

Amateur RADIO

For all two-way radio enthusiasts

DXpedition to Montserrat

Disguised Antennas



Icom IC751A HF transceiver review

**On test: Trio TR751E
144MHz all mode transceiver**

AMRAD 10GHz system

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	Full Range Stocked	RWC Price
FAS14R	Remote ant switch (FC75AT)	79.50
FBA5	Empty battery pack	7.80
FC700	ATU power meter dummy 1d	129.00
FC757AT	Auto ATU inc WARC bands	299.00
FIF65	Comp Place for Apple II	54.50
FL2100Z	HF 1.2KW linear 1.8-30 MHz	749.00
FNB2	10 BV nicad pk for FT208 708	24.50
FNB3	Nicad for FT203 9 703 9R RH	36.50
FNB4	Nicad pack for FT209RH etc	43.50
FP700	20A power supply	169.00
FP757GX	Switched mode power supply	159.00
FP757HD	Heavy duty power unit	185.00
FRA7700	Active ant for FRG7700	44.50
	8800	569.00
FRG8800	All band RX	569.00
FRG9600/MK2-RW	60-950 All-mode scanning RX	469.00
FRT-7700	Receiver ATU for FRG7700	8800
FRV7700A B C D	VHF conv for FRG7700	49.50
	8800	49.00
FRV8800	VHF converter	85.00
FT203R-FBA5	2mtr H H 1.5W	192.50
FT203R-FNB3	2mtr H H 2.5W	219.00
FT203R-FNB4	2mtr H H 3.5W	225.00
FT209R-FBA5	2mtr H H C W empty b case	239.00
FT209R-FNB3	2mtr handhd 3.7W	269.00
FT209R-FNB4	2mtr handhd 5W	265.00
FT209RH	V-UHF 25W transceiver	339.00
FT2700R	W/UHF 25W transceiver	339.00
FT270RH	45W 2mtr transceiver	P.O.A.
FT290R	2mtr multimode	349.00
FT690R	6mtr multimode transceiver	249.00
FT703R-FBA5	70cm H H 1.5W	219.00
FT703R-FNB3	70cm H H 2.5W	235.00
FT703R-FNB4	70cm H H 3.5W	245.00
FT709R-FNB5	70cm H H 1.8W	235.00
FT709R-FNB3	70cm H H 3W	269.00
FT709R-FNB4	70cm H H 4W	270.00
FT726R	2mtr base station	869.00
FT757GX MK2-RWC	All band all mode 100W TXR	869.00
FT790R	70cm multimode transceiver	P.O.A.
FT980	Gen coverage + Ham band transceiver	1739.00
FVS1	Voice synthesizer for FT270 2700	23.55
LOG BOOK	YAESU amateur radio log bk	2.00
MD1B8	Base station desk m phone	69.95
MH12A2B	Speaker MIC for FT203-9 etc	18.95
MH1B8	Fist mobile MIC for FT757 etc	16.95
MMB11	Mobile bk mt for FT290R	29.50
PA3	Mobile DC unit for FT208, 209 etc	18.50
PA4C	AC power unit for FRG9600	13.50
QTR24D	World zone clock	37.50
SAT726	Oscar Sat unit for FT726	112.50
SB1	Switch unit	17.50
SB2	Switch unit for YH1	15.00
SB3	Switch unit	15.25
SP55	External loudspeaker	15.50
YH1	H set/boom MIC for SB1 2/3	16.50
YH2	H set/MIC for FT203/209 etc	16.50
YH55	Mono headphones	16.95
YH77	Lightweight mono h'phones	16.50
YH415	Helical antenna for FT290R	6.99
YM24A	Speaker MIC for FT208 708	25.50
YM49	Speaker MIC for FT290R	18.50



Full Range Stocked

AH7000	25-1300 MHz TX, RX antenna	79.00
AT150	Matching automatic ATU for IC735	
BC35E	Desk-top charger for all nicads	65.95
BP3	Standard Nicad pack	27.95
BP4	High capacity q-charge 10.8V	8.95
BP5	Nicad	57.50
DC1	12V mobile regulator pk (2E)	16.95
EX243	Curtis keyer unit for IC735/745	53.00
EX257	FM unit for ICR71	38.50
EX310	Speech synth unit for 271 etc	41.95
HP1	Mono headphones	32.50
IC-AH1	3.5-30 MHz mobile ant.	189.00
IC-AT10	100W auto ATU	329.00
IC-AT15	Matching automatic ATU for IC735	289.00
IC-AT50	500W automatic ATU	455.00
IC-CPI	Mobile ch'ing lead c/lighter	6.50
IC-HM9	Speaker MIC assy	19.95
IC-PS30	Power supply unit 25A cont.	339.00

IC-UT 16	Voice synth for IC27 series	26.00
IC02E	2 mtr LCD k board 2W 1 ceiver	289.00
IC120	1W 1296 MHz mobile (40MHz cov)	533.00
IC271E	2 mtr all mode 25W b'sin	759.00
IC271H	High power 100W version of IC271E	959.00
IC27E	25W 2 mtr FM mobile 9 memories	379.00
IC27H	45W version of IC27E	419.00
IC28E	New 25W Super 138-174 MHz	325.00
IC290D	25W version of IC290E	499.00
IC290E	10W multimode 2 mtr mobile	479.00
IC2E	2 mtr H H thumbwheel 2W	185.00
IC2KL	1KW PEP linear auto band switching	1250.00
IC3200E	Dual band 25W 1 ceiver	499.00
IC471E	UHF m mode b sin 32 mem	879.00
IC471H	75W version of IC471E	999.00
IC4E	70cm thumbwheel H H 2W	279.00
IC505	3 10W 50MHZ SSB(FM) transceiver	459.00
IC735	New all mode all band 1 ceiver	879.00
IC745E	All band SSB AM CW gen cov TX-RX 16 mem	975.00
IC751E	All band all mode 1 ceiver 32 mem	1350.00
IC04E	70cm LCD keyboard entry handhd 2W	285.00
ICR7000	New all mode 25-26HZ	879.00
ICR71	All band short wave r ceiver 32 mem	775.00
LC11 14	Leatherette case assy for IC02 4E	7.77
LC1 23	Leatherette case for IC24 E	6.50
PS15	External power supply 20A	139.00

SAE FOR LATEST ICOM LEAFLETS, NEW MODELS EXPECTED

RWC TOP 100			
ADONIS	AMS303G	Base stn FM SSB m phone	39.95
ADONIS	AMS03G	Base stn FM SSB comp mic	52.50
AKD	WA1	120-450MHZ wavemeter c/w ant	24.95
ALINCO	ALM-203R	c/w 30W amp	249.00
ALINCO	ALM-203E	2 mtr H H transceiver 3.5W	239.00
ALINCO	EDH-25	DC DC 12V converter	13.50
ALINCO	EMS-20	Speaker MIC for ALM203	18.50
ALINCO	ESC-3	Leatherette case and strap	14.50
AOI-MIC	DM300	600 OHM replacement microphone	6.50
AOI-MIC	DM301N	600 OHM replacement noise can MIC	7.50
ARM ANT	TRAV-JIM	Travelling Jim portable 2 mtr ANT	7.99
BREMI	BR585	10A 13.8 volt power supply unit	59.50
CRITON	LS88B	6 OHM replacement ext loudspeaker	6.60
DAIWA	SA450M	2 way 2.5KW coax switch 0-900MHZ	17.50
FDK	FDK 725X	2 mtr 25W FM mobile transceiver	269.00
FDK	FDK	2 mtr multimode transceiver 750XX	499.00
GAMMA	2MTR S-JIM	Gamma twin slim Jim type ant	9.50
GAMMA	3-5A PSU	3-5 AMP power supply unit	19.50
Hi-mound	HK703	Straight key	29.25
Hi-mound	HK704	Straight key	19.25
Hi-mound	HK706	Straight key	16.65
Hi-mound	HK707	Straight key	15.50
Hi-mound	HK708	Deluxe straight key	49.95
Hi-mound	MK703	Squeeze key c/w base	28.95
Hi-mound	MK705	Squeeze key	25.65
Hi-mound	MK706	Squeeze key	23.50
Hi-Q	Hi-Q coil	2X coil formers/insulators (pat-pend)	7.50
HOXIN	70N2DX	Dual band 6/8 + 3X 5/8 mobile	25.90
HOXIN	70N2M	144.432 dual band 1.2W + 2 5/8 mobile	22.85
HOXIN	70N2V	Dual b'base ant 3'6" long	39.00
HOXIN	HS-358	430MHz tripple 5/8 6 3dB	33.78
HOXIN	HS-770	144.432 duplexer 50W 30dB isolation	19.55
HOXIN	HS-78F	2 mtr 7/8 fold over 4.5dB	16.95
HOXIN	HS-88F	2 mtr 8/8 fold over 5.2dB	16.95
HOXIN	SMC15SE	15 mtr 130W PEP mobile ant 1.72M long	21.50
ICS	AMT-2	AMTOR/RTTY CW/ASCII terminal unit	245.00
ICS	RM-1	L-cost AMTOR/RTTY/CW/ASCII modem	69.00
Jaybeam	8X1-2M	2 mtr 8E crossed ant	41.50
Jaybeam	LR1-2M	2 mtr omni-directional colinear	39.00
Jaybeam	LW10-2M	2mtr 10 element YAGI	27.25
Jaybeam	MBM48	70cm 48E antenna	40.75
Jaybeam	O4-2M	2 mtr 4 element quad	33.95

Full Jaybeam range in stock.

MuTek	BBBA	20-500MHZ low noise wide band preamp	34.90
MuTek	SLNA	2 mtr low noise RF switched preamp	33.95
MuTek	SLNA 1455b	Optimised preamplifier for FT290R	39.00
MuTek	TVVF50c	High performance 2M 6M transverter	189.90
RAYCOM	Series II 12A PSU	7 1 MHZ traps c w instructions	8.95
RAYCOM	7 1MHZ TRAP	PA valve	12.85
RCA	6146B	Nest of dipoles w band ant	69.00
REVCO	2044 5	26 500 MHZ Wide band discone ant	29.95
REVCO	Revcone	30-500MHZ 10 mtr loaded 1.4W tilt-over	12.50
SUN-ANT	KG208 SE10	5.8 mtr tilt-over ant	13.50
SUN-ANT	KG309 SE2	Cast chrome SO239/gutter mount assy	4.75

RAYCOM MOD KITS

Raycom	757	FT757GX last tuning mod kit improves VFO tuning	29.50
Raycom	FBX RWC	LC7136 7 10 mtr FM mod kit kit c w m's (Built & Tested)	23.50
Raycom	LCU-DNT	As above but kit of parts only MOD (inc post)	17.50
Raycom	LCU-DNT	LCU-DNT 10FM mod kit (inc post)	14.95

NEW STORNO COM 713 55 Channel Mod Kit to 2M inc RPTR Shift

29.00

RAYCOM ANTENNAS

Raycom	1.1 G5RV	Full size G5RV mband ant	14.95
Raycom	1.2 G5RV	1/2 size G5RV mband ant	13.95
Raycom	1.4 wave	145MHZ 1.4 wave PL259 fitting	2.99
Raycom	GP900	3db 800-1000MHZ colinear c/w BNC	19.50
Raycom	HBD	Highband dipole assembly	8.50
Raycom	2M HB9CV	inc. Post	9.98
Raycom	70cm HB9CV	inc. Post	7.98
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Raycom	Swivel-mag	Swivel base mag-base c/w cable PL259	9.25
Raycom	Trap-dipole	7 1MHZ trap dipole com kit	29.95

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Raycom	V15L-145	2mtr 15W linear amp 1.3W input	49.50
Raycom	V25F-145	2mtr 15W linear amp 1.3W input	48.50
Raycom	V35L-145	2mtr 35W linear amp 1-3W input	59.50
Raycom	V45F-145	2mtr 45W FM amp 1-3W input	62.50

SPECIAL OFFERS

ARM	Multi P-6	Multi-polarization P ant	
ANT	140-800MHZ	complete whip	36.00
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Raycom	discone	60-600MHZ	27.50
DNT	M40FM	modified 10FM	49.50
DNT	M40FM	unmodified CB27.81	29.50
ALINCO	ALR206E	25W mobile	249.00
ICS	AMT2	AMTOR/RTTY CW Terminal	169.00

SCANNING RECEIVERS

YAESU FRG-9600 MKII	very latest mod gives improved S METER on RX and extended coverage up to 950MHz	
FRG9600/MK2-RW	All mode scanning RX	469.00
BEARGAT 100 VHF/UHF	Handheld	259.00
REGENCY MX8000 AOR2002		429.00
REGENCY HX2000 VHF/UHF	Handheld	259.00
NEW BEARGAT DX1000 10KHz-30MHz SW RECEIVER.	10 MEMORIES, ALL MODE INC FM. ALSO SCANNING	£329.00

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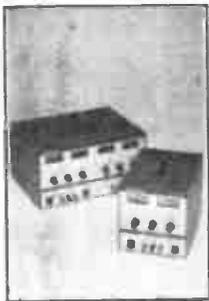
TONNA	20089N	144MHZ 9 element port antenna N	27.95
TONNA	20199	144/435 9+ 19 element Oscar ant	36.50
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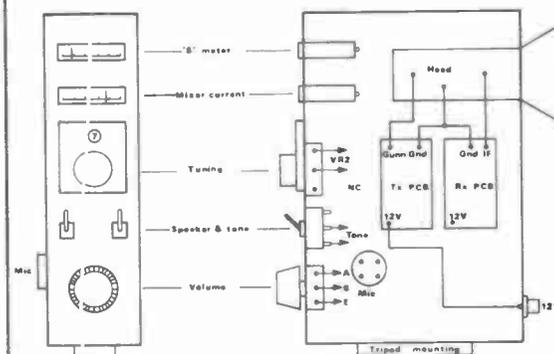
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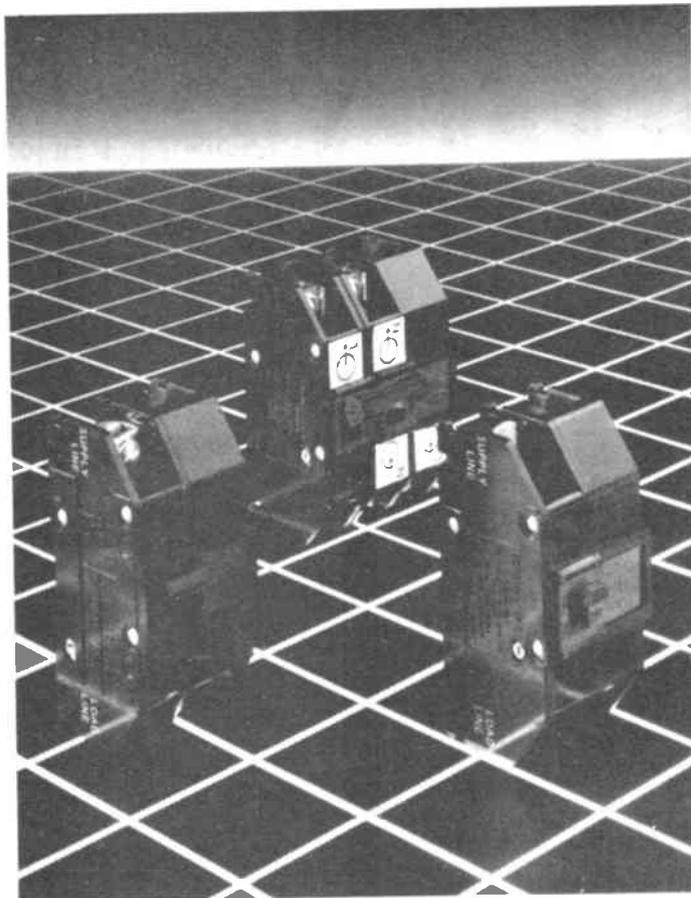
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ACT22	59.75	EC81	7.95	EM2	9.00	MHLD6	4.00
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AH221	38.00	EC88	1.00	EM81	0.70	MS4B	5.50
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AL60	8.00	EC91	5.50	EM85	3.95	N37	12.50
AN1	14.00	EC92	1.95	EM87	2.50	N78	4.50
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ARP34	1.28	EC95	7.00	EN91	1.50	OAZWA	2.50
ARP35	2.00	EC97	1.10	EN92	4.50	OA3	2.50
AZ11	4.50	EC157	439.50	ESU150	14.95	OB2	2.85
BL3	67.00	EC810	12.00	ESU872	25.00	OB2WA	2.50
BS450	27.00	EC832	3.50	ES101	0.80	OC2	2.50
BS810	55.00	EC833	3.50	EY81	2.35	OC3	1.50
BS814	58.00	EC835	3.50	EY83	1.50	OD3	1.70
CIK	19.00	EC881	1.18	EY84	5.95	OM4	1.00
CSJA	39.80	EC881 Special		EY86/87	0.50	OMSB	3.00
C6A	9.00	quality	1.95	EY88	0.55	OM5	1.75
C1112G	78.00	EC882	1.95	EY91	0.80	OP3	4.40
C1108	80.00	EC882 Mul-		EY900A	1.50	OPR50	3.50
C1134	118.00	lard	1.50	EY802	0.70	P61	2.50
CI148A	42.00	EC882		EZ35	0.75	P41	2.50
CI150/1		EC882		EZ40	2.75	PABC80	
C1534	32.00	EC883	1.98	EZ41	2.15	PC26	0.75
CCAL	2.80	EC883	2.80	EZ80	0.75	PC86	0.54
CC3	0.90	EC883		EZ81	0.75	PC92	3.50
CCV Nos Prices		EC883		EZ90	1.50	PC97	1.10
on request		EC883		F6064	2.95	PC800	1.10
D3a	29.80	EC883		FW4800	2.95	PC900	1.25
D83	1.20	EC883		G180/2M	8.95	PC840	0.40
DA41	22.80	EC883		G232 Mullard		PC885	0.54
DA42	17.80	EC883		G240/2D	9.00	PC889	0.70
DA90	2.80	EC883		GC201B	17.50	PC805	0.70
DA100	125.00	EC883		GC104B	17.50	PC806	0.80
DAF91	0.48	EC883		GC104E	17.50	PC808	0.85
DAF91	0.70	EC883		GC124B	17.50	PC828	0.80
DAF96	1.00	EC883		GD85W	8.00	PCF84	0.85
DC70	1.75	EC883		GD120M	5.00	PCF87	1.20
DC90	1.20	EC883		GN10	15.00	PCF200	1.80
DCX4-1000		EC883		GR10G	4.00	PCF201	1.80
		EC883		GS10G	16.50	PCF800	0.40
DCX4-5000		EC883		GS10H	12.00	PCF801	1.35
		EC883		GS12D	12.00	PCF802	0.60
DET16	28.50	EC883		GT1C	14.00	PCF805	1.25
DET18	28.50	EC883		GT1C/S	13.00	PCF806	1.00
DET23	38.00	EC883		GT157M	8.00	PCF808	1.25
DET24	39.00	EC883		GTR150W	1.00	PCF812	0.85
DET25	22.00	EC883		GTR150W	1.00	PCF812	0.85
DF91	0.70	EC883		GU20	35.00	PCF814	2.50
DF92	0.60	EC883		GUX1	24.00	PCF815	2.50
DF96	0.68	EC883		GUX2	24.00	PCF815	2.50
DF97	1.00	EC883		GUX3	24.00	PCF815	2.50
DM63	1.20	EC883		GUX505S		PCF815	2.50
DH77	0.90	EC883		GY501	1.20	PCF815	2.50
DH79	0.90	EC883		GY870	1.20	PCF815	2.50
DH149	2.00	EC883		GY870	1.20	PCF815	2.50
DK91	2.00	EC883		GY870	1.20	PCF815	2.50
DK92	1.20	EC883		GY870	1.20	PCF815	2.50
DL35	2.80	EC883		GY870	1.20	PCF815	2.50
DL70	2.80	EC883		GY870	1.20	PCF815	2.50
DL73	2.50	EC883		GY870	1.20	PCF815	2.50
DL91	1.95	EC883		GY870	1.20	PCF815	2.50
DL92	0.80	EC883		GY870	1.20	PCF815	2.50
DL93	1.10	EC883		GY870	1.20	PCF815	2.50
DL94	2.80	EC883		GY870	1.20	PCF815	2.50
DL96	2.80	EC883		GY870	1.20	PCF815	2.50
DM70	1.95	EC883		GY870	1.20	PCF815	2.50
DM160	2.75	EC883		GY870	1.20	PCF815	2.50
DY86/87	0.68	EC883		GY870	1.20	PCF815	2.50
DY802	0.72	EC883		GY870	1.20	PCF815	2.50
E80CF	11.00	EC883		GY870	1.20	PCF815	2.50
E80F	18.50	EC883		GY870	1.20	PCF815	2.50
E81CC	3.15	EC883		GY870	1.20	PCF815	2.50
E81L	12.00	EC883		GY870	1.20	PCF815	2.50
E82CC	3.80	EC883		GY870	1.20	PCF815	2.50
E83CC	3.50	EC883		GY870	1.20	PCF815	2.50
E83F	5.50	EC883		GY870	1.20	PCF815	2.50
E86C	8.50	EC883		GY870	1.20	PCF815	2.50
E86C	7.95	EC883		GY870	1.20	PCF815	2.50
E86CC	3.80	EC883		GY870	1.20	PCF815	2.50
E86CC	3.80	EC883		GY870	1.20	PCF815	2.50
Special	7.95	EC883		GY870	1.20	PCF815	2.50
E90CC	8.95	EC883		GY870	1.20	PCF815	2.50
E90F	7.95	EC883		GY870	1.20	PCF815	2.50
E91H	4.90	EC883		GY870	1.20	PCF815	2.50
E92CC	3.95	EC883		GY870	1.20	PCF815	2.50
E99F	6.95	EC883		GY870	1.20	PCF815	2.50
E130L	25.00	EC883		GY870	1.20	PCF815	2.50
E180CC	9.50	EC883		GY870	1.20	PCF815	2.50
E182CC	9.00	EC883		GY870	1.20	PCF815	2.50
E186F	8.50	EC883		GY870	1.20	PCF815	2.50
E186F	8.50	EC883		GY870	1.20	PCF815	2.50
E188CC	7.80	EC883		GY870	1.20	PCF815	2.50
E280F	19.80	EC883		GY870	1.20	PCF815	2.50
E283CC	10.00	EC883		GY870	1.20	PCF815	2.50
E286CC	13.50	EC883		GY870	1.20	PCF815	2.50
ES5L	42.00	EC883		GY870	1.20	PCF815	2.50
E810F	28.00	EC883		GY870	1.20	PCF815	2.50
E1148	1.00	EC883		GY870	1.20	PCF815	2.50
E1524	6.85	EC883		GY870	1.20	PCF815	2.50
EA50	1.00	EC883		GY870	1.20	PCF815	2.50
EA78	1.85	EC883		GY870	1.20	PCF815	2.50
EA79	1.85	EC883		GY870	1.20	PCF815	2.50
EA81	0.80	EC883		GY870	1.20	PCF815	2.50
EA8C80	0.70	EC883		GY870	1.20	PCF815	2.50
EA91	2.80	EC883		GY870	1.20	PCF815	2.50
EA92	1.20	EC883		GY870	1.20	PCF815	2.50
EA901	2.00	EC883		GY870	1.20	PCF815	2.50
EB14	1.80	EC883		GY870	1.20	PCF815	2.50
EB41	3.95	EC883		GY870	1.20	PCF815	2.50
EB42	3.95	EC883		GY870	1.20	PCF815	2.50
EB43	2.80	EC883		GY870	1.20	PCF815	2.50
EB44	0.85	EC883		GY870	1.20	PCF815	2.50
EB45	0.85	EC883		GY870	1.20	PCF815	2.50
EB46	0.85	EC883		GY870	1.20	PCF815	2.50
EB47	0.85	EC883		GY870	1.20	PCF815	2.50
EB48	0.85	EC883		GY870	1.20	PCF815	2.50
EB49	0.85	EC883		GY870	1.20	PCF815	2.50
EB50	0.85	EC883		GY870	1.20	PCF815	2.50
EB51	0.85	EC883		GY870	1.20	PCF815	2.50
EB52	0.85	EC883		GY870	1.20	PCF815	2.50
EB53	0.85	EC883		GY870	1.20	PCF815	2.50
EB54	0.85	EC883		GY870	1.20	PCF815	2.50
EB55	0.85	EC883		GY870	1.20	PCF815	2.50
EB56	0.85	EC883		GY870	1.20	PCF815	2.50
EB57	0.85	EC883		GY870	1.20	PCF815	2.50
EB58	0.85	EC883		GY870	1.20	PCF815	2.50
EB59	0.85	EC883		GY870	1.20	PCF815	2.50
EB60	0.85	EC883		GY870	1.20	PCF815	2.50

QVQV3-20A	25.00	U50	2.00	2C39A	29.50	6AK6	2.50	6GK5	1.50	12BH7A	2.50	404A	10.95
QVQV3-20B	25.00	U82	3.00	2C39B	29.50	6AL5	0.60	6GK6	1.95	12BL6	1.75	425A5	8.00
QVQV6-40A	27.50	U191	0.70	2C40	37.00	6AM4	3.25	6GK6M	0.95	12BY7A	2.75	431U	4.50
QVQV7-50	83.50	U213	0.85	2C42	29.50	6AM5	6.00	6GK7	2.00	12C45	1.85	572B	65.00
QVQZ0-20	42.50	U251	1.00	2C51	0.75	6AM6	1.80	6GV7	2.50	12CX6	1.20	5836	1.50
Q575-40	1.50	U801	0.75	2C55	1.50	6AN5	2.68	6GW8	0.80	12D06B	3.50	6146A	7.50
Q592/1D	6.00	UABC80	0.85	2D21	1.50	6AN6A	2.65	6H1	9.50	12DWA4	3.50	6158	3.20
Q595/10	4.85	UABF80	1.00	2D21W	2.50	6AQ5	2.15	6H3N	1.10	12DWW2	2.50	6386	14.50
Q598/45	4.00	UBC41	2.95	2E22GY	45.00	6AQ8	0.85	6H6	1.95	12E1	17.95	6883B	0.95
Q599/10	6.00	UBC81	1.50	2E26	250.00	6AT6	0.75	6H67	0.95	12E14	36.00	6973	5.95
Q599/10	6.00	UBC81	1.50	2J42	93.00	6AT8	1.75	6H7	0.95	12GN7	5.00	705A	8.00
Q599/10	6.00	UBC81	1.50	2K25	27.50	6AS5	2.50	6H75	5.50	12HGT4	4.50	706A	8.00
Q599/10	6.00	UBC81	1.50	2K26	95.00	6AS6	1.50	6H8	2.50	12JG7A	3.50	715C	45.00
Q599/10	6.00	UBC81	1.50	2K26	95.00	6AS7	4.85	6H85	4.95				

STRAIGHT &

LEVEL



PROTECTION IN THE SHACK

The probability of shock or earth leakage currents having a dc content is particularly high in the radio shack or similar circumstances, say Dorman Smith Switchgear. Electronic circuitry may modify the ac voltage waveform, resulting in a complex ac/dc or pure dc leakage current. The need for the close shock protection afforded by rcds is widely appreciated.

However, many people are not aware that the majority of rcds are incapable of sensing shock currents with a dc content, nor is it generally appreciated that many rcds will become less sensitive, slow, or even fail totally to operate if not periodically exercised using their test button.

Dorman Smith Switchgear have recently introduced their Safeline range of miniature circuit breakers/rcds and isolator/rcds which, due to their unique principle of

operation (developed in the UK by Dorman Smith) overcome the shortcomings of traditional rcds.

Capable of sensing ac, dc or complex ac/dc shock or leakage currents (some rcds claim such a capability but can only sense specific ac/dc mixes), and in the case of the mcb/rcd additionally detecting overload currents, Safeline is worthy of consideration by all safety conscious operators.

Details of Safeline and the associated Series 15 miniature circuit breaker ranges are available from: *Dorman Smith Switchgear Limited, Blackpool Road, Preston PR2 2DQ. Tel: (0772) 728271.*

PREVENTION

All too often we hear of accidents with electrical appliances in the home, like lawnmowers, drills and, occasionally, amateur radio equipment.

To help combat such problems, Geefor Enterprises are supplying in-line residual current circuit breakers. These RCCBs are in the square pin 13A form, compact and complete with test and reset buttons. They cost £27.95+£2 p&p, and are available from the manufacturer.

More information can be obtained from: *Geefor Enterprises, 112 Leeds Road, Mirfield, West Yorks WF14 0JE.*

PSUs

A new range of programmable bench power supplies, designated the LB series, has been introduced by Farnell Instruments Limited.

The LB series can be controlled locally by means of 10-turn potentiometers or remotely by means of the integral IEEE488 interface. Providing a 0-30V dc output at 2A (LB30-2) or 4A (LB30-4), the units can operate in a constant current or constant voltage mode.

Output of the LB30-2 is monitored by a large, easily read, analogue meter which is switched to read either voltage or current. The LB30-4 has separate analogue voltage and current meters. Remote sensing of the load voltage is provided to ensure optimum performance when supplying distant loads.

Separate switching of mains input and dc output is provided and LED indicators, housed within the respective switch bezels, illuminate to show mains power on or when the unit is in current limit. The provision of a separate output on/off switch enables the supply to be adjusted in circuit and left in stand-by prior to supplying the load.

Both models have ac mains input and dc output fuse protection and electronic current limiting.

The LB30-2 and LB40-4 are designed to meet BS4743 and IEC348 safety standards.

For further information contact: *Farnell Instruments Ltd, Sandbeck Way, Wetherby, West Yorks LS22 4DH. Tel: (0937) 61961.*

All the latest news, views, comment and developments on the amateur radio scene

BENCH POWER SUPPLIES

Thandar Electronics have announced the introduction of two bench power supplies to complement their existing range of test and measuring instruments.

The TS3021 is a laboratory quality linear power supply able to provide 0 to 2 amps at 0 to 30 volts.

Dual 0.5in 3.5 digit liquid crystal displays simultaneously display output voltage and output current. With the output switch off, the display can be used to preset the output voltage and current limit prior to connection of the load.

The power supply operates in constant current or constant voltage modes with automatic cross-over.

A display annunciator indicates constant current mode when in operation.

Coarse and fine controls permit the output voltage to be set within 5mV and the

current limit control is logarithmic to give good resolution at low current settings. The output is protected against forward and reverse voltages.

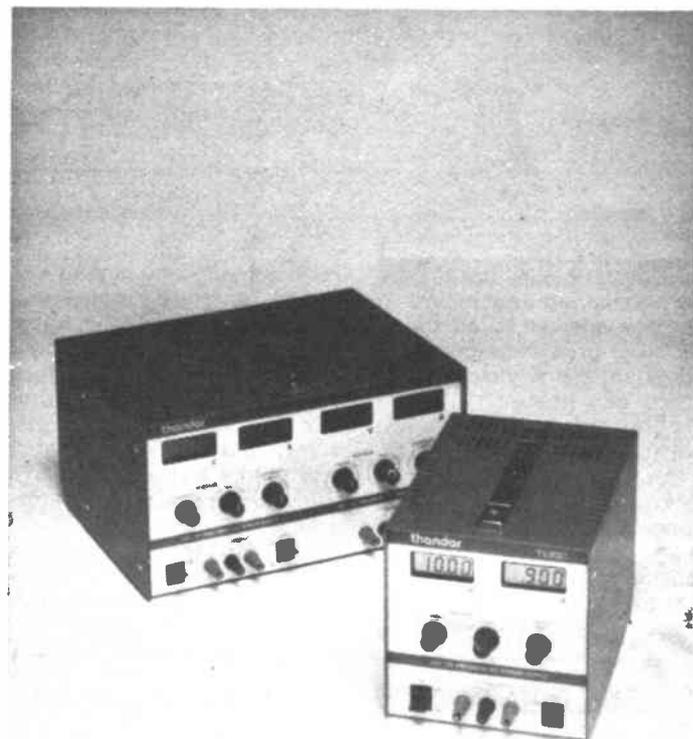
Load and line regulation are better than 0.01%, with ripple and noise typically better than 1mV. Linear operation and the use of LCD meters ensure that RFI and interference generated by the display are minimised.

The TS3022 is a dual version which has two identical and independent thirty volt/two amp supplies in the same case.

Both power supplies have steel cases, rubber feet and integral mains leads.

The TS3021 is priced at £150 + VAT and the TS3022 at £280 + VAT.

For further information please contact: *Thandar Electronics Ltd, London Road, St Ives, Huntingdon, Cambridgeshire PE17 4HJ. Tel: (0480) 64646.*



MORSE AID

Invotron Limited has commenced production of a digital Morse processor (DMP1), which interfaces between a Morse key and a transmitter so that with a conventional (brass pounder) up/down key it becomes possible to send perfect Morse. The Morse processor decodes the input and buffers it in an 8K static RAM store, before outputting

it as a continuous Morse stream with all mark and space durations precisely correct. The DMP1 integral store enables a message or call to be stored and repeated at will, as often as is necessary, by simply pressing the RUN button.

In the correcting mode, the output speed is set by the user to be very slightly lower than the average input speed.

In the repeat mode the output speed can be changed to higher or lower speeds irrespective of the initial input speed.

The digital Morse processor is a powerful trainer, enabling high speeds to be generated from low input speeds for receiving practice. When sending, the indicators will guide the beginner towards improved dot and dash durations and inter-letter spacings.

The product is housed in a rugged metal case.

Further details are available from: *Invotron Ltd, Brookfield Avenue, Blackrock, Co Dublin, Ireland. Tel: (Dublin) 884993/831938.*

MARINE HAND-HELD

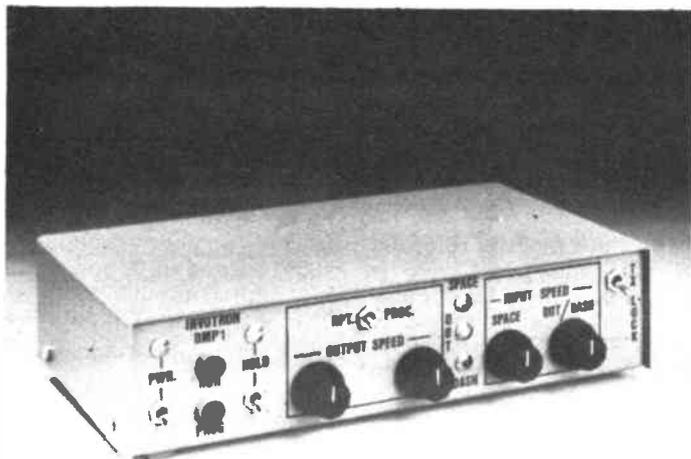
As an addition to the range of Sealine VHF radiotelephones Shipmate has announced the launch of its new MC-56 hand-held, which incorporates the following

features: all 55 international channels fully synthesized; UK marine channel as standard; dual watch facility; channel 16 quick access button; switchable 3W/1W output power; 220V ac charger unit; the ability to add channel 00 for authorised users.

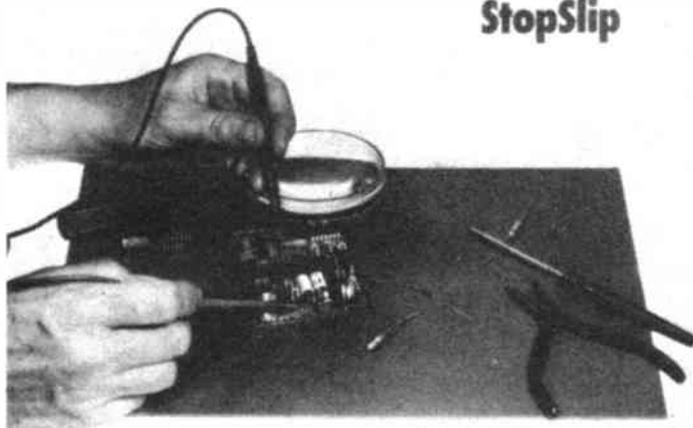
Channel selection is by a rotary switch and channel position is viewed through a magnifier prism. All components are contained and protected within a tough plastic case which incorporates a metal belt clip, nylon wrist strap and a convenient slide-on nicad battery pack. Optional accessories include a carrying case and a fist microphone/speaker unit.

Available from most marine electronics dealers and good chandlers, the MC-56 has an rrp of £250.00 + VAT.

More details are available from: *Shipmate Marine, Electronics Ltd, Unit 5, Elm Court, Crystal Drive, Smethwick, West Midlands B66 1RB.*



StopSlip



ANTI-SLIP MATS

Cobonic Limited claims it has the answer to all those slippery problems that can occur in the workshop, lab, office and home. It's called the Stopslip mat. The possible applications are endless.

Because of its inherent tackiness, any item placed upon its surface will stick there as if glued, without leaving any traces either on the table or on the object. Made from hard-wearing

material, it is long lasting and needs only an occasional wash with warm soapy water to remove accumulated dust and other debris and restore the original tackiness. Stopslip is available in various sizes, and thicknesses of 2 and 3mm. It can also be cut to the required size with scissors.

For further information contact: *Cobonic Ltd, 32 Ludlow Rd, Guildford, Surrey GU2 5NW. Tel: (0483) 505260.*

ORYX PSU

The range of Oryx Micro soldering irons now has a universal power supply unit suitable for all the Micro range. This PSU can be supplied wired for 6, 12 or 24V and is capable of providing 25W.

Working direct from a 240V supply, the double insulated transformer offers maximum safety to the operator using a low voltage iron. Output voltage is designated when ordering, although the internal circuits are still intact and can be changed if necessary.

The 13 lightweight Micro irons available for this unit, with the choice of some 23 tip styles, make this product very useful for micro-miniature work such as surface mount devices.

For further details contact: *Greenwood Electronics, Portman Road, Reading RG3 1NE. Tel: (0734) 595843.*

NEW SOLDER

Multicore Solders Limited have developed a unique, fast acting flux cored solder which is suitable for all electrical and electronic work as well as for most types of metal. The flux in the solder wire is entirely non-corrosive.

