

The SHORT WAVE Magazine

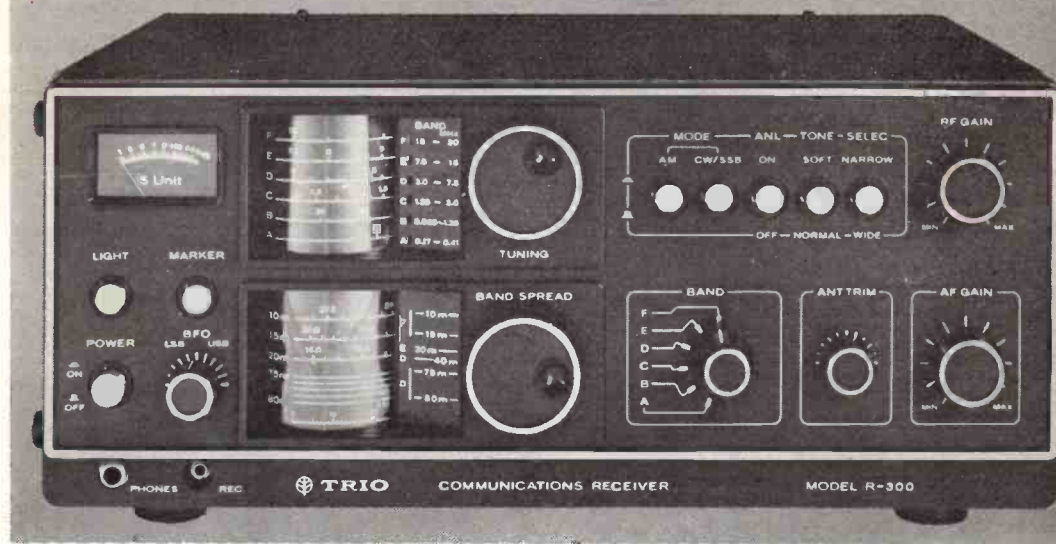
VOL. XXXV

NOVEMBER 1977

NUMBER 9

TRIO R-300

Eavesdrop on the world



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 a Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for many journalists, engineers and technical representatives working abroad. They all want a reliable and sturdy multiband receiver for home use and travel, a receiver working from mains voltage or batteries. And just such a receiver is TRIO's new R-300.

Six Wavebands—LW (710-410 kHz), BC (525-1250 kHz), 4 x SW (160-10m). The four shortwave bands continuously cover the frequency range from 1.25-30 MHz with separate calibration for the commercial (75-11m.) and radio amateur bands (80-10m.) of the large drum-type main tuning and bandsread 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 $1 \mu\text{V}$ for AM and $0.5 \mu\text{V}$ for SSB. For full details, contact the sole importers of the exciting TRIO range.



NEW. CL22 Antenna Coupler
for the SWL.

Only £14 inc. VAT and postage

FULL CATALOGUE 50p from

LOWE ELECTRONICS
Cavendish Road,
Matlock,
Derbyshire

LOWE in Leeds 27 Cookridge Street, Leeds. Tel. 0532 452657

TS820

The ultimate transceiver . . . TRIO's TS-820. No matter what you own now, a move to the TS-820 is your best move. It offers a degree of quality and dependability second to none, and as the owner of this superb unit, you will have at your fingertips the combination of controls and features that, even under the toughest operating conditions, make the TS-820 the leader that it is. Unprecedented demand plus the painstaking care. TRIO lavishes on each TS820 created an initial backlog of orders but happily we can now supply the TS820 from stock. Once you have operated the TS820, you will not be satisfied with anything else.

Features

SPEECH PROCESSOR ● An HF circuit provides quick time constant compression using a true RF compressor as opposed to an IF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control **IF SHIFT** ● The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820 the pacesetter that it is.

PLL ● The TS-820 employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now, PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

Specifications

FREQUENCY RANGE: 1.8-30 MHz (160-10 metres)
MODES: USB, LSB, CW, FSK
INPUT POWER: 200W PEP on SSB
 160W DC on CW
 100W DC on FSK
ANTENNA IMPEDANCE: 50-75 ohms, unbalanced.
CARRIER SUPPRESSION: Better than 40dB.



SIDE BAND SUPPRESSION: Better than 50dB.
SPURIOUS RADIATION: Greater than -60dB (Harmonics more than -40dB)
RECEIVER SENSITIVITY: Better than 0.25µV.
RECEIVER SELECTIVITY:
 SSB 2.4 kHz (-6dB)
 4.4 kHz (-60dB)
 CW *0.5 kHz (-6dB)
 1.8 kHz (-60dB)
 *With optional CW filter installed.
IMAGE RATIO:
 160-15 metres: Better than 60dB.

10 metres: Better than 50dB.
IF REJECTION: Better than 80dB.
POWER REQUIREMENTS: 120/220 v. AC, 50/60Hz. 13.8v. DC (with optional DS-1A DC-DC converter).
POWER CONSUMPTION:
 Transmit: 280W.
 Receive: 25W. (heaters off).
DIMENSIONS: 13½" w. x 6" h. x 13⅝" d.
WEIGHT: 35.2lb. (16kg.)
DG-1, digital readout optional.
TS820 £645 inc. VAT DG-1 £127 inc. VAT

The Portables

TR2200GX. Represents the very best of TRIO design. It is the latest in the line of continuous progress from the first TR2200 and maintains the TRIO tradition of top quality at a reasonable price. The TR2200GX has all the features that you could want—high power output; sensitive receiver; flexible use from internal batteries or external supplies using the power lead supplied; built in removable telescopic antenna with flexible whip available; built in metering of signal strength, transmit output and battery condition; fitted with twelve channels at low, low prices; in short, all that you could want.

All operator controls are placed for maximum convenience on the top face of the rig and a protective carrying case is included in the price.

VB2200GX. This is the matching 10 Watt mobile amplifier for the TR2200GX (and all previous models). It is self contained and of very small size but produces well in excess of 10 Watts for 2 Watts of drive. It contains a regulated power supply for the TR2200GX and has positive SWR protection for the PA transistor. The amplifier may be switched out of circuit if required, but still supplies power for the TR2200GX.

TR3200. Not content with having the lead in 2 metre handy portables, TRIO have gone a step forward and produced the best 70 cm. portable rig to match.

The TR3200 is really terrific; over 2W output with switched reduction to 400mW for local contacts; tailored speech response with a new limiting amplifier and new microphone give you crisp speech quality.

Excellent receiver performance with double IF filtering at 10.7 MHz and 455 kHz with no less than five limiters to guarantee noise free performance on even the weakest signals.



12 channel capability with three channels factory fitted with crystals for 5B8, 1B8 and 2D. Supplied with all accessories as the TR2200GX and including a new high gain 5/8 wave antenna. Don't forget, the following accessories are provided with the TR2200GX and TR3200:—
Removable antenna Free
Carrying case Free
Shoulder strap Free

Battery charger Free
External power lead Free
Prices including 12½% VAT
TR2200GX £139 (3 channels)
 £169 (12 channels)
VB2200GX £45
TR3200 £182 (3 channels)
MB1a £9.70
NiCad pack £9.72

HEAD OFFICE 119 Cavendish Road, Matlock, Derbyshire. Tel. 0629, 2817 or 2430

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

TR-7500

Why settle for anything less ?



TR7500

The TR7500 is the very latest 2 metre FM mobile to be introduced by TRIO and will delight the owner with its combination of performance, reliability and unique design. It represents another step forward in the TRIO product line and is designed to give you the very best FM transceiver available in its class.

Whatever you now own, or may have been thinking of buying, it would be foolish to settle for anything less than the TR7500.

PLL Synthesiser

You have no crystals to buy—ever—with the TR7500 since the operating frequencies are generated by a TRIO designed LSI phase loop synthesiser. This provides 80 FM channels at 25 kHz spacing from 144-146 MHz, all 10 repeater channels and all 10 reverse repeater channels with low noise oscillator injection which is a feature of TRIO PLL designs. The channels are selected by a single knob and no programming is required from the user—just unpack the rig, connect 12 volts dc and you are on the air.

Unique display

TRIO attention to detail at its very best is shown in the method used to display the channel number. TRIO believe that ease of use is the priority consideration, and have arranged the large LED display to show the correct channel number at all times. If you want to operate on S24, turn the channel knob until the display shows 24—simple isn't it? Need R7? Turn the knob until the display shows 7. There's no need to wonder "did I programme S24 into channel 15 or channel 9?"

Repeater operation

Available at the touch of a front panel switch. Turn this to "N" (normal) and you operate normal repeater with 600 kHz transmit down shift. If you wish to listen on the input, turn the switch to "S" (Simplex), and you are there—and can operate simplex on the input frequency. Need reverse repeater? Turn the switch to "R" (reverse) and you operate with receiver down shift of 600 kHz. This facility is most useful when you hear several stations calling into a repeater with only one (of course) appearing at the output. Using reverse repeater operation, you can call into the pack to invite anyone to a simplex channel for direct QSO.

Automatic tone burst is provided, with a front panel LED to remind you that you have the tone burst on. Needless to say, the 1750Hz is generated by TRIO's unique tuning fork oscillator which guarantees spot-on frequency at all times and in all temperatures.

Performance plus

In the same way that the 7200G set new standards in receiver dynamic range and sheer good performance, the TR7500 continues

and improves on this by setting new, even higher standards. A combination of multi section helical filtering at signal frequency, monolithic crystal filters at 10.7 MHz, and sharp multi pole filters at 455 kHz allows the TR7500 to keep right on working under strong adjacent signal conditions when other, lower quality rigs, fold up and die.

The receiver performance for sensitivity is excellent. On the samples checked so far, we obtain 12dB SINAD for a startling 0.18 microvolts and under mobile conditions, we copy repeaters in terrain which previously presented real signal problems.

The transmitter generates a true FM signal at 10.7 MHz which is translated directly to two metres in a fully balanced mixer system. This guarantees a superbly clean signal with no unwanted multiplier products, and an all new PA system with specially developed transistors, gives rugged reliable power in excess of 10 watts.

As a final test for freedom from unwanted in band signals, we ran the TR7500 at full output with a TS700G coupled to it on the bench. Tuning from 144-146 MHz on the TS700G, we found just one signal—the wanted one. It was impossible to find a single unwanted signal coming out of the TR7500 under these extremely severe conditions. Wideband checks using the analyser revealed no spurious outputs detectable above noise level. At this point we retired happy!

Attention to detail

As is well known, TRIO introduced the since copied variable power SWR protection system, and it is of course fitted to the TR7500 with an improved high gain dc amplifier for tighter and faster control.

High/low band switching is by front panel push button, and just to let you know what you are doing in the dark, the S meter illumination changes colour on low band—attention to detail again.

Another simple but typically TRIO thoughtful provision is the special channel knob with a deep moulded indent at S0. You can set this vertical by touch alone and can then count up the channels without even seeing the channel display. Great when mobile and you need your eyes on the road.

Thanks to new standard of mechanical design, the TR7500 with all its potent performance is packaged in a case not much bigger than a TR2200GX!

Accessories

The TR7500 is supplied complete and ready to use with the TRIO quick release mobile mount, microphone, power leads, comprehensive manual etc., etc. Nothing more to buy to own the best mobile/fixated station FM rig on the market.

**DON'T SETTLE FOR ANYTHING LESS THAN
THE TR-7500**
TR-7500 £225 inc. VAT

LOWE in Leeds 27 Cookridge Street, Leeds. Tel. 0532 452657



South Midlands

ESTABLISHED 1958 19 YEARS

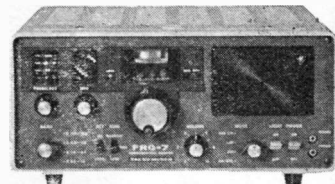
YAESU MUSEN 2-YEAR GUARANTEE 24 HOUR SECURICOR SERVICE

TAKE A YAESU FRG7 ADD A SMC COUNTER AND YOU HAVE THE BEST VALUE AROUND TODAY



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.

The receiver is sensitive (0.5µV for 10dB, S + N(N/SSB)) and stable 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 he supply fail, or portable operation be required, 8 dry cells are automatically switched in.



100Hz Readout (+ Overrange.)

FRG7 ANALOGUE £145(+VAT) FRG7 DIGITAL RECEIVER £199(+VAT) 12½%



FT221R

STOP Think carefully before buying your new 2m. multi-mode rig.

LOOK At the published specifications. Remember some manufacturers claim performance figures their equipment can only just reach. Yaesu write their specifications very conservatively. Look at the features:—Internal VOX, CW sidetone, crystal control facility, 600 kHz and 1.6 MHz shifts, auto tone burst, digital readout outputs, etc. Look at the spurious outputs (or try to find them if the transceiver has a P.L.O. to clear sub harmonics of oscillator chain). Look at the ergonomics, are there more controls than necessary, preselectors or varicaps tuned receiver. Look inside, take off the case (or merely lift the lid): does it look like the bottom of granny's sewing box or is it modular constructed with plug in boards, etc.

LISTEN To weak signals, listen to strong signals, listen to your own signal. Is your PA rates to dissipate 7 times the claimed output power.

TAKE A LOOK — TAKE A LISTEN — GIVE US A CALL — A 221R WITH OUR 2 YEAR GUARANTEE IS WAITING FOR YOU

THE FT227R NEW FROM YAESU

The new FT227R uses a "single knob" tuned digital synthesizer employing a photoelectric sensor for an optical coupled system which eliminates both noisy, unreliable rotary switches, and crystal banks. Full coverage of 2 metres in 5 kHz divisions with a ±600 kHz shift plus a memory feature which permits recall of any entered frequency or particular offset. Bright, large, digital readout gives unequivocal readout of the frequency in use. The receiver offers 0.3µV (for 20dB S+N(N)) sensitivity into a ±6 kHz (at 6dB) bandwidth whilst maintaining a remarkable immunity to overload and image problems. The 20W, DC input transmitter features Hi/low power outputs, AFP, tone burst on repeaters and an out of band inhibition trip, etc.



FT227R



**FC301
MATCH
POWER
METER**

10-160m. Switched, 50/75 input, 500W, PEP max. handling. Power meter with 25, 250 & 500W FSD ranges. 4 position antenna selection 1 wire and 3 SO239 sockets.



**FL110
ALL BAND
LINEAR
AMP.**

10-160m. Switched L.P.F. 15W to 200W, PIP A1(A3), 4W, to 75W, FI. Push pull SRF1427's. Negative feedback with ALC to exciter. RF sensing (Adjustable hang time) with over-ride.



**YO301
MONITOR
TX & RX
SCOPE**

1.8-54 MHz Tx monitor 10-500W. Envelope, Trap and Cross. Vert. 2Hz-4 MHz (±9 and 10.7 provision). Horz. 10Hz-250 kHz, sweep 10Hz-10 kHz. 2 tone generator.

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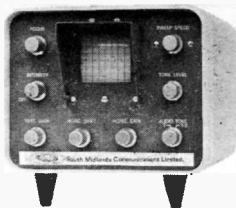
Communications Ltd

OF PROFESSIONAL EXPERIENCE



The MONITORSCOPE is a convenient Test Instrument allowing "on the air" monitoring and testing of Radio Transmitters operating in the frequency range 500 kHz to 30 MHz with a power rating of up to 2KwPEP (1Kw average). The Monitorscope is designed to be connected between the Transmitter or Linear Amplifier antenna socket and the Antenna or Antenna Tuning Unit. A visual display of the Transmitter "envelope" is provided. This will allow the Transmitter to be "talked up" to a full power output whilst watching for "flat topping" which would cause distortion and loss of readability also the "splatter" produced would create interference to Stations on adjacent frequencies. By using the 2-tone Test Generator which is incorporated, an SSB Transmitter may be adjusted to ensure that it is operating in a linear condition, necessary for good quality SSB transmission. Likewise, amplitude modulation and Morse Keying characteristics can be observed. A flexible screened lead is provided for connection to the Transmitter audio or microphone input.

LOOK AT YOUR SIGNAL !!!
SMC MONITORSCOPE only £69 (+8%)



Power requirement : 115/230v. 45-65 Hz. A.C. $\pm 20\%$, 10 watts.
 Input/Output impedance: 50-75 ohms using two SO239 UHF type connectors.
 RF Power Capability : 10-2000 watts PEP
 Sweep Speed : 20-200 Hz
 Tone Oscillators : Nominally 1.3 kHz and 2.3 kHz
 Tone Level Output : 0-50mV rms per Tone at 50K ohm
 Max. E.H.T. on C.R. Tube: 1500v. D.C.
 Panel Controls :
 Intensity/Power on-off Switch Focus
 Audio Tone (Single or 2-Tone) Vertical Gain
 Tone Level Horizontal Gain
 Sweep Speed Horizontal Shift
 Rear Controls : Astigmatism, Tone Balance, "V" Shift (pre-set)

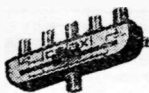
Coax Relays

12v. DC 50 ohm, Silver plated.
 P. and P. 30p (VAT + 8%)
 Power crosstalk (at 500 MHz)
 CX120 50W 35dB Cable entry £9.50
 CX230 300W 40dB BNC sockets £17.90
 CX600N 600W 40dB N sockets £21.50



Coax Slide Switches

Up to: 1kW, 1.5 GHz, 0.3dB less, 1:2:1 VSWR, 50dB isolation, 50 ohm "N" or "PL" fittings.
 Ex-Stock P. & P 30p (VAT + 8%) EX STOCK
 TWS120 1 in 2 out nickel SO239 ... £5.40
 TWS150 1 in 5 out nickel SO239 ... £11.50
 TWS220 2 in 4 out nickel SO239 ... £11.50



Boom Microphone "Headset"

600 ohms magnetic lightweight boom mic. Ideal for mobile or contests, etc.
 (Post free but VAT + 12½%)

MD35 complete £14.75
 Microphone only £9.75
 Footswitch only £5.95



RF SPEECH PROCESSOR 60

Audio to audio, via 10-7 MHz, mains powered, illuminated meter, FT-101 FT2 plugs suitable all phone modes superb on FM

Ex Stock in Totton £41.35 (+ 12½% VAT) (P.P. FREE) NEW!!



Solid State Mobile Linears (UHF and VHF) from KLM and Ampere



LEADER WATTMETERS NEW!
 LPM885 Through line (illustrated). 1.8-54 MHz. 20-200-1000W FSD.
 (P & P 75p) £41.50 +8%
 LPM880. Absorption. 1.8-500 MHz. 5-20-120W. FSD (P & P 95p) £64.00 +8%



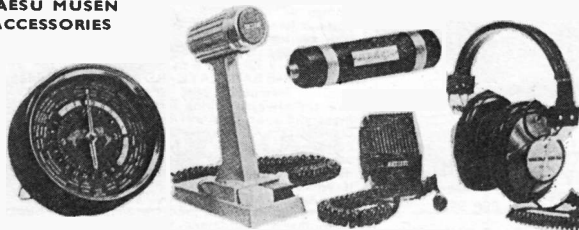
LEADER ANTENNA COUPLER
 LAC895. 3.5-30 MHz. 50/75 coax (SWR >5) and single wire (10-250 ohms) feed transformed to 50 ohm. Wattmeter 20 and 250W. FSD, SSB 500W. PIP.
 £00.00 + 12½%

HIGH MOUNT KEYS (P & P 60p)
 BK100 (illustrated left)
 Mechanical Bug Key ... £12.15 +8%
 HK808 Handkey marble plinth ... £26.15 +8%
 HK707 Hand key 0.5 kg. Dec. delivery. £7.95 +8%



TRANSISTOR DIP OSCILLATOR
 LDM815
 1.5-250 MHz on fundamentals battery c/w earphone and 6 plug-in coils 2 kHz modulation. 1-15 MHz Crystal facility.
 £38.50 +8%
 LIM870 Antenna impedance meter 1.8-150 MHz. 0-1Kohm direct reading c/w load.
 £38.50 +8%

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ALL YAESU ITEMS POST FREE (+ VAT)

QTR24 World time clock, battery powered, analogue readout £13.00 +8%
 YD844 Desk microphone, 50K ohm impedance P.P.T. with lock and microswitch £18.00 + 12½%
 YD846 Hand microphone, 500 ohm or 50K ohm (state which) P.P.T. £7.50 + 12½%
 FF50DX Low pass filter sharp cut off type c/w 2 PL259's. £15.25 +8%
 YH55 Communications headphones low impedance, well padded £8.00 + 12½%

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G3MCN



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

XCR-30 FM Receiver with FM band 87-5 to 101 MHz. £145-00 inc. VAT
£170-00 inc. VAT



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

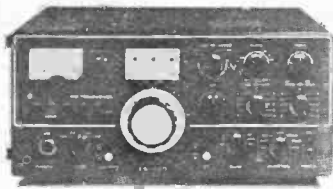
Price £17-50 including VAT and Postage

Mk. 2 VARISSON, £23-00. Covering 550 kHz to 30 MHz. Send S.A.E. for full information and Test Report.



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

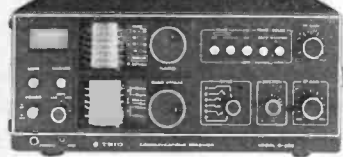
TR2200GX PRICE £130 (3 ch.), £160 (12 ch.) inc. VAT Ex stock
This is the definitive 2 metre FM portable rig which has won praise from all over the world. Over 2W, transmitter output with switched reduction to 400 mW for local contacts. High gain receiver with double IF filtering at 10.7 MHz and 455 kHz for razor sharp selectivity. The TR2200GX is supplied with all accessories including the battery charger for the optional Nicad battery pack, the removable telescopic antenna, the carrying case, the shoulder strap, external power lead, microphone and handbook. Fitted with 12 channels, the price is only £160 inc. VAT. If you wish to start out at a lower price, we can supply the rig fitted 3 channels for only £130. With all its performance, the TR2200GX is a must for the portable operator. At the price, it has to be the best around. Just look around at the next rally and see how many operators are carrying them. Also available are a mobile mounting bracket at £9-45, a matching 10 Watt amplifier for £45 and a flexible antenna. Send for full details now.



TS520 PRICE £432.00



TR7500 PRICE £225.00



R3000 PRICE £184.50

TR3200 PRICE £171 inc. VAT. Ex stock
The newest FM handy transceiver from the ever expanding TRIO range. Superb performance for the 70 cm. operator with all the advantages of portability and TRIO reliability. 12 channel capability in the range 432-436 MHz with three channels fitted (SUB, 18, 20). Transmitter output switched 2W/400 mW and incorporating the exclusive TRIO 1750 Hz tuning fork access tone generator (does that mean you can ring for credit?) High gain 5/8 wave antenna for enhanced performance on transmit and receive. Supplied complete with all accessories as for the TR2200 GX and including the all important battery charger. We have just received the first shipment of the VB 3200 10W amplifier for the TR3200. Rather more complex than the VB 2200, the VB3200 also includes a switchable receive preamplifier. Price £95 inc. VAT. Send for details now.

Other TRIO Models available

TS520 HF Transceiver	£645-00
DG1 Digital Display	£127-00
TS520S HF Transceiver	£489-00
TR700G VHF Transceiver	£426-00
TS700S VHF Transceiver	£542-00
TR7010 SSB VHF Transceiver	£189-00
TR8300 70cm. FM Transceiver	£227-00
PS5 PSU with clock	£58-00
PS6 PSU	£57-00
R559D All mode HF Receiver	£403-00
VB220GX Mobile Amplifier	£45-00
HC2 World Time Clock	£15-50

Accessories

Single Meter SWR	£10-00
Twin Meter SWR	£12-00
50 ohm Dummy Load	£21-93
KW E-Z Match	£32-53
KW109 Matching Unit	£118-12
KW107 Matching Unit	£95-63
KW103 SWR/Power Meter	£19-15
3 Way Antenna Switch	£9-00
KW Antenna Traps	£9-63
Antenna Insulators	17p
PL259 Plugs	51p
SO239 Sockets	51p
Cable reducers	17p
Line conns	75p
Aluminium Co-Ax plugs	15p
Hy-Mount Morse Keys	£8-75
Nye King Morse Keys	£6-75
Junkers Heavy Duty Morse Key	£19-86
Baeur Keing Paddle	£9-75
Katsumi Electronic Keyet	£60-75
Microphone plugs 4 pin	70p
Microphone sockets 4 pin	70p
Yaesu YP150 Dummy Load Wattmeter	£47-50

Postage extra. Min. postage charge 25p.
All items despatched same day as order received.



COMTEK 2m. Linear Amplifier
Modes: SSB - CW - FM - AM
Input: Up to 15 watts SSB
Up to 5 watts FM
Power output: 100 watts PEP SSB
60 watts FM
Receiver Pre-Amp 1Z-18dB. QQV06-40A.
RF switching for easy control.
Price £140-62 inc. VAT

We carry a stock of products by over thirty of the worlds leading manufacturers. For the call we have a wide range of mobile antennas, test equipment, valves, publications, aluminium tubing, cables, plugs, etc.

