practical Wireless
JUNE 1996 £2.20

YAESU HAVE THE POWER!

THE UK's BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

Our Flexible Friend - The Dipole Antenna

Build The PW Easy 144MHz Amplifier

Triangles, Trapezoids & Squares - Locators Explained

QRP Contest Rules

REVIEWED
YAESU FT-3000M

G0SKR Tries The FT-3000M 144MHz Mobile

WIN
An IC-706
DONATED BY MARTIN LYNCH

ICOM IC-T7E
Dual-Band Hand-Held
REVIEWED

9 770141 085037 06

FREE READER'S ADS

High Powered 2-m FM Transceiver **FT-3000M**

It's Awesome!

You know who you are. You drive farther, use your mobile rig longer, and buy the most dependable radio products you can get. The FT-3000M is the *only* amateur 2-m FM mobile radio with 70 full watts of TX power! Reassuring, when you're driving a lonely stretch of highway!

Like the 50-Watt FT-2500M, the FT-3000M is rated MIL-STD 810. And, both let you take the back roads with confidence. Built to resist jolts, bumps and the corrosive affects of dust, mist, and rain, the new FT-3000M, and popular FT-2500M take abuse and perform like champs. Plus, the FT-3000M is a great base, too.

The new FT-3000M comes equipped with some sensational exclusive features!

- WIDE BAND RECEIVE! From 110-180 MHz, VHF, and 300-520 MHz UHF to 800-999 MHz . And, AM aircraft receive!
- TWIN COOLING FANS! Unique, twin fans keep the FT-3000M running cool without a problem! So, don't worry about long transmission keydowns.
- SELECTABLE POWER OUTPUT! An awesome 70 watts, plus 50, 25, and 10 Watts.
- TRUE FM! Voice clarity has never been better.
- INTERACTIVE PROGRAMMING! Continual scrolling menu guides you through 50 settings—and won't let you forget the next step!
- SIMPLIFIED FRONT PANEL! New Quick-Touch™ dual-concentric knob controls menu programming and adjustments.
- PC PROGRAMMABLE! Optional ADMS-2B Windows™ Programming Software programs your FT-3000M in seconds!

The FT-3000M is feature-rich just like the FT-2500M, 50-Watt mobile, and built to the tough performance standards you've come to expect from Yaesu. We think you should have at least one, don't you?

"This is true Wide Band receive! VHF, UHF, and 800-999 MHz."

"Digital Code Squelch gives me more privacy than CTCSS."

"Smart-Search™ scans and stores active channels for quick access."

"Yaesu did it again!"

US MILITARY APPROVED MIL-SPEC 810

Features

- Frequency Coverage
  Wide Band Receive
  RX: 110-180 MHz,
  300-520 MHz,
  800-999 MHz
  TX: 144-146 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Interactive Programming
- High Power Output:
  70 Watts, plus 50, 25 and 10 Watts
- Quick-Touch™ Dual Concentric Control Knob
- Twin Cooling Fans
- ADMS-2B Windows™ Programmable
- Digital Coded Squelch (DCS)
- 81 Memory Channels
- Auto Range Transpond System™ (ARTS™)
- 1200/9600 Baud Packet Compatible
- Smart-Search™
- Alphanumeric Display
- Dual Watch
- Full line of accessories

YAESU

*Performance without compromise.*SM

For the latest Yaesu news: hottest products, visit us on the Internet! http://www.yaesu.com

YAESU UK/LTD. Unit 2, Maple Grove Business Centre, Lowrence, Rd., Hounslow, Middlesex, TW4 6DR, U.K. 0181-814-2001

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SOUTH MIDLANDS COMMUNICATIONS

THIS MONTHS SPECIAL OFFER

YAESU FT-736R Multi-mode quad band base station

only £1399

save £300

2m/70cm 25W
6m/23cm 10W*

*with optional modules

THE KING FOR THE BIRDS! GET READY FOR PHASE 3D NOW!

HF TRANSCEIVERS

KENWOOD

TS-950SDX	list £3995	our price £3495
TS-870S	list £2399	our price £2199
TS-850S	list £1809	our price £1579
TS-850SAT	list £1959	our price £1699
TS-450S	list £1499	our price £1299
TS-450SAT	list £1649	our price £1439
TS-50S	list £1059	our price £929

YAESU

FT-1000	list £3799	our price £2899
FT-1000MP	list £2849	our price £2499
FT-990	list £2199	our price £1899
FT-990/DC	list £1999	our price £1749
FT-900C	list £1199	our price £1049
FT-900AT	list £1399	our price £1119
FT-900	list £1199	our price £999
FT-840	list £959	our price £839

* FT-1000D upgrade kit £399 consists of optional filters BPF 1 and TCXO-1

ICOM

IC-775DSP	list £3699	our price £3239
IC-736	list £1969	our price £1719
IC-738	list £1649	our price £1439
IC-729	list £1325	our price £1175
IC-707	list £889	our price £775
IC-706	list £1195	our price £1059

VHF/UHF HANDI's & PORTABLES

YAESU

FT-50R	list £339	our price £299
FT-10R A06	list £249	our price £219
FT-40R	list £289	our price £249
FT-51R	list £489	our price £419
FT-11R	list £299	our price £259
FT-41R	list £369	our price £319
FT-290R2	list £599	our price £519
FT-690R2	list £649	our price £559
FT-790R2	list £749	our price £649
FT-416G	list £329	our price £229

ICOM

IC-T7E	list £329	our price £299
IC-Z1E	list £529	our price £459
IC-2GXE	list £255	our price £225
IC-2GXET	list £279	our price £229
IC-T22E	list £259	our price £229
IC-T42E	list £269	our price £269
IC-W31E	list £469	our price £419

KENWOOD

TH-79E	list £479	our price £419
TH-22E	list £254	our price £219
TH-42E	list £289	our price £249
TH-28E	list £319	our price £279
TH-48E	list £369	our price £319

VHF TRANSCEIVERS

ICOM

IC-820H	list £1795	our price £1569
IC-275H	list £1495	our price £1395
IC-281H	list £449	our price £399
IC-2000H	list £369	our price £329
IC-2340H	list £689	our price £599
IC-2710H	list £675	our price £599

KENWOOD

TS-790E	list £1959	our price £1699
TM-255E	list £949	our price £829
TM-455E	list £1059	our price £925
TM-733E	list £739	our price £645
TM-251E	list £419	our price £359
TM-702E	list £579	our price £519

YAESU

FT-736R	list £1699	our price £1499
FT-8500	list £749	our price £649
FT-5200	list £729	our price £629
FT-5100	list £679	our price £589
FT-2500M	list £399	our price £339
FT-3000M	list £479	our price £429
FT-2200	list £419	our price £359
FT-7200	list £559	our price £489

A DATE FOR YOUR DIARY
AUGUST 17th
SMC OPEN DAY

Carr A = £2.75 B = £5.50 C = £9.50 (mobiles) D = £13.50 (base stations) E = £16.50

COMET ANTENNA

COMET STATION ACCESSORIES

CBL-30	HF 1:1 Balun 1kW PEP	£23.50
CBL-200	HF 1:1 Balun 2kW PEP	£29.50
CSW-20N	Switch 2 WAY 'N'	£39.00
CF-30MR	HF Low Pass Filter 1kW PEP	£43.95
CF-50MR	6M Low Pass Filter 1kW PEP	£43.95
CF-30H	HF Low Pass Filter 2kW PEP	£69.00
CF-30S	HF Low Pass Filter 150W PEP	£25.00
CF-50S	6M Low Pass Filter 150W PEP	£25.00
CF-BPF2	2M Band Pass Filter 150W PEP	£49.95
CD-160H	PWR 1.6-60MHZ 20/200/2000W	£99.00
CD-270D	PWR 140-525MHZ 15/60/2kW	£89.00
CMX-2	PWR 1.8-200MHZ 20/50/200W	£119.00
CA-21HR	7MHZ Mobile Whip	£49.95
CA-14HR	14MHZ Mobile Whip	£49.95
CA-21HR	21MHZ Mobile Whip	£46.00
CH72S	2M/70CM Whip BNC	£18.50
CH600MX	2/70/23CM Whip BNC	£29.50
HR-50	6M MOBILE Whip	£49.95
CA2X4KG	2M/70CM Mobile Whip	£49.00
Z4	2m/70CM M. whip w/locking collar	£35.00
B-10	2M/70CM Mobile Whip	£21.50
B-22M	2m/70CM Mobile Whip	£44.95
CHL21J	2M/70CM Mobile Whip	£19.00
CA-258	2m/6m Mobile Whip	£29.00
CA-350dB	6M/10M Base Colinear	£149.00
ABC23	3 x ⅝ Base Colinear	£55.00
GP9N	2M/70CM Base Colinear	£135.00
GP15	6M/2M/70CM Base Colinear	£115.00
GP95	2M/70CM/23CM Base Colinear	£119.00

COMET DUPLEXERS

CF-305	HF/VHF Duplexer	£25.00
CF-306A	HF/VHF/UHF Duplexer	£37.00
CFX-514	6M/2M/70CM Triplexer	£54.95
CFX-431	2M/70CM/23CM Triplexer	£49.00
CF-520	2M/6M Duplexer	£29.00

LINEAR AMPLIFIERS

TOKYO HY-POWER

			Carr
HL 100B/10	21-28MHz 100w out	£210	C
HL 100B/20	14MHz 100w out	£210	C
HL 100B/80	7MHz 100w out	£210	C
HL 66V	50MHz 10w in 60w out	£169	C
HL 166V	50MHz 3/10 in 160w out	£299	C
HL 37VSX	2m 5w in 35w out	£119	B
HL 62VSX	2m 5-25w in 50w out	£235	C
HL 180V	2m 5-25w in 170w out	£389	C
HL 36U	70cm 5-10w in 30w out	£155	B
HL 63U	70cm 10-25w in 50w out	£259	C
HL 130U	70cm 3-25w in 120w out	£485	C
HL 2K	HF 2Kw PEP, 2x3-500Z	£1750	E
HL1K/6	6m 10w in 500w out	£995	D

cushcraft CORPORATION

Cushcraft Antennas are one of the best range currently available. They offer superb performance, innovative design, excellent build quality and outstanding value for money.

HF Antennas

R5	10/12/15/17/20 vertical	£295.00
R7	10 thru to 40m vertical	£389.00
R7000	10 thru to 40m vertical	£389.00
AV-3	14-21-28MHz vertical 4.3m long	£99.00
AV-5	3-5-7-14-21-28MHz vertical 7.4m long	£169.00
AP8A	8 Band Vertical	£229.00
APR18A	Radial Kit	£54.00
40-2CD	2-ele 40m Yagi	£499.00
A3S	14-21-28MHz Yagi	£389.00
A3WS	12/17m 3-ele Yagi	£299.00
A103	30m Extension A3WS	£119.00
204CD	4 ele 20m Yagi	£499.00
154CD	4 ele 15m Yagi	£289.00
D4	Dipole 10/15/20/40m	£259.00
D3W	Dipole 12/17/30m	£199.00
A4S	3-4 ele Yagi 10/15/20m	£449.00

VHF Antennas

AR-270	2/70 Dual Band Vertical 1.13m long	£69.00
AR-270b	2/70 Dual Band Vertical 2.3m long	£95.00
AR2	2m Vertical 1.2m long	£39.00
AR6	6m Vertical 3.1m long	£59.00
A148-10S	2m 10-ele Yagi 13.2 dBd	£72.00
A144-20T	2m 10-ele Cross Yagi 12.2 dBd	£105.00
13B2	13-ele 2m Yagi	£119.00
17B2	17-ele 2m Yagi	£199.00
A50-3S	3-ele 6m Yagi	£89.00
A50-5S	5-ele 6m Yagi	£149.00
A50-6S	6-ele 6m Yagi	£249.95
424B	24-ele 70cms Yagi	£119.00
22XB	2m 22-ele Yagi c/w polarization switching	£229.00
738XB	70cms 38-ele Yagi c/w polarization switching	£219.00

AEA TNCs and Data Modems

NEW

DSP232 – Multimode data terminal plus DSP unit. £499 inc.
INTRO PRICE £479 inc Carr C

PK12 – A new VHF TNC that offers superb performance and simplicity of operation. **ONLY £129.00 INC Carr B**

PK12/100K – 100k Mail Drop Memory Upgrade £49.95 Carr A

PK232/MBx – An old favourite that still offers state of the art performance. **£319.00 INC Carr C**

PK900 – Deluxe multimode data terminal **ONLY £479.00 INC Carr C**

PK96 – 9600 Baud packet TNC with 14K of mail drop memory. **£219.00 INC Carr B**

PAK WIN – Windows based packet software programme **ONLY £89.95 INC Carr A**

ANTENNA ROTATORS

AR303	Light duty	£49.95	D
G-450XL	New medium duty model	£269.00	D
G-650XL	New H/D version of G-450XL	£369.00	D

G-800SDX	450° deluxe model	£429.00	D
G-1000SDX	H/D version of G-800SDX	£499.00	D
G-2700SDX	H/D rotator 450°	£959.00	D
G-500A	Elevation rotator	£289.00	D
G-5400B	AZ/EL rotator	£529.00	D
G-5600B	AZ/EL rotator H/D	£629.00	D
RC5-1	Medium duty create	£329.00	D
RC5-3	Medium duty + preset	£439.00	D
RC5A-3	H/D v/speed + preset	£659.00	D
RC5B-3	V H/D v/speed + preset	£989.00	D
GC038b	Lowes clamp G-400, 800, 1000	£25.00	B
GC038G	Lowes clamp G-600	£25.00	B
MC½	Lowes clamp create	£49.95	C
GS-050	Rotary bearing up to 1¼ mast	£29.00	B
GS-065	Rotary bearing 2" mast	£45.00	B
CK46	Create rotary bearing 2" mast	£57.00	B
CD-45	Telex meter controller	£315	D
HAM IV	Medium duty meter controller	£449	D
HAM V	HAM IV with digital controller	£749	D
T2X	H/D with meter controller	£525	D
T2XD	T2X with digital controller	£795	D

DAIWA

Proven Reliability for Today's Amateur!

			Carr
PS120MIIA	PSU 3-15V 9/12A	£69.00	D
PS140MIIA	PSU 13.8V 12/14A	£72.00	D

PS304IIA	PSU 1-15V 24/30A	£129.00	D
RS40XII	PSU 1-15V 32/40A	£169.00	D
CN101L	1.8-150MHZ 15/150/1500W	£59.50	B
CN103LN	150-525MHZ 20/200W 'N'	£68.00	B
CS201	2 Way Switch SO239 1KW	£17.50	B
CS201GII	2 Way Switch 'N' 1KW PEP	£23.50	B
LA2080H	2M L/AMP 1.5-5W IN 30-80W OUT	£136.00	B
DLA80H	2M/70CM Dual Band Amp 0.5-25W IN 80-60W Out Pre Amps	£345.00	C

DX10N	2m/70cm Duplexer UHF/N	£22.50	B
CP10Y6	Cigar plug lead for FT530,etc.	£6.50	A

All discounts are based on recommended retail prices.

CARRIAGE: BASE ANTENNAS £9.50 MOBILE ANTENNAS £5.50 STATION ACCESSORIES £5.50

Showroom/Mail Order 9.30-5pm, 9-1pm Sat Tel: (01703) 251549 Service Dept 9-5 Mon-Fri Tel: (01703) 254247

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Reg Ward & Co: 1 Western Parade, West Street, Axminster, Devon EX13 5NY. Tel. (01297) 34918 9.00am - 5.15pm Tues-Sat

SMC (Northern): Nowell Lane Ind. Estate, Nowell Lane Leeds. Tel. (0113) 235 0606 9.30am – 5.00pm Monday-Friday 9.00am - 1.00pm Saturday

01702 206835 Waters & Stanton

FREE Food & Drink - FREE Entry

FREE Draw for rigs

Open Day Ham Radio's Biggest

Hockley, 10am Sunday 2nd June

3 Marquees Crammed Full Much at Trade Prices!

FT-736R
~~£1999~~ £1399

World's Smallest Scanner

WS-1000
£349

£149

UK's Smallest 70cm Handy

OPEN DAY 1996 - 2nd June

This is our biggest yet, 3 Marquees and all the food and drink you need. There will be RSGB and Short Wave Magazine stands, plus manufacturer's stands from YAESU, KENWOOD and ICOM. There will also be a prize draw for several rigs.

PRICES

Examples are shown on the left of this advert. To get the rock bottom prices you will have to visit us on the day. However, for the rest of June we shall be still be offering great deals.

YAESU - June Deals *

Model	RRP	June Price	OPEN DAY DEAL
FT-1000MP-DC	£2599	£2089	£2049
FT-1000MP-AC	£2849	£2279	£2249
FT-990DC	£1999	£1599	£1569
FT-736R	£1999	£1399	£1349
FT-50R New	£329	£299	£275
FT-840	£959	£789	£769
FT-2500	£399	£329	£309
FT-51R	£529	£399	£389
FT-290RII	£599	£499	£479

TS-870
~~£2399~~
£1969

KENWOOD - June Deals *

TS-870	£2399	£1969	£1949
R-5000	£1059	£885	£859
TH-79	£479	£409	£389
TH-22	£254	£219	£209
TS-790	£1959	£1649	£1599
TM-733E	£729	£629	£599
TM-251E	£419	£355	£339

IC-706
£995

ICOM - June Deals *

IC-706	£1195	£995	£969
IC-775DSP	£3699	£3099	£2999

ALINCO DX-70 In Stock

* THESE DEALS END ON 30th JUNE

Alinco does it again. This is a complete 70cms handheld. Look at the price! Just £149 for a complete station.

400 Memories and coverage from 500kHz to 1300MHz. It's a great performer

ADI 2m & 70cms

The Lowest Price Ever!

AT-200

2 Watts
6 x AA dry cell pack.
5 Watts on ext. 12V
Rx 130 - 174MHz
1750Hz tone.
DTMF built-in
Programme Scanning
Illuminated Keypad
CTCSS Option

70cms AT-400 £189.95

70cms AT-400 Ideal for NOVICE

£164.95

SWR Meters

£69.95

WATSON

Base Aerials

Watson base station aerials give you top performance at realistic prices. Get the real thing and experience true performance. Each one is pre-tuned for the UK bands, encapsulated in fibre glass, and has stainless steel fittings.

From £39!

W-30 2m/70cms 3/5dB 1.15m	£39.95
W-50 2m/70cm 4.5/7.2dB 1.8m	£54.95
W-300 2m/70cm 6.5/9dB 3.1m	£69.95

Power Supplies

3 Amps to 30 Amps - Fully Protected

The Only Ones To have Passed New EMC Regs!

W-3A	3 Amp 12V current/Volt protected	£22.95
W-5A	5 Amp 12V current/volt protected	£29.95
W-10A	10 Amp 12V current/volt prote	£49.95
W-10AM	10 Amp 3 - 15V variable	£59.95
W-20AM	20 Amp 3-15V variable	£89.95
W-30AM	30 Amp 3-15V variable	£119.95

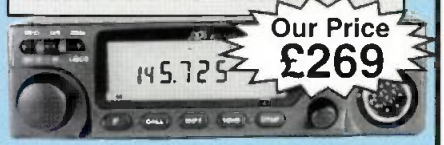
ALINCO DJ-190E

£199

This is the new exciting handheld from ALINCO. For an unbiased opinion, read the PW Review in the May Issue. It's the ideal rig to keep in the car, in the brief-case, or to take on holiday. At our price you can afford to!

- * 2 metre Handheld
- * CTCSS Encode
- * 1750Hz tone
- * 40 Memories
- * Wideband Receive
- * Ni-cads
- * AC Charger

ADI AR-146 2m Mobile



Our Price £269

This rig is superb. It leaves the competition for dead! At our price you can't afford not to have 50W high power 2m FM in the car.

DJ-G5 Dual bander

~~£489~~ £439

Includes a host of exciting features. You get **CTCSS built-in**, 200 memories as standard and a wideband receiver covering 108-174 / 420-470 / 800-950MHz. You'll love its compact size and its electronic vol. / squelch controls. Send today for full details of tomorrow's handheld.

JUST ARRIVED

Cushcraft R-7000 hf vertical plus optional 80m kit. (Beefed-up R-7) £389
New Index Plus QRP rig - £849

Shop and Mail Order; 22, Main Rd., Hockley, Essex. SS5 4QS Tel: (01702) 206835 Fax: 205843

VISA Branch Shop: 12, North Street, Hornchurch, Essex. RM11 1QX Tel: 01708 444765 ACCESS

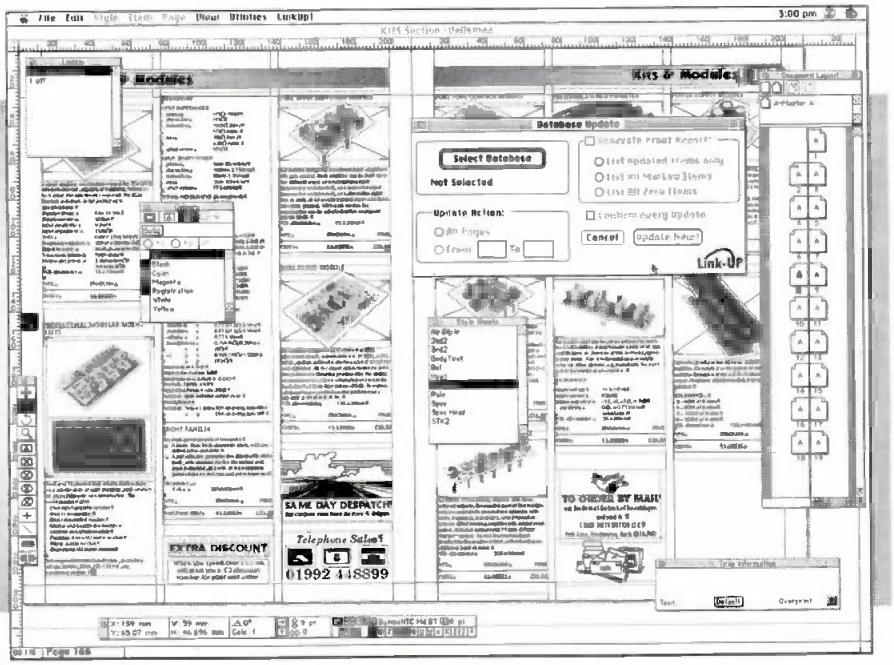
MAIL ORDER To Hockley - 24 Hour Answerphone and Fax. Open 6 Days 9am - 5.30pm

Summer '96 Cirkit Catalogue now in preparation...

▷ **On Sale 25th April 1996**

The Summer 1996 Catalogue has 280 pages packed with over 4000 products.

- ▷ New Multimedia CD ROM Titles
- ▷ New Radio Amateur Equipment
- ▷ Even Further Additions to our Computer Section
- ▷ PIC Microcontroller Projects and Modules
- ▷ Hundreds of New Products Including; Books, Computers, Rigs & receivers, Semiconductors and Test Equipment
- ▷ 280 Pages, 25 Sections and Over 4000 Products from some of the Worlds Finest Manufactures



£1.95 +£0.50 P&P

Cirkit **Tel: 01992 448899 Fax: 01992 471314**

Access VISA

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

C.M.HOWES COMMUNICATIONS

Mail Order to: Eydon, Daventry, Northants. NN11 3PT
☎ 01327 260178

Access VISA

Top Value Receiving ATU

CTU8
Antenna Tuning Unit
500kHz to 30MHz.
Helps reduce spurious signals and interference in the receiver.
SO239 sockets.
Kit (inc. hardware): £29.90
Factory Built: £49.90

Receiving ATU with balun

CTU9
All the features of the CTU8
Plus a balun for balanced feeders
Bypass switch for VLF etc.
Additional terminals for balanced inputs, single wire and earth.
Kit (inc. hardware): £39.90
Factory Built: £69.90

Receiving Antenna Selector

ASU8
Selects between 3 antennas.
Switched attenuator in 5dB steps from 0 to 25dB.
Case and all hardware included in the kit: £27.90
Factory Built: £49.50

Transmitting ATUs

CTU30
30W RF handling, 1.8 to 60MHz.
4:1 Balun. Kit: £39.90
HA30R hardware: £17.90

CTU150
150W handling 1.8 to 30MHz.
Kit: £49.90
HA150R hardware: £16.90

Antenna Interface

CTU30 (see left)

SWB30 SWR Bridge
1 to 200MHz. Kit: £13.90

ST2 Side-tone Oscillator.
Key or RF operated. kit: £9.80

CA30M hardware: £34.90

NEW! – Hardware for SWB30
Build a great looking SWR bridge with the SWB30 kit and the new HA31R hardware pack. Custom made 14swg aluminium case with printed and punched front panel, SO239 sockets, switch knobs, nuts & bolts etc. **HA31R: £18.90**
SWB30 (1 - 200MHz, 30W) Kit: £13.90

WIDE-BAND PRE-AMP, 4 – 1300MHz.
Boost those signals with the **HOWES SPA4!** Low noise IC amp with 10dB switched attenuator. Over 15dB gain. Good dynalmc range, IP3 +15dBm. 50 Ohm. Coax powered for shack or masthead use. Just the job for use with discones etc. in weak signal areas!
SPA4 Kit: £15.90 **Assembled PCBs: £22.90**

MULTI-BAND SSB/CW RECEIVER

The **DXR20** covers 20, 40 & 80M bands with optional extra band modules for 160M, 30M, 15M or 10M amateurs or 5.45MHz or **NEW 11.175MHz** HF air. Many high performance features in this excellent direct conversion design!
DXR20 Kit: £39.90, DCS2 "S meter" Kit: £10.90, HA20R hardware pack: £28.90
(Other receiver kits available. DXR20 & DCS2 also available as assembled PCBs)

The famous HOWES ACTIVE ANTENNA KITS

AA2. Covers 150kHz to 30MHz. The neat compact answer for those with limited space.
Kit: £8.90 **Assembled PCB module: £14.90**

AA4. Covers 25 to 1300MHz. Broad-band performance in a neat, compact package.
Kit: £19.90 **Assembled PCB modules: £28.90**

AB118. Optimised for long distance reception on 118 to 137MHz air-band.
Kit: £18.80 **Assembled PCB modules: £27.90**

MB156. 156 to 162MHz marine band active antenna system (the brother of AB118!)
Kit: £18.50 **Assembled PCB modules: £27.60**

Please add £4.00 P&P, or £1.50 P&P for electronics kits without hardware.

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our **free catalogue** and specific product data sheets. Delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.

EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

There's no doubt about it, *PW* readers are a helpful bunch! I'm able to say this because I've even more first hand experience following the publishing of **Mr J. Joyner's** letter in 'Receiving You' in the April issue.

Following the letter's publication we had some interesting response to Mr Joyner's letter asking for help to enable someone who is deaf to be able to use a form of hearing aid with a TV set. One response came from **Derrick Cornelius G0DLD** who just happens to work for Dorset Social Services!

The photograph shows Derrick, who works as a Care Manager for Social Services, demonstrating a special unit enabling people with hearing loss to listen to television sound. The unit he's showing me is the **Sarabec Crescendo 10,** made by **Sarabec Ltd., Middlesborough TS2 1RH. Tel: (01642) 247789.**

The Crescendo 10 is very simple, compact and safe in use. Importantly, it doesn't require any electrical connection to the TV set. It is only about the size of a pack of cigarettes and incorporates a volume control and on/off switch.

In use, the unit's microphone (on a very long lead) is attached to the TV's loudspeaker using Velcro. It can also be used by someone talking to the user, in the same fashion that Derrick and I are demonstrating in my office!

Derrick tells me that (in Dorset) the Crescendo units are available from the Social Services Sensory Loss team. He suggests that anyone who requires help or knows someone else who requires assistance in hearing, that they contact their local Social Services.

Derrick Cornelius G0DLD demonstrating how the 'Crescendo' hearing aid unit is used, with G3XFD acting the part of a TV 'loudspeaker'!

"Oo Aar Jim Lad. Anyone see a blue and green parrot"? Amateur (temporary) crutch user G3XFD receives instructions on their use from 'professional' Hugh Irvine GI3TLT during his visit to the Bangor & District Amateur Radio Society in Northern Ireland on April 12th.

Photograph courtesy of Stewart Mackay GI4OCK

It may also interest readers that I've recently started using an infra-red set of 'cordless' headphones in my office/cum shack at home. Although the set in use at the moment are mono, it means I've got one less set of leads to worry about on my desk. The next project I'm aiming to set up, is to get myself a pair of infra-red linked stereo headphones, which can be switched to any of my receiving equipment.

Finally, I've no doubt that some readers will find G0DLD's information helpful, and I also think that the 'cordless' approach will prove helpful, as it's done in my case. Thank you readers for your response to the original letter in April *PW*. It just shows how helpful you are!

Bangor Club

As I write this edition of 'Keylines', I have just returned from providing a *PW* talk to the **Bangor and District Amateur Radio Society** in Northern Ireland. And what a trip it turned out to be!

The Manx Airlines (very noisy) BAC ATP turboprop aircraft took just over an hour to fly me from Luton to Belfast City Airport on Friday 12th April. I was met there by my good friend **Terry Barnes GI3USS,** Treasurer of the B&DARS and President of the RSGB for 1992.

The Bangor Society had arranged for me to stay at the 'Old Inn' in Crawfordsburn, not far from Bangor. This delightful Hotel is referred to as the oldest 'Inn' anywhere in Ireland. It was certainly comfortable and the food was excellent!

During the evening I travelled with Terry GI3USS to the Winston Hotel in Bangor. Once there I met many old friends and was formally welcomed by the **Miles Boyle GI0VTS. Stewart Mackay GI4OCK** and **Harry Squance GI4JTF,** Chairman, Vice Chairman and Honorary Sec. B&DARS respectively.

We had a delightful evening. It went on much longer than intended and I didn't get back to my Hotel until 11.45pm! The evening ended with a most unexpected gift when Terry GI3USS presented me with a personal gift from himself in the form of a very useful 144MHz f.m. transceiver suitable for use mobile or in the shack.

I was quite overwhelmed with the welcome from the Bangor Society and the generosity of Terry GI3USS. I'll be using the 144MHz transceiver myself and to loan out to newly-licensed friends who don't have a rig for themselves.

Final Treat

My final 'treat' during the weekend was a guided tour of the Ulster Folk Museum between Bangor and Belfast to see the Irish Railway and Transport Museum. And to be honest, I was staggered at this 'hidden jewel' of a collection.

The railway and road transport collection reflected **the whole of Ireland** and included some magnificent Irish 'broad' and 'narrow' gauge (my particular favourites) locomotives and rolling stock. Terry Barnes son **Michael** acted as our (very!) knowledgeable guide and I spent an enjoyable Saturday afternoon seeing the trains and the newly-opened road transport section.

In the new road transport section I saw a magnificently (newly restored) Belfast trolleybus and Dublin tram and realised I was not only seeing a wonderful collection of vehicles, but was witnessing unity in what has been a troubled area of the British Isles. Thanks to the Bangor & District ARS I came away after a wonderful visit, happy and full of hope for the future of my Irish friends, North and South.

Rob Mannion G3XFD

Win

AN ICOM IC-706 HF & VHF MOBILE TRANSCEIVER WORTH OVER

£1000!

Donated by Martin Lynch & Son of the Amateur Radio Exchange Centre

'TOP TO TWO' COMPETITION *Part 2*

In the February 1996 issue of *PW* **Richard Newton G0RSN** reviewed the latest 'all in one package' mobile from Icom. He stated that as a keen mobile operator he'd be more than happy to own one - well now **all** *PW* readers have the opportunity to own an IC-706 by entering this easy-to-enter **3-part** competition.

Martin Lynch has very generously donated an IC-706 together with 10 of his T-Shirts printed with his logo as prizes for this very special competition.

IC-706

FIRST PRIZE: IC-706, a Martin Lynch T-shirt & a **three year subscription** to ***Practical Wireless.***

SECOND, THIRD & FOURTH PRIZES: A **Martin Lynch T-shirt & one year subscription** to ***Practical Wireless.***

SIX RUNNERS-UP PRIZES: A **Martin Lynch T-shirt**

How To Enter

All you have to do is answer the three multiple choice questions below, all the answers can be found in this issue. Make a note of your answers and keep them in a safe place until next month (July) when we'll be asking the three final questions and printing the entry form.

Questions

Q1: Martin Lynch is well known as an Icom dealer, which Icom rig is reviewed by G1TEX in this issue?

A. IC-775 **B. IC-T7E** **C. IC-Z1E**

Q2: What is the date of the 14th Practical Wireless QRP Contest?

A. June 9 **B. May 19** **C. June 16**

Q3: If you take out a subscription this month what will you receive for FREE?

A. A *PW* Binder **B. Two Free Issues** **C. A Book**

MARTIN LYNCH & Son
THE AMATEUR RADIO EXCHANGE CENTRE

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.

RECEIVING You

PW's Postbag. If your letter is published you'll win a prize.

Letters Received Via The 'Internet'

Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! Editor

Protest Walk

Dear Sir

I refer to 'Keylines', *PW* April 1996 and the proposed 'Protest Walk' for Amateur Radio'.

I'm sorry that your rally and march couldn't take place. It's about time someone made public the amateur radio point of view. Being vociferous, to my mind, is a compliment! What a shame that the RSGB let you down.

You'd offered to organise an effective event that they couldn't be bothered with.

You are most philosophical to agree to continue to support them. However, the RSGB should start to learn that they cannot take that support for granted.

It doesn't matter how many special offers they run - the RSGB will only attract a greater proportion of amateurs to its membership if it provides the services and functions that those amateurs require.

But how can clubs attract younger members? I feel that an honorary 'ice breaker' is helpful (a person, not a ship!). This person would be tasked with ensuring that newcomers feel welcome, are introduced to established members and would have baffling new technicalities explained at their own level.

Entering a roomful of strangers - even friendly ones - can be daunting for many new club members. A friendly, empathic person, assigned to help, makes the experience more welcoming.

Dr. Godfrey Manning G4GLM
Middlesex

Dear Sir

After reading your editorial in the April issue of *PW* I found myself in agreement, for the first time ever, with the management of the RSGB. Their response to your proposal to hold a protest march was totally in accordance with my own.

I am sure that when you have attended a rally in your capacity as magazine Editor, you must have paused in your work sometimes to survey the passing scene. Not a picture of sartorial elegance is it? Un-clean jeans and trainers, scruffy anoraks, unshaven faces, all topped off with the inevitable baseball cap, often emblazoned with the owners callsign in letters 3in high!

Imagine the image of amateur radio which would be created in the mind of 'Mr Average Citizen' on seeing 500 such individuals in one place for the first time. He would not know that most are pleasant, interesting friendly people to talk with and some are downright clever.

No, the image created would be exactly that which you are trying to dispel. Why also, for heaven's sake, waste a petition on 10 Downing Street? They do not control the press, they can't even regulate their own behaviour!

By all means organise a petition on the grounds of misrepresentation of the image of amateur radio, but then get several copies printed and deliver them simultaneously to the Editors of the tabloids and broadsheets. If after a couple of days there was no reaction, follow them up with a letter asking why?

