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 R300 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 an Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for most 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 (75-1-1m.) and radio amateur bands (80-10m.) of the large drum-type main tuning 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 TRIO range.

R300 £184.50 inc. VAT

Sole Importers; LOWE ELECTRONICS
Cavendish Road, Matlock, Derbyshire
Tel.: Matlock 2817 or 2430
The TS520 System
TRIO have now completed the first stage of the total system concept for amateur radio equipment. With the TS520 and its associated accessories, the amateur radio operator can assemble a station to suit any or all requirements for his hobby enjoyment. All modes and all bands, fixed and mobile/portable are provided by the TS520 system.

SSB/CW Transceiver TS-520
A real “compact”; powerful, rugged and reliable. It has everything which otherwise is available only as an accessory at extra cost: built-in power supply for fixed-station use, transistorized DC/AC power converter for mobile operation, loudspeaker, fixed-channel provisions, VOX control, etc. All these are the TS-520’s special features in short format:

Versatile Transmit- and Receive Operations—USB, LSB and CW on all radio amateur bands from 80m. to 10m., and—with the aid of the 2m.-Transverter TV-502—on the VHF-band from 144 to 146 MHz, as well as fixed frequency operation on four channels. The TS-520 also allows reception of WWV stations on 10 MHz for dial calibration. By adding the External VFO-520 (optional) the TS-520 demonstrates utmost versatility; independent RX- and TX operation with different frequencies transceive operation with slightly variable RX frequency by means of the built-in RT circuit (Receiver Incremental Tuning) plus fixed channel operation totalling nine different combinations.

Advanced Circuitry—With the exception of the transmitter driver and final stage which are equipped with blower-cooled vacuum valves of type 12BY7A and 2 x S2001 the TS-520 is fully transistorized. The semiconductor complement consists of 44 transistors, 18 FETs, 1 IC and 84 diodes. The reliability and stability of this circuit has been substantiated by numerous contests and during rugged mobile operation.

Outstanding Receive and Transmit Performance—The transmitter section of the TS-520 features separate driver, plate and final tuning, a 2-stage ALC circuit for local and DX operation, thus assuring undistorted clearly legible TX signals even after hours of continuous operation. Provisions for linear amplifiers, such as ALC input, antenna relay switching output, etc., are available and ready for use. Dual-gate MOSFETs are employed in all critical receiver circuits to improve the input sensitivity, cross-modulation response and spurious rejection. An 8-pole SSB crystal filter in the IF amplifier provides exceptional selectivity and stability. An optional 500kHz CW filter is available as an accessory and can be installed at any time. The switch-selectable time constant of the AGC assured perfect reception of SSB and CW signals.

Precision-type VFO—a feature of all TRIO receivers, transmitters and receivers also contributes to the supreme performance of the TS-520. The VFO is fully encapsulated and is controlled by a meshedgear dial drive (reduction ratio 4 : 1). Dial accuracy is better than ± 1 kHz, frequency drift will not exceed ± 100Hz per hour. Dial calibration is accomplished by means of a built-in 25 kHz crystal marker oscillator.

Built-in Power Supplies—for fixed station use with 120/240v. AC 50-60Hz line voltage or for mobile operation with 12-13.8v. DC by means of the built-in DC/AC converter.

Loaded with Extra Features: threshold-type RF gain control; break-in CW keying with sidetone; VOX/PTT/MOX-control; RIT; TUNE switch; LED function indicators for RIT, VFO and FIX channel operation; WWV receive pushbutton; 4-position fixed channel selector switch; built-in 25kHz crystal marker oscillator; two-stage AGC; multi-function meter; terminals for optional accessories such as: 2m.-Transverter TV-502, External VFO-520, External Speaker SP-520, linear amplifier, headphone, microphone and key.

TS520 £432 inc. VAT

It’s worth remembering that TRIO make a complete range of accessories to add to your operating pleasure and convenience.

We show here the HC2 Ham Clock which gives the HF operator instant readout of the local time in any part of the world. The clock runs for about a year on one HP2 battery and the styling is most attractive. At £14 including VAT and postage, the HC2 is a worthwhile addition to any station.

If you should need the best of microphones, try the TRIO MC50 dual impedance desk microphone. Optimised frequency range for extra communications punch and cardioid response pattern to allow correct vox operation without tripping, £25.35 including VAT and postage.

For the man who likes the microphone in his fist, the TRIO MC10 is the ideal. Matching all TRIO equipment—and most other transceivers, the MC10 is rugged and reliable for long service. Optimised speech response guarantees first class quality on the air, 19.25 including VAT and postage.

LOWE ELECTRONICS
119 CAVENDISH RD.,
MATLOCK,
DERBYSHIRE.
TEL. 0629 - 2817 or 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 QSOs 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 30W transistor which is run at only 20 Watts input to give optimum linearity and protection against misuse.

The construction of the TR7010 follows the rugged reliable package style of the TR7200G—and fits the same mobile mount so that one can fit either rig in the same mounting slide. Fixed (using the matching PS5 supply), or mobile, the TR7010 is the DX SSB/CW rig for everyone.

SPECIAL OFFER

Trio have agreed to maintain a special low price for the TR7010. Stocks are limited.

TR7010 £175 inc. VAT

If you want to check your aerial or transmitter performance, we stock a wide range of SWR and power meters suitable for general station use.

Top of the range for VHF is the Daiwa SW410 which measures in line power up to 120 watts from 145-450 MHz and also SWR in three accurate ranges. Price £48.60 inc. VAT. Lower down the price range is the super Hansen FS302 at £32.50 inc. VAT. Frequency range from 50-150 MHz and power up to 200 watts—and SWR as well.

For SWR measurements only, we have a very attractive twin meter bridge at only £10.90 inc. VAT. This is the SML-25 which has a frequency range of 3-5-150 MHz making it ideal as a general purpose station accessory.

Full details in our catalogue obtainable for only 30p in stamps.
**TD224**

This amazing little box replaces that clanking old teleprinter that was needed to copy RTTY signals. The TD224 accepts mark/space inputs from your terminal unit (normally TTL but 80-80 can be provided as an option) and converts them into a composite 625 line video signal for display on a TV monitor. A UHF modulator is available as a low cost option to enable use of any 625 line domestic TV set as a monitor. From jingle bells to displayed text—it’s easy and silent with the TD224 and a terminal unit DM170.

TD224 £209.25 inc. VAT

**KF430**

Positively the best buy in 70 cm. FM mobiles. Small size (9½ x 3½ x 2½") and light weight disguise an amazing performance. Transmitter output is 10 watts and receiver sensitivity is 0.4 microvolts for 20dB quieting so it really is good. The KF430 is supplied complete with 9 channels fitted, automatic tone burst, microphone, mobile mount, etc., etc., and costs only £180 including VAT at 12½%. Super performance. Super value for money.

KF430 £180 inc. VAT

**NR56**

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 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 it thus an excellent mobile receiver for mounting in the car, boat or caravan as well as for home use.

NR56 £54-00 inc. VAT

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**2 METRE TOP QUALITY FROM TRIO**

TRIO have made dramatic reductions in the price of the TS700G, the best multi-mode 2 metre rig on the market, and the TR7200G, the mobile which beats them all. There will never be a better time to buy than right now, and we will be pleased to separate you from your wallet. If you prefer to spread out the agony, we can offer short term credit even cheaper than Access or Barclay whilst for the masochists among you, we can provide extended pain via the normal credit companies.

Make sure that the price which you see in the advert includes VAT—a purchase at £339 can become £381.37 when VAT is added so watch it. The other area in which to take care is the accessory swamp. Brave amateurs have been known to sink out of sight crying "but I thought it included the battery charger," or the microphone, or whatever. MAKE QUITE SURE THAT YOU HAVE THE CORRECT PRICE INCLUDING ALL THE HIDDEN EXTRAS.

FULL TIME BRANCHES

Communications House, 20 Wallington Square, Wallington, Surrey. Tel. 01-669 6700.

Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708.

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FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ½ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.

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

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

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

STOP PRESS: ATLAS 210X AND 215X

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021-327 1497
Telex 337045 6313
The FDK-U1I is a borne leader. 70cms. is a demanding band, requiring the highest standard of engineering and electronic design. The FDK-U1I is designed to meet this high specification. It is the only 70cms. transceiver to have stood the test of an independent RSGB review in Radio Communication (December 1976) and is now the most widely used 70cms. transceiver in use today. A look at its basic specification and design will confirm its supreme leadership in 70cms. FM.

The receiver employs a triple conversion superhet with a first IF of 45 MHz to ensure high image rejection. (Other rigs employing a first IF of 10.7 MHz at 70cms. really do have image problems!) Triple conversion also facilitates the use of much lower frequency conversion crystals resulting in superior frequency stability. The signal from the antenna passes through a 2 stage RF amplifier and mixer housed in a completely screened box. This is one of the hottest front ends we have come across and confirmed by the RSGB review: 4 UV gives better than 20dB quieting.

The signal then passes through a 2 stage 10.7 MHz crystal filter (a nice design point this!) and on to the main 455 kHz IF chain embodying 6 stages and switchable wide and narrow filters. This ensures really hard limiting and superb adjacent channel selectivity not realised in other models. The receive channel crystals operate a back lit channel dial so that only channels loaded with crystals are illuminated. And of course the now famous priority channel scan ensures continued monitoring of the main simplex channels. (Beware of rigs boasting channel scan adaptors—they simply lock onto the local repeater and stay there!) But perhaps one of its most essential features not included in any other rig is the receiver incremental tuning.

The transmitter section employs a highly stable oscillator chain and is phase modulated by a well tailored audio section for that distinctive, fully deviated signal now so familiar from the many U-11's operating through out the U.K. and continental repeaters. The driver and PA stages are completely enclosed in a metal box together with a very sophisticated filter section producing a signal so free of spurious output that it meets commercial specifications! The PA is fully protected and normally gives 12-13 watts output.

FREE CREDIT

For a limited period you may purchase an FDK transceiver and spread your payments over 6 months without paying a penny extra. This offer applies only to UK licensed amateurs. Example: Multi-II, deposit £49.68 and 6 payments. Multi-U1I, deposit £62.50 and 6 payments. Phone or write for full details and beat inflation.

NEW!

EL-40X Deluxe balun-fed "Mini-Dipole." Approx. length 75ft. Supplied complete with special balun for perfect matching and TVI reduction. A complete set of hardware is supplied including an inverted "V" kit. The high "Q" traps are completely weatherproof yet light in weight and a unique clear vinyl covered copper element is employed to ensure that the antenna lasts for years. 1KW rating.

COMPLETE SYSTEM £28.12.
Whether you are a listener, a newly-licensed G8, an old hand at the HF bands, or Mr. V.H.F., the array of equipment currently available for VHF is most bewildering. On these pages we make a few suggestions from our large stocks that may help guide you through the maze.

If you already have a HF transceiver, or feel one day you may wish to use the DX bands, then, you can do far worse than use a transverter. Perhaps the Yaesu FT250 for two, or the FT620B, suitably modified by us, for four metres. Both offer complete flexibility of station design and require no plugging or unplugging of any leads, whatever, then changing from VHF to HF. As an alternative we offer the range from Microwave Modules. Their 70cm. unit is exceedingly popular, coming in three forms with a 144 MHz, 28 MHz or 50 MHz IF. For this latter item we offer the FT620B 6m. transverter, which by virtue of its high output frequency can substantially improve image problems (even permitting single conversion to 23 cm.). The MMT432/144, when used in conjunction with the Yaesu MUSEN FT221R, from us, will allow full repeater working on 70 cm. with the in-built 1.6 MHz shift and full 4 MHz coverage.

Should your interest be purely in listening, and you have a communications receiver, we offer a range of external converters and amplifiers from 4m. through to 23 cm. You may prefer a self-contained unit such as the FR101D. This covers all UK amateur bands, from 1.8 through to 144 MHz with detectors and filters for AM, FM, SSB, CW, etc.

For mobile use, the range is very wide and the choice difficult. For 70 cm., rapidly growing in popularity, a Multi U/I for FM, or for SSB a Liner 430, which with its Oscar VII capability offers interesting possibilities of mobile satellite QSOs. In this vein satellite translation from 10 to, or the enjoyable full duplex 70-430 MHz, should not be neglected. Crystal controlled FM transceivers, such as the FT233, are very popular. We would recommend that you seek one with at least, a 20-channel capability, even if you may not intend to use all of them. The more advanced systems, more advanced systems, whether this employs digital or crystal mixed techniques, are surprisingly good value when looked at in the long term, with no crystals to buy for band plan changes or to update with activity. We could suggest either a Yaesu Sigmaster 300 or SSB, which covers all of 2m. in 25 kHz steps and has repeater up and down shifts in the necessary parts of the band, or, perhaps, the Kyokuto Digital II. This is a digitally synthesised transverter, covering in 5 kHz steps the entire band (and a receive facility to 149). Repeater up and down shifts of 600 kHz are fitted (but we can modify the transceiver to provide a 1.6 MHz transmitter shift). This automatic crystal controlled frequency control is available as a scanner. This unique device allows you trouble-free searching of the band within a matter of seconds. All important normal functions of the transverter are maintained, but in addition, when scanner is switched on the unit tunes automatically from 145 to 145-87 MHz in 25 kHz steps. As soon as the squelch opens, scanning stops and for seven seconds you hear what is on the channel. If you flick the small toggle switch on the microphone over, the equipment will lock on the frequency. Conversely, should you not wish to use that channel (say lock out the local repeater input or output frequency) you can momentarily squeeze the push to talk and next time round, the scanner will skip this frequency. Any or all of the frequency scanned may be locked out in this manner, to your desired. As the next step to your mobile installation we would suggest a linear amplifier for 2, the KLM 160W output device is strongly recommended. Other units are available providing 800W out on 2 or 45 or 80W, or 140W.

If you seek hand held equipment (or an all-purpose transceiver with your main interest being elsewhere), the KP302 has a fine reputation. As the next step to your mobile installation we would suggest a linear amplifier for 2, the KLM 160W output device is strongly recommended. Other units are available providing 800W out on 2 or 45 or 80W, or 140W.

For home station use, any of the mobile equipments with suitable power supply are quite satisfactory, but special mention should be made of the multimode equipments, such as the FT233R. This operates on selectable SSB (remember LSB for Oscar 7), FM (with full repeater facilities including inverse and 70 cm. shift), CW (with sidetone and semi-break-in) and on AM. Powered from mains or from 12v., its sophisticated circuitry is equally at home working SSB DX or local rag chewing on FM.

IF ANY ITEM HERE OR PREVIOUSLY ADVERTISED HAS WHETTED YOUR APPETITE, PLEASE DO NOT HESITATE TO CONTACT US, AT TOTTON, LEEDS CHESTERFIELD, LINS. or BIRMINGHAM.

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OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

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THE SHORT WAVE MAGAZINE

South Midlands Communications Ltd.
THE LEEDS BRANCH

HOW TO FIND US

If in Leeds city centre, follow signs to "Headingley" or "University" past University on left, over tree lined Woodhouse Moor, into Headingley. Turn left at third set of traffic lights. (Well spaced, some pedestrian operated). Into North Lane. See map.

If approaching Leeds on M1, leave motorway at "Holbeck & City Centre" sign. Then as above.

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Whilst it is undoubtedly true that the UHF, PL259 range leave much to be desired over 200 MHz, their mechanical performance is excellent. We offer plugs in standard or P.T.F.E. insulation for 7/16", with reducers for smaller cables, adaptors and converters. For the discerning BNC, N and C types are stocked. For accessory connections we hold a stock phonoplugs, plastic or metal barrelled, jack plugs 1" stereo or mono, mic. plug, power plugs (for the Yaesu range) and a wide collection of similar ancillaries.