We carry a large range of stock which we cannot advertise in the space available. Send 25p in stamps or postal order and we will forward you our latest price list and equipment information available.
Shop Hours: 9.30 till 5.30 Monday to Friday, 9.30 till 5 p.m. Saturday.
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We are always looking for good clean equipment and spot cash will be paid for receivers, transmitters, transceivers, etc. If you have equipment surplus to your requirement we would be pleased to sell this for you on commission. Our secondhand stock changes daily. If you require a specific piece of equipment send us a SAE and we will let you know as soon as we have the model available. All our secondhand equipment is covered by three months guarantee.
PLEASE NOTE ALL OUR PRICES INCLUDE VAT at the current rate.
Carriage, postage is extra
We can quote for delivery in any part of the world We are located on the A574. Turn at the GREYHOUND MOTEL on the A580 (East Lancs. Road) 5 1/2 miles from the M6; 6 miles from the M62. Easy access from North, South, East and West. NO PARKING PROBLEMS.

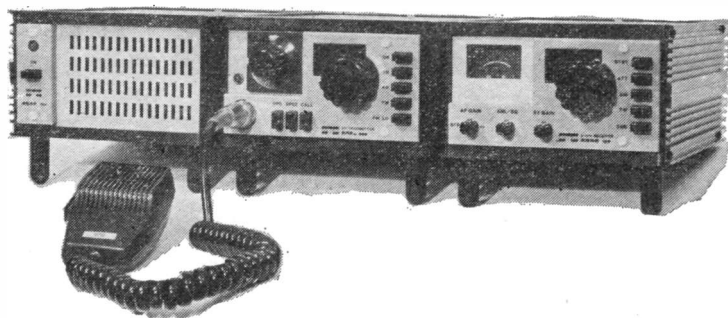
S.T.E. MILAN VHF EQUIPMENT

SEE THE ENTIRE S.T.E. RANGE AT THE AMATEUR RADIO RETAILERS' ASSOCIATION EXHIBITION, GRANBY HALLS, LEICESTER, OCTOBER 27-28-29th, (1977) 10 a.m. to 6 p.m. daily.

ASP 154

ATAL 228

ARAC 102



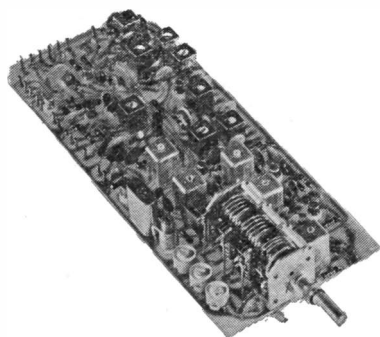
SPEAKER AC POWER SUPPLY UNIT

144 - 146 MHz AM FM TRANSMITTER with Microphone

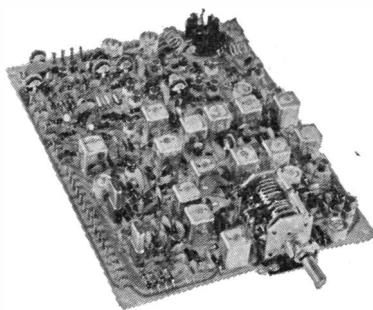
28-30 MHz 144-146 MHz AM-FM-SSB RECEIVER

Price List (including postage)

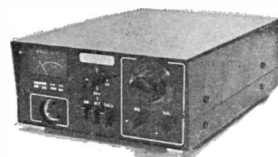
AK20 FM Transceiver	£170-00
ARAC 102 Receiver	£100-00
Atal 228 Transmitter	£126-00
ASAP 154 AC PSU with speaker	£35-00
ARI0 Receiver Module	£37-50
AA1 Audio Amplifier	£4-10
AD4 FM Discriminator	£5-00
AL9 Linear Amplifier	£27-00
AT222 Transmitter	£50-00
AR20 C.C. Receiver	£45-00
AT23 C.C. Transmitter	£50-00
AS 15 Stabilised psu D.C.	£10-00
AG 10 Tone Generator	£4-50
AC2A Converter 28-30 MHz	£20-00
AK20 Transceiver Kit	£110-00



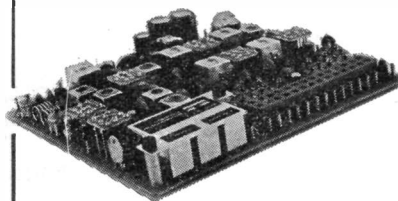
AR10 Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.



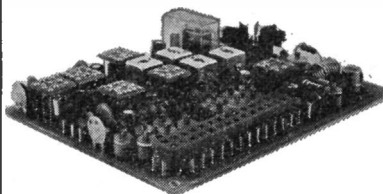
AT 222. A complete transmitter exciter unit for 144-146 MHz on AM or FM. VFO controlled or fixed channel operation. Complete with microphone pre-amp., speech processor including active audio filter. 3 watt output. FM, 25 watt AM. Output impedance 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.



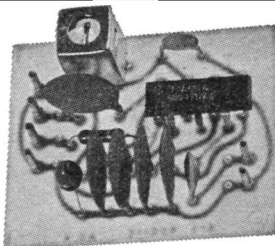
AK20, STE. Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 3 watts output. Sensitivity 0.2 uv f.i.t. tone burst. Complete with microphone, and mobile bracket. Price £170-00



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



AT23. 12 Channel PM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.



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



NEW MODEL ELECTRONIC KEYS Jambic operation—Weighted transmission—Three memory lengths up to 1024 bits. Internal monitor. Transmitter keyed through internal relay. Silver plated contacts. 220v. AC operation. Price £106-00

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Please note new telephone number 0942 - 676790



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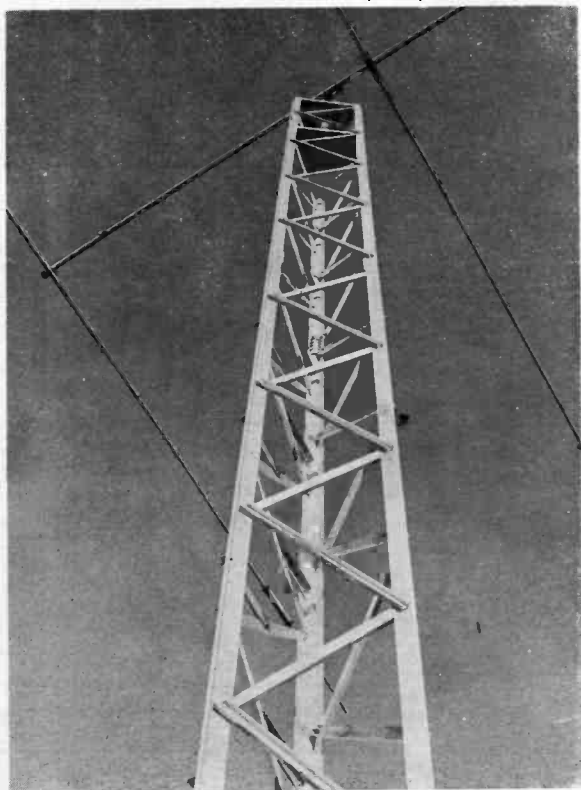
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- * Can be extended to 200 feet !
- * Climbing rungs incorporated
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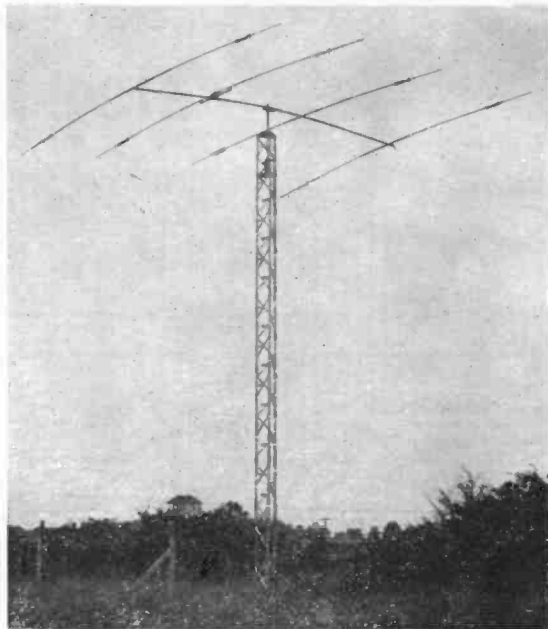
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. . . the better savings **YOU** will get.

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Electronics (UK) Ltd

New! Extended Range 'Penetrator' Series Antennas



Get on top of the pile-up with the New DX-34

- * Heavy duty 2 kW p.e.p. rating
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- * SWR less than 1.3 : 1 at resonance
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DX-31 Dipole 10/15/20 2kW p.e.p. ...	£35.00
DX-32 2 ele. 10/15/20 2 kW p.e.p. ...	£55.00
DX-33 3 ele. 10/15/20 2kW p.e.p. ...	£75.00
DX-34 4 ele. 10/15/20 2kW p.e.p. ...	£99.00
TD1 10/80 Dipole, 10, 40 and 80m. ...	£19.50
TD1 15/80 Dipole, 15, 20, 40 and 80m. ...	£19.50
Type P Dipole, portable 10/80 ...	£24.00

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THE NEWEST LEADER — FT227R FROM THINK HARDER NOW BEFORE BUYING



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COMPARISONS! Have you ever tried it?

Confusing, isn't it—turning from one ad. to another, some giving one piece of information, others not; some showing data in one form, some in a different form. How can you decide on which 2 metre FM rig to buy?

LET US HELP YOU . . . Take as a basic requirement—10 watts FM, with a good receiver, freedom from "funnies." and no need to spend extra later to extend flexibility.

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CHANNELS AVAILABLE BY FRONT PANEL CONTROL . . .	Yaesu FT227R 400 (800 over 4 MHz)	Trio TR7500* 80	Icom IC240* 22	Digital II* 400
FULL 4 MHz COVERAGE (144-148) WITHOUT MODIFICATION . . .	YES	Apparently NOT	Apparently NOT	Receive only
FREQUENCY STEPS . . .	5 kHz	25 kHz	25 kHz	5 kHz
TRUE FREQUENCY DISPLAY . . .	YES	NO	NO	YES
FREQUENCY MEMORY FACILITY . . .	YES	NO	NO	NO
REPEATER SHIFTS . . .	YES	YES	YES	YES
tone BURST . . .	YES	YES	YES	EXTRA
FACTORY-FITTED HIGH/LOW POWER SWITCH . . .	YES	YES	NOT YET	YES
PRICE (including VAT) . . .	£189	£225	£198	£264†
PRICE COMPARISON . . .	LOWEST	£36 MORE	£9 MORE	£75 MORE!

* All details taken from current advertising.

† Tone Burst £11.25 extra.

**NOW . . . YOUR CHOICE IS CLEAR . . . THE YAESU FT227R SCORES ALL ROUND!
BE THE FIRST WITH THE BEST! LET YAESU DO YOUR TALKING!**

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Yes—it's a question that's often been asked—and one that's remained unanswered—until now . . .

We are therefore especially pleased to be able to announce the

YAESU MUSEN FC-301 ANTENNA TUNER

- Featuring: *
- * All-band coverage, 160-10 metres
 - * Power and SWR measurement
 - * Four-way antenna switching
 - * "Gold-Line" styling
 - * Realistic price.

SPECIFICATION :	
Freq. ranges (MHz) :	1.8-2.4 ; 3.5-4.0 ; 7.0-7.3 ; 14.0-14.35 ; 21.0-21.45 ; 28.0- 29.7.
Input impedance :	50-75 ohms unbalanced.
Maximum SWR :	5 : 1 with respect to input impedance.
Maximum power :	500 watts PEP.
Insertion loss :	0.5dB max.
Power ranges (meter) :	25W, 250W, 500W full-scale.
SWR ranges (meter) :	Calibrated to 4 : 1 SWR.
Dimensions :	212(w) x 125(h) x 295(d) mm.
Weight :	4.6 kg.

★ **PRICE £88.88 (you have to love it at that price!) inc. VAT** ★

BOTH THESE NEW MARKET LEADERS FROM . . .

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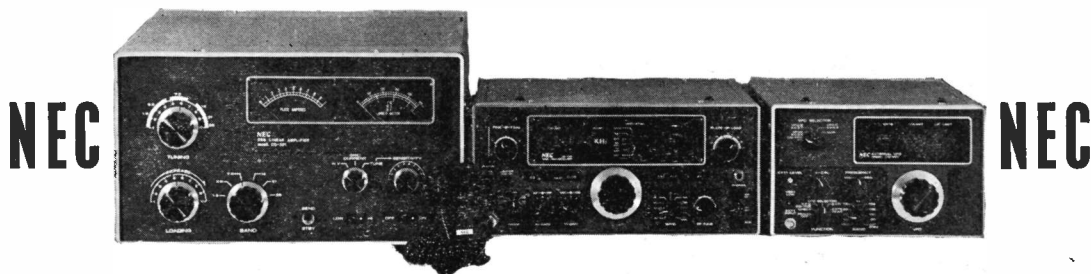
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DISTRIBUTORS FOR NEC AMATEUR RADIO EQUIPMENT



CQ301

CQ110E

CQ201

CQ110E Transceiver (ex stock), **£645** plus VAT **£80.63**, total **£725.63**
(Price includes Securicor Delivery)

Frequency Range 10M — 15M — 20M — 40M — 80M — 160M
and 11M and WWV 15 MHz on receive only.
Mode LSB — USB — CW — AM — FSK — FAX/SSTV.
Power Requirements 100/110/117/200/220/234 volts AC or 13.5 volts DC.
Input Power 280 watts PEP (240 watts on 28 MHz).
Digital Readout—Separate Crystal Filters for each of LSB, USB and CW.

AC and DC power units are built in. Switched metering for "S" meter, Relative Output, Plate Current and ALC for setting MIC Gain.

The following accessories are supplied with the Transceiver—Microphone, DC Power Cable, AC Power Cable 5 RCA Plugs, 2 Spare Fuses, 2 Jack Plugs, 2 Allen Keys and a 60-page instruction book. Built-in speaker with 3 watts output.

A hybrid design utilising the best features of valves and semiconductors is used to give a high performance. 7 Valves—49 Transistors—19 FETs—128 Diodes—25 ICs. The use of the RCA low noise beam deflection valve (7360) as receiver mixer gives the CQ110E high sensitivity combined with remarkable crossmodulation characteristics.

CQ301 2kW Linear Amplifier—10 to 160M with built-in power supply and 2 EIMAC3-500Z Valves. (Ex stock) **£760** plus VAT **£95**, total **£855** (Price includes delivery)

We also stock Antennas and Accessories—Microwave Modules—Modular Communication Systems—Polar Electronic Developments—Antex Products—Components etc.

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FDK

QUARTZ-16

£169 inc. VAT!

FITTED 10 CHANNELS



A POPULAR CHOICE — WHY?

This superb transceiver is now selling faster than ever before. With FDK's reputation for quality, reliability and above all, after sales service, little wonder. (It really amazes us that some customers are kept waiting for spares when the UK importer should have them in stock). Very rarely do our customers have to wait for FDK spares as we have taken the elementary precaution of making sure that we have most items to hand in our workshop. It ties up capital but it also makes for a happy customer!

The Fast Selling 2m. FM Transceiver
NOW ... 145.50 Reads "S 20"!

Yes, the latest version now has a calibrated dial giving direct readout in European "S & R" channels.

SOME QUESTIONS ANSWERED

It covers 144-146 MHz, any frequency, not just the 25 kHz spots! It is easy to QSY without having to wind the channel knob all the way round. For example if you fit S20 in the priority position "A" you can immediately flip from say S7 to S20 in a second. Low power is available but only in the low power position! (In the high power position you will typically obtain 12 watts output). Extra channels can be added simply by plugging in additional crystals thus ensuring complete freedom of movement throughout the band and, more important, a clean spurious free transmission. Tone-burst is automatic but with the facility of switching it out so that a distant repeater can be worked without switching on the local one. A remote vfo is available for complete coverage of 144-146 MHz with the addition of a synthesizer available soon. It also costs a lot less!

TECHNICAL POINTS

On the more technical side we can add that such things as helical filters, 10.7 MHz crystal filters, 455 ceramic filters are all included in the design. The transmitter is completely protected against open circuit or high SWR and the modulation is crisp and clear. The standard frequencies fitted are S0, S20, S21, S22, S23, R3, R4, R5, R6 and R7. Included with the Quartz 16 is microphone, power cord, fuses, plugs, table stand and English manual.

FREE CREDIT! (limited period only)

QUARTZ 16 Deposit £43

MULTI-II Deposit £53

Balance paid over 6 months

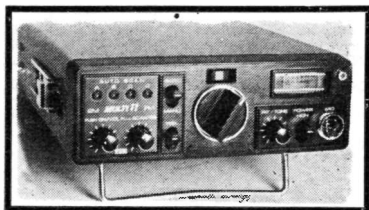
MULTI-UII Deposit £59

Send for full details

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FDK

MULTI-II



A TRANSCEIVER YOU SHOULD CONSIDER

This really is the deluxe 2 metre fm transceiver that outclasses all others. FDK engineering and reliability from the company that specialises solely in VHF communications. But supplemented by the backing of WSE in the UK, full time service staff, £1,000's of spares and a fast turn around—no wonder our company has grown—our customers keep coming back to us!

HIGH POWER OUTPUT

While some transceivers struggle towards 10 watts output, the FDK Quartz 16 coasts along at 12 watts or more. The PA is completely protected against open circuit, short circuit, and high SWR.

DE LUXE 2M. FM RIG 23 CHANNELS Plus Autoscan . . .

. . . and a lot more!

A REALLY HOT RECEIVER

Better than -3uv for 20dB quieting is typical front-end sensitivity of the Multi-II. Little wonder, with its built-in RF pre-amp it is the hottest thing around! But sensitivity is no good without selectivity as well. That's why the Multi-II has a high performance helical filter resonator network in the front end. This is followed by a 10.7 MHz crystal filter and finally a 455 kHz ceramic filter. The result—razor sharp selectivity and QRM free reception.

MANY UNIQUE INNOVATIONS

The unique dial has a back-lighted indicator that is only illuminated when channels are fitted. The S-metre can be switched to read centre-zero. A switch allows the transmission and reception of both wide-band and narrow band FM. A further switch allows the tx driver stages to be switched on to monitor the modulation and check both tx and rx netting. A vfo socket allows the subsequent use of wfo's and synthesizers. A switch on the front panel allows the automatic tone-burst to be defeated so that d x repeaters may be worked without accessing the local ones. A further front panel control allows the receiver to be tuned approximately plus or minus 4 kHz for perfect reception.

4 CHANNEL AUTOSCAN

This feature is a most useful and practical innovation. It permits one to monitor the popular calling and repeater channels whilst keeping one's hands firmly on the wheel. Up to 4 channels may be scanned continuously. As soon as a signal appears the receiver locks-on. However, a flip of a switch and the auto-scan reverts to manual control allowing manual selection of any one of the 4 autoscanned channels.

£209 inc. VAT and delivery (7 channels S0, S20, R3, R4, R5, R6, R7)
£219 (10 channels inc. S21, S22, S23)

ELECTRONICS

FAST
MAIL ORDER
SERVICE



TELEX 897406

FDK MULTI-2700 MkII

MULTI-2700—THE COMPLETE STATION

The FDK Multi-2700 is a front-line all-mode transceiver that incorporates every conceivable feature to ensure maximum enjoyment. In fact, apart from a mains plug and an aerial, there is little else we can sell the owner of a Multi-2700. All in all it is an unbeatable transceiver at an unbeatable price.

ALL MODES — ALL OCCASIONS

All modes are provided AM, FM, SSB and CW. For SSB operation VOX is included and for CW, fast break-ins provided with completely adjustable side tone. The 2700 can be used at home with its internal 240v. AC PSU or taken out to the local high spot and run from 12v. DC. This really has to be the QSO machine that you will never tire of.

BEAUTIFUL TO OPERATE — BEAUTIFUL TO HEAR

The transmitted audio quality of the 2700 is second to none. Its crisp, clear quality reflects the manufacturers knowledge that a clean signal sells more products! The Optimised 16.9 MHz 8 pole crystal filter gives clean SSB signals and good selectivity. On FM, direct modulation of the VCO gives smooth but penetrating audio. Typical power output is 16 watts but the flip of a switch and you have 1 watt on all modes. (An internal adjustment permits the power to be adjusted from approx 1 watt to 6 watts for driving linears or transverters.) The Multi-2700 has a built-in receiver RF pre-amp—no problems here with a deaf receiver.

DUAL VFO CONTROL

Until you have handled the Multi-2700 you cannot appreciate the advantages of dual vfo control. The conventional analogue VFO with its dual speed silky smooth feel, permits accurate tuning on all modes with 1 kHz readout. It also covers a complete 1 MHz segment at a time, resulting in minimum band switching. The flip of a switch and you have full synthesized control of your transceiver. The bright LED display allows the transceiver to be immediately set to any 2 metre channel. A VXO control ensures the synthesiser can be used equally well on SSB,



CW or FM. The versatility of dual vfo control is quite amazing. For example:—use the analogue vfo at the SSB end of the band and the synthesiser on the FM channels; set the synthesiser to the 'sked' frequency and continue normal operation on the analogue VFO; set analogue VFO to DX frequency whilst continuing normal tuning of the adjacent frequencies on the analogue VFO—the combinations are endless. Repeater shifts are completely taken care of. The Multi-2700 has \pm 600 kHz shifts and 1.6 MHz for 70 cms. operation.

ITS VERSATILITY IS ENDLESS

Inter-continental contacts are possible via OSCAR. Press the OSCAR button on the front panel and you bring in the 28 MHz downlink receiver converter to enable true transceiver operation through the satellite. An audio SPEECH PROCESSOR can be switched in to permit extra punch. The amount of compression being adjustable to suit the operator. RIT operates on all modes and both vfo's. A NOISE BLANKER is included for really excellent suppression of ignition pulses. The receiver section covers 143 to 149 MHz (Tx covers 144-146 MHz \pm 1.6 MHz shift). Apart from the two existing repeater offsets one further shift may be programmed. AGC control is continuously variable, as is the VOX DELAY and ANT-VOX etc. All pre-set controls are easily reached through the top hatch of the transceiver. Separate centre zero and rx S-meters are provided. We could go on but if you have read this far perhaps it is time you sent off for the 4-page brochure giving full details of this beautiful transceiver at a really competitive price.

£489 inc. VAT and SECURICOR DELIVERY.

WE ALSO STOCK—YAESU, BELCOM, MICROWAVE MODULES, S.E.M., JAYBEAM, HYGAIN, STOLLE, CDE, MINI-PRODUCTS, SAGANT, BANTEX, ASP, POLAR, MOSLEY, G-WHIPS, SEIWA, KEN, etc. STOP PRESS—NEW JAYBEAM KR400 ROTATORS, SUPPORTS $\frac{1}{2}$ TON, COSTS £95 S.A.E.

FDK 70 cms FM! MULTI U—II OF COURSE



COMPARE ITS FEATURES: £294 inc. VAT & delivery

- ★ AUTOSCAN
- ★ 10 CHANNELS FITTED
- ★ RECEIVER IRT (ESSENTIAL!)
- ★ AUTOMATIC TONE-BURST
- ★ 27 CHANNEL CAPABILITY
- ★ MIC, BRACKETS, CABLES, Etc., inc.

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NAIGAI 2200 LINEAR



230v. AC—500W. PEP input (400W. FM—CW)
TUBE—4CX-350 (Fan cooled)
RECEIVER PRE-AMP—10dB
12v. DC OUTPUT—3 amps
DRIVE REQUIRED—10-13 Watts
FREQUENCY—144-146 MHz
SWR METER—Built-in.

PRICE: £399 inc. VAT and SECURICOR
AVAILABLE NOVEMBER

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ADD TO THIS THE OFT' PRAISED SERVICE OF THANET WITH OUR WELL QUALIFIED TECHNICAL STAFF AND RANGE OF TEST EQUIPMENT AND YOU NEED HAVE NO WORRIES IN BUYING

ICOM FROM **THANET**



FOR MOBILES;

IC-240 The well tried and highly popular FM synthesised rig. If you know a friend with one you will know we have every right to boast about the excellent quality of the signal it puts out. (Perhaps that is why we have sold so many!) Now available with Super-Scan as an extra. By the way this is the same size as the SSB unit on the IC-245E.

£198

IC-245E The leader in multi-mode mobiles. Fully synthesised to give full band coverage in 100Hz or 5 kHz steps. LED readout of frequency to the nearest kHz. FM, USB, CW, Normal or Reverse Repeat or split frequency working with any spacing, automatic tone burst etc. An excellent bit of engineering which can also serve as a base station.

£396

FOR PORTABLES with a decent power output and large battery capacity;

IC-202 The 3W SSB portable which is tunable over all the sideband patch and can be used, when fitted with extra crystals, to cover 144-145 and 145-8 to 146 MHz. Used by many as a prime mover for something bigger because of its excellent clean signal. By far the most popular VHF SSB only set on the market. There are a lot about!

