

# THE SHORT WAVE

# Magazine

VOL. XXXVI

OCTOBER 1978

NUMBER 8

OPEN UP THE EXCITING WORLD  
OF SHORT WAVE LISTENING



## TRIO R300

170 kHz—30 MHz. AM.SSB.CW.  
3 Way AC Mains/Battery Power  
Completely Self Contained  
+TRIO Quality £184.50 carr. £3

FULL CATALOGUE AVAILABLE—SIMPLY SEND 45p IN STAMPS TO MATLOCK

## LOWE SRX- 30



New Receiver

500 kHz 30 MHz. AM.SSB.CW

Mains/12v Operation

£175.00  
carr. £3

Drift Cancelling System for Spot On Accuracy

For full details of these and many more Receivers contact us now

### LOWE ELECTRONICS

119 Cavendish Rd., Matlock, Derbyshire. Tel. Matlock (0629) 2430 or 2817

Ask  
about the  
CL22 Aerial  
Tuner made  
specially for the  
Short Wave Listener  
only £14.16 inc. VAT & postage

# LOWE ELECTRONICS LTD

## TR2300

The TR2300 is an all new 2 metre FM portable which carries on the tradition of Trio top quality transceivers in attractive small packages.

The TR2300 gives you complete band coverage from 144-146 MHz in fully synthesised 25 kHz steps thus eliminating the need for any crystals. Repeater shift and automatic tone burst are provided and an auxiliary channel is included to allow instant QSY on to your favourite net channel.

The TR2300 is the new pacesetter in 2 metre FM portables and it is already selling like hot cakes. If we have any left, you can see it on the stand at Leicester. See it soon.



**NEW**

**NEW**



# TRIO

## TR2300

2 metre FM Portable. Full band coverage from 144-146 MHz in fully synthesised 25 kHz channels. Repeater shift, auto tone burst. Aux. channel for club net frequency, etc.



# TRIO

## TR7500

THE SENSIBLE 2m. RIG

with every possible feature you require.



## TR7500

When comparing other rigs with the TR7500, you may become dazzled by the thoughts of 800 5 kHz channels at your fingertips—forget it—think commonsense and remember that FM in Europe is organised on 25 kHz channels so why tune five times as many frequencies as you really need. The TR7500 is the only imported FM box to be designed for the British user, the others are simply hand-me-downs from the Japanese home market.

With the TR7500, you can enjoy mobile 2 metre operation at its best. Need 520? turn the dial until display reads 20. Move to 517? turn to 17, it's simplicity itself. Repeater operation is equally easy requiring only the touch of a switch to select either 600 kHz normal receiver up shift or reverse repeater operation as desired. Dial readout? you guessed, it's simply 7 for R7, 4 for R4 and so on.

Full band coverage 144-146 MHz is standard on the TR7500 and as a final point to muse upon, consider when happens if we adopt 12½ kHz channels in Europe. With your 5 kHz step rig you are up ye creek without ye paddle but with Trio foresight, you are covered since the TR7500 is basically a 12½ kHz channel rig and 12½ kHz channels are available.

TR7500, the sensible choice. Still only £225 inc. VAT. Matching PS-6 mains PSU, £58 inc. VAT.

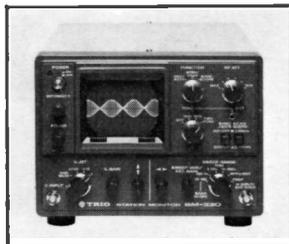
**NEW**

**NEW**



# TRIO

## SM220



**SM220**  
THE  
ULTIMATE  
STATION MONITOR  
AND  
BAND SCANNER

Matching Unit for TS820  
or TS520/520S

# LOWE ELECTRONICS LTD



## TRIO

### TS820



THE TS820 IS THE 160-10 METRE TRANSCEIVER THAT EVERY RADIO AMATEUR WOULD LIKE TO OWN, AND REPRESENTS THE MOST ADVANCED EQUIPMENT FOR THE MAN WHO INSISTS ON THE BEST.

FOR FULL DETAILS, SIMPLY SEND S.A.E. MARKED "TS820" TO MATLOCK



SP520

TL922

TS520S

VFO520S



#### TS520S All Band Transceiver

The TS520S is the finest mid-price transceiver you can buy. Covering all bands from 160-10 metres, the TS520S runs 200W. pep on all bands and has a receiver sensitivity of 0.2µV for 10 dB S/N ratio. Trio built-in features include speech processing, 25 kHz calibrator, VOX and break-in CW and operators all over the world will confirm that the TS520S is the most popular transceiver ever. Also shown is the matching DG-5 digital display, unique in having the additional facility to be used as a 50 MHz frequency counter. Like all Trio digital displays, the DG-5 measures true operating frequency at all time by incorporating all oscillator frequencies

used in the transceiver. TS520S is £525 including VAT. DG-5 is £134 including VAT.

Big Daddy, the TL922 HF linear. Certainly the best HF linear on the market today, the TL922 covers 1.8-30 MHz operation using a pair of 3-500Z Eimac tubes running 2.5kW pep input. In real finger burning terms, that means 1000 watts output key down. Loaded with safety interlocks and time delay switch off systems, the TL922 is a superb animal and its low drive requirement (80W. for full input) makes it compatible with most HF rigs, not only the TS520S and TS820. Magnificent. TL922 is £763 inc. VAT.

#### TRIO PRICES — ALL OUR PRICES INCLUDE VAT. WE DO NOT SEEK TO DECEIVE

TS820	...	£693.00	DG5	...	£134.00	VFO700S	...	£89.00	PS6	...	£58.00
R820	...	£873.50	SP520	...	£18.00	TR7010	...	£189.00	TR2300	...	£210.00
VFO820	...	£120.00	TS700G	...	£458.00	PS5	...	£58.00	TL922	...	£763.00
DGI	...	£136.00	SP70	...	£18.00	TR7400A	...	£334.00	TR3200	...	£185.00
TS520S	...	£525.00	TS700S	...	£580.00	TR7500	...	£225.00	TR8300	...	£244300
VFO520	...	£101.00									

N.B.—THESE PRICES WILL NOT HOLD FOR MUCH LONGER SO BUY NOW

# LOWE ELECTRONICS LTD



## TRIO TR7010

If your station is equipped for FM only, and you wonder where other 2 metre operators have gone when conditions are good—just borrow a receiver and listen to the SSB around 144.3. Direct DX contacts with continental stations are commonplace because of the sheer distance covering ability of SSB. With the freedom from channel restrictions and the ability to have multi-station QSO's with ease, SSB capability can add a new dimension to your amateur radio 2 metre operations.

**SSB and CW operation.** Following the well deserved success of the TS700, Trio used its basic design and put together the ideal mobile/fixed station SSB/CW package—the TR7010.

Combining high receiver sensitivity and clean transmitted signal, the TR7010 gives continuous frequency coverage from 144.2-144.4 MHz to cater for all the DX activity. 48 synthesised 5 kHz channels with VXO and RIT ensure crystal controlled stability with the freedom to move around the band.



**Design expertise.** Both transmitter and receiver in the TR7010 are of the single conversion type using an IF of 10.7 MHz. This gives a clear transmitter signal and a receiver that is free from unwanted image problems. Double balanced mixing is used throughout the transmitter and the carefully tailored audio system in conjunction with a first class crystal filter produces that good signal quality for which TRIO equipment is renowned. The PA stage uses a 30W. transistor which is run at only 20 Watts input to give optimum linearity and protection against misuse.

The construction of the TR7010 follows the rugged reliable package style of the TR7200G—and fits the same mobile mount so that one can fit either rig in the same mounting slide.

Fixed (using the matching PS55 supply), or mobile, the TR7010 is the DX SSB/CW rig for everyone.

TR7010, £189 inc. VAT

## MIZUHO SB-2M THE ALL NEW 2M SSB PORTABLE



The SB-2M portable SSB/CW transceiver makes a welcome change from the procession of FM boxes and offers the user real DX performance in a small, easily carried package. Power output is around 1W, pep (2.5W, input) and sideband generation is by 76514 double balanced modulator and high quality 9 MHz crystal filter thus ensuring very good carrier and unwanted sideband suppression. A further 76514 is used in the heterodyne mixer to guarantee not only a clean transmission but also a receiver free from unwanted spurious responses.

Frequency control is by a wide range VXO giving 50 kHz coverage from one crystal. As supplied, the SB-2M is fitted with four crystals giving a total tuning range of 200 kHz which is adequate for most operators' needs. Alternative crystals can be fitted by the user at any time without the necessity for realignment.

The receiver performance is really outstanding and we can normally hear the Wrotham beacon in Matlock using only the telescopic whip on the rig. As a mode comparison, we can seldom if ever, hear the London repeater GB3LO even using a 10KY at 40 feet and the most sensitive FM rig available. Real DX is yours with the SB-2M and SSB.

Current consumption is low enough to make operation from dry batteries perfectly feasible. However, a Nicad battery pack and charger are also available at modest cost.

The SB-2M comes complete with manual, microphone, carrying strap, etc., and is fitted with crystals to cover 144.1-144.3 MHz. Other crystals will be available shortly.

Why not try sideband, you'll really enjoy it after a dose of FM repeater operation. After all, where does everyone on 2 metres vanish to when there's a lift? You guessed; they're working the real DX around 144.3 and you can join in with the SB-2M.

SB-2M £155 inc. VAT

Don't forget to see all  
this and more at

LEICESTER 78

November 2, 3, 4

Ask about the

NEW DAIWA ROTATORS

NEW TRIO R820

NEW SR9 2 metre FM  
MONITOR RECEIVER

NEW ACCESSORIES

★ and a Grand ★  
★ Clearance Sale ★

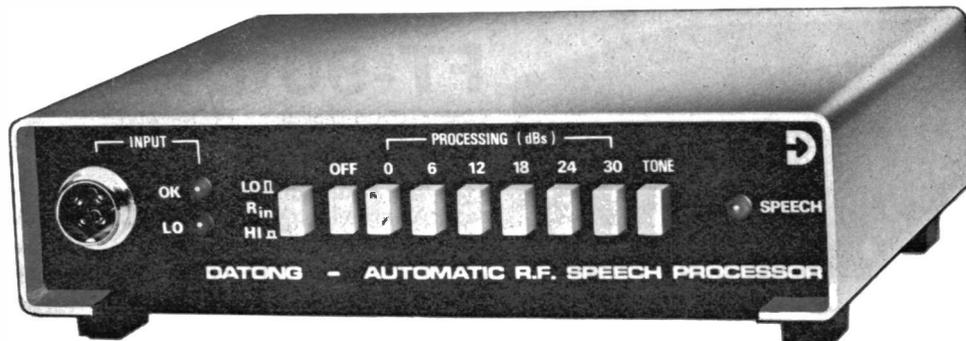
**HEAD OFFICE:** 119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE. Tuesday-Saturday 9 a.m.-5.30 p.m.  
Telephone: 0629 2817 or 2430 9 a.m.-9 p.m. Telex 377482.

**BRANCHES:** Communications House, Wallington Square, Wallington, Surrey. Tuesday-Saturday (morning)  
Telephone: 01-669 6700.  
27 Cookridge Street, Leeds, Yorkshire. Monday-Saturday 9 a.m.-5.30 p.m. Telephone: 0532 452657.  
Soho House, 362 Soho Road, Handsworth, Birmingham Tuesday-Saturday 9 a.m.-5.30 p.m.  
Telephone: 021-554 0708.

**AGENTS:** John-G3JYG. 16 Harvard Road, Ringmer, Lewes, Sussex. Telephone: Ringmer 812071.  
Sim GM3SAN. 19 Ellismuir Road, Baillieston, Nr. Glasgow. Telephone: 041-771 0364.  
Alan-GW3YSA. 35 Pen Y Waun, Efail Isaf, Pontypridd, Glamorgan. Telephone: Newtown Llantwit 3809.

# NEW: THE "INTELLIGENT" R.F. SPEECH PROCESSOR

## MODEL ASP – THE FIRST FULLY AUTOMATIC R.F. SPEECH PROCESSOR WITH CALIBRATED PUSH-BUTTON CONTROLS



- ★ No manual input level control required
- ★ Instant selection of 0, 6, 12, 18, 24 or 30 dBs of true R.F. clipping for maximum talk-power enhancement
- ★ Unique "TONE" button simplifies transmitter adjustment
- ★ LO/HI microphone impedance matching

### PUSH-BUTTON CONTROL

Model ASP sets remarkable new standards of performance and ease of operation for speech processing equipment. As well as providing the genuine 6 to 10 dBs of talk power improvement without harmonic distortion which has made our Universal R.F. Speech Clipper world famous, Model ASP adds the ultimate convenience of instant push-button selection of the degree of R.F. processing. This ranges all the way from 0 to 30 dBs in 6 dBs steps.

Input level adjustments or meter watching are completely eliminated and the automatic control system ensures that you always get exactly the amount of processing that you want despite changes in voice level, or even despite changes in microphone.

With Model ASP you simply select the processing to suit conditions: 0 to 6 dBs for semi-local work; 12 or 18 dBs for DX work; and 24 or even 30 dBs for when the going is really rough.

### UNIQUE SET-UP AID

Having eliminated input setting controls, Model ASP goes even further and simplifies the setting of the transmitter microphone gain. Simply press the "TONE" button and the unit generates a sine wave with the same peak-to-peak amplitude as the processed speech output. Once your transmitter mic. gain (or the preset output level control on the back of Model ASP) is set to give the desired peak P.A. current using this tone, it will be virtually impossible to overdrive the transmitter or to radiate a bad signal.

The result is that you can always rest assured that your signal is exactly as you want it, without the need to watch meters or to carefully control your voice level.

### TWO PROCESSORS IN ONE

Model ASP really consists of two processors in one case. The first is an audio processor and the second is a true R.F. clipper.

The audio processor is not intended to give any speech compression or talk-power enhancement; its job is instead that of an intelligent and unobtrusive yet thorough automatic peak level adjuster which ensures that the subsequent R.F. processor always has an accurately defined peak-to-peak input level. It is exclusively the job of the R.F. processor to boost the talk-power.

### PROVEN R.F. CLIPPING TECHNIQUE

The main processor uses the well proven R.F. clipping technique which has been so successful in our Models RFC and RFC/M. A high quality SSB signal is generated at 60 kHz using the phasing technique because of its smooth frequency response and its long term reliability. This SSB is then clipped, filtered, and demodulated back to audio. The result is an increase in the average to peak voltage ratio of the speech waveform yet without harmonic distortion.

Unlike some A.F. or R.F. compression systems which make you sound louder without improving your readability, true R.F. clipping actually increases the intelligibility of speech in noise. This effect acts in addition to the simultaneous increase in your average power level.

- ★ Connects between microphone and transmitter
- ★ Internal or external supply only 15 mA at 6 to 16v.
- ★ Eight ICs, eleven transistors, three LEDs
- ★ Elegant appearance complements any rig

### ADVANCED AUDIO PROCESSOR

The audio processor has the demanding job of maintaining a constant peak-to-peak speech amplitude despite wide variations in input level and yet without introducing any audible side effects. The circuit has been especially developed for this specialised purpose and is highly sophisticated. It involves detection of both positive and negative speech peaks to allow for the marked asymmetry of many speech waveforms, and five second "hang" time after speech ceases so that the background noise remains constant during speech pauses. So that the circuit is not fooled into a long term gain reduction by loud transients (such as from dropping the microphone) dual time constants are used in the control loop together with special logic circuitry to discriminate against non-speech sounds.

### ACCURATE CONTROL

As well as being highly convenient to use, Model ASP gives a far more accurate control of the degree of R.F. processing than processors which rely on the operator controlling his voice level to "talk-up" a meter to a desired reading. Moreover, the self-control needed for the latter method all too often evaporates in the excitement of DX operating. With Model ASP on the other hand, you can afford to get excited; the automatic control continues to look after your signal while you concentrate on the operating.

### FULL MONITORING

Even a control system with the wide range of Model ASP has its limits and three light emitting diodes are provided so that you can confirm at a glance that your input is within bounds. If your voice level is too low, the "LO" lamp will stay on. If your voice level is within the correct range the "OK" lamp comes on instead, and after a few seconds of speech (during which the processor will "learn" your voice level) it will stay on for about five seconds after you stop talking. This represents the "hang" time of the pre-processor. If both "LO" and "OK" lamps go off together your input is too large.

As a further refinement, the "SPEECH" lamp should stay on only while speech sounds are present. If it stays on between words there is too much background noise at the microphone for good intelligibility, and you should talk closer to it.

PRICE : £65 plus VAT (£73.13 total), including postage (UK only)  
Availability : October. Data sheet in preparation; reserve your copy now.

SEE MODEL ASP PLUS ALL OUR OTHER PRODUCTS AT LEICESTER!!!



**DATONG ELECTRONICS LIMITED**

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

# AMATEUR ELECTRONICS UK

## AEUK—YOUR NUMBER ONE



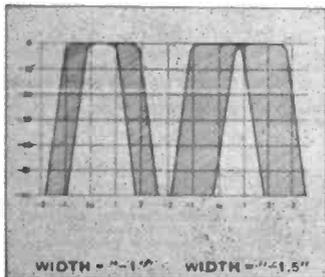
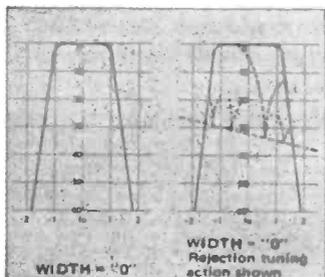
### FT-901DM

COMPETITION-GRADE HF TRANSCEIVER

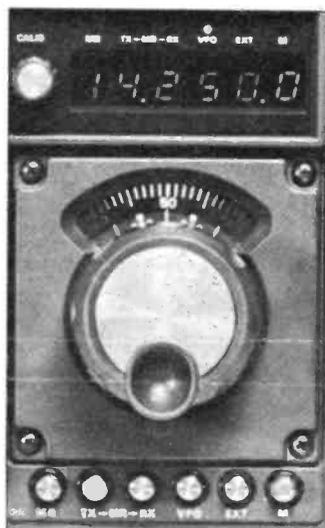
#### HIGHLIGHTS

The ham's dream—to have the best—is now reality. Introducing the FT-901DM all mode HF transceiver from YAESU. Designed to give you the competitive edge either at home or on a DX-pedition, the FT-901DM includes these advanced features:

Unique receiver filtering system including rejection tuning, variable IF bandwidth tuning, and audio peak frequency tuning for the ultimate in unwanted signal rejection.



Digital frequency display with memory circuitry for transmit and receive. Ideal for QSY during net operation, multiplier hunting during contests, or daily schedules. Modern PLL frequency derivation for accurate, stable operation.



Offset tuning for either transmit or receive frequency allows precise zeroing in on that rare DX.



Built-in Curtis electronic keyer. That's one less box to pack along while travelling, and the 8043 chip provides excellent immunity from RF interference.



Hours: 9.30-5.30 Continuous including Saturdays—Early closing Wednesday, 1 p.m.



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

**MAIN  
AGENT**



**ATLAS  
RADIO INC.**

**SOLE  
AGENT**



**SWAN  
ELECTRONICS**

# AMATEUR ELECTRONICS UK

## SOURCE FOR YAESU MUSEN!

### THE SYMBOL OF TECHNICAL EXCELLENCE—



Yes, you get both technical excellence AND copper-bottomed guarantees when you buy YAESU from Amateur Electronics UK. Please remember that only an authorised importer/distributor or one of our appointed dealers can give you the after-sales back up so essential with today's ultra-sophisticated equipment.

As for the YAESU MUSEN range—Well, there's simply nothing to compare and this year's Leicester Exhibition is your ideal opportunity to see all the latest models at close hand on Stand 22 where you'll be sure of a warm welcome from the crowd at Amateur Electronics—Looking forward to seeing you—**KEN PERFECT, '3FIK**

◀ The FRG-7000 has opened new horizons for many a dedicated SWL and licensed op. and as for the FT-101E shown here, suffice to say that it's the world's No. 1 H.F. rig in numbers alone, which must say something! ▼



Once again space does not permit anything approaching a description of Yaesu's ever growing range—therefore Yaesu's latest catalogue with our valuable credit voucher is a must—please see our offer below.



#### HOW TO REACH US (EASY PRIVATE PARKING ON OUR 70ft. FORECOURT)

**FROM SOUTH AND EAST.** We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ½ 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.

(Please note that we shall be closed at Alum Rock for the duration of the Exhibition (Nov. 2, 3 & 4))

#### SPECIAL VOUCHER OFFER

Here's a 10-1 winning offer if you'd like the latest Yaesu catalogue. Just send us four 9p stamps (36p) and we'll send you Yaesu's latest fully illustrated brochure together with our Credit Voucher for £3.60 against your eventual purchase. A couple of stamps will bring you the latest Atlas or Swan leaflets or our current used equipment list.

**BRANCH: AMATEUR ELECTRONICS, UK—COASTAL, CLIFTONVILLE, KENT. KEN McINNES, G3FTE, THANET (0843) 291297. 9 a.m. - 10.30 p.m.**

**BRANCH: AMATEUR ELECTRONICS UK—SCOTLAND 287 MAIN STREET, WISHAW, LANARKSHIRE. GORDON McCALLUM, GM3UCI. TELEPHONE WISHAW 71382. (EVENING CARLUKE 70914.)**

**AGENT: WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON, NEWPORT (CAERLEON 422232)—Only 20 minutes over the Severn Bridge.**



**508-514 ALUM ROCK ROAD** **021-327 1497**  
**BIRMINGHAM 8** **Telex 337045** **6313**

# SEE THE FULL ICOM RANGE

## SIMPLY THE BEST!

available  
ex-stock

and delivery is free

### IC-202E

£169 inc. VAT



### IC-202E

IC202 The 2m. SSB/CW portable which is clean enough to use as a prime mover to drive a linear. The VXO gives continuous coverage over the ranges 144.0-144.2 and 144.2-144.4. The coverage can be extended with extra crystals switchable from the front panel. This is the ideal set to buy if you are thinking of sampling the delights and advantages of SSB on 2m, as it gives full coverage of the SSB and CW portions of the band with easy, continuous tuning.

Available ex stock, delivered free for £169 inc. VAT.

### IC-215E

IC-215 By far the best 2m. FM portable on the market—with more power (3W) than most and batteries some 4 times as big thus giving a reasonable period of operating use. Add to this the superb, clear modulation for which ICOM are so famous and a good receiver, plus a solid, reliable construction and you have really good value for money.

Total channel capacity = 15.  
Channels fitted = 12 (520, 522 RO-9 inc.  
Available ex-stock at £159 inc. VAT and delivery.

### IC-215E

£159 inc. VAT  
and delivery



### IC-240

THE BEST VALUE FOR MONEY IN SYNTHESIZED RIGS

IC-240 Think of the features you would instal in a mobile to provide a combination of optimum usefulness AND SAFETY. You will probably come up with the following requirements:

- 1 Easy channel selection with minimum knob twiddling—yet with all the normal FM channels available.
- 2 A fully automatic tone burst which operates only in repeat mode with NO buttons to press either on the front or the back of the set.
- 3 Instant reverse repeat at the flick of a switch without any re-tuning or memory programming.
- 4 A very sensitive receiver with a spurious reponse performance far better than the average and a very clean transmitter with excellent clear, crisp modulation. (We measured a sensitivity of 0.1µv pd for 10dB sinad).
- 5 A reasonable price—but (more important) a quick, reliable after sales service.

COMPARE THIS LIST WITH PREVIOUS ADS FOR VARIOUS TRANSCIEVERS AND YOU WILL SEE THAT THE 240 WINS EVERY TIME.



### IC-240

alone £198 inc. VAT SUPERSCAN £77.63 inc. VAT. Fitting £6 extra. IC-240 with superscan £275

WE NOW STOCK THE J-BEAM RANGE OF ANTENNAS AT HERNE BAY

AGENTS (Phone first—All evenings except Norfolk and Burnley)

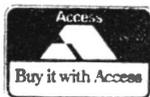
London—Terry G8BAM (01-556 9366) Scotland—Ian GM8DOX (0786 822 212) Norfolk—Ted G3FEW (05088 632)  
Wales—Tony GW3FKO (0222 702982) Burnley—(0282 38481) Midlands—Tony G8AVH (021 329 2305) North  
West—Gordon G3LEQ (Knutsford (0565) 4040) North—Peter G3TPX (022678) 2517

H.P. TERMS AVAILABLE

FOR ALL MAIL ORDERS AND SALES DURING BUSINESS HOURS

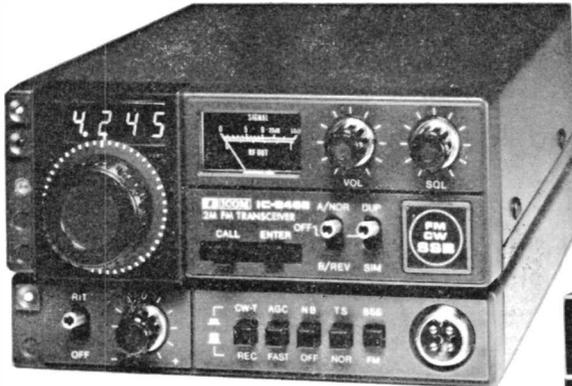
YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM  
**THANET ELECTRONICS**

143 Reculver Road, Beltinge, Herne Bay, Kent  
Telephone : 02273 63859 (2 lines)  
Direct Ansafone line (evenings) 64283



# AT THE LEICESTER SHOW

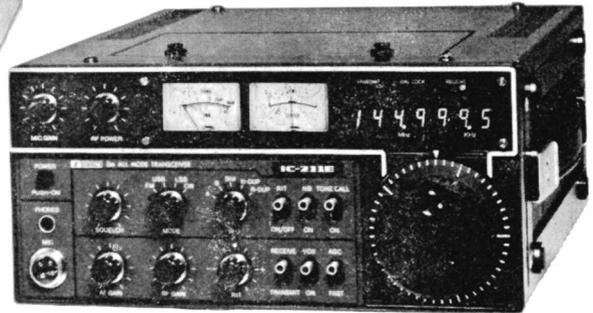
WITH THE TECHNICAL KNOWLEDGE AND EQUIPMENT TO SERVICE THEM PROPERLY BOTH BEFORE AND AFTER SALES



## IC-211E ▼

£549 inc. VAT

Giving you FM/CW/USB/LSB, all produced from the amazing ICOM synthesizer and patent LSI chip. Frequency read out is to the nearest 100Hz and it is amazingly stable and accurate. You can use the two frequency stores as separate VFOs or for any repeater shift required. The tone burst is automatic, of course, and reverse repeat is available at the flick of a switch. Add a keypad (we will give you the circuit to make your own or you will be able to buy one shortly) and find a new facility which is quite impossible with old-fashioned rigs. The original waiting list has now been dealt with and you can now have one from stock.



## IC-245E ▲

£396 inc. VAT

This truly amazing little box gets you mobile on FM, USB or (if you really think it a good idea) CW! The synthesizer is the same as the IC-21E and can be tuned to the nearest 100Hz, again with amazing accuracy. Of course such a versatile little box will often be used as a base station and facilities such as keypad operation can be added. They are now ex-stock!

## IC-701 £999 inc. VAT ▼



The HF rig to beat them all, HERE THIS MONTH. ★ A solid state including the finals ★ 100W RF output Continuous Duty on All Bands. All Modes ★ All bands 1-8-30 MHz ★ USB, LSB, CW, CW (narrow), RTTY ★ Double balanced Schottky Diode mixer used in both Tx and Rx ★ Fully synthesized with Digital readout to 100Hz and two stores to enable split frequency operation ★ ICOM's unique bandpass tune ★ VOX, Semi-break-in CW, RIT, AGC, Noise Blanker ★ Built-in RF speech processor ★ Extremely compact ★ All filters built in ★ 12v. or mains operation ★ Electret desk mic. NO EXTRAS TO BUY.

## ◀ The popular "SLIM JIM" SJ2

144-146 MHz — High efficiency 2 metre omni-directional vertical  
An omni-directional 2 metre aerial developed by T & T from a design by F. C. Judd (G2BCX). Derived from the "J" the SJ2 is a free space aerial with better than 50% greater efficiency than conventional ground plane types due to the very low angle radiation field. The aerial is slim and compact (58 inches long) and as there are no radials it is unobtrusive and has low wind resistance. Supplied complete with mast clamp, £15.50 inc. VAT (carriage £1.00).

Although we specialise in ICOM—Note that the following are available from Herne Bay—with the same Back-up Service :

YAESU

LESON

FDK

MICROWAVE MODULES

J-BEAM

T & T

ASP

Plus a whole range of bits and pieces

DURING THE EVENINGS AND AT WEEKENDS WHEN CALLS ARE CHEAP, WHY NOT USE OUR ANSAFONE TO RECORD YOUR REQUESTS FOR DATA, ETC. (02273) 63850

# FOUR MORE GOODIES FROM



## (1) IC-402 £288 inc.

A 70cm. VERSION OF THE FAMOUS IC-202

IC-402: Utilizing a tunable second oscillator, the IC-402 provides the stability and band spread needed for SSB operation on 430. Crystals are provided for two of the four bands which can be selected from the twenty six 200 kHz segments between 430 and 435.2. Listen to the signals from OSCAR VIII, mode "J" with the superb 0.5uv receiver on either lower or upper sideband.

## (2) IC-202S £215 inc.

THE IC-202 WITH LOWER S/B PLUS CW sidetone and an even better receiver

Specifications :	IC-202S	IC-402
Opp. Sideband	Better than 40dB/kHz	Better than 40dB/kHz
Suppression :	Better than -60dB	Better than -60dB
Spurious Radiation :	600 ohms	600 ohms
Microphone Impedance :	Double Superheterodyne	Double Superheterodyne
Receiver Type :	10.7 MHz	57.6-57.8 MHz, 1st I.F.
Intermediate Frequencies :	0.5uv at 10dB SINAD	10.74 MHz, 2nd I.F.
Receiver Sensitivity :	Better than -60dB	0.5uv at 10dB SINAD
Spurious Sensitivity :	±1.2 kHz or better at -6dB	Better than -60dB
Selectivity :	±2.4 kHz or better at -6dB	±1.2 kHz or better at -6dB
Audio Output :	More than 1W	±2.4 kHz or better at -60dB
Audio Output Impedance :	8 ohms	More than 1W
		8 ohms

## (3) IC-RM3 £99 inc.

### COMPUTERISED REMOTE CONTROLLER

The remote controller you have all been waiting for to add to your IC-211E, IC-245E and IC-701 to provide facilities which are just not possible with competitors' rigs. YOU CAN :

- ★ KEY IN any frequency within the operating range of the rig concerned (it even organises the band changing in the IC-701).
- ★ Store the frequency away in any one of FOUR memories for instant retrieval.
- ★ Step up or down the band in variable steps.
- ★ Scan continuously up or down the band in variable steps.
- ★ Operate forward or reverse duplex from the keypad.
- ★ Have remote readout of frequency in case you want to hide your rig in a cupboard!



## (4) IC-280E £279 inc.

THE ULTIMATE IN 2m. FM SYNTHESIZED RIGS

For the man who wants all the channels in 2m. from 144-146 complete with digital readout of frequency ICOM have produced the IC-280E which has a few interesting extras not provided by the opposition. Such as :

- ★ THREE memories programmable from the front panel (thus giving you four easy-to-switch-to channels without taking your eyes off the road).
- ★ 25 kHz per step to avoid winding for hours!
- ★ Normal and reverse repeat without using up memory space.
- ★ AND (wait for it!) A FRONT PANEL WHICH CAN BE REMOVED FROM THE RIG AND MOUNTED, COMPLETE WITH ALL CONTROLS, METERS AND DISPLAYS, ELSEWHERE IN THE CAR !!!
- ★ Plus of course the high-quality performance, crisp clear transmission and very hot receiver for which ICOM are so famous as leaders in the quality VHF mobile field.

# ICOM..... Simply the Best

FROM YOUR UK DISTRIBUTOR THANET ELECTRONICS HERNE BAY KENT

SEE THEM AT LEICESTER

ARRA



## the systems approach !

Designed for the connoisseur, the ICOM IC-701 HF transceiver brings the latest digital technology to Amateur Radio. Study a few more of the vast list of features offered with the IC-701 . . .

### TWO VFO'S BUILT-IN

The second VFO, which is an optional tack-on with most other transceivers, is an integral feature in every IC-701. Now you can work those Yanks on 40 and 80 metres!

### OPTICALLY COUPLED VFO

A VFO with no variable capacitors! Made under arrangement with Collins Radio, the IC-701 maximises digital readout with positively no time lag or backlash in display stability, even when using 100Hz steps. The IC-701's free wheeling dial is instantly co-ordinated with the high speed, computer controlled six digit readout using an optical chopper. There is absolutely NO mechanical connection between the smooth bearing mounted flywheel knob and the two dual-tracking VFOs.

### COMPUTER COMPATIBLE INTERFACE

External microprocessor control from a PIA interface is possible via the 24-pin accessory socket on the rear panel of the IC-701. The IC-701 can even be interconnected with the companion 2 metre IC-211 to track frequencies for Oscar work.

### REMOTE CONTROL FACILITY

The IC-701 can be remotely controlled via the new optional RM-3 computerised remote controller. This unit includes scan, duplex, memory and tone functions plus a touch-tone pad with digital readout. You can select frequencies and automatically change bands with this CPU controlled accessory.



### CONTINUOUS OPERATION

The IC-701 features continuous operation with a full 200w. pep or 200w. CW input on all bands and all modes. No need to worry about timing key-down operations as the IC-701 is designed to handle the maximum power continuously! If the heat sink starts to warm-up a built-in fan automatically switches on. If a temperature danger point should ever be reached the fan doubles its speed and the digital display flashes to tell you to quit transmitting!

### NO TUNING NECESSARY

Just select the required band and frequency and start transmitting!

### ALL SOLID STATE

While the others are still fooling around with valves, ICOM have produced a solid-state HF transceiver including protected transistors in the final.

### CROSS MODULATION MINIMISED

Cross modulation—a fact of life with some rigs—is minimised with the double balanced Schottky diode mixer used for both transmit and receive.

### SMALL ENOUGH FOR MOBILE

The IC-701 is extremely compact with dimensions 111 by 241 by 311mm. (HWL) and weighs only 7.3kg. No more need to struggle with heavy rigs impossible to mount under-dash!

### FULL METERING

The front panel meter includes swr, power, ALC, compression and collector voltage/current measurement.

### DESKTOP MICROPHONE AS STANDARD

A high-quality condenser electret desk microphone is included as standard equipment with your new ICOM IC-701.

### VARIABLE POWER OUTPUT

In CW and RTTY modes power output can be continuously varied from zero to maximum 200 watts input. SSB output can easily be adjusted for novice use.

### IDEAL FOR THE CW AND RTTY BUFF

The IC-701 includes narrow CW filter as standard plus semi-break-in and sidetone facilities. The IC-701 has switching to select either narrow or wide RTTY shift rates.

### THANET TECHNICAL BACK-UP

Your new IC-701 from THANET comes complete with the THANET one year warranty plus technical and spares support. THANET staff have been factory briefed on the service and alignment procedures.

### PLUS—

- ★ Separate front-end RF stages using dual gate MOSFETs for each band, providing optimum performance.
- ★ Diode matrix to define band edge parameters.
- ★ Operation on all bands 1.8 thru 30 MHz includes WWV.
- ★ Modes include USB, LSB, CW, CW-N (narrow), RTTY.
- ★ Unique ICOM bandpass tuning.
- ★ VOX, Semibreak in CW, RIT, AGC, effective noise blanker.
- ★ Built-in speech processor using advanced circuitry.
- ★ All filters built-in.
- ★ Automatic front panel light dimming to suit ambient light conditions.
- ★ Separate VCOs for each band to reduce spurious and birdies.
- ★ Receive triple conversion.
- ★ Built-in DC power supply, external AC PSU with speaker.
- ★ Full line of matching accessories to come.
- ★ Internal speaker.

**COMPARE THE IC-701 WITH THE OTHERS!  
And see what extras you DON'T have to buy.**

Complete with AC PSU as shown £999 inc. VAT  
IC-701 alone £837 inc. VAT.

THE ULTIMATE! IC-701 state of the art

**THANET ELECTRONICS for**



# RADIO SHACK LTD for BARGAINS!

STAND No. 6

ARRA SHOW LEICESTER

*You know a bargain when you see one!*

Our special package deal cash price for a Drake TR-7 Digital Transceiver with power supply is a talking point around the world  
It is not a price that can last forever!

BARGAINS BARGAINS and more BARGAINS

We still have a few more SPR-4 Receivers left at £450 inc. VAT

Always worthy of consideration is the famous R-4C



at £427.50 inc. What other amateur receiver could possibly compare?

*BRING YOUR USED GEAR TO OUR STAND TO TRADE-IN*

Full range stocked of Trio amateur and test equipment, Astatic microphones, Shure, Hustler, Barker & Williamson, Ameco, G-Whip, Atlas, Standard, Viking Keys, Ten-Tec, Barlow-Wadley, Microwave Modules, Decca, RMS Window antenna mounts, Telex Headsets, Vibroplex Keys, Hy-Gain, CDE Rotators, Jaybeam to name just a few.

SECURICOR

DRAKE SALES SERVICE

HIRE  
PURCHASE



## Radio Shack Ltd

188 BROADHURST GARDENS, LONDON NW6 3AY

*Just around the corner from West Hampstead Underground Station*

Telephone : 01-624 7174

Cables : Radio Shack, London NW6. Telex : 23718 Radack G. Giro Account No. 588 7151  
Open Monday-Friday 9-5, Saturday 9-12.30. Closed for lunch 1-2





**OPERATION  
DRAKE**  
*Round The World*

The brigantine, *The Eye of the Wind*, will have aboard a Drake TR-7 transceiver with the co-operation of the R. L. Drake Co. and Radio Shack Ltd.



**RADIO SHACK LTD** for



**DRAKE**

# STEPHENS-JAMES LTD.

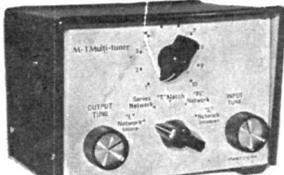
47 WARRINGTON ROAD, TELEPHONE  
LEIGH, LANC'S WN7 3EA (0942) 676790

# G3MCN



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

**XCR-30 FM Receiver with FM band 87-5 to 101 MHz.**  
£190-00 inc. VAT  
£170-00 inc. VAT



**Mk. 1 MULTI TUNER.** Designed and manufactured by us. 50 tunable switched positions for antenna lengths over 5 metres in the 2-30 MHz range. Five different circuits to give an excellent match between your receiver and antenna. Now in use in over 35 countries.

Price £17-90 including VAT and Postage  
**Mk. 2 VERSION, £23-50.** Covering 550 kHz to 30 MHz. Send S.A.E. for full information and Test Report.  
See Test Report in February "Short Wave Magazine".



**YAesu FRG-7 RECEIVER.** Mains and battery operated receiver 0.5 to 30 MHz. Solid state. Advance circuitry offers excellent performance for the DX listener at a moderate price. Price £210-50

Yaesu FRG7000 Receiver ... £367-00  
Yaesu SP1018 Speaker ... £19-68  
Yaesu Desk Microphone ... £22-00

<b>TRIO</b>	
TS820 Transceiver	£693-00
VFO820 External VFO	£120-00
DGI Digital Readout	£136-00
DS1A 12v. DC Inverter	£42-00
YG898 8 pole CW Filter	£37-00
SP820 Speaker	£38-00
TS5205 Transceiver	£525-00
VFO520 External VFO	£101-00
DG5 Digital Display	£134-00
ES59D Receiver	£433-00
TS7005 VHF Transceiver	£580-00
SP70 Speaker	£20-00
TR7010 VHF 5SB Transceiver	£189-00
P55 Power Unit Clock	£58-00
TR7200G VHF Transceiver	£189-00
TR7500 VHF Transceiver	£225-00
TR2200GX portable 3 channels	£142-00
TR200CX portable 12 channels	£172-00
MB1A Mobile mount	£10-00
YB2200 GX 10 watt mobile PA	£45-00
TR8300 UHF Transceiver	£244-00
R300 General Coverage Receiver	£184-50
RF Generator	£56-00
AT200 Antenna Tuner	£93-00
MC50 Desk Microphone	£27-00
H55 Headphones	£23-00
TR7400 2m. 30 Watt FM Transceiver	£334-00
TL922 Linear Amplifier	£763-00
MC365 Microphones	£13-00
DM800 Dipmeter/Wavemeter	£81-84
PL830M 50 ohm 40/120 Watt D. Load	£28-08
PL831M 50 ohm 200/500 Watt Dummy Load	£54-00
TR2300 FM Transceiver	£220-00
Crystals and accessories from stock	

<b>ANTENNA SPECIALISTS</b>	
ASPR332 1/2" Gutter Whip	£8-10
ASP201 1/2 wave Whip	£3-26
ASP677 2m. Whip	£16-75
ASP2009 Standard Whip antenna	£10-12
K220 Magnetic Mount	£7-87
K220A Magnetic Mount	£7-57
<b>DRAKE</b>	
SSR-1 Solid State Receiver	£150-00
TV3300 Low Pass Filter	£18-00
Most Drake models available to order.	
<b>HY-GAIN</b>	
12AVO 3 Band Vertical	£39-94
18AVT/WB 4 Band Vertical	£56-19
18AVT/WB B Band Vertical	£81-45
BN8E Balun	£14-06

**F.D.K.**  
TH56B VHF Monitor receiver. 230v AC or 12v DC operation. 12 channels plus 4 on Auto Scan. 10 channels fitted. PRICE (inc. VAT) £103-40

<b>MICROWAVE MODULES</b>	
MMC70 4m. Converter	£20-25
MM1-1078 LO 2m. Converter	£22-00
MMC32/28 70cm. Converter	£27-00
MMC1296/28 23cm. Converter	£31-50
MMC1296/144 23cm. Converter	£31-50
MMV1296 23cm. Tripler	£33-75

MMD050 50 MHz Counter	£44-96
MMD500P Prescaler	£27-00
MMD500P 500 kHz Counter	£83-32
MMT432/28 70cm. Transverter	£133-88
MMT432/144 70cm. Transverter	£169-88
MMT144/28 2m. Transverter	£88-87

<b>G-WHIP</b>	
Tribander Helical 10-15-20m.	£19-68
LF Coils for Tribander	£5-62
LF Telescopic Whip Section	£2-25
Baseout standard type	£3-37
Multimobile 78, 10-15-20m.	£21-06
MM Coils	£5-91
MM Telescopic whip section	£2-25
Flexiwhip basic 10 metre section	£11-24
Basemount standard	£3-37
Ball type Basemount	£5-00
Coils for Flexiwhip	£5-91
Base thread adaptor USA/G Whip	£6-89
Extendarod 40"	£9-56

<b>OMEGA</b>	
TE-701 Antenna noise bridge to 30 MHz	£23-76
TE-702 Antenna noise bridge to 300 MHz	£29-70
<b>ROTATORS</b>	
AR30	£46-13
AR40	£53-54
CD44	£106-87
AR22	£48-38
KR400	£96-00
DR7500	£97-00
<b>CABLE</b>	
UR43	18p metre
UR67	65p
300 ohm Ribbon	65p
10p metre	
75 ohm low loss	18p

<b>JAYBEAM</b>	
5Y/2M 5 element yagi	£7-70
8Y/2M 8 Element yagi	£10-00
10Y/2M 10 element	£21-31
PBM/14/2m. 14 element Parabeam	£31-16
5SPY/2m. 5 element crossed yagi	£15-97
8XY/2m. 8 element crossed yagi	£19-91
10XY/2m. 10 element crossed yagi	£28-32
Q9/2m. 4 element Quad	£16-31
Q6/2m. element Quad	£21-71
D5/2m. 5 over 5 slot fed yagi	£13-61
D8/2m. 8 over 8 slot fed yagi	£18-22
UGP/2m. ground plane	£7-03
MBM48/70cms. Multibeam	£21-65
MBM188/70cms. Multibeam	£28-96
TAS 17 2m. Whip mobile	£13-05
C5/m. Colinear	£30-93
C8/70cm. Colinear	£39-37
D15/1296 23cm. Antenna	£23-06

<b>SRX-30</b>	
Solid state Receiver 550 kHz-30 MHz	£175-00
<b>BARLOW WADLEY</b>	
XCR30 Solid State Receiver	£150-00
XCR30FM Solid State Receiver	£170-00

**TEK**  
Multi Band Trapped Dipole 80-40-20-15-10 metres. 50 ohm fed. 23 metres in length. This is complete, not a kit. High quality Traps and wire. 2kW PEP rating.  
PRICE (inc. VAT) £50-00

**WESTERN**  
Western Alumasts and Beams now in stock.

**BANTEX**  
Bantex Magnetic Base Mount ... £10-40  
1/2" glass fibre Whip ... £8-44  
1/2" stainless steel Whip ... £9-40  
UHF stainless steel Whip ... £8-63  
Standard base mount ... £2-70

**MARC**  
NR56 2m. FM Receiver ... £54-00

<b>ACCESSORIES</b>	
Single Meter SWR wall mounting	£9-50
Single Meter SWR desk type	£9-50
Twin Meter SWR desk type	£12-50
EK150 Katsumi Electronic Keyer	£60-75
Hymound Morse Keys	£8-10
Nye King 312-001 Morse Keys	£6-75
Nye King 312-002 Morse Keys	£7-85
Nye King 312-003 Morse Keys	£8-45
Standard Type Morse Keys	£3-00
3 way antenna switch	£5-75
6 way antenna switch	£16-85
HP3A High Pass Filter	£2-95
Plastic Antenna Insulators	18p
PL259	51p
SO239	45p
PL289	75p
Cable reducers	15p

<b>SECONDHAND EQUIPMENT</b>	
Barlow Wadley XCR30 Receiver	£120-00
Drake T4XC Transmitter & PSU	£425-00
Drake TR4C with M54 and PSU	£495-00
Heathkit SB303 Receiver	£170-00
Heathkit SB601 Monitorscope	£95-00
Heathkit SB620 Scanalyser	£95-00
KW2000A DC power unit	£35-00
Magnum 2 Mk. 2 Transverter	£90-00
Digitec DI10 V.D.U.	£250-00
Sommerkamp FTDX150 Transceiver	£200-00
Uniden 2020 HF Transceiver	£395-00
Icom IC22A Transceiver	£130-00
Sommerkamp FL1000 Linear Amplifier	£125-00
Barlow Wadley XCR30 Receiver	£110-00
Heathkit GR78 Receiver	£70-00
Heathkit SB303-SB401	£395-00
Yaesu FT101 Transceiver	£280-00
Yaesu FT210 Transceiver	£245-00
Yaesu FR50B Receiver	£80-00

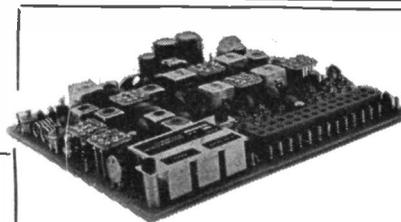
**ACCESS and BARCLAYCARD facilities.**  
Instant HP service.  
Part exchanges always welcome. Spot cash paid for good clean equipment. If you have equipment surplus to your requirement we would be pleased to sell this on commission for you.  
Shop Hours : 9.30 to 5.30 Monday to Friday  
5 p.m. Saturday.

