BUILD
THE PW PEANUT TRANSCEIVER
Amateur Radio In A Nutshell
A LOW VOLTAGE ALARM

FEATURES
ALTERNATIVE TECHNOLOGY
RADIO PERSONALITY
CB CORNER

REVIEWS
NEW HOWES SSB EXCITER KIT
MAPLIN 1GHz FREQUENCY COUNTER

PLUS
BACKSCATTER - RADIO DIARY
COMPETITION - PW DISCOUNT VOUCHER
AND A GREAT DEAL MORE!
OUR COMPLETE LINE OF PORTABLE POWER TOOLS.

When you're talking Yaesu handhelds, power takes on many meanings.

Like maximum RF output. Sophisticated microprocessor control. Deceptively simple operation. Even cost savings—as most accessories are interchangeable throughout the line.

Added up, it's no wonder amateurs choose Yaesu HTs more than any others.

**FT-470. DUAL-BAND OPERATION PERFECTED.**


**FT-411 SERIES. MAXIMUM SINGLEBAND PERFORMANCE.**


**FT-23R SERIES. SMALL, SMART, RUGGED.**


Want more information? Call (0703) 255111 or call into your local authorised Yaesu dealer and ask about the FT-470, FT-411 and FT-23R Series handhelds. The power in handheld performance.

**South Midlands Communications Ltd, S M House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire, SO5 3BY. Telephone (0703) 255111, Fax (0703) 263507, Telex 477351 SMCOMMG.**

Prices and specifications subject to change without notice.

- YAESU
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**June 1990**

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**FRONT COVER**

The Rutland 'Windcharger' kindly loaned by Marlec Engineering of Corby, Northamptonshire.

Thanks also to Beacon Hill Touring Park, Blandford Road North, Nr. Poole, Dorset for the photography location.

**Regular Features**

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The ICOM IC-751A was created for the ham operator who demands high performance whether entering contests, chasing DX or just simply enjoying the shortwave bands. It is an all mode solid state transceiver with a host of features designed for the crowded HF bands of today.

Additional features include 9MHz notch filter, adjustable AGC, noise blanker, RIT and XIT. A receiver pre-amp and attenuator provides additional control when required. The FL32 9MHz/500Hz CW filter is fitted as standard with CW sidetone on Rx and TX modes. On SSB the new FL80 2.4Khz high shape factor filter is fitted.

The transmitter is rated for full 100% duty cycle with a high performance compressor for better audio clarity. With 32 memory channels and twin VFO's, scanning of frequency and memories is possible from the transceiver or the HM36 microphone supplied.

The IC-751A is supplied for 12v operation but can be used with either internal or external A.C. power supply. It is fully compatible with ICOM auto units such as the IC-2KL linear amplifier and the AT500/100 antenna tuners.

Options available:- PS35 internal AC power supply, PS15 external AC power supply, EX310 voice synthesizer, SM8 desk microphone and SP3 external loudspeaker.
Count on us!

IC-726 HF/50MHz ALL MODE TRANSCEIVER
HOT ACTION ON THE HF AND 50MHz BANDS

Now that the HF and 50MHz bands enter a period of intensity, conditions for long distance communications have never been better.

The new ICOM IC-726 is a compact, easy to use transceiver which covers the amateur bands from 1.8 to 50MHz. It can be used in your home, car and in portable locations on SSB, CW, AM and FM modes.

With minimal switches and controls enjoy uncomplicated operating for beginners or veterans alike. And ICOM have incorporated their superior DDS (Direct Digital Synthesizer) system, a feature that enhances PLL lock up times. The same feature is built into ICOM's state-of-the-art IC-781 advanced H.F. Transceiver.

Other features include a general coverage receiver, dual VFO's, band stacking registers, attenuator, preamp, noise blanker, RIT, memories and much more. R.F. output is 100W on the H.F. band and 10W on 50MHz band from separate antenna sockets.

An optional AH-3 H.F. Automatic Tuner will allow you to operate on the H.F. bands in any location. Just push the tuner switch on the IC-726 and the tuner automatically adjusts for a minimum VSWR. The tuner can match a 12M longwire across the 160-10M bands. Use the weather resistant AH-3 in your car (with AH-2b mount and whip) boat, at home or in the field.

Options and Accessories:

- AH-3: H.F. Automatic tuner
- AT-150: A.F. Automatic matching tuner
- PS-55: AC power supply
- CR-64: High stability crystal
- FL-100: CW narrow filter 500Hz
- FL-101: CW narrow filter 250Hz
- SM6/SMB: Desk microphones
- SP7: External loudspeaker

**Helplines:** Telephone us free of charge on 0800 521145 Mon-Fri 0900-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

**Datapost:** Despatch on same day whenever possible.

**Visa & Mastercards:** Telephone orders taken by our mail order dept. instant credit & interest-free HP.
SUMMER SPECIALS
70CMS HANDHELD BARGAIN
BRAND NEW EX COMMERCIAL HANDHELDs
SUITE FOR USE ON 70CMS
6 CHANNEL CRYSTAL CONTROLLED TRANSCEIVER
SUPPLIED C/W NICAD (LESS CRYSTALS & CHARGER)
ONLY £99.00 inc VAT

OTHER OFFERS

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<td>SQ144</td>
<td>2m Swiss Quad</td>
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<td>76B</td>
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<td>GP23</td>
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<td>50/5</td>
<td>5 ELE 6m YAGI</td>
<td>£51.52</td>
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PERFECT PORTABLES

What could Yaesu engineers do to improve on the hugely popular FT90R series? The answer was easy, they designed and built the FT90R2 series.