Most licence holders would, I am sure, support you in this endeavour.

Geoff Whetstone G4YIK
Gateshead

Dear Sir

I was interested to read your editorial in the April edition concerning your planned protest rally in London concerning the use of the term 'ham' by the press. I must agree with the RSGB view that this plan could have backfired to a certain extent.

However, I would suggest that the following procedures could be adopted when the press misuse the term 'ham', when this occurs in the national press, then both the RSGB and amateur radio press should issue a press release correcting the matter.

Also, amateurs should be encouraged to write to the paper concerned in a standard form of protest. When such an incident occurs in a regional or local paper, then the details should be notified to the RSGB and radio press as soon as possible either by FAX or letter complete with the offending article, for them to issue a subsequent corrective statement or protest.

In the meantime, amateurs should also send a letter of objection to the paper concerned. I am sure that the RSGB and the radio press could publish a

Doctors & Dentists

THIS MONTH'S STAR LETTER

Dear Sir

I've thought of an idea to promote amateur radio. We all pay a visit to our dentist and GP or attend the out-patients hospital at some time or another. How often do you see a radio magazine in the waiting rooms?

So, the next time you visit one of these places, why not take your surplus magazines along, someone might just pick one up and read it and say yes, that is a hobby I would like to follow!

Arthur Sharp G0WNZ
Hampshire

Editor's comment: Excellent idea Arthur! So, let's all try Arthur's idea. After all, it's got to be far better than reading old satirical magazines and Golf catalogues!

The 1930s

Dear Sir

I was very interested to see in your March issue the letter headed 'The 1930s' from F. J. Walker as my own history was rather similar. I bought the March issue just casually and it took me back to pre-1939 when I made a one valve short wave set on which it was a thrill to receive Schenectady.

I new a little about radio and I joined the RAFVR as a wireless operator as a way of getting radio knowledge free of charge! There were not so many facilities then for study as there are now at evening classes, etc.

I took *Popular Wireless* then and I never did know whether it was taken over or whether it just vanished in later years. I well remember that there was a 30-line scanning disk type of TV receiver for home construction in it once, but as an apprentice at that time, it's cost was probably beyond me.

I am not very active at present, but found your current number very stimulating and well presented.

Peter Readings G4FML
Surrey

Editor's reply: Reader's memories from the 1930s are very welcome. Did you build the 30-line scanning disk TV receiver Peter mentioned? Write and share YOUR memories and record them for posterity at the same time!

Ladybird Beginnings

Dear Sir
Much as I enjoy *PW* every month I have one request to make. As a five year-old, my father bought me a Ladybird book called *Making a Transistor Radio* which started with a basic crystal set, and developed into a highly sophisticated (for a five year-old) transistorised, amplified radio. Needless to say, I had a great deal of help with the project, but the main thing that kept my interest was that at every stage, you had a working radio.
Perhaps *PW* could consider such a project, spread over several months, which starts out as a simple, single band receiver, and develops through time into a multi-band, multi-mode receiver? I think this would interest both beginners (like me) and old hands alike and at the end of the day, provide a set which could be a source of much pride, as well as not costing the earth all in one go.
I would be interested to hear if such a project has already been covered at some time in *PW*, or if it's possible to do it the future.
Gary Cavie G7SJF
Essex

Editor's comment: The PW 'Clubman' project was run many years ago on the same lines as Gary's suggestion. And comments from readers on his idea are welcomed. The author of the Ladybird book in question was none other than Rev. George Dobbs G3RJV. *Making A Transistor Radio* was a 50-page hard-back book, in full colour, and was published by Wills & Hepworth Ltd. in 1972 at the grand price of 15p! (Archive copy in *PW* office). If you see one at a 'Jumble Sale' (as I did) it would still provide a very helpful introduction for a beginner...at a bargain price.

Reader's letters intended for publication in 'Receiving You' must be original and not be duplicated. Letters are accepted on the understanding that they have only been submitted to *Practical Wireless*. Please ensure that your letter is clearly marked 'for publication in Receiving You' and that it has not been submitted to other magazines. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*.

specimen letter in their publications which the average amateur could use for this purpose.
It is important to educate the general public and the tabloid press that the term 'ham' only refers to a licensed Amateur Radio operator who has gained this title by the passing of a City & Guilds exam, namely the RAE and is pursuing their legitimate hobby. No other type of person, be they a CB operator or scanner enthusiast, etc. falls into this category.
However, in getting this message across we must maintain an almost professional attitude to this matter otherwise we will be just classed as another bunch of 'yobos'.
R. A. Connolly GI7IVX
N. Ireland

Editor's comment: Thanks for all your letters whether 'for' or 'against' the protest march.

Yesterday's Mode?!

Dear Sir
So Morse is yesterday's mode? Well, see the attached!
R. G. Taylor G3AVQ
Oxfordshire

Enclosed with Mr Taylor's letter was an advertisement taken from *The Daily Mail*, March 14th 1996. It was for the post of 'Instructional Officer 1 - Telecommunications' and stated 'You will be required to instruct students in telecommunications procedures and transmitting and receiving Morse Code at 18 words per minute. The advert then goes on to state the necessary qualifications (ONC, C&G, etc.). Oh well! perhaps there's (official) life in the 'Old Mode' yet eh? Editor.

Dear Sir
There have been one or two articles and many letters regarding the abandonment of the Morse test as part of the licence requirement. Commercial radio users no longer use Morse and it will no longer be used even for emergency use, so let's take the opportunity to move our hobby forward, after all we don't take a test before we can use s.s.b. or the data modes! So, let's drop the test, but still allow those of us who want to, the freedom to continue to use Morse. That is - we keep the Morse at the bottom end, data in the middle and s.s.b. at the top, as per band plan.
At the same time, let's take the opportunity to re-structure the radio licence as a graded, self-training exercise. Beginning, perhaps, at Novice, going up in several clear stages to expert. We could even set this up as a 'distance learning' package with one of the major learning institutions so that at the end, we would have a qualification recognised by the world at large. This would help to bring our hobby forward and give it more credibility and a better image as well has giving more credence to the idea of 'self training'.
Peter Halls G4CRY
York

Antenna Specials

Dear Sir
I would like to thank the *Practical Wireless* team for the April edition on antenna specials. I do like the cubical-quad for 144MHz and I will build the antenna soon. In the past I built (from a diagram) from *The ARRL Handbook*, a 4-element cubical quad I was very pleased with the gain of this antenna. I had very good results.
I wondered if you could help me? My 4-element quad was thrown away by my mum! (And I do not have the details to rebuild a new one). Could you help me maybe with any photocopies for a 4 or 5-element quad at 144MHz. Of course I will pay for your time and any photocopies.
Gregory Adrian G7CUF
London

Editor's reply: The team wish you success with the photocopies we sent you Gregory. Incidentally, the team hope readers enjoyed the free Antenna Data Chart issued with the May *PW*.

Denco Coils

Dear Sir
In the PW Changer feature (*PW* March issue) it is stated that the coil manufacturer Denco no longer exists. Not true! Denco is alive and kicking and has recently recommenced the manufacture of the MAXI-Q range of miniature coils for valve and transistor applications. Their address is: **Denco (Clacton) Ltd., 259 Old Road, Clacton on Sea, Essex CO15 3LU.**
K. S. Seddon
Cheshire

Editor's comment: Thank you for the information. Please see the news report in this issue.

Up The Wall!

Dear Sir
In December last I took the RAE and passed, so anyone who wishes can dismiss my views as lack of knowledge of the subject. At this time, the Morse code is driving me up the wall, but anything worth having is worth working for. Not wishing to be restricted to above 30MHz, it has to be done. The A licence is the reward, with the ability to reach people of any nationality anywhere in the world and be understood which must be a marvellous thing.
Mr G. R. Wilkie (March *PW*) advocates abolishing the Morse test and talks of "means test" and "outside toilets". Does he also advocate the abolishment of legs because we have the car? Morse is the 'legs' of amateur radio, the supports on which it was built. By removing the Morse test and thereby making a licence easier, will only make for overcrowding by people not prepared to earn the right.
Whilst writing I thank everyone that I have met and spoken with in this hobby. They are the most helpful and pleasant fraternity that I have encountered.
Bill Holden
Walsall

Send your letters to the *PW* Offices, marking it clearly for 'Receiving You'

STOP PRESS

Just as this issue of PW was going to press we received the news that South Midlands Communications have acquired full control of Siskin Electronics. Phil Bridges and his years of data expertise will allow SMC to grow in the data communications market - all enquiries to SMC on (01703) 255111.

NEWS 1996

Compiled by Donna Vincent G7TZB

BBC 'DAB' Hands At Broadcasting

The BBC sees the future of broadcasting to be Digital Audio Broadcasting (DAB) and the Corporation started the initial DAB services in the autumn of 1995. And to help its listeners, the BBC Engineering Information Department have published a helpful booklet *The Future Of Radio - BBC Digital Audio Broadcasting*.

Present DAB coverage is limited to the London area and parts of south-east at the moment. But the BBC consider that the facilities offered by DAB (including interference free reception, high quality sound, easy-to-use radios, automatic tuning, wider choice of programmes, text and data, will revolutionise the future of radio.

Listeners will need new receiving equipment, in the same way that new equipment is needed to listen to CD recordings, etc. However, the broadcasters are developing more sophisticated applications to make full use of DAB. The possibilities include in-car navigation systems, radios linked to computers and displays of maps and pictures.

Further information is available from: **BBC DAB, Room 509 Henry Wood House, Broadcasting House, London W1A 1AA. Tel: 0171-580 4468 or FAX: 0171-765 4427. E-mail: bbcdab@bbc.co.uk**

Kites On The 'Net

After we published the article 'Five And Nine By Force Four' by **Ron Wilson G3DSV** about combining radio, fresh air and kites in *PW* April we received a letter from an antenna group who are on the Internet.

The Kite Antenna User Group was formed by **A. G. Hanna GI0SMU** with the intent to exchange information and ideas in an effort to re-discover and develop the art of antenna kite flying. Anyone with access to the Internet is welcome to 'surf in' and have a read.

If you're interested in kites for lifting antennas GI0SMU also runs **Sky High Kites at 39 Dalton Crescent, Comber, N. Ireland BT23 5HE. Tel/FAX: (01247) 874224.** Internet: **http://www.kitesantenna.com** E-mail: **Kites@antenna.thegap.com**

Denco Back In Business

Denco (Clacton) Ltd., a name associated with 'home-brew' radio construction for many years is back in business! This news came to light recently following a mention of the formerly well known coil manufacturer in a *Practical Wireless* article.

Readers who had heard that Denco was in operation again, contacted the *PW* office. And following enquiries, Denco's Managing Director **Mr Ron Allwright**, whose father founded the company, confirmed that the company is again manufacturing the Maxi-Q range of coils for valve and transistor use, together with the 1.6MHz and 465kHz i.f. transformers.

Further details on Denco (Clacton) Ltd.'s products are available directly from **Denco (Clacton) Ltd., 259/265 Old Road, Clacton-on-Sea, Essex CO15 3LU. Tel: (01255) 422213, FAX: (01255) 476751.** (*Practical Wireless* will be featuring Denco and its famous products in a future issue. **Editor**).

Low Down On AKD Receiver

Here's the latest 'low down' on the **AKD** communications receiver due to be launched in September - It tunes from 30kHz (yes 30kHz!) to 30MHz **and not as published** in **Rob Mannion G3XFD's** 'London Show Report' (page 40 May *PW*).

Since publication of the 'London Show Report', **Val Wagstaffe** of AKD has pointed out that the receiver, which they're aiming to be available for around £160, will cover from 30kHz to 30MHz. Rob apologises for his mistake and realises that this extra coverage is of great significance. "I'm waiting to get hold of one of these receivers, they'll certainly be of great interest" he told *PW*'s 'Newsdesk'. "And when they've got the receiver on the market...I'll chase them to produce the companion transmitter" joked Rob!

For further information on the new AKD receiver and their other products contact Val Wagstaffe at: **Unit 5, Parsons Green Estate, Boulton Road, Stevenage, Hertfordshire. Tel: (01438) 351710.**

Open Again!

Waters & Stanton Electronics are once again throwing open their doors for what has become an annual, well supported event. The sixth W & S Open Day will take place on **Sunday 2 June at 22 Main Road, Hockley, Essex** and will feature many second-hand and end-of-line bargains together with plenty of free refreshments!

Peter Waters & Jeff Stanton are looking forward to welcoming **you** when, at 10am they open the doors to their showroom. Why not pop along, meet the faces behind the names and who knows, you may even find that bargain you've been looking for!

Kenwood Amateur Dealer of the Year Award

Lowe Electronics have won the title of Kenwood Amateur dealer of the Year 1996 with **Martin Lynch** coming a very close second and **Mike Haydon** being awarded third place. **Mike Atkins** Communications Sales & Marketing Manager of Kenwood stated at the awards lunch, which took place at the Imperial War Museum on April 3, that the competition was an "incredibly close run thing" and that "right up to the end it wasn't clear who would take the title".

Lowe's Managing Director **Richard McLachlan** was presented with the first place plaque and an eight day trip to Japan to visit the Kenwood factories and meet the Japanese development team.

The presentation lunch also marked a change of name for Kenwood. The company will now be known as **Kenwood Electronics UK Ltd.** instead of Trio-Kenwoood UK.

Pictured from left to right Mike Haydon, Richard McLachlan, Mike Atkins and Martin Lynch in front of a British Mark V tank as used in the First World War in 1918.

The End Of An Era

The first 'G' series Amateur radio callsigns were issued in the 1920s but on 1 April 1996 history changed when they gave way to a new 'M' call. A special award ceremony was held on 30 March at Subscription Services Ltd. in Bristol to mark the award of the first M series callsign.

John Keeling of the Radiocommunications Agency awarded **M0AAA** to **Reading & District Amateur Radio Club** and **M1AAA** to **Ian Oliver** who applied for the new series last October. Mr Keeling congratulated the recipients and stated that it was an historic moment in the world of amateur radio.

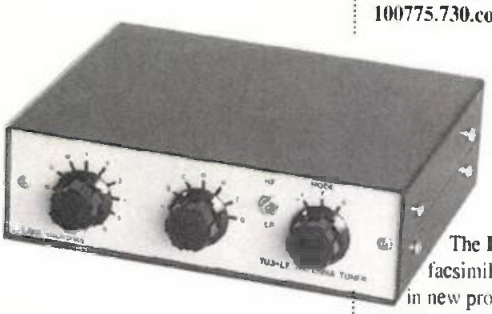
Both M0AAA and M1AAA were presented with specially designed framed certificates together with manually completed versions of the new licences. All those who attended the award ceremony also had the opportunity to look behind the scenes of the radio licensing operation.

Ian Oliver M1AAA (left) receiving his certificate from John Keeling of the Radiocommunications Agency.

John Keeling pictured with some of the younger members of the Reading & District Amateur Radio Club.

New Products

Antenna Tuning Unit



In response to many medium and long wave DXers' enquiries **Lake Electronics** have produced the **TU3-LF** antenna tuning unit which is designed to handle frequencies below 500kHz.

Features of the TU3-LF include:

* All aluminium case finished in matt black with brushed aluminium front and rear facias.
* The cabability when coupled to a end-fed wire of tuning down to 200kHz!
* SO239 connectors and standard 4mm terminal sockets.
* Supplied in kit form or ready-built.
* A maximum useable frequency of around 30MHz.
* If used with a QRP transmitter it will handle up to 20W.

Alan Lake tells us that the Sun Spot cycle is now at its lowest ebb which means that although the higher frequency bands are not so good, DX can be heard easily on the medium and long wave bands. This means that by using the TU3-LF you could experience m.w. and l.w. DXing and so discover a whole new interest!

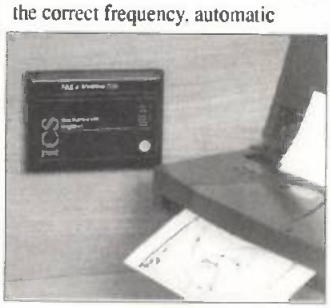
The TU3-LF is available for **£52 plus £4 P&P in kit form** or **£64 plus £4 P&P ready-built** direct from **Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: 0115-9382509. E-mail: 100775.730.compuserve.com**

Weather Facsimile Decoder

The **FAX-4** weather facsimile decoder is the latest in new products to come from **ICS Electronics** and has been designed to make high quality weather facsimile reception more affordable and without the need for a computer.

The FAX-4 will connect between your short wave s.s.b. receiver and most high resolution ink jet and laser printers. It will provide automatic reception of IOC 288 and 576 transmissions at 60, 90, 120 and 240 RPM with a printed resolution of 300 or 360dpi depending on the printer being used.

Operation of the FAX-4 is fully automatic once the receiver is tuned to the correct frequency. automatic



printer switching is provided so there is no need to change leads if the FAX-4 is sharing the same printer as a computer.

The FAX-4 costs **£269.95** and is available from **ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Arundel West Sussex BN18 0BD. Tel: (01903) 731101, FAX: (01903) 731105.**

Dual-Band Hand-Held

YAESU

The latest product to come from the Yaesu stables this month takes the shape of the **FT-50R** dual-band hand-held offering a full 5W of power ouput as well as wide-band receive from 76 - 999MHz. The transmitting frequency range of the FT-50R is 144-146 and 430-440MHz in 5 - 50kHz channel steps.

The recommended retail price of the FT-50R is **£339** and for that you get three selectable receive modes, 112 memory channels, digital coded squelch, high audio output, alpha-numeric display, direct f.m. to name just a few of the features. There are a range of accessories available for the FT-50R all of which are common to the FT-10R/40R range.

Further information can be obtained from **Yaesu UK Ltd., Unit 2, Maple Grove Business Centre, Hounslow, Middlesex TW4 6DR. Tel: 0181-814 2001** or from any Yaesu approved dealer.

Low Power Transceiver

Seattle based **Index Laboratories** have recently announced a replacement for their QRP Plus low power transceiver (reviewed in *PW* February 1995). The new model called the **QRP Plus-1** has been re-engineered with many improvements being made, such as the inclusion of RF speech processing and an all new receiver design.

The receiver side of the QRP Plus-1 is a single conversion design with a 50MHz i.f. and incorporates SCAF variable bandwidth digital filters. The frequency coverage is from 1.8 to 30MHz and is optimised for s.s.b. and c.w.

The transmitter operates on all bands from 1.8 thorough to 28MHz including the WARC bands with adjustment of s.s.b. and c.w. power from 5W down to milliWatt level. The UK distributors **Waters & Stanton Electronics** have the first shipments available for **£849** and would welcome your enquiries for more information on **(01702) 206835.**

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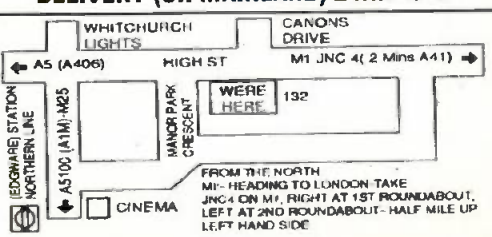

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NOVICE Natter

For Radio Beginners Of All Ages

Elaine Richards G4LFM covers a variety of topics this month, while answering questions raised as a result of delving into her postbag.

I've recently had a letter from **Bill Abrahams** in Belgium, who kindly pointed out that in the April edition of 'Novice Natter' the photograph showing the barometer was not showing the atmospheric pressure and the world clock was not showing the time! Sorry about that, but the photos and captions are added by others and I don't see them until I get a copy of the magazine. (*Apologies for any confusion caused by this.* Ed.)

The barometer shows you whether the trend is falling, rising or steady, it doesn't show the actual pressure as a figure, sorry if the caption was misleading. However, I found that just knowing the trend was enough to plan some DXing.

And rest assured, the world clock does tell the time, very accurately too! Thanks Bill for gently pointing this out!

Lancashire Youngster

Shaun Davies from Lancashire wrote to me back in February, hunting for a dynamic ear phone - that's been sorted out thanks to the Editor (well done Rob, you've no doubt got a good junk box!). Shaun is 12 years old and is interested in radio, his grandad has got a short wave receiver and is going to help Shaun build the ZN414 receiver from the March *PW*.

I do hope that Shaun and his Grandad will let me know how they get on building this project and what kind of results they get. Keep up the good work both of you.

Pen Friends Sought

Dinesh Kumar is a 22 year old student in the southern corner of India, studying for his Masters Degree in Electronics. He's passed the Amateur Station Operator's Certificate exam at Grade I (similar to our RAE) and is awaiting his callsign from the authorities. Apparently, he'll probably have to wait another three or four months yet!

Dinesh is looking for a pen friend in the UK who is about the same age and interested in amateur radio. If you think that writing to another amateur would interest you, then his address is: **K.N. Dinesh Kumar, IV SEM, MSc Electronics, Dept of Electronics, Cusat, Kochi-22, Kerala, South India, DIN - 682 022.** I'm sure he'd welcome your letter.

On Air Manners

The other day I received a letter from a fellow amateur, (nothing to do with this column) but something he said in his letter struck me. He was talking about good manners on the air and some of the problems he had suffered.

I'm sure that many of you will have had tutors stressing during your studying that you should listen to see if a frequency is occupied before you start

International Reply Coupons

Mr Hibbard recently wrote to the *PW* Editorial office with a query about International Reply Coupons (IRCs). The *PW* 'team' thought that perhaps I ought to mention here for any newcomer's benefit, that an International Reply Coupon is really just like an international postage stamp.

For example if I wanted to get a reply from an amateur in New Zealand, either to a letter or perhaps if I wanted his QSL card sent directly to me, it's not fair to expect that station to pay for the postage back to me. So, either I send him local currency to pay for the stamps (this is expensive for me to do, as are international money orders and the like), or I could send him some mint New Zealand stamps bought from a stamp dealer.

The latter option isn't very easy either as I don't know the postage rates in New Zealand. Fortunately there is a third, and much easier option, if I buy an International Reply Coupon from my local Post Office and enclose it with my letter or QSL, the amateur in New Zealand can use it to buy 'one or more postage stamps representing the minimum postage for a priority item or an unregistered letter sent by air to a foreign country'.


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PAYS-BAS NEDERLAND	250 cent	

9. 1992

If I was expecting a reply from New Zealand, I would make sure that I enclosed two or three IRCs just to make sure I had sent enough postage. The IRCs will cost you approximately 77p each to buy over the counter at all Main Post Offices.

If you live in a very small village or only have a small Sub Post Office locally I'm not sure whether they would carry IRCs all the time, but all main offices do. They won't add much weight to you correspondence as they weigh about half a gram each!

If you ever receive IRCs and aren't sure what to do with them, just take them to your local Post Office with a letter that you want to send and they will exchange them for the required value of stamps.

Sometimes, IRCs are used as a form of international currency. And as an example the British DX Club will usually accept IRCs as payment for their publications.

For example, their latest booklet called *Radio Stations in the United Kingdom* costs £2.50 post paid, but you can send six International Reply Coupons instead. I'm sure other groups do the same, they'll always tell you in any adverts or publicity they send out.

I've shown an IRC that I received recently from a reader here so you can see what they look like (note the information given in the left-hand and centre boxes is applicable to each individual country). When I take it to my local Post Office to exchange it, they will stamp the right-hand box with their stamp to validate it. I hope this helps you out.

Start Young In Malta

Anthony Buttigieg 9H1TB wrote me a lovely letter telling me about his young son **Daniel**. Anthony is rather proud, and rightly so, as Daniel is the youngest fully licensed amateur on the island of Malta GC. (Incidentally the GC stands for 'George Cross', awarded to the Maltese people for their bravery in the Second World War).

Daniel started studying for the RAE when he was just 10 years old! Last year he sat the Morse test and then in December he sat the RAE and now, at 14, is a fully licensed amateur. He belongs to the Malta Amateur radio League in Attard and now gives Morse lessons at the club.

Well done Daniel! It just goes to show what you can do if you really try. Thanks to Dad, Anthony for passing on the information, keep me posted as to what you are all up to.

Special Event QSL cards

If you collect QSL cards then you should keep your ears open for some of the Special Event Stations that **John Densem G4KJV** operates. During May, John will be using **GB3BPM** from a coal mine museum in Aberavon.

In June it will be **GB2BHH** from the Malmesbury school for handicapped children, July will mean assisting **G2BRR** with his **GB2ARC** station for the Arthritis & Rheumatism Council for Research.

The other special John's hoping to run is **GB75RBL** in July for the 75th Anniversary of the Royal British Legion (Malmesbury Branch). John makes his own QSL cards, using some kind of computer package and a colour printer - his cards have certainly given me something to experiment with! (see 'Bits and Bytes' this issue).

Quite where John finds the time for all this I'm not sure. He's the QSL Sub-manager for the G4Z series, he's on packet, belongs to the ISWL, the RAF Amateur Radio Society and the Aircrew Association! That's as well as the special event stations and QSL making!

pressing the push to talk (p.t.t.) switch or the Morse key. Many of you do this. But do you listen for very long, or is it just a few seconds and then off you go?

On the frequency you have chosen to use, there may already be a conversation (whether speech or Morse) taking place. However, that doesn't mean to say that you will be able to hear both sides of it.

What if the station nearest to you is listening to a much more distant one when you listen briefly on the frequency. There he is patiently listening and perhaps copying down the other persons details and **bang!** in you go right over the top. Unintentionally, of course, but you couldn't hear the very distant station and now neither can the other party on the channel!

Perhaps you should listen for a short while, and perhaps put out a very quick enquiry to see if the channel or frequency is occupied? That way you have taken every possible step to avoid clashing with others already enjoying a contact.

Something else that bothers me when I listen around on the air are the operators who join an already running discussion - uninvited. If you have something to add or would like to join in, isn't it much nicer to quickly announce you are listening when one station hands over to the next and then wait to be asked to join in?

Amateurs are, by and large, a very friendly bunch, but many of the older operators do appreciate politeness. It's unusual to ignore someone who has asked to join in. I don't think I can ever remember a situation when that has happened - certainly not whilst I was on the air.

I'll get off my 'soap box' in a minute, but please if you hear a station 'testing' or asking for a report on the state of their signal - don't ignore them. I have heard a station asking for a report because they were testing a different antenna, no-one answered (I couldn't as I was just using a receiver at the time, it's so frustrating!).

Anyway, within a few seconds of the transmission finishing, another station appeared calling for a friend, who immediately answered. I'm sure they'd been listening all along, it would have been nice if one of them had helped out the first station.

When you are new on the air, a little politeness goes a long way, it also helps to get over those first nerves. It's very difficult when you start trying to talk to other people over the air, especially if you have never tried things like CB or operating special event stations when you were a Scout/Brownie or Guide, etc.

Finally, a plea to those whose Morse code is well above the testing speed and skill. Spare a thought for those who try and join a Net if they aren't as good as you. With a bit of practice and careful nurturing, they will get better and will be able to make a good contribution to the Morse conversations that go out over the air.

That's it, I'll climb down now. Let me know if you hear any really good stations on the air or have had someone be particularly helpful when you were a little 'green'.

Elaine G4LFM

That's all for this month, I hope I've included something of interest for everyone and helped to answer more of your questions. Don't forget I'm always pleased to receive your letters so keep them coming to PO Box 183, Ringwood, Hants BH24 3XD.

Zoë says:
"keep the News and those Club magazines coming!"

CLUB Spotlight

Compiled by Zoë Shortland

Your pages - your stories! Have you moved into a new club room, won a contest, got a funny story or news of a special event? Then let's hear from you. Send in your club logo too, if you've got one. You never know, you'll probably recruit new members at the same time!

The GPT Amateur Radio Club

Located at Beeston, Nottinghamshire, is the **GPT Amateur Radio Club**, site of GPT Ltd., the UKs largest designer and manufacturer of Telecommunications equipment. Although the club was set-up some 20 years ago by company employees, non-employees are always welcome to join the club.

Meetings are held every Thursday evening and most Sunday mornings in the radio shack on the GPT sportsground. Thursday evenings are usually devoted to operating and general chatter about amateur radio, whilst Sundays are geared around Morse code operation and constructional projects.

About once a month there is a special event evening, where a guest speaker is invited to the club. Sometimes a junk sale is held or a visit to a place of interest to radio amateurs. Additional social events are also held during the year in the company's social club where a buffet and liquid refreshments are provided.

The club currently has about 30 members covering the whole spectrum of operating classes and listeners. Many of the members have joined the club as listeners and have taken the Novice course run at the club by **Alan G7LNV**.

The next Novice club is due to commence in September, ready for the Christmas exam. Some forthcoming events are May 30 - a junk sale and the GPT Gala day on Saturday June 15th, when the club will be operating the station as **GB4GPT**.

New members are always welcome and further information can be obtained from the club secretary **Chris G4VFK** on **0115-922 6321** or E-mail via **archer@ncp.gpt.co.uk**

Salop Amateur Radio Society

The **Salop Amateur Radio Society** was established in 1963, by **G3RRN** 'Doc' and **G3OMX** 'Old Man Christmas'. The society held its first meetings at the home of **Bill Davies (BRS21607)** until the membership outgrew this gentleman's home and hence meetings moved to a local tennis club, though the only Nets they were interested in were on 'Top Band'.

The club membership was 23 strong by October 1963. Some of those members are still with us to this day.

The society club callsign G3SRT was obtained by G3RRN and used by the same gentleman in August 1964 for a Traction Engine Rally, using the 3.5MHz band and home-brew equipment.

At a local school in January 1966, the society began RAE classes. These RAE classes are still running, with the help of members. But now on a less formal workshop system.

The society hope to start a formal course in the near future, either NRAE or RAE, when a suitable venue and a willing set of volunteer instructors can be obtained. Presently, Salop ARS support three repeaters, **GB3LH (RB15)**, **GB3PW (RB6)** and **GB3PW (R7)**. These repeaters are kept in good order by the Repeater management group.

A fairly full program of talks are held on alternate Thursdays, the other meetings being informal RAE tuition and general chat or exchange of ideas. Membership totals around 60 members, both licensed and s.w.l.s. from Shrewsbury and the surrounding areas.

Meetings start at 8pm every Thursday at the **Oak Hotel, The Mount, Shrewsbury**. Further details from **Ian Davies G7SBD, QTHR** on **(01743) 463711**.

Hospice Appeal

'Club Spotlight' has recently received a press release from **Dennis Spratt G7AGZ**, giving details of a forthcoming event. This event is in aid of the 'Mount Edgcumbe Hospice' in St. Austell, Cornwall.

The event starts on the 2nd June 1996 leaving Lands End at 7am BST, hoping to reach John O'Groats in two and a half days to complete the first leg of the journey. Dennis says that he does all the setting-up of the project, including fundraising, doing the event and handing over the cheque.

Dennis will be issuing a certificate to each station that confirms their contact. During each QSO a contact number will be issued and RST report. Due to the fact that this is a charity event, Dennis hopes that each station that wishes to confirm their contact will enclose an s.a.e. to help with the return of mail, as the event is being paid for by Dennis and his brother.

The cost is expected to be around £300, which includes the van hire, fuel and living costs. Dennis is hoping to raise the £2000 target that he has set himself. Since 1991 Dennis has completed three tours of Cornwall and one operation in 1994 in the Pendennis Castle in Falmouth, for which he used GB5MEH on 144 and 29MHz f.m. bands.

If you would like to know more about this event, please contact
Mr Dennis Spratt,
66 Glenthorne Road, Threemilestone, Nr. Truro, Cornwall TR3 6UA.

Stop Press - New Edition Now Out

The 1996 edition of *Radio Stations In The United Kingdom* has just been published by the British DX Club. The booklet is now in its 14th edition and has been completely revised and updated to reflect the current situation.

The new edition follows the successful format of previous years with its frequency by frequency guide to domestic a.m. and f.m. stations in the UK, both BBC and Independent. Some of the features include: Frequencies cross-references to show parallel channels, transmitter powers and locations, background to the various radio services, UK radio stations on satellite (new). There's also an alphabetical list of stations with their postal and E-mail address, plus frequencies, telephone and FAX numbers and advice on reception reporting included

The booklet aims to be the most accurate and comprehensive guide to British domestic radio for the DXer and local radio enthusiasts. And with so many changes since the last edition the BDXC think it's something neither should be without.

Anyone planning a holiday or business trip in the UK or visiting the UK from abroad, would find the guide invaluable in helping to identify the numerous

radio stations now on the air. Many people order a second copy to keep in their suitcase or car!

Radio Stations In The UK is available from the club's London address: **British DX Club, 126 Bargery Road, Catford, London SE6 2LR** for the price of £2.50 Stirling or six international reply coupons or four US dollar bills per copy. This price includes postage world-wide. Cheques or money orders, etc. must be in £ Stirling and made payable to British DX Club.

Hambleton Amateur Radio Society

At a recent meeting of the above society in Northallerton, **John G0VXH** was appointed secretary. The club holds a series of Thursday evening sessions and offers a good mixture of informal chat, operating experience, Morse practice and, if enough candidates present themselves, RAE classes.

There are also talks by experts and recent topics have covered test equipment, domestic television, RAYNET and operating abroad. A 144MHz club Net operates every Tuesday evening at 1930 on S18.

Members have also been actively involved in competitions as well as in an interesting young people in radio through a 'Technology Weekend' and a 'Thinking Day on the Air' station. New members and visitors are welcome and more details can be obtained from **John G0VXH** on **(01845) 537547**.

Special Event Station

The year 1996 sees the Irish Naval service celebrating its Golden Anniversary, 50 years of service. To highlight this special event, members of the Irish Naval Service, with help from EI7M, will operate a special event station **EI5INS** for the month of July 1996.

The event will operate from the Irish Naval Base, which is located on the islands of Haulbowline in Cork Harbour and from EI7M Club Station at Poer Head. To mark this memorable event, a total of seven unique QSL cards will be available.

The cards will give a history of the Irish Naval Service with a different card available for each band worked. The bands are: 1.8, 3.5, 7, 14, 21 and 28MHz Modes will be both c.w./s.s.b. with local operation on 144MHz.

More information about this special event can be obtained from **Stephen Nolan EI9HC, Mannix McAlister EI5HB, QTHR,** or **Communications Division, Naval Base, Haulbowline, Co. Cork, Rep. of Ireland.**

Society Of Stroud

The **Stroud Radio Society** meet on alternate Wednesday nights at the Minchinhampton Youth Centre near Stroud. It is very much an active society who are regularly heard in the contests and are also known for activating Steep Holm Island in the Bristol channel every three or four years.

The society have their own shack and although the antenna system leaves much to be desired, they can be heard calling CQ on club nights. Members would be particularly interested to hear from anyone in arranging a schedule.

The society actively encourage the up and coming amateurs with practical help and advise. They also collect all sorts of unwanted electronic junk to help raise the necessary funds to keep the society going.

On August 25th a radio rally car boot sale will be held, near Stroud, a large venue within easy reach of the motorway. This promises to be a big event with amateurs from all over the country buying and selling.

Several traders have already booked sites and anyone requiring further information can contact the secretary on **(01453) 8362006** or FAX on **(01453) 836245** during office hours or **886964** evenings.

