

**PRACTICAL WIRELESS...THE RADIO MAGAZINE**

# PW

**BE SAFE-  
LIKE PC 919**  
*When Using Your  
Mobile Callsign*

**MOBILE OPERATING  
SAFETY FEATURE  
& SPECIAL OFFER**



**BUILD**  
*The PW Morse-Master*

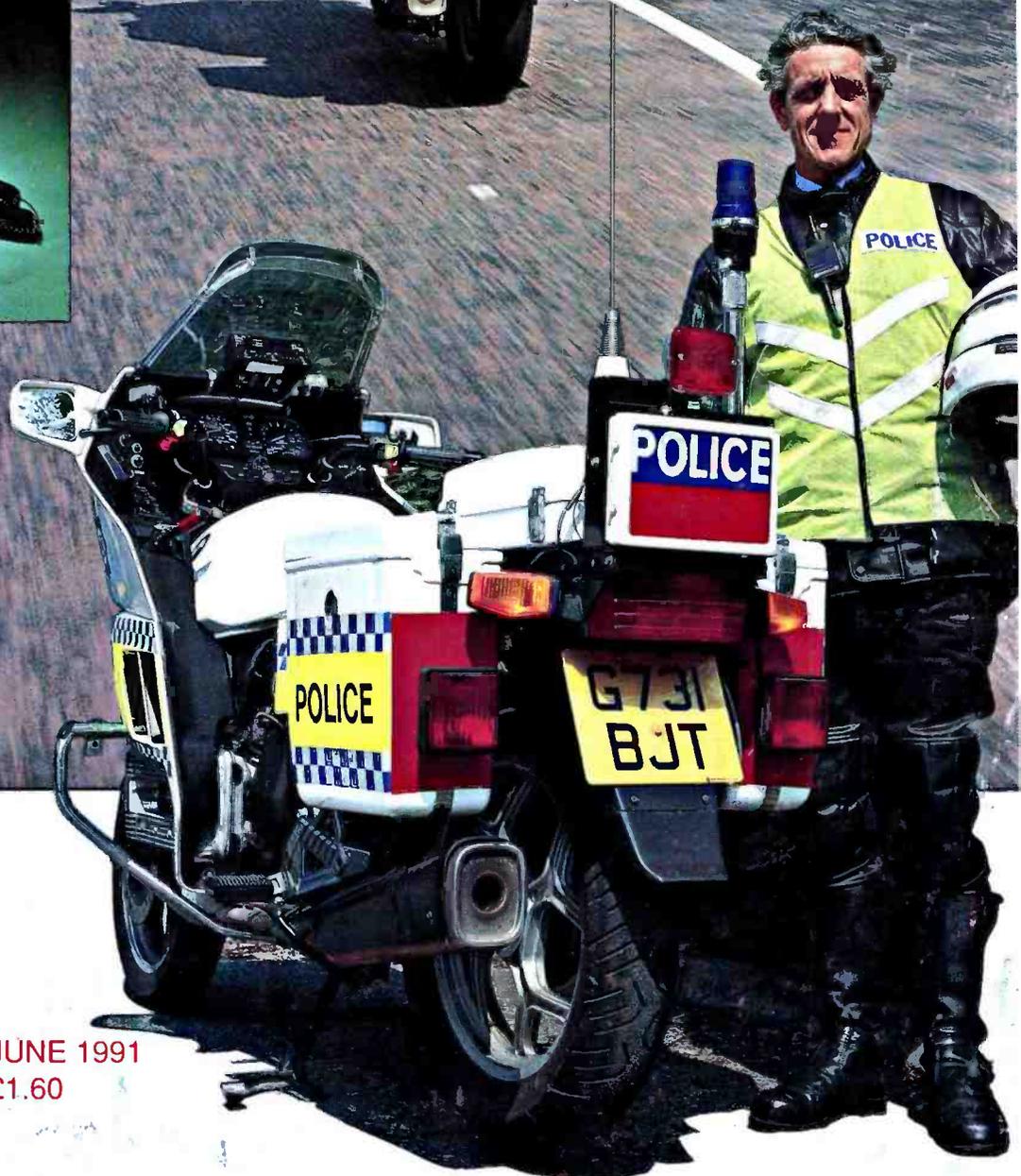
*Make a £1 Balun &  
Whip Up An  
Inexpensive Antenna*

**PLUS**  
*Getting Started - The  
Practical Way  
CB High & Low  
Bargain Basement  
Competition  
& Lots More!*

ISSN 0141-0857



**JUNE 1991**  
**£1.60**



# You'll be hard-pressed to beat the performance of Yaesu's new FT-411 handheld.

Let Yaesu's "next generation" handheld lighten your load!

Picking up where our popular FT-209R Series left off, the 2-meter FT-411 will amaze with its astounding array of features!

**The brains of a base station.** "Sophisticated operation" takes on new meaning in the FT-411. You get 49 memories, plus dual VFOs for quick band-hopping. Keyboard frequency entry. Automatic repeater shift.

Selectable channel steps: 5/10/12.5/20/25 KHz. Programmable band scan with upper/lower limits. Selectable memory scan.

Not bad for a handheld measuring just 55(w) × 32(d) × 139(h) mm (the same size as our FT-23R Series handies).

**Friendly operation.** For operating convenience, the FT-411's keypad features a "do-re-mi" audible command verification. Both the display and keypad can be backlit (brightly!) for night operation at the push of a button. A rotary channel selector allows fast manual tuning. Or key in the frequency directly. Operate VOX (with YH-2 headset option).

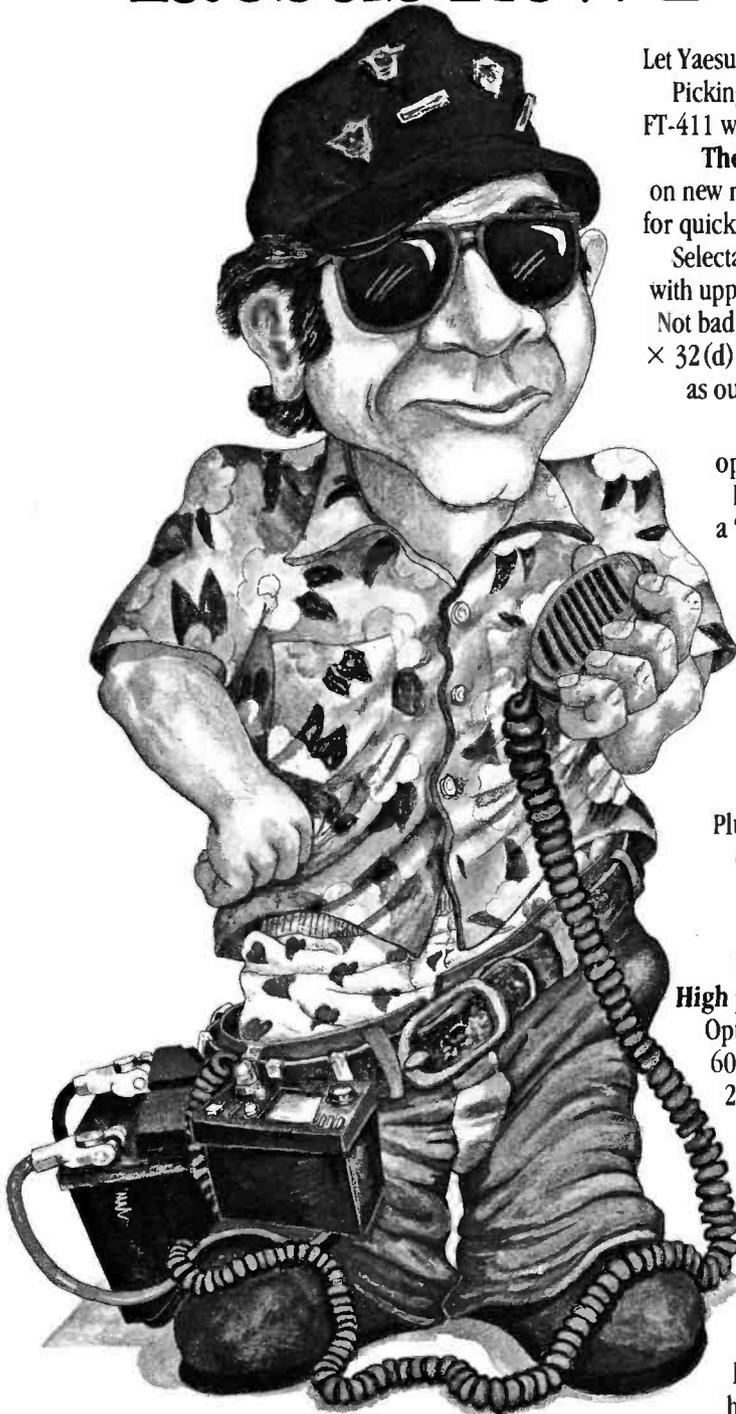
Plus you get a battery saver to conserve power while monitoring. And a (defeatable) automatic power-off feature that shuts down your radio if you forget to turn it off!

#### High power capability.

Optional nicad packs available are FNB10, 2.5-watt, 600-mAh. FNB-12 5-watt, 500mAh pack or tiny FNB-9 2.5-watt, 200mAh pack. Or you can get 6 watts output by applying 13.8-volts DC from an external power supply.

**Swap options with Yaesu's FT-23R Series.** Our rugged best-seller's chargers, batteries, and microphones are fully compatible with the FT-411. The FT-23R is the perfect companion for the FT-411, and at a great price!

**Try out an FT-411 today.** At your local authorised Yaesu dealer. And experience the legendary Yaesu handie performance!



## YAESU

UK Sole Distributor: South Midlands Communications Ltd, S M House, School Close, Chandlers Ford Industrial Estate, Easleigh, Hampshire, SO5 3BY. Telephone (0703) 255111, Fax (0703) 263507, Telex 477351 SMCOMM G.

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**ON SALE JUNE 13**

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# Contents June 1991



19



39

## Regular Features

- 63 Advert Index
- 27 Bargain Basement
- 60 Book Service
- 12 Competition Corner
- 27 Errors & Updates
- 9 Keylines
- 13 Newsdesk '91
- 45 PCB Service
- 31 Radio Diary
- 9 Receiving You
- 12 Services
- 58 Subscribers' Club
- 49 Wireless-Line

- 19 **Safety First -  
On The Air & On The Move**  
*Rob Mannion G3XFD*
- 21 **PW Special Offer**
- 23 **CB High & Low**  
*'Quaynotes'*
- 24 **The PW Morse-Master Part 1**  
*Steve Farrow G8IWW*
- 28 **Whipping Up A Cheap Antenna**  
*James Stirrat*
- 32 **The 1991 PW 144MHz QRP  
Contest Rules**  
*Neill Taylor G4HLX*
- 34 **The Moon-4 Transverter (Part 2)**  
*Andrew Talbot G4JNT*
- 36 **The £1 Balun**  
*Steve Nicholls G0JFM*
- 39 **Satellite Scene**  
*Pat Gowen G3IOR*
- 42 **Reflections**  
*Ron Ham*
- 47 **Getting Started -  
The Practical Way**  
*Rev. George Dobbs G3RJV*
- 50 **Backscatter**

*Mathematics For The RAE,  
The Oscilloscope In Your Workshop and  
Packet Panorama have been held-over this  
month.*

*Front cover Photograph courtesy of Dorset  
Police (Traffic Div.).*

# DUAL-BAND

## IC-W2E Dual-Band FM Handheld

ICOM have produced the hand-held with the perfect combination of size and features. This exciting new transceiver is one of the smallest in it's class yet contains so many functions you'd think it would burst!

### IC-W2E features include:

- Optional pocket beep and tone squelch for quiet standby.
- High speed scan and priority watch.
- Full 5W output power with external 13.5-16V power supply unit
- 24 hour clock with ON/OFF timer.
- 1750Hz tone call to access repeaters.
- Programmable offset frequency.
- Monitor function that allows you to check repeater input frequency.
- External DC power jack.
- Memory mask to hide seldom-used channels.
- Memory transfer function.
- PTT lock function.
- Keypad and tuning control lock.
- Automatic power save.



ICOM

ICOM  
HF/VHF ANTENNA  
FA-144388



# SUPERIORITY

## IC-2410E Dual-Band FM Mobile

ICOM introduces simultaneous reception of two frequencies in the same band! combine this with simultaneous dual-band receive and you have a breakthrough in features not found anywhere with any other radio. Compact design fully utilises the latest technology while using a minimum of knobs and switches. One-touch controls activate both primary and secondary functions, this ease of operation makes the IC-2410E especially safe when in mobile use.

### Outstanding IC-2410E features include:

- Independent volume controls and squelch setting.
- 20db RF attenuator effective against strong signals.
- Built-in duplexer for easy dual-band antenna connection.
- Scan and priority watch functions.
- Illuminated switches and dials for night ops.
- Optional pager and pocket beep for selective calling.
- Optional speech unit.



Mail orders taken by phone. Instant credit & interest free H.P. Interlink despatch on same day if possible

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Telephone: 0227 741741 (24hr). Facsimile: 0227 360155

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Call sign: .....Tel: .....Dept: PW

## A QUART IN A PINT POT?

Never I hear you say, well **YAESU's** engineers have done it again with the **NEW Dualband FT5200**

*ALL THESE FEATURES AND MORE IN A BOX ONLY THIS SIZE*

140mm width  
40mm height  
150mm depth

- ★ Dualband 2m and 70cms
- ★ 50/5W on 2m and 35/5W on 70cms
- ★ Crossband full duplex operation
- ★ Reversed-mask dual LCD display
- ★ Built-in antenna Diplexer
- ★ Trunk Mount Cable Option 3m or 6m
- ★ Automatic repeater Shift selection
- ★ Digital Voice storage system (option)
- ★ 8 Level manual/automatic display dimmer
- ★ Dual external speaker jacks
- ★ User selectable Channel steps
- ★ 16 Memories on each band

## NEW FT-990 HF TRANSCEIVER



Based on the remarkable performance and easy operation of the FT-1000, Yaesu's new FT-990, combines the basic technical features of that top-of-the-line model with several recent advances resulting in a spectacular performer at a very reasonable price.

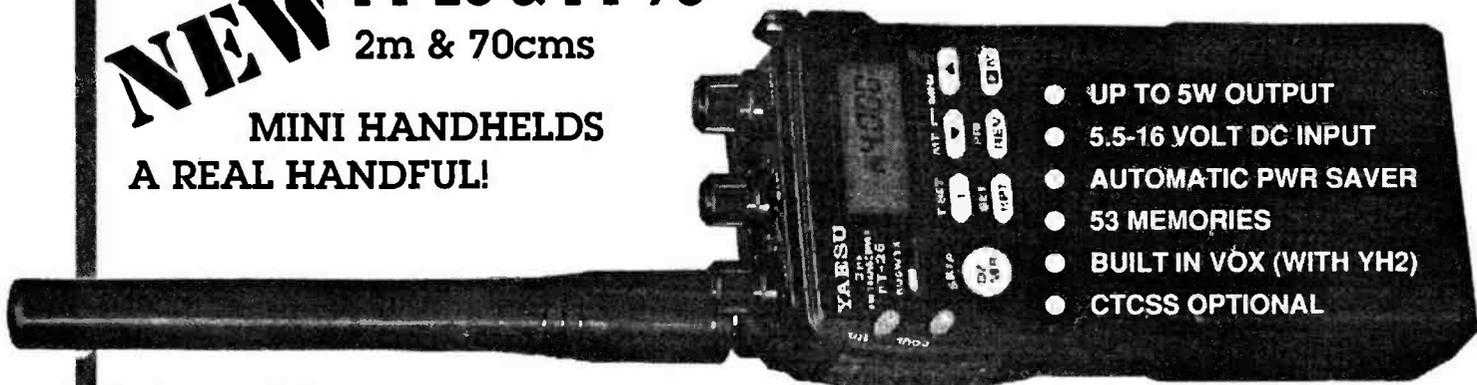
Utilising Direct Digital Synthesisers (DDS) and the extremely quiet receiver circuitry of its big brother, the FT-990 delivers silky smooth tuning, pure local signals and clear reception of even the weakest stations.

- ★ Amateur Bands 160-10m
- ★ General Coverage Receiver
- ★ 100W Output (25W AM Carrier)
- ★ 50 Memories
- ★ Built in icambic memory keyer

So if you're looking for top performance in an HF transceiver, try out the FT-990.

*You might just fall in love!*

## NEW FT-26 & FT-76 2m & 70cms MINI HANDHELDS A REAL HANDFUL!



- UP TO 5W OUTPUT
- 5.5-16 VOLT DC INPUT
- AUTOMATIC PWR SAVER
- 53 MEMORIES
- BUILT IN VOX (WITH YH2)
- CTCSS OPTIONAL

Not shown full size.

**Southampton** (0703) 255111  
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Chandlers Ford Ind. Est.  
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Leeds LS9 6JE  
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Tues-Sat

**Birmingham** 021-327 1497  
SMC Birmingham,  
504 Alum Rock Road,  
Alum Rock,  
Birmingham B8 3HX.  
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1 Western Parade,  
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Devon EX13 5NY.  
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**NEW**

## 6M EQUIPMENT

VERTICAL POLARIZATION NOW PERMITTED IN THE UK

VERTICAL BASE STATION AND MOBILE ANTENNAS NOW AVAILABLE FROM **SMC**

FT650	Multimode 6m, 10m & 12m 13.8DC operation	£1079.00 D
FT690R2	6m 2.5W Multimode Portable	£429.00 C
FT767GX	General Coverage RX Ham BAND TX	£1599.00 E
50/767	6m Module for FT 767GX	£182.89 B
FT736R	Multimode V/UHF Base c/w 2m, 70cms & Duplex	£1359.00 D
FEX736/50	6m Module for FT736R	244.20 B
HT106	6m Transceiver CW/SSB 10W PEP output	£305.50 C

### AMPLIFIERS

HL1K/6	1kW PEP RF Input (pr 4CX250B) 10W Drive	£895.00 D
HL66V	10W in 50-60W out PEP	£131.75 C
HL166V	3/10W in Auto Select 80/160W out RX preamp	£254.00 C
LP50-3-50	3W in 50W out	£155.10 B
LP50-10-50	10W in 50W out	£155.10 B

### ANTENNA BEAMS

DB4	4m/6m Duobander, 4 ELE Beam	£157.00 D
4Y6M	4 ELE Yagi 7.0dBd 3.8m	£66.00 C
50/2	2 ELE Yagi 4.7dBd 4.4'	£35.00 C
50/3	3 ELE Yagi 7.1dBd 5.8'	£43.00 C
50/5	5 ELE Yagi 9.2dBd 12.2'	£65.00 C
CL6DX	6 ELE Yagi 13.0dBd LE 3.1mB5.8m	£117.50 D
CL6DXX	7 ELE Yagi 14.0dB LE 3.1mB7.2m	£172.00 D
CL6DXZ	8 ELE Yagi 14.5dB LE3.1mB9.5m	£235.00 D
2HB6	2 ELE (Both Driven) Antenna	£35.76 C
64B	4 ELE Hy Gain Yagi	£75.00 C

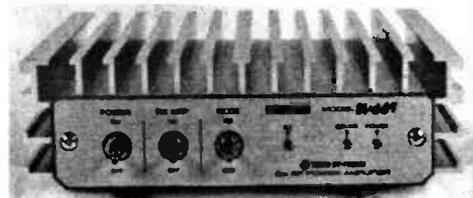
### NEW VERTICAL ANTENNA

HS-GP62	5/8 2-stop collinear 6dBi6.57m	65.00 D
CX725	50/144/432MHz Triple Bander 200W 2.43m	£75.00 C
OSCAR6M	Mobile Antenna	£25.00 B
* CA-350DB	28/50MHz Dual Bander 200W SSB6.90m	£129.00 C

\*Expected availability from July.

### TRIPLEXERS

CFX4310	1.3-150/350-500/840-1400MHz 200W PEP 50dB	£36.78 B
CFX-514	50/144/430MHz 500W PEP 55dB Isolation	£36.78 B
CF-305	28/50MHz Duplexer 600W PEP 60dB Isolation	£25.00 B



Tokyo Hy-Power 6m Power amp HL-66V



FT-690R2



CX-725 6m Vertical Antenna

PRICES FOR POSTAGE ON ALL THESE ITEMS ARE CODED AS FOLLOWS:

A = £1.75  
 B = £4.00  
 C = £6.00  
 D = £10.00  
 E = £15.00

## IMPORTANT ANNOUNCEMENT DAIWA PRODUCTS

**SMC** are pleased to announce that we are now the official UK Distributor for the complete range of DAIWA products. These include the Cross Needle Power/SWR meters, Power Supplies and Coaxial Switches.

**So why not contact us today for more details of the complete DAIWA range.**



- Free Finance on selected items, subject to status. Details available on request.
- Up to £1000 instant credit, a quotation in writing is available on request, subject to status.
- Yaesu Distributor Warranty, 12 months parts and labour.
- Carriage charged on all items as indicated or by quotation.
- Prices and availability subject to change without prior notice.
- Same day despatch wherever possible.

# Waters & Stanton 0702 206835 or 204965

BEST PRICES! FAST MAIL ORDER

## ALINCO

The Serious Alternative

First in Europe!

2 Metre Handheld  
+ AM Airband Rx!

Range: AM 108-138MHz  
FM 138-180MHz

DJ-160EA **£229**



The DJ-160EA is the natural progression from the DJ-160E. Exactly the same package but with a much wider coverage and the addition of AM airband, a first in handhelds. The wide frequency range coupled with all the standard features of the DJ-160E give the new DJ-160EA an unrivalled specification. Standard features include 3 or 0.5 Watts output, LCD display, keypad selection, rotary frequency control, 21 memories, scan and priority, reverse repeater, 5-25kHz steps, DTMF decoder, auto power off, DC-DC 12V converter, 700mAh pack, rapid AC charger. Add to this AM airband coverage and you will see why the DJ-160EA is destined to become the best selling handheld for 1991!

DJ-460E...£229 (70cms)

## Mammoth Ham Radio Sale

Hockley Premises

19th May. 10 AM

Don't Miss it!

Free Refreshments

SUPER PRICES

GREAT BARGAINS

### HF EQUIPMENT GALORE!

We have now installed a superb hf demonstration room for those who want to try out our latest range of gear. As well as a 40 metre Zepp, we have a 3 element rotary beam on the top of our 3 storey building which really gets the DX! If you're in the market for hf gear, come to the experts with "hands on" experience. We can also offer advice on linears, atu's, beams, wire aerials etc.



£339

DJ-560E

INCLUDES TONE SQUELCH

2m & 70cm 2W • 130-174 & 400-520MHz Rx • Key pad entry • Rotary tuning • 2 x Vol/Squ controls • 5/12.5/25kHz etc steps • DTMF • Dual Watch • Scanning • Bell alarm • 40 memories • 12v DC-DC • Auto dial • AC charger • 700mAh pack • 169 x 57 x 32mm • Rubber Duck • Plus many other features. • Phone for details.



Are A

## Ham's Best Friend!

If you want the very best antenna for VHF or UHF then choose from the range that is stocked by most amateur radio dealers! Diamond give you more gain and quality £ for £. They are tough, sleek, pre-tuned, and have a spares back-up that is second to none. All "X" series models are fibre glass encapsulated and knock down into sections for easy transport. And if after purchasing, you are not convinced that they are great value for money with super low VSWR's, simply return the antenna to us within 14 days for a full refund. Now that's the kind of confidence that our competitors don't have. Nuff said!

CP22J	2m 2 x 3/8th 6/5dB gain	49.95
The following have patented "C" load phasing.		
X-50	2m/70cm 4.5/7.2dB 1.7m	59.95
X-300	2m/70cm 6.5/9dB 3.1m	89.00
X-500	2m/70cm 8.3/11.7dB	129.00
X-700	2m/70cm 9.3/13dB	195.00
Others:		
D-707	Active base 1.5-1300MHz	99.00
D-505	Active mobile as above	69.00
CP5	80-10m Hf vertical complete!	189.00
SAE for 26 page Diamond Catalogue. Fabulous!		



DR-590E  
2M & 70CMS  
£499

2m & 70cms • 45 Watts • 10 or 5 Watts low power • Dual watch • Full Duplex • Automatic Repeater Memory • 38 Memories • Auto Band Change • Reverse Repeater • 6 channel steps 5-25kHz • Brightness control • Priority • Bell Function • Detachable front panel option • Built-in speaker • Fist mic and full mounting kit • 150 x 50 x 178mm.

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at our Hockley premises. 10 a.m.-4 p.m.

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Super Prices, FREE Refreshments! Well worth a visit.

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TS 850!  
£1295 +  
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TS-680S	HF with 6 metres + FREE PSU!	£985
TL-922	Hunky 2kW Linear in stock!	£1495
TS-790E	2m/70cms (Part Ex welcome!)	£1495
TH-77E	Dualband handy + Free High Gain Ant.	£389
TR-751E	2m All Mode + FREE PSU!	£599

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Retail Only: 12 North Street, Hornchurch, Essex. Tel: (04024) 44765

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# ARE COMMUNICATIONS TALK TO US

## ICOM

### IC-R100 - WITH SSB!



IC-R100 Mobile/Base Receiver now with SSB!

#### WHY SETTLE FOR ANYTHING LESS!

For the enthusiast who prefers a more permanent installation, the IC-R100 is ideal, giving full frequency coverage of 500kHz-1800MHz and AM/FM/FM wide modes of operation. The IC-R100 boasts 100 memory channels to store your favourite stations and has features similar to the little pocket receiver. **ONLY FROM US - WITH SSB!**

**£510 inc. SSB or 48 Monthly payments of £18.36**

## STANDARD C528

**£349.00 or 48 Monthly payments of £12.57**

## FAIRMATE HP200

1000 Channels  
500kHz - 600MHz  
805MHz - 1300MHz



Receiving Modes:-  
AM/FM/Wideband/FM  
Selectable stops  
5kHz - 995kHz.

Improved Stability over HP100 and AOR1000 comes with:- Ni-CADS, carry case, belt clip, earpiece, DC Cable and 3 antennas. **ONLY £269**

**LOTS OF SECOND HAND ITEMS AT REALISTIC PRICES! YOU CAN'T AFFORD NOT TO PHONE US.**

## ICOM IC-R7000HF Receiver

500kHz - 2GHz



Now available on super credit terms. 48 Monthly payments of £35.98. Cash/cheque/credit card price:

**£999**

Yes, 500kHz to 2GHz CONTINUOUS receive in one unit. Using the ICR7000 multimode facilities. This probably makes the "Two in One" ICR7000HF Receiver the most versatile scanner available today. Because of the enormous frequency coverage. It has 200 mode sensitive channels for increased flexibility.



## A DREAM COME TRUE

Bored with two metres? Then why not turn that 2m rig onto the HF bands



YAESU FT290

HX240 TRANSVERTER

FT290R II £395  
2 METRE TRANSVERTER TOKYO HX240 Transverter £239  
WITH AUTO SWITCH £259

With the HX 240 feed in 3 to 10 watts on 2m and transmit on 10-15-20-40 or 80 with 40 watts output.

Once again ARE COMMUNICATIONS BREAK THE PRICE BARRIER!

Now a 2 metre Hand Held transceiver made by Kenpro. Model KT22E for **£139 inc. VAT** Package includes NICAD pack charger and antenna.



**A GREAT DEAL!**

- ★ Fully synthesised
- ★ Thumbwheel tuning
- ★ 10MHz cover on RX
- ★ 1750kHz Tone Burst
- ★ 600kHz Shift for repeater operation
- ★ Low and High power switch

## ICOM IC-726 HF

Transceivers for both mobile or base - the 726 HAS 6 meters inc.



**PHONE FOR OUR PRICE YOU WILL BE AMAZED**

## ICOM The New Amazing IC-R1 Scan Receiver



Now at a new amazing price!

**£359**

48 Payments of £12.93 per month.

Frequency range 100kHz to 1300MHz no gaps AM or FM Also available on easy terms.

**NOW AVAILABLE WITH SSB £399.00**

## YAESU FT-747 Still the best value available.



**PHONE FOR OUR GREAT PRICE!**

The FT747 HF Transceiver SSB/CW/AM (and optional FM) 100 watts pep output on all HF bands and general coverage on receive 100kHz-30MHz. Dual VFO 20 memories.

Opening Hours Monday-Friday 8.30-6.00pm

Saturday 9.00-3.00pm



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ALL MAJOR BRANDS ON OFFER  
MANY MAJOR ITEMS AVAILABLE —  
INTEREST FREE!

## DUAL BAND 2M+70CMS HANDY'S

 <p><b>IC-24ET</b> <b>ICOM</b> <b>£356!!</b> CASH PRICE</p>	 <p><b>TH-77E</b> <b>KENWOOD</b> <b>£397</b> OF <b>£133</b> DEP + 9 x £29.33</p>	 <p><b>FT470R</b> <b>YAESU</b> WITH FNB10+CHARGER <b>NO INCREASE!!</b> <b>£399</b> CASH PRICE</p>	 <p><b>C528</b> <b>STANDARD</b> <b>£387</b> OF <b>£129</b> DEP + 9 x £28.67</p>
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## HF TRANSCEIVERS WITH GENERAL COVERAGE

<p><b>NEW TS850S</b> <b>KENWOOD</b></p>  <p><b>£1,325</b></p>	<p><b>SUPER BARGAIN</b> <b>TS950SD</b> <b>KENWOOD</b> TOP OF RANGE PSU, ATU, DSP ALL FILTERS <b>£2,995!!</b></p>	<p><b>JST 135</b> HF TRANSCEIVER</p>  <p><b>STAR BARGAIN</b> <b>£1,095</b> CASH PRICE</p>	<p><b>IC-735</b></p>  <p><b>£929</b> CASH PRICE</p>
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## RECEIVERS AND SCANNERS

<p><b>NEW!</b> <b>NRD535</b></p>  <p><b>£1,115</b> NOW AVAILABLE</p>	<p><b>IC-R72E ICOM</b></p>  <p><b>£663</b> or <b>£221</b> DEP + 9 x £49.11</p>	<p><b>AR3000</b> SUPERSCANNER</p>  <p><b>£260</b> DEP + 9 x £56.56</p>	<p><b>AR1000 Mk2</b></p>  <p><b>£254</b> or <b>£85</b> DEP + 9 x £18.78</p>
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## MOBILE DUAL BANDERS

**NEW!**  
**TM702**  
**KENWOOD**



**£455** or  
**£152** DEP  
+ 9 x £33.67

## BONITO

**New High Spec.**  
**Fax Decoder**  
with **SSTV**  
**S.A.E. PLEASE**

## DAIWA

**AMATEUR RADIO ACCESSORIES**



**NS660P** PEP meter

## COMET ANTENNA

'The effective aerial'

**NON RADIAL:** Mobile antennas independent of vehicle ground plane

CHL21J 144/432 Mhz, Unity/2.15dB, 100W Only 29cms long	£14.80
CHL23J 144/432 Mhz 2.15dB/3.8dB 100W Only 0.44 metres	£17.30
CHL24J 144/432 Mhz 2.15dB/5.0dB 100W 0.8 metres long	£25.85
CHL25J 144/432 Mhz, 3dB/5.5dB, 120W, 0.93 metres long	£30.45
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# Keylines

When I worked in broadcasting, with the old (lamented) Independent Broadcasting Authority, I was surrounded by some outstanding engineering talent. You can judge the calibre of that talent by some of the results of their work such as ORACLE Teletext, NICAM stereo sound for TV, and the C-MAC and D-MAC systems, to name but a few.

Many of the people working in the research and development departments, where high levels of engineering expertise was required, were radio amateurs. The Crawley Court engineering headquarters, tucked away in the Hampshire downslands, boasted many active amateurs. Most of the really keen types (with some exceptions) seemed to be the Class B licencees, and several of these were Chartered Engineers.

We had some really brilliant engineers at work within IBA Crawley Court, although I wasn't one of them! Many of the radio amateurs chose to be licensed as Class Bs. Why then, considering the expertise shown by many of the Class Bs should they still appear to

be treated as lesser mortals by officialdom?

## Welcome The Novice

I've always supported the idea of a Novice Licence. You only have to look back at my editorials from last year for suitable evidence. Now of course, I'm pleased to see that it's nearly here. Despite this, I'm very disappointed to see that the Class B licencees still seem to be suffering from discrimination, according to an *Information Sheet* which is to be published shortly.

The information sheet on the Novice Licence clearly says that, despite the fact that a Class B licensee may be an experienced operator on v.h.f., they must have held their licence for 12 months before taking a 5w.p.m. Morse test and being granted a Class A Novice Licence!

This is amazing! It's (in my opinion) the final admis-

sion from the authorities that they DO regard the B licencee as inferior. The official explanation for the ruling is that as the RAE does not cover practical operating skills, the Class B must PROVE his operating skills over a year. What nonsense! All A and B operators have taken the same exam. The amateur who then sits, and passes the Morse exam - won't necessarily have any 'on air' experience.

When I passed the RAE and the Morse test to become a Class A, I had no operating skills either. I had to learn them, and I'm still learning many years later. At the moment I'm only active from my home QTH on the h.f. bands using QRP c.w., but I know there's far more to amateur radio 'on air' techniques than c.w. operating!

Surely, if we're going to impose this insult (and make them pay another licence fee) on Class Bs, it should also apply to all new radio ama-

teurs. Everyone (including newly licensed Class As) should then undertake a year's 'probation' (for that's what it is!) to gain operating experience. If we do impose the condition, I think we'll all benefit, but it HAS to apply to everyone!