No parking problems. Turn at the Greyhound Motel on the A590 (East Lancs.) Road, S.A.E. with all enquiries. 25p will bring you latest information and prices, credited to your first purchase over £5. Postage carriage extra.  
**ALL OUR PRICES INCLUDE VAT**  
Prices on all imported equipment subject to price increase.

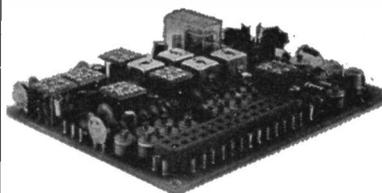
S.T.E. Prices include VAT and postage

Arac 170 10m. and 70 cm.  
Receiver ... .. £127.00  
AA1 Audio Module for AR10 ... £4.10  
AD4 FM Discriminator ... .. £5.00

AL8 Linear Amplifier ... .. £27.00  
AG10 Tone Generator ... .. £4.50  
ATAL 2m. AM-FM Tx ... .. £127.00



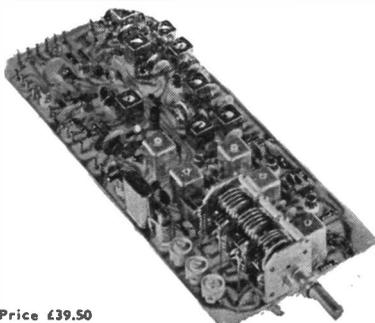
AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0.2uV AF output 3 watts. 12v. DC operation. Price £45.00



AR23. 12 Channel PM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV. Price £50.00



ARAC 102 receiver, 28-30 MHz. 144-146 MHz. AM-SSB-FM-CW Price £100.00

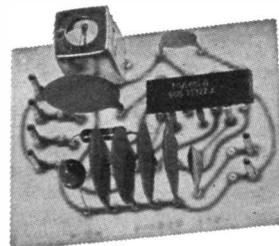
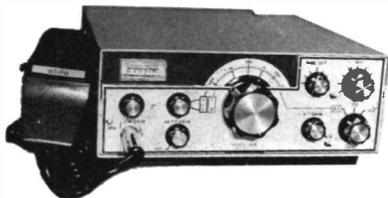


Price £39.50

AR10 Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifier stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.

★ ALDA 103 ★

★ The latest Solid State Transceiver ★ 80-40-20 metres  
Quality engineering gives you all these convenient features:  
BROAD BAND POWER AMPLIFIER ★ SSB 250 watts PEP Nominal ★ CW 250 watts DC  
Maximum ★ BUILT-IN CW MONITOR ★ 6 POLE CRYSTAL FILTER ★ SEMI BREAK-  
IN CW ★ R.I.T. ★ DUAL SPEED VERNIER DIAL ★ MODULAR PLUG IN CIRCUIT  
BOARDS ★ BUILT-IN SPEAKER ★ 13.5 V DC input at 15 AMPS ★  
Send S.A.E. for full specifications. Price £399.00 inc. VAT



455 kHz FM Discriminator Amplifier. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 200-300mV frequency deviation + or - 3 kHz. Price £5.00

TECHNICAL ASSOCIATES

As from 1st May we shall be sole distributors or the whole range of Technical Associates products. This is to combine with our Multi Tuner range to give all the accessories needed for the serious Dx listener and licensed amateur.

Rx Band Pass Filter. 9 I.C.'s. 1 watt output\* 8 switched positions of filters\* High pass 2.5 kHz-2.00 kHz-1.5 kHz-200 Hz-110 Hz-80 Hz\* Ideal for increased selectivity with FRG7, SXR30, ETC ... Price £29.75

Printed Circuit Module. Including rotary switch ... Price £17.25

RX Peak and Notch Filter. Goes between RX and speaker\* All I.C.'s\* By-pass switch\* Notch width control for optimum width of notch ... Price £29.75

Printed Circuit Module. Including all pots and switch ... Price £17.25

Pre-Selector. Coverage 1.6 MHz to 31 MHz\* Three switched bands\* Type 1 with antenna changeover relay for Transceiver op Price £29.75

Type 2 for SWL without relay Price £26.65

Crystal Calibrator. Seven ranges down to 1 kHz. Selected from front panel. Complete with antenna. ... Price £21.85

These prices include VAT and postage.



Solid State Stabilised Power Supplies

Model 122 0-15v 2.5Amp ... .. £13.53  
Model 122S 12.6v 2.5Amp ... .. £18.00  
Model 125 12v 5Amp ... .. £24.00  
Model 153S Duel meter 0-20v 4Amp ... £26.73  
Model 156S Twin meter 0-15v 6Amp ... £33.35  
Model 1210S Twin meter 0-20v 10Amp ... £75.00  
Model 315P 0-15v 3Amp Twin meter ... £28.00

# STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA

See our entire range at the LEICESTER EXHIBITION

telephone 0942 - 676790

ABOVE PREMISES CLOSED 31st OCTOBER-6th NOVEMBER

# WILLIAM MUNRO (Invergordon) LIMITED

DISTRIBUTORS FOR NEC AMATEUR RADIO EQUIPMENT

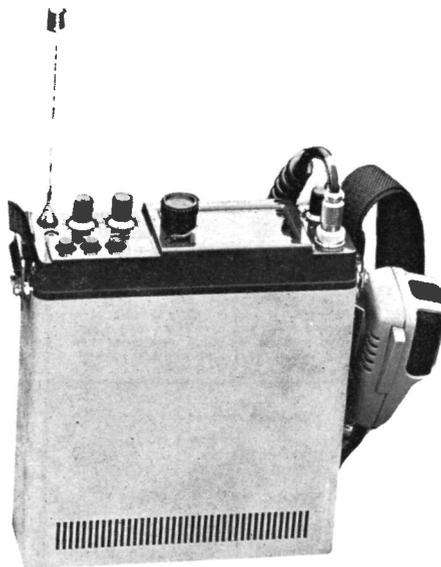
## CQ—P2200E 2 METRE FM PORTABLE TRANSCEIVER

# NEC

### SPECIFICATION

#### General

Frequency range :  
144.00-146.00 MHz.  
Channels :  
12 channels.  
Microphone :  
Dynamic type (10K $\Omega$ )  
Speaker :  
3W 8 $\Omega$   
Supply voltage :  
Built in batt. DC 12v. HP11 x 8,  
external power supply 13.5v.  
Current consumption :  
900mA at transmission.  
110mA at reception.  
Semiconductors in use :  
29 transistors 3 FET's  
16 diodes 2 IC's  
1 LED.  
Dimensions :  
196(w) x 69(h) x 219(d) mm.  
Weight :  
Approx. 2.6kg.  
(including batteries).  
Transmitter  
Emission type :  
F3  
Transmitting power :  
3W. (at HIGH, approx.  
1W. (at LOW)



# NEC

Antenna impedance :  
50 $\Omega$   
Maximum frequency deviation :  
 $\pm 10$  kHz  
Modulation :  
Crystal controlled variable  
reactance modulation.  
Multiplication :  
12  
Undesired radiation :  
—60 dB or less.  
Repeater tone :  
1750 Hz  $\pm 2$  Hz.  
Receiver  
Receiving system :  
Double superheterodyne.  
Intermediate frequency :  
First IF 10.7 MHz.  
Second IF 455 kHz.  
Sensitivity :  
S/N 30 dB or more at 1 $\mu$ V input.  
Squelch :  
—6 dB or less.  
Pass band width :  
 $\pm 10$  kHz or more (at —6 dB).  
Filter :  
Ceramic filter.  
Low frequency output :  
0.5W. (rated output)  
Overall distortion :  
10% or less at 1,000 Hz 0.5W.

This is a very well built piece of equipment with robust case and strong webbing carrying strap. All controls are on the top face making operation easy and comfortable. The built-in extending rod antenna can be used at  $\frac{3}{8}$  or  $\frac{1}{2}$  wave whip depending on the number of sections used. The battery compartment is recessed from the bottom of the unit and is held by one bolt giving easy access to compartment and the battery pack slides out without any connecting wires. External antenna socket is recessed into base. The microphone is particularly comfortable to hold and is the right shape and size.

The 1750 Hz repeater access tone operates on release of the P.T.T. switch thus giving a tone at end of transmission.

The transmitted output is switchable 3w. or 1w.

The meter serves as "S" meter on receive, and battery check on transmit.

An LED "ON AIR" Indicator is provided.

RIT is fitted.

FETS are used for RF stage and an IC for IF stage giving excellent sensitivity, cross mod. and limiting characteristics.

3 Channels **£179** (VAT incl.)

9 Channels **£197** (VAT incl.)

(we will fit the channels of your choice—limit of 12)

### USED EQUIPMENT — Let us know your requirements

We also stock a range of MICROWAVE MODULES, POLAR ELECTRONIC DEVELOPMENT PRODUCTS—ANTEX—Components—ANTENNAS, etc.

IN ADDITION TO OUR OWN SHOWROOM YOU CAN TEST AND EXAMINE NEC EQUIPMENT AT :—

AMCOMM SERVICES  
TONY BLACKMORE  
L. A. WILES & SON  
G. B. PACKER (Comms.)  
PETER AVILL

174A Northolt Road, South Harrow, Middlesex  
2 Joseph Parry Close, Llandough, Penarth, S. Glamorgan CF6 1PL  
Aisthorpe, Scampton, Lincoln  
8 Lock Close, Debenham, Suffolk IP14 6RS  
7 Moorland Crescent, Mapplewell, Barnsley, S. Yorks.

Tel. 01-864-1166  
Tel. 0222-702982  
Tel. 0522-71-351  
Tel. (072886) 214  
Tel. 0226-782517  
(Evenings & Weekends)

Telephone :  
0349 — 852351

100 HIGH STREET, INVERGORDON  
ROSS-SHIRE, IV18 0DN  
BARCLAYCARD

Telex :  
75265

ACCESS

HIRE PURCHASE



**FRG-7 DIGITAL £226.50**

# LEE ELECTRONICS LTD.

ESTABLISHED FOR MORE THAN TWO DECADES  
 OPEN MONDAY-SATURDAY TELEX 298765 KEN G8JVL  
 01-723 5521  
 400 EDGWARE ROAD, LONDON W2  
 LONDON'S LARGEST STOCKISTS OF YAESU ● ANTENNA  
 SPECIALISTS ● STANDARD ● ICOM ● BANTEX  
 JAYBEAM ● REVCO ● QM70 ● ATLAS ● ETC.

**FRG-7 — DIGITAL DISPLAY**  
 Yes. The world famous FRG-7 is now available with digital read-out fitted by Lee Electronics in place of kHz dial.  
 Special Price £216.50 + VAT  
 For customers who already own FRG-7's we can supply the digital read-out complete with installation instructions ... £39.50 + VAT  
 FRG-7 Digital £226.50 FRG-7 with analogue dial £187 + VAT  
 FRG-7 Perspex cover as illustrated £3.50 All plus 12½% VAT

## YAESU MUSEN PRICES (ALL AVAILABLE FOR IMMEDIATE DELIVERY)

FT901DM Digital trans. ... £853.00	FV301 VFO for FT301 ... £86.00	FT101EX Transceiver ... £471.50	YO100 Monitor Scope ... £150.00
FT901D/DE Digital trans. ... £737.50	FR1015 Receiver ... £395.00	FT221R 2M all mode ... £357.00	FC301 Ant Tuner ... £108.00
FT301 trans. 1.8-30 MHz 12v. DC 100W. ... £515.00	FR101D Deluxe Receiver ... £525.00	FT227R 10W 2M 400 Ch. Digital Mobile ... £213.00	YC5001 500 MHz counter ... £168.50
FT301D Digital FT301 ... £588.00	FR101SD Digital S ... £415.00	FT7 HF 10W. Mobile ... £318.00	YC5005 500 MHz counter ... £237.50
FP301 PSU/Sp/peaker ... £98.00	FR101DD Digital D ... £415.00	FL101 Lin/Amp for FT7 ... £130.00	YC500E 500 MHz counter ... £306.50
FP301D PSU/SP/Clock/ IDEN ... £162.50	FL101 1.8-30 MHz Tx ... £453.00	FP4 PSU for FT7 ... £35.00	YP150 Power Meter ... £58.50
	FT101E Transceiver ... £515.00	FL2100B Linear 1.2kW ... £311.00	QTR24 World Clock ... £15.50
	FT101EE Transceiver ... £503.00		FRG7000 Receiver ... £327.00

ALL + VAT 12½% EXCEPT MONITOR SCOPE, CLOCK, COUNTER, WATTMETER, + 8%—FREE DELIVERY IN U.K.

## MICROWAVE MODULES DESPATCHED TO ANY PART OF THE WORLD POST FREE

MMT144/28 Transverter ... £79.00	<b>FREQUENCY COUNTERS</b>	<b>CONVERTERS</b>	ATV435/51 converter ... £24.00
MMT432/28 Transverter ... £97.00	MMD 050/50 MHz counter ... £62.00	MMC432/285 converter ... £26.58	MCC1296 converter 28 or 144 MHz IF ... £30.00
MMT432/285 with Oscar shift ... £119.00	MMD 050/500 MHz counter ... £63.89	MMC70, 4m. converter ... £18.00	All 2m. converters can be supplied with IF outputs of 2-4-12-14- 18-28 MHz 70cm. models with IF outputs of 28-14-18 or 144 MHz.
MMT432/144R with 1.6 MHz shift ... £151.00	Divide by 10 prescaler, 500p ... £25.00	MMC144, 2m. converter ... £18.00	
MMPI2/3 Power supply 12v. 3A stabilised ... £50.00	<b>VARACTORS</b>	MMC144/LO 2m. converter ... £30.00	
432 100W. Linear ... £220.00	MMV 1296, 23cm. varactor ... £33.00	MMC432 70cm. converter ... £24.00	

ALL MICROWAVE MODELS SUBJECT AT VAT IN UK 8% ON FREQUENCY COUNTERS, ALL OTHER MODELS 12½%

## A.S.P. MOBILE AND BASE STATION ANTENNAS

Asp201 ¼w. 2m. mobile ... £3.25	Asp 393 ¼w. 3dB 2m. mobile ... £17.00	Asp E462 70cm. 3dB mobile ... £7.23	Special offer A.S.P. A680 U.K. 6dB 144/148 MHz Co-linear. Power handling 350W. Length approx. 12ft. List £51. Special offer £41.50
Asp2009 ¾ 3dB 2m. mobile ... £7.25	Asp no hole boot mount ... £3.70	Asp E667 70cm. 3dB mobile ... £16.90	
Asp629 ¼w. 3dB 2m. mobile ... £7.60	Asp magnetic mount ... £8.95	Asp A659 UK 70cm. 5dB base antenna ... £19.00	
Asp677 ¾ 3dB 2m. mobile ... £13.50	Asp cutter clip less cable ... £3.85		

PLUS VAT & CARRIAGE

### ICOM RANGE

IC215 2m. 8ch. ... £139.00
IC215 2m. 10ch. (fitted 6 repeaters plus 4 simplex) ... £144.00
IC202 2m. SSB ... £152.00
IC22A 10W. mobile ... £145.00
IC240 10W. mobile ... £178.00
IC245E 10W. FM/SSB ... £332.00
IC211E 10W. FM/SSB ... £470.00

All Transceivers +12½% VAT

**SPECIAL OFFER.** Constant current Ni-Cad chargers. Adjustable charge rate for AA or C type Ni-Cads  
 Ideal for C202/215, C146A, Trio, etc. ... Price £8.35 + VAT p & p 50p.

Free delivery in U.K.

### ICOM ACCESSORIES

Extals S21 or S22 ... pr. £4.50
ER Case 202/215 ... £6.67
Mobile Bracket 202/215 ... £10.23
Helical Antenna ... £3.25, p & p 25p

### KYOCUTO DIGITAL MODEL

2015
10W mobile 400ch. Tx/Rx ... £245.00

### J-BEAM ANTENNAS

ALL MODELS IN STOCK

### F.D.K. RANGE

Multi UI (UII) 70cm. mobile ... £221.00
Multi 11-2m. mobile ... £184.00
Multi 2700 Fm/SSB Tx/Rx ... £435.00
<b>HELICAL ANTENNAS</b>
2m. with 13 BNC ... ea. £3.85
2m. with ph 259 ... ea. £3.85
2m. for IC215, ...
Trio 2200 Gx, standard ...
C146A ... £3.25
All + post 25p + 12½% VAT

### STANDARD RANGE

C146 2M Hand held with carry case, tone burst, S20 and S22 ... £125.00
--

New Mobile Master. 2W. input 10W. output ... £39.50
Base Master ... £21.50
Mobile adaptor ... £4.95
Helical antenna ... £5.50
Small charger ... £5.20
C8600 10W. Mobile ... £115.00
C830S Marine H/Held ... £145.05

Plus 12½% VAT

### QM70

40W. 2m. Linear Amplifier ... £46.20
+ VAT 12½%

SEND 25p FOR CATALOGUE AND  
 PRICE LIST OF OUR FULL RANGE

### ALPHA W63

2m. Mobile with scanning channels. Fitted 9 channels ... £139.95
+ VAT 12½%

YES WE CAN NOW SUPPLY THE FT227R WITH AUTO-SCAN FACILITIES, DESIGNED AND MANUFACTURED EXCLUSIVELY FOR US—NOTE THESE STAR-FEATURES:

- ★ Scans 40 channels
- ★ 2 speed scan rate
- ★ Locks out unwanted channels
- ★ Automatic tone burst for repeater operation
- ★ Reverse repeater facility
- ★ Scans between 145-146 MHz in 25 kc/s. steps
- ★ Scanning facility

Controlled by switch fitted to microphone (not illustrated)

PRICE: £253 + VAT

ACCESS BARCLAYCARD H.P. terms arranged

## YAESU FT227R + LEE ELECTRONICS AUTO-SCAN





# Western

## NEW—WIDER CHOICE FROM Western



### AND



## TRIO

NOW AVAILABLE AT COMPETITIVE PRICES . . .

- ★ LATEST FULL SPEC. MODELS . . .
- ★ FULL 1-YEAR GUARANTEE . . .
- ★ FREE SECURICOR DELIVERY . . .
- ★ ALL PRICES INCLUDE VAT . . .

The latest version of this well-known HF rig . . .

TRIO **TS-820S** **£789**

INCLUDES FACTORY-FITTED DIGITAL READOUT!

Up-to-the-minute on 2 metres mobile FM . . .

TRIO **TR-7500** **£215**

FULL EUROPEAN SPECIFICATION; 1750Hz TONE; 25 kHz CHANNELS

All modes, all facilities on 2 metres, mobile or fixed . . .

TRIO **TS-700S** **£549**

BUILT-IN DIGITAL READOUT—THE LATEST VERSION

# T R I O

# Y A E S U

The "Status Symbol" HF transceiver . . .

YAESU **FT-901<sub>DM</sub>** **£899**

ALL-MODE, ALL-BAND WITH DIGITAL READOUT AND MEMORY

A Worthy successor to the FRG-7 . . .

YAESU **FRG-7000** **£345**

DIGITAL READOUT; CLOCK/TIMER; 250 kHz-30 MHz

The latest 2 metre multi-mode transceiver . . .

YAESU **FT-225<sub>R</sub>** **£529**

ANALOGUE READOUT—DIGITAL OPTION; 25 WATTS OUTPUT

**PAYMENT:** Cash or cheques, ACCESS (Mastercharge), VISA (Barclaycard),  
GIRO TRANSFER (A/c 288 6154) HP and Credit arranged.

# Electronics (UK) Ltd

## TOWERING SAVINGS!

On **WESTOWERS**, **ROTORS** and **ANTENNAS**...

PICK A **Western** PACKAGE...

... AND SAVE 10% ON LIST PRICES!

Yes! Really BIG savings on list prices by following these simple instructions...

- \* CHOOSE a Tower (Box A), Rotator (Box B) and Antenna (Box C)
- \* ADD price of Cable/Mast Package (Box D)
- \* DEDUCT 10% — YES! 10% — to give final price\*
- \* SEND cash or Credit Card number to secure order
- \* *Carriage extra to Devon/Cornwall, Scotland, N. Ireland — see below.*

A		TOWERS	
Westower Standard Post Mounting			
1S/P	25ft./7-75m.	...	£264.60
2S/P	42ft./12-75m.	...	£361.80
3S/P	58ft./18-75m.	...	£430.92
4S/P	75ft./22-75m.	...	£500.04

B		ROTORS	
Emoto 103LBX	...	...	£95.62
Emoto 502CXX	...	...	£145.12
Emoto 1102MXX	...	...	£208.12
Emoto 1103MXX	...	...	£212.62
(NB 103LBX not recommended for 4-el HF beams)			

C		ANTENNAS	
Western DX-31 rotary dipole, 10/15/20m. £43.31			
Western DX-32 2-ele. beam, 10/15/20m. £67.50			
Western DX-33 3-ele. beam, 10/15/20m. £92.81			
Western DX-34 4-ele. beam, 10/15/20m. £121.50			

D		CABLE/MAST PACKAGE	
This comprises:			
3m. (10ft.) 1 29/32" heavy duty aluminium masting			
30m. (100ft.) RGB/u low-loss 50 ohm coax cable			
30m. (100ft.) 8-way rotor control cable			
Price: £33.15			

### PLEASE NOTE:

Only equipment shown above qualifies for this offer. Orders must include tower, rotor, antenna and cable/mast package. Extra cable is available at list prices. Hire purchase is not available for this offer. Due to distances involved, carriage is extra for:—

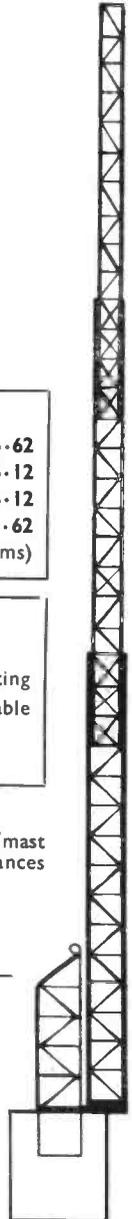
Devon	...	£54.00	Scotland (S. of Pitlochry)	...	£54.00
Cornwall	...	£86.40	Scotland (N. of Pitlochry)	...	£86.40
This should be added to the final price					

JUST TO REMIND YOU... GOOD STOCKS OF EQUIPMENT ARE HELD BY OUR AGENTS IN GM, GI and SOUTHAMPTON

## Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)  
**FAIRFIELD ESTATE**  
**LOUTH, LINC'S, LN11 0JH**  
 Tel: Louth (0507) 4955/6

Our Agents  
 Southern: Alan Paxton, G4BIZ, Southampton, Hants.  
 (0703) 582182  
 Scotland: Alan Cameron, GM3OGJ, Alloa (0259) 214653  
 N. Ireland: Les Lyske, G13CDF, Newtownards (0247) 812449  
 Opening hours  
 LOUTH: 9-12; 1-5pm Mon-Fri. By appointment Sat 9-12.  
 LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58662).  
 Mon-Sat 9-6pm; closed Thurs.



# WATERS & STANTON ELECTRONICS



**Den Tron  
MLA 2500**  
160-10m. 2kW  
PEP  
£695 inc. VAT  
In Stock Now

- ★ 1kW DC continuous
- ★ ALC circuit
- ★ 3 speed cooling
- ★ Military specifications
- ★ 234v./117v. AC
- ★ 2 of EIMAC 8875 tubes

- ★ R.F. Wattmeter RMS/PEP
- ★ Size 5½" x 14" x 14"
- ★ Weight 47lb.
- ★ Ideal for SSTV/RTTY
- ★ 3rd order down 30dB +
- ★ 40 watts drive for 1kW



**Den Tron  
Military  
MT 3000A**  
160-10m. 3kW  
£275 inc. VAT  
In Stock Now

- ★ Antenna selector (5)
- ★ Exciter dummy load (250W)
- ★ 3kW continuous
- ★ 3 core balun
- ★ Tuner by-pass switch

- ★ Compact 5½" x 14" x 14"
- ★ Watt meter 200W/2kW
- ★ Forward/Reverse Watts
- ★ Matches any antenna
- ★ Military construction



**FRG7 RECEIVER**

Choose From  
The Yaesu  
Range:  
**FRG7: £210**  
**FRG7000: £367**  
**FT901DM: £960**  
**FT901DE £788**



**FT901DM TRANSCEIVER**

## GREAT VALUE GREAT PERFORMANCE ... AND FRIENDLY SERVICE!

IN STOCK AGAIN

**NAIGAI**  
**2200 Linear**  
£481.50

(carriage £4.50)



- ★ 230v. AC
- ★ 4CX-350F tube
- ★ Receiver pre-amp
- ★ 10-13 watts drive
- ★ SWR meter built-in

- ★ 500W. PEP input
- ★ 400W. FM/CW input
- ★ Fan cooled
- ★ 12v. DC output
- ★ Covers 144-146 MHz

**FDK**  
**MULTI-**  
**2700**  
£499



SEND FOR 4-PAGE BROCHURE



**FRG7000 RECEIVER**

### ADONIS MICROPHONES—NEW MODELS

Microphones come in all shapes and sizes and many of you will be familiar with the MM202G mobile microphone designed to make driving safer. These, incidentally, are now in stock again. But now we have the pleasure of introducing the new base station models. The M502G is a goose neck design of heavy chrome construction employing a condenser element for really superb quality. A single battery cell gives several months of operation and there is a built-in compressor for the man who wants to sit back and not be hunched over the microphone. Feather touch buttons operate a latching circuit for either press to talk or "lock-on" and an LED flashing light indicates "on air." The M802G offers even more. A 3-way switch provides normal operation, medium or high compression. A meter built into the base monitors the compression. The same high quality condenser insert is enclosed in a noise cancelling housing and 3 switched outputs are provided so that the microphone can be fed to 3 different transmitters. Each output has its own output level control. If you want a microphone to match that new rig then we have the answer.

Your last chance to buy the Microwave Modules MMD 050/500 Frequency Counter. Reduced from £85 to ... .. £65.00

## THE COMPLETE HAM RADIO CENTRE

PHONE ORDERS    ACCESS    BARCLAYCARD    MAIL ORDER    RETAIL CALLERS  
31 SPA ROAD, HOCKLEY, ESSEX    Telephone (03704) 6835    Telex 897406

# WATERS & STANTON ELECTRONICS

## FDK MULTI 800D-25 WATTS

THE MOST ADVANCED FM RIG!



Over 25 watts of high quality FM output at your finger tips. Consider its features and learn why more people are trading up to the 800D. \* Frequency control is electronic from the centre master control—no rotating dial switches to wear out. \* Remote frequency control is available from the new "up/down" microphone buttons. \* Bright LED readout gives true frequency display in 5 kHz steps. \* True frequency counter reads both transmit and receive frequencies in use. \* Instant normal or reverse repeater operation—no re-tuning! \* Xtal controlled tone-burst. \* Variable power control 1 watt to 25 watts (30 watts typical). \* Dual non-volatile memory that lasts even with power off! \* 144-148 MHz coverage for 70cms. transverting. \* Additional programmable frequency shifts. \* Simple auto-scan modification available. \* Remote digital "head-up" display for dash board mounting. \* Plug-in modular construction for ease of servicing. \* Solid block power module. . . . There are cheaper rigs available, but is that really what you want? . . . Send an SAE for the answer! £289 inc VAT

## FDK Quartz 16

10 watts 10 channels fitted, tone burst—all accessories 2M. FM Only £169 inc. VAT

HP Terms : deposit £34



Now with Xtal tone burst!

## Multi-U11

10 watts 70 cms. FM Auto scan 10 channels fitted tone-burst — RIT £259 inc. VAT

HP Terms : deposit £52



## FDK PALM II 2M FM

SIZE: 6" x 2½" x 1¼"!  
WEIGHT: 1 lb. 3 oz!

- COMPARE ITS VALUE  
COMPARE ITS FEATURES
- \* Smallest held-available
  - \* Over one watt output
  - \* High receiver sensitivity
  - \* 6 channel capability
  - \* Simplex or ± 600 kHz switch
  - \* BNC aerial socket
  - \* Flexible whip supplied
  - \* Single xtal per channel
  - \* Extra channels cost £2.45!
  - \* AC charger included
  - \* Ni-cad battery pack supplied
  - \* High quality condenser microphone
  - \* Xtal tone-burst option

### ANOTHER SHOW STOPPER!

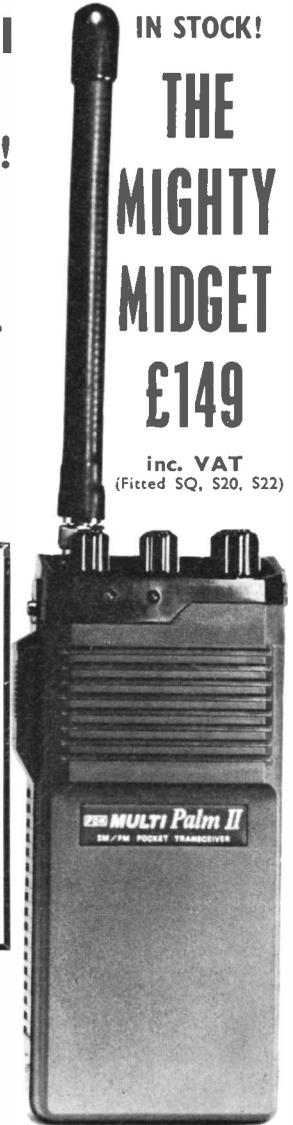
At Waters & Stanton we are continually on the look out for bargains—I. we find a bargain we pass it on to our customers—that's how we got big! Well it's just possible that at Leicester you will see our latest product direct from our American factory—yes you could say East meets West. An HF transceiver that covers 160 to 10 metres. An HF transceiver that has LED digital readout. An HF transceiver that is all solid state with 200 watts input. An HF transceiver that has 3 filters, RIT, broad band tuning. An HF transceiver that comes from a very well respected stable. An HF transceiver that will possible have a price tag around £500, including VAT! But please don't bombard us with letters—the purpose of this is to invite you to visit us in Leicester to learn more about our new baby.

The SSB 2M.  
Hand Portable  
that won't break  
the Bank!

We are pleased to announce that we are stocking the dandy little MIZUHO SB2M SSB 2m. hand-held. This is a real winner and its internal construction is superior to its competitors—so much room—so neat—and its performance is quite delightful. Never heard of MIZUHO—well until now this Japanese firm have specialised in QRP HF equipment but their first VHF product is really something. Of course, you won't find it on every dealers shelf. MIZUHO are pretty particular who handles their products—we pride ourselves in being selected as one of their distributors. Space here is somewhat limited to give full information, but if 2m. SSB from the office, on country walks, on the top of mountains, etc. appeals to you and £155 inc. VAT is not too much for you perhaps you had better send us an S.A.E.

IN STOCK!  
**THE MIGHTY MIDGET**  
**£149**

inc. VAT  
(Fitted SQ, S20, S22)



## THE COMPLETE HAM RADIO CENTRE

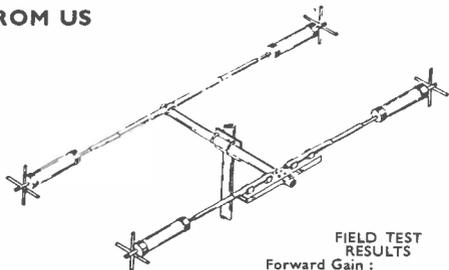
PHONE ORDERS ACCESS BARCLAYCARD MAIL ORDER RETAIL CALLERS  
31 SPA ROAD, HOCKLEY, ESSEX Telephone (03704) 6835 Telex 897406

# WATERS & STANTON ELECTRONICS

**NEW!**

MOSLEY  
MINI-BEAM  
EXCLUSIVELY  
FROM US

10-15-20M



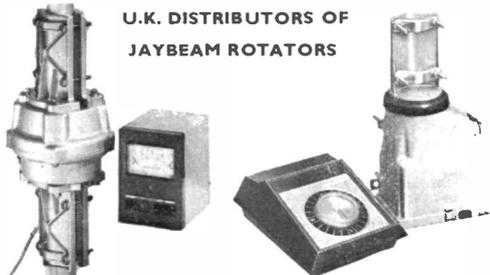
**FIELD TEST RESULTS**  
 Forward Gain : 28 MHz and 21 MHz 5 dB  
 14 MHz 4 dB  
 Front to Back Ratio : 1.5 : 1  
 S.W.R. at Resonance 1.5 : 1  
 Max. Element Length 21 ft.  
 Boom Length 6 ft.  
 Turning Radius 11 ft.  
 Wind Load 60 lbs.  
 Weight 17 lbs.

**SAE FOR DETAILS**

<b>OTHER MOSLEY MODELS (EX STOCK)</b>		
MUSTANG 2KW 10-15-20M	...	£119-25
TA33 600 WATTS 10-15-20M	...	£106-85
TA32 600 WATTS 10-15-20M	...	£72-00
TD3JR WIRE DIPOLE 10-15-20M	...	£24-20
RD5 SWL ALL BAND DIPOLE	...	£27-00

## ROTATOR BARGAINS!

U.K. DISTRIBUTORS OF  
JAYBEAM ROTATORS



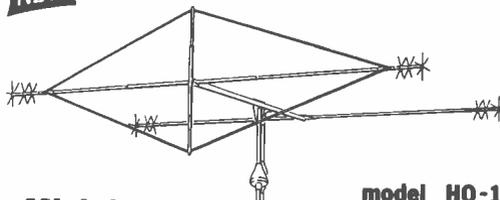
JAYBEAM KR400 supports 1 ton costs £95 inc. VAT. AN ABSOLUTE BARGAIN!

JAYBEAM 9502 ideal for VHF, £45 (only needs 3 core cable), £1-50 carriage

# AUTUMN NEWS!

**NEW**

*Hi-pot Multiple Hat Loaded!*



**Miniature Band HYBRID QUAD Antenna** model HQ-1

**HQ-1** A further stock of the fast selling HQ-1 aerials from USA has arrived. This amazingly compact beam covers 10-15-20 metres and has a turning radius of 6ft. 2in. It will take the full UK legal limit and is the ideal way of putting out a big signal from a small garden.  
Price : £94.00 (£2.00)

## Miniature 4 Band Coaxial Vertical

**MODEL C4 £41.50**

The MODEL C4 features the patented multiple hat<sup>®</sup> principle which allows operation on the 10-15 and 20 metre amateur frequencies with a single feedline. The C4 operates as a full electrical half wave on all bands. This unique feature permits the elimination of cumbersome ground plane radials normally used with vertical antennas. The C4 mounts in minutes with inexpensive TV type hardware.



## JAYBEAM

VHF/UHF ANTENNAS

PMH2/4M 2 way harness ...	£9.39	(£0.75)
C5/2M 5dB colinear ...	£20.95	(£2.00)
5Y/2M 5 el. yagi ...	£7.70	(£1.00)
8Y/2M 8 el. yagi ...	£10.00	(£1.00)
10Y/2M 10 el. yagi ...	£21.32	(£1.50)
PBM10/2M parabeam ...	£25.37	(£1.50)
PBM14/2M parabeam ...	£31.16	(£2.00)
5X/2M 5 el. x'd yagi ...	£15.97	(£1.50)
8X/2M 8 el. x'd yagi ...	£19.91	(£2.00)
10X/2M 8 el. x'd yagi ...	£26.33	(£2.00)
PMH/2C circular harness ...	£5.00	(£0.50)
Q4/2M 4 el. quad ...	£16.31	(£1.50)
Q6/2M 6 el. quad ...	£21.71	(£2.00)
D5/2M el. slot ...	£13.61	(£1.50)
D6/2M el. slot ...	£18.22	(£1.50)
5VMK/2M vertical slot kit ...	£3.83	(£1.00)
UGP/2M ground plane ...	£7.03	(£1.00)
HO/2M halo head ...	£3.26	(£0.75)
HM/2M halo + mast ...	£3.88	(£0.75)
PMH2/2M 2-way harness ...	£6.80	(£0.75)
PMH4/2M 4-way harness ...	£16.34	(£1.00)
PMH4/2M 4-way harness ...	£16.34	(£1.00)
D8/70cm. el. slot ...	£15.47	(£1.50)
PBM 18/70cm. parabeam ...	£18.56	(£1.50)
MBM48/70cm. multibeam ...	£21.65	(£2.00)
MBM88/70cm. multibeam ...	£28.97	(£2.00)

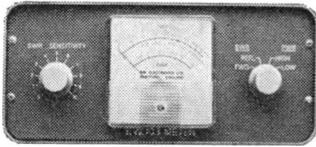
**ACCESSORIES :**

UR43 Cable	18p m.
UR67 Cable	42p m.
75 ohm UHF	18p m.
PL259 plugs	60p
SO239 sockets,	
BNC plugs,	
SO239 joiners	
4 pin mic. plugs	

**THE COMPLETE HAM RADIO CENTRE**  
 PHONE ORDERS ACCESS BARCLAYCARD MAIL ORDER RETAIL CALLERS  
 31 SPA ROAD, HOCKLEY, ESSEX Telephone (03704) 6835 Telex 897406



# Optimum Performance with KW



line feeding an Aerial System or Dummy Load (1) Standing VWave Radio. (2) RF Power with two ranges 0-100 & 0-1000W when used with a 50 ohm Dummy Load.

**Decca KW-103 Combined Swr/Rf Power Meter** is an instrument for measuring a 50 ohm coaxial



**Decca-KW Dummy Load** is air convection cooled and has been designed as a purely resistive 50 ohm load up to 30 MHz. Power capability up to 1000 watts.



**Decca-KW Balun Mk. II.** The Decca-KW Balun is broadband—3 to 30 MHz, rated up to 2kW p.a.p. 1:1 Ratio 50 ohms "unbalanced" feed to "balanced" output. Waterproof moulded case. Suitable for dipole and Beam aeriars.

Note: The well-known KW LOW PASS FILTER passing 3-30 MHz is available from stock.



**Decca -KW 1000 Linear Amplifier** for SSB and CW 10-80 metres, 1200 watts p.e.p. input SSB, can be "driven" by most 100 watt Transceivers and Transmitters. Employs a pair of T160L Tubes in grounded grid. Pi-section input and output circuits. Built-in 2.4Kv P.S.U.



**Decca-KW Antenna Tuning System** including E-Z match, SWR/RF Power meter, Dummy Load, Antenna switch. High power version KW 109 is available.



Serving Radio Amateurs World-Wide

**Amateur Radio Products DECCA COMMUNICATIONS LTD**  
Crampton Road, Orford, Sevenoaks Kent, TN14 5EA. Tel: Sevenoaks (0732) 50911

Write or phone for catalogue. \*Easy terms on equipment available over 12, 18 or 24 months.

**OTHER KW FAVOURITES**  
KW E-Z match; KW Traps (The original and the best) KW Trap Switch; KW Antenna (7-gain beams and Yerticles; Stockists or tors; Shure CDR Rotas-phones etc.) KW spares a minimum of five years after manufacture of equipment. Write or 'phone for Catalogue.

## NEW . . . Exclusively for the ICOM IC240 SUPER - SCAN

HERE'S THE PRODUCT THAT INCREASES THE VERSATILITY OF YOUR IC-240. ADDS A WHOLE NEW DIMENSION TO 2 METRE FM FOR IC-240 OWNERS.



- ★ Scans 40 channels in 25 kHz steps from 145-000 when scan mode is selected.
- ★ Locks out unwanted occupied channels at a touch of a button.
- ★ Adjustable scan rate.
- ★ Adjustable pause period.
- ★ Manual mode feature lets you tune 144-000-147-975 MHz in 25 kHz steps and manually select a desired channel.
- ★ Automatic safeguard on out of band transmission.
- ★ Automatic ±600 kHz shift of transmit frequency when repeater mode is selected.
- ★ Large six digit display shows frequency to 5 kHz.
- ★ Display always shows frequency in use including transmit frequency when PTT is operated.
- ★ Easy installation.
- ★ +9v. available when repeater down mode is selected.
- ★ State of the art CMOS logic.
- ★ Dimensions approximately 6" w. by 1-1" h. by 5-5" d
- ★ Available NOW.
- ★ Low, affordable price.

**£69.00 Plus 12½% VAT**

Contact :— **THANET ELECTRONICS, HERNE BAY — FOR FURTHER DETAILS**  
**LEE ELECTRONICS, LONDON W2**  
**J. YU, 21 LANGLEY AVENUE, SURBITON, SURREY KT6 6QN**

*The*  
**SHORT-WAVE**  
*Magazine*

EDITORIAL

***Delay***

We apologise to Readers and Advertisers for the late publication, for reasons entirely beyond our control, of this issue of *Short Wave Magazine*. The November issue will be a little late (owing to upset schedules), but the December issue should appear on time.

---

The A.R.R.A. Exhibition opens at the Granby Halls, Leicester, on 2nd November, and promises to be the most successful yet. As a showplace for finding out 'what's new' and an opportunity for meeting the people behind the well-known names (and for meeting your friends!) it is second to none, and we strongly recommend all those who have an interest in Amateur Radio, however mild, to pay it a visit. *Short Wave Magazine* will not have a stand this year as our policy is to exhibit every second year, but members of our staff will be attending, and we look forward to meeting many of *our* friends there.

---

It is with great sadness that we have to report the death of Tom Darn G3FGY. Apart from being Organiser of the A.R.R.A. Exhibition, Tom was a much loved and respected man in the Amateur Radio fraternity; he was always prepared to put in more than he got out, towards both individuals and the movement as a whole. An obituary will appear in an early issue.

*Ed. Wilson*  
*G3KFE*

# VHF BANDS

NORMAN FITCH, G3FPK

## VHF NFD

OVERALL winners of this year's VHF NFD were the March and District RAS folk with 3542 points. In second place were the Martlesham and Ipswich clubs with 3243 points, while the third spot was claimed by the Bracknell, University College of North Wales (Bangor), G4ERP Contest Group, with 2581 points. Individual band scores were as follows:

70 MHz: 1, GM3WOJ/P—1490; 2, G3UUT/P—1208; 3, GW4ERP/P—1127.

144 MHz: 1, G3PMH/P—5692; 2, G4BPO/P—5493; 3, GW8BHH/P—5027.

432 MHz: 1, G4BEL/P—1323; 2, G4CFI/P—1219; 3, G3NNG/P—1205.

1296 MHz: 1, G3DY/P—6783; 2, G3XDY/P—5565; 3, GW4BRT/P—4023

Congratulations to all concerned and acknowledgments to the GB2RS News Bulletin Service.

## VHFCC Awards

Another three readers have won 2m. VHFCC certificates this month. No. 301 goes to Len Bailey, G8NQU, from Wellingborough, who started as a short wave listener in the early 1950's with an ex-RAF receiver. His main interest initially was broadcast band DX listening but in 1976, Len bought a Yaesu FRG-7 Rx and began listening on the amateur bands. Reception reports produced a 95 per cent QSL return. In August 1976 a 2m. converter was bought and, after one evening's listening, Len was sold on the idea and took his R.A.E. in May 1977. The current station is a Trio TS-700G and 6-ele. quad at 22ft., but as he is studying CW, activity is limited.

Richard Hook, G8LVB, wins certificate no. 302, for operation

from Ash in Hampshire. Licensed in August 1976, he began with a Pye Cambridge FM10B, bought for £1.00, modified from low band for six channel operation. In February 1977, a Belcom Liner 2 was bought and the dipole changed to 4-ele. quad. In November 1977, his wife bought him a Yaesu FT-221R for his birthday and the aerial was then changed to an 8-over-8 slot fed yagi. Future plans include getting a G4 licence, and RTTY and SSTV. Richard is a founder member of the Surrey Police Radio Society and, on July 29/30 last he put on the first GB8 special event station, GB8SPF.

Julian Moss, G8ILO, receives VHFCC certificate no. 303 for operation from Thorpe Bay in Essex. He was first licensed in February 1974, the first QSO being a mobile one using a Hudson AM-108. Initial operation from the home QTH was on FM with all home-built gear to an indoor dipole. Hearing HG5AIR at S9-plus-40 dB in July 1974 convinced Julian that the only way to go was SSB, so a Yaesu FR/FL50B with QM70 transverter was acquired. This 2 watts provided the first continental DX using a 5-ele. indoor yagi. From October 1975, sessions at Lancaster University provided opportunities for portable operation from fell tops with an Icom IC-202 and Modular Electronics 25 watts linear. The present home station comprises an Icom IC-201, 50 watts amplifier with the 5-ele. beam now rotatable, outdoors, at 30ft. Some satellite operation on Mode "A" is indulged in using a 29 MHz quad aerial with the FRG-7.