PL259 Standard UHF plug 48p UR43 or 70 UHF fixed reducer 55p 250 Back to back (female) 80p "Solderless" UHF RGBU 35p "Solderless" UHF UR43 51p Right angle (1M + 1F) 90p "UG" Reducers state 55p Phono/Car to SO239 SO239 2-hole socket 37p

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SM566 Spark PL/50 £2.25 NSK Gas 50/50 £7.50 LA3 Spark PL/50... T.O.S. LA1 Gas 50/50... £7.50

CABLES RF FEEDERS (Carriage extra) VAT 8%

Feeders are the point where amateurs often falsely economise. For mobile use a cable with a stranded centre (UR76 etc.), for a fixed length unsupported run without a cattenary, or allowing the cable to slap against the mast are taboo, breakages of the centre conductor will arise with disastrous results.

If you are using a 3/8" cable changing to UR43 or 70... "Solderless" UHF UR43 51p Right angle (1M + 1F) 90p "UG" Reducers state 55p Phono/Car to SO239 SO239 2-hole socket 37p

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

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

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FT223 THE NEW 2M-FM TRANSCEIVER

£139.50, 3 crystal pairs; £152.50, 8 crystal pairs (+ VAT 12 1/2%)

The FT223 is an FM transceiver operating on 23 crystal controlled channels (or by external VFO) across 144 to 148 MHz. For mobile use it is safe, illuminated; meter (Rx 5" and Tx out) and main dial (when crystal used), LED's indicate; squelch open, high or low operation, or air, or if the special frequency is selected. Housed in heavy metal case and supplied complete with mounting brackets, connectors, microphone, etc., it is equally at home as a compact (7" x 4 1/2" x 8") base station with a 12v. PSU, (0.45A RX, 1.2A TX, 2.3A HTX). The dual conversion receiver is sensitive (most RF and mixer), and selective, (12 kHz at 6 dB) delivering 2w. to the internal 3" or an external 4 Ohm speaker. A switchable repeater access tone burst and a tone squelch option (4audible selective calling tone T-RX) are all features of this new high quality, low price, transceiver.

DIGITAL II from KYOKUTO

SCANNER AND CRYSTAL T.B. OPTIONS

The Digital II offers complete 5 kHz step coverage across 2 metres and now with the Scanner 33, 23 kHz channels from 145 MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 7 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDS. Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (Rx to 149 MHz) from a tiny 6" x 2" x 7 1/2". Easily underdished and ready for use with the supplied mounting bracket, or slipped in place of the broacast wireless.

For strong handling, and low noise the R.F. mixer, first IF (16.9 MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (4 kHz at -70 dB) Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation) Unitary 6 circuit block construction (for serviceability and screening). Selective calling socket.

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VAT-Rotators 12 1/2%, Cable, and delivery 8% Carryage (BRS or post) FREE. Securicor delivery £1 extra (mainland). All rotators supplied complete with appropriate control box and instrs.

CDE ROTORS

AR30 Light VHF/UHF... £139.50
AR40 VHF and Light HF... £152.50
AR33 Delux control AR40... £157.50
CD44 Medium duty... £95.00
Ham II Heavy duty... £129.00

STOLLER ROTORS

2010/220 Automatic... £41.25
2030 M. matic... £45.50

BEARINGS

CD562 CDE... £4.50
RZ100 Stolle (ballrace)... £10.00

MOUNTING KIT

AK121 CDE to Versatower...

CABLE

5 core AR30/40/33/2010 pr. yd. 25p
8 core CD44/Ham II per yd. 33p

TAVASU HF MOBILE (Carriage 90p) VAT 12 1/2%

Whip Chrome 2 sect. 60"... £3.88
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**Microwave Modules Transverters**

From Ten, Six or Two Metres (a 100, etc., a “620B” or a “221B”), 10W output, balanced Tx mixers, low spurious content, high sensitivity with dynamic range. Full converter range stocked.

**SMC TRAPPED DIPOLES**

For those with limited space, or restricted interests the SMC trap dipole offers coverage of 10-80 (160) MHz in HP for a very small price.

**SMC73 General Coverage Receiver**

The SMC73 is an all Solid State, Mains and 12V communications receiver covering 500 kHz to 30 MHz in four overlapping ranges. Frequency readout is by two illuminated dials tuned by coaxial spun aluminium knobs, the larger for general coverage, the inner for amateur band (40-80m.) band spread (set by use of internal 35 MHz crystal calibrator). FET’s are employed in the RF, Amplifier, mixer, VFO and BFO (these latter two stages being fed from independent stabilised supplies) ensuring good sensitivity, stability (electrical and mechanical) dynamic range, (helped by adjustable RF attenuator), and marked freedom from “pulling” of both the local and beat frequency oscillators. An internal loudspeaker (but with jacks for ‘phones and external speaker), illuminated signal meter, S2239 (UHF) coax, socket and binding posts for antenna switchable envelope modulators are all features of this exciting new low price receiver.

**Microwave Modules Transverters**

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SMC 73 Ex-Stock £114.50 (+VAT)

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The FRG7 is a solid state mains and 12v. receiver offering continuous coverage 0-5-30 MHz at a constant tuning rate and specifications unparalled in its price range.

Its advanced circuitry provides superb performance either as a standby receiver or for SWL’s (BC and Amateur Bands alike).

It provides equivalent performance to 30 crystal controlled converters feeding a low IF, but without the image and other problems of such an arrangement by the use of a Wadley loop (using the same VHF oscillator to mix up, then after pre-mixing with a stable crystal source down again (this cancelling all drift from the variable oscillator)).

The signal path starts with the choice of 3 antenna connectors: for 1-6-30 MHz, a 50/75 ohm feed (to a SO239 (UHF) coax socket and a binding post) and for 0-5-1-6 MHz (medium wave) a separate high impedance binding post. A 3 position 0-40dB switchable attenuator aids reception of very strong signals and reduces adjacent channel interference. The low noise MOSFET RF amplifier provides a SSB sensitivity of 0.25µV (for 10dB N/S+N at 10.5 MHz) and is sharply tuned by a well calibrated "pre-selector" capacitor with 4 band switched coils. Its output is of very strong signals and reduces adjacent channel interference.

The receiver is, mains (234VAC), external (12v. DC) or internal dry cell powered, offering continuous coverage. A transformerless AF amplifier delivers a generous 2W to the internal 5" x 3", or external speaker, drives a phone jack, and a "volume" independent output for tape recorder. The receiver is mains (234VAC), external (12v. DC) or internal dry cell powered, the most economic source being automatically chosen. This is reduced to a stable regulated 10v. (for oscillator and the harmonic generator). A dial lamp switch is provided to conserve power on battery operation.

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FT301 SPECIFICATIONS
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Modes
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<100Hz for 10% line change
Backlash
50Hz or better
Antenna impedance
50 ohms, nominal
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135v. DC 1-1A RX 21A TX
Sensitivity
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Selectivity
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AM* 6 kHz at 6dB (2 : 1 SF)
CW* 600Hz at 6 dB (2 : 1 SF)
FSK as SSB
Spurious responses
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Audio distortion
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100 kHz crystal calibrator + MSF
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>50W A3 and Fl
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Carrier suppression
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Sideband suppression
>-50dB
Spurious radiation
>-40dB
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<th>Price</th>
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<td>FRG7</td>
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<td>3S (58ft.)</td>
<td>125 lbs.</td>
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<td>3HD (58ft.)</td>
<td>250 lbs.</td>
<td>£383.40</td>
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<td>4S (75ft.)</td>
<td>35 lbs.</td>
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<td>4HD (75ft.)</td>
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Since our first editorial appeared last month, we have received many letters of congratulation, plus of course the odd one requiring us to instruct the maternal grandparent in the art of sucking eggs.

In addition there appears to be an upsurge of useful articles in the pipeline: some of a higher standard, technically, for the more advanced readers and some of a more basic sort for the newcomers to the hobby. For all these things, our thanks—essentially we can only produce from what you, the readers, are game to contribute.

On an entirely different angle, it would seem likely that the deadline arrangements which have prevailed for many years will have to be modified in order that we can give the printers enough time for them to be able to guarantee that production output will be on time every month, as it has for so many years past; like so many others among us, they have to run faster just to stand still by way of ever more intensive use of their presses, if they are to stay in business. On our side we intend that SHORT WAVE MAGAZINE will, as for so many years up until our recent events overtook us, will be out on time, every time, come hell or high water.
COMMUNICATION and DX NEWS

WE were, last time out, remarking on the loss of the lead-in to that old long-wire of invisible nature; we should have added that the home end of the span sits on a stub mast above the house, to which access is gained by way of the bathroom roof, which in its turn requires fishing the ladder out of the garage. Just after we posted the copy for last month, came an ominous-looking damp patch, leading to a call to the local builder to come and remove some bad timbers and re-felt the flat roof; it most certainly was not safe for climbing on until the building work was completed—but who cares, we've got a continuous loop halyard, work was completed—but who cares, who cares, who cares, who cares! We could-until this time, when our patch, leading to a call to the local builder to come and remove some bad timbers and re-felt the flat roof; it most certainly was not safe for climbing on until the building work was completed—but who cares, we've got a continuous loop halyard, work was completed—but who cares...

Top Band

Ten years ago, at this time of the year, we would have had to do some very severe filtering to reduce the volume of Top Band correspondence; but such is the falling-off in the activity that we have only a few mentions of the band—we would have been on ourselves but for that infernal halyard breakage...

The Old Firm, GM3YOR and GM3OLK will be out on business over the holiday period July 9 to July 31, of which the area July 12-29 will be, if all goes well, from Shetland Is.; gear will cover all bands from Top Band up to Seventy cem's, both CW and SSB, though no firm operating schedule is planned. However, they will no doubt draw the covers adequately on all bands.

WIWY is the chap who writes the Contest Calendar for QO Magazine, and sends us copies each month; Frank doesn't just write about contests, he plays in 'em when the chance occurs, and one of his favourites is the CQ WW 160 affair. Over there, the Saturday evening was excellent, 34 DX stations being raised in 21 countries, the best for Frank being VR3AH, with F8EY and EA8CR the other new ones. WIWY comments that he was sure many more G's could have been worked and they only followed the proper and accepted procedures in listening for calls, as WIWY had no difficulty in raising the savvy operators with a very brief call—they were in many cases S9 signals at peak. One would have thought by now, after all these years of split-frequency working on the band, that the gang would have realised the need to give an indication as to their listening frequency if they are to work DX in a contest on Top Band.

GM3CFS (East Mey, Caithness) has suffered somewhat with gales turning into storm force, throwing down the aerials and wrapping them round telephone poles. Radio-wise conditions have been up and down, but Jim did manage to latch on to ELON/MM, off Cuba, PT2CW, VE1CD, and W2LW. The ARRL contest was a dead duck, thanks to the high noise levels.

G2HKU (Sheppey) commiserates with us on the problems of getting the direct-mail copies to readers on time, and says he doubts if anyone gets their copy before the week-end; Ted got his on Monday, but he knows of Kentish readers who didn't see theirs until a couple of days later still—as Ted says, we have got a problem, with the cost of mail getting higher and higher for less and less service. Our problem, essentially, is that once it lands in the posts, our control over it goes, and the printer of course has his certificate of posting on the due date. That is one end of the squeeze, and the reader deadline is the other—this must be as late as possible if the news is still to be news. However, to get back to the matter of Top Band, the G2HKU SSB was heard in the speakers of PA0PN, PA0HIU, PA0SE, HB0LD, DK3BJ, HB9AUS, DJ5PN, YU2HDE/3, DL7SU and DJ0YL, the latter being husband and wife. CW accounted for 4U1ITU, OL8CFB, OK2BQL, OL8CGB, GM3AWF, GM3FPQ, F6DBA, OK1AVG, YU2HDE/3 and DL6SS.

Eighty

Reminds one a little of that old saying “From gholies and ghostsies, and long-leggity beasties, and things that go bump in the night, good Lord defend us!”

However, there are those who like it; for example, WA2LTQ, who is now F0CGP with Transworld and there indefinitely. David only operates Eighty and a bit of Top Band, and on Eighty after one month of operation the tally was 103 countries up on SSB, the gear being an FT101B, Alpha 77, HR0-500, and a G3LLL clipper, which last David reckons helps a lot. On the aerial side the prime radiator is a Cubical Quad, but there is also a Beverage for reception and a full-wave sloper for the USA. Jusk think about that—a Cubical Quad for Eighty!

On to G4EDG (Newton Abbot) who mentions that the last batch in from the Bureau included the last few needed for the hundred countries confirmed. Eighty showed contacts with CO2BB, DL7FH/OY, FY7AS, JT0ICB, ZL1BPU, ZL4GU, 6W8FOC, all at the CW end, plus 6Y5DA and 7X2DG on SSB.

An interesting one for G2NJ (Peterborough) was DK4BP/5N/MM in La Spezia Roads—the more one looks at that call and location, the more one is surprised, a German with a 5N call, maritime mobile and sitting on the North-West coast of Italy; the mind boggles! On a different tack, a QSO with G3KLX in Eastbourne had to be terminated so that Doug could go and have his weekly chat with a blind and deaf old lady of 87. Winnie Powley had an eye operation some five years ago which went wrong somewhere along the line and left her blind; then shortly...
afterwards she became suddenly totally deaf. However, she was, and is, a fine telegraphist, and she has a buzzer, the vibrations of which she copies through the sense of touch; G3KLX tapes a couple of stories for her each week, and she puts them through her recorder when she wants to read. She must be our oldest YL Tel.—and good luck to her from us all; to start taking it in a new manner, and to store it instead of writing it down like that, when one is in the eighties is a real achievement.

Usually for him, G3CED/G3VFA made the odd contact on SSB; however, they were not on Eighty, and so will be mentioned elsewhere. Meantime, we simply note that Eighty seems to have upset George in some way, as he has only used it occasionally for tests and contacts with G4EVO.

G4EVO, like G3CED is a Broadstairs man; and like G3CED, G4EVO seems to have felt the attractions of the HF bands with improved conditions. On Eighty, there were quite a few contacts, mainly with G's, but a few into Europe.

G3PKS (Wells) found conditions on the band good early on March 20; around 0700 clock Jack was calling a pal in London, and despite signing KN was called by a horde calling a pal in London, and despite 20; around 0700 clock Jack was waiting, his selection being CX3AL, PY1NEW and UA9SEC.

G2HCU always seems to have a look on the band, and this time his CW seems to have penetrated to U18CQ, and VP2MAQ.

In a similar way, GM3CFS seems to have ripped off a couple of CW contacts in passing from below to above, his selection being CX3AL, PY1NEW and UA9SEC.

G2HCU on the BERU trail—his only operating "in anger" as he describes it—saw a visit to Forty where he collected a few VK and ZL contacts but not a lot elsewhere.

Although he, like most reporters, didn't do a lot on the band, G3PKS notes a propagational oddity around 1115 GMT on March 20; he had called CQ and been answered by a W1; Jack was still pondering this, wondering whether he had a pirate, when HB9BIO at S9 plus umpteen popped up on the frequency, together with K4, a WSZCQ, K0CMF, and others of like ilk. After two minutes there was a silence, and then a reversion to the usual Europeans and stuff for the time of day. Most odd—especially the moment of silence.

Not only did G4EVO make a few contacts on Forty, he made some on Phone too! The run-of-the-mill stuff was largely European, but the Phone working seems largely to have been a net activity, with the call E12CC prominent, and the Argonaut pumping some five watts input peak, or about a couple of watts of output, say, into the Joystick; and the advantages of a salt-water take-off were to be noted here too, the signals going out less well to the west than Eastwards.

