LISTEN TO THE WORLD

Short wave radio is by far the fastest and most convenient type of communications for spreading the news about what is going on in the world. And for this reason TRIO’s R-300 is the right rig for those who’d like to listen to a live report of the Indianapolis Grand Prix, to Radio Peking or to follow the progress of a Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for many journalists, engineers and technical representatives working abroad. They all want a reliable and sturdy multiband receiver for home use and travel, a receiver working from mains voltage or batteries. And just such a receiver is TRIO’s new R-300.

Six Wavebands—LW (170-410 kHz), BC (525-1250 kHz), 4 x SW (160-10m). The four shortwave bands continuously cover the frequency range from 1,25-30 MHz with separate calibration for the commercial (75-11m.) and radio amateur bands (80-10m.) of the large drum-type main tuning and bandspread dials.

Outstanding Input Sensitivity—The dual-gate MOSFET front end assures excellent cross-modulation and spurious characteristics, as well as high input sensitivity. Between 18 and 30 MHz the R-300 operates as a double superhet, giving sensitivity of 1µV for AM and 0.5µV for SSB. For full details, contact the sole importers of the exciting TRIO range.

Sole Importers: LOWE ELECTRONICS
Cavendish Road, Matlock, Derbyshire
Tel.: Matlock 2817 or 2430
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. New 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 µV 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 0.2 µV. 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
If your station is equipped for FM only, and you wonder where other 2 metre operators have gone when conditions are good—just borrow a receiver and listen to the SSB around 144.3. Direct DX contacts with continental stations are commonplace because of the sheer distance covering ability of SSB. With the freedom from channel restrictions and the ability to have multi-station QSO's with ease, SSB capability can add a new dimension to your amateur radio 2 metre operations.

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

Combining high receiver sensitivity and clean transmitted signal, the TR7010 gives continuous frequency coverage from 144.1-144.335 MHz to cater for CW, SSB, and beacon activity. 48 synthesised 5 kHz channels with VXO and RIT ensure crystal controlled stability with the freedom to move around the band.

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

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

Fixed (using the matching PS5 supply), or mobile, the TR7010 is the DX SSB/CW for everyone.

SPECIAL OFFER

Until the end of the Leicester exhibition on 30th October, the TR7010 complete with optional crystals fitted (144.1—144.335 MHz) will be sold at the exhibition offer price of £160 (including VAT). On the 1st November, the price will revert to normal.

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

TRIO
LOWE ELECTRONICS

NR-56 FM RECEIVER

This remarkable little receiver gives the 2m FM listener everything he wants at a very reasonable price. Excellent sensitivity, stability and selectivity coupled with a built-in VFO and very effective squelch make it the ideal receiver for both beginner and keen listener. Although the built-in VFO offers more than covers the entire 2m band, crystal control of FM channels offers many advantages (particularly in mobile operation), so crystals, which are ex-stock, may be fitted for the popular channels and repeaters. It requires 12v. DC for operation and is thus an excellent mobile receiver for mounting in the car, boat or caravan as well as for home use.

- Double filters at 10-7 MHz and 455 kHz.
- Dual conversion 10-7 MHz/455 kHz.
- Narrow filter fitted for European Market.
- FET RF stage for high sensitivity.
- 12v. operation.
- Build-in loudspeaker.
- Small size 6½" x 6½" x 2"
- Mobile mount and personal ear-piece supplied.
- Full coverage VFO built in.
- 11 crystal options (optional crystals ex-stock).
- 22 transistors, 1 integrated circuit, 16 diodes.
- NR-56 £54-00 incl. VAT. Postage 48p. Crystals £1-40 incl. VAT.

FS1007P

The home station FM transceiver with everything. * Mains or 12v. 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 * 5 meter RX filter * 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 * 100 W TX * 0-3μV sensitivity * superb styling and finish.

Special Leicester Exhibition offer on this superb transceiver.
Up to £50 saving on normal list price.
Contact us NOW for details.

SHINWA FILTERS

Low Electronics present a range of HF and VHF filters suitable (indeed most desirable) for the discerning radio amateur. From the very wide range of filters manufactured by SHINWA, we have selected those which we feel are the most useful in this country. All the filters are exceptionally well made in high quality housings 30 x 50 x 180mm (1110G is 160 x 310 x 55mm) and are terminated in 50Ω sockets. They are suitable for a wide range of applications, the 1110G and 110G being particularly attractive to transverter users. The 1110G is the big daddy filter having adjustable bandwidth up to 2 MHz wide at any frequency in the range 135-165 MHz. All filters are supplied with an individual calibration curve so that you can see exactly what you are getting; and prices are most reasonable as you can see.

RAK ANTENNAS

The range of RAK antennas (yes, I know it should be "antennae" but it's "antennas") represents the finest value available to-day. From the comprehensive range, we offer a selection for the amateur and SWL. All traps are fully encapsulated and splashproof. All hardware is in stainless steel and corrosion proofed all. Elements are made from hardened alloy wire (not listener!) for strength with light weight. For the amateur radio operator who needs the ideal set-up, we would recommend (and we use) the 4A8DDXN which gives superb performance on 80 and 40. "Use it" in conjunction with either a vertical or beam for 20, 15 and 10. You will get 80 metre performance approaching that of a full size dipole but in an overall length of 28 metres instead of 40!

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BRANCH OFFICES Communications House, Wallington Special, Wallington, Surrey. Tel. 01-669 6700 Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708 27 Cookridge Street, Leeds. Tel. 0532 432637
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All Strumech Versatowers are designed to withstand wind speeds of up to 117 mph, depending upon area of array.

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SOUTH MIDLANDS COMMUNICATIONS LTD
OSBORNE ROAD, TOTTEN, SOUTHAMPTON
THE LATEST LITTLE GEM FROM YAESU — THE FRG-7
This general coverage solid state receiver is STABLE! The Wadley loop system and triple conversion makes this receiver a must for general coverage 0-50 MHz to 29-9 MHz. Operates on AC, DC or internal batteries giving a wide variety of operating conditions. ONLY £162 inc. VAT and Carriage.

STOP PRESS!
ANNOUNCING A NEW YAESU PRODUCT!!
The FT-301D!!
Solid state digital transceiver
160m. to 10m. coverage. 200W pep
All modes — SSB/CW/AM/FM
6 digit readout TX/RX clarifier
Send S.A.E. for details/prices (likely to be available Nov./Dec.)

BRITAIN’S BEST BUY!
for the serious FM Repeater operator—the STANDARD C828!
There's no other choice!

BASE STATION—MOBILE—PORTABLE
We’re so fascinated by this little beauty that we think it makes everything else "obsolete" (or expensive). The Price £151-88 inc. VAT.
* 10 watts (Hi), 1w. (Lo) output.
* 12 channels SIMPLEX or REPEATER 10 Ch. fitted.
* Single crystal control means you only have to buy 1 CRYSTAL PER CHANNEL.
* Fitted SO, 220, 21, 22, and 23. R3, 4, 5, 6, and 7.
* LED (BUSY) indicates whether you have accessed the repeater or not.
* LED's to indicate EXTERNAL VFO, TRANSMITTER ON REPEATER OPERATION.
* SPEAKER/MIC gives PRIVATE LISTENING and has switch to override the channel selector enabling a changeover to be made to an external VFO (Type CVI10).
* TONEBURST is built in (Automatic on "Repeater")!
* NEW LEATHER CARRYING CASE/ANTENNA TYPE FCB-01L (available later) makes the C828 into a 12 Ch. 1/10w. portable unit.

THE OSKER SWR-200 POWER METER
Features:
Switchable for 52 or 75 ohm systems.
Each instrument is individually calibrated.
Four ranges: 0-2, 0-20, 0-200, 0-2kW and 3-200 MHz.
Excellent styling.
Price: £29.16 (inc. VAT and carriage).

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The WESTOWER
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<table>
<thead>
<tr>
<th>Height</th>
<th>Framed Post</th>
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<th>Wall Mounted</th>
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<td>£375</td>
<td>£45</td>
</tr>
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</table>

Prices include carriage but exclude VAT

And this month two other new "WESTERN" quality products

Penetrate to the four corners of the earth with our new exciting DX 33 "Penetrator."
3-Element Beam for 10-15-20 metres up to 2kW P.E.P. gain up to 8dB. Front/back ratio up to 20dB. Price £73.12 (inc. VAT and corr.)

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**DRAKE**
We normally have the full range of this equipment available. Check with us for prices and details.

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**UNIDEN**
The new Uniden 2030 Transceiver proving to be very popular indeed, this proved to be a real good seller and now we have the 2030 FM Transceiver.
We can also supply equipment by Bantex, Deca Communications, Belcom, Swan and the new Atlas range. Along with antennas, antennas by Hy-Gain, G-Whip, Jaybeam, Microwave Modules, Barlow Wadley, GDR Tech, Space-Mark, Technical Associates etc. Send large S.A.E. and we will send any information you require.
Please note all equipment is air tested before sale. We do not employ any part time employees for sale of equipment all sales made from the above premises and we do not supply to any individual for resale from private accommodation.

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- Baer Keying Paddle (post 25p)
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**SECONDHAND EQUIPMENT**
(Stock at time of going to press)
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- FR1010 Receiver...
- FT101E Transceiver...
- Drake SPR4 with all Crystals and Noise Blanker...
- Panda PR202 Tx (buyer collects)...
- Palomar......
- AR880 Receiver...
- Lafayette H200 Receiver...
- Heathkit HR108 Receiver...
- Eddystone 730/4 Receiver...
- Eddystone EC10 Mk. 2 Receiver...
- Eddystone EC10 Mx. 2 Receiver...
- Eddystone EC10 Mx. 2 Receiver...
- K1200A Transceiver, PSU...
- Swan 700CX Transceiver...
- Swan 1200X Linear Amplifier...
- Trio 3310 Transceiver...
- Liner 2 Transceiver...
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**MAGNUM 2 and 4 Metre Transverters.**
28 MHz low drive input, CW, SSB, AM and FM. Inclusive of relays and power lead, size 10" x 6½" x 3½".
£112.50

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**78 CMS LINEAR AMPLIFIER 2C1G triode valve drive power 5 watts output 50 watts AM-FM SSB-CW.**
£60.40

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£16.00

Our overseas agents will be pleased to supply any of the Magnum products. Overseas Private and Trade enquiries welcome.

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**SWL Tuning Unit Mk. I.** 50 switchable tunable positions. Two inputs single feed or co-ax. Suitable for any antenna over 150 ft. long on 2-20 MHz. Produced in demand to many requests, post free. Now in use in over 25 Countries in 5 Continents.
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Instant HP and Credit Facilities available. Barclaycard and Access facilities. After sales service on all equipment. Part exchanges welcome. Items sold single feed or co-ax. Suitable for any antenna over 150 ft. long on 2-20 MHz. Produced in demand to many requests, post free. Now in use in over 25 Countries in 5 Continents.

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**SHOP HOURS 9.30 TO 5.30 MONDAY TO SATURDAY**

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**LEICESTER—OCT. 28, 29, 30**
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)

<table>
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<th>Item</th>
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<tr>
<td>ARAC 102 Receiver</td>
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<td>AAI Audio Amplifier</td>
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<td>AT22 Transmitter</td>
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<td>AT20 C.C. Receiver</td>
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<td>AT23 C.C. Transmitter</td>
<td>£36.00</td>
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<tr>
<td>AG 10 Tone Generator</td>
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<tr>
<td>AC2A Converter 28-30 MHz</td>
<td>£20.00</td>
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**S.T.E. MILAN VHF EQUIPMENT**

**ASP 154**
144-146 MHz AM FM TRANSMITTER with Microphone

**ATAL 228**
28-30 MHz 144-146 MHz AM-FM-SSB RECEIVER

**ARAC 102**

S.T.E. operating. Sensitivity 0.2uV channel impedance 50-75 ohm. AM - 0.2mv (20db S.N.) FM - 0.3mv (20db S.N.) 12v DC operated AF input sensitivity 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.

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

**AT 222** A complete transmitter exciter unit for 144-146 MHz on AM or FM. VFO controlled or fixed channel operation. Complete with microphone pre-amp, speech processor including 0.2mv audio filter. 1 watt output. FM - 25 watts AM. Output impedance 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.

**AT20** 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0-2uV AF output 3 watts. 12v, DC operation.

**AT21** 12 Channel FM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.

**AR20** 12 Channel FM transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.

**ARAC 170** Receiver. Two bands 28-30 MHz - 430-440 MHz AM-FM-SSB/CW. Tuning 10MHz from 430-440MHz in 5 bands. SSB - 10-13 kHz deviation. FM - 0.3mv (20db S.N.) FM - 0.35mv (20db S.N.) 12v DC OP.

**AK20** FM Transceiver. 12 channel FM operation. Tone burst. 4 watts output. Sensitivity 0.2mV (10db Quieting) 0.35mV (20db Quieting) Complete with microphone. From £123

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

**Linear Amplifier.** Frequency 144-146 MHz output 10 watts FM, 8 watts PEP SSB, 8 watts AM. Input power 1 watt FM, 15 watts AM, SSB. Input impedance 50 ohm output impedance 50-75 ohm. 12v, DC.

Two New Models from S.T.E.

**S.T.E. MILAN VHF EQUIPMENT**

**ASP 154**
144-146 MHz AM FM TRANSMITTER with Microphone

**ATAL 228**
28-30 MHz 144-146 MHz AM-FM-SSB RECEIVER

**ARAC 102**

S.T.E. operating. Sensitivity 0.2uV channel impedance 50-75 ohm. AM - 0.2mv (20db S.N.) FM - 0.3mv (20db S.N.) 12v DC operated AF input sensitivity 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.

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

**AT 222** A complete transmitter exciter unit for 144-146 MHz on AM or FM. VFO controlled or fixed channel operation. Complete with microphone pre-amp, speech processor including 0.2mv audio filter. 1 watt output. FM - 25 watts AM. Output impedance 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.

**AT20** 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0-2uV AF output 3 watts. 12v, DC operation.

**AT21** 12 Channel FM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.

**AR20** 12 Channel FM transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.

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For 144 and 432 MHz, RF sensing, excellent bias arrangements, 12V (13 BDVC), 10W drive, 13 x 5.8 x 20 cms.
AP882A 145 MHz, 80W output, 10A £88.89 (+ VAT) AVAILABLE EARLY OCTOBER
AP857A 432 MHz, 45W output, 6A £88.89 (+ VAT)

THE DIGITAL II (FM 144-105XRII)

THE MULTI UII A NEW DIMENSION IN SEVENTY CMS.
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 for 50 or 25 kHz spacing.
The main dial is channel numbered (e.g., 16 = 433-4, 20 = 433-8 etc.) and is illuminated only when a channel is channelised up. "Two R.F. stages in the receiver provide great sensitivity (0.3V for 30dB N10). The use of a band pass first IF (CF=45 MHz) gives hig..." The transmitter is switchable (1W output draws only 2.5 or 1.3A (O.6 or 0.3A Rx) and has a new crystal fac... The V.C.O. is directly modulated (frequency readout, from...)

With 8 Channels from: SU (0, 8, 12, 16, 18, 20) and RU (0, 2, 4, 6, 10, 14) INTRODUCTORY PRICE ONLY £200 + VAT

The handheld KP202 with its 2W of RF and 3W of audio immunity to image and IF break-through, offers performance to rival all walkie-talkies and mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle whip case and F type plug. Accessory... ONLY 99.50 (+ VAT)

SIX CHANNELS FITTED S20 and S22 and any 4 of: S0, S21, S31, R3, R5, R7

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AR40 VHF and Medium £38.50
AR33 Deluxe control £44.75
AR40 Deluxe £50
CD44 Medium duty £75.85
Ham II Heavy duty £115.00

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BEARINGS CD362 CDE £4.25
RZ100 Stolle (ballrace) £10.00

MOUNTING KIT
AK21 CDE to £3.60
Versatower

CABLE
5 core AR30(40)/33 2010 yr. £20
8 core CD44, Ham II yr. £32

PLEASE NOTE THESE PRICES DO NOT INCLUDE VAT (8% or 12%) Terms—Cash with order or credit card holders just phone in or, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £225. Holders of current U.K. calllins (where references have been provided) can be speedily cleared or normal H.P. at competitive rates is available.
NEW FROM YAESU. The FT301D is an all solid state, 10-160 metre, precision built (plug-in boards), 12-volt, digital readout (to 100 Hz) transceiver, measuring only 11" x 5" x 13½", weighing 22 lb. and is equally at home in the car or with the matching external AC PSU/speaker (and V.F.O.) in the shack. Towards the end of the year, a new mains PSU with built-in 6-digit 12 or 24-hour electronic clock will be ready as will the programmable automatic CW identifier. The sensitive FET-packed receiver has rejection tuning (IF pass band tuning), noise blanker, 3 position AGC, and provision for 600 Hz, 2.4 and 6 kHz crystal filters.

The transmitter employs RF-derived ALC, and a wide band amplifier combined with a pre-set pass band system for 200W PIP of CW or RF-processed SSB or 50W of AM or FSK.

FT301D is now in concentrated production. The first units will, we hope, leave the factory end of September, thus allowing us a demonstration model for the Leicester Exhibition. Price around £500.

THE FT301S EX-STOCK

The FT301S is a new solid state 12v, twin oscillator, plug in construction, which with all options installed offers —

Top band to 10 metres (inc. 5 MHz MDF) in 500 kHz segments, 10W output, built in V.F.O., selectable 24 or 600 Hz 9 stage filters. Front panel controlled VOX (with MOX) and PPT, semi-break in keying (with side tone), calibrator 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 HF crystal filter (with external VFO with same crystal facility), 72W 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.

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, ±5KHz 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 illuminations illuminated accordingly. Carrier level is adjustable for: tone up, AM, for CW operation, whose performance with the semi break in keying, with side tone, and the optional 600 kHz 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., etc., etc., etc., etc.

POWER METER/Dummy Load YP150

The YP150 is a fan cooled 50 ohm dummy load, using a large carbon resistor which maintains impedance (VSWR less than 1.2:1 at 145 MHz) by the use of a "Tapering Trough" and a power meter for use between 1-8 and 200 MHz calibrated 6, 30 and 150W FSO on a large 3½" x 2½" meter with a maximum error of 10% (FSO) size 6 (7") x 4½ x 11 (12") weight 6 lb.