£172

IC-215E The big boy in FM portables, with Rx sensitivity and transmission quality every bit as good as a base station (and better than many!). A healthy 3W of FM and sensible batteries with four times the capacity of those used in most other portables—so that they don't run flat on you in the middle of a QSO quite as often. Despite this and its rugged construction it is still easy to carry around. Lots of these about also!

£162

FOR BASE STATIONS;

IC-211E The leader of them all. Fully synthesised VFO with 7 digit LED readout to the nearest 100 Hz. FM, CW, LSB, USB. There's nothing quite like it. Most would make this their choice if it wasn't for the problem that you have to pay more for the best! (With these days of inflation it isn't silly to think about HP.) See October's ad. for more details.

£529

ALL PRICES INCLUDE VAT, AND DELIVERY IS FREE ON MAIL ORDERS FOR TRANSCEIVERS WHY NOT POP A NOTE ON THE ANSAFONE FOR A PRETTY COLOURED BROCHURE AND DETAILS?

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SCOTLAND—Ian GM8DOX (07868 3223) WALES—Tony GW3FKO (0222 702982) NORTH WEST—Gordon G3LEQ (Knutsford (0565) 4040)
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HERNE BAY
(02273 63859)



** A NEW 240?? AND STILL £198 inc. VAT

The IC-240 from Thanet has had a bit of a face change. Gone is the tone button, which doesn't do anything anyway, and in its place is a crafty little switch which gives simplex in the centre position, normal duplex at DUP A and reverse repeat (on Rx AND Tx) at duplex B. With the IC-240 it is the RECEIVER which is shifted when working Duplex and not the TRANSMITTER as with some other rigs we could mention. This means that you can listen on the input channel, or work reverse repeat, merely at the flick of a switch—you don't have to re-tune the channel knob as you would otherwise.

The function of the LH switch has also altered as it now gives high power in the up position and LOW in the down, the centre being OFF. This, together, with the facility of easy channel change, clear channel indication and sheer rugged construction still puts the IC-240 at the top of the list.

Now that we have sold several hundred 240's we can tell you that these little sets are extremely reliable. The number we have had back for repair under warranty is really very small and the initial teething problems have been ironed out long ago. By the way, should you be feeling a little upset that your nearly new IC-240 has been made out of date have no fear. Unlike a model change in cars, we can sell you a conversion kit for £3 to bring your set right up to date so that you can't tell the difference. Please don't all rush at once though as initial stocks of these are limited. There will be plenty available later.

Check off these points against that competitive rig :—

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Can it cover the whole 2m. band 144-146 ? ...	<input type="checkbox"/>	<input type="checkbox"/>
Is it easy to qsy from say R7 to S20 without too much knob winding ?	<input type="checkbox"/>	<input type="checkbox"/>
Is low power available ?	<input type="checkbox"/>	<input type="checkbox"/>
Can you add extra channels, in the order you want them, without having to buy crystals ?	<input type="checkbox"/>	<input type="checkbox"/>
Is the tone burst automatic ?	<input type="checkbox"/>	<input type="checkbox"/>
Is a scanner available ?	<input type="checkbox"/>	<input type="checkbox"/>
Is it relatively easy to add periferal bits and pieces ?	<input type="checkbox"/>	<input type="checkbox"/>

If the answer is YES to all these and its cheaper than an IC-240 it may well be worth buying.

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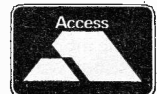
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SHORT WAVE MAGAZINE

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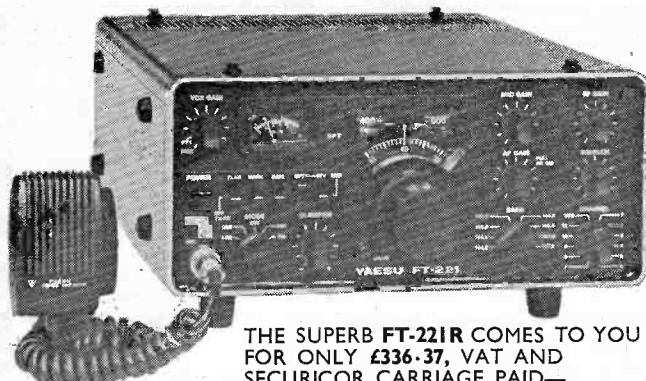
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The SHORT-WAVE Magazine

EDITORIAL

Interference

The sort that goes on, on GB3LO, divides three ways: 1. The chap who used to foul up Top Band transmissions; 2. Those who jam the repeater for idle entertainment; 3. Licensed amateurs jamming deliberately because they don't like the concept of repeaters. The practical result is an equal mixture of hot temper and hot air, with a bit of tyre-slashing thrown in for good measure. The problem, (if indeed there is a problem outside the mind) is one which can reasonably be resolved by letters to the Home Office, the RSGB, or one's MP depending on personal preferences and affiliations. These have been shown to produce results within the last few days over the Phase Two repeater hold-up, where a representation to an MP cleared a seven-month long-jam in almost hours. *That is something jamming or tyre-slashing could never have done.*

However, the Post Office and the Home Office also have a problem. The former have to catch their man *in flagrante delicto*—which is all but impossible with a transistorised bit of gear which doesn't get hot. The Home Office is required, in the case of licensed offenders, to act the part of The Law, their sentence being cancellation of the licence for a greater or lesser time. This, since it doesn't give room for a defence to be formally made, is contrary to Justice and a quite unfair responsibility on the Home Office. For the Post Office, their task should be made easier by imposing a simpler requirement of proof: for example bearings taken and plotted on at least two occasions onto the building in which the offender operates, together with recordings of the received signal, and the display of the offending piece of gear. Proof needs to be as simple as that for a speeding offence, the only other requirement being that it be shown the interference was beyond reasonable doubt deliberate.

This is not to be taken that the writer necessarily has any opinions one way or the other on the desirability of repeaters; but it can and must be taken as a request to "cool it" for the benefit of the vast majority of amateurs, and to take the arguments through the proper channels.

MCC—November 5 and 6, and the Rules were given in the last issue, p. 489. It only remains for us to add that it should be another good clean contest, and lots of fun for those clubs which compete. Good Luck, and may the best club win!

Edwards
 R3KFE.

VHF BANDS

NORMAN FITCH, G3FPK

VHFCC Award

JUST one reader has been awarded a VHF Century Club certificate this month. No. 288 for 2m. operation goes to Ian Gordon, G8IFT, from Rubery, Birmingham. Ian passed the R.A.E. in May, 1973 and he commenced operation on October 30 that year using a home built AM Tx. After much TVI he went over to FM. In 1975-6, he built an SSB rig using the *Plessey* SL-600 series of IC's. The present gear comprises an *Icom* IC-202 with a QV06-40A amplifier. The aerial is an 8-ele. Yagi used in the loft and outside at 20ft. Ian hopes to get this up higher some time and to build a 4CX250B type amplifier. He has been QRV on 70 cm. since 1975 and on 23 cm. since January, 1976. His QTH is 700ft. *a.s.l.* and he has used many local hills for contest work.

Beacons

A fairly constant request is for details of beacons. Brian Bower, G3COJ, has kindly provided the list of U.K. beacons from 4m. through 3 cm. shown in the table and says, "I believe this list to give the correct beacon situation." As will be seen, GB3DD on 1296.89 MHz is on again. The recently commissioned Lerwick beacon GB3LER on 144-965 MHz has been heard aurorally in at least five countries.

A new beacon in Austria is OE5XBL in GI77a on 144-920 MHz running 80-100 watts *e.r.p.* from an 8-ele. Yagi but confirmation is awaited concerning which direction it beams.

Contests

Results:—101 groups entered VHF NFD on the July 2/3 weekend. The combined Martlesham and Ipswich clubs turned the tables on last year's

U.K. BEACONS

Call	ORG MHz	QTH	ERP wt's	Keying
GB3SX	70-685	AL71d	16	F1
GB3SU	70-695	ZN61a	20	A1, F1
GB3NEE	144-130	ZO12a	30	F1
GB3GI	144-137	XO41j	40	F1
GB3VHF	144-150	AL52j	40	F1
GB3CTC	144-915	XK64a	75	A1, F1
GB3LER	144-965	ZU65f	65	F1
GB3ANG	144-975	YQ35c	20	F1
GB3SUT	432-89	ZM31b	60	F1
GB3EM	432-91	ZN32b	50	F1
GB3AND	1296-87	ZL63b	50	F1
GB3DD	1296-89	ZL08e	2	F1
GB3WRN	1296-91	YM28g	2	F1
GB3UOS	3456-0	ZN42c	4	F2
GB3IOW	10100-	ZK34a	0.8	F2
GB3LBH	10100-	AL31c	1.5	F2
GB2ALD	10120-	YJ30h	1	F2

winners, the March and District RAS, by beating them into second place. The Wulfrun Contest Group came third. The leading GI group was the All-Antrim-Amalgamated Contest Group; in GM, the Lothians Radio Society led the field, while the Isle of Man RS took the honours for GD. In the Channel Islands, the Guernsey Radio Society were top. Band leaders were, on 70 MHz, G13FFF/P, the All-Antrim folk; on 144 MHz, G4BPO/P, the Martlesham and Ipswich clubs; on 432 MHz, G8AGU/P, the Plymouth RC and on 1.3 GHz, G3DY/P, the March and District RAS.

In the 144 MHz QRP Contest on July 31, there were 16 entries in the Fixed section which was won by G3BDQ (Hastings) with 1998 points, followed by G8KUC (Canterbury) with 1086. The Portable section attracted 48 entries, the winner being GW3ERP/P with 1548 points, followed by GD4AFN/P with 1260.

The two part 70 MHz Open Contest on August 13 and 14 was won by GU3HFN in the Fixed section with 710 points from 58 contacts. G4AEQ (Manchester) was second with 626 points from 82 QSO's and G3NHE (Sheffield) came third, his 90 contacts being worth 610 points. In the Portable section, G3JYP/P was the winner with 1038 points from 91 contacts;

GM4DMZ/P scored 856 points from 66 QSO's and G3UVT/P was third with 810 points from 82 QSO's. All the above news from GB2RS.

Coming Events:—The 144 MHz CW event is on November 5/6 from 2000-0100 GMT. On November 20, The Grafton Radio Society is holding a 144 MHz all-mode contest from 2000-2300 GMT, scoring as in normal RSGB events. All entries to G8JGE (*QTHR*) by December 9. The club call is G2CJN.

Meteor Scatter

On August 11, Dave Price, GW4CQT in YL25d had an MS schedule with UW6MA in TH69c, the QRB being 3090 kms. Dave only got a few pings and bursts from the Russian but, in a subsequent letter, UW6MA reckons he got a *four minute* burst from Dave, so much so that he wonders if it really was all MS. According to G3POI, the Russian runs good gear, nevertheless, this is too long a distance for pure MS since a simple geometrical exercise shows the ionisation would have to be at about 190 kms. In this instance, it seems likely that Dave's signal enjoyed a bit of tropospheric bending before it "headed for the trail." Of course, if GW4CQT has all the necessary call sign and report information taped, this would undoubtedly be a new, European record. Even so, it is a remarkable distance to propagate a 2m. signal.

Ian White, G3SEK, and Clive Penna, G3POI, have worked out their MS procedure proposals to somewhat supersede the 1975 Warsaw Conference document *WA-79*. The next major shower will be the *Geminids* in December, of which more next month. Meantime, Chris Bartram, G4DGU, has suggested the following "do's and don't's" for newcomers to MS. First the "do's": Use standard procedure; get on frequency (plus/minus 200 Hz); get your timing right (plus/minus 1 second referred to GMT, all receive and transmit periods starting at zero second of any minute); try to speak clearly and listen first.

Second the "don't's": use 144-200 MHz for tropo. contacts; waste words; be an alligator (all mouth, no ears!); try to use speeded-up speech; use phonetics; call "CQ"

unless you have an adequate rig and know how to use it. (Something approaching the legal limit to a reasonable aerial—say 10-elements or more—and some previous experience of schedules SSB MS.)

These notes were compiled after the salutary experience of the *Perseids* when it was very obvious that some enthusiasts had a rather hazy idea of the way to attempt random MS contacts on SSB. The standard procedures for the time being are those set out in *WA 79* which was based upon Joe Ludlow's (GW3ZTH) definitive article in *Radio Communication* for February, 1975. If new to the game, it is recommended you talk to an experienced MS operator before trying MS.

G3POI reports that the Italian expedition to the Pantelleria Islands did take place, the calls used being IH9's LCK, JT, XIX and ZWV. The QTH locator was FW20a giving those lucky enough to work them Zone 33, counting as Africa.

Repeaters

The Home Office has now issued the licence for all the Phase 2 UHF repeaters and all groups should have received their paperwork by now. GB3SV at Bishops Stortford, Herts., was due on RBØ on October 13 and GB3MS, the Mid-Severn one on the same channel, the following day. 'MS is co-sited with GB3MH.

The Satellite Scene

No firm news about the Russian *OSKARS*. UB5WN intimated that the first launch might be at the end of October or the beginning of November. AMSAT-USA is to put up a small, fully manned building at the Goddard Space Center, which sounds very ambitious and expensive. *A-O-D* is now complete and ready to fly but confirmation of launch date is awaited following recent *Delta* rocket failures.

Oscar 7 has been rather erratic of late and has slipped into a slightly lower orbit for some unaccountable reason. It is now in a period of maximum sunlight and getting rather hot and *Nicad* batteries do not like that. It's on-board, 24 hour clock seems to go haywire at times. For example on Orbit No. 13082 on Sept. 24 when it should have been on Mode "A" it was on Mode "B"

instead. At 2227 GMT, the telemetry indicated it thought the time was 0232 GMT the next day, and four minutes later, the TLM decoded it as 0302 GMT!

New stations on 0-7 on CW, Mode "A" include SV1DO, UBØMSK and 4X4IX, all around 29-465-29-470 MHz downlink. 5T5CJ is a strong signal on 29-440 MHz but 5T5CW is rather weak on 29-490 MHz CW running about 5 watts. VP91B is reported QRV on both modes and W5AT is going to PJ2 some time soon.

Ken Willis, G8VR/W1, operates from Southbury, Connecticut, and says that Oscar operation "... is a bit of a scramble ..." over there. He uses a 5-ele. Yagi in the living room and the 10m. dipole is strung around the picture rail. European signals tend to be rather weak but he hopes to be on Mode "B" soon as) the 2m. signals are very strong. Ken says that tropo. conditions over there are very different from what he was used to over here. They have received European 52 MHz TV signals over there this year.

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G8FUF	1	79	199	279
G3POI	—	—	203	203
G3JXN	26	63	82	171
GM4CXP	—	25	122	147
G3CHN	—	—	143	143
G8GML	8	46	85	139
G3FPK	—	—	139	139
G3COJ	16	52	68	136
G4BWG	—	25	110	135
G3OHC	4	30	98	132
G3XCS	—	21	110	131
9H1CD	—	6	120	126
G8HVY	—	33	93	126
G4BAH	—	32	92	124
G8LEF	4	37	79	120
G2AXI	1	43	71	115
G8BKR	1	17	92	110
G4FCD	—	22	88	110
G8HHI	—	24	81	105
G4DKX	5	30	68	103
GD2HDZ	10	32	58	100
9H1BT	—	—	94	94
G8IWA	—	17	74	91

G4DEZ	—	—	91	91
G8AAZ	—	22	66	88
G3FIJ	—	25	62	87
G8GHI	—	22	63	85
G6UW	—	—	85	85
9H1C	—	—	83	83
G8EOP	8	36	38	82
G4AEZ	2	22	57	81
G4AWU	—	—	80	80
G4FBK	—	5	72	77
G8JHX	—	—	74	74
G8JJR	—	—	74	74
G4ERX	1	17	53	71
G8IFT	7	18	45	70
G4GET	—	—	69	69
G3BW	—	21	47	68
GD3YEO	—	8	59	67
G8KUC	—	7	60	67
G8KLN	—	1	62	63
G4CIK	—	—	62	62
G8LHT	—	1	60	61
G3KPU	—	—	60	60
G4GCQ	—	—	60	60
G8KSP	—	—	60	60
G8ITS	—	10	49	59
G8JEF	—	—	58	58
GW4FJK	—	—	57	57
G8KSS	—	—	54	54
OZ9IY	—	—	53	53
GM8NCM	—	1	40	41
G4EYL	—	—	41	41
G8LLG	—	1	38	39
G8JAH	—	1	35	36
G8JGK	—	—	34	34
G8JAJ	—	—	24	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's.

DX Notes

Paul O'Brien, EI4CM (Co. Galway) operated from UO and UN squares the weekend of Sept. 17/18. He was not heard in SE England but G8JHL (Manchester) managed a scratchy QSO at 0829 GMT on the 18th when Paul was in UO square. He has now returned to the U.S.A. but comes back periodically so more rare square operation is on the dards. Con Hunter, EI9V, reckons to be activating UL and

UM squares some time. G3POI reports that CT3AR in Funchal operates portable on 2m. and that CT3AB runs 120 watts of CW on the band. Consequently, as the QRB from central, southern England is about 2,400 kms., MS and E's Madeira to U.K. contacts should be possible.

GM3YOR is contemplating extensive operation next year from OY and/or TF including 2m. and 70 cm. and initially is seeking guidance on licensing and the more practical aspects of such a trip.

Anjou

Sunday, Sept. 18 saw the launch of the 9th *Anjou* balloon from the airfield at Angers-Avrille (ZH48h). It was launched at 7.00 a.m. and was not heard after 9.15. The input frequencies were 432.35-432.65 MHz, the output of the translator being 145.45-145.75 MHz. The only correspondent to report on it was David Butler, G4ASR/A, (XJ05h) who worked 14 F's and 1 G station, the G being G4DML in Southend, Essex. Dave's best DX was F1BKM/P in BC square. At G3FPK, some strong signals were heard though quite why our French friends chose that part of the 2m. band full of FM and repeaters is puzzling. Bernard Stroh, F6EYK, asks that all reports be sent to Jean-Louis Barreau, 82 Bd A. Camus, F-49000, Angers, France.

The UHF Contest

Pretty unanimous agreement that the conditions for the UHF Contest on Oct. 1/2 were lousy! Angus McKenzie, G3OSS (London) told your scribe that GB3SUT on 70 cm. was S1 with his 88-ele. *Multibeam* fed with super low loss coax. He reckons conditions were as bad as he can remember. Angus describes 23 cm. conditions as "diabolical" but with lots of stations operating, of which he worked 16, mostly on CW. At the end of the contest, he recalls hearing GW3UBX/P giving serial No. 005!

GW3UBX/P was the only GW heard by Paul Davies, G8HBQ (Leeds), who worked 35 stations on 70 cm. No portables in the south and west were heard, nor any GM's. It was too windy for Paul to put up his 23 cm. aerial. Ray Elliott, G4ERX (Brentwood), did not work very far afield either but added five

new 1977 counties. George Zitterstein, G8ITS (City of London), found 70 cm. conditions "abyssmal" and made just 11 QSO's.

Seventy Centimetres

G4ERX found many S9 DL's on the 11th until the band went quiet at about 3.00 a.m. on the 12th. John Woodham, G8BKR (Bristol), missed out till about 1700 GMT on the 11th when a couple of F's in AK square were worked followed by a clutch of PA's for the first ever Dutchmen on the band. Some good ducting into Scandinavia on the 19th produced a QSO with SM6ESG (GR72h) for G8HBQ. This station also worked by G4JJ and G8FUW. This September opening very much favoured the northwest of England plus EI and GI.

GD2HDZ took advantage of the Sept. 19/20 lift to work three new squares in SM, viz; FR, FS and GR, for probably the first GD/SM QSO on 70 cm.? Strangely, Arthur did not hear any OZ stations in this period. Lawrence Woolf, GJ8AAZ, worked G8GON/P in Devon on Sept. 11 using two-way, 625 line TV. Lawrence uses a *Vidicon* camera with TTL/Diode ROM call-sign generator. This was a "first" G/GJ two-way TV QSO. For Derrick Dance, GM4CXP (Borders), the period Sept. 17-21 was productive of many SM, LA, OZ, GI, GM and GW stations using 6 watts output to a 46-ele. *Multibeam*. EA1CR (XD32d) is reported to have copied G8HVY's signals during the Sept. 10/11 opening but unfortunately, José was unable to transmit on 70 cm. GM8NCM (Fife) is now QRV on 70 cm.

Two Metres

The main events this month have been the fine opening to the south through east on the weekend Sept. 10/11 and several *auroras*. G3XCS worked EA1CR at RS 59 each way on the 10th and also EA20Z who was mobile in Bilbao in YD square. On the 11th, Colin managed to get through the pile up to LX1DB (DJ32b) on SSB but could not crack LX1GX's pile up. F0DDH in Dept. 09, was overheard telling that his home call is 3A2EE.

G4ASR/A really "hada ball" in the tropo. opening, notching up 16

countries including EA, LX, HB9 and DJ1BP/P/HB0 in Liechtenstein, QRB being 1,110 kms, on Sept. 10. Dave worked 3 EA's, 2 LX's, 18 HB9's and 171 F's over the weekend and his total stations worked in 31 hours was 342! Two Italians called him but were too weak to work. Readers seeking the Scillies in WJ square on 2m. might find G4ASR/P on 144.26 MHz SSB on Nov. 11-13 as Dave hopes to be QRV from there. If so, he will participate in the CW contest with 150 watts of CW to 2 x 6-ele. Quads. G3AUS was another west country operator to work all over France from HB to EA during the Sept. 10/11 lift.

G8BKR missed out on the EA's and though the QRM around LX1DB more reminiscent of 20m. John did work F6FBB/P in AC07c, however. Steve Lowe, G8FEO (Reading), wasted a couple of hours calling F1CYO/P in AE21g on the 10th and gave up when he found that Joël was running 800 watts to a 32-ele. array. On the 11th, Steve was QRV from 1500-0130 GMT working many F's and PA's, most of whom were S9-plus. Ken Osborne, G8KSS (Bristol), is still on AM but with SSB in the offing. He failed to raise HB9AMH/P in DH66c on Sept. 10 but on the 11th, he too managed F6FBB/P near the Andorra border, along with other F's in AF, AG, AM squares. The evening brought forth a few ON's and a PA. On the 14th, Ken heard a couple of F's in CH square. He remarks on the lack of SSB stations above 144.40 MHz but mentions a few operating in the CW section of the band.

C. J. Reed, G8MFP (Warks.), worked some F's, PA's and ON's with his *Trio* TR-7010 and 8-ele. Yagi at 40ft. and mentions 8 sun-spots on the limb of the Sun on Sept. 13. Martin Green, G8MKW (Warks.), took his *Liner-2* to GD for a week in September and enjoyed being on the receiving end of a pile up. He worked "... a host of GI's ..." EI4CM in Galway, GM8MJV/P near Peterhead and GW's and G's.

GM4CXP noted seven auroral events on Sept. 13th, 19th, 21st, 22nd, 23rd, 24th and 26th. On the 13th, GB3LER, proving to be a very reliable portender of auroral activity,

THREE BAND ANNUAL VHF TABLE

January to December 1977

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G2AXI	47	7	53	20	36	7	170
G3OHC	50	7	60	15	29	8	169
GD2HDZ	41	5	57	14	39	10	166
G8HBQ	—	—	70	14	54	10	148
G8GML	—	—	65	14	51	12	142
G3XCS	44	6	53	19	10	4	136
G4BYP	25	5	53	12	28	9	132
G4FCD	36	2	69	19	3	1	130
G8LEF	—	—	66	17	36	11	130
G4ECQ	44	4	65	15	—	—	128
G3FIJ	37	5	50	11	20	4	127
G8BKR	—	—	70	16	28	6	120
G8HHI	—	—	57	15	36	11	119
GM4CXP	18	2	55	21	14	8	118
G4DWZ	26	3	52	13	17	4	115
G8HQJ	—	—	58	17	28	10	113
G8IFT	—	—	61	13	31	5	110
G4AEZ	29	6	37	12	17	4	105
G3BW	—	—	49	12	30	7	98
G3FPK	—	—	74	22	—	—	96
G4CMV	—	—	69	15	7	2	93
G4ERX	—	—	50	13	23	6	92
G4FOR	—	—	62	16	7	2	87
G4DEZ	—	—	67	20	—	—	87
G4FBK	—	—	58	14	12	1	85
G4DKX	7	1	37	11	19	6	81
G8ITS	—	—	46	10	21	3	80
G8JHX	—	—	61	18	—	—	79
G8KSS	—	—	57	17	—	—	74
G8LHT	—	—	58	14	1	1	74
G8GII	—	—	31	5	28	6	70
G8JJR	—	—	55	12	—	—	67
G8MKW	—	—	51	12	—	—	63
G8JGK	—	—	46	12	—	—	58
G4GCQ	—	—	45	9	—	—	54
G4GET	—	—	40	7	—	—	47
G8IZY	—	—	38	7	—	—	45
G4FKI	—	—	21	5	4	1	31

was 53A from 1544-1835 GMT, QTF 020° but only 2 GM's worked. On the 19th, it peaked 5AA (040°) between 1638 and 1750 GMT and Derrick worked SM5FVH (IT25c) and LA3WU (CU47d). On the 21st,

'LER was auroral from about 2240 GMT and still so at 0030 when he went to bed, QTF again 040° this event producing QSO's with EI, G, GI, LA, SM4 and SM6 and OZ, the QTF's being 045-070° but

with DLØPR (EO54c) peaking 57A at 2255 at azimuth 350°. On the 22nd, some auroral SSB was heard at 1547 on an IC-202 plus whip aerial. Between 1611 and 1950 GMT, G, GM, EI, LA, PA and ON were worked at QTF's 050-080°. On the 23rd, Lerwick was 57A from 1551-1712 GMT with LA6HL (CS08c) and GM4BVD (Perth) worked. On the 24th, GB3LER was weakly Au for a few minutes around 1700 GMT. On the 26th, Lerwick was 55A from 1605-1730 and again from 2120-2310 GMT. LA4VHF (CU47c) on 144.89 MHz was heard a few times around 2150 at 41A, QTF being 045°. Only GM8NCM was worked in this event which was predicted by Ed Tilton, WIHDQ, during a talk at Alexandra Palace last May.