Now to G4EDG, who found the conditions better than he would have expected, and his log reflects this; however, Steve has not yet completed his "proper" 7 MHz vertical, and thus has to rely on the present device which he describes as a "bit of a bodge." Be that as it may, the log shows—presumably CW—with KZ5FR, JA1PIG/PZ, K9KDI/6Y5, VP2DD, VP2MAQ, VP8ON, WB5QXI in Oklahoma, WB5NMA in New Mexico, W6PT, W6BAC, W7DAZ, W7IGE in Idaho, W7LR in Montana, W7AO in Arizona, W7DNU, WA7VOS, VE7IG, VE7IT, VU2GW, VP9HO, YS1ESH, YV3AGT, XE1ZV, ZD8TM, ZL3PT, 6W8FOC, 8R1J, and 9D5A.

**Here and There**

Perhaps our first stop should be with G3CED/G3VFA, of Joystick fame—it seems that the February issue of his usual advertisement in the pages of this journal managed to turn his 0.5 to 30 MHz claim into 0:5 to 30,000 MHz!—had that claim been true then we are quite sure G3CED would be sitting right on top of the world, with his pile made years ago! But seriously, even though such an error can happen and occasionally gets through the screening of any printed page, it seems that there are always the characters about who will write rude letters about it to the advertiser concerned, or—we hope jocularly—bring the subject up in conversation or on the air in a QSO. One would have felt that the prime thought would have been to be thankful they hadn't had it happen to themselves, rather than spend time plastering egg all over the face of the unlucky one!

That 9D5A call was to mark the 50th year of the Pahlavi Dynasty in Iran, and made some 12,000 contacts before they closed down—the QSL address is to WA6AHF, says WIWY.

This year the SEANET Convention is being held in Bangkok, and the Thai national society is doing the organising of the SEANET contest which is run to publicise the Convention each year. The CW leg comes up on the weekend of July 9-10, 48 hours midnight to midnight GMT, while the Phone session will be on August 20 and 21 similarly. All bands from 18 to 30 MHz, and the classes are single-band, single-operator, multi-band single opera-
or, and the multi-multi for the clubs and contest groups. The call will be, on CW, CQ SEA, and for the Phone end, CQ SEATEST; and the exchange is to be the usual five or six-digit effort with the serial number beginning at 001. Scores are a bit complex, and perhaps the best way of making sure you get the correct information would be to drop a line to the SEANET Contest Committee, c/o Ismail Razak, "Eshee," 9M2FK, 281-C Jan Pekellling, Bukit Glugor, Penang, Malaysia for the Rules—an SAE or IRC's would be courteous. Penang, Malaysia for the Rules—which should arrive by October 31. an SAE or IRC's would be courteous. Penang, Malaysia for the Rules—which should arrive by October 31.

We have two letters from G3RCA (Wigan); in the earlier letter Tom mentions that his friend 5N2ESH is not having his licence renewed, this apparently being a hang-over from the Civil War powers. We have since heard it from other quarters that the 5N2's are off the air—yet another African country with so little stability that it is afraid of an amateur radio station. On the question of the G3RCA score, we see from the first letter SSB to FK8AH, FK9CD, HM0U, KG6JBE, W7's, VP8HZ, 4S7SW, 5B4DJ, TU2FO, FL8BF. 9J2PH, 9GI1PL, 5T5DY, FC6EFJ, KG6RI. AP5HQ. EP2GJ, VU2JF, FR7ZL/T. 6WOL/V/VP3. C5AR, C5AU. P29KE, D2ASW, FL8FF, 3B8AR, FR7AD, CN8MB, 3B8DA, C6's, 9J2GF, 7X2's, FL8NR, FR7AO/M, FR7ZK, FC2CV, FK8CO, EA9FL, JK8S, ZL4NH. We have two letters from G3RCA (Wigan); in the earlier letter Tom mentions that his friend 5N2ESH is not having his licence renewed, this apparently being a hang-over from the Civil War powers. We have since heard it from other quarters that the 5N2's are off the air—yet another African country with so little stability that it is afraid of an amateur radio station. On the question of the G3RCA score. we see from the first letter SSB to FK8AH, FK9CD, HM0U, KG6JBE, W7's, VP8HZ, 4S7SW, 5B4DJ, TU2FO, FL8BF. 9J2PH, 9GI1PL, 5T5DY, FC6EFJ, KG6RI. AP5HQ, EP2GJ, VU2JF, FR7ZL/T, W6QL/V/VP3, C5AR, C5AU, P29KE, D2ASW, FL8FF, 3B8AR, FR7AD, CN8MB, 3B8DA, C6's, 9J2GF, 7X2's, FL8NR, FR7AO/M, FR7ZK, FC2CV, FK8CO, EA9FL, JK8S, ZL4NH. We have two letters from G3RCA (Wigan); in the earlier letter Tom mentions that his friend 5N2ESH is not having his licence renewed, this apparently being a hang-over from the Civil War powers. We have since heard it from other quarters that the 5N2's are off the air—yet another African country with so little stability that it is afraid of an amateur radio station. On the question of the G3RCA score.

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away almost all the mess, leaving
is up to nearly 200 countries.
9N1MM. Everyone wants 9N1MM,
rather annoying, in VU2DK and
other hand two Gotaways were
ZS6BNH, GW4BLE was on Fifteen, and it
able
tiring, whereas on CW one can cut
Be all this as it may,
testing to the SSB sort, as the hours
think, when the XYL starts the
reason for the non-operation.
there was no operating, and the
price in Arizona.
K7NN, FR7ZL/T, LU1BR, LU4ECC,
PR7ZL, PV2MAQ, 8R1VC, HM2IR, CP6EL, and
DV1DL.
G3PKS used the band for most of his
activity this time, but comments
that there is nothing extraordinary
in the list. On the Saturday after-
noon of March 19 there were some
forty assorted W/K (and N) stations
worked in a couple of hours—all
but W5 or W6 areas. The band
appeared to be in quite good shape
and stayed that way on into the
evening to some extent, although the
noise level was up somewhat and it
took another 55 minutes to bring the
tally of contest QSO's up from forty
to fifty. Otherwise, there have been
several openings to be caught, which
gave G3PKS LZ1CY/MM twice
when the MM was near ZS3,
ZC4IO, EP2CR, A9XBC, PT7WA,
YV5SJ twice, 4Z4NUT, PY3CGJ,
ZP5NW, A9XS, assorted W's,
PY4BFR, VU2GO, 4Z4UW and a
Gotaway in the shape of VP8PL
heard weakly working lots of W's and
believed to be asking for QSL's by
way of G3LJK.
G2HLU played in the ARRL CW
test both weekends and made lots
of contacts, but found it not quite so
good for the second weekend
although he did manage to raise
W7JYW for Montana. The second
phone test weekend was also good
on this band, with WA7WXY and
K7NN, respectively Idaho and
Arizona.

**Oddments**

Many will already know of the
fire that destroyed most of the
village at Het Dorp near Arnhem,
centre for the handicapped and also
the Central Bureau for VERON;
the latter have lost their printing
gear and some of their subscription
records, but PA0TO and PA0BN
are trying to get things back upright
again. Meantime, if you are not
receiving DXpress or VHF Bulletin,
now you know why.

**Ten Metres**

Showed signs of life at various
odd times through the weeks.
G2ADZ wrote a long letter which
somehow didn't quite reach your
scribe in time; so he wrote early this
time to make sure all the information
reached here in good time. He
picked out eleven openings of
significance in February and fifteen
more in March. The February
activity was largely concentrated into
eight days, February 12-20, and
likewise March 12-20. Looking at
it in more detail, we notice that there
were several occasions when DX was
about but no beacon signals, and
also vice-versa; Looking at it
closely, we see Europeans, Africans,
Asians, Oceania, South America,
and a hint of the North Americans
—G2ADZ trying to raise EL2T who
was busily peeling off the W's who
were inaudible to G2ADZ!

On April 3, GW4BLE picked out
a rather nice opening, with ZS2OM,
ZS6ACW, ZS6CS and ZS6FU all
booked in between 1400 and 1430z.
Ex-G2XC also looked at Ten, and
found some events of interest.
Leaving out of account the beacon
signals, 9K2DR and 9J2BO both
seem to have been about, the former
being heard to say he had managed
a WAC in a couple of hours on
March 27. March 19 showed
VP8AI, EA8BA and several LU's,
while on 26th CX1BBI was heard.
G4BHE reckons his tally of
countries for this year is only six
on 28 MHz, as compared with a
total of 75 worked on the band in
1976; as he is aiming at the 100
countries in 1977, we reckon Barry'll
have to stir his stumps a bit!

A final thought comes from
G4EDG on his activities for the
month, by way of a look at Ten,
where his two QSO's were with
VK9XN and OD5SLX.

It does seem as though our con-
tinuous campaign to get more use
of the 28 MHz band is bearing fruit,
as quite a number of local nets have
moved there; one of these is the
Wessex group, who are on from
0930 to 1100z around 28-575 MHz,
and G4EMN assures us they would
be pleased to let in anyone who is
able to work them, this of course
includes any DX. One seems to
recall a Hertfordshire group several
years ago who regularly were joined
on their local net by stations on the
other side of the Atlantic.

**Finale**

For next month, it looks like
May 6, latest, addressed to your
scribe, CDXN, SHORT WAVE MAGA-
ZINE, 34 High Street, Welwyn,
Herts., AL6 9EQ. After the June
issue, we may have to modify our
routines somewhat, of which more anon.
Meantime, Good Hunting.
SOCKET PANEL FOR THE 
KW-2000B

R. G. MARSDEN, G3MWF

ONE minor disadvantage of the KW-2000B transceiver is the fact that the extension speaker output, control of external equipment, external T/R switch and keying input are all connected to the transceiver via an international octal (I.O.) plug. This means that all the leads for these accessories have always to be "tied" together and so therefore do the accessories. It would of course be possible to fit the appropriate sockets to a small box with the four leads terminated at an I.O. plug but in the writer's opinion little boxes attached to leads are difficult to keep tidy.

At G3MWF the inconvenience has been overcome by making up a socket panel and this is fixed under the KW remote VFO, Type 4B. If the VFO is not available then the arrangements to be discussed could be incorporated under the power pack.

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Fig. 1 PUNCHING AND BENDING DETAILS

Fig. 2 METHOD OF FIXING TO VFO

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June issue will appear on Friday, May 27th.
All that is necessary is to punch, drill and bend a piece of duralumin in the manner illustrated in Fig. 1. Fit all the sockets and wire them up, terminating the other ends of the leads to an I.O. plug. With the VFO right next to the 2000B, 24in. leads are ample. The sockets, from left to right, are an 0.25in. diameter jack for speaker, a pin and spade audio socket for external equipment, a Bulgin miniature three pin socket for external T/R and the remaining two 0.25in. diameter jacks (wired in parallel) are for different Morse keys, one a squeeze keyer and the other straight. Naturally if other sockets are used to suit individual taste the holes and spacing may have to be changed.

The front feet should now be removed from the VFO and the "L" shaped panel complete with its sockets should be fitted to the underside of the VFO, using the VFO feet and their screws to hold it in place. Fig. 2 should make the method of fixing clear. The circuit diagrams, Fig. 3, indicated the I.O. numbering employed on the KW-2000B.

The radio station of one of the two largest salvage tugs in the world: the equipment in these tugs (S.A. Wolwraad Woltemade and S.A John Ross of the South African Marine Corporation Ltd.) is provided by Redifon Telecommunications Ltd. and consists of an RMT-1500S marine synthesised SSB transmitter covering all MP, IF and HF marine bands between 400 kHz and 26 MHz; reserve Tx is the G474. Main receivers are the R551 and R554 SSB/DSB gear, with unbroken coverage from 15 kHz to 30 MHz. Also fitted is an Omega Navigator receiver which gives continuous indications of position worldwide to within 1-2 nautical miles; radiotelephones are the Sealand 30, Sealand 66, and GR977 IF/HF with 400 watts p.e.p. on SSB.

1977 MOBILE RALLY SEASON—Update

This list is in addition to the information published in the March issue. May 21, BARTG Convention, Village Hall, Meopham, Kent, lectures by G3PLX and G5BX, trade stands, bring-and-buy stall, members and non-members all welcome. May 22, Northern Mobile Rally, The Victoria Park Hall, Keighley, talks-in on 2m. SSB 144-25, 2m. FM S22, 70 cm. FM 433-20, trade stands etc. May 29, East Suffolk Wireless Revival, Civil Service Sports Ground, Buxleyham, Ipswich (near Suffolk Show Ground), VHF/UHF antenna gain measurement competition and beam test facility, static 2m. DF hunt, SSTV and RTTY demonstrations, 2m. talk-in using GB3PO (R3), S22, SU8, 144-28 SSB, 70-26 AM, trade stands etc. June 5, Maidstone YMCA ARS, "Y" Sportscentre, talks-in on 160m. (G3TRF), 80m. (G4DUT), 2m. (G3YSC). June 12, Elvaston Castle Rally, near Derby, information from G4CTZ, QTHR. June 12, Longleat Radio Rally, Longleat House, Longleat, Warminster, Wilts. June 19, Royal Naval ARS, HMS Mercury (situatet between Clanfield and East Meon, Hants.). August 14, Derby Mobile Rally, Lower Bemrose School, Derby. September 18, Peterborough Mobile Rally, Walton Secondary School, Mountstevan Avenue, Peterborough, talk-in station G3DQW on 2m. June 25, Exhibition Station G3NQ/A, Kendal Grammar School Fete, Kendal, Cumbria, 10-160m. SSB.

CORRECTION

In the article on "Lecher Lines" in the April issue, the formula at the top of the second column on page 96 should be 15,000/cm. = MHz.
ASPECTS OF RADIO COMMUNICATIONS RECEIVERS

Part 1

N. H. SEDGWICK, G8WV

MOST readers will know the block diagram of the simple superheterodyne receiver and will be able to explain the elementary function of each stage. This information is available in so many books that it is not proposed to deal with it in this article, but this elementary knowledge is necessary to the understanding of what follows, and readers should be confident of possessing such knowledge before reading further.

Concept of Selectivity

A receiver must be capable of detecting and amplifying power received on the aerial over the bandwidth of the wanted signal. It is axiomatic that any radio transmission used to convey message intelligence in any form will do so by modulating the carrier with the intelligence by some method or other, and this implies that there will be a spreading of the resultant signal power over a band of frequencies, to which the receiver must respond evenly if it is to introduce no distortion. Using double-sideband amplitude modulation, the bandwidth required is twice the highest audio frequency of the modulation signal. In practice this generally has to be modified to accepting what is tolerable, i.e. some of the power in the upper audio frequency range is lost or reduced but the reduction of intelligibility is negligible.

Radio telegraphy signals are generally modulated with square-wave marks and spaces. Theoretically a square-wave contains frequencies up to infinity, but in practice a bandwidth that will pass up to the fifth harmonic of the keying frequency is easily adequate to maintain the wave-shape good enough for the purpose of conveying the intelligence, and it is not uncommon for the bandwidth to be limited to pass only up to the third harmonic of the keying frequency.

The frequency spectrum over which radio communication can be achieved is fixed by God or nature. Different portions of the spectrum behave differently in propagation characteristics. From the above it will be seen that the bandwidth required by a station for conveying intelligence is fixed by the nature of the intelligence, and has nothing to do with the radio frequency used. The MF band used for broadcasting stretches from 525 to 1605 kHz, a spectrum of 1070 kHz. The HF band commonly used for communications runs from about 2000 kHz to 27,000 kHz, a spectrum of 25,000 kHz, but seasonally and by night the upper frequency which will propagate is greatly reduced and all the stations on the air crowded into the lower part of the spectrum, which is considerably less than half of the total in terms of kHz.