Recently this has been sold

for specialised industrial use, but now it has been made available in a consumer pack. This 60/40 alloy, 1.2mm diameter, 5 core solder wire is packaged in a handy, easy to use dispenser.

This new solder product will interest handymen, do-it-yourself enthusiasts and service engineers.

This product is available from most electrical and hardware stores at a retail price of £1.99 inc VAT (reference MX100).

For further information contact: *Bib Solder Division, Bib Audio/Video Products Ltd, Kelsey House, Wood Lane End, Hemel Hempstead, Herts HP2 4RQ. Tel: (0442) 61291.*

DIGITAL MULTIMETER

A high quality digital multimeter with automatic ranging, mode and display switching, the Pantec Brisk, has been announced by Electronic and Computer Workshop Ltd.

Ideal for all types of electronic and electrical testing, the multimeter has a 3½-digit LCD with a clear data display of test measurements. It provides a range of extra indicators, including mode, polarity,

range, function, low battery and overrange symbols.

The autorange function operates over four measurement modes: ac voltages of up to 600V, dc voltages of up to 1000V, ac/dc current of up to 10 amps and resistance of up to 2 megohms. A buzzer continuity test is included, together with the capability of in-circuit resistance measurement.

Input resistance is 10 megohms and accuracy is from 0.5 to 0.7% on the dc voltage range.

The Pantec Brisk measures 155 x 85 x 30mm and is available from ECW at a price of £55.20 including post/packaging and VAT.

For further information please contact: *Electronic and Computer Workshop Ltd, 171 Broomfield Road, Chelmsford, Essex CM1 1RY. Tel: (0245) 262149.*

VOLTAGE MEASUREMENT

A precision voltage measurement module (DMM 204) is now available with CIL's new Jay series of measurement instrumentation. The Jay range allows different modules to be inserted into the front of the units to perform many measurement tasks, eg temperature, DMM, strain, calibration and simulation.

The Jay basically consists of a Z80-based microcomputer circuit with RS232 option, housed in a bench-mounted case.

The front panel has a 2 x 16 dot matrix LCD display, switches for control functions and access for the modules.

The microprocessor program is stored in PROM within the module. Each module therefore has a different program to perform its particular task. This means that after the instrument is purchased for, say, temperature measurement, other modules can be purchased to perform almost all measurement tasks.

The third module released by CIL, the DMM 204, is specifically designed for precision low level dc measurement. Basic accuracy is ±0.01% of reading with sensitivity 100 nanovolts.

More information is available from: *CIL Electronics Ltd, Decoy Road, Worthing, Sussex BN14 8ND. Tel: (0903) 204646.*

LOW PROFILE PSU

A new low profile 120W switched mode power supply, the model 19B, has been introduced by Greendale Power.

Just 45mm tall, the model 19B is designed for use in microprocessor-based systems such as personal computers, peripherals such as Winchester and floppy disc drives, ATE systems and scientific instruments.

This new PSU achieves its diminutive size by virtue of a comparatively high switching frequency - 70kHz - and has a considerably lower profile than directly competing units. Dimensions are 220 x 100 x 45mm in the open frame (Eurocard rack mountable) version and 223 x 103 x 50mm in the optional cased version.

Five dc outputs are provided, two of which (±5V and ±24V) are fully floating. Standard output voltage combinations are: +5V at 12A (main output), with auxiliary outputs of either +12V/2A, -12V/2A, 5V/2A and 24V/2A or +15V/1.6A, -15V/1.6A, 5V/2A and 24V/2A. Other output voltage combinations are available to special order.

All outputs are regulated to ±0.5% for a 195 - 264V ac line swing when operating at 100% rated load and all outputs remain within specification for a minimum of 20mS after loss of ac power. The auxiliary outputs are short circuit protected, while the main output has current limiting protection against overload and continuous short circuits.

The ac voltage input ranges are 98/132V and 195/264V and efficiency is a minimum of 70%. In-rush surge current at switch-on is limited by special soft-start circuitry; over-voltage protection on the main +5V dc output is set between 5.5V and 6.5V. The model 19B is also protected against ac under-voltage operation.

Standard features of the 19B include common mode input filtering and logic inhibit (logic high, TTL compatible); all units are supplied 100% burned-in. A power failure signal output is optional. The operating temperature range is 0°C to +50°C at full rated load.

For more details contact: *Greendale Power Ltd, Unit 1, Cobnar Wood Close, Chesterfield Trading Estate, Sheepbridge, Chesterfield S41 9RQ. Tel: (0246) 455417.*

STRAIGHT & LEVEL

SCOPE PROBE OPTIONS

Electronic and Computer Workshop Ltd (ECW) has announced the availability of high voltage probes for the cost-effective Crotech range of oscilloscopes. The universal design also allows the probes to be used with virtually any other manufacturer's instrument that utilises a standard BNC input connector.

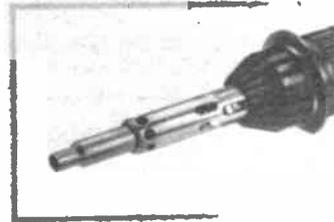
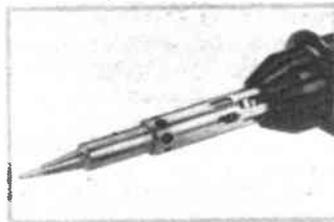
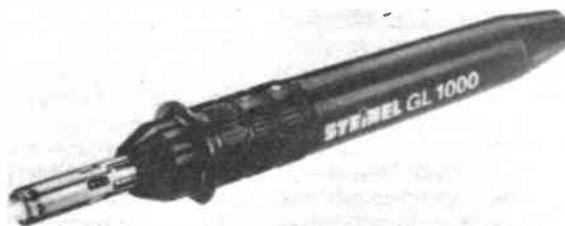
The P100 is a light-weight probe that gives $\times 100$ voltage sensing and permits voltages of up to 1kV to be measured. This is well suited to many equipment testing applica-

tions where HT supplies are present.

For voltages of up to 40kV, such as those present in TV receivers and other UHV rails, the HV40 provides a $\times 2000$ voltage multiplication ratio.

These probes are available from ECW at all-in prices of £28.18 for the P100 and £34.93 for the HV40. Prices include VAT and postage and packaging.

For further information please contact: *Electronic and Computer Workshop Ltd, 171 Broomfield Road, Chelmsford, Essex CM1 1RY. Tel: (0245) 262149.*



VARICAPS

Nevada has announced the release of two new products, the TC-250 and the TC-500 high power variable capacitors.

The TC-250 has a specification of 13-250pF, and measures 101 \times 105 \times 88mm, with a weight of 0.62kg and a breakdown voltage of 7.8kV. It has a plate air gap of 2mm and is priced at £15.61+VAT.

The TC-500 is a twin 13.250pF variable capacitor (500pF max) and measures 101 \times 105 \times 165mm. It weighs

1.134kg and has a breakdown voltage of 7.8kV per capacitor and a plate air gap of 2mm. It costs £19.50+VAT.

The units are available ready assembled or in kit form at a lower price. The capacitors use a special acrylic perspex 6mm thick for the end plates, capable of withstanding extremely high voltages and with good RF properties.

Further details are available from: *Telecomms, 189 London Road, Portsmouth PO2 9AE. Tel: (0705) 698113.*

IT'S A GAS

New from Steinel is the GL1000 butane gas powered multi-purpose thermal tool.

The GL1000 is small and compact, not much bigger than a magic marker, yet it offers the user the ability to weld at temperatures of approximately 1300°C at the hottest point of the welding flame.

For soldering and hot air shrinking applications, a catalyser controls the heat, giving typical temperatures of between 200°C-400°C

soldering and between 100°C-600°C for heat shrinking. The GL1000 will be of use to the professional serviceman, DIY enthusiast and hobbyist alike.

The unit is supplied boxed, complete with adaptors for each application.

The GL1000 uses ordinary butane gas and gives up to three hours use from each gas filled cartridge.

For further details contact: *Steinel (UK) Ltd, 37 Manasty Road, Orton Southgate, Peterborough PE2 0UP. Tel: (0733) 238265.*

analogue signal output with a response time within 3mS. The instrument includes both battery and mains power supply operation and has integral battery charging facilities.

The fast response capability of the JCI 111F can be combined with options for a user-settable alarm circuit or an RS423 communications interface.

A bayonet pin arrangement is provided around the sensing aperture for mounting units which expand the range of application of the instrument.

Charge may be measured using the JCI 151 Faraday Pail, and the JCI 156 and 158 voltmeter adaptors enable the fieldmeter to be used as a sensitive and stable electrostatic voltmeter. With the JCI 155 charge relaxation test unit it will be possible to study fast static charge dissipation effects.

For more information contact: *John Chubb Instrumentation, Unit 30, Landsdown Industrial Estate, Gloucester Road, Cheltenham, Glos GL51 8PL. Tel: (0242) 573347.*

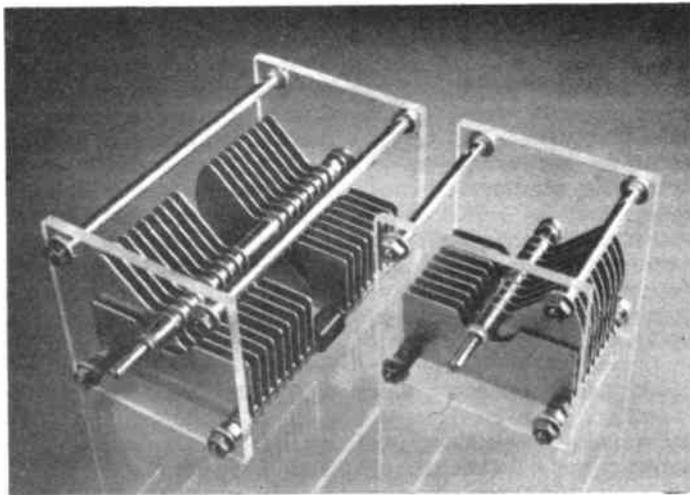
RF PRODUCTS

Waters and Stanton are the sole importers of the Welz range of RF measuring and switching products. Certain Welz products have been specially manufactured to RS Components' specification and supplied via Waters and Stanton, who will offer the product back-up service.

The latest range of Welz products has reached a standard that now makes them equally at home with both the amateur and professional markets, claim Waters and Stanton. It is anticipated that this latest move will make the products more easily available.

Further new products have just been announced, including a combined HF ATU and power meter, a dummy load rated to 1500MHz and an in-line T-pad for connecting 'scopes and counters to coaxial lines handling power up to 500 watts.

Further details and prices can be obtained from: *Waters and Stanton Electronics, 18-20 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835.*



FIELDMETER

John Chubb Instrumentation has developed a fast response electrostatic fieldmeter, the JCI 111F, for measuring both truly static as well as rapidly varying electric fields. The fast response capability enables rapidly changing electrostatic conditions to be followed in manufacturing operations – such as, for example, in production handling of components sliding in contact with insulating surfaces. 50

and 60kHz electric fields can also be reliably monitored.

The JCI 111F sensitivity ranges are 2, 20, 200 and 2000 kV/m fsd with both manual and automatic range selection. Static and slowly varying electric field observations are displayed in a 3½-digit liquid crystal display. This provides a resolution of a few volts per metre and the ability to measure surface potentials to a volt at 90mm separation.

Fast changing electric fields are monitored via the

STRAIGHT & LEVEL

SATCOMS

A new exhibition, Satellite Communications, is to be included in The British Electronics Week, the successful electronics consensus organised by Evan Steadman.

Satellite Communications will be held alongside the other events at Olympia in London from 28-30 April 1987. These comprise: the 12th All-Electronics/ECIF Show; the

5th Circuit Technology Exhibition; the 5th Fibre Optics Exhibition; the 3rd Electronic Product Design Exhibition; the Automatic Test Equipment Exhibition; the Power Sources and Supplies Exhibition.

Further information is available from: *Satellite Communications, The Hub, Emson Close, Safron Walden, Essex CB10 1HL. Tel: (0799) 26699.*

CRT READOUT

Telonic Instruments Ltd, the UK distributor for Kikusui, have announced the availability of a new high specification CRT readout oscilloscope range.

The new range, comprising the COM 7000 series, consists of six models with real-time bandwidths of up to 200MHz, all with CRT readout, built-in DVM and frequency counter. Three of the six new instruments also incorporate digital storage.

The top of the new oscilloscope range is the model COM 7201 - a 200MHz real-time bandwidth instrument, with 50MHz clock rate digital storage capability, GPIB compatibility and CRT readout. In real-time mode the COM 7201 has 4 inputs, all with a 200MHz bandwidth.

A common problem with digital storage oscilloscopes is aliasing when the input frequency approaches half the sampling frequency. To avoid this the COM 7000 range uses a 'vector generator', where two adjacent dots are joined by a vector line. An envelope mode function gives the capability to display irregular pulses or AM modulated waveforms. The pre-trigger system allows the trigger point to be set at 0%,

20%, 50% or 80% of display width.

The COM 7201's storage capability is 1K word save memory per channel (four channels) and four 1K word reference memories.

Other models in the COM 7000 range are similar in basic design, the model COM 7101 having 100MHz real-time bandwidth but being otherwise identical. The model COM 7601 has 60MHz real-time bandwidth and a slower (20MHz) clock rate in its digital storage section, but is otherwise similar to the COM 7201. The COM 7200, COM 7100 and COM 7060 are real-time only oscilloscopes with bandwidths of 200, 100 and 60MHz and with GPIB capability as an optional extra.

COM 7000 represents a departure by Kikusui from conventional techniques of manufacture in that it utilises a large number of custom hybrid ICs to minimise overall component count and adjustment points, thus reducing calibration time and facilitating automatic assembly and test techniques.

Further details on the COM 7000 range are available from: *Telonic Instruments Ltd, Boyn Valley Road, Maidenhead, Berks SL6 4EG. Tel: (0628) 73933.*



FREQUENCY COUNTER

The latest addition to the Black Star range of frequency counters is the Meteor 1500, utilising the latest monolithic microwave integrated circuit technology to measure frequencies up to 1.5GHz.

The Meteor 1500 is an 8-digit battery or mains operated bench instrument with resolution down to 0.1Hz and with a sensitivity of <math><50\text{mV}</math> at 1.5GHz.

Features include a low-pass filter, trigger level control,

three gate times and battery recharging facility.

The wide frequency range and portability make the Meteor 1500 suitable for service and test applications in many fields, including telecommunications, cellular radio, PMR, etc.

The price of the unit is £199 + VAT.

For further information contact: *Black Star Ltd, 4 Stephenson Road, St Ives, Huntingdon, Cambs PE17 4WJ. Tel: (0480) 62440.*

TEST RANGE

Farnell Instruments have just launched the PTS1000, a low cost, easy to use, completely portable transmitter test set with an operating frequency up to 1GHz.

Integral with the PTS1000 are all the measuring instruments normally required to verify the performance of transmitters up to 100 watts continuous rating. These include an RF counter; modulation meter; RF and AF power meter; AF voltmeter; distortion analyser; weighting filters and RF power load.

Designed to run from a clip-on battery pack, an external 12V dc vehicle battery or any standard ac mains (line) input, it measures 120x375x342mm and weighs 8.5kg.

Also new from Farnell is the CTS520 communications test set, designed for the service testing of simplex or duplex radio transceivers, paging equipment and base stations in frequency bands up to 520MHz.

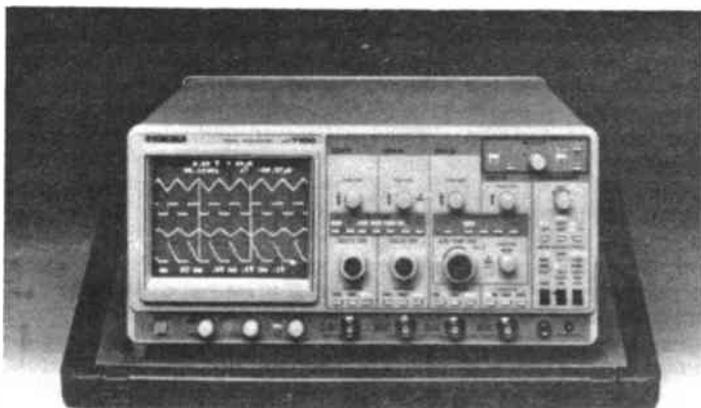
The CTS520 provides the measurement capability of nine separate instruments, plus weighting filters and RF power load, housed in one readily portable case. All instruments can be used independently or in combination to provide comprehen-

sive tests. The instruments include synthesized RF signal generator, RF counter, modulation meter, RF power meter, AF voltmeter, distortion analyser, AF power meter, sinad meter and a CTCSS tone generator. An internal loudspeaker is fitted.

A low cost, portable spectrum analyser, designated the 352C, is another test instrument available from Farnell, and is designed to be an easy to use instrument for monitoring spurious radiations in the range 300Hz to 1000MHz. Five sweep ranges are provided with three measurement bandwidths, from 2MHz on the widest range to 9kHz on the narrowest (3MHz) range. The instrument may be used as a fixed tune receiver over the full frequency range and both AM and FM demodulation is provided with audio output via an internal loudspeaker.

The standard instrument will operate from either ac mains or an external 12V dc supply, and optional versions cater for an alternative 24V dc external (or internal rechargeable) power source.

More information can be obtained from: *Farnell Instruments Ltd, Sandbeck Way, Wetherby, West Yorks LS22 4DH. Tel: (0937) 61961.*



CLUB NEWS

RSGB HF Convention

This year's HF Convention will be held at the Belfry Hotel near Oxford on Sunday 28 September.

As well as the RSGB book stall and the HF demonstration station (GB2H and GB2CAR), there will be a variety of lectures and a car boot sale.

Doors open at 10.00am, admission costing £2, and the lectures kick-off at 10.30 with a talk on HF antennas for small gardens by our very own Don Field G3XTT.

A buffet will be served at 1730, costing £5.50 per head, and those wishing to stay for the meal should contact Roger Brown G3LQP QTHR to reserve a place.

Morse tests will take place at the event but bookings should be made in the usual fashion, through RSGB headquarters, prior to the event.

Further information is available from Don Field G3XTT at 105 Shiplake Bottom, Peppard Common, Henley on Thames RG9 5HJ, or by telephone on (0734) 501359 (day) and (0734) 724192 (evenings).

28th Harlow Rally

The twenty-eighth Harlow Amateur Radio Rally will take place on Sunday 21 September at the Harlow Sports Centre, Hammarskjold Road, Harlow, Essex. Doors open at 10.00am.

Features of the rally include a giant bring and buy, exhibits by special interest groups and Morse tests (which must be pre-booked with the RSGB).

Parking is free and a licensed bar will be available for the essential tippie and other refreshments. Access to the venue is via the M11 (junction 7) or the A414, but talk-in on S22 and G6UT will be available for the confused.

Further information is available from David Gould G3UEG on (0279) 22365 (day) and (0279) 27788 (evenings and weekends).

Peterborough Rally

The Peterborough Radio and Electronics Society Mobile Rally will take place on Sunday 21 September at the Wirrina Sports Stadium, Bishops Road, Peterborough.

The venue is situated on the river embankment and offers

free parking and delicious meals in the adjacent Tropicana Restaurant. With a little ingenuity it should be possible to appease the missus with a slap-up meal and the romantic setting, while you get down to the serious business of radio junk etc.

Further details are available from Peter Wilson G4PNW at 221 Tyesdale, Bretton, Peterborough PE3 6XZ.

ELOHEX 86

The Hornsea Amateur Radio Club are holding a Computer and Electronics Exhibition on the 19 October at the Floral Hall, Hornsea.

The exhibition will include local club and trade stands in addition to the statutory junk, bring and buy stands, raffle and tombola.

Cafe and bar facilities will be available and talk-in will be on S22 and G4EKT. Doors open from 1000 to 1700hrs.

The club meets every Wednesday at 1950 for 2000hrs at The Mill, Atwick Road, Hornsea, North Humberside for a full programme of talks, videos and slides on a variety of subjects. Visitors and guests are always welcome.

Details on the exhibition and club meetings are available from Richard Guttridge G4YTV, tel: (0401) 62498.

Midlands VHF Convention

The RSGB Midlands VHF Convention is being held on Saturday 11 October at Madeley Court Centre, Telford, Shropshire from 1100hrs.

The convention programme includes lectures on Cellular Radio, 10GHz amateur television and meteor scatter. The forum will be followed by an evening buffet until 2200hrs.

As well as a small trade show, bring and buy and book stall, there will be a measurements facility providing most required measurements up to 18GHz.

A 'how to get there' map and further information is available from J Burden G3UBX, 18 Langley Road, Merry Hill, Wolverhampton WV3 7LH for a SAE.

More Junk

The Aberdeen ARS plans to hold one of its frequent junk sales on 5 September, followed on the 12 by a Raynet presentation and slide show, on the 19th by Sid Will's Morse

keyer project, and a lecture, 'Computers in amateur radio', on the 26th.

The society is currently running the WASR (Worked All Scottish Regions) Award. Full details are available from GM4BKV at 67 Greenfern Road, Mastrick, Aberdeen AB2 6TB.

Regular society meetings are held on Fridays at 7.30pm at 35 Thistle Lane, Aberdeen and information can be obtained from Don GM4GXD on (04676) 251.

Welsh rally

This year's Welsh Amateur Radio Convention will be held at The Oakdale Community College, Blackwood, Gwent on Sunday 5 October. Doors will open at 10.00am and the official opening will be at 11.00am by Mr W McClintock G3VPK, President of the RSGB.

The programme will include the ARRL video presentation of the shuttle mission 51F (WOORE/Challenger), a tape/slide presentation of the 1985 Clipperton Island DXpedition, a lecture on amateur fast scan TV by E Edwards GW8LJJ and a VHF feature. Morse test facilities will be available, although applicants must apply previously to the RSGB. There will be £300 in cash prizes, plus other prizes, the usual trade stands, bring and buy and RSGB stand. Admission is £1.50 at the door. Talk-in will be on S22.

Further details can be obtained from R B Davies GW3KYA, 16 Vancouver Drive, Penmain, Blackwood, Gwent NP2 0UQ.

Radio market

A radio market and car boot sale has been organised by the North Cheshire Radio Club for 21 September.

Attractions include trade stands, a licensed bar (*I'll be there!* - Ed) and catering. Talk-in will be on S22 from 10.00am.

Further details are available from Judith G6LZW on Arley 288 or Geoff G0DMZ on (061 969) 1065.

Worked all Clans

The Aberdeen Amateur Radio Society has organised a Worked All Scottish Regions Award (WASR) which is available to all amateurs showing proof of two-way contact with one station in

each of the Scottish regions (Borders, Central, Dumfries and Galloway, Fife, Strathclyde, Grampian, Highlands or Islands and Lothian) since 1 May 1975.

Contact with the Aberdeen Amateur Radio Society, GM3BSQ, may be used as a substitute for any region.

To claim the award a list of claimed regions, countersigned by a radio club secretary or chairman, should be forwarded with a cheque for £1, or IRCs of equivalent value, to: GM4BKV, S Sutherland, 67 Greenfern Road, Mastrick, Aberdeen AB2 6TP.

GB00LD

The Thorbury and District Amateur Radio Club will be operating the above special event station over the weekend of 13/14 September.

The station will be operating during the open days of the Oldbury-on-Severn nuclear power station, and will be operational on HF, 2 metre and 70 centimetre bands.

Special QSL cards will be issued to contacts. Further information is available from Alan Jones G8AZT, c/o 9 Queen's Walk, Thornbury, Nr Bristol BS12 1SR. Tel: (0454) 416381.

Botswana Independence

To celebrate Botswana's 20th anniversary of independence, Botswana amateurs have been allowed to use a special call sign facility during the independence celebrations through September and October.

Full licence holders will use the prefix 802 and novice licence holders will use the prefix 800.

BARS members, including SWLs and other Botswana active radio amateurs are being issued with QSL cards.

Please note that BARS does not operate a running QSL bureau and incoming cards are distributed only to BARS members.

Further information is available from the Botswana Amateur Radio Society, PO Box 1873, Gaborone, Republic of Botswana, Southern Africa.

934MHz Club

Two years ago, five 934MHz enthusiasts got together to form the 934MHz Club UK. From such humble beginnings the club has flourished, and to date has some 750 paid up members. Not bad when

you consider that membership was originally only expected to hit the 200 mark!

The club has gone from strength to strength, having now established what is described as a 'good' relationship with the DTI. Discussions with the department have apparently included the idea of expansion of the band and the possibility of lifting the current antenna restrictions and setting up repeaters.

Further details can be obtained from the newsletter editor and club chairman, Vic Anthony UK.01, PO Box 424 Althorne, Chelmsford, Essex.

Safety net

In the current newsletter from the Echford Amateur Radio Society we read that a talk has been scheduled for 8 September entitled 'HF Propagation', by Roy Flavel G3LTP.

The club runs radio nets on Sundays at 1000hrs local time on 1.980MHz \pm QRM (AM/SSB) and at 2100hrs on 2 metres (S20 and QSY, FM). Everybody is welcome to participate.

Regular meetings are held on the second Monday and last Thursday of the month at 7.30pm for an 8.00pm start. The venue is The Hall, St Martins Court, Kingston Crescent, Ashford, Middlesex. Enquiries should go to Peter Coleson G4VAZ on (0932) 783823.

Morsum Magnificat

A new Morse journal, *Morsum Magnificat*, will shortly be available.

A Dutch version has been published since 1983 by PA0BFN and PA3ALM, and contributions have been received from both amateur enthusiasts and professional Morse telegraphers from around the world.

Now Tony Smith G4FAI has joined the editorial team as English language editor, in order to produce an English version of the journal.

It's aim is to publish material about Morse which is not normally found in popular magazines, including history, anecdotes, technique and illustrations.

UK subscription for one year will cost £6.00 (four issues) including postage. Apply to G4FAI, Tash Place, London N11 1PA, and cheques should be made

payable to *Morsum Magnificat*. Phone 01-368 4588 for further details.

Good education

The calendar of the Basingstoke Amateur Radio Club includes the following events for September: a lecture entitled 'Surface mounted devices' by Rex Waygood G4OXX on the 1st and a demo station on the 13th at the Bishops Channoler School fête.

Meetings are held on the first Monday of each month at the Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke, at 7.30pm.

A 2m DF 'Foxhunt' is scheduled for the last Sunday of each month, starting at 2.30pm from the club premises, although this is subject to weather and support.

Dave Burleigh G4WIZ can provide details of these events and the club generally. Telephone (07356) 5185.

Climb any mountain

The Fareham and District ARC is aiming high on 10 September with a lecture on mountaineering, delivered by Peter G1MCP. Andrew G4XZL also has something to say, this time about home-brewing, on the 24th.

The club meets every Wednesday at 7.30pm, preceded at 7.00pm by a Morse class. All enquiries should go to A S Chester G3CCB, 'Deva Wood', 44 The Ridgeway, Down End, Fareham, Hants PO16 8RE.

Day at the sea

The Norfolk Amateur Radio Club has organised a visit to the Yarmouth Coastguard Station on 10 September, followed on the 24th by a surplus equipment auction.

Meetings are held every Wednesday at 8.00pm at the Valley Drive Community Centre, 97 Plumstead Road, Norwich. Further details are available from Andy Morris G4WTR on Norwich 610874.

Top Band

The Borders ARS is devoting its meeting of 19 September to a talk on Top Band working, by GM3KMR and G3YOG.

General meetings are held on the first and third Fridays of each month at the Tweed. View Hotel in Berwick-on-Tweed. Mrs M Bottomly

GM11RN will be pleased to help with any enquiries. Her address is 4 Home Farm Cottages, Ladykirk, Near Berwick-on-Tweed, Northumberland.

Edgware events

The September schedule of the Edgware and District Radio Society begins on 6/7 September, with the society's participation in the SSB Field Day at Cophall Stadium.

On the 11th, the subject of G3GC's lecture is relays, followed on the 25th of the month by an informal evening with an explanation of 'Floating QTH Construction', by Tom Morgan G0CAJ.

Regular society meetings are held on the second and fourth Thursdays of the month at 8.00pm. The venue is the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex.

Further information is available from John Cobley G4RMD, 4 Briars Close, Hatfield, Middlesex. Tel: Hatfield 64342.

Top cat

ACCumulator, - the Amateur Computer Club's newsletter, has a new editor, Bazyle Butcher.

The club caters for the more technically minded and this is reflected in the newsletter, which carries articles on the construction and use of computers and add-ons. In the latest issue, Leon Heller explains how to build a simple microprocessor controlled PLL frequency synthesizer, and there is also information on the RS232 interface and radio data systems.

To join the ACC, send £6.00 to Andy Leeder, Church Farm, Stratton St Michael, Norwich NR15 2QB.

Olympic city?

In *Probe*, the journal of the Midland Amateur Radio Society (MARS), it is reported that a special event station, GB6OC, is being organised in support of the City of Birmingham's campaign to host the 1992 Olympic Games.

The city is a finalist in the selection procedures to choose an appropriate venue for the games. MARS hopes to publicise the idea that Birmingham is a worthwhile choice.

There are several sporting events arranged in Birmingham

this year, and MARS plans to operate the station at each of them. The first event was the Royal International Horse Show at the NEC, when 151 stations were contacted in 38 countries. Other events have included the Birmingham Superprix on 24 and 25 August and the Brum Olympic Fun Run is planned for 27 and 28 September.

For further information contact Stuart G4NSG.

Staying regular

The Chiltern Amateur Radio Club holds regular meetings on the second and fourth Wednesdays of each month. The first meeting of the month is generally a natter night, while a lecture is arranged for the next meeting. All meetings commence at 8.00pm.

Further details are available from Ron Ray G3NCL on (0494) 712020.

RAE courses

Those of you who have not yet enrolled for a course in preparation for the May RAE exam next year may be interested in the following course information:

Avondale Evening Centre, Edgeley, Stockport on Tuesday evenings. Tel: (061 427) 4730.

Kingston CFE, Kingston-upon-Thames, Surrey on Monday evenings. Also Morse on Tuesdays. Enrolment on 8/9 September. Tel: 01-546 2151.

Reddish Vale Evening Centre, Stockport SK5 7HD on Monday evenings. Morse on Thursdays. Enrolment 15/16/18 September. Tel: (061 477) 3544 ext 237.

Derby CFE, Wilmorton, Derby DE2 8UG, also advanced RAE. Enrolment 8/9 September. Tel: (0332) 73012.

Gosforth Adult Education Centre, Regent Centre, Northumberland on Tuesday evenings. Tel: (0661) 32020.

Hendon CFE, The Burroughs, Hendon NW4 4DE. Enrolment 10 September. Tel: 01-202 3811.

Brunel Technical College, Ashley Down Road, Bristol BS7 9BU on Monday evenings. Morse on Tuesdays. Enrolment 9/10 September. Tel: (0272) 41241 ext 64.

Adult Education Centre, Hilderstone House, St Peters, Broadstairs, Kent on Friday evenings. Contact Hilderstone House for details.



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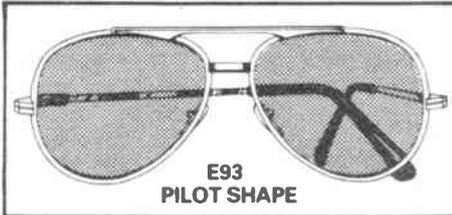
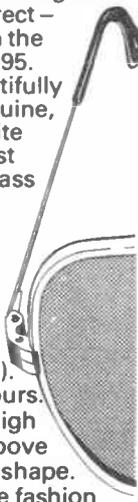
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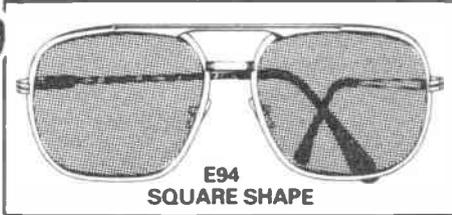
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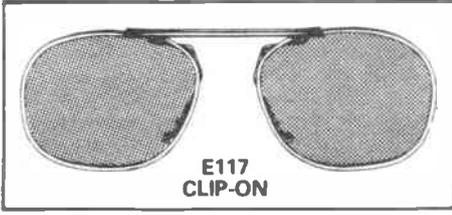
E93 PILOT SHAPE



E94 SQUARE SHAPE



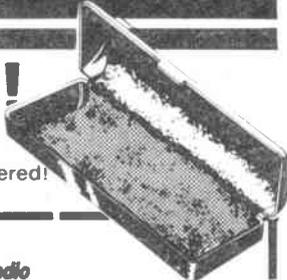
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0986

DX DIARY

News for HF operators compiled by Don Field G3XTT

We might be in the doldrums of the sunspot cycle, but even so ten metres produced some reasonable openings to North and Central America during July, as well as lots of DX from the south. Twenty metres was also excellent, with some very good openings to the Pacific.

Stations worked in the UK included FO0FB, NH6FU/KH9, FK8FB, KX6AX, ZK1XV, 5W1DZ, KH6JEB/KH7, ZK1XP and FO0ASJ, as well as lots of KH6s. ZK1XP was G4AAL of Operation Raleigh, and he and the other operators were to be heard frequently from the ship itself. As an example, I worked GB0SWR/MA (maritime at anchor) in Pago Pago harbour on 24 July at 0715GMT on 14025kHz.

All of this suggests that there is no excuse to stay away from the rig, even at this stage of the sunspot cycle. I have to admit that to work much of this DX on twenty a beam is almost essential. However, this can be something simple like a wire beam fixed towards the north. A tower, rotator and large array is by no means the only way of putting out a big signal.

Almost by coincidence, this leads me on to a plug for the RSGB's HF Convention, to be held at the Belfry Hotel, Milton Common, near Oxford, on 28 September. Yours truly is not only the convention publicity officer, but I will also be giving the first lecture of the day, on the topic of HF antennas for small gardens. This starts at 10.30, and I will be very pleased to see readers of *DX Diary* in the audience.

Minami Torishima

Returning to the subject of Pacific DX, 7J1ACH is now active from Minami Torishima, a remote Japanese island which, because of its remoteness, counts separately for DXCC purposes. 7J1ACH is actually Rick NJ7D, who is on a one year tour of duty at the coast guard station on the island and promises lots of activity, especially on CW. QSLs go to NG7X.

Other Islands

Once again there is plenty of activity due from offshore islands. I4ALU will be operational portable as IF9 from Favignani Island until 30 August, SV1JG/SV5 from Rhodes until 5 September, GD3AHD/P by the Liverpool club from 3-12 September, DF5UG/SV from Euboea Island from 16-31 September, GB2FI from Flatholm Island in the Bristol Channel from 22-26 September and, possibly, an operation from Jerba Island off the coast of Tunisia by DL1FZ from 22 September for 3 weeks.

Incidentally, it is interesting to note that a high proportion of stations high on the Islands on the Air Honour Roll also have very high DXCC scores. Does this mean that IOTA is a refuge for those who have done it all in the DXCC sense, or is it that active DXers chase anything and everything, whether it be 'countries' or 'islands'?

Prefixes

If you do chase anything and everything, then that probably includes prefixes, especially as these are the

subject of *Amateur Radio* magazine's own awards programme, run by Trevor Morgan. Interesting ones to show in recent weeks include SJ9WL, LG5LG, HJ7MBY, EN3D, EJ4ALE, ED5IE, YW5D, YQ0A, SO9UD, J4ODX, 4J4F, AZ8DQ, CS3DIZ, R9AL, XE86OX, LZ92S, YM3KA, EK1NBR, PA6VHS, RN1N, SX1MBA, YU9ARG and ZS25TJ.

Stations in New Caledonia will use the special FK25 prefix until 31 December to mark the 25th anniversary of their Amateur Radio Association. During September and October amateurs in Botswana will use special prefixes to celebrate 20 years of Botswana's independence. Novice stations will use the 800 prefix, and other stations 802. Note that there is no QSL bureau in Botswana, so all cards should be sent direct (or to the QSL manager where appropriate).

All these special prefixes do, of course, conform to the ITU allocations, so it should always be possible to discover where a station is located. Many publications carry the full list of allocations, for instance the RSGB's *Amateur Radio Operating Manual* and the excellent *Prefix and Country/Zone List*, published by Geoff Watts (62 Belmore Rd, Norwich NR7 0PU) for £1.

Other DX

What else is due during September? HC5KA expects to be active as HC8TTY from the Galapagos Islands from 1-7 September, with special emphasis on RTTY activity. A group of Dutch amateurs will

operate from Luxembourg from 5-10 September. The Zone 2 DX Group will operate VO2DX from Labrador from 12-18 September, running two stations on all bands, mainly CW. Looking slightly further ahead, Drew GM3YOR hopes to be signing /4S7 from Sri Lanka from 14-28 October. Why not drop him a line beforehand if you are in need of this one?

LF DX season

Of course, September is also the start of the LF DX season, with good opportunities to work such exotica as KH6 on 80, ZL on 80 and 160 etc, around the September solstice. Last year I worked ZL3GQ on Top Band at 1854GMT on 7 September and VK6HD at 2229GMT on 15 September, also on Top Band.

Rare award

After nearly 8 years of its existence, there is still only one UK station with the 5-band WAZ award (though a couple of others are now almost there). In general it is the LF bands which prove the hardest nuts to crack for this award. Why not have a go this season and get some rare zones under your belt? Then, in a few years time when the sunspots return, you will find it easy to catch the required zones on the higher bands and you will be well on the way to joining the elite band of holders of this award.

Incidentally, no UK station has yet worked all zones on Top Band, though I know of one G station who needs just one zone to complete this feat.

Vietnam

On his return from Vietnam, KM1R reported that neither he nor OK1AWZ had been able to obtain licences, so the station reported using KM1R's callsign was obviously a pirate. It looks as though it could be a long time before there is any legitimate operation from Vietnam.

China

Another new station, BY5QH, should have commenced operation on 20 August, and BY5HZ will be active from October. Foreign amateurs visiting China may now apply to operate from one of the established club stations. At least one of the UK amateurs who worked BY1QH on 40 CW at the beginning of June has received a QSL, so this turned out to be genuine. Tom Wong VE7BC, who played a major part in getting Chinese stations back on the air after a long absence, has now been honoured by the Chinese Radio Sports Association, and is the only person to hold a personal callsign, BX1BC.

