

The

SHORT WAVE Magazine

50p

VOL. XXXVIII

JANUARY 1981

NUMBER 11



NRD-515

receiving for the discerning few.

- NRD 515 SYNTHESISED HF MONITORING RECEIVER £948.75 inc. VAT
- NHD 515 MULTI CHANNEL MEMORY UNIT £161.00 inc. VAT
- NVA 515 LOUDSPEAKER UNIT £27.60 inc. VAT
- CFL 260 600Hz CW FILTER £34.50 inc. VAT

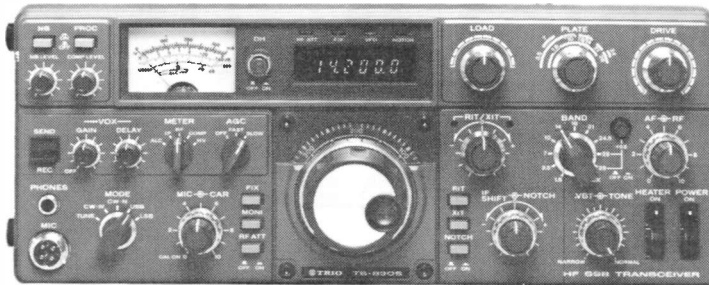
The NRD 515 is a PLL-synthesized communications receiver of the highest class featuring advanced radio technology combined with the latest digital techniques. The new NRD 515 is full of performance advantages including general coverage, all modes of operation, PLL digital VFO for digital tuning, 24-channel frequency memory (option), direct mixing, pass-band tuning, etc. JRC's 65 years of radio communications experience will give you "the world at your fingertips". The NRD 515 is but a single item from the JRC product range which extends all the way to full marine radio installations for supertankers.

LOWE ELECTRONICS Ltd.

CHESTERFIELD ROAD, MATLOCK, DERBYSHIRE. DE4 5LE

TEL. 0629 2430/2817

TRIO *pacesetter in amateur radio*



TS830S *V.B.T. notch, IF shift, wide dynamic range*

Now most Amateurs can afford a high-performance SSB/CW transceiver with every conceivable operating feature built in for 160 to 10 metres (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455-kHz second IF. Its optional VFO-230 remote digital VFO provides five memories.

TS-830S FEATURES:

- **160-10 metres, including three new bands**
Covers all Amateur bands from 1.8 to 30MHz (LSB, USB, and CW), including the new 10, 18, and 24MHz bands. Receives WWV on 10MHz.
- **Wide receiver dynamic range**
Junction FETs (with optimum IMD characteristics and low noise figure) in the balanced mixer, a MOSFET RF amplifier operating at low level for improved dynamic range (high amplification level not needed because of low noise in mixer), dual resonator for each band, and advanced overall receiver design result in excellent dynamic range.
- **Variable bandwidth tuning (VBT)**
Continuously varies the IF filter passband width to reduce interference. VBT and IF shift can be controlled independently for optimum interference rejection in any condition.
- **IF notch filter**
Tunable high-Q active circuit in 455kHz second IF, for sharp, deep notch characteristics.
- **IF shift**
Shifts IF passband toward higher or lower frequencies (away from interfering signals) whilst tuned receiver frequency remains unchanged.
- **Various IF filter options**
Either a 500Hz (YK-88C) or 270Hz (YK-88CN) CW filter may be installed in the 8.83MHz first IF, and a very sharp 500Hz (YG-455C) or 250Hz (YG-455CN) CW filter is available for the 455kHz second IF.
- **Built-in digital display**
Six-digit large fluorescent tube display, backed up by an analogue dial. Reads actual receive and transmit frequency on all modes and all bands. Display Hold (DH) switch.
- **Adjustable noise-blanker level**
Built-in noise blanker eliminates pulse-type (such as ignition) noise. Front-panel threshold level control.
- **6146B final with RF NFB**
Two 6146B's in the final amplifier provide 220W PEP (SSB)/180W DC (CW) input on all bands. RF negative feedback provides optimum IMD characteristics for high-quality transmission.
- **More flexibility with optional digital VFO**
VFO-230 operates in 20-Hz steps and includes five memories. Also allows split-frequency operation. Built-in digital display. Covers about 100kHz above and below each 500kHz band.
- **Built-in RF speech processor**
For added audio punch and increased talk power in DX pileups.
- **RIT/XIT**
Receiver incremental tuning (RIT) shifts only the receiver frequency, to tune in stations slightly off frequency. Transmitter incremental tuning (XIT) shifts only the transmitter frequency.
- **SSB monitor circuit**
Monitors transmit IF signal whilst transmitting, to determine audio quality and effect of speech processor.

TRIO TS-830S £639.52 inc VAT.

MATCHING STATION ACCESSORIES

SP230 EXTERNAL SPEAKER WITH SELECTABLE AUDIO FILTERS	£33.14 inc VAT
VFO 230 EXTERNAL DIGITAL VFO WITH 5 MEMORIES	£194.45 inc VAT
AT 230 ANTENNA TUNER	£106.75 inc VAT
YK 88C 500Hz C.W. FILTER	£26.45 inc VAT
CARRIAGE BY SECURICOR	£4.50

LOWE ELECTRONICS

CHESTERFIELD ROAD, MATLOCK, DERBYSHIRE TEL 0629 2430/2817



TRIO TR7800

2 METRE FM TRANSCEIVER

£268 inc VAT

Securicor carriage £4.50



The new TR7800 is the only 2 metre FM mobile transceiver. Its performance both in your car and shack has to be experienced to be believed. Power output is 25 watts, a needle bending signal. The rig has keyboard entry for fixed station use and for programming the 15 memories. When used with the up/down shift switch on the mike the 15 memories, each having a repeater shift facility, make mobile operation a sheer pleasure. The scan facility, both on memory and 25/5 Kc on keyboard means no missed contacts. Five second hold on each occupied channel gives you time to identify the station before the rig moves on to the next QSO, press the mike switch and the scan instruction is cancelled. Add the priority facility and you have it, the only 2 metre FM mobile rig.

POWER SUPPLY UNITS

THE PP137

Output voltage 13.8V. D.C.

Output current 7 amps.

£32.00 inc VAT carriage £2.00

THE PP1310

Output voltage 13.8V. D.C.

Output current 10 amps.

£49.50 inc VAT carriage £2.00.

TRIO TR9000

2 METRE ALL MODE TRANSCEIVER

TR9000 TRANSCEIVER **£345 inc VAT**

BO9 BASE PLINTH **£32.20 inc VAT**

SP120 SPEAKER **£25.30 inc VAT**

PS20 POWER SUPPLY **£44.85 inc VAT**

SECURICOR CARRIAGE **£4.50**

The 2 metre band, beacons, repeaters, FM simplex, FM repeaters, CW and SSB. Single side band, a mode to conjure with, a decent location, either fixed or portable, a beam antenna and a TR9000 and the world, well given a lift, Europe is at your fingertips.

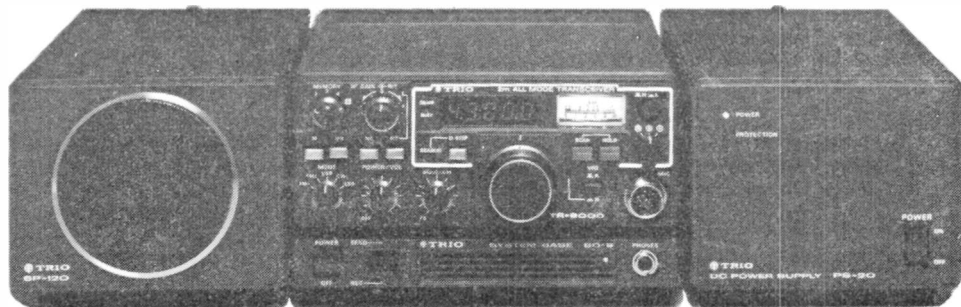
Cast your eye over the front panel. Apart from the now conventional RF/RIT, power/vol and high/low power controls, you will notice added facilities.

There is the 5 channel memory which will store specific frequencies, one of which will give a non standard repeater shift. Just the thing for net channels and your local repeater.

On FM the rig will scan in 25Kc steps holding on each occupied channel. On SSB the search facility can be used enabling 10Kc of the band to be rapidly covered. Used in conjunction with the up/down shift switch on the microphone the area of SSB search can be moved up and down the band in 10Kc steps thus enabling the entire side band frequencies to be looked at quickly.

To enable quick reference to both FM and SSB sides of the band, that is 144 and 145MHz, two separate VFOs are provided thus for ease of operating VFO A can be left around 145.00MHz and VFO B on 144.00MHz.

So there we have it, a superb, simple to operate 2 metre multi mode rig that can be used either in the car or at home as a base station. 10 watts output of high quality speech on SSB and FM, the hallmark of Trio signals on the air.



SP120

TR9000 + BO9 BASE

PS20

LOWE ELECTRONICS

CHESTERFIELD ROAD, MATLOCK, DERBYSHIRE TEL 0629 2430/2817



THE SHIMIZU SS105S 80-10 METRE SSB/CW TRANSCEIVER



This super new transceiver covers 80-10 metres, gives 10W out and is smaller than anything else we have seen so far. Ideal for transverter driving, the SS 105S has FM transit and receive options as well as excellent performance on SSB/CW for HF band use. The SS 105S is supplied in semi kit form so as to keep down the price, but all the RF and mixer boards are ready built and aligned so no test equipment is required. All the cabinet work has been carried out so all you have to do is assemble the IF strip, xtal oscillator, and fit them to the completed chassis. Great idea and it brings back the flavour of home brew with the added advantage that the rig will work when you've finished it. For more info, just ask or come along and see it. It's a great little rig.

SS105S	90-10m solid state SSB/CW/FM transceiver. Semi kit form	Inc. VAT	Carr
SE-NB	Noise blanker kit	£258.75	£4.50
SE-FMrx	RX FM discriminator kit	£7.76	£0.50
SE-FMtx	TX FM generator kit	£17.25	£1.00
SE-MK	RX marker kit	£12.65	£1.00
0.5 CWF	500Hz CW filter	£11.04	£0.50
Optional band crystals		£22.43	£0.50
		£3.45	£0.25

AR 245 2 metre HAND HELD FM SYNTHESIZED 144-146MHz TRANSCEIVER 5 WATTS 1 WATT OUTPUT.

ALSO AVAILABLE THE ORIGINAL AR240A
SAME OUTSTANDING FEATURES BUT 1½ WATTS



AR 245 £178 inc. VAT carriage £1.50
AR 240A £158 inc. VAT carriage £1.50

THE WAY TO HAVE TOMORROW'S EQUIPMENT TODAY

WRITE FOR FULL DETAILS TODAY



FOR ALL THAT'S BEST IN AMATEUR RADIO CONTACT US AT MATLOCK

HEAD OFFICE AND SERVICE CENTRE

CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL. 0629 2430/2817 TELEX 377482
OPEN TUES - FRIDAY 9-5.30; SAT 9-5.00. CLOSED FOR LUNCH 12.30-1.30

For personal attention on the South Coast contact John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Ringmer 812071.

For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. 041-771 0364.

SEND 48p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK
PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION.

RADIO SHACK for A HAPPY NEW YEAR & THE BEST OF EVERYTHING IN AMATEUR RADIO



DRAKE

TR-7 TRANSCEIVER, R-7 RECEIVERS, AND ALL ACCESSORIES

**HY-GAIN ANTENNAS
HUSTLER ANTENNAS
CDE ROTATORS**

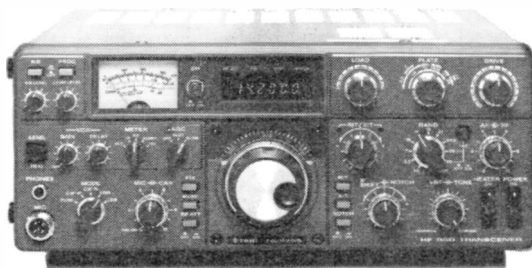
BEARCATS

*With 4m, 2m &
70cm FM
Amateur Bands*



**COLLINS KWM-380 TRANSCEIVER
AVANTI ANTENNAS
TRS-80 COMPUTERS
VIDEO GENIE
HAL RTTY EQUIPMENT
J-BEAM ANTENNAS
ASTATIC MICROPHONES
TELEX HEADPHONES**

**HAVE YOU
GOT YOUR
RADIO SHACK
CHARGE CARD
YET?**



**TRIO HF
& VHF
RECEIVERS &
TRANSCEIVERS**

**LOTS & LOTS
MORE**

**MACROTRONICS RTTY – TEN-TEC
AEA MEMOMATIC KEYERS,
BENCHER PADDLES, VIBROPLEX**

**(ONE DAY WE MAY EVEN
HAVE EVERYTHING
LISTED!!!)**

ACCESS



SALES



SERVICE



BARCLAYCARD



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

Giro Account No. 588 7151

Telephone: 01-624 7174

Cables: Radio Shack, NW6

Telex: 23718



WATERS & STANTON ELECTRONICS

FAST MAIL ORDER SERVICE ANYWHERE IN UK

Prices include VAT & insurance

Carriage shown in brackets

23cm Antenna	£	£
D15 1296 Double 15 slot-fed	34.00	(1.50)
FMH2/23cm 2 way phasing harness	25.40	(1.00)

Matching Transformer		
MT75/50 75/50 ohms	3.60	(0.50)

Chimney Lashing Kit		
IDL Double lashing kit	8.25	(2.00)

Wall Brackets		
W6 6" wall bracket	2.65	(1.00)
W21 21" wall stand-off bracket	10.35	(3.00)
W24HD 24" wall stand-off bracket	14.70	(4.50)

Masts (Aluminium)		
SPM 16' x 1" Portable Mast	15.15	(3.00)
PME 4' extension	2.50	(2.00)
A4 4'6" x 1 1/2" straight	3.80	(1.50)
A5 5' x 1" straight	2.30	(1.50)
A9 9' x 1 1/2" straight	6.50	(2.50)
A10 10' x 2" straight	12.55	(2.50)
A12 12' x 2" straight	14.95	(2.50)
A14 14' x 2" straight	17.40	(3.00)

Accessories		
CP1 Cross-over plate 2" x 2"	3.35	(1.50)
JBL5 15' joining sleeve	6.60	(1.50)
JBL29 Universal clamp	1.60	(0.75)
JBL30 Universal clamp	1.60	(0.75)
JBL53 Universal clamp	1.45	(0.75)
JBL58 3hook guy wire clamp	1.50	(0.75)
JBL63 Universal clamp	1.40	(0.75)
JBL64 Die-cast clamp	1.20	(0.75)
JBL65 Die-cast clamp	1.30	(0.75)
JBL73 Heavy duty	2.10	(1.00)
MBP Mast base plate	3.60	(1.50)

STANDARD VHF/UHF		
C800 2 metre portable receiver	79.00	(n/c)
C8800 2 metre FM mobile	251.00	(n/c)
C7800 70cm FM mobile	297.00	(n/c)

G-WHIP MOBILE ANTENNA RANGE		
Tribander Helical 10/15/20metres	24.75	(2.00)
LF40m Coil for above	6.55	(0.50)
LF80m Coil for above	6.55	(0.50)
LF180m Coil for above	6.55	(0.50)
LF telescopic resonator whip	3.35	(0.75)
Base mount + 3m cable	4.50	(0.50)

AERIAL ROTATORS (complete with control boxes)		
CDE AR30(5 core cable)	47.00	(1.50)
CDE AR40(5 core cable)	59.80	(1.50)
Channelmaster 9502(3 core)	42.00	(2.00)
Sky King SU4000(6 core)	75.00	(2.50)
Jaybeam KR400(6 core)	105.00	(2.00)
CDE alignment bearing	7.75	(1.00)
Channelmaster alignment bearing	11.75	(1.00)

HF ANTENNAS (various manufacturers)		
Mini-Prdts HQ-1 20'15'10m 2 ele.	96.50	(2.50)
Mini-Prdts C4 20'15'10m vertical	48.50	(2.00)
Mosley TD3JR 20'15'10m wire dipole	34.50	(1.50)
Mosley "Mini-Beam" 20'15'10m 2 ele. 600w	99.00	(2.00)
Mosley "Mini-Beam" 20'15'10m 2 ele. 2kw	129.00	(2.00)
Mosley TA32 20'15'10m 2 ele. 600w	89.70	(2.00)
Mosley TA33 20'15'10m 3 ele. 600w	133.40	(2.50)
Mosley Mustang 20'15'10m 3 ele. 2kw	166.75	(4.00)
Hy-Gain 12AVQ 20'15'10m vertical	43.00	(2.00)
Hy-Gain 14AVQ 40'10m vertical	80.00	(2.00)
Hy-Gain 18AVT-W6 80'10m vertical	87.00	(2.50)

HF5 80'10m vertical 200w	48.00	(2.00)
Radial Kit for HF5	28.00	(2.00)
Sagant EL40X 80'40 dipole (79' long)	36.00	(1.50)
Jaybeam TB3HF 3 element 2kw	167.90	(4.50)
Jaybeam VR3HF vertical 2kw	42.50	(3.00)

DENTRON		
MLA2500B 6band 160'10m 2kw linear	895.00	(n/c)
Clloperon-L 6band 180'10m 2kw linear	459.00	(n/c)
DTR-1200L 5band 80'10m 1.2kw linear	t.b.a.	(n/c)
GLA-1000B 5band 80'10m 1kw linear	296.00	(n/c)
DTR-3KA 1.8-30MHz ATU 2kw	t.b.a.	(n/c)
MT-3000A 1.8-30MHz ATU 3kw	275.00	(n/c)
AT-1K 1.8-30MHz ATU 1kw	99.00	(n/c)
HF200A 80-10m transceiver 100w	399.00	(n/c)
Spare set of D50A tubes	24.00	(n/c)
All band Doublet 1.8-30MHz	22.50	(2.00)
100ft. 470 ohm semi-air spaced	12.00	(1.00)

ADONIS MICROPHONES		
AM202G Mobile safety mic.	20.95	(n/c)
AGM202S Mobile safety mic.	20.95	(n/c)
AM202H Mobile safety mic.	29.00	(n/c)
AM502G Base station comp. mic.	39.00	(n/c)
AM802G Base station 3 outputs	59.00	(n/c)

The above model numbers may confuse you with regard to which model suits your equipment. Please telephone or write for free advice.

SEM PRODUCTS		
2 metre power amplifier 5w/30w	50.00	(1.00)
2 metre power amplifier 16w/50w	65.70	(1.50)
2 metre power amplifier Rf sensing 16w in - 10w out 16w/10w	126.50	(1.50)
2 metre converters 28.30 4.6, 2/4	23.00	(0.35)
2 metre Auto pre-amplifier	21.73	(0.35)
70cm Auto pre-amplifier	24.73	(0.35)
2 metre pre-amplifier	14.95	(0.35)
70cm pre-amplifier	17.73	(0.35)
2 metre pre-amplifier	18.66	(0.35)
2.40MHz pre-amplifier	11.73	(0.35)
PA3 2 metre pre-amplifier	8.00	(0.35)
PA 70 70cms. pre-amplifier	10.00	(0.35)
2 Match ATU 3.5-30MHz 500watts	47.15	(1.50)
EZITUNE Aerial tuning aid	30.48	(0.75)
IAMBIC Keyer	34.50	(0.75)

2 METRE PORTABLES		
SB2M 2m SSB portable	99.00	(1.50)
AR245 (previously AR240A) 2m FM 5w	178.00	(1.50)
AR245 carrying case	4.10	(0.50)
AR245 optional helical	4.10	(0.50)
AR245 12v DC car adaptor	4.10	(0.50)

VHF/UHF MONITORS		
TM56B FM Scanner 12v DC/230v AC	79.00	(n/c)
008 B channel FM monitor	69.00	(n/c)
M161 16 channel FM monitor	59.00	(n/c)
MF063 Marine/Broadcast scanner	85.00	(n/c)
BEARCAT 220FB 66-512MHz	258.00	(n/c)
SX 220 26-512MHz	240.00	(n/c)
SR9 Tuneable 144.148 or 156-162MHz	46.00	(n/c)
AR22 2m FM synthesized handheld	83.00	(n/c)
AR22 flexible antenna	3.00	(n/c)

VHF/UHF MOBILE AERIALS		
ASP201 2m 1/4 wave	3.50	(1.25)
ASP2009 2m	9.25	(2.00)
ASP3009 2m 1/4	9.75	(2.00)
ASP462 70cm co-linear	8.25	(1.25)
Magnetic base adaptor	8.50	(0.75)
ASP677 2m 1/4 wave	14.95	(2.00)
ASP667 70cm co-linear	17.95	(1.25)

ASPM125 27MHz 1/4 wave	18.50	(2.00)
Magnetic base adaptor for above	8.50	(0.75)
ASP boot mount adaptor	3.75	(0.50)
2NE 2m 1/4 mobile whip	13.00	(2.00)
RG4M Base for above aerial	3.50	(0.75)
GSS Gutter/boot mount	3.15	(0.50)
M85 Magnetic mount	7.95	(1.00)
10SE 28MHz whip 1.72m long	11.50	(1.25)
15SE 21MHz whip 1.72m long	11.50	(1.25)
20SE 14MHz whip 1.72m long	13.80	(1.25)

WELF PROFESSIONAL POWER/SWR METERS		
SP200 1.8-160MHz 20w-200w-1kw	49.95	(n/c)
SP300 1.8-500MHz 20w-200w-1kw	69.95	(n/c)
SP400 130-500MHz 5w-20w-150w	49.95	(n/c)

SHORT WAVE LISTENER AERIALS		
3-30MHz Inverted L	9.95	(1.00)
3-30MHz Broad band dipole	29.00	(1.00)
Mosley RD5 all-band dipole	40.00	(1.00)

AIR BAND PORTABLE MONITORS		
Sharp FX213 tuneable	13.50	(0.75)
INGERSOLL WW/FM/Airband monitor	12.95	(0.75)
R517 Professional Air Monitor	49.50	(0.75)

SPECIAL OFFER!		
6 Band FT 101ZD's Brand New	499.00	(8.00)

MISC. STATION ITEMS		
SEIF 13.9v 4 amp AC power supply	22.95	(1.50)
PS125 5amp AC power supply	28.00	(2.00)
EK1121 Katsumi Electronic Keyer	29.00	(0.75)
EKM12 Matching side tone	10.95	(0.50)
CW2A Morse code oscillator	6.95	(0.50)
Telegraph CW key	10.50	(0.75)
YV3 Twin SWR/Power meter 3.5-150MHz	11.50	(0.50)
MF10 Self powered 2M FM monitor	12.95	(0.75)
FX1 Station wavemeter	28.00	(1.00)
DM801 700kHz-250MHz dip meter	51.75	(1.00)
Station log books	1.95	(0.50)
12BY7A driver valves	2.75	(0.50)
6146B/52001A P.A. valves	8.70	(0.50)
6J56C P.A. valves Matched pairs	9.95	(0.50)
PL259 plugs	0.63	(n/c)
PL259 reducers	0.17	(n/c)
SO239 chassis sockets	0.80	(0.10)
PL259 joiners	0.85	(0.10)
N: Plugs cable entry	2.00	(n/c)
N: Plugs UR43 cable entry	2.00	(n/c)
4 pin mic plugs	0.85	(0.10)
3 pin mic plugs	0.85	(0.10)
6 pin mic plugs IFDK 750	1.00	(0.10)
3 pin chassis socket	0.85	(0.10)
5 pin chassis socket	0.85	(0.10)
BNC plugs (bayonet)	0.30	(0.05)
Pen Cell Ni-cads (HP7 size)	1.20	(0.05)
Cigar lighter plugs	0.55	(0.10)
UR67 cable 50 ohm per metre	0.69	(0.10)
UR43 cable 50 ohm per metre	0.23	(0.05)
5 core rotator cable per metre	0.20	(0.05)
BL40X bakon 50 ohm	11.25	(0.50)
3 core rotator cable	0.22	(0.05)
Ferrite rings 1 1/2" diameter	0.36	(0.05)
Mosley aerial insulators	0.30	(0.05)
KX2 SWL aerial tuner 5-30MHz	29.00	(1.50)
APM Audio Peak/Notch filter	33.00	(1.00)
HP3A TVI high pass filter	3.50	(0.50)
Drake TV3300 LP low pass filter	18.40	(1.20)
Shure 444 high impedance desk mic.	27.50	(1.50)
Shure 201 high impedance hand mic.	11.75	(1.00)
Trio HCM10 digital word clock	55.20	(1.50)

ORDER WITH CONFIDENCE OUR REPUTATION IS YOUR GUARANTEE

Callers welcome. We are open 9-5.30 p.m. Monday - Saturday Ex. Wednesday 9-1.00 p.m.
Telephone orders - Simply phone in your Barclaycard or Access number and we will despatch goods within 24 hours.
Mail orders - Send cheque or postal order, for correct amount and print clearly name and address - we will do the rest!
DEPT. 3, 18-20 MAIN ROAD, HOCKLEY, ESSEX. Tel. 0702 206835/204965. Telex 995895 HDSG



South Midlands

SMC FOR CHOICE IN GENERAL COVERAGE RECEIVERS

Whether you are: just starting, taking an R.A.E. course, just licensed, or an old timer, SMC has something for you. . . . And at LOW prices. Advertised PRICES on THIS page INCLUDE VAT at 15%, INCLUDE SECURICOR speedy delivery and INCLUDE A TWO YEAR WARRANTY (remember as Yaesu Musen UK distributors our guarantee is FACTORY BACKED).



FRG7 £199 INC. VAT @ 15% & SECURICOR

The FRG7 is an economically priced general purpose communications receiver employing all solid state construction for reliability and performance. It uses a Wadley-loop drift cancellation system for high sensitivity, stability and image rejection. Listen to Radio Amateurs, shortwave broadcasts, BBC and commercial medium wave station, CB and much much more.

A side by side comparison between the FRG7 and any of the mass of "all singing and dancing" transistor portables, possibly costing much more, will soon reveal why the FRG7 is a most popular choice.

- ★ "Industry standard" receiver.
- ★ 0.5-30MHz
- ★ SSB (LSB/USB), CW, AM.
- ★ Selectivity of ± 3 kHz at -6dB.
- ★ Wadley-loop triple conversion.
- ★ 10kHz Direct dial readout.
- ★ Well calibrated "sharp" preselector.
- ★ AM Automatic noise suppression circuit.
- ★ Antenna Hi to 1.6MHz, 50ohm to 30MHz.
- ★ 3 position RF Antennuator.
- ★ 3 position AF (LP, WBP, NBP).
- ★ 110-240Vac and 12Vdc.
- ★ Internal Battery holder option.
- ★ Illuminated edge type "S" meter.
- ★ Optional Battery holder £5.00.

We take ACCESS and BARCLAYCARD OVER THE PHONE, offer HP (including a FREE FINANCE SCHEME on many regular priced items), written quotations provided upon application, and we have branches and agents conveniently situated across the country plus the biggest mail order department right here in Totton.



FRG7700 £309 INC. VAT @ 15% & SECURICOR

The FRG7700 is a deluxe all purpose communications receiver using the latest in large scale integration, phase locked loops and bandpass filters for superb performance. It uses an up conversion circuit with 48MHz first IF with professional quality crystal filter. The receiver can be used for listening to all normal HF services, and the inclusion of FM allows reception of 10m FM, and with a convertor VHF Amateur and Marine bands. The FM detector, the clock/timer, and the optional 12 channel memory (instant write in recall of frequencies anywhere in the tuning range) places the FRG7700 head and shoulders above similar priced receivers.

- ★ Incredible new receiver.
- ★ 0.15-30MHz.
- ★ SSB (LSB/USB), CW, AM, FM.
- ★ 2.7kHz, 6kHz, 12kHz, 15kHz, @ -6dB.
- ★ Up conversion 48MHz first IF.
- ★ 1kHz digital plus analogue display.
- ★ No preselector, auto selected LPF's.
- ★ Advanced noise blanker fitted.
- ★ Antenna 500ohm to 2MHz, 50ohm to 30MHz.
- ★ 20dB pad plus continuous attenuator.
- ★ Constantly variable tone control.
- ★ 110 and 240Vac and 12Vdc option.
- ★ 12 channel memory option.
- ★ Signal meter calibrated in "S" and SIMPO.
- ★ FRG7700M £389. Memory option £83.95.

SOUTH MIDLANDS COMMUNICATIONS LIMITED

OSBORNE ROAD, TOTTON,
SOUTHAMPTON SO4 4DN
9.5.30 Mon-Fri 9-1.30 Sat.



Head Office Showrooms
Cables Aerial Southampton
Telex 477351 SMCOMM G
Tel: Totton (0703) 867333

AGENTS DEMONSTRATIONS, STOCKS AND SALES

G3ZUL	Brian	Stourbridge	(03843)	5917
G1KDR	John	Bangor	(0247)	55162
GMBGC	Jack	Edinburgh	(031665)	2420
G1WVY	Mervyn	Tandragee	(0762)	840656
GW3TMP	Howarth	Pontybodkin	(035287)	846 324
GW8EB	Peter	Swansea	(0792)	872525
GJ4ICD	Geoff	St. Saviour	(0634)	26788

Communications Ltd



SMC MOBILE ANTENNAS

SMC BASE ANTENNAS

NEW! ELEVEN-EIGHTS

Mobile colinear with around 7dB of gain on two meters. About 10' long. 3, quick disconnect sections, plus fold-over joint at top of base section. (ills. left). Bumper mounting recommended.

SMC 118M	Colinear element	£24.65
SMC BSD	Bumper strap	£6.70
SMC SOCA	Cable assembly 4m	£3.00
SMC SOCAL	Cable assembly 6m	£3.35

Carriage £1.75 complete or £0.50 for accessories only

INTERCHANGEABLE ELEMENTS

SMC-HS Mobile antennas, tabulated below, features an inbuilt PL259M connector which mates with the SO239M of the cable assembly (fits a 1/2" hole in car body or the cast chromed gutter mount). This arrangement is ideal for easy removal (element change, car wash and anti-vandal), tests and portable operation.

MODEL	BAND	GAIN	TYPE	POWER	LENGTH	PRICE
20SE	14MHz		(1/4 λ)	100W	1.72m	£12.00
15SE	21MHz		(1/4 λ)	130W	1.72m	£10.00
10SE	28MHz		(1/4 λ)	100W	1.72m	£10.00
4E	70MHz	0dB	1/4 λ	150W	1.03m	£6.50
2H/PL	144MHz		(1/4 λ)		0.17m	£3.00
2NE	144MHz	3dB	1/4 λ	150W	1.30m	£5.50
2VF	144MHz	3dB	1/2 λ	50W	1.06m	£9.00
78F	144MHz	4.5dB	1/4 λ	100W	1.75m	£10.00
78B	144MHz	4.5dB	1/4 λ	150W	1.72m	£11.00
25B	432MHz	5.5dB	2x 1/4 λ	100W	0.94m	10.00
35B	432MHz	6.3dB	3x 1/4 λ	100W	1.36m	£12.00

SOCA Cable assembly, c/w 4m RG58 & PL259 **£3.00**
 GCD Gutter clip. Cost adjustable chrome **£3.00**
 Carriage; **£1.00** complete antennas, or **£0.50** for accessories — any quantity.

HF TRAPPED VERTICAL

10-80M (5 band) vertical, only 4.8m (15 1/2 ft) high and 4.2cm in diameter, it nevertheless is capable of handling 500W PEP on 10, 15 and 20M (200W PEP 40 and 80) within its 1.5:1 VSWR bandwidth. 50 ohm coaxial feed is to an inbuilt SO239 socket. Suitable for mounting at ground level on an earth post (with or without radials) or in an elevated position (only 2.9kg) with wire radials, or better still with the HF5R, radial kit. This has five solid radials of very similar length (2.05 to 2.2m) sloping at 45° to the antenna (1.8kg), and handles 150W PEP. (ills. lower left).

SMCHF5V **£35.00** SMCHF5R **£26.00.**

Carriage on either, or both together **£1.50.**

2 METRE COLINEAR

High gain; 6dB over 1/4 λ. Multiple 1/4 λ construction. Low angle radiation SO239 connector recessed into support tube around 9 1/2". (ills. right).

SMCGP144W (p&p £1.50) **£21.74.**

70CMS COLINEAR

Very high gain 6.8dB over 1/4 λ. Multi 1/4 λ construction. Ultra low angle radiation. Connector recessed in support tube. About 5 1/2' tall.

SMCGP432X (p&p £1.00) **£24.35.**

DISCONES

Four models to choose from. All low VSWR types except VHFL which is RX only skeleton type. (p&p £1.50 except TW435D £0.50)

GDX1 80-480MHz **£36.00**
 GDX2 50-480MHz **£41.17**
 TW435D 400-1200MHz **£23.00**
 VHFL 65-520MHz **£14.65**

LOG PERIODIC

50-500MHz 13 elements 8'6" boom, 10'9" longest element, 50 ohms feed.

LT606 (p&p £1.50) **£75.95.**

ALL PRICES EXCLUDE VAT (15%)

SMC (Jack Tweedy) LTD.

Roger Baines, G3YBO
 79 Chatsworth Road,
 Chesterfield, Derby.
 Tel.: Chesterfield (0246) 34982
 9-5 Tuesday-Saturday.

SMC (Leeds)

Colin Thomas, G3PSM
 257 Otley Road,
 Leeds 16, Yorkshire.
 Tel.: Leeds (0532) 782326
 9-5.30 Monday-Saturday

SMC (Jack Tweedy) LTD.

Jack Tweedy, G3ZY
 150 Horncastle Road,
 Woodhall Spa, Lincs.
 Tel.: Woodhall Spa (0526) 52793
 9-5 Tuesday-Saturday (+ appoint.)





South Midlands

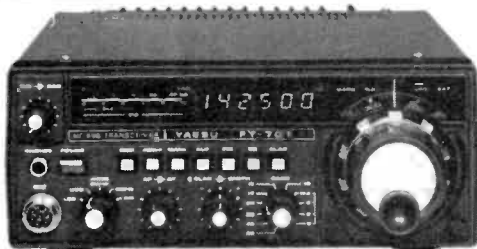
SMC FOR CHOICE IN SOLID STATE HF



FT107M £690 INC. VAT @ 15%
& SECURICOR

If you have been searching for an all solid state HF transceiver with a "broad band" output that will deliver 75 per cent of maximum power into a 3:1 load, then look no further than this Yaesu. The FT107M covers 160-10M (plus) and is fully equipped with: variable IF bandwidth, audio peak/notch filter, RF speech processor, variable threshold noise blanker, full metering — including SWR, and boasts a schottky diode ring mixer for excellent receiver dynamic range. The all new memory system provides 12 stored channels (with fine tuning), scanning from the optional microphone and the exclusive DMS — digital memory shift. This system using a photo interruptor (with fine tuning) to control the 100kHz synthesizer to provide any offset up to 500kHz, from the memory channel (almost the equivalent of 13 VFOs).

- ★ 160-10 metres (including 10, 18, and 24MHz).
- ★ USB-LSB-CWW-FSK-AM multi-mode.
- ★ Full broad band "no tune" power amplifier.
- ★ 240W PIP. 75 per cent power output at 3:1 VSWR.
- ★ 12 memory channels with clarifier on memory.*
- ★ Digital Memory Shift gives offset from memory.*
- ★ Up/down scanning control from microphone.*
- ★ Variable IF bandwidth — 16 poles of selectivity.
- ★ Bandwidths: 6kHz*, 2.4kHz-300Hz, 600Hz-300Hz.*
- ★ Selectable CW "fixed" widths CW-W and CW-N.*
- ★ Tunable Audio Peak (AFP) and Notch filter.
- ★ Diode ring mixer for very high Rx dynamic range.
- ★ Noise blanker — front panel adjustable threshold.
- ★ AGC; slow-fast-off switchable from the front panel.
- ★ Attenuator 0-20dB, plus RF gain on front panel.
- ★ RF speech processor fitted — front panel adjustable.
- ★ Digital (100Hz) plus analogue frequency displays.
- ★ Meter Reads; Vcc, Ic, ALC, Compression and SWR.
- ★ Semi-break in with side tone. Vox built in.
- ★ Choice of built-in or separate power supply units.



FT707 £500 INC. VAT @ 15%
& SECURICOR

The FT707 'The Wayfarer' is an ultra-compact transceiver ideally suited for the home station or as a travelling companion. The FT707 is THE radio of the eighties: 80-10m, including 30, 17 and 12m — all factory installed — 100W output (10W's model) 50% developed in 3:1 VSWR — Digital, bright LED's in mode sensitive counter and analogue readout — Transceiver status at a glance, from string LED and single displays — 16 poles of crystal filtering provides continuously adjustable IF bandwidth 2.4kHz to 300Hz (N.B. This is true 'variable bandwidth' that minimises much of the adjacent channel interference not 'IF shift') — Noise blanker of most advanced design using local AGC loop — Schottky diode ring module, power transistor buffers, ultra clean, low noise local oscillator are combined to produce, size and price notwithstanding — a remarkable receiver.

- ★ 80-10 metres (including 10, 18 and 24MHz bands).
- ★ USB-LSB-CWW-CWN-AM (Tx and Rx operation).
- ★ 100W PEP. 50% power output at 3:1 VSWR.
- ★ Full "broad band" no tune output stage.
- ★ Excellent Rx dynamic range, power transistor buffers.
- ★ Rx Schottky diode ring mixer module.
- ★ Local oscillator with ultra-low noise floor.
- ★ Variable IF bandwidth — 16 crystal poles.
- ★ Bandwidths 6kHz*, 2.4kHz-300Hz (600-350)Hz* -300Hz.*
- ★ AGC; slow-fast switchable from the front panel.
- ★ VOX built-in and adjustable from the front panel.
- ★ Semi-break in with side tone for excellent CW.
- ★ Digital (100Hz) plus analogue frequency display.
- ★ LED Level meter reads: S, PO and ALC.
- ★ Convenient concentric AF/FR gain controls.
- ★ Indicators for: calibrator, fix, int/ext VFO.
- ★ Receiver offset tuning (RIT-clarifier) control.
- ★ Advanced noise blanker with local loop AGC.
- ★ 25kHz crystal calibrator feature.
- ★ Internal, xtal or external VFO control.

SOUTH MIDLANDS COMMUNICATIONS LIMITED

OSBORNE ROAD, TOTTEN,
SOUTHAMPTON SO4 4DN
9.5-30 Mon-Fri 9-1.30 Sat.



Head Office Showrooms
Cables Aerial Southampton G
Telex 477351 SMCOMM G
Tel: Totton (0703) 867333

AGENTS STOCK AND SALES

G3ZUL	Brian	Stourbridge	(03843)	5917
G1KDR	John	Bangor	(0247)	55162
G8MGEC	Jack	Edinburgh	(031665)	2420
G13WVY	Mervyn	Tandragee	(0762)	840656
GW3TMP	Howarth	Pontybodkin	(035287)	846 324
GW3EBB	Peter	Swansea	(0792)	872525
GJ4ICD	Geoff	St. Saviour	(0534)	26788

Communications Ltd

SMC FOR CHOICE IN 2 METRE TRANSCEIVERS



KDK 2025 TRANSCEIVER 2m. FM 25w. OUTPUT



- ★ Custom designed microprocessor control
- ★ 25KHz and 12·5KHz synthesizer steps!!
- ★ 'Instant QSY', 10 times rate button
- ★ 25 Watts of reliable RF output
- ★ Band scan between any 'easy set' limits
- ★ 10 write-in non-volatile memory channels
- ★ Memory scanning with hold facility
- ★ Standard \pm 600KHz or any repeater split

£ 225 INC. VAT @ 15%
& SECURICOR

YAESU FT480R TRANSCEIVER 2m. MULTIMODE

- ★ 144-146Hz (143.5-148.0MHz).
- ★ USB-LSB-CW-FM (A3j, A1, F3).
- ★ 30W PIP A3j, 30W dc A1 and F3.
- ★ FM; 25, 12½, 1KHz steps.
- ★ SSB; 1,000 100, 10Hz steps!
- ★ Dual digital VFO system.
- ★ Four easy write-in memory channels.
- ★ Up/down tuning/scanning from mic.

£ 359 INC. VAT @ 15%
& SECURICOR



YAESU FT207R SYNTHESIZED HANDHELD



The FT207R is a microprocessor controlled synthesized handheld that provides 12.5KHz channel steps!! 4 memory channels are provided and these may, as can the whole band, be scanned. Any one of the memories can be used as a priority channel, operate on any frequency, designate one of the memories as priority, and every few seconds, for a few milliseconds, the set will check occupancy of the channel. All frequency entry is by the keyboard (which includes touch tone). The readout displays frequencies (to 100Hz), memory channel number and 'P'. Switches are provided for keyboard lock (prevents accidental operation) and display 'time-out'. A 600KHz shift and any programmable split, is available, both of course plus and minus. Memory back-up is provided but can be switched off for long-term storage. 2.5W + 200mW outputs and a whole host of accessories complete the brief specification of this exciting transceiver.

£ 199 INC. VAT @ 15%
& SECURICOR

SMC (Jack Tweedy) LTD.

Roger Baines, G3YBO
79 Chatsworth Road,
Chesterfield, Derby.
Tel.: Chesterfield (0246) 34982
9-5 Tuesday-Saturday.

SMC (Leeds)

Colin Thomas, G3PSM
257 Otley Road,
Leeds 16, Yorkshire.
Tel.: Leeds (0532) 782326
9-5.30 Monday-Saturday

SMC (Jack Tweedy) LTD.

Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincs.
Tel.: Woodhall Spa (0526) 52793
9-5 Tuesday-Saturday (+ appoint.)



Bredhurst electronics

HIGH ST., HANDCROSS, W. SUSSEX 0444 400786

BREDHURST STOCK TRANSCEIVERS, RECEIVERS AND MANY, MANY ACCESSORIES — START THE NEW YEAR BY TRYING THE EFFICIENT BREDHURST SERVICE —

GLOBAL SHORT WAVE RECEIVING AERIALS

Global short wave antennas are designed for the serious short wave listener who requires general coverage capability throughout the short wave spectrum. Two models are available, either the broad band dipole or the inverted "L" model. Full details of these antennas are available on receipt of a stamped addressed envelope. The inverted "L" is £9.95 and the dipole is £29. Both come with full instructions, hardware, etc. and the dipole model includes 50ft of 50 ohm coax feeder.

VHF ANTENNAE — BASE STATION

The Ringo Ranger is an omni-directional vertical providing a 6dB gain over a ¼ wavelength whip. Ideal for extending the range of F.M. communications. Frequency coverage 137-160 MHz. Only £25 inc. VAT & carriage.

