moving this coil the coupling can be varied, often with good effect when DXing!

The reception from Grand Bank, Newfoundland, was good enough for **Bill Kelly** of Belfast to enjoy several programmes via CKYQ 610 from 0130, CJYQ 930, CKLM 1570 with a talk in French and the Caribbean Beacon 1610 was also noted in his log.

Graham Powell reports that several stations from the USA have been well received at his location in Pontypridd, including WCAU 1210, WHN 1050 and WINS from New York on 1010—all heard on his Trio R2000 receiver, plus KX-3 a.t.u. & 20m wire antenna around 0230. Signals logged from Canada were CHUM in Toronto, Ontario 1050 also Quebec's CBM in Montreal on 940 and CJRP in Quebec on 1060—all noted around 0250. **George Morley** also uses a Trio R2000 receiver plus an a.t.u. and wire antenna to check the band in Redhill, Surrey. Starting at 0300, in just over an hour one night he logged Canadian CJYQ 930, CKLM 1570 and CKCW in Moncton, New Brunswick on 1220 and from the USA he noted WINS 1010; WHN 1050; WCAU 1210; WOR in New York on 710 and WBAL 1090.

Writing from Randburg, South Africa, **Leo Gieske** says he has been hearing XERF on 1570 from Ciudad Acuna, Mexico at 0447. He picked up VOA on 930 one night at 0358, which he thinks is located in Costa Rica—has any one else heard this station?

Other DX: Leo Gieske was delighted to receive signals at 1930 from 4QD located in Queensland, Australia, which broadcasts on 1548! Using a box loop antenna

TABLE CONTINUES ▶

Fig. 1 (continued) ▼

Freq (kHz)	Station	ILR/ BBC	DXer 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1521	Radio Nottingham	BBC																	X		X
1530	Pennine Radio	ILR					X		X	X		X			X	X		X			
1530	Radio Wyvern	ILR					X			X						X			X		X
1548	Capital Radio	ILR																	X	X	X
1548	Radio Bristol	BBC								X										X	X
1548	Radio Forth	ILR					X		X	X									X		
1548	Radio City	ILR								X						X		X			
1548	Radio Cleveland	BBC													X				X		
1557	Hereward Radio	ILR	X				X		X										X		X
1557	Radio Lancashire	BBC					X			X						X					
1584	Radio Nottingham	BBC																	X		
1584	Radio Shropshire	BBC								X											X
1584	Radio Tay	ILR			X		X														
1602	Radio Kent	BBC								X											

in conjunction with his Drake SPR4 receiver Leo has also heard very weak signals from JOOR in Japan on 1179 and Taiwan on 1000. Turning his loop towards Europe produced fair signals from Bacua, Roumania, also on 1179, which were logged at 1845. QSLs have now been received from Sri Lanka, Deutsche Welle and Yugoslavia—congratulations Leo!

By tuning around the band during the evening on his Philips D-7254 Cassette Radio in Helston, **Alan Williams** was able to compare the World News from the BBC World Service on 648 at 2000 with World News from Leningrad, USSR on 1494 at 2110! Later, he listened to a programme called *Back to the Bible* from TWR Monte Carlo, Monaco on 1467, which followed their station identification at 2200. At 2100 on Sundays, Alan has been listening to the *Radio World* DX programme from BRT2 in Brussels, Belgium on 1512—**Ron Pearce** has been hearing it, too, on his one valve receiver in Bungay, Suffolk!

Francis Hearne of Bristol, has been listening to Radio Tirana, which broadcasts to Europe on 1395 at 2030 and is located in Lushnje, Albania—this station welcomes reports and has attractive QSL cards. Also in Bristol, **Tim Shirley** used a DX400 receiver to log Gorkii, USSR on 828 at 1700; AFN, Munich, W. Germany on 1107 at 1830—and received a nice QSL & pennant; Ain Beida, Algeria on 529 at 2200; Praha +4, Czechoslovakia on 1233 at 2300; Cape Greco, Cyprus on 1233 at 0100; Novi Sad, Yugoslavia on 837 at 0200 and Sfax, Tunisia on 1566 at 0300. A Trio R600 receiver was used to log several l.w. stations including Donebach, W. Germany on 155 at 0500; Brasov, Rumania, which was heard for ten minutes on 155 from 0515 and Motala, Sweden on 191 at 0648.

The BBC 200kHz l.w. transmitter located in Droitwich has been received in Krackow, Poland, by **Wojciech Zajac** at 2100 with SINPO 33333, but so far it has not been heard this year by **John Ratcliffe** "down under" in Southport, Queensland, Australia. John says he is keeping a regular watch for it just after sunset there, when the dawn is about to break here, but has come to the conclusion that this is not always the best time because he has noticed that the signals from 2YA in Wellington, New Zealand, which is 3057km from Southport and those from Samoa and Tahiti, some 8050km away in the Pacific Ocean, arrive between one and two hours before sunset. One interesting point he made is that there is no twilight period in Queensland—right up to sundown it is bright daylight and ten minutes later it is total darkness, just like someone switching off the light!

In the UK, the m.w. signals from Scandinavia are normally only audible after dark via the skywave path, however, it is sometimes possible to detect weak signals during the day and **Philip Rambaut** has managed to log the Norwegian Prog. 1 via Kvitsoy on 1314 in Macclesfield, Cheshire at 1326. The signals from the Solvesborg transmitter of Radio Sweden on 1179, mentioned by **David Jones** of Walton, Liverpool, are good at night in many areas of the UK. Their programmes are interesting and an attractive QSL is available to confirm reception reports!

Up in Forfar, Scotland, **Stewart Russell** had been checking on the signals from some of the official stations in S. Ireland at night. Although RTE Radio 1 on 729 and RTE Radio 2 on 1278 seem to be noted in a number of logs, their lower frequency outlets on 567 and 612 respectively are less often mentioned and Radio Na Gaeltachta, which broadcasts on 540, 828 and 963 in Gaelic, is seldom reported! Stewart has also been hearing the BBC Radio Ulster 100kW Lisnagarvey transmitter on 1341—there seems, however, to be a complete lack of reports on the BBC 1kW transmitters in Enniskillen on 873 and in Londonderry on 792, so there is a challenge for the low power transmitter DX hunters!

Local Radio DX

The popularity of this aspect of our great hobby is increasing, as can be seen from Fig. 1. One of the nice things about Local Radio DXing is that any receiver capable of receiving the m.w. band can be used—there are plenty of them about! However, receivers which have a directional antenna system can help to overcome the problem of the unwanted signal on or close to the frequency of a wanted station—the secret being to "null-out" the unwanted signal rather than peak up the wanted one by carefully adjusting the direction of the antenna.

Like many other DXers **Michael Hill** finds the daytime conditions the best for DXing in Stockton-on-Tees, Cleveland, and added the new ones to his list between 1030 and 1230. **Chris Wood** took his portable receiver to a quiet hilltop near Washington, Co Durham, away from a noisy town, to compile his impressive list! A home-made one valve set was used by Ron Pearce to log his entry for the chart—he would like to hear of others using simple receivers.

"I discovered BBC Radio Guernsey by accident while tuning around the band one weekday afternoon at 1430," says Francis Hearne. **Steven Woods** places his Amstrad 8090 receiver on a swivel chair when DXing at night in Bramcote Moor, Nottingham. "I thought I would send you a log after reading your column and having a go!" writes "newcomer" **Richard Woolerton** of Nuneaton, Warwickshire. "Radio Cornwall is on my most wanted list," writes **Phil Englehard G0DNB** of Macclesfield, Cheshire. Writing from Stamford, Lincolnshire, **Philip Hodgson** says "I long for a loop antenna—as you can imagine the stations tend to pile up on one another and a strong one from one direction drowns out poor signals from another." **Michael Sargeant** compiled his first entry for the chart during the daytime in Bolton, Lancashire.

Many UK listeners are hearing the *Red Dragon DX* programme presented by **Al Dupres** of Cardiff on ILR Red Dragon Radio 1305 & 1359. Al says, "I recently heard a recording of my show as heard in Norway! This was on 1359 at 0045 and I was astounded by the quality." Despite the recent comments by DXers in Edinburgh and Forfar, Scotland, **Rod Hamiliton**, a "newcomer" to DXing, has been hearing the Red Dragon on 1359 at 0100 in Bathgate, West Lothian. Over in N. Ireland, Bill Kelly has been hearing it well in Belfast on 1359, but so far **Harry Armstrong** has not been able to hear it in Co. Armagh, so its exact territory seems uncertain!

QSL Addresses

ILR Invicta Radio, 15 Station Road East, Canterbury, Kent CT1 2RB.
ILR Devon Air Radio, The Studio Centre, 35–37 St. David's Hill, Exeter EX4 4DA.
ILR Severn Sound, P.O. Box 388, Old Talbot House, 67 Southgate Street, Gloucester GL1 1TX.

SW BROADCAST BANDS

Reports as for Medium Wave DX, but please keep separate

by Brian Oddy G3FEX

For the Newcomer SWL

Tuning in a short wave receiver to a broadcast station located in some strange sounding place in a distant country may well result in an old school atlas being opened in an attempt to find out exactly where it is.

Some s.w.l.s obtain a large map of the world and, having pasted it onto a suitable backing material, mount it on the wall. This enables them to place a coloured map pin at the location of the distant broadcast station and perhaps join it up with a length of cotton to a pin at the receiver site. A very impressive display for a visitor to see!

World maps of this type use a method introduced by **Mercator** in the 16th Century of indicating meridians and parallels of latitudes on maps. These are pretty familiar to most of us because we have been looking at them, from time to time, since our earliest days at school! Those used in the UK show Europe and Africa drawn over the middle part of the map.

SEE YOU AT THE LEICESTER SHOW

NEW FROM SONY AIR-7 MONITOR

AM 150KHz–2194KHz AM 108-136MHz WFM 76-108MHz NFM 144-174MHz

The new Sony Air-7 is a superb new monitor having features so far unmatched in a single hand-held monitor by any other manufacturer. Its frequency coverage makes it ideal for airband, public service or marine band monitoring, plus normal domestic use. Highly sensitive, this receiver does everything you could ever desire in one package. The LCD digital display means clear frequency display even under bright illumination and the PLL circuitry ensures drift free reception. Frequency is selected by key-pad entry or electronic tuning and there is provision for disabling the keyboard. 10 memories are provided for each of the 4 main ranges (40 in total) and comprehensive scanning is provided in the bands 108-174mHz. Either full band or memory scanning is possible at a rapid rate. Additionally, delays may be programmed into each memory channel, certain channels only may be scanned and any channel can be designated the "priority" channel. Accessories include BNC helical, battery cartridge shoulder strap etc. Options available:- rechargeable battery cartridge **£15.95**; Mains PSU/ charger **£15.95**.

£249

PLEASE NOTE, unlike some versions on the market, these are not "grey imports" and therefore have both the full frequency coverage and the backing of SONY UK. No other amateur radio dealer in the UK can offer you this guarantee. Be warned!

SONY 2001D + AIRBAND OPTION & AC PSU!