Contests

The LZ DX Contest takes place on 7 September (CW, 24 hours). The IARU SSB Field Day also takes place that weekend, with lots of portable stations active from many countries. The European SSB DX Contest (48 hours) takes place on 13/14 September. This is run by the German society, and is always a good opportunity to work DX. The Scandanavian contests also take place in September, the CW event on

20/21st, and the SSB event on 27/28th. Both of these run from 1500GMT on the Saturday to 1800GMT on the Sunday. I always find them a pleasure to operate in because most Scandanavian amateurs are such excellent operators.

An Irritation?

You may regard these various 'local' contests as being nothing more than an irritation when you want to go on the bands at the weekend and ragchew with friends. On the other hand, they are a splendid opportunity to chase new ones for specific awards. Taking the Scandanavian contests as an example, Finland has a series of awards for working OH stations and OH call areas on the various HF bands. Denmark has an award for working its various call areas. Norway's WALA award requires confirmed contacts with 20 different LA stations on any bands, with at least six located north of the Arctic Circle. Finally, Sweden has awards for working call areas and laens (provinces). Thus, by taking part in these contests alone, you could be well on your way to several new awards.

Awards manual

By the way, I took the above awards information from the RSGB awards manual. Unfortunately this is now out of print, but I believe a new edition is in preparation. In the mean time, if you require details of any common awards I will do my best to help, or you can always drop a line to the appropriate national society.

Eleven years ago

Having reflected at the beginning of this column on recent band conditions, I thought it would be interesting to look back at what was about eleven years ago (in other words, one sunspot cycle). During September 1975 10 metre DX included quite a range of African and South American stations, including VP8, 9Q5, 9G, C9, EL, 7Q and 5T5. On 15 metres there were some interesting calls, like VQ9BP, VQ9SS/C and FL8PE.

On 20 metres there were reports of KM6EA, KS6DV, VR4DX, WA6LRG/KB6 and VS9MB, all prefixes which have long since changed (Midway Is, US Samoa, the Baker, Howland and Phoenix Is and the Maldives, for those of you who are too new to the bands to remember those days). There was plenty of LF DX around, too, in 1975. W, VE, KV4 and ZL on Top Band, VU, YB, VS6 and others on 80, and A2, EP2, YN, VK and ZL on 40.

No surprises

Apart from the unusual prefixes, there were fewer surprises here than I expected to find. Apart from Iran, all these countries still turn up on the bands, albeit with new prefixes in several cases, and propagation then was much as we are finding it at the moment.

A year later, Asian and the occasional Pacific stations were starting to creep into the 15 metre band reports, but it wasn't until the autumn of 1977 that we began to see reports of Asian and Pacific DX on 10 metres.

Ten metres FM

While reflecting on days gone by, two sunspot cycles ago I recall listening to AM stations on 10 metres, crystal controlled, tuning from 28.5MHz up the band and similar practices. Of course it wasn't long before the Japanese transceivers started to flood into the USA and Europe and SSB became all pervasive.

More recently, we have seen an upsurge of interest in 10 metre channelised FM, with some interest in FM repeaters on the band. These changes exactly parallel what has taken place on 2 metres, though for slightly different reasons. The interest in 10 metre FM has come about mainly due to the availability of CB transceivers, which can easily be modified.

This summer, stations equipped for this mode have been able to work some interesting DX. At the moment I do not have the capability to work 10 FM, but would be interested in reports from readers who do.

Indeed, I am always interested in hearing from readers who have a specialised interest on HF, whether it be RTTY, SSTV, the WARC bands, or whatever. At the same time, if you are equipped for 2 metre FM, remember that in many parts of the country HF operators use this band to pass information about HF DX. The most popular channel is 144.525MHz, though other channels are used from time to time.

That's it for another month. I hope to see some of you at the HF convention. 73.

Walter DJ6QT, who operated earlier in the year as D68WS



Wenty 6Y5IC, one of Jamaica's best-known amateurs



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ANGUS MCKENZIE

TESTS

There have previously been only two dedicated multimode rigs for 2m from the Trio stable, the TR9000 and the 9130. The latter was reviewed in *Amateur Radio* three years ago, and whilst I quite liked the rig it was rather insensitive on SSB. Many who have tried that mode on the band with the 9130 might justifiably have been a little disappointed.

Alternatives included the Yaesu FT480, which was quite good but is now rather an old rig, and others which were not altogether satisfactory. A few larger rigs, such as the Icom 271, have been reviewed in these columns, but I have not been happy with them for one reason or another and they have also been extremely expensive. I therefore particularly welcome this new Trio product, which obviously fills a large gap in the market.

The TR751E can give 25W output on SSB, FM and CW, and can be tuned either by rotating the click step tuning knob or from the up/down buttons on the microphone. It has many additional facilities, which help to recommend it very strongly. It is clear that Trio have managed to set a reasonable price by planning a large production line of what I suspect will be one of the most popular mobile rigs.

Before looking at the rig's facilities, however, I feel it appropriate to point out some of the pros and cons of SSB mobile operation on the band. Many have tried the mode, and have discarded it after only a week or so of operation, saying that they found difficulty in getting contacts. Time and time again I have asked the disappointed user what antenna is being used and almost every time it has been a vertical whip, which is only suitable for FM.

If you are to try SSB seriously, it is absolutely essential to use a horizontally polarized antenna, the most popular type being a halo of one form or another, although some have used phased crossed dipoles very successfully. The difference between vertical and horizontal polarization for transmitting to, and receiving, horizontally polarized stations can be as much as three or four real S points. However, just occasionally a whip can work if you are in very hilly terrain and your RF gets out from hill reflections, which can randomise the polarization.

When my wife and I have gone on holiday we have often installed both a halo and a 5/8 whip on the car, and I have used a coaxial switch to select the appropriate antenna. Stations which have been totally inaudible on the whip have been up to 5/6 on the halo, so it is obvious that you are wasting your time trying SSB without horizontal polarization.

On many occasions, I have fed the



TRIO TR751E

the best 2m multimode mobile

output from the mobile rig into a solid-state amplifier with built-in Rx pre-amp, and have always been astonished at the DX that I have been able to pull in.

It is by no means unusual to have contacts up to 150 miles for quite long periods, and very much further under good conditions.

You are not likely to achieve these distances on FM, and it is well known that vertical polarization does not seem to propagate over hill tops anywhere near as well as horizontal polarization. It is for this reason that the latter was chosen so many years ago for many VHF and UHF commercial broadcasting systems, and it is the convenience of vertical polarization that is the reason for its choice in PMR systems.

The Trio's facilities

The rig covers the 2m band from 144 to 146MHz, tuning at various step rates depending on the chosen mode. On SSB and CW it offers a choice of 50Hz or 5kHz steps, and it is a pity that one could not have a switchable 500Hz step mode. When scanning SSB, it actually shifts in 1kHz or 5kHz steps. On FM, the steps change to 5 or 12.5kHz, although I cannot see that many would want the 5kHz position.

You can switch from upper to lower sideband at will, and there is also a useful auto-mode position which automatically selects the mode dependent upon the dialled frequency of the VFO (there are two switchable VFOs included, allowing you to set one at the SSB end with the other for FM).

Below 144.15MHz the rig switches to

CW, but USB is chosen between 144.15 and 144.5MHz. From the latter frequency up to just above the top of the repeater band FM is retained, but at the very top end the rig switches back to SSB. Like the Trio TS711, the mode change buttons cause an appropriate letter to be sounded in CW when pressed, so you can hear if you are in the right mode immediately.

An optional speech frequency readout (type VS1) is available and can be configured to operate at any of three speeds, the fastest being very fast indeed. This readout is excellent and far superior to the Yaesu one.

The rig has ten memories and allows for memory to VFO. Memory 1 also doubles as the priority channel, and priority scanning can be enabled by pressing the priority button. Memories 7 and 8 are used to define the programmed frequency range scan mode, whilst memories 9 and 0 can be used to store different Tx and Rx frequencies if required.

One button has a cyclic function, the three modes being simplex and 600kHz minus or plus repeater shifts. There is also a reverse repeater button which changes round the Tx and Rx frequencies. The memories can store frequency, mode, toneburst on/off and repeater \pm or simplex.

Programmable and memory scanning are provided for either up or down, and you can operate this from the mic. The memory to VFO function is enabled by altering the tuning knob clockwise or anti-clockwise, having selected the required memory. I think this is a very

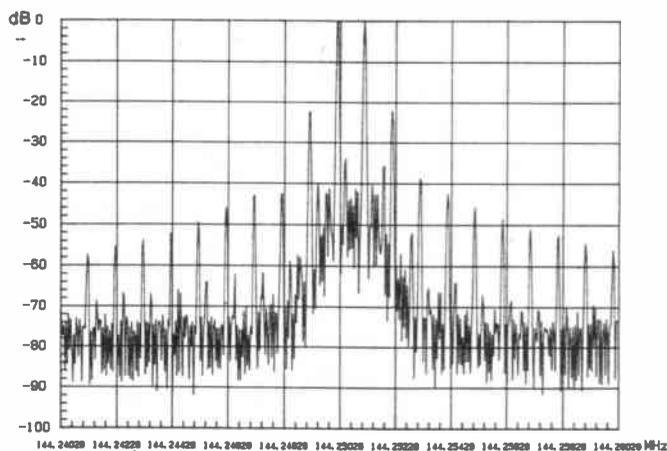


Fig 1
Two-tone test 30W PEP well into ALC. Resolution bandwidth 30Hz

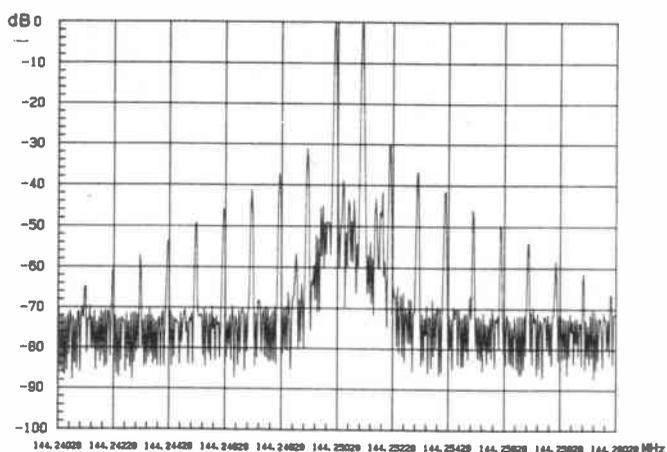


Fig 2
Two-tone test 25W PEP. Resolution bandwidth 30Hz

good point, as it means you can store a calling frequency and immediately QSY from it.

There are many second functions of the buttons and Trio's DCL system is incorporated, although you will need to buy the optional display unit if you wish to use it fully. The frequency display is very easy to read and has a resolution of 100Hz on the normal display, but an asterisk comes up if you tune 50Hz up from a 100Hz channel.

Also included are all the basic status indications. The audio gain control is mounted concentrically with the squelch control, and you turn the rig on by pushing in the control with a click. By the side of this is another concentric pair, RF gain and receiver incremental tuning. RIT is enabled by depressing a button nearby, and this helps you get the pitch of a voice accurately when on SSB. Other buttons provide switching of low or high power (SSB and FM) and noise blanker on/off.

There is a standard Trio 8-pin mic socket on the front panel. The speaker is mounted underneath the rig and a mobile mount is supplied.

On the rear panel is a 50 ohm SO239 socket for the antenna, and 3.5mm jacks for external loudspeaker and Morse key connections. A 4-pin auxiliary socket includes earth, external ALC input, and two pins which short together on Tx. The dc power lead is around 200mm long and is fused in the positive line. It is terminated in a special dc socket, and a long dc extension lead is provided with the appropriate plug on one end. There is

a large heatsink right across the back and I did not notice any heating up problems.

Subjective trials

I had been looking forward to this replacement for the old Trio TR9130, and was delighted to receive the review sample in early May. I connected it up at first to my standard lab 13.8V supply, with my tonna 17 element beam, to have a good listen around the band. I felt it important to give it a long trial before I took any measurements, and it was fascinating to see that first impressions did indeed tie in with the later lab tests. I was immediately struck by the improved sensitivity, for I was able to hear DX stations on a flat band almost as well as with my normal set-up, taking into account that I was not using my masthead pre-amp.

The receiver sounded alive, and seemed to be giving a performance very similar to that of the Icom IC271 with muTek front-end. I found this rather stunning, and it is quite clear that Trio have achieved a far better noise figure in the front-end than ever before on a 2m rig. The performance quite definitely outclassed the TS711 and the TR9130, the latter being a good rig, but one which I have always found just slightly deaf. I do not feel that you will need an external pre-amp with the TR751E, and this really is saying something for a Japanese black box.

The reciprocal mixing performance was quite acceptable and the selectivity good, in the context of a mobile. I did not

note any RF intermodulation problems, and so the front-end intercept point was obviously adequate. The audio quality was above average, although it was just very slightly muffled on the internal speaker, an external Trio one sounding quite a lot better as it was directly facing me. The noise blanker worked well, and the AGC characteristics were very well optimised, and certainly not too fast, as is the case with some of the competition.

More IF gain

There is perhaps a little more IF gain than usual on SSB, and this will be a great help when you are mobile as it will pull up weaker signals in the reproduced audio level. For home station use, when you tend to have a quieter background in the shack, you might find the extra IF gain slightly tiresome. However, there is an RF gain control to back this gain off as much as you need, and this will stop a hiss pumping effect, which I sometimes find a little annoying when there is a lot of gain in the overall receive system.

The squelch control operates on all modes and its action is fairly soft, which I rather like, especially on SSB. With many of the older Trio rigs, the high/low power switch does not operate on SSB, although if you dug inside the TR9130 you could modify it to give you low power SSB and CW. Most sensibly, Trio have designed this rig to give reduced power on SSB. This is a very good feature indeed, as there is no point in running full power if you can still get a 5/9 report with low power, unless you are DX hunting!

Another feature with which I am most impressed is the auxiliary socket, which now includes a short between two of the pins when you go to Tx, a third pin accepting external ALC. Although several Japanese linears on various bands require 12V on Tx only to pull them over, almost all British made linears have a PTT line which requires an earth on Tx, such as those made by BNOS and Microwave Modules. So many amateurs unfortunately do not bother to connect the PTT line of their linears when on SSB, usually because of the absence of a simple shorting pin on the main rig, and the result is the very annoying and continual clattering of relays, combined with the chopping of the first word in every phrase.

Instant VFO to memory

I very much liked the way in which you could go instantly to the VFO mode from a chosen memory by just turning the tuning dial. This will be a great advantage, especially for blind operators. I had a good play around with the optional speech frequency readout, which can be set up to read frequency very quickly. It is easy to install and is so much clearer than usual. You can adjust its injection level into the audio with an internal preset on its PCB.

On FM, the rig was able to separate 12.5kHz channelled stations quite adequately and the audio quality was again

very good, although very slightly muffled. The memory to VFO function is so good that I did not feel the necessity to have more than 10 memories. However, I always like to suggest gilding the lily, and I feel that Trio should have given channelling options between VFO A and B. Perhaps A should retain 5/12.5kHz channelling, whilst B could have been programmed for 12.5/25kHz.

Considering SSB, I would have preferred A to be 50/500Hz, and B 50/5kHz. In practice, I have often missed a DX station with steps greater than 1kHz, although I appreciate that this has to be a compromise with QSY speed. Returning to the 12.5kHz channelling situation, this rig does offer you the possibility of reducing deviation from 5kHz downwards. You can set an internal preset to, say, 2.5kHz, which you should set as a maximum if you frequently use 12.5kHz channels, in order to avoid disturbing stations on 25kHz channels.

The Trio DCL system is barely established, but it may very well become popular in the next year or two. It will be interesting to see if Icom or Yaesu go along with it or bring out their own totally incompatible system! Perhaps I can remind readers that the introduction of many different systems not only always makes for confusion, but puts users off using any of them, as alas was the story of quadraphonic LPs; the public were totally confused by SQ, QS, CD4 and even matrix HJ!

Trio have clearly thought out the ergonomics very carefully and I found it one of the easiest mobile rigs to use, especially considering its comprehensive facilities.

Laboratory tests

When I first measured the SSB RF sensitivity I could hardly believe the result, and I had to go to extreme lengths to measure fractions of a decibel loss in the interconnecting leads to obtain the figure quoted, this being as accurate as possible. Bearing in mind that the actual SSB reproduced bandwidth is in fact rather less than the bandwidth of the IF filter, the noise figure would seem to be somewhere between 2.5 and 3dB, which is truly remarkable.

The FM sensitivity was excellent and as sensitive as one would normally need. Bearing this in mind, I was quite surprised to see that the RF intermodulation performance was also good and well up to that of the better modern rigs, although falling short of the spectacular performance of the muTek transverter.

You are not likely to come up against any problems under mobile conditions, unless you are close to a very strong station. What is of particular interest is that there was no degradation of the figure when we measured 20/40kHz spacing as compared with 100/200kHz, showing that the first IF roofing filter was certainly narrower than usual.

The reciprocal mixing ratios are many decibels better close in than those of the TS440S and 940S (without Lowe mod-

Fig 3

*Two-tone test
10W PEP. Resolution
bandwidth 30Hz*

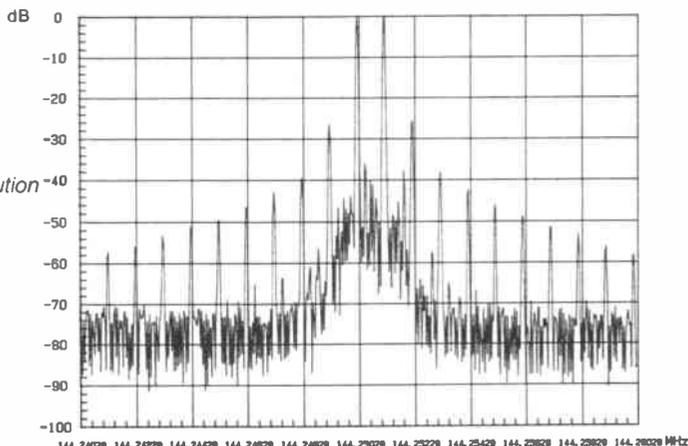
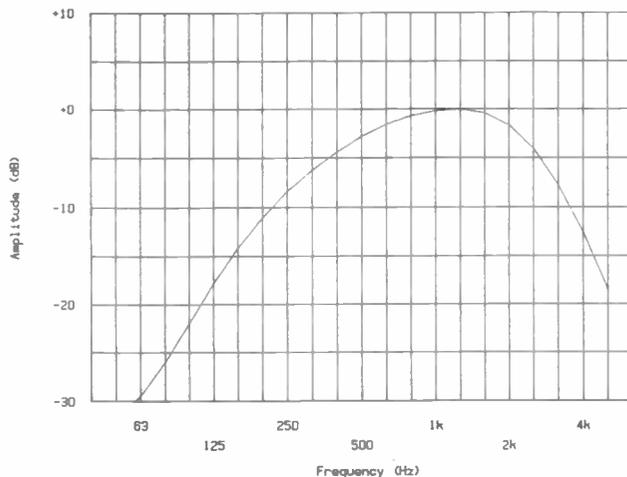


Fig 4

*FM received
audio response
(750µS pre-
emphasis)*



ifications), and when you bear in mind that the synthesizer is working at a much higher frequency than in the HF rigs, this represents a very considerable improvement in design. The effect of this improvement is that you will get much less added noise underneath a weak station when there is a very strong one fairly close in frequency. Thus, I award very high marks to Trio's front-end design.

The SSB selectivity is fairly steep down to -40dB, but opens out just a little at -60dB. I could not detect any filter leakage problem, such as I found on the IC271 series, and the FM selectivity was certainly good enough to cope with 12.5kHz channelling. We noted 17dB difference between S1 and S9 and this range is slightly on the small side, although levels above S9 were reasonably logarithmic.

Particularly interesting

What was particularly interesting was the point at which AGC really began to bite, the audio output level reaching to within 3dB of its maximum with an input signal of only -115dBm (0.4µV). This completely confirms my subjective impression that weaker signals were brought well up in level, which is so helpful for mobile applications. Therefore, quite a weak signal will start moving the S-meter, whilst S9 does represent a reasonably strong signal of around 4µV, well over 40dB above noise.

The product detector distortion

measurement was most satisfactory, showing quite a low distortion figure, but maximum audio output power was just average, although you could get slightly more volume into a 4 ohm external speaker.

On the FM mode, the capture ratio measured very well, showing excellent discrimination between a strong and a weaker FM signal on the same channel. FM distortion was just average, and quite satisfactory. The Rx response on FM fell fairly rapidly below 300Hz, which is just about right. 2.5kHz was a little down, and response again fell reasonably rapidly above 3kHz.

On Tx, the maximum output power on FM was just slightly above the specified 25W, whilst on SSB the rig gave just a little more. I carried out the usual two-tone tests on SSB, using audio frequencies of 700Hz and 1700Hz. The first plot shows the intermodulation products developing when the rig was being pushed very hard indeed a long way into ALC. The performance can be seen to be quite good, but the low order products improved quite a lot when power was reduced to 25W PEP output. 10W PEP had even less distortion, but you can see in plots 2 and 3, 25W and 10W respectively, that the high order products do not improve that much and are at fairly respectable levels anyway. I consider that the plots show the performance to be satisfactory.

The usual AF/RF SSB Tx response plot shows that there is slight LF and HF roll-

Trio TR751E Laboratory Results

Receiver tests

RF sensitivity (12dB sinad)	SSB -127.5dBm	
	FM -124dBm	
RF input intercept points		
+20/40kHz	-10dBm	
+100/200kHz	-10dBm	
Reciprocal mixing ratios ref noise (SSB bandwidth)		
Offsets	5kHz	84dB
	10kHz	93dB
	20kHz	97dB
	50kHz	108dB
	100kHz	114dB
SSB selectivity		
-3dB	2.2kHz	
-6dB	2.5kHz	
-40dB	3.7kHz	
-60dB	5.2kHz	
FM selectivity		
12.5kHz channelling, modulated off-channel required		+10.5dB
25kHz channelling		+75dB
FM capture ratio	4dB	
FM limiting threshold	-129dBm	
S-meter SSB		
S1	-112dBm	
S5	-105dBm	
S9	-95dBm	
Further marks at -83, -67 and -46dBm		
Product detector distortion	1.3%	
FM discriminator distortion		
3kHz deviation/1kHz mod	3%	
1kHz deviation	1.2%	
5kHz deviation	3.5%	
Audio output power at 10% THD		
8 ohms	2.3W	
4 ohms	3.3W	
Max SSB frequency error	240Hz	
SSB AGC threshold	approx -115dBm	
Rx current	460mA	

Transmitter tests

Maximum power output SSB	30W PEP, normally 25W PEP
Maximum power output FM	26W
Low power output (SSB/FM)	typically 4.6W
FM max deviation	6kHz
Typical speech	5kHz
Toneburst	4kHz
Toneburst frequency	within 1Hz
Synthesizer breakthrough on FM	approx 23Hz
Total deviation	typically -46dB
FM Tx audio distortion at 4kHz deviation	3.4%
2.3kHz deviation	1% THD
SSB Tx frequency error after long warm-up	-400Hz
Carrier breakthrough	-46dBc
Alt SSB breakthrough	1kHz mod typically -70dBc
RF harmonics	<-62dBc (no spuri above -75dBc)
Max Tx current drain	4.5A
Low power	2.4A

Dimensions 180 x 60 x 195mm
Weight 2.2kg

off in the microphone amplifier and modulation stages, before the IF filter gets to grips with the signal. The response is reasonably good for mobile. There is very slight carrier breakthrough and very low frequencies also come through at a low level on the alternate sideband, which is not really important. RF harmonics were well below -62dB, referred to the carrier level, and I hunted long and deep for spuri over a wide range either side of the band, but we could see no evidence of any down to -75dBc.

On FM, the transmitted response was well optimised and the deviation was set correctly for 25kHz channelling, the toneburst not only being right on frequency, but also at about the right deviation for standard repeaters. The signal-to-noise ratio on FM was quite adequate, and only a slight synthesizer whine was noticed in the background, at some 45dB below normal peak modulation level, distortion also measuring quite well.

On receive we noted a frequency error of just 240Hz, and on Tx FM, after an extremely long warm-up of many minutes, a maximum error of 400Hz was noted, which is within reasonable tolerances. The rig showed good efficiency on Tx, although the receiver took a fair amount of current, but certainly not greatly excessive.

Conclusions

There are very few rigs that I have reviewed which I don't have long moans about in one area or another, and it particularly pleases me that I have nothing to grumble about with this one. It has been so well designed and shows very clear ergonomics improvements, and is quite obviously going to be a big seller for Trio. It could do much to help SSB mobile become even more popular than it is, but do consider my comments about horizontal polarization for SSB.

The price is reasonable in today's market, and so this product gets one of my strongest recommendations yet. Curiously, its big brother, the TS711, is a lot more expensive, and I expect that many amateurs will consider this rig quite justifiably for use as a base station as well as mobile. If you are thinking of a linear for it, don't forget that there are BNOS models requiring 25W input for around 180W out, which would be very suitable, but don't waste money on the versions with built-in pre-amps; the TR751E is already sensitive enough, unless you are a real DX chaser and want to consider an esoteric masthead pre-amp.

The present retail price of the TR751E is £525, inc VAT, and the MU1 modem board for DCL/DCS is £26.76. The VS1 speech synthesizer costs £27.70.

I would like to thank Lowe Electronics for getting the review sample to me only two days after its arrival in the UK, and to Jeff Ginn for helping me to burn many candles late at night when we did all the measurements.

The IC751A is by no means just a restyled update of the original IC751, as many measurements show that its overall performance is a good deal better than the earlier version. I originally reviewed the IC751 in the January 1984 issue of this magazine, and also wrote an update covering some more information in the October 1984 edition. A brief resumé of the main functions is given for those who do not have access to the original review.

Facilities

The IC751A is an HF transceiver covering all amateur bands from 1.8 to 28MHz, with a general coverage Rx from 100kHz to 30MHz. Modes include USB, LSB, FM, AM and RTTY, and several optional filters are available in various combinations. The rig requires 13.8V dc powering, but an optional extra is a built-in mains PSU, type IC-PS35. The rig is surprisingly compact, measuring 322mm W x 120mm H x 385mm D including projections, and weighs 8.5kg.

Frequency can be accessed either from the VFO and band changing buttons or from the 32 memories, in which you can store frequency and mode. There are two VFOs, and you can select split operation between Tx and Rx or you can program A=B, etc. The large tuning knob gives 10Hz steps on SSB/CW when rotated slowly, but when this is speeded up it becomes 50Hz steps. I agree with Peter Hart, in his *RadCom* review, that 50Hz steps come on at too slow a tuning speed and the shaft encoder does seem to slip rather badly when speeded up. You can press in a large button on the front panel and change the stepping rate to 1kHz, which can be quite useful if you want a rapid QSY. You can select a required memory whilst in the VFO mode by depressing the DFS button (dial function select).

Front panel buttons include mode selection, filter selection, incremental tuning (selectable to Tx and Rx separately), VOX on/off, Tx compressor on/off, noise blanker wide/narrow, MOX Tx/Rx, amateur bands only or general coverage Rx, speech frequency readout enable (optional board required for this, type IC EX310), scanning mode and scan enable.

A small tune lock button will be found useful when you use the rig for mobile. Additional buttons select notch filter on/off, incremental tuning clear, VFO A/B, A=B, split VFO, memory/VFO, memory write and memory to VFO. Front panel rotaries provide adjustments for AF and RF receiver gain, treble tone control and squelch (all modes), Tx carrier drive level and mic gain, pass-band tuning and notch frequency, and RIT/TIT offset (up to ± 9.9 kHz).

Mini rotaries are used for the adjustment of VOX gain/internal electronic keyer speed (keyer board supplied for use with normal iambic paddles), noise blanker level with on/off, and VOX delay with an off position for break-in keying. Two rotary switches select AGC off/fast/slow and meter select



ICOM IC751A

HF transceiver

SWR/power output/ALC/comp level/PA current/PA volts. The front panel digital frequency readout indicates in 100Hz increments, and many status functions are also given. The tuning dial has a tension screw underneath the front panel, as is normally provided on most Icom rigs.

Top and bottom panels

On the top panel are a number of switches and controls. A three position switch is used to select preamplifier on or off, or to insert 20dB RF input attenuation. Another three position switch selects either a crystal marker (10kHz intervals) or monitor, this function allowing one to hear the transmitted audio quality, or CW sidetone. Three rotaries provide adjustment of the internal calibrator frequency, monitor level on Tx and anti-VOX level.

Underneath the rig is a multi-pin data socket for direct interconnection with an external frequency touchpad, type RC10, which is an optional extra. This allows

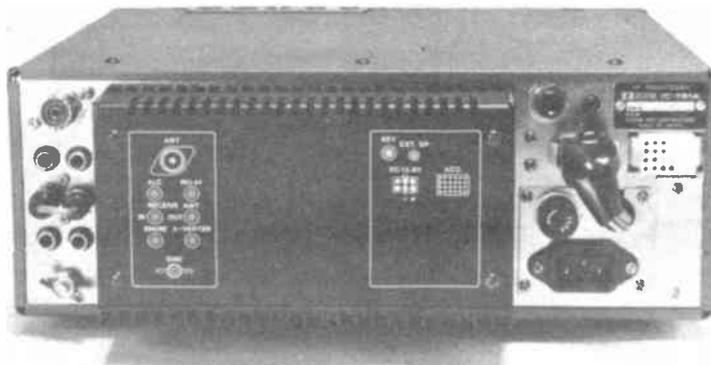
direct entry of either MHz or a complete frequency to 100Hz resolution. It can also enable the speech frequency readout, or select between VFO A and B, which I have found a most useful accessory.

The built-in speaker is mounted on the right side cheek, and there is a substantial carrying handle on the left side cheek.

Under the front is a pull out bail stand, allowing the front of the rig to tilt upwards, which is quite smart. Also on the front panel is an 8-pin Icom standard mic socket and a quarter inch headphone jack socket.

Rear panel

There are many sockets on the rear panel, providing excellent interfacing. The antenna socket is an SO239 and three phono sockets are provided for receive antenna in and out (short phono to phono jumper lead provided), as well as a transverter drive socket giving a level of around 100 μ W (-10 dBm) for feeding transverters with a 28MHz IF. On



Rx, this socket feeds straight through to the mixer, thus giving an improved dynamic range, the 20dB input attenuator functioning on this facility if required.

An Icom multipin accessory socket includes a pin requiring 8V dc to be switched through to it externally, for enabling the transverter socket and for disabling the PA stage. The 8V can be obtained from one of the other pins. The socket is a standard 24-pin type, although only 13 pins are used, connections also being provided for external ALC, linear enable (for IC2KL), amateur band switching data (for remotely controlling the band switching of the IC AT500 auto ATU and IC2KL solid-state linear).

Other pins are for audio/data in/out, for use with external tape recorders, Amtor units or RTTY terminals. An output is provided from the squelch control and also a switched output 13.8V dc supply.

Additional sockets

Additional phono sockets are included for alternative control systems, allowing the rig to be used with a wide range of external devices. The sockets include external ALC input, short on Tx relay and spare. A 3.5mm jack is used for an external speaker connection, and the external key jack is a stereo type, 3 pole, allowing the use of a paddle with the internal keyer, or a normal key.

A special 13.8V dc input socket is also on the back panel, and if you have the optional built-in mains PSU, which is a switched mode type, a flying lead from the latter plugs into the 13.8V socket. The mains PSU has an IEC socket and is fused. Built into the large heatsink on the back panel is an automatic fan, which speeds up when the temperature becomes excessive. There is also a ground terminal on the panel.

Comparison with the IC751

When I reviewed the original IC751, I had to explain that it was necessary to test three separate review samples because of various problems that were encountered. On the original sample, the optional mains PSU induced considerable hum in the frequency generation circuits, thus producing a very nasty ripple on any carrier and a burble on SSB and CW, on both Tx and Rx. Thanet soon put this problem right, and there is absolutely no trouble in the IC751A in this respect.

I experienced some RF feedback in the microphone circuits on the LF bands, especially when I was using the IC2KL linear. This was somewhat better on the second and third samples of the IC751 but it was never completely cleared, the internal circuitry seeming very sensitive to RF pick-up on many of the external connections. This even included the loudspeaker, CW keying and ALC lines. An additional earth connected to the earthing post on the back panel did not help very much, but this RF pick-up tendency seems to have been completely eliminated in the new model. There has obviously been some rearrangement of the internal PCB layouts and interconnections, and perhaps some additional decoupling.

I had one very odd problem with the first two IC751s, and to a lesser extent even the third sample, which I had actually purchased. Sometimes, when loading, even into a comparatively good match, very bad spurious were generated when the rig was used for Tx on the 21 and 28MHz bands. Sometimes these spurious went away, but at other times the power in the spurious was as high as one tenth of the power 'on channel'.

The IC AT500 thus used to go bananas occasionally and failed to match, as

these spurious were a MHz or two away from the tuned frequency and thus upset the apparent SWR. The original problem was rectified at a later stage, about a year after the 751's introduction, with a modification to the PA driver circuitry. I have not noted any problems in this area with the 751A.

I complained that there were a lot of loose boards on early 751 samples, as well as the odd dry joint. The IC751A seems to have no problems at all in this area, and has obviously been subject to greatly improved quality control.

Cosmetic changes

A few cosmetic changes have been made in the updated model. Some of the buttons are more clearly labelled and the monitor Tx button has been changed to a switch on the top panel. The electronic keyer is now built in, and the VOX gain front panel pot also serves to vary the keying speed. Improved break-in circuitry now allows break-in keying up to 40wpm. The tuning knob now has a rubbery periphery which allows one to grasp it more easily, although a few users might prefer the old type knob.

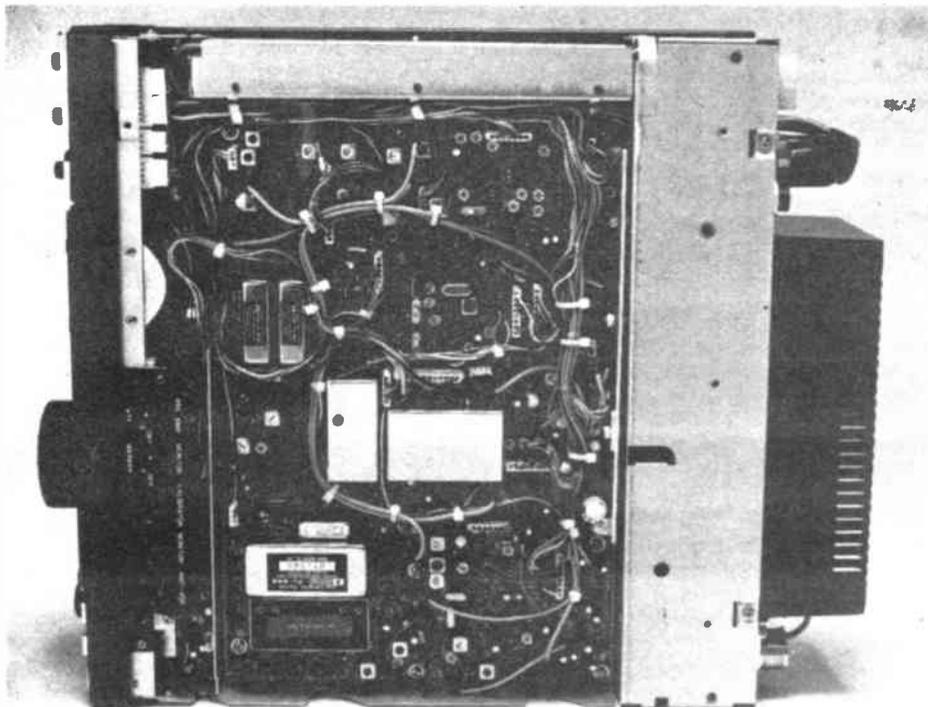
Internal circuitry

The AGC characteristics have been improved and the hissy background on Tx has been reduced by some 10 to 15dB, with a modification suggested to Icom by Thanet. This stops a slight hiss pumping effect in certain positions of the carrier control and mic gain. Provided with the rig is a 2.3kHz SSB filter at 455kHz and a 500Hz CW one at 9MHz. A new 2.6kHz SSB filter, type FL80, has also been fitted at 9MHz, which is always selected on SSB. This filter has much sharper skirts than the one in the original 751. The FM filter at 455kHz has around 15kHz bandwidth, whilst the normal AM filter at 455kHz has 8kHz bandwidth but not very steep skirts. You can switch in the SSB filter for AM.

A number of filters are available as options. If you prefer a 250Hz filter for CW there is an optional one available, type FL53A. This operates at 455kHz. At 9MHz you can replace the 500Hz CW filter either with another 250Hz one or with a 6kHz AM one. You cannot have a choice of three filters at 9MHz, so you have to make either CW or AM your priority. The normal 9MHz SSB filter actually has 2.6kHz bandwidth and it is the 455kHz one that reduces the bandwidth to 2.3kHz, but on pushing the filter button in on SSB the 455kHz bandwidth is increased to 2.6kHz.

Note that the FM filter cannot cope with 10kHz channelling, but Thanet can supply a narrower FM filter for special requirements. The filter switching is extremely complex and confusing and Icom should have a look at the ergonomics of the Trio 440S, which is far easier to understand.

There would seem to be a change in the first IF filtering and gain optimisation, for the first IF selectivity seems better and the blocking performance has been improved. The filter type is of a



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different designation, now FL64, and minor changes in the damping of the first and second mixers may well be contributing to the improvements noted in the close-in intermodulation performance, and possibly also the very greatly improved audio distortion noted on AM.

The main audio gain control now affects the reproduced level overall of CW sidetone, monitor Tx, and the speech synthesizer, if fitted. This will be rather more convenient for many operators. There is now a temperature sensor in the PLL unit which can turn on the fan for improved drift characteristics when the rig is used in a very warm ambient temperature. Although I have never known any problems in this area with the old model, perhaps some users in the tropics noted a problem originally.

