

Practical Wireless

PW

amateur radio & more!

Kenwood TH-F7E Review

***Build a Beacon
Clock***

***Foundation Licence
Update***

Confessions of a G7

***Club Spotlight
Magazine Results***



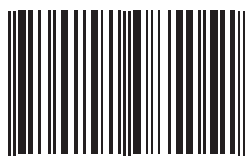
***Inside
Pull-out Poster***

***Commemorating
Marconi's
Success***



Marconi's Atlantic Leap

DECEMBER 2001 £2.75



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WATERS & STANTON

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CUSTOMER SERVICE

CUSTOMER SERVICE
THE ONLY THING
WE **WON'T** DISCOUNT



FT-817 160m - 70cms 5W Portable



£799.95 carr.£8

FT-817 is an incredible design feat by Yaesu, and world reviews agree that there has never been anything like it. It's not expensive either. So why not get out in the fresh air, or put one in the car, and put the fun back into your radio. Check out the exciting AT & ATX portable antennas elsewhere in our add.

HF Whips for FT-817

AT-80 80m telescopic	£24.95
AT-40 40m telescopic	£24.95
AT-20 20m telescopic	£19.95
AT-17 17m telescopic	£19.95
AT-15 15m telescopic	£19.95
AT-12 12m telescopic	£19.95
AT-10 10m telescopic	£19.95
ATX WBNC	£19.95
Phone	£19.95
Carriage charge £2 each	

OTT-1 One Touch Tune

Plugs into rear of FT-817 and gives immediate carrier for adjusting ATU or checking VSWR

£59.95 carr.£6

W-25SM 25 Amp Switch-Mode Power Supply.

Switched 230 / 115V AC input and fixed 13.8V output at 22 Amps continuous and 25 Amps peak. Over voltage and over current protected and fan cooled. Measures 180mm (W), 75mm (H) and 190mm (D) excluding terminals. Provided with detachable 13 Amp plug and cable. **NEW**

£69.95 carr.£6

MFJ-Micro Key MFJ-561

FT-817 Micro Paddle

This tiny paddle really is a masterful idea. It's simple, yet very effective. Built from phosphorous bronze, it comes with 1m lead and 3.5mm stereo plug. **NEW**

£24.95 carr.£2

Z-11 Auto ATU for FT-817 160m - 10m

£199.95 carr.£6

YAESU

FT-1000MP Mk-V 200W HF All Mode £2899

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

SPECIAL OFFER



SPECIAL OFFER ONLY FROM W&S.

Your choice of **FREE** accessories this month only.

Either:

- FREE** MD100ABX BASE MIC. or
- FREE** SP8 EXTERNAL SPEAKERS or
- FREE** TCXD-6 TCXD UNIT or
- FREE** FILTER

PHONE FOR FULL DETAILS

FT-847 160m - 70cm All Mode £1199

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

1.8 to 440MHz, this all-in-one station offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cms. You get genuine RF clipping on SSB for up to 6dB gain and there are 4 separate antenna sockets

Accessories for FT-847

FC-20 ATU	£219 B	MD-100ABX Mic	£110 B
SP-8 Speaker	£139 B	YF-115C Collins	£99 B
FVS-1A Vce synth	£38 B	YF-115S Collins	£99 B

FT-100 D 160 - 70cm All Mode £1049

SAVE

Plus £8.00 Carr.

Yaesu's latest version is now available and includes 500Hz CVF filter; high stab. oscillator and CTCSS decoder.

FT-920AF HF 160m-6m-100w £1099

Plus £8.00 Carr.

100 Watts from 1.8 to 54MHz with dual VFO controls. Features DSP, Shuttle-jog, Internal ATU, 100 memories and built-in message keyer. Supplied with FREE FM unit.

MD-200ABX £249

SAVE

Plus £8.00 Carr.

Yaesu's Secret Weapon!

The best microphone Yaesu have ever produced. Featuring Variable Side Pressure Control. You can adjust the audio response precisely to meet your personal requirements.

But there is more!

There is also provision for fitting and selecting an additional element that can be selected via the switch provided. The HEIL ceramic elements are ideal for this. Why not fit the HC-2 DX element, just £32.95 - IN STOCK



KENWOOD

TS-2000 160m - 70cms+23cms option £1695

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

+FREE HEIL MIC OF YOUR CHOICE



The amazing TS-2000 offers coverage from HF to UHF. And you can go right up to 23cms with the optional module Monitor the DX cluster whilst working other DX, optimise your satellite contacts, enjoy the benefit of built-in ATU. It's all there in one very compact box. Colour brochures available on request.

TS-570DG 160 - 10m All Mode £849

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

Possibly the best value in budget class HF radios. 100 Watts out on all HF bands with DSP and variable CW filtering. Lovely large dial and built-in memory keyer. We even give you a built-in ATU. Great value!

TS-570 Accessories

VS-3 Voice synth	£45 A	MC-80 Desk mic	£72 B
DRU-3A Recording	£99 B	PS-33 Power supply	£199 C
HS-5 H'phones	£52 B	SP-23 Speaker	£68 B
MC-90 Desk mic	£187 B	CW filters each	£61 B
		SSB 1.8kHz	£61.95B

10M OR 15M WHIPS £19.95

SUPER VALUE

Plus £2.00 Carr.

100W 10m & 15m Mobile Whips with magnetic mount + Built-in impedance transformer.

Just over 1m long, complete with magnetic base, shock spring, 5m coax cable with PL259 and built-in impedance transformer for 1:1 VSWR. Centred on 28.5MHz or 21.250MHz, this is an absolute bargain! Get ready for the Autumn and Winter DX.



SGC SG-2020 £599

Plus £2.00 Carr.



0 - 20 Watts Output
SSB CW AM Data
RF & VOGAD Processing
Variable Selectivity (100Hz)

Ideal for GPR, but with VOGAD and RF speech processing it can sound like 100 Watts! Very low current (4A max) makes it ideal for portable work. Variable selectivity down to 100Hz means no extra filters to purchase.

- NEW SG-2020 ADSP now available £799 carriage £8.00
- SG-237 mini auto coupler ideal for SG-2020 £369

ICOM

IC-746 160m - 2m All-mode £1395

3 YEARS FREE WARRANTY

Plus £8.00 Carr.



Accessories

FL100 CW	£59 B	RS-746 Software	£44 A
FL101 CW	£84 B	SM-8 Mic	£129 B
FL103 SSB	£59 B	SM-20 Mic	£149 B
FL223 SSB	£59 B	SP-21 Speaker	£74 B
		UT-102 Vce Synth	£32 B

IC-756PRO 1.8 - 52MHz 100W £1895

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

IC-756PRO Accessories

CT-17 RS-232	£99 B	SP-20 Speaker	£164 B
SM-8 Base mic	£129 B	SP-21 Speaker	£74 B
SM-20 Base mic	£144 B	UT-102 Voice synth	£32 A
		PS-85 Power supply	£266 B

IC-706IIG 160m - 70cm All Mode £999

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

New Heil Hands-Free Headset

This single piece headphone with boom microphone, from Heil USA, allows true hands-free operation using VOX. Wired for IC-706 (all models) it includes PTT switch. Built-in amplifier means no more low audio from older IC-706 models! All this for just £59.95 B

IC-706IIG Accessories

AT-180 Auto ATU	£379 B	FL223 SSB 1.8kHz	£59 B
FL100 500Hz CW	£59 B	DC Lead (spare)	£16 A
FL232 350Hz CW	£59 B	3.5m sep cable	£33 A
FL103 SSB 2.8kHz	£59 B	5m sep. cable	£49 A
		Others: please phone	

IC-775 DSP 200W HF £2099

SAVE

Plus £8.00 Carr.

Your last chance to purchase this heavyweight from ICOM. It covers all HF bands and gives a robust 200-Watts output. This really is a classic DX machine that has many followers around the world.

IC-718 100W HF £549

SAVE

Plus £8.00 Carr.



If you are looking for a radio with pedigree, but without a high price tag, then this may be the one for you. Covers all HF bands plus wideband receive. Plus auto notch, dual vfo, swr meter etc. Plus options including DSP & filters.

LIMITED SPECIAL OFFER!

HEAD OFFICE

22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS • ENQUIRIES: 01702 206835/204965 FAX: 01702 205843

MIDLANDS + NORTH SHOP

BENTLEY BRIDGE, CHESTERFIELD RD, MATLOCK, DERBYSHIRE, DE43 5LE • ENQUIRIES: 01629 582380 FAX: 01629 580020

SCOTLAND + BORDERS SHOP

20, WOODSIDE WAY, GLENROTHES, FIFE KY7 5DF • ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS

YAESU

FT-1500M 2M FM Mobile £159
Plus £8.00 Carr.



SPECIAL OFFER

Small, compact yet built like a Battleship! Should last for years. Look at the Price!

YAESU

FT-7100 2m/70cm Mobile £Phone
Plus £8.00 Carr.

Just arrived is this new dual band radio that has extended rx. Power is 50/35W. Features dual in-band reception and detachable display (requires YSK-7100).

NEW



FT-41R 70cm **CLEARANCE PRICE** £99
Plus £8.00 Carr.

LAST FEW

- * 430 - 440MHz FM
- * Two independent VFOs
- * 151 channels or 75 Alphanumeric
- * 7 channel steps
- * 4 power levels
- * 1.5W 4 x AA cells (FNA-14)
- * 3.5W @ 9.6V DC (FNB-38)
- * Alphanumeric
- * DTMF
- * CTCSS (optional)

KENWOOD

TM-D700E 2m + 70cm FM £449
Plus £8.00 Carr.



Large detached screen and APRS, make this a firm favourite. 50W on 2m and 35W on 70cm. Features 200 memos, CTCSS, Band Scope, built-in TNC, DX cluster monitor; alphanumeric etc.

TM-G707E 2m + 70cm FM £289
Plus £8.00 Carr.



If you are looking for simplicity and low cost, here's the answer: 2m & 70cm with detachable front panel and "Easy operation mode." GREAT!

TM-V7E 2m + 70cm FM £359
Plus £8.00 Carr.



A lovely cool blue display, easy with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

TH-D7E 2m + 70cm £299
Plus £8.00 Carr.

Data Communicator
One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

TH-F7E 2m + 70cm £289
Plus £8.00 Carr.

NEW
With extra wide Rx coverage
Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 470MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

ICOM

IC-207H 2m + 70cm FM £279
Plus £8.00 Carr.



A great budget class radio for VHF & UHF use.

IC-2800H 2m + 70cm FM £419
Plus £8.00 Carr.



Large colour display with video input, and airband rx. 50W/35W and remote head unit.

IC-2100H 2M FM Mobile £229
Plus £8.00 Carr.



Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1299
Plus £8.00 Carr.



Icom's new dual band all-mode base station radio with 23cms option.

ADI

ADI AT-600 2m/70cm £179
Plus £8.00 Carr.

HOCKLEY WAREHOUSE EXCLUSIVE
* Dual Band 2m/70cm
* Up to 5 Watts out
* Airband Receive
* Nicad Pack * CTCSS
* Hod Charger
You won't find better value than this. Limited stocks



ADI AT-201 £99
Plus £8.00 Carr.

* 2m Handy
* 2.5W, 5W (13.5V)
* 1750Hz & CTCSS
* Wideband receive
* Drycell case
* Batteries not included
* Full keypad
Higher power than most palm sized models. Fully illuminated keypad for ease of frequency entry. Channel or frequency readout.

ADI AT-147 2m 50W £199
Plus £8.00 Carr.

Airband Receive
2m FM mobile transceiver. Three power levels 50,10,5W. Displays frequency or channel numbers, and offers Airband AM receive



YAESU VX5R BLACK OR SILVER £PHONE
Plus £8.00 Carr.

Tiny but incredibly rugged, the VX-5R provides transceiver capability on three amateur bands (50/144/430MHz) and almost continuous reception from 500kHz up to 999MHz.

YAESU VX1R 2m/70cm Handheld £145
Plus £8.00 Carr.

Ultra-wide frequency coverage which includes VHF and UHF TV audio, AM broadcast, FM broadcast and AM air band.

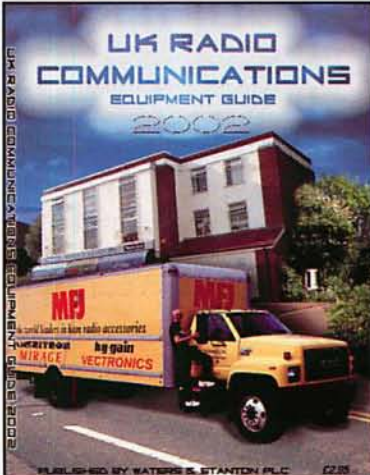


SECOND HAND LIST

HF Transceivers	Scanners Mobile/Base
IC-725 x3 £399.00	AR-3000 £300.00
IC-725 £499.00	RD-500VX £599.00
IC-728 x2 £495.00	Opto-Cam £329.00
IC-737 £699.00	
TS-850S x3 £699.00	Scanners Hand Held
TS-850SAT £749.00	DJ-X1 £99.00
MFJ-9020 £115.00	IC-R2 £109.00
MX-3.5S £149.00	R-11 x2 £199.00
SG-2020 x3 £485.00	WS-1000E £99.00
TS-120S £295.00	MVT-7000 £125.00
FT-920AF £899.00	MVT-7300 £229.00
	VT-125 II £99.00
VHF/UHF Base/Mobile	Station Accessories
Transceiver	PK-232MBX £185.00
AR-446 £199.00	PK-900 £299.00
AKD-2001 x2 £145.00	ALS-600DCE £899.00
RD-110E £125.00	BY-1 £59.00
DR-M06SX £159.00	LPM-144-3-100 £139.00
IC-271E £349.00	Explorer £499.00
IC-290H £229.00	SM-5 £49.00
TM-221ES £149.00	AMT-3 £50.00
TS-811E £495.00	FAX-1 £125.00
MFJ-9406X £149.00	NTR-1 £99.00
FT-225RD £499.00	Explorer £109.00
FT-290R £159.00	EK-4 £35.00
FT-290R II £249.00	KMK £35.00
FT-690R II £299.00	IF-232C £59.00
FT-712RH £125.00	EP-925 £69.00
FT-5200 x2 £299.00	MFJ-249 £149.00
VHF/UHF Hand Held	MFJ-484C £89.00
Transceiver	MFJ-784B £139.00
DJ-190E £99.00	MFJ-784B £100.00
DJ-480 £99.00	MFJ-1274 £100.00
DJ-65 £169.00	MFJ-1278BX £225.00
IC-M11 £199.00	MFJ-1610 £4.00
IC-07E £115.00	PT-105A x2 £25.00
IC-77E x2 £199.00	FAX-1 £119.00
TH-28E £99.00	MML-144-30-LS £69.00
TH-79E £175.00	KX-2 £59.00
TH-D7E x2 £249.00	KX-3 £59.00
C-108 £89.00	2600HA £79.00
C-408 £89.00	3000A+ £289.00
TH-41E £85.00	Micro-RF £69.00
FT-50R £149.00	Mini-Scout £129.00
VX-5R x2 £199.00	Pico-2 £149.00
Shortwave Receivers	Bravo Pro £50.00
YB-500 £69.00	PowerClear £199.00
NRD-345G £349.00	LT-23S £499.00
NRD-525 x2 £529.00	Masterkey II £49.00
R-5000 £400.00	DSP-59+ £149.00
HF-125 £199.00	WAT-2 £35.00
HF-225 x2 £249.00	WM-2000 £59.00
DX-394 £99.00	FL-232C x2 £49.00
R-9914 £69.00	FL-2025 £99.00
ICF-SW77 £199.00	FRT-7700 £45.00
ICF-SW100E £115.00	MD-1 £69.00
ICF-SW1000T £299.00	MD-100ABX £79.00
ICF-SW7600D £79.00	
WA-8000 £199.00	Miscellaneous
TMR-7602 £59.00	AE-2850 £50.00
	KH-104 £60.00
	GPS-II Plus £149.00
	GPS-3000 £89.00
	77-095 £30.00

* 3 MONTHS PARTS + LABOUR GUARANTEE.
* PLEASE RING BEFORE SENDING AN ORDER.

NEW AND EVEN BIGGER



New 2002 Catalogue
336 pages
£2.95
carr. £1.25

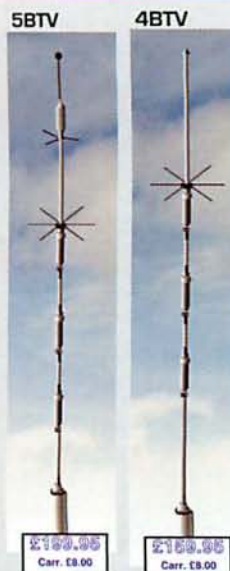


The foremost guide to amateur radio products from the latest transceivers to the smallest of accessories. Full colour pages with comprehensive specifications, there is nothing else like it in the world! There is also some editorial and reviews. Three times the size of many magazines, yet it costs no more.

INCLUDES MONEY SAVING VOUCHERS



Get in Front with HUSTLER



BASE STATION ANTENNAS

Spec	58TV	48TV
Bands	5	4
Coverage	80m-10m	40m-10m
Bandwidth 10-40m	Full	Full
Bandwidth 80m	100kHz	N/A
Resonance	1:15:1	1:15:1
Power	1kW CW	1kW CW
Traps	1" forms	1" forms
Tubing	1.25"	1.25"
Bracket size	1.75"	1.75"
Height	25ft 1" (7.64m)	21ft 5" (6.52m)
Weight	17lbs. (7.7kg)	15lbs (6.8kg)
Wind (112kph)	13kg	-

"I worked my first ZL while actually on the move using a Hustler whip" - Peter Waters G3QJV.
Customers are also telling us how pleased they are with the base verticals. Check the prices!

HUSTLER Mobile Antennas

Model	Band	Bandwidth	Price
RM-10	10m	150-250kHz	£19.95 B
RM-11	11m	150-250kHz	£19.95 B
RM-12	12m	90-120kHz	£19.95 B
RM-15	15m	100-150kHz	£19.95 B
RM-17	17m	120-150kHz	£22.95 B
RM-20	20m	80-100kHz	£22.95 B
RM-30	30m	50-60kHz	£25.95 B
RM-40	40m	40-50kHz	£25.95 B
RM-80	80m	25-30kHz	£29.95 B

Model	Band	Bandwidth	Price
RM-10-S	10m	250-400kHz	£24.95 C
RM-15-S	15m	150-200kHz	£25.95 C
RM-20-S	20m	100-150kHz	£29.95 C
RM-40-S	40m	50-80kHz	£35.95 C
RM-80-S	80m	50-60kHz	£49.95 C

Model	Band	Bandwidth	Price
MO-1	54" (FOLD @ 22")		£31.95 C
MO-2	54" (FOLD @ 27")		£31.95 C
MO-3	54" (NON FOLD)		£25.95 C
MO-4	27" (NON FOLD)		£21.95 C

WATSON

80m + 40m Monoband Verticals £69.95
Plus £8.00 Carr.

NEW

Low Cost LF Mono Band Verticals For Small Gardens

- * Mono Band
- * 40m or 80m
- * Hustler Resonator
- * Height 5m approx
- * 400 Watts
- * Ground mounted
- * No Radials Essential
- * SO-239 Feed

PBX-100 Portable HF £99.95
Plus £8.00 Carr.

80m - 10m 200W

The PBX 100 offers 80m - 10m operation (max 4-bands at any time) with a height of just 3.6m. Supplied with ground spike, it takes seconds to erect, yet collapses down to little more than 1m, like all ground mounted verticals, it benefits from radials, and the radial wire is provided. Use it in the garden, in the countryside or abroad. SO-239 connection.

Base VHF/UHF Verticals

2m / 70cm fibre glass colinears with stainless steel fittings, 3 short radials and SO-239 sockets. These are high performance antennas, pre-tuned and supplied with all hardware for mast mounting.

Dual Band 2m/70cm		
W-30	3/6dB 1.15m long	£39.95 C
W-50	4.5/72dB 1.8m long	£49.95 C
W-300	6.5/9dB 3.1m long	£59.95 C
Triple band 6m/2m/70cm		
W-2000	0/6/9dB 2.5m long	£69.95 C

Great Value Mobile Whips

W-285	2m 5/8th whip with PL259 base	£14.95 B
W-7900	2m/70cm 5 & 7.5dB length 1.58m	£32.95 B
W-627	6m / 2m / 70cm 2 / 4.5 72dB length 1.6m	£34.95 B
W-770HB	2m/70cm whip 3dB / 5.5dB length 1.1m	£24.95 B

All with tilt-over bases.

W-285	
W-7900	
W-627	
W-770HB	

WSMA-450 2m/70cm £12.95
Plus £2.00 Carr.

Just 4.5cm Long!!

Extremely low profile SMA antenna with transmit (Tx) capability on two bands as well as useful wideband reception across the VHF and UHF spectrum. Ideal for use with covert transceivers/scanners, and for shirt pocket use.



WATSON

WATSON

HF Horizontal Beams + Dipoles



When you buy an HF Yagi, you want quality and realistic performance. You also want to know you can get spares. We offer a wide choice with guaranteed spares availability.

COUNT ON US!

MASB	10-20m (5 band) 3 el 2.7m radius 1.2kW	£299.95 C
X-7	10-20m 7 el. 12.5 - 13dB 2kW 6.09m radius	£669.95 D
X-740	40m add on kit for X-7	£269.95 D
A4-S	10-20m 4 el. 8.9dB 2kW 5.49m radius	£529.95 D
A-744	Gives 40m or 30m operation from A-4S	£149.95 D
A3-S	10-20m 3 el. 8dB 2kW 4.72m radius	£459.95 D
A-743	Gives 40m or 30m operation from A3-S	£149.95 D
A3-WS	12 & 17m 3 el. 8dB 2kW 4.4m radius	£349.95 D
A-103	Gives 30m operation from A3-WS	£149.95 D
D-3	10-20m dipole element 7.86m 2kW	£219.95 C
D-3W	12, 17, 30m 17m dipole element 10.37m 2kW	£219.95 C
D-4	10-40m dipole element 10.92m 2kW	£299.95 C
D-40	40m dipole element 12.88m 2kW	£259.95 C
XM-240	40m 2 el. 6dB 7.3m radius 2kW	£699.95 C
Ten-3	10m 3 el 8dB 3m radius 2kW	£189.95 C
ASL-2010	13.5-32MHz 8 el. log periodic, 4dBd 5.86m radius £749.95 D	

The Mini-Beam For Small Gardens



Cushcraft MA5B

The best 3 element mini beam you will ever find. 2 element gain on 10, 15 & 20m, and dipole performance on 12m and 17m. Up to 25dB F/B ratio, it accepts 1.2kW yet has a boom length of only 2.2m and element length of just 5.2m. Turning radius is 2.7m. Uses a single feeder; this really works the DX. Get one up before winter! £299.95 C

Cushcraft Verticals



R8 (illustrated), covers 8 bands from 6m - 40m, stands 8.7m high and requires no radials. You can feed it with 1.5kW and typical VSWR is around 1.2:1 £469.95 C

R8-GK Optional guy kit for R8 £49.95 B

R-6000 6 band 6m-20m that requires no radials and handles 1.5kW. Stands just 5.8m high and was chosen for the RSGB GB4FUN vehicle antenna. It works!! £329.95 C

NEW MA5V VERTICAL 20-10m £229.95 C

WEP-300B Earpieces £2.95
Plus £2.00 Carr.



Over-the-ear earpiece, popular for security and emergency use. Its low cost and firm mounting even in arduous conditions make this a popular item. Kenwood version fitted with 2.5mm jack plug, and the RA version with 2.5mm right-angled mono jack plug.

WSA-1 PSK-31 Adaptor £39.95
Plus £2.00 Carr.

All you need to connect up to your sound card and run PSK-31. Includes CD software.



YS-130 £79.95
Plus £8.00 Carr.



Ideal for medium sized VHF antenna systems, the YS-150 is a good quality Japanese manufactured product. It is supplied with control box with rotary direction setting, plus upper and lower in-line mast clamps.

Frequency Counters



Each counter is supplied with internal NiCad pack, AC charger and whip antenna.

Hunter	10MHz - 3GHz	£59.95 B
FC-130	1MHz - 3GHz	£79.95 B
S. Hunter	10Hz - 3GHz	£149.95 B
S. Searcher	10MHz - 3GHz	£99.95 B

MASPRO VHF/UHF YAGIS



These high quality Yagis are made in Japan and superbly engineered. Features folded dipole, balun transformer, waterproof box and SO-239. You won't find anything better on the market.

Take a look at our prices!

144-WH5	2m 5 el. 8.6dBd 0.93m	£26.95 B
144-WH8	2m 8 el. 8.6dBd 1.79m	£37.95 B
144-WH10	2m 10 el. 9.7dBd 2.3m	£41.95 B
435-WH8	70cm 8 el. 8.6dBd 0.8m	£29.95 B
435-WH12	70cm 12 el. 12.8dBd 1.51m	£35.95 B
435-WH15	70cm 15 el. 14.2dBd 2.19m	£41.95 B

To compare with dBi figures, add 2.4dB

QS-112 Speaker Mic £16.95
Plus £2.00 Carr.



Combined speaker-mic, with PTT switch. Models for Yaesu, Kenwood, Icom, Alinco and Motorola.

SPM-102 Speaker Mic £9.95
Plus £2.00 Carr.

Incredible value!
Has 4-way 3.5mm plug for VX-1, VX-5, FT-50 and IQ-7E Handies



Limited stocks.

WM-308 Base Mic £59.95
Plus £5.00 Carr.

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Cover Subject

The latest hand-held to come from the Kenwood stables is tried and tested by Richard Newton GORSN, who found it to be more than just a dual-band transceiver. In fact after he'd carried out the review Richard billed it as two radios in one - why? - because it boasts an all-mode receiver too!

Photograph courtesy of Kenwood Electronics (UK)

Design by: Steve Hunt

December features

15 Tex's Tips & Topics

Tex Swann G1TEX has more handy hints & tips for you to try from his postbag of your ideas, including using washing up tablet bags and sponge pan scourers!

18 Subscribe Today!

Take out a subscription to the UK's only independent Amateur Radio magazine for just **£6!**

22 Radio Basics

Building bridges backwards is the subject covered by **Rob G3XFD** this month! A strange technique it may be but there is a sensible method behind his apparent madness!

25 Review - Kenwood TH-F7E Dual-Band Transceiver

Kenwood's TH-F7E is a complete hand-held communications package. After putting it through its paces **Richard Newton GORSN** described it as 'two radios in one'. For the full picture read his review.....

28 The PW International Beacon Project Electronic Timer

Phil Cadman G4JCP introduces part one of his project to help you monitor the extremely useful IBP high speed c.w. beacons on the 14, 18, 21, 24 and 28MHz bands.

34 Foundations for the Future

The introduction of Foundation Licence has caused a mixed reaction among Radio Amateurs. So to keep you abreast of the progress as it unfolds we bring you answers to questions and comments from those in the hobby.

38 Antenna Workshop

The principle of antenna radiation is the subject covered in this month's 'workshop'. **Peter Dodd G3LDO** explains all....

40 Everyone's a Winner!

The entries have been judged and the results are in for the PW & Kenwood Club Spotlight Magazine competition. So did you win? Join Rob G3XFD as he presents the 2001 winners.

42 A Century of Success

It's 100 years since Marconi took his great 'Atlantic Leap of Faith' and to mark this remarkable success story, which paved the way for communication as we know it today, **David Barlow G3PLE** pays tribute to a true pioneer.

44 Souvenir Poster

Pull-out and display on your shack wall! This commemorative poster will provide you with a timely reminder of Marconi's achievements way back in 1901.

51 Wireless Telegraphy at War 1939-45

The Post Office Wireless Telegraphy Section played a huge part in Second World War. **Brian Faulkner** was a manager of one of four coastal radio stations and here he tells the tale of the often forgotten work of the WTS workers.

56 Confessions of a G7

Amateur Radio can become more than just hobby says **John Senior G7RXS** in his article. John confesses to being an addict through and through!

60 Practical Wireless 2001 Index

Another year's flown by so it's time to present the Index of Antenna, Features, Practical Projects, Reviews & Theory articles to help you find that article you just know you've read, but can't quite remember when!

Please note that due to a mix-up of schedule dates Carrying on the Practical Way has been held over this month - but **George G3RJV** will be back in the January issue.

—

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Count on us!

rob mannon's **keylines**

Welcome to 'Keylines'! Each month Rob introduces topics of interest and comments on current news.

Now that we've had a little time to digest the implications of the newly-introduced Foundation Licence and other alterations to the Amateur Radio Licensing system in the United Kingdom - the feedback has started coming in! Although I'm generally very pleased at the efforts to help newcomers and others to progress through our hobby...some of the reactions arriving from Radio Amateurs via E-mail and the post...I find disturbing indeed.

I've already received a few letters stating (or the equivalent of) "They'll be giving licences away with breakfast cereals next" and complaints about the continuing requirement for a Morse qualification. However, in answer to the Morse

requirement, I'm sure that **(until the International requirement for a Morse qualification is removed - as it will surely be in 2003 or soon after)** that the Radiocommunications Agency division of the Department of Trade &

Industry - in conjunction with the Radio Society of Great Britain - **have done all they can.**

Indeed...the resultant new requirement is 'tissue paper thin' and some clever legal minds have been at work to almost-but-not-quite do away with the Morse requirement for access to h.f. With this in mind I find it difficult to understand the letters criticising the RA and (particularly) the RSGB for their efforts. Unfortunately (and this goes for both sides of the Must have Morse/Must not have Morse arguments) for some people it's become a personal vendetta rather than a concern. What a shame...why spoil a superb hobby with such bad feeling?

