

# The SHORT WAVE

Magazine

VOL. XXXIV

AUGUST, 1976

NUMBER 6

LEICESTER

1976



AT THE  
**GRANBY HALLS**  
**LEICESTER**

THURSDAY 1200-2000

FRIDAY 1200-2100

SATURDAY 1000-1800

**28, 29, 30 OCTOBER**

ADMISSION TO THE FINEST  
 EXHIBITION OF AMATEUR RADIO  
 EQUIPMENT AND ACCESSORIES

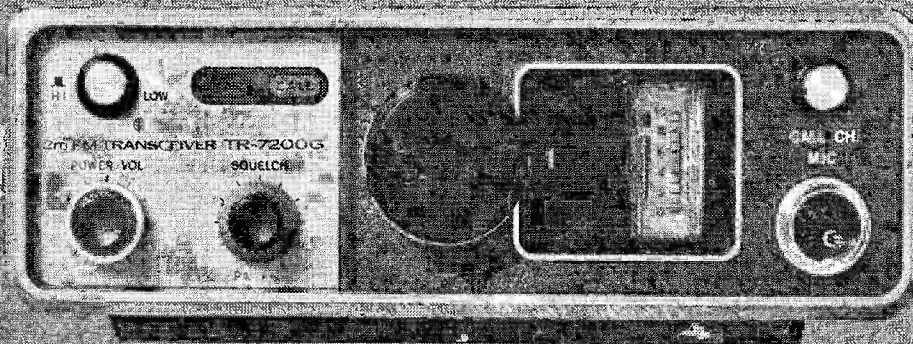
**30p**

CONCESSIONS FOR CLUBS AND  
 STUDENTS. SAE FOR RATES TO  
 G3FGY. QTHR.

**THE AMATEUR RADIO  
 RETAILERS ASSOCIATION**

# WHEN ONLY THE BEST WILL SUFFICE

## TR7200G



### 2 Metre FM mobile transceiver TR7200G

The TR7200G is now the best selling two metre FM mobile transceiver in Europe. It has always been a favourite all over the world among radio amateurs who demand the very best in performance and construction. Now with a complete range of accessories, the TR7200G offers the ultimate in fixed station and mobile FM operation.

#### Performance plus

High receiver sensitivity (typical measured performance 0.3 $\mu$ V for 15dB quieting) gives you a solid readable signal from long distance stations. Also it helps to combat flutter on the received signal when you are mobile in a town since the limiting threshold is superbly low. Minimum transmitter output of 10 watts (typically 14-15 when on the move) together with carefully tailored audio response and a new integrated circuit limiting amplifier gives your signal that outstanding quality that makes people listen. The matching Trio dynamic microphone supplied with the rig further adds to the signal quality and readability.

#### Repeater access tone

Generated by the Trio exclusive tuning fork controlled 1750 Hz oscillator. This is the tone generator that does not drift even when the interior of the transceiver is being cooked through sitting in a hot car on a summer's day. Stabilised amplitude output for constant deviation under all conditions. Access first time, every time.

#### Superb squelch performance

Utilising the very latest in noise signal detection techniques for a squelch sensitivity of better than 0.5 $\mu$ V. This simply means that you can be sure that the weakest usable signals will open the squelch when with other rigs, you always wonder if you are missing something with the squelch in operation.

#### Switched TX output power

1 watt or 10 watts by the touch of a button. Dial illumination colour change to indicate power level in use. Fully variable PA protection which gradually reduces power input to PA with increasing SWR. This allows you to continue operating when your mobile antenna gets wet (and rain really does change the SWR on most antennas).

#### Features, features

The 22 channel dial is engraved with all R and S channel numbers so you don't have to wonder "did I put R6 in chan 11 or 12?". It also, incidentally, has channels designated A, B, C, etc. for your Raynet or local frequencies. The LED under the channel number is RF powered and only lights on the channels fitted with a receiver crystal. The "on air" lamp is also RF powered but from the transmit crystals so you know precisely what crystals you have in the rig. Best engineered mobile mount on the market gives instant slide in/slide out installation with no nasty little screws to fiddle with. Just in case someone else wants to slide out your rig, there is provision for a padlock through the mounting slide to prevent it (of course he could remove the entire dashboard complete with rig). The TR7200G case is dust tight and waterproof and reflects the Trio no compromise design approach. Public address facility. Switchable receiver sensitivity. Helical front end filter, etc., etc. It's the best mobile FM transceiver on the market.

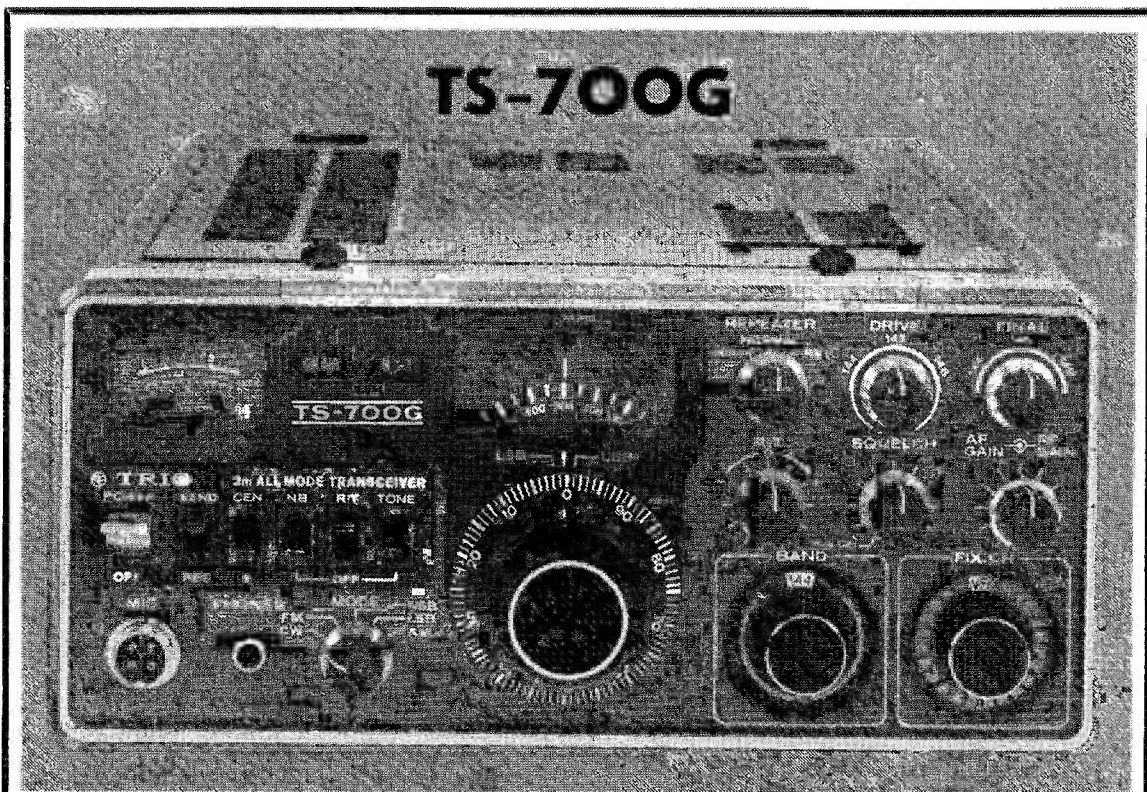
#### New Price Structure

The basic price fitted 5 channels is £162 including VAT. If ordered at the same time as purchase of the rig, we will fit 3 more channels for £10 or 6 for £20 inc. VAT. This means that you can have the finest 2 metre mobile rig fitted 11 channels for £182 incl. VAT.

#### Sole Importers

LOWE ELECTRONICS  
Cavendish Road  
Matlock Derbyshire  
Tel: Matlock 2817/2430





### TS-700G

In case you hadn't noticed, the TRIO TS-700 has a new look. Now updated and incorporating all the features which made it the most sought after transceiver on 2 metres, it now includes additional refinements which you, the keen radio amateurs, have requested.

The basic concept remains the same; a complete 2 metre station package operating from a.c. mains or 12v. d.c. supplies, providing full VFO coverage of the 2 metre band with facilities for 22 crystal controlled channels for popular repeater and net frequency working. The same TRIO design standards such as the ultra linear PA operation resulting from the use of an inverter derived 20 volt supply, are still used. The same supply is also used to feed the driver and the audio stages of the receiver. TRIO's acknowledged leadership in the quality audio field has been put to good advantage in their amateur equipment. Everyone comments on the clean crisp audio quality of the TS-700G both on transmit and receive.

The main refinements can be summarised as follows:

- ★ New improved received front end system contributes to a new standard of sensitivity;  $0.25\mu\text{V}$  for 10dB S + N/N ratio on SSB, 20dB quieting for  $0.4\mu\text{V}$  on FM. This is the best receiver on the market today.
- ★ New FM IF strip with narrower filter for European market.
- ★ New centre zero tuning meter for FM.

- ★ New 100 kHz calibrator with automatic disconnection of antenna to remove confusing outside signals. Automatic transmitter disable in CAL. mode.
- ★ New logarithmic S meter.
- ★ New repeater and reverse repeater operation at the turn of a panel switch. Operates on either VFO or crystal controlled channels.
- ★ New improved audio system for FM and AM transmit. The use of fully balanced mixing at all stages of frequency conversion guarantees a clean signal free from unwanted products. The power output of the transmitter is normally between 15 and 18 watts and this, in conjunction with the TRIO amplified ALC system, gives you an outstanding signal. Just listen to 2 metres and judge for yourself which rig always sounds the best.

If you are considering your once only rig for 2 metres, then the TS-700G has to be your logical choice. Backed by the largest company in Japan making amateur radio equipment, and the best service facilities in Europe at Lowe Electronics, the TS-700G SSB/FM/CW/AM transceiver has to be the all time best buy.

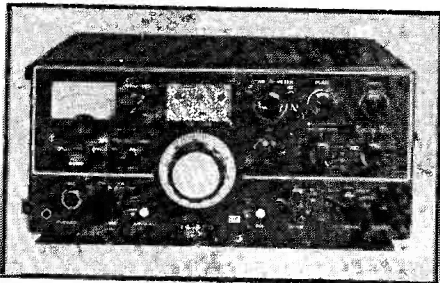
### TS-700G

£382.50 inc. VAT

Sole Importers  
**LOWE ELECTRONICS**  
 Cavendish Road  
 Matlock Derbyshire  
 Tel: Matlock 2817/2430

 **TRIO**

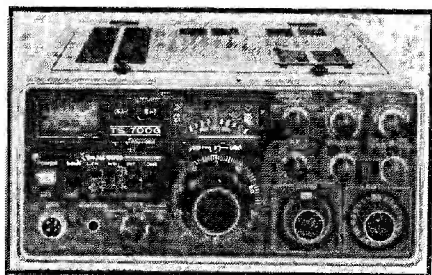
# LOWE ELECTRONICS



## TS520

£378 inc. VAT

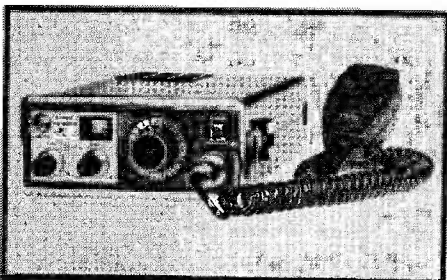
The TS520 is the best value for money HF transceiver available in Europe today. It incorporates all the features of more expensive equipment at no extra cost—AC/12v. operation, speech compression, 1 kHz readout, all band coverage 80-10, VOX, calibrator, blower cooled PA, transverter outlets, 4 function metering, etc., etc. Why not send for details today and find out what Trio design expertise is all about; or just call on us and try the superb TS520 for yourself. You are in for a pleasant surprise.



## TS700G

£382.50 inc. VAT

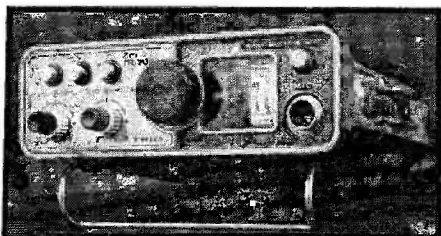
The standard by which all others are judged. Full 2 metre coverage, VFO or crystal controlled. All models AM, FM, USB, LSB, and CW. Mains or battery operation. Normal and reverse repeater facilities. Trio exclusive tuning fork access tone generator. Plus, of course, Trio quality and reliability backed by Lowe Electronics service. If you haven't seen it yet, go to one of our branches and be prepared to be impressed. 15 Watts output. 0.25 microvolt sensitivity. European standard FM selectivity. This rig has all others beaten.



## TR3200

£148.58 inc. VAT

The newest FM handy transceiver from the TRIO range. Superb performance for the 70 cm. operator, 12 channel capability in the range 432-436 MHz with three channels fitted (SU8, SU18, SU20). Transmitter output switched 2W/400mW and incorporating the TRIO exclusive 1750 hz tuning fork access tone generator.  $\frac{3}{8}$ -wave detachable antenna for high gain performance on both transmit and receive. Supplied complete with all accessories as the TR2200G and with the new miniature handy microphone.



## TR7010

£198 inc. VAT

Following the worldwide success of the TS700, Trio have taken the TS700 basic design and packaged it for 2 metres SSB mobile use. The TR7010 sets new standards in receiver sensitivity and low spurious emission on transmit. Operating CW and SSB from 144.1-144.3 MHz, the TR7010 covers all CW, SSB and beacon activity. 40 5 kHz channels plus VXO and RIT provide continuous coverage. 8 extra channels can be used, without retuning, in the range 144-145 MHz by fitting auxiliary crystals. Single conversion using an IF of 10.7 MHz with a superb crystal filter provides outstanding selectivity. Wide range amplified AGC and newly developed FET devices in RF amplifier and mixer stages allow maximum sensitivity to be used with freedom from overload due to adjacent signals. Single conversion transmitter with new fully balanced mixer system generates a beautifully clean signal with crisp audio quality.

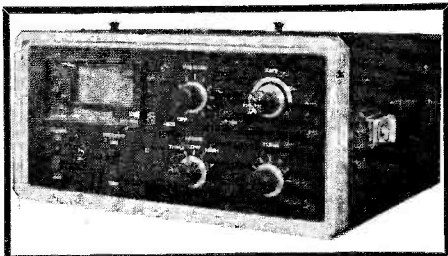
## REMEMBER

WHERE LOWE AND TRIO "LEEDS", THE OTHERS FOLLOW!

SEE YOU ALL AT GRANBY HALL. 28, 29, 30, OCTOBER.



# LOWE ELECTRONICS



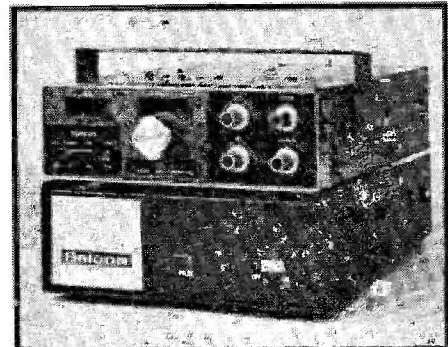
## LA106

£200.25 inc. VAT

High power. High performance. Modest cost.

A reasonably priced, compact, high performance linear for 2 metres. SSB/FM/CW operation. 10W of drive for around 180W input gives your signal the extra kick to get it out of the noise. Built in receive preamplifier with adjustable RF gain and helical filters for increased selectivity and reduced intermod from out of band signals. Built-in regulated 13v. 2.5A supply for Liner 2 or any similar driver.

The LA106 will match any rig such as the TS700, FT221, IC201 in any mode provided that the drive level is around the 10W level. Using a rugged valve in the PA allows you to get away with occasional misuse (just try a high power solid state amplifier into a mismatched load) and gives very low intermod products.



## LINER 2 Mk II

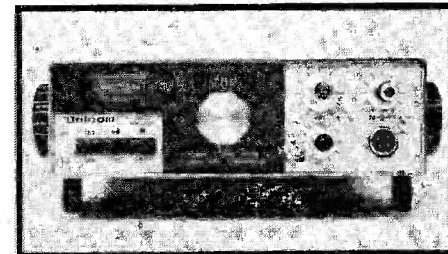
£184.50 inc. VAT

Belcom have just introduced the latest model of the Liner 2 with many detail improvements, notably in the new receiver front end which results in much higher sensitivity, and transmitter modifications which improve the signal quality and lower the level of unwanted signals.

The Liner 2 is still the ideal way to get into real DX operation on 2 metres and continues the Belcom tradition of being one step ahead of the field in amateur radio developments.

Frequency coverage 144-1-144.34. 10W output. Complete with the usual Belcom comprehensive range of accessories including mobile mount etc.

Contact us soon for a demonstration.



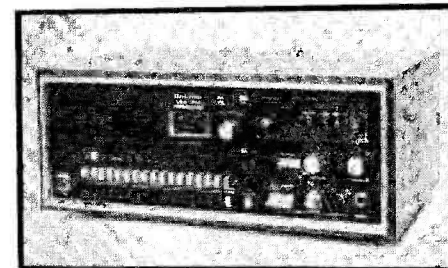
## LINER 430

£290.25 inc. VAT

Two steps ahead comes the Liner 430. Already being used by us to make mobile contacts with the U.S.A., the Liner 430 opens up a whole new dimension of long distance contacts via the OSCAR satellites.

Covering two 480 kHz bands in 20 kHz steps and using the exclusive Belcom Auto watch system which detects the presence of a signal anywhere within VFO range without tuning. No more missing signals and worn out fingers from control twiddling.

10 watts output. Selectable USB/LSB/CW operation. Dual conversion using 50 MHz and 7.8 MHz IF's results in excellent image rejection and high sensitivity. Truly a new dimension in amateur radio from the Liner 430.



## FS1007P

£198 inc. VAT

The home station FM transceiver with everything. \*Mains or 12 volt operation. \*16 channel scanning \* channel skipping facility \* priority channel with front panel crystal sockets \* manual or auto scan \* switched high/low power \* switched wide/narrow deviation \* S meter \* RF output meter \* centre zero tuning meter \* RX fine tuning control \* built in SWR bridge \* built-in digital clock with alarm and auto switch on \* built-in loudspeaker \* 10 watt TX \* 0.3 microvolt sensitivity \* superb styling and finish.

All this and supplied fitted receive crystals for 145, 145.25, S20, S21, S22, 145.6, 145.8, R3, R4, R5, R6, R7 together with transmit crystals for 145, S21, R6 make the FS1007P the most incredible bargain on the FM market. Backed by the combined reputations of Belcom and Lowe Electronics.

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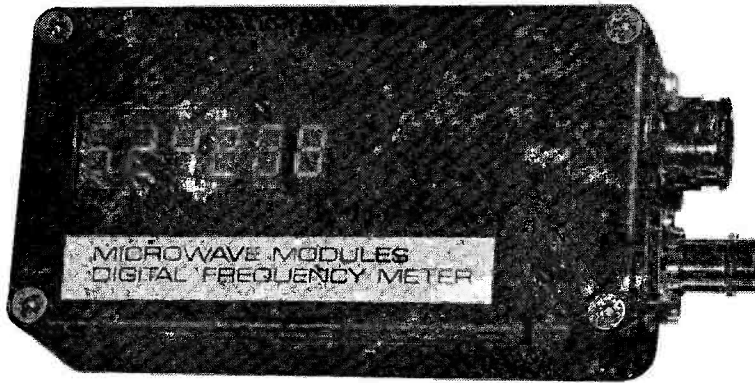
John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071

Sim GM3SAN, 19 Elismuir Road, Bailieston, Nr. Glasgow. Tel. 041-771 0364

OPENING HOURS: 9.5.30 TUESDAY TO SATURDAY INCLUSIVE

SEND 30p IN STAMPS FOR COMPLETE CATALOGUES AND PRICES

# 500 MHz D.F.M.



We are pleased to announce a new product, MMD050/500, as illustrated above. This is a combined version of our 50 MHz Digital Frequency Meter and 500 MHz  $\div$  10 prescaler, MMD050 and MMD500P, providing complete 500 MHz coverage in two ranges. Selection of the appropriate range is achieved by diode switching, and the position of the decimal point is automatically selected at the same time. Other 500 MHz counters on the market cost several hundred pounds. This unit, by providing just the basic counting facility with no gimmicks or frills, is available at a breakthrough low price as detailed below.

## SPECIFICATION

Digit height :	10mm.	Overall display width :	45mm.
Case size :	111 x 60 x 27 mm.	Input connector :	50 ohms BNC
Frequency ranges :	0.45-50 MHz, 50-500 MHz		
Sensitivity :	Better than 50mV over 50 MHz range Better than 200mV over 500 MHz range		
Input impedance :	50-200 ohm		
Power requirements :	11-15 volts DC at 300mA approximately		
Power connector :	5 pin 270° locking DIN. (Plug supplied).		
Accuracy at 50 MHz :	$\pm$ 100Hz		
Accuracy at 500 MHz :	$\pm$ 1 kHz		

The unit is reverse polarity protected and the RF input is diode protected.

## PRICES

MMD050/500 Combined 500 MHz counter	£93.00 inc. VAT
MMD050 50 MHz counter	£66.00 inc. VAT
MMD500P 500 MHz $\div$ 10 prescaler	£27.00 inc. VAT
BNC plugs (Each)	£0.70 inc. VAT

Any further information on these products and others from our extensive range can be obtained by contacting our sales department, who will be only too pleased to help.

# MICROWAVE MODULES LIMITED

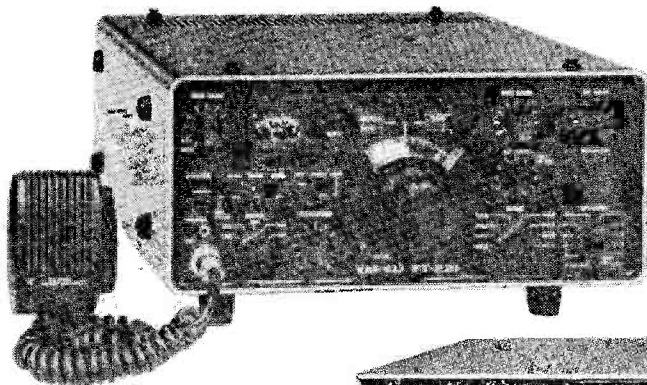
Brookfield Drive, Aintree, Liverpool L9 7AN.

Telephone: 051-523 4011

Cables: Microwave Liverpool.

# AMATEUR ELECTRONICS UK

## YOUR FIRST CHOICE FOR YAESU MUSEN!



**AND THE  
SUPERB  
FT-221**

SSB/FM/CW/AM  
2 Metre  
Transceiver  
**(Ex-stock)**



**MAIN  
AGENT**

**STEP INTO THE  
FUTURE WITH AN  
ATLAS!**

Ask any owner—  
Compare with any other  
transceiver and the answer  
is the same—  
Atlas lead the field!  
Full Service/Spares back-up.



## The Sensational ATLAS-210/215X

A COUPLE OF STAMPS (NO ENVELOPE REQUIRED) BRINGS THE FT-221 OR ATLAS LEAFLET. IF YOU WOULD LIKE THE LATEST YAESU MUSEN MAIN CATALOGUE—DUE TO LIMITED SUPPLIES OUR CHARGE FOR THIS REMAINS AT 25 PENCE POST PAID, BUT FOR THE BENEFIT OF THE SERIOUS ENQUIRER THIS NOW COMES TO YOU TOGETHER WITH OUR CREDIT VOUCHER VALUE £1 FOR USE AGAINST YOUR FUTURE YAESU PURCHASE.

**CREDIT TERMS: New Low Deposit, Trade-ins Welcomed**

BRANCH AMATEUR ELECTRONICS UK—COASTAL, 316-318 NORTHDOWN ROAD, CLIFTONVILLE, KENT. THANET (0843) 22060  
Telephone KEN McINNES, G3FTE for courteous attention  
AGENT WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON 422232

We are sad to report the untimely death of Ron Turner, GM8HXQ, our good friend and Scottish Agent. Ron was widely known and respected both north and south of the border.



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



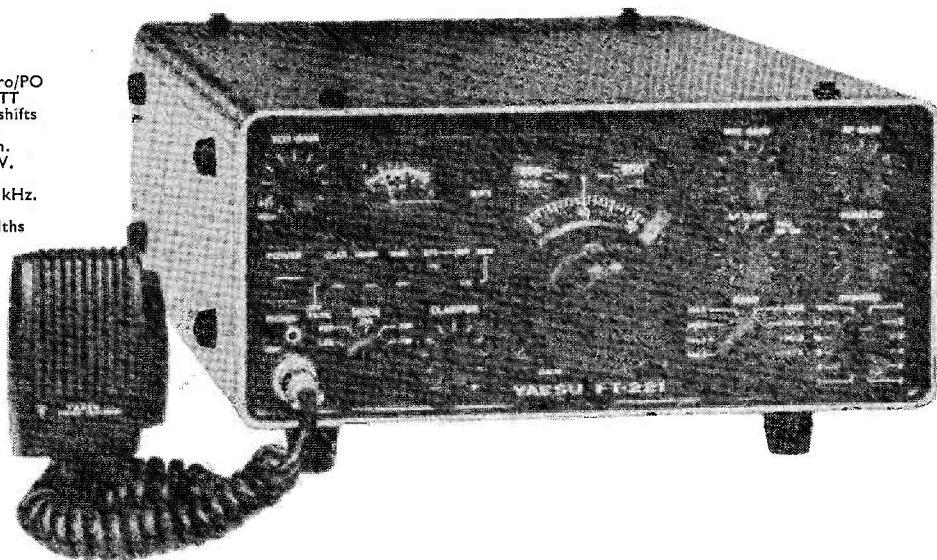
# THE NAME IS YAESU

## FT221 MULTI MODE TRANSCEIVER

100 kHz calibrator  
(1 MHz  $\div$  10)

"S" meter/FM centre zero/PO  
Clarifier IRT and IRT/ITT  
600 kHz up and down shifts  
44 FIX channels (4 x 11)  
Fully adjustable squelch.  
AM, FM, USB, LSB, CW.  
Dual speed VFO drive  
Readout Better than 1 kHz.

2-4 and 12 kHz bandwidths  
PLL VFO  
Clean Output  
Mic. supplied  
Noise Blanker  
AC or 12v. DC  
CW sidetone  
Semi Break-in  
Sensitive  
ALC socket  
RLY Socket  
Plug in boards  
11 $\frac{1}{2}$ ", 5", 11 $\frac{1}{2}$ "  
Rigid 22lbs.  
Tone burst  
Adjustable VOX  
Mic Gain Control.