Although both versions have excellent status indications on the digital readout panel, Icom have now included LEDs behind the frequency step, DFS and band change buttons on the right of the VFO knob, giving one an instant reminder that they are pushed in.

The notch filter has been redesigned and operates at the 9MHz IF with a series crystal. This should give better notch stability. Although I was never perturbed by the slight noise of the linear changeover relay, which feeds through to a phono socket on the rear panel, this has been changed to a Reed type, which is quieter and faster. The audio compressor circuit has been improved, although I was not unimpressed with it on the original model.

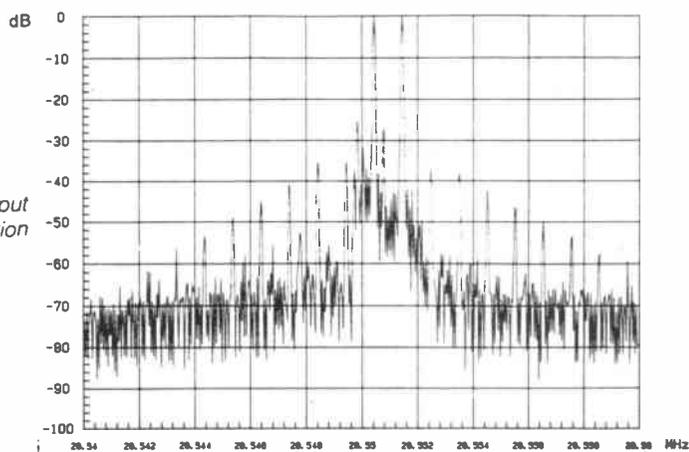
Judging by the audio sound quality of the receiver and many of the new test measurements, there are clearly some important parts of the Rx circuitry which have been redesigned, but which Icom have not made a fuss about in their advertising literature. The improvement in the audio distortion from SSB and AM in particular is very marked, but there are also interesting front-end improvements, for the synthesizer noise is now many dB better, and the intermodulation performance has also been improved.

Subjective performance

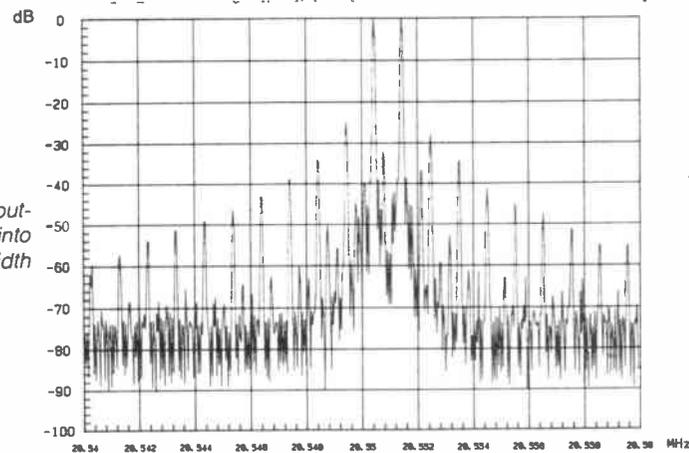
Although there are hardly any differences in the operation of the set when compared with the original model, I was immediately struck by the improved sound quality. Not only was AM a pleasure to listen to, but SSB was obviously cleaner. On the LF bands, it seemed possible to knife out some very weak signals without any trace of muck in the background, showing the main frequency synthesizer to be one of the cleanest on any amateur rig available today.

One could also knife out any very weak CW signals, and many CW enthusiasts are likely to be attracted to the fast QSK facility. The front-end seemed virtually bomb-proof on all bands, with the exception of medium wave. Here Capital Radio on 1.548MHz defeated it, the level from the antenna being well above 1mW at this frequency!

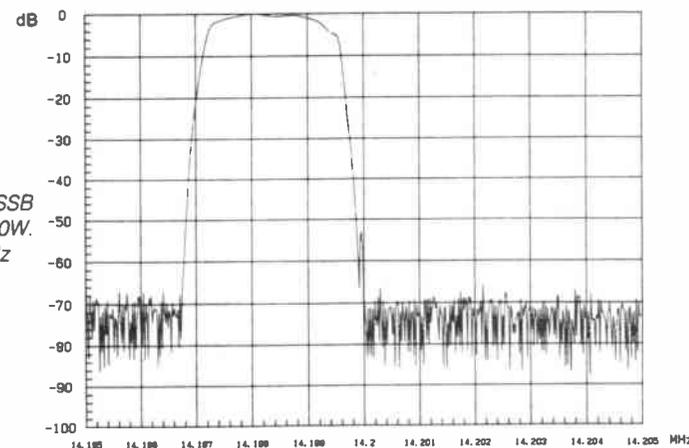
Two-tone test 50W PEP output mod 700/1700Hz. Resolution bandwidth 30Hz



Two-tone test 110W PEP output mod 700/1700Hz well into ALC. Resolution bandwidth 30Hz



AF/RF response, normal SSB filter, LSB max level 1.0W. Resolution bandwidth 30Hz



The improved SSB filtering is really excellent, and I must commend the magnificent skirt selectivity strongly. You can make the SSB bandwidth slightly wider by pushing in the filter button, allowing you to get even better quality from strong SSB signals that are not subject to interference from stations close in frequency. The T notch filter worked extremely well and I prefer it to the one in the older model.

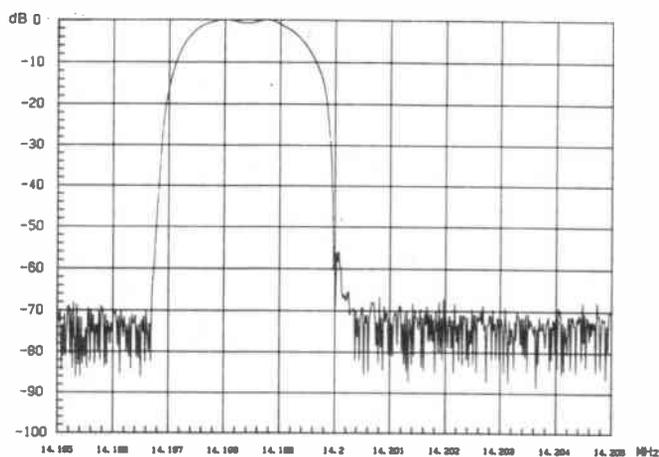
The noise blanker seemed slightly better, although it could not cope with the woodpecker. The RF sensitivity at 28MHz is excellent, allowing one to pick out some very weak ground wave signals when the band is closed. The rig is thus more sensitive than most of its competitors.

All the general facilities worked well, as they did on the older model, but space precludes detailing these. However,

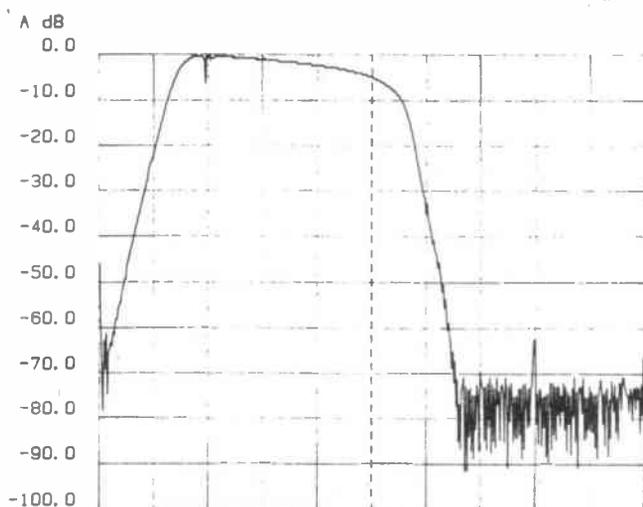
comparing the feel of tuning of both the old and new Icoms with that of the Trio TS940S, I have to admit that I greatly prefer the Trio, as there are far more steps per revolution of the tuning knob and the Trio feels more predictable. You can spin the Trio knob much more easily, as it has a better flywheel action. Also, Trio's tuning speed-up when the knob is rotated fast allows a much more rapid QSY. To do this on the Icom requires you to change the tuning step button, which is, frankly, rather a bore.

I also very much prefer the Trio's general frequency/band access, with direct access to any amateur band and with MHz up and down buttons. It really is rather a nuisance to have to push in the band button, turn the VFO to alter MHz or amateur bands and then press the band button again to resume normal VFO operation. This is not so much a severe

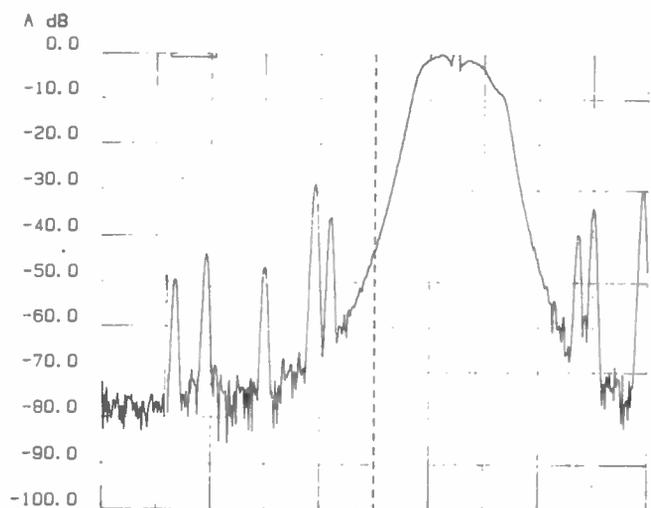
G3OSS TESTS



AF/RF response, wide SSB filter, LSB max level 10W. Resolution bandwidth 30Hz



Normal USB receive response



CW receive response. 250Hz passband

criticism of the Icom as specific praise for the Trio in this area.

Naturally, one will get better quality from a good external speaker than from the internal one and the mic supplied (Electret HM36) does produce the usual 'hand mic' quality, so I would advise a rather better microphone. The HM36 has up/down frequency stepping buttons on it as well as PTT. The Icom desk Electret should be a lot better, but you will have to avoid mics with a high output level from built-in amps which could overload the input stages of the 751A's mic amp.

The transmitter section gives an output which is much cleaner than that of the earlier model, and I did get some

quite good reports of the general quality. The transmissions sounded quite narrow on various bands other than 21MHz (see lab tests), although the mic quality was just slightly criticised when compared with my normal station equipment. The rig is suitable for use with Amtor and there were no criticisms of the keying, provided that the carrier control was carefully adjusted. I have to admit, though, that I am not a fast CW enthusiast, so you will need to check the fast keying for yourself.

Laboratory tests

I decided to concentrate on the areas where there seemed to be differences

between the earlier and later versions. The front-end RF sensitivity was optimised to be at its best on the 28MHz band, which is just where one needs it, the sensitivity on the lower bands being just slightly inferior but better than one would normally need. The RF intermodulation performance was stunningly good, and with the pre-amp switched out the RF input intercept point was the best I have ever measured on an HF rig.

Even with pre-amp in, and RF gain flat out, the intercept point was better than that of many rigs with a front-end attenuator switched in. We noted, in particular, that the intercept point did not deteriorate significantly until one was fairly close to the tuned frequency, and so this rig is far better than, say, the IC745. Carriers spaced at 5/10kHz off-channel produced much less blocking than usual and it would seem that the first IF gain, and both first and second mixers, are all far better optimised than on earlier Icom rigs, other than perhaps the IC735, a rig that I am also keen on.

Reciprocal mixing

I have no doubt that the synthesizer noise on this rig is the best that I have measured on any rig, closely approximating the performance of many of the better analogue VFO rigs of the past, even very close to the carrier. It is considerably superior to the TS940S in this area.

I would not think that you would ever have reciprocal mixing problems in practice, and the excellence of this parameter is one of the reasons why SSB and CW signals on the LF bands seem to reproduce so cleanly. I had the feeling that the performance was so good that I was almost testing the sideband noise of my special muTek crystal-controlled generator.

SSB and CW selectivity

Using the plotting method which I am describing in a separate article, we obtained some remarkable selectivity plots which show the superb SSB selectivity. The steepness of the LF and HF skirts can be seen from the plot, right down to -70dB, the actual bandpass characteristic being well shaped. The 250Hz CW filter also had a good shape at the top but the skirts are not anywhere near as steep, and it is a matter of personal taste as to whether you like very steep skirts on CW. I do not like such a sharp filter myself, as I cannot abide ringing, especially of pulse transients, such as ignition noise or QRN. The review sample did not have a proper AM filter installed and so in the normal selectivity position the passband was quite wide, around 8kHz bandwidth, with the bandwidth going down to that of the SSB filter when the filter button was pushed in.

The audio distortion on AM was infinitely superior to that produced by the old model, and also that of the R71, which was poor. Even at 90% modulation, AM was still comparatively clean, only

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around 2% which explains why it sounded so much better. Even with 300Hz modulation the distortion was still below 5%, which is very good. On FM, distortion was again better than average, whilst SSB and CW product detector distortion was extremely low, and amongst the best measured on any receiver.

A reasonable maximum audio power output was available into 8 ohm speakers, and nearly 50% more power was available into 4 ohms. An examination of the two-tone intermodulation plots of the Tx PA stage shows that the general RF output is much cleaner on the new model, as well as the absence of detectable sprogs which were present on the original version. Audio distortions are clearly at much lower levels and the PA performance can be seen to be quite good, even when driven hard into ALC on the 28MHz band.

At just below ALC, third order had reduced by 5dB to -30dBc, further reducing to -36dBc at 50W PEP output. Higher order products, however, seemed to be at the same comparative levels at all powers, and are perhaps slightly higher than they really ought to be. The best band seemed to be 14MHz, with low order products at surprisingly low levels, even with the rig driven into ALC, whilst high order products were still a little high.

Unfortunately, we did notice a problem on the 21MHz band . . . and when driving the rig into ALC the third order intermodulation performance can only be described as bad, the products being noted at around -15 and -16dBc. At this stage we added a sniffer to the output of the transmitter and actually had a look at the two-tone waveform on a Hewlett-Packard 250MHz scope. Mark Capstick described the picture as being grossly flat-topped, and clearly the PA stage was working much too hard.

We noted that the actual level of each of the carriers, measured on the spectrum analyser, was around 40W, whereas it should have been at around 28W for a reading of around 110W PEP. On reducing the PEP to 100W, the carriers had reduced very substantially and the scope looked a lot cleaner, the third order products then measuring at -20/-22dBc. It is odd that this problem only seems to be on 21MHz, the very band where there had been spurious problems on the earlier version.

The PA is coupled to the output low-pass filters by a broadband transformer, which matches the extremely low impedance of the PA to 50 ohms output. Following the filters is the SWR and ALC detector coupler. Not only is the ALC being starved of volts on 21MHz, (otherwise it would have backed down the drive), but it seems that some form of resonance in the broadband transformer and 21MHz low-pass filter is upsetting the PA loading. Icom will have to take a much closer look at this. When this rig is used on the 21MHz band, I recommend you to reduce the PEP by bringing down

the carrier level control to peak at 80W until Icom devise a modification.

The audio-in/RF-out frequency response plot on SSB shows that in the normal SSB filter position the skirts are extremely steep, as they were on Rx, the passband shape being excellent. This shows the effect of the two IF filters, as opposed to the wider response when the filter button is pushed in, giving a marginally wider passband and less steep skirts. You can compare the shapes of the two plots labelled AF/RF.

There was much less ripple noted on the 751A carrier outputs than on the 751, and both sideband and carrier rejections were at very low levels. The noise level on the output was again much lower, showing the improvement of the modification, which has decreased the IF gain after the filters.

We checked second and third harmonic outputs on all amateur bands, with the transmitter set to give full power CW carrier, and not only were all the harmonics at or below -60dBc but there was no sign of any of the spurs which had been noted on the old 751. On the 28MHz band, second harmonic was at -70dB and third was below -80dB, so this rig is really excellent in this area.

The rig gave up to 110W PEP output on all bands on FM, SSB and CW, and there did not seem to be any power drift with warm-up. Frequency stability was excellent, and you can set frequency accuracy

to within 10Hz or so by using the calibrator control. The drift characteristics were so good that the rig was holding within 10Hz for periods of half an hour or so, while we were doing our Rx selectivity investigations.

I most strongly recommend the RC10 external matrix pad option, which allows such rapid access to any frequency and overcomes some of the criticisms that I have made about difficulties in rapid frequency access. The speech enable button on it will make operation particularly easy for blind amateurs.

Conclusions

When I first reviewed the original IC751 I did give it a recommendation, but this was rather lukewarm. I am most impressed with the IC751A, however, which receives a much warmer recommendation, although it is an expensive rig. I cannot really pick any holes in its technical performance at all, other than the fact that you will have to back off the carrier level control when using the 21MHz band. It excels in so many important areas, the receiver front-end being superb. The actual tuning ergonomics are nowhere near as good as those of the Trio TS940S, probably the rig's closest competitor.

If DX performance on the LF bands is of prime importance I feel this new Icom is the winner, but if you take into account the general overall performance, includ-

Icom IC751A Laboratory Results

Receiver tests

RF sensitivity (12dB sinad) SSB

14.2MHz pre-amp on	- 120dBm (0.22µV)
28.55MHz pre-amp on	- 124dBm (0.14µV)
28.55MHz pre-amp off	- 115dBm (0.4µV)

Effective RF input intercept point

Pre-amp on 100/200kHz spacings	+18.5dBm
Pre-amp off 100/200kHz spacings	+27.5dBm
50/100kHz spacings	+27dBm
25/50kHz spacings	+19dBm
10/20kHz spacings	-5.5dBm
5/10kHz spacings	-17dBm

RF pre-amp gain approx 10dB

Reciprocal mixing performance, ratio between offset carrier and noise floor for 3dB degradation

5kHz	95dB
10kHz	101dB
20kHz	106dB
45kHz	114dB
100kHz	119dB

S5 on SSB pre-amp off -86dBm

Audio distortion

AM:1kHz at 90% modulation	2.1%, 300Hz mod 4.6%
FM:1kHz at 3kHz deviation	1.1%
SSB product detector at 1kHz beat tone	0.7%
Max audio output power for 10% THD	8 ohms 1.6 watts, 4 ohms 3.7 watts

Tx carrier rejection -63dBc

Alternate sideband rejection (1kHz mod) approx -78dBc

ing audio transmitted and reproduced quality and the very important area of ergonomics, I still remain faithful to the Trio, provided you insist on having the Lowe modifications put in.

There are so many swings and roundabouts, for the 751A is much more practical for portable use, as it can be operated from 13.8V dc and is much smaller. Icom's automatic band switching accessories, including the IC AT500 and the surprisingly compact IC2KL solid-state linear, are particularly attrac-

tive companions to the rig, so a final decision is not at all easy.

You should also have a look at the Icom IC735, another strongly recommended rig, which I reviewed in the September 1985 issue. A lot simpler than the IC751, the IC735 nevertheless includes many of its big brother's features.

At the time of writing, the basic rig costs £1,399 inc VAT, the 250Hz CW filter, type FL63A, costs the incredible sum of £98.90, the 6kHz bandwidth AM filter, FL33, costs £39.10, the wide SSB filter,

type FL70, is £44.85, the speech synthesizer, type EX310, is £42.55, and the built-in mains PSU, type PS35, is £182.85.

I would especially like to thank Fraser Stuart of Thanet Electronics for loaning me the review sample and for helping me untie so many awkward knots when trying to compare the old with the new facilities and circuitry. Very many thanks also to Jeff Ginn for assisting with many of the earlier measurements and to Mark Capstick G4RCD for helping me with additional measurements.

THE MEASUREMENT OF RECEIVER SELECTIVITY

by Angus McKenzie G3OSS

One of the more awkward measurements which I frequently have to make is that of the selectivity of the IF filters in an SSB receiver. It is not practicable to open up rigs and delve into the circuitry for points suitable for attaching high impedance probes. One of the more usual methods is to use the S-meter as an indicator, selecting perhaps S5 as a calibration point.

One can measure the sensitivity of a receiver easily enough, and also note down the input level for S5 to be reached at the most sensitive point of the selectivity passband. The level from the signal generator can then be increased by 3, 6, 40 and 60dB in succession and either the signal generator or the receiver offset up and down in frequency, to find the points at which the S-meter returns to S5.

This can give quite accurate results on a good receiver, but because of sideband noise in the generator there may well be difficulties when attempting to measure below -60dB. If necessary, and if very high levels cause blocking, the reference point on the S-meter can be taken

down to as low as S2. However, if the rig has a poor reciprocal mixing performance, the S-meter will be reading reciprocal noise rather than the carrier breakthrough, making the selectivity measurement wider than it should be in terms of the transfer of RF signals to an audio output beat note.

If the receiver is a particularly good one as far as reciprocal mixing is concerned, then I use a crystal-controlled generator at 28.55MHz, made by muTek, which has an exceptionally good phase noise performance with an output level of +10dBm. This output can then be fed through an accurate and well screened 50 ohm attenuator, which requires the receiver to be tuned to find the bandwidth. This test, however, is very laborious, especially if we want to establish the entire selectivity curve, and therefore a means of plotting the curve is desirable.

Eighteen months ago I developed a means of plotting the complete response of an SSB transmitter from the mic in socket to the antenna output without touching the inside of the rig. You will

have seen the AF/RF plots in this magazine resulting from this technique, and I wrote a paper for Marconi on the subject (available from Marconi Instruments, St Albans, Herts AL4 0JN) called *Using the Marconi 2382 400MHz Spectrum Analyser for SSB and CW Transmitter Testing*.

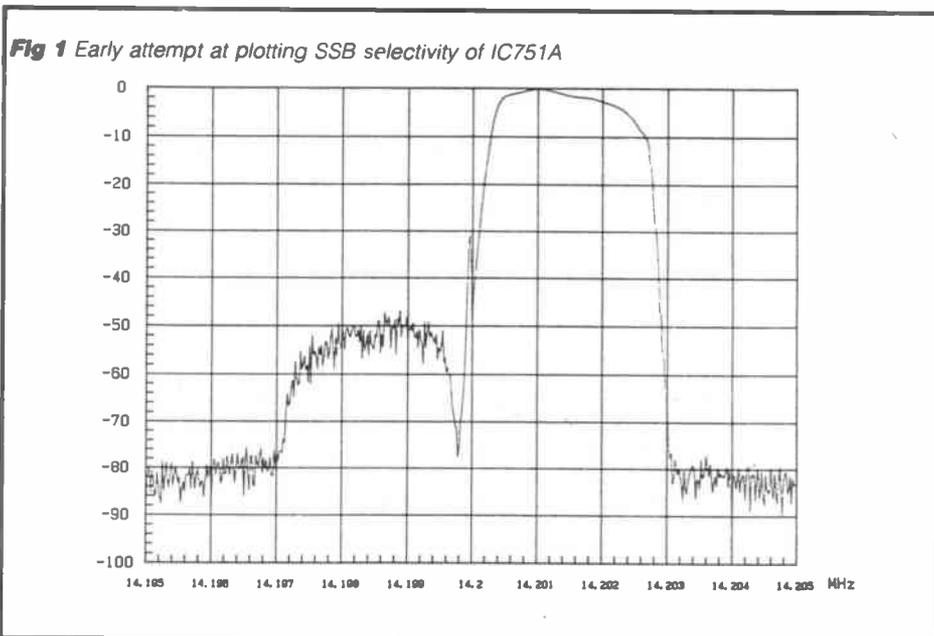
It occurred to me that it might be possible to perform a similar test on a receiver and plot the complete selectivity curve. If the receiver has an RF gain control and the AGC can be switched off, a similar technique can be used to obtain a reasonable dynamic range plot. However, you cannot switch off the AGC on many receivers, whilst on others the RF gain control does not operate in such a way as to back off the complete IF gain and still provide adequate dynamic range for the plot. In any case, it is extremely difficult to determine the correct setting of the RF gain control giving maximum dynamic range from RF input to audio output without any sign of compression.

Figure 1 shows an early attempt at this technique in which my student Jeff Ginn plotted out the SSB selectivity of the IC751A. There was probably some compression, but not much, at maximum output, but you will see a ghost in the lower sideband caused by noise breakthrough, which is most unsatisfactory.

It was quite evident that this technique would only give a rough guide to the real shape, and after considerable thought, I realised that it was necessary to test the receiver with the AGC line itself backing the gain right off in the normal way. The only reasonable way to do this was to add what I call a probe carrier, set to give a 1kHz beat note, to a sweeping carrier, which traversed well in excess of the complete passband of the IF filter.

The test set-up

The tracking generator output from the Marconi 2382 spectrum analyser first feeds through a 50 ohm stepped attenuator and then into one of the input ports of a 50 ohm hybrid coupler. This provides the sweeping signal. A Marconi 2019 signal generator is then connected



Rx SELECTIVITY MEASUREMENT

through to the hybrid second input port, whilst the hybrid output is taken via a 10dB attenuator directly into the receiver antenna input. The receiver's audio output is loaded with 8 ohms, bridged with a frequency counter capable of 1Hz resolution and an ac voltmeter, and taken via at least 30dB attenuation to the IF port of a high quality mixer.

A second Marconi 2019 generator is used to provide the local oscillator input to the mixer, whilst the RF port is directly connected to the normal test input of the 2382 analyser. For optimum system stability the two signal generators and the spectrum analyser should be frequency locked to a stable signal source, such as one derived from Rugby on 60kHz, so that there will be no drift in the system other than that of the receiver.

Assuming that the receiver is to be tested when tuned, say, to 14.2MHz, the probe carrier source 2019 generator is set to 14.201MHz at a level of around -30dBm, which, after coupling and attenuation, becomes around -43dBm into the rig, just over 1mV PD. The rig is then tuned very carefully to obtain a beat note of 1kHz. The tone control is fully advanced, the RF gain flat out and the audio gain adjusted to give between 0.5 and 1V output, or at least 10dB below the clipping point of the audio output stage.

The spectrum analyser is then set to

14.2MHz centre frequency, with 1kHz span per division, in order to measure the 1kHz beat note audio output signal developed from the mixer. It should be noted that there are two carriers displayed on the analyser, one being 1kHz LF at 14.199MHz and one being HF at 14.201MHz. There will also be a trace of 14.2MHz breakthrough from the mixer's LO. Carriers should be symmetrical either side of the centre frequency, at the same level, if the receiver is correctly tuned. This level should be noted.

The spectrum analyser should then be set in the meter mode, with tracking generator on. Centre frequency should again be at 14.2MHz with 1kHz span per division. The marker should then be offset to +1.5kHz and the tracking generator signal attenuated so that the metered level on the analyser is 10dB below the levels that were noted of the 1kHz probe tone. The receiver's frequency may have to be adjusted very slightly to obtain the highest reading, and if the frequency increments are too wide for this, or there is slight drifting, it may be necessary to increase the resolution bandwidth of the analyser.

In the meter mode, the analyser's tracking generator/marker moves in 20Hz jumps, as there are 500 frequency points across the screen, and the levels of any of the carriers within ± 5 kHz of 14.2MHz can be immediately seen by

moving the marker position and noting the metered level. Adjustments can easily be made with the analyser in this mode and, when the system has settled down and the receiver is not drifting any longer, the analyser can be set to the sweep mode and a complete selectivity curve plotted. This is shown in the review of the IC751A, both wide and narrow LSB selectivities being shown between -5kHz and the nominal carrier frequency.

The plots also show small nicks appearing, which represent harmonic distortions of the 1kHz beat note. This is unavoidable, as the distortions are generated in the audio amplifier and product detector stages. The same technique could be applied with other makes of analyser, provided all the same facilities are available, but the Marconi 2382, in my experience, is particularly easy to use and most effective for RF testing within its specifications. It will be interesting to see how many rigs have a far better measured selectivity with this method than with the more normal, but sometimes erroneous, method which I have had to use in the past.

I would like to place it on record that both Jeff Ginn and Mark Capstick G4RCD spent very many hours assisting me in developing this new test method, so they should certainly receive much of the credit.

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Something Special

Val Rogers takes the headache out of running a special event station

'For Heaven's sake, lads and lasses, can't we think of something a bit different for this year's works/school/church field day? Every year it's the same old thing: cake stall, plant stall, tombola, throw the wet sponge at the foreman/head of games/vicar. Hasn't anyone got any new ideas?'

Up you get, the shining hero. The only member of the committee with anything to contribute after that conversation stopper seems to be you. 'How about an amateur radio special event station?'

The big idea

When the shocked silence has died down and everyone has retrieved whatever they threw at you, you will have time to explain exactly what an ARSES (oh dear!) is.

'We get a few amateurs together – I know plenty who'll help set up a special station – and we keep up a constant stream of contacts, as many as possible, maybe all through the night. Visitors are allowed to have a go on the mike now, and we'll have our own special cards printed and send them to all the people we contact. Lots of amateurs collect cards and...' General applause and approval!

Getting organised

Once you've been given the go-ahead to get everything organised (funny how keen committees are to give someone else the go-ahead to do all the work, isn't it?), you suddenly begin to realise just what you've let yourself in for, and the shining hero of the committee comes down to earth with a bump.

So we thought we'd collect all the hows and whys together in one article, a sort of do-it-yourself special event starter pack, and make life much simpler all round.

PRO

First, why have a special event station at all? Well, apart from keeping well in with the boss/head/vicar, it's a very good public relations exercise for amateur radio and stops people who think we're 'blowing smoke all the way up the superslab' and confusing us with our CB brethren.

Called up!

A special callsign can be granted for just about any event you can think of, and probably a few you can't. It can be for an event which is national, international or as local as you like, from Coventry Cathedral's Peace Festival (GB4CPF) to the local college rag week. Over the last few years thousands of callsigns have been issued to celebrate different events, from 'Poppy Day', through two royal births, to Scout and Guide jamborees, and during all this time only about half a dozen have been refused on the grounds of unsuitability.

You can choose your own combination

of letters, provided nobody else is using them, and most people choose letters special to their own event, such as GB4TCF (Town and Country Festival). The RSGB, which took over handling the applications in Silver Jubilee year as an experiment and has been doing it ever since (could the DTI be just one great big committee?), will even supply you with a list of recently issued callsigns, to enable you to avoid those already allocated.

How to apply

First things first: make sure that you apply in good time. The RSGB needs twenty-eight days to process your paperwork and vet your event and chosen callsign to make sure that they are suitable, and it's always good insurance, and more considerate, to allow about six weeks or so.

When you apply, write or telephone to the address at the end of this article and you will be sent the correct application form. On this form you have to state the name of the event and give some details about its nature, to prove that you have a valid reason for wanting the station. You also have to give your chosen callsign, with the appropriate phonetics.

On location

The location of the station, together with its exact starting and finishing times, will also be needed. If you are going to work out in the fields or on top of a mountain you can give the location in terms of its National Grid Reference, with its distance and bearing from the nearest town. Giving the location unfortunately means that you can't have a mobile special event station, but then who wants to run the London Marathon carrying an electric handbag with a rubber duck?

By the way, don't forget that if you want to use the HF bands you must make sure that a Class A licensee applies for the licence and that you have a Class A licensee, although not necessarily the applicant, attending the station all the time your HF gear is being used.

Getting satisfaction

When the RSGB is satisfied that your application is in order you will receive a letter of authority, valid for a maximum of twenty-eight days, to cover the specified callsign and location. If you want to use more than one callsign, or more than one location, you *must* fill in a separate application form for each one.

Don't be caught out as sorrowful friends have in the past, and be tempted to stick your neck out and promise a station to the vicar who rushes round at the last possible minute begging for a special station 'just like the one you did for St Dominic's, down the road.' More than one amateur has come to grief trying to serve God and Mammon, and

you need at least four weeks notice of the event. The letter of authority, giving your own special callsign, must be available at the station throughout the event, and the powers that be have been known to check up on this.

Tell the world

Start getting ready for the great day well in advance. As special event stations are good publicity for amateur radio the RSGB will send you, just for the asking and quite free, its 'publicity package'. This includes posters which will brighten up the walls of your temporary shack, information leaflets and even membership application forms.

As you might well make a few converts, it's also a good idea to have details of your local clubs and RAE classes duplicated; it's much easier to give interested inquirers a leaflet than expect them to remember details.

What's going on?

Locator maps and coloured pins to mark contacts make another good contribution, as does a clearly displayed means of recording and updating contacts. This is where any computer mad friends can be roped in, because there is nothing that fascinates passers-by like a working video screen, and many new licensees happily admit to first being attracted by a good display at a special event station. Do remember to put the micros well away from the working gear, though. As we've all found in the past, the QRM can be summat awful!

There's more!

Next thing on the list is a log-book, together with a good supply of pens, and a card to be pinned up for each station with your special callsign and your locator in large, clear print on it. Also include details about the rig, antenna and the special event itself, because the most experienced amateur can get seizure of the brain when trying to demonstrate the gear to the public, answer dotty questions, find a pen to fill in the log-book and talk coherently down the mike all at the same time without using the callsign he's had for years.

Confirmation class

If you're going to have special cards printed, and it's much easier to tempt contacts if you can promise them a pretty card for their shack wall, get them ordered well in advance. It's a nice idea to have a specially designed card related to your own event, with a cartoon, a photograph or your own special wording or logo incorporated into the design – the more striking and original the better.

Well, don't you give pride of place to the really original QSL cards on your own shack wall? Everyone we know does. Most people find it an advantage to fill in QSL cards as they go along, because

SOMETHING SPECIAL

trying to write several hundred cards out afterwards, particularly from someone else's entries in the log-book, can be a daunting task.

Setting up

Before you even think about setting up the shack or equipping it, assemble your team of (let's be honest) willing suckers. Get as many volunteers as possible because, following Sod's Law, half of them will drop out before the great day, and the more spare people about to fill in logs and QSL cards, talk to interested passers-by, fetch the tea and wads and generally make things easier for the harrassed operators, the better.

Talking of entries in the book, each separate operator must sign the log at the beginning and end of his or her stint. Apart from keeping things legal it does help you to know who's to blame afterwards.

Superscrounge

Once you have your team of splendid volunteers, set about begging, borrowing or stealing the gear. Your own comes first, of course (see what you're letting yourself in for? Who is going to trust an amateur who daren't even use his own gear at the show?). Then whatever else you can scrounge, because although one two metre station with a small aerial is the easiest set-up, a room full of HF band, RTTY, ATV with a good big stack of aerials on a tower is a lot more exciting and really pulls the crowd... which is what we want, isn't it?

Talking of towers, try asking local organisations which regularly work mobile or out in the field... Raynet or a contest group, for example. They are usually only too willing to lend gear in return for a bit of publicity, and that goes for your friendly local 'emporium' as well.

Dire straits

Don't forget to stock up with plenty of spares - rigs and people as well as components. Remember Sod's Law again: if a rig can blow up, it will. An emergency box with soldering iron, solder, screwdrivers, leads, connectors, you name it, is an absolute essential. The

one thing you forget (the meter, perhaps?) is the one thing you will need. And think about insurance, if you can afford it.

Mediating

The next big thing is publicity. Of course there will be general event publicity, but amateurs are well placed to get a bit of their own special local fame. Newspapers, especially the freebies, always like to cover events a bit out of the ordinary, and will probably give you an advance write-up if you explain things to them. They might even send a reporter and photographer along on the day, too.

Local radio stations can also be a good source of advance publicity. You could even be interviewed yourself (oh, the fame!). All good PR work for amateur radio, though. Don't forget GB2RS, either. If you get the information to the RSGB or your regional rep by the Tuesday before you want it broadcast, your special event will be on the Sunday morning news.

Destruction

Finally, make sure you have the heavy gang organised to help break down afterwards. There is nothing more disheartening than watching everyone disappear at the end of the day with a cheery wave of the hand, while you stand in the midst of the equipment wondering how you are going to get a ten-element beam down on your own. The bigger the team you can collect, the easier it is for everybody and the more fun you can have round at the local afterwards.

The big day

There's no time for any more panic now. Wives and husbands, sweethearts and kids have all been roped in (we hope) to help with refreshments, log-book entries and handouts, and it's too late to resign. *This is it!*

As the organiser, we hope that you will have the honour of making the first CQ call (now aren't you glad you pinned the new call sign up in front of you?) and you're away. For the rest of the day you can leave the operating to your team while you play at being foreman, and wander round making sure that every-

thing is going OK, that operators are changing over at the correct times and remembering to sign the book, that they all have enough to eat and drink, and that any panics are quickly and efficiently dealt with.

You will also be talking to members of the public, explaining about amateur radio to anyone interested, persuading shy maidens to whisper 'hello' into the mike as they collapse in helpless giggles, hauling athletic kids down from the borrowed tower, and generally preparing for tomorrow's nervous breakdown. No, you can't have it yet! There's not time.

If you're running a twenty-four hour station things do calm down a bit during the evening, and you can settle down for a peaceful night's operating. Now is the chance to catch up with all the QSL cards that other people didn't fill in during the day and to try your hand at any bands or modes that you've always fancied a go at.

When it comes to dismantling everything afterwards, the big problem is identifying what you've borrowed and getting everything back to its rightful owner. We've always found it a good idea to allot a different coloured reel of insulating tape to each lender and stick a length of tape to everything they lend. It shouldn't be too difficult to sort things out that way.

After effects

Don't think you've finished yet. Once everything has been returned to its owner you'll find yourself left with the log-books and a huge pile of QSL cards to deal with. Store the log-books safely for next time (*what?*) and sort out any cards that can be delivered by friends or through local contacts. This saves a lot of time because the rest have to go through the bureau. Once you've sent off the last of the cards, your job is finished and you can sit back and bask in the glory, enjoy the photographs in the local paper and start planning for next year. Have a nice day!

For application forms write to: *Membership Services Dept, RSGB, Alma House, Cranbourne Road, Potters Bar, Herts EN6 3JW.*

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EXPEDITION TO

Some time ago, I and two fellow amateurs, Dave Vizard G3UKS and Steve Cherry G3SJK, decided that we should operate in the CQ World-Wide DX Phone Contest, which is held during the last weekend of October, from some exotic spot. Several locations were considered – the Maldives, Gambia and so on – the criteria being that the place had to readily issue licences to visitors (or would permit 'guest' operation from a resident's location), be a fairly rare country and be not outrageously expensive to get to.