Angus Mckenzie in Amateur Radio Magazine says "probably represents the best portable radio that one can get" and "far superior to anything that I have tried". We can only agree with his comments. It is a truly superb communications receiver that is completely portable covering 0.15-30mHz, 76-108mHz(WFM) plus 116-136mHz AM airband. We can only touch on the features here such as Synchronous detector on AM for reduced interference; Switchable USB/LSB with separate filter; 55mHz first IF for good image response; both electronic and manual tuning the latter with dual speed; signal metering; RF gain control; 32 programmable memories with scanning; search facility; 4 event timer; 24/12 hour clock, LCD readouts; mains power supply included; etc. etc. We have used this radio extensively on the office desk and it is a delight to be able to listen to the DX on 14mHz; the natters on 3.5mzHz and the latest news from Radio Australia. For home use an external aerial socket is provided and under these conditions it compares well with even the most exotic receivers. In stock now!

£329

ALSO IN STOCK A.N-1 ACTIVE AERIAL KIT £49.00
CARRIAGE ON ALL ABOVE £2.50

JUST PUBLISHED 26-2250MHz No-Gaps!

THE COMPLETE VHF/UHF FREQUENCY GUIDE

- ★ MARINE CHANNELS
- ★ CIVIL & MILITARY AIR
- ★ POLICE, FIRE, AMBULANCE
- ★ SPACE VEHICLES
- ★ HAM RADIO REPEATERS
- ★ UHF TV CHANNELS
- ★ FULL DUPLEX DETAILS
- ★ PMR
- ★ RADIOPHONES

£4.95
p&p 70p

At last the only "COMPLETE" vhf/uhf frequency guide available to the UK radio enthusiast. Not just a collection of random frequencies put together in haphazard fashion but a professionally prepared and printed guide based on the very latest information available. 64 pages packed with a mass of information about this fascinating part of the frequency range. Whatever you want to know, if its between 26 and 2250mHz this guide will quickly take you to it. In fact it would be difficult to imagine any enthusiast not having a copy of this beside him! The book very clearly lays out comprehensive details of all the services that use this part of the radio spectrum with their allocations and where applicable the separate mobile and base station frequencies. It would be impossible to list everything that this publication covers but it includes the following:- All UK marine frequencies with coast station listings; civil airport and ATC frequencies; Military air including air to air and air to ground including Red Arrows; Police; Fire and Ambulance mobiles and base with duplex cross references; NASA voice channels; Russian Space spot frequencies; Weather satellites, PMR; Outside broadcast channels BBC/ITA; 2m and 70cm repeater listings; UHF TV channels; BT radiophones; new band 3 PMR allocations and much more. There is no gaps (like some publications that have attempted to copy us and then got it wrong!); every part of the spectrum is accounted for. No radio shack is complete without this invaluable guide. Send or phone today for your copy.

— OTHER TITLES —

VHF/UHF AIRBAND FREQUENCY LIST 2nd EDITION	£4.95
OCEANIC HF AIRBAND SUPPLEMENT	£2.95
WORLD RADIO TELETYPE HF FREQUENCY LIST	£3.95
AIR TRAFFIC CONTROL	£6.99
AIRBAND RADIO HANDBOOK	£4.99
WORLD RADIO AND TV HANDBOOK	£17.95
SHORTWAVE BROADCASTING GUIDE (times & frequencies)	£4.95

WATERS & STANTON

RETAIL & MAIL ORDER:- 18-20, Main Road, Hockley, Essex SS5 4QS.
Tel: (0702) 206835, 204965

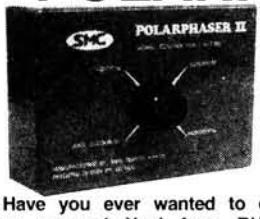
RETAIL ONLY:- 12, North Street, Hornchurch, Essex RM11 1QX.
Tel: (04024) 44765

Visa and Access by telephone. 24 hour securicor £6.50 extra.

SOUTH MIDLANDS COMMUNICATIONS

SMC

POLARPHASER II



70cms VERSION NOW AVAILABLE (£65.00)

NEW

Have you ever wanted to control the polarisation of your xy crossed Yagi from RH-LH, CIRCULAR, VERTICAL or HORIZONTAL, even whilst transmitting? Then this revolutionary product is what you have been waiting for!

The SMC POLARPHASER enables you to alter the polarisation of your aerials continuously through the full 360°.

For satellite users the benefits to be obtained from instantaneous shack control of polarisation are obvious, enabling effective utilization of receive capabilities and power resources along with the ability to reduce or even totally eliminate co-channel interference for terrestial use.

	2 metre	70cms
VSWR	less than 1·5:1.	less than 1.3:1
Frequency	144-146MHz.	430-440 MHz
Power	150 Watts.	100 watts
Connectors	SO239 or 'N' (please specify).	'N' type

£65.00 inc VAT

£49.00 inc VAT (SO239)

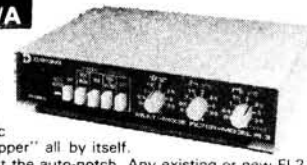
£54.00 inc VAT ('N')

UK Patent No. 2157894A. Manufactured by S.M.C. Design by G2HCG

Access | BARCLAYCARD VISA

SEND LARGE SAE FOR DETAILS
SM HOUSE, SCHOOL CLOSE, CHANDLERS FORD
INDUSTRIAL ESTATE, EASTLEIGH, HANTS SO5 3BY.
Tel (04215) 55111. Telex 477351 SMCOMM G. Fax: (04215) 63507 SMC FX.

AUDIO FILTERS MODELS FL2, FL3, FL2/A



Model FL3 represents the ultimate in audio filters for SSB and CW. Connected in series with the loudspeaker, it gives variable extra selectivity better than a whole bank of expensive crystal filters. In addition it contains an automatic notch filter which can remove a "tuner-upper" all by itself. Model FL2 is exactly the same but without the auto-notch. Any existing or new FL2 can be up-graded to an FL3 by adding Model FL2/A conversion kit, which is a stand-alone auto-notch unit. Datong filters frequently allow continued copy when otherwise a QSO would have to be abandoned.

Prices: **FL2 £89.70, FL3 £129.37, FL2/A £39.67**

ACTIVE RECEIVING ANTENNAS

Datong active antennas are ideal for modern broadband communications receivers – especially where space is limited.

- highly sensitive (comparable to full-size dipoles).
- Broadband coverage (below 200 kHz to over 30 MHz).
- needs no tuning, matching or other adjustments.
- two versions AD270 for indoor mounting or AD370 (illustrated) for outdoor use
- very compact, only 3 metres overall length. ● professional performance standards.

Prices: Model AD270 (indoor use only) **£51.75** Both prices include mains power unit.
Model AD370 (for outdoor use) **£69.00**

MORSE TUTOR

The uniquely effective method of improving and maintaining Morse Code proficiency. Effectiveness proven by thousands of users world-wide.

- Practise anywhere, anytime at **your** convenience.
- Generates a random stream of perfect Morse in five character groups.
- D70's unique "DELAY" control allows you to learn each character with its correct high speed sound. Start with a long delay between each character and as you improve reduce the delay. The speed **within** each character always remains as set on the independent "SPEED" control.
- Features: long life battery operation, compact size, built-in loudspeaker plus personal earpiece.

Price: **£56.35**

Our full catalogue plus further details of any product are available free on request.

All prices include VAT and postage and packing. Goods normally despatched within 3 days subject to availability.

VISA | Barclaycard, Access Orders – Tel: (0532) 552461

DATONG ELECTRONICS LIMITED
write to dept. P.W.
Clayton Wood Close
West Park
LEEDS LS16 6QE
Tel: (0532) 744822 (2 lines)

The addition of map pins and a cotton line to link for example Sydney, Australia, with London on such a map, quickly gives the impression that a radio signal would arrive in London from Sydney in a south easterly direction. Then linking Midway Island in the North Pacific with London would result in the impression that signals would arrive from the west south west. However, strange as it may seem, both directions are quite wrong! The truth is that if we want to determine the true direction of some distant place from our receiving location, such maps are useless!

Depending upon your interests, you may well have hidden away in some dusty corner of the attic, or prominently displayed in the lounge, a **Terrestrial Globe.** Although the real earth is not strictly a true sphere, for most practical purposes it can be considered as such. Hence a globe can be used to determine the true direction of a distant place and its distance from any given location.

To take fairly accurate bearings with a globe, which ideally should be at least 200mm in diameter, simply cut out a paper disc about 80mm in diameter and then draw a straight line from its centre to any point on its circumference. A map pin is then passed through the centre of this disc and is used to hold it in place at exactly the location of the receiving site on the globe. Using a strip of paper as a straight edge between this map pin and the North Pole at the top of the globe, the paper disc is rotated so that the line drawn on its surface coincides with the straight edge and points to the North Pole. A second map pin is then used simply to prevent the disc from rotating. (If the construction of the globe does not permit a couple of map pins to be lightly pressed into its surface, Blutak could be used to hold the disc in place.)

To find the true direction of any distant place, hold a strip of paper as a straight edge between the map pin at the disc centre and the desired location on the globe and draw in a line on the paper disc. Use a protractor to measure the angle between north and this line—this is the bearing in **degrees true.**

It is very important to understand that **true north** and **magnetic north,** as shown by a compass, are not one and the same thing. There is a difference between them which is quoted in degrees and is known as the **variation.** Used with care to avoid the effects of nearby magnetic objects, a good **prismatic compass** will establish the direction of magnetic north fairly accurately—within about one degree or so—and from this true north may be determined by allowing for the variation.

True north may also be established in other ways, which avoid the use of a compass, for example the **Pole Star,** around which all the other constellations appear to revolve. Located almost directly over the North Pole, in the UK it appears roughly half-way between the zenith (overhead) and the northern horizon. During bright sunny days it is possible to use the shadow cast by a perpendicular stick to point to true north at exactly noon (UTC)—be sure to use a plumbline to check that the stick is truly perpendicular.

However, by simply looking at a globe, it will be obvious that although a radio signal may take the direct path between any two points on the Earth, this is not a straight line, but part of a circle! This is called a **Great Circle** route.

Great Circle maps are available*, they are circular in format. The centre of the circle is the location of the place for which the map is specially prepared, for example, London (see Fig. 1a). If you have not seen one of them before, the appearance may seem very strange!

By placing a ruler between the centre of the map and any place in the world, the bearing in degrees True can be read off the 360 degree scale around the outer periphery of the map, and the distance can be measured from the centre with a ruler. Some typical bearings of distant places relative to London obtained by this method are shown in Fig. 1b. It reveals that Sydney lies on a bearing of 66 degrees, i.e. to the north east from London and not to the south east as the Mercator map implied, while Midway Island lies on a bearing of 358 degrees, which is almost over the North Pole!

Today, Great Circle maps are frequently used by professional radio engineers, radio amateurs and s.w.l.s alike. By studying them, it is possible to make the best use of the known directivity patterns of even the simplest of antennas, as we shall see in future articles in this series!

*Great Circle maps, centred on London, are available in the UK from RSGB Publications (Sales), Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Price £2.57 including postage.

Conditions on 25 and 21MHz

(Note: Frequencies in MHz. Time in UTC = GMT).

A group of sunspots has been observed on the surface of the sun, which may well mark the beginning of Sunspot cycle 22. If the next few months confirm that we are once again on an upward trend, then conditions on the higher frequency bands will gradually start to improve. However, until that happens it is unlikely that broadcasters will include 25MHz (11m) in their operational schedules—occasional openings may occur to distant places, but these will not enable a worthwhile service to be established.