DIGITAL DISPLAY YC601

The YC601 is a digital display unit for 101 and 401 series (3-18 MHz!) indicates transmit and received frequencies to 100 Hz on six bright green 9 stage gas discharge tubes. Built-in mains PSU (consumes only 10W), gage time of 100mS, size 3½" x 8½ x 9½" (10½") and weight 5½ lb. Supplied complete with connecting cables, etc.

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Osborne Road is off Rombridge Street

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Northern Branch: THE CHAMBERS, No. 1, THE PARADE
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March 24, 1981

FP301(S) FT301(S) FY301

FT101E

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TELETOUR WITH TH3 MIL. TELESCOPIC GALVANISED
GEM QUAD 2 ELE. FIBREGlass SPREADERS

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10' telescopic heavily galvanised steel mast supplied with guy rings etc. or c/w full rigging kits.
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40' £29.75 or £33.75 cw rigging
50' £37.95 or £69.95 cw rigging

ALIMASTS

4x1.5m £112.90 3 x1.8m £17.20 5 x 2.0m £21.70 7 x 2.0m £43.00

Galvanised lattice 10' sections. Free standing with climbing steps. Carriage £30 ex stock VAT 8%
30' £135.00 cw base grille £9.00
40' £224.50 cw base grille £9.00

VERSATOWERS SEE FAR TILTING

Carriage and rigging (RX)
42' £121.00 (RX 28)
79' £224.50 (RX 28)
101' £303.50 (RX 76)

VERSATOWERS SEE FAR TILTING

TELESCOPIC (30m +) with full tilting facility allowing for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resorting to concrete. Whilst stocks last, we offer the old prices (POA).

TELESCOPIC (30m +) with full tilting facility allowing for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resorting to concrete. Whilst stocks last, we offer the old prices (POA).

CUSHCRAFT VHF OMNI (Carriage 80p) VAT 25%
RINGO RANGER-ARX2 6dB gain over ground plans. Uses 3 x 4
in phase and 4 x stub, ultra low angle radiation approx 10' high, (Illustrated). LOW PRICE. EX-STOCK.
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ARX 36dB Ringer Vert. £23.75
ABW125 ABW harness £7.10
ARX5 ORO AR2 £20.50
ASQ1 2m, Squalo £11.75
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JAYBEAM 70 (4m), 144 (2m), £42.70 (Car. £1) VAT 25%

JAYBEAM 70 (4m), 144 (2m), £42.70 (Car. £1) VAT 25%

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in phase and 4 x stub, ultra low angle radiation approx 10' high, (Illustrated). LOW PRICE. EX-STOCK.
this antenna's no whip-off!

A 5/8 Wave 'Stainless Steel' Mobile Whip Antenna — precision manufactured to this standard of excellence for LESS THAN £10 is good value by any stretch of imagination. Look at these features and judge for yourself.

* Non-corrosive waterproof fixing.
* Detachable for car wash and against theft.
* Nominal coverage 130–174 MHz VHF.
* Strong (tensile strength 90–100 tons per sq. in.) shock spring mounting at base, heavily braided through shock spring to maintain electrical length.
* Loading coil to match electrically at 50Ω and resonant at desired frequency.
* Only 10mm hole required for fixing.
* Supplied with blank cover, 2BA Allen Key and cutting chart (for desired frequency).

MECHANICAL SPECIFICATION
Base: Black moulded 'Talc-Filled polypropylene, a special chemical process during moulding ensures extra hardness.
Ferrule: Machined brass, heavy chrome plated.
Internal Contacts: Beryllium copper 'heat treated' and silver plated.
Antenna Rod: Stainless Steel 2.7mm at base and tapered.
Shock 'Barrel-Spring': 12 gauge spring steel.
Loading Coil: 18 gauge enamel coated copper wire.

ELECTRICAL SPECIFICATION
Gain: +3dB relative to '/wave.
Bandwidth: 5MHz.
Power Rating: 100W
Frequency Range: 130–174MHz
V.S.W.R.: Better than 1.5:1
Input Impedance: 50Ω nom.

undeniable value
£8–10 +12½% VAT

also available is a 1/4 Wave Mobile Whip Antenna that offers the same nominal coverage and mechanical specification as the 5/8 wave model except the 1/4 wave is not equipped with a shock spring and loading coil.

We recommend that the 1/4 wave be roof mounted for optimum ground-plane effect.

£3–65
+12½% VAT
Blank cover
50p extra if required.

These antennae plus a multitude of other interesting equipment, components and construction kits may be found in Doram's new Edition 3 catalogue price 60p inc. p & p and Doram's construction kit brochure 25p inc. p & p or both together for special reduced price of 70p inc. p & p.
Buy with confidence from U.K.’s longest established VHF/UHF manufacturer. Our equipment is now used in over 100 countries worldwide.

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Ideal for long distance V.H.F. use, either direct or via satellites. The Europa B plugs into Yaeji/Sommerkamp equipment for instant V.H.F. operation. For other H.F. equipment use our power supply type CPS 10.

THE EUROPA B gives you:
★ The confidence of our most efficient back up service in the 12 month warranty period and beyond.
★ Highest transmit power available 200W. Highest receive sensitivity available—2dB N.F.
★ Compact, attractive appearance will complement your station. Size: 9" x 4½" front panel 4½" deep.
★ Cleanest output spectrum available. All spurious outputs—80 db.
★ Price: £109-15 complete to plug in and from stock.

EUROPA COMPLETE POWER SUPPLY TYPE CPS 10 Supplies all voltages to Europa and contains a dummy load attenuator to make the Europa compatible with any HP equipment. Price: £45-00—Ex-stock.

SSM Z MATCH 80-10 METRES

This unit has been produced to satisfy the constant demand for a compact matching unit to meet the critical load requirements of the modern P.A. Receivers are also becoming more sensitive to aerial matching and our Z Match can of course be used to match the aerial to your receiver. The units have been tested at 2Kw CW output power into a Bird Termainle Wattmeter/Dummy Load. The aerial connections can be used with balanced or unbalanced feeders and the connectors are screw terminals for wire aerals AND SO239s for coax fed aerals. Don’t forget that multiband aerals respond as well to your harmonics as to the wanted signal. Our Z Match will provide harmonic attenuation as a bonus. Price is only £28-00.

All prices include 12½% VAT and delivery. 12 months guarantee on all units. We offer same day COD (£50 limit)

VHF CONVERTERS 2 METRES, 4 METRES, 70cms. SATELITE BAND, MARINE BAND FROM STOCK

Our own and independent tests confirm that our converters have the edge on performance of any available.

SENTINEL DUAL GATE MOSFET CONVERTERS
★ N.F. 25dB Gain—30dB
★ Very high tolerance crystals, 5 p.p.m. for calibration accuracy.
★ Strong signals and overvoltage and reverse polarity protection built in.
★ Standard I.F.s are: 2 metres: 28-30 MHz, 2-4 MHz, 4-6 MHz, 4 metres: 28-28.7 MHz. Price: £25:00
★ Size: 2½" x 1½" x 3½" long except 2-4 MHz and 4-6 MHz which are double conversion and 4½" 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 it contains an internal mains power supply and a front panel RF gain control.
★ Size: 3½" x 2½" front panel 4½" deep.
★ Stock 2 metre I.F.s 28-30 MHz, 2-4 MHz, 4-6 MHz. Price: £23-00 ex-stock.

SENTINEL 2 METRE CONVERTER KIT, 28-30 MHz IF ONLY

A well proven kit supplied with printed circuit board drilled and with all coils mounted to make assembly easy. Price: £11-50, ex-stock and if it doesn’t work send it back with £2-25 and we will fix it. YOU CAN’T GO WRONG!

SENTINEL MF Another Dual Gate MOSFET 2 metre converter which converts to medium wave in 2 switched bands. Price: £29-00 ex-stock.

2 METRE OR 4 METRE PRE-AMPLIFIERS

These are supplied for Satellite and Marine Band from stock. Other frequencies to order. Two models to choose from:

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—18dB. High gain—18dB.
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PA3 DUAL GATE MOSFET PRE-AMP
★ Small about 1 cubic inch, printed circuit board pre-amp. Now incorporated in thousands of transceivers.

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

SM 70 70cm. to 2 metre FET converter. This is a very high performance 70cm convertor at a very attractive price. Size: 1½" x 2½" x 3½". N.F. 3½dB. Gain 30dB. Price: £18-00 ex-stock.

SM71 70cm. (432 MHz) PRE-AMPLIFIER

Selected FETS give a noise figure of 2-3dB and a gain of 18dB. Size: 1½" x 2½" x 4½". 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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If you require more detailed information or help, we are a telephone call or a letter away, so do not hesitate to ask.

You can call in anytime to inspect or collect equipment. Paul, G3MXG.
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- Built-in Telescopic Antenna
- Synthesized
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- Excellent Performance

TRIED AND TESTED WITH MANY THOUSANDS ALREADY IN USE. (SAE FOR DETAILS).

£202.50 inc. SECURICOR DELIVERY

We are offering the following items at reduced prices. They are ends of lines and stock we want to clear to make room for new lines. We have no literature on them and cannot enter into correspondence, so we offer them to callers only. They are all brand new and boxed.

Caringella ACA-1 audio compressor
ACA-1K audio compressor (kit)
STR-I standard time rx.
STR-1K standard time rx. (kit)
Waters 372 Clippreamp
Hallicrafters HA-1 keyer
Robot 708 Monitor
Robot 80A Camera

Prices in brackets are usual retail prices.

The following are amongst our used equipment. All have been checked and are in g.w. order. No literature is available.

Trio TL-911 linear amplifier
Creed 75R teleprinter
KW 201 receiver
KW 108 monitorscope
Hammarlund HQ-170 receiver
Grundig Satellite receiver

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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 £135.50 deposit)

11 CHANNELS WITH FACTORY FITTED R/C AUTOMATIC TONE BURST
£168.00 including VAT (or £128.00 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, KENT AND CORNWALL 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 and the receiver is of top quality design giving high sensitivity and hard IF limiting. The filter provides excellent adjacent channel rejection which is so important with today's 25 kHz channel spacing.

In fact the IC-22A is good solid value for money. Maybe it does lack some fancy gimmicks—but it doesn't need them. The Rx light comes on when a signal is received and the squelch opened—not just to tell you that there is a crystal in the socket. (You KNOW that crystals are there on the 11 most important channels.) You can work the chap next to you in the car park without pulling any plugs out and he won't blow your head off! What you get is what you want—plenty of expensive crystals and a no-fuss tone burst which doesn't demand that you press an extra button when driving. (The no-fuss THANET warranty is worth thinking about too.)

By the way, the size of the IC-22A is 2½" high x 6¼" wide x 8½" deep and it fits into the excellent quick-release mobile mounting bracket which is supplied with the rig.

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, Devon and KENT.
R5 HAMPSHIRE, BIRMINGHAM and CORNWALL.
R6 CAMBRIDGE, SOUTH WALES, NORTH WALES AND LANCASHIRE.
R7 LONDON, WORCS., Aberdeen, N. LANCs. and W. Wales.

COMING SHORTLY FROM THE ICOM STABLE

We are pleased to give you advance warning of the IC-215 which will be here in early December.

It is a 3 WATT, 15 CHANNEL, FM PORTABLE with a generous supply of crystals. It resembles the IC-202 in size and appearance and the design is to the usual high quality ICOM standard. A demonstration model and further data will be available at the Leicester show.

THANET ELECTRONICS
34 CLIFF AVENUE, HERNE BAY
KENT (02273) 63859
THE MULTI-MODE RIG THAT SETS THE PACE IN LUXURY AND QUALITY

£357.75 inc. VAT

The luxury multi-mode rig which was described in full in our advertisement in May, providing full 2 metre coverage on FM, SSB and CW using its ultra stable VFO. Full facilities for Repeater and reverse repeater use at the flick of a switch, built-in automatic crystal controlled one burst fitted by us, full break-in facilities on CW and VOX are just a few of the excellent facilities found on the increasingly popular IC-201. Send for further details or leave a message on our answering service during the evenings.

£357.75 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 beasty 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!

£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.

£250.00 inc. VAT

The ultimate luxury in 2 Meter mobiles. Comes fitted with 80 channels to suit the 2 meter band—plan, complete with crystal controlled tone burst and repeater facility. Nothing else to buy unless you want reverse repeater which can be obtained by adding ONE extra crystal. Covers all the UK simplex and repeater channels and provides a very clean signal by virtue of its excellent PLL circuitry. Send for further details of this and the rest of the excellent range of ICOM equipment.

We also stock MICROWAVE MODULES products and REVCO antennas for mobile

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Record-breaking Space-saving Antenna

The JOYSTICK VFA (Variable Frequency Antenna—a six-band, patented omni-directional antenna of extreme flexibility) is a MUST for confined locations—at the worst it can stand in the corner of the shack and still do its stuff. But space problems or no... what you need most is EFFICIENCY.

In recent test runs, using extreme QRP and under poor current sunspot conditions, the VFA produced good QSO's with FOUR continents. The makers claim that its low angle radiation conserves the precious watts going out and the equally desirable microwatts coming in on receive. High angle radiation, however, so scatters your signal power that stoking up becomes the order of the day. And then what happens? Harmonic radiation and risk of TVI is on the increase... QRO men beware! The name of the game is to achieve solid communication efficiently at the minimum power... we claim the winning name for this game is JOYSTICK!

ALREADY IN USE BY AMATEUR TRANSMITTING AND SWL STATIONS WORLD-WIDE AND IN GOVERNMENT COMMUNICATION

SYSTEM 'A'
£32.40
250w. p.e.p. OR for the SWL

SYSTEM 'J'
£38.60
500w. p.e.p. (improved 'Q' on receive)

PARTRIDGE SUPER PACKAGE

COMPLETE RADIO STATION FOR ANY LOCATION
Comprising: the NEW R.300RX (with Xtal Marker) Headphones, VFA, System 'A,' all connecting cables. Delivery: Securicor (our risk). ASSEMBLED IN SECONDS! BIG CASH SAVINGS! - OR R300 ONLY £168.75 INCL.

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G3CED
G3VFA
# SHORT WAVE MAGAZINE

(GB3SWM)

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SEPTEMBER, 1976

No. 395

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SPECIAL-EVENT STATIONS
Bridgend: At the Recreational Centre, Sept. 11-12, GW3EOP/A to be operated by the Port Talbot Amateur Radio Society for the South Wales Model Show — which has to be seen to be believed, they tell us! — with SSB on all bands, but mainly using 80/40/20m. Special QSL card for all contacts. R. Bray, GW4ESV, 8 Cerise Close, Aberavon, Port Talbot (6712), Glam.
Stafford: From the Staffs. Wing, Air training Corps Exhibition, at R.A.F. Station, Stafford, signing G4ATC on 160/80/20/2m., also operating on the ATC's own HF/VHF channels for the two hundred or so ATC squadrons active on their networks. In charge of the radio arrangements is V. J. Reynolds, G3COY, QTHR.

TWO HUNDRED MILLION MILES
In all that has appeared in the public print about the American space-craft landing on Mars, and the conjectures surrounding the possibilities of life on that gloomy planet, little has been said about the stupendous feat of electronic engineering that has made the exploration possible. A signal takes about 19 minutes to cover the distance (remarkable enough in itself) and not only have we seen some convincing real pictures but intricate tests and experiments are being carried out, and watched, by remote control across the 200-million-mile path. Such an achievement must surely rank as one of the milestones of man's progress in Science — beside it, the object of the exploration seems of relatively small importance.

COURSES FOR THE R.A.E.
Following from the notice on the Editorial page, July, we list on pp.429-430 of this issue more than 40 scheduled courses of instruction for the Radio Amateur's Examination, up and down the country. Though the List shows good coverage, there are still many "gaps" — those able to fill them by offering similar courses should let us have details as soon as possible for publication in the next issue. Because most courses start in September or early October, there is not much point in publicity for them later in the year.

"RF AMPLIFIER FOR THE SEVENTY CENTIMETRES"
In a comment on this article in the July issue, G8FMK suggests that if resonance of the line inductors around 432 MHz cannot be obtained, L3 should be 1½-in. bent to ½-in. radius; L4 also to ½-in. but 2 ins. long; L5 made half-wave of 16g. (3½-in. long) spaced ½-in. centres; and L6, 1½ ins. in the arms, at ½-in. radius. Of course, at frequencies of this sort, minor difference in constructional form can have a considerable effect — so the comment by G8FMK (who finds this PA very good on 432 MHz) is helpful and interesting.

HARDLY BELIEVE IT!
At a certain Engineering Institute, the head is a Mr A. C. Mains and one of his current students is a Mr D. C. Circuit — and we are assured that this is not a fabrication, the name of the College of Technology concerned having been given. In a way, though, this is no odder than the name of a colleague of ours, many years ago, who was the operator of secrecy radio equipment and whose real name was W. T. Cypher — and that was actually his job!

FORTHCOMING RALLY DATES
Peterborough: On Sept. 19 at Walton School, Mount-steven Avenue, talk-in by G3DWQ on two-metre channels S0 and S20.
Torbay: For August 29, venue changed to Haldon Race Course, four miles out from Exeter on the A.38, sign-posted, with talk-in on 160/80/2m., also 70 cm., call sign not mentioned.
Harlow: On Sept. 26, at Nettleswell School, details from T. Robinson, G3WUX, 5 Rectory Road, Harlow, Essex.
COMMUNICATION and DX NEWS

L Ast month, we were complaining about the heat; as your scribe sits down to write this, the temperature is rather more comfortable and Twenty is not over-burdened with noise of the natural variety; while Eighty your scribe has not listened, not so much from fear of a busted eardrum from static, as from the fact that, at last, the pundits have been proven right—a bird flew into the aerial at the far end about 11.45 one night, resulting in a mighty twanging noise, and broke the span off at the very far end. But that’s the first time the 28g has been brought down by animal life in ten years.

It’s a pity some people took umbrage at the writer's comments on GB3LO and the FM-simplex boys, by extending it to include the other users of two metres; so let it be clear that G3KFE was not and is not anti-VHF, but very much concerned at the activity going on with GB3LO and on the simplex channels as regards jamming and deliberate license-breaking by certain stations, most of whom would appear in fact to be plain pirates. As for 80m. the QRM'ing of DX at the HF end, and the operation of AM stations in the CW portion of the band, are the only real gripes, and the former is largely—at least when the writer’s been listening—not so much from G’s as from other EU’s. As for the nattering that goes on, the pundits may be boring, they may be technically off-the-beam on whatever they are discussing—but that is their opinion and they are entitled to it, and rag-chewing, provided it is within the terms of the licence is fair and legitimate operation. Piracy, obscenities, and jamming of a repeater is not legitimate operation.

