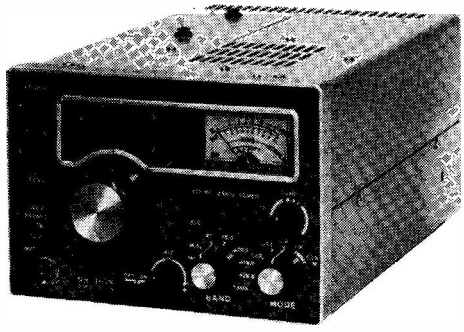
50p

The SHORT WAVE Magazine

VOL. XXXIX APRIL 1981 NUMBER 2

THE SHIMIZU SS105S *80-10 metres ssb/cw transceiver*



This super new transceiver covers 80-10 metres, gives 10W out and is smaller than anything else we have seen so far. Ideal for transverter driving, the SS105S has FM transmit and receive options as well as excellent performance on SSB/CW for HF band use. The SS105S is supplied in semi kit form so as to keep down the price, but all the RF and mixer boards are ready built and aligned so no test equipment is required. All the cabinet work has been carried out so all you have to do is assemble the IF strip, xtal oscillator, and fit them to the completed chassis. Great idea and it brings back the flavour of home brew with the added advantage that the rig will work when you've finished it. For more info. just ask us or come along and see it. It's a great little rig.

		Net.	Inc. VAT	Carr.
SS105S	80-10m solid state SSB/CW/FM transceiver. Semi kit form	225.00	258.75	4.50
SE-NB	Noise blanker kit	6.75	7.76	.50
SE-FMrx	RX FM discriminator kit	15.00	17.25	1.00
SE-FMtx	TX FM generator kit	11.00	12.65	1.00
SE-MK	RX marker kit	9.60	11.04	.50
0.5 CWF	500 Hz CW filter	19.50	22.43	.50
Optional band crystals		3.00	3.45	.25

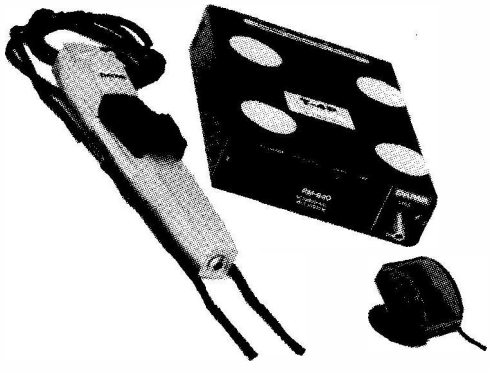
AR 22 *2 metre FM pocket synthesized, 141 - 149 MHz receiver.*

AR 240A *2 metre hand held synthesized 144 - 146 1½ watt transceiver.*

***AR22 £83** inc. VAT. **AR240A £158** inc. VAT. Carriage £1.50*

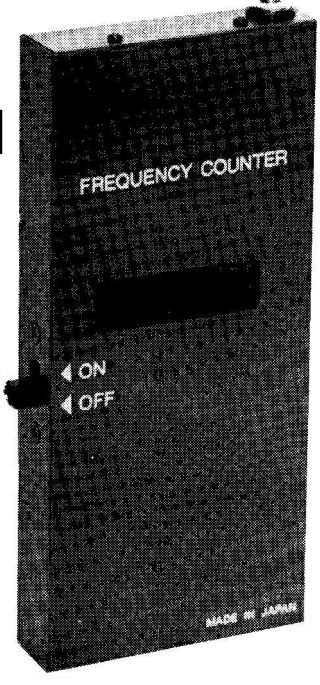
SOON AVAILABLE IS A MARINE VERSION OF THE AR22, THE AR22M, 156 - 162 MHz £89

INFRARED MOBILE MIKE SYSTEM



The Daiwa infrared mike system comprising of a control box, sensor and infrared mike enables you to dispense with the hand mike and cable when operating in your car or shack. By using an infrared beam audio is transmitted from the mike to the sensor and then to the control box which activates the transmitter. To transmit, press the locking switch on the mike and talk. To receive, release the switch and your rig immediately returns to receive. When you have finished your contact return the mike to its slot in the control box and the mike nicad battery is maintained at full charge. For those of you who like fresh air and drive with all the windows open there is a matching wind shield available at an additional 75p. So there we are, the latest in technology to bring safety to your mobile operation, the Daiwa infrared mike.

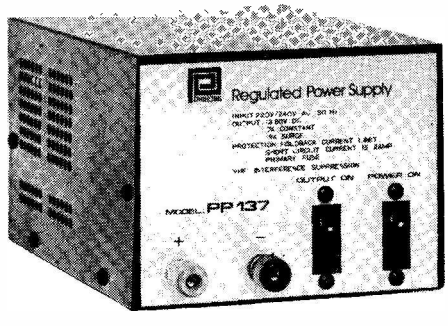
DAIWA INFRARED MIKE SYSTEM
£45.00 inc. VAT. Carriage £1.50.



FREQUENCY COUNTER *Model HFC 55*

The HFC 55 is a sensibly priced, easy to use digital frequency meter covering 10 kHz-55MHz in a single range. The bright 5 digit display gives a direct reading of frequency when the built-in telescopic aerial is placed near a source of RF. The HFC 55 operates from internal dry batteries and is housed in a strong metal case to withstand regular and continuous use.

HFC 55 Frequency Counter **£36.50** *inc. VAT. Carriage £1.50.*



POWER SUPPLY UNITS

the PP1305 . . . . . 4amp 13.8volts d.c. **£18.40** *inc. VAT*
the PP137 . . . . . 7amp 13.8volts d.c. **£32.00** *inc. VAT*
the PP1310 . . . . . 10amp 13.8volts d.c. **£49.50** *inc. VAT*
Carriage £2.00.

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AMATEUR RADIO CENTRE OF THE SOUTH—WELL WORTH A VISIT

		£	£
JBL64	Die-cast clamp	1.20	(0.75)
JBL65	Die-cast clamp	1.30	(0.75)
JBL73	Heavy duty	2.10	(1.00)
MBP	Mast base plate	3.60	(1.50)

AZDEN EQUIPMENT

PCS3000	2m 25W transceiver	219.00	(n/c)
PCS2800	10m 10W transceiver	169.00	(n/c)
5m remote cable kit		25.00	(n/c)

G-WHIP MOBILE ANTENNA RANGE

Tribander Helical 10/15/20 metres	24.75	(2.00)
LF40m Coil for above	6.55	(0.50)
LF80m Coil for above	6.55	(0.50)
LF160m Coil for above	6.55	(0.50)
LF telescopic resonator whip	3.35	(0.75)
Base mount 1 hole fixg + 3m cable	4.50	(0.50)

AERIAL ROTATORS (complete with control boxes)

CDE AR30 (5 core cable)	47.00	(1.50)
CDE AR40 (5 core cable)	59.80	(1.50)
Channelmaster 9502 (3 core)	42.00	(2.00)
Sky King SU4000 (6 core)	75.00	(2.50)
Jaybeam KR400 (6 core)	79.00	(2.00)
CDE alignment bearing	7.75	(1.00)
Channelmaster alignment bearing	11.75	(1.00)

HF ANTENNAS (various manufacturers)

Mini-Prdts HQ-1 20/15/10m 2 ele.	96.50	(2.50)
Mini-Prdts C4 20/15/10m vertical	48.50	(2.00)
Mosley TD3JR 20/15/10m wire dipole	34.50	(1.50)
Mosley "Mini-Beam" 20/15/10m 2 ele. 600w	99.00	(2.00)
Mosely "Mini-Beam" 20/15/10m 2 ele. 2Kw	129.00	(2.00)
Mosely TA32 20/15/10m 2 ele. 600w	89.70	(2.00)
Mosely TA33 20/15/10m 3 ele. 600w	133.40	(2.50)
Mosely Mustang 20/15/10m 3 ele. 2Kw	166.75	(4.00)
Hy-Gain 12AVQ 20/15/10m vertical	43.00	(2.00)
Hy-Gain 14AVQ 40-10m vertical	60.00	(2.00)
Hy-Gain 18AVT/WB 80-10m vertical	87.00	(2.50)
HF5 80-10m vertical 200w	48.00	(2.00)
Radial Kit for HF5	28.00	(2.00)
Sagant EL40X 80-40 dipole (79' long)	36.00	(1.50)
Jaybeam TB3 HF 3 element 2Kw	167.90	(4.50)
Jaybeam VR3 HF vertical 2Kw	42.50	(3.00)

DENTRON	£	£
MLA2500B 6 band 160-10m 2Kw linear	695.00	(n/c)
Clipperton-L 6 band 160-10m 2Kw linear	459.00	(n/c)
DTR-1200L 5 band 80-10m 1.2Kw linear	t.b.a.	(n/c)
GLA-1000B 5 band 80-10m 1Kw linear	295.00	(n/c)
DTR-3KA 1.8-30mHz ATU 2Kw	t.b.a.	(n/c)
MT-3000A 1.8-30mHz ATU 3Kw	275.00	(n/c)
AT-1K 1.8-30mHz ATU 1Kw	99.00	(n/c)
HF200A 80-10m transceiver 100w	399.00	(n/c)
Spare set of D50A tubes	24.00	(n/c)
All band Doublet 1.8-30mHz	22.50	(2.00)
100ft. 470 ohm semi-air spaced	12.00	(1.00)

ADONIS MICROPHONES

AM202G Mobile safety mic.	20.95	(n/c)
AGM202S Mobile safety mic	20.95	(n/c)
AM202H Mobile safety mic.	29.00	(n/c)
AM502G Base station comp. mic.	39.00	(n/c)
AM802G Base station 3 outputs	59.00	(n/c)

SEM PRODUCTS

2 metre power amplifier 5w/30w	50.00	(1.00)
2 metre power amplifier 16w/50w	66.70	(1.50)
2 metre power amplifier Rf sensing 16w in — 100w out 16w/10w	126.50	(1.50)
2 metre converters 28/30, 4/6, 2/4	23.00	(0.35)
2 metre Auto pre-amplifier	21.73	(0.35)
70cm Auto pre-amplifier	24.73	(0.35)
2 metre pre-amplifier	14.95	(0.35)
70cm pre-amplifier	17.73	(0.35)
2-40mHz pre-amplifier	18.66	(0.35)
2-40mHz pre-amplifier	11.73	(0.35)
PA3 2 metre pre-amplifier	8.00	(0.35)
PA70 70cms. pre-amplifier	10.00	(0.35)
Z Match ATU 3.5-30mHz 500 watts	47.15	(1.50)
EZITUNE Aerial tuning aid	30.48	(0.75)
IAMBIC Keyer	34.50	(0.75)

2 METRE PORTABLES

SB2M 2m SSB portable	99.00	(1.50)
AR245 (previously AR240A) 2m FM 5w	178.00	(1.50)
AR245 carrying case	4.10	(0.50)
AR245 optional helical	4.10	(0.50)
AR245 12v DC car adaptor	4.10	(0.50)

VHF/UHF MONITORS	£	£
TM56B FM Scanner 12v DC/230v AC	79.00	(n/c)
008 8 channel FM monitor	69.00	(n/c)
M161 16 channel FM monitor	59.00	(n/c)
MF083 Marine/Broadcast scanner	85.00	(n/c)
BEARCAT 220FB 66-512mHz	258.00	(n/c)
SX200 26-512mHz	240.00	(n/c)
SR9 Tuneable 144-148 or 156-162mHz	46.00	(n/c)
AR22 2m FM synthesized handheld	83.00	(n/c)
AR22 flexible antenna	3.00	(n/c)

VHF/UHF MOBILE AERIALS

ASP201 2m ¼ wave	3.50	(1.25)
ASP2009 2m ⅝	9.25	(2.00)
ASP3009 2m ⅝	9.75	(2.00)
ASP462 70cm co-linear	8.25	(1.25)
Magnetic base adaptor	8.50	(0.75)
ASP677 2m ⅝ wave	14.95	(2.00)
ASP667 70cm co-linear	17.95	(1.25)
ASPM125 27mHz ¼ wave	18.50	(2.00)
Magnetic base adaptor for above	8.50	(0.75)
ASP boot mount adaptor	3.75	(0.50)
2NE 2m ⅞ mobile whip	13.00	(2.00)
RG4M Base for above aerial	3.50	(0.75)
GSS Gutter/boot mount	3.15	(0.50)
MB5 Magnetic mount	7.95	(1.00)
10SE 28mHz whip 1.72m long	11.50	(1.25)
15SE 21mHz whip 1.72 long	11.50	(1.25)
20SE 14mHz whip 1.72 long	13.80	(1.25)

WELZ PROFESSIONAL POWER/SWR METERS

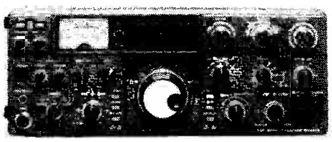
SP200 1.8-160mHz 20w-200w-1Kw	49.95	(n/c)
SP300 1.8-500mHz 20w-200w-1Kw	69.95	(n/c)
SP400 130-500mHz 5w-20w-150w	49.95	(n/c)

SHORT WAVE LISTENER AERIALS	£	£
3-30mHz Inverted "L"	9.95	(1.00)
3-30mHz Broad band dipole	29.00	(1.00)
Mosley RD5 all-band dipole	40.00	(1.00)

AIR BAND PORTABLE MONITORS

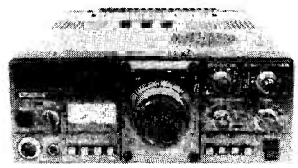
Sharp FX213 tuneable	13.50	(0.75)
INGERSOLL MW/FM/Airband monitor	12.95	(0.75)
R517 Professional Air Monitor	49.50	(0.75)

TRIO TS830S £639.52



A brand new model having all nine bands fitted and providing 200 watts input SSB/CW. Built-in 230V ac supply, 6146B tubes and full digital and analogue display. Plus a really comprehensive variable selectivity and notch filtering system. The DX'ers dream.

TRIO TS130S £491.05



Base or mobile this solid state HF transceiver covers eight bands SSB/CW with a genuine 100 watts output. No tune up, IF tuning and speech processing are just a few of its features. 12V dc operation with full digital display plus optional PS30 for 230V ac operation.

TRIO TR230 £166.00

The TR2300 still amazes us at its value for money. Portable, mobile or base station it is equally at home in all 3 situations. 1 watt 80 channels complete with ni-cad ac charger. An ideal rig for the beginner.

TRIO R1000 £285.20

The receiver that revolutionised short wave listening. Full 30 band coverage 200kHz to 30MHz SSB/CW/AM. Both digital and analogue readouts are provided together with 230V or 12V dc operation facilities. Trio engineering at its best and at a very competitive price.

TRIO TR9000 £345.00

An all mode 2 metre transceiver that serves the dual roll of mobile and base station. Features include digital readout, 12½ or 25kHz steps in FM, five memories band scanning and a lot more! Send for coloured leaflet.

TRIO TR7800 £268.00

The latest Trio 25 watt FM transceiver with a host of features that makes mobile operating a real pleasure. Built-in keypad, digital readout, 14 memories — the list of features is endless. Send a SAE for full details.

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ANTENNAS HF MOBILE

G WHIP HF MOBILE Ant. Fibreglass stems helically wound (exc selecta)

TRIBANDER	Antenna. Two sections 10-15-20m Slide switch	£21.50	SP	£0.75
GWBASESTND	Base standard type	£3.90	SP	£0.55
LF40	Loading coil 40m	£5.70	SP	£0.45
LF80	Loading coil 80m	£5.70	SP	£0.45
LF160	Loading coil 160m	£5.70	SP	£0.45
LFWHIP	Telescopic whip	£2.90	SP	£0.45
MULTIMOBILE	Antenna. Mast head 10-15-20m self selecting	£25.00	SP	£1.00
GWBASESTND	Base standard type	£3.90	SP	£0.55
MM40	Loading coil 40m	£5.70	SP	£0.45
MM80	Loading coil 80m	£5.70	SP	£0.45
MM160	Loading coil 160m	£5.70	SP	£0.45
MMWHIP	Telescopic whip	£2.90	SP	£0.45
FLEXIWHIP	Antenna. Mast + Whip telescopic (10m Basic section)	£15.00	SP	£0.75
GWBASESTND	Base standard type	£3.90	SP	£0.55
FF15	Loading coil 15m	£5.70	SP	£0.45
FF20	Loading coil 20m	£5.70	SP	£0.45
FF40	Loading coil 40m	£5.70	SP	£0.45
FF80	Loading coil 80m	£5.70	SP	£0.45
FF160	Loading coil 160m	£5.70	SP	£0.45
SELECTAMAST	Mast HT Alloy 39 ins Basic section	£9.00	SP	£0.65
SELECTAEXTEND	Mast extension 18" Bumper or fixed use	£5.00	SP	£0.45
SELECTAHEAD	Self selecting coils 3 off, 10-15-20m	£14.50	SP	£0.45
SM40	Loading coil 40m Medium power	£5.70	SP	£0.45
SM80	Loading coil 80m Medium power	£5.70	SP	£0.45
SM160	Loading coil 160m Medium power	£5.70	SP	£0.45
SMWHIP	Telescopic whip (Sm)	£2.90	SP	£0.45
SH10	Loading coil 10m HP (High power) c/w SS Whip	£10.50	SP	£0.65
SH15	Loading coil 15m HP (High power) c/w SS Whip	£10.50	SP	£0.65
SH20	Loading coil 20m HP (High power) c/w SS Whip	£10.50	SP	£0.65
SH40	Loading coil 40m HP (High power) c/w SS Whip	£10.50	SP	£0.65
SH80	Loading coil 80m HP (High power) c/w SS Whip	£13.50	SP	£0.65
SH160	Loading coil 160m HP (High power) c/w SS Whip	£13.50	SP	£0.65
THREADADAPTOR	Thread adaptor 20-24 fits G whip to USA Base (Slug)	£0.80	SP	£0.35
THREADCOVER	Threaded base cover hexagonal chromed "nut"	£0.60	SP	£0.35
HOLDALL	Cloth holdall bag fits multimobile or tribander	£0.95	SP	£0.35
EXTENDAROD	Mast extension 39" improves LF performance (not selecta)	£10.00	SP	£0.65
SMC35	Base heavy duty. Ball type. Rec. Selecta and Multimobile	£5.00	SP	£1.25

HY-GAIN MOBILE ACCS.

415	Bumper strap Stainless steel band c/w base	£10.80	SP	£1.50
499	Body mount domed (hemispherical) chromed 3.5" D	£10.80	SP	£1.00
511	Spring heavy duty barrel shape 3lb 4.5" L	£9.50	SP	£1.25
417	Spring medium duty barrel shape 2lb 4.5" L	£8.20	SP	£1.00

SMC MOBILE WHIP (Whip + coil + helical + spring + mount Bumper or body)

SMCHW/4/A	Antenna (spot f) MHz complete. 2-30MHz	£54.00	SR	£1.50
SMCHW/4/A1-2	Coil/Whip (spot f) MHz. Additional Freq. to spec above	£14.00	SP	£0.55

SMC-HS MOBILE *(Complete antenna = Element + cable assembly)*

SMC20	Element 20m 1.72m 'Fold over' 100W PEP	£12.00	S	£1.50
SMC15SE	Element 15m 1.72m. 'Fold over' 130W PEP	£11.00	S	£1.50
SMC10E	Element 10m 1.72m. 'Fold over' 100W PEP	N/A	S	£1.50
SMC10SE	Element 10m 1.72m. 'Fold over' 200W PEP	£11.00	S	£1.50
SMCSOCA	Cable assembly '239m c/w 4m cable + PL259	£3.00	SP	£0.55
SMCGCD	Gutter clip deluxe adjustable angle	£3.00	SP	£0.55
MX913/M	Dust cover. metric fits SMCSOCA (SO239M)	£0.40	SP	£0.35

ANTENNAS VHF/UHF MOBILE

ASCOT MOBILE ANTENNA *(Complete Unit = Base + Whip + Mount)*

340	Base Stand. ¼ wave 0dB¼ 60-550MHz	£2.00	SP	£0.35
310	Base Swivel ¼ wave 0dB¼ 60-550MHz	£3.65	SP	£0.35
344	Base Sprung ¼ wave 0dB¼ 60-120MHz	£5.55	SP	£0.45
440	Base Stand ⅝ wave 3dB¼ 145MHz	£2.35	SP	£0.35
330	Base Swivel ⅝ wave 3dB¼ 145MHz	£4.35	SP	£0.35
341	Base Sprung ⅝ wave 3dB¼ 145MHz	£6.35	SP	£0.45
350	Base Fine tune ½ wave 3dB¼ 145MHz DC Ground	£6.35	SP	£0.45
351	Base Sprung ½ wave 3dB¼ 145MHz DC Ground	£7.00	SP	£0.55
057	Whip, tapered SS 127cms	£1.70	SP	£0.85
056	Whip, parallel SS 63cms	£0.65	SP	£0.65
085	Mount cable. ⅜ & ¼ c/w 4.5m cable	£2.65	SP	£0.55
085LR	Mount cable. ⅜ & ¼ c/w 4.5m cable. for fibreglass	£3.35	SP	£0.55
092	Mount Mag. ⅜ & ¼ c/w 4.5m cable	£9.35	SP	£0.75
084	Mount cable. ½ wave c/w 4.5m cable	£4.35	SP	£0.55
088	Mount cowl ½ wave to SO239	£5.00	SP	£0.35
091	Mount Magnetic - ½ c/w 4.5m cable	£9.35	SP	£0.75
089	Gutter clip adaptor screw fitting takes all base types	£4.35	SP	£0.55
093	Boot lip adaptor screw fitting takes all base types	£3.30	SP	£0.45
031	Blank off ⅜ & ¼	£0.65	SP	£0.35
044	Blank off cover ½	£0.35	SP	£0.35

BANTEX MOBILE ANTENNA *(Complete unit = Element + Base)*

42SS	Element Stainless 42" 70MHz, low band. ¼ wave	£2.00	SP	£0.95
40GF	Element. Glassfibre 40" 70MHz, low band. ¼ wave	£3.65	SP	£0.95
20SS	Element Stainless 20" 144MHz, high band. ¼ wave	£1.35	SP	£0.65
18GF	Element. Glassfibre 18" 144MHz, high band. ¼ wave	£3.00	SP	£0.65
B5	Element ⅝ Glassfibre. 144MHz 'Open spring' coil	£7.65	SP	£0.95
BGASS	Element ½ Stainless. 144MHz sealed slim black coil	£7.00	SP	£0.95
BGAGF	Element ½ Glassfibre. 144MHz sealed slim black coil	£8.65	SP	£0.95
B5U	Element ⅝ Stainless. 432MHz	£2.65	SP	£0.65
UCL	Element Mid load coil. 432MHz ¼ + ½ wave	£8.35	SP	£0.75
UDL	Element Mid base load. 432MHz ⅝ + ½ wave	£14.00	SP	£0.75
BM	Base standard ½" hole	£2.00	SP	£0.85
BA	Base snap-in type ⅜" hole	£3.00	SP	£0.75
BC	Base claw fixing 11-16mm hole	£3.65	SP	£0.85
BD	Base trunk lip 2 screw fitting	£6.65	SP	£0.55
BMM	Base Magnetic c/w 12' cable	£12.35	SP	£1.00

SMC-HS VHF MOBILE ANTENNA *(Complete unit = Element + Cable Assembly)*

SMC118M	Colinear 2m 11/8 wave with fold over	7dB¼	9.7'	£24.65	SR	£1.75
SMC6PZT/PL	Telescopic 2m PL259 fitting. 6 section	0dB¼		£3.00	SP	£0.35
SMC6PZT/BNC	Telescopic 2m BNC fitting. 6 section	0dB¼		£3.45	SP	£0.35
SMC2H/PL	Helical 2m. PL259 fitting			£3.00	SP	£0.35
SMC2H/BNC	Helical 2m. BNC fitting			£3.85	SP	£0.35
SMC4	Element 70MHz ¼ wave	0dB¼		£6.50	SP	£0.00
SMC2NE	Element 144MHz ⅝ wave fold over	3dB¼	4.3'	£5.50	SP	£1.25
SMC78F	Element 144MHz ⅝ wave fold over	45.dB¼	5.7'	£10.00	SP	£1.25
SMC78B	Element 144MHz ⅝ wave ball adjust	4.5dB¼	5.6'	£11.00	SP	£1.25
SMC258	Element 432MHz 2 x ⅝ fold over	5.5dB¼	3.1'	£10.00	SP	£1.25
SMC358	Element 432MHz 3 x ⅝ fold over	6.3dB¼	4.7'	£12.50	SP	£1.25
SMCOCA	Cable assembly 239m c/w 4m cable + PL259 fits above			£3.00	SP	£0.55
SMCSOCAL	Cable assembly 239m c/w 6m cable PL259			£3.35	SP	£0.35
SMCGCD	Gutter clip deluxe adjustable angle (option for SMCSOCA)			£3.00	SP	£0.55
SMCBSD	Bumper + strap deluxe stainless band			£6.70	SP	£0.75
MX913/M	Dust cover metric fits SMCOCA			£0.40	SP	£0.35

N.B. PRICES EXCLUDE VAT (15%)

ANTENNA ROTATORS

KR500	Kenpro, Elevation type	Meter calb ±90°	to 50Kg load	£75.00	SR	Free
RLD3	SMC, Bell type	Automatic controller	to 0.23 sq. m.	£29.35	SR	Free
505	Stolle, Bell type	Automatic controller	to 0.23 sq. m.	£29.35	SR	Free
AR30	CDE, Offset type	Turn and Push control		£41.00	SR	Free
2050	Stolle, 'Through Rotor'	Automatic controller		£45.00	SR	Free
9502A	Channel Master, offset	Secondary pointer		£46.00	SR	Free
9508	Channel Master, offset	Secondary pointer	to 0.46 sq. m.	£57.00	SR	Free
KR250	Kenpro, Ball type	Twist and Switch control	torque 200Kg/m.	£39.00	SR	Free
AR22	CDE	Solenoid control	to 0.3 sq. m.	£45.00	SR	Free
AR40	CDE	Turn and Push control	to 0.3 sq. m.	£52.00	SR	Free
KR400RC	Kenpro	Round meter 360°	torque 400Kg/m.	£79.00	SR	Free
BT1	CDE	4 set and manual control	to 0.5 sq. m.	£79.50	SR	Free
CD45 ↑	CDE	8 x 4cm meter readout	to 0.8 sq. m.	£99.00	SR	Free
KR600RC	Kenpro	Round meter 360°	torque 600Kg/m.	£115.00	SR	Free
Ham IV	CDE	8 x 4cm meter readout	to 1.4 sq. m.	£145.00	S	Free
T2X	CDE	8 x 4cm meter readout	to 2.8 sq. m.	£199.00	S	Free
H300	HyGain	Digital readout	adequate	£329.00	S	Free

ROTOR HARDWARE

CD562	Support Bearing CDE	1⅝" Stub 1⅝" Main, for AR30Etc.	RRP £8.10	£6.75	SP	£0.85
AK121	Adaptor Kit Tower CDE	"Bell" Rotor to flat plate		£4.00	SP	£0.65
50425	Clamps, U Bolts ST CDE	Replacement AR22 AR40		£4.30	SP	£0.90
50463	Clamps, U Bolt HD CDE	Replacement BT1 CD45 HAM4		£6.40	SP	£1.35
51472	Mast Mount Kit ST CDE	Complete for HAM4 etc.		£10.50	SR	£1.50
51467	Mast Mount Kit HD CDE	Complete for HAM4 etc.		£21.00	SR	£1.50
9523	Support Bearing	Channel Master Upper type 2" mast 1¾" Stub		£10.20	SP	£1.20
9525	Rotary Bearing	Channel Master Guy type to 1½"		£11.30	SP	£0.85
KO50	Rotary Bearing	takes 1⅝" mast		£10.65	SP	£1.00
KO65	Rotary Bearing	takes 2" mast		£15.35	SP	£1.30

ROTOR CONTROL CABLE

RC3W	3 way	For 9502A, 9508	per metre	TOS	
RC4W	4 way	For AR22	per metre	£0.23	Kgo.031
RC5W	5 way	For AR30 AR40 BT1 2010 KR400RC	per metre	£0.26	Kgo.040
RC6W	6 way	For KR500, KR250, KR600RC	per metre	TOS	
RC8W	8 way	For CD45 HAM4 T2X etc.	per metre	£0.39	Kgo.083

GUYED MASTS

TELOMAST, TELESCOPIC (10' Section, Guyed)

TMM30	Mast 30' c/w Plates, Thrust Washers, Clamps, Pins. 32-44mmOD 16G	17Kg	£27.00	R	£3.60
TMM40	Mast 40' c/w Plates, Thrust Washers, Clamps, Pins. 32-51mmOD 16G	22Kg	£37.00	R	£4.55
TMM50	Mast 50' c/w Plates, Thrust Washers, Clamps, Pins. 32-57mmOD 16G	28Kg	£47.00	R	£5.70
TMRK30	Rigging kit 30' (contents detailed below)	11Kg	£30.00	SR	£2.25
TMRK40	Rigging kit 40' (contents detailed below)	17Kg	£42.00	SR	£3.60
TMRK60	Rigging kit 50' (contents detailed below)	31Kg	£51.00	R	£6.25
PR1563	Foot mount swivelling	(Rigging; 30' - 1pc, 40' 1 pc, 50' 1pc)		£2.85	SP	£1.00
CG6	Bulldog Grip 6mmD 'U'	(Rigging; 30' - 18pc, 40' 24pc. 50' 30pc)		£0.16	SP	£0.55
THIM30	Galvanised 30mm OA	(Rigging; 30' - 9pc, 40' 12pc, 50' 15pc)		£0.13	SP	£0.35
TPR933	Turnbuckle 115 x 8mm	(Rigging; 30' - 9pc, 40' 12pc, 50' 15pc)		£0.65	SP	£0.60
SMCGA	Guy Anchor Plates	(Rigging; 30' - 3pc, 40' 3pc, 50' 3pc)		£0.95	SP	£0.40
FE7X18G100	Galvanised 7 x 8	(Rigging; 30' - 3pc, 40' 5pc, 50' 6pc)	100'	£4.40	SR	£1.50
TMCSO	Stand Offs, for coax			£0.20	SP	£0.35
3427	Base Plate to 55mmOD			£4.20	SR	£1.50
GS27	27" 'T' section	Guy Stake		£3.75	SR	£1.50

TOWERS

HAMTOWER (Self-Supporting)

HT30M	Tower 30' c/w HTBG	10' Lattice, 15", 22lbs, Sections	£275.00	RBL	DIST.
HT40M	Tower 40' c/w HTBG		£355	RBL	DIST.
HT10B	Section 10' Base		£82.50	R	£6.80
HT10E	Section 10' Extra		£84.25	R	£7.50
HT10EHD	Section 10' H.D.		£111.15	RE	11.35
HTRM	Roof Mounting frame		£58.50		
HTBG	Base Grillage		£34.00	SR	£3.20
HTTP	Top Plate		£28.00	SR	£2.90
HTCF	Cap Fitting		£28.00	SR	£2.50
HTTM	Tube mount internal		£14.00	SR	£2.90

TELETOWER, Telescopic

TT17	Tower 17m, c/w Rig	75Kg + Rigging	£340.00	L	DIST.
TT17	Tower 24m, c/w Rig	108Kg + Rigging	£495.00	L	DIST.
TT30	Tower 30m, c/w Rig	165Kg + Rigging	£600	L	DIST.