The FT221 design offers an unparalleled level of technical sophistication, combining latest "state of the art" techniques with extreme reliability and ease of operation.

One look at the construction: plug in boards throughout (with presets positioned for easy access) one glance at the circuitry and you will be convinced that the FT221 may have rivals but no peers.

The final frequency is derived via single signal frequency mix from 10.7 MHz. The tunable component is produced by a 133 MHz voltage controlled oscillator (VCO), phased locked to the sum of; the temperature compensated 8 MHz VFO (or one of the 11 fix crystals) and the nonpupled 14 MHz band (or repeater shift) crystals. The DC control voltage from the VCO is applied to 8 varicap diodes in both the transmitter and the receiver effectively electrically ganging the RF tuned circuits to the VFO and Band crystals, thus both the transmitted and receiver are always fully on resonance even when using the repeater facility. This narrow band technique further improves the transmitter output spectrum and the receiver's immunity to overload, rendering continual tweaking of pre-selectors obsolete.

If for any reason, the VCO should not lock, an indicator light flashes, the transmitter, and the receiver audio, being disabled.

The transmitter employs; a balanced FET mixer, RF derived ALC (which is fed to the two first mosfet TX I.F. amplifiers) preventing over driving and allowing operation at full rated output on low DC supply voltage and ends by using a BAM 20 (series modulated for true A.M.) to drive (a 40W P.E.P.) BAM 40 PA, rated by its manufacturer to withstand any VSWR irrespective of phase angle.

The sensitive receiver offers a remarkable immunity to overload, the mosfet RF stage is AGC controlled, the FET mixer feeds a transfilter then an I.F. amplifier. This band limited signal, of the correct level, is presented to the noise blanker gate (before any serious pulse stretching occurs) and hence to either the quality crystal filter on SSB, or the 455 kHz mixer for FM.

Designed for the serious amateur, it also offers a unique double push tone burst, selcal socket, and linear amplifier provisions (relay make and break and ALC sockets) with the spectral purity that allows you to use one with a clear conscience.

"The rig here is a FT221 need one say more?"



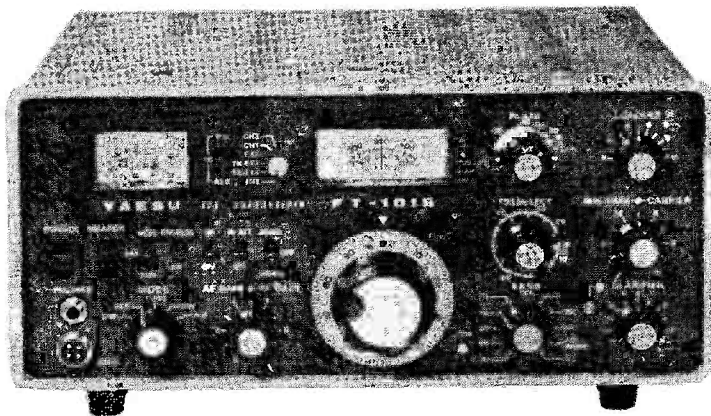
# MUSEN—THE REPUTATION IS UNPARALLELED!

## FT-101E/EE

### ● Solid State 160 thru 10 Metre Transceiver

The world's number one transceiver now offers even more value and performance in one, compact, thirty pound package. An effective, RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile ups—without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E/EE features the latest in solid state technology, incorporating time proven,

plug-in "computer type" modules for unparalleled reliability and serviceability. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere—ideal for today's active amateur. Just add an antenna and 12v. DC or 100-234v. AC for instant operation on 160 thru 10 metres. The FT-101E/EE is another step forward in amateur communications from the world's leader in communications equipment. YAESU—The Radio Company.



FT-101 TRANSCEIVER

	FT-101 E	FT-101 EE	FT-101 EX
160m Bnd. Cry.	✓	✓	X
80m Bnd. Cry.	✓	✓	✓
40m Bnd. Cry.	✓	✓	✓
20m Bnd. Cry.	✓	✓	✓
15m Bnd. Cry.	✓	✓	✓
11m Bnd. Cry.	✓	✓	X
10mA Bnd. Cry.	✓	✓	✓
10mB Bnd. Cry.	✓	✓	✓
10mC Bnd. Cry.	✓	✓	X
10mD Bnd. Cry.	✓	✓	X
WWV/JJY**			
Bnd. Cry.	✓	✓	X
Marker			
Bnd. Cry.	✓	✓	✓
Fix (CH1/CH2)			
Bnd. Cry.	X	X	X
CV Filter	X	X	X
RF Processor/			
FIX Unit	✓	X	X
DC-DC			
Converter	✓	✓	X
Cooling Fan	✓	✓	X
Microphone	✓	✓	X

✓ = Installed.  
 X = Not installed  
 \*\* = Receive only

### Features

- \* Built-in AC and DC power supplies
- \* Built-in RF-speech Processor for increased talk power (E model only)
- \* 260 Watts PEP, SSB, 180 Watts CW, and 80 Watts AM.
- \* Factory sealed, solid state VFO for optimum stability and accurate 1 kHz readout
- \* Effective Noise Blanker, threshold adjustable, for elimination of noise spikes
- \* Built-in, fully adjustable VOX
- \* Automatic break-in CW operation with sidetone
- \* Selectable 25 kHz and 100 kHz calibrator
- \* ±5 kHz receiver clarifier w/separate ON/OFF switch
- \* Built-in WWV/JJY reception
- \* Heater switch to shut off final tubes for conservation of current drain

- \* Reliable easy to operate level switch
- \* Adjustable carrier level for tune-up and novice operation
- \* Built-in speaker
- \* High-Q, permeability tuned, RF stages to provide the performance required even in base station operation
- \* Includes dynamic, hand-held type microphone.
- \* Indicator lights for internal VFO and clarifier operation
- \* Eight pole SSB filter for unparalleled selectivity on today's crowded bands
- \* All mode operation—SSB, CW and AM
- \* Built-in internal crystal control provision and Dual VFO adaptor
- \* Complete line of compatible accessories for flexible station design

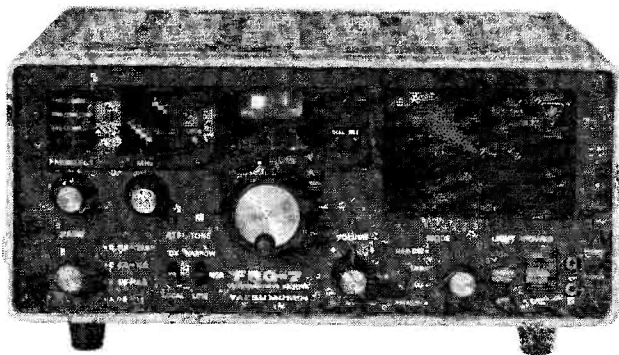
**YAESU MUSEN KNOW THE PROBLEMS—  
 AND HAVE SOME PRECISE ANSWERS!**



AND NOW FROM THE LARGEST  
INTERNATIONAL MANUFACTURER—  
**NEW GENERAL COVERAGE**

**RECEIVER FRG-7**

***HERE'S THE SET  
THAT YOU HAVE  
BEEN WAITING  
FOR!***



YAESU MUSEN HAVE NOW MET THE NEEDS OF COUNTLESS SHORT WAVE LISTENERS AND OTHERS WITH THIS EXCITING NEW RECEIVER —STUDY THE SPECIFICATION BELOW AND WE ARE SURE YOU'LL AGREE !

**Synthesized All Solid State General Coverage Receiver !!**

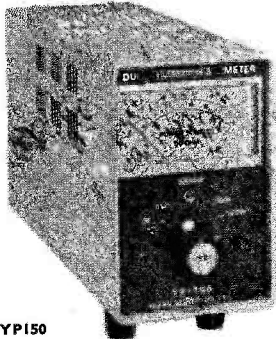
**Features and Specifications**

Mode :	SSB (LSB, USB selectable), AM and CW.	Selectivity :	More than $\pm 3$ kHz at $-6$ dB. Less than $\pm 7$ kHz at $-50$ dB.
Coverage :	500 kHz to 30 MHz continuous coverage.	Audio Output :	More than 2 watts.
Frequency Readout :	Better than 5 kHz.	Power Requirement :	100/117/200/234 volts AC 50/60 Hz or 12 volts DC (8 dry cells*). If the AC supply fails the DC supply is automatically connected. * Cells are not included.
Frequency Stability :	500 Hz within any 30 minutes after warm up.	Size :	13½" wide, 6", 7" overall high, 11¼" deep.
Sensitivity :	0.5 $\mu$ V for 10 dB S+N/N for SSB and CW. 2 $\mu$ V for 10 dB S+N/N for AM.	Weight :	Approx. 15½ lbs.

***ADD STATUS TO YOUR STATION WITH YAESU***



# YAESU MUSEN FOR TEST GEAR — NO OTHER INTERNATIONAL MANUFACTURER OFFERS SUCH A RANGE OF ESSENTIAL TEST EQUIPMENT AND TUNING AIDS.



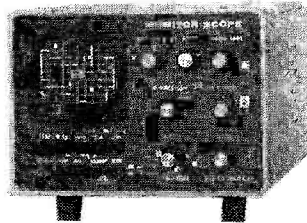
YP150

### POWER METER/DUMMY LOAD

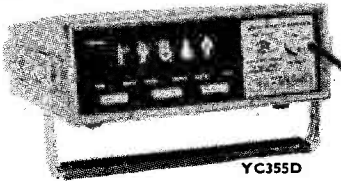
The YP150 is a fan cooled 50 ohm dummy load (using a large carbon resistor which maintains impedance (V.S.W.R. less than 1.2 : 1 at 145 MHz) by the use of a "Tapering Trough") and a power meter, for use between 1.8 to 200 MHz. Calibrated 6, 30 and 150W. FSD on a large 3 1/2" x 2" meter with a maximum error of 10% FSD. Size 6" (7") x 4 1/2" x 11" (12"). Weight 6 lbs.

### MONITOR SCOPE

The YO100. The Multi purpose monitor offers through line display, 1.8 to 60 MHz of transmitted signals, of 10 to 500W, monitoring of the IF of a receiver (3.18 MHz standard 445 kHz and 9 MHz options), trapezoidal exhibition, audio and R.T.T.V. portrayal. Built in 1.5 and 1.8 kHz oscillators permit the measurement of power, in accord with statutory two tone P.E.P. measurement requisites.



YO100



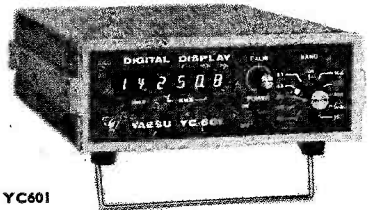
YC355D

### DIGITAL FREQUENCY METER

The YC355D counts from 5Hz to 35 MHz. The D model's prescaler extends this range to over 200 MHz. The ingenious design offers: a dual range system (providing eight digit readout but using only five cold cathode tubes) and operation from mains, or 12v. DC. at the flick of a switch. The accuracy offered is time base (1 MHz crystal (±0.0005% at 25°C, ±0.0025%, 0 to 40°C)) + 1 count. Input impedance is switchable 1 Mohm or 50 ohm (B.N.C. socket), construction is on double sided epoxy board. Size 8 1/2" x 3" x 11" (12 1/2"), weight 7 lbs.

### DIGITAL DISPLAY

The YC601 digital display unit (for 101 and 401 series (3.18 MHz IF)) indicates transmit and received frequencies to 100Hz on six bright green, 9 segment gas discharge tubes. Built in mains P.S.U. (consumes only 10W), gate time of 100mS., size 3" x 8 1/2" x 9" (10 1/2") and weight 5 1/2 lbs. Supplied complete with connecting cables, etc.



YC601

**YAESU MUSEN AUTHORISED UK AGENTS  
(IN ALPHABETICAL ORDER)**

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**G3FIK**



**SOUTH MIDLANDS COMMUNICATIONS LTD.**

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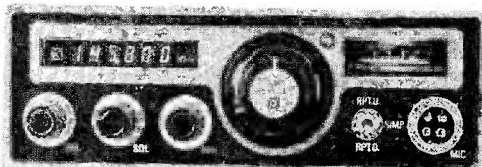




# South Midlands

ESTABLISHED 1958 — OVER 18

## THE DIGITAL II (FM 14.4-10SXRII) COMPACT STATE OF THE ART 2 METRE FM TRANSCEIVER



The de luxe 2 metre F.M. transceiver with a 5 kHz stepped synthesiser and bright digital readout, from 6 seven segment LED's. Selectable 10 or 1 Watt output, for simplex or duplex (up and down shifts), across 144-146 (rx to 149 MHz) from a tiny 6 1/2" x 2 1/2" x 7 1/2" Easily underdash mounted with the supplied mounting bracket, or slipped in place o the broadcast wireless.

For strong signal handling and low noise the R.F. mixer, first IF (16.9 MHz), second mixer (and LO) are all FET's. The front end is tuned by variacaps fed by the DC output of the P.L.L. with superb selectivity provided by 15 pole ( $\pm 8$  kHz at  $-6$  dB,  $\pm 15$  kHz at  $-70$  dB) Ceramic filter.

LED lamps indicate if the P.L.L. is unlocked or the squelch open.

The V.C.O. is directly modulated (for exceedingly linear deviation).

Unitary 6 circuit block construction (for serviceability and screening).

Selective calling socket (mic/LS/PTT etc.) on rear panel.

**INTRODUCTORY PRICE ONLY £225 + VAT**

## THE MULTI UII A NEW DIMENSION IN SEVENTY CMS. F.M.

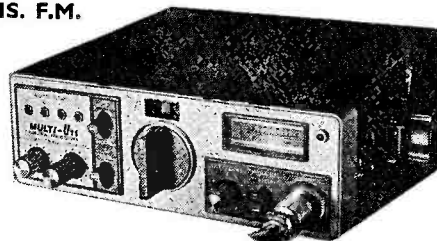
A unique combination of frequency control by either external VFO, 23 switchable or 4 instantly selectable auto scanning channels.

Both the Tx deviation and the Rx bandwidth are switchable accommodating 50 or 25 kHz spacing.

The main dial is channel numbered (e.g. 16 = 433.4, 20 = 433.5 etc.) and is illuminated only when a channel is crystallised up. "Two R.F. stages in the receiver provide great sensitivity (0.5Vv for 30dB NQ). The use of a band pass filter IF (CF 45 MHz) gives high image immunity and low channel crystal drift. Further conversions to 10.7 and 455 prevent IF image whilst providing good pass and skirt selectivity." The transmitter of switchable 10/1W output draws only 2.5 or 1.3A (0.6 or 0.3A Rx) and has a netting of new crystal facility.

Other features include, diode RF switching, R.I.T., "on the air" lamp, PO meter, S meter, AFP, reverse polarity protection etc.

With 8 Channels SU (8, 16, 20) and RU (2, 4, 6, 10)



**INTRODUCTORY PRICE ONLY £200 + VAT**

## THE HANDHELD KP022

2W RF and 1/2W Audio makes this with its immunity to image problems and IF break through one of the best buys today. Its performance rivals many fixed/mobile 10W sets.

The KP202 is supplied complete with HC18U crystals for S20 and S22 telescopic whip, leather handle/whip case and F type plug. Accessories include internal crystal controlled tone burst, flexible stubby helical antenna, leather case, spare F plugs, F to UHF adaptors, base mast, NI cads, etc. etc.

With 6 channels S20 and S22 and 4 of:- S0, S21, S23, R3, R5, R6, R7 £99-50



KP202  
KCPI2

## COAX SLIDE SWITCHES

Up to: 1kW, 1.5 GHz, 0.3dB loss, 1:2 | VSWR, 50dB isolation, 50 ohm "N" or "PL" fittings available. Ex-Stock P. & P. 30p, VAT 8% only

TWS 120 1 in 2 out Nickel SO239 £4-45  
TWS 150G 1 in 5 out Gold SO239 £9-50



## COAX RELAYS

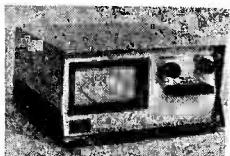
12v. DC, 50 ohm, Silver plate. Ex-Stock. — P. & P. 30p. — VAT 8% Power Crosstalk (at 500MHz)

CX120 50W 35dB Cable entry £17-50  
CX230 300W 40dB BNC sockets £16-00  
CX600N 600W 40dB N sockets £19-00



## ROTATORS

Ex-Stock in Totton for fast delivery VAT-Rotators 12 1/2%. Cable and deliv. 8% Carriage (BRS or post) FREE. Securicor delivery £1 extra (mainland) All rotators supplied complete with appropriate control box and instrs



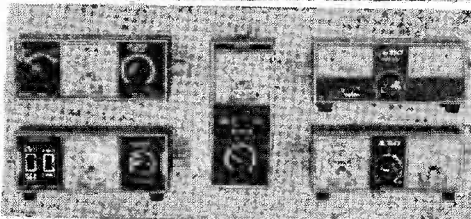
AR30 (illus. right near and centre) £29-25  
AR40 (illus. right centre and far) £38-50  
AR33 (De-luxe control AR40) £44-75  
CD44 (C.B. illus. left) med. duty) £75-85  
Ham II (C.B. illus. left) hy. duty) £115-00  
2010/220 Stolle though Rotator type ... £40-00  
5 core—AR30/40/33 2030 per yd. 20p  
8 core—CD44, Ham II per yd. 32p



## AEC METERS SWR, Power (Pr), Field Strength (F.S.)

Unless Stated — SWR ( $\pm 10\%$ ), 1.5 to 160 MHz, 50/75  $\Omega$  (P. and P. 40p. — VAT 8% ONLY)

SWR10 (TLH) single meter horizontal type ... £8-15  
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SWR40 (Centre) single meter Vert. type with F.S. ... £7-80  
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# Communications Ltd

YEARS OF PROFESSIONAL EXPERIENCE



## YAESU MUSEN 2-YEAR GUARANTEE 24-HOUR SECURICOR SERVICE

FRG7 — FT221 — FT101 — FRI01 EX-STOCK. FT301S 3 WEEKS

### THE FT301S EX-STOCK This Month

The FT301S is a new solid state 12v. transceiver of plug in construction, which with all options installed offers:—

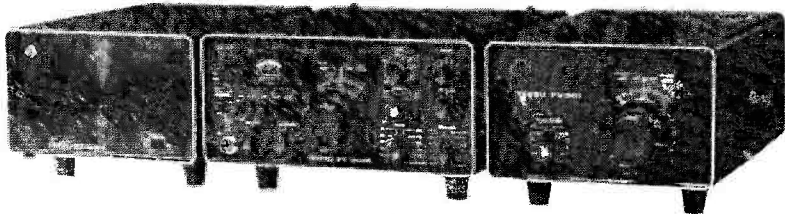
Top band to 10 metres (inc. 5 MHz MSF) in 500 kHz segments, 10WV output, built in RF speech processor, selectable 2.4 or 600 Hz crystal filters, front panel controlled VOX (with MOX) and PPT, semi break-in keying (with side tone), clarifier with a separate off switch, 25 kHz crystal calibrator, 1 kHz readout from the dual speed VFO (100 and 16 kHz per turn), single knob resonance, internal VFO or 11 crystal per segment (or external VFO with same crystal facility), 3WV audio to the internal or external AC p.s.u.'s loudspeaker.

The transceiver employs a pre mix VFO and single conversion signal frequency IF (9 MHz) uses MOSFETS in the RF and mixer stages followed directly by a roofing filter for sensitivity coupled with dynamic range.

MODES A1, A8j (USB + LSB selectable)  
SELECTIVITY 2.4 kHz 6dB (SF 1.7:1)

SIZE 11" x 5" x 11 1/2"  
SENSITIVITY 0.5uV for 10 dB S/N

SELECTIVITY 600 Hz 6 dB (SF 2:1)  
WEIGHT 161 lbs.



### The FT101E, complete HF station FT101E(EE-EX) EX-STOCK

The FT101E a complete mains or 12v. DC station contained in a compact 30lb. package. 260W P.I.P. of SSB (with in-built R.F. speech processor), 180W., CW and 80W. of AM, 10 to 160m. (inc. 10 MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100kHz calibrator,  $\pm 5\text{kHz}$  clarifier (with separate on/off switch), etc., etc.

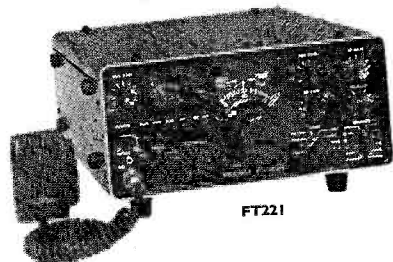
The VFO is stable and linear (readout to 1kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for: tune up, AM, for CW operation, whose performance with the semi break in keying, with side tone, and the optional 600Hz filter installed is of a high order. Linear and transverter provisions are made with sockets for: relay contacts, ALC output, all internal HT supplies, low level RF heater links and switches, etc., etc.



FT101E

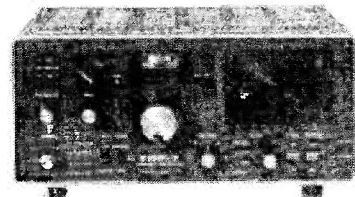
### The FT221, complete 2m station EX-STOCK

The FT221. The multimode USB, LSB, AM, FM, CW (with semi-break-in and side tone), 2m. transceiver offering the choice of: phase locked VFO or 44 crystal channels, simplex or repeater (600Hz up and down shifts), with unique "double push" auto tone burst, mains or 12v. (3A) operation, excellent selectivity, SSB 2.4kHz (1.7: S.F.) or FM 12 kHz. Front panel adjustable VOX and mic gain, a calibrator (1 MHz  $\pm$  10), 1 kHz readout and linearity, sensitive squelch, clarifier with IRT and IRT with ITT (makes F.S.K. easy), switchable "S" and centre zero tuning meter, noise blanker, serviceable plug in boards all contained in 11 1/2" (14" x 5" x 11 1/2", 22lb. rigid package.



FT221

### The FRG7, general coverage receiver EX-STOCK



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

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

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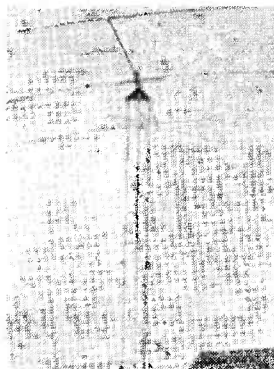
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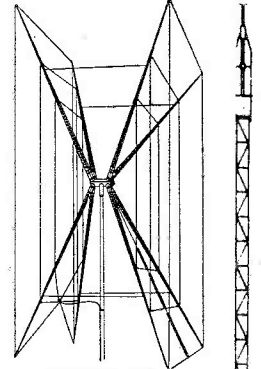
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10' sections without or c/w rigging.  
Carriage £2.75, ex-stock VAT 8%  
30' £22.85 or £41.75 c/w rigging  
40' £29.75 or £53.75 c/w rigging  
50' £37.95 or £69.95 c/w rigging



**HAMTOWER with TH3 Jnr. SELF SUPPORTING**  
Galvanised lattice 10' sections.  
Free standing with climbing steps.  
Carriage £3.50 ex stock 8% VAT.  
30' c/w base grillage ... £135.00  
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**TELETOWER with TH3 Mk. III TELESCOPIC GALVANISED**  
Carriage and rigging (RX) extra  
42' ... £121.00 (RK £28)  
57' ... £174.00 (RK £28)  
75' ... £224.50 (RK £49)  
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10-20m., 2, 3, or 4 ele. F/B ratio 25dB low radiation angle.  
Tri-dectic fibre glass spreaders withstanding 100m.p.h. winds yet weighing only 21 lbs.