Hambleton Club Visit

During my visit to the **Hambleton Amateur Radio Society** in Northallerton, North Yorkshire on Thursday 11 October (part of a combined trip to this club and the **Rochdale QRP Convention** on Saturday 13 October) - where I was made **very welcome** not finally leaving the building until 11.30pm!) I was asked what my thoughts were on the Foundation Licence. In answer I told the group I supported it - especially the practical element of the examination (building on the success of the Novice RAE) although I hope that finding a suitable course and accessible centre will not be a problem for students.

I also shared with those present how disturbing I find it to receive (in some cases) letters verging on the poisonous- where the writers object very strongly to entry level operators getting on the bands - accompanied

by comments such as the 'Licence free with the cereal packet' jibes. Letters like these really cause me to feel shame...surely our hobby is not that elitist?

Although I'm not keen on a profusion of different licence classes (bearing in mind the old A and B syndrome and the still-in-evidence class distinction in British society) I think everyone should have the right to start at the beginning and progress to whatever standard they wish, or can achieve. Our hobby is remarkably flexible and multi-faceted - there's room for all tastes and skills.

After all, no one accuses Junior and Infant Schools of lowering standards by taking

people with little existing knowledge do they? Instead the schools try their best to ensure all their students achieve **their best personal results with a foundation in education**. Not everyone will go on to further education or

university but on the whole they'll have a foundation to build onto with experience and achieve the best of their personal abilities, interest and goals.

So, let's hope that we can all work together and build on the foundations to provide a secure 'house' - our wonderful hobby of Amateur Radio. In this house there'll be plenty of room for the many specialities in our hobby and hopefully there'll be a welcome at the door for all who wish to enter!

Face Of The Future?

Along with the occasional brickbats and ear-bending sessions I get to meet many delightful people at shows, rallies and club visits. One such delightful **(and she really is delightful)** person is 14 year-old **Helen Laura Watt ZE0AVH**, daughter of **Alister Watt G3ZBU** the Secretary of the **Horsham Amateur Radio Club**. I originally met Helen at the Alexandra Palace Show in 2001, although I'd already met her Dad during a club visit to Horsham.

Helen's callsign '**Always Very Happy**' certainly goes with her character! She's an excellent example of the youth entering Amateur Radio and I'm very pleased to say that - with the support of Dad G3ZBU - she'll be writing about her experiences with an h.f. rig in *PW* very soon.

Meeting young people like Helen gives me much confidence for the future of Amateur Radio - a hobby for all ages!

Rob G3XFD



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Components For PW Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for *PW* projects are available from the *PW* PCB Service, **Kanga Products, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *PW* are £2.50 each and photocopies are £2.50 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

A complete review listing for *PW/SWM* is also available from the Editorial Offices for £1 inc P&P.

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We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *PW*, then please write to the Editorial Offices, we will do our best to help and reply by mail.

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by *Practical Wireless*.

All other letters will receive a £5 voucher.



● **Dear Sir**

You may remember I work in the Prison about your prison visiting experiences and **Deey** (now on parole and based in Tyneside). I am pleased to hear your views regarding complimentary remarks made about the service. This makes a refreshing change from the service has endured recently.

Every day thousands of Prison Officers work with those unfortunate enough to be deprived of their liberty. In some cases this punishment may be thoroughly deserved, in other cases less so, that's entirely a matter for the courts to decide. Either way, on a daily basis prison staff work with vulnerable, suicidal, frustrated and all too often, violent prisoners. Many of these people have untreatable personality disorders or other mental health problems.

Despite this, prison life is not all doom and gloom.

There are many comprehensive (no pun intended) education facilities, workshops and a whole range of specialist services available to those in need. More importantly, compassion, understanding and a healthy sense of humour all play a vital part in making prison life more than just bearable.

I could go on and on and on describing the frequently ignored (not newsworthy?) side of the service, i.e. the intensive courses designed to address offending behaviour and several other accredited rehabilitation programmes but I feel I have said enough and hopefully made my point!

Back to Amateur Radio, during our conversation you mentioned a number of G3 callsigns you've met during your voluntary prison visitor travels. I wonder how many other active Radio Amateurs there are in the service? To this extent, I would be most grateful if you would point others working in this field toward myself. Perhaps a weekly net can be arranged or a club formed?

Thanks again for the chat Rob, keep smiling and long may *PW* continue.

Paul Morrison GOVHT

**Bromsgrove
Worcestershire**

E-mail: paulmorrison999@btinternet

Editor's comments: I was delighted to meet Paul, another one of the much under-valued people working for the Prison Services in the UK and I hope enough interest develops so a club can be formed. Good luck in your efforts Paul!

Careful With That Callsign!

● **Dear Sir**

Patrick Allely GW3KJW's article in the November issue about pitfalls in the legal requirements of the Amateur Radio licence made fascinating reading. However, I must disagree with his conclusions

regarding the recording of power levels in the log.

Reference to the *Terms, Provisions and Limitations Booklet BR68* reveals that we are required to show in the log (paragraph 6(1)e of the booklet) 'power (or power level in dBW)'. The position of the

brackets is crucial; power is separated from power level in dBW, **showing that we have a choice of one or the other.**

It is therefore perfectly legal for Patrick to record his power level as 0dBW, but it is also perfectly okay for me to continue to show my power, in units that are not specified in BR68 (I normally use watts, but have been known to use milliwatts).

It may be relevant to note that later in the same booklet, maximum permitted power levels are given in both watts and dBW. Having said this, I must admit that I have no legal training, so I would be interested to hear the views of the Radiocommunications Agency on this.

John Francis G4XVE
Saxmundham
Suffolk

Editor's comments: There's been a tremendous amount of feedback from Patrick's article (including many comments on the topic above) - most were too late for this issue so we hope to include more next month.

Freedom of Bletchley Park

● **Dear Sir**

During the Second World War I worked at one of Marconi Wireless Telegraphy Company's factories in Hackbridge, near Mitcham in Surrey, fault-finding on the RAF Type 1155 receivers. In the evenings at home I listened to Morse signals on the band 7 to 7.5Mc/s (now MHz) and logged any unusual signals and coded messages. This work was as a Voluntary Interceptor (VI) under the auspices of the Radio Security Service (RSS), which in turn was responsible to MIS/6.

These logs and messages, which were sent in by around 1200 VIs from all over the UK, were found to be quite important. Some of them were found to originate from Gestapo headquarters and their agents all over the world.

Certificates recognising this work have been available to people who contributed in this way to the Bletchley Park effort, either because they

actually worked at the Park, or who were involved in providing the messages that were decoded there. I am very pleased to say that I have received one of these certificates together with a pass card giving me free entry at any time the Park is open to the public.

If any of you older readers had any such connection with Bletchley Park during the War I would like you to contact me. There have been several annual reunions of wartime RSS members at the Park, held during May.

Ray Fautley G3ASG
7 Kingfisher Road
Downham Market
Norfolk PE38 9RQ

Radio Basics & Capacitors

● **Dear Sir**

I found the information on capacitors provided by G3XFD in Radio Basics (RB) - October *PW* - very helpful. However, as a vintage radio enthusiast, I'd like to pass on a tip that might save a few vintage capacitors from an early waste bin trip!

Rob is quite right to warn that many old tubular capacitors are now chemically decomposing and therefore unreliable, but there is a simple extra test to show the suspects. Using a Digital Voltmeter (DVM) on the millivolts range, check to see if there is voltage across the capacitor when it comes out of the junk box. If it behaves as a battery then chemical decomposition is occurring and the component should be discarded or fitted with new modern innards if it's to go in a restored set. In bad cases, the battery effect can be strong enough to disable a set if the capacitor is in the a.g.c. loop by altering control bias voltages.

Tony Hopwood
Upton-upon-Severn
Worcestershire

Editor's comment: In addition to Tony's



☐ Sponsored Radio

Children in Need

The **Moorlands And District Amateur Radio Society (MADARS)**, based at the Creda Factory in Stoke-on-Trent, take to the air on Friday 16 November from 1900 hours for a 24 hour sponsored event to raise money for the Children in Need charity. The MADARS have been allocated the special event callsign **GB0CIN** which will aired from the club's radio room.

Raising over £900 last year for Children in Need the club will be aiming to break that figure this year but they need your help. Listen out for GB0CIN as they operate on h.f., c.w. and s.s.b, v.h.f. on s.s.b., f.m. and SSTV and u.h.f. f.m. and make contact.



● The Debate Goes On

Class Bs Granted HF Access

In last month's PW we unveiled the changes to the current Amateur Radio licensing structure. Now a month on things have progressed some more!

Following the announcement made on 21 September 2001 further discussions between the RSGB and RA have resulted in agreement of a bridging process that will allow Class B licence holders access to the h.f. bands without having to take a 5w.p.m. Morse test. From 2 January 2002 Class B Licensees who have held their licence for 12 months or longer may obtain a Foundation Licence by taking the new Morse Assessment and therefore gain access to the h.f. bands as Foundation licensees using an M2 callsign.

Martin Cain of the RA said "This shows the value that the RA places on our relationship with the RSGB. The Agency, following recommendations from the RSGB, is very pleased to be able to fast-track Class Bs into the Foundation Licence structure".

The RSGB are due to announce a special Morse campaign for Class Bs who wish to take this long-awaited opportunity to operate on h.f. Watch this space!

Additionally it's been reported in the *GB2RS News Broadcast* that Ireland's licensing authority is continuing with the 12w.p.m. Morse test requirement. A spokesman for The Irish licensing regulator has told the Irish National Society that the 5w.p.m. Morse test can only be introduced as part of a new licence. Until further notice all candidates for Ireland's Class A licences will still be required to sit a 12w.p.m. test.

● Space - The Final Frontier?

Amateur Satellites At National Space Centre

A new Amateur Radio Satellite Service ground station opens at the National Space Centre, Leicester.

Radio Amateurs and their families from across Leicestershire and the East Midlands gathered on 9 October 2001 to be shown around the National Space Centre's ground station by staff members and the Founding Committee of the National Space Centre Amateur Radio Society (NSCARS). The Society will use the special event callsign **GB2NSC** and is sponsored by the Radio Society of Great Britain, the Amateur satellite organisation Amsat-UK, Yaesu UK and Kenwood Electronics UK.

The station GB2NSC will operate at the heart



of the National Space Centre, in the Space Now display. The Society is at present using the display to demonstrate how to contact Amateur Radio equipment on

board the orbiting International Space Station.

The equipment acts as a data relay to rebroadcast signals from GB2NSC to other Radio Amateurs across Europe. The NSCARS hopes to speak direct to the astronauts soon and will also demonstrate communication via other orbiting satellites operated by Radio Amateurs.

Welcoming more than 30 new paid-up members to the Society, GB2NSC Chairman Andy Thomas said:

"We will have two major roles: An ambassador for modern Amateur Radio, introducing the hobby to a wide cross section of the public of all ages from school children upwards and as a premier satellite station, developed by society members., where members can meet with and learn from, experienced satellite operators, and specialists in all aspects of Space Radio".

For more details on GB2NSC or the International Space Centre check out the club or space centre websites.

Subscription News

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If you are a subscriber to PW or intend to become one in the future you must read this.....

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In the January issue we look forward to welcoming Harry Leeming G3LLL to the magazine

"All In A Life's Work" will give readers all the advantages of a lifetime's experiences from Harry's workbench. Experience of a lifetime, covering subjects such as: safety advice and fault finding tips of technical queries. Harry will cover it all.

JANUARY ISSUE ON SALE 21st December

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November SWM

The SHORT WAVE Magazine

Whether you are brand new to the hobby of radio monitoring or a seasoned DXer, there is something in *Short Wave Magazine* for you every month!



BROADCAST SECTION

● Bandscan USA ● LM&S

INFO IN ORBIT SPECIAL

Setting up his WXSAT station from scratch, since moving house, Lawrence Harris takes us through the process step-by-step, along with another article on Digital Weather Satellites and his usual monthly offering.

REVIEWED

Kenwood TH-F7E

- Nearly time to write to Santa with your radio wish list, however, Dave Roberts says don't make that list just yet!



Sanyo WS1000 WorldSpace

- Jerry Glenwright, a newcomer to satellite radio, gets to grips with WorldSpace's Sanyo WS1000.

Whips & Loops - A Second Look

- John Wilson investigates the RF Systems LF-520 and the Wellbrook Communications LFL1010.



FEATURES

Islands of Scotland

- Scanster Dave Roberts shares his recent experience of IOSA.

The Other Man's Shack

- Kevin Nice takes a close look at another reader's monitoring station.



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Tex's

Hello and welcome to the occasional column that, although it's called Tex's Tips and Topics, it's really about your ideas, tips and tricks. So, here are a few suggestions from readers seeking to win book vouchers for every tip published!

Tips & Topics

One on the ideas to arrive from **Roy GOTAK** depend on sneaking into the kitchen or having a very understanding XYL. Roy says "When packing up for a portable or mobile outing there are a lot of wires, connections, leads and small pieces which need to be kept neat and tidy. (whoever called this 'wireless' was telling porkies!).

"I use those small net bags with a drawstring, gleaned from the washing tablet boxes, to keep patch leads, microphones power leads and the like from getting tangled up in the bottom of the work box. It satisfies all my criteria, you can see what's in the bag as shown in **Fig. 1**, it works, and it's free!" (Well apart perhaps from the bruises anyhow Roy).

Sponge Scourers

Strangely enough the next tip from **Denzil G3KXF** also encourages us to root around in the kitchen for items of use for our radio hobby. Who wouldn't react positively to an E-mail that starts "Save the cost of 'proper' manufacturers sponges for Weller and other soldering

stations, by using used kitchen sponge scourers?"

So, with my attention grabbed, Denzil continued "The scourers are the ones with a yellow sponge 'laminated' to a green abrasive pad. Choose the thin ones about 25mm thick by 110 x 70mm. To promote marital bliss, they can be used first for washing the dishes, where the green part usually wears away first. When they are due to be scrapped, tear off the remaining green plastic, cut to size and you can get two from each sponge. I have found them to be more durable than the proper ones".

Keep up the good work Denzil, there's a voucher on its way for that one. Strangely enough over a recent weekend I was in a local store that sells all sorts of items at wonderfully low prices, when I came across a bag of cellulose sponges. There were five sponges around 10mm thick and about 100 x 60mm in size, all for 99p. Not quite as cheap as Denzil's tip perhaps but, just as good for the job!



● Fig. 1: Washing tablets are the normal inhabitants of this small drawstring bag, but it makes a splendid home for bits in the toolbox says Roy GOTAK.



● Fig. 2: The final stage of making a copper pipe framework to carry the station for portable operations.



● Fig. 3: Made from easily available copper water pipe and fittings, the dimensions are cut to suit your needs.

A Frame-up

In a recent letter from **John Goacher G3LLZ** there were four photographs showing a splendid idea for a frame to hold a rig and battery for convenience or as a carrier for portable operation. The frame is made from copper water pipe and fittings available from all plumbing suppliers. However, when cutting the copper pipe, if you use a hacksaw, then check to see that the ends are cut square and are de-burred.

The various lengths of tubing should all be cut as accurately as possible. Then, using the pre-soldered corners and T-joints (often called 'capillary joints' in the trade), the frame is assembled to make sure that it all fits together squarely before starting to solder it together. During soldering the frame is set on a fireproof flat base with building bricks placed on the top of each leg to make sure they are tight and square.

A small to medium sized butane torch can be used on each joint starting from the top and working downwards after each joint has been checked and allowed to cool. When all the joints are secure, then the whole frame can be cleaned

and painted to suit.

The shelves were made from medium density fibreboard (MDF) with a lip made from an 8mm square batten, inside of each frame tube to keep the shelf in place. To complete the design and to keep the radios in place, non-slip matting rubber matting is fixed to the top of each shelf.

Spill-Proof

The lower shelf holds a spill-proof lead-acid battery suitable for several hours use in the field. Each piece of equipment that requires 12V power has colour coded wander plugs fitted to the power lead that fit into a fused and switched distribution box mounted near the front of the unit. An additional pair of sockets are fitted on the box to act as charge points for the battery.

The four photographs **Figs 2, 3, 4** and **5** of the carrying frame show the workmanship put into making it a very splendid piece of equipment to take into the field.

Now to the matter of awarding the extra voucher for the idea that has 'the edge' this month. And much as I liked free sponges, and the idea of wash-in-a-bag microphones, the sturdy metal frame for portable operation gets my vote! Congratulations to all and let's be having some more ideas - keep them coming, you too could win vouchers.

Tex



● Fig. 4: The three sets of terminals on the left are the switched and fused supply points, while the single pair on the right make up the charging point for the spill-proof lead-acid battery.



● Fig. 5: Make sure that the switch and wiring used has sufficient current carrying capacity for the total load you intend putting on the supply.

As an incentive, each published 'Tip' gets a £5 Book service voucher for the author. The best idea each month gets an additional £5 voucher as well. So, get writing! G1TEX



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7 Core.....**0.80p** per metre

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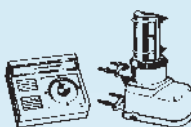
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Length 1420mm Wide Band 16 Element directional beam which gives a maximum of 11-13dB Gain Forward and 15dB Gain Front to Back Ratio. Complete with mounting hardware. (The Ultimate Receiving Antenna - a must for the Dedicated Listener.)

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* Rotation Torque-222Kg

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* Mast Size - 28-44mm

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* Cable-3 core

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(Ideal for Light to Medium Beams, i.e. LOG PERIODIC above.)

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Complete with 'U' Bolts

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Complete with 'U' Bolts

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25 METRES OF ENAMELLED WIRE INCLUDES 10M PATCH LEAD & INSULATOR



FOR USE ON WITH RECEIVER 0 - 40 Mhz. ALL MODE NO ATU REQUIRED 2 "S" POINTS GREATER SIGNAL THAN OTHER BALUNS. MATCHES ANY LONG WIRE TO 50 OHMS IMPROVED RECEPTION

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Freq. 137.5 MHz

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This Antenna is designed for external use to receive weather satellite signals.

Complete with mounting hardware.

£39.95**UK SCANNING DIRECTORY**

7th edition

£19.50**£29.95****SUPER SCAN STICK**

Freq. Range 0-2000MHz

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It will receive all frequencies at all levels unlike a mono band antenna.

It has 4 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals. (Ideal for the New Beginner and the Experienced Listener alike.)

(For the expert who wants that extra sensitivity)

(Ideal for the Ham Radio user)

(Ideal for the control tower & aircraft listener)

(Ideal for the Ham Radio user)

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£39.95**SUPER SCAN STICK II**

Freq. Range 0-2000 MHz.

Length 1500mm.

This is designed for external use. It will receive all frequencies at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals plus there is an extra 3db gain over the standard super scan stick. (For the expert who wants that extra sensitivity)

(Ideal for the Ham Radio user)

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£39.95**MULTISCAN STICK**

Freq. Range Receive - 0-2000 MHz.

Transmit

144 - 146 MHz

gain 2.5 DBd

420 - 430 MHz

gain 4.5 DBd

Length 1000 mm.

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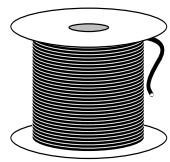
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20ft BARGAIN MAST SET

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OUR LOW PRICE

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ALL MEASUREMENTS ARE APPROX

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Fibreglass available up to 5m lengths.

NB. WE CAN ONLY DELIVER UP TO 2.5m LENGTHS

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6 section telescopic masts. Starting at 2 1/2" in diameter and finishing with a top section of 1 1/4" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and stainless steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 10 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

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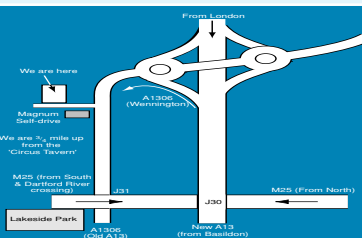
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Radio Basics

Well known for
using unusual
techniques to
encourage
newcomers to the
hobby - Rob
Mannion G3XFD
does something
really strange
this month by
building a bridge
backwards! Read
on to find out the
methods behind
his apparent
madness!

Readers who have followed this series will by now have got quite used to some rather (when compared to other standards) odd techniques used in this column. However, if you've followed them in the way I've suggested, they should have brought success and enjoyment in a project which worked and taught you something on the way. So

provide the audio signal (a buzzing sound) which is used to detect the 'null' (more about this later) and the amplifier brings the resultant signal to a level you can hear either on a loudspeaker or headphones.

If you've not built the i.c. audio amplifier or the multivibrator I suggest you start on them now so that you'll be ready to incorporate them into the main project. You can then add them to the actual bridge circuit which will be described, with the full circuit provided in a subsequent issue of *PW*.

Switching - a subject that is rather a frightening subject for some constructors - enters into this project. This is because

Vintage Bridge

The project featured this month is actually based on a vintage Wheatstone Bridge circuit which first appeared in *PW* in the early 1960s. The bridge uses a combination of a known capacitor or resistor (on the reference side of the bridge) and the unknown component on the other side together with a reference signal source.

The user then adjusts the bridge via a 'balancing' potentiometer which will then indicate balance via the null detector or amplifier. It all sounds complicated but to be honest it's not! I built my first

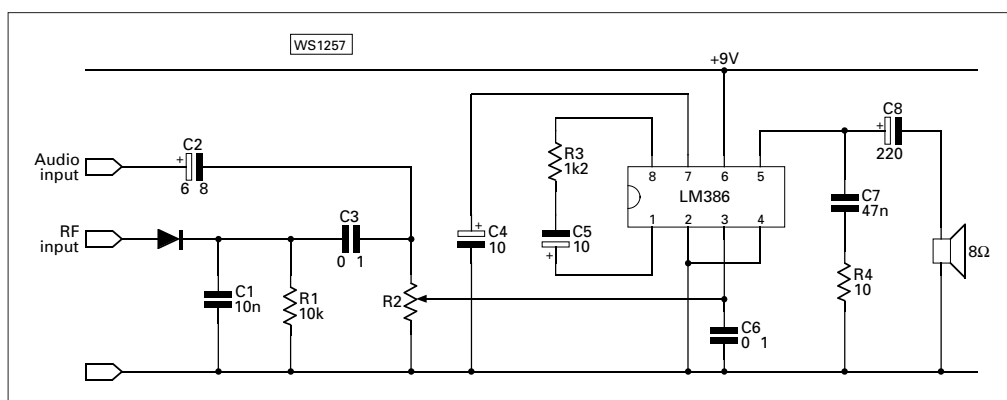


Fig. 1: The LM386 integrated circuit (i.c.) audio amplifier previously featured in the Radio Basics series, is used as the null detection amplifier in the resistance capacitor bridge project (see text).

hopefully you'll have learned to trust the techniques used in the RB approach to encourage the newcomer to radio.

Your trust in my 'different' approach is needed now because **we're actually going to start preparing to build a project backwards - backwards in the sense that the front panel dial, box and other hardware will be built first.** But don't worry, this is done so that our project - a portable capacitor/resistance bridge - will give the best results possible with a simple circuit.

The bridge project uses two other earlier Radio Basics (RB) projects which, if you've built them, can easily be incorporated into the latest unit to great advantage. They are the simple audio amplifier circuit, **Fig. 1**, using the LM386 integrated circuit (i.c.) published in the October 1999 (part of the Basi-Tracer project) *PW* and the multivibrator circuit, **Fig. 2**, which appeared in the September 1990 issue of the magazine.

The multivibrator will

there's some power supply switching to be undertaken plus a single pole six way switch to be used to select the different ranges in the bridge circuit. If you've read last month's RB coverage of switching circuitry, you'll now realise why I chose to introduce it at that time to prepare the way for this important and very useful test instrument.

bridge (with a buzzer for the signal source) as a young schoolboy in 1958. If I could manage it then...you can now. So have confidence in yourself!

The version I built in those days used a separate signal source (the buzzer) to so that a null (a drop in level as the potentiometer achieves a 'balance' and the null develops). In another version I

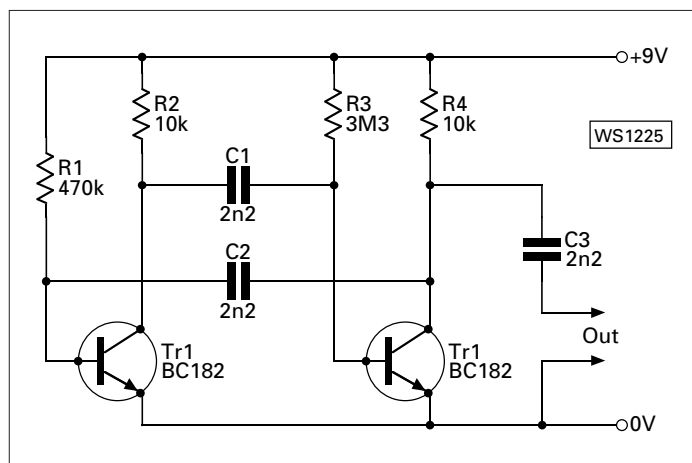


Fig. 2: The multivibrator circuit shown here - another project from the Radio Basics series - provides the signal source for the bridge project (see text).

used a 6.3V a.c. source from a filament/heater transformer.

It is still possible to provide the signal from a buzzer circuit - but that can be rather hit & miss - and we can use a more reliable source using the multivibrator. So, with some of the background explained...let's get on with looking at the construction of the simple C/R bridge...something that will be one of the most useful simple items of test gear in your workshop.

Building Backwards?

I should now explain why we're tackling the C/R bridge project from what may be considered to be back-to-front, as we'll be building the control panel and calibration dial first, before building the electronics. The reason why is simple indeed...and its because on this instrument the layout, size and quality of the scale and its control is of **prime importance**.

Often in basic constructional projects the final appearance of whatever's being built does not matter much to the constructor. All that's required in many cases is that the project works! However, with this project - the time spent in making the bridge's front panel scale and control will be repaid by an instrument that's

easier to use, allowing precise final readings of capacitance and resistance values to be obtained.

Carefully built - this project will last you many years. And with proper attention to the front panel...even those of us who are at the bi-focal spectacle stage of life will find the instrument easy to use.

Front Panel

The illustrative drawing, **Fig. 3**, shows the layout of the panel. However, please note that it's **deliberately not to scale**, enabling you to make your own panel to whatever size suits you or the materials you have to hand.

Important advice: Before you start to collect materials for the panel, please bear in mind the following advice.

Try to make the front panel and the scale itself as large as possible - bearing in mind convenience! By making the pointer longer, finer (and more accurate) results can be obtained.

One of the prototypes I've built uses a panel size of 225 x 225mm, with the actual scale diameter being 175mm. I used my favourite easy to use Synthetic Resin Paper Board (SRPB) p.c.b. material and you'll see a photograph of this in the second part of the project.

My final prototype bridge balance control potentiometer is adjusted in operation by using a spun aluminium knob (removed from an old hi-fi unit) and a section of clear plastic cut from an audio cassette case, mounted together using epoxy resin adhesive. The main trace from the scale was then traced out onto the board with a felt tip pen poking through a hole drilled at the end of the scale to provide alignment for the paper sheet onto which the calibrations marks will be eventually placed.

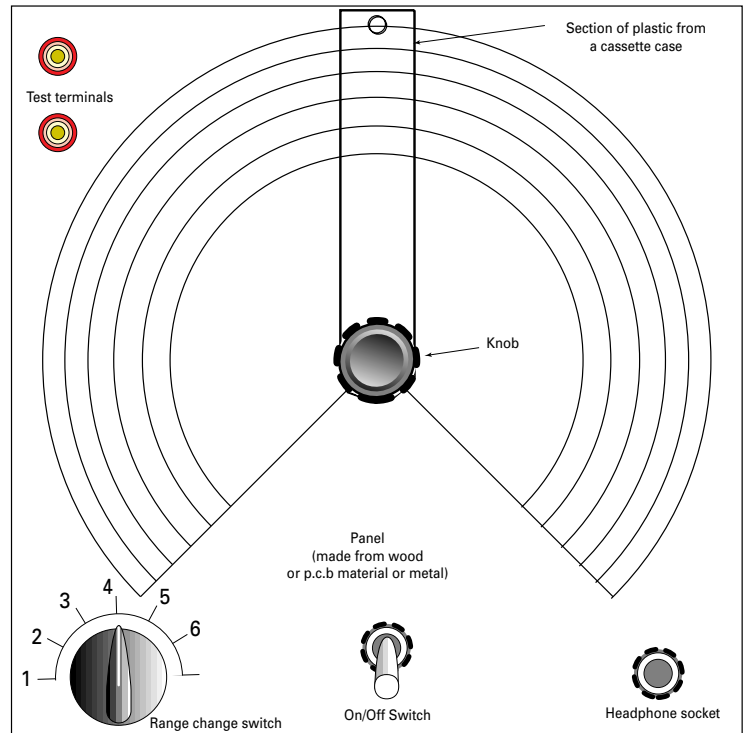
Please note that the potentiometer 'swing' (the rotation of the shaft) is not far off 360° - in my case I found that none of the modern potentiometer/variable resistors - had a rotation of less than 270° and the 4.7kΩ good quality type I used in the prototype (see end panel for component sources) rotates throughout 300°. This

factor, when combined with the as-large-as-you-can-make-it scales, will make it an easy instrument to use.

Incidentally, you can make a larger pointer by using a cheap

scale can be read directly.

However, having to use a separate calibration sheet for each range may not be considered a disadvantage when compared to marking out the paper scale



● Fig. 3: Drawing showing the layout of the capacitor-resistor bridge's front panel. Note that six separate scales are required, for the three capacitive and three resistive measurement ranges (see text). Take care when making the central hole for the 4.7kΩ potentiometer shaft. Remember that the control will have to rotate as much as 300° - mount the potentiometer too far above or below the centre of the board and the scale (and pointer!) will go off the front panel at the end of its travel!

clear plastic ruler - provided you're prepared to ignore the markings. However, if it's measured in millimetres the markings will actually help you read the resultant six different scales.