VERSATOWERS Telescopic, Tilting, Galvanised Lattice Towers

10M10P30	30' Nom Post Mount Minitower	£307.00	RL	DIST.
10M10BP30	30' Nom Base Plate Minitower	£325.00	RL	DIST.
13M20P25	25' Std Post Mount	£252.00	RL	DIST.
13M20P40	40' Std Post Mount	£345.00	RL	DIST.
13M20P60	60' Std Post Mount	£422.00	RL	DIST.
13M20P80	80' Std Post Mount	£805.00	RL	DIST.
13M20FB25	25' Std Fixed Base	£188.00	RL	DIST.
13M20FB40	40' Std Fixed Base	£280.00	RL	DIST.
13M20FB60	60' Std Fixed Base	£357.00	RL	DIST.
13M20FB80	80' Std Fixed Base	£739.00	RL	DIST.
13M20SP25	25' Std Socket	£293.00	RL	DIST.
13M20SP40	40' Std Socket	£386.00	RL	DIST.
13M20SP60	60' Std Socket	£464.00	RL	DIST.
13M20SP80	80' Std Socket	£847.00	RL	DIST.
13M20BP25	25' Std Base Plate	£295.00	RL	DIST.
13M20BP40	40' Std Base Plate	£389.00	RL	DIST.
13M20BP60	60' Std Base Plate	£464.00	RL	DIST.
13M20BP80	80' Std Base Plate	£847.00	RL	DIST.
13M20W25	25' Std Wall Mount	£203.00	RL	DIST.
13M20W40	40' Std Wall Mount	£296.00	RL	DIST.
13M20W60	60' Std Wall Mount	£373.00	RL	DIST.
13M20M25	25' Std Mobile Type	£1356.00	RL	DIST.
13M20M40	40' Std Mobile Type	£1484.00	RL	DIST.
13M20M60	60' Std Mobile Type	£1576.00	RL	DIST.
13M20M80	80' Std Mobile Type	£1998.00	RL	DIST.
13M20T85	85' 'T' Post Mount	£1135.00	RL	DIST.
10M10W30	30' Nom Wall Mount Minitower	£295.00	RL	DIST.
10M10FB30	30' Nom Fixed Base Minitower	£285.00	RL	DIST.
16M20P40	40' HD Post Mount	£514.00	RL	DIST.
16M20P60	60' HD Post Mount	£584.00	RL	DIST.
16M20P80	80' HD Post Mount	£880.00	RL	DIST.
16M20P100	100' HD Post Mount	£1061.00	RL	DIST.
16M20FB40	40' HD Fixed Base	£404.00	RL	DIST.
16M20FB60	60' HD Fixed Base	£478.00	RL	DIST.
16M20FB80	80' HD Fixed Base	£880.00	RL	DIST.
16M20FB100	100' HD Fixed Base	£920.00	RL	DIST.
16M20SP40	40' HD Socket	£558.00	RL	DIST.
16M20SP60	60' HD Socket	£640.00	RL	DIST.
16M20SP80	80' HD Socket	£937.00	RL	DIST.
16M20SP100	100' HD Socket	£1118.00	RL	DIST.
16M20BP40	40' HD Base Plate	£524.00	RL	DIST.
16M20BP60	60' HD Base Plate	£606.00	RL	DIST.
16M20BP80	80' HD Base Plate	£902.00	RL	DIST.
16M20BP100	100' HD Base Plate	£1083.00	RL	DIST.
16M20W40	40' HD Wall Mount	£412.00	RL	DIST.
16M20W60	60' HD Wall Mount	£483.00	RL	DIST.
16M20M40	40' HD Mobile Type	£1723.00	RL	DIST.
16M20M60	60' HD Mobile Type	£1823.00	RL	DIST.
16M20M80	80' HD Mobile Type	£2241.00	RL	DIST.
16M20M100	100' HD Mobile Type	£2316.00	RL	DIST.
13M20T120	120' 'T' Post Mount	£1550.00	RL	DIST.

VERSATOWER ACCESSORIES

LG1013W	Luffing Gear 10/13M	For Wall mounting 10M10 and 13M20 Towers	£35.50		£1.75
LG16W	Luffing Gear 16M20	For Wall mounting 16M20 Towers	£68.50		£4.00
HDB10BPFB	HD Bolts (4) M24X450	For BP and FB Minitowers (10M10 Series)	£7.50	SR	£1.50
HDB1316BPFB	HD Bolts (4) M20X300	For BP and FB 13M20 and 16M20 Towers	£15.50	SR	£1.90
T1200	Standard 1200LB		£13.00	SR	£1.50
K1500	Auto-Brake 1500LB		£35.75	SR	£1.60
K2500	Auto-Brake 2500LB		£59.50	SR	£2.85
102A	Electric 110VAC		£181.50	SR	£3.20
AG1500	Electric 12VDC		£155.00	SR	£1.80
WRL	Rope Lubricant 16ozs.	Nominal Aerosol can	£2.40	SP	£0.80

N.B. PRICES EXCLUDE VAT (15%)

CABLES, RADIO FREQUENCY

COAXIAL 50 OHM CABLE							
URM95	Solid centre 2.2mm	dB per 100m:- 1.9/1 7.5/10MHz	per metre	£0.20	SP	Kg 0.014
UR43	Solid centre 5.0mm	dB per 100m:- 1.4/1 4.4/10	per metre	£0.20	SP/R	Kg 0.047
UR43/100	Drum 100m UR43	14.2/100 28.5/300 59.4/1000MHz	per 100m	£19.00	SR	£1.50
UR76	Stranded core 5.0mm	dB per 100m:- 1.7/1 5.4/10	per metre	£0.22	SP/R	Kg 0.045
UR76/100	Drum 100m UR76	17.3/100 31.5/300 72.2/1000MHz	per 100m	£21.00	SR	£1.50
RG58U	Stranded core 5.0mm	dB per 100m:- 1.4/1 4.4/10	per metre	£0.22	SP/R	Kg 0.039
RG58/U/100	Drum 100m RG58U	16.0/100 N/A/300 N/A/1000MHz	per 100m	£21.00	SR	£1.50
RG213	Low loss 10.2mm	dB per 100m:- 0.61 2.0/10	per metre	£0.48	SP/R	Kg 0.170
RG213/100	Drum 100m RG213	6.6/100 12.2/300 24.5/1000MHz	per 100m	£45.00	S	£3.30
UR67	Low loss 10.2mm	dB per 100:- 0.6/1 2.0/10	per metre	£0.52	SP/R	Kg 0.176
UR67/100	Drum 100mm UR67	(6.6/100 12.2/300 24.6/1000MHz	per 100m	£49.00	S	£3.30
COAXIAL 75 OHM CABLE						
307EP	Economy Typic 4.3mm	dB per 100m:- N/A/1 N/A/10	per metre	£0.16	SP/R	
307EP/100	Drum 100m 307EP	10.5/100 18.7/300 37.7/1000MHz	per 100m	£14.00	SR	£1.50
UR70	Stranded light 5.7mm	dB per 100m:- 1.5/1 4.7/10	per metre	£0.24	SP/R	Kg 0.052
UR70/100	Drum 100m UR70	15.2/100 27.8/300 53.5/1000MHz	per 100m	£22.00	SR	£1.50
UR39	Medium duty 7.8mm	dB per 100m:- 0.8/1 2.5/10	per metre	£0.36	SP/R	Kg 0.108
UR39/100	Drum 100m UR39	8.4/100 15.8/300 34.4/1000MHz	per 100m	£33.00	SR	£2.40
UR57	Low loss 10.2mm	dB per 100m:- 0.6/1 1.8/10	per metre	£0.57/R	SP/R	Kg 0.165
UR57/100	Drum 100m UR57	6.2/100 11.4/300 23.4/1000MHz	per 100m	£52.00	S	£3.30
BALANCED TWIN CABLE						
302	75 Ohms light duty	dB per 100m:- N/A/1 N/A/10	per metre	£0.14	SP/R	Kg 0.023
302/100	Drum 100m 302 (75)	12.5/100 20.3/300 38.4/1000MHz	per 100m	£12.00	SR	£1.50
306	300 Ohms Ribbon	dB per 100m:- N/A 1 1.2/10	per metre	£0.15	SP/R	Kg 0.024
306/100	Drum 100m 306 (300)	4.6/100 7.5/300 17.1/1000	per 100m	£13.00	SR	£1.50
2 x 21	240 Ohms Oval foam		per metre	£0.11	SP/R	
2 x 21/100	Drum 100m 2 x 21 (240)		per 100m	£9.00	SR	£1.50

CONNECTORS COAXIAL

BNC COAXIAL PLUG 50 OHMS					
UG88	Standard type 5.5mm	UR(43-76), RG(58-141) also RG(142-223)	£0.64	SP	£0.35
UG959	Large type 11.2mm	UR7, RG(165-213-215) also RG(214-225)	£2.60	SP	£0.35
BNC COAXIAL SOCKET 50 OHMS					
UG290	Standard, 4 hole type		£0.66	SP	£0.35
UG1094	Nut fixing type		£0.62	SP	£0.35
UG89	Free, cable end, 5.5mm	UR(43-76), RG(58-141) also RG(142-223)	£0.82	SP	£0.35
BNC COAXIAL COUPLER 50 OHMS					
UG914	Back to back female		£0.93	SP	£0.35
UG491	Back to back male		£0.93	SP	£0.35
UG274	'T' 2 female 1 male		£1.44	SP	£0.35
SMC3FBNC	'T' 3 female		£1.74	SP	£0.35
UG306	Elbow, Male-Female		£1.62	SP	£0.35
BNC INTERSERIES ADAPTOR 50 OHMS					
UG255	BNC plug-UHF socket		£1.53	SP	£0.35
UG273	BNC socket-BNC plug		£1.53	SP	£0.35
BNC CABLES 50 OHMS					
BNC18BNC	1.5' RG58 BNC ends		£2.22	SP	£0.35
BNC36BNC	3.0' RG58 BNC ends		£2.30	SP	£0.35
BNC36CROC	3.0' RG58 BNC/clips		£2.17	SP	£0.35
UHF COAXIAL PLUG					
PL259	Standard type 11.2mm	50 Ohms (UR67 RG(8-2-13)) 75 Ohms UR57 RG11	£0.48	SP	£0.35
PL259P	Push on type 11.2mm	50 Ohms (UR67 RG(8-23)) 75 Ohms UR57 RG11	£0.69	SP	£0.35
UG175	Reducer 5.0mm	50 Ohms (UR(43-76) RG(58-223))	£0.12	SP	£0.35
UG176	Reducer 5.6mm	75 Ohms (UR70 RG(59-140))	£0.12	SP	£0.35
PL259R	Reduced type 5.0mm	50 Ohms (UR(43-76) RG(58-223))	£0.58	SP	£0.35
PL259A	De-luxe type 11.2mm	50 Ohms (UR67 RG(8-213)) 75 Ohms (UR57 RG11)	£0.98	SP	£0.35
PL259B	De-luxe type 5.0mm	50 Ohms (UR(43-76) RG(58-223))	£0.78	SP	£0.35
PL259SL	'Solderless' 11.2mm	50 Ohms (UR67 RG(8-213)) 75 Ohms (UR57 RG11)	£0.55	SP	£0.35
PL259SS	'Solderless' 5.0mm	50 Ohms (UR (43-76) RG(58-223))	£0.55	SP	£0.35
PL259E	Angle type 5.0mm	50 Ohms (UR(43-76) RG(58-223))	£0.83	SP	£0.35
PL259M	Metric type standard	50 Ohms (UR67 RG(8-213)) 75 Ohms (UR57 RG11)	£0.65	SP	£0.35
PL259PM	Panel mount 4 hole		£0.93	SP	£0.35
UHF COAXIAL SOCKET					
SO239F	Standard 4 hole fix		£0.42	SP	£0.35
SO239F31000	4 hole PTFE Au plate		£0.84	SP	£0.35
SO239T	2 hole fixing type		£0.42	SP	£0.35
SO239NI	Nut fix inside type		£0.51	SP	£0.35
SO239NO	Nut fix outside type		£0.51	SP	£0.35
SO239E	Free angle type 5.0mm	50 Ohms (UR(43-76) RG(58-223))	£0.88	SP	£0.35
	Free cable end 5.0mm	50 Ohms (UR43-76) RG(58-223))	£1.93	SP	£0.35
	Free cable end 11mm	50 Ohms (UR67 RG(8-213)) 75 Ohms (UR57 RG11)	N/A	SP	£0.35
MX913	Dust cap		£0.35	SP	£0.35
MX913/C	Dust cap c/w chain		£0.40	SP	£0.35
MX913/M	Dust cap metric type		£0.40	SP	£0.35
UHF COAXIAL COUPLER					
PL258	Back to back female		£0.79	SP	£0.35
PL274	Back to back chassis		£0.93	SP	£0.35
PL258M	Back to back male		£1.20	SP	£0.35
M359	Elbow male-female		£0.93	SP	£0.35
M358	'T' 2 female 1 male		£1.20	SP	£0.35
M358AF	'T' 3 female		£1.48	SP	£0.35
M458	'X' 3 female 1 male		£1.85	SP	£0.35
UHF INTERSERIES ADAPTOR					
UG255	UHF socket-BNC plug		£1.53	SP	£0.35
UG273	UHF plus-BNC socket		£1.53	SP	£0.35
SO/FP	UHF socket-F plug		£0.60	SP	£0.35
SO/25	UHF socket-2.5mm jack		£0.69	SP	£0.35
SO/35	UHF socket-3.5mm jack		£0.69	SP	£0.35
UHF CABLES					
PL36PL	3.0' RG58 PL259 ends		£1.61	SP	£0.35
N COAXIAL PLUG 50 OHMS					
UG536	Small type 5.5mm	UR(43-76), RG(58-141-142-223)	£2.35	SP	£0.35
UG21	Standard type 11.2mm	UR67, RG(213-165-215) also RG(214-225)	£1.15	SP	£0.35
N COAXIAL SOCKET 50 OHMS					
UG58	Standard 4 hole fix		£0.82	SP	£0.35
UG1052	Free cable end 5.5mm	UR(43-76), RG(58-141-142-223)	£2.49	SP	£0.35
UG23	Free cable end 11mm	UR67, RG(213-165-215) also RG(214-225)	£1.48	SP	£0.35
MX913	Dust cap		£0.35	SP	£0.35
MX913/C	Dust cap c/w chain		£0.40	SP	£0.35

N.B. PRICES EXCLUDE VAT (15%)

ANTENNA PARTS AND ACCESSORIES

ANTENNA WIRE						
CU14SWG	Hard Drawn Copper Single Strand About 14SWG 100lb/mile		per metre	£0.15		kg0.028
CU14SWG108	HD Copper 33m Coil		per 108'	£4.78	SP	£0.65
CU14SWG132	HD Copper 40m Coil		per 132'	£5.87	SP	£0.75
CU7/029H	Hard Drawn Stranded		per metre	£0.16		kg0.026
CU7/036	CAD Copper Stranded		per metre	£0.22		kg0.046
CU7/044	CAD Copper Stranded		per metre	£0.29		kg0.068
CU/TER	CU/Terylene Braid About 3mmD		per metre	£0.14		kg0.011
CU7/029S	Soft Copper Stranded for Radials etc		per metre	£0.15		kg0.026
BALUN TRANSFORMER						
BN86	HY- Gain 1 to 1	3-30 MHz SO239 C/W Bolt for ant mount		£13.50	SP	£0.65
HIQ1	Van Gorden 1 to 1	3-30 MHz SO239 Hang up type		£8.70	SP	£0.55
DIPOLE CENTRE PIECE						
CCJ2BNC	Standard C/W Fitting	UG88 etc to mate with inbuilt BNC Socket		£4.35	SP	£0.45
CCJ2UHF	Standard C/W Fitting	PL259 etc to mate with inbuilt		£4.35	SP	£0.45
CCJ1N	HD Type C/W Fitting	UG21 etc to mate with inbuilt 'N' socket		£8.25	SP	£0.55
CCJ1UHF	HD Type C/W Fitting	PL259 etc to mate with inbuilt UHF socket		£6.35	SP	£0.55
AJU	Polyprop Clamp & Lug	Type		£0.85	SP	£0.35
PARCT	Porcelain 'T' Shaped	Suit Twin flat etc		£0.48	SP	£0.35
INSULATOR END STRAIN						
SMCP2	Polyproplene 3"			£0.37	SP	£0.35
PORC3	Porcelain 3"			£0.48	SP	£0.35
SMCP1	Polyproplene 8.5"			£1.85	SP	£0.35
EG38	Porcelain Egg 1.5"			£0.35	SP	£0.35
EGG51	Porcelain Egg 2.1"			£1.85	SP	£0.45
LIGHTING ARRESTOR						
SMC566	Spark SO239/PL259	Free in line mounting		£2.60	SP	£0.35
SMC567	Spark SO239/SO239	Free in line mounting		£2.60	SP	£0.35
WIGHTTRAPS ANT. TRAP						
IMXST	Standard White 3.5MHz Resonance 500W PIP Each 0.140kg per pair			£6.25	SP	£0.65
IMXHP	High Power Blue 3.5MHz Resonance 1000W PIP Each 0.185kg per pair			£9.40	SP	£0.75
IMXTB	Top Band Spacesaver 1.8MHz Resonance Each 0.155kg per pair			£9.40	SP	£0.65

RIGGING AND FITTINGS

CABLE GRIP						
CG5	Bulldog Grip 5mmD 'U'	(0.1875") Galvanised		£0.14	SP	£0.35
CG6	Bulldog Grip 6mmD 'U'	(0.125") Galvanised		£0.14	SP	£0.35
HD9	Brass Line Champ	For use with copper wire		£0.42	SP	£0.35
BRACKET, STAND OFF						
W12	12". C/W 2" U	Bolts. T Section type. Galvanised pair		£6.50	SR	£1.50
W18	18". C/W 2" U	Bolts. T Section type. Galvanised pair		£8.50	SR	£1.50
W21	21". C/W 2" U	Bolts. T Section type. Galvanised pair		£8.75	SR	£1.50
W21HD	21". HD C/W 2" U	Bolts. D Shaped with Brace. Galvanised pair		£10.95	SR	£1.50
W24	24". C/W 2" ins U	Bolts. T Section type. Galvanised pair		£11.50	SR	£1.50
D SHACKLE, pin size						
DS6	6mm (¼") GALV			£0.24	SP	£0.35
DS8	8mm (5/16") GALV			£0.28	SP	£0.35
DS10	10mm (⅜")GALV			£0.36	SP	£0.45
DS11	11mm (7/16") GALV			£0.54	SP	£0.45
DS13	13mm (½") GALV			£0.63	SP	£0.55
GUY ROPE						
HTS3	HT Steel 3mmD 1 x 19.	Approx BS 720kg per metre		£0.19	kg	0.049
HTS4	HT Steel 4mmD 1 x 19.	Approx BS 1285kg per metre		£0.24	kg	0.086
HTS5	HT Steel 5mmD 1 x 19.	Approx BS 2000kg per metre		£0.28	kg	0.135
HTS6	HT Steel 6mmD 1 x 19.	Approx BS 2875kg per metre		£0.36	kg	0.194
X150	Rustproof 3mmD Multistrand	150 metre		£16.30	SR	£1.50
FE7X18G100	Galvanised 7 by 18 Gauge	100'		£4.40	SR	£1.50
FE7X18G300	Galvanised 7 by 18 Gauge	300'		£12.50	SR	£1.65
TPS3	Terylene 3mmD. Approx BS 70kg	per metre		£0.08	kg	0.007
TPS4	Terylene 4mmD. Approx BS 295kg	per metre		£0.12	kg	0.017
TPS6	Terylene 6mmD. Approx BS 570kg	per metre		£0.17	kg	0.037
TPS8	Terylene 8mmD. Approx BS 1110kg	per metre		£0.29	kg	0.067
GUY STAKE						
GS18	18" 'T' section type 38 x 38 x 5mm Galvanised			£2.55	S	£1.50
GS27	27" 'T' section type 38 x 38 x 5mm Galvanised			£3.75	S	£1.50
GS36	36" 'T' section type 51 x 51 x 6mm Galvanised			£7.75	S	£1.50
GUY TENSIONER						
TPR933	Turnbuckle 115 x 8mm (4.5")			£1.65	SP	£0.60
RS150X10	Turnbuckle 150 x 10mm (6")			£3.85	SP	£0.60
MAST FITTING						
SMCMP3	Guy Plate 3 hole 2" mast zinc plated			£0.95	SP	£0.50
SMCMP4	Guy Plate 4 hole 2" mast zinc plated			£1.65	SP	£0.50
SMCMB3	Guy band 3 hook 2 inch mast fitting			£1.15	SP	£0.60
SMCMB4	Guy band 4 hook 2" mast fitting			£1.65	SP	0.75
SMCMC1	Cap. Cast Alloy. 2"			£1.85	SP	£0.55
SMCMBP1	Base Plate. Alloy. 2". Shoe type			£3.40	SP	£0.65
THIMBLE						
THIM30	Galvanised 330mm OA (1.25") for Steel Wire			£0.13	SP	£0.35
THIM38	Galvanised 38mm OA (1.5") for Steel Wire			£0.15	SP	£0.35
THIM44	Galvanised 44mm OA (1.75") for Steel Wire			£0.17	SP	£0.35
THIM51	Galvanised 51mm OA (2.0") for Steel Wire			£0.22	SP	£0.35
F1235	Nylon 30mm OA/(1.25") for Prestretched Terylene etc			£0.14	SP	£0.35
F985	Nylon 38mm OA/(1.5") for Prestretched Terylene etc			£0.16	SP	£0.35
TUBE(MASTING)						
AL32X16G	Aluminium 1.25" 16 Gauge wall		per metre	£1.40	kg	0.449
AL38X16G	Aluminium 1.50" 16 Gauge wall		per metre	£1.55	kg	0.539
AL49X7G	Aluminium/Nom/2" 7 Gauge wall		per metre	£3.45	kg	1.762
FE49X7G	Steel Galv/Nom 2" 7 Gauge wall		per metre	£2.70	kg	4.810
MISCELLANEOUS HARDWARE						
RB6	Rawbolt 6mm Bolt			£0.25	SP	£0.35
RBBD2	Rawbolt 8mm Bolt			£0.32	SP	£0.35
RB10	Rawbolt 10mm Bolt			£0.42	SP	£0.45
RB16	Rawbolt 16mm Bolt			£1.45	SP	£0.90
PSS25	Pulley 25mm winch stainless frame			£0.48	SP	£0.35
PSS38	Pulley 38mm winch stainless frame			£0.68	SP	£0.35
55904	Cable clip 10-14mm			£0.07	SP	£0.35
55903	Cable clip 7-10mm			£0.05	SP	£0.35
SMC53	Mast to boom clamp 1.2" mast to 1" boom 1 diagonal U Bolt			£1.10	SP	£0.75
SMC63	Mast to boom clamp 1.2" mast to 1-1.25 boom 2 parallel U Bolt			£1.25	SP	£1.00
SMC73	Mast to boom clamp 1.2" mast to 1" boom heavy duty			£1.85	SR	£1.50
SMC59/15	Mast Jointing sleeve 15" long for 2"			£4.95	SR	£1.50
SH63	Shap hook 63mm O/A			£0.68	SP	£0.35
UBOLT2	'U' Bolt 2" Centre 9mm Galvanised			£0.32	SP	£0.45
ER4	Earth rod copperweld 4 foot C/W Clamp			£4.25	SR	£1.50
SMC2LK	Lashing kit, 2 way C/W wire clamps bolts			£5.00	SR	£1.50

N.B. PRICES EXCLUDE VAT (15%)

ANTENNAS HF FIXED/TRANSPORTABLE

GEM QUAD PRODUCTS

GQ2E	2 Element Antenna 10-15-20m 18'x18'x9.5' "Boomless"				£124.00	R	£3.75
GQ3E	3 Element Antenna 10-15-20m 6.5' Boom				£187.00	R	£6.45
GQ4E	4 Element Antenna 10-15-20m 13' Boom				£249.00	R	£7.05
GQCK1	Conversion Kit 1 Ele (2 to 3 to 4 Element)				£63.00	R	£2.90
GQCK2	Conversion Kit 2 Ele (2 to 4 elements)				£125.00	R	£4.70
GQSPIDER	Centre piece (spare) welded aluminium				£26.25	SP	£1.25
GQSPREADER	Spreader Arm (spare) tridetic fibreglass 13.6' 2.2lb				£9.85	R	£1.50

HY GAIN HF ANTENNA *(Commercial, Industrial & Military Antennas to Order)*

12AVQ	Vertical 10-20m inc. trapped self supporting		14.0'H	£37.50	SR	£1.50
14AVQ/WB	Vertical 10-40m inc. trapped self supporting		18.0'H	£52.50	SR	£1.50
18AVT/WB	Vertical 10-80m inc. trapped self supporting		25.0'H	£76.00	SR	£1.50
14RMQ	Roof mounting Kit 12AVQ 14AVQ & 18AVT			£19.50	SR	£1.50
18V	Vertical 10-80m inc. loaded "tapped"		19.0'H	£27.80	SR	£1.50
18HT	"HY Tower" 10-80m Stub decoupler		50.0'H	£225.00	R	£10.90
103BA	3 Ele Yagi 10 metres	17.0'LE	8.0'B	£51.00	SR	£1.50
105BA	5 Ele Yagi 10 metres	18.5'LE	24.0'B	£92.00	R	£2.75
153BA	3 Ele Yagi 15 metres	23.0'LE	12.0'B	£62.75	R	£2.05
155BA	5 Ele Yagi 15 metres	24.5'LE	26.0'B	£117.50	R	£4.15
203BA	3 Ele Yagi 20 metres	35.0'LE	16.0'B	£117.50	R	£3.45
204BA	4 Ele Yagi 20 metres	36.5'LE	26.0'B	£155.00	R	£5.10
205BA	5 Ele Yagi 20 metres	36.5'LE	34.0'B	£205.00	R	£6.60
402BA	2 Ele Yagi 40 metres	43.0'LE	16.0'B	£158.00	R	£4.55
DB10/15A	3 Ele Yagi 10-15m	23.0'LE	13.0'B	£115.00	R	£3.40
TH3JNR	3 Ele Yagi 10-15-20m	24.2'LE	12.0'B	£113.50	SR	£2.15
TH2MK3	2 Ele Yagi 10-15-20m	27.3'LE	6.0'B	£109.75	R	£2.25
TH3MK3	3 Ele Yagi 10-15-20m	27.0'LE	14.0'B	£157.00	R	£4.05
TH5DXX	"Thunderbird" 5 Ele	31.0'LE	18.0'B	£178.30	R	£4.70
TH6DXX	"Thunderbird" 6 Ele	31.1'LE	24.0'B	£205.00	R	£5.90
HYQUAD	2 Ele Quad 10-15-20m	13.5'TR	8.0'B	£169.00	R	£4.25
18TD	Dipole Tape 10-80m		132'	£56.00	SP	£2.00
BN86	Balun Ferrite 1:1 3-30MHz SO239 Input C/W U Bolt			£13.50	SP	£1.00
LA1	Lightning Arrestor Gas filled bulkhead Mount SO239			£39.50	SP	£0.65

JAYBEAM HF ANTENNA

VR3	Vertical 10-15-20m DC Short	6lb	13.5'H	£37.00	R	£1.50
TB3	3 Ele Yagi 10-15-20m PEP	14.6'TR	14.1'B	£146.00	R	£3.75

KLM HF ANTENNA *(Multi purpose log periodics and long Yagis to Order)*

KT34	4 Ele 10-15-20m controlled BW 4KW	24.0'LE	15.0'B				

MINI BEAM ANTENNA

C4	Vertical Miniature 10-15-20m	8LB	11.5'H	£42.15	SR	£1.50
HQ1	"Mini" Quad beam 10-15-20m	11.0'LE	4.5'B	£83.85	SR	£2.80

MORGAIN DIPOLE. COMPRESSED LINEAR LOADED 14AWG 40% Copperweld

4010HD	Antenna 10-40m	Nom 50 Ohms	2.5KW	PIP	1.0Kg	36'	TBA
8010HD	Antenna 10.80m	Nom 50 Ohms	2.5KW	PIP	1.4Kg	69'	TBA
MGCCAP	Coax socket adaptor plate (terminals to SO239)						

MOSLEY HF ANTENNA

TA31JR	Dipole 10-15-20m NB 1½" only. 200W RMS	13.3'TR	26.7'E	£50.00	B	£4.50
MCK31/32JR	Conversion Kit TA31 to TA32			£45.00	B	£4.50
TA32JRE	2 Ele trapped beam 10-15-20m 200W RMS	13.7'TR	6.0'B	£78.00	R	£2.25
MCK/32/33JR	Conversion Kit TA32 to TA33			£50.00	B	£4.50
TA33JRE	3 Ele trapped beam 10-15-20m 200W RMS	14.7'TR	12.0'B	£116.00	R	£2.40
TA33JRHPE	3 Ele C/W Balun HP (High power TA33JRE)	14.7'TR	12.0'B	£132.00	R	£2.60
MUSTANG1	Dipole 10-15-20m 1KW RMS	13.3'TR	26.3'B	£66.00	B	£4.50
MUSTANG2	2 Ele trap beam 10-15-20m 1 KW RMS	14.7'TR	6.0'B	£117.00	R	£2.40
MUSTANG3	3 Ele trap beam 10-15-20m 1KW RMS	15.0'TR	12.0'B	£145.00	R	£2.60
MCK33/MUSTANG	Conversion kit 1 Ele (Driven) only			£55.00	B	£4.50
ELAN1	Dipole 10-15 metres 10-15m 200 RMS	10.1'TR	20.3'E	£46.00	B	£4.50
ELAN2	2 Ele trapped beam 10-15m 200W RMS	11.0'TR	6.0'B	£66.00	B	£4.50
ELAN3	3 Ele trapped beam 10-15m 200W RMS	12.0'TR	12.0'B	£93.00	R	£2.40
RD5	Trapped dipole ham bands. Wire kit SWL only		69.0'E	£35.00	SR	£1.25
SWL7	Trapped dipole BC Bands. Wire kit		40.0'E	£35.00	SP	£1.25

SMC DIPOLE ANTENNA *(Made up, centre insulator, end insulators, wire)*

SMC10MD	10m	CCJ2	SMCP2	7029H	c/w PL259	max 17.5'	£10.85	SP	£0.65
SMC12MD	12m	CCJ2	SMCP2	7029H	c/w PL259	max 19.7'	£11.00	SP	£0.65
SMC15MD	15m	CCJ2	SMCP2	7029H	c/w PL259	max 23.4'	£11.05	SP	£0.65
SMC17MD	17m	CCJ2	SMCP2	7029H	c/w PL259	max 27.2'	£11.30	SP	£0.75
SMC20MD	20m	CCJ2	SMCP2	7029H	c/w PL259	max 35.2'	£12.00	SP	£1.00
SMC30MD	30m	CCJ2	SMCP2	7036	c/w PL259	max 48.7'	£13.00	SP	£1.25
SMC40MD	40m	CCJ2	SMCP2	7036	c/w PL259	max 70.3'	£14.65	SP	£1.50
SMC80MD	80m	CCJ2	SMCP2	7036	c/w PL259	max 140.6'	£18.85	SR	£1.50
SMC160MD	160m	CCJ1	SMCP1	7044	c/w PL259	max 273.3'	£37.00	SR	£1.50

SMC MANPACK DIPOLE 3-30MHz. Adjustable. PVC Copper/Terylene Braid.