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13 versions. 6 to 21m. from stock.  
Rigging extra. Carriage £1.  
VAT 8%  
4 x 1.5m. £13.60 3 x 3m. £17.20  
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18AVT/WB-10-80m-wide band, 50 ohm, 1kW. Self supporting, 25', trapped 1/4, roof or ground mounted, low radiation angle, vertical.	
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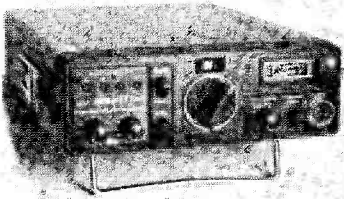
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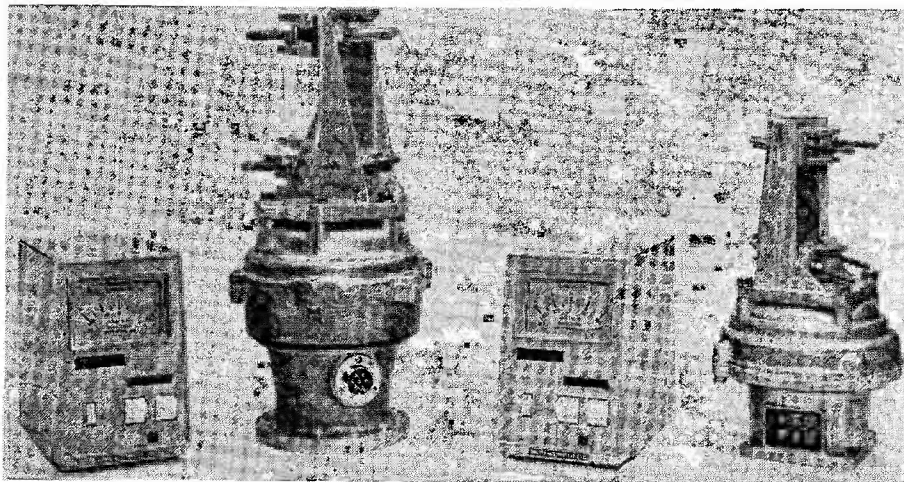
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(kg./cm.)	
<b>CDE model</b>	<b>Torque</b>
AR30	575
AR40	820
CD44	1,152
HAM-2	4,025
<b>Emoto model</b>	
102 LBX	1,500
1100 MXX	10,860

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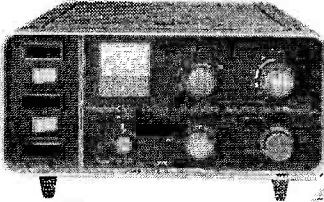
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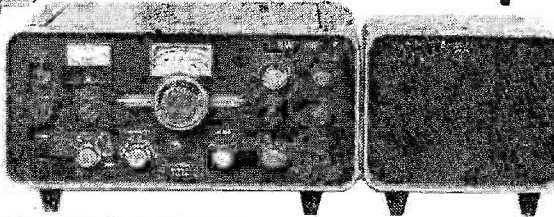
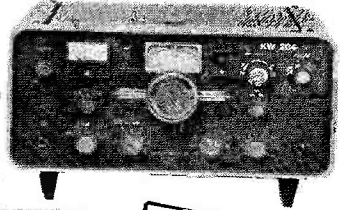
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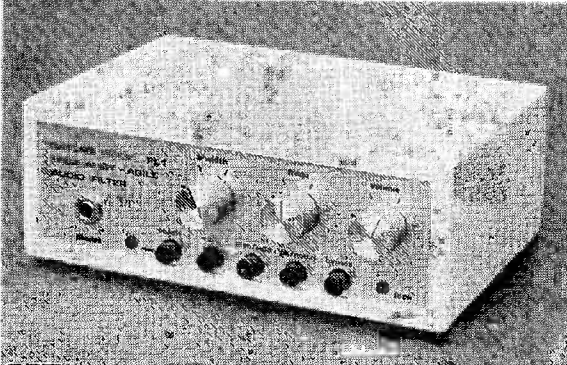
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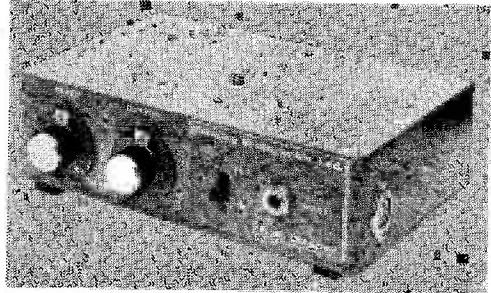
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# SHORT WAVE MAGAZINE

(GB3SWM)  
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**Managing Editor:** AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

*Advertising:* Charles Forsyth

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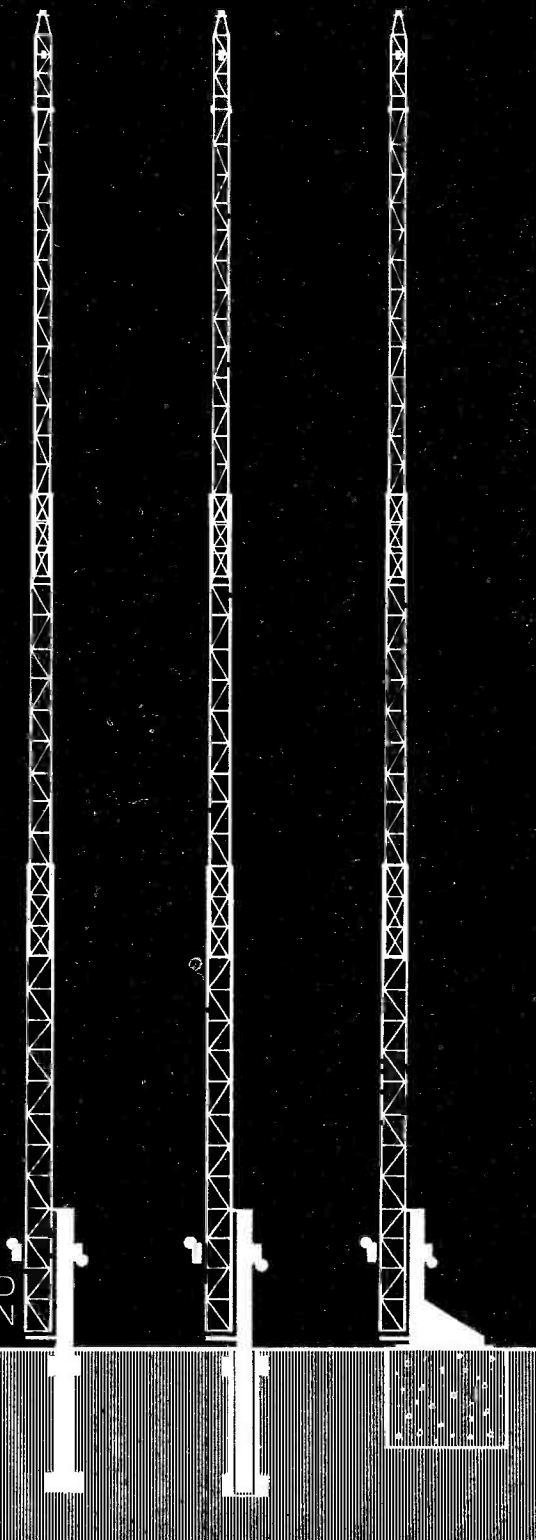
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# The SHORT-WAVE Magazine

## EDITORIAL

### **Budmarsh**

We must return now to our old friend the Budmarsh of Coochpawani,\* leader (imaginary) of the Afro-Asian bloc on the International Telecommunications Union, Geneva, the body responsible for producing frequency allocations for all the world's radio services and requirements. The Budmarsh—who was first introduced in this space in the October 1963 issue—will be in action again during the next World Administrative Radio Conference in 1979. This will be when a particular matter of the utmost importance to us all as radio amateurs will be discussed—a problem fully recognised and clearly understood in responsible circles throughout the world of Amateur Radio: That of retaining reasonable areas of frequency for AT-station operation. It is, of course, still not at all clear what the solution is going to be.

What we have to remember is that the Budmarsh and his friends have a voting power out of all proportion to their true status, which is that of junior and somewhat inexperienced members of the Union, with little interest in and less understanding of Amateur Radio. Some of these nations have populations hardly more than that of an English county—yet they enjoy equal voting rights with the U.K., the U.S.A. and the U.S.S.R. In these circumstances, it could well be that in the process of bargaining against heavy voting odds, the European nations will have to give way in some directions in order to get their requirements met in others.

At the I.T.U. conference table (and this is the point of the foregoing) some of these bargains could well be struck at the expense of the amateur frequency bands, as being one of the easiest channels along which to secure agreement.

Of course, it may never happen—but all the signs are that it very well might. Unfortunately, the central fact emerging from all this is that the greatest menace to the future of Amateur Radio is not so much the "crowded state of the bands," or the "excessive use of power," or the "irresponsible behaviour of some amateur elements," or even "discriminative licensing"—but the Budmarsh of Coochpawani and his Afro-Asian friends.

And what, you may now ask, is likely to be the outcome of it all? The broad answer as we see it is that, whatever decisions may be taken on paper, they will remain paper decisions because Amateur Radio cannot now be destroyed simply by decree.

Austin Forsyth  
G6FO

\* (A loose rendering from the Hindustani would be "Villain Who Could't Care Less")

## COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

FOR most of us, the month in retrospect has been one of *heat*, with shacks uninhabitable for much of the day and sleep elusive most of the night; while for the gardeners among us it has been a unmitigated disaster and a revelation in shades of yellow.

So—there will be many of the less dedicated ones who have not even switched on during this month after just a whiff of the heat coming out of loft or garden-shed shack, and who can blame them?

On the other side of the coin, this month saw a letter from an ex-G8 type who took the Morse and got his A-ticket; in the happiest letter one has had in years he exults over the working of his 100th country. Good for him—working a repeater will never have that sort of thrill to offer!

On a different tack, there have been many writers to this piece over the years who have been hot under the collar about operating standards in and out of pile-ups. For any of these, the writer's advice is this: Spend an hour or so listening to the abuse and the obscenities on GB3LO, then look at the operating standards on the FM simplex channels and be thankful our HF band operating is as good as it is!

### Ten Metres

Use, or lose! The local net activities on the band are slowly increasing—we have already mentioned several in these pages, and we hear of more through the grapevine. Swansea's idea of giving the first few minutes over to CW, and then changing over to SSB is even better than it would seem on first sight, because it not only gives a bit of practice to the phone-only wallahs *just in case*(!), but it also gives some QSO-type practice to the SWL's learning code. This is a very-positive incentive as compared with just listening to old Joe do the road banging out prepared passages.

The only other report on Ten at the moment of writing is from G2BY (I.o.W.), back from his run to W9-land and *hotter* at home! Bert happened upon a ten-minute

opening on June 26, and worked K1LWI for his first W on the band since 1970.

Right on the last moment in came a packet containing three letters all bearing references to Ten! G3NOF (Yeovil) found short-skip Europeans aplenty, and, apart from the June 21 opening to the States, he has noticed that it opens up on occasion after midnight with weak East Coast W's, at least up to July 6. Don made contact with HP1GD, K1BCG, K1RQF, K1VUJ, W2FPG, W2PIC, W3LIT, W41WZ, WA9JGN/4, WB8FAZ and WB8IZO, all SSB of course.

GW4BLE (Newport, Gwent) noted the ten-metre openings and theorises that they may have been due to some sort of double-hop Sporadic-E effect. He worked SSB to EI2CI, EL7F, F0CQK/FC, G4AKF in Essex, plus other London-area G's, G4DMN in Liverpool, six assorted LU's, LX2HC, a brace of PY's, W1-2-3-4-8, 5T5KJ, 9X5PT, a lot of other EU stations, and a 4X4—quite like old times indeed!

G4DMN exults that his exams are now over, and he can get down to the bands. Richard, back in Wirral, now is saving up for a Versatower to get the beam up another 20 feet; meantime he has heard his first signs of life on Ten, with W's and signals from the Caribbean, though he didn't work anything.

### Fifteen

Again the doldrums. G2BY worked a few Europeans but nothing he would consider as DX. G3KFE looked at the band a few times, mostly near what he would have expected to be the closing-down period and was rewarded for his pains on one occasion by some South American signals gently fading away into infinity as his PA heaters warmed up, and for the rest was able to assure himself that his neighbour's colour TV was duly switched on. Otherwise *Nix*. GM4EQY (Paisley) mentions a long list of DX in his letter, of which more anon, and, hidden among the

small print, has just one QSO on the band, which was with LU2AFH—fair enough since his dipole is cut for Twenty!

G4DMN offers only the comment that stations were heard but none worked—from which one may deduce that they were not of enough interest to justify a call.

The midnight openings on Ten referred to by G3NOF were also noted with respect to 21 MHz, saying that the signals were S9 on this band—notably W2HCW and WA2VFA, both of whom have big aerial systems. Outside Europe, the only actual QSO's recorded were with K2LG/MM in the Persian Gulf, and TU2GF.

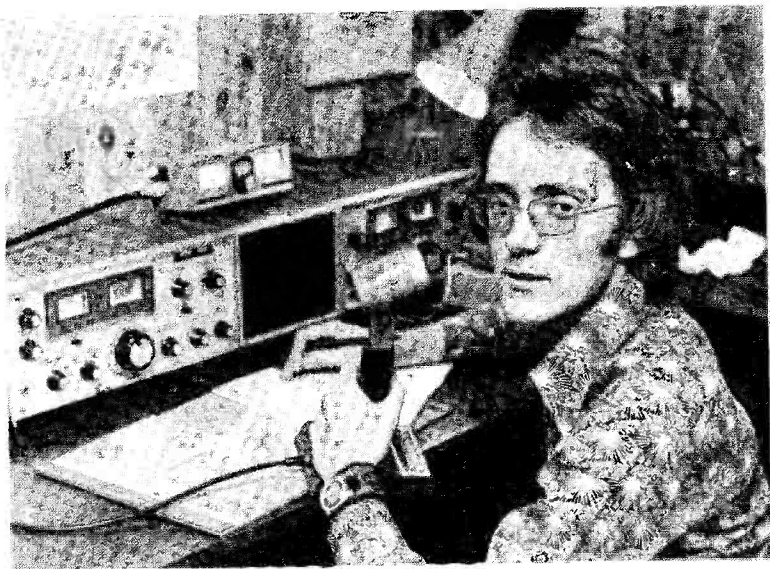
### Twenty

Here we must start with GM4EQY from Paisley, he being ex-GM8HDB and the writer of the enthusiastic letter mentioned earlier. John runs a Trio TS-520 with an *indoor* dipole, and with this has run up the 100 countries since November 1975. Looking at the current 14 MHz list, we see all the U.S. call areas save W5, all the VE call areas, plus YV5DUW, CE5RC, HP2FY, PZ1BG, CP5DT, FY0DHI, ZP5YD, HK1CJC; HI8MOG, PJ8CO, 9Y4VV, 6Y5DA, KP4BCL, 8P6FV, FG7TD, 9G1JX, 6W8DY, 5T5ZR, ZE1EA, 9J2WR, 5N2NAS, 5Z4PG, CN8BF, 9X5RK, VK3AKK, VK1BH, UL7, UA9, EA8FF, 9K2DT and A6XR.

G2BY worked CW with KH6JJ, 8P6DA, UA0FAC (Sakhalin Is.) and the usual crop of JA's; but from the westward the only contact of interest was with WITW, active since the early twenties.

G3CED/G3VFA (Broadstairs) has been rather too busy with work, to the point where the XYL suggested that he must have been a galley-slave in an earlier incarnation—now that is a *polite* sort of brickbat! When he has been able to get on, George frankly admits that usually it is possible to make and complete a SSB QSO with his two watts and old seven-and-sixpenny mike while still tuning round the CW end

The callsign GW4BLE is well-known on the air and also as a regular CDXN correspondent. Stephen Cole is at 25 Fernlea, Risca, Newport, Gwent, and keeps GW4BLE active on all bands Eighty to Ten, running a Yaesu FL/FR-400 combination with an FL-2000B linear, into a TH3 Mk. III on a Strumech tower, with a long-wire as back up. Stephen's interest is mainly in DX and contest work, and he also holds GW4ENT for the Gwent Contest Group.



looking for someone to call. True enough, and also a statement containing a Great Truth—if you want a QSO on either mode, *don't* call CQ but search around.

G4DJY uses 120 watts to a Joystick, and, it might be commented, has an eminently readable logging fist, unlike some of the spider-in-the-ink ones that are about! All his contacts but one were on Twenty, and included lots of W's, both in their normal and ITU or Bicentennial variations(!), EA8LK, VP9BY, a doubted "Y13A," calling for QSL's through W2GHK, PY's, 3AØGY, UA9JAA in the almost Welsh-sounding Khantymansk, UI8, UL7, UV9BA, WA1WGV/MM (who wasn't saying where he was), JW5NM in Svalbard and AC2GHK/4—this last was a chance missed to enquire as to the goodness of that Y13A claiming Stew as his QSL address.

G4EVO runs a couple of watts to a Joystick, and is now in our end of radio after 47 years of the sea-going variety—he would have been about 75 when he took the R.A.E.! On Twenty, the two watts were, not surprisingly, deployed on CW, with which mode the whole of Europe was covered with good exchanges both ways, right up to the Asian and African edges.

G2HKU (Sheppey) stuck to his key, and raised KZ5RQ, UAØAG and UAØGF. On a different tack, Ted is a bit unhappy about the

proposal to run the "WG1JFK" station at Runnymede past the DXCC desk for separate country status; he reckons that on this basis every embassy in the world would qualify! However, one wonders whether this is quite true, in that an embassy is, as it were, a patch "lent" to the country concerned, whereas that patch at Runnymede on which the memorial stands and on which the WG1JFK station was *given* to the U.S.A., which makes it an American station on U.S. territory without any possibility of argument. However, one could have wished the decision could have been made to run it as a possible "new country" rather earlier and more publicly, so that people would not have passed it up as not worth the effort, which one is sure many folk did.

Ray, GW4CXM, has given 14 MHz the occasional once-over. On CW, there were AAØWCR, D2AZB, FY7YE, FL8JC, HKØBXX, K7KBN, KH6CF, LU1CAH, PY7DBZ, UD6CM, UI8AG, UJ8BQ, VE7MH, XN1KE and ZS5EL, while SSB accounted for CX7BF, M1D, N4ISC, ZS6ST and ZL4FT. A bare crop this time, he complains, blaming it all on the nagging he is getting from GW4BLE (both are at Newport, Gwent) about his VHF DX. GW4BLE, prudent chap, refrains from comment!

G2BJY (Walsall) says he is giving up wondering about this 14 MHz

"funny" aerial and going back to Eighty soon, so he can fill in the rest for his 5BDXCC. Before we go any further let us make comment on that: This old scribe has seen the G2BJY acres, and would say that, not only is it as postage-stamp-sized as any he has visited, but it is also *intensively* cultivated, Geoff liking fresh food with his DX. This means a low mast, to keep the guys in the garden, a take-off surrounded by buildings on all sides to soak up the outgoing RF, an end-fed wire for all bands, and an all home-built station; when he changes his band of activity, he usually has a rebuild in the process, as from Ten to Top Band a year or so ago. What Joe Average would have considered to be a more or less ideal situation for a QSO-less existence—and yet G2BJY has his hundred up on all bands save Eighty for 5BDXCC, and that same aerial has managed the U.S. on Top Band. To paraphrase a popular song of years ago—"It Ain't what you Run; it's the way that you Run it!" Geoff notes this time CW contacts with EP2's, JA, UI8, UL7, UA9, UAØ, UG6, WB7ACT (Montana) and W7KEY (Arizona, who said he had been in London the previous day) AA7UQE (Oregon) and K6CR—thus did the W-less aerial finally vindicate its honour! However, one sad gotaway was JD5AAD; Geoff had "G2BJ?" from him, went back to resolve that

problem, and then lost the quarry under the European QRM who continued calling the JD when the latter had swung round and was calling CQ Africa!

For your scribe there has been a problem, over and above the universal one of trying to keep the garden at least faintly alive, and that has been that in order to keep the shack "cool" one has to have a fan running—and our thirty-year old specimen has chosen this year for its first display of tantrums since it was saved from the scrapheap ten years ago; its then owner declared it wouldn't work, not any way at all "so take it away." We did, we cleaned it, oiled it, put a plug on it and away it went.

GW4BLE has, like the rest of us, tended to keep out of the shack—as he says, it's bad enough just sitting in there, but when the linear is doing its convector-heater act then things are Just Not Acceptable! However, D6A was collected, plus a crop of Northern and Southern Americans in the intervals of activity not spent listening on Ten.

G3NOF again mentions the prevalence of short-skip—this seems to have been more marked than usual for most of the summer, which leads one to wonder just *why* it should be so noticeable. Is it just the poor conditions which show these short-skip stations up or is there some mechanism which has been more active this year? Anyway, the morning VK/ZL's were not conspicuous around 0600, but instead

W6-7, VE4-5-6-7-8, Pacific stations and the odd KL7, and on the occasional morning even the East Coast W's. These in any case have often been heard around 0900 and on through the day. Africans have not been too good in general but there have been a few openings into the Indian Ocean around 1600. Don added it all up to SSB QSO's with AAØCPX, AB6HEQ, AC6RKP, C5AR, C31FO, C31JW, D6A, HB9ED/MM on Lake Zurich, HKØBKK, HR6SWA (Swan Is.), IE9SEZ (Ustica), JA's, KH6ISB, KL7EN, OY8I, TU2EG, VE4WZ, VE6KW, VE8RCS, VQ9HCS, VQ9R, lots and lots of W's in the rare areas, W6EWH/VQ9, (Chagos, this one), VU7GV, WS2JRA, XJ8RO, YS1GMG, ZL1KN, ZS5PG, ZS6BNH, 5Z4HZ, 9J2GF and 9L1NP.

G4DMN reckons that Twenty staying open well into the night is a good thing, he having sat at the rig till three in the morning on occasion. He booked in CX2CL, CT2BS, FG7AN, FGØCRZ/FS7, G3ZY, GI3LFH, GM3MBP, HI8MVF, HKØLE, OH5MJ/HBØ, WA6QFO/KM6, G3KZR/M/LA, PJ2CW, VP8HZ, W5VTM in Oklahoma for the 48th state for the Bicentennial WAS, XJ4CX, XJ8RCS and XN2AB.

On the home front, GM3YOR (Kirkcaldy) has spent most of his time on Twenty, his CW having included CO2OM, PZ1AP, EP2DO, VE2RV, VP2KK, VE7SV/8, YV3AGT, UK8AAK, UA9MAX;

Drew mentions that the Glenrothes crowd had two stations for Field Day. One had a Quad, a TH3 beam, and dipoles at 60 feet for the LF's and worked all sorts of DX, while the other station had almost exactly the same power availability into a "G5RV" aerial, which also made lots of contacts but no DX on any band. A convincing demonstration of the importance of the aerial *given equal equipment in the shack and equally good operators*, which is the only time when the comparison is valid.

### Round Off

Which is where we try to account for some of the odd things on the DX scene over the past few weeks. We have already mentioned WG1JFK as being in the running for new country status, and ARRL are on record as saying quite specifically that "It is considered a U.S. station operating from U.S. territory" which seems to say that it will get thumbs-up from the DXAC.

Bill Rindone, WB7ABK duly set off on his travels, and showed from TA, some reporting him signing WB7ABK/TA and some ZK2AQ/TA. He then went on to the Sudan where he was momentarily stymied for want of a way out of Khartoum airport, thanks to an unsuccessful military coup. He was, at the time of writing, being heard from ST2AR and also ST2SA, already a week overdue for his original estimated arrival at D6A, and indicating a further week of delay as likely before he gets back on the countries-run.

And, for what it is worth, that provides us with our lead in to the D6A operation carried out by K5QHS from Moroni in the Comoros group, during which some local back-up occurred, with San being reported as using the rig, of FH8CE; the exercise ran from July 5 to July 9, with a little side-dish from Mayotte as K5QHS/FH8 beforehand and FL8CB after, before flying back to the States where he was to be met by W2DIE, and led in the general direction of ARRL Hq. QSL's to Box 2588, Hot Springs, Arkansas 71901. Now, why the indecent haste to get to ARRL Hq., you may ask? Well, 'twould seem that while most of the Comoros voted for independence, Mayotte voted for staying with France, which

### TOP BAND COUNTIES/COUNTRIES

Starting date, November 1, 1975

Call	AM	CW	SSB	Countries	Total
G4CZE	76	72	69	11	226
G4CBQ	23	86	71	13	193
GM3YOR	2	130	18	28	178
G4EAX	50	25	80	10	165
GW3WMY	71	80	—	10	161
G4EPL	17	46	78	10	151
G4AEJ	62	52	14	8	136
G4AYS	30	76	—	7	112

Scoring is on the following basis: one point for a county on SSB, two per county on CW and three per county on AM. In the case of an AM/SSB contact, claim two points, scored in the AM column by the AM station and in the SSB column by the SSB station. No other cross-mode contacts permitted.



For a recent meeting at WIBB's QTH, there gathered ace 160-metre DX men WIHGT and PYIRO, with WIBB himself on the left.



displeased the other islands and seems to have led to a bit of a *hou-ha*; so possibly ARRL will wait for the dust to settle a bit before it tries to decide on this one.

Juan da Nova, Tromelin and Glorioso are all blank of amateur activity, but on July 15, that situation will be altered as far as Europa goes, as FR7ZL will be there, either at 14025 kHz CW or at around 14195 kHz SSB, generally using an HW32, dipoles and a 12AVQ. Guy will be there for about two months, and is well known for his reliability and speed in the matter of QSL cards.

In the matter of the sunspots, there seems to be some confirmation for the optimistic G8KG (as against pessimistic W4UMF) approach to the question of Cycle 21; undoubtedly, over the past few weeks there has been a tendency for the sunspots visible to observers like you and me to be near the solar poles rather than the solar equator, a location which indicates they are connected with Cycle 21, as the spots from cycle 20 are to be found near the equator. Of course, every-

one is in the same boat when it comes to long-term forecasting, and anyone could be right; but as anyone will know, when it comes to the short-term W4UMF is better than the weather-forecasters any day.

That 7J1RL operation didn't go so badly, really—100 contacts on Top Band and 500 QSO's on 50 MHz as part of a sum total of 9000 contacts made. . . . A station signing CZ30 is said to be in the Olympic Stadium, Montreal.

#### Lower Bands

All three, Top Bands, Eighty and Forty, receive scant word, even though in long letters. Let's look at Eighty and Forty.

Eighty, or course, is, above all in our contest, the home of the QRP buff—and, incidentally, raises the question of where is G3RJV of late? No QRP Club *newsletter*, no reference to it, no reference to him or the Club in others letters otherwise full of QRP news, not even a sub renewal notice, let alone a Final Demand—we must have

been seen supporting the wrong side! But, seriously, one hopes all is well with the QRP Club organisation and G3RLV as its sparkplug.

G2NJ finds river-bank operating, as at Alwalton, to be quite the nicest way of going/P and interested some other people in the incoming CW signals, notably from G3RIL and G3CED; the latter was a thirty-minute QSO with note a letter lost at the Alwalton end. Other contacts were, from home, with G6PG (North Walsham) who was using an HW8, and with G3GET in Sittingbourne, also QRP.

G2HKU tried both Eighty and Forty; on the "lower plane" he found WG1JFK on SSB, while CW gave him a QSO with UW9WL. Up to 7 MHz and here there were CW contacts to not, on SSB, with UA9WS, UL7OAO and YV4LF, while the brass came in for KV4CI, VK1BE, W8DI in Arizona, and ZL3JC.

Eighty for G2BY meant a QSO with G2NJ, and another with G3KPO, now back on the air after his move to the Isle of Wight. As for

Forty, Bert was able to renew contact with his old friends VK3MR and VK3XB, but in his opinion the band is not a patch on what it was at the same time last year. On a different point, G2BY comments that among the large and complex rotatable TV aerials he saw on his Stateside trip (Wisconsin), he reckons a six-element beam for Amateur Radio would hardly be noticed! Be that as it may, there is no doubt whatever that the W's have no difficulty in getting some wonderful amateur arrays passed by the authorities for planning.

### Calling the YL's

We have a letter from Diana Hughes, G4EZI, who is interested in the formation of a YL net in this country. She suggests that a Saturday morning session, between 11 and noon, clock time, be tried on a frequency of 3705 kHz-ish depending on the QRM situation, but would be interested in any alternative proposals—drop her a line at 3 Primley Park Crescent, Leeds LS17 7HY and let her know you are interested and your suggestions if you can't make the Saturday time proposed. And, others, *don't*'s create too much QRM (either at home or on the channel) and give the lasses a chance.

### Top Band

For a start, we have G2HKU, who reports that despite the heat he did manage to get in the shack for long enough to work PA0PN and DL6KK, respectively on SSB and CW. His other activity has been winding RF chokes for his Linear and trying them out—and still he finds the most successful is the old National design which was adjustable, despite the modern trend to continuous-wound types.

Many of the Top Band enthusiasts will be wanting GI for counties on Top Band; between August 27 and September 13, GM3YOR and GM3OLK are proposing to activate *all six* GI counties, spending two days in each at least, with the pattern to be 160/80 one evening, VHF the next, other bands during the day-time. Skeds welcome, to GM3YOR—*QTHR*. On the operating front, Drew has sent in his long-threatened entry for the Ladder after a careful check of his score, from which we

rather gather that Drew's indexing system must be a bit like the G3KFE one!