You should also leave room on the panel for the single pole six way rotary switch (I prefer to have this mounted on the left, but the choice is yours), a double pole on/off switch and a earphone jack socket.

Alternative Scale

An alternative scale can be provided by using a large 360° protractor, available from stationery shops for around £2. These protractors will provide a very professional looking finish to the front panel of your bridge...but they have the disadvantage of requiring the user to refer to a separate calibration sheet for each range, whereas the draw-it-yourself

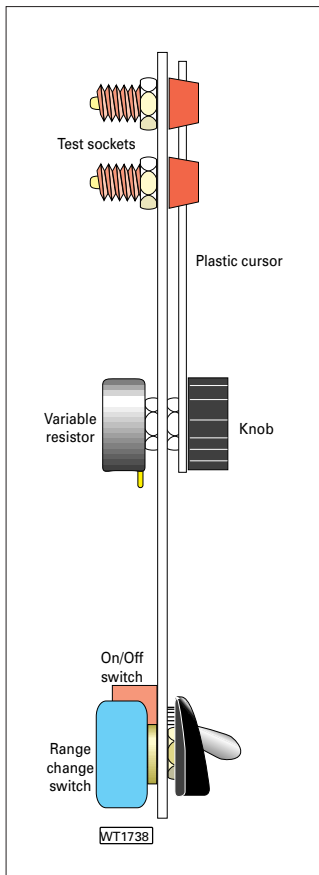
required with the method I prefer! Again, the choice is yours.

Next time I'll show you how to combine all the important elements together with the bridge circuit itself. Completing and calibrating the bridge is then a very simple affair! Cheerio until then.

PNW

Component Sources

The good quality 4.7kΩ potentiometer used in the G3XFD prototype was supplied by Sycom (see advert this issue) along with the rotary single pole six way switch for range selection. Protractors and plastic rulers for scales and pointers came from Staples, the stationers (most high street stationery shops will have them in stock).



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● The Kenwood TH-F7E...a small transceiver whose many features overshadow and outshine others according to G0RSN.



People say that variety is the spice of life. So, when the Editor asked me to have a look at the new hand-held transceiver from Kenwood...I was eager to see what it had to offer.

The Kenwood TH-F7E is a dual-band Amateur hand-held f.m. transceiver, covering the 144 and the 430MHz allocations. But that's **not all this radio has to offer**, it also has a separate all mode receiver built-in covering 100kHz to 1.3GHz with no gaps.

The Kenwood TH-F7E is a very smart little unit and is what I would term as a small but reassuringly chunky rig. It's small enough to fit comfortably in your hand (the radio is a bit like me, short and robust!).

With the supplied 7.2V Lithium-Ion battery pack fitted the transceiver measures about 58 x 87 x 30mm and weighs in at about 250gm. (The measurements don't include protrusions).

Typical Elegance

The TH-F7E has the typical Kenwood elegance; it's well made and has the familiar feel of quality that I would

to be careful...otherwise I would select something I didn't want or cancel something I did want! Having said this, the Multi-Scroll key on the Kenwood TH-F7E was much better than most I've used and it didn't detract from my overall enjoyment of the rig.

Transceiver Coverage

The transceiver's coverage is split into two distinct and separate Bands. One is the dual 144/430MHz narrow band f.m. (n.b.f.m.) transceiver. These two transceiver frequency ranges are called A Band and provide the straightforward Amateur Radio f.m. transceiver.

The frequency ranges on Band A are 144 to 146MHz and 430 to 440MHz. The other Band has 11 frequency ranges and is called the B Band and is a feature of the separate multi-mode receiver.

Frequency Ranges - Band B
 100kHz to 1.71MHz
 1.71 to 29.7MHz
 29.7 to 87.5MHz
 87.5 to 108MHz
 108 to 137MHz
 137 to 174MHz
 174 to 230MHz

Kenwood TH-F7E

Dual-Band Transceiver

Richard Newton G0RSN seems to have thoroughly enjoyed himself trying out the Kenwood TH-F7E...a dual-band transceiver which has an amazing number of features. In fact he suggests it's "Two radios for the price of one"!

expect. It also has a good display, which can be backlit with a pleasing orange light.

If used in the single band mode the frequency display is very large. But with the full dual-band display the numbers and characters are smaller although the display remains uncluttered and easy-to-read.

The controls are well labelled and on the whole easy to use. With a transceiver of this size the controls are often very small...but I feel Kenwood have done their best to balance size with ease of use, not everyone has nimble little fingers do they?

The Kenwood TH-F7E employs the use of a little toggle button or what Kenwood call a **Multi-Scroll Key**. This is silver coloured and I felt that it was not in keeping with the transceiver's style. (I've had problems with controls of this nature on other transceivers...they're prone to accidental operation).

The Multi-Scroll key is used to navigate and select the menu options and can be used for tuning and other functions. I had

230 to 400MHz
 400 to 470MHz
 470 to 862MHz
 862MHz to 1.3GHz

The modes available for receive on the B Band are l.s.b., u.s.b., c.w., f.m., n.b.f.m., w.f.m. and a.m.

Apart from the impressive array of frequencies and operating modes the Kenwood TH-F7E is equipped with the following frequency tuning step options: 5, 6.25, 8.33 (Air Band only), 9 (Broadcast a.m. band only) 10, 12.5, 15, 20, 25, 30, 50 and 100kHz.

Tuning Chunks

You can also tune The Kenwood TH-F7E in 1MHz chunks. There's also a **Fine Tune** capability for use during a.m. and s.s.b. operation below 470MHz enabling the transceiver to tune in increments as small as 33Hz. The default for fine tune is 100Hz, this can be set up in the menu to be either 33, 100, 500Hz or 1kHz.

Having incorporated a fully functional transceiver on the receiver side of things,

Kenwood have given the TH-F7E the ability to operate as a fully functional dual-band radio. This means that you have dual frequency operation **even within the same frequency bands** if you so desire.

The two bands will also act independently so you can monitor one while scanning on another. The audio output can be balanced to favour one band or another, or to just mix the two audio outputs. **A very versatile radio indeed!**

The TH-F7E is supplied with a carry strap and belt clip, 7.2V Lithium Ion battery pack, helical antenna with

Richard GORSN found the main display on the TH-F7E to be very clear and the audio to be "very good" (see text).



a SMA fitting a wall charger and an excellent handbook which would put those received with most h.f. base stations to shame!

Power Settings

The radio has a variety of transmit power settings, and using the supplied battery pack the output on the **High Power** setting is 5W. This drops to 500mW on the **Mid Power** setting and down to 50mW on the **Extra Low Power** setting.

An external power supply can be used and when connected to 13.8V d.c. the radio again transmits 5W high power. However, the mid power setting then rises to 2W, although the extra low power output level remains the same.

Along with the external power supply jack socket on the side panel of the transceiver is the speaker microphone jack, which provides three different facilities. One is a simple speaker-microphone connection and this includes normal Packet TNC support. The next is a special setting to support a Packet TNC with squelch status support. The radio will also support 9600bps Packet but only on the A Band.

The third function of the speaker microphone socket can also be used to

connect the radio to a personal computer (PC) allowing the programming of the radio with a small application available over the Internet. (The necessary cable is an optional extra). However, considering the Kenwood TH-F7E has just over **400 memory channels** this may not be a bad idea!

Memory Management

The 400 memories on the TH-F7E can be managed in a variety of very useful ways. You can recall all 400 memories and then configure the transceiver to recall the memories in the current band. This means that if you're using 144MHz you could tell the radio only to recall the memories containing data in that band.

The 400 memories are divided into eight groups of 50 memories, these too can be recalled as groups and can be linked for scanning purposes. Memories can be deleted individually or whole memory groups can be deleted in one go. Additionally - as with most modern radios - memories on the TH-F7E can be given alphanumeric name tags. (A **Call Channel** is also provided on both the 144 and 430MHz bands).

There are also 10 **Information Memory** channels; and these can be recalled and scanned by pressing the **INFO** button on the front panel. I used them for putting in my own Information Channels and programmed in the low power departure information at Bournemouth International Airport (Hurn) on 121.950MHz, the



Literally only half of what you hold in the hand is the radio...the rest is the battery in this amazing package (see text).

London Volmet South frequency on 128.600MHz and some of my favourite Marine Band frequencies.

Scan Options

The scan options on the TH-F7E are many and various. These include 10 programmable band scan ranges, scanning selected groups of memories, scanning whole bands, etc., and it also has a simple band 'scope type function.

Full CTCSS and DCS for selective calling is provided. However, one function that particularly caught my eye was the built-in **Voice Activated Transmit (VOX)** capability. **I thought this was a terrific idea, well done to Kenwood for that one!**

The one problem with these new radios is that there's almost too much to talk about. But "The proof of the pudding is in the eating" as my Dad used to say. So, read on to discover my 'on the air' results



- The plug-in power supply unit provides an excellent size-for-size comparison as the 10kHz to 1.3GHz general coverage and 14/430MHz dual-band TH-F7E poses alongside.

On The Air

A perfect opportunity to try the TH-F7E out on the air came during a field trip when **Steve Rann G1YNY** and I enjoyed a one-day 'cultural' trip to France, using Brittany Ferry's service from nearby Poole to Cherbourg. So when (at some unearthly hour of the morning) Steve arrived to pick me up...I was ready for action with the TH-F7E.

Whilst we were still alongside in Poole, Steve who also holds a Marine Radio licence, enjoyed tuning the TH-F7E into Poole Harbour control. We had great fun listening to the Marine frequencies as we started our cruise across the English Channel.

Even a good way out to sea I could still plainly hear the morning group on the local GB3SC repeater at Bournemouth.

Unfortunately, at that distance even 5W would not make the trip so we contented ourselves with listening-in and decided we would try calling in Maritime Mobile (MM) on our return voyage.

The TH-F7E was our constant companion on our cruise and it did a great job. Using just the supplied whip antenna we were hearing all sorts of interesting stuff on Marine and Air band. Steve and I then tuned round the commercial radio stations and found that the rig gave an excellent account of itself on the v.h.f. Band II broadcast f.m. channels.

As we approached 'dear Old Blighty' on the return trip we called on 145.500 and the local repeaters on 145.625MHz and 433.375MHz as G0RSN/MM and G1YNY/MM and eventually we got a reply. **Steve G0TOT** from Studland, kindly gave us a call. Studland is near the entrance to the natural harbour of Poole and we ended up having an excellent simplex contact with Steve on both 145 and 430MHz.

Steve (in Studland) reported that the radio sounded very good indeed, even with the wind noise (by then it had got a little fresh on deck to say the least!). Steve kept us in radio company all the way into the port (thanks for your help Steve).

In The Car

During the next week I continued putting the TH-F7E through its paces, using it in the car. I found that I could get a good deal of enjoyment with it sat on a mobile 'phone bracket wedged in the air grill, using the helical antenna so I could chat to my Father-in-Law, **Terry Wood G7VJJ**, on the way home from work.

Terry was very complimentary about the audio from the rig. I also have to say the audio quality on receive is very good as well.

I connected the TH-F7E it to an external antenna, a small collinear erected at my new home. Putting out calls on 145.500 and 433.500MHz (it's really a struggle getting a contact in my area these days) and **Jerry G7JEZ** came to my rescue. Jerry was mobile in Kinson,



- Richard G0RSN notes in his review that the ferry trip on MV Barfleur from Poole to Cherbourg was rather windy!

about 8km away from me.

I spoke to Jerry using both the 500mW setting and the full power of 5W. Even on low power Jerry said that I was a very good signal with him despite the fact he was using a hand-held transceiver himself, which he described as "a squeaky little thing"!

Steve told me that despite his transceiver, my transmitted audio seemed very good because he could clearly hear me over the noise of the aircraft buzzing around him! (Kinson is on the approaches to Hurn airport!). I reckon that the Kenwood TH-F7E did pretty well to get a 5 and 4 report from Jerry under these conditions!

The HF Bands

The final test was to evaluate reception on the h.f. bands. And to be quite honest...I was not **expecting** any great things here but just unscrewing the screen shield on the PL259 plug for the collinear opened up the world of h.f. I tuned round 7MHz and on 7.078MHz I.s.b. I heard **OH3UU** (Finland), and this station, whose name I did not catch, provided a super signal.

On having a quick scout around, this time on the 20 metre band, I heard another very strong signal on 14.205MHz u.s.b. which turned out to be **Selim TA2DS** (Turkey), with a whopping big signal from Istanbul. I was frankly amazed at the ease of tuning, audio and the general performance of this little hand-held radio on h.f. using s.s.b.

Second To None

In conclusion, I think that if you buy the Kenwood TH-F7E as an Amateur Radio dual-band transceiver with a built-in receiver I'm sure you'll be impressed, because in this role I believe it's second to none. If however, you buy it as a receiver with a built-in Amateur Radio transceiver I'm not so certain you would see it as quite such a good buy - as the functions and general operation are largely centred on the Amateur Radio transceiver side of the TH-F7E.

What I particularly liked about The Kenwood TH-F7E was the fact that **it is a true dual-band radio**. In other words...you have the option to use it as a single band radio if you wish, or use both bands simultaneously.

Product

Kenwood TH-F7E
144/430MHz dual-band
transceiver

Company

Kenwood Electronics (UK) Ltd

Contact

Sales

Telephone

(01923) 816444

Pros & Cons

Pros: As an Amateur Radio dual-band transceiver with a built-in receiver I'm sure you'll be impressed, because in this role I believe it's second to none.

Cons: The functions and general operation are largely centred on the Amateur Radio transceiver side of the TH-F7E.

Price

£289.95 (r.r.p.)

Summary

The TH-F7E is a joy to operate, easy to carry and really left me with the feeling that I'd tried two radios 'for the price of one'. Now that can't be a bad thing can it?

Thanks

Thanks for the loan of the review TH-F7E go to

Kenwood Electronics (UK), Kenwood House, Dwight Road, Watford, Hertfordshire WD18 9EB.

pw

The *PW* International Beacon Project Electronic Timer

Phil Cadman G4JCP introduces a *PW* project to help you monitor the extremely useful IBP high speed c.w. beacons on 14, 18, 21, 24 and 28MHz. Can't read Morse at 22w.p.m? Don't worry...with the IBP l.e.d. electronic 'clock' you don't need to!

Regular *PW* readers will have already learned about the concept of monitoring the International Beacon Project's 18-transmitter system, which works on a repeating three minutes cycle on 14, 18, 21, 24 and 28MHz, from the simple electro-mechanical projects published in the August and September issues of *PW*.

In the articles (part of the Radio Basics series), **Rob G3XFD** showed that by using a simple synchronous electric motor driving (via a simple rim drive in the first version, and a dedicated motor with a specified gearbox for the second version) a

rotating disc, it would be possible to provide an indication of what beacon should be heard during a particular time slot. To do this the electric motor would rotate the disc forming the 'clock face' (in the first, rim driven, version it was an old 33r.p.m. LP record) once every three minutes.

The clock face was then marked

off in 18 segments of 20°, to provide the individual beacon timing slots. Each of these 'slots' were then marked with each beacon's callsign and its number in the sequence. Each beacon appears once every three minutes on most bands (there are minor exceptions but this does not detract from the viability of the technique) and then goes silent on that band until the three minutes cycle starts again.

In practice, the system can be considered as being 'based' (timing wise) on 14.1MHz. And for the purposes of the explanation we'll take **4U1UN** (New York, the No. 1 beacon) as the start point as that's just what it is! **Note:** The IBP frequencies are as follows: 14.100, 18.110, 21.150, 24.930 and 28.200MHz.

The sequence starts on the hour and runs onwards from there in continuous three minute cycles. So, by listening on 14.1MHz - **if** the prevailing propagation conditions allow 4U1UN to be heard - you'll hear its transmission (more about this later) for 10 seconds. It then goes silent on that band and transmits on the next band up - 18.110, ten seconds later of course, and then switches up to 21, 24 and 28MHz, all following in sequence at 10 second intervals (with maintenance, faults, and propagation taken into account!).

Following the 28.2MHz transmission the 4U1UN beacon will then go completely silent for two minutes ten seconds, 50 seconds after starting its sequence. It then begins all over again! The other beacons all follow suit - VE8AT in Northern Canada, as No. 2, follows New York and so on. The beacon timing sequences track westwards all the time and 40 seconds after the sequence has started you will (with good conditions) hear the KH6WO beacon in Hawaii - No. 4, sending its c.w. identification. After travelling around the world the sequence ends up with No. 18 - YV5B in Venezuela, before it all starts again with 4U1UN.

Basically speaking the same sequencing follows on the other four bands. So, if you listen to one of the beacon frequencies for three minutes - you'll get an instant appraisal of band conditions. Additionally - for QRP enthusiasts - it's interesting indeed to note **just how often** the beacons can be heard at the 100mW output level! When the fourth dash is heard....conditions can be very good indeed.

But that's all very well if you can read Morse at fairly high speed - but if you can't...don't worry because the system G3XFD and I've come up with doesn't require you to be able to read the c.w. itself! (although some knowledge will of course help you).

After you've built your 'clock' and it's correctly timed...you shouldn't be surprised when you realise that **you can recognise the beacon's Morse callsign** before you look to see which l.e.d. on the



- One of the prototype IBP l.e.d. indicator 'clock' timers built by G4JCP, with the simple dial and wooden casing fabricated by G3XFD. This version, equipped with the five-band switching option, also features the five-band manually-adjusted rotary dial pointer and is powered by re-chargeable batteries. In use, the 'clock' is best started - using an accurate clock - whilst the system is being prepared to assist the monitoring of the 14MHz IBP frequency. Once the electronic timer is working and correctly set, the clock's rotary indicator dial can then be physically rotated to the right, in effect to the l.e.d. which illuminates 10 seconds later than the 14MHz 'set' l.e.d. (thus moving the relevant beacon's position to the next band up) to change band to any of the four other IBP allocations. When used together with a suitable receiver a complete appraisal of the prevailing propagation conditions is then provided (see text).

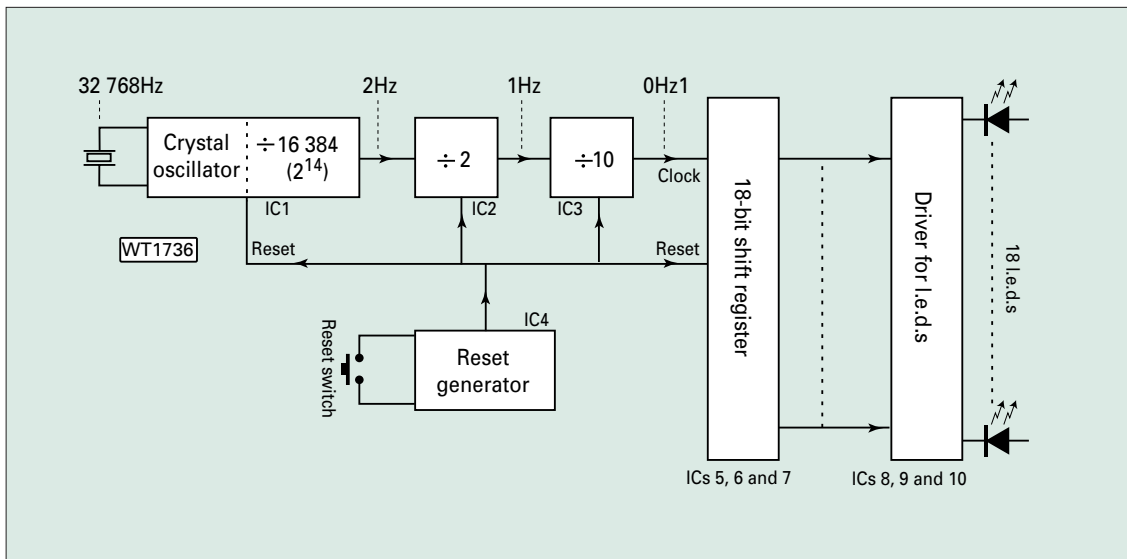


Fig. 1: Block diagram of the IBP electronic timer unit. The circuit timing for the entire project is derived from a 32,768Hz miniature watch crystal connected to a CD4060B counter. The CD4060B is actually a 13-stage divider whose input circuitry includes an inverter. This inverter can be used to make an RC or crystal oscillator (see text).

clock face is illuminated! This is because the brain will very often help you to identify the call signs because you've got the permanent 'prompt' provided by the clock face with each beacon prominently marked. Very helpful!

Method Without Morse

When each beacon, equipped with a Kenwood TS-50S transceiver, identifies itself it does so by sending the call sign in c.w. at 22w.p.m. and then sends four discrete dashes at 100, 10, 1W and finally 100mW power levels. Employing the *PW* beacon 'clock' method will enable you to identify each beacon. Once set with an accurate clock (such as the terrestrial teletext or some other accurate system) the clock will run for several months before needing to be re-set.

The original method used a mains driven synchronous motor to rotate a disc (the old LP), but this system - uses integrated circuits and light emitting diodes. It actually illuminates each of the 18 I.e.d.s in sequence, ten seconds apart. These are then mounted in the fixed part of the 'clock face' and can be battery powered and can be taken literally anywhere.

The first I.e.d. version uses a movable clock face for changing bands, in conjunction with the sequencing I.e.d.s which are mounted in a fixed position on the unit's front panel. The movable disc carries the beacon information and is rotated towards the right (from the 14MHz position) for band changing, but a five band electronically switchable version can be built later.

Although the five-band electronically switchable version is more complicated than the single band version, it has the advantage that it can be mounted with the I.e.d.s (for example) illuminating the geographical position of the beacon it represents on a flat plan Atlas of the World. It also means that you could place the I.e.d. indicators (with the electronics inside the globe) so that they are visible from the outside surface of a globe of the Earth, marking the position of each beacon. The really adventurous could then make the globe rotate at the same rate as the diodes switch...that could be really impressive couldn't it?

Both the single band and five-band versions use the same timebase circuit and the same reset circuit. The I.e.d. driver chips are also common to

both designs and **Fig. 1**, shows a block diagram of the project.

This month, I'll concentrate on providing you with the block diagram together with a description of the circuitry and how it works. Additionally, bearing in mind that comparatively few constructors enjoy (or have even tried) logic-based projects both myself and G3XFD agreed it would be a good idea to provide a special section to encourage you all. **Note:** It follows the main text. **Editor.**

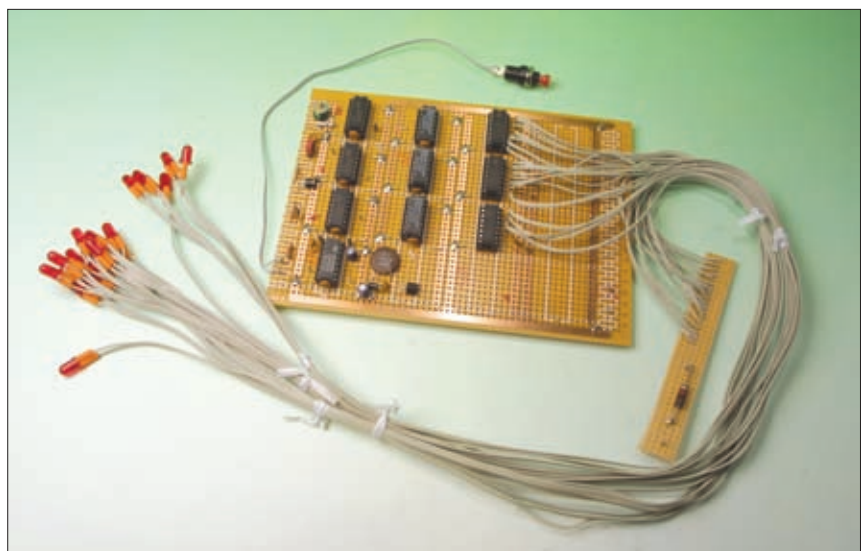
Single Band Version

All the logic devices used in this design are pure CMOS. The devices themselves being members of the CD4000-series logic family. The only bipolar devices are the open collector I.e.d. drivers and the three-terminal regulator.

Current drain, excluding I.e.d. current, is very low. The prototype consumed only 4mA (excluding I.e.d. current, most of which was attributable to the operating current of the 78L05 regulator. The logic devices should draw less than 1mA in total.

While 5V is the preferred logic supply voltage, the circuit will work quite happily over a 4V to 7V range. Consequently, the 78L05 can be dispensed with providing the logic supply is kept between these limits.

Fig. 2: The finished project, built onto Vero DIP board, ready for use with a suitably marked 'clock face' with individual beacon details. Note the 18 individual I.e.d. indicators. These all illuminate in 10 second intervals, the complete cycle taking three minutes, to coincide with the IBP system (see text).



Four 1.5V dry cells or five 1.2V NiCad/NiMH cells are eminently suitable.

Although CD4000-series logic devices are specified to work over a 3V to 15V range, the crystal oscillator and ULN2003A l.e.d. drivers restrict the circuit to the 4V to 7V range quoted above. To save battery power the l.e.d. supply can be turned off, leaving just the logic energised when the display isn't needed.

Each logic i.c. should have its own decoupling capacitor (C6,7,8,9,12,13 and 14 which should be placed as close to the i.c. as is practicable.

A dual monostable multivibrator, IC4, produces a de-bounced reset pulse from a normally-open push button. Both monostables trigger on the first closure of the reset switch. IC4a produces a single 20 μ s reset pulse and is then prevented from triggering again by IC4b which has a much longer period, around 300ms. In this way, any switch bounces (or multiple presses in quick succession by the operator) are ignored. Only the initial switch closure is recognised as the signal to reset.

Until Next Time!

Well, that's enough for you to digest until Part 2! Then I'll present the circuit diagrams and further advice, including boxing the unit and the dial presentation. This is a very different type of project for *PWW* - readers are constantly asking for more projects and we hope that many of you will be interested in this extremely unusual idea.

Much background work and several different prototypes have been built for this unique project which removes the need to tie-up a computer (If you've got one available that is!). They've proved invaluable in monitoring prevailing propagation conditions as, no doubt, will your version!

PWW

Hints On Building

Firstly - building logic based circuits is quite different to building discrete or linear i.c. circuits. As one i.c. package may contain several gates (or other functional blocks, which are used throughout the circuit, the physical positioning of the i.c.s may not follow their position in the circuit diagram.

If the design has more than, let's say, six logic devices or if the interconnecting wiring is complex, then it's best to use Vero DIP breadboard rather than ordinary Veroboard. Looking at side 'B' (the component side) with the printing the right way up, position the i.c. devices vertically with pin 1 at top left. Devices with 0.3 inch lead spacing fit within the vertical white lines while devices with 0.6 inch lead spacing will overlap one hole on one side and two holes the other side. Remember to leave at least a two-hole gap (vertically, between devices).

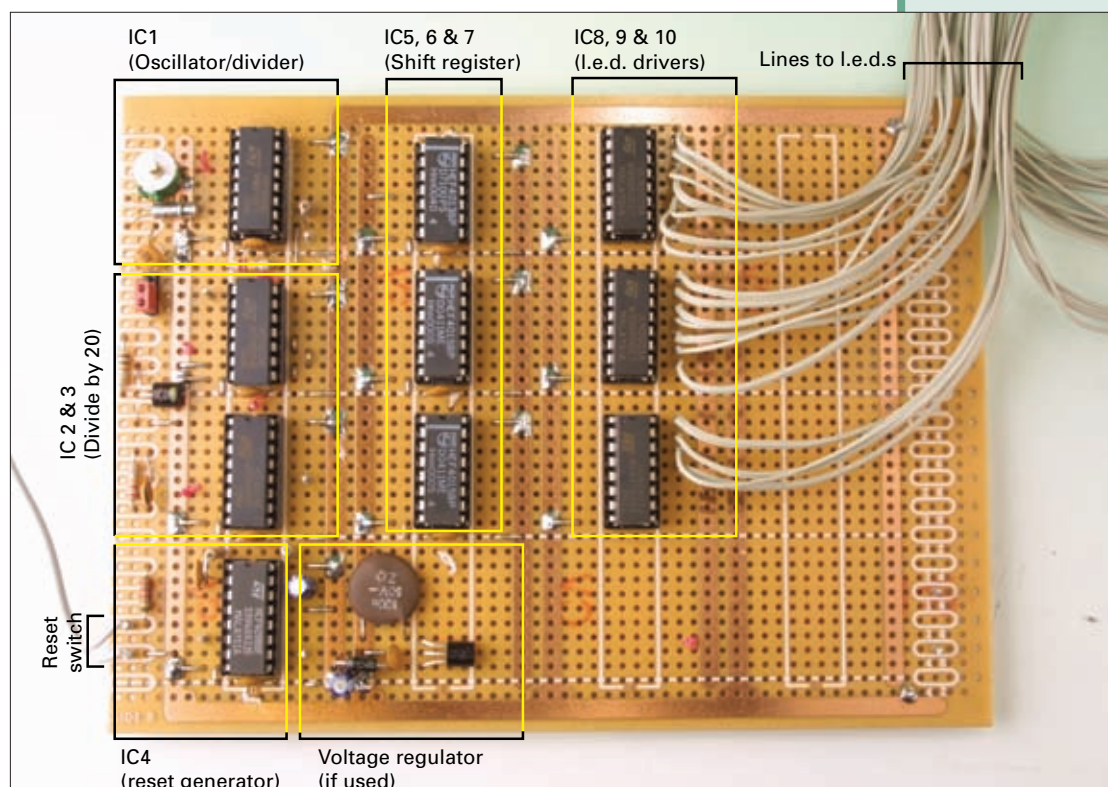
Before beginning construction, take - enlarged if possible - photocopies of both the DIP board (both sides and the circuit diagram). Using a felt tipped pen, mark the outlines of the i.c.s on both top and bottom of the DIP board photocopies. Then number each corner pin on each device. This will help later on, when you begin to wire the interconnections. You'll find it's very easy to wire to the wrong pin.

Sockets Mandatory!