LWBA	Antenna c/w 9m RG58, 80' Halyard Tails, Coax Plugs etc.	£39.50	SP £1.50

SMC TRAPPED DIPOLE 10-80m. 100' Potted Traps. Mil Spec. Centre Insulator

SMCTD/S	Standard 14SWG white traps hard drawn copper 500W pep	£26.50	SP £1.50
SMCTD/HP	Hi power 14SWG blue traps hard drawn copper 1000W pep	£29.50	SP £1.50
SMCTD/P	Portable package ant copper/terylene braid. 75' coax, plugs	£32.50	SR £1.50

SMC-HS ANTENNA

SMCHF5V	Vertical 10-80m Trapped self supporting	15.7'H	£35.00	SR	£1.50
SMCHF5R	Radial kit, loaded, 5 solid rods at 45 degree	6.5'-7.3'	£26.00	SR	£1.50

ANTENNAS VHF/UHF FIXED

HIDAKA VHF ANTENNA

LT606	Log periodic 50-500 3dB¼			£75.95	R	£1.50

JAYBEAM 4 METRE

4Y/4M	Yagi, 4 element length 7.5'	7.0dB	£18.00	SR	£1.50
PMH2/4M	Harness, 2 way		£10.60	SP	£1.25

JAYBEAM 2 METRE

HO/2M	Halo, head only	1' square	-30dB	£3.95	SP	£0.55
HM/2M	Halo, with 24" mast	1' square	-30dB	£4.70	SP	£0.65
UGP/2M	Ground plane folded radiator	height 1.7'	0.0dB	£8.80	SP	£1.50
C5/2M	Colinear omni. vert	height 13.1' 7.1lb	4.8dB	£38.5	SR	£1.50
LR1/2M	Colinear	height 9.8' 3.3lb	4.5dB	£21.00	SR	£1.50
5Y/2M	Yagi, 5 element	length 5.2'	7.8dB	£9.80	SR	£0.50
8Y/2M	Yagi, 8 element	length 9.2'	9.5dB	£12.60	SR	£1.50
10Y/2M	Long Yagi 10 element	length 14.4' braced	11.4dB	£27.00	SR	£1.50
14Y/2M	Long Yagi 14 element	length 17.5' braced	13.0dB	£31.30	SR	£1.50
D5/2M	Yagi, 5 over 5 slot	length 5.2'	10.6dB	£17.50	SR	£1.50
D8/2M	Yagi, 8 over 8 slot	length 9.2'	12.3dB	£23.60	SR	£1.50
PBM10/2M	10 ele parabeam	length 12.9' braced	12.4dB	£32.00	SR	£1.50
PBM14/2M	14 ele parabeam	length 19.5' braced	13.7dB	£39.00	SR	£1.50
Q4/2M	Quad, 4 element	length 4.9'	10.0dB	£20.60	SR	£1.50
Q6/2M	Quad, 6 element	length 8.7'	12.0dB	£27.30	SR	£1.50
5XY/2M	Yagi, 5 ele crossed	length 5.5'	7.6dB	£19.80	SR	£1.50
8XY/2M	Yagi, 8 ele crossed	length 9.2'	9.5dB	£24.70	SR	£1.50
10XY/2M	Yagi, 10 ele crossed	length 11.8'	11.3dB	£32.80	SR	£1.50
PMH2/C	Harness, Cir. Polar.			£6.50	SP	£0.45
PMH2/2M	Harness, 2 way			£8.60	SP	£0.75
PMH2/2ML	Harness, 2 way long -- for large antennas			£9.60	SP	£1.00
PMH4/2M	Harness, 4 way			£20.10	SP	£1.50

JAYBEAM 2M/70CMS

X6/2M/X12/70	Ant 6 ele 2. 12 ele 70	length 7.2' 12.0dB	8.5dB	£33.50	SR	£1.50

JAYBEAM SEVENTY CMS

C8/70	Colinear, Omni. Vert.	height 10.5' fibreglass	7.8dB	£43.50	SR	£1.50
D8/70	Yagi, 8 over 8 slot	length 3.6'	12.3dB	£18.00	SR	£1.50
PBM18/70	Parabeam 18 element	length 9.2'	14.9dB	£22.00	SR	£1.50
MBM48/70	Multibeam, 48 ele	length 6.0'	15.7dB	£25.00	SR	£1.50
MBM88/70	Multibeam, 88 ele	length 13.1'	18.5dB	£34.20	SR	£1.50
8XY/70	Yagi, 8 ele crossed	length 8.5'	10.0dB	£29.70	SR	£1.50
12XY/70	Yagi, 12 ele crossed	length 8.5' c/w H'ness, 'N' skt	13.0dB	£36.80	SR	£1.50
PMH2/70	Harness, 2 way			£7.40	SP	£0.65
PMH4/70	Harness, 4 way			£15.70	SP	£1.25

JAYBEAM 1296MHz

D15/23	Yagi, 15 over 15 slot	length 2.8'	15.0dB	£29.60	SR	£1.50

JAYBEAM 136MHz

8XY/S	Yagi, 8 ele crossed (satellite band)		9.0dB	£25.70	SR	£1.50
10XY/S	Yagi, 10 ele crossed (satellite band)		11.0dB	£33.80	SR	£1.50

JAYBEAM BAND 2

SBM4	Yagi, 4 element			£14.30	SR	£1.50
SBM6	Yagi, 6 element			£20.50	SR	£1.50
FMS9	Yagi, 9 element multi reflector			£36.70	SR	£1.50

KLM VHF ANTENNA (special orders only -- Prices to be agreed)

KLM-130-15	Log Periodic 15 ele 35-135MHz			£190	
KLM144-13LB	Yagi 144MHz 13 ele optimised long boom	15.5dB	21.5'B	£70.00	
KLM432-16LB	Yagi 432MHz 16 ele optimised long boom	15dB	12.5'B	£60.00	

KLM BALUN, SLEEVE (Prices to be agreed)

144-148-50N	2m	50-50	N Type	2KW		£19.30
144-148-62N	2m	50-75	N Type	2KW		£19.30
144-148-75N	2m	50-100	N Type	2KW		£19.30
144-148-100N	2m	50-200	N Type	2KW		£19.30
420-470-50N	70cms	50-55	N Type	2KW		£19.30
420-470-62N	70cms	50-75	N Type	2KW		£19.30
420-470-75N	70cms	50-100	N Type	2KW		£19.30
420-470-100N	70cms	50-200	N Type	2KW		£19.30

KLM POWER DIVIDER (Prices to be agreed)

140-150-2N	2m	2 way	N Socket	2KW	50 ohms	£21.30
140-150-4N	2m	4 way	N Socket	2KW	50 ohms	£30.00
400-470-2N	70cms	2 way	N Socket	2KW	50 ohms	£19.30
400-470-4N	70cms	4 way	N Socket	2KW	50 ohms	£26.95

SMC VHF ANTENNA

GP2U	Ground Plane OdB¼	1.7'	£4.35	SP	£1.00

SMC-HS VHF ANTENNA

SMCGDX1	Discone 80-480MHz 3dB¼ low VSWR 6.6lbs	3.3'	£36.00	SR	£1.50
SMCGFX2	Discone 50-480MHz 3dB¼ Rx only	6.2'	£41.70	SR	£1.50
SMCVHFL	Discone 65-520MHz	5.0'	£14.65	SR	£1.50
SMCGP-144W	Colinear 2m Multi ⅝ wave 6.5dB	10.2'	£21.70	SR	£1.50
SMCGP432X	Colinear 70cms 3 x ⅝ wave 6.8dB	5.6'	£24.35	SP	£1.00

TELEWAND UHF ANTENNA (Quads to order)

TW435D	Discone 400-1200MHz 0.3Kg	1.2'	£23.00	SP	£0.50
TW400C	Quad-Loop 12 ele 432MHz 15.5dB 2.0Kg	7.9'B	£44.95	SR	£1.50
TW400B	Quad-Loop 18 ele 432MHz 18.0dB 3.0Kg	11.5'B	£59.35	SR	£1.50
TW400A	Quad-Loop 25 ele 432MHz 20.5dB 3.5Kg	16.1"B	£82.35	SR	£1.50

NB. All prices (including carriage) exclude VAT 15%. The code letters which follow the price indicate: (i) S, Securicor delivery is possible, (ii) Normal transport means (P post, R road, L lorry).

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Cables, ropes. etc., are shown as weight per unit length. Carriage is £1.50 to 7Kg thereafter add an extra £0.15 per Kg.

ADVERTISERS' INDEX

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CONTENTS

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AUTHOR'S MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of A4 sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT WAVE Magazine

EDITORIAL

FM Citizens Band

A more inept approach to legalising CB, based on half-cooked technical data, one would look far to see. Since all the UK illegal CB seems to be on basically AM equipment, the question now arises — what is to be done about the AM (including SSB) lawbreakers? One would guess, *nothing*. Why? Because the people who are to do the enforcement haven't adequate powers. Why? Because some snuffling senior civil servant is not going to let it out of his pigeonhole lest he get nailed for making a decision before retirement! For that, we talk about earnings-related inflation-proof pensions — *yeuch!*

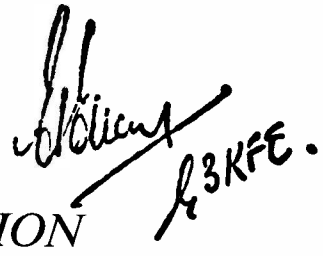
So — what does it mean to the amateur fraternity? We see one immediate problem, and that, clearly is the spillover into the 28 MHz CW segment, which is already happening. Since authority won't do anything, we have to do it ourselves. Either work the guy, get his address out of him, and organise the disappearance of his rig, which can be given as a present to Timothy Raison MP, or, alternatively, put some CW at high speed on a tape and direct it with full power on to the perisher until he moves out of our band. If two stations co-operate, they can send practice moonbounce QSOs, or even just ordinary ones; but if we don't get in there and fill that band, we will for all practical purposes have lost it.

A Very Good Question to add to the brew is this: some of the Yaesu rigs have CB, presumably at the same 100-watt output level as for the amateur bands, as part of their specification. Therefore we enquire how Yaesu could design a CB facility that is above the legal level in any country that the writer knows of, and market it world-wide. Secondly, since the importation of these rigs was illegal unless the CB segment was disabled on transmit (as we understand the law), under what unknown ordinance has it been possible for such gear to be freely on sale from umpteen outlets of all descriptions, not just to licensed amateurs *but to the CB fraternity as well.* Make no mistake, a few painful hours listening on 27 MHz will indicate the number of FT-901's and such being used by CB operators and, what is more, leading the creep into our 28 MHz CW segment.

Sure, it's easy to modify anybody's HF rig to go on CB, but to put it on the front panel is more than a little different. And it's no use blaming the RSGB for this one: we know they, like us, and lots of others who feel strongly, have been getting just no sense out of the authorities.

Prizewinners

The Volume 38 article prize has been awarded jointly to Rev. G. C. Dobbs G3RJV, and Chris Page G4BUE. George Dobbs' "The S.C.D." provided a simple, practical, and highly effective design for a QRP transmitter. One of the main features, we felt, of G4BUE's "An Introduction to QRP Operation" was the emphasis it placed on the value of high operating standards in general — standards which are all too often these days sadly watered-down and sometimes even non-existent (a situation hardly helped by the present massive illegal and untrained use of the ether). Congratulations to both of them!



WORLD-WIDE COMMUNICATION

VHF BANDS

NORMAN FITCH, G3FPK

Convention Time

SATURDAY, April 11 should see hordes of VHF types making their ways to the new venue, The Sandown Park Racecourse, in Esher, Surrey, for the annual *RSGB VHF Convention*. As in previous years, the event comprises three sections:— a comprehensive trade show from 1030, a three stream lecture period from 1430 for three hours, and a social evening from 1930 to midnight.

Geoff Stone, G3FZL, says that all the trade stands were sold out within ten days of their notifying exhibitors and a list has been opened for next year already. Some 10,000 square feet of exhibition space is available so traders will be displaying "black boxes" as well as components and accessories. Specialist groups will be represented and there will be a display of home-constructed gear.

The Convention Address at 1400 will be given by RSGB President Basil O'Brien, G2AMV. Lecture stream "A" is described as *General,* and starts with G4ANB on locator systems, present and future. This will be followed by *Magazine* author John Nelson, G4FRX, on "The Use and Abuse of the 4CX250-series of Transmitting Valves," based upon his definitive articles. The final session is on "Repeaters. Where do we go from here?" by G3XDV.

The "B" stream is devoted to *VHF Propagation and Satellite Communications,* and starts with G2FKZ with "Aurora. The Boundary Fence Problem," followed by G3COJ and Thomas Damboldt, DJ5DT, on "VHF Ionospheric Propagation." The last talk will be by G3AAJ and other AMSAT members on the "New series of OSCARS." Stream "C" is *Microwaves* and starts with G4CNV and Mrs. Petra Suckling, G4KGC, on "Making a start on 10GHz," followed by G3WDG on "Microwave E-M-E" and ending with G8AGN on "Microwave Propagation."

The Social Evening is to feature a "Substantial 'knife and fork' three course plus coffee buffet supper," with dancing to the *Second Foundation Modern Dance Band,* and the presentation of awards at 2100. Tickets for the Convention only are £1 (75p for under-18 folk) and for the Convention and Evening Festivities, £7.50. Those only going for the evening affair will also pay £7.50. Advanced booking for the £7.50 version by *April 8 latest,* applications to:— Miss D. P. Beisiegel, RSGB, 35 Doughty Street, London WC1N 2AE, with cheques made out to the RSGB. Tickets for the Convention and Exhibition *only* will be available at the turnstiles.

The site is about half a mile west of the *Scilly Isles* roundabout, on the north side of the Portsmouth Road, now the A307. Entrances A, B and C are earmarked for the event and there is very ample car parking. It will be a pleasant change not to have to wander between two, separate buildings as used to be the case in the *Winning Post* era.

Awards News

Paul Turner, G4IJE, from Sheering in Essex, is the 12th reader to be awarded a 2m. QTH Squares Century Club certificate. All the QSOs were made after January 1, 1979 and comprised 66 *via* tropo., 3 by *Ar,* one *via E's* and 31 by MS mode, giving him a total of 101 confirmed, out of 168 worked. The QTHCC was issued on February 23. Simultaneously, Paul was awarded 2m. VHF Century Club certificate no. 334.

David Thorpe, G4FKI, has won 4m. VHFCC certificate no. 13, the breakdown being 66 on SSB, 15 on CW, 12 on AM and 7 on FM. His first 4m. contact was G4APA on March 15, 1978 using a *Pye* Vanguard Tx. and a converter to a tunable Rx. The Vanguard was later modified for CW and in 1979, a valve transverter was built. The present station uses an *Icom* IC-201 to drive a *Microwave Modules* MM70/144 transverter, providing 10 watts to a 3-ele. beam. So far, 5 countries and 45 counties have been worked and QSOs with northern GM counties and any EI or GI stations are sought. The best DX heard is ZB2BL, with GM3YOR (YQ) the best worked.

On 2m. Pam Rose, G8VRJ, from Sturton by Stow in Lincolnshire, receives VHFCC award no. 332. Her licence arrived on February 22, 1980 and she had a ready made station to operate, that of her husband, G8CTG. The station consisted of a *Yaesu* FT-301 and *MM* transverter with a *10XY* aerial on a 60ft. tower. Pam soon discovered she liked DX hunting so the installation was updated by adding a low-noise preamplifier, power amplifier and better coaxial feeder. Last September, a *Cushcraft* 19-ele. "Boomer" was bought and G8VRJ has since obtained a couple of RSGB awards as well as her VHFCC. She also operates on 70cm. from the 10ft. *a.s.l.* QTH (ZN57j) in the Trent Valley.

Neil Clarke, G8VFV, from Ferrybridge in W. Yorks., has won 2m. VHFCC certificate no. 333. He passed the *R.A.E.* in December 1979 and got his call on February 11, 1980 making his first QSO on the 17th. Initial operation was on FM, then on SSB using a borrowed *Trio* TR-7010 until July. Next, an *Icom* IC-202 and *S.E.M.* 30 watts amplifier were acquired and the 6-ele. *Yagi* changed for a 12-ele. *ZL-Special.* Neil's QSL return rate has been 75-80% and he thanks all those interesting stations, local and DX, he has worked and especially those who QSL-ed promptly. He just missed being the first G8V-- to get a VHFCC certificate — that went to G8VRJ — but he was the first OM to win one in the series, and for all SSB.

Stephen Clarke, G8LXY, from Luton, received 2m. VHFCC award no. 335. His interest in amateur radio was stimulated by his science master at school, Greg Gilman, G3SCP, and he took the *R.A.E.* in May, 1974 but did not get the licence till August 1976. His first QSO was with G4EYR on March 4, 1977 using a *Yaesu* FT2-FB to a curtain rail aerial. This was superseded by a *Uniden* 2030 transceiver and 5-ele. *Yagi.* An IC-202, borrowed in December 1977, whetted his appetite for SSB. 1979 saw an interest in contest operating, so an *Icom* IC-211E was bought in July. Further ideas include the use of an RF speech processor, the possible replacing of the IC-211E with a 144/432 MHz, dual-band transceiver with 70cm. operation in mind. For details of the *Magazine's* VHF/UHF awards, send an *s.a.e.* to the address at the end of this feature.

Beacon Notes

José Mª Gene, EA3LL, has written that EA3XS does sometimes put his Tx on 2m. on 144.153 MHz, just sending his call sign and this explains the signals on MS during the *Quadrantids* referred to in the February feature. On from Kenya on 6m. is reported a beacon 5Z4YV on 50.025 MHz. To date, FX3THF on 144.905 MHz has not reappeared and there is no authentic news concerning its operation. Nearer home, engineering work in connection with the fourth TV channel on the site of the Angus beacon, GB3ANG, on 144.975 MHz, will result in some intermittent service over the next few months.

Contests

The 1,296 MHz Trophy and *s.w.l.* contest takes place on April 4 from 1600 to 2400 GMT. This is a two section affair, single-op. and multi-op., with scoring at 1pt. *per* kilometre. This is followed on April 5, from 0900-1700 GMT by the 432 MHz event, but this is an all-class one with no separate sections and the radial ring scoring system.

The 2nd Spring BARTG VHF/UHF Contest runs from 1800 on April 18 through 1200 GMT the following day, but a minimum 4 hour rest period is mandatory. This is for 144 and 432 MHz but no crossband or repeater QSOs. Full rules from G8APB at 148 Porter Road, Brighton Hill, Basingstoke, Hants., RG22 4JT.

The 144 MHz CW Contest is a 6 hour one starting at 0900 GMT on April 26, and is an all-section event with radial ring scoring. The following weekend, May 2/3, sees the IARU-Coordinated, RSGB 432/1,296/2,304 MHz Contest and also the 144 MHz and *s.w.l.* affair, of which more details next time.

DX Notes

EA3LL has confirmed that EA8XS (SO73d) in the Canary Islands will be using a *Tempo* 6N2 amplifier but reckons the aerials will be four 19-ele. *Cushcraft* "Boomers," and not the sixteen mentioned last month. Ove Karlsson, OH0JN, from the Aland Islands, has now moved from JU square to KU. Paul Turner, G4IJE, and others have already worked him *via* MS.

The following items were passed on by John Hunter, G3IMV, from the 20m. VHF net. DF7RG reckons to be going to the Principality of Monaco, 3A, sometime this year and to run one kilowatt to four 16-ele. aerials on 2m. PA0OOM plans to operate as C31NL in the Principality of Andorra, July 14-27. Y21PL says he will operate from HO71f in the *Perseids* and UK5EDB reckons to be on from PG, PH, QG and QH squares in the same period.

Readers needing WD square in Spain should keep an ear open for ED1ECO during all 144 and 432 MHz contests this year. EA3LL says that this station is operated by members of the La Coruña VHF Group, which includes EA1s ED, TA and ZK, and that on 2m. they have a *Tempo* 6N2 amplifier with four 16-ele. *Yagis* at 1,000m. *a.s.l.*

The Space Scene

On January 30, the vehicle that launched *Oscar 8* on March 5, 1978, was reported to have disintegrated into 136 separate pieces. However, *0-8* itself continues to work normally although its spin rate has dropped from one revolution in 5 mins., to one in 17-22 mins., according to AMSAT sources. The reason for this is unknown. On the user side, YO2IS is reported on Mode B on *0-7* and this transponder is still functioning reasonably well after over 29,000 revolutions. On the AMSAT-UK VHF net on February 15, it was mentioned that attempts to load the "Codestore" in *0-7* had been unsuccessful for the previous two weeks, and that it would be in Mode C — a QRP version of Mode B — on Tuesdays.

AMSAT-DL has issued a letter concerning the proposed transponder frequencies for the next *Phase 3* satellite, scheduled for launch on February 24 next year. The "U-Transponder" would have an uplink band 435.300 — 435.150 MHz with a down-link on 145.820-145.970 MHz, while the "L-Transponder" would be 1,269.950 to 1,269.950 MHz up, and 436.150-436.950 MHz down. On the AMSAT-UK 80m. net on March 8, G3AAJ referred to a letter from Jan King, W3GEY, who is Vice-President Engineering, stating that the "U" transponder would be the main one and the "L" one a "possibility." AMSAT-UK will be passing members' comments to AMSAT-DL by April 15. Your scribe's immediate reaction is that the "U" system should be reversed due to the increasing QRM in the space sub-subsection of the 2m. band from licensed and pirate FM-ers who obviously have no respect for any band plan, and whose selfish activities would make reception of weak space signals difficult.

ANNUAL VHF/UHF TABLE
January to December 1981

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	Points
G2AXI	28	4	49	10	36	7	—	—	134
G8GXE	—	—	33	9	38	8	7	4	99
G3PBV	—	—	44	9	35	5	5	1	99
G3FPK	—	—	68	16	—	—	—	—	84
G4ARI	17	2	52	10	—	—	—	—	81
G8TFI	—	—	42	10	19	8	—	—	79
G8RZP	—	—	47	7	20	3	—	—	77
G4DEZ	—	—	54	15	—	—	—	—	69
G8FMK	—	—	23	10	15	3	9	1	61
GW3CBY	7	2	31	7	9	5	—	—	61
G8VR	30	3	20	6	—	—	—	—	59
GD2HDZ	5	1	17	7	21	7	*1*	*2*	58
G8KAX	—	—	28	5	20	3	—	—	56
G8SKG	—	—	39	10	2	1	—	—	52
G4FKI	20	3	6	2	16	4	—	—	51
G8TIN	—	—	32	6	6	2	—	—	46
G8WUU	—	—	39	6	—	—	—	—	45
G8TRW	—	—	35	8	—	—	—	—	43
G8VFV	—	—	37	6	—	—	—	—	43
G8RMA	—	—	25	9	4	4	—	—	42
G8WRD	—	—	17	5	12	7	—	—	41
G3FIJ	9	1	8	2	12	1	—	—	33
G4GXL	—	—	24	9	—	—	—	—	33
G8RWG	—	—	26	4	—	—	—	—	30
G8LXY	—	—	7	2	14	5	—	—	28
G8VJJ	—	—	21	4	—	—	—	—	25

Three bands only count for points. Non scoring band figures in italics.

Six Metres

First, a real puzzle for the propagation experts. When Charlie Newton, G2FKZ, found he had an hour to spare in Athens airport in mid-February, he telephoned Costas Fimerellis, SV1DH, for a chat. He heard that, on February 16, Costas was receiving strong signals *via* TEP mode from ZE2JV on both 6m. and 2m. He had been listening for beacon ZS1STB, located at the extreme southern tip of the continent, for over a year, without success. As conditions on February 16 were the best ever heard on VHF, Costas felt convinced he should be able to copy this beacon, however it was not to be heard. Then he turned his 6m. beam north and there it was — clearly identifiable!

Now SV1DH is one of the most reliable and experienced students of VHF propagation, anywhere, and this was a first hand report to G2FKZ, so there can be no doubt whatever as to the authenticity of this item. Precisely what mode of propagation was responsible for reception over a 32,000 km. long path, *via both* polar regions will exercise the brains of the experts for a long time to come. Next month, it is hoped to publish a fuller account of this amazing occurrence.

On the same day, this time on 2m., ZD8TC (Ascension Island) worked KP4EOR (Costa Rica) *via* TEP, a QRB of around 6,300 km. SV1DH suggests this is the first reported incident of simultaneous north/south *and* east/west TEP.

Four Metres

Syd Harden, G2AXI, managed to get on for the last hour of the *Aurora* on February 6 enabling him to add GM and 5, 1981 counties for the table. QSOs included GM3WOJ (Dumfries); G6WR (Cumbria); G4DSC (N. Yorks.); GM3YOR (Fife) and G3UUT (Cambs.). G3DAH, G2AMV and G3ZRF provided another three on the 8th and G4GFD the 13th made it 28 so far. Dave Thorpe, G4FKI, (Essex) also got GM3YOR in the February 6 *Ar* and also heard GI. Dave used just 10 watts of CW.

Ken Willis, G8VR, (Kent) concentrated on 4m. in the February 6 *Ar* and was surprised at the very considerable activity. He started at 1815, with first-phase fade-out at 2130. A short second phase was apparent at 2247 when GM4YOR was heard working a GM3. Using only 15 watts, Ken made 6 contacts, each a new county, GM4DIJ (Lothian); GM4IGS (Strathclyde); GM3YOR, GM3WOJ, G6WR and G3XXQ (Tyne and Wear). Other GMs QRV on 4m. include 3OBC and 3TAL in Fife; 3JDX (Lothian); 3WFJ and 3ZXE in Tayside; 3JFG (Highland) and 4CXP (Borders).

Your scribe was discussing activity with G2AXI and Syd reckons that only about 6% of operators use commercial gear at present. The unique nature of 70 MHz ensures that the Oriental manufacturers are not interested in offering "black boxes," and there can be little incentive for commercial concerns to mass-produce equipment. However, if, as expected, we get a 50 MHz allocation in the reasonably near future, there would be a golden opportunity for an entrepreneur to market a combined 6m. and 4m. transverter or complete transceiver perhaps.