I'm beginning to believe that some people in authority and in the RSGB, really do regard that Class Bs are second-class although I don't agree. Let's get away from this 'class war' before it's too late. We don't want a full (official) classification system like they have in the USA do we? I don't!

## London Show

Once again, I'm pleased to report that I thoroughly enjoyed the London Amateur Radio Show at Pickett's Lock. The show, only in its second year, has proved that it can thrive despite the recession.

In a very short time, I think

that the London ARS will earn its niche in the calendar in the same way as the long established Leicester event has already done. The Southgate Club (the main organisers) deserve hearty congratulations for their marvellous work and friendly approach.

The club even managed to get one of their members to be the Mayor of Enfield in time for the show. Surely there's no better way of proving their organising abilities. Well done Southgate - see you at Pickett's Lock next year, although 'His Worship' will be back in 'civvies' by then!

## Last Call For Germany

If you're interested in our projected weekend coach trip to the Friedrichshafen Hamfest in Germany - you'd better let us know soon! The planned trip is over the last weekend in June (28, 29 and 30th). Full details are available from the PW office and the trip should cost around £100. Hurry, we don't want to leave you behind do we?

73s DE Rob Mannion  
G3XFD

# Receiving You...

Send your letters to the Editorial Offices in Poole, the address is on our contents page. Writer of the Star Letter each month will receive a voucher worth £10 to spend on items from our PCB or Book Services, or on PW back numbers, binders, reprints or computer program cassettes. And there's a £5 voucher for every other letter published. Letters must be original, and not duplicated to any other magazines. We reserve the right to edit or shorten any letter. Brief letters may be filed via our Prestel Mailbox number 202671191. The views expressed in letters are not necessarily those of *Practical Wireless*.

## ★★★★★STAR LETTER★★★★★

Dear Sir

After reading the constructional article 'A Valved Transceiver for 3.5MHz' in the April *PW* several times, I feel I must write to congratulate you. Although I'm only 15 years old, and wasn't here in the 'valve' era, I live and breath valves.

The 'Roman Candle' has something the transistor doesn't. With valves you have the ability to see inside the circuit, and you have plenty of room to play

with. Being a 3rd generation of radio enthusiasts, and of course *PW* reader, I have assembled a fairly sizeable array of test gear. This includes a BC221 frequency meter, a Tek '545A' scope and a TF144G signal generator. With these, and the help of an ex-RACAL regulated h.t. power supply, I can get most things to work. I am also at present restoring a No. 19 set.

So, let's see more 807s, 6V6s, 6L6s or even

813s on the go. I intend to be using these when I get my full ticket. I must also congratulate you on your excellent new format which makes reading not only easier, but also a lot more enjoyable.

Finally, I'd like to send my best wishes to Mr T. F. Pool VK7YAI from Tasmania ('Receiving You' *PW* April), and let us, like him put the 'amateur' back into 'amateur radio'.

Bob Hurst G7HIU  
Frimley, Surrey

Editor's comment:

The *PW* team are pleased you liked the valved project Bob. We intend to offer readers the occasional valve project, and we'd like to know what you would like to build with valves, (I'm not so sure about the 813s though!) so keep writing and let us know your standpoint on valved projects.

# Receiving You...

**Dear Sir**

I was very pleased and interested to see a valved construction article in the April 1991 issue. For many years (since before WWII) my interests have been with valved gear. I still construct various projects, mainly receivers, both t.r.f. and superhet, when I can obtain valve-type 465kHz i.f. transformers, which is not easy these days! The antenna and oscillator coils have to be home wound too, of course.

I have read *Practical Wireless*, also for very many years and can I ask amid the 'magic black-box' and intricate transistor era, for more valve construction articles? Many thanks.

**H. E. Chamberlain  
Newark-on-Trent  
Notts**

**Editor's comment:** As I've already said Mr Chamberlain, we're pleased to include the occasional valve project. Don't forget to let us know your preferences. As regards valved equipment components, you can always advertise your surplus parts in 'Bargain Basement' and seek other bits in the same way. At present my biggest supply of parts is the local car boot sale - but as receivers become collectable the prices are rising fast!

**Dear Sir**

On behalf of AMSAT, I make a direct appeal to 29MHz f.m. users to ensure that they employ only that part of the 29MHz allocation by the IARU, and avoid general terrestrial use of the amateur space service allocation that runs from 29.350 to 29.550 MHz.

Satellite signals of 2-3mW at 300km distance on c.w. and s.s.b. simply cannot compete with the powerful wide-band f.m. signals from those who may not even be aware of their trespass. The offenders may not even have the capability of being able to hear the mode(s) that the IARU allocated space section carries.

Some UK stations are also using the satellite exclusive 145.800 to 146.00MHz section of 144MHz band for local QSOs. This practice is equally damaging to satellite based communications.

Co-operation and consideration will enable all users of the 28MHz band to participate and will be greatly appreciated. Please help by passing this information on to any 29MHz f.m. user, who might otherwise remain unaware.

**Pat Gowen G3IOR, Norwich, Norfolk**

**Dear Sir**

I am writing as a new reader to *PW*. I must compliment you and say that I would categorise your magazine in the most glowing terms.

You have brought together laboratory level knowledge in an easy-to-understand way. This stimulates the thinking processes of those of us who have operator technician level knowledge, (not PhD level) and is certainly appreciated.

It would reasonably appear that some magazines supposedly written for 'enthusiasts', are actually written for astro-physicists and the like!

Thank you again for writing a truly superior magazine on a topic which I enjoy very much indeed.

**Bruce D. Graham  
Argyll  
Scotland**

**Dear Sir**

Many thanks for printing the spoof article 'Pulsed System Receivers' by Gerald G3MCK in April's *PW*, (the only time in the year you could!). I have written to Gerald saying I'm also studying Greek Mythology at the Österhause Institute. It nearly had me April-fooled, but the lack of any synchronisation signal convinced me in the end.

I first bought *PW* when I was eight years old (36 years ago) and will continue to buy it, come rain or shine. The marvellous balance of educational projects and information, plus a good sense of humour - still make it number

one on my shopping list.

Kindest regards to all at *PW* - you all deserve a 50% pay rise immediately, but please keep the price at £1.60! I've been on the unemployed/sick list for six years now and even my dog looks hungry.

**Dave Logan G4EZF  
Hyde  
Cheshire**

**Editor's reply:** We're pleased that you enjoyed our April fool article Dave. Quite a few readers went to the trouble of composing 'leg pull' types of letters in reply. Some were so good that I'm still not sure if I had been fooled myself or learned something new!

**Dear Sir**

Having just read Mr J. Bolton's letter about rallies in the April 1991 edition of *PW*, I feel moved to offer a possible explanation for his injuries and to point out that not all such events are as unpleasant as he describes.

Most of Mr Bolton's painful experiences at rallies can be put down to overcrowding, but to explain this more fully, we should take a wide look across the UK rallies scene.

In addition to well established rallies, lots of new ones have sprung up in recent years, some of them quite small. Many of these are run on a shoestring budget and are held in buildings which are inappropriate for the purpose.

When they are descended upon by hundreds of bargain-hunting radio amateurs, conditions can soon become unpleasant. If there are closely spaced stands or lots of small rooms located off narrow corridors, chaos will almost certainly ensue. Additionally, there are often no added attractions for the XYL and children at such events.

Mindful of such experiences as Mr Bolton describes, one particular group of people got together to organise an event which would be a pleasure to visit, rather than an ordeal to be suffered. The result was the London Amateur Radio Show, held at the Pickett's Lock Centre in Enfield, a purpose-built sports and exhibition centre.

The organisers don't cram in as many exhibitors as possible, there is adequate ventilation, and the exhibition areas feature wide aisles, plenty of parking and facilities for the disabled. Indeed, you'll find all the things you would expect to find at a top-notch exhibition.

Although it would be a long way for Mr Bolton to travel, we feel that a visit to London might restore his faith in Amateur Radio 'rallies'.

**Steve White G3ZVW  
London Amateur Radio Show  
Palmer's Green, London**

**Dear Sir**

I have followed your remarks in 'Keylines' on repeaters with interest and especially your 'confession'! There must have been many of your readers in the same boat and we are grateful for your putting them straight.

There are, however, some further points I wish to add. The members of the RSGB, through their subscriptions, have been supporting the repeater network for 17 years and it has now grown to over 270 units, not counting packet nodes. The society holds the

licence for all repeaters and pays the nominal sum of £12 per repeater per annum. It is responsible to the Radiocommunications Agency for vetting all proposals, ensuring their compliance with the agreed specifications and maintaining an up-to-date list of 'shut down operators'. This information is held on the HQ computer and has to be available at any time to the RA.

Each group holds a franchise from the Society to operate a repeater on its behalf. Last year the Council of

# Receiving You...

## Dear Sir

I cannot understand why *PW* carried the article 'A Valved Transceiver for 3.5MHz' in the April issue. To say that its design was antiquated would be a kindness. Most amateurs had discarded 'straight' receivers before 1950! As a nostalgic look backwards the article could have been tailored to interest both old hands and newcomers, but lengthy description and details of how it could be built cannot be justified in a progressive amateur radio journal in the 1990s.

Few amateurs licensed after 1970 have any experience of valves or the high and potentially lethal voltages they need. I most certainly would not advise any beginner or novice to dabble with a design that has a 250V d.c. supply. Gathering the needed parts to build this freakish rig would be both tedious and also expensive. When completed the results would not justify the effort! Using solid state design, 2-3W of r.f. can easily be attained, and a simple direct conversion receiver will always out-perform a 'three-valved blooper'.

In the past I always found it impossible to net a straight receiver to a transmitter unless the receiver had exceptional screening. The signal, even when the transmitter was not connected to an antenna, grossly overloaded the detector.

Please dear Editor, resist any step backwards when deciding upon articles for your excellent *PW*. Valves are interesting devices and today still fill one important niche; as amplifiers in high power linears.

I keenly look forward to many more of the interesting and up-to-date modern designs from the stable of the Rev. George Dobbs G3RJV.

**John D. Heys G3BDQ**

**Guestling**

**Nr Hastings**

**Editor's comment:** What do YOU think readers?

## Dear Sir

First of all let me state that I purchase *PW* every month, and what a great magazine it is. It is well worth the money so please keep up the good work.

I have been a s.w.l. for quite some time now and enjoy the hobby very much.

What I want to know is whether I've got some kind of record for having to wait so long for a QSL card.

First of all I'm grateful to the amateur who sent me the card,

and I am not complaining.

I heard him on the radio in October 1987 and received a card from him in January 1991, by the way, the amateur was in Britain! I must be honest I was shocked to receive it after so long.

Well, I've read in *PW* of people complaining of how long they have to wait for cards, all I can say is after receiving my card, there's hope for them yet!

**P. Lloyd Barking**

## Dear Sir

Many radio amateurs live in suburban housing, where the back garden is fairly long, around 20m, but quite narrow, let's say 7m or so.

Please could we, therefore, have some articles on end-fed multi-band antennas with particular attention to effective r.f. earthing? I could also do with some advice on r.f. earthing when using an upstairs shack.

**Lawrence Clarke G0GZK Caversham**

**Editor's comment:** I'm pleased to say that we've got something under way already on these lines Lawrence. Appropriately enough we're starting at the lowest frequency band, 1.8MHz, where most people have antenna problems. Watch this space!

## Dear Sir

I've been a *PW* reader for some years now. I thought you'd like to know that there are two working *PW* 'Gumnut' QRP c.w. transceivers in our community, despite the fact that we've only got a population of 50 people! Hope you're not disappointed by the change of name though, as the peanut is known as the 'gumnut' hereabouts.

I enjoy *PW* and regard it as the best value off the book-stalls, despite the price mark-up here and the fact it's often 12 weeks out-of-date. I'm pleased I've got mine on subscription as I get it quite quickly.

My family and I have been out here for some eight years, coming from the Sheffield area. I'm the Head of the Maths Dept. at Hamilton College, and my XYL's a journalist.

In closing, we've noticed that Australian news is somewhat dated when it appears in *PW*. Perhaps we ought to write to you more often?

**Steve Curtis VK3CAX Branxholme Australia**

**Editor's reply:** Thank you for writing Steve. I feel that readers would certainly be interested in a 'Letter From Australia' article from you, especially as it sounds as if you are in a fairly remote location. Perhaps you could enclose some photographs and make us all jealous with the space you have for antennas!

the RSGB, which is elected by the members to act on their behalf, decided that repeater groups should bear part of the cost of the licence, third party insurance and administration (estimated to a total over £50 per unit) to the tune of £25 per repeater.

Most of the administration is done by the volunteer members of the RMG, otherwise the cost would be much higher. The growth of packet has increased the workload to the extent that there is now a separate Datacomms

committee to be funded.

The most significant expense for many repeater groups is site rental. The society has been able to negotiate better terms en masse than individual groups could. Commercial rates of around £1000 per annum are common today.

Many of the 144MHz repeater groups have a large membership to emphasize their popularity. However, it is the minority interest groups such as TV and microwave operators and even some 430MHz groups who may feel

the pinch.

I am sure that many of your readers would wish to contribute to a fund which RMG could administer and make grants to groups lacking sufficient local support. Some amateurs feel that membership of one local group is sufficient to indicate their support of repeaters in general. So it could be up to the wealthier groups, who have had many years of free licence, etc., provided by the RSGB, to support the central fund rather than leave it to a few individuals.

If anything, the

charge has brought home to many amateurs, that repeaters don't just happen and somebody has to pay. The RSGB news is also now read over some repeaters, notably in remote areas such as Orkney Islands and Wales.

**Dave W. McQue G4NJU Vice Chairman & Special Projects Manager RSGB Repeater Management Group Bletchley Milton Keynes**

# Services

## Queries

We will always try to help readers having difficulties with a *Practical Wireless* project, but please note the following simple rules:

- 1: We cannot give advice on modifications to our designs, nor on commercial radio, TV or electronic equipment.
- 2: We cannot deal with technical queries over the telephone.
- 3: All letters asking for advice must be accompanied by a stamped, self-addressed envelope (or envelope plus IRCs for overseas readers).
- 4: Make sure you describe the query adequately.
- 5: Only one query per letter please.

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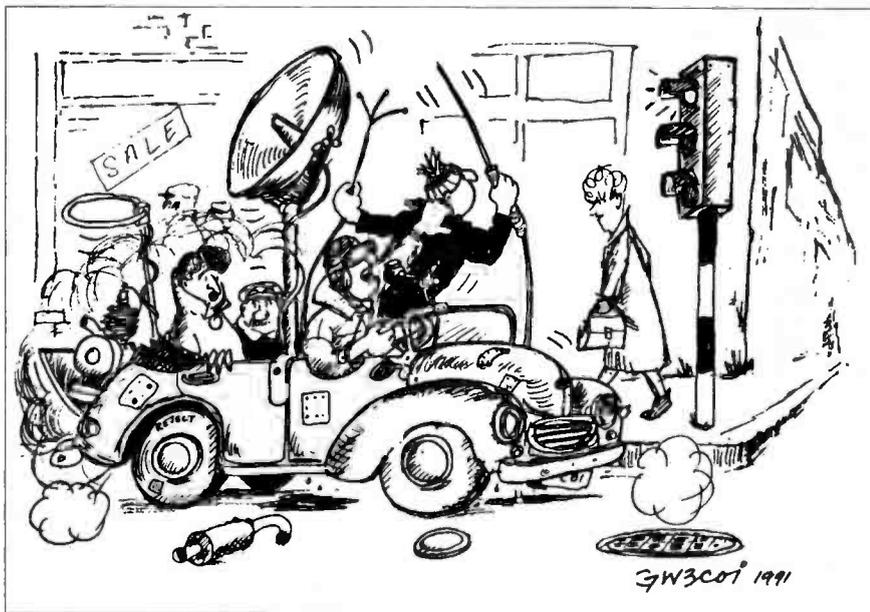
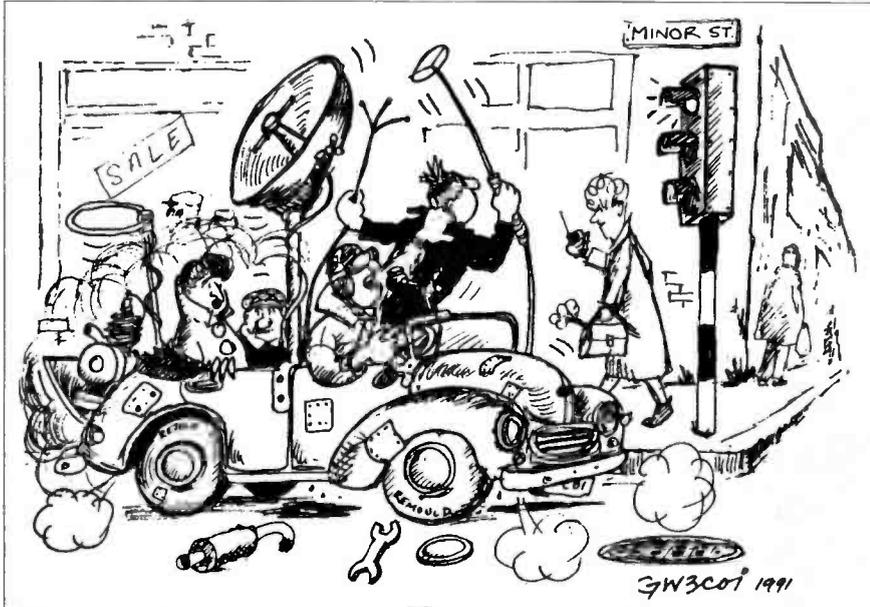
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# Competition Corner

PLEASE NOTE THAT FROM NOW ON WE WILL ACCEPT PHOTOCOPIES FOR COMPETITION ENTRIES. (PHOTOCOPIES MUST BE ACCOMPANIED BY THE 'FLASH' BELOW).



# SPOT THE DIFFERENCE

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SPOT THE DIFFERENCE JUNE 1991

# Newsdesk '91

## Club News

**Plymouth RC** meet Tuesdays, 7pm at the Fredrick Street Centre, Plymouth. On May 14 they have a talk on the RSGB by John Forward G3HTA, the 21st is a rally briefing, the 26th is their radio rally & electronic fair and the 28th is a rally de-brief. Details from **Sandy Pimlott G8IDE** on (0752) 363607.

**Sutton & Cheam RS** meet 3rd Thursdays, 7.30pm at Downs Lawn Tennis Club, Holland Avenue, Cheam with natter nights on 1st Mondays in the Downs Bar. On May 16 they have their AGM. Further details from **John Puttock G0BVV** at 53 Alexandra Avenue, Sutton SM1 2PA.

**Llanelli (Coleshill) ARS** meet Mondays, 7.30pm at the Coleshill Day Centre for the Handicapped, Coleshill Terr. Llanelli. RAE class, c.w. class, nights on the air and various talks. Special event station in July at Pembrey Country Park. Further information from **Roy Jones GW0KJZ** on (0554) 820207/759844.

**Maidenhead & District ARC** meet at The Red Cross Hall, The Crescent, Maidenhead, 7.30pm. May 21 is Preparations for HF NFD. Details from **Neil G8XYN** on (0628) 25952.

**Mansfield ARS** meet at the Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. June 6 is a VHF Activity/Construction night. For further details, contact **Mary G0NZA** on (0623) 755288.

**Dorking & District RS** meet 2nd & 4th Tuesdays, 7.45pm at Friends Meeting House, South Street, Dorking (opposite the Spotted Dog). May 14/June 11 are Informals and May 28 is RF Measurements - Basic Techniques, a talk & demo. Further details from **John Greenwell G3AEZ** on (0306) 77236.

**Braintree & District ARS** meet 1st & 3rd Mondays, 8pm at the Community Centre, Victoria Street. They have an informal evening on June 3. Details from **M. Andrews, 22 Arnhem Grove, Braintree, Essex CM7 5UQ**. Tel: (0376) 27431.

**Coventry ARS** usually meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas Street, Radford, Coventry. May 10/24 are Nights on the Air and Morse Tuition, the 31st is Outdoor DF - with Andy G6ULX as the fox and June 7 is Radio Communications in Sierra Leone, a talk by Simon G0GWA. Details from **Neil on (0203) 523629**.

**Derby & District ARS** meet Wednesdays, 7.30pm at 119 Green Lane, Derby. May 15 is 2m direction-finding practice - Allestree Park, the 22nd is The G06CW Expedition - an illustrated talk by G0FOG/G0IXR, the 29th is The Joys of Operation by G4DVVV, June 5 is a Junk Sale and the 12th is The Leicestershire Repeaters - an illustrated talk by G0CND/G1IXR. Details from **Richard Buckby** on (0773) 852475.

**The Bangor & District ARS** meet 1st Fridays, 8pm at the Winston Hotel, Queens Parade, Bangor, Co. Down. On June 7 they have the showing of the new RSGB Video. Further details from **Terry Barnes G13USS** on (0247) 473948.

**Norfolk ARC** meet Wednesdays, 7.30pm at The Norfolk Dumping, The Livestock Market, Harford, Norwich. May 15 is GB3NB Repeater AGM, the 22nd is Propagation Forum, Jim Bacon G3YLA, the 29th is Final HF NFD Briefing, June 1/2 is HF CW NFD at East Tuddenham site, the 5th is Real Radio evening and the 12th is an Informal. Details from **Jack Simpson G3NJJ** on (0603) 747992.

**Fylde ARS** meet 2nd & 4th Thursdays, 7.45pm at South Shore Tennis Club, Midgeland Road, Blackpool. May 9 is an Equipment Browse Sale, the 23rd is an Informal and June 13 is DF Fox Hunt. **Eric Fielding G4IHF, 6 Thornton Avenue, Lytham St. Annes, Lancashire FY8 3RL**. Tel: (0253) 726685.

## Young Electronic Designer Awards

On April 3, HRH The Duchess of York presented the 1991 Young Electronic Designer Awards at the Science Museum.

The 21 young designers, whose ages ranged from 12 to 24, came from 15 different educational establishments in all parts of the United Kingdom.

The Texas Instruments' Prize of £2500 for the most commercially viable project was awarded to Pollyanna Robinson (Junior), of the Godolphin School, Salisbury. The Mercury Communications 'Planet Award' (also worth £2500) for the most environmentally and socially aware technology went to Jonathan Saville (Intermediate), of Queen Elizabeth Grammar School, Wakefield. The three category awards were won by Stephen Brown (Senior), Royal Naval Engineering College, Plymouth; Jonathan Saville (Intermediate); and Pollyanna Robinson (Junior).

The annual scheme is organised by the YEDA Trust (a registered charity) and is open to students between the ages of 11 and 25, at secondary schools, polytechnics and universities in the UK. There are three category prizes (under 15, 16-17 and 18-25) as well as the two special sponsors' awards.

YEDA is jointly sponsored by Texas Instruments Ltd., and Mercury Communications Ltd.

For further information, please contact:

**The YEDA Trust**  
24 London Road  
Horsham  
West Sussex  
RH12 1AY.  
Tel: (0403) 211048.



Jonathan Saville



Stephen Brown

## The Worked All Britain Award's Group

Member's of The Worked All Britain Awards Group, are reminded that the forthcoming AGM will be held on 12 May 1991 in the Ballroom at Drayton Manor Park, Staffordshire.

Nominations for Committee should be sent to The Secretary, Keith Draycott G3UQT, QTHR, two weeks prior to

the meeting, as should any comments or points of order.

The Agenda of the AGM is available in the current *WAB Newsletter* and will be circulated at the meeting.

All Contest Trophies will be presented during the AGM, last years recipients are requested to return them to Contest Manager G4SKQ, QTHR.

## Coach Trip

The **South Devon RC** are running a coach trip to the Drayton Manor rally. There are three pick-up points: Paignton, N. Abbot and Exeter. Seats at £6.50. For details contact: **South Devon Radio Club PO Box 4 Brixham Devon.** Tel: (0803) 522995.

# Newsdesk '91

## CAP.Co Electronics Ltd

CAP.Co Electronics Ltd., as from 1 March 1991, have acquired the licence for the production and marketing of all the aluminium products previously manufactured by Western Electronics Ltd.

The principal products are the ALUMAST high strength lightweight aluminium tower, the DX-PENETRATOR series of Tri-bander beams and vertical antennas.

Built to the traditional high quality of the existing CAP.Co products, the addition of these items will expand considerably the range of antennas available from this British manufacturer to the radio amateur.

**CAP.Co Electronics Ltd.**  
**Unit 28**  
**Penley Industrial Estate**  
**Penley**  
**Wrexham**  
**Clwyd LL13 0LQ.**  
**Tel: (0948) 74717.**

## New Catalogue

STC Instrument Services has just produced its massive 1991 catalogue which now contains an even more comprehensive range of instruments and power supplies from more than 70 leading manufacturers.

Copies of the catalogue are available free-of-charge. If required, a complete demonstration of an instrument (or instruments) will be provided on request.

For further details, contact:

**Tony Leach**  
**STC Instrument Services**  
**Edinburgh Way**  
**Harlow**  
**Essex CM20 2DF.**  
**Tel: (0279) 641641.**

## Open Day

AMDAT is pleased to host an Icom Open Day on Saturday May 18. Icom (UK) will be on hand with an extensive display of Icom equipment, so come along and try out the best range of amateur and s.w.l. equipment.

**4 Northville Road**  
**Northville**  
**Bristol BS7 0RG.**  
**Tel: (0272) 699352.**

**SEND ALL  
YOUR LATEST  
NEWS TO  
SHARON  
GEORGE AT  
THE  
NEWSDESK.**

## Scottish Squares

Some rare 'Worked All Britain' squares will be activated on v.h.f. by two keen operators, who plan to leave Leicestershire on May 25 and drive to the Grampian mountains in Scotland and the Orkney Islands.

Those taking part will be Roy Barker, signing GM7ARB and Steve Watson, signing GM1KWF. They intend to be operating both mobile and portable. Orkney will be activated on 50 and 144MHz during the evening of May 28, throughout May 29 and in the morning of May 30. Frequencies to note are 50.110 and 144.440MHz.

Both Roy and Steve promise to QSL all stations they work during this expedition

## Lecount

Lecount, a communications company launching into the CB market, has been established in the p.m.r. sector for the last six years and now has a wide client base, mainly in the London area.

They have site engineers and installers available to service and maintain equipment, to carry out base installations and antenna work.

Lecount launched its CB products in January of this year. They are manufacturing antennas for both the amateur and CB markets, with a current research and development commitment to producing a range of accessories due to be

released this year, including power supplies and pre-amps. They are also carrying out research and development for the production of two new transceivers, which are planned to be ready for production at the end of 1991.

Lecount feel that they can bring some new ideas and experience across to the market and help to promote CB, by giving more public awareness of the benefits and potential uses.

**Lecount**  
**5a Oak Industrial Park**  
**Great Dunmow**  
**Essex CM6 1XN.**  
**Tel: (0371) 875100.**

## Changes

Two important changes on the Council of the International Short Wave League are as follows:

The new Hon. Secretary is:  
Mrs Evelyn May G10FC  
ISWL Headquarters  
10 Clyde Crescent  
Wharton  
Winsford  
Cheshire CW7 3LA.

The new Hon. Treasurer is:  
Peter G. Rayer  
ISWL G-13038  
6 Firbank Road  
Charminster  
Bournemouth  
Dorset BH9 1EL.

The Honorary Secretary will be pleased to hear from any short wave or broadcast band listeners and licensed amateurs, seeking information on league membership and their QSL Bureau.



## Real Dual Display

The latest multi-tester from Alpha Electronics features a true combined analogue and digital display. In the centre of the large moving pointer analogue section is a 3.5 digit liquid crystal display. These combine to show both varying and instant measurements.

The TMK 600 is fully guaranteed for two years and measures a.c. r.m.s. voltage to 750V in five ranges with an analogue sensitivity of 1M $\Omega$ /V. The d.c. voltage is to 1000V also in five ranges. The a.c. and d.c. facilities use seven

ranges to measure up to 10A. Resistance together with an audible continuity feature uses six ranges to fully cover 20M $\Omega$ . Additional tests include diode and dBs.

Model 600 is battery operated and housed in a yellow ABS case. Designed to comply with the latest safety standards, it is fitted with an HBC ceramic fuse. Easy-to-operate and extremely reliable, this latest instrument from Alpha is ideal for all general applications and is supplied ready for use.

Price of Model 600 (exc. VAT) is £124.95.

For further details, please contact **Fred Hutchinson of Quiswood Ltd., on (0756) 799737.**

## Alive & Well!

The '10m FM Group' are still alive and well! Unfortunately, the Editor has not been able to work on the Newsletter due to pressure from other jobs, but has said there should be a Newsletter out soon. However, to ensure the future of the Newsletter, and the group, would another member be willing to take on the task of Editor?

Any volunteers please contact Pat Billingham G4AGQ, Brighton College, Eastern Road, Brighton BN2 2AL. Any other queries about membership, etc., to Bill McGill G0DXB, 14 Farquhar Road, Maltby, Rotherham, South Yorkshire S66 7PD.

# Newsdesk '91

## Scarborough Fayre

The Scarborough Special Events Group will be on the air as GBOSF for the opening weekend of the world-famous Scarborough Fayre, on June 8th and 9th.

Operation will be around 3.725 and 7.055MHz in the h.f. bands plus 144MHz s.s.b. and f.m. Full colour QSL cards will be available to commemorate the occasion and further details can be obtained from **Roy Clayton G4SSH, 9 Green Island, Irton, Scarborough, North Yorkshire YO12 4RN.**

## BBC World Service

Compact disc technology is now used to deliver recorded BBC programmes to radio stations around the world.

As from April, BBC Transcription, the World Service department which is the world's largest distributor or recorded radio programmes, now uses CD in place of the LPs it has traditionally supplied. Sixty titles were launched on CD during April, nearly 60 years after BBC Transcription first issued BBC recorded programmes for a global audience.

## Junk Sale

Newport ARS have their Junk Sale on Sunday July 7 at Brynglas Community Centre, Newport. Open 10.30am to 2pm (10am for the disabled). Light refreshments will be available. Talk-in GW1NRS on S22 from 9am. For further information, contact **Kevin GW7BSC on (0633) 270727 work or (0633) 262488 home.**

## WWII Air Forces Radar Reunion

On May 17, 18 and 19th, in Coventry, former RAF, WAAF, Commonwealth Air Forces and civilian personnel plan to hold the first major reunion since World War II. They formed a highly secret force working in small stations, the very existence of which was unknown to most of the Hurricane and Spitfire pilots who were directed to their targets by the radar information.

From this first defensive role, radar developed into an aggressive weapon for the accurate direction of bomber and reconnaissance aircraft to their targets.

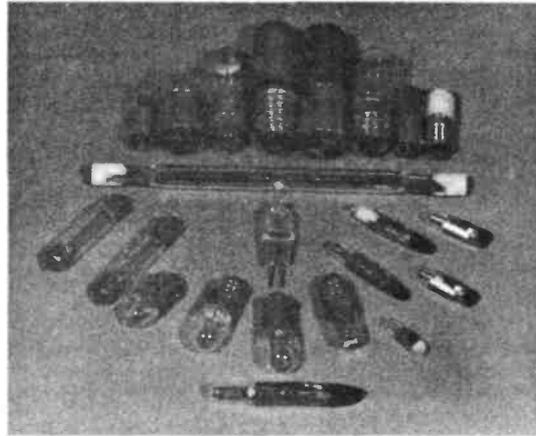
In Britain, the full scale development of radar began in 1935. By the outbreak on WWII, a complete chain of radar detection stations was in operation along the East and South coasts of Britain.

In the Battle of Britain, it was this radar information which gave our defences vital early warning and avoided the need for our outnumbered fighters to maintain standing patrols.

The fighter pilots shot the enemy down - but it was radar that found the enemy.

If you are one of those wartime operators, mechanics, technical officers or controllers from Great Britain, Canada, Australia or New Zealand, please contact:

**Squadron Leader M. S. Dean RAF Royal Air Force Finningley Doncaster South Yorkshire DN9 3LQ. Tel: (0302) 770771 Ext. 409 or (0522) 730338 evenings**



## New Range

Hampshire-based Electroustic Limited announce the availability of an extensive range of high quality miniature lamps designed for use with electronic/electrical equipment with

application across all types of industry.

The three basic types available consist of:

1. Filament signal lamps with a voltage range of 6-70V with current ratings from 20-200mA.

2. Neon signal and green fluorescent lamps with a voltage range of 60-220V and a current rating of 0.3-3.5mA.

3. Multi-l.e.d. lamps which have four or six high luminosity chips, are available in red, green or yellow with a voltage rating of 6-48V d.c. and a current rating of 10-35mA making them suitable for direct replacement of conventional telephone lamps.

These rugged products have a life expectancy between 3000 and 100 000hrs and have application in the electrical/electronic, communications, engineering and manufacturing industries.

**Brian Mills on (0264) 333664.**

## Biggest-Ever Boost

A £1m boost for news and current affairs programming on BBC World Service started on Sunday March 31. The changes include a second daily edition of the flagship news and current affairs programme *NewsHour* and new financial and business programmes. More foreign correspondents and reporters are also being appointed as far afield as Washington and Delhi. There will be an extra midweek edition of the long-running programme *From Our Own Correspondent*.

Other changes, such as the introduction of extra bulletins of world news and more editions of existing programmes such as *Newsdesk*, stem partly from the success of such innovations during the Gulf War.

Altogether, over 200 news bulletins go out from Bush House every day in 36 languages. The World Service reaches a global audience of 120 million regular listeners.