Just over a year later I received a phone call from Dave Vizard, who was arranging a contest trip. It seemed that the idea was already well developed – Dave had heard about a place on the island of Montserrat in the Caribbean which was available for hire, and which already had towers and antennas on site. It seemed to be the ideal situation; we would only need to bring the rigs, plug them in and be on the air, or so we thought.

A couple of American amateurs had

built houses on the island and equipped them with towers and antennas, and as they only used them for holiday homes there were long periods of the year when they were vacant. Fortunately one of these periods coincided with the CQ World-Wide Contest, so Dave booked both villas with the hope that he could get enough people together for the expedition to make it economically viable.

By the time he called me he already had a team of seven: himself, Steve Cherry G3SJK, Alan Ruddell G4BGH, Jean and Mike Mills G4XRJ and G4XRJ, Dave's YL Virginia Pugh and an SWL colleague of his, David John. The most economical number of people was nine so, after I had joined the team, we wanted one more. This place was filled by Drew Givens GM3YOR, who came down from Kirkaldy in Fife to join our group for a planning session one weekend in September.

It was not easy to try to organise the trip in advance and Dave did a very good job trying to imagine all the possible

eventualities. Our main problem was that we did not know what facilities were going to be available at the location. Although Dave and Steve had made several skeds with Doc VP2MF, who lived on the island and looked after the two houses in the absence of the owners, it seemed to be very difficult to determine precisely what we needed to bring and what was available. During our discussion meeting at Dave's house it was decided to take as much equipment and as little in the way of personal possessions as possible, the theory being that it would be difficult to buy necessary amateur radio bits and pieces in Montserrat, whereas it should not be any problem to buy clothes and so on.

Eventually the day of departure arrived and the group met at Heathrow, where various customs forms had to be completed, but the formalities went very smoothly thanks to the co-operation of both British Airways staff and HM Customs and Excise.

Arrival at Antigua was quite an experience. It was 85°F and so humid that my glasses and camera lens steamed up within yards of walking out of the plane. From here we had to take another plane to Montserrat.

We were met at Montserrat's airport (Blackburn) by a taxi driver friend of Doc, who had brought along our Montserratian amateur licences. In recent years Montserrat has stopped issuing VP2M--callsigns to non-resident amateurs, and instead issues Own Call/VP2M. This is fine, but we wanted a short, snappy callsign to use in the contest. We had asked Doc to use his not inconsiderable persuasive talents to try to get a proper VP2M--callsign for the group, and he had come up trumps. By joining Dave up as an official member of the Montserrat Amateur Radio Club he had managed to get the licensing authority to re-issue one of only twenty-six original two letter callsigns, VP2MW.

The drive from the airport to Woodlands, where the houses are located, showed what an impressive island Montserrat was. Being volcanic, Montserrat is quite mountainous and the road wound round innumerable hairpin bends on 1 in 4 hills, occasionally offering superb views across the Caribbean or wooded green Montserratian valleys. In the south of the island is a still smouldering volcano, the peak of which is 3,000 feet asl. In the centre of the island is a range of smaller hills, known as the 'Saw Tooth Mountain', about 2,000 feet high, and we skirted around the north of these to arrive at Woodlands.

Doc and his wife, Ilse, met us at 'Oberhaus' and immediately made us very welcome as they showed us around. The other villa, 'Unterhaus' was, logically enough, located a few hundred feet away



MONTSERRAT

down the hill towards the Caribbean. Both houses had shacks containing Kenwood gear: at 'Oberhaus' there was an elderly TS520 with a Dentron GLA-1000 linear, whilst at 'Unterhaus' there was a slightly more modern TS120. Neither of these rigs would have been suitable for a continuous 48-hour contest operation, and the Dentron linear only put out about 300 watts (the maximum legal power on Montserrat is 1 kilowatt) so it was just as well that we had brought our own rigs.

At 'Oberhaus' there was a sixty-foot mast with a TET 4-element tri-bander beam on top, whilst at 'Unterhaus' there was a fifty-foot mast with a TET 3-element tri-bander. The higher mast also supported what Doc called an 'umbrella' vertical: it consisted of two diamond-shaped loops at 90° to each other connected to the top of the mast and fed at the bottom with 300 ohm ribbon feeder. Doc claimed it worked as a good DX antenna on 160 and 80 metres, but it did not seem to be resonant at any particular frequency and had to be tuned with an ATU and a 4:1 balun. When used there seemed to be an awful lot of RF around in the shack, which was located almost directly beneath the large loops, so we decided to use it only as a receiving antenna.

There was also a 40 metre quarter-wave vertical on the roof of 'Oberhaus', the metal roof of which acted as a ground plane, but this was also resonant out of the European part of the 40 metre band and, since the metal roof of the building was part of the antenna, it created a lot of RF in the shack. At 'Unterhaus' there was a horizontal piece of wire suspended between two sixty foot poles: this had once been a G5RV multi-band dipole, but the feeder had fallen off some time in the past, making it totally useless.

At Doc's QTH he had a rotatable 6-element log-periodic mono-bander for twenty metres (four driven elements plus a reflector and director - a most curious antenna, which nevertheless in later tests proved to be slightly up on a TH6DXX) and low dipoles for 40 and 80 metres, intended for working around the Caribbean area only. Between Doc's QTH and 'Oberhaus', a distance of several hundred feet, was a buried length of RG8 coaxial cable, which was later found to be very useful. Doc also had a sixty-five foot tilt-over tower which, when we arrived, had nothing on it, as well as several other masts, poles and towers scattered around the three plots.

Before we arrived, Doc had ordered one of Hy-Gain's Discoverer 7-3 3-element beams for forty metres, which he wanted us to help him to put up on the tilt-over tower. Since we hoped to use this antenna in the contest, we were only too willing to give it a try.

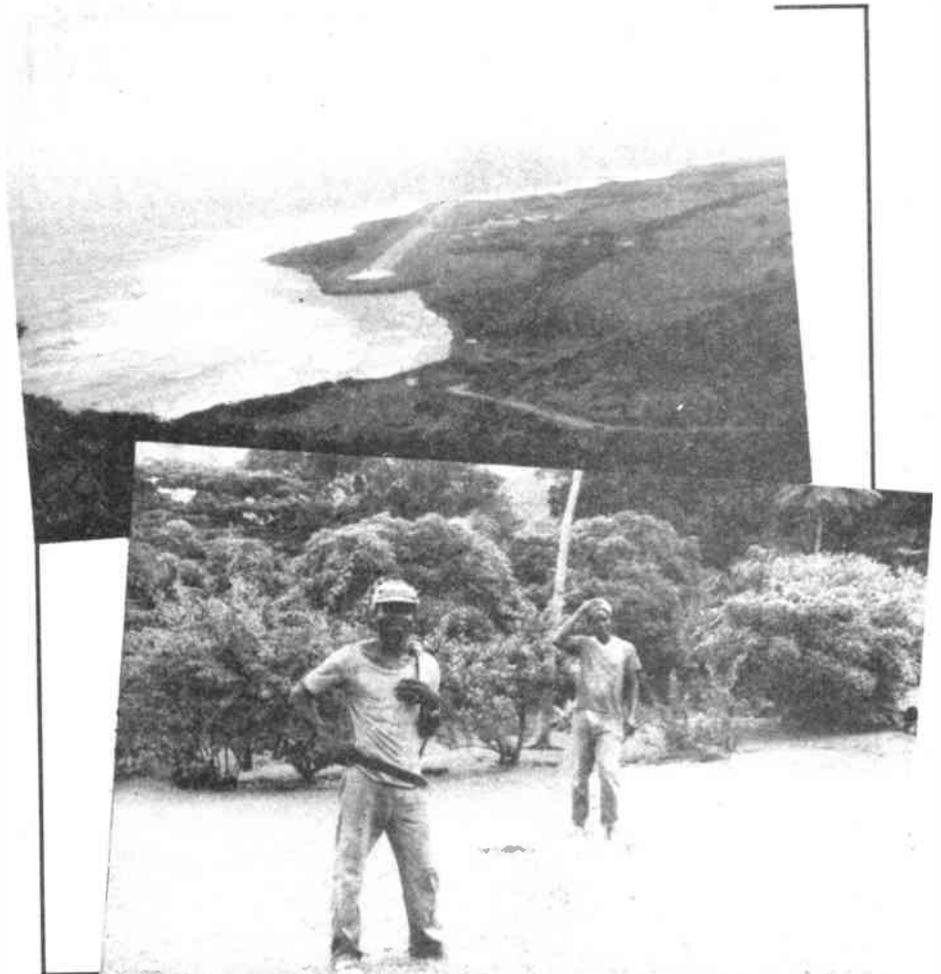
Its construction is fairly simple if one closely follows Hy-Gain's instruction booklet, but its sheer size made it a lengthy job. When it had finally been put together we realised that it was just too big to be manhandled into position at the end of the tilt-over tower, so one element was taken off, as well as part of the boom. The idea was that the 'top' two elements would be attached to the tower, the tower would be winched vertical, rotated through 180°, lowered again, the remaining part of the boom and the third element attached, and then finally raised again.

It was at about this time that it was discovered that neither of the two rotators were working properly, so they were both stripped down and put together several times before one of them worked most of the time.

We then attempted to get the 3-element up, but as the tower was being winched vertical, the unbalanced weight of the top element caused the whole antenna to 'windmill' around, leaving the part of the boom that we had to get to

some thirty feet up in the air, even when the tower was winched fully down again. On examining the bolts they were found to be as tight as they could be without sheering, so we concluded that it would not be possible to put the antenna up this way. Another method was tried, also without success, during which a tropical wind storm blew up, causing the tower to sway and shudder violently.

After this attempt everyone agreed, with some regret, that it was going to be impossible to put up the 3-element beam on this tower. It was decided that the antenna should be reconfigured as a 2-element version and this should be erected instead. Eventually the operation was complete: it had taken three long, sweaty days to get up our first antenna! With some trepidation the antenna was tested out: it performed perfectly, being resonant more or less where we had planned, in the middle of the European phone band, and although only a 2-element, showed some considerable directivity on that useful marker, Radio Tirana on 7065kHz. Our



EXPEDITION TO MONTSERRAT

first few reports and then an enormous pile-up of Europeans proved that it had been worth the effort.

By this time we had only three more days in which to put up and get working some good DX antennas for 80 and 160 metres and also, since we had made the 40 metre beam resonant below 7100kHz and we were allowed to transmit up to 7300kHz (where the SWR was very high on the beam), another antenna for the 40 metre Stateside band.

The wire which had once been the G5RV was taken down and replaced by an 80 metre dipole, cut for around 3790kHz. That may sound easy, but in fact one of the poles was so rusty that when a strain was put on it several bolts snapped and the sixty-foot pole telescoped down into itself until only the bottom section, maybe twelve feet high, remained visible. This was a real blow, but after we had got over the shock of apparently destroying one of Doc's masts (a fact he took with good humour) we continued and eventually had an 80 metre dipole in the clear, but only at an average height of 30 feet instead of 60 feet.

Tests showed that it worked extremely well into the States, being in the clear over the Caribbean and with a seawater path all the way to Florida. We heard a few weakish European signals so it

seemed the antenna was working as well as could be expected.

We had hoped that a high dipole in the clear would prove to be a good DX antenna, but since the collapse of the mast the dipole was so low that it would only be good for high angles of radiation, even if it was still in the clear. So we still needed a DX antenna for 80 metres. We decided that almost all our 80 metre contacts would be into the States (for which the dipole should work very well) or into Europe, so we agreed to put up a quarter-wave sloper pointing towards Europe to use in addition to the dipole.

This involved Drew GM3YOR climbing the unguayed tilt-over mast which supported the rotatable 40 metre beam up to a height of about 60 feet, and attaching the outer of the co-ax to the tower using a giant clamp. We also put out between twenty and thirty radials of various lengths at the bottom of the tower, fanned out in the approximate direction of Europe. After several attempts at pruning (carried out in a tropical rain-storm) the antenna became resonant at the desired point and tests on receive appeared to show a slight gain over the dipole on European signals.

The next antenna to go up was the other 40 metre beam, made out of bits and pieces rescued by Doc. Using a little

guesswork and intuition, a couple of us put it together whilst the rest of the crew constructed a 40 foot steel lattice tower that Doc had lying around in one of his garages. This second 40 metre beam was set up to be resonant in the American phone portion of the band, around 7200kHz, and when tested it proved to be more or less correct. It was secured to the tower in a fixed direction overlooking the Caribbean, beaming Stateside. Unfortunately, the very next day there was another tropical squall, almost a mini-hurricane we thought (though Doc said it was nothing), and the antenna swung around, almost 180° away from where it should have been, necessitating Dave G3UKS climbing the tower to reposition it as soon as the storm had died away.

At the same time I had put a 160 metre dipole together and Drew again climbed the 70 foot tower (containing by this time the main 40 metre beam and the 80 metre quarter-wave sloper) to secure the centre. Although there was so much space at Doc's location, it was difficult to route the long 160 metre dipole because of the terrific amount of vegetation and we had to settle for an inverted-V configuration more or less in the clear. On air tests showed that we attracted enormous Stateside pile-ups on Top Band, especially when we used the 1 kilowatt linear which, incidentally, is quite legal on Montserrat, even on Top Band.

The main problem for us, however, was hearing the stations through a static level which never dropped below S9 during the whole period we were on the island. In addition to this there was an electrical 'fizzing' noise, which appeared after one of the mini-hurricanes. It was not there all the time, but when it was it made almost all frequencies useless except for very strong signals.

This electrical QRN persisted and something had to be done. A couple of us went for a walk along the road carrying a transistor portable and a sledge hammer and eventually determined that the cause was a faulty HT insulator on a power line pole. When the offending pole was bashed with a sledge hammer the noise lessened for a few seconds, but then re-appeared. Eventually we called the Montserrat Power Authority, who speedily sent along a couple of engineers who were very friendly and helpful. They even turned off the power to the whole of the Woodlands area of Montserrat in order to replace the offending insulator, after which the noise disappeared.

By the time Drew and I had walked back from the scene to the shack, however, the dreaded noise was back, though not as badly as before. We returned with a 2 metre walkie-talkie and gave the pole a few more bashes with the sledge hammer (all this took place in temperatures of 30°C!), whilst Steve G3SJK reported on what was happening to the noise level on 20 metres. After half a dozen whacks Steve



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reported that the noise level was down to an acceptable S4 or 5 and we left it at that. For the rest of our stay on Montserrat, though, even throughout the CQ WW Contest, that noise level was to plague us on all bands, although thankfully it was never as high as it had been immediately after the storm.

The final antennas to go up were a Hy-Gain TH6DXX (6-element tri-bander for 10, 15 and 20 metres) on a spare 60 foot pole at Doc's location and two Beverage receiving antennas each about 260 feet long, one beaming to Europe and one towards the States. Both of the latter worked reasonably well, with lowish signal levels but a much lower level of noise pick-up, including static, than any of the other antennas.

With all the antennas erected it was just a matter of connecting up the two stations in the main shack, making sure there was not too much interference between them, and preparing log and duplicate-checking sheets before the start of the contest. Luckily it was possible to use antennas several hundred feet apart from each other with rigs in the same room, and so with the very good front-end characteristics of the Drake TR7 and Trio TS930S transceivers it was often possible to listen on the same band that the 'main' station was transmitting on.

By the time that all the antennas had been put up, both stations connected and mutual interference checks carried out, it was already Friday afternoon. The contest began at 8pm local time, Montserratian time being four hours behind GMT, so it had taken virtually a whole week to put up antennas and get the gear into a suitable state for contest operation.

We divided ourselves into two teams of four, each with two experienced contest operators and two less experienced operators. Each team operated for eight hours, whilst the other team slept, ate, went swimming or generally relaxed. For those who couldn't relax there was always the TS520, which we had connected up on the veranda overlooking the Caribbean, and any of the spare antennas not required for the two operating stations could be patched through to it.

Within each team of four we swapped main operators every two hours, so that one of the experienced contest operators had two hours of continuous pile-up operation, assisted by one of the less experienced operators or SWLs, whilst the other experienced operator was scouring the bands for new multipliers, again assisted by an SWL or less experienced operator.

Naturally, the calls were thickest and fastest when we were working American stations on 15 and 20 metres. At best, we were working about 265 QSOs per hour, or 4.4 QSOs per minute (one QSO every fourteen seconds). I have never before experienced such long runs of high-rate QSOs. Often one operator would be running 250 QSOs per hour for his full

two hours, hand over to the other operator who inherited the same pile-up, which he worked for two hours and then handed back to the first operator who took over the same pile-up again, with the VFO knob not being touched once in the whole time.

In these conditions perhaps 90% of the stations worked were in the USA, with the other 10% made up roughly equally with Canadians and the few Europeans with big enough signals to get through. However, all the time there was somebody constantly scanning all the bands to look for new multipliers – stations in DXCC countries or CQ Zones which we had already contacted. To make sure that we did not call a station in a country which we had already contacted (whilst our main station was on another band), something that is not allowed in the rules of the contest, it was the responsibility of the second operator to carefully go through every log-sheet as the log was completed and cross off all new countries as they were worked on a check-log for all six bands.

Although the pile-ups from the American stations were very great, we concluded after several hours of operation that conditions generally were not wonderful. It was difficult working DX, especially Africans and the Pacific countries, which were very few and far between, even though it should have been much easier to work into the Pacific from the Caribbean than Europe. On 20 and 15 metres we worked most of the DX which we heard, although there were a few inevitable 'gotaways', including a ZS6 and a C53 on 15 metres. Africa was our worst direction, with the 2,000 foot 'Saw-Tooth Mountain' right in the way of our beams.

Dawn propagation on the low frequency bands was good, with ZLs and T32 stations on 80 metres at quite good strengths, though they were not always easy to work through their own pile-ups of American stations. Another problem which haunted us throughout most of the contest was the return of the dreaded noise from the power cables, which usually hovered around the S6 level. This was no great problem on 20 or 15 metres, where most signals were S9+, but on 80 it made DX contacts very difficult. On Top Band the problem was compounded by atmospheric static noise, always a problem in the tropics, which rarely dropped below S9.

Almost all contacts on 160 metres were with American stations, from California to New England, and mostly at S9+ signals. We also worked quite a few Canadian stations and a sprinkling of other Caribbean and South American stations (mainly those competing seriously in the contest; there did not seem to be much other activity). The only real DX station we worked on 160 metres was in Hawaii: he must have had an incredible antenna system, for not only did we not hear any other stations in the Pacific at all, he also got through our S9+ static QRN, and heard our call the first

time. I heard a big pile-up of W6s calling a personal friend of mine, ZL2SQ, on Top Band, but unfortunately I could not hear Harry through the noise level and so both a country and zone multiplier got away.

The rotatable 40 metre beam worked extremely well, perhaps *too* well at times. Whenever we beamed into Europe on 40 metres in the contest the resultant pile-up was so large it became impossible to pick out any calls other than the occasional really big signals, and the whole thing quickly degenerated into a shambles, with Europeans calling us all the time. Even when we were able to pick out a call sign and called a specific station, he would not necessarily be able to hear us through the other Europeans still calling and if there was a split second when nobody came back to us immediately then everybody started calling again. To try to alleviate this problem we tried working split, transmitting above 7100 and listening around 7042, but although a few good operators worked us very rapidly this way, after a few minutes nobody seemed bothered to try; they kept calling us on 7042 and were obviously listening on the same frequency. The moment we went back to 7042 ourselves the huge pile-up resumed.

We found out later that due to propagation conditions most Europeans were not strong with each other, though they could hear us at S9+ (that beam really put out a big signal) and so found it difficult to believe that they were not equally loud and clear with us. It seems most did not realise that there could be twenty or more stations all calling simultaneously and all at about the same strength. Also, we were running a cool kilowatt into the beam whereas probably the average European was using 100 watts to a low dipole, and so their signal with us was a lot less than ours with them. Apologies to any readers who heard us at S9+ on 40 metres (or any other band) and who called us for hours without getting a reply. Now you know why.

On the second evening of the contest 20 metres was still open, but only to the States, and no matter which band we looked on we could not find any additional multipliers. Forty metres was well open to Europe, but the only signals we could hear (apart from Radio Tirana on 7065!) were the multi-operator contest stations which we had already contacted (some several times before!). Although we were still working maybe 3 QSOs per minute on 20 metres, Dave suggested that we moved down to 40 metres to try to pick up some more multipliers. Although our multiplier-checking station was constantly scanning 40 metres without hearing anything that we had not worked before, we decided to give it a try and a single 'CQ Contest' call around 7040 brought back the same enormous pile-up we had experienced before.

No doubt quite a few of these contacts were duplicates (which count 0 points) but just occasionally a non-contester would call us and sometimes these were

EXPEDITION TO MONTSERRAT

in new countries and even zones. We worked an SV this way, which being in zone 20 gave us two new multipliers which we would probably not have got on 40 metres if we had not called CQ ourselves. Also a YO and a GU called us and gave us two more multipliers, and so it became clear that the move from 20 to 40 metres had really paid off; having four multipliers on one page of log-sheet towards the end of the contest (after hours of not even hearing any new multipliers) was something of a coup. But it was really tough going on 40 metres, so after a while we moved down again to 80 to work the apparently unlimited numbers of Americans who had still not contacted us.

The contest ended at 8pm local time on the Sunday evening: a far more civilised time of day than midnight or 1 or 2am, the time the contest ends in Europe. Although everyone was pretty tired it was necessary to have a meal, so whilst some of the group started preparing this the rest of us went though the log-sheets to work out the provisional score. On 3820 a group of testers had gathered to discuss their scores: our main multi-single rivals, 4V2C from Haiti were on, and at first they sounded worried that we might have beaten them.

VP9ED, VP2VCW and a handful of Ws were on frequency and, after a while, since we hadn't called in, they started to

VP2MW: Final score (after deduction of duplicate contacts)				
Band	No of QSOs	No of CQ Zones	No of DXCC countries	Points
1.8MHz	210	8	12	412
3.5MHz	916	19	65	1854
7MHz	1077	28	86	2518
14MHz	1346	30	98	3292
21MHz	1744	27	93	3770
28MHz	421	15	32	847
Total	5,714	127	386	12,693
Total score, all bands, equals the total number of points, multiplied by the total zone and countries multipliers, ie $(127 + 386) \times 12,693 = 6,511,509$ points				

call us. However, by this time the meal was ready, so we thought we would leave them to ponder our score for a little longer and went off to have some food. After eating they were still there on 3820, so we put them out of their misery: 4V2C had beaten us by a small margin on each band, probably by enough to win in the Caribbean area. However, magnanimous in victory, they congratulated us sportingly on giving them a good run for their money and said we had done very well for our first attempt.

There only remained a few days of the holiday. We spent these in a relaxing manner, either by the swimming pool at 'Oberhaus', by the beach, a twenty minute walk from the houses, or sight-seeing on the island. The main town on Montserrat, Plymouth, is a quaint town, a mixture of old colonial buildings and

shanty-town shacks. A few modern buildings such as Barclays Bank, Radio Antilles' (the 300kW MW commercial station on 930kHz) studios, and a couple of supermarkets, and that's about it.

Local delicacies at a restaurant in Plymouth were the Montserratian beef, which was excellent, and 'mountain chicken', which no one had the nerve to order after being informed that it was actually frog!

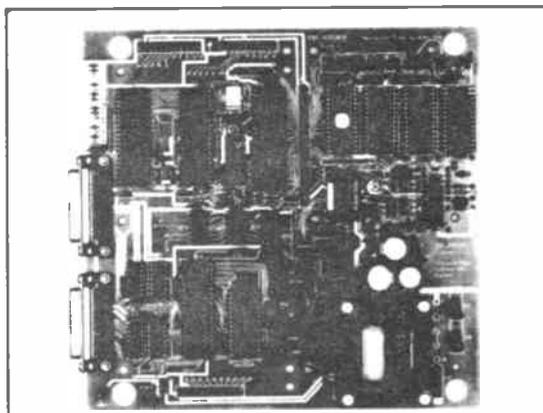
The last day of our trip was spent packing up the rest of the gear. Nine hours after leaving Antigua Airport we arrived in cloudy, grey, November Heathrow, the warmth of the Caribbean nights and people just a memory away. After a few days I began thinking, 'Where next?' St Kitts and Nevis look very nice from the air, and they have a brand new prefix. . .

Written by Steve Lowe G4JVG

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Valid for life

The recent announcement by the DTI that a pass in the radio amateur Morse test will be valid for life is probably regarded by most amateurs as a good thing. Previously, a further test was required if a break of over twelve months in licensed operation occurred, or if a licence was not obtained within twelve months of passing the Morse test.

Until now the attitude has been that if amateur transmissions interfere with 'official' or emergency traffic, a knowledge of Morse is essential to ensure that instructions to QSY, or even QRT, sent in Morse can be understood.

This is why a break from operating of more than twelve months called for re-testing, to ensure that Morse could still be read if the need arose. It was nonsense really, because many amateurs have never touched a key since they got their A licence and have now forgotten most of the Morse they ever learned. It was probably a realistic assessment of this situation which persuaded the DTI to change the rules.

No need for a test?

But does this change bode well for the future of amateur Morse operation? Is it a step toward saying there is no need for a Morse test at all? The DTI's Radio Amateur Information Sheet No 3, 'Morse', says that it is a requirement of the International Radio Regulations that those who work the HF and MF bands must have a knowledge of Morse code. It also says that the use of Morse in the maritime and other professional services is declining.

In these circumstances it is probably only a question of time before the Morse test is abandoned as a requirement for licensed operation in the amateur HF bands. The only Morse anywhere on the air will be amateur Morse and, inevitably, that too will decline and disappear.

Today's Morse enthusiasts may find it hard to agree with this forecast, but think about it. No one is born with a built-in love of Morse. Apart from those who learned it professionally, every one of us came into Morse operating because we had to learn it to get our HF licences.

Struggle to pass

It is virtually impossible to inspire a non Morse person to take up the mode just by telling him, or her, how enjoyable it is. How many of us struggled to pass the test, still not sure if we would ever use CW on the air? In my own case, probably typical of many others, it was not until I had my first QSO on the key that I realised how absorbing and compelling Morse communication can be.

This came about because the test was obligatory. If there had been no test, the chances are I would never have taken up Morse. The latest change in the regulations has occurred, says the DTI, following representations from radio amateurs, and has been made after consultation with the RSGB. I can't help wondering if this particular negotiated 'benefit' marks the beginning of a process which could see the end of amateur Morse.



Tony Smith G4FAI takes his bimonthly look at the world of dots and dashes

Pressure

Perhaps I am overstating the case, but if we ever get to the stage where the Morse test is no longer required by international regulations, there will be pressure on national administrations to abandon it.

The International Maritime Organisation has plans to discontinue Morse for emergency operation world-wide by 1996, replacing it with automatic digital systems. By the turn of the century, in just fourteen years time, it is possible that there will be no more professional Morse on the bands.

Who will follow on?

A good number of today's amateur CW operators will still be on the air then, and many more will have joined their ranks. But who will follow them when there is no compulsory test to nudge potential recruits in the right direction?

It may not be too soon to start discussing this problem and what should be done about it. Those outside Morse, understandably, will not be concerned, but if we don't talk about it, no one else will. Am I alarmed unnecessarily? What do you think?

Mailbox

G0FAH wrote to me when he had been using HF CW for just two weeks. He was running two watts from a Ten-Tec Argonaut, and in that time had worked 64 stations, including 4U0ITU. Not bad for a beginner!

Bill stressed how welcome good slow Morse is to a new operator, and mentioned a number of matters which bewilder newcomers when they first get on the bands.

I will comment on some of these in a future column, simply observing at this time how useful a good CW operator's handbook, written especially for amateurs, would be.

Morse classes could also help in this direction if they gave advice to their

students on operating procedures, and what they will find in the CW sections of the bands when they finally get on the air. If the class you run, or went to, does just that, I apologise, and would like to hear about it.

Embarrassing start

Keith G0CGB also refers to early days with an amusing account of his first CW QSO: 'After calling three times, I paused and listened hoping no one would reply', then after repeating his call, 'Oh my God, someone's replying.... I'll pretend there's QRM and send QRZ, that way I'll get a second stab at copying him...'

That was all of six months ago, and by now Keith probably realises that 'QRZ? or QRM' is not a ploy used exclusively by beginners!

He was inspired to use his Morse by the promise of the G-QRP Club's Novice Award, which has done much to encourage newcomers to CW, whether QRP or not.

George G6YQZ agrees that Class B Morse operation should ideally be on A1A and liked my suggestion about using 144.100 - 144.150MHz. He says, however, that in Rochdale he has never heard an A1A QSO on 2m at all.

Relaxed style

It seems a pity that 2m is so little used for CW. The absence of QRM lends itself to a relaxed style of operating, ideal for newly licensed operators seeking to gain both practice and confidence. In London, where I live, there is a fair amount of activity, but the position seems to be vastly different in some other parts of the country.

With summer conditions on 80m it can be a relief to turn to the calm of 2m, where Monday night is CW night. There's no reason why it shouldn't happen other nights too and I will gladly publicise days and times of regular CW activities for anyone seeking to stimulate activity on this band.

SHORT WAVE LISTENER

TREVOR MORGAN GW40XB

Well, summer came at last! Albeit delayed by a month or so, we saw the sun and a corresponding rise in the DX capabilities of the bands, with even the ten metre band showing signs of life. Reports from readers abound with DX contacts, with many listeners catching those elusive Chinese stations and the occasional DXpedition.

I have been asked why we don't list the catches in table form. Well, to be quite honest, I have never seen the point in complete listings of stations. Often the stations have long disappeared by the time the list gets into print, due to expeditions going home or conditions changing, leaving a list way out of date and virtually useless. However, I do mention the prefixes heard by correspondents, so if you've heard some good stuff let me know!

Longleat Rally

I had the pleasure of being at the Longleat Rally in June with a small display for the International Listeners' Association and, as a result, managed to shake the hands of some of our readers and members. To those who came over... thanks a lot! It made the effort worth-while and took membership over the hundred mark!

Longleat is one of the year's high spots for many, with the traditional marquees full of goodies. Receivers seemed to be pretty scarce this year and I only saw one RA17, which was going for a cool £145! Just goes to show how a good 'un will hold a good price! However, with over £100 being asked for an EC10, I think the salesmen are taking advantage of the new listener somewhat. Similarly, the prices being asked nowadays for the wide-spaced variable capacitors we use for antenna tuners are getting ridiculous, and it pays to shop around carefully. I recently bought a 275/275 ganged variable with a geared reduction drive of 2.5-1 for just 85p in a local shop, yet a non-geared

model at the rally was going for a £4 price tag!

Of course, new equipment was plentiful, with some buyers parting with over a grand for a receiver with lots of shiny knobs and buttons (yes, I actually saw such a sale take place!), so who am I to complain about four lousy quid for a capacitor?

Out with the gang

Like many of you, my enjoyment of the rallies comes from the trip there with the 'gang' and the fun of browsing round the oddments stalls, buying a funny looking box with a few switches on for 50p and hoping it will come in useful one day... the shack is full of these!

The next visit will be to Wembley where I shall, no doubt, extend my stock of funny boxes.

Talking about funny boxes brings me to kits. Many readers have written asking me about construction kits for filters, antenna tuners and all sorts of wierd and wonderful things, so this month we are having a look at the market for these items.

Not everyone has the electrical knowledge to design his own circuit and complete a job from scratch, especially among the listening fraternity, where a lot of very keen listeners have only the basic knowledge picked up during their time on the receiver. For these people, the designers of the kits provide a useful service in encouraging the newcomer to try his hand at construction and learn a bit about circuits in the process. Kits usually come complete with the printed circuit board and onboard components, plus any variable pots for volume controls, or switches, etc. However, this is not always the case, so check the adverts. Cabinets are usually an extra, as are knobs and external wiring.

Finishing the job off is always, it seems, a problem. Some constructors just leave the cabinet in its bare alumi-

nium state and label where necessary with a Dymo machine. One of the nicest finishes I have used involves drilling the cabinet where necessary then painting it with grey primer. Follow this with a coat of Chrysler metallic grey (one of the Holts car sprays) which is a good match for the standard grey.

When this is dry instant lettering (Letraset) can be used or self-adhesive lettering, which is available printed in white on transparent film in the regularly used legends. Finally, a coat of satin finish polyurethane seals the lettering, gives a nice sheen to the job and takes the odd knock well.

Receivers

These range from the simple single band direct conversion receiver to the 'all singing, all dancing' double conversion superhet. It depends how ambitious you are.

Maplin Electronics do the Heathkit SW7800, which covers 150kHz to 30MHz in thirty overlapping bands. As this is made for the American market the mains input is for 120V, so it is necessary to use an external 12V supply. The receiver features a double conversion circuit, SSB and CW as well as AM, five-digit frequency readout (LED), and connections for balanced 50 ohm or high impedance wire aerials. At £349.95 it's not a cheap receiver, but Heathkit have a good reputation for their after sales service and setting up service if you should be in trouble.

For the VHF/UHF scanner enthusiasts there is the GR740, also by Heathkit. This has forty programmable channels in seven bands with direct keyboard tuning. Bands are 30-50, 118-136, 144-148, 148-174, 421-450, 450-470, and 470-512MHz with search and full scan facilities. There are also priority and lock-out facilities and search limitation. Once again, not a cheapie at £249.95 but a superb kit. Complete to the last screw.

Also from Maplin is their direct conversion 80m receiver at £18.95 (basic kit, case and fixings extra). This covers 3.5-3.8MHz with a simple single board circuit which is quite simple to construct and requires little in the way of test equipment to set up.

Cirkit Holdings market the RX80 HF communications receiver, which is not one but nine separate kits plus a 22-way switchbank! The price varies according to how many bands and which facilities you require, but the complete set-up would be in the range of £300. This includes digital readout, NBFM, 2 metre coverage and the power supply, and is a complete kit with all parts. It covers 1 to 30MHz with crystal controlled HF modules for each of eleven bands. Very comprehensive!

Cambridge Kits produce some interesting and unusual kits. Amongst these is one for a receiver for 10-150kHz! If you want to do some unusual listening then this little direct conversion receiver is an interesting project which includes all parts and costs £26.20 including P&P. There are also a number of receive converters available from this company, including one for the 50 and 70MHz bands at £33.30.

Superb kits

Howes Communications are no strangers to readers of this column. Latest in their range of superb kits is the TRF3, which is a tuned radio frequency broadcast receiver covering 5.7 to 12.8MHz in three bands. It has a signal attenuator and switched antenna input for different types of antenna. The price is £13.90 plus the cost of a suitable tuning capacitor and case, etc (about another £5).

The Howes DCRx has proved itself to some of our readers, who have logged over 100 countries with it. Available for individual bands at £14.80, this kit is extremely easy to construct and includes all the board mounted components includ-

ing coils. The instructions are very clear and explain each step. Ideal for beginners.

Having made your receiver, you will need an antenna tuner to match that odd bit of wire to the input impedance of the receiver.

Cirkit are marketing the TAU antenna tuner in kit form. This system uses very high quality components and, subsequently, is not cheap. However, the ATU will handle 5kW, so is pretty meaty, and the capacitors and roller coaster are beautifully made. The cost is around £150.

At the other end of the market, the Cambridge antenna tuner covers 100kHz to 30MHz in six ranges and can be modified for use as a wavemeter or field strength meter. It will handle 10W and has high 'Q' coils and an air dielectric capacitor. Reasonably priced at £28.20 complete.

A good buy

The Howes CTU30 is another reasonably priced ATU which uses the 'T' network with two Jackson air-spaced capacitors. This model has a balun for feeding balanced antennas and the kit includes all parts except for the cabinet and antenna connectors. A good buy at £24.90.

D J Stanton have the AT130 by Dominant at £40. This is of Pi network design with twin capacitors, twelve position tapped coil and covers 1-30MHz. Other versions using 'T' match and Trans-match circuits are planned for the future.

So, having got the signal into the receiver, let's have a look at the output end of the set-up. There are all sorts of off noises on the bands from stations operating close (and sometimes on top of!) the one you are trying to log, and anything you can do to eliminate, or at least reduce, background noise can only be to the good.

Maplin have a nice kit in their 'DXer's audio processor'. This has a low-pass filter giving 36dB per octave over 2.5kHz, a high-pass filter with 18dB per octave attenuation under 150Hz and an expander which attenuates noise during the breaks in speech. At only £9.95 for the kit this is a good buy and recommended, especially for SSB reception.

Cambridge Kits have a 'tunable audio notch filter', which

has a 40dB notch, a built-in speaker amplifier and tunes from 350-5000Hz. This kit comes complete at £19.90.

Cirkit do a very nice 'active SSB/CW filter', but this is marketed as a module rather than a kit as such. At £15.87 it represents good value, but you'll have to complete the job of boxing it, etc.

References

Maplin Electronic Supplies, PO Box 3, Rayleigh, Essex SS6 2BR

Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts EN10 7NQ

Cambridge Kits, 45 Old School Lane, Milton, Cambridge

Howes Communications, 139 High View, Vigo, Meopham, Kent DA13 0UT

D J Stanton (Radio), 16 Addison Road, Worcester WR3 8EA

Naturally, not all the kits available from these companies are listed but those that are not are featured in the catalogues and often reviewed in this magazine.

And so to this month's mailbag... and what a bag it was too! First to Peter Oliver of Paisley, who didn't even give me a chance to get the new Broadcast Listeners' Award printed before his claim dropped through the letter-box! With broadcast stations featured from Europe, the Middle East, Africa, Asia and Australasia, the Americas logged on short wave and most of Europe on medium wave, the list was very interesting. Peter also logged Mexico on his TV, but I think it must have been something to do with some sort of sports news (!). Being an Englishman living in Scotland must have been real hell, Pete! By the way, if you happen to be near Glenrothes on 13 September, keep your eyes peeled for Peter at the Scottish rally!

