

The SHORT WAVE Magazine

VOL. XXXVIII

DECEMBER 1980

NUMBER 10

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
CARRIAGE BY SECURICOR £4.50	

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 mixings, 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.

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CHESTERFIELD ROAD, MATLOCK, DERBYSHIRE. DE4 5LE

TEL. 0629 2430/2817

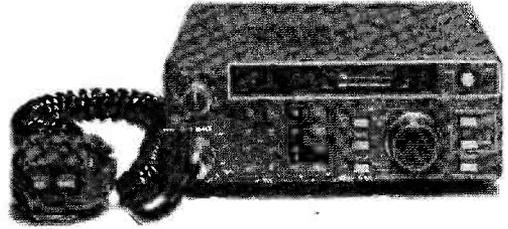
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TRIO TR7800

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.



- ★ Direct entry keyboard
- ★ 15 multifunction memories simplex and repeater
- ★ Priority alert on channel 14
- ★ Optional battery back-up for all memories
- ★ Reverse repeater facility
- ★ 25 watts/5 watts power output
- ★ Digital readout of frequency *and* memory channel
- ★ Up/down manual scan/shift on microphone
- ★ Up/down microphone control of frequency shift
- ★ Up/down microphone control of memory channel

TRIO TR9000

2 METRE ALL MODE TRANSCEIVER

TR900 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.

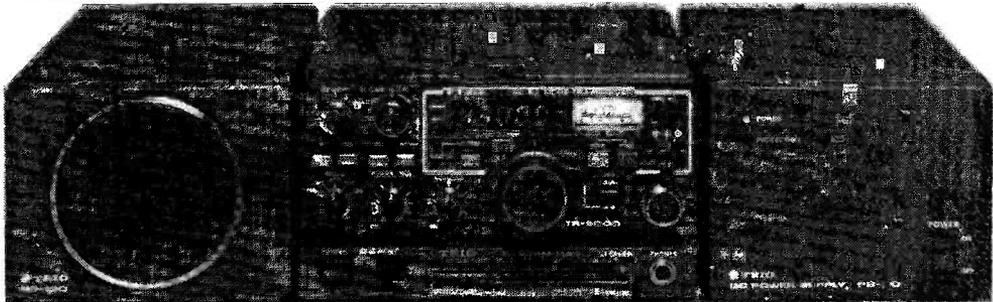
Cast your eye over the front panel. Apart from the now conventional RF/RIT, power/vol and high/low power controls, you will notice added facilities.

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 2metre 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 SPEAKER

TR9000 + BO9 BASE

PS20 POWER SUPPLY

Don't forget, we stock almost everything that the keen DXer, short wave listener or radio amateur could possibly need, including the complete range of J Beam aerials, Microwave Modules equipment, feeder, clamps, insulators – in fact our catalogue makes good reading for 48p and includes honest advice on aerial matters. For all that's good in Amateur radio, contact Lowe Electronics at Matlock.

LOWE ELECTRONICS Ltd.

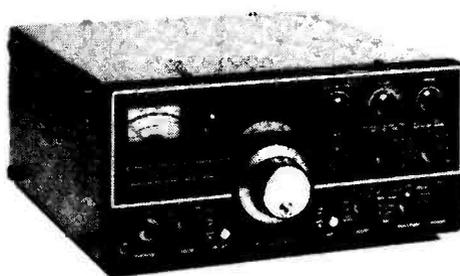


TRIO TS520SE

HF SSB TRANSCEIVER

£437 inc VAT

Securicor carriage £4.50



The TS520SE standard specification includes CW wide/narrow switching (using the optional 500 Hz filter), semi break-in keying with sidetone, PTT or VOX operation, really effective noise blanker, switched AGC time constants, 5 function metering, switched RF attenuator, RIT, speech processing for punchy transmit audio, fixed channel facilities, 25kHz calibrator, fan cooled PA, internal loudspeaker, and of course the TS520SE will take all the wide range of current matching accessories including the DG5 true frequency digital readout, the VFO520S remote VFO unit, the SM220 station monitor scope and panoramic display and so on.

When talking to prospective purchasers of the TS520SE, the question we are most often asked is "how does it compare in price to its rivals?" and the transceiver it is most compared with is the Yaesu FT101Z series. The price for the FT101Z taken from March 1980 RadCom is **£575** including VAT and you also should add PA fan at **£13.80** (the fan is standard on the TS520SE) making a grand total of **£588.80**.

The TS520SE costs **£437** including VAT.
Now tell me if that's not value for money.

In the face of ever increasing complexity in amateur radio equipment, its comforting to know that the TS520SE is still in volume production. Radio amateurs all over the world (and dealers too) have voted the TS520SE "my favourite transceiver" because of its astounding reputation for reliability, high sensitivity receiver, and of course the unequalled Trio audio quality coming from the transmitter. The TS520SE incorporates all of the features demanded by today's amateur, and at an outstandingly low price. No wonder it's top of the list in popularity, and comparison with other transceivers will convince you that the TS520SE is the best value for money on the market today.

Of course, the bare figures cannot tell you just how nice the TS520SE feels in use, nor can they tell you the pleasure of hearing other operators saying "never heard better audio OM, what rig are you using?"



TRIO TS830S

HF SSB TRANSCEIVER

£639.52 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

FOR ALL THAT'S GOOD IN AMATEUR RADIO

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

LOWE ELECTRONICS Ltd

the AOR AR 245

FM TRANSCEIVER 5 watts/1 watt output
£179 including VAT. Securicor carriage £4.50

"A staggering technical achievement"; "How can they get it into such a small size?"; "Outperforms any rig I've ever had". These are typical of the comments made by amateur radio operators after seeing and using the remarkable AR245 2 metre FM handheld transceiver. What does it mean to you? Well, at last you can really take your amateur radio with you, anywhere you want to go, because in this handheld unit, you have a complete synthesized 2 metre FM transceiver covering 144.000 to 147.995kHz in 5kHz steps. Also included are + and - 600kHz shifts and a crystal controlled tone burst unit.

INCLUDED IN PRICE -

NICAD PACK, CHARGER, WHIP, XTAL TONE BURST, ETC



the AOR AR 22

FM RECEIVER
£83.00 including VAT. Carriage £1.50
HELICAL WHIP FOR AR22 £3.00 inc VAT.

The AOR model AR-22 is a multi-channel PLL synthesized VHF FM communications receiver covering in 5kHz steps 141.000MHz to 149.995. The AR-22 is designed primarily for the 2 metre amateur band frequencies from 144.000 to 146.000MHz.

The AR-22 is based on advanced PLL synthesizer technology which generates the local oscillator signal for a dual conversion receiver with an outstandingly clean signal reception. You will find that the AR-22 receiver is the equal of many full size base station receivers and yet is capable of being carried in your jacket pocket.

The AR-22 has many advanced features including:

- ★ Direct frequency reading in 5kHz steps by digital thumb control and slide switch.
- ★ The automatic circuit tuning system permits it to receive all frequencies without degradation in receiver sensitivity.
- ★ Rugged and reliable double-sided glass-epoxy printed circuit board.
- ★ High performance optional mini-helical antenna.



There were shepherds abiding in the field, keeping watch over their flocks by night. And lo, the angel of the Lord came upon them, and the glory of the Lord shone about them, and they were sore afraid.

And the angel said unto them, "Fear not, for behold, I bring you good tidings of great joy, which shall be to all people. For unto you is born this day, in the city of David, a Saviour which is Christ the Lord."

And suddenly there was with the angel a multitude of the heavenly host, praising God, and saying:

"Glory to God, glory to God in the highest, and peace on earth, goodwill towards men." LUKE 2, V 8 to 14

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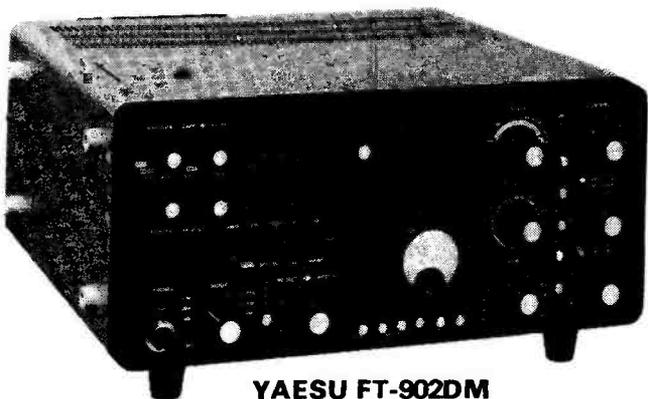
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FOR ALL THAT'S BEST IN HAM RADIO CONTACT US AT MATLOCK ANYTIME

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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, 50/60 Hz; DC 13.5 V, negative ground.

Power consumption:

AC 117 V: 70 watts receive (45 watts HEATER OFF), 320 watts max transmit; DC 13.5 V: 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 μV 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 "0": 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.

WE WISH YOU ALL A VERY MERRY CHRISTMAS

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BIRMINGHAM 8

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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), 285 VA 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 10 dB (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 (180-15 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.



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

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



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 Squeech 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 £3.60p — a 10 to 1 winning offer.

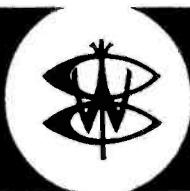


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Western FOR HF TRANSCEIVERS ALL PRICES DOWN!



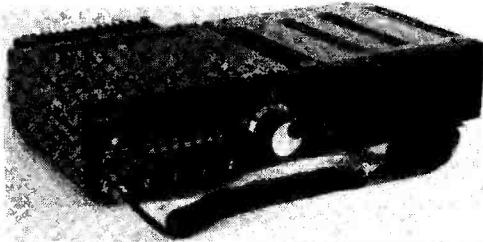
**CHECK
Western
PRICES!**

FT-707

Truly christened the "WAYFARER". Yaesu's new solid-state transceiver goes anywhere, base or mobile, and has all the desirable "big rig" features together with exceptional performance. 100W RF output; digital readout; IF width control; LED 'S' and 'Power' meter display; FULL band coverage, 80-10 metres, including 30m, 17m and 12m. This *must* be the transceiver all you YAESU fans have been waiting for!

ANCILLARY UNITS

FP-707 AC PSU/Speaker
FC-707 Antenna Tuner
YM-36 Hand Microphone
MMB-707 Mobile Bracket



TS-120S TRIO

A very popular mobile or base station solid-state HF transceiver. Small in size but big on features at a sensible price. This little gem from TRIO-KENWOOD features digital readout, IF shift to beat the QRM, VOX and break-in CW, 100W RF output on all bands 80-15 metres (slightly lower on 10m). Superb value for an up-to-date HF rig.

CHECK Western PRICES!

... OR IF YOU STILL PREFER 6146Bs IN THE FINAL ...

FT-101Z FROM YAESU MUSEN

Latest in a famous line, but what an improvement! Full band coverage, IF width control for superior selectivity, excellent performance and Yaesu's well-known quality. ZD model has digital readout built-in, both models in excess of 100 watts RF out (lower on 10m). Try our price for size!

TS-520SE FROM TRIO-KENWOOD

It would be hard to find better value for an HF transceiver than the TS-520SE. Covering all HF bands 160-10 metres, it features 6146B in the PA; Wide/Narrow CW switching (with optional filter); speech processor; high sensitivity and dynamic range; RF attenuator and other features to make your operating a pleasure. A first-class transceiver at a down-to-earth price!

TREAT YOURSELF FOR CHRISTMAS! (or let the YL/XYL/OM do it!)

We have a wide range of accessory items which will make ideal gifts for the radio amateur in your life. A SAE will bring up-to-date price lists of such things as: -

Antennas	SWR Meters	Microphones	Plugs and Connectors
Antenna Accessories	Power Meters	Head Phones	Valves
Rotators	Morse Keys	Clocks	Cables

... and if you feel really generous, try us for - HF, VHF, UHF, TUNERS, SCANNING RECEIVERS, etc., etc.

A NEW TELESCOPIC MAST FOR THE BUDGET-CONSCIOUS AMATEUR

Ever felt like having a tilt-over mast but thought you couldn't afford it? Ever thought that the big lattice masts were too much when you only need support for your VHF/UHF antennas?

THE ALL-NEW 30ft. 'ULTIMAST' is the answer to your problems

- ★ Slim, unobtrusive appearance
- ★ One-winch operation
- ★ Self-supporting for large VHF antennas
- ★ Can be guyed to increase loading capability
- ★ Telescopic and tilt-over
- ★ Simple ground fixing
- ★ Inexpensive
- ★ Choice of head units (optional extra)

PRICE - YOU'LL NOT BELIEVE IT! PHONE AND SEE HOW LOW!

HOLIDAYS - WE ARE CLOSED FROM 24th DEC 1980 to 4th JAN 1981 inc.

Electronics (UK) Ltd

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**THINKING of a TOWER?
... NOW'S THE TIME!**

It's not too soon to be planning your WESTOWER installation. You may be knee-deep in snow now, but by the time your application has found its way through your Town Hall's Planning Department — AND... by the time your bank balance has recovered from Christmas — the spring flowers will be peeping up through the ground and your spade foot will be itching to start digging the hole for your WESTOWER base!

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.

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BEWARE...

of incomplete claims like "Windspeeds up to 117mph" which carefully omit any mention of headload. WE COULD make such claims — but prefer to give FULL DETAILS to help you make your choice of WESTOWER. This is the WESTERN "SQUARE DEAL" policy.

... AND NOW FOR SOME PRICES

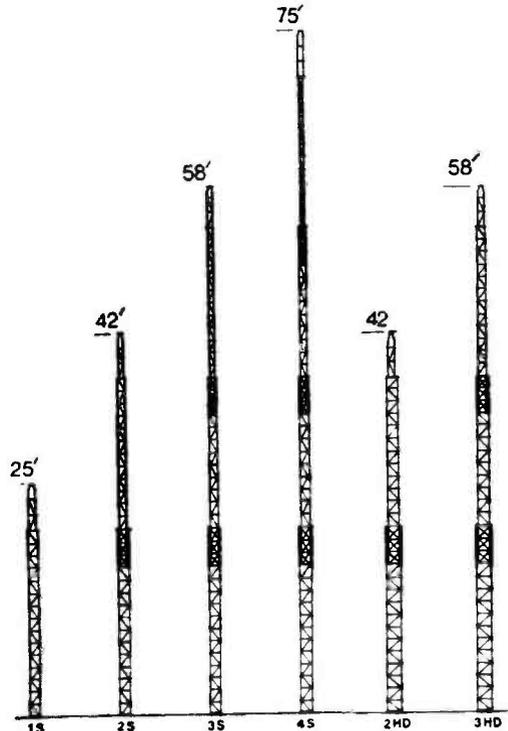
2S/FBP 42 ft. framed base, standard	£396.75
3S/FBP 58 ft. framed base, standard	£515.20
2S/W 42 ft. wall mounting, standard	£354.20
2HD/FBP 42 ft. framed base, heavy duty	£516.35
3HD/FBP 58 ft. framed base, heavy duty	£631.35
4HD/FBP 75 ft. framed base, heavy duty	£759.00

* Carriage is FREE — except Cornwall/Devon/Scotland. VAT at 15% is included in above prices.

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FEATURES

- ★ Heights from 25ft. to 120ft.
- ★ 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.



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Thanet Electronics for ICOM

the amateur's professional friends

This month we are showing you:

IC720 — Highly popular Amateur Band Transceiver and GENERAL COVERAGE RECEIVER.
 IC240 — The best value for money in synthesized rigs.
 Thela 7000E — An outstanding communications computer.
 IC202S — A pair of magnificent sideband portables.
 IC402

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 multimade mobile.

On these, and all our other products:

- * we offer a full year's warranty on all parts and labour * All prices including V.A.T.
- * Free delivery for all transceivers, using registered first class post * H.P. and Part Exchange welcome

IC-720-

The "Masterpiece" in modern communications

An exceptional 9-band HF transceiver for less than £700, INCL.

The "Masterpiece's" signal purity and superior receiver keeps you abreast of the advancing technologies and incorporates features wanted by amateurs worldwide.



General

FREQUENCY COVERAGE

RECEIVE: 0.1 — 30.0MHz
 1.8 — 1.999MHz
 3.6 — 4.099MHz
 6.9 — 7.499MHz
 10.0 — 10.499MHz
 13.9 — 14.499MHz
 17.9 — 18.499MHz
 20.9 — 21.499MHz
 24.3 — 25.000MHz
 28.0 — 28.999MHz
 29.0 — 29.999MHz

Temperature

Limitation: -10°C — +60°C
 Antenna Impedance: 50 ohm
 Power Requirement: 13.8V DC, neg. ground, ± 15%
 Current Drain: Min audio output 0.9A.
 Max audio output 1.2A

DIMENSIONS:

TRANSMIT: SSB 16A, CW, RTTY 20A, AM 14A
 111 (H) x 241 (W) x 311 (D) mm.

Transmitter

Emission Mode: CW(A1), RTTY(F1), SSB(USB/LSB), AM 100W Continuous (AM 40W)
 Output Power: SSB, AM Balanced Mod. CW, RTTY reactance mod.
 Spurious Output and Harmonic Output: More than 60 dB below peak power
 Carrier Suppression: More than 40 dB below peak power
 Unwanted Sideband: More than 50 dB down at 1000Hz AF Output
 Microphone Imp: 1.3K Ohm, dynamic with built in pre-amp.

SPECIFICATION

RECEIVER

Receiving System: Superhetrodyne, with continuous band-width control.
 Receiving Mode: A1, A3J (USB/LSB), A3, F1.
 Intermediate Freq.: 1. 39.731 MHz
 2. 9.0115 MHz
 3. 10.750 MHz
 4. 9.0115 MHz
 Sensitivity: Less than 0.25 micro volts for 10dB S + N/N
 Spurious Response: Better than 60dB
 Rejection Ratio: SSB, CW, RTTY ± 1.15kHz at -6dB (Adjustable to ± 0.4kHz min) ± 2.1kHz at -60dB
 Selectivity: CW Narrow (option) ± 250Hz at -6dB ± 750Hz at -60dB
 AM (without filter) ± 3kHz at -6dB ± 9kHz at -60dB
 with filter ± 2.6kHz at -6dB ± 6kHz at -60dB
 Audio Output: More than 2 watts
 Audio Impedance: 8 ohms

Due to the popularity of this model we apologise if there is any delay in delivering

Also available from our shop in Herne Bay are:

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

We wish all our past, present and future customers, A VERY MERRY CHRISTMAS and would like to inform them that we will be closed from DECEMBER 25th to JANUARY 1st. (Inclusive).

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.

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



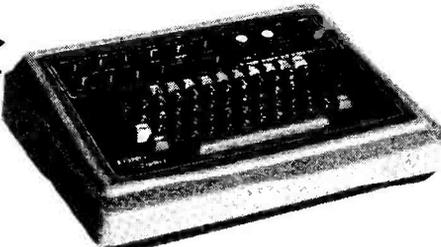
£169 INCL.

- * 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 specification)	144-146MHz
Voltage	13.8 VDC Negative Ground
Current Consumption	TX 2.0Amp at 10W RX 700mA at MAX Audio 400mA Squelched
Size	58mm (h) x 156mm (w) x 218mm (d)
Weight	1.9 kilograms
Antennas Impedance	50 OHMS
Number of Channels	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	10 watts
Deviation	5KHz
Microphone Impedance	500 OHMS
Speech Level	Lower than -60dB below carrier
RECEIVER:	
Modulation Acceptance	F3
Type	Double Superhet, 1st I.F. 10.7MHz, 2nd I.F. 455kHz
Receiver Sensitivity	0.4uV or better
1 Microvolt S+N/N	30dB or better
Spurious Response	50dB or more at emission
Bandpass	± 7.5KHz/6dB, ± 15KHz/60dB
Squelch Sensitivity	3dB below 1 microvolt
Audio Output	1.5 watts or more into 8OHMS

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
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 ASFK – 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 (72, 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.



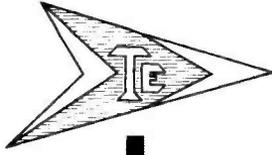
What a tremendous pair

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.
Their versatility is well worth an enquiry.

IC-402
£242 INCL.



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



The more you hold it the more you enjoy it the 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.

SPECIFICATIONS:

Transistors 4, — FETs 3, ICs 6 Diodes 21.
Frequency coverage 144-145.995 but will go to 147.995
Frequency Resolution 5kHz steps.
Frequency control by digital PLL synthesizer with thumbwheel switches.
Frequency stability within ± 1.5 kHz.
Useable temperature -10 degrees C to 60 degrees C.
Antenna Impedance 50 ohms.
Power supply requirements DC 8.4V; with attendant battery pack DC 7.2 — 10.8V negative ground is acceptable.
Current drain at 8.4V

Transmitting:	High 1.5W	Approx 550 MA
	Low 0.15W	Approx 220 MA
Receiving at max audio output		Approx 130 MA
	Squelched	Approx 20 MA

Transmitter output power High 1.5W, Low 0.15W at 8.4V.
Mode F3, variable reactance frequency modulation, ± 5 kHz.
Spurious Emissions more than 60dB below carrier.
Microphone built-in Electret condenser, Optional Speaker Mic can be used.
Operating Mode, Simplex or Duplex ± 600 kHz from receive frequency.
Receiver Double Conversion superheterodyne FM.
Intermedia \pm Frequency 1st 10.695MHz; 2nd 455kHz.
Sensitivity Better than 0.3uV for 20dB noise quieting.
Squelch sensitivity — less than 0.3uV.
Spurious response Rejection ratio more than 60dB.
Selectivity More than ± 7.5 kHz at -6dB point
Less than ± 15.0 kHz at -60dB point
Audio output More than 300mW-8 ohms.
Tone call Crystal controlled.

It will seduce you in it's own way the ICOM IC 251E £479^{INCL.} only



AFTER YEARS OF SUCCESS THE IC-211E HAS NOW BEEN REPLACED BY THE IC-251E. NOT JUST A FACELIFT, BUT A NUMBER OF IMPORTANT DEVELOPMENTS HAVE BEEN INCORPORATED.

MICROPROCESSOR CONTROL — CPU control with Icom's original programs provides various operating capabilities. No backlit dial controlled by Icom's unique photo-chopper circuit. Band edge detector and Endless System provides out-of-band protection. No variable capacitors or dial gear, giving problem-free use. The IC251E provides FM, USB, LSB, CW coverage in the 144-146 MHz frequency range. Thus the IC251E can be used for mobile, DX, local calls, and satellite work (easily extended to 148 MHz).
MULTI-PURPOSE SCANNING — Memory Scan allows you to monitor three different memory channels. Program Scan provides scanning between two programmed frequencies. Adjustable scanning speed. Auto-stop stops scanning when a signal is received in all modes.
DUAL VFO'S — Two separate VFO's can be used either independently or together for simplex operation, and any desired frequency split in duplex operation. Automatic 600kHz shift available on switch-on.

CONTINUOUS TUNING SYSTEM — Icom's new continuous tuning system features a luminescent display that follows the tuning knob movement and provides an extremely accurate readout. Frequencies are displayed in 7 digits representing 100 MHz to 100 Hz digits. Automatic recycling restarts the tuning at the bottom of the band when the top is reached — and vice versa. Quick tuning at the bottom of the band when the top is reached. The SSB and CW modes, and 5 KHz steps and 1 KHz steps in the FM mode, is provided for trouble free use.
EASIER OPERATION AND LIGHTER WEIGHT — The most compact, lightest weight all-mode 144 MHz transceiver. First to use a pulse power supply in communication equipment, for lighter weight and cooler running. 50mm-diameter large tuning control knob for smooth and easy tuning. Trouble-free controlling knobs for both receiving and transmitting. LED indicator for transmit and receiving modes.
MOST SUITABLE FOR BOTH FIXED AND PORTABLE STATIONS — Built in 240V AC and DC power supplies. Convenient Dial Lock switch for mobile operation. Easy carry handle. Effective Noise Blanker. IC-SMS high quality stand microphone is suitable for fixed station operation. Powerful audio output 1.5 Watts at 8 ohm, for easy listening even in noisy surroundings.

OUTSTANDING PERFORMANCE — The RF amplifier and first mixer circuits using MOS FETs and other circuits provide excellent Cross Modulation and Two-Signal selectivity characteristics. The IC251E has excellent sensitivity demanded especially for mobile operation, high stability, and with Crystal Filters having high shape factors and exceptional selectivity. The Transmitter uses a balanced mixer in a single conversion system, a band pass filter and a high performance low-pass filter. The system provides distortion-free signals with a minimum spurious radiation level.

**SEND FOR MORE DETAILS ON
TECHNICAL CHARACTERISTICS.**

Thanet for



ICOM



IC-255E-

An experts mobile choice

for only
£255
INCL.

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 (± 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
- Multiway 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 microphone 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.



£399 INCL.

144MHz ALL-MODE TRANSCEIVER INCORPORATING A MICRO-COMPUTER – CPU control with Icom's original programs provides various operating capabilities. No backlash dial controlled by Icom's unique photo-chopper circuit. Band edge detector and Endless System provides out-of-band protection. No variable capacitors or dial gear, giving problem-free use. The IC-260E provides FM, USB, LSB, CW coverage in the 144-146MHz frequency range. Thus the IC-260E can be used for mobile, DX, local calls and satellite work. Easily extendable to 144-148.

MULTI PURPOSE SCANNING – Memory scan allows you to monitor three different memory channels. Program Scan provides scanning between two programmed frequencies. Adjustable scanning speed. Auto-stop stops scanning when a signal is received, in all modes.

DUAL VFO'S – Two separate VFO's can be used either independently or together for simplex operation, and any desired frequency split in duplex operation.

CONTINUOUS TUNING SYSTEM – Icom's new continuous tuning system features an LED display that follows the tuning knob movement and provides an extremely accurate readout.

Frequencies are displayed in 7 LED digits representing 100MHz to 100Hz digits. When in Duplex and using the tuning-knob the two VFO's track together. Automatic recycling restarts tuning at the top of the band, i.e. 145.999.9 MHz when the dial goes below 144.000.0MHz. Recycling changes 145.999MHz to 144.000.0MHz as well. Quick tuning in 1kHz steps is available, and fine tuning in 100Hz steps in the FM mode, is provided for trouble-free QSO.

OUTSTANDING PERFORMANCE – The RF amplifier and first mixer circuits using MOS FET's and other circuits provide excellent Cross Modulation and Two Signal Selectivity characteristics. The IC-260E has excellent sensitivity demanded especially for mobile operation, high stability and with Crystal Filters having high shape factors and exceptional selectivity. The transmitter uses a balanced mixer in a single conversion system, a band pass filter and a high performance low pass filter. This system provides distortion free signals with a minimum spurious radiation level for an output of 10W or more.