We are thus faced with the fact that the frequency spectrum available is fixed by God or nature, but the number of stations trying to use it is fixed by man, and the international disciplines which seek to control his behaviour in this respect seem to be fairly unsuccessful. The individual communicator may lodge his protests at the way he is treated by his competitors, but in the long term his success in communications will depend on the equipment he uses and how he sets it up to meet the conditions prevailing. He must set a good example by ensuring that his transmitters radiate power only in the minimum bandwidth required for his purpose, and of course reject power radiated by other transmitters by adjusting his receiver bandwidth to the minimum required for the signal he is receiving. If he uses a selectivity setting of 3 kHz bandwidth to receive a signal requiring only 0.5 kHz in which to convey its intelligence, he is putting up the risk of message mutilation by interference (QRM) by five to one. In the early days of motoring it was a fairly safe bet to take a blind bend on the wrong side of the road. One was indeed unlucky if one met another car coming. Nowadays such an action is almost certain death, and so with HF communications. Thirty years ago one could use quite a wide channel bandwidth with reasonable hope of immunity from interference. Nowadays, if there is a hole in the spectrum which will propagate somebody is sure to get into it!

Another reason for limiting receiver bandwidth to a minimum is often made much of. Noise from all sorts of sources is distributed right across the spectrum. The smaller the aperture in the spectrum that the receiver detector sees, the smaller the amount of noise power it will detect. Whilst this is quite true, we know by experience that when the signal drops so low that it is competing with wide-band noise, it has in the great majority of cases already been mutilated by QRM. However, both noise and QRM problems come to the same answer that bandwidth should be limited to the minimum required to receive the intelligence, and so the emphasis placed on one or other aspect is rather academic as far as selectivity is concerned.

Having decided we must have selectivity in our receivers accurately adjusted to the bandwidth required, we must next consider the shape of the selectivity response. Selectivity is generally specified in terms of Hz difference between the half-power points. If one couples a signal generator into a tuned circuit and tunes the generator across the circuit bandwidth whilst measuring the voltage across the circuit, a peak amplitude will be found at exact resonance. If the generator is then detuned either side of resonance and the frequencies f1 and f2 at which the voltage falls to 0.707 of its peak noted, then the difference in Hz between f1 and f2 represents the selectivity figure of the circuit, since half power is 0.707 of the voltage, or 3dB down. The same will apply to a number of tuned circuits in cascade, and thus to a complete receiver.

Consider Figure 1. This shows a typical selectivity response curve for a given Q. The first thing one notes is that the selectivity figure for the circuit tuned to 100 kHz is 4 kHz, but if the circuit is tuned to 200 kHz the figure becomes 8 kHz, and at 2000 kHz it becomes 80 kHz, provided Q remains constant. Thus, whilst the shape remains proportionately identical, the selectivity in terms of bandwidth (which is what we are interested in) is degraded in exact proportion to the increase in f0.

This brings us to the major objection to the “Straight” or TRF receiver, which is simply a receiver where all circuits are tuned to the incoming signal frequency. As
one tunes the receiver up in frequency the selectivity becomes worse and we cannot control it to the minimum bandwidth required for the signal. A receiver designed to receive only one frequency in the MF or LF bands could well be a "straight" set, but if we wish to tune over a band of frequencies we are in trouble. There is therefore a case for changing all signal frequencies received to one specific frequency which we can deal with properly, and this leads to the superheterodyne principle.

Look at Figure 2. This represents the ideal selectivity response shape for receiving a signal having a bandwidth requirement of 4 kHz. All frequencies within the bandwidth pass through the receiver without attenuation, because the response shape top is flat. All frequencies outside the bandwidth are attenuated to nothing because the response shape sides are completely vertical. We can do no better. Compare this with Figure 1. Any modulation frequency component 2 kHz removed from \( f_0 \) will be attenuated by 3 dB. In fact, any frequency not exactly \( f_0 \) will be attenuated in some degree, and a receiver using such selectivity shape will inevitably introduce amplitude distortion of the signal at its output. Consider also an adjacent signal 3 kHz removed from \( f_0 \) and thus out of band. If this signal strength is the same as our wanted signal it will pass through to the receiver output with only 6 dB attenuation, and thus cause interference. Note that both tuned circuits have the same selectivity figure, and it becomes apparent that this figure is not, in itself, adequate to judge a receiver performance in respect of both linearity of frequency response and protection against adjacent signal interference.

It is not possible to produce a selectivity shape as shown in Figure 2 because of practical limitations, but a good approximation can be made by use of band-pass couplings, producing a shape on the style of Figure 3. This is a big improvement on Figure 1 in both respects. A band-pass coupling in its simplest form consists of two tuned circuits critically coupled together to produce the shape shown. This is fairly simple to achieve for one frequency \( f_0 \), but if one attempted to tune it over a wide frequency range it would be impossible to hold the critical coupling correct over the range. It would also require two variable capacitors per circuit instead of the usual one. This is another reason for the superheterodyne principle of changing all signal frequencies to one intermediate frequency. We can for special purposes insert a very high quality crystal band-pass filter having excellent shape characteristics in the IF chain, and so improve things still further.

Another advantage of the superhet., often given prior place by examination candidates, is that in a cascaded amplifier such as a receiver, it is easier to prevent self oscillation if the input and output frequencies are different. This is quite true, but it is a "by-product" advantage at best. Amplifiers can be made stable by proper design and layout, and the superhet would not have developed into practically the only possible type of communications receiver if it had not been for the two reasons previously stated.

(to be continued)
NO TEST GEAR? USE YOUR RECEIVER!

A. D. TAYLOR, G8PG/GW8PG

THE grid dip oscillator (GDO) and L-C bridge are useful and versatile instruments, but not all amateurs have access to them. Also, those of us who do have access to these instruments have had the experience of operating from a remote site and finding that just when we needed it most our test equipment was sitting in the shack miles away. This article shows how by applying first principles the writer overcame such a crisis with the aid of a general coverage receiver.

Finding The Resonant Frequency

Fig. 1 shows our old friend the absorption wavemeter. If the coil L is coupled to an RF source and tuned to the source frequency by means of capacitor C, the rectified current flowing through the meter produces a reading when the frequency the wavemeter is tuned to is the same as the source frequency. The wavemeter can thus be calibrated to provide an approximate indication of frequency (in the order of ±100 kHz if loosely coupled). As the deflection on the meter increases with the amount of RF induced into the coil, the device can also be used as a radiation meter by placing the coil close to the aerial terminal via a few inches of wire. Adjust Cl until a point is found where the signal strength decreases sharply, then tune carefully for minimum signal.

The coil and capacitor in the wavemeter form a parallel tuned circuit, which is of course a rejector circuit. If such a circuit is connected in series with the receiver aerial (Fig. 2a) it will reject signals at the frequency to which it is tuned, thus providing a means of calibration. The conventional way of doing this is with a GDO, but how does one go about it if no GDO is available? Provided that one has a calibrated general coverage receiver available, the answer is surprisingly easy. The coil and capacitor in the wavemeter form a parallel tuned circuit, which is of course a rejector circuit. If such a circuit is connected in series with the receiver aerial (Fig. 2a) it will reject signals at the frequency to which it is tuned, thus providing a means of calibration. Suppose that we wish to calibrate the wavemeter at 7 MHz. Tune in a steady 7 MHz signal on the receiver, then disconnect the aerial. Temporarily connect the aerial to point X on Fig. 1, then connect point Y to the aerial terminal via a few inches of wire. Adjust C1 until a point is found where the signal strength decreases sharply, then tune carefully for minimum signal. The wavemeter is now tuned to the same frequency as the incoming signal. The procedure is then repeated at other frequencies until adequate calibration has been obtained. The same procedure can be used to check parallel tuned circuits destined for use in transmitter tank circuits and aerial tuning units. In these instances it must be remembered that additional stray capacitance will be introduced when the components are installed in the equipment, so if necessary the number of turns on the coil should be adjusted until the circuit resonates with the capacitor vanes in their mid position. The same method may also be used for adjusting series tuned circuits such as harmonic traps. In this instance the circuit under test is connected between the aerial and earth terminals of the receiver as shown in Fig. 2b. Other than the difference in the connections the procedure is the same as for the parallel tuned circuit.

Capacitance Measurement

Apart from the receiver, the main tool here is a 10 turn coil wound on a 1½ inch former (wire size not critical) and some fixed capacitors. The coil is connected in series with the receiver aerial as in Fig. 2a, and a range of fixed capacitors with values from 15 pF to 1000 pF are connected in parallel with it in turn. In each instance the resonant frequency of the combination is determined with the aid of the receiver, and this frequency and the value of the capacitor in use are noted. A graph of frequency against capacitance is then constructed (similar to a frequency/tuning dial reading calibration graph). Once the graph is available the capacitance of unmarked capacitors in the 15-1000 pF range can be measured by connecting them in parallel with the coil, determining the resonant frequency and reading off the capacitance required to resonate at this frequency from the graph. A rather similar method can be used for finding the inductance of coils which will tune within the frequency range of the receiver. If the unknown coil is connected in series with the aerial with a 100 pF capacitor in parallel with it, the resonant frequency can be found. The inductance of the coil in milli-Henrys can then be calculated by means of the formula

\[ \frac{25,330}{F^2 \times 100} \]

where F is expressed in MHz and the 100 represents the 100 pF capacitor. This method may not be as accurate as a good bridge, but it will serve for most amateur purposes.
SATellite TELEcommand CENTRE AT THE UNIVERSITY OF SURREY

N. A. S. FITCH, G3FPK

READERS who attended the series of lectures given by the AMSAT-UK team at last year's VHF Convention at Brunel University may recall seeing the partially completed command transmitter. This was shown during a lecture by G8IEF describing the British Telecommand Station situated in the University of Surrey at Guildford.

In its present form the station commenced operating last summer and has been used primarily to command Oscar 6 whenever the satellite is in range of the U.K. The command transmitter operates in the two metre band around 144.78 MHz and was the subject of much speculation when it first appeared last September. Since then, the bandwidth has been reduced considerably and command is very positive.

Figure 1 shows part of the Telecommand Centre. From left to right, the items comprise—on the top shelf; the command PA unit, the closed circuit TV monitor looking at the dish aerial, the Autocommand tape input from the main computer and the full, back-up Autocommand unit. On the middle shelf there is the command selection keyboard and Autocommand control and override, the Autocommand computer which takes information from the University's main “1905” computer and operates the entire station automatically, then the manual aerial and control panel with Manual/Auto track/computer track on-line/Radio control selection and position indicators. On the bottom level is the Racal RA-17 receiver for the downlink, the Trio TS-700 for up and down link, a Ham-M rotator for the terrestrial array (not shown) and a KW-2000B transceiver. Off the picture is RTTY equipment for Oscar 7 telemetry.

Figure 2 shows the dish aerial and tracking mount weighing 3½ tons. The system is steerable in elevation and azimuth and powered by two 30 volts, 30 Amps. DC motors. The serve system was designed and built by the UOS Department of Electronic Engineering and incorporates two 900 watts solid state servo amplifiers. The aerial has a pointing resolution of 0.05° and a pointing accuracy of 0.25° and may be steered either manually, by on-line computer, by an automatic tracking system or by radio control.

The 70 cms. and 2m. crossed Yagis are used for communicating with Oscar 6 and Oscar 7 and for telecommand transmission. The dish itself, has a 10 GHz feed and is used at present in terrestrial 10 GHz colour television experiments on 3 cm. The aerial is on a tower, 110 feet high.

The station runs entirely automatically. Data is fed into the main 1905 computer at the beginning of each week and the week's orbits are then calculated. The output is then processed by a “MINIC” computer and then fed into the Autocommand computer. The station is then operated for one week, switching on the transmitters and PA to warm up for five minutes, appropriate command selection, aerial azimuth and elevation, etc. The system tracks and commands Oscar 6 for the orbit, then shuts everything off till the next one.

Martin Sweeting, G3YJO, the AMSAT-UK Telemetry Coordinator, who kindly provided the notes for this short article, says that the UOS hopes soon to install a microprocessor system capable of doing all the necessary orbit calculations itself and running the station.

If A-O-D is successfully launched into orbit later this year to become Oscar 8, the UOS station will assume command of that also.

Keep in touch by reading "Short Wave Magazine" regularly.
MINI-ZL SPECIAL FOR TWENTY METRES

DESIGN AND CONSTRUCTION - STEP-WINDING

F. C. SMITH, GW2DDX

There must be many amateurs who, like the writer, have little space in which to put up a full sized beam. As far as 21 MHz goes, the “Easy Quad” described in the September 1976 issue of SHORT WAVE MAGAZINE solved the requirement for a reliable and suitable DX aerial; but to extend it to Twenty was not felt to be practical because of the greater span of the support canes which would be required. Hence a mini-beam for 14 MHz was given some thought.

A “compressed beam” is one in which the elements are considerably shorter than normal, inductance being incorporated to bring the assembly back to resonance. Unfortunately there is a limit to the amount of shortening beyond which the trade-off between length on the one hand and gain and bandwidth on the other becomes less than one wishes to suffer. Bearing this in mind, a study of quarter-wave whips using the continuous, step-wound technique was made, and a bandwidth of 250 kHz at 14 MHz noted. The current distribution is sinusoidal rather than linear, and thus there is a higher centre impedance; a beam made in this manner is easier to tune and exhibits a greater efficiency than a conventional compressed beam.

The total width of the elements is twelve feet, which makes this a useful aerial for portable or Field-day activities.

Initially, a dipole was constructed along these lines and erected at thirty-three feet; as it showed promise as a DX aerial, the technique was extended to make a Mini-ZL Special.

**Materials**

Four canes, each seventy-five inches long are needed, tapering from three-quarters of an inch to three-eighths; check that they have no splits and are straight. Treat them for weather with a coat of paint. The wire is 20 SWG enamelled, wound on in accordance with Fig. 2. Take care that the windings are all tight so as to maintain their spacing; when the winding is finished, a wrapping of adhesive tape and varnishing completes the cane. Treat each cane similarly. The step winding may be found a little tedious but once started presents no difficulty. An eight-foot boom is also required, say, of 1 inch diameter, and the two coils are eight turns of 12 SWG wound into a length of 1 1/2 inch. (Winding coils of this thick wire is most easily achieved if you possess, or know someone else who has, a lathe.—Editor). The final mounting of the canes may be left to the reader's own ideas.

Fig. 1 shows the method used by the writer for the mounting of the beam, which enables the beam to be pulled up or down the mast as required. The coils used in the centre of each element of the array are not there to compensate for the shorter elements; the coil and link method is favoured at GW2DDX as being the best way to get a near-perfect match to the feeder.

The velocity-factor of the phasing line is 0.75, and it should be remembered that to get the desired 135 degrees of phase shift the line needs to be transposed. The elements are grid-dipped with the coils in situ, and the phasing line is connected 3 1/2 turns in on each coil. If the elements, when grid-dipped, show resonance to be not quite where required, a few turns may be removed from the top of the canes, equally on each side. A six-

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**Fig. 1. Method of mounting MINI-ZL**
8 turns 1\(\frac{1}{4}\)" 12 swg

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<th>Spacing</th>
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<th>(\frac{1}{2})&quot;</th>
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Cane diameter \(\frac{3}{4}\)" tapering to \(\frac{3}{8}\)"
Wind with 20swg enam. wire

Fig. 2 Winding details for canes

The turn link of thin flex is inserted at the centre of the driven element to which the 72 ohm feedline is connected.