Logo For Canadian Amateurs

'Club Spotlight' has heard from **Jim Hatch G3OOL** regarding a new logo. The 11-pointed Maple leaf plus the eleven smaller maple leaves depict the ten Canadian provinces together with the Yukon and North-west Territories. The light-ning flashes are there to remind the world that Canada has made good use of radio for over three quarters of a century to enable those who live in its remotest parts to have contact with the outside world.

Contact has been provided through the Canadian Broadcasting Corporation and the Canadian Army Signals' whose network throughout the north relayed messages and weather reports to places such as Vancouver, Edmonton, Winnepeg, Toronto, Montreal and Halifax. Also via Radio Canada International (RCI) the world service of the CBC that keeps it's Canadian sons and daughters informed of news from home.

In this vast country, the Canadian Amateur came into their own and when posted to the remoter regions, whether it was with the Hudson Bay Company or some other pioneering company. A friendly amateur back near their home town was always ready to pass family messages to loved ones.

Canadian Amateurs have played a great parts in AMSAT right from its conception and now lead the world in another first with IPARN, an amateur satellite system to allow communications anywhere in Canada using 144MHz equipment. Basically, it has been set-up to co-ordinate Search & Rescue and the Emergency Measures Organisation in dense and sparsely populated areas of the country.

Why you may ask, has an organisation like this been set-up in the UK and Europe? The answer is because at the end of the Second World War over 9000 Canadian servicemen decided for one reason or another to live here in Great Britain.

Some of those had radio operating experience, plus the fact that even today Canadians are coming to Europe on business or for pleasure, with the reciprocal licensing arrangement that are in place it is always nice to meet and catch up on the news from the grass roots so to speak. Canadians above all love to chat!

New Repeater Equipment

The **Fenland Repeater Group** have now installed new equipment in the GB3FR v.h.f. repeater, located on the Lincolnshire Wolds. It consists of a Tait 800 base, kindly donated by Tait Mobile Radio of Huntingdon, Cambs. This presently utilises MkI Sheffield University Logic, which permits sub-audio or 1750kHz tone access.

The transmitter uses a stacked pair of folded dipoles and the receiver uses a 3dB gain collinear. The site has full battery back-up with a reduced TX output to allow uninterrupted operation in case of an emergency.

The coverage now conforms well to the designed coverage maps and good reports have been received over the period the new system has been in use.

The Fenland Repeater Group also manages the u.h.f. repeater GB3SO located in Boston.

Vince Edwards G8NGZ holding the new repeater equipment accompanied by Len Badderley G8LXI, the repeater keeper.

Send your club information to Zoë Shortland at the PW Offices.

RADIO Diary

Compiled by Zoë Shortland

1996

May 12: The Drayton Manor Radio & Computer Rally will be held at Drayton Manor Park, near Tamworth. Trade stands, Bring & Buy, flea market, local clubs and special interest exhibits, licensed bar and a fun day for all the family. **Peter Haylor G6DRN** on **0121-443 1189, mobile (0860) 657468** evenings please.

***May 17/19:** The Dayton HamVention, the largest amateur radio show in the world, is taking place at the Hara Convention Centre in Ohio. Doors open at 12pm on the 17th and the event runs until early afternoon on the 19th. For the early risers, the Flea Market is open from 6am on the 17th. You will be able to visit many trade stands, attend lectures and meet amateurs from all over the world.

May 18: Ipswich Computer Show, Willis Corroon Sports & Social Club, The Street, Rushmere St Andrew, Ipswich. Doors open 10am to 4pm. **Sharward Promotions, Upland Centre, 2 Upland Road, Ipswich, Suffolk IP4 5BT. Tel: (01473) 272002.**

May 18/19: The Yeovil Club's Amateur Radio Convention Weekend. **Note! This year it's at a new venue in Sherborne, Dorset.** Saturday 18th is amateur and family activity day and convention dinner and Sunday 19th is the 12th QRP Convention at the Digby Hall, Sherbourne. Talks, competitions, displays, selected traders, food, etc. Open 9am to 5pm. Admission/prize draw is £2. Talk-in on S22. For full details contact **G3CQR, QTHR** or telephone **on (01935) 813054.**

May 19: Trafford Rally (The Great Northern Rally), new venue, The George H. Carnall Leisure Centre, off Lostock Road, Urmston, Manchester (junction 4, M63). There will be the usual traders and attractions, ground floor location, refreshments, catering and licensed bar. Admission is £1.50, OAPs £1 and under 12s free. Free parking for up to 300 cars. Doors open 10.30am, till 5pm. Talk-in on 2m S22 via GX1TRC. **Graham G1LJK** on **0161-748 9804.**

May 19: Dunstable Downs Radio Club present the 13th Annual National Amateur Radio Car Boot Sale at the Stockwood Country Park, Luton, near junction 10 M1. Open from 10am until 5pm. Talk-in on S22. Free entry to the Mossman Collection of horse-drawn vehicles and craft museum. Plot details on **(01582) 613899**, pre-bookings for plots until May 14th. Plots can be purchased on the day.

May 26: The 20th annual East Suffolk wireless revival will be held at The Maidenhall Sports Centre, Stoke Park High School, Ipswich, Suffolk. Admission is £1.50 which includes car parking. Talk-in on S22 GB4SWR. There will be a Bring & Buy, car boot sale, vintage radio display, Novice stall, rig clinic, antenna test, RAIBC, BYLARA and RAYNET stands with lots, lots more. **(01394) 271257.**

May 27: Important dispersal sale of vintage radio receivers and equipment. Sale includes 'Spy' sets from Britain, Germany, Japan and USA, First World War spark transmitter, 1920s and 1930s domestic receivers. Entry to sale (in the Midlands area) by catalogue (cost £2, cheque or stamps only, admitting two people). Viewing from 8am. Full details of sale and venue from **Charles Miller, 'Larkhill', Newport Road, Woodseaves, Staffordshire ST20 0NP. Tel/FAX: (01785) 284696.**

June 2: The Ripon & District Amateur Radio Society are holding their 39th Northern Mobile Rally at a new venue - Ripon Racecourse. There will be all the usual traders, Bring & Buy and bar/refreshments, etc. Doors open at 11am (10.30am for disabled visitors). Access - follow signs to racecourse from A61 Ripon by-pass. More details from the Rally Manager **Gerald Brady G0UFI** on **(01765) 640229.**

June 9: The Aldershot Amateur Radio Rally will be held at the Badshot Lea Sea Cadets HQ, Lower Weybourne Lane, Badshot Lea, near Aldershot. Varied selection of traders with most aspects of the hobby covered. Local club stands, on site catering at low prices and ample car parking. Doors open 10am, entrance fee £1, which includes free raffle entry ticket. **Roland Brade G3VIR** on **(01252) 837860.**

***June 9:** The 27th Elvaston Castle National Radio Rally is being held at the usual venue, which is the showground of the Elvaston Castle Country Park. **Keith Ellis G1ZLQ** on **(01332) 662896.**

June 16: The Newbury & District Amateur Radio Society are holding their 9th Annual Radio Boot Sale at the Recreation ground, Cold Ash, Newbury, Berkshire. The site is just under two miles from the A4/A34 road junction and is well signposted. Admission and parking free for buyers and a generous plot will be available at £8 to those selling. Access allowed to the site for setting up from 8am. Refreshments/toilets/disabled parking and children's playground on site. Talk-in with GB4NBS on S22. Further information from **George** on **(01488) 682814.**

***June 30:** The 39th Longleat Amateur Radio and Electronics Rally, organised by the Bristol Group of the Radio Society of Great Britain will be held at Longleat Park, near Warminster, Wiltshire. A major feature of the rally will be the Bring & Buy section. There are also all the other usual Longleat facilities such as the Safari Park, House and beautiful lake and grounds. **Gordon G0KGL** on **0117-940 2950.**

***July 13:** Cornish Radio Rally. More information from **Ken G0FIC** on **(01209) 821073.**

July 14: The 16th Sussex Amateur Radio & Computer Fair is being held at the Brighton Race Course from 10am to 4pm. There will be over 100 trade stands, free parking and admission is only £1.50. The rally is one of the largest in the South of England. Refreshments and bars at reasonable prices. A rally not to be missed! **(01273) 501100.**

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

The Editorial staff of *PW* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.

Editor

* Practical Wireless & SWM in attendance

practical REVIEW

FT-3000M
144MHz Mobile Transceiver

By John Goodall G0SKR

John Goodall G0SKR took the latest offering from Yaesu - a high power 144MHz mobile rig on holiday over Easter and enjoyed himself as usual!

It would seem that most new mobile rigs seem to have just about exhausted all combinations for the usefulness of all the gongs, bells and whistles. But that's not so with Yaesu, the FT-3000M 144MHz mobile transceiver appears to have gone just one step further.

The move? it's a transceiver providing a maximum output power of no less than 70W! Not satisfied with stopping at simply a power output increase, Yaesu have also crammed the FT-3000M full with a host of useful features.

Upon removal from its packing, the FT-3000M reveals none of its hidden secrets, other than its twin rear-mounted fans. Its size, 220mm (from the tip of the front mounted tuning knob to the rear of the twin fans) x 140mm width x 40mm in height is around that of the average dual band rig.

The twin rear mounted fans give some idea of the unit's power. Things within the rig get somewhat warm with all that r.f. power!

Front Panel

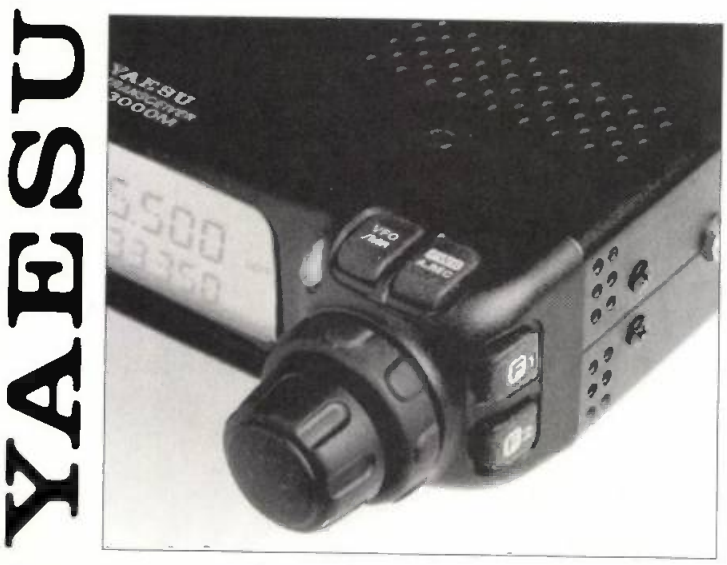
The front panel of the FT-3000M sports only five buttons besides the normal volume and squelch and tuning knobs. To say the front is uncongested is an understatement.

The tuning knobs, inner and outer, are for the size of the rig, exceptionally large. The outer being 29mm in diameter and the inner being 22mm diameter. These make operation, even mobile, extremely easy.

To the left of the front panel are located the volume and squelch controls. Immediately adjacent and to the right of these controls are found two clear l.e.d. indicators. The one next to the volume control, shows red when the transceiver is in transmit mode, the other, lights green to show a received signal.

The liquid crystal display (l.c.d.) unit on the front panel is a healthy 65 x 29mm. The one large and clear display giving visual confirmation of almost all the rig's functions.

To the right of this display are located the main tuning knobs. Between the main tuning knobs and the l.c.d., towards the upper edge of the front panel, there's a tear drop shaped clear button. This illuminates red when pressed, and is used for 'Smart-Search', searching between fixed points and logging busy frequencies.



The FT-3000M's main controls.

Control Buttons

Above the main tuning control knobs are two (large and easy-to-find and use) push buttons. The left one toggles between **VFO** and **Memory Channels**, while the right is used for **Power On/Off** and for **Audio Record**. (The audio record facility requires the installation of the additional DVS-4 Digital Voice Recorder).

To the right of the main tuning knobs can be found two similarly sized buttons, F1 and F2. The upper of the two (**F1**), allows instant recall of a **Home**, **Call** or often used frequency.

The lower button (**F2**), allows reverse repeater mode or allows you simply to listen on the repeater input. Both F1 and F2 can be programmed by the operator to almost any of the functions available to the rig.

The Microphone

Now where does the microphone go? Well, 44mm along the left side of the transceiver can be found the module socket for the plug on the microphone lead. (Oh, how manufacturers really make it difficult for hands free mobile operation!).

It's yet another type of module plug having only six contacts against the more popular eight contacts. The size again makes it even more of a problem, 10 x 7mm, and it appears not to be available from the average component supplier.

It may be legal to drive while holding a microphone on the other side of the Atlantic. But come on manufacturers, isn't it about time you considered the UK and European market for once? After all the FT-3000M is supposed to be a mobile transceiver and us humble UK Amateurs do try and operate within the bounds of the law, that is 'Hands Free' when mobile.

At least with the standard eight pin screw-on collar microphone plug we had a certain standard to work from, although the pin-outs varied with manufacturers.

Extra Controls

While on the subject of the microphone, besides the normal p.t.t. the following extra controls can be found. These, mounted on the front of the microphone (the MH-42 Condenser Microphone supplied with the review model) are two medium sized buttons, and two smaller controls.

The two medium sized buttons

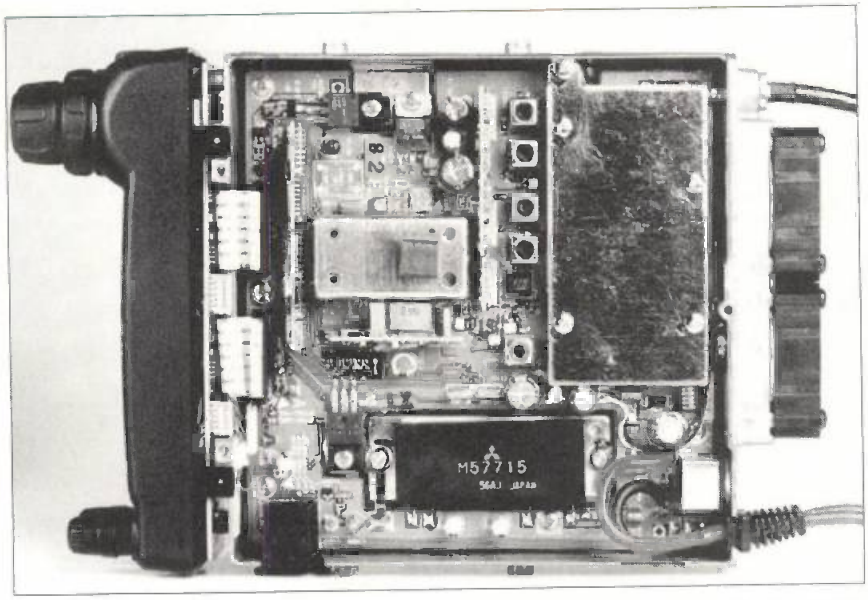
FT-3000M Review

Continued from page 21

are marked **ACC** for the upper and **VFO/MR** for the lower control. The **ACC** button in fact operates the 1750kHz toneburst. The **VFO/MR** control toggles between the VFO and Memory Channels.

Of the smaller buttons, the left-hand one marked **P1** toggles the four transceiver power output levels. These are **Low 1** (10W), **Low 2** (25W), **Low 3** (50W) and **High** (70W). And **P2** selects the bands.

On the top edge of the microphone can be found two medium sized buttons. One is for moving **UP** frequency or to a higher **Memory Channel**, and the other for **DOWN** frequency or **Memory Channel**.



Inside view showing the twin cooling fans (right).

Transceiver Memories

The FT-300M transceiver has 70 Regular Memories; 10 Programmable Memory Scan memories, 5 pairs of 2 frequencies. It also stores and one **Home Call** or often used frequency.

Yaesu's new rig also has an extremely clever Interactive Menu Programming system. Pressing and holding the **VFO/MR** button on either the rig or the microphone reaches this facility. The lower display on the screen prompts each query.

Alphanumeric display can be used for identifying memory channels. The set offers band scanning in **VFO mode**, memory bank scanning, programmed memory scanning, and priority memory scanning.

Many Secrets

Once installed, the FT-3000M revealed many of its hidden secrets. The extended receive facility being just one of the many. For example, the receiver covers the v.h.f. 'Airband' from 110 - 137MHz with a.m. being automatically selected within this range.

There's also no less than 50 (Yes fifty!) separate pages of scrolling menu functions are to be found within this rig. Quite amazing!

Powering up is achieved by pressing and holding for half a second, the **PWR** button, which is above the main tuning knobs. The display is clear and easy to read and is illuminated in a fluorescent orange.

Main Menu

The **Main Menu** is accessed by pushing and holding the inner main tuning control for over half a second. And in the upper left of the display can be seen the Menu Page Number.

By turning the outer tuning knob each page can be selected in numerical order. For example; select page 34 with the outer tuning knob and then with the inner knob, select one of eight display backlight levels: **1** = bright, through to **8** = dim.

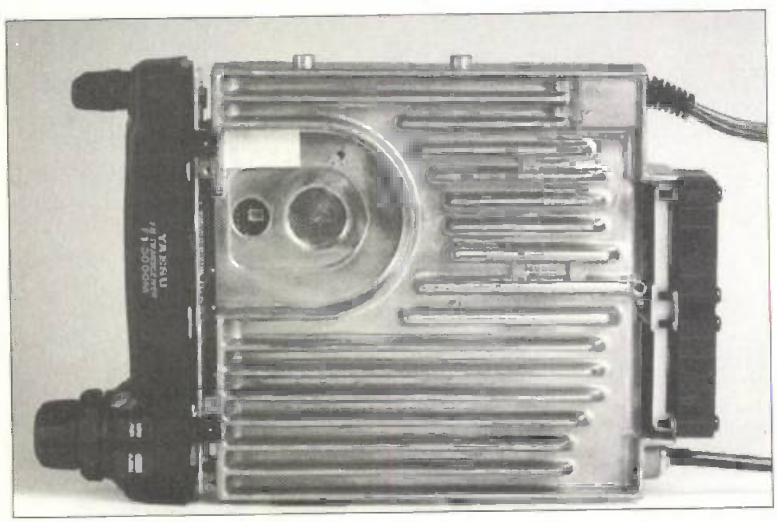
To return from Menu display to the Main display simply push briefly the inner main tuning knob. The display shows in large numerals, the frequency in operation with smaller numerals underneath showing the Sub-Display.

The Sub-Display can show one of five modes to be found on Page 33 of the Menu. Sub-Channel frequency can be displayed; Alphanumeric display to operators choice; Scrolling guide showing short messages across the lower display; Voltage of the power source displayed; Sub-Display OFF.

By a simple brief push on, the inner main tuning knob toggles between **Main** and **Sub** frequencies. With other menu pages this facility can be used for Dual- watch, Menu Page 26; Split frequency operation outside normal repeater offsets, Menu Page 44; Full Duplex (telephone style) operation with transmit on v.h.f. and receive on u.h.f., is also featured on Menu Page 44.

Spectrum Scope

The FT-3000M incorporates a very useful Spectrum Scope. This views channels or frequencies above or below the displayed frequency. It will operate in either **VFO**, displaying frequencies above or below that displayed, or in **Memory Mode** displaying Memory Channels above



Showing the massive heat-sinking. The moulding (top left) is for the loudspeaker.

Manufacturer's Specifications

General	
Frequency range	
Receive only	110 - 18 MHz; 300 - 520 MHz; 800 - 999MHz
Transmit	144 - 146MHz
Channel Steps	5, 10, 12.5, 15, 20, 25 & 50kHz
Frequency stability	±5 ppm from -5 to +60°C
Repeater shift	+600kHz (Programmable)
Emission type	F3 (F3E), F2
Supply voltage	13.8V d.v. ±15%
Current consumption	
Receive	<800mA(Signal) <500mA (Squelched)
Transmit	70 W(15A), 50W(10A), 25 W 7A) ; 10 W(5A).
Operating temp. range	-20 to +60°C
Case size	140 x 40 x 180mm (Excluding knobs)
Weight	1.25kg
Transmitter	
Output	70/50/25/10W
Modulation system	Variable reactance
Maximum deviation	±5kHz
Spurious emissions	>60dB below Carrier
Microphone type	2kΩ Condenser
Receiver	
Circuit type	Double Conversion Superheterodyne
Intermediate frequencies	45.05MHz & 455kHz
SINAD Sensitivity	<0.20μV (v.h.f.) <0.25μV(u.h.f.)
Selectivity	-6/-60 dB) 15/28kHz
Image rejection	Better than 70dB (v.h.f.)
Squelch sensitivity	Better than 0.12μV (v.h.f.) Better than 0.16μV (u.h.f.)
Audio output	2W @ 8Ω for 10% THD
Output impedance	4 to 16Ω (8Ω internal speaker)

or below that displayed.

Strong or weak signals are identified as such by a single zero for weak and stacked zeros for strong signals. To operate the Spectrum Scope, Menu Page 41 has to be selected. Then with the inner tuning knob, it was switched **On.**

The display **Signal** and **Power Meter,** which is an unconventional upward indicating display on the extreme left of the l.c.d., rolls upwards in **Scope Mode** to maximum, and returns to zero during Scope operation.

Setting-Up

Setting-up of the FT-3000M was accomplished with the help of several local and willing Amateurs. These included **John G0TZW** who assisted in the vehicle, and **Don G0IJE** and **Doug G0CZG** who assisted with reports from their respective home locations.

Doug G0CZG lives near the *PW* editorial offices in Broadstone and Don G0IJE towards the northern boundary of Bournemouth (both some distance from my home). A couple of hours of test transmissions followed.

With the various power output levels, the Voltage at Supply Display proved very useful. On High power the output of the vehicle battery was soon taken down to just over 11V. It wouldn't present any problem mobile with the engine running but even when stationary it would be best to keep the engine running.

Personally, I feel that for the average mobile f.m. operation 10W for the lowest setting is a little on the high side. I think 5W would have been more favourable.

Incidentally, the rear mounted twin fans are temperature operated and I thought the rig was going to go into total meltdown before they switched on. But in fact they did switch on with consistent accuracy at 35°C (That's hot!).

Fine Engineering

In conclusion, with the couple of points against the microphone, plugs and sockets, it's still a fine piece of engineering and a great deal of thought gone in to its production. I enjoyed using this remarkable transceiver with its many facilities. During many QSOs it got good reports on audio and provided good audio on receive.

I'm grateful to all those amateurs who helped during the review, particularly those mentioned. And also those who helped whilst I worked mobile into GW land over the Easter Holidays.

PW

After seeing a copy of G0SKR's review, Barry Cooper G4RKO of Yaesu UK Ltd sent is the following comments:

I read John's review with interest and was pleased he found the new FT-3000M extremely easy to operate and crammed full with a host of useful features. John also raises a point that I would like to comment on.

The microphone is fitted with a standard 6-pin connector, type RJ11, which is readily available from component suppliers such as Farnell or Maplins. Yaesu can also supply a made up lead suitable for connecting to a remote microphone or headset - we support all moves towards safe mobile operation.

Barry Cooper G4RKO

YAESU

My thanks to **Yaesu (UK) Ltd., of Unit 2, Maple Grove Business Centre, Lawrence Road, Hounslow, Middlesex TW4 6DR. Tel: 0181-814 2001,** for the loan of the review transceiver. The FT-3000M costs **£479** and is available from all Yaesu dealers.

The PW Easy 144MHz Amplifier

By Ben Nock G4BXD

Ben Nock G4BXD describes a 144MHz amplifier converted from a surplus a.m. transmitter which he says is both easy on the pocket and easy to build.

I don't know about you, but the hardest part of any construction project I find is the metal chassis bashing. This project simply takes a commercial item of gear, with all the required bits already fitted, and adapts it to Amateur Radio use. It also takes, what is in effect, turns an unusable bit of gear into a useful item.

The heading photograph, shows the transmitter before modification. After the modifications you have a mains powered 50W amplifier. And there's no drilling, no cutting large holes in steel for meters or valve bases, the p.s.u. is already built and the set only requires a simple tune up.

Pye Base

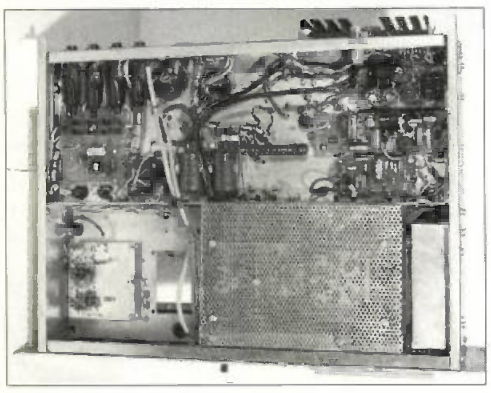
The gear in question is the Pye T30 a.m. transmitter, a base station unit. It runs a QQV060-40A in the p.a. stage, with built-in mains power supply. The transmitter is a 30W a.m. unit, available very cheaply on the surplus market.

There are six versions available and versions A, B & C should tune to 144MHz straightaway. Versions D, E and P are suitable for 70MHz and version E might even go onto 50MHz. (An S, V or N in the number refers to the original channel spacing and is of no real interest).

Warning: All the modifications I'm describing should only be carried out with the set fully isolated from the mains supply.

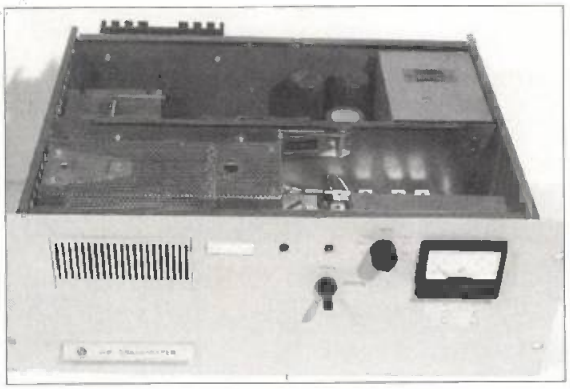
First Stage

The first stage of the project is to remove all the unwanted items from the set. The p.c.b.s that need removing are PCB 4 (the oscillator), PCB 12 (multiplier strip), PCB 10 (TX a.f. unit) and PCB 44 (audio pre-amplifier).



This underview shows the oscillator p.c.b., lower left, to be removed along with the two p.c.b.s above the p.a. mesh. Note: The p.c.b. at the top right hand corner, PCB1, is to be left in place and connected, although it will need lifting temporarily to help in removing the modulation transformer.

The crystal oven, if fitted, can be removed along with the modulation transformer. Then T2 and R37, fitted to the antenna changeover relay also needs removing but will be covered later. **Note: PCB 1, the a.f. driver board, must NOT be removed.**



The front view photograph shows the mod transformer to the rear left. This is removed along with the p.c.b. holding the small silver cans, just visible behind the meter/switch housing.

On PCB 12, unsolder the coaxial cable at the end of the p.c.b. nearest the p.a. compartment then cut the rest of the wires. On all the other p.c.b.s to be removed, you simply cut all the wires leading to them.

You will find that a few wire links come away completely. Remove them and then simply follow the wires back, cutting them at the other end. All the screened leads coming from the multi-pin socket at the rear (marked 'Facilities') can be removed.

Modulation Transformer

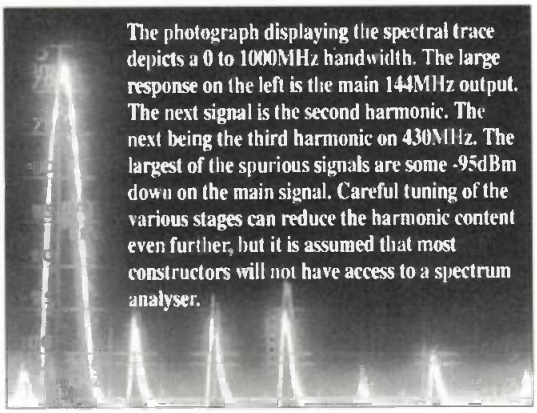
On the modulation transformer, the h.t. feed to the p.a. valve goes to Tag 5, and the p.a. to Tag 4.

Follow the wire from Tag 4 through to the stand-off just to the side of the p.a. underside. The wire that went to Tag 5 (a thick brown wire) is now routed and soldered to this stand-off. This connects the h.t. to the p.a. direct.

Now remove the modulation transformer by cutting the other wires off and un-bolting it. You'll need to carefully lift the a.f. driver (PCB 1) to get at the bolts holding the transformer to the chassis.

Next, remove R37 (2.2kΩ), this is found attached to the antenna changeover relay, under a small cover, itself under the bottom screening shield. Remove the shield, then locate the relay cover by following the coaxial cables down. Then unscrew and lift the cover and R37 can be seen attached to the relay along with one of the coaxial cables.

You'll have then completed the 'what needs to be removed' stage! Only a few additions are now needed, but no drilling, cutting, bashing, etc. of the chassis is required.



The photograph displaying the spectral trace depicts a 0 to 1000MHz handwidth. The large response on the left is the main 144MHz output. The next signal is the second harmonic. The next being the third harmonic on 430MHz. The largest of the spurious signals are some -95dBm down on the main signal. Careful tuning of the various stages can reduce the harmonic content even further, but it is assumed that most constructors will not have access to a spectrum analyser.

Antenna Relay

A further antenna relay is now needed along with some method of activating the changeover. If the driving rig has a p.t.t. output then this can simply be used, but assuming a hand-held or similar is to be used then some form of r.f. switching is probably the best method.

The circuit in Fig. 1 provides the necessary function. The new relay does not need to be an expensive 50Ω

type (except for the purists amongst you), any 12V type should prove satisfactory, as no high level r.f. powers are involved at this point.

The diagram, **Fig. 2,** details the new relay fitting. The centre connection goes to the socket marked r.f. on the rear. (The coaxial cable that originally went there now goes to the normally closed contact on the relay). The normally open contact goes to the driver coaxial cable that should have been unsoldered earlier on from the r.f. driver board, which protrudes in front on the p.a. compartment.

The relay coil is grounded on one side and goes to Pin 5 of PCB 9 on the other. The r.f. switch (made-up on tag strip) can be mounted near the new relay using one of the old screw posts.

Mains Transformer

Next, remove the cover from the mains transformer, where there should be a wire going to Tag 10. Move this to Tag 11, (this will increase the anode voltage to the p.a.).

Warning: A word of caution. You are dealing with 400 to 450V in this equipment. Whilst little in the way of wiring alterations are needed, you should bear these voltages in mind when working on the transmitter.

My advice is that when measuring anything that you use a 'crocodile' clip for one of the meter leads (I suggest the negative lead). Clip it to the case or the point of measurement, then with one hand behind your back use the other probe to test for volts, etc. This method ensures that you cannot be leaning on the grounded chassis whilst touching high voltage.

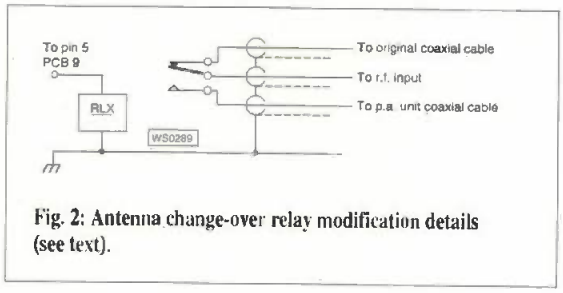


Fig. 2: Antenna change-over relay modification details (see text).

Power Amplifier

The power amplifier stage consists of a QQV03-10 and the '6-40A. The multiplier p.c.b. that was removed earlier in the conversion supplied about 300mW to the p.a. stage. So, any hand-held capable of at least 1/2 a watt is sufficient to drive the amplifier.

With the r.f. switching fitted applying about 200mW of r.f. to the input socket should trigger the amplifier to switch to transmit.

Alignment is a simple matter using the built-in front panel meter and an s.w.r. meter in line with the dummy load (**we should never tune up with the transmitter connected into the antenna should we?**).

Next, apply 144MHz r.f. to the input and, with the meter switched to **Ig Drive**, tune the variable capacitor situated just outside the p.a. cage behind the **On/Off** switch. Now tune for maximum meter deflection.

Then switch the meter to **Ig p.a.**, and tune the capacitor located beside the small valve in the cage. (You will need a long, small shafted screwdriver). You should also see some r.f. indicated on the s.w.r. meter.

Then switch the meter to **Ia p.a.** and (while watching the s.w.r. meter at the same time) adjust the big capacitor, marked **'p.a. Anode'**, for maximum r.f. output. The coupling and antenna tune can also be adjusted for maximum output on the s.w.r. meter.

Repeat the tuning of all the capacitors for maximum output. Once the set is tuned up on a particular frequency (let's say 145MHz for example) you might care to broaden its tuning slightly.

Broadening Tuning

To 'broaden' the tuning, set the input r.f. to 144MHz and adjust the first capacitor for peak output. Then set the input r.f. to 146MHz and adjust the **p.a. Anode** for maximum output.

The overall output will of course be lower, but it give a more even output across the band. If f.m. operation only is envisaged (say between 145 and 145.600MHz) then these can be the band limits used.

Regulated Supply

A more substantial 12V (13.8V) regulated supply, useful for feeding the driving rig can be derived from one of the now redundant modulation transistors. These are 2N3055 types, situated on the small heatsink pad behind the h.t. chokes.

The circuit, **Fig. 3,** is what's needed to help provide another power supply. The supply for the new regulator being taken off pin 4 on PCB 9, the existing regulator.

As there is a 5A fuse in the secondary supplying the regulator, it could be expected to provide at least a couple of amps at 12V. But you would hardly need that for a hand-held!

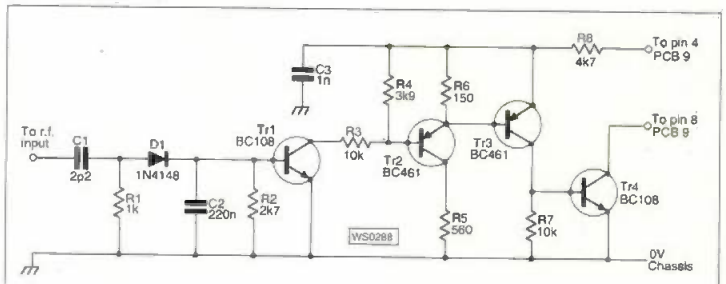


Fig. 1: Circuit providing modification for r.f. switching on the modified Pye transmitter unit (see text).

Modifications Completed

After the modifications I've described are completed the unit makes a nice, self contained amplifier and power supply. In use, you should get 40 to 50W out for 500mW input.

If you cannot get down to 500mW then a small attenuator will need to be fitted between the relay and the input to the p.a. compartment. (Too much drive will cause increased harmonic output and a poorer signal quality).

If the unit can be bought for a very low price then the few modifications I've covered will bring a substantial reward for a few hours work. Given even a basic level of competence, it should take no longer than a couple of night's work in the shack.

So, get busy with that soldering iron. You'll have fun and get 'an easy amplifier' for 'Two'!

PW

Shopping List for Fig. 1.
(See text for further details)

R1	1kΩ
R2	2.7kΩ
R3	10kΩ
R4	3.9kΩ
R5	560Ω
R6	150Ω
R7	10kΩ
R8	4.7kΩ
C1	2.2pF
C2	220nF
C3	1000pF
T1	BC108
T2	BC461
T3	BC461
T4	BC108
D1	1N4148

Extras (New components): Relay SPCO, with 12V coil.