## Illegal Use of Amateur Radio

On 13 March 1990, at Medway Magistrates Court, a 'pirate' operator was found guilty of unlicensed installation and use of amateur radio apparatus, and was fined a total of £500 and ordered to pay

costs of £525 to the Agency.

This prosecution was a direct result of a report of alleged unlicensed operation through the amateur repeater GB3KN, passed to the Radio Investigation, by The Amateur Radio Observation Service.

## Car Boot Sale

The 3rd Annual Rugby ATS Amateur Radio Car Boot Sale takes place on Sunday July 28. Doors open 10am. The new venue is the recently opened BP Truckstop on the A5, three miles East of Rugby and just two and a half miles North-west from Junction 18 of the M1 motorway. Talk-In by GB8CBS will be available on 144MHz, S22.

Pitches will be available at £5 per plot for the whole day (no advance booking necessary), admission to non-stall holders 50p. Further details can be obtained from **Peter on (0455) 552449 or Kevin on (0203) 441590.**

# Newsdesk '91

## The Novice Licence Is Here!

The following details are taken from an information sheet published by the Amateur Radio Licensing Section of the Radiocommunications Agency.

The Amateur Radio (Novice) Licence has been introduced with the aim of encouraging people of all ages, but particularly young people, to take up amateur radio. Government Ministers recognise the value of amateur radio as a training ground for careers in radio and electronics and, as a rewarding pursuit in itself. They hope that the Novice Licence will lead many more people to get involved in radio.

This information sheet explains what is involved in being a novice licensee, how the novice licensing system works and how it fits in with the full amateur radio licensing system.

### Do I need a licence?

By law a licence from the Radiocommunications Agency is required to send messages by radio. The licence sets out the conditions that apply, for example that you may need certain qualifications.

### What types of Novice Licence are available?

There are two types of Novice Licence, the Amateur Radio (Novice) Licence Class (A) and the Amateur Radio (Novice) Licence Class (B).

Class A Novices can use all amateur frequency bands allocated to novices, including some bands below 30MHz. Class B Novices have access to all the frequencies allocated to novices above 30MHz. Both types of licence allow a maximum power of 5W d.c. input or 3W r.f. output.

### What will the Novice Licence enable me to do?

Amateur radio has been allocated a large number of frequency bands, enabling amateurs to communicate with each other, both locally and world-wide, using a variety of techniques.

Novice licensees have been given small segments of the major bands, allowing them to experience almost all aspects of amateur radio at first hand - though as beginners they must work with fairly low powers. Novices are likely to use mostly voice or Morse code, but the licence allows them to send computer to computer messages, an increasingly popular part of amateur radio. Novices will have an all round taste of amateur radio in practice.

Both Amateur (Novice) Licences allow the novice to use a wide variety of frequency bands. Those permitted under the Amateur Radio (Novice) Licence (B),

where most novices will probably begin, will allow regular contacts in their local area and occasionally at longer range, possibly several hundred kilometres.

The Amateur Radio (Novice) Licence (A) gives access to additional frequency bands used particularly for long range communications. Novices using these bands will be able to make contacts with other countries, and perhaps other continents, very often using Morse code.

### What if I just want to listen to amateur radio?

Many people gain a lot of enjoyment simply from listening to amateur radio transmissions. No licence is required for this, provided that the radio equipment you use is designed for reception only. If you do not wish to take the training course and exam, or are not yet sure how to proceed, a period of listening in to amateur transmissions can be a very useful introduction.

### What qualifications are required?

To obtain the Amateur Radio (Novice) Licence (B) you must first successfully complete a practical training course (run by the RSGB) and then pass the Novice Radio Amateur Examination (NRAE subject number 773) conducted by the City and Guilds of London Institute.

To obtain the Amateur Radio (Novice) Licence (A) you need the above qualifications plus a pass in the Novice Morse Test at five words per minute (5w.p.m.), conducted by the RSGB.

Existing full radio licensees can be given access to novice frequencies not covered by their licences. Full Class B licensees of at least one year's standing are eligible to become Class A Novice Licensees, if they pass the 5w.p.m. Novice Morse test. Such a licensee will hold both a novice and a full Class B Licence, will have both novice and full Class B call signs and pay fees for both licences.

### What does the training course consist of?

The training course is run by the RSGB. It will be available at many locations throughout the UK. The aim of the course, is to train novice licensees in the basic skills of amateur radio and make sure they are well prepared to go on the air. The course covers how to operate an amateur radio station, a 'sketch' of basic radio theory and practice in constructing your own equipment. It also covers the conditions of the novice licence, an introduction to Morse code and many practical aspects of amateur radio. Each course is likely to last for about 30 hours spread over

12 weeks, although some trainees may need longer than this. Trainees will be continuously assessed and will have to complete specific construction projects. Assessment will be of a general nature and a weakness in one or two areas will not adversely affect the overall assessment. There will be no final assessment at the end of the course.

### How do I find out about the Training Course?

Information about the training course can be obtained from the RSGB. Mark your envelope 'Novice Training'.

### What does the NRAE consist of?

The Novice Radio Amateur Examination is conducted by the City and Guilds of London Institute. The examination will be held four times a year at centres located throughout the UK. The 90 minute examination comprises of 45 multiple choice questions based on subjects covered in the training course. The Amateur Radio Novice Licence Schedule is provided for reference during the examination.

Information on the NRAE can be obtained from the City and Guilds of London Institute.

### What does the Novice Morse Test consist of?

The Novice Morse Test will require a candidate to demonstrate his or her skill in receiving and sending Morse code at 5w.p.m. per minute.

Information on the Morse Test can be obtained from the Radio Society of Great Britain.

### Why do I need to know about Morse code?

Morse code is a very efficient means of communications which enables low power transmitters to achieve good long distance contacts. Morse is also the universal language for amateurs and enables them to communicate even when they have no language in common. Even those who don't take the 5w.p.m. Morse test to qualify for the Amateur Radio (Novice) Licence (A), will find an introduction to Morse useful.

### How much does the training course cost?

There is no fee for the training course, although trainees will have to meet the cost of materials used, such as components for construction projects and worksheets. This is estimated at about £25.

### What does it cost to take the NRAE?

The City & Guilds' fee for the NRAE is £8.95. Individual examina-

tion centres may also make an administrative charge to candidates.

### What is the fee for a Novice Licence?

The Radiocommunications Agency's fee for either class of novice licence is £15.00 per annum. However for those under 21 years of age it will be free.

All licensees will be sent a renewal reminder each year, one month before the licence expires and, if no response has been received, another reminder one month after the licence has expired. If the licensee is still under 21 at the date of renewal, they will need only to indicate the wish to continue to be registered as a novice licensee.

### How much will it cost to operate as a novice?

There is a very wide range of equipment available from moderately priced kits to very expensive radio transceivers. Novices are free to use any type of equipment provided they stay within their licence conditions. There should be many sources of low cost equipment for novices. For example, construction kits designed for the purpose and second-hand equipment is available through clubs, press advertisements and amateur rallies. Training course instructors will be able to advise trainees on the best way to get equipment at reasonable cost. Local amateur clubs may also be able to help.

### What call signs to novices use?

Novice licensees have a separate series of call signs whose format is similar to that for full amateur radio licensees. Some examples are:

2E	0	ACG - Class A (Novice in England)
2W	3	CLA - Class A (Novice in Wales)
2M	1	RGD - Class B (Novice in Scotland)

Novice licensee call signs are made up of the following elements:

'2' + Regional locator + Class + three letters

Taking these in turn:

1) the numeral 2 is the unique prefix for a UK novice licensee.

2) The 'regional secondary locators' indicate the region of the UK where the licensee lives or from which they are transmitting. They are:

E	England
M	Scotland
I	Ireland
W	Wales
D	Isle of Man
U	Guernsey
J	Jersey

These are the same as for full licensees, with the exception of England for which no regional secondary locator is required for full licensees.

3) The class of licence (A or B) is indicated by a numeral. The numerals 0, 2, 3 and 4 denote Class A and 1, 5, 6, 7 and 8 denote Class B. These are the same as those used for full licensees.

4) the three letters are issued in alphabetical series (AAA, AAB, AAC,..... ZZZ, ZZY, ZZZ). Each call sign is unique to an individual licensee.

### Where do I apply for my licence?

The Radio Amateur Licensing Unit (RALU), run by Post Office Counters Ltd, issue all amateur radio licences. All applications for licences should be made by post to the RALU.

Application forms may be obtained from the same address and appear in the booklet 'How to become a Radio Amateur'.

### Is anyone else covered by my licence?

No. But novice licensees may operate the station of a full licensee under his or her direct supervision, using full licensee's call sign.

### Contact Pointers

For all enquiries concerning individual licences or their issue:

Radio Amateur Licensing Unit  
Post Office Counters Ltd  
Chetwynd House  
CHESTERFIELD S49 1PF  
Tel: 0246 217555

### For enquiries on the practical training course and novice Morse test:

'Novice Training'  
Radio Society of Great Britain  
Lambda House  
Cranborne Road  
POTTERS BAR  
Herts EN6 3JE  
Tel: 0707 59015

### For enquiries on the NRAE (subject 773):

City & Guilds of London Institute  
46 Britannia Street  
London WC1X 9RG  
Tel: 071- 278 2468

### For other enquiries on radio:

Amateur Radio Licensing Section  
Radiocommunications Agency  
Room 613  
Waterloo Bridge House  
Waterloo Road  
LONDON SE1 8UA  
Tel: 071-215 2217

# Newsdesk '91

## Morse Tests at London Show

Once again the London Amateur Radio Show provided Morse tests for potential Class A licencees. A pass rate of 88% (16 attempted, 14 passed) was achieved over the two-day event.

The centre was visited by Roy Clayton G4SSH, who is the Senior Morse Examiner for the Country. Roy was very pleased by the set-up, and in particular the 'on demand' system pioneered by the organisers of the show. This system is now under review for application at other events.

Booking appointments were handled by the Southgate ARC staff from their Information stand and free coffee and biscuits were provided for the candidates.

The examiners would like to thank the members of Southgate ARC for their help and co-operation in organising the tests. They were pleased to see the high standard of candidates. Incidentally, the tests were held in the rifle range, perhaps accounting for the high pass rate!

## Mammoth Ham Radio Sale

Waters & Stanton introduce their Mammoth Ham Radio Sale on Sunday May 19 at their Hockley premises, from 10am to 4pm. Talk-in on 145.550MHz + h.f. New & used equipment, bring & buy, junk stall, super prices, free refreshments! Well worth a visit.

**22 Main Road  
Hockley  
Essex SS5 4QS.  
Tel: (0702) 206835/204965.**

## Friedrichshafen Hamfest

Readers interested in the proposed PW weekend trip to the biggest European amateur radio show, had better hurry and let us know. See 'Keylines' in this, and the April issue.

## RSGB HF Convention 1991

The Annual RSGB HF Convention will be held at the Penguin Hotel, Daventry, Northants, on 28/29th September 1991.

As usual on the evening of Saturday September 28, there will be a dinner for DXers with a well-known speaker from the DX world. Overnight accommodation will be available in the hotel at a special rate.

On Sunday 29th there will be various talks and events.

For further information, please contact:

**Bob Whelan G3PJT  
36 Greenend  
Comberton  
Cambridge CB3 7DY.**

Practical Wireless, June 1991

## Straight Key Evening

Organised by the Edgeware & District RS, the Straight Key Evening is their 9th annual event and as ever all c.w. operators are welcome.

Taking place on Friday May 17, on 3.5MHz, 1900BST onwards, call CQ SKE.

The Edgeware Club will once again be running their special event callsign GB2SKE and they hope to have the call in use during the afternoon on 7MHz.

No one is too inexperienced to take part in SKE, and everyone will find a friendly welcome. You may rediscover your c.w. roots!

**John Bluff G3SJE  
SKE Organiser  
52 Winchester Road  
Kenton  
Harrow  
Middlesex HA3 9PE.  
Tel: 081-204 1034.**

# MARTIN LYNCH

G4HKS

THE AMATEUR RADIO EXCHANGE CENTRE

286 Northfield Avenue, Ealing, London W5 4UB. Tel: 081 566 1120 Fax: 081 566 1207

## A UNIQUE SCANNER TAKES A MASSIVE LEAP FORWARD

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**NEW**



Take a look at these advanced features:

- ★ Full infrared remote control/programmer
- ★ Continuous tuning 25 to 999.95MHz
- ★ Multi-colour high luminance LCD display
- ★ 200 channels of programmable memory
- ★ Two remote switched antenna inputs
- ★ Multi step channel increments - 5/10/12.5/20/25/50/100kHz
- ★ AM/NBFM+FM wide receiving modes
- ★ Mega-fast scanning - 30ch/sec.
- ★ Multi function scanning modes
- ★ Multi mode squelch options
- ★ Channel lock-out facility
- ★ Internal lithium back-up
- ★ Unique strength meter
- ★ Switchable attenuator
- ★ RS232C port available
- ★ Remote power on/off
- ★ Programmable delay
- ★ 13.8V DC operation
- ★ Priority watch
- ★ Alarm facility
- ★ Mute facility
- ★ DIN size - ideal for base or mobile installation
- ★ Built on die-cast chassis to commercial specification
- ★ Dimensions 50(H) x 178(W) x 150(D)
- ★ 12 Months parts and labour guarantee



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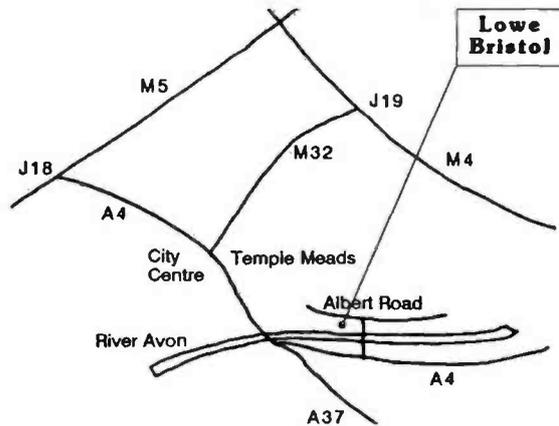


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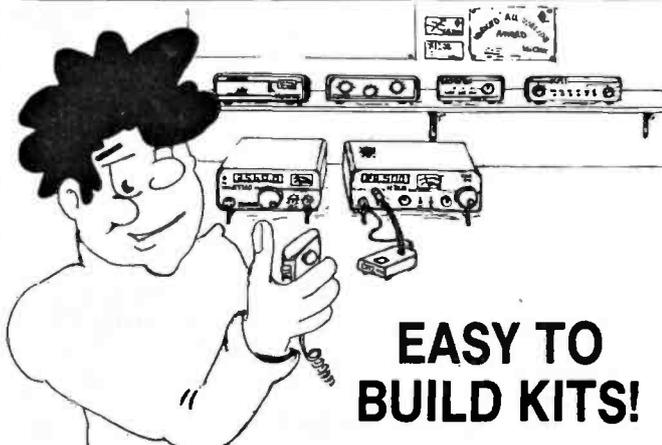


### HOW TO FIND US

The new Lowe Communications Centre at Bristol is just over the Totterdown bridge from the main A4 Bath road in St Philips. From the traffic lights on the A4, go across the bridge and turn immediately left at the 'T' junction. You will see the centre on the left in front of the river. Turn first left and park anywhere in front of it. Parking is free as you would expect at one of our shops. We are just 10 minutes from the end of the M32 motorway and a short walk from Temple Meads station.

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AT160 Kit: £39.90

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Please add £1.20 p&p to your total order value.

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All kits contain a good quality printed circuit board with screen printed parts locations, full clear instructions, and all board mounted components. Credit card sales and technical advice are available by phone during office hours. UK delivery is normally within 7 days.

73 from Dave G4KQH, Technical Manager

# Safety First - On Air & On The Move

Spring is here, and summer's not far behind. Many radio amateurs are dusting off the old mobile rig ready for the holidays. Rob Mannion G3XFD takes a look at safety aids for mobile working and some bad habits you can avoid.

Summertime has always been the busiest time of year for mobile activity and I have no doubt whatsoever that this summer won't be any different. But mobile operating style and methods have changed over the years - and so has the equipment!

Although there are very many amateurs operating converted p.m.r. rigs, especially on the v.h.f. bands today, it's not so long since this source of equipment was virtually the only one available. The h.f. band mobile enthusiast often built his own rig, and there the early valiant attempts by manufacturers to break into the market, such as the TW 'Communicator' series of dedicated, transportable amateur bands only transceivers. Perhaps with the re-birth of a.m. on 70MHz one or two of these rigs may re-appear!

However, as I've already said, things HAVE changed. No longer does the mobile rig take up all of the front seat. No longer can you hear the rotary-converter humming away, supplying the p.a. stage.

Nowadays, the vast majority of mobile operating is done on v.h.f. with very small, compact and easy-to-use multi-band, multi-facility 'you name it - it's got it' transceivers. Mobile operating is with us in a big way, but so is the traffic and it's much bigger than any of us!

## Safety First

Believe it or not, my first mobile rig was an ancient (even then) valved Pye Reporter using the then popular 'halo' horizontally polarised 144MHz antenna. Without realising it, our cartoonist John Worthington GW3COI, has re-created my very first Morris car, complete with mobile antennas, in his 'Spot The Difference' cartoon this month. To be truthful, as keen as I was, even I couldn't find room for the parabolic dish antenna!

So, you can see that if my car was anything like the Morris Minor in the cartoon (and it was), my attitude to 'safety first' was somewhat lacking. It was radio that came first - not safety! In those days I used the telephone handset that came with the rig, but I couldn't get away with that now - nor should I.

## The Safe Approach

There is certainly no excuse for not being properly equipped for safe mobile operating today. Equipment is light, attractive and very easy to operate. With the speed, acceleration and density of modern traffic, the radio amateur who ventures out onto the roads lacking basic safety precautions - is a fool.

Our cover photograph shows Constable Bill French PC 919, of the Dorset Police, going about his duties very properly equipped. Bill and his commanding officer kindly agreed to help us with our safety drive, as after all, teaching by example is the best way.

All Bill French's patrol bike radio gear can be operated while his hands are controlling the powerful bike. The audio output is directed to his helmet, and he has the minimum of trailing wires and plugs.

Although there are not so many radio amateurs who operate from motorbikes, those that do, seem to be in the forefront of safety. In fact, several of PC 919's police colleagues are motorcycling radio amateurs - and to them safety is of paramount importance. Why then, if the motorbike rider is seen to be trying to be safe - do mobile operators in cars take dangerous short cuts?

## Sitting Comfortably

Sitting comfortably in our cars, encumbered only by our seat belts, most of us are very sensitive to changes in heat, noise, the children fighting in the back seats and many other distractions. Any distraction,

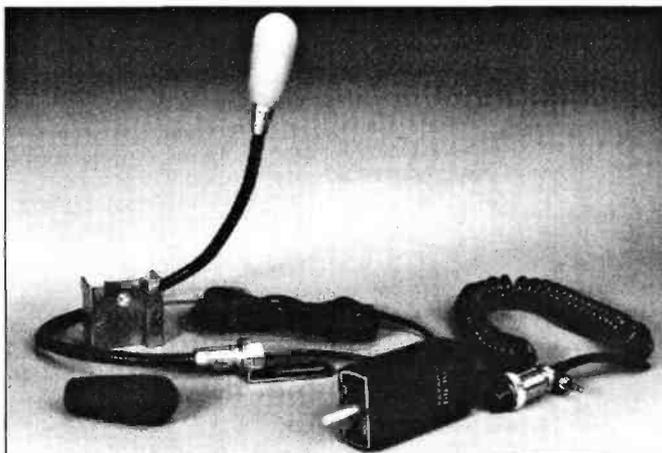


Fig. 2: The Yaesu MF-1A3B mobile microphone and the Yaesu SB-10 switch-box. (Photo courtesy SMC Ltd.)



Fig. 1: PC 919 ready for action! The audio and radio control leads run between Bill French's helmet and the handlebars while the associated transceiver and antenna are at the very rear of the 'bike.

(Photo courtesy Dorset Police)

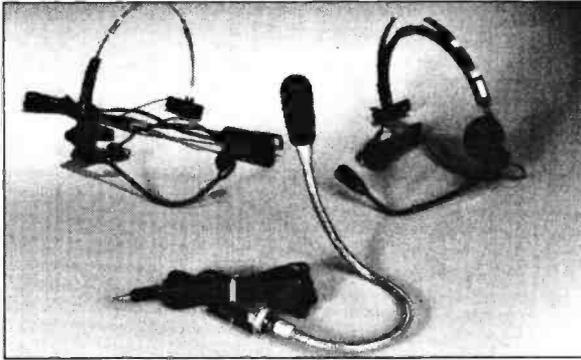
be it clothing, harness or dangling leads, particularly if it's draped over us, are often very unwelcome.

However, on the motorbike the rider can't relax. They're literally part of the machine, one mistake and they've possibly got themselves into real trouble and that, in my opinion, is why they are more safety conscious and try to make radio operation safer for themselves.

Motorists on the other hand, aren't used to close-fitting crash helmets, some don't even wear their seat belts! Sitting in their cars, some people feel safe even when they're driving in the fast lane of the motorway operating a 'poser phone' or hand-held microphone - but radio amateurs should know better shouldn't they!

## Swan Necks

The simplest mobile radio operating aid is the 'swan neck' microphone. You've only got to look into a touring coach to see how they can be used to advantage.



**Fig. 3: The ICOM HS-15 'swan neck' microphone and (left) the ICOM HS-51 mobile headset. The folding HS-10 ICOM mobile headset and boom mike is on the right.**

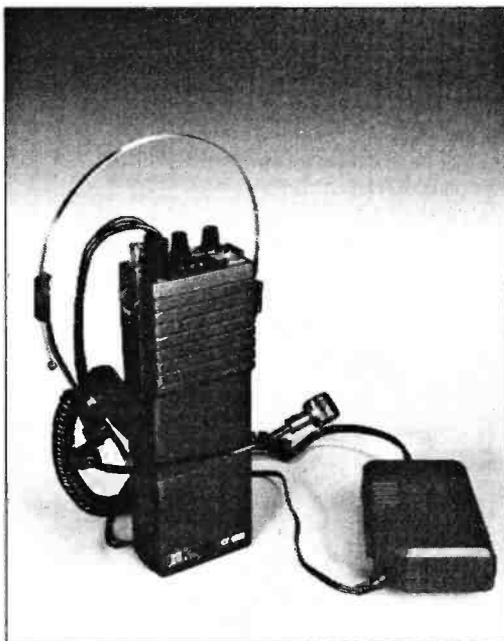
*(Photo courtesy of ICOM UK Ltd.)*

They are simple to fit and easy to use.

Until recently, this sort of microphone was best made at home. Nowadays though, there are some really attractive and unobtrusive designs available from the well-known manufacturers.

Yaesu for example, have the attractive and easy-to-mount MF-1A3B Mobile Microphone, Fig. 2, which fits a variety of their transceivers. Available from the appointed dealers, it comes complete with fixing attachments and lead. It's also accompanied by clearly-illustrated instructions.

With the same idea in mind, ICOM produce the HS-15 Mobile Microphone. Again, this is a simple, but very effective 'swan neck' design Fig. 3. To accompany this safety aid, ICOM supply the associated HS-15SB switch box that can be connected in-line between the rig and the operator on a number of their range of transceivers. Yaesu have a similar arrangement available in the form of their SB-10 PTT Unit to operate several of their rigs.



**Fig. 4: The MA-18 VOX unit connected and working with a CTE CT 1600 hand-held 144MHz transceiver.**

*(Photo courtesy of Nevada Communications)*

## Home Construction

Home-brew is still an option for this sort of safety aid, but the temptation for the owner of a nice shiny rig, is for them to go and buy the associated microphone. From the wide range I've seen when preparing this feature - I'd certainly recommend that you ask your dealer what they've got available for your particular rig.

I've been a very keen h.f. bands mobile operator for many years. Those of you who've met me, will realise of course that due to my artificial right arm, I have to play really safe. When I have my left hand off the wheel - in effect it's really a 'hands-off' job!

From the very start of my serious h.f. band mobile work, I used a single (large padded) headphone, boom microphone unit, similar to the aircraft style. My Yaesu FT-75 dedicated s.s.b. mobile transceiver only required a simple switch control to be mounted next to my driving seat. The rig was mounted in a large motor-caravan and the single headphone helped to offset the limited audio output of the FT-75 against the engine noise.

Although I used this system for over 12 years, I don't recommend the use of a single large headphone. I found that wearing the headphone unit made me concentrate more on the radio than on my driving! Although it did screen me from the children when they became noisy.

Having said that I don't recommend a single headphone type unit, I've discovered that ICOM supply a much better model which folds away very neatly. My old single headphone unit covered my ear completely and was very hot. The ICOM HS-10 is very lightweight indeed and comes complete with a discreet little microphone and single headphone. It's so small that you won't feel like a 'real charlie', when stopped at traffic lights alongside a bus full of inquisitive people!

The HS-10 and other commercially available headphone microphone units don't cut you off

from the world. Wearing one of these units, it's possible to hear the radio clearly, talk to anyone in the car and not feel too hot. In my opinion, they're the best all-round simple solution.

## Vox Box

Voice-operated automatic change-over systems, VOX as we tend to know it, should (in an ideal world) be the answer for many of us. Mobile operating ought to be as easy as talking to someone over a fence! However, that's not the case, especially when you've got an older car like mine.

Despite the drawbacks associated with threshold background noise, which causes unwanted triggering of the VOX, the systems are worth using. A good VOX system in a mobile environment is an ideal way to enjoy mobile working, but they do need careful initial setting-up in a vehicle.

## Other Modes

Of course, I mustn't forget that there are other modes of transport including 'Shank's Pony' and pedal cycles. In fact, all the modes mentioned so far could benefit from having a VOX-controlled transmit-receive switching system. Although in the budget bracket, the Alan (CTE) International Model MA18 VOX unit in Fig. 4, is very versatile. Nevada Communications in Portsmouth loaned one for testing, and it's proved itself to be a handy little unit.

As supplied to us from Nevada, the VOX unit was wired up to work with a 144MHz hand-held transceiver. Despite this, there's nothing to stop the keen mobile operator from modifying their own rig to work with the combined VOX/p.t.t. unit. The VOX unit has a particular advantage if you only have a hand-held, because you can, by using an external vehicle mounted antenna, use your hand-held mobile in the car with perfect safety. Hands free in fact!

## Other Aspects

Don't forget that there are many very important safety aspects to be considered when working mobile. The following items are but a few of the often neglected points:

1. Properly fused, connected and terminated 12V leads.
2. Fully anchored equipment.
3. Controls within reach of the driver and arranged so that they don't interfere with driving.
4. That the vehicle electronic

ignition and automatic braking system (ABS) if fitted, are protected from r.f. interference.

5. Antenna mountings arranged so they're safe for you and other road users.

6. Antenna arranged so that there's no danger of high r.f. voltages injuring you or third parties.

7. No transmissions from petrol station forecourts (due to the danger of petrol vapour explosion).

The list could be endless and I have no doubt you'll spot others to

add to the list. The rule should be - make your own list and don't break your own rules!

Finally, I must thank everyone who helped us with the safety feature, including ICOM (UK) Ltd, Nevada Communication and SMC. I'm particularly grateful to Chief Superintendent Russell, the Divisional Commander, Traffic Operation, Dorset Police and PC 919 Bill French for their friendly co-operation. Our message and their advice is - **Whatever you do when operating mobile - Drive Safely!** PW



**Fig. 5: Is he going to stop you? Be prepared, be careful, drive safely and he won't!**

(Photo courtesy of Dorset Police)

**Safety First -  
On Air & On The Move**

# Special Offer

**Only £44.50** including P&P

Save **£7.75** on the RRP with another great offer from Practical Wireless



Drive Safely - On The Move With The *PW* June Special Offer of the MA 18 VOX unit with combined headset and microphone unit for £44.50 including post and packing. Hurry, don't be overtaken in the safety drive - fill out the coupons and send them off to *PW* today!

The MA 18 combined VOX and p.t.t. unit comes complete with its own headset and boom microphone. You can make it the basis of your safe mobile working, whether it be straight portable working, cycling, motorcycling or in the car.

**Features of the MA 18** are: adjustable headphone unit, adjustable position electret boom microphone, manually operable p.t.t., automatic voice activated switching (VOX), 1.5V d.c. operation (will accept NiCads), adjustable microphone sensitivity and transmit/receive delay.

## How to order:

Complete both coupons in ink, giving your name and address clearly in block capitals. Coupon 2 will be used as the address label to despatch your MA18 Vox Unit to you. Send your coupons with your cheque to: *Practical Wireless, Vox Unit Offer (June), Freepost, Enefco House, The Quay, Poole, Dorset BH15 1PP*. If you wish to pay by credit card (Access, Mastercard, Eurocard, or Visa only), please fill in your card details and sign the coupon where indicated. Available only to readers of *PW* in England, Scotland, Wales, N. Ireland, the Channel Islands and Isle of Man. Orders are normally despatched within 28 days, but please allow time for carriage. The closing date for this offer is 12th June 1991.

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Vox Unit June 1991

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**PW JUNE 1991  
VOX UNIT OFFER**



*This time round 'Quaynotes' has news of a plentiful supply of spares for 934MHz rigs, replies to some of your letters and passes on an idea for home-brew QSL cards.*

**T**hanks to one and all for writing. All your letters are passed on to me with the minimum of delay and the editor of *PW*, Rob Mannion, always finds time to pass on the 'phone messages that come up. Keep it up everyone - please.

As usual I'm going to start off at the 'high end' and it's with some good news that I can start the ball rolling this month. Nevada Communications in Portsmouth, run by a well-known radio amateur Mike Devereux G3SED, wrote to the *PW* office to tell everyone about the large quantity of 934MHz spares he's got in stock.

### Cybernet Delta Spares

In his letter Mike asked me to remind everyone that Nevada were the main importer of the Cybernet Delta One 934MHz rig. Mike reckons that over 75% of 934 operators bought these rigs. Unfortunately, the set is no longer made, but Mike reports (and I quote) "I'm pleased to tell you that we have a massive amount of spare parts and can probably keep these sets going for the next 20 years"!

Mike Devereux went on to encourage 934 enthusiasts even more. "The many 934MHz operators may be interested to know that we're offering a special 'Delta One' overhaul for the cost of £24 including return postage".

For the £24 charge your rig will get a full service, a realignment, and it'll come back to you with a full report of receiver sensitivity, frequency accuracy and r.f. power output. Rounding off this bit of very good news, Mike says that they've also still got quite a selection of 934MHz accessories. Sounds as if it's worth a visit doesn't it? You can contact Mike on (0705) 662145 or call at the shop at 189 London Road, North End, Portsmouth, Hampshire PO2 9AE. Tell them 'Quaynotes' told you to come!

### Mail Box

The number of letters coming my way seems to be increasing. I have no doubt that you will bear with me if you have to wait a little while for a personal reply. Your letter will be acknowledged in 'High & Low' usually before you get the 'personal' letter.

To help the *PW* office out (Donna Vincent sorts the mail for me. She's called 'Toad' in the office - I wonder why?) please mark your envelope to: 'Quaynotes' CB

### Yorkshire WF7 6JS.

Mr Carlisle says that he's been considering 'getting into 934 for a while'. I've no doubt he'll have read the news from Nevada with as much interest as everyone else.

Mike (Tango Papa 162), at PO Box 13, Southport in Lancashire, also wrote in response to John Gale's letter. They share the same opinions on the excellent 934MHz facilities. Unfortunately, Mike says that due to a drop in activity (operators migrating to amateur radio together with 'poser-phone'

people calling, to offer "way over the asking price" for this transceiver. How do I know? I rang too, but I was among the 100 or so unlucky callers. Who says that 934 is dead? See you next month - keep calling on the band and writing to me!

### Scene On Twenty-Seven

We're off to sunny Spain with our first letter this month. Well, no, that's not quite true, but we've at least heard from Dennis (Lima Delta 27) from Great Chesterford in Essex. Dennis has an apartment in Spain and along with enjoying his delightful holiday home, he specialises in making his own photographic QSL cards, as in Fig 1 and 2.

It's not an idea I've tried myself, but I have been assured by Dennis that if you expose a full 35mm cassette and take up the offer of another set of prints, they work out at only 10p each.

Dennis sends the cards, back to his British contacts that he's made via his UK f.m. 4W 27MHz rig from Spain. "Although they always seem so surprised" Dennis told me in his interesting letter "I have made about 2000 contacts with the UK, when the lift is on".

That sort of working is not bad when you consider how many stations could be on that channel at that distance! At the Spanish end, Dennis uses a 27MHz wire dipole. He's next out there in Alicante province in June and hopes to fly his antenna from a kite. We'll listen out for you Dennis, and don't forget to let us know how you get on.

John Whalley from Tenterden in Kent, has written to me again about his proposed rural 27MHz net. John was pleased that the idea was mentioned in 'High & Low'. He's going to let me know if there's enough response to start the system. In the meantime, I'm going to forward any letters received offering help and advice, directly to John.

That's the lot for this time. The entries for the 'Loopy' competition to win a CAP.Co. 27MHz loop antenna are arriving thick and fast. The *PW* office is threatening to send all the entries to me to store in my house. They're a helpful bunch aren't they? See you next time and keep busy whether you're on High or Low channel CB radio.



934 or CB 27. This way will help me to sort you all out. If you're like me (a foot in both camps) just write to 'Quaynotes' c/o *PW*.