**General**

A beam in which the phase relationship is 0 or 180 degrees presents no problems; but the requirement for unidirectional radiation means that the phase angle should be between about 90 and 135 degrees. In the GW2DDX version as originally made, the forward lobe seemed rather wide, and although the beam performed normally it was assumed that the phase relationship was nearer 90 than 135 degrees. It was decided to try a \(\frac{1}{2}\)-wavelength phasing line. A length of coaxial cable having a velocity factor of 0.75 was therefore cut to a length of 21 feet three inches and connected in place of the existing \(\frac{1}{2}\)-wave phasing line which had been eight feet six inches; the surplus was coiled up and tied to the boom. Either length works well, but it does seem that with the longer phasing line the forward lobe is narrowed down to a more acceptable figure.

**Results**

Attenuation off the sides of this beam is a little down compared with a full-sized array, which is to be expected. However the Mini gives a good account of itself on 14 MHz when the band has not been at its best. All around Europe have been around S8 to S9, and on into the far lands at reasonable strength; VK and ZL have heard at workable strength but the pile-up has been too much to be worth battling through with the writers KW Viceroy run at 150 watts.
THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for June issue: May 4)

Once again your scribe reaches for his typewriter; this month in the clear knowledge that, with some main stuff to come in, we already appear to have a Bumper Bundle. So, perhaps it would be a good time for us to mention the question of the chaps who wish to send in all the dates for several months at one go, with the very laudable idea of saving the club postages and at the same time saving themselves some work. Much as we would like to do so, it is impossible to devise a scheme of things which will enable us to do this without serious risk of errors creeping in. Essentially, the problem revolves around the number of reports to be handled each month. The result is that, to accept multiple entries from a club, one has to have a photographic memory, which is one thing this writer has not got! Normally, all the mail is kept for a month and then disposed of (not enough room in the shack as it is!) and the essential need is to remember to separate those which should be carried through to next month—a memory which must be relied on just at the moment in the month when the pressure is at its greatest. And, of course, if the memory errs, no one says "poor old soul, he must be forgiven mistakes made in his dotage," but rather do they say "You are discriminating against my club, dammit!" Again, to be fair, that was precisely how this old conductor felt when he missed the 'bus (before he dammit!" Again, to be fair, that was precisely how this old conductor felt when he missed the 'bus (before he dammit!"

Reports

Regional this time, to celebrate our having a wee bit more time to process them; and the upper clip seems to be the Southerns, so that is where we'll start.

Verulam are always in session on the fourth Thursday in each month, at the Market Hall in St. Albans. This gives us May 26, on which evening there will be a talk on Operating Techniques—the speaker is not named. In addition, from May to September, the gang have informal gatherings on the second Thursday of the month, at Salisbury Hall, London Colney.

We make a couple of rude noises in the direction of Southgate, there being absolutely no information on their QH, address or the meeting dates. However, it so happens that we recall their QTH is at the Scout Hut, Wilson Street, Winchmore Hill, just off the village green. Also we believe they usually foregather on the second Thursday. Another place you might find them is around Coopers Lane, Chingford, London E4, and the arrangements are easy enough to recall, since they get together every Friday evening.

R.A.E. revision, May 13 a Practical evening, May 20 G3MLS to talk about Modulation, and May 27 for a talk by G8EIM on SS/TV. However, for the current venue, we must refer you to the Hon. Sec.—see Panel.

At Silverthorn, the Hq. is Friday Hill House, Simmons Lane, Chingford, London E4, and the arrangements are easy enough to recall, since they get together every Friday evening.

A funny thing happened to Edgware recently—their attendances have shot up although the membership seems to be relatively not much changed. I don't think I'd be worried by it—but it would be nice to know just what did the trick! Find them on the second and fourth Thursdays in each month at 145 Orange Hill Road, Burnt Oak, Edgware.

It looks like the first Thursday in each month for Cray Valley, the venue being the Eltham United Reformed Church Hall, 1 Court Road, Eltham, London SE9. However we don't know what is down for the May meeting, as the new committee will hardly have had a chance to sort it out by the time they wrote to us; but we don't ever recall them failing to put something interesting on.

At Chiltern a new Hon. Sec. is noted—see Panel—and he writes in to let us know that they are making a big effort to keep up the standards; the venue is now 42 Castle Street, High Wycombe, and the regular routine is to get together on the fourth Wednesday in each month.

At Echelford we were a little saddened to read that they were suffering a shortage of nominations for the various offices, to let some of the existing committee people have a rest after several years of work. We hope that by AGM time, all this will have been sorted out. The group get together at the Hall, St. Martins Court, Kingston Crescent, Ashford, Middlesex, on the second Monday and the last Thursday of each month.

Tuesday, May 3, is in the normal routine at Thames Valley, but we notice that the June date is 8th—a Wednesday—so make a note in the diary if you are going to attend in June at Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. As for the real current news, on May 3, there will be a quick discussion on NFD, to be followed immediately by a mammoth Junk Sale.

Quite a change for Shefford on May 5, when G4ARL will talk about "Under the sign of the Spread Eagle"—the history and development of Barclays Bank. On 12th,
G3RWL will be talking about OSCAR, and on 19th they will all be visiting Bedford club. Finally, May 26 sees a talk on “Plastic Embedding” by guest speaker, Mrs. Culpan.

Not only the usual date of May 2, but also May 23 appear on the Southdown fact-sheet. The first is a Junk Sale, while the second is down for a discussion of NFD and contesting. Both are at the new Hq., Chaseley Home, South Cliff, Eastbourne.

It’s a mighty long time since last we heard from Stowmarket: now they write to say that from this month they will change Hq. to the Red Cross building in Stowmarket; now they write to say that from this Home, South Cliff, Eastbourne.

Over to Maidenhead now, still at their Hq. at the Ambulance Hall, The Crescent—it has been variously reported as being St. John and Red Cross, but let it be clarified a little by your scribe who says there is only one of ’em in the Crescent anyway! The dates are May 5, when G3ZHY will be talking about “Magic Boxes” which are training aids for would-be CW operators which are designed around a PROM. Tuesday, May 17 is a bit nearer the date set aside for NFD, and so the lads will be fully occupied getting ready for the battle.

Over to Mid-Sussex, and the tale of their planning application for the Tower at the Marle Place Hq. in Burgess Hill; were it not so funny as they tell it, one

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HARLOW: L. Jarrett, HB9AMS, Case Postale 161, 161 Boulevard de la Gare, 78120 Longueville, France.
HARRIDEN: F. H. Mundy, G3XSS, 51 Charney Road, Haddenham, Oxford (38199), Oxon OX9 4PE.
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LONDON: S. A. Morley, G3FWR, 22 Old Farleigh Road, Seddon, South Croydon, CR2 8PB. (01-657 3258).
LONDON (B.A.R.T.G.): A. Keech, G4BOX, 26 St. Albans Road, Chesham, Buckinghamshire. (01-644 4157).
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SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Chesham, Buckinghamshire. (01-644 4157).
WOLVERHAMPTON: J. Cook, G8EDG, 75 Windmill Lane, Wolverhampton WV3 8NQ.
WORLD SCOUT BUREAU: L. Jarrett, HB9AMS, Case Postale 161, 161 Boulevard de la Gare, 78120 Longueville, France.
WHITE ROSE: R. R. Hughes, G4DZ1, 3 Pinley Park Crescent, Leeds LS17 7HY.
WIRRAL: H. I. Crofts, G3JLF, 3 Barmouth Road, Wallasey. (051-638 2515).
WOLVERHAMPTON: J. Cook, G8EDG, 75 Windmill Lane, Castlecroft, Wolverhampton WV3 8NQ.
YEOVIL: D. L. Mclean, G3N0F, 9 Cedar Grove, Yeovil, Somerset.
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.
would be foaming at the mouth over the idiocies of bureaucracy, but they kept their sense of humour with the result that in the end they got their beam, which at least makes it far easier for a visitor to flush them out. Look for it on May 5, when G3WNS will be showing films "In the Steps of Lawrence of Arabia," and again on May 19 when the Wanderer Reminisces, the roamer of the title being their President G5RV of course. Finally, please, everyone, note that the Hon. Sec. is not G3JMB any longer, he having been given the hard word by the doctor; G3ZYE is filling the hole.

The TS "Terra Nova" at 34 The Waldrons, Croydon, is "home" for the Surrey lads, and it looks as if the first and third Wednesdays are the ones to keep open. By now, of course, after the AGM, they will be just getting the new programme sorted through so if you must have the very latest, a call to the Hon. Sec. seems indicated—see Panel.

Midlands

Quite a big place, this, and yet, as with Scotland, one never ceases to be amazed at the apparent rarity of the genus Radio Club, and the way they hide their lights under a bushel. However, Bromsgrove are taking the wraps off their latest publicity scheme, which is to be an Award. They say that as U.K. amateurs will be allowed to use the prefix GE during the period June 4-10, the award would be "in the Steps of Lawrence of Arabia," and again on May 19 when the Wanderer Reminisces, the roamer of the title being their President G5RV of course. Finally, please, everyone, note that the Hon. Sec. is not G3JMB any longer, he having been given the hard word by the doctor; G3ZYE is filling the hole.

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the Entertaining Electron, and Oracle, all under the control of Jim Slater of IBA—anyone outside Bristol who is interested can get in touch with the Hon. Sec.—see Panel. On a different tack, the gang will be at Lang-lean as usual, on June 12, with a separate rendezvous tent and a large refreshments tent; the whole rally site has been moved to the Anglers Pond nearer to the House.

Another Mobile Rally to be mentioned is the Torbay one; this is down for August 28 at Haldon Race Course near Exeter, on the A38 heading towards Newton Abbot. For other details of the club, it is suggested you contact the Hon. Sec.—see Panel. May 28 is down for NFD work.

Over the water now, to Limerick, where the local club continues to thrive; for all the details, get in touch with the Hon. Sec.—see Panel.

Yeovil Hon. Sec. G4EVI says that although they are continuing to foregather each Thursday at the usual spot, there are possibilities of a move in the offing; so any would-be visitors should get in touch with the Hon. Sec. at the address in the Panel before they finalise any plans. One special date for the gang to recall is May 19, when G3XFW will be talking about “Breaking Down RF Amplifier Circuits.”

New Club

North Bristol are a new group based on Lockleaze Community Centre, near Gainsborough Square, Bristol, where they can be found every Friday evening. They are recruiting as hard as they can, and would particularly welcome SWLs—they already have an R.A.E. class running, and hope to fix up lots of talks in the coming weeks.

North

1977s North-West Convention is being organised by the University of Lancaster, and will be held there on September 17-18. Trade stands, competitions, a dinner, and a coach tour. On a different tack, the University club is not a “closed” one; anyone, whether SWL or licensed is welcome, the meetings being on Wednesday evenings in Furness College Bar, at 8, followed up by some operating from the club Shack.

The May meeting of the East Lancs group is transferred to May 3 which is a Tuesday instead of a Thursday, at Canterbury Street, Blackburn—we would like to tell you the topic and the starting time, but they are, thanks to Murphy’s Law, the only bits of the print to be smudged; but it is quite clear that there is a bar which will be open from 2130!

Northern Heights get together at the Peat Pitts Inn, Ogden, Halifax, on alternate Wednesdays; May 4 is a Surplus Equipment Sale, while on May 14 there is a Social at Sutcliffes Farm, Golden Heptonstall organised by Mrs. G4EFX.

Up at Scarborough, things are going quite nicely, with membership rising rapidly, and a mention each week in the local paper. They are to be found on Friday evenings at the Technical College, Scalby Road.

Everything the White Rose group touches seems to be a success; as at the beginning of March they had already accepted 87 applications for their White Rose award, and their Wednesday evening meetings get more and more attendees, Hq. is at 83 Town Street, Armley, Leeds.

We are pleased to hear that the radio group based on Durham University has been revived; alternate Wednesdays during term time in the Physics Building, Science Site, South Road, Durham, sees them in session and very keen to welcome members from outside the University. More details can be obtained from the Hon. Sec. —see Panel.

If you go to York, you have to remember that they miss the third one in each month, but get together on all the other Fridays; on May 30 they have a trip to Hull Technical College which is already at the time of their letter over-subscribed! All sorts of interesting activities seem to go on with this group.

Over the Border now, and our first port of call is to Lothians; May 12 is a Junk Sale, while May 26 is not yet settled, while for June there is the AGM on the ninth and a Forward Planning session on June 23, after which they will be in recess until September. All the details from GM4BYF, or turn up at the Adult Education Centre, Riddles Court, Lawnmarket, Edinburgh.

Another New One in GM

This one is at Perth; in the absence, as yet, of somewhere to meet, they are getting together in each other’s homes on a rota basis. This being the case, if you wish to get to know them, we suggest it would be a courtesy to get in touch with the Hon. Sec. first—see Panel for his address.

General

A place in which to fit all the groups that are not on a purely local basis; and our first one is the World Scout Bureau, who have sent a copy of their report on the 1976 radio activities; and it seems likely that in JOTA 1976 there were probably in excess of 7000 stations on, some 1277 being over in the States.

The UK FM Group Newsletter for the London group is quite interesting, and one can understand the views of the member who found getting to the Grove Park Hotel Hq. at the junction of Bolton Road and Spencer Road, Chiswick. This venue is adjacent to Chiswick station, and is more “get-atable” than many of the other proposed places—but it has to be accepted that any Hq. address will be awkward to get at from some part of London, which is getting to be a rather large village!

BARTG will have their main event of the year on May 21, at Meopham Village Hall, with all the usual attractions, Bring and Buy stall, lectures by G3PLX and G5XB, a picture tape factory and a fine selection of Trade Stands. On a different tack, their Spring Contest on the weekend March 26/27 was notable for DX on all continents, and an increased UK participation for G8CDW to plough through to get to the results. One popular station, on RTTY for the first time was JY1.

Finale

That brings us to the bottom of the pile for another month; for next time, we want your programme gen for June, together with the Hq. address, the address of the Hon. Sec. (and his name of course!) and any other data that would be of interest to a prospective member. Address it all, to arrive by May 4 latest (23 days before the last Friday of the month), addressed ot Club Secretary, SHORT WAVE MAGAZINE, 34 High Street, Welwyn AL6 9EQ.
Awards and Tables

Here have been no VHFC certificates awarded this month though several claims are in the pipeline. The rules are few and simple. The certificates are available for 4m., 2m. and 70 cm. activity, for individual bands only. Applicants should have at least 100 confirmations from stations operating from different locations. That means you can submit cards from a station or group operating successively from different counties, for example. To claim, just send a list of the confirmations with a potted history of your amateur radio activities and a description of the equipment used, past and present, to the address at the end of this feature. You will then be asked to send six cards chosen at random for verification after which, if all is in order, your certificate will be issued. Your contacts must have been made from the one, fixed location, but it does not matter if you change your call part way through due to licence up-grading. Satellite and repeater QSO’s are not permissible.

To enter the Three Band Annual and “Squares” tables, it is stations worked, not necessarily confirmed, that are counted. All modes count, only repeater and satellite QSO’s being excluded. The counties are the latest ones, of course, such as Merseyside, Gwent and Highlands, rather than Rutland, Middlesex, Merioneth, Angus and so on. You can count the Irish Republic counties of which there are 26.