Two Metres

A most welcome letter from Wes Wysocki, SP2DX, in Sopot, near Gdańsk, included a list of 116 QSOs made in the memorable *Ar* of December 19 last from JO43c. He detected the event by chance with the aerials pointing to the west, when DL and PA stations were copied. Signals were stronger with the beams north but, with such an intense event and a — 3dB. beam width of 40-50°, Wes concluded that QTF did not play a crucial role. He adopted "contest-style" tactics so that as many stations as possible could be worked to the south. Consequently, he only added two more squares to make his total a formidable 280.

Wes's list shows 18 countries worked. The furthest north station was the last one at 2250, OH7P1 (NW60d) and the furthest south, YU2EZA (IG54f) at 1515. G4CMV (ZN11d) at 1707 and UA3RFS (UM08a) at 1606 were the furthest westerly and easterly stations, respectively. Only four Gs were contacted between 1647 and 1729 — 3BHW, 4CMV, 4JJB and 3IMV. The long, first phase ended at 1930 and another one started about 2200 but limited to LA, SM, OH and UA1/3 in northerly locators. Wes closed down at 2250 but the *Ar* was still in progress. For the record, his station runs about 500 watts output to two, vertically stacked 11-ele. *Quagis*. The Rx has a 1.3 or 1.8 dB noise figure.

Jesus Suarez, EA1QJ, (VD59h) is another member of the La Coruña VHF Group and has sent in an excellent list of tropo. DX worked at the end of January. From 2219 on January 23 through 0146 on the 24th, he had 27 QSOs with G, GD, GI, GW and EI stations, the most northerly being GD3YEO/Mobile (XO68b) at 1,243 km. There existed a very clear, sea path across the Bay of Biscay, right up the Irish Sea, but G3VYF (AL33j) was also worked at S6 each way at 0035.

On January 29, in a short early evening session G8JDX (YK) and 3 GWs in XM and XN were worked, and a little later on, EI4AEB (WN) GI4GVS (XO21b) at 1,278 km., GW2HIY (XN) and F1CRP. The next day, from 1726 on the 30th, through 0219 on the 31st another 34 QSOs were made, made up of 9 Gs, 1 GD, 9 GIs, 1 GJ, 12 EIs and 2 Fs, but no GWs. The best DX was GI8XTD (VO04f) at 1,286 km. Later on, on the 31st, 24 more QSOs were completed, comprising one F, 2 EIs, 1 GD, 1 GW, 2 GJs, 11 GIs and 6 Gs in YL, ZK and ZL squares.

During the evening of February 2, Jesus contacted 7 French stations in AI, BH, BI, ZH and ZI but at weaker strengths. He is QRV for skeds on SSB or CW for those wanting VD square and runs 300 watts output on SSB to a 16-ele. *Yagi*. His QTH is:— Apartado 1299, Coruña, Spain.

S.w.l. Graeme Caselton (Kent) enjoyed his first big lift on January 29 and logged lots of new PD0s on the band, plus GW8FNX. Further PE, ON and Fs were logged up to February 2. Dave Sellars, G3PBV, (Devon) is now running his 7th station on 2m. consisting of a *Trio* TS-120V with a pair of coupled 28 MHz tuned circuits on the driver output, driving an *MM* transverter, feeding a *S.O.T.A.*, 100 watts amplifier. He caught the February 6 *Ar* from 1930 and worked GM4BYF (YP04d) for his first ever *Ar* QSO from the QTH. It faded at 2100, but returned briefly at 2130. The only continental heard was SP2AOZ (JO44f) around 2000. A brief lift was enjoyed after the 70cm. contest on the 8th and HB9AEN/P, HB9MTY, both in DG, F1BUU and F1EY were worked even though no southern French or Swiss beacons were copied on 2m. or 70cm.

Mike Lee, G3VYF, (Essex) added OH0JN (KU) on MS for square no. 204, on February 28. In the January 29/30 period, Ken Osborne, G4IGO, (Bristol) worked a few stations in DK, DL and XI squares and, on the next day, EA1s ED, QJ and TA in VD. In the *Ar* of February 6, he contacted SM4IVE (HT) at QTF 045°, GM4COX (YP) and GI8YDZ (WP) between 1800 and 2030. In the second phase, 2240-2305, he worked E16AS (WN) and heard five others. The tropo. lift on February 8 brought F6GDX (AF) and F1CYB (BH). On the 24th, from 1855-1900 at QTF 010°, GM3J1J (WS) was copied *via Ar*, and a few more weak signals were detected from 2105-2145. In the *Ar* of February 26, between 1856 and 1947, Ken worked GM4IHJ (YQ) and GI3RXV (WO), with SM4IVE, 3 GMs and a GI heard at QTF 040°. At 1938, GB3ANG was copied at S5, but T9 at QTF 030°. It was not audible on the correct heading before or after. He asks, *"Auroral E's?"*

Tony Collett, G8GXE, (Berks.) has notched up a few more counties. On February 21, at noon, DJ0JW/A (DL65b) peaked S9 with nothing else audible. The next day, GD2HDZ provided the first Isle of Man 2m. contact from home. "Not bad for nine years licensed!" he reckons. Flemming Jul-Christensen, G8RMA, (Eastbourne) had 148 QSOs in the end-of-January tropo. lift and enters the annual table.

Andy Markham, G8RZA, (Essex) heard the *Ar* on February 6 at 1815 but did not work anyone. QTFs for the GMs copied were 020° and for SMs, 035°. Neil Clarke, G8VFV, (W. Yorks.) reckons conditions to have been only slightly above average, north/south, during February, with only a small opening to PA on the 26th.

A telephone call at 1245 from G3IMV on March 5 alerted your scribe to the long *Ar* event which apparently went on till about 2030. This was the third *Ar* down to a *coronal hole* on the Sun and which

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3POI	—	—	299	299
SP2DX	—	—	280	280
DX3UZ	—	—	257	257
G3IMV	—	—	240	240
I4EAT	—	25	238	263
G3VYF	—	84	203	288
G3CHN	—	—	196	196
EA3LL	—	15	194	209
GJ4ICD	1	88	188	277
G4ERG	—	16	186	202
G3SEK	—	—	182	182
9H1CD	—	13	178	191
G4IJE	—	—	169	169
G3FPK	—	—	168	168
G3KEQ	—	—	166	166
G4IGO	—	—	165	165
9H1BT	—	11	163	174
G4CMV	14	59	157	230
G3BW	5	27	155	175
G4DEZ	—	—	147	147
G8HVY	22	83	141	246
G4BWG	—	37	137	174
G8LGL	—	25	121	146
GJ8KNV	2	54	119	175
G3XDY	30	80	118	228
G8IXG	—	—	115	115
G8HHI	2	46	113	161
G8MFJ	—	23	113	136
G4AWU	—	22	113	135
G3COJ	24	74	112	210
G8ATK	5	56	111	172
G8OPR	1	38	111	150
G3JXN	39	81	107	227
G8LFJ	—	18	107	125
G4FBK	—	5	105	110
G3PBV	12	59	104	175
G8LEF	22	62	101	185
G8TFI	—	51	100	151
G8KGF	—	28	99	127
G8VR	—	3	99	102
G8JJR	—	20	98	118
G2AXI	2	54	96	152
G8CXQ	—	—	96	96
G4ERX	5	45	92	142
G8GXE	11	55	89	155
G6UW	—	1	89	90
G8KPL	—	7	87	94
G4GHA	—	—	86	86
G4JZF	—	—	85	85
GD2HDZ	12	41	83	136
G8IFT	15	34	81	130
G8JAG	—	7	79	86
G8KAX	5	41	77	123
G3FIJ	—	27	76	103
G8TGM	—	—	76	76
GJ3RAX	1	27	74	102
G8RMA	—	12	71	83
G4HFO	—	46	68	114
GI8EWM	—	25	67	92
G8VLQ	—	27	65	92
G8RWG	—	—	63	63
G8JGK	—	—	62	62
G8SVG	—	—	58	58
G8FMK	14	51	57	122
G8TIN	—	3	55	58
G8SKG	—	5	53	58
G4GSA	—	6	51	57
G4GXL	—	—	44	44
G8VFV	—	—	38	38
G8VJJ	—	2	37	39
G8LXY	—	18	31	49
G8WRD	—	14	16	30

Starting Date January 1, 1975. No Satellite or repeater QSOs. "Band of the Month" 2m.

triggered off events on January 10/11 and February 6. It was quite an intense affair with QTFs 010-070°. G3BW (YO33g) was a very loud signal throughout. Many local Gs were very strongly *Ar* for much of the time. The event seemed to peak around 1545 with UR2RQT (MS80e) and UC2ABN (NN18e) buried amongst many strong DLs at QTF 050°. OZ1BDO (EP47h) who was 55A at G3FPK, gave a 529 report. The SM and LA stations were rather weak in this event.

Paul Turner, G4IJE, settled for working 30 DLs in 52 QSOs in the March 5 *Ar* best DX, an a new square, being SP9MM in JK. In common with G3FPK, Paul copied beacons GB3GI, GB3CTC and DL0PR, but not SK4MPI (HU). Also, GB3ANG was only *Ar* at the beginning, the disappeared. Although there are no major meteor showers at present, Paul has completed a few MS skeds by random meteors, *viz*:— OK2VIL (JJ) on February 5; YU1EU (KE) on February 6; DF7RG (GI) on February 18 and OH0JN (KU) on March 1. Nothing was heard from YU2KDE (JF) or UQ2GFZ (NR) on February 7 and 12 respectively, but on March 3, many pings were received from OK1IDK/P in GJ. Martin Adams, G4IYA, (Kent) had a successful MS contact with Y21TL (GL) on February 9.

Geoff Brown, GJ4ICD, has now worked 188 squares, the latest being a GM4 in WS in a recent *Ar;* prior to that, EI9BG (VM27c); GI8HXY (WP78j) and EI6DL (VN50f) in the end-of-January tropo. Reg Woolley, GW8VHI, (W. Glam.) managed to work some new ones at the end of January, including EI4AVB (VN40c) on the 27th, 3 Fs in YH and ZH on the 30th, F1CVU (AJ31d), GD3AUV (XO67d) and EI2CV (VL) on FM on the 31st. On February 1, Reg contacted GI8KZS/P (WO40d) and EA1TF on FM in VD59b.

Seventy Centimetres

G2AXI ". . .had a little dabble in the contest on February 8. . ." adding 6 more 1981 counties:— G4ERO (Dorset), G8ECR (W. Sussex), G8LLN (Hertford), G3SHK (Wilts.), G4BVY (Hereford) and G8SFI (N. Yorks.). Frank Howe, G3FIJ, (Essex) opening his 1981 account on 70cm., also used the contest to work 12 counties. G3PBV made 28 QSOs in the contest worth a claimed 260 points. Dave found the QSB slow and deep. Contacts over 400 km. were G8SFI, G8ECN/A (Norwich) and G3AMW (Hull). An hour *after* the event he worked HB9AEN/P in DG!

G4FKI's total so far of 16 counties and 4 countries was achieved with 10 watts of SSB in the contest, the countries being DL, G, ON and PA. G8GXE had a concerted go in the contest as a multi-operator entry, assisted by Chris Easton, G8TFI, and John Brakespear, G8RZP, the team completing 101 QSOs for about 500 pts. Best DX was F1BUU (ZE) at 731 km. The tally included 7 PAs, 2 Fs, 2 DLs and an ON, the best DX to the north being GD2HDZ. Tony says the leading stations were giving serial numbers around 130 at the end.

Terry Hackwill, G8WRD, (Berks.) took part in his first 70cm. contest on February 8 which gave him an opportunity to see what could be achieved under flat conditions. GD2HDZ was a very welcome QSO in the last five minutes, but the scoring became very slow in the last hour. GD2HDZ did not say how many QSOs he made in the contest, but it did produce 9 more 1981 counties in poor conditions.

GJ4ICD leads the 70cm. section of the squares table with 88, the latest four being EI9BG (VM), DD3UD (EI), G4JKN (XL) and EI9Q (WM). Using a beam on a 12ft. pole in his back garden, GW8VHI used the end-of-January lift to work F1FHI (ZH) on the 30th, EI9Q on the 31st and GW8OOJ/P (YL) on February 1. His QTH is 150ft. *a.s.l.* so he figures he needs a really tall tower to clear a 1,000ft. mountain three-quarters of a mile away!

EA1QJ also operates on 70cm. and, during the fine, north/south tropo. period at the end of January, Jesus had two contacts with Peter Hallam, GI4GVS (XO21b). These were at 2230 on the 30th and at 1917 on the 31st on SSB and CW respectively, the QRB being 1,278 km.

The Gigahertz Bands

G3PBV is getting things ready for SSB operation on 23cm. so has worked nothing lately on the band. Reporting on the lift of January 30 to February 1, John Tye, G4BYV, (Norfolk) mentions F9FT's reappearance in "our" part of the 23cm. band. Marc was working G4BEL, G8BFX and himself from CJ square. On 13cm., John worked DL9LU (DK) at S9-plus. DB5KS (DL) worked G3LQR, G8BEL(?) and G4BYV, and G8ADC in Luton contacted G8ADP (Bristol) and himself.

G8GXE only mentions two QSOs on 23cm. in February:— G4GLN (London) on the 12th and G3RQZ (Kent) on the 26th. John Lemay, G8KAX, (Essex) has just received a *muTek* low noise amplifier and hopes he will have a 10 watts amplifier ready for the April contest. "I will then be looking for skeds with anyone, anywhere, during April," he writes. From Jersey, GJ4ICD writes that F9FT has worked an SM6 on 23cm., and that Jean-Pierre Lecarpentier, F1ANH, has bought a transverter for the band and promises operation from AK, YI, ZI and ZJ squares.

Final Miscellany

G8KAX has been suffering some interference for a while, one kind of which he has been able to cure, the other, not. First, he was puzzled by a raspberry of the thermostat-sounding kind which occurred with monotonous regularity for a few seconds, every five minutes, morning, noon and night. The culprit was an innocent-looking clock in his own house. This has a clockwork spring which is wound up by a small, electric motor. A 1,000pf. capacitor across its winding gave a complete cure. This clock is made in Ireland and the name is *Hanson*.

The second nuisance is more serious. It is continuous and has been positively traced to a *Doppler* type burglar alarm protecting a nearby garage. Not unexpectedly, the Post Office's attitude is one of "hard luck," as it does not seem to interfere with other services. The QRM is in a narrow band in the 2m. band.

Congratulations to the Brakespears, Jackie, G8RZO, and John, G8RZP, on the arrival of a second junior operator of the YL variety in late February.

The 144/432 MHz Contest was going on as this was being edited. Occasional listening at G3FPK suggested that the conditions were pretty flat. In southern England, it was very wet and windy most of the time and no "real DX" was being worked. There was a small *Aurora* in progress around 1800 on March 7, but the furthest heard from ZL60j was SM5 who was too weak to call. No doubt some participants would have used CW to notch up a lot of points, *via Ar*.

Deadlines

With the *Lyrids* shower peaking around April 22, there should be some rewards ahead for the ever-increasing number of MS addicts. All your letters and claims for the May issue by the *very early* deadline of April 1, and for the June feature by May 6. As usual send it to:— "VHF Bands," SHORT WAVE MAGAZINE, 34, High Street, WELWYN, Herts. AL6 9EQ. *73 de G3FPK.*

IF YOU HAVEN'T GOT ONE —YOU OUGHT TO BUILD ONE

THE ESSENTIAL ATTENUATOR

REV. G. C. DOBBS, G3RJV

IN every field of human endeavour there is usually one small inexpensive item that becomes indispensable after its initial discovery. For the typist, it is *Tippex* correcting paper; for the pipesmoker, the disposable chalk pipetrap; for the radio amateur, the stepped attenuator. So if you are a radio amateur, or short wave listener, and haven't discovered the usefulness of RF Attenuation, stay around with this article.

Even amateurs with the more sophisticated equipment discover problems on the crowded 40 metre band on a winter's evening when those juicy DX signals are swamped by broadcasts of eastern mu-sick or multi-coloured propaganda. That new VHF converter lacks the makers proud claims for sensitivity, or is it overloading the receiver front end? Yet if other amateurs appear to work 40 metres at the same time with simple direct conversion receivers, the answer probably lies in the resistors of his attenuator.

On the face of it, this appears nonsense. Why pay good money for a receiver with excellent quoted selectivity and amazing sensitivity to bung resistors at the front to reduce the incoming signal. As for attenuating the signal into a simple direct conversion receiver — what chance is the poor little thing going to stand? Well — we spend a lot of time worrying about sensitivity in receivers and often forget that *dynamic range* can be a major factor in a receiver's performance. *Dynamic range* is the range of multiple signal amplitudes in the receiver bandpass that can be accommodated by the receiver. Or in my language, "When I'm listening to a weak signal, with the front end gain turned up, how big can a nearby signal be without clobbering the reception". Mathematically it is usually expressed as the dB difference (or ratio) between the largest tolerable signal and smallest discernible signal which can appear in the passband without causing distortion problems.

Poor dynamic range causes all sorts of problems when there are strong signals lurking around the receiver passband, hence the reference to 40 metres on a winter night; strong signals can desensitise the receiver. Cross modulation of the desired signal can occur. Odd signals may cunningly appear in the receiver tuning range when a strong signal pops up nearby, caused by IMD (intermodulation distortion) products in the mixer. Poor dynamic range is a real horror story.

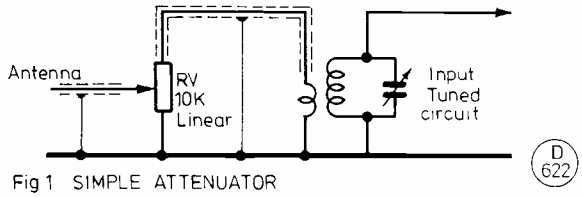


Fig 1 SIMPLE ATTENUATOR

When operating a receiver with poor or normal dynamic range in a situation where weak signals and strong signals are likely to appear in the same passband — a typical amateur band — front end attenuation can be more useful than most amateurs imagine. When converters are used ahead of a main receiver, and the converter has appreciable gain, it is essential. A strong signal amplified in a converter and fed into a receiver can easily degrade the performance of the receiver.

Fig. 1 shows a simple attenuator in place in the input tuned circuit of a receiver; it is merely a carbon linear track potentiometer acting as a potential divider to the incoming signals. This is a basic form of the L-network attenuator. The L-circuit has the problem that the input and output resistances of the circuit may not be matched, but in simple receivers (for example, a basic direct conversion receiver) this may be no real obstacle. This circuit can give quite a good account of itself if a good clean tracked potentiometer is used and the interconnecting leads are screened and as short as possible. Better circuits are those where the input and output resistances remain constant for a range of attenuation.

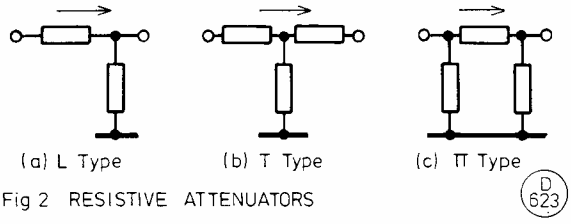


Fig 2 RESISTIVE ATTENUATORS

Fig. 2 shows the three common types of resistive attenuator circuit. The simple potential divider in the attenna input circuit is a version of the L-circuit; with this circuit it is not possible to vary the amount of attenuation and retain constant input and output resistances. Both the T-circuit and the pi-circuit overcome this problem and it is possible to make several fixed value attenuation pads which can be switched in or out of a signal as required. The pi-circuit is the simplest to switch and uses slightly higher and more convenient values of resistor. High quality switchable attenuators are available commercially but are relatively expensive. It is possible to construct step attenuators from preferred value resistors and cheap slide switches which are more than adequate for amateur use. We will conveniently skirt around the mathematics which ensures the termination resistance of the attenuator is equal at both ends and matches the required signal impedance. A suitable circuit for a step attenuator for a 50-ohm signal impedance is shown in Fig. 3.

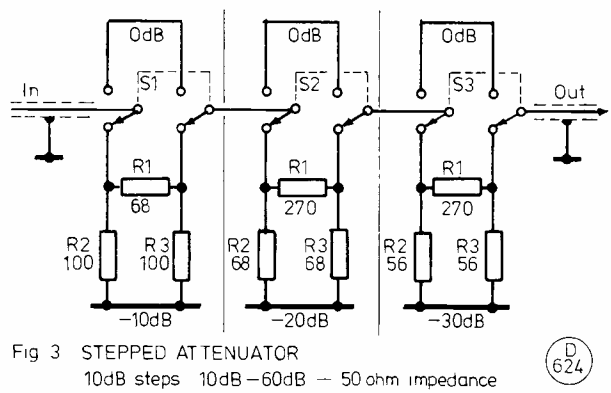


Fig 3 STEPPED ATTENUATOR
10dB steps 10dB–60dB — 50 ohm impedance

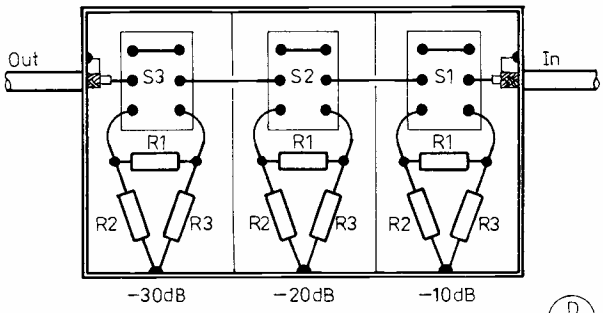


Fig. 4 STEPPED ATTENUATOR (Practical layout)

The step attenuator in Fig. 3 has three attenuation pads, to match a 50-ohm input and output impedence, with attenuations of −10dB, −20dB and −30dB. These may be switched in and out of the circuit by shorting out the undesired pads, and with this arrangement 10dB steps up to −60dB can be achieved. This range is adequate for most amateur radio applications. If further attenuation is required more pads can be added to the circuit. The ideal values of resistance for the pads have been rounded up or down to the nearest common preferred value resistors; ordinary 5 per cent carbon half — or quarter — watt resistors can be used in the circuit for the usual amateur small signal applications.

The practical layout for such an attenuator is shown in Fig. 4. In this version (and there are several of these around the G3RJV shack), inexpensive slide switches are used. Some care must be taken in the construction. Short leads ought to be used when possible to extend the useful frequency range of the unit; shields around each pad are useful at higher frequencies or when pads of 20dB or more are being used; the leads in and out of the attenuator should be screened and, when possible, short. One simple method of fabricating a screened box with shields is to use double sided printed circuit board. This may be cut to size and soldered to form the required box. Cheap slide switches, especially those bought on the surplus market, are notorious for their poor switching action, so all switches used in such a circuit should be checked carefully with an ohn-meter before the circuit is built.

Once the attenuator is built it can be used for receiver applications; it goes between the 50 ohms input of the receiver and the antenna in use. In the case of a transceiver some point in the input circuit that does not expose the attenuator to the transmitted output will be required. Miniature switches and quarter-watt resistors enable an attenuator to be built into a receiver if this is required. When in use the attenuator's value in many receiving applications soon becomes apparent.

In addition to the applications in reception, the step attenuator is a useful station accessory. It may be used in the output of an RF signal generator in servicing or estimating receiver performance. The step attenuator has a further bonus in that since it is made from resistors, it can change a source that is highly reactive into one that is known and resistive: sources of doubtful impedance can appear as a clean resistive termination at the end of an attenuator. It may also be used for measuring changes in signal level.

The step attenuator is a simple, easy to build, item of equipment that will be an asset in any amateur's shack. I have used a direct conversion receiver on the amateur bands at night and heard nothing but broadcast breakthrough until 20 or 30 dBs of attenuation were applied and then amateur signals appeared as if by magic. If you haven't got one, give it a try!

REVIEW

THE TRIO TS – 830S SSB/CW TRANSCEIVER, AND VFO – 230 REMOTE VFO

THE writer has for the past five years used a Trio TS-520, together with its outboard VFO-520 as his main rig. This review of the TS-830S and VFO-230, then, will to some extent compare the two — indeed they were worked alternately for some parts of our testing. In addition to this, the TS-830S was used for a CW contest entry, and for the invigilation of our own MCC on both evenings.

Description

To summarise the changes since the earlier rig was first put on the market, the '520 went to the '520S in which it lost its DC PSU and gained Top Band, and finally into the TS-520SE which with some further simplification and modification just had to be the best value for money for a reasonably priced home-station which could give a good account of itself. Somewhere along the line a parallel development began as the TS-820, which grew into the present TS-820S when the additional bands were announced at WARC '79. The DC power supply is now an optional extra on the TS-830S, and major changes in this new transceiver include: IF shift, wide-narrow bandwidth adjustment on the front panel, a tone control, the original bands plus the three new ones (which are only available on receive in the equipment as tried, but are easily activated when the time comes without a return to the maker), a front-end attenuator, a full blown RF speech processor and an extra meter position to enable it to be set to one's liking, digital readout to 100 Hz, and positions on the mode switch for CW Wide (standard) and CW Narrow — which is the way it comes when you fit one or two of the four filter options available. In addition, the controls which were on the side under a flap on the old '520 are now all brought to the back or front panel.

All our cables made up for the '250 were immediately usable on the new box, save for the transverter (because we haven't got one!) and the control of an outboard linear. The latter would have had to be altered but since our linear awaits its new valves, we didn't worry too much about *that*.

Comparing the two outboard VFOs, the VFO-520 is a straight copy of the one in the main TS-520, plus RIT, and can either be off, receive only, transmit only, or both. It couples into the main rig by a cable, and when you don't want it, you just pull the plug out of the back of the '520 and fit another plug with a link in it. Nothing so simple with the TS-830S and its attendant VFO-230. This one has a digital display and a microprocessor, five switchable positions of memory, RIT, a little button by which you shove a displayed frequency into memory and another to fish it out again, a "lock" switch which disables the VFO dial mechanism so you can't knock yourself off frequency, another little press switch which allows you to take a quick listen on whatever frequency is set up for transmitting whether it be outboard or inboard VFO. It consumes some 13 watts, and keeps the microprocessor and memories alive even though the main rig is shut down. So — you have to learn to *drive* this baby if you want to get the best out of it! The outboard VFO is a phase-locked loop system so no warm-up drift; as the steps of the PLL are only 20 Hz apart you really don't notice the discrete steps. Again, frequency is shown on a digital display, but only those digits to the right of

the decimal point; the full frequency is as shown on the main display. The TS-830S and its VFO-230 still have the knob bezel calibrated in kHz and you can line up to a graticule (but the TS-830S shows up the discrepancy between the coarse, pre-printed, scale behind the glass, and the bezel, far more than the old model). The output of the main rig VFO is taken into another p.c.b. which bears the magic words "PLL Unit" — so there is also a phase-locked system here. This PLL also controls the counter unit. A confusing thing is that the VFO circuit is given a number, but this number doesn't appear on the full circuit; it took a few minutes to rumble that the different number is for the "VFO Unit Assembly", which we guess covers the mechanical arrangements as well.

Performance

So much for descriptions, what about the rig? Now, bear in mind that on CW we were comparing a receiver with the optional CW filter fitted not to mention narrow/wide switching (TS-520), against a SSB receiver with IF shift, variable bandwidth but without the optional CW filter(s). On SSB, of course, the TS-830S' variable bandwidth, IF shift and tone control, not to mention a notch filter, told heavily in its favour once one had learned the way to use each control and to trade-off against the others. On CW, one would have expected the '520 to win if only because it had the optional CW IF filter, not to mention the writer's five years' experience of using it to get the best out of it. In the event, one wonders whether the expense of CW filters for the TS-830S would be worth it in view of its superb existing flexibility.

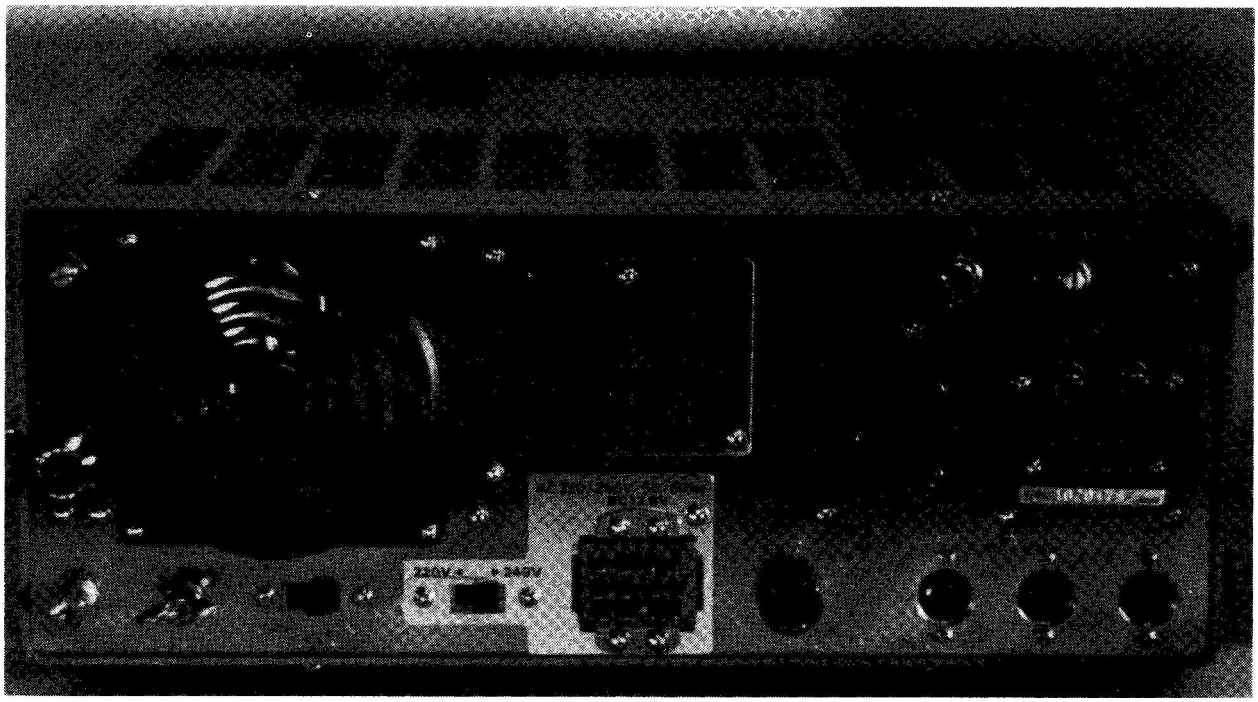
One of the old-time tricks for CW DX was to set the receiver to give a low beat-note on the wanted signal, so as to give greater proportional difference in note to stations a given distance apart in RF frequency. Coming to the TS-830S and its various adjustments, one can again use this old-timer's ploy, the notch facility being quite independant of the other facilities; indeed the SSB filtering gives much better skirt rejection than the old-timer receiver anyway. On the other hand, there are the two CW positions on the mode switch, so if you fit the options, you can have the best of both worlds. And if you have the matching speaker, we understand it has some audio filtering also — we didn't have it for test, and used either our own speaker, or phones through an MFJ filter.