The Bands

Let us start with Ten, which has been showing us during the summer just how much can happen even when one is right at the bottom of the sunspot cycle; recall that Ten-Metre Activity Day back in the Spring, and the odd reports since? Well now, the promised Autumn event is now firmed up, as October 3, times 0001z to 2359z, and the rules of the game are essentially the same as before, saving that this time it is suggested the CW operators use the first 100 kHz, and the Phone men stick to the area 28-5 to 28-6 MHz, simply so as to reduce the situation we had last time where some folk got left out of the activity because they were sitting on frequencies which were not being searched. Exchange reports plus a serial number, although this is not a contest, but a propagation study; the serial numbers will help the organisers to collate the gen from the various logs sent in. Last time some 400 U.K. stations took part, in addition to many from other countries and parts of the world—let’s see if we can double this level of activity this time. Send a summary of stations worked/heard, plus comments on band conditions and propagation as it seemed to you, to David Whitaker, 57 Green Lane, Harrogate, N. Yorks. And, for the record, may we comment that David is a long-time SWL and the brother of G3GW; he himself has monitored the band through the summer and found a surprising number of countries—some 70 have been logged this year so far, and in July the following were noted: FM7WR, YN1FWM, HB0LL, TI2TB, KP4EAJ, YV4BDB, YSIAME, PZ1AE, A9XBC, Y9Y4NP and VP9AD.

G2HLU (Reading) found plenty of interesting stuff round Europe, all on CW, with the best “DX” worked as a UB5; that other OT, ex-G2XC (Horndean) has gone up from the Heath HR-10B to an SB-303, which he has just finished. Ted looked through his old logs, and reckons he can never recall so much Sporadic-E propagation back in 1947/48—this year he has never failed to find Ten open whenever he has listened in daylight, even though it be only to Italy!

The spider-like handwriting of G3DNF (Leeds) (his description!)—takes us to task for wondering about G3RVJ last time; Gordon remarks that the latest issue of the quarterly Sprat is to hand just in time to miss last month's deadline! On a different topic, G3DNF describes Ten as being “catch as catch can!”—but after several weeks of fun, the band died just in time for the QRP Contest. That’s old man Murphy again.

GW4BLE (Newport, Gwent), found the odd opening to the ‘States in the early evenings, plus the S9 EU’s and the odd one from South America, adding up in all to VE1XV, W1-4, YV4BDX, YV4BDB and 8P6BN.

G3NOF (Yeovil) is yet another one who remarks on the number of 10-metre openings this year; for him it has been lots of G’s and EU’s during the day, with W’s audible, weakly but clearly, from 2000 right through till the small hours. Don worked H18MOW, W3IK, W3KDD, W3VUH, W4IHZ, W5UDK/1, W8MUS/8, W8ODW, WA1QZB, W3RNJ, WB4YFK/4 and W2HWH/3, for his crop this month.

G4EAN (Nottingham) writes in; he runs an FT-101B plus outboard VFO, an FL-2100B Linear and a TH3 beam up on a Versatower; he operates from his bedroom; all contacts SSB, the operating approach is one good long session, say, once a week, rather than the same amount of time spread over short daily sessions; one long session produced twenty-odd contacts on Ten, while the best of the month’s crop was SV1AE

Now Fifteen

With all this activity on Ten, one would expect Fifteen to show even more liveliness; and, always bearing in mind that we have been sitting in the bottom of the sunspot cycle, and with mainly “low Normal” conditions predicted, “conditions” are, in part at least, a reflection of activity, and activity has been up—so conditions have seemed better! And, of course, it has to be admitted that there does seem to be an increase in the proportion of sunspot activity out towards the solar poles, which would seem to indicate we are at or near the bottom. And, of one thing we may be certain—the only way from the bottom is UP!

One correspondent, ex-G2XC, says he hasn’t heard 21 MHz during a sunspot maximum for comparison, but after what he reads of other folk’s
To celebrate its 30th anniversary, the Gibraltar Amateur Radio Society ZB2A, established ZB30ANY at the local John Mackintosh Hall. Here we see G8B1 (from Welwyn Garden City, Herts., and the founder of the R.A.F. Amateur Radio Club on the Rock) operating an FT-101 transceiver under the ZB30ANY call. He flew out to Gibraltar specially for the occasion.

views, he gains the impression that his attic aerials are doing even better than he had at first thought. Comparing his results for June against those mentioned here last time; allowing for nine days away at the start of the period, the following were for about 30 minutes from 1515z for the Solent group sked with ZS6CR, and again for an hour or so later in the evening, Ted logged 15m. CW from EA9AQ, YV3VU, WB8RUQ, 4Z4NUT and 9J2BO, while SSB accounted for A9XBC, CE3RC, CE7BF, CP6CZC, CT3AF, CX4BD, CX4CR, EL2R, HK3PA, KP4EIC, KP4CH, KZ5LU, a gangle of LU’s and PY’s, OA4AZB and OA4HW, P21DR, UK9AAN, East Coast W/K’s, ZD7SD, ZD9BT working GB2SM, ZE1FD, ZP5PK, ZS6’s, 4X4HT, 5N2NAS, 5Z4NH, 5Z4PG, 5Z4RG, 8P6AJ, 9G1HC, 9G1HZ, 9G1KB, 9J2WR, 9Q5DM, 9Y4AB and 9Y40K. For July it was essentially the mixture as before saving that in addition D2AZB and D2ARM, FG7AM, VE’s and such, indicated that the propagation was inclining more East-West than in the previous month.

G2HLU indicates he has had the “odd small pieces of luck,” in which category Harold includes ZP5AO for an all-time new one.

G3WKF (St. Austell) is a new correspondent who paid the penalty last time round by writing direct at the last moment—instead of to the Editorial address. G3WKF, it seems, is getting a bit bored with VHF, and having gear available, it seemed an idea to get away on the HF’s. A home-built 21 MHz Quad was built, but it was found to be a bit of a brute to set up and adjust. So, back to the drawing board, and this time the Mark II had remote adjustment of the gamma match and the stub by way of a couple of those one r.p.m. model-maker’s motors, which require no more steam than that provided by a U2 battery. A local field was chosen for a P effort with the Quad at 54 feet, and the following were worked during a week: PY2BGA, 9Q5DM, 9J2GA VQ9R, CE4DR, VP5F, ZP5ZI, W8JAC, 9X5JB, 8P6FX, CE4KX, CE2AZ, KV4AD, WA2VFA, 9G1JR, LU5HFO, CE3AUL, ZC4DH, ZS6BLI, EA8CK, FG7TD, some more LU’s, 9J2WR, P25AA, and—most interesting—9J2CJ using five watts of SSB to a good high beam. One gets the feeling that maybe G3WKF will stick around on HF for a while!

GW4BLE says he only had three days on the band, so his log is hardly representative—but it seems very so to this scribe, carrying as it does references to C31HD, C31MS, D2ALB, G3ZRS/MM off ZS3, KP4ECH, LU4AIW, LU8MBV, ZE3JO, ZS3BL, 5Z4RG and 9J2WR. Recently, meeting the brother of ZE3JO, your scribe got news of one who used to be a regular correspondent.

In contrast to most of the others, G3NOF seems to have picked all the wrong times this month, he having heard only Europeans; although the grapevine had told him others were about, in particular early afternoons and late evenings, Don managed to draw a blank—the first one that G3NOF has reported on 21 MHz since your scribe started in on this piece years ago.

G4EAN had just one session on Fifteen, on July 11, when he connected with SM6ATK/P3, HK3DBZ and OZ6AZ.

Maritime Mobile

G3ZGC/MM reports on his latest trip. He rejoined Esso Scotia, GZJG, on July 8, and at the time of writing was on the track to the Persian Gulf and back with the same old FT-75 which Richard now calculates to have done 250,000 miles with the ship. His letter was dated July 29, from Capetown, and his contacts
seem to have split between 21 MHz, on which he hooked JG1MRB/MM on a tanker Hida Maru, JENN (heading for JA from the Persian Gulf) and Forty on which most effort has been expended, with DJ7KP/MM on a sailing yacht on Lake Constance worked, plus G3ZRS/MM (Clan Robertson, GMVE, trading G-ZS and back). Time after time the band has been full of G’s and EU’s on Forty, and call after call has yielded no reply whatever, save that Richard did manage a 459 from G3LIK after a QSY from Twenty; of course as the G3ZGC/MM is the first to say, the BCI is heavy in Europe on 7 MHz—true enough, but a good attenuator at the front-end of the receiver can work wonders!

**Twenty**

Action, all action! Well, not quite as exciting as that, maybe, but tending in the right direction at least. G3KFE had a few listens on the HF end of Twenty for A4XGQ in the evening but heard nothing of him—not surprisingly when one realised Alan was on the “other” shift and so operational at 0615! A4XGQ is the only station active on Masirah, the RAF station being out of use, but his problem is being within very close proximity of a QRO BC station, with his Quad looking straight through the BC aerials to see the U.K.

That last paragraph was written 24 hours ago, and in the meantime, who should have written in but A4XGQ! Alan has stuck to two-way SSB, and his list, all taken with the beam fixed on the U.K., includes, naturally, lots of Europeans, also EL2EN, EP2MY, HZ1SH, JY9CS, JY6TC, M1D, R3FL, SV1KT, TA12B, UA6DDV, UA9TN, U9WMU, U5ARTEK, VK, VQ9HCS (Astove), WB6EEW/VQ9, VU2HI, WA9EEV/VQ9, YB2CR, YK3IBA, ZC4AU, 4S7DA, 5B4CW, 5Z4LV, 6W8AAD, 7X4MD, 9H1EY, 9H4B, 9J2BL and 9K2DP. An annoying gotaway was 5X5—the only one still around, who was mistaken for a 4X4, the latter country being verboten to Masirah ops under their licence terms; however, a suitable word of consolation has been passed to the 5X5.

G2HLU complains that often when he goes to Twenty the band is “duff,” but admits that it is not always thus—Murphy has to sleep sometimes! At these times the TS520 CW has rattled the cans at W6’s and W7’s, a KL7, FC9UC, JA5PL, JW5NM and Z55EL; and of the first three prefixes mentioned there were even the odd occasion when they were hooked by a CQ call.

QRP on Twenty for G3DNF with two watts yielded C31IX, UH8HBM and YV5ANT—which must take him close to a two-watt WAC.

The only time the beam was turned from its usual Westerly heading by G4WBE was when he was looking for Bill Rindone from Geyser Reef—more anon about Bill’s doings—and the westerly heading gave contacts with CP8AT/M, HC2WF, HC5EE, HK4DF, HK6BRK, L12CF, NG2USA and VP5Z5/MM off H8, and a plus while “resting from the contest” as one of the G4WENT operators in AL7HCN for Steve’s only second ever KL7.

The summary picture from G3NFO shows the band opening to W6, W7, V6, V7 at 0600 on some days and on others to the Pacific; KH6’s and KL7’s for example. East Coast W’s have been heard as early as 0900, the KL7 and W7 signals having been heard at odd times to 1300. During the day there has been very short skip, with S9 G’s, and little heard of VK/ZL. Around 1600 there have been some short-path openings to JA, while the evenings have been occupied by North and South Americans. G3NFO’s SSB signals penetrated to A4XGQ, AA7JAA, AA7UQV, A68MRY/KL7, AH3GK, AL7HCN, AL7HRP, AL7HRN/6, AD5FVA, AD5TCI, C31KA, C31KM/P, CT6CAL, CZ20 (the Olympic Games station), D4CBS, FW8CO, G3ZRS/MM (off West Africa), HR1SO, IF9HLO, IH9HLO, IL7WTI, JA1EQD, JA3WQH, JA9ED, K5OV, K7RSC, KH6HDT, KH6HHN, KL7HCN, KL7IEU, KL7INU, PE2EVO, R1SKW, TR8BJ, VE6AKG, VE8HT, VE7AQF, VE7BC, VE7BGK, VE7BVH, VE7C01, VE7DSR, VP1MPW, VR5AH, VH72U, various rare W7’s, VQ9P, 3D2AJ, 9J2GF, with gotaways in the form of FO8DO, FO8EX, KA6RI, VR3AK and SWIAX.

G4EAN managed CZ20, VE1AZN, AB2WOU, ZB2RB (G3VGW and XYL G4EYL), and a first-ever CW QSO with EA1DN.

G4DJO (St. Annes-on-Sea) is a Joystick user who sticks to CW only at the 120-watt input level. Before his holidays Peter made it to various parts of W/K, CZ2RV (VE2RV during the Olympics), OY2H, followed by a break for holidays and a session in one of the U.S. contests which produced a great string of different States (with C31UX neatly stitched in the middle for variety), KV4CI/MM2, VE5BX, TA12B, another fine assortment in the YV contest including one with the “unlikely” sounding call of CX1EK/AC4 (shades of AC4RF!), LG5LG, and 4J4A.

Another Joystick user is G4EVO, who buckles it to a five-watt CW rig and works all round Europe and occasionally into Russia-in-Asia.

G4CQK (Walton-on-Thames) is playing happily with a Heath HW-8

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“... and this is the heat-sink for my new PA...”
QRP rig, with, as he puts it "not much to report," but no doubt he got quite a kick out of working VE3GSZ with three watts on 14 MHz.

Odd Comments

G2HKU had a fall in front of a car, and in twisting to avoid it wrenched the ligaments in his foot which put him hors de combat. However, three weeks later G2HKU got back on the air after his XYL had brought down the PM2B to his bedside, and spliced numerous lengths of coax to extend the aerial down from the shack. Although the CW is a bit shaky (Ted having to hold the key in one hand and use it with the other), some QSO's have been made, with G2NJ, PA0PN, ON4GU and DK7PM.

Some interesting experiments with S-meters have been done by Ted, ex-G2XC, who seems well set on the way to making a come-back after all those years when the ticket was allowed to lapse. He noted that signals on the SB-303, after the meter had settled (which, incidentally seems to take a longer time than other specimens of the breed), could be Q5 and but S0 on the meter, and so carried out an interesting little experiment with a signal generator and attenuators and the receiver tuned to maximum on an unmodulated signal. The attenuation was increased until the meter just dropped to zero, at which point the signal was still quite readable. With AGC off, a VOM connected on the speaker and switched to its dB range, the input was further reduced until inaudibility was reached 14 dB of signal input lower. Thus, Ted concludes, the signal which just moves the S-meter is in fact S3, so he uses this as a correction-factor. A good point this; after all, the signal-strength reading scale as it is quoted in the books starts from S1, while every setmaker seems to calibrate his S-meter by taking S9 as the starting-point. Since we are talking about dB's, we are taking about ratios and the two methods must give different answers throughout the range.

A note of congratulation to G4EAX (Long Eaton) who, despite imminent marriage, continues to press on with Top Band as the Table will show; but by the time our next deadline comes round John will have achieved the happy state and we must wait and see how Amateur Radio fares!

Cray Valley group celebrate their 30th Anniversary in October, and it is as part of this celebration that they will have GB3OCV on the air throughout October on the HF bands, with a commemorative QSL. In addition, Top Band enthusiasts can play in a contest they are holding on October 17—all details from G3YWO, with an s.a.e.

G3RJV (Calverton) found himself encouraged by what he heard on the few occasions he could get on the bands, even though he could himself not work out of Europe, while an /P day brought, as he put it, "more sunburn than DX!" However, to return to the QRP Activity Weekend arranged for September 25-26! For this, the QRP chaps are going to see how much they can work each other—not a contest but an Activity. They will be congregating around 3540, 7040, 14065, 21040, and 28040 kHz, plus/minus say, five kHz, so give 'em a chance by avoiding QRM at these
TOP BAND COUNTIES/COUNTRIES

Starting date, November 1, 1975

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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 end. No other cross-mode contacts permitted.

frequency areas for the weekend.

The YL Net about 3705 kHz on Saturday mornings got off to a good start, we hear through the grapevine; keep it going, girls, and we hope you get some more “attendees” on the net—eleven till noon, is the time.

We have the results of 1975 CQ WW Phone and CW Contests to hand, thanks to W1WY. It looks as if the U.K. participation was higher than for many years. Looking at the Phone section, G3LNS was fifth in the all-band single-op. section, while in the single op. single-band entries we see G3WJN at the top of the 21 MHz pile and G3XYP fourth on 14 MHz. On CW, G2BOZ came sixth on 28 MHz, with G3HCT doing the same on 14 MHz, while G3HTA was sixth on 3.5 MHz, and GD4BEG second on Top Band. Congratulations to all, and to the large number of people who put in entries from U.K.

DX Doings

Eventually WB7ABK managed to get clear of the Sudan, and opened up from Geyser Bank under the call-sign YM0AA, which made for quite a lot of confusion, this being a Turkish prefix—as Bill was signing /TA when he was in Turkey doubtless the ticket followed him on after his departure! His next move was to be to go to D6A, but at this writing your scribe has not heard him from there.

Ex-A35AF reported on from ZK2AR was ex-A35AF, doing a brisk trade. However, he is not there permanently, and hopes to operate from another Pacific location before returning home to JRIATU, where all his QSL’s should be sent.

Time will be running short when you read this if you want to work 4J0KAA, being a commemorative from Wrangel Is., with QSL’s to UA3AXF or UA3GM. This operation is to terminate around September 8.

A quick look at the Contest Calendar of W1WY shows the European Phone over the weekend of September 11-12, and on October 2-3 the VK/ZL/Oceania first leg, the second leg coinciding on October 9-10 with the RSGB 21/28 MHz contest, for which we would hope as many as possible will get on Ten and use the band. And, of course, the last weekend in October is the CQWW DX Phone contest with the CW leg on the last weekend in November.

The LF Bands

This long, hot summer has not been all that encouraging on the LF bands; your scribe usually decides whether to look at ‘em on the way home, from the amount of static that is audible on the MW car radio. Whence, of course, a shortage of reports.

There is much to be said for putting plenty of wire down into the garden, reports G2BJY, amput our descrip-

tion of his aerial last month—it not only does the RF good, but it seems to grow cucumbers too (one of Geoff’s was so big he had to get help to lift it out of the frame!).

G2HLU mentions one early session on Forth, when he worked CO2SM for a new one and also VK3MR-of-the-rhombics, who said that conditions were very poor, giving Harold some consolation for his 339 report!