DXing from a sunlit African plain must sound like heaven to most of us stuck in the back-shed sheltering from the rain! Stan Porter, ORS45992/7Q7-001, out in Malawi, runs his FRG7, ICF2001, ICF7600D, etc through a dipole strung up between two pet giraffes (only kidding... I think)! However, he's managed to pull in BV2, AP2, BT1, CE0, D68, DU1, FP4, H44, HL1, KC4, PJ2 and a host of other choice

DX that made my eyes turn a funny shade of green as I wrote out his Gold award verification! Stan is one of those nice RNARS chaps too and a member of the Certificate Hunters' Club, with 38 decorations for his efforts, but our Lifeboat Award has really got him going! Well done Stan. Keep hunting!

Not allowing the 'exiles' to get away with it all, Frank Brown, RS88134, of Redcar, also hit me with a claim for Gold, with 1011 prefixes listed. These included some fine ones such as BV2, BY1, JT1, FK6, FO8, KH6, 3D2 and 5W1, with his two favourite ones being VE8RCS in Alert on Ellesmere Island and DP0GVN, with the German Antarctic station giving him the icing and the plate! Frank is on the hunt for the last few for his single band Gold for twenty and Silver for fifteen now, so I expect I'll have to go down to the engraver again.

Another one for Gold, this time from Jon J Sales G0AZJ of Lancaster, who used his FT200 to good effect. Jon believes the challenge of the awards has helped him become a better operator... they certainly get you listening hard, Jon! Among the crowd fighting to get into Jon's log were TK4, 9G1, HH5, XJ3, 6Y5, P29, VP9, ZC4, 8P6, HK6, VQ9, 5N9 and VU2. Jon is looking for a copy of Plus 2 Basic on tape. If anyone can oblige, drop him a line at 17 Chestnut Grove, Lancaster LA1 5RW.

Taking off!

Jim Marchant of Northfleet came up with the 500 for his Silver this month. Being relatively new at the game, Jim has really taken off over the past few months and is now using the G1FTU program for RTTY, recommending it highly (me too, Jim!). One area seems to be hiding from him so far, but Jim says he'll catch that KIWI or bust! He's now tuning over fifteen and ten and has found South Africa, Indonesia, Iraq and Syria amongst the usual fodder.

Corporal Ian Tough, ORS88350, in Akrotiri is trying to master the old dots and dashes 'cos he wants to get a nice ZC4 callsign! Meanwhile, back at the receiver, he hit me with Bronze and Silver claims at the same time, just to be clever! With AP2, AI5/TF,

BY8, CX2, HZ1, HK4, J28, JR4/4S7, J37, KP2, KX4, PY7, P43, T56, V44 and a mass of other juicy prefixes in the lists; Ian is certainly finding them out there with his FRG7.

Philip Le Brun, RS87677, of Cheltenham, put in his claim for bronze with 299 for starters with a threat of more to come. The Chinese also featured in his lists, along with A22, C39, EL0/MM, HP3, JW5, AA6, PT7, T77, VP2, VP8 and 5Z4, to name a few. Philip is doing his listening as part of his Duke of Edinburgh Award Scheme under the eagle eye of G3LP. Good luck, Philip!

Barrie Musselwhite of Warminster got back in action pretty fast and claimed his Silver with AP2, AL7, CS7, CX6, HV2, J41, LU4, XT2, YB2, ZB4, 5T5, 9Y4 and 8P6 high on the lists. Now he's on the hunt for the Broadcast Award. Well done, Barrie!

Last but not least

Last on the claims list this month is Osmo Salo OH3KN, from Riihimäki in Finland, who claimed the Bronze for two-way contacts. Osmo found the award a good challenge which helped his operating techniques. Now for the Silver, Osmo!

We must welcome Dines Bogoe of Dragoer, Denmark to the column. Dines, OZ-DR-2242, has joined the ILA crowd and hopes to be in on the award hunting. He uses the Trio TS430 with a two-element beam and a window from his QTH just south of Copenhagen Airport. Just the place for some air band listening, I should think, Dines!

By this time many listeners will know if their hard efforts at the RAE have been rewarded with that pass slip. Don Pye of Edware is one of those waiting patiently at the time of writing but has a local council with an aversion to anything resembling aerials, so even two metres is going to be dodgy. Don has joined up with Tony Blackburn in the Firefighters Group and is just itching to get on the net with the gang!

Welcome to R A Bell of Bradmore, who is using the Trio JR310 with a 30m end-fed and lists HK7, PY1, HR1, ZP5, ZS6, VP2, 9Y4, VK6 and XA1, so the rig seems to be pulling them in.

Newcomers to the column from abroad include

Antonella and Moreno Rossi of Acquaviva in Italy. The brothers are very active listeners using an Icom R70 and a Mark 82 set for HF and a Yaesu FRG9800 for VHF and UHF. It seems that the authorities are the same in Italy as they are here as regards aerials, so the boys have to use indoor types. Welcome to the column, lads.

Chris Gibbs of Camberly is using the Trio R1000 and Sait MR1411 fed through a Yaesu FRT7700, with a long wire

running N-S and an AD370 active antenna. Chris's interests are stated as 'broad' but adds that RTTY is of particular interest at the moment, with his BBC B doing the necessary alongside his home-brew RTTY/CW decoder.

From newcomers to the column we go to an old-timer on the listening front, with a very nice letter from Howard Done of Barry. Howard has been a listener since the pre-war years of 1937. Presently using the Trio R2000, he has

used many receivers in the past, from a Paulette 3, AR88, CR100, modernising to the FRG7 and 7700. Aerials include a full-size G5RV for HF, with GP5 for VHF and GP7 for UHF. Howard makes the often repeated remark that 50MHz is very much under-used, and after all the trouble taken to get the band too!

Howard's comment on 50MHz raises the point about the bands as a whole, in fact. Have we gone too far with the granting of licences for new

bands? Do we need more or are the ones we have being used? Reports from listeners often add the comment that the 10, 18 and 24MHz bands are quiet and 2 metres is often the same.

Well, having thrown the proverbial muck at the fan, I'm now going to hide before it flies back! So, until next month, keep listening and enjoy what's left of the summer. Correspondence should be sent to 1 Jersey Street, Hafod, Swansea SA1 2HF.

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CONTEST LOGGING

Why use one computer when you can use two? Joe Kasser G3ZCZ explains how to log contacts quickly and accurately

Contests are a natural application of computers to amateur radio. After all, the purpose of a contest can be stated as gathering data (the calls and reports of stations worked) in such a way as to avoid duplicates. When working contests in a manual (non-computer) mode, if you desire to avoid duplicates you usually have to keep two sets of records for each contact. The log entry has to be made and a duplicate sheet of some kind has to be kept to give real time notice of potential duplicate contacts.

Major contest operators do things quickly. When one is working a pile-up, the calls have to be logged quickly and accurately and duplicates have to be weeded out speedily. For that reason, the job of contest logging is dedicated to one computer. If the station log, comprising general QSO data as well as logs of past contacts, is available on disc, a second computer can be used to scan that log in real time and notify the operator of previous contacts.

This is a great piece of one-upmanship, for now you can not only tell other stations that the QSO is a duplicate, you

can also tell them when you worked last time, and ask them if they have received your QSL card and why they haven't sent you one (if you have the time and the inclination).

The contest program

The use of a good contest logging program simplifies the paper work during and after a contest and allows the operator to concentrate on working stations. During the contest, the operator has only to perform the following tasks: a) Enter the callsign of the station worked; b) Enter the report received; c) Tell the computer to log the contact.

The computer takes care of the rest of the data handling, and thus performs the following tasks: a) Keeps a check-list in memory to notify the operator if a contact has been made on the same (duplicate) or another band; b) Updates date and time information automatically; c) Stores the contact data in a floppy disc file.

Consider the two programs needed to provide this capability and the linkage between them.

The contest logging program gives the

operator the following choices:

C Enter the Call of the station to be or being worked. When the call is entered, the computer will perform a check to see if the call has already been worked and if so on what band. If the call has been worked on the band in use at that time it will also display the word DUPLICATE.

R Enter the Report received into the log.
L Enter the QSO information into the Log-book/check-list. The data is written into the log file in ASCII format, delimited with commas. This makes it easy to modify with a word processor and read into the program used by the second computer. You may also list the contents of the log file to the screen under DOS using the 'TYPE' command.

F This command is used to flag an erroneous log entry. Since the log on disc is a sequential file and the log data is not double buffered by the program, once an entry is written into the log it is gone. This command deletes the call from the check-list and puts a '/' entry into the log-book. You may use your favourite word processor (in the non-

Fig 1 Contest program

```
10 ON ERROR GOTO 950
20 BA="G3ZCZ CONTEST LOGGING PROGRAM VERSION 1.95":CLS:WIDTH 80:LOCATE 10,1:PRINT BA
30 BANDS="7:179:4000:D1M:8(179),F1(179),B1(BANDS):R1="00":S1="59":C1="?"
40 BLANK=""
50 C1="RANDOMFL/0?":L0="BLANK":Q1="":Q1="Q1:R1:118:58:518:119:48:L28=L08:L38=L08:L48=L08
60 L5=L08:L6=L08:L7=L08:L8=L08:L9=L08:L10=L08:L11=L08:L12=L08:L13=L08:L14=L08:L15=L08:L16=L08
70 FOR I=1 TO BANDS:READ B(I):NEXT:DATA 1,4,16,64,256,1024,4096
80 FOR I=1 TO BANDS:READ B(I):NEXT:DATA 10,15,20,40,80,160,2
90 LOCATE 12,1:INPUT "Enter name of LOG file (D:NAME) Log type .LOG Assumed ",L4:IF L4="" THEN 90
100 GOSUB 800
110 OPEN L4+".LOG" FOR OUTPUT AS #2
120 OPEN L4+".LOG" FOR INPUT AS #1:LOCATE 20,1:RETURN
130 GOSUB 300 :GOSUB 390 :GOSUB 420:GOTO 800
140 LOCATE 23,1:PRINT "LOADING LAST ENTRY STRINGS":OPEN L4+".CHK" FOR INPUT AS #3
150 INPUT#1,C4,T4,B4,C4,R4,S4,M4,P4,Q4,D4,R4 : PRINT #4,C4,T4,B4,C4,R4,S4,M4,P4,Q4,D4,R4
160 PRINT "OPENING LOGBOOK":L4=M4-B
170 IF EOF(1) THEN GOSUB 650:INPUT "Waiting, touch ENTER to continue ":A4:GOTO 800
180 INPUT#1,C4,T4,B4,C4,R4,S4,M4,P4,Q4,D4,R4 : PRINT #4,C4,T4,B4,C4,R4,S4,M4,P4,Q4,D4,R4
190 GOSUB 270:M4=C4:R4=S4:M4(B4):FOR Q4=1 TO BANDS:IF INT(F1(B4)-Q1(1))+Q1(2)-Q1(3)+Q1(4)-Q1(5):GOTO 210
200 NEXT
210 PRINT#2,Q4,"";T4,"";B4,"";C4,"";R4,"";S4,"";M4,"";P4,"";Q4,"";D4,"";R4,"";I4:GOTO 170
220 LOCATE 26,1:PRINT BLANK$:LOCATE 28,1:RETURN
230 L0="BLANK":MID$(L0,6)+M4:R0="BLANK":MID$(R0,6)+M4:Q0="BLANK":MID$(Q0,6)+M4:Q1="BLANK":MID$(Q1,6)+M4
240 IF C4="" THEN MID$(L0,1)="" ELSE MID$(L0,1)=M4:Q1="BLANK":MID$(Q1,1)=M4:M4(4,2)
250 MID$(L0,45)+M4:MID$(L0,49)+M4:MID$(L0,53)+M4:MID$(L0,57)+M4:RETURN
260 T4=LEFT$(TIME$,2)+MID$(TIME$,4,2)+MID$(DATE$,2)+"/"+LEFT$(DATE$,2)+"/"+MID$(DATE$,4,2):RETURN
270 J=0:IF C4="" THEN 350
280 FOR I=1 TO LEN(C4):A4=MID$(C4,I,1):J=J+(ASC(A4)-47)*25:IF J/10 THEN J=0
290 IF J#9 THEN J=J#9 : GOTO 290
300 IF LEN(M4(4))<1 THEN 350
310 IF LEFT$(M4(4),1)="" THEN 350
320 IF LEFT$(M4(4),LEN(C4))=C4 THEN 340
330 J=J+1:GOTO 290
340 I=0:RETURN
350 I=1:RETURN
360 INPUT "REPORT RECEIVED ":I4:RETURN
370 GOSUB 220:INPUT "REPORT SENT ":S4:IF S4="" THEN 370 ELSE RETURN
380 GOSUB 220:INPUT "POWER (watts) ":P4:IF P4="" THEN 380 ELSE RETURN
390 GOSUB 220:INPUT "BAND ":F4:IF F4="" THEN 390
400 FOR I=1 TO BANDS:IF INT(F4)=B(I) THEN 410 ELSE NEXT:LOCATE 22,1:FOR I=1 TO BANDS:PRINT B(I):";":NEXT:GOTO 390
410 R4=MID$(STR$(F4),2):R4=I2:GOSUB 650:RETURN
420 GOSUB 220:INPUT "MODE ":M4:IF M4="" THEN 420 ELSE RETURN
430 GOSUB 220:INPUT "CALL SIGN ":A4
440 IF A4="" THEN 430:IF LEFT$(A4,1)="" THEN A4=LEFT$(A4,LEN(A4)):GOTO 440
450 LOCATE 22,1:PRINT BLANK$:LOCATE 22,1:C4=A4:GOSUB 270:IF I=1 THEN PRINT "OK":GOTO 510
460 F2=F1(I):PRINT "WORKED ON ";
470 FOR Q1=BANDS TO 1 STEP -1:IF F2=Q1(1) THEN 500
480 PP=INT B(I(2)):"";F2=F2-B(I(2)):IF B(I(2))=INT(F) THEN PRINT "DUPLICATE":CHR$(7);
490 IF F2=B(I(2)) THEN 470
500 NEXT
510 RETURN
520 GOSUB 220:INPUT "ARE YOU SURE ":A4:IF A4="" THEN RETURN
530 IF M4(1) THEN GOSUB 220:PRINT "CAN'T FIND A ZERO ENTRY":RETURN
540 IF A4="" OR LEFT$(A4,1)("<")="" THEN RETURN
550 C4=C4:GOSUB 270:F1(I)=F1(I)-B(I):IF F1(I)=0 THEN M4(I)=""
560 C4=""/:GOTO 600
570 IF LEN(M4)=0 THEN 580 ELSE IF LEFT$(C4,1)="" THEN 580 ELSE 590
580 LOCATE 22,1:PRINT BLANK$:LOCATE 22,1:PRINT "GET THE DATA FIRST":RETURN
590 C4=C4:GOSUB 270:F1(I)=F1(I)+B(I):M4(I)=C4
600 PRINT#2,Q4,"";T4,"";B4,"";C4,"";R4,"";S4,"";M4,"";P4,"";Q4,"";D4,"";R4,"";I4
610 IF C4="" THEN 620 ELSE M4=M4+1:GOTO 630
620 M4=M4-1:IF M4=0 THEN M4=0
630 GOSUB 220:L13=L12:L12=L11:L11=L10:L10=L9:LOCATE 1,5:PRINT B4
640 L9=L8:L8=L7:L7=L6:L6=L5:L5=L4:L4=L3:L3=L2:L2=L1:L1=L0:GOSUB 660
650 C4=""/:R4=S4:M4=I4:RETURN
660 I=3:GOSUB 700:PRINT L13:I=4:GOSUB 700:PRINT L12:I=5:GOSUB 700:PRINT L11:I=6:GOSUB 700:PRINT L10
670 I=7:GOSUB 700:PRINT L9:I=8:GOSUB 700:PRINT L8:I=9:GOSUB 700:PRINT L7:I=10:GOSUB 700:PRINT L6
680 I=11:GOSUB 700:PRINT L5:I=12:GOSUB 700:PRINT L4:I=13:GOSUB 700:PRINT L3:I=14:GOSUB 700:PRINT L2
690 I=15:GOSUB 700:PRINT L1:RETURN
700 LOCATE 1,1:PRINT BLANK$:LOCATE 1,1:RETURN
710 GOSUB 220:INPUT "ARE YOU SURE ":A4:IF A4="" THEN RETURN
720 IF LEFT$(A4,1)("<")="" THEN RETURN
730 CLS:PRINT "SAVING LAST ENTRY STRINGS BEFORE CLOSING":OPEN L4+".CHK" FOR OUTPUT AS #3
740 PRINT#3,L13,"";L12,"";L11,"";L10,"";L9,"";L8,"";L7,"";L6,"";L5,"";L4,"";L3,"";L2,"";L1
750 CLOSE#3:CLOSE#1:CLOSE#2
760 KILL L4+".BAK"
770 NAME L4+".LOG" AS L4+".BAK"
780 NAME L4+".BAK" AS L4+".LOG"
790 GOTO 1000 : REM END
800 GOSUB 800:LOCATE 1,5:PRINT B4:L4:GOSUB 660
810 LOCATE 17,30:PRINT "CURRENT ENTRY":GOSUB 260:GOSUB 230
820 MID$(L0,1)=STR$(M4+1):LOCATE 16,1:PRINT BLANK$:LOCATE 16,1:PRINT STR$(M4+1),C4,I4
830 GOSUB 220:INPUT "ORU ":A4:IF A4="" THEN 830
840 FOR I=1 TO LEN(C4):IF LEFT$(A4,I)=MID$(C4,I,1) THEN 850 ELSE NEXT:GOTO 830
850 GOSUB 220:ON I=2:GOSUB 360,370,380,390,420,430,520,570,710,890,860:GOTO 810
860 LOCATE 21,1:PRINT BLANK$:PRINT BLANK$:PRINT BLANK$:RETURN
870 LOCATE 22,1:PRINT L0:RETURN
880 CLS:KEY OFF:LOCATE 25,1:FOR I=1 TO LEN(C4):PRINT MID$(C4,I,1)";":NEXT:RETURN
890 GOSUB 220:INPUT "ARE YOU SURE ":A4:IF A4="" THEN RETURN
900 INPUT "WHICH PREFIX ":A4:IF LEN(A4)<1 THEN A4=""
910 I=0:FOR I=1 TO M4:IF LEN(M4(I))<2 THEN 940
920 IF A4="" THEN 930 ELSE IF A4=LEFT$(M4(I),LEN(A4)) THEN 930 ELSE 940
930 PRINT M4(I);";":I=I+1:IF I=4 THEN I=0:PRINT
940 NEXT:PRINT:INPUT "READY WHEN YOU ARE, HIT ENTER TO CONTINUE":A4:CLS:GOSUB 800:GOSUB 660:RETURN
950 IF ERL=120 THEN OPEN L4+".LOG" FOR OUTPUT AS #3:CLOSE#3:OPEN L4+".LOG" FOR INPUT AS #1:RESUME 130
960 IF ERL=140 THEN PRINT "CHECK LIST ERROR, RECOVERING...":RESUME 160
970 IF ERL=760 THEN RESUME 770
980 PRINT "ERROR":ERR; " AT LINE ";ERL
990 RESUME 800:REM CLOSE DOWN IN AN ORDERLY MANNER
1000 END
```

Fig 2 Find program

```

*CALLFIND VERSION 85-09-10 (STAND ALONE VERSION)

*LOCAL VARIABLES callflag,callheard
SET TALK OFF

USE logbook INDEX logbook
STORE T TO callflag

*MAIN LOOP
DO WHILE callflag
  GOTO TOP
  ACCEPT "Call/Prefix (* To terminate) ~" TO callheard

  IF callheard = "*"
    STORE F TO callflag
    * CLEAR LOOP CONTROL FOR EXIT
  ELSE
    ERASE
    ? "Log entries for CALL PREFIX = ", callheard
    ?
    ? " ENTRY"
    ?? " CALL DATE TIME BAND 'X' RX MODE S R COMMENTS"
    ? "-----"

    FIND %callheard
    IF # = 0
      @ 5,1 SAY callheard
      @ 5,12 SAY "does not appear to be in the log"
    ELSE
      DO WHILE call = callheard.AND. (.NOT.EOF)
        ? @,call,date,time,band,rx,tx,mode,qslsent,qslrx,comments
        $P IP
      ENDDO
    ENDIF
  ENDIF

  * RESET POINTERS
  GOTO TOP
ENDDO

* GET READY TO EXIT
RELEASE callflag,callheard
RETURN
    
```

document mode) to delete that entry and the previous one from the log-book when the contest is over.

Q Check the log entry data on the screen before saving it in the log file. This command may be used, for example, to verify that the correct band data is set after changing bands.

X Enter the signal report Xmitted to the other station into the log.

/ This command is used to scan the contents of the check-list for prefixes. You use this when you are sure that you have worked a station but the computer tells you that you haven't. You may also use it to check if a prefix has been worked as a help in deciding if you want to get into a pile-up or pass it by.

The computer will prompt you to enter a prefix. If you want to look at all the calls in the check-list, enter an asterisk as the desired prefix and you will get a list of every call in the check-list in the order in which they were inputted.

W Enter the transmitter power used in Watts into the log-book.

Indexed DBASE2 data file structure

Fid	Name	Type	Width	Comment
001	DATE	C	008	Date in format YY/MM/DD
002	TIME	C	004	Time in format HHMM
003	BAND	C	003	Band, eg 10, 20, 40
004	CALL	C	010	Call sign
005	RX	C	003	Signal report received
006	TX	C	003	Signal report transmitted
007	MODE	C	004	Mode of QSO, eg SSB, FM
008	POWER	C	004	Transmitter power
009	QSLSENT	C	001	QSL sent info, eg B (bureau)
010	QSLRX	C	001	QSL Rx info, eg R (received)
011	COMMENTS	C	010	Comments and notes

M Enter the Mode used in the contest in the log. You may enter anything, but the most commonly used ones are SSB and CW.

***** This command terminates the program. It saves the data associated with the last 12 contacts in a file with the '.CHK' extension, so that when the program is restarted the operator will not even notice that a break occurred. The disc files are closed and any previous file present from the start of the session is named as a back-up file.

? This command clears the screen dialogue lines.

It is normally used rarely, only in the event that the Basic interpreter generates an error message in response to a user input.

The typical one normally seen is 'REDO FROM START' which results from an alphabetical response to the BAND command, where Basic is looking for a number not a string.

Database search program

The second program is run on a second computer. It contains the logs of previous contacts in one large database. As the contest logging program is being run, whenever the operator enters a call sign to be checked the same call sign is output to the second computer and a search of the database (old logs) is made to see if the call is in the log. If it is, all previous contacts are listed. If not, a message to that effect is displayed. If the two CRTs are placed side by side, all the information is available to the operator literally at a glance.

Consider what additional information the operator has 'on-line': a) All previous contacts with any one station; b) By entering the prefix for a particular country, all contacts with that country (and more importantly the QSL status for DXCC purposes) made before the contest may be seen. This is an aid for deciding whether to join or stay in a pile-up for a DX contact.

Contest logging program

The contest logging program listed in *Figure 1* is a stand-alone program. That means that it may be run as is, without the second (database) program. It is the latest version (at the time of writing) of several generations of contest logging programs. This version is written in Basic for the IBM PC and compatible computers.

The following brief outline is presented as an aid to following the operation of the program:

- 10 Error trapping vector.
- 20 Heading.
- 30 Setting up and defining parameters (space for 4000 contacts).
- The following bands are recognised: 10, 15, 20, 40, 80, 160, 2.
- 90 Enter name of log file. It is usually the name of the contest, such as WPX85, or ARRL85. The program adds the file extension '.LOG' automatically, and creates a back-up ('.BAK') as needed.
- 110 Opens the disc files.

Fig 3 Update program

```

*LOGUPDATE VERSION 850911
*UTILITY TO ENTER CONTEST LOG DATA INTO DATABASE BY HAND

SET TALK OFF

USE logbook

STORE T TO callflag

GOTO BOTTOM
STORE call TO lastcall

*INITIALISE NEW VARIABLES
STORE date TO ndate
STORE time TO ntime
STORE band TO nband
STORE power TO npower
STORE mode TO nmode
STORE rx TO nrx
STORE tx TO ntx

SET INDEX TO logbook

*MAIN LOOP
DO WHILE callflag
  ERASE
  STORE "-" TO nqslsent
  STORE "-" TO nqslrx
  STORE " " TO ncall
  STORE " " TO ncomments
  STORE " " TO logflag
  STORE T TO dataflag

  DO WHILE dataflag
    @ 10,1 SAY "LAST CONTACT WAS"
    @ 10,20 SAY lastcall
    @ 12,1 SAY "DATE"
    @ 13,1 SAY "TIME"
    @ 14,1 SAY "CALL"
    @ 15,1 SAY "BAND"
    @ 16,1 SAY "POWER"
    @ 17,1 SAY "MODE"
    @ 18,1 SAY "REPORT (RX)"
    @ 19,1 SAY "REPORT (TX)"
    @ 20,1 SAY "COMMENTS"
    @ 23,1 SAY "logit (+BL)"

    @ 12,13 SAY ndate
    @ 15,13 SAY nband
    @ 16,13 SAY npower
    @ 17,13 SAY nmode
    @ 18,13 SAY nrx
    @ 19,13 SAY ntx

    @ 13,13 GET ntime
    @ 14,13 GET ncall
    @ 20,13 GET ncomments
    @ 23,13 GET logflag
    READ

  DO CASE

  CASE logflag = "*"
    STORE F TO callflag
    STORE F TO dataflag

  CASE logflag = "L"
    *LOG ENTRY
    APPEND BLANK
    STORE F TO dataflag
    REPLACE qslsent WITH nqslsent
    REPLACE qslrx WITH nqslrx
    REPLACE date WITH ndate
    REPLACE time WITH ntime
    REPLACE call WITH ncall
    REPLACE band WITH nband
    REPLACE power WITH npower
    REPLACE mode WITH nmode
    REPLACE rx WITH nrx
    REPLACE tx WITH ntx
    REPLACE comments WITH ncomments
    STORE call TO lastcall
    STORE " " TO ncall
    STORE " " TO ncomments

  CASE logflag = "B"
    @ 15,12 GET nband

  ENDCASE
  ENDDO

  * GET READY TO EXIT

  RELEASE logbook,callflag,lastcall,ndate,ntime,nband,npower
  RELEASE nmode,nrx,ntx,nqslsent,nqslrx,ncall,ncomments
  RELEASE logflag,dataflag

  RETURN
    
```

CONTEST LOGGING

- 140 Reads the previous contacts into the log, after the program has been terminated, during a break in the contest operation.
- 220 Subroutine to reset the prompt line.
- 230 Subroutine to set up the current data line.
- 260 Subroutine to re-arrange the date and time strings.
- 270 Subroutine to check if the call has already been worked.
- 360 Subroutine to accept the report received.
- 370 Subroutine to accept and override the default report sent information.
- 380 Subroutine to set up the 'power' information for the log.
- 390 Subroutine to set up the 'band' information for the log/check-list.
- 420 Subroutine to set up the 'mode' information for the log.
- 430 Subroutine to accept and process the call of the station being worked.
- 520 Subroutine to fudge a contact.
- 570 Subroutine to log the contact (puts the data in the log and check-list).
- 600 Subroutine to display string data of previous 12 contacts on screen.
- 710 Subroutine to terminate the program and name the log files properly. The last 12 contacts are saved in a file with the '.CHK' extension, so that the display when the program is restarted will appear as if the break had never taken place.
- 800 Main loop.
- 860 Subroutine to clear the screen dialogue area.
- 870 Subroutine to display the data associated with the contact (QSO) in progress (current contact).
- 880 Subroutine to display prompt line at bottom of screen.
- 890 Subroutine to display all calls in the check-list, in the order that they are in the list.
- 950 Subroutine to perform error trapping and recovery.

The variables and parameters used in the program perform the following tasks:

- B() Binary code for each band.
- B% Index into B() and B1() for band in use.
- B1() Bands.
- BANDS Number of bands recognised.
- F User band information.
- F1() Part of check-list for band that QSO was made on.
- F2 Temporary band information for scanning check-list.
- I% General integer variable.
- J General variable (index into check-list).
- M9() Size of check-list (maximum number of QSOs).
- N4 Valid QSO count.
- Q% General integer variable.
- A\$ User answer string (holds operator input).
- BLANK\$ Line of space characters.
- B\$ Band.
- C\$ Call of station being worked.
- C4\$ String containing allowable command characters.
- C8\$ Call of previous contact.
- D\$ Formatted date.

Fig 4 Number program.

```
* NUMBER ADDS NUMBER TO COMMENTS
SET TALK OFF

STORE I TO qso:count

USE logbook

DO WHILE .NOT. EOF
  STORE STR(qso:count,10) TO number
  DO WHILE $(number,1,1) = " "
    STORE $(number,2,10) TO number
  ENDDO
  REPLACE comments WITH TRIM(number)+comments
  STORE qso:count + 1 TO qso:count
  ? call
  ?? comments
  SKIP
ENDDO

RELEASE qso:count,number
RETURN
```

Fig 5 Log conversion program

```
10 WIDTH 80:PRINT "LOG CONVERSION PROGRAM 2.0"
20 REM CONVERTS CONTEST LOG TO STANDARD LOG
30 INPUT "WHAT IS THE LOG NAME ";L$
40 CLS:M=1
50 OPEN L$+".888" FOR OUTPUT AS #2
60 OPEN L$+".LOG" FOR INPUT AS #1
70 IF EOF(1) THEN 160
80 INPUT@1,C#,T$,R$,CR$,R#,SR$,MS$,PR$,QSO$,GR$,IS
110 PR=LEFT$(R$,2):NR=STR$(N)+NR+I$(C#,2)
120 IS=I$(R$,3,LEN(I$)):IS=NR+" "+IS:NR=N+1
130 PRINT@2,C#;"T$";T$;"R$";R$;"CR$";CR$;"SR$";SR$;"MS$";MS$;"PR$";PR$;"QSO$";QSO$;"GR$";GR$;"IS$";IS$
140 PRINT @2;" ";T$;" ";R$;" ";CR$;" ";SR$;" ";MS$;" ";PR$;" ";QSO$;" ";GR$;" ";IS$
150 GOTO 70
160 CLOSE#1 : CLOSE#2
170 NAME L$+".LOG" AS L$+".RUN"
180 NAME L$+".888" AS L$+".LOG"
190 END
```

- DATE\$ Basic date string.
- G\$ Title.
- L\$ Name of contest log-book.
- LO\$ Current QSO line.
- L1\$-L13\$ Previous QSO lines.
- M\$ Mode.
- N4\$ Temporary QSO number string.
- P\$ Transmitter power.
- QR\$ QSL received information.
- QS\$ QSL sent information.
- R\$ Report received.
- R1\$ Default report value.
- S\$ Report transmitted.
- S1\$ Default transmitted report value.
- T\$ Formatted time string.
- TIME\$ Basic time string.
- W\$() Calls worked (check-list).
- X\$ Comments (used to hold received contest data).

Database search program

The second program is written in DBASE2, and assumes that the main station log-book is kept in an indexed DBASE2 data file with the structure shown in the table.

The index is given the same name as the log file using the statement 'INDEX ON CALL TO log-book', where 'log-book' is what you called the log. The floppy disc will thus hold two files, namely the actual database (LOGBOOK.DBF) and the index file (LOGBOOK.NDX).

The DBASE2 program to find the call in the database log is listed in *Figure 2*. The reason it is so small is that DBASE2 is a great language for playing with data. The program starts by initialising the variables and then enters a loop. The loop accepts a callsign or prefix from the terminal and searches the log for it.

If one is found, all calls beginning with the prefix are displayed. If the prefix or call is not found, a message to that effect is shown. The loop terminates when an asterisk is entered as the callsign, which is the same code for terminating the contest program.

Interfacing the programs

Up to now, two programs running on separate computers have been described. In order to make them work together they have to be interfaced. This is a custom task and may have to be performed in a different manner for

different computer pairs.

The contest program has to be modified to output the callsign to the second computer. It is recommended that this be done via the RS232 communications port. Line 115 should be added to output the relevant communications port (COM1 or COM2 at the baud rate desired, or as needed by the second computer). Line 445 should also be added to output the callsign (C\$) as each new call is entered by the operator.

Error trapping should be added at line 965, so that if something goes wrong with the RS232 interface or the second computer the contest program does not bomb, and will continue to work in a degraded manner in which the extra facility provided by the second computer is no longer available. It would also be good practice to add line 755 to close the communications link when the program is terminated.

Typical examples are:

```
125 OPEN "COM1:1200,N,8" AS #4
525 PRINT#4,C$
845 CLOSE #4
965 IF ERL = 445 THEN RESUME 450
```

In this example, the serial port is opened as a 1200 baud, no parity, 8 data bit and 1 stop bit communications line.

The second computer should preferably be one with a separate RS232 CRT terminal. If this is the case, its interface cable can be modified by removing the wire from the keyboard and routing it to the serial port connector of the first computer instead. Many 8-bit machines run CP/M-80 and DBASE2.

A program possibly also in Basic should be run on the contest computer so that it acts as a remote terminal to start up the second computer, load DBASE2 and enter the CALLFIND command. As this is a software article, there isn't really space to describe the customisation process in detail. If you are not sure of what to do, there is probably someone in your local club who could advise you.

The database

In order to use the two programs together, the DBASE-database should have some data in it. This means that entries from old log-books need to be copied into the computer. If the log is

CONTEST LOGGING

large it may take a long time (a great way to spend your time while 'reading the mail'), so a DBASE2 program called UPDATE (listed in *Figure 3*) may be used to speed up matters. This update program is optimised for entering data from old contest logs into the DBASE2 database.

The first entry should be made manually using the APPEND command in an interactive manner to set the date, mode and power information. The UPDATE program is then invoked by the 'DO UPDATE' statement. After the contact data for each QSO has been input, the program prompts for a decision. It gives the operator the choice of three things to do:

- ★ Terminate the program
- L Log the entry into the database
- B Change the band information

It must be repeated that this program is designed for rapid entry of old contest logs into the database, logs in which the only differences between one entry and the next are the time, callsign and reports, with the occasional change of band. Any other data must be set or changed using DBASE features.

After the data is in the database, use the following statements to massage the data a little. To duplicate the report from the comments column to the report column use the following interactive command:

REPLACE ALL rx WITH \$(comments,1,3)

Then, to delete the report from the comments column, use this statement: REPLACE ALL comments WITH \$(comments,3,10)

If you want a serial number added to each comment line, perform the NUMBER command listed in *Figure 4*. This program is an example of string handling in DBASE2.

Post contest updates

Once the contest is over, the log file must be corrected using a word processor to delete any fudged entries. A program to do this job was available in the original package described in my book *Software for Amateur Radio* (Tab Books, number 1560), but has not been converted to Microsoft Basic because it was found that some editing was always performed on the log.

Serial numbers can be added to the comment space in the log and the report area set properly by the LOGCONV program listed as *Figure 5*. This program reads each line of log information, strips the report section from the comments and puts it into the report space (line 110), adding the serial number of the contact into the comments space (line 120). When the program has done its job, the original log has been renamed with a '.RUN' file extension while the converted log data file has the extension '.LOG'.

The log file is now ready to be converted to a DBASE format file for further processing. If the second machine that contains the database is not an IBM PC or compatible, the contest.LOG file has to be transferred to a disc that the second machine can read using one of the format transfer programs readily available.

Summary

This article has shown how two computers, each running separate programs written in different languages, may be linked together into a multi-tasking operation during an amateur radio contest.

If two machines are not available, it is still worthwhile to use the programs separately in series. The contest program is run during the contest, the data then transferred to the database file format and checking can commence. Other programs written in DBASE2 may then be used to generate DXCC records, perform QSL functions, or what have you.

A floppy disk bearing updated versions of the programs has been submitted to the IBM PC User's Group and is available from: The IBM PC User's Group, PO Box 593, London SW1 2PG

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I scarcely knew the code for SOS in 1939 at the outbreak of war, but by 1945, thanks to training and practice in Bomber and RAF transport commands, 30wpm could be read with passable accuracy.

It was almost impossible to face life in 1946 without the thought of some involvement in radio, but listening on the medium wave broadcast bands was a bit of an anti-climax after calling up group controls in Malta and Cairo, for instance, on the key during the many flights abroad.

It was in early 1947 that a rather strange aerial was seen to be moving around above the chimney of a neighbouring house and, having been used to arrangements of wires on aircraft, a moving aerial was a bit of a surprise. Obviously a case for further investigation!

A tactful call was made on the owner of this strange phenomena, G2TA, who was soon to be unravelling the mysteries of amateur radio, the efficiency and results to be obtained using his 'beam', the right times and bands to use, the best equipment, magazines and the correct society to join.

All this new-found knowledge was soon put to good use and the construction of a battery powered 1v1 receiver fed with a 66ft end-fed wire in the garden was undertaken.

I vividly remember the disbelief when the first callsign I'd ever heard, VS1IT, came over the headphones, soon to be followed by KP6AA who sent his QSL card in 1961. His QSL details were not known until 1960 but he still had a few of his old KP6AA cards left!

As the price of the batteries for the 1v1 kept rising it was decided that it would be cheaper in the long run to invest in a mains powered receiver, so the Eddystone 740 found its way into the shack for the princely sum of £35! As this superb piece of equipment is *still* in operation, it must rate as the best £35 ever spent. They don't make them like that today!

Those first two callsigns were the beginning of over forty years of absorbing pleasure listening on the bands and, in the early days, operating the key (which was possible at that time provided a licensed person was supervising), hunting the DX and receiving 95% of their cards (perhaps due to the CW), and trying to log more calls than the other chaps in the monthly 'set periods' specified by magazines of the time, and trying out different aerials and so on.

Up until about 1960 the combination of an ATU and preselector on the 1v1 and a Q multiplier on the 740 brought in 320 countries and, as only inhabited islands seemed to be left to hear, a move was made to the short wave broadcast bands.

It became a bit tiresome trying to find new broadcast countries after 120 had been heard and, as this was considered a good score (until one listener notched up 145!), a return was made in 1981 to the amateur bands.