Now G4CZE, who returns to the fold after being at a series of different /A locations during his work, training as a transmitter engineer for the BBC—he reckons nine so far since he started the training! However, wherever he has been, his faithful 140-foot bit of wire and CW/SSB rig has been with him (yes, it's the *same* bit of wire!) while the old AM/CW rig is kept at home near Wigan, tacked to a 240 foot wire at 18ft., fed on all bands through at ATU. However, the present (Droitwich) location is reckoned to be the worst so far encountered with the colour-TV timebases really cutting things up to the extent that in TV hours the only usable band is two metres! Alan also has an entry in the Ladder, as will be noted.

At G4AEJ (Yardly, Birmingham), eyes will be first turned to the Ladder, he being interested in seeing the GM3YOR score and reckoning Drew will be on top. The second look no doubt will be to make sure his own score is correctly entered; Lem's latest efforts seem to have been directed towards the AM stations, to judge by his score amendment, but he also has booked in three new countries to keep the score rolling nicely on.

### Contests, Expeditions and the Like

Malaysian Amateur Radio Transmitters Society will be putting on a DX-pedition to the Islands of Tioman, Rawa, Pemanggil, Aur and Tinggi off the Southeast coast of Malaysia in the China Sea, operating 24 hours daily between August 14 and 18. For a special QSL, sent direct, send a dollar or its equivalent in any currency or sufficient IRC's to: DX-pedition 9M0EXP, P.O. Box 777, Kuala Lumpur, Malaysia. Thanks to Tan Bin Hussain, 9M2DW, for this information—he is a real OT, having held a license since before the War.

A brief note of the results of the BARTG Contest results, which show nine U.K. entries from the licensed chaps, one in the SWL section, and one check log from the U.K. Of this lot, I8AA was the overall winner with 200 contacts and 28,624 points, while G3VXO was

top G in 11th place overall, with 130,800 points from 145 QSO's. In the multi-operator section the only G entrant was G4ALE, placed fifth with 60,392 points from 84 contacts.

Now we have to announce the World-Wide Contest of SEANET, this year being sponsored by ORARI, the Indonesian national society, commemorating the 31st anniversary of Indonesian Independence Day. This one runs over August 21-22, Top Band to Ten, and in previous years has been quite popular. We suggest you airmail for the rules for this one, but get it quite clear that although phone and CW operations are over the same weekends, you can only participate in the phone leg *or* the CW one—you can't send in a mixed phone/CW entry. Rules and scoring otherwise are fairly clear so airmail for them to 9M2FK, Ismail Razak, 281-C, Jalan Pekeling, Bukit Glugor, Penang, Malaysia, to whom also the logs should be addressed, to reach him by October 30 1976 *latest*—he has to get the results out in time for them to be announced at the SEANET Convention at Djakarta, Indonesia, on November 14.

BATC are co-sponsors in the Albatross SS/TV contest over the weekend September 4-5, 1500-2200z on the first day, and 0700-1400z on the second. Exchange picture with callsign, signal report and contact number. Score one point per QSO on 14 MHz, five on any other band, or fifteen if the QSO is *via* an Oscar; multiplier five per country, ten for each continent. Total score QSO points times multiplier. Logs to be received by Franco Fanti, I4LCF, Via Dallolio n. 19, Bologna, Italy by October 2. Frequencies to be used 3754, 7040, 14230, 21340 and 28670 kHz.

### Conclusion

We seem to have reached the end of our allotted space for another month, thanks to all those who have written in, not to forget the assistance of *West Coast DX Bulletin*, Geoff Watts *DX News Sheet*, and of course W1WY's invaluable bulletin of forthcoming contests.

For now, then, that's it. For next month the deadline will be **August 10** latest arrival, addressed as always to "CDXN," **SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.**

## QRO LINEAR FOR MULTI-BAND WORKING

WITH VHF POSSIBILITIES

THE linear here described will run to very nearly the full legal SSB output on the LF bands and will give quite a high output on 144 MHz. The DC input possible is some 600w. p.e.p. Initially, it was the intention to build a QRO Linear for two metres only.

Some 4X150A valves were available also a suitable blower motor. During the design process it became apparent that if the linear could be induced to run on the LF/HF bands as well there would be many advantages—saving in space, equipment and avoidance of much costly duplication.

No information on a suitable circuit could be found from any of the usual sources so the actual construction work was undertaken with some trepidation. The necessary bases were obtained for the 4X150A's. It was thought essential to use the correct bases in this project as the built-in screen by-pass capacitor would probably be quite an asset if neutralisation problems and parasitic oscillations were to be avoided.

### Design

Since VHF circuitry calls for more careful design and layout, this part of the unit was first built using quarter-wave anode lines and conventional cross-neutralised push-pull circuitry. For ease of tuning and a better Q-factor half-wave grid lines were employed.

The LF circuitry then had to be fitted in and the tank circuit was considered first. Due to the relatively high capacitance of most switches it was decided to use plug-in coils and the only components readily available suitable for use at the contemplated power level were the old Eddystone 5-pin transmitting types (still available from some sources.)

There were insufficient contacts on these for push-pull use, or even parallel operation into a parallel-tuned tank with link coil, which would have required seven or six pins respectively. Parallel operation in a *pi*-network circuit was incorporated, however, as this could be done with the 5-pin type available.

The plug-in socket was mounted on brackets quite near the valves and short braided connections run from the outer pins to the valve anode clips. These leads have negligible effect on VHF operation. There appeared to be no easy way of disconnecting the two-metre tank from the valves during LF operation and since the valves were going to be strapped in parallel anyway, this would result in the Lecher-line tank being shorted at both ends, thus only adding a small amount of capacity overall to the circuit. It would, however, be necessary to transfer the DC feed point, by direct switching, from the Lecher lines to the *pi*-network in order to prevent loss of RF when used on LF (or loss of HT when operating on VHF). This is easily accomplished by a ceramic switch (S5 in Fig. 1).

The remaining problem was then how to feed the LF energy to the grids. The first method tried was to feed the power from C1 to the junction of R2, RFC1 and RFC2; this was all right on 3.5 MHz, but the im-

pedance of the chokes made things difficult on higher frequencies, so the arrangement shown was adopted. This consists of a rather elementary but quite effective switch S1A-S1C which shorts the grid lines together for LF use, but adds just a very small capacity across the grid lines in VHF operation.

The oscillator/driver section of the transverter was rebuilt on a small chassis mounted at the rear, between the blower and the small power supply. This is incorporated to provide bias voltages for the PA and also power for the transverter.

### Testing

The power packs should be checked through and, with the blower on, the heater voltages to the 4X150A's adjusted to ensure that it is exactly 6.0v. The resistor R11 in Fig. 1 must be set to give this voltage. The bias to the PA should be 50v. with the relay contacts closed and HT applied to the transverter. RF energy at 144 MHz from the transverter or other drive source should now be fed to the grid line. If the dimensions are followed closely resonance of the grid lines will occur at some setting of C1; if the strays are low, however, it may be necessary to add the small capacitor C2 as shown in Fig. 1.

With the transverter giving maximum output, at least 2.3 mA of grid drive should be available, using the grid circuitry shown.

The grid shorting switch should now be selected to the LF position and the application of some 10-30w. from the LF/HF SSB source should result in grid current flowing, depending on the value of R1. If no grid current appears, then the output of the exciter is insufficient and will have to be increased, or R1 increased. It is inadvisable to increase R1 to more than about 250 ohms, as the PA stage may become unstable. The preferred value for R1 is:

$$R1 \text{ ohms} = \frac{(V)^2}{W \text{ peak}}$$

Where V = 4X150A bias voltage (about 50v.).

W = Peak watts from exciter.

The next step is to put the valves into operation by application of some 250-300v. stabilised to the screens and about 400-600 to the anodes. (N.B. Ensure that S5 is selected to VHF to avoid damage to the valves through running with screen voltage but no anode voltage. *Screen and anode* supplies should *always* be switched off before S5 is operated or coils are changed.)

The standing anode current will be about 100 mA with 50v. bias. Each valve should be checked individually for balance which ought to be within a few milliamps to avoid uneven power distribution and excessive distortion at full drive. The circuit should remain stable at all settings of the tank and loading condensers. Single-tone SSB drive should then be applied until a milliamp or so of grid current flows, and with an 80-ohm load connected, the PA should be loaded to some 200-300 mA. The neutralising capacitors should then be adjusted until grid peak, screen peak and anode dip all coincide. (In practice this adjustment was very simple to perform.) The tank condenser should be approximately half open at resonance, and there should be no trace of instability.

When all is well at this power level the HT can be increased in steps, and the tuning and loading checked

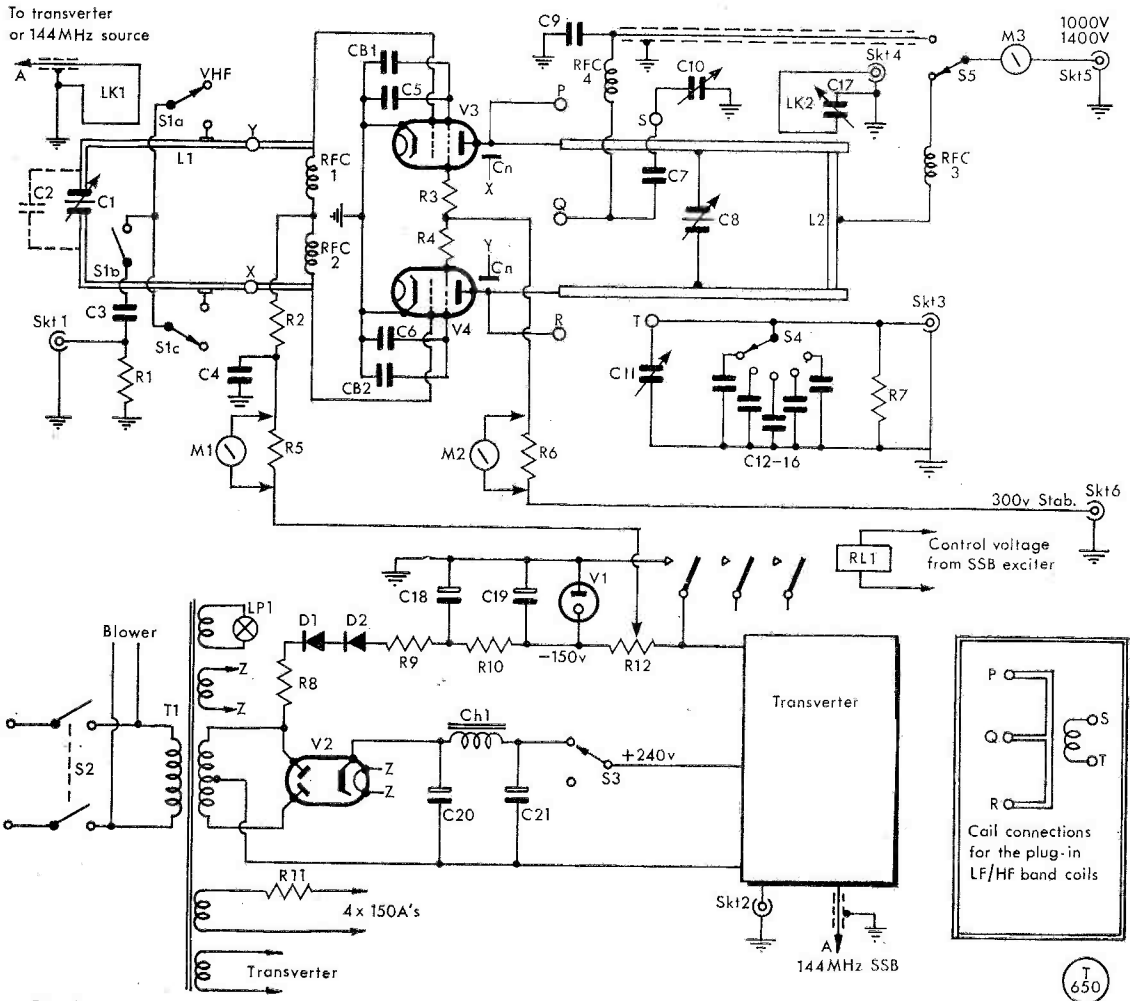


Fig. 1

Fig. 1. Circuit of the Linear Amplifier, using forced-air cooled 4X150A's, and designed to operate at full power — 600w. p.e.p. SSB— on the HF bands, and also on two metres at reduced power. This band flexibility is achieved by an ingenious arrangement whereby the VHF grid and tank circuits remain in being when the PA is operated on the other bands using a set of plug-in coils. Thus, all bands two metres to 80 metres are covered. On VHF, the 4X150's are in symmetrical push-pull, while on the HF bands they are in parallel, this switching being effected, on the tank side, by the mere act of plugging in the required HF band coil and, on the grid side, by the shorting action of S1A-S1C; since the valves are then in parallel, the Lecher lines for VHF have no more than a slight capacity effect. Conversely, when the PA is on two metres, the short braid tails V3-P and V4-R are "in the air" and any effect they have can be taken up by the C8 tuning of L2. Sk1 is the HF-band drive point; Sk3 the aerial connection for the HF bands; and Sk4 the RF output point for two metres — and this PA could probably be taken to 70 centimetres as well!

each time. The coupling between L2 and LK2 may need slight adjustment to obtain satisfactory loading. There should be no sign of flash-over in the tank condenser and stability should remain unimpaired.

At full drive, i.e., Class-AB1, just on the point of grid current, full loading occurs with a screen peak of about 10-20 mA and an HT anode current peak of 420-450 mA, depending on the particular valves. One peculiarity with valves of this type is that the screen current can be *negative*, especially at low drive levels, and

this negative current will be greater at higher anode voltages.

For LF operation, S1 should be selected to the LF position and the correct tank coil plugged in. The HT switch S5 should then be selected to the correct position after which power may be applied to the anodes and screens. Standing current should be the same as in the VHF case and again there should be no trace of instability. No neutralising is necessary as the passive grid resistor R1 ensures stability.

## Table of Values

Fig. 1. Circuit of the 4X150A Linear

C1 = 15 + 15 $\mu$ F, split-stator	Ch1 = 10-Hy 100 mA
C2 = 2-3 $\mu$ F*	RFC1,
C3 = .01 $\mu$ F, s/m	RFC2,
C4, C5,	RFC3 = VHF, 19in. 28g. on 1w. res. body
C6 = .01 $\mu$ F, tub. cer., 500v.	RFC4 = Tx RF choke, K.W. or home- made QRO PA type
C7 = .004 $\mu$ F, rated 2.5 kV	S1A-
C8 = 8 + 8 $\mu$ F w/s split-stator*	S1C = see text, and Fig. 4
C9 = .005 $\mu$ F, rated 2.5 kV	S2A-
C10 = 230 $\mu$ F, Tx type*	S2B = DP mains, toggle
C11 = 300 $\mu$ F	S3 = SPST toggle, input on/off
C12, C13,	S4 = 1-p., 6-w., ceramic, coarse loading
C13, C14,	S5 = 1-p., 2w., ceramic mic hi-volt, HF/VHF select
C15, C16 = .0018 $\mu$ F, in 300 $\mu$ F steps	HT
C17 = 25 $\mu$ F	T1 = 240-0-240v., 100- 150 mA, 1/5v., 3/6-3v. windings
C18, C19,	RL = Control relay, as required
C20, C21 = 16 $\mu$ F, 450v. elect.	Blower = Type 26BT ( <i>Air- flow Develop- ments</i> )
CB1,	M1 = 0.5 mA, grid
CB2 = In 4X150A base	M2 = 0.25 mA, screen
Cn = see text	M3 = 0.500 mA, plate
R1 = 100-200 ohms, 10- 20w. carbon	LP = 6.3v. pilot
R2 = 3,000 ohms, $\frac{1}{2}$ w.	D1, D2 = 0A210, or similar silicon diodes
R3, R4, = 22 ohms, $\frac{1}{2}$ w.	V1 = VR-150/30, or OA2
R5, R6 = 1,000 ohms, $\frac{1}{2}$ w.	V2 = 5Z4, or similar
R7 = 68,000 ohms, $\frac{1}{2}$ w.	V3, V4 = 4X150A, forced- air cooled
R8 = 12 ohms, $\frac{1}{2}$ w.	
R9 = 10,000 ohms, 5w. w/wound	
R10 = 25,000 ohms, 5w. w/wound	
R11 = .06 ohm, 2w.*	
R12 = 40,000-ohm w/ wound potentiometer, set bias	

NOTE: For all items marked\*, see text for explanation or discussion.

## TABLE OF COIL DATA

VHF — 2m.	
L1	— Grid lines: $\frac{3}{16}$ in. dia. copper rod, 9in. long spaced 1in. centres.
L2	— Tank lines: $\frac{3}{16}$ in. copper pipe, 10in. long, spaced $\frac{1}{4}$ in. centres.
LK1	— Grid link: 26g. p.v.c., hairpin 2 $\frac{1}{2}$ in. long, 1in. wide.
LK2	— Tank output link: 14g. p.v.c. insulated, hairpin $\frac{3}{16}$ in. long by $\frac{1}{4}$ in. wide.
HF Bands	
80m.	— 14 turns 14g. copper on 2 $\frac{1}{2}$ in. ceramic coil former.
40m.	— 8 turns 14g. as above.
20m.	— 4 turns 14g. as above.
15m.	— 3 turns 12-gauge copper, silver plated.
10m.	— 2 turns $\frac{3}{16}$ in. dia. copper tube, plated.

NOTE: Actual coil sizes for 10-20m. bands will depend on circuit minima, and may require adjustment.

## General Constructional Notes

Extra .01  $\mu$ F tubular ceramic capacitors are used in each screen circuit to provide additional decoupling at the LF end of the range. No ill-effects need be anticipated by their inclusion. Despite the lumped VHF circuit elements present no parasitic occurrences have been noted. Efficiency is high and distortion is low.

In order to eliminate shot noise and other undesirable effects relay RL1 is incorporated. This mutes the PA valves and anodeverter during "receive" periods.

The VHF anode lines are made from  $\frac{1}{16}$ in. copper water pipe. For maximum efficiency they could be silver-plated and more elaborate arrangements made for short circuiting the remote ends and for connecting the

open ends to the anodes. However, any improvement would probably be marginal. The remote ends are short circuited by a clamp made from a  $\frac{1}{2}$ in. wide strip of copper which is made to grip each tube tightly. Similar clamps are made to provide connections to the valve anodes and these latter clamps are joined to the lines by short lengths of braided copper.

Both anode and grid lines are mounted on ceramic pillars of the type used as condenser mounts in such as surplus TU units, formerly available. If these are not to hand stand-off insulators, of ceramic or polystyrene rod, could be used.

The tank condenser C8 for the VHF lines is a wide-spaced split-stator type (as used in the 19 Set) of about 8-8  $\mu$ F capacity. (One of the large parallel-disc type neutralising capacitors of the original Eddystone pattern could equally well be used). The RF voltage at the position at which this capacitor is mounted is somewhat less than the maximum occurring at the open ends of the lines and there is no sign of flash-over with the condenser used. In order to obtain the desirable tank-circuit symmetry, however, the front mounted plate of the specified condenser was trimmed to match the rear plate in shape and size. This also facilitated mounting the capacitor on the lines (by sweating the two stator lugs). The rotor earth connection was also cut away leaving the rotor fully isolated. The front panel control is connected to the condenser by a length of polystyrene rod.

For the output link the wire used should be well insulated as there is a chance that it could come into contact with the anode lines, thus presenting the full HT voltage at the aerial socket. When the final position for this link has been ascertained it should be fixed into position using ceramic or polystyrene insulators.

The LF tank condenser C10 is one of the "Command" transmitter wide-spaced types. The maximum capacity is in fact rather too low as it stands, but by slight adjustment of the stator end locking screws the air-gap can be altered (increased on one side and decreased on the other) resulting in an increase in total capacity. Using a GDO, some fixed capacitors of known value and a small coil, it is a simple matter, by substitution, to set this tank condenser to a maximum value of about 220  $\mu$ F at which capacity the gap is more than enough for the RF voltage involved. The reason for using the condenser suggested was simply that it was available and would fit more easily into the space provided. Any other suitable tank capacitor could equally well be used. The minimum capacity of the circuit as a whole is quite low but slightly too high for optimum results with regard to Q-factor for full efficiency on 10 metres and possibly also on 15 metres. The ideal solution here would be probably to use a separate condenser of about 5-50  $\mu$ F for 10, 15 and 20 metres—but this would require the use of a 6-pin coil or separate switch to bring into circuit the larger capacitors necessary for 40 and 80 metres. These points would have to be considered in the design stage as they will effect space requirements and panel layout.

On the LF side, the loading arrangements are quite conventional. A 300  $\mu$ F variable condensed C11 is used with several fixed capacitors switched in parallel, giving a wide range of capacity for output matching. These are C12-C16 in Fig. 1.

(over)

Very short leads and the minimum of stray capacity and inductance are achieved by the layout. In order to provide a good return to the cathode for chassis currents, a small hole is drilled through the chassis near the tank condenser and a stout lead is run directly from its frame through the hole to the cathode ground connection beneath the chassis.

The RF choke used is not specified as this was home-made and many constructors will wish to use chokes that are to hand. One point to note, however, is that the mounting bolt at the "cold" end passes through the chassis *via* a ceramic bush. This bolt is connected to the cold end of the choke and permits a very short return path to cathode through the decoupling capacitor, thus preventing RF currents from circulating all round the chassis, which could lead to instability.

A resistor R7 is connected across the LF/HF output socket in order to prevent voltages from building up across the loading condensers. (Before this resistor was fitted C11 flashed across every few seconds as the charge on it rose!)

The diagram Fig. 1 shows the method by which the LF tank circuitry is connected. The two outer coil socket connections (P and R), which go to the 4X150A anodes, are short-circuited by the corresponding connections on the coil base. The latter are taken to the centre-pin of the coil base (Q) as well. The corresponding connection on the socket goes to the *pi*-net RF choke and also to the blocking condenser C7. The remaining two sockets—(S and T) are connected to the tank and loading condensers respectively, while the corresponding base pins on the coil unit are joined to the coil.

The neutralising capacitors are made from short lengths of tinned copper wire of about 26g. Care should be taken during their adjustment to avoid touching these wires against the anodes or anode lines. These very small condensers should be adjusted with an insulated tool, preferably of polystyrene. A small piece of copper shaped to form a hook can be used for this purpose; it can be fixed to the end of the rod by heating and then pressing it into the end of the rod.

Full dimensions of the unit are not given as the size required will depend on the exact layout and dimensions of components adopted in individual cases, but as a guide the Linear as illustrated is built on a chassis of 18in. x 12in. x 3in. deep and the PA compartment measures 18in. x 7½in. x 9in. high. Flanges should be provided around the bottom edges of the chassis to permit a base panel to be fitted using self-tapping screws; this is absolutely essential in order to ensure that all the available air from the blower is directed through the only two exits—the valve anode columns. Any gaps which could permit air leakage must be suitably sealed.

The valves should not be run unblown for more than a few seconds, even with only heaters on, as there may be over-heating of the base seals which could lead to fracture. When HT is applied care should always be taken to ensure that over-heating does not occur. The writer has so far been unable to find any data on the limiting temperature for the anodes but the base seals should not be permitted to rise above 150° C. In practice, with a quiescent DC input of about 130-140 watts, the stream of air from the valve anodes becomes noticeably warm when

the Linear is "talked up" to some 600 watts p.e.p. input.

### Use on Other VHF/UHF Bands

Although no experiments have been tried there is the possibility that this Linear Amplifier could be used on either 4 metres or 430 MHz. The following suggestions are offered:

(A) 70 MHz. If a very low minimum tank capacitor is used a passive *pi*-network could be tried. The coil required for this band would, however, be very small and efficiency would be poor. A better approach would be to try push-pull; in this case a condenser could be fixed to the 144 MHz cold point of the grid lines, this being of sufficient size to resonate the grid lines to 4 metres. This would result in a fairly low-Q grid line as far as 70 MHz is concerned, but for Class-AB1 operation drive requirements would be quite low. The anode lines could be resonated to 70 MHz by plugging in a suitable condenser across the two outer socket connections of the coil socket. Again the Q would be fairly low, but even with low tank efficiency it should be possible to run the unit to 100 watts or so p.e.p. output. The maximum allowable output to 70 MHz is 2/3 x 50 x 4 watts (about 132 watts p.e.p.). The quiescent DC input can be reduced by switching off the heater supply to one of the 4X150A's or by reduction of HT.

(B) 430 MHz. For 70 centimetres, it may be possible, at some reduction in efficiency, to use the Linear simply by tuning the grid and anode lines in the three half-wave and three quarter-wave modes respectively. (It may be necessary to alter the length of the anode lines or the size or position of the tank condenser C8 in order to get to resonance.)

In either case there may be reasons why these proposals may not work, but there is considerable scope for experiment. Even if the Linear could be induced to work at only 15-20 per cent efficiency, the results would be worthwhile for the sake of convenience and flexibility.

Mention has been made above of switching off one of the valve heaters. At one stage in the construction of the Linear the author was left with one good and one rather poor 4X150A. Quite successful results were obtained both at LF and VHF by using just the good valve, the other being plugged in with heater disconnected in order to balance the VHF circuit. (Note: Where experimental operation on 70 cm. or 4 metres is required the RF chokes RFC1-RFC3 may need alteration, or several chokes in series may be required.)

### Power Supply

Although several transformers were available rated at voltages from 500 to 1,000 volts at about 250 mA, none would deliver the 1,400-1,500 volts which was considered necessary for this RF Amplifier. It was therefore decided to try a circuit (which had been seen in various publications) in which two transformers are used, the outputs being connected in series, and thus either adding together or subtracting. This circuit has proved a great success in practice and so a brief description is given here.