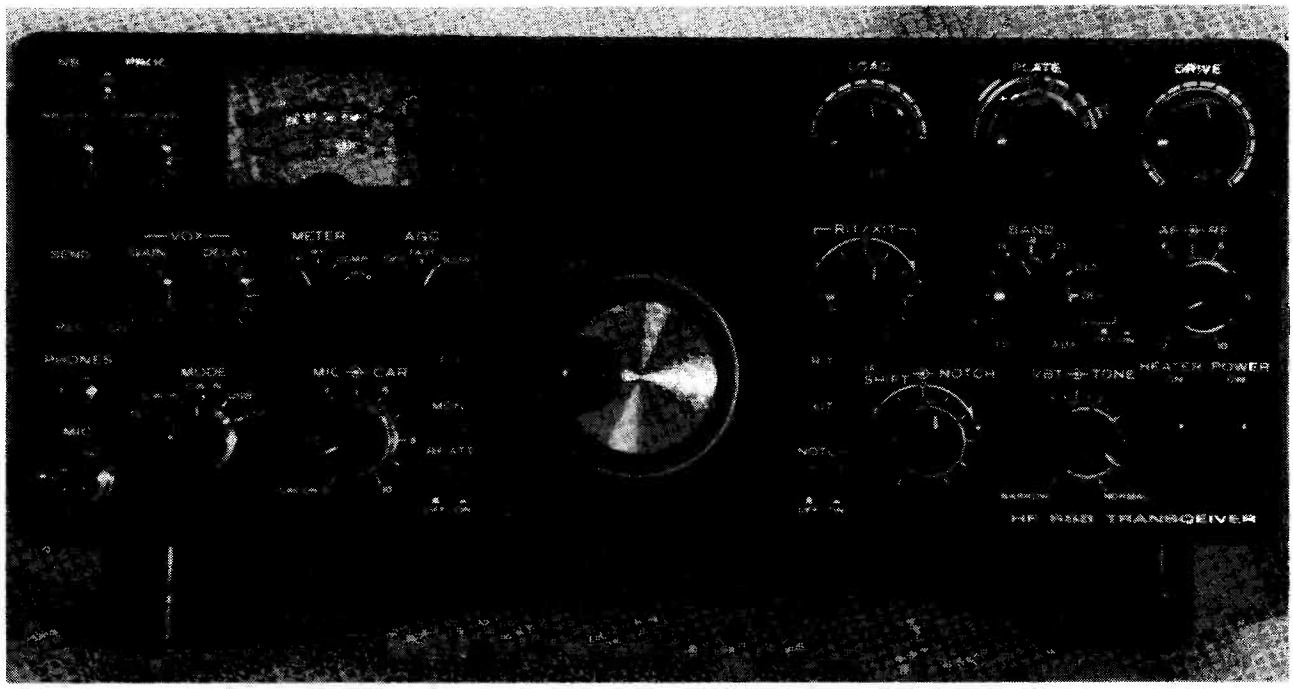
We like the extra facilities the TS-830S affords, in that they cater for both the CW and the SSB operator. While HS1ABD may have been able to make 3600 QSOs on CW in the recent CQ WW, operating as HK3AXT (without any form of CW filtering), we doubt whether he couldn't have vastly improved his score with an '830S in the trim as we have it here.

Now, the outboard VFO. Frankly, the feelings are rather mixed. The "memory" business is all very well if one is paddling around looking for likely DX; a little touch of a button and a discrete bleep and you have him locked on. Likewise as a retriever of lost stations; put him in a memory when the QSO starts, and if he disappears there is no doubt you can at least come back spot on to his original frequency should you be incautious enough to go looking for him. For Top Band DX, great to be able to indicate where you will listen. All true; but you have some watts being dissipated there 24 hours a day to add to your electricity bill unless you tie the main transmitter and the outboard VFO to the same mains outlet; and remember always to switch off there rather than on the TS-830S, which leaves no indication that the outboard VFO microprocessor is still active and soaking up mains power. There are so many operating options made available that a dithery operator may well lose more than he gains from them.

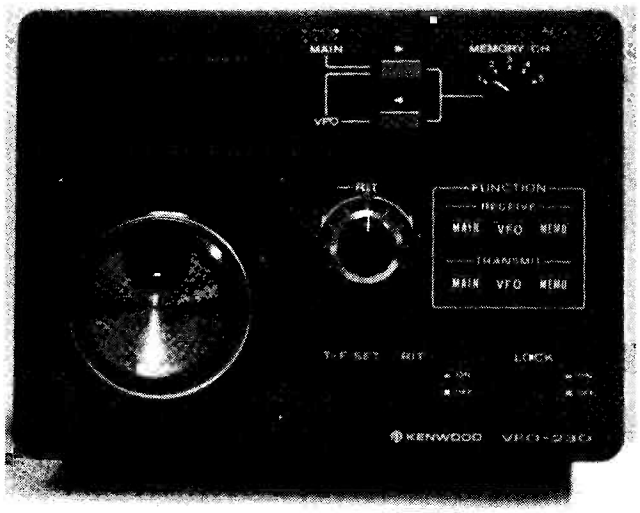
Reverting to the TS-830S, what about the panel and controls? There are over thirty compared to the TS-520's twenty-one on a larger panel. No real problems here, however, save that if you are a bit short on operating-table space, the key or mic. could be a hindrance to the proper operation of the controls. We think the modern outer knob of the dual-concentric controls looks a bit cheap-and-cheerful as compared with the ones on the old rig, but they do seem to be less prone to letting you accidentally twiddle the other control too.

On those types of noise for which it has a chance, the noise blanker is superb. Since last we were on Top Band a neighbour has acquired a thermostat contact that arcs for about ten seconds and comes up to S7 and wipes up everything one may be listening to. The noise blanker just removes it, at the touch of a button. Of course, our bands are, heaven help us, infested with other kinds of noise against which it is not so effective — but it does its best, and we would suggest that anyone who lives near a house lived in by a d-i-y addict, or a place where neighbours "tune" their cars by suppressor-removal and much hard work every evening in their garages, should look *very* seriously at the '830S for this alone.





The reliability of the Trio range with valve PA stages is legendary, thanks to the use of a fan as standard. The transmitter of the TS-830S puts out as good a signal as any '520, and as much of it band for band. The RF clipper seemed to do as well as the *Datong* unit used with the '520. On specifications, which were all met within the accuracy of our test gear, it handsomely outdoes the TS-520. On the receive side, the TS-830S specification is impressive and well met.



Criticism

There are two, for the writer at least. The first one is the use of the switch ganged to the Mic. Gain as a means of switching on the calibrator — having checked calibration one goes to transmit and wonders where the drive has gone — calibrator on is mic. off! Maybe more important in the long-term is the question of spares: we don't know of anyone who makes such a combination — everybody buys switched pots which come on when the knob is rotated, but this one comes on in the "off" position — which means either a "special" of some sort of mechanical linkage lurking under the bottom.

The other one is the provision of a little extra push-button which, on the ten metre ranges only, takes you up 500 kHz on the bandswitch marking; we suppose it was more or less inevitable that some such trick would be needed to get the number of positions required and still use the wafer type switch. But, right alongside the RA/AF Gain control?

Maintenance

The TS-520 handbook was of such a nature as to make it into a workshop manual in all but name. Frankly, we suspect the TS-830S would be an easier thing to service, but the maker obviously thinks otherwise. Trio's manuals, on the TS-830S and also the VFO-230, are in essence "driver's instructions" albeit with a circuit diagram included; however, there is a Service Manual available, according to the manual, so servicing it for yourself is not by any means impossible. Certain things need to be twiddled anyway, such as the calibrator crystal, the sidetone amplitude, PA neutralisation and so forth; these are set out clearly and distinctly in the manual.

Conclusion

Our last significant action was to press the "monitor" button with a pair of headphones on, and listen to the noise out on the air. It sounded good. Indeed, your reviewer it going to save up for one, and when the new rig arrives the TS-520 is going to be operated /M. Need we say more?

GETTING STARTED WITH RTTY

J. Brown, G3LPB

THIS article is written mainly for the beginner; it may have some interest for others already involved in this aspect of amateur radio. By no means a new method of communication — it has been around the amateur scene for years — but many people seem to get interested and are then put off. Imagine for a moment a station some thousands of miles away controlling your own gear, and in return you controlling his, which is the condition that actually occurs with RTTY. Imagine also the myriads of mechanical and electronic bits and pieces; there is a whole new world waiting for you! The thrill when, say, an XE station answers your CQ call by (almost) operating your station — he is certainly operating the teleprinter, by remote control. Certainly, it is not as easy as it sounds but the trick can be turned with a little understanding.

We will work through the requirements without becoming too technical and try to make things more easily understandable. All can enjoy this aspect of the hobby, though in this article little mention will be made of commercial ('plug-in and go') gear. We will touch on it, for the rich man, but the article is being written for the chap who likes building, maybe as much as operating, his equipment.

Many operators of RTTY are turning to the use of VDUs, (visual display units); this type of thing is done on a TV screen or similar, and of course this has created the opening for some good mechanical teleprinters to become available to others at a competitive price. The VDU, accompanied by its electronic keyboard is a silent RTTY set-up and there can be no doubt that this silence is in itself a useful asset. However the mechanical machines so released have actually been operated — and hence maintained — and so they should not cause any problems in setting up the system.

One has to be very careful in buying teleprinters: there are, freely available, many machines from computer units which are almost useless for RTTY as they are of a different coding, *i.e.* they do not send the *Murray* code but use ASCII. These machines are almost impossible to convert albeit an electronic conversion can be done but it is *not* a newcomers first project! They are usually polished and clean, so get advice from someone who uses a similar machine. Only experienced eyes will tell the differences.

There are many reliable sources of machine and in fairness this should be pointed out, however buying one from another radio amateur is usually the way to get the right type of machine as it has probably been used for RTTY. The models to look for are the Creed-ITT Model 54 and Model 75; there were a lot of these modified for computer and data use and, therefore, are no good for our RTTY, so care is needed.

Receive Only

The requirements for this are a good stable receiver, a "terminal unit" or convertor which will now onwards be referred to as a TU, and most important, a known good machine (*i.e.* teleprinter). In most cases the acquisition of these items depends on the 'pocket money' available and the ambition of the operator. As pointed out previously we will make little mention of commercial units; where they are mentioned, some are PC boards built and tested for you to put in a case and wire up.

Fig. 1 shows the basic requirement and the convertor or TU. Its job is to convert audio tones from the receiver into signals that are decoded in the TU and which in turn will decide on the operating conditions of the magnet drive of the machine. This is on the right-hand side of the 'printer. Early TUs were valved but now it is normal to use solid-state with integrated circuits and transistors, and the allied bits like diodes.

The TU drives the magnet into two states. The first is where the magnet is held to the left side or the normal "hold" position; the other is known as the "space". To make this more intelligible, with the teleprinter running and no mechanical movement occurring is the condition known as the hold or "mark". Recall it as "marking time". With the machine running and the magnet held in the right hand position — the "space" position — and some of the mechanics of the machine are operating. All the TU has to do is to provide the magnet with the correct coded information from the audio tones. A practical transmission will have, for every letter, a specified combination of marks and spaces and the magnet will be switched from side to side in accordance with the appropriate code to result in the selection of the right bit of the type head and stop its rotation before the type hammer hits the selected character.

Fig. 2 shows a block diagram of the TU, nowadays always solid-state. It takes the signal from the receiver output, preferably a 600-ohm line, and feeds it to a limiter stage; but it will work from a speaker (we will explain this later). The signal out of here is a "sort-of" square wave which is fairly constant, thus eliminating to some degree the fading on the incoming signal. This limited signal is fed to a discriminator stage; the output, due to the presence of the two filters and diodes is nothing more or less than two DC voltages, one positive to earth and the other negative to earth. (By "earth" we mean the chassis rail.) The stage is a frequency to voltage converter in simple terms, and these voltages are maybe in the region of three volts. They can now each be fed to a stage where the output is around 8-10 volts, positive for mark and negative for space. These signals are now fed to the splitter stages and their drivers; these in turn drive two power transistors that are the magnet supply. As the action is one of quickly switching on and off, the dissipation is low despite the magnet supply being some 70-80 volts positive and negative. What little dissipation there is in the transistors occurs in the main during the transitions, and we want to get these over quickly! The action of the magnet on the mechanics of the machine carries out the correct operation required.

Many of the published circuits that have appeared are arrivals from America from W6FFC and his colleagues there, too many to mention. Before this time there were many RTTY operators in the UK using circuits like the G3BST of about 1961, the W2PAT, the famous "Twin Cities" also from America, and another famous name, the DL6EQ design, which probably helped many along the way. The last-mentioned was a couple of PCBs with easily-obtainable bits and pieces and was available in UK from *Spacemark Ltd.* at a very cheap price. There were also available filters, tuning devices, etc., all at a very competitive price. The result of this was that many were able to use the same TU and compare notes over the air, which led to a sudden upsurge of RTTY activity and interest.

Then along came the Mainline series mostly using the prefix ST, and there must be thousands of the ST5 and ST6 around; these were from the W6FFC outfit and really "went to town", as all the bits were available. Again there were PC boards and kits available for the series. About this time appeared the Spacemark TU, and the SRD1. The Spacemark TU was a professionally made TU

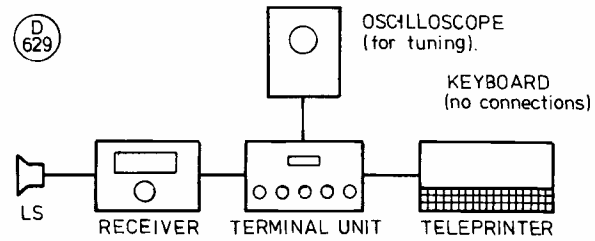


Fig.1 RECEIVER SET-UP (Low volume is needed).

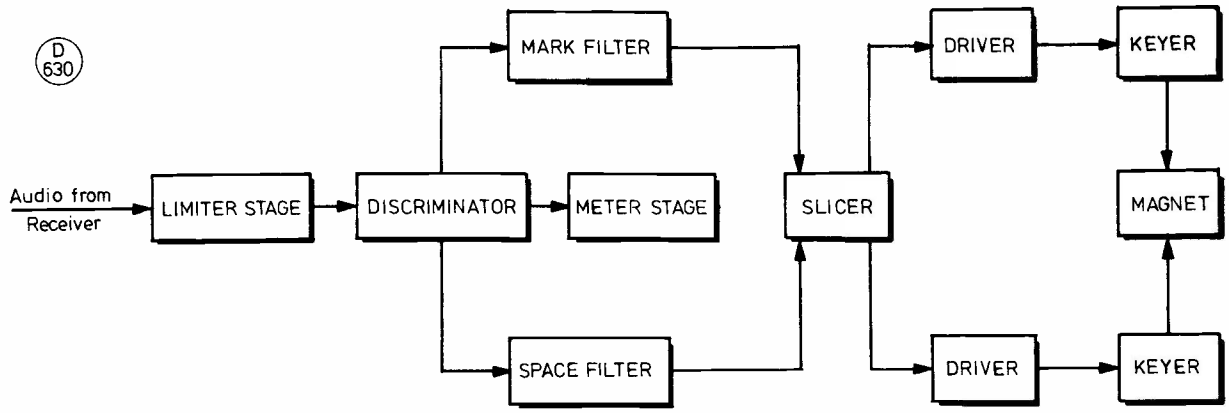


Fig. 2 BLOCK DIAGRAM OF TERMINAL UNIT

having all the added features like meter tuning, autostart, switched filters, motor start and stop, etc. The SRD1 was probably many RTTY chaps' introduction to the hobby; it was a small, self-contained unit with its own power supply switched shifts, both receive and transmit. As far as I am aware, these types are no longer available.

When we used valves for keying, we had to use the single current keying mode. This is where the magnet is held in the mark position mechanically or by the use of an elastic band, the magnet adjusted so that a voltage of around 80 and current of 30 mA could pull the magnet to the space position easily and yet allow the "mechanical" method to get it quickly back to the mark side or rest position, when the voltage from the keyer circuit was removed. This was known as a loop unit. However, the method used by the Post Office and professional users was to employ the more elegant double-voltage loop. So, pressing into service some of the high-speed Carpenter or Siemens relays which were relics of the war many hams entered into double-current keying. This is diagrammed in Fig. 3. Connecting in this style produced excellent copy of RTTY.

However, many of these sources have gone but we need not despair as there are still some amateurs who care! Coming to mind immediately are the BARTG types (British Amateur Radio Teletype Group); this is an organisation that caters for the RTTY buff. They issue a newsletter at regular intervals, carrying all sorts of news, modifications, etc., not to mention readers' advertisements, and they have also printed a booklet "RTTY the Easy Way" of which the first edition has almost become a collectors' item nowadays. The current edition of this little book carries a lot of interesting data on machines, operating, and so forth. In it also are circuits, layouts, and so on for a complete TU, which can be built with a minimum of effort and money. One, built by the writer, is shown in the photograph, and has given yeoman service with no snags. BARTG also have available some components that are difficult to get hold of at times, including the power transformer and the filter coils. This unit comprises two printed circuit boards to which great thought was given by the designers, and are very professionally finished. One carries the receive side and power components while on the other are the transmit side bits, the latter sitting above the receive board on pillars. Interconnected these make a complete TU. There is also a discount scheme for members of BARTG.

The TU shown in the photograph is, as already remarked, used by the writer and has given excellent service. It is essentially the BARTG design but contains a few extra items, and at the time of writing should be buildable for some £25, albeit shopping around may make it a bit less. The case was built from aluminium, undercoated and sprayed the required colours, lettered using *Letraset,* and the result was a nice-looking little unit. The whole case was sprayed with clear lacquer before the components, PCB's and so on were mounted on it, giving a durable finish.

Another firm catering for the home constructor and doing an excellent job, is *M.K. Products.* They make a lot of items for SS/TV as well as for RTTY, but in the latter vein there are available items like PC boards, complete boards built and tested, complete TU's, plus of course the advice service. All are competitively priced and nicely finished. They have two types of TU: one uses transistors and a couple of ICs, whilst the other is aimed at the VDU chap and uses all-IC filters, etc., with only two transistors of which one is for the meter and the other one has an open collector for feeding the UART IC in the video unit. This also can be used with an available, extra, small PCB that is driven from the UART board; this will allow hard copy on the machine as in the normal TU drive. The IC active filters are selectable to 170 to 425 Hz shift and need careful original tune-up. They are best left alone unless one has an audio oscillator and counter. There is also available an AFSK unit for transmitting which is very stable and small. Another asset is the IC type of filter; this makes RTTY a separate device and tuning round in the crowded bands is really something to be seen. Altogether, M.K. boards make up a fine TU. Remember, if you built it, you know where the bits are! This could greatly help in any breakdowns you may have.

Tuning the filters should be done using an audio oscillator and counter, although many have managed by using a cassette having the correct tones on a tape made, possibly, by an existing RTTY station, It is very basic that the better the filters are tuned the better the results. Time spent here is rewarded by the copy from the machine.

Another scheme coming to mind took place some years back when the Mid-Severn Valley club did their MSV TU, again done on PCB's and mainly for VHF using 850 Hz shift which was in

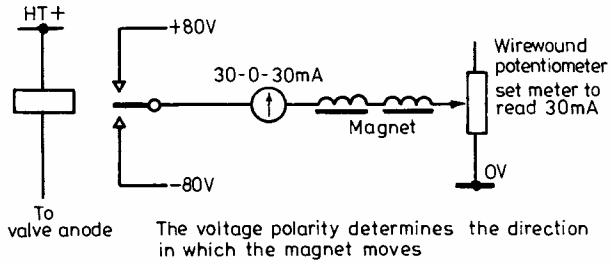


Fig. 3a Method used in Double-Current Keying

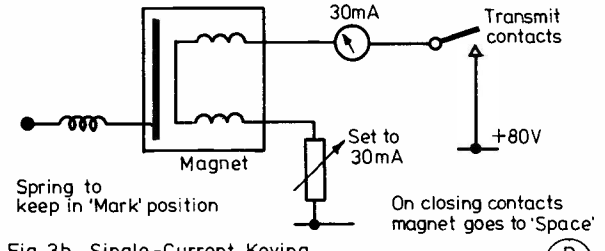


Fig. 3b Single-Current Keying

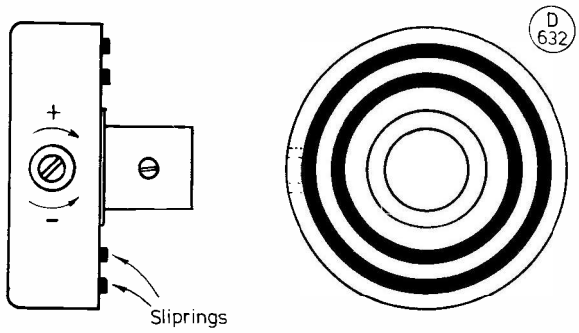


Fig.4 GOVERNER SHOWING SPEED ADJUSTMENT SCREW.

vogue then; the completed job was a good little TU. This also was receive only, or combined with an inductance tone generator, for AFSK transmitting.

Churchtown Electronics produce a professional model TU but is used by some hams. It contains everything one could wish for — automatic motor control *i.e.* autostart and timed to stop, LED tuning indicators, selected and switched filters, FSK and AFSK built in. These are mainly exported but some are in use in the UK.

Brookes Electronics offer two models which have all the necessary facilities. One even includes a TTL-compatible output.

HAL Devices also offer a re-make of the ST6 made in USA but available in UK; they also offer silent keyboards and the ancilliary gear.

Now the visual ones. Best known is the G3PLX which has appeared in many exhibitions and is a visual readout on a monitor or domestic TV; the keyboard of this again is silent, but could probably be used with a Murray-coded keyboard. PC boards, etc. are available from *Catronics* for this model. *Catronics* also do a completely-built TU and their leaflet covers all the data side of this.

In the VDU field we also have the *HBR* units which are available from advertisers. There is one known as the Digitex, yet another VDU model.

The last one to be mentioned is the *C.P. Developments* Model APR100. All of the above have been shown at exhibitions, both of the organised variety and at purely club functions.

The only one actually seen by the writer was a prototype of the *Churchtown* model which was quite nice; it should be called "silent RTTY" — it is fascinating to see the readout appearing on the screen.

Many will also accept input from a cassette tape-recorder so there is really no limit to its use. The keyboards are all, of course, electronic; *HBR* make two versions, one for ACSII and one for Murray RTTY code.

Standards

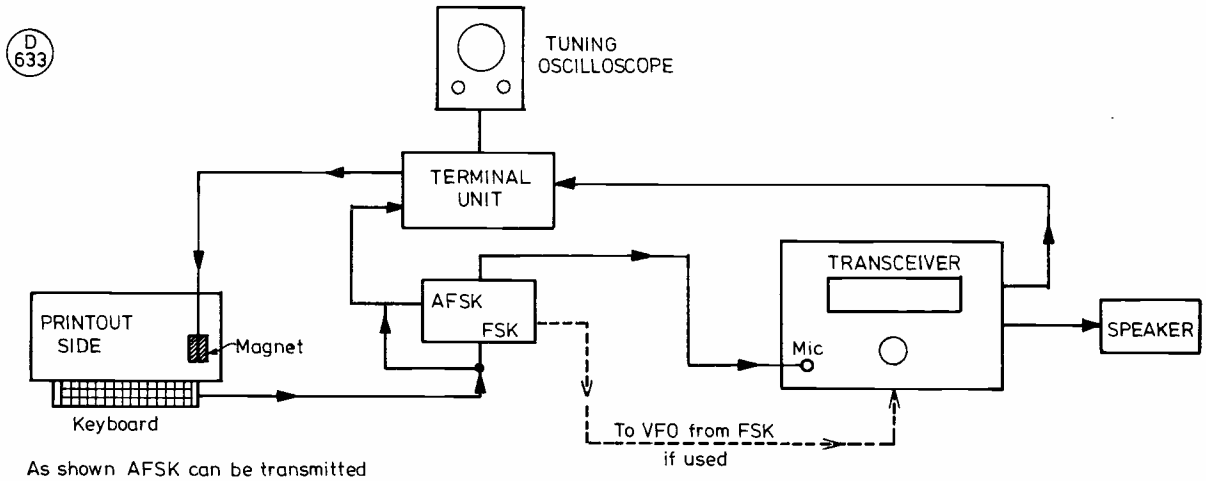
Amateur RTTY comes under standards set by the IARU, and decisions have been made as to standard tones and shifts. The currently accepted ones are shift and speed; most will now be using 170 Hz shift at a speed of 45.45 bauds. We will go into this in a moment in more detail. We also use upper sideband at all times using SSB transmitters or transceivers. Many of the older model TU's can be modified to obtain the current tones and shifts out of them. BARTG have published suitable modification data for a long time, and have covered the ST5, ST6, SRD1, and many others.

We had now better go into the terminology of RTTY. The baud is the shortest single signal unit in a signalling code and may be expressed as the reciprocal of the time of the shortest signal element. If the shortest signal element were, say, 20 milliseconds in length, then the telegraph speed would be 1/0.02 = 50 bauds.

The difference in the frequency of the two tones is known as the shift; the terms for the two tones are "mark" and "space". For amateur use, the space is always the same frequency, namely 1275 Hz. Then the mark tone for 170 Hz shift becomes 1445 Hz (amateur), for 425 Hz shift the mark must be at 1675 Hz (commercial), and the mark for 850 Hz becomes 2125 Hz (amateur at VHF). Commercial stations in many cases run 50 bauds and 425 Hz shift and it is possible to copy 425 shift on a 170 Hz TU by removing some 'C' from across the mark filter and "straddle tune" — not correct tuning, but tuning until the printout becomes intelligible. These shift frequencies are accompanied by speed differences, and some amateurs use 50 bauds, while others use 45.45 bauds. The latter were able to copy many stations, since 45.45 baud operation is standard in USA and most of Europe; in UK one finds 50 bauds at VHF almost entirely. By turning to 45.45 bauds and 170 Hz everyone can work everyone else.

While on the terminology, perhaps we should notice the difference between FSK and AFSK. In the former case, one needs to shift the carrier frequency; with an SSB transmitter this will occur naturally when the two AF tones are put into the mic. socket. On the other hand if we use the same two tones to modulate an AM signal, the carrier is present and stands still, while the two tones simply modulate the carrier. Thus for reception, FSK is received like SSB, with a BFO, and AFSK is received without BFO, just like an old-fashioned AM signal.

How do we get our 45.45 bauds? Some teleprinter-motor governor covers have a stripe painted on them which help in identifying the speed, but as covers are interchangeable this is not much help! Most machines bought from surplus stores and dealers are sure to be of the 50 baud breed, having come from the Services, GPO and similar organisations. To change the speed on one of these is simple: refer to Fig. 4. Around the periphery of the



As shown AFSK can be transmitted
FSK is shown dotted

Fig.5 TRANSMIT SIDE

governor cover is a band of stripes and somewhere along this will be found a hole with access to a screw. There are markings cover with a plus and a minus sign, indicating which way to turn the screw to alter the speed. The effect of the screw is to adjust the governor contacts so that they maintain the motor at the correct speed. Switch *off* before doing this as the screw is on one power lead of the motor, and hence is live, while the case is earth.

Before we dive in for a twiddle, let us mention the motors a little more. They come in various voltages; some have been met using 24v.DC, 110v.DC, 160v.DC, 250v.DC and 250v.AC. Some have a synchronous motor and so will only operate on 50 bauds; they have no governor of course. It will copy any remaining 50 baud commercial transmissions but that is about all.