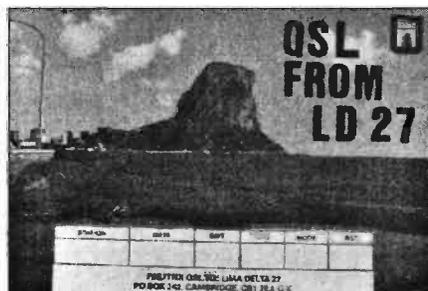
A friendly letter has arrived from Mr W. Carlisle in North Humberside. He's very interested in 934MHz and has asked me to pass on his letter to John Gale UK492 who wrote from London in an earlier 'High & Low'. There's no problem in forwarding stamped addressed letters for you, as I can get the office to do that for me and they won't be delayed very much at all. Mr Carlisle has also asked for the address of the 934MHz Club and so here it is again: The 934 Club UK, 93 Avon Walk, Featherstone, Pontefract,

interference) that you "can hear a pin drop" on 934MHz in his area. Funnily enough, Mike mentions that in 1984/85 when he came on, most operators in his area were 'on air' with Cybernet Delta's.

### Hot Line

To round off the 'high end' this month, I've got an interesting little story to tell you about a 934MHz rig. This particular transceiver was advertised in 'Bargain Basement' in the May issue of *PW*.

The person advertising was caught unawares. The 'phone started ringing as soon as *PW* was published. Apparently the 'phone almost melted with the number of



**Fig. 1: One of Dennis LD27's, home-brew photographic QSL cards used from his Spanish QTH.**



**Fig. 2: Another QSL card from Dennis LD27, this time showing a scene from Cambridge, near his home QTH.**

*'Quaynotes'*

## Construction



# The PW Morse-Master

## Part 1

*Steve Farrow G81WY wanted to improve his Morse. He built this neat little unit to provide a Morse transmission facility on his 144MHz f.m. rig. It provided him with so much practice that he's now passed the 12w.p.m. test!*

The Morse code is far from obsolete, but learning it is a task that few look upon with any enthusiasm. There are many ways to learn, but the most useful help, particularly when you're approaching the test speed, is an experienced 'A' licence holder who is prepared to assist in the task.

With the willingness of many of the on-air RSGB Slow Morse instructors to offer two-way practice after the main transmissions, practice can be more effective. Standardisation is slowly taking place and most transmissions are now centred (on v.h.f.) on 145.25MHz using a keyed audio tone on f.m. The drawback is the need to provide a keyed audio tone to modulate the transmitter while still allowing instant voice modulation for talkback.

### The Morse-Master

To overcome the drawback and to make Morse practice as painless as possible, I designed the PW Morse-Master. It consists of a small box connected between the microphone and the transceiver.

Within the box is a battery-powered keyed audio oscillator together with the necessary switching to permit the use of microphone and key at will. A piezo transducer provides an audible output for the sidetone or for off-air practice.

As the unit was originally designed for use with the Yaesu FT-290 Mk I, seven-pin microphone connectors

were used, wired to the Yaesu standard. The Morse-Master can, however, be used with almost any f.m. transceiver currently available by fitting the relevant, correctly wired microphone connector.

### The Circuit

The Morse-Master circuit is shown in Fig. 1.1. The keyed oscillator is made up from three gates of a four gate Schmitt trigger i.c. together with resistor R2 and capacitor C4. Each gate is a two-input NAND Schmitt trigger. The first gate is used as an inverter, allowing the Morse key to correctly control the second gate, the oscillator itself.

The third gate acts as a buffer between the oscillator and the output drive transistors. The frequency of the oscillator is determined by the values of R2 and C4 and by the input threshold voltages of IC1.

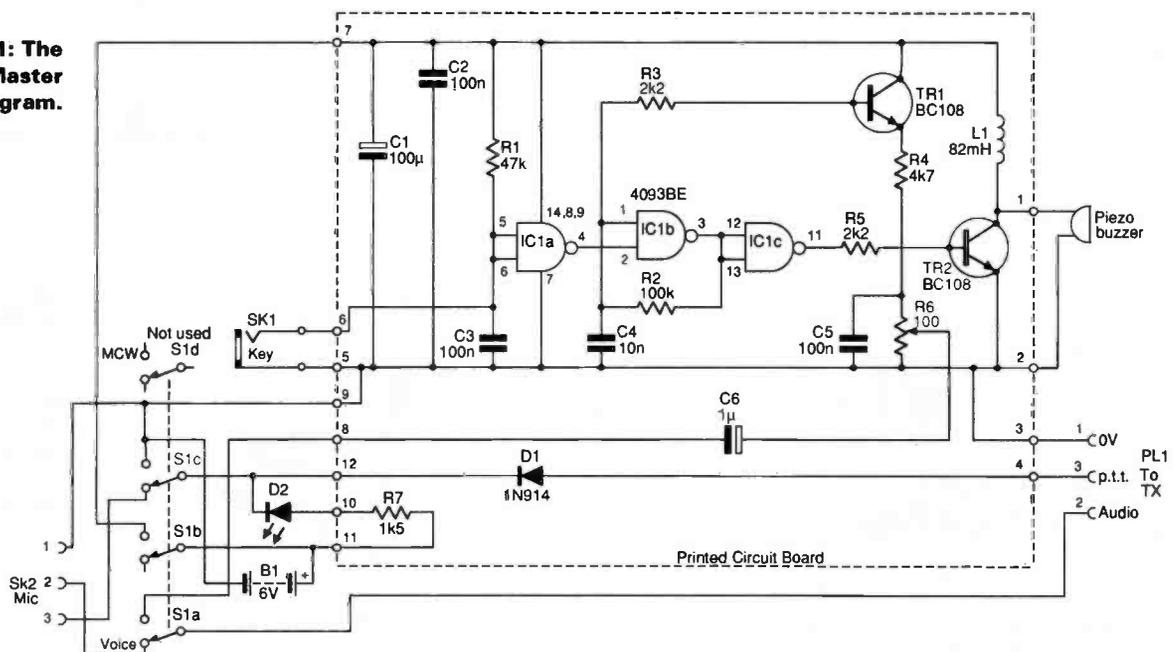
In the key-up condition, the output pin 3 of the oscillator is high and C4 is charged. When the key is depressed, input pin 2 of the oscillator switches high, allowing pin 3 to switch low. Capacitor C4 then discharges via R2. When the voltage across C4 drops to the lower threshold voltage, pin 3 switches high. Capacitor C4 charges via R2 until the voltage across C4 exceeds the upper threshold voltage. Pin 3 then switches low again, discharging C4. The cycle repeats, producing a waveform that is roughly triangular at a frequency of about 2kHz until the Morse key is released.

### Threshold Voltages

The threshold voltages are fixed proportions of the supply voltage. As the batteries discharge with use, the thresholds move closer together and less time is taken in charging and discharging C4, thus increasing the oscillator frequency. This effect is a useful state-of-battery guide!

The modulating output of the oscillator is buffered by transistor TR1, and fed to a low pass filter R4 and C5. This reduces the harmonic content of the waveform to a slight degree. The potentiometer R6 adjusts the output level of the oscillator, allowing the deviation of the transmitted f.m. signal to be set correctly when transmitting the keyed audio tone.

**Fig. 1.1: The Morse-Master circuit diagram.**



## Sidetone Production

The sidetone output of the oscillator is produced from the buffered, square wave output pin 11 of IC1. Transistor TR2 drives the piezo transducer. To increase the volume of the sidetone output, the inductor, L1, provides an inductive 'kick', increasing the voltage applied to the transducer and hence the audio output.

As TR2 switches off, the magnetic field generated by L1 collapses. The energy stored in the field is converted into a voltage pulse which is applied across the transducer in addition to the battery voltage.

## Switching Facilities

The keyed audio tone/voice switching is performed by a 3-pole change-over switch. The p.t.t. line to the transceiver is earthed and the l.e.d. transmit indicator is illuminated when either the microphone p.t.t. button is depressed or when the switch is set to the keyed audio tone position. The diode, D1, prevents a possible 'backfeed' from the battery via the l.e.d. into the transceiver p.t.t. circuitry when the transceiver is in the 'receive' position.

*In part 2, I'll describe the final wiring, setting up and boxing the unit ready for use. In the meantime, how about familiarising yourself with the Morse code ready to use the Morse-Master?*

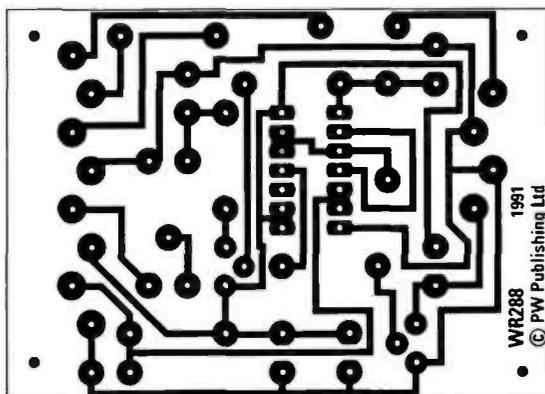


Fig. 1.2: The p.c.b. track lay-out.

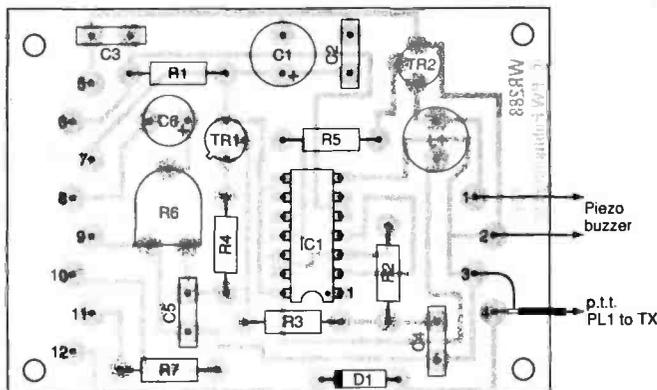


Fig. 1.3: Component overlay and off-board connection details.

## How Much? Approximately £30

## How Difficult? Intermediate

## Shopping List

### Resistors

0.25W 5% Carbon Film		
1.5kΩ	1	R7
2.2kΩ	2	R3, 5
4.7kΩ	1	R4
47kΩ	1	R1
100kΩ	1	R2

### Variable Miniature pre-set

100Ω	1	R6
------	---	----

### Capacitors

#### Electrolytic 63V working

1μ	1	C6
----	---	----

#### Electrolytic 10V working

100μ	1	C1
------	---	----

#### Miniature Polyester

10n	1	C4
-----	---	----

100n	3	C2, 3, 5
------	---	----------

### Inductor

L1	82mH Toko 181LY-823
----	---------------------

### Semiconductors

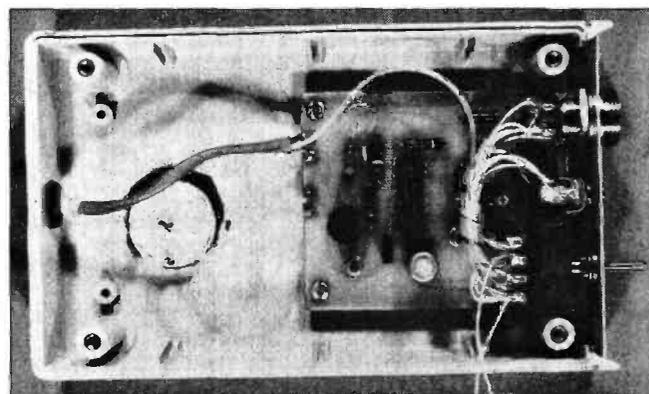
BC108	2	TR1, 2
-------	---	--------

1N914	1	D1
-------	---	----

CD4093BE	1	IC1
----------	---	-----

### Miscellaneous

Note: IC1 should be a CMOS 2 input NAND Schmidt device (see text for static precautions), suitable box (Cirkit, Maplin, Marco Trading), p.c.b. (PW PCB Service), Veropins, piezo transducer (various suppliers), 7-pin microphone plug and socket (see text), 3.5mm jack socket, grommets and stick-on feet, self-tap screws, 3-pole change-over switch, 2-core screened cable, equipment wire (to suit), epoxy resin adhesive, rub-on lettering, clear varnish, lacing cord, heat-shrink sleeving, four AA size battery cells.



The PW Morse-Master with its Lid off.

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CUSHCRAFT A50 6 6EL	£196.00
TONNA 20505 5EL	£ 51.82
KLM 7EL YAGI	£195.00
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20813 13EL YAGI	£ 50.12
20809 9EL YAGI	£ 33.84
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MBM88 88EL M/B	£ 81.78
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ARX450B/R/RANGER	£ 45.00

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JAYBEAM 20655 55EL YAGI	£ 50.34
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-----------------------	---------

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## Errors & Updates

**Mathematics for the RAE PW May 1991 Page 35**  
An unusual mistake crept into the long division example on page 35 of the May issue of PW. Both question and answer were wrong, the correct question and solution appear here:

$$\begin{array}{r}
 35000 \\
 \overline{) 230967.000} \\
 \underline{210000} \\
 209670 \\
 \underline{175000} \\
 346700 \\
 \underline{315000} \\
 317000 \\
 \underline{315000} \\
 2000
 \end{array}$$

Our apologies to the author, Ray Fautley G3ASG, and readers following the series.

# Whipping Up A Cheap Antenna

*Flexible tape whip antennas aren't a new idea, but James Stirrat has brought their use up-to-date so they can be considered as cheap, and useful alternatives for receiving and transmitting equipment.*

I find that most ready-made whip antennas have drawbacks for portable operation. Rubber helicals are too short to obtain the height advantage which can be gained from a longer element.

Long telescopic whips break or bend at the slightest spill. Glass fibre rods are heavy and difficult to pack away into a bag or the boot of a car.

## Wartime Idea

During World War Two, flexible tape antennas came into being on portable sets, and I have seen one or two manufactured versions since. Flexible tape antennas are really rugged, and return to the vertical position of their own accord after a knock or spill.

I thought this type of antenna might be suitable for a home-brew experiment. I was right! I soon found that they were easy and inexpensive to make at home, being virtually indestructible and useful for a range of activities including h.f., v.h.f. and u.h.f. portable applications.

To become familiar with the way flexible tape antennas work, you should take a steel tape measure and pull out about 350mm of tape. Hold it upright like an antenna, knock it over with your free hand and it will quickly return to the vertical position.

## Bargain Buy

The tapes are easy to find. I bought some inexpensive, imported steel tape measures from a bargain shop. When I removed the steel tape from the containers and cut the tabs off the ends, I took great care not to leave a dangerous sharp edge or to cut myself on the edges as they were prepared.

I left the first tape 1.5m long, and found that the top 380mm would return to the vertical under its own 'steam' after a knock. Then I cut the second steel tape to 1.120m, and held them together with twists of wire before knocking the top over again.

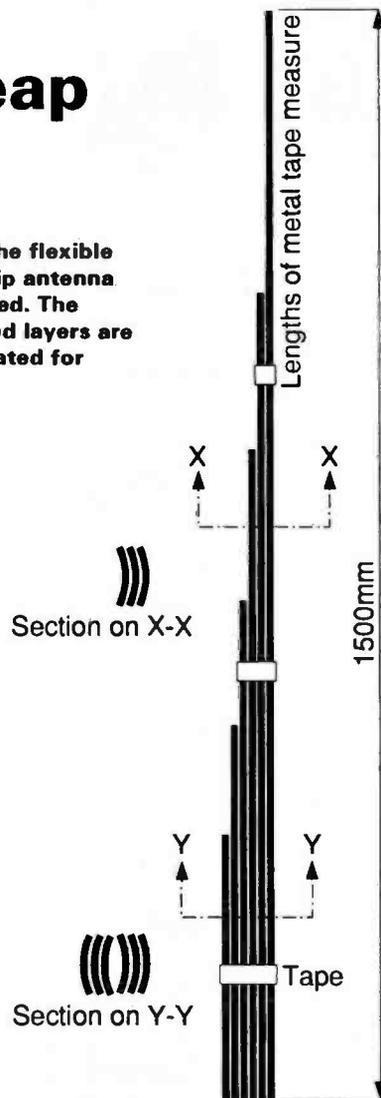
On this occasion the top 550mm could return to the vertical on its own, so I cut a third length of tape to 950mm for the third lamination. With these three tapes held together, the top 700mm returned to the vertical, and so the experiment went on!

## Placed Together

To strengthen the sections of steel tape, I placed the longest lengths together 'convex face to concave face'. However, I made the overall antenna much firmer by placing the bottom shorter lengths concave to concave with respect to the longer ones.

The measurements I've given are best taken as experimental rather than an absolute guide to

**Fig. 1: The flexible tape whip antenna assembled. The laminated layers are exaggerated for clarity.**



construction. This is because tapes will vary from one to another in their manufacture.

The laminations will need to be held together on a long-term basis. For this job the most satisfactory material readily available for crimping are the brass-coloured metal picture hooks often found around the house. To use the hooks, you can straighten them out, and bend them to shape before crimping them in position with pliers.

You can however, simply and effectively bind the laminations together with pvc tape. The tape becomes invisible if the antenna is spray-painted for a professional looking finish.

Mind you, before painting, I did have to clean the steel tape carefully and quietly! The XYL's nail polish remover turned out to be the particular solvent which worked the best, removing the existing factory finish on the tape I'd bought.

## Broken Telescopic

One of my final 'production' tape antennas was used to replace a broken telescopic rod. I managed to do this by 'persuading' the end slowly and carefully inside the sawn-off bottom section of the broken telescopic antenna.

It is worth remembering that a portable antenna need not be fitted to the set it's used with. It can be fixed to an ordinary office spring clip, and then clipped to clothing or backpack and connected to the set with a wire. I hope my ideas have 'whipped up' some enthusiasm for building a cheap alternative antenna!

## Shopping List

**Steel tape measure (from scrap rules or bought new). SAFETY NOTE:** The edges of cheaper imported steel tape rules can be very sharp. As the steel is very thin, great care should be taken when the edges are broken or cut, especially when attempts are being made to scrape and clean paint and numerals off to expose bare metal for electrical contact purposes. Binding tape (pvc), suitable solvent (use in open air), tin-snips to cut tape. Brass, copper wire for binding tapes together (see text).

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# Radio Diary

\* Practical Wireless &  
Short Wave Magazine in  
attendance

**May 12:** Yeovil ARC have their 7th QRP Convention at the Preston Centre, Monks Dale, Yeovil. Doors open at 9am, admission is £1.50 which includes programme. All the usual traders, plenty of food and refreshments available. There will be four lectures during the day. **David Bailey at 7 Thatcham Close, Yeovil BA21 3BS.**

**May 12:** Royal Naval ARS have their rally at HMS Plymouth, Plantation Quay, Govan Road, Glasgow. Doors open 10.30am, admission £2 for adults and £1 for children and OAPs. There will be traders, Bring & Buy, displays, lectures and talk-in on S22. Admission allows you to wander around the ship until 9pm. Good family day out. Further details from **John Dundaf GM00PS on 041-959 3385 answer machine 24hrs.**

**May 12:** Midland ARS Drayton rally will be held at Drayton Manor Park, Nr Tamworth, Staffordshire (just off A5, approx two miles from M42). Various events include Zoo and large amusement park. Family day out. Caravan parking available. **Peter G6DRN on 021-443 1189.**

**May 18:** The Swindon Radio Rally is to be held at the Oasis Leisure Centre, North Star Avenue, Swindon, leave M4 at Junction 16. Doors open at 10.30am, trade stands, grand Bring & Buy, Repeater Group, etc., ample free parking. Talk-in by RAYNET on S22 from 0500hrs. For details contact **Jim G7GEA on (0793) 611859** or **John on (0793) 619014.**

**May 19:** Mid-Ulster ARC have their annual 'Parkanaur' rally at the Silverwood Hotel, Lurgan, Co. Armagh. The rally will be open to the public from 12 noon. There will be the usual trade stands, Bring & Buy, bookstall, QSL bureau, etc. Talk-in on S22, 145.550. The proceeds of this rally will go to the Stanley Eakins Memorial Fund at Parkanaur, nr Dungannon. **Jim Lappin G11YGS. Tel: (0762) 851179.**

**May 19:** The 34th Northern Mobile Rally will be held at the Great Yorkshire Showground, Harrogate, North Yorkshire. Gates open 10am, doors open 10.45am, admission by programme £1, children free, car parking free. Hundreds of traders, special interest groups, local clubs, etc. **Mike G0MKK on (0423) 564353** day or **(0423) 507653** evenings.

**May 26:** The Maidstone YMCA ARS are holding their biennial rally at the YMCA Sports Centre, Maidstone. As usual the rally will feature Trade and Special Interest Groups stands, refreshments and ample free parking. **Alan Judge G0NCW. Maidstone 750709.**

**May 26:** Plymouth Radio and Electronics Fair is being held at Plymstock School, Church Road, Plymstock, Devon. Doors open at 11am. Attractions include large Bring & Buy, RSGB bookstall, many trade stalls, RSGB Morse testing and refreshments. Talk-in on S22. **Jan Fisher G0IVZ. Tel: (0752) 340946.**

**May 26:** The 15th Annual East Suffolk Wireless Revival 1991 is being held at the Maidenhall Sports Centre, Ipswich, Suffolk. Attractions this year include Bring & Buy, car boot sale, radio society book stall, c.w. pile-up competition, vintage radio display, plus non-radio stalls, childrens' play area and model flying display. Refreshments available, admission is £1, ample car parking. Talk-in on S22. **Iain Moffat G1WCK, 30 Daimler Road, Ipswich, Suffolk IP1 5PQ.**

**June 2:** The Northampton Radio Club are holding their car boot sale at the rear of the Red Lyon public house, which is on the A45, 400m from Junction 16 for the M1. There will be parking for over 500 cars. The entrance fee will be 50p per car or 25p per person. If you are selling, the fee is £6.50 in advance or £9 on the day. There will be a licensed bar open from 12 noon, there's food all day long as well as a Bring & Buy stand. Any bookings to **Paul G0HWC. Tel: (0327) 41267.**

\***June 9:** The RNARS Rally will be held at HMS Mercury, near Petersfield. Gates open between 1000 and 1700. In addition to the dozens of Trade stands and the RNARS tent, there will be a Bring & Buy, a flea market offering tables for hire by the hour, a car boot sale, a large arts & crafts exhibition, radio-controlled power boats, cars and trains to mention but a few of the attractions. **Cliff Harper. Tel: (0703) 557469.**

\***June 9:** Elvaston Castle Radio Rally will be held at Elvaston Castle Country Park, Derby. **Peter Neal (0332) 700265.**

**June 9:** The Norfolk RAYNET rally and car boot sale will be held at Barford, Norfolk. Car boot pitches £5, trade stands, refreshments, etc. Talk-in on S22 by G4GLI. **Pat Bates G01YD. Tel: (0692) 404593** evenings only.

**June 9:** The Southend Rally will be held in the Rocheway Centre, Rochford, Practical Wireless, June 1991

Essex. Car Boot pitches will be available, either pre-booked or on the day on a first-come-first-served basis. **Stephen Blinkhorn G1XGP. Tel: (0702) 712595** evenings.

**June 9:** Mid-Lanark ARS are holding their annual Open Day at Newarthill C. E. Centre, High Street, Newarthill. There will be the usual traders plus some new ones, a Bring & Buy stall, catering facilities, raffle prizes and a lucky catalogue number. Talk-in on S22. The society have applied to hold Morse tests as usual, applications must be made in good time to the relevant department at RSGB HQ. Doors open 11am. Admission/Catalogue is £1. **David Williams GM1SSA, 32/34 Carfin Street, New Stevenson, Motherwell, Scotland ML1 4JL. Tel: (0698) 732403.**

**June 16:** Denby Dale & District ARS have their Rally at Salendine Nook High School, Huddersfield. Open 11am until 4pm. Same venue as last year. **J. D. Chappell at 221 Huddersfield Road, Shelley, Huddersfield HD8 8LJ.**

\***June 30:** The 34th Annual Longleat Rally will be held, as usual, at Longleat House, Warminster, Wilts. **Shaun O'Sullivan G8VPG. Tel: (0225) 873098.**

**July 7:** The York Radio Rally will be held in the Tattersall Building, York Racecourse, Knavesmire, York. Doors open at 11am, entrance fee 50p and there's ample free parking. Attractions include amateur radio, electronics and computer traders, arts and crafts, Morse Testing, a licenced bar and cafe. Talk-in on S22. **Dave G7FGA. Tel: York (0904) 790079.**

**July 7:** Kings Lynn ARC present the Great Eastern rally at The Corn Exchange, Tuesday Market Place. Open 10am, entry £1, free parking, Bring & Buy, licenced bar, refreshments. Talk-in S22. **Derek Franklin G0MQL, Laurel Farm, 7 Holly Close, West Winch, Kings Lynn, Norfolk PE33 0PW.**

\***July 13:** The Cornish RAC will be holding their rally at Penair School, St Clements, Truro. All the usual attractions, refreshments, free parking, etc. Doors open 10am, 9.30am for the disabled. Talk-in on S22. **Rolf Little Tel: (0872) 72554.**

**July 14:** The Sussex Amateur Radio & Computer Fair will again be held at Brighton Racecourse. All the usual traders and other attractions will be there. Doors open at 10.30am. **Ron Bray G8VEH. Tel: (0273) 415654** office hours.

**July 21:** The 8th McMichael rally and car boot sale at the Haymill Youth and Community Centre, Burnham Lane, Slough (near Burnham railway station). Starts at 10.30am and admission is £1. The car boot sale is £6 per pitch on the day. There is free parking on site and talk-in is available on S22. **Neil G8XYN on (0628) 25952.**

**July 28:** Rugby ATS have their annual Car Boot Sale, venue to be advised nearer the time. The event opens at 10am and talk-in will be provided by G8CBCS on S22. **Kevin G8TWH on (0203) 441590.**

\***July 28:** The Scarborough ARS will be holding their annual rally at The Spa, South Foreshore, Scarborough. Doors open at 11am until 4pm. Many trade stands, large Bring & Buy, Tombola, licenced bar and refreshments. Morse tests, followed by a demonstration by the North Yorkshire Morse test team. Entrance 50p including a prize draw. **Ian Hunter G4UQP (QTHR). Tel: (0723) 376847.**

**August 11:** The 32nd Annual Derby Mobile rally will take place this year at a new venue, Littleover Community School, Rykneld Road, Littleover, Derby. The school is situated on the A5250 road, just north of its junction with the A38. Talk-in on 144MHz. All the usual attractions, including the famous monster Junk Sale. **Martin Shardlow G3SZJ, QTHR. Tel: (0332) 556875.**

\***August 11:** Hamfest 91 will be held at the Flight Refuelling Sports & Social Club Grounds, Merley, Wimborne, Dorset. The event opens at 10am and will feature a Bring & Buy, trade stands, radio and electronics car boot sale, craft fair, field displays and attractions for the whole family. Special disabled parking is available in the grounds and overnight camping can be arranged. **John G0API. Tel: (0202) 619649, Rob G6DUN. Tel: (0202) 479038.**

**August 18:** The West Manchester Radio Club's 'Red Rose Rally' will be held at the Bolton Sports & Exhibition Centre, Silverwell Street, Bolton (town centre). All the usual trade stands, societies, Bring & Buy, etc. All at pavement level, with facilities for the disabled. Refreshments available all day and bar. Doors open at 10.30am for disabled and 11am for the general public. Admission £1, children free. **Dave G1100 on (0204) 24104** evenings only.

# The 1991 Practical Wireless 144MHz

## 0900-1700 GMT, 16 June 1991

If you enjoy low power v.h.f. operating, are a contest enthusiast, or are just looking for a day of high activity on the 144MHz band, the ninth annual PW QRP Contest will provide the ideal opportunity for a day's fun! The format of this event has proved very popular to newcomers and experienced operators alike. The 3W power output limit enables even a modest station to compete effectively. The large number of stations taking to the hills around the UK also provides the chance of some long-distance contacts for everyone.

Nothing substantial has changed in the rules this year, but all entrants are asked to read them very carefully. When submitting your logs, please make sure that you have supplied all the information required. It's particularly important that the list of locator squares worked is provided (rule 6h) - entrants who omit this give the adjudicator extra work, and he will respond by reducing the offender's score, usually by 5%.

With the incentive of the Winner's Cup, the PW Tennamast Trophy, and many certificates for the best achievers, we hope that all entrants will have a thoroughly enjoyable and successful day.

### The G4HLX Adjudication 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 1700UTC on 16 June 1991.

All stations must operate within the terms of the licence. Entrants should observe the band plan and keep clear of normal calling frequencies (144.300MHz and 145.500MHz) and those used by GB2RS during the morning (144.250MHz and 145.525MHz). Keep clear of any other frequency that is obviously in use for non-contest purposes.

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)

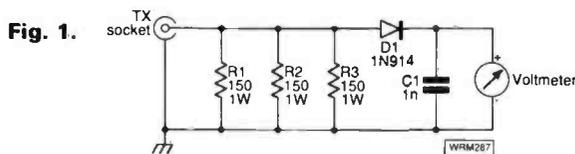
Information must be sent to, and received from, each station individually, and contact may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.

If a non-competing station is worked, and is unable to send his full universal locator, his old-style QTH locator ('QRA'), or his location may be logged instead. However, for a square to count as a multiplier (see rule 4), either a full 6-character IARU universal locator, or full 5-character European QTH 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.l.c. line, reached via the accessory socket. The output power can be accurately measured using the simple circuit of 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 eight-hour period 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 297mm) 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 here illustrates how each sheet should be headed.

### PRACTICAL WIRELESS 144MHz QRP CONTEST 1991

Date

Callsign

Locator

Sheet No  
Of

Time GMT	Callsign	Report & Serial No		Locator
		Sent	Received	

# Hz QRP Contest

ie

## 6. Entries

Accompanying each entry must be a separate sheet of A4 sized paper bearing the following information:

- name of entrant (or of club etc. in a group entry) as it is to appear in the results table
- callsign used during contest (including any suffix)
- name and address for correspondence
- details of location of station during contest; for portable stations, a national grid reference is preferred
- locator as sent
- 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 permanent home station or a portable station established solely by him/her; if multi-operator, include a list of operators' names and callsigns
- total number of contacts and locator squares worked
- list of the locator squares worked
- a full description of the equipment used including TX p.e.p. output power
- if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used
  - to reduce and
  - to measure the output power
- 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'.

This declaration concludes the entry, which should 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 1991**. Late entries will incur a heavy points penalty.

Any other general comments about the station, the contest and conditions during it are welcome, but should be written 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 5 August 1991.

## 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's wise to have an alternative site available in case this problem does occur.

Make sure your transmitter is properly adjusted and is not radiating a broad or poor-quality signal, e.g. by overdriving 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. 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 adjudicators will be final.

The leading station will receive the winners' cup, and the leading Scottish station will be awarded the *PW* Tennamast Trophy. Certificates will be awarded to runners-up and in many other categories, including the leading station in each locator square.

**Good luck and 73s from Neill Taylor G4HLX  
and everyone at PW.**

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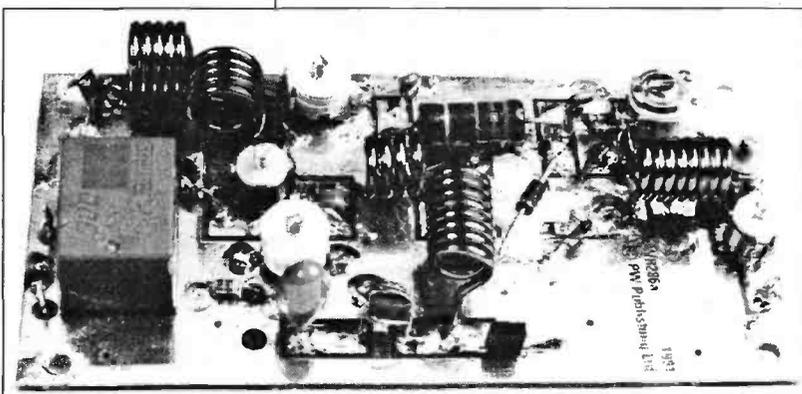
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# The Meon-4 Transverter (Part two)



*Andrew Talbot G4JNT described the Meon-4 transverter last month, he now turns to a suitable 70MHz linear amplifier*

## Errors and Updates From Part One

In the component overlay diagram of Fig. 1.5, in the first published part of this project, there was a mis-naming of a pin.

The pin marked '+12V RX' shown at the lower edge of the board, should have been labelled '+12V'. This pin is the supply for the 75.5MHz oscillator, and must be enabled at all times when the Meon-4 is in use.

Page 20, L2 in Table 1, should read 0.06µH not 0.6µH.

The Meon-4, described in the first part of this article produces about 300-500mW of power at 70MHz. To be of real use however, it requires a separate power amplifier stage, to raise the r.f. output power to a more suitable level. It will also be of a level to drive many external linear amplifiers.

## Superior Semiconductor

The power amplifier module makes use of the fact that a transistor designed for 175MHz has a much higher gain when used at lower frequencies. A single SD1143 transistor should provide around 14dBs of gain at 70MHz. This small amount of 'cheating' allows a linear output of 8W to be achieved. In practice it's more likely to be 10W output. At this power level though, the amplifier is beginning to saturate, with consequent loss of linearity. Not to mention increased intermodulation products when amplifying an s.s.b. signal.

## Design Thoughts

The somewhat simple looking p.a. stage, is shown in Fig. 2.1. It contains only three semiconductors, one transistor and two diodes. Diode D102 is the bias-setting diode. Its purpose is to give a degree of thermal stability and improve linearity. Non-linearity of an amplifier causes spurious signals, usually at a multiple of the output frequency.