FM MONITOR RECEIVER AR22

AT A NEW LOW PRICE
OF

- ★ Full band coverage, 141.000-149.995MHz
- ★ Direct frequency reading in 5 KHz steps by digital thumbwheel and slide switch
- ★ Automatic electronic RF tuning system for wide band coverage
- ★ Compact and lightweight
- ★ Rugged, reliable double sided glass epoxy printed circuit board
- ★ High performance mini rubber flexible antenna £3 extra
- ★ Includes nicads and charger

£83

inc. VAT, carriage
N.B. available soon
150-160 MHz version.



BEARCAT 220 FB

£258 inc. VAT, carriage

Coverage 66-88 MHz
118-136 MHz
144-148 MHz
148-174 MHz
420-512 MHz

A receiver which covers all these bands and offers scanning, lockout of unwanted signals, search,

programmable memories, priority, etc.

THE FABULOUS BEARCAT



LISTEN TO VHF ON YOUR HF RECEIVER, using Micro-wave Modules Converters

For 2m MMC 144/28 £24.90

For 70cm MMC 432/28 £29.90 inc. VAT and carriage.

For improved reception on HF use KX2 Listeners A.T.U. £29.95 (carriage £1)

TRIO R 1000



£285

inc. VAT & carriage

TRANSCEIVERS

H.F.

Trio TS 130V	£404.00
Trio TS 130S	£491.00
Trio TS 520 SE	£437.00
Yaesu FT 707	£499.00
Yaesu FT 101Z	£488.00
Yaesu FT 101ZD	£569.00
Trio TS 830 S	£639.00
Trio TS 180S	£679.00
Yaesu FT 107M	£859.00

2 M MOBILES

Icom IC 240	£169.00
FDK Multi 700EX	£199.00
Standard C8800	£250.00
Icom IC 255E	£255.00
Trio TR 7800	£265.00

2 M HANDHELDS

FDK Palm II	£99.00
Icom IC 2E	£159.00
Trio TR 2300	£186.00
AOR AR 245	£178.00
Trio TR 2400	£198.00
Yaesu FT 270R	£199.00

2 M MULTIMODES

FDK Multi 750	£295.00
Icom IC 260E	£339.00
Trio TR 9000	£345.00
Yaesu FT 480R	£359.00
Icom IC 251	£479.00

RECEIVERS

H.F.

Lowe SRX 30	£158.00
Yaesu FRG 7	£189.00
Trio R 1000	£285.00
Yaesu FRG 7700	£309.00

2 METRE F.M.

Search 9	£45.00
AR22	£83.00
FDK TM56B	£79.00
Bearcat 220	£258.00

MARINE V.H.F.

Search 9	£45.00
TM56B	£79.00
Bearcat 220	£258.00

2M HANDY TALKIE



ICOM IC2E

- Fully synthesised
- Power output 1.5 W.
- BNC Antenna Socket
- Weight 450 gms.
- Hi-Low power switch
- Ext. Mic. jack

£159 inc. VAT & carriage

ACCESSORIES

Morse Key HK 707	£10.50 (€0.50)
Morse Elbug EK 121	£29.95 (€0.50)
Electronic Key EK 150	£74.00 (—)
Power Supplies	
13.8v 4A	£22.95 (€1.00)
13.8v 5-6A	£29.95 (€1.50)
13.8v 5-7A	£46.00 (€1.50)
Yaesu FP12 12-16A	£78.00 (€2.00)
Dummy load DL 20 (30W)	£6.00 (€0.30)
Yaesu low pass filter (1kw)	£19.95 (€0.75)
High pass filter (T.V. lead)	£3.50 (€0.25)
Ferrite rings (1" dia) 2 off	£0.80 (€0.20)
Headphones Yaesu YH55	£10.35 (€0.50)
Trio HS4	£10.35 (€0.50)
Trio HS5	£21.85 (€0.50)
Clock Yaesu QTR 24D	£24.50 (€0.60)
Trio HC10	£55.00 (€0.50)
SWR meter YW-3 (twin meters)	£11.50 (€0.50)
SWR + power meters JD 110 (2M)	£13.00 (€0.50)
Daiwa CN 620A (2M)	£52.00 (€0.50)
Daiwa CN 630A (70cm)	£71.00 (€0.50)
Safety Microphones MM 202S (clip-on)	£20.95 (€0.50)
Daiwa RM 940 (infra red)	£45.00 (€0.50)
Listeners A.T.U. KX2	£29.95 (€0.75)
Trio dip meter DM801	£51.00 (€0.75)

PLEASE PHONE YOUR ENQUIRY FOR ANY OTHER ITEMS

ACCESS ● BARCLAYCARD ● PART EXCHANGE

MID SUSSEX HOUSE ● HIGH ST. ● HANDCROSS ● WEST SUSSEX RH17 6BW

Mail Order

Tel.: 0444 400786 9 am - 5.30 pm

Retail Callers

TO ORDER ANY OF THE ABOVE ITEMS SIMPLY WRITE ENCLOSING A CHEQUE OR PHONE YOUR CREDIT CARD NUMBER

AMATEUR ELECTRONICS UK

KEEP AHEAD WITH YAESU!



YAESU FT-902DM

Yes indeed, when you buy Yaesu Musen equipment you are buying the very latest that technology can offer in the field of Amateur Radio and this month we feature brand new models from Yaesu which incorporate the new WARC bands.

The FT-901DM has long been considered the ultimate in H.F. transceivers and now the new FT-902DM makes its appearance, bringing all the superb features found on the 901 and giving the added bonus of the new band facilities. No other equipment available on the market today can offer you the performance of the 902DM — just look at the following condensed specification: —

FT-902DM SPECIFICATIONS

GENERAL

Frequency coverage:
1.8-2.0 MHz, 3.5-4.0 MHz, 7.0-7.5 MHz,
10.0-10.5 MHz, 14.0-14.5 MHz, 18.0-18.5
MHz, 21.0-21.5 MHz, 24.5-25.0 MHz,
28.0-29.9 MHz.

Power requirements:
AC 100/110/117/200/220/234 V, 50/60Hz; DC
13.5 V, negative ground.

Power consumption:
AC 117V: 70 watts receive (45 watts HEATER
OFF), 320 watts max transmit; DC 13.5V: 5 A
receive (1.1 A HEATER OFF), 21 A max
transmit.

Size:
342(W) x 154(H) x 324(D) mm.

Weight:
Approx 18 kg.
TRANSMITTER

Emission:
LSB, USB, AM, CW, FM, FSK.
PA input power:
SSB — 180 watts PEP

CW — 180 watts DC
AM, FM, FSK — 80 watts DC.

Carrier suppression:
Better than 40 dB.
Unwanted sideband suppression:
Better than 50 dB @ 1000 Hz.

Spurious radiation:
Better than 40 dB below rated output.

Transmitter frequency response:
300-2700 Hz (—6 dB).

3rd order distortion products:
Better than 31 dB below rated output.

Stability:
Less than 300 Hz drift from a cold start; less
than 100 Hz drift over a 30 minute period after
warm-up.

RF negative feedback:
6 dB at 14 MHz.

Modulation type:
SSB — balanced modulator; AM — amplitude
modulation of a low power stage; FM — variable
reactance frequency modulation,
maximum deviation ± kHz.

Antenna output impedance:
50-75 ohms unbalanced.

Microphone impedance:
500-600 ohms (low impedance)

RECEIVER

Sensitivity:
0.25 μ V for S/N 10 dB.

Image rejection:
1.8-21 MHz — better than 60 dB; 28 MHz —
better than 50 dB.

IF rejection:
Better than 70 dB.

Selectivity:
WIDTH control at "O" SSB 2.4 kHz (—6 dB),
4.0 kHz (—60 dB); CW/FSK (with optional CW
filter installed) 0.6 kHz (—6 dB), 1.2 kHz (—60
dB); AM (with optional AM filter installed) 6
kHz (—6 dB), 12 kHz (—60 dB); FM 12 kHz (—6
dB), 24 kHz (—60 dB).

Passband tuning:
Continuous from 300 Hz to 2.4 kHz.

Audio output:
Better than 3 watts @ 10% THD, audio output
impedance 4-16 ohms.

Specifications subject to change without
notice or obligation.



A HAPPY NEW YEAR TO YOU ALL

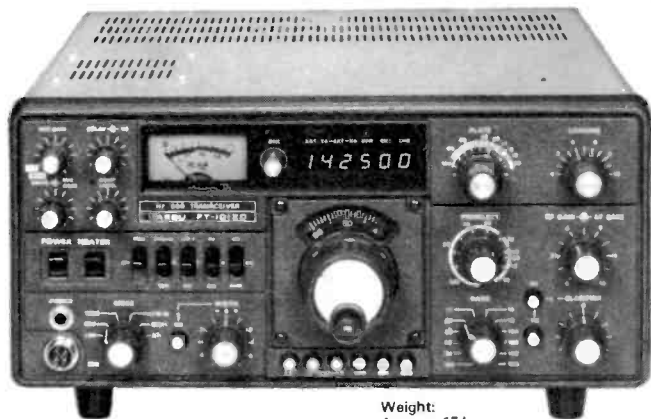


508-514 ALUM ROCK ROAD
BIRMINGHAM 8

021-327 1497
Telex 337045 6313

AMATEUR ELECTRONICS UK

AEUK — Your number one



FT-101ZD SPECIFICATIONS

GENERAL

Frequency coverage:

160m 1.8-2.0 MHz, 80m 3.5-4.0 MHz, 40m 7.0-7.5 MHz, 30m 10.0-10.5 MHz, 20m 14.0-14.5 MHz, 17m 18.0-18.5 MHz, 15m 21.0-21.5 MHz, 12m 24.5-25.0 MHz, 10m 28.0-29.9 MHz.

Operating modes:

LSB, USB, CW, AM.

Power requirements:

100/110/117/200/220/234 volts AC, 50/60 Hz; 13.5 volts DC (with optional DC-AC converter).

Power consumption:

AC 117V: 75VA receive (65VA HEATER OFF), 285VA transmit; DC 13.5V: 5.5 amps receive (1.1 amps HEATER OFF), 21 amps transmit.

Size:

345 (W) x 157 (H) x 326 (D) mm.

Weight:

Approx. 15 kg.

TRANSMITTER

PA input power: 180 watts DC (SSB/CW), 50 watts DC(AM).

Carrier suppression:

Better than 40 dB.

Unwanted sideband suppression:

Better than 40 dB @ 1000 Hz, 14 MHz.

Spurious radiation:

Better than 40 dB below rated output.

Third order distortion products:

Better than -31 dB.

Transmitter frequency response:

300-2700 Hz (-6 dB).

Stability:

Less than 300 Hz in first 30 minutes after 10 min. warmup; less than 100 Hz after 30 minutes over any 30 min. period

YAESU FT-101ZD (WARC)

Here is the brand new FT 101ZD which now comes complete with the new WARC bands and retains all the superb features which have made this the finest value for money HF Transceiver ever available to the discerning amateur.

Negative feedback:

6 dB @ 14 MHz.

Antenna output impedance:

50-75 ohms, unbalanced.

Microphone input impedance:

500-600 ohms.

RECEIVER

Sensitivity:

0.25 μ V for S/N 10dB (SSB/CW) 0.5 μ V for S/N 10dB (AM).

Selectivity:

2.4 kHz at 6 dB down, 4.0 kHz at 60 dB down (1.66 shape factor); Continuously variable between 300 and 2400 Hz (-6 dB); CW (with optional CW filter installed); 600 Hz at 6 dB down, 1.2 kHz at 60 dB down (2:1 shape factor).

Image rejection:

Better than 60 dB (160-15 metres);

Better than 50 dB (10 metres).

IF rejection:

Better than 70 dB (160, 80, 20-10m);

Better than 60 dB (40m).

Audio output impedance:

4-16 ohms.

Audio output power:

3 watts @ 10% THD (into 4 ohms).

Specifications subject to change without notice.

The brand new FL-2100Z Linear Amplifier matching in style of course to the FT-101ZD and FT-902DM, and now incorporating the new WARC bands also.



Access or attractive H.P. terms readily available for on-the-spot transactions. Full demonstration facilities. Free Securicor delivery.



HOW TO REACH US (EASY PRIVATE PARKING ON OUR 90ft. FORECOURT)

FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ¼ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.

FROM NORTH. Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.

FROM THE WEST AND SOUTH-WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

Hours: 9.30-5.30 Continuous including Saturdays—Early closing Wednesday, 1 pm

AMATEUR ELECTRONICS UK

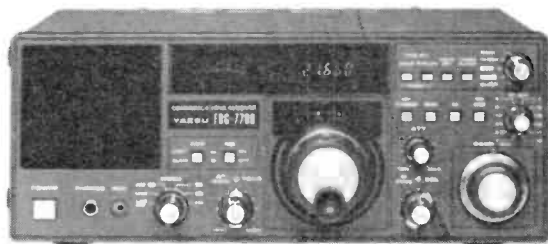
source for YAESU MUSEN

A NEW BREAKTHROUGH IN RECEIVER TECHNOLOGY!



Last but not least, here is the very latest in receivers by Yaesu Musen — the brand new FRG-7700 which sets new standards for general coverage receivers, and has features not found on any competitive product regardless of cost. This is truly a new breakthrough in receiver technology.

The exciting new FRG-7700 GENERAL COVERAGE RECEIVER from YAESU MUSEN, the world's largest manufacturer of Amateur Radio equipment, will satisfy the demands of the most critical Short Wave Listener or Licensed Operator with its superb performance and incredible specification — just consider the following condensed details:



Frequency coverage 150 KHz-29.999 MHz.

Modes AM (fitted Narrow, Medium and Wide Filters).
 USB, LSB, CW and FM.
 Memory option with twelve channels and automatic band selection.
 CPU Digital Clock and Timer.

State-of-the-Art Noise Blanker.
 FM Squelch Control.
 Mains or Battery operation.
 Digital and Analogue read-out.



For full details of these new and exciting models, send today for the latest YAESU CATALOGUE and LEAFLETS. All you need to do to obtain the latest information about these exciting developments from the world's No. 1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3.60 p — a 10 to 1 winning offer.



AGENTS: NORTH WEST — THANET ELECTRONICS LTD, GORDON, G3LEQ, KNUTSFORD. (0565) 4040.
 WALES & WEST — ROSS CLARE, GW3NWS, "GLENVIEW", NEWPORT ROAD, MAGOR, GWENT.
 (0633) 880146
 EAST ANGLIA — AMATEUR ELECTRONICS UK — EAST ANGLIA, Dr T. THIRSK (Tim) G4CTT,
 NORWICH 06925 865
 NORTH EAST — NORTH EAST AMATEUR RADIO, DARLINGTON. 0325 55969.
 SOUTH EAST — AMATEUR ELECTRONICS, UK — COASTAL, CLIFTONVILLE, KENT.
 KEN McINNES, G3FTE, THANET. (0843) 291297, 9 a.m.-10.30 p.m.



**508-514 ALUM ROCK ROAD
 BIRMINGHAM 8**

**021-327 1497
 Telex 337045 6313**

Thanet Electronics

for ICOM

the amateur's professional friends

This month we are showing you:

IC-451 UHF Base Station

IC240 – The best value for money in synthesized rigs.

Theta 7000E – An outstanding communications computer.

IC202S

IC402 – A pair of magnificent sideband portables.

On these, and all our other products:

- * we offer a full year's warranty on all parts and labour
- * Free delivery for all transceivers, using registered first class post

IC2E – Probably the smallest made, extra sensitive handy talkie.

IC251E – Must be the best value in 2M base stations.

IC255E – A great value 25W mobile transceiver.

IC260E – The ideal choice for multimode mobile.

- * All prices including V.A.T.
- * H.P. and Part Exchange welcome

IC-451 UHF Base Station



£579 inc. V.A.T.

ICOM are proud to announce the introduction of the 70cm version of their famous 2m base station – the IC-251. Of course, it is engineered to the usual high ICOM standards and includes such features as:-

- * 3 memory channels
- * Automatic repeater shift on switch-on
- * Additional selectable shift for European DX
- * Selectable channel steps for FM (supplied with 25KHz – others are diode programmable)
- * Full power control on SSB/CW/FM
- * Superb receiver performance using MOSFETS
- * Multipurpose scanning
- * Covers 430-440 MHz
- * Xtal controlled Toneburst
- * Cool running chopper power supply

Also available from our shop in Herne Bay are:

- | | | |
|---------------------|-----------|-------------------------|
| * MICROWAVE MODULES | * WESTERN | * ANTENNA SPECIALISTS |
| * J-BEAM | * G-WHIP | * YA ESU MUSEN |
| * RSGB PUBLICATIONS | * BEARCAT | * VIDEO GENIE COMPUTERS |

IMPORTANT

We would like you to phone, or write to us so that we can give you as much detailed information as possible on any particular product. Use our 24 hour ansafone when calls are cheap.

Send for Technical Details

Thanet for  ICOM

143 RECLVER RD.,
BELTINGE,
HERNE BAY, KENT.
Tel: 02273/63859



The IC-240 - The start of a revolution in 2 meters transceivers



£169 INCL

- Easy channel selection with minimum knob twiddling – yet with all the normal FM channels available – an all important safety feature.
- A fully automatic tone burst which operates only in repeat mode with NO buttons to press either on the front or on the back of the set.
- Instant reverse repeat at the flick of a switch without any re-tuning or memory programming.
- A very sensitive receiver with a spurious response performance far better than the average and a very clean transmitter with excellent clear, crisp modulation. (We measured a sensitivity of 0.1 uv pd for 10dB sinad).

SPECIFICATIONS

GENERAL

Semiconductor Complement

Transistors 34
FET 7
IC 13
Diodes 33 to 128 depending on channels

Frequency Range (for specifications)
Voltage
Current Consumption

144-146MHz
13.8 VDC Negative Ground
2.0AMP at 10W
RX 700MA at MAX Audio
400MA Squelched

Size
Weight
Antenna Impedance
Number of Channels

58mm (ht) x 156mm (wt) x 218mm (dt)
1.9 kilograms
50 OHMS
22 channels selected from any of the 80 channels on 25kHz spacing

Frequency Control

Stabilized Master oscillator PLL programmed by diode matrix

TRANSMITTER

Power Out
Deviation
Microphone Impedance
Spurious Level

10 watts
5KHz
500 OHMS
Lower than 60dB below carrier

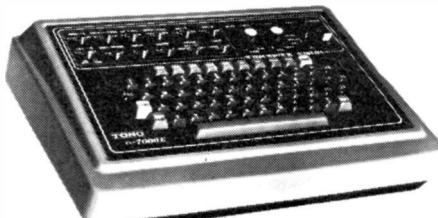
RECEIVER
Modulation Acceptance
Type

F3
Double Superhet, 1st 1 F 10.7MHz
2nd 1 F 455kHz

Receiver Sensitivity
1 Microvolt S-N N
Spurious Response
Bandpass
Squelch Sensitivity
Audio Output

0.4uV or better
5KHz or better
80dB or more attenuation
-15kHz -60B, -15kHz -60B
-8dB below 1 microvolt
1.5 watts or more into 80HMS

FOR ONLY
£640.00
INCL.



Tono Theta 7000E A great computer on offer from Thanet

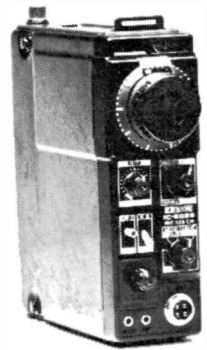
The new THETA 7000E means that every Amateur can enjoy the visual display of CW, RTTY and ASCII in both transmit and receive modes. Just connect the TONO to any TV set via the antenna terminals or to a page printer from the parallel port provided. Bring up your CW speed in receiving or sending by either watching receiver sent or from recorded cassettes. Connection to the transceiver is via the key, phone and mic sockets.

Some of the Outstanding Features
COMMUNICATIONS COMPUTER THETA 0-7000E
UHF and Composite Video Output * Printer interface * Wide range of transmitting and receiving speeds – 10CW speeds * 8RTTY * Built-in demodulator for high performance for 170, 425 and 820 Hz shift * Crystal controlled modulator for ASK – Hi or Lo tone * Convenient ASCII key arrangement * Large capacity display memory

– 2 pages 32chr x 16 lines split screen for Rx & Tx if required * Automatic transmit/receive switch * Anti-noise circuit * Battery backed up memory 7 channels of 64chr * Send function * Buffer memory – 53 character type ahead, rub out function * Simultaneous access of the memory – 53 character type ah
LF (line feed) cancel function * Cursor control function * Word mode operation * Automatic CR/LF (172, 60 or 80 chr per line) * Echo function

* Word Wrap around function * Transmit/receive in ASCII mode or RTTY * CW identification function * Mark and break (space and break) system * Monitor circuit & CW practice function * Variable CW weights * Cross pattern checking output terminal * Log computer output provided * Test message function (RV and QBF),
Phone or write for the price list of accessories for this unit.

IC-202S
£169 INCL.



What a tremendous pair

The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW, * Large Battery capacity (HP11 type) or Nicads if you wish * A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m * Each of the four 200kHz band positions allows operation anywhere in 2m. (Supplied with 144-144.2 and 144.2-144.4) * Top of the band Oscar xtals available for "cross-pond working" * It has a DC socket and SO239 sockets for mobile or base station working, barefoot or as a prime mover * Mobile mounting brackets, Nicad packs, chargers, cases all available options. You must agree, a very versatile well proved rig.

IC-402
£242 INCL.



The 70cm twin of the 202S having very similar features, covering the frequency range of 432-435.2 MHz.

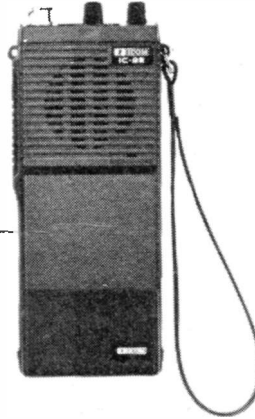
Their versatility is well worth an enquiry.

Send for Technical Details

Thanet for  **ICOM**



**2E or not 2E that
is the question
we have the
answer
IC-2E
Handy
Talky
£159 INCL.**



CHECK THE FEATURES

FULLY SYNTHESIZED – covering 144-145.995 in 400 5kHz steps.
POWER OUTPUT – 1.5W with the 9V rechargeable battery pack as supplied – but lower or higher output available with the optional 6V or 12V packs.
BNC ANTENNA OUTPUT SOCKET – 50 ohms for connecting to another antenna or use the Rubber Duck supplied.
SEND/BATTERY INDICATOR – Lights during transmit, but when battery power falls below 6V it doesn't light indicating the need for a recharge.

FREQUENCY SELECTION – by thumbwheel switches, indicating the frequency.

+5kHz SWITCH – adds 5kHz to the indicated frequency.

DUPLEX SIMPLEX SWITCH – gives simplex or plus 600kHz or minus 600 kHz Transmit.

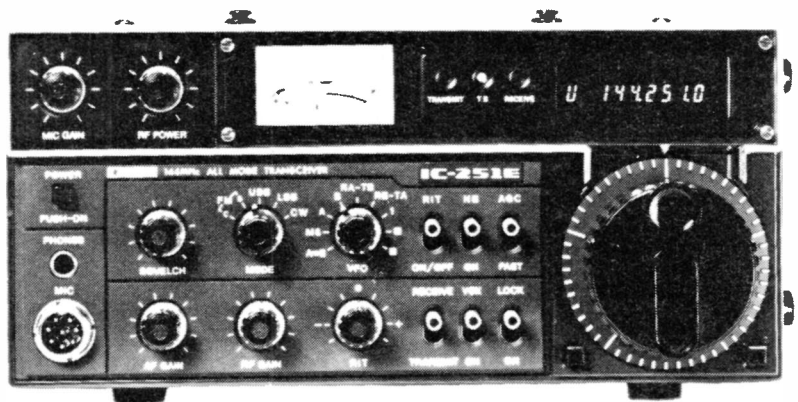
HI-LOW SWITCH – reduces power output from 1.5W to 150mW reducing battery drain.

EXTERNAL MICROPHONE JACK – If you do not wish to use the built-in electret condenser mic an optional microphone/speaker with PTT control can be used. Useful for pocket operation.
EXTERNAL SPEAKER JACK – for speaker or earphone.

This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

**It will seduce you in it's own way
the ICOM IC 251E**

**only
£479 INCL.**



Send for Technical Details

Thanet for



ICOM



for only
£255
INCL.

IC-255E- An experts mobile choice

NOW WITH
IMPROVED
FRONT-END



**25 Watts – 5 Memories – Scanning – 600kHz
AND User Selectable Repeater Shift – Full Coverage in 5kHz or 25kHz Steps.**

- Crystal controlled Tone Burst
- Full band coverage – extendable to 148MHz if required
- Four digit LED display
- 25 Watts output or 1W low power
- A superb receiver using grounded gate FET front end
- Scanning over a user programmable range
- Memory scan
- Stop on empty or busy channels
- Tuning in 25kHz or 5kHz steps
- 5 Memories – retained while the power is connected to the rig
- Built-in 600kHz Repeater Shift
- Alternative programmable shift
- Reverse Repeater facilities
- RIT \pm 3kHz for those off channel stations
- Scan control from the microphone (optional mic available)
- Good loud audio
- Optically coupled tuning between control knob and CPU
- Multitway 24 pin socket on back for touchpad, computer, or external control
- Rugged modular PA (Guaranteed of course!)
- Mobile mount which can be padlocked
- Up-down scanning microphones available

CAN YOU RESIST SUCH A TEMPTATION

Enjoy VHF mobile at it's best-IC-260E

Replacing the IC-245E, the IC-260E offers such extras as full frequency read out, upper and lower sideband, and scanning as well as FM and CW. Thus, it makes an ideal base station, when used with a DC power supply, as well as a mobile. The use of a microprocessor instead of an LSI chip has enabled Icom to offer this at a lower price than the IC-245E.



Send for Technical Details

£339 INCL.

AGENTS (PHONE FIRST – All evenings and weekends only, except Burnley)

Scotland	Jack GM8GEC (031-665-2420)	Midlands	Tony GBAVH (021-329 2305)
Wales	Tony GW3FKO (0874 2772)	North West	Gordon G3LEQ (Knutsford (0565) 4040)
Burnley	(0282 38481)		



STEPHENS-JAMES LTD.

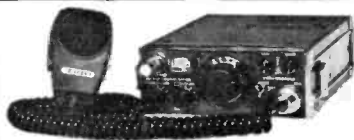
47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA **G3MCN**
Telephone (0942) 676790



R820 RECEIVER

THE ULTIMATE IN RECEIVERS

Frequency coverage 160-10m plus SW Broadcast Bands. All modes CW-USB-LSB-RTTY. Digital Readout. Noise Blanker. Fully variable I.F. Bandwidth, plus Bandpass tuning, plus rejection notch filter. **£690.00**



TR2300

TR2300 2m Synthesised Portable Transceiver. We have lost count of the number of this model we have sold over the last 12 months. Hikers, campers, climbers, you can hear them all over the country and reliability which is the essence of TRIO equipment. **£166.75**

JAYBEAM

5Y 2M 5 element yagi	£11.27
8Y 2M 8 Element yagi	£14.49
10Y 2M 10 Element	£31.06
PBM 14/2m. 14 element Parabeam	£44.80
5XY 2m. 5 element crossed yagi	£22.77
8XY 2m. 8 element crossed yagi	£28.40
10XY 2m. 10 element crossed yagi	£37.72
Q4 2m. 4 element Quad	£23.69
Q6 2m. element Quad	£31.39
D5 2m. 5 over 5 slot fed yagi	£20.12
D8 2m. 8 over 8 slot fed yagi	£27.40
UGP 2m. ground plane	£10.12
MBM48/70cms. Multibeam	£28.75
MBM88/70cms. Multibeam	£39.33
TAS 2m. Whip mobile	£15.29
C5/m. Colinear	£44.27
C8/70cm. Colinear	£50.00
D15/1296.73cm. Antenna	£34.04

Carriage on Antennas £3.00



TRIO R1000

R1000 Receiver £285.20

The latest general coverage from Trio. Frequency coverage 200 KHz to 30 MHz in 30 bands. Using an advanced PLL system. Full digital readout. Three filters 12 KHz for AM -6KHz narrow AM and 2.7 KHz SSB. Also incorporates a noise blanker. Operation is from 100-240 V AC or 12 V DC.

TR9000



The TR9000 is a compact lightweight 2 mtr FM/USB/LSB/CW Transceiver with an outstanding array of functions. FM1 for 25KHz steps (for mobile use) FM2 for precise 100Hz steps (for base station use). Microcomputer control giving many advanced features. Built in 5-channel memory. New type microphone with UP/DOWN switching. Built in high performance N Blanker. Side tone for CW. **ALL THIS PLUS MUCH MORE FOR £345.00 inc. VAT.**

TRIO R820 Receiver	£690.00
SP820 Speaker	£37.95
SM220 Monitor scope	£197.80
TL922 Linear Amplifier	£596.00
VFO520S	£98.80
SP520 Speaker	£17.25
TS120V 80-10m. Mobile Transceiver	£347.30
PS 20 AC power supply for TS120V	£44.85
MB100 Mobile mounting bracket	£17.25
SP70 Speaker	£18.40
R1000 Receiver	£298.00
TR2300 2m. Portable Transceiver	£166.75
TS520SE HF Transceiver	£437.00
TR2400 Hand held 2m Transceiver	£198.00
TS120S 200 watt Transceiver	£432.40
TL120 Linear Amplifier	£128.80
HS5 Headphones	£21.85
HS4 Headphones	£10.35
MC50 Desk Microphones	£24.15
MC30S Hand Microphone 50K	£13.80
DM800 G.D.O. 'Wavemeter	£51.75

NEW TRIO TS130S NOW IN STOCK



TR7800

Continuing TRIO's policy of presenting the Radio Amateur with the finest equipment available, we are pleased to announce the NEW TR7800 2m FM Mobile Transceiver. 15 memory channels - Priority channels with split ± 600 KHz or non-standard operation - "Priority alert" bleeps when signal on M14 priority channel. Frequency coverage 144.00, 145.955 in switchable 5 KHz or 25 KHz steps. Front keyboard for selecting frequencies, programming memories and controlling scan function. **ALL THIS AND MORE for £268.50.**



TRIO TS120 TRANSCIVER

ALL SOLID STATE HF BAND
TRANSCIVER

Freq. 3.5-30 MHz Amateur Bands and WWV. I.F. Shift System. Noise Blanker, Vox, Single conversion system using PLL circuit. Digital display dial.

TS 120V 10 watts PEP	£347.30
TS 120S 200 watts PEP	£432.40



TS 180S

TS 180s. HF Transceiver. An all solid state Transceiver with Digital Frequency Control. A rig that has the facilities that DXer, Contest operator or any Amateur would desire for maximum flexibility on the 160 through 10 metre bands. Up to 200 watts PEP input. No tune final amplifier. **£679.65**
With digital readout.

ACCESS & BARCLAYCARD facilities. *Instant HP service Licensed Credit Broker - quotations upon request*

Try our new "Overnite" service for £5.00. Guaranteed 24 hour service if order placed before 11 a.m. (except North GM).

Part exchange always welcome. Spot cash paid for good clean equipment. If you have equipment surplus to your requirement we would be pleased to sell this on commission for you.

Shop Hours: 9.30 to 5.30 Monday to Friday.
5 p.m. Saturday

No parking problems. Turn at the Greyhound Motel on the A580 (East Lancs.) Road, S.A.E. with all enquiries. 25p will bring you latest information and prices, credited to your first purchase over £5. Postage carriage extra.

ALL OUR PRICES INCLUDE VAT

HF SSB TRANSCIVER AROUND £640 inc VAT

carriage by Securicor £4.50

The new TS830S, the latest from TRIO. A high performance, very affordable HF SSB/CW transceiver with every conceivable operating feature built in for 160 through 10 metres (including the new three bands). The TS830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift and an IF notch filter, as well as very sharp filters in the 455 kHz second IF. Together with the optional VFO230 (remote digital display VFO) which provides split frequency operation and 5 memories for frequency hold, the amateur has available today's advanced technology linked to the proven reliability and exceptional linearity of a valve PA.

- * VBT variable bandwidth tuning
- * IF notch filter
- * IF Shift
- * Various filter options
- * Built in digital display
- * 6146B final with RF negative feed-back
- * Optional Digital VFO for increased flexibility
- * Innovative PLL system of frequency generation
- * RF speech processor
- * Adjustable noise blanker level
- * Adjustable audio tone
- * RF attenuator
- * RIT/XIT
- * SSB monitor circuit
- * Expanded frequency coverage

ROTATDRS	CABLE
DR7500X £98.04	UR43 24p metre
DR7500R £107.98	UR67 80p
ART300C £97.50	300 ohm Ribbon
Sky King SU200. £40.40	12p metre
Sky King SU400. £75.00	75 ohm low loss 24p
DR7600X £135.00	

SRX-30
Solid state Receiver 550kHz-30MHz £175.00

Mobile Antenna Range	
5 8th Whip PL259 fitting	£8.50
Magnetic Mount PL259 fitting	£8.00
7/8th Whip	£13.00
Basemount and lead	£3.50
Gutter mounts	£3.15

Accessories	
2 way Antenna Switch 50 ohm-200 watt	£6.60
3 way Antenna switch SWL push button type	£4.60
3 way Antenna Switch 2 kW PEP 0.500MHz	£10.60
4 way Antenna Switch 50 ohm 200 watt PEP	£10.60

Single Meter SWR Wall type	£10.87
Single Meter SWR Desk type	£11.00
Twin Meter SWR Desk type	£13.55
T345N Thru Line Wattmeter 140-435 MHz	£34.45
DL-50 50 watt 50ohm Dummy Load	£7.50
DL-1000 1kW Dummy Load 50 ohm	£37.95
Morse Keys Lightweight	£3.25
Oscilloscope SWR200B Twin Meter	£40.19
HyMound HK70B	£10.50
Katsumi EK150 Electronic Keyer	£79.00
Bencher IAMBIC keying paddle	£29.75

DX-008 Programmable Frequency Counter	£116.25
HP3A High Pass Filter	£3.25
Twin Keying Paddle Chrome plated with heavy base. Precision Unit	£26.50
KX2-SWL Antenna Tuner	£29.90

Full Range	
Mini Products	
C4X 3band Vertical	£48.00
HQ1 Mini Beam	£96.00

Hy Gain	
12AVQ 3band Vertical	£43.12
14AVT/WB 4band Vertical	£60.37
18AVT WB 5band Vertical	£87.40

Diawa 144 Mhz and 70 cms Antennas in stock

F.D.K.	
Multi-750E Transceiver	£299.00
Multi-700EX Transceiver	£199.00

R517 Hand Held Tunable 118 144MHz
plus Crystal Control on three Fixed Frequencies. UNDER £50 inc. VAT



BEARCAT 220 FB
Specifications.
Frequency range:

Low Band Mobile	66 - 88 MHz
Aircraft	118 - 136 MHz
Amateur Band	144 - 148 MHz
Public Service & Marine	148 - 174 MHz
UHF Amateur	420 - 450 MHz
UHF Band	450 - 470 MHz
UHF Band	470 - 512 MHz

STANDARD

C8800 2M FM Mobile Transceiver	£252.00
G-WHIP	
Tribander Helical 10-15-20m	£24.72
LF Coils for Tribander	£6.55
LF Telescopic Whip Section	£3.35
Basemount standard type	£4.48
Multimobile 78, 10-15-20m	£28.75
MM Coils	£6.55
MM Telescopic whip section	£3.33
Flexiwhip basic 10 metres section	£17.25
Basemount standard	£4.48
Ball type Basemount	£6.32
Coils for Flexiwhip	£6.55
Base thread adaptor USA G Whip	£0.75
Extendarod 40"	£11.50

DRAKE

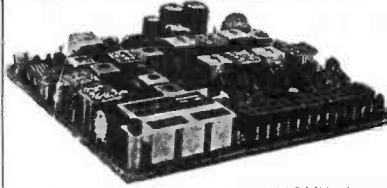
TR7 Digital Transceiver	£1035.00
PS7 Power supply	£207.00
RV7 Remote VFO	£138.00
MS7 Speaker	£29.90
R7 Digital Receiver	£989.00
Filters for TR7	£39.10
FA7 Fan for TR7	£20.70
MN7 ATU/RF Meter 250 Watts	£124.20
MN2700 ATU 2 KW	£207.00
DL300 Dummy Load 300watts.	£20.70
DL1000 Dummy Load 1 KW	£37.95
TV3300 Low Pass Filter	£18.40
AK75, Doublet Antenna 132' top with 470 ohm Feeder.	£23.00

MICROWAVE MODULES

MMT 1296/144 1296 MHz	
Lin/Transverter	£184.00
MMT70/144 4m Lin/Transverter	£115.00
MMA 1296 Receiver pre-amp	£29.90
MML 144/40 40 watt Linear Amplifier	£69.00
MMA 144V 2m RF Switched preamplifier	£29.90
MML432/20 Lin Amp and Pre-amp	£69.00
MMT 144/28 2m Transverter	£99.00
MMT 432 28S 70cm Transverter	£136.85
MMT 432/144R 70cm Transverter	£173.66
MMT70 144 4m Transverter	£115.00
MML 144/25 2m 25 watt Linear	£48.30
MML 144/100 2m 100 watt Linear	£142.60
MMC70/28 4m Converter	£24.90
MMC 144/28LO 2m Converter	£26.90
MMC432 28S 70cm Converter	£29.90
MMC 1296/144 23cm Converter	£32.20
MMD050/500 500 MHz freq. conter	£69.00

ANTENNA RANGE

HG5 Vertical 10-80m	£48.50
HFR Ground Plane Kit	£28.00
GDX-2 Discone 50-480MHz	39.50



AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0.2uV AF output 3 watts. 12v DC operation Price £50.00

RECEIVERS AND TRANSCEIVERS
(Inc. VAT and Postage)

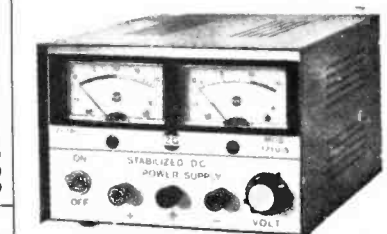
SR9 Tunable 144-146 MHz Receiver	£46.00
AMR217B Scanner Receiver. AC or DC operation	£113.50
R512 Aircraft Band Scanning Receiver	£135.00
Regency Digital Flight Scan Synthesised Aircraft Band Receiver	£215.00
Phillips FM321 70cms FM Transceiver	£264.00
Yaesu FRG7 Receiver	£199.00
FDK TM563 Scanning 2m Receiver	£109.00
'Sky ACE' Hand held Aircraft Band Receiver.	£49.50
Bearcat 220 Scanning Receiver	£258.75
AR22 2m Hand Hold Receiver	£83.00

SECONDHAND EQUIPMENT
We have a very rapid change over of secondhand equipment, especially in receivers. Our lists are updated each day, please send SAE for latest or telephone. Here are a few of the items from our range. All prices include VAT.

Drake TR4C HF Transceiver MS4S Speaker/ power supply	£395.00
Trio R820 Receiver	£500.00
KW200 Receiver	£165.00
Drake R4C + CW Filter	£400.00
Eddystone 830/7 Receiver	£395.00
Drake TR7 transceiver + PSU 7	£895.00
Trio TS515 Transceiver + PSU	£200.00
ICOM IC701 Transceiver + PSU	£575.00
Yaesu FRG700 Receiver	£200.00

SOLID STATE STABILISED POWER SUPPLIES
Maximum ratings quoted. Prices include postage.

Model 122 12.6V 2.5A	£15.55
Model 125 10-15V 5 amp	£29.50
Model 156S 4.15V 5 amp Twin Meter	£40.00
Model 1210S 4-20V 10 amp Twin Meter	£85.00
Model 1210 10amp 13v	£68.00
Model 1220 1 13.5V 20 amp	£90.00
Model 1220 2 13.5V 12 amp	£80.00



Mod. 1210 S

STEPHENS-JAMES LTD.
47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA
Telephone (0942) 676790

Buy with Visa
BARCLAYCARD
VISA

AMATEUR RADIO EXCHANGE



Brenda (G8SXY) and Bernie (G4AOG) invite you to visit the only shop in London where you can see and try ALL the leading makes of Amateur Radio equipment under one roof . . . YAESU, ICOM, TRIO/KENWOOD . . . compare them all, and choose the rig that's right for you. The only make you can't choose is the coffee . . . that's "instant Brenda"!!



FRG-7

Still the finest value-for-money communications receiver on the market at only

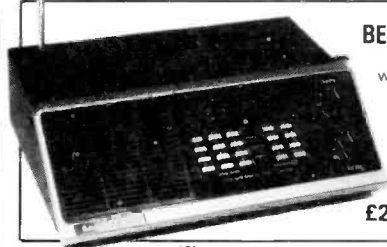
£185 inc. VAT and free Heliscan aerial worth £15.



R-1000

Trio/Kenwood's successful new receiver with the PLL system that has proved so popular

£285 inc. VAT and free Heliscan aerial worth £15.



BEARCAT 220FB

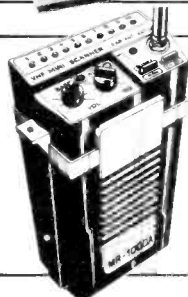
The super scanner which brings you all the excitement of the VHF and UHF frequencies . . . aircraft, marine, amateur, plus so much more.

£258.75 inc. VAT

FRG-7700

Yaesu's latest receiver with FM right across the band and optional memory facility plus excellent filtering.

£309 inc. VAT and free Heliscan aerial worth £15 (Memory extra)



MR-1000A

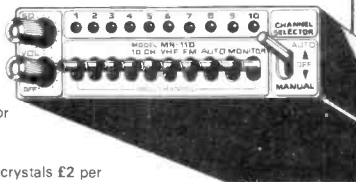
The finest-value pocket VHF scanning receiver ever offered. 10 channels, with scan or manual tune across selected crystal-controlled channels. Complete with Nicads and charger.

£39 inc. VAT (2m amateur band crystals £2 per channel)

MR-110

VHF scanning receiver. 10 channel capability, with lock-out facility. Superb sensitivity. 12v only so ideal for mobile work.

£39 inc. VAT (2m amateur band crystals £2 per channel)



ARE YOU A G8 ABOUT TO TAKE YOUR 'A' LICENCE? OR ARE YOU TAKING YOUR G4 STRAIGHT AWAY?