When starting the construction - first, solder in the i.c. sockets (**yes, they ARE mandatory - trust me on this!!**). Then connect the power pins - Vss and Vdd - to the power traces with either 22 or 24 gauge tinned copper wire. Hook-up wire - the 0.6mm stuff - stripped of its insulation is fine.

As you look at the board (component side up) and the printing the right way up again the top horizontal track is the positive supply (Vdd) track and the bottom

Fig. 3: Annotated photograph showing major components of the beacon timer project built on to the suggested Vero DIP board. In the special accompanying article (Building Logic Circuits) the author strongly recommends the use of i.c. sockets and other techniques to ensure success with this project (see text).



Logic Based Circuits

horizontal track is ground (Vss). As you make each connection, mark it with your felt tipped pen on the circuit diagram.

You'll see that the power tracks are on both the component side and the solder side of the board. However, don't forget that the holes are not plated through so to ensure both tracks are connected, I solder the Vss and Vdd power connections on both top and bottom of the board. The decoupling capacitors should then be soldered in next, making links with bare wire as needed. **Again, mark each connection on the circuit diagram as you make it - not later!**

Interconnecting Wiring

Before starting on the interconnecting wiring, solder in any passive components and discrete devices, including things like Veropins for external connections and test points. Mark these components on the DIP board photocopies. At this point I connect un-used i.c. inputs to Vss or Vdd as required by the circuit diagram.

The wire I use to make all interconnections is miniature, insulated silver-plated wire (one strand of 0.25mm, it's the stuff that's really meant for hand wire-wrapping. I recommended you get the type that has Kynar insulation. The virtue of Kynar is that it resists run back when soldering. **Using ordinary pvc insulated wire is a dead loss. As is using any wire substantially thicker than 0.25mm.** Fortunately, **RS Components** sells this wire (in six colours, too but I don't know of any other supplier). Get two or more colours if you can, as it's useful to use different colours for different types of signal on the board. It also makes wires easier to follow when every wire isn't the same colour.

The wire can be quite difficult to strip and you need a very steady hand when soldering. Miniature wire cutters are recommended, and miniature pliers are needed to hold the wire both for stripping and for soldering the wire on the board. Don't solder more than two wires to any i.c. pin, so 'daisy chain' connections where necessary. **Once again, mark each connection - as you make it - on the circuit diagram.**

Concentration & Patience

Building logic circuits this way is not particularly difficult, but it does require care, concentration and patience. Double check everything you do. Before inserting the i.c.s, check, using a continuity tester, that each i.c. has its supply connections and that all unused inputs are tied to either Vss or Vdd as indicated on the circuit. Next, apply power and check for short circuits.

If all is well, switch off and insert the devices. If the circuit doesn't work, then there are three likely possibilities: the circuit is wrong (wait for the correction - and the red faces*). There's a faulty component - not that likely; you did follow all the necessary anti-static precautions, didn't you? You've made a mistake - double check everything again.

Fault finding logic circuits is difficult without an oscilloscope; a digital storage 'scope at that. One incredibly useful, but relatively low cost piece of test gear, is a logic probe. Used correctly, it's almost as good as a 'scope and occasionally better. Get one if you plan to build logic circuits regularly.

*We are being *extra, extra careful* with this project Phil! *Editor*.

Notes About Decoupling

Adequate decoupling is most important when building logic-based projects.

Ideally, one decoupling capacitor per i.c. device should be used.

In any event, it's not a good idea to use less than one decoupling capacitor between two (adjacent) devices. And, most importantly, decoupling capacitors should always be positioned as close as possible to the devices they're decoupling.

The value of each decoupling capacitor may range from 1nF to 100nF, but popular choices lie between 10nF and 100nF. Values above 100nF are not necessary and may actually be less effective than lower values.

Where supply leads are long (or batteries are used) it's also advisable to put one or more much larger value capacitors across the supply. One such capacitor per 10 to 15 devices is more than adequate; 10µF electrolytics with a low e.s.r., such as bead tantalum types, are a good choice.

Even though a logic circuit may only operate at low frequencies - a maximum of 32,768Hz in the case of the IBP clock - the logic devices themselves switch logic levels very quickly. The switching speed does vary between logic families but, in general, logic outputs will switch from one state to the other - that is from low to high or from high to low - in just a few nanoseconds.

Logic i.c.s (except the open collector/drain type) have totem-pole outputs; as the output switches there is a short interval when both output devices are partially conducting. This causes quite a large a momentary increase in the current drawn by the output stage.

If there is any appreciable inductance in the supply connections, the supply voltage can dip alarmingly. **Remember: you can't change the current through an inductance instantaneously.** In extreme cases, the dip can be so great as to cause the logic device - or indeed, an adjacent device - to malfunction.

If a logic output drives several inputs - as do the clock and reset lines in the IBP clock - then the situation is made worse. The inputs to the other devices have a small capacitance associated with them, as does the interconnecting wiring (or printed circuit tracks). This capacitance is either charged or discharged as the output changes state. Although the total capacitance involved may only be in the order of a few tens of picofarads, the speed at which the charge/discharge takes place causes significant pulses of current to flow in the circuit.

If two or more outputs change state together then the situation is compounded yet again. It is the job of the decoupling capacitors to hold the supply to each device as steady as possible, and to stop any current pulses producing voltage 'spikes' of sufficient amplitude on the supply rails to cause circuit malfunctions.

Never underestimate the problems of insufficient decoupling or poor supply layout. Trying to find a voltage spike that may only be a few nanoseconds wide and which only occurs infrequently, can be a difficult task even if specialist equipment is available. Far better not to generate any spikes in the first place!

G4JCP

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★ Impedance 50 ohms ★ Radiation Directional
★ Polarization Horizontal ★ V.S.W.R 1.2-1
★ Power Rating 1000 watts
★ Band Width 600 kHz ★ Gain 11dBd ★ Boom Length 4030mm ★ Dimensions 5725mm x 4030mm x 100mm ★ Weight 6.10 Kilos
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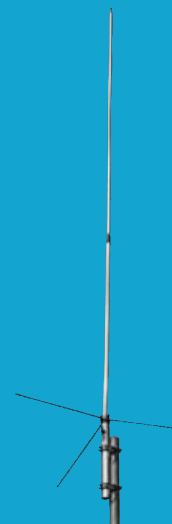
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Foundations for the future

Love it or loathe it the Foundation Licence is the biggest development to British Amateur Radio in years. So to allay fears, answer questions and keep our hobby alive for future generations read on....

It's been over a month since the first announcements were made regarding the long awaited changes to the Amateur Radio Licensing Structure and if the *PW* postbag has been anything to go by the reaction has been very mixed. Comments ranging from 'They'll be giving licences away on the back of cereal packets next' to 'a positive step forward' have been received and it's obvious that there are many who are not too happy with the changes.

However, the changes are not meant to be obstructive or single people out. The Foundation Licence has been designed and introduced for people of all ages, abilities and walks of life to encourage and help those with an active interest to facilitate a simple entry into Amateur Radio as a hobby. The Radiocommunications Agency and the Radio Society of Great Britain have looked long and hard at the current Licensing Structure and it's hoped that the introduction of the Foundation Licence will allow licensees to make progress up the Amateur Radio 'ladder' as they wish and at a rate that's right for them.

As the licensing

structure is changing there are probably plenty of you wondering if the hobby is still for you or, what you will now need to do to take up the hobby of Amateur Radio and whether you still need a licence at all! So, with the air still buzzing with comment we bring you a selection of questions and answers that have been commonly raised in an attempt to dispel those fears and to encourage all you 'would-be' Amateurs to get studying!

Questions & Answers

Q: Why Do I need a Licence?

A: It is a legal requirement under the Wireless Telegraphy Act 1949. You must obtain a licence from the Radiocommunications Agency before you can legally send and receive messages by radio, unless you are operating under the direct supervision of a full licensee.

Q: What will the new Foundation Licence enable me to do?



A: The Foundation Licence will allow you to operate Amateur Radio within the limitations set out in BR68/F.

Q: What qualifications will I need?

A: You will need to have completed a training course of approximately ten hours in duration followed by an assessment consisting of 20 multiple choice questions administered by a registered body, such as a local Amateur Radio club. The qualification will be on a 'know what to do' basis.

Q: What does the training course consist of?

A: The course will be basic and has been designed to focus on safety, avoiding interference and good operating practice and will last approximately ten hours.

Q: They are rumours that the Foundation Licence will mean an increase in the Licence Fee - is this true?

A: No - the annual fee will be £15 and will still be free for those under 21 and over 75 years of age.

Q: Will there be any age restrictions to taking the test?

A: No - If you are good enough to pass, the RSGB and RA say you are entitled to hold a licence.

Q: As a Foundation Licensee can a home-brewed and designed transmitter be used if it is signed-off by an existing licensee?

A: No. The use of home-built transmitters will not be allowed under the Foundation

Practical Wireless, December 2001



Following an announcement in the 7 Oct 2001 *GB2RS News Broadcast* (see News pages) Class Bs will now be able to take the Foundation Licence Morse Assessment and if successful apply for an M2 callsign to enjoy operating on h.f. So if you've been dying to use rigs like these - the world is now your oyster!

Licence. This is because that to properly construct home-brew equipment a greater technical knowledge is required than the Foundation course can provide and therefore there's a risk that the equipment may cause interference to other radio users.

Q: After the taking the Foundation Licence how much further will it be possible to progress in the hobby of Amateur Radio?

A: There will be two further stages - an Intermediate Licence and a Full Licence. Each licence will require you to obtain a more detailed knowledge of different aspects of radio and take additional examinations.

The Syllabi for these is still under discussion but will roughly equate to: The Intermediate Licence will equate to the current Novice Licence Class and the Full Licence will equate to the Class A Licence.

Q: As an existing Amateur, is the introduction of the Foundation Licence lowering the standards for Amateur Radio ?

A: Clause 1 (1) of the Amateur Licence makes it clear that Amateur Radio is a service of self-training. The Agency and the RSGB believes that a sensible balance needs to be struck between an entry hurdle that is high enough to ensure levels of safety and competence and yet is not so high as to discourage those who, with the right encouragement will go on to progress up the licensing structure to Intermediate or Full Level. It is this balance that the Foundation Licence seeks to achieve.

It may be early days in the life of this new licensing structure and there will undoubtedly be plenty more questions and points arising as the pilot schemes end and the Foundation Courses begin to run from January 2002. Remember **this is the future of Amateur Radio** and love it or loathe it, it's the way forward so, support it and just because your licence may have followed a different structure it doesn't matter. It's a hobby and one that can bring hours of



● Encouraging young blood into the hobby is the aim of the game. After all without them Amateur Radio could disappear, so if you know of an enthusiastic radio lover, become their Elmer and guide them along the path.

enjoyment, build friendships and provide an escape from the trials of everyday life - so use it or we could be in danger of losing it!

Write to us with your thoughts, comments and don't forget to let the

Newsdesk know if your club is registering to run the Foundation Course so we can publish the details and encourage newcomers to join in.

PW

Thoughts....

Foundation Licence - good or bad? Here's what some of the influential figures in the hobby have to say!

"In reaction to the Licensing Structure Changes announcement at Leicester in September the Agency has had a good but mixed response. There are three main views to the announcement:

- generally supportive to the Agency's initiative and saw it as a logical way to encourage youngsters and also people of all ages in the hobby.
- a number of Class B licensees initially were disappointed as they felt that the initiative gave them no easy path to the h.f. bands. However, this views seems to have diminished when the Agency recently clarified that they would need to only satisfy the morse requirement for the Foundation syllabus and;
- a number of individuals have real concerns that this is the way forward for amateur radio.



There have been a number of 'teething problems' associated with the announcement of the Foundation Licence, but, we are confident that all such problems will be resolved in time for the official Launch date on 1 January 2001. We felt that it was more important to get the information out as quickly as possible rather than delay the launch".

Aaron Abiaw, Radiocommunications Agency, Licensing Department



"I am greatly encouraged by the introduction of the Foundation Licence. This is a major milestone in Amateur Radio which should act as a catalyst for all those enthusiasts who have considered Amateur Radio, but thought it beyond their grasp. I hope that the initiative is also taken by the various trainers to evolve a transition path to enable the new blood to easily progress to a full licence.

On a personal note I look forward to operating on h.f. as a Foundation Licensee once I have passed the Morse assessment, where I fully intend to finally build my

Morse capability to make full use of the spectrum even though the requirement is likely to be dropped in 2003.

The Foundation Licence is a real 'shot in the arm' for our hobby".

Kevin Nice G7TZC, Editor of the UK's leading radio monthly - Short Wave Magazine.



"We have long complained that Amateur Radio is elitist, too complicated to attract newcomers, doesn't give people an easy way into the hobby and is just out-of-date. It looks like the RA and RSGB have been listening after all and are now acting to improve Amateur Radio. The new, three tier, structure will be easier to understand, start with practical aspects of the hobby and move into more technical theory as the different levels of licence are studied.

Having some knowledge of technical subjects doesn't make a good radio operator. Training in tuning a radio, talking on air and a practical understanding of interference is more likely to produce a good Amateur operator. With the numbers joining the hobby decreasing, anything that reverses this trend has got to be worth supporting whole-heartedly".

Elaine Richards G4LFM, Editor Radio Active



"I'm delighted to comment and think the Foundation Licence is an excellent idea and I hope it builds on the success of the Novice Licence scheme with its structured training, and that the new practical courses and exam go on from where the NRAE left off because it showed the failings of the RAE. Anything which provides better training for operators, with the potential to progress onwards technically is a good idea".

John Corless EI7IQ, Vice President of the Irish Radio Transmitters Society

Further Info

Further questions and answers can be found on the Radio Society of Great Britain's website and more information on the licensing structure is available on the Radiocommunications Agency site: Point your browser at:

RSGB: www.rsgb.org
RA: www.radio.gov.uk

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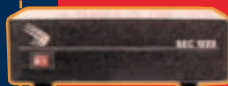
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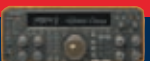
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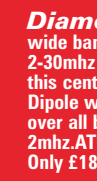


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Antenna Workshop

Peter Dodd G3LDO explores the basic principles of radiation from an antenna.

Some explanations of electromagnetic phenomena have been around for many years, but very little has found its way into Amateur Radio literature. I hope that the following will help to clear up the some of the mysteries of 'near' and 'far' fields and the differences between radiation resistance and ohmic resistance in an antenna.

So, let's take a look and dispel the mysteries!

Conductors and Insulators.

The atomic structure of material is most often described as being planetary in nature, a model first proposed in 1913 by **Niels Bohr**. In this model electrons orbit the nucleus as planets orbit the sun in our solar system. The electron's orbital velocity and mass are in balance with the electrical force between the

supply, where they are absorbed to reappear at the negative point again.

Unlike Copper, most materials, such as wood or plastic, are not good conductors, they are instead insulators or 'dielectrics'. In these materials comparatively few electrons are available to move in response to the impressed electric or magnetic field.

Electron Visualised

The electron is visualised, **Fig. 1**, as a spherical object, which is the source of an electric field known as the E-Field. This field spreads out in three dimensions from the electron in straight lines. Initially we will simplify our model by considering a universe that consists of only one individual electron.

If the electron is suddenly moved to a different position there will also be a shift in the lines of force of the E-field. This causes kinks in these lines, **Fig. 2**, which move away from the electron at the speed of light.

To simplify the visualisation process even further we will now only consider one E-field line associated with this electron. As shown in **Fig. 3a**, a sudden shift in the position of our electron has produced a 'kink' in the E-field line, which is travelling away from the electron.

Propagating away from the electron, the kink up-dates, later in time, the E-field in front of it. Part of the energy exerted by the force that originally moved the electron, is expended in propagating the kink in the field.

So, the kink carries with it radiating energy. And because the field diverges in all directions, the energy also radiates in all directions. The size of the kink depends on how quickly the electron changes position (acceleration). However, to make the field radiate

continuously the electron must be continuously wiggled or vibrated as shown in **Fig. 3b**.

The Magnetic Field

There's a magnetic field associated with any movement of electrons (current flow) and if current varies, so does the magnetic field. The oscillating electron creates an oscillating magnetic field, known as the H-field as shown in **Fig. 3c**. In the same instant as producing a vertically oriented E-field, (using the orientation shown in

Fig. 3b, there's also an horizontally oriented H-field).

The E and H fields will be in time phase, the peaks of the fields occur together, **Fig. 3d**. They're locked together because they were produced by the single event of the electron's acceleration. The fields are always locked together with their vectors at right angles to each other. Such a wave is called an Electromagnetic (EM) wave

Single Electron

A single electron won't produce a very powerful EM wave, no matter how fast or how much it is vibrated. So, in a practical antenna large numbers of electrons have to be vibrated with high acceleration.

An electric current is simply a mass migration of free electrons. If the current is alternating, as in an antenna, the free electrons vibrate back and forth in unison, driven by a potential supplied by the transmitter. Any individual electron moves to and fro around an average position. But how far and how fast might an electron travel?

Consider an antenna consisting of 2.5mm diameter copper wire which is excited by a transmitter on 14MHz. Each free electron near the surface of the wire is suffering 14 million cycles of motion every second. From the number of free electrons per cubic mm of copper and the electric charge on each, we can calculate the peak speed of an electron at a place where antenna current is, let's say, one ampere.

The resultant speed works out to be less than 10mm per second. At that rate the

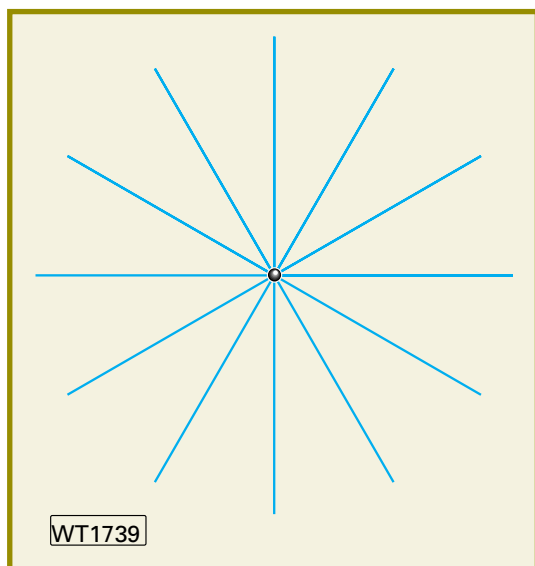
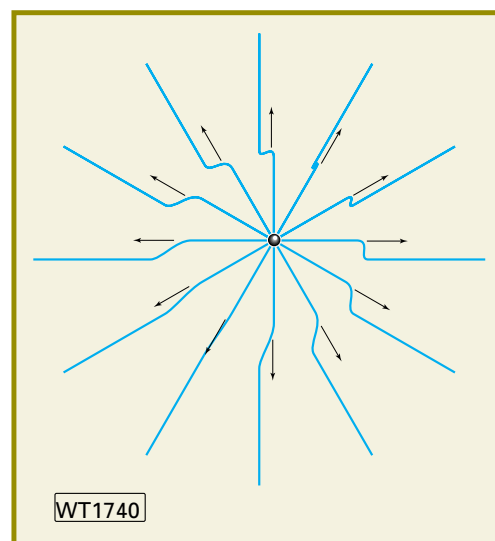


Fig 1: Diverging lines of force from an electron, shown only in two-dimensions, although they actually radiate in all three dimensions.

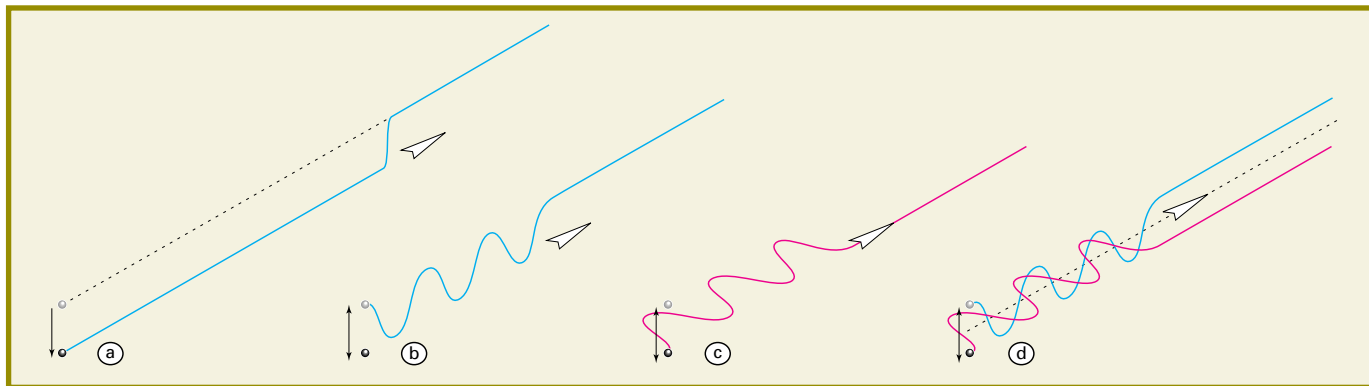
electron (arbitrary assigned negative) and the nucleus (assigned positive).

In an atom of Copper 29 electrons orbit the nucleus at four specific distances known as shells. The electrons in the outer shell is easily detached from the atom by any weak field. These electrons are termed free electrons and at room temperature there are trillions of them moving randomly from atom to atom.

When an external electrical force, such as voltage from a battery, is applied across the conductor then the free electrons migrate along the voltage 'slope'. They appear to flow from the negative to the positive side of the



Should the electron be suddenly moved, a discontinuity kink will occur in each of these lines of force. The 'kinks' moves away from the electron at the speed of light.



- (a) A kink in an E-field line due to the single sharp movement of the electron which produced the field.
- (b) Continuously 'wiggled' electron creates a continuously radiating E-field in which the changes radiate away at the speed of light.
- (c) The H-field created by the changing E-field of the 'wiggled' electron, is at right angles to the E-field.
- (d) An EM wave, comprises of both E and H-fields, with their phases locked together and their vectors at a right angles to each other.

electron doesn't move very far during each half cycle of vibration, its peak-to-peak travel being less than a millionth of a millimetre. Although this distance is tens of thousands times its own diameter.

We can compute the electron's deceleration and acceleration, which are greatest when the electron is coming to a stop and then starting up in the other direction. At an antenna current of one ampere, these quantities reach more than 50 000g. Where 1g is the acceleration due to gravity of around 9.81m/s^2 . (In terms perhaps more easily understood, if a car were to accelerate at 1g, then it would reach 60m.p.h. in under three seconds. **Editor**)

Short Digression

I'll take a short digression to talk about the nature of space. Empty, or free space is a medium through which energy can be transmitted. It has zero gain and no attenuation. Furthermore, it is perfectly linear, which means that the weakest signals and the most powerful can be accommodated without interaction.

Because E-fields in free space do not interact, then we can assume that the vector sum of a number of fields will be the simple sum of all the fields and not include some product terms as would be the case if space were non-linear. This is known as the principle of superposition.

One of the implications of superposition is that we can consider each electron individually when it comes to the generation of EM waves. Now we can simply add up the effects of each electron to determine the overall strength of EM waves in all space.

Fortunately, superposition teaches us that we can also do our analysis by taking a group of electrons here and another there and once the effects of each group has been determined, we can add them all together to get the total effect.

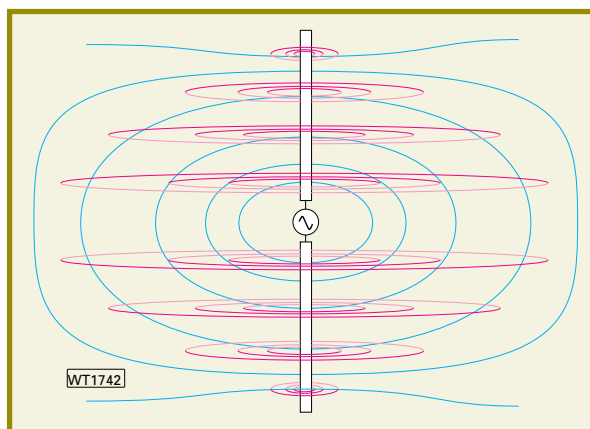
Near Fields

In the real world of antennas our ability to produce the ideal current configurations

described above is limited. There are certain side effects; one of these is the production of so called 'near' fields.

Consider the dipole, when currents flow, charge builds up on its ends, simply because the current has nowhere to go. These charges will produce a varying voltage between the ends of the dipole. It has become, in effect, a capacitor with which, there will be E-fields from the positive pole to the negative pole. These fields are called reactive or 'near' fields.

When r.f. currents flow in a dipole, H-fields are the direct result of those currents and so



- Near E and H-fields are produced individually and do not affect each other in any way. These E and H-fields, existing only relatively close to the antenna (2-10λ), are 180° out of phase with each other.

are part of the radiated wave. However, there will also be near H-fields produced by the displacement currents, which exist while the near E-field is building or collapsing along the antenna.

These near E and near H-fields, unlike true EM waves, are not coupled together. The ratios of the various near fields can be individually controlled, by changing the geometry of the antenna. Furthermore, the H-field reaches its maximum when the E-field is changing the fastest, while the capacitive E-field is at its maximum when the voltages at the ends of the dipole are maximum.

Therefore, the two fields in Fig. 4 are not in time phase, as are the E and H-fields in Fig. 3d. This is why the near fields do not radiate, but simply store energy in the immediate

vicinity of the antenna. We'd rather do without them, but they are an inevitable 'parasitic' effect of the operation of the antenna.

Near field strengths die out very quickly with distance from the antenna.

When measuring the gain or pattern of an antenna, you must be sure to measure in the region where the near fields have fallen well below the radiated fields, or a false result will be obtained leading to wrong conclusions about a particular antenna's performance.

If only instruments could be made that measured just the EM waves and not the reactive E or H-fields. But for the foreseeable future, this is unlikely to happen!

Radiation & Ohmic Resistances

Now to round off, by considering both radiation and ohmic resistances. An electron carries an electric charge and since an electric charge may be pulled by an electric field, it follows that a force is exerted on the very electron that is producing the E-field. The effect is a drag proportional to speed, as if the electron were moving through a viscous fluid. This drag force is due to the radiation resistance.

An electron moving in a conductor also suffers a drag force due to frequent progress-impeding collisions between the electron and the atoms in its path. This drag is ohmic resistance, the familiar **R** in Ohm's Law.

Both kinds of resistance dissipate energy at a rate equal to I^2 time the resistance value. An alternating current, flowing against radiation resistance, turns electrical energy into radiant energy, which wings its way off into space. Current flowing against ohmic resistance just transforms electrical energy into heat. **PW**

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Why an Antenna Radiates, Kenneth MacCleish, W7TX, QST, Nov 1992.

Did your club
enter the 2001 PW
& Kenwood Club
Spotlight
Magazine
Competition? If
they did...read on
to see just how
they fared this
year as Rob
Mannion G3XFD
presents the
results.

Everyone's A Winner

Club Spotlight Magazine Results 2001

I'm delighted to say that the number of entries for the 'Local' category of the 'Spotlight' competition is still very good indeed - **14 high standard entries!** Although there were **only two entries** in the 'National' category this time...the two clubs that entered were also of a very high standard.

Unfortunately one part of the competition administration failed at a crucial time in the judging process because Securicor Omega managed to lose the entire package of entries in their Norwich depot for almost two weeks! Normally Securicor are very efficient and the judges - who live in Cornwall, Norfolk, Hertfordshire, Dorset and Wiltshire - soon receive and despatch the parcel to and from the office.

Because of the Securicor delivery delays, together with one of the judges having their own club enter the competition...different point scorings were adopted this year. Additionally, because of the delays **Jamie Donaghy M0CLI** from the former Salisbury Club who normally takes **Tex Swann G1TEX's** place on the National category entries, competing for the **Bert Newman G2FIX 'Bert's Bell' Trophy** was unable to take part.

Tex Swann G1TEX was also unable to adjudicate this year because his club - the Poole Radio Society - entered their newsletter this year and he of course wanted to be non-partisan in the judging. So, appreciating his decision I decided that **for 2001 we would adopt a scoring out of 40 points rather than 50 as there were only four judges.**

Because of the constraints mentioned the 2001 adjudication panel consisted of **David Barlow G3PLE** (the originator of the Spotlight Competition), **Jim Bacon G3YLA**,

Dave Wilkins G5HY from Kenwood UK and myself **G3XFD**. **Despite the difficulties...**I'm delighted to say that this year's entries were really excellent. So, on with the results!

National Category

Note: The quoted comments are extracts only - all entrants will receive the adjudication sheet from their entry. The figures in brackets behind the comments refer to the points awarded by that judge.

This year's National Club category winners were the **Remote Imaging Group (RIG)** with the **RIG Journal** who scored the maximum number of points possible - **40**. Although it's professionally printed - the judges took into account the superb editorial content and style with comments such as "Always one of my favourites" from Dave Wilkins G5HY (10). David Barlow G3PLE commented "Superb magazine" (10). My own comments were "Absolutely fascinating - okay it is professionally printed but they do have to provide the editorial. More beginner's articles please!" (10).

The 'Bert's Bell' trophy was presented to **Nigel Evans**, on behalf of **RIG**, **Fig. 1**, on the Saturday of the Leicester Show by **Hilda Rusbridge** the (I've got permission to publish the following information!) **82-year old** sister of the late G2FIX. Hilda, makes a special point of travelling to the show from her home near Andover in Hampshire. Travelling is something she's used to doing...and as she's recently had a sub-aqua diving holiday in Australia, so the trip to Donington was a purely 'local' jaunt! Thanks for your support Hilda and son-in-law **Jerry Amos**.