To minimise these out-of-band spuri, a filter with a reasonably sharp cut-off is needed. In this design, a

'fifth order' Chebyshev filter, consisting of C110-C115, L106 and 107 reduces the level of any harmonics generated.

Input matching is controlled by C101/102. At the output, capacitors C110/111 take care of the necessary matching. The variable capacitor C113 is to allow a small amount of filter trimming.

## Construction

The p.c.b. design and component overlay are shown in Fig. 2.2. As with the transverter itself, the p.c.b. is designed to fit across the width of a standard diecast box and still allow room for the control circuitry.

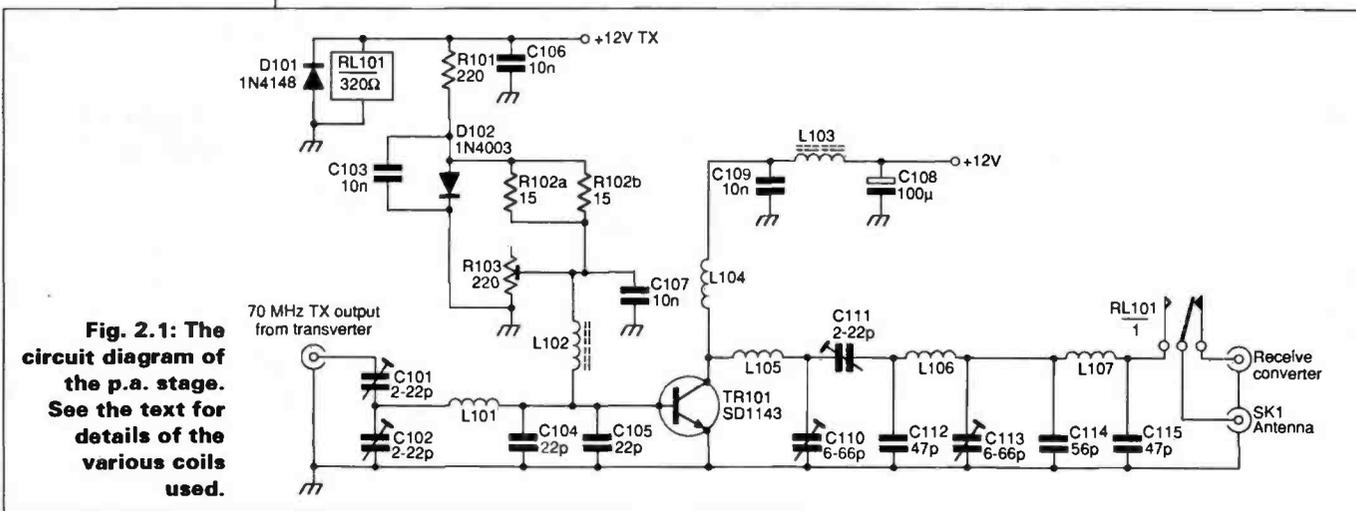
The coils are the major part of this design, and should be made as accurately as possible. The capabilities of the filter depend very much on the accuracy of these inductors. Refer to Table 1, for the sizes and number of turns for each of the coils. I use high-speed twist drill shanks as formers for coils. To set the coils properly after winding, trap both free ends of the winding in a vice and pull and 'wriggle' the coil and former.

Use the overlay diagram and assemble the project on the 'land' side of the p.c.b. The transistor is also mounted and soldered from this side. There are no special techniques of construction, other than to take care when handling TR101. At about £14, they are expensive to replace!

## Alignment

To begin alignment you should set capacitor C113 to mid-position. To align the power amplifier, maximum power is applied from the transverter and the output trimmer capacitors C110 and C111 are adjusted first, followed by C101 and C102 for maximum output. If the collector current is initially greater than 1A, then drive may be reduced. It should be increased to maximum as the matching is set up. When you're satisfied that no more adjustment is possible carefully adjust C113. Repeat the above procedure several times to maximise power output.

Any attempt to set up the output matching entirely at reduced power will lead to the wrong operating point being selected for TR101. This will lead to an increase in intermodulation products and splatter. When the power amplifier is correctly tuned an output power of more than 10W should be obtained.



**Fig. 2.1: The circuit diagram of the p.a. stage. See the text for details of the various coils used.**

### Next Stage

All that now remains to be done, is to integrate the control and attenuator circuitry together. A board developed for this job will be presented in the next part of the Meon-4, and all will be brought together to complete the working station.

**Table One**

Coil No.	Turns Gauge	i.diam. (Former)	length overall
L101	7(1.2mm)	6mm	12mm
L104	7(1.2mm)	6mm	12mm
L105	4(1.2mm)	6mm	10mm
L106	5(1.2mm)	8mm	6mm
L107	5(1.2mm)	8mm	6mm

L102 and L103 are made from 4 turns of 0.6mm enamelled copper wire wound on a ferrite bead

Suppliers (Price £14.69 inc p&p.) of the SD1143 transistor are:

Raedeck Electronics,  
Bannerly Road,  
Garretts Green,  
Birmingham.  
Tel: 021-784 8655.  
FAX: 021-789 7128.

How Much? £22 + p.c.b.  
How Difficult? Intermediate

### Shopping List

#### Resistors

1W 5% Carbon Film  
220Ω 1 R101

0.25W 5% Carbon Film  
15Ω 2 R102a,b

Miniature Variable (horizontal mounting)  
220Ω 1 R103

#### Capacitors

Miniature Monolithic Ceramic  
22pF 2 C104,105  
47pF 2 C112,115  
56pF 1 C114  
10nF 4 C103,106,107,109

Tantalum Bead 16V working  
100μF 1 C108

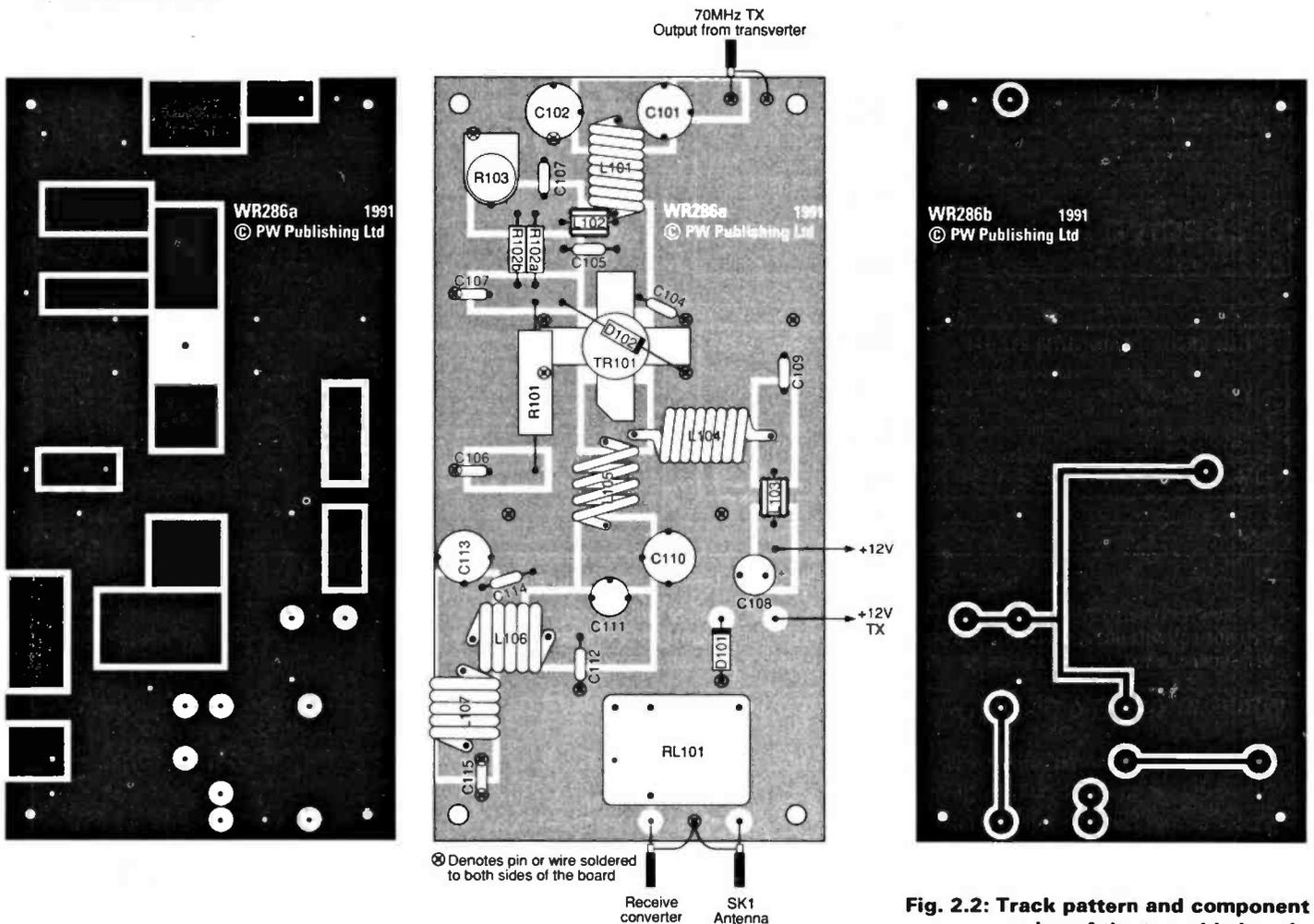
Miniature Foil Trimmer  
2-22pF 3 C101,102,111  
6-66pF 2 C110,C113

#### Semiconductors

1N4003 1 D102  
1N4148 1 D101  
SD1143 1 TR101

#### Miscellaneous

Relay 12V single pole c/o (Maplin type YX97F), p.c.b. available from our PW p.c.b.s, miniature coaxial cable, 0.6 and 1.2mm enamelled copper wire for coils, two ferrite beads.



**Fig. 2.2: Track pattern and component overlay of the two-sided p.c.b.**

# The £1 Balun

*Steve Nicholls  
GOJFM has come  
up with some  
money saving  
ideas, in the form  
of simple  
balanced-to-  
unbalanced  
transformers to  
stop you wasting  
that precious r.f.  
energy.*

Most h.f., and many other antennas are based on simple dipoles which are a form of balanced antenna with equal but opposite voltages on each 'pole'. Many modern transceivers have a socket for the antenna based on an SO239 termination. This is absolutely ideal for connection to a coaxial cable.

A coaxial cable has many advantages, including being capable of being laid anywhere, bent round tight curves, and, indeed capable of being buried. Unfortunately however, a coaxial cable is an unbalanced form of feeder.

## Balance To Unbalanced

When you join a balanced antenna (such as a dipole) to an unbalanced lead (such as a coaxial cable) problems can occur. You can get r.f. currents flowing down the outer braid caused by the voltage on the side of the dipole to which it is connected.

Radiation can then occur from the braiding (which forms the outer screen of the cable) which can't be cancelled out by the electromagnetic field from the inner conductor. This happens because it's effectively trapped inside the cylinder created by the copper braiding, and the statement 'equal and opposite fields cancel each other out' can't apply.

## Dreaded Interference

Braid radiation causes problems. The biggest nuisance of course, may be TVI, but let's look at the various other problems that can result from braid radiation. Feedback of r.f. in the shack, changes in the effective radiation pattern of the antenna, changes in the impedance presented to the rig, resulting, perhaps, in an unacceptable v.s.w.r.

Sooner or later most radio amateurs find that they need a balun. This is the accessory that permits a link between a BALANCED antenna and an UNBALANCED antenna feeder.

## How Baluns Work

There are many types of balun and many ways of connecting a balanced antenna to an unbalanced line. Although, some form of transformer is needed to prevent those unwanted currents flowing down the braid!

The transformer may take the form of quarter

wave resonant circuits or stubs which present high impedances to the unwanted currents. Nowadays though, it's common practice to use a close-wound transformer coupling circuit.

Baluns not only permit balance-to-unbalanced connection, but can also be used to help match impedances. This is especially useful when using 300Ω to 60Ω feeder, into a rig that desperately wants to 'see' an antenna of somewhere near 50Ω impedance!

The impedance of a half-wave dipole is approximately 50-70Ω: so, a '1:1' balun would be suitable to feed the dipole into a 50Ω coaxial lead. A folded dipole has an impedance of approximately 300Ω: a '4:1' balun would convert this to about 70Ω - again, suitable for connection to a coaxial lead.

## Not Conventional

Unlike conventional transformers, balun transformer ratios '1:1' and '4:1' do NOT refer to the number of windings. The concept of a balun is related to the principle that: if two wires are positioned right next to each other, the electromagnetic field from one wire will also go round the other wire, producing identical currents.

So, you can see it's vital that the wires forming the windings within the balun are as close to each other as possible. But it doesn't matter too much if there are gaps between the pairs of wires, see Fig. 1.

A '4:1' balun is produced from a BIFilar winding which has *two* coils. A '1:1' balun is produced from a TRIFilar winding which has *three* coils, see Fig. 2.

## Handy Accessory

A balun is an accessory that would be handy to have in the shack 'treasure box' but, because they can cost anything up to £30 they're often not found. Recently, I discovered I needed a balun to connect a folded dipole, consisting of 300Ω cable and feeder to some coaxial cable, and then to the rig.

Unfortunately for me, it was Saturday. Our local emporium closes Mondays! I couldn't wait until Tuesday to test the new antenna, so I hunted round the shack, begged and borrowed from local friends and generally obtained the bits I needed to make up a balun.

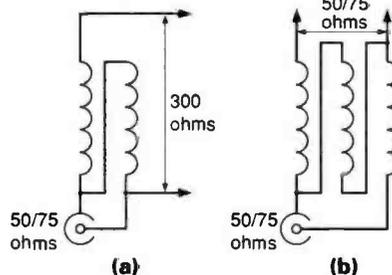
The components were:

- two short brass bolts, and two brass washers,
- a piece of ferrite rod,
- approximately 400mm of enamelled wire,
- some self-amalgamating tape (or shrink-tube),
- an SO239 socket from an old CB antenna tuner,
- and an empty 35mm film container.

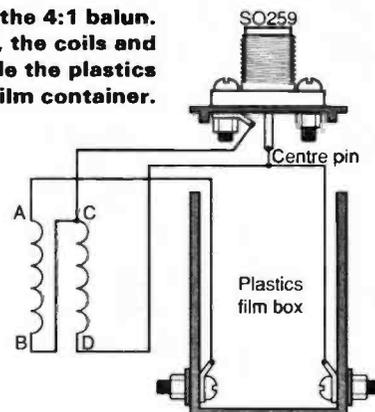
**Fig. 1: The wires must be bound tightly together, but windings may be slightly spaced if necessary. The diagram shows a bifilar balun with two coils.**



**Fig. 2: An example of a 4:1 bifilar (a), and (b) a 1:1 trifilar balun.**



**Fig. 3: The wire connections for the 4:1 balun. After connecting up and testing, the coils and ferrite rod may be located inside the plastics film container.**



As I needed to join a 300Ω feeder to a 50Ω coaxial cable, I had the task of making the '4:1' type, or 'bifilar' balun with two coils.

### Balun Building

The wire was carefully wound round the ferrite rod for eight turns, and cut leaving two 'tails' of 100mm. A similar second coil was then wound adjacent to the first. Squeezing the two coils together, showed that the ferrite rod need only to be 20mm long.

Ferrite rods are of ceramic construction, and, like a glazed tile, can be difficult to cut. Perhaps you'd like to try my successful method.

The rod was scored all round with a hacksaw, some 20mm from the end (leaving enough spare rod for a couple more turns if necessary) before being held over the edge of the table. The next stage is a light tap with a pair of pliers (it's best to wrap them in a light cloth to protect the rod) which should cause it to break cleanly.

### Marking The Tails

The two coils were identified as AB 'red' and CD 'blue'. The ends of each 'tail', were suitably marked with an appropriately coloured 'permanent ink' felt-tip marker.

I compressed the two windings onto the rod, which were then held in the compressed state by self-amalgamating tape. You can also use heat-shrink tubing for this job, as it's just as effective.

At this stage, each coil was checked for electrical continuity, and electrical isolation from the other coil, by simply connecting a meter to the 'blue' and 'red' tails.

The SO239 socket is a neat fit on the top of the film canister, and it's held in place by a small nut and bolt. The nut and bolt pass through the base of the socket and the lid, and form a convenient screen terminal.

The two brass bolts are then passed through each side of the base of the film canister, forming two terminals, the washers and bolts are positioned but left loose at this stage.

All that remains now, is to solder the coil ends to the appropriate terminals, see Fig. 3.

Connect A red to one brass terminal.

B red to C Blue and also to SO239 socket base.

D Blue to the other brass terminal and also to SO239 centre pin.

When I tried the finished prototypes, I did so by running very low power. I then carried out a full test, with the following results:-

#### V.S.W.R Table

The v.s.w.r. table shows the measured results at specific frequencies. The measurements at A are with the coaxial cable connected directly to the antenna. The two columns B and C are the results obtained with the balun connected.

MHz	A	10W B	130W C
18.11	7.7:1	1.3:1	1.5:1
18.13	7.6:1	1.3:1	1.6:1
18.15	7.6:1	1.4:1	1.6:1
24.93	4.6:1	1.1:1	1.4:1
24.95	4.6:1	1.3:1	1.4:1
24.97	4.7:1	1.2:1	1.4:1
24.99	4.6:1	1.3:1	1.4:1

### Costings

The total costs of this home-brew project were checked at the local radio shop as follows:-

Ferrite rod 100mm long, 50p. Therefore 20mm for balun	13p
Nuts, bolts and washers for terminals:	14p
Heavy duty enamelled wire 30p per metre. 400mm for balun	12p
SO239 socket - from CB antenna matcher (often available at rallies. etc.).	50p
Empty 35mm film canister	free
Solder, self-amalgamating tape, terminal bolt on SO239:	11p
<u>Total cost of Balun</u>	<u>£1.00</u>

Although the apparent v.s.w.r. readings increased slightly when power was gradually increased, all readings were well within the acceptable range of my transceiver.

### Cautionary Note

The output from the transmitter is going directly through the windings of the balun, and care must be used in the selection of sufficiently heavy enamelled wire. The specified 1.2mm (18s.w.g.) wire will provide 20 turns per inch on the ferrite rod. This should be adequate for any power output within the legal limits! For lower powered operation, a thinner wire such as 0.5mm (26s.w.g.) still has a fusing current rate of 24A and provides 50 turns per inch.

Brand new enamelled wire isn't expensive, and it's false economy to buy a smaller gauge. Good quality enamelled wire can often be stripped from old transformers and electrical motors. However, if you do this, great care must be taken in checking that the old enamel has not chipped off. If it has, it could cause the coils to subsequently short-circuit when wound very closely together. Silk and cotton covered wire is not recommended, due to the heat that can be generated in the coils.

When using the balun for the first time, check its warmth from time-to-time to ensure that it's not overheating. Provided the balun is used in the shack, ventilation holes may be cut in the side of the film canister to provide cooling.

### Location of the Balun.

If located at the mast-head, the balun must, of course, be well weather-proofed. Using this balun, I have found that self-amalgamating tape firmly holding the canister lid to the canister, with polyurethane lacquer or silicone grease over the brass terminals, and the SO239 plug and socket provide adequate protection. PW

### Suggested further reading

Radio Communication Handbook, RSGB  
HF Antennas L.A. Moxon G6XN, RSGB.

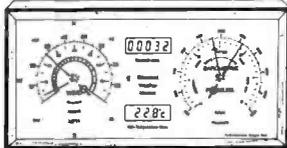
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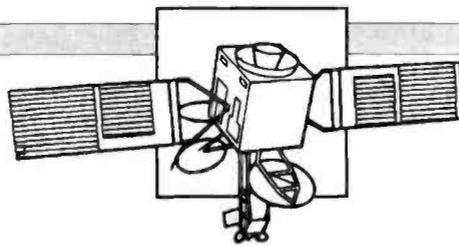
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# SATELLITE SCENE

by Pat Gowen G3IOR

Musa U2MIR, as shown in the photograph of Fig. 1, has been very active on amateur radio and celebrated his fortieth birthday during the past month. A noticeable hush occurred over the period of the PROGRESS-M-7 docking problem. This is when the enormous and sustained solar flux and magnetic storms of late March gave intermittent and irregular drag and navigating factors, giving rise to a 'near miss' with the supply vehicle. It is believed that PROGRESS-M-7 was carrying a brand new donated Icom 70cm handy-talkie.

## MIR Operations

Although not so active on speech f.m., Musa has been seen on 145.550MHz and very busy on 145.325MHz Packet using F3NW-2 as a mailbox, to and from which some surprising content has been effectively loaded, despite the constant horde of callers. On one occasion he was seen



Fig. 1.

*This month, Pat looks at the final days of the SAYLOT space station and looks forward to the JUNO space mission which will have a UK cosmonaut aboard.*

to be passing MIR amateur radio magazine content. On another he was sending out his own spacecraft's Keplerian element sets! Future and current crews are considering ways of using one or two specified BBSs in each country, from which they can effectively upload and download messages. If this becomes possible, you would put your brief message to Musa on say, GB7XXX, and check it out later for a reply.

Regarding the problems we have in getting QSOs with U2 and U9MIR from areas with high v.h.f. f.m. activity, when the normal 145.550MHz simplex frequency is blocked, I have made a few recommendations for Boris to put to Musa, including the use of split-frequency or even split-band operation. Boris will discuss this with the crew over the v.h.f. 143.625MHz non-amateur radio link, and explore the possibilities.

Another way is to organise ourselves so that everyone can get a brief QSO. This was recently done in Hawaii, after difficulty had been encountered during early packet con-

**Tim Mace  
GB2MIR  
AND Helen  
Sharman  
GB1MIR,  
ready for lift-off.**



tacts. To overcome this, Joe Weite KH6GDR suggested parcelling out time slots in a manner that would make best use of the geographical location of each ground station. As a result 16 full two-way f.m. voice contacts were conducted with U2MIR in an 11 minute pass. The stations worked were: WA6EMV, NH6XW, NH6VT, AH6HU, K6WR, WH6CJO, NH6RY, KA6NEI, KH6GDR, WY0H, KZ0A, KJ9U, AH6GR, NH6UY, KH6GPI and KH6QR. The motto is that whilst mutual co-operation can work for the benefit of all, indiscriminate competition is mutually destructive!

Meanwhile, the next MIR crew have been preparing for the flight, and will be there soon after you read this news. Sergej, who was U5MIR in 1989, and mission commander Anatoly, spent half a day with Boris UW3AX. They were given a full training session on voice and packet amateur radio communication, using the duplicated MIR station set up in Boris's office at *Radio Magazine*, from where they sent a packet radio greeting to their friend Musa. Both Anatoly and Sergej are very enthusiastic about amateur radio, so, with the cosmo-

nauts of the standby crew also having had training sessions on amateur radio, this now gives the golden opportunity to have MIR on the air for all of 1991. Like Musa, now UV3AM, Sergej has applied for his home license also.

Anatoly and Sergej are planned to take the British cosmonaut Helen Sharman to MIR by SOYUZ on May 12, and Musa and Victor will accompany her back home to Earth on May 20. Helen will be using the MIR amateur radio station during her visit with the callsign GB1MIR/U. She'll also have training in techniques on the simulator with Boris before her flight, as will stand-by UK cosmonaut Tim Mace, who has the callsign GB2MIR/U.

Richard Horton G3XWH and myself are involved in the co-ordination of the 'JUNO' project from Britain, which incorporates an educational mission designed for making contacts and responding to questions from some nine schools around the UK. They have been supplied by our highly co-operative Radiocommunications Agency with special callsigns as GB0JUNO

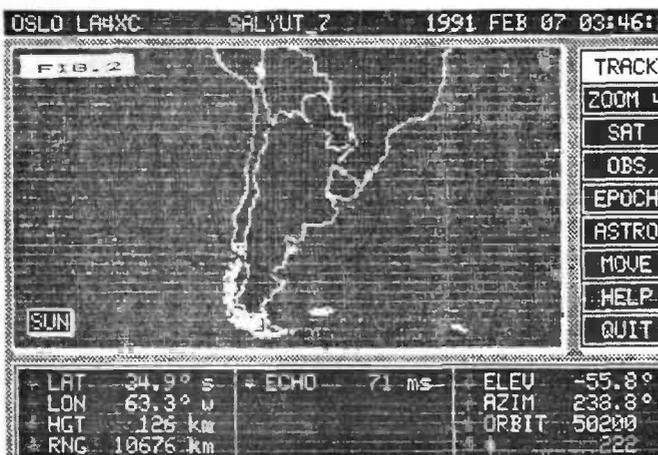


Fig. 2.

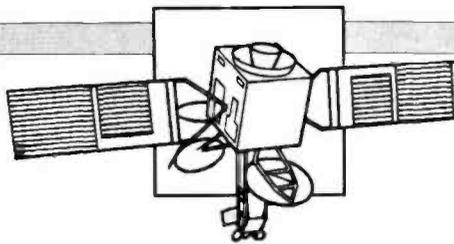


Fig. 3.

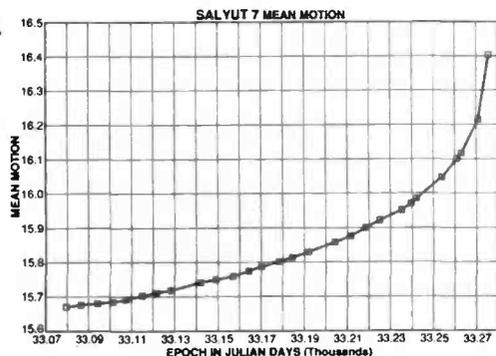


Fig. 4.

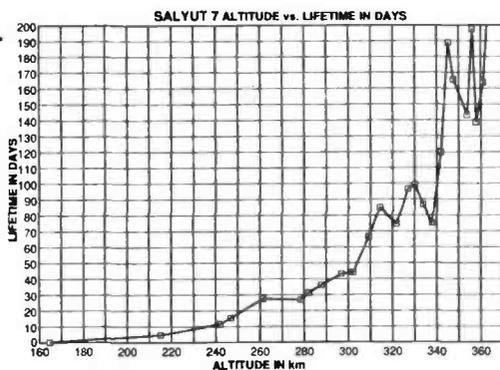
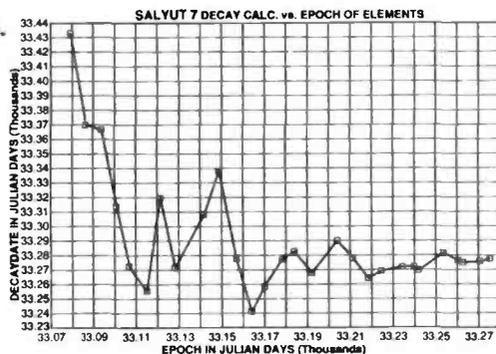


Fig. 5.



(G3XWH) at Harrogate Ladies College, GB1JUNO (GW7EPO) at Bigyn County Primary School in Llanelli, GB2JUNO (GM0MYV) at Alford Academy, Alford, Aberdeenshire, GB3JUNO (G0KRU) at Hewett School, Norwich, GB4JUNO (G4SOT) at Canterbury High School, GB5JUNO (GI7CMC) at Belfast Royal Academy, GB6JUNO (G1ZHH) at Looe School Sunrising, GB7JUNO (G7CND) at the Royal Grammar School, Guildford, and GB8JUNO (G4YQC) at Orwell Park School, Ipswich.

It's hoped they'll have time available in the very busy work and schedule rota to try to communicate

with amateurs in general, and perhaps to perform a few interesting propagational experiments with ground listeners.

### The New Satellites

Although RS-14/OSCAR-21 began in grand style with the RUDAK Speech Synthesiser announcing in the voice of 'Hal' (the paranoid computer from 2001, *A Space Odyssey*) that all systems were in perfect working order. Apparently due to an erroneous master command, it now appears that the -12dB receiver input attenuator pads were accidentally switched in. Several attempts were made by

AMSAT-DL and AMSAT-U-Orbita to drive a signal into the deaf receiver to command full input sensitivity by using over 10kW e.i.r.p. via a large moonbounce dish, but all failed. It is believed that the attenuator insertion switch has locked in, thus denying command signal access.

Other than the 145.820MHz c.w. beacon, which has been used to provide valuable diagnostic information, the system is quite dead, with no transponder and no RUDAK up to the end of March. A new command system is now underway that should bring OSCAR-21 back to life, but, if this fails, then the COSMOS control may be asked to use their override system to get things back to normal once more.

### RS-12/13

This brand new satellite pair also hit a problem when first placed into operation in Mode A. The sharing COSMOS NAVSAT transmitting on 149.9MHz broke into the 145MHz transponder and ROBOT uplink receivers, completely blocking them for uplinking stations. All that could be heard, was the ROBOT's continuous carrier and RTTY-like transmissions over all of the 29MHz downlink passband. On Wednesday March 21 Leo RA3AT, head of the command station RS3A, promptly switched RS-12 into Mode KT, where it's to stay for the foreseeable future. It is functioning perfectly, with very strong downlinks in both the 28 and 144MHz bands. It is an ideal satellite for the h.f. operators, who will be able to continue to work DX even when the 21 and 28MHz bands are otherwise dead, and to work inter-continental DX via the satellite whilst the bands are on the edge of the m.u.f., as the re-angulation, whilst insufficient for direct terrestrial QSOs, is often adequate for the low satellite angular incidence to the ionised layers.

The net result is one of the most interesting, most effective, providing the best DX and easily accessible systems ever known, with a host of both old and new satellite users coming up on the 21 to 19/145MHz transponder. In the first few passes of active operation I worked DK1MO, DK4ZK, DK6DBN, ES4RR, EA5FA, F6EMT, G3BGM, G3CAG, G3CQE, G3LDI, G4CUO, G4LWM, G4MQK, G4RRX/M, IK4HDO, LZ1JH, OE1LM, OH5LK, PA0COB,

PA0HOP, SM0KV/0, UO5OKW, UA1NA, UZ3WZZ, UK4PAX, WA1JUV, W3QBK, ND0F, and best of all, ZL2APM for the very first G:ZL and antipodal satellite QSO.

Yes - it IS possible, by carefully selecting mid-way mutual sub-horizon passes on the grey line, and employing the ducting possible at both 21 and 29MHz! Passes between 3 to -45° elevation can be used by those with low angle intercept antennas such as high beams, etc.

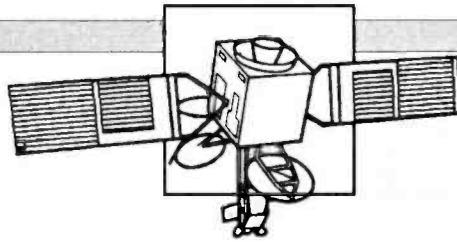
The frequencies are marginally different in space vacuum to those measured while under test on Earth. The 144MHz c.w. telemetry beacon is on 145.9132MHz, shifting from 145.9164 to 145.9100 during an overhead pass. The 28MHz band beacon shifts from 29.4086 to 29.4074MHz, and the h.f. ROBOT downlink from 29.4549 to 29.4535MHz. The 144MHz ROBOT downlink goes from 145.9627 to 145.9563MHz.

### ROBOT Calling

The ROBOT calling frequency is 21.1297 +/- with only 0.45kHz of Doppler shift. As the frequency is 3.2kHz wide it gives only the problem of access, it being a little 'deaf' at this time. A signal of 100W e.i.r.p. at high angle passes will enter it readily between 6 and 40 w.p.m. c.w. by calling 'RS12 de G3XXX AR' where G3XXX is your callsign, and the 'AR' is barred, if you send good, properly spaced, Morse with no QSB cut outs and no QRM additions.

The transponder input from 21.210-21.250MHz will give a 29.411-29.451MHz return, with only some 0.9kHz of combined Doppler shift. With this translation, e.g., add 8.201MHz plus or minus 0.45kHz to your uplink frequency and you have your corresponding downlink. This will help those who have a single transceiver and thus cannot receive on 29MHz at the same time as they transmit on 21MHz.

To find the exact 144MHz band downlink frequency for the same 21.210-21.250MHz uplink input range to give a downlink from 145.9167-145.9566MHz at TCA, allowing for the +/-3.5kHz additive Doppler shift maximum found on an overhead pass, e.g., you should add 124.7067MHz +/- 3.5kHz to your uplink frequency. You'll then have your downlink translation. The total



passband, given as 40kHz, is in fact at least 70kHz wide, although at reduced transponder sensitivity and output efficiency.

### SALYUT-7 Re-Entry Contest

Harry LA4XC, who came close to winning our recent contest, sent in the decay graphs, Figs. 2 to 9, which tell the whole story of SALYUT-7's re-entry. Fig. 2 shows the computerised exact spot and time of re-entry. The graph, Fig. 3 is the mean motion through plot times of the fundamental Julian day since 31 December 1899, a fairly smooth decay as may be expected. The graph, Fig. 4 showing the altitude against the lifetime in days is unexpected, as a marked number of anomalous deviations of height may be seen. The decay, calculated against the element epoch in Fig. 5, shows some fascinating departures from the 'norm', as does Fig. 6, the calculated decay to the lifetime, and Fig. 7, the calculated altitude and decay date. More surprising is Fig. 8, which shows notable changes of inclination in the decay period observed, which may just be Lunar and Solar effects. Perhaps the most surprising is Fig. 9, the eccentricity graphed against the nodal period. I would expect a gradual near linear curve to circularity with time, but, this is seen not to be so, with some notable increases of eccentricity clearly seen. Do we now have to compensate our pass time calculations for the effects of the Moon and Sun, and are there others that need to be considered also?