Both transformers at hand were of good quality,

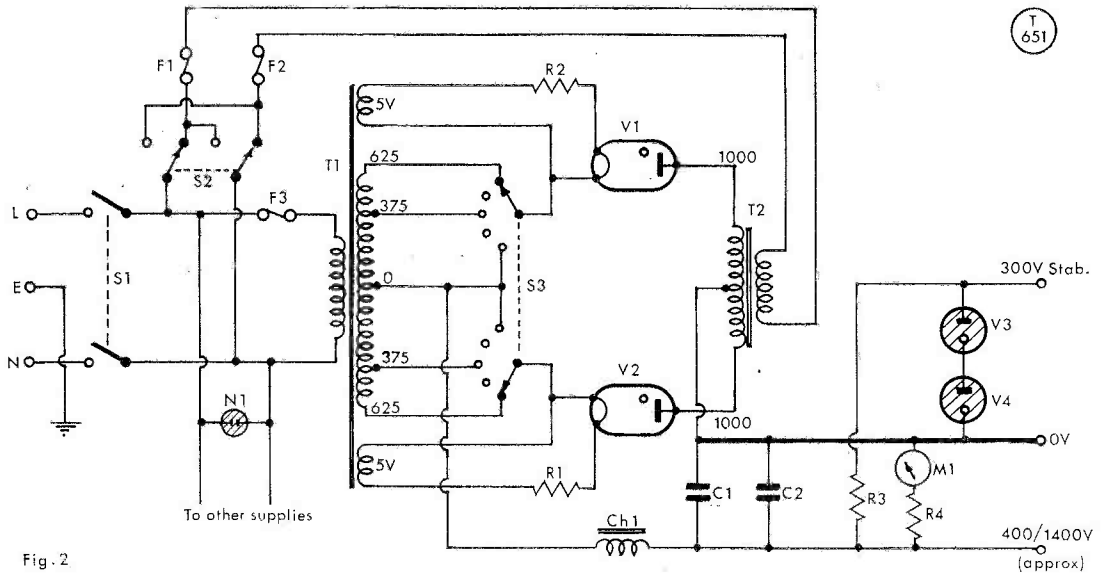


Fig. 2

Fig. 2. The EHT power unit for the High Power Linear is built as a separate item and, again, shows considerable ingenuity in design, in that two lower-voltage transformers are used to get the final HT of 1400 volts, this being made variable in steps down to about 400v. by the switching in the secondary of T1. Thus, the QRO Linear can be run up from a comfortably low HT for test and adjustment purposes, and power input is variable as required under actual operating conditions. In this circuit configuration, T1 and T2 must be of good quality and the insulation throughout of a high order, with an HV ceramic switch at the S3 position.

one being rated 1000-0-1000 volts at 250 mA. These transformers were wired to a pair of 866A mercury vapour rectifiers, as shown in Fig. 2. The 866A requires 2½ volts at 5 amps for the heater, and from a well insulated source. A suitable heater transformer was not available so it was decided to use the 5v. 3 amp windings of one transformer, incorporating ½-ohm 15 watt dropping resistors in series. This moderate over-running of the 5-volt windings has no noticeable effect on the temperature of the transformer which remains very cool at all times. In addition, the insulation level of these heater windings is more than adequate for the voltage experienced.

The switch S3 enables the transformer taps to be selected at will and S2 permits reversal of the mains polarity to the 1,000v. transformer. Thus, outputs of some 400, 650, 900, 1150 and 1400 volts are available, depending on the position of these switches. As no time-delay of HT switching is included it is suggested that S3 be selected to intermediate positions, i.e. to "off," after each period of use and left in this position for a minute or two after S1 is closed. This will ensure that the MV rectifiers have warmed up before HT is applied. It is also suggested that S2 be used to switch to the higher voltages and returned to the lower voltage position, each time it is necessary to change the taps, to avoid excessive burning of the contacts of S3 (S2 being more suitable for this duty due to the higher current rating).

Although rated at 250 mA the transformers will easily supply the high peak currents required by this Amplifier without any sign of distress. The output filter consists of a 10 Henry choke and two 8 µF capacitors which results in low ripple content, and as the impedance

### Table of Values

Fig. 2. The HV Power Unit for QRO Linear

C1, C2 = 8 µF, 1500v.	S2 = DPDT toggle, 3 amp
R1, R2 = ½ ohm, 15w. (see text)	S3 = 2-0., 5-p., HV ceramic
R3 = 30,000 ohms, 60w. w/wound*	T1** = Tapped HV windings rated 250 mA, with 2-5/5v. heaters
R4 = 100,000 ohms, 25w. w/wound	T2** = Tapped 300-1200v. rated 250 mA
Ch1 = 10-Hy, 500 mA, low res.	V1, V2 = 866A MV rect., for similar
N1 = 240v. neon pilot	V3, V4 = VR-150/30, or OAZ
F1, F2 = 3-5 amp fuses	
M1 = 0-20 mA, for bleed check	
S1 = DP toggle, mains	

NOTES: Value of R3\* depends on HT actually used. \*\*T1, T2 can be series-connected on output side to give required HT voltages, provided both will deliver full-load current and are adequately insulated to withstand increased HT; they can be mounted on s/o insulators, with primary fusing rated for appropriate input current at mains voltage. Both these transformers should run cool under full-load conditions.

of the choke is low (40 ohms) regulation is excellent.

The voltage falls from 1460 to 1360v. when the load current is taken from 140 mA (PA and VR chain) to 500 mA. The VR chain supplies 300 volts stabilised to the screens and is capable of giving up to about 30 mA at the higher HT voltages, although the output current range would be less at lower voltages unless R3 (Fig. 3) is reduced.

### Conclusion

This Linear Amplifier and its associated power supply have now been in operation for several months. Per-

formance has been all that was expected. During initial testing the snags were leakage of RF through the original  $\pi$ -network choke, and the flash-over of C11 already mentioned. Some trouble was also experienced with the first 4X150A's tried due to their low emission; substitution of good-quality valves resulted in the currents coming up to expectation. The only other trouble was a breakdown in the screen by-pass capacitor of one of the

4X150 holders. (This was not a new holder.) Since a new base could not be located the trouble was repaired by stripping down the holder and repairing the fault. (This proved much simpler than expected and provided care is exercised in lifting the flanges the operation can be tried on damaged 4X150 bases with confidence.) The repaired base has now been in service almost as long as the Linear without further trouble.

## CLIPPER FOR THE LINER-2

### SUITABLE ADD-ON UNIT

P. BURNETT (G4BLL)

THERE are many different species of speech "modifiers" available on the commercial and home-brew scenes today, which vary in their performance from downright unsociable, or, "... you'd be better off without it" to "very good if you can afford it."

Not wishing to attempt anything as ambitious as an RF processor and accepting the "limitations" of AF processing, it was resolved to try and design a unit which was simple but effective, easy to construct while achieving a professional appearance. The version shown here evolved as a true, matching, add-on unit for the Liner-2. There is no basic reason why it should not also function satisfactorily with other transmitters.

The circuit is shown in Fig. 1 with no claim to originality. However, in practice and in conjunction with the Liner-2 it works very effectively. It will be seen that it amounts to a two-stage pre-amplifier followed by a logarithmic clipping stage, with input and output filtering to reduce the bandwidth to about 500-3000 Hz, which is essential if distortion is to be kept within acceptable limits. In practice no reports of audible distortion have been received on any of the units which have now been in regular use for some months.

The power required for the unit can be derived from the Liner 2, or by fitting a small dry battery within the case of the clipper itself, some 2-6 mA only being required.

Several different forms of construction are possible. The Mk. I & II versions were both built on *Veroboard* with the clipping level control brought out to the front or back panel. The Mk. III version uses a specifically designed printed circuit board which is shown in Fig. 2, and which is built around a push-button switch with the clipping level internally pre-set. The circuit as given is capable of providing up to 20 dB of clipping. Fig. 3 gives the front and rear panel and case dimensions for the Mk. III version.

#### Getting It Going

Setting up the unit is simplicity itself and can be carried out without special test gear, although it is useful to be able to view the output signal on an oscilloscope when a one kHz tone from a signal generator is

#### Table of Values

Fig. 1. Circuit of the Clipper

C1, C3 = 470 $\mu\text{F}$	R4, R7 = 1,200 ohms
C2 = 100 $\mu\text{F}$	R8 = 220,000 ohms
C4 = 0.1 $\mu\text{F}$	R9 = 10,000 ohms
C5, C6 = 0.47 $\mu\text{F}$	VR1 = 10,000-ohm
C7 = 0.22 $\mu\text{F}$	potentiometer
C8 = 0.01 $\mu\text{F}$	Tr1,
R1, R10 = 22,000 ohms	Tr2,
R2, R5 = 470,000 ohms	Tr3 = BC109, or similar
R3, R6 = 15,000 ohms	

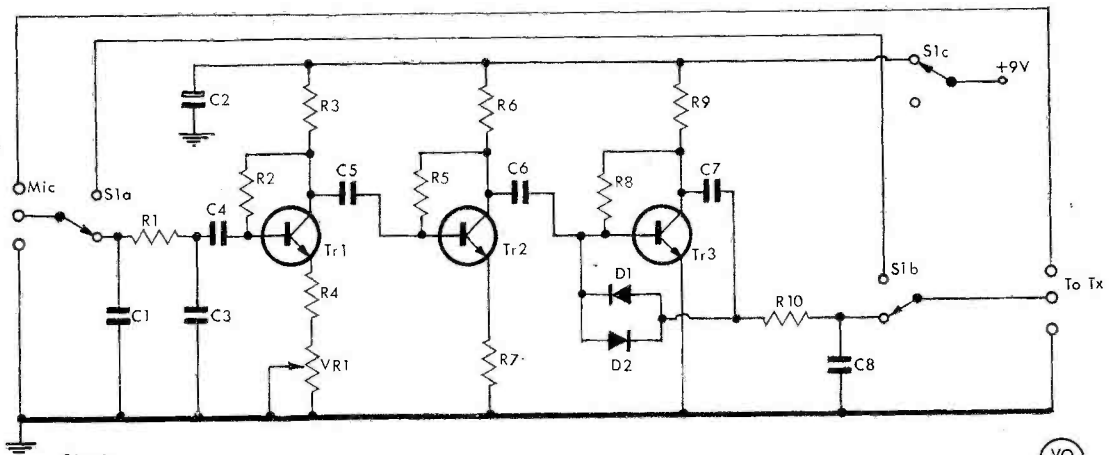


Fig. 1



Material: Front and rear panels  $\frac{3}{32}$ thk aluminium angle  
 Case 16swg aluminium

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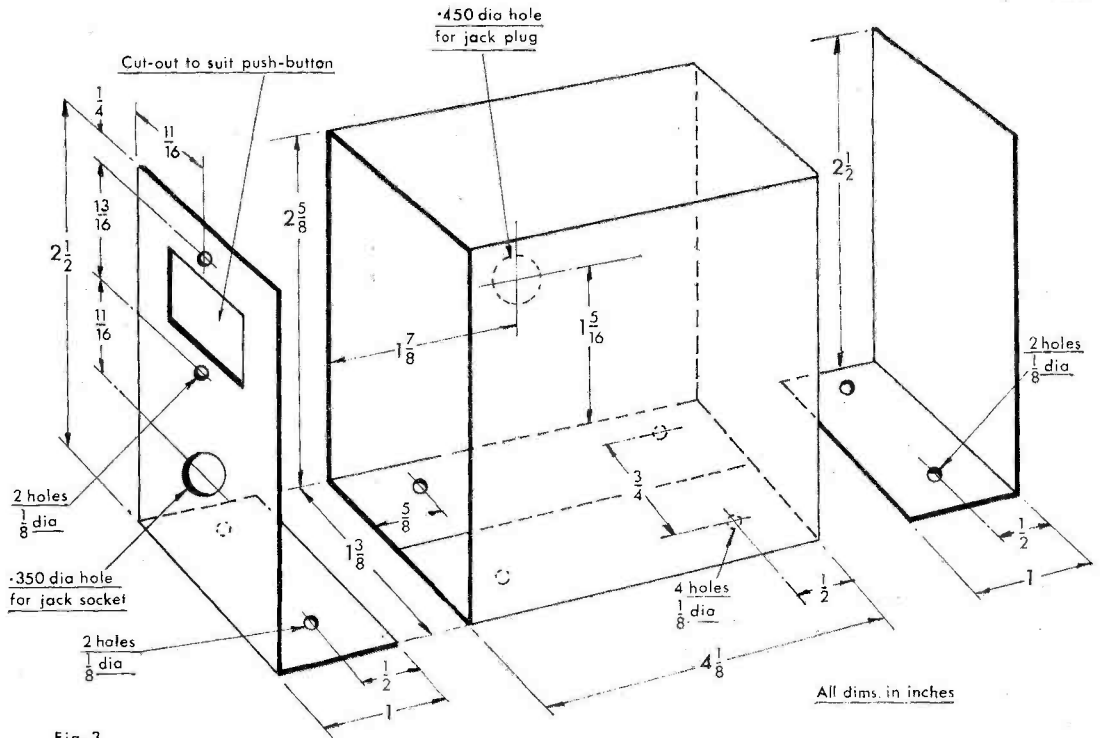
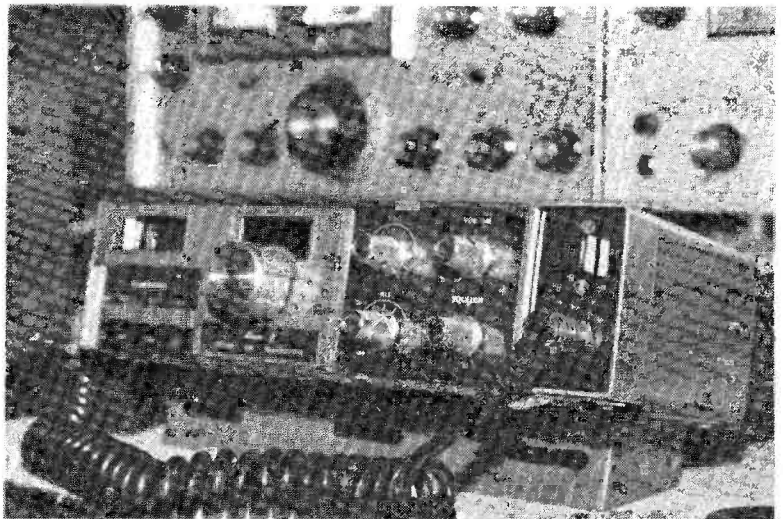


Fig. 3

Liner-2 with the matching Clipper Unit at right.



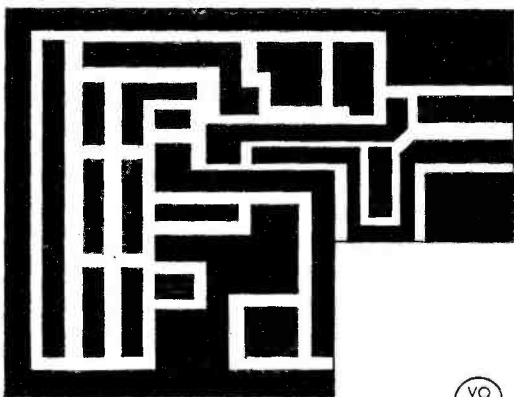
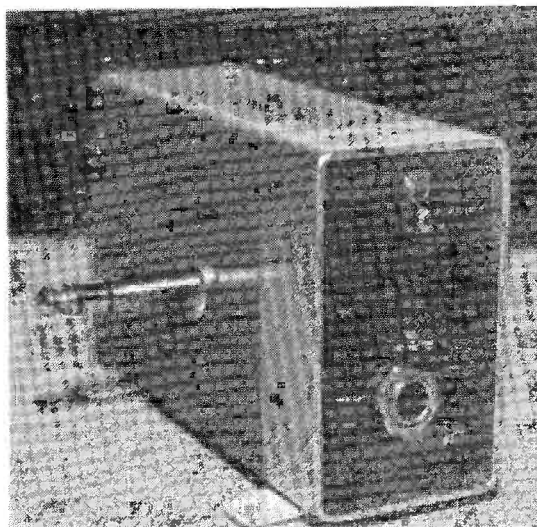
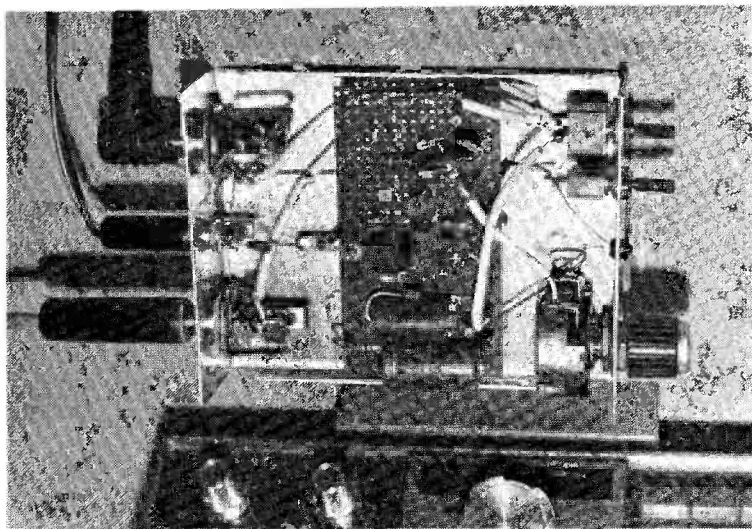


Fig. 2

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283***Suitable PCB Layout*****Finished appearance of the "Mk. III"  
Clipper Unit for the Liner-2.****Interior layout of one of the versions  
of the Clipper discussed in the text.**

fed to the input, as the optimum clipping level can be determined before the onset of distortion. However, in the final analysis it is reports over the air which matter and the clipping level control should be set from reports received from distant stations only. As a guide, with the component values given, maximum usable clipping consistent with speech clarity should be obtained with the

level control turned to about the three quarter position, with probably half-way proving to be the best one from reports received.

In conclusion, it can be stated that, providing some discretion is used to avoid overdriving, Liner-2 owners will find the relatively small amount of time and effort involved in building this little unit well worth while.

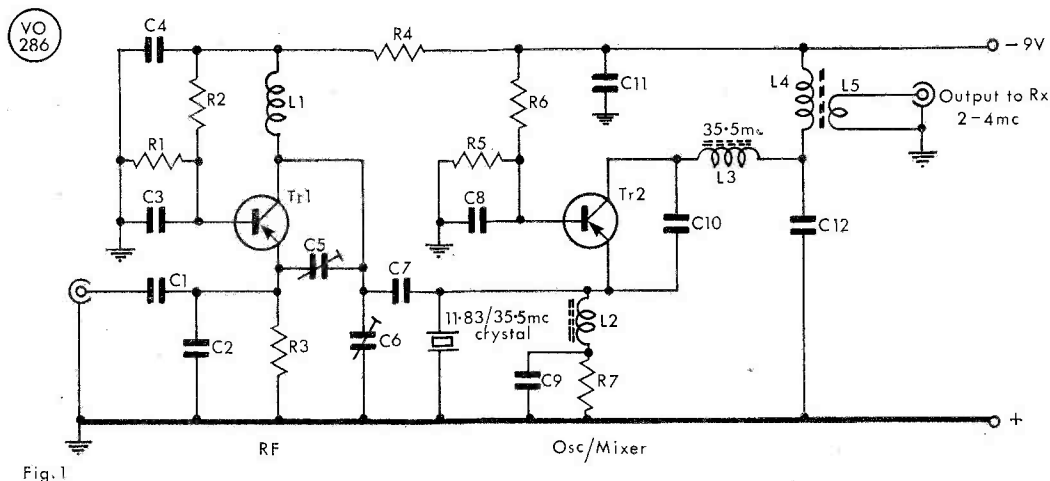


Fig. 1

Fig. 1. Circuit of the transistorised two-metre converter described in the accompanying article; all values are given in the table. There is sufficient fourth-harmonic in the oscillator to produce enough self-injection for satisfactory operation.

## TWO-METRE TRANSISTOR CONVERTER

### HIGH GAIN WITH TWO TRANSISTORS — CIRCUITRY AND CONSTRUCTION

THE present offering is a development of the idea of a fully transistorised VHF converter using a low intermediate frequency.

Referring now to Fig. 1, the full circuit of this converter, it will be seen to consist only of an RF stage, Tr1, grounded base, and a crystal controlled self-oscillating mixer, Tr2, also in grounded base configuration. The 11.834 crystal is oscillated in overtone at 35.5 MHz, feedback from collector to emitter being via 12  $\mu\text{F}$  capacitor C10, the coil L3 being resonant with the strays at this frequency. The IF transformer, L4, L5, almost untuned, covers 2.4 MHz and is in series with L3 and the collector; the junction between L3 and L4/5 is partially decoupled by C12. Oscillation could take place even without the crystal connected from emitter to ground, but in this position it does lock the frequency very successfully.

Transistors are not noted for their freedom from harmonics, especially when oscillated in this manner, and considerable 4th harmonic appears at 142 MHz, enabling the 144-146 MHz band signals to be tuned over 2.4 MHz on the main receiver after frequency changing.

#### The RF Stage

The RF stage has no input tuning, but its collector is tuned (L1, C6) and 5  $\mu\text{F}$  coupling to the emitter of the mixer is provided (C7). If one sorts out the manufacturers' data on these transistors it transpires that, whereas the input to a valve is capacitive, the input to

these transistors at this frequency is inductive, or negative capacitive! A simple series capacitor C1 from the aerial can therefore "tune" the transistor, matching being improved by C2, of 8  $\mu\text{F}$ , from emitter to ground, and C5 (twisted pair of wires) from emitter to collector.

The collector tuning is quite sharp when C5 is properly adjusted, though if made too large, oscillation can occur.

It must be obvious from the way the circuit is closely interwoven that the dependence of one transistor on the other one is very considerable and quite difficult "calculations" are involved if a satisfactory design is to result.

#### Performance

Of course, it is perfectly ridiculous to suggest that two transistors will do what five would do. From this circuit, a gain of around 15 dB may be expected with a consumption of 7½ mA at 9 volts, about equal current to

### Table of Values

Fig. 1. Two-metre Converter using Transistors

C1 = 15 $\mu\text{F}$	R1 = 1,500 ohms
C2 = 8 $\mu\text{F}$	R2 = 6,800 ohms
C3 = 500 $\mu\text{F}$	R3, R7 = 680 ohms
C4, C8, C9, C11 = .003 $\mu\text{F}$	R4 = 68 ohms
C5 = 1 $\mu\text{F}$ (see text)	R5 = 1,000 ohms
C6 = 2-10 $\mu\text{F}$	R6 = 10,000 ohms
C7 = 5 $\mu\text{F}$	TR1 = AF10 Mullard
C10 = 12 $\mu\text{F}$	TR2 = AF114 (OC171), Mullard
C12 = 180 $\mu\text{F}$ Z	Xtal = 11.834/35.5 MHz overtone type.

#### COIL DATA FOR TRANSISTOR CONVERTER

- L1 — 3 turns 16g. enam.,  $\frac{1}{16}$  in. diameter, slightly spaced.
  - L2 — 34 turns 30g. enam., close-wound on small dust core.
  - L3 — 12 turns 26g. enam., on  $\frac{1}{16}$  in. nylon former with dust slug, turns slightly spaced.
  - L4 — 50 turns 40g. enam., on piece of  $\frac{1}{16}$  in. aerial ferrite.
  - L5 — 15 turns 32g. enam., wound over cold end L4.
- (Note: Lugs of 22g. tinned copper should be bound to L4, L5 former before winding to make solder connections. These coils are low-Q to avoid self-oscillation).

Fig. 2. Circuit of a suggested IF stage for the transistorised converter—see text. Note the inverted form of the bias network, with the limiting resistor in the common base-collector feed; this results in the saving of one decoupling condenser.

each transistor.

If more gain is needed, an IF stage (Fig. 2) could be added, though then L5 at 15 turns might be increased to 20 turns, and a second L4-L5 wound to go after the IF stage.

While the transistorised two-metre converter described here represents a practical working design for VHF, there is no doubt that the circuits, will be considered primitive by some experts!

For instance, use of a 71 MHz crystal would have eased the situation somewhat, as would a UHF transistor, such as the RCA 2N1742, which has an *alpha* cut-off around the 70-centimetre band. A satisfactory 70 cm. converter could be produced using similar circuit design principles applied to the 2N1742. By that time the art of operating a transistor near its *alpha* cut-off will have been mastered and a certain amount of rule-of-thumb information will be available.

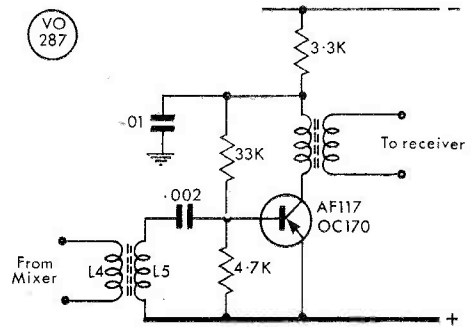


Fig. 2

Finally, it might be mentioned that a later version of the present design—using an untuned RF stage with 4  $\mu\text{F}$  injection from the collector of the oscillator-multiplier into the emitter of the mixer, instead of inductive injection—is giving even higher gain and efficiency than before.

## SIDEBAND/CW ADAPTOR FOR BC RECEIVERS

### RESOLVING AMATEUR SIGNALS ON A BROADCAST RX.

F. G. RAYER, A.I.E.R.E. (G3OGR)

IN the writer's experience of radio (over 40 years) he has known of many who started their own activities by hearing amateurs on 40, 80 or 160 metres with a domestic receiver. Numerous transistor receivers now tune "shipping" or bands including some amateur frequencies, but AM is little used and they will not resolve CW or SSB. The unit described here overcomes this. Whether made to keep in listening contact with a net while on holiday, or as a gift for a young SWL, its main advantage lies in the fact that it requires no modification or contact with main receiver circuits, and no setting up for the receiver IF. It avoids the bugbear of cheap transistor receivers fitted with a BFO for the IF—touchy tuning due to the wide coverage and poor type of drive usually provided.

The unit is a separate, stable oscillator working at signal frequency. It actually tunes about 1.75-2.0 MHz, with harmonics covering higher bands, and is calibrated for 160 and 80 metres, bandspreading these over most of the capacitor swing. Fig. 1 is the circuit. VC1 is a readily obtainable Jackson component with integral reduction drive and its value makes C1 necessary for bandspreading. If VC1 were 100  $\mu\text{F}$  C1 could be omitted. Transistors other than the 2N3704 will be found to work quite well.

### Construction

A die-cast box for rigidity is good, but not essential. L1 has fifty-two turns of 32g. enamelled wire, side by side on a 7/16in. diameter former with adjustable core. Slight changes in diameter will not upset coverage too much. A little *Bostik* or other adhesive will hold the turns in place.