Either way, why not start listening right now on a Yaesu FT-101 transceiver? It really knocks spots off the average general coverage receiver, with better selectivity, better sensitivity, better stability . . . And remember, cooling fans and microphones come FREE with 101s from A R E !!

So, buy your rig now, and claim your mic and fan when you get your G4.

FT-101Z **£488** inc. VAT

FT-101ZD **£569** inc. VAT



Closed Wednesday, but use our 24-hour Ansaphone service, or ring Martin (G4HKS) on 01-575 5291 for evening sale enquiries.

2 NORTHFIELD ROAD, EALING, LONDON W13 9SY. Tel. 01-579 5311

So easy for Overseas visitors - Northfields is just seven stops from Heathrow on the Piccadilly Line

LICENSED CREDIT BROKERS ★ Ask for written quotation

INSTANT HP FOR LICENSED AMATEURS AND 6-MONTH NO-INTEREST HP TERMS AVAILABLE



SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

ADVERTISER'S INDEX

	Page
Amateur Electronics UK	683, 684, 685
Amateur Radio Exchange ...	692
Amcomm Services ...	726, 732
J. Birkett ...	737
Bredhurst Electronics ...	682
British National Radio and Electronics School ...	738
Cambridge Kits ...	738
Catronics Ltd. ...	735
C. B. Electronics ...	731
Colomor Electronics Ltd. ...	739
Crayford Electronics ...	739
Datong Electronics Ltd. ...	694
Garex Electronics ...	731
Gemini Communications ...	738
G2DYM Aerials ...	730
G3HSC (Rhythm Morse Courses) ...	739
D. P. Hobbs Ltd. ...	740
Lee Electronics Ltd. ...	733
Leeds Amateur Radio ...	734
Low Electronics	<i>front cover, inside front cover, 673, 674</i>
Merseyside Amateur Radio Supplies ...	737
M.H. Electronics ...	739
Northern Communications	733
Partridge Electronics Ltd.	<i>back cover</i>
P.M. Electronics Services ...	727
Quartslab Marketing Ltd. ...	730
Radio Shack Ltd. ...	675
R. T. & I. Electronics Ltd. ...	732
S.E.M. ...	728
Small Advertisements	734, 735, 736
South Midlands Communications Ltd. ...	678, 679, 680, 681
Spacemark Ltd. ...	740
Stephen-James Ltd. ...	690, 691
S.W.M. Publications	<i>inside back cover, 736, 738, 739, 740</i>
Thanet Electronics Ltd.	686, 687, 688, 689
T.M.P. Electronics ...	737
Uppington Tele/Radio (Bristol) Ltd. ...	739
Reg Ward & Co. Ltd. ...	740
Waters & Stanton Electronics	676, 677
Geoff Watts... ...	730
Western Communications (Galway) Ltd. ...	729
Western Electronics (UK) Ltd.	724, 725
W. H. Westlake ...	739

Vol. XXXVIII

JANUARY, 1981

No. 447

CONTENTS

	Page
Editorial —“Short Wave Magazine” changes shape	695
VHF Bands , by N. A. S. Fitch, G3FPK	696
“SWL” —Listener Feature.	700
Antennas —The Weak Link, Part XIII, by A. P. Ashton, G3XAP	703
Clubs Roundup , by “Club Secretary”	709
Using and Abusing the 4CX250 Family of Valves, Part I , by John H. Nelson, G4FRX	713
Modifications to the Icom IC-701 and IC-211 Transceivers , by Anthony Green, VP2EZ, A4XGR, VS6EZ, G4HRD	717
Communication and DX News , by E. P. Essery, G3KFE	721

Editor: PAUL ESSERY, G3KFE/G3SWM

Advertising: Charles Forsyth

Published at 34 High Street, Welwyn, Herts. AL6 9EQ, on the last Friday of the month, dated the month following. Telephone: 04-3871 5206 & 5207

Annual Subscription:

Home: £7.50, 12 issues, post paid
Overseas: £7.50 (\$17.00 U.S.), post paid surface mail

Editorial Address: Short Wave Magazine,
34 High Street, Welwyn, Herts. AL6 9EQ, England.

Prices shown in advertising in this issue do not necessarily constitute a contract and may be subject to change.

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

© Short Wave Magazine Ltd.

E. & O. E. VAT Reg. No. 239 4864 25



DATONG ELECTRONICS LIMITED

...and the beauty isn't just skin deep!

Multi-mode Audio Filter Model FL 2

Adds variable selectivity to existing communications receivers without internal modifications. Gives extremely sharp pass-band edges for truly exceptional filtering performance on all modes but especially for SSB. Its 10 poles of fully variable low and high pass filtering give **sharper filter edges even than normal crystal filters.** A separate manually tuned notch filter is also fitted. In "cw" mode all 12 poles of filtering are combined to give exceptional skirt selectivity. Connects in series with loudspeaker.

General Coverage Converter Model PC1

Model PC1 converts any good two metre SSB receiver or transceiver into a **superb general coverage communications receiver.** Coverage is 0 to 30 MHz in thirty synthesised bands of 1 MHz and no receiver modifications are required.

Advanced **parametric mixer** and **LSI frequency synthesiser** ensure that the overall performance is limited only by that of the main receiver. Also usable with 28-29 MHz receivers via a conventional 2-metre converter.

Automatic r.f. Speech Processor Model ASP

Makes your transmitted speech louder and clearer for a given transmitter power. The 'Rolls-Royce' of r.f. speech processors Model ASP **adjusts itself to suit your voice level** and your microphone. Simply select the degree of r.f. clipping in steps of 6 db's from 0 to 30 db's. Connects in series with the microphone.



The Answer to the Morse Test Model D70

The Datong Morse Tutor (Model D70) is your passport to a full licence. Compact, with internal battery and speaker plus personal earphone it provides unlimited random morse for practice.

With Model D70 you can practice morse anywhere, anytime, and at your own pace. With the Morse Tutor practice becomes a pleasure because you get results quickly.

Very Low Frequency Converter Model VLF

If your communications receiver gives poor results below 500kHz Model VLF is the answer. It also adds MW and LW coverage to amateur bands-only receivers for news, time checks etc.

Connects between antenna and receiver input.

Converts signals from 0 to 500kHz to the range 28 to 28.5MHz, with low noise and high sensitivity. Useable to 1MHz with reduced sensitivity.

Active Receiving Antennas

Ultra-compact receiving antenna systems giving wideband coverage from 200kHz to over 30 MHz at high sensitivity.

Models AD270 and AD370 give **similar receive performance to large conventional antenna systems yet are only 3 metres in overall length.** The balanced dipole configuration also gives good rejection of local interference.

Model AD270 (an upgraded version of Model AD170) is for indoor mounting.

Model AD370 is waterproofed for outdoor use.

Model AD370 & AD270 head units only are also available separately for upgrading earlier AD170 systems.

Models AD270, AD370



- Crystal controlled for high stability
- Quality construction in diecast aluminium box (size 112x62x31mm), SO239 connectors, LED indicator, in/out switch.
- Operates from internal 9 volt battery or external supply (5-15 volts DC)

Products not shown in this advertisement

Model FL1, Self-tuning notch/peak audio filter.
Model D75, R.F. Speech Processor.
Model RFC/M, R.F. Speech Processor P.C.B. Module.
Model MPU, Mains Power Unit.
Accessory Leads

PRICES: All prices include delivery in U.K. Basic prices in £ are shown with VAT-inclusive prices in brackets.

FL1	59.00	(67.85)	AD270	33.00	(37.95)
FL2	78.00	(89.70)	AD370	45.00	(51.75)
PC1	105.00	(120.75)	AD270 + MPU		
ASP	69.00	(79.35)		37.00	(42.55)
VLF	22.00	(25.30)	AD370 - MPU		
D70	43.00	(49.45)		49.00	(56.35)
D75	49.00	(56.35)	MPU	6.00	(6.90)
RFC/M	23.00	(26.45)			

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Telephone: (0532) 552461

The SHORT-WAVE Magazine

EDITORIAL

“Short Wave Magazine” changes shape

From the March issue (which also marks the start of Volume 39) the format of *Short Wave Magazine* will be based on the international A4 size, overall dimensions being increased to 275 x 200mm. Although our standard number of pages will be reduced by eight, the change nevertheless means that there will be a net increase of nearly 30% in type area available; and this in turn means that, in addition to our full range of technical and feature articles, we shall be able to devote more space to photographs, news items, etc., than in the past.

Amateur radio is growing rapidly, and over the next months *S.W.M.*, as the only freely available journal in the U.K. devoted *exclusively* to amateur radio, will be reflecting this growth, and commenting on the changes and progress (and sometimes otherwise!) of this great hobby.

As a part of this, *your* views are always welcome and needed — after all, we are all in it together. So, particularly with a view to the new ‘letters to the Editor’ column, let’s have as much ‘reader feedback’ as possible. Deadline for the March ‘letters’ column (the first airing of the feature is to be in next month’s issue) is January 30th.

Ed. Collins
G3KFE.

VHF BANDS

NORMAN FITCH, G3FPK

FIRSTLY, a Very Happy New Year to all readers. May 1981 bring some very nice DX for everyone.

The Tables

The popular QTH Locator Squares table will continue in its present form, with the January 1, 1975 starting date. As previously, it will adhere to a four monthly cycle in the order of total squares on all three bands, followed by rankings in order of 2m., 70cm., and 23cm. squares worked, respectively. QSLs need not be possessed claimed squares. The 23cm. All-Time table will be published from time to time as space permits.

The main change is to the annual table. To encourage more 23cm. activity, this band will be included in the list, enabling Class B licensees to be able to use three bands if they wish. Class A licensees may enter for all four bands but only the totals of the highest three will be used in calculating the points. It is proposed to show the non-scoring band figures in *italics*, and to call this "The Annual VHF/UHF Table." One important result of this new table will be that 23cm. operators' calls can be seen at a glance. Even if you only work a few countries and countries on 23cm., please include them in your entries.

Awards

Two more 432 MHz VHF Century Club certificates have been issued. No. 29 went to Pete Connors, G8LEF, from Huddersfield, W. Yorks. It took three years to collect the 100 cards but his list does not include a single G station. The original gear was a *Belcom* Liner-430 and 48-ele. *Multibeam* at 30ft. Later on, a BFR91 pre-amplifier stage was added, then a 50 watts amplifier, the aerial later being changed to a 21-ele. *Tonna Yagi* at 50ft. Pete says, "Interestingly enough, all the good DX was worked on just 10 watts into 50ft. of UR67, including

OE3HJW/3. I've found that most stations in mainland Europe run relatively lower powers on 70cm., often home brewed."

Tony Collett, G8GXE, from Langley in Berks., receives 70cm. VHFCC No. 30 for operation from January 1979. The first station comprised a *Yaesu* FT-221 transceiver and *Microwave Modules* transverter, with a 48-ele. *Multibeam* indoors at first, later at 30ft. outdoors. In December, 1979, a 3CX100A5 amplifier was completed to boost the power to 50 watts. In April 1980, a *Trio* TS-120S "prime mover" was acquired and used on 28 MHz to transvert up to 70cm. The next month saw an 88-ele. *Multibeam* replacing the earlier aerial. At the same time, Tony commenced operation on 23cm. He says that QSL returns have been good but slow with 50 of the 53 counties worked confirmed.

On the QTHCC front, your scribe now has 152 squares confirmed on 2m. so has awarded himself the "150" sticker. The German national society, D.A.R.C., issues the *UKW Europa-Diplom* which is based upon a countries and QRB points system. There are four classes; III is for 10 countries and 60 QRB points; II for 15/95; I for 20/130 and the *Trophy* category for working 30 countries and scoring 300 points. DL40L is the manager of this award and writes that only two G stations have won any category. No. 106, Class III went to G8ITS; No. 24 Class I and Trophy No. 35 to G3FPK! The points calculation is difficult to describe — though easily understood when indicated on a "squares" map — and, if you want an application form and rules, send a couple of IRC's to:- George Grahle, DL40L, Erlenweg 7 — OT Derneburg, D-3201 Holle 4, Fed. Rep. of Germany. By the way, the WAE countries list is used and this is as for the DXCC except that Sicily (IT9) and the Shetland Isles (GM) count as separate countries. To rationalize European VHF country counting, from Jan. 1, 1981 on, readers may count the above two as additional countries in the annual table.

News from Spain

José M^a Gené, EA3LL, has sent a little booklet chronicling the 1980 *Sporadic* E openings reported by some Spanish 2m. operators. The reports cover June 1, 5, 8, 16, 19 and 30; July 7, 8, 11, 12, 13, 19, 25, 27 and 31, August 3 and 9. They show that between them, the EA's worked 24 countries from EI to

UB5 and 9H to DL. Only two operators list CW contacts, EA5AMR (ZZ) and EA6AU (BZ) in Mallorca. EA5FN (ZY) lists some FM QSOs. during the big event on July 11.

The following stations contributed to the report; — EA1's NC (YD); QA (VC); TA (VD); TH (YC) and UK (XC). EA2VP (YC). EA3's LL and WZ in AB, and AIR, ADW, AWD, BLV, LA and XU all in BB. EA4's AAO (WZ) and NT (YA). EA5's APW and FN in ZY, and AMR, HM, KF and NY in ZZ. In the Balearic Islands there is EA6FB (AY) in Ibiza, and EA6AU and 6CP (BZ) in Mallorca. There were no reports from EA7, the southern part of Spain, e.g. Granada, Sevilla, Malaga and Cordoba, but EA8EY (RO) in Tenerife, and EA8XS (SO) on Gran Canaria are listed.

Obviously not all the stations worked from the U.K. sent in their reports, but it does indicate that there seems to be many squares in Spain that are crying out for VHF activity. What is needed is a well-organised MS DX-pedition on the lines of the very successful ON5FF, ON6UG, G8RNM trip to UN square last summer. Unfortunately, there is no reciprocal licensing agreement between the U.K. and Spain yet, so this kind of operation would have to be undertaken by the EAs or amateurs from DL, HB, ON or PA.

Satellite News

The launch date for AMSAT's *Phase 3-B* satellite will be Feb. 24, 1982. This means that AMSAT staff and volunteers have a great deal of work to do to build, thoroughly test, and get the package to E.S.A. on time. Funding is all important and all donations will be welcomed. Potential philanthropists should make their donations payable to:—"Project Oscar Fund", and send them to G3AAJ, who is AMSAT-UK secretary, at 94 Herongate Road, London E12 5EQ.

The E.S.A. has now fished out the ill-fated *ARIANE* LO-2 vehicle from the Atlantic Ocean and re-assembled the engine which malfunctioned. The cause of the disaster was a design fault in the fuel injection system to the combination chamber. Modifications to the geometry of these fuel injectors have been made and future components will only be chosen after exhaustive, static engine firings on the test stand. Hopefully, LO-3, due for launch this coming March, should function correctly.

AMSAT's booklet, *The Best of Oscar*

News, has been received and proves to be highly readable and informative, considering the haste with which it was produced. Editor Ron Broadbent, G3AAJ, reckons he spent a total of *ninety hours* with the printer in order to have it ready in time for the Leicester show. Copies can be obtained for £1.52 post free, from G3AAJ — address above. Ron has asked us to state that all inquiries about AMSAT matters, services and supplies *must* be accompanied by a stamped and self-addressed envelope; no *s.a.e.* no reply!

Contest News

Results:— Eddi Ramm, DK3UZ, has sent along the results of the *AGCW-DL* VHF contest run last Sept. 27. The Class "A" section, up to 3.5 watts RF, attracted 15 entries, the winner being DF1ZA/P. The Class "B" section, up to 25 watts, saw the biggest entry of 36, only two from Britain though. G4AHN (ZL56c) was 25th, with 2,100 pts., and G4GGV (ZL37g) came 32nd with 644 pts. DL6WT/A (DJ09h) won it with 21,546 pts. The more-than-25 watts section "C" saw 14 entries and DL1BU (EJ45a) won with 27,040 pts., with DK3UZ second with 25,248 pts. from EN20c. CW addicts from ten countries took part but once again, the British participation was very disappointing.

Coming events:— The first of the 1981 VHF contests is the 70 MHz CW one on Jan. 18, from 1000 to 1500. It is a single section event. The 432 MHz Fixed contest is scheduled for the same hours on Feb. 8, but is a two section affair for single or multi-operator stations. For each, the usual report/serial number, QTH locator and QTH information are required, with radial ring scoring.

Band Plan

In the *GB2RS* news broadcast on Dec. 7, there was an item concerning a proposed amendment to the 2m. band plan affecting the exclusive SSB section. The RSGB's VHF Committee feels the time has come to separate the local and DX activities. There are frequent cases where one is trying to copy a weak DX station on the 144.30 MHz calling frequency only to have this signal swamped by a strong, local or mobile station who cannot copy any

The VHF Committee has suggested that the 144.40 - 144.50 MHz region be used by those who are only seeking local contacts, leaving the 144.15 to 144.40 MHz section to those who are looking for the DX. In principle it seems a

THREE BAND ANNUAL VHF TABLE
January to December 1980

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G4CMV	50	6	72	20	55	12	215
GD2HDZ	45	6	60	14	40	7	172
G4HNS	41	5	59	12	43	9	169
GJ4ICD	—	—	67	25	47	17	156
G8GXE	—	—	67	19	54	15	155
G3PBV	18	4	58	15	45	10	150
G8OPR	—	—	65	23	51	8	147
G3BW	—	—	72	26	40	8	146
G8TFI	—	—	63	20	47	12	142
G8LVQ	—	—	70	17	43	10	140
G3CO	45	6	46	12	17	6	132
G8IFT	—	—	61	14	44	10	129
G8FMK	—	—	62	14	43	9	128
G4BYP	36	5	49	11	23	4	128
G8HHI	—	—	57	16	41	11	125
G3FIJ	40	6	46	12	17	4	125
G4BWG	13	3	56	20	23	8	123
G8MFJ	—	—	64	19	31	8	122
G4DEZ	—	—	71	29	—	—	100
G8VR	8	1	53	24	8	1	95
G4FKI	38	5	23	7	15	7	95
G4IGO	—	—	65	28	—	—	93
G8KAX	—	—	43	11	31	8	93
G8JJR	—	—	42	15	27	7	91
GW3CBY	20	5	41	10	10	5	91
G4ARI	27	4	48	12	—	—	91
G3FPK	—	—	68	21	—	—	89
G8KGF	—	—	48	14	17	6	85
G4ERX	15	2	30	10	18	8	83
G4HGT	—	—	64	11	—	—	75
GM8TSI	—	—	53	13	5	2	73
G3KPU	—	—	33	5	28	6	72
G8RWG	—	—	58	14	—	—	72
G8TIN	—	—	51	15	—	—	66
G3EKP	22	5	18	6	8	5	64
G8VJJ	—	—	50	13	—	—	63
G8VFEV	—	—	49	8	—	—	57
G8RZA	—	—	43	11	—	—	54
G8JGK	—	—	35	13	—	—	48
GM8MNG	—	—	39	6	—	—	47
GW3MHW	40	5	—	—	—	—	45

sensible proposition but the suggestion to adopt 144.40 MHz as a mobile and local calling frequency is not acceptable.

As many readers know, the needs of keen VHF/UHF DX-ers throughout Europe are catered for by the excellent periodical, *DUBUS Informationen*, and meteor scatter news is a prominent feature. Anyone who has listened to the Random MS frequency of 144.20 MHz during showers like the *Perseids* or *Geminids* will realise that it has become hopelessly cluttered. Therefore, FIJG has made the suggestion that an additional MS frequency for random SSB be established and he has proposed 144.40 MHz — see *DUBUS* issue 3/1980, page 178.

Accordingly, it would seem essential to avoid this frequency and that 144.50 MHz be used as the local SSB calling frequency, that conveniently marking the edge of the exclusive SSB section. Alternatively, 144.45 MHz could be used, though why a calling frequency for local QSOs is necessary at all is debatable.

The present SSB *GB2RS* QRG of 144.25 MHz would not fit into this concept. It is a nuisance during contests

and it would seem logical to shift it back to its old AM QRG of 144.50 MHz. The RSGB has asked that comments on the local/DX proposals be sent to Tom Douglas, G3BA, via Doughty Street, or direct to *QTHR*.

Six Metres

Brian Bower, G3COJ, (Bucks.) reports that VK60X in Carnarvon, W. Australia, has appeared on the band on 52.005 MHz and that Gordon Pheasant, G4BPY, (Staffs.) had a crossband contact with him on Nov. 27 at 0936, using the 28.885 MHz "talk back" QRG. Since Oct. 21, 1979 G4BPY has worked all continents this way. Next to contact the VK6 were G3COJ and G5KW, but he faded out by 1005. The beacon in Carnarvon, VK6RTT, which used to be on 52.900 MHz has now changed QRG to 52.320 MHz.

John Baker, GW3MHW, (Dyfed) is a keen 6m. watcher and reckons the band is proving very interesting this season. He has carried out tests with WA1EKV to establish the highest QRG at which communication is possible at a given time. On Nov. 17, the W was very strong

on 50.1 MHz, but had dropped to S1 at 51.7 MHz. John says that PA0RYS and PA0XXB have been heard transmitting on 6m. He reports that ZD8TC is a keen 6m. chap and worked over to VE7 on Nov. 10. Conditions were particularly good on Nov. 15 with U.S.A. stations losing interest in crossband 6/10m. working, preferring to work into I, PA, SV, EI, Central and South America direct.

Four Metres

November 17 must go down as an historic day in the annals of the 4m. band. G4BPY completed the first trans-Atlantic 4/6m. crossband QSO with VE1ASJ at 1627 GMT. Gordon's report was RST339 at best. This suggests an F₂ layer critical frequency approaching 23.4 MHz., an astonishing figure. On Dec. 7, G3COJ, G4ENA (Glos.) and twin brother G4ENB (Beds.) also contacted VE1ASJ in the same way. The proposal for a 4m. beacon in New Brunswick by VE1ASJ, has unfortunately been turned down.

Ken Willis, G8VR, (Kent) is now equipped with a 4-ele. *Jaybeam* at about 30ft. The morning of Nov. 30 found operation almost impossible due to very strong QRM from a pulse modulated signal which seemed to tune in about 70.05 MHz but which produced strong signals all across 4m. It was heard by G4FKI (Ilford) and G3DAH (Herne Bay), but G3CO (Colchester) and G8GP (S.E. London) were working through it. Ken is keen to try some MS on 4m. and invites interested stations to contact him at QTHR.

GW3MHW's long-running skeds with G2AOK continue at 2000 and John hopes others will join them. G3BOC, G3IKR, G4FRO and G4BPY are all good signals into Dyfed. G3FDW and G8VN were contacted again in above average conditions on Nov. 12. G3UUT (Cambs.) is a welcome signal back on the band. John reports that VE1ASJ received ZB2BL on 70 MHz on Nov. 16.

Two Metres

The period since last month's report has been rather disappointing apart from a tropo. Lift to southern France and northern Spain on Nov. 19. Bill Hodgson, G3BW, (Cumbria) has been busy with MS but does not reckon he will work much more in 1980. (With 72 counties and 26 countries, who will disagree?) He laments over the very poor QSL return rate, citing just 59 square

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3JXN	39	81	107	227
G3COJ	24	74	112	210
G8HVV	22	83	141	246
G8LEF	22	62	101	185
G8IFT	15	34	79	128
G4CMV	14	59	157	230
G8FMK	13	49	54	116
GD2HDZ	12	41	83	136
G3PBV	9	59	102	170
G8GXE	8	53	86	147
G8LHT	7	39	98	144
G3BW	5	27	143	175
G8ATK	5	56	111	172
G4ERX	5	45	92	142
G4AEZ	5	29	61	95
GJ8KNV	2	54	119	175
G8HHI	2	46	113	161
G2AXI	2	54	93	149
G8KAX	2	40	74	116
G8OPR	1	36	103	139
G3J3RAX	1	27	74	102
G3FOI	—	—	298	298
G3YVF	—	84	192	276
GJ4ICD	—	82	182	264
I4EAT	—	25	238	263
DK3UZ	—	—	252	252
G3IMV	—	—	236	236
EA3LL	—	15	185	200
G3CHN	—	—	196	196
9H1CD	—	13	178	191
G4ERG	—	16	174	190
G3SEK	—	—	182	182
9H1BT	—	11	163	174
G4BWG	—	37	137	174
G3FPK	—	—	168	168
GM4COK	—	12	154	166
GM4CXP	—	25	136	161
G4IJE	—	—	161	161
G4IGO	—	—	160	160
G3KEQ	—	—	159	159
G8LGL	—	25	121	146
G8TFI	—	47	95	142
G4DEZ	—	—	139	139
G8MFI	—	23	113	136
G4AWU	—	22	113	135
G8JJR	—	20	98	118
G3KPU	—	25	91	116
G8KGF	—	20	95	115
G8IXG	—	—	115	115
G4HFO	—	46	68	114
G8LFJ	—	—	106	106
G4FBK	—	5	100	105
G8CXQ	—	—	96	96
G3FIJ	—	27	68	95
G8KPL	—	7	87	94
G8VLO	—	27	65	92
G18EWM	—	25	67	92
G8VR	—	3	88	91
G6UW	—	1	89	90
G8JAG	—	7	79	86
G4GHA	—	—	86	86
G4JZF	—	—	85	85
G8TGM	—	—	76	76
G8RMA	—	5	66	71
G8JGK	—	—	62	62
G4GSA	—	6	51	57
G4GXT	—	1	56	57
G8RWG	—	—	50	50
G8VFW	—	—	37	37

Starting Date January 1, 1975. No satellite or repeater QSOs.
Band of the Month 23cm.

confirmations out of 143 worked since Jan. 1, 1979. Dave Sellars, G3PBV, (Devon) figured the only bright spot was the F0GCS foray into northwest France, when he worked them in XH, XI and YH. Dave now uses a *Trio* TS-120V transceiver on 10m. as a "prime mover" for the VHF/UHF transverters. He has modified it by breaking the connection between the driver and PA stage and bringing the two leads out to a couple of BNC sockets at the back. On HF, these

are linked, while on VHF the driver output is connected to the appropriate transverter through a relay and lowpass filter. The PA valve is left connected, but undriven, with no adverse effects and no need to have to absorb a lot of unwanted FR power.

Paul Turner, G4IJE, (Essex) enjoyed the Nov. 19 lift but found the activity disappointingly low. Between 1801 and 2013, he worked a lot of French stations including:— F1CEP and F6EAP in AD; F1AJE (AF); F6BZA (AG); F1CYB (BH) a colossal signal; F1FCF (CH); F1FVP and F6DBP in ZE and F6CCH in ZG. For the next couple of hours, there was nothing new, but at 2215, he worked EA2CA (YD60c) in San Sebastian. Although HB9HB on 144.125 MHz was copied at 2045, repeated "CQ HB9" calls did not result in a single Swiss reply.

Welcome to Martyn Jones, G8CXQ, (Warks.) who enters the squares table with 96 worked. Nov. 1 brought QSOs with F6CCH (ZG) and F6FRR (ZF) for the latest new ones. His set-up is a *Trio* TS-700G and 100 watts amplifier using a QV06-40A valve. The aerial is a 9-ele. *Tonna Yagi* at 28ft. and the QTH 255ft. a.s.l. Tony Collett, G8GXE, (Berks.) spent little time on 2m. However, Nov. 2 brought him two new squares; EA1CR (XD) and F6FRR (ZF).

Neil Clarke, G8VFW, (W. Yorks.) needs only Cumbria and Cleveland to complete all English counties worked. He very kindly supplied a copy of the daily synoptic charts for the whole of September and has promised to send these each month. This is very much appreciated as it affords an excellent opportunity to study tropospheric propagation and to check if the theories work!

G8VR writes that the Swedish beacon, SK4MPI, (HU46d) is a good indicator of both impending *Aurora* and of random meteor rate. It is normally inaudible in Hartley but, by sitting on the frequency during the day when working around the house, it will come up on meteor bursts, some of them quite strong. Ken says that typical bursts on Dec. 6 lasted 5-10 seconds. The good conditions on Nov. 1/2 provided Geoff Brown, GJ4ICD, with three more counties; EI2AK in Louth, G4KXB in Northumberland, and G8PWX in Tyne and Wear, the last, in ZP, being a new square. LA1EKO in the North Sea (BQ) was a welcome addition.

In a note from Stornaway, Jon Hague, GM3JII, (WS69c) writes that



Ruben Gonzales, EA1CR, taking it easy at 1,873m. a.s.l. This photograph was taken in the Cordillera Cantabrica range, near Pajares, the XCO1b locator site from which he has worked many British stations on 2m. and 70cm.

his main interest is in *Ar* work. But in the wild Western Isles, it is not easy to keep aerials up! Jon mentions "Sunday jaunts up Clisham" for *-/P* operation. This is a 2,622ft. mountain in WR square. His "local" repeater is the Faroes and, at 700-plus metres *a.s.l.*, it is often a good signal.

The Verulam Club's contest on Nov. 30 saw high activity but only average conditions. The Club Station, G3VER, had problems and was off the air for an hour or so. Mention must be made of the really first class signal radiated by G4JKS/A, operated by Hilary Clayton-Smith; extremely strong at G3FPK, yet clean as a whistle. Which is more then can be said for G8TVL/A. When your scribe politely mentioned it was rather distorted and wide, he simply ignored the comment and selfishly continued to emit a very sub-standard signal.

Conditions in the Fixed contest on Dec. 7 were rather flat and little "real DX" was worked, it seems. As it occurred in the middle of editing this piece, G3FPK made only one QSO. Occasional listening revealed weaker-than-usual signals from GJ3RAX and GI8TBQ, with the going rather slow

towards the end, for the leading contenders.

Reg Woolley, GW8VHI, (W. Glam.) is another new contributor who put his 10 watts and 5-ele. beam to good use in the Nov. 1/2 affair, his best DX being EA1CR. Other stations worked were F6CCH (ZG), F1FHI (ZH) and F1EWP (AG) together with others in XI and YI.

Seventy Centimetres

Not a great deal to report on this band. G3PBV managed to work the FOGCS lads in XI square but failed to make it with them in XH, although they did hear each other. Clive Morton, G4CMV, (W. Yorks.) added Mid Glam. on Nov. 4, in the shape of GW8GKF, to bring his 1980 country total to 55, while DF1VW/P (DJ) brought square no. 59.

G8GXE was on for the Nov. 1/2 event and was justifiably delighted to work EA1CR. F1QV (AG) was another new square and Tony also contacted F1FHI (ZH) and F1AJD (AF). At 0200, a "CQ" call was answered by G8LZM in Cleveland for another county. Nov. 7 produced QSOs with husband and wife team PA0HRA and HRB, with nobody

else audible. In the *Cumulative* session on Nov. 11, in rock-bottom conditions, 34 QSOs were made. Tony thinks that many 2m. operators still believe that 70cm. is only suitable for short distance working. But time after time, he finds conditions *better* on this band than on 2m.

Dave Thorpe, G4FKI, (Essex) added G4KUJ (Herts.); G8DDY (I.O.W.) and G6GL (Avon) in the *Cumulatives*, and new ones for GJ4ICD during the Nov. 1/2 fun were G3BW (Cumbria); G8PWX (Tyne and Wear); G3ZIG (Norfolk); G3UBX (W. Midlands) and G3WOH (Merseyside). Squares added in this opening were ZP and YO, making it 82 worked. GW8VHI tried three times to work EA1CR but had no luck. On Nov. 1/2, Reg worked four Fs in YI square and heard others in AG, AF, ZD and ZE. Anyone needing Dyfed on 70cm. should look out for GW8VHI/P on 2m. as he will have 70cm. gear with him.

Twenty-three Centimetres

Again, little to report on 23cm. except that there seems to be 100% support for including the band in the annual table. G8GXE was on for the Nov. 11 leg of the *Cumulatives* making just seven QSOs averaging 40 kms. He says that more and more QSOs are now being made directly, without prior setting up on 70cm. However, for the longer distances, it pays to line the beams up accurately on 70cm. first.

Finale

Next month's column will feature the final placings in the three band and individual tables for 1980 so don't forget to send in your scores. The deadline is January 7, which should give you plenty of time. Don't forget that, from Jan. 1 IT9 and the Shetland Islands will count as extra countries for the annual table. All your contributions to: "VHF Bands", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

• • • **SWL** • • •

SHORT WAVE LISTENER
FEATURE

By Justin Cooper

ONE hopes that by the time you read this, the after-effects of the long Christmas break and the Big Eats will have worn off; and of course once the Festive Season is over, you might be allowed back into your shack, which has been closed while all the ritual gettings-together have been following their annual course. Likewise, those of you intending to put in for RAE will be heading towards the college office to put your name down and pay the money for the May exam.

Now is the time for a bit of forward planning. Hopefully, you all took a look at the aerial system before the autumnal gales, and it may well be that you can plan something a bit better in good time for building and erecting during the summer. Down below, a new ATU, or at least some improvement to an existing one might be contemplated, or an attenuator built so that some signals may be found on Eighty or Forty that were previously hidden beneath the intermodulation noise when the gain was too high. Perhaps a home-brew receiver, or a better shack layout — it's quite amazing what an improvement to personal comfort might be achieved with small rearrangements.

So, let's look at the letters and see what goes on.

A new reporter first, **M. N. W. Thornton (Romford)**, who has an FRG-7 and for aeriels an inverted-L fed by an ATU, plus a 14 MHz dipole. Recent work has been on the building of a two-metre converter, and a version of the "Slim Jim" aerial. With this, Michael hopes to knock a dent in the two-metre band. One thing could be commented upon here, and that is the question of "modes" and aerial polarisation; the FM stations use vertical aeriels as being the best type for mobiles, and hence so do the repeaters and the base-station FM merchants. However, the interesting activity on SSB, AM, and CW, all use horizontal aeriels of several elements, mostly based on the Yagi principle of a dipole and parasitic elements. In addition, it should be noted that a receiver with no FM detector may or may not be tolerable on FM. The reasoning is a bit like this: if one has an IF whose shape plotted on a graph looks a bit like a camel's hump, then by detuning the FM signal to one side you can make the slope turn the FM into a passable likeness of AM for the detector to look at. This is what is called "slope detection" and, back in the days when FM was occasionally heard on the HF bands as a means of getting a signal out to DX without TVI, it was pretty normal for the FM operator to alter his deviation to suit the receiver at the other end, for best copy. Now of course the widespread use of better IF filters has resulted in IF responses becoming much more like the ideal flat top for about 2 kHz, and a fall on either side by 60 dB down within a total bandwidth of 4 kHz at the latter point. That's more like a cliff than a slope — and so slope detection becomes pretty well impossible unless you can add an FM detector to the receiver, either as an "outboard" gadget, or as a modification within the receiver. There are plenty and enough ways of doing the job, with diodes, transistors, ICs or whatever, which should be a lot easier to get going than the two-metre converter!

And, talking of converters, when you think you've got it about right, see if you can find an amateur who still has his

own converter, and compare signals on yours and his converter. It doesn't take a lot to make the difference between docility and instability (just like humans!) and when you've got docility, you are after best signal-noise ratio and dynamic range. The former is a straight swap-'em-and-see matter, but the latter isn't so easy and may even not be too important, depending on where you are. The point here is that most converters are gainy, and so in some locations overload may occur in the main receiver long before the converter gets distressed — and the cure for that is simply to use either an attenuator between the two, or wind the RF gain back until sanity reigns again.

Mrs. R. Smith (Nuneaton) has the 1000 well and truly up, as a glance at the Table shows. Congratulations! Ruth wonders whether she is the first YL to get to the 1000 mark; in fact, Mrs. J. B. Jane (East Looe) was the first, as recorded in the May, 1976, "SWL" piece. Others have been near over the years but have mostly got a ticket for themselves and dropped out as a result before they reached 1000. Indeed, one could say the part of the Table above that 1000 is almost invariably the home of those who, for one reason or another, prefer to remain as SWLs, even though they may well have the technical knowledge to pass the RAE.

R. Middleton (Bury St. Edmunds) is not a chap for words; he just steadily presses on to the upper reaches of the river and signs his name to the list!

Now to **K. Kyezor (Brandon)**; and he puts us in need of your aid. He wants the QSL address of the W2TTO net control station of the daily 4X4 net. About the nearest we can come is the W2 QSL Bureau, which is: North Jersey DX Association, P.O. Box 8160, Haledon, N.J. 07508, U.S.A. If anyone can offer a better target please write direct to K. Kyezor, 40 The Paddocks, Thetford Road, Brandon, Suffolk IP27 0DX.

A. Stevens (Crowthorne) is thinking of buying the receiver part of the Plessey 1600 transceiver kit as sold by Ambit, building that up to make a sensitive SSB receiver as an update on his Trio 9R-59DS. While it sounds like a good idea, we wonder whether Allan couldn't do something about the 9R-59DS problems. For example, one would think it more than possible to get a spectacular improvement in warm-up drift by drilling a few holes in the bottom of the case, the chassis of the receiver, and the top of the case, so as to establish a through-flow air convection system; and of course the stabilisation of HT and heaters will help enormously. The improvement this brings about may well leave little but the drive arrangements to improve . . . a thought for the day!

Another quick look and list from **B. F. Hughes (Worcester)** — the "quick look" being for your scribe (who wasn't visible) at Leicester!

E. W. Robinson (Bury St. Edmunds) has celebrated his tenth year of sending in lists for the Table, and earlier this year he passed the seventy years mark — and still going strong in both departments!

Just a list with no comment from **P. Ford (Longlevens)** so we pass hastily on to **P. J. Boyce (Coventry)** who has been helped by G4IQR to buckle a two-metre converter to his JR-310 receiver; and a day or so later he found **Oscar 7**, and then

the FM stations, so the pattern of things has made an interesting contrast.

Contest

There aren't all that many SWL contests as such, but **D. A. Whitaker (Harrrogate)** sends us details of the White Rose Radio Society's first LF Bands SWL contest. It runs from 1500 GMT on January 24, to 0900 GMT on 25th, 1981. Anyone in the world may enter and there will be two sections — Phone only and CW only (*i.e.* no mixed). Listen on 1.8, 3.5 or 7 MHz, and don't "follow" anyone around for too long — a particular callsign must *not* appear more than 20 times on any band. Scoring will be one point per logging of a station in one's own continent, and five per logging outside your own continent. The multiplier is the number of countries heard on *each* band added together, and is based on the RSGB countries list, but the call areas of W, VE, VO, VK, ZL each count as separate countries. No points claimable for CQ, QRZ or similar calls, and no /AM or /MM signals count. Log to show: date, time, band, station heard, station being worked, and report at SWL QTH. Points only to be claimed for stations actually heard, and the callsign given in full. If both ends of the QSO are being claimed both must appear in the "Station Heard" column. Entries to the Contest Manager, G4IDJ, White Rose R.S., 8 Manor Court, Shadwell, Leeds LS17 8JE, and to *arrive* not later than March 17. Certificates of Merit will be awarded at the discretion of the committee of the White Rose club, and their decision is final.

R. Baker (North Walsham) is taking the local RAE class and says there seems to be something of an explosion of interest, as the group has now occupied two classrooms and there are some YLs as well! We hope he is right for East Anglia is something of a desert in terms of amateur radio, with exceptions in one or two places.

Our next letter comes from **D. Casson (Earley)** who has put up a G2DYM trap dipole which has proved to be a great success, and by the time this reaches you will be — like many others! — chewing his fingernails waiting for the RAE result. Meantime, Derek notes that he has had a lot of help from G2HLU in sorting out some problems with TVI (we assume Derek means in terms of the exam!).

A. Rowland (Mansfield) takes us to task for our comment about built-in notch filters and their absence, saying there is an IF one built into the R-820. But the statement made still holds good in general; the receivers mentioned being all very modern and in the top price bracket. However, to go back to

ANNUAL HPX LADDER

Starting Date, January 1, 1980

SWL	PREFIXES
J. Worthing (Shrewsbury)	499
R. D. Newall (Bracknell)	493
P. J. Boyce (Stoke)	383
B. Mussetwhite (Warminster)	335
M. N. W. Thornton (Romford)	311
N. Askew (Coventry)	260
M. Hill (Bedworth)	207

200 Prefixes must have been heard for an entry to be made, all since January 1, 1980, and in accordance with HPX Rules, see p. 702. At a score of 500 transfer to the All-Time list is automatic.
(Note: Final 1980 list will appear in March "SWL"; and a new Table will start commencing 0001 January 1, 1981.)

HPX LADDER

(All-Time Post War)

SWL	PREFIXES		
<i>PHONE ONLY</i>			
K. Kyezor (Brandon)	2473	L. Stockwell (Grays)	821
B. Hughes (Worcester)	2249	B. A. Payne (Leeds)	812
S. Foster (Lincoln)	2034	D. J. S. Williams	
E. W. Robinson		(Wednesbury)	761
(Bury St. Edmunds)	1786	A. Twelves (Rhos-on-Sea)	756
M. C. P. Bennett (Datchet)	1571	F. C. D. Barnes (Cardiff)	669
M. J. Quintin		D. J. F. Gordon (Chepstow)	627
(Wotton-u-Edge)	1517	B. L. Henderson (Salisbury)	596
H. A. Londesborough		B. Shepherd (Staines)	571
(Swanland)	1450	A. Stevens (Crowthorne)	560
H. M. Graham (Moulton)	1304	R. Baker (N. Walsham)	560
M. Ribton (Oxted)	1091	J. A. Darby	
M. Law (Chesterfield)	1187	(London SE16 3HJ)	510
M. Rodgers (Harwood)	1182		
Mrs. R. Smith (Nuneaton)	1094	<i>CW ONLY</i>	
P. Ford (Longlevens)	1040	H. A. Londesborough	(Swanland) 1247
M. Shaw (Huddersfield)	1038	D. W. Waddell	(Herne Bay) 1094
R. Middleton		J. Goodrick (Bognor Regis)	809
(Bury St. Edmunds)	954	T. Grimbleby (Hull)	722
D. C. Casson (Reading)	881	A. Rowland (Mansfield)	524
J. F. Hobson (Ely)	866		
J. Doughty (Bloxwich)	826		

Minimum score for an entry: 200 for CW, 500 for Phone. Listings include only recent claims and are in accordance with HPX Rules, see p. 702. A "nil" return is allowable to hold a place.

the CW discussion SWL Rowland has the RNARS 30 w.p.m. certificate, and recommends a listen on 3.517 MHz on the first Thursday of any month at 2000 local time, when the QRQ runs are given, along with the details from G3BZU. On a different tack again, information is wanted as to the article in *QST* discussing the fastest Morse champion. This was Ted McElroy, and the speed was some 75.2 w.p.m. achieved in 1939. For many years McElroy ran a company which made various high-speed Morse devices for commercial transmission applications, and a bug key; he was advertising in ARRL's *Handbook* in 1939, 1946 and 1953, but by 1956's edition his advertising had disappeared. He was, for a short time, also a distributor for the Hallcrafters gear. In his heyday, he was a big enough name for Webb's Radio (then C. Webb Ltd.) to be his European distributor. If anyone has a copy of the article concerned, SWL Rowland would be very interested to know. Offers and information to the writer — we'll pass 'em all on!