It all shows what can be done by way of research by using the data derived from the Keplerian elements of our satellites.

Remember, if you need the latest updated Keplerian element sets for all of the manned, weather, general interest, amateur OSCARs, RSs and microsats, then just send in a large s.a.s.e. marked 'Keplerian Elements PSE' to Sharon at *Practical Wireless*, who will mail you a copy back by return of post.

### Phase III Satellites

Currently, OSCAR-10 is not receiving sufficient solar panel illumination to support even the beacon, let alone the transponder, and we must NOT attempt to use it until further notice. This period of dormancy is

expected to last for several months, after which it will once again be released for general use.

On March 27, OSCAR-13 was scheduled for a reorientation to target of BLON 180 and BLAT0, but the severe magnetic storms effected the programme, and an emergency schedule of having the transponder off from mean anomaly 220 to 035 and on Mode B only from 035 to 220 was dictated. From current to 19 June 1991 the transponder operational schedule is expected to be:

Mode B: MA 000 to MA 095. Mode JL: MA 095 to MA 125. Mode LS: MA 125 to MA 130. Mode S: MA 130 to MA 140. Mode BS: discontinued. Mode B: MA 140 to MA 256. For the eclipse period from May 22 to June 24 it may be off from MA 200 - 035 to conserve power. The omnidirectional antennas will be used from MA 240 to 030. Mode BS is discontinued, because Mode S operation while the Mode B transponder is active, has been found to be impractical due to interference from Mode B users.

Some fascinating DX has been on OSCAR-13, viz BV6JV, VQ9CQ, ZF1RC, etc., and signals have been excellent, fully audible on simple ground plane and mobile whip antennas.

### FUJI-OSCAR-20

Dave Rowan G4CUO, makes the most of FO-20, and has now worked all states and North American call areas. Recent additions to his DX include KB5KJ in Arkansas and SV8RV. More recently he and G4ZHG have been using FO-20 as a cross satellite bridge to work distant DX stations, by going into RS-12 on 21.230MHz i.s.b., via the 145.930MHz output to FO-20 which then produces its output on 435.860MHz u.s.b., all plus and minus a little differential Doppler.

### Othersats

Well, I've not mentioned anything about RS-10/11, the UoSATS, the microsats, the problems with these and DOVE, nor of any of the awaiting constructional data, nor of the interesting satellite propagational abnormalities evidenced this past month, because there was so much other news. Perhaps I'll find room for this next month, when we have more space for 'Space'. PW

Fig. 6.

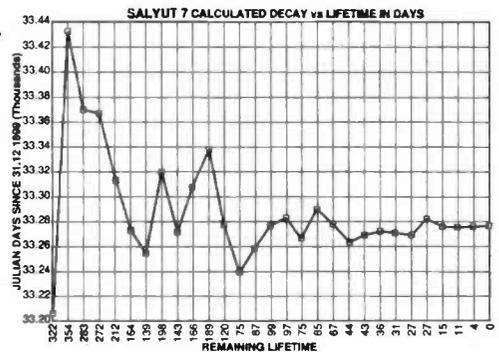


Fig. 7.

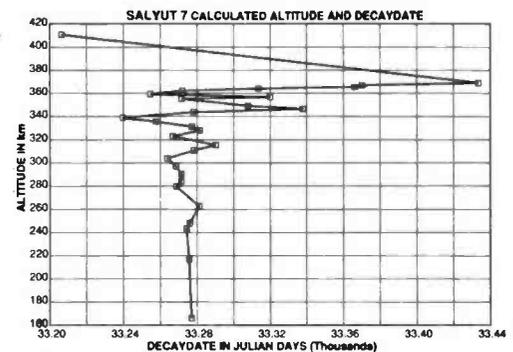


Fig. 8.

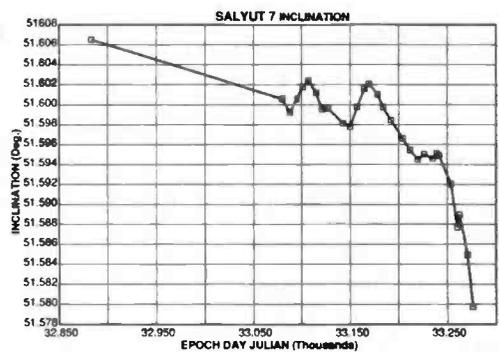
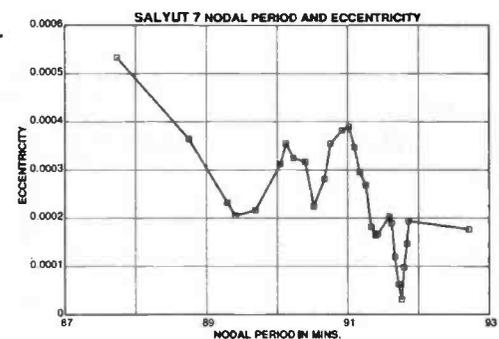


Fig. 9.



# Reflections

*This month Ron Ham takes a look into the archives and finds an interesting comparison 100 years apart!*

For some years Joan and I have been members of the West Sussex Archive Society and spend at least one or two days per week researching early papers in the County Record Office at Chichester. One of my voluntary jobs is to word process transcripts of original documents, such as letters to and from important people who lived in the 19th century. For the past nine months I have been dealing with the private letters of Richard Cobden, at one time an MP for the Manchester area. Keeping in mind that this man was 'there at the time' and without the benefit of hindsight he wrote to another former MP, Bright, in September 1858, about some sad cases of consumption (tuberculosis) and said, "What is the use of all modern



Fig. 1.



Fig. 2.

appliances, such as steam and electric telegraphs for lessening distant separation, if they are not available in a case of life and death like this?"

## Into Space

Almost 100 years later, in October 1957, when the Soviets placed the first satellite, *Sputnik 1*, into earth orbit, there were complaints about wasting money on space research when so much was still needed on earth, what use is it all, etc. To the technically minded, especially radio enthusiasts and astronomers, it came like a bolt out of the blue, because, at that time, radio was partially in the doldrums. The transistor revolution was in its infancy, and thermionic valves were still being used for domestic radio and television receivers.

Suddenly there was something new and everyone was keen to hear this 84kg sphere, with its four antenna sections unfolded, transmitting 'bleeps' around 20 and 40MHz. Words like apogee and perigee, inclination, launch-time and orbital-time, telemetry and windows became a more familiar part of our language. Now, a mere 33 years later, there are hundreds of communications, military and scientific satellites in daily use. Space stations are in position, and man has explored parts of the moon several times. Unmanned space-

craft have landed on the planets Mars and Venus, while others have sent back pictures from the extremes of our solar system. As the recent Gulf war showed, the world is now a very small place with instant coverage of 'as it happens' news and reports on events.

## Allied Interests

"I hope one day to be able to combine my boyhood hobby of astronomy with my amateur radio and do some work in this direction," wrote Alan Gale G4IMV from Rochdale. Many readers think like you do Alan, and along with astronomy goes computing, engineering and photography. Each allied to one another and to some aspects of the art of radio-communications. Amateurs have a fine record of work in each of these fields. So, why shouldn't we chat about them in future episodes of this column? While on the subject of other interests, I spent Easter Sunday afternoon at nearby Parham House taking photographs of the official opening of 'Veronica's Maze', which had been built during the winter months. The new Maze at this Elizabethan house was opened by Simon Brett of Thames Television to a musical fanfare from the Horsham Borough Silver Band. Among the bandmen present was Mike Levett G4TSQ, from Yapton, seen in action in Fig. 1.

## New Instruments

Although a member of the British Astronomical Association, I am basically an 'armchair' astronomer. With my fascination for instruments, I now have a couple of new and useful tools in my office such as a 'Stellarscope', Fig. 2 and a 'Galilei' clock, Fig. 3. Both are available from the Armagh Observatory at £12.95 and £29.95 respectively. The Stellarscope is user friendly. There are optional starmaps for the northern or



Fig. 3.

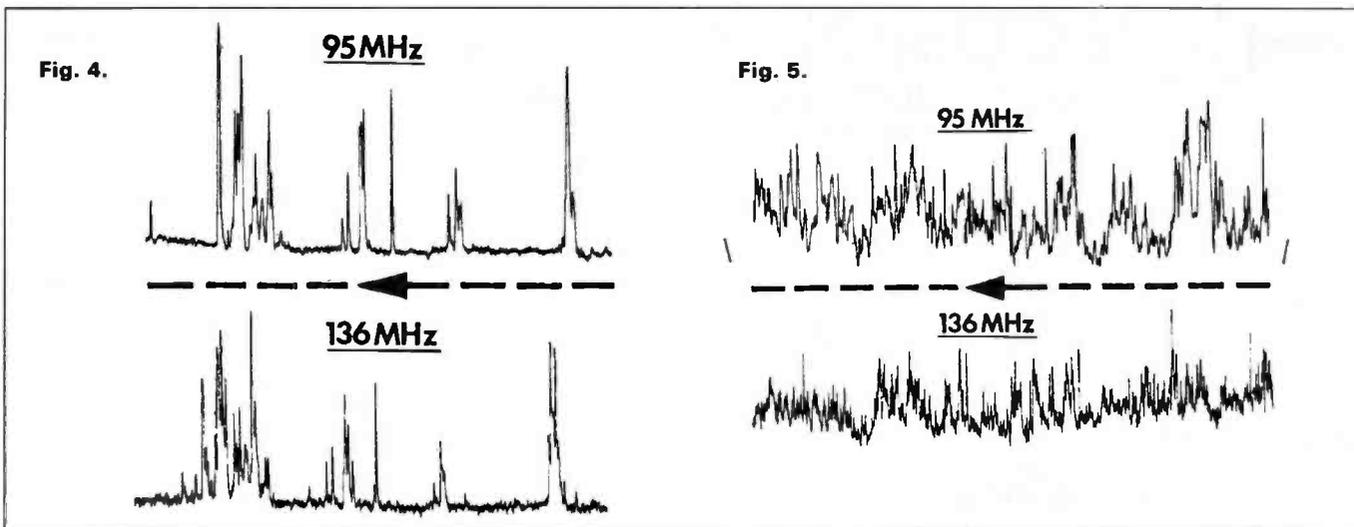
southern hemispheres which have been computer generated with the help of the French Geographical Institute (IGN). Whichever map is fitted in the 'month' end of the tube, can be viewed by using it like a telescope and adjusting the thinner end for focus. The time and date are selected by adjusting the left and centre rotatable tubes.

The Galilei clock, powered by one 1.5V AA cell, has a 111mm diameter luna map on the top with a revolving half casing which automatically gives the current phase of the moon.

Just below the main time scale, on the base plate, is a calendar with a sliding window for accurate setting. A clock such as this will indicate when the moon is going to be too bright for auroral or meteor observation, or what area you can expect to observe on its surface at a given time. The lunar face is a photograph which has north at the top showing the Mare Frigoris with Mare Crisium on the right and the Flamsteed's crater area in the Oceanus Procellarum on the left.

## Radio Astronomy

In recent years, I've written in both *PW* and our sister journal *Short Wave Magazine* about building and using a simple radio telescope for Practical Wireless, June 1991



observing the sun. Apart from the astronomical interest in studying the variable behaviour of our nearest star, it's useful to the propagation enthusiasts to know when the sun is emitting radio waves. Briefly, these waves are a warning that the sun is active and that streams of charged particles are being ejected. As in the case of light, the former requires only 8.3 minutes, but the latter can take more than 20 hours to cross the 93 million-mile gap between the sun and the earth's orbital path.

As some of you already know, the instrument I built in 1968 worked almost daily until 1984. In that time I proved that, as the textbooks say, the sun is a very powerful transmitter of radio waves, around 150MHz, when sunspots are present. Generally, these waves come in two forms. They arrive in individual bursts lasting from 0.5 to 10 minutes, Fig. 4, or in the form of continuous noise, Fig. 5, which can last for several hours or even days. The left-facing arrow in both Figs. 4 and 5 indicates the direction of chart movement and the 'quiet' receiver background noise line can be seen, between the solar bursts, in Fig. 4.

When using a radio telescope it is sensible to monitor the sound to make sure that no terrestrial signals, interference or otherwise, are causing false readings on the instrument's recording chart. My telescope observed at 95 and 136MHz, because solar noise covers a band-width and sounds like the sea rolling across the shore. It has also been described as 'whoOOooshing', 'hissing' and, as Fred Pallant G3RNM (Storrington) remarked in his recent beacon log, like 'high pressure steam'.

### Dedicated Equipment

The basic requirements for a simple solar radio telescope are a Yagi type antenna directed toward the sun, cut to the observational

frequency, and a v.h.f. converter tuned to the observational frequency with a known i.f. output. You'll also need a communications receiver which can tune to the i.f. output from the converter (the receiver also provides an audio monitor), a d.c. amplifier (741 op. amp. chip) to amplify the detector voltage from the communications receiver sufficiently to drive a pen recorder and a time switch. This is to operate the instrument if you are not there. The pen zero control is connected to the d.c. amplifier. Before any of you embark on such a project, remember that recording chart is expensive. You can record for days or sometimes weeks, especially at the low end of the sunspot cycle, without any results. You can end up with just a line of receiver noise drawn on your chart.

An old friend and regular contributor to my columns is **Cmdr. Henry Hatfield** (Sevenoaks) who, some years ago, built a spectroheliograph. This enables him to observe and record activity, such as flares, filaments, prominences and 'hot-spots' on the sun's surface. His fascinating work is typified by the photograph, Fig. 6, he took at 1617 on 31 August 1989, of gas clouds rising above the sunspots. His observatory would not have been complete without the pair of radio-telescopes which he built to monitor the sun's output at 136 and 1297MHz.

### Important Observations in March

Something big happened on March 25! We know this because regular 28MHz beacon watchers including Chris van den Berg (The Hague), Gordon Foote (Abingdon), Henry Hatfield, Ted Owen (Maldon), Fred Pallant, Ted Waring (Bristol) and Ern Warwick (Plymouth), all used to logging world-wide beacon signals on a daily basis, found the band almost dead. "Nothing, but solar

noise - no beacons - not even any QRM!" were the remarks attached to Fred Pallant's log. I think we can blame the sun for this because, during the month Henry Hatfield observed one sunspot group, 14 filaments, seven quiescent prominences and a small flare on the sun's disc at 1430 on the 8th; 4grps, 14fs, 7qps at 0956 on the 18th; "one huge spot and about seven smaller ones" seen despite cloudy conditions at 1115 on the 22nd; 2grps, 8fs, 9qps and a medium flare at 1156 on the 25th; 4gps, 13fs, 5qps and slight activity on the east-limb at 1200 on the 29th and 4gps, 12fs and 6qps at 1153 on the 30th. In addition he recorded bursts of solar radio noise at 136MHz on days 4, 7, 12, 15, 16, 17, 20, 26 and 29th and a continuous noise storm on days 21, 22, 23, 24 and 25th. His second radio telescope, working at 1297MHz, recorded bursts on the 4, 12, 16, 24 and 25th.

With his projection apparatus, Ted Waring, counted 10 sunspots on on the 1st, 47 on the 13th and 36 on the 23rd and reports seeing a "long straggling group on central

meridian (c.m.) on the 13th" and a "complex sunspot group with 'M' shaped umbra near c.m. on the 23rd". Ern Warwick reports surging background noise, most likely solar, on 28MHz at 1035 and 1230 on the 23rd and at a high level again around 1600 on the 24th. He also heard the German beacon, DK0WCY, on 10.144MHz give weak auroral warnings between 0930 and 1100 and 1700 and 2000 on the 24th and from 1600 to 1930 on the 25th. In addition Ern noted echoing on the signals from the United States beacons, WA4DJS, on the 11th and 24th and W3VD on the 19th and fast-fading on the signals from the African beacons ZS5VHF and Z21ANB on the 16th and echos on Z21ANB on the 24th. David Glenday (Arbroath) logged unidentified pictures on Ch. E2 (48.25MHz) during 'F2' openings early on the 3rd and the 11th.

It's a good idea to compare these reports with your own logs, and keep in mind that any of these events can happen when sunspots are present.

PW



Fig. 6.

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20MRK	HF2V 20m Add on Kit	£33.50	£2.00
30MRK	HF2V 30m Add on Kit	£33.50	£2.00
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1540D	Cushcraft 15-40D 4E1 15m Beam	£140.00	£8.00
203CD	Cushcraft 20-3CD 3E1 20m Beam	£236.91	
204CD	Cushcraft 20-4CD 4E1 20m Beam	£326.70	
215WB	Cushcraft 15E1 2m Yagi Antenna	£98.99	£8.00
4218XL	18 Element 2m Boomer	£121.90	£8.00
A3SS	Cushcraft 3 Ele Tribander SS	£324.02	
A4S	Cushcraft 4 Ele Beam Antenna	£281.85	
A5-6	Cushcraft 6m 6 Ele Beam Antenna	£182.51	£8.00
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MFJ422BX	Electronic Morse Keyer W/O Bencher	£78.48	£3.00
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MFJ901B	200 Watt ATU	£70.05	£2.50
MFJ931	Artificial Ground	£88.61	£3.50
MFJ941D	300 Watt Basic Tuner	£105.40	£3.50
MFJ945C	Versa Tuner 1.1 Mobile	£91.71	£3.50
MFJ949D	De Luxe 300W ATU	£168.82	£3.50
MFJ982B/C	1.5kW ATU	£256.84	
MFJ986	1.5kW Roller inductor Tuner	£278.82	

## LOADS & SWITCHES

Item	Description	Price incl. VAT	P/P
T35	Toyo 30W 1-500MHz Dummy Load	£10.20	£2.00
T100	Toyo 100W 1-500MHz Dummy Load	£45.00	£2.00
T200	Toyo 200W 1-500MHz Dummy Load	£84.00	£2.00
DL1	Texpro 1.5kW 160-10M Dummy Load	£75.00	£2.00
KS 2	Koyo Coaxial switch 2 way 1.0kW	£28.89	£2.00
S20N	Koyo Coaxial Switch 2 way 1.0kW 1-1000MHz 'N'	£32.86	£2.00
SA 450M	Toyo Coaxial Switch 2 way 2.5kW 1-1500MHz SO239	£18.50	£2.00
SA 450N	Toyo Coaxial Switch 2 way 2.5kW 1-500MHz 'N'	£28.00	£2.00
DRAE UHF	UHF 3 position Antenna Switch 'N'	£24.15	£2.50
DRAE VHF	VHF 3 position Antenna Switch 'SO239'	£18.89	£2.50

## VSWR/POWER METERS

Item	Description	Price incl. VAT	P/P
W180	Koyo 15/60W 2m In-Line VSWR	£32.91	£2.00
W544	Koyo 7/40/400W 140-460MHz	£107.00	£2.00
W560M	Koyo 3/20/200 1.8-520MHz	£99.90	£2.00
W570	Koyo 5/20/200 1.8-1300MHz	£124.76	£2.00
K 20	Koyo 15/50W 2m	£24.60	£2.00
K 100	Koyo 2kW 1.8-60MHz	£79.98	£2.00
K 200	Koyo 200W 1.8-60MHz	£61.55	£2.00
K 400	Koyo 200W 140-525MHz	£63.65	£2.00
YM 1E	Toyo 120W 3.5-1500MHz	£32.00	£2.00
T 435	Toyo 200W 2m & 70cm VSWR/Wattmeter	£87.77	£2.00

## WIDE BAND ANTENNAS

Item	Description	Price incl. VAT	P/P
AH 7000	Discone 25-1300MHz	£82.00	£4.00
YADC 2	Discone 14-1300MHz	£78.00	£4.00
OSC 8	Discone TX/RX 70-680MHz	£23.95	£4.00
SC3000	Discone 300-512MHz	£63.99	£4.00

## ICOM

Item	Description	Price incl. VAT	P/P
IC-751A	HF All Band General Coverage Rx 12V	£1500.00	-
IC-735	HF All Band General Coverage Rx 12V	£376.00	-
IC-726	HF All Band General Coverage Rx + 6m	£369.00	-
IC-725	HF All Band General Coverage Rx 12V	£758.00	-
IC-505	6M Transceiver, SSB/CW 12V	£529.00	-
IC-25E	2M FM Handportable with Nicad/charger	£275.00	-
IC-25ET	2M FM Handportable Keypad entry DTMF	£295.00	-
IC-2GE	2M FM Handportable with Nicad/charger	£265.00	-
IC-228E	2M FM Mobile 25W 20 Memo 12V	£365.00	-
IC-228H	2M FM Mobile 45W 20 Memo 12V	£385.00	-
IC-290D	2M SSB/FM/CW 25W 5 Memo 12V	£559.00	-
IC-275H	2M Transceiver SSB/FM/CW 100W 12V	£1,038.00	-
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IC-45ET	70CM FM Handportable Keypad entry DTMF	£310.00	-
IC-4GE	70CM FM Handportable inc Nicad/charger	£299.00	-
IC-R100	Wideband Receiver	£499.00	-
IC-AT150	Automatic Antenna Tuner 100W	£329.00	-
IC-AT500	Automatic Antenna Tuner 500W	£529.00	-

## KENWOOD

Item	Description	Price incl. VAT	P/P
TS960SD	NEW Transceiver	£3,199.00	-
TS940S	9 Band TX General Cover Rx	£1,995.00	-
AT940	Auto/ATU	£24.88	-
TS140	HF 9 Band Gen Cov TX/Rx	£862.00	-
TS680S	HF/6m TX Gen Cov. Rx	£985.00	-
TS440	9 Band TX General Cov. Rx	£1,138.81	-
PS50	Hi/Duty PSU	£222.49	-
AT230	All Band ATU/Power Meter	£208.87	-
TH25	NEW 2m H/Held	£238.00	-
TH45	NEW 70cm H/Held	£289.00	-
TH75	NEW 2m/70cm H/Held	£398.00	-
TH205	2m H/H	£215.26	-
TH215	2m H/H Keyboard	£252.13	-
TR151	2m 25W MM Mobile	£389.00	-
TM701	NEW 2m/70cm FM Mobile	£489.00	-
TM721	2m/70cm FM Mobile	£675.00	-
TM231E	NEW 2m FM Mobile 50/10/5W	£289.00	-
TM431E	NEW 70cm FM Mobile 35/10/5W	£318.00	-

## TEN TEC (U.S.A.)

Item	Description	Price incl. VAT	P/P
TT 562	Omni V HF Transceiver CW/SSB/FM 200 9 bands	£1,900.18	-
TT 585	Paragon General Coverage HF Transceiver 200W	£1,839.00	-
TT 561	Power Supply for Omni, Paragon	£215.00	-
TT 282	6.3MHz 250Hz Filter	£80.00	£2.00
TT 285	6.3MHz 500Hz Filter	£60.00	£2.00
TT 288	6.3MHz 1800Hz Filter	£60.00	£2.00
TT 1140	Circuit Breaker	£18.00	£2.00
TT 217	90MHz 500Hz Filter	£80.00	£2.00
TT 218	90MHz 1800Hz Filter	£80.00	£2.00
TT 219	90MHz 250Hz Filter	£80.00	£2.00
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TT 234	Ten Tec ATU 2.0kW 'L' match 160m-10m	£361.69	-
TT 258	Ten Tec ATU 200W 'T' match 160m-10m	£153.33	£3.50

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FT1000	HP Transceiver	£2,995.00	-
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FNB10	Nicad Battery Pack (23/73)	£34.50	£2.00
FT736	2/70cm 25W Base Station	£1,359.00	-

## ROTATORS

Item	Description	Price incl. VAT	P/P
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CD4511	Hy Gain for up to 8.5 sq. ft. wind load	£238.80	-
HAM4	Hy Gain for up to 15 sq. ft. wind load	£325.80	-
T2X	Hy Gain for up to 20 sq. ft. wind load	£389.00	-
2303	9W King Light Duty Rotator	£339.89	£4.50
G400RC	Yaesu Round 360° metre	£189.00	£5.00
G600RC	Yaesu Round 360°	£219.00	£5.00
AR200XL	Offset lead unit, 3 wire, rotary dial control	£49.50	£4.00
G250	Yaesu twist and switch control	£78.00	-
KS050	Kenpro Stay Bearing	£18.95	£4.00
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WR268	IRWELL (r.f. p.a.)	FEB 90	6.12
WR264	IRWELL (relay)	FEB 90	5.10
WR263	IRWELL (vfo)	JAN 90	6.12
WR267	FORTYNINER	JAN 90	6.12
WR266	TUNED ACTIVE ANTENNA	JAN 90	5.71
WR265	TUNED ACTIVE ANTENNA (psu)	JAN 90	5.71
WR262	REPEATER TIME-OUT	DEC 89	4.92
WR261	AM TX FOR 1.8MHz	NOV 89	6.63
WR260	10MHz RECEIVER	OCT 89	5.10
WR259	10MHz RECEIVER	OCT 89	5.10
WR258	10MHz RECEIVER	OCT 89	5.10
WR257	LOW BATTERY WARNING	SEPT 89	6.00
WR256	ACTIVE FILTER	AUG 89	7.10
WR254	TX CONTROL FOR MOBILE USE	JULY 89	5.18
WR253	TS940S MODIFICATION	JUNE 89	5.65
WR252	TWO TONE OSCILLATOR	MAY 89	6.65
WR251	RF OPERATED RELAY	FEB 89	3.87
WR250	DC/AC POWER CONVERTER	JAN 89	3.29
WR249	"MARLBOROUGH" MF CONVERTER	DEC 88	4.70
WR248	"BADGER" 144MHz RECEIVER	OCT 88	9.29
WR244	PRACTICE MORSE KEY	JULY 88	3.02
WR245	STOPBAND FILTER FOR PW BLENHIEM	JUNE 88	2.96
WR243	VHF MONITOR RECEIVER (AUDIO)	APRIL 88	2.35
WR242	"ORWELL" VARICAP TUNE OPTION	MAR 88	6.12
WR241	"ORWELL" MED. WAVE RECEIVER SET	MAR 88	
WR240	"	"	9.29
WR239	"	"	
WR238	"OTTER" 50MHz RECEIVER	JAN 88	7.25
KANGA	HIGH STABILITY VFO (see issue)	OCT 87	-

Board	Title of Article	Issue	Price £
WR236	"BLENHIEM" VHF CONVERTER	SEPT 87	7.14
WR235	MAINS ON/OFF FOR BATT RADIOS	SEPT 87	3.05
WR234	SIDE-TONE OSCILLATOR	JUNE 87	2.75
WR232	"AXE" SIGNAL TRACER	MAY 87	
WR231	"	"	9.40
WR230	"	"	
WR228	"BLANDFORD" RECEIVE CONVERTER	APRIL 87	
WR227	"	"	9.90
WR226	"	"	
WR298	"ITCHEN" LCR BRIDGE	APRIL 87	5.97
WR225	"WOODSTOCK" SW CONVERTER	MAR 87	4.18
WR219	MASTHEAD PRE-AMP PSU	FEB 87	2.55
WR218	MASTHEAD PRE-AMP FOR 144MHz	FEB 87	4.28
WR224	"WESTBURY" BASIC WOBBLATOR	JAN 87	3.57
WR214	MOD SRX-30D (AUDIO)	DEC 86	3.05
WR223	HIGH-IMP MOSFET VOLTMETER	DEC 86	2.96
WR222	"TAW" VLF CONVERTER	NOV 86	5.92
WR216	LF BANDS ACTIVE ANTENNA	NOV 86	2.44
WR220	GET STARTED LOW-COST CONVERTER	OCT 86	2.44
WR215	SIMPLE 50MHz CONVERTER	SEP 86	3.67
WR213	MOD FRG-7 (CARRIER Osc)	JUN 86	2.75
WR210	"ARUN" PARAMETRIC FILTER	MAY 86	8.27
WR211	"MEON" FILTER (SMALL)	APR 86	3.16
WR209	SIMPLE AUDIO OSCILLATOR	MAR 86	4.38
WR208	RF SPEECH PROCESSOR	MAR 86	4.18
WR207	CRYSTAL CALIBRATOR	JAN 86	2.13
WR205	RTTY/MORSE MODEM	JAN 86	5.51
WR203	SIMPLE CAPACITANCE METER	OCT 85	2.85
WR199	"MEON" 50MHz TRANSVERTER	OCT 85	6.83
WR202	ECONOMY UHF PRE-SCALER	SEP 85	3.77
WR201	ADD-ON BFO	AUG 85	2.55
WR200	LOW-COST CRYSTAL TESTER	JUL 85	2.55
WAD302	BATTERY CHARGER CONTROLLER	JUN 85	3.05
WR197	"COLNE" (Osc/Converter)	JUN 85	3.98
WR198	"COLNE" (Product Det/Audio)	MAY 85	3.98
A005	"COLNE" (VFO)	APR 85	3.16
A004	"COLNE" 3.5/114MHz RX (RF Amp)	APR 85	3.16
WAD249	MOD FRG-7 (BFO)	FEB 85	3.05
WAD280**	TRIANGIC KEYS	FEB 85	7.25
WA002	"TEME" (RECEIVER)	JAN 85	6.68
WA001	"TEME" (VFO/DOUBLER)	DEC 84	5.29
WR178	DART (Audio / change)	DEC 83	3.05
WR177	DART (p.a.)	NOV 83	3.05
WR176	DART (v.f.o.)	NOV 83	3.05
WAD246	"DART" FOLLOW-UP	DEC 84	4.07
WR196	"TEME" 7/14MHz WRP (TX)	NOV 84	3.77
WR195	STABLE TONEBURST	NOV 84	2.65
WR189/92 Pair	BUG KEY WITH 528-BIT MEMORY	OCT 84	8.68
WR185	AUTO-NOTCH FILTER	JUN 84	6.63
WR183	TOP-BAND DF RECEIVER	APR 84	6.63
WR179	TRANSCIEVER VOX UNIT	MAR 84	7.66
WR161	"MARCHWOOD" 12V 30A PSU	JUL 83	4.28
WR165 oct set	"SEVERN" 7MHz QRP TX/RX	-	15.21
WR169	"SEVERN" (TRANSMITTER)	JUL 83	6.63
WR168	"SEVERN" (CH.OVER/SIDETONE)	JUL 83	6.63
WR166	"SEVERN" (RECEIVER/AUDIO)	JUN 83	6.63
WR165	"SEVERN" (VFO)	JUN 83	5.31
WR167	RTTY TERMINAL UNIT FOR ZX81	JUN 83	7.96
WR160	LMS REGENERATIVE RECEIVER	FEB 83	5.31
WR156	REPEATER TIME-OUT ALARM	NOV 82	5.31
WR143	ATV CONVERTER	APR 82	7.25
WR144	IAMBIC KEYS	MAR 82	6.63
WR126	"EXE" 10GHz TRANSCIEVER	AUG 81	7.86
WR095	TRANSCIEVER POWER SUPPLY	SEP 80	3.92
WR068	AF SPEECH PROCESSOR	JAN 80	5.31



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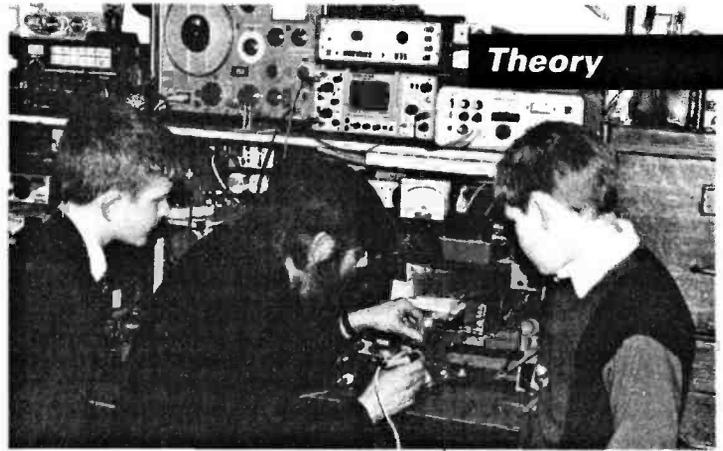
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# Getting Started - The Practical Way



*“There are two quantities that we like to keep track of in electronic circuits: voltage and current. These are usually changing with time; otherwise nothing interesting is happening”*  
From Horowitz and Hills’ *The Art of Electronics*.

## Discrete And Integrated

Electronic circuits are made up from components. The components are joined together to produce the desired effects on the electrical voltages and currents within the system.

If you’ve looked into a piece of electronic equipment, you’ll have seen an array of component parts joined by wires (why was it ever called ‘wireless’?). Although nowadays, of course, you’re more likely to see the copper tracks of a printed circuit board!

Most of what you can see, plays a part in the operation of the circuit. The individual parts will be called ‘discrete components’. All the components have their distinctive place and role within the circuit.

It’s also possible to form complete circuits on small chips of silicon. This technique is rather like a whole family of components living under one roof.

Complete, extremely complex electronic circuits containing hundreds, and sometimes thousands, of components can be produced. The circuits are formed simultaneously onto a small silicon slab, which can be contained within one small package less than 2mm long.

A compact device of this type is called an ‘integrated circuit’ (i.c.). The i.c. is the more accurate term for the well-known ‘microchip’ (or ‘chip’ for short) so often quoted in the modern media.

The vast numbers and varieties of modern i.c.s, to suit every purpose, means that they can be found literally anywhere. They’ve become an essential part of the modern electronic technology, providing us with the small, sophisticated electronic circuits inside every-day household equipment from washing machines to video recorders.

## Integrated Project

Now it’s time for you to pick up your soldering iron! I’m going to show you how to build a little i.c. project. Don’t think I’m making you run before you can walk, by using a chip, for there’s common sense behind my idea!