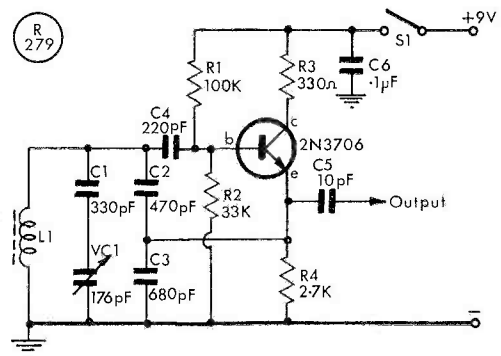
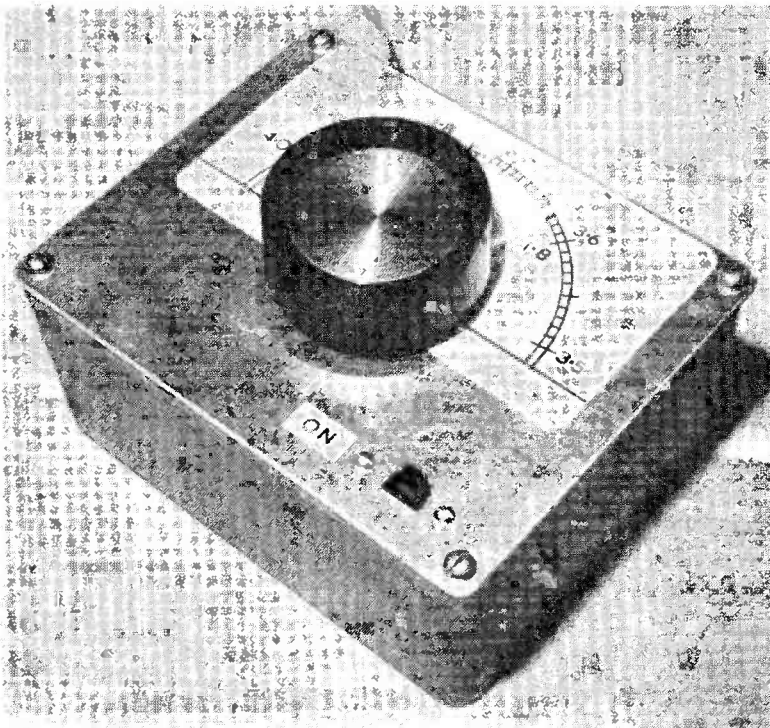


Fig. 1

The oscillator circuit.

### Table of Values

R1 = 100,000 ohm	C3 = 680 $\mu\text{F}$ silver mica
R2 = 33,000 ohm	C4 = 220 $\mu\text{F}$
R3 = 330 ohm	C5 = 10 $\mu\text{F}$
R4 = 2,700 ohm	C6 = 0.1 $\mu\text{F}$
L1 = 330 $\mu\text{F}$ silver mica	VC1 = 176-200 $\mu\text{F}$ , with slow-motion dial
C2 = 470 $\mu\text{F}$ silver mica	



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The Sideband/CW Adaptor as described has a calibrated scale and can be neatly constructed in a small diecast box.

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A bracket fixed by the capacitor carries the small perforated board. The pictures show a suitable placement of components, but this is not critical.

Solder about 12in. of thin flex to C5 and lead this out through a small hole in the box. Make a clip to hold the

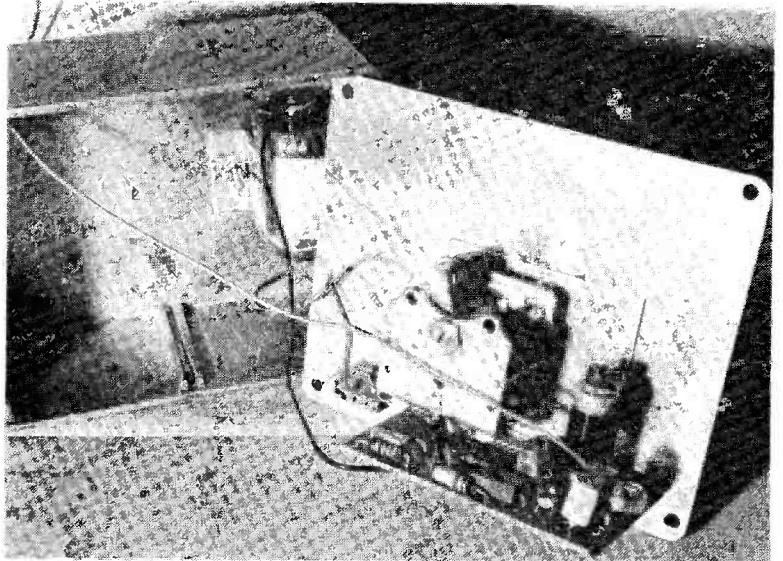
battery in position. A card scale is cemented to the box lid. A stout wire pointer can be soldered to VC1 spindle, or a transparent cursor can be made to fix with a bush and screw, or can take a small rubber grommet which is a tight fit on the spindle.

(over)

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Construction inside, showing the battery mounting.

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### Calibration and Use

Check with the station receiver for coverage, so that the coil core can be set for about 1.75-2.0 MHz with a little to spare each end of the scale. The core is cemented in place. Final calibration is with the oscillator in its box, and can be from the station receiver, preferably with a crystal marker, or by heterodyning the oscillator with the Tx VFO. Higher frequency bands are direct multiples or harmonics of the fundamental range.

Some adapters fail with all but weak SSB and CW because the BFO carrier injection is not strong enough at the detector. This is not so here because the carrier is amplified by the whole of the receiver. Place the lead from C5 near the receiver front-end, or near its external aerial (if fitted) or behind or under the set as found to be satisfactory. The amount of oscillator coupling into the receiver has to be reasonable, but is not critical. In one unit of similar type tested, R4 was a 2500 ohm pot. with C5 to the slider, thus giving adjustable output, but this was felt not justified.

When a CW or SSB signal has been tuned in with the main receiver, its adjustment can be left because critical tuning for best results is with the VFO, *e.g.*, it is the relationship between transmitter and VFO frequencies which matters when getting the CW pitch or SSB right.

The output lead can be cut down, and it is *not* wound round the end of a 132ft. aerial, unless you want to put a signal out! The aim is to provide coupling to the receiver. It will be found that the VFO can be used right through the 1.8, 3.5, 7.0 and 14.0 MHz bands, though if HF bands only were in view an oscillator based on 7 MHz would be better.

## CC BFO FOR SSB

### CRYSTAL OSCILLATORS FOR STABILITY

**A**LTHOUGH most SSB operators regularly use a standard communications receiver and the BFO technique for their reception of Sideband signals, it seems that many of them encounter the same disadvantage—namely, BFO drift, necessitating constant readjustment.

One way of getting round this problem is to use a crystal-controlled BFO, as shown in the circuit, made up as an additional screened unit. Although admittedly this is not a complete answer—for if the receiver's own local oscillator drifts it will still necessitate returning—it does help considerably by eliminating one source of drift.

The CC/BFO, as shown here, consists of two conventional crystal oscillators, one working on the lower sideband, and the other on the upper, the correct oscillator (or sideband) being selected by switching the twin-triode's cathode to ground.

### Crystal Selection

Obtaining crystals at the correct frequencies may be the main difficulty in making up this unit. The writer was lucky, but those having receivers with an "odd" IF channel may have trouble in getting crystals.

Mainly by trial-and-error, it was found that the crystals should be, *one*, 2 kHz above the IF; and, *two*, 2 kHz below it. That is to say, with a 455 kHz IF, the crystals would be 453 and 457 kHz. A slight tolerance either side of the correct frequency is permissible, although it is surprising how much difference a crystal a few *cycles* off frequency will make.

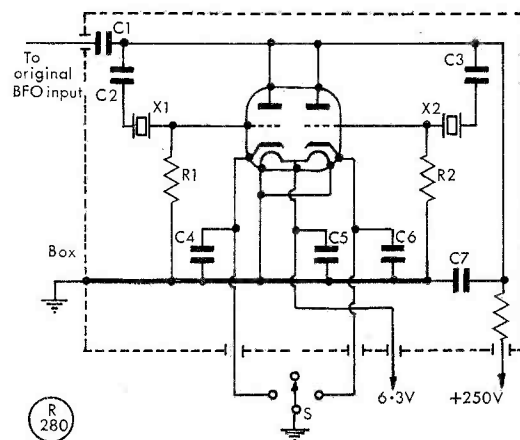
### Construction

Complete screening is essential, and the CC/BFO should be built into a small metal box, with all leads into the box decoupled at the point of entry. The output of the unit must be by screened cable to the feed point for the BFO already fitted in the receiver—this tunable BFO should, of course, be disconnected (but not discarded, as it will always have its uses for other receiving functions).

### Results

This writer has had the CC/BFO as described here in use for about six months and (as the receiver's own oscillator is pretty stable after a warm-up period) SSB signals can be tuned in easily and accurately, and no tuning readjustment is necessary for periods of half-an-hour and more.

Of course, the idea discussed here only goes part of the way towards obtaining better SSB reception. Much improved results would be given by a phasing-type adaptor and crystal-controlled front-end for the receiver—but for those not prepared to go to such lengths, the CC/BFO suggested here is well worth trying as a first step towards improved stability.



The USB/LSB fixed-tune BFO unit described in the article, to overcome BFO drift in SSB reception. Condensers C1-C7 are all .01  $\mu$ F; R1, R2 are 4.7  $\frac{1}{2}$ W.; R3 is 27K,  $\frac{1}{2}$ W.; the valve is a 12AT7, and X1, X2 are the crystals, respectively 2 kHz above and below the Rx IF channel. The appropriate sideband is selected by the switch.

# VHF BANDS

NORMAN FITCH, G3FPK

THE volume of mail this month is greater than usual, reflecting the recent E's and tropo. openings. It seems that most readers worked something new and the table scores have shot up accordingly.

## VHFCC Awards

Paul Lock, G8HTE (Probus, Cornwall) has earned VHFCC No. 262 for 2m. operation. He was licensed in 1974 and has used a Yaesu FT-220 with an additional two-stage, 20 dB gain preamplifier on "receive." The aerial is a *Parabeam* at 30ft. a.g.l., the site being 318ft. a.s.l. with a clear take-off over the water to the East and South. No. 263 for Two goes to Richard Haysom, G8HQN (Bristol) who started operations in January 1974. The equipment includes a *Telford* TC9 Tx and TC7 Rx into a *Hallcrafters* SX-110 tuning 28-30 MHz. A *Trio* TR-7010 is also used. Richard has a *Heath* HW-202 amplifier whilst the aerial is an 8-ele. Yagi at 25ft. a.g.l., the QTH being 200ft. a.s.l.

It is over four years since a VHFCC was awarded to an overseas reader so it is a pleasure to record that certificate No. 264 went to Vicente Torres, EA5IG, from Castellón de la Plana. The majority of the QSO's were with other EA5 stations and EA3's, but his list includes nine EA6's worked on AM and FM, plus FC2CU and some Italians.

## The Scottish Scene

Convalescing in Kintyre from a prolonged illness, Jock Wilson, GM6XI, has once more sent concise notes on Scottish activity. Edinburgh amateurs GM3ZVB, GM3ZVL and GM8CWH are all ex-members of the George Watson's Boys College Radio

Club and have now graduated from the Heriot Watt University with Honours Degrees in Electronics and Electrical Engineering.

Generally, the VHF bands are very quiet in Kintyre but activity leapt up upon the arrival of GM3RFA/P and GM8AOB. The latter, whilst mobile in Islay, was RS59 from a hand-held SSB rig and whip. When conditions are good in southern Kintyre, the GB3MP repeater comes in at good strength and can be accessed. It is anticipated that the GB3CS repeater could be operational in late August or early September. The signals from GB3MP in southwest Scotland are likely to be strong enough to interfere with GB3CS. No FM stations could be heard from southern Kintyre and only two were worked from the northeast end of the peninsula.

An 80m. QSO with GM3BQA revealed that the GM's in the east were experiencing fine openings on 2m. and 70 cm. GM3ZBE (Aberdeen) has worked 150 stations on 70 cm. and GM3BQA (North Berwick) fifty! The OZ, 70 cm. beacon was very strong at Jim's QTH. GM8BJF (Edinburgh) has "tasted his first blood" of 70 cm. Euro-DX and likes it, but in Kintyre nothing was heard. Many favourably placed GM's have been working through the Scandinavian repeaters. GM5VG's son, GM3PNB, says that Bill is active again after recovering from a recent eye operation and that, despite his recent disposal of gear, GM3EOJ "is still with us" multimode on Two.

Robert Dixon, GM3ZDH (Wick), also writes about the fine VHF/UHF conditions both on the amateur and marine VHF bands. GM3ZDH had to work over most of the VHF NFD weekend but did manage to raise his first continentals in the shape of OZ9HBO, OZ10F and LA5UG, with the beam fixed south! Local portables were working strings of PA's and some ON's, GM8DQK/P, using just an IC-202 and 8-ele. beam. 'DQK has an FM rig too whilst GM3SFH is expected on two metres soon with AM.

## Contests

Results have been received of the Verulam Club two-metre contest on

## QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G8FUF	1	72	159	232
G3COJ	10	45	54	109
G4DGU	1	35	65	101
G2AXI	1	33	44	78
G8GML	—	24	70	94
G4BWG	—	22	106	128
G3BW	—	21	47	68
GD2HDZ	6	19	41	66
GM4CXP	—	18	102	120
G3FIJ	—	18	39	57
G8IFT	5	15	34	54
G4AEZ	—	15	44	59
G8GII	—	11	62	73
GC8AAZ	—	9	53	62
G8BKR	1	6	73	80
G8ITS	—	1	39	40
G8JAH	—	1	35	36
G3POI	—	—	137	137
G3CHN	—	—	118	118
G3FPK	—	—	116	116
G4CDF	—	—	109	109
G8HVY	—	—	86	86
G4BAH	—	—	85	85
9H1CD	—	—	82	82
G6UW	—	—	80	80
G8HHI	—	—	69	69
G4DKX	2	—	61	63
G4CIK	—	—	61	61
G8KLN	—	—	59	59
G8KSP	—	—	58	58
G8KKX	—	—	55	55
OZ9IY	—	—	53	53
GD3YEO	—	—	52	52
G8JJR	—	—	52	52
G8HLT	—	—	48	48
GW8HVP	—	—	48	48
G8HAF	—	—	45	45
G4EYL	—	—	41	41
G8JEF/A	—	—	38	38
G8JEF	—	—	25	25
G8JAJ	—	—	23	23
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" is 70 Centimetres.

November 23 last. G3YLG (Hemel Hempstead) was the winner with 3030 points from 92 QSO's with 31 counties. G8DKK (Henley-on-Thames) was second with 2607 pts. and G4BWG third with 2072 pts.

Winner of the Fixed section of the 1-3 GHz Open on April 24/25 was G3JXN (London) with 827 pts. from 20 contacts, whilst the accolade for the Portable section went to G3WDG/P with 21 QSO's worth 2093 pts. Forthcoming events are the 4m. Portable Contest over August 7/8 (1900-2300 & 0700-1500 GMT) and the 2m. Open Contest at the September 4/5 weekend.

There has been insufficient time for any detailed reports from participants in VHF NFD but it would seem that stations on the eastern side of the country did better than those further west. The Hull boys are claiming 22,215 pts. divided roughly into 2,000 on 4m., 8,000 on 2m., 6,000 on 70 cm. and 6,000 on 23 cm. Their spokesman G8IWA says, "... conditions were superb with good lifts prevailing to the continent all the time."

### Satellite News

AMSAT reports that the June 16-18 low power tests on *Oscar 7*, mode B were a great success. W6BG records 45 stations worked using just 500 *milliwatts* to a dipole, whilst Pat Gowan, operating as GD3IOR, managed 65 QSO's with 5 watts of CW and 10 watts p.e.p. on SSB. TU2EF lists a number of G and GI stations worked on QRP. DX stations active on the satellites include ZD8RD, ZS2AB, 9J2PH and 9X5SP. GW8BR should be on very soon and WINU will be in VP9 in September. I5TDJ's trip to HVICN has been put back to October but he planned to be on from IS from August 2/3. The Surrey Telecommand station at Guildford is now operational with automatic tracking of the 4½ tons ex-Admiralty AZ-EL dish mounted aerial.

Once again *Oscar 6* has "caught up" *Oscar 7* and they will cross the Equator together on August 9. This means that it will be possible to access 0-7 in mode B, signals being picked up by 0-6 and relayed down on the appropriate days around this date. Readers interested in Satellite

communication are reminded that the UK-AMSAT VHF net is held on 144-280 MHz each Sunday evening from 7.30 p.m. local time on SSB with G8CSI (Surrey) in the driving seat. As well as orbit predictions for the coming week, the latest DX news is given plus details of any special experiments. All are welcomed to join in whether or not they are members of AMSAT.

### DX-Peditions

G3SCP/LX/P should have been worked by the time this issue appears. Gregg Gilman was testing out the complete portable station from Luton on July 11 and it sounded fine. From August 27 to September 13, GM3YOR and GM3OLK are considering a portable expedition to GI to activate all six counties. At least two full days would be spent in each with 2m. and 4m. operation every other night. QRG's proposed are 70-17 MHz CW/SSB and 144-275 MHz CW/SSB plus, possibly, S20-S24 FM. Requests for skeds to: GM3YOR, *QTHR*.

Those who missed the G4DMY/P operation from the Scilly Islands earlier this year will be pleased to learn that G3NYY/P plans to be QRV on SSB during September 3-6 to give us a crack at WJ square again. Walt is an experienced portable operator and many readers will have contacted him -/P from the Isle of Wight recently. Operation each evening 1700-2100Z 144-27 MHz SSB and 144-10 MHz CW using a *Liner 2* and 8-*ele*. Yagi. Skeds via GM3NYY (*QTHR*).

### Beacons

The Dunstable Downs 23 cm. beacon, GB3DD, is back on 1296-05 MHz on low power on a 190ft. mast. To date, the new low-loss coax has not been fitted. As we go to press, the Sutton Coldfield beacon, GB3SC, is off the air for maintenance and should be back soon, presumably on its newly allocated QRG of 432-89 MHz.

### Twenty-Three Centimetres

Your previous conductor, Mike Dormer, G3DAH (Herne Bay) has increased his all-time score on this band to 28 counties and eight countries, taking advantage of the recent fine conditions. In addition to strings of DL, ON and PA stations, he worked SM6ESG

(GR72h), OZ1US/P and OZ5ESB/P (both EP14c), plus GC3EGV/P in Alderney. Also on 28 counties now is G3JXN (London), plus five countries. If some of the other participants in the all-time table would like to send in their latest scores, the list can be published next month.

G4DGU (Abingdon) ran the Reading Club's 23 cm. station in NFD and had 42 contacts in 5 countries. The gear ran 6 watts output on CW/SSB to a pair of loop Yagis with the BRF91 preamp/filter/converter at the feed point with the aerial p-i-n switch. Chris is QRV with the same basic equipment from home but with the preamp, etc. indoors. The aerial system is due for a major overhaul. G8FUF (Benfleet) is busy with a 23 cm. SSB transmit mixer, "... which is causing no end of headaches ..." It seems we can soon expect some square chasing from Keith on this band. G8IFT (Birmingham) using 3-4 watts of NBFM worked PAØVV (CM72d) on July 2 at 2200Z and ON6DH (CL51h) at 0618Z on the 3rd.

G2AXI (Basingstoke) is now on the band trying to perfect the aerial changeover system. G4BYV (Norfolk) added SM6ESG for a new country for a total of nine and worked another 20 more stations, "... all locals, like OZ, etc.!" John's 23 cm. SSB is all home built. A "DJ9ZR," 144 MHz SSB source mixed with 1152 MHz from the 13 cm. rig. Mixer and PA are 2C39A's, the output being 20 watts. The receive converter employs a BFR90 preamp. into a "DL3WR" design, whilst the aerial is a 4ft. dish with dipole feed at 70ft. To date 73 different stations have been booked in. G4BYV has worked PAØVTW on 13 cm. getting 5 & 8, and says that G3LQR raised OZ9OR on 13 cm. which must be a first?

### Seventy Centimetres

Activity from G3BW (Cumbria) was somewhat curtailed due to holidays but Bill worked his 9th country in the shape of EI6AS/P with a little help from GW3NMF and others. For G3DAH, the best DX was GC4FAM/P on Sark, GM3JFG/P and GM8AGU/P during their Scottish tour, SK6AB, SM6's



ESG, FYJ and GWA, LA3EQ, LA8OJ and lots of ON, PA and DL stations. G3XCS is now on the band from Cornwall with SSB and would welcome skeds (QTHR) G4DGU was a little disappointed in that only weak D, OZ, PA and SM6 signals had been heard. Only the night before NFD was Chris able to work any DX, including an OZ running 6 watts to a dipole! There are plans afoot for a 22-ele. long Yagi for 70 cm. MS experiments. G8HBQ (Leeds) caught the G8AGU/GM3JFG team in seven counties/regions and Paul writes, "70 cm. has been the best I have heard to date."

On July 2 and 3, G8IFT's 10 watts of SSB to the 18-ele. *Parabeam* brought Gordon five PA's and an ON in BL, CL and CM squares. John Locke, G8LOC (Solihull) is mobile with a U10B *Cambridge* on 433.2 MHz and says that activity is rare at present in the Birmingham area. He wonders who the portable station was in the Chilterns, heard on May 20 between 6.30 and 8.30 p.m.? GC8AAZ (Jersey) has his rotatable and tilttable 12XY 70 cm. array ready to go up. He, GC8EZA and GC8GDX now have *Pye* U450L's, soon to have video modulators provided.

GD2HDZ (Laxey) has heard the Midlands lads working Continental DX which has been inaudible with him. From across the water, G18EWM has had contacts with G3BW, GD2HDZ, G18HXY, GM4CXP, GW3NNF and GW4DRR, plus the G/GM8AGU/P on all but two nights. The Emley Moor beacon has been received well and Steven is also QRV on *Oscar 7*, mode B. The rig is a TS-510 into a *Modular Electronics* transverter with a 46-ele. *Multibeam* at 50ft.

From north of the Border, GM4CXP is another who has heard nearby stations giving and getting good reports to the Continentals which were barely audible in Maxton. Nevertheless, Derrick *did* work LA, OZ and SM, plus G, GI and GM. He reckons backscatter to be commonplace on 70 cm. For example, on July 3 he was copying G's at RS 21-41 working OZ's and signals were peaking to the east, whilst PA and DL stations beaming to the U.K. were peaking

## THREE BAND ANNUAL VHF TABLE

January to December 1976

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3BW	52	7	55	14	34	6	168
G5DF	43	5	63	13	30	9	163
G2AXI	40	6	50	13	35	8	152
G3FIJ	36	5	48	11	30	8	138
G4BWG	27	3	63	18	18	5	134
GM4CXP	15	4	70	19	18	7	133
G8HBQ	—	—	67	11	41	8	127
G3BOC	36	6	57	13	—	—	112
G3XCS	28	5	45	16	11	5	110
G8GML	—	—	53	13	26	8	100
G3FPK	—	—	71	21	—	—	92
G8BKR	—	—	64	12	6	2	84
G4AEZ	17	2	40	9	13	1	82
GD3YE0	6	5	55	13	—	—	79
G8GII	—	—	45	11	16	6	78
G4BYP	20	6	43	6	—	—	75
GD2HDZ	11	3	21	5	30	4	74
G8HHI	—	—	54	13	—	—	67
G8KLN	—	—	52	13	—	—	65
G8KKX	—	—	45	13	—	—	58
G4CZP	—	—	51	7	—	—	58
G8ITS	—	—	46	11	—	—	57
G8KSP	—	—	43	10	—	—	53
G4DKX	14	2	23	11	—	—	50
GC8AAZ	—	—	25	9	10	5	49
G8HAF	—	—	42	4	—	—	46
G8IFT	—	—	20	5	12	4	41
G8GLS	—	—	18	4	—	—	22
G8LGZ	—	—	9	3	2	1	15

to the northeast. On July 4, SK6AB had his beam heading on GM and was called by DC1XC, but when they turned their beam south, they lost each other!

## Two Metres

Although there has been some excellent propagation on tropo. in the last few weeks, undoubtedly the *E*'s sessions have taken pride of place. As reported last month, the first 2m. QSO between Malta and the British Isles was achieved by GC8AAZ and 9H1CD on June 6. Since then, 9H1CD has worked 94 F, 60 G, 8 GW, 34 PA, 13 ON,

18 DJ, one SM and one OZ for a total of 230 contacts! Henry was in on six *E*'s openings on June 23, 25, 28, two on the 29th and the 30th. Four of them lasted between 107 and 120 minutes, the one on the 28th 10 minutes, the last one 50 minutes. The following are "First's": GC8AAZ, GW4CXM, ONSUN, G3CHN and PA0GNK. 9H1CD's QTH score is now 82 squares, the County score 19, out of which 16 were firsts. There were very short *E*'s openings on July 1 and 2 also, which yielded G2AKQ and another four F's. Best DX for Henry is

G4CJG (ZO22g) at 2283 km. but 9H1BT (HV03f) has worked GD3YEO (XO68e) the QRB being about 2500 km. 9H1BT runs a Braun SE400, also a TS-515 plus home-built transverter and 2 x 11-ele. Yagis. Henry has a similar set up but uses 4 x 11-ele. Yagis. Other 9H1's use either TS-700 or FT-221 transceivers and include 9H1B, 'C, 'D, 'DY and 'EU.

The first U.K. station heard and called by 9H1CD was G4BAH (London) shortly before the QSO with GW4CXM. Bob got Henry's call but then he just disappeared. On behalf of all readers, we say, "Thanks, Henry, for your dedicated efforts—and *Viva E's!*"

G2AXI worked LZ1BW (LC27e) on June 28, the following day yielding 9H1CD on SSB. Father-and-son team G2AXQ and G8GIN managed 9H1C (HV03e) on June 25 using 6 watts p.e.p. to an HB9CV aerial just 2ft. above their caravan roof from a site at Great Yarmouth, providing that QRO and big aerials are not essential for *E's* success. G3BOC (Shrewsbury) netted IT9BXX (GY67d) and 9H1BT (HV03f) plus IT9GYR on the morning of the 29th, his first *E's* for 12 years. G3XCS (Cornwall), in the space of six minutes around 1900z on the 28th, raised YU1NPW (KE13j), YU1EXY and YU1BKL (KE13j). The following morning brought QSO's with I8GJA (HA22d) and IT9PLT (HX77h) and the evening of the 30th, EA5IO (ZX36b)—all that on SSB. G4CJG (Co. Durham) after no success on the 25th and 28th, even though B and II FM was full of strong Italian stations, did hook IT9TAI (GY66c) with just 2 watts and the beam due south on the 30th; a subsequent QSO with 9H1CD is thought to be the DX record from G via *E's* at just under 2500 km. Any challengers? G8GXA (Herts.) worked IT9ZHA on FM plus some others and advises that IT9BXX only QSL's direct. Reg says there was not so much *E's* from Sicily as there was from Malta.