Shopping List for Fig. 3.
(See text for further details)

R10	1kΩ
R11	330Ω
Tr5	BFY51
Tr6	2N3055
D2	13V Zener

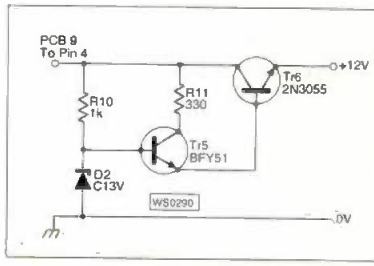


Fig. 3: Circuit of simple regulator unit employing otherwise redundant modulator transistors used in the a.m. Pye transmitter (see text).

14th Annual Practical 144MHz QRP Co

0900-1600UTC, Sunday 16 June 1996.

Contest Adjudicator Heill Taylor G4HLX reminds us that it will soon to be time to get the picnic basket out, search out a good site and get the portable rig ready for the annual PW QRP 'fun' contest.

The time is nearly here again to dust off the 144MHz portable equipment and take to the hills for a day of v.h.f. activity with your low power transmitter. It's great fun!

Anyone with a 3W transceiver, preferably s.s.b., can run an effective station in this event. And you compete on equal terms with the other stations in the contest.

Whether you go all-out to win the coveted Winner's Cup, to gain a certificate in one of our various categories (we issued 23 for last year's event), or just to enjoy the high level of QRP activity, you are sure to have a rewarding day.

For stations in Scotland, there is the **Tennamast Trophy 'In Memoriam To Frank Hall GM8BZX'** to strive for. This trophy, renamed and dedicated to the late Frank Hall GM8BZX (RSGB President 1990) will be awarded to the leading GM or MM station.

This year's **First Prize** for the **Overall Winner** is a **Yaesu FT-10R 144MHz hand-held transceiver,** worth **£249,** kindly donated by **Yaesu (UK) Ltd**.

The prize for the **Runner-Up** this year is **a Solar Laminate Panel** providing 2.5W at 12V, donated by **Bob Keyes GW4IED,** of **Key Solar Products.**

Presentation of the **Winner's Cup and Yaesu Prize, and Runners-Up** prize will take place on **Saturday 18 October** at the **1996 Leicester Show. The Tennamast Trophy 'In Memoriam To Frank Hall GM8BZX'** will be presented by **Beth Hall,** widow of **Frank,** at a venue (to be confirmed) in Scotland.

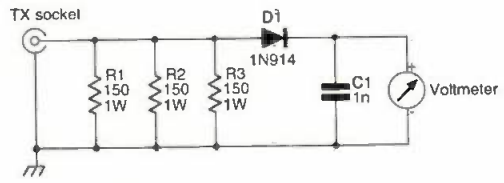


Fig. 1: Simple power reduction circuit (see text).

New To Contests?

New To Contests? If you've not entered a v.h.f. contest before, here's a great way to get started. You'll be joining many other regular v.h.f. contesters who had their first taste in the *PW* QRP Contest.

First of all though, how about getting together with some friends, perhaps gathering a group together from your local club? Then choose a site to use, a good hill-top portable site is best, but try to make sure no-one else is hoping to use the same spot!

Next, then get together the equipment you'll need. It's a good idea to have a 'dry run' long enough before the day to put right anything that needs attention!

A good s.s.b. transceiver, efficient antenna(s), low loss feeder, and of course some means of powering the station if you are going to be portable - these are the minimum requirements.

Of course, the more antenna gain you have, the better your signal. Some groups have used enormous arrays in past *PW* QRP Contests. But don't be over-ambitious for your first attempt!

To encourage simple stations, I publish a separate list of stations using only one antenna, with a certificate for the leader of these. So, you too could do well, even with a simple antenna.

Group Entry

Having a group entry made up of friends makes setting up and operating the station on the day of the contest a good deal easier. But don't be put off from having a go as a single operator, if you prefer.

Practical Wireless 144MHz QRP Contest 1996

Date	Callsign	Locator	Sheet No Of

Time UTC	Callsign	Report & Serial No		Locator
		Sent	Received	

Fig. 2: Sample log sheet for PW 144MHz QRP Contest (see text).

Wireless ontest

Do have a go. You might make it into our list of top ten single operators, or even get the certificate awarded to the leader.

Read The Rules

If you're entering the contest for the first time, you will, of course want to read the rules below thoroughly. And even if you've entered before (and are tempted to skip them) I ask that no matter how familiar you think you are with the rules that you **read them again carefully!**

And when preparing your entry, please make sure you include all the information asked for. It really does help my job as adjudicator **if you do your part of the job** well in the first place.

Important Rule Change

There is one very important change in the rules this year. The contest is **one hour shorter** than it has been before.

As discussed after last year's event, seven hours now seems to be long enough for the number of contacts that most stations manage to find. **So, the 1996 contest will finish at 1600UTC.** (I welcome comments from entrants about this change after we have seen how it works out).

As last year, the second session of the RSGB Backpacker's Contest takes place on the same day as the PW QRP Contest. But this year the **start times are co-ordinated at 0900UTC,** and the required contest exchange is the same for both contests (but note that the Backpacker's event ends at 1300UTC). This will make it straightforward for operators who want to submit their logs for both contests.

Internet Pages

Finally, if you have access to the Internet, you might like to look at the PW QRP Contest pages on the Web. These contain an archive of the results of previous years' events, and a sample log sheet and covering information sheet for you to download. The Internet address is http://www.rmplc.co.uk/eduweb/sites/ntaylor/pwqrp.html.

Let's hope for good summer weather, and really good propagation to give us all some DX contacts. Good luck, and I look forward to receiving your logs!

Neill Taylor G4HLX

Contest Rules

1. General: The contest is open to all licensed radio amateurs, fixed stations or portable, using s.s.b., c.w. or f.m. in the 144MHz band.
Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1600UTC on 16th June 1996.
All stations must operate within the terms of the licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300 and 145.500MHz) even for CQ calls.
Avoid frequencies used by GB2RS during the morning (144.250 and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes. Contest stations must allow other users of the band to carry out their activities without hindrance.
The station must use the same callsign throughout the contest and may not change its location.
Special event callsigns may not be used.

2. Contacts: Contacts will consist of the exchange of the following minimum information:
(i) callsigns of both stations
(ii) signal report, standard RS(T) system
(iii) serial number: a 3-digit number incremented by one for each contact, starting at 001 for the first
(iv) locator (i.e. full 6-character IARU Universal Locator for the location of the station).
Information must be sent to, and received from, each station individually, and contact may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.
If a non-competing station is worked and is unable to send their full universal locator, their location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full 6-character IARU universal locator must have been received in at least one contact with a station in the square.
Contacts via repeaters or satellites are not permitted.

3. Power: The output power of the transmitter final stage shall not exceed 3W p.e.p. If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter a.f.c. line, reached via the accessory socket.
The output power can be accurately measured using the simple circuit in, **Fig. 1.** Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a good whistle into the microphone.

4. Scoring: Each contact will score one point. The total number of points gained in the seven hour period (see rule change regarding length of contest) will then be multiplied by the number of different locator squares in which contacts were made (a 'square' here is the area defined by the first four characters of a universal locator).
Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = 5 x 52 = 260.
Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log, and clearly marked as a duplicate.

5. Log: The log submitted as an entry must be clearly written on one side only of A4 sized (210 x 297 mm) paper (the normal way up, not sideways), ruled into columns showing:
(i) time GMT
(ii) callsign of station worked
(iii) report and serial number sent
(iv) report and serial number received
(v) locator received (or location).
Underline or highlight the first contact in each of the locator squares worked.
At the top of each sheet, write:
(a) callsign of your station
(b) your locator as sent
(c) sheet number and total number of sheets (e.g. "sheet no. 3 of 5").
The sample shown (Fig. 2) illustrates how each sheet should be headed.

6. Entries: Accompanying each entry must be a separate sheet of A4 sized paper bearing the following information:
(a) name of entrant (or of club, etc., in a group entry) as it is to appear in the results table
(b) callsign used during contest (including any suffix)
(c) name and address for correspondence
(d) details of location of station during contest; for portable stations, a national grid reference is preferred
(e) locator as sent
(f) whether single- or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator, include a list of operators' names and callsigns
(g) total number of contacts and locator squares worked
(h) list of the locator squares worked
(i) a full description of the equipment used including TX p.e.p. output power
(j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) to measure the output power
(k) antenna used and approximate station height a.s.l.
Failure to supply the previous information may lead to loss of points or disqualification.
The following declaration must then be written and signed by the entrant (by one responsible person in the case of a group entry): "I confirm that the station was operated within the rules and spirit of the event, and that the above information is correct".
The declaration concludes the entry. It should then be sent, with the log sheets, to: ***Practical Wireless* Contest, c/o Dr. N. P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxfordshire SN7 8LX.** A large s.a.e. should be enclosed if a full set of contest results is required.
Entries must be postmarked no later than 1st July 1996. Late entries will incur a heavy points penalty.

Comments Welcomed
Any other general comments about your station, the contest and conditions during it are welcome. But please write them on a separate sheet of paper.
Photographs of the station are also invited (but please note that these cannot be returned). If these are not available by the time the entry is submitted they may be forwarded later, to arrive by 29th July 1996.

7. Miscellaneous: When operating portable, obtain permission from the owner of the land before using a site. Always leave the site clean and tidy, removing all litter. **Observe the Country Code.**
Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have an alternative site available in case this problem does arise.
Make sure your transmitter is properly adjusted and is not radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression.
On the other hand, be aware that your receiver may experience problems due to the numerous very strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the receiver input.
The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it's best to be able to switch it off when necessary.

8. Adjudication: Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts will carry a heavy points penalty. Failure to supply the complete information required by Rule 6 may also lead to deduction of points.

A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the adjudicator will be final.

The Dipole Antenna

Our Flexible Friend

By Matt Probert

Matt Probert who is an experienced and keen short wave listener, takes a look at the basic dipole antenna to demonstrate that it's a really 'flexible friend'!

One of the most common amateur radio antennas is the dipole. It's both simple to construct and convenient to erect.

The basic dipole is comprised of two straight conductors of equal length placed end-to-end close together. At the centres, where the conductors come together, they are fed by a twin conductor cable to a radio transmitter or receiver, see **Fig. 1**.

For transmission, radio signals supplied to the conductors forming the dipole should have a wavelength twice the combined length of the conductors. Standing waves are set-up on the conductors which energise the surrounding atmosphere, and thus radiation occurs. Similarly, incoming radio signals with a wavelength twice the combined length of the conductors cause voltages to be induced in them which travels to the connected radio receiver.

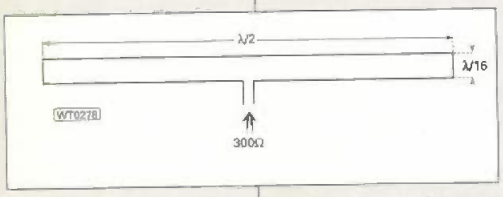


Fig. 2: A 'folded' dipole (see text).

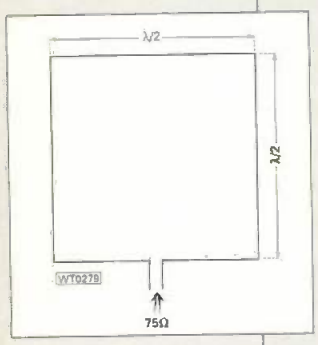


Fig. 3: Although not (strictly speaking) a derivation of the dipole, the loop antenna exhibits very similar properties to the basic dipole (see text).

The relationship between the antenna and the frequency at which supplied radio waves cause standing waves to be set up is referred to as 'resonance'. A dipole antenna exhibits resonance at frequencies where the total antenna length is a multiple of half wavelengths.

The property describes the dipole antenna as being 'harmonic'. It means that in practice a dipole antenna cut to a half wavelength at a frequency of 7MHz is also resonant at 14, 21 and 28MHz.

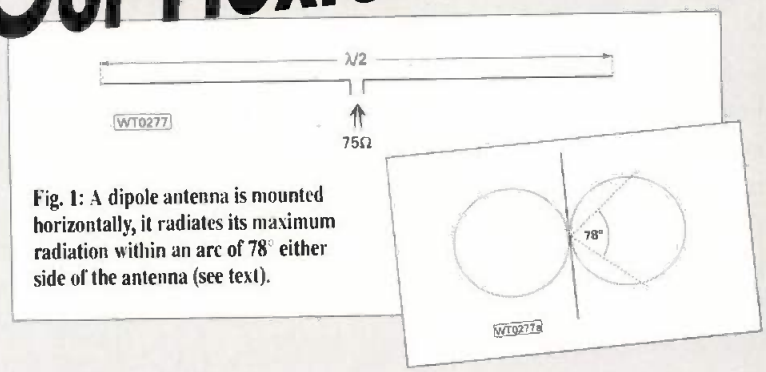


Fig. 1: A dipole antenna is mounted horizontally, it radiates its maximum radiation within an arc of 78° either side of the antenna (see text).

Harmonic Operation

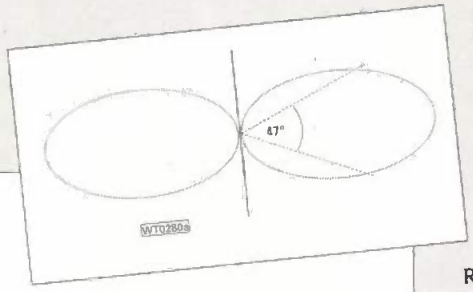
To the radio amateur harmonic operation of a dipole can mean that just one, cheap and simple antenna can be used for a number of wave bands. Very useful!

A dipole antenna may be erected either horizontally, in which case it will radiate and receive horizontally polarised radio waves. Or it can be erected vertically, in which case it will radiate and receive vertically polarised radio waves.

The impedance at the centre of a half wavelength long dipole is approximately 75Ω. This is a conveniently low value for easy matching into most modern radio equipment.

When a dipole antenna is mounted horizontally, it exhibits a bi-directional radiation pattern. In the horizontal plane it has a maximum radiation occurring within a 78° arc either side of the antenna, as shown in **Fig. 1**a. The centre of the arc is at right angles to the dipole.

If the dipole is mounted vertically, however, in the horizontal plane it exhibits an omnidirectional radiation pattern. In other words it's transmitting and receiving radio waves unidirectionally.



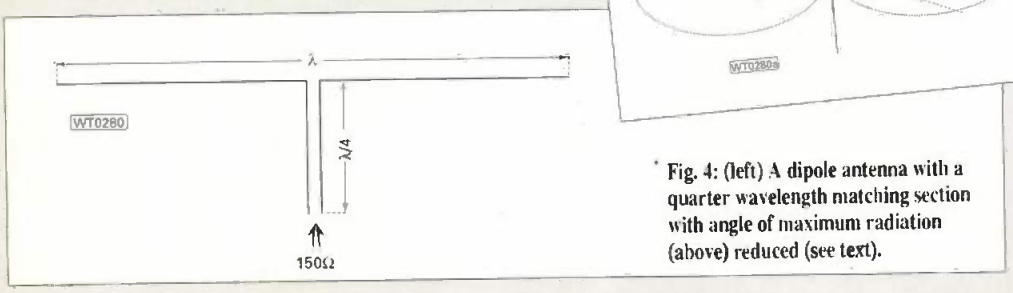


Fig. 4: (left) A dipole antenna with a quarter wavelength matching section with angle of maximum radiation (above) reduced (see text).

Higher Impedance

The basic half wavelength dipole may be given a higher feed point impedance of 300Ω by amending the basic antenna into the folded dipole illustrated in **Fig. 2**. This design is also resonant over a wider band of frequencies than the basic dipole and as such is more suitable for use on wide frequency bands, such as the 28MHz band.

Loop Antenna

Although it's not strictly speaking a derivation of the dipole, the loop antenna, illustrated in **Fig. 3**, is interesting. It exhibits very similar properties to the basic dipole, but can be erected where space does not permit a dipole to be erected.

The loop antenna exhibits the same bidirectional characteristics of the dipole. These, in the illustration shown are in the plane of the paper, just like the dipole in Fig. 1, and the folded dipole in Fig. 2.

From the **receiving station's point of view**, the loop antenna is more suitable than the dipole. This is because the loop antenna's greater physical size results in higher voltage levels being induced in it than are developed in a dipole.

Full Wavelength

Returning to the dipole now, and as the relative length of the antenna increases from one half wavelength through a full wavelength and onwards there are marked effects. The radiation pattern exhibited by the antenna becomes more

pronounced, and with the reduced angle of radiation so the 'gain' of the antenna increases.

The feed point impedance of the long dipole also increases which can provide some matching problems. To combat this impedance problem, a quarter wavelength matching section (often called a 'stub') may be connected perpendicular to the dipole as illustrated in **Fig. 4**. The impedance is thus reduced to a manageable level.

Going back to the radiation pattern of the long dipole, it will be seen from **Fig. 4a** that when a dipole is one full wavelength long, the angle of maximum radiation is reduced to 47°. Regrettably, when the dipole exceeds one full wavelength long, the radiation pattern becomes 'splattered' with minor lobes appearing which reduce the true bidirectional characteristics somewhat.

High Frequencies

At medium and high frequencies (below 30MHz) it's not often practical to erect a dipole vertically due to the height required. However, since most communications at these frequencies are with both horizontally and vertically polarised radio waves, the reduction in reception of vertically polarised signals is unimportant.

On the other hand, on v.h.f. and u.h.f. operating, radio waves tend to be either vertically or horizontally polarised. Because of this factor the limitation of not being able to receive one polarisation is more significant.

A pair of dipoles constructed into a cross design and fed in parallel, as illustrated in **Fig. 5**, are responsive to both forms of polarisation. However, a significant actor to bear in mind is that the feed point impedance is halved by this arrangement, to 40Ω with standard dipoles, and 150Ω with folded dipoles.

Radiation Pattern

The radiation pattern of a dipole may be compressed into one direction only. This is achieved by the placing, one quarter wavelength behind the dipole, of a second parallel element called a 'reflector'.

The reflector should be 0.52 wavelengths long. The directionality may be further enhanced by the addition of a third parallel element called a 'director' 0.14 wavelengths in front of the dipole.

The director should be 0.45 wavelengths long. This antenna arrangement is called a 'Yagi' and is illustrated in **Fig. 6**. **But, you must bear in mind that (as with the basic dipole when extra dipole 'elements' are added) the feed-point impedance is effected by the addition of extra 'elements'.**

Each extra element lowers the feed point impedance. Because of this impedance change, some form of matching is required to bring the Yagi antenna to either 50 or 75Ω (the latter being the commonly used impedance for radio and TV broadcast reception antennas).

The radiation pattern for a three element Yagi is illustrated in **Fig. 6a**. Further directors may be added to enhance the directionality of the Yagi.

Horizontal & Omnidirectional

A contrary situation occurs when it's desired to combine horizontal polarisation with an omnidirectional radiation pattern. A dipole may be bent into a circle so that the far ends come close together. But while this gives some resemblance of omnidirectionally, the radiated and induced voltages are both reduced resulting in poor performance in all directions.

A more effective solution is to connect three dipoles together in parallel as illustrated in **Fig. 7**. In this way the radiation patterns of each dipole complement the others to provide an omnidirectional radiation pattern.

Since the three antennas are connected in parallel, any transmitter power supplied is split three ways. This results in each dipole radiating less power than it would if the other two were not present.

However, as a receiving antenna the arrangement works very well due to its large physical size. The feed point impedance may be very low if basic dipoles are used (as mentioned with the Yagi configuration), but if folded dipoles are used then the feed point impedance is approximately 100Ω.

The basic dipole antenna is interesting. It's worth a second look and with care you too can get the best from our 'flexible friend' the dipole antenna.

PW

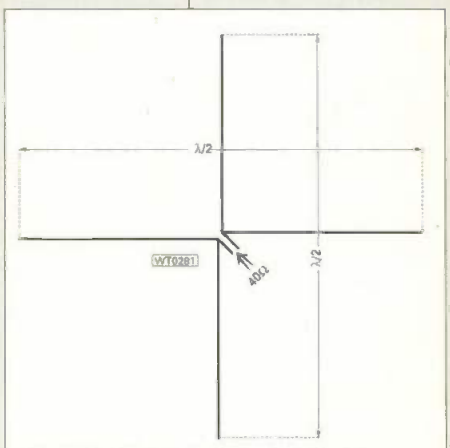


Fig. 5: Feeding multiple dipole antennas, although providing many advantages, also reduces the feed point impedance (see text).

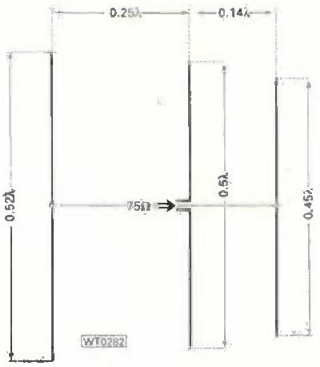


Fig. 6: The basic dipole antenna, used in conjunction with the familiar reflector and directors is known as the Yagi. The more elements used, the lower the feed impedance will become (see text).

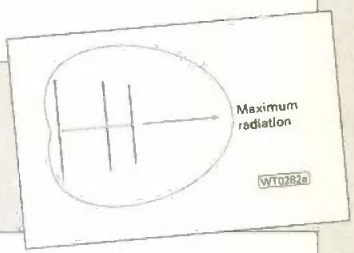


Fig. 6a: A three element Yagi and associated radiation pattern.

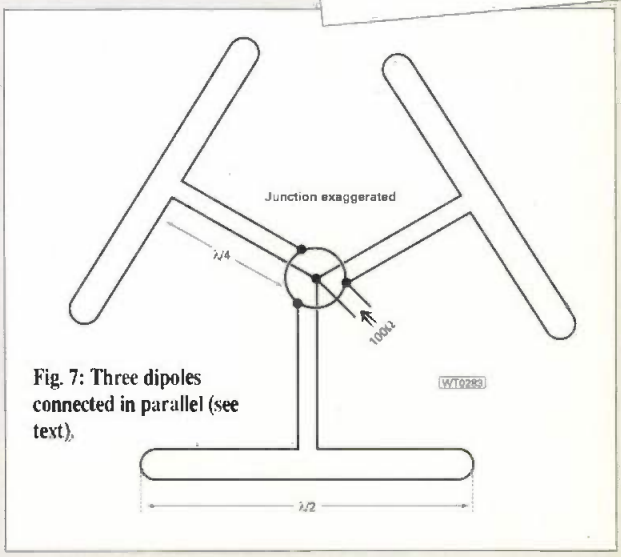


Fig. 7: Three dipoles connected in parallel (see text).

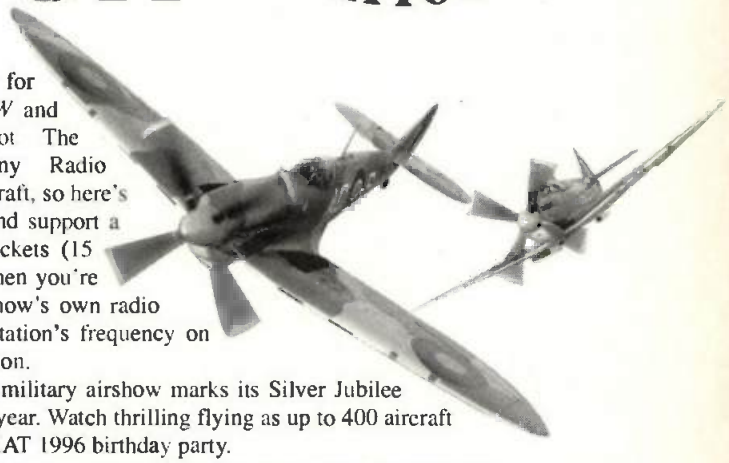
Further Reading

Antennas, by John D. Kraus, published McGraw-Hill (1988).
Fundamentals of Radio, Frederick Emmons Terman, published by McGraw-Hill (1938).
Radio Engineering, by E. K. Sandeman, published by Chapman & Hall Ltd (1953).
The Practical Aerial Handbook, Gordon J. King, published by Newnes (1970).
Radio & Television Engineers' Reference Book, J. P. Hawker (G3VA). Published by Newnes (1960).
Editorial note: Both Gordon King's book and that of Pat Hawker are often still available at public libraries.

Air Tattoo Competition

1971 1996 INTERNATIONAL AIR TATTOO 1996

The Royal Air Force Benevolent Fund's Silver Jubilee International Air Tattoo 1996 At RAF Fairford Gloucestershire 20 & 21 July.



You could attend the Air Tattoo for **FREE** by entering the joint *PW* and RAF Benevolent Fund 'Spot The Difference' competition. Many Radio Amateurs have an interest in aircraft, so here's your chance to enjoy a wonderful weekend and support a good cause at the same time, as 30 adult tickets (15 pairs) are on offer (worth £40 a pair)! And when you're on the way, don't forget to listen in to the show's own radio station on medium wave. Look out for the station's frequency on approach road signs, to hear the latest information.

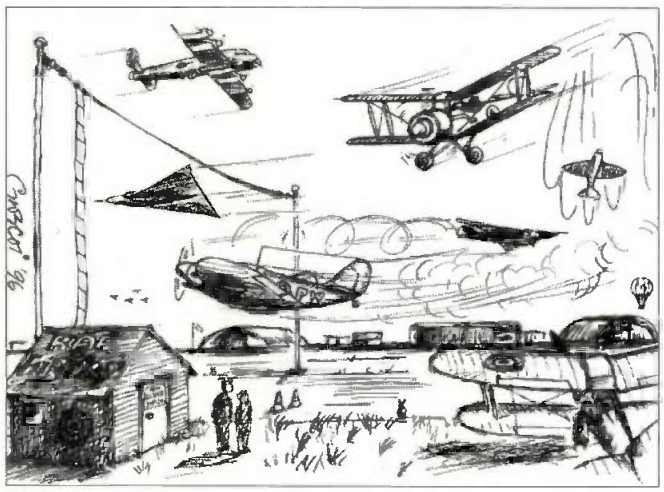
Join the celebrations as the world's biggest military airshow marks its Silver Jubilee with the most spectacular flying display of the year. Watch thrilling flying as up to 400 aircraft from 35 nations arrive at RAF Fairford for the IAT 1996 birthday party.

Crack aerobatic teams will be there too - including the RAF's 'Red Arrows' with their brand new routine for 1996 created for their world tour. Also showing their skill will be the Turkish Stars. La Patroille de France and other top teams from the international circuit. So don't miss the air show of the year!

Even though the RAF haven't let our cartoonist, Worthington loose on aircraft since the Second World War, he managed to get a 'sneak' preview of the flying rehearsal for the 1996 IAT. But, John's memory is failing him (although his humour never fails!) and he's made a few mistakes in the second picture. Find them all and you could win one pair of the 15 pairs of adult tickets we've got to give away in the competition.

Spot The Difference And Win Your Tickets!

Good luck and 'chocks' away'!



How To Enter

All you have to do is to mark the 12 differences on the second version of the cartoon, good luck. Then send your completed entry form (photocopies acceptable with corner flash to *Practical Wireless*, **AIR TATTOO Competition, June 1996, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. The Editor's decision on the winner is final and no correspondence will be entered into.

Name .....

Callsign .....

Address .....

.....

.....

Postcode .....

❒ If you do not wish to receive future mailings as a result of entering this competition please indicate. Entries to reach us by Friday 28 June 1996.

AIR TATTOO COMP JUNE '96

ICOM

IC-T7E Dual-Band FM Transceiver

By Tex Swann G1TEX

Tex Swann G1TEX takes a break from working as our Technical Projects Sub-editor to take a look at a dual-band hand-held fresh from the Icom stables.

I've looked at many hand-held v.h.f. and u.h.f. transceivers in the past, so the Editor asked me if I'd like to try another one. That's when I was offered the chance to try a new one from the Icom stable.

What did I think of this set? Ah well! You'll have to wait for my opinions while I describe it first!

So, let me start with what I found in the box that is about the size of two small ornamental bricks side-by-side. Inside the box I found a slim 30-page instruction book in English with a shirt pocket-sized multi-fold 'aide-memoire' quick instruction sheet.

Hand-Sized

The IC-T7E is a small hand-sized transceiver that almost immediately fell into the right position in my left hand. Like many people who are right handed, I prefer the radio in my left hand. And I noted that it felt right without any experimentation at all.

The transceiver sat on the heel of my left hand with the p.t.t. switch neatly under my left thumb. My fingers although curled around the set were not in any danger of pressing keys at the wrong time. A good start!

What astounded me was the p.s.u./battery charger. It's enormous compared to the rig! The output of 12V at some 200mA (nominal) is not enough to give full power on its own, but it looks as though it should.

If anything, I think the rig (including battery pack) is lighter than the charger. Mind you it pays to have a charger this size. I found I had inadvertently left it plugged in for about a week at one point and it wasn't even warm!

But back to the radio! It produces an incredibly clear audio signal, from what can only be a 25mm loudspeaker. I must also assume that the microphone is also somewhere behind that grill, as I cannot find a hole marked 'Mic'.

The 'on air' reports I received from those who know my voice were that the transmit audio was life-like. So, the hidden microphone was obviously working well!

The Controls

The controls on the IC-T7E are in four main areas. The main keypad with 16 (some have four separate functions) keys takes over the lower middle of the front panel.

Above and right of the keypad are the **Band**, **Tone** and **H/L** (High-Low and Set) buttons (all three are dual-function controls). The electronic power on/off switch is just above the keypad.

On the left hand panel of the set is the large 'soft action' p.t.t. button. Just to the left of the display, which occupied the top of the front panel, is a physical action **Lock** switch.

Just under the lock switch is the **Moni** button. This functions as a squelch defeat control.

However, the **Moni** button has a trick up its sleeve. It also works as a 'listen on input frequency' control when the transceiver is in repeater mode. (Very useful to find out if you stand a chance of using simplex with a station you're talking to on the local repeater).

Flicking the **Lock** button to the 'up' position disables most of the command buttons (except the **Power**, **p.t.t.** and **H/L**) buttons. Pressing any disabled button results in a 'bleep', to indicate that it has been pressed.

The final clutch of controls are on the top panel on the right-hand side. They neatly balance the BNC antenna connector on the left.

A concentric type rotary 'click' select control is provided on the IC-T7E, and this, along with the volume control fall easily to the right hand when the radio is in the left hand. If using the radio with only the left hand, then a bit of wriggling is needed to get to them easily.

Combination Sockets

Nestling in the middle of the IC-7E's top panel is the combination of 3.5 and 2.5mm microphone and earphone sockets (the microphone is 2.5mm). The manual provides a suggested circuit for wiring your own microphone and headphone.

Interestingly enough, both

The IC-T7E showing battery pack released from transceiver unit.

Manufacturer's Specifications

General	
Frequency Coverage	144.000-145.995MHz 430.000-439.995MHz
Tuning Step rates	5, 10. 12.5, 15, 20, 25, 30 or 50kHz
Frequency accuracy	± 5ppm (over 0 - 50° C range)
Antenna connector	BNC 50Ω
Battery packs	4.8 - 9.6V NiCad rechargeable or 4 x AA cell battery pack.
Exteranl power	4.5 - 16V at a maximum of 1.3A
Dimensions (7.2V/600mAh battery)	122 x 57 x 28 (h. w. d.) excluding antenna
Weight	320g with 7.2V/600mAh battery pack
Usanble temps range	-10 to +60° C
Transmitter	
RF Power	v.h.f. 4 / 0.5W (@13.5V) u.h.f. 3 / 0.5W (@13.5V)
Current drain	v.h.f. 1.2A High /0.6A low power (@13.5V) u.h.f. 1.3A High /0.6A low power (@13.5V)
Modulation Mode	F3E (f.m.) variable reactance
Deviation	± 5kHz (@25° C)
Spurious emissions	less than -60dB
Microphone impedance	2kΩ
Microphone socket	2.5mm 'stereo' type
Receiver	
Receive system	Dual conversion superheterodyne i.f.s 45.15MHz and 450kHz
Sensitivity	<0.16µ V for 12dB SINAD
Squelch sensitivity	<0.16µ V
Selectivity	More than 15kHz @ -6dB Less than 30kHz @ -60dB
Spurious rejection ratio	More than 60dB
Image rejection ratio	More than 50dB @ i.f./2
Audio Power	<250mW @10% distortion into 8Ω load
Current drain	v.h.f. 140mA (at 250mW out) or 16mA on power save u.h.f. 150mA (at 250mW out) or 19mA on power save
Receive Mode	F3E (f.m.)
Audio output socket	3.5mm 'stereo' (see text for limitations)

sockets are stereo type but only the tip and stem seems to be used in both cases. So, if you have stereo 'phones only one side will be 'live'. On the microphone plug a 3.5V supply is available to the ring connection, but doesn't seem to be used.

Under the power socket on the right hand panel of the rig is what I at first took to be the function button. That was until I found that pressing it. enabled the battery to be removed! It was at this point I found that the greatest part of the transceiver's weight is the battery pack.

Reading The Manual

I gave up looking for the **Function** button to get the other functions for the buttons - score 'minus one' to the big-head who thought he could get away **without reading the manual**. Now where did I put that manual? **The moral must be: Read the manual first!**

Take it from me, with the IC-T7E you will need to sit down and read the manual, and try everything out several times before you're familiar with the controls. But in essence, the action depends on press-hold or a 'tap' for operational purposes.

Any function that has a choice (such as tone, squelch, or offset) can be selected by the use of the main rotary control to cycle through the alternatives. A familiarisation session on first getting the radio, where you set all the various channels into the (up to 70) memories, would be very worthwhile.

Storing Channels

It's becoming the norm with hand-helds to provide many ways of storing channels frequencies into memory. Once there they may be scanned, skipped, or listened to depending on the mode the rig is working in.

With the IC-T7E there's a simple 'Channel' operating mode available. With this mode of operation (this function is selected by pressing **MR** while powering the set on. Repeating the action sets the rig back to normal use). Only frequencies programmed into memories are actually used.

The simple 'Channel' mode makes life so much easier where different operators have to use the set on several frequencies. This is especially helpful when the frequencies may be on either 144 or 430MHz.

Memories can contain an independent mixture of frequency, band, tone and offset information. The Icom IC-T7E also has built-in dual tone multi-frequency (DTMF) and continuous tone sub-audible squelch (CTCSS).

If the other station has DTMF, then you can set the IC-T7E up to act as a pocket 'bleeper'. You can hide it away and on reception of a signal with the correct squelch tone, it will beep for up to 30 seconds. You don't have to concentrate on all incoming calls, or even listen out for your callsign.

Pressing the '**T scan**'/'**#**' button for about one second sets the set scanning the range of CTCSS frequencies until the squelch has lifted. So, if a repeater uses tone squelch, you can find out what call tone it is, easily and with minimum fuss.

The manual is simple (Once I had determined to read it!) and has easy to follow instructions. It contains illustrations of what to expect on the display when carrying out the operation described. In all I found it a good example of how to create a helpful and informative manual.

My Opinion

So coming back to the original question, what is my opinion of the IC-T7E? In answer, I've a difficult job...just how can I pack my feeling into the time and space I have?