The introduction and use of integrated circuits so quickly in this series, means that a useful circuit can be built using very few components. The i.c. we’re going to use is the LM3909, which is an oscillator circuit designed to flash a light-emitting diode (l.e.d.).

Although it is a simple i.c., Fig. 4.1, shows that inside the small package there’s a lot of circuitry. The i.c. is a complete oscillator circuit with matching resistors. At this stage, you can ignore the explanation of the function of the oscillator. There’s no need to worry about the various designations of the pins either, we’re just going to use it!

## Common Package

The package for this i.c. is the commonest type of integrated circuit packaging known as ‘dual-in-line’ (d.i.l.) format. This is because of the two rows of pins on either side of the flat rectangular pack.

The i.c. pins are numbered along one side, then back along the other side, as shown in Fig. 4.2. Pin 1 is the ‘locator’ pin and is identified by a notch in the end of the package. Sometimes, the manufacturers also provide an indented spot above pin 1. The i.c. we’re using is an eight-pin d.i.l., and it’s the smallest size in this format.

## Introducing Capacitors

After resistors, capacitors are probably the next most common components used in electronic circuits. The simplest capacitor, shown in Fig. 4.3, is formed from two plates separated by a non-conducting material, called the ‘dielectric’.

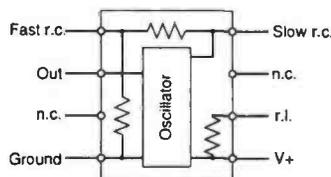
The capacitor’s plates ‘block’ the path of d.c. (direct current) and store the electrical energy. However, a.c. (alternating current) where the polarity (+ and -) is constantly changing at any one point in the circuit, can in effect, flow through a capacitor.

A simple way to sum up the function of a capacitor is: that it blocks the path of d.c., but allows the a.c. to flow.

## Meet The Farad

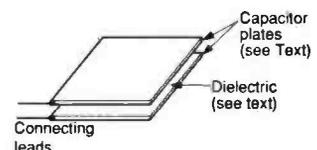
The conventional unit for capacitance is the farad. The term is taken from the name of Michael Faraday,

*In Part 4 of his series for the newcomer to radio, the Rev. George Dobbs G3RJV, offers a quotation and then takes a look at chips and capacitors. Then he explains how to make a project using a ‘dead bug’ combined with the ‘Ugly’ technique!*

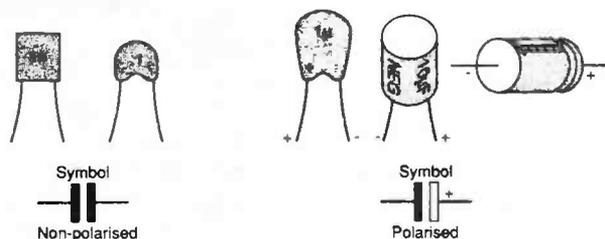


**Fig. 4.1: Internal circuitry and connections of the 3909 i.c.**

**Fig. 4.2: The 8-pin dual-in-line (d.i.l.) integrated circuit (i.c.) package showing pin configuration and locator method.**



**Fig. 4.3: Construction of a simple capacitor (see text).**



**Fig. 4.4: Types of capacitor, their associated electrical symbols and typical exterior casing markings (see text).**

the pioneering scientist. One farad is a hopelessly large unit, so most capacitors values are in small fractions of a Farad. The commonest values are as follows:

microfarad ( $\mu\text{F}$ ) = one millionth of a farad  
 picofarad (pF) = one million-millionth of a farad  
 $1\mu\text{F} = 1\,000\,000\text{ pF}$ .

There are two main varieties of capacitor: **polarised** and **non-polarised**. These are shown in Fig. 4.4. Normally, the lower values of capacitance are made in the non-polarised form.

Larger values of capacitance require many layers of plates and dielectric, so they are formed using an electrical process which produces a more compact component. A side-effect of this manufacturing technique is that larger value capacitors are usually polarised.

### One Way Round

The fact that a capacitor is polarised, means that they can only be used one way round in a circuit. The positive (+) lead or connection must be connected to the most positive side of the circuit.

The outline appearance and associated circuit symbol for common types of non-polarised and polarised capacitors, is shown in Fig. 4.4. Don't forget that the polarised capacitors have a circuit symbol showing which end is connected to positive.

Polarised capacitors come in two types. The aluminium (or ordinary) electrolytic and the tantalum electrolytic are the most common form. Although tantalum types are much smaller than the ordinary electrolytic, they are more expensive.

Polarised capacitors **MUST** be connected the correct way round in the circuit. At worst, electrolytics will smoke and die - tantalums sometimes explode!

The polarity should be clearly marked on polarised capacitors. On electrolytics, the negative (-) lead is often marked and on tantalums the manufacturers usually mark the positive (+) lead.

Electrolytic capacitor housing can either be of the 'axial' or 'radial' form, as in Fig. 4.4. The axial form has the leads emerging from either end of the casing. The radial form has both leads emerging from the same end of the casing.

Axial electrolytic capacitors, usually have an indentation around the positive (+) lead end. The value of the capacitor in pF or  $\mu\text{F}$  should also be printed on the capacitor housing and, in the case of polarised types, the maximum working voltage.

This short excursion has been a real 'whirlwind' tour of capacitors. Don't worry though, if you're not entirely happy about capacitors. We'll look at these components more closely in the next part of this series along with their practical applications. On the way, you'll discover just how useful they are!

## Practical Project

Now it's time to get on with the practical i.c. project. A simple practical circuit for the LM3909 i.c. is shown in Fig. 4.5. This circuit allows the 3909 to flash an l.e.d. at a certain number of flashes per second (f.p.s.) depending upon the value of the capacitor.

The capacitor in this application is used as a storage and discharge device. A charge of electricity builds up in the capacitor and is then discharged to flash the l.e.d.

A larger value of capacitor takes longer to charge and discharge, hence the rate (or f.p.s.) of the flashing can be varied by the capacitance values.

### Fast And Slow

The 3909 i.c. has a facility for a fast and slow rate of operation based around pins 1 and 8. A switch (S1) is shown so that two rates of flashing can be chosen.

In practice, I didn't use a switch. To keep things simple, I used two lengths of wire from pins 1 and 8. The wires could be twisted together, or untwisted, for the slow or fast rate.

With pins 1 and 8 not connected, the flash occurs about every second (1 f.p.s.) and with pins 1 and 8 joined the l.e.d. flashes approximately two and half times per second (2.5 f.p.s.).

### Common Red

The l.e.d. is a common red type. The capacitor C1, is a  $100\mu\text{F}$  electrolytic type. The capacitor's working voltage can be low, (mine was 6.3V). The power source is a single 1.5V battery cell. I used an AA cell in a battery holder.

No switch is shown on the battery, because it can be pulled out of the holder. A switch can be added for S1, but perhaps the easiest way is to choose the fast or slow rate and wire the circuit accordingly.

### The Ugly Way

There are many ways of building electronic circuits and we'll try most of them at sometime in this series. One very simple method is known as 'Ugly Construction'. This term was first adopted by Wes Hayward W7ZO1, who uses this method even for quite complex circuits.

The principle is simple. All electronic circuits work in respect to ground (sometimes chassis or 'earth'), and this is usually the negative end of the power supply.

When the 'Ugly' technique is used, everything is built up from the ground connections. The circuit is built on a piece of blank printed circuit board (p.c.b.) material.

The p.c.b. is made from thin copper, laminated onto an insulating material, which nowadays is often made from glass fibre and a man-made resin. In the 'Ugly' technique, the board is used, copper side up, to form a base plate for the construction.

All components connected to ground, are directly soldered to the copper. The other lead or leads of the components are pointed upwards, and become mounting points for their associated components.

### Anchor Points

The 'Ugly' technique often provides enough anchor points for all the components in the circuit. If other fastening points are needed, stand-off insulators can be added to the board.

You may not need the stand-offs, if junk box

resistors (of a value of 1MΩ or more) are used. For our purposes, the odd MΩ or two around most circuits, makes very little difference to performance. So, don't worry!

The project might sound complex, but it's not. Go ahead and build this little circuit - you'll soon see how well it works and learn a bit more at the same time.

### Using Dead Bugs

Using i.c.s with the 'Ugly' technique could be a problem because the 'chip' pins point downwards. However, the solution is simple - and all you have to do is to turn the i.c.s upside-down.

The i.c. can be fixed on its back, onto the copper surface with a non-permanent adhesive, or double-sided tape. Then you should arrange the 'legs' of the i.c. to point upwards. When they are in this position, they really do look like dead beetles, hence the term 'dead bug construction' for this simple technique.

### Simple To Build

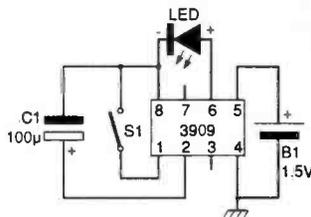
Building the circuit is simple. To help you, there's a layout guide shown in Fig. 4.6. You should connect pin 4 to the copper ground. Then connect C1 between pins 8 and 2 and the l.e.d. between pins 6 and 8 (make sure you've got the polarity right on both components!).

The battery supply (check you've got the battery connected the right way round) goes between ground and pin 5 (+). Pins 1 and 8 can be joined or not, according to the flash rate required. That completes the whole circuit. Simple isn't it?

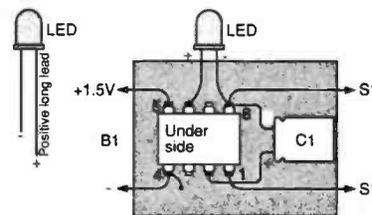
### Useful Trick

When you've finished, check for short circuits caused by solder 'blobs'. Then you can connect the battery and the l.e.d. should flash. If it doesn't, check all the connections. If it still won't work, even if you can't see anything wrong - put the project down and go away and have a cup of tea and read *PW*.

It's always best to come back to the job - with a 'fresh' pair of eyes. You'll probably spot the problem immediately when you come back. This is because your brain will see the project afresh, and not see what you think should be there. This method works - try it sometime!



**Fig. 4.5: The circuit diagram and connections for the light-emitting diode (l.e.d.) flasher project and polarity identification method for the l.e.d. used in the project.**



**Fig. 4.6: The completed project built the 'Ugly' way. See text for power supply and switching arrangements.**

### Is it Useful?

I've no doubt you're wondering if the project has any practical use. Well, the answer to that question is that the use of the flasher is only limited by our imagination. But, to help you on your way I'll suggest one idea to you.

For example, it's possible to use the circuit as a 'decoy' alarm system. You can do this by mounting the project in a small box and placing it on the dashboard of a car, or in a house window. This may give the impression that some sort of alarm is present.

If the flash rate is too high, increase the value of C1, perhaps to 220µF or even 330µF. The current drain is so low, the battery should have a long life in this circuit.

### Project Shopping List

One LM3909 i.c. (Maplin WQ39N or Marco LM3909,) one 100µF Electrolytic capacitor 6.3V working (any supplier), one l.e.d. (red) any supplier, 1.5V battery and holder. Small piece of printed circuit board blank (about 25 x 30mm).

*That's all for this month. Drop me a line and let me know how you're getting on with the projects. Whatever happens, enjoy what you achieve. The radio hobby is great fun!*

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# Back-Scatter

## HF Bands

Reports to

Paul Essery GW3KFE

287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA

This month I have been out of the DX arena; alterations to the shack mains outlets, a change to one of the rigs, tracing the sources of S9 noises all over the 3.5MHz and 144MHz bands, and the restoration of a beam which had suffered excess of gravity; not to mention the inevitable gardening.

The beam, a Jaybeam TB3, is all ready for erection - and a prize jigsaw that'll be, with the old mast and beam to come down, and various obstructions (guys, boats and spiky plants!) to be avoided or moved. At this point we must place on record just how helpful the Jaybeam folk have been in answer to various calls for help. At one stage they promised to send me some bits "tomorrow now, I think we've missed today's post collection" - but the bits were on the doormat by the time they were supposed to be leaving the Works!

After the long spell of good conditions it was of course going to be somewhat of a contrast when things got back to normal, and it was amusing to hear, all over the place, the comments on 'how bad' things had become!

### The 1.8MHz Band

The 1.8MHz net on 1932kHz on Tuesdays, 1900 clock time seems to be booming, though I have not been able to join for three weeks now. The Powys crowd are always glad to 'receive visitors' to this net.

Down in Kent, G2HKU (Sheppey) continues his ON7BW contacts on s.s.b. and Ted says it is interesting to notice how different the HF6V is from the G5RV. Now ON7BW is received better on the G5RV, but gets a better signal from G2HKU when the latter transmits on the HF6!

I have a letter from Wyn GW8AWT (Llandeilo) who has been doing a bit of listening round. Wyn wonders about the GB4XXX who is operating from a caravan between Pwllheli and Portmadog. He has been on since last October, assisted it seems by copious draughts of ale. Perhaps the authorities (or the local amateurs) will sort this one out.

Still with 1.8MHz, I hear the next issue of the *Top Band Newsletter* will be out soon, so if you want a copy, send off to the address I gave a month or so ago.

### The 3.5MHz Band

Almost the only activity here (GW3KFE) has been hunting for the noise source which is causing a total QRT on this band for many hours daily.

However, G0KRT lives in Welling and runs a 25m antenna, counterpoise and QRP. The low-power c.w. transmission is handled by the Lake DTR3 and reception is by a Howes receiver. This QRP set-up managed to work others of like mind including

GM0DHD, G0COY, G4IVR, G4PPG and the higher-powered operators of DF5XW, DH5IAX, DL1BDW, DL1JT, PA0CVF. Eight other G stations also obliged with reports.

Turning to ON7PQ (Kortrijk), Pat mentions his c.w. as reaching out to 9L/DF3ZJ, TU2MA and UJ8JI.

Just the one from GW0HWK (Wrexham) who managed W2AC before moving to another band.

### QRP Weekend

Well, the Europe for QRP Weekend is a long way ahead, but there's plenty of time for preparations; 1600Z September 27, to 2359Z September 29th, c.w. only on 3.560, 7.040, 14.060, 21.060, 28.060kHz, +/- 10kHz with maximum power of 5W output. The exchange is to be the RST, plus power output plus operators name. Logs to Petr Doudera OK1CZ, OK QRP Club, Ul Balerie 1, 16200 Praha 6, Czechoslovakia, by 30 October 1991. Full rules can be obtained from A. D. Taylor G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND. The G-QRP Club and the OK QRP Club are running this one jointly. I hope the QRP boys will be well supported in this effort, which replaces the 1990 East-West QRP Weekend event. See if YOU can screw your rig down to 5W and join in!

### Grenville 400

There's early warning of the Grenville 400 event too. The special call GB4SRG will be on the bands in September, commemorating the 400th Anniversary of the death of Sir Richard Grenville. More details and dates when I receive them.

The 3X1SG situation remains somewhat obscure, it seems as though the DXCC Desk haven't received any documentation on this operation.

### The 7MHz Band

I have watched this band for many years and never cease to marvel at the way the 'specialists' can pull the DX out of the hat, while studiously keeping quiet about it! However, GW0HWK has a one-word comment: Nix!

The new trap dipole and a.t.u. at G3VVC (Bath) seems to be working well and they have expanded Andrew's horizons. On 7MHz c.w. he notes TA2D, KE2S and W9TKV. The c.w. from G2HKU went out to W8UMA, VK6HD, UF6FB and SV9BAI. Now we turn to GM3JDR (Aukengill), where the difference between winter days and summer days is far more pronounced, and hence the change in 'conditions' are far more

noticeable. Don found 7MHz losing liveliness as days got longer, but at least he connected with ZK1XL, W6TSQ, CG6UX, PY4BGO, PY7VJD, CN8ST, CM8OH, ZL1AZE, VG2EA, UA9HEC, UA9YDD, RI8BER and UL7MBL before he moved higher in frequency.

Over in Belgium, ON7PQ is an all-c.w. station and Pat mentions his scalps on this band as being ZL9DX, D68YH, A92FM, V31RA, TA4A, VU2SU, PY2MG and PJ9L.

### The 10, 18 and 24MHz Bands

The first entry here is from Mary GONZA (Kirkby-in-Ashfield), who mentions WB8KDL, N4RAC, W2FJ, 3A/F9UW/M, VK5VN, AA2BX, HB0LL, WB8ZSO all on s.s.b. while the c.w. hooked K5LZT.

Next GM3JDR, who has been giving these bands a bashing this time. On 10MHz he reports 9M2AX, RL7PJL, UA9FG, UA9CB0, UW9TB, T77C, YU400/5B4, D68YH. On 18MHz FS/OH6XY/P, VE7SR, K8XF/MM in the mid-Atlantic, 9V1YB, RL7GA, UA9XDU, UJ8JI, UA9CB0. Finally, on 24MHz ZD8VJ, 4S7NE, VS6BG, PY1BVY, ZL3KB, ZL2UW, VK6AF, VK4ES, VK1FT, VK5FE, VK3MJ, UJ8KA, RA9YD, PY5CQ, FR/DK9FN, 3A2LF, EL2SM, A41JV, HL1CG, HL2SB, VU2UR, VU2NBT, 3B8CF, RA9YA, UA90P, UA9TC, UA9CUD, UA9AQN, UW0SQ, RM8MA, UI8QU, UA9FHJ, VP2V/W2GUP, CT3FD, YN/SM0DIG, KP2/SM5FTU, VY2DST, HK7AAG, VK9LM and ZS1ADS. All on the key of course.

Now to ON7PQ, Pat has 24MHz producing 4U1ITU, VP2V/VE5RA, PA0GAM/ST0, FR/DK9FM, D68YH, FS/OH6XY/P, FO0IGS, D68YD, 4K1A (Antarctica) and EL2CX. On the 18MHz front he found 8J8WUS/8, RI8BQ, FS/OH6XY/P, 5W1JC, UJ8JI, 9V1YB, FR/DK9FN and 5B4ES. Lastly, 10MHz which yielded VK9LM, 4U1ITU, PJ2/OH6XY, 9L9DXG, 9J2SZ, 4K4/UA9CDV, 4K1ADQ (S. Shetland), FR/JG3KUT, 4K1F and 9L/DF3ZJ.

At G2HKU Ted reports 10MHz giving 9Y4KB, LX1MU and OZ7AG, while 18MHz provided J8/LA3FL, W2MUM, ZP6XDW, VK2PA, V01BD, W4VQ; and 24MHz came up with AB5X and 9Q5UN.

Next to report is Mike GW0HWK. On 18MHz he mentions VP2MLD, ZD8VJ, VP9HE, 4S7EA, FG5BG, D44BC, WP4CEL (Puerto Rico), TK5BF, OH3GZ, OK1FIG. A move to 24MHz resulted in contacts with UZ0AXX, W3KN, W7ZG, OK1FIG, K4RGN, PY1PM, HA0HW, K2VXV, EA9NN, RA6JF and OD5QX.

The report from G0GQP (Milton Keynes) indicates he uses 90W and an inverted 'L' in the evenings, to find the usual East Coast Ws, FO0IGS (Tahiti)

VE3AJJ, ZL2AAG, JA1DYY, 4S7EA, ZP5JCY and A92BE on s.s.b. while the keyer was plugged in for VE3FFS. Dave says he has just obtained an AEA CP1, so he is now honing-up his keyboard skills for RTTY and AMTOR.

Down in Somerset, G3NOF (Yeovil) comes in at this point, to note KL7XD on 18MHz, while 24MHz produced A22AA, A61AD, D44BC, EL2SM, JA1WPX, JA20LJ, JA5NNS, JA8DSO, JA9BFN, JR5JAO, KL7XD, RA9YA, RH1E/RC2AR, ST0DX, TL8SC, UA4HTT/RV4L, UF7FWR, UI8QU, UM8MTA, V73BN, VE8QL, VP2EE, VU2RX, VU2XYL, Z21CS, ZS1ACY, ZS6AIS/7P8, 3B8CF, 3X1SG, 6W70G and 9J2WVS.

Our next input comes from 9H1IP (M'Scala, Malta), where Vince went on 18MHz to raise VP9HE, EA8PP, KP4RL, V05WX, KM1E/C6A, KP4IX, ZL2AAA, VP2VE, CN8NS, KC7V (Arizona), WF5T (N. Mexico), HF0POL (King George Is, S. Shetlands), CU2EN, FM5WD, OY9JD and P40MR. Turning to 24MHz we find 5R8JD, VE8QL, RD7DZZ, UJ8KA, UZ0AXX, EL2SM, UF6DZ, ZB2IF, UA4PO, KE7TV, TG9AJR, HK5LEX, KE0B (Minnesota), CN8NS, NW7K (Idaho), A71AL, KL7XD (Alaska) VQ9AY, HP3FL, T30DR, FM5WD, WA5LLX, UA4HTT/RV4L, VP9LQ, CS5CGX, ZS6AIS/7P8, P40MR and A61AD.

### The 28MHz Band

Ladies first, and Mary GONZA starts the ball rolling. She had contacts with 9L1FC, and the usual crop of quickie contacts in the ARRL DX Contest. For ON7PQ, 28MHz yielded c.w. contacts with PZ1DY, 9L9DXG, D68YH, 5W1JM and A92FM. Ted at G2HKU keyed with N3JT, HK3RQ, AA4JN, 6W6JX, W3VT, PY4AR, K1RH and KB2SG. Now GW0HWK. Mike mentions N7BQ, 4K3BB, 9H3NU on Gozo who is also G4CVZ and ZS6WXP. G0GQP stuck to his 1100-1300Z operating time and offers c.w. with WA1TET, VE3PUA, Z21HL, RB5LAE, UZ3AZT, KA3UWD, UB5FAV, KC4UUG, U6WLIJ, KC1SF, W8RSW, and KC4QMX. On s.s.b. there were EL2SM, JR6EA (Okinawa), TR8GL, 8J8WUS, KB8TDX/YI, VK2PRH, JH6CJN, 7X4VAK, JK6PDE, YD7KFK, VE3AJJ, KA0TOF (Colorado), VE1ATT, P29RB, VK6PY, Y09FNJ who was QRP at 1W, 9H1MK and UW9VA.

For G3NOF the list included AA6DX/KL7, BV2AV, BV2WA, C56/G4LLI, FK8FR, FY5FA, FY5FG, HL1KIB, HL5FBT, HLOAGD, HLOC, JA5EXW, JG7NIH, JH4JWI, JM1PPQ, JR4ABB, JR5IAQ, KB0IAN/HZ, P29RM, RI6B, T30A, TA3PB, VE6AQ, VS6CT, VU200, YJ8RN, ZC4HH, 3X1SG, 7L1WII, 9L1IUS and 9L/DL6WA.

### The 21MHz Band

On 21MHz, Don G3NOF mentions EK0KBZ, EK0TAX, EX3FKW, ET2A, FO0IGS, G2DQV/ZL2, H44AP, J79MD, KA3HMS/V73, KAOZFX (N. Dakota),

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Jaybeam	T83 Mini 3e HF Tribander	403.10 (10.00)
Creative	CD318 JR 4e HF Tribander	308.00 (10.00)
Creative	CD318 4e HF Tribander	387.00 (10.00)
GPV63	2m Cotliner	45.49 (8.00)
WX1	2m/70cm Base Fibre Glass	66.00 (8.00)
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IC725	HF Base Transceiver	779.00 (10.00)
AT190	150W ATA (735)	335.00 (8.00)
PS55	Ext PSU (735)	195.00 (6.00)
IC505	50MHz multi-mode portable	639.00 (6.00)
IC229E	NEW 2m 25W FM Mobile	299.00 (8.00)
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IC275E	2m 25W Base Stn	1090.00 (10.00)
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BC25	Desk Charger	76.38 (3.00)
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BP90	Empty Battery Case (SE SERIES)	10.76 (2.50)
BP94	Battery Pack 7.2, 1000mAh (SE)	74.03 (3.00)
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HM468	NEW Mini speaker mic	24.15 (2.50)
H551	Headset inc PTT/Vox unit	42.15 (2.50)
LC81	SET 2m CTC/RU/PSM	6.84 (2.50)
SM8	1.3kg/800g BP Base Mic	67.87 (3.00)
R1	150MHz-1300MHz RX	398.00 (6.00)
R72	NEW HF RX	859.00 (10.00)
R100	500KHz-1800MHz	510.00 (8.00)

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HK705	Straight key (adjustable tension)	26.76 (4.00)
HK706	Straight key (adjustable tension)	29.80 (4.00)
HK707	Straight key (adjustable tension)	25.00 (4.00)
HK707	Straight key (adjustable tension)	27.00 (4.00)
HK707	Straight key (adjustable tension)	27.00 (4.00)
HK802	Straight key (Deluxe-Bress)	100.00 (4.00)
HK803	Straight key (Bress)	91.50 (4.00)
MK703	Squeeze key	37.80 (4.00)
MK704	Squeeze key	25.50 (4.00)
MK706	Squeeze key	36.76 (4.00)
STARMASTER		
Dewsbury	Electronic Keyer Unit (No Paddle)	89.96 (4.00)
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AR200XL	Light Duty	60.50 (8.00)
G250	Light Duty	79.76 (8.00)
G400	Medium Duty	182.00 (8.00)
G400RC	Medium Duty (Round Face)	172.85 (8.00)
G800RC	Medium/Heavy Duty	240.00 (8.00)
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G500A	Elevating Rotator	203.00 (8.00)
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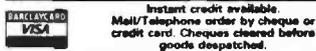
TS950S	NEW HF Transceiver	2998.00 (10.00)
TS140	HF 9 Band Gen. Cov. TX/RX	880.00 (10.00)
TS805	HF/6m TX Gen. Cov. RX	995.00 (10.00)
TS440	9 Band TX General Cov RX	1163.87 (10.00)
AT440	Auto/ATU	1447.87 (4.00)
PS12	Hi/Hi/PSU	226.00 (8.00)
AT230	AH Band ATU/Power Meter	213.20 (8.00)
PS430	Power Supply	177.86 (8.00)
SP31	Speaker	84.84 (4.00)
TL822	10/160 2kW Linear	1689.00 (10.00)
TH2	2m Hi/Hi	264.00 (8.00)
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TH77	2m/70cm Hi/Hi	398.00 (8.00)
TH27	NEW 2m Hi/Hi	254.00 (8.00)
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TR761	2m 25W M/M Mobile	810.00 (10.00)
TR790	VHF/UHF Transceiver	1625.00 (10.00)
R2000	Gen Coverage HF/RX	699.00 (10.00)
VC10	118-174MHz Converter (R2000)	165.48 (4.00)
RS000	General Coverage HF/RX	895.00 (10.00)
VC20	118-174MHz Converter (RS000)	170.86 (4.00)
TM702	NEW 2m/70cm FM Mobile	465.00 (8.00)
TM731	2m/70cm FM Mobile	675.00 (10.00)
TM241E	2m FM Mobile 80/10/5W	295.00 (8.00)
TM441E	70cm FM Mobile 35/10/5W	325.00 (8.00)
MC50	4P Desk Mic	47.08 (4.00)
MC60A	BP Desk Mic	90.13 (4.00)
MC80	Electric Desk Mic	65.18 (4.00)
MC85	Desk Mic Audio Level Comp	101.18 (4.00)
MC43	4P Flat Mic	22.70 (3.00)
MC35	4P Flat Mic	22.20 (3.00)
MC55	Mobile Mic (6p.o. 8p)	33.84 (3.00)
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H55	Deluxe Hipones	38.36 (3.00)

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Comet CD120	1.8-200MHz	78.80 (4.00)
Comet CD180H1	1.8-60MHz	90.85 (4.00)
Comet CD2700	140-528MHz	78.80 (4.00)

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SMCS 2N	2 way 'n' Sats Switch	24.00 (4.00)
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T100	100W Dummy load	90.00 (3.00)
T200	200W Dummy load	66.50 (3.00)
WA1	Wavemeter 120-450MHz	27.84 (3.00)
PR232	Packard/RTTY Terminal	319.95 (4.00)
Detong D70	Morse Tutor	66.35 (4.00)
Detong FL2	Audio Filter	102.07 (4.00)
Detong FL3	Audio Filter/Automatic	163.21 (4.00)
Detong ASP	Processor 4pin	97.01 (4.00)
Detong ASP	Processor 8pin	97.01 (4.00)
Detong AD370	Active Antenna	81.89 (4.00)



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# Back-Scatter

P29NMD, RH2E/RA3QAK, ST0DX, UA0QEL, UA0KD, V73BN, VP9IB, VK9KL, VU2TTC, ZL9DX, 3A2LF, 5W1JM and 9K2/HB9CVN. From GW0HWK reports of W7KTI, VP2MDL and VP2/N1RR on Anguilla. Although busy, G3VWC says he hasn't forgotten the WARC Bands, but it's been such a pleasure to be re-acquainted with 21MHz c.w. after some 20 years, that he worked UA9DM, UA0ZEA (Kamchatka), VE5XM, VE6BIR, VE7AOE, CG6AUV, EA8GS, 7X2CR, CX5RV, N6FL, KD6GC, W6JNX, N7HUS, W7CE and W7MDK.

At G2HKU just one QSO is recorded for the band, and that's VU2RDM on c.w. Finally for this band ON7PQ, who keyed with 4U1ITU, ZL9DX, 3B9FR, UO7XX, 9V1OK, 4K1ADQ, 5W1JM, A92FM and T31AF.

### The 14MHz Band

Not surprisingly, the 14MHz band has been somewhat neglected. Don G3NOF says he worked A71AL, BV5AF, EK0BKX, KH6IRT, OD5MM, S01A, VA100U (=VE3), VE4RP, VQ9AY, WB6STU/KH2, XF0C, ZS9S, 3B9FR,

5H3DR, 7X2VZK, 7Z1AB and 9M8FH. At GW0HWK the tally was 9N1MM, UH3Y/UA4HVV and KB8TU. G2HKU used the band for his sked on s.s.b. with ZL3FV, while c.w. made it across to W6TBG and VP5P. G3VWC mentions 9H1NB and W7SQT in Wyoming. Pat at ON7PQ notes his c.w. reaching out to 8J8WUS/8, A35DJ, T31AF, RA0X/UV3DA, 9J2SZ,

4K4/UA9CDV, 4K1ADQ (S. Shetland, FR/JG3KUT, 4K1F and 9L/DF3ZJ.

### News

The up-to-date news of what's going on on the bands can be obtained by way of a call to Wireless-Line on (0898) 654632, which is updated every week on Fridays.

### Finale

It only remains to remind you of the deadlines which are June 3 and June 21 - the latter's somewhat tight, but they take account of problems at this end. My address is given at the head of the column. 'Bye for now!

### Solar Data for March 1991

A major increase in solar activity was observed during March, and although the quiet side of the sun was looking our way during the first few weeks of the month over 40 flares were recorded. This period, up to March 10, was the most disturbed time since mid October 1990. The active side of the sun came into view from March 11 and as a consequence, high levels of solar activity were observed. Numerous flares and ionospheric disturbances were reported. On March 22 at 2242TC, a major flare ripped out of the sun, peaking at 2247UTC and ending at 2310UTC. The result of this was an h.f. radio blackout on March 23 and a wide spread auroral opening on March 24. This was the most intense geomagnetic and auroral storm since the large scale event of March 1989.

The solar flux index, during March, was well over the 200 mark on most days, the exception being the period between March 28-31. It peaked at 276 units on March 18, dipping to 192 units on March 31. The daily geomagnetic A index ranged from a value of 4 units on March 11, to 62, 80 and 72 on March 24, 25 and 26.

### May-June 1991 Forecast

During this period there will be a lessening of the geomagnetic effects, which cause auroral propagation. Similarly, the trans-equatorial path, on 50MHz, will also become less



## Back-Scatter

**VHF Up**  
Reports to  
David Butler G4ASR  
Yew Tree Cottage  
Lower Maescoed, Herefordshire HR2 0HP

noticeable. However, Sporadic-E openings will become more prevalent, mostly effecting the 50 and 70MHz but occasionally reaching up to 144MHz. Historically, there is normally a good 144MHz opening during the first week of June. Tropospheric conditions during June will generally be above average but never spectacular!

### Aurora!

A major flare which occurred during the evening of March 22, was the cause of a widespread auroral opening on March 24. Unlike many openings, this event started weakly, only gaining in intensity from about 2200UTC. It then continued to at least 0300UTC, allowing many DX contacts to be made. A weaker event also occurred during the evening of March 25.

Ted Collins G4UPS (I080) concentrated on 50MHz and worked a number of stations, between 2200-

2300UTC, including DK2ZF, G3SDL, GD3AHV, G14GPC, GM3WYL and GM4DGT. He also heard many ON and PA stations.

At my QTH I made a handful of c.w. contacts on 50MHz, the best DX being with OH2TI (KP20), OZ1ABE (JO65) and SM7FJE (JO65). Moving up to the 70MHz band, I only made s.s.b. contacts with GW4HBK (I081) and G0EHV (I094).

Conditions on the 144MHz band were very good but unfortunately for many UK operators, the aurora occurred on the same day as the RSGB v.h.f. convention and many stations missed the event. Tony Ashcombe G4APA, driving back to Cheshire from Sandown Park, had a visual sighting of the aurora, between 2120 to 2140UTC, when he was 20km from home. He still managed to work a number of Polish stations, on 144MHz, once in the shack.

Ela Martyr G6HKM (J001) contacted EI3GE, GM0CLN and three DL stations on s.s.b. She also heard

LA1ZE at 59A but didn't make contact.