Alistair Simpson, GM8NCM (Fife), found September to have been an eventful month. He now has a lively, 200 watt linear for his FT-221R which he is taming! On Sept. 19, he worked OZ's and SM's via tropo. in EP, EQ, ER, FR, FS, GR and GS squares and on the 22nd, G8GXP, GM4EOU and GM8DMZ via the Aurora, all QTF 040°. At G3FPK, GB3LER was first copied on tropo. at RST 419 on Sept. 16 at 2243 GMT. An opening to the west produced EI4CM (VN51) on the 14th. On the 17th, the Edinburgh and District Radio Club operated from ZR42h and RS 58 reports were exchanged at 1802 with GM8MJV/P. Sept. 17 produced 3 GI's on SSB. Only the Auroras of Sept. 21 and 22 produced any contacts but the going was tough due to a persistent "burbler" around 144.04-144.06 MHz. Chris Bartram, G4DGU (Oxon.), managed LA5JS (DS70d) via the Sept. 21 Au, QTF 020° and SMØDJW (IS10d) at 1822 GMT on the 22nd, QTF 0°.

Deadlines

That's it for another month. All copy for December by Nov. 3 and for January by Dec. 8 to:—"VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

THE DATONG UC/1 UP-CONVERTER

A TEST REPORT

BBROADLY speaking, amateur radio equipment falls into two categories. Firstly there are the obvious items like transmitters, receivers, wavemeters and aerial tuning units and secondly the "Why didn't somebody think of this before?" type of accessory. The *Datong UC/1* Up-converter belongs in this latter category.

Prior to the introduction of Class-B licences, VHF/UHF operators invariably used a normal down-converter feeding into an HF band receiver. Nowadays this situation has been largely reversed in that many Class-B licensees own high performance, self-contained two-metre receivers or transceivers and later wish to listen on the LF/HF bands. An expensive solution is to buy a complete receiver covering these bands but a more cost effective and certainly space-saving alternative is to acquire an up-converter using the two-metre receiver as a tunable IF. The *Datong UC/1* is a unique accessory to achieve this.

The Circuit

When connected as shown in Fig. 2 the UC/1 will enable thirty, one megahertz bands up to 30 MHz to be tuned using a 144-145 MHz receiver as an IF strip.

The heart of the device is a frequency synthesiser with a basic crystal controlled reference frequency of 1 MHz. (In some models a 5 MHz crystal is used in which case the frequency is first divided by five.) A train of very narrow 1 MHz pulses is fed to a balanced sampling gate phase locking a voltage controlled oscillator to any multiple of 1 MHz between 115 and 144 MHz. Harmonic locking of the PLL allows the reference frequency for the PLL to be equal to the channel spacing without the need for high-speed dividers. The trade-offs are low spurious for reasonable cost.

The LF/HF signals are routed through a low pass filter and 0, 15, 30 dB switched attenuator to the pre-selector. The pre-selector is a five band, capacitor tuned stage covering nominally 90 kHz to 30 MHz using encapsulated inductors and very low noise J-FET's. The pre-selector output is actively impedance matched to the first mixer which is a balanced type using a dual J-FET type E431. The local oscillator frequency is any one of the thirty between 115 and 144 MHz selected by the "MHz" switches and it passes through a wideband buffer amplifier to the gates of the E431 mixer to give the 144-145 MHz IF output.

A conventional two-metre down-converter is incorporated in the UC/1 using two dual gate MOSFET's as

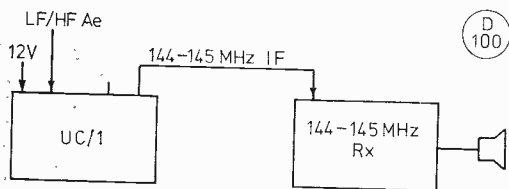


Fig. 2 CONNECTION TO 2m RECEIVER

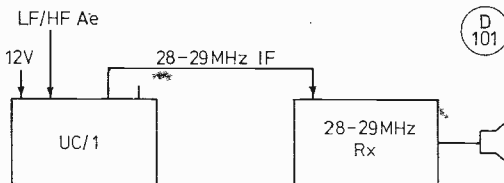


Fig. 3 CONNECTION TO 10m RECEIVER

145 MHz amplifier and mixer with the second local oscillator signal being derived from a 116 MHz overtone crystal, voltage stabilised. This gives an alternative IF output of 28-30 MHz.

Installation

The UC/1 requires a DC voltage between 9 and 15 at no more than 150 mA. The power socket is a standard three-pin DIN type and a matching plug is provided. The three input/output sockets are SO-239 VHF types. For use with a two-metre receiver, the UC/1 is connected as shown in Fig. 2. If a receiver tuning 28-29 MHz is employed, the built-in two-metre down-converter is used and the inter-connexions are as in Fig. 3. In this case, an attenuator is automatically switched in front of the 144/28 MHz converter to prevent overloading the second mixer.

For straight use as a two-metre down-converter with a tunable 28-30 MHz IF the same inter-connexions as Fig. 3 are used except that the two-metre aerial is plugged into the 144-146 MHz input/output socket as shown in Fig. 4.

Operation

Two-metre reception at the reviewer's station is achieved with a *Solid State Module's* 2/10m. down-converter feeding into a *Hallicrafter's* SX-146 receiver. The UC/1 was used in both Fig. 2 and Fig. 3 modes, thus utilising either the SSM or UC/1 down-converter respectively.

Setting up any frequency up to 30 MHz is quite simple. To take as an example setting up on a frequency of 17.319 MHz, the "MHz" selector switches would be set to "1" and "7" and the preselector switch to the "9-7-30 MHz" band. The main receiver dial would be set to 144.319 or 28.319 MHz, depending on which IF was used. Lastly the signal would be peaked up by the "RF Tune" control on the UC/1. Note that the "MHz" switches would actually select the phase locked 127th harmonic of the 1 MHz crystal as the local oscillator frequency which, mixed with the incoming signal on 17.319 MHz would give the IF of 144.319 MHz.

Using a few feet of wire around the picture rail as an aerial, everything from MSF on 60 kHz to 27 MHz Citizens' Band from Italy and the *Oscar 7* downlink on 29.4-29.5 MHz was heard. Naturally, the facilities of the SX-146 were all available such as various modes, variable bandwidth, calibrator, noise limiter, gain controls, etc.

About ten years ago, one dealer advertised a particularly mediocre receiver as having, "twice the number of stations above 15 MHz!" That was another way of warning that the thing had a diabolical image response. The first IF of the UC/1 is 144-145 MHz so, for coverage

from near "DC" to 30 MHz, the image signals would be between 289 and 259 MHz. Obviously there are *no* images.

The switched attenuator ahead of the preselector is an essential refinement. With no attenuation some cross modulation and overloading was noticed on certain frequency bands where the received signal strengths were very high. However, switching in 15 dB of attenuation always eliminated these problems.

The harmonics of the 1 MHz crystal were all detectable without an aerial connected but were overlooked when any aerial was used. For those who need the highest accuracy, those at 5, 10 and 15 MHz could be used to beat against MSF or WWV to ensure that the synthesiser crystal is really "spot on." A trimmer associated with the crystal and accessible through a hole in the larger diecast box in the photograph would allow this to be achieved using the attenuator to match the amplitude of the received signal to that of the harmonic.

The gain of the 145 MHz down-converter was about 15 dB less than that of the SSM device, but then gain is not necessarily too important. The circuit produced no objectionable cross modulation effects nor did it suffer any overloading from very strong signals during a recent

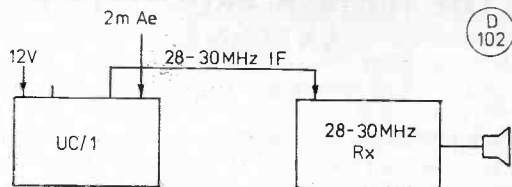


Fig. 4 CONNECTION AS 2m CONVERTER

contest. Due to the use of a 116 MHz overtone crystal, no annoying spurious from non-amateur VHF transmissions were found.

Conclusions

The reviewer was very impressed with the UC/1. Without doubt it is another thoroughbred from the *Datong* stable; an ingenious design using "state-of-the-art" techniques. The workmanship and presentation is of the fine standard we have come to expect from this manufacturer. The writer is not aware of any comparable device on the market to enable a two-metre receiver to be used as a tunable IF for an LF/HF bands, continuous coverage receiving system.

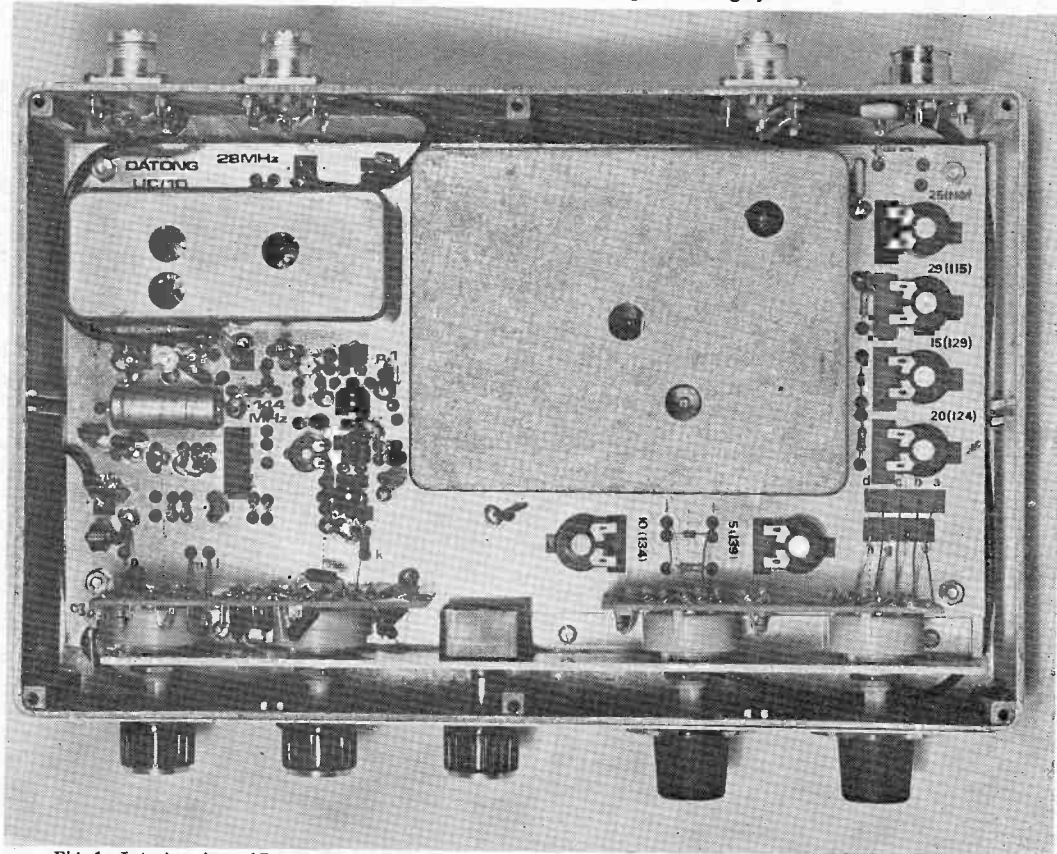


Fig. 1. Interior view of Datong UC/1 Up-Converter. From left to right, the two controls on the first PCB are the input attenuator and band selector. The middle knob is the preselector tuning and the two knobs on the right-hand PCB are the "units" and "tens" of MHz selectors. The sockets at the rear are the 2m. input/output, the 10m. output, the 0.09-30 MHz input and the power supply.

THE GM3RFR BROOMSTICK ANTENNA

S. POLSON, GM3RFR

THE following is a detail of investigations carried out over the past two years at GM3RFR QTH. The aim of the experiments was to discover if antennas, and particularly antennas for the 40m. and 80m. LF bands, could be grossly compressed in size and yet remain effective. First experiments were made with a 20 metre compressed antenna, the amount of work involved being much less than for 40 or 80 metre antennas: failure could occur and there was obviously no point in taking more time to reach the failure point.

Anyway, to the method of operation: A length of sturdy insulated wire approximately twice the length required for a quarter-wave antenna, e.g. 33 feet, was close-wound on to an ordinary broom-stick. The total winding length, dependent on the thickness of the wire, should be less than twelve inches. In other words the normal 16ft. 6in. ground plane is compressed to approximately 1/17 of its normal length.

The tuning procedure was as follows. A length of twin 50-ohm feeder was attached, one wire of the feeder to the antenna and the other to a radial of 16ft. 6in. in length; using a Tx and a SWR meter sufficient output from the Tx was injected into the antenna to give a reading on the meter. A check was made at each end of the 14 MHz band for the lowest SWR reading. A low but not too low reading at 14.00 MHz would suggest the antenna is too long and gradually a turn or two should be clipped off until a low reading is seen around 14.2 MHz. A lowish reading at 14.35 MHz would suggest that the antenna is too short and by adding a few turns the SWR can be brought to a satisfactorily low reading at the middle of the band.

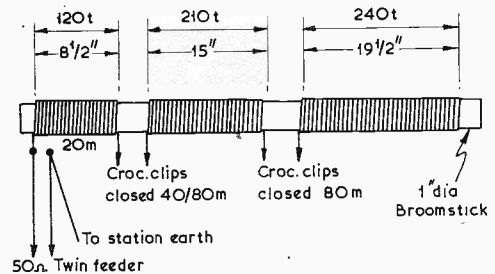
A further adaptation was to attach the antenna by a short length of wire, in place of the radial, to the station earth, thus permitting indoor usage. A slight adjustment to the number of turns again resulted in a satisfactory SWR. The final product was properly refurbished, coated by insulating tape and then tried out. The results have been surprising: all Europe responded easily to the indoor version and subsequently VE and W were worked, followed by LU and CX, with the antenna leaning against the wall inside the shack. By the way, the position of the antenna *does* matter as neighbouring walls have a detuning effect and indeed the best position in the 'RFR shack has been horizontal, six feet above ground between the top frame of the window and a handy cupboard.

Having been successful on 20 metres it was obvious that experiments should follow in the realms of 40 and 80 metres where compression would permit antennas on these bands to be put aloft in the form of ground planes. A start was made on the broom-stick which held the completed 20 metre model. Using the same procedure as before, and leaving a gap of about 2 inches between the 20 metre winding and the new winding, sufficient additional wire of a similar type was wound on for the combine to reach resonance on 40 metres; again after some cutting and trimming the antenna was ready for testing. It was tried outside with one radial during a

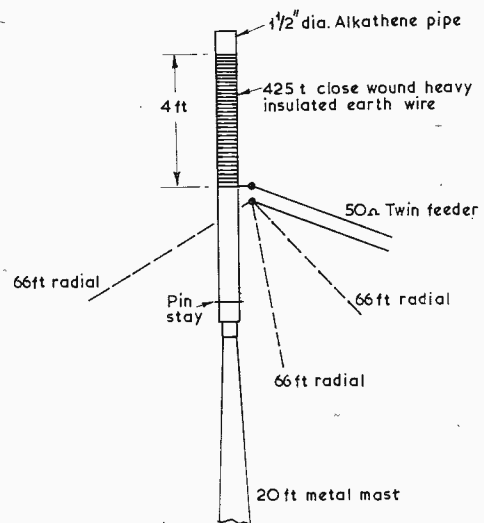
40 metre contest: all Europe was worked plus CT3 and UA9. Finally enough extra wire was wound on to make the system resonant on 80 metres. A useful tri-band indoor antenna was therefore created which resonated on all three bands with the earth wire attached. Crocodile clips were used to link up sections as required.

A friend subsequently suggested the use of a hollow *alkathene* 1½ in. water pipe as a base for one of these antennas and an 80 metre version using about 157 feet of insulated earth wire was made up as per recipe. Sixty-six feet were scaled down to 4 feet and the contraption mounted with 3 radials at 22 feet above ground in the vile hollow which contains the 'RFR antenna farm. Resonant point was 3.72 MHz, a bit too low for the SSB DX section of the band. On 5 watts p.e.p., OZ, OH, G, EI and GM have been worked: on QRO, contacts have been made with VE, 5Z4 and VS6.

It should be said of the broom-stick that it obviously cannot compare as a DX'er with its giant full-size relations, but as a pigmy it carries a useful punch and might be a handy avenue of experiment for those poor souls who, locked in modern concrete jungles and trammelled by the limitations of planning permission, have to keep their antennas in a cupboard.



(a) Indoor tri-band version



(b) Vertical 80m version

Fig. 1 GM3RFR BROOMSTICK AERIAL

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

ONE often wonders just how anyone can ever afford to have a hobby at all in this day and age, unless they have a working wife and an approach to economy that is almost fanatical so as to be able to afford even simple gear. Yet people are for ever changing their receivers, for instance, for ever-more-expensive boxes each time selling the previous one at a loss.

Apart from the economics of it, one wonders whether the approach is at all valid in terms of SWL. Certain it is that the writer had held his call for well over twenty years before he first aspired to a new bit of gear, then he bought a KW-2000B; and that one was replaced by a TS-520 only as a result of a legacy. Neither is any better on receive than the KW-77 receiver which "stands by"—though probably being used more in fact!—and the old 888, both of which belong to the *Magazine* rather than your old J.C. thanks to the original Editor, G6FO, who wished to make sure there was no excuse to be late with the copy by claiming the lateness was due to mending the old home-brew!

But, whatever you have in the shack, there is ever a need to keep it "up to scratch" and free from faults (particularly of the insidious "getting a bit older" type). One should have a Table of Voltages in the handbook somewhere which can be checked when the set is first bought, and marked-up with the figures found with *your* meter and *your* receiver; just about any fault will be reflected by changes in the readings, including the "old age" one. If you are unlucky enough to be landed by an intermittent fault then you have a problem indeed. The formal method is firstly to try and carry out any limiting of the field by comparing the symptoms against effects which would be expected from a fault in a particular stage. If nothing very obvious is noted, you have to recall that somewhere in the circuit you have a fault which will cause almost certainly a change either in the voltages noted or the currents drawn by each stage. Therefore, you can break the circuit into two halves and insert a current meter: you will then be metering half the circuit. Note the reading of the current meter while things are working properly, and when the fault appears. If there is a change, you are metering that part of the circuit in which the fault lies; and so you progress, slowly but surely to the offending stage and component.

However, from the insides of receivers, to what comes out of them.

The Mail

Initially, let us look at the new reporters. *I. McKay* (*Dingwall*) last reported in 'way back, and he wonders whether anyone still has copies of "SWL" from back in the 1965-1967 days available for disposal—he has "slung" his and wishes he had them back. Offers to lain at 5 Castle Gardens, Dingwall, Ross-shire.

L. Stockwell (*Grays*) uses an HA-600 receiver to a sixty-foot wire at twenty feet, which he feeds to the receiver through an ATU. Looking at the list we find Len has a claim to fame by way of the two "BY" stations

he mentions—whatever they were, they were not from BY, and if they were from BY they wouldn't be using BY anyway! Confusing, isn't it? But no amateurs from Red China about sums it up, and we guess they could be mishearings for PY's.

SWL has been the hobby of *A. Cuthbert* (*Jarrow*) for the past ten years, from the fourth floor of an 11-storey tower-block on which no aerials are permitted; aerials are the main interest, clearly, for one in such a situation and various attempts at a beam have been made but not all that successfully. It seems from the writers' experience that indoor beams are not all that clever at HF, and probably the best chance is to use an all-driven array rather than a parasitic or Yagi type. The initial Eddystone 2245A is still there, but has been put into second place; the prime receiver was a Drake 2C which eventually developed a fault which couldn't be dealt with, and now there is an Inoue IC-700R. To date some 170 countries have been put in the log.

"Caught it from the teacher" is *W. Pretty's* explanation for his addiction to SWL; teacher had an HRO and long-wire at school it seems. However there are now two SWL's in the *Diss* area, as *Wesley* seems to be on from home now with a CR-70A. This is a very simple receiver admittedly, but there is no reason why, properly used, it shouldn't work several wonders; after all, *John Fitzgerald* used a brace of transistor portables for years before he got round to a "proper" receiver, and indeed his HPX total at that time was around the 8-900 mark we seem to recall. We reckon that if you can knock your CR-70A into the All-Time list before you go to something more expensive, you will have learned about the skilful usage of simple gear, which is of inestimable benefit in getting the best from any receiver.

Another return to the fold is indicated by *D. Hill* (*Crawley*) who last reported in from Edinburgh some eight years ago before marriage, two shifts of home, and three junior ops, provided some variation in the activity! Now things have stabilised a bit, an FR-101 is run into dipoles on 14, 21, and 28 MHz; since August 1—six weeks to the time of his letter—some 339 entries have been logged. Many years ago, Dave passed the R.A.E., and now that his interest has been sparked off by *Oscar*, and he has got the knack of predicting the passes, he is seriously thinking of having a go at a G8 for just this last activity. A minor mystery was a station heard on the downlink giving no call sign but repeating a QRA locator of UI48e which would put him off the S. Coast of Ireland!

Dipoles for 28 and 21 MHz, plus an eighty footer for the rest, and all or any fed into an FRG-7 receiver is the formula for *K. Kniveton* (*Kingswinford*). As to where to send DX reports for the *Short Wave Magazine*—why not here? They always are of help in evaluating conditions, and if enough people are interested in a DX Corner we wouldn't mind putting one in.

The accuracy of the dial readings on a Trio 9R59DS is noted by *K. A. Burch* (*Plymouth*); this is normal on a

general-coverage receiver—dial accuracy of 2 per cent is as good as the normal signal generator, and to go up to a closer accuracy you have to calibrate against a crystal. For a general-coverage receiver one needs 1 MHz steps as well as the usual 100 kHz ones, and to be able to go down to 10 kHz steps is nice; they can all be obtained by an IC or two and a 1 MHz crystal, which in its turn can be checked against WWV. The use of a counter on a receiver is pretty-looking, but when one has taken into consideration that the counter has to monitor every oscillator in the receiver and mix them in the correct manner in order to look at the final receiver frequency, that there will be an error of \pm one count on each, and that the counter itself can only be as accurate as its internal crystal oscillator the achieved accuracy is not much, if any, better than using a calibrator and a good set of ears. Half the world at least seems to have bound itself to the idea that if you display something digitally you have made it not just more, but absolutely, accurate which is, frankly, the acme of foolishness. Both digital and analogue displays have their good and bad features, which determine which is right for a particular application.

In answer to the inquiry last time round by L. Stockwell, *K. Rogers (Lutterworth)* comments on his NR-56 in use in the car; he uses it /M as much as at home, the car aerial being a 5/8 wave whip; and, praise be, his Ford Escort doesn't generate any noise! Having answered one, Ken asks one in return—how the blazes does one rid oneself of TV line-timebase QRM? A Good Question, to which the only answer is probably for every amateur and SWL in the country (including all the BC listeners!) to write to his MP and ask precisely what his party is going to do about it, and other forms of similar QRM. If a dozen letters of this sort landed on the mat of every MP in the country one morning, each demanding a reply, and each with a copy for the personal attention of the Minister of the Environment, one would think that "things" would happen! And, we could add, we suspect that the average TV service-man would be shown up as the bodger he is, saving the few—and honourable—exceptions. For the meantime, there is a little one can do. For a start, check whether it is mains-borne or coming in via the aerial; if the former, a filter on the mains will help, in the latter case fitting a balun to any coax-fed aerial such as a dipole should help the screen to do its job; and any of the varieties of skywire which need an earth connection are out. If that fails, turn off the power station and run off your own generator!

G3KFE is taken to task for giving bad gen in the September issue; ISWL's Bureau doesn't need an *s.a.e.* for the incoming cards to be put in—which is one of the major benefits of ISWL membership. Actually, old 'KFE is getting a mite absent-minded in his dotage, as he should have known the right answer! *John Fitzgerald (Gt. Missenden)* is now fully kitted-out for reception on all bands between 1.8 and 432 MHz, the four-metre band being covered by a converter and a dipole as from the August contest, in which some 3 countries and 28 counties were heard. The winter time to come is for another(!) serious attack on the Morse, both to lift the present 150 prefixes heard to an "enterable" score and, in the long term, to permit John the luxury of a call sign, having passed the R.A.E. years ago.