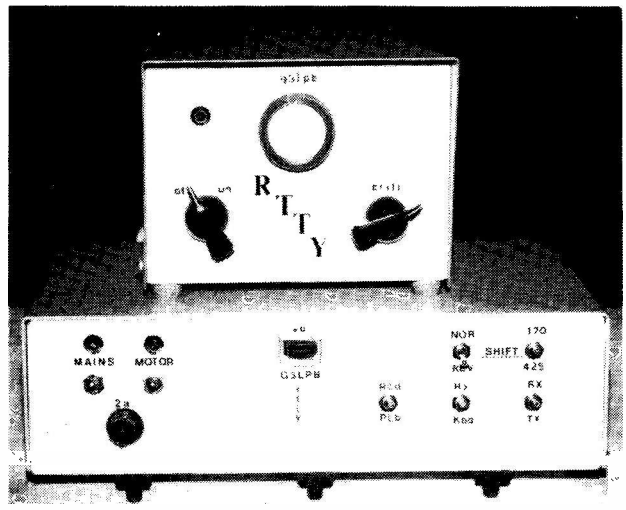
Reverting to the adjustable motors, having switched off and located the adjustment screw just mentioned, about seven turns anti-clockwise will put you close to 45.45 bauds; a little bit of fine adjustment may be needed to get you bang on. One method of getting the speed right is to run the printer for a given number of seconds and count the number of characters printed out. More on this in a moment. It should at this point be stressed that a machine will print out on an adjusted keyboard correctly *regardless of motor speed.* So the "local" copy from the machine is no criterion at the far end! This is important, as many a QSO has been lost because the speed was wrong. Copy can only be obtained from a distant signal when the motor is within a few r.p.m. of the correct figure.

50 baud transmissions are around — there is at the time of writing a transmission around 4012 kHz which can be reached by most receivers and transceivers — it is almost the last signal a Heathkit transceiver can copy. This gives out five-digit coded information at all times, and is very strong and good copy at G3LPB.

On the 45.45 baud side, one thinks of PA0AA on Friday evenings on 3.6 MHz with a news bulletin given in CW, SSB and RTTY, with times, frequency, shift, etc., all given verbally. Another one is GB2ATG giving excellent signals on Sundays around noon, again with excellent coverage and a good signal quality.

Requirements

To obtain copy we need three things, namely a good drift-free receiver (and a good drift-free signal coming in!), correct machine speed, and the correct shift. Incidentally, if we have a speaker at low volume as well as the printer, one can very rapidly get the "feel" of an RTTY transmission (and blush privately with the thought that this is what we were calling QRM last week!). The same thought, of course, applies to any other specialist activity on the bands, such as SS/TV — recognition of the signal for what it is Using a speaker in this manner will soon enable you to recognise the synchronising of the magnet with the signals heard, and if garbage is coming out, flipping the normal/reverse switch on the TU will probably turn it into copy. It is also quite amazing that a good TU can copy a signal that the ear has all but lost amid the QRM!



Author's BARTG terminal unit, with the Visitune on top.

Of the three, receiver tuning is probably the most critical, with any wandering causing garbled copy. The writer has tried all sorts of schemes for correct tuning indication: magic-eye indicators, LED circuits using one tuned to mark, one to space and one at mid-band, but in the final analysis CRT methods seem to be preferable to all the others. In this context the "Visitune", as we call it, will be written-up later in the series. If this shows tuning to be correct but garble comes out, one only has to reverse the normal/reverse switch on the TU.

Incorrect motor speed is something which can be happening at either end, and any deviation can result (if it is minor) in misprints, or in a bad case complete garble. Murray code, which the printer uses, is designed to limit the effect of differing machine speeds, but the allowable variation is small.

Our third variable is the shift. Both stations must be operating with the same shift. The ear, by way of the loudspeaker, will be saying "that's an RTTY signal" but the machine won't want to know. Most, if not all, amateur transmissions use the 170 Hz shift, and most amateurs will recognise the "tune" of the RYRYRY sent by amateurs as a pre-transmission run — if we copy it as SYSYSY then the normal/reverse switch will turn it into the right letters. A word of warning here, though — you may come across a signal where the op. is using his own language rather than English — don't wreck the rig until you've established that!

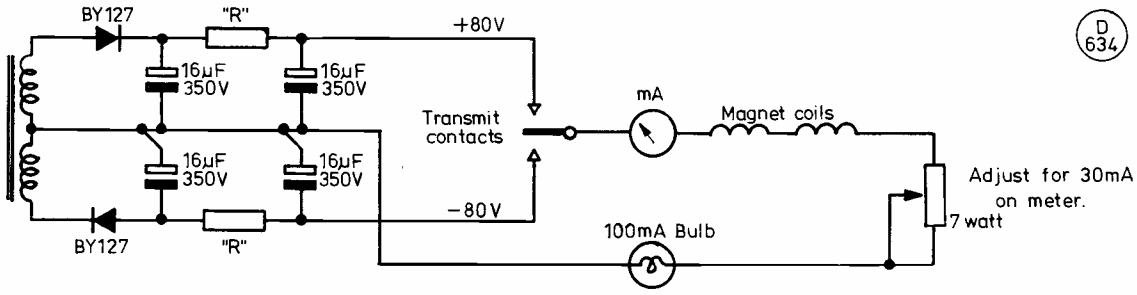


Fig. 6 EASY METHOD OF TESTING A PRINTER

The value of 'R' = $\frac{\text{(voltage at rectifier minus 80v.) x 1000}}{\text{30 mA.}}$

This arrangement allows the machine to be used like a typewriter, and only gives an indication of the condition of the teleprinter as a printer, and ensures the keyboard is working. It is a good idea to put a bulb in series as shown; if contacts are mis-adjusted the lamp lights and does no damage to contacts, meter or coils. In use, the bulb flickers. In the mark position the centre contact is connected to the positive supply to hold the machine in the rest condition (the connections to the magnet may have to be reversed to attain this).

Transmit

We have already defined FSK and AFSK. Those who swear by AFSK don't work DX! The method is that we have an audio oscillator which, when keyed, changes frequency. If we set the oscillator to our desired higher frequency, we can then use a transistor, or such, to bridge some more capacitance into the circuit so the oscillator changes to the lower frequency. The keyboard of course does this switching, and also has another loop which actuates the magnet drive to give local copy if required. The audio tones are fed into the mic. socket of the transmitter, and any press-to-talk leads can be brought out from the transmitter to be available at the printer position. So, in summary, AFSK is just shifting of two tones.

FSK is the other, and we would think more popular method, and here the technique is to use a varicap diode and a DC voltage to shift the VFO frequency as required, the keyboard again having the control as with AFSK. This way requires the BFO at the distant end to regain the audio tones. If you have a sealed VFO with a valve, one way of getting the wire connection to the VFO is to remove the VFO valve, poke a bit of tinned copper wire down the appropriate valve-base pin, and replace the valve. Simple! Some TUs allow both AFSK and FSK, so why not try both? The general arrangements are as shown in Fig. 5, and Fig. 6 shows a method of connecting up a local loop for checking the teleprinter.

To revert to the varicap and VFO, some RTTY stations have pressed into service such good old transmitters as the DX-100 and the LG-300, but of course there is a problem here in that a VFO and a string of multipliers must mean that for a given VFO shift you will end up with a different output shift on each band. But they are still potent one-band RTTY transmitters, or can be used multi-band provided one can think of a way to guarrantee the correct shift comes out of the transmitter. Don't forget that with RTTY the transmitter PA is on a 100% duty cycle while you are transmitting, so keep the PA anode current down to the correct current, or lower. If you insist on a Big Signal, build a big linear and let that take the pounding!

Operating

Tune up as usual, off frequency, with the usual check that you aren't causing QRM, but *watch those meters.* Now send a test run of RYRYRYRY, preceded by a couple of presses of the carriage return key, a stab at 'letters' and 'car. ret.' (carriage return) then one line feed, and into the RYRYRY routine; followed by "Test de G3SWM", another carriage return, letters and line feed, and launch our "CQ de G3SWM", watching the carriage position at all times — if in doubt perform a carriage return and line feed. If you forget, the machine at the other end will just print letter-on-letter at the end of the line. At the end of your CQ call, end "pse K" as if you were on the key, and go to receive. If someone is going to call you, he will start with a few RYRYRYs to give you a tuning signal, and then "G3SWM this is G3LPB calling you". You now go to receive and the QSO continues. If he is tuned correctly but you get garble, try switching the normal/reverse key, and check also you are on Upper Sideband.

Speed of sending is of no consequence — everyone had to start somewhere, and most from scratch, so they will wait while you peck away, and you will soon gain facility in the art.

The other chap may come back with a fast flurry of RTTY; he is probably using a *tape reader.* This is a machine that takes a roll of tape, perforated with sprocket holes, and with a collection of little holes in it which tell the reader which letter to send. A paper memory, and a pre-prepared over, in fact. The tape is prepared using a *perforator* which can be elsewhere than cluttering the operating table, although a few ops. use one to prepare their reply as your own over is coming in.

You may on occasion come across the term "Autostart" — this is a facility whereby the TU controls the machine motor driving volts, switching on at receipt of a signal, and shutting off so many seconds after receipt of the last letter — this facility is normally found on commercial machines only.

Finally, let us deviate to the matter of machines. Tape machines are rarely seen these days, but Creed began with them, as will be recalled by telegrams of that era — the twenties onwards. (These were the Creed Model 3, mostly with a suffix letter after them — *Ed.*) Upon the foundation of the Model 3 and its variants, Creed turned to the Model 7 page printer. Again it was a success, and variants were still being developed well after W.W.II. Other gear which may be encountered outside the UK include machines by Siemens, Lorenz, Olivetti, and Teletype. All these are usable provided you can get spares when needed, so let us return to Creed (ITT-Creed nowadays), and look at them more closely. At a speed of 50 bauds, each character takes 150 mS, and there are sixty on a page printer line. So, if we let the machine run from the start of a line to the end and time it, we should get nine seconds. To do this, we should remove the cover, and hold out the pawl lever on the transmit side, depress a key, and with the third hand start the stopwatch. Just keep the key down and you will get a line of sixty characters. Nine seconds indicates you are looking at a 50-baud machine, and 9.9 seconds says you've got a 45.45 machine. In the former case your motor should be going at 3000 r.p.m., and the latter is equivalent to a motor speed of 2727 r.p.m. Naturally, the synchronous motor is going to stick to its 3000 r.p.m. Governed motors, adjusted as already mentioned and checked as above, will govern to 0.5% despite plus-or-minus 10% variation in supply voltage and the load variations on normal service.

The Creed Model 7 was originally a page printer, but it has run through dozens of models, some with tape output and some with the "flat-pack" tape as well as the page models. A more modern version is the Model 54. Tape machines are all right if you can get hold of the tape, and given that you can invariably remember about the chap on the other end with a page printer — and the carriage return and line feed keys are labelled for some other use in a tape printer. Be warned! The Model 8 was a variant which was receive only, and was very reliable; the Model 7E is a lot different — it prints out each character as received rather than printing one as the next is coming in, like other machines. Other ITT-Creed machines are the 47, 54 and 75 Models, with the 444 as the *ne plus ultra* of the mechanical jobs.

Keyboards present a problem; getting hold of a keyboard may look easy, but it must have the right mechanics. If not it won't give local copy, let alone drive the TU properly!

Perforator Number 44 has a keyboard and a mechanical punch arrangement to give prepared tape to a 6S6 auto-sender. Its output replaces that of the keyboard, and arrangements can be made to switch from one to the other.

Now, about adjustments . . . don't! Leave well alone and just confine yourself to a spot of lubricating oil, a new ribbon, or a new roll of paper.

So now you have it. Next time we will be talking about the "Visitune" as promised. Meantime, some names and addresses:

BARTG, c/o 234 Gillingham Road, Gillingham, Kent. Join them first, then go for TU, bits and pieces, PCB's, etc. "RTTY the Easy Way" is obtainable from them.

M.K. Products, 28 Turnberry Close, South Gosforth, Newcastle, Northumberland. This firm carries bare and complete PCB's, and complete units.

Catronics Ltd., Communications House, 20 Wallington Square, Wallington, Surrey. PCB's and IC's for the G3PLX VDU drive unit.

Spacemark Ltd., Thornfield House, Delamer Road, Altrincham, Cheshire. Toroids and other useful bits.

Brookes Electronics, 69 Leicester Street, Norwich. Complete units to fit your own case.

Lowe Electronics Ltd., Chesterfield Road, Matlock, Derbys. For HBR electronic RTTY.

Radio Shack Ltd., 188 Broadhurst Gardens, London N.W.6. For Digitex and HAL.

C.P. Electronics, Hughenden Road, Hughenden Valley, High Wycombe, Bucks.

Churchtown Electronics, St. Merryn, Newquay, Cornwall.

CLUBS ROUNDUP

By "Club Secretary"

AS the number of licensed radio amateurs rises, so inevitably does the number of clubs. Hence, the depth of the pile to be taken in each month. So perhaps this is a good moment for us to recall the rules for the benefit of club scribes. If you want to send your report monthly, fine, but each time you must send in your programme data, meeting-place, time and date, name and address of Hon. Sec. If you have up to a year ahead organised that's OK too, but we will only treat it as valid for *three months,* by which time we expect an up-date. The up-date can indeed be as simple as a statement "nothing's changed!", but we need to know for the benefit of anyone writing in and to avoid any misleading of readers. Remember, they blame *us,* not you!

The Mail

We have lots! So, straight down the alphabet. **Acton, Brentford & Chiswick** seem to be the top one most times, and for this month they have G4HMC explaining "how he did it" with QRP, on 7 MHz. With operating standards falling all the time, we feel that talks like this are a very good thing indeed. Chiswick Town Hall, 7.30 p.m. on April 21.

A.R.M.S. Hon. Sec. is our own *VHF Bands* columnist, covering his other interest of amateur radio mobiling, anywhere in the world where such is possible. There is also a useful rally calendar, and reports on past rallies, something which is very worth-while for anyone who is going to organise one, not to mention the odd technical article and so forth. Full details from G3FPK at the address in the Panel.

Every Tuesday, residents around Hart Hill, near Charing in Kent, watch the little crocodile climbing to the top — the 'crocodile' being composed of members of the **Ashford** club heading for their Hq on the top of the hill. Their main interests are, not unexpectedly, operating at HF, VHF and UHF. If this is your part of the world contact the Hon. Sec. — *see* Panel.

B.A.R.T.G. look after the chaps with the RTTY gear in the shack — and well they do it too, between supplies of the specialised bits and a very fine newsletter, plus all the contest organisation. If you have, or intend to operate RTTY, then this is a 'must' for you.

For **Bishops Stortford,** the arrangements are fairly simple — the third Monday in the month at the British Legion club, at the top of Windhill — it lies on the right as you walk up the hill. There is usually something doing, even though they often put it together at the very last moment!

Bournemouth foregather on the first and third Fridays of each month, the venue being the Dolphin Hotel, in Holdenhurst Road; as we do not have the very latest of news (up-date?) we must refer you the Hon. Sec. — *see* Panel for his address.

Now **Braintree** where the story is one of members' lecturettes on April 20, at Braintree Community Centre, Victoria Street, which is next to the bus station.

At **Bromsgrove,** where they foregather on the second Friday of each month, the main detail lacking is the Hq address — so we must refer you to the Hon. Sec. at the address in the Panel. At least we *think* that's the Hon. Sec. — they've just had an AGM which is maybe why we haven't received the very latest news.

Bury have it all set out: venue the Mosses Community Centre, Bury, date April 14, and subject Amateur Television, as seen by G8HBR. While the 'formal' with talk or whatever is, as indicated, the second Tuesday, the gang will be found there on any Tuesday, doing various interesting things.

The letter from **Cannock Chase** is largely to tell us that a new Hon. Sec. takes over — *see* Panel. He adds that they are booked in on Thursday evenings at the Bridgtown War Memorial Club, Union Street, Bridgtown, near Cannock.

At **Cheltenham,** we find the address to look for is The Old Bakery, Chester Walk, Clarence Street. This time we see they have a joint meeting with the G3SSO group and Smiths Industries club, to hear a talk on VMOS devices by someone from Siliconix, which should be of great interest, particularly for those who learned their radio on valves! The 'natter nite' is down for April 17 at the same Hq.

Wednesdays at **Chesham** are held at the Chesham Whitehill Community Centre, the second one being set aside for the business-and-speaker routine, leaving the others for the all-important discussion on one's pet project and anything else pertaining to the hobby.

It's quite a while since we had an input from **Cheshunt,** but they still have their place at the Church Rooms, Church Lane, Wormley, near Cheshunt. Notice we say Wormley — if one is coming from the north, one can do an overshoot and arrive at the wrong Church Lane! So if you intend to go and visit them on Wednesdays, it would be a smart scheme to get hold of the Hon. Sec. (*see* Panel) or G3OJI on Ware 4316, to get the right directions. On a different tack, they have a winter Morse class project they are trying to get rolling, so anyone in the area with a yen to bone up on CW, get in touch *pronto* with G3OJI as above.

Deadline for "Clubs" for the next three months—

May issue — March 27th
June issue — April 24th
July issue — May 29th
August issue — June 26th

Please be sure to note these dates!

At **Chiltern** the letter from the new Hon. Sec. gave us particular pleasure in that it was from an SWL of some 20-odd years who had finally taken the plunge and got a licence and is enjoying it. He tells us that the gang are at the John Hawkins Furniture factory in Victoria Street, High Wycombe, on the last Wednesday in each month.

After some 33 years in the same place the **Clifton** crowd have changed their Hq address. However, we have it that yet another move may have been made by the time this reaches you, so a contact with the Hon. Sec. seems the right thing — *see* Panel for his address.

Into East Anglia now, and **Colchester's** Hq at Colchester Institute in Sheepen Road, where on April 2 *Waters & Stanton Electronics* will be showing some of the latest things in transmitting and receiving. More details from the Hon. Sec. — *see* Panel.

The poor old newsletter editor at **Congleton** seems to have received a rather unpleasant surprise when he found material wouldn't just roll in — no doubt he has found a labour-saving arm-twisting machine by now! Try Congleton Library, in the Lecture Theatre, on the first Wednesday each month.

After all these years it seems odd to receive a **Cornish** "Link" with a cover using just one colour of ink, even though the pattern hasn't changed. Bring it up at the AGM, on April 2, at the SWEB Clubroom, Pool, Camborne. The AGM will be followed by a talk on "how to create chaos" by those two dabsters G3XFL and G3VWK.

Coventry are based on Baden-Powell House, Radford Coventry; the programme is very varied and interesting, says the Hon. Sec. — phone him for the latest details and also directions on finding the Hq address.

Names and Addresses of Club Secretaries reporting in this issue:

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DUMFRIES & GALLOWAY: D. H. Stewart, GM4JAP, Drumbuie Cottage, Newmains, Kirkbean, Dumfries.
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EX-G: F. W. Fletcher, G2FUX, 53 St. Ives Park, Ringwood, Hants. BH24 2JX. *(Ringwood 3561)*
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GUILDFORD: L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey. *(Guildford 76375)*
HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. *(Hereford 3237)*
HULL: Mrs. H. V. Cunliffe, 12 Pearson Avenue, Hull. *(Hull (0482) 447355)*
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ISLE of WIGHT: T. Fallick, G4FYI, Harmony, Main Road, Chillerton, Newport, I.o.W. *(Chillerton 328)*
KIDDERMINSTER: R. Manton, G4ILQ, 7 Osborne Close, Offmore Farm Estate, Kidderminster, Worcs. DY10 3YY. *(Kidderminster 4930)*
KILMARNOCK & LOUDOUN: W. Strachan, GM3RZT, 38 Loudoun Avenue, Galston, Ayrshire. *(Kilmarnock 820052)*
MEDWAY: P. J. Poole, G4EVY, 5 River Drive, Strood, Rochester, Kent ME2 3JW. *(Medway 76463)*
MEIRION: Mrs. J. Jones, GW8SYX, 25 Fford Dyfrig, Tywyn, Gwynedd. *(Tywyn 710-402)*
MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray, Leics. LE13 1TZ. *(Melton Mowbray) 3369)*
MEXBOROUGH: I. Abel, G3ZHI, 9 Grove Terrace, Maltby, Rotherham, Yorkshire. *(0709 814911)*
NORTHERN HEIGHTS: M. Topham, G8NUC, 1200 Great Horton Road, Bradford. *(Bradford 73271)*
PETERBOROUGH: D. Wilson, G4KSW, 4 Conway Avenue, Peterborough.
READING: C. Young, G4CCC, 18 Wincroft Road, Caversham, Reading Berks. RG4 7HH.
ROYAL NAVY: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth, Hants. PO8 8SQ. *(Waterlooville 55880)*
ST. HELENS: P. Gaskell, G8PQD, 131 Greenfield Road, St. Helens, Lancs. WA10 6SH. *(St. Helens 25472)*
SALISBURY: A. C. A. Newman, G2FIX, 74 Victoria Road, Wilton, Nr. Salisbury, Wilts. SP2 0DY.
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SCUNTHORPE: J. A. Sheardown, G8TIY, 5 Winteringham Lane, West Halton, Scunthorpe, S. Humberside DN15 9AX. *(0724 732438)*
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SOUTHAMPTON: P. Harris, G4BDQ, 10 Westridge Road, Portswood, Southampton SO2 1WQ.
SOUTHDOWN: R. E. Holtham, G4EKS, 2 Benbow Avenue, Eastbourne, E. Sussex BN23 6AB. *(Eastbourne 31620)*
SOUTHGATE: Mrs. V. Austin, 89 Chaseville Park Road, Winchmore Hill, London N21. *(01-360 5832)*
SPALDING: W. Martin, G3UWD, 46 Mill Drove, Bourne, Lincs.
STOURBRIDGE: C. Williamson, G4IEB, 14 Lawn Street, Stourbridge. *(Stourbridge 2006)*
SUNDERLAND: D. J. Holland, 17 Egerton Road, West Harton, South Shields. *(South Shields 551045)*
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VALE of the WHITE HORSE: A. Lovegreen, 16 Church Lane, Wallingford. *(Wallingford 37482)*
VERULAM: G. N. Dale, G3PZF, 16 Palfrey Close, St. Albans.
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WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent TN14 5AF. *(0732 56708)*
WIRRAL: G. O'Keefe-Wilson, G8VPF, 20 South Drive, Upton, Wirral. *(051-677 1531)*
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset. *(Yeovil (0935) 24956)*
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

In the same town there is **Coventry Technical College** with a club. They hope to be listening to G3BA on April 6, but they are 'at home' every Monday evening.

From the **Crawley** newsletter we gather that they have a new Hon. Sec. — *see* Panel. The normal venue is at Trinity Church Hall, Ifield on the second and fourth Wednesdays; or rather, the former date is at the venue specified, while the latter is held at the home of one of the members, taking turns.

Cray Valley are at Christchurch Centre, Eltham High Street, London SE9, on the first and third Thursdays, the former generally being the 'formal' date.

At **Crystal Palace,** they are booked in at Emmanuel Church Hall, Barry Road, London SE23, and on Saturday, April 18, there will be a series of lecturettes by members, one of which will be G3IIR on the gentle art of soldering. (These days, that could be a subject in itself!)

Dartford Heath D/F are the specialists in the D/F game, but they also have their indoor meetings, based on the Scout House, Broomhill Road, Dartford. Normally they are there on the first and third Friday evenings, but this may be varied if it clashes with a D/F event elsewhere. Hence before you go, contact the Hon. Sec. *see* Panel.

April in **Derby** starts with a Foolish Junk Sale on, would you believe, April 1! If we say they get together weekly at 119 Green Lane, doubtless you will have deduced that they have every Wednesday evening. The Hq is the whole top floor of the building, and is very nicely laid out indeed.

We must now head up north, to **Dumfries and Galloway,** where the venue is at the Cargenholm Hotel, New Abbey Road, Dumfries on the first and third Mondays of the month, at 7.30. For April 20, they have a computer night organised.

From Scotland, over the water to GI, and **East Antrim.** At the time of their letter, and doubtless also when this comes to be read, they are on a member-hunt; be shanghai'ed at Carntall Hall, near Mossley on the second Tuesday of each month. April 14 is a surplus equipment sale.

The first Thursday and the third are the ones if you want to meet the **East Kent** group. The first meeting in the month seems to

be generally at the Dominican Hall in Canterbury, as a formal, while the other date is down for a pub evening at "The Sun", St. Nicholas-at-Wade, both having a start time of 2000.

Now to **East London RSGB,** where the Hon. Sec.'s covering letter mentions several interesting meetings at clubs in the area, most of them within hail of the writer but all on awkward dates! However, back to East London, and the general routine is a meeting on the afternoon of the third Sunday in each month at Wanstead House, 21 The Green, Wanstead — within a couple of minutes walk of Wanstead Tube station. April 12 should be a bumper effort, as Pat Hawker, G3VA, will be coming along to talk about Technical Topics, and particularly DC receivers.

Not so very far away is **Edgware,** at 145 Orange Hill Road, Burnt Oak; April 9 is down for a talk on film sound tracks by G3PSP, and on April 23 they will have an informal discussion which will include the question "should the RST system be abolished?"

Next to the **Ex-G Club,** for those born, or naturalised, or whose parents were born, in UK but are domiciled abroad. Details from the Hon. Sec. — *see* Panel.

At **Fareham** foregather on the first and third Wednesdays — details of the venue and dates for April from the Hon. Sec. at the address in the Panel.

Grafton should be well settled at their new venue by now; the "Five Bells" is in East End Road, Finchley, on the second and fourth Fridays in each month. A full programme has always been somewhat of a feature at Grafton, so doubtless things will be humming again by now.

Turning now to **Guildford,** April 10 is down for NFD plans, and on 24th there is an AGM. The place is Guildford Model Engineers Club Hq in Stoke Park, Incidentally, a very sensible warning adorns the tail-end of their newsletter, on the risk of theft of gear from parked cars. Since that was written, legalisation of CB has been announced, albeit no date is known yet — but if that announcement doesn't bring a spate of stolen /M gear we will be more than a little surprised!

Talking of warnings, there is one in the **Hereford** newsletter, concerning the danger of the beryllium oxide packed into many RF transistors, to aid cooling, and also used inside some fluorescent tubes. Manufacturers of new RF transistors usually have a warning on the packet, but unmarked surplus transistors can be a serious danger because they are unknowns. Disposal of these is a considerable problem; if the maker is known they will dispose of old ones returned to them, but with an unknown or surplus device one wonders what should be done. Certainly *not* into the dustbin. The local club foregather at County Control, Civil Defence Hq, Gaol Street, Hereford on the first and third Friday.

At **Hull** we have a new Hon. Sec. to note — *see* Panel. We also have a note that they are clustered together on Friday evenings, save for Good Friday, which is a "no meeting" date. However we do not have a note of the venue.

Ipswich are at the "Rose and Crown" on the second and last Wednesdays of each month, this spot being at the junction of the A45 to Norwich and Bramford Road. April 8 is a brains trust, and then on 29th they have the AGM.

IRTS come next and it is nice to see their newsletter again. IRTS handle all the work of a national society, and any enquiries regarding EI clubs or groups should be sent in their direction.

Over in the **Isle of Wight** things tend to be quiet in the winter, since most of the group like to enjoy a quiet natter or argument in one corner, while others are running the rig on 3.710 MHz, every Friday evening in the Unity Hall, Wootton Bridge, near the Sloop Inn, I.o.W.

We were a bit startled to open the **Kidderminster** newsletter and have a Xerox copy of *Short Wave Magazine* letter-head drop out! Our "VHF Bands" columnist, G3FPK, had written on the subject of the local net frequency, and a copy of it was enclosed in each newsletter — thus reaching all members — with a request for comment. Democracy prevails! To return to the club itself, they have every other Tuesday evening at Aggborough Community Centre, Hoo Road, which is next door to the Harriers football ground. April 14 is down for Amateur Television, with G5KS and G8GUN, and the informal thus falls on April 28.

The West of Scotland Amateur Radio Society's (GM4AGG) morse class. Pictured in the club shack are, left to right, Willie GM4GIH, Grant GM8XZF (who became a GM4 since the photo was taken), George GM4HYF, SWL Colin (standing), Willie GM8IHQ, and Tommy GM8YVG.

News!

That's what all the with-it advertising always says; and we are advertising the formation of a club in the **Kilmarnock and Loudoun** catchment area, the Hq being at The Buchanan Centre, Riccarton, Kilmarnock, on the first and third Tuesdays. The start is timed for around 7.45, so as to allow for RAE tuition from 6.45.

Also new is the **Medway** group's new address, at St. Luke's Church Hall, King William Road, Gillingham, at 7.30 every Friday. We have the old Hon. Sec.'s address in the Panel, but he will doubtless be pleased to do the needful for enquirers until we get an update.

On we go to **Meirion,** and their Hq at the Ship Hotel in Dolgellau, on the first Thursday in the month.

Melton Mowbray are going out of the hobby for the meeting on April 17, and out of their Hq. The gathering will be at the Register Office in High Street, and G3NVK will be talking about some aspects of the Law, and Births, Marriages and Deaths. Normal venue is the St. John Ambulance Hall, Asfordby Hill.

Although we have a chatty newsletter from **Mexborough** it doesn't tell us about the Hq address or meeting data. So contact the Hon. Sec. — *see* Panel.

At **Northern Heights** the gang are to be found on Wednesday evenings at the Bradshaw Tavern. We don't have any details for April, save that April 1 is the AGM!

The new committee are busy getting things sorted out at **Peterborough,** based as ever on the Scout Hut in Lincoln Road, Peterborough, and the third Friday in every month.

Looking at the **RAIBC,** we see they have a total of 615 blind and invalid members, plus of course the supporters and representatives. Looking through the membership list, one notes that each county has members and supporters, though there seems to be a lack of supporters in Norfolk, Shropshire, and EI. Can't some reader help fill these gaps? The Hon. Sec. would be pleased to tell you what is needed.

At **Reading** the Hq is at the "White Horse" in Emmer Green; this is off the B481 Reading-Nettlebed road, and there the group will be found every other Tuesday in the pub clubroom.