In passing, it was generally found easier, and quieter, to 'winkle out' a weak

amateur CW signal from ten thousand miles away than it is to do the same to a broadcast station using 250kW in, say, Africa.

It may help the newcomer, and even interest some old hands, if the methods used when listening are explained.

The early years were spent at the receiver listening intently until most of the 'easy' countries had been heard. It then became obvious that a more subtle method of listening would pay off and save many hours of fruitless searching. This approach paid dividends as the quality of logged callsigns improved and less time was spent on the bread and butter stuff.

Casual listening consisted of skipping fairly quickly through the band to see if there were any DX pile-ups (let the Txers lead one to the DX) then, if there wasn't a 'dog fight', checking the stronger signals. DX sometimes comes in quite strongly.

It was found worthwhile to dig down to about the third layer of signals and concentrate on the really weak ones, ignoring the strong, and gradually work up to the top layer again, clinging to the S2 signals that sound as though they might prove fruitful as they often peaked up to S4 or so; closed eyes helped concentration.

The AF gain was turned back while listening to a strong station and turned up to hear the weaker one. With CW, the reverse applies when using the RF gain as the control.

When hunting the DX it is important to get as much information as possible just before looking for that rare or wanted country or island. Firstly, this can be obtained from 'over the air hot news' by listening for the Txers discussing frequencies and times for 'skeds' and working out listing arrangements, from keen fellow DX chasers or, finally, from magazine DX columns – provided that they are well in advance of the date.

Have a listen on the receiver for stations that are currently on or coming on.

If the station is on but his transmitting period is going to be short, gun for it continually. Otherwise keep checking his planned frequencies, repeatedly making spot checks; it's not wise to listen for long periods on one spot.

Watch for the well-known DX operators, such as G6ZO and G3AAE, to name but two, who are likely to be there quietly listening for an opportune

A LIFETIME OF LISTENING

Goff Curtis BRS20104 has been a short wave listener since the '30s. Here, Goff tells us of some of his experiences

moment to pounce and lead us to the DX we are hunting.

The beacons on 14100 give a fairly good clue as to the propagation conditions and what areas may or may not come through. If those outside Europe are not coming in it's generally an idea to switch off and try again later that day or the next.

W1AW propagation forecasts are sometimes of help to UK listeners and can be found around 14068 at 1400GMT.

Apart from normal reasoning, hearing DX is largely a mixture of luck and patience and even the simplest receiver can be used if the DX is around.

Naturally, the better the receiver, the better chance you have and the same goes for aerials. A dog *can* walk on two legs, but it's more efficient on four!

Another useful item of equipment to the listener is the tape recorder. Aside from the obvious uses, I use it for recording the more unusual calls – to be drooled over later. The QSL card is nice, but the recording of the actual transmission as received is more interesting than a card with TNX QSL 73. *Really* rare stations are sent two cards by airmail and bureau, with as much information as possible and an accompanying letter of appreciation. CW reports are especially welcomed by most DX stations, and one Pacific station replied, 'Thanks for the *first* CW report ever'. Another included my QTH in his next call to this area.

Finally, over my many years of listening, and especially DXing, it's always been an absorbing and interesting, but *never* boring, hobby. There's always something to listen for somewhere – what's more, it costs nowt after the initial expense. Good hunting!



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AmRad 10GHz system

by Glen Ross G8MWR

In this instalment I will explain the final stages of the project: getting it all together in a box, checking it out and then actually making the first contact and knowing that the whole thing is doing its stuff. Believe me, getting that first microwave contact on gear you have built yourself beats any black box operating hands down!

Layout

This is not at all critical and really consists of no more than finding a suitable size box and putting all the bits inside. However, there are a few points to bear in mind.

Because you will usually be operating out in the open, it is essential that the box is reasonably waterproof, and it must also be capable of taking some rough treatment. You are sure to drop it; I have even accidentally backed my car over the box containing the electronics! On exposed sites the amount of stray RF flying around from broadcast and PMR stations can be at a very high level, and so excellent screening capabilities are required.

The obvious answer to these points is the use of a die-cast box, and one measuring around 7 by 5 by 2 inches gives adequate space to mount all the component parts of the complete system without crowding.

The head

Figure 1 shows a typical mounting for the microwave head. Because the connections on the head will come very close to the metal case, the first thing to do is to glue a piece of postcard or thin plastic to the inside of the box underneath the head to stop any short-circuiting.

Next, the head should be situated against the side wall of the box and the position of the four mounting holes should be carefully marked and drilled. To get the correct polarization, the head must be fitted with the long dimension of the waveguide aperture in line with the long length of the side of the box.

Aerial mounting

The small horn aerial from the Solfan unit should now be bolted to the outside of the box using the mounting holes that you have just drilled. Using a scribe or

fine pointed pencil, mark the outer face of the box to match the waveguide aperture in the Solfan head. Remove the aerial from the box and drill two or three large holes inside the marked area and use a small square section file to remove all the metal inside the scribed lines.

Reassemble the whole thing and check that the rectangular hole which you have produced matches the waveguide in the head and aerial exactly. If you find that the hole is not correctly centred, small adjustments can be made by overdrilling the four fixing holes, so allowing a certain amount of movement between the various parts. What you have done, in effect, is to make the side of the box into a very short length of waveguide.

Draughtproofing

Two of the biggest enemies of the microwave head are damp and draughts, both of which will affect the stability of the oscillator. Before finally fitting the head in the box, place a couple of layers of Sellotape across the waveguide where the head meets the inside surface of the box. Alternatively, use a small piece of the clear plastic sheet that is commonly used to 'blister-pack' DIY goods. Do not use thick material, as the leakage of microwave through this can cause a weird collection of difficult to trace problems.

The final part of the head mounting consists of drilling clearing holes in the lid of the die-cast box to clear the brass tuning screw and the small matching screw on the head. This should be done carefully, with only the minimum of metal being removed so as to maintain the weatherproofing, etc.

PCBs

Before mounting the boards, check all the joints carefully. If you are using boards supplied by the Microwave Society you will find that several locations have alternative mounting holes to accommodate various sizes of component. Make sure that the holes you have selected have a gap in the track between them. Another point to check is that all the components whose leads go through the board at points where there are no clearance holes are soldered to the pad under the board and also to the earth plane. This is *most* important.

Important

There are two major points to notice on the Rx PCB. If you are not going to fit an S-meter, you need not fit VR1 but you must still fit C11. If this is not done you may find the IC going very unstable. The second point concerns the diode current meter; if this is not fitted then the mixer current pin *must* be earthed to the ground plane. If this is not done the whole receive system will be very dead indeed.

Both the boards should be fitted to the box using metal nuts, bolts and spacers. Do not use the plastic board supports that are available as it is essential, for stability reasons, that the boards are solidly earthed.

Metering

Both the meters can be of the cheap edge mounted type as used in tape recorders. The one used for diode metering should be shunted with a suitable resistor, so as to have an effective FSD of 3 to 5 milliamps. No exact value can be given for the shunt as it depends on the individual meter, but values of around 22 ohms seem to be about right.

Another method of shunting is to connect a 100 ohm preset across the back of the meter and then to adjust this to give something around centre reading. It is normal for this reading to vary as the tuning is adjusted.

The S-meter sensitivity is adjusted on the board to give a reading that seems about right on an incoming signal. It cannot be accurately calibrated and is used for comparative purposes only, its major use being during dish alignment.

It will be found that there is always a standing voltage on the meter. This can be eliminated by connecting a 10kohm preset across the 12 volt supply line and taking the earth end of the meter to the slider. This should be set to the earth end of the track and then slowly turned until the meter backs off to read zero.

Tuning control

Ideally, this should be a ten turn pot of around 1kohm. Figures 2 and 3 on page 40 of the May issue show ways of using different values. If difficulty is found in getting a suitable pot, a normal volume control type coupled to a small slow motion or epicyclic drive works just as well. Even if a ten turn unit is used a counting dial is not essential; a 1.5 inch knob will give an extra bandspread effect. A counting dial, although it cannot be accurately calibrated due to thermal drift etc, does provide useful reference points.

Microphone

The microphone socket may be one of the locking four pin types found on so much amateur and CB gear. This should be wired as earth, mic and PTT lines, and the fourth pin can be wired to the loudspeaker pin so as to give an output for the 'airline' type mic/headsets that are now cheaply available. These are excellent for working full duplex, as they cut out all the audio feedback effects that can be a nuisance on this mode.

AMRAD 10GHz SYSTEM

A further refinement is to wire the audio output from the board to a SPDT toggle switch on the front panel so that the headphone or loudspeaker options may be selected. A cheap CB type microphone of around 600 ohms impedance is ideal for use with this rig.

Supply leads

Because of the possibility of unwanted signal pick-up, all leads coming into the box should be screened, including the battery lead. This can conveniently be made of co-ax cable or well-screened audio cable. The connecting socket may be a cheap Belling-Lee TV type, but a better answer lies with the usual SO type plugs and sockets which have the great advantage of having a locking action.

All leads, including the microphone lines should have .01 disc ceramic capacitors connected directly from the pins on the sockets to the metal box. If the battery supply lead does not come in through a plug and socket then the negative line should be earthed to the inside of the case at the point where it enters the box.

Loudspeaker

To get the greatest amount of audio, the speaker should be a 3 ohm type. An 8 ohm one can be used but with a considerable reduction in audio, an important point when working on a windy hilltop. Some care will have to be taken in fitting the speaker to the lid so that it does not foul the PCBs. One of the modern slim 'wafer' type speakers is ideal.

The grill may be made by drilling concentric circles of small holes, but a better, more waterproof method is to use some of the perforated metal grill, as used on old record players. Whichever type is used, it is an advantage to fit a sheet of thin plastic film behind the panel so as to effectively waterproof the loudspeaker.

Odds and ends

Provided a die-cast box has been used none of the internal wiring need be screened, except, perhaps, the lead from the mixer to the Rx PCB if this is more than two or three inches long. The unit can easily be powered from a set of 'C' size nicads. The total current consumption is around 200 milliamps, so about 10 hours of operating comes from freshly charged cells. If a horn aerial or a small dish is to be used then the unit may be mounted on a heavyweight photographic tripod and a metal plate with a suitable thread may be fixed to the bottom of the case.

Back-up

For anyone who runs into trouble, there is a complete hand holding service available from the Microwave Society, 81 Ringwood Highway, Coventry CV2 2GT. The society will also be pleased to advise on any aspect of operating and equipment for 10GHz and above. All that now remains is to wish you 'Happy giggling'.

Fig 1 Inter-unit wiring diagram

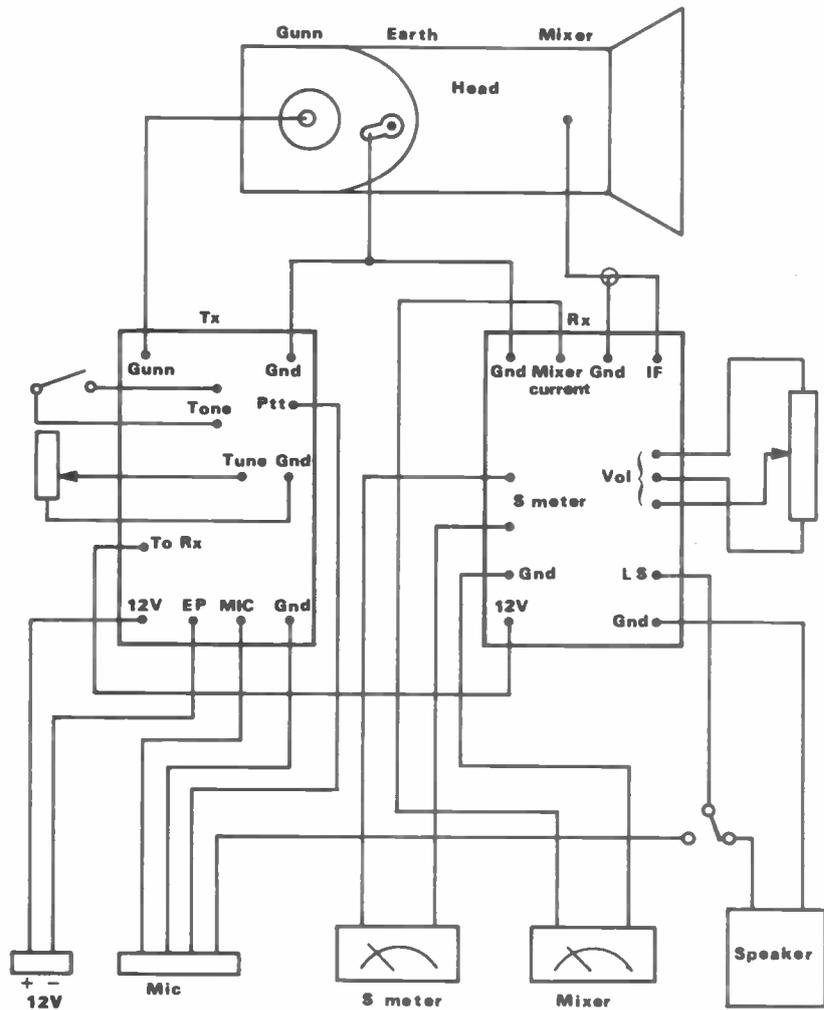
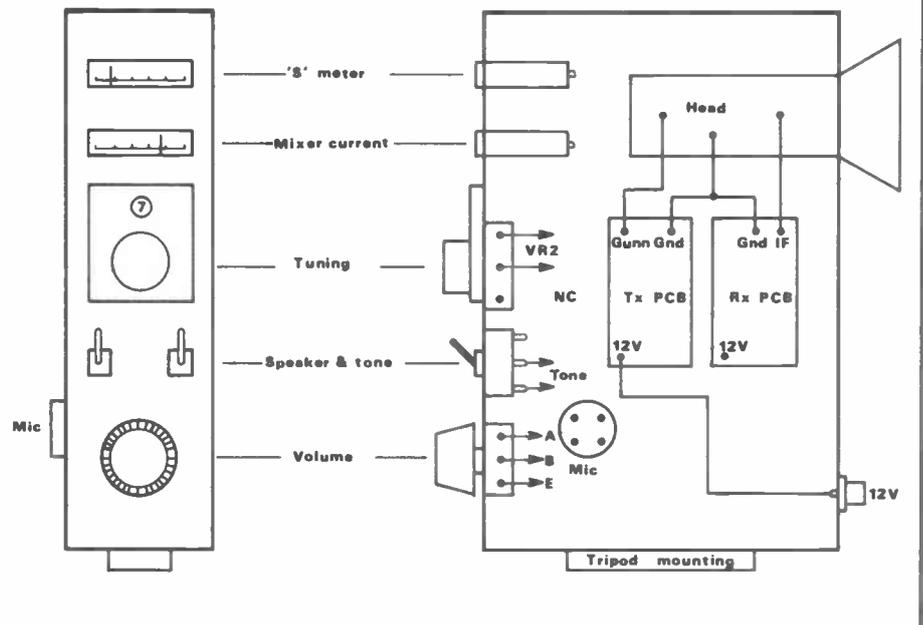
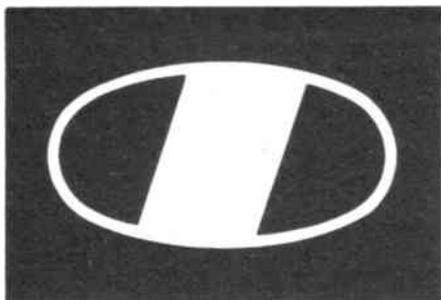


Fig 2 Front panel and internal layout





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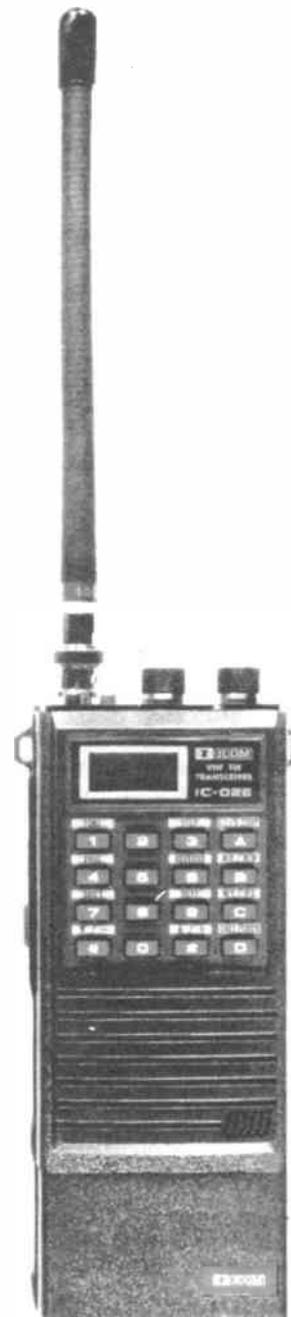
IC-02E/04E 2 metre and 70cm keypad handportable.

These direct-entry CPU controlled handhelds utilize a 16-button keypad allowing easy access to frequencies, memories and scanning. Ten memories store frequency and offset. Three scanning systems, priority, memory and programmable band scan, (the IC-02E now with an improved CPU retains duplex offset). These handhelds have an LCD readout indicating frequency, memory channel, signal strength, transmitter output and scanning functions. Power output is 3 watts or 0.5 watt in low power position for the IC-02E and 2.5 watts or 0.5 watt for the IC-04E. (5 watts is possible with the IC-BP7 battery pack or external 13.8V.DC.)

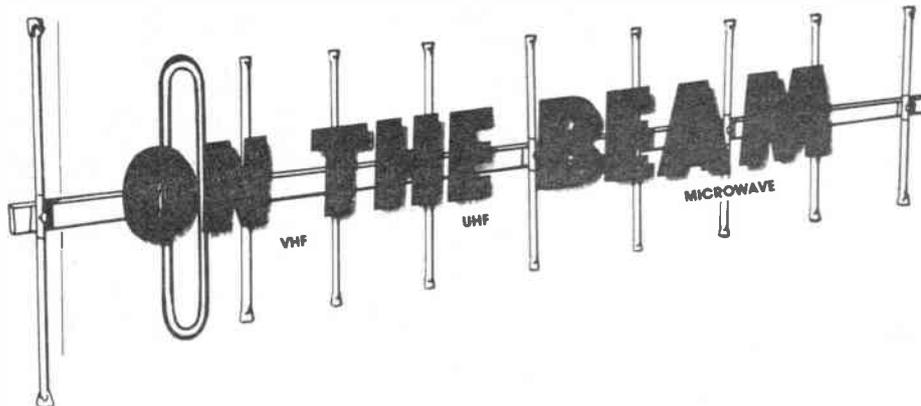
STOP PRESS. New handheld available. Just released is the **IC-12E** 23cm keypad handportable, this new transceiver has direct keypad entry for frequency, memories and scanning systems. Ten memories store operating frequency simplex or duplex. An internal power module provides 1 watt or 100 milliwatts of RF power. Five tuning speeds including 12.5kHz and 25kHz.

Also available for ICOM handhelds are a large range of optional extras including a variety of rechargeable nicad power packs, dry-cell battery pack, desk charger, headset and boom mic, speaker mic, leatherette cases and mobile mounting brackets.

For more information on these handportables and other ICOM Amateur equipment contact your local authorised ICOM dealer or Thanet Electronics Ltd.



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News and comment from Glen Ross G8MWR

Where did the sporadics go? The last year or two has seen a marked decline in the amount of sporadic activity, especially on two metres. This year we have had general access to 50MHz for the first time and the sporadic propagation there has been quite good, but it seldom seems to have reached two metres. We certainly have not seen much of the massive day long activity that was common two or three years ago.

Brief openings

On 16 May there was an opening of a few minutes, which just gave time for some contacts into UQ2. On 30 May there was an opening lasting all of thirty seconds when an Italian station briefly appeared.

On 1 June there was an opening lasting about one minute when a couple of Italian stations were heard, and 5 June again showed a short opening with some contacts into YU land. The following day the short opening made a few contacts into Italy possible and later in the day there was a ten minute opening to YA and YO with a TK5 in Corsica heard briefly. On 20 June there was a ten minute opening into LZ and YU.

The first day of July brought a 45 second opening into YU and on 2 July there was a 45 minute opening into Russia, with some very strong signals present. Some short bursts of signal were heard from OE on 8 July, but even adding all this lot together does not amount to very much when compared with recent years.

Microwave Dinner

Not an event for the fast food brigade but the annual get together and dinner for operators on the bands above 1.2GHz, which was held at Wolverhampton. The event was a great success and it was a pleasure to meet some of our readers there. It was very interesting to eavesdrop on some of the conversations during the informal session and to hear advice being given. This ranged from high technology to the "it it wiv a bleedin' big 'ammer" type, all apparently gratefully received by the enquirers!

Next year it is being held on 17 July

from 2pm onwards, with various demonstrations and advice centres available covering most of the microwave spectrum and operating techniques. Just the place to go to if you want to get in on the act and don't know how to make a start. Make a note of the date now and I will give you further details nearer the time.

Repeaters

Four major two metre repeaters changed frequency in May to make space for the Isle of Man repeater. The changeover seems to have gone fairly well, with the only bit of confusion being caused by GB3BM moving to the spot previously occupied by GB3MH located a few miles down the road at Malvern. Because of similar signal strengths in the service area, a lot of people were happily working through the wrong repeater until it all got sorted out.

One of the problems brought about by the move has been that users of crystal controlled equipment are having to get hold of new crystals for the rig and this is no longer an easy matter.

Swap shop

However, help is at hand in the form of a crystal exchange or cost reimbursement scheme, set up with the blessing of the RSGB to enable people from the various areas of change to swap crystals. The whole scheme is being administered by Chris Reed G8MFP, who can be contacted for details at 'Ashlea', London Road, Stretton on Dunsmore CV23 9HX. Do not forget to send him an SAE for the reply.

There is one more change of frequency and this one concerns GB3NH, which has been having some trouble with GB3CB located in Birmingham. Different aerial systems have been tried on 3CB to minimise the problem but without a happy result, and the only answer now seems to be yet another frequency change.

The beacons

Reception reports are being requested for the Greenland beacon, OX3VHF, which operates on two bands. The unit on 50.045 runs 20 watts to a

groundplane and the 144.902 unit has 5 watts to a four element yagi beaming WSW and another four watts to a four element yagi pointing ESE. The beacons are located about 200 metres ASL at the southernmost tip of Greenland, the locator being GP6OQQ. Any reports should be sent to OX3LX, Teledation, Box 187, DK-3290 JJulianehaab, Greenland.

A beacon that is normally well heard in north-south openings is EA1VHF, the Spanish beacon located in VD59c (I have given in, I now use both old and new locators!). However, it has been noticeably absent for some time. News from EA3LL says that the repeater has been having problems but does not specify exactly what these problems are.

The certificates

On the top of the pile is a claim from Alex GW1PNH who goes for a 144 Bronze, his best DX being LA1ZE in JO square at a distance of 861km. Most of the operating was done from a 2000ft ASL site in the Black Mountains, which I know well from my microwave forays. It is nice to know that I am not the only person to have been frozen solid up there! The operating was done using a TR9130 and a five ele yagi.

Mike Stevens G1IQJ from Epsom updates to a 144 Gold and is looking forward to using his new 80 watt amp. A bit further east we find John G4TGK at New Romney, who goes for the 144 Silver with a tally of 58 counties, 14 countries and 42 squares. Some of the nice DX includes YO2DL, LZ1KDP and YU6ZBG.

Some more

Just to show that the younger end of our readership is not going to be left out, we have received a claim for 144 Bronze from 15 year old Phillip Everitt G1CRH, from Huntingdon.

He has been using an FT290 running just 2.5 watts to a five ele yagi at 80ft ASL. He says he had a lot of trouble getting the 500km distance part of the award, but eventually made 664km to DL2LAX who gave a report of S9 + 20!

Next on the list is Linda G0AJJ, from North Walsham, who goes for a 144 Silver including a best DX of 924km with SM6PIS. She has followed this with a 432 Bronze, the best contact for this being 525km to G14GVS. Moving up a bit, we come to a claim for a 1296 Silver from Tony Gillett of Cambridge. Sorry, Tony, I can't read my own writing to decipher the callsign. He runs 10 watts to four 23 element yagis at 37ft and is saving hard for some 'bottles' to get some more power.

We do it mobile!

Or at least Paul G4XTA does. His claim for a 144 Gold has a best DX contact of 1628km with CT1BZT in Lisbon, which was made while Paul was operating mobile. He does not give any details of the equipment used but this is a contact most people will envy. Dave G6LUA, of Iver, weighs in with a claim for 432 Bronze, his best contact being at 1063km to EA1BLA in IN53 square.

To finish the list this month we have

ON THE BEAM

claims for both 144 Bronze and Silver from Peter G1ITE, of Heatfield in East Sussex, who claims a best DX of 2200km made with SV1OE in Greece. If you want details of these awards, please send an SAE to the address at the end of the feature.

Common licence

The CEPT common licence is an arrangement under which you can operate from other countries without actually getting a reciprocal licence, provided your home country is a signatory to the agreement.

A lot of progress has been made, and at present West Germany, Norway, Austria, Liechtenstein and Switzerland (and, by the time you read this, possibly Holland and Denmark) all have this facility.

RSGB at work

The RSGB is pushing the DTI to get suitable documentation for the British amateur to make use of this facility and it is hoped to get an early decision. According to a report from G6JNS, the RSGB has been issuing documents which purport to be valid CEPT class 2 licences, but his enquiries with the German authorities reveal that these documents are not acceptable and that anyone using these could end up getting their equipment confiscated. Until a notice is published you must have a

normal reciprocal licence for the countries in which you intend to operate.

Exception

There is, however, an interesting point concerning this new international licence and the Norwegian authorities. It has been reported that the TELE dept, roughly the equivalent of our DTI, will recognise the licence documents of all other CEPT countries even if these have not yet implemented Rec T/R 61-01.

They will also allow visiting amateurs to operate on a class 2 licence on the bands above 144MHz, even though this facility is *not* available to Norwegian amateurs.

One problem which has been pointed out by DL1FL is that unless full documentation issued by the host country is carried you may still find yourself in trouble with the border guards. It all sounds very confusing.

Morse tests

The provision of testing centres is now really starting to get under way, and a report from the RSGB says that since July this year 136 examiners in forty-seven areas have been appointed.

However, eleven of these areas only have one examiner and so are not yet officially operational. This conflicts with reports that on at least one occasion only one examiner has been present at a test

and the question is being asked as to how two examiners can then sign the pass slip? Interesting figures are that at that time 288 people had taken the test with a pass rate of 63%.

Microwave nets

Information has been received from G6YLO about the new east coast microwave net which gets together on Wednesday evenings on 144.170 at 2000GMT.

The object is to encourage operation on all bands from 70cm up, but mainly to co-ordinate the activities of those interested in 10GHz operating. There is also a flourishing South Yorkshire microwave net that meets on Wednesdays at 2200GMT, but this one is on a frequency of 144.33MHz. Perhaps it would be a good idea to see if they can make contact with each other? We also have news of new groups being formed in the West Midlands and also in the Bristol area. More information will be published as it becomes available.

The big switch

That sees us out of space for this month and, incidentally, also sees the third birthday of the column. I wonder what the fourth year will bring? Whatever it is, let me know your news and views by writing to 81 Ringwood Highway, Coventry or using Prestel on 203616941.

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■ ANGUS MCKENZIE TESTS

The Icom IC28E 2m FM mobile rig and the Diawa Icom IC12E 23cm hand-held FM transceiver

■ COBRA CONVERSIONS

Roger Alban with an update on the conversion techniques for the various Cobra transceivers

■ VISIT TO ARRL HQ

Jim Smith nips over to Connecticut to investigate the offices of the American Radio Relay League

DON'T MISS THE OCTOBER ISSUE

On sale 25 September

SECONDHAND EQUIPMENT GUIDE

by Hugh Allison G3XSE

About two years ago I was quite taken with what was then a new two metre single sideband transceiver, the Totsuko TR2100M. Although I must confess to never having heard of Totsuko before, the rig looked very good indeed, both physically and electrically, especially at a new price of about £120 at the time.

If the adverts escaped you then, the TR2100M is very roughly the same size and weight as the Trio 2200 FM box and, indeed, in its black leather-look carry case can easily be mistaken for one. When you look at the front panel, however, you quickly see that this is altogether a different kettle of fish. Tuning is done on a 0 to 200 dial, plus there is a row of push-buttons marked 0, 200, 400, 600 and 800, so to get on 144.3, for example, you have to hit the 200 button and dial up 100.

Exposure

Stability is good, with about a 1kHz wander during the first five minutes then nothing at all, setting accuracy is excellent and long term temperature drift negligible (I stupidly left one in a car in full exposure to the sun all day. On my return the rig was too hot to touch yet it was spot on, still on the frequency I had left it tuned to). RIT and RF gain controls are provided, as is an internal pull-out whip. Receiver performance is adequate rather than startling (about half a microvolt for 10dB sig plus noise to noise) with punchy crisp audio output, so all in all the Rx side is OK.

On transmit you get a nominal watt out, but throw a switch on the back (or should that be bottom?) panel, give it an external 12V supply and you will be rewarded with a glorious 10 watts out. Incidentally, throwing the high power switch completely disconnects the internal nicads and should be the first thing to check when you are presented with a dead rig. Other features are SSB/CW switching and a surprisingly effective noise blanker that really seems to get to grips with the barrage of ignition noise in my van.

Incidentally, all the above figures are taken from a cheap secondhand example I bought and am delighted with. I got no handbook with my example so the figures may not be typical.

Having given the rig such a good write-up, the naturally suspicious reader must be wondering why I am singing its praises. Has the importer bribed your scribe? Unfortunately (I am open to offers), the answer is no. It is just that it

broke my heart at Elvaston to see a newly licensed Class B amateur dithering by a stall that had both a Liner 2 and a TR2100M, both at £50. He obviously wished to play with the big boys down the SSB end and couldn't make up his mind which rig to choose. In the end his mates convinced him to buy the Liner 2, since, quote: 'At least it's a well-known rig'.

In my view this was a bad choice, since, as I have said before, the Liner is difficult to tune across the band, is bigger and heavier and its transmitter is notorious for its out of band spurious emissions (OK, I'll admit it, I don't like them). I hope that the above glorious write-up will educate our valued readers into not making the same mistake. Quite frankly, however, at the £50 to £60 that these rigs suddenly seem to be appearing at on the secondhand market, I think they are a bargain.

Elvaston Castle Rally

I judge a rally by the following standards: coming away with a Cortina boot full of rubbish (ie, bargains that I have bought) plus a few odds and ends on the back seat = rally excellent; boot over half full = good; floor covered = fair; and just a few toys to play with = rally poor. Last year Elvaston Castle was excellent, this year only good.

It might have been excellent but for the Israeli or Peruvian or somesuch folk music. It was blaring out so loud in the flea-market as an accompaniment to the folk dancing in the arena that it was painful to enter the area at times and even kept your scribe away from the bargains. Can we have it turned down next year please?

Alpha 2m FM box

These rigs are coming on ten years old now, and were an early 25 watt FM synthesized rig. Like the Liner 2 they are a pain to tune across the band. You have to juggle MHz push-buttons (the rig covers 144 to 148) plus separate rotary switches for 100s and 10s of kHz to get on frequency, plus, just for good measure, another push-button for +5kHz. Not too handy for a tune about to see if there is anyone on the band, but OK for the once a week club ragchew.

Normally these fairly big rigs sell for about £60 in grade 1 condition, ie working perfectly, no mods or scratches and complete with handbook plus mobile mount, but recently your scribe has picked up several non-working examples for the usual rule-of-thumb 'third

the price for a non worker' yardstick. The main failings on these (and on a few that I have repaired for their owners) fall into two camps: the frequency display malfunctioning and the transmitter not giving any output.

Where the fault lies

In the case of the latter the fault is always, unusually, the driver and pre-driver transistors going open circuit. I cannot explain why the PA device survives when all around is decimated, but this seems to be the case. The transistors used are fairly hard to obtain, but the beloved Pye Westminster (VHF variant, boot mount) can come to the rescue. For £1.50 for a tatty example, the BLY33 and 38 in the PA can be ripped out and then grafted in. The 33 will go straight in physically and electrically, but the 38 needs a single hole drilled between the two that used to hold the driver (keep the emitter leads as short as you can. Retweak and you have made a cheap repair.

The display faults are due to the seven segment LEDs being mounted on small boards complete with their driver chips. The small boards (one display per board) plug into a board connected to the channel switch. If an address pin goes open circuit (and they do) the display will show a complete whole number that is erroneous, as distinct from a number with segments missing which is more normal.

The erroneous display can quite often be cured by simply pulling the small board out (slacken the front panel by undoing the four retaining screws, two each side) and refitting it, since the self-cleaning action of the pin-type plug and socket is often enough to do the job. Failing that try a drop of cleaning fluid, and failing that resolder all the connections to the tracks on the small board. There are so few connections it is easier to reflow the lot than to look for dodgy connections. Most dodgy connections seem to be on the top component side.

Pye Compact and Pocketphone

The Pye Pocketphone is probably well-known to most readers, and they are deservedly popular on 70cm as a cheap way of getting onto the local FM repeater. Receivers have been fairly constant at about £2.50, uncrystalled. The transmitter prices seem to vary according to supply, but £10 was about the maximum. Prices seem to be a bit lower at the moment, and £10 should bag you a

SECONDHAND

pair (one Tx, one Rx) not crystallised on 70. The price seems to have come down, due to a massive release onto the secondhand market of ex-London Transport stock. These will tune onto 70 and seem no different from the fuzz ones, despite rumours to the contrary.

Compacts are not quite as common as the Pocketphone. These have a Tx and Rx in one box. The main boards are the same as Pocketphones, the difference being that the receiver shares the rod antenna with the Tx, so a Compact appears to have a more lively receiver than the tiny grill antenna of the Pocketphone will allow. The receiver ends up driving a comparatively decent speaker compared with the metal squarker in the Pocketphone, which makes the Compact less tiring to listen to.

The final difference is the batteries. The Pocketphone transmitter uses the long red 18 volt battery, and these seem to go for about £1.50 on the surplus market. The Compact is powered entirely (ie, Tx and Rx) by two Pocketphone yellow Rx batteries, which can often be bought for 10p each. This amounts to a saving of £1.40 for using a Compact in preference to a pair of Pocketphones (am I really that tight?).

Compacts also have a little bit of spare room inside which allows easier fitting of a toneburst. Expect to pay £10 to £12 for an uncrystallised one and about £18 to £20 for a crystallised variant. They are a little bit big and heavy by today's standards and, of course, single channel, but I like them. In use, the compact to compact range is roughly a mile and a half to two miles, dependant on terrain. Repeater to compact is a bit better than to Pocketphones due to the superior Rx aerial, being very roughly seven or ten miles, but the exact performance at a specific location cannot be predicted. Try and borrow a pair of Pocketphones if you feel your QTH may be marginal.

Trio TR2

The stuff that suddenly turns up in quantity on the secondhand market never ceases to amaze me. The Trio TR2 is a good example. I hadn't seen one of these machines for ten years, then at

Longleat they were everywhere (well, I saw three).

The TR2 is an all valve two metre AM machine. It has two VFOs, one for the Tx and one for the Rx. Even if it is converted to FM it is not over stable. The whole machine sucks up amps on 12 volts and gives off loads of heat. Normally I would recommend any Trio equipment as being good, reliable, well designed gear, but the TR2 is so old and technology has progressed so far that this one now rates as a lemon. Masochists only.

Trio JR599

Now this is a different ball game altogether. It is an all band SSB communications receiver, with a 'proper' tunable IF using a 5 to 5.5MHz VFO (actually 4.9 to 5.5 to give 600kHz chunks) capable of 240 or 12V operation.

These units were sold a bit like cars, with various levels of trim. The custom deluxe variant was the base model with only an SSB and FM IF filter and no VHF converters fitted. The back panel had gaping holes in the metalwork and it looked as though stuff had been ripped out. It hadn't; the converters were never fitted. The next trim level was custom special (M) which had a superb CW filter fitted as standard, plus a 144MHz converter. The custom special (X) had a 50MHz converter as well. If you ever own any variant of these, don't even think about re-aligning the RF pack without the proper trimming tool. The cores are fragile and will shatter with the smallest tweak.

Dodgy

A common problem in the 599 series is a dodgy band selection switch. If it doesn't seem to index properly it is usually only that the nut securing the mechanical gubbins has come loose. If you remove the bottom panel (mains plug out first) and rotate the bandswitch backwards and forwards one band you will soon see this loose nut. A quick tweak with a pair of pliers will sort it all out.

The main tuning knob is velvet smooth and the VFO is magically stable, so couple this with the decent filters and

you are talking about a powerful receiver capable of holding its head, performance-wise, with some much more modern receivers. The receiver is fitted with a squelch control, which operates on all modes, including SSB. A TX599 was available to allow transceive operation. The JR599 seems to fetch between £65 and a ton. The Tx on its own (very rare) will fetch about £120 to £150, and a pair is in the low 200s. £250 would be absolute top whack.

One obscure electrical fault is the failing of R19 in the receiver. This 1M Ω resistor can cause low gain, no variable AGC attack and an S-meter pinned to its end stops all the time by going open circuit. To ease repair, solder a 1M Ω resistor between any pin marked BS and the AG1 pin. This saves taking the board out, which can be frustrating. This is a simple cure to a difficult to find problem.

The handbook for the 599 is a real gem. Coming from the now long gone days of Trio's once famous Japanese English, it says: 'We are sure that users can entertain themselves with a smart and pleasant QSO'.

Mizuho MX2

I mentioned these SSB two metre hand-portables some time ago and warned of their slightly dodgy tuning capacitor. A reader wrote in to say that he owned one which had suddenly died on him. The symptom was some audio hiss; I concluded that it needed 200mV up the aerial socket to receive and no Tx at all. I had recently bought two non-workers at different rallies for a couple of quid each that were both exactly the same. The cases showed no signs of physical abuse yet there was a hairline crack on the SSB generating PCB (the smaller of the two boards).