Oddly enough, *M. C. P. Bennett (Datchet)* effectively is taking your conductor to task for the same evil of forgetfulness—of course those odd calls mentioned last time by *K. Linge* were surely MARS stations and so not acceptable. On a different tack, 4079WARC and YTØIARU are both genuine calls, emanating from Yugoslavia.

J. Ollis (Solihull) also mentions these two, and also comments on the noticeable and steady improvement of the bands; true enough, but the sad part about it is that the general shape of the sunspot curve is a sawtooth with a fast rise-time and slow decay; and the last one was quite an exceptionally long time a-dying, as even now the odd spot is being noted from the old cycle. John has not neglected the constructional side of things, having fitted a Toko mechanical filter to the receiver and made the result work nicely, not to mention building an HF band converter which seems to be OK on Twenty although misbehaving a mite on Fifteen and Ten; a few ferrite beads here and these will doubtless calm it down.

"What is a MARS station?" asks *K. Linge (Willington)*. It is a unique animal, operated by an amateur but not part of the Amateur Service as defined in the international sense. These stations tend to appear wherever "GI's" are, operating phone-patch traffic back to the States, or handling third-party messages in the same way. Unlike an ordinary American "handling traffic" the MARS station is set up especially for handling traffic, and if the operator comes up to work the world, he will be using a different call sign.

The very next letter is from *G. Brazil (Dublin)* who has a great beef about the MARS stations—and other Americans—handling phone-patch traffic. MARS stations are outside our bands (just) and so of no interest, but the normal "traffic" activity is amateur-to-amateur and so in our bands and a darned nuisance. We couldn't agree more, but the *W's* got that privilege years ago, almost before they knew their signals could girdle the earth, because the telephone service there is not a monopoly—and there is no doubt that the public-relations of an amateur with his neighbour are improved by the ability to pass on an urgent message. Also the countries to which traffic may be passed are clearly defined in their licence. All of this, of course refers to non-emergency traffic: when the chips are down in earnest, whatever the country and whatever the rules, amateurs will do all they can to help. Old-timers will never forget the epic of the *Flying Enterprise* and her radio-amateur

ANNUAL HPX LADDER

Starting date, January 1, 1977

SWL	PREFIXES	SWL	PREFIXES
D. W. Waddell (Herne Bay)	499	K. M. Rogers (Lutterworth)	371
S. Hammond (Solihull)	499	A. R. Darby (London SE16)	341
R. E. Thomas (Corwen)	449	G. M. Parker (Peaslake)	331
Dr. H. Squance		K. Kniveton (Kingswinford)	309
(Bangor, Co. Down)	445	J. W. Grice (Castleford)	304
P. Ramsey (Steventon)	431	M. Turner (Luton)	282
P. Sharpe (London W2)	426	Mrs. S. Waterfall	
M. Shaw (Huddersfield)	419	(Chasewater)	277
K. Linge (Willington)	415	S. W. Allsopp (Banbury)	270
K. A. Burch (Plymouth)	403	B. Shepherd (Staines)	263
D. Hill (Crawley)	399	G. Brazil (Dublin)	237
G. A. Passmore (Pembroke)	393	L. Stockwell (Grays)	236
K. Piper (Bognor Regis)	386	P. Q. Armitage (Amersham)	203

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

master, Kurt Carlsen, or the East Coast floods—bad enough for us, but a major disaster for the Dutch with so much of their country below sea level. It was in fact the aftermath of the latter which resulted in the formation of RAEN, and the facility in the G licence to handle traffic for the authorities in such a disaster. However, back to Gerard and his queries: *IJ* and *IK* are off-shore islands belonging to Italy and as such not of any great rarity-value save to a prefix-hunter, while the *J28* call prefix has been allocated to the Republic of Djibouti when that area gained independence.

On a different theme, *M. J. Thomson (Dundee)* comments on the usefulness of a BC221 as a front-end injected BFO for use with any old transistor portable. True enough, and it has the further advantage that it can, by adjusting the spacing between the BC221 and the receiver, be made to provide injection of just the right quantity as well as quality.

Returning to that question in July about *W6* in the far off pre-1939 days, *W6OJW* points out that in those days *W6* covered California, Utah, Nevada, and Arizona. Alaska, now *KL7* was then *K7*, while the now *KH6* was then known as *K6*. Thanks, Bill!

Once again, *Bert Glass (Plymouth)* is threatening to give up, as he is finding it a bit hard to winkle out new ones on CW, and also Bert is of the opinion that his "pet" 21 MHz band has been under the weather of late; one might, just might, argue that proposition!

S. W. Allsopp (Banbury) has been a bit pushed for time lately, but has used some to go through his copy of Geoff Watts' Prefix List and marvel at the value thereof for a keen SWL or for that matter transmitter. We would agree and, what is more, it is quite amazing just how easy it is to keep up to date given that you keep your back-numbers of *DXNS*. The writer was spurred into correcting his own copy from April-last to date, in a matter of five minutes, by working backwards until he picked up corrections already noted.

K. Piper (Bognor Regis) often has a session before he goes to work in the morning, hunting the *VK*'s—unless he forgets to get up! The latter is your scribe's besetting sin also, come to think of it!

Another newcomer—we missed him in the sorting as his handwriting is a perfect double of the familiar fist of *A. Nielson*! *R. Towlson (Nottingham)* has entered a claim for the "1977" in parallel with an All-Time one, as he was unsure as to whether he needed to appear in the "1977"; so we are showing him straight in the All-Time in accordance with our established practice. Ray uses a FRG-7, and would like to hear from Joystick users—his address is 35 Brushfield Street, Hyson Green, Nottingham NG7 5LL.

Dr. H. Squance (Bangor, Co. Down) is in the process of moving into a garden shack, the *XYL* having dropped a few broad hints about the landing "shack" being rather cluttered; so his list is a bit small this time. The next moves in the game will be to pass the R.A.E. and apply for a *G18* call.

S. M. Phillips (Dunkinfield) is, he says, at last taking positive steps towards R.A.E., with a view to taking it before 1980—and Morse is also in hand with the same idea in mind.

On to *K. A. Whiteley (Castleford)* who heard LA4AR/MM and believed the station was a *YL*, which startled

HPX LADDER

(All-Time Post War)

SWL	PHONE ONLY	PREFIXES	SWL	PREFIXES
K. Kyezor (Irechester)	1781	J. Aspinall (Leeds)	807	
S. Foster (Lincoln)	1643	D. Taylor (Harborne)	800	
R. Shilvock (Kingswinford)	1600	P. Rooney (Liverpool)	737	
R. Carter (Blackburn)	1510	R. Towlson (Nottingham)	685	
B. Hughes (Worcester)	1507	M. Gibson		
J. Fitzgerald		(Barrow-in-Furness)	666	
(Gt. Missenden)	1486	S. T. Bowen (Kippax)	641	
K. A. Whiteley (Castleford)	1380	I. Wilkinson		
M. J. Quintin		(Llandudno Junction)	636	
(Wotton-u-Edge)	1358	P. L. Shakespeare		
P. C. Jane (East Looe)	1352	(Foulness)	616	
A. W. Nielson (Glasgow)	1245	M. Law (Chesterfield)	602	
H. A. Londesborough		S. M. Phillips (Dunkinfield)	562	
(Swanland)	1188	J. G. Ollis (Solihull)	522	
E. W. Robinson				
(Bury St. Edmunds)	1185			
M. C. P. Bennett (Datchet)	1179			
J. H. Sparkes (Trowbridge)	1125			
G. Ridgway (Ardleigh)	1105			
Mrs. J. B. Jane (East Looe)	1081			
H. M. Graham (Harefield)	992			
P. Barker (Sunderland)	954			
M. Rodgers (Harwood)	911			
B. T. Mackness (Dagenham)	871			
W. H. Smyth (Hartlepool)	861			
S. Budd (Worthing)	848			
L. Gibson				
(Barrow-in-Furness)	828			

CW ONLY

N. A. Phelps (Devizes)	1341
A. Glass (Plymouth)	1323
H. A. Londesborough	
(Swanland)	1019
J. H. Rosling (Bakewell)	470
A. F. Roberts	
(Kidderminster)	465
P. L. Shakespeare	
(Foulness)	378

Minimum starting score 200 heard for CW, 500 for Phone. Listings in accordance with HPX Rules, and only include recent claims. A "Nil" return is permissible to hold a place.

him. In fact, *YL*'s as radio officers are about, and it's not that long ago that we published a photograph of a *YL R/O*.

Odd that straight after *K. Whiteley*'s letter, which mentions his visit to *Jim Grice*, should be the letter from *J. W. Grice* of *Castleford* next in the pile. *Jim* seems to be having a spot of tuning-drive trouble with his Trio 9R59DS; maddening, but not serious to repair. *Jim* says he would like some articles on the 9R59DS and their improvement—we'll print 'em if anyone will come up with something suitable.

A CW log from *J. H. Rosling (Bakewell)* seems to about round off the letters this time, save for those others who confined themselves to "just a list" with no comment. On this point, Mr. and Mrs. Jane of East Looe have two entries each, having just missed the boat on the July lot; but there seems to be a slight discrepancy in the arithmetic which says maybe they have done themselves out of the odd prefix or two—so for the moment we have taken their highest score claim as being right.

Other Points

It has always been a marvel to this old scribe just how "het up" and argumentative people will be over the Phone/CW thing; just today a friend was saying he would take the course for a Yachtmaster certificate but not the exam because it contained Morse at four w.p.m. The fact that so many beacons sign themselves in Morse, and that a "set" of them are all on the same frequency doesn't seem to raise in his mind any doubt as to whether he could copy any one of them with a list of the code dits and dahs in his hand—we hope the lifeboat crew can read his lamp SOS in Morse!

But seriously, one forever wonders at the postures adopted on both sides, and the wondrous way in which facts are banded about as subjects for argument and debate. Perhaps, here in "SWL", we can recite some of

the facts, and thus clear them out of the way of the arguable points which are largely matters of preference anyway. Fact Number One is that for a given path a CW Morse signal will convey information at the lowest power level; the reason lies in, firstly, the fact that the "modulation" is always 100 per cent, the carrier switching on and off, and secondly because with a modern receiver tailored to CW, there is a minimum noise bandwidth to take into account — noise of course in this sense being equally distributed across the pass-band of the receiver; thirdly, Morse CW signals are more tolerant of poor receiver-operation, as compared with, say, SSB although one has to admit that the human ear might protest a bit at the result. Fact Number Two is that, while SSB is far more able to cover long distance or QRM-filled paths than AM, with the best will in the world it needs a bigger signal to be laid down at the receiver simply because the intelligence is contained in varying amplitudes of signal and the fact that there is no "redundancy" while CW, having benefit of redundancy, can be copied by any reasonably capable pair of ears at a level such that the key-down signal is equal to the noise level, and even lower for a skilled operator. Fact Number Three is the "elitism" aspect; *any* person with an R.A.E. pass and a licence is part of an elite to the chap who just builds two-transistor amplifiers from one of the comics—this is why the latter is for ever bleating about "why can't I have a call without passing the R.A.E.?" Similarly, within the amateur field itself, we have elitism: at the bottom of the pile comes the G8 with his "B" licence, in the middle the "A" licensee, and at the top of the pile the /T chaps. Long may it continue so—the fewer people in populous countries like ours who have an "A" licence the better, so that the CW operator finds himself in a better situation with respect to QRM, with respect to "lid operators" and with respect to pirating of any sort. Once that is away, then all that is left is *personal preference!*

Second Wave

Since we were daft enough to set a Sunday deadline for you all, the mail was divided into those who assumed J.C. meant Saturday and those who opted for Monday—we've dealt with the first group, now we have the second wave!

First we have *H. M. Graham (Harefield)*, who collected a prize funny-man when he heard (on Eighty, where else!) "MUW" asking amateurs to clear off his frequency and calling QRZ with no replies audible. Probably some type of military or Cadet Force station. An oddity on 14MHz was 8P30H, no location given and no-one heard replying, but with a Scandinavian-sounding voice. Looking at the bands in general, Maurice found a few EU stations only on Ten, Fifteen like the curate's egg, and Twenty looking up. As for the LF's, Forty and Eighty weren't of much use in terms of DX heard, but a few more WAB areas were weeded out.

P. Rooney reports this time from *Littleton, Chester*; studies at Oxford were successfully completed and then there was an almost instant QSY to the College of Law in Chester, so that yet again there just has to be a nil return. Meantime, Philip wants to know how you measure a minus quantity like spare time!

S. Foster (Metheringham) finds less time to operate at night now, as the junior op. sleeps right through!

Stew encloses a note from G3XCS concerning various old suffixes which may be heard tacked on to the end of *W* calls. It seems that if a station upgrades, say, from Novice to General class, or General to Extra, he is given the rights of the new class immediately. To avoid him being noted by FCC monitoring stations, he tacks a two-letter code on the end of his call sign, for example W4DQD, operating in the General class parts of the bands after upgrading from Novice, would sign, on CW, "W4DQD/SV" or on Phone "W4DQD interim SV." Since the SV is a two-letter abbreviation of the location of the office where the deed was done, and since FCC have some 24 such offices, the possibilities of errors in prefix claims are obvious. Two at least of the offices have codes like amateur prefixes: SV for Savannah could be mistaken for SV Greece, and PA for Philadelphia could be taken as a PA Netherlands.

P. Q. Armitage (Amersham) was led to the path of ruin by his teacher, John Fitzgerald, who got him reading such things as radio magazines; the reading was followed up by a receiver, and then an aerial. Quentin wants to know whether there is a fully described 80-10 metre trap dipole in the literature which has a top 100-130 feet long. Well, the thing which in the U.K. is often called the "KW trap dipole," as it is commercially made by KW, is known in the States as the W3DZZ design, and all the details have been published. However with 130 feet to play with, there are all sorts of devices possible, such as for instance a quarter-wave against earth, or a "G5RV" aerial.

M. Shaw (Huddersfield) managed to "lose" three Prefixes in the course of making-up an index system, and so asked would we send his initial entries back to him for checking. This we have done—but we must make it clear from now on we will not be able to continue the practice, owing to the high cost of postage, and the time spent of necessity in scratching about in the archives—we like to do a bit of SWL-ing ourselves!

On now to *P. L. Shakespeare (Foulness)*, who has been tackling both the phone and the CW ends of the bands, with intermissions of—wait for it!—decorating and house repairing.

One of the best reasons for running a two-metre ladder we have ever heard comes from *R. E. Thomas (Gwyddelwern)*, who indicates that he could thereby obtain a suntan while sitting on the top of sundry Welsh mountains listening for DX!

A final-final is from *D. L. Mallet (Maidenhead)*, who points out that the USA MARS stations discussed earlier in fact operate out of our bands—for example the AE4WDF signal is on 14.40 MHz.

Finale

Which is where we come to the deadline date for next time—make it Friday, November 11, to give us a reasonable allowance for the inevitable delays in Christmas mails between ourselves and the printers, and also the long Christmas break. Meantime, enjoy yourselves—at the time of writing this N4XX predicts a solid week of High Normal conditions, and it looks as though things could be quite fun on the bands over the Christmas period. The mailing address, as always, is to "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

TIME-OUT WARNING CIRCUITS

A. B. PLANT, B.Sc., C.Eng., M.I.E.E., G3NXC

TO many operators using the VHF repeaters, the time-out blips are becoming a depressingly familiar feature of their contacts. In an attempt to avoid the problem, numerous amateurs have built themselves simple timers which give some form of indication when the 60-second allowable period has elapsed. The usual comments heard over the air about such devices relate to the lack of consistency of the timing period or to the fact that the circuits do not give any warning of impending time-out. In the following article, the author shows why the simple circuits can be very inaccurate and describes a more accurate system. A more complex circuit, which gives an indication of impending time-out, is also described.

Simple System

The 555 integrated circuit is often used for timers of this type, as shown in Fig. 1. Initiation of the timing period occurs when the +12 volt supply is switched on, the trigger pulse duration being determined by the time constant R1, C1. At switch on, the output of the 555 is driven high thus holding off VT1. When the time period is completed, the output goes low which turns VT1 on and activates the warning device. From the 555 data book, it can be found that the time period, t , is given by the expression: $t = 1.1 \times R2C2$. The data book also recommends that, for a 15-volt supply, the value of R2 should not exceed 20 megohms.

Using the above equation, values of 5M6 and 10 μ F give an answer near enough for all practical purposes. For the capacitor to be of reasonable size and price an electrolytic type is usually chosen and this is where the problems start. Electrolytic capacitors tend to suffer the twin disadvantages of high leakage and high temperature coefficient of capacitance.

Consider the circuit of Fig. 1 using a 10 μ F 25 volt electrolytic capacitor whose leakage current is defined as $I = V/15 + 0.6 \mu A$, where V is the voltage across the capacitor (this is realistic for an aluminium capacitor run up to 33 per cent of its rated voltage). The first sign of the problems to come would be that with R2 set to 5M6 the circuit would never time out. To get the circuit to give a 60-second period would require the value of R2 to be reduced to about 3M.

Having to adjust the value of R2 to yield the correct time is not too serious—as long as the constructor is aware of the need to reduce the value by such a large amount. More serious are the effects of the temperature coefficients of leakage current and capacitance. Some typical data show that raising the ambient temperature from 20°C. to 30°C. causes the leakage current to increase by 20 per cent and the capacitance to increase by 5 per cent.

Feeding the 30°C. figures into the appropriate equation shows that the time period would extend to about 86 seconds at the higher temperature. If the leakage current increases, by 30 per cent (and the temperature does not have to increase much beyond 30°C. for this to happen), the circuit would *never* time-out.

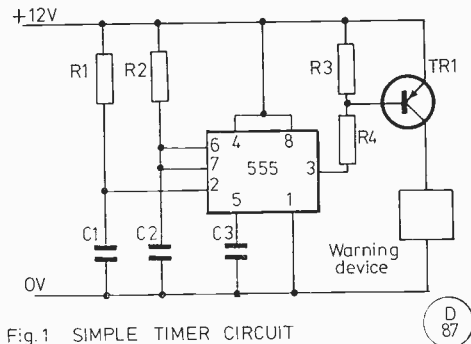


Fig.1 SIMPLE TIMER CIRCUIT

Stable Simple Circuit

Ferranti have introduced a new type of timer IC, the ZN1034E; although the operation appears similar to that of the 555, the way in which it achieves this is quite different. An RC circuit sets the frequency of oscillation of an astable circuit. The application of a trigger pulse causes one of the output pins, the "Q" output, to be set high and the oscillator to be connected to a 12-stage binary counter. After the counter has been clocked 4096 times, the "Q" output pin is set low and this state held until the next trigger pulse is received. Two output pins are provided, "Q" and "Q̄". The "Q" output operated in a similar way to the 555 output, i.e., it goes high for the duration of the time period, whilst the "Q̄" output is normally high and goes low for the duration of the period.

The prime advantage of the ZN1034E is that the action of the counter reduced the time constant required of the RC circuit. By the addition of an adjustable calibration resistor, the factor by which the RC time constant is effectively increased can be varied between 2736 and 7500. An internal pre-set calibration resistor is provided, if this is used the multiplication factor is 2736.

Fig. 2 shows a timer circuit suitable for the 60 second time out application; the circuit is triggered by the application of the supply voltage. At switch on, the "Q̄" output, pin 2, is low thus holding VT1 off. When the timer period expires, "Q̄" goes high which causes VT1 to conduct and operate the warning device. The R and C values are such that stable components of reasonable size may be used. Calibration can be carried out by monitoring the frequency on pin 13 and adjusting VR1 until this equals 68.25 Hz; alternatively, the timer

Table of Values

Fig. 2. Stable Timer Circuit

C1 = 0.1μF	R4 = 10K
R1 = 180K	VR1 = 100K
R2 = 820R	IC1 = ZN1034E
R3 = 2K2	TR1 = BC108

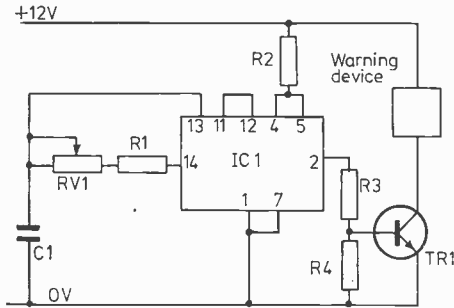


Fig. 2 STABLE TIMER CIRCUIT

(D 88)

can be run in its normal mode and VR1 adjusted until a 60 second period has been achieved. The second method is usually the easiest to carry out, but requires a plentiful supply of black coffee!

Timer with Pre-warning

Whilst the ZN1034E circuit can give the accuracy required for the repeater time out application, the action is still of the "sudden death" variety. The circuit of

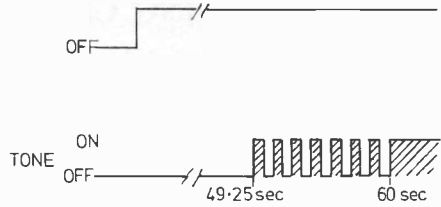


Fig. 4 DIAGRAMMATIC REPRESENTATION OF TIMER OPERATION.

(D 90)

Fig. 3 is more complex than those described previously but offers the advantage of a 10 second warning period prior to the 60 second time out signal. The heart of the circuit is a CMOS 14 stage binary counter and the basic operation is similar to that of the ZN1034E.

Inverter gates IC1A and IC1B form an astable multivibrator oscillating at about 170 Hz, the frequency being determined by R5, VR1 and C1; inverter IC1C is included to buffer the oscillator from the rest of the

Table of Values

Fig. 3. Pre Warning Timer

C1 = 22n	R10 = 3K9
C2 = 1μ 30v.	VR1 = 47K
C3 = 0.1μ disc	MR1 = 9.1 volt zener
C4 = 68n	MR2,
R1 = 220R	MR3 = 1N914
R2 = 27K	VT1 = BC179
R3,	VT2 = BC108
R6,	IC1 = CD4049
R7 = 82K	IC2 = CD4011
R4 = 330K	IC3 = CD4020
R5 = 100K	MBT = Mini Bleepone
R8 = 33K	(see text)
R9 = 6K8	

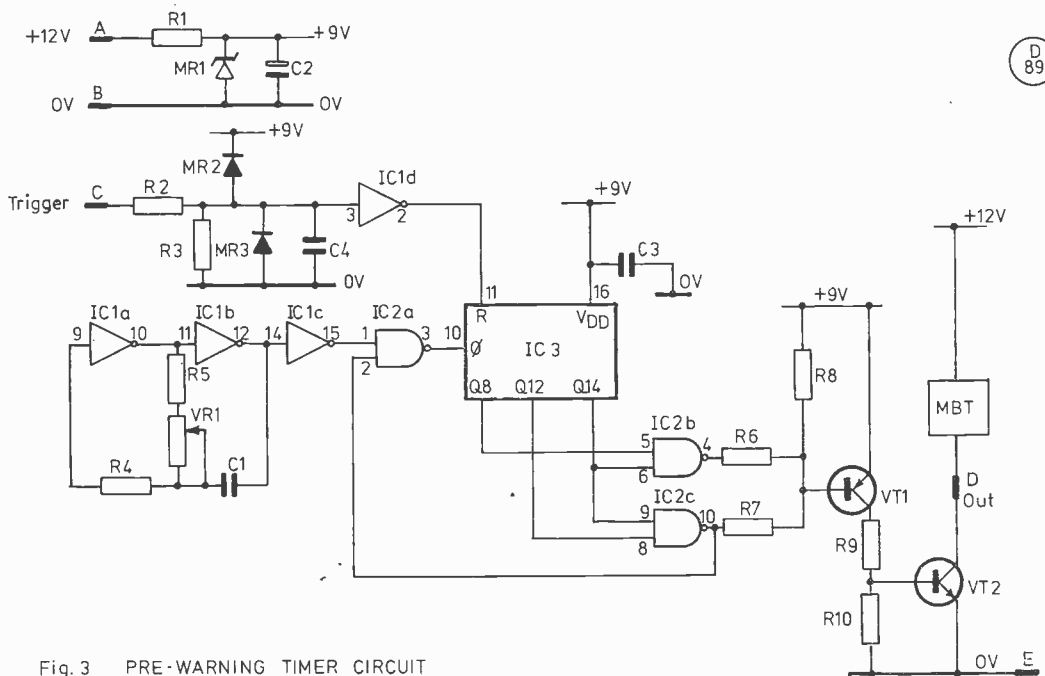


Fig. 3 PRE-WARNING TIMER CIRCUIT

(D 89)

Table of Values

Fig. 5. Simple Tone Generator

- R9 = 2K2
- R10, R11 = 82K
- C5 = 4n7

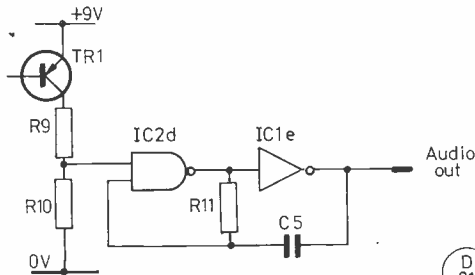


Fig. 5 SIMPLE TONE GENERATOR



circuit. With the trigger input held at low the counter, IC3, is held in the reset condition; in this condition, Q8, Q12 and Q14 are low which results in the outputs of IC2B and IC2C being high, hence holding off the warning device (MBT). When the trigger is taken high, the reset signal is removed from IC3 which then starts to count. After the appropriate time period, Q14 goes high which enables IC2B and IC2C; as Q14 goes high, Q12 goes low thus continuing to hold IC2C output high. IC2B, being enabled, lets through an inverted version of Q8 which causes the output device to be "bleeped" as the repetition rate of the Q8 output.