The conditions on the 21MHz (13m) band have been slightly better than hitherto, but are still very unreliable. A number of regular broadcasters use this band to beam their programmes to specific areas of the world during daylight hours. Although some of these broadcasts may not be intended for the UK, the signals can often be received here via the skywave path off the back of the transmitting beam antenna, or via back scatter routes. A good example of this type of reception was mentioned by **Robert Taylor** who has been hearing Radio Prague, Czechoslovakia, beaming to Asia on 21·705 at 0830 in Edinburgh.

Direct transmissions are made to Europe by a number of stations and one of the most frequently reported is UAE Radio Dubai on 21·700. Their programmes, which commence at 0615 and close at 1500, are mainly in Arabic with short periods in English. A variety of programmes are directed to Europe by Radio RSA on 21·590 from Johannesburg, S. Africa. These commence in Portuguese at 1000, but change to English and French from 1100 until closedown at 1556. Some idea of the reception of Radio RSA in Europe can be ascertained from the reports of **Wojciech Zajac** who noted SINPO 33343 in his log in Krakow, Poland at 1300 and by **Neil Dove** who logged their World News and Financial Report at 1430 as SINPO 35443 in Lockerbie.

Some of the other broadcasters which may be heard on 13m in the UK include Radio DW Cologne on 21·680 with a programme for Asia from 0900 via transmitters in Julich, W. Germany; UAE Radio Dubai on 21·605 between 1000 and 1500, with programmes for Europe and RBI Berlin; GDR beaming to Asia on 21·540 at 1230—all logged by **John Sadler** in Bishop's Stortford. **Neil Dove** logged RFI in Paris, via transmitters located in Allouis, France, with programmes intended for Africa on 21·620 at 1430. Radio Japan, which beams programmes in English to Europe at 1500, via a relay station in Moyabi, Gabon on 21·625 was mentioned by Wojciech Zajac. Finally VOA, beaming to Africa via a relay in Monrovia, Liberia on 21·485 was received by **George Morley** of Redhill at 1640.

In an interesting report from Johannesburg, **Simon Illingworth** details the 13m band as unreliable there. He says that strong signals are often only audible for ten minutes then totally disappear. In fact many signals never reach Africa as their target—VOA is non-existent, Radio Moscow disappears early on 21·450 and even Radio Nederlands via Madagascar on 21·480 is unreliable! According to **John Ratcliffe** of Southport, Australia, things are not much better there either, except for VOA, which is like a local!

Bearing in degrees true from London	
Ascension Island	195
Bombay	092
Cape Town	165
Falkland Is	214
Havana	278
Honolulu	338
Midway Is	358
Moscow	066
New York	288
Pitcairn Is	283
Quito	261
Rio de Janeiro	219
San Francisco	316
Sydney	066
Tahiti	314
Tokyo	033
Vancouver	323
Vladivostok	034

Fig. 1(a) (top): Simple Great Circle Map (Courtesy RSGB)
Fig. 2(b) (bottom): Typical Great Circle bearings from London

The 17 and 15MHz Bands

The reception conditions on the 17MHz (16m) band have been very variable in the UK. Some periods of very poor conditions, with high noise levels present, have made it almost impossible to hear any signals at

all! At other times the reception of signals from several continents has been possible.

Despite the fact that broadcasts from Radio Australia are not intended for Europe on this band, many DXers enjoy looking for their signals in the early morning! Using a Trio R2000 receiver, "old timer" George Morley has been making regular checks on their 17·715 signals and found that between 0600 and 0700 was often the best time to listen. Later, **Chris Wood** of Washington, Co. Durham, has been listening to their news at 0730 when conditions permit. Some listeners may have noticed Radio Australia's call-tune in the background of their transmission around 0850. **George Hewlett** of Torquay says this is their Chinese Service, which commences on 17·715 at 0900. George spends many hours a day monitoring the broadcasts from Radio Australia on behalf of the Directorate of Telecom, Australia.

Many of the 16m signals received by DXers in the UK are often weak, because they are not directed to Europe, although their programmes may be in English. An example is All India Radio, which can sometimes be heard in the UK at 1000, beaming programmes in English to Australia from New Delhi on 17·875. Radio Finland directs its programmes in English to Africa at 1400 on 17·785 but **Darren Taplin** has been hearing them in Tunbridge Wells. Up in Stockton-on-Tees **Alan Curry** has been listening on 17·565 to the Voice of Greece at 1235, with a programme in English for the USA. Many of these broadcasts are in foreign languages too, which may make identification difficult! Take for example the stations logged by **Philip Rambaut** in Macclesfield, Radio Nederlands beaming to Asia via a relay station in Madagascar on 17·575 at 1050 with Dutch and English and three stations beaming to Africa around 1700, namely Radio Algiers on 17·745 with French; RAI Rome, Italy on 17·780 with Italian and Radio Cairo, Egypt on 17·785 in the Vernacular.

Although there are a number of broadcasts directed to Europe which are in English, a number of foreign languages are also used and some of these may be quite unfamiliar to DXers. An example is Radio Pakistan, mentioned by **Al Dupres** of Cardiff. It broadcasts daily to Europe on 17·660 in Urdu from 0715, with dictation speed news in English at 1100. UAE Radio Dubai logged by **Roy Degg** of Stoke-on-Trent beams to Europe on 17·865 from 1000 with programmes in Arabic plus short periods of English. Programmes in Russian, Yiddish, Hungarian and Hebrew are all aimed at Europe between 1530 and 1855 by The Voice of Israel, Jerusalem on 17·710.

Several of the programmes in English which are so popular with listeners in Europe, were detailed in an interesting log from **Alan Williams** of Helston. The wide variety of topics which are broadcast on 17·790 by Radio HCJB from their location in Quito, high in the Andes mountains of Ecuador at 2130 were mentioned. Those of RCI Montreal, Canada, were also mentioned, they frequently cover exciting sporting events and local news during their evening transmission on 17·820 at 2130. **Francis Hearne** of Bristol has been listening to the Voice of Free China, which broadcasts from Taipei, Taiwan, via a relay transmitter in Okeechobee, Florida on 17·845. Their popular programmes at 2200 about Chinese cooking and learning the language are followed by news. On Mondays, Wednesdays and Fridays, programmes in Dutch and English reach the listener from Radio Surinam via an RNB Brasilia transmitter on 17·755, located in Brazil—although **Jim Willett** of Grimsby has been listening to them at 1800, they are not often reported.

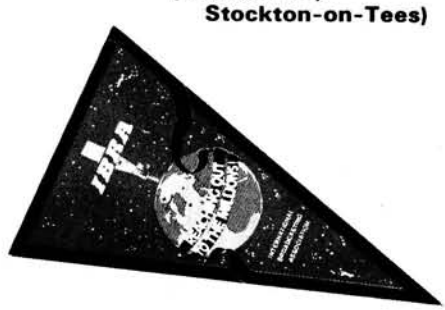
Conditions on the 15MHz (19m) band have been rather more reliable than the higher frequencies and many broadcasters "back-up" their 13m or 16m transmissions by also radiating the same programme on this band or on 25m. Some may even use three bands in an attempt to ensure that their signals reach a given target area!

Many interesting stations may be found on this band during the day and a detailed report from **Alan Hollingworth,** who uses a Vega receiver in Southsea, Hampshire, provides an insight to 19m listening. At 0700, signals from Radio Japan were received via a relay located in Moyabi, Gabon on 15·230 and were noted at SINPO 32323. At 1000, he picked up the news from the Voice of Israel, Jerusalem on 15·650 and at 1230 listened to the news about Austria from Radio Austria Int, Vienna on 15·320, followed by a fashion report and world news. At 1400 a talk about terrorism attracted his attention from Radio Norway Int, Oslo on 15·310. Later, at 2130, local romantic music followed by a talk entitled *What in the World* were enjoyed from Radio HCJB Quito, Ecuador on 15·270 and at 2145 the news and a report from France was received from RCI Montreal, Canada on 15·325. At 2200, a talk about the growth of power world-wide was received from VOFC Taipei, Taiwan, via a relay in Okeechobee, Florida on 15·440—certainly plenty to interest the listener, Alan!

Up in Scotland, **Ian McLuckie** uses a selection of antennas with a Trio 9R-59DS receiver when DXing in Darvel, Ayrshire. He has been listening to *Jazz Hour* from VOA, Washington, via their relay in Tangier, Morocco on 15·205 around 2225 and to AFRTS Los Angeles, USA via their transmitter in Bethany, USA, on 15·345 at 2130. Also in Scotland, **Alexander Little** of Glasgow is anxiously waiting for a QSL to confirm his reception of Australian VLH15 on 15·230 at 2230. He uses a 20m wire antenna in conjunction with a Vega B210 receiver.

Writing from Bristol, **Tim Shirley** says he has been listening to Radio Australia on their new frequency of 15·415 from 0800 to 1300 and has found the signal to be very good around 1100. Tim recommends to all DXers a programme called *Short Wave Feedback* on Sunday evenings from Radio Korea, Seoul, S. Korea on 15·575 between 1800 and 1900. The only report this time on the signals beamed towards Europe and Africa from S. America came from **John Sheridan** of Mapperley who used an RCA AR88 to log RNB Brasilia, Brazil on 15·155 at 1800 as SINPO 33323 and RAE Buenos Aires, Argentina on 15·345 at 2100 as SINPO 33322.

Pennant from IBRA Radio (Michael Hill, Stockton-on-Tees)



The 11, 9, 7 and 6MHz Bands

There are many broadcasters operating on these bands, taking advantage of the generally more stable conditions present and signals from all continents can be heard at some time during the day or night.

During the daytime, most of the stations mentioned in recent months can still be found on the 11MHz (25m) band. However John Sheridan picked up a station on 12·015 at 1200 which he has been trying for years to log—Radio Ulan Bator, Mongolia! A wide choice of stations exists during the evening, such as Radio Kuwait on 11·675 which **Andrew Hill** has been hearing in Cheslyn Hay, Staffordshire at 1800; Radio Beijing, China on 11·500 logged by **John Parry G4AKX** in Northwich, Cheshire at 1900; Radio Damascus, Syria on 12·085 at 2105—noted by **Derek Thomley** in Birmingham as SINPO 55555; Radio Moscow on 11·950 from 2000 and RCI Montreal, Canada on 11·960 at 2100 mentioned by **Colin Diffell.** Colin uses a Sony ICF 2001D receiver plus their AN-1 active antenna in Corsham, Wiltshire.

Some of the more interesting signals on the 9MHz (31m) band were reported by **Julian Wood** of Buckie and by **Tony Bernascone** of North Ormesby. John has been hearing Radio Japan via a relay in Moyabi, Gabon on 9·645 at 2200 and Tony logged Radio Tirana, Albania, with Spanish on 9·430 and with Portuguese on 9·500; The Voice of Israel on 9·435 with news in English; Radio Cairo, Egypt on 9·475 in Arabic; Radio Bucharest, Roumania on 9·570 and Radio Habana, Cuba on 9·550 direct and via their relay in the USSR on 9·590 all from 2300. The Sunday morning programmes at 0800 from Adventist World Radio on 9·670 have been attracting the attention of **Sheila Hughes** in Morden, she noted SINPO 44344 in her log.