## Beacon News

In the 23 cm. band the Edinburgh beacon is now operational on 1296.99 MHz. The *e.r.p.* is 25 watts to two corner reflectors beaming NE and NW. Reception reports should go to GM8BJF at 8 Corrennie Drive, Edinburgh 10.

## Two Metres Super DX

The article in the August issue on the transequatorial tests on 2m. between the Mediterranean and southern Africa has produced some further fascinating details. Roland Whiting, 5B4WR, reports that the tests have continued without a break but that, unlike the earlier

6m. tests, there does *not* appear to be any marked seasonal dependence so far. He writes:—"In signal reception since the end of May no significant Doppler shifts have been observed and I now consider this as a secondary and possibly equinoctial phenomenon and not directly related to the main mode of 2m. propagation, which seems to be dependent on a 'noisy' sun."

Openings between 5B4WR and ZE2JV occurred on June 12, and July 2, 7, 10, 15, 21, 22 and 30, while on July 12, there was a good opening between ZE2JV and SV1AB but with nothing heard in Limassol. ZE2JV was copied in Israel on July 10 at 1805-1845z.

In *DUBUS Informationen* issue 2/78, Edgar Mueller, YV5ZZ, writes that Joe Reisert, W1JR, and other U.S. experts suggest this long distance propagation is not *via* TEP at all, but by a new kind of propagation called "FAI" or Field Aligning Irregularities, not known until now.

Mediterranean readers should note that the ZS6LN beacon operates from 1200-1600z daily with up to 700 watts to a 48-ele., array on 114-115 MHz. ZS6DN operates on 144-130 MHz with 800 watts to a 48-ele. array, times being 0600-0900, 1500-1930.

## A New QTH Locator System

To the serious VHF/UHF operator, the familiar five-character QTH locator is as important as the call-sign. However, it is not unique.

Consequently the idea of a world locator system is being discussed. The two systems being considered are first the *Georef Fields* wherein the primary squares are 15° by 15° and second the EA8EX one, modified by SM5AGM, in which the primary squares are 10° East-West and 5° North-South. To give examples, G3FPK's world locator in the *Georef* version would be MKQG5436, and in the EA8EX system, HST7LS.

Before examining these proposals further, readers' opinions are sought as to whether such a locator system is *really* necessary, bearing in mind great circle distances can only be calculated by reference to latitude and longitude in degrees. So why not use these in the first place in those few instances when these larger QRB's need to be calculated?

### VHF in Iceland

Alistair Simpson, GM8NCM, has sent a detailed account of the Glenrothes and District ARC's operation from Iceland. Poor locations for VHF in the first week led to disappointing results, the first MS success being with G3POI on August 27 from a site near Reykjavik (PY72b). The next sked with G4DEZ was not completed in spite of a promising start. The next site near Hella in the southwest was another very poor location. The first good one was RX06j where from they operated on August 1 and 2 and made complete MS QSO's with DK3XT (FN), DK3UZ (EO), DJ9CZ (DL), SM4FVD (GT), SM4DHN (GU), OZ1OF (EQ) and G4FUF (AL). The last QSO from here was with SK6AB (FR) before they moved to the final location in SY28j on August 3. That was a cliff top site on the southeast coast.

The first completed sked was with SM3BIU (HX) at the end of which a 15 minute *aurora* occurred (QTF 80°) during which they worked SM3FGL (HV) and SM3AKW (IW), then SM3BIU again. Thereafter MS skeds were resumed with DK5AIA (FL33b) at 2,100 kms. Later on the 4th they worked G3SEK and PA2DWH, ending up as they started with G3POI.

All this was the culmination of 57 skeds and some 117 hours of MS operation. During the trip, the boys visited the Icelandic Radio Association's club in Reykjavik and caused a considerable stir when they revealed working G the previous night. There is some 2m. activity through a local RØ repeater and it is to be hoped that some of the TF's might now try for some real DX.

### Meteor Scatter Round Up

Edmund Ramm, DK3UZ (EN20c) sent a list of 18 completed MS QSO's made between June 18 and August 3 in 14 different squares. These included RA3YCR (RN52f); 9H1BT (HV03f); LZ2JT (MD79h) and GM3YOR/TF (RX06j) which was completed in 45 minutes and gave Edmund 2m. country no. 35. But he complains, "... if only those QSL's would come in."

During the *Perseids*, Fausto Minardi, I4EAT (FE60f) worked SM3AVQ (IU27a); UK3AAC (SP); UA3LBO (QO21h) and F6EMT

(ZH) plus G8KRZ and G8LGL on random SSB. Phil Johnson, GJ8KNV, mentions contacts with II, OE, SM and YU stations in the same shower. The only successful sked for Paul Broadhurst, G8LGL (YL46c) was that with OE5VHL (GI). Those with I1KTC and I7DMP brought only a few short bursts and pings. The I4EAT QSO included a 40 seconds burst from Fausto, half of which was S9-plus.

Ken Osborne, G8KSS (Bristol), completed a *Perseids* sked with I4EAT in 1½ hours using 50 watts. He heard and called LX1DB, YU1NAC, UR2RQ (30 sec. burst) and DJ5RQ with many others heard. Ken complains of the poor timing of overs by some stations on the random frequency. Keen listener Mike Allmark from Leeds reminds us that the random MS calling frequencies of 144-100 for CW and 144-200 for SSB are used all year round and that tropo. operators should avoid them. The *Perseids* produced three new countries and 14 more squares for Mike bringing his scores to 33 countries and 151 squares. IT9TAI (GY) at 2,100 kms. was his best DX and other interesting ones heard included UR2CV (NS); YO2IS (KF); OH5NW (NU); YU1NPW (KE) and SM2CKR (KX).

Clive Penna, G3POI (AL51g), stuck to skeds in the *Perseids* and worked UR2NW (LT); SM2BYC (MZ); LZ2KBI (LD); SL2CU/2 (KC); UA3LBO; SM2IUE (IZ); SM4ANQ (HU); SM3BZS (HY) and HBØQQ (EH68d) in Liechtenstein, which latter also worked G3SEK and GW4CQT. Clive's sked with SV1AB (LY) did not produce a QSO although George did get a 20 seconds burst from him. Indidentally, SV1AB does *not* make MS skeds any more. Gotaways were UA3LAW (PO) and ZB2BU from whom only two tiny bursts and two pings were received in spite of a prime time sked. Nothing at all was heard from UA3OG in UR15f but that was on the limit anyway.

General opinion is that this year's shower was not as good as that of 1977. Bursts were of shorter duration. G3POI says his longer distance skeds were quite rewarding but that results over the shorter distances were more disappointing. Another point was that some of the offsets for optimum

beam headings were quite large, a factor to be carefully considered when using very narrow arrays.

Eric Grossmith, G3WOH (Merseyside), mentions a keen interest in 70 cm. MS along with Tim Hughill, GW4FJK (Dyfed). Eric points out that RF amplifiers for 432 MHz with noise temperatures of as low as 80°K are now available at about the \$40 mark, so the construction of a really sensitive Rx is that much easier now.

### Twenty-three Centimetres

Bob Short, G3GNR (Devon), would welcome skeds for 2000-2200 local time on the band, CW or SSB. The gear comprises a 2C39 high level mixer and 2C39 PA giving 25 watts output to a quad loop yagi 40ft. *a.g.l.* The site is 484ft. *a.s.l.* 14 km. NW of Okehampton. Bob's pre-amp. is a two stage affair giving 24 dB gain to a *Microwave Modules* converter. Stations worked so far include G3COJ, G3JXN, G3KMS, G8AGU and GW4ASR/P.

G3WOH is busy sorting out a low level mixer for the band. John Tye, G4BYV (Norfolk) took advantage of the lift on August 18/19 and worked PAØEZ in Hilversum at RS 59 as did G8EUV in Southend and G3ZEZ in Clacton, Essex. John got an S4 report from ON5FH in Sint-Amansberg. The PAØHQN beacon in CM53j was audible both on 23 cm. and 13 cm. GJ8KNV has just started assembling gear for this band as a longer term project with 10 watts of solid state RF in mind. A 34-ele. *Q-L-Y* aerial for the home station has been made. Finally, Arthur Breese, GD2HDZ, asks that Roger Taylor, G4BEL, reconsider his decision to drop out of the All-Time Table.

### Seventy Centimetres

Some paralysing radar interference has "clobbered" the band lately. On Aug. 23, GD8EXI reported it as originating off Anglesey and the following night Richard and Syd Harden, G2AXI (Hants.), calculated it was off the Lizard. County seekers will be glad to learn that Jerry Goldsmith, G4CJG, plans to put Durham on the 70 cm. map very shortly, both from home and -/P.

Colin Wooff, G3SPJ (London), has added Cheshire, G8AWS and Cumbria, G3JYP, to his score.

With G3OSS as "Ringmaster," Bill, G3JYP and Colin made it using 10 watts of CW. Alan Scott, G4BYP, writing probably for the last time from Liverpool, had not caught any lifts and hopes that the new and more elevated Cheshire QTH will reveal more activity.

During the Aug. 18/19 lift period, G4BYV worked DC2XK/OZ (ER) who was 86 using just 10 watts and G8HVY/M in Dorset. On Aug. 27, Walt Davidson operated as G3NYY/P from Lincolnshire in AN51f and gave this rare square to John Woodham, G8BKR, John Pilags, G8HHI and others. Tony Oakley, G8IWA (N. Humberside), was unable to work HB9AEN/P when the latter QSY-ed from 2m. to 70 cm. in the evening of Aug. 25. The ensuing pile-up and QSB made that impossible. However, he did work a couple of new counties for the table. The next day produced GM4CNV/P for another new county and square.

Paul Melbourne, G8GML (Cambridge) has spent much of this year getting going on 436 MHz fast scan TV "... on Channel 16½ as we call it ...". The PA runs 20 watts with a "Lynx" camera. He reports much increased ATV activity in the area and recently trapped 50 viewers at once at the Cambridge club, including the Lord Mayor of Cambridge and representatives of the Heidelberg club who were visiting during "Twin City" festivities.

Regarding interference from the *Syledis* radio location system, the licence requires that transmissions be screened from the land. The aerial has a 90° beam width.

### Two Metres

On tropo., Jack Kay, G3CO (Essex), sums it up when he wrote, "... there have been one or two openings to the south east which have brought in one or two HB9 stations and southern French calls." Aug. 19-21 produced QSO's with HB9AMH/P (DH66c); LX1BK/P and HB9AMO/P (DG32a) as well as F's in AF, AG, BF, BH, DF, DH, DI and DJ squares. Bob Mackean, G4HAO (Liverpool), found conditions quite good from Aug. 23 when he worked EI9Q. G8BKR's best DX were HB9AMO/P and F6CUR/P (DF11j) on the 26th.

I4EAT (Faenza) confirms *Sporadic*

### THREE BAND ANNUAL VHF TABLE

January to December 1978

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3SPJ	58	7	64	14	38	6	187
G2AXI	43	7	54	14	30	7	155
GD2HDZ	45	5	54	10	32	7	153
G3CO	48	7	51	13	22	6	147
G4ERX	25	1	53	14	24	9	126
G8HHI	—	—	62	19	33	6	120
G8LEF	—	—	53	14	38	13	118
G8BKR	—	—	69	15	27	4	115
G4BWG	23	4	54	14	14	5	114
G8GXP	—	—	55	12	40	7	114
G3FPK	—	—	78	22	—	—	100
G8MFJ	—	—	61	14	22	2	99
G4DEZ	—	—	74	24	—	—	98
G4AEZ	23	4	36	10	19	5	97
G3FIJ	31	3	40	6	14	2	96
G4BYP	9	3	44	9	25	6	96
G8EWM	—	—	60	11	17	6	94
G4GEE	—	—	54	8	29	3	94
G8KSS	—	—	69	17	—	—	86
GJ8KNV	—	—	43	17	14	8	82
G8APZ	—	—	57	16	4	1	78
G8KGF	—	—	60	16	—	—	76
G4HAO	—	—	62	12	—	—	74
G8GML	—	—	31	8	25	6	70
G8ITS	—	—	43	6	12	3	64
G8JJR	—	—	51	10	—	—	61
GM4CXP	—	—	44	14	1	1	60
G8BIJ	—	—	50	9	—	—	59
G3KPU	—	—	51	8	—	—	59
G4GXT	—	—	51	8	—	—	59
G8GRT	—	—	35	4	15	3	57
G8MKW	—	—	47	9	—	—	56
GJ8ORH	—	—	30	15	4	5	54
G4FKI	6	1	29	6	9	1	52
G8NYS	—	—	44	8	—	—	52
G4GET	—	—	42	9	—	—	51
GJ8AAZ	—	—	31	6	7	5	49
G8OGD	—	—	38	5	4	1	48
G8LHT	—	—	36	10	—	—	46
G8JGK	—	—	29	9	—	—	38

E contacts on July 8 and 10 with GJ8ORH, G3IGV, G3CHN, G8KMH, GW8ELR, G8NEY, G8GHU and G8BKR with GW4HDF heard on the 10th. Both Fausto and Steven Ruff, G18EWM, confirm the latter's E's QSO with I4VOS/4 was on June 3 in a very short opening. G4HAO caught the very short E's opening on Aug. 18 from 1710 to 1720z hearing YU1NPW (KE13j) and YU1CBX (KF24j). At the same time, G8KSS worked HG5AIR (JH47h) and heard OE3RBC and an OK3. In the E's event on the 8th, G8MFJ worked I4XCC (GD03d) at 1019z and heard other Italians plus the Gibraltar beacon, ZB2VHF, for three minutes at 1027 at S5. Your scribe managed a QSO with HG5AIR on the 15th and heard an OE whom others could have worked, had not a G station taken so long waffling on about his QTH being so many kms. from so-and-so!

During the Aug. 8 opening, Roger Thorn, G3CHN (Devon), copied the ISØA beacon (EA08a) in Sardinia from 1005 to 1036 but figures all the ISØ's were still in bed! SV1AB says he could not positively identify any British calls in the July 10 event due to the colossal QRM. He confirms that SV1KH worked G4BHL and that SV1DH worked GW4CQT that evening, but did not mention any SV/G QSO's on the 8th.

A very intense *Aurora* occurred most conveniently on Bank Holiday Monday, Aug. 28. First station heard at G3FPK was GM3JIJ (WS69c) whose "CQ" was answered at 1313z. The most southerly station heard was probably F6FHP (AE) and F1KBF in Paris was taped on SSB. Bob Nash, G4GEE, got a tip-off from an SM in the morning about the event *via* 20m. He was operating GB3TCF at Stoneleigh later and worked a number of U.K. stations on SSB and CW between 1343 and 1514z.

Bill Duckett, G8BKF (Salop) came in on it at 1335 and worked PAØFRE (CL03j); G8KSS; DB1BP (DN36b); DC9DX (FN53f) and PE1AIU (DN63f). QTF's were 45° but, although GB3VHF was copied *Ar*, GB3LER was not. G8BKR worked G8HPW in Tyne and Wear plus a few others. G8HHI logged the start at 1319 and worked several

G, GI, GM, GW and German stations at QTF's between 45 and 67°. F, EI and OZ were heard with fade-out at 1523z. G8IWA first heard GI8JPG, then worked DC1BP (DN36b) followed by DC5BP in EM25h getting RS 59A from each. Due to very heavy QRM, G8LGL only heard a GI and some Midlands stations in this affair.

GD2HDZ was pleased to work GM3JFG (XR40c) who is otherwise impossible to work *via* tropo. Art Smyth, GM3XNE (Ayrshire), "tripped across" his first *Ar* of the year having just hoisted a 6-ele. *quad* aloft. From 1458-1546, 14 CW QSO's were made including GU4EON (YJ48h) and GM3BOC/A (YS71e). Derrick Danse, GM4CXP (Borders), mentions GB3LER being *Ar* on Aug. 18 from 1850-1854z at QTF 25°, also on the 30th at 1630-1635 and 2350-0015z. LA8YB (FT13a) was worked at 0007z on the 31st (30°) and another phase occurred from 1555-1620z when G8BCL (ZN11d) and GW4GSS (YN75j) were contacted. (45°). Your scribe heard only GM8NCM at 1553 on the 31st and nothing after 1603z (15°). Incidentally the Aug. 28 *Ar* was heralded by the first ever morning *Ar* recorded from 0900-0945z. It started on 4m. around 0500!

#### Four Metres

The Contest on August 12/13th enabled devotees of 70 MHz to up their scores in the tables. Although conditions did not seem particularly good, G3CO added another seven counties and worked GD, GJ, GU and three GM portables. G2AXI also worked GJ3WMR/P and GD2HDZ for two more countries and counties for 1978, plus G3FDW/P in Co. Durham. GD2HDZ added seven more counties in the contest and worked GM3JFG in the *Aurora* on Aug. 28, and GI3RXV, who is impossible to work on tropo. from Laxey. Angus McKenzie, G3OSS (London) was delighted to work GM3JFG in the *Aurora* over a distance of about 710 kms. It seems that Iain had literally just got his 4m. gear going.

#### Contest News

Conditions in the 2m. Open on Sept. 2/3 were only fair with no great DX worked. GW8BHH/P

worked into HB and EA and EA3AIR confirms working some G and GW stations, while operating -/P from BC square from whence they scored 75,000 points. G3FPK was G3CW1/P's 700th contact at 1410 and G3PIA/P ended up with 581 QSO's and GW8BHH/P with 670. The Vange ARS used the call G4FUF/P and made 608 QSO's including HB and LX, and their correspondent Ray Elliott, G4ERX, says conditions to the SW were good.

*Coming events:* The first three legs of the 432 MHz *Cumulatives* are on Oct. 13, 21 and 29 from 2000-2230z. The 432/1296/2304 MHz Open is on the week end Oct. 7/8, 1600-1600z. The 70 MHz Fixed affair is from 0900-1700z on Oct. 22. Looking ahead to November, the 144 MHz CW event on the 4/5 week end from 2000-0100z takes place in the Marconi Memorial Contest, a CW-only clash of 24 hours, 1600-1600z. The scoring for the latter is one point per kilometre and only QTH locators need be exchanged in addition to the usual RST and serial number. In the 308 entries last year there was *not one* from the British Isles—shame!

#### Satellite News

On Sept. 9 your conductor received news from AMSAT-UK Secretary Ron Broadbent, G3AAJ, that there must be no more Mode "B" use of *Oscar 7* until further notice due to battery problems. Mode "A" use is not affected and it may be used when in this mode on days when it should be on Mode "B" apart from Wednesdays, of course.

Printed circuit boards for the 29 MHz pre-amp. are available from G3AAJ for 60p plus 9in. x 4in. *s.a.e.* Anyone wanting an *Oscar 8* cursor for the polar projection map should send him 28p in stamps. (QTHR.)

#### Finale

Sorry no Squares Table this month due to lack of space. Next month it will be order of 2m. scores. The deadline for November is Oct. 5 and for December, Nov. 2—very early so please mark it in your diary. Everything to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 *to* G3FPK.

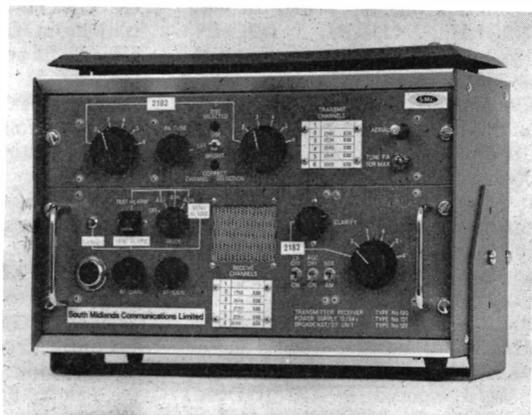
## LEICESTER, 1978

### ONE OF THE MOST IMPORTANT AMATEUR RADIO ANNUAL EVENTS IN EUROPE

**M**ANY of our well-known advertisers will be showing their wares at this year's National Amateur Radio Exhibition at the Granby Halls, Leicester (organised by the Amateur Radio Retailers Association). The event this year is on the 2nd, 3rd and 4th of November.

*Amateur Electronics UK* of Alum Rock Road, Birmingham, who as main importers of Yaesu Musen, Swan and Atlas products will be displaying a large range of units by these three major manufacturers and featuring in particular a completely new line by Swan Electronics of Oceanside, California. The ever-growing Yaesu Musen range is, of course, well known to readers and this year in particular has seen the release of many new models. For the mobile operator the new Swan 100MX Transceiver will be of particular interest. Apart from the major equipment, a complete range of accessories and ancillary gear will be on display on the Amateur Electronics stand, and G3FIK points out that the Leicester Exhibition is also the highlight of the year for him as this is his main opportunity to meet many old friends.

*Lowe Electronics* of Matlock, the sole importers of Trio equipment, are showing as usual several interesting new products, but undoubtedly the star of their show will be the new Trio TR2300 two-metre portable FM Transceiver. For the dedicated HF man they will be showing the no-compromise R820 Receiver, designed to compliment the incredibly successful TR820 Transceiver. Also new from Trio, is the SM220 Monitor Scope, the outstanding feature of which being that it can monitor band activity as a "panadaptor," showing at a glance what's happening across the band in use. On the stand, you will find the new Mizuho 2-metre SSB portable, new Daiwa rotators, a new 50 MHz counter for less than £40, and a regulated 13.5v. power supply for less than



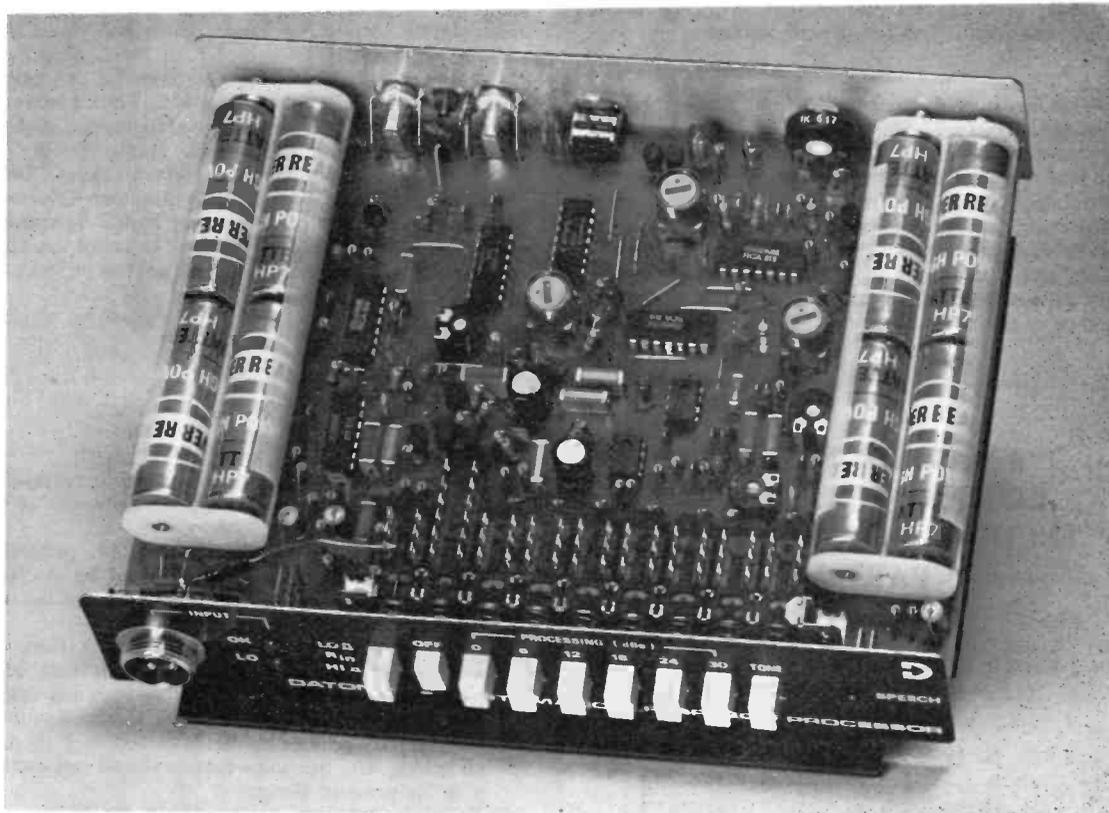
A fine-looking marine R/T from South Midlands Communications Ltd. See it on their stand.

£17. Much more to see, but simply be there and sample the delights for yourself—because there is no room to mention all that will be on show on the Lowe stand.

*Thanet Electronics* of Herne Bay are introducing the new IC-701 HF transceiver, which is Icom's first venture away from the VHF and UHF market for many years. The IC-280 is their latest addition to the 2-metre mobile market (giving digital frequency readout) plus the IC-RM3 which is the microprocessor-controlled remote controller for use with the IC-211E, IC-245E and the IC-701. There is also the IC-202S, a portable SSB rig, which will be very popular with those people who are interested in working through OSCAR. The IC-402S is the new 70cm. version of the IC-202, and no doubt this will be used by many who have caught the "SSB or 70" bug. *Datong Electronics Ltd.* of Leeds will have two new products at this year's show. As usual, this highly inventive firm will be running excellent working demonstrations of all their products, which include the Model FL1 Frequency Agile Audio Filter, the Model UC1 Up-Converter, the Universal RF Speech Clipper, the Datest 1 and Datest 2 Transistor Testers, and the Model AD170 Active Receiving Antenna. The major new product on show is the Model ASP: this, as far as we know, is the world's first RF Speech Clipper which is completely automatic and which therefore needs virtually no setting up for optimum results. The second new product is the Model IBS Interface Unit for use with the Model AD170. *S.E.M.* from the Isle of Man have recently expanded their popular "Sentinel" range of receiver pre-amplifiers to include auto-models to cover the HF/VHF/UHF ranges. Aerial matching arrangements seem to go in and out of fashion, but there can be little doubt the "Z-match" circuit remains the primary one; *S.E.M.*'s Model SO-239 is their variation of the Z-match circuit, with an addition so that the circuit can either be balanced or un-balanced. This can be seen, along with the range of *S.E.M.* Converters, Transverters, Pre-amplifiers etc., on the stand of the *Amateur Radio Shop* (Huddersfield). Proprietor Jim Fish, G4MH, will also be showing his usual stock of equipment and accessories, plus large numbers of second-hand Transceivers, Receivers and ancillary equipment. An "Aladdin's Cave" for all amateur enthusiasts.



The new Trio SM-220 Station Monitor which will be displayed on the Lowe Electronics Ltd. stand



The inside of the new Datong Model ASP Automatic RF Speech Processor. Datong Electronics Ltd. have a well-deserved reputation for innovation and high-quality products, which will be enhanced by this latest addition to their range.

John Birkett of Lincoln will once again bring along one of the most popular displays at the Exhibition, and if you can get near enough you will find all those small components that you have been looking for, plus a fine range of test equipment, etc.

The FDK Palm 11 is a new hand-held two-metre transceiver at a size to suit both your hand and your pocket: this is being shown by *Waters and Stanton Electronics* of Hockley, Essex, the main importers and distributors of FDK equipment. Fast mail order service backed by large stocks have helped to bring this firm into the top league of Amateur Radio suppliers. Other items to be shown include the very best of British equipment, plus imported goods from around the world. Mini-Products antennas and the Dentron range of linear amplifiers and antenna tuners will all be on show on their stand.

Another popular stand is that of *B. Bamber Electronics* of Cambridge. They show a wide range of ancillary equipment including Weller soldering equipment, die cast boxes, vinyl covered and aluminium boxes, Eagle multimeters and test equipment, plus Spiralux and Draper tools for the electronics enthusiast. Their main attraction is, as always, their selection of surplus equipment—they are renowned for providing anything from a petrol generator to an RF transistor—and the friendly staff are always on hand to advise customers about the

bargain they wish to purchase. They will also have a large supply of Mail Order catalogues available.

*Western Electronics (UK) Ltd.* of Louth, Lincolnshire are one of the countries leading suppliers of Amateur Radio equipment. They carry large stocks of the famous Yaesu Musen range, plus many products which they have designed and produced themselves. Their test equipment is world famous and it's not unusual to hear that DX station say that he is using a Western tower and beam. We are promised new items at this year's exhibition, though there is no advance information—so be sure to visit their stand.

Yet another very popular exhibitor at Leicester is *Stephen-James Ltd.* of Liverpool. New products on show will be a three-band Solid-State HF Transceiver for fixed or mobile use, with an input of 250 watts p.e.p., a 2-metre tunable pre-amp. and a Solid-State AM Receiver. All this, plus the products of Yaesu Musen, STE Milan, Technical Associates, Barlow Wadley, etc., on the Stephens-James stand.

*Radio Shack Ltd.* of London will be showing the full range of Drake equipment, plus equipment from many other manufacturers. Pride of place must go to the new Drake TR-7 Transceiver, which is surely one of the finest pieces of gear ever produced by Drake, and should be one of the stars of the show. Radio Shack will also have

on display products from, amongst others, Trio, Telex, Prestel, Cushcraft, Ten-Tec, Shure, Jaybeam and Hy-Gain.

What can be said about the stand of *South Midlands Communications Ltd.*? The line-up of new and established equipment is so impressive that it is impossible to list it all here. As a random selection, there will be a full range of Mobile Antennas, the new Telewriter, a 1296 MHz Transvertor, a new General-Coverage Receiver, many new items of test equipment, masts, rotators, Versatowers, and of course all the latest Yaesu Musen equipment, plus much more. With so much to see this stand could be an exhibition on its own! There will also be the

stand of their branch *S.M.C. (Jack Tweedy) Ltd.* Here again another wonderful range which will excite any radio amateur enthusiast.

Microwave Modules Ltd., Catronics Ltd., Amateur Radio Exchange, C.B. Electronics Ltd., Polar Electronic Developments Ltd., John's Radio, Hilomast, Crayford Electronics, Modular Electronics, Radio Society of Great Britain, International Short Wave League, Radio Invalid and Bedfast Club, British Amateur Television Society, RAEN, British Amateur Radio Teleprinter Group, and many more, will all be at Leicester this year. No doubt to see everything you will need to be there for all the three days of the Exhibition!

*Advertising Feature*

## AMATEUR RADIO— COMMUNICATION OR TECHNOLOGY, OR BOTH? PART VI

CONTINUING THE THEME  
OF A RETURN TO HOME-BREW  
WITH THE DESCRIPTION OF  
A GENERAL PURPOSE HF  
TRANSMITTER

N. H. SEDGWICK, G8WV

A PRIME factor of home-brew activity is not to waste time and money on making something which is really not wanted, or which will not be adaptable to changing conditions or capable of reasonable modification to extend one's interests as they develop. On the bookshelf in this shack is a 1937 amateur publication which describes and shows photographs of an "ideal" 150-watt transmitter: it is built on a wooden baseboard with all controls mounted on individual pieces of Ebonite screwed to the edge of the board, with no screening whatever, or protection against the user killing himself by contact with high voltage. At the time this publication was in regular use for reference by home-brewers the writing was on the wall, for the BBC was already transmitting television on VHF from Alexandra Palace, and many London amateurs were already in trouble with TVI.

Times have indeed changed, and home-brewing of HF transmitters requires expertise in a number of techniques and crafts. A project needs careful thinking out as regards the operational and functional philosophies of the proposed device and the actual technical and mechanical design of it, before setting drill to metal. So let us go through the process of specifying, designing, and making the home-brew HF transmitter adaptable to developing interests in the various modes of operation in that field, and using straightforward non-gimmicky components, choice of which may largely be determined by the fact that they are already in possession. First we do the thinking . . .

### Specification

- (a) To be capable of continuous-wave operation at about 150 watts input with Class-C operation of the PA for high efficiency.
- (b) To be switchable to linear operation, preferably Class-B since the drive power has to be available to meet requirement (a), and this mode has the best efficiency in linear modes.
- (c) To cover all the HF amateur bands. (Here the writer admits to regarding 28 MHz as a 'stunt' band requiring luck with sunspots rather than any degree of skill in working DX. Hence it has been omitted from the transmitter to be described, but there is no reason why the home-brewer should not include it in his personal design).
- (d) To have frequency agility within the bands, (*i.e.* provision for use with VFO).
- (e) To have an internal drive source for CW operation, but capability of being externally excited by other sources using any common narrow-band form of modulation—F1, A3j etc. and to permit mixing the external source with a VFO to produce the final radiated frequency, or to accept an external source at the final radiated frequency.
- (f) To be completely screened and protected from radiation of harmonics directly from the transmitter as distinct from the aerial.
- (g) To have fixed impedance coaxial output to permit use of low pass filtering in the output lead to reduce TVI risk.
- (h) To have pi output tank and aerial coupling circuit, thus ensuring that there is always a relatively high capacity in shunt to harmonics directly across the output.
- (i) To be 'modular' in construction to make easy major modification or repair of major faults.
- (j) To be of mechanical construction that can all be done in the shack using common hand tools and a pistol drill.
- (k) To be simple of operational adjustment.

The next step is to decide what valves and major components should be used, and this calls for a survey of what is already available. The PA valve determines how much drive is required, power supply, etc., so choice of that must be the first consideration.

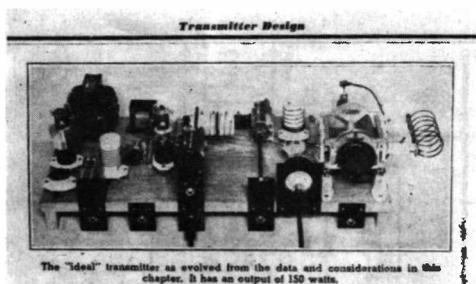


Fig. 1. The 'ideal' transmitter, 1937.

## Survey

1. *PA Valve.* There are lots of long established valves with the necessary power handling capacity that can be used, but most of them require anode voltage exceeding 1000 volts, which 'ups' the cost of all associated components. There are also lots of pentodes and tetrodes which can be used in parallel pairs or push-pull to handle the required power with anode voltages of the order 600-750 volts. Note that push-pull PA operation complicates pi-tank arrangements, and parallel operation is preferred nowadays.

Fig. 2 shows a selection of valves of the right sort of rating which were available in the shack at the survey. The Allies probably won the last war with the 807, and it is still one of the most rugged and reliable of valves. The 6146 has slightly higher ratings and is much shorter, although it takes up the same amount of chassis area; it is an expensive valve, particularly in the 'B' version, and less rugged than the 807, although the short electrode leads are an advantage in terms of stability. The EL38 was designed for video amplification and has very high mutual conductance which makes it well suited for Class AB1 linear operation, but its high sensitivity also makes it liable to retroactive instability in HF use, where the practice is to use up to 750 volts on its anode, and it can die very suddenly in such circumstances; it is also rather tall with long electrode leads which do not help the stability problem. The 829B was originally the 'must' valve for VHF: it is a twin tetrode rather akin to two 807 valves in one envelope, but fat and short in build so that it does well in a transmitter constructed with the modern rather small components. The transmitter shown in the photographs uses an 829B and has a front panel only  $5\frac{1}{2}$  inches high; it was really the shape and dimensions of the 829B that made it first choice.

2. *Ratings and Tank Circuit.* Choosing the PA valve sets the main HF voltage, and in the case in point it was made 650 volts which gives 150 watts input at 230 mA and the maximum permissible anode dissipation of 40 watts at 73 per cent efficiency. This is quite practicable in Class-C, but running CW in Class-B at 65 per cent efficiency requires reducing input to 114 watts to keep the anode dissipation at 40 watts maximum, in which case output will be 74 watts as against 110 watts for Class-C mode. The p.e.p. rating for SSB speech can be made higher than the Class-B CW rating, depending on one's brinkmanship, but in any case not so high as to run into non-linearity on peaks; this information fixes the output impedance and enables the

pi-tank circuit constants to be calculated. The method of doing this is given in both *RSGB* and *ARRL* handbooks, and there is no point in repeating it. However, the reactances of inductance and capacitance are the same for the impedance match into the load irrespective of frequency, so if L, C1 and C2 are worked out for 3.5 MHz they will be halved in value for 7 MHz, quartered for 14 MHz, and divided by 6 for 21 MHz. It is usual to work on a loaded 'Q' for 10 or 12 for the tank circuit, and this limits the frequency tuning range of any particular inductance/variable-capacity combination. This is no worry to the amateur as the bands are narrow and he expects to change tank coil for each band.

3. *Neutralising.* Although anode-grid capacity is quite low in the 829B at 0.12 pF, it will be doubled by using the two halves of the valve in parallel, and neutralising will certainly be necessary. There are cute neutralising circuits for tetrodes that rely on the cold end of a coil having a small RF voltage on it because the decoupling condenser has been purposely made a little small for the job; this allows quite a large feed-back neutralising capacitor to be used, but it has the disadvantage that it increases minimum anode tuning capacity and also the neutralising holds good for only one frequency band.

With a single-ended pi-tank circuit it is difficult to get an anti-phase RF voltage to feed back to the grid, so it is better to use a centre-capped grid coil tuned by a split-stator capacitor, and feed back to the anodes from the end of the coil opposite to the grid connection. This same end can be connected to the anode of the driver valve *via* a DC blocking capacitor to help balance the electrode capacities across each half of the coil; a neutralising voltage for the driver valve can then be picked up at the PA grid.

Neutralising for the PA is by a stout wire projecting from the driver coil through the chassis near to the 829B anodes (at a point well clear of the load end of the tank circuit) and cut to length to give good neutralising without any actual connection being made to the anode

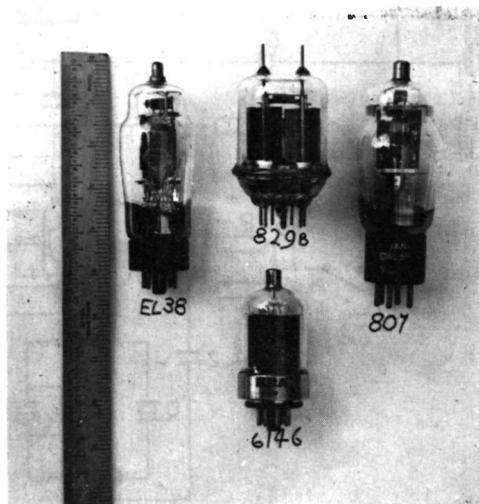
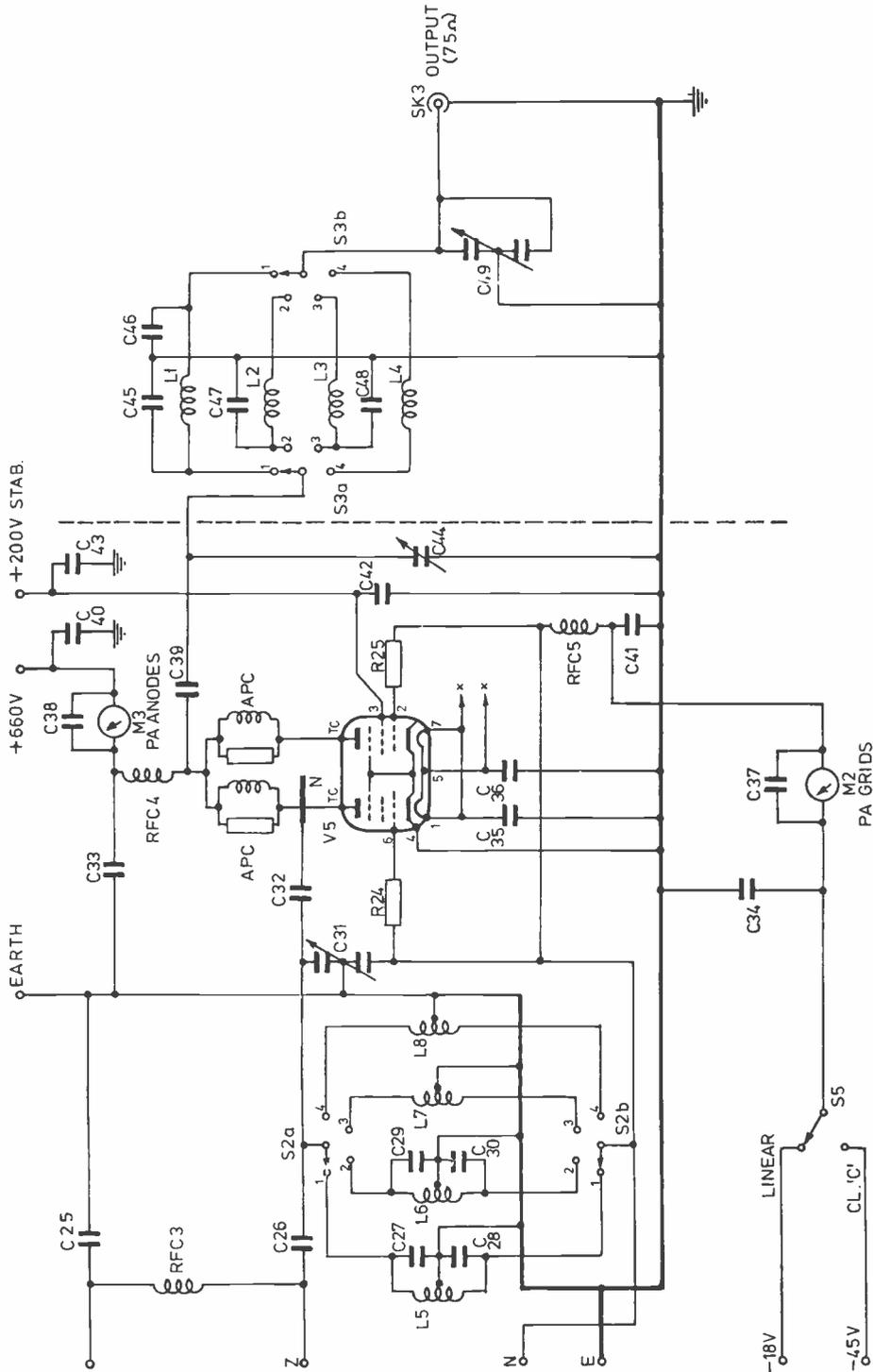


Fig. 2. Selection of valves of suitable rating for the PA.





D  
229  
B

FIG. 4 b G8WV HF TRANSMITTER - MODULE 'B'

Table of Values

Figs. 4a and 4b

R1 = 22K	RFC2,	C8, C9,	X2 = 12.5 MHz
R2, R3 = 180K	RFC3,	C12, C14,	X3 = 16 MHz
R4, R7 = 33K	RFC5 = 1.5 mH	C22 = 0.01 $\mu$ F	SK1 = external drive
R5, R20 = 820R	RFC4 = 2 mH	C17 = 1000pF	SK2 = VFO input
R6, R8,	M1 = 200 $\mu$ A FSD	C26, C46 = 430pF	SK3 = PA output
R9, R12 = 100K	M2 = 20mA FSD	C27, C28 = 150pF	S1 = 4-pole 4-way
R10 = 150R	M3 = 300mA FSD	C29, C30 = 47pF	S2, S3 = 2-pole 4-way
R11 = 10K 3W	D1 = OA95	C32 = 15pF	S4 = S.P.S.T.
R13 = 68R	D2, D3 = OA202	C47 = 140pF	S5 = S.P.D.T.
R14 = 4K7	ZD1 = 18v. 400mW	C48 = 22pF	L1 = 7.4 $\mu$ H
R15 = 330K	RV1 = 5K variable	C18 = 100 $\mu$ F, 100v. elec.	L2 = 3.7 $\mu$ H
R16, R17 = 8K2	T1 = pri. 6.3v., sec. 20v.	C19, C20 = 15 $\mu$ F, 63v. elec.	L3 = 1.85 $\mu$ H
R18 = 47K	C1, C5,	C21, C39 = 0.01 $\mu$ F 1kV	L4 = 1.23 $\mu$ H
R19 = 47R	C6, C7,	C33 = 0.1 $\mu$ F 1kV	L9, L11 = 15 $\mu$ H
R21 = 220R	C13, C16 = 330pF	C40 = 0.005 $\mu$ F 1kV	L12 = 1 $\mu$ H
R22, R23 = 10K	C2, C4,	C43 = 0.01 $\mu$ F 400v.	*L5 = 16 $\mu$ H 48 turns
R24, R25 = 27R	C10, C15,	C44 = 80pF variable	26 s.w.g. C.T.
V1 = 12AU7	C23, C24,	C49 = 500 + 500pF	*L6 = 7 $\mu$ H 32 turns
V2 = 6BE6	C25, C34,	variable	26 s.w.g. C.T.
V3 = 6BA6	C35, C36,	C11, C31 = 125 + 125pF	*L7 = 2.2 $\mu$ H 18 turns
V4 = 5763	C37, C38,	variable	26 s.w.g. C.T.
V5 = 829B	C41, C42 = 0.1 $\mu$ F	JK1 = Key Jack	*L8 = 1.34 $\mu$ H 14 turns
RFC1,	C3, C45 = 220pF	X1 = 9 MHz	26 s.w.g. C.T.

\* The two halves of each coil are bifilar wound; cores are 'Amidon' obtainable from *T.M.P. Electronics*. T68 = 2 cores.

circuit; this neutralising holds good over the complete range of frequencies because the neutralising capacity so obtained is directly equal to the anode-grid capacity of the valve. The system means that only half the RF voltage developed across the grid coil is applied to the PA valve grid/cathode circuit. However, ignoring circuit losses, the 829B needs less than one watt to fully drive it in Class-C, and a 5763 RF tetrode with 250 volts supply running in Class-A will give more than 4 watts and so easily provide adequate drive. Class-A operation is not very efficient DC-wise, but it allows the preceding valve to be simply a voltage amplifier, and so requires the least RF driving power of any of the modes.