G8HHI (Yateley) landed OE3UP (HI70j) and LZ1AB (LC27d) and heard OE, YU and I. G8HTE (Cornwall) worked IT9TAI and IT9PLT on the 23rd and very unselfishly dashed out to telephone G3CHN about the opening, enabling

Roger to achieve the first G-to-9H 2m. QSO. How's that for the Ham Spirit? On subsequent days Paul worked OE3UP, 9H1BT, 9H1CD and EA5IO. The 29th brought 9H1's 'B, 'BT and 'CD, plus IT9TAI to G8KLN (W. Sussex) and G8JDX/P on Dartmoor, on the evening of the 29th, got IT9PLT, IT9JLU (HX56j) and IT9TDN (HY68b) in three minutes! G8LHT (Doncaster) was pleased with his 2309 km. QSO with 9H1CD the morning of the 29th using just a *Liner-2* and 4-ele. Quad. From the Isle of Man, GD3YEO made the first 2m. contact with Malta, 9H1BT, QRB 2500 km. and also worked YU1BKL. GM4CXP reports EA40K (Madrid) at S9-plus-30 dB the evening of June 30, but Derrick could not raise him, Spanish beacon EA3URE (BB13f) was heard twice with "snatches" from HA, I and YU. From Wales, GW3XJQ got OE3UP on the 28th from Dyfed whilst GW4CXM has the satisfaction of being the first GW station to work Malta on 2m. For the record, June 23, 1728z with 9H1CD, QRB 2227 km. Ray worked YU3BDE on the 29th whilst the 30th yielded I8GJA, I0DLP (GB03f) and EA40K. GW4EA1 (Gwent) was monitoring 145.0 MHz with the beam *east* when up came EA4IZ who was worked at 1910z on the 30th. Your scribe managed IT9, 9H1 and LZ and heard YO2IS, HG1SW and HG7CY plus most of the other stations mentioned above, except the OE. IS0PUD was worked on CW by G3SEK, GW4BXE and GW4CQT, and GC8HEF is rumoured to have heard a CT1.

All this has rather over shadowed some fine tropo. openings. G4CJG says that the DX took a long time to reach Durham but by July 1, PA and DL were workable. During NFD, there was much coast-to-coast ducting evident and a lot of LA, OZ and SM stations were worked. G8BKR (Bristol) collected some more counties and squares thanks to the two Scottish expeditions, plus G13SXG (Down). G8HTE near Truro, added EA1CR in XD square, the Spaniard using 4 watts of AM to a 9-ele. Yagi. Paul worked GI and GM8A0B/M, the latter using an *IC-202* with its quarter wave whip. G8JAH (Northants.) with FM to

work the DX, so far has 10 countries and 35 squares to his credit. Kerry would like to see much more FM operation off the "S" channels and we certainly endorse this idea. His best DX to date is Bergen in Norway at 950 km. G4CXL (Weybridge) also worked EA1CR at 0115-0140z in mid-June on 144-553 MHz, in XD32d, giving Ray his first EA and Country No. 30 on the band.

G8LGZ (Derbys.) has recently acquired a *TS-700G* and is beginning to work a bit of DX using just an indoor ground plane. (When sending in claims for the tables, it is sufficient to list the call/county/country claimed; no need for dates, times, etc.) G8IFT (Birmingham) has worked lots of PA's, some DL's and SM7WT with 60 watts of NBFM. "Almost total frustration just about sums up activities here in June . . ." is how GD2HDZ starts off, due to Arthur's missing out on all the *E's*. Nevertheless, the score in the table has gone up well (and sorry for the "aircraft type" call sign OM in the July list!)

GD3YEO (Douglas) reports a nice lift to the south and southwest on June 8 whilst a CW night, portable as GD3FLH/P on the 14/15th, coincided with duct into PA, DL and ON. GM4CXP says he is thinking of QSY-ing to 20m. to avoid the QRM! In the period June 29 to July 7, Derrick worked all U.K. except GC, plus DL, F, LA, ON, OZ, PA and SM. But the prize getaway was OY5NS copied at RS 31. EA1KC (XD32d) was raised twice on June 11 by GW4CXM, the EA on CW, Ray on SSB.

At G3FPK, the two Scottish trips gave new regions and squares and many were pleased that the G6UW lads activated the rare ZR square in Grampian region. The *E's* and tropo. brought 16 countries and some new squares, including CU, thanks to LA6CU and LA6LU in the first week of July. Those seeking county Cleveland should listen for G8FTZ from Billingham who was kind enough to call your scribe to give him his penultimate, mainland, 1976 county, on June 30.

#### Four Metres

NFD brought in a nice crop of counties for G2AXI including GC3VPF/P (Alderney), G13KVD/P

(Antrim) and GM4BYF/P (Strathclyde). G3BW (Cumbria) spent most of NFD weekend on the band and was pleasantly surprised to hear so much activity. Bill worked Cornwall, the Isle of Wight, Guernsey and Alderney and has done exceptionally well on the band this year so far. During NFD, G4CJG/P worked 99 stations and comments that conditions were "fairly good." GD3YEO has modified a low-band Pye *Ranger* to a 4m. transverter. Richard says that the mods. were "ridiculously simple". This set up, plus a QV06-40A PA, were used in the recent Region 1

contest, when 22 stations were worked—best DX G3AUS (Devon).

### Final Round Up

So much news this month that several items have had to be cut. Perhaps if things return to normal for a few weeks, we will be able to catch up! To clarify some points about the tables: In the Three-Band Annual, you may include Irish Republic *counties* in your scores. Some do, some do not, it seems, at present. The island of Islay is *not* a county, just part of Strathclyde region. About the status of

WG1JFK, it is illogical that this could be given country status even though the little bit of ground at Runnymede is American territory. So are all the foreign embassies here and abroad and they merely count as stations in the host countries.

### Deadlines

Contributions for the September issue by August 6, and for the October edition, September 3 to:—"VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. 73 de G3FPK.

## NEW QTH'S

This space is for the publication of the addresses of holders of new call signs, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code. In the case of direct subscribers needing Change of Address, please state for card index adjustment. Address items for this space to: "New QTH Page," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

G4CZE/A, A Mercer, 15 Princes Avenue, Droitwich, Worcestershire, WR9 7DE.  
 G4EOJ, T. K. Ilott (ex-G8KPC), 69 Upperfield Drive, Felixstowe, Suffolk, IP11 9LT.  
 G4ESI, S. T. McClean, 13 Maple Road, Ballymagorry, Strabane, Co. Tyrone, N.I.  
 GW4ESL, P. J. Edwards, 14 Northfield Close, Lodge Farm Estate, Caerleon, Newport, Gwent, NP6 1EZ.  
 G4EXM, G. Cullum, 37 Coniston Crescent, Humberston, Grimsby, South Humberside, DN36 4AY.  
 G4EZF, W. D. Logan, 27 Shaw Street, Mottram, Hyde, Cheshire, SK14 6LE.  
 G4EZI (Mrs.) D. Hughes, 3 Primley Park Crescent, Leeds, LS17 7HY, West Yorkshire.  
 G4FBK, M. A. Kipp (ex-G8HOW), 43 Southdown Crescent, South Harrow, Middlesex. (Tel. 01-864 1412.)  
 G4FCA, J. A. Haddon, Morley House, Munstone, Hereford (2686).  
 G4FCL, P. Lawson (ex-G8ING), 46 Gerard Street, Derby, DE1 1PA.  
 G4FCN, C. J. Coker (ex-G8GCS), 2 Causeway Cottages, East Street, Ipplepen, Newton Abbot, Devon. (Tel. 0803 812117.)  
 G4FCT, J. N. Gunn, 8 College Gardens, Hornsea, North Humberside, HU18 1EF.  
 G4FCU, R. F. Restall, 418 Newport Road, Middlesbrough, Cleveland, TS5 4BT. (Tel. 0642 40883.)  
 G4FDE, V. Cunningham (ex-G8KCE), 8 Vine Close, Eastfield, Peterborough, Cambs., PE1 5LS.  
 G4FDG, R. G. W. Taylor, Courtland, Dulford, Cullompton, Devon, EX15 2EQ.  
 G4FDL, M. France (ex-G8JYB), 106 Harvey Lane, Golborne, Warrington, Cheshire, WA3 3QL. (Tel. 0942 75904.)  
 G4FDN, P. G. McGuinness (ex-G8FDN, EI2VGI), 27 Fellowes Road, Carshalton, Surrey, SM5 2SX. (Tel. 01-669 7210.)

GM4FDU, R. McKinlay (ex-GM8IQR), 36 Grogston Terrace, Edinburgh, EH10 7AE.  
 GM4FFG, F. R. Hailstones, 13 Mercury Terrace, St. Cyrus, Kincardineshire, DD10 0AY.  
 G4FFH, P. Cook (ex-G8KNK), 21 Maree Close, Sinfyn, Derby, DE2 9LL.  
 GM4FFP, I. D. Campbell (ex-GM8KJY), 35 Radernie Place, St. Andrews (4688), Fife, KY16 8QR.  
 G5BQR, K. S. Amos (W8BYRF), 1 Byron Close, Upper Caldecote, Nr. Biggleswade, Beds.  
 G8KLT, P. Valteris, 1 Grove Cottage, Mill Lane, Chetnole, Nr. Sherborne, Dorset, DT9 6PB.  
 G8KWX, P. D. Harrison, 2 Penryn Avenue, Brooklands, Sale, Cheshire.  
 GM8LLY, W. J. Muir, 53 Deantown Avenue, Whitecraig, Musselburgh, East Lothian, EH21 8NX. (Tel. 031-665 2592.)  
 G8LOC, J. G. F. Locke, 64 Braemar Road, Olton, Solihull, West Midlands, B92 8BS.  
 G8LRN, J. Dougherty, 49 Thomas Street, Ryhope, Sunderland, Tyne & Wear.  
 G8LST, S. A. Thompson, 5 Wigton Way, Harold Hill, Romford, Essex, RM3 9HA. (Tel. Ingrebourne 41935.)

### CHANGES OF ADDRESS

GM2FLQ, W. D. Oliphant, 11 Bridge of Westfield, Thurso, Caithness, KW14 7QN.  
 G3WS, F. S. A. Jenkins (VK2BFJ), 90 Wyong Road, Killarney Vale, New South Wales, 2262, Australia.  
 GW3CBA, J. Kellaway, 50 Winston Road, Barry, Glam.  
 G3FRM, M. Page, 26 First Street, Pont Bungalows, Leadgate, Consett, Co. Durham.  
 G13GGY, J. A. Porter, Hollybush, 237 Culmore Road, Derry (1973), N.I.

G3HDJ, L. J. Smith, 118 Charnwood Avenue Westone, Northampton, NN3 3DY.  
 G3III, G. P. Lovelock, The Shambles, Whatcote, Warwickshire, CV36 5EE. (Tel. Tysoe 543.)  
 G3JRW, R. W. Semple, 1 North Road, Belfast, BT5 5NE, N.I.  
 G3OGO, J. M. Nisbet, Bank Cottage, Waverley Village, Nr. Kidderminster, Worcs., DY11 5XA.  
 G3RKZ, B. R. Tibbert, 16 Nicola Gardens, Littleover, Derby.  
 G3RKZ/A, B. R. Tibbert, 11 Darwin Road, Mickleover, Derby.  
 G3SIW, T. V. Cowell, 10 Mosedale Road, Liverpool Lanes, L9 3BX.  
 G3TIS, J. A. Clarke, Yeomans Cottage, The Street, Brook, Ashford, Kent.  
 G3UFU, J. L. Barry, 13 Mill Rise, Bourton, Dorset.  
 G3VLQ, M. A. Tindal, Flat 6, 28 Granville Road, Reading, Berks.  
 G3XLY, D. Barry, 13 Mill Rise, Bourton, Dorset.  
 G3XLZ, J. J. Tozer, 9 Bainbridge Court, Colebrook, Plympton, Plymouth, Devon.  
 G3ZII, M. Rathbone, 36 Portland Street, Southport, Merseyside.  
 G4ATM, F. L. Coldwell, L.D.S., R.C.S., 120 Highcross Road, Poulton-le-Fylde, Lancs., FY6 8BX.  
 G4BZF, Sqn. Ldr. M. B. Reed, RAF, 12 Larch Road, North Colerne, Nr. Chippenham, Wilts.  
 G4CZJ, J. B. Jenkins (VP1BJ, DA2YJ, VS9ABJ), 18 Valley Road, Blandford Camp, Blandford Forum, Dorset.  
 G4DCK, M. R. Holliday, Tosca, 11 Cedar Drive, Loddon, Norwich, Norfolk, NR14 6LE.  
 G4ERW, D. G. Lurcock, 1 Copse Bank, Childsbridge Lane, Seal, Sevenoaks (61677), Kent, TN15 0DE.  
 G8ABU, M. C. Davidson, 31 Hartshill Close, Hillingdon, Middlesex, UB10 9LH.  
 G8BSK, P. G. Robins, 290 Priors Road, St. Denys, Southampton, Hants. (Tel. 556274.)  
 G8GDD, F. Moss, 7 The Paddocks, Worksop Road, Aston, Nr. Sheffield, South Yorkshire. (Tel. 0742 872187.)  
 G8HXF, K. Haywood, 191 Somerton Road, Brighton, Bolton, Greater Manchester.  
 G8LMO, H. G. Moody, 59 Helmont Road, Sheffield, South Yorkshire, S8 8QJ. (Tel. 0742 54047.) Correction.

## THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for September issue: August 4)

NO doubt many groups have noted falling attendances over the past few weeks, and there may possibly have been the odd Club worrying about it—but it is as well to be reminded that rise and fall in the attendance register seasonally is quite normal in the absence of a "star attraction," which may well cause a lot of chaps to "slip the collar" despite wifely urgings to the contrary. In the absence of these, the routine is almost like the annual cycle on the HF bands, with Spring and Autumn the best times, midsummer and midwinter the poorest for attendance—and therefore, the best times to get that "extra-special" activity on to the calendar! It is so easy, having missed a couple of meetings on the trot, to get out of the old habit and before the Secretary can say *Hi*, a member has been lost to the Club unless someone is deputed to get the truant back into the fold.

At the time of writing, one could not blame anyone for missing a date; the tropical heat, which has made workplaces into purgatories, and shacks uninhabitable, has caused many of us to lose hours of precious beauty-sleep on hot nights, and been very strong factors in the minds of those who have not turned up.

However, enough about weather and attendance! Let us instead look forward and see what is offered us for August.

### Scotland & North

Nice to hear again from West of Scotland, and a new Secretary appears after the AGM—see Panel. He makes the very valid point that they welcome SWL's, and, more, SWL's can and *do* play an active part in the running of the Club. Find them at 22 Robertson Street, Glasgow G2 8DU, on any Friday evening from 7.30 p.m.

At York there has been much of a special-event station nature of late, but the Friday evening sessions are still enjoyed each week (except, be it noted, the *third* Friday), and visitors welcomed; G3WVO reckons they add a tremendous lot to Club life, which is based on Hq. at the British Legion Club, 61 Micklegate, York.

For Scarborough who normally foregather at the local Technical College, there is a problem for July-end through to mid-September; but a later letter indicates they have found a Friday-evening spot at the Salad Bowl Cafe, Queen Street, near Boyes Stores, from 7.30 to 9.30, on Friday evenings while the College is closed.

Over to White Rose, who have "their own place" for Hq. rather than a hired room, so that they can knock down walls and hang things up as part of the activity; thus they now have a lecture room, lounge, canteen/workshop, and shack to enjoy every Wednesday evening at 83 Town Street, Armley, Leeds 12, not to mention the string of talks and lectures which are "in the pipeline." One is amused by the statement that the equipment fund is now "of useable proportions," which brings to your scribe a thought of a White Rose pantechicon full of pint pots each laden with silver and copper coinage

collected each week, and the dismay on the face of a seller faced with counting it all!

### Midlands

We have now to leave the Ridings and Caledonia for an area where rather more of the groups write letters to tell the world they exist; the first one is at Wirral. However, the *Newsletter* doesn't go far enough ahead for us to go into August detail beyond saying simply that they have the first and third Wednesdays at the Sports Centre, Grange Road, Birkenhead at 7.45 p.m.

After umpteen years, the Midland committee have decided to move, from the Midland Institute to the *University of Aston, Gosta Green*, in Room 110; they may be found here on August 17, albeit we have no details on the activity.

The same handwriting under a different letter-head tells us about the South Birmingham crowd, who are based out at West Heath, at Hampstead House, Fairfax Road. Only problem was, he got tangled up with dates and we haven't the current story, for which you must contact G8BHE—see the Address Panel. However, we believe the usual routine to be to book the first Wednesday in each month.

At Wolverhampton, at their Hq. at Neachells Cottage (which is in Danescent Road, Stockwell End) they make it Monday evenings each week, with the proviso that the Bank Holiday Monday of August 25 is "no meeting." August 2 is down for G8IZS and G3UBX to discuss the Oscar satellites, while on August 16, equipment will be available to measure noise figure,



R.O.A.

"... go on, ask him where he went for his holidays ..."

intermodulation, crystal frequency, and so on, the intermediate August 9 date being held for a general matter.

If you are in **Cheltenham**, there are, we believe, three or four Clubs to choose from, but only one—the RSGB group—report regularly to this piece. They now foregather on the first Thursday of each month at the Old Bakery, Chester Walk, which is behind the Public Library in Clarence Street, the start being set for 8.0 p.m.

For **Hereford** the newsletter has the date August 20, and the legend "something in the pipeline!" However, there is no doubt about August 6, when they have a Constructional Contest, with a visiting amateur to Judge. The Hq. address is County Control, Civil Defence Headquarters, Gaol Street, Hereford.

The letter from **Derby** is a model of brevity and yet contains all the information we need. Namely, the venue at 119 Green Lane, Derby, the Secretary's name and address, and the details, as follows: A surplus sale is the opener, for August 4, followed by Preparation for the Mobile Rally on the 11th (the Rally itself, at Rykneld School is on August 15); a D/F session on the 18th, and finally an evening of Technical Topics on the 25th.

### Going West

Our first stop in this direction is **Cornish**, who continue at the SWEB Clubroom, Pool, Camborne. They have G4DMY down for August 5, taking VHF as his topic—no doubt the recent repeater in Cornwall has sparked off interest there, as it has done in so many other parts of the country.

The revived **Plymouth** newsletter makes an excellent start, with improved duplication, and plenty of interest to the reader, be he local or, like us, at a distance. The group still have their Hq. at Virginia Settlement, Virginia House, Bretonside, Plymouth, where they

assembly on the first and third Tuesdays in each month.

G3GDW, reporting for **Torbay** put us in a bit of a spin when he wrote an addendum which arrived before the letter to which it referred! However, they are still thriving, taking their summertime Friday evenings, plus the formal monthly affair, which this time is on Saturday, August 21, brought forward a week from the usual routine in view of the Club participation in the Marldon Apple Pie Fair. In addition to all this, on each morning about 3.755 kHz roughly, there is a Club net, except on Sundays—doubtless G3UIQ (see Panel) could pass on the times for all these activities.

### South & East

These are the areas where, it is alleged by some, civilisation has penetrated more deeply, thus accounting for the greater number of reports from Clubs in the area; but having himself emigrated from elsewhere to this part, your conductor rather subscribes to the view that the Home Counties' only real virtues are the invention of cricket by the Kentish men, and the avoidance in the area of those soul-less and enormous public houses of the Midlands and North, against which must be set the sad fact that this South-East area led off with the idea that amateur-radio aerials are *not* things of beauty in the landscape but rather things to be planned out of existence. However, the natives do at least form Clubs—so let's see what they have to say.

At the top of the pile we have **North Kent**, who foregather on the second and fourth Thursdays in each month at the St. Mary's Institute, 2 North Cray Road, Bexley. The *Newsletter* to hand is taken up largely—and very properly—with matters AGM, but it does mention that several talks had been lined up for the near future while not mentioning specific dates, for which we must refer you to G4ARQ, as Panel.

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

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W3 8LB.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2 1EZ.  
 B.A.R.T.G.: J. P. G. Jones, GW3IGG, Heywood, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed, SA62 4LR.  
 BISHOPS STORTFORD: M. G. Long, 17 Lea Close, Bishops Stortford (51768), Herts.  
 CHELTENHAM (RSGB): G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.  
 CHILTERN: I. Eamus, G3KLT, Windrift, Shortacre Lane, Princes Risborough, Aylesbury, Bucks.  
 CORNISH: S. Halfyard, G4EIS, Studio 12, Rosewall Terrace, St. Ives (5576), Cornwall.  
 CRAVY VALLEY: M. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.  
 CRYSTAL PALACE: G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London, SE19. (01-653 4340.)  
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3 7GE.  
 ECHELFORD: R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.  
 HARROW: L. Light, G3KDL, 22 Chippenharn Avenue, Wembley, Middx., HA9 6NQ. (01-902 2570.)  
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).  
 MIDLAND: A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingham, B29 5UJ. (021-427 3088.)  
 MILTON KEYNES: M. Probart, G8JYW, 29 Agnes Road, Semilong, Northampton, NN2 6EU.  
 NORTH KENT: R. Wells, G4ARQ, 12 Bulbank Road, Belvedere, Kent.  
 PLYMOUTH: E. A. P. Swainsbury, G4EJO, 106 Plymstock Road, Plymouth, PL9 7PJ.

REIGATE: F. H. Munday, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.  
 ROYAL NAVY: FCRS M. Matthews, G3JFF, c/o Royal Navy ARS, H.M.S. Mercury, Leydene, Hants.  
 ROYAL SIGNALS: Capt. (TOT) J. Cooper, G3DPS, Royal Signals, Blandford Camp, Blandford Forum, Dorset.  
 SCARBOROUGH: C. H. Whitaker, 1 Ryefield Close, Eastfield, Scarborough, YO11 3DN.  
 SHELBURNE: Mrs. F. M. Bettany, 5 Old Well House, The Grove, London, N6 6LD. (01-348 6669.)  
 SOUTH BIRMINGHAM: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham, B32 1LB. (021-422 9787.)  
 SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex, BN20 9JG.  
 SOUTHGATE: B. Oughton, G4AEZ, 48 Morley Hill, Enfield, Middx. (01-366 7166.)  
 SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon, CR2 8PB. (01-657 3258.)  
 TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.  
 VERULAM: B. H. Pickford, G4DUS, 130 The Drive, Rickmansworth, Herts.  
 WAMRAC: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wawne, Nr. Hull, Yorks.. HU7 5XU.  
 WEST OF SCOTLAND: G. Milne, GM4BLO, 22 Norse Road, Scotstoun, Glasgow.  
 WHITE ROSE: R. R. Hughes, G4DZI, 3 Primley Park Crescent, Leeds, LS17 7HY.  
 WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Merseyside. (051-638 2515.)  
 WOLVERHAMPTON: D. T. Pugh G8BSR, Brigands, 38 Applebrook, Shifnal, Salop.  
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

For the **Acton, Brentford & Chiswick** group, the high spot of the meeting on August 17 will be the hook-up with member G3CCD who will be on holiday in France as F0UT, arrangements having been made in the line of gear, aerial, and sked; the venue as always is 66 High Road, Chiswick.

Now to **Verulam**, who meet in the Market Hall, St. Albans, and on the fourth Thursday of each month. This gives August 26 as the date, and the subject the Construction of Digital Counters. There is in addition an informal meeting on the second Thursday in each month at Salisbury Hall, London Colney.

**Crystal Palace** book the third Saturday in each month, at Emmanuel Church Hall, Barry Road, London S.E.22, and looking down the programme list at the bottom of the *Newsletter* we see that the subject is Aerials, although the name of the speaker is not given.

The compilers of the *Newsletter* at **Southgate** absolutely *hate* making any firm statement as to the date of the meeting and the subject, far enough ahead for us to write into this column; however, by careful scrutiny of last month's calendar we guess their date as the second Thursday in each month, while the Hq. address we know to be at the Scout Hut, Wilson Street. Subject, not known—but no doubt G4AEZ would be pleased to give you the gen should you care to contact him at the address in the Panel.

There is *no* meeting in August for the **Chiltern** crowd, at least in the formal sense; however, it is stated that, if enough are interested, an informal, casual, meeting could doubtless be arranged. However, this is no indication that the Club is folding up—far from it, as they will be back in full swing on September 22, at 42 Castle Street, High Wycombe.

Although the normal venue for **Southdown** is at the Victoria Hotel, Latimer Road, Eastbourne, the set-up for August is that they will all foregather on the evening of August 2, at Butt's Brow, NGR TQ 580 017.

St. Martins Court, Kingston Crescent, Ashford, Middx., is the place, on the second Monday and the last Thursday in every month, for the **Echelford** group; they seem to generally make the first date the formal, although for August 9, the "not yet arranged" sign is still up.

What a pleasant change it is to find a *Newsletter* in which its editor has to remark that a regular item has been crowded out—his happened to the **Cray Valley QUA**. It does however tell us that they get together at the Eltham United Reformed Church Hall, 1 Court Road, London, S.E.9, and by a bit of deduction we get the first and third Thursdays as the normal monthly dates, of which, generally, the first meeting in the month is the formal, complete with lecture, demonstration or whatever, and the other one is the Natter evening.

The **Harrow** offering this time is quite clearly a copy of a "hand-out" at some special-event activity, and as such is a model of its kind. From it we can instantly gather that the Hq. is at the Sea Cadets place, Woodlands Road, Harrow, every Friday evening from eight till ten.

**Reigate** have two homes; on August 3 they have the natter at the Marquis of Granby, Hooley Lane, Redhill, while the "main" meeting, which will consist of short talks and equipment demonstrations, is on August 17

at the Constitutional Hall, Warwick Road, Redhill.

As far as **Surrey** are concerned, we have a bit of a problem. We know that the speaker will be G3GVV, who will be talking about the Region 2 meeting in Miami, and the date August 18. The venue, however, is given simply as *T.S. Terra Nova*, with no more address data, for which latter we must refer you to the Secretary—see Panel.

The group at **Milton Keynes** have their Hq. at Lovat Hall, in Silver Street, Newport Pagnell, on the second Monday. This gives August 9 for a Chat night, and we are asked to give advance warning that in September there is the AGM.

A letter from **Shelburne** says the group are at Hq. in White Lion Street, Angel, London, N.1, but are closed through August until September 6, after which they will resume their normal Monday and Thursday weekly routine. Since the Secretary (*see* Panel) recently married G8ILY, a change of QTH is in the offing, and so while letters may go to the address in the Panel, telephone calls, if not successful to the number shown, may be dialled to 01-368 7081 for a second try.