Sending along a report after a summer break from DXing, **Bill Stewart** of Lossiemouth says he has been checking the 7MHz (41m) band and found RCI Montreal, Canada on 7·235 with news in English at 1915. **John Berridge** has been listening in Cardiff to the 6MHz (49m) broadcasts from Radio Australia during the afternoon and early evening on 6·035. **Stewart Russell** of Forfar has been hearing a UK based relay of VOA on 6·040 at 1700—located in Wooferton, Shropshire, this causes interference to the signal from Radio Australia on 6·035 due to sideband splatter. Stewart also logged BRT Brussels, Belgium on 5·910 at 2100—this is a popular station. RBI Berlin, GDR, mentioned by **David Jones** of Walton, Liverpool, and **Brandan Murray** of Co. Derry, N. Ireland, broadcasts to Europe on 6·115 at 1815.

Many DXers who make use of the NPL's Standard Time/Frequency signals radiated by MSF, Rugby on 10, 5 and 2·5MHz will be surprised to learn that this service is to be withdrawn as from 29 February 1988. My thanks to **Donald Wood** of Kingston upon Thames, Surrey, for the information and obtaining confirmation of this from the NPL in Teddington—any queries should be addressed to Division of Electrical Science, NPL, Teddington TW11 0LW.

Once again there has been plenty of activity on the 5, 4, 3 and 2MHz bands, as reference to Fig. 1 shows.

Freq (MHz)	Station	Country	1	2	3	4	5	6	7	8	9	10	11	12
3·200	TWR	Swaziland										0115		
3·215	R. Orange	S. Africa							1959					
3·215	R. Orion	S. Africa	2250		2255				0300					
3·220	R. Kara	Togo				2050				2055				
3·230	ELWA Monrovia	Liberia				2135								
3·230	R. RSA	S. Africa							0305					
3·250	Radio 5	S. Africa								2120		2000		
3·270	SWABC 1	Namibia	2235			0410			2145			1820		
3·300	R. Cultural	Guatemala				0428								
3·330	R. Rwanda	Kigali							0311					
3·356	R. Botswana	Setswana				2050				2045		1805		
3·366	GBC Radio 2	Ghana				2130			2230	2040				
3·905	AIR Delhi	India			2230							2359		
4·500	VNG Lyndhurst	Australia								1900				
4·500	Xinjiang	China			2200									
4·545	Alma Ata	USSR								2359				
4·635	R. Dushanbe, Tadzhik	USSR								2345				
4·737	R. Mozambique	Mozambique												2100
4·740	R. Afghanistan	Afghanistan								1830				
4·760	ELWA Monrovia	Liberia	2220											
4·760	TWR	Swaziland									0258			
4·765	Espirite Santo	Brazil												0120
4·765	Habana	Cuba				0446								
4.770	FRCN, Kaduna	Nigeria				2253	1817		2100					
4·770	R. Mundial, Bolivar	Venezuela				2301				2350				
4·775	TWR, Manzini	Swaziland												2110
4·790	R. Atlantida	Peru								0200	0320		0350	
4·795	R. Douala	Cameroon	2245				1915		2100	1916				
4·800	LNBS Lesotho	Maeru							2000					
4·805	R. Diff de Amazonas	Brazil								2359	0015			
4·810	R. RSA	S. Africa					1940		2100	2107	2154	2100	2048	2115
4·815	R. Diff TV Burkina	Burkina Faso				2250	1815		2040	1905	2335	2140		2117
4·820	R. Botswana	Botswana	1935				1930	?	2035	1930	2035		0355	
4·820	La Voz Evangelica	Honduras Rep	0500										0345	
4·830	Africa No. 1	Gabon			1955		1815		2000	2200			2026	2125
4·830	R. Tachira	Venezuela								0204	0104			
4·832	R. Reloj	Costa Rica	0445								2050			
4·835	RTM Bamako	Mali				2330	1939		2120					
4·845	ORTM Nouakchott	Mauritania				2135			2033					
4·845	R. National, Manus	Brazil		0125							0214		0220	
4·850	R. Yaounde	Cameroon							2101					2132
4·850	R. Capital, Caracas	Venezuela											0355	
4·865	Lanzhou PRC	China												2135
4·870	R. Cotonou	Benin	2205		0210		1920		2015	2100	2226	2230		
4·880	SABC R. Suid Afrika	S. Africa					1928							
4·885	R. Clube do Para	Brazil									0110			0210
4·885	Voice of Kenya	Kenya							1850					
4·890	ORTS, Dakar	Senegal	2210		2240									
4·895	Ashkhbad	USSR	2203											
4·895	R. Bare, Manus	Brazil										0230		
4·900	R. diff Nat Conakry	Guinea							2000					
4·905	N'djamena	Chad	1840							1900				
4·915	Accra	Ghana	2245				1938		2115					
4·915	Voice of Kenya	Kenya												2145
4·920	R. diff Nat Chad	Chad					1844		2015					
4·920	R. Quito	Ecuador								0215				
4·926	R. Nacional, Bata	Eq. Guinea												2150
4·940	Yakutsk	USSR	2203	0200										
4·945	Caracol Neiva	Colombia											0415	
4·945	R. Nat Porto Velho	Brazil									0145			
4·945	RSA	S. Africa					1825							
4·951	R. Mandre de Dios	Peru									0204			
4·958	Azerbaijan	USSR	2050											
4·970	R. Rumbos	Venezuela											0401	
4·980	Ecos del Torbes	Venezuela								0210	0310		0300	
4·990	FRCN, Lagos	Nigeria	2230		2230		1850		2107		2303		2159	
4·990	Radio RSA	S. Africa			0330								0335	
4·990	Yerevan	USSR	2040											
5·005	R. Nacional, Bata	Eq. Guinea	2145						2145			2145		
5·010	R. Garoua	Cameroon					1935		2100					2210
5·025	R. Rebelde	Cuba									0222			
5·027	R. Uganda, Kampala	Uganda	2040						2010					
5·034	Bangui	Cen African Rep	2100											
5·035	Alma Ata	USSR	2040								2359			
5·037	La Voz del Upano	Ecuador									0139			
5·040	George	USSR	2105											
5·045	R. Cultura do Para	Brazil									0108	0245		
5·047	Togblekope	Togo	2200					1945		2150				

◀ **Fig. 1**

1 Neil Dove, Lockerbie
2 Al Dupres, Cardiff
3 Bill Kelly, Belfast
4 George Morley, Redhill
5 Fred Pallant, Storrington
6 John Parry, Northwich
7 Graham Powell, Pontypridd
8 Michael Sargeant, Bolton
9 John Sheridan, Mapperley
10 Tim Shirley, Bristol
11 Ron Young, Danbury
12 Jim Willett, Grimsby

Short Wave Broadcast Station Awards

A number of specially designed Awards, measuring about 215mm by 280mm and suitable for framing are available to all s.w.l.s from the USA. Sponsored by the N. American SW Association (NASWA), full details can be obtained by writing to: **John Kapinos, 86 South Quinsigamond Avenue, Shrewsbury, Mass 01545, USA.**

My thanks to **Edward Baker** of Cramlington, Northumberland, for sending along this information.

Station Addresses

RNB Brazilia, Radio Bras, Caixa Postal 04-0340, 70-000 Brazilia DF, Brazil.

Radio Surinam International, Postbus 2979, Paramaribo, Surinam.

Radio Zambia, External Service, Broadcasting House, P.O. Box 50015, Lusaka, Zambia.

S.E.M.

UNION MILLS, ISLE OF MAN
Tel: MAROWN (0624) 851277

NEW. S.E.M. QRM ELIMINATOR. Do you suffer from local QRM. Motors, power lines, TVs, local station? We can stop it, with this entirely new concept developed by us. Phase out interference using a small indoor pick up aerial. 1.8-30MHz. £85. If you don't believe its true, try one for 10 days, if it doesn't solve your problem, we'll refund, less £5 to cover costs.

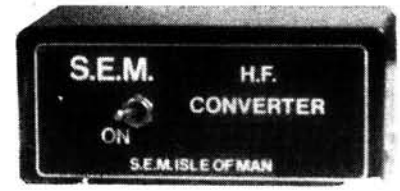
NEW S.E.M. Dummy load. 100W with dummy load/through switch **£22.00.**

NEW S.E.M. TRANZMATCH. Now has a switch to select DIRECT to aerial, BALANCED or UNBALANCED or DUMMY LOAD. The matching unit retains its tremendous versatility capable of matching virtually any aerial to 50 ohms at up to 1kW. The link coupled output isolates the aerial from the rig, which can cure TVI both ways. We are constantly hearing from people who have bought other ATUs and then had to use one of ours to match their aerials, and their robust construction is proved by the ones in daily use for 15 years. 1.8-30MHz £110. Ezitune built in £39.50 (see below). Built in dummy load £8.90 Ex-stock.

S.E.M. 2 metre Transmatch **£32.00** Ex-stock.

S.E.M. EZITUNE. Do you use an antenna matcher? You need our Ezitune to tune it to your frequency without transmitting. Listen to the 59+ noise on your receiver and adjust your aerial tuner for a dip in the noise and you are matched up to 50 ohms (1:1 SWR). Protect your radio and stop tuning QRM. **£45** boxed, or p.c.b. + fixing bits and instructions to fit in any A.T.U. **£39.50.** Ex-stock.

VERY WIDE BAND PRE-AMPLIFIERS
They cover from 3-40MHz or 20-500MHz with a noise figure of 1.5dB and an unprecedented +30dB 3rd order 1P at the INPUT. This means that they are quite exceptional in handling very strong signals, very important on wideband pre-amps. Gain is 9dB.
We make each in three types. Straight pre-amp, this has a signal loss if you switch it off, **£32.00.** One which switches to "straight through" when switched OFF, can be used for transmitting through (100W) if supplied with 12V on receive and 0 on TX, costs **£35.00.** An R.F. switched unit is **£45.00.** All Ex-stock.
We are continuing to make our highly acclaimed dedicated 2 Metre pre-amps with adjustable 0-20dB gain and 1dB N.F. Receive only **£21.90.** R.F. switched **£34.00** and with 240V P.S.U. **£39.00.** Ex-stock.



CONVERTERS
Our new H.F. CONVERTER opens new horizons for receivers, use with the new all mode V.H.F., U.H.F. receivers FRG9600 and ICR7000, extends their coverage down to 100KHz, giving you LF, MF, HF, VHF and UHF. You tune your RX from 100MHz up, e.g. 103.500 is 3.5MHz. It has two aerial sockets, one for H.F. into the converter and one for V/UHF switches straight through into your RX when you switch the converter OFF, i.e. No plugs to change. All this for **£45.00.** Ex-stock.

R.F. NOISE BRIDGE. If you are experimenting with aerials you need one of these units. Tells you the resonant frequency and impedance of your aerials and also invaluable for measuring ¼, ½, etc., wavelength of feeders, etc. **£45.00.** Ex-stock.

WAVEMETER. A pretty little absorption wavemeter, to satisfy the licence conditions. 1.5-30MHz with a meter indication. **£39.50.** Ex-stock.