4. *RF Voltage Amplification and Keying.* Having agreed that the preceding valve in the chain may be a voltage amplifier, that puts it into the receiving RF amplifying class, in which case a vari- $\mu$  type can be used and one can control the drive level to the 829B by varying the grid bias to this valve; it can be a 6BA6 or EF93, or similar type. One can also arrange to key this valve in Morse code operation by switching the screen grid voltage through the Morse key, and to make quite sure the valve is cut off when the key is at 'space' one can connect the screen grid *via* a high resistor (say 330K) to the negative bias supply so that it is biased well negative when the key contact is open.

5. *Mixer.* Preceding the voltage amplifier there must be a mixer to allow introduction of the VFO to give frequency agility. This calls for a pentagrid such as a 6BE6 or EK90 with the VFO connection to the normal oscillator grid and the signal source (modulated or CW) to the signal grid. The VFO voltage must always firmly exceed the signal source voltage, as otherwise modulation of the latter will be distorted when the peaks exceed the VFO voltage.

6. *Tuning.* Tuning of the anode of the mixer and anode of the voltage amplifier will provide sufficient selectivity to pick the right frequency out of the mixer, and the tuning of the two stages can be ganged. If the tuning ratio is set at just over 2:1 two ranges will cover all the HF amateur bands, and something like a 2-gang 150 pF

variable capacitor is required. This tuning cannot, however, be ganged to the grid tuning capacitor of the 829B as this will be a centre-tapped circuit requiring a similar capacitor arranged as a split-stator device, placing its two sections in series across the grid coils and thus halving the maximum capacitance across the tuned circuit.

7. *Drive Coils.* It is a good idea to use toroidal coils for the centre-tapped grid coils. These tend to be better balanced than straight former wound coils and have the advantage of a closed magnetic core circuit, so that the magnetic flux is contained within the coil and they should not need screening. However, they must be shunt coupled, for DC current in the windings will change the core permeability and alter the tuning.

8. *Drive Source.* If the VFO is 5 to 5.5 MHz, which is common for use with 9 MHz SSB exciters, one needs a 9 MHz oscillator to provide 3.5 and 14 MHz signals ( $9 - 5.5 = 3.5$ ,  $9 + 5 = 14$ ), a 12.5 MHz oscillator for 7 MHz ( $12.5 - 5.5 = 7$ ), and a 16 MHz oscillator for 21 MHz ( $16 + 5 = 21$ ). These can be from fundamental crystals switched into an oscillator by the frequency band switch selecting the mixer and voltage amplifier tuned circuits. The oscillator can be a twin triode with separate cathodes, such as a 12AU7 valve with one half connected as a Pierce oscillator and the other half as a cathode-follower to provide a low impedance output.

An HT switch to the oscillator/cathode-follower can be labelled "INTERNAL/EXTERNAL" and the external drive input connected direct across the cathode follower output resistor. It will be necessary to unplug the external drive when the internal drive is used, and similarly to switch off the internal drive when the external drive is used; if this requirement is not acceptable it means an RF type switch to change the connection into the signal grid of the mixer, but it will still be necessary to have the HT switch to allow the internal oscillator to be switched off when not in use. The external drive frequency can be at a frequency suitable for mixing with the VFO in the mixer to produce the wanted radiation frequency, or it may be on the frequency to be

# South Midlands Communications Ltd.

## Your Invitation to the SMC Stand at Leicester '78

See some of SMC's selection from a Hundred Manufacturers in ten countries

1 Gross Major Yaesu items	1 Doz. Antenna Tuners	2 Doz. Microphones
1 Doz. SWR/Power Meters	1 Doz. Morse Keys, etc.	6 Doz. VHF Antennas
4 Doz. Versatowers	1 Doz. Rotators	1 Doz. Coax Cables
$\frac{3}{4}$ Doz. Frequency Counters	4 Doz. HF Antennas	$\frac{1}{2}$ Doz. Masts—Tubular
4 Doz. Crystal and Ceramic Filters	4 Doz. Valves	4 Doz. Coax Plugs/Sockets
30 Doz. Crystal Frequencies	$\frac{1}{2}$ Doz. Dipole Centres	$\frac{1}{2}$ Doz. Antenna Wires
6 Doz. Riggings and Fittings	1 Doz. Insulators	$\frac{1}{2}$ Doz. Balun Transformers

Taken from stock of :—500 Transceivers, 500 Receivers, 1000 Rotators, 50,000 Plugs., etc., etc.

**REMEMBER: YAESU** the choice of the discerning  
SMC your only single stop source

2 Year Guarantee — Free "24 Hour" Securicor Service — Enlarged Service facility

++ FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED ++



## FT901DM

THE FT901DM TRANSCEIVER OFFERS UNPARALLELED RECEIVER PERFORMANCE COMBINED WITH STATE-OF-THE-ART TRANSMITTER DESIGN. THE RECEIVER FEATURES REJECTION TUNING, DUAL FILTER VARIABLE-BANDWIDTH TUNING, AND AUDIO PEAK FREQUENCY TUNING FOR MAXIMUM REJECTION OF UNWANTED SIGNALS. THE TRANSMIT SIDE INCLUDES A BUILT-IN CURTIS 8043 IC KEYS, RF SPEECH PROCESSOR, AND A TEN-SECOND "TUNE" POSITION TIMER WHICH PREVENTS DAMAGE TO YOUR FINALS DUE TO EXCESSIVE "KEY DOWN" PERIODS DURING TUNE UP. OTHER ADVANCED FEATURES INCLUDE FREQUENCY MEMORY FOR INSTANT RECALL OR SPLIT OPERATION, AN ADVANCED NOISE BLANKER, AND OFFSET TUNING FOR EITHER TRANSMIT OR RECEIVE FREQUENCIES. YAESU'S UP-TO-DATE MODULAR CONSTRUCTION UTILIZING PLUG-IN CIRCUIT BOARDS MINIMIZES SERVICE TIME. ALL MODES (USB, LSB, CW, FSK, AM, AND FM) AND ALL BANDS (160-10 METRES PLUS MSF RECEIVE) ARE PROVIDED.

Rejection Tuning  
Variable width IF  
Variable Audio Peak  
Advanced Noise Blanker  
Digital Readout to 100 Hz  
Analogue Readout to 1 kHz

Keyer IC in-built  
Semi Break-in with Side Tone  
RF Speech Processor  
RF Negative Feedback  
PLL Frequency Generation  
100-25 kHz Crystal Calibrator

Vox Front Panel Control  
AGC Slow Fast Off  
Built-in Speaker  
180W, PIP 80W, AM/FM  
100-230v. AV 50 or 60 Hz  
 $\pm 5$  kHz Clarifier (T, R and/or TR)

Output Power Control  
Keyer Speed Control  
Squelch on FM  
Power/IC/ALC meter  
AMGC Side Noise Eliminator  
12v. DC Invertor in-built

Remember the full line of matching accessories :—FC901 ATU/Power meter. FV901 External VFO with 40 memory channels, Manual 3 speed tuning and scanning, YO901 monitor scope with RF, IF, AF facilities. 2 tone oscillator and panadaptor facilities. SP901 external speaker. FTV901 Transverter covering 70, 144, 432, in one box (including repeater shift), etc., etc.

FREQUENCY RANGE :  
10-160m. CB, MSF (RX)  
POWER REQUIREMENTS :  
100/110/117/200/220/234v. 50/60Hz  
13.5v. DC (Negative Earth)  
AC 45W. RX, 70W. SRX : 320W. TX  
DC 1A. RX, 5A. SRX, 21A TX  
MODES (TX and RX) :  
LSB, USB, AM, CW, FM, FSK  
DIMENSIONS :  
13.5" x 6" x 13.5"—40 lbs.

PASSBAND TUNING :  
2-4 kHz to 300Hz Cont.  
BANDWIDTHS (with filters\*) :  
SSB 2-4 kHz (1-7 : SF)  
CW\* 0.6 kHz (2 : ISF)  
AM\* 6.0 kHz (2 : ISF)  
FM 12 kHz (2 : ISF)  
CROSS MODULATION IMMUNITY :  
80dB (20 kHz off 20dB Sig. at 14 MHz)  
DESENSITIZATION IMMUNITY :  
90dB (20 kHz off 20dB Sig. at 14 MHz)

SENSITIVITY :  
0.25  $\mu$ V for 10d S/N  
IMAGE RESPONSE :  
18-21 MHz better than -60dB  
28 MHz better than -50dB  
IF REJECTION :  
Better than -70dB  
STABILITY :  
300 Hz Cold 100Hz  $\pm$ H. (AWU)  
AUDIO OUTPUT :  
3W. at 10% THD (4-16 ohm)

THIRD ORDER DISTORTION :  
Better than -31dB  
TRANSMITTER POWER :  
180W, PIP A1, A3, 80W. IN A3h,  
E3, F1  
CARRIER SUPPRESSION :  
Better than -40dB  
UNWANTED SIDEBAND :  
Better than -50dB (at 1 kHz)  
SPURIOUS OUTPUTS :  
Better than -40dB

FT101, FT200, FT301, FT7, ASTRO200A ALSO ON THE STAND

++ LINEAR TRANSVERTERS FOR 70, 144, 432, FROM 28 MHz

FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED ++

++ SOUTH MIDLANDS COMMUNICATIONS LIMITED FOR  
ALL YOUR VHF AND UHF ANTENNA REQUIREMENTS +-

## NEW! FROM YAESU CPU 2500R



THE CPU2500R IS THE ULTIMATE IN 2 METRE FM TRANSCEIVER DESIGN. FREQUENCY CONTROL IS POSSIBLE EITHER BY THE OPTICALLY COUPLED MAIN TUNING KNOB OR BY CONTROLS ON THE MICROPHONE. FOUR MEMORY CHANNELS ARE AVAILABLE WITH SCANNING PROVISION OF DIAL OR MEMORY FREQUENCIES. THE CPU2500R COMES IN FOUR VERSIONS (DETAILED BELOW), 10 or 25 WATT, STANDARD MICROPHONE (CONTAINING UP/DOWN REMOTE ELECTRONIC TUNING CONTROLS) OR KEYBOARD MICROPHONE (ALLOWING REMOTE INPUT OF DIAL OR MEMORY CHANNELS, PROGRAMMING OF REPEATER SPLITS, SCANNER CONTROL AND TONE PAD FACILITIES). AUTOMATIC BURST AND LONG EUROPEAN REPEATER ACTUATION TONES ARE BUILT IN.

CPU2500R Standard mic 25W./ CPU2500RK Keyboard mic 25W./ CPU2500RS Standard mic 10W./ CPU2500RK5 Keyboard mic 10W.

FT227R, FT227RS, FT223, 2015R, Dig. II ON THE STAND

++ LINEAR AMPLIFIERS WITH 80, 160, 280+ WATTS OUTPUT  
FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED +-



## FT 255 RD

YAESU'S STATE OF THE ART, FULLY MODULAR (PLUG IN BOARD) MULTIMODE, 2 METRE TRANSCEIVER OFFERS UNPARALLELED FLEXIBILITY OF USE: IN FREQUENCY READOUT (ANALOGUE AND DIGITAL SCALES), IN FREQUENCY SETTING (ON THE STABLE VFO, OR THE MEMORY OR ONE OF THE 11 CRYSTALS (22 FREQUENCIES OVER 2 MHz)) IN SIMPLEX (25W, PEP ON 55B AND I-25W, OUT ON FM) AND IN REPEATER USE ( $\pm 600$  KHZ,  $\pm$  AUX, SPLIT AND XTAL TONE BURST).

THE USE OF A 134 MHZ VCO AND SINGLE SIGNAL MIX PRODUCES AN EXCEEDINGLY CLEAN SIGNAL AND MAINTAINS GOOD SIGNAL HANDLING IN THE OUTSTANDINGLY SENSITIVE RECEIVER.

144-148 MHz inclusive Coverage  
Multimode SSB-LSB-FM-AM-CW  
AC mains or 12v. DC working  
Smooth Dual speed VFO  
Digital readout to 100 Hz  
Mode sensitive digital readout  
Analogue readout to 1 kHz

Front Panel FM power control  
Front Panel sensitive squelch  
Front Panel VOX/MOX/Control  
Front Panel Mic. Gain control  
Switchable effective noiseblanker  
Switchable AGC—Slow or fast  
Switchable lights/readout brightness

Semi Break in CW with side tone  
Clarifier on Rx or Rx + Tx  
Carrier works on VFO, xtal & mem.  
ALC external phono socket  
Normal/Reverse repeater split  
Auxiliary repeater shift option  
Relay make-break-common sockets

22 Fix Channels (2 x 11) (2 MHz)  
Memory Option 5 or split use  
"ST" centre zero I/P output meter  
Switchable 20dB RF attenuator  
Switchable Xtal cont. tone burst  
Switchable Meter function on Rx.  
Accessory rear panel DIN socket

FREQUENCY RANGE :  
144-148 (4 x 1 MHz)  
 $\pm 600$  kHz + another shift  
AUDIO OUTPUT :  
2W (int. or ex. 4 $\Omega$  speaker)  
AUDIO DISTORTION :  
10% at 2W.  
SENSITIVITY :  
0.5 $\mu$ V for 20dB S/N (SSB)  
0.35 $\mu$ V, for 20dB Q5 (FM)  
1.0 $\mu$ V for 10dB S/N (AM 30%)

FREQUENCY STABILITY  
100Hz/30 mins. (A.W.U.)  
20Hz for 10% line change  
SPURIOUS RADIATION :  
Better than -60dB  
AUDIO RESPONSE :  
0.35-2.6 kHz + 3dB  
POWER REQUIREMENTS :  
AC-234/220/200/117/110/100v.  
RX 30VA Tx 160VA DC-11.5-  
16.0v. Neg.  
Ground RX 1.2A TX 6.5A

SELECTIVITY :  
2.3 kHz at 6dB (1.78 : 1 SF)  
12 kHz at 6dB (2.33 : 1 SF)  
SIDE BAND SUPPRESSION :  
Better than -40dB  
CARRIER SUPPRESSION :  
Better than -40dB  
OUTPUT POWER :  
24W. PEP A3J  
25W. F3 A1 (Adjustable)  
8W A3

DIMENSIONS :  
12" (14") x 11" x 5" (6")  
Weight approx. 20 lbs.  
SPURIOUS RESPONSES :  
Less than 1 $\mu$ V  
IMAGE RESPONSE  
Better than -60dB  
MODES :  
USB, LSB, FM, AM, CW  
READOUT RESOLUTION :  
Digital to 100Hz  
Analogue to 1 kHz

FT225R, FT221R, YC221, M27000 ALSO ON THE STAND

++ LINEAR TRANSVERTORS FOR 432, 1296 FROM 144 MHZ  
FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED +-

++ SOUTH MIDLANDS COMMUNICATIONS LIMITED PROVIDE  
FOR ALL YOUR HF ANTENNA, ROTATOR AND MASTS NEEDS ++



## FRG 7000

THE FRG7000 IS A HIGH PERFORMANCE ALL SOLID STATE COMMUNICATIONS RECEIVER DESIGNED TO COVER THE ENTIRE HIGH FREQUENCY SPECTRUM OF 0.25 TO 30 MHz. WITH BRIGHT 3" SEVEN SEGMENT LED'S PROVIDING DIGITAL READOUT TO 1 kHz. ALSO INCLUDED IS A 24 HOUR DIGITAL CLOCK FOR BOTH LOCAL AND GMT TIME WITH A TIMING FEATURE FOR AUTOMATIC RECEIVER (AND/OR TAPE RECORDER THROUGH REAR PANEL RELAY CONTACTS) ON/OFF SWITCHING.

The Barlow-Wadley loop (Triple conversion Super-heterodyne) system used, offers extremely stable (better than 500Hz/hr. A.W.U.) performance. Ceramic IF filters with a 6dB bandwidth of 3 kHz for SSB & CW (8 kHz at 50 dB) and 6 kHz bandwidth for AM (14 kHz at 50dB) provide optimum intelligibility coupled with good rejection of interference.

The Mosfet RF amplifier offers an outstanding sensitivity of 0.7 $\mu$ V for 10dB S/N on SSB and 2 $\mu$ V for 10dB S/N on AM, without sacrificing strong signal performance. Wide provisions are made for antenna connections; for M.W. broadcast (0.25-1.6 MHz) a high impedance binding post, for 1.6-30 MHz a SO239 socket (to take a 50-75 ohm unbalanced coaxial feed) plus binding post (for random low impedance length S.W. antenna). Also on the antenna terminal strip is the earth and a mute (earth for standby) connector.

Audio output of up to 2 Watts drives the internal speaker, but plugging in an external 4 ohm unit or headphones (1/2" Jack) disables this. A socket for tape recording produces about 50mV independent of the volume control setting. A built in mains power supply allows operations from 100/110/117/220/230v. AC (50 or 60Hz). To reduce the power consumption (of 25W) the front panel lamps and displays may be extinguished.

For high reliability FET's and IC's are used extensively throughout the receiver providing maximum performance within a compact cabinet (36(w), 12.5(h) 20.5(d) and 7Kg.). For ease of service plug in boards are employed widely.

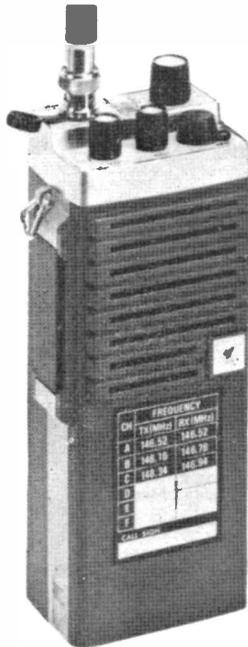
A switchable RF attenuator, AM noise limiter and amplified AGC, assist in reception under adverse conditions of: strong adjacent signals, impulse noise and deep signal fading. The continuously variable audio filter minimises the high or low audio responses as required, and a fine Tune ( $\pm$  2.5 kHz) allows easy zeroing of a desired station.

Frequency readout is taken directly from the digital display. The first two digits are controlled by the "MHz set" oscillator, the remaining three by the VFO (both via a CPU). The receiver front end is a narrow band with preselector and rangeswitch colour coded for ease of use, to provide the maximum in sensitivity and rejection of out of band signals.

Accessories included are the handbook, plugs (for every socket in the receiver) and 3 and 10m. wire antennas.

FRG7, FRG7D, SMC73, FR101 ALSO ON THE STAND

++ ALL SWL (HAM AND BCL) SUPPLIES ARE AVAILABLE  
FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED ++



## NEW! FT202R BY YAESU

THE FT202R IS A MULTIPURPOSE, SIX CHANNEL, HAND-HELD, 2 METRE, FM TRANSCEIVER, THAT OFFERS THE HIGHEST OF PERFORMANCE IN A LIGHTWEIGHT, COMPLETELY PORTABLE, PACKAGE. THE RECEIVER IS A DOUBLE SUPERHET.—MOSFET RF, FET MIXER, 2 STAGE OF 10.7 MHz CERAMIC FILTERING, INTEGRATED CIRCUIT, IF AND AUDIO STAGES WHICH PRODUCES A HALF A WATT OF CRISP CLEAR AUDIO. THE TRANSMITTER PROVIDES OVER A WATT OF OUTPUT TO THE TOP PANEL BNC SOCKET, INTO WHICH MAY BE PLUGGED THE SUPPLIED HELICAL, A MOBILE WHIP, OR THE HOME STATION ANTENNA. DRY CELLS OR NI CADS CAN BE USED, AND A CHARGER IS AVAILABLE, WHICH NOT ONLY RE-CHARGES THE BATTERIES, BUT WITH A SUITABLE DC SOURCE PERMITS BASE STATION OPERATION WITH EXTERNAL MICROPHONE (WITH PPT) AND SPEAKER.

1 Watt RF minimum  
6 channel capability  
BNC Antenna socket

Less than 1 lb. (no cells)  
6.1 (7.1)H x 2.1 (2.1)W. x 2"D.  
"S" and battery meter

Built-in speaker and mic.  
Remote speaker, mic. socket  
Impact resistant ABS case

Includes 3 (or 6) pairs of crystals.  
Complete with Leatherette carry case.  
Complete with a dummy battery.

Includes semi auto tone burst.  
Complete with BNC helical whip,  
Complete with long shoulder strap.

VOLTAGE REQUIREMENTS :  
9.6v. DC  $\pm$  10% (max. 12v.)  
CURRENT CONSUMPTION :  
30MA SRX, 200MA RX 500MA TX  
BATTERIES REQUIRED :  
8 AA Ni Cad or 7 Dry cells

TX POWER OUTPUT :  
1 Watt or more  
DEVIATION :  
Up to  $\pm$  5 kHz  
SPURIOUS RADIATION :  
-60dB or better

RX SENSITIVITY :  
0.3  $\mu$ V for 20dB quieting  
SELECTIVITY :  
11 kHz at -6dB  
AUDIO OUTPUT :  
500mW at 10% T.H.D.

KP202, MS2, MR2, MR3 (U & V) ALSO ON THE STAND

++ SSB, FM, CW, AM OR FSK FROM TOP TO TWENTY-THREE  
FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED ++

## ++ FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED ++



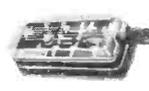
UHF LINEARS



TRANSVERTERS



SWR BRIDGES



BUG KEYS



COAX SWITCHES



QUARTZ CRYSTALS



MORSE KEYS



POWER METERS



ROTARY BEARINGS



ANTENNA TUNERS



VHF WATTMETERS



UHF WATTMETERS



MOBILE WATTMETERS



CRYSTAL FILTERS



VHF PREAMPS



HF BALUNS



COAX SWITCHES



COAX RELAYS



VHF PREAMPS



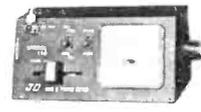
BOOM MICS



POWER SUPPLIES



ANTENNA TUNERS



SWR METER

## ++ FROM SOUTH MIDLANDS COMMUNICATIONS LIMITED ++

If you cannot liaise at Leicester; call in at Chesterfield, Leeds, Lincolnshire, or Totton, or phone an Agent for an appointment to examine products from Yaesu and:—

"Alimasts"  
Ampere  
Ascott  
Bantex  
Barlow-Wadley  
Belcom  
Burns  
CDE  
CIR  
Center Rise  
Cushcraft  
Dentron  
Diawa  
Electronic Developments  
F.D.K.

Fulton  
G. Whip  
Gem Quads  
H.S.  
H.Z.P.  
Hansen  
Henry Radio  
Hi Mound  
Hills  
Honda  
Hy Gain  
I.C.E.  
Icom  
J.D.  
J.R.C.

Jaybeam  
Junfer  
KDC  
KE  
KLM  
K.W. (Decca)  
Katsumi  
Ken  
Kenpro  
Kuranishi  
Kyokuto  
Leader  
Leson  
M.F.J.  
Maeden-Sound

Metron  
Mickey Mouse  
Mini Beams  
Mosley  
N.E.C.  
Nagasawa  
Naigai  
Omega  
R.S.G.B.  
Reace  
S.M.C.  
SML  
Sanyo  
Seiwa  
Shure

Soar  
Speciality Coms.  
Stolle  
T.T.E.  
Tavasu  
Technical Assoc.  
Telco  
"Telomasts"  
"Telotowers"  
Tempo  
Toshiba  
Unadilla  
Varian  
"Versatower"  
Wightraps

Failing this, send a large SAE for Yaesu Catalogue, 22 page stock list, etc.

**SMC (Jack Tweedy) LTD**

**ROGER BAINES, G3YBO**  
79 Chatsworth Road,  
Chesterfield, Derby  
Tel.: Chesterfield (0246) 34982  
9-5 Tuesday-Saturday

**G AGENT**

Brian Kennedy, G3ZUL  
"Mence Lodge"  
Heath Lane  
Stourbridge  
England  
☎ (03843) 5917

**NORTHERN (Leeds) BRANCH**

**COLIN THOMAS, G3PSM**  
257 Otley Road  
Leeds 16, Yorkshire  
Tel: Leeds (0532) 782326  
9-5 Mon-Weds & Fri-Sat

**GW AGENT**

Howarth Jones, GW3TMP  
Britannia Stores  
Mold  
Clwyd  
Wales  
(035287) 846/324

**GM AGENT**

Ian McKechnic, GM8DOX  
42 Newton Crescent  
Dunblane  
Perthshire  
Scotland  
(0786) 822212

**SMC (Jack Tweedy) LTD**

**JACK TWEEDY, G3ZY**  
Ham Shack, Roughton Lane  
Woodhall Spa, Lincs.  
Tel.: Woodhall Spa (0526) 52793  
9-5 Tuesday-Saturday (+ appoint.)

**GI AGENT**

Mervyn Anderson, G13WVY  
32 Knockview Drive  
Tandragee  
Craigavon  
Northern Ireland  
(0762) 840656

**SOUTH MIDLANDS COMMUNICATIONS LIMITED**

OSBORNE ROAD, TOTTON  
SOUTHAMPTON SO4 4DN  
OPEN 9-5.30 MONDAY TO SATURDAY

**MAIL ORDERS**

Head Office, Showrooms  
Cables: Aerial Southampton  
Telex: 477351 SMCMM G  
Tel: Totton (04216) 7333 (3 lines)



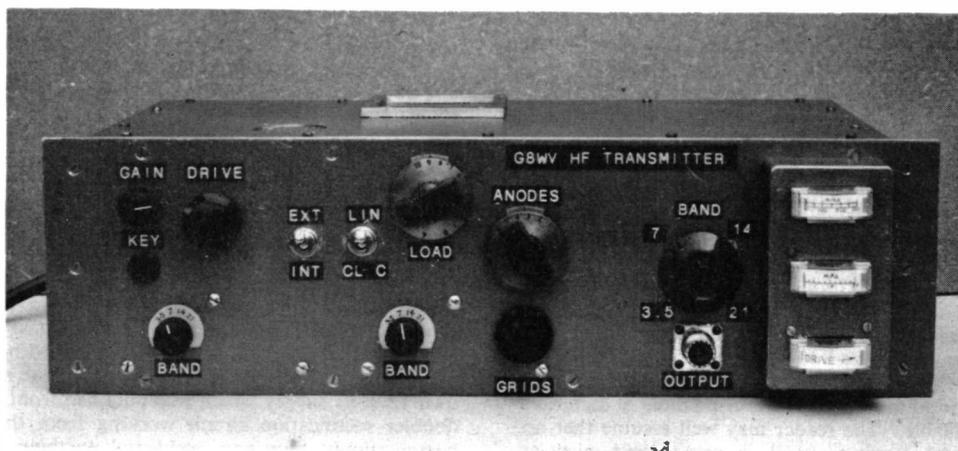


Fig. 3. The complete general-purpose HF transmitter.

radiated, when the VFO should be unplugged and the mixer used as a straight amplifier.

9. *Monitoring for Tuning.* It will be necessary to have a diode RF voltmeter to indicate RF peaking to the grid of the 5763 driver, as the 829B grids are separately tuned: the latter will be monitored on the normal grid current meter. Class-C operation requires 12 mA grid current and 45 volts of bias, and Class-B requires 18 volts of bias and grid current adjusted to give rated anode current. The grid current meter can be 0 to 20 mA and the anode current meter 0 to 300 mA. The initial drive meter needs no calibration as it is simply a peak indicator for tuning. The meters will need screening, as otherwise they make a large gap in the protection against radiation of harmonics and possibly TVI direct from the transmitter, thus bypassing the filtering in the output circuit and lead.

Rather than extend the meters and their screens back through the panel it will be very convenient to mount them in a small die-cast box and to screw that box onto the front panel, so grouping the meters and screening them very successfully. A fortunate advertisement in *Short Wave Magazine* offered 200 micro-amp. edgewise meters at 90p each, and these turned out to be of German origin fitted with dB scales which dropped into slots in the plastic frame. The scales were easily removed and replaced by hand-written ones on slips of cartridge paper and stuck into place. The necessary shunts for the grid and anode meters were wound in Eureka wire on carbon resistors of much higher value, and set by trial and error with a battery, variable resistor, and universal meter. These meters were one of the few purchases made specially for the transmitter in the photographs, and they were well suited and very cheap at £2.70 for the three!

10. *Bias Supply.* A small 6 to 20 volts 50 Hz transformer came to light in the survey. This is a typical example of adapting design to what is available, and certainly there would have been no point in having such a thing specially made for this job. There are many ways of producing the bias voltages, but it so happened that the 6 volts AC was in the transmitter for the heaters, and the 20 volts AC fed into a voltage doubler consisting of two 0A202 diodes and two 15 mF 63 volt electrolytics; this

produced just the 45 volts needed for Class-C operation, and when loaded with a resistor and 18 volt Zener also produced the Class-B bias, and two resistors in a voltage divider circuit produced the 7.5 volts bias for Class-A operation of the 5763. It was a gift from the junk box! However, such gifts can lead to later sorrow if the rare and unexpected component becomes faulty and the design of the home-brew device has been centred on it, so that replacement is essential and probably very expensive as a special one-off to order job. It is often better to leave one's options open and stick to readily obtainable stuff, but in this case rewinding a small transformer with low voltage primary and secondary winding in fairly thick wire by hand is quite practicable, and the beauty of iron-cored transformers is that the cores never catch fire, so they can always be rewound!

11. *Chassis and other Metal Work.* The remains of an old Government surplus power supply unit yielded an alloy panel  $\frac{1}{8}$  in. thick and measuring 19 x 14 inches, and it was possible to cut a relatively hole-less panel measuring 16 x 5 $\frac{1}{2}$  inches from it for the transmitter front panel. This factor clinched the choice of the 829B as PA valve as it was just the right height, and suggested the use of two die-cast boxes each measuring 6 $\frac{3}{4}$  x 4 $\frac{3}{4}$  x 2 inches, which were already in stock, to serve as very robust chassis for the two modules: one housing the low power stuff up to and including the 5763 valve, and the other housing the PA valve and its circuitry (except that the tank coils assembly and rotary selector switch were mounted directly to the front panel at the side of the PA module).

A second small die-cast box was screwed to the rear panel behind the tank coils assembly, and the power supply cable entry made into the transmitter behind that box, in which each lead was decoupled by suitable capacitors before the supply leads enter the body of the transmitter. Some 18 s.w.g. aluminium panels were bought quite cheaply from radio components specialists to form sides, back and top and bottom panels; these were cut to size and half-inch flanges bent along their edges as necessary to allow them to be screwed together to form the outer screening box with the front panel. Strips of  $\frac{1}{2}$  in. aluminium angle  $\frac{1}{8}$  in. thick were screwed

along the rear top and bottom of the front panel to provide the flanges to which the top and bottom panels could be screwed (the aluminium angle was found in a model shop and one would not wish to buy much of it at the price!).

Self-tapping screws Size 4 were used throughout on the outer screening, and another piece of 18 s.w.g. aluminium was fitted to serve as a screen between the two modules. Air circulation about the 5763 and 829B valves was arranged by cutting holes directly above and below the valves in the top and bottom panels, and covering them with perforated metal sheet rivetted to the panels and firmly clamped around the perimeters to ensure complete electrical bonding to earth.

All these details had to be thought out during the survey to get the size and positioning of components, etc., just right and to make use wherever possible of materials already available. The reader may well assume that no piece of metal, however small, is ever thrown away at G8WV!

12. *Painting.* It is so easy these days to buy an *Aerosol* paint spray at a garage, and the metallic finishes are excellent for amateur radio equipment. Before painting make sure all the necessary drilling is done, assemble the metal work as far as possible, clean off grease and dirt, and then spray evenly. Once sprayed it should be left to harden for at least twenty-four hours before handling. Use of undercoat, etc., is advised on clean metal, but if the metal has been cut from existing equipment and has been commercially finished there is not much point in priming it.

14. *Labels.* The XYL's *Dymo* machine used to label the 'specials' in her greenhouse will also produce most of the stick-on labels for the front panel, though it will not do labelling that needs setting on an arc to denote rotary switch position functions. These latter can be done on coloured card with mapping pen and indian ink, and stuck to the panel with impact adhesive.

That concludes the survey. Whilst most technologists will accept the fact that the choice of final amplifier for an amateur 150 watt transmitter still lies with valves rather than semi-conductors, there are sure to be some eyebrows raised at the low-level stages of the transmitter being valved in this article. Consideration was given to hybrid design, and in fact the crystal oscillator was initially made with a transistor followed by an FET untuned amplifier. It worked all right, but needed its own 12 volts supply which was obtained from a voltage doubler rectification circuit working from the 6 volts heater supply, but any accidental earthing of either side of the heater wiring immediately burned up some of the doubler diodes. Agreed, it was the method of providing the 12 volts which was the trouble, but any alternative method would require an isolating transformer. Looking into this problem, it was noted that the biggest thing about the oscillator circuit was the switch wafer selecting the crystals, and this would be the same for valve or transistor circuitry. Supplies for a valve existed in the module and there was plenty of room, so a twin triode was the obvious answer. There was simply no merit in using semi-conductors in the circumstances so they were replaced by the valve.

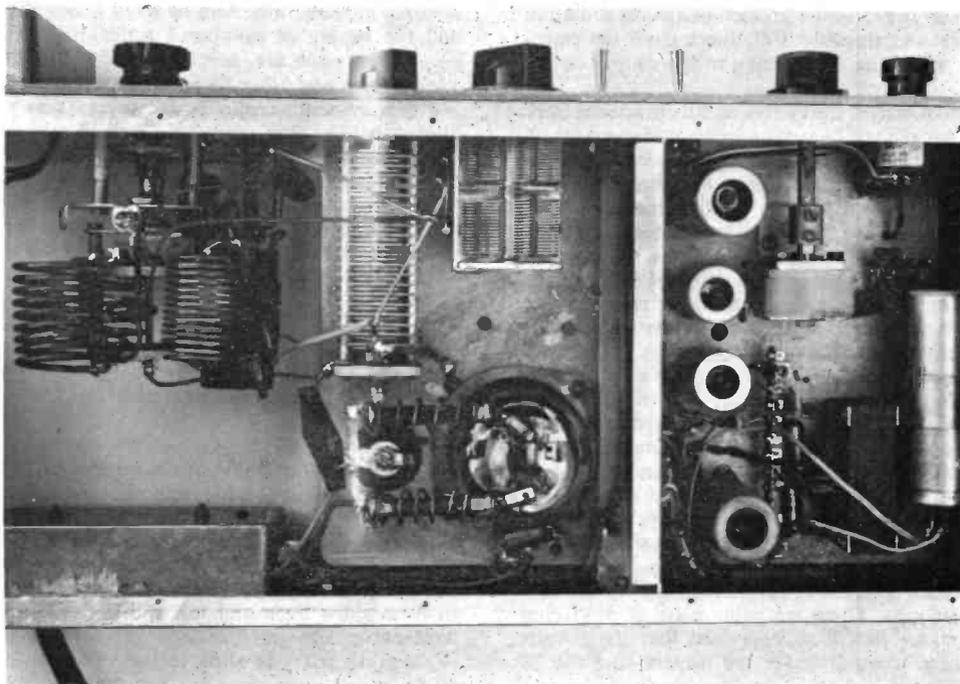


Fig. 5. Top view of the modules and tank assembly.

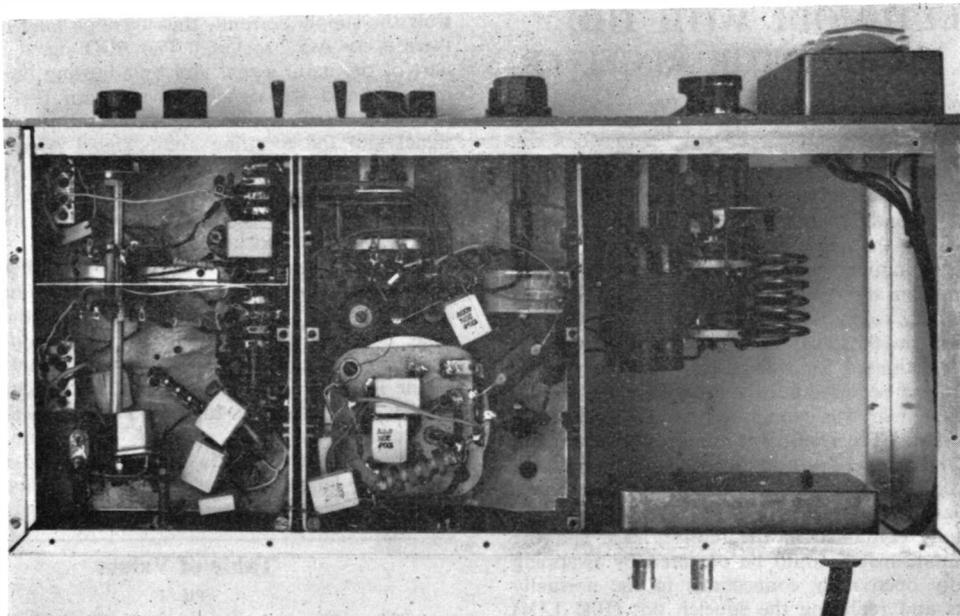


Fig. 6. The transmitter from underneath, with bottom plate removed.

Had the remainder of the low power module been transistorised the argument above would have been reversed, but use of a transistor driver to the PA had been considered and rejected for a number of reasons. First it would have required a 'high power' transistor to serve as driver (which would have run pretty hot and dissipated its heat into the chassis), and the output impedance would be very low and a considerable transformation upwards would be needed to satisfy the grid drive voltage needs of the PA valve. The 829B input capacitance of 29 pF shunted across a fairly high transformer untuned secondary impedance (remembering that the impedance ratio is the square of the voltage ratio in a transformer) would cause a falling-off of the drive voltage as frequency was increased. This could be prevented by tuning the secondary so that the valve input capacitance is lumped into the tuning capacitance, but this would immediately introduce neutralising problems for the driver transistor as its input would also be tuned.

Secondly, the low gain of RF amplifying high-power transistors (5 dB minimum in case of BLY84) would necessitate more than one amplifying stage inserted between mixer output and driver input; the couplings between them would need to be tuned because of the multiplicity of signals at the mixer output arising from sum and difference mixes from fundamentals and harmonics of the frequency sources, and the high harmonic content present in the outputs of transistor big-signal RF amplifiers. Tuning of the couplings would involve tapping or double winding of coils and so additional

switching requirements, and also neutralising of each amplifier stage. Controlling the gain of the amplifier to provide correct drive for the 829B whilst retaining linearity for SSB at all levels could also give trouble.

The case for valves with their high impedances directly suited to the tuned circuits, internal screens between input and output circuits, high gain compared with RF power transistors in practical applications, and no real worry about heat generation, given air circulation, seemed overwhelming in the context of 'shack' manufacture. It is conceded that hybrid construction using a solid state module to drive a valve module may have merit for commercial products because of the suitability of solid state devices for mass production techniques, but the high degree of design and production development work required for such purposes is quite inappropriate to one-off model-shop productions, which is really what home-brew amounts to.

There is more to be written concerning such matters as marking-out and bending sheet metal, the making of holes both large and small, the relationships of holes and screws and taps, and the horrible fact that there has emerged a meritocracy that would discredit the inch and the vulgar fraction and make obsolete such life-long friends as our micrometer, steel rule, and the ARRL formula for the length of a half-wave dipole! Tracking of ganged circuits, the delicate and maddening art of neutralising tetrodes, and the insidious infiltration of parasitic oscillations have all played their parts and will be offered for your consideration.

*to be continued*

## MULTI-MODE WITH THE NR-56 FM MONITOR RECEIVER

L. G. RIX, B.Sc., G3XJW

**A**FTER some years of inactivity the writer decided to investigate the possibilities of 2m. mobile operation, and to assess the situation the NR-56 monitor receiver was installed in the car. Before long, though, it was smuggled back indoors and the idea of using it to resolve SSB transmissions emerged.

The 455 kHz second IF lends itself to a simple BFO incorporation, but the integral FM limiter and discriminator are not optimised for side-band! Obviously some modification was required but the thought of butchering new, tidy equipment was enough to provoke a search for another option. The result was the scheme described, which is in the nature of an add-on unit, with connections to the power feeds and transposition of audio leads (the only changes to the basic equipment). Nonetheless, the unit is totally contained in the receiver case and the outboard mode-switch could be obviated by swapping the normally open relay connections to the normally closed ones and replacing the squelch pot (10K LIN) with a component including an on-off switch which breaks the relay supply line when fully counter-clockwise. The squelch action, although audio-derived, is of little use on SSB anyway.

Fig. 1 shows the circuit of the converter which is completely straightforward. The Ferranti ZN414 micro-radio IC is used as IF amplifier, demodulator and audio drive to convert a 455 kHz SSB signal to AF applied to the NR-56 volume control; the BFO circuit is standard, and this stage and the 'receiver' both used IF transformers from a junk-box portable as their tuned circuits. The potential 72 dB gain of the ZN414 depends on the exact supply voltage applied, and the input signal con-

trols the supply current—thus through load resistor R7 there is an AGC system. The BFO signal constitutes part of the input signal and by adjusting the degree of injection and the signal pick-up from the NR-56 IF strip, optimum results may be obtained on an SSB signal and the resulting audio signal maximised.

The construction of the unit is on the copper side of a piece of printed circuit laminate nominally 50mm. x 25mm., cut to fit in the available space against the channel oscillator socket in the NR-56.

The IF transformers are attached to the board by spot-soldering their cans flat to the board, one at each end, so that with the board vertically fitted the adjusting slugs are accessible through the hatch in the NR-56 base panel. Most of the components are soldered direct to the IFT pins or to the decoupling capacitors, which may be soldered flat to the board and serve as stand-off mounts. Supply and coupling components may be mounted with their leads through holes in the board, the copper lamina cleared with a *Verob* spot-face cutter or small drill; all leads must be kept short to prevent

### Table of Values

Fig. 1

R1 = 27K	C5 = 25 $\mu$ F 25v., electrolytic
R2 = 5K6	C6 = 0.1 $\mu$ F, polyester
R3 = 1K	C7 = 1 $\mu$ F 3v., tantalum
R4 = 1K8	C8 = 10 $\mu$ F 6v., tantalum
R5 = 100K	C9 = 25 $\mu$ F 25v., electrolytic
R6 = 10K	TR1 = PBC108
R7 = 820 ohm	IC1 = Ferranti ZN414
R8 = 220 ohm	D1, D2 = general purpose silicon
R9 = 22K	Zener diode = 8.2v.
R10 = 560 ohm (all $\pm$ w. 10%)	
C1, C2, C3, C4 = 0.01 $\mu$ F, min. disc ceramic	
IFT1, IFT2 = Miniature 455 kHz IF transformer, interstage, single-tuned (from <i>Ambit International</i> or surplus)	
RLA = 2-pole changeover, 12v. operation	
S1 = on/off switch, single-pole	
	Copper laminate, screened lead, <i>Blu-Tack</i> , etc

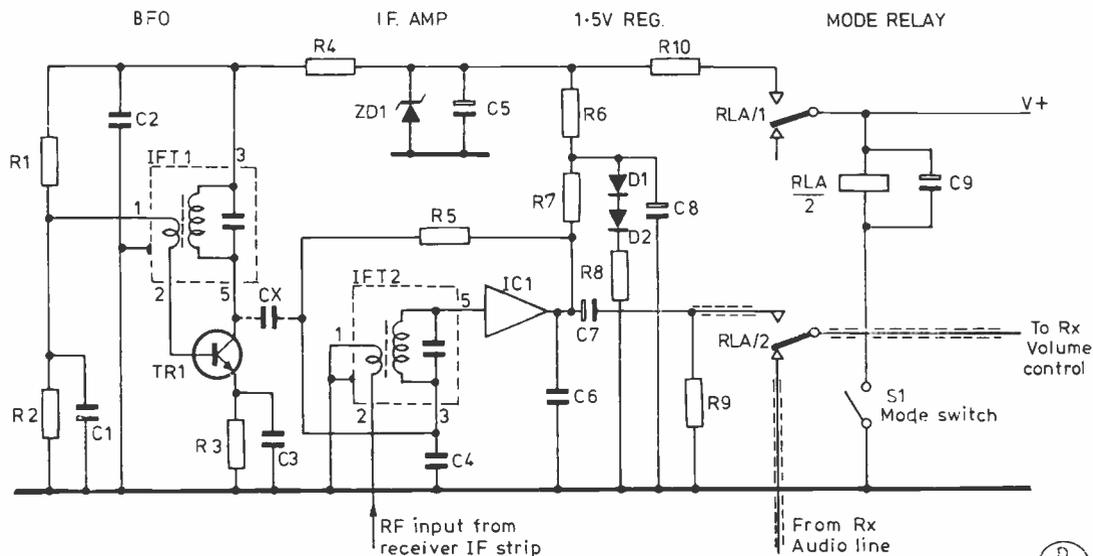


FIG. 1 CIRCUIT DIAGRAM OF ADD-ON I.F. UNIT

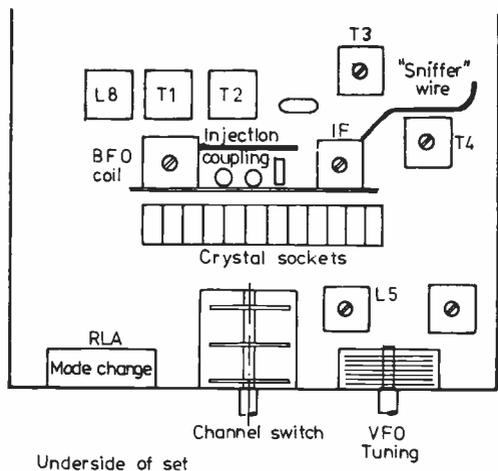
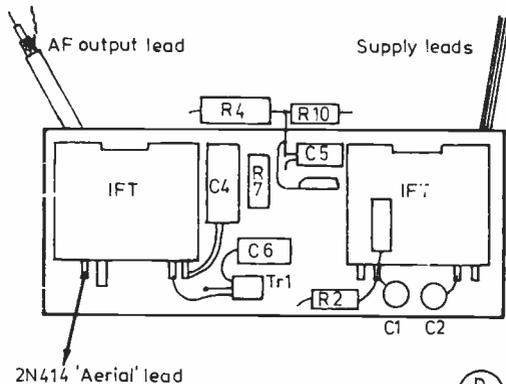


Fig. 2 MECHANICAL LAYOUT

D 226



2N414 'Aerial' lead

Fig. 4 DETAILS OF AMPLIFIER UNIT

D 228

instability particularly around the ZN414.