Runner-up in the National Club category for 2001 was the entry from the **Benelux QRP Club**, based in Holland but with membership in Belgium and Luxembourg (and the UK). Despite being published only in Dutch...as usual their *Nieuwsbrief* - the title provides a clue of just how easy it is for the English reader to enjoy the magazine - scored **39** points out of a possible 40. My comments were: "This is an incredibly good Amateur Radio magazine...if it had an English language edition PW could have a real competitor in helping people to enjoy the hobby" (10). Dave Wilkins G5HY said "Very wide range of contents, clear drawing and diagrams...no clip art!" (9).

So, well done to RIG and the Benelux QRP Club. Good luck next year and let's hope we have more entries for the 'National' section. Please send your entries in...the judges always enjoy reading them and it's fascinating to watch the magazines develop and change.

A Close Run Thing!

Points in the Local category: This year the maximum number of points is 10 for each entry per judge, and maximum possible score is 40. Figures in brackets are scores awarded by that judge.

The standard of presentation and editorial content of this year's **14 Local Club Category** entrants was excellent but the 2001 winners - the **Cockenzie & Port Seton Amateur Radio Club** from Scotland won with **38.5** out of

● Fig. 1: Hilda Rusbridge, sister of the late Bert Newman G2FIX - presents the 'Bert's Bell' G2FIX trophy to Nigel Evans of the Remote Imaging Group, the 'National' category winners, at the 2001 Leicester Show.



ner!

40 points, winning by only a half point! As usual the adjudicators were **very impressed** by the C&PS ARC's entry, its editorial content, style and the ethos behind the club...which regularly raises money for charity. All activities are reflected in their club magazine which - from their own comments - is growing fast within Scotland and may well soon become a 'National' category entrant rather than a 'Local'.

Dave Wilkins G5HY from Kenwood, **Fig. 2**, is shown presenting the 'Spotlight' trophy (which Kenwood sponsor) to **Bob Glasgow GM4UYZ** and supporters from the C&PS ARC at the Leicester Show. Dave's own comments on their entrant were: "Ten out of ten for style...good contents - excellent club news - very clear font" (10). Jim Bacon G3YLA said "Another professional looking entry from a regular entrant. I particular liked the clear font, un-cluttered lay-out, news and contest details calendar" (9). David Barlow G3PLE commented: "One advantage of judging the Spotlight entrants is that I get to read the C&PS ARC newsletter. Consistently the best in my opinion". (9.5). My own (G3XFD) comments were "Superb read, wonderful typeface, stunningly simple but superbly effective front cover. Shows what can be done"! (10).

The biggest surprise this year came from a **first time entrant** - the **Crawley Amateur Radio Club**, based in West Sussex. Their spirited entry scored only **half a point difference** below the winners! To emphasise the quality of this club's entry it's best to read what the judges had to say. Dave G5HY said "Very clear, good choice of font, good club content and colour choice" (9.5). Jim G3YLA commented: "A very well laid out clearly printed entry, good editing and use of colours...and a really good read". (9). David G3PLE said "Splendid effort"! (9.5). My own comments were "Simple format, superb presentation, well edited with good editorial. Next year's winner"? (10). Only time will tell if the CARC will win next year...but what an excellent start. **Well done Crawley!**

Echelford Amateur Radio Society were awarded **36.5** points and their entry earned some interesting comments from the judges. David G3PLE said "A very good production with all the required features. It's monthly and deserves all praises". (9).

Milton Keynes Amateur Radio Society's entry also scored **36.5** points - another first time entry, earning the following praise from Dave G5HY: "Wow...very impressive"! (10).

Three clubs - the **Oldham Radio Club**, the **Silverthorne Radio Club** and the **Warrington Amateur Radio Club** each earned **35** points for their entries. Commenting on Oldham's



entry I said "What a good entry, still serving their members - super club, super magazine" (9). On the Silverthorne Club's entry David G3PLE said "Presentation and content very good indeed. Good club magazine" (8.5). On Warrington's entry Dave G5HY commented "Very nice print quality, good editorial content to see the club's programme included". (8).

Sutton & Cheam Radio Society's entry earned 34 points and support from David G3PLE "Another monthly, full of news, information, pictures and technical articles". (9).

Poole Radio Society's entry was awarded **32** points. Dave G5HY commented "Very good 'club comment' section, good simple lay-out and extensive contact details". (8).

Colchester Radio Amateur's newsletter was awarded **31** points and drew the following comments from myself: "This club is really active, the newsletter is news based, an excellent club publication, very well done". (9).

Wimbledon & District Amateur Radio Society's entry earned **29** points. Jim G3YLA said "A very accomplished newsletter with a friendly mix of articles and a good page of club details and programmes". (7).

Leiston Amateur Radio Club's (Suffolk) entry earned **29** points and "Nice little newsletter" comment from G3YLA.

The **Telford & District Amateur Radio Club's** entry gained **26.5** points and the following comments from myself "Nice 'newsy' club magazine with some innovative stories. Well done Telford"! (7.5).

Finally - but certainly not the least appreciated! - is the entry from the busy **Nunsfield House Amateur Radio Group** in Derbyshire. They earned **26** points and Jim G3YLA commented "A small but nicely formed factual newsletter - does the job well". (6).

So, well done everyone! The judges look forward to your entries next year. However, in the meantime perhaps you'll do as several club Editors have asked and send copies of your newsletter to the other club entrants to read and enjoy. After all...we can all learn can't we? Good luck to you all...and thank you for your excellent efforts!

● Fig. 2: Dave Wilkins G5HY presents the PW & Kenwood UK 'Club Spotlight' club magazine competition trophy to Bob Glasgow GM4UYZ and friends from the Cockenzie & Port Seton Amateur Radio Club, Scotland. This year C&PS ARC won the trophy by the narrowest of margins...half a point! - as standards were so high.



A Century Of Success

David Barlow G3PLE lives near Poldhu in Cornwall. Here he takes the opportunity, in a special feature marking the end of the centenary year, to pay tribute to Marconi's success in bridging the Atlantic on 12 December 1901.

● Making history - Marconi is shown sitting inside the old Fever Hospital at Signal Hill, Newfoundland. The spartan conditions of the semi-derelict building can be clearly seen from the photograph - although the weather conditions outside must have made this Victorian building seem very comfortable indeed! (Copyright photograph courtesy of Marconi PLC).

One hundred years ago on 12 December 1901 one of the most audacious gambles was taken, both in terms of business and wireless technology when Marconi took his great 'Atlantic Leap of Faith' and proved trans-Atlantic wireless communication was possible. It was truly an act of faith because in April 1900, the distance record for one-way communication was 80 miles (129km) and vast sums of money were to be ploughed into an experiment to establish two-way communications across the Atlantic.

In 1896 the 21-year-old Guglielmo Marconi came to England. On the 27 July 1897, the Wireless Telegraph and Signal Company Limited was founded with the aim of developing and selling the Marconi apparatus. By the turn of the century the renamed Marconi Wireless Telegraph Co. Ltd. was making annual losses and sales of the apparatus were minimal.

In four years Marconi's apparatus had hardly changed, it was bulky and inefficient. Three main problems existed: lack of range, lack of privacy and the broadband raw spark signals meant that only one station could operate at a time.

Marine Communication

The Marconi directors realised that the most profitable use of wireless telegraphy lay with

merchant shipping. So, in April 1900, the Marconi International Marine Communication Co. Ltd. was established to meet this objective.

Putting wireless on board ships created a need for coast stations with telegraph lines to the main shipping centres. Eight coast stations were established during 1901 and these were at St. Catherine's Point on the Isle of Wight (Niton), North Foreland (Kent), the Lizard, Caister (Norfolk), Withernsea (Humber Estuary), Holyhead, and at Crookhaven and Rosslare in Ireland - all close to Lloyds signal stations, which had the required telegraph facilities.

Marconi shocked his board of directors by proposing to send and receive signals across the Atlantic. His directors, let alone being taken aback by the cost of such a bold experiment, pointed out that the powerful station proposed would blot out all marine communications!

Marconi, who had been working on this problem, had just obtained his famous patent **No. 7777**. He demonstrated that by using inductance and capacitance (jiggers and Leyden jars) in conjunction with the spark coil to form an early form of tuning circuit, and then to matching the values at the spark transmitter to those at the receiver, 'syntony' could be achieved. **While this overcame the board's objections it did not actually solve the problem.**

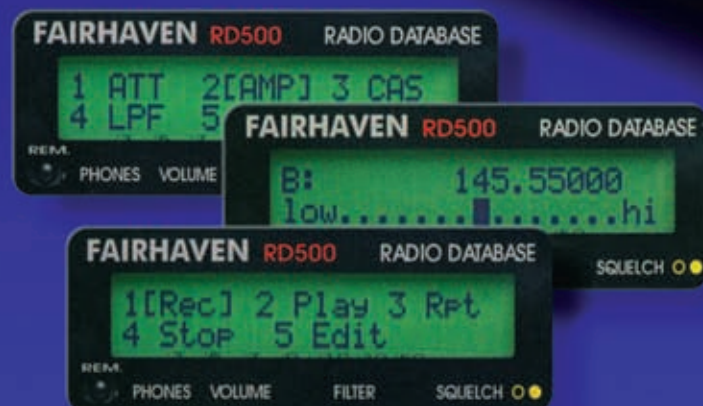
Continued on page 47 ●

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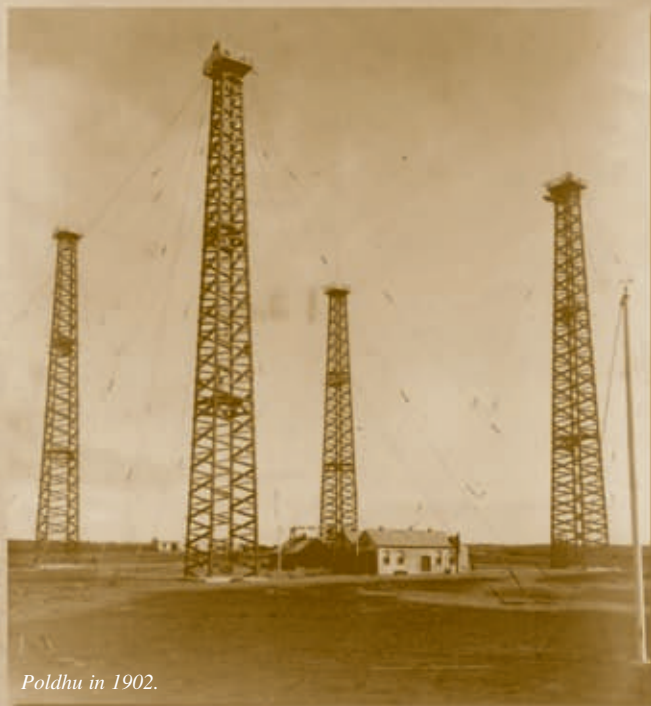
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Commemorating

12



Poldhu in 1902.

Main Photograph: A rare photograph taken from a balloon, of the Poldhu Hotel and one tower, Spring 1903.

g Marconi's Atlantic Leap

December 1901



*Guglielmo Marconi
(1874-1937)*



Glace Bay, Nova Scotia.



Marconi

Photos reproduced courtesy of Marconi's Atlantic Leap.



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● Fig. 1: Posed in front of one of the huge kites which were used to hoist antennas aloft, Kemp, Marconi and Paget prepare to brave the bitter, gale-force winds awaiting them outside. This photograph was actually taken inside the old hospital with the kite between them and one of the large windows. (Full photograph is featured on page 46 of *Marconi's Atlantic Leap*). (Copyright photograph courtesy of Marconi PLC).

Suitable Site

In June and August 1900 Marconi looked for a suitable site for the 'great experiment' and, in addition, a coast station to cover the Western Approaches. They eventually selected the site in Cornwall, at Angrouse Cliff, Poldhu, near Mullion in the borough of Helston. The coast and test station for Poldhu was to be sited adjacent to the Lloyds Signal Station at Bass Point near the famous Lizard Point. (This site is now a museum).

Work commenced on the Poldhu high power station in October and preliminary tests started in January 1901, simultaneously with the Lizard station receiving signals from Niton, a new distance record of 186 miles (300km) and a huge boost to morale.

The equipment at Poldhu was enormous when compared with any previous apparatus. A 32hp Hornsby-Ackroyd oil engine drove a 25kW Mather & Platt alternator delivering 20kW at 50Hz connected to the primary of a step up transformer with 20kV at the secondary, which was applied to the first stage spark gap.

The second stage spark gap could be loaded to 10kW. It is an established fact that the sound of the spark could be heard a mile (800m) away in Mullion and there are reports that it was sometimes heard three miles (5km) away in Ruan Minor!

Tests at Poldhu continued and signal reception progressed from the Lizard to Niton. Then, in June, the new distance record was achieved when signals were received 225 miles (362km) away at Crookhaven, Ireland.

Cape Cod

Meanwhile across the Atlantic a 'twin' station was being built at Cape Cod, Massachusetts. The aim of the experiment was two-way communication and Cape Cod was to be an exact duplicate of Poldhu.

At both sites the antennas were to comprise 200ft (61m) circles of 20 masts,

each 200ft high. Such a configuration required a vast number of guy wires and it was found that the r.f. absorption was very high. **They were unaware that this configuration would neither be directional nor very efficient.**

However, natural forces were to rectify the problem because in September 1901 an exceptional gale at Poldhu blew the masts down. There was a rapid re-design using the wreckage of the old masts.

Work commenced immediately to erect two 160ft (48m) masts 200ft apart with an insulated stay between them from which 50 copper wires descended, fan shaped, to the transmitter. This array could best be described as a mis-matched lash-up.

While time enabled reconstruction at Poldhu, a gale at Cape Cod in October caused sufficient damage to render the station inoperable when the antennas

collapsed onto the buildings. Over £50,000 (over £1 million in today's terms) had been spent on the 'great experiment' and wreckage lay all around. It looked as though the big gamble had failed.

Marconi in Newfoundland

Marconi, together with his assistants **P.W. Paget** and **G.S. Kemp** set off for the Americas and arrived at St. John's, Newfoundland on 6 December. They set up the receiving equipment in a disused fever hospital on the aptly named Signal Hill. The photograph (heading picture) shows Marconi inside the old hospital).

The former hospital was a good site for flying kites and balloons for the antennas (**Fig. 1.**, shows Kemp, Marconi and Paget posing inside the building). However, the ground was poor for an earth connection and they dug holes in the frozen ground and lay zinc plates to overcome this problem.

The weather at St. John's was abysmal throughout their stay. It was hardly conducive for the flying of kites and antenna bearing balloons. The balloons were ripped from their moorings and the huge kites smashed beyond use. Marconi was also concerned that the variable capacitance caused by the varying height

Centennial Poster & Book

Practical Wireless is pleased to present the pull-out centre page poster to commemorate Marconi, his great achievement against great odds and the tremendous growth of our branch of science. The *PW* team also hope you enjoy your poster and this special feature, written by **David Barlow G3PLE**, who lives near the site of the Poldhu transmitter and who is also a member of the Poldhu Amateur Radio Club...which appropriately enough meets in a building adjacent to the former Hotel (now a Nursing Home) which features in the souvenir poster.

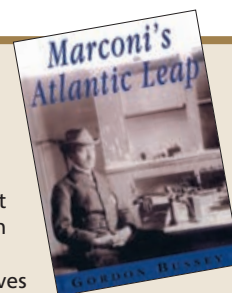
Thank you also to Gordon Bussey and Marconi's Archivist - **Louise Weymouth** for their help and extremely helpful co-operation selecting suitable photographs for our poster...together with **Steve Hunt** and **Bob Kemp** in our Art Dept.

Rob Mannion G3XFD, Editor PW.

Special Book Offer

Marconi's Atlantic Leap was researched and written by **Gordon Bussey**. It contains many previously un-published photographs showing the building of the original transmitters in Cornwall and in North America, plus many other fascinating historical background details. **I can thoroughly recommend it to readers.**

To buy your own centennial souvenir copy of *Marconi's Atlantic Leap* for **£4.60** (inc. P&P) please telephone - credit card orders accepted - **(01825) 723398**. Write to **Vine House Distribution Ltd., Waldenbury, North Common, Chailley, East Sussex BN8 4DR**. (Cheques payable to Vine House Distribution Ltd.)





● Fig. 2: This photograph shows Marconi (left, supervising operations...and perhaps looking a little apprehensive?) and his team attempting to launch one of the giant kites. (From page 49 of Marconi's Atlantic Leap) Marconi's assistant Kemp wrote "We received the three dots of the S signal repeated. We lost the first kite with two wires, each 510ft long, after it had been the means of giving us one hour of reception which was better than yesterday. Another kite was raised with one wire 500ft long, which appeared more in harmony with the earth's electric medium and the signals from the Poldhu station. We were able to keep this kite up for three hours and it appeared to give good signals".
(Copyright photograph courtesy of Marconi PLC).

way communication had not been achieved, his great experiment was, nevertheless, one of the 20th Century's most significant scientific achievements.

Marconi's was a triumph that the world of wireless celebrates 100 years on. They're celebrating a triumph that was the first giant step from spark to satellite and one that changed the world.

PNW

of the kite would affect reception.

The group had taken two types of receiver with them: a 'filings' and an 'Italian Navy' coherer. The filings coherer consisted of a tube (from which the air had been evacuated) in which two silver plates, separated by granules of silver and nickel, had been placed.

On reception of an r.f. signal the granules would cohere* and the resistance between the plates would typically be $1k\Omega$. When restored to its previous state it would be more than $1M\Omega$. 'Restoration' of the coherer was often achieved by the use of a device something like the striker on an electric bell - it literally 'tapped' the side of the glass tube - thus shaking the filings to restore them to their normal state.

The Italian Navy coherer consisted of a mercury globule between two iron plates. This acted more as a diode or contact rectifier and had the advantage that it was self-restoring.

On December 9th a cabled telegram was sent to Poldhu with the instructions that the letter S in Morse was to be sent from 3pm to 7pm daily. The letter S was chosen to alleviate strain on the transmitter and for ease of recognition.

For two days the filings coherer was used - although they did know that it was unsuitable for long distance reception. The more primitive Italian Navy coherer was then tried.

* To stick or hold firmly together.

Can You Hear?

On 12 December 1901 at 12.30pm Newfoundland time, Guglielmo Marconi handed his earpiece to George Kemp and said "Can you hear anything Mr. Kemp"? Kemp took the earpiece, listened, and could distinctly hear the three dots through the static.

The signal was to be heard on a few further occasions. Marconi had achieved his greatest triumph. In 12 months, the distance had been increased from 80 to 2400 miles (3862km) and, although two-

Visiting Cornwall? There's Much of Interest

Every summer the roads in Cornwall are crammed with cars with the occupants heading - mostly - for the beaches...but did you know there's much of interest for the radio enthusiast too?

The Poldhu site, the former Hotel and the huge Goonhilly British Telecom International Satellite earth station site

are all actually on the Lizard Peninsula. The wind-blown, wild but very beautiful area is best approached from Helston. From Penzance and the main A30 you can drive up to Helston via the **A394**. From Helston you can then drive on the **A3084** heading out towards the Lizard itself. Approximately three miles (5km) from Helston you'll come to a roundabout - here you have a choice. Turning left on to the **B3293** will take you to Goonhilly Downs and the BTI's Satellite Earth Station. **Note:** Special tours for the General Public are available see note below. From the Goonhilly site an un-classified road takes you across Goonhilly Downs towards Runa Major. On entering the hamlet of Ruan Major you have a choice of heading onwards to the left and visiting the Lizard Point itself.

Heading back towards Helston you can then follow the **A3083**, turning left onto the very short **B3296** towards Mullion Cove. From Mullion (or the unclassified road that eventually leads to White Cross and Cury) you can take the coastal footpath that leads along **The Lizard Heritage Coast**. Here you'll find the **Marconi Memorial** overlooking the sea and Poldhu Point. It's marked on Ordnance Survey maps, is a beautiful walk, **but be prepared for wind and variable weather!**

Useful telephone numbers: British Telecom International's Goonhilly Earth Station's Visitor Centre is open from Easter to October. For details please call (Freephone) **0800-679593**. Contact the **Visitor Centre, Goonhilly Earth Station, Helston, Cornwall TR12 6LQ**.

Tourist Information: For details on accommodation and places of special interest, contact the Tourist Office (open all year, Mon-Fri 10am -1pm, 2-4pm, Sat 10am-1pm, Helston on **(01326) 565431**, FAX: **(01326) 572803**. Write to **Cherry Bailey, Manager, Helston Tourist Information Centre, 79 Meneage Street, Helston, Cornwall TR13 8RB**. E-mail: to **info@helstontic@demon.co.uk**

The Poldhu Club GB2GM: Special celebrations - including opening of a new Visitor Centre - **take place on Wednesday 12 December 2001**. The Club meets every Tuesday and Friday and visitors are very welcome at **the Club House, Poldhu Cove, Mullion, Cornwall TR12 7JB**. Full information on the club is available on the Mullion Village Website: **www.mulliononline.com** and **Mrs Carolyn Rule M0ADA** from the PARC can be contacted by E-mail at **carolyn@mulliononline.com**

International Marconi Day (IMD) 2002: The International Marconi Day will take place on 27 April 2002.



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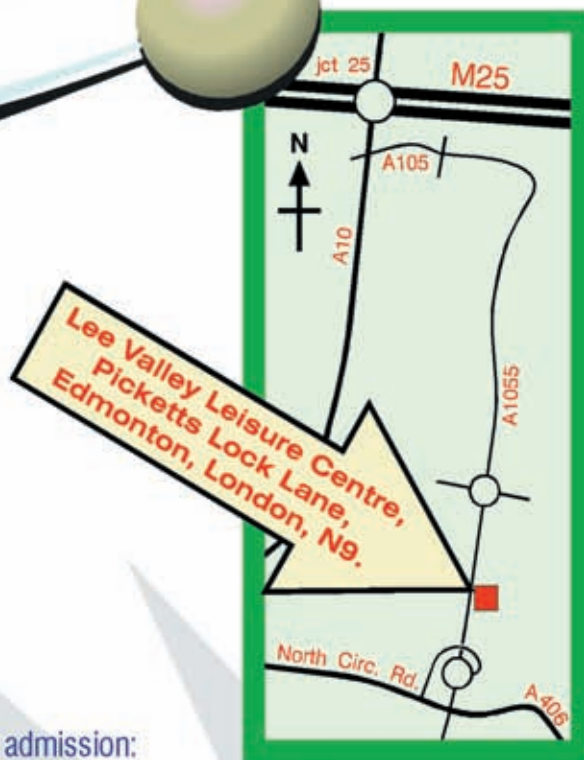


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Wireless Telegraphy At War 1939-45

Former Coast Station Manager Brian Faulkner pays tribute to the valuable - and often understated - work of the Post Office's Wireless Telegraphy Section during the Second World War.

● Cullercoats Coast Station in 1947, a typical installation of the period from 1939 to 1952. A Post Office Receiver Type WT7 is in front of the operator, with the associated Goniometer on the left. (Author's collection).

While the work of organisations such as Bletchley Park during the Second World War are well documented there were other groups, perhaps not so well known, whose contribution to the War effort is still largely untold. One such group was the Wireless Telegraphy Section (WTS) of the Post Office.

At the outbreak of hostilities, the eight coast radio stations in Britain and the two in the (then) Irish Free State (now The Irish Republic), along with the long-range station at Portishead were immediately taken over by the Admiralty. The Post Office still controlled and manned them but a Military guard and Royal Naval Censor were posted at each.

Much of the historical information about coast stations has been lost, but the outbreak of the Second World War is captured in the diary of Cullercoats Radio "Hostilities commenced. Broadcast by DAO at 2155".

Fifteen minutes or so later there's another entry,

the announcement that a British passenger ship had been sunk. "2218 Alarm and SOS de Athenia GFDM - torpedoed 56.42N 14.05W".

Forbidden To Transmit

From the outset of the War, British merchant ships were forbidden to transmit messages except in the case of distress or enemy reports. All private radio telegrams were prohibited except for those, subject to censorship, destined for neutral ships not in convoy.

Special arrangements were made for traffic with armed merchant cruisers, armed trawlers and patrol vessels that had Merchant navy operators.

Inevitably, traffic from ships in distress rose dramatically. During the last four months of 1939, 314 cases were dealt with compared with 71 in the corresponding period the previous year.

The normal Direction Finding (DF) service through coast stations was suspended, although bearings were still taken on enemy and neutral ships and occasionally

given to certain ships on instructions from the Admiralty. The full service was restarted in February 1940 and the following year, the Post Office was asked to set up new stations at Cape Wrath, on the north western coast of Scotland and near Aberdeen as ships made greater use of the North West Approaches.

In case coast stations were put out of action, emergency stations were established nearby to take over services, and two mobile Post Offices were converted to mobile coast stations. In the event, little damage was done to any coast station, despite being prime targets.

A number of bombs were dropped near Land's End but no damage was caused. Seaforth had a small amount of damage to its buildings and antennas and Cullercoats suffered structural damage when a parachute mine fell on the edge of the site. A German bomber attacked Niton on the Isle of Wight but a nearby hotel took the brunt of the damage.

Invasion & Capture

Plans were also made in case of invasion and the capture of coast stations. The signal 'ZZZZ', meaning "Abandoning Station" was to be sent in the event of imminent capture. Flanking stations would acknowledge and pass the message to their local Naval Authorities.

Staff were told to destroy transmitting valves and burn code books. Instructions also decreed that: "Diagrams and technical instructions must be put in a place of concealment where it will be very difficult for the enemy to find them, but where they will be still accessible for use if required".

A meeting between the Admiralty (NID9), War Office (MI8c) and the Post Office early in 1940 discussed the possibility of neutral ships leaving British ports passing information to enemy stations. As it was thought highly improbable that this information would be sent from ships other than those in the North Sea and English Channel, Wick, Cullercoats and North Foreland were ordered to maintain a 24-hour listening watch of the 550-850 metre band.

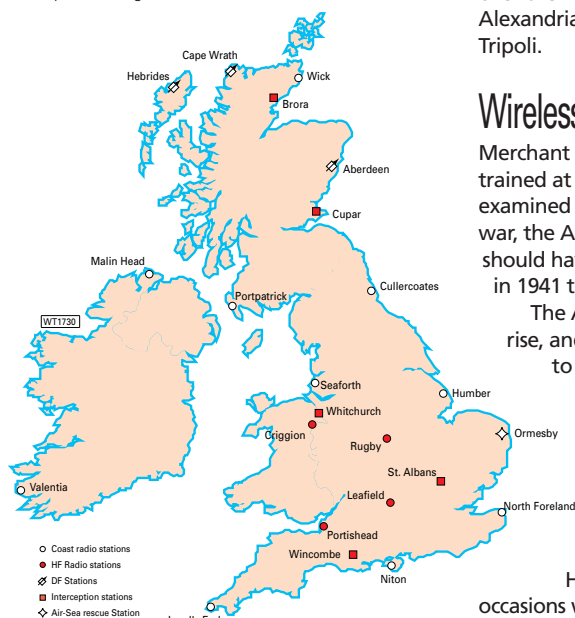
Bearings of any suspect signals were taken and all information passed to the Admiralty. To back this up, Post Office Ship Inspectors were asked to look out for unauthorised transmitters or transmitters tuned to "irregular" frequencies in the medium-frequency band when they visited neutral ships. If any such transmitters were found, a special radio watch was kept on that ship for 24 hours after it left port.

Despite having a policy of not communicating with enemy coast stations, a 'rescue service' was started by both Britain and Germany to give assistance to aircrew of both sides, forced to ditch in the sea. Coast stations broadcast the position of the aircraft in distress and entries, such as those below from North Foreland (GNF) and Norddeich (DAN) Radios, became commonplace in distress logs.

"SOS de GNF - British airmen in distress at 48 degrees 40 north 04 degrees 50 west

SOS de DAN - Deutsche Flieger in See position 53 grad 40 min bord 1 grad 45 min ost"

- Outline map showing positions of the various coast and special Post Office Wireless stations in Britain and the Irish Republic during the Second World War (see text).



Air Sea Rescue

A new station, exclusively for air sea rescue work, was built at Ormesby, near Great Yarmouth, in 1942. Coast stations worked closely with Naval and RAF authorities, taking bearings of automatic wireless transmitters operated from dinghies.

The scale of these operations can be judged from the fact that in the first eight months of 1943, no less than 1011 airmen were rescued from the sea, and in the same period the following year, over 1600.

For the D-Day landings, an additional radio-telephone transmitter was installed at Niton Radio, so that naval staff at Portsmouth could speak directly with ships at sea. Transmitters at North Foreland Radio were controlled from Dover and a mobile station set up at Chichester for use as a reserve.

Arrangements were quickly made for Portishead Radio to take over the long-range services of Naval stations abroad, if required. In 1942, certain Naval services were transferred from Whitehall to Portishead. Here Post Office and Naval operators sat side-by-side, each pair searching a particular waveband. If either heard a ship call, the Naval operator completed the working if it was Naval, and the Post Office operator if it was a Merchant ship.

In 1940, the station started a long distance service with civil aircraft and air stations abroad, on behalf of the Air Ministry. Initially this was restricted to Trans-Atlantic services and the

Lisbon and African routes. Direct communication was achieved with aircraft over the Persian Gulf and ground stations at Alexandria, Asamara, Bathurst, Lagos and Tripoli.