ADDITIONAL CIRCUITS – The IC-260E has a built-in Noise Blanker, CW Break-in CW Monitor, APC and many other circuits for your convenience. The IC-260E has everything you need to really enjoy VHF operation, in an extremely compact rugged transceiver.

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

Scotland Jack GMBGEC (031-665-2420)
Wales Tony GW3FKO (0874 2772)
Burnley (0282 38481)

Midlands Tony G8AVH (021-329 2305)
North West Gordon G3LEQ (0565) 4040
Yorkshire Peter G3TPX (022638 2517 Evenings) (0226 5031 Day)





South Midlands

SMC FOR THE SWL AND BCL



FRG-7700

COMMUNICATIONS RECEIVER

- ★ 30MHz-150KHz PLUS
- ★ SSB, CW, AM + NBFM!!
- ★ 4 SELECTIVITIES
- ★ 12 CHANNEL MEMORY*

General Coverage

From 30MHz to 150KHz (lower at reduced spec) in 1MHz bands selected by a 40 way rotary switch calibrated 0-29 plus 1, 3, 7, 10, 14, 18, 21, 24, 28 and 29.

SSB, CW, AM and FM. N.B.F.M. detector and squelch opens new horizons. 10m FM simplex plus repeaters, and with a converter, marine, PMR lab use, and the VHF/UHF amateur bands, where the high quality noise blanker will be found to be most efficient.

Selectivity

4 filters fitted as standard! SSB, 2.7KHz and FM 15KHz. For AM, 3 positions! Narrow 2.7KHz, Medium 6KHz and Wide 12KHz. With the tone control, and switchable AGC it provides the operating flexibility demanded by discriminating BCL's.

Sensitivity

Fraction of a microvolt sensitivity from a 35K73 mosfet makes the best use of inefficient aerials for difficult locations. A 20dB switchable attenuator and a continuous

RF attenuator minimise problems with very powerful stations.

Ease of use

No preselectors! The use of the latest up conversion circuits with a 48MHz first IF and professional grade crystal filter plus dual PLL system provides automatic selection of the input band-pass filter direct from the band sector or memory.

The VFO has both a pleasing bright, but dimmable digital readout and a back illuminated analogue scale. The illuminated meter is calibrated in both conventional 'S' units (0-9 +20, +40 +60dB) and in SINPO 1-5 for broadcast station reporting.

Timer

An inbuilt quartz clock/timer is featured. Time is displayed in 12 hour format (with AM/PM indicators) on the digital frequency readout, ideal for accurate log keeping. In the event of a mains failure the clock will continue to run (but does not of course, display) on the memory back up cells. For use with a tape recorder: - 3.5mm jack

provides 100mV of audio (irrespective of the position of AF gain control) and relay contacts (15V @ 1A max) provide remote control.

Memory (option)*

12 frequencies *anywhere* within the timing range may be stored by simply touching the M button and then recalled by pressing the MR button, no preselector or range switch adjustment. The memory is tunable by ± 1 KHz and is kept alive year long by 3 'AA' dry cells. The memory may be used for storing all the frequencies of a particular broadcast station, and with a converter, the common marine channels, 2m FM channels (switch between the VFO and memory for repeater input/output)

World Wide Portability

Power: - Mains 240-220/100-120V AC, 50/60Hz and 12V DC external supply option.

Size: - 13" x 5" x 9".

Weight: - 14lbs (carrying handle).

Speaker: - Inbuilt 8 ohms, 1.5W of AF. External 4-16 ohm unit. ¼" phone jack for personal listening.

FRG7700 £309

Prices Include VAT 15%

FRG7700M £389

Free Securicor Delivery

Memory Unit £83.95

2 Year Distributor Warranty

SOUTH MIDLANDS COMMUNICATIONS LIMITED

OSBORNE ROAD, TOTTON,
SOUTHAMPTON SO4 4DN
9-5.30 Mon-Fri 9-1.30 Sat.



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AGENTS STOCK AND SALES

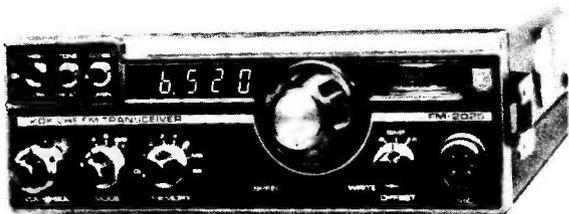
G3ZUL	Brian	Stourbridge	(03843)	5917
G13KDR	John	Bangor	(0247)	55162
GMBGEC	Jack	Edinburgh	(031665)	2420
G13WVY	Mervyn	Tandragee	(0762)	840656
GW3TMP	Howarth	Pontybodkin	(035287)	846 324
GW8EBB	Peter	Swansea	(0732)	872525
GJ4ICD	Geoff	St. Saviour	(0534)	26788

Communications Ltd



SMC FOR 2M MOBILE AND BASE

KDK 2025 TRANSCEIVER 2m. FM 25w. OUT

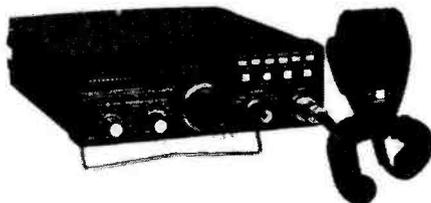


- ★ Custom designed microprocessor control
- ★ 25KHz and 12.5KHz synthesizer steps!!
- ★ 'Instant QSY', 10 times rate button
- ★ 25 Watts of reliable RF output
- ★ Band scan between any 'easy set' limits
- ★ 10 write-in non-volatile memory channels
- ★ Memory scanning with hold facility
- ★ Standard \pm 600KHz or any repeater split

£ 225.00 INC. VAT @ 15% & SECURICOR

YAESU FT 480R TRANSCEIVER 2m. MULTIMODE

- ★ 144-146MHz (143.5-148.0MHz).
- ★ USB-LSB-CW-FM (A3, A1, F3).
- ★ 30W PIP A3, 30W dc A1 and F3.
- ★ FM; 100, 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.



£ 359.00 INC. VAT @ 15% & SECURICOR

MIRAGE 'B' SERIES 2m. AMPLIFIERS



- ★ 12VDC. Linear. Reliable.
- ★ RF & Manual Switching with delay.
- ★ Low noise low gain pre-amp.
- ★ Remote control option.
- ★ B108 10W in 80W out (1-2W in 15-30W out).
- ★ B1016 10W in 160W out (0.2-15W drive).
- ★ B3016 30W in 160W out (15-45W drive).

B108	5 1/2" x 3" x 8"	10-12A @ 13.8VDC	£ 120.75
B1016	5 1/2" x 3" x 12"	20-25A @ 13.8VDC	£ 163.88
B3016	5 1/2" x 3" x 12"	20-22A @ 13.8VDC	£ 189.75
RC1	Remote control unit c/w 18' cable		£ 17.25

Above prices include VAT at 15% and postage.

SMC (Jack Tweedy) LTD.

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

NORTHERN (Leeds) BRANCH

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

SMC (Jack Tweedy) LTD.

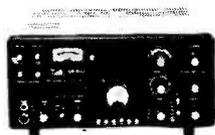
Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincs.
Tel.: Woodhall Spa (0526) 52793
9-5 Tuesday-Saturday (+ appoint.)





South Midlands

SMC FOR YOUR WIRELESS



FT101ZD £569
10-160m. SSB, CW, AM, Digital. Variable IF bandwidth.



FT225RD £499
2m. SSB, CW, FM, AM Digital readout 25+ watts 230V AC + 12V DC.



FT901DM £799
10-160m. SSB, CW, AM, FM, Deluxe Digital Ultimate 'usable' HF transceiver.



FRG7 £199
0.5-30MHz General Coverage Receiver, 230V AC, 12V DC + Battery pack. AM/SSB.

YAESU

Whether you are: just starting, taking an R.A.E. course, just licensed, or an old timer, SMC has something for you. . . . And at the **LOWEST** ever prices.

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



FRG7000 £299
0.25-30MHz General Coverage Receiver, 230V AC + 12V option. Timer, Digital AM/SSB.



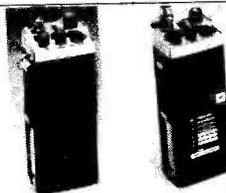
FT707 £500
10-80m. 100W PEP. SSB, AM, CW, Variable IF bandwidth.



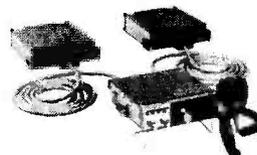
FT107M £690
160-10m + 2 Aux. SSB, CW, FSK, AM. Memory option. Deluxe all solid state.



CPU2500RS £299
Synthesized 2m Transceiver, 4 models plus stepper versions.



FT202R £99
1W. 6Channel. 2m. Handheld
FT207R £199
3W. 12½ KHz. Synthesized 2m.



FT720RV £315
Synthesized 'remotable' 70cms and 2m transceiver (full range illustrated).

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 SMCMM G
Tel: Totton (0703) 867333

AGENTS STOCK AND SALES			
G3ZUL	Brian	Stourbridge	(03843) 5917
G1KDR	John	Bangor	(0247) 55162
GM8GEC	Jack	Edinburgh	(031665) 2420
G13WVY	Mervyn	Tandragee	(0762) 840656
GW3TMP	Howarth	Pontybockin	(035287) 846/324
GW8EBB	Peter	Swansea	(0792) 872525

Communications Ltd



SMC FOR ALL ANTENNA REQUIREMENTS

HF ANTENNAS

GEM QUAD PRODUCTS		
GQZE	2 Ele antenna	£124.00 R £3.75
GQZE	3 Ele antenna	£187.00 R £6.45
GQZE	4 Ele antenna	£249.00 R £7.05
GQCK1	Con kit 1 ele	£63.00 R £2.90
GQCK2	Con kit 2 ele	£125.00 R £4.20
GQSPIDER	Centre piece	£26.25 SP £1.25
GQSPIDER	Spreadier arm	£9.85 R £1.50
HY GAIN HF ANTENNA		
12AVQ	Vertical 10-20m	£37.50 SR £1.50
14AVQ/WB	Vertical 10-40m	£52.50 SR £1.50
18AVT/WB	Vertical 10-80m	£76.00 SR £1.50
14RMQ	Roof mount kit	£19.50 SR £1.50
18V	Vertical 10-80m	£27.80 SR £1.50
18HT	"HY Tower"	£225.00 RC £0.90
103BA	3 Ele Yagi 10m	£51.00 SR £1.50
1068A	5 Ele Yagi 10m	£92.00 R £2.75
1538A	3 Ele Yagi 15m	£62.75 R £4.15
1558A	5 Ele Yagi 15m	£117.50 R £4.15
2038A	3 Ele Yagi 20m	£117.50 R £3.45
2048A	4 Ele Yagi 20m	£156.00 R £5.10
2058A	5 Ele Yagi 20m	£226.00 R £6.80
4028A	2 Ele Yagi 40m	£158.00 R £4.55
DB10/15A	3 Ele 10-15m	£115.00 R £3.40
TH3JR	3 Ele 10-20m	£113.50 R £2.15
TH2MK3	2 Ele 10-20m	£109.75 R £2.25
TH3MK3	3 Ele 10-20m	£167.00 R £4.05
THSDXX	"Thunderbird"	£178.30 R £4.70
THDXX	"Thunderbird"	£205.00 R £5.90
HYQUAD	2 Ele Quad	£169.00 R £4.25
BN86	Balon ferrite 1:1	£13.50 SP £1.00
LA1	Lightning arrest	£39.50 SP £0.65
JAYBEAM HF ANTENNA		
VR3	Vert 10-20m	£34.00 R £1.50
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TA33RE	3 Ele beam	£116.00 R £2.40
TA33RHPE	3 Ele c/w balun	£132.00 R £2.60
Mustang 2	2 Ele beam	£117.00 R £2.40
Mustang 3	3 Ele beam	£146.00 R £2.80
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SMCTD/H	Hi power 14swg	£29.50 SP £1.50
SMCTD/P	Portable ant	£32.50 SP £1.50
SMC-HS ANTENNA		
SMCHFSV	Vertical 10-80m	£36.00 SR £1.50
SMCHF5R	Racial kit loaded	£26.65 SR £1.50
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LFWHIP	Telescope whip	£2.90 SP £0.45
MMmobile	Antenna 10-20m	£25.00 SP £1.00
Multio 180	Loading coil each	£5.70 SP £0.45
MMWHIP	Telescopic whip	£2.90 SP £0.45
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UR67	Low loss 10-2mm	p/m £0.52
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UG491	Back to back male	£0.93
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UG306	Elbow male - female	£1.62
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PL259B	De-luxe type 5-0mm	£0.98
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MBN88/70	Multi, 88 ele	£32.80 SR £1.50
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PMH4/70	Harness 4 way	£14.30 SP £1.25
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(P.S. Bernie's photo will appear in a later issue if enough people ask!)

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SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

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Editor: **PAUL ESSERY, G3KFE/G3SWM**

Advertising: **Charles Forsyth**

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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.

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The SHORT-WAVE Magazine

EDITORIAL

Increase

The economic pressures which affect all of us mean that, regretfully, we have to announce an increase in the cover price of *Short Wave Magazine* to 50p, with effect from the January 1981 issue; direct subscription rate will be £7.50 (2nd class post). The new subscription rate takes into account increased postal charges which also come into force in January, but subscribers should note that, as always, we shall still be carrying part of the cost of posting the *Magazine* ourselves. Current subscribers will not, of course, pay the new rate until their subscription falls due for renewal. Single copies, despatched from Welwyn by first-class post, will cost 70p.

“A Word in Edgeways”

Don't forget our new monthly letters to the Editor column — “A Word in Edgeways” — starts with the February issue, and that the deadline for your letters to arrive at the *S.W.M.* offices in Welwyn for this first airing of the column is January 2nd. We have quite a clip of letters already, but the more the merrier. So don't be shy, if you have something to say reach for your writing pad — and say it!

Christmas

The national Christmas holiday means that the January issue is not due to appear until January 2nd.

The festive season is indeed nearly with us, and so it remains to wish all our readers and advertisers a very Happy Christmas and a peaceful and successful New Year.

Edwards
G3KFE.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

THE bands seem to have slipped a bit and winter conditions seem to be upon us — more or less coincidental with the change from Summer Time. As for the weather, any of us who were thinking of jobs on the aerial “before the gales” were looking aloft with some anxiety! On the other hand, that is not really a comment on conditions — after all, a flat band today is better than anything that one can imagine at the bottom of the 11 year sunspot cycle.

On contests, awards and similar activities, the *Verulam* contest was notified too late for us to mention it last time around, and it's too early for us to indicate the results at the time of writing!

B.A.R.T.G. have sent in data on their 1981 Spring contest which will be of interest to the RTTY chaps. It is over the weekend March 21–23, which gives you lots of time to apply for the details, log sheets and summary sheets, enclosing an envelope of size 9" x 6" either stamped for return postage or, for the overseas chaps, self-addressed and enclosing a couple of IRCs, the address to write to being Ted Double, G8CDW, 89 Linden Gardens, Enfield EN1 4DX. Completed logs to the same address, to arrive by May 31, 1981 to qualify for entry.

Top Band types will be interested in the ARRL 160 CW contest, over the weekend December 5–7, 2200 GMT on the Friday to 1600 on the Sunday. Exchange RST and your country or ARRL section. Contacts between people in the same country/section count two points, others five points. The multiplier comprises the number of ARRL sections, plus VEs and the number of countries worked. Entries to be postmarked not later than December 29, addressed to ARRL Communications Dept, 160 Contest, 225 Main Street, Newington, Conn. 06111, USA. Any newcomers to Top Band DX operation should remember the split frequency scheme, whereby the Americans are listening on 1825–1830 KHz, and Europeans transmit on around 1800–1805 KHz; it should be recalled that some countries have smaller allocations than us, and it helps

to note at the end of a call just where you are going to listen. KH6 stations will be on 1990–2000 KHz, and listening at the bottom of the band or, hopefully, in the “DX Window”.

The ARRL Ten-Metre contest is on December 13–14, and won't be of much interest to Gs since this one is essentially the world working the Ws, and any QSO other than with a W station doesn't count.

Looking a bit further forward, in February the CWSPCW contest comes up on the first weekend, 48 hours from 0001z Saturday morning to 2359z Sunday evening. QSO same country counts one point, another country in the same continent two points and QSO's with other continents three points. The multiplier is the number of countries worked (ARRL list) plus the number of Brazilian prefixes worked. QSOs will be RST plus serial number for most; CWSP members send RST plus serial and /CSWP, and QRP stations add /power in watts (e.g. 579043/5). Logs to be mailed before March 15, addressed CSWP, Contest Committee, P.O. Box 15098, 01000 São Paulo, SP, Brasil. Last year no Europeans figured in the results at all, sad to say, albeit all the other continents were represented.

Next we come back to WAB, and their new Winter Activity Award. The start is December 1 and the finish midnight on the last day of February 1981. Score 1 point for the county, one for the WAB area, one point for the rateable district, and one point if the chap on the far end happens to be a WAB book-holder. A minimum of 250 points are required to apply for the award. Claim sheets ready-prepared are available from G3ABK, 11 Turpin's Chase, Welwyn AL6 0QZ, while the applications for the award should go to K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW. *An objective of this particular exercise is to raise some money for RAIBC.* Incidentally, we forgot to mention each county, area, district and bookholder can only be claimed once for all, albeit there is no objection to working the same station again if its location changes. Any

doubts will be dispelled by having a listen to the WAB nets to be heard around 7060 KHz, 3,760 KHz, and 1930 KHz.

December 14 is the date set for the R.A.F. ARS members contest, 1400–1800z, on 1.8, 3.5, 7, 144, and 432 MHz. Score four for the lower bands, five for 144 MHz and six for Seventycem contacts, between members of course.

On the first full weekend of March we see the ARRL DX Contest, Phone leg, and the third full weekend in February the CW leg. The Rules have gone back, in essence, to the 1979 format, that is W/VE stations *versus* the world. For the full details, drop us a line and we will Xerox you a copy — stamped addressed envelope please.

Now, we must turn from the contests and awards to another scene.

DX Scene

We hear that Carl and Martha Henson, who have been in Uganda, were due to leave there on November 2 for home, and it sounds as if WB4ZNH and WN4FVU may have some interesting tales to tell of the state of that unhappy country.

If you hear of a Cocos-Keeling operation, the chances are pretty fair you'll be too late! It seems the nature of the business which will take a ham and his gear there are probably such that he won't know until the last minute whether he's going, let alone whether he'll have time to operate! A discouraging scenario for a would-be DX-petitioner. However, a listen around 1000–1200z period, for VK5QX, may at least give a little warning; the spot to look is in the region of 14195 KHz.

For various reasons the writer wasn't even able to listen to any of the CQ WW Phone contest, but it seems to have been quite a party, with conditions playing it very nicely, and Ten being considered the best band. If the 7 MHz signals during the contest were some of the largest ever heard in the East Coast W area, at umpteen dB over S9, they also had to contend on this side with the high noise level and some very big EU signals as well.

On a different tack, the TA stations are still out of action and the country is virtually in a state of martial law; no one should write to any TA station's address until the air clears a little is about the best advice for the moment — so if you are wanting a TA QSL you'll have to exercise your soul in patience!

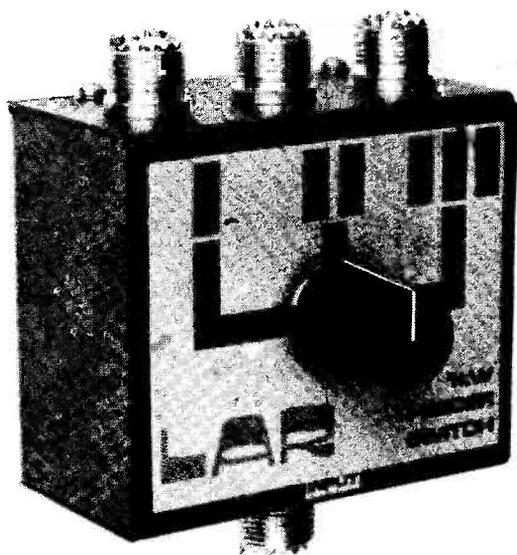
During the month we hear of a possible exercise to St. Peter and St. Paul Rocks by some six PYs — but we haven't a date at the time of writing. All the above from *TDXB*.

Now to Geoff Watts' *DXNS*, and of course his very valuable Prefix List. Frankly we were astounded at the number of people who were coming to our stand at Leicester and asking, in effect, for something exactly fitting the "measurements" of the Geoff Watts' list. Look for his advertisement in any issue of *S.W.M.* and see what you are missing!

The group who recently visited BY, which included W6AM and several other well-known amateurs were reported to be preparing a write-up for *QST*. We also hear that Cheng Ping, who is ex-BY1PK and connected with CARL, has indicated that the "BY1PK" who is trailing around the bands on occasion is Phoney Phred again. In view of the upswing in BY interest, that particular Slim could be more than just a blasted nuisance. . . . On the other hand, there does seem to be indications that genuine China operations may be on the cards — but to decide *when*, would require a crystal ball. It'll come, though, for sure!

Top Band

First place must go to W1BB, who indicates that he is going to have to slack off a bit on his commitments, and particularly on operations at night from the W1BB/1 DX location, due to weather, vandals and the toll of age. Reading again through his *Bulletin*, Stew has still plenty of zest for things, even though he has been writing that compilation for close on fifty years! Among the interesting notes, we find a little bit of wisdom from W2EQS, at 108 countries worked and confirmed on 160 — the greatest requirement is to be on the right frequency at the right time. Too darned right, which is why DX columnists aren't often to be seen on the DX Top Band lists! On the aerials front, we hear that W8JI has worked out an arrangement of sixteen phased loops which make a receiving aerial



This 1 kW feeder switch is one of the latest products of LAR Modules Ltd., of Leeds. Priced at £16.95 inc. VAT, this switch features rugged construction and silver-plated contacts and connectors for RF use.

that is just *superb* — surely there just has to be a way of getting it to take power from the transmitter.

Sadder news for Top Band is that K1PBW has taken down his aerials and moved to the city, to devote time to helping homeless and fatherless boys. All we can do is praise the idea, and hope Ernie will make of it the success he made of Top Band DX. Good luck!

Another 100 countries man is G3SZA, who has Top Band DXCC certificate number 16. He'll still have to go a long way to catch old W1BB and his 153 countries; but congratulations.

Over in the Antipodes, we hear of the death earlier in the year of VK3CZ, a keen Top-Band operator who will be much missed. However, there seems to be an upswing of activity down-under under the influence of such as VK5KL and VK5KO and VK3MR. Some twenty are in there chasing the DX, so there is a chance for some Antipodean QSOs this season. We don't forget the ZLs either, and hear that ZL3GQ will be around at the right time.

It seems almost a sense of anti-climax to turn from W1BB and the international scene of Top Band, to the

more parochial activities of those of us who haven't any enormous "poke" to the signal. And here one must make the point that the old saw about not being able to work them if you can't hear them is absolutely true and always will be. For Top Band one requires, obviously, a quiet location from the point of noise from neighbourhood electrics and power lines, but also the mysterious "it" which turns an apparently nondescript spot into a real winner.

G3PKS (Wells) seems to have avoided the bandage works for the moment but fears that the pills inside him may resonate at some speed with the keying arm — dodgy, that! The main activity on 160 has been the Monday evening nets, and a few Gs on CW, plus one UA6 coming in at around 559, just in nice time for the aerial change-over relay to decide to turn up its toes. We know the feeling!

Quite a pile of signals heard and worked by G2HKU (Sheppey), with SSB to OK1KPU, YU3EF, OH0NA, PA3AJT, PA0PN, HB9H, EA1VG, EA5HM, EA8AK, DZ7YY, and OZ6XT, not to mention CW QSOs

with UA2FAL, RC2WBP, F9RO, EI9J, UA3DQS, and SP5INQ.

Eighty

G3PKS says, regretfully, that DX for breakfast was in short supply, starvation only being avoided by lots of QRN. The odd Ws and ZLs were heard, and WB2RNT and ZL4IE worked on CW. During the day, inter-G working seemed pretty fair with less QRM than on 7 MHz.

G2HKU was CW all the way; the Big Rig connected with W4DHz, W2BA, and W4ZMQ, while the little QRP box made it to DK8GT.

Now on to G2NJ (Peterborough). Nick worked SP1DPA/1 and enquired about the power permitted the SPs, as a result of an earlier QSO. It seems they have 750 watts input on most bands, but like us are at 10 watts for Top Band. G2NJ also noted a brace of G9 signals on 3520 KHz, testing and producing excellent signals.

Over to Dudley, where G3ZPF lurks in wait for DX on 80 once the dreaded summer-time is over. So far his lurks haven't been too successful, although a solitary UA9 was gobbled up with glee.

Nice long letters to read, from G4BUE (Upper Beeding) always contain lots of meat. Chris was at Leicester on the one day the writer was not, but it seems he and G3RJV had a meeting of the clans set up for the Thursday. The QRP club, says Chris, may well be considered to be established, with some 930 members! Chris had a real basinful in the CQ WW SSB contest; after noting the top QRP score last year was 183K, Chris got stuck in and racked up some 500K points, which now gives him something to keep crossed fingers about. Over all bands the weekend's operating collected some 89 countries in all, and Chris speculates on the possibility of a QRP DXCC in one weekend's operating. Eighty yielded GJ, GD, IS0, and LX.

Forty

Seems to have become a favourite stamping-ground for G4ITL (Harlow) for lunch-time QSOs around Europe, although Bernard rarely omits a quick scan of Ten as well. As he remarks, it is good training in the art of operating a receiver with all those megawatts around, and it ends up with you actually liking the band!

On to G2HKU who seems to have mixed things a bit; SSB to VP5WW,

FM7AV, EA8QL, then CW to OX3AX and W4ZMQ, and the tiddler rig's CW collected F6BSQ, K1MA, OR6CP, and F5IE.

At G3PKS the band was found to be quite lively most of the day for inter-G working, but with the odd sudden hiccup in which your G QSO would disappear, to be replaced by a roaring band-full of EUs, and after a few minutes all reverted to normal. Jack noticed the revival of some of that pre-war "spitch" telephony on the band, and says he thinks they are overdriven speech processors of one or another variety and their owners should have them put down! We don't *quite* go along with that, but there can be no doubt that with a compressor or clipper doing its job it should be *reducing* splatter — but if you wind up the audio output too high the result can be splatter *and* unreadability!