Eventually, the Q12 output goes high which causes the output of IC2C to go low and hold the warning device on. With the output of IC2C low, gate IC2A is

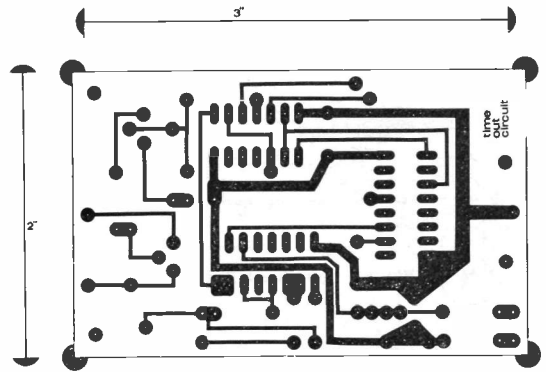


Fig. 6. Printed wiring board layout.

disabled thus preventing the clock pulses reaching IC3 and hence latching the circuit into this condition.

To the user, the effect of the circuit is that for 50 seconds after triggering it, the warning device is silent; it then gives seven beeps over a 10 second period after which the device comes on and stays on until the circuit is reset. Fig. 4 shows the operation in diagrammatic form.

It can be shown that the time from initiation to the start of the first bleep is $8320/f$ and to the start of the continuous tone is $10112/f$ seconds, where f is the frequency of the astable multivibrator; with the frequency set for an overall period of 60 seconds, the start of the first bleep occurs at about $49\frac{1}{2}$ seconds. The trigger input terminal may be connected to the +12 volt supply, in which case the circuit operation is initiated by switching the supply on. If the circuit is to be used in this way, it is important to keep the values of C2 and C4 to those

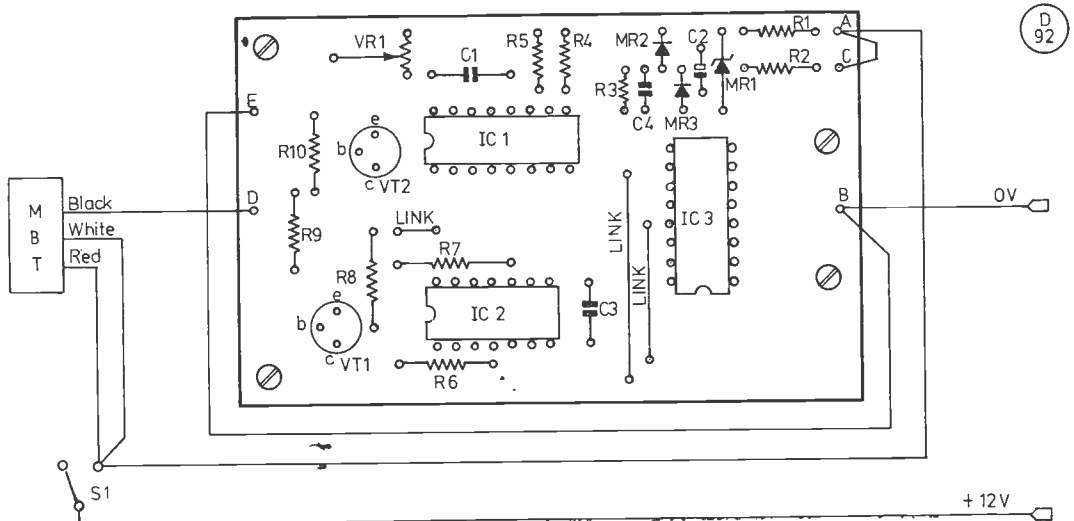


Fig. 7 ASSEMBLY



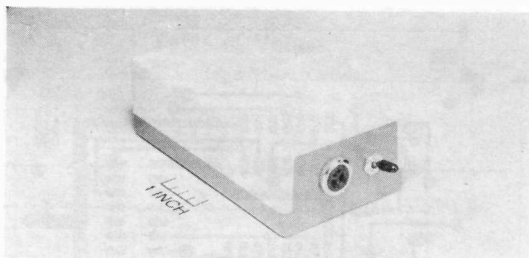


Fig. 8. Completed Timer Unit.

shown; with C2 made too large or C4 too small, the reset signal for IC3 will go low before the power supply has had time to stabilise and the circuit may not function as expected. However, if the circuit is to be operated from a constant supply and the trigger switched, C2 may be any convenient value above $1 \mu\text{F}$ and C4 could be reduced to 470pF or less. Diodes MR2 and MR3 prevent transients on the trigger line causing damage to the input of IC1D. The V_{DD} supply for the CMOS circuits is generated by a 9.1 volt zener diode as shown in Fig. 3.

The circuit has been designed to operate a low power high-intensity warning device. In the author's unit, this device is a Mini-Bleptone manufactured by A. P. Besson of Hove. They require very little power, about 5 or 6 mA from a 12 volt supply, but deliver a very penetrating note. An alternative arrangement could be to use the spare two input gates of IC2 and one of the spare inverters of IC1 to form a gated oscillator as shown in Fig. 5. The output signal, which is at about 1870 Hz, can be fed to an audio amplifier to produce the warning.

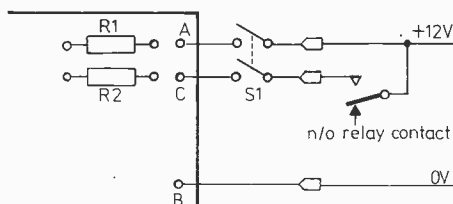
Construction

A printed wiring board was used by the author to interconnect all of the components except an on/off switch and the Mini Bleptone; this printed wiring board, the layout of which is shown in Fig. 6 is 3.2 by

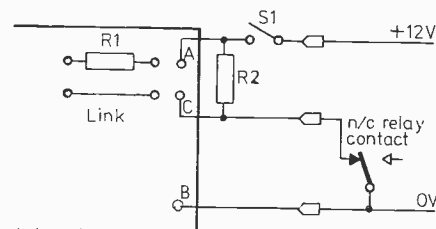
2 inches. Fig. 7 shows the disposition of the components on the circuit board and the interconnections between the board and the external devices. If the CMOS devices are to be soldered directly to the circuit board, the usual precautions need to be taken, *i.e.* the soldering iron bit should be earthed and the IC's mounted after all of the other components.

The Mini-Bleptone has three flying leads: two of these, coloured red and black, are for the supply with the red lead being the positive connection. The third wire, coloured white, may be connected to either the red or the black lead. If the former connection is used, the device gives out a single high pitched tone. The other option results in a lower frequency modulated tone. Which tone to opt for is a very individual matter and the author would advise intending builders of the circuit to try both options before committing himself.

A standard plastic equipment box, of approximately $4\frac{1}{2}\text{in.} \times 2\frac{1}{2}\text{in.} \times 1\frac{1}{2}\text{in.}$ can be used to contain the components. Figs. 8 and 9 show the assembled unit with and without the lid fitted. The 12 volt supply and trigger signal, if the latter is required, can be fed in to the rear of the box *via* a 3 pin DIN socket; most FM transceivers have some form of output available on their rear panels when the rig is transmitting. This output may be in the form of either a +12 volt supply or a pair of relay contacts. For the case of the +12 volt supply, the trigger input should be linked to the supply, as shown in Fig. 7, and the supply taken from the switched +12 volt signal. If relay contacts are provided, pin A of the printed circuit board should be connected to a fixed +12 volt supply and the relay contacts connected as shown in Fig. 10.



(a) Using normally open relay contact.



(b) Using normally closed relay contact.

Fig. 10 CONNECTIONS FOR RELAY INITIATION

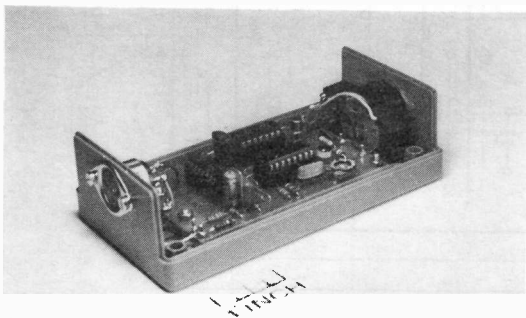


Fig. 9. Timer assembly, showing internal details.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

Since last writing a *CDXN*, your conductor has had a pleasant holiday in which he enjoyed a session with G3UUZ but for one reason or another didn't quite make it to see G3RPC; walking the lanes and paths without a thought for either the *Magazine* or for radio of any sort was the main part of the prescription, even though we may have missed some pleasing conditions on the bands. And, praise be, we are definitely beginning to see the upswing owing to the new sunspot cycle; the general indications now that we can see the whole form for 1976 are that the two bottom months were March and June 1976, both with smoothed numbers of 12.2; thus March 1976 is being taken as the start of Cycle 21, which makes Cycle 20 to have lasted 11.5 years. At that time, solar flux figures day by day were doing well to get up to seventy, while the reports for mid September 1977 show periods of a week or more when the flux had not dropped below 100—so, keep trying!

Ten Metres

Our regular observer, G2ADZ (Chessington) sent a couple of reports; his first, through the system, we haven't yet got to hand, but the second one was sent direct to let us know that the week-end of October 2 was a real humdinger, with all continents heard, and a wandering gremlin in the transceiver which meant his best was about five watts; VK5GK was ragchewing with a *G* for quite a while; VU2KVI was calling CQ in the Phone section while a *G* station called CQ DX right on top of him, *UA9's*, *UA0's*, *UL7AAB*, and an *HL* with a lot of QSB on his signal; from Africa 5R8AL, several *ZS*, of which Bill managed to attract ZS6DL and 9GIJN; some weak *W's* from Four-land, and weak Europeans. The band was open as far as G2ADZ was concerned from 0830 right through to 1950 clock-time. An interesting thing about it was the number of *G* stations who came out of hibernation, when

normally they just don't appear to surface. Odd . . . Returning to the matter of that gremlin, one seems to recall that the things bred in the bottom of Fremlin bottles and danced up and down the wings of *Merlin*-engined aeroplanes bringing all sorts of "interesting" problems in their wake; the G2ADZ one probably popped out of a bit of war-surplus in the junk-box after the warm weather had brought it out of hibernation.

Those 21 MHz attic aerials of ex-G2XC (Horndean) work quite well on 14 and 28 MHz too; South Americans and *ZE*, VP9BA and a station on the same frequency sending VE0UNEEEA; the grand opening seems to have begun on September 30, on which a couple of *ZS* signals were logged; then on October 1 and 2 a couple of short sessions at the receiver produced more *ZS's*, ZE1CB, ZE3JO (nice to hear of Mal again), ZC4IO, 5R8AL, all CW, while on SSB JY3ZH, *UA's* including UA9CAS, *ZS's*, 4X4, 7P8AC, 9GIJX, and 9J2GJ were all booked in.

We have already mentioned the second letter from G2ADZ; now we have the first one to hand through the system, which covers the month of September. G2ADZ reckons the band just couldn't make up its mind, as there were six blank days, six short-skip days, DX worked/heard on thirteen days, sometimes overlapping the short-skip, and five days when DX beacons were to be heard *but nothing else*. The openings when they did come along were in the evenings, and built up suddenly to give contacts with PY2WUZ, 4X4BS, PY1ZAE many times, 9G1MK, 4X4WF, ZE2JV, HK0BKX, and LU5DON; also ZS6DL and 9GIJN. On the Gotaway front one notes a couple of *VP8's*. On September 19, there was an opening to North America, but the skip seemed to be favouring the Germans and G2ADZ didn't manage to raise one although hearing *W1*, *W4*, *W8* call areas, plus S9 from *PY* and S9-plus from 5T5ZR.

During a QSO with PY1ZAE, Bill received the information that the *PY* beacon, PY1CK had been QRT for over a year.

Top Band

We have already made a few comments on the band, in the preamble, but we have reports from various parts to add to the tale. GM3YOR has been somewhat restricted as to his operating time since he returned from the far North, but he still managed to improve his score in the Table—actually the improvement is not, sad to say, as much as it looks since Drew has to admit he forgot how to score his entry properly. On a different tack, Drew and Dave, GM3OLK are looking into the possibilities of doing *OY* and *TF* for their DX-pedition next year, covering all the bands from Top Band right through to 432 MHz. They ask if anyone has ideas on who are the right people to contact for licences and other matters they would be pleased to hear from them.

Like so many of us, G2HKU (Sheppey) has been a wee bit "under the weather" during the last period. In addition the home-end mast is down for overhaul, which has brought one end of the "G5RV" aerial down to seven feet high; this doesn't seem to make a lot of difference to the signals in either direction, but with the feeder in the apple tree much of the RF is busily cooking the apples, and when the weather is a little wet, the VSWR indicated dances a hornpipe. Nonetheless, PAOPN was worked on SSB, plus CW QSO's with G13LFH, G13PDN, OL4ATY.

Steve at G4EDG (Newton Abbot) continues to be surprised at the things happening to him on this band. One annoyance was to do several late night stints and hear assorted *W's*, who couldn't be raised as they clearly weren't tuning the low end. What, Steve plaintively enquires, can one do about it? One supposes a call on their fre-

quency would be worth a try, but if you raise them it might be an idea to ask them to keep an ear to the DX segment down at the bottom of the band because they are getting out better than they realised. Of course the boot can well be on the other foot too; one knows of at least one operator who has missed several DX QSO's through not listening in the DX segment; but one should take care about this sort of thing lest the idea of the DX Window become swamped by local QSO's on either side of the Pond. G4EDG had better luck in the opposite direction, though as a result of hearing a lot of chat about ZL contacts among the eighty-metre rag-chews. So, he spent a while searching all through the September period without any luck, but on the last day around 0618 ZL3GQ was heard at a strength of around RST229. This fired the imagination, so Steve tried a CQ or two the following morning, and was amazed to hear ZL3GQ, this time at 549, giving him a call in response to the CQ. Overslept on October 2 because of lying awake half the night wondering about it no doubt, but on October 3, a call of CQ ZL raised ZL3GQ once more, this time with a nice solid 569 both ways, after which ZL3GQ was heard to call N6DC—no sign of the N6DC signal was heard though. Other QSO's during the month were with PY1RO and 9HICG, and between them these have raised morale considerably at G4EDG! As a matter of interest, the aerial at Newton Abbot is in fact the 7 MHz ground-plane, loaded at the top by about eighty feet of wire.

Eighty Metres

One very pleased GM reports for the first time, namely GM4EQY (Paisley), he having for the first time managed to get across the Atlantic on Eighty SSB, using an indoor dipole driven by the trusty TS-520; John says it was almost as much of a thrill to work K2NN and W1ZY like this as it was earlier to grab the first VK on Twenty also with an indoor dipole.

One reader who never misses the odd comment on Eighty is G2NJ (Peterborough); this time he enquires how many noticed the way

the band went completely dead from around 1100z to 1330z during which period neither he nor G2CAS could find any phone or CW contacts, although 7 MHz was still yielding at least an SM6/MM calling another SM. Incidentally it is rather amusing to see the way that G2NJ/M operates—he sits on the back seat working CW on 14 MHz with a Uniden rig while G5NX/M up front takes care of the two-metre Phone stuff. On an entirely different theme, G4DQA, who is on leave in Sunderland, has been making enquiries about a /MM licence; he is after a British call, but is operating from a foreign tanker.

One or two excellent days, avers G4DMN (Wirral), with KH6XX at 0615 as prize of the month. However the band has suffered from some degree of disturbance but other QSO's, all SSB, included C6AEY, DK3AD/W3, EA9FE, EL0N/MM/2, KP4DDO, HH2HL, KP4EBH, PJ2FR, YV1AVO, YV4YC, DL2RL/YV, VE3PET, X01FG (VO1 in disguise), ZD8EW, ZD8RR, ZL4AP, 4Z4DT, 4Z4MQ, 9K2DR, 9G1JX, 9G0ARS and 9Y4NP.

Now we turn to G2HKU, who seems to have bought some new batteries, insofar as his QRP input is now up to 3 watts, with which he made G13LFH, G13PDN and OL4ATY, CW of course.

Forty

Perhaps the first surprise here is in the heading to the letter from G4EAN (Nottingham) who hopes his letter will reach us in time for the *December* issue—clearly no faith at all! Last time round Ian was complaining that the SWR on his aerial had suddenly rocketed up; the problem was resolved fairly easily by re-soldering the duff connection in the co-ax PL259 plug, and the rather wistful thought "Wish I could solder! "However, hope is not given up yet, and Ian hopes to get the 18AVT trained before the winter is out.

Trying QRP on Forty seems a good way of driving one's self round the bend, but a surprisingly large bunch do this with some degree of success, notable G2HKU who offers SM5AHD.

Stick to the key if you want to work some real DX, advises

GM3YOR, who used this mode to work EP2SV, N2US, K3EST, UL7CAD and PY7AOW.

Next we have G4GIE, who is down to half power as compared with Eighty on this band, with 240 milliwatts output to a Joystick which combination offered him contacts with DJ7WJ, DM2CZJ, DF1HF, ON5VC, G3OSZ, DF3LG, DA2SL, DL8YT, YU2BOP and F6COB. Meantime the old rig stands to suffer some competition, as we are given to understand that an HW-8 is on the stocks for some more band coverage.

On now to GW4BLE, who only made one attack on the band with the specific intention of working the Galapagos Is. DX-pedition, an ambition which was not achieved (Snap!); on the other hand, as a sort of consolation prize, SSB QSO's were made with KZ5DG and LU5OI.

Another one who didn't listen much was G4DMN, although he does admit to a couple of morning sessions which brought him SSB QSO's with HC1AL, HI8SRH, OA4VR, PJ2FR, VK2WC, VK3BKM, VK7CK, ZL3GQ, ZL4IJ, WA1SQB/VP9 and 9G0ARS.

It is now forty years since G6TC (Wolverhampton) first got his ticket, and Ted is as active as ever; at the moment it is 7 MHz where the DX is being hunted, and the month brought in 50 VK/ZL QSO's, the star turns being VK3MR and VK3VJ, both of whom have been worked in the morning and the evening times. In addition, Ted notes W5, W6, W7, VE5, PY, LU and KH6, all worked on CW with an inverted-vee dipole fed with balanced feeder.

Strays

An interesting come-back to that piece about Poldhu (October issue, p. 475) came in the letter from G3CED, writing basically to note that work is far too thick on the ground for him to spend time on the air; George says he recalls the broadband effect of spark being used during W.W.II, as a means of, hopefully, putting off the early radio-controlled flying bombs being thrown at *H.M.S. Beaufort*; because the control frequency was not known, they rigged a primitive and quite untuned fixed spark which, if nothing else, clobbered all channels

TOP BAND/TEN METRES COUNTY/COUNTRY LADDER

Starting date January 1, 1977

Call	TOP BAND			TEN METRES						
	AM	CW	SSB	Countries	Total	AM	CW	SSB	Countries	Total
GM3YOR	—	160	—	14	174	—	2	—	20	22
G4FJU ...	30	68	68	13	179	—	—	—	—	—
G4AEJ ...	50	30	12	6	98	—	—	—	—	—

Scoring is on the following basis: one point per county worked on SSB, two per county on CW, three per county worked on AM; two points for county AM/SSB QSO's, each end to score two points in the appropriate column for the mode used. No other cross-mode working permissible. Countries score one point each regardless of mode.

on the ship. The captain claimed the result of his seamanship was their survival, PO Tel. Partridge reckons it was his spark-gap machine. And, like the Poldhu question, the truth will never be known!

We now have to hand the results for the 1977 CQ WW Top Band Contest, thanks to W1WY, and it raises some interesting results when one looks at the actual score breakdown. For instance, it is quite clear that K1PBW ran well out into first place, among the Americans, with a score of 180,432 points. However, KV4FZ made 385 contacts which netted him a points score of 270,648. Then we can go on to G3UBR, who made some 306 contacts which netted a mere 87,250 points. It raises some interesting questions, one of which is very definitely that one needs to do more than just work lots of stations if the grade is to be made. For a winning score, one must work at least 30 countries in the contest, for a station in Europe. Incidentally, we should at this point note that W1WY himself is no slouch at Top Band operating, as his log showed some 160 QSO's and the first *W* to *F* QSO into the bargain. Frank notes that the 1978 battle is slated for 2200z Friday evening January 27 until 1600 on Sunday January 29, giving a total of some 42 hours of activity, through which you need to keep up a steady QSO rate of one every six minutes or so throughout the time! Rules are the same as last year, but with more stress on the penalty and disqualification criteria this time. This means careful log work, and the result should be mailed to: CQ 160 Contest, 14 Vanderventer Avenue, Port Washington, L.I., N.Y. 11050, with a postmark no later than February 28, 1978.

Verulam Club Contest is down for a four-hour shortie, 0900 to 1300z, the two-metre one dated November 27, and the Top Band one December 11—details from G4DUS at the appropriate address which is given in the Club Secretary's box associated with the "Clubs" piece.

The CQ WW DX Contest has its Phone leg on October 29/30, and the CW one November 26-27, from 0001 Saturday to 2359 Sunday all times GMT of course. Exchange RS(T) report plus your CQ Zone. QSO points three for each one outside your own continent, same continent one point, same country no QSO points but one for the Multiplier. Multiplier to be one for each Zone worked, and one for each country worked. Final score is the sum of the total QSO points, times the sum of the Zone and the Country Multiplier. Logs postmarked before December 1 for the Phone or January 15 for the CW contests to CQ WW DX Contest Committee, 14 Vanderventer Avenue, L.I., N.Y. 11050, USA.

Looking at the Surprises, one of the first is hardly in the category of a surprise, that those 3V8P contacts included a rubber QSL, bouncing straight back; on the other hand, we hear that after all this time, some WG1JFK QSL cards have surfaced. Changing the subject dramatically we have it that VS6DA, during a recent VK trip, broke the world record for a hot-air balloon by rising to 30,500 feet, some 500 feet above the previous best; contact being maintained up to 1200 feet as VK6XB/BM with VK6RU, while VK6AO was in the ground crew.

Fifteen

Not unexpectedly it's been a bit up-and-down, with most of the activity in a North-South polarity, but it has been doing its stuff in a far more enthusiastic-making way than of yore; so let's look in the box.

GW4BLE found it in very good shape, even opening on occasion to the West Coast USA. SSB was used to hook up with 3D6BP, VP8PL (S. Orkneys), KPBR1, KP4BPJ, S88TH, ZS6BNO, ZS2MI, FR7BI, 5H3KS, 5Z4KW, 7P8BC, A2CZV, EL3T, SU1CR, 9G1JX, 9GØARS, VU2DK, 9K2DR, 4Z4MQ, K6NA, STØRK, ZE1CH and 9J2WS.

"CDXN" deadlines for the next three months—

December issue—

November 3rd

January issue—December 1st

February issue—January 5th

Please be sure to note these dates!

Openings to the West Coast are also mentioned by G4DMN, who connected with A4XHA, GD3FXN, GW4BLE, HZ1AB, HK3AWY, JRI, N6KA, S88TH from Transkei, K5DUT, WA6NGJ, WØFXV, KØSA (Colorado), YN1PJ, ZP5RA, 4Z4MQ and 9J2CB.

"Varying from very good to very bad" about sums up the views of ex-G2XC; he heard A2CVL, HD8CD, JA's, KØW1Q/DU2, KG6JIH, KX6BU, P29BB, P29JF, S88TH, VS6HF, lots of W6 and W7, several YB's, ZS2MI, 5H3KS, 5V7WT and 9N1MM.

G3NOF, cautiously, says he has found conditions good at times. Morning openings both long and

short paths to JA, Africans in the later afternoons, preceded by openings to VU, AP, 9VI and so on, with the usual North Americans from noon to midnight, but with deep QSB and fading out. South America has been noted later in the evenings, all adding up to QSO's with C5AAP, CE1NF, CE3PY, CP1BP, CX6AM, KK3DFT, K5EJO, KH6JJD/VQ9 (Diego Garcia), KP4DLC, KP4ERR who got this call for the Virgin Islands out of the FCC computer instead of the more usual *KV4* prefix, LU6DWA, N7ZL, PT2TF, PY2AKJ, PY8JO, S88TH, VP2AZB, VP2SAG, VU2KMK, WA4FZG/KV4, WA7NJI, WB5SFS, WD5BHA, WB5DKS, ZD7SD, ZP5CBE, ZS1EZ, ZS1JJ, ZS6HE, 9J2WS, 9L1NP and 9L1SE.