G2NJ (Peterborough) had quite a crop of contacts with the QRP folk; one of the most interesting was with G5OJ (Ewhurst) who had 1-2 watts to a breadboard transmitter using a single old Ediswan PV625X null-emitter triode (!) and another with G15DX who’s aerial was down for hay-cutting but who was getting out very well with a Joystick. On Eighty G4EVO seems to have covered most of nearer Europe with his QRP CW and Joystick, getting quite good reports all round.

G3RJV has been fully occupied keeping the QRP Club “on the road” and working, but now that holidays are once more with us, he will doubtless put the rig back on the air and do some QRP DX—certainly George promises to appear for the QRP Activity weekend.

In an interesting (but late!) report G4EDG (Newton Abbot) discusses Forty, he says “produces some amazing DX either late at night or early in the morning.” With a home-built three-band trap vertical having numerous radials and an FT-560, he lists some very impressive CW/DX results, from Australasia round to the distant W/VE areas. But he admits to being much bothered by the thoughtless, inconsiderate and ineffective operating of numerous EU’s (he gives the palm to the YU’s for this general liddery) who spoilt, among others, a good QSO of his with rarity 9A1TICO.

Big Switch

Is where we go QRT for another month and give you the deadline date—it’s September 13, arrival addressed as ever to “CDXN,” SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

Keep in touch by reading “Short Wave Magazine” regularly.
SIDEBAND TRANSLATOR FOR TOP BAND
CONVERSION DESIGN USING HF PRIME MOVER

Those thinking of embarking upon SSB operation on the 160-metre band—and already possessing an SSB transmitter working on higher frequencies—could hardly find anything simpler or more convenient than the circuit shown above.

It is an oscillator-mixer arrangement using two readily available valves, as being the easiest approach to match in with most existing equipment—hence, an ECF80 driving a 5B/254M, with Sideband drive to Cathode 2 of the ECF80. The 5B/254M is a robust valve, like the 807, which could be substituted without significant circuit changes.

Construction

The small translator was built on a standard aluminium chassis measuring 12ins. x 8ins. x 2ins, with the long side going from front to rear. The oscillator-mixer was to the rear and in-line construction followed with the amplifier valve next and the tuning coil and capacitor to the front. There was sufficient room for the ATU to be mounted beside the tank circuit had this been required, although for the writer’s particular layout it was more convenient to have it remote and feed the energy from the tank over co-axial cable to the ATU.

The output of a K.W. “Viceroy” Mark II SSB exciter was fed into the mixer on 7 MHz and as this was using lower sideband and the crystal injection for the conversion frequency was also on the lower side, the lower sideband would appear on Top Band. Everything tuned up exactly after the GDO had set the coils; more than adequate drive was obtained from the mixer into the 5B/254M for ABI operation—in fact, the grid meter could be run up to 4 mA with full carrier insertion and at this the output could be loaded to well beyond the limit. At 40w. p.e.p. input the linearity is excellent and well below the distortion level. Reports received have

<table>
<thead>
<tr>
<th>Table of Values</th>
<th>Sideband Translator circuit for Top Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 = 2.7 µF</td>
<td>R5 = 75 ohms, 1w.</td>
</tr>
<tr>
<td>C2 = 0.05 µF</td>
<td>R6 = 47,000 ohms, 1w.</td>
</tr>
<tr>
<td>C3 = 60 µF</td>
<td>R7 = 1,000 ohms, ½w.</td>
</tr>
<tr>
<td>C4, C7, C8, C10, C12, C13</td>
<td>RFC = 2.2 mh RF choke</td>
</tr>
<tr>
<td>C5, C9 = 0.1 µF</td>
<td>Xtal = 5.2 MHz</td>
</tr>
<tr>
<td>C6 = 50 µF</td>
<td>APC = 5ins spaced on resistor body</td>
</tr>
<tr>
<td>C11 = 15-400 µF</td>
<td>L1 = To tune 5-2 MHz with C3</td>
</tr>
<tr>
<td>R1 = 47,000 ohms, ½w.</td>
<td>L2 = To tune 1 MHz</td>
</tr>
<tr>
<td>R2 = 47,000 ohms, ½w.</td>
<td>L3 = To tune 1 MHz</td>
</tr>
<tr>
<td>R3 = 100,000 ohms, ½w.</td>
<td>V1 = ECF80</td>
</tr>
<tr>
<td>R4 = 680 ohms, ½w.</td>
<td>V2 = 5B/254M</td>
</tr>
</tbody>
</table>
indicated that the signal is very clean and entirely acceptable in every way.

Alternatives

So straightforward is the circuit that it requires no explanation in detail, and it can be copied easily and with confidence as shown here. It might be useful, however, to comment on one or two alternatives which could be tried, as it is not everyone who has a 7 MHz exciter with the correct sideband output at the right power level. Some SSB transmitters of older design had upper sideband on the 7 MHz range and this would require a 9 MHz crystal to be used in place of the 5-2 MHz of the lower sideband set up. Again, if the SSB rig has only 14 MHz output with upper sideband, then a 16 MHz oscillator will do the trick quite nicely. A word about the signal frequency drive levels: Only about 10 volts RMS is required across the terminating resistor in the mixer cathode and this is just about right for most excitors using 6CL6's or the like as Class-A amplifiers. But if the output of the SSB transmitter is something like a pair of 6146's then perhaps the easiest way of doing things is to terminate the transmitter in its dummy load and then to reduce the RF voltage across this.

For the more adventurous, it will be obvious that a little drive can be filtered off before the linears of the HF rig and the linear PA disabled when Top Band operation is desired. How the drive at 7 MHz is derived is of little consequence as long as it does not exceed the 10 volts or so required. It is also wise not to have too much drive at the conversion frequency from the crystal and the 2-7 μF coupling capacitor C1 was found to be adequate for the HT used on the oscillator anode, measured as 100 volts. The fussy ones might like to stabilise this voltage, of course, and it would be a useful refinement for those whose mains are not too steady.

If this article has given some readers ideas about using the same sort of approach for VHF purposes, the writer would say—please do not try it. A very different type of design must be adopted for VHF to keep unwanted products down to a safe level.

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EASY QUAD FOR FIFTEEN METRES

DESIGN AND CONSTRUCTION

F. C. SMITH (GW2DDX)

HAVING tried many ideas for antennas, some good, others not so good, the lack of space necessitated something compact but efficient. The two-element Quad is a good DX design, but its construction is something else!

How to get a Quad built and airborne with the least trouble gave the writer food for thought. Finally, he came up with the Easy Quad: Easy to construct, Easy to get aloft, and cheap to build. To the amateur who has a thin purse and little garden space, this easy Quad could be the answer, and from a DX angle it undoubtedly works. It requires only one person to construct and erect it, and can be hoisted to the top of a thirty-three foot mast in short time, rotated by hand, and when it blows hard can be lowered to a few feet above ground level.

A point of interest is to the diamond shape. The greater the physical separation of the high-current points in the two half-waves, the lower the angle of maximum radiation in the vertical plane. Thus, this configuration of the Quad elements gives a bonus.

Materials

Wire for the elements can be twin lighting flex; the heavy gauge is ideal. This can be split into two single strands to double the length. Four seven foot by half-inch canes will be required for the centre span (make sure they have no cracks or splits in them) and two five foot seven inch by one inch thick canes for the top and the bottom sections. One-inch canes ensure strength for hoisting, and at the bottom the cane is heavy enough to keep the wire elements taut. A five foot seven inch all tube one inch thick is needed for the boom, together with two cross-sections, each four foot six inches, also one inch thick. The canes are slotted into these cross-sections, as in sketch herewith. Two angle-alloy T-pieces are also needed to assemble the middle structure, as in the drawing. A three-inch ring fitted to the mast is anchored to the centre of the boom, thus ensuring the boom stays centred on the mast when hoisted.

Construction

Having measured out the wire elements, eleven foot five inches, each leg, place the boom (assembled) on the ground (or garage roof), insert the four canes and having drilled the ends as per drawing run a short piece of 16g. wire through and twist around the tube to lock the canes. Place the one-inch top cane across the boom, run the aerial wire through the insulator and lock it. If this is not done the wires will slide out of plumb. Now measure eleven foot five inches to the cross canes and again secure, making sure the wire cannot slip. Having done this both to the driven element and the reflector, you can now hoist the structure about ten feet in the air. Bring in the trailing wires and fix to the bottom cane. The method of fixing may be left to the constructor; insulators or barrier strip can be used here. Fit the thirty-inch stub to the reflector and a 72-ohm flat line to the driven element, hoist the aerial and when about twelve feet from the ground the Quad can be tuned up in the normal way by using a step ladder.

Results

The tuning of the Quad follows normal practice, details which can be found in the Amateur Radio Handbooks. The important dimension is the physical length of the sides of the array. This having been satisfied, the
Fig. 1. General layout of the Quad for 21 MHz. Dimensions are: Sides, 11ft. 5ins.; Element spacing, 5ft. 7ins.; Feed impedance, 70 ohms (flat-twin); Stub, 30ins.

(continued overleaf)
tuning of the stub will optimise forward gain or front-to-back ratio with no difficulty.

The Easy Quad described here compares favourably with the three-element Yagi, signal reports being much the same when working DX stations using the three-element beam. The Quad at a height of \( \frac{3}{8} \)-wavelength to the bottom element gives a good account of itself, ZS, ZE, SZ4, OD, 4X4, W and ST having all been worked, this when the band has been only partly open for DX. It is proposed to add 10-metre elements at a later date by interlacing for when Ten starts to open up. For an antenna costing under five pounds, the Easy Quad seems not a bad proposition.

**Do You Know That —**

— Cheap flexible drives, capable of working through angles, can be contrived from discarded lengths of fractured speedometer cable. Just cut off the required piece, heat its ends, and force them into paxolin tube (or plastic-type insulant), to which the mechanical connections can be made. Old speedo. cable can often be had for the asking from repair garages, or at minimal cost from a car-breaker's yard.

— Mis-alignment of the central element of a coax socket during soldering (caused by the insulation going soft under heat) can easily be prevented by putting a spare coax plug into the socket while the inner is being soldered. This will not only hold the middle pin rigidly in the correct position, but will also act as a partial heatsink during the actual soldering operation. The work should be allowed to cool off to normal temperature before the plug is pulled out, when it will be found that the central insulator has set hard again, leaving the socket pin accurately centred.

— Any multi-meter type of test set having a DC range of about 0-10 mA can be adapted for comparative field-strength measurements by wiring a suitable RF choke in series with a diode, this network then being put across the meter terminals. The instrument is aperiodic and can be used on any amateur band if a short pick-up rod is fitted to the junction of the diode and the RF choke.

— Strong single nylon fishing line used as end insulation with 33g. nickel-plated piano wire, obtainable as model aircraft control line in 150ft. lengths, will make, together, a strong and almost invisible aerial for LF-band working at heights of 30-40ft. These ingredients are available at any of those shops combining sports goods and model supplies—and no reasonable neighbour could object to such an aerial passing over his garden.

— The resonance point of any mobile aerial can be altered by as much as 100 kHz (on 160m.) by adjusting the angle from the vertical through up to 45°. This can avoid the necessity for capacity hats, adjustable top sections, tapped coils, or other impediments.

— The few volts needed to power an odd piece of transistorised equipment, e.g. the microphone preamp. for a modulator unit, can easily be derived from a spare LT winding on any small transformer by using a cheap transistor as a diode half-wave rectifier, working into a 100-ohm resistor as a surge limiter with 1000 \(\mu\)F of smoothing.

— A quick RF choke for Rx purposes can be contrived by using a discarded 465 kHz IF transformer with the parallel condensers removed. One such can will provide two chokes and the inductance will be in the order of 1-2 mH.

— If needing to play \( \frac{3}{4} \) i.p.m. tape on a \( \frac{3}{4} \) i.p.m. tape deck, the diameter of the capstan spindle can be doubled by overwinding it with insulating sleeving, or anything similar. A permanent adaptor can be made from a piece of plastic rod exactly double the diameter of the capstan, drilled to be a tight fit on the capstan spindle. The result will be found quite satisfactory.
--- When loading a quarter-wave end-fed aerial—such as a wire of about 130ft. for Top Band working—a low-wattage bulb with a shorting switch, inserted in series with the aerial and as close as possible to the feed point from the Tx, will glow when maximum RF current is flowing in the aerial; thus, it is a very useful indicator for tune-up purposes. While actually transmitting, the bulb should be shorted out (using the switch). It will also serve as a rough guide to modulation—the bulb should flash under modulation.

--- Adaptors for plugging HC6U-type crystals into FT-243 holders can be made from HC6U sockets by soldering half-inch lengths of tinned copper wire on to the inside of the solder-tags. If wire of about 16g. is used, it will be necessary to do a little bending and shaping to ensure a snug fit.

--- Guaranteed jam-proof nylon and fibre pulleys, impervious to weather and very suitable for aerial installations of all sorts, can be obtained from any shop supplying the needs of yachtsmen and small-boat enthusiasts. These shops also carry very useful lines in cordage and swivel fittings, adaptable to amateur aerial installations.

--- A car headlight dip-switch makes an excellent foot-operated control for a relay-actuated Tx/Rx change-over system. New switches can be obtained from most garages doing repair work, while used switches can be found in any car-breaker’s yard for a few coppers. The contacts should be carefully cleaned, and the switch solidly mounted, so that it will withstand constant foot control.

--- Fig. 1

--- Fig. 2

--- REDUCED-SPACE AERIALS FOR TWENTY

PRACTICAL CONFIGURATIONS

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

A DIPOLE cut for one band, fed with co-ax and plugged directly into the transmitter, is probably the easiest aerial to use. It is, of course, the yardstick against which the gain of other aerials is measured, but is good for general purposes and by the writer has been found to give satisfactory contact with JA, VK and other DX, using a K.W. 300w. p.e.p. transceiver. (No doubt multitudes of dipole users know this.) Over the holiday period there was occasion to use dipoles needing even less space, and two are shown here.

Inverted-Vee

This is shown in Fig. 1. With a high, straight dipole about 33ft. is the calculated length for the middle of the 14 MHz band. Each leg of the Vee was initially 16ft. 9in. as shortening is easier than soldering bits on. The SWR was 1.5:1 at 14-05 MHz and 2:1 at 14-15 MHz, so clearly this was a little too long for the site. Overall length should be reduced about 3in. for each 100 kHz on this band, so 2in. were cut from each end. SWR was then 1:1:1 at 14-05 MHz, 1:3:1 at 14-15 MHz, and 1:8:1 at 14-25 MHz, so another 2in. were removed from each end, leaving 16ft. 5in. legs. The SWR then came down to 1:2:1 at 14-05 MHz, nearly 1:1 at 14-15 MHz, and about 1:2:1 at 14-25 MHz, so this was suitable and regarded as being about as near as one could get.

The actual aerial is 7/22 wire, and the lower ends were about 4ft. above ground (easy to reach). The co-axial feeder is 52-ohm.

L-Aerial

This is shown in Fig. 2, and has one leg vertical, and the other horizontal 2ft. from the ground. This particular height suited the supports available, and can be changed, the aerial being pruned if necessary to suit. It was found that lengths of 16ft. 2in. were needed here, and gave under 1:4:1 SWR from 14-05 to 14-25 MHz. This SWR is good enough for all practical purposes. The feeder is again 52 ohm.

Supports

With legs at 90° to each other, and bottom ends 4ft-high, the apex of the inverted-V is about 15ft. above ground. Similarly, the top of the vertical in Fig. 2 needs a support about 18½ft. high.

These heights are not very great, but it is helpful to have the aerial as far as possible in the clear, or at least to avoid too much earthed structure close to the aerial legs. Fig. 1 was found satisfactory with the whole sloping somewhat so that a cord could run to a chimney. A wire from the chimney to a high adjacent support, to raise the aerial as in Fig. 1, was also used. This was the method employed for Fig. 2, to get the vertical straight up.

Both aerials gave satisfactory all-round results, and can be fitted up in quite a small space—about 24ft. for Fig. 1, and 17ft. for Fig. 2.
ANTENNASCOPE
FOR AERIAL MEASUREMENTS

The device described here was originated by W2AEF and published in CQ some years ago. He called it the "antennascope" and it has appeared in various guises since. In effect, it is an easily constructed and calibrated aerial-test meter for impedance measurements, and is used in conjunction with a GDO as the RF power source.

Normally, the range of impedances in which we are interested for aerials and feeder lines is about 50-400 ohms, and this is easily accommodated by the circuit shown here. As can be seen, it is a bridge arrangement, and is not particularly frequency-conscious except in the VHF ranges. Calibration is effected on the resistor R1, against resistors of known value connected across the "Test Z" point, with the GDO coupled to the input side at some convenient frequency—say, 14 MHz.

In operation, the unknown feeder—or aerial-feeder combination—is connected at Z and, with the GDO supplying RF at the frequency of interest, R1 is adjusted to produce a minimum reading on the meter M. If R1 has been correctly calibrated, that reading will be the impedance of the load. It follows that, in a resonant system, it should be possible to see impedance changes as a mis-match occurs when the GDO is swung over a wide frequency range. Similarly, the mis-match or impedance variation can be checked as the system is changed from band to band. Indeed, this aerial test meter will make all sorts of startling revelations once its multifarious applications have been grasped!

To Construct

The circuit should be made up neatly as a single unit in a small box, with the meter M mounted in conjunction with R1 working against a marked scale, and having terminals for the "Test Z" connections with a probe for the GDO link.

For R1, a good-quality composition type resistor should be used and the diode D can be any semiconductor having a high backward and low forward resistance. The meter is shown as 0-100 µA, but in fact a less sensitive instrument could be used if the RF driving power is increased (as from a VFO) and the diode will stand more current. In practice, however, it is better to keep these elements "sensitive," as thereby calibration will be more accurate and better impedance readings obtained.

Under usual conditions, chassis-earthling is sufficient—that is to say, bonding the earthy side of the circuit to the box is enough. But if the device is to be used in a static layout—as when a GDO is incorporated and the instrument is used as a regular test meter on the bench—a physical earth should be provided and the calibration carried out under these conditions.

To Calibrate

In the ordinary way, a calibration done at around 14 MHz will hold good for the HF bands, 7-28 MHz. But if the LF bands are wanted, either separately or as well, it would be better to calibrate with the GDO feeding in RF at about 2.5 MHz, and to scale R1 accordingly.