In-between the strong local Europeans could be found some choice DX. Some of the more rare stations included ES2RJ (K028), ES5WE (K038), LY2BH (K025), RB5AL (K061) and UA1XM (K037). I've certainly found that the easiest way to work into the USSR on 144MHz is via aurora, as the QSLs of Fig. 1 show.

Graham Peyman G0KON (DOR) located on the south coast was very pleased to work DJ9YE (JO43), OE3JPC (JN88), SM7SCJ (JO65), SP2AOZ (JO94), SP5CZA (K002) and SP9EWU (JO90), the contact with SP5CZA, at 1578km, being his furthest distance worked so far via aurora.

Rick SM7SCJ (JO65) reports working 13 UK stations on c.w. and, at 0227UTC, a 10 minute rag-chew with EI4DQ (I051) on s.s.b.

There was a much weaker auroral event during the evening of March 25. Between 1750-1805UTC, I made c.w. contacts with G10NMZ (I074), GM4DJS (I085), GM4ILS (I087), GM0CLN (I085) and GMDJIN (I085) but found little else to work.

Readers may be interested to know that an auroral alert warning beacon, DK0WCY, operates continually on 10.144MHz. It transmits one of three messages, 'No aurora', 'Weak aurora', 'Strong aurora'. It runs 100W into a dipole from its QTH in northern Germany and is audible all over Europe.

### Meteor Scatter

The following data, concerning meteor showers occurring during May-June, will help you determine in which direction to beam at specific times and when the shower is below the horizon.

The Arietids meteor shower will be encountered between May 29 and June 19, peaking on June 7. Although this is a rich shower, the particles are small and therefore the bursts are of short duration. Between 0500-0700UTC beam north or south, 0700-0900UTC beam north-east or south-west, 0900-1100UTC beam east or west, 1100-1500UTC beam north-west or south-

To Radio *G4ASR*

## UB5BAE

*KW29SM*

Confirming our 2x CW/SSB QSO on ... *14.4* ... MHz  
Date *14.3.89* GMT *08.00* ... RST ... *59A* ...  
QTH: ZONE 18, USSR, **TERNOPOL** REG. 076  
Pse/Tnx QSL crd via box 88, Moscow, USSR. 73 de *Archie*

Zone 18  
Reg 038

## LITHUANIA

Sudial  
LPO6 d

# UP2BJB

To Radio *G4ASR* cfm Aurora Tropo Me Es QSO

DAY	MONTH	YEAR	GMT	MSK	MC	RST	2WAY
10	03	1989	13.11		144 402 1200	59A	CW 3000

Rx \_\_\_\_\_ Tx \_\_\_\_\_ Ant \_\_\_\_\_  
Pse via BOX 88  
Test QSL Moscow USSR Op. *Algis Vateckas* 73!

Fig. 1.

# Back-Scatter

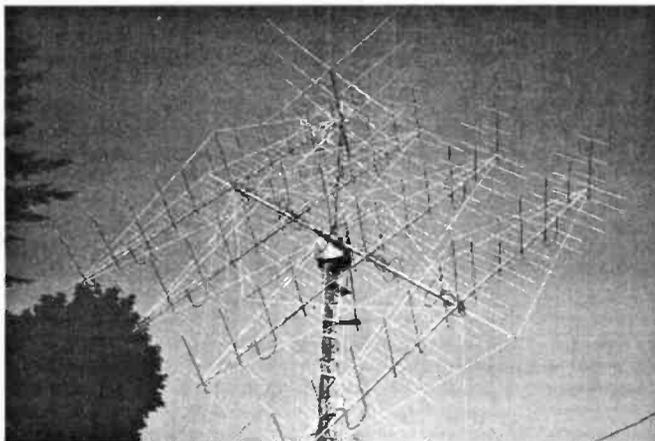


Fig. 2.

east. The shower radiant is low between the hours of 1700-0400UTC and is therefore not usable for meteor scatter.

The Zeta Perseids meteor shower will be encountered between May 23 and July 15, peaking on June 8. Between 0500-0700UTC you should beam south or north, 0700-0900UTC beam south-west or north-east, 0900-1300UTC beam west or east, 1300-1500UTC beam north-west or south-east. The stream is below the horizon between 1700-0500UTC.

The June Lyrids meteor shower is prevalent between June 10-21, peaking on Saturday 15th. It is a complex stream with multiple peaks. It gives its best results on the north-south path between 1900-2300UTC and 0300-0700UTC. The east-west path is generally poor.

## Moonbounce

Hank K2GAL (FM29) has got a 144MHz station up and running. Recent contacts have included G4EZP, G4FUF, G4HUP, G4KUX, G4PIQ, G4MYX1, G0AEI, G0KAS and G0LBK.

Dave Blaschke W5UN (EL29) recently completed the first ever 144MHz DXCC, 100 countries worked and confirmed, all via e.m.e. Dave runs 1.5kW into an array of 48 Yagis which allows him to work single Yagi stations with ease. In fact, he mentions that quite often he can hear European stations rag-chewing on tropo when they are 'inadvertently' beaming towards the setting moon! Many of the stations worked for DXCC were h.f. expeditions which had OSCAR satellite equipment with them. In many cases, these stations were running around 100W and a single Yagi. Graham G0KON is one of a growing number of UK stations that has worked W5UN. He reports that he made a QSD on February 25 and that it was his most exciting time since coming onto the 144MHz band.

18 May 1991		
UTC	Az	El
0900	64	6
1000	75	14
1100	86	22
2130	268	24
2230	280	15
2330	290	6
19 May 1991		
1030	73	6
1130	80	15
1230	96	24
2200	260	24
2300	272	15
0000	283	6

Fig. 3.

Of course, W5UN is not the only station with a large antenna array. There are quite a number of similar stations scattered around the globe which allow the single Yagi station to participate in limited e.m.e. communication. Another such station is Lionel VE7BQH. His antenna is a 336-element Cushcraft Collinear array. It is mounted on a 10m horizontal boom supporting four booms onto which are mounted three groups of collinear arrays, each consisting of 28-elements. Unlike other similar arrays, this one has polarity adjustment, as Fig. 2 shows. Local stations in Herefordshire may be interested to note that I have recently purchased a similar antenna, but only 96-elements in size. Even so, it will be 10m wide by 5m high.

Many of you may think that whenever the moon is above the horizon then you can work stations off the moon. This is not the case as many factors have to be taken into account. For example, the sky contains areas of intense noise and quiet areas. Certain sources of noise in space may even be stronger than the noise from the sun. The sun, of course, creates considerable noise and e.m.e. operation when the moon and the sun are close together in the sky should be avoided. Throughout any particular month there are periods when e.m.e. communication is more favourable than at other times. The weekend with the best combination of favourable factors is designated the e.m.e. activity weekend. These dates are known to all the moonbounce enthusiasts around the world and it is at such times that you are more likely to hear signals off the moon. The chart, Fig. 3, gives details of such activity weekends. It is based on central England and gives the times when the moon is passing through the vertical beamwidth of a fixed Yagi. Listen very carefully at these times, within the designated e.m.e. sections of 144MHz or 430MHz. Let me know what you hear. You may be surprised!

The F6KSX Group will be operating from the Island of Jersey on 430MHz e.m.e. between July 4-6 and on the 144MHz band between July 7-8. This group provided the excellent CUBEME expedition in 1990.

There's nothing like forward planning, especially where e.m.e. operation is concerned. For those that wish to participate, the ARRL e.m.e. contest dates have been set for October 26-27 and November 23-24.

## The 50MHz Band

The excellent conditions that occurred during February continued daily through to March 10, allowing many stations to work into Australia, Philippines, Guam, Argentina, Uruguay and Brazil. After that date the geomagnetic activity completely wiped out the band for long distance F2 work but occasional t.e.p. openings into Africa occurred spasmodically to the end of the month.

The following details have been compiled by reports from G3BDQ, G3IBI, G3WDS, G3ZSS, G4J1CO, G4PBP, G4UPS and G6HKM, to whom I thank for their input.

The first really good day for DX was March 3, although the previous days had seen activity from FY, TL, LX, TU, VK, 6W and 9L. Between 0830-1230UTC, on the 3rd, the following were putting 'rock crushing' signals into the UK; KE0SC/OU3, KG6UH/DU1, KJ0WD/DU3, KG6DX, VK6JQ, VK6PA and VK8ZLX. In addition to these were numerous JAs, FY, HL, TL, TR, V73AT, 5N and 9L. Conditions on March 4 were less intense but DU, JA, KG6, VK were all available between 0830-1100UTC as were FY, TR, TU, 6W and 9L from 1000-1300UTC. A quiet day on the 5th was followed by tremendous opening on March 6. The band opened up to DU, KG6 and VK at 0800UTC and stayed open to the far east to around 1200UTC. Layer upon layer of JA stations were heard and VK6PA reportedly worked hundreds of European stations during the four-hour opening. In the afternoon, between 1500-1600UTC, the band opened up to South Africa with ZS6AXT, ZS6LN, ZS6PJS, ZS6RN and

ZS6WB much in demand. Propagation to South America was good on March 9 and 10 with CX4HS, FY7THF, LU6DLB, LU7DZ, PY5CC, ZP5AA and ZP6XDW being heard between 1200-1300UTC. An interesting late night opening to Japan via the long path, between 2300-2330UTC on March 14, was observed by stations situated in the Cornwall area. Another late night opening occurred on March 15 with PY5CC being worked at 2240UTC. More interesting, was the reception of VP8CEN on the Falkland Islands at 2310UTC. Other openings were observed during the month, some of the notable DX stations not already mentioned being A22BW, FR/JG3KUT, G8MFE/5N2, KH4AF, KP2A, PZ1AP, V51DM, V51E, V51KC, ZD8VHF, ZS4S, ZS9H, Z23JQ, 3DA0BK, 3X1SG, 7Q7JA and 7Q7RM.

Yet another tremendous month with many operators completing WAC on 50MHz. It all bodes well for the winter DX season!

## The 70MHz Band

The fixed station contest on March 31 created some activity on the band but as it coincided with Easter Sunday, activity was considerably reduced. The possible winner of the multi-operator section, G4KUX, only managed 60 contacts, 10 of those in the last four hours. This was not very good, particularly as it was only a six hour contest. The group were running an FT-726R, Microwave Modules transverter and a 4CX250B amplifier into two 8-element Yagis. Mere mortals, with typically 25W and a 4-element Yagi were really struggling to find contacts. It took me 50 minutes and 16 contacts to realise that there were far better things to do on a sunny Easter Sunday than stay in the shack!

John Bruce G4SJB can normally be found during 70MHz contests operating from some favourable portable location. He reports that it is his intention to operate from a site approximately 8km south-west of Omagh, County Tyrone during the 70MHz WAB contest on June 9, and also from a site in County Fermanagh during the Trophy contest in September. John also mentions that he expects to operate from his 'normal'

Annual c.w. ladder

Station	Band (MHz)			Points
	50	70	144	
G4OUT	3	77	—	80
G4ASR	12	29	—	41
GW4VXX	—	11	—	11
GM4CXP	1	6	—	7

Number of different stations worked since 1 January 1991

Annual v.h.f./u.h.f. table  
January to December 1991

Station	50MHz		70MHz		144MHz		430MHz		1296MHz		Points
	Counties	Countries									
G8ESB	4	2	13	2	36	6	25	6	4	2	100
G6HKM	11	29	30	10	30	10	12	3	—	—	95
G4ASR	—	11	40	4	10	5	—	—	—	—	70
GM4CXP	2	1	2	2	22	3	—	—	—	—	32

# Back-Scatter

portable QTH in County Down during v.h.f. field day.

**Pat Vernalls GW6IMS** (GDD) is a very welcome newcomer to the band, being situated in the rare locator square IO72. Although located at 50m a.s.l. with nearby mountains rising to 800m, he has been very pleased with the results so far. Pat is running an FT-290R feeding into a transverter based on the 'PW Meon' design. This then drives a 25W p.a. into a 4-element Yagi. A Pye A200 amplifier is presently being modified for the band and it is hoped that this will produce around 60W p.e.p. output. He also mentions that a local station, **GV6ARL**, is currently building a transverter for the band.

Now that the Sp-E season is rapidly approaching, it may be worthwhile looking for crossband contacts from 70MHz to either 50 or 28MHz. **Marcel FD1DQK**, located near Paris, is very keen to work UK operators via this mode. If conditions look right and you can't find him on 28.885MHz, telephone him on 010 331 4599 0290 to arrange a schedule.

## The 144MHz Band

Apart from the period of auroral activity towards the end of the month, there doesn't seem to have been very much in the way of DX on the band during March. **Ralph Sachs G2CZS** (JO01) came on for a few hours during the RSGB 144/430MHz contest on March 2 and was pleased to work a number of stations on s.s.b. including **DF0CG** (JO31), **DK0JK/P** (JO40), **FA1PEJ/P** (JO00), **F6KTV/P** (JO10), **OT4AVJ/A** (JO10), **PI4KGL** (JO22) and **PI4VLI** (JO11). Within the UK he worked G and GW but nothing further than IO94 to the north and IO81 to the west. He mentions that he is looking forward to better tropo conditions and the Sp-E season.

## Licence Changes

The Radiocommunications Agency (RA) have recently made changes to the UK Amateur Radio Licences (A) and (B) which will be of positive benefit

## 144MHz QRB Table

Top distances (kms)		
Tropo	3160	GM4YXI
Aurora	2029	G4ASR
Sp-E 3080	G0EVT	
Meteor	2107	G4ASR

to many v.h.f./u.h.f. operators. From 5 April 1991, the power available to the c.w. operator has been increased to that of the old p.e.p. level. Therefore you may now run 100W e.r.p. (20dBW) on 50MHz, 160W (22dBW) on 70MHz and 400W on 144MHz (26dBW) and above. It is interesting to note that these c.w. powers can also be used on f.m., but please don't try it through your local repeater! Operators may now also use vertical polarisation and mobile operation on the 50-52MHz band.

## Amplitude Modulation

In an attempt to increase 50MHz band occupancy at times other than DX openings, *PW* will be publishing, in a future edition, a design for a 50MHz a.m. transmitter/receiver. Code-named the 'GAM', it will feature crystal controlled frequencies around 51.300MHz, the calling frequency in the 'all mode' section of the band. This area has been chosen, after consultation with the RSGB v.h.f. Manager, so that A and B class licensees and Novices can all participate. To gauge interest in this mode of operation I would like to hear from any of you that already run a.m. on 50MHz. There is also a possibility that a design for the 70MHz band may be forthcoming, and therefore I would also like to know of those that run a.m. on that band.

## DXpedition Update

Peter PA3BIY will be operating from various Norwegian locator squares between May 18-27. He will operate via meteor scatter, between 0200-0700UTC, on 144.148MHz, transmitting during the first 2.5 minute period. When

operating random, he will announce the QRA square by calling "CQ DW LAPA3BIY". Further details were given last month.

Johannes OE3JPC, is planning a 144MHz expedition to locator JN56 during the last two weeks of May. He will operate mainly on c.w. using meteor scatter. Contact him on the v.h.f. net for a schedule.

The 'DL West v.h.f. DX Group' will be active from Luxembourg between June 28-30. They will operate from JN29 with the call sign LX/DL4EBX, primarily using c.w. meteor scatter on 144.073MHz. The group will transmit during the second 2.5 minute period at a speed of 1200 letters per minute. Operation on s.s.b. is also possible. They will of course be very active if an aurora or Sp-E opening occurs. Schedules will be taken in advance on the v.h.f. net, 14.345MHz, by DL1EFJ and DL8EBW or by telephoning 010 49 202 781170.

Up and coming DXpeditions during the summer include Minquies Reef (IN88) by GJ4ICD in early June, Iceland by LA6HL between July 4-25 and the Faroe Islands, also by LA6HL between July 26-28. GB2XS will be operational from IO78 between August 10-24.

## QRZ Contest!

The ARRL 50MHz Spring Sprint contest will be held on May 25-26. Although it is unlikely that signals from North America will be heard in the UK, it is always worth while knowing in case the unexpected happens! Similarly, the ARRL v.h.f. QSO party will be held on June 8-10. If you can't find any DX to work, you could also participate in the UK Six Metre Group 'Summer Sp-E Contest' being held on the same date and lasting for 48 hours. The contest exchange consists of RST, membership number and locator. Serial numbers are not required.

A 70MHz phone contest organised by the Worked All Britain (WAB) group, has been arranged for June 9 between 1400-1800UTC. Exchange signal reports and WAB area.

An RSGB 144MHz contest

commences at 1400UTC on May 18. There are entry categories for single and multi operators and for the s.w.l.

A 144MHz telephony contest has been organised by the WAB group to run between 0900-1700UTC on June 30. This contest is for QRP operation only. Further details of all WAB contests can be obtained from G4SKQ QTHR.

Operators of the 430MHz band are well catered for during the weekend of June 22-23. An f.m. contest for fixed and portable stations, will be held between 1400-1800UTC on the 22nd followed by a c.w. event between 2000-2400UTC. On June 23, the 430MHz Trophy contest will be held between 0900-1700UTC.

A number of microwave contests have been arranged throughout the summer season, to take advantage of the enhanced tropo conditions during this period. Two contests, the 1.3GHz Trophy and the 2.3GHz Trophy will be held on June 2, both between 0600-1400UTC.

Cumulative contests, for the bands between 3.4GHz and 24GHz, will be held between 0900-2100UTC on May 26, June 16, July 14, August 18, September 15 and October 20.

The Danish Society EDR have organised a microwave activity week to run between June 15-22. The event is intended to promote narrowband activity on the 10GHz band.

A Mayday microwave ATV contest, organised by the BATC, will run between 0001-2359UTC on Monday May 12. It is intended for fast scan television on all bands from 1.3GHz and up. A European co-ordinated ATV event will be held on June 8-9, commencing at 1400UTC. It is for either slow scan or fast scan modes on all authorised bands.

Scandinavian activity contests will be held on the following dates: 50MHz activity on May 28, 144MHz on June 4, 430MHz on May 14 and June 11 and Microwaves on May 21 and June 18. All band sections run between 1700-2100UTC. You can obtain a full set of rules by sending me a stamped addressed envelope.

## Deadlines

Please send your letters to reach me by the end of the month. I always write up the column in the first few days of the following month. Don't forget that I can also receive messages via packet radio at my mailbox GB7TCM.

Photographs of your shack, antennas or any v.h.f. activity are especially welcome. Other pictorial items such as QSL cards, awards, certificates etc are also required. These can all be returned if necessary.

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# Back-Scatter

## Broadcast Round-up

Reports to Peter Shore via the PW Editorial Office

There was a sharp intake of breath amongst the international broadcasting community on March 22, when Radio Canada International announced that it had been hit by the worst budget cuts in its history, resulting in the cessation of many RCI broadcasts. No longer would RCI programmes in English and French be produced: broadcasts in these languages would be replaced by relays of the Canadian Broadcasting Corporation's domestic services. Japanese, German, Portuguese, Czech, Slovak and Hungarian services ceased, although Russian, Ukrainian, Arabic, Spanish and Chinese continue. The station's budget of Can\$20 million was cut to around Can\$13 million, which the Canadian government will fund. Around half of the station's 193 employees lost their jobs. Details of the current schedule of English programmes appears later in this column. The producer of RCI's *SWL Digest*, Ian MacFarland, plans to move to Radio Japan, where he will presumably host the DX programme, and continue many of the features which have been popular on the *SWL Digest*.

Radio Tirana has stopped broadcasts in Persian, Chinese, Indonesian and Swedish - a curious mixture - and some other languages have had their hours reduced. The overall reduction in the station's output is more than 30%, from 458 hours a week to around 310. More details in the 'European Stations' section.

A clandestine station which has been operating for almost seven years closed on March 20. Radio Iran Toilers, operating from transmitters inside Afghanistan, was against the regime in Iran, but believes that sufficient changes have occurred in the Islamic Republic to render the clandestine operation unnecessary.

The Voice of Turkey which has expanded its Arabic service has announced that it is to increase the number of languages it broadcasts in, according to TRT's director, Kerim Erdem. No other details have been announced so far, but we'll keep you up-to-date.

The time for summer holidays is approaching, and now may be a time to consider a portable short wave radio to keep in touch with the h.f. bands, and BBC World Service of course. One reasonably priced receiver is the Sony ICF-7600DA. This is not to be confused with the more sophisticated - and expensive - 7600DS which has push-button tuning, s.s.b. and so on. The 7600DA is, however, a reasonably modern set, offering both an analogue tuning scale and digital frequency read out, the best of both worlds! But the difference between most sets having an analogue tuning scale and the 'DA', is that on this receiver it is an l.c.d. There are 12 short wave bands, covering the present broadcast bands from 900 metres to 11m, including the 21m or 13MHz band. Medium wave and

long wave are cleverly combined in one band, and there is v.h.f. f.m., too. Tuning is by a conventional rotary knob on the right-hand side of the set, coupled with five memories on each band (short wave, f.m., and the combined medium/long wave bands). Short wave tuning is in 5kHz steps, and although the short wave spectrum is divided, most out-of-band frequencies are covered, for example 9.41 and 12.095MHz for BBC World Service. Sensitivity is adequate, but selectivity suffers on short wave from a slightly too wide filter. However, with a clock and alarm facility, main power off switch and ear phone socket all in a package the size of a paperback book, the set makes an ideal travelling companion. In the UK the Sony ICF-7600DA costs around £140.00.

### Europe All times GMT(=UTC)

Radio Tirana's schedule of English broadcasts is now:

0230-0300 on 11.825, 9.76MHz  
0330-0400 on 11.825, 9.76MHz  
0430-0500 on 11.835, 9.48MHz  
0630-0700 on 9.50, 7.205MHz\*  
1130-1200 on 11.835, 9.48MHz  
1400-1430 on 11.985, 9.50MHz  
1530-1600 on 11.835, 9.50MHz  
1830-1900 on 9.48, 7.12, 1.395MHz\*  
2030-2100 on 11.835, 9.50MHz\*  
2230-2300 on 9.48, 7.215, 1.395MHz\*  
2320-2400 on 11.825, 9.76, 7.30, 6.12MHz

European services are marked\*.

BRT Brussels in Belgium has made some alterations to its schedules, with news now at weekends as well as Monday to Friday. There is now news at the start of all editions of *Brussels Calling*, and on Saturdays there is a new press review at 0900.

Some changes to Radio Netherlands Australasian service occurred in early April, with the expansion of the 0830 transmission to a full 55-minute programme each day (replacing the 25 minute broadcast). The frequency changed to 9.63MHz, ex 9.77MHz. There is a new transmission to Australia at 0930-1025 on 11.895MHz. The English transmission at 1030 is replaced by Dutch which is carried on 11.89 and 6.02MHz. Radio Netherlands has introduced some single side-band test transmissions from its new transmitters at the Bonaire relay station. These can be heard at 0030-0125 on 15.56MHz u.s.b. This transmission is in compatible s.s.b. mode, with 6dB carrier reduction. There is a transition period for the complete change-over of all short wave broadcasting from the current double side-band mode to s.s.b., which has to be completed by the end of 2015. This date may be advanced by the World Administrative Radio Confer-

ence (WARC) to be held in February 1992. Some countries want the date for the complete switch-over to s.s.b. transmissions advanced. There are some drawbacks to this, however. Most of the world's radio sets, particularly in the Third World where the majority of the international radio audience lives, are not s.s.b. capable. Will these listeners be deprived of access to short wave broadcasts, or will there be a massive release of cheap s.s.b. sets on to the world market?

Radio Norway is also using s.s.b. transmissions in its summer schedule, and Danmarks Radio, which is broadcast over Radio Norway's facilities, has s.s.b. transmissions too. The present schedule is:

0500-0600 on 17.765 u.s.b., 15.175 u.s.b.  
0600-0700 on 21.705 u.s.b., 17.765 u.s.b.  
0700-0800 on 17.765 u.s.b., 15.165 u.s.b.  
0800-0900 on 21.73 u.s.b., 17.74 u.s.b.  
0900-1000 on 25.73 u.s.b., 21.73 u.s.b.  
1000-1100 on 15.165 u.s.b.  
1100-1200 on 17.79 u.s.b.  
1200-1300 on 21.705 u.s.b., 21.695 u.s.b.\*, 17.82 u.s.b.\*  
1300-1400 on 21.71 u.s.b., 17.79 u.s.b.  
1400-1500 on 21.71 u.s.b., 17.79 u.s.b.  
1500-1600 on 21.705 u.s.b., 17.79 u.s.b.\*  
1600-1700 on 21.705 u.s.b.\*, 17.755 u.s.b., 15.23 u.s.b.  
1700-1800 on 21.705 u.s.b., 17.76 u.s.b.  
1800-1900 on 17.755 u.s.b.\*  
1900-2000 on 21.705 u.s.b., 17.73 u.s.b.\*  
2000-2100 on 21.705 u.s.b.  
2100-2200 on 21.705 u.s.b., 17.74 u.s.b.  
2200-2300 on 17.73 u.s.b.  
2300-2400 on 17.755 u.s.b.

Radio Norway uses the frequencies for the first thirty minutes in the hour, and Danmarks Radio takes over at half past. English programmes from Radio Norway are carried on Saturdays and Sundays on the frequencies marked\*.

Staying with Scandinavia, Radio Sweden changed some timings with the European clock changes. English language programmes are now carried to Europe at:

1700-1730 on 9.615, 6.065, 1.179MHz  
1830-1900 on 15.27, 6.065MHz  
1930-2000 on 9.655, 6.065, 1.179MHz  
2030-2100 on 1.179MHz  
2200-2230 on 6.065, 1.179MHz  
2330-0000 on 11.705, 9.695, 1.179MHz

In Latvia, Radio Riga International has English and German news summaries at 2130 on 576kHz and 5.935MHz, whilst an English service on Saturdays is heard at 1830 on 5.935MHz, repeated on Sundays at 0700 on 5.935MHz.

### Africa and the Middle East

An unlikely catch unless you are travelling to Africa, is Radio Ghana's external service on 6.13MHz. English is carried 0645 to 0745 and 1845 to 2000, with French at 0800-0900 and 2000 to 2100.



Iraq is now back on its old frequency of 15.60MHz in parallel with 8.35MHz. These channels carry the domestic service Radio of the Iraqi Republic in Arabic. The station is on the air from 0125 until 2200 close-down. Other frequencies to watch are 6.54, 4.6 and 3.98MHz. Meanwhile there is a clandestine Voice of Iraqi Kurdistan, hostile to the Saddam Hussein regime, operating on 5.684MHz at around 1830 to 1930. The station has also been noted on 5.941MHz.

Another clandestine operation is the Voice of the People of Kurdistan, which has been noted on both 3.96MHz and occasionally on 7.03MHz. One time to try is at 1700, although the station operates during the morning period in Iraq, which suggests around 0700 onwards.

Radio RSA, which as regular readers will know, no longer transmits to targets outside Africa, has English transmissions:

0400-0500 on 11.92, 7.27MHz  
1100-1200 on 17.835, 11.90, 11.805, 9.555MHz  
1500-1700 on 17.835, 15.21, 7.23MHz  
1700-1800 on 17.835, 15.21, 7.23MHz

A new 600kW long wave transmitter located at Van, is testing in Turkey on 225kHz. It carries TRT Radio 1 and covers eastern and south eastern Turkey.

### Asia and the Pacific

AWR Asia has introduced services to the Soviet Union and Africa. Russian is now heard from the Guam based station at 1000 daily and 1900 at weekends only, all on 13.72MHz. Swahili is on the air at weekends also on 13.72MHz.

Radio Bhutan is now using a new 50kW transmitter for its short wave service on 5.025MHz. The station has local languages between 1100 and 1415, with English 1415 to 1500. The station seems to be audible mainly in northern and eastern parts of India, but is a rare catch in Europe.

Radio Pakistan's English service to Europe is heard now at:

0800-0845 on 21.52 and 17.595MHz  
1100-1120 on 21.52 and 17.595MHz  
1600-1630 on 21.48, 17.725, 17.555, 15.515, 13.665 and 11.57MHz  
1700-1800 on 9.37 and 7.305MHz

The Voice of America relay station in the Philippines is carrying the newly inaugurated Tibetan service. It is heard at 0230-0245 on 15.43, 17.705 and 21.57MHz.



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# INDEX TO ADVERTISERS

AH Supplies .....	38	Maplin Electronics Cover iv	
AKD .....	46	Martin Lynch .....	17, 33
ARE Communications .....	7		
Allweld Engineering .....	59	Nevada .....	51
Arrow Radio .....	8	PWT Electronics .....	52
Birkett, J .....	38		
Bredhurst Electronics .....	57	R & D Electronics .....	38
		RAS Nottingham .....	38
CB Sales Devon .....	46	RSGB .....	59
Castle Electronics .....	52	RST Valve .....	20
Colomor .....	38	Radio Shack .....	64
		Raycom .....	29
Datong .....	22		
Dewsbury .....	29	SEM .....	38
Dressler Communications	30	SRW Communications .....	52
		Siskin .....	22
ERA .....	57	South Midlands Communi-	
		cations .....	Cover ii, 4, 5
Howes C.M Communi-		Spectrum .....	22
cations .....	18	Stephens James .....	26
		Suredata .....	57
ICS Intertext .....	46		
Icom (UK) .....	2, 3, Cover iii	Technical Software .....	26
Johns Radio .....	57	Ward Reg & Co .....	52
		Waters & Stanton .....	6
KW Communications .....	44	Western Electrical .....	26
Kings Lynn Radio Rally ...	46		
Lake Electronics .....	38		
Langrex Supplies .....	22		
Low Electronics .....	18		

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<b>AKAI</b>			
VS9300/EK Svc Man	VCR 2.50	4210 Svc Man	CTV 2.00
VS9300EG Svc Man	VCR 2.50	4210 Svc Man	CTV 2.50
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2252R Svc Man	CTV 2.50		

### Abbreviations:

Svc .....	Service
Man .....	Manual
CTV .....	Colour TV
T/T .....	Teletext
Sys .....	System

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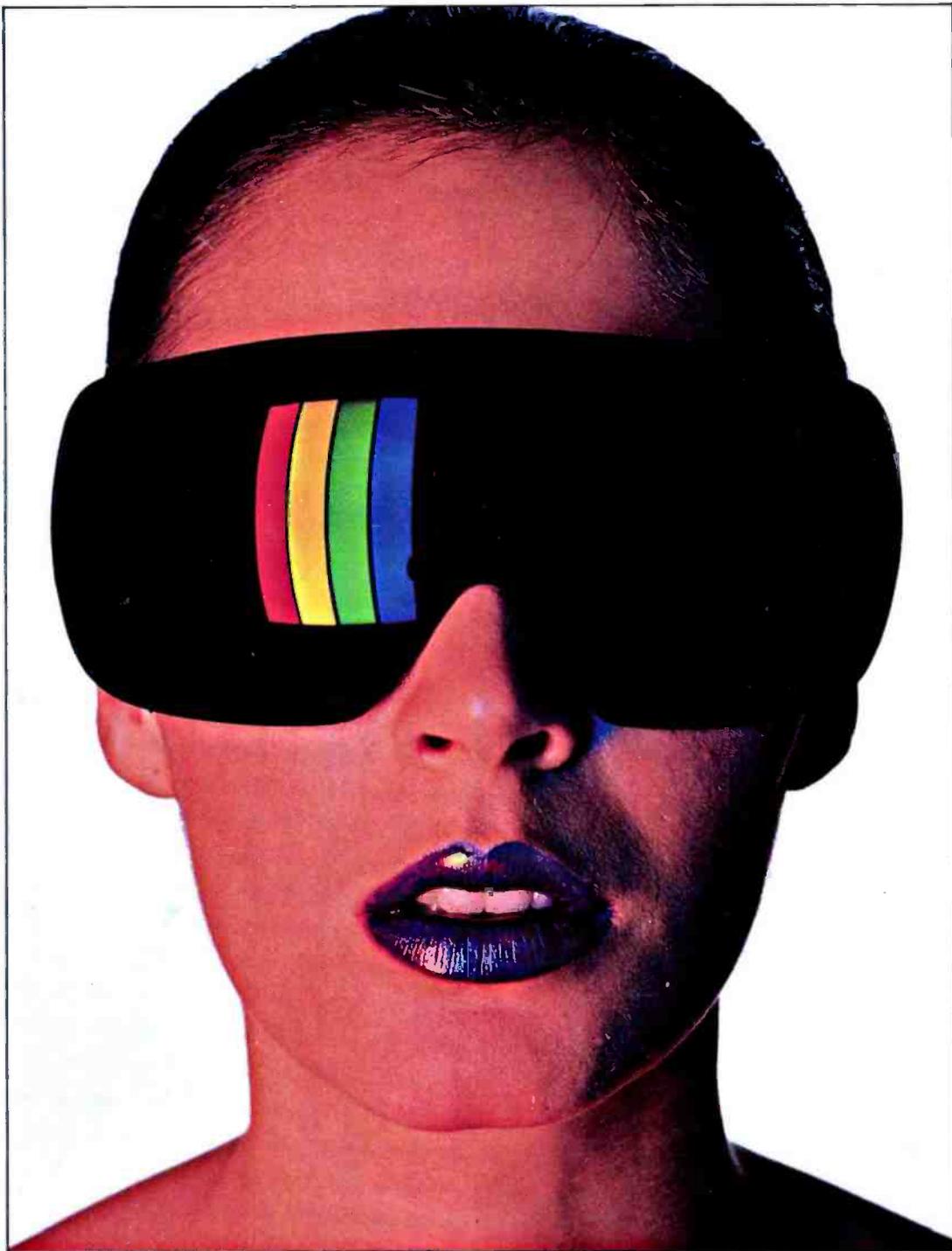
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