D. W. Waddell (Herne Bay) is very terse this time with just a list and a gallop to the post-box. This gives us more time with **J. Doughty (Walsall)** who wants to know which country owns the HK0KY he heard recently. HKs are prefixes to be careful with: Colombia takes in all those with numbers other than '0' in the callsign. HK0s are fairly often around from San Andres and Providencia, but the HK0 prefix also covers Bajo Nueva, Serrana Bank, and Malpelo Is. The *Call Book* gives HK0KY as Hernando Correal, his address being P.O. Box 417, San Andres.

On we go now to **D. J. S. Williams (Reading)** who comments on hearing a signal on Sicily signing IOCLW/9, rather than the more correct IOCLW/IT9. What should he count it as? In DXCC terms he could be Sicily if it says so on the QSL card, but in HPX terms it seems he is a mere I9 — if you haven't already got such a thing!

Solihull

The Houghton family, at 11 Broadwell Road, Solihull, deputed one of their number to write to us and enquire

HPX RULES

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

where they can get the needful knowledge for the RAE; we have written with a few suggestions, but would hope that some of the locals reading this can lead them into the circle.

J. A. Darby (Rotherhithe) has an R-1000 receiver plus a wire ZL-Special which is running N-S and so fires E-W which is the preferred direction if one looks at a Great Circle map. Incidentally, such an all-driven array is reckoned to be a better performer in a loft-space than a parasitic type by G6XN — and we recall ex-G2XC writing a detailed article on the pair he put in his loft space, and the work he put in to make sure it all came out right (*Short Wave Magazine*, June 1977).

Another list comes in from **B. A. Payne (Leeds 18)** who goes up to 812.

J. F. Hobson (Ely) mentions a KC4MJ/M from mainland U.S.A. — confusing, isn't it! On a totally different tack John

had a day at Leicester which resulted in the acquisition of a Datong FL-2.

We have an apology to make to **H. M. Graham (Moulton)** as we appeared to turn him into "H. M. Gordon" last time! Maurice seems to have stuck mainly to 21/28 MHz, with little time on 14 MHz, and using the LF bands only for the continued chase for WAB areas. Mostly Ten has been good, with Fifteen not so popular as it is plagued with TV-set noises and other weird manifestations. But, all in all, Maurice had a fair share of the DX available on these bands.

A wanderer returned indeed — we last heard from **N. Askew (Coventry)** back around 1973 — and he is still using the old Heath RG-1 and short wire. Looking at the list, the re-start seems to have been dated around October 25, and to November 17 some 260 prefixes are logged. Not bad!

Disaster! **J. Goodrick (Bognor Regis)** seems to have sent in a claim that didn't arrive. However, we have taken in the score that appears missing, and will leave John to recheck his total score.

On to **B. Henderson (Laverstock)** who agrees that our prediction last time was dead right; and now there is a bit of room to swing aerials around, to see if this will get the totals up a bit.

S. Foster (Metheringham) decided he would be sitting down to some real listening for a change, so he parked wife and kids and had a ball in the CQ WW SSB contest, with 34 hours out of the 48 at the receiver. The result included 34 new prefixes, 132 DXCC countries, and 34 CQ Zones. On a different tack, Stew confirms that LA9MI/P was indeed on Jan Mayen, and has been there on and off since as far back as 1964 — Stew has *records* and it's all there!

Finale

It is strange why we never hear much from readers who listen to the less common modes. For instance, P. Barker in Sunderland used to be a SS/TV addict, the only one to report in this piece to our memory; and we don't ever recall anyone using RTTY or ATV. At one time there used to be some DX-TV chaps about up in the North mainly, but we've not heard from them for years. On another side, we don't seem to have seen much in the letters about home-brew either — in these hard times one would have thought there was a lot of sense in home construction. After all, it's by no means expensive these days, when you compare it with pre-war days. Back in the thirties, a price of fifteen shillings was not uncommon for a valve — so for many people a valve meant half a week's pay, and one needed one for a receiver and another for the transmitter. An interesting thought in itself, that the greater DX-ers of those days mostly preferred a single-valve receiver as being less noisy and so more sensitive in skilled hands. And the one-valve transmitter — to get a decent note out of it was quite an achievement; but on the other hand, you could more or less buy yourself a frequency from one firm, who would grind your rock to be just where you wanted it. Imagine — a frequency all your own!

Deadlines

Are January 22, and March 19 to arrive; as always, send your letters to your J. C., "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

ANTENNAS — THE WEAK LINK, PART XIII

LONG WIRES AND LISTENER'S ANTENNAS

A. P. ASHTON, G3XAP

This concludes the popular and highly informative series of articles on the often-neglected aspect of amateur radio. G3XAP's work has been very well received in many parts of the world, and indeed our French contemporary journal, "Radio-REF", is to translate much of it for their readers. "Short Wave Magazine" is glad to have had the opportunity to publish such a fine exposition. — Ed.

ONE of the most popular antennas for amateur use is the simple wire antenna — especially for those of us with small gardens. These are often referred to as long-wire antennas, although to be regarded as "long" they should be at least one wavelength long at the frequency of operation. The most common method of feeding such antennas is to bring the end of the wire right to the transmitter/ATU, and it is this form of antenna which will be discussed first.

Directly Fed Wire Antennas

The attraction of having a single wire antenna with no feeder which will work on all bands from 160 to 10 metres and whose length is not especially critical has led to the end-fed wire being a very popular device with the radio amateur. Such antennas

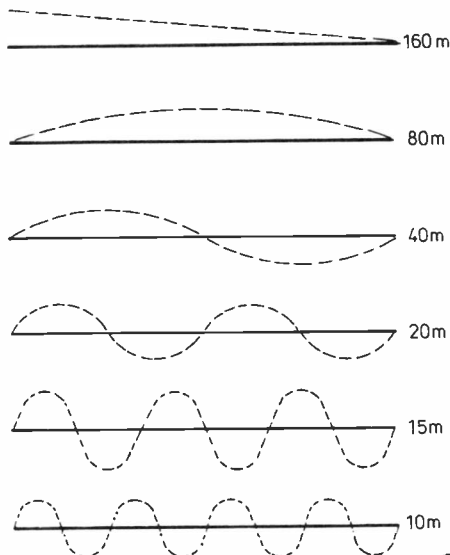


Fig. 1

D 606

Current distribution on 130-ft. end-fed antenna for each of the six bands 160-10 metres. Note: antenna is fed from the left hand side.

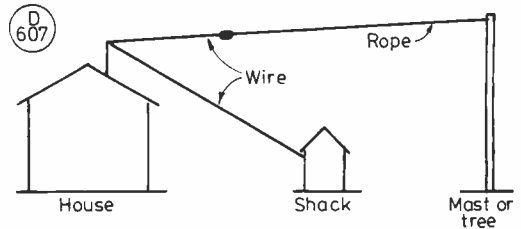


Fig. 2 (a)

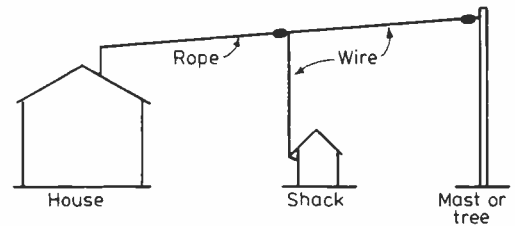


Fig. 2 (b)

Two methods of suspending an end-fed wire antenna. Note that the wire shown in (b) suffers considerably less from screening by the house.

can be made to work very effectively provided that certain pitfalls are avoided.

The first thing that must be understood is that if a single wire is to be used on all bands, then the current and voltage distribution will be different on each band. To illustrate this point we will consider a wire approximately 130 ft. in length, and Fig. 1 shows the current distribution on the wire for each band 160 to 10 metres. Because of the "end effect" discussed in a previous part, the antenna will not be exactly resonant on all bands, so the distribution shown in Fig. 1 must be only approximate. The effect of this is that the current at the feed point will probably not be exactly at a minimum on all bands 80 to 10 metres as shown, but it will be fairly close. Similarly the current may not be exactly at an antinode on 160 metres.

From Fig. 1 we can see that on 160 metres the antenna is fed at a point of maximum current and is said to be "current fed", whilst on 80 to 10 metres it is fed at a point of current minimum. As the point of minimum current is the point of maximum voltage, the antenna is said to be "voltage fed" on these bands. The significance of the method of feeding will be discussed later. What must also be appreciated is that a point of maximum current is also a point of maximum radiation in the transmitting mode and a point of maximum signal "pick up" whilst receiving. If we are bringing the end of the antenna right to the transmitter/receiver it is immediately apparent that on 160 metres most of the radiated power from the wire will take place from that area which is actually inside the shack or in close proximity to it! Furthermore, the received signal is being badly screened by the shack and surrounding structures, and this antenna is therefore a real compromise on this band.

On 80 metres the current antinode is half way along the wire and if the device is to be erected (as is common) by taking it to a convenient high point and then continuing in a horizontal direction, care must be taken to ensure that the mid-point is not screened by the supporting structure. Fig. 2a depicts a typical installation in which screening on 80 metres could be severe

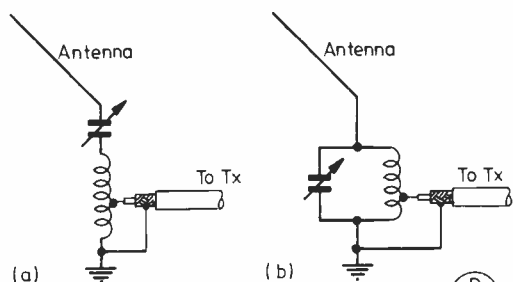


Fig. 3

Series matching (a) and parallel (b), for an end-fed antenna.

since the high current portion of the antenna is in close proximity to the house. Fig. 2b shows how, with a knowledge of the current distribution and a little thought, the situation can be significantly improved. On 40 to 10 metres the situation is not so bad because on these bands we have more than one current antinode, at least one of which will probably be 'in the clear'; however, the screening effect should still be considered and even on these bands the configuration shown in Fig. 2b is still preferable.

In the example shown the antenna's length is such that it is fed at or near a voltage antinode on 5 bands, and at or near a current antinode on the other. Because of this, the amount of reactance present at the feed point will be relatively small. However, if the wire length is such that it is fed at a point that is not near to a current or voltage maximum, very high levels of reactance may be present and it may prove difficult to match the antenna to the transmitter with a matching unit. In the example shown a simple matching unit is all that is required and this takes the form of a series resonant device if the antenna is current fed, and a parallel resonant circuit for voltage fed arrays. Figs. 3a and 3b show the circuit arrangements for series and parallel tuned matching units suitable for end-fed antennas, whilst Fig. 4 shows a device that can be switched from series to parallel tuning as required. A suitable value for the variable capacitor C1 would be 400 of 500 pF, whilst L1 could be 70 turns of 16 s.w.g. enamelled copper wire wound 8 turns per inch on a 2½ inch diameter former.

If 160 metre coverage is not required, C1 could be reduced to 200 or 250 pF, and L1 could be 40 turns on a 2 inch diameter former. Because of the components used, tuning can be a little

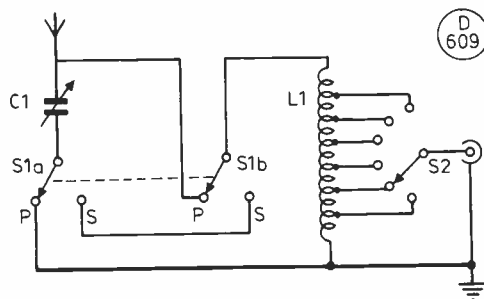


Fig. 4 A switchable series parallel matching unit for end fed antennae

critical on the higher frequencies (especially 15 and 10 metres) and it may be found more satisfactory to use a second unit with components of more suitable values. A 100 pF capacitor with a coil consisting of 20 turns on a 1 inch diameter former should prove suitable and it will be found that tuning on 15 and 10 metres is far less critical than with the other unit. The switches used should be high quality ceramic devices and interconnecting wires should be short and direct — 16 s.w.g. enamelled wire is suitable. (Any reader contemplating the use of a 'roller coaster' type variable inductance in an antenna matching unit should ensure that the device is clean and of good quality manufacture as second rate components can be extremely lossy).

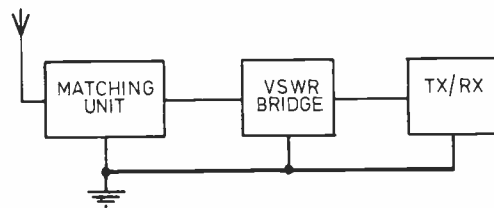


Fig. 5 Interconnection of units for end fed antennae

In practice the tuner should be positioned as shown in Fig. 5, set for series or parallel tuning as required and adjusted to give a minimum SWR reading on the SWR bridge. It should be possible to tune for negligible reflected power on any band by appropriate 'tapping' of the coil and tuning of the capacitor. Unless a good earth system is provided, tuning of the device may be found to be impossible and it may also be noted that the equipment in the shack gets hot with RF when tuning is attempted. The simplest form of earth system to use is the counterpoise which takes the form of a quarter-wave 'radial like' wire for each of the bands covered. The wires should be connected directly to the earth point of the antenna matching unit and can simply run along the ground in any convenient position (insulated wire should be used), the general idea being shown in Fig. 6. Note that the open ends of these wires will have a high RF potential and should be taped up for the sake of safety. Suitable lengths for the counterpoise wires are: 160m., 135 ft; 80m., 66 ft; 40m., 33 ft; 20m., 16.5 ft; 15m., 11 ft; and 10m., 8.5 ft.

Suitable lengths for end-fed wire antennas of the type described are 66 ft. which will give series tuning on 80 metres and parallel tuning on 40-10 metres; 135 ft. (as discussed above); 200 ft. which also gives series tuning on 80 metres and parallel on the other bands — except 160 metres where, being a $3/8\lambda$, the feed point is mid-way between the current and voltage antinodes. With a length of about 260-270 ft. parallel tuning will be suitable on all six bands and it should also be possible to avoid any of the screening effects mentioned above.

It should be noted that any random length of wire can be used in the end-fed configuration but, as mentioned above, certain lengths can give rise to high values of reactance which may prove difficult, or impossible, to tune out with the matching units described.

It is also *strongly* stressed that when tuning the matching unit a *very low* input from the transmitter should be used because when an antenna is voltage fed an *extremely* high impedance is present and *damage to the transmitter's P.A. could result* if high powers are used.

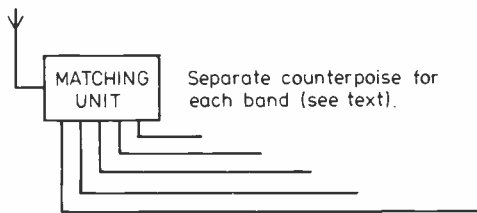


Fig.6 The use of counterpoise earth with end fed antennae D 611

Long Wire Antennas

Although some of the lengths suggested for directly fed antennas would qualify them as long wires on the higher frequency bands, this section will deal with wires which are not directly fed and which are erected as a "straight" wire rather than being distorted to fit the space available as depicted in Fig. 2. If a wire is erected in anything other than a straight line, many of the properties to be described will be invalidated.

There is no magic length above which a wire may be described as "long", neither is there any point in attempting to define the term "long". However, for this discussion we will confine ourselves to antennas with a length of at least one wavelength.

The gain of a long wire antenna is a function of its length in wavelengths and it therefore follows that if the same wire is used on more than one band, the gain will be different for each of the bands that it covers. For example, a wire which is 5 wavelengths long on 20 metres has a theoretical gain of about 4 dB, but if the same wire is used on 10 metres its length is 10 wavelengths and the gain increases to a little over 7 dB. Fig. 7 shows the length v gain for single long wire antennas.

The radiation pattern is also a function of the length of the wire and Fig. 8 shows the patterns for wires of 1, 2, 4 and 8 wavelengths, whilst Fig. 9 shows the angle of the major lobe with respect to the wire for any wire length up to 10 wavelengths. It will be noted that this angle decreases as the wire is lengthened and, if it is appreciated that the radiation pattern is similar in the vertical plane, it will be realised that an increase in length is also having the effect of reducing the angle of radiation of the major lobe. Obviously if the wire were in "free space", the angle of radiation would be the same as the angle between the lobe and the wire in the horizontal plane (e.g. 18° for an 8λ wire); but, as with all horizontal antennas, the ground reflected ray modifies the vertical plane radiation pattern and the actual angles of radiation will be somewhat

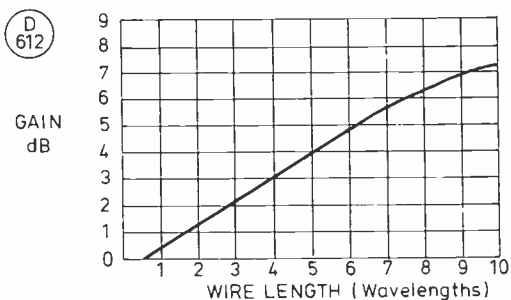


Fig.7 Gain-v-Leg Length for Long wire antennae

higher. However, with long wire antennas the ground effect is not quite as pronounced as with, for example, half-wave dipoles and radiation angles from long wire antennas tend to be lower than from shorter antennas at the same height.

An important result of this fact is that the actual angle of radiation from a long wire antenna is more a function of wire length than of ground reflection effects and this property can be used to lower the angle of radiation by tilting the wire. Consider Fig. 10 which shows a 4 wavelength wire tilted at an angle of 10° to the ground. It will be seen that if the radiation is at 26° from the wire, the resultant angle of radiation will be 16° — a very useful angle!

There are several ways in which a long wire antenna may be fed, but the process is simpler if the antenna is to be used on one band only rather than being used as a multi-band antenna. For a single band device, a low impedance feeder can simply be inserted at a current antinode; referring back to the wire shown in Fig. 1, it can be seen that if such a long wire were to be used on 10 metres only, the wire could be broken at the current antinode nearest to either end and a twin feeder attached. However, it should be noted that the feed impedance at this point is a function of the length of the wire. Typical values are 110 ohms for a 2 wavelength wire, 145 ohms for 6 wavelengths, and 160 ohms for a 10 wavelength device and it is apparent that open wire feeder is probably the best material to use.

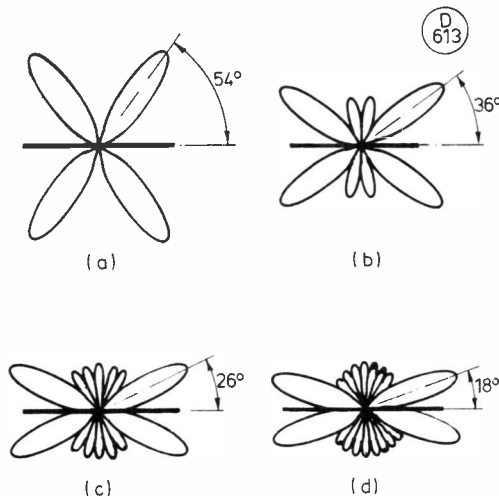


Fig.8 RADIATION PATTERNS FOR LONG WIRE ANTENNAE (a) 1λ; (b) 2λ; (c) 4λ; (d) 8λ.

To use a long wire antenna on more than one band, the method most often used is to end feed with open wire, as shown in Fig. 11a. Matching the feeder to the transmitter will be easiest to achieve if the feeder is a multiple of half waves in length at the lowest frequency to be used. For example, with an antenna to be used on 80 to 10 metres, the feeder could be a half wave on 80, making it respectively 1, 2, 3 and 4 wavelengths on 40, 20, 15 and 10 metres. In an earlier article on feeders we said that radiation from open wire feeders was negligible, but it should be realised that in this application there will be some radiation from the feeder as the currents in the two conductors will not be equal. This is due to the fact that (a) at the antenna end of the feeder the current in one conductor will be

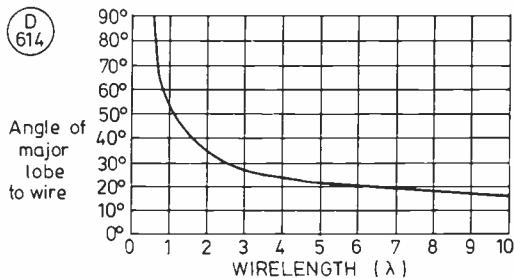


Fig.9 Angle between wire and major radiation lobe for Long wire antennae

practically zero (the "open wire"), whilst in the other conductor the current will be somewhat higher since at a current node (voltage antinode) the current does not drop to zero; and (b), because (as discussed above) the antenna cannot be exactly resonant on every band, the feed point will not be exactly at a voltage antinode on every band.

The situation can be improved by centre feeding the antenna with a resonant length of open wire feeder as shown in Fig. 11b — this system functions in a similar manner to the end-fed device as far as the feeder is concerned, but the current and voltage distribution on the antenna is different to the end-fed variety and this is not, in fact, true harmonic operation and gains achieved will be slightly lower with centre-feed. Figs. 12a and 12b show the current and voltage distribution on a long wire antenna for end-feed and centre-feed respectively.

As seen in the radiation patterns shown above, although appreciable gains can be achieved with long wire antennas, they are essentially bi-directional devices. The patterns can be made virtually uni-directional by terminating the wire with a non inductive resistor, see Fig. 13. The effect of the resistor can be visualised by considering the operation of the antenna in the reception mode. Any current induced into the antenna which is flowing toward the resistor will be "absorbed" by it rather than being "reflected" back along the wire as is the case with an unterminated wire. Current flowing in the other direction will be passed to the feeder and hence to the receiver, as usual. The result of this is that signals received from the direction leading to the resistor are absorbed by it — those received from the opposite direction are received as normal.

It will be noted that such an antenna does not have any standing waves (it is known as a travelling wave antenna) and as such is not resonant. This condition of non-resonance means that it can be used over a fairly large frequency range with a substantially constant feed impedance — this frequency range can be of the order of about 2 or 3 to 1; from, say 10 to 20 or 30 MHz. The terminating resistor should be non-inductive,

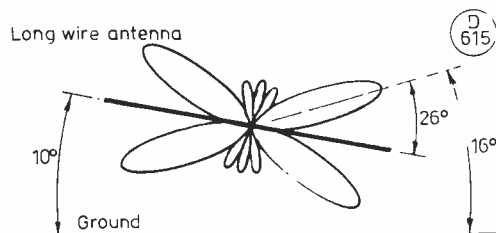


Fig. 10 REDUCTION OF ANGLE OF RADIATION OF LONG WIRE ANTENNA BY TILTING

about 600 ohms in value, and able to dissipate about 50% of the transmitter's output power. It can be made up from a "parallel connected" arrangement of resistors of lower power rating; for example, for a 100 watt output transmitter, ten 5 watt, 5600-ohm resistors in parallel could be used. The input impedance of such an antenna is around 500 to 600 ohms and it can therefore be fed with 600-ohm open wire feeder. (Note, however, that centre feeding is not suitable for terminated wires).

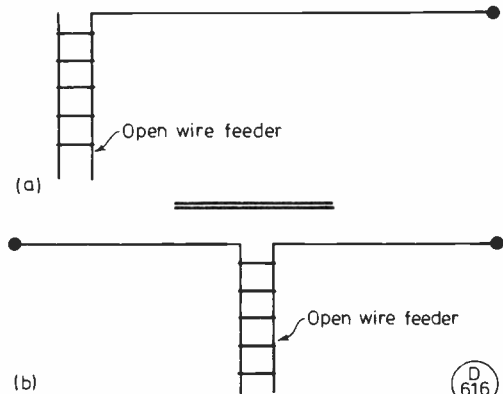


Fig. 11

End feeding (a) and centre feeding (b) a long wire antenna.

Combination Wire Arrays

If more than one long wire is erected, and their placement is carefully planned, we can enhance the lobes of radiation in some directions whilst cancelling them in other directions — the result being much sharper patterns and, hence, more gain. With two wires (the V-beam) the gain can be increased by up to 3 dB, whilst for a 4-wire array (the Rhombic) a further 6 dB can be realised over the single wire; thus for those of us with the available space, very substantial gain figures can be achieved. Fig. 14 shows how two long wires, correctly positioned, produce a sharper pattern than a single wire — the effect of using four wires is to produce an even sharper pattern, the theory being the same as for two wires. The angle between the wires should be twice the angle between the wire and the major lobe from a single wire antenna, the angles shown in Fig. 9 are therefore half those that should be used between the wires in a combination array. V-beam and Rhombic antennas can also be terminated to render them non-resonant and unidirectional, Fig. 15 showing the placement of the resistors; the resistors are of the same value as those used for single wires.

The Rhombic represents a very high gain antenna indeed, and the author can vouch for its effectiveness on 28 MHz, having used a terminated device beamed towards VK from where stations have been worked with inputs of well below 5 watts CW! The leg lengths of this antenna were 6 wavelengths and the theoretical gain was calculated as being in excess of 13 dB — i.e. equivalent to that of a 10-element wide spaced Yagi!

The Inverted-V Antenna

The true inverted-V antenna is a combination long wire array, although usage implies the centre-fed 'V' shaped dipole

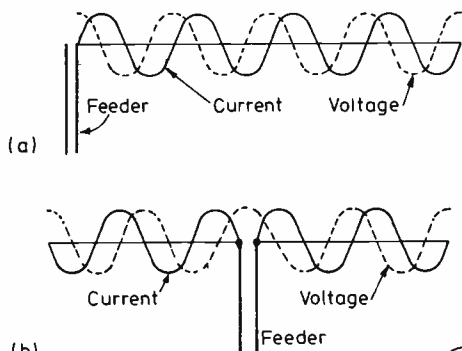


Fig. 12

Voltage and current distribution on (a) an end-fed, and (b) a centre-fed, long wire antenna.

common in amateur radio today. Basically it is a tilted wire antenna, shaped in an inverted 'V', the angle of the 'V' being arranged to enhance low angle radiation. Fig. 16 shows such a device with a leg length of 2 wavelengths (i.e. 4 wavelengths total) and it can be seen that since the major lobe from a 2-wavelength wire is at an angle of 36° to the wire, a choice of apex angle of 108° gives maximum reinforcement of radiation horizontal to the ground. Again, the terminating resistor renders this antenna virtually unidirectional, but note that if the frequency of operation is changed, the apex angle will no longer be optimum.

Listener's Antennas

The fact that the antenna is the weak link in the typical amateur station was the reasoning behind the title of this series, and the author believes that this statement is even more true when listening stations are concerned. Because a "piece of wire" suspended between the receiver and a convenient tree or post enables the listener to receive signals, he is content to accept the situation — indeed he has no reason to question its efficiency. It is difficult to shake the listener's belief in his piece of wire when he has used it to receive stations from all over the world! Most listeners find out the hard way — by becoming licensed amateurs and attempting to use the "old faithful" end-fed wire for transmitting — usually with disastrous results.

Unlike the amateur, the listener does not cause damage to his equipment by having a massive impedance mismatch — he merely receives signals at a lower strength than he would with an efficient system. The lack of proper earthing does not cause his

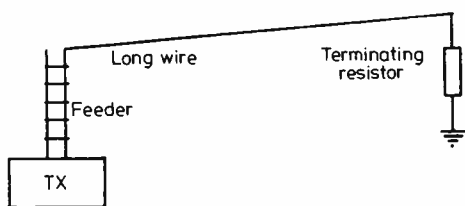
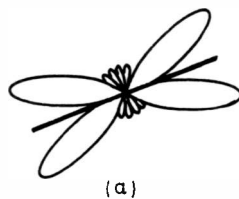
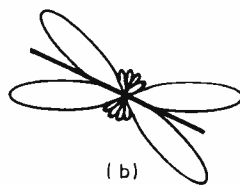


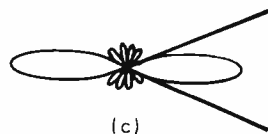
Fig. 13 Placement of terminating resistor on terminated long wire antenna



(a)



(b)



(c)

Fig. 14

The V-beam antenna. The two single wires (a) and (b) are combined to form the 'V' at (c); by choice of correct angle bi-directional radiation results.

equipment to become hot with RF — again the result is a simple reduction in signal strength.

An example may serve to put the matter into perspective: a listener contacted G3XAP and said that his receiver did not work on 1.8 MHz and he had only heard one amateur on this band — this being G3XAP at a range of about 3 miles! The offending receiver was delivered to the 'XAP shack and attached to the inverted-L antenna (60 ft. vertical, 135 ft. top wire and 70 radials) and the band was alive with stations. A quick squirt of RF from a signal generator later confirmed that the receiver was indeed working as it should. The reason for this is so obvious that no more need be said — except that a decent 1.8 MHz antenna was erected by the SWL concerned and that this soon became one of this favourite bands.

Where does this all lead us? For the non-ambitious listener who is content to simply switch on his set and listen to whatever stations appear, with no great desire to search for the "elusive" DX, the piece of wire is fine. However, there are two other types of SWL — the ambitious one who wants to hear everyone from everywhere, and the one who wishes to become a licensed amateur himself. It's not too long ago that the author fitted both of these categories — simultaneously! The author can do no more than say that a listener's results will improve dramatically if a poor antenna is replaced by a properly planned system, and one way to demonstrate this is for the listener to take his receiver to a local amateur and "hook it up" to an efficient antenna.

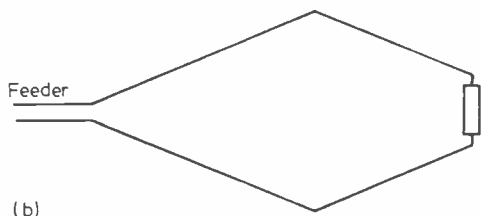
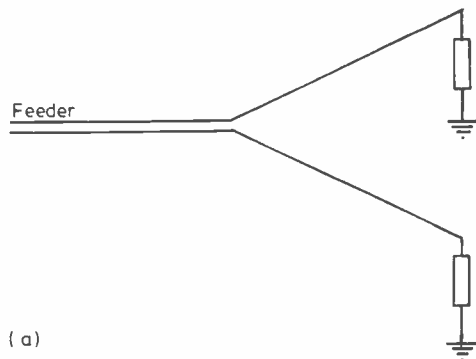


Fig. 15

Terminated V-beam antenna (a), and terminated rhombic antenna (b).

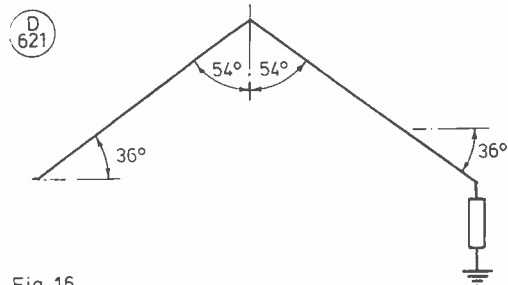


Fig. 16

The inverted-V antenna. Leg length in this example is two wavelengths. The apex angle for other leg lengths can be determined from Fig. 9.

In the author's case the first attempts were disastrous, the effect of which was to make a resolution that the G3XAP signal would be worked on until it stood out from the crowd. A period of 11 years has been spent experimenting with antennas — this work is still progressing, with 50 acres of farm land to play with; all the antennas described in this series have been constructed and evaluated by G3XAP.

It is hoped that this series will have made it a little easier for newcomers to the scene — if the kind words offered by many readers are anything to go by, this aim has been met. The author feels that the series has been worthwhile if as a direct result just one reader has improved his enjoyment of our great hobby.

For the budding amateur, the time to erect the transmitting antenna is *NOW* — don't wait for the ticket to arrive first. If you do, you will be tempted to try out the transmitter on the existing set up, and this can cause many problems. The matching unit (if any) will probably not take the power from the transmitter without flashing over, the wire of the antenna may be too light to survive the voltages and currents to which it will be subjected, and the earth system in use is probably such that it will be completely inadequate.

Unless the operator already has a pronounced preference for one or two bands, the beginner is best advised to go for an all-band system — possibly a trapped dipole or end-fed wire. Obtain a good matching unit and ensure that the components are suitable for transmitting (i.e. wide spaced capacitors, etc.) — if in doubt ask a local amateur. Acquire some test equipment now — a good VSWR bridge, a GDO and a simple field-strength meter are the *minimum* requirements (plus a wavemeter to satisfy licence conditions, of course). When your licence arrives you can have the joy of putting your transmitter on the air with the knowledge that all is well — or you can feed power into a lash up, the results of which can be disastrous. You can destroy the output devices in your transmitter's PA within seconds of attempting your first CQ; failing this, you can call CQ for hours and wonder why no-one comes back to you. The results of your first spell of transmitting can be absolute bliss or downright demoralising.



Subscription rate to
Short Wave Magazine
is £7.50
for a year of twelve
issues, post paid

SHORT WAVE MAGAZINE, LTD.
34 HIGH STREET,
WELWYN, HERTS AL6 9EQ

CLUBS ROUNDUP

By "Club Secretary"

AN appeal for help starts us off this time. We have a letter from George Barber, No. 1 Alcaig, Conon Bridge, Ross-shire IV7 8HT. George is an SWL Senior Citizen, and he is looking to meet other enthusiasts. We have given him details of the last known whereabouts of the Inverness Club Sec. — and we would very much like to see him brought into the fold if at all possible. Can anyone help, please? We don't know, but we suspect that a local SWL to natter to would take care of half the problem, so if anyone happens to be around the Conon Bridge area, and is going to a local club, or can spare a few minutes for a natter, it would be appreciated.

The Mail

We hear rumblings from Southport that they don't like being in the Midlands group — and yet Derby's G2CVV once protested at being put wrongly in the North. In actual fact the line is drawn somewhere around Manchester and East-West across the country, with little juggling here and there. Anyway, we never hear from Southport! So . . . we'll go alphabetically again.

Acton, Brentford & Chiswick meet on the third Tuesday of each month at 7.30 p.m. at Chiswick Town Hall, Chiswick High Road.

Every Tuesday at **Ashford** in Kent, the local amateurs and SWLs head for the top of Hart Hill near Charing, where they have HF, VHF and UHF operating, constructional work, or just plain nattering. Enquiries to the Hon. Sec. — see Secretaries Panel for his details.

Axe Vale have their place in the Adam Room at the George Hotel in Axminster, and it looks like the first Wednesday in each month — but check details with the joint Hon. Secs. — see Panel.

B.A.T.C. caters for the lads and lassies who like to play their amateur radio in pictorial form: amateur TV, whether low or high definition, slow or fast scan. And, we think they do a fine job — they may yet cause this writer to re-activate his early TV activities!

Now to **Bournemouth**, which means the Dolphin Hotel in Holdenhurst Road — but we don't have the dates, so we must refer you to the Hon. Sec. — see Panel.

The **Bury** committee believe in getting stuck into their programme work for a year at a time — which is a good thing all round. January 12 sees talks on contests, repeaters, aeriels and mobiles, between G4BVE, G8GTP, and G4JAG as *maestri*. The Hq address is at the Mosses Community Centre, Cecil Street, Bury, and if you miss the date mentioned, don't worry — they are there on every Tuesday evening constructing things, or having a noggin and natter session, or whatever.

The newsletter editor of the **Brighton** club added a note to the top of our copy challenging us to say something rude about his efforts — nothing doing, as we think it pitches things just about right from the club point of view, and is printed in the most economical manner, which means that so long as the editor doesn't mind doing 90% of the writing himself, then he (and his newsletter!) will survive for a long time. In our

experience the over-ambitious efforts always make the editor disgruntled at the lack of material from the members; and consequent demise of the newsletter. To revert to the matter in hand they are to be found at 47 Cromwell Road, Hove, every other Wednesday at 7.45. We notice a request to members to avoid parking outside 45 Cromwell Road, as this is a nursing home and the space may be vital in an emergency.

At **Cheltenham** the venue is the Old Bakery, Chester Walk, Clarence Street, Cheltenham, on the first Thursday and third Friday in each month.

Chiltern are lucky in having a member who can help with Hq, and transportation in bulk for Field Days and suchlike events; but they won't be going out in January as they have the AGM on January 28 at the Canteen, John Hawkins Ltd, Victoria Street, which is off West Wycombe Road, High Wycombe at 8 p.m. sharp for the start.

A new one to us is at **Congleton** where they are to be found at the Library on the first Wednesday of each month. They are in the process of putting together a rather interesting programme for the coming year. More details from the Hon. Sec., at the address in the Panel.

Deadline for "Clubs" for the next three months —

(February issue — January 2nd)
 March issue — January 30th
 April issue — February 27th
 May issue — March 27th

Please be sure to note these dates!

There's a snappy start at **Cornish** this year, on January 1, at the SWEB Clubroom, Pool, Camborne: the topic is test gear, and the speaker G3OCB. February 5 is set aside for a talk on repeater construction.

Crawley are at Trinity United Reformed Church, Ifield on the second and fourth Wednesdays of each month. For programme details in 1981, we suggest you contact the Hon. Sec. — see Panel.

Now we press on to **Cray Valley**, at Christchurch Centre, Eltham High Street, London S.E.9 on the first and third Thursdays in the month. However, we suggest a contact with the Hon. Sec. if you are thinking of visiting, as they have received an indication that some 25% of their dates for 1981 are let to someone else and no alternatives are offered; that sounds to this old scribe like a broad hint from the landlord.

For January, the **Crystal Palace** programme is yet to be settled at the time of writing, but it *will* be on January 17, at Emmanuel Church Hall, Barry Road, London S.E.22. Notice this is a *Saturday* evening, something which very few clubs do.

At **Dartford Heath D/F** the Hq is at the Scout House, Broomhill Road, Dartford, Kent, on the first and third Fridays in each month.

The Oddfellows Hall at 119 Green Lane, Derby has its whole top floor given over to the **Derby** club, so they attend on every Wednesday evening, January being set out something like this: January 7 a Junk Sale, 14th a look at the year in retrospect by

GB4MAM was the call of the special exhibition of World War II radio equipment displayed at the Mosquito Aircraft Museum, London Colney, Herts., to celebrate the Battle of Britain anniversary in September. This included a complete No. 42 Set with its power supply and ATU in the original rack, thought to be a rare specimen. In the picture is Pete Mitchell, G8XRM, of Verulam A.R.C. (St. Albans), who helped to organise the station.



way of slides and films; on January 21, Zycomm are coming along to demonstrate the Sugiyama range of equipment, and on January 28 the club station will be put on the air.

Dover is the short title of the club "officially" known as "SE Kent (YMCA) Amateur Radio Club" — which clears up a small problem in our filing system. As will be gathered from the title the gang foregather at the YMCA in Godwyne Road — with meetings every Wednesday evening. Details from the Hon. Sec. — see Panel.

At **Dudley**, we must refer you to the Hon. Sec. at the address in the Panel for all the details of the club Hq and dates.

By the time you come to read this, the **Dumfries and Galloway** crowd will have been through their AGM, so the new officers will be working-out the programme details. Meantime, we can say they foregather at the Cargenholm Hotel, Newabbey Road, Dumfries, on the first and third Mondays in each month; the first meeting being in general of the natter-session variety, while the later one is the formal effort with talks, films and whatever.

It's January 13 for **East Antrim**, for a Mobile Clinic, at Carntall Hall, near Mossley. Details from G14JXM, the Hon. Sec., at the address in the Panel.

Our copy of the programme for the **East London RSGB** group ends with the AGM in December — but no doubt G3PKQ will be delighted to pass on the details of the current activity, or you can just go along to Wanstead House, 21 The Green, Wanstead, London E11, at 3 o'clock on the afternoon of the third Sunday in every month.

No doubts in mind where **Edgware** are concerned; they will be at Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, for one of their rare informals.

Up in GM, the amateur population around **Edinburgh** get together at the Calton Hill Observatory every Tuesday excluding Christmas and New Year — details from the Hon. Sec. It appears from their letter that they have their own adapted premises, which suggests they have the advantages that go with having one's own place as Hq.

Like so many others, **Exeter** have Hq in a local Community Centre, this one being in St. Davids Hill, Exeter. Dates and Details are to be had by contacting the Hon. Sec. — see Panel.

Next we come to the **Ex-G Club**, which is for those who were born in U.K. but are domiciled abroad. They keep in touch by

way of nets and a very good newsletter — all the details from the U.K. Hon. Sec. — see Panel.

It is quite a time since last we heard from the **Fareham** crowd, but we notice they are still based on Portchester Community Centre, on the first and third Wednesdays of each month. January 7th is the AGM, and on 21st there will be a talk on electrical theory by G8VOI and G4ITF.

Those who are interested in low power operation, and simple equipment, will be interested in the **G-QRP Club** and its regular newsletter — full of interesting news, ideas, circuits and so forth. Details from the Hon. Sec. — see Panel for his address.

A note on the top of the **Guildford** newsletter puts us right — they foregather on the second and fourth Friday at the Model Engineers Hq building in Stoke Park. This would of course plonk a meeting on to Boxing Day, and so they have put it back a week.

Hastings are based on 479 Bexhill Road, St. Leonards, but their formal main meeting is on the third Wednesday of each month at the Community Centre, Croft Road, West Hill, Hastings, at which there are lectures on a wide range of topics; for example the January meeting is down for a talk on airport electronics.

Our next port of call is at **Hereford**, who have a place at the Civil Defence Hq, County Control, Gaol Street, Hereford, where they are to be found on the first and third Friday in each month.

Ipswich make a move in January to new Hq at the "Rose and Crown", Norwich Road, Ipswich, where they have a separate room; the second and the last Wednesdays will be at this venue, but the old school place will be used during term-time for the other Wednesdays and special events. Details from the Hon. Sec. — see Panel.

We are sad to hear that no-one has come forward to replace Karen, EI2DW, as newsletter editor, so for this month only EI8Z, the President of IRTS, has done the job. We hope someone will step forward, as this is one of the ones we look forward to seeing. In effect it covers all of Ireland, and so any enquiries about EI club matters should be addressed to the Hon. Sec. — see Panel.

In the **Isle of Wight** a favoured activity is to operate, and for HF they have just brought a 130-foot wire into service to

supplement the 14 MHz dipole, so G3SKY should be a bit more audible in future. Look out for them on Fridays around 3.710 MHz from about 2000 local, from Unity Hall, which is near the "Sloop Inn", Wootton Bridge, Isle of Wight.