'CDXN' deadlines for the next three months—

January issue — December 4th

February issue — January 8th

March issue — February 5th

Please be sure to note these dates.

14 MHz

As always, this is where it all happens, albeit one must accept that in these peak years of the sunspot cycle much of the business is creamed off by 21 and 28 MHz. Right now, though, one can put the receiver on at virtually any time of day or night and find something of interest.

As an example, G4BUE, who doesn't much like SSB anyway, found EA9, KL7, FM7, HB0, UF6 and 4X4 with his five watts p.e.p. during the CQ WW SSB.

Brickbat of the month for G3ZPF goes to the W who sent him a QSL for a 1973 QSO . . . David QSL's those of special interest and new countries, so the chap must have been of some interest, but G3ZPF can't recall quite what at this distance!

Twenty for G2NJ meant, primarily, a trip to the Fens with G5NX; G5NX up front with the two-metre Phone and the steering-wheel, while G2NJ has the back seat and the Uniden rig on Twenty CW. They were parked outside a shop when an arm came through the window

and the QSL of G3MLP on the end — a nice personal QSO with which to start the trip! Once they got out on to the Fen districts, G2NJ found it ideal for a radio amateur, with a far lower local noise level than, say, Peterborough, and little man-made noise. An interesting CW QSO during this trip was with SR2W1 in Gdynia, running 700 watts, followed by HB9BWJ/P near Zurich, and so on and so on — leaving Nick wishing for a shack in the Fens!

A nice long chatty letter from G2HLU (Earley) says he is now pretty well mended and back to normal so long as he doesn't over-do it; but an early retirement is planned for 1982 to enable some of the more interesting facets of life to be pursued. Sounds a good idea!

On the QRP front, G4CQK (Walton-Thames) uses 5 watts p.e.p. *input*; on 14 MHz, QSOs included SP0ZDZ, and TAIHY — he must be pleased about the latter since the TAs are all off the air.

G3NOF (Yeovil) like so many others, has been kept off 14 MHz by the attractions of 21/28. However, Don notes the morning openings around 0730 to the West coast Ws are all but gone for this year, and the VK openings peak sharply and quickly go; but openings to the same places were noted around 1700. G3NOF made his SSB number with AH8A, FG0FIS/FS7, JAs, VKs, VK9NC, VK9CCT/VK9Y (Cocos-Keeling), W6KG/SV9 (the Yasme expedition), and ZLs.

This month has seen more activity from G2HKU, as astute observers of the scene will note already, but Ted really went to town on 14 MHz: SSB with CE3PK, ZL1VN, ZL3RS, ZL3SE, ZL3FV, and ZD7AL, while the CW brought in VK3BMJ, KL7MF, PY4ABI, K3UOC/YV4, HC2XA, UL71BQ, PY2CQM, VK5YD, 3B8CF, 7X4BL, VE7AAR, UM8PAC, 4Z4OL, HV1CN, LU2EMK, U6JOK, CZ6AZB, UH8BD, UK0QA, UL7BA, UA9ADY, all with the QRO, while the little rig managed to contact HH2VP, VK3BMJ, and UT5CF.

Just a few quick checks to see there was something for everyone, says G3PKS, and one QSO, with W1YC.

For G3FPK (Purley), this was the last month with the FT-707, the review (*S.W.M.*, November 1980) having been completed. However, we have an idea Norman will remain on the HF's a while yet, since he has left the aerial up and still has his good old reliable Halli-

crafters machine. Anyway, on Twenty, SSB locked on to KA6HIQ/KH3 (Johnston Is.) on the morning of October 4; for the rest it was all-CW, and FO0CT (Tahiti), UK8MAA/U8Q, U4W, 1H0FGM, FG0FIS/FS7, N4TO/KP4, XE3RT, JW0EM, HB0LL, VU2BK; and HM1EX at 2230 one evening.

21 MHz

Space, like darkness, closes in on us. G4BUE had a gripe about the American QRP club who moved their QSO Party on to the date occupied by the RSGB 21 MHz affair. He thought conditions were well down on last year so that he made 141 QSOs against 237 the previous year, and 35 as against 47 countries. However, after the RSGB event finished Chris hung around until the band folded about 2030; a total of 27 USA stations, with power five watts or less, including W6SKQ. Turning to the CQ WW SSB, as already noted G4BUE made a serious attempt at winning the QRP section; on 21 MHz some 50 countries were worked, including KV4, HK, C6, ZB, VP2M, 9K2, OH0, ZL, VP9, JA, KL7, and KP4. Outside contest hours, we note VP2KAQ, M1C, N4TO/KP4, ZL1AH, ZD8TC, G4CNY/VP9, ZB2EO, AL7H, KV4AA, 9J2BO, and all W call areas.

G2HLU noted that the writer has been working Novice Ws on 21 MHz at 5 w.p.m. and comments that it is a great satisfaction to let one of these have his first QSO out to DX — but they all QSL direct and few if any ever seem to have heard of IRCs!

Your old scribe has to admit that this novice working is fun, and it's about the best rate he can keep up for any long period on the old pump-handle; and of the bugs assorted in the shack none can get down slow enough! Perhaps a side-swiper of the old-fashioned variety will be the answer.

G4CQK is QRP with an Argonaut, which was enough to land HZ1HZ and OH0AM on SSB, and rather more on 28 MHz as we shall see.

Another one to remark on the slide into winter conditions is G3NOF: sadly, we did not have the usual get-together as Don was unable to get to Leicester. He made up for this by working AL7H, C31LQ, CM2RX, EA9EO, F9UW/3A, G3JK1/5A, G3AAE/VP9, G4CWS/ZB2, G4CNY/VP9, FG0FIS/FS7, H44SH,

HK0FBF, J3AH, JAs, JW2CF; KC6YC, KC6ZR, both on Yap; KL7Y, TF3YH, UA1PAL, U18PAL, VKs, VK9NC, VK9NW, VP2EA, VP5TC1, VS6CT, W6EUF/OH0, W6KG/SV9, WD6DGQ/KH6, WN4FVU/5X, XE2AQ, YB2BLI, YC2BJR, YJ8NPS, 3A2EE, 3D2FJ, 9K2EW, and 9X5MH.

On now to G2HKU, who was all-CW; the higher power netted LU9ACZ, K9EF/8R1, ZP5NW, while the little box connected to LZ1YE, WB1AOD, SV0BE, W2AXZ, W2DW, WA2GOS, and WB3BWM.

G3PKS was puzzled by JF2NX/MM near Kalimantan, as he couldn't locate it in his references. This is the Indonesian part of Borneo according to the *Penguin Dictionary of Places*.

G3FPK couldn't see much point in wasting time on 21 MHz when 28 was so good, but he did have an interesting QSO with VE8MC, Mould Bay, Prince Patrick Is. (at 76½ degrees N.) with SSB, while CW picked up FY7BY as a new one on the band, plus FP8HL and 5W1CY.

Ten Metres

Quite handsome, at times. G3FPK notes that the new VE8AA beacon was audible at 1912 on October 2, with the digital readout saying 28.2254 MHz; this is the most northerly of all the beacons on this band. CW yielded a weirdie in YO0XP0 (obviously an exhibition station of some sort), and K6KG/SV9 which last completed the set for WAE 1 on CW. On the SSB front KC6YC was a new one, A4XIU, AP2P, A9DXB, VS6CT and 6W8AR.

G3PKS says he paid a few visits hereabouts, and raised JE1DMS, KV4CI, UA0AGY, JA1AJN, JR1JML, UA9CNM who was using 5 watts into a Quad, K3BV, JA7FS, G3KGB in Taunton at S7-9 over a 25 mile path, W1VOQ, VE1AJJ, ZB2GH, and JA7AS, with the signals varying from just audible up to the S9 mark.

On we go to G2HKU, who mentions SSB with SV0AU, and CW with KV4AA, WB7OUL, K7NHV, 3B8CF, and QRP CW managed K7ABV, UA3PGO, UA3YBO, UT5YV, and UA3ABZ.

G3NOF comments on the suddenness with which winter conditions came in, along with the clock-changing routine. Thus the long-path openings to VK/JA/Pacific have been brief, around 0900, changing to short path around 1000, with the VKs peaking

between 1100–1300. Ws and VEs have been in as early as 1100 and as late as 2100, with the Western Reaches best between 1530 and 1730; and a few Africans were noted in the afternoons. SSB QSOs were made with AP2ZR, C5AAP, CO2FRC, CO2OM, EA9EO, FG0DYM/FS7, FM7AV, FP8HL, G3AAE/VP9, GJ5DPY, H44SH, HS1AMI, HZ1HZ, 18GZQ/1H9, K2ON/C6A, KA5BPE/VP2A, KG6RT, KL7D, KL7Y, K7LR (Idaho), JAs, N2BA/H18, P29NLS, PJ2CC, TA4A, TF3IRA, U18ZAC, VKs, VS6CT, VP2VDH, VP5WW, VP9AD, W6KG/SV9, W7IAA, UA1PAL (Franz Josef Land), XE2MX, ZLs, 8P6s, 9J2BO, and K2MQ.

The QRP at G4CQK was turned to the SSB mode to work A4XIH, C5AAP, EA9EO, HR1RMG, KB6LO, UA0SKC, U18LAG, UJ8JGJ, VE6JD, VE7TG, VK4NWM, KA5BPE/VP2A, VP8PP, G3AAE/VP9, VS6CT, and YS9RVE. On CW, just one, a QRP-QRP contact, both using Argonauts at five watts input, with WD2ABL.

During his attempt to take the world in the QRP category in the CQ WW SSB contest, G4BUE hooked some sixty countries on the band. Among the plums, contest or otherwise, all QRP, we find SSB with EA9, JA, KL7, LU, FP8, H18, HC, YV, A4, XE, CO, C6, 8R, FM7, KV4, PJ2, PY, TF, VP2V, VP5, VP9, 4X4, 9Y4, IS0, ZS3, ZS, and SV. The ZS3 was a new country on QRP; the favourite mode for Chris is CW, but with the above-mentioned it had to take a back seat, and Chris only keyed with KH6AQ and 5Z4YV.

Our final reporter is G3ZPF. David and his pals had a local net on 28.3 which they had to shift because of some two-metre operators who were hearing the gang on the two-metre SSB calling channel. Luckily the ten-metre lot use CW, so the VHF types didn't understand the rude remarks as they shifted 25 KHz to keep the peace. Outside the local net, Ten yielded C5AAP, OX3AI, PYSEG, CN8MC, ZP5RG, C6ANU, plus Ws and VEs, all on SSB.

Finis

That's it for another month. Dates are in the 'box', and the address is as always "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Keep it going!

THE RABBIT PATCH, PART V

THE THIRD OF FOUR PARTS DESCRIBING THE CONSTRUCTION OF A MULTI-TEST UNIT

BY "BUCK"



Fig. 12. Close-up of FET section wiring.

WITH the meter section of the Test Unit completed we turn to the remaining sections which provide facilities for checking:—

- (i) the serviceability and performance of Field Effect Transistors (FET).
- (ii) the serviceability of capacitors from 2.2 picofarads up to 250 microfarads or more.
- (iii) continuity in a manner that is both positive and safe in action.
- (iv) the type and performance of transistors.
- (v) the polarity and performance of diodes.

Lest it be thought that the construction of this Unit has placed overmuch emphasis upon checking and testing serviceability and performance levels the suggestion is offered that it is better to know beforehand the condition of the components we take so much trouble to include in our projects than to sweat out a fault-tracing programme when things don't turn out as expected.

Section 'B' — Field Effect Transistor Tester

Theory: There are three essential elements in FET: the Source (s), the Drain (d), and the Gate (g). If a negative supply is connected to the source, and a positive supply connected to the drain, current will flow through the device. By varying the voltage applied to the gate, the drain current (I_d) can be varied in sympathy. Making the gate voltage (V_g) negative will reduce the I_d ; and *vice versa*. The point at which the I_d becomes practically zero is called the 'pinch-off region'. Similar principles apply to a dual gate FET which has two gates (g_1 and g_2). The signal normally being applied to g_1 , with g_2 being used to control gain or for the oscillator input when the transistor is working as a mixer.

For the performance of a FET to be checked it is necessary to apply measured voltages to the gate and the source and then to measure the drain current that flows as the V_g is varied. Fig. 13 shows the circuit of such a testing unit. VR1 and VR2 can be 500 ohm or 1 kilohm linear variable resistors, but should not be more than 1K because of the voltage drop that could be introduced by using higher values (especially in the source circuit). R1 is the limiting resistor for the light emitting diode (LED) which serves as an 'on-off

warning device. The value of R1 can be anything from about 1.5K to 2.5K. The connections for gate, source and drain are taken to three terminal posts to allow any transistor to be readily connected into circuit. Instead of this arrangement a number of different sockets could be connected in parallel to accommodate the wide range of packages in which FET's are made. The outputs of the test circuit are also taken to terminal posts to allow them to be patched into the meter section by flying leads.

Construction: With the terminal posts, switch and variable resistors mounted on the panel the wiring is straightforward and is as shown in Fig. 14. To avoid confusion when working 'back-to-front' on the reverse side of the panel it is a wise plan to label each terminal post and connecting point with its identity before beginning to solder.

Operation: Flying leads are used to connect the meters to the output terminals. Meter no. 1, switched to the 0–2v. range, being connected to the V_g output; meter no. 2, on the 1–0–1v. range, to V_{gs} ; and meter no. 3 on the 10 mA range to the I_d output. Connect a FET to the correct 'g', 's' and 'd' terminals and adjust V_g (VR1) to read 1v. on meter no. 1. If V_s (VR2) is now adjusted so that meter no. 2 reads 0v. the voltages on gate and source will be shown to be equal, *i.e.* 1 volt. This, in turn, means that the gate-voltage/source-voltage relationship (V_{gs}) is 0. If VR1 is now made to give less than 1 volt, the gate has been made negative relative to the source, and the drain current (I_d) shown by meter no. 3 will fall. Making the gate positive relative to the source by increasing the voltage reading on meter no. 1 causes the I_d to rise.

As a simple indication of serviceability it is enough to establish that a variation of V_g produces a variation of I_d . The drain current cannot be controlled by the V_g if the transistor is at fault. If, however, some comparison is required between the relative merits of two or more FET's it becomes necessary to tabulate the voltage and current readings over a range of adjustments. Thus, two FET's on test might produce the following results:—

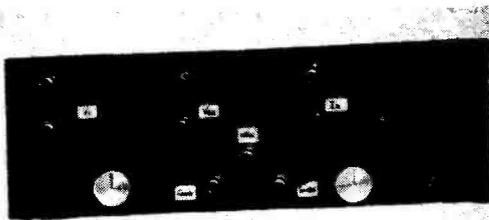


Fig. 11. Front panel showing FET section.

V_{gs}	I_d (mA)	
	FET 'A'	FET 'B'
0.4 negative	1.6	1.9
0.2 negative	2.2	2.4
0	2.8	2.7
0.2 positive	4.0	3.6
0.4 positive	4.8	4.2

In this example FET 'A' has produced a 3.2 mA swing over a V_g change of 0.8 volts, whilst FET 'B' can only manage a 2.3 mA swing over the same range. Which of the two transis-

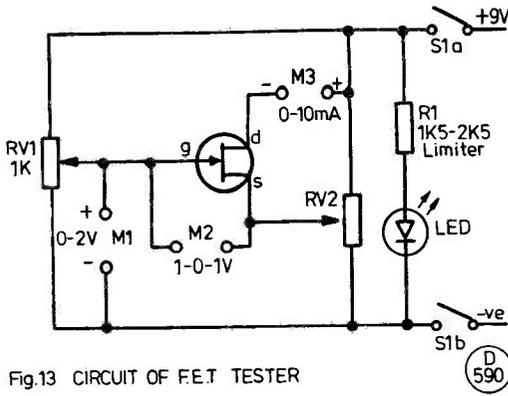


Fig.13 CIRCUIT OF F.E.T TESTER

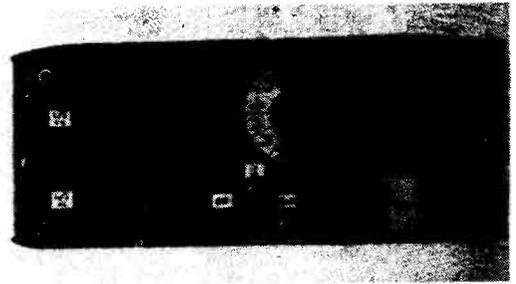


Fig. 15. Front panel showing capacity and continuity section.

tors is the better depends, of course, upon the use for which it is required, but the facts upon which the choice can be made are now apparent.

Section 'C' — Capacitor and Continuity Tester

Theory: If the idea of looking into the why's and wherefore's is thought to be dreary, then skip this part and move straight on to the 'Construction' bit. The thing will operate quite happily whether you know the theory or not — provided the right wire is joined to the right component as illustrated in the wiring diagrams. An oscillating circuit suitably connected to a capacitance and a resistor will oscillate at a frequency determined by the values of C and R, and the circuit is known as an 'RC Oscillator'. Given a certain value for R, changing the value of C will change the frequency of oscillation (f_o). In the audio frequency (AF) band this change can be presented as a few cycles per second (clicks), up to several kHz (squeals). The process in this instance is limited only by the value of R. Altering the value of R alters the range of C values that can operate.

If such a circuit is constructed having a functioning oscillator, a choice of selected resistors, and a facility that permits various capacitors to be inserted into the circuit as required, the audio output taken to a suitable speaker/phone circuit will give an indication of the serviceability of the capacitor.

No sound means no serviceability! Further, if such an oscillator be made having a fixed value of C and R, and a break is made in the circuit wiring, any other circuit connected between the two points of the break will allow the sound to be heard if there is continuity in the second circuit. No sound means no continuity!

CMOS IC Basics: As the oscillator in this section of the Test Unit, a Complementary Metal Oxide Silicon Integrated Circuit (CMOS IC) can be used — which despite its grandiloquent name only costs around 20p. "Complementary" because a PNP and a NPN transistor are used to obtain a push-pull output from a common signal input; "metal oxide silicon" because this material is used in the manufacturing process; and an "integrated circuit" because it is a combination of the equivalent of a number of separate (discrete) components — in this case transistors and diodes — that have been made into one miniature device.

The CMOS IC used here is one of the simplest — an inverter. So-called because it is designed to give an output state that is the opposite to its input state; simple, because only two active components are employed. In addition to the main components some diodes are incorporated as a safety measure designed to limit input voltages to a safe level, and to protect the device from the destructive effects of external static charges; so fingers should be kept away from the

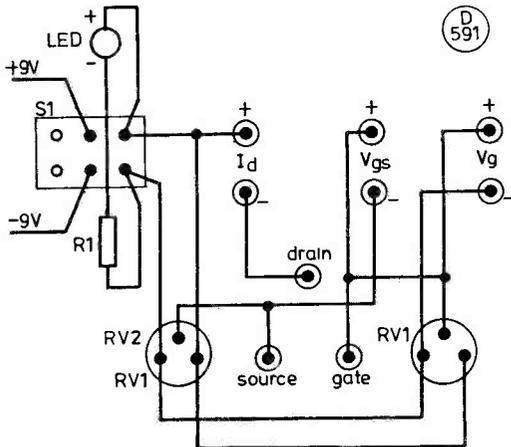


Fig.14 WIRING FOR F.E.T TESTER

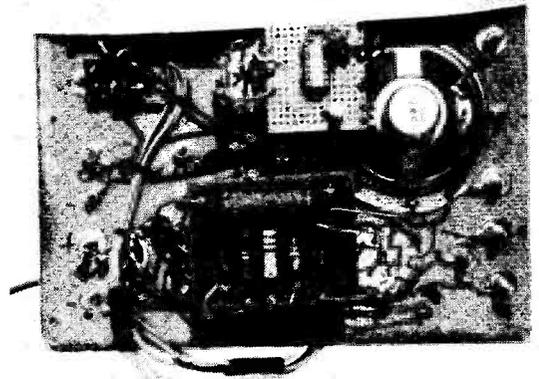


Fig. 16. Close-up of the capacity and continuity section, and the transistor section wiring.

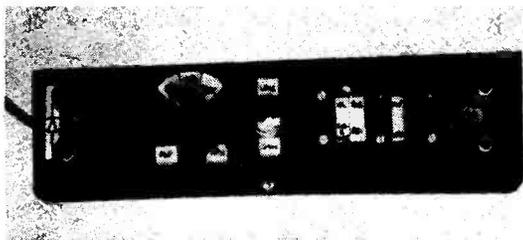


Fig. 17. Front panel showing transistor section.

contact pins — just in case. The two main components of the inverter are Insulated Gate Field Effect Transistors (IGFET's), one being a P-Channel and the other an N-Channel; a diagram of these IGFET's is given in Fig. 18 (the diodes being omitted for clarity). The inverter is really a switching device in which the input can be held in either one of two states: a high state when the input is at, or near, the positive supply level, and a low state when the input is at, or near, the negative supply level. The output state can be either high or low, but will always be the opposite (inverted) to that of the input.

When the gate of the IGFET is at a voltage that is roughly equal to that of the source-voltage there is a high drain to source resistance (some thousands of megohms), and practically no current will flow. If the gate is now forward biased (*i.e.* made more positive in the case of the P-Channel IGFET, or more negative in the case of the N-Channel IGFET), the drain to source resistance will fall to a few hundred ohms and current will flow. In Fig. 18 the transistors act as single-pole, single-throw (SPST) switches because when the input is low TR1 is turned on, and TR2 is turned off and the output is in the high state; when the input is high the position is reversed.

The current consumed by the device is mainly affected by the number of times per second that the switches are operated — the faster the change-rate the higher the consumption, until at high frequencies the current can reach many milliamperes per unit. The CMOS IC used in the Tester, although not precisely identical to the type described above, has the same characteristics. First preference goes to a 4011, which is a 'Quad two input NAND gate'. Second choice is a 4001, which is a 'Quad two input NOR gate'. In either case, four inverters can be made from each device and

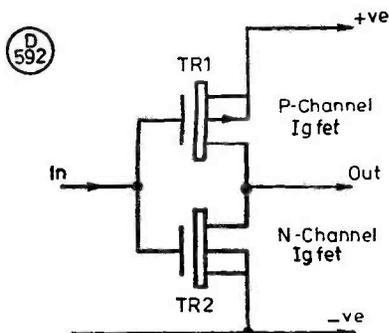


Fig. 18 BASIC CIRCUIT OF A CMOS INVERTER

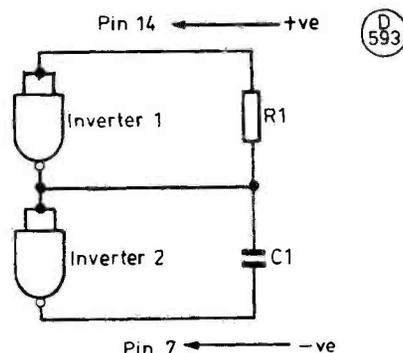


Fig. 19 CIRCUIT OF AN ASTABLE MULTIVIBRATOR

the inputs to each inverter will be connected in parallel when used in this circuit.

Oscillator Design: The oscillators are astable multivibrators, which is a compressed way of saying that each circuit will have two stages (inverters), the output of each stage being coupled to the intake of the other and operating at a frequency self-determined by the values of the circuit constants and not by any external 'trigger' source. Fig. 19 shows the circuit of such an arrangement in general terms.

When the supply voltage is connected between pins 7 and 14 of the IC one of the gates will go to the high state, and one to the low state. Which stage does what is unpredictable as it depends upon the characteristics of the two gates concerned. Let us suppose that, when the supply is switched on, the output from inverter no. 1 has gone high, and that from inverter no. 2 has gone low. C1 will charge up *via* R1 from the high output of no. 1; the values of C1 and R1 will determine the length of time taken to raise the voltage of C1 (and thus increasing the input to no. 1), until it reaches transfer voltage level. At this point no. 1 output will switch from high to low, driving no. 2 input low and causing no. 2 output to switch from low to high; whereupon C1 is discharged into the inverters and begins to charge up from the low (negative) output from no. 1. When the transfer voltage level is reached the process repeats itself and the circuit condition returns to the original state. Thus the circuit will continue to oscillate at an f_0 determined by the time constants of C1, R1, all the time the supply voltage remains connected.

Which is about as far as we need go in plodding through the fields of theory for the time being and we can push on with the building details.

Construction: A close-up view of this Section is given in Fig. 15. While most of the wiring can be done between the components mounted on the panel, there is a need to provide a sub-chassis mounting to carry C1, R6, the transistor BC108, and the CMOS IC; this is shown in the top half of Fig. 16, and has a single stand-off mounting similar to those employed in the meter section. Circuit details are given in Fig. 20 which also shows the pinning of the 4011 IC (the 4001 is identical), and the physical wiring shown in Fig. 21. The sub-chassis can be made from copper-stripped Veroboard (15 rows of 14 holes); or from a piece of insulating material about 45 mm. square and 3 mm. thick. If Veroboard is used the continuity of the copper strips must be breached between the IC contacts and around the securing screw as shown in Fig. 21.

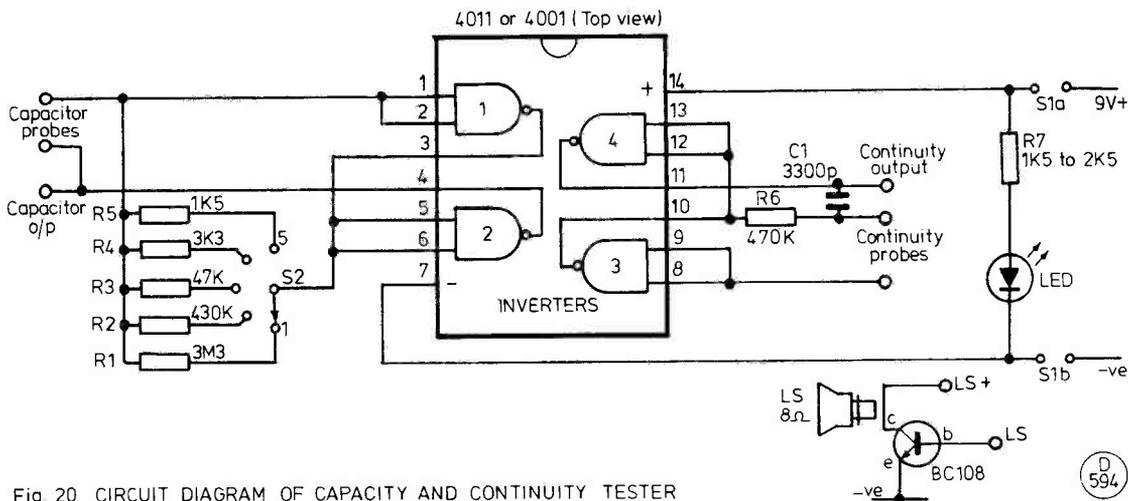


Fig. 20 CIRCUIT DIAGRAM OF CAPACITY AND CONTINUITY TESTER

On the other hand, if plain board is used some of the contact points must be joined by tinned copper connecting wire under the board as shown by dotted lines in Fig. 21. In both cases there are strapping connections to be made with insulated single strand wire on the component side of the board. These straps are to be made between: E6 and E9 (K5 and K8), D10 and D14 (L1 and L7).