IAMBIC KEYER. We use the world famous CURTIS chip which eliminates the little idiosyncracies common in other keyers. Opto-isolators from the chip ensure that R.F. can't get in, a common problem with multi-chip keyers. **£45.00.** An excellent twin paddle key often mistaken for ones costing several times more at **£19.50.** Ex-stock.

2 METER LINEAR POWER AMP/PRE-AMP. People are constantly telling us that comparing different makes our Pre-amp is best. (See Pre-amps for spec.) Three models. Sentinel 35 12× power gain e.g. 3W IN-36W OUT. Ideal for FT290 **£85.00.** Sentinel 50, 10W IN-50W OUT **£95.00.** Sentinel 100 10W IN-100W OUT **£135.00.** All Ex-stock.

AUDIO MULTIFILTER. Has fully adjustable BAND PASS, HIGH PASS, LOW PASS and 2 NOTCH filters. From 2.5KHz to 20Hz. Making the most versatile filter available. **£69.50.** Ex-stock.

T.V.I. Our Braid Breaker/High Pass Filter cures T.V.I. by plugging into the TV aerial socket. **£7.50.** Ex-stock.

S.E.M. SWITCH. 3 way ant. switch + 4th position to earth. 1kW. S0239S D.C.-150MHz. **£23.00.** Ex-stock.

12 MONTHS COMPLETE GUARANTEE INCLUDING ALL TRANSISTORS.

Prices include VAT and delivery. C.W.O. or phone your CREDITCARD No. Ring or write for further data. Orders or information requests can be put on our Ansaphone at cheap rate times.

CRICKLEWOOD ELECTRONICS LTD

It's no secret!

. . . that there is a *real difference* at *Cricklewood Electronics*. That's why you should never be without the *FREE* CRICKLEWOOD ELECTRONICS COMPONENTS CATALOGUE, for sheer variety, *competitive prices* and *service* from the U.K.'s number one 100% component shop. No gimmicks, no gadgets or computers, just components, millions of them, all easily available by mail order, calling or credit card telephone orders. Just pick up the phone (or a pen) to get your FREE copy now (no SAE required). You have nothing to lose.

CRICKLEWOOD ELECTRONICS LTD.
40 Cricklewood Broadway NW2 3ET.
01-450 0995 & 01-452 0161
ALL MAJOR CREDIT CARDS ACCEPTED
Telex 914977 Phone or write today

RADIO & RTTY BOOKS

MARITIME RADIO HANDBOOK Tune into the World's Shipping

Twenty-four hours a day, 365 days a year the world's shipping are transmitting on shortwave. Listen in to hear what's going on. A great variety of information is transmitted from emergency distress calls to weather reports. The second edition of "Maritime Radio Handbook" (180 pages) is now available, which contains twice as much information as the first. It gives hundreds of stations transmitting between 4 and 26 MHz. It lists the regular transmissions of coastal stations giving times of transmission, callsign, name of station, country abbreviation, mode of transmission, type of transmission such as traffic list, service announcements, or navigation, frequencies and other information. This edition has an additional section giving a listing of transmissions in country and station order, to assist the shortwave listener to tune into the station of his or her choice more easily.
Prices £11.25 + 65p post & packing in UK and Eire. Overseas £1.00 sea mail, £2.60 airmail.

GUIDE TO UTILITY STATIONS 1986 Now lists 15,083 SW frequencies. Aero, CW, Fixed, Commercial, RTTY, FAX, etc. stations, plus callsigns and much more. The most comprehensive frequency book available. **£16.00 + £1.45 p&p**

SCANNERS. A VHF/UHF Listener's Guide with frequency lists **£7.95 p&p FREE.**

COMMUNICATION SATELLITES New expanded 2nd edition covering ham, weather, navigation, DBS, US and Russian space mission satellites etc. **£13.25 + £1.55 p&p**

RADIO BEACON HANDBOOK Worldwide listing of 8,500 Long and MW Beacons by callsign, frequency, station and more **£8.85 + 35p p&p**

AERAD – Europe & Middle East Lists all airports and the VHF frequencies used **£5.85 + 65p p&p**

RADIOTELETYPE PRESS BROADCASTS. A comprehensive book on the worlds Press Agencies including full details of their services, frequencies and times of transmission **£11.85 + 65p p&p**

RADIO HACKERS' CODEBOOK Decoding with home computers, codes and cyphers **£6.95 + 65p p&p**

Two or more books Post & Packing FREE. (UK and Eire only).
Ask for our free catalogue of all books. Delivery normally from stock within 14 days.

INTERBOOKS, PWD16, Stanley, Perth PH1 4QQ, Scotland. Tel: (0738) 828575

COMMUNICATION CENTRE OF THE NORTH

The largest range of communications equipment available in the North. Full range of receivers, transceivers, antennas, power supplies, meters. Ali tubing – wall brackets – rotators – insulators.

We are the original amateur radio suppliers in the North West with 20 years experience in all types of equipment.

Wide range of Base, Mobile, Antennas for all applications. Full range of equipment on display. Guaranteed after sales service.

Stockists also for Tonna, Welz, TET, G.Whips, Jaybeam, RSGB Publications, Diawa, Microwave Modules.

RECEIVERS

TRIO R2000 Solid State Receiver	**£565.00**
Wide Band Scanning Receiver AR2002, 25-550 MHz AM-FM + 800 to 1300 MHz	**£487.00**
R532 Airband Receiver	**£224.00**
R537S Hand Held Airband Receiver	**£69.50**
NRD525 Solid State General Coverage Receiver	**£1,195.00**
AT1000 SWL Antenna Tuning Unit	**£58.00**

Please send SAE for full information and up-to-date prices as these fluctuate to change in sterling rates.
For the caller a wide range of Aluminium Tubing, Clamps, etc. at competitive prices, i.e. 12' × 2" Ali Tubing **£9.00.**

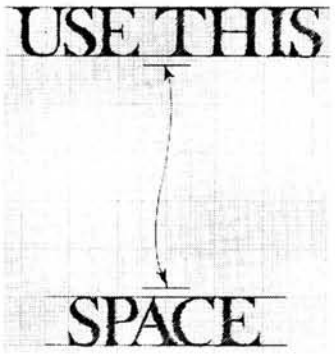
Full range of RSGB and ARRL publications in stock.
Part Exchanges welcome. Second hand lists daily.
Send S.A.E. for details of any equipment.
HP terms. Access/Barclaycard facilities.
Open 6 days a week. 24 Hour Mail Order Service.

Goods normally despatched by return of post.

Phone 0942-676790.

STEPHENS JAMES LTD.

47 WARRINGTON ROAD,
LEIGH, LANCS. WN7 3EA.



SMALL ADS

The prepaid rate for classified advertisements is 40 pence per word (minimum 12 words), box number 60p extra. Semi-display setting £13.24 per single column centimetre (minimum 2.5 cm). Please add 15% VAT to total. All cheques, postal orders etc., to be made payable to Practical Wireless. Treasury notes should always be sent registered post. Advertisements, together with remittance should be sent to the Classified Advertisement Dept., Practical Wireless, Enefco House, The Quay, Poole, Dorset BH15 1PP. Telephone (0202) 678558.

Whilst prices of goods shown in advertisements are correct at the time of closing for press, readers are advised to check with the advertiser both prices and availability of goods before ordering from non-current issues of the magazine.

Receivers and Components

MAXI - Q
COILS AND CHOKES
PREVIOUSLY MADE BY DENCO
S.A.E. PRICE LIST
8 BRUNEL UNITS, BRUNEL ROAD, GORSE LANE IND. ESTATE, CLACTON, ESSEX CO15 4LU.
TEL: (0255) 424152

RADIO CANADA. Peking, Australia, Voice of America. A Vega 206 (6× SW/MW/LW) pulls these and dozens more. £24.95. "Good buy" Practical Wireless. Year's guarantee. Return despatch. CORRIGAN-RADIOWATCH, Building 109, Prestwick Airport, KA9 2RT.

ESR ELECTRONIC COMPONENTS
- FULL RANGE OF COMPONENTS
- MOTORS & SERVOS
- ROBOT ARMS & INTERFACES
- VELLEMAN ELECTRONIC KITS

Send for new catalogue **60p** *inc. P&P*

13a Station Road, Cullercoats, North Shields, Tyne & Wear NE30 4PQ
091 251 4363

SPECIALIST VHF MONITOR RECEIVERS. Pocket-sized with 26-30/54-176MHz providing Public-Service Action, Aircraft, Marine, Ham-Radio, CB, Business Radio, PSB, Surveillance, Utilities, General Broadcasts & More! Ultra sensitive with integral VFO, Squelch & Volume facility @ £29.50 all inc. CWO/COD Welcome. D. Taylor (Dept PW8) 8 Emmerson Street, Crook, Co. Durham, UK.

CRYSTALS Made to order for any purpose and large stocks of standard frequencies for computers, modems, etc. Amateur CW (QRP) freqs *£4.00* and CB conversion crystals at *£4.50*.
PROGRAMMABLE OSCILLATORS (PXO) for baud rates, MPU, and freq markers *£12.50*.
FILTERS Crystal, monolithic, mechanical and ceramic for all standard IF's. Special 10.695MHz for big improvement to most CB rigs at *£4.50 each*.
S.A.E. FOR LISTS. PRICES INCLUDE VAT AND POST
P. R. GOLLEDGE ELECTRONICS
G3EDW, Merriott, Somerset, TA16 5NS
Tel. 0460 73718

DECCAFAX VIEWDATA PLINTH VP1
Includes 1200/75 Modem, CPU, PSU, Numeric Keypad and Monitor Turntable. Printer, Keyboard and Cassette Sockets. Colour monitor output TTL 75 ohm.
New, in Makers original packing..... **£19.95**
or VP3 (RS232 version)..... **£15.95**
Includes VAT, add £5 for carriage.
M.E.M., 166 Maney Hill Road, Sutton Coldfield, W. Midlands B72 1JW.
021-354 7375

ELECTRONIC COMPONENTS FOR SALE. S.A.E. lists: 15 Kings Road, Sutton Coldfield B73 5AB. Tel. 021-354 5409.

SWL & DXING PRODUCTS. SAE details please: D. J. Stanton (Radio), 16 Addison Road, Worcester WR3 8EA.

TRANSISTORS RESISTORS CAPACITORS
BC108/9 **15p.** LED's 3-5mm **12p.** SAE for full list. 2SC166 **£1.60.** ¼W 5% Res **2p.** Prices include VAT. 2N3055 **65p.** Jack Plugs **10p.** P.P. 75p.
T.R.C. SUPPLIES
4A GARFIELD ROAD
SCARBOROUGH, YORKS YO12 6NQ

FREE COMPONENT LISTS. SAE please. JOHN (G8BX0), Three Westpark, South Molton, Devon EX36 4HJ.

IMPROVE YOUR DX'ING with our communications aids. Preselector, calibrator, audio filter, step attenuators. SAE lists. THEASBY ELECTRONICS, 31 Middleton, Cowling, Keighley, West Yorkshire BD22 0DQ.