In fact, the transceiver is very capable. And it's capable of far more than I'll ever need. I'm sure anyone would find that this set will suit whatever they wanted from a dual band hand-held.

It's difficult to see how more functions and ease of use can be packed into a set (but you **must** read the manual to get all the information). I think the Icom IC-T7E is a rig to buy now and use for several years. The build quality would lead me to think it will give excellent service over that period.

I enjoyed using the rig for two reasons: I had a very capable rig that covered both 144 and 430MHz f.m. Additionally, I could verify that the dual-band antenna tuner unit that I looked at a few months ago actually does work with a single antenna and a dual-band transceiver.

My thanks go to Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741, FAX (01227) 741742 for the loan of the review unit which is available for £329 from Icom dealers.

PW

practical REVIEW

After seeing a copy of G1TEX's review, Dennis Goodwin of Icom (UK) sent us the following comments:

Thanks for letting me see a copy of the Icom IC-T7E review. I have nothing extra other than the fact the reviewer makes no comment on the price of the transceiver.

For a long time, Icom equipment has suffered criticism over high pricing, but although we've now managed to reduce the price of equipment, there's no mention of this (The IC-T7E is currently priced at £329, this is £100 less than our IC-W31E model) in the review. Other competing models are considerably more expensive. So, come on, if we have to suffer adverse comments on pricing, please be fair and give good reports when we can reduce prices!

Dennis Goodwin

Editor's comment: The reviewer, G1TEX was unaware of the IC-T7E's price when he had the rig over Easter. When I had the price confirmed by Icom Tex's comments were that the transceiver was "Good value for the money....and I can't fault it at that price".

Rob Mannion G3XFD

LOW PRICES and CU

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The PW Brassica

By Maurice Schofield G4WUP

Maurice Schofield G4WUP describes the PW Brassica, a vertical antenna that will fit in a 'cabbage-patch', and is suitable for most of the higher h.f. bands.

This antenna project was designed to fit in a small garden, hence the name 'Brassica' - 'Cabbage patch' antenna. It's actually a vertical monopole with loading coils and an 18.1MHz trap with a capacity hat.

The prototype, as designed, could be used on the 14, 18, 21 and 28MHz bands. On the 14 and 18MHz bands no tuner is required, but the assistance of a tuner is needed on the 21 and 28MHz bands.

The Brassica should give an s.w.r. of better than 1.5:1 on both the 14 and the 18MHz bands. But on the 28MHz band the antenna only covers about 28.15 to 28.6MHz with a reasonably efficient coverage.

Have a look at the drawing of the overall antenna as shown in **Fig. 1**. The overall height is about 3.3m from the ground.

When cutting the various lengths of aluminium tube, leave some 50-100mm extra on the length of the topmost (12mm diam) section. This will be trimmed to resonance later.

It's important that the base of the antenna is close to the ground (within 25-50mm) and is insulated from the ground mounting pole. (You must also keep the grass trimmed around the base if it's on the lawn).

The two main coils are made from 6mm aluminium rod (or tubing) wound around a 45-50mm former. This should give an internal diameter of around 55mm after winding. Pull the coils to the length shown, hammer the ends flat and drill suitable holes as shown in **Fig. 2** and **Fig. 3**.

Joining the antenna sections together (under the two large coils) are two Nylon 66 parts. The dimensions are as a guide and they should be made a tight fit on the aluminium tubing used. These items are shown in **Fig.s 4** and **5**.

Dimension B should fit inside the lower tube and dimension C inside the middle tube. It may be necessary to modify the sizes of the holes in the tops of the joiners to suit different diameter tubing.

The next part to be made is the antenna feed point adapter shown in **Fig. 6**. The main idea with this part, is that the outer of the SO239 socket **must be insulated** from the bottom antenna element. It might be possible to modify the base of a CB 'Silver Rod' style antenna by taking the base loading coil out, but I haven't tried that.

The outer of the SO239 socket must be taken, via a thick wire, to a ground spike close to the bottom of the antenna. This ground spike must make a good (low resistance) bond to earth to be effective.

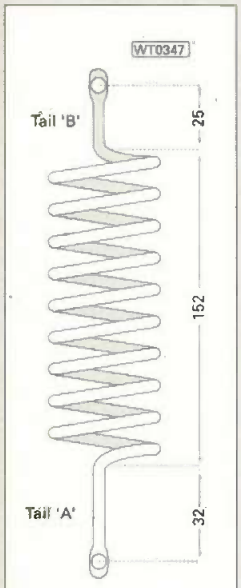


Fig. 2: Details of the lower coil. Made from 6mm diameter rod or tubing it should have an internal diameter of some 55mm.

Adjustments And Tuning

Now once you've built the antenna, it's come to the time of adjustments and tuning of the various sections of the antenna. After assembling the three main vertical elements and coils mount the antenna in the operating position.

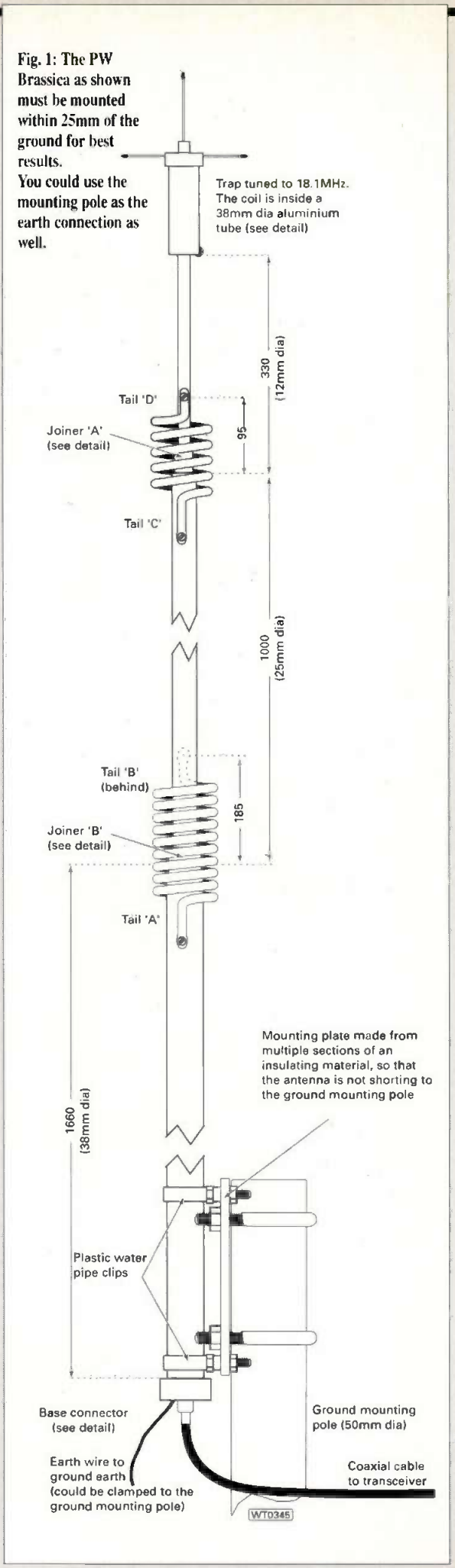


Fig. 1: The PW Brassica as shown must be mounted within 25mm of the ground for best results. You could use the mounting pole as the earth connection as well.

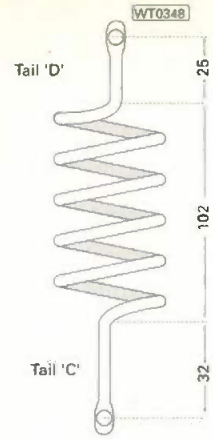


Fig. 3: Details of the upper coil. Made like the lower coil, (Fig. 2) it should also have an internal diameter of some 55mm.

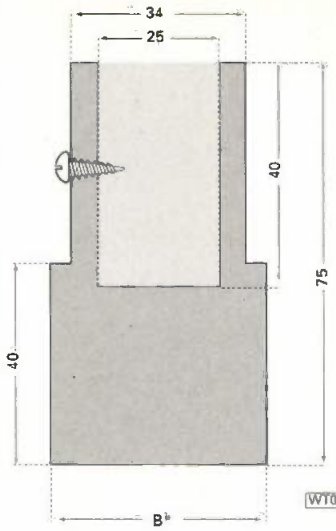


Fig. 4: The Nylon 66 joiner for the two lower sections of the antenna. Dimension B to be a tight fit inside the lower tube.

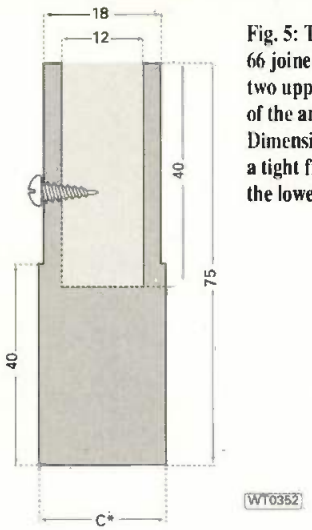


Fig. 5: The Nylon 66 joiner for the two upper sections of the antenna. Dimension C to be a tight fit inside the lower tube.

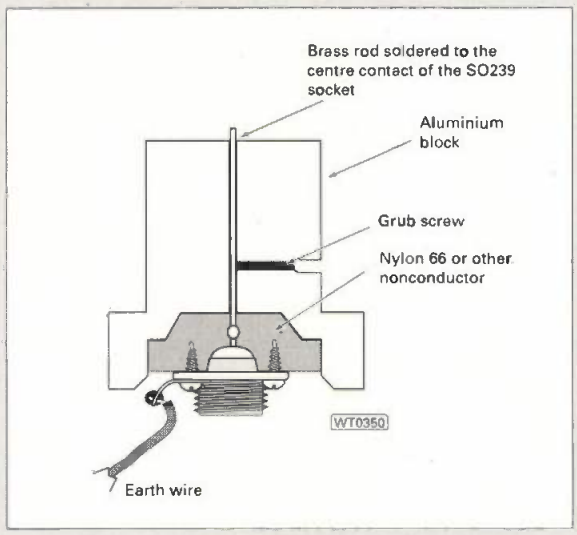


Fig. 6: The baseplate is made from a block of aluminium with an insert of Nylon 66 (or other insulating material) for mounting the SO239 socket on. The outer of the socket must not touch the metal section, but must be taken to a good earth point.

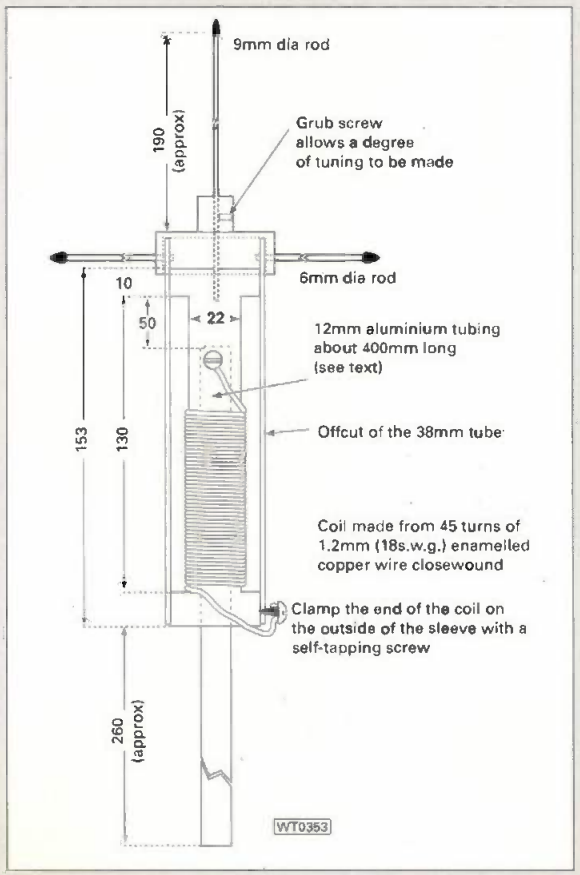


Fig. 7: Details of the 18MHz trap, the sleeve (an offcut section of 38mm tubing) must be a good friction fit inside the 'top hat'. See the text for details of how to tune the antenna itself before fitting the trap assembly.

You must now trim the topmost section of the antenna (without the trap section) to the centre of the 18MHz band. Or alternatively to the frequency of interest in the 18MHz band.

To tune the antenna, trim 5-10mm length off the top element while checking the s.w.r. above and below the frequency of interest. When the tuning is correct the s.w.r. will be at the lowest point at the centre frequency. At frequencies, above and below the centre tuned frequency the s.w.r. will have risen a little.

Now you come to fit on the trap and capacity hat section. These are shown in Figs. 7, 8 and 9. The 'top-cap' has the effect of allowing the whole antenna to tune to the 14MHz band. The trap itself is pre-tuned and needs little in the way of adjustment.

When fitting the vertical (9mm diameter) rod start with it a little overlong. To tune the antenna to the section of the 14MHz band the length of this section is adjusted, a few millimetres at a time, to give the lowest s.w.r. within the 14MHz band. Again the s.w.r. will rise above and below this centre frequency.

With my prototype Brassica I've had contacts over most of the world. So just because you only have a cabbage patch doesn't mean you can't 'propagate' well.

PW

Maurice Schofield has said that he is willing to manufacture and provide the various pieces that go to make up the PW Brassica. For the cost of the various sections please contact Maurice direct at **15 Holm Oak Gardens, Broadstairs, Kent CT10 2JF.**

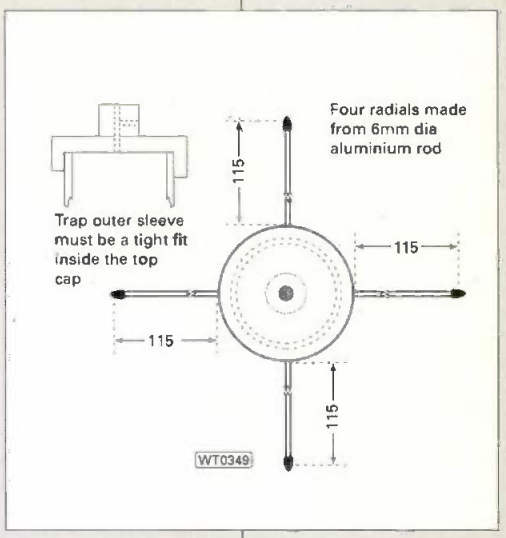


Fig. 8: Details of the 'top hat'. It's about 50mm in overall diameter.

Those Amazing Auroras

By Ian Poole G3YWX

As they're much in the news, Ian Poole G3YWX takes a look at the facts behind those amazing auroras. They're not just a wonderful sight in the northern night sky...they play a big part in radio propagation.

Auroras are a magnificent sight in the Polar night sky, taking the form of beautifully coloured glows gracefully changing and sweeping to and fro like shimmering curtains. The colours are usually greens and reds, although on occasions bluish tints can be seen.

Sometimes, very spectacular displays can consist of streamers of colours. These can change their shapes quite noticeably over a period of a few minutes.

Few people who have seen an aurora can fail to be moved by their magnificence. Unfortunately, most of us who live in the United Kingdom, are too far south to see one. (Although there was a remarkable event in the Autumn of 1989 which produced a pink, diffuse sky and was visible all over the south of England).

However, even if you've not seen the beautiful displays, you can get other benefits! This is because to radio amateurs, an aurora means that v.h.f. radio propagation will be greatly affected and there's the possibility of many DX contacts to be made.

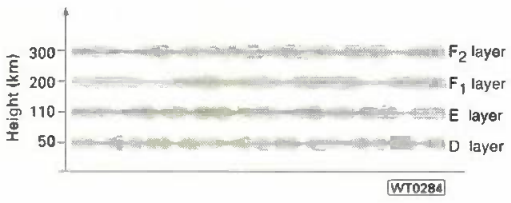


Fig. 1: The Ionosphere.

Dramatic Effect

An aurora can have such a dramatic effect on radio propagation. So it's interesting to look behind the scenes to see exactly what causes them and how they happen.

Auroras have been seen in the skies since the very earliest times. And although they have been studied down the centuries there are still very many questions to be answered.

The way in which auroras occur is very complicated, and it has only been since the advent of satellites that some of the vital data has been able to be collected.

Until the 1950s and the early 1960s very little was known about the process behind auroras. But, even with satellites, the data which is collected is not always easy to analyse and interpret.

In fact there are still many aspects about auroras which are not fully understood. Indeed not all the authorities on the subject agree with one another. Various theories are put forward by different scientists and they are modified in the light of new data, from month to month.

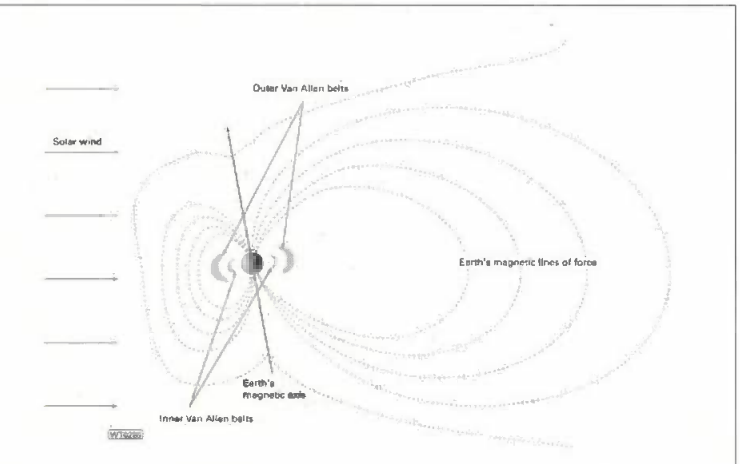


Fig. 2: The earth's Magnetosphere.

The effects of auroras on radio are not well documented in the books on propagation. At most they give a short explanation of some of the results.

Very few books investigate the causes. This is possibly because they have not been understood at all well for long. Also the way in which they occur is very complicated.

In fact it was the lack of information which started me investigating them as a home project. The results are given here, and hopefully the description will give a basic understanding of the topic which I found very fascinating.

Magnetic Storms

Let's take a look at the historical perspective where it has long been noted that there's a correlation between magnetic storms and visible auroras. Then in 1741, the Swedish scientist Celsius, famous for his development of the centigrade scale discovered that the auroral images aligned with the magnetic field.

Other observations were also made and one important factor discovered, was the number of sunspots. These were first observed by Galileo back in 1611.

Since Galileo's discovery, the number of sunspots has been continuously monitored. During the years 1645 and 1715 a distinct minimum was noted, and it was also found that very few auroras occurred during this time.

A study of auroras was made by Stormer in the early part of this century. In his studies, published in 1911, he put forward one of the earliest theories for their formation, saying that they were caused by the motion of charged particles in the geomagnetic field.

However, the main advances occurred with the advent of satellites. Some of the first were sent aloft in 1958. The American scientist James Van Allen studied the results from them and gave his name to some zones above the earth.

Since 1958 many far more sophisticated satellites have been used. The result is that more data has been collected about all the factors which affect the formation of auroras both visible and those which affect radio propagation.

Before looking at how an aurora takes place we must first discuss some of the major 'players'. And of course, the sun is the 'lead player'!

Sun Important

The sun is very important, being the source of heat for the earth on which we live. In fact it's a phenomenal source of energy of all forms giving very large amounts of energy to us even at a distance of 93 million miles.

To be able to provide the heat, the surface of the sun reaches a phenomenal temperature - 6000°C. However, the sun spots are comparatively cool - only about 4000°C!

In fact it's because the sun spots

Continued on page 40

Those Amazing Auroras

Continued from page 38

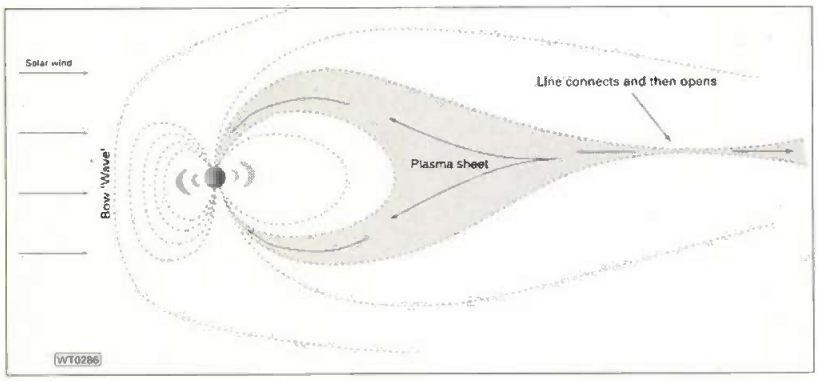


Fig. 3: The mechanism of an aurora.

are slightly cooler that they emit less light and appear as dark spots when an image of the sun is projected onto a card. However, these temperatures are nothing when compared to the core of the sun where the energy producing nuclear fusion reactions occur.

At the sun's core, the temperature is estimated to reach 10 000 000°C. Although this heat energy takes in excess of a million years to reach the surface of the sun.

In view of its colossal temperature, it's hardly surprising that the sun can be very violent often throwing off copious amounts of material. And in fact there is a steady flow of material called plasma which streams out from the sun.

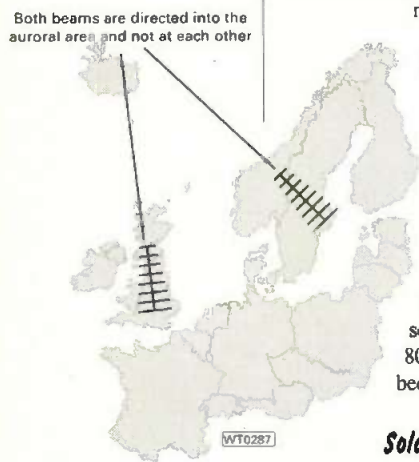
Hydrogen And Helium

Plasma consists mainly of hydrogen and helium molecules, and they are so hot that they are ionised, losing their electrons. Because of this the plasma is conductive, and as a result it's affected by any magnetic fields that are present.

The plasma stream is always present. It travels very fast, (about 300 or 400km per second when it reaches the earth). Fortunately, it's normally at a relatively low level (about 2 to 10 ions per cm^3).

However, both the figures I've quoted can vary quite considerably, rising dramatically when there are disturbances on the sun. At these times, speeds of 700km per second and densities of 80 ions per cm^3 have been noted.

Fig. 4: Backscatter (see text).



Solar Flares

Solar flares are also very important. These are actually enormous disturbances on the sun's surface. They vary in size, some being quite small compared to the others. But by any standards they are all colossal when compared to anything on earth.

Apart from varying in size, solar flares also vary in their formation and their effects. Some can be clearly seen using the correct visual apparatus, which projects an image of the sun on to a screen. **Warning: Never look directly at the sun, even through sunglasses or other dark material. (And don't even think of looking at it through a telescope!).**

Others flares cannot be seen, but instead they emit energy in the radio spectrum as well as X-rays and colossal amounts of plasma. In fact these 'invisible' flares are the most likely to cause auroral events.

Upper Reaches

The upper reaches of the atmosphere are also very important. This is where, extending up to altitudes of about 400km above the earth, the familiar D, E and F ionospheric layers, see **Fig. 1**, which give the normal h.f. propagation over long distances, are to be found.

Above the D, E and F layers are the areas of the magnetosphere, **Fig. 2**, where the earth's magnetic field extends. This magnetic field extends many thousands of kilometres out from the earth, but it's influenced by many factors from outer space.

Even so, a simplified illustration of the earth's magnetic field can treat our planet like a bar magnet. This magnet has its North pole inclined at about 11.5° away from the true north-south axis giving the magnetic north at about 78.5N 29°1 E and the south pole at 78.5°S and 111°E.

The magnetic field provides many functions. And the most obvious is that it's possible to use it to give an approximate indication of north and south. And although it's not particularly accurate and varies with time, travellers have used it for centuries, and even today with sophisticated satellite forms of navigation, the magnetic field is still widely used.

As Fig. 2 shows, the earth's magnetic field also extends out from the earth, reacting with the solar wind. The two interact, and the solar wind compresses the magnetic field on the sunward side of the earth.

However, on the other side of the earth the field becomes distended, as shown in Fig. 2. In general the magnetic field prevents the particles from the solar wind from entering the ionosphere, however some can enter through the cusps in the polar regions.

Van Allen Belts

One important area of the magnetosphere are the Van Allen Belts. These consist of two 'doughnut' shaped areas as shown in Fig. 2.

The lower of the belts extends from about 1000 to 5000km above the earth. While the outer one is between about 15000 and 25000km.

The Van Allen Belts consist of areas of electrons or protons with a surprisingly high energy which are trapped in the earth's magnetic field. The inner layer contains protons whilst the outer one contains electrons.

Solar Wind

Under normal conditions the earth's magnetic field is able to deflect the solar wind and the magnetosphere is not disturbed. However, on occasions, the solar wind increases and the magnetosphere is disturbed.

Solar flares are one of the main causes of disturbances. And as their frequency is closely related to the sunspot numbers it's found that they reach their peak just after the sunspot maximum.

Another source of solar wind is a coronal hole, a phenomenon which can occur even during solar minimum conditions. This explains why ionospheric disturbances occur even during periods of the absence of any apparent solar activity in terms of the number of sunspots visible.

When the solar wind increases a number of effects are noticed. One is that visible auroras are produced.

Visible auroras occur because the Van Allen Belts become overloaded with particles. This results in many of them 'spilling out' along the magnetic lines of force towards the earth. As they do so they collide with other particles.

Ionised atoms may then collide with other particles causing the molecules to split or they may combine with free electrons. In either

instance, light can be produced (the colour depending upon the elements involved).

In general the auroral colours are white, green and red. This is as a result of the nitrogen and oxygen which are usually involved in these collisions.

As the particles are charged they represent a current. This can result in a number of other effects being exhibited.

In the late 1980s a particularly intense aurora resulted enormous current surges on the power lines in North America. This caused very large areas of the continent to be blacked out and a large degree of embarrassment and cost to the electricity companies.

Radio Auroras

The way in which radio auroras occurs is very complicated. A vast number of different effects occur, some of which are in the upper reaches of the atmosphere while others are at great distances away from the earth.

As might be expected there are many stages to an aurora, and conditions vary widely during its course. The h.f. bands probably vary most of all, being enhanced sometimes, and totally blacked out at others.

After a flare has occurred, many effects are noticed. And one of the key elements in an aurora is that the plasma sheet on the side of the earth away from the sun becomes 'pinched' due to the variations in the plasma flow.

The 'pinching' effect draws plasma back up towards the earth as shown in **Fig. 3**. It then enters the upper reaches of the atmosphere at the north and south magnetic poles.

The particles pass through the outer parts of the ionosphere with little effect. However, as the altitude decreases they reach the E layer and things begin to happen!

In the E layer the particles start to collide with the gas molecules. This increases the levels of ionisation in these areas to a very large degree.

The result is that the ionisation reflects signals at much higher frequencies than normal. Communications can be established well into the v.h.f. portion of the spectrum and sometimes reflections have been detected at frequencies up to up to about 1000MHz. (This top figure is somewhat exceptional although the normal maximum for amateur communications is around 430MHz).

It's unfortunate for h.f. enthusiasts that many of the plasma particles travel on downwards into the D layer. This is where (again) the levels of ionisation are greatly increased.

The increased level of ionisation serves to absorb radio waves at much higher frequencies than would normally be affected. In this way much of the h.f. band communications can be blacked out.

During the course of a normal aurora the polar regions are affected first. Usually the polar cap absorption is confined to latitudes greater than 60°, although during some of the larger events this will extend a little further towards the equator.

Events Vary

Although different auroral events will vary widely from one to the next they will have many similarities. And often the event will commence with a number of small flares.

The small flares cause the level of solar radiation to increase and this brings an improvement in h.f. band conditions. Coupled to this, the solar noise also rises.

The small flares are only a precursor to the main flare which occurs causing a sudden ionospheric disturbance. At this point the h.f. bands close for a short while. However, they soon recover as there's an increase in solar flux.

About 20 to 30 hours after the original flare the solar wind 'shock wave' hits the earth causing a magnetic storm. The h.f. bands fail and a full aurora starts.

Propagation on v.h.f. will then be enhanced and contacts can be made over distances of a several hundred kilometres. Then having reached a peak the aurora ends and the h.f. bands slowly recover, with the low frequencies being useable first.

For the h.f. operator there is little that can be done during an aurora except to patiently wait while the bands are recovering. This (unfortunately!) can take up to a week before they are back to the state they were before the storm.

However, for the v.h.f. operator there are exciting possibilities of DX, and contacts can be made over many hundreds of kilometres. But, as the ionisation is concentrated around the poles communication is only possible at certain latitudes.

In the UK v.h.f. operators in Scotland, Northern England and Northern Ireland are best placed. Despite this, it's possible for stations in Southern England to use it when there is a large aurora.

Interestingly though, stations in Southern Scotland and Northern Ireland seem to be well placed for making some of the longest distance contacts, although stations further north will see more auroras.

Beams Essential

Beams are essential for auroral working. They should be turned towards the north, pointing into the auroral zone. Signals are then reflected back, i.e. using back-scatter.

'Back scattering' means that the beam heading for the optimum signal will not be in the direction of the station being contacted. Indeed, the direct path may is more than likely to be off the back or side of the beam as shown in **Fig. 4**.

Auroral propagation distorts any signal badly. Speech transmissions can be very difficult to copy, particularly wide band modes. However, on occasions s.s.b. can be used. Naturally c.w., occupying a very narrow bandwidth as it's very resilient to distortion. So, because of this, c.w. is by far the best mode to use.

But even c.w. becomes distorted, having a very rough tone superimposed onto it. This can vary from one aurora to the next, or even during the course of an event.

Typically, signals flutter very rapidly because of the changes occurring in the ionosphere This flutter can even be so fast that it appears as a low frequency tone or buzz up to 50 or 60Hz.

In addition to the auroral tone, there's a Doppler shift added to the signal. This is caused by millions of plasma particles entering the ionosphere. Each particle will give a minute point for reflection and each will have a different velocity. This means that the Doppler shift will have a spread of frequency shifts, resulting in the very distinctive hissing sound. As a general rule the average frequency shift at 145MHz is about 500Hz.

Nature Simplified

My quick look into the nature of auroral events has been simplified to a large degree. The full explanation is not fully understood by those involved in its study full time and I've no doubt that any of you who saw the recent BBC TV 'Horizon' programme on BB1 TV found it as fascinating as I did!

What we do know about auroral effects is that it's caused by an exceedingly complicated interaction between a large number of effects. Research involves a complicated mix of astronomy, physics and radio.

But despite its complicated nature any radio amateur or short wave listener can benefit from a study of the nature of propagation. It's fascinating!

Even though the basic concepts of auroral propagation have been understood for many years there's still a vast amount to learn about the subject. In fact in writing this article I have discovered just how little I know! **PW**

BBC Television 'Horizon' Programme

Early in 1996 BBC1 television in the UK featured a documentary programme on auroral studies and the American Alaskan 'artificial auroral' studies. Unfortunately, the BBC are no longer producing booklets for this excellent series and transcripts are no longer available. However, I contacted the BBC direct and they inform me that they now have a page on the 'Internet' **http://www.bbcnc.org.uk/tv/horizon/index2.html** where further information can be obtained.

Further Reading

HF Communication Science and Technology, by John M. Goodman Published by Van Nostrand Reinhold ISBN 0-442-00145-2

Radio Auroras by Charlie Newton G2FKZ Published by RSGB ISBN 1-872309-03-8

Meteorological and Astronomical Influences on Radio Wave Propagation. Edited by B Landmark, Published by Pergamon Press

'The Society's IGY Aurora Programme' by Charles Newton G2FKZ *RSGB Bulletin* May 1966 and December 1966.

'VHF Report' *Practical Wireless* **(March 1996) by David Butler G4ASR.** (This column regularly deals with auroral propagation and the March column was devoted to the subject). Back numbers available from Editorial offices.

Trapezoids, Triangles & Squares

By Patrick Allely GW3KJW

All is not 'square' in locator 'circles! Patrick Allely GW3KJW explains the mysteries behind the various locator systems.

"My locator is IO72pt, or if you prefer the old system, it is XM17j and my WAB location is SH22". That statement, and hundreds of others similar, heard regularly and especially on the v.h.f. bands, have become accepted as part of the mystique of amateur radio.

The 4, 5 and 6 symbol codes mean a lot to some people and absolutely nothing to others! They are the cause of great confusion and listening around the bands, and I find that surprisingly few people know how to relate a geographical location to a locator code.

Once upon a time, when radio amateurs spoke to each other, not only did they give their name, but also the name of their location. Or they stated its distance from the nearest well known place.

For instance, I might say, 'I am located 15km south west of Pwllheli in the village of Y Rhiw'. And to anyone with a reasonably good knowledge of my part of Wales, such information is sufficient.

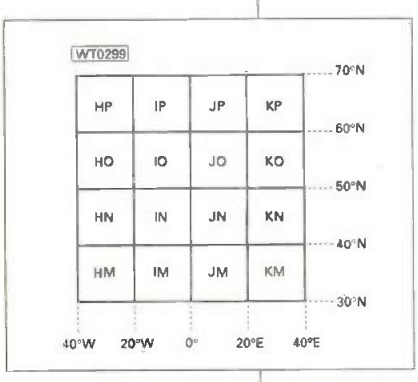


Fig. 1: 'Fields' of Western Europe (se text).

However, to the average amateur, this does not convey any useful idea of location. Additionally, the listener's perception of the correct pronunciation of 'Y Rhiw or Pwllheli' may vary so widely from the true one as to make it unrecognisable.

To avoid the location problem on the h.f. bands, it would be easier to say, 'I am located in North Wales'. This is precise enough for, say an American, who states that he is located in Texas, a state bigger than the United Kingdom!

On v.h.f., amateurs desire to know what distances they can work. They like to 'collect' squares and they wish to know bearings.

Generally they don't wish to struggle to understand a location known in a tongue foreign to them, especially when band conditions may be marginal. Locator systems obviate the necessity for tackling sometimes 'jawcracking' place names and speed up the whole process, although my knowledge of geography suffers somewhat.

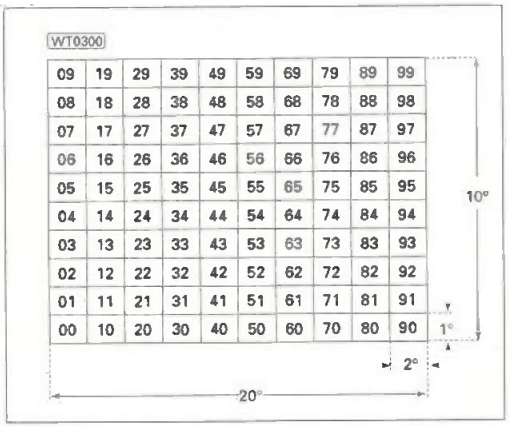


Fig. 2: Showing numbered 'squares' (see text).

Longitude & Latitude

Two of the locator systems in use are based on longitude and latitude and can easily be written into a simple computer program. But, more satisfyingly (and with a little bit of patience) can also be worked out with pencil and paper. The third system is based on a true grid system.