Wire spills (surplus resistor leads) are soldered to the top corners of the board and spiralled around the screened lead audio output and the supply leads for support purposes. The control relay is attached with impact adhesive to the back of the front panel in the large space provided.

To gain access to the innards of the receiver the cadmium-plated underside panel is detached by removing the four black screws (two each side) and one cadmium plate close to the front panel: the base panel is now carefully levered clear and the speaker-lead clips may be detached from the board. To remove the p.c. board and front panel from the remaining casing the two bright screws at the rear of the board are removed, plus the pairs of black screws into the panel and one on the topside of the case. The aerial connector and power leads should be carefully unsoldered. A twisted pair of red/black connecting wires may now be attached to the board, and the grey screened lead from the volume control disconnected as shown. A suitable extension length of screened wire is attached to the audio IC and both screened leads and the power supply wiring led to

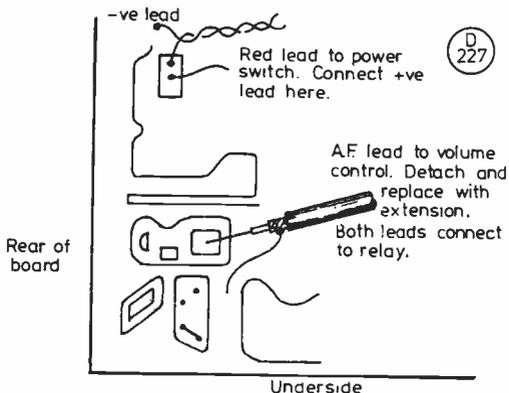


Fig.3 ELECTRICAL CONNECTION TO RECEIVER BOARD

D 227

topside of the board. See Fig. 2. The board and casing are now reassembled and reconnected: with the screened leads connected, function should be as normal.

The power supply and audio leads may now be connected to the relay as necessary and the audio switching of the relay checked; the completed amplifier/BFO board may be checked for short circuits etc. and then mounted as shown using impact adhesive or *Blu-Tack*. The supply leads and audio output lead should be connected to the relay, and a suitable switch on flying-leads may be used to check the relay function and the switching of supply to the add-on unit.

To set up the SSB function assuming no DC faults have arisen, the receiver is switched on and the relay activated when the white noise from the loudspeaker will reduce in volume; the squelch control should be backed-off to non-function position.

The 'aerial' lead from the ZN414 input coil is now tucked into the NR-56 IF, as depicted, to pick up 455 kHz signal and the input coil is peaked for maximum noise from the loudspeaker; stray BFO injection may 'flatten' the ZN414 characteristic and so whilst setting up the amplifier tuning, the beat oscillator should be well off-tuned. The oscillator is now tuned-in when noise will reduce, since the BFO tends to operate the AGC of the ZN414; the stray capacity coupling may be adjusted by length and positioning of the pick-up wire. Optimum setting is determined by listening to an off-air signal or the main-station Tx running into a dummy load (the minimum junction consistent with demodulation is the setting to aim for). Wax may be used to seal the coil cores and wire locations.

The writer found that the BFO tuning range was inadequate since the IFT integral capacitor when in parallel with transistor capacitance shifted the resonant frequency too far LF. This problem was remedied by carefully cutting away the screening can-top to permit the core to be further unscrewed.

The final work is to mount the mode-change switch on a suitable bracket located with the panel side-screws.

In use the modified receiver works quite well, with the slight oscillator pulling when in VFO mode being tolerable. For a small cost the basic receiver has been made multi-mode to enhance its usefulness as a standby; and, of course, in use with the main rig it permits monitoring of all operational modes as required by the Licence!

## THE MONTH WITH THE CLUBS

BY 'Club Secretary'

PERHAPS our first task is to mention with sorrow the early death of G3VAD, Robin Sinclair, as a result of a mishap on the road to work from his home in Hatfield Heath, not far from Bishops Stortford. Robin was never a chap to shirk his part, and had served the Harlow club as Hon. Sec.; and like all intelligent men he had several interests, in all of which he served by putting more in than he could expect to take out. His daily lot was in the field of Education, and there he dispensed not only the set syllabus, but led his students into the beginnings of his own wisdom—something so much more important than mere knowledge.

### Help!

We have a letter from Mr. R. D. McClelland, of 257 Causeway Road, Currysheskin, Bush Mills, Co. Antrim, N. Ireland, who wishes to get in touch with any clubs within striking distance of his home. Would the Hon. Secs. of any clubs meeting this requirement please get in touch with reader McClelland at the address above.

### The Mails

Here we must note that the recent delays in the postal system resulted in a few clubs being missed from the piece last month, as they came to hand after the copy had gone off for setting. These appear this time.

### Westerly

There has been a club at Rhyl for long enough, but it has had, perhaps, more share of the ups and downs of life than one can consider reasonable; but we hear that they are now booked on the fourth Thursday at the Ambulance Rooms, Rhyl Fire Station, Coast Road, Rhyl; and on the other Thursdays there is a local net on 145 MHz. For October 26 there is to be a demonstration of Slow Scan TV. Let us hope they are on the way back up, and can attract all the missing faces and more back into the fold.

Now we turn to Cornish who are at the SWEB Club-room, Pool, Camborne on the first Thursday in each month. It is interesting to notice that they can show, for the July meeting, an attendance of fifty-five members. That is a fine measure of the amount of organising ability they can call on, and it also means that they have something set up for every meeting—the next one being October 5.

Back over to the Emerald Isle again now, to IRTS Region 1, who have a concentration of Dubliners in its committee and hence a club Hq. in Dublin—not to mention a very good newsletter which notes the activity in all parts of the country. For more details, contact the Hon. Sec.—see Panel.

Hereford seem to have come a long way since the time when they were doubting their ability to survive unless attendances improved; they now have quite a gathering on the first and third Friday in every month at the Civil Defence headquarters in Gaol Street; by the time this reaches you they hope that the modifications to the

building which have been going on for a while now will be completed so that they can have a good clean up of their rooms. For more details of their doings, contact the Hon. Sec. at the address in the Panel.

### Scotland, North and Midlands

All lumped together this month, and the top of the pile is the letter from Northern Heights where they have just elected G3MDW as their third Hon. Life Member as a gesture of thanks for all the years he served them as Secretary/Treasurer. A well-deserved honour indeed. We also note that the EGM which bestowed this honour on Arthur also agreed that a change of Hq. was in order, and so they are now booked in on the second and fourth Tuesday of every month at the Bradford Sub-Aqua Club Hq., Mountain, near Queensbury—this gives us dates of October 10 and 24.

Another move of Hq. in the same area is being done by White Rose, who have well and truly outgrown their old Hq. at 83 Armley Town Street, and so have had to find a bigger home, preferably with as many of the features of the old place as they could manage. Thus, they have come to an arrangement with the Moortown Rugby club, Far Moss, off The Avenue, Allwoodly, Leeds 17, whereby they use the ballroom for general meetings, and have a bit of land for a club shack and workshop, where they can settle in with a bit of breathing space—find them there any Wednesday evening.

We turn now to Midland, who have their main meeting (on October 17) as the AGM, in Room 110 at the University of Aston, Gosta Green, Birmingham. They also have a date on October 3 at the Brasshouse Centre in Broad Street, which is an informal with a station on the air or whatever.

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

(For November issue—September 29th)

For December issue—October 27th

For January issue—November 24th

For February issue—December 29th

Please be sure to note these dates!

The South Birmingham news comes in by way of the same envelope that contained the Midland letter—a good way of saving postage indeed. South Birmingham are open for business on the first Wednesday in each month, but in addition every Thursday evening there is an HF night in the club shack, and every Friday evening they are open from 7.30, for a natter or a call-in over the air. The address where all this happens is Hampstead House, Fairfax Road, West Heath.

Macclesfield is a well-organised and thriving outfit to judge by their Newsletter—but the snag is that they do not mention the Hq. address, so we must point you in the direction of the Hon. Sec.; his name and address appear in the Address Panel.

Over at Coventry the scribe sent us the dates for September, plus the vital bit that they are at Baden-Powell House, 121 St. Nicholas' Street, Radford every Friday evening; the general arrangement is to have every other date operating the club station, and fill in with talks, films, demonstrations and so forth.

Reading the interesting story of 32 NFD sessions by G3WIO, who served all those years as one of the galley staff, your scribe was amused to note she ended by asking someone to explain just why *Wirral* have never repaid all their cookery by *winning*—a very fair question, and we hope she gets a reasoned answer! Perhaps it will be a matter of G3WIO deserting the galley and getting out on to the operating side of things to ginger them up! Meet the gang at the Sports Centre, Grange Road West, Birkenhead, on the first and third Wednesdays in each month.

Avoncraft Art Centre is the Hq. of Bromsgrove, for a talk on October 13 by G8ASO, his theme being that of RTTY. In addition they will be occupied on the October 21/22 weekend with Jamboree-on-the-Air from one of the local Scout groups.

October for Derby is a matter of the normal weekly Wednesday-evening sessions at 119 Green Lane; October 4 and 18th for Night-on-the-Air sessions, October 11 for a natter night, and October 25 for a talk by G3RJV of the G-QRP Club on Lower Power Transmitters.

At Stourbridge the formal sessions are at Longlands School, Brook Street; October 2 for Construction, and 16th for the formal meeting. In addition we understand they have an informal on the first Tuesday of each month at the *Bird in Hand*, Oldswinford.

October 17 is the date set aside in the Solihull calendar for the AGM, to which all are asked to turn up. The venue, as ever is the Manor House, High Street, Solihull, and the routine to meet on the third Tuesday each month.

Finally, we must note the formation of a new club in the Leicester area, known as the *Wigston* radio club, with the name and address of the Hon. Sec. in the Panel. Sad to say, no information on the Hq. or the plan

of meetings was included—just that the Hon. Sec. would be pleased to hear from anyone, SWL or licensed, who cares to call, write or phone.

### Nationals

Here our first one is the *Royal Signals* group, and they have a very fine *Newsletter* called "Mercury." This issue was of personal interest in that it indicated where an old friend of some 20 years had moved to, and also some new aspects of the beacon principle, suggesting that one W. Shakespeare was the first officer to give an account of the use of beacons in a play called *Macbeth*. We live and learn! Seriously, though, a most interesting newsletter, and well worth a subscription to qualified people, these being in the main past and present members of the Corps, plus a few Associate members at the discretion of the committee.

Next we note the *Royal Navy*; apart from the parent group there is a sub-section at *HMS Daedalus*, in the Portsmouth area, and another based on *HMS Belfast* where she lies opposite the Tower of London on the Thames. We hear from the latter a little shout of joy that they have been issued with the call sign GB2RN for the station they have set up aboard.

R.A.I.B.C. come next, and we hear that there is a new Hon. Sec., namely Mrs. F. Woolley, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE. We would think that just about everyone in our hobby knows that RAIBC is the group who look after the interests of the invalid and blind members of our hobby; indeed it is not unusual for blind and invalid folk to be introduced to this open window on the world, and then helped with the rig and aerials and, most importantly, the R.A.E. and Morse. Full members we have mentioned, but

### Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. (01-992 3778.)  
 BROMSGROVE: R. Blacker, G4GBE, 23 Leasowe Road, Rubery, Birmingham B45 9TB.  
 CHESHUNT: R. E. Chastell, G8LNM, 4 Fairley Way, Cheshunt, Herts. EN7 6LG.  
 CHICHESTER: T. M. Allen, G4ETU, 2 Hillside, West Stoke, Chichester PO18 9BL, West Sussex. (West Ashling 463.)  
 CORNISH: S. T. S. Evans, G3VGO, "Glengormley," Carnon Downs, Truro, Cornwall. (Devoran 864255.)  
 COVENTRY: D. Parker, G8OMB, 41 Brookdale Road, Nuneaton, Warwicks. CV10 0BL.  
 CRAWLEY: A. V. H. Davis, G3MGL, 41 Gainsborough Road, Crawley (20986), West Sussex RH10 5LD.  
 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.)  
 DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby, DE3 2BJ. (0332 56875.)  
 G-QRP: Rev. G. C. Dobbs, G3RJV, "Willowdene," Central Avenue, Stapleford, Nottingham. (Sandiacre 394790.)  
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237.)  
 IRTS (Region 1): J. Ryan, EI6DG, 23 Dollymount Grove, Clontarf, Dublin 3.  
 MACCESFIELD: J. Warden, G8ATI, 1 Sevenoaks Close, Macclesfield (20661), Cheshire SK10 2AW.  
 MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 2AN. (021-422 9787.)  
 NORTHERN HEIGHTS: L. Cobb, G3UI, 27 Moorlands Crescent, Cousin Lane, Halifax (60574), West Yorks.  
 R.A.I.B.C.: Mrs. F. Woolley, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.

REIGATE: F. H. Munday, G3XSZ, rear of Manor Farm, off Reigate Road, Hookwood, Surrey. (Horley 73878.)  
 RHYL: R. S. Stubbs, 81 Dyserth Road, Rhyll, Clwyd.  
 ROYAL NAVY: FCRS M. Matthews, G3JFF, 127 Drift Road, Clanfield, Portsmouth, Hants PO8 PQ.  
 ROYAL SIGNALS: Major (QM) R. A. Webb, G3EKL, 3 Hillcrest, Scotton, Catterick Garrison, North Yorks. DL9 3NJ.  
 SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road, South Chingford, London E4 9EA. (01-529 2282.)  
 SOLIHULL: L. G. Boswell, G4AEJ, 170 Kestrel Avenue, Yardley, Birmingham B25 8QX.  
 SOUTH BIRMINGHAM: Mrs. G. Apperley, G8KPA, 35 Denise Drive, Harborne, Birmingham 17.  
 SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon Eastbourne, East Sussex BN20 9JG.  
 SOUTHGATE: F. Fitch, G8EWG, 16 Kent Drive, Cockfosters.  
 STEVENAGE: T. J. Tugwell, G8KMV, 11 The Dell, Stevenage, Herts. SG1 1PH.  
 STOURBRIDGE: S. Shacklock, G4IP, 12 St. Peters Road, Stourbridge, West Midlands DY9 0TY.  
 SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton Surrey.  
 SUTTON & CHEAM: J. K. Korndorffer, G2DMR, 19 Park Road, Banstead, Surrey. (01-255 8729.)  
 UK FM GROUP (London): R. G. Street, G3TJA, 3 White Ledges, St. Stephens Road, London W13.  
 VERULAM: B. Pickford, G4DUS, 130 The Drive, Rickmansworth (77616), Herts.  
 WHITE ROSE: R. R. Hughes, G4DZI, 3 Primley Park Crescent, Leeds LS17 7HY.  
 WIGSTON: S. R. Parker, 59 St. Michaels Avenue, Leicester LE4 7AH.  
 WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Avenue, Wallasey. (051-638 2515.)

the other two grades are of Supporter and Representative, both drawn from the ranks of the active.

Last on this list we have the **G-QRP Club**, and here the big news is that the decision of the committee is to award the G2NJ Trophy to G3RJV, who has been the "sparkplug" of the operation right from the beginning until now when the club has several hundred members, all interested in low power working. Oddly enough, if you look in the Address Panel, your eye will be pointed at G3RJV, who is still the Hon. Sec.

### Southern

Top of the bill is **Southgate**, who can be found on the second Thursday of each month at the Scout Hut, Wilson Street, Winchmore Hill, at 7.45. For the October session, they are looking forward to a talk on Oscilloscopes by *Tektronix*, and the Publicity Officer in his letter makes a point of the welcome they give a visitor, which we can agree with from personal experience.

They have two Hq. places at **Sutton & Cheam**; one at Sutton College of Liberal Arts, and the other at Ray's Social Club, London Road, North Cheam. Looking at the table in the *Newsletter* where it is all nicely set out, we see October 11 at Ray's and October 20 at Sutton College, the latter being a change from a Wednesday to a Friday. We understand the programme details are all being settled as this is written.

British Aerospace Dynamics "B" is the new name of the Hq. of the **Stevenage** gang, which until very recently was Hawker Siddeley Dynamics and before that bore the name of De Havilland (and time your scribe recalls the horror of the staff at the proposal to drop the famous De Havilland name). They are booked in to the Staff Canteen on the first and third Thursdays of each month; this month, October 5 is down for a talk on the GB3PT RTTY repeater, October 11 is a special Wednesday evening session to hear G3LTF give his famous Moonbounce talk, and on 19th there is a Junk Sale.

At **Cheshunt** they meet every Wednesday at the Church Room, Church Lane, Wormley, Herts.; October 4 and 18 are the natter sessions, with a talk on Signals and Noise by G4DCP on October 11; and on 25th, G3OJI will give a resumé of progress on 10 GHz—we don't know whether that refers to his own progress or to the progress of gear for the band.

Pressing on we come to **Crystal Palace**, who foregather on October 21 at Emmanuel Church Hall, Barry Road, London S.E.22. At the time of writing, they were still in the process of negotiating their October entertainment, but they will no doubt have something set up in good time. It is nice to hear that the group have a satisfactory inflow of new members to maintain a good attendance; it is the first sign of malaise when new members "don't stick" and conversely a good sign when they do!

The **Chichester** group have the first Tuesday and the third Thursday every month, the venue being the

Lancastrian Wing of Chichester High School for Boys, Basin Road, Chichester—this works out to October 3 and October 19. For more details, contact the Hon. Sec. at the address in the Panel.

Sad to say we have to report that the editor of the **Cray Valley Newsletter** had a minor stroke while he was still in the process of making up the sheets, so the front-page is written by one who signs himself *Tovarisch Standinski*, no less; we wonder about his callsign—is it possibly MOIFFI? The main meeting at Christchurch Centre, High Street, Eltham is on October 5, when G8AYN will be talking about the Post Office microwave radio network; and the natter evening will be on October 19.

Last time we got news of the late change of programme at **Southdown** just too late to correct the copy; but we have it that October 2 is down for a Junk Sale, at Chaseley Home, South Cliff, Eastbourne.

Now we turn to **Surrey** where they have a place at *T.S. Terra Nova*, 34 The Waldrons, South Croydon, and will be found there on the first and third Wednesdays of each month.

On to **Silverthorn**, who have a place at Friday Hill House, Simmons Lane, Chingford where they can be found every Friday evening. However, we have to admit that it is very noticeable that most of the *Newsletter* is the work of one hand, and that hand a somewhat disgruntled one—he would doubtless be much happier if someone gave him some material to publish!

**Crawley** have a date on October 25, at the United Reformed Church Hall, Ifield, Crawley, for G4BLJ of the Post Office, Brighton, to talk about Interference. There is also an informal, dated for October 11, but as this is at the home of one of the members, we feel it would be polite to contact the Hon. Sec. before making plans; he is to be found in the Address Panel.

Although we have the **Reigate Newsletter** in front of us as we write, we cannot find any details of the October meetings; however we can say there is one at the Constitutional Centre, and another at the Marquis of Granby; for the rest we have to ask you to contact the Hon. Sec.—see Panel.

Now to **UK FM Group (London)** who get together at the Grove Park Hotel, Chiswick, W.3 at the junction of Spencer Road and Bolton Road. We have, on occasion, felt that we didn't quite agree with their published authors, though they do put out a very fine *Newsletter*, with, particularly, very good print—a pleasure to read after dozens of the other sort! This month, the best bit by far is the contribution by Pat Spenceley, G8LZA, who describes how she came to be the driver of an Addressograph machine (the UK FM Group one, of course) and what it does and doesn't do, not to mention how the plates wander all round the group before reaching her—quite hilarious. In addition there was a well thought-out editorial (even though we don't agree with it!) and some very useful technical material.

**Verulam** have their main meeting on the fourth Thursday of each month at the Market Hall St. Albans; this gives October 26 for a talk on Vintage Wireless. As for the informals they revert to the R.A.F.A. Hq. in Victoria Street for the winter months. Visitors are welcome to the meetings, but we suggest you contact the Hon. Sec. if you aren't too familiar with the locality, and he will give you directions for getting there—it's easy when you know how!

**AMSAT-UK** comes up again as a subject, this time at **Acton, Brentford & Chiswick**, where G3AAJ will be doing the honours, and doubtless mentioning the group of which he is Hon. Sec. The venue is the usual one of Chiswick Trades and Social Club, 66 High Road, Chiswick, on October 17th.

### Finale

That's about the lot for this month. Deadlines are shown in the "box" in the piece, for the next few months. The address is, as ever, "Club Secretary," **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts. AL6 9EQ.

### Late Ones

Not, we hasten to add, because they missed the deadline to arrive at Welwyn, but because they were in a packet of mail which was delayed between Welwyn and your conductor.

**A.R.M.S.** caters for all the mobileers, whether VHF or HF, with, if anything a slight bias in favour of VHF; but items of interest all appear in *Mobile News*. For details—G3FPK, QTHR.

**Torbay** are at Bath Lane, rear of 94 Belgrave Road, Torquay on October 28, to hear G3PQH talking about Rocks and Stones. Details, G3UIQ on Newton Abbot 3025—he has moved from his callbook address.

**York** have their base in the United Services Club, 61 Micklegate, York, every Friday evening *except* the third one. Details, G3WVO—QTHR.

**Dumfries & Galloway** have the first and third Mondays in each month at Cargonholm Hotel, New Abbey Road, Dumfries, with visitors welcome. They have a "special" event at Hq. on Sunday, November 19, with GM8FFX to give the talk, and lots of displays, stalls, and whatever, of which more next time.

**West Kent** next, where the dates are October 13, for G3XPX to talk about Instrumentation in the Amateur Station, and October 27, when G3AIO will talk about Navigation—not so far divorced from amateur radio as might appear at first. And G3KFE says that it is largely a matter of finding out that you aren't where you thought you were! Details from G4DYF—QTHR, or turn up at the Adult Education Centre, Monson Road, Tunbridge Wells. On the Tuesday after each of these they have an informal at the Drill Hall in Victoria Road. They are also on for J-O-T-A with the 2nd Tonbridge Scouts; they note that Scout Hq. at Gilwell Park have useful leaflets on organisation and follow-up.

Every Thursday evening it is for the **Nottingham** gang, at Sherwood Community Centre, Woodthorpe House, Mansfield Road. Details, G4EKW, QTHR.

Finally, for the record, the abbreviation QTHR says that the person concerned is as noted in the current G-Callbook. So, now you know for future reference!

## FROM STORNOWAY ON FORTY METRES

VINCENT EVANS, G4AVT

**A** TWO-WEEK caravanning holiday on The Isle of Lewis was planned for June this year, with the FT-101 to be included in the luggage. Time for transmitting would be limited to fit in with daily touring out of Stornoway and general holiday activities and it was decided that for static mobile working from the car was the answer.

The 40m. band seemed to be in good shape for G/GM working, so thoughts turned to a suitable antenna for this band, to meet the requirements of the expedition. It would be a loaded vertical of course, but as static mobile was intended it could be larger and therefore presumably more efficient than smaller mobile types. It would have to be quick and easy to erect and dismantle, and compact for stowage.

The best place for a car aerial is on the car roof, with all the metal beneath it: however not everyone wants to mutilate the car roof to fit a base mount. One solution is to make use of the roof rack, and here the constructor

is called upon for a degree of ingenuity as there are many different patterns and shapes of rack. Whatever arrangement is made there should be a good DC path from the earth side of the aerial mount (and the outer shell of the co-ax socket) through the roof rack to the car body. Next comes the rubber insulation (the tyres) between this



G4AVT's XYL at the door of the caravan, somewhere en route to the Isle of Lewis. Visible on the roof of the car is the aerial described in the text.

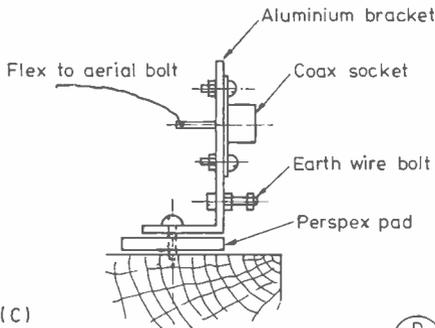
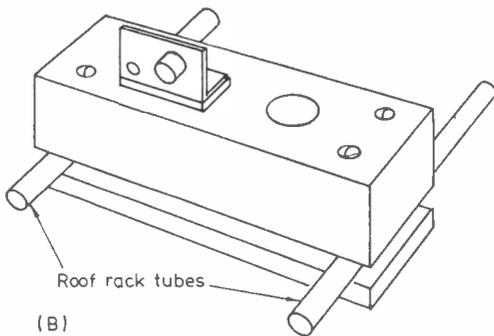
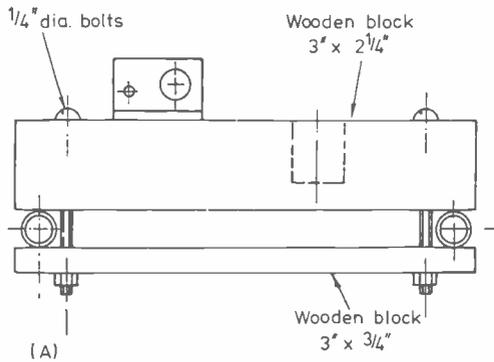
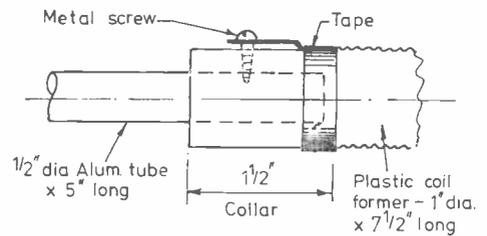


Fig. 1. ROOF RACK AERIAL ASSEMBLY

D 240

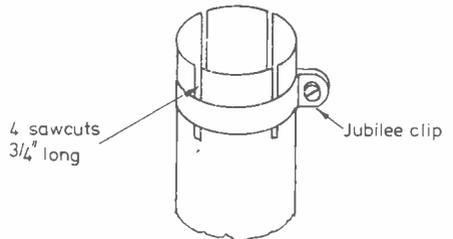
mass of steel and the good earth; it is a good idea, but not vital, to have a heavy gauge wire from an available fixing point on the car body (bare metal contact, of course) to a short earth rod driven into the ground. This may be practical in the countryside, but a pneumatic drill job in the High Street is not advocated!

The author's solution to the roof rack aerial mount is shown in Fig. 1. The piece of timber should be dry hardwood (oak or mahogany, etc.) and when finished and drilled several coats of exterior varnish applied; the hole drilled to take the lower tube of the aerial should be a good fit, but not so tight as to make insertion and removal difficult. The bracket for the co-ax socket is



Coil data: 85 turns 18swg enam. wire.

(a)



One 5" dia. tube and top aerial tube

(b)

Fig. 2. LOADING COIL AND FORMER

D 241

mounted on a paxolin or perspex pad to break up any moisture film resulting from a damp atmosphere; an independent earth wire is taken from the co-ax bracket to a Jubilee clip on the roof rack (good bare metal contact is required here) and from there to a suitable metal screw or bolt on the car body. This wire should be 5ft. 6in. long and can be conveniently taken through the door jamb to a screw of the interior trim (any other length may affect the tuning and telescopic adjustment).

The coil former is a 7½in. length of electricians white plastic conduit tube of 25mm. outside diameter. The two collars which fit inside each end of the tube were moulded using *Holts Cataloy* resin and hardener, and it will be seen from Fig. 2 that each collar takes a 5 inch length of ½in. outside diameter aluminium tube (from old TV aerial) to which the ends of the coil are attached.

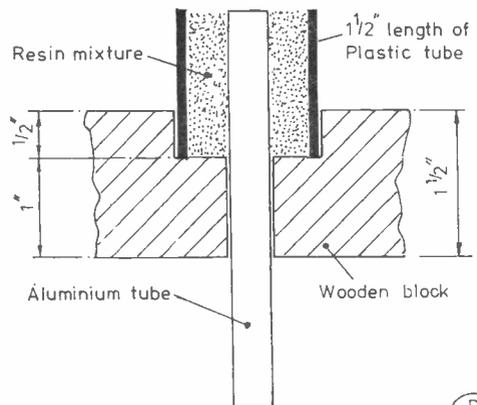


Fig. 3. Mould for coil former collars

D 242

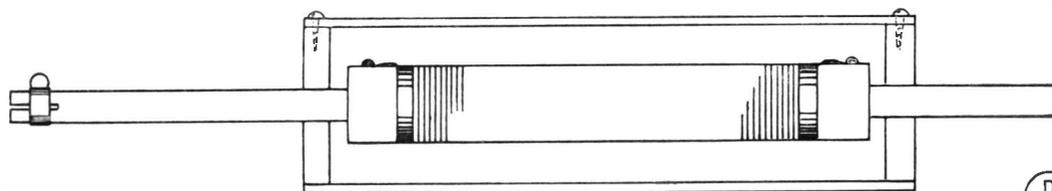


Fig. 4 COMPLETED COIL

This method of construction was adopted so that other coils for, say, 80m. and 160m. could at some future date be similarly made, and easily substituted using the one set of top and bottom aerial tubes. One of the 5 inch lengths requires four saw cuts in one end, each cut  $\frac{3}{8}$ in. long; over this end fits a *Jubilee* clip of suitable size, to clamp the upper aerial tube.

The mould for the collar into which the resin mixture is poured is shown in Fig. 3. A piece of wood about  $1\frac{1}{2}$ in. thick is recessed to a depth of  $\frac{1}{2}$ in. to accept, with close fit, a  $1\frac{1}{2}$ in. length of the plastic conduit tube. The wood is further drilled to receive the 5 inch length of aluminium tube. The metal tube is pushed through until it is level with the top of the plastic tube, and then resin mixture is poured into the gap between the two tubes until nearly level, and left to harden. The wooden mould and tubes should be treated with release agent before assembly to

enable separation when ready (the author used Vaseline as a release agent but the wooden mould had to be carefully split to release its contents, no doubt due to the unpolished surfaces of the drillings). Place the finished collars flush in the ends of the coil former, and drill clearance holes for the metal screws which connect the coil ends to the aluminium tubes: the coil can now be wound on. Clean one inch of the coil wire free of enamel and make an eye; anchor the eye under one of the metal screws and tape the wire to the former  $1\frac{1}{2}$ in. from the end. Wind on 85 turns close wound and tape again. Leave enough wire to reach the screw and extra to make an eye before cutting off.

The bottom aerial tube is a 4ft. 6in. length of aluminium tube,  $\frac{3}{8}$ in. outside diameter; a hole to receive an 8BA bolt is drilled 3in. from one end, for attaching the wire from the co-ax socket (centre). The other end is sawn with four cuts, each  $\frac{3}{8}$ in. long and a *Jubilee* clip fitted over; this receives the lower coil tube. The upper aerial tube is two feet long and  $\frac{3}{8}$ in. outside diameter and fits comfortably four inches into the coil's top tube, which is already prepared with a *Jubilee* clip. A surplus telescopic antenna, which extended three feet maximum, was inserted into the top of the aerial and fixed with a metal screw and slight crimping.

The weather shield is an 8 $\frac{1}{2}$ in. length of grey plastic rainwater pipe measuring  $1\frac{1}{2}$ in. inside diameter. Two collars are made  $\frac{3}{8}$ in. thick, to fit inside the ends, and have  $\frac{1}{2}$ in. dia. centre holes. A wood mould is made on the same principle as the previous one. In this case the recess is made to receive a  $\frac{3}{8}$ in. deep ring of the water pipe, and further drilled to receive a short length of the  $\frac{1}{2}$ in. tube. When finished the collars are placed flush in the ends of the weather shield and drilled for metal fixing screws; the complete coil is shown in Fig. 4.

The aerial can now be finally assembled (Fig. 5) and the telescopic part extended so that the distance from its tip to the top of the weather shield is 42 inches. Tuning is fairly critical and must be done with the aerial 'in situ,' i.e. in its roof rack mounting and on top of the car. A GDO is most useful in these circumstances but the job can be done using a reliable SWR meter and the transceiver. Tune at the middle of the band and raise or lower the telescopic portion one inch at a time for best SWR. The final result should be less than 1.5 to 1 on any part of the band. Make sure by listening that no QSO is taking place at the frequency you use.

The aerial fulfilled its intended purpose and came up to the best of expectations: daily QSO's took place with West Lancashire (the home QTH area), including G4ATM and G4BDM. Other QSO's at good strength were established with G3BLE and G4FCC in Northumberland, G3IES Bristol, G13GRD Enniskillen and numerous continentals.

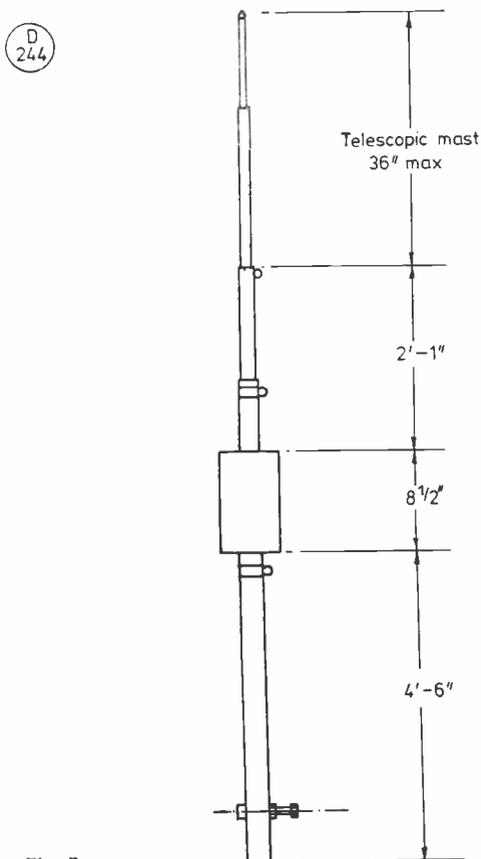


Fig. 5

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

LAST month, some of the mail destined to be the "building bricks" from which this piece is put together arrived too late to be used owing to the chaos in the postal service at the time. Apologies to those who were left out.

When the sunspot smoothed average (12-month) hit the bottom back in March and June 1976 it was down to 12; the ninety-day running average backwards from August 13, 1978, was showing 135, and the twelve-monthly mean bouncing near the 100 mark—so clearly there is one mighty big change in the scene since the 1976 doldrums. But as usual, "good conditions" in the mind are equated against yesterday or last week, or last month at the most. Thus, we still talk of the summer doldrums even though these periods are much better than the Spring-Autumn peaks of the 1976 activities. This has caused more DX-peditioning, more looking at the possibilities of "new countries" and a rush of blood to the DXCC Desk at ARRL, which reduced the practical maximum score for a new starter in the DX game even further below the "possible" for an amateur who started his post-war DX-ing back in 1945.

All the signs are that by the time you come to read this, the Mellish Reef will be removed from the wanted list of many DX-ers, this one QSL-ing to VK2BJL, Box 85, Round Corner, New South Wales, 2158, Australia. H44JB runs the boat, and the team at the time of writing includes VK2BJL, VK2CK, JAIKSO and WA8NOA.

As for the 8Z4 Neutral Zone operation, it is reported that the operation by Prince Abdullah and Sheik Ahmed was all-SSB despite the fact that there is considerable evidence of a Phoney CW version.

Southern Sudan operation seems to have been fairly heavy of late, with STORK back in business after leave in Germany. K5YY is reported as all but there, and LA6IV is reported to be signing /STO.

YI1BDG operation continues at a steady level, although it is under-

stood that the FT-560 shipped to them was turned down by the authorities. A close friend of your scribe says that he wants to take a communications receiver to Iraq that doesn't look anything like a communications receiver so that he can have at least a listen-round while he resides in a country where no licences are granted to expatriates; the appearance is required to be thus to avoid the risk of its confiscation at the airport. On his last posting, it was the reverse—expatriates allowed licences, locals barred. We seem to recall a cynic who said that the sum total of the world's human effort at any given time is zero—maybe he wasn't far from the truth!

Clipperton QSL's should from now on be sent to HB9MX only. WA9INK having done his share of the chore.

Burma is a country which doesn't look like seeing much Amateur Radio while the present regime continues; however there is an SP who is posted to the Embassy there and is in for a several-year stint; he is equipped and will be looking for an XZ licence. You never can tell, but SP6AUC just *may* turn the trick.

Another of the "maybe" category ones is BY; some years ago, it will be recalled, we noted that noises from BY were not to be dismissed as instant pirates. That, with hindsight, was a bit of unjustified optimism, but we know of at least one effort which almost came to fruition and was not blocked on the Chinese side. It seems that the current Chinese government is steering far closer than its predecessor to creating a scientific and technological interest in the population. What better stimulus could there be than a nice big daffy of genuine BY amateurs?

That 4U1UN which has been wandering around the band for some weeks is still garnering interest—the reason is that country status for the UN Secretariat is being mooted.

Now to a less direct point, namely the brewing up of a big signal. We seem to recall mentioning a

fair aerial system on 21 MHz by W6KPC. Now we hear he is going to put up something for 14 MHz—twenty-four elements, no less, with a top height of 190 feet. That should test his receiver and its front-end performance out fairly thoroughly, and other people's too!

## Silent Key

We hear of the death of James Pershouse, 9M2DQ. An active amateur for as long as this writer can recall, he was also very helpful to those who were less than well-off to enjoy the hobby. He will be missed, not only locally but in many parts of the world to which his helping hand had reached. A very fine man, and our sympathy to his people in their sad loss.

## The Bands

Perhaps we should start again with Ten as it has been in rather a sad state of late. We have two letters from G3NOF (Yeovil); the previous month's report and the current one. The earlier one refers to nothing but short-skip and Russians, while the latest one says no contacts were made at all and only Europeans heard.

### 'CDXN' deadlines for the next three months—

November issue—October 5th  
December issue—November 2nd  
January issue—November 30th  
*Please be sure to note these dates.*

G2ADZ (Chessington) is an addict of the band, but even he has to admit that it hasn't been brilliant, and of course the dropping of band conditions have led many back to lower bands and higher activity. Thus band openings are probably overlooked, as people used to 14 and 21 MHz have a listen round and then give up. A CQ on an apparently dead 28 MHz band can be surprising in its results! Bill notes JA8PMF/MM off the Brazilian coast and slowly steaming north, a contact with HV3SJ which appeared to be

due to Sporadic-E conditions and so worth mention, DJ7ST/OH0, VK2AHM who gave out a report of RST 419(1), ZS5UW, CE3ZW, YV4AMG, 1A5DMK on Elba, assorted LU/PY, UM8, UH8, UA9, CX1DDI, and OE5CA/YK. G2ADZ comments that the band needs a dose of really good conditions and that it will happen for the very simple reason that he is going on holiday!

G4BHE (Basingstoke) is another confirmed ten-metre man, and Barry has a tally of 125 countries on Ten this year. The present month has seen him booking in QSO's with CE3BZD, CX7BF, EL11, D68AD, FM7BB, FR7ZL, JY9OZ, KZ5USN, OY7ML, VK3NE, VK2NFR, WI-4, ZD7PV, ZE3JO, 5B4EP, 5R8AL, 7P8AH, 8P6JZ, 9J2CB and 9K2FX. Taking the G2ADZ and G4BHE reports together it is pretty clear that all continents have been workable during the month on this band for the operator willing to keep an ear out.

#### Forty

A much under-rated band; one needs skill to get the best performance out of the receiver on this band, where one is surrounded by megawatts of commercial power aimed by rhombics, while looking for the microvolt signal underneath. But—it can be done, and is being done: G3KMA is on 215 countries on 7 MHz alone, and we suspect GM3JDR is probably at a similar level, to mention two recalled at random.

G2BJY (Walsall) tackled the idea of a valve direct-conversion receiver for 7 MHz, and found it an excellent little tool, albeit one has to watch out for such things as microphony and hum; the line-up is a 6BW7 RF amplifier, into a semiconductor balanced mixer, 6AG5 oscillator, and transformer-coupled AF stages to get enough to drive the speaker with only one AF amplifier into an EL84 in the output. The key to its performance lies in the fact that the oscillator injection is adjustable and the mixer balance also. Trials with an EF184 as the RF stage were run, but the line-up originally chosen was preferred in the end. As Geoff says, much fun, and *the whole bag-of-tricks out of the junk-box*. Performance is reckoned to be as

good as a conventional receiver both in SSB and CW terms.

We don't usually carry SWL reports in this piece, they having Justin Cooper to themselves, but we make an exception for SWL Jean-Yves Camus (Chatenay-Malabry, France) who listens with the help of a Grundig Satellit 2000 and telescopic aerial; several hours of listening to 8Z4 and the associated pile-up brought some philosophising on human nature. The *deliberate* interference was the bit that annoyed most, being present all the time he was listening. All in all, a most interesting and revealing letter, of which more anon.

G2NJ (Peterborough) notes that the migration of the 3.5 MHz CW merchants to 7 MHz seems, despite generally poor conditions, to have continued, so that the QRP lads can get more use of their favourite stamping-ground.

Nice to hear from G3CED/G3VFA; George has only QRP—Joystick aerial, no earth, PM2, PM3A or HW-7 receivers and transmitters at inputs from 300 mW up to a maximum of two watts, mostly from a car or motorbike battery (good point this, lead-acid batteries probably have the best low-impedance characteristics for QRP rigs). CW into this lot resulted in more activity than he has indulged himself in for months, and some of this was on Forty and covered most of Europe. After a long period of operating with QRP all round George reckons that the best bets for DX are firstly, band-edge CQ calls, and secondly to call "QRO DX" in contests. However, he says that while the DX is good for business "gimme the old homely ragchew—that's what amateur radio is really about!"

G8RY (Newmarket) has for a long time used the usual variants on the co-ax fed half-wave eighty-metre dipole, but then went over to an eighty-metre half-wave fed with open-wire feeders and a Johnson Matchbox for all band to 21 MHz. Trying it on each band indicates the losses to be lower, and by putting a chain insulator in each side at 28ft. 8in. from centre, he ended up with a double extended Zepp on 21 MHz, high at the centre and with the ends drooping inverted-vee fashion. This arrangement is

good on 14 and 21 MHz, but also will load on 7 MHz and worked into Germany. The orientation is such that on 21 MHz it fires one way to JA and t'other to South America.

G3PPR (Sherborne) writes again; he and the school club put on a station on the end-of-term day, using 80 and 40 on the grounds that a clear QSO with Yeovil is more impressive than indecipherable monkey-chatter from America or wherever. A lecture to the Sherbourne Round Table was also given which should put our hobby on the map in that town. Back at the ranch, an "aerial of sorts" has gone up for 40 and it has been found good for inter-G working in daytimes and good for CW with Germany by the bucketful in the evening; using it on the third harmonic frequency of the aerial is also satisfactory, but we must mention Rod's "don't go much for these VHF bands!"

G2HKU (Sheppey) stuck to his CW and found EA8FJ, AA4BA, N4OW, UF6FDS, YV10B, UB5MC/UF6 and EP2IA. Ted passes on the word that ZL3KN has joined the ranks of the Silent Keys—an Old Times in ZL, keen and effective on HF CW and a good exponent of the arts of home-building of equipment, who will be sorely missed.

#### Top Band

At a low ebb this year, with no reports of Transequatorial activity, and not a lot of activity. However SWL Jean-Yves Camus says that there is a ten-metre group set up by REF for SWL and transmitting enthusiasts, and he is reckoning on trying to whip up enthusiasm enough to form a similar group in France were the level of interest is even lower than in U.K. at present. On the operating side, Jean-Yves reports hearing G3JMJ and G5BM.

Our only other mention this time comes from G2HKU, who used SSB to PA0INA and PA0PN, plus CW QSO's with GM3HBT, GM3LWS and OH1MA.

#### Twenty

Is always the backbone of our long-distance communications. Your scribe was a trifle amused to read in a club newsletter that older G8 + 3 chaps are getting alarmed at the number of newcomer G8's who

regard the G8 as merely a stepping-stone to a G4. Has it ever been anything else? Just as in U.S.A. a Conditional or Novice ticket is just a stepping-stone to an Extra Class, so in this country a G8 is but a part step up to a full 'A' licence, and anyone who wants to stay with a G8 must accept that he stays a second-class licensee. Whether he wants to use CW or to operate on 14 MHz is quite irrelevant; since most youngsters today get enough in school physics to give them an R.A.E. pass, it just boils down to a Morse pass being the only thing you can't buy, at least for those on the right side of 25. And, anyone who has gone down and struggled through a shaky CW QSO will know how much different are the standards of courtesy, something which alone makes Morse worth the getting.

However, we digress from our theme a little! Picking up the letter from G2HKU, we notice the large number of QSO's he has made; clearly the change of machinery has whipped up the enthusiasm somewhat as the length of the list demonstrates. An odd quirk is that after 30 years or more of trying, a Wyoming QSO filled in the complete list for WAS—only three times in all that period have Wyoming signals even been heard. Murphy tried to put his oar into the QSO, by making this relay stick on receive—but a sharp clout on the can put Murphy momentarily out of business while the contact was finished. Ted notes a SSB QSO with WB6YKB and CW QSO's with VK3BZ, WA6IXA, VK3AXX, VK6XA, G3LGP/WØ, VK5RK, VK3VJ, VK3BNF, W6SZ, UAØAN, W6CLU, VK2TB, VK3PX, G6ZY/CN, VK3NK, VK4AAG, VK4XA, VK4FB, XE1TE, VK2QL, K6SMF, FYØEOL, LU3EIJ, UM8MAQ, YV1AD, UKØAAO, K6DEF, K7GE, UF5FN, ZL1MT, and the prized W3NT/7 for Wyoming.