Repeaters

As readers within range of GB3LO will know, the Crystal Palace device has been off the air for some time. It was closed down at the request of the Home Office and there is no indication when service will be resumed. The licensee, the RSGB, is at pains to point out that the closedown was not due to the persistent interference. It seems a pity that those who have used the repeater properly and who contribute to its upkeep have been rather left in the dark concerning the closedown. As it is, there are many rumours around as to why it was necessary. Normally such matters are solely the business of the individual amateur and the Home Office but in this case, all Society members have helped pay for the repeater programme. It does seem rather unnecessary to treat infringements of licence conditions as state secrets!

G3CHN (Devon) mentioned a French repeater in Department 9, Ariège, on channel R1. All “F” repeaters will be in the “FZ” series, the number indicating the REF region, as with the beacons. This repeater would be FZ2THF and runs 10 watts to eight dipoles, 1205m. a.s.l. The “Ile de France” repeater, FZ1THF, (8121f) is located at Clamart, Dept. 92. It is on R6 experimentally, running 10 watts e.r.p. from an omni-directional aerial at 205m. height. The repeaters might be useful as beacons for those with vertically polarised aerials.

On the 70 cm. scene, Jack Hum, G5UM, reports that G3PVG has succeeded him as Chairman of the Leicester Repeater Group. To counter the idea that only a handful of local operators would use 70 cm. repeaters, a show of hands at the group’s AGM revealed over a score ready to use GB3LE on RB4.

Intruders

Following the paragraphs on unidentified intruders in the 2m. band, Joost Berden, G3RND, says that he does not think the buzzing noise complained of by G8HUY originates from Russian satellites. The only USSR QRG anywhere near the band is 143-625 MHz and that is used only when a Soyuz link up with the orbiting space station is planned. It is purely a beacon signal to locate the orbiter. During such operations, 121-27 MHz is used on FM for voice communication. Other general USSR satellite QRG’s are: 137-15; 137-20; 137-30; 137-40; 150-0; 180-0 and 400-0 MHz.

Joost suggests that the noise described sounds like that he used to hear when he was in Yorkshire and which came from certain aircraft radio altimeters. Similar noises in the 70 cm. band appeared to be coming from the BMEWS installation at Fylingdale. G3RND advises that detailed records of this kind of interference be sent to the Home Office.

Most UHF operators around our coasts will have experienced the racket generated by the radar probes from Soviet “trawlers” and Joost reports that their activities are ruined by high power SSB fired at them. Since they operate just below the 70 cm. band, he suggests those suitably equipped can quite easily cause them to close down.

DX Notes

Via G3POI comes news that from mid-July to mid-August, OE4XMS will be operating on 2m. from HI12j using 400 watts to a 20-ele. array, 1000m. a.s.l. During the last three weeks of July, ON61D will be in HB9, operating from DG75 square. From the Faroe Islands, OY2A in Torshavn has joined OY5NS on the 2m. band. For many U.K. operators, Irish Republic counties are not too easy to come by. G3CHN passed along the news that EI5DA (Co. Louth) is ready to start on 2m. as soon as his “black box” arrives.

Those who have not worked Cornwall, and/or XJ square, will be pleased to read that David Butler, G4ASR, will be on again from May 9 to June 1 from the Lizard Peninsula. He will be on 2m., 70 cm. and 23 cm., both fixed and portable as follows:—

May 9-12 from G4ASR/A (Ruan Minor) on 144-26 MHz: May 14 from G4ASR/P on 23 cm. and on the 15th, 70 cm., these being contest days: May 16-26, G4ASR/A on 2m. portable contest as G4ASR/P on 2m. and on the 15th, 70 cm., these being contest days: May 16-26, G4ASR/A on 144-26 and 432-26 MHz: May 28/29, 2m. portable contest as G4ASR/P and May 30 to June 1, G4ASR/A on 144-26 MHz. Times of the -/A operation will be 1900-2230 GMT on weekdays and 1000-1900 GMT at weekends. David is QTHR on 01-360 9470 evenings or Epping 74351 during working hours for those wanting to arrange skeds. The Cornish number is Helston 4141, daytime. On 2m., G4ASR runs 100 watts SSB/CW to two 6-ele. Quads: 50 watts SSB/CW to an 88-ele. Multibeam on 70 cm. and 14 watts CW on 23 cm. with a Quad Loop.
Yagi. The "prime mover" is a Yaesu FTDX560 with a Datong clipper, power being generated when operating portable from a Honda E300.

**Mediterranean News**

Henry Souchet, 9H1CD, writes that he is glad he got started on 70 cm. He now has five QTH squares worked but so far he has not worked Malta! During February, he had a first QSO with 18CVS on CW in HA13c, exchanging reports of RST 509, and has daily skeds with IT9ZDA in Messina. 17EMG in Taranto has also been worked on via Haifa but could not make it direct.

On Feb. 23, there was a fine tropo. opening into Israel with the Haifa repeater on R3 completely readable, even with the beam north. Six 4X/4Z stations were worked via the Haifa relay by Henry, 9H1BT and 9H1FI. The latter, Tony, is a newcomer to the band and they each worked 4X4MR in Natania, direct. 9H1CD and 9H1BT also worked 5B4AP in Limassol via Haifa but could not make it direct. Once again, Henry found vertical polarisation useless and all the repeater contacts were with his bay of horizontal Yagis.

**The Gigahertz Bands**

Although QRV in one form or another from 4m. to 23 cm., Ned Cartwright, G4DKX (Ipswich) is now constructing 13 cm. gear for tests with G3LQR and G3ZEZ. Brian Bower, G3COJ, (Bucks.) is continuing his 23 cm. SSB project and Brian Oughton, G4AEZ (London) should be on 23 cm. with SSB by now. G4AEZ's gear comprises a Microwave Modules converter into an FT-101B for reception. For transmission, a 2C39A mixer, solid state LO chain and a valved 2m. SSB transverter is used. The aerial is a dipole fed, 3ft. dish at 45ft. but Brian says feeder losses are the main bugbear at present.

**Seventy Centimetres**

Syd Harden, G2AXI (Hants.) now has a 3CX100A5 amplifier going with 40 watts output, "... made, of course, from a lot of junk!"

A reconstituted axial blower sends a gale down the half-wave stripline keeping the bottle at about 0°C. G2AXI is putting a lot of effort into "solid stating" all the VHF/UHF gear up to the finals. Even so, Syd took time off to work G4ASR/P in Cornwall, for a new QTH square, XJ as did G3COJ.

During the Open Contest on March 20, Dr. John Tindle, G3JXN (London) made 76 complete contacts in poor conditions, for 252 points. He missed G4ASR/P but did work a Welsh portable and three PA's. The most exciting event appears to have been a lightning strike which did not seem to do any damage. Angus McKenzie, G3OSS (London) made 76 complete contacts of RST 509, and has daily skeds with G4FQD for a new QTH square, XJ as did G3COJ.

**Three Band Annual VHF Table**

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<th>Two Metres Countries</th>
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```

Even so, Syd is putting a lot of effort into "solid stating" all the VHF/UHF gear up to the finals. Even so, Syd took time off to work G4ASR/P in Cornwall, for a new QTH square, XJ as did G3COJ.
put out a "CQ" call at 0530 after a contact with ON6AT/A, which resulted in a pile-up of over 30 Germans.

Arthur Breese, GD2HDZ (Laxey), took a little time off the 2m. Open to work ON6AT/A on the band at RS59 both ways. By contrast, conditions for the 70 cm. Open and worked to for a contest—awful!" From Jersey, Lawrence Woot, GJ8AAZ, forsook the 2m. Open and worked down to the south of France. He is another TV enthusiast currently experimenting with a pattern and callsign generator. Lawrence is appalled at the idea of the Jubilee "GE" prefix. Having waited so long for the GJ/GU system he feels it rather senseless to use a common prefix for all British stations. He suggests, "Presumably the next step is to allow all European stations to use 'EU' irrespective of location!" Never mind, OM, it is only optional.

**Two Metres**

Following the hasty notes about the 2m. Open Contest in last month's column, it now transpires that OK, OZ, LA and SM stations were worked adding up to 21 countries worked. Did any group contact them all? Using an indoor dipole, listener Glen Sweeney (Nottingham) heard G, GD, GU, 7 GW's, 2 F's, 2 ON's and DK0KN/P, all on SSB. He now has a 5-ele. *Yagi* aerial.

Using 10 watts of AM, Ken Osborne, G8KSS, worked G14BC/P, ON6AT/A, DL0WU (DL66b), DK0MR/P (DK46d) and a couple of F's in YI square. After the contest another ON, F and two PA's were worked. Best DX heard in the contest was AD and EK continentals made up of 210 DL's, 130 PA's, 40 ON's, 29 F's, 3 HB's and less than 416 contacts were concluded. All in all, conditions were "ordinary" after which the DX never let up till late on. The opening started to central and north Germany gradually moving southwards early on the Sunday morning to take in HB, OE, south Germany and France. The points claimed from 785 scoring QSO's was 14,764. No less than 416 contacts were continentals made up of 210 DL's, 130 PA's, 40 ON's, 29 F's, 3 HB's and 3 OE's, but no I's or DM's heard. The station comprised two *Trio* TS-700's to a pair of 4CX250B's running 350 watts with a 14-ele. *Parabeam*. The receivers were modified to deal with strong signals. The team comprised G3WCS, G3WOH, G4FJK, G8GMC, G8IZS and Russ.

**Four Metres**

Most reports concern the Open

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**QTH Locator Squares Table**

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<th>70 cm.</th>
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<td>173</td>
<td>173</td>
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</table>

Starting Data January 1, 1975. No satellite or repeater QSO's. "Band of the Month" 70 cm.

HB9BIR/P in EG square and OE2CAL/P2. Second hand, it seems that GW3UCB/P team made 858 contacts, some 350 being continentals. Russ Stewart, G8BHH, has written to account for his team's effort from Beacon Hill, Powys, 1740ft. a.s.l. They made 801 QSO's but lost an hour due to breakdowns. For the first couple of hours conditions were "ordinary" after which the DX never let up till late on. The opening started to central and north Germany gradually moving southwards early on the Sunday morning to take in HB, OE, south Germany and France. The points claimed from 785 scoring QSO's was 14,764. No less than 416 contacts were continentals made up of 210 DL's, 130 PA's, 40 ON's, 29 F's, 3 HB's and 3 OE's, but no I's or DM's heard. The station comprised two *Trio* TS-700's to a pair of 4CX250B's running 350 watts with a 14-ele. *Parabeam*. The receivers were modified to deal with strong signals. The team comprised G3WCS, G3WOH, G4FJK, G8GMC, G8IZS and Russ.
Contest of April 3. Graham Badger, G3OHG (Sutton Coldfield), was on for 4 hours during which he made 35 QSO's. Conditions were below average with slow and deep QSB. No GM's were heard and the best DX was GD3FLH/P. G3OSS also found conditions poor generally, but with momentary "lifts." Angus started late and made about 50 contacts, mostly SSB but resorting to CW for the more difficult exchanges. He found more SSB than last year but very little AM. There seemed to be few London stations on and no Norfolk, Suffolk, GM or GI stations were heard. G3UUT/P in N. Yorks. was consistently good and there was a good deal of Midlands participation. Angus complained that some stations do not seem to understand the CW request, "QRS" as several did not slow down for him.

Peter Gamble, G4ECQ (Hereford and Worcs.) is now QRV on 4m. with a home built valve transverter and home made 3-ele. Yagi. He is always willing to QSY to 4m. from 2m. Richard Girling, G4FCD (Hertford) should have 25 watts of 2m.

A Real Aurora

The first decent Aurora this year, as far as more southerly stations were concerned, occurred on April 6/7, just too late for written accounts. G3FKP was alerted by a phone call from GM8FFX at about 2120 GMT. First signal heard—as usual—was GM3JFG in Fortrose (XR40c). Most of the stations heard had been worked in previous such events except LA8UU in CT80j, which would have been a new square. Chris Bartram, G4DGG (Oxon), has a receiver tuned to Meldrum and proved a good indicator of the event. He worked most of what he heard, including GM, LA, SM5 and SM6. All the QTF's were between 009° and 029° true.

ON6AT/A mentioned working SM4DLT in GT square and GM8FFX and from the Dubus net, it seems that SM5JEY worked F9FT, so it went quite far south for some. It was obvious that many London operators were quite oblivious of this Aurora which lasted till about 0330 GMT, at least in GM. Observations at G3FKP were that it "came and went" with GM8FFX on SSB and GM3JFG up to S9 at times. May we have your detailed accounts for the June issue please, with QTH locator and QTF and QTF/A information?

Results: The 1976 Verulam Contest results indicate that 21 stations took part in the 2m. leg on Nov. 28. Winning station was G3VRE/P with 5062 pts. from 114 contacts, runner-up being G4DDP/P whose 95 QSO's totalled 3209 pts.

Forthcoming: May 7/8 is an IARU Region 1, 144/432/1296 MHz affair from 1600-1600 GMT. May 14 is the 1-3 GHz Open from 1700-2400 GMT, followed nine hours later by the 432 MHz Open and Listeners' Contest from 0900 to 1700 GMT. May 22 sees the first leg of the 10 GHz Cumulatives. The 144 MHz Portable event is the weekend May 28/29. That lot should keep you all going!

Satellite News

A third cell of the battery has gone down in Oscar 6 but the transponder is still relaying 2m./10m. signals satisfactorily. It is switched off when the telemetry on channel 3A falls to 332 (18 volts). To preserve the life of 0-6 it is essential to use as little power as possible.

The 435-1 MHz beacon on Oscar 7 has been switched on again and will be on each first Mode "A" day of the week. (A week starts on Sunday) Please send reports of the TLM to AMSAT at PO Box 27, Washington DC, 20044, U.S.A.

Every Monday is now a QRP Day on 0-6 and on 0-7, either mode: 10 watts e.r.p. maximum.

For those who want to work out orbital data for A-O-D, due for launch in November, the parameters are: period 10279 minutes; apogee perigee 561-59/454-47 statute miles respectively; inclination 98-99° retrograde. If the launch is successful, A-O-D will become Oscar 8 and the longest overhead pass will be 15 1/2 minutes. As with 0-6 and O-7 night time orbits will be ascending ones.

Three Thousand Up

Seeing last month's note about G8HUY prompted Jack Hum, G5UM, to tell us that John of Ripon was his 3000th station worked on 2m. from his present site near Leicester, these past ten years. The 3000 were "different stations," i.e. fixed, mobile portable and -/A. In the case of -/A care is necessary, adds G5UM, to ensure that the same site is not counted more than once. For example, several -/A calls are heard from Nottingham and Loughborough Universities. For the purpose of counting different stations, the form is, "If you have worked one, you have worked the lot," and this is the computation used at G5UM. For the record, "Uncle Mike" adds that the totals on the only other two bands worked were 695 on 70 cm. and 572 on 4m. up to the end of March, which is some sort of conspectus of different stations who have equipment for these bands.

Band Plans

Some who read last month's comments by G8KSS concerning adherence to the 2m. band plan have called G3FPK to agree with the view that it should be respected. Chris Baker, G8JGK (Essex), wrote to say he wholeheartedly agreed with your conductor's comments. He continued, "When the conditions improve, I am looking forward and hoping to work DX, so would be rather upset if, after calling 'CQ DX' any DX was flattened by an S9 carrier." Chris says he has worked DX on AM and FM over the past two summers,. . . . . so surely G8KSS can QSY to 144-50-145-0?" G8KSS, in a further letter, maintains that he is not against band plans in general, only your scribe's " . . . very rigid view of them." He says, "I shall be calling on and around 144-52 MHz when Aurora and Sporadic E is around, looking for any contacts and would like to hear from anybody interested here and abroad. QTHR." Perhaps operators interested in AM or cross mode contacts would monitor 144-52 MHz for G8KSS. Why not establish it as an all mode calling frequency?