Wireless Operators

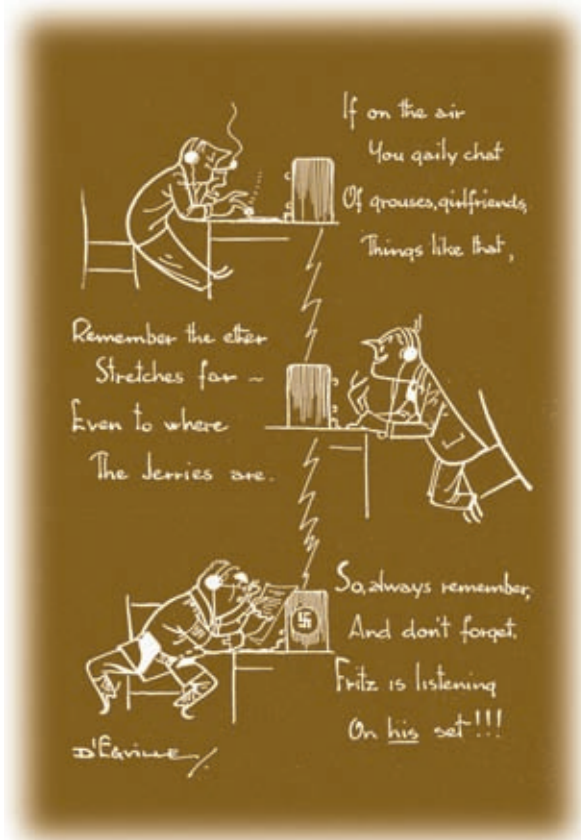
Merchant Navy wireless operators were trained at private wireless schools but examined by WTS staff. At the outbreak of war, the Admiralty ordered that British ships should have at least two wireless operators; in 1941 this was increased to three.

The Admiralty order was a significant rise, and the Ministry of Shipping agreed to accept a lower grade of technical but not operating certificate to increase the number of operators available. Known as the Special Certificate, the holder could operate equipment but not take charge of a radio installation.

However, in 1942, there were occasions when an operator with a higher certificate was not available. The Ministry of War Transport then allowed Special Certificate holders to take charge after passing a practical test. The WTS also taught Morse to Armed Forces personnel and by the end of 1942, 6200 men and 2300 women had been trained.

Point-To-Point

Before the Second World War, transmitters at Rugby and Leaffield operated wireless



- Reproduction of typical Second World War cartoon poster emphasising security (Author's Collection). Brian Faulkner found the original cartoon poster in the back of a war-time safe when he was tidying it up.

telegraphy point-to-point services with several European countries. Services with Czechoslovakia, Danzig and Poland ceased at the commencement of hostilities and the Rome service ceased when Italy entered the war.

A new service with the Vatican City started in December 1940. But, by the end of 1941 it was the only one operating, as those with Hungary, Estonia, Latvia and Romania, had closed down.

The long-range transmitters at Rugby and Leafield, normally used for press broadcasts, were taken over by the Admiralty for up to 12 hours a day. They were keyed from Whitehall and used to work warships.

The long distance radio-telephone service through Rugby all but disappeared when private messages were banned. So, in order to maintain the press services, two of these transmitters were allocated to telegraph broadcasting.

Reuter's world press broadcast service was originally transmitted through Rugby and Leafield (Oxfordshire) from the Central Radio Office using omni-directional antennas. However, from 1941, the Post Office operated this from Reuter's office at Barnet (Greater London). Using directional antennas, it covered North and South America, South Africa, the Near East, and North and South East Asia. In 1942, broadcasts were also beamed to the West Indies and Central America.

In March 1943, a serious fire, caused by the radiation effect from the VLF transmitter GBR, gutted the transmitting room and put Rugby off the air for several days. Fortunately such an eventuality had been foreseen and services were quickly restored through Criggon Radio*, near Shrewsbury.

* **Note:** See Craggy Criggon - Wartime Wizardry, by Hari Williams, featuring the VLF back up work from this station, published in the September 2001 issue. **Editor.**

Interception Work

Confidential interception work on behalf of the Foreign Office was carried out at stations at Sandridge (St. Albans) and Cupar (Fife). A third station was opened at Brora (Sutherland) in April 1940 and a fourth at Whitchurch (Shropshire) the following year.

The work of the interception stations focused, in the main, on the reception of foreign point-to-point traffic. This rose from around 500,000 words a month in 1939 to over five million by the end of the war.

By 1943, Cupar had outgrown its buildings and the service was moved to a bigger station at nearby Hawklow. The following year a new station was opened at Wincombe (Dorset). To meet the increase in staff required for this expansion, training was given to 83 women volunteers from within the WTS who would otherwise have been

released to the Forces or industry.

Following D-Day, 18 of the younger men from the stations were released for service in the Royal Corps of Signals to man the three press services operating from the beachheads. It was appreciated - the Prime Minister, Winston Churchill sent a letter to the Postmaster General expressing his appreciation of the work being carried out by these special service stations.

Emergency Stations

The Government was very conscious of the fact that communications would be badly affected if the Germans invaded and in 1940, emergency wireless stations were set up throughout the country. Along with the Coast Stations, and transmitters at Rugby and Leafield, they formed a wireless network designed to carry urgent traffic in case of complete disruption of the Inland service in

any part of the country.

By the end of 1942, there were 40 Emergency Stations, including 10 mobile. Weekly tests were carried out and, from time to time, full-scale trials with coded traffic were held.

Almost 100% of the work of the WTS was deemed war work for which publicity could not be given. Over 5000 distress cases were handled, nearly 10000 Special Certificates awarded and over 5 million words of Press sent.

In addition, more than 10,000 operators were trained in Morse for the Services and over 1000 men and women recruited to undertake what was termed at the time, 'special warlike work'. This was no mean contribution to Britain's war effort from a group of people totalling no more than 800 at its height.

PW

A Typical Security Notice from The Second World War (Wording, terminology and spelling as on original).

1: Never make any unnecessary signal.

Your signal may help the enemy and, if the signal is not essential why make it?

2: Never chat with the Operator at the other end on any subject whatsoever.

Was it Bert you spoke to, or was it Fritz? Well, Fritz was listening anyway.

3: If you have been given a proper operating procedure, stick to it faithfully and do not sign off with your initials or a signature tune on the key.

If you do not stick to the proper procedure, you will appear on the enemy's card index as a man who is likely to give news away and you will be very closely watched in consequence. Our own experience shows that operators who do this sort of thing are always worth watching as sooner or later they will spill the beans.

4: Never go off your allotted Frequency under any circumstances.

This helps to identify your Station and may cause interference with other, and perhaps more important, stations.

5: Do not try to use Sporting or other slang as a Private Code; the Germans know our slang as well as you.

'Nuff said!

6: Avoid long calls and tuning transmissions as much as possible.

These transmissions help the enemy D/F stations, and this applies most forcefully to mobile transmitters.

7: Learn the Q-Code and use it.

QRU is very much better than "Have you anything for me". QWX should not be used in wartime.

8: Never allow the same message to be transmitted in two different cyphers.

Alter the wording of one message without spoiling the sense, before encyphering it.

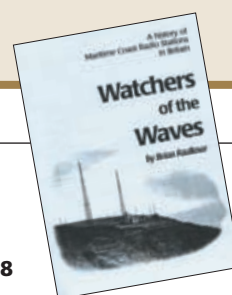
9: If you have sent a coded message, do not repeat parts in clear because the other chap cannot make them out.

What is the use of coding messages if you hand the enemy the key on a hot plate, which is what such an act implies?

10: Never pass Code Words or Cypher Instructions over the air in clear.

See (8), but this is a damnsight worse.

"When you go upon the air Remember Fritz is waiting there".



Further reading: Brian Faulkner, who during his service with the Post Office and (latterly) British Telecom, was the Manager of four Coastal Radio Stations is also the author of *Watchers Of The Waves*. This is an illustrated, informative book providing a fascinating insight to an extremely important time in the history of radio communications in Britain and Ireland. The book is available for **£14 inc. P&P** from **Wimborne Publishing, 408 Wimborne Road East, Ferndown, Dorset BH22 9ND. Tel: (01202) 873872.**

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DRAKE	SW-2 HF RECEIVER	£299.00	KENWOOD	TSU-8 TONE SQUELCH UNIT	£25.00	YAESU	FRG-100 HF RECEIVER	£300.00
FAIRHAVEN	RD-500 WIDE BAND RECEIVER	£575.00	KENWOOD	VFO-120	£50.00	YAESU	FRG-7 HF RECEIVER	£99.00
HARRIS	FR-590 TOP CLASS RECEIVER	£2,250.00	KENWOOD	VFO-180 EXTERNAL VFO	£75.00	YAESU	FRG-7700 HF RECEIVER	£220.00
HOWES	CTU8 ANTENNA TUNER UNIT	£20.00	KENWOOD	VS-1 VOICE SYNTHESISER	£30.00	YAESU	FRG-9600 60-905MHz All mode Receiver	£199.00
ICOM	AT-180 AUTOMATIC ANTENNA TUNER	£200.00	KENWOOD	VS-2 VOICE SYNTHESISER	£30.00	YAESU	FT-1000MK5 200W DSP HF TRANSCEIVER	£2,600.00
ICOM	FL-100 500Hz CW NARROW FILTER	£40.00	KENWOOD	YK-455CN-1 270Hz CW CRYSTAL FILTER	£100.00	YAESU	FT-1000MP AC HF BASE DSP TRANSCEIVER(Late serial no)	£1,550.00
ICOM	FL-222 1.8KHz SSB NARROW FILTER	£100.00	KENWOOD	YK-88A-1 AM FILTER	£40.00	YAESU	FT-1000MP DC BASE TRANSCEIVER	£1,200.00
ICOM	FL-223 1.9KHz SSB FILTER	£40.00	KENWOOD	YK-88C-1 500Hz CW NARROW FILTER	£40.00	YAESU	FT-101 TRANSCEIVER MINT!	£200.00
ICOM	FL-52A 500Hz CW NARROW FILTER	£99.00	KENWOOD	YK-88CN1 270Hz CW FILTER 8.83MHz IF	£40.00	YAESU	FT-101Zmk111 HF TRANSCEIVER inc FM	£375.00
ICOM	FL-53A 250Hz CW FILTER	£100.00	KENWOOD	YK-88S-1 2.4KHz SSB NARROW FILTER	£40.00	YAESU	FT-23R HANDY TRANSCEIVER	£89.00
ICOM	IC-2100H 2M MOBILE TRANSCEIVER	£150.00	KENWOOD	8.83MHz IF	£40.00	YAESU	FT-2500M MOBILE TRANSCEIVER	£190.00
ICOM	IC-229H 2M / 50W FM Mobile TRANSCEIVER	£130.00	KENWOOD	YK-88SN 1.8K SSB FILTER (TS-440 / R5000)	£40.00	YAESU	FT-2500RMK1 2M ALL MODE TRANSCEIVER	£180.00
ICOM	IC-229H FM TRANSCEIVER	£140.00	KENWOOD	YK-88SN 1.8K SSB FILTER (TS-440 / R5000)	£40.00	YAESU	FT-290RMK1 Includes Bracket + FL-2010 LINEAR AMP	
ICOM	IC-251 2m MULTIMODE TRANSCEIVER	£295.00	KENWOOD	8.83MHz IF	£40.00	YAESU	FT-290RMK11 MOBILE 2M MULTIMODE	£275.00
ICOM	IC-275E 25W TRANSCEIVER	£525.00	KENWOOD	PS-430 POWER SUPPLY	£120.00	YAESU	FT-3000M 2m 70W MOBILE TRANSCEIVER	£175.00
ICOM	IC-290 2m MULTIMODE TRANSCEIVER	£240.00	KENWOOD	TM-G707E MOBILE TRANSCEIVER	£220.00	YAESU	FT-41R HANDY TRANSCEIVER	£120.00
ICOM	IC-2KL AUTOMATIC LINEAR AMPLIFIER + PSU	£999.00	KENWOOD	MCL1100 EASY READER	£75.00	YAESU	FT-470 DUALBAND HANDIE TRANSCEIVER	£150.00
ICOM	IC-490E 70cms MULTIMODE MOBILE TRANSCEIVER	£265.00	KENWOOD	MJF-1020B INDOOR ACTIVE ANTENNA	£40.00	YAESU	FT-690MK11 6M MULTIMODE MOBILE	£295.00
ICOM	IC-725 HF TRANSCEIVER	£375.00	KENWOOD	MJF-1278 MULTI MODE DATA CONTROLLER	£199.00	YAESU	FT-7 MINT! CONDITION	£275.00
ICOM	IC-728 HF TRANSCEIVER	£399.00	KENWOOD	MJF-462B MULTI READER	£140.00	YAESU	FT-726R 2 / 70 / 6m TRANSCEIVER	£375.00
ICOM	IC-735 HF TRANSCEIVER	£400.00	KENWOOD	MJF-462B MULTI-READER	£100.00	YAESU	FT-730R 70CM MOBILE TRANSCEIVER	£120.00
ICOM	IC-737 HF BASE BUILT IN ATU 100W	£595.00	KENWOOD	MJF-956 SWR AND ANTENNA TUNER	£30.00	YAESU	FT-736R 2m / 70cm TRANSCEIVER	£650.00
ICOM	IC-756 HF / 6m All Band Transceiver	£999.00	KENWOOD	MJF-986 ANTENNA TUNER	£195.00	YAESU	FT-736R 2m / 70cm / 6m TRANSCEIVER	£750.00
ICOM	IC-765 HF BASE TRANSCEIVER	£950.00	KENWOOD	MJF-989 3KW ROLLER COASTER ATU	£230.00	YAESU	FT-7400 70cm MOBILE TRANSCEIVER	£160.00
ICOM	IC-821H VHF / UHF MULTIMODE TRANSCEIVER	£699.00	KENWOOD	MJF-959B RECEIVER ANTENNA TUNER	£55.00	YAESU	FT-747GX HF TRANSCEIVER	£399.00
ICOM	IC-R10 HANDY WIDE BAND RECEIVER	£199.00	KENWOOD	PT-135 POWER SUPPLY	£80.00	YAESU	FT-757MK1GX HF TRANSCEIVER	£375.00
ICOM	IC-R7000 RECEIVER MINT! CONDITION	£550.00	KENWOOD	MICROWAVE MODULES MML-144/100 2m 100W LINEAR AMPLIFIER	£129.00	YAESU	FT-767GX HF BASE 100watt built-in ATU	£599.00
ICOM	IC-R72 RECEIVER	£399.00	KENWOOD	MICROWAVE MODULES MML-144/50S 2m 50W LINEAR AMPLIFIER	£80.00	YAESU	FT-790R 70CM MULTIMODE MOBILE TRANSCEIVER	
ICOM	IC-R75 HF / 6m RECEIVER	£475.00	KENWOOD	MICROWAVE MODULES 28/144 TRANSVERTER 28/144	£125.00	YAESU	FT-7B HF 50 W MOBILE TRANSCEIVER	£199.00
ICOM	IC-T81E QUAD BAND HANDY	£250.00	KENWOOD	NAIGAI NAG-144XL 2m 400W PEP LINEAR AMPLIFIER	£325.00	YAESU	FT-80C 0-30MHz COMMERCIAL TRANSCEIVER	
ICOM	IC-T8E HANDY TRANSCEIVER	£175.00	KENWOOD	OPTOELECTRONICS SCOUT FREQUENCY COUNTER inc MEMORIES	£220.00	YAESU	FT-840 HF MOBILE TRANSCEIVER	£450.00
ICOM	IC-W21E HANDY TRANSCEIVER	£199.00	KENWOOD	PAC RATT PIC-232 Multitone, dual port data controller	£175.00	YAESU	FT-847 HF 2 / 6 / 70cm BASE TRANSCEIVER	£999.00
ICOM	PS-15 20A POWER SUPPLY FITS ALL ICOM	£110.00	KENWOOD	PACCOM TNC-320 TNC	£90.00	YAESU	FT-900AT HF/ DETACHABLE FRONT BUILT IN ATU	
ICOM	PS-85 POWER SUPPLY	£175.00	KENWOOD	PANASONIC DR-49 RECEIVER	£125.00	YAESU	FT-980 HF TRANSCEIVER	£495.00
ICOM	SP-21 LOUDSPEAKER, BOXED	£55.00	KENWOOD	PANASONIC 28/144 TRANSVERTER	£100.00	YAESU	FT-ONE HF BASE TRANSCEIVER	£450.00
ICOM	UT-102 VOICE SYNTHESISER	£20.00	KENWOOD	SAGRA AMP-600 2M 1KW PEP MAINS AMPLIFIER	£750.00	YAESU	FTV-901 TRANSVERTER inc 2m Mod.	£165.00
ICOM	UT-84 TONE SQUELCH UNIT	£25.00	KENWOOD	SEM TRANSMATCH Z MATCH ATU inc 160m	£75.00	YAESU	MD-1 DESK MICROPHONE	£75.00
ICOM	AT-120 ANTENNA TUNER	£200.00	KENWOOD	SEM ANTENNA TUNING BRIDGE	£30.00	YAESU	SP-5 LOUDSPEAKER Including Audio Filters	£100.00
ICOM	IC-R71E RECEIVER	£399.00	KENWOOD	SHURE SR-444 CLASSIC BASE MIC	£35.00	YAESU	SP-767 LOUDSPEAKER Including Audio Filters	£80.00
JRC	NRD-535 HF RECEIVER	£600.00	KENWOOD			YAESU	SP-8 LOUDSPEAKER Including Audio Filters	£100.00
KANTRONICS	KAM PLUS TNC	£220.00	KENWOOD			YAESU	SP-980 LOUDSPEAKER Including Audio Filters	£55.00
KANTRONICS	KP-3 TNL	£89.00	KENWOOD			YAESU	VX-5R 2 / 70 / 6 HANDIE 5W	£220.00
KENWOOD	AT-250 AUTOMATIC ANTENNA TUNER	£200.00	KENWOOD			YAESU	XF-114SN 2KHz SSB FILTER	£60.00
KENWOOD	AT-50 AUTO ANTENNA TUNER	£175.00	KENWOOD			YAESU	YO-100 SCOPE VERY RARE!	£150.00
KENWOOD	AT-50 AUTO ATU	£175.00	KENWOOD			YAESU	YS-60 SWR METER 1.6 - 60MHz	£30.00
KENWOOD	DFC-230 FREQUENCY CONTROLLER	£70.00	KENWOOD			ZETAGI	B-132 10 / 11m LINEAR AMPLIFIER, MAINS	£60.00
KENWOOD	PS-20 10A POWER SUPPLY FITS TR-9130 ETC	£55.00	KENWOOD					
KENWOOD	PS-50 POWER SUPPLY	£145.00	KENWOOD					
KENWOOD	PS-52 POWER SUPPLY	£150.00	KENWOOD					
KENWOOD	SM-220 SCOPE 830 etc	£200.00	KENWOOD					

**John Senior
G7RXS confesses
to his addiction
to Amateur
Radio. And it
seems there's no
cure in sight even
though he
obtained his
licence 40 years
after discovering
radio!**

It all started when I was given an Ivalek crystal set for a birthday present back in the late 1940s. This provided hours of entertainment and with my father's assistance many types of antenna were tried and tested.

The first was a simple long wire down the garden attached to a rather large Poplar tree. Unfortunately, when the first wind blew the tree swayed gently in the breeze, it came crashing down! However, this seemed to have no effect whatsoever on the received signal and I still continued to listen to Hilversum, Radio Luxembourg and of course the BBC.

Then we hit upon the idea of attaching the already long wire to the local farmer's electric fence (yes, it was turned off). It had surprisingly little effect on the signal and when the farmer wanted his fence back for its proper use we had to use an indoor version, connecting the antenna lead to the spring base of my divan bed which worked a treat!

Salesman Cousin

My cousin **Michael**, being somewhat older and more experienced, successfully sold my father a number of his own components to make our own sets. We had circuit diagrams, plug-in coils (made by Igranic) of the large basket weave type a variable condenser (as they were then called) an adjustable cat's whisker

and - the height of luxury - some high impedance S.G. Brown headphones.

We started building by raking out the fire to a nice red glow to heat the soldering iron, a great heavy lump of copper on the end of what looked like a poker! Coils were then wound on toilet roll cores.

I then progressed slowly onto single valved sets and such horribly expensive things as accumulators, 120V high tension (h.t.) and grid bias (1.5 to 9V) batteries. It didn't seem to matter what I did...one of the three was always flat!

When the first surplus transistors became available (the blue, red and white spot types) using a *PW* circuit I soon had crystal set feeding a single transistor amplifier into a large 3Ω extension speaker. Whilst the volume was admittedly low, it was quite adequate for bedroom listening - better than headphones. Interestingly, the selectivity was as good as my parents mains driven set in the living room!

Grammar School

After the Eleven Plus Examination I attended Penistone Grammar School in what was then the West Riding of Yorkshire. There I studied the usual mixed bag of subjects but with a scientific lean.

Minor subjects such as History, Geography, Latin and English Literature were soon dropped by the

Confessions of a G7



school and Physical Education (or Games, call it what you will) was soon dropped by me. This was by virtue of feigned illness or forged sicknotes!

I then specialised in Maths, Physics and Chemistry and remember our Physics teacher, one **Percy Rhodes**...better known as 'Perce' who had the idea of forming a radio club and arranging a visit by local Radio Amateurs. That day arrived, and we all stayed back after school, and those who had not previously succumbed, ate their sandwiches in eager anticipation.

It turned out that one of the visitors was **Desmond Heath G3ABS** from Denby Dale (my own home village). He was accompanied by **Jack Wood G3LBP** from Silkstone.

The rigs they brought were of tremendous size as of course in those days there no transceivers. When I last spoke to Desmond he told me the transmitter was a Panda Cub, and the receiver an equally heavyweight AR88...which you may know of!

The microphone was fascinating...it was a converted hand torch with a crystal insert where the glass should have been. Long live Heath Robinson (no relation to Desmond Heath G3ABS!).

The antenna system used for the visit was just as memorable - a long wire stretching from the rig to of all things, a scaffold pole erected in a galvanised dustbin full of house bricks. From memory I don't

● Many adventures were waiting for this young chap on his 40 years journey towards the G7RXS Amateur Radio Licence!

think any actual contacts were made...but on hearing the American Amateurs talking to each other my enthusiasm was fired.

The RAE?

As we'd been studying the properties of the thermionic valve, propagation and waveforms, etc., in Physics I thought "why not attempt the RAE with this vast store of knowledge I had achieved and build a transmitter? Circuits abounded in the magazines of the time. However, with the approaching A Level examinations and the possibilities of University, all hobbies were put on the back burner.

Fortunately, I was successful with the examinations and went off to the University of Kingston upon Hull. Here there followed a period of drinking, debauchery and more drinking and radio and electronics were forgotten for the time being!

After University I returned home briefly and re-started radio work...but soon found a job was needed to pay for my keep. So, off I went to Imperial Chemical Industries (ICI) as a laboratory assistant but this soon turned out to be a dead end job.

In fact, the job could make you particularly dead if some of the nasty chemicals that seemed to abound were incorrectly handled. Chlorsulphonic acid sticks in my mind as a particularly vicious brute which combined explosively with water and also with asphalt composition floors if spilt. How do I know? (well that would be telling wouldn't it?).

Following some heavy prompting from Mother, I applied for a job as a bank clerk and surprisingly was immediately accepted. I worked in Huddersfield and for the following 10 months it was "Hey ho and off to work we go" with radio in the evenings. However, Banking being what it was in those days my, first posting soon came, and I left home...without my soldering iron.

Playing Darts

Then, while playing in a darts match, I met a certain young lady **Pat** (she was dispensing food at the time!) and after due courtship we married in 1963. Time flew by and there followed postings to Leeds, Hunslet, Wombwell, Barton-on-Humber and finally Leicester.

During our travels Pat and I had three children - **Paul, Stephen** and **Linda** - so there was no time left for radio. Then suddenly, out of the blue, at a routine meeting with my personnel manager a voluntary early retirement package was offered. I couldn't really afford to refuse!

So, there I was, 53 years old, retired

with a pension, with Pat still working to keep me in the standard to which I had become accustomed. I had nothing to do apart from gardening, decorating and the like.

Words like Initiative, Intention, Inspiration and Inthusiasn (sorry Editor it wouldn't look right spelled correctly) all

suddenly I was enlightened...Desmond's dustbin!

Yes, a dustbin full of bricks and a scaffold pole did the trick. The only difference being that with the passage of time my dustbin was plastic not galvanised. But at least it pointed me in the right direction and my first QSO took place at 1538 UTC on 7th March 1994 when I made contact with **G7RWQ**.

Great DX! - only a distance as the crow flies, sorry the radio wave propagates, of almost 3km but it was nevertheless my **first QSO**. It was only three minutes long due to my inexperience and my QSOs are much longer nowadays.

Repeater Groups

After reading an article in *PW* about Repeater Groups I decided to join the Leicestershire Group. Although it was enjoyable attending the Open Meetings...I was always a little wary about Annual General Meetings as retired Bank Managers often end up as Treasurer!

However, at the 1998 AGM despite keeping my head well down (I must have fallen asleep!) when I looked up I'd been elected as Chairman, a post which I still hold. When the Leicester Amateur Radio Show first moved to Castle Donington somehow I also managed to become the Flea Market Manager, another job I still hold.

So, there it is, thanks to cousin Michael for setting me on the road to radio construction, to Desmond

Heath for firing my enthusiasm and Natwest Bank for putting a 31 year gap in my aspirations. I achieved my G7 just less than 40 years after starting out and wonder if anyone else has taken longer?

I now have a computer and Morse tuition programmes with a view to an A licence but I doubt if my remaining life span will allow the same times as it took for the B licence! Never mind, I can always try the Foundation Licence or await developments after the next IARU conference in 2003.

Incidentally, the last time I spoke to Desmond G3ABS we had a very enjoyable conversation. We were both born in the same small village, Denby Dale, famous for its monster meat pies weighing over a ton (yes, a ton and containing anything up to 30,000 portions).

Finally, a most interesting article by Desmond on the subject of Loop Antennas appeared in the January 1997 Edition of *PW*. Desmond's article is certainly worth a read by anyone experiencing difficulty in installing long wires for h.f.

Amateur Radio is a fascinating and challenging hobby isn't it?



● "Before we start this QSO...let's just look at the state of your overdraft eh?"
Retired Bank Manager John Senior G7RXS enjoys Amateur Radio and balances his hobby activities with family life. (Photo courtesy of Linda Senior).

have one thing in common - they all begin with **I**! Time soon began to weigh heavily on my hands and something had to be done!

Rapid Results

Looking through *Practical Wireless* solved the problem when I saw an advertisement for the Rapid Results College, whose tuition I had used previously for banking examinations. Very keen now...I paid up front for the whole course and before the year was up **G7RXS** was born.

Once I'd got my licence a quick trip to the SMC shop - no longer there - at Alum Rock Road in Birmingham, and I was the proud owner of a brand new Black Box transceiver, power supply and a suitable antenna. On looking at the total cost of my purchases...my initial thought was why didn't I stick to my crystal sets? But my flexible plastic friend came to my rescue!

The rig was quickly installed in a spare bedroom but the antenna proved more difficult. Not being agile enough, or brave enough, to attempt climbing on the roof I gave the matter some serious thought over a few pints of Tetley's Yorkshire Bitter and

Valve & Vintage

Copies of
mint-condition
Eagle comics
on the counter
provide a clue
there's a 1950s
theme and
that Phil
Cadman
G4JCP is in
charge of the
wireless shop
this month.
After he's
stopped
reading about
Dan Dare's
latest
adventures!

Autumn greetings and welcome to the V&V wireless 'shop'. I've completely recovered from the dose of 'semiconductoritis' which beset me last time...it was probably due to the effect of the Summer heat on this somewhat ageing valve enthusiast!

I've had a follow-up letter from **Richard Youard** of North London. As you may remember, Richard wrote to me about a regenerative receiver he'd built many years ago which was entirely powered by a 4.5V battery. And now he's built a similar receiver - using a 6K7G - and it's working well.

At first Richard couldn't get the detector anywhere near oscillation, resulting in very poor performance. The problem was eventually solved by drastically increasing the coupling between the reaction winding and the grid winding (This helped because at very low anode voltages and currents, valves like the 6K7G have much reduced gain).

Using a medium wave coil for the grid winding and an adjacent long wave coil for the reaction winding - both on the same ferrite rod - the set's selectivity turned out to be excellent. No additional antenna was needed to receive local stations. Quite impressive Richard!

Following publication of my September column I received a letter from **Peter** of Saffron Walden, Essex. He tells me that some time ago he acquired a number of old *Practical Wireless* magazines, amongst which was an issue featuring the very same low-voltage 6K7 receiver that Richard had originally written to me about.

Peter very kindly enclosed photocopies of both the original article from July 1948, and a follow-up article from September 1948. Most interesting...thanks Peter!

Hopefully I'll be able to include the circuit in my next Valve and Vintage column. But Peter, what's your address? Please write again so I can at least reimburse your costs.

Inspirational Frank Rayer

The author of the original article turned out to be **F. G. (Frank) Rayer G3OGR**. A name I well remember appearing almost every month in one magazine or another in the late 1960s.

My correspondent Peter remarks that G3OGR was something of an inspiration in the mid 1960s when he began reading *PW*, a sentiment I share. He

suggests an article about the late G3OGR would be well received*, and I fully agree with him. Something for the Editor to think about, perhaps?

*An article is already in preparation for publication in *PW*'s 70th anniversary year. However, if you ever met G3OGR personally...we'd like to hear from you **Editor**.

Grundig Reporter

Looking through old copies of the *RSGB Bulletin* (now *RadCom*), I found an advertisement in the December 1952 issue for the **Grundig Reporter** tape recorder. You may recall that I acquired one of these machines a while back - see the June 2000 Valve and Vintage.

What surprised me was the advertised price: 75 Guineas. That's £78.75 to you youngsters. A Guinea was (and still is!) equal to 21 Shillings (£1.05). Before decimalisation, prices of up-market goods were often quoted in Guineas, and at 75 Gns. the Reporter **was definitely up-market!**

Also on the theme of portable audio recorders, I've been meaning to include a photograph of a portable

disc cutter for some time now. The one pictured, **Fig. 1**, belongs to **John Gomer** of Colchester, Essex.