Books and Publications

EUROPEAN & BRITISH broadcast stations clearly listed in DIAL-SEARCH: MW, LW and selections SW, VHF; 46pp + 2 maps. "Excellent" (PW); "Good value" (Radio Nederland Booklist). £3.30 including postage (abroad £3.50 or 15 IRCs). – WILCOX (PW2), 9 Thurrock Close, Eastbourne BN20 9NF.

Service Sheets

SERVICE MANUALS. Television, Audio, Video, Vintage, Test etc. LSAE enquiries: MAURITRON (PW), 8 Cherrytree Road, Chinnor, Oxfordshire, OX9 4QY.

TECHNICAL INFO SERVICES
76 Church St – Larkhall – Lanarks
FULL SIZE SERVICE SHEETS
Any radio, audio £2.50 + l.s.a.e.
CTVs/MusC £3.50 + l.s.a.e. complete set

SERVICE SHEETS
World largest collection
service manuals 30's – date
from £4.50-£35 each.

Comprehensive T.V. Repair Course
Complete Radio Service & Repair Course
ONLY £9.50 EACH

Unique comprehensive repair
data & circuits for almost
every TV & video in stock.

S.a.e. brings any quotation
FREE 50p mag. inc. service sheet!
Pricelists unique elect. publications

FOR FAST QUOTES RING
0698 884584 before 5pm
0698 883334 after 4pm

Aerials

ANTI-TVI AERIALS. Trap Dipoles. Traps for beams, verticals or wire aerials. Baluns. Data sheets 24p SAE. Aerial guide £1. (03986) 215. G2DYM, Uplowman, Devon EX16 7PH.

Kits

GEIGER COUNTER. Inexpensive gen-purpose portable radiation monitor (audiovisual). Kitform (full assembly data) £79.92. Built £89.32. Post incl. Others, send SAE. Becker-PW, 8 Finucane Drive, Orpington. 0689 37821.

ORDER FORM PLEASE WRITE IN BLOCK CAPITALS

Please insert the advertisement below in the next available issue of Practical Wireless for ..... insertions. I enclose Cheque/P.O. for £ ..... CAT. heading .....
(Cheques and Postal Orders should be made payable to Practical Wireless)

NAME .....

ADDRESS .....

.....

PRACTICAL WIRELESS
Classified Advertisement Department,
Enefco House, The Quay, Poole,
Dorset BH15 1PP. Telephone (0202) 678558
Rate **40p** per word, minimum 12 words.
Box No. **60p** extra.
PLEASE ADD 15% VAT TO TOTAL

Company registered in England. Registered No. 1980539. Registered Office: Towngate House, 2 Parkstone Road, Poole, Dorset, BH15 2PJ. 11/86

Educational

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc.) write or phone: THE RAPID RESULTS COLLEGE, Dept JX19, Tuition House, London, SW19 4DS. Tel. 01-947 7272 (9am-5pm) or use our 24hr Recordacall Service: 01-946 1102 quoting Dept. JX19.

Veteran & Vintage

NOW AVAILABLE – Bumper Catalogue – 170 pages – For collectors of Vintage Radio, Audio & T/V Equipment. Price: £2.00 post paid U.K., £3.00 post paid overseas. VINTAGE WIRELESS CO. LTD., Cossham Street, Mangotsfield, Bristol BS17 3EN. Phone 0272 565472.

TEN 1940's RADIOS. Spares. Most serviced. Five pen recorders. £255. Evenings – Rustington (0903) 776818.

Wanted

EE8 American field telephones, any condition, any quantity. Phone Monday-Friday 9-5 p.m. 01-743 0899.

Software

RADIO SOFTWARE
48K SPECTRUM & SPECTRUM 128

RTTY — QSO review, printer dump, type ahead, memories etc. Both require filter. TRANSCEIVE **£8.50** RECEIVE ONLY **£6.00**

CW — Self tracking 8/30 wpm, type ahead, memories, etc. TRANSCEIVE **£8.50** RECEIVE ONLY **£6.00**

SLOW SCAN TV — Save to printer, brightness, contrast & Inverse controls, tuning aid, etc. RECEIVE ONLY **£7.00**

FILTERS — Unboxed RTTY only ..... **£6.00** C.W. only **£7.00**
Boxed RTTY/C.W. Switchable **£11.50**
Ditto with Tuning LED **£13.50**

TERMINAL UNITS — No space to fully describe this superb unit. (Send for full details and specification) **£45.00**

S.A.E. for full details of these and other products:

J. & P. ELECTRONICS LTD.
New Road Complex, New Road, Kidderminster, DY10 1AL
Tel: (0562) 753893

COMMODORE COMPUTERS (+4, C16, 64, 128). "MICROCOM" cw/rtty tx/rx with superb morse tutor. "TURBO LOG" ultimate high speed station log. "MICROCOM INTERFACE" ready built. S.A.E. to: Moray Micro Computing, Enzie Slackhead, Buckie, Moray, AB5 2BR. Tel. 0542 7384.

Miscellaneous

CASES 19" rack and free standing from £12.00. NEWRAD Wick Ind. Est., New Milton, Hants. Tel. 621195

QSL CARDS. Gloss or tinted cards. SAE for samples to TWROG PRESS, Dept. PW, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd.

G2VF D.I.Y. H.F. Long and Medium Wave loop antennas. SAE for details: F. RYLANDS, 39 Parkside Avenue, Millbrook, Southampton.

HEATHKIT U.K. Spares and Service Centre. CEDAR ELECTRONICS, Unit 12 Station Drive, Bredon, Tewkesbury, Glos. Tel. (0684) 73127.

MORSE CODE PREPARATION
Cassette A: 1-12 wpm for amateur
Cassette B: 12-25 wpm for professional examination preparation
Each cassette is type C90.
Price of each cassette (including booklets) **£3.95.**
Morse key with separate battery (PP3) – driven solid-state oscillator and sound transducer produces clear tone for sending practice. Price of key with electronic unit **£8.95.**
Price includes postage etc. Europe only.
MH ELECTRONICS (Dept PW)
12 Longshore Way, Milton, Portsmouth PO4 8LS

THE SCIENTIFIC WIRE COMPANY
811 Forest Road, London E17. Telephone 01-531 1568

ENAMELLED COPPER WIRE

SWG	1lb	8 oz	4 oz	2 oz
8 to 34	3.63	2.09	1.10	0.88
35 to 39	3.82	2.31	1.27	0.93
40 to 43	6.00	3.20	2.25	1.61
44 to 47	8.67	5.80	3.49	2.75
48	15.96	9.58	6.38	3.69
SILVER PLATED COPPER WIRE				
14 to 30	9.09	5.20	2.93	1.97
TINNED COPPER WIRE				
14 to 30	3.97	2.41	1.39	0.94
Fluxcore Solder	5.90	3.25	1.82	0.94

Prices include P&P VAT. Orders under £2 add 20p.
SAE for list of copper and resistance wire.
Dealer enquiries welcome.

For Sale

ICOM R71E COMMUNICATIONS RECEIVER, brand new including VHF unit, voice synthesiser, remote controller, external speaker, headphones, world clock in makers carton, must sell, bargain. Tel. 01-767 7736.

SONY ICF 2001D synthesised receiver brand new in box, air/AM/FM with AN1 active antenna, must sell, bargain. Tel. 01-767 7736.

TV AERIAL 60FT SECTIONAL £500. Quantity coaxial cable offers. 043886 408 mornings.

MANUFACTURERS SURPLUS STOCKS

Electronic Components, Test Gear, Radiotelephones, Computers, Photographic and Video Equipment. All at knockout prices.

Catalogues Available from:

B. BAMBER ELECTRONICS, 5 STATION ROAD, LITTLEPORT, CAMBS. Phone: ELY (0353) 860185.

WAVEGUIDE, FLANGES & DISHES. All standard sizes & alloys (new material only) from stock. Special sizes to order. Call: EARTH STATION 01-228 7876, 22 Howie Street, London SW11 4AR.

TAPE RECORDERS. Ferrograph type series 3, mono, valve unit for 240v mains 7½/3¾, 600 ohm or high imp I/P, £55. Also Ferro Ser. 7 mono, transi unit mains, Mill version, £75. Note both these recorders sold as complete but have been held in M.O.D. stores for some time and may require attention, circ & book supplied. **MORSE KEYS.** Medium size Army key on die cast base ass adjustable, £6.50. **DISH AERIAL.** Airborne Radar X band dish aerials 32" dia 5" deep, some perforations, new, £24.50. **OPTICAL SIGHT.** Monocular angle sight 5×27.5, £7.50. **TAPE.** Audio recording tape ¼" on 8¼" dia HD ali spools 1800/2400ft, 4 mixed for £11.50. **AERIAL KIT.** Army 30ft mast or aerial kit in 10 3ft screw sections, 1" dia with guys, base, stakes, etc, in carrying bag, new cond, £34. **HAND GENY** Army hand geny nom O/P 12v DC regulated at 1 amp intended for charging but would power equipment direct. Supplied with stand, strap, cable, etc, new cond, £34.50. **SNAIL BLOWERS.** Medium size blower single ended for 115v 50/60c two phase with int conds, outlet size 2×2¼" inlet 3¼" dia, overall size 6½×6½×5", new American surplus, £14.50 (240/115v trans if req £3.50). **POWER RELAY UNIT** for 240v as smoothed DC O/P of 24 at 500 Ma, also relay panel ass with relay 50v rect, transis, etc, in neat wall or free standing box, size 6×5×3", new cond, £6.50. **L.T. TRANS.** for 200/250v sec 6.2 at 5a & 6.2v at 3a, size 3×2¾×3½", new, £6.50. **PRE SELECTORS.** HF tunable 2/29Mc/s in 4 bands, can also be swt out of circ direct cal with 10.1 slow motion dial, each band as two high Q coils tuned by either 2 or 4 sections of 4 gang conds intended for 75 ohm I/P & O/P, all coils adjustable of LF/HF, very well made unit on 19" panel used with older type Rx will reduce image & cross mod iterference, no power req, £24.50. **INTRUDER ALARM UNITS.** Light activated as photo diode SCR swt unit control unit with mains p.u. and 6v nic cad batt, 12v ext two tone siren, modern style unit in neat case, new, £19.50. **POWER SIG GENS.** For 240v provides approx 20 watts of RF variable 1.5 to 12Mc/s in 3 bands 75 ohm O/P RF O/P can be adjusted by int variac meters for Ma & RF O/P, in Army style case with circ, £65. **PANEL METERS.** Misc types 2/3" dia, mostly new, 4 different for £7.50 or 8 for £12. **SIG GENS.** Marconi TF144H general purpose 10Kc to 70Mc/s var O/P etc, metered, tested, with book, £125. Also TF1370 wide range Osc 10c/s to 10Kc sine & sq tested, with book, £85. **HANDSETS.** Old style GPO type with carbon mike & press to talk swt, £6.50. **VOLTAGE REGULATORS.** Nom O/P 220v at 30 amps I/P range 193/247v variac type transis, tested, £85. **COAX LEADS.** All 50 ohm RG58 1.5mts BNC/BNC £3.50, BNC/UHF £3.20, UHF/UHF £2.60, UHF/N £3.70, BNC/N £4.50, N/N £5.70. Test Leads 1.2mts BNC or UHF to insul crocs, £2.65. BNC & UHF also available in 75 ohm, interseries adaptors also available, see list.