Deadlines

That about wraps it up for another month. Please send all your notes and claims for the June issue by May 5 and for the July edition, by June 2 to:-"VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.
OVER the last couple of pieces we have nattered on somewhat about receivers, and the usefulness of a listen to CW as a self-training process in trying to become competent SWLs on Phone. One topic we have not touched—ever—in this column concerns the “after life” when the licence has become an accomplished fact rather than a dream. Most of us, when this moment comes, have to build up the station within the constraints of a budget and what we know so far about our likely interests. Right from the start it is as well to accept that in the vast majority of cases there will be marked changes in the pattern of the interest; the DX SWL is deflected to listening to repeaters, or the avid home-constructor becomes a pure operator who only builds when he needs a bit of gear unobtainable in any other way, and so on. Thus, when you get the first ticket it is a good thing not to spend too much but to keep back some for later. This being the case perhaps it is as well to briefly comment on transmitters. The first thing to be aware of is that the arrival of SSB made a vast difference to our ideas in all the other modes of transmission too. Perhaps the most important of these changes has been the widespread improvement in stability. The old-time Top Band net on AM for example, would not notice a warm-up drift of the odd kilohertz or so, would often not be netted within a kilohertz either, and were all possessed of receivers which drifted in varying degree (The CR100 for example, said in its handbook that the maximum selectivity was not to be used much above a megahertz or so; a tacit admission of the receiver' shortcomings). Thus it is fair to say that equipment performance which would not be acceptable to the extent that both the owner of the rig and the receiver of its signals would be nigh to foaming at the mouth in 1977, would have been quite acceptable in 1947. In those far-off days we expected things to drift, and to go over after a transmission almost always involved tuning round to find the other chap, not to mention following him about once he was found. Thus the use of the transceiver was out and we all had “separates,” even on mobile or portable rigs.

Our receiver was almost invariably a surplus one, and the transmitter home-brewed; to get a six-band rig we started with a VFO or a crystal at Top Band and followed up with a string of doublers, each one of which, in its operation also doubled the effect of VFO drift on the final frequency so that the Top Band VFO with a warm up drift of, say, 1 kHz would drift 16 kHz at Ten! The mixer-VFO scheme, where you make a low-frequency VFO and mix it with a stable crystal oscillator so that you end up with only small drift on the final frequency, was known but considered to be “way out” for the ordinary chap. And of course, all the AM phone meant that the heterodyne QRM was out of this world, and only the very dedicated phone operator ever worked out of his own continent, which meant that the only effective way to work real DX, or for that matter to hear it to any extent, was to learn the Morse Code, both to get away from the QRM but also because the low-power signals could be copied—weak-signal performance was everything to the amateur receiver and one would trade anything in the performance line in favour of sensitivity. Under such conditions to work DX (and, pre-war, four out of five G stations would be operating on 14 MHz some time or other in any given week-end) needed good operating to even think of overcoming the shortcomings of the gear.

The Mail

And for a start, the newcomers, of whom we have a bumber crop this time. P. Eistob (BFPO 40) wants to know something about RAEN; and also Great Circles and distances. RAEN groups naturally use chosen frequencies, the choice depending very largely on the local gear and terrain over which the groups operate. On the other question, the Great circle map gives true directions and distances at the cost of distortion of shapes; and the practical Great Circle path is the true shortest distance between two points on the Earth’s surface. A calculation of distance and bearing between two points on the earth is a basic navigational question; the essential formulae may be obtained from the ARRL Antenna Book given that you know the latitude and longitude of the two points. The sums can be worked through with a book of logs, a scientific calculator, or through the Tables given in a nautical almanac such as Reed’s.

On a different tack altogether, I. P. Ruddock (Hertford) wonders why it is necessary at all to go through an R.A.E. and Morse test for an amateur licence—he has had six tries so far and no joy as yet. In the last analysis, the test is there to meet the requirements of international law; and in the process to make sure that a candidate for a ticket is capable of keeping his rig in trim, or at least in knowing when it is playing up; of ensuring he has knowledge of the existence of TV1, shared bands and all the rest of it. If there were no exam., we could say for sure that the cost of active policing of our bands alone would put the cost out of most people’s reach, and the cost of type-approval of all our equipment to ensure it met the requirements of the licence would mean that every amateur would have to spend around a thousand pounds for the test gear to tell him his rig is “up the creek” and needs repairing, if he intended ever to use any home-brew gear; and of course every amateur would have to be crystal-controlled to avoid his going out of the band. And, SWL Ruddock says later in his letter that he would like to see Citizens Band here after a paragraph in which he complains about the goings-on over the GB3LO repeater—CB in the States makes the goings-on on GB3LO sound like the vicar’s tea-party!

C. Chilton (Bulwell) is a newcomer who uses an FR-50B receiver with a sixty-foot ended aerial. Colin wants to know the HPX Rules—we will reprint them in full in a forthcoming issue, but essentially, it involves the collection of amateur radio prefixes (G3 is one prefix, GW3 a second, G4 a third, a GW4 fourth, and so on).
rather than of stations as such. The thing to do is to log all you hear properly, and then when the Rules are printed again, have a comb-through and total them up. In addition some sort of index system is required to make sure you don't accidentally claim a prefix twice or for that matter fail to claim one at all. One supposes the easiest index uses a few packets of index-cards from the local stations, contained in some sort of box.

Another one who isn't quite sure of the Rules for HPX is P. Sharpe (London W2), even though he has sent in a quite acceptable starting score in the meantime. Phil originally started his interest back in 1962, and at that time was a member of Chelsea club until examinations claimed him in 1964. Thirteen years later, the bug bit again, with the purchase of a Drake SSR-1; and the aerial is about 35 feet draped round his room which is itself about fifty feet above ground level.

P. L. Shakespeare (Fonfoulness) and his interest aroused when a technician at his work was tossing out some radio magazines—said technician happened to be G3SCY, and seems to have gone out of his way to help along our reporter; reader Shakespeare had an old National Panasonic T-100D portable, partly "as is", and G3SCY mended it and also, maybe more important, showed him how to use another receiver to give front-end carrier injection for CW and SSB reception.

### HPX LADDER

(All-Time Post War)

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<tr>
<th>SWL</th>
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<th>PREFIXES</th>
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<td>A. Glass (Plymouth)</td>
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<td>Mrs. J. B. Jane (E. Looe)</td>
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<td>N. A. Philips (Devizes)</td>
<td>1258</td>
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Minimum starting score 500 for Phone, 200 for CW. Listings in accordance with HPX Rules, and only include recent claims.

Although he has passed R.A.E., J. G. Ollis (Solihull) says he can't afford to take out a ticket yet. He has a home-brewed double-superhet, which has a severe attack of fallen sensitivity above about 21 MHz, leading to thoughts of pre-selectors. Watch for this one—a test with a good standard signal generator and an oscilloscope looking at the output could well show you that the sensitivity of the receiver is not down so much, but that the level of incoming noise has fallen so great that impression! On a different tack comes the question of the advantages of the product detector over the use of a diode detector and BFO. Essentially, the BFO of a diode-detector set-up is of a low voltage injection, to keep it from upsetting the AGC line (unsuccessfully, as some manufacturers accept tacitly) and also, more important, to avoid the pulling of the BFO by the big signal coming down the IF. Fitting of a product detector enables much larger injection voltage from the BFO, and this is accepted in that the BFO is now called a CIO! In addition, the isolation between the CIO and the AGC can be improved to the point where AGC is practical, although many receivers opt for audio derived AGC. That being said, J.C. has been using diode-detector gear for years on SSB, and, properly adjusted, there is not a lot in it.

A very brief first entry comes in from A. R. Darby (Rotherhithe); he has an FR101S receiver and a Joystick aerial mounted thirty-five feet up in the air above the roof of a block of flats, to give him a first claim of 341.

On now to G. Parker (Guildford) who has an end-fed wire into a Heath HR10B; further studies of an interesting subject like R.A.E. are awaiting clearance of the O-level examinations. Guy has a pet hate in amateurs who do not repeat their callsigns clearly enough, which is fair enough as far as it goes, but it must also be borne in mind that the stations concerned may be in a QSO of perfect copy at each end, in which case the unnecessary repetition or phonetically spelling-out of all the QSO data is, as far as the two stations are concerned, pure liddery! It also spins-out the rubber-stamp contact, so causing an overall increase in QRM by increased occupancy of the band. Practically, though, it would be no bad thing were callsigns to be spell out phonetically on the final signing, just for the benefit of the SWL.

Our last newcomer is Mrs. S. A. Waterfall (Truro), who has an AR88D with a PR30 preselector; one wonders if she has yet joined up with the Cornish Club gang YL's yet. If she hasn't, we bet she will after R.A.E. night, when your conductor happens to know of another one, at least, YL who will be taking the examination in that area! On a more serious tack for a moment, a query is 6B2SST, heard on January 25 on 14 MHz.

A look at the prefix list says that this would be an SU if it were genuine! We feel it genuine! A pity—it would have been interesting were it genuine!

### The Others

P. Ramsay (Steventon) says he suffers with static between 1·9 and 2·0 MHz—it is hardly likely that the noise from an electricity-pylon line could be so narrow banded, as one would normally find it gently tailing off as the receiver is tuned higher in frequency. Thus the question has to be "What the blazes is it?" and the most likely answer we can think of says Lorain-A, the European chain of which is centred on 1950 kHz.

That WT1AAA whom we wrote off as a Slim has turned out to be real—several folk wrote in about this one, among them being G3BH and G3KE's old buddy, W4WFL. It seems the computer broke down—the most regular failing of computers, although not as comprehensively as seems to have happened here. Anyway that means WT is a "good" prefix, though it will disappear when the box of tricks is mended and "proper" calls allocated.

T. W. Morgan (Swansea) recently bought a used
CR70A receiver and is finding his way about the bands for the first time: one of his earlier listening sessions came out to be the same time as the CQ WW Contest. The numbers heard in such contests usually consist of the report, followed by a three-digit number which goes up one for each contact made—usually beginning at 001, but for some contests, to avoid the backmarkers giving up, it is permissible to start the serial-number at any point, continuing upwards as before. Thus the contests will on phone swap a five digit number of which the first two digits will be the R and S of the report, while the CW contest will send RST plus serial, to give a form like, for example 599001, 579002, and so on.

Nice to hear again from K. Kyezor (Inchirae), who remarks on hearing the W's from the Western Reaches over here as early as noon, which is highly unusual for W6, W7, and W8.

B. F. Hughes (Worcester) remarked last time how he was pleased with his FRG-7; and this time he analyses his results since it was installed as compared with the All-Time; and it certainly is an impressive analysis when due allowance is made for Bernard having been listening for long enough to have seen the bands change their characteristics as the sunspot cycle continued.

On the other hand, J. Aspinall (Leeds) is not so happy with the comparison between his R-300 and the pre-war Hallicrafters SX17 he is restoring; the objection being largely due to the difference in the amount of bandspread available. However, what your J.C. suspects Joe hasn’t taken into account is the difference in the performance of the two receivers as far as weak-signal reception on the one hand and weak-signal response in the presence of strong out-of-the-passband stations on the other. The point here is that the valves on the SX 17 receiver front-end have lots of gain ahead of the mixer, to overcome mixer noise, and at the same time the performance of these high-gain RF stages falls off pretty quickly with time, the noise figure deteriorating from the “book” value of a new valve to something much higher very quickly, after which it stabilises at the lower figure; and the gain built into these two RF stages is quite enough to upset the operation of the mixer in the presence of the strong signals present today. In addition, of course, although there is a bit less band-spread on the R-300, it is probably more accurate in the frequency readout, and the semiconductor devices are not subject to the same tendency to fall off as they have no cathode to be “poisoned” and wear out.

P. Wells hails from Colne and has been listening to DX on all bands; but he has now made the decision to sell all the gear in the shack to raise the wherewithal for a two-metre all-in-one receiver—one would think that the combination of his present receiver, possibly endowed with an FM detector if one is not already fitted (there are IC’s that are useful in this context) and his existing converter, would serve equally well.

A. Glass (Plymouth) writes to catch up with the scoring, having not been able to contribute last time round; and Bert notes that N. A. Phelps should have been above him on the CW Ladder. Yes, indeed, but this time there seems to be no score in from SWL Phelps so Bert goes back to the top.

SS/TV is the main interest at P. Barker (Sunderland) where the home-brew gear has been displaced by Robot stuff which has had the effect of bringing up the scoring, both in terms of countries and prefixes in this mode.

K. A. Whiteley (Castleford) wants to know about the Delta Loop aerial. This one can best be regarded as a Cubical Quad pulled out of shape, the rectangle being replaced by a “triangle standing on its head” which is probably an easier shape to manufacture in the “plumbers delight” all-metal technique, and there are claims that a Delta Loop can be more gainy than the equivalent Quad, although this writer has his doubts as to whether the difference is significant. The great advantage of a Quad or Delta Loop aerial is its tendency to improve in performance as compared with an equivalent Yagi, when it is mounted “close” to ground in terms of wavelength at the design frequency; and the lower the aerial is, the more the comparison favours the Quad.

Talking of aerials, M. C. P. Bennett (Slough) has been well occupied in the exercise of handing up a TA32 two-element triband beam; the improvement is most marked and the local council are said to have been very helpful all along the line.

R. Carter (Blackburn) has been spending a lot of his time on the bands listening-out for WAMRAC members overseas, without success, but of course in the process along came a few more scoring prefixes. Two doubtful ones included CH1IJ heard on Forty, which might—just might!—have originated in VE-land, and VQ1ZM which just has to be a phoney—VQ1 was the prefix for Zanzibar, 'way back before it was “liberated” to become part of a dictatorship.

W. Bache (Kingswinford) is home-bound after an accident, and in three months of listening has amassed 230 countries; we were highly amused at his tailpiece, in which he mentions UZ6CL as the western terminus of the Trans-Siberian Railway. As for UZ6CL sounding somewhat American, this is not at all unusual.

A long letter from E. W. Robinson (Bury St. Edmunds) is full of comments and queries. To deal with the queries, the HI10 prefix heard was quite genuine, and the D4CBS was to the best of the writer’s knowledge, from Cape Verde Is.

K. M. Rogers (Lutterworth) disappeared from our lists some four years ago, in favour of other forms of radio activity. Ken now makes his return with new gear in the form of an R-300 and an NR-56 for two metres,
although his aerials are the same as they were four years ago. His HPX query is about the Americans using "N" call signs—quite above board.

How do you work out the exact frequency you are on with a Trio JR-310, asks G. A. Passmore (Pembroke). Quite easy; on most of the Trio receivers the main tuning knob has a skirt with engraved marking on it. "O" on the knob, "O" on the dial, represents the bottom end of whatever band you are switched to, and when you switch the calibrator on, both these "O"s can be set where they should be and a control used to bring the calibrator harmonic to zero-beat; the modern TS-520 simply moves the "skirt" of the knob relative to the knob itself, and your scribe seems to recall this also was the case on the JR-310, although it is many years since he ran the rule over one; the alternative ways of "zeroing" include a varicap diode with a front panel "twiddle" to set zero, and physical movement of the fiducial to be over zero when the rig is at zero. In the Trio rigs the dial skirt then reads off linearly the intermediate frequencies between two calibration points; it is usual to calibrate at the nearest calibration point before reading off the frequency.