The **Royal Navy** continues to go from strength to strength, around 1600 members at the last count. If you are eligible the Hon. Sec. will be only too pleased to sign you up; his address is in the Panel.

At **St. Helens** we are to record a change of venue, from the

YMCA to the Conservative Association Rooms, Boundary Road, every Thursday evening from 7.45.

Salisbury are next in the pile, and we find them at the Activity Centre, Wilton Road, every Tuesday. Quite apart from the normal club activities we hear that G5YN will be conducting his Morse classes.

Now we have to record a new P.R.O. for **Saltash** — it is nice to hear from the club that used to turn out the "Tamar Pegasus" regularly, that they are still going, still at the same venue (Burraton Toc H Hall, at the junction of Warraton Road and Oaklands Drive, Saltash) and on the first and third Friday.

Scunthorpe are at The Shack, Grange Farm Hobbies Centre, Franklin Crescent, every Tuesday evening; more data from the Hon. Sec. — *see* Panel.

Fridays at Friday Hill House is the thing to remember if you want to meet the **Silverthorn** gang in this stately home hide-out in Simmons Lane, Chingford, London E4.

It has to be a long time since we heard from **Southampton** directly, but the new Hon. Sec. — *see* Panel — tells us they are around every Wednesday evening, and at the time of writing are moving; by the time you read this, the Hq should be the Toc H building, Little Oak Road, Bassett, Southampton. For the first fews weeks at the new place they will be running talk-in on Two, channel S22.

Southdown are based on the Chaseley Home for Disabled Ex-Servicemen and it is pleasing to note one of the residents on the committee — with so many Hq's one can think of ways in which the booking can be of two-way benefit. Find them on the first Monday of each month.

At **Southgate** they have settled on the Scout Hut, Wilson Street, The Green, Winchmore Hill, London N21. The April meeting will be a talk on the sinking of the *Titanic* by Mrs Hance, the official historian of the GEC/Marconi outfit.

April 3 is the date at **Spalding,** at the Teachers Centre, Knight Street, Pinchbeck, and the details were still to be finalised at the time of writing.

Now we head for **Stourbridge,** and here the form is to go to Longlands School, Brook Street, on the first and third Mondays. More details from the Hon. Sec. — *see* Panel.

We are a little puzzled to hear that the **Sunderland** area had been devoid of a club: but so it would seem, and the new group have secured good premises at the Brewery Yard, Westbourne Road, Sunderland, where they have at present every Monday evening, but hope to extend to another evening so as to give an RAE course 'ere long.

Nothing new about our next one; **Surrey** have been around and a force to be reckoned with for many years. On April 6 they have an AGM, while on 20th they have an RAE revision — everyone welcome to this one. The venue is *T.S. Terra Nova,* 34 The Waldrons, South Croydon, on the first and third Mondays.

Another AGM to be noted is the **Sutton & Cheam** one, we assume at the Banstead Institute, on April 24.

At **Thurrock** the requirement is to find Grays Park Hall, and then get to the top floor on a Tuesday evening. As a "starter for ten" we offer the information that the Hall is in Orsett Road, Grays, Essex.

An overview of **Torbay** activities was long overdue to set our records right — we have now done so. The venue is as always Bath Lane (rear of 94 Belgrave Road), Torquay. Informals come every Friday evening, and in addition there is a business meeting plus lecture on the last Saturday in each month; April's formal will be the AGM.

It is nice to hear again from the **Vale of the White Horse.** They have by mutual agreement changed to the first Tuesday in every month at the "White Hart" in Harwell Village, Oxon.

Next stop is **Verulam,** where the group meet in the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans. We don't have the full April gen at the moment but would guess at April 28; as for the speaker, we believe it is G3XAP on aerials. Check with the Hon. Sec. — *see* Panel.

WACRAL of course is the group for all denominations of committed Christians, having grown out of its original Methodist shape. Details on membership world-wide from the Hon. Sec. — *see* Panel.

Wakefield have April 7 and 21, the first for the AGM and the second for a natter-night, at Room 2, Holmfield House, Denby Dale Road, Wakefield. Start at 8 p.m., but if one is early and old enough, a few members will be found in the bar from around 7.30 p.m.

At **West Kent** time is short if you intend to visit Tunbridge Wells Telephone Exchange on April 10, as the Hon. Sec. wants to know how many will be going to the Prestel demo they have set up. As for April 24, the AGM will keep it occupied, at the Adult Education Centre, Monson Road, Tunbridge Wells.

The first and third Wednesdays are booked at the Sportscentre in Grange Road West, Birkenhead, by the **Wirral** group. April 1 sees the Hon. Sec. giving a talk on navigating in a motor-car rally, and on 15th there is a junk sale.

April sees the **Yeovil** locals giving G3MYM a bashing: four talks to be prepared by him! April 2 for transmitting loops, ground wave propagation on 9th, equivalent circuits on 16th, and not-so-common aerials on 23rd. That leaves April 30 for the AGM! Building 101, Houndstone Camp.

The **York** AGM, we gather, was a lively affair, with some shifting of seats, but some continuity as well, including the scribe — *see* Panel. They are at the United Services Club, 61 Micklegate, York, on every Friday evening except the third one.

Finale

That's the bottom of the pile for another month, and the deadline is shown in the 'box'. Address your letters and data to your scribe at SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

April Mobile Rallies

We have details of two mobile rallies in April, both on April 26th. **Drayton Manor** mobile radio rally, organised jointly by Midland A.R.S. and Stoke-on-Trent A.R.S., at Drayton Manor Park, Tamworth, Staffs., opening at 11 a.m. The Park is located on the A4091 within easy reach of M1, M5 and M6, and is well signposted; talk-in on 2m. and 70cm., trade stands, Raynet, etc., children's entertainment. Contact G8BHE, QTHR, for details (tel: 021-422 9787). **Southend and District** mobile rally, Southend Airport Exhibition Centre, Aviation Way, Southend-on-Sea, Essex, licensed bar, talk-in station, bring and buy stall, aircraft museum; details from G8ORV, QTHR. (Tel: 0702-616239). A list of rallies to be held during the rest of the year will be published in the May issue.

Stolen

M. J. Linda, G4GTH, reports the theft of the following items from his car on February 6th in Bournemouth: Trio TR-2300, serial no. 921187, with reverse repeater modification, without case and strap; dark grey home-built 25W. amplifier, 12 x 3 x 3-in. Any information to G4GTH, QTHR, 0202-763899, £10 reward offered for recovery.

Correction

The decoupling capacitor next to the morse key in Fig. 1 on page 22 of the March 1981 issue ("Using Extremely Low Power") should be 0.1μF, not 0.01μF as shown.

SIMPLE MEMORY KEYERS FOR METEOR SCATTER, PART I

KEN WILLIS, G8VR

THE past year has seen a considerable increase in the use of the CW meteor scatter mode as a means of working DX on two metres. The writer's interest in this mode arose during the *Quadrantids* shower in January 1980, when Paul Turner, G4IJE, QTH near Harlow, Essex, was heard working all sorts of exotic call signs on the band with a quality of high-speed CW which could only be described as superb. Some subsequent QSO's on the band with Paul plus a modicum of correspondence yielded sufficient information for the writer to get started, with the result that several new countries, never before heard, let alone worked, were soon added to the log at G8VR. G4IJE has, in preparation, an article aimed at helping the beginner to get going on CW MS. Without encroaching too much on his terrain, it can be stated that for this mode of operation, one needs:

(*a*) about 1000 watts, or more, *e.r.p.* of stable RF, with a frequency-setting capability to within 500 Hz, not a difficult task for users of today's black boxes.

(*b*) a high-speed CW sender capable of being programmed during an actual QSO, and

(*c*) a tape recorder, either cassette or reel-to-reel, modified if necessary to be variable in speed over a range of at least four to one.

In early CW MS work, high-speed senders comprised loops of tape on to which a message was recorded by keying an audio tone. The tape was then speeded-up and some form of electronic circuit used to sense the audio tone and to use its presence to generate a signal to key the transmitter. Nowadays the method has been replaced by the use of memory keyers using microcircuits. The one described here is due to G4IJE, and it is certainly the simplest which the writer has come across despite much literature research both here and in the USA. Its simplicity contributes to its reliability in use, and since it uses no more than four integrated circuits, it is very easy to build and very economical in its power demands.

CW MS skeds are usually carried out at speeds of 400 to 1000 letters-per-minute (lpm) which, on the basis of a 'word' consisting of five morse characters, represents sending speeds in the range 80 to 200 words per minute. This is much too fast for mere mortals to copy, hence the need to record the received information on tape and then play it back at speeds which the operator can read. Therefore it is not essential to be a very competent CW operator to work MS though if one *can* read fast morse under adverse conditions this will certainly improve one's chances of success. Similarly, one does not need to be a fast sender in order to use this little keyer. Messages can be loaded into it at slow speeds to suit the operator and the speed then wound up to generate the required lpm for the QSO.

The usual MS CW QSO consists of four separate parts, each requiring a different message content. A typical QSO will take the form:—

(*a*) Calls only, *e.g.* YU2CCB G8VR YU2CCB G8VR YU2CCB G8VR . . . etc.

(*b*) Calls plus a report *e.g.* YU2CCB G8VR 26 26 YU2CCB G8VR 26 26 . . . etc.

(*c*) Calls plus report and "Roger", *e.g.* YU2CCB G8VR R26 R26 YU2CCB G8VR R26 R26 . . . etc.

(*d*) Call of sending station plus "Rogers" (8 or more), *e.g.* G8VR RRRRRRRR G8VR RRRRRRRR . . . etc.

Two points emerge from this. Firstly, it must be possible to re-programme the keyer device fairly rapidly during the sked as information is received which changes the status of the QSO. Secondly, since the keyer described here is designed to reproduce over and over again any message loaded into it, the total number of letters needed to be stored will normally not exceed 15 to 20. For example, one of the longest messages to be sent will consist of a pair of calls plus a couple of "R26's", that is, YU2CCB G4IJE R26 R26, which is a 21-letter message, counting the spaces between groups as one letter.

After building and successfully using two or three of these keyers, the writer went on to develop a "Rolls Royce" version which embodies not only the memory unit but also a complete electronic keyer together with four separate selectable memories so that a whole QSO can be set up in advance on the assumption that it will follow a certain course. This is not as far-fetched as it sounds since the reporting system used in MS contacts is fairly predictable, and in any case messages can be changed readily during a QSO if events require this. While this 4-memory unit has proved to be a boon in use, those not wishing to go to such lengths should not be deterred by the apparent simplicity of the basic single-memory model: it is entirely adequate for serious MS work and well within the capabilities of the average amateur to construct and get going. The 4-memory unit, however, will be described in *Part II* of this article to appear shortly.

The Basic Memory Keyer

Fig. 1 is a functional block diagram of the basic keyer, while Fig. 2 gives the full circuit. Referring to this circuit diagram, the heart of the unit is the Type 2102 random access memory chip, U1. This chip is capable of storing 1024 bits of information, more than enough to accommodate a typical MS message. This memory is accessed or "scanned" by means of a CMOS binary divider, U2, which is a type 4040 integrated circuit. The interconnections between the 2102 and the 4040 shown in the circuit diagram permit the memory to be accessed in a sequential manner at a speed determined by a clock which drives the binary divider. This clock is formed from a pair of NAND gates in the chip U3, suitably connected to produce sustained oscillations at the required frequency; clock speed is determined mainly by C1 and RV1. Either could be varied to alter the clock speed, but in practice it is convenient to bring out RV1 as the main speed control knob located on the front of the unit. Spare gates in U3 are used as an inverter in series with the data input as shown.

Signals emanating from the memory chip as it is accessed in the "Read" mode are passed through gates in U4 to an audio oscillator which also uses NAND gates in U4. This oscillator is basically the same circuit as the clock, but uses time constants which result in an acceptable audio note. The function of this oscillator is purely to provide side-tone so that the operator can hear both what he is inserting into the memory and what is being read out when the 'read' mode is selected. The side-tone frequency can be adjusted to suit a personal choice by varying the values of either or both C3 and R9. The gates in U4 which connect the output signal to the side-tone oscillator also route it to a transistor (type BC107, 2N2222 or similar) which is used to key the

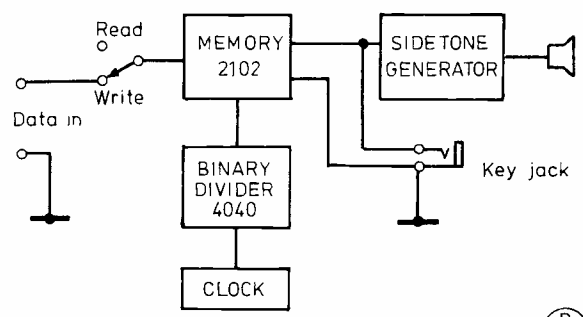

Fig 1 BLOCK DIAGRAM OF BASIC MEMORY KEYER

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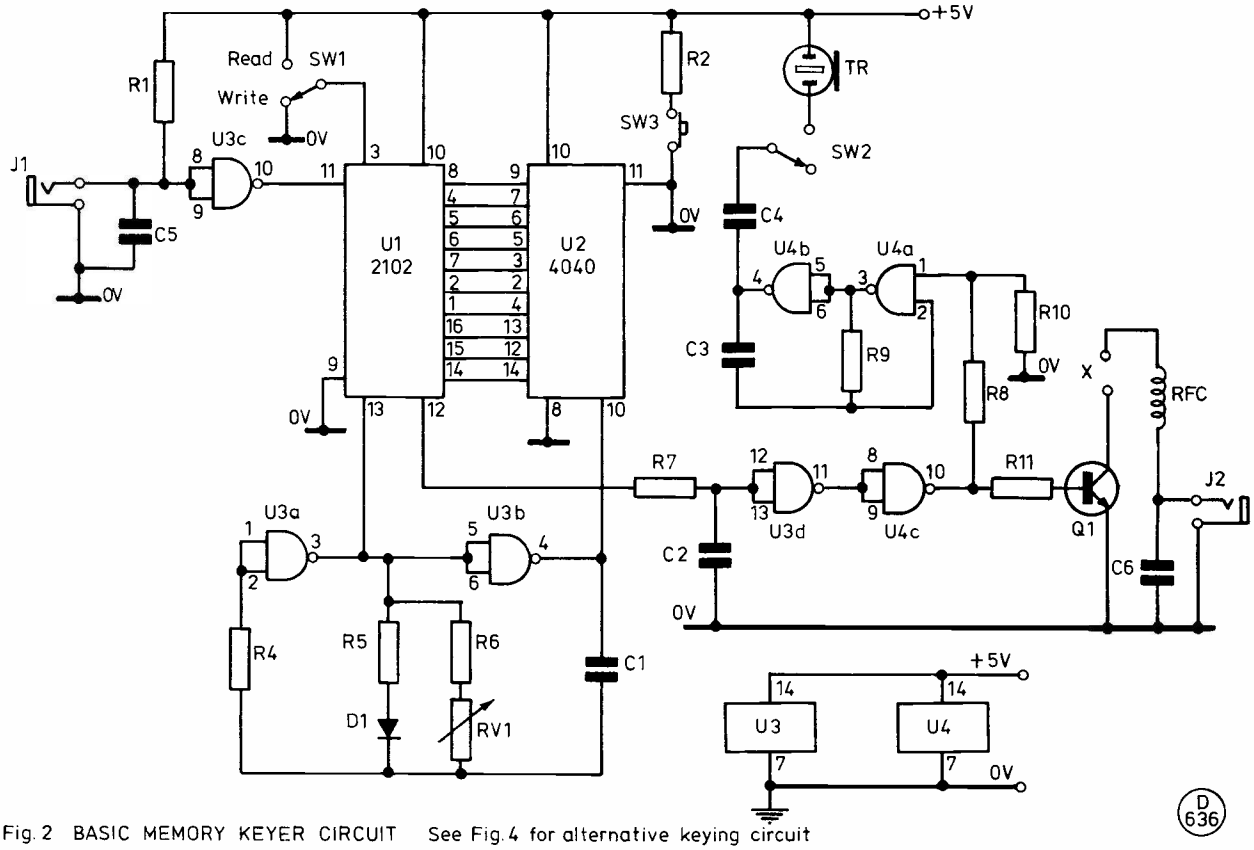

Fig. 2 BASIC MEMORY KEYER CIRCUIT See Fig. 4 for alternative keying circuit

transmitter. These gates fulfil a useful function in that they clean up the signal coming from the memory chip which otherwise would be a bit 'spiky' in its waveform and lead to a rough CW note.

The reset button is a single-pole, normally-open push-button switch. If it is pressed momentarily and released, it ensures that the memory scan will start from the beginning rather than from some random position along the array — which would be the case if the memory were to be loaded or read-out while in the free-running condition. The reset control is perhaps more useful in contest work than in MS applications, as described later.

The 'read/write' switch, as its name suggests, changes the conditions of the memory chip from one in which it can receive and store data to that in which it will feed out any data stored in it at a rate demanded by the clock driving U2.

Construction

There is nothing very critical about the layout of components in this memory keyer, so only general comments are necessary in this context. Unlike RF circuitry, this circuit operates by switching DC levels at relatively slow speeds which means that wire lengths and stray capacities are relatively unimportant. This is fortunate because the circuit is not an easy one for the amateur to reduce to printed circuit form due to the large number of connections which cross over in joining U1 and U2. This is an even greater problem in the 4-memory unit to be described in *Part II* of this article.

It is best to use conventional in-line sockets to mount the four IC's, since there is nothing more frustrating than having to unsolder a faulty IC to replace it with a new one; if these sockets are soldered side by side into a piece to experimenter's board

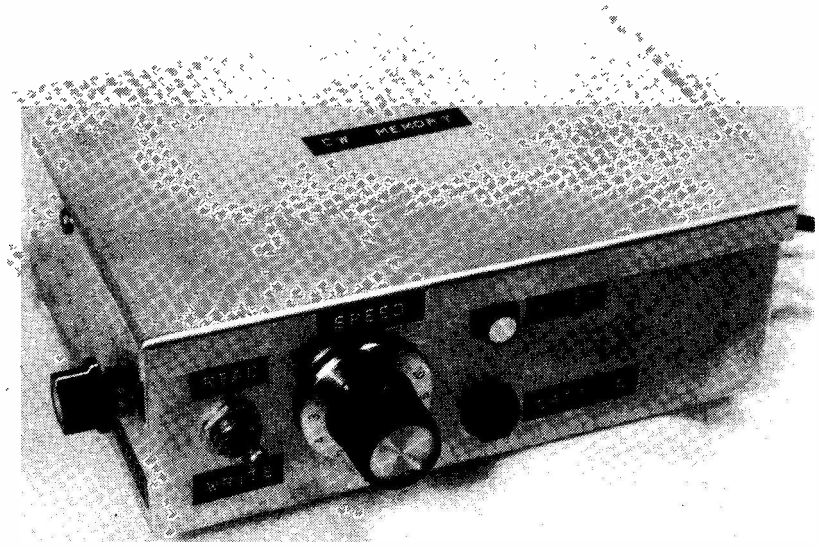

Fig. 3. View of basic Memory Keyer. The unit is built into a 7 x 5 x 2½-in. aluminium box, which includes a small mains power supply. The knob on the left hand side switches the side-tone on and off.

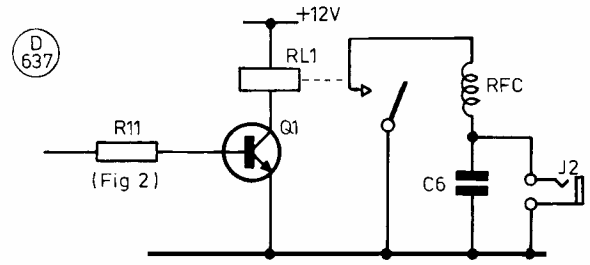

Fig.4 ALTERNATIVE OUTPUT CIRCUIT USING KEYING RELAY

equipped with copper-clad holes at standard spacings, this will provide a light but firm base on which to hang the interconnecting wiring. A space of at least one inch should be left between sockets to simplify these interconnections, and the wire used should be as small diameter as possible in view of the small size of the sockets. it is a good idea to use as many different colours of wire insulation as are available to facilitate tracing wires around the circuit. However hard one tries, the wiring between U1 and U2 will tend to finish up looking like a bird's nest, albeit a very colourful one! This is of no significance, however, and in fact the writer has purposely experimented with units having really long leads in essential connections just to prove that this circuit can be built successfully by someone who has never before attempted to wire up a group of integrated circuits. The associated resistors and capacitors are few in number and can be similarly suspended from the board with 'hard wiring' used throughout.

Some wires from the board will go to external controls on the front of the unit. Specifically, these are the speed control, reset button, read/write switch, side-tone switch and data-in socket. Anyone who *is* capable of laying out a printed circuit for this unit will finish up with a clean-looking unit, and possibly a market for the board among other constructors! The external appearance of the unit can be made very good indeed, so the condition of the wiring is unimportant except possibly in the matter of radio-frequency interference.

Radio-Frequency Interference

By its nature, this keyer must operate in high RF fields, and it is necessary to exclude as much of this energy as possible from the keyer circuit to avoid spurious triggering and similar effects. This suggests that the unit be housed in a die-cast box or a similar closed metal container. The model shown in Fig. 3 was built in an aluminium box with a close-fitting lid, the box measuring 7" x 5" x 2½"; the essential controls are brought out mainly to the front as shown. This particular unit also includes a small AC power supply, though the use of batteries has much to commend it provided they don't go flat in the middle of an important sked.

RF interference is further reduced by the use of capacitors C5 and C6 and the small choke RFC1 in the circuit of Fig. 2. None of the models so far built has been prone to RF interference, although it has been noted that the side-tone note may change slightly when the key is down, though this has not affected the performance of the keyer in any way. Due to the "DC" nature of the circuits, users should not hesitate to try bypassing various points around their own versions of the keyer if RFI should be experienced. Good quality 0.001μF capacitors of low working voltage will probably suffice to show where further decoupling might be advantageous.

Speed Setting	Scan Time (Seconds)
0	14.0
1	13.7
2	13.5
3	13.0
4	12.0
5	10.5
6	7.5
7	5.5
8	3.5
9	1.5
10	1.2

Table. 1. Scan time of "clock". Period is determined by C_1 and RV1 in Fig. 2.

Table of Values
Figs. 2, 4 and 5

R1, R3, R4, R8,	=	100K
R2, R5, R7, R9	=	10K
R6	=	4K7
R10	=	2M2
R11	=	22K
RV1	=	100K linear (anti-log law preferable, if available)
C1	=	0.1μF
C2, C5, C6	=	0.001μF
C3	=	0.047μF
C4	=	0.1μF
C7, C8	=	0.01μF, 350v.w.
C9	=	1000μF, 25v.w.
RFC1	=	any small RF choke
Q1	=	BC107, 2N2222, etc.
D1	=	any silicon diode
D2	=	bridge rect. 25v, 0.5A
U1	=	1K Static RAM. *Signetics* 2102 or *Texas* TMS 4035
U2	=	4040 12-bit binary counter
U3, U4	=	4011 Quad 2 input NAND gate
U5	=	5v. regulator. *e.g.* 7805
RL1	=	12v, or less, reed relay, normally open
SW1	=	SPCO toggle
SW2, SW4	=	SPST toggle
SW3	=	push button, normally open
T1	=	min. mains transformer, 10-12v. 100mA, or more, secondary
TR	=	small transducer. *e.g.* crystal microphone insert
J1, J2	=	2 pole, normally open jack skt.

Note: All resistors are ¼-watt and all capacitors low voltage except C7 and C8.

Keying the Transmitter

Fig. 2 shows point 'X' going to the transmitter key-jack. Most modern transmitters will exhibit a positive voltage across the key terminals when in the CW mode with the key up; this voltage is used to drive the output transistor in the keyer. Most modern black boxes will key using the circuit shown. A good guide is to measure the voltage across the key terminals and if it is in the range 6 to 12 volts, the unit will probably key satisfactorily; if not, a

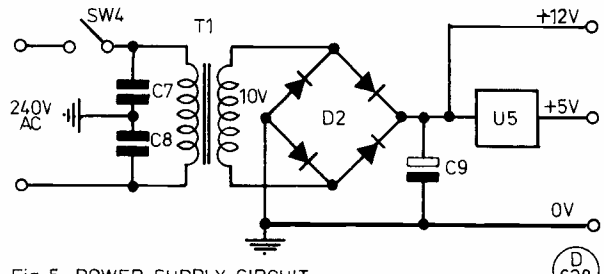

Fig. 5 POWER SUPPLY CIRCUIT

keying relay must be added to the circuit. Most relays suitable for high-speed keying require more than 5 volts to operate, whereas the rest of this keyer circuit requires no more than this. In fact 5 volts should not be exceeded or the memory, in particular, may be destroyed.

Fig. 4 shows how this problem can be overcome. A small reed-relay can be wired so that its coil connects point 'X' with a 12 volt source, and the relay contacts used to key the transmitter. At G8VR a TS-700 operates happily when keyed by the transistor, but an FT-200 used as a prime-mover does not, so a relay has been incorporated. (A word of caution, though: mechanical relays suffer from contact bounce which can cause waveform distortion at very high keying speeds. A more elegant solution is to "beef up" the transistor keying capability with an additional NPN device, such as a 2N3440 or 40390 and details of this refinement, and how to cope with negative key up voltages, will be given in *Part II*). A small 12-volt power supply is used (Fig. 5) with a 5-volt regulator providing the lower voltage rail to the keyer section; a 9 or 12 volt battery could also be used in conjunction with a 5-volt regulator, though 9 volts may prove to be too low to operate the relay. Whatever power supply is adopted, the use of an associated 5-volt regulator is a small price to pay for protecting the IC's from possible over-voltage damage. Some constructors may choose to use external power supplies already available in the shack. Another word of warning, however: leads external to the metal enclosure housing the keyer may need decoupling and/or filtering to avoid RF being carried into the box via these connectors.

Using the Keyer

Programming this little keyer is simplicity itself. When the completed unit is switched on with the read/write switch in the 'read' mode, random signals from the side-tone oscillator will probably be heard. This is 'garbage', arising from stray charges residing in the 2102 memory chip which are being accessed and fed out as the clock drives the binary divider through the memory array. Budding MS operators may be in for a pleasant surprise at this point: one particular make of 2102 sends out a perfect morse symbol 'R' when unprogrammed, and if the speed control is advanced fully clockwise (maximum speed) a welcome string of high-speed "Rogers" will result, boding well for the future! When this first happened at G8VR, the Old Man, not knowing at that time what was happening, looked up at the sky to see if there were any other signs and portents such as an impending *aurora,* but the phenomenon proved to be more practical than celestial! However, if such noises are heard, this is good news since the unit then appears to be functioning correctly.

The next step is to insert a key, either straight or electronic versions, into the 'Data In' jack; the read/write switch is now turned to the 'write' position. It is a good discipline at this point to turn the speed control to maximum speed for a few seconds and then return it to the slowest speed position. This causes the 'scan' to sweep rapidly several times through the memory, cleaning out any remaining garbage contained therein. (This is analogous to erasing a magnetic tape before use). It is not an essential procedure, however, since when data is inserted it will, just like a tape recorder, erase any previously inserted data left in the memory.

Next, press the reset button and hold it there; this brings the read-out from the memory to its starting position. With the speed control at the lowest setting, release the reset button and key some morse into the unit. A simple message such as CQ CQ CQ de G4..... is suitable. Then as soon as possible, switch to 'write', and you should be able to sit back and listen to a perfect reproduction of what you entered into the memory *via* the side-tone generator. By turning up the speed the morse will get faster and faster without losing any of its character, until at the top of the speed range the letters will run into one another and produce the familiar "blur" of a typical high-speed MS transmission.

Calibration

The unit is, at this point, ready for use, but to realise its full capabilities, some simple calibration is advisable. In inserting a test message it is very likely that it was either too short so that there was a gap at the end before it was repeated, or that it was too long, in which case some characters would be missing from the playback. The trick is obviously to fill the whole 'scan' period of the memory with message characters, for this will greatly increase the efficiency of the transmission and improve one's chances of completing a QSO. This sounds most complicated, but a little practice and a modest amount of calibration will reduce this to a very simple procedure.

The first step is to form some idea of the time constants of the memory keyer. A single short dash should be inserted in the memory with the speed setting at minimum. With a watch, the interval between these dashes on repetitive playback is timed and the result noted down. For convenience the speed control should have a numbered scale, and without altering in any way the original timing dash already inserted, the interval between dashes on playback should be timed for several settings of the speed control. As the speed increases it will be easier to count groups of ten or more dashes and to work out the individual intervals in this way. A graph or tabulation can now be constructed which will provide information on the duration of each scan of the memory for any setting of the speed control; Table 1 illustrates such a calibration for a speed-control knob engraved zero to 10. It will be noted that there is a tendency for the scale to become somewhat squeezed up at one end due to the law of the potentiometer used. It is worth experimenting to achieve a potentiometer which gives the most open scale, though with a little practice such non-linearity does not matter very much.

Now suppose a message is to be loaded into the memory which contains, 18 characters, *e.g.* SM7GWU G8VR 26 26, and that it is required to send this message at 600 lpm. This means that the 18-letter message must be transmitted about 33 times per minute or once every 1.8 seconds approximately. Reference to the calibration chart shows that the appropriate speed-setting will be about '9' on the dial in this particular case. All that now remains to be done is to arrange that the whole message just neatly fits the 'space' available for it. It does not matter at what speed the message is inserted into the memory provided it fits the time available for it. Therefore a message can be inserted very slowly with the speed control at minimum, or somewhat faster with the speed-control further advanced. This becomes partly a matter of personal choice, and partly dictated by the number of characters to be inserted. There is clearly a minimum speed at which the message must be inserted for any setting of the speed-control. Once again this sounds very much more formidable than is in fact the case.