The fleapower of G3CED/G3VFA is always driven in the CW mode, and it managed to find its way all over Europe, particularly in the contest on August 12, in the middle of which we note from the log a one-minute QSO with a YU in which George dished out a number but didn't get one back; one detects

a rather hurt note in his "Not a contest QSO" in the remarks column.

GM4DLU says he is the only owner of a three-element beam on the shores of Loch Lomond, 13 feet above sea level and surrounded by hills on all sides at Balloch. Andy drives the beam by way of an HW-101 plus, when needed, a homebrew afterburner. 14 MHz has been found to be fairly good of late, with a few off days; so SSB contacts were made with TF6M, VE6CCZ, KL7ENY, KL7HCC, KV4AA, 9V1NR, JY9OD, 9Y4FS, 4D88UT from Manila, LU9CBA/YV5 in Caracas, LU7FAZ, JW7FD on Bear Is. and OJØMA who was calling CQ and getting no takers: "Where have all the callers gone?" he mused aloud and GM4DLU nipped in smartly for a QSO.

G2CZH told G4HFQ (New Milton) to write in—Tnx, Roy—and tell us of his progress. He took R.A.E. in Harrow under G8ELB, passed and then moved on to the South Coast for a spell of decorating and house-renovation before being let off to join the Wessex gang, where G4FQB took him in hand for CW and SWL-ing with a CR-100. The decision to go to an FT-101EE and the purchase of a G8VB ATU was a further spur, plus a ground-mounted 14AVQ. Eventually the full call was obtained, and on the very first evening a contact with ZP5LOB made the XYL sit up and take notice!

G3NOF (Yeovil), says G3PPR, is the local *proper* DX-er, and thus it was with some mirth that Rod says G3NOF was the only inaudible one in the local net—but G3NOF gets out to the long-distances which is what he wants. Both the July and August reports refer to short-skip, and activity on the band was down in July, only TF6M and TI5EWL being noted; August showed also good openings to VK/ZL around 0630, and W6/W7 interspersed on occasion. Much DX has been heard on the P29JS DX Net, and the Pacific DX Net, with QSO's recorded with DA1GF/OHØ, DA1GR/OHØ, FPØTH, KH6CA, OA4ATS/HK3, OJØMA, many VK's including VK9ZM on Willis, W7PRU, and VS5CW.

#### Odd Notes

With W1WY's much-appreciated

Contest Calendar we have the word that the Navassa DX-pedition is definite for November 25-December 2 with eight operators. Among them Randy Rowe, NØTG, 3237 Connecticut Drive, St. Charles, Missouri 63301 who will handle the QSL's, for which an s.a.e would be appreciated. The CW mode will be most used, as there has been none from Navassa since the CW DXCC award was instituted, but phone will not be overlooked. Look for them around 3505, 7005, 14030, 21030, and 28005 kHz and CW, with Phone on 3795, 7180, 14205, 21280, and 28550 kHz. The style of operation (transceive, split and listening 5-10 kHz up, districts, US/DX, and so on) will be announced as the operation proceeds.

We have already mentioned most of the contest activity for October in last month's *CDXN*, but we missed out the ARCI QRP contest over October 7-9, 0200z to 0200z. Exchange RST, and state, province or country, members adding their membership number, non-members their power input. Score 3 for a member, 2 for a non-member, and 4 for a contact other than W or VE. The multiplier is one for each state, province and country worked, plus a power multiplier of one for over 100 watts input, 25-100 watts times 1-5, 5-25 watts times two, 1-5 watts input times three and less than one watt times five. Listen on CW around 1810, 3560, 7060, 14060, 21060 and 28060 kHz, and for SSB 1810, 3985, 7285, 14285, 21385 and 28885 kHz; Novices will be found around 3710, 7110, 21110 and 28110 kHz. The summary sheet to carry details of the scoring, equipment and power used, and a signed declaration, plus large s.a.e. if results are desired. Entries to E. V. Blaize, N5BE, 417 Ridgewood Drive, Metairie, LA 70001, U.S.A.

A nice letter comes in from K. H. Show (Swansea) who wrote in first about a year ago asking for advice on getting started; we seem to have pointed in the right general direction because he is now GW8PNR, the call arriving almost a year to the day from his original letter. Smart going that, and congratulations indeed.

Geoff Watts next—he of the Prefix List and *DXNS*. Geoff sponsors a series of IOTA awards,

meaning "islands on the air." They are open to all amateurs and SWL's for confirmations of QSO's with amateurs on islands throughout the world. The series comprises IOTA Africa, IOTA Antarctic, IOTA Asia, IOTA Europe, IOTA North America, IOTA Oceania, IOTA South America, IOTA Arctic, IOTA British Isles, IOTA West Indies, plus IOTA World, and at the top IOTA Century Club. We hear that IT9JT has all twelve, and is also the first to get the 300 up in the IOTA CC. Details on all these from Geoff Watts, who for 40p U.K., one dollar or 5 IRC's will send you the 18-page directory of islands, which we know to be regularly updated by Geoff by notes in *DXNS*. Geoff is at 62 Belmore Road, Norwich NR7 0PU.

Another one is the Royal Navy's Mercury award, for contacts with the necessary number of RNARS members. Class 1 is for UK types who require 20 points, Class 2 for Europeans at 10 points, Class 3 for DX at 5 points, all at one point per QSO per band, with the GB3RN, GB3RM, GB3RNR, GB3HMS, and G3BZU (the Hq. station) each worth two points. Usual GCR and 30p for 5 IRC's to G3HZL—QTHR. RNARS also sponsor the Hampshire County Award for which the Manager is G2GM, who is also QTHR. On the covering compliments-slip comes the big news, which is that the *HMS Belfast* group have managed to obtain GB2RN as a full call, like the Science Museum's GB2SM—congratulations.

### Eighty

To most people, Forty has been more of an attraction for daytime inter-G working, partly due to flat conditions. However, a good afternoon will bring them back. Thus the thinning out, especially at the CW end, has been a pleasure for, paradoxically, the QRP chaps who gain more from lack of QRM than they lose from bad conditions. G2NJ found that between mid-morning and teatime things were pretty awful, with much noise and deep fading; however he worked these QRP stations: G4CCB (one watt), G2FWA using an HW-8, G2CP with one watt, G3WWJ using his HW-8 at two watts, G2FI down in Wadhurst who recently obtained an HW-8 and promptly

worked over the Pond with it, G3IVF with 3 watts, G3JKB with three watts—first QSO since 1955!—and G3IJD who was QRO with four watts. Turning to the /A and /P calls, Nick notes G2CAS/P using a B2 rig at Beckwithshaw (south of Harrogate) who was booming in, G3LVZ/P the same afternoon, and F6EWB/P Chartres early in the morning. Perhaps the best of all, though conditions made it a bit of a job to complete, was the contact with GM3SWK/A at Stornoway, Lewis.

### Fifteen

Rather seems to have been most HF DX operators idea of a reasonable compromise. One of the minor pleasures is in giving the W novices a first taste of DX, they lying between 21.1 and 21.2 MHz.

The last week in July saw a big improvement, avers G3NOF, who spent most of his time in July on Fifteen, with the mornings yielding VK/ZL/JA/VU/W6/W7, JA's on short-path from nine till five, while the 5W1 merchants worked till lunchtime before fading out, and often short-skip all day as well. August's conditions on the whole have been like the curate's egg. July saw entries in the log of contacts with A4XGY, A6XB, AP2MQ, C5AAP, C5ABD, EP2PE, EP2RL, F0CH/FC, K4ERO/HCI, K5HCI, K6DQ, K6YRA, K8RM/AM off Italy, KP4KW, KZ5RO, JA's, JR6PTT (Kinawa), K5MVP, K6SMF, K0AX/DU2, KL7HCC, KL7IXZ, KL7NA, KL7TR, N6QK, P29JS, SV1IW (Crete), SV1JG (Dodecanse), UA0AN, UD6FD, UF6DZ, VE6EO, VE7DRX, VK2NOT, VP2MBB, VP2MZZ, VP9HZ/MM off S. Africa, VU2LQA, VU2RAK, W6, W7, including WB7PHD in Idaho, WA4ADU/KL7, YB0ACD, ZP5RS, ZS1HL, ZS1KZ, ZS1JJ, ZS6AQI, ZS6RA, 5W1AX, 5W1BN, 9M2DW, and 9V1TP, while August gave A4XGC, A9XCF, AE6E, AP2JL, G4DVJ/MM in the Arabian Gulf, H44LW, H44ZZ, IA5DMK, KA7BNK in Oregon, K6SMF, K6YRA, JA4EZY, JR1AQG, P29JS, P29MF, P29NPS, SU1CR, TA2BK, UK0SAA, VP2SQ, VS6EZ, VU2NU, W6YH, W7DPG (Montana), W7LRH (Arizona), W7HXG (Oregon), W7MXM (Idaho), W01IQ (S. Dakota), WB4OHC/MM, WB6YID/

HC5, YB3AE, YB0HH, ZC4MT, ZF2CA, 9K2DR and 9M2EK.

SSB contacts for GM4DLU were with W's 8-9-0, W6 and VE7DGT.

Turning to G2HKU, Ted seems to have tired himself out on Twenty, but still roused himself to work CW to VU2GOB, G3LGP/W0, and VE3AR.

A strictly 21 MHz merchant reporting for the first time is G2HCP (St. Anne's) who runs about 2½ watts to an HW-8 and a ground-plane. Derek has been using QRP since November '77 so he wryly remarks that he has got used to a fair amount of fruitless calling! However, he does on occasion ring the bell, to the extent that August gave him QSO's with some 33 countries in five continents; C31NM and 9A1A were new ones for Europe, while outside Europe lay PY, UF6, UA9, UA0, VE6, W's 1-2-4-8-9-0 and 4Z4, with EP2IA and ZE1BL hooked in the EU DX Contest. No doubt about the little HW-7 and HW-8 from Heathkit and the earlier Ten-Tec boxes, which certainly appealed to a surprisingly large market, and refined many people's abilities on the operating side too.

G8RY's aerial-pruning/revamping exercise to give an extended-double-Zepp broadside-on to JA yielded remarkable results on one day of testing, the crop being 9 JA's, a brace of Russians, an Austrian, one from down in the south of Brazil, and a CT3 in Funchal. Not a bad day's loggings.

G3CED/G3VFA was as QRP as usual, and showed what the flea-power can do with contacts to WIH2, N4WX, 9H1ED, PS8RW, YU1BCD, UB5MCI/UF6, JA7YAA, JH3CXL, JW5BSM, YU1PCF, some more contest Europeans, YT3M (against this one the log enquires "Oozee?"), YT3M (a fortnight later with all the details), WA9EDZ who gave a good report and then himself faded out, and another clutch of European quickies looking for points.

### Signing

That's all for this time; the deadline dates are in the "box" in the body of the piece, and the more letters the merrier. Address, as ever, to "CDXN," SHORT WAVE MAGAZINE, 34 HIGH STREET, WELWYN, HERTS. AL6 9EQ. BCNU.

# SEM

P.O. BOX 6, CASTLETOWN, ISLE OF MAN Tel. MAROWN (0624-85) 277



PRE-AMPLIFIERS TO IMPROVE YOUR RECEPTION  
ON VHF AND HF OR UHF

**H.F. WIDEBAND PRE-AMPLIFIERS—1-40 MHz**  
Noticed how your receiver gain and S meter falls off on 15 and 10? These pre-amplifiers will cure that. They are ideal for OSCAR and used with a short wire, make a very effective ACTIVE AERIAL. Wideband 1-40 MHz. 15 dB gain.

**THE SENTINEL AUTO H.F. PRE-AMPLIFIER**  
With a change over relay which is operated by your transceiver relay for direct connection in your aerial co-ax. Price : £11.81\* **IN STOCK**

**THE SENTINEL STANDARD H.F. PRE-AMPLIFIER**

Same circuit as above but less the relay. Price : £9.00\* **IN STOCK**

**V.H.F. AND U.H.F. PRE-AMPLIFIERS**  
**SENTINEL AUTOMATIC FET 2 METRE PRE-AMPLIFIER**

The pre-amplifier that contains an r.f. switch for direct connection in your transceiver aerial lead. Lowest possible noise figure and high gain to overcome the receiver noise. Suitable for all modes. Thousands of these pre-amplifiers are now in use. Price : £15.75\* **IN STOCK**

**SENTINEL AUTOMATIC 70 CM. PRE-AMPLIFIER** Price : £20.25\* **IN STOCK**

**SENTINEL STANDARD PRE-AMPLIFIERS**  
Same circuit as the Auto above but without the r.f. switching. 2 metre, Marine Band, Satellite Band. Price : £9.85\*, 70 cm., £13.50\*. both **IN STOCK**

## PA3

The original PA3 2 metre pre-amplifier. Size about one cubic inch to fit inside your transceiver. Price : £6.27 **IN STOCK**

## PA3/70

70 cm. version— $1\frac{3}{4}'' \times 1\frac{3}{4}'' \times \frac{1}{2}''$ .

Price : £9.00 **IN STOCK**

## SENTINEL 2 METRE POWER AMPLIFIER/PRE-AMPLIFIER

The selected FET pre-amplifier provides a noise figure much lower than the average transceiver, and ample gain to overcome the receiver noise. The transmit amplifier now uses the latest generation, internally matched, mismatch protected stripline transistor, providing four times power gain, e.g. 12W. in., 48W. output. The amplifier is linear for use on all modes using a power transistor biasing circuit which provides excellent linearity. An r.f. operated relay is used with a delay suitable for use on all modes and the relay can be also operated by the transceiver relay. Size : 6" x 2" front panel,  $4\frac{1}{2}''$  deep. Price : £59.62 **IN STOCK**  
Also available without the pre-amp for £49.50  
Yes, it will work with the FT221 and the TS700.

## SEM Z MATCH

The necessity to terminate modern equipment with the correct NON REACTIVE impedance is solved with our Z Match. 15-5000 ohms. BALANCED OR UNBALANCED. SO239s and 4mm. terminals for co-ax or wire. Rated up to 1KW. Calibrated slow motion dials make adjustment and re-setting easy. Price : £38.81 **IN STOCK**

## SEM EUROPA C 2 METRE TRANSVERTER

200W. input. Plugs straight into your Yaesu equipment. Price : £112.50 **EX STOCK**  
CPS10—Power supply for use with other transceivers. Price : £56.25 **EX STOCK**

**SENTINEL DUAL GATE MOSFET 2 METRE CONVERTERS**—I.F.'s : 28-30 MHz, 4-6 MHz, 2-4 MHz. N.F. 2dB. Gain, 30dB Price : £20.25 **EX STOCK**

**SENTINEL X**—Same as above with A.C. power supply. Price : £24.75 **EX STOCK**

**SEM 70.** 70cm. to 2 metre converter. Price : £20.25 **EX STOCK**

**SENTINEL 70.** 70cms. to 10 metre converters. Price : £22.50 **EX STOCK**

**SENTINEL TOP BAND CONVERTERS** Price : £20.25 **EX STOCK**

\* SO239 sockets available on these units at an extra cost of £1.69

Circuits and instructions provided with equipment. For more details of any of our equipment, please ring or write. Prices include VAT and delivery.

12 months' guarantee. To order : C.W.O. or credit card. Just phone your credit card number for same day service.

ALL OUR PRODUCTS WILL BE AVAILABLE IN  
LEICESTER FROM THE AMATEUR RADIO SHOP  
G4MH

**The Shop with  
the Smile!**

# AMATEUR RADIO EXCHANGE



PROPRIETORS: BRENDA APTAKER, BERNARD GODFREY (G4AOG)

This month NOT ONLY . . . their normal friendly welcome at Ealing, BUT ALSO . . . Brenda and Bernie go West . . . for a special two-day Show at the Plymouth Guildhall, bringing comprehensive ranges of YAESU and ICOM for West Country enthusiasts to try. Also a super selection of other gear, both new and secondhand. All welcome, as ever, to browse or to buy!



**SATURDAY, OCTOBER 14**  
10.30 a.m. - 6 p.m.



**SUNDAY, OCTOBER 15**  
11 a.m. - 6 p.m.



## LEADING LONDON STOCKISTS OF YAESU AND ICOM EQUIPMENT

### YAESU FOR FAST DELIVERY

FT90IDM ...	£960.00	FC301 ...	£121.00	FT227R ...	£239.50
FT90ID ...	£829.50	FT501 ...	£495.00	FT223 ...	£156.50
FT10IE ...	£579.00	FRG-7 ...	£210.00	FT224 ...	£166.50
FL2100B ...	£349.50	FRG7000 ...	£367.50	YC500E ...	£344.50
FT7 ...	£357.50	FL101 ...	£489.00	FT221R ...	£401.50
FT301D ...	£661.50	FR101D ...	£590.50	FT225R ...	£548.50

### ICOM IN STOCK

IC215 2m./12ch. ...	£159.00
IC202 2m. SSB ...	£169.00
IC240 10W. mobile	£198.00
IC245E 10W. FM/SSB	£396.00
IC211E 10W. FM/SSB	£549.00

Special for all FT-227R owners, ★

★ Modification kits available now, giving 1 MHz scan and 25 kHz shift PLUS data on auto tone burst and reverse repeater application.  
£19.95 plus £1.00 p. and p.

All prices include VAT at the appropriate rate, but not carriage, and may be subject to change without notice.

Phone for details of current stocks, new and secondhand. Closed Wednesdays.

Easy terms  
up to 2 years



Credit sales  
by telephone



Instant HP for  
licensed amateurs

So easy for Overseas Visitors — Just 7 steps from Heathrow

2 NORTHFIELD ROAD, EALING, LONDON, W13 9SY

Tel. 01-579 5311

# You'll find the best in the Heathkit Catalogue.

## AMATEUR RADIO COURSE

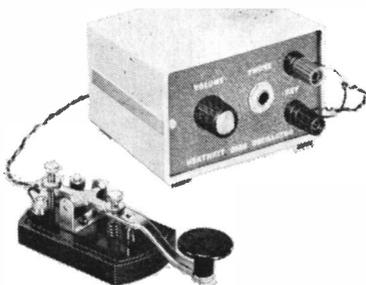


A complete course, expertly prepared with easy-to-follow step-by-step instructions. Includes everything you'll need for the Amateur Radio Examination.

\* ER-3701 **£16.34 including postage**

### HD-1416 Code Practice Oscillator

- \* Easy to assemble
- \* 9V battery operation
- \* Built-in speaker
- \* Volume and tone control
- \* Can be used with the Amateur Radio Course
- \* £10.32 including postage



### SW-717 Short Wave Radio

- \* 4 bands
- \* Solid state circuitry
- \* Advanced design
- \* 120 or 240V operation at 50-60Hz
- \* Takes about 5 evenings to assemble
- \* £81.17 including postage

Everything you need is in the Heathkit catalogue. More than 200 kits for radio and electronics enthusiasts.

The features and specifications are excellent but they are easy to build and your success is guaranteed. Use the coupon now.

**SWM107/8**

**Send for your Heathkit Catalogue!**

To: Heath (Gloucester) Limited, Department  
Bristol Road, Gloucester, GL2 6EE. (Registered number 606177)

Please send a copy of the Heathkit Catalogue. I enclose 20p in stamps.

Name \_\_\_\_\_

Address \_\_\_\_\_

HEATH  
**Schlumberger**

The world's biggest producers of electronic kits.

N.B. If you are already on the Heathkit mailing list you will automatically receive a copy of the latest catalogue without having to use this coupon.

ACCESS AND  
BANKAL CARD  
WELCOMED

There are Heathkit Electronics Centres at 233 Tottenham Court Road, London (01-636 7349) and at Bristol Road, Gloucester (Gloucester 29451).

## C&C electronics

10 WEST PARK, LONDON SE9 4RQ

Telephone: 01-882 9397



### 2 METRE AND 70 CMS. CRYSTALS

NORMALLY IN STOCK AT £1-95

TX Crystals 4 and 8 MHz in HC6/U and 40 pf 12 MHz for TRIO  
RX Crystals 44 MHz in HC6/U and HC25/U  
for channels R0, R1, R2, R3, R4, R5, R6, R7, S20, S21, S22, S23 and S32.  
Icom crystals 18 and 14 MHz for R0, R1, R2, S10, S21 and S23.

Many other frequencies in stock. Send s.a.e. for lists.

MADE TO ORDER AT £2-25 Delivery 4 to 6 weeks  
Specification normally  $\pm 30$  ppm  $\rightarrow 30$  to  $+60^\circ\text{C}$ ,  $\pm 10$  ppm at  $25^\circ\text{C}$ . in  
HC6, HC18 and HC25/U holders. When ordering please give crystal's  
load capacity and holder or specify equipment in which crystals are to  
be used.

TX 4 to 4.06 MHz, 6 to 6.084 MHz, 8 to 8.12 MHz, 12 to 12.17 MHz, 18 to  
18.25 MHz.

RX 10.25 to 10.4 MHz, 11.1 to 11.28 MHz, 14.81 to 15.04 MHz, 44.43 to  
45.1 MHz, 51.56 to 52.24 MHz.

Also at £2-25 crystals for Japanese 2 metre and 70 cms. equipment not  
covered by the above frequency ranges. Also Pye U10B and W15U 70 cm.  
crystals.

PLEASE NOTE THERE ARE NO DISCOUNT RATES ON THE ABOVE CRYSTALS

SPECIAL OFFER Price £1-25  
25 pf 18 MHz TX Crystals for 145-725(RR5), 145-750(RR6), 145-775 (RR7).

PYE POCKETPHONE RECEIVE CRYSTALS  
HC18/U between 84.46 and 84.86 MHz  $\pm 10$  ppm at  $25^\circ\text{C}$ . Delivery  
4 to 6 weeks. (SU 8 crystals held in stock). Price £2-50 (TX crystals  
£2-25).

CONVERTER CRYSTALS IN HC18/U  
96-000, 101-000, 116-000 MHz in stock. Price £2-95.

ONE BURST AND IF CRYSTALS IN HC18/U  
7-168 MHz for 1750 kHz and 10-245 MHz for 10.7 MHz IFs. Price £2-25.

FREQUENCY STANDARDS (8% VAT)  
100 kHz in HC13/U Price £2-95; 1000 kHz in HC6/U Price £2-80;  
10.7 MHz in HC18/U Price £2-25; 455 kHz in HC6/U Price £2-95.

### I OFF CRYSTAL PRICES

Fundamentals Group	Frequency Range	Load Capacity	Price
1	0-030 to 0-099 MHz	100ppm	£14-25
2	0-100 to 0-369 MHz	100ppm	£9-75
3	0-370 to 0-730 MHz	100ppm	£10-00
4	0-732 to 1-499 MHz	100ppm	£9-75
5	1-500 to 1-999 MHz	30ppm	£3-45
6	2-000 to 3-999 MHz	30ppm	£3-00
7	4-000 to 20-999 MHz	30ppm	£2-85
8	21-000 to 24-000 MHz	30ppm	£2-25

3rd Overtones	Frequency Range	Load Capacity	Price
9	21-000 to 63-000 MHz	30ppm	£2-85

5th Overtones	Frequency Range	Load Capacity	Price
10	60-000 to 104-999 MHz	30ppm	£2-95
11	105-000 to 119-999 MHz	30ppm	£8-25
12	120-000 to 130-000 MHz	10ppm	£12-00

5th, 7th and 9th Overtones	Frequency Range	Load Capacity	Price
13	130-001 to 216-000 MHz	10ppm	£20-00

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

HOLDERS 30 kHz to 200 kHz HC13/U, 170 kHz to 196-000 MHz HC6/U  
4-000 to 216-000 MHz HC18 or HC25/U. Prices on application for other  
holders.

DELIVERY: Groups 1 to 4, 12 and 13—six to eight weeks  
Groups 5 to 11—four to six weeks

Please state holder required when ordering.

DISCOUNTS (Only applicable to Groups 1 to 13)  
5% mixed frequency discount for five or more crystals within any price  
group. For orders of same frequency and specification discounts start  
at five off in groups 1 to 4, 12 and 13. In all other groups discounts start  
at 10 off. Special rates for bulk purchase schemes including free supply  
of crystals for UK repeaters.

CRYSTAL SOCKETS HC6/U and HC25/U Price 16p  
MINIMUM ORDER CHARGE £1-50

All prices include postage to UK and Irish addresses. Crystals supplied  
to any specification for industrial, mobile radio or marine use, etc.

State equipment/specification when enquiring. Please send postage  
stamp with all enquiries.

PRICES ARE Ex VAT. PLEASE ADD 12½% UNLESS OTHERWISE STATED



Opposite South Harrow Tube and Bus Stations



194A Northolt Road  
South Harrow, Middx.  
England. Tel.: 01-864 1166

The legal use of amateur radio transmitting equipment requires an amateur licence. Therefore, it is the policy of this organisation that amateur radio transmitters, transceivers and amplifiers be sold at retail only to persons who can show that they are properly licensed to operate that equipment.

JUST TELEPHONE YOUR CARD NUMBER OR SEND YOUR CHEQUE WITH ORDER



01-864 1166 01-422 9585

**MICROWAVE MODULES**

MNC70 4m. Converter	£20-25
MNC144/28 LO 2m. Converter	£22-50
MNC32/28 70cm. Converter	£27-00
MNC1296/28 23cm. Converter	£31-50
MNC1296/23cm. Converter	£31-50
MNV1296 23cm. Tripler	£33-75
MMD500 80 MHz Counter	£66-96
MMD500P Prescaler	£27-00
MMD500P 500 MHz Counter	£85-32
MMT432/28 70cm. Transverter	£133-88
MMT432/144 70cm. Transverter	£169-88
MHT 144/28 2m. Transverter	£88-87

**JAYBEAM 4M ANTENNAS**

4Y/4M 4 el. yagi	£12-65 (£2-00)
PMH2/4M 2 way harness	£8-35 (75p)

**2M ANTENNAS**

C5/2M 5 dB colinear	£30-95 (£2-00)
5Y/2M 5 el. yagi	£7-70 (£1-00)
8Y/2M 8 el. yagi	£10-00 (£1-00)
10Y/2M 10 el. yagi	£21-32 (£1-50)
PBM 10/2m parabeam	£25-37 (£2-50)
PVM 14/2m parabeam	£31-16 (£2-00)
5XY/2M 5 el. x'd yagi	£15-97 (£1-50)
8XY/2M 8 el. x'd yagi	£19-91 (£2-00)
10XY/2M 8 el. x'd yagi	£26-25 (£2-00)
PMH/2C Circular harness	£5-00 (50p)
Q4/2M 4 el. quad	£16-31 (£1-50)
Q6/2M 6 el. quad	£21-71 (£2-00)
D5/2M el. slot	£13-61 (£1-50)
D8/2M el. slot	£18-22 (£1-50)
SVMK/2M vertical slot it	£3-83 (£1-00)
UGP/2M ground plane	£7-03 (£1-00)
HO/2M halo head	£3-26 (75p)
HM/2M halo + mast	£3-88 (75p)
PMH2/2M 2-way harness	£6-80 (75p)
PHH4/2M 4-way harness	£16-34 (£1-00)

**70cm. ANTENNAS**

D8/70cm. 8 el. slot	£15-47 (£1-50)
PBM 18/70cm. Parabeam	£18-56 (£1-50)
MBM48/70cm. Multibeam	£21-65 (£2-00)
MBM89/70cm. Multibeam	£28-97 (£2-00)
12XY/70cm. 12 el. x'd yagi	£29-70 (£2-00)
PMH2/70cm. harness	£5-00 (50p)
PMH4/70cm. harness	£12-26 (£1-00)
C8/70cm. 8dB colinear	£39-07 (£2-00)

**YAESU PRICE LIST**

(FREE DELIVERY)

<b>AMCOMM SERVICES</b>			
FT101E	£515-00	FL2100B	£307-00
FT101E	£498-00	FR901D	£737-50
FV101B VFO	£80-50	FT901DE	£737-50
SP101B speaker	£17-50	FT901DM	£853-50
FRI01S	£395-50	FP4 AC PSU for ET227R and FT7	
FRI01D	£493-50	FT7	£31-00
FRI01S Dig	£481-00	*YO100	£150-00
FRI01D Dig	£573-50	*YO301	£167-00
FL101	£410-00	*YO101	£182-75
FT200B	£325-00	*YP150	£52-00
FP200B PSU	£69-00	YC601	£115-00
FT221R	£357-00	FL110	£123-00
FT225R	£487-50	FRG7	£182-40
FT225R	£535-00	FRG7000	£324-00
memory	£81-00	YD844 desk mic	£18-00
FT227R	£202-00	YD846 hand mic	£7-50
FT301	£515-00	YH55	£8-75
FT301D	£588-00	QTR24	£15-50
FP301 PSU	£96-00		
FP301D de luxe PSU	£153-50		
FV301 VFO	£80-00		

\* These items add VAT 8% others 12½%

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

**RF POWER METERS**

JD110 single meter 10 & 100w. 1.5-150 MHz	£11-74
Reace UH74 single meter 10w. FSD 432, 144	£14-27
Hanson FS60M 20-200w. FSD 50-150 MHz	£26-37
Leader LPM885 thru-line watt meter/SVR 20, 200, 1000w 1.8-54	£48-31
SML SWR23 twin meter 3.5-150 MHz	£11-30
All include VAT and Carr.	

**ANTENNA TUNING UNITS**

Denton MT3000A 10:160M continuous 3kV	£365-00
Leader LAC895 10-80 500w. SWR/PWR/ATU	£91-00
MFJ10 160m. 200w. toroidal SO239 sockets	
16010 2 variables SO239	£33-00
900 3 variables SO239	£39-50
SST1 random wire	£26-60
SST2 ultra tuner	£33-50
Amcomm 200 ultra tuner SO239 complete with PL259 plugs	£33-50
All include VAT and Carr.	

**GM70**

70/28 MHz Converter	£16-50
144/28 MHz Converter	£16-50
432/28 MHz Converter	£22-00
432/144 MHz Converter	£22-00
432 + 434/28 MHz Converter	£26-00
432 + 434/144 MHz Converter	£26-00
28/70 MHz 2 Watt Solid State Transverter	£52-00
28/144 MHz 2 Watt Solid State Transverter	£52-00
BUCANER 28/144 MHz 15 Watt Solid State Transverter	£79-00
SCORPION High Power 28/144 MHz Transverter	£93-00
40/50 Watt 144 MHz Linear Amplifier	£45-00
COUGAR 144/432 MHz FM Transverter	£55-00
COBRA 144/432 MHz FM Transverter	£73-50

**CRYSTAL FILTERS**

YF107H600 10.7 MHz 8 pole CW	£20-25
YF30H350 3179.3 kHz 8 pole CW	£20-25
YF30FC1 3.179 MHz 6 pole CW	£20-25
YF107F2.4 10.7 MHz 6 pole SSB	£20-25
YF90F 9 MHz 6 pole AM/FM	£20-25
YF90H12 9 MHz 8 pole AM/FM	£20-25
YF90H2.4 9 MHz 8 pole SSB	£20-25
YF90H600 9 MHz 6 pole CW	£20-25
YF107H2.4 10.7 MHz 8 pole SSB	£20-25
YF107F12 10.7 MHz 6 pole AM/FM	£20-25
Carrier crystals HC/18U	£2-25
All include VAT and Carr.	

TDS Pip Tone for SSB/144 MHz connects	£7-05
2m. Pre Amp SD306 low noise excellent cross mod performance	£7-05

Post + Tax paid everywhere  
 £16-50  
 £16-50  
 £22-00  
 £22-00  
 £26-00  
 £26-00  
 £52-00  
 £52-00  
 £79-00  
 £93-00  
 £45-00  
 £55-00  
 £73-50

**ROTATORS**

(Inc. Carr. Plus VAT)

AR20 Light VHF/UHF	£34-00
AR30 Light VHF/UHF	£41-00
AR22 VHF Light HF	£43-00
AR40 VHF Light HF	£47-50
AR33 Deluxe control '40	£59-00
BT1 Medium duty	£79-50
CM4 Medium duty	£95-00
HAM II Heavy duty	£129-00
2010/220 Automatic	£43-50
2030 Memomatic	£48-00
Bearings	
CD562 CDE (up to 2" and 1½")	£5-00
RZ100 Stolle (ball-race)	£10-00

**ICOM**

IC 215E	£141-00
IC 202E	£150-00
IC 202S	£192-00
IC 240	£176-00
IC 240 with scan	£244-00
IC 245E	£352-00
IC 211E	£488-00
Plus 12½% VAT	



Multi UI 70cm. mobile	£221-00
Multi 11.2m. mobile	£184-00
Multi 2700 FM/SSB Tx/Rx + 12½% VAT	£435-00

**SMC MONITOR SCOPE £69 + 8% Delivery Free**

★ ★ ★  
**FOR VISITORS TO LONDON**

PLACE YOUR ORDER BY PHONE  
 WE'LL DELIVER TO YOUR HOTEL OR MEET YOU ON DEPARTURE, AND ACCOMPANY YOU TO THE LANDING OFFICER AND ARRANGE CARRIAGE OF YOUR PURCHASE.

★ ★ ★

POWER SUPPLIES  
 SWR BRIDGES,  
 Etc., Etc.

# P.M. ELECTRONIC SERVICES

## PROFESSIONAL COMPLETE CRYSTAL SERVICE AMATEUR

VAT—PRICES EXCLUDE VAT, FOR YOUR CONVENIENCE THE VAT INCLUSIVE PRICE IS SHOWN IN BRACKETS — OVERSEAS ORDERS (Inc. Eire and Channel isles) NO VAT CHARGEABLE

### 2M TX & RX CRYSTAL AVAILABILITY AND PRICE CHART

CRYSTAL FREQUENCY RANGE USE (Tx or Rx) and HOLDER	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	36 MHz-TX-HC6 & 25/U	44 MHz-RX-HC6/U	44 MHz-RX-HC25/U	48 MHz-TX-HC6 & 25/U	52 MHz-RX-HC25/U	70 MHz-TX-HC25/U
OUTPUT FREQUENCY														
144-030 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
144-4 (433-2) ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
144-480 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
144-800 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
144-850 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-000/R0T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-025/R1T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-200/R8T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-300/S12 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-350/S14 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-400/S16 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-425/S17 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-450/S18 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-475/S19 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-500/S20 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-525/S21 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-550/S22 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-575/S23 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-600/ROR ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-625/R1R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-650/R2R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-675/R3R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-700/R4R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-725/R5R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-750/R6R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-775/R7R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-800/R8R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-950/S38 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a

PRICES : (a) £1-95 (£2-19); (b) £2-32 (£2-61); (c) £2-80 (£3-15); (d) and (e) £3-20 (£3-60).

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

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

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

#### JAPANESE AND AMERICAN EQUIPMENTS

With the ever increasing popularity of Japanese equipments we have further expanded our range of stock crystals. We can now supply for YAESU (FT2F, F2F2FT, FT2 Auto, FT224), most of the ICOM range and the TRIO-KENWOOD range. We can also supply from stock crystals for the HEATHKIT HW202 and HW17A.

YAESU FT211 CRYSTALS NOW IN STOCK, ALL AT £2-80 (£3-15). All popular channels—For repeater use advise xtal frequency required as earlier models have different shift xtals to later FT211R. We can also supply the crystal to give NORMAL "tune to RX" working (as FT211R). For 70cm, we can supply the 1-6 MHz shift xtal for direct use with a MICROWAVE MODULES MMT432/144 which we can supply for £151-00 + VAT (H). SPECIAL OFFER : If ordered with transverter 70 cm. shift crystal FREE !!

#### MODULAR COMMUNICATIONS SYSTEMS

For the RTTY enthusiast we can recommend and supply the "MCS" range of products. This includes terminal units, AFS keys, magnet drivers for TTL interface, telegraph distortion measuring adaptor, RTTY audio processor, power units, etc., etc. For the CW man we have the "MCS" CW filter which give three stages of active filtering. Please send S.A.E. for full details of the "MCS" range.

CRYSTALS FOR NEW BRITISH 70CM CHANNELS  
Due to the much higher multiplication involved (3 times that on 2m.) all our stock 70cm. crystals are now to much closer tolerances than our standard amateur range.

We are stocking the following channels RB0 (434-60/432-00), RB2 (434-66/433-05), RB4 (434-70/433-10), RB6 (434-75/433-15), SUB (433-20), RB10 (434-85/433-25), RB14 (434-95/433-35), SU18 (433-45) and SU20 (433-50)—TX and RX for use with: PYE UHF Westminster (WU15), UHF Cambridge (U10B), Pocketfone (PF1) and STORNO CQL/CQM 662 all at £2-32 (£2-61). For the U450L Base Station we have the TX crystals for all the above channels. The RX crystals for the U450L Base Station, together with the TX and RX crystals for the remaining SU channels (SU12-433-30-R1TY, SU16-433-40, SU22-433-55) for all the above equipments are available at £3-20 (£3-60) to Amateur Spec. or £4-20 (£4-72) to same spec. as stock items. Delivery approx. 4 weeks.

4M. CRYSTALS FOR 70-26 MHz—HC6/U  
TX 8-7825 MHz and RX 6-7466 MHz or 29-780 MHz £2-32 (£2-61)  
10-245 MHz "ALTERNATIVE" IF CRYSTALS £2-32 (£2-61). For use in Pye and other equipment with 10-7 MHz and 455 kHz IF's to get rid of the "birdy" just above 145-0 MHz in HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS—HC6/U, HC13/U and HC25/U (Low loss) 16p each (18p) + 10p P & P per order (P & P free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS — HC18/U  
All at £3-00 (£3-37), 38-666 MHz (144/28), 42 MHz (70/28), 58 MHz (144/28), 70 MHz (144/4), 71 MHz (96/42), 85 MHz (144/28), 101 MHz (1,296/432/144), 101 MHz (432/28), 101-50 MHz (434/28), 105-666 MHz (1,296/28) and 116 MHz (144/28).

CRYSTALS MANUFACTURED TO YOUR SPECIFIC REQUIREMENTS  
Prices shown are for one off to our amateur specs., closer tolerances are available, please send us details of your requirements.

A Low frequency fundamentals :  
Adj. tol. ± 50ppm Temp. tol. ± 100ppm 0 to 70°C  
6-0 to 19-999 kHz, £28-12 (£31-63) 80 to 99-999 kHz, £7-30 (£8-21)  
20 to 29-999 kHz, £17-75 (£19-97) 100 to 149-99 kHz, £6-68 (£7-51)  
30 to 59-999 kHz, £15-51 (£17-45) 150 to 499-99 kHz, £6-20 (£6-97)  
60 to 79-999 kHz, £12-41 (£13-96) 500 to 799-99 kHz, £7-30 (£8-21)

B Mid frequencies :  
Adj. tol. ± 30ppm Temp. tol. ± 30ppm 0 to 60°C  
800 to 999-9 kHz Fundamental ... £9-30 (£10-69)  
1-0 to 1-4999 MHz Fundamental ... £9-40 (£10-57)  
\*1-5 to 2-0 MHz Fundamental ... £3-95 (£4-44)  
\*2-0 to 21 MHz Fundamental ... £3-36 (£3-78)  
21 to 25 MHz Fundamental ... £6-48 (£7-29)  
25 to 27-99 MHz Fundamental ... £8-90 (£10-01)  
28 to 30 MHz Fundamental ... £9-68 (£10-89)  
\*15 to 21 MHz 3rd Overtone ... £3-95 (£4-44)  
\*21 to 63 MHz 3rd Overtone ... £3-36 (£3-78)  
\*60 to 63-999 MHz 5th Overtone ... £3-95 (£4-44)  
\*64 to 105 MHz 5th Overtone ... £3-36 (£3-78)

C High frequencies :  
Adj. tol. ± 20ppm Temp. tol. ± 30 ppm —10 to 60°C  
105 to 180 MHz, £6-48 (£7-29) 180 to 250 MHz, £10-54 (£11-86)  
Delivery : \*normally 4/6 weeks—all other frequencies 6/8 weeks.  
Holders : All V. Low frequencies are in HC13/U or similar, otherwise supplied in HC6/U, HC18/U and HC25/U are available at frequencies above 4 MHz. HC17/U (same pins as FT243) available at 25p (28p) extra on above prices. Unless otherwise specified fundamental will be supplied to 30ppm circuit condition and overtones to series resonance.

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS  
100 kHz in HC13/U and 455 kHz in HC6/U, £2-95 (£3-19);  
1 MHz and 5 MHz in HC6/U and 10 MHz and 10-7 MHz in HC6/U and HC25/U, £2-80 (£3-02).

BURNS ELECTRONICS  
We are the Northern Appointed Agents for BURNS KITS etc. and can supply many of their products from stock.

ANZAC MD-108 DOUBLE BALANCED MIXER  
5-500 MHz supplied with full details for only £5-95 (£6-43).

CRYSTALS FOR PROFESSIONAL USE  
CRYSTALS TO COMMERCIAL SPECIFICATIONS

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30—7 p.m. and ask for Mr. Norcliffe.

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.



# We'll put you on the air.

Learn how to become a radio-amateur in contact with the whole world. We give skilled preparation for the G.P.O. licence.

**Free!**

Brochure without obligation to:

## British National Radio & Electronic School

P.O. Box 156, Jersey, Channel Islands.

SWE 10/78

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Block caps please

# C.B. ELECTRONICS

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

Telephone : Wigan (0942) 216567

THE BEST IN THE NORTH-WEST

**HOW TO FIND US :-** From M6 junction 26 follow signs for Wigan A577 at first traffic lights (T junction) turn right towards Wigan. At next traffic lights you are there, *BUT* turn left and 10 yards further turn right by telephone kiosk. Premises are slightly to your right. Plenty of parking space. Mileage from motorway 1/2 mile. **From Wigan** follow the A577 Skelmersdale to traffic lights at Fleet Street, Pemberton (Ye Olde White Swan on your left). Turn right then 10 yards right again. By Co-op. Mileage from Wigan 2 1/2 miles.

<b>YAESU</b> .....	FT225R .....	£548-33	CDE AR40 .....	£53-00	PTT mics. ....	£4-50
FT901DM .....	FT225RD .....	£601-87	CDE CD44 .....	£107-00	<b>WESTERN</b>	
FT101E .....	FT227R .....	£239-62	<b>EMOTATOR</b>		Power meter HF .....	£48-62
FL2100B .....	FT223 .....	£172-00	103LBX .....	£95-62	Power meter VHF .....	£48-62
FT200 .....	FT221R .....	£401-60	502CX .....	£145-12	<b>ASP Antennas</b>	
FP200 .....	<b>F.D.K.</b>		1102 .....	£208-00	2009 5/8 wave .....	£9-72
FT301 .....	Multi 800 .....	£289-00	<b>WESTERN</b>		201 1/4 wave .....	£3-13
FP301 .....	Multi 11 .....	£172-00	Alumast 30' .....	£139-32	677 5/8 wave .....	£14-95
FT7 .....	Multi U11 .....	£249-00	Ant. Sw. ....	£10-50	462 5/8 wave .....	£7-56
FC301 .....	Multi 2700 .....	£489-00	Morse Key .....	£2-25	Magnetic Base .....	£8-50
FRG7 .....	TM56 .....	£104-00	Morse Key .....	£8-25	Boot mount .....	£3-50
FR101D .....	Quartz 16 .....	£159-00	High Pass Filter .....	£2-95	<b>SWR Bridges</b>	
FL101 .....	<b>Rotators</b>		Headphones .....	£4-50	Single meter .....	£9-50
FR101's .....	CDE AR30 .....	£46-00			Twin meters .....	£12-50

DUE TO FLUCTUATING EXCHANGE RATES, PLEASE CHECK FOR CURRENT PRICES.

**WANTED : RECEIVERS & TRANSCEIVERS HF or VHF**

PART EXCHANGES WELCOME

S.A.E. ALL ENQUIRIES

H.P. AND CREDIT TERMS

# AMATEUR RADIO RETAILERS ASSOCIATION



AT THE

## GRANBY HALLS LEICESTER

Thursday, Friday and Saturday  
November 2nd, 3rd and 4th

10 a.m. to 6 p.m. daily

**ADMISSION - 40 pence**

(Special concessionary prices for Clubs, Schools, etc.  
—if booked in advance)

**£500** IN VOUCHER PRIZES TO BE WON **£500**

**CONTINUOUS FILM SHOWS FROM 1 P.M. DAILY**

---

LIGHT REFRESHMENTS AVAILABLE 11 a.m. until 5 p.m.  
Also Bar, Ice Cream, Soft Drinks, etc., etc.

---

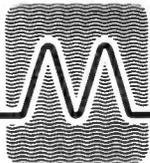
Taking part are:—

AMATEUR ELECTRONICS UK LTD.; WESTERN ELECTRONICS (UK) LTD.; DATONG ELECTRONICS;  
WATERS AND STANTON; STEPHEN-JAMES LTD.; M. B. RADIO (LEEDS); S.M.C. (JACK TWEEDY) LTD.;  
RADIO SHACK LTD.; THANET ELECTRONICS; SOUTH MIDLANDS COMMUNICATIONS; TAURUS  
ELECTRICAL; LOWE ELECTRONICS; JOHN BIRKETT; AMATEUR RADIO SHOP (HUDDERSFIELD);  
B. BAMBER ELECTRONICS; ELEY ELECTRONICS; ELECTRO SUPPLIES; CATRONICS; R.S.G.B.; F. K. GALKA;  
HERON-PIKE; A. H. THACKER; SURPLUS & GENERAL SUPPLIES; C.B. ELECTRONICS; ISHERWOODS  
ELECTRONICS; R. J. FINCH AERIALS; ACE MAILTRONIX LTD.; SOTA COMMUNICATION SYSTEMS;  
JOHN'S RADIO; C.P. DEVELOPMENTS; G. B. PACKER (COMMUNICATIONS); ARROW ELECTRONICS;  
MINFFOROD'S; C. & C. ELECTRONICS; RICHARD WHITE; HILOMAST; J. M. G. ELECTRONICS; MICRO-  
WAVE MODULES; CRAYFORD ELECTRONICS; RADIOTRONICS; AMATEUR RADIO EXCHANGE; I.S.W.L.;  
R.A.I.B.C.; B.A.T.C.; MODULAR ELECTRONICS; ROBIN BETTISON; B.A.R.T.G.; R.A.E.N.; REPEATER  
GROUPS, Etc., Etc.