The following components are mounted, end-on, on the sub-chassis: C1 (3300 pF) between J1 and J3, R6 (470K) between M3 and M5.

The four pairs of input pins on the IC (pins 1 and 2, 5 and 6, 8 and 9, 12 and 13) are joined by soldering on the underside

of the sub-chassis. Despite the provision of an internal protective diode system IC's can be damaged by accidentally applied static voltages; as can excessive heat if a soldering iron is carelessly applied to the pins. To minimise the possibility of disaster a 14-pin DIL (Dual-in-Line) socket is used which enables the circuit to be completed and soldered before the IC is introduced. Until the IC is put into the socket it should be kept in the protective foil or conductive foam in which it was supplied.

to be continued

ANOTHER MODIFICATION FOR THE FRG-7 RECEIVER

REPLACING THE BFO WITH A CRYSTAL OSCILLATOR

IAN KEYSER, G3R00

AFTER completing the conversion of my FRG-7 receiver to a transceiver (*Short Wave Magazine*, June 1980), it was found that there was a rather annoying warm-up drift of the LC BFO. This was traced to core heating of the BFO coil, so little could be done other than to replace the coil. Therefore it was decided that the BFO must be replaced by a crystal oscillator.

Firstly, an idea was hatched using the existing components but, although possible, it required rather awkward switching for the crystals. The next idea was to remove the components from the board and mount a new board vertically at that position, but after further investigation it was feared that the stray injection into the IF strip might be too high. The only other alternative was to use a separate board.

To determine optimum frequencies for the CIO (carrier injection oscillator) a sked was arranged with G2ACG, and with a counter clipped to the BFO the frequency of the BFO was adjusted for optimum audio for both USB and LSB. In this case, as luck would have it, they were 455 and 452 kHz — requiring only one crystal to be cut, the other being "off the shelf".

Circuit Requirements

These were fairly simple, there had to be at least two outputs with an amplitude of half a volt r.m.s., one for the product detector and balanced modulator, and the other for a digital dial. The crystal switching had to be "one line" to be compatible with the existing wiring; thirdly, the circuit had to be "sure fire" on the existing 12v. supply.

The circuit, Fig. 1, is fairly straightforward: TR2 is a conventional oscillator, but using diode switches. The cathodes of the diodes are taken "low" for the associated crystal to be switched into circuit. TR3 is a simple DC coupled amplifier to bring the output up to the required level and the emitter, being un-decoupled, is used for the output for the digital dial. (Full details of this are published in the G-QRP Club journal, *Spratt*). TR1 is used as an inverter to enable single-line switching to change from USB to LSB.

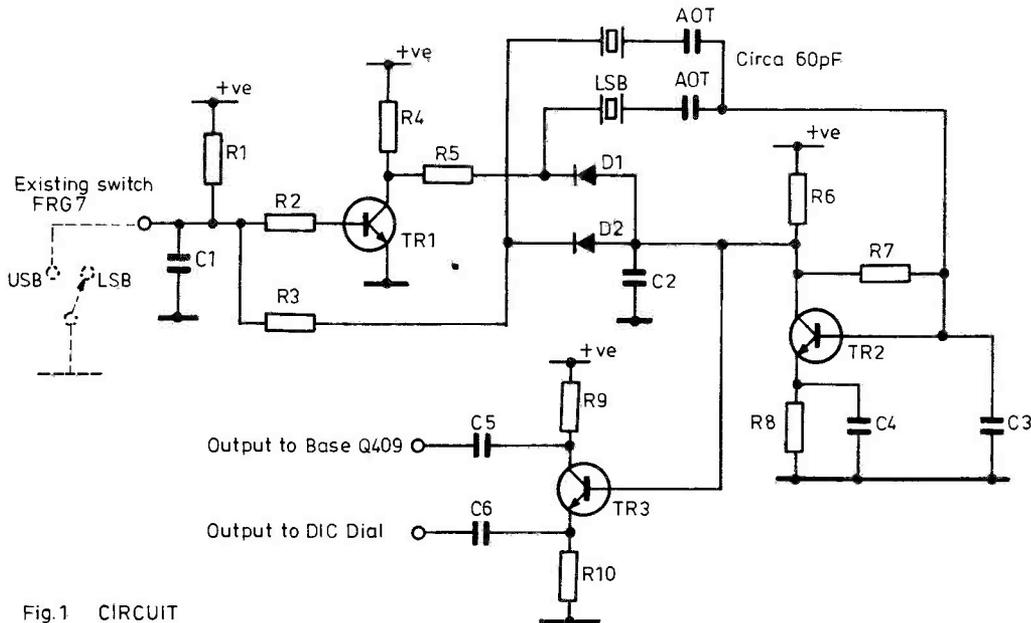


Fig. 1 CIRCUIT

Table of Values

Fig. 1

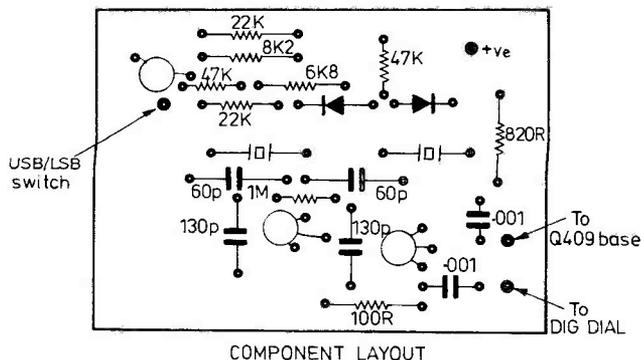
- | | |
|--------------|---------------------------------|
| R1 = 6K8 | R10 = 100R |
| R2, R6 = 47K | C1, C4, |
| R3, R5 = 22K | C5, C6 = 0.01 μ F d/ceramic |
| R4 = 8K2 | C2, C3 = 130 pF, poly |
| R7 = 1M | TR1, TR2, TR3 = BC109 |
| R8 = 3K3 | D1, D2 = 1N914 |
| R9 = 1K | Xtals = to suit filter |

Note: all resistors are 1/8-watt.

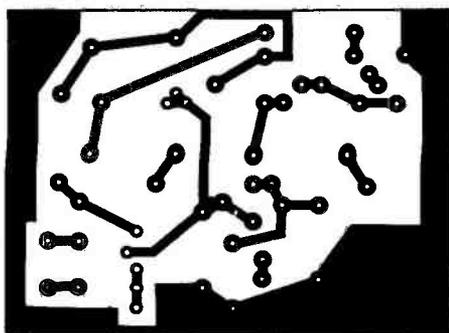
Construction

The board was mounted on the rear right-hand side of the chassis, the battery box already having been removed during the conversion to transceiver. Insulation proved to be very simple: TC404 was removed and this point used for picking up the switching line; Q408, C435 and T406 were removed and the signal fed in the hole where the drain, Q408, was connected.

It is now possible to go on the air without waiting for the set to warm-up, and gone are the days of reports of "topy" audio!



COMPONENT LAYOUT



TRACK - UNDERSIDE

Fig 2 FRG7 C.I.O. PRINTED CIRCUIT

SEMI-FOLDED DIPOLE

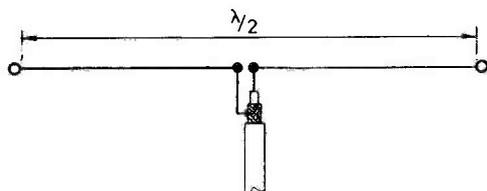
IAN H. MOTH, G8SOH

IT is said that there are only two types of antenna, the "Hertz" and the "Marconi" — all other types being variations on a theme. The antenna described here is a very slight variation on Hertz's simple dipole, but the effects are rather puzzling and should be of interest to the experimenter.

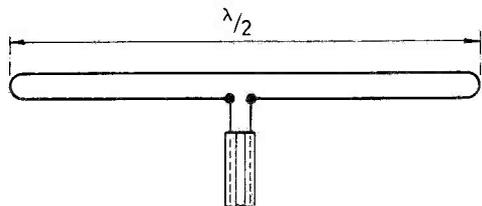
As every successful RAE candidate knows, a simple dipole, Fig. 1a, possesses a resonance according to its length, and such an antenna may be tuned by gradually clipping off the ends until the measured SWR bottoms-out at the required frequency. This is generally sufficient, but in the vast majority of cases there will remain a certain, small amount of mismatch. This arises because the impedance at the centre of such an antenna (assuming it is erected well clear of the ground and surrounding objects) will be 72 ohms, while the amateur will have almost certainly standardised on a 50-ohm system.

Alteration of 1st Mode Impedance

The aforementioned successful RAE candidate may also know that the feed impedance of a dipole increases four-fold if the elements are folded over as in Fig. 1b. Folded dipoles like this, manufactured from 300-ohm ribbon cable, make a convenient, simple antenna for domestic VHF receivers with a 300-ohm nominal input. What is not so well known is that any feed impedance can be obtained by intermediate folded elements. Fig. 2 shows a 50-ohm dipole, the measurements (mm) corresponding to the author's prototype designed for 145 MHz. Initial work was conducted at 630 MHz (using non-radiative methods, it is hastened to add) and the result scaled up, which indicated that antennas for different frequencies may be scaled *pro rata* for first approximation to better than 5%.



(a) Ordinary dipole (Feed impedance 72 ohms)



(b) Folded dipole (Feed impedance 300Ω nominal)

Fig. 1

D 587

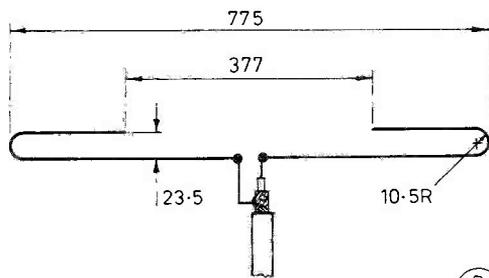


Fig. 2 Semi Folded Dipole (Feed impedance 50Ω)

D 588

Construction

The author's 2m dipole was made from aluminium wire of about 3mm diameter. If hollow tubing is used, the decreased velocity factor will entail some shortening. An inherent difficulty with this antenna is that it is not easily adjusted during the tune up, except for "fine tuning", where the resonant frequency may be lowered by opening out the fold-overs, and *vice versa*. It is suggested that copper wire, perhaps offcuts from domestic house wiring "twin core and earth" be used for experimentation, as it is easier to bend, cut and solder bits back on to, than more brittle materials. Final manufacture should be on some kind of former, which need be no more than an off-cut of wood with a large peg at one end and a

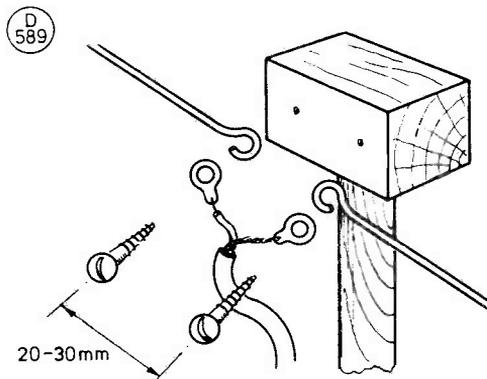


Fig. 3 Inexpensive feeder connection (see text).

small one at the other. The centre connector used by the author was cannibalised from an "Aerialite" UHF TV antenna, which provided a convenient, waterproof and professional finish. Constructors without cast-off domestic antennas may care to adopt the suggestion in Fig. 3, where the elements are secured in a wood block with small wood-screws, and the cable attached with the aid of solder tags. Waterproofing may be effected by a liberal application of bath sealant or similar material.

When tuned to 145 MHz, the author's prototype showed a match corresponding to an SWR of better than 1.05:1.

Acknowledgement

The author is indebted to Mr. D. A. Staniland for advice and theoretical guidance.

CLUBS ROUNDUP

By "Club Secretary"

THIS piece is written in the run-up to 'Leicester', and doubtless by the time it is read your scribe will have met many "Hon. Secs." at the stand — these personal contacts are most interesting for the writer, the more so when it is a first meeting after years of seeing the same handwriting regularly, and one can then put a face to a name and a club.

For ourselves, a new way of missing a club meeting has been found: cut it till the last minute before leaving home, and find the car won't start! So, you Hon. Secs. who complain about the stay-at-homes, here is another valid reason.

Obituary

The Hon. Sec. of IRTS writes sadly to tell us of the death of E13Z, Patrick Conway. To the E1s, E13Z was one of the best known and liked, as for some twelve years he read the weekly IRTS News Bulletin on Sunday at noon. Apart from this aspect of the hobby, Pat was interested in the earlier years of radio, and was known also as a knowledgeable chap on many other subjects. He is very much missed by the EI amateurs, who have already sent their condolences to his wife Cathleen. To theirs, we would add our own. *Vale* E13Z.

The Mail

Again we will be using alphabetical order, save that the few who come in at the last moment will be in a separate bunch.

So, off we go with **Axe Vale** who seem to like their new home in the Adam room, George Hotel, Axminster. They are at the Hq on December 3, when G3ECH will be the speaker — they reckon things are really looking up for the club now.

B.A.T.C. is the group to belong to if you are into amateur television. They have a regular newsletter, with much of interest to the amateur TV enthusiast, and a well-organised sales set-up to cover many of the specialist items required for TV transmission.

Bournemouth have a new Hon. Sec. — see panel for his address. The meetings are still at the Dolphin Hotel, Holdenhurst Road, Bournemouth on the first and third Fridays of the month.

On to **Brighton**: December 3 is given over to a film night at 47 Cromwell Road, Hove. The general arrangement is to foregather on alternate Wednesdays at this address.

Hq for **Bury** is the Mosses Community Centre, Cecil Street, and on December 9 they have the AGM. This is not to say they are a monthly-meeting group: they have informals on every Tuesday evening.

Cheltenham are based on the Old Bakery, Chester Walk, Clarence Street, where they have the AGM on December 4, with a natter session on December 19 which will be a Christmas get-together.

It is a Members Evening at **Crawley** on December 10, with the venue being the usual Trinity United Reformed Church Hall in Ifield.

Down west next to **Cornish** where we find their normal venue to be the SWEB Clubroom, Pool, Camborne on the

first Thursday of each month; we do not at the time of writing have the programme, but they never miss — always something going on.

Next we turn to **Cray Valley** where they have the first Thursday in the month at Christchurch Centre, High Street, Eltham, London S.E.9. This gives the date as December 4, and doubtless the Hon. Sec. — see Panel — will be only too pleased to tell you what's on.

December 20 is down for **Crystal Palace's** Film Show and Christmas Party, at Emmanuel Church Hall, Barry Road, London S.E.22.

Our next stop is with **Dartford Heath D/F**, who are now ten years old; as far as we can recall they have always used the same Hq, namely the Scout House, Broomhill Road, Dartford, Kent. For December we see they have a club hunt on December 14, and an Extra-ordinary General Meeting at the "Horse and Groom" public house, starting at 2000 on December 16.

At **Derby** they have their own rooms at the top floor of the Oddfellows Hall, 119 Green Lane, Derby. December 3 is a Junk Sale, while the Constructors Contest is on 10th. The Christmas party is on December 17, and the Christmas Eve date is scrubbed in favour of "turkey-stuffing at home" (!). However, they are back together again on December 31 with a natter-nite at Hq.

Deadlines for "Clubs" for the next three months —

January issue — November 28th
 February issue — January 2nd
 March issue — January 30th
 April issue — February 27th

Please be sure to note these dates!

Back to the south coast again, this time to **Dover**, where they have a natter session on December 3, and a Technical Talk-in on 10th; the venue is the YMCA, Godmyre Road, Dover, and the club station G3YMD monitors S20 and GB3KR for anyone requiring talk-in facilities.

For **Dudley** we have to refer you to the Hon. Sec. as the newsletter currently to hand doesn't say where or when — his details are in the Panel.

One of the few GM clubs to report in is the **Dumfries and Galloway** gang who are based on the Cargenholt Hotel, New Abbey Road, Dumfries, on the first and third Mondays of each month. That gives us December 1 for the Christmas Social, and the AGM on December 15 — the most important date of any club's year.

Now we have covered G and GM, we go over the water to **East Antrim**, a recently formed group who are still on the lookout for more members — find the club at Carntall Hall, near Mossley, at 2000 on the second Tuesday of each month — the Hon. Sec.'s name and address are to be found in the Panel. We make the reference to him because we notice in the programme we have that they may have the December 9 meeting, which will be the Armagh tape-and-slide show, and a Christmas party, at Whitley's Bar.

East London RSGB group are one of the few who use Sunday afternoons — so look for them at Wanstead House, 21 The Green, Wanstead, E.11, on December 21 for the

Annual Business Meeting and Junk Sale. The start time is 1500.

For **Edgware**, December 11 is down for a Junk Sale, at Hq in Watling Community Centre, 145 Orange Hill Road, Edgware. We can understand the December 25 date being scrubbed — a Christmas Day meeting wouldn't be popular with the XYLs and harmonics! On a totally different tack, Edgware members were saddened indeed to hear of the sudden death of Doug Findlay, DFC, G3BZG, who, apart from being a stalwart in the local sense, was also very much in the picture nationally in the years after the war: he was RSGB President in 1957.

North again, up to **Edinburgh**, where they continue to use Calton Hill Observatory as their Hq, at 8 p.m. every Tuesday evening, with the exception of Christmas and the New Year. Details from the Hon. Sec. — see Panel.

In **Exeter** they have had an AGM, and a change-around of officers, at the Community Centre, St. Davids Hill, Exeter — but we guess the PRO, whose address appears in the Panel for the moment, will be only too pleased to answer any questions about the new year's meetings; but we'd like the name and address of the Hon. Sec. for the records, please!

The name of the **Ex-G Club** is, we suppose, self-explanatory: for radio amateurs born in the UK and currently domiciled abroad. Contact is maintained with the UK by way of regular nets, and they have a most interesting newsletter — the current one has a delightful tale of skulduggery in the Isle of Wight, culled from the Isle of Wight *Weekly Post* of January 8 last. Details from the UK Hon. Sec., at the address in the Panel.

The **G-QRP Club** is very definitely becoming an international affair, and they now have in excess of 900 members.

Looking at the **Guildford** newsletter, we note they have a Vintage Wireless and OT's night on December 12; and against December 26, the legend "shall we or shan't we" has

been deleted and the word "social" written. Hq of course is the Model Engineers Hq in Stoke Park.

It must be nearly twenty years ago that the late G6QB Howard Thomas, told the writer about the closing-down of the Hastings club, and it is therefore a great pleasure indeed to hear that once again **Hastings** are an active and thriving group. They have the third Wednesday in each month, at West Hill Community Centre, Croft Road, in Hastings, while the informals are held in the club's own place at 479 Bexhill Road, St. Leonards. More details from the Hon. Sec. (see Panel) about the various activities there.

Next we have the familiar look of the **Hereford** newsletter, from which we gather they have made a decision to have one formal and one informal meeting in each month; thus December 5 is "To Be Arranged" and on 19th there will be a Christmas Quiz (and, we suspect, some hilarity too!). The venue, of course, is the County Control Civil Defence Hq, Gaol Street, Hereford.

The Hon. Sec. of the **Ipswich** group writes to tell us that their problems over Hq have been solved by a move from the beginning of January to a separate clubroom at the "Rose and Crown", Norwich Road, Ipswich; it should be noted that the separate clubroom means the youngsters will be still welcome. So what about December? We suggest you contact the Hon. Sec. — see Panel for his address. We might also note that from the start in the new Hq they will be booked in on the second and last Wednesdays of each month — with the informals, Morse classes and so forth, still at the Handford House in Ranelagh Road, during school term-times.

It seems hardly a day since E12DW, Karen, took over the editing of **IRTS** Newsletter, and now we find we have just read her last compilation — a pity, and the new editor will have something to live up to. We also noted that the Hon. Sec. has grown himself a callsign — congratulations! Now, of course, we come to the hard bit, because we pass any

A hark-back to summer: some of the RAFARS members at the 1980 Drayton Rally. Top row, left to right: G4EJU, G4DYP, G4AYD and G4AJD; bottom row left to right: G3DCG, G3ZZR, G2FIX and G4DEW.



Names and Addresses of Club Secretaries reporting in this issue:

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersburg Avenue, Acton, London W3 8LB.
- AXE VALE: Mr. & Mrs. Retter, G4JBG, 48 Fairway Rise, Chard, Somerset TA20 1NT. (*Chard 4163*)
- B.A.T.C.: M. Cox, G8HUA, 2 Holme Lane, Bottesford, Scunthorpe, Humberside.
- BOURNEMOUTH: G. T. Lloyd, G8GTB, 4 Gorleston Road, Parkstone, Poole, Dorset.
- BRIGHTON: J. Trimmer, G4JDM, 7 Dale Crescent, Patcham, Brighton.
- BURY: M. Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs. BL8 2TT. (*061-761 5083*)
- CHELTENHAM: G. Cratchley, G4ILL, 47 Golden Miller Road, Prestbury, Cheltenham (*Cheltenham 43891*)
- CHILTERN: B. Catteral, G4IWC, 78 Fairacres, Prestwood, Great Missenden, Bucks. (*Great Missenden 4504*)
- CORNISH: S. T. S. Evans, G3VGO, "Glengormley", Carnon Downs, Truro, Cornwall. (*Devoran 864255*)
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- CRAY VALLEY: P. J. Clark, G4FUG, 42 Shooters Hill Road, London SE3. (*01-858 3703*)
- CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. (*01-699 6940*)
- DARTFORD HEATH D/F: A. R. Burchmore, G4BWV, 49 School Lane, Honon Kirby, Dartford, Kent DA4 9DQ.
- DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. (*0332 556875*)
- DOVER: P. Chamberlain, G8EGT, 59 Capel Street, Capel-le-Ferne, Folkestone, Kent CT18 7LY. (*Folkestone 42387*)
- DUDLEY: N. Rock, G3RLY, 28 Conway Avenue, Kingswinford, Staffs. (*Kingswinford 77617*)
- DUMFRIES & GALLOWAY: C. Rodgers, GM8TKA, 5 Elder Avenue, Lincluden, Dumfries DG2 0NL.
- EAST ANTRIM: J. Welch, G14JXM, c/o 20 Bryantang Brae, Doagh, Ballyclare, Co. Antrim BT39 0RJ. (*Ballyclare 40384*)
- EAST LONDON RSGB: R. Holmes, G3PKQ, 92 Dunedin Road, Leyton, London E10 5NJ.
- EDGWARE: D. L. Lisney, G3MNO, 119 Draycott Avenue, Kenton, Harrow HA3 0DA. (*01-907 1237*)
- EDINBURGH: A. Nadauld, GM3RFQ, 171 Causewayside (2F/1), Edinburgh EH9 1QF. (*031/068 1749*)
- EXETER: G. Draper, 1 Carillon Close, Heavitree, Exeter EX1 3AZ. (*Exeter 37170*)
- EX-G: F. W. Fletcher, G2FUX, 53 St. Ives Park, Ringwood, Hants. BH24 2JX. (*Ringwood 3561*)
- G-ORP: Rev. G. C. Dobs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37. (*021-770 5918*)
- GUILDFORD: L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey. (*Guildford 76375*)
- HASTINGS: D. Edwards, G4KMJ, 214 Hillside Road, Hastings, Sussex. (*Hastings 752383*)
- HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. (*Hereford 3237*)
- IPSWICH: J. Tootill, G4JFF, 76 Fircroft Road, Ipswich, Suffolk IP1 6PX. (*Ipswich 0473 44047*)
- I.R.T.S.: C. Yeates, E17AAB, 126 Beech Park, Lucan, Co. Dublin, Eire.
- ISLE OF WIGHT: T. Fallick, G4FYI, Harmony, Main Road, Chillerton, Newport, I.o.W. (*Chillerton 328*)
- JERSEY: S. Smith, G3JEZA, 19 Parade Road, St. Helier, Jersey, C.I. (*Jersey 23249*)
- KIDDERMINSTER: R. Manton, G4ILQ, 7 Osborne Close, Offmore Farm Estate, Kidderminster, Worcs. DY10 3YY. (*Kidderminster 4930*)
- LIVERPOOL: R. Simmons, G3PNS, 62 Daneville Road, Liverpool L4 9RG.
- MEIRION: Mrs. J. Jones, GW8SYX, 25 Fford Dyfrig, Tywyn, Gwynedd. (*Tywyn 710-402*)
- MELTON MOWBRAY: R. Winter, G3NVK, 32 Redwood Avenue, Melton Mowbray, Leics. LE13 1TZ. (*Melton Mowbray 3369*)
- MID-LANARK: D. Smillie, GM4FKD, 27 Easter Crescent, Cambus Court, Wishaw, Lanarkshire.
- MILTON KEYNES: W. Backhouse, G4HZI, 46 Tattenhoe Lane, Bletchley, Milton Keynes, Bucks. (*Milton Keynes 77479*)
- NORTHERN HEIGHTS: M. Topham, G8NUC, 1200 Great Horton Road, Bradford. (*73271*)
- NOTTINGHAM: M. C. Shaw, G4EKW, 50 White Road, Nottingham NG5 1JR.
- R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.
- REIGATE: Dr. J. S. Roberts, G8FDJ, 15 Bakehouse Road, off Horley Row, Horley, Surrey.
- ROYAL NAVY: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth, Hants. PO8 8SQ. (*Waterlooville 55880*)
- SOUTH DORSET: R. Cridland, G3ZGP, 13 Clarendon Avenue, Redlands, Weymouth. (*Upwey 812893*)
- SOUTHGATE: J. Fitch, G8EWW, 16 Kent Drive, Cockfosters, EN4 0AP. (*01-440 7353*)
- STEVENAGE: E. Godfrey, 94 Common View, Letchworth. (*Letchworth 72184*)
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- TYNESIDE: J. Dingwall, G4ILW, 10 Loweswater Road, Gateshead, Tyne & Wear NE9 6TN.
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- WACRAL: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wavne, Nr. Hull, Yorks. HU7 5XU.
- WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent. (*Sevenoaks 56708*)
- WIRRAL: G. O'Keefe-Wilson, G8VPF, 20 South Drive, Upton, Wirral. (*051-677 1531*)
- WISBECH: D. Dunn, G8RZN, Five Bells, Parson Drove, Wisbech, Cambs.
- WORCESTER: M. Tittensor, G4EKG, 16 Durcott Road, Evesham, Worcs. WR11 6EQ. (*0386 41105*)
- YEovil: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset

enquiries about amateur radio in EI on to him — see the Panel for his address.