Over some more water now to **Jersey**, where they have a place in the Communicare Centre, Quennevais, St. Brelade, on the second Wednesday of each month.

Now to **Kidderminster** where things are booming of late at the Aggborough Community Centre, Hoo Road, Kidderminster, 7.30 for 8 p.m. This venue is adjacent to the Harriers Football Ground. January 6 sees them having an auction sale, and on January 20 there is a "Ham Evening" — which can be construction, operating, Morse practice, nattering, or whatever.

Liverpool next, where the programme is: January 6 a surplus sale, January 13 video studio techniques lecture, January 20 Flying by G4AHS; and on 27th, G3WOH will be looking into some aspects of VHF aerial design.

Meirion is the name of the club who look after the area around Dolgellau; they get together at the Ship Hotel in Dolgellau, on the first Thursday in each month. More details from the Hon. Sec. — see Panel. January 8 is down for a talk on the importance, or otherwise, of SWR and, following that up, on the "G5RV" as a multiband aerial, the speaker being GW4BIF.

Back now to the very heartland of England, to **Melton Mowbray**, who for many years now have had a place in the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, where they are to be found on January 16, for a talk on intruder alarms, given jointly by G4HTH and G8RBY.

At **Mexborough** the Hon. Sec. is pessimist enough to expect hang-ups in his programme for the forthcoming season. They are based on Harrop Hall, Dolcliffe Road, Mexborough, every Friday evening. January 9 is down for a talk on printed-circuit techniques, and on 16th a member noted just as "Graham" discusses 'the finishing touches to the shack'; on 23rd G3MWN will discuss wartime spy equipment. Finally, on January 30 G4AOO will be talking about RTTY, operation and use.

For the programme details of **Mid-Lanark** we must refer you to the Hon. Sec. at the address in the Panel; but we can say that they Hq at Wrangholm Hall Community Centre, Jerivston Street, New Stevenson, Motherwell ML1 4UQ, and that the gathering is every Friday evening from 7.30 p.m.

Now to **Midland**, where work seems to be going on fast to make the new Hq in Broad Street habitable before this appears in print, so perhaps it would be a good idea to get in touch with the Hon. Sec. — see Panel — and find out when and where (Aston University, Brasshouse Passage, or the new Hq), save for January 20 which is firm for Room 118 at Aston University.

Although we have a letter from the Hon. Sec. of **Milton Keynes**, he seems to have got out of sync., but we know the venue is the Lovat Hall, Newport Pagnell, and history says the second Monday — try it, or contact the Hon. Sec. for the latest gen.

At **Northern Heights**, they normally foregather on Wednesdays at the Bradshaw Tavern, Bradshaw, Halifax. However, the 7th is scrubbed this month, and on 14th the New Year starts for them with a talk by a Mr. Barker about RFI. Then on January 21 Instagraptic Products' rep. will be coming along to talk about printed circuit boards. It sound a little as though the pocket-money should be brought to both these! Finally on 28th, the activity is not at the time of writing decided.

Now **Nottingham**, hidden away with Robin Hood in Sherwood Community Centre, in Woodthorpe House, Mansfield Road. Every Thursday it is, from 7.30 p.m., and there is always something organised.

Another one we've not heard from for some time is **Peterborough**; in the interim G3EEL has gone from Hon. Sec. up to the chair, and G4KSW takes over — see Panel. Their booking is on the third Friday in each month, and in January the Scout Hut in Lincoln Road will resound to the battle of wits between the Class A and Class B licensees in a quiz.

R.A.I.B.C. What can we who are whole and healthy even begin to understand about the members, the invalids and the blind, and their problems. Supporters and representatives do

Bernard Salt, G4ITL, operating GB2HSA (Herts. Scouts Association) during the recent J-O-T-A, and watched by Scouts and visitors.



Names and Addresses of Club Secretaries reporting in this issue:

ASHFORD: J. A. Clarke, G3TIS, Yeoman's Cottage, The Street, Brook, Ashford, Kent. (*Wye 812888*)
 CONGLETON: N. R. Clayton, G8UYT, 2 Moorfields, Leek, Staffs. (*Leek 385992*)
 FAREHAM: B. Davey, G4ITV, 31 Somervall Drive, Fareham, Hants. PO16 7QL
 MEXBOROUGH: I. Abel, G3ZHI, 9 Grove Terrace, Malby, Rotherham, Yorks. (*0709 814911*)
 MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, B'ham B32 2AN. (*021-422 9787*)
 PETERBOROUGH: D. Wilson, G4KSW, 4 Conway Avenue, Peterborough.

SCUNTHORPE: J. A. Sheardown, G8TIY, 5 Winterringham Lane, West Halton, Scunthorpe, S. Humberside DN15 9AX.
 SOUTHDOWN: R. E. Holtham, G4EKS, 2 Benbow Avenue, Eastbourne, E. Sussex BN23 6AB. (*Eastbourne 31620*)
 STOURBRIDGE: C. Williamson, G4IEB, 14 Lawn Street, Stourbridge. (*Stourbridge 2006*)
 SUTTON & CHEAM: G. Brind, G4CMU, 26 Grange Meadow, Banstead.
 THURROCK: A. M. Taylor, G4KJ1, 11 Kathleen Close, Stanford-le-Hope, Essex. (*S-I-H 5057*)
 VERULAM: G. N. Dale, G3PZF, 16 Palfrey Close, St. Albans.
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

See December issue 'Panel' for names and addresses not appearing here.

something about finding out — helping in whatever way they can. We can do our bit by pointing a potential member in the right direction; and you can do yours by passing any surplus gear that could be useful in their direction, and of course by getting your club (or yourself) to make a donation to the R.A.I.B.C. funds. Details from the Hon. Sec. — see Panel.

On to **Reigate**, where the newsletter seems set to disappear — a bad thing to happen as we learn so much about the club from the newsletters. However, they will be at the Constitutional and Conservative Centre, Warwick Road, Redhill, on the third Tuesday of each month.

January 6 sees G4GZB talking to the **Scunthorpe** crew about aerial construction, at The Shack, Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe, S. Humberside. In addition to the formal each month, all the Thursdays are put to use as well. More details from the Hon. Sec. — see Panel.

We have it that there is a possible change of Hq in line for the **South Dorset** gang; that being so we refer you to the Hon. Sec. — his address and number are in the Panel.

A rather snazzy coloured front cover disguises the **Southdown** newsletter, not to mention giving an update on the Hon. Sec.! The group are to be found at the Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, on the first Monday of each month, with a 7.30 for 8 p.m. starting time.

There is only one meeting for **Stevenage** in January, namely January 15, when they will have a talk by some representatives of the CEGB — the canteen of the British Aerospace (ex-HSD, ex-de Havilland) works in Gunnels Wood road. Please arrive at 8 p.m. for an 8.15 prompt start.

Now **Surrey**, and *T.S. Terra Nova*, 34 The Waldrons, South Croydon, on the first and third Mondays. This means January 3 for the New Years Party, and January 19 for an informal meeting around the club station, discussion and so forth.

We were a bit sad to see **Stourbridge** newsletter without the nice cover they have been using for so long; they foregather in Longlands School, on January 5 for construction, and January 19 for the Constructors Contest. There is also the Annual Dinner, on January 26.

The **Sutton & Cheam** club have two places, Sutton College of Liberal Arts (SCOLA) and the Banstead Institute. The January 16 date at SCOLA is 'open' at the time of writing but doubtless that will be sorted in good time. On January 23 at Banstead Institute, G4BOX will talk about modern communications.

A new name to us is **Thurrock** who have a place on the top floor of Grays Park Hall, Orsett Road, Grays, Essex, where they foregather each Tuesday evening. In addition to Morse

classes, they make a point of welcoming visitors and prospective new members. Details from the Hon. Sec. at the address in the Panel.

Up to **Tyneside** now, to the Community Centre, Vine Street, Wallsend; the gang are now operational on the HF bands with a three-element triband beam. Details from the Hon. Sec. — see Panel.

The Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans, is the venue for the **Verulam** club meetings nowadays; normally they have the second and fourth Tuesdays, the former being informal and held at the R.A.F.A. Hq in Victoria Street, St. Albans during the winter months, while the latter date is the main meeting at the Memorial Hall address. Details from the temporary Hon. Sec. — see Panel.

January 16 is set aside for the **West Kent** Junk Sale; and having off-loaded all that junk and taken on some more they return on 30th for a slide show, at the Adult Education Centre, Monson Road, Tunbridge Wells.

The Sports Centre, Grange Road West, Birkenhead, has been home to the **Wirral** lads for years; they are to be found there on the first and third Wednesday of each month.

The **Wisbech** group is almost all licensed amateurs, and so they would particularly like to hear from local SWLs and home-electronics fans who might fill out the ranks. They meet fortnightly on Thursday evenings at the "Five Bells", Parson Drove, near Wisbech; details from the Hon. Sec. — see Panel.

We are assured by the Hon. Sec. of **Worcester** that, regardless of whether there is a newsletter or not, they will be in position at the "Old Pheasant", New Street, Worcester, on the first Monday in the month. January 5 is down for Micro-Print Ltd of Stoke-on-Trent to come along and demonstrate their do-it-yourself computer kits.

Building 101, Houndstone Camp, Yeovil, is the home of the **Yeovil** group; they have weekly meetings on Thursdays, one in each month being given over to a talk or whatever. Details from the Hon. Sec. — see Panel.

Finally, **York**, based as ever on the United Services Club, 61 Micklegate, York, every Friday *except* the third one in each month.

Deadline

As defined in the 'box' in the body of the piece, for the next three months; your letter posted after January 2nd will contain the details of the March goings-on, and should arrive by the specified date, addressed as ever to your scribe, **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts. AL6 9EQ. And — may 1981 be a better year for us all!

USING AND ABUSING THE 4CX250 FAMILY OF VALVES, PART I

JOHN H. NELSON, G4FRX

Written by a noted authority in the field, this article is arguably the definitive treatment of the subject — Ed.

In the August 1977 issue of *Short Wave Magazine*, the author wrote an article on using valves of the 4CX250 family in amateur service. This generated much correspondence, telephone calls and lengthy QSOs, and during the course of the last three years much has been learned about the properties of some common amplifier designs, and different techniques tried. Considering that this family of valves has been around in one form or another since 1947, there still seem to be many misconceptions about their use, and difficulties occurring in the area of obtaining good, clean high-power signals.

This article is intended as an amplification and update of the earlier one and, the author hopes, timely insofar as one only has to tune 2m, or 70cm, during a contest or good conditions to hear some truly appalling high-power signals being radiated, for which (one hopes) the only reason is ignorance. It can be shown, as I hope to do here, that high power amplifiers need not be difficult to set up or use, and indeed that it is possible under some circumstances to generate a high-power signal which is narrower than that from the exciter alone! Many people are still opposed to high power on the grounds that it is unnecessary and anti-social: there are times, to be sure, when high power is not necessary, and one wonders sometimes why stations have to run 400 watts to chat across London, but high power operation does have its place in many experimental and contest situations on VHF and UHF. It should not be anti-social to use high power, assuming that the amplifier (and, for that matter, the exciter) are properly engineered: if this can be shown to be so, any further problems must lie in the receiving system. Often they do, and often receiver design can be shown to be deficient — but, as in the case of many instances of TVI, the problem should be tackled in the right quarter, that is to say in the receiver. So if your amateur colleague two streets away renders your receiver unusable when he comes on with 400 watts and a good beam, don't curse all linear amplifiers — get the soldering iron and calculator out and do something about it!

However, this article is about valves rather than GaAsFETS and Schottky diodes; and, as with the earlier article, we begin not with the valve but with its base. A common problem, and probably the first snag that the intending amplifier constructor meets, is that these bases are hard to find: and this is compounded by the fact that probably 80% of the bases to be found at rallies and so on are totally unsuitable for use on VHF or UHF. For 144 MHz use, the correct base is the Eimac SK600 or 600A (the differences being minor and connected mainly with the sealing of the built-in screen decoupling capacitor) or the SK610 or 610A. The only difference between the 600 and 610 series is the fact that the 610 has the cathode pins (2, 4, 6 and 8) grounded to the valve-base screening ring, which is ideal for practically every use of the valves.

In passing, we may as well dispose of one common fallacy, which is that the 4CX250 family (for the purposes of this article taken as the 4CX250B, 250R, 350A, 350FJ plus the variants with different heater voltages, conduction cooling, etc.) are intended for grounded-grid use. They are *not*, and perform very badly therein. This family of valves is characterised by high permeance, together with extremely small spacing between the grid bars and between the grid structure and the cathode. For correct operation of a tetrode of this type, the screen requires much larger voltages than the control grid, whereas valves designed specifically for grounded-grid use, such as the 8873 series and the 8877, have lower gain figures and a more equal balance between absolute electrode currents. If the electrodes of the 4CX250 family are tied together the control grid tends to draw colossal current, and there is a serious risk of destroying it. For example, with a 4CX250B operated in grounded-grid, the peak grid current can easily be *twice* the value of the peak anode current, *i.e.* about half an amp! One commercial 2m, linear amplifier using this configuration makes matters even worse by using a valve of the 350 family, which are intended for Class AB1 linear service only (*i.e.* no grid current, and a grid dissipation of zero watts). Valve life for the hapless device is therefore a few tens of hours, as opposed to about thirty thousand, potentially, and linearity is also poor at full power; the intermodulation products are some 15 dB higher than they could be with this valve.

8904
4CX350FJ
RADIAL BEAM
POWER TRIODE

TECHNICAL DATA

The EIMAC 8904 (4CX350FJ) is a complex radial beam tetrode with a maximum plate dissipation of 150 watts, standard for Class AB linear or amplifier service. The tube has rugged internal structures features.

The 8904 (4CX350FJ) may be used as an exact replacement for the 8322 (4CX350F) in most applications, requiring only minor control adjustment and re-tuning. The tube has improved intermodulation distortion characteristics. It contains a 20.5 volt heater and is recommended for non equipment designs.

GENERAL CHARACTERISTICS

ELECTRICAL	
Cathode Construction	Unipotential
Voltage	25.5 1.5 V
Current, at 26.5 volts	8.5 A
Transconductance (Average)	
to 150 MHz	22,000 μ mhos
Amplification Factor (Average)	
Grid to Screen	17
Direct Inter-electrode Capacitances (grounded cathode)	
Grid	22.0 pF
Control	5.0 pF
Grid to Plate	0.833 pF

1. Capacitor at 0.1 μ F and operating voltage are based on performance tests. These figures may change as their voltage or the amount of additional plate or grid dissipation. EIMAC is not responsible for operation unless the operating voltage using the information on this equipment design.

2. Capacitance values are for a 500 pF test impedance at 100 MHz. The values are based on measurements with a Network Analyzer at 100 MHz.

MECHANICAL

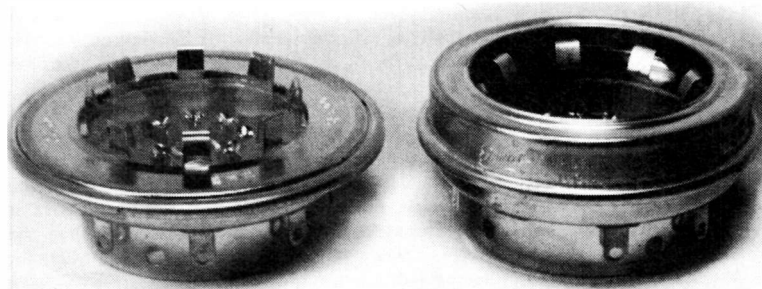
Name	Special 9-pin JEDEC RB-236
Recommended Air-System Section	EIMAC SK-600 Series
Recommended Air Chamber	EIMAC SK-600 Series
Maximum Overall Dimensions:	
Length	2.41 in. 62.50 mm
Diameter	1.64 in. 41.65 mm
Operating Position	Any
Cooling	Forced Air

Printed in U.S.A.

© 1977 EIMAC Industries, Inc. 94875

The high-power operator's best friend: the manufacturer's data sheet! Shown in conjunction with a 4CX250B and a 10p piece for scale.

Reproduced by kind permission of EMI-Varian Ltd.



At left, and SK 600A base, and on the right an SK 620A. Note the raised shield surrounding the screen contacts on the upper side of the SK 620A — one of the factors contributing to stability at UHF.

So grounded-cathode operation was the aim of the valve designers, and should be the aim of the amplifier designer too: and the SK 610, if found, does the job for you by earthing all the cathode pins. If using other types of socket, it is very important that the cathode pins are solidly earthed, preferably *via* copper strap or braiding and that nothing else uses the connexion for a path to earth, or there might be a possibility of unwanted coupling and hence instability.

At 432 MHz a different base, the SK 620 or 620A (or, with cathode pins already grounded, the 630 or 630A) may be required, and in fact very nearly all the 70cm. amplifier designs known to the author do require them. The difference between the two types lies mainly in the value of the built-in screen decoupling capacitor, which is about half the value in the UHF base. This being so, the SK 620 capacitor introduces much less series reactance in the screen circuit of the valve itself, which permits the valve screen grid to be more thoroughly grounded with respect to RF at UHF. This single fact is one of the chief keys to stability.

One of the most popular amplifiers for 432 MHz is the K2RIW design. Now, contrary to a comment appended to a recent contest result given in *Radio Communication*, the K2RIW amplifier does *not* possess "less than unconditional stability" if properly built, using the SK 620 base and decent valves; it can, in fact, be a superbly stable and reliable design. One or two modifications need to be done, but these are well known and well documented and the end product can be an excellent amplifier. But any attempt to build it with an SK 600 series base, or any cognate equivalents by other manufacturers, is asking for big trouble! You may be lucky, but you will probably not be — it is better to use the correct base for the job from the outset.

The only other bases that appear to be available for the 4CX250 family that are much good at all are of A. E. I. origin. Most were apparently meant for use at frequencies not exceeding 300 MHz but one or two have been found with a screen decoupling capacitor of about 1100 pF, which would suggest that they would be worth trying on 70cm. The normal value for the SK 620 series is 1100 pF at 1kV, while the value for the VHF SK 600 series is 2700 pF at 1kV.

Beware of people at rallies, who will say of the most extraordinary looking bases "oh yeah, mate, that's a UHF base all right, just what you want for 70cm". The odds are very much that it is not and, as we have seen, the secret of success is the *right* base, with a built-in screen decoupling capacitor of the correct value and a raised screening ring on the underside of the base to prevent the grid pin "seeing", electrically speaking, the other connexions on the valve base. Now the author knows very well that the correct base, like the correct valve of a decent pedigree, is expensive, typically around the £25

mark; and the average impecunious amateur is usually heard to mutter "what a rip-off!" It is anything but, in fact — the silver plating and precision engineering in them costs a fair amount of money, and the thing is a little bit more complex and has to do rather more than an octal valveholder! For a professional product, is it really so expensive? What did you pay for *your* black box?

UHF and the 4CX250R

In the earlier article it was stated that the 4CX250R was simply a "ruggedised" version of the '250B for mobile, etc., use. It was subsequently discovered that this conclusion was based on incorrect information and inadequate tests, and also that some design changes to this valve had been made. The net effect is that the transconductance of the 4CX250R is about 20% higher than the figure for the 4CX250B and its figure of merit (sometimes known as gain-bandwidth factor, and calculated from $\text{transconductance}/2\pi C_i$, where C_i is the sum of the input and output capacitances of the valve) is much higher. In practical terms this means that the 4CX250R is the best valve of the family for 70cm. use, giving some 10% more output for a little less drive and being slightly more linear in the process. Of course, the 4CX350 series would be even better, having even higher transconductance and figure of merit but — alas! — their gain is falling off at 432 MHz. They are, however, quite unparalleled on 144 MHz, as will be seen later.

Tuning and Loading

In a sense, this section of the article ought, perhaps, to have been lumped together with the notes on getting a new amplifier going, which appear almost at the end; however, many of the problems that people have with existing amplifiers seem to be in this area, so we will deal with it now.

The author has from time to time had the honour of giving lectures to amateur radio groups (some of which have been quite disastrous, since invariably an effect which you come across at home invariably fails to reproduce in front of an audience!), and a frequent question to the audience when talking about the 4CX250 family is "how many of you use them in linear amplifiers?". Let us say ten hands rise in the air. The next question is "how many of you tune and load for maximum indicated RF output?". Again, usually, ten hands rise. So, the intrepid lecturer's next statement is on the lines of "Gentlemen, ten of you may own 4CX250 amplifiers but *none* of you own linear amplifiers!" At which point the rotten tomatoes start to fly and the author retires gracefully to the

bar — well, not quite, but the reaction is sometimes quite pronounced!

Why is this? In a tetrode amplifier the screen current is an extremely sensitive indicator of how the valve is loaded, and the screen current of the valve (or of each valve in a two-valve design) should really have an individual meter all to itself — woe to those who switch one meter to about half-a-dozen different functions for the sake of "economy"! If we accept that one cannot properly set-up a linear amplifier without an oscilloscope, an intelligent appreciation of grid, screen and anode currents with, in the early stages, someone who knows how to use a receiver listening to the results, is a good second-best; and in routine use the meters will tell you much about drive-level, loading, neutralisation and resonance. They will not give any direct readings of "linearity" though.

Now as was said in the earlier article, valves of the 4CX250 family are particularly prone to a phenomenon known as "secondary emission", which is what causes the screen current meter sometimes to read negative: *i.e.* electrons are flowing out of the screen grid rather than into it.

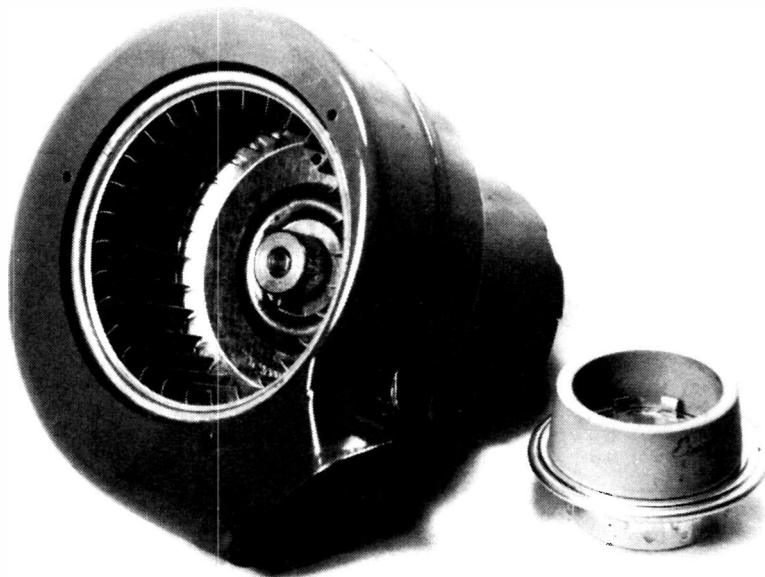
Armed with this knowledge, the next step is to obtain a copy of the maker's data sheet for the valve in use, and it must be stressed that the data sheet can quite literally be your single greatest ally in correctly operating an amplifier using this class of valve. (Don't be content with simply extracting the basic valve data from the back of the *ARRL Handbook* or wherever, since this is nothing like enough for the job in hand.) Having obtained one, turn to the section marked "typical operation". In it, there will be shown figures for single-tone (*i.e.* carrier) and two-tone screen current, and these are important to know. For instance, if we refer to the data sheet for the 4CX250B we find that in a typical amateur case of 2 kV on the anode and 350 V on the screen, the single-tone screen current at an anode current of 250 mA is specified at -5 mA and the two-tone at -2 mA. These figures refer to *correct* loading — or, to put it another way, if we connect a dummy load to the amplifier and apply sufficient

drive to cause the valve or valves to draw the maximum current of 250 mA each, the loading should be adjusted so that the screen current meter shows -5 mA, again per valve in the two-valve case. The amplifier would then be correctly loaded, and hence producing minimum distortion in the form of intermodulation products.

Now this figure of -5 mA is "typical" and to some extent it will vary a little between valves, even new ones, because the amount of secondary emission varies to some extent — it depends on many factors, and different manufacturers use slightly different materials for their valves. Older valves tend to produce more negative screen current, which increases with age (this is one argument for using new valves, or known good valves, in a new amplifier; it can then be set up correctly at the outset, to the correct numbers), but overall, good valves should produce somewhere round about this figure.

The RF power output produced by an amplifier loaded correctly in this fashion will typically be about 10% less than if it were tuned and loaded for maximum "urge"; however, quite a lot of the 10% represents spurious intermodulation products which widen the signal in the latter case. They certainly do not add to the intelligible signal. To put some figures on it, a single 4CX250B with a 2 kV on the anode and 350 V on the screen was driven to 250 mA anode current and its output examined on a spectrum analyser. Correctly loaded, it produced 289 watts into a dummy load with third-order intermodulation products 35 dB down, and fifth-order 38 dB down; a performance roughly in accordance with the manufacturer's specification. Tuned and loaded for "maximum smoke" an output of 328 watts emerged, with the intermodulation products this time at -23 and -27 dB respectively. The audible effect in the first case was a clean and narrow signal which completely disappeared in about 4 kHz total; in the second case the signal was some 7 kHz wide, with slight audible roughness. I believe that this proves the point.

For the benefit of those with new amplifiers, some notes on setting-up, including establishing the correct loading, will be found later on in the article.



A suitable blower of a type widely available as surplus, shown with an SK 600A base and its associated Type SK 606 chimney. The SK 620A base requires a slightly different chimney, the Type SK 626. See text for comments on cooling.

Cooling

Again, this was discussed in the earlier article, but some misunderstandings still arise in this area and it seems appropriate to examine the requirements in some detail. The life of any valve is directly related to its operating temperature, and *a fortiori* in the case of a forced-air cooled device, for which, in amateur service at least, a good rule-of-thumb would be "the more air the better". In the practical amateur world, we do not consult the data sheet and then order something appropriate from the blower manufacturer — we go to a rally or to the Edgware Road, or whatever, and see what can be found. Unfortunately, few people have access to airflow measuring equipment (and it probably isn't portable if we do) and some guesswork is necessary; and in the author's experience, many people tend to guess the wrong way where blowers are concerned.

The average centrifugal blower, when you get it home and try it out, may well produce a miniature hurricane in the shack, but the problems begin when it is asked to do the same in the face of the valve anode structure. If we turn to the data sheet again, we find a table showing cooling requirements in cubic feet per minute for a given anode dissipation and — this is the important point — at what back pressure the blower is required to deliver this rate of flow. Or, to quote the 4CX250B data sheet, at 250 watts anode dissipation 5.7 c.f.m. is required at a back-pressure of 0.7 inches of water. The data sheet says "... the blower selected in a given application must be capable of supplying the desired airflow at a back-pressure equal to the pressure drop shown above (*i.e.* 0.7 inches of water) plus any drop encountered in ducts and filters". The "back-pressure" against the airflow, represented by the anode structure of the valve, the valve base and any other obstructions, is what tends to turn the mighty wind from the blower on its own into a light zephyr emerging from the valves; and in service the air which does emerge is probably hot enough to scorch the nice paintwork on the top cover of the amplifier.

The aerodynamics of a blower feeding air against back-pressure are dreadfully complicated and, in the absence of a Ph.D. in free-stream airflow theory or a portable flowmeter, the things to take to the rally or wherever are a ruler and an eye for the maker's data plate. For two valves, a rule of thumb seems to be at least 3in. inside diameter blower wheel turning at at least 3,000 r.p.m. Some data plates will give the motor r.p.m. but some will not, and it is necessary to guess. Try to find a friend's blower which does meet the criteria and see how much air it produces; that may give an idea of the standard to aim for. It will seem that this kind of blower will produce far more airflow than could possibly be required from the data sheet, but the really crucial point is how much it produces in the presence of the back-pressure. So try it: put your hand over the blower outlet and then open your fingers a little to permit a somewhat restricted airflow. Instinctively, one expects a tremendous high-pressure jet of air to emerge, but not so; it isn't like putting your finger over the end of a hosepipe, for instance. A surprisingly moderate flow rate will be the result, and if the other hand is placed near the blower inlet, a surprisingly large amount of air will be felt to emerge from *there*!

Blowers vary somewhat in their ability to deliver air in the presence of back-pressure, no doubt due to turbulence and swirl effects in the casing and general aerodynamic unpleasantness — so it is of the utmost importance not to be

seduced into believing that the healthy free-stream blower output will be duplicated when the valves are plugged in. Also note that the occasional surplus blower has its flow rate marked on the motor data plate; remember that this again is a free-stream value and is *not* related to the flow rate through the valves. And while on this point, any fan of the *Rotron*, *Muffin*, *Boxer*, etc., family (*i.e.* the ordinary airscrew type fan) is quite unsuited for this application. Their ability to cope with even moderate values of back-pressure is even worse than that of the centrifugal blower, and most of the small ones that the author has come across have 1,500 r.p.m. motors and fine-pitch blades, so their basic flow rate is fairly low anyway. These fans are fine for other purposes but leave them out of your linear.

A healthy size blower is a noisy device, which is possibly why many amateurs tend to use ones which are too small! If the noise is irritating the blower can be mounted remotely and its output fed by car radiator or heater hose to the amplifier, although it will need to be a larger blower in any case to allow for the losses in the hose. Unfortunately, there really is no such thing as a really quiet blower, and indeed if your blower is a quiet one it is almost certainly much too small! So remote mounting of a really large one is well worth considering. After all, nothing less is at stake than the health of the valves and the reliability of the amplifier, and it is hardly risking both for the sake of a little peace and quiet!

On the subject of reliability, blowers can fail. Two main types of fault seem to occur fairly often; the rotor itself loosening on the motor shaft or, more rarely, the motor itself failing. Either is "lethal" if nothing is done about it, so it is sensible before putting the blower into service to check how the fan is mounted. If by grub screws, as many are, it is well worth either removing the fan and drilling the spindle for bolts or, if the motor shaft is not accessible, some *Araldite*, or similar, on the spindle plus firm tightening is a wise policy.

In either case, if the airflow fails and is not noticed, or nothing is done about it, the valves will fail in a few seconds, so some form of airflow sensor is worth consideration. One arrangement which works well is due to G8DRE, and appears as part of the generally excellent power supply and control design for 4CX250 amplifiers in the October 1977 issue of *Radio Communication*; the designer, G4AJW, explains the system well in the article. The author's arrangement is similar, insofar as a vane of thin copper in the throat of the blower is arranged to operate a low-torque microswitch (as used in coin mechanisms, etc.) which is connected to the appropriate control logic in the power supply. (A suitable switch is available from *RS Components* under the stock number 339-207.) It is advisable to arrange for all voltages on the valve to be removed immediately in the event of airflow failure, and the G4AJW design does this.

Finally on the subject of cooling, it was stated in the earlier article and is reiterated here for the sake of emphasis that the blower *must* come on before *any* voltages are applied to the valve, even the heaters, and ideally the blower should continue to run for a minute or so when the amplifier has been switched off, to allow the anode core to cool evenly. A small flaw in the G4AJW design is that the blower and heater are switched off simultaneously, but a minor redesign can use the built-in 1 minute timer to keep the blower running after shutdown. It's an interesting exercise to look at his circuit and work out how to do it — I won't spoil the fun by revealing it here!

to be continued

MODIFICATIONS TO THE ICOM IC-701 AND IC-211 TRANSCEIVERS

INCLUDING A MULTI-FUNCTION INTERFACE

ANTHONY GREEN, VP2EZ, A4XGR, VS6EZ, G4HRD

A POPULAR transceiver used by amateurs in many parts of the world is the Icom IC-701, and in conjunction with the IC-701PS power supply and RM2 or RM3 remote control unit makes a very good rig. However, that is not to say that it cannot be improved!

The first thing the writer noticed was that there was no indication that the IC-701PS was still connected to the mains

supply when the on/off switch on the IC-701 was in the 'off' position. Next, that in order to preserve the memory in the remote control unit, RM2 or RM3, it needs a permanent supply connected to it.

Modifying the Power Supply

Examination of the IC-701PS circuit diagram, Fig. 1, showed that it would be easy to indicate that power was still connected to the unit and at the same time, with just a small amount of work, arrange for 12 volts to be made available power the RM2/RM3 memory circuit.

The IC-701PS circuit diagram showed that the small transformer energising the mains on/off relay for the high power transformer is on all the time, consuming 2 VA, unless the mains on/off switch on the back of the power unit is switched off. It is a simple job to remove the front panel of the IC-701PS and, after removing the speaker and then the baffle,

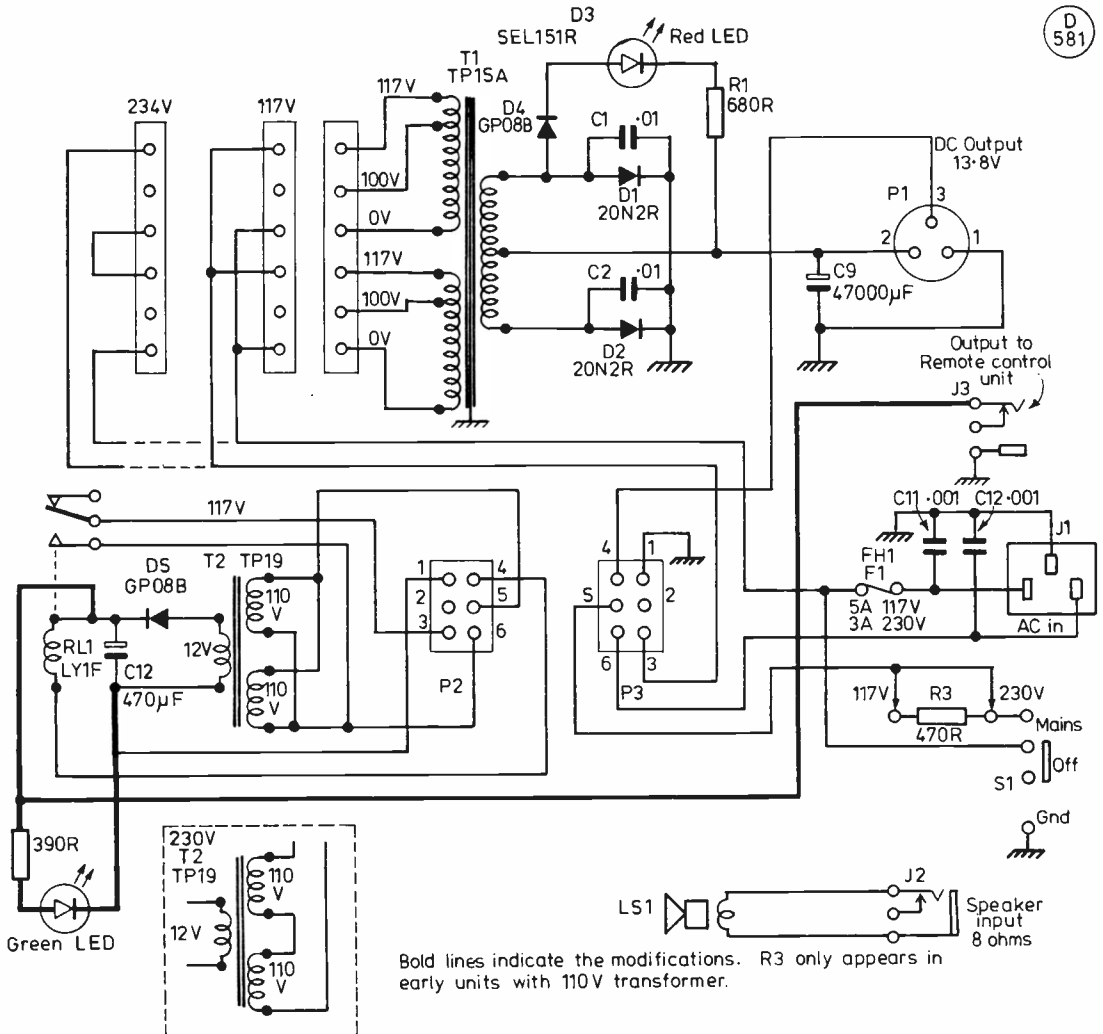


Fig. 1 IC-701 POWER SUPPLY SCHEMATIC DIAGRAM MODIFIED FOR MAINS-ON LED & RM2/3 MEMORY POWER

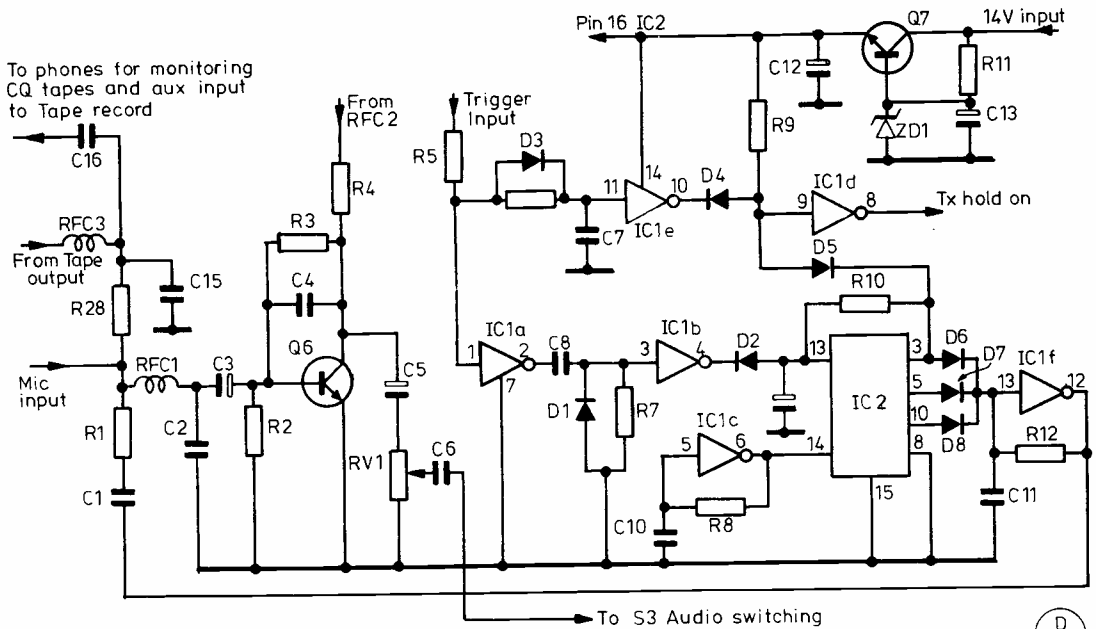


Fig 2 MIC AMPLIFIER AND 'K' GENERATOR

D
582Table of Values
Fig. 2 to Fig. 6

R1 = 390K	C21 = 100 μ F, 25 v.w.
R2, R13, R19 = 10K	C24, C26 = 200 μ F, 25 v.w.
R3 = 47K	RFC1 to RFC3 = wound on
R4 = 6K8	dust iron cores of discarded
R5, R29 = 22K	IF transformers
R6, R7, R8 = 3M3	Q1, Q4, Q5, Q8 = F9012E or
R9 = 4K7	BC327
R10 = 15K	Q2 = F9013E or BC107
R11, R15, R17 = 8K2	Q3 = 2N3053
R12 = 150K	Q6 = F9013I or BC109
R14, R16, R20 = 150R	Q7, Q9 = F9013E or BC108
R18 = 5R, 2 watt	D1 to D8 = 1N4149
R21 = 100R	D9, D14 = 1N4001
R22, R24, R26 = 82K	D10 to D13 = 1N4149
R23, R25, R27 = 680R	D15 to D18 = 1N4149
R28 = 33K	D19, D20 = 1N4001
R30 = 330R	IC1 = 40106
R31 = 33R	IC2 = 4017
RV1 = 220K trimpot	IC3 = TA7313P
RC2 = 1M trimpot	ZD1 = 7.5v. zener
RV3 = 5K log. with switch	ZD2 = 5.1v. zener
C1 = 0.01 μ F	RLA, RLB, RLC = 6v. DPCO
C2 = 2K pF	midjet
C3, C5 = 0.5 μ F	RLD, RLE = 12v. DPCO
C4, C15, C20 = 1K pF	with heavy contacts
C6, C8, C14, C25 = 0.1 μ F	SW1, SW3 = DPCO
C9 = 2.2 μ F, 10 v.w.	SW2 = SPCO
C10, C17, C22 = 0.04 μ F	SW4 = DPCO with centre 'off'
C11, C16, C18 = 5K pF	SW5 = part of RV3
C12 = 200 μ F, 10 v.w.	LS1 = speaker in IC-701 power
C13, C23 = 47 μ F, 10 v.w.	unit
C19 = 30 μ F, 10 v.w.	LED's = red, yellow, green

Note: all resistors are 1/4-watt except for R18.

get to the front grille of the unit. The first available hole in which an LED could be mounted was the second one in from the right at the bottom of the grille: a green LED was therefore placed there and held in position by its snug fit in the moulded hole, helped by a touch of suitable glue. A pair of thin wires were routed back to the relay transformer; the easiest way to do this is to cut, or melt away, a small piece of plastic on the back of the front panel where the bottom panel securing screw is inserted. A 390-ohm limiting resistor was fitted in the positive lead and terminated at the cathode of D5, the 12v. positive supply for the relay; the negative lead from the green LED was terminated on the transformer. Baffle, speaker and front panel were then re-assembled.

However, to provide a power source for the remote control memory a further modification is necessary. From D5 cathode run a single wire to one of the spare tags on the left-hand terminal block on the top of the IC-701PS; as a precaution against short circuit, put a 100-ohm 1/4-watt resistor between this tag and another spare tag on the terminal block. From this second tag, run a wire round the side of the power unit and, having removed the red wire between the fan DC outlet socket and the 33-ohm resistor (R2), attach it to the socket (this socket then should no longer be used to power the optional DC fan). The only change needed on the RM2/RM3 unit is to replace the external memory power plug to one compatible with the fan socket; when doing this, remember that the centre pin is negative.