W. H. Smyth (Hartlepool) was a bit startled at our refusal to accept any "AM Only" entries in the Ladder: he has for years broken down his lists by mode, and we have not commented because this was also a help to us; but for years, in fact ever since SSB become the predominant mode, we have made it a rule to classify all the "Phone" entries as the sum of all the prefixes heard on any form of telephony; partly because to do otherwise would involve an enormous amount of checking at this end (have you ever worked a chap on "SSB" and received a QSL saying he was on AM?) and partly because of the risk that enough people would run special-mode entries for AM, FM, SSB/TV, or whatever, that we would have to expand the Ladder into several parts. This also covers prefixes heard via Oscar, although it has to be admitted your scribe has had some soul-searching thought over this last.

Having managed 325 in the 1976 Ladder, S. Hammond (Solihull) has now managed a Trio 9R59DS receiver plus ninety feet of wire fed at one end, with which he has started with 211 for the 1977 list.

H. M. Graham (Harefield) missed the bus last time but in so doing has managed to pile even more news into the present letter. Nothing much on Ten; Fifteen opening well, but not every day, and, as ever, the meat of the DX on Twenty. W7JZU was in Wyoming to complete the set of States, but one has grave doubts as to C7UBP, heard in mid-afternoon back in early December; as the C7 series are allocated to the World Meteorological Organisation it is fairly safe to assume this one was a phoney. Another odd one, which Maurice himself reckons to have been misheard was an "NM3SI" around 2000z on March 3.

T. Scrimshaw (Birmingham 31) is still struggling along, and only has a BFO facility on one band, namely Eighty; with this he attacked the ARRL Contest and got more prefixes logged in a weekend than he had done in a year before! In fact, if Tim were to make a "calibration chart" of his front-end injection, he could probably use it on Twenty also—your scribe has on occasion done the "two portables" trick like this, using the second harmonic of the oscillator frequency as a successful "bodge."

A difficulty for D. W. Waddel (Horne Bay) is that his FRG7 receiver works well on the HF bands but is very difficult to handle on Eighty—quite the reverse of the normal situation, in fact. Two things spring to mind immediately: one, that 1-8, 3-5, and 7-0 MHz use lower sideband while the HF's use upper, and secondly that signal strengths tend to be higher (and noise!) on Eighty, which means that often the limiting factor is the amount of C1O injection available to cope with a big signal at the product detector. One could try to cut back on the RF/IF gain, regardless of whether the AGC is on or off, and see if this cleans a big signal up; if it does you have the answer, and only wind up the gain for the weak signals, or, better fit an attenuator. If, on the other hand, the problem arises on both big and small signals, then there must be some investigating to be done.

**ANNUAL HPX LADDER**

**(Starting date January 1, 1977)**

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Starting score 200, in accordance with HPX Rules. All Prefixes to have been heard in 1977.

**The Rest**

That's about our lot from the space point of view; so here we can just acknowledge Table entries from: D. Taylor, Harborne; A. W. Nielson, Glasgow; L. Gibson, Barrow-in-Furness; Mrs. J. B. and Mr. P. C. Jane, E. Looe; M. Gibson, Barrow-in-Furness; J. H. Sparkes, Trowse; G. Ridgeway, Ardleigh; J. B. McDowell, Bristol; M. J. Quintin, Wotton-Under-Edge; S. Bowen, Kippax; H. A. Londesborough, Swanland.

**Deadline**

On to the merry-go-round again, this time for a deadline of May 19—sorry it's so early!—to arrive, addressed as always to your scribe, SWL, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, AL6 9EQ. 73 de J.C.

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(East Lancs. Road). OPEN 9.30 to 5.30, MONDAY TO SATURDAY.
We enter our third year as sole distributors for the S.T.E. range in the U.K. The popularity of this equipment is growing all the time. With the kind help of the Directors of S.T.E. we have managed to keep the prices stable for the past three years. This equipment sell for about 20% in some of the ECC countries and to keep cost to the customer down we have not sold to the ASP 154.

The quality of these P.C.B.'s are the finest we have ever seen. Following on from the ARAC 102 receiver for 28-30 MHz and 144-146 MHz fully tunable we now have the ARAC 107 28-30 and 430-440 MHz with AM and SSB Facilities. The base station AK20 transceiver will be soon supplied with mobile mount and also available in kit form. We also look forward to many new models from S.T.E. in the next year.

Price List (including postage)

<table>
<thead>
<tr>
<th>Product</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK20 FM Transceiver</td>
<td>170.00</td>
</tr>
<tr>
<td>ARAC 102 Receiver</td>
<td>100.00</td>
</tr>
<tr>
<td>Atal 228 Transmitter</td>
<td>128.40</td>
</tr>
<tr>
<td>ASAP 154 AC PSU with speaker</td>
<td>35.00</td>
</tr>
<tr>
<td>AR10 Receiver Module</td>
<td>37.50</td>
</tr>
<tr>
<td>AAI Audio Amplifier</td>
<td>4.10</td>
</tr>
<tr>
<td>AD4 FM Discriminator</td>
<td>4.50</td>
</tr>
<tr>
<td>AL8 Linear Amplifier</td>
<td>27.00</td>
</tr>
<tr>
<td>AT22 Transmitter</td>
<td>50.00</td>
</tr>
<tr>
<td>AR20 C.C. Receiver</td>
<td>50.00</td>
</tr>
<tr>
<td>AT23 C.C. Transmitter</td>
<td>36.00</td>
</tr>
<tr>
<td>AS 15 Stabilised psu D.C.</td>
<td>10.00</td>
</tr>
<tr>
<td>AG 10 Tone Generator</td>
<td>4.50</td>
</tr>
<tr>
<td>AC2A Converter 28-30 MHz</td>
<td>20.00</td>
</tr>
<tr>
<td>AK20 Transceiver Kit</td>
<td>110.00</td>
</tr>
</tbody>
</table>

AK20, STE. Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v DC operation. 8 watt output. Sensitivity 0.2 uv R.I.T. tone burst. Complete with microphone and mobile bracket.

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It's no secret, though, that we have recently expanded our entire production capacity, enabling us not to just manufacture our standard range of first class VHF/UHF converters and varactor triplers, which have gained world wide acclaim over several years, but to arouse new interest by launching on to the market certain new products such as our 50 MHz and 500 MHz frequency counters, - 10 500 MHz prescaler and our latest range of all-mode linear transverters for 144 MHz and 432 MHz. This month we are briefly reviewing this wide range, but please do not hesitate to contact us either by post or telephone for any technical details, or to request detailed data sheets for any of the products mentioned below.

### 144 MHz.

- **MMT144/28:** 144 MHz linear all-mode transverter.<br>Features: 10 watts RMS output power.<br>30dB receive gain.<br>2.5dB noise figure.<br>Aerial changeover achieved by a pin diode switch.<br>Price: £88.88 inc. VAT.<br>

- **MMMC144/28:** Single conversion 144 MHz receive converter with protected dual gate MOSFETs.<br>Typical gain: 30dB. Noise figure: 2.5dB.<br>Price: £80-85 inc. VAT.<br>

- **MMA144:** Double conversion 144 MHz receive converter which achieves good image rejection at low intermediate frequencies.<br>Typical gain: 30dB. Noise figure: 2.5dB.<br>Price: £14-15 inc. VAT.<br>

### 1,296 MHz.

- **MMC1296/28:** 1,296 MHz receive converter utilising a hybrid ring mixer, with a matched pair of schottky diodes driving a MOSFET I.F. amplifier.<br>Typical gain: 25dB.<br>Price: £85-90 inc. VAT.<br>

- **MMV1296:** 1,296 MHz varactor tripler.<br>Will accept up to 30 watts of 432 MHz drive and achieve 60% efficiency.<br>Price: £33-35 inc. VAT.<br>

### 432 MHz.

- **MMT432/28:** 432 MHz all-mode linear transverter.<br>Features: 10 watts RMS output power.<br>30dB receive gain.<br>2.5dB noise figure.<br>Aerial changeover achieved by a pin diode switch.<br>Price: £88.88 inc. VAT.<br>

- **MMT432/144:** 432 MHz DOUBLE CONVERSION all-mode linear transverter.<br>Features: 10 watts RMS output power for 10 watts 144 MHz input.<br>10dB receive gain.<br>3.0 dB noise figure.<br>Aerial changeover achieved by a pin diode switch.<br>Price: £144-146 inc. VAT.<br>

- **MMC432/28:** 432 MHz receive converter featuring 2 RF amplifiers and a MOSFET mixer.<br>Typical gain: 30dB. Noise figure: 3.0dB.<br>Price: £24-25 inc. VAT.<br>

### DIGITAL PRODUCTS

- **MMD050:** Six digit 50MHz frequency counter.<br>Frequency range: 0-45-50 MHz.<br>Input sensitivity: Better than 50mV RMS.<br>Price: £66-95 inc. VAT.<br>

- **MMD050/500:** Six digit 500 MHz frequency counter.<br>Two ranges: 0-45-50 MHz, 50-500 MHz.<br>Combined version or MMD050 and MD500P.<br>Price: £85-92 inc. VAT.<br>

- **MMD500P:** Divide by 10 prescaler to give 500 MHz capability when used with MMD050.<br>Fully TTL compatible.<br>Output level is 2.5 volts p.p.<br>Input sensitivity: Better than 200mV.<br>Frequency range: 50-500 MHz.<br>Price: £27-90 inc. VAT.<br>

### 70 MHz.

- **MMC70/28:** Receive converter for 70 MHz.<br>L.F.'s: 4-8, 14-14.7, 18-18.7, 28-28.7 MHz.<br>Price: £40-45 inc. VAT.<br>

- **MMC70/28LO:** Similar to MMC144/28LO.<br>Features buffered local oscillator facility at 42 MHz for transverter use.<br>Price: £32-35 inc. VAT.<br>

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Model UC/1 converts any existing amateur-bands-only receiver which has coverage of 28-29 MHz or 144-145 MHz (e.g., HF bands receivers or transceivers and 2-metre "all-mode" transceivers) into a general coverage receiver with equivalent high performance. Compared with the alternative of purchasing a separate receiver for general coverage, Model UC/1 avoids wasteful duplication and gives better performance for less outlay.

FEATURES:
- Gives complete no-gap coverage from 90 kHz to 30 MHz, i.e. thirty switched 1 MHz bands.
- Also operates as a 2-metre converter with receivers covering 28-30 MHz.
- Two separate outputs are provided, one for 144-145 MHz and the other for 28-29 MHz receivers.
- No receiver modifications are required. Model UC1 simply connects in series with the aerial feeder.
- Overall performance is limited primarily by that of the main receiver.
- Straightforward digital switch selection of the desired 1 MHz band segment eliminates critical adjustments such as "tuning for lock."
- Built-in aerial attenuator.
- Frequency synthesiser locked to 1 MHz crystal.

PRICE £97.50 plus 12½% VAT, Total £109.69 (including delivery in UK)

Data Sheet for UC/1 available free on request. Also available: Frequency-Agile Audio Filter Model FL1; Universal RF Speech Clipper; details on request, or refer to our advertisement in December's issue.

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FRIO1D Digital readout
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FRG7 General Coverage Receiver - Immediate Delivery

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple-mixer, drill cancelling loop for continuous, spin-tuned inclusive coverage of 5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the VFO knob as normal; tuning the VFO knob as normal.

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple-mixer, drill cancelling loop for continuous, spin-tuned inclusive coverage of 5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the VFO knob as normal; tuning the VFO knob as normal.

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The receiver is portable (0.5W for 106B, 5 + N/S (SSB) and stable (within 500Hz for any 30 minutes after warm up) with A.M., SSB and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, should the supply fail, or portable operation be required. 8 dry cells are automatically switched in.
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<tr>
<th>Antenna Code</th>
<th>Frequency Range</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASP201</td>
<td>1W, 108-512 MHz</td>
<td>Mobile Ant.</td>
<td>£3.23</td>
</tr>
<tr>
<td>ASP629</td>
<td>1W, 130-174 MHz</td>
<td>3 dB gain, DC grounded mobile ant.</td>
<td>£6.61</td>
</tr>
<tr>
<td>ASP677</td>
<td>1W, 140-174 MHz</td>
<td>3 dB gain mobile ant.</td>
<td>£13.51</td>
</tr>
<tr>
<td>ASP6462</td>
<td>1W, 420-440 MHz</td>
<td>3 dB gain mobile ant.</td>
<td>£7.23</td>
</tr>
<tr>
<td>ASP667</td>
<td>425-440 MHz</td>
<td>5 dB gain Collinear mobile ant.</td>
<td>£16.91</td>
</tr>
<tr>
<td>ASP749UK</td>
<td>1W, 144-174 MHz</td>
<td>Mobile Ant.</td>
<td>£23.30</td>
</tr>
<tr>
<td>ASP619</td>
<td>Hi-Band Splitter</td>
<td></td>
<td>£16.45</td>
</tr>
<tr>
<td>ASP700UK</td>
<td>Power capability 200W</td>
<td>Length approx. 18'</td>
<td>£57.75</td>
</tr>
<tr>
<td>ASP639UK</td>
<td>1W, 425-440 MHz</td>
<td>Collinear mobile ant.</td>
<td>£13.51</td>
</tr>
<tr>
<td>ASP677UK</td>
<td>Power capability 250W</td>
<td>Length approx. 18'</td>
<td>£135.00</td>
</tr>
<tr>
<td>ASP697UK</td>
<td>1W, 430-450 MHz</td>
<td>DC grounded base station collinear</td>
<td>£13.35</td>
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<tr>
<td>ASP710UK</td>
<td>New Magnetic Mount</td>
<td></td>
<td>£135.00</td>
</tr>
<tr>
<td>ASP629, ASP677, ASP667</td>
<td>Available now</td>
<td></td>
<td>£135.00</td>
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- **From Wigan** follow the A577 for Skelmersdale to traffic lights at Pemberton (Swan Hotel on your left). Turn right then 10 yards right again. By telephone kiosk. Mileage from Wigan 2½ miles. Closed Wednesday.

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<tr>
<th>SYSTEM 'A'</th>
<th>£36.00</th>
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<tr>
<td>250w. p.e.p. OR for the SWL</td>
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<table>
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<tr>
<th>SYSTEM 'J'</th>
<th>£42.60</th>
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<tbody>
<tr>
<td>500w. p.e.p. (improved 'Q' on receive)</td>
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<td>Is offered with the FRG7 RX. SAVE £12.21!</td>
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<td>NEW — LOW PRICED PACKAGE. The all solid state SMC 73 with all the Partridge extras. SAVE £17.28!</td>
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<table>
<thead>
<tr>
<th>OUTPUT FREQUENCY</th>
<th>USE (TX or Rx) and HOLDER</th>
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<tr>
<td>144.030</td>
<td>MHF-HE-H-H/G</td>
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<tr>
<td>144.450/2</td>
<td>MHF-HE-H-H/G</td>
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<tr>
<td>144.80</td>
<td>MHF-HE-H-H/G</td>
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<td>149.500</td>
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<td>150.000</td>
<td>MHF-HE-H-H/G</td>
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PRICES: (a) £-36 (b) and (c) £-90 + VAT (H).

2M TX & RX CRYSTAL AVAILABILITY & PRICE CHART

<table>
<thead>
<tr>
<th>CRYSTAL FREQUENCY (MHz)</th>
<th>USE (TX or Rx) and HOLDER</th>
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<tbody>
<tr>
<td>432.000</td>
<td>MHF-HE-H-H/G</td>
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<tr>
<td>433.000</td>
<td>MHF-HE-H-H/G</td>
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<td>434.000</td>
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<td>MHF-HE-H-H/G</td>
</tr>
<tr>
<td>437.000</td>
<td>MHF-HE-H-H/G</td>
</tr>
<tr>
<td>438.000</td>
<td>MHF-HE-H-H/G</td>
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