The method of calibration is simple: With the GDO providing RF drive, a series of carbon resistors of known value from 10 ohms upwards should be connected across the "Test Z" points and R1 adjusted till the meter reading is a minimum, thus balancing the bridge; this minimum setting of R1 corresponds to the value of the resistor in circuit, and hence to the load impedance on the device. By repeating the procedure over the range of R1, either its dial can be marked with the appropriate values, or a graph could be drawn against the R1 scale settings. There is no more to it than that.

If the meter tends to read too high, either R4 should be increased in value or the GDO coupling loosened—and the reverse if good readings cannot be obtained on a 0-100 microamp. scale. It is not possible to be specific about what readings can be expected, because they will be affected by the degree of GDO injection and the sensitivity of the meter.

To Use

Any load impedance to be measured must be of the two-terminal variety, i.e., it is not possible to measure the impedance of an end-on single-wire type of aerial, though the tuned circuit with which such an aerial is being worked could be checked.

Otherwise, it is simply a matter of "finding resonance" on R1, and the operation of the test meter is as that of a GDO when checking a tuned circuit.

To measure a length of feeder line, take a section of the line which is short in relation to the frequency—say, 10 feet in the case of an 80m. system. With the far end of the line shorted, tune the GDO for a dip reading. Then take the short off the line, and adjust R1 for minimum. That value is then the impedance of the line in that frequency area.

By thinking out the possible applications, numerous tests and experiments can be carried out, either on existing systems or on projected aerial-feeder layouts.

![Circuit diagram](image-url)
Precautions

Never apply more than the loose-coupled RF output of a GDO or VFO to the device. During the calibration process, make checks at different input frequencies; if the response is not flat over a wide frequency range, suspect R1 to be giving a slight tuning effect. If results are erratic during calibration, especially at HF, try screening R1. While calibrating, make sure that the test resistors really are within a few per cent of the marked value; if these resistors can be bridged beforehand, so much the better; wirewound resistors of any value should be avoided for test purposes, even for the LF bands.

For VHF operation, the device should be built low-loss, with R1 in a screened compartment and on an extension spindle. The calibration frequency (GDO or VFO input) should be in the frequency area over which the device is to be used, e.g. at about band centre in the case of the TV channels.

As shown here, the circuit has not been tried on frequencies higher than the amateur bands up to 70 MHz. Two significantly different sets of calibration values were obtained—with the same set of test resistors—at 2 MHz and at 60 MHz input frequency. Between 6 MHz and 18 MHz input frequencies, the difference was negligible—which brings us back to the original point that 14 MHz is a good calibration frequency for the HF bands.

SPEECH-AMPLIFIER CLIPPER

USING 741 OP. AMP.

I. D. POOLE, B.Sc. (G3YWX)

WHEN the author decided to get back on two metres and the opportunity of buying an old ship-to-shore radio telephone came the chance was taken. There was a fair amount of scope for modification, and in spite of the fact that it used valves it looked a good start. The unit consisted of two separable sections, each containing a Tx and Rx, but the top one (which it was decided to use) did not have its own PSU or speech amplifier. The power unit was easily knocked up out of bits from the junk box and supplied 300v. for the valves and 20v. smoothed for the low-voltage sections.

As far as the modulator was concerned it was decided to construct something which gave good results whilst not costing too much. Although RF clipping is undoubtedly better than AF clipping it was not thought that the (very much) extra expense would be worthwhile.

Design Considerations

Not only was it thought necessary to introduce some form of clipping but also to limit carefully the frequency response.

As the circuit had to drive a valve reactance modulator an output of about 30 volts peak-to-peak was needed. It can, however, be very easily modified to give less output, as described later.

It was also thought as well to limit the frequency-response both before and after clipping—afterwards to ensure that the high frequency distortion introduced by the clipping is removed, and before to allow only the wanted portion of the speech to be clipped and hence introduce less distortion.

The cut-off of all the CR networks limiting the high frequency response was designed to be 3 kHz—the lowest frequency for a listener to differentiate between words like "cottage" and "sausage."

The low-frequency response was tailored so that the cut-off was slightly above the standard 300 Hz, for two reasons. First, the lower frequencies contribute very little to the intelligibility of the signal, tending only to add a "naturalness" to it; and secondly, when clipped, the lower frequencies introduce harmonic distortion which is within the audio band.

Owing to the fact that harmonics are generated when clipping takes place the high-frequency response has to be limited above 3 kHz. The networks used to achieve this give an overall roll-off of 12 dB per octave, which is thought to be adequate.

As there was a likelihood of using a tone-burst for repeater operation, it was decided to have one of the operational amplifiers as a virtual earth mixer. Owing to the fact that the tone-burst does not require clipping it meant that the mixer had to be the second stage.

Circuit Description

The supply voltage available for the amplifier was 20v. only, and as the 741's require dual supplies these are simulated by R1 and R2 for X1 and R7 and R8 for X2.

The gain of the first stage is about 100. This is determined by R3 and R4. C4 increases the feedback at high frequencies and therefore reduces the gain, giving a top cut. C3 increases the feedback at low frequencies, and C1 is designed to give a cut-off at just above 300 Hz. The effect of both C1 and C3 is to give a total roll-off of 12 dB per octave at low frequencies. C2 is included to give the input some protection from RF picked up on the microphone lead.

D1 and D2 provide the clipping and should for this circuit be germanium. As their turn-on voltage is about 0-2 volts the total audio voltage at this point will be about 0-4 volts peak-to-peak. RV1 provides some adjustment of the amount of clipping.

Whereas X1 was used in a non-inverting configuration, X2 is used in the inverting one, and can therefore be used as a virtual earth mixer to combine the audio from the clipper and the tone burst. The gain of this stage is given by:

\[ AV = \frac{R9}{R1} \]

This is again modified by the capacitors in the circuit. The input resistor is effectively R10 for the tone-burst, and R5 + R6 at low frequencies for the clipped audio. C7 and C9 serve to give a high frequency cut-off at about 3 kHz to remove the unwanted distortion products.

The circuit as shown gives about 15 volts peak-to-peak on the output terminal of X2. This can be decreased by decreasing R9 and increasing C9 by the amount by which one needs to decrease the gain. T1 was a step-up transformer to enable the 30 volts peak-to-peak to be
obtained, whilst using a 20-volt supply. It is thought that most people would not want this, and it can be substituted by the actual load.

Construction

As with most audio circuits, the layout of this unit is not very critical. The author’s unit was built up on a matrix board, which meant that any modifications could easily be made. The components used were from the junk box and hence many of them are not critical, especially the electrolytic capacitors—most of which are wide tolerance. The capacitors used to tailor the frequency response are, however, a little more critical, 10% or so being quite adequate.

The supply is not critical, although it should be well decoupled to earth through a large capacitor. It could be increased, but it should not exceed 30 volts.

The value of R10 depends upon the output from the tone burst. It is a relatively simple matter to calculate the value, or it can be determined by trial and error—after all the proof of the pudding is in what it does and not what it is calculated to do!

Conclusion

In practice the unit has given good results and reports of a punchy signal have been obtained. Obviously, an RF clipper would have produced better results, but at much greater cost.

Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>C2</td>
<td>47 µµF</td>
</tr>
<tr>
<td>C3</td>
<td>0.022 µF</td>
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<tr>
<td>C4</td>
<td>330 µµF</td>
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<tr>
<td>C5, C6</td>
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<tr>
<td>C7</td>
<td>0.047 µF</td>
</tr>
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<td>C8</td>
<td>10 µF</td>
</tr>
<tr>
<td>C9</td>
<td>0.002 µF</td>
</tr>
<tr>
<td>R1, R2</td>
<td>100,000 ohms</td>
</tr>
<tr>
<td>R3</td>
<td>1500 ohms</td>
</tr>
<tr>
<td>R4</td>
<td>150,000 ohms</td>
</tr>
<tr>
<td>R5, R6</td>
<td>1200 ohms</td>
</tr>
<tr>
<td>R7, R8</td>
<td>22,000 ohms</td>
</tr>
<tr>
<td>D1, D2</td>
<td>Germanium diodes</td>
</tr>
<tr>
<td>X1, X2</td>
<td>SN72741, LM741 or similar</td>
</tr>
</tbody>
</table>

"... These miniature rigs are all very well, but . . . ."
Rx PROJECT POSTPONED—SOME INTERESTING
TECHNICAL QUERIES—NOTES AND NEWS—
LATEST LADDER POSITIONS

A S our Project, discussed last time out in this space, looks like developing into a full-length article, it is being deferred until space becomes available, which should be in the next issue or two. It is only when starting on an idea like this that one realises how much ground there is to be covered, even for a simple design. So it stands over for the time being.

In the meantime, there is much of interest in the current mail and it should be mentioned here that readers are always free to discuss their own particular problems, to be dealt with in this feature for the interest and (we hope) the edification of the generality of readers.

However, we can not undertake to conduct any correspondence with readers individually—life is full enough as it is!—the idea being that if you have a problem, technical or otherwise, our attempted solution of it is quite likely to be helpful to others involved in some similar difficulty.

The Mail

We start with J. Waters (Derby) who has the “oldest man in the business”—lack of replies to SWL reports in the shape of return of QSL cards. Of course, the point here is the question of the value to the recipient of such reports; most reasonably active amateurs on the air have had more than enough of the “You are S9-plus while working VK’s, as heard from the next street, and please can I come and view your station, and collect my QSL in person” variety of reports, and they tend to be ruthless in pitching these into the shack W.P.B. unanswered! However, once in a while comes a report that is worth a reply—for example, the chap who reports to a DX station that he was S9 in U.K. and way above any other signals from the area, even though he was getting no reply to his CQ calls; or that the caller was getting multitudes of replies but did not seem to be hearing any of them, even though his listening frequency was clearly stated. For a DX-pedition the thing to do is report on several QSO’s, giving signal strengths of both ends if audible, the way the DX signal was fluctuating, the degree of liddery on the frequency, how his signal varied when he swung his beam in another direction, and so on; some of the best reports give this sort of gen in graphical form, along with comments on Wx, band conditions and the receiving set-up. Always a report to a station who is getting no replies, or only local ones but is being heard at a distance, is far more likely to net a QSL, other things being equal.

A second new chum is L. West (Slough), who has had an interest for a long time, which came to fruition by way of the purchase of an FR-101S. Initially, there was “a piece of wire,” and a two-metre converter was fed from a ground-plane aerial, but more recently an 18AVT has been put up and RAE results are awaited; meantime the Morse is being brushed up to standard for a test in August.

W. Bingham (Carrickfergus) always sends his letter in without a full name on it, which means some research to find who it refers to! (Letters with just a Christian name are no help at all—we cannot possibly remember them all!) However, once more we have managed to sort it out; one query in this list is that of the N-series prefixes—these are of American origin and quite an assortment have been heard of late.

A suffix query comes in from R. G. Williams (Borehamwood) who heard “WA7RAF/MM Region One,” and “W89LTW/MM Region Two” and wonders? The “region” bit is a reference to the part of the world in which the ship was at that time—the world is divided into three “regions” of which, roughly, U.S.A. and the Americas comprise Region Two, Europe is Region One, and the rest of the world Region Three.

T. Scrimshaw hails from the Northfield area of Birmingham, and at the ripe old age of twelve, he listens on a Bush VTR178 multiband receiver, with which he gets carrier-injection facilities for SSB reception by using a modified Tandy kit. The next move is to get a slow-motion drive to make tuning a bit easier.

P. Wells (Colne) is somewhat confused by the previous reference to the OEO prefix as being like the U.S. series; the point we were trying to make was that both are “special calls” assigned for some commemoration or other in the respective countries.

J. M. Devereux-Colebourne (East Garston) found a particular interest in hearing VK9XI on Christmas Island, he having been, in his time, District Commissioner there. Now, at 73 years of age, he has embarked on self-training for RAE, there being no courses anywhere near he can attend; but, starting from no knowledge, John hopes to be on the air and operating with a G4 call within a year—and all this writer can say is he wishes more old-timers would “have a go” and get their tickets.

R. W. Roberts (Mold) is pleased that we are trying a receiver project, and says he wants a simple two-metre converter to go with such a receiver. No need for this old scribe to do anything here—it was done, in its essentials, last month (p.353) albeit with germanium transistors. These should receive much more care in the solder-

ANNUAL HPX LADDER
(Starting date January 1, 1976)

<table>
<thead>
<tr>
<th>SWL</th>
<th>PREFIXES</th>
<th>SWL</th>
<th>PREFIXES</th>
</tr>
</thead>
<tbody>
<tr>
<td>G. Ridgeway (Ardleigh)</td>
<td>494</td>
<td>R. G. Williams (Borehamwood)</td>
<td>255</td>
</tr>
<tr>
<td>S. T. Bowen (Kippax)</td>
<td>442</td>
<td>C. K. Verstage (New Zealand)</td>
<td>219</td>
</tr>
<tr>
<td>R. A. Charlesworth (London N.22)</td>
<td>302</td>
<td>R. Staples (Lymn)</td>
<td>214</td>
</tr>
<tr>
<td>G. De Vereux-Colebourne (East Garston)</td>
<td>295</td>
<td>P. Ramsay (Stevenson)</td>
<td>203</td>
</tr>
<tr>
<td>L. West (Langley)</td>
<td>273</td>
<td>P. Poliany (Coventry)</td>
<td>200</td>
</tr>
</tbody>
</table>

Starting Score 200, in accordance with HPX Rules.
ing than is needed with silicon-based devices, and heat-shunts used as necessary. For de-soldering anything on a printed board, use a suitable tool such as the suction type, three variants of which are available from Doram, and doubtless many other suppliers. With these one just depresses the plunger, offers the tool and the iron to the PCB until the solder runs, and then press the red button which soaks the molten solder up into the tool. From here it can be removed simply by depressing the plunger once again. And, of course, for such things as IC’s and transistors which are fitted at the proper spacing on the board, it is the easiest thing in the world to turn up a suitable bit (to heat all the pins at once) in the lathe, to fit whatever soldering iron one prefers.

Another technical problem hits K. White (Stockton-on-Tees) who has fitted a mechanical filter to his FR5OB and finds the insertion loss is nearer 20 dB than the 7 dB figure quoted for the filter. Quite likely; there are the losses in the terminations at each end to consider, not to mention the need for a complete realignment, and the “apparent” loss due to the reduced noise output, the latter being for all practical purposes directly related to the IF bandwidth. Certainly, before making any try at adding an extra gain stage, one should do reliable measurements of the sensitivity of the receiver in terms of microvolts EMF (or PD, if you prefer), which is a darn sight more important than mere gain, which should never be allowed to be excessive; for good performance excess is almost worse than not enough. On a different point, SWL White has been told that the colour TV line time-base QRM he suffers will cost £70 for the GPO to investigate, and then they couldn’t do anything about it anyway. This sounds a little like the old, old story from the old soldier; the more so as the local Rediffusion coaxial cable for the “pipe TV” system runs under the eaves! The quickest answer would probably be some very strong letters to some high places with carbon-copies to all the recipients.

A. Probin (Burnley) has gone from a 66-footer to a 132 wire which he claims is a “fantastic improvement.” More than likely, the real reason can be found in the direction in which the longer wire has its major lobes (and indeed minor ones, come to that); they are now probably pointing in more preferred directions. It should be noted when talking about loaded verticals for Eighty, that they have a quite narrow bandwidth, and they also tend to favour DX, which is not necessarily all that desirable on 3.5 MHz.

E. W. Robinson (Bury St. Edmunds) has finally made the 1000 HPX mark, which pleases him no end. YU8DX was a “special!” to mark the 120th anniversary of the Yugoslav scientist Nicola Tesla (he of the Tesla oscillator and many other electrical inventions, who worked mostly in U.S.A.); and the D6A DX-pedition, who was listened to for over an hour and didn’t give his own call sign in all that time—but he heard it from his callers enough times! San Hutson did a good job putting Moroni on the air, and since he was operating within the licence conditions, if identification was certain he should be claimed—but only if you are sure you heard D6A, which implies you must have heard both ends of at least one QSO.

A. J. Butley (Crosby Green) has returned to the fold after eight years, and now has to make do with a bed-frame as the aerial, coupled to an HA-500 receiver.

R. Carter (Blackburn) has found things uncomfortably hot, and then suffered breakage of a Rx drive cord, which took three goes to rectify—first time wrong way round, second time right but too slack, and third time lucky! That is an easy victory where some drive-cords are concerned!

ON4UN has made a list of sunrise and sunset times for every country in the world, a copy of which has come into the hands of J. Fitzgerald (Gl. Missenden); a very useful document for chasers of the DX, as these times often are good, and always are the best times for DX on the lower frequency bands. In John’s case, it yielded UL7BC at 0007 on Eighty SSB—UL7 sunrise time—the first time he tried it.

Like so many, H. M. Graham (Harefield) has a shack in a small upstairs bedroom, and found it too hot for listening for prolonged spells even with an open window. However, he heard a lot of Europeans on Ten and a couple of South American stations. Maurice keeps a record of zones and countries heard each month, and has done so for years; it shows that, with the sole exception of 1976, every year since 1965 has seen March as the best month.

P. Barker (Grangetown) is getting ready for a move to a new house 14 miles away, which takes him from 75 feet above sea level to 320ft.—but there is Tunstall Hill a couple of hundred yards to the Southwest, bearing a trig. point saying 368 feet. This may be a bit of a block at VHF, but it would be wise to wait and see, as J.C. suspects that Paul has picked about the right height to take advantage of refraction over the crest of the hill—and in any case there will be more space for the delightful activity known as aerial-farming.

R. Mackean (Liverpool) should have his RAE pass slip in by the time this reaches print—he hopes. And if that desirable objective is attained he will start with a G8 call—as he is only 14 yet, he reckons the Morse can wait a little. An interesting one heard on the bands recently was ZV11G/P—this, if genuine (and one sees no reason why not), would hail from PY-land, as the Prefix List indicates. Roy has been listening to the GB3MP repeater, and notes it is having some minor teething troubles, such as early timing-out. One just hopes its troubles are all technical ones—listening to the London repeater makes one feel sick at times!