Above prices include Carr/Postage & VAT, goods ex-equipment unless stated new. Allow 14 days for delivery. SAE with enquiry or 2×17p stamps for List 38/1.

A.H. SUPPLIES
122 Handsworth Road, Sheffield S9 4AE.
Telephone: (0742) 444278.

VALVES

*High Quality **Very High Quality

Prices correct as at 14/07/1986 but may fluctuate.

A1065	1.40	EC52	0.65	EF89	1.60	EY81	0.75	PL200*	2.80	UCC84	0.85
A2293	8.80	EC91	4.40	EF91	1.60	EY86/87	0.60	PL36	1.10	UCC85	0.70
A2900	12.75	EC92	1.85	EF92	2.15	EY88	0.65	PL81	0.85	UCH42	2.50
AR8	1.15	ECC81	0.95	EF95	0.95	EZ80	0.70	PL82	0.70	UCH81	0.75
ARP3	1.15	ECC82	0.95	EF96	0.60	EZ81	0.70	PL83	0.60	UCL82	0.95
ATP4	0.90	ECC83	0.75	EF183	0.80	GM4	8.90	PL84	0.90	UF41	1.35
B12H	6.90	ECC84	0.60	EF184	0.80	GY501	1.30	PL504	1.15	UF80	0.95
CY31	1.40	ECC85	0.75	EF812	0.75	GZ32	1.05	PL508	2.00	UF85	0.95
DAF96	0.85	ECC88	0.80	EFL200	1.85	GZ33	4.20	PL509	5.65	UL84	0.95
DET22	32.80	ECC189	0.95	EH90	0.85	GZ34	1.05	PL519	5.85	UM80	0.90
DF92	0.65	ECC804	0.90	EL32	0.85	GZ34*	3.20	PL802/SE	3.45	UM84	0.70
DF96	0.70	ECF80	0.95	EL34	2.10	GZ37	3.95	PY80	0.70	UY82	0.70
DH76	0.75	ECF82	0.95	EL34*	4.55	KT66*	15.50	PY81/800	0.85	UY85	0.85
DL92	1.10	ECF801	0.95	EL82	0.70	KT77**	16.10	PY82	0.75	VR105/30	1.45
DY86/87	0.65	ECH42	1.20	EL84	0.80	KT88	17.00	PY88	0.60	VR150/30	1.80
DY802	0.70	ECH81	0.70	EL86	0.95	KT88**	25.00	PY500A	2.10	X61M	1.70
E92CC	2.80	ECH84	0.80	EL90	1.75	ML4	3.20	QQV03/10	5.95	X66	1.80
E180CC	11.50	ECL80	0.70	EL91	6.50	ML6	3.20	QQV03/10*	10.00	Z749	0.75
E1148	0.58	ECL82	0.75	EL95	1.25	MX120/01	29.50	QQV03/20A	27.50	Z759	19.00
EA76	1.60	ECL85	0.75	EL504	2.70	N78	9.90	QQV06/40A*	28.50	Z800U	3.45
EABC80	0.80	ECL86	0.90	EL509	5.85	OA2	0.70	QQV06/40A	49.50	Z801U	3.75
EB34	0.70	EF22	3.90	EL519	7.70	OB2	0.80	QV03/12	5.75	Z803U	16.00
EB91	0.60	EF37A	2.15	EL821	8.45	PCL82	0.95	SP61	1.80	Z900T	2.45
EBC33	1.85	EF39	1.10	EL822	9.95	PCL84	0.85	TT21	43.70	1A3	2.75
EBC90	0.90	EF80	0.65	EL180SE	4.50	PCL86	0.80	TT22	48.30	1L4	0.65
EBC91	0.90	EF83	3.90	EM80	0.85	PCL805-85	0.95	UABC80	0.75	1R5	0.80
EBF80	0.95	EF85	0.60	EM87	2.50	PD500-510	4.30	UBF80	0.70	1S4	0.65
EBF89	0.80	EF86	1.25	EY51	0.90	PFL200	1.10	UBF89	0.70	1S5	0.75

VALVES AND TRANSISTORS Telephone enquiries for valves, transistors, etc. Retail 749/934, trade and export 743 0899
POSTAGE: £1-£3 50p; £3-£5 60p; £5-£10 80p; £10-£15 £1.00, £15-£20 £1.50. Minimum order £1.00. Delivery by return.

COLOMOR (ELECTRONICS LTD.) 170 Goldhawk Rd, London W12
Tel: 01-743 0899 or 01-749 3934. **Open Monday to Friday 9 a.m.-5.30 p.m.**

MAKE YOUR INTERESTS PAY!

More than 8 million students throughout the world have found it worth their while! An ICS home-study course can help you get a better job, make more money and have more fun out of life! ICS has over 90 years experience in home-study courses and is the largest correspondence school in the world. You learn at your own pace, when and where you want under the guidance of expert 'personal' tutors. Find out how we can help YOU. Post or phone today for your **FREE INFORMATION PACK** on the course of your choice. (Tick one box only!)

Electronics	☐	Radio, Audio and TV Servicing	☐
Basic Electronic Engineering (City & Guilds)	☐	Radio Amateur Licence Exam (City & Guilds)	☐
Electrical Engineering	☐	Car Mechanics	☐
Electrical Contracting/ Installation	☐	Computer Programming	☐
GCE over 40 'O' and 'A' level subjects			☐

ICS Name _____
Address _____ P. Code
International Correspondence Schools Dept EES B/6, 312/314 High St., Sutton, Surrey SM1 1PR. Tel: 01-643 9568 or 041-221 2926 (24hrs).

YOUR LOCAL DEALERS

LONDON

AMCOMM/ARE

Approved dealer for Yaesu and Icom

373 Uxbridge Road, London W3 9RN
Tel: 01-992 5765

(Mail order a speciality)

LONDON

Dressler (UK) Ltd.

A large selection always in stock – all makes

191 Francis Road, Leyton, LONDON, E10
Tel: 01-558 0854

(Mon-Sat 9am-5.30pm)

WORCESTERSHIRE

A. Kelly Electronics and Communications Equipment

RSGB Publications, Mutek, DRAE, Microwave Modules, Starmaster Keys, TAL Aerials, ALINCO. We buy and sell second hand equipment.

3 Stoke Road, Aston Fields, Bromsgrove, Worcs. B60 3EQ.
Tel: 0527 71165

(Open 6 days a week, evenings by Appointment)

ESSEX

Selectronic

The UK's leading suppliers of 934MHz personal radio equipment

203 High Street, Canvey Island, Essex
Tel: 0268 691481

(Open Mon-Sat 9-5.30)
Amateur radio equipment also in stock

HERNE BAY

Thanet Electronics

The Official Icom importer

2 Stanley Road
Herne Bay, Kent
CT6 5SH
Tel: 0227 369464

(Open Mon-Sat 9-5.30, except Thurs 9-1)

SOUTHAMPTON

South Midlands Communications

Official Yaesu Importer

S.M. House, School Close, Chandlers Ford Industrial Estate, Eastleigh Hants SO5 3BY.
Tel: 04215 55111

PORTSMOUTH

Telecomms

Importers of the Nevada range of 934MHz equipment

189, London Road, North End, Portsmouth, Hants, PO2 9AE
Tel: 0705 662145

DEVON

Reg. Ward & Co. Ltd.

The South-West's largest amateur radio stockist. Approved dealer for Trio, Yaesu and Icom

1 Western Parade, West Street, Axminster, Devon, EX13 5NY
Tel: 0297 34918

(Closed 1:00-2:00 and all day Monday)

BUCKINGHAMSHIRE

Photo-Acoustics Ltd.

Approved Trio, Yaesu and Icom dealer (part exchange always welcome)

58 High Street, Newport Pagnell, Buckinghamshire MK16 8AQ
Tel: 0908 610625

(Mon-Fri 9:30-5:30, Sat 9:30-4:30)

WEST MIDLANDS

Dewsbury Electronics

Approved Trio, Yaesu and Icom dealer

176 Lower High Street, Stourbridge, West Midlands
Tel: 0384 390063

(Open Mon-Sat 9.30-5.15)

MERSEYSIDE

A.R.E. Communications

For all your amateur radio needs – most models in stock.

38 bridge St., Earlestown, Newton-Le-Willows, Merseyside
Tel: 09252 29881

(For commercial enquiries ring Bernie or Brenda on 01-997 4476)

DERBYSHIRE

Lowe Electronics

The official importer of the TRIO range of equipment (See main ad. for the full list of all our shops)

Chesterfield Road, Matlock, Derbyshire, DE4 5LE
Tel: 0629 2817/2430/4057

INDEX TO ADVERTISERS

RADIO SHACK *SAVES YOU MONEY ON SCANNERS!*

AT LAST – A SCANNER WITH 200 CHANNELS AND DIRECT ACCESS TO 22,000 FREQUENCIES

The PRO-32 is the very latest hand-held scanner which features not only 200 memories but also:–

- ★ Two scan & search speeds
- ★ Two second scan delay
- ★ Frequency synthesised – no crystals needed
- ★ Priority function – monitor your favourite frequency whilst listening around
- ★ Large LCD display which shows channels and frequencies being scanned, monitored or programmed, plus status of channels
- ★ 66-88MHz VHF Low Band
- ★ 108-136MHz (AM) Aircraft Band
- ★ 138-174MHz VHF Amateur/Public/Marine
- ★ 380-512MHz UHF Amateur/Public
- ★ Squelch Control
- ★ Earphone Jack
- ★ External Antenna Jack
- ★ 7½" × 2 15/16" × 1⅝"
- ★ Built-in Speaker
- ★ Flexible Antenna
- ★ Required 6 AA batteries or AC or DC adaptor
- ★ Requires 3 memory batteries (life approx 1 year)

PRO-32 SCANNER	**£239.95**
MEMORY BATTERIES (set of 3)	**£3.60**
SET OF RECHARGEABLE NICADS	**£11.95**
AC ADAPTOR/CHARGER	**£11.99**
CARRIAGE	**£3.45**
TOTAL	**£272.94**
OUR PACKAGE DEAL PRICE	**£254.95**

Also still available
BC-200FB 16 CHANNEL SCANNER

£199.95 NOW SAVE £40
£159.95 (CP&P £3.45)

Access

RADIO SHACK LTD

188 BROADHURST GARDENS, LONDON NW6 3AY

(Just around the corner from West Hampstead Station on the Jubilee Line)

Giro Account No. 588 7151 Telephone: 01-624 7174 Telex: 23718

VISA

Published on the second Thursday of each month by PW Publishing Limited, Enefco House, The Quay, Poole, Dorset BH15 1PP. Printed in England by Benham & Co Limited, Colchester, Essex. Distributed by COMAG, Tavistock Road, West Drayton, Middlesex UB7 7QE, telephone West Drayton 444055, Telex 8813787. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa – Central News Agency Ltd. Subscriptions INLAND £13 and OVERSEAS (by surface mail) £15, payable to PRACTICAL WIRELESS, Subscription Department, Competition House, Farndon Road, Market Harborough, Leicestershire LE16 9NR. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed of by way of Trade at more than the recommended selling price shown on the cover, and that it shall not be lent, resold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

TELECOMMS BUMPER CATALOGUES

CB £1.
934MHz £1.
29MHz £1.
Each catalogue is packed full of info. and includes a £2 voucher.