The systems are:

1: The Maidenhead of World Wide Locator system.

2: The European Locator system.

3: The Worked All Britain locator system. (This is a simplification of the Ordnance Survey National Grid, and used as such, is not an accurate means of establishing a precise location).

To understand any of the systems, you must have the basic knowledge of how to read a map. You must also be able to obtain your bearings in degrees and minutes.

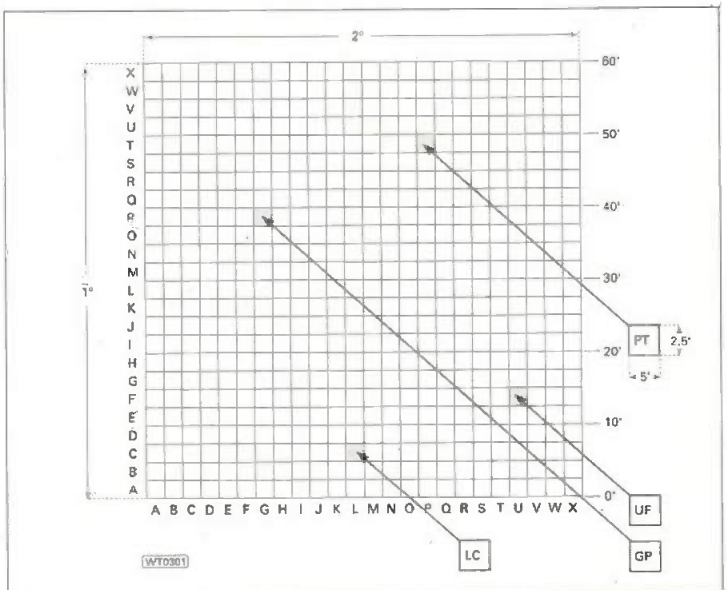


Fig. 3: Showing the final grid of the Maidenhead System (see text).

Continued on page 44

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ECC35	7.50	GY501	3.00	UCL83	3.00	6CB6A	3.00	12BE6	2.50
ECC81	3.00	GZ32 Mull	8.50	UF89	4.00	6CD6GA	5.00	12BH7A GE	7.50
ECC82	3.00	GZ33	6.00	UL41	12.00	6CL6	3.75	12BY7A GE	7.00
ECC83	3.50	GZ34 Mull	15.00	UL84	3.50	6CG7	7.50	12DW7	15.00
ECC85	3.50	GZ37	6.00	UY41	4.00	6CH6	5.00	12E1	15.00
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ECF80	1.50	KT88 China	12.00	VR150/30	2.50	6DQ5 GE	17.50	30P19	2.50
ECH35	3.50	N78	9.00	Z759	10.00	6DQ6B	12.50	300B(PR)	110.00
ECH42	3.50	OA2	2.70	Z803U	25.00	6EA8	3.50	572B	95.00
ECH81	3.00	OB2	2.70	2D21	3.50	6EH5	1.85	805	50.00
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ECL82	3.50	OD3	2.50	4CX250B STC	55.00	6FQ7	7.50	811A	18.50
ECL83	3.50	PCF80	2.00	5R4GY	6.00	6GK6	4.00	812A	65.00
ECL86	3.50	PCF82	1.50	5U4G	5.75	6H6	3.00	813	27.50
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EF37A	3.50	PCF801	2.50	5V4G	4.00	6J5	3.00	866A	25.00
EF39	2.75	PCF802	2.50	5Y3GT	2.50	6J6	3.00	872A	20.00
EF40	5.00	PCL82	2.00	5Z3	4.00	6J7	4.00	931A	25.00
EF41	3.50	PCL83	3.00	5Z4GT	2.50	6JB6A GE	19.00	2050A GE	12.50
EF42	4.50	PCL84	2.00	6AH6	4.00	6JS6C	20.00	5751	6.00
EF80	1.50	PCL85	2.50	6AK5	1.50	6JE6C	20.00	5763	10.00
EF85	1.50	PCL86	2.50	6AL5	1.00	6JS6C GE	20.00	5814A	5.00
EF86	10.00	PCL805	2.50	6AM6	2.00	6K6GT	3.00	5842	12.00
EF91	2.00	PD500	6.00	6AN5	5.00	6K7	4.00	6080	7.50
EF92	2.00	PL36	2.50	6AN8A	4.50	6K8	4.00	6146B GE	15.00
EF183	2.00	PL81	1.75	6AQ5	3.25	6L6G	10.00	6550A GE	25.00
EF184	2.00	PL82	1.50	6AR5	25.00	6L6GCSYL	12.50	6883B GE	16.00
EL32	2.50	PL83	2.50	6AS6	3.00	6L6GC Siemens	7.50	7025 GE	7.00
EL33	10.00	PL84	2.00	6AS7G	9.50	6L6GC GE	12.50	7027A GE	20.00
EL34 Siemens	8.00	PL504	2.50	6AT6	2.00	6L7	3.50	7199	12.00
EL36	4.00	PL508	5.50	6AU5GT	5.00	6L06/6JE6C	20.00	7360	25.00
EL80	25.00	PL509-519	7.50	6AU6	2.50	6Q7	4.00	7581A	15.00
EL41	3.50	PL802	4.00	6AW8A	4.00	6RHH8/6KN8	12.00	7586	15.00
EL81	3.00	PY81	1.50	6B7	4.00	6SA7	3.00	7587	23.00
EL84	2.25	PY88	2.00	6B8	4.00	6SC7	3.00	7868	15.00
EL86	2.75	PY500A	4.00	6BA6	1.50	6SG7	2.50	Prices correct when going to press	
EL91	3.00	PY800	1.50	6BA7	5.00	6SJ7	3.00		

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Trapezoids, Triangles & Squares

Continued from page 42

World Wide System

The 'Maidenhead' or 'World Wide Locator System' is the method generally used, and came into use on the 1 January 1985. It replaced the European system and has now, after initial resistance become accepted.

Maidenhead is based on bearing co-ordinates. And the basic unit or 'Field' it uses is an area of 10° of latitude by 20° of longitude.

In other words, a 'Field' could be bounded by the co-ordinates 50°N to 60°N and 0° to 20°W. (This is in fact the 'field' **IO** which covers most of the United Kingdom and Ireland. The 'field' covering the adjoining 20°E i.e. from 0° to 20°E and from 50°N to 60°N is **JO** field and so on, as in **Fig. 1**.

You'll see from Fig. 1, that as Lizard Point, Isles of Scilly and the Channel Islands are south of 50°N, but between 0° and 20°W, they fall into 'field' **IN**. Similarly anywhere east of the Meridian (Kent, East Anglia, etc.) falls into 'field' **JO**, a fate shared with a number of countries in Western Europe!

Must Start Somewhere

The 'field' system must start somewhere! So, a flat map of the world was used, and the bottom left hand corner of which was the co-ordinate 90°S and 180°W - at the South Pole.

From the South Pole point of reference, a 'field' was created covering the area 10°N of the South Pole and 20°W. This was then designated AA and all other 'fields' are projected from this original 'field'.

You will see that the letters of the English alphabet can be used. This is because only a maximum of 18 letters are needed, (360°/20° = 18 on the east/west bearing and 180°/10° = 18 on the north/south bearing) a total of 324 'fields' the final one being designated RR.

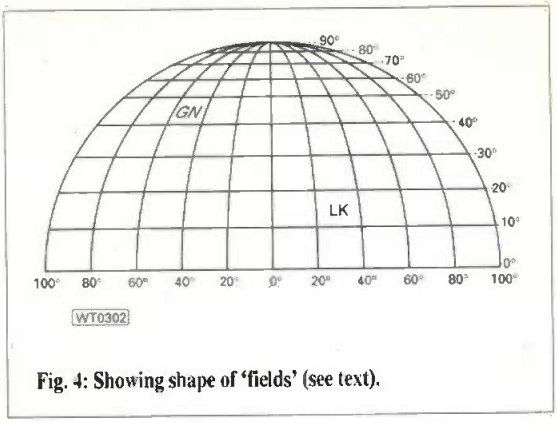


Fig. 4: Showing shape of 'fields' (see text).

Having established the basic 'fields' then 10° x 20° areas are divided into 100 'squares' each 1°N by 2°E or W. A grid of 10 by 10 and each of these 'squares' is numbered, again starting at the bottom left hand corner. The initial 'square' is 00 and the number increased upwards and outwards, see **Fig. 2**.

Even the division by 100 is not precise enough. So the 'squares' are subdivided into smaller 'squares'.

Fortunately for mathematicians 2° is 120' and 1° is 60', both divisible by 24. This results in a grid of 24 by 24 being created, splitting up the large 'squares' of 1° by 2° into 576 small 'squares' each bounded by 2.5'N or S by 5'E or W.

Little Squares

The little 'squares' are identified by letters using the English alphabet from A to X. And again they start at the bottom left hand corner, as in **Fig. 3**.

You can now establish the Maidenhead locator of any spot in the world if the longitude and latitude are known. Take, for example, the co-ordinates 52°48'50"N and 4°40'30"W. The 'field' IO encompasses 50°N to 60°N and 0° to 20°W, so 52°N and 4°W must be in the IO 'field'.

Any location between 4°-6°W on the horizontal line must be 7 and any location on the vertical line between 52°-53°N must be 2. **Note that since I'm working to the west of the meridian I am reading the 10 by 10 grid from right to left.** This provides the locator IO72.

Taking the final two letters, 40'30" (which corresponds to the letter 'p') and 48'50" (which corresponds to the letter 't') the full Maidenhead Locator is therefore IO72pt. This is precise enough for most purposes.

Of course, it could be worked out by computer slightly more quickly. But what's the use of a computer if you don't understand what you are computing? In any event most computer programs involving locators tend to ignore the seconds of arc and give a slightly inaccurate answer.

A point to bear in mind is that even though the 'fields' or 'squares' are equal in degrees, they are not equal in physical size. Additionally, you should realise that not one of them is actually 'square', and at best have only two parallel sides.

The world is round and so all lines of latitude converge at the poles making the area of 'squares' bigger around the equator than they are at the poles. Some 36 'fields' are more like little triangles with only one straight line and two curved sides. These are the 'fields' that meet at the poles (see **Fig. 4**).

European System

The European Locator System, which is now little used came into being in 1969 and is very similar to the Maidenhead. (I'm including it in this article because a number of 'diehard' v.h.f. enthusiasts dislike the Maidenhead and insist on using the older system. Fortunately, for all intents and purposes, the systems are interchangeable and conversion can quickly be made!).

Since the system was intended for use in Europe, there being comparatively little interest in long distance v.h.f. communication in other parts of the world, the European system is not valid outside Europe.

The European system is also based on a series of 'squares'. Its basic unit being bounded by 1°N by 2°W.

In the European system 'squares' are designated by two letters using all 26 letters of the English alphabet. They commence with AA bounded by the reference co-ordinates 40° to 41°N and 0° to 2°E then working upwards and outwards, as in **Fig. 5**.

The 'squares' are subdivided into 80 smaller squares in a grid of 8 upwards and 10 across each smaller square being 7.5' by 12'. These squares are number 1 to 80, as in **Fig. 6**.

Finally, the small 'squares' are again subdivided into 9 by forming a grid of 3 by 3. Each small 'square'

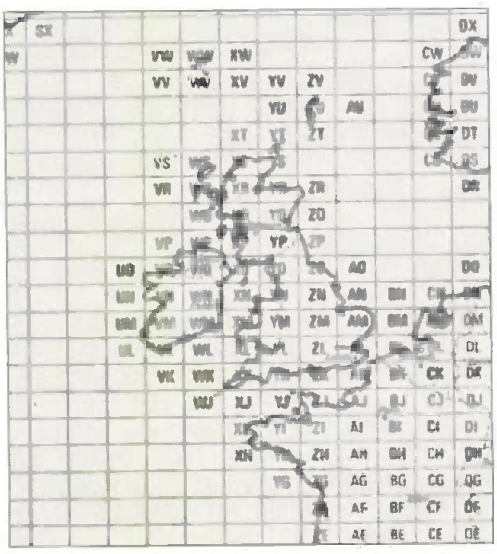


Fig. 5: The European Locator system.

covers an area of 2.5' by 4' and these smallest 'squares' are lettered a to j missing out the letter i, as in **Fig. 7**. (This gives a slightly more accurate fix than the Maidenhead system, but since the same locator code can be repeated at a different location many miles away, there can be some confusion).

To demonstrate, I'll take the example used previously (52°48'50"N and 4°40'30"W). Anything between 6° and 4°W must be in the X line and anything north of 52° but not greater than 53°n must be in the M line horizontally.

So, 52°N, 4°W is in the 'square' XM. 48'50"N is between 45' and 52.5' and must be in the line 11-20 whilst 40'.30" is between 36' and 48' so the second number must be a 7. The total of the number is 17. (The result is now XM17).

Finally, the difference between 52.5' and 48'.50" is 3'.40". This is between 2.5' and 5'N on the little grid and 48' minus 40'30" = 7'30" which is between 4' and 8' on the little grid so indicating the final letter j. The full location is therefore XM17j. (Perhaps it's just as well that this system is falling into disuse!).

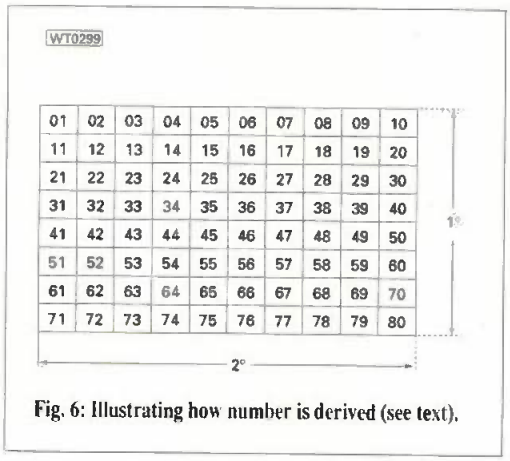


Fig. 6: Illustrating how number is derived (see text).

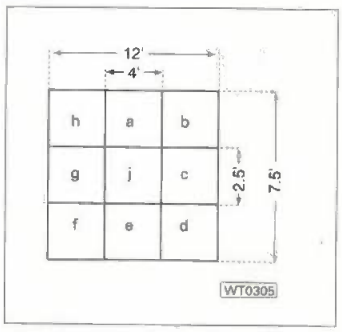


Fig. 7: Showing how final number is determined (see text).

Worked All Britain

Finally, there's the Worked All Britain System. This is a simplification of the Ordnance Survey National Grid and is not based on longitude or latitude.

The origins start over 200 years ago when mainland Britain was mapped accurately for military purposes and a grid system was devised to correctly locate any spot. This system, refined and corrected is still in use today and is based on squares which are true squares.

The British Isles are divided into 500km squares each labelled with a single letter from A to Z, missing out the letter I to avoid confusion and set in a grid of 5 by 5. The point of reference being the bottom left hand corner of the S square which is in the Atlantic south west of the Scillies **(see Fig. 8)**.

Each of the big 500 by 500km squares is again divided by 25 smaller squares in a grid of 5 by 5 and lettered in the same way. And it follows that there's now a grid of 100 by 100km.

The 100 x 100 area is designated by the primary letter for the 500km square and the secondary letter from the secondary grid, ie. SH. This 100 x 100 square is divided again by 100 giving a grid of 10 x 10 reducing the area to 10km x 10km.

These squares are numbered 0 to 9 both vertically and horizontally. The final position is indicated by combining the number east of the lettered square with the number north of this square.

or example, SH22 will be 20km to the east of the SG/SH border and 20km north of the SN/SH border. This puts a location within an area of 100 square km - in fact, two locations in SH22 could be 14km apart (this is not an accurate system of location and was not intended to be).

To continue with the Ordnance Survey National grid and show it's precise accuracy, the 10 by 10km grid is again divided by 100 in a 10 by 10 grid. Each area is now being 1km by 1km and this again is divided again by 100 leaving a final area of 100 x 100 metres, precise enough for most purposes. (As a matter of interest 52°48'50"N 4°40'30" corresponds to SH228279).

Only The UK

The WAB system can only apply to the United Kingdom. And I often feel slightly irritated when I hear UK amateurs asking Irish amateurs for their WAB location!

Fortunately, the Irish are very tolerant and take the mistake in good humour. One day, no doubt, an amateur from Dublin or Cork perhaps, will ask a UK amateur for his 'Worked All Ireland' locator!

Once you have established your own locator and know the locator of a distance station it's a simple matter to then calculate the distance and the relative bearings. This can be done with a computer, pocket calculator or with a set of mathematical tables, the formula being:

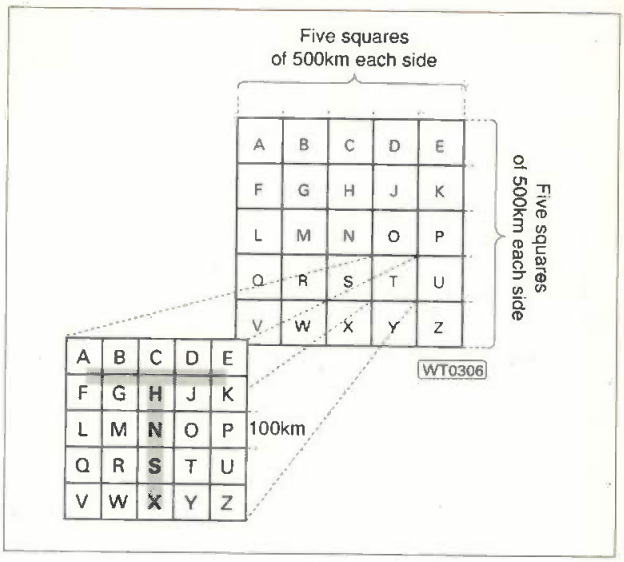


Fig. 8: Showing how 'Primary' and 'Secondary' letters are derived (see text).

$$\cos(D) = \{\sin(A) \times \sin(B)\} + \{\cos(A) \times \cos(B) \times \cos(L)\}$$

Where
A = Home latitude
B = Distant latitude
L = Longitudinal difference between A and B.
D = The angle of arc between A and B

1° of arc = 111.1km or 69.00 miles
1' of arc = 1.85km or 1.15 miles = 1 nautical mile

Knowing D then the bearing can be calculated using

$$\cos(C) = \frac{\sin(B) - \{\sin(A) \times \cos(D)\}}{\cos(A) \times \sin(D)}$$

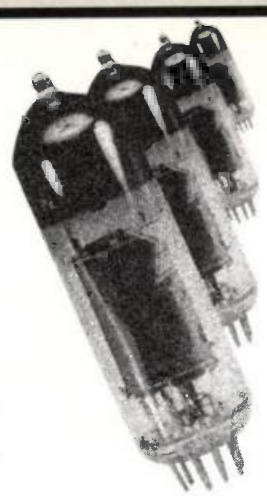
For stations in the Southern Hemisphere latitudes must be shown as negative. Cos(L) is positive between 0° and 90°. Negative between 90° to 180°.

(Sin(A) and Sin(B) are negative in the Southern Hemisphere).

Finally, although it looks a little complicated...it's not. A simple pocket calculator with sine and cosine functions will do all the hard work and provide an accurate answer. Happy locating!

PW

Valve & Vintage



By Phil Cadman G4JCP

It's Phil Cadman G4JCP's turn to look after the PW vintage wireless 'shop' this month. And just look what he's got on the bench....it's a valved t.r.f. set!

I know what you're all thinking - not **another** t.r.f. set! But the answer is yes, and for good reasons. One, it is almost impossible for this circuit not to work (great for beginners). And two, have you tried getting hold of intermediate frequency transformers (i.f.t.) suitable for use in valve designs? They're all but unobtainable.

Before I describe the circuit I ought to say a little about tuned radio frequency (t.r.f.) receivers and regenerative detectors. Tuned radio frequency receivers are so called because all r.f. amplification is done **at the incoming signal frequency**.

The t.r.f. is unlike superhet designs - which I shall mention next time. In the superhet of course, most of the radio frequency amplification takes place at a constant, fixed tuned **intermediate** frequency.

To be pedantic, the design I'm describing is not a t.r.f. receiver because it has no r.f. amplifier. It's actually simply a detector, albeit a regenerative one. Connect the circuit to an audio amplifier and you have a **regenerative receiver**. But it can be easily turned into a t.r.f. by adding an r.f. stage.

Regenerative Detectors

Regenerative detectors are usually based on the so-called 'grid-leak detector'. Add a little positive r.f. feedback and two interesting side-effects appear.

One side-effect is that the sensitivity of the detector increases. That is, a much smaller r.f. signal will be detectable.

The second side-effect is that the detector becomes more selective. This is particularly useful since in regenerative receivers there is usually only one tuned circuit to provide selectivity.

The Circuit

A few feet of wire should suffice for the aerial. This is capacitively coupled, via C1, to the tuned circuit L1/C2.

The capacitively coupled method of coupling is not really suitable for longer aerials which are better coupled via an over-wind of a few turns on L1. Connect one end of the over-wind to earth and the other to your aerial.

Resistor R3, is the 'grid-leak' after which the detector is named. Variable resistor R1, allows the screen-grid voltage of V1, (and hence the amount of regeneration) to be varied.

Valve V1, detects, or rather demodulates, incoming radio frequency signals by acting as a simple diode detector. The diode in question being formed by the cathode and control grid.

The valve then amplifies the demodulated audio. On reaching the anode of V1, any r.f. signal is shunted to ground by C6 leaving just audio frequencies to pass through C7 and on to the following audio amplifier.

The h.t. supply should be taken from the positive of C9, shown in Fig. 1, of my March column. You can wire the EF80's heater in parallel with the other valve heaters shown in Fig. 3. of the same article.

You **can** use this circuit with a different amplifier. This is providing you can find 6.3V at 300mA for the heater and some 80 to 120V at a couple of mA for the h.t.

If the available h.t. is greater than 120V then it's permissible to increase the value of R6 until the voltage across C5 is within the range 80 to 100V. If you do this then you **must** increase the wattage of R6 to 1W and increase the voltage rating of **all** the capacitors in the circuit to at least that of your source of h.t. **For safety's sake, if in doubt, don't do it!**

Power Supplies

While on the subject of power supplies, it has been pointed out that the power supply shown in my March column has no fuses. The mains supply should **always be fused** at no more than 1A and preferably by a fuse within the mains plug itself.

In addition, you can put a h.t. fuse rated at 250V/100mA in series with the secondary of transformer T3, shown in Fig. 1, in my March column. This will protect the transformer in the unlikely event of D1 or D2 going short-circuit.

Tuning Coil

The inductor L1, despite its importance in the circuit, is wound on a rather familiar item. I used the cardboard tube from an empty paper kitchen roll.

And although this is a long wave receiver there's no reason why L1 cannot be wound to cover other frequencies. However, the lack of selectivity will be much more of a problem on the higher frequencies than on long wave, especially after dark.

For those of you who wish to experiment I'll now go through the design procedure for L1. It's not difficult!).

The receiver's frequency coverage is determined by the maximum and minimum capacitances that appear in parallel with L1. Naturally, the maximum value of the tuning capacitor will, to a great extent, determine the **lowest** tunable frequency.

However, the **highest** tunable frequency cannot be predicted as easily as the lowest. The highest frequency is determined by all the stray capacitances in this part of the circuit plus the minimum capacitance of tuning capacitor C2.

For simplicity, you can ignore the stray capacitances. And if things don't work out quite right add or remove a few turns of wire.

Coil Designs

When I designed my prototype coil I took the hint from commercial designs. I decided that BBC Radio 4 ought to be received with C2 at about half-mesh, say 250pF.

The inductance of L1 can easily (honestly) be worked out by re-arranging the formula for resonance:

$$f = \frac{1}{2\pi\sqrt{LC}}$$

Where f is the resonant frequency, L is the coil inductance in Henries and C is the tuning capacitance in Farads.

Re-arranging provides:

$$L = \frac{1}{4\pi^2 f^2 C}$$

Substituting **C** = 250pF and **f** = 198kHz (the frequency of BBC Radio 4 from Droitwich, for the benefit of readers living abroad!) gives a value for **L** of 0.002584H or 2584µH. It's usual to work in micro-Henries when dealing with r.f. inductors so as to avoid all the zeros after the decimal point.

All that's left to do now is to work out how many turns are needed to give an inductance of about 2500µH. Notice, you can ignore the cathode tap, it isn't going to affect the resonant frequency to any degree.

There are complex formulas for winding coils but I began with Wheeler's formula for single layer coils.

$$L(\mu H) = \frac{r^2 n^2}{9\times r + 10\times l}$$

Where **r** is the radius of the coil, **l** is the length of the winding and **n** is the total number of turns. The measurements are in inches and the inductance is given directly in micro-Henries. (The coil does not have to be close-wound).

Wheeler's formula is accurate to 1% and that's good enough for me. Masochists with a penchant for maths can indulge themselves with accurate inductor design if they get hold of a second-hand copy of the *Radio Designer's Handbook* by F. Langford Smith. (Incidentally this is an excellent book for theory for anyone who can handle simple maths).

All these formulas use imperial measurements. Rather than give the metric equivalents, which are decidedly more messy, it is easier to convert the coil dimensions and use the imperial formulas.

Once you know the required inductance and have measured the radius of your cardboard kitchen-roll former (0.9 inches, in my case) two unknowns remain: the length of the winding and the total number of turns.

To the rescue comes a less well known version of Wheeler's formula in which the length of the coil is replaced by the total number of turns divided by the turns per inch. The formula is quite a mouthful because solving for **n** leads to a quadratic equation.

$$n = \frac{5L}{tr^2}\left[1 + \sqrt{1 + \frac{0.36\, t^2 r^3}{L}}\right]$$

The new term **t** is the number of turns per inch and **L** is still in µH.

If you use thin insulated wire, as I did for the prototype, then you'll only manage about twenty turns per inch. Unfortunately, plugging-in the numbers gives a coil with 1560 turns; that's nearly 80 inches long! The only possibility of ending up with a sensible sized inductor for long wave use is to use a multi-layer coil.

Formulas for multi-layer coils are conspicuous by their absence, the first mention of multi-layer coils I chanced upon was in the 1947 edition of the *ARRL Handbook*. It's quite simple, even if

$$L(\mu H) = \frac{0.2a^2 n^2}{3a + 9b + 10c}$$

it's a touch inaccurate.

Where **a** is the mean diameter of the coil in inches, **b** is the length of the winding in inches, **c** is the radial depth of the winding in inches and **n** is the number of turns.

Basic Program

You should forget any chance of re-arranging that lot to solve for a coil design, I cheated and wrote a BASIC program which used a couple of FOR loops.

The outer loop varied the number of layers and the inner loop varied the coil length (and so the total number of turns) in steps of one wire diameter. When the inductance reached 2500µH the program stopped.

My 'Basic' method produced a coil 5.2 inches long with four layers giving 416 turns in total. But be warned, it's quite difficult to wind a multi-layer coil on a cardboard tube. You really need some end cheeks, a roll of sticky-tape and a lot of patience to wind one properly.

My ancient *ARRL Handbook* says that the cathode tap should be about 10% of the total number of turns on the coil. But that figure consistently gave me too much regeneration.

I presume that the too-much-regeneration problem is because the EF80 has higher gain than the valves of yesteryear on which this rule-of-thumb was based. So I tried a 5% tapping point and this gave much better results.

Inductors for medium wave and higher frequencies need far fewer turns and so the re-arranged Wheeler's formula will give sensibly sized coils. For example, a medium wave coil (about 200µH) will only need a single-layer of 140 turns on a 1.8 inch diameter tube.

Adjustment Compromise

The adjustment of R1 is somewhat of a compromise. As the screen grid voltage rises the gain of the valve increases and so does the amount of regeneration.

In addition, the operating point of the valve varies and this results in a change in the de-modulation characteristics. (The point of maximum regeneration is not necessarily the best point for detection).

To find the best compromise first disconnect the cathode of V1 from the tuning coil and connect it directly to h.t. negative. Use as much aerial wire as you need to receive a station at good strength. Then adjust R1, till the demodulated signal sounds the best. The mark the setting of R1.

Next, move V1's cathode back to the tuning coil. Then adjust R1, to the point at which the stage just oscillates.

Compare the two settings. If they are far apart change the cathode tapping point on L1 by a few turns. Then see at what setting of R1 the stage just oscillates. Repeat the procedure until the just-oscillating setting is reasonably close to the best demodulation setting.

One last thing, in normal use **don't let the detector oscillate**. If it does then it behaves like a tiny transmitter and may cause interference to neighbouring receivers! (As the BBC's Captain Eckersly used to say in the 1920s "Please don't do it"!).

For anyone wishing to experiment with either t.r.f. receivers or regenerative detectors I recommend getting hold of radio books published in the late 'forties or early 'fifties. The yearly *ARRL Handbooks* are one example. Later books concentrate on superhet designs and have little useful information on t.r.f. sets.

Note: There's a classic t.r.f. design in the older RSGB Handbook (4th Edition), *published in the 1960s. It's also a 'sure starter'. Editor.*

Closing Time

Before I put the shutters up this time can I make a plea for some information. **Mr D. Long**, of Wanstead, is trying to find out about a Savoy radio. The name may be the manufacturers name or the name of the model.

And a rather unusual set has made its way into the hands of **Robert Usher**, of Medstead, Hampshire. It's a t.r.f. set **type 74**, made by Samwell & Hutton of Ilford. Rather interestingly its serial is **Number 1**. Any information on either set would be most welcome.

So, until it's my turn 'in the shop' again I'll say cheerio. Please keep your letters and E-mails coming. You can send your letters to me either via the *PW* offices, via E-mail to **phil@oldpark.demon.co.uk** or direct to me at: **21, Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.**

Shopping List

Resistors

*Carbon (or metal) film 0.25W**		
22k	1	R2
1MΩ	1	R3
10kΩ	2	R4 and R6
100kΩ	1	R5
Variable (rotary panel mounting)		
47kΩ	1	R1 (linear)

Capacitors

Electrolytic, 160V working(minimum)		
47µF	1	C5
Polyester, 160V working		
100pF	2	C1 and 3
100nF	2	C4and 7
250pF	1	C6
Variable, air spaced		
500pF	1	C2

Valve

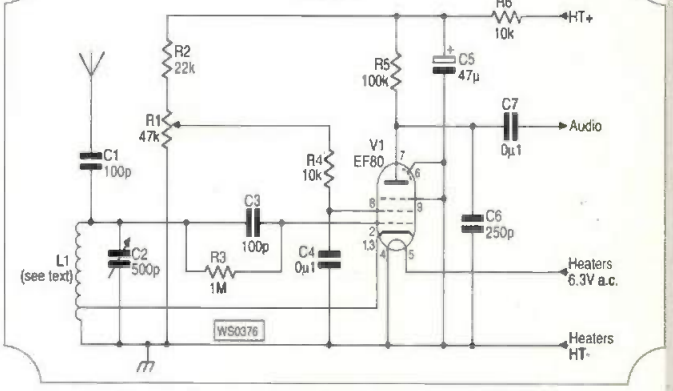
EF80	1	V1

*These would be better as 0.5W minimum due to voltage problems.

Miscellaneous

You will also need either aluminium sheet (or p.c.b. material) to make up a chassis (or a suitable two-piece aluminium box). B9A valveholder, interconnecting wire and a coil former (see text).

Fig. 1



A simple regenerative detector. Phil Cadman G4JCP says it's easy to build and provide good results. Build it and re-discover 'valved' radio!

Cheerio from Phil, see you in September.

Planning And Antennas - Gerald Stancey G3MCK looks at a variety of ways of bypassing the need to apply for planning permission for your antenna system.

Antenn

Success in amateur radio depends on the antenna, and for some amateurs erecting any antenna is a real problem. This is particularly true for those who live in areas where the planning restrictions appear draconian.

However, take heart, all is not lost! With a little thought and cunning you may be able to steer your way through what, at first, may appear to be insurmountable obstacles.

The antennas described in this article are unlikely to be S-meter benders but they will enable you to radiate some signal. And, with care and good luck, it may be a good signal.

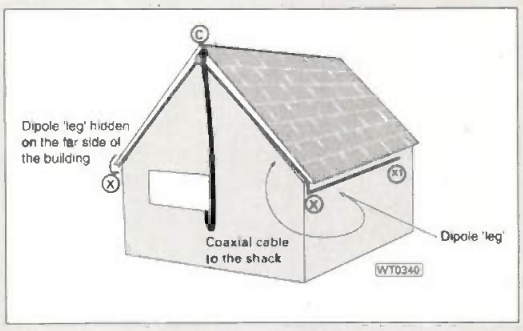


Fig. 1: An inverted 'L' dipole hidden on the bargeboards of a building. Use insulated standoffs as support points.

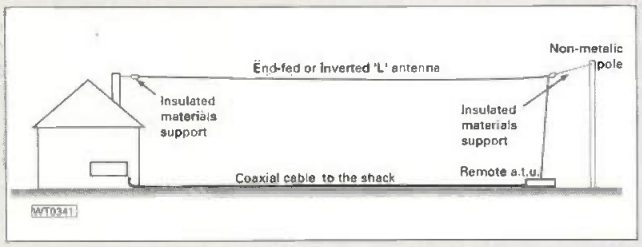


Fig. 2: A low visual impact antenna wire with a remote a.t.u. could be the answer. For security the a.t.u. should be inside a secure building at the bottom of the garden.

No Need

First of all it is essential to realise that you do not need to apply for planning permission to erect an antenna. If you erect one without permission nothing will happen unless someone makes a complaint.

Even after a complaint is made, unless the planning authority upholds it, you will be allowed to keep your antenna up. Recognising this fact opens up a viable approach to antenna erection in one of three classes.

Namely these classes of antennas are: ones that either cannot be seen, or are unlikely to be seen, or if visible are unlikely to upset the local authority planning officers. However, before looking at examples of each of these classes it is necessary to collect some background information.

Firstly who is imposing constraints against erecting outside antennas? Is it the local authority, "her inside", or is it some self-imposed constraint such as not wanting to upset the neighbours?

Make sure you understand what is really stopping you from putting up the antenna of your dreams as this will influence your approach. Next find out the attitude of your local authority.

It may be better to check the attitude of your local authority via a third party, such as another amateur. Doing it this way avoids advertising your intentions. Especially check their restrictions on outside TV/f.m. antennas.

For example, some authorities allow an outside TV/f.m. antenna, provided it's not more that 3m (10ft to those of us who believe in the superiority of the imperial system) higher than the highest part of the house. Also find out what has already been allowed and what is accepted by common usage. With this background information you can now look at some possible solutions.

Invisible Antenna

The obvious members of the class of 'invisible' antennas, are all indoor antennas. This type of antenna can be surprisingly effective. The general rule with invisible antennas is to get them as high as possible. This usually means putting them in the roof space.

At v.h.f. there is usually not much problem in fitting an antenna system in the loft. However, this is unlikely to be the case at h.f. where it may be necessary to wrap the antenna elements round the loft.

If you are using a 'long wire' then all you need do is decide how much wire you want to wrap around the roof-space and feed it through a good a.t.u. connected to a good earth. It may be difficult to establish a good earth so there can be merit in using doublets or dipoles.