Finale

And that, mes amis has to be it for this time. Meanwhile, we have to acknowledge letters and Table entries from: B. T. Mackness, Dagenham; T. Wilson, Peterhead; M. Law, Chesterfield; K. A. Whiteley, Castleford; M. C. P. Bennett, Datchet; P. C. Jane, East Looe; N. A. Phelps, Devizes; M. J. Quintin, Wotton-under-Edge; M. Gibson, Barrow-in-Furness; A. Glass, Plymouth; A. F. Roberts, Kidderminster; B. F. Hughes, Worcester; M. Rodgers, Harwood; G. F. Gullis, Ogbourne, St. George; G. Ridgway, Ardleigh; W. H. Smyth, Hartlepool; L. Gibson, Barrow-in-Furness; R. Shilvock, Kingswinford; and J. H. Sparkes, Trowbridge; thanks to you all for the interesting chat and data, and we’ll see you again next time round, for which the deadline must be to arrive first post on September 23, addressed to “SWL,” SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.
E-M-E FROM WA6LET

SEVENTYCEM MOON REFLECTION TESTS, STANFORD RESEARCH INSTITUTE, CALIFORNIA, MAY 1976

VICTOR FRANK, WB6KAP, reports that in January 1976 there were plans for E-M-E tests on 1296 MHz using the 150-foot dish at the Stanford Research Institute in Menlo Park, California. By March it was apparent that the station and feed were not going to be ready in time so instead it was decided to carry out further work on 432 MHz, adding a number of scientific tests to demonstrate the characteristics of the Earth-Moon-Earth communication path.

It was planned to request special temporary authority from the Federal Communications Commission (FCC) to use the 20 kilowatt klystron amplifier at Stanford tuned to 432 MHz so that E-M-E reception would be possible for most of the 432 MHz DX enthusiasts. These were to be one-way tests consisting of two minutes of A0 for chart recording signal strength against time, followed by 50 microsecond pulses at 50 pulses per second to allow

Looking at the Moon—the aerial used by the WA6LET group (Stanford Research Institute, Menlo Park, Calif.) for their May 1976 moon-reflection tests on the amateur 70-centimetre band. In spite of the lack of advance (European) publicity, some considerable success was achieved—see article herewith. The aerial itself, adjustable in azimuth and elevation, is U.S. Govt. property and can only be used by special dispensation. It is hoped to run a further series of tests on 432 and 222 MHz (the latter band is available to amateurs in the U.S.) and to be able to give better advance notice; as it was only one U.K. station sent in a "heard" report.
measures of pulse dispersion, and CW groups at various power levels.

The possibility of running tests on 222 MHz simultaneously was considered. As the six-inch, rigid coax feeding the circularly polarised horn were to be used for the 432 MHz high-power tests, nothing could be placed in front of the horn. So it was thought that feed antennae could be placed around the sides of the horn and still illuminate the dish properly. Two 2-gele, rear-fed Yagis were constructed for a 222 MHz linearly polarised feed or equipment and were borrowed, an excitor from WB6TJO and an amplifier from WB6NMT.

The week before the tests involved many hours of work on the 222 MHz system by K6QJM, W6YFK, WA6KKK, WB6KAP and WB6TJO. By noon on the Friday, the systems were being tested on the Moon. Echoes were received on 432 MHz but not on 222 MHz. When the 222 MHz feed was removed, it was discovered that the front-to-back ratio was about unity so reflector lengths were adjusted and the front-to-back ratio brought up to 10 dB.

Feeder Troubles

Unfortunately, it was not possible to use the 20 kW klystron, after all, so at moonrise on Sunday—about 1000 UT—the first A0 and variable power tests on 432 MHz were staged, varying the power from 1 kW down to 25 watts in 3 dB steps. The first contact was at 1014 UT with F9FT. No 222 MHz echoes were received and this was discovered to be due to a failed antenna changeover relay at the feed. More 432 MHz A0 and variable power tests were carried out at 1400 UT and half an hour later the 222 MHz feed system was lowered and checked. The malfunctioning of the changeover relay was found to be due to too much voltage drop in the line to the coil. Increasing the supply to 36 volts cured this. By 1530 UT, WA6LET was back on the air, but still no 222 MHz echoes were detectable. After more A0 and variable power tests at 1800 UT, the last contact was with JA1VDV who could not copy the SSB signal. The last echoes were heard at 1935.30 UT.

Results

During 4½ hours of operation, WA6LET made 64 two-way contacts on 432 MHz with 53 different stations in 12 countries and 14 states. Five were on SSB with K2UYH, K5CE, VE7BBG, F2TU and F3NQ. Of the stations, 28 were new to WA6LET on 432 MHz. The countries worked were F, I, JA, LX, OK, ON, OZ, PA, SM, VE, VK and W. The only British station to send in a report was G8AXU. The 14 amateurs manning WA6LET were W6HDO, K6OJM, K6ZX, K6TZX, W6VG, W6YFK, WA6BMR, WA6DIA, WA6KKK, WA6UM, WB6JZY, WB6KAP, WB6TJO and K7CAD/6.

A post-mortem revealed that the 222 MHz feed antennae were spaced about one wavelength apart. It is suspected that this wide spacing, combined with coupling between the feed elements, the horn and supporting structure, messed up the pattern, proving that one cannot just put up any old feed for E-M-E work.

It is not considered appropriate to use this half-million dollar U.S. Government facility for more tests similar to those already carried out. Future tests could be in new bands, like 50, 222, 1296 or 2304 MHz or with new equipment or techniques. And next time it is hoped to be able to give more advanced warning of the tests, so that there can be full U.K. participation.

In conclusion, it must be said that conducting these E-M-E tests is somewhat like having a baby. There is some joy, some suffering and a lot of work involved. The length of time is about the same. “Two” per band is probably more than enough! 

N.A.S.F.

BOOK REVIEW

ARRL “ELECTRONICS DATA BOOK”

This is a new publication from the American Radio Relay League, who have originated so much that is good and practical in the way of technical and semi-technical material in the field of Amateur Radio.

The Data Book treats in depth the data for RF circuitry, L/C/R networks, broad and narrow band inter-circuit transformer design, antennae and feeders, and shows a large selection of “thumb nail” solid-state circuits. With this goes a great wealth of tabular material—such as dB equivalents to voltage, current and power ratios; RF circuit data; a reactance nomograph; a table of L/C constants, numerous formulae, inductance data for all types of coils, chokes and toroids; and much similar information of the sort one needs to look up or check.

The solid-state circuitry includes more than 50 designs involving transistors of numerous types, for AF, RF and switching applications. A useful chapter deals with what might be called engineering, construction and testing, with circuits for several test instruments.

In general, this is the sort of book which will not only find a place on any experimenter’s work-bench but (like many other ARRL publications) would also undoubtedly be of great practical value to many professional electronics engineers and designers working in the field of radio communication—and, at the price, for these days it is very good value for money.

It is in large format (11 x 8½in.), of 128 pages, well produced and clearly printed, copiously illustrated in line and adequately indexed, and the writing is (as with all ARRL publications) in straightforward language.

ARRL Electronics Data Book, price £2.90 inclusive of postage, from: Publications Dept., Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

“Short Wave Magazine” is independent and unsubsidised and now in its 34th volume
VHF BANDS
NORMAN FITCH, G3FPK

VHFCC Award

By now the callsign 9H1CD must be a very familiar one to readers of this column and to two-metre operators in particular. Henry Souchet from San Gwann in Malta has made several QSO’s this summer via E’s and, since he only QSL’d direct, has accumulated the necessary 100 cards for his VHFCC quite quickly, to gain Certificate No. 265. The equipment at 9H1CD consists of a Braun SE-400 Digital transceiver driving a QV00-40A linear amplifier, the aerials comprising a bay of four 11-ele. Yagis. Henry was first licensed in 1970 and is a graduate of the University of California (in Viticulture and Enology), holding the post of adviser to the Maltese government on the matter.

New readers are reminded that the VHF Century Club certificate may be claimed for 4m, 2m, and 70 cm. separately. A list of 100 confirmations should be sent to the address at the end of this feature. Do not send any QSL’s. You will then be asked to produce six cards, picked by us at random and, upon verification, your Certificate will be issued. Only applications from one, fixed location can be considered, which rules out portable operation. Also, no repeater or satellite contacts are eligible. If you have two, fixed QTH’s you may claim your VHFCC from both.

Contests

The Microwave Contest on June 19/20 attracted entries on all six bands. No points/QSO’s details are available but in the 1-3 GHz section, the winner was G3EEZ/P, with runner-up G3XJN. First place in the 2-3, 3-4 and 5-7 GHz sections went to GW8ADP/P, the respective runners-up being G3EZ/P, G3BLN/P and G3EEZ/P. On 10 GHz, top man was G3KSY/P with GW4BRS/P in second place. There were two entries on 24 GHz.

In the Region 1 VHF contest on June 20, the multi-operator section was won by the North Liverpool Radio Club, with 3293 points. In the single operator section, leading station was G4CZP with 2600 points. The “Outside Region 1” section was won by G4ESK with 384 points.

At the beginning of the 144 MHz QRP contest on July 25 there was a brief E’s opening during which GW3WRA/P worked IT9T1 (Y66c) which helped Stuart achieve the substantial score of 1150 points. He mentioned 155 QSO’s to GW3UC/P’s 160 but that the latter’s total was probably under 1000 points. There was little time for monitoring the band at G3FPK in this event but it seemed that conditions were average after the E’s at the start. A few of the signals were below the standard one would have expected, suggesting that some operators thought that the limitations of

| QTH LOCATOR SQUARES TABLE                       |       |
|-----------------------------------------------|--|--|--|--|
| Station | 23 cm. | 70 cm. | 2 m. | Total |
| G3JXN   | 16     | 49     | 65   | 130   |
| G3COJ   | 10     | 45     | 54   | 109   |
| GD2HDZ  | 6      | 19     | 41   | 66    |
| G3IIT   | 5      | 15     | 35   | 44    |
| G4DKX   | 2      | 61     |      | 63    |
| G8FU    | 1      | 159    | 232  |       |
| G4DGU   | 15     | 66     | 102  |       |
| G8BKR   | 1      | 6      | 73   | 80    |
| G2AXI   | 3      | 33     | 44   | 78    |
| G3POI   | 150    | 150    |      |       |
| G4BW    | 22     | 108    | 130  |       |
| GM4CXP  | 19     | 102    | 121  |       |
| G3CHN   | 118    | 118    |      |       |
| G3FPK   | 117    | 117    |      |       |
| G4CDF   | 109    | 109    |      |       |
| G4BHAH  | 14     | 89     | 103  |       |
| G8GML   | 26     | 70     | 96   |       |
| 9H1CD   | 95     | 95     |      |       |
| G8HUY   | 86     | 86     |      |       |
| G6UW    | 80     | 80     |      |       |
| G3XCS   | 9      | 67     | 76   |       |
| G8GH    | 11     | 62     | 73   |       |

| TWENTY-THREE CENTIMETRE ALL-TIME TABLE          |       |
| Station | Counties | Countries | Total |
| G4BEL   | 38       | 10        | 48    |
| G3DAH   | 28       | 8         | 36    |
| G3JXN   | 28       | 5         | 33    |
| G3NHE   | 24       | 5         | 29    |
| G4BYV   | 17       | 9         | 26    |
| G4ALN   | 20       | 5         | 25    |
| G3JVL   | 21       | 4         | 25    |
| G3COJ   | 17       | 6         | 23    |
| G6NB    | 19       | 4         | 23    |
| G3OBD   | 20       | 3         | 23    |
| G8ARM   | 20       | 2         | 22    |
| GD2HDZ  | 9        | 5         | 14    |
| G5DF    | 13       | 1         | 14    |
| G8AOD   | 11       | 2         | 13    |
| G8FMAK  | 12       | 1         | 13    |
| G8EOP   | 5        | 4         | 9     |
| G8AH    | 7        | 2         | 9     |
| G8ABH   | 7        | 1         | 8     |
| G8FJG   | 7        | 1         | 8     |
| G8GNZ   | 4        | 2         | 6     |
| G8IIT   | 3        | 1         | 4     |
restricted power could be overcome by shouting louder!

On the eve of the contest, the GW3WRA group were rather perturbed to hear another group operating from their site. Fortunately the other Club agreed to move. G3SEK, chairman of the VHF Contests Committee, pointed out to your scribe during a subsequent QSO that, if said Club had not moved, they would have been disqualified under rule 4, since they did not have permission to use the site. Ian has suggested that, when contemplating use of a new site, Clubs check on previous contests to see if that particular QTH locator appears in the logs.

The conditions during VHF NFD seem to have been much as was mentioned in last month's column, as borne out by the entries. Moreover, it seems that some groups suffered violent thunderstorms which knocked out stations on 23 cm and 70 cm. A few lowered masts and repaired to the nearest pub!

Forthcoming Events: Sept. 4/5 from 1600-1600 GMT is the time for the Two-Metre Open and Listeners' contest, coinciding with the Region I IARU 144 MHz event. The weekend Oct. 2/3 is the UHF/SHF affair in Region I, 432 MHz and above, again 1600-1600z.

The Cray Valley group inform us that they are running a Club two-metre contest, open to all comers, on October 10—details from G3YWO, QTHR.

BARTG have their RTTY (teleprinter) event on two metres on Sept. 11 and 19th—in this case, information from G8CDW, QTHR. In both instances, an s.a.e. for return would be appreciated.

Liner Clinic

Many Liner-2 owners have discovered that with the noise blanker switched in when there is a very strong station operating in the two-metre band, the signal appears to “splatter” no matter what channel it is tuned to. Many operators—including your scribe—have been accused of having enormously wide transmissions by Liner-2 owners, many of whom had no idea it was their own noise blanker which caused the manifestation!

Gregg Gilman, G3SCP, has suggested a cure for the problem which, as can be seen from the diagram herewith, is simply some decoupling of the supply to the audio IC driving the speaker. The surgery requires removal of the speaker to get at R125. The reason for the trouble is that the noise blanker diodes clip a very strong signal in the IF passband, causing harmonics galore which find their way into the “HT” supply to the output IC. The additional decoupling effects a cure. Remove R125 and replace by R125a, 2,200 ohms and R125b, 1,200 ohms, bypassed by C, 15 μF. Next month, space permitting, “The Blown Power Fuse Saga” and its cure.

Satellite News

As reported last month, the June 16-18 QRP tests on Oscar 7, Mode-B were very successful. Accordingly, AMSAT has decided that every Monday when Oscar 7 is on Mode B should be QRP Day and users should restrict their e.r.p. to ten watts maximum. This means that those using the several available transverters in the ten-watt class “bare foot” will have a chance to experiment with satellite communication with small aerals. /

For those new to Oscar 7, this satellite is available every day except Wednesday which is reserved for special experiments for which AMSAT permission is required. On odd days of the year, O-7 is on Mode A, which means transmitting to it in the band 145-85-145-95 MHz and listening for signals in the 10m. band from 29-4-29-5 MHz. Mode B occurs on even days of the year during which one transmits in the band 432-125-432-175 MHz the downlink in the 2m. band being 145-975-145-925 MHz inverted. Normally, stations use USB on the uplink for both modes which comes down as USB on 10m. but LSB on 2m.

The schedule for Oscar 6 is now Monday, Thursday and Saturday, ascending orbits, i.e. when the satellite is travelling from South to North, which are late afternoon and evening passes. O-6 is a 2/10m. transponder the uplink QRG's being 145-9-146-0 MHz, the 10m. downlink from 29-45-29-55 MHz. Orbital information for both satellites is transmitted in the Sunday morning by GB2RS and also in more detail on Sunday evenings on 144-28 MHz from 7.30 p.m. local time by G8CSI (New Malden, Surrey).

Phase 3 of the satellite program will be a highly elliptical orbit spacecraft with an apogee of 39,000 km. and perigee of 1,460 km. It seems this will not be launched until 1980, due to the non-availability of a suitable launch vehicle. Meantime, an interim satellite to back up O-7 could be put up in late 1977, perhaps with a 21/29 MHz transponder aboard, in addition to another 145/29 MHz relay.

AMSAT-UK plans to construct a micro-processor device to turn the RTTY and Morse telemetry from the satellites into a visual display on the TV screen. G8CSI (QTHR) would like to hear from anyone with expertise in this field for assistance in designing the hardware and software—quite an undertaking!

DX-Peditions

The abundance of E's news last issue precluded detailed comment on the June Scottish expedition by the Cambridge University Wireless
Society members. Nigel Hoults, G4CIK, sent some interesting notes on the trip. They started in Cumbria on June 11 in bad weather and only a few, Northern stations were worked. The next site was near Kilsyth (XG60d). Although it looked good only thirty 2m. QSO’s and two on 4m. were achieved, maybe due to its being a Saturday evening. For the next two days’ operation from a farm near Port Ellen on the Isle of Islay in the Strathclyde region produced 115 contacts on 2m. and eight on 4m. G, GI, EI, ON and PA stations being worked.

After Islay they returned to the mainland to Fife and discovered that GM8AGU/P was operating from their intended site! On the following day, the stations were on continuously in good conditions, which were best around 10 p.m. when F1CF and F6ECI near Paris were worked. GB3PI was accessed by a 2-watt, hand-held transceiver feeding a 6-ele beam! This proved the best site of the trip with about 120 2m. QSO’s and six on 4m.

At the writer’s suggestion, they then travelled up to ZR square and a take-off “...just like that of GM8FFX...” This site produced 63 stations on 2m. and only four contacts on 4m. The final site was in the Borders region, near GM4CXP’s location. Some 45 stations were worked during the Region 1 contest on the 20th, including four EI’s. That was the only day when 4m. was very active, resulting in 20 QSO’s. The final result was 288 QSO’s on 2m. and 40 on 4m. with 9 countries worked on 2m., and lots of counties. The only station to work them every day on 4m. was G6WR in Whitehaven.

The G3SCP visit to Luxembourg was a disappointment since there is not one report from any reader who worked Gregg. The trip was well planned and it may be that conditions were not good enough for working back into the U.K.

Four Metres

E17CV (Co. Dublin) writes asking what frequencies other than 70-26 MHz are in common use in the U.K.? Sean says that a number of Dublin amateurs are getting 4m. FM gear ready and would like to work G stations when the conditions permit.

At present, 70-48 MHz is in common use but the latest plan is to adopt 70-5 MHz as the calling channel, with 70-475 and 70-525 MHz as working channels. It is recommended that this plan be used.

G4BYP (Liverpool) added his seventh country to this year’s score in VHF NFD—Guernsey—and increased the counties score to 34. Incidentally, you may count Irish Republic counties as well as U.K. ones. GD2HDO (Laxey) also used the event to good effect to double his counties score and more than triple the previous counties tally.