## TALK-IN BY LEICESTER RADIO CLUB GB3ARE

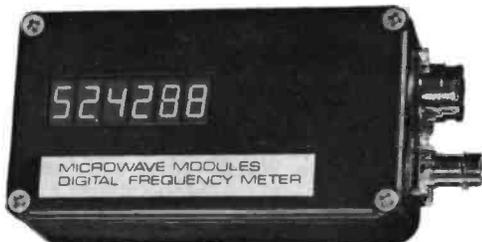
All information: Tom Darn, G3FGY, 20 Mount Pleasant, Ripley, Derbys., DE5 3DX  
(PLEASE NOTE NEW ADDRESS)

WHERE ALL THE LEADING TRADERS & IMPORTERS PUT ON THEIR OWN SHOW



# MICROWAVE MODULES LTD

## MMD 050/500 500 MHz DFM NOW ONLY £69 inc. VAT!!



### SPECIFICATION

<b>Digit Height</b>	: 10mm.
<b>Display Width</b>	: 45mm.
<b>Case Size</b>	: 111 x 60 x 27mm.
<b>Frequency Ranges</b>	: 0.45-50 MHz : 50-500 MHz
<b>Sensitivity</b>	: Better than 50mV RMS over 0.45-50 MHz : Better than 200mV RMS over 50-500 MHz
<b>Input Connector</b>	: 50 ohm BNC
<b>Input Impedance</b>	: 50 ohm
<b>Power Connector</b>	: 5 pin 270° locking DIN socket
<b>Power Requirements</b>	: 11-15 volts DC at 300 mA approximately

### FEATURES

- ★ 12 volt DC operation
- ★ 0.45-500 MHz coverage in two ranges
- ★ 100 Hz resolution on 50 MHz range
- ★ 1 kHz resolution on 500 MHz range
- ★ Reverse Polarity Protected

### GENERAL DESCRIPTION

Recent advances in MOS technology have made possible the development of this extremely compact frequency meter which for the first time offers the user a convenient cost-effective means of frequency measurement.

A close tolerance quartz crystal in the 5 MHz range together with CMOS binary divider integrated circuits generate the accurate 400 mS gating period for the main counter MOS LSI circuitry.

This LSI circuitry drives a multiplexed 6 digit LED display through current amplifiers. This display is fed from an internal store which is constantly updated from the main counter register and thus the display is continuous and flicker-free for a constant frequency reading. The display uses the latest high efficiency red LED's with a digit height of 10mm. and overall display width of 45mm.

This counter has two ranges which are selected by supplying +12 volts to one of two pins on the DIN socket. Internal diode switching brings the input in the 0.45-50 MHz range to a wide-band amplifier which drives a high speed TTL divider in the main counter logic. On the 50-500 MHz range the diodes switch in a high speed ECL prescaler and the decimal point is changed accordingly.

A low angle AT cut quartz crystal is used giving a typical temperature stability of 0.5 ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 200 Hz at 50 MHz, or 2 kHz at 500 MHz.

The counter has reverse polarity protection and operates satisfactorily from a nominal 12v. DC supply. A suitable 5 pin DIN plug is supplied.

## MICROWAVE MODULES

BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND

Telephone: 051-523 4011 Telex 628608 MICRO G

**CRYSTALS** : 84-08, 84-22, 84-27, 84-40, 84-58, 84-76, 84-94, 84-99, 85-12, 85-30, 85-35, 85-48, 85-66, 90, 91, 92, 97 kHz.  
1820, 1845, 3566, 3671, 7047, 7054, 7077, 7080, 7092, 7099, 7124, 7129, 7270, 14112, 14250, 14400 kHz (less 25%  
2 or more) ... .. £3

50,000 others in stock, enquire with S.A.E.

**200 CRYSTAL SELECTOR SWITCH UNIT**, HC6U sockets in groups of 5, 20-way and 10-way switches ... .. £4

**62H RECEIVER CRYSTALS**, 4,000 in stock for air and 2m. band (less 25% 2 or more) ... .. £3 ea.

**USING AN AIRCRAFT RADIO**, 2nd edition. A book by C. L. Day, sent 1st class post ... .. £1.70

**UHF RX 300 MHz**, double superhet all valve, single channel size, 6 x 8 x 12 with circuit ... .. £10

**RELAYS 12 VOLT DPCO**, Suitable for crystal changeover in mobile rigs (less 25% 2 or more) ... .. £3

**AIR BAND MONITOR RECEIVERS**, crystal controlled, single and multi channel, from ... .. £35

**TRIO 9R59D**, presentation model, very good condition, offered for sale on behalf of a client ... .. £50

**WANTED—SURPLUS RADIO TELEPHONES, AIRCRAFT RADIO, CRYSTALS AND MANUALS**

CALLERS AND EXCHANGES WELCOME AT:

**BAGINTON ELECTRONICS**

COVENTRY AIRPORT

Tel. (0203) 302449

S.A.E. ALL

ENQUIRIES

# J. BIRKETT *Radio Component Suppliers*

## 25 THE STRAIT . LINCOLN . LN2 1JF

Telephone: 20767

10-7 MHz CRYSTAL FILTERS. Type 445LQV/914A B.W.  $\pm 15$  kHz 820 ohm imp. at £2.50, 445LQV 914B B.W.  $\pm 7.5$  kHz at £3.50. Both ex-equipment.

SOLDER-IN FEED THRU's. 6-8pf, 300pf, 1000pf. All 20p doz. VHF POWER TRANSISTORS. 2N 5591 25 watt 175 MHz at £5.50.

2 GHz STRIPLINE NPN TRANSISTORS at £1 each.

X BAND GUNN DIODES with data at £1.65.  
X BAND DETECTOR DIODES like 1N23 at 25p, SIM 2 at 15p.  
MINIATURE 10+10pf BUTTERFLY PRE-SET CAPACITORS at 25p.

VARI-CAP DIODES. BA 102 at 20p, BB 121 at 15p.  
ERIE 1000pf DISCOIDAL FEED THRU's at 8p each.  
DIVIDE BY 2 300 MHz COUNTERS with data at 65p  
DIVIDE BY 4 150 MHz COUNTERS with data at 65p  
MINIATURE 20 ASSORTED FT 243 CRYSTALS for £1.50.  
ROTARY SWITCHES. 2 Pole 4 way at 20p, 2 Pole 10 way at 40p.  
VHF FETS. J 310 at 20p, 2N 3819 Type at 20p, 6 for 75p, 40673 Type at 33p, 4 for £1.10.

UHF STRIPLINE TRANSISTORS. 800 MHz NPN BF 362 at 25p.

10-250 MHz HC 18U CRYSTALS at £1.50 each.  
NUT FIXING 1000pf FEED THRU's at 15p each.  
UNMARKED GOOD VHF POWER TRANSISTORS.  
2N 3866 at 3 for 75p, 2N 3553 at 3 for £1.10.

HC6U CRYSTALS. 38 MHz, 40 MHz, 44.3 MHz, 45.9 MHz, 46.5 MHz, 46.7 MHz, 48.3 MHz, 50.1 MHz. All at 50p.

20 ASSORTED FT 241A CRYSTALS for £1.10.

100 C280 CAPACITORS, assorted for 57p.  
ELECTROLYTIC CAPACITORS. 1000uf 100v.w. at 50p, 2200uf 100v.w. at 60p, 3300uf 40v w. at 50p, 3300uf 63v.w. at 60p, 4700uf 63v.w. at 60p.

SPECIAL OFFER OF CMOS. CD 4001 at 10p, CD 4007 at 10p, CD 4011 at 10p, CD 4020 at 60p, CD 4029 at 60p.

SUB-MINIATURE TANTALUM. 4-7uf 10v.w. at 5p, 6 for 25p.

1/2" COIL FORMERS square Base with can. core, at 3 for 10p. TAA 661 F.M. I.C. at 50p, CA 3089Q at £1.

3 PIN PLUG AND SOCKET like R.S. European type with 2 metres of cable at 75p pair.

RADAR WIDE BAND AMPLIFIERS I.C.'s with data. Un-tested, 6 for 57p.

50 ASSORTED 2 WATT ZENERS. Un-tested for 57p.  
ERIE RED CAP .01uf 100v.w. CAPACITORS at 5p each.

MOTOROLO WIDEBAND AMPLIFIERS I.C. MC 1350 with data at 50p.

OUR MIX HC6U 80M. CRYSTALS. 3500 to 3600 kHz, 3 for £2.50.

OUR MIX HC6U 80M CRYSTALS. 3600 to 3800 kHz. 3 for £2.15.

STC FT241A TYPE 285 kHz CRYSTALS at 20p, 10 for £1.20.

50 ASSORTED 10X TYPE CRYSTALS for £1.50.

VARIABLE CAPACITORS. Direct Drive. 5pf at 75p, 10pf at 75p, 15pf at 75p, 30pf at 85p, 50pf at 85p, 125+125pf at 55p, 100+200pf at 55p, 180+180pf at 60p, 250+250+25+25pf at 55p, 500+500pf at 60p. With Slow Motion Drive. 300+300pf at 55p, 250+250+20+20+20pf at 75p, 365+365pf at 65p.

TRANSISTORS. Plastic BC 108 or BC 178. Both at 10 for 55p.

VHF POWER TRANSISTORS. 2N 3375 at £1 each.

10 AMP S.C.R.'s. 100 PIV at 25p, 400 PIV at 50p, 800 PIV at 60p.

400mW UNMARKED GOOD ZENERS. 3.6v., 6.8v., 10v., 11v., 12v., 13v., 16v., 18v., 24v., 30v., 33v., 36v. All at 10 for 40p.

DAU TRIMMERS. 2 to 9pf at 10p, 5 to 38pf at 10p, 6 to 45pf at 10p, 8 to 125pf at 12p, 8 to 140p at 15p.

IS44 DIODES, 25p doz. BAW 62 HIGH SPEED DIODES at 12 for 35p.

Please add 20p for post and packing on U.K. orders under £2. Overseas orders at cost.

## R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

EDDYSTONE EC10 MK1 Receiver	£110.00 (£2.00)
HAMMARLUND HQ170A. B.S. Receiver	£180.00 (£4.00)
KW201 B.S. Receiver	£130.00 (£4.00)
NATIONAL HRO 50T Receiver	£140.00 (£4.00)
NATIONAL NC190 Receiver	£80.00 (£3.00)
EDDYSTONE EB35 Receiver	£100.00 (£3.00)
EDDYSTONE EC10 MK2 Receiver	£140.00 (£2.00)
EDDYSTONE 840C Receiver	£80.00 (£4.00)
EDDYSTONE 940 Receiver	£170.00 (£4.00)
YAESU MUSEN FRDX400 Receiver	£160.00 (£3.00)
HAMMARLUND HQ180 Receiver	£180.00 (£4.00)
TRIO 9R59DS Receiver	£65.00 (£3.00)

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

All types of AVOMETERS and MEGGERS, normally in stock also accessories and spares

EW DIGITAL AVOMETER TYPE DAI16 in stock ... £99.00  
Send for details.

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

S. G. BROWN'S HEADPHONES. Type "F" 120 ohm, 2000 ohm, 4000 ohm, £14.50 (£1.00); Rubber Earpads for same, £1.32 per pr. (40p); Standard Jack plugs, 24p (12p).

SINCLAIR DIGITAL MULTIMETERS

DM2	£55.00 (£1.20)
PDM35	£29.95 (65p)
Mains adaptor for either model	£3.00 (70p)
Carrying case for DM2	£5.00 (70p)

YAESU MUSEN FRG-7 Receiver in stock ... £177.00 (£3.00)

YAESU MUSEN FRG-7 Digital Receiver in stock ... £240.00 (£3.00)

YAESU MUSEN FRG-7000 Receiver in stock ... £324.00 (£4.00)

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

NOTE: 12% VAT must be added to all prices, new and secondhand, except Test Equipment which is 8%, inc. carr. and packing.

Carriage for England, Scotland and Wales shown in brackets. Terms: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export.

HOURS—9.30 a.m.—5.30 p.m. MON.—FRI.

At R.T. & I.

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

PARTRIDGE "JOYSTICK" New improved VFA. £19.50. Joymatch IIB, £19.50. LO-Z500X, £25.00. Joymatch A.T.U. Kit. £8.20. A.T.U. Kit Assembled, £9.90. Artificial earth and bandswitch £8.20.

Note—Partridge prices include postage, packing and VAT.

TRIO EQUIPMENT.

New Trio R-300 Receiver, in stock £164.00 (£3.00)  
All Bands with xtal calibrator.

SHURE MICROPHONES, 526T, £30.80 (£1.00); 444, £25.40 (£1.00); 401A, £13.00 (£1.00); 202, £12.00 (£1.00); 201, £11.40 (£1.00); 414A, £19.50 (£1.00); 414B, £19.50 (£1.00). Full details on request.

KEYNECTORS, piano key mains connector units, £4.25 (40p). Trade enquiries welcome.

VALVES. Please state your requirements.

ADVANCE TEST EQUIPMENT—we are agents—your enquiries please.

TMK METERS: TM500, £23.75 (£1.00), TW20CB, £28.50 (£1.00), TP55N £15.25 (£1.00), Model 700, £49.00 (£1.00), also cases for same.

We also supply PHILIPS & LABGEAR COLOUR TV TEST EQUIPMENT, including Colour Bar Generators, Cross Hatch Generators. Degaussing Coils, Oscilloscopes, CRT Testers, Transistor Testers, etc., etc.

KW EQUIPMENT: KW103, £23.00 (£1.50); KW107, £108.00 (£1.50); KWE-Z MATCH, £40.00 (£1.50); KW109, £118.00 (£1.50); KW Balun, £8.50 (£1.00); KW Antenna Switch, £8.00 (£1.00); KW Dummy Load, £20.00 (£1.20), etc.

## R. T. & I. ELECTRONICS LTD.

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

NEAREST STATION: LEYTONSTONE (Central Line)

CLOSED SATURDAYS

# The Antenna that Hertz missed out on!

We suppose it was quite an achievement to predict radio-wave transmission and then devise a shock-excited VHF dipole in those far off days, but what a time the Grand Old Man could have had on the range -5-30 MHz, if only he'd had a Joystick VFA (Variable Frequency Antenna) to play with. And what's more whilst his original experiment was transmission across a room, with the Joystick many delighted users have found an indoor installation (its only 7' 6" long) has got them better DX (receiving and transmitting) than experienced on previous antennae.

IN USE BY AMATEUR TRANSMITTING AND SWL STATIONS WORLD-WIDE AND IN GOVERNMENT COMMUNICATION

**SYSTEM 'A' £41.00**  
250w. p.e.p. OR for the SWL

**SYSTEM 'J' £47.95**  
500w. p.e.p. (improved 'Q' on receive)

## PARTRIDGE SUPER PACKAGES

COMPLETE RADIO STATION FOR ANY LOCATION

Featuring the World Record Joystick Aerial (System 'A'), 8ft feeder, all necessary cables, matching communication headphones. Delivery Securior our risk ASSEMBLED IN SECONDS! BIG CASH SAVINGS—Note that we have been able to REDUCE Packages 3 and SRX30

PACKAGE No. 1. **£222.00**  
As above with R.300 RX. SAVE £14.15!

PACKAGE No. 2. **£237.45**  
Is offered with the FRG7 RX. SAVE £14.15!

PACKAGE No. 3. **£184.50**

Here is a lower-price, high-quality package featuring the LOWE SRX 30., with all the Partridge extras. SAVE £14.15!

RECEIVERS ONLY, inclusive delivery, etc.  
R.300 £184.50 FRG7 £199.95 SRX30 £146.75



Just telephone  
your  
card number



Phone 0843 62535 (ext. 4) or 62839 (after office hours) or write for details—send 9p stamp

NOTE : All prices are those current at the time of closing for press inclusive of current VAT at 12½% and carriage.

4, PARTRIDGE HOUSE, PROSPECT ROAD, BROADSTAIRS, CT10 1LD. (Callers by appointment).

G3CED  
G3VFA

**PARTRIDGE**  
BROADSTAIRS WENT ENGLAND  
**ELECTRONIC LTD**

# FROM Catronics

## Low-cost Miniature REPEATER ACCESS— TONE GENERATOR

SMALL SIZE—only 1.7in. x 1.1in. x 0.6in.  
LOW COST—only £4.50 inc. VAT.  
Ready built, tested and set to 1750Hz.  
Power supply requirement is 8-15 volts at less than 5mA, making it particularly suitable for portable and mobile transmitters.

## CRYSTAL CONTROLLED TONE BURST GENERATOR

At a size to fit most rigs—only 2in. x 1in. x ½in.  
at a price to suit your pocket—only £9.20 (incl. VAT)  
Operates on 9-15v. DC output adjustable 0-100mV.

## CRYSTAL CALIBRATOR

Catronics model M6 giving outputs at 1 MHz, 200 kHz, 100 kHz, 50 kHz and 25 kHz at the flick of a switch, with harmonics audible up to 2m. band, 6 volt supply. Complete PCB module, accurately set to frequency and switch assembly, £10.40. Also available—kit of parts for regulator for operation on 9 to 20 volt supplies, £11.60. Complete boxed unit with battery, £16.90 plus 75p p. and p.

## VHF and UHF PRESCALERS

The range now includes 3 Prescaler Modules :  
300 MHz → 100 Model FS5000. This top of the range model enables the range of most HF Digital Frequency Meters to be extended up to 500 MHz. By dividing the input signal frequency by a factor of 100, the output is sufficiently low in frequency to drive standard TTL logic circuitry even when measuring frequencies in the 70cm. band. PCB size is approx. 3½" x 2". Only £29.00.  
500 MHz → 10 Model FS500. Similar specification and size to model FS500 but having a frequency division ratio of 10. Price only £17.50.

The above models require 5-5v. supply. An "on-board" regulator for use on 9-15v. supply can be supplied for an additional £2.00.  
150 MHz → 10 Model FS150. VHF Prescaler kit for use up to 150 MHz with switchable → 1 preamp mode for use down to audio frequencies. Still the most popular Prescaler available at the low kit price of only £17.50.

NOTE: Catronics Prescalers will work into ALL the popular DFMs including those by Heathkit, RCS, Yaesu, etc. and the G3XGP design—in fact we haven't found one yet into which it won't work!

## 40W ON 2M FOR £19.50

A Kit for building a 40 watt r.f. power amplifier for boosting the output of 10-watt F.M. mobile transmitters. Automatic solid-state T/R switching is incorporated. Design as published in September 1976 edition of "Electronics Today International." COMPLETE KIT for only £19.50 plus 65p p. and p.

## FREE PRICE LIST

Send s.a.e. for full Price List or 45p plus large 18p s.a.e. for your copy of our DATA CATALOGUE which includes information on RTTY equipment, DFM's, Plessey SL600 i.c.s., 7400 i.c.s., etc., etc.

All our prices include VAT at current rates. Please note our minimum U.K. post and packing charge, except where indicated, is 30p.

 Catronics LTD. (DEPT 810)

COMMUNICATIONS HOUSE (Dept. 810)  
20 WALLINGTON SQUARE,  
WALLINGTON, SURREY, SM6 8RG  
Telephone : 01-669 6700

# Have you got all these ARRL titles on your shelf? . . . .

Solid State Design for the Radio Amateur	... ..	£5.35
Electronics Data Book	... ..	£3.25
Antenna Book, 13th edition	... ..	£3.60
Understanding Amateur Radio	... ..	£3.28
A Course in Radio Fundamentals	... ..	£2.18
FM and Repeaters for the Radio Amateur	... ..	£3.05
Radio Amateur Handbook 1978 (soft cover)	... ..	£6.50
Specialised Communications Techniques for the Radio Amateur	... ..	£2.60
Hints and Kinks	... ..	£1.88
Single Sideband for the Radio Amateur	... ..	£3.30
VHF Manual...	... ..	£3.20
Learning to Work with Integrated Circuits ( <i>new title</i> )	... ..	£1.65
Getting to Know OSCAR from the Ground Up ( <i>new title</i> )	... ..	£2.30

(all prices include post/packing)

Available from **SHORT WAVE MAGAZINE**

Publications Dept.,

34 HIGH STREET, WELWYN, HERTS., AL6 9EQ. Telephone: Welwyn 5206/7

**SIMPLE, LOW-COST**

## WIRE ANTENNAS

by William Orr, W6SAI

This excellent and thoroughly recommended handbook, is the publication on the practical approach to building aerials. After starting with aerial fundamentals there are discussions and descriptions of ground-plane, end-fed, DX dipole, vertical and wire beam antennas, plus coverage on a universal HF antenna system and working DX with an "invisible aerial"; the SWR meter and coaxial cable also have chapters to themselves.

The whole book is presented in an authoritative immensely clear, readable and enjoyable manner with the emphasis on the practical throughout—to the extent that even the chap who can hardly strip a piece of co-ax need not feel at all left out! Just as practical for the SWL, too!

192 pages

**£3.15** inc. post

Order from:

Publications Dept.

**SHORT WAVE MAGAZINE LTD.**

34 High Street, Welwyn, Herts. AL6 9EQ.

Latest 1978 (56th Edition)

## CALL BOOK— DX LISTINGS

(i.e. all amateur call-signs outside the U.S.A.)

In this issue . . .

- \* 280,928 licensed radio amateurs
- \* 133,162 changes in listings
- \* QSL Managers around the world
- \* Radio Amateur Prefixes of the World, with Map
- \* ARRL Countries list
- \* Great Circle bearings
- \* Standard Time charts
- \* World-wide QSL Bureaux
- \* Plus much, much more!

856 pages

**£9.05** inc. postage

Order from:

Publications Dept.

**SHORT WAVE MAGAZINE LTD.,**

34 High Street, Welwyn,  
Herts., AL6 9EQ

## ("SITUATIONS" AND "TRADE")

15p per word, minimum charge £1.80. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50% for Bold Face (Heavy Type). Box Numbers 35p extra. No responsibility accepted for transcription errors. Replies to Box Numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

## TRADE

German Language booklet, specially written in easy stages for Amateur Radio operators and SWL's. Innovation memory sheet for beginners, numbers, telling the time, two-way QSO, radio phrases, technical and general vocabulary, brief grammar and verbs, etc., £1.50 (£1.75 overseas).—Mary Craven (XYL/G4EQI), "Grass Moor," Radford Road, Alvechurch, Birmingham B48 7DT.

Resistors, miniature film  $\frac{1}{4}$ -watt 2%, 1-1p each, post 10p.—North Wales Communications, Seafeld Main Road, Ffynnonogroyw, Clwyd CH8 9SN.

9R-59DS valves. Complete replacement. S.a.e. or phone. See Partridge Electronics Ltd. main advertisement.

Get out from anywhere, even Pentonville, with the new technology "Joymaster" system. For advance information, s.a.e. or phone. See Partridge Electronics Ltd. main advertisement.

Attention SWL's and DX-ers! Our range of units for both medium and short wave SWL-ing is rapidly expanding. For example, why not boost your receiver's performance with one of our PRS RF Preselectors! Only £14.80 inc. Get ready for the winter DX months. S.a.e. for details of complete range. Mail Order only.—Amtest, 55 Vauxhall Street, Worcester WR3 8PA.

Valves, new and boxed: 6JM6, 6HF5, 6JS6/C, 6JB6/A, 6KD6, 6LQ5, 6146B, 7360, and many other types available. Please send s.a.e. for list.—Wilson, G4AZM, Tel: Bolton 54165.

Electronic components and equipment, fantastic selection, list 10p.—Grimsby Electronics, Lambert Road, Grimsby.

Dual-gate Mosfet 2m. converters, 2-4 and 28-30 MHz IF's available ex-stock, £15. Other IF's to order. 2m. Mosfet pre-amps., £6. Stabilised PSU's, 12v. 3A, suit most black boxes, £13. S.a.e. for full details.—Taylor Electronic Developments (Blackburn), 85 Revidge Road, Blackburn, Lancs. (Tel: 0254-60455.)

November issue: Due to appear October 27th. Single copies at 50p post paid will be sent by first class mail for orders received by Wednesday, October 25th, as available.—Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Good second-hand equipment always wanted. Come to AMATEUR RADIO EXCHANGE for the best deal.—2 Northfield Road, Ealing, London W13 9SY. (Tel: 01-579 5311.)

Dart Stationery presents Reception Report Letters for the DX-er. Professionally styled letters, printed in two colours, on high-quality paper, and made into pads of 100 letters for tidy storage: 1 pad, £2.10; 2-plus pads, £1.80 per pad. All prices include post/packing. Every order received carries a 10-day return of money guarantee if not completely satisfied. Mail orders only, please. Please send cheque or P.O. payable to Dart Stationery, 20 Bromley Road, London E17 4PS.

## CALL BOOKS

## INTERNATIONAL :

<b>RADIO AMATEUR CALL BOOKS (1978)</b>	
"DX Listings" . . . . .	£9.05
"U.S. Listings" . . . . .	£9.60
<b>U.K. Call Book, 1978 Edn. (RSGB)</b>	£3.20

## MAPS

<b>"SHORT WAVE MAGAZINE", DX ZONE MAP (GREAT CIRCLE)</b>	
In colour. New 8th Edition. . . . .	£2.25

<b>AMATEUR RADIO MAP OF WORLD Mercator Projection — Much DX Information — In colour. Second Edition . . . . .</b>	<b>£1.05</b>
---	--------------

<b>RADIO AMATEUR MAP OF THE U.S.A. AND NORTH AMERICA State boundaries and prefixes, size 24" by 30", paper . . . . .</b>	<b>90p</b>
--	------------

<b>RADIO AMATEUR'S WORLD ATLAS</b>	
In booklet form, Mercator projection, for desk use. Gives Zones and Prefixes (New 9th Edition) . . . . .	£1.60

## LOG BOOKS

<b>Standard Log (New Glossy Cover) . . . . .</b>	<b>£1.50</b>
<b>Receiving Station Log . . . . .</b>	<b>£1.50</b>
<b>Minilog (New style) . . . . .</b>	<b>£1.05</b>

(The above prices include postage and packing).

Available from

## SHORT WAVE MAGAZINE

Publications Dept., 34 High Street, Welwyn,  
Herts. AL6 9EQ - Tel. Welwyn (043871) 5206/7

(Counter Service, 9.30-5.15, Mon. to Fri.)

(GIRO A/C No. 547 6151)

## RADIO AMATEUR PREFIX-COUNTRY-ZONE LIST

published by GEOFF WATTS

Editor of "DX News-Sheet" since 1962

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

- its DXCC "status"
- the normal prefix
- the special prefixes
- the ITU call sign block allocation
- the continent
- the "CQ" Zone No.
- the ITU Zone No.

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

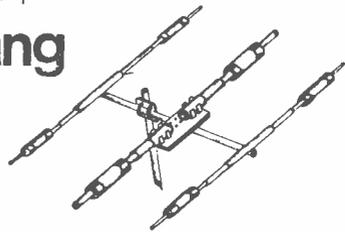
Tell your Club-members about it. Order a gift copy for that overseas friend 15 pages. Price 40p (UK) or sent overseas (air-mail) for \$1 or 5 IRCs (55p)

GEOFF WATTS

62 BELMORE ROAD, NORWICH, NR7 0PU, ENGLAND

# impact

## Mustang Mk2



for 10, 15 & 20 metres

This Antenna incorporates the well-tried Impact Traps as used in the TA-33 Jr. for the Director and Reflector Elements: but the Driven Element is of heavier construction, and uses higher power and larger Traps. All Traps are weather and moisture protected. This process has been tried and tested over a period of several years to ensure maximum performance under differing climatic conditions.

The MUSTANG Mk. 2 was designed to fulfil the need for a beam capable of handling the maximum legal power ratings of all amateur licences throughout the world. It will therefore, handle comfortably 2kW p.e.p. or 1kW on CW and AM. At the same time, it is very compact, light and strong. It has a low wind load. This three-element beam gives outstanding performance on 20, 15 and 10 metres.

### FIELD TEST—RESULTS AND DATA

Forward Gain ...	up to 8dB	Wind Load ...	90lb.
Front to Back Ratio ...	20dB	Turning Radius ...	15ft.
Maximum Element Length ...	25ft. 9in.	Shipping Weight ...	15kgs.
Boom Length ...	12ft.	Boom Diameter ...	1 1/2in.
Assembled Weight ...	26lb.		

Visual standing wave ratio is less than 1.5-1.0 at resonant frequency Mustang 3 Elements, 10, 15 and 20 metres, £118.00

## MOSLEY ELECTRONICS LIMITED

Administrative Address only

196 Norwich Road. New Costessey, Norwich NR5 0EX.

(All antennas available ex works, carriage and VAT extra)

Send for HANDBOOK containing full range of Antennas and exclusive technical information. 28 pages 75p. Refundable upon purchase of Antennas.

## G. W. M. RADIO LTD.

All prices include VAT and post/carriage.

**ULTRA 3A4AC3.** Working order, less crystals. Handy 3 lb. portable covers 68-101 Mc/s. 200 mW. output. Complete with used but good rechargeable batteries, £45. A few battery chargers available for quantity orders.

**POCKETFONES PFI.** A further supply of these hand held 430 Mc/s. Tx/Rx, again we are unable to test because crystals removed by supplier but these are just out of service. With circuits and tuning instructions, £20 pair (one Tx one Rx). **CAR ADAPTORS.** Rx plugs in, battery is charged and output taken to 3 watt amplifier into 3 ohm speaker. (No speaker supplied), £8. **PFI Battery CHARGERS** for 12 of each, £15.

**G.E.C. CONTROL BOXES.** 6 channel switching, Volume, Mute "Off, Radio" controls. 24 way male, 6 way and 4 way female miniature Paignton chassis plug/sockets. Unused, £2.50.

**SPEAKERS.** Brand new mobile speakers by Lamerhold (type 232/3). Black plastic case, silver coloured grill, swivel bracket and 5 feet lead. Rate Rated at 2 watts, 3 ohms, £4.25.

**A.K.G. Lightweight HEAD & MIKE sets,** model K58. Mike 2/300 ohms. headphones 75 ohms. Ideal for mobile use and in excellent condition, £5.50. **S.G. BROWN** 2000 ohms headphones, fair condition, £3. All the above checked and working.

**R.F. FILTERS,** clean up your supply leads, 2.5 amps at 250v. AC or 600v. DC, £1.25 or 5 for £4. These are very good quality.

**ALARM CLOCKS.** Wehrle Commander. Steady/repeat alarm. Large magnificent and brand new, £9.50.

**REED RELAYS** for recent auto keyer designs, 200 ohm coil, 15p plus 10p post any numbers.

**OSCILLOSCOPES.** Single Beam CD523.5.2. £45. Overhauled and good working order. BC221 Frequency Meters, a further delivery, overhauled and in working order, £20.

**PYE CAMBRIDGE U10B.** UHF 70 cms. boot mounting with Control Box, cable and mounting tray. NO mike or speaker. Exceptionally clean as these have been used for data transmission only, £40 each.

**RECEIVERS.** **EDDYSTONE** 730/4, 480 kc/s. to 30 Mc/s. in "as new" condition. In Military transit box with switching unit. Unrepeatable at £185 (less £10 if collected).

**DYMAR.** Table cabinets for R/T base station, polished wood case (slight scratches) 12v. 3 amp stabilised PSU and speaker, £15. Redifon 12-way remote control units, on/off, volume and squelch. Fine quality stick mike, moving coil low impedance, as new, £10. Speakers, 3 ohm 5 1/2" x 2 1/2" replacement for most mobiles, 3 for £2.

Carriage charges included ore for England and Wales only.

Terms: Cash with orders. Early closing Wednesday.

40-42 PORTLAND ROAD, WORTHING, SUSSEX

Telephone: 34897

**Yaesu FT-277R,** optic tuned, £180. **FT-221R** multi-mode transceiver, £33.25. **Yaesu FT-224** mobile transceiver, 24 channels, 12 fitted, £120. **FT-301D,** with super Deluxe power supply, £650. **Yaesu FT-225R,** latest multi-mode transceiver, 25 watts, £450. Standard walkie-talkies, 2 watts, £120. All VAT paid. Second-hand equipment: **Karl Braun 600** multi-mode two-metre transceiver, 40 watts, with VFO, £250. **Karl Braun 280** synthesised two-metre mobile transceiver, £125. **Icom 225** synthesised mobile transceiver, £125. **Belcom 2-metre** amplifier with pre-amp., £110. **Eddystone EC-10 Mk. II** with antenna and two PSU's, £100. **Sony** all-band receiver, mains/battery, 3 VFO's and BFO, £185. **Siemens** quadrophonic tuner/amplifier, £250.—**Dagenham Wholesale Supplies.** Ring 01-592 7800 daytime, 0277-823434 evenings.

**Radio Amateur Examination City & Guilds.** Pass this important Examination and obtain your G8 Licence with an RRC Home-Study Course. For details of this and other Courses (GCE, professional examinations, etc.) write or phone: **The Rapid Results College, Dept. JV/1, Tuition House, London SW19 4DS.** Careers Advisory Service, 01-947 7272 or ring 01-946 1102 for Prospectus. (24-hr. Recordcall).

**Why and FT-101?** 1.5-times competitions power output, RF speech slipping (G3LLL or Yaesu), plug-in 2m. transverters with repeater shift. NBFM attachments, modification data and our service. Also try us for G-Whip, FT-7, FRG-7, SRX-30, etc. S.E.M. Europa and Converters, SWR bridges, mics., co-ax., RSGB Books, and super CW filters for FT-101, FT-301, TS-520 and TS-820. Telephone your Access/Barclay Card number.—**Holdings of Blackburn Ltd.,** 39/41 Mincing Lane, Blackburn. (Tel: 0254-59595/6.)

## READERS' ADVERTISEMENTS

8p per word, minimum charge £1.20, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 35p extra. Replies to Box Numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EO.

## READERS

**Selling:** Brand new National Panasonic DR-48 digital general coverage receiver, still in maker's box and guaranteed, only £245 or near offer. Will deliver within 30-mile radius of London.—Ring Pye, 01-390 2607.

**Selling:** FR-50B Rx, amateur bands 80-10m., £55. Trio 9R-59DS with SP-5DS speaker, £50. Both little used and in excellent condition. Buyers collect.—Ring Greenwood, Rownhams 736873.

**For sale:** EC-10 Mk. II with AC/PSU, £100. R.1155 with AC/PSU, £20. R.209 with AC/PSU, £22. TCS-12 Rx with AC/PSU, £16. Lafayette HE-30 general coverage Rx, £37. B.44, £10. No. 38 Set, £5. Avo Model 7, £20.—Ring Allinson, Aspatria 20243.

**Sale:** Commercial HF linear, 2kW, £70. 3kV PSU, £26. Collins TCS-12, £15. Pye Cambridge High-Band portable AM all-transistor, single channel, without PA, £35. Bendix BC-1000A TRx, collector's item, £16. Marconi FSK unit, £35. PSU, 400v. plus 600v., £20. PSU, 250v., £15. Commercial 3kW ATU, £50. Antenna preselector, in case, £25. Low-Band Cambridge, boot-mounted, less controller, £13.—Ring Barraclough, 01-680 2995 daytime.

**Selling:** Realistic DX-160 general coverage receiver, all modes, 5 bands, with speaker, Codar PR-30 preselector, phones and instructions, £70.—Ring Lance, 021-779 2583.

**QSL collectors:** American radio operators would like to trade cards, one-for-one. Send cards to Wade Swancey, Box 3119, RAF Mildenhall, Bury St. Edmunds, Suffolk IP28 8NF.

**For sale:** Yaesu FT-201 Tx/Rx, coverage 80-10m., SSB/CW/AM, AC/DC, with Shure 201 mic. and Datong processor, all £275 or near offer. G3PLX video RTTY, ST-5 terminal unit, tone generator, 'scope tuner, keyboard, National Panasonic 12in. Bew-TV modified for direct. video or normal use, complete system £175 or near offer. TA-33Jr. with AR-40 rotator and new style control box, all £90 or near offer.—French, G4ATF, QTHR. (Tel: 0424-440419 evenings or weekends).

**Selling:** Hammarlund SP-600JX, 0.54 MHz, with speaker manual and spare valves, very good condition, near mint: offers? Catronics calibrator, £12. Hamgear PM-IID Super preselector, £12. Both mint.—Yates, 1 Islands Brow, St. Helens WA11 9PW.

**Sale:** Eddystone 880/4, absolutely mind, superbly engineered SSB Rx brand new Collins 3 kHz mechanical filter, manual and speaker, £395. Have TF-801D/1 signal generator, 10-485 MHz, with manual, want TF-144 H/4 or 4S; 500 MHz counter; TF-1066B, scrap HP-175A 'scope mainframe or EHT module; CV-157/URR side-band adaptor; Nuvistors 8056, 7587, 7895; R-389/URR VLF Rx; CV-253/ALR tuning unit.—Fletcher, 62 Moorbridge Lane, Stapleford, Nottingham. (Tel: 0602-397446).

**Selling:** National Panasonic DR-22 Rx, excellent condition, £110. EC-10 Mk. II, some use, with manual, £45. Toshiba R-1500, 5-band, as new, £40. DEG-2 digital crystal calibrator, with instructions, £10. Buyers collect.—Ring Dye, 01-642 5921 after 6 p.m.

**Wanted:** Eddystone 640 or 750, or similar; also K.W. transceiver. Will collect South/Midlands.—Ring Morgan, 073525-3701.

**Sale:** JR-310 receiver, with wide/narrow filter, original packing and manual, immaculate, £75. Matching SP-5DS speaker, £5. Hamgear PM-VIII calibrator, £10. Hy-Gain 12-AVQ antenna, £20. Or the lot, £100.—Browne, Willoughby, Westhill, Yarmouth, Isle of Wight PO41 ORX. (Tel: Yarmouth 148).

**Sale:** Grundig 'Satellit' 2100, as new, with SSB unit and leather carrying case, £195.—Ring Carpenter, 01-650 6596.

**Selling:** Sentinel HF pre-amplifier, £8. Sentinel converter, 144/4-6, £10. Eddystone 898 drive and dial, £5. KW-2000 mobile PSU, 12v., £25.—Grieveon, 6 Spinney Bank, Kings Sutton, Banbury, Oxon. OX17 3RL.

**Sale:** Chinow 872 8mm. sound camera, Chinow C200S sound projector and synchro-recorder, unused, £160.—Ring G8OJV, Sedgley (09073) 71252.

**Sale:** U.450L base station, with xtal for SU8 and RB14, case and part of manual, £35 or near offer. Also W.15U: offers?—Moon, 11 Stanesfield Road, Cambridge.

**For sale:** STE AK-20 2m. mobile transceiver, fitted with Catronics 'Eurocat' 80-channel Type 7200G synthesiser, £120. Icom IC-30A 70cm. mobile, 5 channels, as new, with 48-ele. Multibeam, £175.—Devine, G8LGE, QTHR. (Tel: 0924-825025).

**Wanted:** Anything for Canadian No. 52 Set, especially aerial feedthrough insulator C2 (CMC/114059). No. 12 sender, for spares. No. 19 Mk. III, complete.—Ring Taylor, G3UCT, Fleet (02514) 6998.

## SAMSON ETM-3C C-MOS KEYS

1  $\mu$ A battery drain—Why switch off?

- Self-completing dots/dashes/spaces. ● Can be used either as normal electronic keyer or as an iambic mode squeeze keyer.
- 8-50 wpm. ● Constant 3:1 dash-dot ratio. ● 6 C-MOS ICs and 4 transistors. ● Plug-in PCB. ● Long battery life—typically 1  $\mu$ A drain when idling—Built-in battery holder for 4 x 1.5v. batteries (but will work over 3-10v. range). ● PCB has both a reed relay (250v., 0.5 amp., 25w. max.) and a switching transistor (300v., 30 mA max.)—either keying method can be used. ● Has the well-known fully-adjustable Samson precision twin keying lever assembly. ● Operate/Tune button. ● Sidetone oscillator.
- Grey case 4" x 2" x 6". ETM-3C, £63.88.

**ETM-4C MEMORY KEYS:** Has ETM-3C features plus 4 memories of 22 characters each (or 2 of 44). Erase/Rewrite memories as needed—Send CQ's etc. by pressing a button.

**BUILT FOR DEPENDABLE MARINE AND COMMERCIAL SERVICE  
JUNKER PRECISION HAND KEY**

A superbly engineered straight key used for many years by professionals afloat and ashore. With this key you can't help but send good Morse. Free-standing—no screwing down. Front and back contacts—fully-adjustable gaps/tension. Key-click filter. Hinged grey cover, £36.54

### BAUER KEYING PADDLE

Single-paddle unit on 1 1/2" x 2" base for home-built E1-bugs. Adjustable gaps/tensions, £11.66.

### 88 mH TOROIDS

For CW, RTTY, SSTV and other filters, 90p each.

All prices post paid UK and include 12 1/2% VAT.

Please send stamp with enquiries.

**SPACEMARK LTD.**  
THORNFIELD HOUSE, DELAMER ROAD  
ALTRINCHAM, CHESHIRE  
(Tel: 061-928 8458)

## REG. WARD & CO. LTD. (G2BSW) (G8CA)

KW 103 VSWR Meter and Combined Power Meter	... £23.00
KW 107 Combined E-Z Match, VSWR and RF Power Indicator, Dummy Load and Antenna Switch for 3 Outlets	£108.00
KW 3-way Antenna Switches (for coax)	... £10.50
<b>YAESU</b>	
Yaesu FT 301D All solid state TCVR	... £585.00
Yaesu 101E...	... £515.00
FT200B Transceiver and FP200 A/C PSU	... £420.00
Yaesu FR101S RX	... £395.00
Yaesu FR101D	... £525.00
Yaesu YO100 Mon. scope	... £145.00
FRG-7000	... £327.00
Yaesu FRG7 New General Coverage Receiver	... £187.00
Sentinel 2m. Preamps and 2m. Converters/Europa Transverters	
SP101B Speaker	... £19.00
YD844 Desk Mic.	... £18.00
YD846 Hand Mic.	... £7.50
YH55 Headphones	... £8.75
YC500J	... £160.00
YP150 Dummy Load/Wattmeter	... £58.50
<b>SHURE MICROPHONES</b>	
Model 444, £25.30; Model 201 £9.50.	
<b>SEM Z matches</b>	... £34.50
<b>USED</b>	
KW.201 RX and H/Book Comp. with external Heathkit Q. Multiplier	... £130.00

### WANTED

Yaesu FR50B's in good condition.

**VALVES for YAESU, etc.** 6BM8, 6BZ6, 6U8, 6EJ7, 6AV6, 6KD6, 12AX7A, 12BY7A, 12AU7, R.C.A. VALVES for KW and Heathkit equipment. 6146, 6146B, 6HF5, 6LQ8, 6G5, 6EA8, 6GWB, 6GK6, 6CM6, 6CL6, 6CB6, 6BN6, 6H56, 6EWE, 12BA6, 12BE6, 12B26, 6J56C, etc., and many other types.

**J Beams and Stolle Rotators:** 140ft 14g. copper ant. wire; Ribbed and T-Insulators; 52 and 75 Q-co-ax. and U.H.F. plugs and sockets. Mast Couplers for 2in. Masts. Wightraps. G-Whips mob antennas, 12AVQ and 18AVT, etc. SWR 10 (Twin Meters), SWR/PWR Meters.

**AGENTS FOR G2DYM ANTI-TV ANTENNAS**

**AMTRON KITS**

**TRADE INS WITH PLEASURE. OUR STOCK OF GOOD SECOND HAND EQUIPMENT CHANGES DAILY—LET US KNOW YOUR REQUIREMENTS**

Due to currency fluctuations prices of imported equipment are liable to alteration. Add 12 1/2% VAT except test equipment and used equipment. N.B. Test equipment 8 1/2% VAT.

**HP TERMS AVAILABLE CARRIAGE EXTRA ON ALL ITEMS**

**ACCESS/BARCLAY CARD**

**AXMINSTER - DEVON Telephone: 33163**

G4DSG

G3HEO

**D. P. HOBBS LTD.****THE COMPONENT SPECIALISTS**

YAESU FT227R 800 channels 2 metre FM Transceiver ...	£214.88
YAESU FRG7 Receiver. '5-30 MHz P.L.L. ...	£200.25
FDK Quartz 16 2 metre FM Transceiver, fitted 10 channels ...	£157.25
LOWE SRX30 Receiver. '5-30 MHz ...	£158.62
NR56VF1 2 metre FM Monitor Receiver ...	£54.00

**MICROWAVE MODULES EQUIPMENT :**

MMC 2 metre Converters. 2-4, 4-6, 14-16, 28-30m. IF's ...	£20.25
MMC 2 metre Converters. 28-30m. IF with L.O. output ...	£22.50
MMC 70 4 metre Converters. Any IF ...	£20.25
MMC 432.70 cm. Converters. Any IF ...	£27.00
MMC 1296 23 cm. Converters. 28-30 or 144 IF... ..	£31.50
MMT 432/285 Transverter ... ..	£133.88
MMT 432/144R Transverter ... ..	£169.88
MMT 144/28 Transverter ... ..	£88.88
MMD 050. 50 MHz 6 digit Counter ... ..	£66.96
MMD 500P 500 MHz Prescaler ... ..	£27.00
MMD 50/500. 500 MHz Counter ... ..	£85.32
QM70 Cobra 2m.-70 cm. FM Transverter with Mic Audio and Toneburst ... ..	£73.00
QM70 Cougar 2m.-70 cm. FM Transverter ... ..	£55.00
Stolle 2010 Rotator ... ..	£48.94
Stolle 2030 Rotator ... ..	£54.00
Toko CFU-050D. 455 kHz Ceramic Filters (inc. P. & P.) ea. 40p	
2N697 Transistors ... .. (inc. P. & P.) 5 for 50p	
2N1146A TO3 Power Transistors. SIM. OC25 (inc. P. & P.) ea. 50p	
Surplus Valves. 12AT7 (ECC81); 12AU7 (ECC82); 12AX7 (ECC81); 6AL5 (E891). ... .. (inc. P. & P.) A1 30p EA.	