On the **Isle of Wight**, the locals are to be found in Unity Hall, Wootton Bridge (which is near the Sloop Inn) on every Friday evening.

Further afield yet now, to **Jersey**, where they are comfortably set up in the Communicare Centre, St. Brelade. They can be found here on the second Wednesday in each month, albeit at the moment of writing we don't have any idea of the latest programme details.

At **Kidderminster** they foregather fortnightly on Tuesdays at Aggborough Community Centre, Hoo Road, which is near the College of Further Education and adjacent to the Harriers Football ground. December 9 is down for a talk on Raynet by G8ASO, and on December 23, not surprisingly, the meeting is scrubbed. They don't say so, but it seems the Monday dates have disappeared from the programme, but a call to the Hon. Sec. would no doubt resolve that question. They do, however, have a social evening on December 20 at the "Fox" in Chaddesley Corbett. We might add that the membership of this club is increasing at a truly surprising rate.

Liverpool are so certain we can recognise them that they refer to themselves only as "I. & DARS" — luckily we know

enough about what's where in that great city and were able to identify. They live in the Conservative Association rooms, in Church Road, Wavertree, and on December 2 G8NNX will be talking about Computers, while on 9th G3PFZ will be talking about RTTY with particular reference to the Creed 7E printer — so watch where you put your feet! (Some of the bits are small and sharp!) December 16 is a Get Together B.Y.O.B. — doubtless the regulars can translate, but for any newcomers we suggest a call to the Hon. Sec. for details; he is in the Panel.

Earlier this year, enthusiasts for our hobby in GW formed the **Meirion** group, based on Dolgellau, at the Ship Hotel on the first **Thursday of each month, and covering a quite enormous area**. For details, contact the Hon. Sec. at the address in the Panel.

December 19 is the date to set aside for a visit to **Melton Mowbray** club, with a Junk Sale to be followed by the formal matter of the presentation of the G3FDF Trophy. They get together at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

Up to **Mid-Lanark**, at Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motherwell; December 5 is a Bring-Buy-Swap night, and on 19th there will be some films to be watched.

Midland seem to be making fine progress with their new home in Broad Street, but they seem to have no data as to where they are having their formal meetings meantime; we suspect the University of Aston, but we must refer you to the Hon. Sec. — see Panel.

Now to **Milton Keynes**, where they are based on the Lovatt Hall, Silver Street, Newport Pagnell, on the second Monday of the month.

At **Northern Heights** they have taken up the space normally given over to programme arrangements in favour of a full print of WIBB's letter reacting to the news of the death of G3MDW, who despite disability was both a fine club man, and a good business man too. Turning to our cards, we find the venue to be the Bradshaw Tavern, every Wednesday evening, this is at Grid Ref: 303083, and Halifax buses 3 and 26 pass the door.

On to **Nottingham** and Sherwood Community Association, Woodthorpe House, Mansfield Road, Sherwood, Nottingham. December 4 is down for a Forum, while on 11th they have a talk on aerials by G. Dover, G4AFJ; then on December 18 there will be a Christmas Quiz. All kick off at 7.30.

Pressing on regardless, we come to **RAIBC**, who are themselves pressing on regardless in their aim of helping all the blind or invalid types become SWLs or even licensed amateurs. Details from the Hon. Sec. — and how about your club or you yourself doing something to help?

Reigate seem to have a problem in getting a replacement editor for their newsletter — we hope it will have been sorted out by the time this comes to be read. They have Hq in the Upstairs Meeting Room, Conservative and Constitutional Club, Warwick Road, Redhill, on the third Tuesday of every month. This gives December 16, for a Constructional Contest.

The **Royal Navy** is a club name that explains itself! Members are drawn from past and present RN or reserves, and from the Merchant or foreign navies — details from the Hon. Sec., at the address in the Panel.

A new meeting place is the prime need for **South Dorset**, or at least it was when they wrote. This being the case, a call to the Hon. Sec. — see Panel — might be a good idea before rushing off to the old venue!

It is the second Thursday in each month which is booked at the Scout Hut, Wilson Street, Winchmore Hill, by the **Southgate** crew. Everyone is most welcome to the December meeting — it's the AGM!

Over the years the writer has been a member of many clubs, and he was at Southgate a quarter-century ago; a few years later he found himself at **Stevenage** and again joined the club. Both, be it noted, survived! Seriously, the Stevenage group is going now better than ever, and for December they have a talk on Hospital Radio on 4th, with the Annual Dinner at the Broadway Hotel in Letchworth; that leaves the 18th for a nice quiet old natter session.

A change of dates must be noted for **Surrey**, where they have moved from Wednesdays to Mondays to avoid a clash with the cadets' band-practice and the consequent QRM. So from now on it's the first and third Mondays at *T. S. Terra Nova*, 34 The Waldrons, Croydon. December 1 is down for a visit from Bredhurst Electronics, while on 15th, they have the informal, during which they will have the club station on the air, and an informal Christmas "do".

Up to **Tyneside**, where they have a place at the Community Centre, Vine Street, Wallsend; they are to be found there every Monday evening, and they have a club station

complete with a three-element beam which ought to encourage some DX-chasing locally!

For **Verulam** the "main" meeting is now on the fourth Tuesday in each month at the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans. This gives December 16 for the AGM. On the informals, from October to April, they are at the R.A.F. Association Hq in Victoria Street, St. Albans, on the second Tuesday of each month.

The letters **WACRAL** stand for World Association of Christian Radio Amateurs and Listeners. They have members in many lands and seem to be growing apace. Details from the Hon. Sec. — see Panel.

We head next for **West Kent** where they will be entertaining Techtronics and learning all about choosing an oscilloscope and using it. The venue for this is the Adult Education Centre, Monson Road, Tunbridge Wells, and the date December 5.

Wirral use the Sportscentre, Grange Road West, Birkenhead, on the first and third Wednesdays of each month — latest details from the Hon. Sec., see Panel.

A new one to us is at **Wisbech**, where they are actively after new members — they foregather fortnightly at the "Five Bells", Parson Drove, near Wisbech, every other Thursday at around 7.30, the next date being December 11. More details from the Hon. Sec. — see Panel.

Now **Worcester** where the Hon. Sec. is at pains to explain how their programme dates — first Monday in each month, at the "Old Pheasant" in New Street — are unchangeable and thus no need to check with him if we don't hear. But, for us, that's the point; if we don't have the detail by way of a recent programme or letter, we assume something has gone wrong and refer you, the reader, to the address Panel. That way, a potential new member at least gets in contact, and isn't lost through our making hopeful assumptions. We've seen too many clubs have to change Hq or programme at the last minute! But, thanks for noticing! On January 5, the lads will have Micro-Print of Stoke-on-Trent, showing their do-it-yourself computer kits.

On to **Yeovil** at Building 101, Houndstone Camp, Yeovil, where they are to be found at 7.30 on, every Thursday evening. For December the main meeting will be on 11th when G3MYM discusses the using of an RF voltmeter.

Last — Not Least

We said at the beginning that the clubs who arrived in the last batch before the deadline would appear in a separate pile.

Acton, Brentford and Chiswick are at the Town Hall on Tuesday, December 16 to discuss "members selected items". Incidentally the Town Hall is in Chiswick High Road.

Chiltern have a date change for December, to *December 17*, so as to avoid any clash with Christmas arrangements. The Hq is at the canteen of John Hawkins Ltd. (furniture factory), Victoria Street, which is off West Wycombe Road, with plenty of parking space in front of the factory.

Finale

That's it for another month; deadlines are as set out in the 'box' in the body of the piece, and are for arrival here, addressed as ever to "Club Secretary", **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime, all our best wishes to clubs and their members, for the Festive Season and the New Year.

A KILOWATT LINEAR FOR 80 TO 10 METRES

PASSIVE GRID DESIGN USING 4CX250B'S

R. I. THOMAS, GW4BCD

THE author has built several linear amplifiers for the HF bands and quite a few valve types have been used. 813's, 807's, PL509's, 4-250's and several other types have been employed, and all were found to work with varying degrees of success. In 1976, however, an old STC T.1488 aircraft Tx was acquired and the intestines of this were removed and re-assembled into a HF linear. This used a pair of 4X150A's and when this was tried on the air it worked extremely well, out-performing all previous designs put together by the writer.

Success with this amplifier prompted the author to purchase a pair of 4CX250B's for further experimentation. These were assembled into a HF linear, and results were so impressive that the station at GW4BCD now uses this type of valve for final amplification on all bands from 80 to 2 metres. At HF the valves are very docile and a very simple linear can be assembled using the passive grid mode. As commercial linears are extremely expensive this design has a lot to recommend it, since 4CX250B's are currently in cheap and plentiful supply on the surplus market.

PA Circuitry

See Fig. 1. The two valves are operated in parallel and use a conventional pi-network output circuit. No neutralizing is required as the valves are unconditionally stable with or without a load, provided R1 is less than about 220 ohms. The exact value of R1 at which the amplifier becomes unstable will vary from valve to valve, but in general 220 ohms seems to be the upper limit of R1. Up to this value the amplifier is very well

behaved, however. The higher the value of R1 the less drive required by the amplifier, provided of course the exciter can load into this value. Constructors who have low power solid state rigs would be well advised to include some form of matching circuitry between their rig and the linear. A suggested circuit is shown in Fig. 2.

Table 1 gives the value of R1 for different levels of driving power. The anode APCs may or may not be necessary as parasitics seem to vary from valve to valve; they were necessary in the prototype, however. Screen and grid supplies are fed to the valves *via* 2 watt carbon resistors — these are very important and should not be omitted. Note that separate bias supplies for each of the valves are used: this is to be recommended unless one is in the happy position of being able to handpick matched valves. 4CX250B's seem to vary considerably with their bias requirements — one valve needing 50 volts for a given amount of quiescent current, another valve needing 45v. for the same. With separate bias supplies one can set both valves for the same standing current, and be

Table of Values
Fig. 1.

R1 = 50 to 200R, 20w. (see text)	S1 = heavy duty, ceramic insulation
R2, R3 = 50R, 2w.	RFC1 = 112 turns, 28 swg, on
R4, R5 = 4.7K, 1w.	½-in. dia. former
R6, R7 = 100R, 2w.	RFC2 = 2.5 mH standard choke
C1, C2 = 1000 pF, 10 kV DC, disc-ceramic	APC1, APC2 = 6 turns, 16 swg. over 22R 2w. resistor
C3, C4, C5, C6, C7, C9 = 1000 pF, 1 kV DC, disc-ceramic	L1 = 5½ turns ½-in. copper tube, 2-in. dia., tapped at 2t
C8 = 500 pF, 1 kV DC, silver-mica	L2 = 30 turns 16 swg, tapped at 3t and 15t from L1
VC1 = 250 pF, wide spaced	V1, V2 = 4CX250B
VC2 = 1000 pF, BC Rx type	

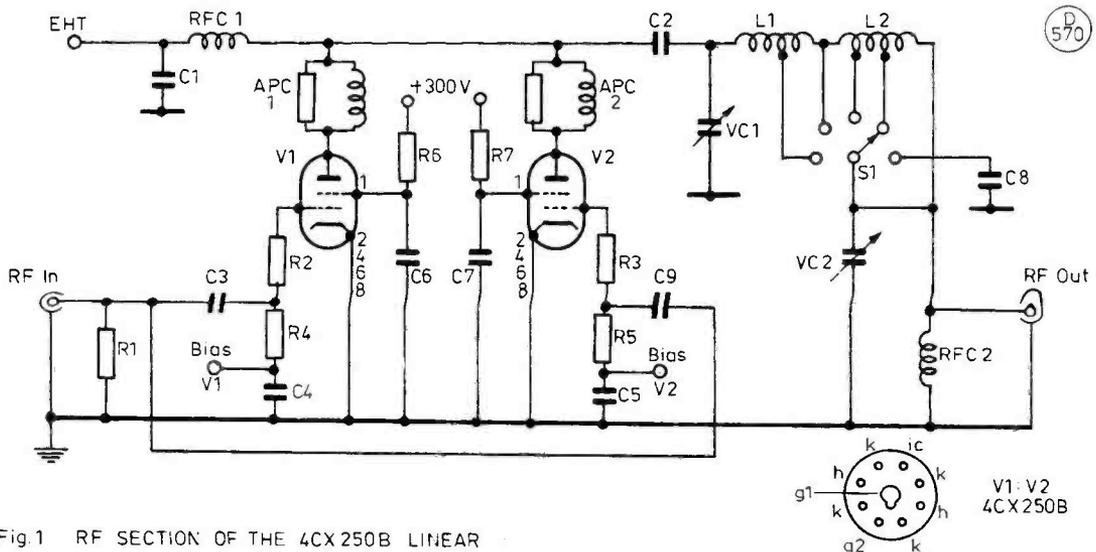
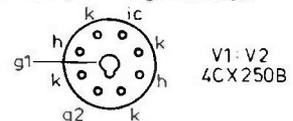
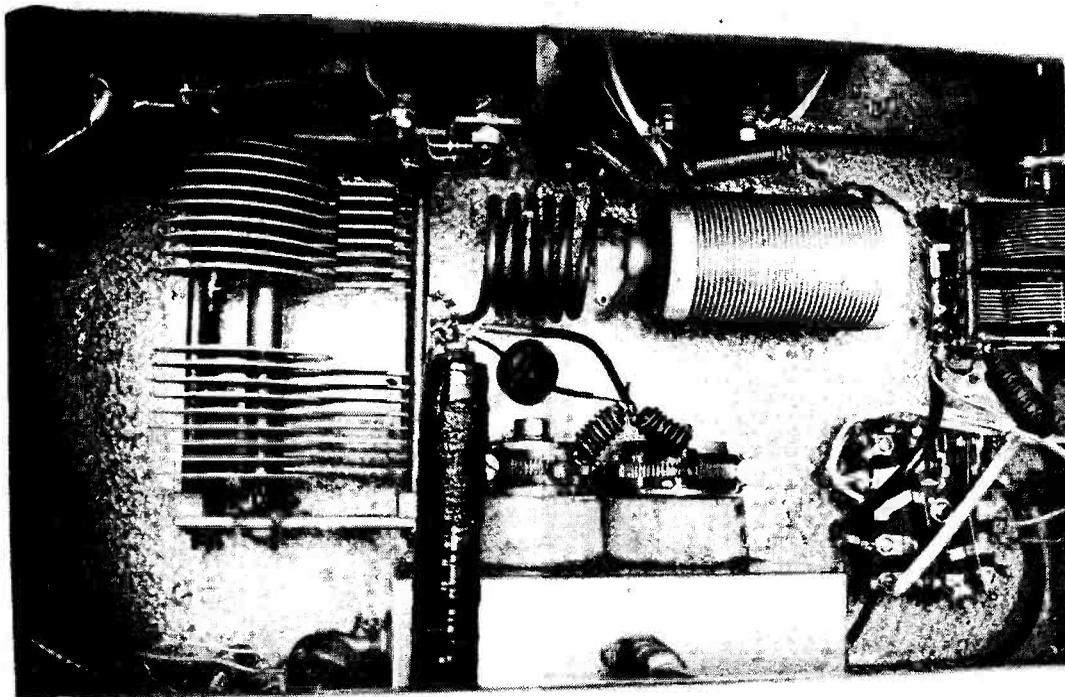


Fig. 1 RF SECTION OF THE 4CX250B LINEAR





Looking into the tank of the GW4BCD QRO linear

reasonably confident that the two valves are load-sharing fairly well over the full input cycle.

The filaments take 6 volts and it is better to be on the low side of this figure rather than above it. Odd secondary emission effects can occur if filament voltage is too high, and this can lead to damaging a valve. This effect does not seem so great at HF as it is at VHF, but it can be a problem even on the DC bands. Take care also to interlock the blower with the filament supply as the valves need blowing with only the filaments on; control circuitry is given in more detail later. The anode supply can be anything from 1 to 2 kilovolts, with slightly better efficiency being obtained at the higher voltage.

The anode supply choke RFC1 is fairly critical in design. As can be seen from the photograph the choke in the prototype suffered from overheating when the amplifier was rather

unwisely loaded into an SWR of over 4:1. If it is found that this component overheats when the amplifier is loaded into a good match a few turns can be added or removed to stop this. It is probably this component more than any other that dictates that the amplifier should not be used into a load where the SWR exceeds 2.5:1. Screen voltage should be around 300v. stabilised. As screen current should not exceed about 15 mA when the amplifier is properly loaded into a good match, stabilisation is taken care of simply by a pair of VR150 voltage regulators in series.

Choice of Components

Fortunately at HF one does not have to go to the trouble of obtaining the expensive VHF valvebase — common-or-garden 8B8 bases work well up to 30 MHz, indeed the author has seen

<i>R1</i>	<i>Drive for 400 watts output</i>
50 ohms	50 watts
75 ohms	34 watts
100 ohms	25 watts
125 ohms	20 watts
150 ohms	17 watts
175 ohms	15 watts
200 ohms	13 watts

Table 1. Values of grid resistor, R1, for drive power available.
Note: assumes anode voltage to be 2000v., and screen voltage to be 300v.

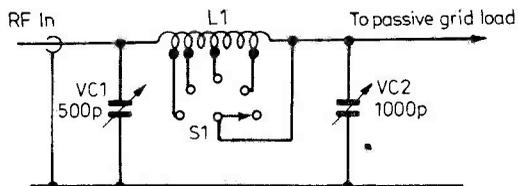


Fig. 2 One method of matching a 50 ohm exciter to a 200 ohm grid resistor. L1 to resonate on the band in use

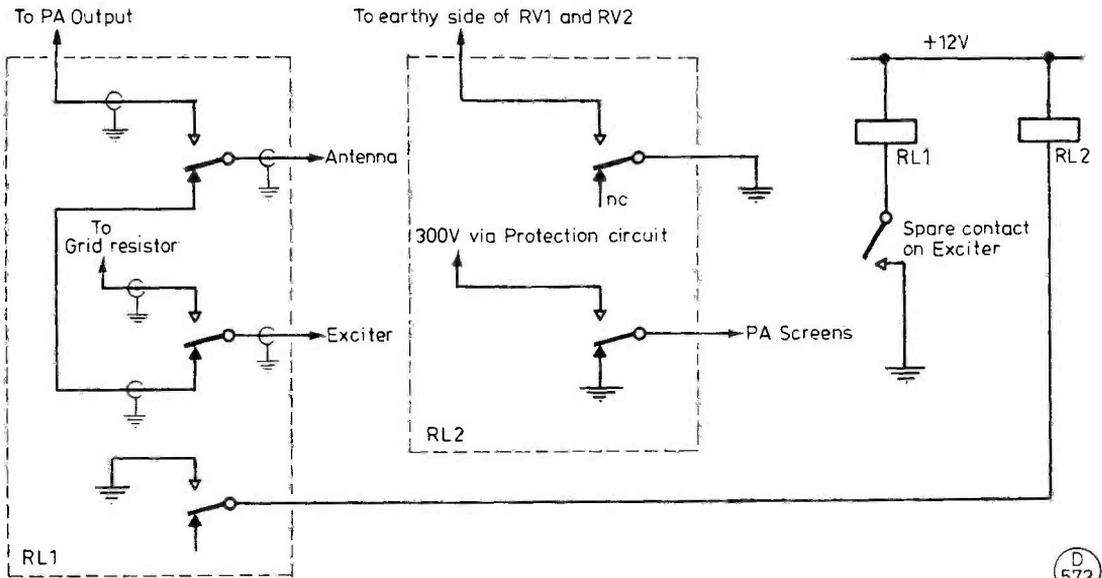


Fig. 3 CONTROL CIRCUITRY FOR THE 4CX250B AMPLIFIER

D 572

a 70 MHz amplifier using these bases. Chimneys are necessary of course, but it is fairly easy to make these out of suitable material. The chimneys used in the author's amplifier were cut from ceramic crucibles and glued to the sub-chassis, as can be seen in the photograph.

With regard to a blower, generally the bigger the better. The author's amplifier uses an enormous device which sends a gale through the anodes of the 4CX250B's. It is not necessary to go to this extreme, although both valves in the prototype were bought secondhand in 1976 and are still working well, despite repeated unintentional attempts at destruction. The writer puts this fairly remarkable longevity down to the 'overkill' used in blowing the valves. A suggestion by GW8EHK, who has used these valves at VHF for years, is that if one can hold a sheet of foolscap paper two inches from the anodes and it tends to rise from the airflow, then one has enough airflow. It should be noted that this rule-of-thumb only holds good for the 4CX family, as the 4X series is of glass rather than ceramic

construction and subsequently needs a lot more air passing through its anode. For the record the 4CX250B needs 5 cubic feet per minute of air at 200 watts dissipation, whilst by sharp contrast the 4X150A needs 100 c.f.m. if run at its limits.

The choice of tank circuit components is more or less dictated by the surplus market. The anode tuning capacitor needs to be wide-spaced, and the band-change switch should be of ceramic construction. All the tank circuit components shown in the photograph were obtained at one rally for less than £2; but these sort of components are gradually disappearing from the market, unfortunately. The loading capacitor was recovered from a 1950-vintage broadcast Rx. As previously mentioned the anode supply choke is a fairly critical component, and if a different diameter former is used from that specified, then turns may have to be added or taken off to ensure efficient operation. If the load SWR is high this choke tends to get hot anyway, but if it gets hot with a good load this is a sure sign that it has a resonance near the frequency in use; cut-and-try is then the only way of putting things right.

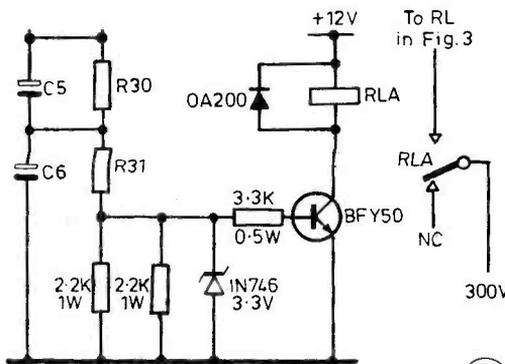


Fig. 4 SCREEN GRID PROTECTION CIRCUITRY

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Table of Values
Fig. 5

- D1 to D27 = BY127
- D28 = bridge rectifier, 500 p.i.v., 500 mA
- R1 to R24 = 220K
- R25 = 22R
- R26 to R31 = 220R
- R33 to R35 = 2M, 2w.
- R36 = 6.6K, 10w.
- R37, R38 = 220R
- R39, R40 = 10K, 1w.
- R41 to R44 = as reqd. for meter shunts
- C1 to C6 = 300 μ F, 450v.
- C7 = 32 μ F, 500v.
- C8 = 60 μ F, 350v.
- RV1, RV2 = 10K, 1w.
- VR1, VR2 = VR150 or similar
- M1 = 600 mA f.s.d.
- M2 = 500 μ A for 3 kV f.s.d.
- M3, M4 = 1mA f.s.d.
- T1 = 0-1500v., 500 mA
- T2 = 350-0-350v. 100mA, 6.3v. 6A
- T3 = 0-125v. 25 mA
- FS1 = 5A
- FS2 = 500 mA anti-surge
- FS3 = 60 mA
- S1 = double-pole on-off 240v.

The change-over relay used in the prototype is fairly robust, although it is surprising what one can get away with here, providing again the load SWR is fairly low. (The author has seen a miniature change-over relay in use in a kilowatt linear, with no apparent problems.) The anode supply decoupling and blocking capacitors are both 1000 pF, 10 kilovolt DC working disc-ceramic types obtainable very cheaply from advertisers in the *Magazine*. They have been in use in the prototype since 1976 with no problems.

Construction

As can be seen in the photograph, the author's amplifier is built into a commercial cabinet, with two valves mounted on a small air/RF-tight box. A hole to take the blower outlet is in the lid of the box and back of the cabinet, and the blower is then bolted to the back of the cabinet. The only problem with this arrangement is that the front panel gets too hot to touch after a long transmission!

When wiring up the valvebases try to keep all capacitor leads fairly short, especially those which decouple the screen pins. Take all cathode connections directly to earth separately, using fairly stout wire. The screen and grid supply feed resistors should be soldered directly to their respective pins, as this obviates any tendency to parasitics at these electrodes. The anode APCs are soldered directly to the *Jubilee* clips which are clamped around the valve anodes. Here again some experimentation may be necessary to stop any parasitics which may be present.

Feedthrough capacitors are used to take the various potentials into the sub-chassis — not strictly necessary at HF but a convenient way of doing things. Constructors will have their own ideas about pi-tank layout, and provided that leads are kept fairly short this is not particularly critical. Particular care should be taken with soldering in the tank circuit however, as a bad joint here can cause a good deal of loss because of the high circulating current present in this part of the circuit.

Control Switching

See Fig. 3. Apart from signal path switching, it is necessary to earth the screen pins of the valves and apply a blocking bias to their grids if total cut-off is to be achieved during standby periods. This is accomplished by RL2. Note that RL2 is activated by RL1, thus ensuring that the valves cannot conduct until a load is present. It is also of paramount importance with 4CX250B's (as indeed with any tetrode) that screen voltage comes on after anode voltage, and is never applied if anode voltage fails. A protection circuit suggested to the author by GW8EHK is shown in Fig. 4: this has been incorporated in the prototype and works well.

The transistor Tr1 needs around 1mA of base current to operate the relay, this is obtained from the EHT supply via the EHT smoothing capacitor network. The two 2.2K resistors and the 3.3v. zener diode ensure that the base of the transistor is never overdriven. The relay, of course, switches the screen voltage to the amplifier, thus ensuring that screen voltage cannot be applied without anode voltage being present. Note that the screens are also protected by a 60mA quick-blow fuse. The other point to watch regarding control circuitry is, as previously mentioned, to make sure that the blower comes on the same time as, or before, the filament supply. This is simply done by supplying the blower from the primary of the filament supply transformer; see Fig. 5.