We nearly forgot the **Bishop Stortford** lot, who have Hq. at the British Legion Club in Windhill. For them, August is normally not a heavily attended session, so they make it a Ragchew evening on August 16.

### The Nationals

**B.A.R.T.G.** had a very good turn-out for their annual convention, held at Meopham in Kent. This group is aimed at all those who have an interest in the use of a teleprinter in connection with their radio amateur activity, whether as listener or as transmitter.

**R.N.A.R.S.** comes next, with a very good and very readable *Newsletter*, giving details on all the goings-on of the members, who are, essentially, the Naval or ex-Naval types, with room for those of foreign navies and the Merchant Navy, too. It's well worth a sub—all the details from G3JFF—see Panel.

Another very interesting *Newsletter* is that by **Royal Signals**, possible even fatter than the Royal Navy compendium—one wonders how these groups cope with the postage on such enormous issues! Nonetheless, to the members they are certainly well worth the sub., as the healthy membership list shows only too well. Again, all the details from the G3JFF—see Panel.

If you operate /M then you are catered for by **A.R.M.S.**, who do all sorts of things in the interest of world-wide mobile operation, as well as producing the *Mobile News* so regularly (and so well).

A final one in this group is **WAMRAC**, catering for a membership, licensed or SWL, who are of the Methodist persuasion, in any part of the world. After 19 years of activity, the group now have some 350 members, and the current issue of the *Newsletter* is Number 100.

### Signing

That's the lot for another month; next time we need the details on your *September* programme, plus the address to look for, the Hon. Sec's name and QTH, and, if possible, telephone number. All this, to arrive by first post on **August 4**, addressed to your "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.



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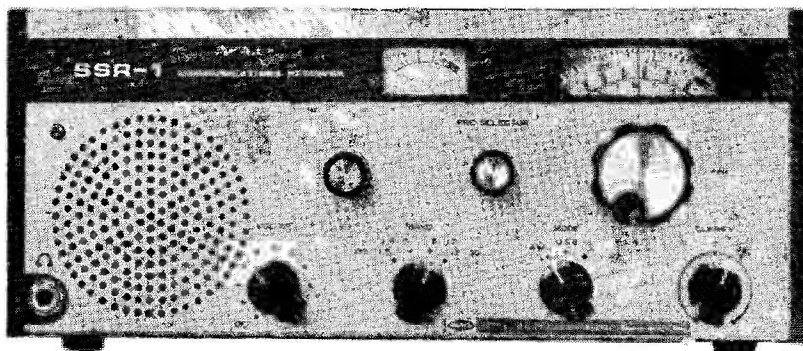
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Elbow Adaptors ... ..		85p
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Osker SWR Power Meter (S) (post 48p)		£25-92
Osker SWR Power Meter (B) (post 48p)		£29-00

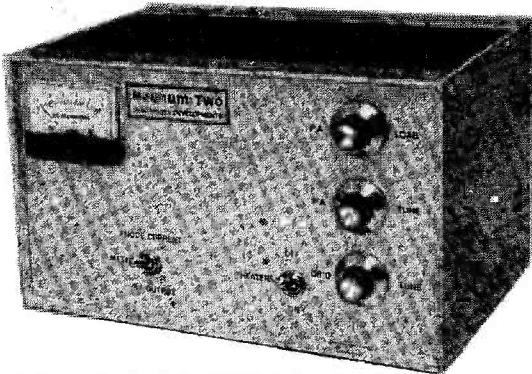
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### NEW MODELS

Uniden 2030 2M FM	
Mobile Transceiver	FROM £126-30
S.T.E. AK20 2M FM	
Mobile Transceiver	FROM £123

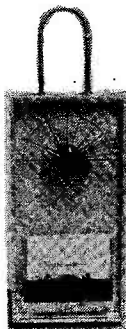


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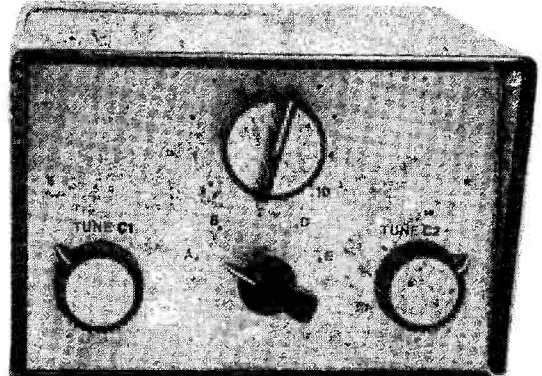
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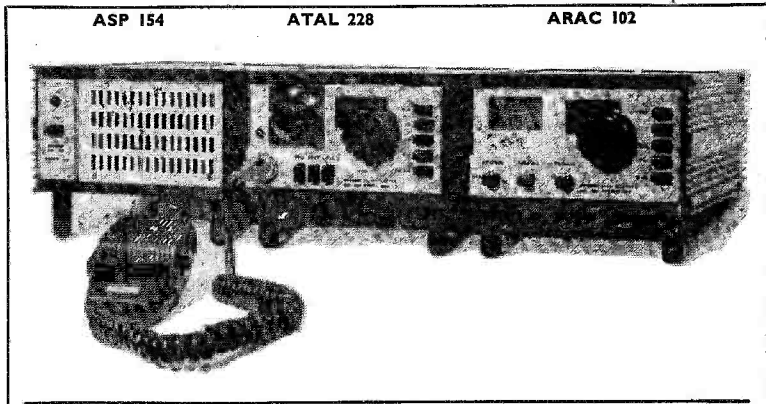


# S.T.E. MILAN VHF EQUIPMENT

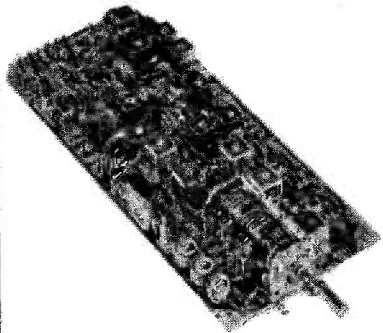
During the last two years the popularity of the range of equipment by S.T.E. has been growing. The ARAC 102 receiver has been a "Best Seller" (have you seen any second-hand?). Later in the year the Atal Transmitter came into stock and all reports have been good. Now we are offering the complete range of modules for the D.I.Y. enthusiasts. Transmitters, receivers, etc. The construction of these modules are first class — the P.C.B.'s are the finest we have ever seen.

**Price List (includes postage)**

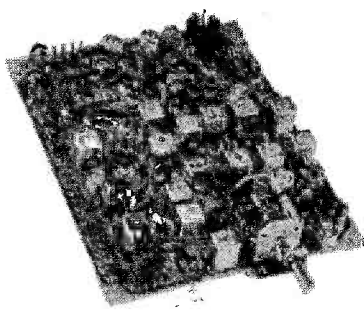
- ARAC 102 Receiver ... £100.00
- Atal 228 Transmitter ... £126.00
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- ARI0 Receiver Module ... £35.00
- AAI Audio Amplifier ... £4.10
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- AG 10 Tone Generator ... £4.50
- AC2A Converter 28-30 MHz £20.00



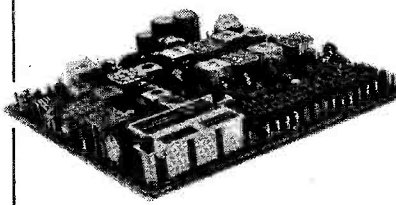
SPEAKER  
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28-30 MHz 144-146 MHz  
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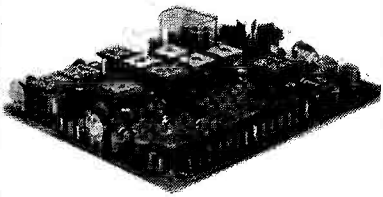
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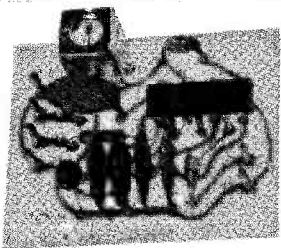


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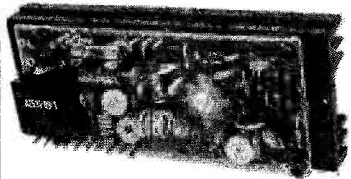
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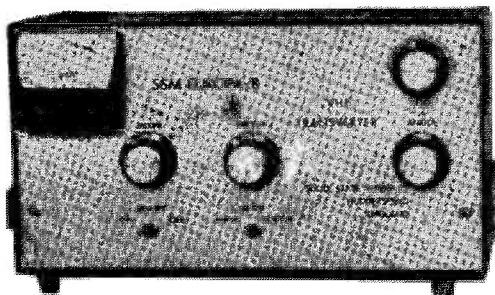
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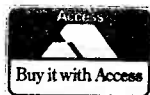
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- ★ Standard I.F.s are: 2 metres: 28-30 MHz, 2-4 MHz, 4-6 MHz, 4 metres: 28-28.7 MHz.
- ★ Size only: 2½" x 1½" x 3" long except 2-4 MHz and 4-6 MHz which are double conversion and 4" long. Price only £18-00 and ex-stock.

**SENTINEL X 2 METRE CONVERTER**

- A de luxe version of the Sentinel. Performance spec. is the same but: contains an internal mains/power supply and a front panel RF gain control.
- ★ Size: 5" x 1½" front panel, 4" deep.
- ★ Stock 2 metre I.F.s 28-30 MHz, 2-4 MHz, 4-6 MHz. Price: £22-00 ex stock.

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**SENTINEL LOW NOISE FET PRE-AMPLIFIER**

- ★ This pre-amplifier uses a selected low noise FET to provide the ultimate in sensitivity and selectivity.
- ★ Isolated supply lines, compatible with any equipment.
- ★ Low noise figure—1dB. High gain—18dB.
- ★ Size: 1½" x 2½" x 3". Price: £8-72 ex-stock.

**PA3 DUAL GATE MOSFET PRE-AMP**

- ★ Small about 1 cubic inch, printed circuit board pre-amp. Now incorporated in thousands of transceivers.
- ★ Low noise figure—2dB. Gain 18dB. Price: £6-27 with fitting instructions.

**70 cm. U.H.F. CONVERTERS AND PRE-AMPS**

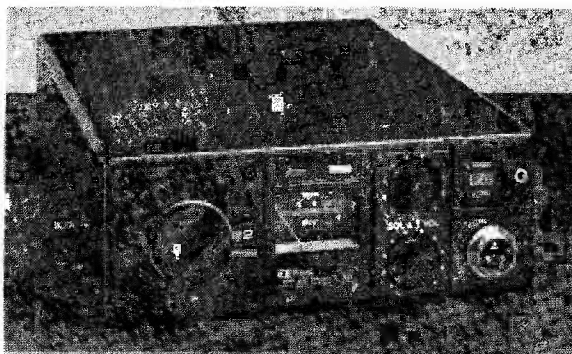
SM 70 70cm. to 2 metre FET converter. This is a very high performance 70cm. converter at a very attractive price. Size: 1½" x 2½" x 3". N.F. 3-5dB. Gain 30dB. Price: £18-00 ex-stock.

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Selected FETS give a noise figure of -3.5dB and a gain of 18dB. Size: 2½" x 1½" x 4". This unit is also available on other frequencies, e.g., 400 MHz region for satellite or radio astronomy use, for which it was originally developed. Price: £10-00 ex-stock.

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# THANET



## IC-22A

THE FAVOURITE MOBILE WHICH COMES  
WITH ELEVEN CHANNELS FITTED  
6 SIMPLEX 5 REPEATER

11 CHANNELS WITH A CRYSTAL CONTROLLED AUTOMATIC TONE BURST  
£175.50 including VAT (or £35.50 deposit)

11 CHANNELS WITH FACTORY FITTED R/C AUTOMATIC TONE BURST  
£168.00 including VAT (or £34.00 deposit)

HOW ABOUT TREATING YOURSELF TO AN IC-22A IN ORDER TO GET THE BEST FROM ALL THE NEW 2 METRE REPEATERS WHICH ARE OPENING UP ?

WITH THE OPENING UP OF THE REPEATERS IN NORTH WALES, LANCASHIRE, BIRMINGHAM AND KENT THE COVERAGE IN THE U.K. IS GROWING ALL THE TIME.

The IC-22A is the most suitable mobile rig for repeater use. Both the crystal controlled and the factory fitted R/C tone burst are arranged by us to be entirely automatic, operating only on repeater channels when a burst of tone is given at the start of each transmission. There is no need to press buttons while driving !

The audio tailoring and limiting are ideal for repeater use, giving the characteristic clear sound associated with the IC-22A.

Your IC-22A comes fitted with SIX simplex channels, SO, S20, S21, S22, S23 and S24 PLUS the FIVE U.K. Repeater channels R3, R4, R5, R6 and R7.

Look at this list and find where your nearest repeater is (those shown in capitals are already in operation).

- R3 SUFFOLK and YORKSHIRE.
- R4 Central Scotland, DERBYSHIRE AND CHESHIRE, Cornwall and KENT.
- R5 HAMPSHIRE and BIRMINGHAM.
- R6 CAMBRIDGE, SOUTH WALES, NORTH WALES AND LANCASHIRE.
- R7 LONDON, WORCS., Aberdeen, N. LANCS. and W. Wales.

PLEASE NOTE :—Recent reports about problems with radiation by IC-22As on 72 MHz have over exaggerated the situation. This only occurred when operating into poor aerial systems, and then only at very low levels. All new sets have a modification done by us to eliminate the problem. We will be pleased to let you have details of this on receipt of an S.A.E.

### SILLY DITTY CORNER !!

This news really ought to be sent,  
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Won't cause aircraft flying Lowe,  
To roll over in t'snow,  
And sent Billy home with a dent.

P.S.—Does this apply to Liners too ?



**THANET ELECTRONICS**  
34 CLIFF AVENUE, HERNE BAY  
KENT (02273) 63859



# ELECTRONICS

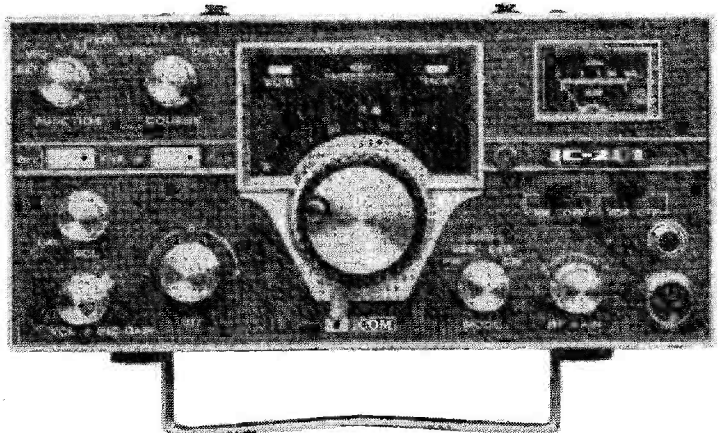
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## IC-201

THE MULTI-MODE RIG THAT  
SETS THE PACE IN LUXURY  
AND QUALITY

£357.75 inc. VAT



## ICOM IC-201 £357.75 inc. VAT

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## ICOM IC-202 £161.10 inc. VAT (rechargeable batteries £18 extra)

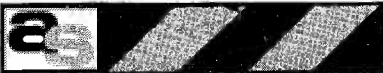
This new rig from the ICOM stable is going to be another winner. You have a hand-held portable, giving 3 watts output on SSB or CW, with VXO tuning giving you continuous coverage from 144.0 to 144.4 and the option of other frequencies if you use crystals in its spare sockets. Add a linear and you have a beefy base station. To introduce this excellent transceiver it is offered at a price of £161.10 INCLUDING VAT. Send for a data sheet for further details—just the thing for going portable this summer! SEE RAD COM AND JUNE SWM FOR REVIEW.

## ICOM IC-3PA £42.18 inc. VAT

The perfect companion to convert your ICOM mobile into a base station. Provides 13.6v at 3.5A. Well regulated, with automatic electronic overload.

## ICOM IC-225 £250.00 inc. VAT (still some at £225 without crystal controlled tone burst)

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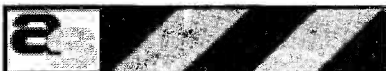
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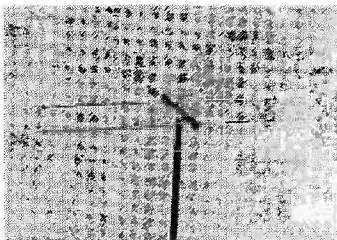
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**For sale:** Books on communications, UHF, microwaves, electronics, also Surplus Equipment handbook; Stentorian 5-in. 15-ohm speaker; MR-2P S-meter; Manuals for SP-600 and S.36; UHF converter, 225 to 400 MHz. — Hughes, 11 Henley Road, Ludlow, Salop.

**For sale:** Creed 7E/RP teleprinter with silence cover, MSV terminal unit TU-5 and 6S/5 auto transmitter, all in good working order, £60 the lot. — Jesson, G4CNY, 181 Kings Acre Road, Hereford. (Tel: 0432-3237 evenings).

**Sale:** Yaesu FT-200 with AC power supply, crystals for all of 10m., p-i-t mic., manual. £240.—Weatherley, G3WDI, 16 Beverley Court, Carlton Colville, Lowestoft, Suffolk.

**Selling:** Hammarlund HQ-160 Rx, coverage 0.5-30 MHz, with Q-multiplier, xtal calibrator, band-spread on amateur bands, good condition, needs alignment, £40. — Ring Fletcher, G8AFE, Prestbury 48484 (Cheshire).

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**Sale:** FT-221, hardly used, two months old, £350. 4-ele 2m. quad; Bantex magnetic based 5/8 whip, £25 pair. FT-101 and CW filter (agent modified), £350. FL-200B, £150; both as new. Heathkit signal monitor (factory aligned), £75. Nordmende "Globe-trotter", amateur and general-coverage Rx, FM/AM/CW/SSB, mains/portable, excellent condition, £175. W.W.II suitcase spy set, complete and working, £50. 10-80m. mobile antennae and base mount, unused, £75. Uher Royale de luxe 4-track stereo tape recorder, absolutely mint condition, £400 — Jennings, G3ZAI, QTHR.

**Wanted:** Heathkit SB-102 transceiver, or SB-401 transmitter. — Parsons, 46 Beaumont Rise, Fareham, Hants.

**For sale:** SSTV Venus SS-2 monitor and C-1 camera, as new, perfect condition, still in original box with manuals, (today's price £614), will accept £430. Buyer collects, or by special arrangement. — Ring Button, G3BG, Draycott 2037 (Derby).

**Selling:** Trio 9R-59DS receiver, £50. Solid State Modules 2m. converter, £10. Skywood CX-203 receiver, 170 kHz-30 MHz, £15. Joystick VFA antenna and ATU, £15. Codar PR-40 preselector, £7. Hartley 13A D/Beam oscilloscope, £15. Ferrograph 704 stereo tape deck, £140. **Wanted:** Trio JR-599X receiver. — Lucas, 47 Rowrah Crescent, Middleton, Manchester, M24 4WR.

**Wanted:** Copy of building and circuit diagram for Heathkit RA-1 amateur-band receiver, buy or borrow. — Parmenter, 135 Rochester Way, Blackheath, London S.E.3. (Tel: 01-856 9674).

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**Sale:** Drake SPR-4, new, extra xtals, with service manual and telescopic antenna, £375. — Condon, 33 Kilmolton Green, Borehamwood, Herts.

**For sale:** FT-101B, immaculate condition, £300. (Reason for sale, owner short of money). West Midlands. — Box No. 5521, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**Wanted:** 10X xtals, by OAP for calibrator. Must be cheap. — Smith, 2 Stevens Close, Blandford Forum, Dorset.

**Wanted:** Barlow-Wadley XCR-30 Mk.II receiver. Details and price please. — Cartwright, 1 Patshull Road, Albrighton, Wolverhampton.

**For sale:** Comdel CSP-11 speech processor, complete with instructions and circuit diagram, as new, £29. No offers. — Ring Stead, G2UZ, Leeds 784074.

**Wanted:** AR88D main tuning dial; also BC-221. Must be mint. — Box No. 5515, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**Selling:** Trio 9R-59DS Rx, very good condition, £45. MMC144/2, 3 months old, suits above Rx, £15. — Ring Szczepanek, Blackburn (0254) 53988 (Lancs.)

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**Sale:** Eddystone EC-10 Mk.II, new 1976, with unused Power Pack, £125. — Ring Leighton, Guildford 66543 evenings.

**For sale:** Eddystone 940 general coverage receiver, tuning 500 kHz-30 MHz in five ranges, re-valved and re-aligned, £130 inc. personal delivery up to 150 miles, or £120 buyer collects. — Smith, G3PZZ, 38 Leasway, Wickford (2791), Essex, SS12 0HE.

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**For sale:** Drake 2B receiver and matching Q-multiplier/Speaker, £80 or near offer. Trio TR-2200 2m. transceiver, £61 or near offer. — Ring Rollin, G4AFU, Barnsley 89441 office hours.

**For sale:** Drake SPR-4 general coverage receiver with broadcast and amateur band crystals, AL-4 loop antenna, mains and DC power cords, manual, perfect condition, a real bargain at £275. Sony TC-124CS stereo cassette-recorder, mint condition, with two speakers, mic., leads and carrying case, £55. — Alis, 7 Hillside Avenue, Wembley, London. (Tel: 01-902 4358, evenings).

**Sale:** Codar 70A, £25. B.S.R. unit, new, £7. Buyers collect. — Farrer, 16 Duncan Road, Gillingham, Kent. (Tel: Medway 56853).

**Selling:** Heathkit HW-7, £30. Pye U-10B UHF 'Cambridge', complete and working on 433.2 MHz, £35. Icom IC-22A, fitted with 14 channels, complete as new, very little used, £140. ASPE-667 433 MHz collinear, £10. — Axford, G4AQZ, QTHR. (Tel: 025-584 632, Clacton).

**Wanted:** Crystals in range 1050 kHz to 1630 kHz, 960 kHz to 990 kHz, and 550 kHz to 820 kHz; also 813 valves. Exchange or sell: New HC6U crystals 1111.112 kHz. (Merseyside). — Box No. 5516, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

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**Selling:** Codar mini-Clipper, built January, hardly used, £12 posted. **Exchange:** Small Rx including aircraft band. — Short, 49 Shaw Road, Dudley (S2563), West Midlands.

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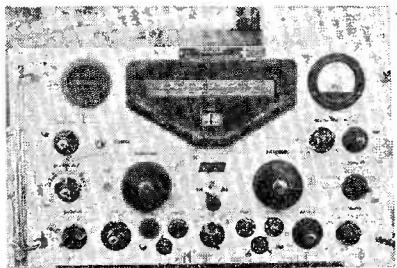
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4816	4817	4825	4842	6455	6708	6745	6746	6748	6749	6752	6753	6754	6756
6757	6802	6822	6933	6937	7015	7016	7017	7018	7019	7203	7204	7205	7206
7207	8368	8400	8477	8631	8701	8900	8945	9160	9288	9375	9381	9387	9404
9406	9410	9461	9529	9545	9562	9566	9841	9858	9891	9925	9941	10025	
10040	10141	10158	10208	10324	10325	10341	10355	10365	10366	10367			
10394	10483	10496	10524	10525	10536	10650	10681	10687	10692	10693			
10694	10695	10696	10698	10699	10701	10703	10704	10707	10708	10709			
10710	10711	10713	10714	10716	10717	10724	10732	10733	10734	10741	10742		
10760	10764	10767	10772	10785	10786	10798	10807	10814	10929	10933			
11003	11004	11016	11049	11065	11066	11067	11071	11132	11133	11142			
11157	11158	11159	11504	11637	11752	11897	11908	12287	12288	12290			
12293	12294	12295	12300	12302	12306	12305	12308	12309	12310	12311			
12313	12321	12370	12371	12372	12373	12375	12376	12378	12379	12380			
12381	12384	12387	12390	12391	12392	12394	12395	12400	12406	12409			
12467	12468	12469	12473	12374	12475	12476	12477	12478	12479	12481			
12484	12486	12491	12523	12523	12524	12525	12526	12527	12528	12529			
12531	12532	12533	12534	12535	12536	12537	12538	12539	12541	12543			
12544	12545	12546	12548	12550	12559	12562	12572	12586	12480	12482			
12483	12485	12487	12488	12489	12490	12492	12493	12494	12695	12703			
12704	12706	12802	12816	12851	12856	12858	12859	12867	12868	12869			
12950	12964	12966	12967	12968	12969	12972	12973	12975	12976	12977			
12978	12979	12981	12982	12983	12984	12985	12986	12987	12988	12989			
12900	12991	12992	12994	12995	12996	12998	13009	13001	13009	13017	13032		
13041	13052	13055	13061	13071	13088	13090	13100	13106	13117	13121			
13128	13145	13146	13209	13260	13266	13301	13327	14085	14157	14158			
14159	14161	14164	14166	14167	14168	14167	14170	14171	14172	14173			
14175	14174	14177	14178	14176	14179	14180	14181	14182	14183	14184			
14185	14186	14187	14250	14251	14252	14253	14254	14255	14256	14257			
14259	14260	14261	14262	14264	14265	14266	14267	14269	14271	14273			
14274	14275	14276	14278	14279	14360	14361	14362	14363	14364	14365			
14368	14369	14370	14374	14375	14377	14378	14381	14382	14384	14385			
14387	14389	14390	14406	14408	14410	14412	14414	14423	14424	14425			
14426	14428	14429	14431	14432	14433	14434	14435	14439	14442	14443			
14446	14447	14449	14450	14451	14484	14485	15268	15272	15297	15300			
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29487	29493	29500	29512	29513	29515	29512	29625	29662	29662	29675			
29700	29775	29850	29800	29825	29850	29892	29937	29939	30000	30052			
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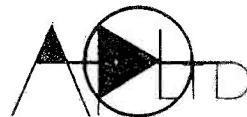
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TV PLUGS (metal type), 5 for 50p.

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1 Meg. Lin. POTS  $\frac{1}{2}$ " plastic spindle, 2 for 50p.

50k. ohm Lin. POTS,  $\frac{1}{2}$ " plastic spindle, 40p each.

TWIN IF CANS, approx.  $1\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{2}$ " high, around 3-5 to 5 MHz, 2 separate transformers in one can, internally screened, 5 for 50p.

IF CANS,  $\frac{1}{2}$ " square, suitable for rewind, 6 for 30p.

IF CANS,  $\frac{1}{2} \times \frac{3}{8} \times 1\frac{1}{2}$ , suitable for rewind, 10 for 30p.