Both of my rigs had only cracked the track, the board being mechanically sound, and both had cracked 'east to west', ie across the board, about a quarter of an inch up from the SSB IF filter. I mentioned this to the reader and his had done this too. He swears that he has never dropped his so this is an odd fault to look out for on these otherwise fine little rigs.

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■ FT790R 70cm multimode, 9 months old, used homebase and mobile only hence no case or nicads fitted. N-type connector at rear but co-ax easily changed to BNC on front panel, offered £225 by dealer in px so offered privately at £245. G4WLD John. Tel: 01-857 8096, evenings please

■ Bremi BRL 200W linear, good condition, renewed valves recently, £50 or nearest offer. Buyer collects unless fairly local. Contact Mr Martin Fuller, 37 Green Field Close, Eccles, Nr Maidstone, Kent ME20 7HU. Tel: Maid 70485

■ FRG7, boxed, good condition, £100 post extra. Sony ICF 7600D, mint, all access etc. First £105. Tel: (0246) 41 0545 (evenings)

■ Revcone discone 50-550MHz aerial with lengths of co-ax totalling 44ft, and clamps and quality BNC connector, £20. Also 14ft x 2in aluminium mast, £10. Buyer to collect. Tel: (0272) 506208

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over total length (resonant at 14MHz), beautifully constructed. In excellent condition throughout. Extremely simple and fast to erect, £85 ovo. Mr Paul Beazley. Tel: Flitwick 718061

■ Selling SEM Z-match with easy tune, £45. G4BMK RTTY software and interface for CBM64, £45. Bremi 12V, 5/7 amp mains PSU, £10. KW PA coil and switch with choke (unused), £15. Pair unused 5763s £6. Pair unused 6AQ5s £6. Postage extra. G3PXV. Tel: Mereside (073129) 403 (Cambs)

■ KW Ezee match, £40. Two pairs of two metre crystals (receive and transmit) on R3 and S18. 12 and 15MHz series, suitable Yaesu FT202R, etc. £4 for all four. M R Davies, Laburnum House, Guilsfield, Welshpool, Powys SY21 9PX. Tel: (0938 75) 441

■ Xtals 22MHz in HC18/U, £1. 38.6666MHz in HC18/U, £2. 1.843MHz in HC33/U, £1. Post paid. P Smith, 3 Raven Ave, Tibshelf, Derbyshire DE5 5NR

■ ZX Spectrum 48K interface and joystick. Books, mags, 24 games, £100. Tel: Fareham 287306

■ Yaesu 101ZD MkIII FM all band, CW filter, fan, mic, £500 ovo. FC902 ATU to match, £100, SP901 spkr to match £30. Sell all together £550. G4ZRG. Tel: (051 638) 1550

■ M/M 432MHz. Down to 28MHz cvtr, works OK but no instructions, hence price of only £6.00. Also groundplane ant for two metres, unused, £5.00. Redifon CR74 marine tcvr. Xtalled for 28 channels, power is one and 25 watts. Well made set, works OK £60.00. Heath signal gen, audio square and sine, £13.00. Mike G6MNX. Tel: (0904) 422773 QTHR

■ Modems for sale: Prism Acoustic 1200/75 complete with lead for BBC data manual and software. Also Protek 1200 with Comstar ROM and manual for modem. Software for both is Viewdata and Scrolling Terminal. Terminal available on its own for £5.00. Modems each £35 or nearest offers. Tel: Carlisle (0228) 26436, evenings

■ Tristar 777 CB transceiver. CW, SSB upper, lower, AM, FM double superhet, low, middle, high band, 26.515 to 27.855MHz. Coarse, fine tuning, owners manual, instruction manual, 12V dc. (new xtals required for 10m conversion), £75. Pair of 0227 ■ Trio TH21E still under guarantee, complete Fwith SMC30 speaker/mike, BNC adaptor, dc converter, boxed as new. W A Benton G1OIO, 9 Priory Road, Burgess Hill, Sussex RH15 9HD. Tel: (044 46) 42122

■ Have FT480, FT290, SEM ATU, 2 PSUs, 20A, 25A, Yaesu 707 MMB2, Tower masthead. New drill to suit your rotor and bearing, £25. 50MHz (6m) multimode plus beam, offers. Martyn Bolt, 112 Leeds Road, Mirfield, W Yorkshire WF14 0JE. Tel: (0924) 495916

■ FT480 recent SMC service, £285, FT290 muTek board auto toneburst, £250, 6m mobile multimode 3 ele beam, £150. 2m solid-state linear, min 160W out, £150. FT107M mobile HF rig, new, used Rx only, 10m FM rig, freq readout mikes for 101, 901, 902, 707 mobile fist and desk, SAE for list. Martyn Bolt, 112 Leeds Road, Mirfield, W Yorkshire WF14 0JE. Tel: (0924) 495916

■ Frequent lists: *Scanner Guide* (new), £2. *Ocean Air Band*, £1. *World RTTY List*, £2.50. Phone for latest DNT 10m FM good rig, £40. Martyn, 112 Leeds Road, Mirfield, W Yorks WF14 0JE. Tel: (0924) 495916

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Yaesu FT101E, Mk3, fitted new bands, 350Hz CW filter, recent SMC overhaul, £360, YC601 digital readout, £70. Reduced prices Heath Scope 0-12-U with manual, £20. Matched pair 6JS6CS, £15. Callbook DX listing 1984, £5. UK590 Amtron SWR meter, £7. *Radio Amateurs Operating Manual*, £2. All carriage extra, prefer collect as housebound, no phone. Jess G4GOF QTHR

Sentinel auto HF pre-amplifier, 2-40MHz, 9-12V. Can be transceiver switched, £12. Yaesu speaker FSP-1 8 ohm extension or mobile, £5. Class 'D' wavemeter No1 Mk2, 100/1000kHz xtal, FVO 1900-800kHz, plus harmonics, mains instructions, good condition, £9. Yaesu FT101ZD AM unit as new, circuit, £10. Crystal calibrator No 10, 500kHz xtal, VFO harmonics to 30MHz, requires 3V (2-U2) 90V book, £5. Alan Edwards, 32 Heldhaw Road, Bury St Edmunds, Suffolk IP32 7ES. Tel: (0284) 60984

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Mags for sale: *Wireless World*, Dec '53, Mar-Sept '54, Nov-Dec '54, Oct '55-Mar '56, May '56-Aug '57, Jan '63-June '63, Jan '64. *Short Wave Magazine*, 1962 complete, 1963 complete, 1964 complete, Jan '65, Jan '67-Aug '67, July '68, April '69-Sept '70, Feb '71-June '71. *Radio Communication*, May '69-Mar '70, Aug '68. *RSGB Bulletin*, 1964 complete, 1965 complete, 1966 complete, Jan and Mar-Aug '67. Offers please. Richard Williams, 32 The Gower,

Thorpe Egham, Surrey TW20 8UD. Tel: Chertsey 60476 evenings

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For scanner users: Revco VHF, UHF trap dipole broadband antenna, new, £45. Datong broadband preamplifier 5-200MHz, £25. Datong 370 receive antenna, 200kHz-30MHz with PSU, as new, £40. T Ridgway, 15 South Road, Aberystwyth, Dyfed, Wales SY23 1JF. Tel: (0970) 4271, after 6pm

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International Radio Tube Encyclopaedia, 1954-1955, published by Bernards (publishers) Ltd, price and particulars to G Wegg, 23, Kerdane, Dane Park Rd, OPE, Hull HU6 9EB. Tel: (0482) 955052

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The Technique of Radio Design, E E Zepler, second edition pref'd, any condition; or on loan. C Burrell, 2 Clachamish Bernisdale, Isle of Skye, Scotland IV51 9NY

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6 way dll switch	.50	.25
16MHz Xtal	.80	.40
3V6 100mAh PCB battery	1.30	.65
6850	1.30	.65
RELAYS-		
12v DPDT 5amp PCB	1.00	.50
24v 10amp 3 pole	2.00	-
Base for above	.30	-
24v 1amp DPDT (cradle)	-	.50
24v 1amp 4pole (cradle)	-	.80
24v DPDT 1amp PCB	-	.75
24v SPST 1amp PCB	-	.60
6v DPDT 1amp PCB	-	.75
5v DPDT 1amp PCB	-	.75
B.N.C. sockets	.40	.20
35ohm speakers 3in	-	.50
9v buzzers PCB	1.99	-
15way D sockets	.80	.40
6116LP-3	-	1.50

SPECIAL OFFERS	
Automatic Car Immobiliser	£5.99
Automatic Key Pad Car Immobiliser	£13.99
Reversing Bleeper 24v	£7.20
Reversing Bleeper 12v	£7.20
Copper Clad Board - Single Sided 6in x 2 1/2in	.30p
Copper Clad Board - Double Sided 6in x 2 1/2in	.35p

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Desk top cabinet
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VHF linear amplifier
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Universal Nicad Charger with 4 AA/
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SALE!

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the advertising
department on:
0277 219876
for details

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Amateur RADIO

ADVERTISING RATES & INFORMATION

DISPLAY AD RATES		series rates for consecutive insertions			
depth mm x width mm	ad space	1 issue	3 issues	6 issues	12 issues
61 x 90	1/8 page	£66.00	£62.00	£59.00	£53.00
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263 x 394	double page	£830.00	£780.00	£740.00	£660.00

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263 x 186	1 page	£590.00	£550.00	£530.00	£470.00	
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SPECIAL POSITIONS	Covers	Outside back cover
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	Facing Matter	10% extra (Bleed area = 307 x 220)
		15% extra

DEADLINES		*Dates affected by public holidays			
issue	colour & mono proof ad	mono no proof & small ad	mono artwork	on sale thurs	
Sep 86	31 Jul 86	6 Aug 86	8 Aug 86	28 Aug 86	
Oct 86	28 Aug 86	3 Sep 86	5 Sep 86	25 Sep 86	
Nov 86	2 Oct 86	10 Oct 86	10 Oct 86	30 Oct 86	
Dec 86	30 Oct 86	5 Nov 86	7 Nov 86	27 Nov 86	

CONDITIONS & INFORMATION			
<p>SERIES RATES Series rates also apply when larger or additional space to that initially booked is taken. An ad of at least the minimum space must appear in consecutive issues to qualify for series rates. Previous copy will automatically be repeated if no further copy is received. A 'hold ad' is acceptable for maintaining your series rate contract. This will automatically be inserted if no further copy is received. Display Ad and Small Ad series rate contracts are not interchangeable.</p>	<p>If series rate contract is cancelled, the advertiser will be liable to pay the unearned series discount already taken.</p> <p>COPY Except for County Guides copy may be changed monthly. No additional charges for typesetting or illustrations (except for colour separations). For illustrations just send photograph or artwork. Colour Ad rates do not include the cost of separations. Printed - webb-offset</p>	<p>Above rates exclude VAT.</p> <p>PAYMENT All single insertion ads are accepted on a pre-payment basis only, unless an account is held. Accounts will be opened for series rate advertisers subject to satisfactory credit references. Accounts are strictly net and must be settled by the publication date. Overseas payments by International Money Order.</p> <p>FOR FURTHER INFORMATION CONTACT Amateur Radio, Sovereign House, Brentwood, Essex CM14 4SE. (0271) 219876</p>	<p>Commission to approved advertising agencies is 10%.</p> <p>CONDITIONS 10% discount if advertising in both Amateur Radio and Radio & Electronics World. A voucher copy will be sent to Display and Colour advertisers only. Ads accepted subject to our standard conditions, available on request.</p>



£1 BAKERS DOZEN PACKS

Price per pack is £1.00. * Order 12 you may choose another free. Items marked (sh) are not new but guaranteed ok.

1. 5-13 amp ring main junction boxes
2. 5-13 amp ring main spur boxes
4. 5-surface mounting switches suitably insulated for mains voltage
5. 3-electrical switches intermediate type, will also replace 1 or 2 way switches, white flush mounting
7. 4-in flex line switches with neon
9. 2-mains transformers with 1V 1A secondaries
10. 2-mains transformers with 12V 1/2A secondaries
11. 1-extension speaker cabinet for 6 1/2" speaker
12. 12-glass reed switches
17. 2-ultra transmitters and 2 receivers with circuit
19. 2-light dependent resistors
25. 4-wire switches - Bp 2 way, Ap 3 way, Zp 6 way, Zp 5 way, 1p 12 way small one hold frong and good length 1/2" spindle your choice
28. 1-6 digit counter mains voltage
30. 2-Nicad battery chargers
31. 1-key switch with key
33. 2-aerosol cans of ICI Dry Lubricant
34. 96-1 metre lengths colour-coded connecting wire
39. 1-long and medium wave tuner kit
41. 8-rocker switch 10 amp mains SPST
45. 1-24 hour time switch mains operated (s.h.)
48. 2-6V operated reed switch relays
49. 10-nano valves - make good night lights
50. 2-12V DC or 24V AC, 3 CO relays
51. 1-12V 2 CO miniature relay very sensitive
52. 1-12V 4 CO miniature relay
53. 2-mains operated relays 3 x 8 amp changeover (s.h.)
55. 10-rows of 32 gold plated IC sockets (total 320 sockets)
55. 1-locking mechanism with 2 keys
56. 1-miniature unselector with circuit for electric jigsaw puzzle
60. 5-ferrite rods 4" x 5/16" diameter serials
61. 4-ferrite slab aerials with L & M wave coils
63. 1-Mullard thyristor trigger module
64. 10-assorted leads 1/2" spindles
65. 5-different thermostats, mainly bi-metal types
66. 1-magnetic brake - stops rotation instantly
67. 1-low pressure 3 level switch can be mouth operated
69. 2-25 watt pots 8 ohm
70. 2-25 watt pots 1000 ohm
71. 4-wire wound pots - 18, 33, 50 and 100 ohm your choice
72. 1-1250 watt dimmer Ultra rat SE20
77. 1-time reminder adjustable 1-80 mins clockwork
81. 2-30A panel mounting 3-pole fuses
85. 1-mains shaded pole motor 1/2" stack - 1/8" shaft
89. 1-mains motor with gear box 1 rev per 24 hours
91. 2-mains motors with gear box 18 rpm
96. 1-thermostat for fridge
96. 1-motorized stud switch (s.h.)
101. 1-2 1/2 hours delay switch
103. 1-mains power supply unit - 6V DC
104. 1-mains power supply unit - 4.5V DC
105. 1-5 pin flex plug and panel socket
105. 1-5" speaker size radio cabinet with handle
110. 10-solder type volume controls
111. 2-musical boxes (less keys)
112. 1-heating pad 200 watts mains
113. 1-FM front and with tuning condenser and date
114. 1-1W amplifier Mullard 1172
115. 1-wall mounting thermostat 24V
118. 1-task effect extension 5" speaker cabinet
120. 2-p.c. boards with 2 amp full wave and 17 other res
121. 4-push push switches for table lamps etc.
122. 10-mix twin screwdrivers with clockwork operated
123. 10-staples for the flex
124. 25-clear plastic lenses 1/2" diameter
127. 4-pilot bulb lamp metal clip on type
128. 10-very fine drills for PCBs etc.
129. 4-extra thin screw drivers for instruments
132. 2-plastic boxes with windows, ideal for interrupted beam switch
134. 10-model aircraft motor - requires no on/off switch, just spin to start
136. 2-car radio speakers 5" round 4 ohm made for Radiomobile
137. 1-6 1/2" 4 ohm 10 watt speaker and 3" tweeter
142. 10-4 BA spanners 1/4" and 3/8"
145. 2-4 reed relay kits 3V coil normally open or c/e if magnets added
146. 20-pilot bulbs 8.5V 3A Philips
147. 1-sacrot switch kit with date
149. 4-socket covers (protect inquisitive little fingers) for twin 13A
152. 1-air or gas shut off valve - clockwork operated
153. 1-air or gas shut off valve - thermostat operated
154. 1-12V drip proof relay - ideal for car jobs
155. 3-varicap push button tuners with knobs
158. 5-12 very connector blocks 2A 250V
159. 3-12 very connector blocks 2A 250V
162. 1-13A fused and switched spur for surface mounting or can be removed from box for flush mounting
163. 3-13A sockets good British make but brown
169. 4-short wave air spaced trimmers 2-30'
171. 1-shocking car kit with date - have fun with this
172. 10-12V 6W bulbs Philips m.s.s
178. 3-oblong amber indicators with millipins 12V
180. 8-round amber indicators with neons 240V
181. 100-p.c.c. grammets 3 hole size
182. 1-short wave tuning condenser 50 pf with 1/2" spindle
184. 1-three gang tuning condenser each section 500 pf with trimmers and good length 1/2" spindle
188. 1-plastic box stopping metal front, 16 x 95mm average depth 45mm
192. 2-double pole 20 amp 250V flush mounting switch - white
191. 8-B.C. lamp holder adapters white
193. 6-5 amp 3 pin flush sockets brown
195. 5-B.C. lampholders brown bakelite threaded entry
196. 1-in flex soldermat for electric blanking soldering iron etc
197. 2-thermostats, spindle setting - adjustable range for ovens etc
199. 1-mains operated sound with remote 1" travel
200. 1-10 digit switch pad for telephones etc.
201. 8-computer keyboard switches with knobs, pcb or vero mounting
206. 20-mres 80 ohm, standard type co-ax off white
211. 1-electric clock mains driven, always right time - not cased
216. 1-stereo pre-amp Mullard EP9001
232. 2-12V solenoids, small with plunger
236. 1-mains transformer 9V 1 amp secondary C core construction
241. 1-car door speaker (very flat) 8 1/2" 15 ohm made for Radiomobile
241. 2-speakers 6" x 4" 16 ohm 5 watt made for Radiomobile
243. 2-speakers 6" x 4" 16 ohm 5 watt made for Radiomobile
244. 1-mains motor with gear-box very small, toothed output 1 rpm
245. 4-standard size pots, 1/2" mag with dc switch
249. 1-13A switched socket on double plate with fused spur for water heater
256. 2-mains transformers 2V 1A secondary split primary so ok also for 115V
263. 1-mains transformer 15V 1A secondary p.c.b. mounting
269. 50 3.5V torch bulbs
290. 3 7" reel to reel tape spools
291. 1 ten turns 3 watt pot 1/2" spindle 100 ohm
292. 50 two plate brown bakelite casing rears
293. 50 silicon diodes mixed unmarked
294. 50 Germanium transistors mixed and unmarked
295. 10 round pointer knobs 1/2" spindle
296. 3 car cigar lighter socket, plugs
297. 1 cover for 24hr time switch ref 8D45
298. 2 15 amp round pin plugs brown bakelite
300. 1 mains solenoid with plunger compact type
301. 10 ceramic magnets Mullard 1" x 3/8 x 5/16
303. 1 12 pole 3 way ceramic wave charge switch
304. 1 stereo amp 1 watt per channel
305. 1 tubular dynamic microphone with desk rest
306. 1 module, speaker & battery to make musical card
307. 5 thermal fuses 15 amp woods mate
308. 1 T.V. turret tuner (black & white T.V.)
309. 12 adaptable legended knobs 1/2" spindle
310. 10 oven thermostats
311. 1 Clara Elliot sealed relay 12V
312. 1 pressure pad switch 24 x 18 (Trigger Mat)
313. 5 sub miniature micro switches
314. 1 12" 8 watt min fluorescent tube white
315. 1 8" 4 watt min fluorescent tube white
316. 1 round pin kettle plug with moulded on lead

MULLARD UNILEX AMPLIFIERS

We are probably the only firm in the country with these new in stock. Although only four watts per channel, these give superb reproduction. We now offer the 4 Mullard modules - i.e. Mains power unit (EP9002) Pre amp module (EP9001) and two amplifier modules (EP9000) all for £6.00 plus £2 postage. For prices of modules bought separately see 'TWO POUNDERS'.

CAR STARTER/CHARGER KIT

Flat Battery! Don't worry you will start your car in a few minutes with this unit - 250 watt transformer 20 amp rectifiers, case and all parts with date £16.50 or without case £15.00 post paid.

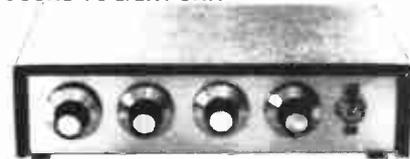


Ex-Electricity Board. Guaranteed 12 months.

VENNER TIME SWITCH

Mains operated with 20 amp switch, one on and one off per 24 hrs. repeats daily automatically correcting for the lengthening or shortening day. An expensive time switch but you can have it for only £2.95 without case, metal case - £2.95, adaptor kit to convert this into a normal 24hr. time switch but with the added advantage of up to 12 on/off per 24hrs. This makes an ideal controller for the immersion heater. Price of adaptor kit is £2.30.

SOUND TO LIGHT UNIT



Complete kit of parts of a three channel sound to light unit controlling over 2000 watts of lighting. Use this at home if you wish but it is plenty rugged enough for disco work. The unit is housed in an attractive two tone metal case and has controls for each channel, and a master on/off. The audio input and output are by 1/2" sockets and three panel mounting fuse holders provide thyristor protection. A four pin plug and socket facilitate ease of connecting lamps. Special price is £14.95 in kit form.

12 volt MOTOR BY SMITHS

Made for use in cars, etc. these are very powerful and easily reversible. Size 3 1/2" long by 3" dia. They have a good length of 1/2" spindle - 1/10 hp £3.45 1/8 hp £5.75 1/6 hp £7.50

25A ELECTRICAL PROGRAMMER

Learn in your sleep. Have radio playing and kettle boiling as you wake - switch on lights to ward off intruders - have a warm house to come home to. You can do all these and more. By a famous maker with 25 amp on/off switch. A beautiful unit at £2.50

THE AMSTRAD STEREO TUNER

This ready assembled unit is the ideal tuner for a music centre or an amplifier, it can also be quickly made into a personal stereo radio - easy to carry about and which will give you superb reception. Other uses are a 'get you to sleep radio', you could even take it with you to use in the lounge when the rest of the family want to view programmes in which you are not interested. You can listen to some music instead. Some of the features are: long wave band 115 - 170KHz, medium wave band 525 - 1650KHz, FM band 87 - 108 MHz, mono, stereo & AFC switchable, fully assembled and fully aligned. Full wiring up data showing you how to connect to amplifier or headphones and details of suitable FM aerial (note ferrite rod aerial is included for medium and long wave bands). All made up on very compact board.

Offered at a fraction of its cost only £4.95

GOODS ARE ON APPROVAL

these notes are often hastily written and technical information sheets are seldom available about the items we have to describe, also advertisements sometimes go to press without our having a chance to correct any mistakes, however, everything we sell is supplied on the understanding that if it is not suitable for your project you may return it within 7 days for credit. If there was a definite error of description in our copy then we will pay postage, if not, then you pay the postage. Note this offer applies to kits, but only if construction is not started.

FANS & BLOWERS

Woods extractors
5" £5 + £1.25 post, 6" £6 + £1.50 post
4" x 4" Muffin equipment cooling fan 115V £2.00
4" x 4" Muffin equipment cooling fan 230/240V £5.95
5" Planair extractor £5.50
9" Extractor or blower 115V supplied with 230 to 115V adaptor £9.50 + £2 post.
All above are ex computers but guaranteed 12 months.
10" x 3" Tangential Blower, New, Very quiet - supplied with 230 to 115V adaptor on use two in series to give low blow £2.00 + £1.50 post or £4.00 + £2.00 post for two.

IONISER KIT

Refresh your home, office, shop, work room, etc. with a negative ION generator. Makes you feel better and work harder - a complete mains operated kit, case included. £11.95 plus £2.00 post.

TELEPHONE BITS

Master socket (has surge arrester - ringing condenser etc) and takes B.T. plug £3.95
Extension socket £2.95
Dual adaptors (2 from one socket) £3.95
Cord terminating with B.T. plug 3 metres £2.95
Kit for converting old entry terminal box to new B.T. master socket, complete with 4 core cable, cable clips and 2 BT extension sockets £11.50

MINI MONO AMP

Fit into volume control and a hole for one control should you require it. The amplifier has three transistors and we estimate the output to be 3W rms. More technical data will be included with the amp. Brand new, perfect condition, offered at the very low price of £1.15 each, or 13 for £12.00

J & N BULL ELECTRICAL

128 PORTLAND ROAD, HOVE, BRIGHTON, SUSSEX BN3 5QL

MAIL ORDER TERMS: Cash, P.O. or cheque with order. Orders under £20 add £1 service charge. Monthly account orders accepted from schools and public companies. Access & B/C card orders accepted. Brighton 0273 203500. Bulk orders: write for quote.

OVER 400 GIFTS YOU CAN CHOOSE FROM

There is a total of over 400 gifts in our Baker's dozen range and you become entitled to a free gift with each dozen pounds you spend on these packs. A classified list of these packs and our latest 'Telev Letter' will be enclosed with your goods, and you will automatically receive our next news letters.

TWO POUNDERS*

- 2P2 - Wall mounting thermostat, high precision with mercury switch and thermometer
- 2P3 - Variable and reversible 8-12v psu for model control
- 2P4 - 24 volt psu with separate channels for stereo made for Mullard UNILEX
- 2P6 - 100W mains to 115V auto-transformer with voltage tappings
- 2P7 - Mini key, 16 button membrane keyboard, list price over £12
- 2P8 - Mains motor with gear box and variable speed selector. Series wound so suitable for further speed control
- 2P9 - Time and set switch. Boxed, glass fronted and with knobs. Controls up to 15 amps. Ideal to program electric heaters
- 2P10 - 12 volt 5 amp mains transformer - low volt winding on separate bobbin and easy to remove to convert to lower voltages for higher currents
- 2P11 - Power amp module Mullard Unilex EP9000 (note stereo pre-amp module Unilex 9001 is 80218)
- 2P12 - Disk or Tape precision motor - has balanced rotor and is reversible 230v mains operated 1500 rpm
- 2P14 - Mug Stop kit - when thrown emits piercing squawk
- 2P15 - Interrupted Beam kit for burglar alarms, counters, etc.
- 2P17 - 2 rev pr minute mains driven motor with gear box, ideal to operate mirror ball
- 2P18 - Liquid/gas shut off valve mains solenoid operated
- 2P19 - Disco switch-motor drives 6 or more 10 amp change over micro switches supplied ready for mains operation
- 2P20 - 20 metres extension lead, 2 core - ideal most Black and Decker garden tools etc.
- 2P21 - 10 watt amplifier, Mullard module reference 1173
- 2P22 - Motor driven switch 20 secs on or off after push
- 2P24 - Clockwork operated 12 hour switch 15A 250V with clutch
- 2P26 - Counter resettable mains operated 3 digit
- 2P27 - Goodmans Speaker 6 inch round Bohm 12 watt
- 2P28 - Drill Pump - always useful couples to any make portable drill
- 2P29 - 24 position Taxyley switch contacts rated 5A - 1/2" spindle
- 2P31 - 4 metres 38 way interconnecting wire easy to strip
- 2P32 - Hot Wire amp meter - 4 1/2 round surface mounting 0-10A - old but working and definitely a bit of history
- 2P34 - Solenoid Air Valve mains operated
- 2P35 - Battery charger kit comprising mains transformer, full wave rectifier and meter, suitable for charging 6v or 12v
- 2P36 - 20 Amp meter, with shunt unused but ex-equipment
- 2P38 - 200 R.P.M. Geared Mains Motor 1" stack quite powerful, definitely large enough to drive a rotating aerial or a tumbler for polishing stones etc.
- 2P42 - Tubular heater, 60 watts per ft, unused but slightly storage soiled, made by G.E.C. Perfect order (must be collected by appointment as 12ft long)
- 2P43 - Small type blower or extractor fan, motor insert so very compact, 230V
- 2P46 - Our famous drill control kit complete and with prepared case
- 2P47 - Joy switch kit complete as previously sold
- 2P48 - Telephone ringing unit - reduces mains to 50 volts and changes frequency from 50 Hz to 25 Hz to give right ringing tone
- 2P49 - Fire Alarm break glass switch in heavy cast case
- 2P51 - Stereo Headphone amplifier, with pre-amp
- 2P54 - 2 1/2 kw blower section of coal or log effect fire, this is a sheet metal assembly which holds the elements, the motor with fan, and the lamp holders and bits which give the flickering flame effect. Collect or add £3 to cover p&p
- 2P55 - Mains motor, extra powerful has 1 1/2" stack and good length of spindle
- 2P62 - 1 pair Goodmans 15 ohm speakers for Unilex
- 2P63 - 1 5kV 20 mA mains transformer ex-equipment
- 2P64 - 1 five bladed fan 6 1/2" with mains motor
- 2P65 - 2 resettable trips 4.5A mains
- 2P66 - 1 2kW tangential heater 115V easily convertible for 230V
- 2P67 - 1 12v-0-12v 2 amp mains transformer
- 2P68 - 1 15v-0-15v 2 amp mains transformer
- 2P69 - 1 250v-0-250v 60 mA & 86.3v 5A mains transformer
- 2P70 - 1 E.M.I. tape motor two speed and reversible
- 2P71 - 1 PAPT 240 5 Hz motor
- 2P72 - 1 115V Muffin fan 4" x 4" approx.
- 2P75 - 1 2 hour timer, plugs into 13A socket
- 2P76 - 1 audio tweeter partner to SP26 speaker
- 2P77 - 1 instrument box with key size 12" x 4 1/2" wide 6" deep
- 2P81 - ORACLE V1010 instrument panel, is a MEDIUM with extras, it is the heart of many video systems including the Prestel unit we recently stocked. It uses 25 I.C.'s, 2 crystals, u.h.f. modifier Axtel UM1233 etc. You receive this, new, unused and complete except for 7 of its own I.C.'s.
- 2P82 - 9v-0-9v 2 amp mains transformer
- 2P83 - 25m 75 twin flat flex for mains appliances
- 2P84 - Modem board with press keys for telephone redialer
- 2P85 - 20v-0-20v 1/2 A Mains transformer
- 2P86 - Sangamo 24 hr time switch 20 amp S.H.
- 2P88 - 120 min. time switch with knob
- 2P90 - 90 min. time switch with edgewise engraved controller
- 2P91 - Panel meter size 2 1/4" x 2" scaled power factor
- 2P92 - Bailey & Macky pressure switch 50 p.s.i.

£5 POUNDERS*

1. 12 volt submersible pump complete with a tap which when brought over the basin switches on the pump and when pushed back switches off, an ideal caravan unit.
2. Sound to light kit complete in case suitable for up to 750 watts.
3. Silent sentinel ultra sonic transmitter and receive kit, complete.
4. Dial indicator, measures accurately down to .01mm, "John Bull" or equally first-class make, a must for toolmaker or lathe worker.
5. 250 watt isolating transformer to make your service bench safe, has voltage adj. taps, also as it has a 115V tapping it can be used to safely operate American or other 115V equipment which is often only insulated to 115V. Please add £3 postage if you can't collect as this is a heavy item.
6. 12V alarm bell with heavy 6" gong, suitable for outside if protected from direct rainfall. Ex GPO but in perfect order and guaranteed.
7. Tape punch and matching tape reader, not new but believed in perfect working order if not so we would repair or replace within 12 months. Please add £2.50 postage.
8. Sensitive voltmeter relay, this consists of a 4 1/2" dia moving coil meter with electronics (we will supply cct. dig.) over £120 each, they are new and still in maker's boxes
9. Box of 25 fluorescent tubes 40 watt daylight or warm white ideal window pelmetts, signs, etc. Please collect or add £2 postage.
10. Box of 25 18" fluorescent tubes assorted colours, please collect or add £2 postage.
11. 24 x 8 ft 85-120 watt warm white tubes. Ideal plant growing. Collect or send open cheque to cover carriage.
12. Equipment cooling fan - mini snail type mains operated.
13. Ping pong ball blower - or for any job that requires a powerful stream of air - ex computer. Collect or add £21 post.
14. Unselector 360 degrees rotation, 5 poles, 50 ways, 50V coil. For many applications
15. Control panel case, conventionally designed with hinged front and finished metallic silver, easily arranged as lockable size approx. 15" x 10" x 5 1/2", wall mounting.
17. Two kits mailbox size surveillance transmitter and 2 FM receivers.

TELECOMMS

DISTRIBUTORS OF AMATEUR AND PERSONAL RADIO EQUIPMENT.

SEND £1 FOR OUR FULL CATALOGUE AND RECEIVE A £2 VOUCHER



93.4 MHz PERSONAL RADIO

CYBERNET DELTA 1	£355
20 Channel TCVR W/Scan & Memory	£139.95
NEVADA HRA 900 M/Head G a As F.E.T. Amp	£125
NEVADA TC12L 12 EL Loop QUAD 18 dB	£39
NEVADA HPS 900 SWR/PWR Meter	£89.95
NEVADA PA7-E Base Colinear 7 dB	£66
NEVADA HAS-1 'N' Type Co-axial Switch	£59.95
NEVADA P593A Power Divider (for 2 ants)	£24.50
SEND FOR OUR FULL 93.4MHz CATALOGUE	£1

2 MTR EQUIPMENT

RF AMPLIFIERS

All amplifiers except broadband models are tuned for 29.6MHz centre freq. Should you require a lower freq. i.e. 28.5MHz please state when ordering. Export models available for 26-30MHz

MOBILE AMPLIFIERS C.T.E. MOD 767

76 Watts FM
INPUT:- 0.5-10 Watts
SWITCHABLE:- Class AB, Class C
SUPPLY:- 13.8 Volt
REMOTE CONTROL FACILITY



C.T.E. MOD 737 50W FM AM/SSB/CW	£37.69
C.T.E. MOD 767 80W FM AM/SSB/CW	£43.00
C.T.E. MOD 767 80W FM Broadband	£99.98
C.T.E. MOD 757 150W FM Broadband	£22.23
ZETAGI B35 25W FM 26-30MHz	£47.87
ZETAGI B150 70W FM 26-30MHz	£108.42
ZETAGI B300 150W FM (2-30MHz)	£23.75
NEVADA TC35 30W FM 26-30MHz	

MAINS OPERATED AMPLIFIERS

C.T.E. DC9 Solid State 150W FM (Broadband)	£148.50
ZETAGI BV 131 150W FM (Valve) (26-30MHz)	£99.12
ZETAGI B132 150W FM Solid State (Broadband)	£99.12

2 MTR HANDHELD NEW MOD. C.T.E. CT1600

A superbly sensitive new handheld covering 142-149MHz
● Repeater shift
● High/low power 1.5/0.5 Watt
● Thumbwheel selector



VHF MOBILE AMPLIFIERS

C.T.E. B110 144MHz 110 Watt W/Pre Amp	£169
C.T.E. B42 144MHz 40 Watt	£59.88
ZETAGI LA05435 144MHz 45 Watt	£65.10

C.T.E. B42 MOBILE AMP

40 Watt output
10 Watt input



ALINCO 2 MTR PRODUCTS

ALR-206E 25 Watt FM Mobile	£295
SPECIAL OFFER ALM-203E H/held with 30 Watt Amp	£249

POWER SUPPLIES

F911 10 AMP MAX. 13.8V DC

C.T.E. F1920 20 Amp Supply	£99.99
C.T.E. F911 10 Amp Supply	£49.47
ZETAGI 1210S 12 Amp Supply	£89.70
ZETAGI 12101 10 Amp Supply	£68.83
ZETAGI 12201 25 Amp Supply	£107.73
ZETAGI 1220S 25 Amp W/Meters	£123.92
ZETAGI 1240S 40 Amp W/Meters	£199.95

C.T.E. FD 1350 1.3 GHz FREQ. COUNTER

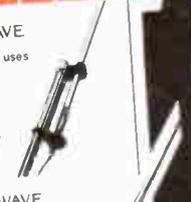
For the technically minded this counter is ideal for both 27MHz and 93.4MHz use
12 Volt Operation
High Resolution



29 MHz BASE ANTENNAS

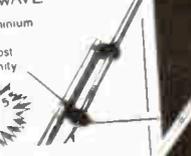
NEVADA TC52 1/2 WAVE

This top class British made half wave uses high grade aluminium and a low loss coil handling up to 1 KW
WIND RESISTANCE:- 75 MPH
GAIN:- 2.5 dB
FREQ:- 28-30MHz



NEVADA TC58 5/8 WAVE

British made using high grade aluminium and a low loss coil complete with small radials this antenna is our most popular amongst the 29MHz fraternity
POWER:- 1KW
GAIN:- 35 dB
FREQ:- 28-30MHz
LENGTH:- 66 METRES



SALIUT 3/4 WAVE

Using a unique base hoop this antenna offers exceptional ground wave coverage on 10 FM
POWER:- 2KW
GAIN:- 45 dB
FREQ:- 28-30MHz
LENGTH:- 91 METRES



NEVADA

HIGH QUALITY BRITISH MADE 29MHz FM PRODUCTS

NEVADA TC35 RF POWER AMPLIFIER

INPUT:- 1.4 Watts FM
OUTPUT:- 25-30 Watts FM
SUPPLY:- 13.8V DC
FREQ:- 26-30MHz



A switchable RF power amplifier with polarity protection and correctly matched input stage centred on 29MHz

NEVADA TC27 RX RECEIVER PRE-AMP FOR 26-30MHz

A superior low noise pre-amplifier for 29MHz FM operation
Variable gain -6dB's to +18dB's suitable for use with transceivers up to 25 Watts output



NEVADA TC27 RXM MOBILE PRE-AMPLIFIER FOR 29MHz FM

An F.E.T. low noise pre-amplifier with variable gain. Designed to improve reception on even the best transceiver
GAIN:- -6 to +20dB's



NEVADA TM27 ANTENNA MATCHER

Ideal for both home and mobile use this matcher really works allowing full coverage of the 10 MTR band and handling 100 Watts



TC2 2 WAY ANTENNA SWITCH

A robust unit with unique double screening handling up to 200 Watts and exceptionally low insertion loss
FREQ:- 1-100MHz



NEVADA PLP 1 LOW PASS TVI FILTER

Ensures your transceiver has 'clean' output cutting off just over 30MHz
Low cost. peace of mind



NEVADA PSDL PROFESSIONAL DUMMY LOAD

FREQ:- DC to 3GHz
A must for the HF, VHF and UHF operator. This dummy load at last offers wide freq. coverage at an affordable price



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