Metering

On the prototype four surplus meters are used; Fig. 5. refers. One is permanently displaying EHT volts, this being primarily a safety precaution. Anode current is also permanently displayed, and here rather than apply nearly two kilovolts to the panel meter, the meter is placed in the earthy leg of the bridge rectifier. The 22 ohm resistor across the meter is a safety precaution: if the meter open-circuits for some reason, the resistor holds it at only a few volts above earth. The other two meters display grid or screen current and are switched to display, one or the other.

Power Supply

This is shown in Fig. 5. Obviously here availability of components dictate what is to be used, and the circuitry shown used components the author had available. Not much comment on the circuitry is needed as it is perfectly standard. Do please be careful with the EHT supply, as one does not get a second chance with this sort of voltage! Note that the 6v. filament supply is obtained by applying 240v. mains to the 250v. tap on the primary of the filament transformer. This, coupled with a slight voltage drop on the heater supply cable, gives 5.97v. at the filament pins on the prototype.

Setting Up

Attach a 50 ohm dummy load to the output of the amplifier. This should be capable of handling the full output of the amplifier, although if care is taken in keeping the tuning procedure down to short intervals, a load capable of handling 100 watts should suffice; this should be connected via a power meter.

Before placing the valves in their holders it would be advisable to check them for inter-electrode shorts, especially if second-hand valves are to be used. Place the valves in their sockets and check that filament voltage is 6v. or slightly less. Apply anode voltage and actuate the relay that places the valves to "transmit"; set standing current to 50mA for each valve. Screen current should indicate 2 or 3mA negative — this is normal. If parasitics are present they will make themselves known by appearing as RF output on the power meter with no drive applied, or anode current will tend to vary slightly as the tune and load capacitors are adjusted. With a low value resistor at R1 it is highly unlikely that the amplifier is oscillating at signal frequency, so any sign of spurious output will almost certainly be the result of a parasitic oscillation. This can be dealt with by modifying the anode APCs.

If there are no signs of any *spurii*, a little drive can be applied and the tune and load capacitors adjusted for maximum output on the power meter. Anode current should rise smoothly as drive is applied, and as resonance is found screen current should rise to 4 or 5mA positive. When loading the amplifier initially take care that screen current is kept within safe limits — say 40mA for the two valves; screen dissipation for a single 4CX250B is only 12 watts, and this can easily be exceeded, especially when initially aligning the amplifier, as the LC ratios in the pi-tank may not be quite optimum. In the author's amplifier screen current can be set to any value between 5 to 25mA by a minute adjustment of the loading capacitor, this having almost no effect on RF output; screen current is normally set to around 5 to 10 mA by this method. Apply full drive and peak the pi-tank capacitors for maximum output on the power meter. Anode current is dependent to some extent on EHT voltage, and in the author's amplifier

peaks to 470mA at 1900v. at 400 watts output. This figure is more or less the same over the five bands. No grid current should be allowed to flow of course, although in the prototype the grid current meter is seen to just move slightly on speech-peaks. This is estimated at 100 micro-amps.

Around 45% efficiency is all that can be expected from an AB1 linear, and the author's amplifier approaches this on all bands. Note that the pi-tank LC values given in the tables have been optimised for a 1900v. EHT supply, and if anode voltage differs from this to any great extent some experimentation should be done with these to obtain best efficiency. If less voltage is used, then slightly less inductance is called for, if a higher voltage is applied the reverse applies. It is very instructive to watch output power gradually increasing as the

optimum values of L and C are approached: on 10 and 15 metres tapping 1 or 2 turns up or down the coil can make a large difference in power output, even though the tank circuit was resonant at the previous position.

Conclusion

The amplifier has been in use by the author for nearly four years, with no problems. A home-brew 25 watt exciter is used to drive the amplifier, and the difference in reports when switching in the amplifier is significant, to say the least. As Cyril, GW3KSQ, put it when testing the amplifier initially, "from a whisper to a roar".

Finally thanks are due to GW8EHK, GW4HNT, GW4BCF for their help, and GW4IMC who took the photograph.

MODIFICATION TO THE ICOM IC-211 TO PERMIT TIME-OUT ALERT

ANTHONY GREEN, VP2EZ, A4XGR, VS6EZ, G4HRD

When the Hong Kong Amateur Radio Transmitting Society installed its first 2-metre repeater recently, they also set the transmission timer to two minutes. I decided that I didn't want the ignominy of timing out the repeater so, after a little thought, I evolved a circuit which fits snugly inside the IC-211 microphone and gives a 10 to 15 second warning before time-out occurs.

Very little modification needs to be done to the IC-211: all that is required is a 12v. source attached to pin 3 of the microphone socket, and this is obtained from J5 of the power unit.

Some modifications are necessary in the microphone plug. There are three wires and a screen braid, and the screen must now be wired to provide the only earthing wire for the micro-

phone: the now spare wire is used to carry the 12v. supply to the time-out unit.

The values of R2 and C1 may need slight adjustment to compensate for variations in voltage and capacitance: it should only be necessary to select R2 to give time-out alert 10 to 15 seconds before the repeater switches off. The green LED is mounted on the top of the first microphone and it is very noticeable when it starts to flash its warning.

Tables of Values
Fig. 1

- | | |
|--|---|
| R1 = 10K | C1 = 50 μF, 16v. w. |
| R2 = between 560K and 1M,
select on test. | C2, C4 = 0.01 μF |
| R3 = 100K | C3 = 0.04 μF |
| R4 = 10M | D1 = 1N914, or general purpose
silicon diode |
| R5 = 100R | D2 = green LED |

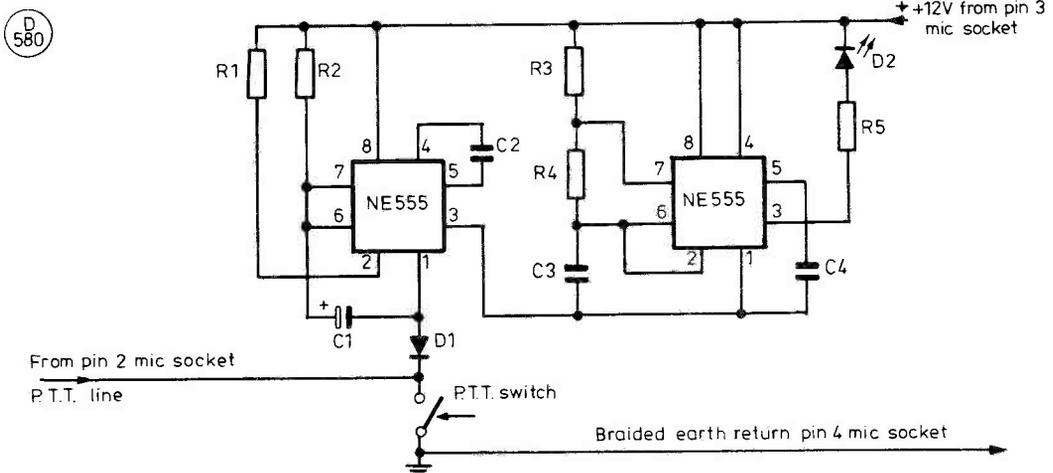


Fig 1 ONE MINUTE, FORTYFIVE SECOND TIME OUT ALERT

VHF BANDS

NORMAN FITCH, G3FPK

Honest Reporting

LISTENING around the two metre band in particular, one is disappointed at the number of sub-standard signals. This applies to FM, CW and SSB alike. In many cases the operators are quite unaware that their signals are anti-social, and for two reasons. First, they cannot monitor their own transmissions, and second, nobody has told them about their hum, key clicks, distortion, excessive bandwidth or whatever.

From the licence point of view, Clause 4(2) clearly states we should make periodic test transmissions to ensure we are not over-modulating, causing key clicks, etc, recording these tests in the log book. How many of us ever do so? The majority of radio amateurs are reasonable folk and, if told in a polite and helpful manner that something is not quite right, or even horribly wrong, are willing to find a quiet spot in the band on which to carry out some tests to put matters right.

Of course, one has to convince oneself and the fellow whose signal is being criticised, that one's own receiving system is not contributing to the effect. To this end, it is fairly easy to establish the input level at which a receiver starts to behave non-linearly and to ensure that any tests are carried out below this level.

The most common types of nuisance on CW are key clicks and here it must be stated that certain transceivers generate very sticky keying which has proved very difficult to cure. Other signals have a *white noise* noise content giving rise to a wide transmission. On SSB, some commercial rigs never sound right and have a raspy sound even when one is assured the microphone gain control is well backed off. Obviously, when such signals are amplified by ten or more dB., the

problem becomes worse. The simple test of the quality and freedom from unacceptably high third order products of an SSB signal is to tune carefully away from it and listen. With a good signal, the speech should disappear cleanly as one tunes it out of the pass-band of the filter. For example, when receiving upper sideband, and tuning away slowly to the low frequency side, the audio should rise in pitch cleanly and without any spikey or spitchy peaks. If it does not, then there are third order distortion products present at too high a level.

The most common complaint about FM signals is excessive deviation which results in an unnecessarily wide signal. However, your scribe has heard some FM transmissions with an incredible hum content. It could be that the practice of operating a transceiver from a battery connected to a charger is responsible for this.

Particularly if large amounts of RF are involved, one should be very careful when using external speech processing gadgets. Quite often, a whiff of RF getting in on speech peaks results in some nasty distortion as well as reducing the readability such devices are supposed to enhance. G6LX aptly refers to this as "speech *de*-processing!"

Finally some comments about so-called "linear amplifiers". Unfortunately, many of these are decidedly anything but linear, and this applies particularly to solid state devices used for SSB purposes. The very nature of the transfer characteristics of solid state amplifiers makes it very difficult to keep the third order products at a low level and achieve good efficiency at the same time. In this matter, it would seem advisable to employ valves of the 4CX250B class to generate powers in excess of 100 watts. It is possible to get the intermod. products 40-50 dB. down with valves of the '250B and '350F type, whereas it is not easy to achieve -30 dB. with a transistor amplifier. Moreover it is not only the third order intermod. products that are the *prime concern* with solid state devices: quite often, the 5th, 7th and higher products are considerable.

A definitive article on this topic is being prepared by John Nelson, G4FRX, which it is hoped to publish at a later date. Meantime, it is to be hoped that some honest reporting of signal *quality* will result from these comments.

Technical Notes

Many 2m. operators own the popular *Nag 144* amplifier but John Nelson, of Cambrian Electronics, is receiving a stream of inquiries from users concerning the short life of the valve. The problem stems from the fact that the 4CX350FJ valve was never designed for grounded grid operation. John says: "... this is not helped by the fact that, particularly when used on CW or FM, the existing blower is rather inadequate. Our current recommendation is to change the 4CX350FJ for a 4CX250F. This will produce less power output but will last somewhat longer. It will be necessary also to carry out minor re-tuning. This modification is still a compromise, since performance will not be outstanding. It is really necessary to re-arrange the input circuit for grounded cathode operation, probably in a passive grid configuration, for correct performance parameters to be met."

Awards News

Ken Homewood, G8NPC, from Hastings, E. Sussex, receives 2m. VHF Century Club Certificate no. 328. His station consists of a *Trio* TS-700G and solid state amplifier using a 2N6084 giving 40 watts output. The aerial is a 6-*ele. Quad* in the attic. Although 200ft. *a.s.l.*, the QTH is screened to the west, north and south by 400ft. hills and to the southeast by a block of flats. Ken is a member of a couple of clubs and repeater group and does his stint as a contest operator with the Hastings Electronics and Radio Club, G6HH.

Jon Dougherty, G4FUT, from Sunderland, has been awarded 2m. VHFCC certificate no. 329 for all-auroral QSOs. It took 3½ years to get the cards, the return rate being a miserable 30% with the greatest lack of response from those sent direct with IRC. Jon began as an *s.w.l.* at the age of 12 using an R-1155 Rx, given to him brand new in 1951. Military service in the Malayan Army as a *Regimental Signaller* in the late 1950s kept the radio interest alive. In 1958, he managed to carve up a military net on Salisbury Plain while operating in the jungle with 20 watts of AM, even though he failed to raise his own base but 30 miles away.

Jon obtained his amateur licence in 1976. The equipment consists of a *Trio* TS-700G, a choice of two, home made amplifiers, one using a QV06-40A,

the other a QY3-65, with a 6-ele. *Quad* at 40ft. for 2m. For 70cm., there is 8 watts of CW to a home made 12-over-12 *Yagi* with which it is hoped to get 100 cards for a 432 MHz VHFCC. He also operates on the HF bands with home made Tx's, supported by a *Yaesu* FT-401 transceiver which is "... always blowing up!"

Contest News

Results: The RSGB Region 1 VHF Contest which took place on Sept. 14 attracted over 80 participants of whom only 10 bothered to send in logs. Norman Horrocks, G2CUZ, report understandably describes this as "most disappointing". Winners of Section 1 for Region 1 multi-op. stations were PACT/G4BVE, with a total of 7,458 points. The Wirral Radio Society were second with 3,074 pts., both using 70, 144 and 432 MHz. Reader John Wilkinson, G4HGT, won the single-op. Region 1 section with 1,366 pts. and G80EG was second, with 933. They only used 144 MHz. The outside Region 1 winner was another regular contributor, Dave Cox, G80PR, (Hants.) with 906 pts., ahead of G8NQP who notched up 660; again on 144 MHz only.

Coming events: The 2m. leg of the Verulam ARC's Tx and Rx Contest is from 0900 to 1300 on Nov. 30. Exchanges to consist of report/serial number and administrative county, which is not often the postal one. Scoring is one point per QSO with G3VER worth 10. Multiplier is the total number of counties worked with countries outside the U.K., like Belgium, counting as another county. Logs, postmarked Dec. 15 latest, to G3JKS, 115 Marshalswick Lane, St. Albans AL1 4UU.

The popular 144 MHz Fixed Contest is on Dec. 7, 0900-1700. All modes, radial ring scoring and two sections, single- and multi-op. Entries to G3XDY, 16 Pearcecroft Road, Ipswich IP1 6PJ.

SSB Repeater — Again

Several years ago there was a proposal by G3RKL for an SSB repeater in the SSB part of the 2m. band, coupled with a plan to "channelise" the SSB sub-band. These proposals met with near universal opposition and were subsequently buried. However, G3RKL has now

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	54	12	214
G2DHDZ	45	6	60	14	40	7	172
G4HNS	41	5	59	12	43	9	169
GJ4ICD	—	—	68	26	47	17	158
G8GXE	—	—	67	19	53	14	153
G3PBV	18	4	58	15	44	10	149
G8OPR	—	—	65	23	51	8	147
G8TFI	—	—	63	20	47	12	142
G3BW	—	—	72	25	37	7	141
G8VLQ	—	—	68	17	40	10	135
G3CO	45	6	46	12	17	6	132
G8IFT	—	—	61	14	43	10	128
G8FMK	—	—	62	14	43	9	128
G4BYP	36	5	49	11	23	4	128
G3FIJ	40	6	46	12	17	4	125
G4BWG	13	3	56	20	23	8	123
G8MFJ	—	—	64	19	31	8	122
G8HHI	—	—	55	11	40	9	115
G4DEZ	—	—	71	29	—	—	100
G4IGO	—	—	65	11	—	—	93
G8KAX	—	—	43	11	31	8	93
G8VR	5	1	53	24	8	1	92
G8JLR	—	—	42	7	27	7	91
G4FKI	38	5	23	7	11	7	91
G4ARI	27	4	48	12	—	—	89
G3FPK	—	—	68	21	—	—	85
G8KGF	—	—	48	14	17	6	83
G4ERX	15	2	30	9	18	8	79
GW3CBY	20	5	30	9	10	5	79
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
G8RZA	—	—	43	11	—	—	54
G8VVF	—	—	45	8	—	—	53
G8JGK	—	—	35	13	—	—	48
GM8MG	—	—	39	6	1	1	47
GW3MHW	40	5	—	—	—	—	45

proposed that an SSB relay in Sheffield be established in the FM part of the band with input around 145.185 and output 145.785 MHz. The views of local amateurs are sought on this controversial suggestion, in particular it would be instructive to ascertain if there is any great demand for such a repeater, which is *not* intended to be a linear transponder like the *Oscar* satellites carry, by the way.

Beacon Notes

From Brian Bower, G3COJ, and Mike Lee, G3VYF, some notes about 70cm. beacon FX4UHF. It is located in Department 64, right near the Spanish border — ZD52c. The QRG is 432.87 MHz, the power 50 watts *e.r.p.* and the aerials two 10-ele. *Yagis*, slightly depressed towards the horizon and phased to give a broad pattern. The *a.s.l.* of the site is 900 metres and it is supposed to transmit some telemetry. This information was given to our correspondents by F6CBC.

Gigahertz Bands

There is a possibility of 23cm. activity from Spain according to Alan Bellfield, G4GLN, who heard this from Rubén González, EA1CR. Rubén is very keen but said that the only QSOs he would be likely to have would be with British stations since French amateurs are denied the use of much of the band we use. Rubén also admitted to an interest in 3cm. narrowband techniques. If that should develop, the sea path from northern Spain to southern Ireland would be a very tempting one to try to beat the Italian 10GHz world record of QRB of 757 kms.

G4GLN can generate an easy 400 watts of RF on 23cm. with his six 3CX100A5 valves. Alan has just put up four of the latest *Tonna* 23ele. *Yagis* which he says are much more "bird-proof" than the loop *Yagis*. He mentioned the many operators now using the *S.O.T.A.* and *Microwave Modules* QRP transverters and reckons that, considering some of them

are using UR-67 feeder and likely losing half the power at the aerial, they are doing quite well. G4GLN made about a dozen contacts in the Nov. 3 leg of the *Cumulatives*.

John Lovell, G8JHL, (Gtr. Manchester) devotes most of his operating time to the UHF's now and runs a pair of 7289s on 23cm., developing a measured 150 watts of RF. The aerial array is four 15-over-15 *Jay-beam* Yagis. During the Nov. 3 *Cumulative* period, John worked 17 stations and in just three weeks had notched up 19 counties and three countries. He uses an NEC 64535 mast-head preamp. and LDF-4 feeder cable.

Dave Sellars, G3PBV, (Devon) is busy "collecting the bits for an SSB transverter", and proposes using dual conversion to 28 MHz, with a 97.538 MHz crystal to avoid 2m. breakthrough problems. In another beginning-of-the-month tropo. lift, on Nov. 1, the beacons were coming in well with GB3CLE heard only for the fourth time. GB3WHA, not usually heard, was quite a good signal, but GB3DUN has never been heard by Dave. GB3I0W is the most consistent beacon in flat conditions.

Tony Collect, G8GXE, (Berks.) is participating in the *Cumulatives*, the first three legs producing 8, 12 and 10 QSOs respectively, all under 50km. except for G4HWA/P near Newbury, which gave the first Berks. contact. The October UHF/SHF Contest gave Ian Gordon, G8IFT, (Birmingham) a new county — Essex — thanks to G4GLN/P, at 219km. GW4CBW/P and G4HWA/P were also good signals. He has clocked up 23 counties and 4 countries this year so far, the *Cumulatives* having thus far provided reasonable activity. YL square, a new one, was worked, thanks to GW8HZK/P with only 1½ watts. Ian's best DX has been G8BFX and G3DY, both around the 130km. mark.

Ed Baker, the general editor of the I.S.W.L.'s magazine *Monitor*, has informed us of the death of Walter Tomlin. G8AII, on Aug. 27. He used to be the editor of the VHF Bands feature in *Monitor*, and was a contributor to this column in the past and a participant in the 23cm. All-time Table.

Seventy Centimetres

The November 1 lift brought G3COJ, (Bucks.) his first Spanish QSO, with EA1CR, plus a couple of

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3VYF	—	83	187	270
G8HVV	22	83	141	246
GJ4ICD	—	82	182	264
G3JXN	39	81	107	227
G3COJ	24	74	112	210
G8LEF	22	62	101	185
G3PBV	9	59	102	170
G4CMV	13	58	156	227
G8ATK	5	56	111	172
GJ8KNN	2	54	119	175
G2AXI	2	54	93	149
G8GXE	8	51	84	143
G8FMK	13	49	54	116
G8TFI	—	47	95	142
G4HFO	—	46	68	114
G4ERX	5	45	92	142
GD2HDZ	12	41	83	136
G8HHI	1	40	107	148
G8KAX	2	40	74	116
G8LHT	7	39	98	144
G4BWG	—	37	137	174
G8OPR	1	36	102	139
G8IFT	15	32	79	126
G4AEZ	5	29	61	95
G3JAX	1	27	74	102
G3FIJ	—	27	68	95
G3BW	3	26	140	169
I4EAT	—	25	238	263
GM4CXP	—	25	136	161
G8LGL	—	25	121	146
G3KPU	—	25	91	116
G8EWM	—	25	67	92
G8VLQ	—	25	63	88
G8MFI	—	23	113	136
G4AWU	—	22	110	132
G8JJR	—	20	98	118
G8KGF	—	20	95	115
G4ERG	—	16	174	190
EA3LL	—	15	185	200
9H1CD	—	13	178	191
GM4COK	—	12	154	166
9H1BT	—	11	163	174
G8KPL	—	7	87	94
G8JAG	—	7	79	86
G4GSA	—	6	51	57
G4FBK	—	5	100	105
G8RMA	—	5	66	71
G8RV	—	5	88	91
G8UV	—	1	89	90
G4GXT	—	1	56	57
G3POI	—	—	298	298
DK3UZ	—	—	252	252
G3IMV	—	—	236	236
G3CHN	—	—	196	196
G3SEK	—	—	182	182
G3FPK	—	—	168	168
G4IJE	—	—	161	161
G4IGO	—	—	160	160
G3KEQ	—	—	159	159
G4DEZ	—	—	134	134
G8IXG	—	—	115	115
G8LFJ	—	—	106	106
G4GHA	—	—	86	86
G4JZF	—	—	85	85
G8TGM	—	—	76	76
G8JGK	—	—	62	62
G8RWG	—	—	50	50
G8VFX	—	—	33	33

Starting Date January 1, 1975. No satellite or repeater QSOs. "Band of the Month" 70 cm.

new French squares, F1AJD (AF) and F6CBC/P (ZD). The F6 relayed GB3VHF back, crossband! G3PBV was copying FX4UHF at S4 on Nov. 1 but could not hear "Wandering Willie", in AC square at all. On the home front, Dave added Cheshire, G4GV1, and Cleveland, G8LZH, while from France, F6CBC, F8SM/P (ZF) and F6CCH (ZG) were worked. Others from the south were heard busily working Gs in

the ZO area. HB9F was a good signal but no amateur activity was heard from the southeast and Dave has noticed this before. He wonders if HB9F was getting into a secondary, high-level duct, all on its own?

G8GXE wrote before the lift that things had been quiet, despite the beacons coming in quite well. QRM from a radio neighbour has limited his *Cumulative* activities as he cannot use his preamp. On Oct. 18 and 26, 36 contacts were made but the weaker stations were buried in the QRM. G8IFT mentions some strong French signals in the October contest, plus PEOMAR/P (CL) and GM3SPJ/P (XO). Ian reckons *Cumulatives* activity to be down on last year, though.

Chris Easton, G8TFI, (Middx.) is still seeking his first GM and GI contacts on the band but has done quite well in the *Cumulatives* with some 40 QSOs completed and some new counties added. Nov. 3 was the best session so far. The Nov. 1 lift produced EA1CR (XD) whose 10 watts gave a fine signal into Britain. More DX was worked in the shapes of F8RZ (ZF); F1FHI (ZH) and F6FRR (ZF). Ken Willis, G8VR, wrote from his Connecticut QTH on Oct. 26 that he is building the K2RIW amplifier in his Naugatuck workshop. Incidentally, this amplifier is now being offered completely built or in partial kit form, by Geoff Brown, GJ4ICD. It incorporates a few improvements and inquiries should be directed to P.O. Box 100, Jersey, Channel Is.

Arthur Breese, GD2HDZ, had a call from G3BW on Nov. 1 to say that GJ4ICD was on the band looking for him. But neither could hear a whisper of the other. A little later Midlands and Manchester stations were giving S7 reports to PAs which were inaudible in the Island. GJ4ICD got a couple of new squares out of the Nov. 1 affair; G8PWX (ZP) and G3BW (YO), bringing the tally to 82.

Two Metres

Mike Allmark, (Leeds) lists some nice DX heard during the Oct. 3 lift including seven HBs in EH square and a couple of OKs in GK. On Oct. 19 he listened in to G4IDR's E-M-E QSO with K1WHS and was delighted to hear his very first signals bounced off the Moon. His Rx was a tuned line 3SK48 preamp. to an IC-202 with Datong FL1 filter. Jack Kay, G3CO, (Essex) was

pleased to work EA1CR again after a 15 years interval, along with a lot of other DX to the south and southeast on Nov. 1.

G3PBV only had a couple of QSOs in the Nov. 1 lift, with G3SQN (Cumbria) and G8LZM (Cleveland), the latter after a QSY from 70cm. Although G8LZM was running ten times the power on 2m, he was three S-points weaker. Dave reckons the only way he will ever be able to work into EI, GI, GM and Tyne and Wear would be via MS, so wonders if anyone would care to offer a sked? He heard several GMs in the *Perseids* and has a big amplifier on the stocks, to be followed by a keyer.

On the MS scene, G3VYF made it on SSB on Oct. 20 with YO7VS (LE). Dave Thorpe, G4FKI, (Essex) had a go in the Nov. 2 CW contest and added some new counties, but thought conditions the previous evening better. The super opening in early October did not seem to reach G4FUT in Sunderland, leading to, "a growing suspicion that the Continent does not exist!"

John Wilkinson, G4HGT, (Liverpool) dragged out the key to work some nice middle-France DX on Nov. 1/2 to AE, AF, AG, BF and BG squares, plus HB9AMO/P in DG. Graham Taylor, G4JZF, (Staffs.) thought he would have nothing to report, till the Nov. 1 event. The signals from F to GM seemed to be going over his head, but he did manage a contact with EA1CR, and a few new squares in France. Congratulations to Steve Cottis, (N. Yorks.) who has traded in G8TFR for G4KMH. His Yaesu FT-480R/4CX250B amplifier combination with 12-ele. ZL-Special at 30ft. has been doing him proud. The Aurora of Oct. 30 saw QSOs on the key with GM4JJJ and GM4BYF at 1655 and 1707 followed by a goodly selection of distant squares on the Nov. 1/2 lift, when SSB produced F1DV (BG); F6CCH (ZG), etc.