John's type of recorder dates from the late 1940s and produced high quality recordings on 78r.p.m. discs. One company that produced portable disc recording systems was **Birmingham Sound Reproducers**, better known in later years as **BSR**.

The BSR company became world famous for their automatic record changers, a position all but unchallenged until the end of the 1970s. The company also produced the TD2



● Fig. 1: A portable disc cutting recording unit owned by John Gomer (see text).

tape deck, a popular choice with tape recorder manufacturers who didn't manufacture their own tape transports.

Back in the late 1940s, BSR sold the DR66 recording outfit consisting a DR.33M recorder, AR.15C amplifier and monitor loudspeaker, **Fig. 2**. The unit was designed to record on 5 to 13in blanks at 78r.p.m.

The recording blanks themselves were made of a compound of cellulose nitrate. This was a smoother and more uniform substance than the shellac then used in the manufacture of commercially pressed 78 r.p.m. discs.

The improvement in surface noise was quite noticeable, but cellulose nitrate wasn't as hard as shellac so the discs wore out faster and needed more care when playing. With a maximum cut of 96 grooves per inch, the DR.33M recorder could provide recording times of up to five minutes on a 12 inch disc.

Magnetic Recording

Actually, it's somewhat surprising, looking back, that magnetic tape recording was virtually unknown in

the UK at the period we're looking at. And yet in Germany, as far back as 1934 - tape recording was becoming a serious competitor to disc recording. Indeed,

machines was not lost on the engineers who examined them and very soon improved copies had been made both in the UK and in the USA.

and the tapes that fed them - generated large revenues which, in turn, allowed manufacturers to develop even better tapes. Only now is optical storage in the form of the writable compact disc and the MiniDisc seriously challenging the supremacy of magnetic tape as a recording medium.

Nowadays there are portable DAT and MiniDisc recorders available; with professional models costing around £1,000. For portable domestic use (astonishingly small) battery powered MiniDisc recorders are available for around £130.

Latest Innovation

The very latest innovation is the digital multi-track, **Fig. 3**. These machines - about the size of a packet of breakfast cereal - record to hard disk. Yes, the same thing as in your computer!

Depending on model, between eight and 16 tracks can be recorded separately, then mixed together and transferred onto compact disc using an attached (or internal) CD writer/re-writer.

Eight track models - the one pictured is a 16-track model - are available for under £1,000. It seems that after 50 years we're back to portable disc recorders! (Although they're nothing like what could be imagined back in the late 1940s).

In fact, recording to hard disk is becoming commonplace in recording studios too as 24 track digital hard disk recorders are now available at prices which are a fraction of their analogue counterparts. And a removable hard disk - of comparable audio capacity - is a good deal cheaper than a reel of two-inch tape!

While straying into the realm of audio recording might seem a little remote from vintage radio...I think it's appropriate. It's entirely

thanks to these old disc and tape recordings that we can still listen to programmes that were first broadcast over 75 years ago.

Ah, I see I've run out of tape! So cheerio for now, and I hope everyone has a very happy Christmas and New Year.

● Fig. 3: The shape of modern professional audio recording - a 16 track recorder the same size as packet of breakfast cereal! (See text).

Please send your comments and letters to me either via the PW offices, via E-mail to phil@valveandvintage.co.uk or direct to: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**. See you in 2002!

PW



● Fig. 2: The BSR type DR33C disc recorder and AR15C amplifier (see text).

throughout the Second World War, the Germans made extensive use of the tape recorder in their propaganda campaigns.

The foundations of the tape recording system we're all familiar with today were laid by the Danish engineer **Valdemar Poulsen**. It started in 1898 when he developed a working recorder using steel wire to record sound waves. Unfortunately, it was very crude and probably sounded awful!

If the name Poulsen sounds (no pun intended) familiar then you'd be right. He's the same Poulsen who built the Poulsen arc transmitter!

Up to that time, spark transmitters produced damped radio waves which were fine for Morse transmissions but useless for speech. They also spread across a wide bandwidth causing severe interference to each other and Poulsen's transmitter was a great improvement.

Poulsen himself seems, quite understandably, to have neglected sound recording in favour of his arc transmitter, and so it fell to others to develop the recorder. As well as steel wire, thin steel tape was also used for a time although this too was not wholly satisfactory. It wasn't until 1928, when paper tape coated with magnetisable iron particles was patented. It was only then that the actual development of magnetic tape recording began in earnest.

At the end of 1945 several German recorders - known as Magnetophon machines - were transported to the USA and to Britain. The potential of these

Also, the - now plastic based - tape the machines used was quickly developed into a strong and durable medium. This finally allowed the magnetic tape recorder to 'come of age'.

Improved Frequency Response

Throughout the 1960s, recording tape continued to improve and other compounds were introduced in an effort to extend the usable frequency response of the tape and to improve signal-to-noise ratios. Chromium dioxide and cobalt doped tapes were two other types that went into mass production.

Along with increased frequency response came the improved signal-to-noise ratios. Track widths could be reduced, and so the multi-track tape recorder was born. Domestic recorders had four tracks on quarter-inch tape while large studio machines could record as many as 24 tracks on two-inch tape.

Improvements in tape technology also led to the Philips Compact Cassette. This finally ousted domestic reel-to-reel tape recorders, and also assisted the introduction of home video recorders.

Consumer demand for both products -



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 Automatic Gain Control
 Direct Conversion Receiver
 Signal Strength Meter

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 Kenwood TH-F7E Dual-Band Transceiver by Richard Newton G0RSN
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Theory

Wanted or Unwanted? - You Choose by Joe Carr K4IPV

23 Jan



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KENWOOD TS-950S	HF BASE STATION	999
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KENWOOD TR-751E	2M MULTIMODE	295
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YUPITERU MVT7000	HANDHELD SCANNER	129

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KENWOOD VS2	VOICE BOARD	40
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WATSON W420	118-530MHz SWR/PWR METER	49
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YAESU FRV-8800	VHF CONVTOR FOR FRG-8800	59
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YAESU HF-726	21-28MHz MODULE FT-726R	99
YAESU FIF232	CVAN...COMPUTER INTERFACE (FT736R) 79	

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SB-4	Dual band Mobile 144/432 length 0.92 mtrs	£29.95
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Comet CFX-514N	50/144/430MHz	£47.95

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CF-505	50MHz low pass filter, 150W CW	£21.50
CF-50MR	50MHz low pass, 1kw PEP	£37.50

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£99

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- 4:1 Balun

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F/B Ratio	From 16 to 18dB
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Element length (max)	5 mtrs
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Weight	11kg
Max Diameter	50mm
Wind Load	(144 km/h) 255 N
Power	500 Watts

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ZK6-4	50MHz	4	2.75m	2.03	11.4	-28	4.30	£99.95
ZK6-5	50MHz	5	4.35m	2.64	12.1	-28	6.50	£129.00
ZK6-6	50MHz	6	6.40m	3.53	12.5	-35	7.70	£149.95
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ZK10-4CL	28MHz	4	5.00m	3.60	11.4	-28	10.20	£149.00
ZK10-5DX	28MHz	5	8.00m	4.80	12.7	-35	13.40	£215.00
12m Band								
ZK12-3	24MHz	3	3.50m	3.30	9.1	-25	6.90	£128.00
15m Band								
ZK15-2	21MHz	2	1.30m	3.36	6.3	-18	6.60	£112.00
ZK15-3	21MHz	3	4.15m	3.98	9.1	-25	10.90	£155.00
ZK15-4	21MHz	4	6.40m	4.67	11.4	-28	15.40	£185.00
17m Band								
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ZK17-3	18MHz	3	4.90m	4.85	9.1	-25	11.58	£159.95
20m Band								
ZK20-2	14MHz	2	1.70m	4.57	6.3	-18	10.00	£149.95
ZK20-3	14MHz	3	6.20m	5.60	9.1	-25	13.50	£199.95
ZK20-4	14MHz	4	9.40m	6.58	11.4	-28	21.00	£259.00
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- 2M + 20W 70cms

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

Although I included a few reports last time around I did tend to gloss over what really happened on the v.h.f. bands during August. So to make amends I'll bring you up to date as to what's occurred in the last few months. Before I kick off with your reports though I should clarify that the majority of DX contacts mentioned in this column are made using either Morse (c.w.) or s.s.b. telephony in the appropriate sub-bands for each mode. On v.h.f. and u.h.f. this equates to contacts being made in the bottom 200kHz or so of each band.

According to your reports Sporadic-E propagation occurred on the 50MHz band every day during August from somewhere in the UK. Much of it was the normal single-hop mode enabling contacts to be made within Europe with stations up to 2000km away.

During some openings however, there was an extension to the path when 2 or even 3-hop events took place. DX stations worked on the 50MHz band included CU8AO (Azores), EK6AD (Armenia), EX8MLT (Kyrgyzstan), HZ1MD (Saudi Arabia), JY9NX (Jordan) and 4Z5AO (Egypt). Stations in Africa were also contacted via multi-hop Sp-E and these

included ET3VSC (Ethiopia), TR0CA (Gabon), TT8JE (Chad), TY22DX and TY68F (Benin), 3V8SM (Tunisia), 5A1A (Libya) and 6W4RK (Senegal).

The contacts made were not particularly unusual but what was surprising was the number of multi-hop openings during August to North America. My records show that the 50MHz band was open to Canada, USA and the Caribbean area during nine continuous days between August 5-15. That was really

Africa and South America. Contacts via t.e.p. mode can only be made with stations over the geomagnetic equator, hence trans-equatorial.

African contacts included the stations of C98MZS (Mozambique), FR1GZ (Reunion Island), ZD7VC (St.Helena), ZD8EME (Ascension Island), ZS6WB (South Africa), Z21FO and Z22JE (Zimbabwe) and 7Q7RM (Malawi). Openings to South America were reported on 12 days during August with contacts being made with stations such as

THIS MONTH DAVID BUTLER G4ASR HAS YOUR VHF DX REPORTS AND DETAILS OF THE LEONIDS METEOR SHOWER.

amazing! In addition to operators in the regular call areas (W1, W2, W3, W4, W5, VE1, VE9, VO1) were stations such as FG5FR (Guadeloupe), NP2JV (St.Croix, Virgin Islands), KP4EIT and WP4U (Puerto Rico).

Trans-Equatorial propagation (t.e.p.) was reported on 23 days during August with numerous contacts being made into southern

CE3RR (Chile), CX1CCC and CX2AV (Uruguay), LU9AEA and LW1DZ (Argentina), PY3YY and ZZ3LYB (Brazil).

In contrast propagation on the 50MHz band during September was very much poorer. Propagation using Sp-E was reported on eight days during the month, these being rather brief and restricted to single-hop paths. There were only two t.e.p. openings reported, PY5CC (GG54) on September 1 at 1945UTC and C98RF (LH07) between 1935-2020UTC on September 22.

Philip G0ISW (IO84, Cumbria) reports that around 1815UTC on August 7 he heard the station of TT8JE (JK72). Signals were only peaking 51 and he was unable to break the pile-up of stronger stations in southern England.

That was bad enough but events on August 27 were even worse. From 1650UTC Philip heard a strong French station calling CQ on 50.120MHz. As he had worked most of the locator squares in France he decided to wait until the station identified where he was located.

As the signals began to fade some minutes later, he realised where FR1GZ really was. It was Reunion Island in the Indian Ocean! By then the station had been spotted on the DX Cluster and his chance of working a new country had gone.



● The antennas at the Czech club station OK1KIM

PROPOGATION CONDITIONS ON 144MHZ

Now it's time to look at propagation conditions on the 144MHz band. Last time around I mentioned the excellent tropo openings into central Europe (Austria, Czech Republic, Poland) and the Canary Islands, Africa, so I won't dwell on those now. What I didn't mention was that there were two Sp-E openings during August which reached the 144MHz band. An opening on August 4 between 1500-1515UTC enabled a few contacts to be made from central England with stations in Bulgaria, Italy and Sicily.

A more lengthy event occurred on August 27 between 1315-1445UTC. The 144MHz band was open for many stations throughout England, Wales and Northern Ireland. Propagation was mainly into southern Italy with stations such as I7FML (JN80), IK7UXU (JN81), IW7BWZ (JN90) and I8MPO (JN70) being worked within a few kHz of the s.s.b. calling frequency. Other DX spotted around this time included SV/IW0EBY (Greece) and Z31LA (Macedonia). This event was quite late in the Sp-E season, normally accepted to fade out in the UK by the end of July.

An even later opening was reported by stations in the Netherlands. **Eltje Veen PA3CEE** (JO33) reports making an s.s.b. contact with the station of UT0YW (Ukraine) at 0730UTC on September 2. Eltje mentions that he has been active on the 144MHz band since the early 1980s but this was the first time that he has noticed Sp-E propagation so late in the year.

SOLAR ACTIVITY

There has recently been an upsurge in solar geomagnetic activity with some people suggesting that there might be a double peak to the current Solar Cycle. If this is correct then there just might be a chance of some F2-propagation during the winter months. I wouldn't hold your breath though!

As a consequence of the increased solar activity a number of auroral openings occurred on the v.h.f. bands. These were reported on August 5, 17, 22, 25, 27 and September 15, 23, 25, 26 and 29. Stations in Scotland and Northern Ireland probably observed a few more events not listed here.

Very few of the back-scatter openings produced anything in the way of DX though. The best was probably the event on September 23 which commenced around 1500UTC and continued through to 2030UTC.

Apart from the stations of LC1LAT (Norway) and SM6FHZ (Sweden) very little else was reported on the 50MHz band. Activity on the 144MHz band was marginally better though with a number of DX operators in the UK making c.w. contacts with the stations of LA2AB (JO59), OZ1DD (JO45), OZ2TF (JO46),

SM0NKZ (JO99), SM1FMT (JO97) and SM5BSZ (JO89).

On occasions the ionisation originating from the incoming auroral particles precipitated a propagation mode termed Auroral-Es. Usually Au-Es is formed from the ionisation remaining after an auroral storm and its associated geomagnetic disturbance have subsided. It isn't always formed as it (probably) relies on suitable E-layer wind shears to concentrate the ions into a layer sufficiently dense to reflect v.h.f. signals. Unlike auroral back-scatter signals, which sound very distorted and 'hissy', those reflected from Au-Es layers exhibit very little distortion.

Recent Au-Es events were reported on the 50MHz band on August 5, 22, September 23 and 25. Most of the reports were of beacon stations located in areas with minimal Amateur Radio activity such as OX3SIX (Greenland), OY3SMC (Faroe Islands), TF3SIX (Iceland) and VE8BY (Canada). This latter beacon by the way is approximately 4000km from the UK. On August 5 the station of **Calum Macpherson GM0EWX** (IO6, Isle of Skye) reported working TF3GW (HP94) with 59 signals.

METEOR SCATTER

We are now less than two weeks away from the Leonids meteor shower predicted by nearly everyone to be a storm this year. This meteor shower is caused by the comet *Tempel-Tuttle* which swings around the Sun every 33.2 years and leaves behind a trail of dust and debris. When Earth passes through this stream of material the small bits burn up in the atmosphere creating ionisation from which v.h.f. signals can be scattered.

The Leonids run between November 14-21 and will peak on Sunday 18th. In Europe the shower rises above the horizon around 2300UTC and sets the next day around 1230UTC giving nearly 12 hours of activity.

The shower is expected to peak in the early morning hours of November 18 with rates that could exceed the 1999 event (2500 meteors per hour). Several prediction models are predicting two significant peaks.

One peak is expected over the USA with a level of activity of around 2000 meteors per hour. The second significant peak will be over Australia and the Far East. The level of activity for this event could be anywhere from 7000 to 15000 meteors per hour!

Another model does not anticipate distinct peaks such as those just described. Instead, the prediction here is a general increase in activity for the entire night of November 18.

Note however that while nearly everyone is predicting a storm there is more uncertainty as to exactly when and thus where the storm will occur. If you weren't on during the 1966 storm or for the 'fireball surprise' of 1998 then the years of 2001 and 2002 may be the chance

of a lifetime. If you were on then you don't need any encouragement from me!

SCATTER PROCEDURES

If you do decide to participate in what might be an exciting night of DX there are a few ground rules that need following:

Please follow the accepted IARU Region 1 meteor scatter procedures. These may be found in various v.h.f. handbooks but you'll probably find it more convenient to look for them on the Internet. One excellent article aimed at the 50MHz operator can be found on the **UK Six Metre Group** web site at <http://www.uksmg.org/meteor-scatter-operating.htm> Another useful source of similar information can be found at <http://www.scit.wlv.ac.uk/vhfc/iaru.r1.vhfm.4e/5B.html> These pages give details of timing, reporting system, reporting procedures and confirmation procedures.

So what equipment do you need to join in the fun? Most contacts will be made using c.w. or s.s.b. on the 50 or 144MHz bands.

Although you may be able to make contacts with low power it can be a bit frustrating. Medium power of 50-100W will give good results especially if coupled with a good antenna and low-loss feeder cable.

A horizontally mounted Yagi antenna of between 8 to 16-elements will be sufficient but it will be useful to be able to rotate it towards selected activity areas throughout Europe. No doubt many stations will be experimenting with WSJT (FSK441) which I described last month. This digital mode enables a low power station to produce some quite remarkable results.

One low power station who has been using WSJT effectively on the v.h.f. bands is **Philip G0ISW**. He runs 20W output into a Create Log Periodic antenna. A recent contact with the station of PA3GST (Netherlands) was completed very quickly. The QSO on 50.270MHz had been arranged via the DX Cluster.

Philip mentions that he is totally hooked on this mode as it is so easy to use. Utilising 30 second periods the programme does most things automatically and is very user friendly. He often monitors 50.270 or 144.370MHz and has now heard many stations via meteor scatter.

DEADLINES

That's it again for another month. Please let me know if you had any success during the Leonids meteor shower. Forward any news, views, comments or photographs to the address and by the date given at the top of the column. Thanks for your letters and good luck with the DX. See you again next month.

73, David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

I start this month with news of a very successful holiday operation to the Scottish Summer Isles and the Island of Tanera Mor EU-092. **Jim Martin MM0BQI** obtained the special call sign **GB5SI** to commemorate a 'Special Issue' of stamps released on the 1 August by the Summer Isles, which have a unique post boat to carry letters and parcels for the Royal Mail.

Jim goes on to say "I started planning the trip on my way home from last year's IOTA contest on Benbecula and I was prepared to set the heather well and truly alight! However, as luck would have it I broke my shoulder a week before this year's contest and had to rely on my family to build the antenna farm of a tri-bander, two verticals and a dipole!

"The antennas all did a great job, especially the beam whose rotator came loose during the first evenings Force 6 winds. I could not raise my arm high enough to attempt a repair so had to contend with the antenna pointing due north for the rest of the contest. After 18 hours of operation I had managed 1400 QSOs which was an improvement on last year.

"Outside of the contest I enjoyed running a few pile-ups on s.s.b. and managed a half hour QSO with Des ZK1DD in the South Cook Islands using RTTY on 14MHz. 2500 stations in 90 countries were worked in 8 days including Peru which was an all time new one for me and takes my DXCC total to 230".

If you were lucky enough to work Jim you can QSL via the bureau. For further details on the Summer Isles and their unique stamp



collection look at www.summer-isles.com and Jim also has a site at www.qsl.net/mm0bqi where you can access his logs and read reports on all his various radio activities.

PROPAGATION REPORT

Conditions on the bands have generally been very good this month, although at times it has been like we were at a sun spot minimum! However, most bands have had some degree of

long and short distance propagation. I was pleased to work **Roger ZL7/G3SXW** (Chatham Islands) on 7MHz c.w. one morning at 0724UTC for a new country before heading off to work!

A propagation report from **Don Mclean G3NOF**, Somerset says "The 14MHz band has been open on the short path to Asia between 1500 and 2000UTC and the long path to VK (Australia) and ZL (New Zealand) showing signs of life for an hour or so at 0600UTC.

"The 18MHz band was similar to 21MHz on occasions this month with the bands opening around 0700 and closing at 1900UTC. Asian stations were particularly strong in the morning with the North Americans heard from

lists many contacts operating various modes that included PSK31, c.w. and s.s.b. Using a QRP Plus with less than 3W output Roy worked TF3RJ (Iceland) 1410, EA6/DL2KE (Majorca) 1440, DK2VM (Germany) 1758, CT1DJG (Portugal) 2103, PY6WJ (Brazil) 2115 and YO2LOG (Romania) 2154UTC all with PSK31.

THE 18 & 21MHZ BANDS

On 18MHz Don G3NOF used his TS-950 and trapped dipole to establish s.s.b. contacts with J3/PA7FH (Grenada) 0735, KL7AC (Alaska) 0845, J8/PA0ZH (St. Vincent) 0850, FM5AD (Martinique) 2304 and W6C (U.S.A.) at 2324, a special event station operating on Route 66.

THIS TIME CARL GW0VSW ROUNDS UP YOUR REPORTS AND WELCOMES TWO NEW REPORTERS TO THE HF FOLD.

1200UTC until late evening at times. A few Pacific signals were heard with flutter over the North Pole between 0900 to 1100UTC. On 28MHz the band has been very good during the afternoons with strong signals heard, particularly from South America". Thanks for that Don!

YOUR REPORTS

First off this month is all c.w. man **Ted Trowell G2HKU** on the Isle of Sheppy, Kent who found time to operate between gardening and painting. Using a Ten-Tec Omni V and G5RV on 10MHz Ted worked JY9NX (Jordan), JM1TUY (Japan) and ZC4DW (UK Sovereign Bases on Cyprus) around 1900UTC.

A warm welcome now for new reporter **Mark Hampton M5MDH**, Hampshire, who uses a TS-2000 and 100W into dipoles, most of which are indoors. Mark was pleased to 'Bag a few nice ones' this month on 14MHz using s.s.b. Stations worked include HS0/IK4MRH (Thailand) 1926, VP8DAX (Falkland Islands) 2122 and CX4BT (Uruguay) at 2214UTC.

Mike Baker G3SUK, Stowmarket, Suffolk has been using an IC-746 and Carolina Windom antenna only 66ft long to work TF1IRA (Iceland) at 1749 followed by YB0AZ (Indonesia) at 1853 and EO1OZ (Ukraine), UE3FFF (European Russia) and 9A1XX (Croatia) around 2215UTC. All contacts were made using s.s.b.

Also on 14MHz was **Roy Walker G0TAK**, Cleveleys nr.Blackpool whose large logbook

The conditions on 21MHz were very good when Mark M5MDH operated s.s.b. during a late afternoon/evening session. Between 1530 and 2115 Mark worked JA6DPL (Japan), ZX3B (Brazil), EM1HO (Antarctica), KP4DKE (Puerto Rico) and RI9K (Asiatic Russia).

Welcome now to another new reporter **Paul Quinn M10CRR**, Ballyvoy, Northern Ireland, who was also active on 21MHz working YB0DNK (Indonesia) 1423, 9M2KE (Malaysia) 1550 and VQ9IO (Chagos) at 1605UTC.

THE 28MHZ BAND

Not far away from Paul M10CRR is **Peter Lowrie M15JYK**, Newtonabbey who spent a good deal of time on 28MHz this month. Peter's s.s.b. log lists contacts with 4Z5LA (Israel), 4L0G (Georgia), 5B4KH (Cyprus), RZ9SR (Asiatic Russia), JY9NX (Jordan), 5A1A (Libya) and OD5IU (Lebanon). All contacts were made between 1120 and 1405UTC.

SIGNING OFF

Well, space has run out once again and it's time to sign off. Thanks to all of you for your support of the column, it's always good to receive your 'phone calls, letters and E-mails. That long range stuff called DX is out there waiting to be worked!

Your reports are certainly a good incentive to new and potential operators. Have a good month.

73, Carl GW0VSW

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SD-52	80/40/20/15/10m	2 Trap	105ft	£113.95
SD-54	80/40/20/15/10m	4 Trap	97ft	£171.95
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SD-610	160/80/40/20/15/10m	10 Trap	148ft	£359.95
SD-162	160/80m	2 Trap	208ft	£135.95
SDW-22/12-17W	12/17m	2 Trap	23ft	£87.45
SDW-22/17-30W	17/30m	2 Trap	41ft	£87.45
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For those of you who are contemplating using DigiPan on PSK31 and are not quite sure of how to get going there's no need to worry any longer. **Jim AD1C** and **Tom W1TO** have assembled the DigiPan manual into RTF format, easily handled by MS Word and most other word processors. The whole thing can be downloaded from www.ad1c.com/HamRadio/rtty.htm

Thanks to Jim and Tom for making it easier for newcomers to get up and running in this great new mode.

UI-VIEW & APRS

I first wrote about APRS many years ago in *PW*, when it first appeared in the USA. This was long before it became known in the UK.

Now APRS is huge both in the USA and Canada. Indeed, most of the *VARPA* Newsletter is now devoted to APRS and although this program has not caught on in the UK, the UK relative - UI-View, written by **Roger Barker G4IDE** has.

I have steered clear of writing too much about UI-View here, mainly because it has been more than adequately covered in stand-alone articles. **George G3IPG**, living in

ROGER G3LDI REPORTS ON UI-VIEW & APRS, USEFUL SITES TO TRY AND HAS THE RESULTS OF HIS PACKET SURVEY.

Pulham St. Mary, just down the road from me, produced the list shown in **Fig. 1**.

The list was taken from UI-View and shows stations adjacent to G3IPG. Anybody interested in using UI-View would do well to visit a site run by **Andy Pritchard G7OCW**.

Andy was thinking of getting out of packet when he tried UI-View and now he runs a Web site devoted to it. Have a look at <http://www.welcome.to/uiview> See **Fig. 2** for an idea of what you will find on the site.

ATTACHMENTS

Every so often you'll receive an E-mail with an intriguing attachment. It's usually intriguing because you can't open it. The thing to do is note the files' extension and look it up at:

www.dmmcabe.uklinux.net/update2/fileextensions.html This should tell you what type of program to use to open it... then be prepared to be disappointed.

CIRCUITS GALORE

Bill NA2M forwarded a note about a website worth studying. The schematics of dozens and dozens of radios of all brands can be found at: http://krasnodar.online.ru/hamradio/sch_eng.html This is a remarkable collection and a useful site to bookmark.

HAND-HOLDING FOR BEGINNERS

Hardened internet aficionados may scoff at the kind of simple tutorials on how to perform connection, networking and housekeeping tasks etc., in Windows that features in Virtual Doctor. But everyone has a parent, friend, child or significant other person who is scared of 'meddling' with his or her computer and will be reassured by this site that maintaining your own machine is pretty easy.

As well as the usual text and image tutorials Virtual Doctor includes a large collection of (almost) idiot-proof video tutorials that begin playing as soon as you click the link. Take a look at: www.virtualdr.com **Fig. 3**.

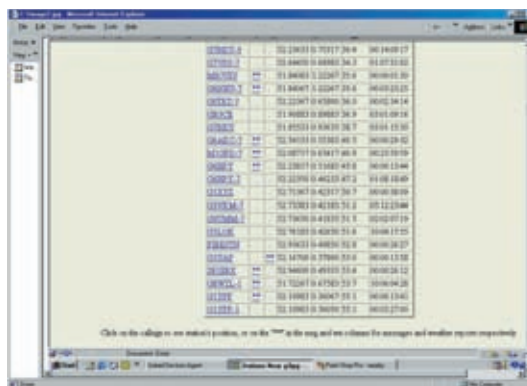


Fig. 1.



Fig. 2.



Fig. 3.

SEPTEMBER'S SURVEY!

The response to the Packet Survey that I ran in September's issue was disappointing. The results were much as expected and confirmed my suspicions. Here's a round-up of the results:

Total number of replies via the packet network = 4, Total number of replies via E-mail = 10. Interestingly enough several of the E-mail replies were solicited. A couple of friends in two radio clubs south of Norwich asked members to reply, so I would guess this accounted for 4-5 replies that I wouldn't have otherwise received. Allowing for this, there is not much difference between the two modes.

In a way, I was relieved that I was not swamped with hundreds of replies, as it would have taken ages to sort and collate the information. Another comment I received from two sources was that the sender was not sure of my address. This I find strange, as *PW* always prints my packet address and my E-mail address in two places. One is at the top of my column and the other is at the front of the magazine in a list of contributors under author info. However, after double-checking, I see that my postal address is not given, whereas other authors do have their postal addresses published. *Sorry Roger - an oversight on our part - all corrected now!* **Editor.**

There are several things that emerged from the survey. Obviously you also enclosed some of your comments as well as the replies to the questions.

The general consensus of opinion is that while the Internet is obviously faster with E-mails, there is still a place for the packet network, in spite of a noticeable decline. Obviously an ad-hoc network is limited in its goals and with limited funding; there is not much we can do immediately to compete with E-mails.

Despite the problems, it is quite encouraging to hear that we should maintain

the packet network. In fact the replies to question 15 were very emphatic that we should **not** close it down.

I was surprised to find that two of those who were not on packet now showed a willingness to give it another try, providing there were some improvements! The one reply from an old friend in the NE of Scotland bemoaned the fact that there was no packet network there at all. Despite this, he took the time to answer all the questions and it looks like there is a lot of work to be done up there to improve the network. However, the local terrain is an obstacle that must be very difficult to overcome.

Despite the speed of the Internet it was very pleasing to see how many of you were using both systems. I use both, keeping my Amateur traffic to packet and my quasi-business and non-Amateur traffic on the Internet.

One person mentioned that it would be a good idea to have an E-mail to packet server. Using Telnet this can be done and is in fact being done, not with mail but with bulletins imported from Newsgroups. Most of this is totally unnecessary, producing lots of garbage on a very limited system.

For example, the latest spate of bulletins and JPGs from Japan are received using Telnet. If these were intended for the packet network they would have been put there in the first place!

Leave Newsgroups on the Internet. Still, it's good exercise for the reject file! Some of this imported garbage is from non-Amateurs as the originator. This is not even legal!