Modifying the IC-701/IC-211

Having tackled the modifications to the IC-701PS, the next aim was to improve the IC-701. As it stands it is a very good set, but in the author's opinion two things would improve it: having listened to several operators' transmissions with the standard Icom desk microphone, it appeared they were rather lacking in high frequency response, and that the receiver's

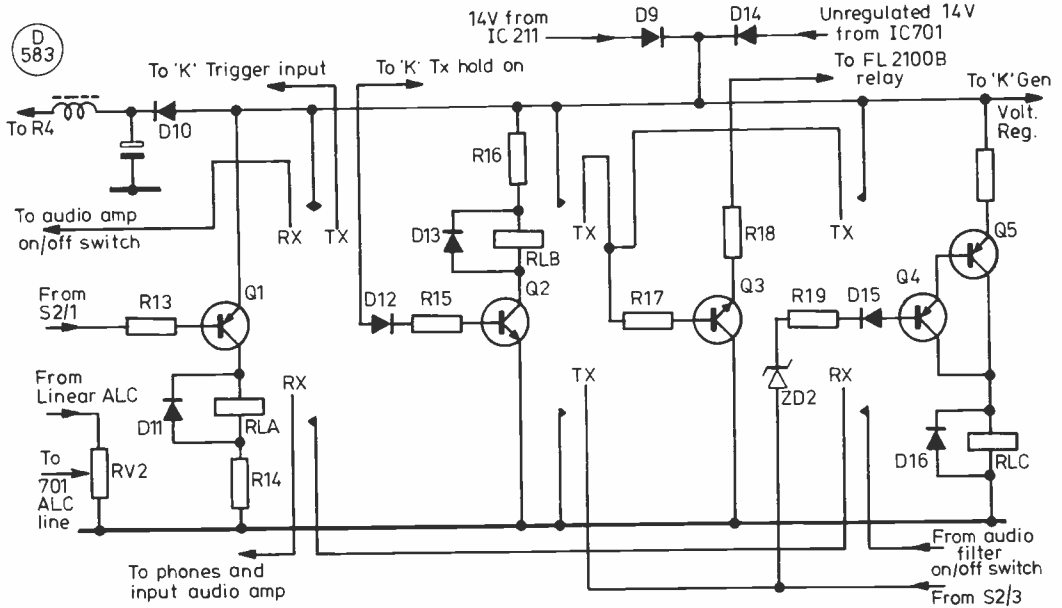


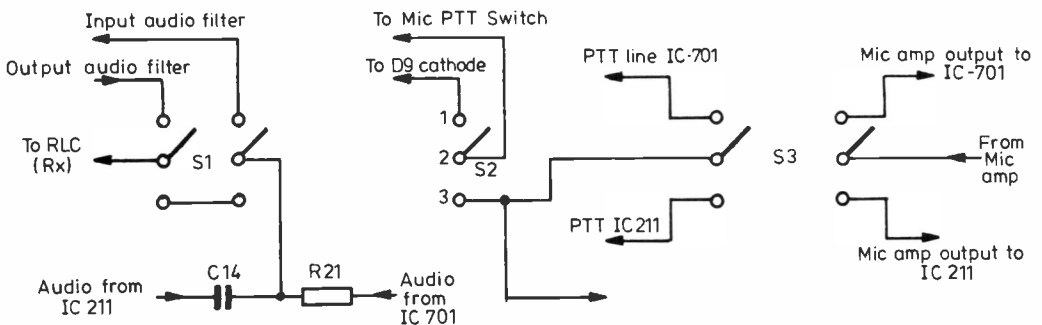
Fig. 3 RELAY SWITCHING

audio output was somewhat 'bassy'. It was decided that as a set of headphones, a boom mic. and an Autek QF-2 audio active filter were available, the boom mic. would be used with a suitable preamplifier, and the audio filter used solely to process the audio to the headphones.

To avoid having to buy the Icom EX-1 interface, the microphone amplifier, Autek filter, the switching for both the IC-701 and IC-211, the 'K' generator and antenna switching would all be incorporated in one cabinet, measuring 2½-in. high x 6½-in. long x 4-in. wide. This interface performs a variety of functions: it interlinks the IC-701 to the IC-211 and throwing a switch permits operation of either unit's transmitter while listening to either set, making it possible to monitor the receiver of the other set. This is most useful when operation on HF, as it is possible to listen on VHF with the IC-211. The writer uses his IC-211 mostly with a Microwave Modules 2 to 6 metre converter, and together with the RM3

which is programmed to scan portions of 2m., 50.040 to 50.200 MHz can be monitored; also, by an additional circuit in the transverter, 52.040 to 52.200 MHz can be covered, alternating between the two bands. As 6 metres is often dead for hours and days at a time, a little audio fed at the same time to the headphones from both the IC-701 and IC-211 alerts the operator to a 6 metre opening whilst concentrating on HF until 6m. opens.

Perhaps a word here about the Autek QF-2 filter is in order. It comes ready-built but without cabinet, speaker output stage, or power supply. The filter consists of a printed circuit board and two double-ganged potentiometers and a three-position switch. In addition, the author incorporated tape recorder input and output sockets to the interface, used primarily to play back pre-recorded CQ tapes which are monitored in the headphones.



- S1 : Audio active filter in/out select.
- S2 : 'K' Generator in/out select.
- S3 : Select Transceiver for Transmit.

Fig. 4 FUNCTION SWITCHING

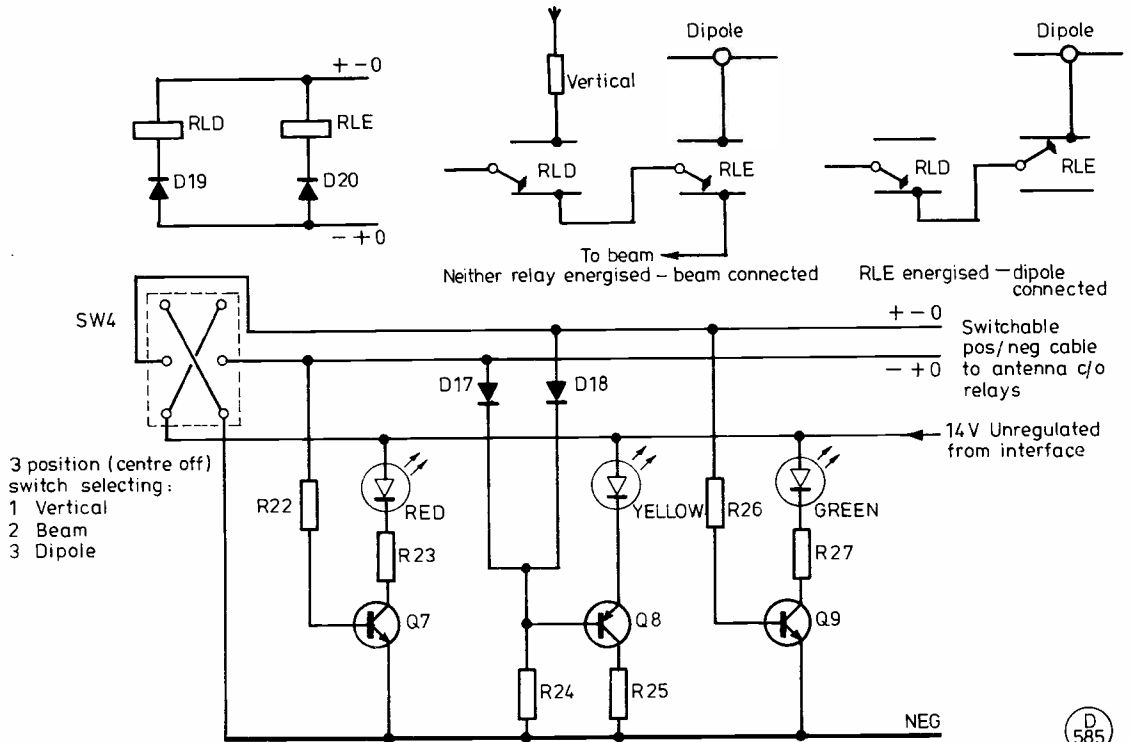


Fig 5 ANTENNA SWITCHING CIRCUIT WITH L.E.D DISPLAY

Actual modifications inside the IC-701 and IC-211 are minor; Fig. 2 to Fig. 6 show the circuits. Remove the base of the IC-701/IC-211 and disconnect the earth wire attached to pin 4 of the mic. socket; then to this point attach a wire to connect to the headphones socket (a bit of trial and error is necessary here to locate the correct point to solder this wire to). In the writer's case, audio was wanted to this lead all the time, and still to be there when a phone plug was inserted to 'kill' the speaker output. The previously unused pin 3 was brought into service to carry the unregulated 12 volts to the interface box; it

is a good idea to add a 10-ohm resistor in this lead close to pin 3 in case of short-circuits during testing and setting-up of the interface box.

At this stage it was felt advisable to modify the Icom microphones to make them compatible with the newly arranged sockets. Thus, the earthing wires to pin 4 of the mic. plugs were removed; then a small amount of plastic was filed away at the plugs and a small tag soldered to the earth wires on the microphone, the tag being eased into the filed-away area of plastic so as to make contact with the metal shell of the plug.

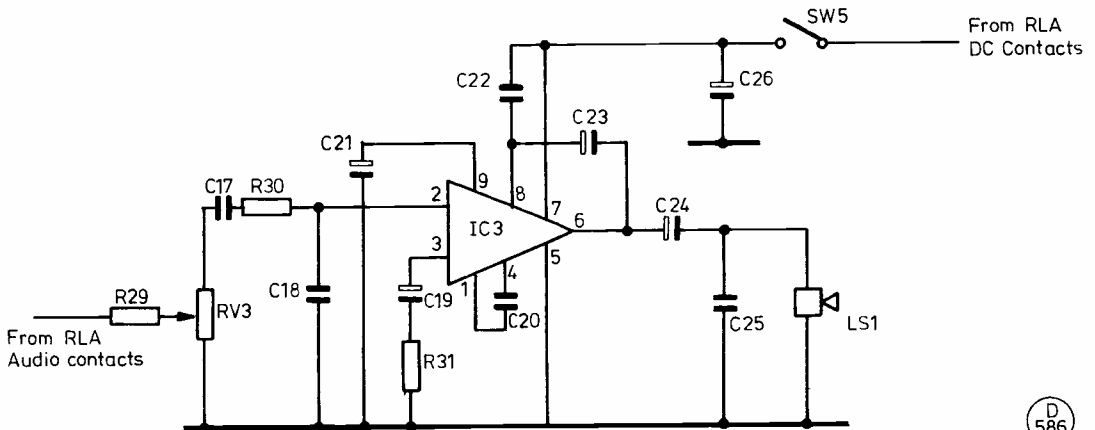


Fig 6 INTERFACE I.C. AMPLIFIER

The fixing grub screw was then screwed in to ensure that the earth wires were securely grounded.

A length of 4-core screened wire was used to connect the IC-701 to the interface box. In a similar manner as described for the microphone, the screen wire was terminated on the metal shell of the mic. plug, and the four wires to the four pins: pin 1 mic. input, pin 2 p-t-t, pin 3 unregulated 12v., and pin 4 audio to the headphones. The screened wire on the metal shell is the earth return. Connecting the IC-211 was a similar process, and both control cables were terminated at the interface with 5-pin plugs and sockets. The Autek filter works very well — efficiently processing the audio to the headphones on all switch positions, and replacing the annoying 'bassy' signal with a clear note to the ears; it is also very effective in nulling out the irritating tuning carriers which DX stations seem to suffer from more than most!

The microphone amplifier and the switching transistors were mounted on a piece of *Veroboard*, as was the optional 'K' generator which was secured to the base of the cabinet by thick double-sided tape. The amplifier section was built close to the headphone/boom-mic. socket. However it is advisable to use RF chokes and ferrite beads to ensure rejection of RF pick-up. The amplifier is suitable for a wide range of low-impedance microphones; an input of 0.05v. peak-to-peak will give an unloaded output in excess of 1.5 volts.

Relays RLA, RLB and RLC are 6v. operation with two changeover contacts in each. If suitable 12v. relays are available, then the 150-ohm resistors in series with the relay coils can be eliminated. However, it is essential to use small quiet, relays so that the mechanical noise from them will not interfere with VOX operation.

On page 19 of the Icom IC-701 handbook, an interface circuit is shown with a 10 K-ohm potentiometer across the linear's ALC line: this value is much too low for the FL-2100B

and damps the ALC voltage far too much. A one megohm trimpot is a more satisfactory value and is mounted on the *Veroboard* with easy access for adjustment.

Interface Cabinet Layout

The layout of the wiring and switches on the interface cabinet is as follows. The 5-pin plug and socket for the cable from the IC-701 is located on the right side of the interface, and on the left side for the IC-211. Also on the left are fitted two small 4-pin plugs and sockets for the linear control and antenna switching, plus the switches to select audio active filter and 'K' generator.

On the front of the cabinet are the controls for the audio active filter, the IC amplifier volume control, and the three LED's indicating which antenna is selected. The right side of the cabinet carries the antenna selection switch, earphone-type sockets for tape recorder in and out, and for ALC output from the linear, plus the transmitter selection switch.

Conclusion

The multi-function interface was first put together in February 1979, and since then a number of changes and improvements have been incorporated into it — the design described here being the author's 'Mk. III' model. During the course of development the interface has been in operation for several hours daily without failing once.

Icom owners may be glad to know of the formation of the Icom International User's Club. Membership costs \$12 U.S. per year for 10 informative newsletters, and the club is run by Robert A. Pohorence, N8RT, 9600 Kickapoo Pass, Streetsboro, OH 44240, U.S.A. — which is the same address for the Trio/Kenwood Club.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

The Bands

Well into the winter conditions now; 28 MHz dead by the time tea was eaten and the shack warmed through, and 21 MHz not lasting much longer. On several occasions Twenty was found to be closed to everywhere by 2200, albeit on occasion things were rather better.

Look Ahead

The ARRL DX Contests first, purely as a reminder, and to note the reversion to the old format, in which the world tries to work the W/VE types — or

should that be the other way round? We gave dates last time out.

Another Top Band contest must be noted: the CQ WW 160 CW one on January 23-25, 2200z Friday to 1600z Sunday now has a fledgling 'brother', same times February 27/March 1 but with all QSOs on SSB. Deadline is February 28 for the CW and March 31 for the SSB entries (postmark), direct to D. McClellon, N4IN, 3075 Florida Avenue, Melbourne, FL32901, USA. Alternatively they can be sent to CQ Magazine at their new address, 76 N. Broadway, Hicksville, NY 11801, USA

— and in either case the envelope should be marked CW or SSB as the case may be. Log sheets should be 40 contacts to the page, each line showing: time GMT, number sent and received, and separate columns for points claimed and multiplier claimed; indicate the multiplier only on the first working. Incidentally, we note that CQ have put in a piece about observation of the "DX Window" over there, and the resultant split-frequency operation, plus a firm statement that they will be cracking down on any violations *hard*.

We seem to be getting conflicting

vibes on the Heard Island DX-pedition; Geoff Watts has it from VK9NS (P29JS as he was known until recently) that the show is still on if the funds are forthcoming. The *DX Bulletin* has it that the costs are in the order of around 100,000 dollars and that the trip may in fact end up by going to Mellish — which is wanted by so many lower down the DXCC listings; also which seems the vital bit, that K6LPL has bowed out of the whole works.

Also from *TDXB*, a note that there is already a blooming amateur radio service in the People's Republic of China, operating on 80, mainly CW and with very low power; progress seems to be slow but steady.

The Y11BGD group is still in existence, and has a new address: RC Baghdad Scientific Centre, PO Box 5864, Baghdad, Iraq. The tribander was taken down, and the Atlas rig, not to mention the complete Drake station donated by JY1, has been moved to their new quarters, but have not been re-erected. The rumours of a serious Iraq operation by nationals of other Arab countries are still, incidentally, buzzing around, and it may well happen in January/February. This time-slot would enable the Iraqi operators to join with the others, at least half a dozen of whom are coming from JY.

TDXB again: the Burma road didn't even make a start this time for JA1KSO — Nob says he was never going to operate from that country at all, and please forget the rumours. And, while the Turkey situation is not yet clear, some small number of TA QSLs are coming out of the country and reaching their destinations. However, it is *not* appropriate to put a callsign on the envelope of a QSL request, which should go direct to the *Call Book* address, as the TA Bureau is not operational. The TAs are undercover and the situation in the country is still very tense.

In the true tradition of optimism, there is a station around signing 1A0KM, from Malta, representing the Sovereign Military Order of Malta, also known as the Knights of Malta — they are hoping to get this past the DXCC rules as being analogous to Mt. Athos.

VK4NIC/3X is going to be in Guinea for some time yet, and seems to be operating from a list taken by W4FRU or WA4WPN on most days at 1600; Ian is only operating 21/28 MHz and has

no facility for split-frequency working at the time of writing, although the word goes out that he has a couple of weeks leave over Christmas and will obtain means of managing a split frequency operation. He is a VK Novice, and isn't keen on pile-ups, although he does realise the fact that Guinea is on a lot of peoples' 'wanted' list. It is also the case that the work he is doing may upset the routine somewhat and he may not be able to put in his appearance on the bands at the specified time.

Lists

Personally, your scribe is of the opinion that the working of a station by way of a list is very closely akin to, and little better than, working a station through a repeater. Others may look at things differently, but my own view is that a list operation should not count towards DXCC credit; G3KFE has never applied for DXCC, but he does "collect" countries in an analogous manner for his private amusement. This way he doesn't have the considerable costs of any QSL-ing other than as a courtesy *via* the Bureau, and he can apply his own rules to make the game a bit harder — no pile-ups and no lists! On the other hand looking at it from the angle of the chap at the sharp-end, who may not be a very savvy operator, the list provides a way of removing the need to sharpen up his wits and learn how to control a pile-up. But it does seem that the list has three things against it, namely, it isn't a QSO, it doesn't help the DX operator learn to control things; and because of the first two, the third follows, which is that the list results in fewer stations being worked in a given time. Have you ever heard a list operation clearing 200 QSOs an hour, which is not as fast as some of the better contest operators can do for several hours at a time?

The Letters

G3NOF (Yeovil) indicates that his recent retirement has brought a change in his operating habits; there is not so much of the early-morning stuff, for example! On Ten, Don noted the short-path openings to the Pacific and ZL, with the VKs following an hour later, 1000z and 1100z respectively. North America from 1100 to 1830, and a few KH6s around 1900; which all added up to 28 MHz SSB QSOs with KH61BA,

N7TT, RH8ACV, VEs, VKs, VP1BEH, VP2MCK, VP2MFL, VP5TC1, W6QL/SV5, W7EOE (Nevada), W7OF, YJ8NPS, 5N0RMJ, 8P6KY, 8P6ON, 8P6OR and 8Q7KK.

Just one contact from G2HKU (Sheppey) on this band, with WA7ZVI (Oregon); but Ted has some hard words to say on the subject of the Poltava Pestilence, which seems to be upping its activities of late.

'CDXN' deadlines for the next three months—

February issue — January 8th
 March issue — February 5th
 April issue — March 5th

Please be sure to note these dates.

21 MHz

Conditions on 21 MHz, says G3NOF, have been broadly similar to those on Ten, although the openings have been later; VKs on the short path peaking between 1200 and 1400z, and at the same time signals coming in from P29, YB, FK8, and such, while the Americans have been about from noon until 2000. SSB made QSOs with: AP2MC, A9XDB, FK0DH, H44JB, HK8BVN, HK0FBF, HPIACK, HS1AMB/P, HS4AMI, K7AII (Oregon), KH6WU, P29NBF, P29NRL, P29NSF, TF3HN, TF3YH, TN8AJ, UN1CC, VE1AI/1 (Sable Is.), VKs, VK9ZG (Willis Is.), VP2SAM, W6QL/SV5, YC2BJR, YJ8NPS and YK1AO.

And, that's all the mention of 21 MHz we have — no doubt some will arrive, in full accord with Murphy's Law, just after the piece has gone to the printers!

14 MHz

As always, is where the pay-dirt is, although at sunspot peaks like the present some of the traffic creams off to 21 and 28 MHz; but to be any good as a DX-er, you have to be able to cope with 14 MHz in one of its more frustrating moods.

G4BUE (Upper Beeding) notes that the G-QRP Club has reached the 1,000 members mark. None of us thought, when G3RJV first mooted the idea back in 1974, that it would ever come

up to 1,000 members, or that the membership would rise at the same rate in the bottom of the cycle of sunspots as at the peak. Chris played 14 MHz CW in preparation for the CQ WW CW effort in which he made a serious attempt with the QRO; down with the tri-bander and up with a home-brew special 4-element beam carefully set up. The result was of the order of 1800 QSOs, in 28 zones and 76 countries, to give a multiplier of 104 — rather disappointing in its way, but there was a definite lack of Asia and Africa activity. So, in sum, QRP on this band included VK3LCU/2 on Lord Howe Island, KH6IM, 4U1UN, VS6EY, and a load of W6s while checking the beam through. In the contest it was full power, and Chris notes VP2KAA, PJ2CC, AL7Z, HI3JEI, ZD8TC, A35VU, FP8AP, HZ1HZ, K2LE/DU2, AL7H, HH2VP, NP4A, EA9EU, 6Y5YL, KL7PJ, VE1A1/I on Sable, 5Z4MM, KV4AA, 8P6M, 8P6J, LX8CA, 8Q7BD, KH6BZF, ZB2EO, OY6FRA, VU2JN, 5W1BZ and KH6ND.

For G3NOF, Twenty was a matter of long-path VK/ZLs peaking at about 0800-0930, while the short path was frequently noted to be open right through to 1900, but little has been heard of Africa or the Pacific, save for T3AT (often a good signal around 1900). Don talked to HK3DDD, HK0FBF, J3AH, SU1BA, T3AT, VP2MH, VQ9RS, VU2PP, XT2AU and 6O0DX.

It was also SSB for G2HKU, who stuck to SSB for his morning skeds with ZL1VN, ZL1SV, ZL3RS, ZL3SE, ZL3FV.

Forty

This is a band which is unfairly neglected; given an adequate aerial for the site, there is good stuff there on most evenings at times when most people can get on and chase it — all you need is a good receiver front-end, plenty of selectivity to wind in as required, and a notch filter; though unless you have learned to drive your station you won't hear a thing! But, once the knack is learned, then there is much good stuff for the taking. Anyone who has the 100 countries up on this band is both patient and knowledgeable.

G2HKU (Sheppey) used his SSB to raise 9H1BB, and CW for N400, W4AI, N6YK/VP2A, UA9UGD, KP2A,

4U1UN, and TA2TAT; while a little bit of QRP — 3 watts — was enough for a CW exchange with DJ3GS. Otherwise, the reporters seemed to be celebrating the coming of Christmas by ignoring Forty altogether.

A somewhat similar treatment was meted out to Eighty; but the G-QRP Club Activity Weekend did show how things were — a listen round 7030 kHz was a revelation as to the level of QRP activity, with lots of QRP-QRP contacts. Incidentally, while talking about QRP, we have it that there are negotiations going on between the various national QRP clubs for some sort of International QRP contest and maybe even a QRP Field Day, which should be fun.

Eighty

Our first offering comes in from G2HKU, who stuck to 2 or 3 watts of CW to work HA6NQ and GW4FXF.

G3ZPF (Dudley) was at the Leicester show on the Thursday and wondered where the writer was. Otherwise occupied! David makes a valid comment on the show when he said it took him an hour to get to the head of the queue to get in, and he has some scathing remarks to make about the catering facilities. The problem is that the show has grown so much since the earlier days that it does really need a bigger venue — but that means far higher cost, which would inevitably result in much falling-away among the exhibitors (not to say far higher charges for eating!); and someone has to put up the guarantee when the Hall is first booked; we can't see the ARRA members, with the best will in the world, putting up the guarantee for a booking either at Birmingham or one of the London exhibition Halls — our hobby is just not up to it. However to return to the matter in hand, G3ZPF was on Ten for the local nets, and prowling around late at night on Eighty CW, where he heard a couple of VEs and Ws, and one VO1, all with such a pile-up on them that he was satisfied that the DX on the band is just rare, rather than not being picked up in the G3ZPF receiver. However, one solitary UA9 was snaffled just to prove everything still worked. On a different tack again, the micro-computer is now being taught how to act as a fast/slow (or slow/fast) scan converter for SS/TV use. Amazing what these APPLES can be made to do.

Top Band

G3PKS (Wells) found the HF bands in pretty fair shape and so to make things a bit harder he went for a forage around Top Band. With Top Band MCC and the CQ WW 160 there was plenty of opportunity to peek around; and Jack found he was making some 70 odd QSOs including the local nets in the month, plus the gotaways. As Jack as yet hasn't got the split-frequency facility organised, there were more than the gotaways listed, the remaining category, one supposes, being headed "unworkable from this station!" A number of GMs plus DJ4AX, DF3KT, LA2EG, LA9SC, DK1CU, LA2EG again, OZ1LO, DL0FJ/P, OE5KE, UK2RDX, OH0NA, DJ6TW, DL3OO, DJ4AX, OK1DF, UP2PAP, PA0HIP, and DL0KF; the gotaways including UA3DQS, UL7CAD, EA, F8DC, OL7CMY, DL6AA and others. Other Gs were to be heard making better contacts, and a very warming Sunday-morning session listening to the Transatlantics. The message, says G3PKS, to all the waverers is "Get back on the Top Band — it's great!"

Top Band seems to have attracted G2HKU also, as Ted mentions SSB contacts with GW3EOP, GM3ZQM/P, PA0PN, and PA3AJT; CW was used to work LA9SC, LA2EG, EA5HM, LA9YF, DL1SN, LA5HE, DJ4AX, LA9OC, OZ1LD, UK2PCR, LA7AH, U1ML (Archangel), UP2BAW, UA1DZ, UL7CAD, OE1XA/3, OE3XMS and OE6RXG.

So — there it is for another month; we hope to have some more reports for next time round, and would appreciate word from those who have not been in touch. But, for now, Good Hunting!

Deadline

The dates are in the 'box', as usual. The address is "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. For those few who write directly, please note that the writer is no longer QTHR, and so *all* his mail should go to the Welwyn office. For the rest, our thanks to all those who have supported this piece in 1980, and we hope you will stay with us in 1981; and, for those who dropped out of the habit of letter-writing, we would like to hear again of your doings on the air. A Happy 1981 to all who read this piece, and all who contribute to it.

Western Electronics


TRIO
Western FOR BOTH YAESU and TRIO

TRY A Western PACKAGE TO START 1981

THE '707 PACKAGE


 FT-707
 +
 FP-707
 +
 FC-707
 +
 YM-36 mic

 only **£555**

LIST PRICE SEPARATELY £573.95

THE '101Z PACKAGE


 FT-101Z
 +
 FC-902
 +
 YE-7A hand mic

 only **£579**

 LIST PRICE SEPARATELY £593.50
 ADD £80 FOR 'ZD — ADD £14 FOR DESK MIC

THE '9000 PACKAGE FOR VHF

 TRIO TR-9000
 + BO-9 BASE
 + PS-20 POWER SUPPLY

 only **£389**

LIST PRICE SEPARATELY £402.45

THE '720 PACKAGE FOR V/UHF

 YAESU FT-720RV (2M)
 + E-72L EXTENSION CABLE
 + FP-4 POWER UNIT

 only **£305**

ADD £30 FOR FT-720RU (70CM)

THE '120 PACKAGE (while stocks last)

 TRIO TS-120S
 + PS-30 POWER SUPPLY
 + MC-35S MICROPHONE

 only **£499**

THE '7625 PACKAGE (while stocks last)

 TRIO TR-7625 (25W 2M)
 + RM-76 REMOTE CONTROL UNIT

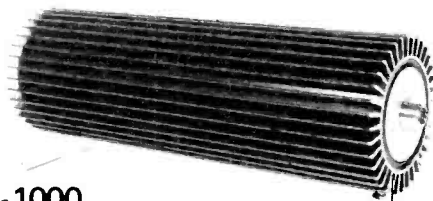
 only **£279**

JUST TWO FROM OUR SELECTION OF STATION ACCESSORIES

NEW!
POWER/SWR METER
 1.8 to 500 MHz


YES! — A power meter that covers all bands 1.8 to 500MHz.

- * Sensors (a) 1.8-160MHz, 1kW, SO-239 connectors
- (b) 1.8-200MHz, 200W, SO-239 connectors
- (c) 130-500MHz, 150W, N-type connectors
- * Measures SWR, FWD, REFL power
- * Push button selection of sensor to meter
- * Size 220(W) x 91(H) x 113(D); weighs 1.8kg.

£69.95

MDL-1000
DUMMY LOAD

These popular dummy loads should be in stock again by the time you read this. Rated at 300W continuous or 1000W intermittent; suitable at HF or VHF, fitted SO-239 socket and chrome stand; oil filled and sealed

£29.95
ALL ABOVE LISTED PRICES INCLUDE VAT AT 15% AND CARRIAGE

Western Electronics

Lift Yourself Above the QRM with WESTOWER

FEATURES

- ★ Heights from 25 ft. to 120 ft.
- ★ Self supporting (no guys) up to 58 feet.
- ★ Full headloads up to 75 mph (Standard Series) or 100 mph (Heavy Duty Series) — reduced loading above these speeds.
- ★ Unique Framed Base Plate for mounting. Post or wall mounts also available on Standard Series.
- ★ All have reinforced head units.
- ★ Heavy duty towers have auto-braked winches.

A range of steel lattice telescopic, tilt over towers offering high strength at moderate prices. Used extensively by commercial and professional bodies, the WESTOWER is designed to the latest British Standards by our own Chartered Engineers and manufactured in our own factory using modern electrically controlled welding techniques.

DON'T FORGET!

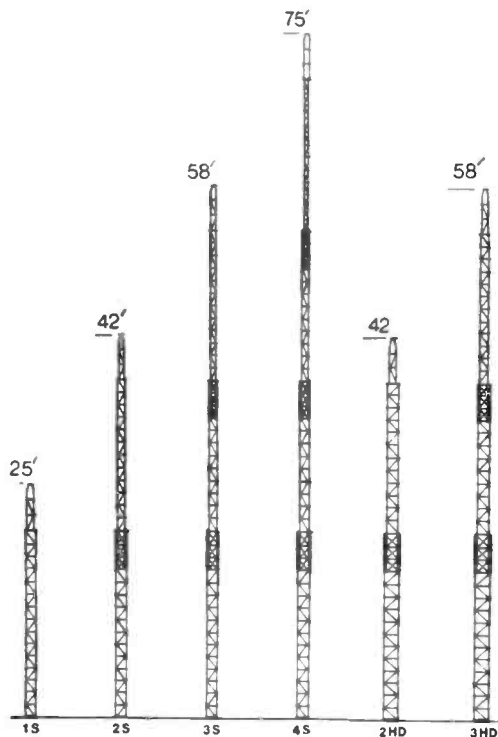
With WESTOWER you deal DIRECT with the DESIGNERS/MANUFACTURERS and NOT WITH THE AGENTS.

FIRST HAND INFORMATION AND ADVICE is YOURS for the asking.

SEND FOR LISTS OF OTHER
EQUIPMENT AVAILABLE
(LARGE SAE PLEASE)
ACCESS — VISA — H.P.

(ask for written quotations)

CREDIT CHARGE CONTINUOUS
CREDIT — SEND FOR DETAILS.



DESIGNED and MANUFACTURED in GREAT BRITAIN by **Western**

Western Electronics (UK) Ltd

FAIRFIELD ESTATE
LOUTH, LINCS, LN11 0JH
OPENING HOURS: — 0900-1200; 1300-1700 Mon/Fri; SATS
only BY APPOINTMENT 0900-1200.

Tel. Louth (0507) 604955

Telex: 56121 WEST G

SCOTLAND
Jim Henderson, GM4HKW
FALKIRK (0324) 25559

NORTHERN IRELAND
Les Lyske, GI3CDF
NEWTOWNARDS (0247) 812449

SOUTHAMPTON
Alan Paxton, G4BIZ
SOUTHAMPTON (0703) 582182

LEICESTER
Mays Hi-Fi, Churchgate
LEICESTER (0533) 58662

MAIL ORDER FROM



by two way
FREEPOST

MICROWAVE MODULES

MMT 432/28S	£149.00
MMR 432/144R	£184.00
MMT 28/144	£199.00
MMT 144/28	£99.00
MMC 28/136	£27.90
MMC 28/156	£27.90
MMC 29/144	£27.90
MMC 144/any IF	27.90
MMC 144/28LO	£29.90
MMC 70/any IF	£27.90
MMC 432/28S	£34.90
MMC 432/144S	£34.90
MMC 1296/any IF	£32.20
MMC 050/500	£69.00
MMA 28preamp	£14.95
MMA 144V preamp	£34.90
MMV 1296/28	£32.20
MML 144/100linamp	£142.60
MML 432/100linamp	£228.85
MML 144/25linamp	£59.00
MML 432/50linamp	£119.00
MM 2000	£169.00

MONITOR RECEIVERS

SX 200 Scanning Receiver	£240.00
STANDARD c800 10ch + 1 low power transmit CH	£79.00
AR 22 Pokcer Receiver 144-150 MHz	£91.50

ROTATORS

Skyking SU 4000	£79.00
Emoto 502CXX	£139.75
KR 400	£105.00
AR 40	£59.00
KR 9502A	£50.00
Rotor Bearing	£12.00

*All items VAT and carriage paid.

MORSE KEYS

HK 707 Straight Up/Down keyer	£11.44
BK 100 Semi-automatic mechanical bug	£17.88
MK 702 Up/Down keyer on marble base	£22.43
MK 702 Manipulator	£22.43
MK 704 Squeeze paddle	£14.38
MK 705 Squeeze paddle on marble base	£22.43
EKM 1A Morse code practice oscillator	£8.63
MK 1024 Automatic memory keyer	£135.13
EK 150 Semi/Automatic keyer	£74.75

LINEAR AMPLIFIERS

2M10-80P 144MHz 10W input/80W output with 9dB preamp	£138.00
2M25-150P 144MHz 25W input/150W output with 9dB preamp	£184.00
2M10-150P 144MHz 10W input/150W output with 9dB preamp	£209.88
2M3-150P 144MHz 3W input/150W output with 9dB preamp	£209.88

G. WHIP Mobile Antennas

Tribander 10-20 Slide	£24.73
L.F. Coil 40/80/160 MTS	£6.56
L.F. Whip Telescopic	£3.34
Multimobile 10-20 Auto	£28.75
M/Mobile Coil 40/80/160	£6.56
M/Mobile Whip Telescopic	£3.34
Flexiwhip 10M Mast	£17.25
F/Whip Coils 40/80/160	£6.56
Base Standard	£4.49
Base Heavy Duty	£5.75
Extensarod	£11.50

UNADILLA/REYCO

Antenna Traps - Precision moulded coil forms stainless - hardware - Aluminium tube irridit finish - Coated aluminium wire. Fully waterproofed.
Available 7/14/21 MHz £10.99

W2AU BALUN

3.5/30 MHz 2.5 Kw with Lightning Arrestor - Suitable Vees, Yagis, Doublets, Quads etc. £10.99

STANDARD

C8800 2m Tcwr	£252.00
C7800 70cms Tcwr	£275.00

DETRON

GLA 1000 Linear Amp 10/80 1Kw	£295.00
MLA 2500 Linear Amp 10/160 2Kw	£699.00
MT 3000 3Kw Tuner/SWR/Dummy Load	£275.00

AR 245

5/1 watt transceiver	£179.00
ICOMIC 2E handheld	£155.00

SWR/RF POWER METERS

SWR 25 3.5/170 MHz	£12.94
LEADER LPM 885-HF 1Kw	£58.00
HANSON 3.5/150MHz 200w	£28.75
REECE UHF 74 144/432	£16.28
HANSON FS 500H 1.8/60MHz 2Kw	£67.85
OSKAR SWR 200 3.30 MHz 2Kw	£40.00

SHURE MICS

201 Hand ceramic omnidirectional high impedance	£14.49
202 Hand ceramic noise reducing high impedance	£15.18
401A Hand controlled magnetic high impedance	£16.56
401B Hand controlled mag. low impedance (200 ohms)	£16.56
444 Desk adjustable height controlled magnetic	£32.43
526T Desk controlled response transistor preamp	£39.33

DUMMY LOADS

DL20 30W DC-150MHz with PL259 connector	£6.33
T-80 80W DC-500 MHz with SO239 connector	£22.94
T-150 150W DC-500MHz with SO239 connector	£32.78

STILL HELPING WHERE IT HURTS

Here's a list below to make buying easier for you - Work it out yourself - You'll see - It really is easy!

Product	List Price	Deposit	12 Payments
Yaesu FT 902DM	£799	£312	£40.54
Yaesu FRG 7700/S	£309	£120	£15.80
Yaesu FRG 7700S/2M	£315	£120	£16.29
Yaesu FRG 7700M	£389	£189	£16.69
Yaesu FRG 7700M/2M	£399	£199	£16.69
Yaesu FRG 7000	£299	£115	£15.30
Yaesu FT 101ZD	£569	£223	£28.81
Yaesu FT 101Z	£488	£190	£24.84
Yaesu FT 225RD	£499	£194	£25.43
Yaesu FL 2100Z	£362	£180	£15.20
Yaesu FT 707	£500	£200	£25.04
Yaesu FT 480R	£359	£175	£15.30
Trio R 1000	£298	£115	£15.20
Standard C8800	£252	£99	£12.71
Standard C7800	£275	£109	£13.81

Many Other Items Available on Similar Terms
Call for Details

FDK Multi 700EX

£199.00

FDK Multi 750E

£299.00

Send 30p for our bumper bundle literature

No Quibble Guarantee
Same Day Despatch
All Items Advertised

Choose your AMTECH here

Amtech 100 Mobile Match	£16.95
Amtech 200 Random Wire ATY 10-160m	£25.95
Amtech 300 Random and Coax Fed ATU	£39.95
Amtech CW 250 - The most outstanding CW filter available	£24.90
Amtech Channelguard - A plug in device to eliminate those unwanted stations	Decoder £15.25 Sender £7.25
Amtech FM7: FM Demodulator for FRG 7	£11.90

ANTENNAS

Wide range in stock including JAYBEAM - HYGAIN - CUSHCART - ASP TELECON - HOKUSHIN etc.	
Bantex 5/8 whip complete antenna	£8.99
Bantex 1/4 w whip complete antenna	£3.50

NO POSTAGE REQUIRED

AMCOMM SERVICES,
FREEPOST,
HARROW HA2 0BR.

Please send me

atenclosed cheque/P.O. for

.....or charge my VISA/ ACCESS

Nr.....

Name

Address

.....Post Code.....

AMCOMM SERVICES

194 NORTHOLT ROAD, SOUTH HARROW, MIDDX.

Telephone: 01-864 1166, 01-422 9585

Opposite South Harrow Tube Station on Piccadilly Line

Showroom Opening Hours
Tuesday to Saturday 9 - 5.30
Sunday by Appointment

All items over £100
available on easy terms
at List Price

P.M. ELECTRONIC SERVICES

PROFESSIONAL COMPLETE CRYSTAL SERVICE AMATEUR

Prices shown exclude VAT — UK Customers please add 15%.

70 CM CRYSTALS

Due to the much higher multiplication involved (3 times that on 2m) all our stock 70cm crystals are to much higher tolerances than our standard range. We are stocking the following channels: RB0 (434.60/433.00), RB2 (434.65/433.05), RB4 (434.70/433.10), RB6 (434.75/433.15), SU8 (433.20), RB10 (434.85/433.25), RB11 (434.875/433.275), RB13 (434.925/433.325), RB14 (434.95/433.35), SU18 (433.45), SU20 (433.50) — TX & RX for use with — PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) AND UHF PF70 Range, and STORNO CQL/COM 662 all at £2.32. For the U450L Base Stn we have the TX crystals for the above channels. The RX crystals for the U450L Base Stn together with TX and RX crystals for any other 70cm channel (eg RB/SU12 (434.90/433.30) RTTY, SU16 (433.40), SU22 (433.55) etc.) for most UHF equipments are available at £4.48 for crystals up to 63MHz, and £5.16 for 63 to 105MHz to amateur spec or £5.26 for up to 63MHz and £6.06 for 63 to 105MHz to the same closer spec as our stock items. Delivery approx. 5/6 weeks.

TWO METRE CRYSTALS

CRYSTAL FREQUENCY RANGE USE (Tx or Rx) and HOLDER	OUTPUT FREQUENCY									
	4 MHz-TX-HC6/U	6 MHz-TX-HC25/U	8 MHz-TX-HC6/U	10 MHz-RX-HC6/U	11 MHz-RX-HC6/U	12 MHz-TX-HC25/U	14 MHz-RX-HC25/U	18 MHz-TX-HC25/U	44 MHz-RX-HC6/U	52 MHz-RX-HC25/U
144.4 (433.2)	b	e	e	e	e	e	e	e	e	e
144.480	e	e	e	e	e	e	e	e	e	e
144.800	e	e	e	e	e	e	e	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e
145.000/R0T	a	a	a	a	a	a	a	a	a	a
145.025/R1T	a	a	a	a	a	a	a	a	a	a
145.050/R2T	a	a	a	a	a	a	a	a	a	a
145.075/R3T	a	a	a	a	a	a	a	a	a	a
145.100/R4T	a	a	a	a	a	a	a	a	a	a
145.125/R5T	a	a	a	a	a	a	a	a	a	a
145.150/R6T	a	a	a	a	a	a	a	a	a	a
145.175/R7T	a	a	a	a	a	a	a	a	a	a
145.200/R8T	a	a	a	a	a	a	a	a	a	a
145.300/S12	e	e	e	e	e	e	e	e	e	e
145.350/S14	e	e	e	e	e	e	e	e	e	e
145.400/S16	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e
145.450/S18	e	e	e	e	e	e	e	e	e	e
145.475/S19	a	a	a	a	a	a	a	a	a	a
145.500/S20	a	a	a	a	a	a	a	a	a	a
145.525/S21	a	a	a	a	a	a	a	a	a	a
145.550/S22	a	a	a	a	a	a	a	a	a	a
145.575/S23	a	a	a	a	a	a	a	a	a	a
145.600/R0R	a	a	a	a	a	a	a	a	a	a
145.625/R1R	e	e	e	e	e	e	e	e	e	e
145.650/R2R	e	e	e	e	e	e	e	e	e	e
145.675/R3R	e	e	e	e	e	e	e	e	e	e
145.700/R4R	e	e	e	e	e	e	e	e	e	e
145.725/R5R	e	e	e	e	e	e	e	e	e	e
145.750/R6R	e	e	e	e	e	e	e	e	e	e
145.775/R7R	e	e	e	e	e	e	e	e	e	e
145.800/R8R	a	a	a	a	a	a	a	a	a	a
145.950/S38	a	a	a	a	a	a	a	a	a	a

CRYSTALS MANUFACTURED TO ORDER

Prices shown are for one off, to our amateur spec., closer tolerances are available, please send us details of your requirements.