George Gullis, G8MFJ, (Wilts.) lists some choice stuff collected on Oct. 3 including Y24TN (GK); three Germans in Berlin (GM); OK1A1Y/P (HK); OZ1DPR and OZ1ELF in EP; Y25QL/A (GL) together with a couple of PAs and 22 other Germans. G8TF1 worked EA1CR on 2m, as well as on 70cm, on Nov. 1 and found conditions very good to the north of Britain, too,

with Gampian folk GM8FFX and G8SM6P worked. Chris managed to organise a QSO between GM8MBP and F6FRR (ZF) and was able to copy both sides when beaming north. On the following morning, GM8BDX (YP) was contacted and Alex was indeed an enormous signal in London.

Roger Gregory's, G8TIN, (Oxon.) activities are seriously curtailed by studies and overtime, so he has not added much recently apart from OE5XPL (HI) on Oct. 3. G8VR writes: "Just to show how clinical MS can be, on the evening of Oct. 9 I worked LA7KK on the 14 MHz VHF net and told him I had never managed to work LA on 2m. A MS sked — CW, of course — was immediately arranged for the same evening, and by midnight I had got his 'Rogers' and another country and new square were in the bag."

GJ41CD is now up to 182 squares on the band, the latest editions on Nov. 1 being LA1EKO (BQ) and G8PWX (ZP). At long last, your scribe has worked ZG square via F6CCH on Nov. 1.

Four Metres & Up

G3PBV only managed about 45 minutes in the Oct. 26 Fixed Contest, working 8 stations including three all-time new counties. G4FKI is still looking for skeds, with EI and GI stations; any offers? Dave thinks a *Cumulative* contest would be a good idea on 4m. John Baker, GW3MHW, (Dyfed) writes that the GM3WOJ transverter has now arrived *chez*-ZB2BL. Jimmy has tested it and reports it TVI-free on his own set. John was on during part of the 4m. contest and worked about ten stations, but both he, and G4CG, ask that people point their beams towards Dyfed and Devon. If anyone will donate a suitable Tx, he suggests it may be possible to have a 4m. beacon in Cornwall. (GB3CTC has been allocated 70.675 MHz, long since. *N.A.S.F.*)

G3COJ reports that 6m. has been coming to life with all continents except Australasia heard between Oct. 26 and Nov. 1. Brian had 10/6m. crossband QSOs with EL2FY and 5B4AZ and heard VP2VGR. GW3MHW reports that on Oct. 25, EL2FY worked 47 JAs,

and four more on the 31st. The EL has worked extensively into the U.S.A. ZD8TC is also QRV and is frequently on 28,888 kHz seeking cross-band contacts. OZ7JV has received 5B4CY on 50.499 MHz at S2 on Oct. 25.

6m. started to open up around mid-October. ZS6PW heard U.K. Ch. 2 TV and copied Euro-TV up to 62.25 MHz on the 16th, the same day that VE1AVX got his signals across to DK1PZ. G2AOK just about copied VE1AVX's beacon the following day. On the 22nd, GW3MHW had a fine cross-band QSO with Ed Tilton, W1HDQ, of erstwhile QSTVHF fame, and then contacts with other W1, 2 and 3 stations. John says that one of the first stations heard when the band opens is W2UTH, whose daughter, WD2AKA, is also QRV with 500 watts. He now has his 6m. beam higher and seems to be hearing more from the south as a result. Three ZS6 beacons, 5B4CY and ZB2VHF have all been received.

Mike Allmark has been copying a lot of Band 1 TV of late, via F2 layer. Oct. 25 was very good with stations from Russia, Dubai, Zimbabwe, and possibly Nigeria / Ghana and Australia? Zimbabwe TV is received some times around 1130-1200 and Mike queries if the propagation mode is *T.E.P.*?

Tabular Stuff

The Squares Table is a little shorter this month as the entries of those who have not reported since last December have been deleted. They can always re-enter at a later date and carry on from where they left off. Incidentally, if you move less than 50 kilometres from the original QTH, there is no need to start all over again for this table: this is in line with the rules of the QTHCC award.

Sign Off

That about wraps it up for another month. Have fun in the *Geminids*. All your reports and claims to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ by Dec. 3 for the January issue. The following deadline will be January 7, just after the *Quadrantids*. A very Happy Christmas to all readers and may there be a super lift during the holiday. *73 de G3FPK.*

WATERS & STANTON ELECTRONICS

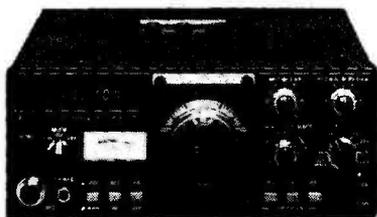
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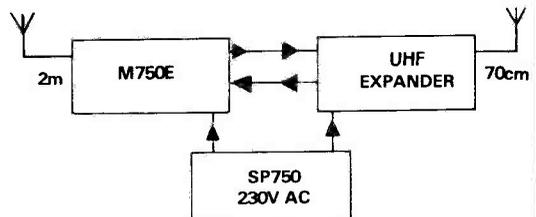
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TR2300	2M FM synstd portable	166.75	(4.50)	AT180	Matching 200W ant. tuner	95.45	(4.50)
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M2	Mobile mount	17.25	(1.00)	YK88S	Second SSB filter option	28.75	10.50
RA1	Rubber flex antenna	6.90	(0.50)	TS1305	AC power sply. for TS1805	85.10	(4.50)
PS1200	AC power unit and charger	29.50	(1.50)	TS130V	8 band 200W mobile trans.	401.05	(4.50)
TR2400	FT FM synstd handheld	183.35	(4.50)	TS130V	8 band 200W mobile trans.	404.34	(4.50)
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SC3	Soft carrying case	11.50	(0.50)	TS120V	80-10m 200W mobile trans.	347.30	(4.50)
LH1	Hard leather holster	18.50	(0.50)	MB100	Mobile mount	126.80	(4.50)
PB24	Spare battery pack	14.25	(1.50)	YK88C	500Hz CW filter	28.75	10.50
TR3200	70cm FM portable	164.45	(4.50)	YK88C	270Hz CW filter	28.62	(1.00)
PL1	Spars power/charge lead	1.30	(0.15)	YF0120	External VFO	89.70	(4.50)
AT1000	Gen. Coverage Receiver	286.20	(4.50)	SP120	External speaker unit	25.30	(1.25)
YAESU				AT130			
FT101Z	160-10m 6 band trans.	498.75	(n/c)	PS20	AC pow sply. for TS120/130V	44.85	(4.50)
FT101ZD	as above with digital	568.25	(n/c)	AC pow sply. for TS120/130V	85.10	(4.50)	
DIG101Z	Digital kit	86.25	(n/c)	MA5	5 band mobile aerial system	74.75	14.50
DCT101Z	12V DC adaptor	34.50	(1.00)	TL922	160-10m 2Kw linear	595.70	14.50
FV101Z	Remote VFO	126.50	(n/c)	MC50	Deluxe desk microphone	24.15	(1.50)
FT107M	160-10m 9 band transr	690.00	(n/c)	MC35S	Fist mic 50k impedance	13.80	(1.00)
FV107	Remote VFO for FT107	92.00	(n/c)	MC30S	Fist mic 50k impedance	13.80	(1.00)
FC107	160-10m atu	97.75	(1.50)	LF30A	HF lowpass filter	18.40	(1.00)
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FP107	Internal model	97.75	(2.50)	TS730E	2m/70cm dual band trans.	730.25	(4.50)
FTV107	Transverter main frame	110.40	(n/c)	SP700	2m multimode mobile	346.00	(4.50)
TV1071Z	Transverter	207.00	(n/c)	B09	Base synth for TR9000	32.20	(4.50)
144V107V901	144V 107V901	101.20	(n/c)	TR7800	2m FM synstd mobile 25W	288.00	(4.50)
50V107V901	Transverter	69.00	(n/c)	RM76	Microprocessor control	60.95	(1.50)
430V107V901	Transverter	178.25	(n/c)	Battery holder 5.00 (1.00)			
SP107P	External speaker	55.20	(2.50)	0.2-30mhz P.O.A.			
SP107	Internal speaker	27.60	(2.00)	Frequency counter 270.25 (n/c)			
DMST107	12 channel memory	100.05	(n/c)	YCS00E 346.00 (n/c)			
CW	CW filter for FT107	23.00	(0.50)	FRG7700 308.00 (n/c)			
AM	AM filter for FT107	23.00	(0.50)	MEM with frequency memory 380.00 (n/c)			
YM34	Desk mic for FT707/FT107	21.28	(1.50)	144-146 mhz handheld 2 watt 199.00 (n/c)			
YM35	Up/down mic for	12.86	(0.75)	230V AC charger 18.98 (1.50)			
YM36	500 ohm noise cancel mic	13.20	(0.75)	NC2 39.68 (1.50)			
YM37	500 ohm mic for FT707/FT107	8.63	(0.75)	NC9 7.48 (0.75)			
FT707S	150-10m 9 band trans 10w	465.75	(n/c)	Ni-cad battery pack 16.68 (0.75)			
FT707	160-10m 9 band trans. 100w	489.00	(n/c)	Heavy duty case 20.70 (0.75)			
FP707	230V AC PSU	109.25	(2.50)	12V PSU 16.68 (1.00)			
FC707	160-10m atu	74.75	(1.50)	FBA1 Ni-cad pack charging adaptor 2.59 (0.95)			
FV707DM	Digital vfo for FT707	178.62	(n/c)	FT22SR 144-146 mhz Base station 448.00 (n/c)			
M7	Metal rack	14.95	(1.50)	FT22RD With digital readout 499.00 (n/c)			
MMB2	Mobile mount	14.95	(1.50)	Memory option module 92.00 (n/c)			
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FL2100Z	160-10m 1200 watt linear	362.25	(n/c)	2m 10W SSB/CW/FM trans 359.00 (n/c)			
YP150	150w dummy load/meter	83.25	(1.75)	S72 Switching box 55.20 (n/c)			
YH55	8 ohm comm headphones	10.35	(1.25)	E72S 2m of connecting cable 23.00 (1.00)			
FF501	Low pass filter	19.95	(0.75)	E72L 2m of connecting cable 27.20 (1.00)			
OTR240	24 hour quartz clock	24.96	(1.50)	720RV 10W 2m module 166.75 (n/c)			
FP12	230V AC 12 amp DC	78.20	(2.50)	720RH 10W 70cm module 201.25 (n/c)			
FP4	230V AC 4 amp DC	41.40	(2.50)	MIMB3 Mobile mounting bracket 5.00 (1.50)			
FSP1	9.35 (1.00)	9.35	(1.00)	FT101Z (WARC) 8 band HF trans. t.b.a. (n/c)			
FRG7	0.5-30 mhz comm. receiver	189.00	(n/c)	FT101ZD (WARC) 8 band HF trans. t.b.a. (n/c)			
TRIO							
TS830S	160-10m transceiver	639.52	(4.50)	FDK VHF/UHF EQUIPMENT			
VFO2300	Digital VFO	194.45	(4.50)	M700X 2m FM 25w 12%/25kHz trans 199.00 (n/c)			
AT230	All band ATU	156.62	(1.00)	M750E 2m FM/SSB/CW 144-146 trans 299.00 (n/c)			
SP230	External speaker	33.14	(1.50)	Expander 169.00 (n/c)			
DR2	Dc pack for TS830S	39.90	(1.50)	PS750 230V A.C. 6 amp psu 69.00 (2.50)			
DSC230	Digital frequency controller	163.13	(1.50)	Palm IV 2m FM 6 channel portable 85.00 (n/c)			
YK88C	500Hz CW filter	17.25	(1.00)	Palm IV 1750Hz tone burst 10.00 (n/c)			
YK88CN	270Hz CW filter	437.00	(4.50)	PalmSizer 2m FM 40 channel handheld 149.00 (n/c)			
YG3356E	160-10m transceiver	103.50	(1.50)	Multi 3000 2m FM/SSB/CW 10w base stn 399.00 (n/c)			
DK520	Conversion kit	10.36	(0.75)	TM56B 2m FM monitor 79.00 (n/c)			
AT200	160-10m antenna tuner	82.80	(1.50)	FDN40SP Speaker/mic for PalmSizer 11.00 (0.50)			
SM220	Station monitor scope	197.80	(4.50)	CC2 Case for Palm III/IV 5.75 (0.50)			
B58	Panoramic display	48.30	(0.50)	BC2 230V AC battery charger 4.50 (0.50)			
B55	Scan board	48.30	(0.50)	SC2 Case for Palmizer 9.75 (0.50)			
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YG455C	500Hz CW filter	58.65	(0.50)	B72 Ni-cad battery pack 12.00 (0.50)			
YG455CN	250Hz CW filter	60.95	(0.50)	Xtals For Palm II and Palm IV. 3.00 (1.50)			
YG88A	6kHz AM filter	34.50	(0.50)	Xtals For TM56B 2.50 (0.15)			
TS180S	160-10m solid state trans.	679.96	(4.50)				
VFO180	External VFO	96.00	(1.50)				
SP180	External speaker unit	36.80	(1.50)				

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MMT144/28	2m linear transverter	99.00	(1.75)
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MMT432/144	70cm linear transverter	173.65	(1.75)
MMT70/28	4m linear transverter	115.00	(1.75)
MMT70/144	4m linear transverter	115.00	(1.75)
MMT1296/144/23cm	linear transverter	194.00	(2.25)
MML144/25	2m 25 watt linear amplifier	48.30	(1.75)
MML144/40	2m 40 watt linear amplifier	69.00	(1.75)
MML144/100	2m 100 watt linear amplifier	142.60	(2.75)
MML144/100P	2m 100 watt linear amplifier	142.60	(2.75)
MML432/100	70cm 100 watt linear amplifier	228.65	(2.75)
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MMA28/144	10m converter	24.90	(0.65)
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MMA432/144.5	70cm converter	29.90	(0.65)
MMA435/51	70cm ATV converter	29.90	(0.65)
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MMA1296/144/23cm	linear transverter. 2m output	59.00	(1.75)
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MMA144V	2m RF switched preamplifier	29.90	(0.65)
MMA1296	23cm preamplifier	29.90	(0.65)
MMF144	2m filter	6.90	(0.65)
MMF432	70cm filter	6.90	(0.65)
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V83	HF-VERTICAL Tribander	42.50	(3.00)

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PMH2/4M	2 way phasing harness	12.20	(1.00)

		£	€
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5Y/2M	Element	11.25	(2.00)
8Y/2M	8 element	14.50	(2.50)
10Y/2M	10 element	31.00	(3.50)
PBM1/2M	10 element Parabeam	36.80	(3.50)
PBM14/2M	14 element Parabeam	44.85	(4.50)
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8X/2M	Crossed 8 element	28.40	(3.50)
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PBM18/70cm	18 element Parabeam	25.30	(2.50)
MBA48/70cm	48 element Multibeam	28.75	(3.00)
MBA96/70cm	96 element Multibeam	35.30	(4.50)
8X/70cm	Crossed 8 element	34.15	(3.50)
12X/70cm	Crossed 12 element	42.32	(4.50)
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JBL59/15 15" jointing sleeve	6.60	(1.50)
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JBL63 Universal clamp	1.40	(0.75)
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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)
LF160m 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	(1.00)
Mosley "Mini-Beam" 20/15/10m 2 ele. 600w.	99.00	(2.00)
Mosley TA 32 20/15/10m 2 ele. 2kw.	129.00	(2.00)
Mosley TA 32 20/15/10m 2 ele. 600w.	433.40	(2.50)
Mosley TA 33 20/15/10m 3 ele. 600w.	133.40	(2.50)
Mosley Mustang 20/15/10m 3 ele. 24w.	466.75	(4.00)
Hv-Gain 12A2V 20/15/10m vertical	43.00	(2.00)
Hv-Gain 14A4V 40/10m vertical	80.00	(2.00)
Hv-Gain 18A7V 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 180/10m 2kw linear	695.00	(n/c)
Clipterton-L 6band 180/10m 2kw linear	469.00	(n/c)
DTR-1200L 5band 80/10m 1,2kw linear	t.b.a.	(n/c)
GLA-1000B 5band 80/10m 1kw linear	235.00	(n/c)
DTR-3KA 1.8-30MHz ATU 2kw	t.b.a.	(n/c)
MT-300DA 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)
100R 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	66.70	(1.50)
2 metre power amplifier RF sensing 16w in - 100w out 16w/10w	126.50	(1.50)
2 metre converters 2B/30, 4/6, 2/4	23.00	(0.36)
2 metre Auto pre-amplifier	21.73	(0.36)
70cm Auto pre-amplifier	24.73	(0.36)
2 metre pre-amplifier	14.95	(0.36)
70cm pre-amplifier	17.73	(0.36)
2.40MHz pre-amplifier	18.66	(0.36)
2.40MHz pre-amplifier	11.73	(0.36)
PA3 2 metre pre-amplifier	8.00	(0.36)
PA70 70cms. pre-amplifier	10.00	(0.36)
Z 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)
O08 B channel FM monitor	69.00	(n/c)
M161 16 channel FM monitor	59.00	(n/c)
MF963 Marine/Broadcast scanner	85.00	(n/c)
BEARCAT 220FB 66-512MHz	258.00	(n/c)
SX200 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 1/2 wave	3.50	(1.25)
ASP2009 2m 1/2	9.25	(2.00)
ASP3009 2m 1/2	9.75	(2.00)
ASP462 70cm co-linear	8.25	(1.25)
Magnetic base adaptor	8.50	(0.75)
ASP677 2m 1/2 wave	14.95	(2.00)
ASP667 70cm co-linear	17.95	(1.25)

	£	€
ASPM125 27MHz 1/2 wave	18.50	(2.00)
Magnetic base adaptor for above	8.50	(0.75)
ASP boot mount adaptor	3.75	(0.50)
2NE 2m 1/2 mobile whip	13.00	(2.00)
RG4M Base for above aerial	3.50	(0.75)
G5S Gutter/boot mount	3.15	(0.50)
MBS Magnetic mount	7.95	(1.00)
10SE 28MHz whip 1.72m long	11.50	(1.25)
15SE 21MHz whip 1.72 long	11.50	(1.25)
20SE 14MHz whip 1.72 long	13.80	(1.25)

	£	€
WELZ 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 RDS all band dipole	40.00	(1.00)

	£	€
AIR BAND PORTABLE MONITORS		
Sharp FX213 tuneable	13.50	(0.75)
INGERSOLL M/W/M/F Airband monitor	12.95	(0.75)
RS17 Professional Air Monitor	49.50	(0.75)

	£	€
NAIGAI		
500 watt pep 2m amplifier	429.00	(n/c)

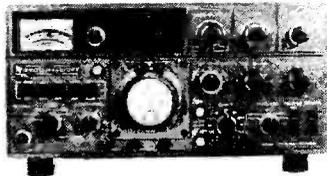
	£	€
MISC. STATION ITEMS		
SEIF 13.8v 4 amp AC power supply	22.95	(1.50)
PS125 5 amp AC power supply	28.00	(2.00)
EK121 Katsumi Electronic Keyer	29.00	(0.75)
EK M12 Matching side tone	10.95	(0.50)
CW2A Morse code oscillator	6.95	(0.50)
Telegraph CW key	10.50	(0.75)
YW3 Twin SWR/Power meter 3.5-150MHz	11.50	(0.50)
MF210 Self powered 2M FM monitor	12.95	(0.50)
FX1 Station wavemeter	28.00	(1.00)
DM801 700kHz-250MHz dip meter	51.75	(1.00)
Station log book	1.95	(0.50)
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6146B/S2001A P.A. valves	8.70	(0.50)
6JS6C P.A. valves. Matched pairs	9.95	(0.50)
PL259 plugs	0.63	(n/c)
SO239 chassis sockets	0.86	(0.10)
PL259 reducers	0.86	(0.10)
SO239 chassis sockets	0.86	(0.10)
N. Plugs cable entry	2.00	(n/c)
N. Plugs UR43 cable entry	2.00	(n/c)
4 pin mic plugs	1.06	(0.10)
3 pin mic plugs	0.86	(0.10)
6 pin mic plugs (FDK 750)	0.86	(0.10)
3 pin chassis socket	0.86	(0.10)
4 pin chassis socket	0.86	(0.10)
BNC plugs (bayonet)	0.90	(0.05)
Pen Cell Nil-cads (HP7 size)	1.20	(0.05)
Clear lighter plugs	0.56	(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	0.30	(0.05)
BL40X batun 50 ohm	0.17	(n/c)
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)
APM1 Audio Peak/Notch filter	33.00	(1.00)
HP34 TVI high pass filter	3.50	(0.50)
Draka TV3300 LP low pass filter	18.40	(1.20)
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Shure 201 high impedance hand mic	11.75	(1.00)
Trio HCM10 digital world clock	56.20	(1.50)

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TR820 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	£10.24
8Y/2M 8 Element yagi	£13.23
10Y/2M 10 Element	£28.41
PBM/14/2m. 14 element Parabeam	£40.38
5XY/2m. 5 element crossed yagi	£20.70
8XY/2m. 8 element crossed yagi	£25.88
10XY/2m. 10 element crossed yagi	£34.27
Q4/2m. 4 element Quad	£21.51
Q6/2m. 6 element Quad	£28.52
D5/2m. 5 over 5 slot fed yagi	£18.29
D8/2m. 8 over 8 slot fed yagi	£24.84
UGP/2m. ground plane	£9.37
MBM48/70cms. Multibeam	£28.18
MBM88/70cms. Multibeam	£37.49
TAS 1/2m. Whip mobile	£15.30
C5/m. Colinear	£40.02
C8/70cm. Colinear	£45.43
D15/1296 73cm. Antenna	£30.94
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



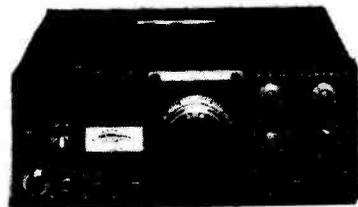
TR7800

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 simplex \pm 600 KHz or non-standard operation - "Priority alert" beeps 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**.

HF SSB TRANSCEIVER 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.



TRIO TS120 TRANSCEIVER ALL SOLID STATE HF BAND TRANSCEIVER

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.

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5 p.m. Saturday

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- * IF Shift
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- * 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 550 kHz-30 MHz £175.00

Mobile Antenna Range

5.8th Whip PL259 fitting	£8.50
Magnetic Mount PL259 fitting	£8.00
7.8th Whip	£13.00
Basement 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
DL50 50 watt 50 ohm Dummy Load	£79.00
DL 1000 1kW Dummy Load 50 ohm	£37.95
Morse Keys Light weight	£3.25
Oscerblock SWR200B Twin Meter	£40.19
HyMound HK 708	£10.50
Katsumi EK 150 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

C4X 3 band Vertical	£48.00
HQ1 Mini Beam	£96.00

Mini Products

12AVQ 3 band Vertical	£43.12
14AVT/WB 4 band Vertical	£60.37
18AVT/WB 5 band 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:
66 - 88 MHz
118 - 136 MHz
144 - 148 MHz
148 - 174 MHz
420 - 450 MHz
450 - 470 MHz
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
Basement 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
Basement standard	£4.48
Ball type Basement	£6.32
Coils for Flexiwhip	£6.55
Base thread adaptor USA/G Whip	£0.75
Extendarod 40"	£11.50

DRAKE

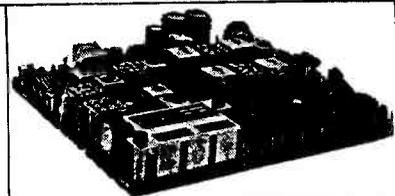
TR7 Digital Transceiver	£1035.00
PS7 Power supply	£207.00
RV7 Remote VFO	£138.00
MS7 Speaker	£29.90
R7 Digital Receiver	£989.00
Filters for TR7	£39.10
FA7 Fan for TR7	£20.70
MN7 AT/UR Meter 250 Watts	£124.20
MN2700 ATU 2 KW	£207.00
DL300 Dummy Load 300watts	£20.70
DL1000 Dummy Load 1 KW	£37.95
TV3300 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
MMT 70/144 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
MML 432/20 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	£173.65
MMT 70/144 4m Transverter	£115.00
MML 144/25 2m 25 watt Linear	£48.30
MML 144/100 2m 100 watt Linear	£142.60
MML 144/100 2m 100 watt Linear	£24.90
MML 144/28 4m Converter	£26.90
MML 144 28L0 2m Converter	£29.90
MML 432 28S 70cm Converter	£32.20
MML 1296/144 23cm Converter	£69.00
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)

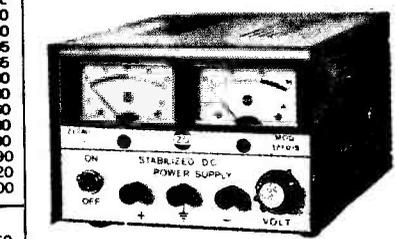
SR9 Tunable 144-146 MHz Receiver	£46.00
AMR217B Scanner Receiver AC or DC operation	£113.50
R512 Aircraft Band Scanning Receiver	£135.00
Regency Digital Flight Scan Synthesised Aircraft Band Receiver	£215.00
Phillips FM321 70cms FM Transceiver	£264.00
Yaesu FRG7 Receiver	£199.00
FDK TM563 Scanning 2m Receiver	£109.00
'Sky ACE' Hand held Aircraft Band Receiver	£49.50
Bearcat 220 Scanning Receiver	£258.75
AR22 2m Hand Held 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
Swan 100MX Transceiver + AC PSU	£460.00
Trio R820 Receiver	£500.00
KW202 Receiver	£165.00
Racal RA 1218 Receiver	£1,500.00
Racal R4C + CW Filter	£400.00
FR50B RX-FL50B TX-VFO	£190.00
Eddystone 830/7 Receiver	£395.00

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 1210/1 10amp 13v	£88.00
Model 1220/1 13.5V 20 amp	£90.00
Model 1220 2 13.5V 12 amp	£80.00



Mod. 1210 S

STEPHENS-JAMES LTD.
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Telephone (0942) 676790 LEICESTER EXHIBITION - November 6-7-8th.