2 MTR EQUIPMENT

2 MTR HANDHELD
NEW MOD. CTE. CT1600

A superbly sensitive new handheld covering 142-149MHz
- Repeater shift
- High/low power 1.5/0.5 Watt
- Thumbwheel selector

£199

VHF MOBILE AMPLIFIERS

C.T.E. B110 144MHz 110 Watt W/Pre Amp.	£169
C.T.E. B42 144MHz 40 Watt	£59.68
ZETAGI LA05435 144MHz 45 Watt	£65.10

29MHz BASE ANTENNAS

NEVADA TC52 ½ WAVE

This top class half wave uses high grade aluminium and a low loss coil handling up to 1 KW.
WIND RESISTANCE:-75 MPH
GAIN:- 2.5 dB
FREQ:- 28-30MHz

£27.82

NEVADA TC58 5/8 WAVE

Using high grade aluminium and a low loss coil complete with small radials this antenna is our most popular amongst the 29MHz fraternity.
POWER:- 1kW
GAIN:- 3.5 dB
FREQ:- 28-30MHz
LENGTH:- 6.6 MTRS

£29.75

SALIUT 3/4 WAVE

Using a unique base hoop this antenna offers exceptional ground wave coverage on 10 FM
POWER:- 2kW
GAIN:- 4.5 dB
FREQ:- 28-30MHz
LENGTH:- 9.1 MTRS

£49.72

934MHz PERSONAL RADIO

CYBERNET DELTA 1 TRANSCEIVER

- Scan
- Memories

£355

NPR 900 934 MHz Handheld	£459
UHF 1200 20 Watt Amplifier (12V)	£148

ANTENNAS

TC12L 12 Element Loop Quad 18dBi	£39
VICEROY 12 Element Yagi 15dBi	£29.95
P7-ME Mobile Mag. Mount 7dBi	£44
PA7-E Base Colinear 7dBi	£66

SWITCHES

WELZ 2 Way 'N' 1 GHz	£39.95
WELZ 2 Way 'N' 1.5 GHz	£46.16
HAS-1 M/Head 'N' 1.5 GHz	£59.67
CX 903 M/Head 'N' 1.2 GHz	£42.50

CABLE

5D-FB 0.2 dB Loss	£0.72/Mtr
8D-FB 0.16 dB Loss	£1.68/Mtr
10D-FB 0.117 dB Loss	£2.52/Mtr

PRE-AMPLIFIERS

HRA-934 L GaAs F.E.T. Pre-Amp	£139.95
HRA-900 M/Head Pre-Amp	£139.95
GS903 V/Gain Pre-Amp	£168

METERS

HPS 900 SWR/PWR 5/50 Watt	£89.95
SWR 903 SWR/PWR 8/40 Watt	£59.95
SP 930 Remote SWR	£57.32

NEVADA PSDL
PROFESSIONAL DUMMY LOAD

FREQ:-DC to 3GHz
A must for the HF, VHF and UHF operator. This dummy load at last offers wide freq. coverage at an affordable price.

£29.95

We are the U.K's largest distributor of 934 MHz equipment.
Send £1 for our full catalogue and receive a £2 voucher.

RF AMPLIFIERS

All amplifiers except broadband models are tuned for 29.6MHz centre freq. Should you require a lower freq. i.e. 28.5MHz please state when ordering. Export models available for 26-30MHz.

MOBILE AMPLIFIERS
C.T.E. MOD 767

£43

76 Watts FM
INPUT:- 0.5-10 Watts
SWITCHABLE:- Class AB, Class C
SUPPLY:- 13.8 Volt
REMOTE CONTROL FACILITY

C.T.E. MOD 737 50W FM AM/SSB/CW	£37.69
C.T.E. MOD 767 80W FM AM/SSB/CW	£43.00
C.T.E. MOD 757 150W FM Broadband	£99.98
ZETAGI B35 25W FM 26-30MHz	£22.23
ZETAGI B150 70W FM 26-30MHz	£47.87
ZETAGI B300 150W FM (2-30MHz)	£108.42
NEVADA TC35 30W FM 26-30MHz	£23.75

MAINS OPERATED AMPLIFIERS

C.T.E. DC9 Solid State 150W FM (Broadband)	£148.50
ZETAGI BV 131 150W FM (Valve) (26-30MHz)	£99.12
ZETAGI B132 150W FM Solid State (Broadband)	£99.12

NEVADA

HIGH QUALITY BRITISH MADE 29MHz FM PRODUCTS

NEVADA TC35
RF POWER AMPLIFIER

INPUT:- 1-4 Watts FM
OUTPUT:- 25-30 Watts FM
SUPPLY:- 13.8V DC
FREQ:- 26-30MHz

£23.75

A switchable RF power amplifier with polarity protection and correctly matched input stage centred on 29MHz.

NEVADA TC27 RX
RECEIVER PRE-AMP FOR 26-30MHz

A superior low noise pre-amplifier for 29MHz FM operation. Variable gain -6dB's to +18dB's suitable for use with transceivers up to 25 Watts output.

£22.34

NEVADA TM27
ANTENNA MATCHER

Ideal for both home and mobile use this matcher really works allowing full coverage of the 10 MTR band and handling 100 Watts.

£10.95

TC2
2 WAY ANTENNA SWITCH

A robust unit with unique double screening handling up to 200 Watts and exceptionally low insertion loss.
FREQ:- 1-100MHz

£6.50

NEVADA TC27 RXM
MOBILE PRE-AMPLIFIER FOR 29MHz FM

An F.E.T. low noise pre-amplifier with variable gain. Designed to improve reception on even the best transceiver.
GAIN:- -6 to +20dB's

£19.95

TELECOMMS

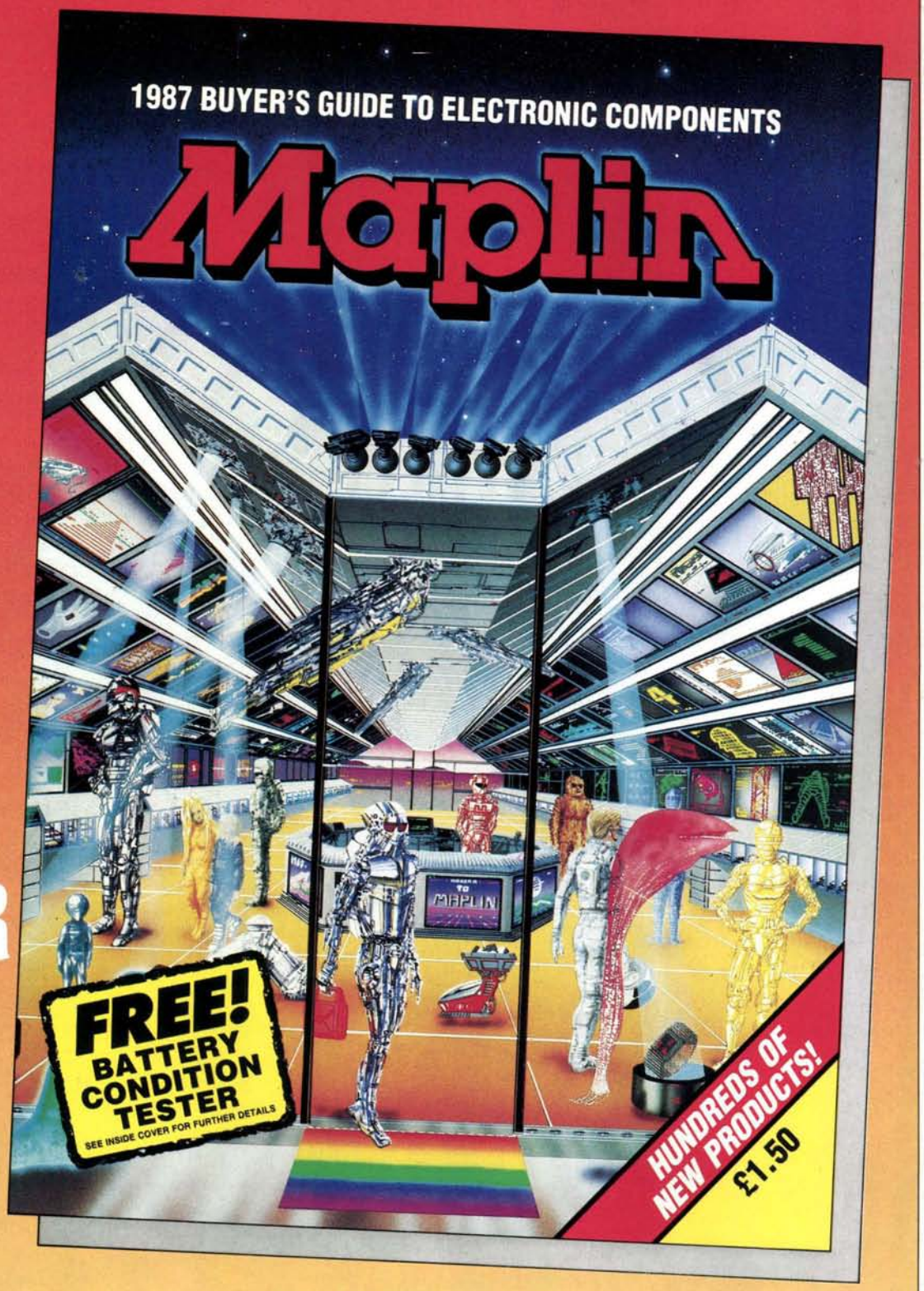
HOTLINE (24 HOURS)
0705 662145
189 LONDON ROAD, PORTSMOUTH,
HANTS, PO2 9AE,
TELEX 869107 TELCOM G

USE YOUR CREDIT CARD (AMERICAN EXPRESS, ACCESS OR VISA) FOR IMMEDIATE DESPATCH

TRADE ENQUIRIES WELCOME.

WORLDWIDE DISTRIBUTORS OF AMATEUR & PERSONAL RADIO EQPT.

ON SALE FROM 14TH NOV. DON'T MISS YOUR FREE GIFT. ORDER YOUR COPY NOW!



Pick up a copy of our new 1987 catalogue from all branches of W.H. Smith for just £1.50.
Or post this coupon now, to receive your copy by post for just £1.50 + 40p p & p. If you live outside the U.K. send £2.50 or 11 International Reply Coupons. I enclose £1.90.

Name .....

Address .....

.....

.....

.....Post Code PW/11/86

AVAILABLE IN ALL W.H. SMITH STORES FROM 14TH NOV. ORDER YOUR COPY NOW!

MAPLIN ELECTRONIC SUPPLIES LTD.
Mail Order: P.O. Box 3, Rayleigh, Essex SS6 8LR.
Telephone: Southend (0702) 554161

SHOPS
- BIRMINGHAM Lynton Square, Perry Barr, Tel: 021-356 7292.
- LONDON 159-161 King Street, Hammersmith, W6. Telephone: 01-748 0926.
- MANCHESTER 8 Oxford Road, Tel: 061-236 0281.
- SOUTHAMPTON 46-48 Bevois Valley Road, Tel: 0703 225831.
- SOUTHEND 282-284 London Rd, Westcliff-on-Sea, Essex. Telephone: 0702-554000

Shops closed all day Monday.