But if you use a dipole do not be surprised if the bandwidth is lower than expected and that the s.w.r. is higher than expected. Although there is one big advantage of indoor antennas - they are protected from the weather so they can be made from flimsy material. Also they are accessible so are easy to adjust.

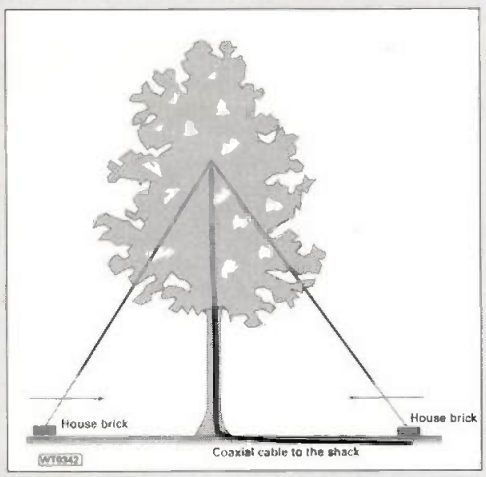


Fig. 3: Burying the centre of an inverted 'V' antenna in a tree doesn't seem to harm the signal much, as long as the ends are in the clear. The house bricks keep the antenna stretched but allow movement when the tree sways.

Closely related to indoor antennas are those which are wrapped round the outside of your house. For instance a dipole supported just clear of the barge boards or hung under the eaves. See **Fig. 1**, for an example of this type. Unhappily this class of antennas is more likely

to cause interference problems, but it's surprising what can be done with filtering and reducing power.

Low Impact

There are antennas that have a low visual impact. The classic example is a piece of wire from the chimney to a convenient tree or pole as shown in **Fig. 2**.

I've shown an inverted 'L' but it's possible that a dipole (trapped or straight) or G5RV is considered to have a sufficiently low visual impact. This solution assumes that you already have a tree for support at the far end. If you have to erect a pole then you are probably in the area of having to apply for planning permission.

Not only is the G5RV almost invisible, but there's also some doubt whether it constitutes a 'development' in the sense of planning permission. But remember, for this class of antenna to work well, a good a.t.u. and earth is required.

In a future article I will look at antenna tuning units, but for the moment you might like to seriously consider making your own. Use a parallel tuned circuit and link coupling, the older handbooks give plenty of guidance.

If you can erect a dummy TV/f.m. antenna this could be used as the support for an inverted-V dipole which can be made virtually invisible by using thin wire. Do remember to put some sort of TV/f.m. Yagi on top of the pole which you have clamped to the chimney to support your antenna.

People expect poles on chimneys to be topped with Yagis so don't disappoint them! If you have no front garden a sloper is another possibility.

Finally if all else fails run a length of coaxial cable to the top of your dummy TV antenna. Don't connect it, just tune the coaxial cable as a random length wire antenna.

Inverted-V antennas seems to work very well on the l.f. bands, even with their centres buried in a tree. But it is essential to ensure that the ends are in the clear as shown in **Fig 3**.

The v.h.f. operator will most certainly be able to get away with a 430MHz Yagi by claiming it is a TV antenna. Also it is possible that a small beam for 144MHz may be passed off as an f.m. antenna.

Beating Planners

There appears to be ways of beating the planners! Current planning rules don't require permission if the antenna is under three metres above ground. Within this restriction you can erect magnetic loops and loaded vertical quarter-wave antennas.

A very low dipole is also worth trying. I have recently been testing a low 7MHz dipole and find that running 30W of c.w. I can easily work round Europe. At times I've even worked the W1 call area of America.

Antenna Performance

The antennas described are not recommended as being high performance. But, with a degree of luck and good engineering you may be surprised at how well they do work.

To get the best performance you will have to experiment and perhaps it may be necessary to limit your operation to a few bands. With perseverance there is no reason why most amateurs cannot get on the air, make contacts and have fun.

PW

Using Trees As Supports

The big problem with trees is that they sway in the wind and unless precautions are taken you will end up with a broken antenna. The classic way of dealing with this problem is to use a pulley system and weight.

However, due to friction and inertia pulleys and weights are not 100% effective. To make it work better the following precautions are advisable. Firstly install the antenna with some sag, this will allow the tree to sway a little without any problem.

Use the lightest rope and the best quality pulley you can find; your local marina is an excellent source. Marine gear is expensive but the quality is good and it may turn out cheaper in the long run. Use the lightest counter-balance weight and let it normally rest on the ground, this will allow you to have some slack in the antenna.

A length of rubber band or light spring between the end insulator and the rope makes a good shock absorber. It may also be worth while installing a 'weak link' at this point to ensure that if a failure occurs then it's not in the middle of your antenna.

Fishing tackle shops sell lines of various breaking strain which are suitable for this purpose. However, don't forget to attach a light line to enable you to recover the end of the rope if the 'weak link' does break, **Fig. 4**.

A simple system for protecting inverted-V dipoles is to attach the ends of the antenna to house bricks which are left on the lawn (Fig. 3). As the tree sways the bricks slide across the grass. From time-to-time it's necessary to go out and re-position the bricks. This method is crude but works very well.

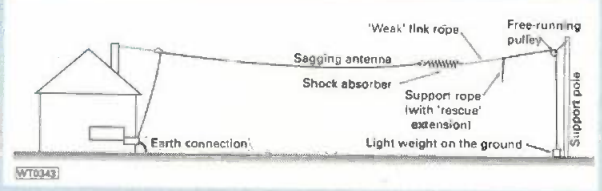


Fig. 4: another low visual impact antenna, but with a shock absorber system to minimise the chances of a breakage due to strong winds.

Moking Wires Invisible

The human eye has an angular resolution of about 1°. This means that thin wires are invisible from a distance of only a few metres. The problem with using very thin wire is that birds can break it.

However, wire of about 0.5mmm diameter (24/26s.w.g.) is not very obvious and is reasonably immune to bird strikes. If you are going to use bare copper wire it is a good idea to leave it out to lose its shine before erecting it. A nice new gleaming wire is remarkably obvious.

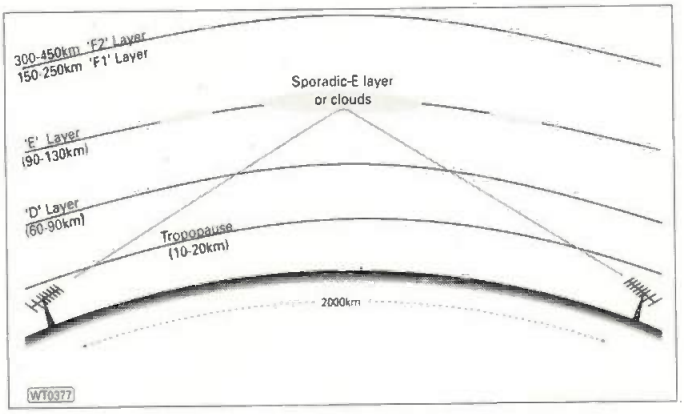
A barge board dipole is virtually invisible if you use insulated wire whose covering colour is close to that of the paint work. For covered wires that are silhouetted against the sky, black is the probably the best colour; white is very obvious.

Nylon fishing line is excellent for supporting light-weight antennas and it's not necessary to use end insulators. If you do need to use insulators then shirt buttons are suitable being light and small.

DAVID BUTLER G4ASR

VHF REPORT

David Butler G4ASR takes a look at how to make contacts via Sporadic-E propagation and investigates the possibility of contacting DX stations on the 50 and 144MHz bands.



Sporadic-E 'clouds' between 90-130km above the ground act as a 'mirror' to give a 200km path on v.h.f. rather than just line of sight.

As you can probably appreciate there are many different types of propagation modes that enable radio signals to 'travel' from one point to another. These may include refraction, ducting and forward troposcatter in the troposphere, all generally referred to as tropo.

Then there's a multitude of propagation modes that occur in the ionosphere. Among these are E-layer and F2-layer propagation, Aurora (Au), Sporadic-E (Sp-E), Auroral sporadic-E (Au-E), meteor scatter (m.s.), trans-equatorial (t.e.p.) and field aligned irregularities (f.a.i.) to name but a few.

There's also propagation modes that involve some form of reflection from obstacles. These can include diffraction from hillsides or mountain tops, moonbounce (e.m.e.) and scatter from objects such as buildings or aircraft.

By no means is my list comprehensive. But it serves only to indicate the variety of modes that can be encountered in the v.h.f./u.h.f./s.h.f. area of the radio spectrum.

Sporadic-E Principles

The mode that I want to look at this time is Sporadic-E. Although I've described this on a number of occasions over the years it's worth recalling the principles again for newer readers.

A v.h.f. signal normally travels horizontally through the troposphere and unless an enhancement occurs (giving rise to a tropo 'lift') the signal will weaken and disappear at some point beyond the radio horizon. Large proportions of the signal will also pass completely through the troposphere and enter the ionosphere.

The lower layer of the ionosphere is the D-region and this is virtually transparent to v.h.f. signals. Hence your signal will pass easily through this region.

The next layer the signal encounters is the E-region, located between 90-130km above the earth's surface. Again under normal circumstances the level of ionisation is insufficient to reflect v.h.f. signals back to earth.

However, on occasions some thin and dense layers (or clouds) of ionisation can be formed which **are** sufficient to reflect your v.h.f. signal back down to earth. This intermittent ionisation in the E-layer is termed sporadic-E. (*In the September and October 1995 issues of PW David gave an in-depth understanding of the mechanisms by which Sp-E is formed.* **Editor**).

Mirror In The Sky

So, basically you have a 'wobbly' signal reflecting mirror in the sky some 100km above the earth's surface from which you can reflect your v.h.f. signals. Just imagine if you were a radio signal and could actually see this 100km high mirror. How far away could it be before you just start to lose sight of it over the horizon?

Surprisingly, from a radio point of view, it could be up to 1000km away. This means that you are able to communicate over a distance of twice this range. A distance of 1000km from you to the Sp-E cloud and then a further 1000km from the cloud to the distant station.

Wow! that puts your v.h.f. signal into eastern Europe or even North Africa! Can this be true? The answer is most definitely **Yes**. And it's done routinely year after year.

In reality the attainable distance is dependent on a number of factors. The geometry of the path depends to a large extent by the height of the ionisation. This can vary between 90-130km or so.

The attainable distance is also dependent on how well both antenna systems can 'see' the horizon. So, in general terms the higher the better.

For maximum distance you need an antenna system that has a low angle of radiation. In other words one that places all the r.f. energy on the horizon rather than one that squirts the signal up into the sky. All things being equal the distances normally encountered with 'single-hop' Sp-E will lie somewhere between 1500-2500kms.

Mode Recognition

In my opinion it's very important to know which propagation mode you are hearing signals by. Identifying what you're listening to and understanding its characteristics will enable you to work far more DX than someone who doesn't know what's going on.

So, how do you recognise Sp-E? Although this is fairly easy to answer it does assume you have a basic understanding of the other main types of propagation. With this knowledge you can eliminate other modes and at the same time know what to expect at any particular time of the year.

In common with all propagation modes that occur in the ionosphere there are external forces that, in general terms influence when any particular mode will occur. Most if not all ionospheric modes are solar driven and data from many years of Sp-E studies show that it is primarily a midsummer phenomenon.

Bear in mind though that Sp-E, in common with most other ionospheric modes, is frequency dependent. As an approximation, for every ten days of openings on the 50MHz band there may be only one day on which an opening at 144MHz might occur. This frequency dependency also affects the length of the traditional Sp-E season.

On the 50MHz band it normally occurs between May-August with a short mid-winter peak between December-January. On the 144MHz band however the peak months are between June-July with winter openings being virtually non-existent. It should be noted that it will never occur on the 430MHz or higher frequency bands.

To recap, Sp-E affects the 50, 70 and 144MHz v.h.f. bands during May-August with an occasional mid-winter peak affecting primarily the 50MHz band. (I should mention at this point that it is also prevalent on the h.f. bands and can reach as high as the U.S. 220MHz band but that's another story).

To further determine the propagation mode by which signals are arriving the next important sign to look for is the location of the received

station. Tropo enhancements on the 50 and 70MHz bands are never spectacular and if the received signal is over 800km away it is more than likely to be via the E-layer.

On the 144MHz band however tropospheric ducting can extend up to 3000km and beyond on occasions. So, if you hear an EA8 station (Canary Is.) on the 144MHz band it doesn't necessarily mean it's via Sp-E.

However, there are a few more clues to look for. Signals propagated via single-hop Sp-E will generally be very strong and possibly exhibit rapid fading, particularly on the 144MHz band.

Unlike auroral propagation (where the signal is roughened by doppler shift) a Sp-E signal exhibits no distortion. Signals are often present for minutes or hours at a time unlike meteor scatter where signals are only heard in intermittent bursts.

Geographical Openings

Finally and this is very important, Sp-E openings generally exhibit a high geographical selectivity especially on the 144MHz band. So it's very likely that you'll only hear stations from one or two locator squares whilst an operator a few kilometres away from you hears nothing at all.

A few minutes later you may hear stations in a completely different area or country. It all depends on the level of ionisation and the focusing affect of the Sp-E cloud. The same is true of the 50MHz band but the affects may not be so apparent.

The level of ionisation needed to support communication at this frequency is not so high and the focusing affects are much reduced. At times it appears that huge areas of the E-layer are sufficiently ionised allowing openings in many different directions at the same time.

Conditions In 1995

Now I'll take a look at the midsummer Sp-E season that occurred last year. The first recorded opening on the 50MHz band was on April 25 1995 with the last being recorded some 146 days later on September 17. (There were two days in October, 11 and 12, when further openings occurred but I'm going to ignore these).

During this 146 day period the 50MHz band was open on 98 days, thus giving a 67% chance of finding a day when the band was open. This is reasonably high but it should be noted that the beginning and end of each season is rather sparse of openings.

For example although the first event was noted on April 25, the next didn't occur until five days later followed by a further gap of seven days until the next opening. Looking at my records it can be seen that the Sp-E season really got going on May 19 and continued for 97 days until August 23. During this period the band was open on 81 days giving an overall daily chance of openings of 83%. That's much better odds!

By comparison, during the same 97 day period the 144MHz band was only open briefly during 10 days, something less than a 1 in 10 chance of being in front of the radio on the right day! However, for those who were fortunate to choose the right day there was DX galore.

North Africa

For example **John Nixon G7SMA** (IO93) running 25W s.s.b. and an indoor 5-element Yagi worked EA9IB (IM85) in North Africa over a path length in excess of 2000kms. Another operator, **Graham Taylor G7UJC** (IO83), worked YU7BW, 9A1CCY and 9A1KDE on the 144MHz band. Graham incidentally was running 25W s.s.b. into a 5λ/8 over 5λ/8 vertical antenna. You see, it really is a case of being in the right place at the right time!

Conditions on the 50MHz band were also very good last year. In addition to the expected European openings the band was also open via multi-hop Sp-E to North America on eighteen days.

There were a total of ten days of transatlantic openings in June and a further eight days of openings during the first two weeks of July. This was far greater than normally expected and supports the theory that Sp-E propagation is more prevalent during sun spot minimum.

And it may interest you to know that sun spot minimum is predicted to occur during the summer so this year may be the best ever. Indeed 1996 got off to a very good start with a noticeable increase in 50MHz winter Sp-E and reports of the maximum usable frequency (m.u.f.) exceeding 100MHz on February 3.

If you want to work consistent DX on the v.h.f. bands (via any propagation mode) it is universally accepted that this is accomplished by using single-sideband (s.s.b.) or Morse (c.w.). I'm not saying frequency modulation (f.m.) or other communication techniques can't or won't allow you to work long distances it's just that narrow-band modes are that more efficient.

Because of the characteristics of Sp-E, especially on the 50MHz band, the use of QRP powers and small antennas works very well. You'll be able to make contacts all over Europe and if you're lucky considerably further.

Low Power

I can't say it's particularly easy with low power but every contact you make will be very special. It's the same regarding the 144MHz band although I would recommend that you invest in some form of directional antenna. If you've only a few watts to play with it's always best to concentrate all of it in one particular direction.

One of the easiest ways of catching an opening on the 144MHz band is to keep your receiver tuned to 144.300MHz, the s.s.b. calling frequency. When the band does finally open up you will either (a) hear DX stations or (b) hear someone else working the DX. If it's the latter then don't worry.

As I've already mentioned Sp-E can be very geographically selective. So, all you need to do is sit tight and wait for propagation to enter your area. More often than not it eventually will.

I always find it useful to be prepared before the event when it comes to log keeping. I've made up special 'scribble' sheets with columns for time, frequency, call sign, reports and locator.

During intense openings I can be working up to three stations a minute for as long as the opening lasts. In this way I can get down the information very quickly and then at my leisure transcribe the contacts into my station log book. It's also very useful to have a tape recorder running to pick up on mistakes!

Predicted Opening

There are some DXers, myself included, who try to predict a specific day when an opening on the 144MHz band will occur. None of these stand up to any form scientific analysis but I feel I should let you in on my secret.

I always reckon that the Tuesday after the first weekend in June is a good bet. This year it's June 4. I'm having the day off so why don't you join me?

However a word of warning. The Sp-E season can be as fickle as the British summer so don't blame me if you hear nothing!

Be Prepared

On the other hand the v.h.f. bands could be wide open so now is the time to make sure your station is working correctly. If you have any doubts about the integrity of your antenna or coaxial cables attend to them now.

What about that intermittent fault you have on the microphone cable or the flat battery in your Morse keyer. Get them fixed now!

Then you can relax in the knowledge that when you do encounter your first Sp-E opening everything should be working correctly. Please let me know how you get on.

Scandinavian Meeting

Finally the venue for this year's Scandinavian v.h.f./u.h.f. meeting is Espoo, Finland. The actual location is the resort of Nupurin Kartano, next to Lake Nupurinjarvi, 25km west of Helsinki.

The event will be held on June 7-9 and includes a barbeque on Friday, followed by lectures, flea market and dinner on Saturday. Indoor accommodation, camping and caravan facilities are available. Further details can be obtained from **Jukka Sirvio OH6DD** whose E-mail address is **jsi@hut.fi.**

Deadlines

Please send reports, especially of Sp-E openings, or any other news (to reach me by the end of the month) to **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP.** You can also contact me via packet radio @ **GB7MAD,** the DX Cluster @ **GB7DXC** or E-mail via **davebu@mdlhr1.igw.bt.co.uk** Alternatively you can telephone me on **(01873) 860679.**

END

MIKE RICHARDS G4WNC

BITS&BYTES - COMPUTING IN RADIO

Mike Richards G4WNC looks at some of the common problems associated with computing in radio in answer to readers' queries.

One of the simplest, yet very common problems encountered by new Hamcomm users is failure to load the software. I've received many letters that either claim the disk's empty or that the files cannot be found on the hard disk.

Other than the occasional blank disk that escapes, the difficulty is usually caused by problems spelling the name Hamcomm! Yes I know this sounds silly, but when you're completely new to computing and haven't grasped the concept or operation of the directory system, confusion comes very easily. So, please check your typing before sending the disk back.

Run-Time Problems

Another common problem recently experienced by **Peter Best** and **Tom Davies** is run-time errors when using JVFAX for FAX reception.

There are many potential causes of run-time errors, but one of the most common is running JVFAX after a Windows session. Whilst in theory this ought to be alright, you often find that the extended memory configuration used for Windows does not match that needed by JVFAX.

The simplest solution is to create a separate boot disk for JVFAX. You can do this by putting a blank formatted disk in drive A and typing SYS A: from the C: prompt. This will copy across the COMMAND.COM interpreter plus a couple of hidden system files.

You can then create your own AUTOEXEC.BAT file using a text editor and add the commands: 'C:' is needed to get you onto drive C 'CD\JVFAX' (or whatever you call your 'JVFAX' directory) JVFAX. If you then boot your computer with this disk in drive A:, JVFAX will automatically be loaded.

You can, of course, make the AUTOEXEC file very much more sophisticated by including menu systems, but I recommend starting with a very simple set-up and progressing from there. You also need to note that JVFAX will not operate successfully in a multi-tasking environment such as Windows. This is because it uses non standard system calls and relies on direct access to the computers timing facilities.

In a multi-tasking system the computer's resources are shared between a number of programs so it's virtually impossible to maintain the highly accurate timing required for FAX reception.

Ghosting

Mark Brickley G6VVC writes asking why he suffers permanent 'ghosting' when receiving FAX using his FT-840 transceiver. Mark has tried monitoring signals from lots of different stations, but the problem persists.

To understand this problem you need to think a little about the FAX receive process. Let's use a typical amateur FAX signal of 120r.p.m. and 288 IOC as an example.

Mark's problem is the appearance of a second image just to the right of the main image. Now, as the lines of the FAX image build-up from left to right, this implies that there are two signals arriving at the decoder with a small time difference between the two.

A few simple calculations will even reveal the size of this time delay. First you need to calculate the horizontal speed of the scan line in mm per second.

To calculate the horizontal speed of the scan line you just measure the width of your screen or printed FAX image in mm and multiply this by two as there are two scans per second. With this information to hand, you measure the distance between the main and ghost images.

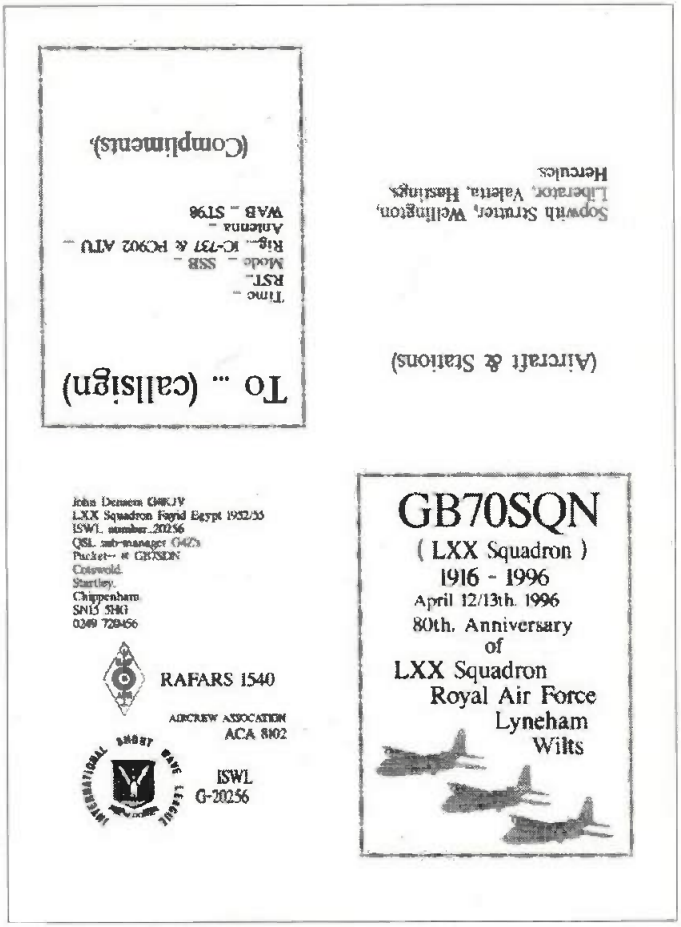
The signal delay in seconds is then the distance between the main and ghost image divided by the scan speed in mm per second. I know it sounds complicated, but it isn't really.

Here's an example to illustrate the point. On my screen, the FAX image is 200mm wide so the scan speed becomes 200 x 2 = 400mm per second. If I had a ghost image that was 1.4mm to the right of the main image, the time delay between the two would be 1.4/400 i.e. 0.0035 seconds or 3.5ms.

Now we understand what causes ghost FAX images, why does Mark suffer the problem all the time? One possible effect is what's known as group delay distortion which can be caused by audio filters.

Group delay is where the reactive components in a filter cause different frequencies to be delayed by varying amounts. Ghosting or smearing can also be caused by ringing filters.

The golden rule for all FAX reception is to keep filters as wide as possible and only narrow them down to cut out serious interference. As soon as you reduce the receive bandwidth you start to lose the fine detail from the FAX image.



The interesting QSL card produced by John Densem G4KJV (see text).

Inherited Amstrad

Les Mobley G2HPH has recently inherited an ageing Amstrad PCW8256 computer and would like to use it to transmit and receive RTTY. Although this is possible, there are a few significant problems.

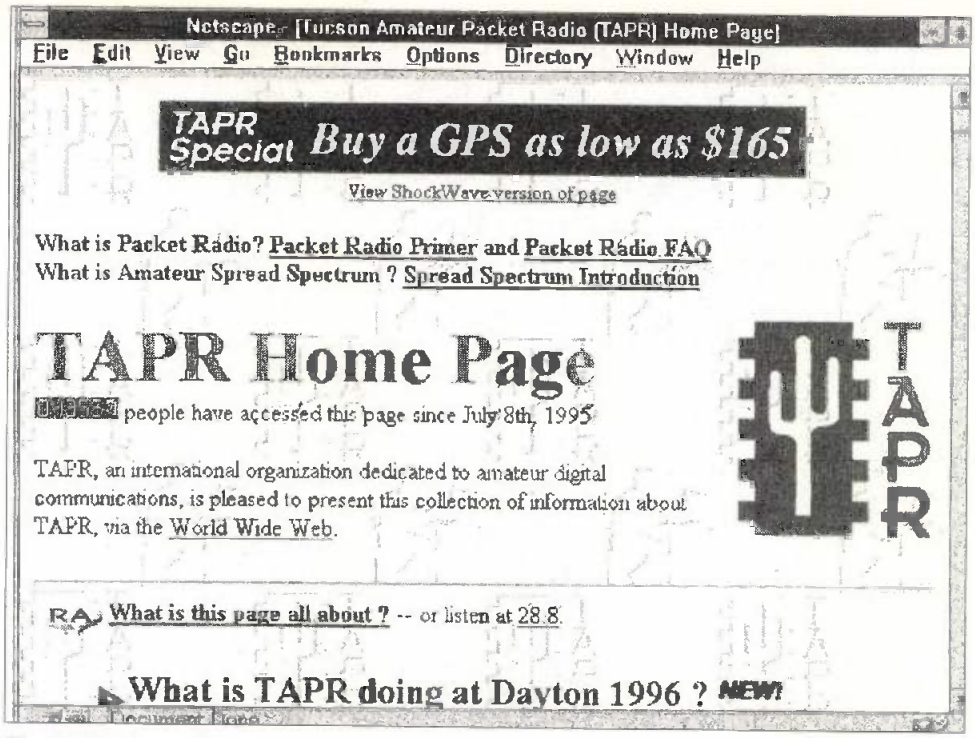
The first problem is the Amstrad's lack of a serial port. With most decoding software, the serial port is used to make the vital connection between the computer and transceiver, so no serial port spells trouble.

The lack of a serial port can be overcome by using the Amstrad serial port adapter. This is a plug-in expansion card with its own UART that creates a standard RS-232 serial port.

The only snag is that the plug-in expansion cards were not very common in the Amstrad's heyday, so they will be even more difficult to find now. If you do manage to find a serial port, the next problem is to find some RTTY software.

As far as I'm aware there was only ever one program on the market and that was distributed by BARTG. The other alternative is to write your own software, but you will need machine code programming skills for this.

Now all this sounds a bit like a dead loss! But if you know different, please let me know so that I can pass the details on to Les.



The TAPR Home Page.

Suitable Port?

Dick Stanbridge G8NT writes with a problem in selecting a suitable COM port to use with his Venus electronics JVFAX and Hamcomm interface. In his case, the system shows two COM ports available and they are COM 1 and 4. This is an unusual set-up as you would normally expect to see COM 1 and 2 available.

In Dick's computer, COM 1 is already in use for his serial mouse and he's proposing to use COM 4 for HAMCOMM/JVFAX. I would strongly recommend taking a look at the PC's manual and altering the jumpers to standardise the serial card configuration to COM 1 and 2. This is because there are a few oddities associated with PC serial ports.

The oddities come about because the interrupts that service the ports are shared so, COM 1 and 3 normally use IRQ4, whilst COM 2 and 4 use IRQ3. In theory COM1 and 4 should be alright, but you may encounter problems with some software.

If you find you need to add more serial devices at a later stage I would strongly recommend using an external data switch connected to COM 2. This will minimise the configuration problems, whilst giving maximum flexibility.

Interesting QSL Cards

Whilst helping **Elaine G4LFM** with her 'Novice Natter' column recently I came across a particularly interesting QSL card produced by **John Densem G4KJV**. What struck me about the card was that it had been produced by overprinting an A4 sheet and folding it in the same way as a birthday card to make a very smart presentation.

In order to produce this type of QSL card you need to divide the A4 sheet into four quarters, print the cover and back panel on the lower two sections, with the inside printed upside down on the top two sections. While I can see that this could be done with a Word macro, I'm sure someone must have developed a program to do this.

Do you know where I can find such a program? If so please write and let me know.

Digital Signal Processing News

If you're interested in amateur radio d.s.p. software and developments, one of the main Internet sites to watch is the HFSIG upload section of the Tucson Amateur Packet Radio FTP site.

The site can be found at **ftp://ftp.tapr.org** and the upload directory is: **/tapr/SIG/hfsig/upload/**. There is a constant churn of interesting software and this is the site used by **Johan Forrer** for his new releases.

The very latest goodie to arrive is the new MAXAS Macro Cross Assembler for the Texas TMS320C26 digital starter kit. The software has been written by **Mike Kerry** of Grosvenor Software fame and corrects a number of problems with the Texas OSKA assembler.

The new cross assembler also includes better validation, more assembler directives and full operand arithmetic. This looks to be a significant improvement for anyone seriously interested in TMS320 programming. I've written to Mike to see if he'll let me include this assembler in my DSP starter disk. Watch this space for more info.

The other new arrival is the latest version of Johan Forrer's PCTOR software for the Texas DSP starter kit. This is now at version 3.08 and includes a number of interesting enhancements.

The RTTY mode has been enhanced to work with 1.5 stop bits and any COM port can be used to connect the Texas DSK. I also note that the modem file contains DSK modem code for nine modem configurations.

The transmission parameters supported are: High tones f.s.k: 170Hz/50baud, 170Hz/100baud, 200Hz/200baud 1600/1800Hz 300baud; Low tones f.s.k: 170Hz/50baud, 425Hz/50baud, 850Hz/50baud; High tones a.f.s.k: 170Hz/50baud, 170Hz/100baud.

Another important attraction is that this is one of the few AMTOR/PACTOR systems that will operate comfortably under Windows. This is because all the critical timing and communications activities are carried-out within the DSP unit, not the PC. I've added this latest version to my DSP starter disk, so please see the Reader's Offers section for full details of how to get your copy.

You can also download the software from the TAPR site as described earlier. The file name is TOR308.zip. My thanks to Johan Forrer for his hard work developing this impressive package. If you find the software useful, **please remember to register** with Johan.

Special Offers

Here's the full list of reader's offers with all the latest software. Please leave up to two weeks for delivery.

IBM PC Software(1.44Mb disks):

Disk A (Order Code **DKA**) - JVFAX 7.0, HAMCOMM 3.0 and WEFAX 3.2.
Disk B (Order Code **DKB**) - DSP Starter plus Texas device selection software.
Disk C (Order Code **DKC**) - NuMorse 1.3.
Disk D (Order Code **DKD**) - UltraPak 4.0.
Disk E (Order Code **DKE**) - Mscan 1.3 and 2.0.

Printed Literature:

Beginners Utility Frequency List (Order Code **BL**).
Complex Signals Utility Frequency List (Order Code **AL**).
Decode Utility Frequency List (Order Code **DL**).
FactPack 1 Solving Computer Interference Problems (Order Code **FP1**).
FactPack 2 Decoding Accessories (Order Code **FP2**).
FactPack 3 Starting Utility Decoding (Order Code **FP3**).
FactPack 4 JVFAX and HAMCOMM Primer (Order Code **FP4**).
FactPack 5 On the Air with JVFAX and HAMCOMM (Order Code **FP5**).
FactPack 6 Internet Starter (Order Code **FP6**).

For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four, £2.50 for 7 and £3.00 for 9). For software send £1.00 per disk (£1.75 for 2, £2.50 for 3 or £3.00 for 4 and £3.75 for all 5) and a self addressed sticky label (don't forget I provide the disk!). Please make cheques payable to M. Richards.

That's all for this month, so until next time keep computing and keep those letters and news items coming to me Mike Richards G4WNC, 'Bits & Bytes', PO Box 1863, Ringwood, Hants BH24 3ZD. CompuServe 100411,3444: Internet mike.richards@dial.pipex.com

END

IAN POOLE G3YWX

EQUIPMENT SPECIFICATIONS

Ian Poole G3YWX looks at f.m. deviation, an area that often causes many amateurs confusion, especially when starting out.

The v.h.f. and u.h.f. bands are probably the greatest growth area in amateur radio today. The convenience of operation, with a wide variety of portable, mobile and hand-held equipment is part of the reason for this popularity.

Another reason for v.h.f. and u.h.f. being a growth area is the growing interest in data modes where it's possible to combine an interest in amateur radio with the latest in computer technology. Packet radio and TCP/IP are both being used increasingly. They are a convenient form of communication, and give the flexibility and facilities we've come to expect from modern day computer controlled facilities.

Even though computers are widely used, the more familiar speech based modes are still as popular as ever. It's only necessary to tune over the bands to hear a wide variety of conversations taking place.

Mobile operation is part of the reason for the popularity of the v.h.f./u.h.f. bands. It's possible to take the hobby outside the house and use the radio to talk to people during the ever increasing amounts of time we tend to spend travelling in cars these days.

Frequency Modulation

The aspects of amateur radio I've mentioned have one thing in common. They use frequency modulation or f.m.

The f.m. mode operates by causing the audio signal to vary the frequency of the carrier in line with the audio voltage present at any instant, as shown in **Fig. 1**. The advantage is that all the audio is carried as frequency variations.

The f.m. transmission makes the signal far more tolerant of signal level variations, a major facet of mobile or portable operation. If the receiver gain is made high, some of the later stages of the receiver can be driven into limiting, thereby removing any effects of level variation.

Linked to level variation is a reduction in noise level. And as most noise appears as amplitude variations, these two can be removed to give a signal which has a much better signal to noise ratio.

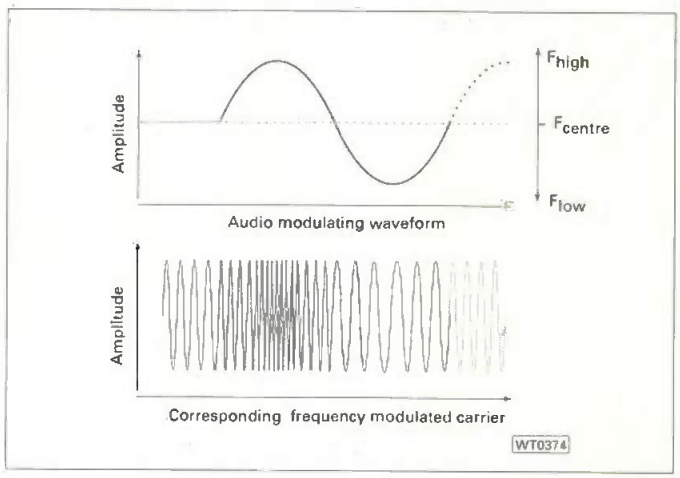


Fig. 1: Frequency modulating a carrier.