RADIO SHACK LTD for DRAKE

R. L. DRAKE PRODUCTS

	inc. val	curr.
TR-7/DR-7	Transceiver/Gen. cov. Receiver, Digital	1035.00 5.00
PS-7	Power Supply 120/240V for TR-7	207.00 5.00
PS-75	Standby Duty P.S.U. for TR-7 120/240V	138.00 5.00
RW-7	Remote V.F.O. for TR-7	132.25 2.00
MS-7	Matching Speaker for TR-7 and R-7	29.90 2.00
R-7/DR-7	Digital Receiver 0.30 MHz	989.00 5.00
SL-300	CW Filter for TR-7 and R-7 (300Hz)	39.10 0.50
SL-500	CW Filter for TR-7 and R-7 (500Hz)	39.10 0.50
SL-1800	SSB/RTTY Filter for TR-7/R-7 (1800 Hz)	39.10 0.50
SL-4000	AM Filter for R-7 Receiver (4000Hz)	39.10 0.50
SL-6000	AM Filter for TR-7 and R-7 (6000Hz)	39.10 0.50
AUX-7	Range Prog. board and 1 Receiver module	32.20 1.00
RRM-7	Range receiver modules for Aux-7 (500KHz)	5.75 0.50
RTM-7	Range tcvc. modules for Aux-7 (500KHz)	5.75 0.50
NB-7	Noise Blanker for TR-7	66.24 1.00
NB-7A	Noise Blanker for R-7 Receiver	66.24 1.00
FA-7	Fan for TR-7 and PS-7	34.50 2.00
MMK-7	Mobile mounting kit for TR-7	124.20 5.00
MM-7	ATU/RF Wattmeter, 160.10 m (250w)	207.00 5.00
MM-2700	RF Wattmeter/VSWR Bridge (HF)	59.80 2.00
WH-7	Service Manual for TR-7	18.50 2.00
385-0004	Service Manual for R-7	18.50 2.00
385-005	TR-7 Service Kit	37.95 1.00
7037	Linear Amp. 2kw, 10m-160m. Without Tubes.	759.00 10.00
L-7E	Tubes for L-7E (2 x 3 500Z)	138.00 5.00
TR-4CW(RIT)	Transceiver AM/SSB/CW with R.I.T.	496.80 5.00
AC-4	120/240V Power Supply for TR-4CW	109.25 5.00
34-PNB	Plug in Noise Blanker for TR-4CW	73.60 1.00
DC-4	DC Power Supply for TR-4CW	138.00 5.00
RV-4C	Remote V.F.D. for TR-4CW	109.25 1.00
FF-1	Crystal Control for TR-4CW	39.10 1.00
MS-4	Speaker for TR-4CW; R-4C; SPR-4	29.50 2.00
TV-42LP	Low Pass Filter 100w	10.35 1.00
TV-3300LP	Low Pass Filter 2kw	18.40 1.50
7073	Hand Microphone for TR-7	18.40 1.00
7077	Desk Microphone for TR-7	29.90 2.00
DL-300	Dummy Load 300w	20.70 1.00
DL-1000	Dummy Load, 1000w	37.95 2.00
RCS-4	Remote control ant. switch, 5 way 14 line	82.80 5.00
CS-7	Remote control ant. switch, 5 way (7 line)	115.00 5.00
B-1000	Balun for MN-7 and MN-2700, 4:1	20.70 1.00
1525-EM	Encoder Microphone	36.80 1.00
AA-10	2m Amplifier, 1w in, 10w output	46.00 1.00
WV-4	RF Wattmeter 20/200 MHz	69.00 2.00
SPR-4	Programmable gen. purpose Receiver	460.00 5.00
DC-PC	DC Power Cord for SPR-4	4.60 0.50
FL Filters	For R-4C, .25/5/1.5/4.0/6.0kHz each	39.10 0.50
Manuals	Spare Operating Manuals	6.00 1.00
Crystals	Accessory Crystals for R-4C and SPR-4	6.44 0.50
Interface	R-7/TR-7 connecting cable	20.70 1.00
AK-75	Multiband Antenna	23.00 2.00
AA-75	Antenna Insulator Kit	2.30 0.50
RP-700	Receiver Projector	69.00 1.00
SP-75	Speech Processor	79.35 2.00

BENCHER PRODUCTS

BY-1	Keyer Paddle (Black base)	28.75 2.00
BY-2	Keyer Paddle (Chrome base)	37.75 2.00
BY-3	Keyer Paddle (Gold plated)	92.00 2.00
ZA-1	Balun 3.5-30 MHz for dipoles	12.65 1.00
ZA-2	Balun 14-30 MHz for beam antennas	13.80 1.00

COLLINS EQUIPMENT

KWM-380	Amateur HF Transceiver	1897.50 10.00
KWM-380 OPTIONS		
AC-3801	Noise Blanker	124.20 5.00
AC-3802	Speech Processor	
AC-3803	Control Interface	86.25 2.00
AC-3810	CW Filter, 500 HZ	62.10 1.00
AC-3811	CW Filter, 250 HZ	62.10 1.00
AC-3812	RTTY Filter, 1.7 kHz	62.10 1.00
AC-3813	AM Filter, 6.0 kHz	62.10 1.00
KWM-380 ACCESSORIES		
AC-2801	Rack Mount	86.25 2.00
AC-2806	Blower Kit	124.20 2.00
AC-2821	DC Standby Power Cable	34.50 2.00
MM-280	Handheld Microphone	23.00 2.00
MM-281	Handheld Noise cancelling Mic.	28.75 2.00
SM-280	Desk Top Microphone	48.30 2.00
SM-281	Desk Top Noise cancelling Mic.	54.05 2.00
AC-2827	CW Key	18.40 2.00
AC-2828	Microphone Foot Switch	23.00 2.00
AC-2829	Headphones	41.40 2.00
AC-2830	Lightweight Headphones	23.00 2.00
KWM-380 BOOKS		
NTN	Owners Manual	4.00 1.00
NTN	Service Manual	20.00 2.00

HAL COMMUNICATIONS

	inc. val	curr.
DS-2000	KSR	322.00 5.00
	Optional Morse for DS-2000	98.90 5.00
	KSR version 3 X	920.90 5.00
DS-3000	KSR version 2 X	675.00 5.00
DS-3100	ASR super deluxe	1536.40 5.00
ST-6000	Demod. Keyer Scope	414.00 5.00
ST-5000	Demod. Keyer	207.00 5.00
RVD-1005	V.D.U. Baudot	230.00 5.00
DKB-2010	Demod. keyboard with memory	253.00 5.00

TEN-TEC EQUIPMENT

TRANSCEIVERS		
Argonaut, 5w SSB/CW, 3.5-30MHz	276.00	5.00
Triton IV 200w, SSB/CW, 3.5-30MHz	437.00	5.00
Triton IV as above with Digital readout	545.25	5.00
Omni-A Analog, Series B, SSB/CW, 1.8-30MHz	598.00	5.00
Omni-D, Dig. Series B, SSB/CW, 1.8-30MHz	701.50	5.00
Century 21, CW only, 3.5-29MHz	230.00	5.00
Century 21, Dig, 70w, CW, 3.5-29MHz	299.00	5.00
Delta Digital, 200w, SSB/CW, 9 Bands	552.00	5.00
POWER SUPPLIES		
115/230 vac, 13vdc, 1A, for Argonaut	27.60	2.00
252M0/E	89.70	5.00
262M/E	101.20	5.00
280	92.00	5.00

ACCESSORIES

Crystal Calibrator	18.86	2.00
CW Filter for Argonaut	29.90	2.00
29.0/29.5 Crystal for Models 540/544	3.45	0.50
29.5/5.30 MHz Crystal for models 540/544	3.45	0.50
Microphone, ceramic, with plug	18.40	2.00
500 Hz 8 pole Ladder Filter	36.80	1.00
1.8 kHz 8 pole Ladder Filter	36.80	1.00
160m Converter for Models 540/544	69.00	2.00
Crystal Oscillator for Models 540/544	23.00	1.00
Remote V.F.O. for Models 540/544	112.70	5.00
Remote V.F.O. for Models 545/546	87.40	5.00
Dig. Display/Counter for Models 540/544	124.20	5.00
CW Filter for Models 540/544	17.25	2.00
Antenna Tuner	43.70	2.00
Noise Blanker for Models 545/546	32.30	1.00
Noise Blanker for Models 540/544	18.40	1.00
Crystal Calibrator for Model 570E	18.86	1.00
Ant. Tuner/VSWR Bridge for Century 21	57.50	2.00
DC Circuit Breaker for 540/544/545/546	5.75	1.00
DC Circuit Breaker for Century 21	5.75	1.00

KEYERS

645	Ultamatic, dual paddle for 545/546	55.20	2.00
670	Single-paddle keyer for 570/574	18.86	2.00
KR-5A	Single-paddle keyer, 6-14 vdc	25.30	2.00
KR-50	Ultamatic, dual paddle, 117 vac 6-14 vdc	69.00	2.00

AVANTI ANTENNAS

AH151-3G	2m on-glass mount antenna	19.78	5.00
AH150-3M	2m magnetic mount antenna (3dB)	24.95	5.00
AH450-5G	1/2cm on-glass mount antenna	21.85	5.00
AH450-3G	70cm on-glass mount antenna (3dB)	19.78	5.00
AH28-5B	10m dual polarity base antenna	79.35	5.00
AV-200	17.25m on-glass mount antenna	17.25	2.00
AV-241	27 MHz magnetic mount antenna	25.30	5.00

VIBROPLEX

Presentation	Super deluxe	89.70	2.00
Original	Deluxe	59.80	2.00
Original	Standard	46.00	2.00
Lightning	Deluxe	59.80	2.00
Lightning	Standard	43.70	2.00
Champion	Deluxe	59.80	2.00
Vibro-Keyer	Deluxe	46.00	2.00
Vibro-Keyer	Standard	46.00	2.00

BEARCAT SCANNING RECEIVERS

BC-210		184.00	5.00
BC-220		258.75	5.00
BC-250		258.75	5.00

TELEX COMMUNICATIONS INC.

HFC-91	Underchin headphones	6.21	1.00
HMC-2	Underchin headphones	9.20	1.00
HTC-2	Twin Receiver headphones	14.72	1.00

BOOM MICROPHONE HEADSETS

CM-610	3.2-20 ohms, high impedance mic.	29.90	2.00
CM-1210	3.2-20 ohms, high impedance mic.	39.10	2.00
CM-1320	3.2-20 ohms, high impedance mic.	48.30	2.00
CM-1320S	3.2-20 ohms, Single headphone	36.80	2.00

DUAL MUFF HEADPHONES

C 610	Dual Receiver magnetic	6.90	2.00
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SPECIFICATIONS

FREQUENCY RANGE: Tunable in 10 Hz steps.

RECEIVE MODE: 1.6-30.0 MHz, 0.5 to 1.6 MHz at reduced sensitivity.

TRANSMIT MODE: SSB or CW 160-thru 10 metre amateur bands.

*HF-380 1.6 to 30 MHz.

MODE: SSB (voice and RTTY, either sideband selectable), CW, or AM (receive only).

POWER REQUIREMENTS: 105, 115, 125, 210, 220, 230, 240, 250, ±5% V ac (Internal strapping option) 50-60 Hz 12 V to 15V dc (Connector strapping). 120 W input in receive max; 600 W input in transmit max.

FREQUENCY ACCURACY: Accurate to within ±5 Hz when the 39.6 MHz oscillator and the 455.0MHz oscillator are set within ±3 Hz. Warm-up time is 10 min.

FREQUENCY STABILITY: Stability is within ±150 Hz over the temperature range of 0-50°C.

*HF-380 is within ±20 Hz over the temperature range.

TRANSMIT PERFORMANCE:

OUTPUT IMPEDANCE: 50 ohms nominal.

POWER OUTPUT: 100 W PEP nominal from 1.6-30 MHz. In CW or RTTY, there is automatic turndown to 50 W after

10 seconds, 50% duty cycle, key down 15 minutes max.

With the optional blower kit, power is 100 W average, 50% duty cycle, key down 1 hour max at 25°C. ½ hour max. at 50°C for all modes.

UNWANTED SIGNAL SUPPRESSION: (minimum values below output)

Carrier suppression	50dB
Undesired sideband, 1kHz ref	55dB
Harmonics (all)	40dB
Mixer products	55dB

THIRD ORDER DISTORTION: 25 dB below each tone of a two tone test.

AUDIO INPUTS: Microphone—low impedance type, internal strap for HI-Z. Line—600 ohm input unbalanced impedance; level of 40 mV sufficient to produce full output.

AUDIO FREQUENCY RESPONSE: Not more than 5 dB variation from 300 to 2400 Hz.

RECEIVER RESPONSE:

ANTENNA IMPEDANCE: 50 ohms.

SENSITIVITY: Not more than 0.5 uV for

$$10 \text{ dB } \frac{S+N}{N} \text{ at antenna input for SSB}$$

and CW, 2.0 to 30 MHz. Broadcast band attenuation is a nominal 30 dB.

SELECTIVITY: In operating modes of USB, LSB, CW, and AM.

BW at -3dB (min)		BW at -60dB (max)	
2.1 kHz	* 140Hz	4.4 kHz	600Hz
* 1.7 kHz	* 6.0 kHz	3.4 kHz	25 kHz
* 360 Hz	8 kHz	1.25 kHz	50 kHz

* optional

IF AND IMAGE REJECTION: Greater than 60 dB.

AUDIO OUTPUT: Not less than 3.5 W into 4 ohm load at 1 kHz, at not more than 10% total harmonic distortion. Line audio output, -10 dBm nominal into 600 ohms.

AUDIO FREQUENCY RESPONSE: Not more than 5 dB variation from 300 to 2400 Hz.

AGC: Audio output variance not more than 8 dB as the RF input varies from 2.0 uV to 100 mV open circuit.

INTERMODULATION DISTORTION: Two signals spaced 20 kHz at a level of -10 dBm each will produce IMD down 50 dB min.

SIZE: 15.50" (39.4 cm) W, 6.5" (16.5 cm) H (w/o feet), 7.5" (19.1 cm) H (w/feet), 18.00" (45.7 cm) D.

WEIGHT: 50 lbs (22.7 kg). Specifications subject to change without notice.

20p stamps for details please

ACCESS

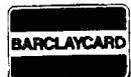
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MK 702	Up/Down keyer on marble base	£22.43
MK 702	Manipulator	£22.43
MK 704	Squeeze paddle	£14.38
MK 705	Squeeze paddle on marble base	£22.43
EKM 1A	Morse code practice oscillator	£8.63
MK 1024	Automatic memory keyer	£135.13
EK 150	Semi/Automatic keyer	£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
Multi-mobile 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

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

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Product	List Price	Deposit	12 Payments
Yaesu FT 902DM	£799	£312	£40.54
Yaesu FRG 7700S	£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 1012D	£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	£25.00
Yaesu FT 480R	£369	£175	£15.30
Trio R 1000	£298	£115	£15.20
Standard C8800	£252	£99	£12.71
Standard C7800	£275	£109	£13.81

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MICROWAVE MODULES		
MMT 432/28S		£136.85
MMT 432/144R		£173.65
MMT 28/144		£90.85
MMT 144/28		£90.85
MMC 28/136		£24.90
MMC 28/156		£24.90
MMC 28/144		£24.90
MMC 144/any IF		£24.90
MMC 144 28LO		£24.15
MMC 70/any IF		£24.90
MMC 432/28S		£29.90
MMC 432/144S		£29.90
MMC 1296/any IF		£32.20
MMD 050/500		£69.00
MMA 28 preamp		£14.95
MMA 144 preamp		£14.95
MMV 1296 23cm tripler		£34.50
MML 144/100 linamp		£142.60
MML 432/100 linamp		£228.85
MML 144/25 linamp		£48.30
MML 432/50 linamp		£113.85
MM 2000		£169.00

UNADILLA/REYCO		
Antenna Traps - Precision moulded coil forms stainless - hardware - Aluminium tube irritid finish - Coated aluminium wire. Fully waterproofed.		
Available 7/14/21 MHz		£9.99
WZAU BALUN		
3.5/30 MHz 2.5 Kw with Lightning Arrestor - Suitable Vees, Yagis, Doubles, Quads etc.		
		£9.99
STANDARD		
C8800 2m Tcvt		£252.00
C7800 70cms Tcvt		£275.00
DENTRON		
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

FDK Multi 700EX		£199.00
FDK Multi 750E		£299.00
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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.		
Special - Rubber Duckie 1/4W BNC or 259 £6.50		

SCANNING RECEIVERS		
BEARCAT 220FB		£240.00
BEARCAT 210		£220.00
PUMA 20 900 channels		
Programmable		£99.00
STANDARD c800 10ch + 1 low power transmit CH		£79.00
AR 22 Pokerc Receiver		
144-150 MHz		£91.50

NEW AR 245		
Hand Held PLL Frequency Synthesised transceiver - covers 141 MHz-149.99MHz. Output 1.5 watts. Up Down Repeater Shift. Tone Burst. Complete with Nicads, Charger and Antenna.		
£175 incl. VAT & Carr.		

ROTATORS		
Stolle 2010		£47.50
KR 400		£105.00
AR 40		£59.00
KR 9502A		£50.00
Rotor Bearing		£12.00

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

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Model No. Drake M.	Description	Retail Price				
1242	DSR-2	£2686.00	1330	UMK3	Mobile Mounting Kit UV3-UHF/VHF Tcvr.	£53.39
1240	R7/DR7		1340	UV3	Synthesized 144 FM Tcvr. (performance VHF at its best)	£430.00
1241	R7	£864.00	1343	UV3	Synthesized 144-220FM Tcvr.	£572.00
			1344	UV3	Synthesized 144/432 FM Tcvr.	£572.00
			1346	UV3	Synthesized 144-220-432 FM Tcvr.	£716.00
			1339	1339	Remote Head for UV3 System	£70.00
Professional Marine Ships Transceivers						
TR77	Marine Transceiver	£2864.00	Power Supplies			
R77	Marine Receiver	£1886.00	1504	PS3	120/240V AC PSU for UV3	£85.00
MN77	Matching Network	£216.80	1502	PS7	120/240V AC PSU for TR7	£234.00
MR3	Ships Main Receiver	£1907.00	Major Accessories			
Professional & Dedicated Amateur Communications Equipment						
1336	TR7(DR)	£1170.00	1528	L7E	Linear Export 10-80M incl. WARC	£858.00
1338	RV7	£149.50	1538	MN7	Antenna Network Match 250W	£134.00
1536	Aux7	£36.50	1539	MN2700	Antenna Network Match 2KW	£224.00
1537	NB7	£74.91	1510	B-1000	4:1 Balun, use with MN7/2700	£19.00
1529	FA7	£23.41	1531	MS7	Matching Speaker	£33.93
7021	SL300	£44.25	1514	WH7	HF Watt Meter/SWR 1.8-30MHz	£70.00
7022	SL500	£44.25	1525	1525EM	Encoding Mic. for UV3	£39.00
7023	SL1800	£44.25	7073	7073	Service/Extender Board Kit for TR7	£44.00
7024	SL6000	£44.25	7077	7077	Desk ASTATIC Mic. for TR7	£34.50
7026	SL4000	£6.25	LOADS FILTERS MANUALS			
1335	MMK7	£38.96	1550	DL300	Dummy Load 300Watt	£23.50
			1551	DL1000	Dummy Load 1000Watt	£42.92
			1610	TV75-HP	HPF TV Filter — mount on TV Set	£11.00
			1605	TV-42-LP	100W cont. rate LPF: it works:	£11.70
			1608	TV-3000-LP	1000W cont. rate LPF	£20.81
			385-0002	UV3	Service Manual Comprehensive	£19.00
			385-0004	TR7	Service Manual Comprehensive	£22.90

NOTE above prices include 25% VAT. Overseas Buyers see below.
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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/CQM 662 all at £2.32. For the U45CL Base Stn we have the TX crystals for the above channels. The RX crystals for the U45CL 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 £6.05 for 63 to 105MHz to the same closer spec as our stock items. Delivery approx. 5/6 weeks.

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 159.99kHz	£9.25
40 to 79.999kHz	£12.40	160 to 499.99kHz	£6.19
		500 to 799.99kHz	£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.)	£10.35	*25 to 30MHz	£8.28
*1.5 to 2.599MHz (fund.)	£4.93	*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	*105 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.

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	b	e	e	e	e	e	e	e	e	e
144.800	c	e	e	e	e	e	e	e	e	e
144.850	c	e	e	e	e	e	e	e	e	e
145.000/ROT	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	c	c	c	c	c	c	c	c	c	c
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	e	e	e	e	e	e	e	e	e	e
145.500/S20	e	e	e	e	e	e	e	e	e	e
145.525/S21	e	e	e	e	e	e	e	e	e	e
145.550/S22	e	e	e	e	e	e	e	e	e	e
145.575/S23	e	e	e	e	e	e	e	e	e	e
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	e	e	e	e	e	e	e	e	e	e
145.950/S38	a	a	a	a	a	a	a	a	a	a

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 holder 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

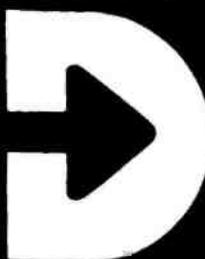
200 KHz and 455 KHz in HC6/U £3.50
100 KHz in HC13/U and 1 MHz in HC6/U £2.95
5 MHz in HC6/U and 10 MHz + 10.7 MHz in HC6/U + HC25/U £2.80

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.



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 from 0 to 30 db. 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.



- * Crystal controlled for high stability.
- * Quality construction in diecast aluminium box (size 112 x 62 x 31mm), 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.

Models AD270, AD370

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)	AD370 + MPU	37.00	(42.55)
VLF	22.00	(25.30)			
D70	43.00	(49.45)			
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



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 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: RO to R7 for FT221 RO 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 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 Pocketfone PF1, PF2, PF70 and Wood and Douglas £4.50 a pair or TX £2.25, RX £2.50. SU8 (433.2) 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.

STONE 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.

PRICES ARE EX VAT. PLEASE ADD 15%.



MARKETING LTD
P.O. Box 73
Summit House
London SE18 3LR

Telephone: 01-690 4889 24 hr. Ansafone: Erith (03224) 30830
Telex: 912881 CWUKTX-G (Attention QUARTSLAB)
Cables: QUARTSLAB London SE18

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
3rd OVT	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	£4.00
	8	10	2.60 to 3.999 MHz	£4.55	£3.70
	9	10	4.00 to 20.999 MHz	£4.55	£3.60
	10	10	21.00 to 24.000 MHz	£6.00	£5.40
	11	10	21.00 to 59.999 MHz	£4.55	£4.00
	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.

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 MPU, 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.

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.

OVERSEAS DISTRIBUTORS

West Germany, Austria and Benelux countries — SSB Electronic, Karl Arnold Str. 23, 5860 Iserlohn, West Germany.
Denmark — Asbjorn Jorgensen, Aabrincken 1, Tapdrup, DK800, Viborg, Denmark. Portugal — Sorubal SARRL, Rua General Pimenta de Castro, 15-81, Lisboa 5, Portugal.
(Enquiries invited from companies in other countries.)

POPULAR QUALITY LINES IN PLUGS AND SOCKETS, ETC.,
All below inc. VAT @ 15%. Post 20p per parcel any quantity.

PL259 PLUGS Excellent Quality 55p each (8 or more 50p each)
REDUCERS for above for UR43/76 15p each (8 or more 14p each)

4 PIN MIKE PLUGS As used on most rigs 60p each
4 PIN MIKE SOCKETS to fit above, chassis mt. 60p each

2 x SO239 COUPLER 2 Sockets back to back in line 70p each
2 x PL259 COUPLER 2 Plugs back to back 70p each

SO239 SOCKET Square Chassis Mount 55p each
SO239 SOCKET Single Hole Mount 50p each

SO239 to PL259 ELBOW COUPLER £1.00 each
T' CONNECTOR 3 x SO239 outlets £1.20 each
T' CONNECTOR 2 x SO239, 1 x PL259 £1.30 each

SOLDERLESS SPLICERS for UR67 80p each
SO239 to BNC PLUG Adaptor £1.60 each
BNC SKT to PL259 PLUG Adaptor £1.60 each

BNC COUPLER 2 x Female £1.40 each
BNC COUPLER 2 x Male £1.95 each

LIGHTED DUMMY LOAD This lights up Red. Max 10 watts. £1.20 each
30W DUMMY LOAD 50ohms £6.00 each
(Both Dummy loads fitted on to PL259 Plug) S.A.E. FOR FULL LISTS

W. H. WESTLAKE, GEMWV, CLAWTON, HOLSWORTHY, DEVON

CRAYFORD ELECTRONICS

G8AYN FLEXIBLE HELICAL AERIALS FOR HAND PORTABLES G81WX
VHF-UHF

Frequency	Connector/Fitting	Price
70MHz (4m)	2BA, BNC, PL259	£6.00
145MHz (2m)	2BA, BNC, PL259, Pye PF70, 2200GX, 2300, IC215, IC2025	£4.20
	Right angle BNC, PL259, TNC	£5.35
433MHz (70cm)	Storno 500, Pye Bantam	£5.00
	4BA (use on PFI) BNC, min BNC, Pye PF70, 3200, Storno 500	£2.65

Prices inclusive of VAT and carriage, most items ex-stock. Many others available, including commercial, marine etc.

ACCESS SAE all enquiries BARCLAYCARD
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**MERRY CHRISTMAS TO ALL.
LOOKING FOR PRESENTS?
WE HAVE SOMETHING
FOR ALL RADIO
ENTHUSIASTS.**



NEW. SENTINEL L. F. CONVERTER. 10kHz - 2MHz IN. 28-30MHz OUT. 9-12V. 5mA. **£2.80 Ex stock.**

SENTINEL DUAL GATE MOSFET 2 METRE CONVERTERS. IFs: 2-4, 4-6 or 28-30MHz. 1db N.F. 30db gain. **£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. **£20.80 Ex stock.**

SENTINEL 70 70cm CONVERTER 432-434MHz IN. 28-30MHz OUT. **£28.80 Ex stock.**

SENTINEL 2 METRE or 70CM PRE-AMPLIFIERS

These units have been redesigned to give the ultimate in performance and reliability. 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: 3¾" 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: £8.00 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 6 amps. Same size as the Sentinel 30.

SENTINEL 100. 10 times power gain. 10W IN 100W OUT. 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 **£45.00. 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.

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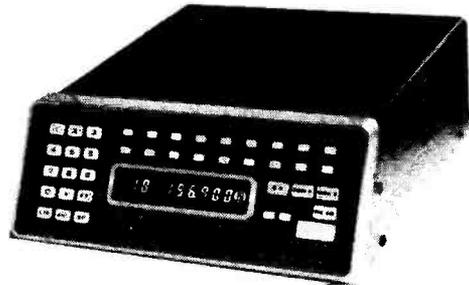
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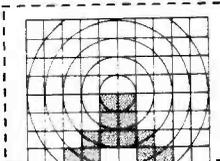
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