A Low frequency fundamentals in HC13/U or HC6/U

Adj. tol. ±50ppm. Temp. tol. ±100ppm 0 to + 70°C.

6.0 to 19.999kHz	£ 28.12	80 to 99.999kHz	£ 10.06
20 to 39.999kHz	£ 17.74	100 to 159.999kHz	£ 9.25
40 to 79.999kHz	£ 12.40	160 to 499.999kHz	£ 6.19
		500 to 799.999kHz	£ 7.30

B High frequency fundamentals/overtones in HC6/U, HC18/U or HC25/U

Adj. tol. ±20ppm. Temp. tol. ±30 ppm - 10 to 60°C.

*800 to 900.9kHz (fund)	£ 9.75	*21 to 24.99MHz (fund)	£ 6.73
*1.0 to 1.499MHz (fund)	£ 10.36	*25 to 30MHz	£ 8.28
*1.5 to 2.599MHz (fund)	£ 4.98	*15 to 62.99MHz (30/T)	£ 4.48
*2.6 to 20.99MHz (fund)	£ 4.48	*60 to 105MHz (50/T)	£ 5.16
*3.4 to 3.999MHz (fund)	£ 6.21	*106 to 125MHz (50/T)	£ 7.76
*4.0 to 5.999MHz (fund)	£ 4.93	125 to 180MHz (O/T)	£ 7.50
*6.0 to 20.99MHz (fund)	£ 4.48	180 to 25MHz (O/T)	£ 12.49

Delivery * Normally 5/6 weeks (express available), all other frequencies 7/8 weeks. Holders: Low frequencies HC 13/U or HC 6/U dependent on frequency. High frequencies are available in HC 6/U, HC 18/U or HC 25/U unless marked * only available in HC 6/U or ‡ only available in HC 18/U and HC 25/U, HC 17/U (replacement for FT 243) and HC 33/U (wire end HC 6/U) available as per HC 6/U above at 30p extra on HC 6/U price. Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

CRYSTALS FOR PROFESSIONAL USE

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Also for commercial use, eg TV or computer crystals, etc, we can supply at very competitive prices. Please send S.A.E. for details or telephone between 4.30-7pm and ask for Mr. Norcliffe.

EXPRESS SERVICES

Many types made to order crystals are available on our EXPRESS SERVICE with a delivery of three days on our class "A" service. Telephone or Telex for details.

TERMS: CASH WITH ORDER — MAIL ORDER ONLY — S.A.E. WITH ALL ENQUIRIES — PRICES INCLUDE P.&P. (BRITISH ISLES) EXCEPT WHERE STATED — OVERSEAS CHARGED AT COST.

PRICES: (a) £1.95; (b) £2.32; (c) £2.50; (e) £4.48.

AVAILABILITY: (a), (b), (c) stock items, normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could be able to supply from stock.

N.B. Frequencies as listed above but in alternative holders and/or non stock loads are available as per code (e).

ORDERING. When ordering please quote (1) Channel; (2) Crystal frequency; (3) Holder; (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

4M. CRYSTALS FOR 70.26 MHz — HC6/U

TX 8.7825 MHz and RX 6.7466 MHz or 29.780 MHz £2.32.

10.245 MHz 'ALTERNATIVE' IF CRYSTALS £2.32. For use in Pye and other equipment with 10.7 MHz and 455 kHz IF's to get rid of the "birdy" just able 145.0 MHz in HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS — HC6/U, HC13/U and HC25/U (Low loss) 16p each

CONVERTER/TRANSVERTER CRYSTALS — HC18/U

All at £3.00, 38.6666 MHz (144/28), 42 MHz (70/28), 58 MHz (144/28), 70 MHz (144/4), 71 MHz (144/2), 95 MHz (342/52), 96 MHz (1,296/432/144), 101 MHz (432/28), 101.50 MHz (434/28), 105.6666 MHz (1,296/28) and 116 MHz (144/28).

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS

200 KHz and 455 KHz in HC6/U £3.50
100 KHz in HC13/U and 1 MHz in HC6/U £2.95
5 MHz in HC6/U and 10 MHz + 10.7 MHz in HC6/U + HC25/U £2.80

CRYSTALS FOR MICROPROCESSOR USE

Please let us know your requirements eg 4 MHz HC 18/U 1 off £2.00, 100 off £1.10, 1000 off 90p, 25,000 off 50p.

ANZAC MD-108 DOUBLE BALANCED MIXER

5-500 MHz supplied with full details for only £6.95.

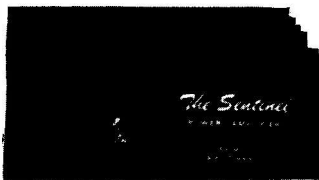
S.E.M.

P.O. BOX 6, CASTLETOWN, ISLE OF MAN

Tel: MAROWN (0624) 851277

HAPPY NEW YEAR TO ALL

WE HAVE THE
TECHNOLOGY TO
IMPROVE YOUR
STATION IN 1981



NEW! SENTINEL L. F. CONVERTER. 10KHz-2MHz IN. 28-30MHz OUT. 9-12V. 5mA. £20.80 Ex stock.

SENTINEL DUAL GATE MOSFET 2 METRE CONVERTERS. IFs: 2-4, 4-6 or 28-30MHz. 1db N.F. 30dB gain 9-12V. 15mA. £24.73 Ex stock.

SENTINEL X 2 METRE CONVERTERS. Some as above plus mains power supply. £28.80 Ex stock.

SENTINEL TOP BAND CONVERTER. 1.8 - 2.3MHz IN. 14-14.5MHz OUT. 9-12V. 5mA. £20.80 Ex stock.

SENTINEL 70 70cm CONVERTER 432-434MHz IN. 28-30MHz OUT. 12V. 20mA. £28.80 Ex stock.

SENTINEL 2 METRE or 70CM PRE-AMPLIFIERS

These units have been redesigned to give the ultimate in performance and reliability. They now use the latest 3rd generation Dual Gate Mosfet (BF900 series) and have an r.f. gain to control the gain down to unity. N.F. 1db (2M) gain 18db. Four models to suit your requirements.

1. SENTINEL AUTO FET PRE-AMPLIFIER.

From the inventors of R.F. switched pre-amps. Connects straight into transceiver aerial lead and the R.F. switch changes over between transmit and receive on any mode. 9-18V. Size: 1½" x 2¼" x 4". Price: £25.00* 2 metres. £28.80* 70cm. Both Ex stock.

2. PA5. 2 Metre pre-amplifier.

Same as the SENTINEL AUTO but with mains power supply. Size: 3¼" x 6¼" x 2¼". Price: £30.00 Ex stock.

3. SENTINEL STANDARD

Same high specification less r.f. switching - £15.00* 2 metres. £17.50* 70cms. Ex stock.

4. PA3. The original miniature pre-amplifier.

Size 1 cubic inch to fit inside transceivers. Same performance as above - Price: £7.50 2 metre. £10.70 70cms. Both Ex stock.

All these pre-amps are available for other frequencies. Marine band Ex stock.

SENTINEL 2 METRE POWER PRE-AMPLIFIERS

From the inventors of combined Power/Pre-amps. **ULTRA LINEAR - ALL MODES.** Switch STRAIGHT THROUGH when OFF. R.F. switch operates at .1W. Fully SWR protected transistors. Provide same power gain at lower drive powers. Supply 13.8V (12-16V). Receive pre-amp. 1db N.F. 18db gain. SO239s. Three models to suit your transceiver. These units have all been re-designed to make use of the latest techniques for highest reliability and performance.

SENTINEL 30. 10 times power gain. 3W IN 30W OUT. Maximum drive 5W. 3.2 amps. 6" x 2¼" front panel, 4½ deep. £50.00 Ex stock.

SENTINEL 50. 5 times power gain. 10W IN 50W OUT. Maximum drive 16W 6amps. Same size as the Sentinel 30. Ex stock.

SENTINEL 100. 10 times power gain. 10W IN 100W OUT. Max. drive 16W. Size: 6½" x 4" front panel, 3½" deep. 12 amps. Price: £126.50 Ex stock. All available less pre-amp for £8.00 less.

MAINS POWER SUPPLIES FOR SENTINEL POWER/PRE-AMPLIFIERS.

6 amps for the 30 and 50. £34.50. 12 amps for the 100 £47.00. Both Ex stock.

SENTINEL H.F. WIDEBAND PRE-AMPLIFIERS

2-40MHz. 15db gain. Ideal for 15 and 10 metres and OSCAR or an ACTIVE AERIAL. 9-12V Size: 2¼" x 1½" x 3". Two versions.

1. SENTINEL STANDARD H.F. PRE-AMPLIFIERS

Performance as above £10.00* Ex stock.

2. SENTINEL AUTO H.F. PRE-AMPLIFIERS

Same performance as above with a change over relay, r.f. operated by your transceiver for direct connection in your aerial co-ax. £16.93* Ex stock.

S.E.M. IAMBIC KEYS

Undoubtedly the best keyer circuit. It uses the CURTIS custom designed CMOS LSI chip. Sidetone, tunes, etc. As users say "I've never been able to use one before" £34.50 Ex stock.

NEW! The World's first CMOS Twin Paddle Morse Key Gold plated touch contact paddles with CMOS technology and no mechanical adjustments for only £15.00. Ex stock. No supply is required when used with the S.E.M. Keyer.

S.E.M. TRAN Z MATCH has had a few changes too. NOW covers 160-10M. The most VERSATILE transmatching system. Will match from 15 to 5000 Ohms BALANCED or UNBALANCED at up to 1KW. Link coupled balun means no connection to the equipment, which can cure TVI both ways. 160-10M TRAN Z MATCH £57.00. 80-10M £50.00. EZITUNE built in for £19.50 extra. SO239 and 4mm connectors for co-ax or wire feed.

S.E.M. EZITUNE - JOIN THE RUSH

Makes SWR Bridges obsolete. Noise generator and 50 Ohms SWR Bridge and R.F. Switch combine to allow you to tune up your transmatch etc. without transmitting. Saves your P.A. Stops Q.R.M. £28.75* Ex stock.

S.E.M. FORWARD/ REFLECTED POWER METER - £28.80 Ex stock.

Prices include VAT and delivery. C.W.O. or credit cards. Phone card number for same day service. Items marked * have Belling Lee sockets. Add £1.73 for SO239s. It's impossible to put everything in here but RING or WRITE for more information. BL plugs 25p, PL259's 80p.

EIØCL

EI8DC

G4CIV

WESTERN COMMUNICATIONS (Galway) LTD.

KILCOLGAN, GALWAY, IRELAND

Tel. Within the State: 091-65166 or 65208.

U.K. Callers: 0009-65166/65208.

Telex: 28933 MHTC EI

Mon. 8.30 a.m. — 6.00 p.m. Fri.

Importers — Exporters — Factors **Distributors of Telecommunication Equipment**

Your nearest AGENT West, Midlands &
South for:

DANCOM Landmobile — MPT + P&T
approved. — Agents required.

YAESU MUSEN; STANDARD; DRAKE
TR7/DR7/L7

note our Drake Tx/Rx, full cover 0.30ML
RX, 1.5 — 30ML TOX.

QUARTZ — Crystals — fastest delivery.

Microwave Modules Products Stocked.

BEARCAT. 210/22FB/250FB.

LUNAR — Amps and Pre Amps.

Distributor for: Wescom Commercial,
Marine, Amateur Antennas.
Agents required.

SPECTRUM — Repeaters — Duplexers
Commercial — to order

Distributor for: G. WHIP of Wales — full
line in stock.

DANCOM — Marine, Type Approved.

SYT. Land line, interface equipment.

SAXTON — RG&u + 58u — Cable.

Stockists of: J. Beam, Cushcraft

We also have all the accessories and hard-to-get plugs, sockets, etc.
Suppliers and Manufacturers — Note.

Look out for our January Trade Show in the Galway Bay Sailing Clubhouse.



FOR QUALITY CRYSTALS—AT COMPETITIVE PRICES. POPULAR FREQUENCIES IN STOCK—MADE TO ORDER 10kHz to 225MHz.

QSL leads the field in supplying crystals world wide to major communications companies, broadcasting authorities and posts and telecommunications administrations. As a result we can supply the amateur with a high quality, competitively priced product over a frequency range from 10kHz to 225MHz. Get the power of the professionals in crystal supply behind you!

2 METRE STOCK CRYSTALS. Price £1.83 for one crystal. £1.74/crystal when two or more purchased.

	HC6/U 30pF TX	HC6/U 30pF TX	HC25/U 30pF and 40pF TX	HC25/U 20pF and 30pF RX	HC25/U 25pF and 20pF TX	HC6 & 25/U SR RX
R0	4.0277	8.0555	12.0833	14.9888	18.1250	44.9666
R1	4.0284	8.0569	12.0854	14.9916	18.1281	44.9750
R2	4.0291	8.0583	12.0875	14.9944	18.1312	44.9833
R3	4.0298	8.0597	12.0895	14.9972	18.1343	44.9916
R4	4.0305	8.0611	12.0916	15.0000	18.1375	45.0000
R5	4.0312	8.0625	12.0937	15.0027	18.1406	45.0083
R6	4.0319	8.0638	12.0958	15.0055	18.1437	45.0166
R7	4.0326	8.0652	12.0979	15.0083	18.1468	45.0250
S8	—	—	12.1000	14.9444	18.1500	44.8333*
S9	—	—	12.1020	14.9472	18.1531	44.8416*
S10	—	—	12.1041	14.9500	18.1562	44.8500*
S11	—	—	12.1062	14.9527	18.1593	44.8583*
S12	—	—	12.1083	14.9555	18.1625	44.8666*
S13	—	—	12.1104	14.9583	18.1656	44.8750*
S14	—	—	12.1125	14.9611	18.1687	44.8833*
S15	—	—	12.1145	14.9638	18.1718	44.8916*
S16	—	—	12.1167	14.9667	18.1750	44.9000*
S17	—	—	12.1187	14.9694	18.1781	44.9083*
S18	—	—	12.1208	14.9722	18.1812	44.9166*
S19	—	—	12.1229	14.9750	18.1843	44.9250*
S20	4.0416	8.0833	12.1250	14.9777	18.1875	44.9333
S21	4.0423	8.0847	12.1270	14.9805	18.1906	44.9416
S22	4.0430	8.0861	12.1291	14.9833	18.1937	44.9500
S23	4.0437	8.0875	12.1312	14.9861	18.1968	44.9583

SR = Series Resonance

*HC25 only

Also in stock: R0 to R7 for FT221 R0 to R7 and S8 to S23 for following: Belcom FS1007, FDK TM56, Multi 11 Quartz 16 and Multi 7, Icom IC2F, 21, 22A and 215, Trio Kenwood 2200, 7200, Uniden 2030 and Yaesu FT2FB, FT2 Auto, FT224, FT223 and FT202.

Also in stock 4 and 8 MHz TX in HC6/U for 145.8 MHz. Icom crystals TX for 145.6 MHz (RRO). 44 MHz RX crystals in HC6/U for 145 (RRO). All at above price.

4 METRE CRYSTALS for 70.26 MHz in HC6/U at £2.25. TX 8.78250 MHz. RX 6.7466 or 29.78 MHz in stock.

70cm CRYSTALS in stock 8.0222 and 12.0333 in HC6 £1.85. Pye Pocketone PF1, PF2, PF70 and Wood and Douglas £4.50 a pair or TX £2.25, RX £2.50, SUG (4.33.2) RBO, RB2, RB4, RB6, RB10, RB11, RB13 and RB14.

CONVERTER CRYSTALS in HC18/U at £2.85. In stock 38.666, 42.000, 70.000, 96.000, 101.000, 101.500, 105.666 and 116.000 MHz.

TONE BURST AND I.F. CRYSTALS in HC18/U at £2.25 in stock. 7.168 MHz for 1750 kHz and 10.245 MHz for 10.7 MHz IF's.

FREQUENCY STANDARDS in stock £2.75. HC6 200 kHz, 455 kHz, 1000 kHz, 5.000 MHz and 10.000 MHz. HC13 100 kHz, HC18 1000 kHz, 7.000 MHz, 10.700 MHz, 48.000 MHz and 100.00 MHz.

QuartSlab

MARKETING LTD
P.O. Box 73

FORMERLY C&C ELECTRONICS

London SE18 3LR

Telephone: 01-890 4889 24 hr. Ansafone: (03224) 30830

Telex: 912881 CWUKTX-G (Attention QUARTSLAB)

Cables: QUARTSLAB London SE18

PRICES ARE EX VAT. PLEASE ADD 15%.

MADE TO ORDER CRYSTALS SINGLE UNIT PRICING

	Price Group	Adjustment Tolerance ppm	Frequency Ranges	Price and Delivery	
				A	B
Fundamentals	1	200 (total)	10 to 19,999 kHz	—	£23.00
	2	200 (total)	20 to 29,999 kHz	—	£16.50
	3	200 (total)	30 to 99,999 kHz	—	£10.50
	4	200 (total)	100 to 999,999 kHz	—	£6.00
	5	50	1.00 to 1,499 MHz	£9.00	£6.00
	6	10	1.50 to 1,999 MHz	£4.75	£4.20
	7	10	2.00 to 2,599 MHz	£4.75	£4.70
	8	10	2.60 to 3,999 MHz	£4.55	£3.00
	9	10	4.00 to 20,999 MHz	£4.55	£3.60
	10	10	21.00 to 24,000 MHz	£6.00	£5.40
3rd OVT	11	10	21.00 to 59,999 MHz	£4.55	£3.80
	12	10	60.00 to 99,999 MHz	£5.00	£4.00
	13	10	100.00 to 124,999 MHz	£6.15	£5.20
5th, 7th & 9th OVT	14	20	125.00 to 149,999 MHz	—	£6.00
	15	20	150.00 to 225.00 MHz	—	£7.50

Unless otherwise requested fundamentals will be supplied with 30pF load capacity and overtones for series resonance operation.

HOLDERS — Please specify when ordering — 10 to 200 kHz HC13/U, 170 kHz to 170 MHz HC6 or HC33/U, 4 to 225 MHz, HC18 and HC25.

DELIVERY Column A 3 to 4 weeks (this service is subject to availability). Column B 6 to 8 weeks.

Please note that it is not always possible to provide the A delivery service but a telephone call will confirm its availability.

Any orders received for A delivery when it is not available will automatically be placed on B delivery and a credit note issued for the difference in price.

DISCOUNTS. 5% mixed frequency discount for 5 or more crystals at B delivery. Price on application for 10 or more crystals to same frequency specification. Special rates for bulk purchase schemes including **FREE** supply of crystals used in UK repeaters.

EMERGENCY SERVICE SURCHARGES (to be added to A delivery prices). 4 working days £12, 6 working days £7, 8 working days £5, 13 working days £3 (maximum of 5 crystals on 4 day delivery).

CRYSTAL SOCKETS HC6/U and HC25/U 16p.

MINIMUM ORDER CHARGE £1.50.

COMMERCIAL USERS. Crystals can be supplied for industrial control, etc. in the range 4-21 MHz fundamental and 3rd OVT 18 to 60 MHz at £1.15 for 100 off. This is only a limited example of our capabilities. Please enquire about other quantities, frequency ranges, watch and sub-carrier crystals. We can supply crystals for marine and land mobile radio telephone use. Send for details.

MPU Crystals available at competitive prices please contact us for details.

TERMS. Cash with order, cheques and postal orders payable to QSL Ltd. All prices include postage to UK and Irish addresses. Please note Southern Irish cheques and postal orders are no longer acceptable. Please send bank draft in pounds Sterling.

RADIO AMATEUR PREFIX-COUNTRY ZONE LIST

published by GEOFF WATTS
Editor of "DX News-Sheet" since 1962

The List you have always needed, the list that gives you everything, and all on one line! For each country: —

- | | |
|---------------------------------------|----------------------|
| a. its DXCC "status" | e. the continent |
| b. the normal prefix | f. the "CQ" Zone No. |
| c. the special prefixes | g. the ITU Zone No. |
| d. the ITU call sign block allocation | |

Full information on Antarctic stations, USSR Klub-stations, obsolete prefixes used during the past 5 years, and much more, and the List can be kept always up-to-date because ample space has been provided for adding every new prefix, each new ITU allocation, etc. Everything arranged alphabetically and numerically in order or prefix. Ideal for Contest operators and SWL's.

Tell your Club-members about it. Order an extra copy for that overseas friend. 15 pages. Price 55p (UK), Overseas (air mail) \$2.00 or 6 IRCs.

GEOFF WATTS

82 BELMORE ROAD, NORWICH NR7 0PU, ENGLAND

ANTI-TVI TRAP DIPOLES

1981 Range: Shortwave Listener
Indoor models £14.50 & £27.50.
Outdoor models £30.00 & £36.00.

Tx-ing models £52.50 & £59.75.

Lists 10x8in 17p SAE. Aerial Guide 50p.

Publication "Indoor and Invisible Aerials for S.W.L.s" — £3.50.

Callers Welcome. Tel: 03986-215.

G2DYM, UPLWMAN, TIVERTON, DEVON

COMPARE THESE FEATURES

- ★ MICROPROCESSOR CONTROLLED 32,000 CHANNELS
- ★ AM & FM ALL BANDS
- ★ WIDER COVERAGE: 26-58, 58-88, 108-180, 380-514 MHz; includes 10m, 4m, 2m, & 70cm Amateur bands.
- ★ 5kHz & 12½kHz FREQUENCY INCREMENTS
- ★ 16 MEMORY CHANNELS WITH DIRECT ACCESS
- ★ SELECTIVE PRIORITY CHANNELS WITH LOCKOUT
- ★ 2 SPEED SCAN; SCAN DELAY CONTROL
- ★ 2 SPEED SEARCH UP AND DOWN
- ★ SEARCH BETWEEN PRESET LIMITS UP AND DOWN
- ★ 3 SQUELCH MODES inc. CARRIER & AUDIO
- ★ Dx & LOCAL CONTROL
- ★ RELAY OUTPUT FOR Aux. CONTROL
- ★ INTERNAL SPEAKER
- ★ EXTERNAL SPEAKER & TAPE OUTPUTS
- ★ LARGE GREEN DIGITRON DISPLAY BRIGHT/DIM
- ★ AM-PM CLOCK DISPLAY
- ★ 12v DC, 230V AC OPERATION

“SCAN-X” VHF/UHF

BROAD BAND FIXED STATION AERIAL £19.90
Ideal for SX-200 and other VHF/UHF receivers.

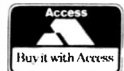
U.K. IMPORTERS & DISTRIBUTORS:
REVCO ELECTRONICS LTD.
POUNDWELL STREET
MODBURY, DEVON, PL21 0RQ
Tel: Modbury (0548) 830665
Dealer enquiries invited

SX200

THE ULTIMATE SCANNER



£241.50 INC. VAT Delivered



MAIN SERVICE & SALES AGENTS:
GAREX ELECTRONICS
7 NORVIC ROAD
MARSWORTH, TRING
HERTS. HP23 4LS
Tel: Cheddington (0296) 668684

C.B. ELECTRONICS

UNIT 3, 771 ORMSKIRK ROAD, PEMBERTON, WIGAN, WN5 8AT

Telephone: Wigan (0942) 216567

THE BEST IN THE NORTH-WEST

HOW TO FIND US — From M6 junction 26 follow signs for Wigan A577 at first traffic lights (T junction) turn right towards Wigan. At next traffic lights you are there, *BUT* turn left and 10 yards further turn right by telephone kiosk. Premises are slightly to your right. Plenty of parking space. Mileage from motorway ½ mile. From Wigan follow the A577 Skelmersdale to traffic lights at Fleet Street, Pemberton (Ye Olde White Swan on your left). Turn right then 10 yards right again. By Co-op. Mileage from Wigan 2½ miles.

YAESU	Morse keys	Emotator	HF Antennas
FT901DM £799.25	Standard..... £3.15	103LXB..... £98.00	HQ1 mini beam..... £98.60
FT 101Z £488.75	Nye King..... £12.00	502CXX..... £145.12	
FT 101ZD £569.25	Nye King heavy duty..... £13.50	1102..... £239.00	
FL2100Z £362.25			
FT7B £399.00			
FC902 £126.50	F.D.K.	ASP Antennas	Cushcraft Verticals
FRG7 £199.00	Multi 750E..... £299.00	2009 5/8 wave..... £11.39	ATV3..... £43.00
FRG 7000 £299.00	Multi Ull..... £249.00	201 1/4 wave..... £4.31	ATV4..... £76.00
FRG 7700 £309.00	Palmsizer £159.00	397 Low Band..... £7.13	ATV5..... £78.00
FT 225RD £489.00	Palm IV..... £159.00	E462 UHF..... £6.75	
FT 227RB £263.36	TM56B £104.00	677 5/8 wave..... £14.95	Hi Gain
FT202 £99.00	Multi 700EX..... £199.00	462 5/8 wave..... £7.56	12AV0 £43.00
FT 207R £199.00		Magnetic Base..... £10.50	14AV0 £80.37
FT107M £690.00	CDR Rotators	Boot mount..... £3.50	18AV0 £98.70
FT 707 £500.25	AR30..... £47.15	High Pass Filter..... £3.00	TH3MK3 £186.00
FP707 £109.25	AR40..... £59.00	Headphones..... £5.20	
FC707 £74.75	CD44..... £109.25	PTT mics..... £4.50	
FC107 £97.75	CD45..... £113.85		2m Collinear
Charger £18.87	Ham IV..... £166.75	STANDARD	Ringo Ranger..... £22.00
QTR24 £18.40		C8800..... £252.45	GPV5..... £22.00
YP150 £67.27		C7800..... £276.45	

TERMS: ACCESS, C.W.O. (CARRIAGE AND POST EXTRA AT COST)

BUSINESS HOURS
Mon, Tues, Thurs, Fri 9.30-5.30
Sat 9.30-4.30
Closed Wednesday

S.A.E. ALL ENQUIRIES

SOUND ADVICE — SOUND VALUE

A GOOD START is essential to short wave listening and expert advice is important in achieving this — So here's some — If you've made up your mind to buy a receiver you should be aware it will perform only as well as the antenna it sees. The old adage regarding wire antennas "As long and as high as you can" is still good, but at best is only good for PEAK PERFORMANCE on one or two frequencies, at worst none.

Whichever frequency you tune your receiver to, for PEAK PERFORMANCE on all frequencies you need good matching between your Receiver and Antenna to hear the best from it. If you plan to listen on the high frequency bands up to 30MHz then you know you can't have an antenna for every frequency! Or can you? — Well, not quite! BUT we can offer you MUCH IMPROVED PERFORMANCE from your receiver by using an antenna tuning unit, that will electrically change the length of your antenna to match the frequency you select — In other words — A MATCH AT ALL FREQUENCIES.

You'll see many antennas being advertised under gimmicky names, but when it comes down to it they're only random wires or odd configurations. At the end of the day, if you're expecting the performance the manufacturers specified, then you'll still have to buy an antenna tuning unit.

Tell you what we'll do — we'll prove it to you — we'll give you one ABSOLUTELY FREE when you buy your FRG 7 or FRG 7700 and we'll give you complete advice on an antenna to suit your available space, which should only cost you a couple of pounds!

So let's put the offer in big print for you!

1 YAESU FRG7 + AMTECH 200 ATU	£199.00
1 YAESU FRG 7700 + AMTECH 300 ATU	£309.00
VAT included	

What's the difference between the Amtech 200 and Amtech 300? Well both will tune any random length of wire but the Amtech 300 will do a little extra — it will also tune co-axial fed antennas — Their normal selling price? The Amtech 300 £39.95 — The Amtech 200 £25.95 — What can you lose? So get cracking MAKE A GOOD START! HAVE PEAK PERFORMANCE FROM THE OFF.

JAYBEAM — HYGAIN — BANTEX — AMTECH — CUSHCRAFT — SWAN — ATLAS
and 50 other major lines — all ex stock



AMCOMM SERVICES

194A NORTHOLT ROAD, SOUTH HARROW, MIDDX.

Tels: 01-864 1166 & 01-422 9585

Opening hours: Tues-Sat 9.00-5.30, Sundays by appointment. Closed Monday.



R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

EDDYSTONE EC10Mk. 1 Receiver	£131.10
EDDYSTONE EC10Mk. 2 Receiver	£165.60
EDDYSTONE 840C. Receiver	£109.25
EDDYSTONE 940. Receiver	£236.90
EDDYSTONE 990S. 230-870MHz. AM/FM	P.O.A.
DRAKE SPR4 Receiver	£405.75
TRIO JR310 Amateur B.S. Receiver	£131.10
HAMMARLUND HQ170 Amateur B.S. Receiver	£213.90
RACAL RA17 Receiver	P.O.A.

We are MAIN DISTRIBUTORS for AVO, MEGGER, TAYLOR and SULLIVAN INSTRUMENTS

THE LATEST AVO AND TAYLOR METERS IN STOCK

AVO Digital Multimeter Model DA211	£51.75
AVO Digital Multimeter Model DA212	£74.75
AVO Digital Multimeter Model DA116	£122.93
AVO Digital Multimeter Model DA117	£155.25
Taylor Analogue Multimeter Model 131	£15.20
Taylor Analogue Multimeter Model 132	£21.85

Cases for AVO, TAYLOR & MEGGER instruments in stock.
Send for Details

We also repair all types of instruments
Trade and Educational enquiries invited

S. G. BROWN'S HEADPHONES. Type "F" 120 ohm, 2000 ohm, 4000 ohm, £29.95, Rubber Earpads for same, £3.26 per pr.; Standard Jack plugs, 50p.

ALL PRICES INCLUDE VAT AND CARRIAGE. Terms: C. W. O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export.

SINCLAIR EQUIPMENT

DM235 Digital Multimeter	£58.99
Carrying Case for DM235	£10.92
Mains Adaptor for DM235	£5.17
PDM35 Pocket Digital Multimeter	£35.59
PFM200 Pocket Digital Frequency Meter	£58.42
YAESU MUSEN FRG-7 Receiver	£204.75
YAESU MUSEN FRG-7000 Receiver	£344.75

At R. T. & I.

- ★ We have full H.P. facilities.
- ★ Part exchanges are a pleasure.
- ★ We purchase for cash.
- ★ We offer a first-class overhaul service for your electronic equipment, whether you are an amateur or professional user.
- ★ We have EASY PARKING facilities.
- ★ We welcome your enquiries for specific items which although not advertised, may very well be in stock.

PARTRIDGE "JOYSTICK". New improved VFA, £29.00. JOYMATCH IIB, £22.55. LO-2500, £28.62. JOYMATCH A.T.U. Kit, £10.50. A.T.U. Kit assembled, £12.75. Artificial earth and bandswitch, £10.50.

TRIO EQUIPMENT

New Trio R-300 Receiver, in stock, £193.89
All Bands with xtal calibrator.

SHURE MICROPHONES, 526, T £35.42; 444, £29.21; 401A, £14.95; 202, £13.80; 201, £13.11; 414A, £22.43; 414B, £22.43. Full details on request.

SCOPE'S OSCILLOSCOPES IN STOCK.

VALVES. Please state your requirements.

TMK METERS: Model TP10S, £18.05. Model 500TU-B, £33.23. Model TW20CB, £39.56. Model TP5SN, £21.27. Model 700, £68.42. Also in stock Leather cases for above.

Model 700B, £72.16. Model 3020E (Digital) £115.00. Full details on request.

In present conditions we regret that all prices are subject to alteration without notice.

R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London E11 4DX Tel. 01-539 4986

NEAREST STATION: LEYTONSTONE (Central Line)

HOURS — 9.30 am - 5.30 pm MON.-FRI. CLOSED SATURDAYS

Lee Electronics Ltd



This is the new FRG 7700



Look at these features: -

- ★ Full Coverage 150KHz to 29.999MHz
- ★ High Stability DUAL PLL System
- ★ Automatic Band Pass Filter Selection
- ★ 3 Filters for AM Reception
- ★ Fast/Slow AGC Steps
- ★ Narrow Band FM Reception Capability
- ★ Timer Facility
- ★ Optional 12 Channel Memory Unit (with internal battery back-up)

PRICE £309 inc VAT - Memory Unit £83.95 inc VAT - Memory Unit Fitted £389 inc VAT

400 EDGWARE ROAD
LONDON W2
01-723 5521 Tlx: 298765



NORTHERN COMMUNICATIONS

AMATEUR ★ COMMERCIAL ★ MARINE

YAESU, FDK, ATLAS, DENTRON, STANDARD, JAYBEAM
NAG, ASP, SWAN, G WHIP, MM, CDE, SEM



CUSHCRAFT Power and Performance ANTENNAS

ATV3 - Vertical 10/15/20	(a)	£35.40
ATV5 - Vertical 80/10m	(b)	£76.00
A 144/7 - 7element 10db Yagi 144Mhz	(a)	£24.95
A 144/11 - 11 element 11.3db Yagi 144Mhz	(a)	£27.85
214B - Junior Boomer 14 element 15db Yagi 144Mhz	(c)	£45.00
A3219 - 19 element "Boomer" 16.5db long Yagi 144Mhz	(c)	£64.00
ARX2 - Ringo ranger 6db Vertical 144Mhz	(a)	£26.50
AR10 - Ringo Ranger Vertical 10metres	(a)	£22.00
A10/3 - 3 element Yagi 7.6db 10metres	(b)	£52.00
A15/3 - 3 element Yagi 7.6db 15metres	(b)	£72.00
A20/3 - 3 element Yagi 7.6db 20metres	(c)	£139.75
ATB34 - 3Band HF Yagi 7.5db 10/15/20metres	(*)	£235.75

Prices include VAT, *carriage extra. (a) £1.50; (b) £2.50; (c) £3.50
M700E £199.00 M750 £299.00

OR our very own 2 metre 12 element ZL SPECIAL
ZL-12 13db gain from a 10ft 6in long boom

NEW Portable, Compact 8 element ZL SPECIAL
ZL-8 9.5db gain only 6ft On long split boom

NEW! - WIDEBAND ANTENNA - NORCONE

The new "NORCONE DISC 512" is a wideband, unity gain antenna, specially developed for coverage of 66Mhz to 512Mhz. An ideal partner for the BEARCAT and other scanning monitor receivers. It may also be used for transmission. Full coverage of 70, 144, 432 Mhz Amateur bands, Aircraft, Marine and Public Services

SWAN 100MX HF TRANSCEIVER - Now at a Price You Can Afford

80-10 metre Solid State, compact HF rig for mobile and fixed operation. 235 watts input. Send for details of this amazing rig! Including VAT

Mains PSU also available.

FDK - MULTI 700EX & 750EX

In the very best traditions of FDK the new M700EX (2m FM25 watts) and M750EX (2m Multimode Mobile SSB/FM) are here to offer you the very best in 2 metre operating at economic prices.

If you liked the Multi 700E then you'll love the EX version! The new M750EX makes it possible to work the SSB DX, without breaking the bank! Contact us for details.



303 CLAREMOUNT ROAD, HALIFAX HX3 6AW, West Yorkshire
VISIT OUR SHOWROOM - Tues-Sat inc. 9.45a.m. - 5.30p.m.
Tel: (0422) 40792 and 24-hour answering service G3UGF



LAR

THE SHORT WAVE WIZARDS



**Trio R1000 PLL C&L
SWL
Communications
Receiver 200 KHZ to
30 MHz. £285.00**

TRIO EQUIPMENT

R 820 The ultimate S.W.L. Receiver	£690.00
SP 820 Matching Extension Speaker	£37.95
HS 5 Communications Headphones	£21.85
HS 4 Communications Headphones	£10.35

Full Range of Trio Transceivers in Stock.

COMMUNICATIONS RECEIVERS

Lowe SRX30 Still the Best Value	£158.00
YAESU FRG 7 General Coverage	£199.00
YAESU FRG 7000 Digital Readout	£299.00
FGR 7700 Receiver	£309.00

All YAESU Transceivers available.

ICOM AMATEUR EQUIPMENT

LAR are Yorkshire's largest stockists of the full ICOM range of transceivers.

V.H.F. AMATEUR RECEIVERS

Search SR9 V.F.O. or crystal control 2M F.M. 144-146 MHz. .	£46.00
(Marine 156 to 162 MHz also available)	
AMR 2178B 2M F.M. Scanner 144-146 MHz. Fitted 8 crystals battery/mains. The best and most popular 2m. monitor	£120.00
Extra crystals for the above receiver	£2.50

TUNERS, SWITCHES AND SHACK CLOCKS

K x 2 SWL Antenna Tuner 500KHZ to 30MHZ.	£29.90
LAR OMNI Match (HF VHF Mobile & Linear. Send 20p for details)	
Cx/3 SWL 3way antenna switch.	£5.60
LAR 1 KW P.E.P. Feeder Switch (Switch to Quality)	£16.95
COPAL 24hour Digital clock mains operated.	£12.95

AIR BAND RECEIVERS

Sharp FX 213AU Hand held portable	£16.00
SKY ACER 517 VFO and crystal control	£49.50
SIGNAL R 512 Scanner Fitted 5 Channels	£138.00
Crystals for R 517 or R 512	£2.80
Regency Digital flight scan (no crystals required)	£230.00
BEARCAT 220FB. Scanner 66 to 512 MHz	£258.75
SX2000 Scanner 26-514 MHz.	£239.20

(All prices include VAT. Securicor delivery arranged on request)

Buy by post or phone your Barclaycard, Access, or LAR Creditcard number. Alternatively, call in for a chat. The shop is just 10 minutes from Leeds City Station, and there's easy parking if you travel by car ★ Instant HP for licensed Amateurs ★ Extended Credit Terms Available ★ Send 50p for Catalogue and Price List.

Leeds Amateur Radio
27 Cookridge Street, Leeds, LS2 3AG.
Tel: 782224

TRIO DISTRIBUTOR. LAR are area distributors for Jay Beams, Antenna Specialists, Hilomast, Icom, Microwave Modules and Ascot Products.

("SITUATIONS" AND "TRADE")

20p per word, minimum charge £2.40. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50 per cent for Bold Face (Heavy Type). No responsibility accepted for transcription errors. Box Numbers 40p extra. Replies to Box Number should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

TRADE

1 kW 432 MHz amplifiers, SK620A sockets, 2 x 4CX250B, blower, relays, etc., £250 complete; or metal-work ready for tubes and sockets, only £90. Also full range of Yaesu, Sota, Microwave Modules in stock (no VAT). — GJ4ICD, QTHR. (Tel: 0534-26788).

TVI/AFI? Cure it with ferrite rings, 67p each including postage. — **TMP Electronics**, Britannia Stores, Leeswood, Mold, Clwyd CH7 4RU.

FOR SALE: Eddystone 640, 840, 680X; G.E.C. BRT-400 and terminal unit; two Marconi CR-100's; R. 107, PCR-3, RA-117, etc., etc. All overhauled. Also thousands of new crystals, 100 kHz to 111 MHz. **Wanted:** Old receivers in any condition, cash paid by return post; does not matter what you have, ring **now!** — Birkett, "The Moorings", Halvarras Road, Playing Place, Truro, Cornwall. (Tel: 0872-862575).

Aerial wire, 14 s.w.g. hard-drawn copper: 70 ft. coils £5.50; 140 ft. coils, £8.90. Including postage. — **TMP Electronics**, Britannia Stores, Leeswood, Mold, Clwyd CH7 4RU.

February issue: due to appear January 30th. Single copies at 70p post paid will be sent by first-class mail for orders received by Wednesday, January 28th as available. — Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Radio Amateur Examination City and Guilds. Pass this important Examination and obtain your G8 Licence with an RRC Home-Study Course. For details of this and other courses (GCE, professional examinations etc.) write or phone: **THE RAPID RESULTS COLLEGE, Dept. JV1, Tuition House, London SW19 4DS.** Careers Advisory Service, 01-947 7272 or ring 01-946 1102 for Prospectus (24-hr. Recordacall.)

Tonna (F9FT) antennas for 2m., 70cm. and 23cm. Send 30p for full catalogue. — **Random Electronics (S)**, 12 Conduit Road, Abingdon, Oxon. OX14 1DB.

UK aircraft frequencies list, £1. UK marine frequencies list, £1. Including HF, VHF. — **PLH Electronics**, 20 Vallis Road, Frome, Somerset.

Good second-hand equipment always wanted. Come to **AMATEUR RADIO EXCHANGE** for the best deal. — 2 Northfield Road, Ealing, London W13 9SY. (Tel: 01-579 5311.)

SX-200 scanning receiver covers most bands from 26-512 MHz, AM/FM, £208.00 + VAT. Send s.a.e. for data. — W. H. Westlake, Clawton, Holsworthy, Devon.

QSL cards. Sample pack and price list forwarded on receipt of 20p stamp. — **Derwent Press**, 69 Langstone Drive, Exmouth, Devon EX8 4HZ.

READER'S ADVERTISEMENTS

10p per word, minimum charge £1.50 payable with order. Add 25 per cent for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 40p extra. Replies to Box Number should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

READERS

SELLING: FT-101EE with all accessories including narrow CW filter, excellent condition, £350. — Craske, G3ZLS, QTHR.

FOR SALE: Panasonic RF-2800 digital quality AM/FM portable, as new (cost £220), £85. — Thomas, 6 Athelstan Close, Axminster, Devon.

WANTED: Components list and technical data for Eddystone S.680A Rx. Buy or copy, expenses reimbursed. — Crawford, 68 Athelstane Road, Glasgow G.13. (Tel: 041-959 2913).

SALE: Icom IC-240, £135. Mobile whip, $\frac{3}{8}$ -wave, magnetic mount, £10. Trio JR-599 Custom Special, £195. Hustler 5-band vertical, unused, £45. Yaesu 'Gold Line' ATU, as new, boxed £85. — Ring Cole, Hornchurch 55733.

FOR SALE: Drake SSR-1 receiver, general coverage, solid state, brand new conditions, £110 or near offer. — Ring Webb, Box 742681 (Wilts.).

SELLING: Lafayette HA-350 amateur bands receiver, SSB/AM//CW, £70 or near offer. — Ring Brown, Wetherby 61782.

SELL OR EXCHANGE: Racial RA-17 general coverage receiver, with manual, excellent condition, £175. Eddystone 770U Mk. II Rx, coverage 150-500 MHz, with manual, excellent condition, £100. Or exchange one or both for Bearcat 220, or similar. — Ring Smith, 051-638 5554.

SALE: IC-22A with tone burst and $\frac{3}{8}$ -wave magnetic mount. — Ring Hill, 0908-607939.

WANTED: Transistor oscilloscopes, 10mV., 10 MHz; Tequipment D54, D61A, dual trace. Other makes considered. — Healey, 7 Firtree Road, Hastings, East Sussex. (Tel: 0424-427374).