The most discouraging outcome was the fact that when asked if the Satgate system was used, there wasn't one positive reply. In fact several did not even know what it was or how to use it!

One reply said that his correspondent in VK was not on packet so E-mail was the only way to exchange mail. To some extent the same problem exists in VK, but some progress is being made to rectify this situation. It's rather

worrying when nine of the replies were not concerned at all if the Satgate finished. If this were representative, then this would explain the lack of mail, most of it being sent via E-mail.

Several of you commented that packet and E-mail couldn't compete. I think this is obvious, but the Sysops are trying to maintain an Amateur Radio based system for those that wish to send mail using Amateur Radio, rather than the telephone. If we extrapolate on this, why buy an h.f. rig, tower and antennas, when you can just pick up the 'hone and talk to your friends in VK, or wherever! The satisfaction comes (or should do!) from using a pure radio-based system.

Having said that, with all the Telnet so-called forwarding going on now, h.f. and even v.h.f./u.h.f. forwarding will cease and we will just become part of the Internet by stealth.

The number of you supporting the network financially, either directly or indirectly, encouraged me. Several also said they would be prepared to become more involved, but with an improved network. I think the improvements will have to come, as it's no longer 'cool' to be on packet.

If only we had a network like the one in Germany, or Slovenia, with genuine high-speed backbone and high-speed user access, then I think the users would return. The content must also be improved. However, some of the users could use some more knowledge of the BBS system.

I have never seen anybody use the Teletext server, Library, Files section, or most of the other servers on the BBS. Most users these days don't even access the BBS themselves; they leave it to the auto-system to download mail and headers. That's the sum total of activity. I don't think the Conference mode has ever been used on my BBS.

Space has caught up with me again, so until next month keep 'keyboarding'!

Roger G3LDT

Q1 asked if you wished to maintain the present packet system.

Two said no. Seven said yes. Three wanted it improved. One was not bothered. One said there was no packet system in the NE of GM anyway!

Q2 asked if you were prepared to send mail via packet in spite of it being slower than E-mail.

Nine said yes. Three said no. One said it depended on the importance of the mail. One said none of his friends were on packet now.

Q3 asked if you supported your BBS financially.

Eight said yes. Five said no. One said he would but he did not have one in NE GM.

Q4 asked if you belonged to a data group. Two said yes. Eleven said no. The NE GM does not have one!

Q5 asked if you would be prepared to get more involved.

An even split this time. Four said no. Four said yes. Four said possibly. One said he was too old (You're **never** too old!)

Q6 asked if you would be concerned if the Satgate mail delivery finished.

Nine said no. Two said yes. Two said they were unsure.

Q7 asked if you would care if the BBS system finished.

Seven said yes. Five said no. Two were not bothered.

Q8 asked if you send regular E-mails.

Nine said yes. Five said no.

Q9 asked if you use the Satgate regularly.

All replies answered no to this question.

Q10 asked if you have compared E-mail and Packet.

Eight said no. Five said yes.

Q11 asked if you have deserted packet for the Internet.

Five said yes. Seven said no. Two used both.

Q12 asked if you would be prepared to try packet again.

Two said no. Three said yes. Nine use it anyway.

Q13 asked how often you use packet.

Seven use it daily. Three occasionally. Four never.

Q14 asked if you were bothered about the route.

All replies answered no to this question.

Q15 asked if we should close down packet and rely solely on the Internet.

Seven said no. Two said yes. Four were neutral.

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In the last In Vision I gave a broad introduction to the Amateur Television scene on the 10GHz band. There were nine 3cm ATV repeaters in service around the country with more in the planning stage. So this time I will 'zoom in' to take a closer look at the typical transmit and receive techniques needed at around 10GHz.

At the heart of many 10GHz ATV repeaters lies a Dielectric Resonator Oscillator (DRO), more commonly referred to as a 'puck'. This is a free-running oscillator that has its frequency set by a lump of dielectric material - a ceramic puck about the same shape and size as an aspirin tablet. It's the same sort of oscillator that is used in satellite TV low noise blocks.

The puck can be carefully modified to trim its frequency, if necessary. Vision and sound frequency modulation is then applied to the DRO - often with the - Gunnmod II modulator kit designed by **Bob Platts G8OZP**. A DRO will produce a few milliwatts of r.f., enough to drive a microwave amplifier to achieve around 1W of final output.

Whatever the r.f. output that's eventually achieved, this has to reach the antenna somehow, and at 10GHz the losses of traditional coaxial feeder become significant. Microwave power has to be 'launched' into the waveguide feeder and propagates within the cavity - how it does this is highly mathematical and, as they say, 'beyond the scope of this article'!

You may have heard of the TE01 mode. This is Transverse Electric 01; TM is Transverse Magnetic - two of several microwave modes, which you may wish to read more about, perhaps in the *RSGB Microwave Handbook*.



Antennas for 10GHz ATV are often made from further lengths of waveguide. When slots are cut into the sides, according to strict dimensions, omni-directional radiation pattern will occur. The horn or dish will produce a more directional pattern.

Every broadcast satellite TV installation is potentially a 10GHz ATV receiver! A Low Noise Block (LNB) converts the c. 11GHz incoming r.f.

Ken says "We actually switched on for installation test at 1845hrs on Tuesday 3 July in beacon mode only. We completed the final line up of the Duplexer /Filter, which has proved successful. The only item to be finalised was the logic".

Ken continues: "The ATV repeater GB3TB is sited on Great Hill, Barton, Torquay. This is about 2km from the hospital and co-sited with

MORE ATV NEWS PRESENTED BY OUR VISIONARY EXPERT GRAHAM HANKINS G8EMX.

down to c. 1.2GHz, so for ATV the 9.7GHz DRO within the LNB has to be retuned to around 9.1GHz. A (typically) 10.315GHz incoming ATV frequency is shifted down to 1.215GHz for input to a satellite receiver which, after perhaps some modifications to increase the video gain, will form a 10GHz ATV receive setup.

CHALLENGING TRANSMITTER

Measuring the frequency and power of 10GHz transmitters used to be a challenge in itself. **Alan G3TQA**, who is developing **GB3YX**, a new 10GHz ATV repeater application to be sited near Bradford, tells how the Yorkshire ATV Group tackle this:

"We have access to microwave test equipment so measuring power and frequency is easy! The traditional amateur method is to use a cavity wavemeter. This is usually home-made and consists of a lump of waveguide with a hole in one wall to couple some power into a copper tube cavity, which is tuned by a micrometer. You twiddle the micrometer looking for a dip in the output power, then twiddle it some more to find another dip. The difference between the two readings is a half wavelength - then you get a calculator out"!

Alan adds: "That's the traditional method. Most 10GHz ATV users just twiddle the transmitter frequency until they see something on their receiver!" For more information see the Yorkshire ATV Group's web site at <http://www.yorkshireatv.org.uk>

Of course, some of the 10GHz and above enthusiasts regard the 1.3GHz ATV band as virtually d.c.! The 24cm band remains the most popular ATV band and new repeaters are frequently coming into service.

Torbay is a recent addition to the network. The Torbay Amateur Television Group has switched on **GB3TB** says Group Secretary **Ken Harper G0EKH**.

GB3TR the 2m voice repeater. It is within 300 metres of a professional communications tower and 180m a.s.l. It overlooks the bay with clear takeoff to Portland, Dartmoor and Channel Islands".

Thanks for that update Ken.

QUARTERLY MAGAZINE

The British Amateur TV Club's quarterly magazine was delivered through BATC members' doors a few weeks ago. Last year, *CQ-TV* won the *Practical Wireless* **Bert Newman G2FIX** 'Bert's Bell' award for best magazine from a national Club and that award had been sitting proudly on the desk of **Ian Pawson**, the BATC's editor.

Ian has now handed the Bell back to PW for the current worthy winner but *CQ-TV* continues to improve - now with increased colour and smoother paper for the pages and cover, which improves the reproduction of pictures. The Club has always regarded the quality of its magazine as a vitally important service to its nearly 2000 members world-wide and previous issues are available on CD-ROM to anyone considering joining or any member who has lost (perish the very thought hi!) any previous issue.

If you visit the BATC's web site at <http://www.batc.org.uk> don't forget to enter the Forum. On the website you will find the BATCs on-line chat room, where members and visitors have posted questions or comments about ATV or the BATC.

Beginners questions are always welcome here. The Club is full of ATV experts, enthusiasts and several who are professionally involved in TV broadcasting and most willing to help or advise any newcomers.

Well, that's the end of another year so I wish everyone a very Merry Christmas and Happy New Year, hope to see you 'In Vision' in 2002!

Graham G8EMX

TUNE-IN

TOM WALTERS

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Writing this at the beginning of October, with open hostilities against Afghanistan and the Taliban regime likely to start any day, it's impossible to know how things will stand when you read this. But in the past weeks, since the attacks on America, international radio has sprung forward into a much higher gear than usual.

At the time of going to press several air strikes have been made by Allied forces to Afghanistan training camps and bases in the continuing war against terrorism. Editor

Initially, all stations stepped up their news

pepped up its Dari and Pashto services.

Speakers of Dari and Pashto were served also by stations in neighbouring countries - **Radio Pakistan, The Voice of the Islamic Republic of Iran, Tajik Radio** and **Radio Tashkent**, as well as by **All India Radio, Radio Cairo, The Voice of Russia** and **China Radio International**. Saudi Arabia went up to 24 hours a day. The station usually close at 2300UTC. They may be using 9.555, 9.870, 11.820, and 11.935MHz after this time.

As for radio from Afghanistan itself, **The Voice of Shariah** is controlled by the Taliban and in addition to an extensive internal service operates an external service in Dari and

They get some 3000 letters a year from over 50 countries!

Mongolia radio have just announced that their programmes are available online at www.mongol.net/vom/index.htm Their English short wave schedule (mid-2001, new one not available at the moment) was on air at: 1100-1130 on 12.085; 1500-1530 on 12.015, 12.085 and at 2000-2030 on 12.085.

They also broadcast in Mongolian, Chinese, Russian and Japanese. They have won prizes for their programmes from the Asia-Pacific Broadcasting Union and NHK Japan. They publish the most endearing details on their web site about the staff of the English section. Such as, there are four altogether, and two of those are on leave!

TOM HAS THE LATEST BROADCAST BAND NEWS, INCLUDING HOW BROADCASTS HAVE BEEN AFFECTED BY TERROISM.

coverage through existing programmes, with some additions. But very rapidly, with a protracted haul in view, longer-term arrangements were set up.

The **BBC World Service** increased their medium wave coverage to the region near Afghanistan, using the new frequency of 1314kHz from Abu Dhabi, in the United Arab Emirates, in addition to the familiar 1413kHz from Oman. The BBC also expanded short wave in the Pashto, Arabic, Urdu and Persian languages. As for North America, while Internet and feeds to rebroadcasters were stepped up, **there was no return to short wave!**

However, short wave showed its immense value across the whole Middle East/South Asia region, as the 'war against terrorism' got under way. The station **NPR Worldwide** went straight into continuous programming at the time of the attacks on North America and maintained rolling coverage for many days afterwards.

The **Voice of America** (VOA) patched together a multi-lingual continuous output and increased its news coverage in Dari and Pashto (the languages of Afghanistan) and in Persian. The VOA, now acting editorially independently of the US government, announced that it would broadcast an exclusive interview with Taliban leader Mullah Omar. "No you don't" said the Department of State. But VOA showed its independence, as well as a totally new brand of impartiality, by going ahead and putting out the interview four days later.

Radio France International added time to its Persian broadcasts. **Deutsche Welle** (DW)

Pashto, as well as in Urdu, Uzbek, Turkmen Arabic and Russian.

There is also, at the time of writing, a quarter-hour English transmission at 1515-1530UTC, although the transmissions are irregular and unstable. The advertised frequency is 7.200MHz, but actual transmission wanders around a bit, usually centring on 7.085MHz. The Northern Alliance does not run any radio stations.

AUDIO SERVICES APLENTY

There are plenty of audio services on the Internet. However, in a country like Afghanistan that's of little use; satellite is ridiculously expensive for most people; and rebroadcasting of other countries radio is unknown. **Thank goodness for short wave!**

Afghanistan is a remote country, with an inhospitable terrain that makes life very tough. A bit like Mongolia, really.

Through its external radio service, Mongolia makes itself known to the world.

EUROPEAN SCENE

Back on the European scene, the news from Deutsche Welle is that a new boss has been appointed. **Erik Bettermann** joins at a time when DW is asked to project a better image of Germany overseas, but keeps getting its budget reduced.

Money has to be found now to fund an external German-language TV station, while in radio the station will press ahead with equipping itself with digital equipment. Modernisation of radio will also be part of the move of DW from Cologne to Bonn, probably in the middle of next year.

The current English for Europe schedule from DW is: 0600-1900 on 6.140 and at 2000-2045 on 7.130MHz. A bit odd and a bit sparse, but DW is now trying to develop audiences in Asia and Africa, they are also putting much emphasis on the Internet. The web site can be found at: www.dwelle.de

WorldSpace has for some time been rumoured to be in financial difficulties. As with all new technology, price is always the big problem. WorldSpace receivers started off at about £400 (\$550 dollars). A while later, the price came down with a bump to £100 (\$140) in the UK.

Now WorldSpace are having the receiver made in India for as little as £70 (\$100). The digital side of the receivers is dedicated to picking up the WorldSpace proprietary digital signals, but they also can receive conventional f.m., a.m., m.w. and s.w.

Finally, a note from Nigeria. The elusive **Voice of Nigeria** has been busy repairing its old analogue studios and installing a digital studio. Some rather ancient transmitters have been repaired, computers are going in and there has been much staff training taking place. So now perhaps before long we can look forward to a regular and reliable service!

Bye for now, Tom



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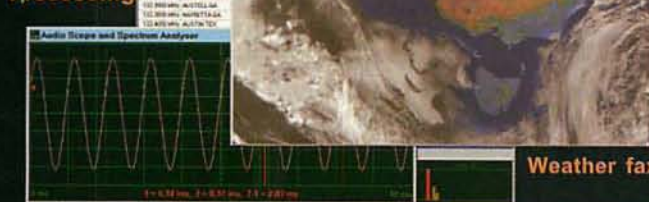
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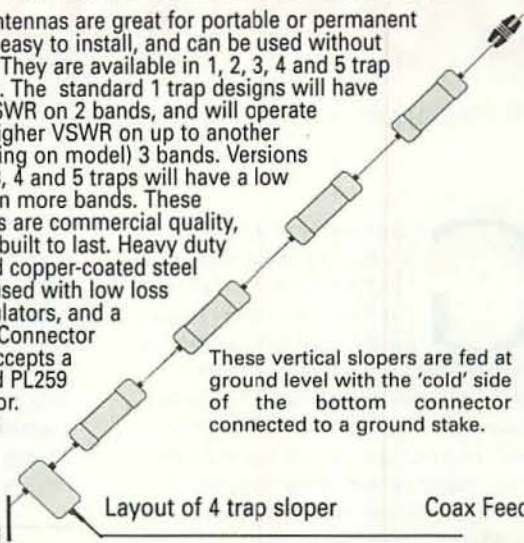
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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

G'Day once again from 'Down Under'. It's late at night in late October as I write, and I've been racking my brains for ages in a futile search for something light to open this quarter's column with. It's a tough task. The world's economy is under a cloud following the tumultuous events of September 11, with several major airlines pondering their trimmer futures, the tourism industry wondering what the heck has hit, major sporting fixtures cancelled and the world as a whole at a heightened state of alert.

It's not just an economic cloud we find ourselves under, is it? It is almost as though someone's made us question the fundamental security which we took for granted only a few weeks ago. Should we, in the so-called free world, feel safe to simply walk the streets any more?

It's been a shocking and tragic few months since we last met, and I fear the world has changed for the worse. There are times when one who lives way down here might be grateful for Australia's relative isolation from the rest of the world and this is one of those times.

However, do not think we are not just as scared and concerned as those in the thick of it. We are absolutely on the side of justice and right. As one of my US correspondents wrote in his report to Antipodean readers, "Make no mistake, America will prevail". Let's hope that common sense and common decency, and peace, will prevail as well!

You know, we who have radio as our hobby are in the box seat at a time like this. We can roam the bands at will, tuning into whatever we choose.

I seem to recall your legislation is a little different to ours, as even at a time like this we can legally listen to literally anything and anybody. **All** of us can even **talk** to people in places you wouldn't really want to visit right now.

You know, if there's anything bright to come from tragedy, it has to be the ever-surprising inner strength and resilience of people from all walks of life. There were many heroes that day and the following ones in the USA and many of them were radio operators just like you and me.

HATS OFF TO THE YANKS...

If anyone ever questions the worth or value of Amateur Radio, perhaps you might quietly remind them of the efforts of ordinary people over the course of many days in the USA. Maybe, if you're just a little bit the 'Doubting Thomas' yourself, ask yourself how you would respond to a huge human disaster in your own community.

Think about it for a moment. Australia

of smashed cars, at donning breathing apparatus and funny plastic suits to soak up or hose nasty things away, even at rescuing cats from trees (no, we haven't, yet!), we even get to put fires out! But do you reckon these burly fellows in fire-retardant clothes can use a radio? Nope, I give up on them!

In general, their radio skills aren't worth a twopenny. So, how about the local police or ambulance officers? It's pretty much the

CHRIS EDMONDSON SHARES HIS THOUGHTS ON EVENTS IN THE USA AND SAYS

REMEMBER RADIO PLAYS A VITAL ROLE!

has an emergency Amateur Radio network, as do most western countries and it gets lots of practice - car rallies, bicycle races, even an annual canoe race - but does this really qualify one to assist with or even control an emergency service network in trying times? Are we really up to the task?

Heck yes! Let me own up to another side of my life which many of my radio friends think just a little strange. I am a trained rescue officer with the Queensland Fire and Rescue Authority, on permanent 24-hour call.

We're not a full-time brigade because our isolated little community numbers only 6000. But, just like the career fire fighters in larger towns, we specialise in structure fires, vehicle smash rescue, and so on. We get a **lot** of work. In this state we have two totally different types of brigade - the bushfire volunteers who look after bush fires and the more traditional professional 'firies', as we're known.

For some entirely unknown reason, people generally take a while to accept that the Publisher of Australia's hobby radio and electronics magazine jumps when the pager goes off! I've been turned out twice so far today and we're in the midst of all sorts of panicky calls about white powder which may or may not contain the Anthrax bacterium.

Fire fighters are good at coping with hazardous materials, at cutting people out

same story, just with a different skill set thrown in.

Sure, the emergency services have great equipment in the main and we firies are no different, with a lovely network of repeaters high up here on the mountain and down on the Gold Coast, about 25km away. There's even a most impressive emergency tender which doubles as a mobile communications centre, with computers, satellite 'phones and FAXes, portable repeaters and all.

Yet in the right hands, the radio gear in my own private car could quite possibly put the whole thing to shame. Not only that, but I would hope its driver might also have a better idea about passing lots of third party messages and keeping an overall view of things.

Okay, let's think a bit more about this and get it firmly in perspective. This little community has about 20 or so active local Amateurs. I know that something like half of them have pretty complete stations set up and virtually everyone up here has either banks of batteries or a modest generator to cope with the nastiest of summer storms, when power outages are the norm rather than the exception.

If something really dire happened up here, could we cope? **Yes, we could** and so could **you**. We Radio Amateurs have a different set of skills, but they're just as important as those of a fire or 'ambo'.

How would your local fireman cope with

a DXpedition pile-up? What about a summer 3.5MHz scramble or a local contest?

How would even the most highly-trained base station operators cope in extreme circumstances? Probably not very well at all.

Base stations operators are trained to deal with comparatively low traffic loads, with pretty predictable messages and to do so in such a way that there is complete unambiguity in everything they do. They don't learn to fight QRM and QRN, to work in less than optimal conditions, or with anything less than solid armchair f.m. copy.

It's generally hardly conducive to learning how to react and cope quickly and efficiently to major emergencies! The whole thing can fall apart in a hurry, right when the cool, soothing voice from base, whatever it may be, is most needed.

What's more, all that rigid protocol, preparation and training simply falls into a million pieces when one link in the communications chain fails. It might be a faulty length of coaxial cable or a sticky microphone foot switch, but in the field it could just as easily be the mute cranked up a bit too high or a poor channel selection. These people are trained to talk, not to understand how the whole show screws together!

Could the average Amateur monitor the performance of his station and overcome limitations by applying a little nous? I don't need to answer that one, surely. At least I hope not!

COMMS SPECIALISTS

For years, our friends in the USA have recognised the high value of communications specialists like their 'ham' radio operators (how I loathe that term!). In some areas, at the first whiff of trouble the Amateurs rush in to augment emergency communications, while in others they actually take over altogether.

There are Police forces around the globe whose high-tech and very expensive central communications stations have an inoffensive and inexpensive Amateur transceiver tucked away in a corner. Just in case, you understand.

Have you ever wondered why the US Amateur is so respected in the places that count? Have you worked it out yet? Ask the average American what a ham is, and

they'll more than likely get it right the second time (the meat usually comes first!).

Okay, so we don't have the high-tech encrypted digital transmission equipment. We may not even have so many of the dedicated links, but then again, we don't have the megabuck budgets either. Does it matter?

South-East Queensland, where I live, boasts a quite remarkable network of



● Chris VK3CE is Editor of Radiomag & Radio & Communications Magazine - two magazines in one!

interlinked packet radio digipeaters and voice repeaters and there's all manner of portable gear able to be chucked into a car boot and operational on the air in minutes if needed. Is your area any different?

Do not underestimate **your** worth to the community when the chips are down, even if you've not long held a licence or don't have crate loads of equipment. Keep your station at the ready, however, modest, in the event that one day you might be the one to make a real difference.

If you don't know who runs your local area communications disaster effort, make it your business to find out. **Do it today!**

Perhaps your effort may save lives, but you can feel satisfied in the knowledge that you have helped make the future of Amateur Radio a little more secure.

FULL CIRCLE

It's funny how things can turn full circle. I was on a real high last time we met after my whirlwind trip around the globe.

The only down side to it was its ridiculous brevity. Four days for the USA, three days to do the entire British Isles, a week for the whole of Europe! Complete lunacy! All it managed to do was fill me with an intense desire to return, and soon, to build upon the trail of wreckage I left in my high-speed wake.

That was three months ago. Six months back, having started an all-new radio magazine for Australia, I was in an anxious and sombre mood. Were it to fail I'd be penniless and most likely, homeless to boot.

For the previous 14 years I had produced a monthly radio magazine for Australia's largest magazine publishing house, until its owner decided quite suddenly that his company would no longer serve that market.

The problem, you see, which eventually led to my starting anew, was that while I wanted to buy my former baby from my former boss, I quite simply couldn't afford the pretty steep asking price. I was far from happy to see it pass into the hands of another publishing house and it had enough money to keep paying the printer until I gave up, broke, or the cows came home, whichever happened first.

So *Radiomag* hit the bookshelves in hot competition with *Radio and Communications* early this year. We crossed our fingers, worked harder than ever before, and prayed. And won!

I am thrilled to announce that little David has triumphed and has once again vanquished Goliath. Last month we purchased *Radio and Communications* outright, and now produce *Radiomag + R&C*. Where to from here? Well, it's one step at a time, but one thing is for sure: we're here to stay!

As always, I'd welcome your visit to the web site, an E-mail with comments or questions, or the occasional picture postcard to remind me of the bits I missed while there. Also **do** think about how you can use Amateur Radio to help your local community, be it small or large.

You never know, like me, you may find the concept of being a helping hand a valuable concept and a most rewarding experience! I have to go now. Today's third call, at 2.45am, is for a rubbish bin on fire - it might be yours!

VY 73 Chris

Trader's Table

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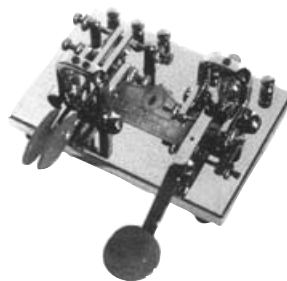
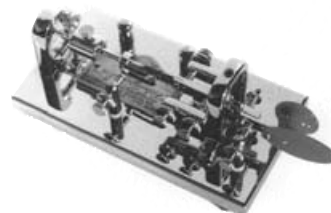
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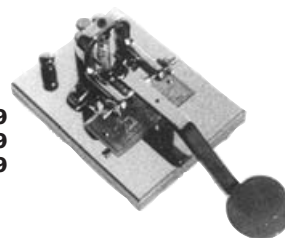
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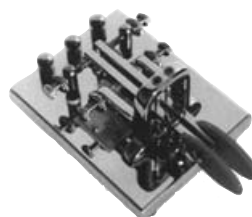
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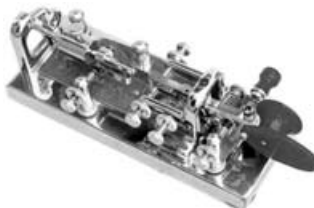
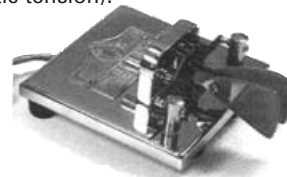
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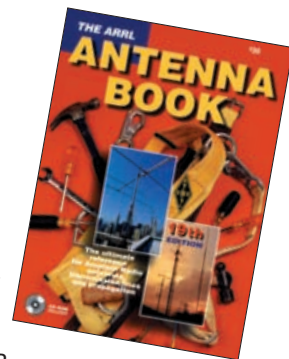
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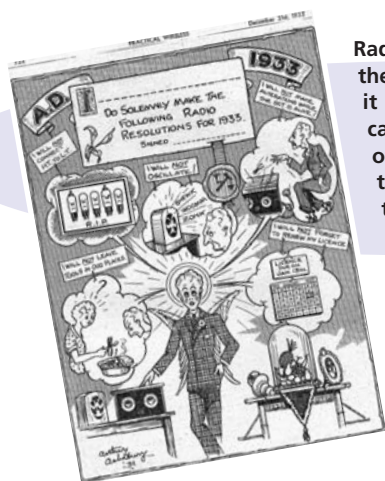
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topical**talk**

With Christmas just around the corner and *Practical Wireless* now in its 70th year we thought it would be fun to get nostalgic....but before we do we'd like to remind you that in the coming 12 months we'll be featuring memories of days gone by and as well as our own **we need yours!** So, if you have a story to tell or something you'd like to share send it in to the editorial offices - perhaps you bought Issue 1 or have a favourite project that you built and used on air? - whatever your memory of days gone by let us know!



Radio Resolutions - this amusing cartoon featured in the 31 December 1932 edition of *Practical Wireless* - it was published weekly in those days. The cartoonist of the time obviously had a good sense of humour and we think you'll agree he captures the theme well. Perhaps this gives you food for thought on what your radio resolutions for 2002 should be, remember though... whatever they are make sure you stick to them!

The 24th of September 1932 saw the launch of a new magazine aimed at the ever-growing circle of wireless enthusiasts especially those interested in home construction. Over the last 70 years *PW* has strived to produce, informative, interesting and topical magazines, ever evolving in keeping with the hobby's growth. So here's to the future of Britain's Only Independent Amateur Radio Magazine - long may it serve Radio Amateurs the world over.



Did you know?

In the 70 years of publication there appears to have been a total of six Editors to date. But can you name them? It appears that after Fred Camm's death in 1959 the Editor became very elusive until latter years, so if you can name them let us know!

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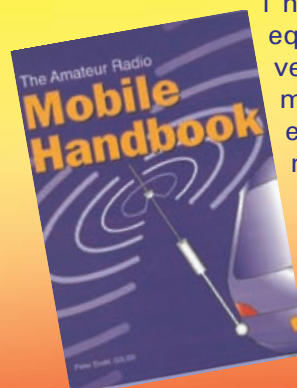
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"Brick-Wall" Selectivity

Today's Premier class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics saves you precious seconds in a DX or contest pile-up. Yaesu HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. IDBT: Interlocked Digital Bandwidth Tracking System

The IDBT feature greatly simplifies operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system monitors the settings of the SHIFT and WIDTH controls, and automatically sets the DSP bandwidth to match the user settings within the net bandwidth of the Analogue IF Filtering.



IDBT: A Breakthrough in Selectivity!



10-pole Collins® Mechanical SSB Filter

II. VRF: Variable RF Front-End Filter

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.



VRF Features Large High-Q Coils and High-Quality Relays



VRF Typical Bandpass Response (3.5 MHz)

III. 200 Watts of Transmitter Power Output

Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.



Philips Power MOSFETs

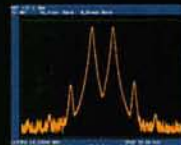


High-Speed Automatic Antenna Tuner



IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP, a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd-order IMD suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!



Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning / Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!



Access VRF and IDBT Features via Shuttle Jog Dial



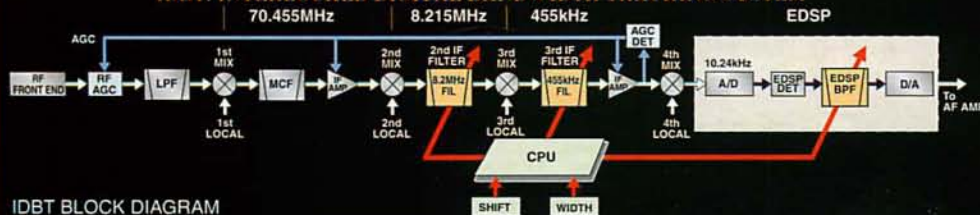
DC 30 V / 13.5 V
Power Supply FP-25

Photo shows optional MD-100asx
Deluxe Desk Microphone

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP

IDBT: INTERLOCKED DIGITAL BANDWIDTH TRACKING SYSTEM



IDBT BLOCK DIAGRAM

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Specifications subject to change without notice. Specifications guaranteed only within Amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.