A first report from an old call: G2DHV (Sidcup) back on with 50 watts to a dipole. George offers SM7EDI/MM, VK8GG, VR4BT, KG6JIH, SU1IM, F6EBN/MM, J28AY, 9J2BO, OZ5MM/MM near Togo, ZS6BRJ, VU2BAI with a very good signal, 9Y4FG and 9Y4TR.

For GM3YOR there were CW QSO's to EA9EO, LU3EX, PY1BOA, UK9ADZ, UK9CAE, UK9CBD, UK9SAY and UV9AH.

A new reporter is GI4GDV (Lisburn) who has been giving 21 MHz quite firm notice of arrival, starting on September 2 with a string of South Americans, followed later by *W6's* in a bunch, and so through the month: 5N2NAS, KP4ERR (this chap seems to have puzzled lots of people—wonder how long it'll take the authorities to sort it out?) HZ1AB, TU2HH, UD6DFD, UK9QAA, A4XGY, OD5IZ, 4Z4UZ, JA6FIO, 9K2FO, A9XCD, ZS6ADQ, "SC6BPQ," S79DF, ZP5AP/P8, SV1TSL, KZ5CA, CT3AF, 9K2FO, lots of *W's*, and on October 2, from 1000z a veritable string of *JA's*, while an evening look produced East Coast *W's* plus HI8XHB.

Twenty

Last this time, but by no means least—in fact the picture overall is livelier than one has seen for quite a while.

Our first reporter this time is

G4DJY (St. Annes-on-Sea) who mentions heavily restricted operating time at the moment, although the attempt is made to get on for a half-hour daily. Stations worked included contacts in all continents although, as he says, none of them is "much to write home about" save for CR9AJ and P29JS. The countries score is now up to 130 worked, and 91 confirmed and—he has operated phone this month!

G4GIE is down to 240 milliwatts by the time he reaches 14 MHz, but he still managed to get through to ISOYDD, UA1QAU, UB5ZP, F8PM, F6BRF, DK9AY, DK8EI, HA7KTM, UK3MBQ and UW3ZK.

Next on the list is G3ZSU (Maidstone) who says he has thrown away the Top Band aerial and put up a Delta loop on Twenty. He had a go with it one evening and got a spate of TVI complaints which were thought to have been cleared up years ago. Nevertheless there were a few *W's* put in the log, with a *W7* notable, *LU*, *PY*, plus an early-morning long-path opening to VK5QG. On a different tack altogether, Shaun mentions that he took his rig to EI with him for the summer holiday. To Get an EI licence one has to apply for each band separately, and Top Band is the subject of a special permit under the Wireless Experimenters Act and needs a good reason and several weeks delay before one sees the permit turn up. It also takes several weeks to get *any* sort of "ticket" through and G3ZSU thinks it is not unreasonable to allow three months after the forms have been filled in. An address is required and it should be transmitted upon the commencement of each QSO and at each thirty minutes.

GW4BLE found things excellent in the mornings over the long path, which in any case is his best take-off area. All contacts were on SSB, with FM7WV, FP8DF, P29JS, VS6MM, 9L1JM, HD8GZ, C9MDB, KZ5JM, TI2CAP, HI8MDB, YN1KL, VP2LDD, VP2LDJ, S88TH, PJ3BW, HP1JC, 9Y4LR/M, 9Y4NP, 4079WARC, VU2DK, PJ2FR, 9G1JX, 9G0ARS, 5V7WT, FB8ZL, YS1RRD, YS1GMV, CP1AT, 8P6FU, HP1SI, OA4BI, OA7MZ, JY9VK, *VK1* to *VK8*, *ZL1-4*.

Like pretty well everyone else, G4DMN mentions the longpath *JA* openings around 0730z. Richard worked C6AEY, HD8CD, JA, HC1BL, JE1SSE, *VK2-VK6*, ZL, 4S7DA, 7P8BC, K4YT/8R1, 9M2DW, and 9M2EE.

In a rather throw-away line, Ted, ex-G2XC remarks that his pair of "W8JK" aerials in the loft for 21 MHz also function, for listening at least, on Twenty, although the directivity is not quite so good—and different. Nevertheless *VK's* and *ZL's* have been heard.

The later band-openings mentioned previously caused G3NOF to ask his locals, and their observations tallied nicely. In the mornings the *JA's* are in by 0730z, preceded by *VK/ZL*, and some West African openings have been noted at this time too, although not much from the Pacific (which G3NOF reckons might be in part owing to the effect of his new working-hours). SSB QSO's have been made with DK1YG/HB0, DU1MEL, HZ1TA, HZ1TB, I4LCK/IH9, K7LUH/CY6, KH3CHC, KL7HQW, N7ML, P29JS, TT8SM, TU2GA, U6OS, UK0LAD (Zone 19), UW0NE also in Zone 19, VE6TD, VE6UX, VK3ABH, VK3AGG, VK3MO, VK4IV, VK5QI, W6RHC, W5QKZ, W5TYQ (New Mexico), W7APA, W7LQQ, W70F, W7VV, WA7GVM, WA7LCP, WB70FO, W7MR, both in Utah, WD0AOY in Colorado, ZL2NY, 4079WARC, 9G1JX, and 9G0ARS.

For G4EAN there is the promise of more next month; but for the moment Ian has had to be content with VO1FN, VE3FMI, VE6DX and VP9IR.

Up in the Kingdom of Fife GM3YOR came out fighting, the CW going out to overcome EP2IA, DL2RL/YV6, LU6ACA, LU9FAZ, PY4CZ, UK6KAA, U18LBA, UA9ABV, UK9CBD, VE1BKB, W6PN, WA6TLA and 8P6IM.

Finale

You have it all there for this month; for the next offering look into the box in the body of the column, which gives the dates. Address, as ever, is to CDXN, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts, Herts. AL6 9EQ. Till then, good DX.

THE QRP SCENE, 1977

Worldwide Activity

FOLLOWING a period of ever increasing effort and enthusiasm the United Kingdom has emerged as the world centre of QRP activity, closely followed by the Western European mainland. In the UK most activity revolves around the G-QRP Club which during the past three years has built up a membership totalling 19 countries. Main centre of West European mainland activity is the Benelux QRP Club, embracing the Belgium/Netherlands/Luxembourg complex, and the QRP section of the German CW activity group, which also includes HB stations. Although not yet formally organised there is also considerable activity in France, and during QRP contests the Italians, Czechoslovakians and East Germans appear in considerable numbers. Adding to this widespread activity in the U.S.A., Japan and other areas, produces a picture of steadily increasing world-wide QRP operation.

DX Working is Commonplace

To many QRO operators the words "QRP contact" conjure up a picture of two stations desperately trying to hold an RST 339 QSO over a distance of 100 miles. Nowadays nothing could be further from the truth. Some examples may illustrate this point: in the 3 watt class, DJ1ZB, G3KPT and G8PG already have over 50 countries confirmed, and many other stations are near this total. During the January 1977 DL QRP Contest GM3OXX, running 2 watts to a dipole, worked 28 countries and four continents on 14 MHz in 15 hours; in the same contest G4BUE turned in a score which is likely to be an all-time record. In the mobile field, OE1SB has worked some outstanding DX with a 5 watt rig in a VW Beetle. Portable-the-hard-way is represented by DL7DO/P who likes to operate from above the winter snow line; his ski-carried 28 MHz milliwatts have produced some outstanding contacts, often when the temperature was so low that the batteries had to be carried next to the skin to prevent them freezing! Also in the milliwatt range the work done by G4AYS will be familiar to all readers of *CDXN*. In an equally difficult environment, G4EFZ enjoys his QRP with the aid of some lengths of wire in the roof space of his council flat, energised by the 5w. c.c. rig recently described in the *Magazine*.

VHF/UHF not Forgotten

While a great deal of QRP work takes place on the HF bands, VHF and UHF are not neglected, with many G8+3s and others consistently using low power. One outstanding contact was the UK-Canada QSO achieved by G3NEO when using 5w. on the 70 cm. *Oscar* up-link; various other 5w. space contacts were also made. This work, plus consistent performance on other VHF and HF bands won G3NEO the G2NJ Trophy awarded annually by the G-QRP Club. These low power contacts *via Oscar* have another significance, however: the next generation of amateur satellites will allow access by tens

of thousands of amateurs for long periods, and because of this occupancy rigid power discipline will be essential if the operation of the satellite is not to be seriously affected. The maximum recommended power is 100w. e.r.p., equivalent to 10w. into a beam with 10 dB gain. As the G3NEO contacts show, however, lower power will often be effective, and every user of the satellite must be ready to reduce power whenever conditions permit this.

Research and Experiments Encouraged

Research and experiments, both operational and technical, are carried out by QRP operators in the UK. Current subjects include loop aerials for fade-free short range communication on 3.5 MHz; propagation, including exploiting summer *E* layer appearances on 21 MHz; and the development of transistor transmitters. It is anticipated that during the next few months a large scale investigation into the development of aerials for use in restricted spaces will begin, and this is scheduled to run for 12 months. What may prove to be an even more significant advance than the introduction of SSB is coherent CW (CCW). In this method control of the transmitter and receiver at both stations is by means of a highly stable oscillator (ideally, stable to within 1 Hz). This oscillator also drives a clock circuit which controls an el-bug and a special gated active filter; with the clocks in synchronism, the el-bug at the sending station can only start a dot or dash symbol at the instant that the filter at the receiving station is being gated on. The filter will recognise the beginning of the symbol and remain on for its duration, after which it is gated off. The originators of the system claim that at 12 wpm (9 Hz bandwidth) it provides the equivalent of a 100 times power increase because it gives a 20 dB improvement in signal-to-noise ratio. They also state that in tests between Japan and the U.S.A. a 10w. CCW signal provided the same communication effectiveness as a 1 kW conventional CW signal! In the UK, QRP enthusiast G3FMW is tooling up for the method, so we may hear of the first UK/U.S.A. CCW contact before long.

Home Construction is Booming

A complaint never heard in QRP circles is the one about everybody using the same Oriental black boxes. A proportion of commercially built rigs are in use, but the majority of QRP operators build their own gear, either from kits such as the Heath HW-7 and HW-8, or from scratch. Designs published in the *Magazine* are popular, and these are supplemented by some useful circuits published in *SPRAT*, the quarterly journal of the G-QRP Club. The latter include valve and transistor rigs for CW, DSBSC and AM developed by enthusiasts such as G3YUQ, G3IGU, DJ1ZB, W9SCH and G8EPE. An increasing number of newly licensed stations are turning to QRP, and it is felt that this is partly due to the attraction of making contacts with reasonably simple home-built equipment.

Schedules and Contests

Regular contacts between QRP stations in Europe are now being organised. Such stations should be looked for around 3540 kHz, 7040 kHz and 14065 kHz. Activity is particularly likely on the two higher frequencies between 1130 and 1200 on Sundays, and on the lower

frequency between 1400 and 1600 on Sundays; spot frequencies for QRP SSB are currently being investigated. Much inter-European QRP working also takes place during QRP contests. The DL AGCW QRP Contest, a world-wide affair, takes place twice yearly in January and July and all bands between 1.8 and 28 MHz are used. UK stations often occupy leading positions (*details from G8PG*). The RSGB QRP contest, held each April, uses the 3.5 and 7 MHz bands; this contest is now open to non-members resident outside the UK. Special QRP activity weekends are also held regularly. Of course many QRP stations work DX during the more conventional contests; for instance during the 1976 ARRL DX Contest two 3-watt G stations were at one stage averaging a trans-Atlantic contact every five minutes!

Special Awards

Several highly prized certificates for outstanding QRP work are awarded by the G-QRP Club; the Club also awards trophies for outstanding contributions in specific areas (*details from GRJV*). Incidentally the Club welcomes SWLs, and offers them training aids such as Morse tapes.

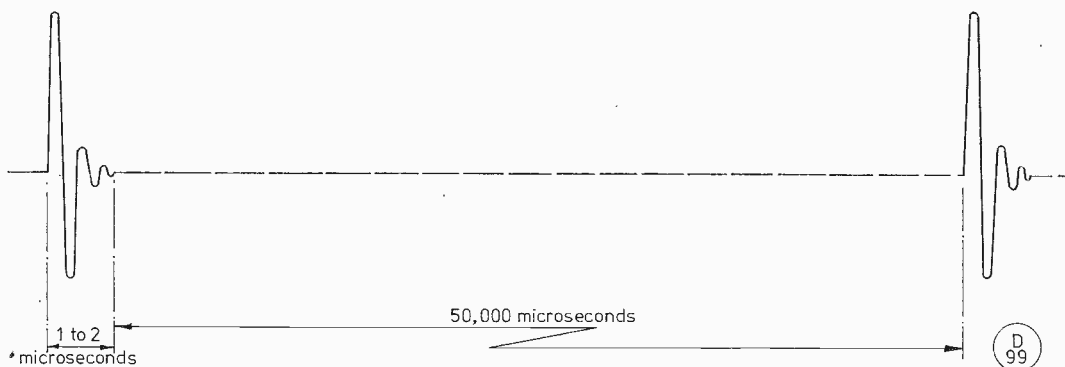
Summary

To sum up, despite the low state of the sunspot cycle the level of international QRP activity appears to have reached an all-time high. It is characterised by an exceptional spirit of friendliness and co-operation.

CORRECTION

The diagram in the article "The Poldhu Story—Fact or Fiction?" on p. 475 of the October issue is incorrect

and should have been as shown below. We apologise to the author G. R. M. Garratt, G5CS—and to readers—for our mistake.



Probable waveform of the 1901 Poldhu transmitter. Each "train" of oscillations comprised a single swing of enormous amplitude, the successive waves dying away within $1\frac{1}{2}$ -2 microseconds. There was then an interval of 50,000-100,000 microseconds ($1/20$ th- $1/10$ th second) before the next spark generated a fresh train of oscillations. Since all the energy (3-5 kW.) was radiated within the very brief period (1-1½ microseconds) of each train of oscillations, it is probable that the *power* in each initial half-wave exceeded 100 megawatts with the generation of very powerful harmonics in the HF frequency band.

TESTING A MUSEUM PIECE

F. H. WALKER, ex-G4TX/G5AX

WHEN visiting the Science Museum at South Kensington in 1926 I noticed that there was very little SW gear on exhibition, so I wrote to the Curator asking if he would be interested in a receiver as used by many amateurs of that period. He was interested, and I built the Rx in the spring of 1927, and presented it to the Museum.

I saw the Rx on exhibit on a few visits to the Museum over the years, but gave the matter little thought until I retired from the film recording business in 1973. Looking over old logs of the '20s etc., I thought of the Rx and a photograph of it which was lost and wrote to the Director of Telecommunications at the Museum asking for a copy. The Director kindly sent the photo and this led to a visit to the Museum in July 1976 when it was

suggested that I had the Receiver at my home to evaluate its ability after fifty years!

The circuit was the popular Reinartz "Det & One Step" of those days, with Gecophone slow-motion all-brass variable condensers, S.L.F., air spaced "low loss" coils 3in. dia., a Ferranti AF3 intervalve transformer, a Bowyer Lowe HF choke, and a Mullard PM5A detector followed by a PM6 LF valve. To try out the receiver a dry battery was used for the filaments, and 54 volts of HT from PP3s; the only phones I have are low impedance so a small transformer was added in the plate circuit.

My aerial is only 20-ft. high and 50-ft. long: when first connected the Rx was very noisy owing to the oxide on the variable condenser contacts, and the large coils picked up mains hum from the shack wiring (not in conduit). These troubles were soon cured, and reception on 7 MHz and 14 MHz quickly obtained. On CW

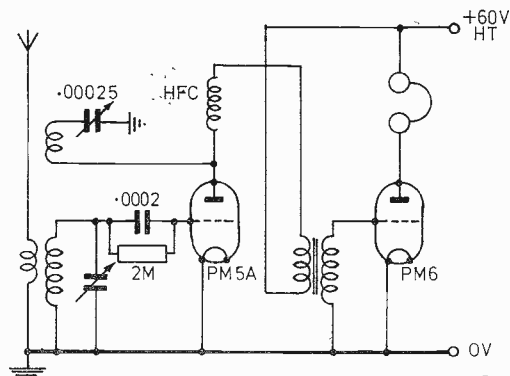
selectivity was very good and many of the SW Broadcast stations received clear of QRM. With the coils provided, the coverage was from 7 MHz to about 18 MHz and the amateur bands and a few "marker" stations enabled a graph to be made of the frequency range of the three coils. This showed the excellence of the S.L.F. condensers.

It was on a similar Rx to this that I received Australia on November 12th, 1924, the reception being reported in the Press the following day (this being the first amateur reception of that country in England, the transmitter being A3BQ, Box Hill, Victoria).

When the receiver was constructed there was no mains supply within $\frac{1}{4}$ -mile, and that was DC, so the matter of hum pick up on the large coils was never dreamed of! On the amateur bands the best reception was on 14 MHz where *W's*, *K's*, and very many European stations were received on CW; SSB was not so well received. I feel that the quality of Morse from amateur stations is much better these days, and noted the use of electronic keys.

Until a few years ago I was using a CRO Rx, and feel that as far as CW goes the Museum Rx would hold its own with the CRO, but would require a little more skill in handling.

My interest in radio started in 1920 when a weekly paper "The Scout" published an article on making a crystal set for the reception of ships, FL (Eiffel Tower), MPD (Poldhu), etc., and having built this Rx listened to MPD's Wx reports sent at 12 w.p.m. until the code was mastered; the following year a one-valve set was made and the SW listening started. In 1922 the Transatlantic Tests were held in the December, and a number of Americans on 200 metres were heard. The harmonics from the arc transmitter GBL at Leafeld, Oxon., caused a lot of QRM. Much midnight oil was burnt in



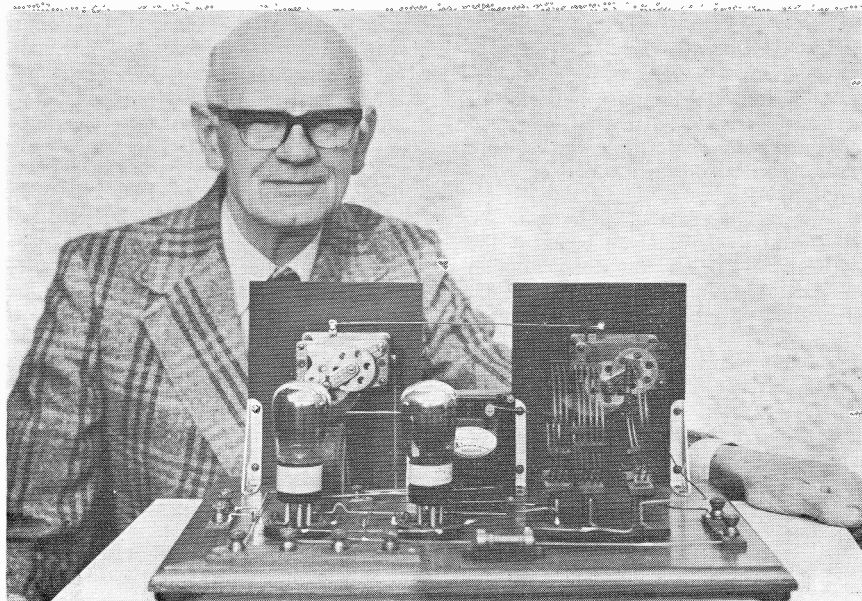
Schematic of the Science Museum SW receiver

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the mid '20s, QSL cards being greatly in demand!

A transmitting licence with the call G5AX was obtained in 1925 and QRP work on 100 metres with a DE5 valve, a Hertz antenna, and 120v. HT allowed a QSO with Canada and the States. It was also in this year that I met my lifelong friend Tom Dearlove, G3FMN, and together we conducted many experiments with a W.E.205 valve on 5 metres. In 1929 I was working with Western Electric Co. installing cinema sound equipment and from then on, except for a period during the War, no further radio work was done, but in the '50s I re-licensed and obtained the call G4TX, worked QRP on 7 MHz, and later on 28 MHz with a rotary beam obtaining phone QSO's with many *K's* and *W's*.

In conclusion I feel that I was very lucky to have experienced the joys of early amateur radio when the SW bands were so free from QRM, and a new signal gave one's heart a faster beat!



Fred Walker with the receiver described in his article.

THE MONTH WITH THE CLUBS

By "Club Secretary"

BEFORE we get down to the gory details and doings for this time, we have a plea for help: a letter from a young SWL who lives in Fressingfield, which is near Diss, in Norfolk, and wants to join a club. The nearest clubs of which we know are **Ipswich, Norwich and Stowmarket**; does anyone know of a nearer one, or if not will any member of one of these clubs who goes anywhere near Fressingfield on his way to meetings please get in touch with: W. Pretty, 7 Priory Crescent, Fressingfield, Diss, IP21 5PL.

The South-East

As usual numerically the largest pile; either the rest of the country is less "clubbable" or they have a dislike of being known!

November's programme for **Harrow** is all taken at Roxeth Community Centre, Scott Crescent, West Harrow. Friday, November 4 sees three short lectures being given by members, the subjects being respectively Op-Amps, Flip-Flops, and FETs. A week later, on 11th there is an informal and on 18th G4AUF will talk about Micro-Processor Applications; and on 25th the month is rounded off nicely with a Bring and Buy Sale.

Milton Keynes Hon. Sec. isn't standing for re-election this year; a pity from our point of view since he was one of the few who organised things to help us get it right. Sadly the October date is now past—it was a visit to the Whitbread brewery in Luton; but on November 14, they have Brian Wilks from Wolverton College of Further Education, who will be taking as his theme "Aerial Polar Diagrams."

All we can say for **Echelford** is that their Hq. is at St. Martins Court, Kingston Crescent, Ashford, Middlesex, on the second Monday and the last Thursday of every month; but the details as to what is going to happen on these dates are not given; if you must know before you make a firm decision to attend, contact the Hon. Sec. at the address in the Panel.

It is the first and third Thursdays as a routine for the **Cray Valley** chaps, their Hq. for these being at the United Reformed Church Hall, 1 Court Road, London SE9. We don't have details on these two, but we can tell you that the annual Buffet-Dance will be on November 19, at Tudor Barn.

A wee bit further southwards now: **South-East Kent** YMCA who foregather every Wednesday evening at the YMCA, Godwyn Road, Dover. An interesting feature is that the gang have talk-in arranged on GB3KR for any visitor to any meeting.

At **Maidenhead** they have a room at the Red Cross Hall, The Crescent on the first Thursday and the third Tuesday in each month, and they always have something of interest organised.

Sad to say, the **Surrey** newsletter, which is usually so good, this time fails to tell us the Hq. address, and we are too far ahead for the meeting details; however,

we have the first and third Wednesdays for the calendar, and the name and address of the Hon. Sec.—see Panel.

On to **Sutton & Cheam**; their newsletter, like so many others in the London area, carries comments on the problems with GB3LO. However, to return to our theme, we can say that this crowd have two homes—Sutton College of Liberal Arts, Cheam Road, Sutton and Ray's Social Club, London Road, North Cheam. However there isn't any clear definition of the pattern of future meetings so we have to refer you to the Hon. Sec.—see Panel.

It's a very rare club that is so healthy that it has a clubroom capable of holding sixty and yet is having to seriously consider restricting membership! This is the case with **Bournemouth (Wessex A.R.G.)**, and long may it continue. They can be found on the first and third Fridays, at the Dolphin Hotel, Holdenhurst Road, at 7.30 for 8.0. November 4 is down for a talk by G3AAO on Air Traffic Control Communications, while on 18th G3BRW will be talking and showing slides of visiting radio contacts in the Seychelles and Australia.

November 19 it is for **Crystal Palace**, when they will be hearing a talk and demonstration by *Catronics*, at Emmanuel Church Hall, Barry Road, London SE22. They also have an informal, but since this is at member's homes a contact with the Hon. Sec. would be courteous before a visit.

DON'T FORGET THE 1977 MCC !!

NOVEMBER 5th and 6th

See p. 489 of the October issue for rules, etc.

Now we come to **Verulam** who have their Hq. hidden away in the Market Hall, St. Peter's Street, St. Albans, with plenty of room for a large attendance—which they get regularly thanks to a live-wire committee. They are even organised to the extent that a PA system is brought along to each meeting for the benefit of the speaker in a room where the acoustics are not too good. The "main" meeting is at the Hq. above on the fourth Thursday in the month, while on the second Thursday there is an informal, held in the R.A.F. Association Hq. in Victoria Street, St. Albans.

Quite a large September issue of the **Reigate** "Feedback" with a couple of cartoons, and extracts from the issue of fifteen years ago. However, when we turn to the dates, we find them all neatly listed out on the front page: November 8 for the Natter session at the Marquis of Granby, and November 22 for G3NPF to talk about Printed Circuits.

A nice idea at **Southdown**, who are hoping to put on a Home-brew Gear Demonstration possibly in liaison with the Eastbourne Model Flying Club, on November 7, the venue, as usual being the Chaseley Home, South Cliff, Eastbourne. Looking forward to December, on 5th there is the Annual General Meeting.