Prices include VAT

Part Exchanges Welcome ACCESS BARCLAYCARD

11 KING STREET, LUTON, BEDS. Tel.: 20907  
 NOW OPEN — D. P. HOBBS NORWICH LTD.  
 13 St. Benedict Street, Norwich, Norfolk. Tel.: 615786

For sale: FT-101 Mk. I, modified for Top Band, £240 or near offer.—Ring Henman, G3UNT, Maidstone 55297.

Selling: Hudson FM base-station radio-telephone, £50. Transistor/diode tester, £15. Type 51 waveform generator Transistor / diode tester, £15. Type 51 waveform generator, £10. UHF Rx-Tx tester, £10. VCR-139A cathode ray tube, £5. Carriage extra. S.a.e. with enquiries.—Hayward, Sunnyfields, Lighthouse Road, St. Margarets Bay, Dover, Kent.

Sale: K.W. Viceroy SSB Tx, 80-10m., £65. KR-77 Rx, 160-10m., £75. Heathkit RA-1, 160-10m., with Q-multiplier, crystal calibrator, amateur-band pre-selector, £40. Spare valves for each.—Ring Roche, G4CJH, Maidstone 54777.

For sale: Collins 390, 500 kHz-32 MHz, digital readout to 200 Hz, very good condition, with spare valves, etc., £295. SSB adaptor, 455 kHz input, ctal/man. control, fast/slow AVC, with speaker and phones, 6 kHz fine tuning, £65. AR8516L, 80 Hz-30 MHz, good condition, £175. All with manuals. Wanted: R.216.—Burton, 159 Redworth Road, Shildon, Co. Durham. (Tel: 0325-315122, 9 a.m.-5 p.m.).

Sale: Trio 9R-59DS receiver and SP-5DS speaker, good condition, £40. Buyer collects.—Ring Howitt, Orpington 34952.

Wanted: Two 813 valves and bases; heavy-duty band change switch suitable for linear.—Hayes, G3JBU, QTHR. (Tel: 0604-43037.)

Selling: Eddystone 770U, 150-500 MHz, excellent, with manual, around £150.—Watson, 69 Ormscliffe Road, Rednal, Birmingham.

Sale: FT-220 multimode 2-metre transceiver, mobile or fixed, 144-146 MHz, 10 watts, £195.—Ring Gregory, G8JDX, 0752-774045.

For sale: Icom 202E, CW/SSB, mint, £155. Marconi HP-56N, xtal transceiver, 156-184 MHz, 12v. mobile, complete, manuals, as seen, £35 or near offer. Wanted: High quality hand key.—Alder, G4GMX, 130 Hicks Avenue, Greenford, Middx. (Tel: 01-575 1839 evenings.)

Sale: Drake T4-XC with AC-4 PSU, 160m., mint condition, owner from new, £320.—Ring Bray, G3RWQ, 0905-54303.

Wanted: Manual for BC-342N.—Wood, 34 Maple Drive, Stroud (5145), Glos.

Sale: Eddystone EC-10 Mk. II, FM detector, £90. HRO-M, £20.—Poulter, G3WHK, 119 Aragon Road, Morden, Surrey. (Tel: 01-330 5795.)

For sale: CR-100 Rx. Heathkit SWR meter, Acton signal generator, 100 kHz-100 MHz. Two 16ft. x 2in. dia. alloy masts. Raymart 'Bandchecker', 3 MHz to 35 MHz. Set of Basic Electricity books. Set of Basic Electronics books. Home-built 100 kHz xtal calibrator. Offers any item?—Critchley, G3UTK, 9 Abbey Close, Penkridge, Stafford.

For sale: IC-202, 9 channels fitted, 3 months old, mint, £120. Europa 'B' transverter, mint, new and spare valves, £70. EC-10 Mk. I, very good condition, £75. Pair of brand new 4CX250B's: offers?—Ring Shearer 0245-467068 evenings.

Selling: FRG-7 digital receiver, AM/SSB/FM. RTTY T/U, solid state, all shifts. RA-1217 digital receiver, RA-337 LF converter, RA-316 FSK converter. BC-221AK with PSU, £22. Creed 7 ERP, 250v. AC, with silence cover, £15. Three mechanical filters for 51-J4.

**RZP ELECTRONICS**

Offer a comprehensive repair and maintenance service for all makes of receivers, transmitters, transceivers, test equipment, ancillaries, etc. Industrial Electronics and professional communications equipment can also be repaired on site.

**FOR REPAIR SEE RZP**

10A THE BROADWAY  
 BEXLEYHEATH  
 KENT  
 Tel.: Orpington 20666

ATM FSW T/U, 10-1000 Hz shift, wide/narrow filters, £18. CRM-1 tuning 'scope, £10. NBFM module, suitable FRG or any 450-470 kHz IF, £8. First sensible offer accepted for unpriced items, all in mint condition. **Wanted:** Cabinet for RA-17, RA-37 or RA-237 LF converter. S.36 or R.1949 and S.37 receivers. (Norfolk). —Box No. 5661, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**November issue: Due to appear October 27th.** Single copies at 50p post paid will be sent by first class mail for orders received by Wednesday, October 25th, as available. —Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**For sale:** FT-101E, 18 months old, perfect condition, £395.—Ring Rowse, GW3LOD, Carmarthen 6482.

**Sale:** Trio TS-520, CW filter fitted, very good condition, £375 or near offer. Delivery arranged if necessary. MMT 432/285 transverter, as new, with neat H/B PSU, £125.—Smith, 49 Hucknall Avenue, Ashgate, Chesterfield, Derbys.

**House Move forces sale of radio equipment, most brand new:** IC-202E, IC-215 (15 channels) with Nicads, whips, cases, charger, Yaesu YC-500J frequency counter, 2m. RF amp/Rx pre-amp., Datong RF clipper, QM-70 2m. converter, Dactron 13-8v. 7A. PSU, SWR meters, dummy load, Slim Jim.—Ring King, Denham 4358.

**Selling:** KW-107 antenna tuner unit, 8 months old, £60 plus carriage.—Ring Davies, Crayford 54661.

**For sale:** Liner-2 SSB transceiver, good condition, fitted PA-3 pre-amp., £95.—Ring Cooper, G8MCG, Upminster (04022) 25577.

**For sale:** Yaesu FR-101DD digital receiver and speaker, latest model, perfect condition, £460.—Ring Burlington, Clavering 433 (Essex) evenings.

**For sale:** Racal RA-217 receiver, 1 to 30 MHz, mechanical digital readout, solid-state, excellent condition, with manual, £450 or near offer. Redifon AFS-12 terminal unit with power unit, AFS-13 combiner, Marconi HU-12 terminal unit with power unit, one HU-12 for spares, Marconi manual, two Creed Model 75R Mk. IV teleprinter receiving units with silence covers, on stands, with paper winders, the lot £80 or near offer.—Ring Andrews, Emsworth 5652 (Hants.).

**Wanted:** EA-12 with manual.—Newman, 85 Bartle Road, Gleadless, Sheffield S12 2QP. (Tel: Sheffield 393257).

**Selling:** Sommerkamp 2-metre mobile transceiver, 12 channels fitted, £75. Electroniques front-end, amateur bands, valve type, unused, £10. KW-201 amateur bands receiver, £95. KW-204, never used, £180.—Ring Chiverton, 01-680 3197.

**Wanted:** Ex-Army R.109 Set. Also interested in other war surplus wireless equipment.—Ring Baynes, 01-949 2317.

**Wanted:** Heathkit plug-in 100 kHz crystal calibrator for use with RA-1.—Kemp, 43 Sackville Close, Cambridge CB4 2ST.

**Sale:** KF-430, 12-channel, 70cm. FM, £140. Multi-11 12-ch., 6 months old, £160 or near offer.—Redfern G4CLN, QTHR. (Tel: 05304-5735.)

**For sale:** Lafayette PF-60 FM receiver, coverage 152-174 MHz, solid-state, mains/battery, £25 carriage paid. (Sussex).—Box No. 5662, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**Sale:** Yaesu FT-101E, mint condition, £395.—Ring Fish, G4GPL, 01-953 6921.

## TIME WRONG?

**MSF 60 kHz RECEIVER**, built-in antenna, £13.70 or with parts (no case or pcb) for sequential YEAR, MONTH, DATE, DAY, HOURS, MINUTES, SECONDS display, only ... .. £24.40

**LOSING DX? ANTENNA FAULTY?** Measure resonance and radiation resistance FAST with an Antenna Noise Bridge, 1-150 MHz 20-200 ohms and 2-1000 ohms 1-30 MHz, more DX for £9.80

**CLOBBERED? PUNCH THROUGH** with a Speech Compressor, more TALK POWER, only ... £8.60

**RARE DX UNDER GRM? BEAT** tiring whistles and cw with a Tunable Audio Notch Filter, speaker amplifier, WINKLE them OUT for only ... £8.90

**LOSING RADIO 4? NEW!** 200 kHz to Medium Wave Converter, built-in antenna, inductive (place near receiver) and coax outputs ... £9.70

**WHERE'S THE RARE DX? 1 MHz, 100, 25 kHz** Crystal Calibrator, markets to VHF, only £13.80

**SIG. GEN.?** 10 Hz-200 kHz, sine/square ... £10.80

**NO LONG WAVE? 100-600 kHz Converter** feeds your 3-5-4 MHz receiver, only .. £9.90

*Each easy-assembly kit includes all parts, printed circuit, case, postage, etc., instructions and money back assurance, so SEND off NOW. Overseas prices—IRC.*

**CAMBRIDGE KITS 45 (SK) Old School Lane, Milton, Cambridge**

G4FLN

IAN AUSTIN

G8ADO

**REGULATED POWER SUPPLIES** to convert mobile equipment to fixed station. Adjustable 12-14 volts at 5 amps, cont. 7 amps, int. with over current protection, 230-240v. AC. British manufacture ... .. £25-85 (£11-12 p. and p.)

**SIGNAL GENERATOR.** Advance Type B4A5. 100 kHz-80 MHz in six bands ... .. £45-00 (plus carriage)

**SIGNAL GENERATOR.** American services TS403B, U. 1800-4000 MHz ... .. £30-00 (plus carriage)

**GENTS LCD SQUARE FACE WRIST WATCHES** with stainless steel bracelet, continuous display hour, sec. and date. Six months guarantee ... .. £8-70 (30p p. and p.)  
Cronograph version ... .. £14-47 (30p p. and p.)

**OSCILLOSCOPE.** Military version of Hewlett Packard HP170, DC, 30 MHz. Twin beam ... .. £115-00 (plus carriage)

**OSCILLOSCOPE.** Military version of Tektronix 545A with Type K plus in ... .. £120-00 (plus carriage)

**PYE VANGUARDS.** B Band 2 chan. ... .. £15-00 (plus carriage)

**VALVES 2C39.** Ex-equipment tested ... .. £1-20 (30p p. and p.)

### TRANSFORMERS

3 0-0-300v. at 120 mA. 6-3v. at 4 amps. 6-3-0-6-3v. at 2 amps ... .. £4-00 (45p p. and p.)  
12v. at 2 amps. 12v. at 2 amps. 24v. at 2 amps ... .. £3-00 (40p p. and p.)  
17v. at 5 amps. ... .. £4-30 (45p p. and p.)  
17v. at 4 amps. 17v. at 4 amps ... .. £6-30 (60p p. and p.)  
27-0-27v. at 1 amp ... .. £2-00 (35p p. and p.)  
30-0-30v. at 1 amp ... .. £2-00 (35p p. and p.)

**CAPACITORS.** Mullard Tubular Polyester 0-47 mfd, 160v. 10 for 50p (15p p. and p.)

**POTS.** 1 K ohm 1 watt Colvern 5 for £1-00 (15p p. and p.)

**MONDAYS LANE, ORFORD, WOODBRIDGE, SUFFOLK**  
Telephone: 039-45 328

**CRAYFORD ELECTRONICS**

GBAYN

G81WX

**New items in stock:**

HONEST 50 MHz 12/5v. DC 5 digit counter with 455 kHz offset ... .. (36p) £38-00  
 HANSEN DL20. 15 watt 50 ohm PL259 dummy load (24p) £4-64  
 HELICAL aerial with PL259 HS-FI ... .. (16p) £3-38  
 Power supply ODR123C 12v./3A stab. ... .. £14-49

Prices include VAT, carriage in brackets

PART EXCHANGE—TRADE-INS WELCOME

We are near Brands Hatch, just off the A20

ACCESS SAE all enquiries BARCLAYCARD

6 LOVELACE CLOSE, WEST KINGSDOWN, SEVENOAKS

KENT TN15 6DJ 24 hour Answer Service 047485 2577

**RCA Tx's WANTED**

ET4336 or ET4332 also spares for same

**WE PAY VERY HIGH PRICES****COLOMOR ELECTRONICS LTD.,**

170, Goldhawk Road, London, W.12. 01-743 0899.

**MORSE MADE EASY BY THE RHYTHM METHOD!**

**FACT NOT FICTION NO. TAPE WON'T WORK AS WELL**  
 If you start RIGHT you will be reading amateur and commercial Morse within a month. (Most students take about three weeks). That's why after 24 YEARS we still use three scientifically prepared 3-speed records with which you cannot fail to learn the MORSE RHYTHM automatically, it's as easy as learning a tune. 18 w.p.m. in 4 weeks guaranteed. Complete course comprising 2 x 12" + 1 x 7" 3speed records + books. £5-50 inc.p.p. (overseas + £1). Dth. only a.s.e. or ring Stan Bennett (G3HSC) 01-660 2896. Ex RAF keys £2.70. (Box 14) 45 GREEN LANE, PURLEY, SURREY

**AR88D WANTED****WE PAY £90.00**

for sets in good condition.

**COLOMOR ELECTRONICS LTD.,**

170, Goldhawk Road, London, W.12. 01-743 0899.

**CASH & CARRY WAREHOUSE PRICES**

on a wide range of Radio-TV, Hi-Fi and Electrical

LATEST GRUNDIG SATELLITE 3000 SW RECEIVER

DIGITAL READOUT ON ALL BANDS. BUILT-IN SSB UNIT.

QUARTZ CLOCK 7.5 WATTS OF TOP CLASS AUDIO.

SEPARATE BASS AND TREBLE.

**NORMAL PRICE £395.00 OUR SPECIAL PRICE £325.00**

Also National DR48 £270, DR22 £113-50, Sony ICF 5900 £75

SAE for price list, 40p stamps for catalogues. Prices inc. VAT

Established over 50 years—based on first-class service

G3ST PARK ELECTRIC CO. LTD. G8HGE

211 Streatham Road, Mitcham, Surrey. 01-648 6201

**ALL VALVES & TRANSISTORS**

Call or phone our  
 Mr. Stephan for a quotation  
 01-749 3934

We are one of the largest stockists of valves etc. in the U.K.

**COLOMOR ELECTRONICS LTD 170 GOLDHAWK ROAD LONDON W12**

**Wanted:** Page printer (commercial and met. copy), with or without keyboard. Must be working.—Box No. 5663, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**Selling:** AR88, £75. Hallicrafters HT-40K Tx with 21 xtals, £25. Heathkit SW-717 Rx.—Ring Parker-Jones, G4COD, Shrewsbury 62494, 222557 office hours.

**For sale:** TN-16 tuning unit, £5. Creed 75RO silence cover, synch. motor, £8. CT-82 noise generator, £5. Transistorised ASC-11 TDMS, £10. TDMS-6, £10. All cash and carry. **Wanted:** Bradley CT-471C multimeter. LF adaptor for Racal RA-1217.—Passfield, 144 Gilmore Road, Lewisham, London S.E.13. (Tel: 01-318 5290.)

**Sale:** Sommerkamp FT-277E SSB transceiver, mint condition, with matching speaker and accessories, £450.—Ring Wright, 01-529 0589.

**For sale:** Yaesu FT-101 transceiver (transmitter unused), £270. CI-5 oscilloscope, £40.—Ring Churchill, Poole 86354.

**Sale:** Trio JR-500S amateur bands receiver, 80-10m., plus 9.600-10.200 MHz for WWV, £50. Buyer collects.—Ring Kim, BRS.34540, 01-648 0028 after 7 p.m. (Morden, Surrey).

**Wanted:** Two-metre Tx and Rx with suitable antenna, preferably no solid-state.—Ring Thomas, 021-382 4048.

**Selling:** Trio AT-200, as new, £75. 12-AVQ, as new, £28. Doram C-Mos keyer, assembled, £10. Carriage extra.—Allnutt, G4CQK, QTHR. (Tel: Walton-on-Thames 27199.)

**Sale:** Marconi Type 365A heavy brass key, ballrace pivots, £25. Class-D wavemeter, mains, £10. Lafayette HA-55A aircraft Rx, 108-136 MHz, £25. ETM-3C keyer, as new, £40.—Ring Wyse, G3IWE, Warrington 601485.

**For sale:** Three-centimetre (microwave) front-end, including Gunn transmitter, Varactor tuner/modulator, Schottky mixer, ferrite circulation, 17 dB horn, new and unused, with maker's test sheet and instructions, £69 inclusive.—Jarvis, Salewheel, Ribchester, Preston PR3 3XU.

**Sale:** Two Storno CQM13C-10's, highband, with photocopy handbook, £18. Cossor 343 ganging oscillator, 0-06-20 MHz, handbook, £15.—Ring Levett, G8HCJ, Brighton (0273) 419555 evenings.

**Selling:** FR-50B with calibrator, as new, £60. Eddystone EC-10, very good, £40. Buyers collect.—Stanbury, 25 Penbryn Road, Skewen, Neath, W. Glam.

**Sale:** Yaesu FR-DX400 (all options), FL-DX400, manuals, cartons, £320. Two matching speakers, £10 each. Spare valves list.—Ring Brooke, GW3GHC, 0633-680481.

**Wanted:** HF bands transceiver, Heathkit, Trio, Yaesu, or other good make.—Ring Beekar, G3WY, Evesham 45497.

**For sale:** Heathkit HW-8, completed and working but untested, £85. Heathkit HD-1410 electronic keyer, mint, £30. Lowe SRX-30 receiver, as new, £125.—Ring Stampton, G3ZDR, Gravesend 63284.

**Wanted:** Up to £50 offered, depending on condition and facilities, for Pye (or similar) 12v. DC mobile, positive and negative earth, fully modified for 2m. FM, with tone burst and minimum of 6 channels. Details and price please.—Box No. 5664, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

## HAVE FUN

GET MUCH MORE OUT OF AMATEUR RADIO THIS WINTER WITH A ROBOT "400" SSTV SCAN CONVERTER. OF COURSE £666 IS A FAIR AMOUNT OF DOUGH, BUT THE "400" IS AN INVESTMENT BOTH FINANCIALLY AND IN FUTURE PLEASURE. ASK ANY "400" USER IF THEY WOULD BE WITHOUT IT. NO SIR, NO WAY.

S.A.E. for full details on the "400" and how to start really enjoying your amateur radio again.

### AERO & GENERAL SUPPLIES

Nanaimo House, 32 Rufford Avenue, Bramcote,  
Nottingham NG9 3JH Tel.: (0602) 397588

## B. BROOKES ELECTRONICS

69 LEICESTER STREET, NORWICH NR1 2DZ  
Tel.: (0603) 24573

### ATTENTION ALL FRG7 OWNERS

Fit one of our FDU7 Digital Display Units, reading from 000 to 999 giving these fine receivers a frequency resolution of 1 kHz. (Full fitting instructions supplied) £34.95 (80p) Postage

We now make a Digital Display Module for the Drake SSR-1 and the Lowe SRX-30 complete and tested, with wiring details. You just add case and power, 7 to 9 volts. £32.00 (80p)

We also make the following R.T.T.Y Demodulator:

HBS/3. Commercial 170.425.850 Hz Shift. Supplied with magnet and T.T.L. Logic Outputs £48.00 (£1.10)  
Active receiving Aerial £13.00 (60p)

(C.W.O. Cheques or Access accepted)

## MORSE CODE RECEIVING AND SENDING

### Receiving:

CASSETTE A For Amateur Radio examination preparation. Speed slowly increasing from 1-12 w.p.m.

CASSETTE B For Professional examination preparation. Computer produced morse from 12-24 w.p.m. Including international procedure signs and symbols and their incorporation into messages.

### Sending:

Morse Key and Buzzer Unit for sending practice and own Tape preparation. Phone output.

Prices: each cassette, including booklets, £4.50  
Morse key and buzzer unit, £4.50

Prices include postage, etc.

M H ELECTRONICS  
12 LONGSHORE WAY, MILTON,  
PORTSMOUTH, PO4 8LS

## G2DYM ANTI-TVI TRAP DIPOLES

CUT OUT TVI, TX-ing and SWL-ing MODELS

S.W.L., £29.81: 500 watt or S.W.L., £41.06:  
2KW, £46.68 all complete inc. insulators, 75ft. feeder, VAT and P & P. Aerial matching units S.W.L. and 500 watt 10-160 metres inc. shipping and B.C. Bands, £16.25: 2 KW, £22.50 inc. VAT and P & P. Send 10" x 7" 12½p S.A.E. and 3 x 9p stamps for full details, aerial article, test reports and testimonials.

G2DYM, LAMBDA, WHITEBALL,  
WELLINGTON, SOMERSET

## WANTED

for cash urgently:

GOOD USED RECEIVERS,  
TRANSMITTERS, TRANSCEIVERS

**The Amateur Radio Shop G4MH**

13, Chapel Hill, Huddersfield.

Telephone: 0484 20774

## T.M.P. ELECTRONIC SUPPLIES

FULL RANGE OF YAESU MUSEN EQUIPMENT IN STOCK BACKED  
BY SMC 2 YEAR GUARANTEE

AMIDON TOROIDAL CORES IN STOCK. SAE for DATA etc.  
W2AU BALUNS with built-in lightning arrester £12.50  
W2AU Aluminium Quad Spiders £25.00 per pr.  
Coax — UR67, 50p per metre; UR43, 18p per metre.  
Ribbon Feeder. Coax Plugs, Rotators, etc., etc.

### USED EQUIPMENT

TRIO TS-S15 with AC PSU. Mint £240.00  
FRDX400. Basic model £140.00  
MULTI II. 10 channels £160.00  
TRIO TR2200GX. 12 channels £140.00  
IC 22A. 2 models £140.00 & £145.00  
FT-2FB. Like New but only a few xtals £80.00  
YP150 Dummy Load/Wattmeter £40.00  
DENTRON JR MONITOR ATU £40.00  
SHURE 444T £25.00

Britannia Stores, Leeswood, Mold, Clwyd CH7 4SD  
Tel.: Pontybodkin 846 (035287)

Open Daily 9.30-5 p.m. Early closing Tuesday 1.30; Saturday 2.30

## SPECIAL LIMITED OFFER SBE AMPLIFIED MOBILE SPEAKERS

Add a separate speaker to your mobile system for better and louder audio. The SBE Amplified speaker includes a 6 watt amplifier built in for crisp, loud audio in all conditions, only two leads, 12v. DC (pos. or neg. earth) and audio input complete with miniature jack plug to fit speaker skt. of your rig. Ideal for motorway driving, or upping the power of the portables, etc. Attractively finished in black.

Limited number at £11.00 plus 60p post

W. H. WESTLAKE, G8MWW  
Clawton, Holsworthy, Devon

TELEPRINTERS NEW AND BOXED 7B £10.00,  
PRINTING REPERFORATORS TYPE 86B NEW  
WITH KEYBOARD £15.00, WITHOUT KEYBOARD  
£10.00, TAPE READERS AND AUTO SENDERS  
TYPE 6S/5 etc. NEW £10.00, USED £7.50, REPERFORATOR 7TR/3 NEW WITH SPARES £15.00, USED £10.00, 7E TELEPRINTER USED £15.00, 7E RP TELEPRINTER NEW AND BOXED £25.00, USED £17.50, 54 TELEPRINTERS USED £25.00. ALL EX-WORKS.

Stand No. 19, A.R.R.A. Exhibition

## JOHNS RADIO

424 BRADFORD ROAD, BATLEY, YORKS.  
Telephone 0924-478159 (9.30 a.m. to 1 p.m.)

## a selection of specially recommended titles . . . . .

* SIMPLE, LOW-COST WIRE ANTENNAS, by W. Orr W6SAI	... ..	£3-15
* A GUIDE TO AMATEUR RADIO, 17th Edition (RSGB)	... ..	£1-70
* HAM RADIO, A BEGINNERS' GUIDE	... ..	£3-33
* WORLD RADIO TV HANDBOOK 1978	... ..	£8-30
* WORLD DX GUIDE	... ..	£5-35
* WORKING WITH THE OSCILLOSCOPE	... ..	£1-90
* AMATEUR RADIO TECHNIQUES, 6th Edition (RSGB)	... ..	£3-95
* TOWERS' INTERNATIONAL TRANSISTOR SELECTOR (New Revised Edition)	... ..	£5-15
* VHF/UHF MANUAL, 3rd Edition (RSGB)	... ..	£6-70
* VHF HANDBOOK, by W. I. Orr W6SAI (New Edition)	... ..	£3-95
* RADIO VALVE AND SEMICONDUCTOR DATA, 10th Edition	... ..	£2-40
* RADIO COMMUNICATION HANDBOOK, VOL. I (New 5th Ed.) RSGB	... ..	£9-30
* RADIO COMMUNICATION HANDBOOK, VOL. II (New 5th Ed.) RSGB	... ..	£8-05

(all prices include post/packing)

### Available from **SHORT WAVE MAGAZINE**

Publications Dept.,

34 HIGH STREET, WELWYN, HERTS., AL6 9EQ Telephone: Welwyn 5206/7

New Title!

## SHORTWAVE LISTENER'S HANDBOOK

by NORMAN FALLON

If you've wanted to listen to the world, but didn't quite know how to go about it—this book will answer your questions; even if you are an experienced listener or DX-er you'll find many valuable tips. This convenient all-points guide covers choosing a receiver and antenna, coping with listening conditions, logging stations, hunting weak signals, and how to build simple projects to improve your equipments' effectiveness; it also explains how to go about getting reception reports, station schedules, etc. There's a list of the world's major broadcast stations and a glossary of SWL terms.

138 pages

£3-85 inc. post

Order from:

Publications Dept.,

**SHORT WAVE MAGAZINE LTD.,**

34 High Street, Welwyn, Herts., AL6 9EQ

## HAM RADIO

A BEGINNER'S GUIDE

by R. H. Warring

Written by a well-known author, this book deals with transmitting and receiving equipment; its installation and maintenance; the operation of amateur stations; call signs; amateur transmitting licences; Morse Code transmission described in detail.

Excellent reading for those wishing to gain a sound knowledge of Amateur Radio without the need to become too technically expert.

152 pages

£3-33 inc. post

Publications Dept.

Short Wave Magazine Ltd., 34 High Street,  
Welwyn, Herts. AL6 9EQ. Tel: Welwyn (043871) 5206/7

## S.W.M. "DX ZONE MAP"

NEW 8th EDITION !!

In four colours, on durable paper for wall-mounting, 33½ in. wide by 24½ in. deep. Giving essential DX information—bearing and distance of all parts of the world relative to the U.K., the Zone areas into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long close enough for accurate plotting. Hundreds of place names, mainly the unusual ones, and most of the rare islands.

Prefixes corrected to August 1977

Price £2-25

including postage and special packing in  
postal tube to avoid damage in transit.

Publications Dept.

Short Wave Magazine Ltd., 34 High Street,  
Welwyn, Herts. AL6 9EQ. Tel: Welwyn (043871) 5206/7

# Technical Books and Manuals

(ENGLISH AND AMERICAN)

## AERIAL INFORMATION

Practical Aerial Handbook, 2nd Edition (King)	£6-20
Beam Antenna Handbook	£3-00
Cubical Quad Antennae, 2nd Edition	£3-00
Simple Low Cost Wire Antennas, by Orr	£3-15
73 Vertical Beam and Triangle Antennas (E. M. Noll)	£3-75
73 Dipole and Long-Wire Antennas (E. M. Noll)	£3-75
Antenna Handbook (ARRL) 13th Edition	£3-60

## BOOKS FOR THE BEGINNER

"Short Wave Magazine" R.A.E. Questions and Answers, 1972-1976	£2-15
Solid State Short Wave Receivers for Beginners (R. A. Penfold)	£1-10
Beginners Guide to Radio (New 8th Edition)	£3-05
Beginners Guide to Electronics	£2-60
Course in Radio Fundamentals, ARRL	£2-18
Guide to Amateur Radio (17th Edition) (RSGB)	£1-70
Ham Radio (A Beginners Guide) by R. H. Warring	£3-33
Morse Code for the Radio Amateur (RSGB)	50p
Radio Amateur Examination Manual (RSGB)	O/S
Simple Short Wave Receivers (Data)	£1-05
Understanding Amateur Radio (ARRL)	£3-28

## GENERAL

How to Make Walkie-Talkies (Rayer)	£1-45
Amateur Television, new 2nd Edition (BATC)	£2-30
50 (FET) Field Effect Transistor Projects, by F. G. Rayer	£1-40
Amateur Radio Awards (RSGB)	£2-10
How to Build Advanced Short Wave Receivers (Penfold)	£1-35
50 CMOS IC Projects (R.A. Penfold)	£1-15
50 Projects Using IC CA3130 (R.A. Penfold)	£1-15
Better Short Wave Reception, New 4th Edition	£3-15
FM & Repeaters for the Radio Amateur (ARRL)	£3-05
Easibinder (to hold 12 copies of "Short Wave Magazine" together)	£2-35
Oscar—Amateur Radio Satellites	£4-20
Test Equipment for the Radio Amateur (RSGB)	£4-40
World Radio & T.V. Handbook 1978 Edition	£8-30
World DX Guide (new title)	£5-35

## HANDBOOKS AND MANUALS

Radio Communication Handbook, Vol.1 (5th Edition), RSGB	£9-30
Radio Communication Handbook, Vol. II (5th Edition), RSGB	£8-05

Surplus Conversion Handbook	O/S
Teleprinter Handbook (RSGB)	£8-83
Radio and Electronic Laboratory Handbook, 8th Edition (Scroggie)	£8-75
Amateur Radio DX Handbook	£3-33
RTTY Handbook (73 Magazine), new title	£3-65
Radio Amateur Operators Handbook	O/P
Slow Scan Television Handbook	O/S
Specialized Communications Techniques for the Radio Amateur (ARRL)	£2-60
Working with the Oscilloscope	£1-90
Radio Amateur Handbook 1978 (ARRL), soft cover	£6-50
Radio Amateur Handbook 1978 (ARRL), hard cover	O/S
Shortwave Listener's Handbook (new title)	£3-85
Learning to Work with Integrated Circuits (ARRL) (new title)	£1-65
Weather Satellite Handbook (new title)	£3-15

## USEFUL REFERENCE BOOKS

Solid State Design for the Radio Amateur (ARRL)	£5-35
Foundations of Wireless and Electronics, 9th Edition (Scroggie)	£4-50
Amateur Radio Techniques, 6th Edition (RSGB)	£3-95
Engineers Pocket Book, 6th Edition	£2-03
U.K. Call Book 1978 (RSGB)	£3-20
Hints and Kinks (ARRL)	£1-88
Radio Data Reference Book RSGB	£3-60
Single Sideband for the Radio Amateur (ARRL)	£3-30
Sun, Earth and Radio	O/P
NBFM Manual (RSGB)	£1-35
Electronics Data Book (ARRL)	£3-25
Getting to Know OSCAR from the Ground Up (ARRL) new title	£2-30

## VALVE AND TRANSISTOR MANUALS

Digital IC Equivalents & Pin Connections	£2-82
Towers' International Transistor Selector, (New Revised Edition)	£5-15
Service Valve and Semiconductor Equivalents	55p
Radio Valve and Semiconductor Data (10th Ed.)	£2-86

## VHF PUBLICATIONS

VHF Handbook, Wm. 1 Orr (New Ed.)	£3-95
VHF Manual (ARRL)	£3-20
VHF/UHF Manual (RSGB), 3rd Ed.	£6-70

O/P (Out of print)

O/S (Out of stock)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

Many of these titles are American in origin

(terms C.W.O.)

(prices are subject to alteration without notice)

Available from

**SHORT WAVE MAGAZINE**

Publications Dept.

34 High Street, Welwyn, Herts. AL6 9EQ - Welwyn (043871) 5206/7

(Counter Service. 9.30-5.00. Mon. to Fri.)

(GIRO A/C. No. 547 6151)

# B. BAMBER ELECTRONICS

DEPT S, 5 STATION ROAD, LITTLEPORT, CAMBS., CB6 1QE

Tel.: Ely (0353) 860185 (Tuesday - Saturday)

CALLERS WELCOME BY APPOINTMENT ONLY

TERMS OF BUSINESS: CASH WITH ORDER. MINIMUM ORDER OF £2.00. ALL PRICES NOW INCLUDE POST & PACKING (UK ONLY)

PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE WITH ALL ENQUIRIES.

**PLEASE ADD VAT AS SHOWN**

## Add 8% VAT (except where shown)

IC AUDIO AMP PCB. Output 2 watts into 3 ohm speaker, 12v. DC supply, size approx.  $5\frac{1}{2}'' \times 1\frac{1}{2}'' \times 1''$  high, with integral heatsink, complete with circuits, £2.00 each.  
NICAD CHARGER CONVERTER PCB. (Low power inverter). Size approx.  $4'' \times 1\frac{1}{2}'' \times 1''$  high, 12v. DC supply, 60v. DC output, through pot on pcb, for charging Nicads, etc. (ideal for charging portable batteries from mobile supply). Only needs one BFY50/51/52 or similar transistor, which can be mounted direct on the pcb pins on board, fitted with a star-type heatsink (not supplied), £2.00 each.

THE NEW EAGLE INTERNATIONAL CATALOGUE IS AVAILABLE ON REQUEST containing Audio, In-car, and test equipment, etc.

WELLER TCP2 and PU2D PSU. Temperature controlled soldering iron with matching Power Supply Unit, containing sponge and spring stand, £30.00.

AND SPIRALUX. Tools for the Electronics enthusiast. S.A.E. for list.

AE CS108/R MICROWAVE MIXER DIODES, up to X-Band, max. noise figure 8-5dB at 9-375 GHz, 80p each.

## Add 8% VAT (except where shown)

IC TEST CLIPS, clip over IC while still soldered to pcb or in socket, gold-plated pins, idea or experimenters or service engineers. 28 pin DIL, £1.75; 40 pin DIL, £2.00. Or save by buying one of each for £3.50.

DECIMAL KEYBOARDS, pressure sensitive type, when pressed contacts go from O/C to approx. 25 ohms. Switches only, no encoders. Size approx.  $3'' \times 3''$ , with large square touch plates. 0-9 + Clear, A, B, Dual Watch, and spare. Few only, £2.00 while stocks last.

8-TRACK CARTRIDGE PLAYER UNITS, with internal mains psu and 25 watt mono amplifier (100W) line. To play standard 8-track cartridges. All contained in a smart veneered wood cabinet, size approx.  $14''$  wide  $\times$   $5\frac{1}{2}''$  high  $\times$   $11''$  deep. Supplied with circuits. Brand new and boxed. SORRY SOLD OUT.

MAINS TRANSFORMERS, TYPE 15/300, 240V input, 15V, 30mA output, £1.50 each.  
MAINS TRANSFORMERS, TYPE 45/100, 240, 220, 110, 20, 0V input, 45V at 100mA output, £1.50 each.

LARGE ELECTROLYTIC PACKS, contain range of large electrolytic capacitors, low and high voltage types, over 40 pieces, £3.00 per pack (plus 12% VAT).

## Add 8% VAT (except where shown)

10-7 MHz SSB XTAL FILTERS (2-4 kHz Bandwidth) Low imp. type, Carrier and unwanted sideband rejection min. -40dB (need 10-69835 and 10-70165 xtals for USB/LSB, NOT SUPPLIED). Size approx.  $2'' \times 1'' \times 1''$ , £10.00 each.

LOW PASS FILTERS (low imp. type) 2-9 MHz, small metal encapsulation, size approx.  $1\frac{1}{2}'' \times \frac{3}{4}'' \times \frac{3}{4}''$ , 75p each.

## A NEW RANGE OF QUALITY BOXES AND INSTRUMENT CASES

### Aluminum Boxes with Lids

AB10	$5\frac{1}{2}'' \times 4'' \times 1\frac{1}{2}''$	75p
AB13	$6'' \times 4'' \times 2''$	£1.00
AB14	$7'' \times 5'' \times 2\frac{1}{2}''$	£1.25
AB15	$8'' \times 6'' \times 3''$	£1.50
AB16	$10'' \times 7'' \times 3''$	£1.75
AB17	$10'' \times 4\frac{1}{2}'' \times 3''$	£1.50
AB25	$6'' \times 4'' \times 3''$	£1.25

Yval Coated Instrument Cases  
Light Blue Tops and Plain lower sections. Very smart finish.

WB1	$5'' \times 2\frac{1}{2}'' \times 2\frac{1}{2}''$	75p
WB2	$6'' \times 4'' \times 1\frac{1}{2}''$	£1.35
WB3	$8'' \times 5'' \times 2''$	£1.80
WB4	$9'' \times 5\frac{1}{2}'' \times 2\frac{1}{2}''$	£2.00
WB5	$11'' \times 6\frac{1}{2}'' \times 3''$	£2.25
WB6	$11'' \times 7\frac{1}{2}'' \times 3\frac{1}{2}''$	£2.50
WB7	$12'' \times 6\frac{1}{2}'' \times 5\frac{1}{2}''$	£2.85
WB853	$8'' \times 5\frac{1}{2}'' \times 3\frac{1}{2}''$	£2.25

## SEE YOU ON STAND 15 AT THE LEICESTER EXHIBITION 2nd, 3rd, and 4th NOVEMBER 10am to 6pm Daily.

## PLUGS & SOCKETS

NC Plugs, new, 50p each

PL289 PLUGS (PTFE). Brand new, Packed with reducers, 75p each.

SO139 SOCKETS (PTFE). Brand new (4 hole fixing type), 60p each.

N-TYPE PLUGS, 50 ohm, 60p each.

GREENPAR (GE30015). Chassis Lead Terminations. (These are the units which bolt on to the chassis, the lead is secured by screw cap, and the inner of the coax passes through the chassis), 30p each, 4 for £1.00.

FULL RANGE OF BERNARDS/BABANI ELECTRONICS BOOKS IN STOCK. S.A.E. FOR LIST

## TRANSISTORS

TO3 TRANSISTOR INSULATOR SETS 10 sets for 50p.

BSX20 transistors (VHF OSC/MULT), 3 for 50p.

BC107 (metal can), 4 for 50p.

BC108 (metal can), 4 for 50p.

PBC108 (plastic BC108), 5 for 50p.

BFY51 TRANSISTORS 4 for 60p.

BF152 (UHF AMP/MIXER), 3 for 50p

2N3819 Fet. 3 for 60p.

BC148 NPN SILICON, 4 for 50p

BC158 PNP SILICON, 4 for 50p.

BAY31 Signal Diodes, 10 for 35p

BYX 38/300 Stud Rectifiers, 300v at 25A 4 for 60p.

SCRs 400v, at 3A, stud type, 2 for £1.00.

TIP2955 Silicon PNP power transistor, 60v, at 15A, 90 Watts, Flat pack type, 2 for £1.50.

GERMANIUM DIODES, approx. 30 for 30p.

1N4148 (1N914) DIODES, 10 for 25p.

471CG RCA OP AMPS, 4 for £1.00

SUB-MINIATURE ROTARY SWITCHES, 4 x 5 way make contacts, Size approx.  $\frac{3}{4}''$  dia.  $1''$  deep, 3/16" spindle, 50p each.

DIE-CAST BOXES Size approx.:  
 $4\frac{1}{2}'' \times 2\frac{1}{2}'' \times 1\frac{1}{2}''$  (11 x 60x 30mm) £1.25  
 $4\frac{1}{2}'' \times 2\frac{1}{2}'' \times 1\frac{1}{2}''$  (12 x 60 x 30mm) £1.75  
 $4\frac{1}{2}'' \times 3\frac{1}{2}'' \times 1\frac{1}{2}''$  (121 x 95 x 25mm) £2.10  
 $4\frac{1}{2}'' \times 3\frac{1}{2}'' \times 2''$  (121 x 95 x 51mm) £2.45  
 $4\frac{1}{2}'' \times 4\frac{1}{2}'' \times 2''$  (171 x 121 x 51mm) £3.10  
 $4\frac{1}{2}'' \times 3\frac{1}{2}'' \times 3''$  (121 x 95 x 76mm) £3.50  
 $6\frac{1}{2}'' \times 4\frac{1}{2}'' \times 4''$  (171 x 121 x 101mm) £4.75  
 $8\frac{1}{2}'' \times 5\frac{1}{2}'' \times 2''$  (222 x 146 x 51mm) £4.25  
 $10\frac{1}{2}'' \times 6\frac{1}{2}'' \times 2''$  (273 x 171 x 51mm) £5.30

SOLDER SUCKERS (Plunger type). Standard model, £3.50. Skirted model, £6.00. Spare nozzles, 65p each.

PLASTIC PROJECT BOXES with screw on lids (in Black ABS) with brass inserts. TYPE N81 approx.  $3'' \times 2\frac{1}{2}'' \times 1\frac{1}{2}''$ , 45p each. TYPE N82 approx.  $3\frac{1}{2}'' \times 2\frac{1}{2}'' \times 1\frac{1}{2}''$ , 55p each. TYPE N83 approx.  $4'' \times 3\frac{1}{2}'' \times 1\frac{1}{2}''$ , 65p each.

SMITH'S CLOCK MOTORS, 200-250v 50 Hz 2 watts, 1 Rev. every 2 mins., 3 hole fixing.  $\frac{1}{4}''$  spindle, £1.00 each.

SLOW MOTION MOTORS, 120V 50 Hz 1 RPM, Size approx. 2 dia.,  $1\frac{1}{2}''$  deep, with  $\frac{1}{4}''$  spindle, 60p each or 2 for £1.00.

HF CHOKES wound on  $\frac{1}{2}'' \times 1''$  long ferrites 4 for 50p.

VHF CHOKES wound on 6-hole tubular ferrites, 5 for 40p.

DUAL TO18 HEATSINKS  $1'' \times \frac{1}{2}'' \times \frac{1}{2}''$  with screw-in clamps, 3 for 50p.  
CERAMIC TAG STRIPS (4 on 1 mount), 10 mounts for 50p.

TUNED COILS, 2 section coils, around 1 MHz, with a black smart tuning knob, which moves an internal core to vary the inductance, many uses, easily rewound, 3 for 50p.

2-6pt, 10mm. circular ceramic trimmers (for VHF/UHF work), 3 pin mounting, 5 for 50p.

ON/OFF/IRX STANDBY SWITCHES for AM108 Cambridge and Vanguard control boxes, 60p each, 3 for £1.00.

OSMOR REED RELAY COILS (for reed relays up to  $\frac{1}{4}''$  dia., not supplied), 10v, 1K ohm coil, 2 for 50p.

GLASS BEAD FEEDTHROUGH INSULATORS, solder-in type, overall dia, 5mm, pack of approx. 50 for 50p.  
LARGE GLASS BEAD FEEDTHROUGH INSULATORS, as above but 8mm. dia. pack of approx. 50 for 70p.

## ALL BELOW — ADD 12½% VAT

BSR AUTOCHANGE RECORD PLAYER DECKS with cue device, 33-45-78 RPM, for 7", 10", 12" records. Fitted with SC12M Stereo Ceramic cartridge and styl. Brand new, £14.

GARRARD AUTOCHANGE RECORD PLAYER DECKS. Model 6,300 with cue device, 33-45-78 RPM, for 7", 10", 12" records. Fitted with KS41B Stereo Ceramic cartridge and styl. Brand new, £16.00.

TV LINE LINEARITY COILS. Special offer 10 for £1.00.

TV SCAN COILS, B/W, to fit 110 degree tubes £1.00.

BARGAIN PACK OF LOW VOLTAGE ELECTROLYTIC CAPACITORS. Up to 50v. working. Seatronic manufacture. Approx. 100, £1.50 per pack.

A large range of capacitors available at bargain prices, S.A.E. for list.

TV PLUGS (metal type), 4 or 50p.  
DIN 3-pin LINE SOCKETS, 15p each.  
3 PIN DIN PLUGS, 15p each.

## ELECTROLYTICS

ELECTROLYTICS, 50µF, 450v., 2 for 50p.  
ELECTROLYTICS, 100µF, 275v., 2 for 50p.  
ELECTROLYTICS, 470µF 63v., 3 for 50p.  
ELECTROLYTICS, 1,000µF 30v., 3 for 60p.  
ELECTROLYTICS 5,000 mfd. at 35v., 50p each.  
ELECTROLYTICS, 5,000µF 50v., 60p each.  
ITT ELECTROLYTICS, 6,800 mfd at 25v., high grade, screw terminals, with mounting clip, 50p each.  
MULLARD ELC1043/05 VARICAP TV TUNERS, £5.00 each.  
CELESTION 8" x 5" ELLIPTICAL SPEAKERS, 20 ohm, 3 watts rated, £1.50 each.