SELLING: Bearcat 220FB, used only once, £215. AR88D, immaculate, very rare specimen, kept in cotton wool, fantastic order, with S-meter, £80. Buyers collect. (Buying flat, need cash). — Ring Howard, 01-693 8775 evenings.

SALE: KW-1000 linear, £175. K. W. Victor, £50. AR88LF, £30. BL-221, £20. Fuller phone test set, ex-W.W.II, £35. — Ring Cottrell, G3PSY, Tenderden 4531.

FOR SALE: Yaesu FRG-7 receiver, mint condition, £150. — Ring Pickering, Waltham Cross 20020 (Herts).

SELLING: FR-101 De-Luxe, analogue, plus 2 and 4m., BC and CB bands, 15 months old, complete check and realignment by importer's to above maker's spec., £400. — Ring Bastow, Wakefield (0924) 252987.

February issue: due to appear January 30th. Single copies at 70p post paid will be sent by first-class mail for orders received by Wednesday, January 28th, as available. — Circulation Dept., Short Wave Magazine Ltd., 34 High Street Welwyn, Herts. AL6 9EQ.

NOW AVAILABLE!

AUTUMN 1980 EDITION



VHF COMMUNICATIONS

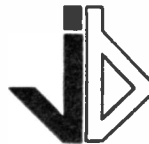
Including Special Articles on:
Home-Made Parabolic Dishes
Receiving METEOSAT Images (Pt 5)
Microprocessor for Amateur Applications (Pt 3)
70cm Receive Converter
10GHz SSB Modules (Pt 1)

Send £1.50 for a copy of this edition or £5.30 for 1980 Subscription

VHF COMMUNICATIONS is the English Language edition of the German publication UKW-BERICHTe, a quarterly amateur radio magazine especially catering for vhf/uhf/shf technology. It is published in the spring, summer, autumn and winter.

All special components required for the construction of the described equipment, such as printed circuit boards, coil formers, semiconductors and crystals, as well as complete kits, are available for despatch direct from Germany. Many of the printed circuit boards, in addition to a few selected kits, are stocked in the U.K. A price list of kits and materials is available — send sae for your copy.

Orders and enquiries should be sent to
VHF COMMUNICATIONS, Dept 111,
20 Wallington Square, Wallington,
Surrey SM6 8RG



**THINK JAYBEAM—
THINK CATRONICS**

We generally have the wide range of 'Jaybeam' aerials in stock as follows:

FOR 70cms BAND

D8/70cm Double 8 yagi	£20.45
PBM18/70cm 18 ele P'beam	£24.70
MBM48/70cm 48 ele M'beam	£28.15
MBM88/70cm 88 ele M'beam	£37.45
12X/70cm Cross 12 ele yagi	£38.50
8XY/70cm Cross 8 ele yagi	£31.05
C8/70cm 8dB colinear	£45.40

FOR 23cms BAND:

D15/1296 Double 15 yagi	£30.90
-------------------------	--------

PHASING HARNESSSES:

PMH/2C 2m circular	£6.75
PMH/2M 2m stacking	£8.95
PMH/70 70cms stacking	£7.75

MASTS and ROTATORS, etc.

SPM 16' portable mast	£13.70
PME 4' extension	£2.30
SVMK Vertical mount	£6.60
9502 Rotator	£55.75
9523 Alignment bearing	£11.70
KR400 H. Duty Rotator	£105.80

ALL PRICES INCLUDE VAT, but please add carriage as follows: Harnesses, halos, and UGPs — £1. Other aerials and masts — UK Mainland & Isle of Wight, £4.50. N. Ireland, £11.50.

Pay by Barclaycard, Trustcard, Viscard, Access, Eurocard, Master Charge etc.; cash, cheque, H.P. or Catronics new Credit Card

CATRONICS LTD. (Dept. 111)



Communications House,
20 WALLINGTON SQUARE,
WALLINGTON, SURREY.
Telephone: 01-669 6700

CALL BOOKS

INTERNATIONAL:

RADIO AMATEUR CALL BOOKS (1981)	
Foreign ("DX") Listings.....	£9.65
U.S. Listings.....	£10.15
U.K. Call book, 1981 Edn, (RSGB)	£4.25

A few 1980 DX and U.S. Listings still available at a special sale price of £6.50 and £7.00 each respectively, including p/p.

MAPS

"SHORT WAVE MAGAZINE" DX ZONE

MAP (GREAT CIRCLE)

In colour, *New 9th Edition!*..... £3.35

AMATEUR RADIO MAP OF WORLD

Mercator Projection — Much DX Information

— in colour *Latest 14th edition*..... £1.10

RADIO AMATEUR MAP OF THE U.S.A.

AND NORTH AMERICA

State Boundaries and Prefixes, size 24" x 30",
paper *Latest 6th edition*..... 95p.

RADIO AMATEUR'S WORLD ATLAS

In booklet form, Mercator projection, for

desk use. Gives Zones and Prefixes
Latest 11th edition..... £1.65

LOG BOOKS

Amateur Radio Logbook	£2.60
Receiving Station Log	£1.70
Mobile Logbook	£1.10

(The above prices include postage and packing)

Available from:

Short Wave Magazine

Publications Dept.,

34 High Street, Welwyn, Herts. AL6 9EQ

Tel: Welwyn (043871) 5206/7

(Counter Service, 9.30-5.00 Mon. to Fri.)

(Giro A/c No. 547 6151)

BUTTERWORTH TITLES NOW IN STOCK...

The Practical Aerial Handbook, 2nd Edition

by Gordon J. King

232 pages (Soft Cover) £7.00 inc. post

Foundations of Wireless and Electronics, 9th Edition

by M. G. Scroggie

521 pages (Soft Cover) £5.40 inc. post

Radio and Electronic Laboratory Handbook, 9th Edition

by Scroggie-Johnstone

591 pages (Hard Cover) £19.05 inc. post

Available from Publication Dept.

Short Wave Magazine Ltd.

34 High Street, Welwyn Herts., AL6 9EQ

OFFERING: Barlow Wadley XCR-30 portable receiver with VHF, hardly used. Nikkon Super 8 zoom cine camera. Reasonable offers please. — Ring Tildesley, Stafford 660356.

SALE: Sullivan and Griffiths universal inductance meter, one micro-H to one Henry, £350. Precision Wheatstone bridge, £250. — Ring Cottrell, G3PSY, Tenterden 4531.

SELLING: K.W. Atlanta transceiver, 500 watts, with PSU, £160 or very near offer. — Robinson, G3SAX, QTHR. (Tel: 05883-556).

SALE: 9R-59DS receiver with xtal calibrator, superb condition, £80. — Ring Scott, Washington 479941.

SELLING: TS-120V, 6 months old, with PSU, £295 or near offer. — Ring Baker, 0732-355993 ext. 1 (Kent).

FOR SALE: Grundig Satellit 3400, LW/MW/FM, 18 SW bands, SSB, digital all bands, LCD clock, immaculate, little used, superb audio, genuine reason for sale, any examination (Cost £409), £260. — Lane, 6 George V Avenue, Margate, Kent.

SALE: Trio 9000, unused, 2 months old, boxed, £325 or near offer. Jaybeam 10Y/2M, 1 month old, £25 or near offer. — Ring Ollerton, Rainford 4729 evenings.

SELLING: Grundig Satellit 3000, £220. Datong indoor active antenna, PSU, £25. Crystal calibrator, 25 kHz to 1 MHz, £7. Microwave Modules 144/28 MHz converter, £15. Bearcat 220FB scanner, new July '80. Sharp 9595 stereo radio recorder, auto digital tuning scan memory, new April '80 (cost £209), £150. Every item with personal guarantee. Offers welcome; please write first. — Woodman, Flat 3, 17 Halesworth Road, Lewisham, London SE13 7TJ.

FOR SALE: Trio R-1000 G.C. Rx, 1 month old, unwanted gift, £235. Prefer buyer collects, or Securicor delivery extra. — Ring Culling, Dereham 2790 (Norfolk).

SALE: Radio, television, and tape recorder service-sheets, 3200 sheets, in spring-back binders; also manuals, text books, etc. "The Second Great War", a day-by-day fully documented history by Sir John Hammerton, in 8 vols., 4000 pages. Offers? — Watts, 62 Belmore Road, Norwich. (Tel: 0603-33103).

WANTED: American Type BC-611 handy-talkie with details, extras, etc. — Elliott, 54 Bankhouse Road, Hanford, Stockton-on-Tees, Staffs.

FOR SALE: TS-520, mint condition, with CW filter, £325. K.W. Vespa Mk.II, £85. Both with handbooks. — Bower, G3MKU, QTHR. (Tel: Shephed 2611).

WANTED: Two VHF sockets for 4CX250, with chimneys. — Ring Ward, G4JQN, Westbury (0373) 864478 evenings. (Wilts.).

FOR SALE: Caiscope dual-trace 10 MHz 'scope, 6 months old, £200. Heathkit IG-5282 audio signal generator, £25. Heathkit IG-5280 RF oscillator, £25. All 'or near offer'. — Cox, 76 Pengarth, Conwy, Gwynedd LL32 8RP.

FOR SALE: Complete HF station comprising: KW-204 SSB/CW Tx, 160-10m., 180 watts input to two 6146B's (just replaced), fitted VOX, with Shure 201 mic., mint condition, £175. KW-202 Rx, SSB/CW/AM, 160-10m., with built-in peak/notch Q-multiplier, and matching speaker, mint condition, £170. — Ring Ward, G4JQN, Westbury (0373) 864478 evenings. (Wilts.).

J. BIRKETT *Radio Component Suppliers*

25 THE STRAIT · LINCOLN · LN2 1JF

Telephone: 20767

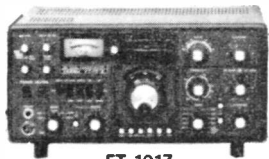
FERRITE RINGS Ext. Dia. 24mm, Int. Dia. 11mm @ 35p.
 BELLING LEE SUB-MINIATURE CO-AX CONNECTORS Type L1403
 Chassis Socket @ 60p, L1403 R-Angle Plug @ 60p.
 GREENBAR BNC 50 OHM PLUG @ 60p.
 BELLING LEE BNC CONNECTORS L1637 Fixed Socket @ 60p,
 L1637 FREE SOCKET @ 50p, Double Screened Types L1647 Free
 Socket @ 50p, L1647 Fixed Socket @ 50p, L1647 Nut Fixing
 Bulkhead Socket @ 50p.
 SPECIAL BFY 90 IN STRIPLINE FORM @ £1 each.
 VHF WIRE ENDED CHOKES 10U.H., 33U.H., 330U.H., All 7p each.
 FERRANTI PLASTIC WIRE ENDED DIODE 800 PV 750mA @ 12 for £1.
 10MHz CRYSTALS in T05 Can @ £2.30 each.
 PAPER CAPACITORS 10U.F. 370V.A.C. 5½" x 2½" x 1½" @ £1.50
 each.
 FETS equivalent to MPF 105 Type TIS-14 @ 4 for £1.
 SINCLAIR AA SIZE NI-CAD CHARGER @ £3.30.
 MULLARD SUB - MINIATURE 1000pf 63v.w., DISCS @ 25p doz.
 EDDYSTONE TRANSMITTING VARIABLE 30 + 30pf (60pf) @ £2.20.
 BSF 21 MATCHED PAIR OF FETS @ 50p pair.
 BSV 81 INSULATED GATE VHF FET (MOST) @ 30p.
 N CHANNEL FETS 2N 3822 @ 30p, 2N 3823 @ 25p.
 BAX 53 VERY HIGH SPEED SILICON BRIDGE in TO72 Case 40 PIV
 200mA with data @ 40p.
 MULLARD PHOTO TRANSISTOR BPX 70 @ 50p each.
 SPECIAL OPTO DEVICES CADMIUM SULPHIDE PHOTOCONDUCTIVE
 CELL RPY 18 with data @ £1.65 each.
 OPR62 CELL with data @ £1.30 each, LEAD SULPHIDE PHOTO -
 CONDUCTIVE CELL RPY 75 with data @ £3.50, RPY75A with
 Germanium Filter @ £4.50.
 COX85A GALLIUM ARSENIDE PHOSPHIDE NINE SEGMENT DISPLAY
 For numbers 1 to 19 Red Light, with data @ £1.85.

FERRITE BEADS FX1115 @ 15p doz. ½" Long Type @ 6 for 10p.
 MULLARD 808 TYPE TRIMMERS 4pf, 10pf, 20pf, 60pf, All @ 15p each.
 SOLID SILVER WIRE END TRANSMIT - RECEIVE PIN DIODES with data
 @ 40p each.
 VHF FETS. J304 @ 30p, BF 256C @ 4 for 75p.
 3/16" COIL FORMERS with core @ 6 for 25p.
 MULLARD UHF MODULE BGY 21 420-470MHz 12 Volt Min. Power Out
 1.2 Watt 20mW Drive with data @ £12.
 MULLARD UHF MODULE BGY22C 360 to 512MHz 13 Volt Min Power
 Out 2.5 Watt 50mW Drive with data @ £12.50.
 MULLARD UHF MODULE BGY 23 12 Volt 420 to 480MHz Min. Power
 Out 7.5 Watt 2.5 Watt Drive with data @ £15.
 DISC CERAMICS .1uf 18v.w., .1uf 25v.w., .22uf 8v.w., .5uf 25v.w., All
 @ 5p. each.
 X BAND GUNN DIODES with data @ £1.65.
 HIGH POWER VHF TRANSISTOR 175MHz 45 Watts, FM or SSB, 5 Watt
 Drive Type 570BLY 28 Volt with data @ £8.30.
 SOLDER - IN FEED THRU'S 6.8pf, 27pf, 300pf, 1000pf, All @ 20p doz.
 UHF POWER TRANSISTOR BFR64 470MHz 12-24 Volt 4 Watt with data
 @ £4.
 UHF POWER BLW82 13 Volt 30 Watt 470MHz @ £9.80.
 HF - VHF POWER 587BL (BLX39) 27 to 70MHz 40 Watt FM or SSB 2
 Watt Drive with data @ £3.
 MULLARD BLY55 175MHz 4 Watt 13 Volt 400mW Drive, with data
 @ £2.50.
 MULLARD BLY97 175MHz 4 Watt 24 Volt 140mW Drive, with data
 @ £3.
 MOTOROLA UHF POWER MODULE 13 Volt 13 Watt Drive 150mW Type
 MHW710/2 440MHz with data @ £12.50.

Please add 30p for post and packing. Orders over £3 post free.

YAESU MUSEN

FT-101Z
 FT-901
 FRG-7000
 FT227RB
 FT-7B
 FT707



FT-101Z

FT-101ZD
 FRG-7
 FT225RD
 CPU-2500R
 FT207R
 FT107

All ex-stock and FREE SECURICOR DELIVERY

APPOINTED JAYBEAM DISTRIBUTOR FOR NORTH WALES
 ASP MOBILE ANTENNAS. SEM PRODUCTS STOCKED
 FULL RANGE OF AMIDON TOROIDAL CORES IN STOCK

COPPER AERIAL WIRE 14swg Hard Drawn. 140'	£8.84
Same as above 70'	£5.34
POWER SUPPLIES 12v @ 4 amp.	£25.00
LOW PASS FILTERS 1KW .5db loss.	£19.50
SEM Z MATCH 160-10m.	£50.00
MULTIMETERS 1000v AC/DC 500K resistance.	£17.00
BALUN KITS 1:1 or 4:1 LF 160, 80, 40, 20m.	£5.86
HF 20, 15, 10m.	£7.05
SWR METERS 3.5-150MHz TWIN METER.	£14.00
144 & 432 MHz.	£17.00
QUAD SPIDERS.	£25.00
SR9 2m FM RECEIVERS.	£48.00
AIR BAND RECEIVERS + MW.	£15.00

Plus lots of other items inc. plugs, sockets, coax.

 * **SEE THE NEW FRG-7700 IN STOCK NOW** *
 * **ONLY £309 - two year warranty** *

TMP ELECTRONIC SUPPLIES

Britannia Stores, Leeswood, Mold, Clwyd CH74SD
 Tel: Portybodkin 846 (036287)

Shop hours: Mon, Wed, Thurs, Fri, 9.30-5 pm; Tues & Sat, 9.30-1 pm

TRIO — YAESU

**MERSEYSIDE
 AMATEUR
 RADIO
 SUPPLIES**

**IN STOCK
 NOW**

**YAESU
 FT-480R**

117 OXFORD RD

WATERLOO
 LIVERPOOL L22

**SOMMERKAMP
 TS802**

051 920 7483.

MONDAY TO SATURDAY
 10.00 - 17.00

**YAESU
 FRG-7700**

ANTENNAS & ACCESSORIES

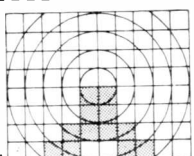
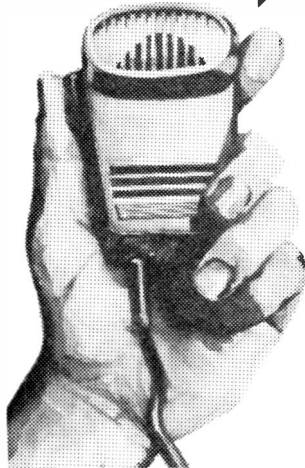
PART EXCHANGE WELCOME

ACCESS — BARCLAYCARD

We give you the world.

Enrol in TUTORCOURSE and we'll take you step by step towards a full Amateur Radio Operator's Licence. Clip the coupon and discover the world.

FREE
BROCHURES



TUTORCOURSE Amateur Radio Operator

Please rush me details of your
AMATEUR RADIO COURSE

Name _____

Address _____

Block Caps Please

Post now without obligation to
SWT/1

**British National Radio
& Electronics School.**

P.O. Box 156 Jersey, Channel Isles

YOUR
SOMMERKAMP
IMPORTER



1 Railway Road, Blackburn, Lancs. Telephone 51842
(Telephone Evenings Bolton 592929 G4GHE.)



THE LATEST SOMMERKAMP - FRG7700 COMMUNICATION RECEIVER. 150KHz - 30MHz multimode, digital frequency readout, 12 programmable memories, variable bandwidth, built-in clock/timer. Price £389.00.

SOMMERKAMP 2 METRE RIGS

TS802 Hand held 80ch. 2 watt. New low 1981 price £129. TS280 Mobile 80 ch. 50 watt £199.00. Low power version 10 watt £159.00. FT480 Mobile 30 watt £359.00.

SOMMERKAMP H.F. RIGS.

FT 277ZD (= FT 101 with extras) £589.00. FT 307 (= FT 107 with extras) £899.00 FT 767 (= FT 707 with extras) £499.00

ROTATORS, ANTENNAS, GENUINE SOMMERKAMP SWR BRIDGES AND 12 VOLT POWER SUPPLIES.

All prices include VAT. Barclaycard and Access welcome.
H.P. terms available. Part Exchange. S.A.E. for details

ANTENNA DAMAGED?

LOSING DX? Check it FAST with an Antenna Noise Bridge, MEASURE resonance 1-150MHz and radiation resistance 2-1000 ohms, £11.80.

TIME EXACT? MSF CLOCK is ALWAYS CORRECT - never gains or loses, self-setting at switch-on, 8 digits show Date, Hours, Minutes and Seconds, also parallel BCD output for computer or alarm and audio to record and show time on playback, receives Rugby 60KHz atomic time signals, built-in antenna, 1000Km range, ACCURACY, £54.80.

RARE DX UNDER QRM? DIG it OUT with a Tunable Audio Notch Filter, between your rx and speaker, BOOST your DX/QRM ratio, 40dB notch, £10.90.

V.L.F.? EXPLORE 10-150KHz, Receiver £13.70.

MISSING DX? Get SPOT-ON with a Crystal Calibrator, between your antenna and receiver, 1MHz, 100, 25KHz markers to vhf, £19.80.

LONG WAVE DX? Exciting 100-600KHz Converter to 3.5-4MHz, built-in antenna tuner, £13.90.

LINEAR OKAY? Check, Two Tone Oscillator £11.70.

NO RADIO 4? 200KHz Converter, get ALL the NEWS, suits any medium wave receiver, £14.40.

Each fun-to-build kit includes all parts, printed circuit, case, postage, etc., instructions, money back assurance
so GET yours NOW.

CAMBRIDGE KITS

45 (SN) Old School Lane, Milton, Cambridge.

BETTER SHORT WAVE RECEPTION

by William I. Orr W6SAI and Stuart D. Cowan W2LX
4th Edition

In the latest edition of this excellent work for all those who own (or intend to own) a radio receiver, these two well-known and respected writers have produced chapters covering: the radio spectrum and what you can actually hear world-wide; the tuning of a shortwave receiver; the business of buying a receiver, both new and secondhand; a description of the SW Rx in non-technical terms, together with receiver adjustment and alignment; DX-ing above 30MHz; a description of the VHF receiver; building and adjusting efficient aerials; reception techniques.

Thoroughly readable and "digestible", this book is without doubt a very valuable addition to the bookshelf of any SWL.

160 pages

£3.00 inc. post

Order from

Publications Dept.

Short Wave Magazine Ltd.
34 High Street, Welwyn, Herts. AL6 9EQ

G2BAR HAM BAND AERIALS

	Price	
	inc. VAT	P.P.
2 metre Folded Dipole YAGI	£7.48	£1.15
5/8D. 5 element square section boom	£10.35	£1.15
8/8D. 8 element reinforced boom		
2 metre 'J' Pole		
1/JP. 1/4 wave matching sections, enclosed connectors with half wave radiator, 15mm square elements	£6.90	£1.15
70cms. Folded Dipole YAGI's		
6/6D. 6 element square section boom	£6.90	£1.15
11/11D. 11 element reinforced boom	£10.93	£1.15
HF. 1/4 wave Mono Band Verticals with insulator and ground post sections		
10/HFV. 10 metre vertical, 3 sections of telescoping tubing dia. 1" to 3/4"	£9.78	£1.15
15/HFV. metre vertical, 4 sections of telescoping aluminium dia. 1" to 3/4"	£11.20	£1.15
20/HFV. metre vertical, 6 sections of telescoping aluminium tube dia. 1 1/4" to 1/2"	£13.23	£1.15
HF Band Dipole. Reflector Director Elements Only		
10 metre Mark II 1/2 wave element 7 sections of aluminium telescoping tube dia. 1" to 3/4"	£9.78	£1.15
15 metre Mark II 1/2 wave element 9 sections of aluminium telescoping tube dia. 1 1/4" to 1/2"	£12.08	£1.15
20 metre Mark II 1/2 wave element 7 sections of larger dia./lengths of telescoping tubing 1 1/4" to 1/2"	£14.65	£2.30
2 element YAGI Beams		
Driven and Director elements. Boom to element clamps		
Tubular Gamma Match tuning unit supplied.		
10 metre - 2 element array	£31.68	£4.00
15 metre - 2 element array	£39.80	£4.00
20 metre - 2 element array	£49.45	£4.00
Well designed and constructed		
Boom to Mast. bracket plate. 4U Bolts	£4.60	£1.15
Trapped Vertical 1/4 wave 300 watt		
10 - 15 and 20 metres. Tuned Slim Line Traps - Telescoping Aluminium Elements for easy adjustments	£28.18	£4.00
Portomasts 12'4 telescoping aluminium tubing extended to 12' 6" mast including 3guys and ground pegs	£9.20	£1.15
18'. 18ft. Portomast with 6guys and ground pegs	£13.60	£1.15

Now even better value - please send 30p stamps for literature and news

UPPINGTON TELE-RADIO (BRISTOL) LTD.
12-14 Pennywell Road, Bristol BS5 0TJ. Telephone: 0272 557732

CRAYFORD ELECTRONICS

G8AYN G81WX
FLEXIBLE HELICAL AERIALS FOR HAND PORTABLES
VHF - UHF

Frequency	Connector/Fitting	Price
70MHz (4m)	2BA, BNC, PL259	£6.00
145MHz (2m)	2BA, BNC, PL259, Pye PF70, 2200GX, 2300, IC215, IC202S	£4.20
	Right angle BNC, PL259, TNC	£5.35
	Storno 500, Pye Bantam	£5.00
433MHz (70cm)	4BA (use on PFI) BNC, min BNC, Pye PF70, 3200, Storno 500	£2.65
		£3.35

Prices inclusive of VAT and carriage, most items ex-stock. Many others available, including commercial, marine etc.

ACCESS SAE all enquiries BARCLAYCARD
6 LOVELACE CLOSE, WEST KINGSDOWN,
SEVENOAKS, KENT TN15 6DJ
24hr Answer Service 047485 2577

NEW FROM JAPAN . . .

Most rigs are good but the limiting factor in received audio and readability of a signal is the small speaker in ever increasingly smaller sets . . . now at last we have located a really **SUPERB EXTERNAL SPEAKER UNIT** . . . the best we have ever heard, extremely well made, fitted complete with 3.5mm jack plug for you to plug straight in to your set. The **AZDEN** Speaker is 8ohms to suit all sets and will handle up to 6 watts. The **CLARITY** of the signal you receive will be much better and **LOUDER** than with any other unit available.

It is so good that you can try it for 14 days and if are not completely satisfied may return it for a complete refund.

PRICE £11.80p inc. 15% VAT, post 65p

W. H. WESTLAKE, G8MWW, CLAWTON
HOLSWORTHY, DEVON.

"CALLBOOKS" 1981 HAVE ARRIVED!

Foreign ("DX") Listings £9.65

U.S. Listings £10.15



The above prices include postage and packing

Publications Dept.,

Short Wave Magazine

34 High Street, Welwyn, Herts. AL6 9EQ

Tel: Welwyn (043871) 5206/7

MORSE CODE RECEIVING AND SENDING

Receiving: C-90 Cassettes. CASSETTE A for Amateur Radio examination preparation. Speed slowly increasing from 1-12w.p.m. CASSETTE B for Professional examination preparation. Computer produced morse from 11.12-24w.p.m. incl. international procedure signs and symbols and their incorporation into messages.

Sending: Morse Key and Buzzer Unit for sending practice and own tape preparation. Phone output. Prices: each cassette, incl. booklets, £4.75. Morse key and buzzer unit, £4.75.

Prices incl. postage, etc. Overseas Airmail £1.50 extra
M H ELECTRONICS (Dept. 3), 12 Longshore Way, Milton, Portsmouth PO4 8LS

ALL VALVES & TRANSISTORS

Call or phone for a
most courteous quotation
01-749 3934

We are one of the largest
stockists of valves etc. in the U.K.

COLOMOR ELECTRONICS LTD. 170 GOLDHAWK ROAD
LONDON W12

MORSE MADE EASY BY THE RHYTHM METHOD!

FACT NOT FICTION • No expensive equipment required only a turntable

If you start RIGHT you will be reading amateur and commercial Morse within a month. (Most students take about three weeks). That's why after 25 YEARS we still use three scientifically prepared special records with which you cannot fail to learn the MORSE RHYTHM automatically. It's as easy as learning a tune. 18 w.p.m. in 4 weeks guaranteed. Complete course comprising 2 x 12" + 1 x 7" multi-speed records + books. £5.50 plus (U.K. p.p. + 75p. Overseas, sufficient for 750 grms.) Despatch by return from: - S. Bennett, G3HSC, (Box 14), 45 Green Lane, Purley, Surrey CR2 3PQ.

01-660 2896

G4DSG D. P. HOBBS LTD. G3HEO

THE RADIO COMPONENT SPECIALISTS

YAESU FRG7700, 150 KHz-30 MHz Gen. Cov. Rec. Dig. Readout and Clock..... £309.00
 YAESU FRG7, .5-30 MHz Gen. Cov. Rec. 1 MHz Segments..... £199.00
 LOWE SRX30, .5-30 MHz Gen. Cov. Rec. 1 MHz Segments..... £158.00
 FDK 700EX 2mtr. FM, TCVR, Dig. Readout, Scan, Etc..... £199.00
 FDK 750E 2mtr. FM, SSB, CW, TCVR, Dig. Readout..... £299.00
 DAIWA SR9 2mtr. Monitor Rec., VFO + 11 Fixed Positions..... £46.00
 R517 Aircraft Band Monitor Rec., VFO + 3 Fixed Positions..... £49.75
 REGENCY Digital Flight Scan Air Band Rec. with Memory..... £215.00
 REGENCY M100 Digital FM Scanning Rec. 66-90 MHz, 144-174 MHz, 440-512 MHz..... £199.00
 DM350 50K P.T.T. Mics..... £4.83 + 30p p&p
 DL20 Dummy Loads 15 Watt (30W Peak) PL259..... £6.04 + 30p p&p
 AY 3-8500 T.V. Games Chips..... £2.00
 FND500 Com. Cath. Displays..... £1.00
 40KHz Transducers..... £4.25 Pr.
 Electrolytics ideal for Linears, 400MFD, 400V. and 700MFD, 350V.
 £1.20 each + 30p p&p

Microwave Modules, 2 mtr, 70 cm, 23 cm Converters. 2 mtr and 70 cm Transverters. Ascot, Bantex and Jaybeam Aerials.
 Vero Products, Ally and Plastic Boxes, Res., Caps., ICs., Transformers Etc., Bernards and R.S.G.B. Technical Books.

Prices include VAT. All Mail Orders to Luton. Access Barclaycard.
11 Kings Street, Luton, Beds. Tel. 20907

Open 9 am - 5.30 pm Mon - Sat. Closed all day Wednesday

Also visit **D. P. HOBBS NORWICH LTD.**

13 St. Benedict's St., Norwich. Tel. 615786

Closed all day Thursday

**SAMSON ETM-3C
C-MOS KEYS**

1µA battery drain — Why switch off?

● Self-completing dots/dashes/spaces ● Can be used either as normal electronic keyer or as an iambic mode squeeze keyer ● 8-50 wpm ● Constant 3:1 dash-dot ratio ● 6 C-MOS ICs and 4 transistors ● Plug-in PCB ● Long battery life — typically 1µA drain when idling — Built-in battery holder for 4 x 1.5 v. batteries (but will work over 3-10 v. range) ● PCB has both a reed relay (250 v., 0.5 amp., 25 w. max.) and a switching transistor (300 v., 30 mA max.) — either keying method can be used ● Has the well-known fully-adjustable Samson precision twin keying lever assembly ● Operate/Tune button ● Sidetone oscillator ● Grey case 4" x 2" x 6". ETM-3C, £66.86.

ETM-4C MEMORY KEYS: Has ETM-3C features plus 4 memories of 22 characters each (for 2 of 4). Erase/Rewrite memories as needed — Send CO's etc. by pressing button. £124.95.

BUILT FOR DEPENDABLE MARINE AND COMMERCIAL SERVICE

JUNKER PRECISION HAND KEY: A superbly engineered straight key used for many years by professionals afloat and ashore. With this key you can't help but send good morse. Free-standing — no screwing down. Front and back contacts — fully adjustable gaps/tension. Key-click filter. Hinged grey cover, £39.87

BAUER KEYING PADDLE: Single-paddle unit on 1½" x 2" base for home-built El-bugs. Adjustable gaps/tensions, £13.85.

All prices post paid UK and include 15% VAT
 Please send stamp with enquiries

SPACEMARK LTD.

THORNFIELD HOUSE, DELAMER ROAD

ALTRINCHAM, CHESHIRE

(Tel: 061-928 8458)

REG WARD & CO. LTD G2BSW**YAESU**

FT901DM.....	£799.25	FT225RD.....	£499.00
FT901D.....	£724.50	FT225R.....	£449.00
FC902.....	£126.50	FT480R.....	£359.00
FT301D.....	£660.00	CPU2500RK.....	£332.25
FP301D.....	£140.00	FT227RB(St).....	£281.75
FT101ZD.....	£569.25	FT207R.....	£199.00
FT101Z.....	£488.75	FT202R.....	£99.00
FT707.....	£500.25	YO101.....	£180.00
FP707.....	£109.25	YC500J.....	£189.75
FC707.....	£74.75	YC601.....	£120.00
FT73.....	£399.00	YP150.....	£63.25
FT200B/FP200.....	£399.00	FP12.....	£78.20
FR101DD.....	£690.00	FP4.....	£41.40
FR101S.....	£454.25	SD901.....	£28.75
FRG7700.....	£309.00	YD148.....	£21.27
FRG7000.....	£299.00	YD844.....	£21.27
FRG7D.....	£249.00	YE7A.....	£8.62
FRG7.....	£199.00	YH55.....	£10.00

SWAN

ASTRO 102BX.....	£798.00	PSU 6 (for 102).....	£142.00
ASTRO 150.....	£613.00	PSU S (for 150/100).....	£135.00
100MX.....	£418.00	ST3 ATU.....	£122.00

KDK FM202SE £225.00

Valves: Most types available. All valves for Yaesu and KW equipment stocked. We also stock: Shure microphones, Hy-Gain, Jaybeam, Ascot, Cushcraft. Agents for G2DYM Antennas. SEM equipment. Rotators and Rotator control cable. Co-ax and Twin Feeders. 'Co-ax' and Antex Antenna Switches. Aerial Wire and Hardware.

HP Available. Please check prices and availability before ordering. VAT at 15%, included in all prices.

ACCESS/BARCLAY CARD/TRUSTCARD.

GEORGE STREET, AXMINSTER, DEVON EX13 5DP.
 Telephone: 33163 (Std 0297).

"S.W.M."**DX ZONE MAP**

New 9th Edition!

Great Circle projection on durable, quality, paper for wall mounting, 33¼ in. wide by 24½ in. deep.
 Giving essential DX information — bearing and distance of all parts of the world relative to the U.K., the Zone areas into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. Hundreds of place names, mainly the unusual ones, and most of the rare islands.

Zones and Prefixes corrected to August 1980

Price **£3.35**

including postage and special packing in postal tube to avoid damage in transit.

Publications Dept.

Short Wave Magazine Ltd.,

34 High Street, Welwyn, Herts. AL6 9EQ.

Tel: Welwyn (043871) 5206/7

Technical Books and Manuals

(ENGLISH AND AMERICAN)

AERIAL INFORMATION

Antenna Handbook (Orr and Cowan)	£4.10
Practical Aerial Handbook, 2nd Edition (King)	£7.00
Beam Antenna Handbook	£3.15
Cubical Quad Antennae, 2nd Edition	£3.15
Simple Low Cost Wire Antennas, by Orr	£3.50
73 Vertical Beam and Triangle Antennas (E. M. Noll)	£4.00
73 Dipole and Long-Wire Antennas (E. M. Noll)	£4.00
Antenna Book (ARRL) 13th Edition	£3.60
The ARRL Antenna Anthology	£2.75
Two-metre Antenna Handbook, F. C. Judd G2BCX	£4.35

BOOKS FOR THE BEGINNER

Questions and Answers on Amateur Radio, by F. C. Judd G2BCX	£2.05
Elements of Electronics, <i>Book 1</i>	£2.50
Elements of Electronics, <i>Book 2</i>	£2.50
Elements of Electronics, <i>Book 3</i>	£2.50
Solid State Short Wave Receivers for Beginners (R. A. Penfold)	£1.50
Beginners Guide to Radio (8th Edition)	£3.70
Beginners Guide to Electronics	£3.70
Beginners Guide to Microprocessors and Computing	£2.05
Course in Radio Fundamentals, ARRL	£2.80
Guide to Amateur Radio (new 18th Edition) (RSGB)	£2.95
Ham Radio (A Beginners Guide) by R. H. Warring	£3.95
Morse Code for the Radio Amateur (RSGB)	£1.20
Understanding Amateur Radio (ARRL)	£3.65
Radio Amateur's Examination Manual, 8th Edition (new syllabus) RSGB	£2.70

GENERAL

How to Build your own Solid State Oscilloscope (Rayer)	£1.75
Projects in Radio and Electronics (Newnes)	£2.60
How to Make Walkie Talkies (Rayer)	£1.75
How to Build Advanced Short Wave Receivers (Penfold)	£1.40
Better Short Wave Reception, 4th Edition	£3.00
FM & Repeaters for the Radio Amateur (ARRL)	£3.20
Easibinder (to hold 12 copies of "Short Wave Magazine" together)	£2.70
Oscar - Amateur Radio Satellites	£4.30
World Radio & T.V. Handbook 1980 Edition	£9.40
World DX Guide	£5.40
Guide to Broadcasting Stations (new 18th Edition)	£3.40
Radio Stations Guide	£1.75
Long Distance Television Reception (TV-DX) for the Enthusiast	O/P
Solid State Basics for the Radio Amateur (ARRL)	£3.35
Counter Driver and Numeral Display Projects, Rayer	£2.05
Weekend Projects for the Radio Amateur, ARRL	£2.15

Electronic Test Equipment Construction (Rayer)	£2.05
Power Supply Projects (Penfold)	£2.05

HANDBOOKS AND MANUALS

Radio Communication Handbook, Vol 1 (5th Edition) (RSGB)	£9.75
Radio Communication Handbook Vol. II (5th Edition) (RSGB)	£8.40
TVI Manual (2nd Edn.) (RSGB)	£1.60
Radio and Electronic Laboratory Handbook by Scroggie-Johnstone, 1980 (9th) Ed.	£19.05
RTTY Handbook (73 Magazine)	o/s
Slow Scan Television Handbook (73 Magazine)	o/s
Specialized Communications Techniques for the Radio Amateur (ARRL)	o/s
Working with the Oscilloscope	£4.05
The Radio Amateur's Handbook 1981 (ARRL) soft cover	<i>available shortly</i>
The Radio Amateur's Handbook 1981 (ARRL) hard cover	<i>available shortly</i>
Shortwave Listener's Handbook	£3.30
Learning to Work with Integrated Circuits (ARRL)	£1.70
Weather Satellite Handbook	o/s
Single Sideband for the Radio Amateur (ARRL)	£2.95
Test Equipment for the Radio Amateur (RSGB)	£4.50
Amateur Radio Operating Manual (RSGB)	£4.80

USEFUL REFERENCE BOOKS

Solid State Design for the Radio Amateur (ARRL)	£5.00
Foundations of Wireless and Electronics, 9th Edition (Scroggie)	£5.40
Amateur Radio Techniques, new 7th Edn (RSGB)	£6.00
U.K. Call Book 1981 (RSGB)	£4.25
Hints and Kinks (ARRL)	£2.85
Radio Data Reference Book (RSGB)	£3.65
Electronics Data Book (ARRL)	£3.25
Radio Frequency Interference (ARRL)	o/s
Amateur Radio Awards, RSGB	£3.40

VALVE AND TRANSISTOR MANUALS

Towers' International Transistor Selector 1980 Edition (Up-Date No. 2)	£10.40
Radio Valve and Semiconductor Data (10th Edition)	£4.35

VHF PUBLICATIONS

VHF Handbook, Wm. 1 Orr	o/s
VHF Manual (ARRL)	£3.30
VHF/UHF Manual (RSGB) 3rd Edition	£7.20

O/P (Out of print)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

O/S (Out of stock)

Many of these titles are American in origin

(Terms C.W.O.)

Prices are subject to alteration without notice.

Available from

SHORT WAVE MAGAZINE

Publications Dept.

34 High Street, Welwyn, Herts. AL6 9EQ - Welwyn (043871) 5206/7

(Counter Service. 9.30-5.00 Mon. to Fri.)

(GIRO A/C No. 5476151)

From the World-Record JOYSTICK people!

A REVOLUTIONARY ANTENNA THEY CALLED "IMPOSSIBLE"

THE JOYFRAME (Patient Applied for)

Amateur Bands 3.5-30 MHz.

The ultimate in small package, poor QTH, versatile antennas. Comes in easily assembled package which makes up to a 21 x 21 x 21 (inches) triangle. The unit JUST STANDS ON TOP OF TX/RX! Two knob control — and is rotated by hand for directivity on 80m. Is omni-directional on higher freq.'s and for many SW BC stations. Incredible low angle radiation. Tested at 2 watts (only) CW at our works — world wide contacts! "Soak test" with GZVF using only 30 watts has satisfyingly filled his log with world wide QSO's. Loop TRANSMISSION performance with such a small unit has, we believe, never been seriously contemplated before, but rather written off as "impossible". Years of research from the firm that produced the JOYSTICK VFA and related systems now offers the JOYFRAME to the amateur fraternity and is the answer to the "maidens prayer" to everyone with a space problem. All the benefits of JOYSTICK products: substantially harmonic-free, low angle, efficiency, compact.

COMPLETE JOYFRAME £60.00

(incl. ATU)

(or write — 14p — or phone for literature)

ANTENNAS (our regular lines)

THE JOYSTICK VFA (Variable Freq. Antenna)

- Only 230cm long, easily assembled and installed.
- Continuous tuning 0.5-30MHz Omni-directional
- Substantially harmonic-FREE

SYSTEM 'A' For the SWL or 160m. Tx. £48.55

THE JOYMASTER SUPERMATCH SYSTEM

- Newer development for higher power, improved performance and even greater capability in the awkward QTH!
- Includes matching ATU ● Amateur Bands (incl. 'new' bands) 3.5-30MHz ● 500 w.p.e.p.

NEW SUPERMATCH SYSTEM £82.00

with 13' Joyradial 5 band radial

SUPERMATCH ATU £50.00

available to improve performance of existing antennas. Impressive, versatile, try it!

JOYRADIAL (3.5-30MHz) £6.90

RECEIVERS

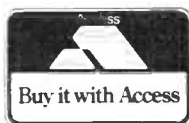
Get on the air in seconds!

- FRG7700 £309 (£380 with Memory) ● FRG7 + free wire aerial ONLY £187 ● Package "R.1" FRG7 + ATU + World Record VFA and FREE HEADPHONES £218 ● Package "R.3" FRG7700 (without Memory), VFA, ATU, Headphone £345.50 ● Package "R.4" FRG7700 (with Memory), VFA, ATU, Headphones £425.50

TRANSCEIVERS ETC.

We reckon we're offering the LOWEST YAESU PRICES

Try phoning us for your PERSONALISED quote with or without Partridge antennas. For example: ● FT101ZD — only £559 ● FT901DM — only £795 ● FT7B — only £395.



JUST TELEPHONE YOUR CARD NUMBER

0843 62535 (Ext. 4) (62839 after office hours) or send 14p for FREE literature. Prices correct as at press. NOTE our prices are always INCLUSIVE OF VAT, carriage. Prompt service too, goods usually despatched WITHIN 48 HOURS!



G3CED
G3VFA

4 Partridge House, Prospect Road,
Broadstairs, Kent CT10 1LD
(Callers by appointment)