Conditions during the 4m. Portable contest, Aug. 7/8 were “up and down” according to G3DPAH (Herne Bay). Mike reckons that all signals sounded good excepting one portable who was grossly overmodulated. G4BGW (Peckham) added 17 counties and three countries in 60 QSO’s to his total so far and thought that activity could have been better. G4DZW (Golders Green) worked GW4ABR/P at a QRB of about 250 km. using just 200 milli-watts and Peter is claiming a record of 1.25 km. per milliwatt unless anyone else has done better!

Two Metres

Once again, there has been a good deal of Sporadic E propagation this past month and the writer is more than ever convinced that this phenomenon is more common on 2m. than has so far been expected. As this is the one mode where the e.r.p. and location are less important than being on the right time, the low power operator has an excellent chance of working long distances. Also, the “grape vine” seems to work very well the moment there is the slightest whiff of E’s about and a dead band suddenly springs to life.

This summer, the pattern has usually been that Belgian stations have begun an E’s session before it reached the U.K. G8BAH (London) has often maintained an “open line” to ON to stations who monitor European DX TV channels and FM broadcast stations. Thus, Bob has been in on the act from the first minute. Experience has shown that E’s can build up very quickly, perhaps within half an hour of its starting on 10m. Some operators have monitored the 4m. band listening for East European broadcast stations to reveal E’s. However, lack of such stations does not necessarily indicate no E’s, just that it may not be towards that direction. Useful indicators are Italian Band FM stations and Spanish TV on VHF. E’s communication is often very localised. You may hear a station only 20-30 miles away giving an S9 plus report to a distant station you cannot even detect, whilst at other times, certain DX stations are being worked over a wide area.

As expected, 9H1CD (HV03e) has been in on most of the July E’s sessions. In a recent letter, Henry covered the five-hour opening of July 21 during which he had 146 contacts with 11 countries: 44 DL, 8 DM, 28 F, 39 G, 3 GC, 4 GW, 1 OE, 6 ON, 7 OZ, 1 PA and 5 SM, to bring the QTH square score to 95. The first QSO was with OE3JUP at 1512z and the last at 2004z with F1DYS. Henry asks that we should make it clear he only QSL’s direct and his address is: H. G. Souchet, “Davis” 29/2, San Gwann, Malta—and in views of the hundreds of cards, an IRC would be appreciated.

G3XCS (Cornwall) wrote, “I imagine that by now reports of Sporadic-E are a ‘drug on the market’.” During the July 21 opening, Colin worked IW2AFR/A (HY40h), IT9TAI and 9H1CD between 1822 and 1957z. On the 24th, another smaller opening brought I4EAT/P (FE60f) at 1801. To prove the point about high power not being essential for successful E’s QSO’s, G8BKR (Bristol) reports working IT9TAI with 10 watts on the 25th, John’s first DX by this mode. He reports hearing the IT9 work G6GN, GW4BXE, GW8FTA and GW8JLY. G8BKR mentions good tropo conditions in the earlier part of July, especially between 0600 and 0800z, when DL, ON and PA stations were worked.

G8KLN (W. Sussex) was in on the July 21 E’s and exchanged 5-and-9 reports with IT9PLT (HX77h) at 1740z and also contacted 9H1CD again. Alan also heard the brief opening on the 24th. A tale of woe from GM4CXP who “... found it a lean month after the tropo faded out around teatime on the 9th.” Derrick fed his FT-101B with 12 volts, the wrong way round, which didn’t do it much good, after which
the front end of his transverter blew up. The old Liner-2 was temporarily pressed into service. He then experimented with an IC-202 until that gave up the ghost. He has promised the locals that, if any more mishaps occur, he will take up golf! A classic case of Murphy working overtime, OM.

At G3FPK, the July 21 E's event lasted, off-and-on from about 1530 to 1950Z. Stations heard/worked were exclusively in the Malta, Sicily and Southern Italy areas. The beam was turned to Iberia and a couple of CQ calls made but no replies were heard. Subsequently, G3YFO told your scribe of a 15m QSO he had had with CT4ES (Lisbon) who mentioned that several two-metre addicts there had heard and called G3FPK and a G4!

Proof of the very widespread nature of the July 21 event has come via G4BAH, whose Belgian friends worked SV1DH in LZ square, and UB5KKS in OI both on SSB. SV1DH raised 40 stations using 10 watts as his linear was out of service. One of our French readers, FSZA, worked the SV1, QRB about 2426 km. Other DX stations on were 9H3Z in Gozo Is. (HW) and IC8EGO (HA32g) on Capri, missed by G3FPK but worked the next day on SSB via Oscar 6; obviously a keen fellow. GC8AZZ (Jersey) worked T9PLT on the 21st at 2005Z, for a new one and had two more contacts with 9H1CD, on the 21st at 1950Z and the 24th at 1730Z.

G3CHH (Devon) and EI9Q (Waterford) called CT2BS on CW in the late evenings during the month but not a whisper was heard from him. OY5NS has been worked by PA9CIS and other PA's but G3BHW's QSO with Niels was ruined by scores of PA stations calling whilst Eric was trying to get his report through to Torshavn. The G3PMH/P team will be QRV from rare QTH square AN in the two-metre open event and those seeking VM should listen for E19B (Co. Clare) on 144.2 MHz SSB/CW on Sunday mornings with E19Q.

### Seventy Centimetres

Full of enthusiasm for the band is G4BIAH but Bob is very disappointed at the general lack of activity. For example, on the evening of August 9, the Danish beacons were coming in well but there was no sign of any DX being around, let alone worked. This leads to the suggestion of an activity period each week. How about Friday evening from, say, 2000 local? G4BYP, an habitual entrant in the Three-Band Annual Table, has now added 70 cm. capability although Alan admitted to somewhat primitive aerial arrangements. GM8LBC (Aberdeen) says that he will be staying in Plymouth from about Sept. 13, equipped for FM on SU20, 433-50 MHz, and would welcome some contacts.

### Twenty-Three Centimetres

GD2HDZ is claiming a G1/GD "first" for his QSO with GI3VPK/P, on July 3. Any challengers? During the good conditions at the beginning of July, Arthur had a second contact with PA9VV. He is one of the few users who has up-dated his All-time 23 cm. score to 9 counties and 5 countries. G3DAH and G3JXN have jumped up to second and third place respectively. It is a pity that the GigaHertz operators seem to be reluctant to inform us very often of what they are doing.

### Repeaters

G81WA reports that GB3NA on R3 is now back on the air from the original site until the Home Office gives the "thumbs up" to the move to the new location, which should give better coverage to the North. Progress on GB3HU on RB10 continues slowly. The secretary of the Tyne & Wear Repeater Group, G3URE, reports that meetings are held on the 2nd and 4th Wednesdays of each month. Details of the group and its proposed repeater on R5, GB3TW, from J. W. Thexton, G3URE, QTHR.

### Beacons

The 70 cm. Sutton Coldfield beacon, GB3SC, is now operating well on its new QRG of 432-89 MHz. On 2m, DL0PR (EO54d) was a good signal at G3FPK on the night of Aug. 9 on 144-910 MHz and it is nice to have GB3ANG back again on its new frequency of 144-975 MHz.

### Band Plan

Lately, a few AM and FM stations have been operating in the SSB allocation of the 2m. band, presumably seeking cross-mode contacts. It would seem sensible for any SSB station answering CQ calls to suggest a QSY to the multi-mode section of the band, 144.5-144.9 MHz.

### Deadlines

That's it for another month. All your reports and claims for the October column by Sept. 8 and for the issue following, by Oct. 8 to "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. 73 de G3FPK.

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**PHOTOGRAPHS ALWAYS WANTED**

Readers are reminded that we are always glad to have good photographs of Amateur Radio interest for general illustration in SHORT WAVE MAGAZINE. Though colour prints can sometimes be satisfactorily reproduced black-and-white, we much prefer the latter in the original. Except that we cannot conveniently make use of photographs that are either very small or very large, size is not of great importance as this is in any case determined to our requirements in the block-making process. What is important is that the picture should be clear and sharp with fully descriptive notes — and this description should not be written on the back of the print itself, but on a separate piece of paper lightly attached to the photograph. Payment is made for all pictures used, immediately on publication.

Send to: Editorial Dept., SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.
THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for October issue: September 9)

I n the writing of this piece, one often receives comments in the mail about this-and-that; and one also notices that a change of secretary following an AGM results in the disappearance of a Club from the lists, sometimes for long periods, before they again surface with a report. Now, the Secretary File maintained by the writer serves two purposes—the obvious one of providing him with a card-index from which to make up the address panel, and the secondary (but equally important) one of providing a reference list when a letter comes in from a new reader asking for some help and advice. In such cases, a part of our advice is “Join the local Club, because there you will be able to get to know your locals who can help you solve your problems as they arise.” This is fine, when we can give, with that advice, the address from the file in the knowledge that it is up-to-date. On the other hand, if it isn’t, or we don’t know for certain, then time has to be spent punting around for more recent data, or at worst, we have to say that we don’t know of a Club, or that there used to be one but we don’t know whether it still exists.

So—the moral of this little tale is simple. Please, Mr. Secretary, when you are elected to the job, make your first task to advise us, with the name of your Club, your own name and address and telephone number, and any other information you feel to be appropriate, even if you don’t mean to report regularly. For the rest, we need to have the gen on your next month’s activities, dates, venue and so on. And, for those readers who are of the opinion that the “Clubs” space is wasted, please remember that each month there are people who come into Amateur Radio by the mere fact of joining the local Club and so being encouraged into RAE, Morse maybe, and a licence of their own—all because they “saw it in this space.”

Reports—National

Our first one in this classification is A.R.M.S., looking after the interests of anyone who holds a /M licence, or is a mobile-operating SWL. The current issue of Mobile News contains a nice balance between the current craze of two-metre FM, HF mobiling, rallies, Oscar 6 and 7 working with QRP, and details of a tone-burst unit for the TR-2200G and a shift unit for the Storno Viscount to enable use on more than one channel.

Radial is the newsletter of the R.A.I.B.C. group, catering for those among our ranks, SWL or aspiring amateur or licensed, who are blind or otherwise handicapped; here we are to mention a change of Secretary, with G3NQB handing over to G2CLP, whose address will be found in the Secretaries’ Panel. May we just add that if you know of a blind or handicapped person interested in Amateur Radio, please put them in touch with R.A.I.B.C., who through their “supporters” do so much to help; and if you can find the time to do a bit of supporting yourself, they could do with you as well!

Now we come to the low-power fans; here the group is the G-QRP Club, who have just come out with another issue of their Newsletter Sprat. As usual, full of “meat” and possibly one of the most interesting newsletters consistently to hit this desk; many a member has cause to bless the “reprint” service, covering all sorts of articles in hard-to-get back numbers of various magazines—the latest one is the Tucker-Tin SSB rig by ZL2AMJ. Over the weekend September 25/26, there will be a QRP Activity weekend, details of which will doubtless be in CDXN.

BARTG (British Amateur Radio Teleprinter Group) offer a new edition of their booklet for beginners in this art, RTTY The Easy Way, and report that their GB2ATG news bulletin broadcasts on 2/80m, are attracting increasing audiences—reports are still very welcome, to establish use and coverage.

West—And More Westerly

In this section it is our pleasure to be able to report the formation of a new group in Northern Ireland—Carrickfergus and District Y.M.C.A. G18KZU says that they get together once monthly at the YMCA Hall, Lancastrian Street, Carrickfergus; get the September date from him (see Panel) as it is intended to discuss a winter programme, and, hopefully, to have a talk organised as well. We wish them every success in their efforts.

Now to Torbay, where they are glad to say the membership is still rising and they get holiday visitors; look out for them operating at Exeter Spastics Faye on September 18, using G3NJA; or go to the meeting at Bath Lane (rear of 94 Belgrave Road), Torquay on September 25, when there will be a talk on Components by ITT.

Plymouth have revived their QUA Newsletter with an improved print. From it we read that they are still at the Virginia House, Breton Side, on the first and third Tuesdays of each month—September 7 being down for a surplus sale.

Now to Cornish, who forgather on September 2, at the SWEB Clubroom, Pool, Camborne, to hear G3NPB talk on “My Favourite Aerials.” Don’t know about G3NPB, but the writer’s favourites are all ones he can’t dream of putting up!

The informative Newsletter from Hereford gives their next meetings as being on September 3 and 17 at C.D. Hq., Gaol Street, their usual place. Interesting events are arranged by this group, that in July having been a “radio evening out” with portable gear, involving an operating competition; more than 20 members turned out for this.

Wirral have meetings on September 1 and 15, 7.45 p.m., at the Sports Centre, Grange Road West, Birkenhead; they show a list of 39 licensed members and, judging from their Newsletter, cover a wide range of Amateur Radio activities.

Midlands

Our first stop can well be at Derby’s Hq., 119 Green Lane. There is a Surplus Sale on September 1, and G2CVV will talk on the History of the Licence on the 8th. Direction Finding takes up September 15—we presume this will be an outdoor event although it is not stated specifically—and the Ladies’ Night on the 22nd will be a Cheese-and-Wine Party. Finally, there is the 29th, and
for the first time in many moons, they have “to be announced” against this item.

Over to South Manchester, where the VHF types are again getting together on Monday evenings at the Club shack, Greena, Shady Lane, Baguley. As for the formal meetings, these are taken on Friday evenings at Sale Moor Community Centre, Norris Road, Sale. Looking at the Friday evening efforts, there are usually a couple of Activity Nights, and the rest are given over to talks, film shows and so on—get the latest details from G8GDM, as Panel. Or... why not go along one Friday evening?

At South Birmingham there is a Film Show, down for September 1 at Hampstead House, Fairclay Road, West Heath, to which they say visitors will be welcome.

The same hand, G8BHE, is also on the committee of the nearby Midlands group, and so their news comes together. Midland are at Room 110, University of Aston, Gosta Green, Birmingham. September 21 is the date booked, and they will hear G4ELO talking about Test and Measuring Equipment.

There is always something of interest in the Cheltenham RSGB group Newsletter, quite apart from the meeting detail; but it is the latter we are interested in. The venue is the Old Bakery, Chest walk, which is behind the Public Library in Clarence Street, and it is always the first Thursday in the month. Thus, September 2

is down for G2BAR to come and talk about, and display, Slow-Scan TV. Looking forward to October, we notice that the normal rule is broken, as the date is the 14th; this is not a regular alteration, but just applies in October.

At Peterborough, the Radio and Electronics Society (there is another group in the area) have their place in the Scout Hut, Occupation Road, on Friday, September 17. As their rally on the 19th, it isn’t too hard to guess what they will be doing—preparing and discussing preparations for that Rally.

On September 23 Northampton will be at their Hq. in Spencer Dalling Community Centre, Tintern Avenue (off Gladstone Road). The speaker will be none other than G5UM, and his theme “1000 metres to 10 GHz.” Older readers will doubtless recall that G5UM was the motivator of the old Welwyn group, and advocate of VHF for miles around that centre; had he remained there, we feel sure the Welwyn Club would still be thriving...

Northern

Our first task is to advise that the Star group have managed to find themselves a new place—this is at Raglan Road, Woodhouse, Leeds, and we are told that Club meetings are from 10 in the morning to 10 at the evening on Sundays!
At the Cornish Radio Amateur Club Rally in July at Camborne Tech., they again had a visiting party of Communicators from Culdrose Air Station to give some Morse testing, under CRS Rhodes (standing, left), with Wren radio operators Carole Shaw, Linda Beard and Diana Ford.

The other Leeds group, White Rose, have their home at 83 Armley Town Street, and may be found there on any Wednesday evening. Tip for finding them: Look for a house next door to the pub between which two places people can be seen going with empty (or full, as the case may be) glasses!

Glenrothes are one of the few GM Clubs to report and we are told they have a room at Provosts Land, Douglas Road, Leslie, every Wednesday evening, and on the first Sunday evening in the month there is the formal, which on September 5 is the AGM.

The Scarborough Secretary was so taken with the details of the Club activity at the recent “Fair of the Century” (in which they made a very good showing) that he quite forgot to tell us the details of the venue or the dates! So—we must refer you to him, at the address in the Panel; and once again take the chance to stress that the essential details like Hq. address and meeting dates should never be left out—we have hundreds of Clubs on file, and just can’t expect to recall all the details, even if there were no changes—but there are changes here and there almost every month to take into account as well! So, please, give us the date, the Hq. address, and the Secretary’s name, callsign and QTH every time.

We understand that the Northern Heights chaps are hard at work readying themselves for the coming years with a complete set of 1976/77 activities. That is quite something when you realise they are to be found every Wednesday evening at the Peat Pitts Inn, Ogden, Halifax, not to mention various outside activities.

With the present high postal charges it is very surprising that there are not more groups of Clubs who decide to put out their information jointly, as for example is done (as we have said) by Midland and South Birmingham; another case comes to notice with the Association of Sheffield Amateur Radio Clubs. From their Newsletter, we have it that Workop are every Thursday evening at the Anchor Inn, while Sheffield have September 20 at the Sheaf House Hotel. As the two college groups will be back in action, it is fitting that the Association AGM and Trade Fair should be down for October 4, at Room 3106, Sheffield Polytechnic; and doubtless the Secretary of the Association can put you in touch with the Poly. or the University groups should you be interested after the new term has started.

Every Friday evening except for the third in each month is the routine for York, the place to home on to being the British Legion Club, 61 Micklegate. Looking a little farther ahead, there is the Annual Dinner on October 29, plus a couple of exhibition stations before that, to keep them amused.

Down South

Quite a while since last we heard from Stevenage still meeting as of yore in the Hawker Siddeley Dynamics canteen, Gunnels Wood Road, Stevenage; it’s a good few years since your conductor asked G5JJ if this could be done—he agreed, it was organised and within weeks both of us left both the firm and the district! However, to the matter of today, or rather of September 2; Jimmy Mathews, G6LL, is coming out of hiding to talk to the lads about some of the intriguing uses to which radio was put during the War. Then, on September 16, there will be another meeting, for which the topic is yet to be announced.

First we must congratulate the Secretary at Farnborough on changing from G8KUY to G4FEA. As for the meetings, these are down for September 8, when Ron Ham will be talking about “the hissing phenomenon”—the amateur discovery of Solar radio waves, and September 22 which is still to be filled.

September at Crystal Palace is down for G8GKQ to speak, on a subject to be announced; however, their Newsletter space was a trifle short and so the actual date and the venue were not mentioned, for which we must refer you to G4AVV at the address in the Panel.

We were nearly in a twist over the Silverthorn gen, as the front cover of the Newsletter and the covering
For 85 (Southgate) Sqn. ATC event on June 26, the Silverthorn Radio Club operated GB3ATC very successfully.