For consistent results, an electronic keyer is probably best since its speed can be accurately set and selected. If such a keyer is also equipped with a calibrated speed-control knob, a similar calibration chart can soon be drawn up which tells the operator that to insert 17 characters with the memory keyer speed set at '3', a keyer speed of '6' (for example) is needed. It soon becomes second nature to fill up the space completely with a message and thereby avoid any wasteful gaps between repetitions of the read-out. If one guesses wrongly and the message is just too long for the time available, slow down the memory speed or increase the keyer speed and put it in again — it takes but a few seconds. As previously mentioned, however, in re-writing a message it is a very good practice to wipe out the old one by switching to 'Write' and advancing the speed knob to maximum for a few seconds since this provides a completely clean slate on which to write the new data.

A little artithmetic will show that if one wishes to transmit at 1000 *lpm* using the keyer described, a message could be inserted twice to double the number of characters in the time-slot, *e.g.* SM7GWU G8VR 26 26 SM7GWU G8VR 26 26 contains 36 characters, so to transmit this at 1000 *lpm* would require the speed

to be set at about "8½" (2.2 seconds). This can be very convenient, always assuming you can slow down the 1000 *lpm* sufficiently on your recorder to be able to read it back. Yet another word of warning: if the power supply to the unit is cut off even for an instant the data stored will be lost. Similarly whenever the read/write switch is turned to 'write' it will erase everything in the memory as the scan sweeps through it.

Contest use

This little keyer is useful in contests where a CQ is transmitted repeatedly, as it allows the operator time to write up the log while it churns out its message. However some means of switching rapidly from the memory keyer to a standard form of key will be necessary so that after a few "CQ CQ de G....." calls, the operator can intervene with the necessary "AR K" to terminate the call and commence listening. The reset button now becomes more useful since it is preferable that a message should start from the beginning if it is a CQ, whereas in a MS message it does not much matter where a message starts or ends in the five minute sending period typically used, since it will be transmitted hundreds of times and seldom heard all in one piece. Do not be tempted to slow down the clock speed with the aim of cramming in a lot of information. For example, a nicely spaced string of dots from a bug key fed in with a scan period of 20 seconds resulted in obvious distortion during playback in 'read' mode.

Bearing in mind the above limitation, the four-memory unit to be described in *Part II* can be very useful in contests since it enables various messages to be set up to include such information as QTH or QRA locator, thereby further reducing the amount of repetitive sending required from the operator. Meanwhile, this part of the article contains all the information needed to enable one of these little units to be built and operated.

To be continued.

9-PLUS AERIAL FOR VK

F. G. RAYER, T.Eng. (CEI), G3OGR

THIS is probably one of the smallest space and cheapest wire aerials which the writer has personally used, and which can move the station transceiver S-meter from zero to over 9, with a VK. It is a well-known aerial, though listening around does not suggest it is often used. It can work all bands with good efficiency, and may of course be erected with dimensions, angle and bearing to suit the main interests, or available supports.

Directivity was found more or less in agreement with theory, but changes for different bands. Though actually placed for VK, this aerial has provided contacts with 9H2, PY, 9M2, DU2, JA, CT2, 7X2, 9V1, 4X4, 4Z4, VS6, CR3, PY2, CX8, and other areas.

The aerial itself is in two sections, each 92 feet long, each horizontal, and with an open wire or tuned line from the feed point, wires running at right-angles from here. One wire is east-west, and the other north-south, and feed is at the east and north ends. Such a V-aerial is in effect half a rhombic (or an open-wire line centre-fed horizontal aerial with one top portion at an angle to the other, instead of both being in line); height above ground is about 28 feet.

The legs are about two full-waves on 21 MHz, and nearly 1½ waves on 14 MHz; when used on lower frequencies, length resembles that of an extended double Zepp on 7 MHz. For 3.5 MHz it is considerably too long but works well because of the open wire line.

As a great variety of lengths would be feasible, the expected gain for various lengths appears below. Lengths are for one leg, in terms of wavelength at the working frequency.

Length	*dB Gain*
1	2½
2	5½
3	7
4	8
5	nearly 9

These are for optimum angle between the wires, which can be found from the following:

Length	*Angle Between Legs*
1	90 degrees
2	68 degrees
3	60 degrees
4	52 degrees
5	45 degrees

It will be seen that the aerial mentioned was not exactly correct for any frequency, the right angle being insufficiently sharp, but suiting the supports. With the correct angle, maximum radiation is two-directional, on a path midway between the two wires, or bisecting their angle; there is also substantial radiation in other directions, and at higher wave angles spreading each side the optimum path.

Coupling

A tuner can be regarded as essential, and can be of the same type as used with a Zepp, tuned doublet, or any aerial with open wire line. The line itself can be 7/26, with 4-in. spacers about every 3 feet, and the 14 or 16 s.w.g. hard drawn wire as used for the aerial can be used if manageable. There are whole series of top and feeder lengths which will produce particular tuning situations at the transmitter end: in general, if one leg plus the feeder comes to a number of half-waves, feed is high impedance and calls for parallel tuning. But if one leg plus feeder comes to an odd number of quarter-waves, series tuning for low impedance will be called for.

After using a great variety of tuners, an enthusiast for such feeders will know that the minimum requirement is a substantial coil tunable to the working frequency, with spaced turns and tapping clips, a variable capacitor (or two) to place across the coil (or part of it) or in series with it and the feeder; and either a coupling loop for the transmitter feed, or a further tapping only a couple of turns or so from the middle of the coil, which is then earthed. Some form of SWR indicator between transmitter and tuner is desirable, and possibly a 500pF or 2 x 500pF broadcast band receiver variable capacitor in series with the feed tap at the coil, will usually allow excellent results on all bands. For 3.5 MHz down, 28 turns, eight turns per inch, 2½-in. diameter, 14 s.w.g., will suit. For HF bands only, half this number will suffice. For awkward feeder lengths, feeders can be tapped in equally from the coil ends. Log taps once found, as this saves trouble later. As example, for 14 MHz Tx feed tap was one turn from earthed centre-tap, aerial feeders each three turns from centre-tap, and 100pF VC leads each four turns from centre-tap.

"A Word in Edgeways"

Letters to the Editor

The views expressed here are not necessarily those of the Editor, nor should they be taken to represent any particular SHORT WAVE MAGAZINE policy.

Dear Sir — After almost thirty years on the amateur bands I thought I'd heard just about everything — until tonight. I spent an hilarious ten minutes listening to a recent 'G4-plus-three' on SSB trying to make contact with a CW beacon on 160 metres! God bless us — how about bringing back that compulsory twelve months on the key? He *nearly* got the callsign!

Nev Kirk, G3JDK

Dear Sir — A CB pirate friend of mine commented the other day "amateur radio must be an expensive hobby". He's right, I haven't seen a new Tx/Rx combination under three figures lately. I can't afford this and like building equipment anyway, so it's relevant that all my equipment is home-brewed except the multimeter and a receiver bought for £9 (there are some major repairs needed!). I managed to pass the Morse test after three months practice at two hours a week, and am looking at the simple transmitters and receivers used by the QRP men: small boxes, simple equipment well built and operated properly on most, if not all, the HF bands, typifies amateur radio as far as I'm concerned. My view is that the RAE and Morse test are no more difficult than any other exam. There are always people available to help if you want to build your station, and after that the standards of operating you achieve are up to you. Even VHF QRP is possible with simple gear.

The point is that it's so unnecessary to use CB and keep an eye over your shoulder for the Home Office, or to buy a rig and abuse the repeater facilities, or to play back a recording and not give your call sign (as one local did the other day). You can get a lot of fun out of amateur radio with a little practice and consideration for other people, who have as much right as you to the allocated bands. If we are not in it for fun, or in some cases profit from selling what people want, what are we in it for? The answer in most cases is unprintable!

Pete Brent, QRP Club No. 561

Dear Sir — As the owner of a Liner-2 I read with great interest the letter of Julian Moss G4ILO, and the comments of Norman Fitch G3FPK, in his "VHF Bands" column on the SSB band plan, both in the February issue of *S.W.M.*

As Mr. Moss says, and a study of the band plan in the same issue confirms, regimentation runs riot on the 2m. band with various special interest groups hacking out their own private 'no go' areas. I must express surprise at the attitude of G3FPK: the *Magazine* constantly refers to the "spirit of amateur radio", which hardly goes with his attitude of "we won't let a few thousand peasants with their ancient Liner-2's stand in the way of the Synthesised Superman" *(Mr. Polding's words, not G3FPK's — Ed.)*.

Perhaps Mr. Fitch, or one of the SSB band plan sponsors, would enlighten us on the following:

(a) Who is making the decision on the band plan?
(b) For whose benefit is it supposed to be?
(c) What is the amount of local traffic on SSB as compared to 2m. FM?
(d) Who will decide what is DX and what is local?
(e) Will some minimum distance be set for a QSO on a given frequency?

It would appear that if this plan goes into effect, after contact is made on the calling channel, locations will have to be exchanged and measurements made on a map before one knows whether to QSY up or down. In the case of the unfortunate limited channel operator, he will in many cases have to say "sorry old man, but you are too near for me to continue this QSO", and sign off.

Finally, it is ironic that Mr. Fitch urges the benefits of progress in the same paragraph as he complains of the invasion by FM operators into the SSB band: this is a direct result of the replacement of the crystal-channelled FM sets by fully synthesised ones. In the same issue there is an advertisement for a hand-held rig that covers 144-148 MHz: half of this range is outside the amateur band, and a fair part of the remainder is outside the FM part of the band. Thus only one third of its advertised range is legally usable within the band plan; yet the governing body's own magazine *Radio Communication* carries a similar advertisement, which I find morally indefensible.

J. T. Polding, Huddersfield

Dear Sir — I have been a SWL for some time now, and with a special interest in propagation, I'm all ears-aflap for the QTH and antenna power from anywhere. What binds be rigid is when, pen poised over the log ready to catch that elusive VK's information, rapidly fading to S2, it gets absolutely mangled by the 'orrible "woodpecker"!

What is it? How does it happen? It seems to be pretty well global — I've heard American, Canadian, Swedish and British all complain at various times, and I've even heard in the background noise to some foreign despatch on the television. I timed it on one occasion, and it came in bursts of from one to four seconds, separated by about three seconds, almost as if it were QRM. Also I chased it through the whole of 3 to 4 MHz and found it popping up approximately every couple of hundred kHz, again as if it were QRM — but if it is, what is its purpose?

The strange thing is, I don't recall ever reading a word about WPX in any radio literature, magazine or otherwise. Is there anyone who can pull the wraps of this mystery?

J. Mathers, Chippenham

Address your letters for this column to "A Word in Edgeways", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

Eighty

IF YOU are looking for relaxation, this is not the place to chase DX; on the other hand, there are plenty of chat and rubber-stamp QSOs, oracular wisdom of both good and bad varieties, and of course the Things which we share.

G3ZPF (Dudley) has the panache to get away with it, and the CW end did enough to hook EA6FD, KP4P, and VP5FP. This last one had to be watched for an hour while he chewed the rag with various southern Ws. When the lull did come, David was in there "with me wellies a-flyin'!" and duly got his reward, while no-one else in EU seemed to have noticed the chap — but by the time David was through, they *all* had! As G3ZPF says, after completing one's own contact there is a sadistic pleasure in watching the rest of the world fighting! Other stations included a selection of W/VE, and a couple of gotaways which would have been new countries were 0Y7ML and 5B4UF. Another 'ZPF comment: "if there are ever two countries on the band and I'm after them, *invariably* they end up working each other, get sick of the breakers and go QRT!" Final crusher was a QSO with VE1ZZ who had worked over 100 countries on Eighty this year of grace 1981 — crikey!

Over in Chelmsford lives G8JGK, who split out of the chrysalis on January 15, and turned into G4LDS. The HF rig comprises an FT-101 with Holding clipper, and a Shure 444 mic. plus a TA-33Jr and inverted vee trap dipole for the LF bands, the latter being suitably treated by one of K.W.'s E-Zee Match ATUs. On the first day of issue (January 27) there was GM4DLU; by February 2 there is note of the first gotaway in W4ZD, but an 0N4 for consolation. However, not surprisingly the rest of the operating time went on to the HF bands.

G2HLU (Reading) reckons that the radio shack has been pretty uninhabitable for much of the winter, unless one injected heat for some hours beforehand; this has been a bit agin the odd ten-minute look-see, and in favour of week-end sessions. Harold had a basinful in all four of the RSGB activity periods, and another in the PACC contest; but the domestic world had to take precedence when the ARRL CW contest was on, so little operating time could be afforded to it. For variation, SWL Casson received some morse practice (cheers from Justin Cooper — he has a thing about morse!), and there was an 80-metre CW QSO with G3HQQ, who was down in Worthing with a one-watt machine and a S8 signal.

G2HKU (Sheppey) seems to be in fine fettle; he has a really first-class beef about the monstrous noise from Poltava, and then got down to operating his Argonaut on Eighty CW at three watts, to raise DJ4FV, SM0KSJ, and G6AB.

Most correspondents mention the CB position, but not in the eighty-metre context. However, G5NX/M was having a CW QSO with G2NJ (Peterborough) when the Law stopped him and had had to convince them he wasn't a CB-er! Another interesting QSO was with G2HW, on Friday, February 13, when G2HW made his first QSO for 23 years. Using a B2 (the wartime spy set for you youngsters!) he had already hooked G2IF, G2CP, and G6MU by the time he reached G2NJ. On the /MM front, G2NJ found OH7PS/MM near Cuxhaven, on CW, around 1445z.

Top Band

An interesting paradox arises here, in that there can be said to be increased activity partly, at least, as a result of reduced activity! Now that all the local natters haunt the two-metre band, and Loran-A has been pensioned off, it could almost be said that if you have a good site (or can make a site good by one's "gardening" work!) working the DX is pretty easy on CW for a savvy operator, if he has a split-frequency capability. On the other hand, while calling CQ in the 'window' area around 1825-1830 kHz, and listening down at the bottom of the band for the answers is generally right, one should *always* just take a quick listen for a call on one's own spot — sometimes a bit of DX is there and doesn't have access to the bottom of the band.

G4AKY (Harlow) is back on the band for the first time since 1977. As one of the select group who have worked all continents on Top Band, Dave is entitled to a view on the vexed question of over-power operating. Dave reckons that time spent generating extra power is far better employed in the aerial, earth and receiving department, not to mention getting the very best match possible. Initially, an FT-902DM was used, but this was not up to scratch and after a bit of to-ing and fro-ing, *S.M.C. Ltd.* agreed and replaced it. (We feel that the problems with the first one were in the main very much down to Yaesu, but of course the distributor has to cope with the problem). While this was going on, some 40 milliwatts were tried with an AR88D, and the result was CW QSOs with GM3IGW, OZ1W, OH0XX, OK1KSO, GI4KHS, UK2PCR and UK2RDX. The arrival of the replacement FT-902 was the signal for the fur to fly; operating from around 2300 until 0100z with ten watts CW, February gave some 5 OKs, 6 SPs, 30-odd European Russians, LAs, UA9CRS for Asia, EA8QO, EA9EU (Ceuta, QSL *via* I8UDB), and G3PQA/5N0. This last was originally considered to be doubtful, but it is heard on the grapevine that he does QSL. Adding in North America that makes four continents worked since coming back on the band! For a change the SSB mode was used to talk to OK1MMW, OK3KFF, OK1KSO, SP5IXI, UP2BAW, OK1KPU, SP9EVP, SP9DH, RB5GCJ and DL3AA.

Our other Top Band reporter is G2HKU; his SSB skeds with PA0PN continue, plus CW to PA2CHM, UL7CAD, UL7PBY, UA1CWZ, UM8MAZ, UT5AB, UD6BW, DK8EI, GW3UDU, OY7ML, LA9SC, DJ6ZB, PA2BFM, LA4O, GM3PFQ, UR2RRJ, PA0ABM and LA5YJ.

"CDXN" deadlines for the next three months—

May issue — April 2nd
June issue — May 1st
July issue — June 4th

Please be sure to note these dates.

Oddments

The 23 years since the Scout Jamboree-on-the-Air began have seen some pretty vast changes, in Scouting, in amateur radio and in the world in general. Naturally, then, we would expect to see changes in J-O-T-A. From our side, the widespread, indeed almost universal, use of the transceiver does mean it is far easier for us to set up a station for the local troop. On the other hand one has to realise that this is a bit off-putting because that box costs much, much more than the average Scout's pocket-money! Perhaps a static display would help there, with some word of explanation. Secondly, the average G amateur is unlikely to be experienced in DX chasing, while Scouts are likely to think of our hobby as a world-wide communications dream and romance, rather than working G8s through repeaters

or listening to casual chat, unless it be with another Jamboree station. Perhaps we need to think about effective club participation in J-O-T-A to take account of all the changes.

A letter from G2BJY (Walsall) notes that he and G8KI are both still on the hunt for ex-CWR members. Forty years on is quite a while, but if *you* know if anyone who might have been CWR during the W.W.II years get them to drop a note to G2BJY or G8KI — both are QTHR.

The South Coast gang are getting themselves well involved in the activities associated with hosting an IARU meeting; among others we observe they will have a station operational during the Region 1 IARU conference itself, and signing GB1IARU.

We have a note here on some quite interesting awards from Nigeria, and since the rules and details are quite complex, it seems best to suggest that anyone with an interest should contact: B. P. Collinge, 5N4BPC, P. & T. Division, Enugu, Nigeria. These awards are to be a replacement for the 5N2 awards; the letter dying on December 31, 1979, and the new ones starting from January 1, 1980.

Forty

An excellent band for the chap who knows the game, but, sadly, plagued with a shortage of reporters — a bit like clubs in GM of whom we hear, but *from* whom it is rare to hear!

G4BUE (Upper Beeding) is the only one to mention the band, even briefly. He looked in on the ARRL CW DX contest, for which he made a fixed wire boom: take one 14 foot boom, and hang it at the top of the tower, put an inverted vee dipole on one end, and a director at the other, in this case fixed on the States, and away you go! The result, on this band, was 65 contacts, and a multiplier of 22. But, as Chris says, it is usually best for the contester to put up these special aerials for a specific contest and then take them down again for normal operations. The overall (QRP at five watts to the Argonaut) score ran out in the end to some 865 contacts, and a multiplier of 160.

Forecast

First off, a busted flush; the Heard Is. expedition is off — the word used is postponed, but we doubt whether VK9JS will have another try. The problems are formidable, to put it mildly, and VK9JS is not in the right physical location to put a finger instantly on the problem areas; once there, one has no doubt Jim could cope with the operating side of things.

We have it that YI1BGD has returned to the bands, sometimes working to a list, but occasionally he is to be found on his own around 14210 kHz and the lunchtime period.

If you are after KH5, KH5K or ZM7 this is your spot. We understand that an expedition sets off from KH6 to produce six days at Palmyra from April 8, another six days from Kingman Reef, from April 15. The boat, owned by KB7NW/VS5JB, will then take them to 5W1 where the operators will disembark, and a new gang taken on for a short spell at ZM7.

This Smom thing still continues to puzzle. We now hear that this group has its own territory and has accredited diplomatic relations with at least 45 countries in all continents. The DX Advisory committee have also received various inputs on this, and we hear they are to re-examine the DXCC status of a country which appears to have much more right to the name than originally appeared. So, if you haven't worked 1A0KM, do so! The point here is the operation is at the moment halted pending the country-status decision by ARRL, so if you hear him, you'll know you've either got a pirate or a new country!

Turning to Top Band DX — the hard sort — we hear that VK6HD is going to do some LF-band DX chasing. On the odd days he will be found around 3505 kHz, and on the even ones, he will be operating on 1802/1807 kHz, listening 1820-1850 kHz from 15 minutes before his sunrise. That gives UK times of: March 1, 2205; March 11, 2213; March 21, 2220; April 1, 2228; April 11, 2234; April 21, 2240; May 1, 2248; May 11, 2256; May 1, 2301; June 1 2309; June 11, 2314 and June 21, 2317; all these times being GMT of course.

Twenty

Now, there's a thing — it is still carrying much DX, but the majority of our reporters are looking elsewhere for their fun. G4ITL continues his regular efforts, and we have heard G4KVR out hunting for ZL of a morning.

An interesting statistic comes out of the G4BUE rough tabulation of his score by bands and states/ provinces. Twenty: 46; Fifteen: 44; Ten: 48. That must mean something! Probably partly activity and partly the nature of propagation.

Looking at the G2HKU log, we see SSB with ZL1VN, ZL3SE, ZL3RS, ZL3FV and G4JIM/W8; then some CW was tried, and this approach brought him VK3XB, JH3EUJ, UA0KCL, JA6GU, K4FW/-VP2K (that is the Ten-Tec man!), N9MM, K5SF, W7EJ and K0ZX.

Next we can bring in our words from G3NOF; Don is another one to be worried about the CB situation, and is already finding them intruding into our bands. Don seems to have been a bit restricted in his operating on Twenty this time, but he did manage SSB QSOs with C5AAP, G4COA/W0, HH2DF, TI2CF, TI9LI, VP2MH, VP2MIX, VK4NIC/3X, and 5T5AY.

Now 21 MHz

It's a bit unusual to hear from G2NJ on this band, but he did have a session with G5NX/M, using CW with the Uniden rig into a mobile whip from the back seat, while G5NX did the driving. Nick found as usual that the continentals were quite receptive to some CW/M, and a run to Kettering and back yielded HA, SM, SP, OE, UB, OH and YU; the OH9SW contact was of interest as he gave his local temperature as minus 17 degrees C, in contrast to Nick's comfortable billet. Another short run — only 12 miles — produced LZ, SP, UW and a brace of HAs; the second of these appeared just as they were turning into the home straight (a rather short road), so G5NX sportingly drove around the block until the QSO could be completed and logged as all/M.

G3NOF again; Don found the band rather like Ten, with the long-path VK/ZL opening less reliable than the later short path opening which seemed to be around 1200-1400, with a sprinkling of YJ, P2 and H4 as a garnish. Around 1400 the DU, YB and KL7 stations were in evidence, but not a lot from the Pacific other than FO at 1100 and KH6 at 1800. As for the States, it hasn't been much good until about 1500,

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"According to the meter you're cloudy with rain."

but once going seems to have been active until midnight on occasion. G3NOF worked SSB to A4XIH, A9XDB, CT2DF, DU1CGC, DU1EFZ, DU1JB, F0FGI/FC, FM0FOL, FO8TOL, FR7CE, H44AP, HI8PPB, HM1SX, J3AH, J73PP, JAs, KG4KK, KH6ND, NL7K, P29KK, P29NUN, PA0FM/PJ3, PJ7ARI, TL8CN, VE7s, VKs, VK4NIC/3X, VP5TCI, VS6CT, VU2IF, W3WPY/DU, W6s, W7s, XE3IS, YC2YY, ZL4IJ, 6W8AR, 9Q5AH and 9U5JM.

Back to G3LDS, who started off right by going on the band on his second day to work OE2VEL, followed by W6 and a brace of W5 and W7 each, which is the way to do things. The following days added VP2SAM, a full clutch of W areas, and with confidence achieved the early morning was tried for some *real* DX on Ten, of which more anon. Meanwhile, on 21 MHz, the Ws continued to be snapped up as the opportunity offered.

Ten Metres

G4HZW was pleased to get his rig back, and Knutsford is once again hearing the welkin ring. One of the more interesting notes is that on occasion Ten has gone to sleep around 2100 and then opened again around midnight to DX. The 20 watts p.e.p. plus two-element Quad at 24 feet managed SSB to N0AV, WA6CUP, WD9FKM, JR3RVO, JE2PKD, OH3XT/OH0, HV3SJ, G4COA/W0, KH6IBA (who has been worked four times already), NL7P, KA7CTZ, KH6KU, XE2PG, VY1CM, VE7AQN/P, KA7J (who was running his kilowatt into a vertical and commented on his inability to hear people!), WL7ANI up in Alaska at 0010z, followed ten minutes later with VE7DRI, while the evening of that same day made it to W6BGJ and WA6VEB. Then there came a morning off work, and that resulted in JL1CGL, UA0JCS, ZL1AZV and ZL1AXN as appetisers for lunch; after the return to work, we hear of VK3NIC/3X, FM7AV, FG7BG, TU2JD, 5N1BCD, PY1DMQ, PY4ACQ, to complete a worthwile ten day spell of activity.

At G4LDS, the first day gave W7IHH and N1AP, and the follow-up included WBOLQC, VE1BTR, WB4MUY, VE3COO, then a call from VE7HN, morning calls on VK4NIK, VK4NZW, ZL3WE, ZL3ACT, ZL3SA, JI7WEL, VE7AAZ/4U, JA3BVJ, UL7PBR, a couple of EA3s, 9Y4TAM, the Chelmsford Net (which includes the UK one and Cambridge, Mass.) Next K9FID and KA5KHI, XE1OE, JM1, JA1, and at 0915 there came a call from HS4AMI to round off the period.

G3NOF says he has been off this band for a month with a touch of TVI. The usual monitoring continued though, and it was noticed how little African and Pacific activity was to be heard. The only SSB contacts were with FM7AV, FM0FOL, W2BBK/PJ7, W7EOI in Montana, WB9TIN/VP2A, 8P6CR, 9K2DR, 9Y4JA and 9Y4VU.

Nice to hear again from G2ADZ (Chessington) with a few worked as the chores permitted. As usual, it was CW, with 9M2GZ, UA0YT in Zone 23, A4XIZ, TA1KD, ZF1HS which was a school club station, and 3D6BK. In addition there was a beacon signing VK2WI on 28335 kHz noted; and ZS5VHF, with quite a long message for a beacon, using 28202.5 kHz. QSL to ZS5TR.

The only ten-metre activity for G2HLU was the already-mentioned short spell in the ARRL CW, during which the band was very lively indeed. On a different tack, G2HLU notes three CB magazines in a local shop before CB had been legalised, and wonders if these are the precursors of other magazines covering the illicit. Imagine the "Burglar's Weekly" and the "Pot-Smoker's Guide"!

For G2HKU it was QRP on Ten, with the following list: VE6OU, W0YK (Colorado), W7CPK (Oregon), K7NHV (Idaho), N2AIR/7, W6RR, VE7CXD, K16O, W9TM, N9MM, VE5UF, N4IO/KP4, VE2AH, K4EWG and ZD8TC.

Finale

If you should happen across the new Republic of Belau, KC6KR, the station is that of Mr. Kodep R. Iyong, the Communications Officer for the new republic, says *TDXB*. Initial operation was by JA8DNZ and companions, and they left a FT-901, FL-2100B and a TA-33Jr; they were also going to ship a better mike, and then KC6KR will be in business. Try around 21275 kHz initially, shortly after 0800z; other bands and both Phone and CW are on the way. QSLs to JA8DNZ, Hiro Ogawa, P.O. Box 54, Sapporo 062-91, Japan.

QRT

Is where we refer you to the dates in the 'box' and remind you these are to *arrive;* address them to "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. And, by the time this comes to be read, I reckon the spring DX season will be well in flower!

May issue due to appear on Friday, April 24th.

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Selling: Lafayette HA-600A Rx, 150 kHz to 30 MHz, £50. Eddystone EC-10, £70. Hy-Gain 12AVQ aerial, £32. Mosley Elan 2-ele beam, £45. TS-120S with PS-30, £415. Datong FL1 audio filter, £50. All 'or near offer'. — Ring Marriage, G4JFE, Newbury 41613.

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For Sale: R-820, six months old, as new, with SP-820, £560 or near offer. — Ring White, Chipping Sodbury 310811.

Sale: Yaesu FRG-7, brand new, working abroad so must sell, £155. — Ring Porter, 01-898 0769.

Exchange: SP-400 and R.308 for AN/APR-4 38-1000 MHz; also 888 for R.216. All with handbooks, in working order but require attention. — Everall, 36 Eleanor Road, Waltham Cross, Herts.

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Selling: Pye Cambridge 2m. FM, boot mounting, 6-channel, £40. AR88LF receiver, £30. Sentinel 2m. converter, £9. Lowe monitor receiver, 12-channel, £12. — Ring 01-542 5707.

Sale: Yaesu FT-7 transceiver, as new, with mains power supply and all accessories, £275. — Ring Baker, GW2SB, 0244-545177.

For Sale: CW/RTTY keyboard, send perfect CW, easy as typing, 5 to 100 w.p.m., with memory etc., £125. KW-107 ATU system, £50. Both 'or near offer'. — Ring Manklow, G4CGV, 0424-427994.

Selling: Racal RA-17 with manual, spare valves, excellent condition, £150. — Ring Jowett, Storrington (09066) 3890.

Sale: Two FT-207R transceivers, two YM-24 microphone/speakers, one NC-2 charger/base unit, two spare batteries, boxed, new, unused (cost over £500), accept £300. (Sussex). — Box No. 5736, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

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Sale: Eddystone EC-964 marine Rx, 1.6 to 4.5 MHz, £75. MM-432/144 70cm. transverter, £90. Pye F460, working SU8, £100. Hallicrafters RBX-2 U.S. Navy Rx, 100-200 MHz, £40. Eddystone 770U, £80. *Wanted:* NC-183D G/C Rx, SX-42, BC-348, HQ-160, or similar, any condition. — Ring Perrin, Kidderminster (0562) 63358.

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For Sale: Eddystone EC-10 Mk. II, £125. Codar-Telecom RQ-80 aerial tuner, £18. Accept £135 for both. — Ring Leach, Braintree 26470.

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