Acton, Brentford & Chiswick are based on Chiswick Trades and Social Club, 66 High Road, Chiswick, London W4. November 15 will be devoted to a report

on the club entry in MCC.

There isn't any data on the meetings of **Mid-Sussex** in the Newsletter—it is rather more taken up with the fact that everyone who takes on the Editorship seems to suffer some misfortune in the way of health! So—all we can do is suggest you contact the Hon. Sec. for the needed information, and take the chance to commiserate with them! The venue, by the way, is Marle Place Further Education Centre, Burgess Hill.

Time was when we used to hear from **Maidstone YMCA** as regularly as clockwork; and the club scribe says this state is going to be restored—good for him! The venue is the “Y” Sportscentre, Melrose Close, Cripple Street, Loose, Maidstone, Kent, every Friday. The first and third Fridays are devoted to the beginner, although of course everyone is welcome; November 11 is down for a visit to the new Kent Police Hq., and on 25th another talk by G8HLE, the subject this time not known at the time of writing. And of course, November 5/6 will be MCC weekend, for which it is threatened to put G3TRF and it's thumping great signal back on the air.

Midlands

Firstly, a couple of new ones. The first is called **Foster Cambridge Amateur Radio and Electronics Club**, based on Foster Cambridge Ltd. Sports and Social Club, Howard Road, Eaton Socon, St. Neots. Outsiders who are interested are welcome to join as Associate members—this is the normal situation where a club has its Hq. in a company's social club. At the moment, the crying need is for some licensed amateurs—believe it or not they have eleven members chasing May's R.A.E., but not a single licensed member yet on the books. Details, from the Hon. Sec.—see Panel.

Our second newcomer is at **Bury St. Edmunds** where the group get together on the second Monday in each month at 29 Angel Hill, which appears to be the G3GBB spot, at least until they can get up the numbers enough to justify looking round for Hq. and setting things up formally. Details from G3IRM at the address in the Panel. For both these clubs, our best wishes and hopes for long-term success.

Stockport have November 9 and 23 booked at Blossoms Hotel, Buxton Road, Stockport; the former for a talk on Astronomy and the latter for the Construction Contest. Looking on to December we see the AGM on December 14, the December 28 date being scrubbed. Incidentally, the group now have 110 licensed members which must come close to a record number.

It's not so many moons ago that the Hon. Sec. at **Hereford** was beeing at low attendances—this time he can record a headcount of thirty at the last meeting, so they must be doing the right things. They have their bookings on the first and third Fridays in the month, and this gives November 4 and 18th, at County Control, Civil Defence Hq., Gaol Street, Hereford.

An inaugural meeting is to be held at the Old Bakery Chester Walk, Cheltenham on November 3—this will be the first session of the combined **Cheltenham** club and RSGB group, plus some non-members of either; this has come about by way of a lot of planning, a lot of give-and-take, and above all, a lot of good will on all sides. Let us hope the combination goes from strength to

strength. For the moment, and until we have any firm news of a change, we will put the RSGB group Hon Secs, name and address in the Panel, that being the most recent information we have.

Mid-Warwickshire don't often report to this piece, but they are announcing their Autumn/Winter programme by way of a newsletter which reached us. From this we see they have moved from their old place to 61 Embscote Road, Warwick, there they now have the first and third Mondays in each month. November 7 is given over to a talk and demonstration of TV Cameras and Monitors, and on 21st SWL Smith will be talking about Contests and Awards open to SWL's—he himself has brought home the Continent and the World award in ISWL contests so he knows what it's all about.

The **Wolverhampton** Newsletter usually has something of interest, and occasionally the shafts of wit from the Vice-President, apparently acting as typist, can strike hard, right on target . . . but at other times? Seriously, the group foregather at Neachells Cottage, Danescourt Road, Stockwell End every Monday. November 7 sees G8EDG and G3UBX talking and demonstrating the FRG-7 receiver while on 14th there is a Natter Nite in the Club room. The Junk Sale on 21st will be a bit more complex than usual—on the one hand the Junk Sale, and on the other the flea-market. The only reservation the committee make (and we are surprised that no club to the writers' knowledge has ever done this) is that any item brought to the clubroom for sale must be removed, or it will become club property and subject to resale. The final date in November is 28th, on which the committee meeting takes place.

The group associated with **Nunsfield House**, Alvaston, Derby have their AGM on November 4, while on 11th they have a talk on the GB3DY repeater by members of the repeater group concerned; and on 18th there is a Surplus Sale. On November 25, someone un-named is going to try and take a peek at the future in terms of electronic component developments—a brave man indeed!

Deadlines for “Clubs” for the next three months—

(For December issue—October 28th)

For January issue—November 25th

For February issue—December 30th

For March issue—January 27th

Please be sure to note these dates!

Another of the once-a-week clubs is at **South Manchester**, where the Hq. is at Sale Moor Community Association, Norris Road, Sale on Friday evenings. G3HZM will be bringing in a bit of nostalgia for the OT's when he talks about the club history on November 4, and on 11th the “inner-man” is comforted by the Annual Dinner. November 18 is set aside for Mr. B. Moreman to talk about “Ionospherics in Antarctica.” Finally on November 25, G3LEQ discusses and demonstrates some VHF/UHF gear. In addition to all this, there are still informal VHF sessions at the Club Shack, Greeba, Shady Lane, Baguley.

Its AGM time for **Peterborough**, at the Scout Hut,

Occupation Road, on Friday November 18, the start being timed for 7.30.

November 8 is down for a Giant Surplus Equipment Sale, while December 13 is the AGM, says Bury's Hon. Sec., who adds that they also have every Tuesday booked at Mosses Community Centre, Cecil Street, Bury.

Up North

Our first from this neck of the woods is **Northern Heights**, still getting together at the Peat Pitts Inn, Ogden, Halifax on alternate Wednesdays. November 2 is shown as a Junk Sale, November 16 as the "Wakefield Project"—whatever that may be, it's probably meaningful to the members!—and November 30 is a Quiz with the White Rose side.

York next, at the United Services Club, 61 Micklegate, York, where the routine is a bit puzzling even for the members; they turn up on Fridays *except the third one in each month*. November 11 is a special date for them, as they will be receiving a talk from the *Vero Electronics* representative.

Now to **East Lancs**, which is the name of the group serving the Blackburn area; the only snag about their newsletter is that it doesn't mention *anything* about Hq., dates, subjects or whatever; although to be fair, the Hon. Sec.—we assume—noted October 6 on the front cover, which we suppose implies the first Thursday in the month. More details from the Hon. Sec.—see Panel.

A change of venue for **Wakefield** is indicated; the aerials and facilities at the old place were not enough to balance out the pleasanter surroundings at Holme-field House, Thorne's Park. November 8 sees them "away" from either place, as they are going to the Rose and Crown, Methley for a Pie and Pea Supper. However,

they are back in Holme-field House again on November 22 for an evening on the Two-Metre Transceiver Project.

Another new club appears; this one is called the **Edinburgh and District**, and would appear to be a re-birth of the Pioneer club which died for lack of a more suitable Hq. The group now have Hq. at the premises of the Edinburgh Astronomical Society—most appropriate as some of the members have interests in Radio-Astronomy, sunspots and similar things. For all the details on what sounds from the newsletter to be a lively youngster of a club, contact the Hon. Sec.—see Panel.

Away West

This covers Wales, the West Country, Ireland's two parts—with just two reports!

The first is from **Cornish**; they never miss sending along a copy of the "Link" with all the news and views. From it we recall that they get together on the first Thursday in each month at the S.W.E.B. Clubroom, Pool, Camborne; we don't at the time of writing know what they in fact organised for the November date but it is sure to be of interest.

Yeovil have sent out a circular to all in their "catchment area" known to be interested in our hobby, setting out what they have to offer in the way of facilities—which seem to be quite a lot. The Hq. is now at Building 101, Houndstone Camp, where they can be found on any Thursday. Thus, on November 3, G3BEC and G3NOF induce some nostalgia with a combined effort on pre-war amateur radio, and on 10th the members will be bringing along their slides of radio interest; it's the members again on 17th, this time giving five-minute talks, and the month is rounded out by G3BMO talking about SSB. This idea of a circular to all the locals is a good

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. (01-992 3778.)

B.A.R.T.G.: J. P. G. Jones, GW3IGG, Heywood, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed SA62 4LR.

BOURNEMOUTH (Wessex ARG): G. D. Cole, G4EMN, 6 St. Anthony's Road, Bournemouth (20027), BH2 6PD.

BRISTOL CITY (RSGB): B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, BS20 8HQ. (Bristol 848140.)

BURY: E. R. Thirkell, G4FQE, 59 Oulder Hill Drive, Bamford, Rochdale.

BURY ST. EDMUNDS: P. Lumb, G3IRM, 14 Linton Gardens, Bury St. Edmunds, Suffolk IP33 2DZ.

CHELtenham (Combined): G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.

CORNISH: H. F. Adcock, 1 Bowglas Close, Castle Road, Ludgvan, Penzance TR20 8HD. (Cockwells 562.)

CRAY VALLEY: J. M. B. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.

CRYSTAL PALACE: G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London SE19 2LD. (01-653 4340.)

DERBY (Nunsfield House): I. Cage, G4CTZ, 25 Petersham Drive, Alvaston, Derby DE2 0JU.

EAST LANCs: E. A. Lomax, G4DGR, West End Post Office, Accrington (34012), BB5 4NQ.

ECHELfORD: R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.

EDINBURGH: J. Martin, 22 Ross Gardens, Edinburgh EH9 3BR. (031-667 8707.)

FOSTER-CAMBRIDGE LTD.: D. Davis, 10 Springbrook, Eynesbury, St. Neots, PE19 2DT.

G-QRP CLUB: Rev. G. C. Dobbs, G3RJV, 131A Mansfield Road, Nottingham (411546).

HARROW: M. A. Kipp, G4FBK, 43 Southdown Crescent, South Harrow, Middlesex HA20 0QT. (01-864 1412.)

HEREfORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).

MAIDENHEAD: M. Adams, G3ZLQ, 76 Blind Lane, Bourne End, SL8 5LA.

MAIDSTONE YMCA: M. Baynham, G3VCW, Le Perquage, Copperfield Drive, Leeds, Maidstone, Kent.

MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill (3552), Sussex.

MID-WARWICKSHIRE: N. K. Read, G8CXL, 86 Telford Avenue, Leamington Spa, Warwick CV32 7HP.

MILTON KEYNES: D. Stimson, G3THC, 108 Cambridge Street, Wolverton, Milton Keynes (316730) MK12 5AH.

NORTH BRISTOL: K. Osborne, G8KSS, 10 Mortimer Road, Filton, Bristol BS12 7LF.

NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (244329) HX2 8XG.

PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.

REIGATE: F. H. Munday, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.

ROYAL SIGNALS: Lt.-Col. (Ret.) Sir E. Y. Nepean, Bt., Goldens, Teffont (275), Salisbury, Wilts.

SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex BN20 9JG.

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idea, although if all are sent through the mails it could cost a tidy sum; but certainly the chaps in the Call Book could be sent theirs by hand—who knows, it may turn up some new members or bring back some lapsed ones!

Others

The first of these is the **G-QRP Club**, which is now up to 292 members; but *will all members please note the change of address for G3RJV to that shown in the Hon. Sec. address panel.* Doing this will, it is hoped, reduce the chance of mail going astray and get the information to the members most quickly. Turning to the club and its activities, the latest issue of their **SPRAT** is as usual full of interesting things—your scribe is already in haste to get this piece finished and get the old soldering-iron to work again! Of course the commercial-gear users are catered for also, by way of the **QRP Awards** and so on. In fact this is much more like what we used to call a club—something for everyone, and everyone helping as needed.

The letter from **HB9AMS** about the **Jamboree-on-the-Air** event for 1977 was a bit too late for our longer deadlines, and so for 1977 we've missed the 'bus. All is not lost though, as we can tell you that the 1978 date is the weekend October 21-22, 1978—which should give you time to get ready.

The news from the **Royal Signals** this time is that each issue of "Mercury" is going to cost 14p, and forces a rise in subscription from January 1, 1978. On the other hand, your scribe is of the humble opinion that the issue is front of him right now is one of the best he has seen for a long time. Details from the Hon. Sec.—see Panel.

Finale

That's the pile, once again. For next month the deadline is publication day of this issue—but your forward dates for three months are as usual, and will continue to be each month, set out in a "box" in bold face in the body of the piece. So—let's have your next lot of news, along with the Hon. Sec. name and address, the Hq. address details and all the rest of it. Address it to "Club Secretary," **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime, keep up the good work.

Hold Up!

Just as we were taking this lot to the post, who should we bump into but Postie—bearing *two* packets of several-days-old mail! When we ripped it open, we found several "Clubs" items so we are adding the gen on the end of the piece here, and will take in the Hon. Sec.'s various addresses to the Panel by a quick re-typing job.

B.A.R.T.G., with the familiar fist of **GW3IGG** to tell us that they have their AGM on November 12, at London House, Mecklenburg Square, London WC1; please, members, make the attempt to turn up and give the committee the advantage of hearing your views. On a different tack, the "lectures for clubs" programme goes on, and several thousand miles have been clocked-up by members going to give talks. And, of course, the Newsletter—always well worth a read—has now been turned into "tabloid" shape with the approval of the readership.

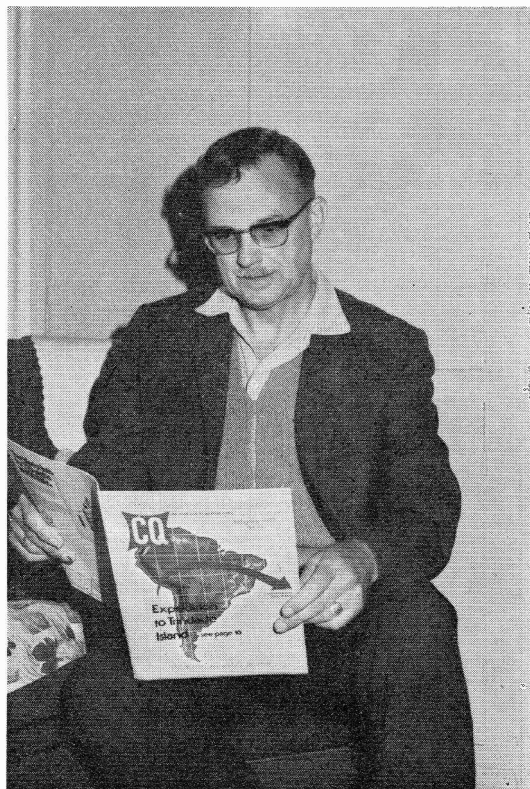
An interesting and off-beat subject for **Torbay** on November 26, is **Marine Biology**, by Mr. L. Jackman.

The Hq. is at Bath Lane, rear of 94 Belgrave Road, Torquay.

Both our next two come from Bristol; let us give the new **North Bristol** its place first; they foregather at Romney Avenue, Lockleaze, every Friday evening. And if you want to take R.A.E. or revise your knowledge, they are doing a course at the Hon. Sec.'s address—see Panel.

Next we have **City of Bristol RSGB** group; their first request is to clarify the route to Hq. for newcomers: to get to the Small Theatre, Queens Building, University Walk, aim yourself for the Wills Memorial Building, that being a well-known Bristol landmark; University Walk is just behind that block and has a "continental-type" barrier entrance. As for the date, that will be November 28, to include a talk by Gordon Mather, G3GKA.

It's November 1, if you want to join **Thames Valley** at their meetings at Giggs Hill Green Library, Giggs Hill Road, Thames Ditton, when their speaker will be G3XZV, who will be talking about that eternal favourite—Aerials. Looking forward a little, nothing is finalised for December 6, but on January 3 comes the Grand Inquisition, in the form of an AGM, something which all members should do their best to attend.



Geoff Watts, Editor of the world-famous "DX Newsheet" 1962-1976, has been elected to the "CO" Hall of Fame in recognition of his services to amateur radio. Geoff, who has been associated with *Short Wave Magazine* for many years, will be the subject of an article in a forthcoming issue; in the meantime, we send him our heartiest congratulations.

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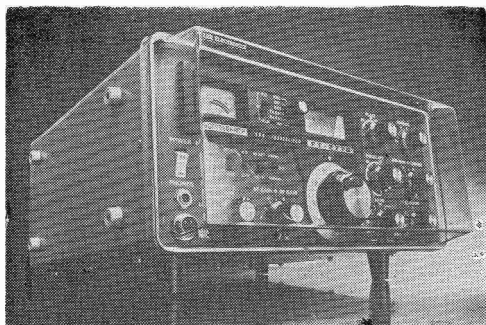
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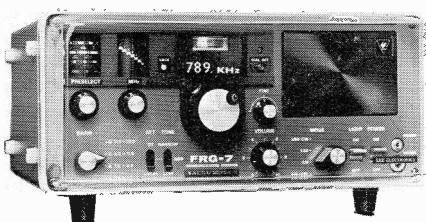
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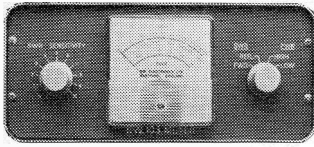


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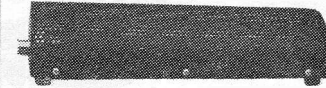
with KW



Decca KW-103 Combined Swr/RF Power Meter is an instrument for measuring a 50 ohm coaxial line feeding an Aerial System or Dummy Load (1) Standing Wave Radio. (2) RF Power with two ranges 0-100 & 0-1000W when used with a 50 ohm Dummy Load.



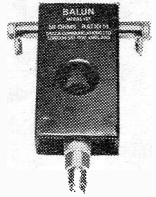
Decca - KW 1000 Linear Amplifier for SSB and CW 10-80 metres, 1200 watts p.e.p. input SSB, can be "driven" by most 100 watt Transceivers and Transmitters. Employs a pair of 1160L Tubes in grounded grid. Pi-section input and output circuits. Built-in 2-4Kv P.S.U.



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



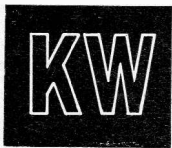
Decca-KW Antenna Tuning System including E-Z match, SWR/RF Power meter, Dummy Load, Antenna switch. High power version KW 109 is available.



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

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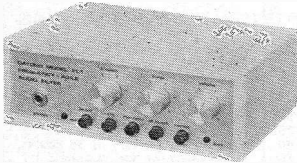
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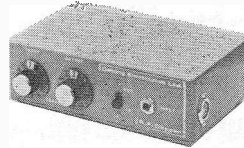
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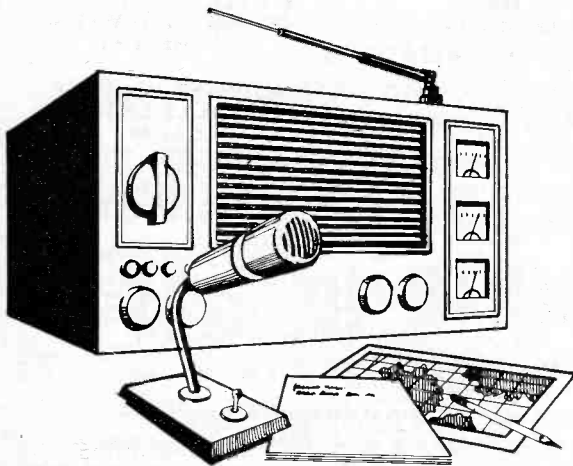
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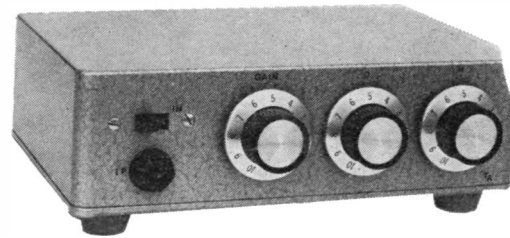
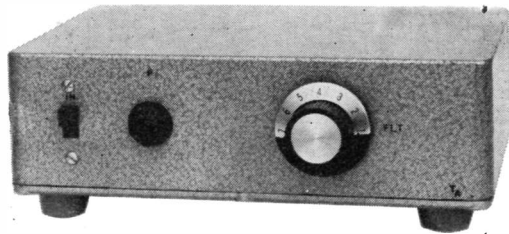
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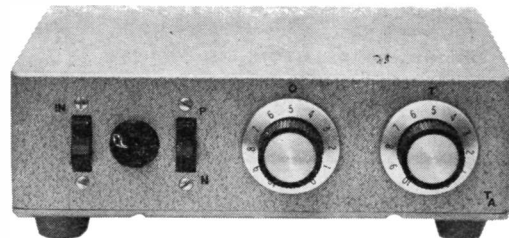
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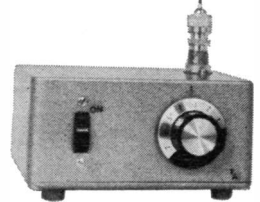
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OUTPUT FREQUENCY														
144-030 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-4/433-2 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-480 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-800 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-850 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-000/S0 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-050/RT ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-075/R3T ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-100/R4T ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-125/R5T ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-150/R6T ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-175/R7T ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-200/R8T ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-300/S12 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-350/S14 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-400/S16 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-500/S20 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-525/S21 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-550/S22 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-575/S23 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-600/S24 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-650/R2R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-675/R3R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-700/R4R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-725/R5R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-750/R6R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-775/R7R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-800/R8R ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-950/S38 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b

PRICES : (a) £2-36 (b) and (c) £2-90 + VAT (H).

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ON/OFF/RX STANDBY SWITCHES for AM10B Cambridge and Vanguard control boxes, 40p each, 3 for £1.

OSMOR REED RELAY COILS (for reed relays up to 1/2" dia., not supplied), 12v., 500 ohm coil, 2 for 50p.

THIS MONTH'S SCOOP PURCHASE, PYE CAMBRIDGE AM AUDIO PCB. Brand new, 60p each, or 4 for £2.00.

ALL BELOW — ADD 8% VAT

WELLER TCP2 and PU2D PSU. Temperature controlled soldering iron with matching Power Supply Unit, containing sponge and spring stand, £30.00.

CHARGER PCBs for ITT Starphone batteries (12v.), with battery compartment. Requires 28v. DC at 50mA. Contains transistorised circuit for constant current limiting, £2.75.

RED LEDs (Min. type), 5 for 70p.

VIDICON SCAN COILS (Transistor type, but no data) complete with vidicon base, £6.50 each. Brand New.

TRANSISTORS

TO3 TRANSISTOR INSULATOR SETS, 10 sets for 50p.

BSX20 transistors (VHF OSC/MULT), 3 for 50p.

BC108 (metal can), 4 for 50p.

PBC108 (plastic BC108), 5 for 50p.

PNP AUDIO TYPE TOS TRANSISTORS, 12 for 25p.

BFY51 TRANSISTORS, 4 for 60p.

BF152 (UHF AMP/MIXER), 3 for 50p.

2N3819 Fet, 3 for 60p.

BC148 NPN SILICON, 4 for 50p.

BC158 PNP SILICON, 4 for 50p.

BAY31 Signal Diodes, 10 for 35p.

BYX 39/300 Stud Rectifiers, 300v. at 2.5A, 4 for 60p.

BA121 Varicap Diodes, 4 for 50p.

IN914 DIODES, 10 for 25p.

741CG RCA OP AMPS, 4 for £1.00.

VALVES

QQV03/20A (ex equipment), £3.00.

QQV03/16 (ex equipment), 75p or 2 for £1.20.

DET-22 (ex equipment), 2 for £1.00.

68H6 (ex equipment), 2 for 50p.

All the above valves are untested, except for heaters, and no guarantee of percentage of emission is given. Sorry, no returns.

68V6 VALVES (BRAND NEW), 85p each or 2 for £1.50.

MULLARD 85A2 85v. STABILISER VALVES (Brand New), 70p each or 2 for £1.20.

ALL BELOW — ADD 12 1/2% VAT

BARGAIN PACK OF LOW VOLTAGE ELECTROLYTIC CAPACITORS. Up to 50v. working. Serronic manufacture. Approx. 100, £1.50 per pack.

A large range of capacitors available at bargain prices, S.A.E. for list.

TV PLUGS (metal type), 4 or 50p.

TV LINE CONNECTORS (back-to-back sckt.), 4 for 50p.

DIN 3-pin LINE SOCKETS, 15p each.

3 PIN DIN PLUGS, 15p each.

ELECTROLYTICS

ELECTROLYTICS, 50µF, 450v., 2 for 50p.

ELECTROLYTICS, 100µF, 275v., 2 for 50p.

ELECTROLYTICS, 470µF 63v., 3 for 50p.

ELECTROLYTICS, 1,000µF 30v., 3 for 60p.

ELECTROLYTICS 5,000 mfd. at 35v., 50p each.

ELECTROLYTICS, 5,000µF 50v., 60p each.

ITT ELECTROLYTICS, 6,800 mfd at 25v., high grade, screw terminals, with mounting clip, 50p each.

MULLARD ELC1043/05 VARICAP TV TUNERS. Brand New, £4.40 each.