The September issue has been delayed, as only a part of the material they sent in! Anyway, it all came out in the end and we can say that they have Hq. at Friday Hill House, Chingford, where they get together weekly in a permanent shack and lecture room—the other details can be obtained from G4AJA, as Panel.

Sutton & Cheam have a place at the Sutton College of Liberal Arts, Cheam Road. We cannot, at the time of writing, confirm the actual dates for September on, as these were under negotiation at the time of their letter; however, we believe they will be aiming at the third Tuesday in each month. Meantime, this being the case, we feel that should you wish to attend, you ought to check with the Hon. Sec.—see Panel for his address.

It looks like the first and third Thursday for Cray Valley, the former being the “main” session and the other one an informal, at Eltham United Reformed Church Hall, 1 Court Road, London, S.E.9. September 2 is their Ladies’ Night, with a film-slide show, and the 16th is one of their popular Natter-Nights. During October, CVRS celebrate their 30th anniversary and to mark it, they will be operating GB3OCV on the HF/ VHF bands, with a special QSL card to commemorate contacts; they also have a two-metre contest on October 10 and another on Top Band on October 17. Details from Secretary G3YWJ, with an s.a.e. please.

At Rosedale Sports Club, the Cheshunt lads are hoping to get a permanent building organised on the plot, for a shack and between-meetings gatherings. For the moment, we give the September Wednesday data: On the 1st, operation of the Club station and some CW practice, with a talk entitled “Firm Control of smaller sprogs” by G3OJ on the 8th. Then on the 15th, there is a repeat of the first meeting, and on the 22nd an Open Discussion on Topical Events. Finally, on September 29, G4DCP and G8KYF will talk on “Simply Sound.”

For Acton, Brentford & Chiswick, on September 21, the scheme is for the members to report on their holiday activities. This one is at Chiswick Trades and Social Club, 66 High Road, Chiswick.

Down to the South Coast now, to Southdown, and the Victoria Hotel, Latimer Road, Eastbourne, on September 6. The subject was not finalised at the time of their letter, they being maybe more pre-occupied with the return visit they were paying to Radio Club de Normandie over September 25/26.

Dartford Heath D/F have been silent for some time now, and it was nice to see the familiar cover in the pile again. They have Hq. at the Scout House, Broomhill Road, Dartford, where the meetings are arranged to cover all sorts of activities besides the outdoor D/F interest, and indeed they are also actively on the hunt for new members. Try September 10 for the Club night, or alternatively there is an SSB Field Day on 4/5, or they may be found—some at least—at the Loughton D/F event on September 26.

The new Hq. of Surrey at T.S. Terra Nova was duly shown off to the families of the members on August 4, by way of a cheese-and-wine party. Meantime, the matter in hand—the dates are the first and third Wednesdays in September, the first one being the formal.

Our Echelford newsletter is not quite up-to-date, but it does contain the essential information, namely that the Hq. is at St. Martin’s Court, Kingston Crescent, Ashford, Middlesex, and that they are there on the second Monday and the last Thursday of each month. Sadly, the forward date column doesn’t go far enough for our needs, but doubtless something will have been fixed up by the due date.

It is the second and the fourth Thursdays of each month, we are assured by the Edgeware Secretary, that matter. Those are the dates when you are to head for Watling Community Centre, 145 Orange Hill Road, Burnt Oak. In September, the first session is an informal, and on September 23, G4CRG and G4CRJ will demonstrate electronic coding and decoding of Morse.

At Verulam the last informal of the summer season, at Salisbury Hall, London Colney, takes place on September 9—future months’ informals will be at the R.A.F.A. Hq. in St. Albans. As for the main meetings, these are at the Market Hall, St. Albans, where on the 23rd, G3JKB will be talking about Antennae and ATU’s.

Finish

We’ve come to the bottom of the heap again, and so it remains for us to tell you that the deadline for next time, with all the dope and doings for October, will be to arrive not later than first post on September 9. Send it all to “Club Secretary,” SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. Till next time, 73.
COURSES FOR THE R.A.E.

To qualify for a U.K. amateur transmitting licence, it is necessary to pass the Radio Amateur Examination, held in December and May each year. It is Subject No. 765 in the syllabus of the City & Guilds of London Institute, 76 Portland Place, London, W1N 4AA, from whom can be obtained a set of question papers for recent years, at 30p post free, with the current syllabus.

Also available for those who want to know is an official pamphlet entitled How to Become a Radio Amateur, free on application to: Home Office, Radio Regulatory Division, Amateur Licensing Dept., Waterloo Bridge House, Waterloo Road, London, SE1 8UA. This gives essential basic information.

For the Subject No. 765 examination itself, courses are offered at various centres all over the country, mainly on a part-time evening-class basis and usually at nominal fees, these courses coming under the Local Education Authority. Some are, however, organised by local Clubs and other such interested bodies. They all have the same objective: To prepare, from scratch, candidates who wish to qualify for a licence.

Most instructors themselves hold amateur licences and in many instances are also qualified teachers, with years of experience in taking R.A.E. classes. In addition to the listed Courses, local Clubs also run R.A.E. classes in Theory and Morse — so always find out if the Club in your locality is offering R.A.E. instruction.

Passing the R.A.E. without the Morse qualifies only for the Class-B licence, confined to VHF operation, with G8/3 callsign, e.g., G8XYZ, Full licences are in the G4/3 sequence, i.e., G4ZZZ.

Following is the First List of Courses as notified to us in time for this issue. Further lists will be published as notifications are received.

Notices should be set out in the form shown here, and addressed to: "R.A.E.," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

Aberdeen: At the Technical College, course instructor G4MEKC. Apply S. Sutherland, GM4BKV, 67 Greenfern Road, Aberdeen (691716).

Bangor, Co. Down: At the Technical College, classes starting 20 Sept., twice weekly on Mondays and Thursdays, 7.0-9.0 p.m., enrolment from Sept. 8. Details from the College or the tutor, C. A. Billington, G13WSS, QTHR or Hollywood 4277.

Barry (Glam.): At College of Further Education, Colcott Road, Tuesday evenings 7.30 p.m., starting Sept. 21, enrolment Sept. 13-15. Course fee £7, or £4.50 (under 18). Lecturer in charge, D. H. Adams, GW8VPB.

Bath: At the Technical College, enrolment as soon as possible, instructor P. A. Bubb, G3UWJ.

Blackburn: At the College of Technology and Design, Feilden Street, instructor H. Leeming, G3LL.

Borehamwood: At the College of Further Education, Elstree Way, on Wednesdays, 7.0-9.30 p.m., enrolment evenings Sept. 8-9, with G. L. Benbow, G3HB, as lecturer.

Bridgnorth: At the College of Further Education, Stourbridge Road, on Monday evenings, starting on Sept. 20.

Brooklands: At the Technical College, Heath Road, Weybridge, enrolment Sept. 13-15, course commencing Thursday, Sept. 23, fee £7.50, or £3.75 for under 18's.

Burgess Hill: At the Adult Education Centre, Marle Place, Leylands Road, on Tuesdays, 7.30 p.m. Also a Basic Course on Electronics. Tutor, Richard Canning, G6YJ, as in previous years.

Burton-on-Trent: At Needwood High School, Rolleston-on-Dove, enrolment Sept. 16, evening, class starting Sept. 21, 7.30-9.30 p.m., fee £2. Course instructor, D. Reynolds, G4BPW.

Bury: At Mosses Youth & Community Centre, Cecil Street, enrolment Aug. 31 and Sept. 7, 8.0 p.m., for course commencing on Sept. 21. Further details from J. Clifford, G4BVE, 10 Arley Avenue, Bury.

Camborne: At the Cornwall Technical College, on Monday evenings, 7.0-9.0 p.m., starting Sept. 20.

Canterbury: At the College of Technology, apply to the College.

Chesterfield: At the College of Technology, apply Course Organiser, at the College.

Crawley: At the Sarah Robinson School, Ifield, enrolment Sept. 17, 7.0-9.0 p.m., for Monday evening courses, 7.0-9.0 p.m., starting Sept. 27. Further details from the tutor, R. Scivens, G3LNM (Crawley 22540).

Dudley: At the Technical College, Tuesdays and Wednesdays 6.30-8.30 p.m., enrolment evenings Sept. 7-8. Details from Dept. of Electrical Engineering and Science.

Durham: At the Technical College, Framwellgate Moor, classes starting Sept. 20, prior enrolment essential. Course instructor J. Greenwood, G3ZJY.

Eastbourne: At the College of Further Education, enrolment Sept. 6-9, for course starting on Sept. 20. Further details from M. B. Welling, G3ZFE, 29 Hawkstow Crescent, Hailsham, Sussex.

Farnborough (Hants): At the Further Education Centre, Coe School, St. John's Road, on Thursdays at 7.30 p.m., starting on Sept. 30. There will also be a Morse course. For details apply The Principal, at the Centre.

Gosforth: At the Secondary School, Gosforth, starting in September, on Tuesday evenings, 7.0-9.0 p.m. Enquiries to the Principal at the School (Tel: Newcastle-upon-Tyne 668439); class instructor D. R. Loveday, G3FPE. The R.A.E. will be held at the School.

Hemel Hempstead: At the Dacorum College, Marlowes, on Tuesday evenings, 6.0-9.0 p.m., starting on Sept. 14. Enrolment Sept. 6-7, evenings. Further details from the course tutor C. Burke, G3VOZ (Tel: Hemel Hempstead 833300).

Ilkeston: At the Dept. of Technology, South East Derbyshire College, on Wednesday evenings, 7.0-9.0 p.m. Apply T. Nixon, Dept. of Technology.

Kesgrave (Ipswich): At the Adult Centre, Modern School, enrolment evenings Sept. 14-15, fee £4.50 for ten-week course, classes starting Sept. 21, 7.20 p.m., instructor R. Morgan, G3FVP.

(cont'd over)
Knottingley, Yorks.: At the High School, on Tuesday evenings from Sept. 21, 7.0 p.m., enrolment evening Sept. 16.

London (Acton): At the Technical College, High Street (opposite Acton Town Hall), enrolment evenings Sept. 9, 13, 15, 6.15-8.15 p.m., classes start Sept. 22, 6.30-9.0 p.m., inclusive fee £6-50, course instructor W. G. Dyer, G3GEH.

London (Beckenham): At the Adult Education Centre, on Wednesdays 7.30-9.30 p.m., starting Sept. 22, enrolment forms available from the Principal, 244 Croydon Road, Beckenham.

London (Chingford): At the Adult Education Centre, Simmons Lane, enrolment and commencement of course Sept. 20, 7.30 p.m., fee £6. Instructor A. P. Foss, G8EAY (Tel: 01-500 6034).

London (Eltham): At Hill School, S.E.9, on Tuesdays 7.30-9.30 p.m., commencing Sept. 21. Enrolment forms from the Principal, Institute Hq., Art Centre, Haimo Road, Eltham.

London (Finbury): At Shelburne Radio Club, White Lion Street, Angel, N.1, classes starting Sept. 6. Enquiries to Tutor, G3SFL (Tel: 254 8528), R. Cummings.

London (Harrow): Class at Hatch End High School, Pinner Road, enrolment Sept. 18, morning, and Sept. 21, evening, at Nower Hill High School, Pinner Road, fee £11-70, inclusive Morse tuition. Classes start Sept. 29, 7.0-10.0 p.m.

London (Highgate): Grafton Radio Society Course, as in previous years, at Holloway Institute Annex, Highgate Hill, enrolment Sept. 13, course starting Sept. 20, 7.0-10.0 p.m., lecturer B. C. Bond, G3ZKE (Tel: 485-7065).

London (Ilford): At the County High School, Cranbrook Road, starting Sept. 29, enrolment evenings Sept. 13-16, fees £7-50 or £3-75 for juniors. Course instructor W. G. Hall, G8JM.

London (Paddington): At the Institute, Amberley Road (off Harrow Road, No. 18 bus), enrolment Sept. 13, 6.30-9.0 p.m., classes starting at the Institute on Sept. 23. Instructor, D. T. Busby, G8ELB (Tel: 864 4411, Ext. 39), for information.

Manchester (Openshaw): At the Technical College, Whitworth Street, commencing Sept. 21, 6.45 p.m., enrolment Sept. 6-8. Course includes Morse, and is conducted by A. B. Langfield, G3IOA, and E. Horne, G8IYX. An advanced course is also offered for licenced operators wishing to progress beyond the R.A.E.

Manchester (Swinton): At Moorside High School, East Lancashire Road, on Thursday evenings, starting Sept. 30. Details from P. Whatmough, G8BFP (794 3700).

New Ollerton (Notts.): At Dukeries Comprehensive School, commencing Sept. 21, 7.0 p.m. Enquiries to C. J. Morgan, G8LPX, 113 Henton Road, Edwinstone, Mansfield.

Princes Risborough: At the Adult Education Centre (County Secondary School) Theory Class on Mondays 7.0-9.0 p.m., instructor R. Whiting, G3POF, and Morse on Thursday evenings, under S. Ford, G4ACV. Classes begin on Sept. 20, enrolment Sept. 8-9, or first meeting of class.

Scunthorpe: Amateur Radio Club course at Grange Farm Hobbies Centre, Franklin Crescent, starting in September. Information from H. Holmes, G3MSB, at the Centre.

Sheffield: At King Edward Lower School, Darwin Lane, Sheffield 10, on Wednesday evenings, starting on Oct. 6, 7.0 p.m. Apply J. Bell, G3JON (Tel: 367774), for details.

Shirehampton (Bristol): Held by the Radio Club at Twyford House, High Street, classes in Theory and Morse will start early in October. Apply for details to R. W. Andrews, G4BWB, fttTHR, or ring 426486.

Slough: Classes in Theory, Morse and Advanced amateur radio techniques at the Langley College of Further Education. Apply for details E. C. Palmer, G3FVC, Dept. of General Studies, Station Road, Langley Tel: Slough 49222.

Walsall: At the College of Technology, St. Paul's Street, with tuition in Theory, Morse and practical work. Further details obtainable from the College office, or ring 25124.

Wigan: At the Adult Education Centre, Parson's Walk, enrolment Sept. 6-9, 6.30-8.30 p.m., fee £8-70 for 30 weeks, course starting Sept. 20, 7.0-9.0 p.m. Instructor, T. Austin, G3RCA.

Wirral: At Birkenhead Technical College, Borough Road, on Thursday evenings, 6.30-9.0 p.m., enrolment early September at the College, instructor L. Roberts, G3EGX.

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For this month's Reader Small Advertisements, see pp. 442-446
MICROWAVE MODULES SET THE STANDARD ONCE AGAIN!

We are pleased to announce a 2 metre solid state transverter, MMT144/28, similar to our highly successful 432 MHz transverter, MMT432/28, which is in use around the world for satellite and terrestrial communication.

This 144 MHz unit is fully compatible with any 28 MHz drive source, and provides 10 watts continuous power output from extremely robust power transistors capable of withstanding severe mismatch. The combination of a balanced mixer incorporating protected dual gate MOSFETS, to produce a spurious-free linear signal, and a low noise receive converter makes the unit ideal for all modes of transmission at 144 MHz, particularly where a high degree of linearity, stability and sensitivity are of prime importance. Due to their linear mode of operation both transverters will successfully accept SSB, FM, AM or CW signals for conversion from 28MHz up to 144 MHz and 432 MHz respectively.

Housed in a highly durable diecast case, this transverter is similar in appearance to the pictured 432 MHz transverter, MMT432/28.

In both transverters the 10 watt power level developed by the transmit section is switched by a PIN-diode changeover relay which has a through loss in the receive or transmit mode of less than 0.2 dB.

**SPECIFICATION**

<table>
<thead>
<tr>
<th>MMT144/28</th>
<th>MMT432/28</th>
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<tr>
<td><strong>Frequency coverage</strong></td>
<td>144-146 MHz</td>
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<tr>
<td><strong>DC power requirements</strong></td>
<td>12 volts nominal</td>
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<td><strong>Current consumption</strong></td>
<td>2.2 amps. peak</td>
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<tr>
<td><strong>Power output</strong></td>
<td>10 watts continuous rating</td>
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<tr>
<td><strong>Drive requirements at 28 MHz</strong></td>
<td>500 mW or 5 mW</td>
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<tr>
<td><strong>Level of spurious output</strong></td>
<td>-65 dB</td>
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<tr>
<td><strong>Receive converter gain</strong></td>
<td>30 dB</td>
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<tr>
<td><strong>Receive converter noise figure</strong></td>
<td>Better than 2.5 dB</td>
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<tr>
<td><strong>Power socket</strong></td>
<td>5 Pin Din</td>
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<tr>
<td><strong>RF input/output sockets</strong></td>
<td>50 ohm BNC</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>187 x 120 x 53 mm.</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>800 g.</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>£85.50 inc. VAT</td>
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</table>

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<tr>
<th>Component Type</th>
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<tr>
<td><strong>VHF STRIPE</strong></td>
<td>Low Noise NPN Transistors like BFR 90 at £3 each</td>
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<tr>
<td><strong>Texas DARLINGTON</strong></td>
<td>PNP Power Transistors at 35p Texas 800 volt 2 Amp Plastic TO 3 NPN TRANSISTOR 50p each, 3 for £1.10</td>
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<td><strong>VHF Dual Gate</strong></td>
<td>MOS FETS like 40 673 33p each, 4 for £1-10</td>
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<tr>
<td><strong>20 Assorted Tuning Varactor Diodes</strong></td>
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<td><strong>VHF Power Transistors</strong></td>
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<th>Description</th>
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<td>ASP201</td>
<td>4-6 MHz</td>
<td>20dBi gain, omnidirectional</td>
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<tr>
<td>ASP205</td>
<td>4-6 MHz</td>
<td>25dBi gain, beamwidth 3°</td>
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<tr>
<td>ASP440</td>
<td>130-145 MHz</td>
<td>3-element Yagi</td>
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<td>ASP655</td>
<td>130-145 MHz</td>
<td>5-element Yagi</td>
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For detailed independent test reports of Model FLI, please see Radcom June 1976 and Short Wave Magazine July 1976.

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<table>
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<th>OUTPUT FREQUENCY</th>
<th>4 MHz-30 MHz</th>
<th>6 MHz-50 MHz</th>
<th>10 MHz-80 MHz</th>
<th>14 MHz-120 MHz</th>
<th>18 MHz-200 MHz</th>
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<th>30 MHz-400 MHz</th>
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