Deviation

In just the same way that the level of modulation for an a.m. signal is important the amount of frequency change (or deviation) is also important for an f.m. signal. This is so for a number of reasons.

If the deviation is too great then the signal could swing outside the bandwidth of the receiver causing severe distortion to the signal. It may also take up too much bandwidth, and interfere with stations on adjacent channels. Finally if the deviation is too small then the audio will appear very weak and additional audio gain will be required.

The deviation of a signal is normally measured as the number of kilohertz (kHz) the signal is shifted up and down. For example, the BBC v.h.f. f.m. broadcasts use a deviation of ±75kHz.

In other words for the peak audio levels the BBC signal moves up and then down in frequency by 75kHz. Because of the large amount of deviation this is known as wideband f.m. (WBFM on some scanners/shortwave receviers).

Amateur communications use much smaller deviations than the broadcasters and ±5kHz maximum is standard. This, along with other signals having low levels of deviation is known as narrowband f.m. (NBFM on many scanners/shortwave receviers).

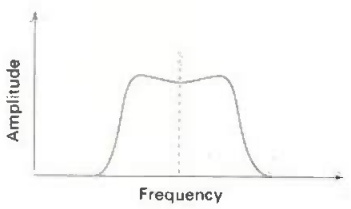


Fig. 2: The spectrum of an f.m. signal.

Signal Bandwidth

The amount of deviation a signal occupies determines the amount of bandwidth it will occupy. For the v.h.f. f.m. signals transmissions with ±75kHz, it's accepted that a receiver bandwidth of 200kHz is adequate.

The reason that v.h.f. f.m. transmissions occupy a greater bandwidth than their deviation is that like a.m. signals, f.m. signals also have sidebands. However, the way in which these sidebands spread out from the carrier is much more complicated than those for a.m.

In fact the f.m. sidebands spread out to infinity either side although their level quickly falls as shown in **Fig. 2**. Fortunately it's possible to remove many of these low level sidebands completely without any noticeable effect to the signal.

For narrowband f.m. transmissions the bandwidth they occupy must be tailored to the band conditions. Currently amateurs operate on a channel spacing of 25kHz and the amount of deviation used means that signals on one channel do not unduly interfere with those on the next.

Many commercial systems use a 12.5kHz channel spacing and they require a lower level of deviation. This is why some commercial sets appear to have a low level of modulation when converted for the amateur bands.

However, if amateur band occupancy means that we have to move to a 12.5kHz channel spacing then we may have to reduce our levels of deviation.

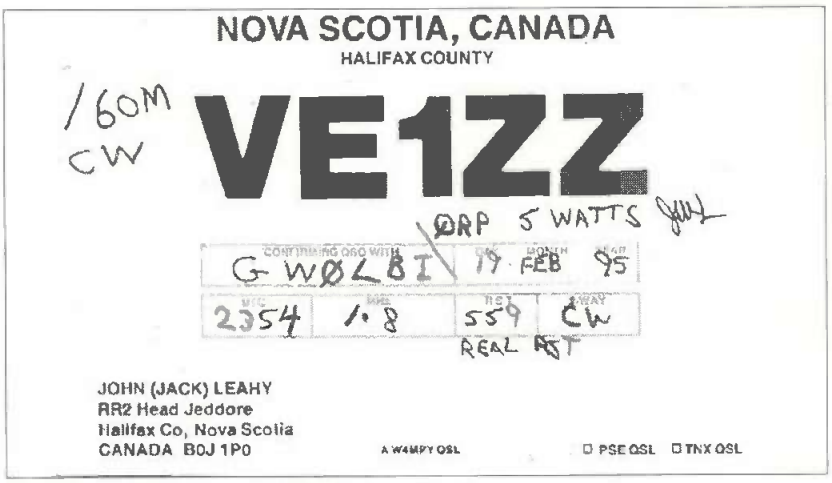
Cheerio for now, next time I'll take a look at antenna gain and remember if there's anything in the Equipment Specifications series I haven't covered, which causes you confusion please drop me a line c/o of the Editorial Offices.

END

LEIGHTON SMART GW0LBI

HF FAR & WIDE

Leighton Smart GW0LBI takes a look through your reports to see just what's been happening on h.f.. to guide you to success working that DX!



Canada on QRP c.w. on 1.8MHz (see text).

At the time I'm writing this, we're entering April. And according to our reporters, it appears that the higher bands, particularly 14MHz, are showing signs of definite improvement, recently remaining open till around 2300. It's a sure sign that things are getting better for the DX operator!

The *RSGB DX Newsheet*, edited by dedicated QRP operator **Chris Page G4BUE**, includes news that HH6JH (Haiti) is on the air every Sunday on 14.260MHz s.s.b. for IOTA and prefix hunters (although no specific time is given). Javier XE2CQ is operational on the WARC bands, mainly 10MHz at 000UTC and/or 0600 for Europe on 10.109MHz, ±QRM, listening 1KHz up. QSL direct only.

Your Reports

Space is at a premium this month, and I'm starting your reports with **John Heys G3BDQ** in Hastings.

Although busy, John has been able to spend some time on 1.8MHz c.w. He's logged 28 US stations in 14 different States between 0600 and 0650UTC, as well as working a few VE stations (Canada).

Now over to 'early bird', **Ted Trowell G2HKU** on the Isle of Sheppey. He's been 'up with the Lark', so to speak, on 1.8 and 3.5MHz with his 'Top Band' c.w. contacts this month including K1KI (USA), Jack VE1ZZ in Newfoundland (a well known 1.8MHz DXer, see **Fig. 1**) as well as W1KM, and N2RM also in the USA, all at 0500UTC.

Ted's 3.5MHz report consists of contacts with numerous north American stations. These included as W1MK, KT3Y, and K1KI, all at around 0700UTC.

Down to south east Wales now, and **Steve Locke GW0SGL** in Mountain Ash. It seems that he's taken a real liking to 3.5MHz of late.

Using a simple dipole at 10m in height and 100W of r.f. power Steve lists (all c.w.) contacts with 9G1NS (Ghana), TI5KD (Costa Rica), KP4DKE (Puerto Rico), PJ9/W8UVZ (Netherlands Antilles Islands), KX2A, W8IQ,and K4PQL (USA) all worked after 2300UTC.

The 7MHz Band

The 7MHz band now, with first report from our 'ace QRPer' **Eric Masters G0KRT**. Eric, in Worcester Park, Surrey, uses a 'powerful' 5W of c.w., and an 86 metre long wire antenna, hooked up with EA5GLO/M in Spain at 2049, I0WOK (Italy) at 2100, and YU1XU (Serbia) at 2024UTC.

Terry Ibbitson G0VTI in Wakefield reported working VR2RJ (Hong Kong) at 2038, and 3V8BB (Tunisia) at 2100 on 7MHZ s.s.b., while c.w. accounted for a contact with TA2IJ (Turkey) at 2014UTC.

Also on 7MHz c.w. was **Carl Mason GW0VSW** in Skewen, West Glamorgan. Carl lists 100W contacts with SV2CQB (Greece) at 2048, 6W6JX (Senegal) at 2052, and F5SSI/QRP (France) at 1830UTC.

Ted G2HKU lists amongst many others, 7MHz c.w. contacts with VP5/K0KX (Turks & Caicos Islands) at 0700, N4RJ (USA) and 9H1AL (Malta) at 0800, as well as ZB2JK (Gibraltar), W7SW/MM off the coast of Greece at 1800, and K1ZZ, N3RS, WD8LLD and many other N. American stations at around 2000UTC.

The 14MHz Band

Don Mclean G3NOF in Yeovil starts off on the 14MHz band lists. His monthly propagation report says that "14MHz has been open around 0800 to Australia, New Zealand and Asia on the long path. The band usually closes around 2000, but has been open recently as late as 2300; African stations were heard at around 1800UTC.

Don's log report contains s.s.b. contacts with A25/H5ANX (Botswana) at 1835, (QSL to ZS6EW), BV6DF (Taiwan) at 0942, C56DX (Gambia) at 1809, (QSL to DL7DF), VP8CTM (Falkland Is) at 2255UTC. He also reports working P40V (Aruba Is), at 1846, VK7BC (Australia) at 1517, ZW8P (Brazil) at 1003, EM1KA (Antarctica) at 2052, (QSL to 9H3UP), 9G1YR (Ghana) at 1810, TT8FT (Chad) at 1813, QSL via home call, and ZL1HY (New Zealand) at 1000UTC.

New reporter **Dave Ditchman G0WIU** from Deal in Kent, writes in as a newly licensed amateur. Welcome aboard Dave! He's been busy on 14MHz, and lists his 100W DX contacts with 5N4KST (Nigeria), C56/G3RZ (Gambia), C6AIC (Bahamas), 9G1BJ (Ghana), 9K2RX (Kuwait),PT7AZ (Brazil), and finally AP2JZB (Pakistan). Seems he's enjoying himself!

A report now, from s.w.l. **Len Stockwell** in Grays, Essex. Len uses an FRG-100 receiver and G5RV antenna, and reports s.s.b. reception of VE3BZU (Canada) at 1418, 9K2ZC (Kuwait) at 1401, ZB2CI (Gibraltar) at 1400, SV5DDP (Dodecanese Islands) at 1356, 4Z4M (Israel) at 1405, and VE3ZRB (Canada) at 1408UTC.

Bristolian s.w.l., **Gordon Foote G7NCR** with his monoband receiver reports s.s.b. reception of AA2KD (USA) in contact with IV3PDG in Italy at 1740, VE3DTV (Canada) working IK4HAL at 1746, W1DID (USA) working GJ3YHU on the island of Jersey.

Gordon also logged EA8/DL7AU in Germany at 2004UTC, W4AYF (USA) working Gill G0GCZ in Manchester, along with GI4TUV in north east Ireland, VE2LD (Canada) in contact with Ron G0JPD in Northampton, and finally WZ1Y (USA) working Dave GW0JUJ in Pontypridd, Stan G2PU in Cambridge, and Peter G0WMC .

The 18 & 21MHz Bands

Just enough time for a quick look at the 18 and 21MHz bands and I'll start with Don G3NDF. Don lists 18MHz s.s.b. contacts with D44BC (Cape Verde Islands) at 1849, FS/WE9V (French Saint Martin) at 1605, TN/KF4BTY (Congo) at 1848, VP2MBO (Montserrat) at 1715, Z21CS (Zimbabwe) at 1732, (who is around 18.150MHz most days at this time), and 7Q7KL (Malawi) at 1658UTC (QSL to G0IAS).

Don's 21MHz s.s.b. provided contacts with EL2DT (Liberia) at 1639 (QSL to Box 2751, Monrovia, Liberia), ZS2OM (South Africa), and 9J2SZ (Zambia) at 1636UTC, (QSL via SP8DIP).

Finally for this month, John G3BDQ briefly reports working 9J2BO (Zambia), FR5HA (Reunion Island), and 9K2RF (Kuwait) on 21MHz s.s.b., while Ted G2HKU offers up RA1PC (Novaya Zemlya Island), VP2EWW (Anguilla), 8P6DU (Barbados), OD5/SP7LSE (Lebanon), and KP4GL (Puerto Rico) on 18MHz c.w. all at around 1100, and on 21MHz c.w. he adds C56CW (Gambia), J28JA (Djibouti), CE2LZV/MM in the Black Sea, 5N3/SP5XAR (Nigeria) and FS/N0BSH (French Saint Martin Island) all at around 1100UTC.

Signing Off

It's signing off time! My grateful thanks to our reporters for their information and effort, which makes the column what it is.

All the best DX, and cheerio for now. Don't forget - all reports, letters and photographs to me **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid-Glamorgan, Wales CF46 6RD. Tel: (01443) 411459.**

END

PETER SHORE

BROADCAST ROUND-UP

This month Peter Shore has news of a new relay station as well as details on where to tune to catch your favourite radio stations.

Advance news from **BBC World Service**: it is to stop using the short wave relay station at Lesotho in southern Africa at the end of the summer frequency period. Instead of using its own transmitters, the BBC will be hiring more time on Channel Africa's transmitters at Meyerton in South Africa.

The Meyerton units are 500kW senders as opposed to the 100kW transmitters at Lesotho, and should improve reception in the central area of Africa. This means that **Radio Lesotho** may also stop using short wave (4.80MHz is the frequency) as the transmitter is sited at the same station as the BBC World Service transmitters.

The BBC World Service has announced that it is to build a new relay station in Oman to replace its existing site on the island of Masirah. The station, which will cost around £30 million to construct, will have four 300kW short wave transmitters and two 600kW medium wave transmitters. The station should be operational by the year 2001 and will improve reception in the Middle East, Indian sub-continent and Central Asia.

Special Event

Radio Austria International ran special programmes for the annual International Marconi Day (IMD) on 20 April. (Around 25 special event amateur radio stations operate on IMD from places connected with Marconi's career). The Austrian connection involves the Vatican.

In February 1931, the Vatican's short wave transmitter, developed by Marconi, went on the air and an experimental short wave transmitter in Vienna relayed the opening programme to the whole of Europe. It was the first short wave relay in the then brief history of radio.

The ORF's amateur station was on the air all day on 20 April, using the special call OEM1M. A special QSL card was issued to mark the event.

Meanwhile, Radio Austria International's conventional broadcasts continue. The summer English language schedule from Vienna to Europe is: 1230 on 6.155, 13.73 and 2030 on 5.945, 6.155 and 9.88MHz

If you have invested in the new Astra Digital Radio (ADR) set-top box, you can hear Radio Austria International on one of the ADR channels in CD quality. If you have traditional analogue satellite equipment, listen on the World Radio Network audio subcarrier at 0430 and 1800UTC.

Misnamed Station

An apology. In a recent edition, I misnamed a radio station, albeit completely unintentionally. **Alfredo Cottroneo** sent an E-mail to the *PW* Editorial Office pointing out that I had referred to the Italian Radio Relay Service (IRRS). The IRRS is no more, and is now known as **NEXUS-International Broadcasting Association**.

The NEXUS service relays UN Radio as well as putting out some of its own material. If you would like to tune in, here is the summer schedule: 0500-0930 (weekdays) on 3.985; 0500-0530 (weekends) on 7.125; 0730-1330 (weekends) on 7.125; 1330-2000 (weekdays) on 3.985 and 2000-2200 (Friday, Saturday and Sunday) on 3.98MHz. The address is **NEXUS, PO Box 10980, I-20110 Milan, Italy**.

Free Publicity

The **HCJB**'s Japanese service received some of the most effective free publicity possible - something many international broadcasters would welcome - when NHK television (Japan's equivalent to the BBC) broadcast a 45-minute documentary featuring HCJB programme makers **Kazuo** and **Hisako Ozaki**. The Ozakis have worked at HCJB for 32 years and it was a fitting tribute to the veteran broadcasters.

An NHK crew spent 17 days in Quito recording material, and documented the impact of HCJB's Japanese broadcasts world-wide. Even though the Ozakis run the Ecuador station's Japanese service almost unaided, they receive a huge number of letters. More than 4,500 were received in 1995.

If you would like to listen to HCJB, English can be heard at: 0030-0700 on 9.745; 0700-0830 on 11.615 (to Europe); 0100-1130 on 5.90 and 1700-2200 on 15.54 and 11.96MHz. And Japanese can be heard: 0430-0500 on 9.765; 1130-1200 on 9.415 and 2200-2300 on 11.615MHz.

New Transmitter

A new 100kW transmitter has been installed at HCJB's transmitting site outside Quito. Like most of its other equipment, this transmitter was built by HCJB's engineering section in the USA. It should be on the air this summer.

Meanwhile, Japan broadcasts in English. The NHK service uses transmitters in Gabon, Canada, Singapore, Sri Lanka, French Guiana, the UK and Ascension Island to send its programmes world-wide.

English to Europe is now at: 0500-0600 on 7.23, 11.725, 17.81; 0700-0800 on 7.23, 11.725, 11.385, 15.165, 17.81 and 21.61 and 2300-0000 on 5.965, 9.535, 9.56, 11.85MHz.

You can also hear the Japanese broadcaster's national service at 2000 until 2400 on 11.665 and 11.91MHz.

Sunday Programme

Radio Denmark has a 15-minute English programme on the first Sunday of the month from 08.38UTC. This programme can also be heard via World Radio Network on the 1st and 3rd Sunday via satellite and certain cablenets throughout Europe at 16.15UTC (Astra 11.538GHz and the audio subcarrier at 7.38MHz) and in North America at 19.15UTC (Galaxy-5 3.820GHz and the audio subcarrier at 6.8 MHz).

The producer, **Julian Isherwood**, can be reached at **PO Box 666, DK-1506 Copenhagen**, or via E-mail: **jui@dr.dk** European listeners can tune in at: 06.30 on 7.180; 07.30 on 7.180; 10.30 on 9.480; 11.30 on 7.295; 12.30 on 9.590; 13.30 on 9.590; 17.30 on 7.485; 18.30 on 7.485; 19.30 on 7.520 and 20.30 on 7.485MHz.

Bulgaria Schedule

Finally this month, the latest schedule from **Radio Bulgaria**. English is on the air at: 0400 on 9.70 and 11.72; 1130 on 13.79; 1230 on 15.62; 1900 and 2100 on 9.70 and 11.72 and 2300-2400 on 7.48 and 9.70MHz

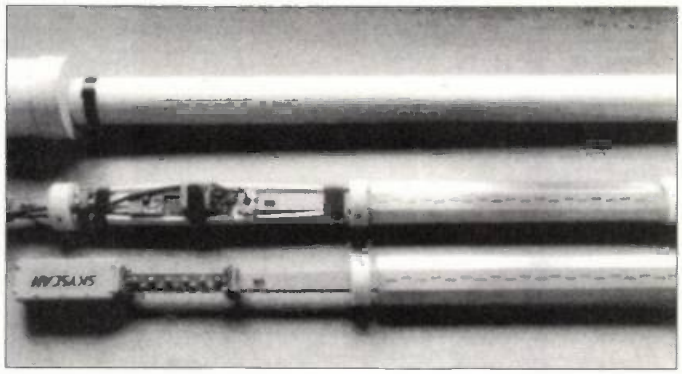
Next month I'll be taking a brief look at a radio set that thinks it's a cassette recorder - or is it the other way round? Find out more in the July issue of *Practical Wireless*. Until then, good DX!

END

GRAHAM HANKINS G8EMX

FOCAL POINT

Graham Hankins G8EMX has the latest news from the world of Amateur Television.



Microwave antennas aren't always dishes! There are 10GHz slotted waveguides, producing an all-round (omni-directional), horizontally polarised radiation pattern for the GB3XG Repeater.

A remarkable example of microwave ducting, when 10GHz Amateur Television pictures skimmed across the surface of the North Sea, was reported in the December 1995 'Focal Point'. But you don't always need a vast stretch of water. The recent very cold winter produced more evidence of amazing microwave propagation.

Stoke on Trent reader A. **Horsfall G4CBW**, was receiving 10GHz signals from somewhere south. These later became P5 pictures (solid line and frame locking, low noise, correctly locked colours and/or good black and white definition) from **GB3XG**, the Bristol 3cm (10GHz) Repeater. This was a path length of about 187km.

The weather conditions were freezing fog from the south coast to the Midlands. Thanks to **Phil Smith G1HIA** of the **Severnside ATV Group** for that report. Phil put his own pictures into GB3XG, these were seen by G4CBW and the two stations finally signed their logs off at 3am!

The Severnside ATV Group are set to appear locally on broadcast television soon. Their recent social night, and the **GB3ZZ** 1.3GHz Bristol Repeater, was recorded for transmission on HTV (formerly called Harlech Television) sometime in early June.

At the time of writing, precise programme title, date and time are not yet known. Readers in Wales keen to see this may wish to telephone HTV on **0117-977 8366**.

Still with news from Wales. **Brian Kelly GW6BWX** writes: "There are outline plans to link the major towns in Gwent via two 10GHz band repeaters. One will be co-located with **GB3BC** (144MHz voice repeater) on a mountain called Mynydd Machen. The other repeater will be at a site a few miles further north.

Brian continues: "Ideally, the Mynydd Machen repeater would have reversed input and output frequencies. It could then become a link in a chain between GB3XG and the northern repeater".

Providing switchable 10GHz links between many of the existing 1.3GHz repeaters is an exciting future development that ATV could make. Such interconnections would enable, for instance, a national GB2RS news service in vision to become a reality. Even a link between just two repeaters could be viable, if it led to increased on-air traffic.

Any expansion of the ATV network depends crucially on available high sites. Or at least, places which have a clear r.f. path over a reasonably wide area. Repeater sites need to provide a secure room to house the equipment and, ideally, minimal formality when Repeater Group members wish to gain access.

Do you know of, possess or can you authorise likely accommodation for a 1.3GHz or 10GHz repeater, anywhere in the UK? Please let me know if you can help.

Solent Update

Now an update from the **Solent Club for Amateur Radio and Television** (SCART) in Southampton. Their special issue of newsletter *In Sync* has the following notes from editor **Ian Bennett G6HNJ**: "The club has bought a 5m mast section which has been erected at the proposed site - the Royal British Legion Club, Park Gate. Credits for the initial test go to **Steve G7BVK** (mounting brackets and transmitter), **Mike Walters G3JVL** (Alford slot antenna) and **Ian G6HNJ** (20W power amplifier).

"Reported results were very promising - P4 (slight noise on picture but otherwise good detail and colour) from **Frank G0LFI**, Portsmouth, **Charlie G0LPP**, Gosport, and **Ricky G0SBV**, New Forest. A colour P3 picture (obvious noise) was seen by **Alan G1APD**, Hedge End, and a mono P2 (substantial noise, but recognisable content) by **Charlie G7RVN** in Swaythling."

For anyone waiting to start on ATV, the Solent Club can supply a range of kits, p.c.b.s and test cards. Contact **Mike Samders G8LES**, 39 **Telegraph Lane, Four Marks, Alton, Hants GU34 5AX**.

Dartmoor Repeater

There is a new ATV repeater being tested in Dartmoor. **Tony Reynolds G8CEQ** (ex VK6ZGZ, Perth, Australia), Chairman of the **West Devon ATV Repeater Group**, tells me: "The Group has been given permission to install a 24cm (1270MHz) repeater on North Hessary Tor BBC transmitter mast. The repeater is presently putting P4 signals into Plymouth, Torbay and Newton Abbot during beacon transmissions.

Tony adds: "The final antennas will be corner reflectors on the 'bow-tie' design, to give several directional headings instead of an all-round radiation pattern".

Other News

Whether you are transmitting ATV or just watching, don't forget the **British Amateur Television Club's** Summer Fun contest. This will be from 1800hrs Saturday June 8 until 1200hrs on Sunday June 9.

The American ATV scene is covered by *Amateur Television Quarterly*, which is available from the USA on subscription. One of the E-mails sent to publisher **Henry Ruh KB9FO** is *Underwater ATV*. This involves using toy submarines equipped with 434MHz ATV transmitters with quarter-wave antennas inside the hull. Problems encountered were multipath reflections from the pool walls and plumbing. Possible solutions were f.m. modulation or circular polarisation.

The final pages of *ATVQ* are headed: 'If you are only talking on your ham (amateur) radio, you are missing the big picture.' Hear Hear! as we say in the UK. I'll mention *ATVQ* again Henry, if you could send me a copy?

A small practical project to whet your appetite for ATV is being planned for a future edition of 'Focal Point'. It would be great to hear from individual ATV operators, plus news from other countries.

Frequently Asked ATV Questions

Q: 'Why is the vision signal amplitude modulated for 430MHz (70cm), but frequency modulated almost always on higher bands'?
A: There are several reasons. A common way of receiving 430MHz ATV is with a domestic TV set, which is designed for a.m. video. The power transistors in 430MHz transmitters can handle a.m. without significant heat dissipation and de-rating problems. This is not so easily achieved with 1.3GHz power devices without significant cost, so f.m. simplifies the power output stages of 24cm transmitters.

Q: 'How do I know is there is ATV activity in my area'?
A: One way is to listen on 144.750MHz, the 2m ATV calling channel. Another is for local ATV Nets - several stations on-air in an area at certain times - to send details of their activity periods to 'Focal Point'. How about it ever yone?

Starting in my next column I'll be running an 'A TO Z Of ATV'. So, cheerio for now, keep those newsletters, photos and club magazines coming to me Graham Hankins G8EMX, 11 Cottesbrook Road, Acocks Green, Birmingham B27 6LE or to G8EMX@GB7SOL.

END

Advertisements from traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors.**

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AC current panel meter, 0-20A, 4.5 x 4in, moving coil movement, manufactured by S.E.W. (Japan), brand new, £5.90. *1995 Passport To World Band Radio*, £9.50. Tel: NW London 0181-954 1750 day/evenings.

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Aldis lamp complete in correct box, 9 x 8 x 12in, also unused spare bulb, g.w.o., £50 No offers and buyer collects. Tel: Suffolk (01359) 259518.

Alinco v.h.f. transceiver DR110T mobile with handbook, only, £150. Two large power supplies, 200amp, only £20. Yupiteru MVT8000 scanner, £95. Aerial tuner, £25. Andy, Suffolk. Tel: (01449) 775395.

FT-7, v.g.c., £250. FL-50B, FR-50B, FV-50B, exit v.f.o., three units, excellent, £250. Delta One, £200. Delta One 40 channel, £230. Kenwood 2m (144MHz) TR-7500, v.g.c., £100, v.g.c., all excellent. Andy G7UAD, Derbys. Tel: 0115-930 8096.

Fully automatic a.c. voltage regulator, model ST1500W (1500 VA), dual range input, 50-130/160-240, fully metered, practically new, £40. *RadCom* January 1980-December 1995, full separate index, excellent condition, best offer, £50 +. No offers for regulator, carriage extra. Buyer collects. G2FZU, Notts. Tel: (01636) 813847.

Icom R70, excellent working order, price, £350. My residence between Keighley & Skipton. Yks. Tel: Nr. Keighley (01535) 635433.

Kenwood TH-78E dual-band handic, memory expansion, headset, soft case, hand strap, speaker mic., NiCad, charger, manual, boxed, very good condition. £340 o.n.o. Joe G7VQS, Warwick. Tel: (01926) 651310.

Kenwood TH-78E hand-held, CTCSS, soft case, spare NiCad, d.c. lead, charger, boxed, immaculate, £285. Pete, Surrey. Tel: 0181-393 9115.

Kenwood TR9500 v.h.f. transceiver, good condition, £325 o.n.o. Mirage 70cm (430MHz) 100W amp, £225. 22-element 70cm (430MHz) Yagi 16dBd, £35. Tel: Middlesex 0181-423 0576 after 6pm.

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Kenwood's latest transceiver TS-870S digital signal processing, with Manson EP925 p.s.u., both brand new in November, £1895. Also SEM QRM eliminator, brand new, £65. G3EGC, Bolton. Tel: (01204) 301502.

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Racal 1792 receiver, backlit display, late model C 1988, as new, perfect bite, offers? Would exchange Collins 851S1 or similar Harris equipment, w.h.y.? Pat G3YFK, Nr. Shrewsbury. Tel: (01743) 884858.

Trio TS-120S 100W h.f. mobile/base with mounting bracket and manual, v.g.c., £300. G2DYM trap dipole, 160-10m (unused), £85. Auto NiCad charger for h/h-discharge/charge/trickle, £25. Derek G0OEW, Nantwich. Tel: (01270) 668111.

Uniace 200 converted to 29MHz f.m., nice rig with chrome front in excellent condition, £45 inc. postage. Tel: Cardiff (01222) 488723 after 5pm.

Yaesu 757 GX h.f. transceiver with box, mic and manuals, £399. Also Yaesu u.h.f. hand-held, crystals for SU20 and SU18 with charger and batteries, £40. Roy G4TDF, Birmingham. Tel: 0121-742 3832.

Yaesu FT-101Z Mk11 100W h.f. 160-10m s.s.b./c.w., excellent condition, complete with original manual, £250. Ultimate RTTY/c.w. station, accessory telereader CWR685 portable, RTTY terminal and Morse keyer, 5in display keyboard, £200? Collect. Stephen G7VFY, NW London. Tel: (0956) 544202.

Yaesu FT-480R transceiver, 144MHz, s.s.b., c.w., f.m., 10W, good condition, Kent key, loft antenna, 100 amp/hr battery, £280. Would deliver locally. Steve, Bognor Regis. Tel: (01243) 824034 evenings.

Yaesu FT-757GX, £375. FDK 2m (144MHz) multi-mode 1/20W, £225. Hammaster 2025 2m (144MHz) f.m. 1/20W, £120. Approx 75ft 7/8" Heliax, £40. Alex G0JZE, Chipping Norton. Tel: (01608) 643585.

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Exchange

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IBM PS2 50 series 386SX20, VGA colour, 20Mb HD (doubled), Windows 3.1, Dos 6.21, mouse, 3.5 DD, plus Yaesu FRG-7 h.f. RXer, digital display, g.w.o. for h.f. transceiver. Tel: Glos (01453) 824136 after 6pm.

Pioneer CD deck, excellent condition, boxed, four months old. Aiwa cassette deck, also excellent condition, also four months old, boxes, manuals, receipts, exchange for amateur 2m (144MHz) or 4m (70MHz) rig Yaesu/Kenwood/Alinco. G4OLC, QTHR. Tel: (01670) 855953.

Wanted

Circuit diagram for Rogers Ravensbrook stereo or amplifier needed for repair. Also any info or accessories for Midland 73-005 2m (144MHz) hand-held. Richard G7JLZ, QTHR. Tel: (01752) 880090.

Eddystone receivers, models 1570, EC10, EB35, EM34, 960, 890, 930, 870, 870A in particular, but any other models considered, also any scrap sets for spares to help out fellow constructors, some doubles for sale. Peter, Surrey. Tel: (0374) 128170 anytime.

Fine Tuning's "Proceedings - 1990" wanted buy/borrow plus mods info for Sony ICF-2001D. Wayne, Livingston. Tel: (01506) 411598.

FT-736R radio or FT-767 with 2/6/70cm, must be in very good condition, money waiting for the right transceiver, if no Yaesu, will consider Kenwood TS-790E or Icom IC-820H. Tel: Sheffield 0114-245 4579.

German WW2 radio equipment, parts, Clandestine sets WS18, WS62. For sale Soviet Red Army v.h.f. packset, £75 shipped. Rag Otterstad OZ8RO, Hosterkobvej 10, DK-3460, Birkerod, Denmark. Tel: 010-45-4281 5205, E-mail: danmec@inet.uni.c.dk

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VINTAGE SERVICE DATA, circuits & manuals for: HiFi, Military, Radio, Television & car radio up to the 1960's. Free brochure. Tudor Gwilliam-Rees, 50 Meddon Street, Bideford, North Devon EX39 2EQ. Tel: 01237 424280.

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Bargain Basement June '96

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Peter Shore
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John Breeds

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John Case GW4HWR
This is the recommended course book for anyone taking the Novice Licence. Covering all aspects of amateur radio and electronics it would be useful to anyone starting out in amateur radio. Every left hand page is for your own notes of explanation. 124 pages. £5.99

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Anita Louise McCormick KA8KGI
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EMC

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William R. Nelson WA6FQG
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Robin Page-Jones G3JWI
This paperback book provides essential information and reading for anyone who has an EMC (interference) problem. With the help of the well-illustrated text and techniques, much of the mystery from the troublesome world of electromagnetic compatibility is removed. 117 pages. £7.99

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Edited by Hugo Gernsback
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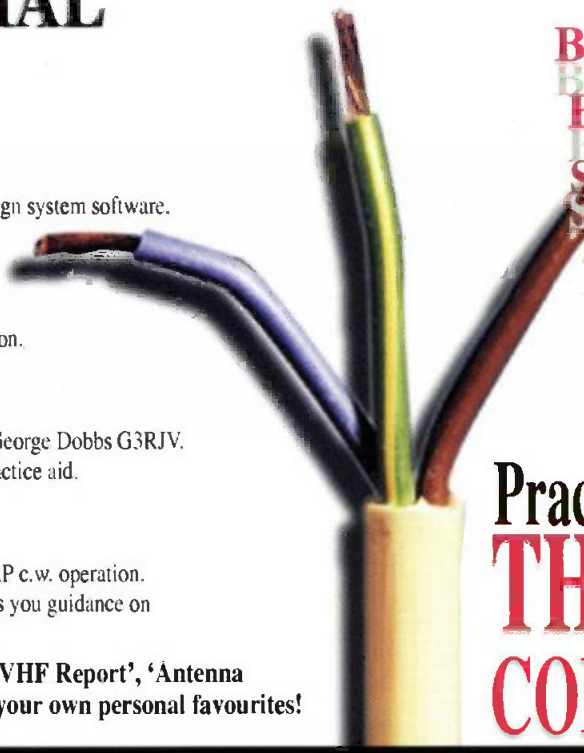

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Using Scanners and Longwire Antennas - Peter Rayer takes a look
CONSTRUCTION - Inexpensive Passive Pre-selector - Dr F. Crossley discusses his solution
Build A Remote Tuned Loop by Andrew Howlett
Making Connections an in depth look at feeding antennas with Joe Carr
A Ferrite Loop Converter by Richard Q. Marris
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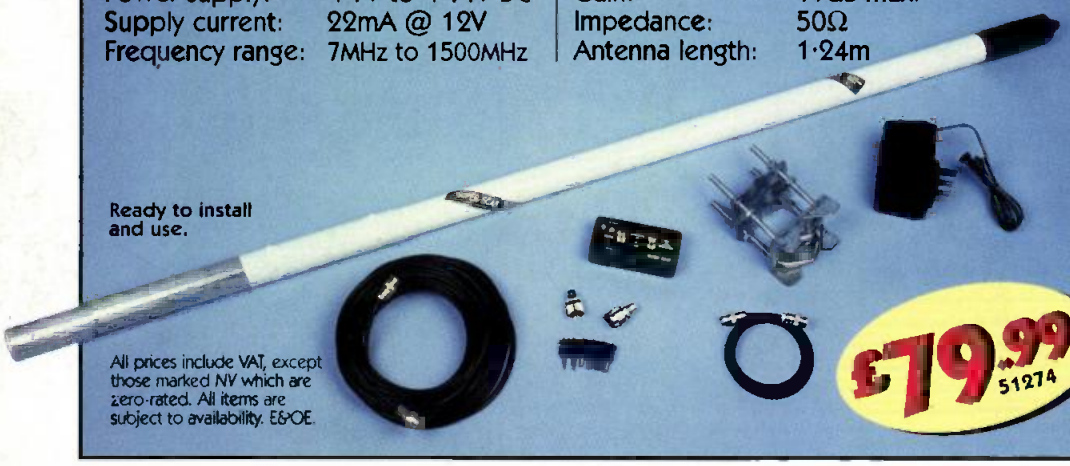
Power supply:	+9V to +14V DC	Gain:	19dB max.
Supply current:	22mA @ 12V	Impedance:	50Ω
Frequency range:	7MHz to 1500MHz	Antenna length:	1·24m



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