The FT90R2 series of transceivers provide high performance and a 2.5W output, when used with 'C' cells or nicads, ideal for serious portable operators, or when combined with matching linears, an easy to use compact multimode mobile or base station.

What more could you ask from a transceiver?

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FT690R2 RRP £429.00 inc
FT790R2 RRP £499.00 inc

ALL THE ABOVE ARE SUPPLIED WITH FBA8, MH10E8, STRAP AND ANTENNA AS STANDARD.

OPTIONS INCLUDE

- FL2025 2m 25W LINEAR £115.00
- FL6020 6m 10W LINEAR £105.00
- FL7025 70cm 25W LINEAR £139.00
- FBA8 EMPTY CELL CASE £27.00
- MM831 MOBILE BRACKET £17.50
- CSC19 VINYL CASE £8.50
- NC28C NICAD CHARGER £11.50
- FTS7 CTcss UNIT £40.00

SOUTHAMPTON SHOWROOM open 9.00-5.00 Monday to Friday, 9.00-1.00 Saturday. Service Dept open Mon-Fri 9.00-5.00.

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SAGRA-600
★ 2m Linear Amplifier
★ 600W Output 25W Drive
★ 2 x 4CX250B VALVES

NOW ONLY £769.00

AS REVIEWED IN APRIL 90 HAM RADIO TODAY

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HL165V 6m 3/10W in 80-160W out RX Preamp £249.00
HL37V 2m 3W in 32W out RX Preamp £89.00
HL62V 2m 10W in 60W out RX Preamp £135.00
HL110V 2m 2/10W in 100W out RX Preamp £215.00
HL180V 2m 3-25W in 120W out RX Preamp £295.11
HL36U 70cm 3/10W in 40-50W out RX Preamp £135.00
HL60U 70cm 10/25W in 50W out RX Preamp £215.00
HL130U 70cm 3-25W in 120W out RX Preamp £399.00

VHF LINEARS

HL/KGX 160-10m 2 x 4CX250B 1Kw PEP RF INPUT £945.00
HL2K 160-10m 2 x 3-5007 2Kw PEP RF INPUT £1425.00

HENRY RADIO LINEARS

5k £3895.00 3k CLASSIC inc 160m £2995.00

LIGHT IN THE HAND AND ON THE WALLET

OPTIONS AVAILABLE

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FBA10 7.2/29V cell case only 6xAA £11.50
FBN10 12.0V 500mAh Nicad pack £34.50
FBN12 12.0V 500mAh Nicad pack £57.50

CHARGERS
NC1C Charger mains (FNB10) £17.17
SMC01 Charger mains (FNB12) 13A style £12.80
NC2C Charger mains (FNB12) 1A style £13.80
NC29 Desktop quick charger 5hr (FNB10/11/12) £99.00

SPEAKERS/MIC
MH18B Speaker/mic £31.05
MH18AB Speaker/mic Miniature type £31.05

CASES
CSC23 Soft Carrying Case (FBA10/FBN10) FT23/73 £10.58
CSC28 Soft Carrying Case (FBA10/FBN10) FT23/73 £16.58
CSC36 Soft Carrying Case (FBA10/FBN10) FT411/811 £10.00
CSC37 Soft Carrying Case (FNB12/14) FT411/811 £10.00

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VHF Headset PTT via VOX (except FT23/73 & FT470) £28.75
PAD Mobile DC Adapter/Charger (FNB9/10) £24.15
DCTPA6 DC Lead for PAM cig lighter (Plug) £4.03
CLIP1 Belt Clip £4.00

FREE INTERLINK DELIVERY on major equipment
Small items: Plugs, Sockets, etc by cost £1.75. Antennas, cables, Wires & larger items, Lynx up to £5. Interlink delivery available, upon request for items other than radios from £7.30 depending on weight. Same day despatch whenever possible.

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FREE FINANCE ON SELECTED ITEMS
On many regular priced items. SMC offers Free Finance (on invoice balances over £120) 20% down and the balance over 6 months or 50% down and the balance over a year. You pay no more than the cash price!
Details of eligible items available on request.

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FANTASTIC SAVINGS ON SOME OF YAESU’S BEST SELLING RADIOS

FT736R*  NOW ONLY £1199
SAVE £160
*CAN BE EASILY INTERNALLY LINKED FOR 9600 & 1200 BAUD PSK PACKET OPERATION

FT4700RH  NOW ONLY £499
SAVE £176

FT470  NOW ONLY £349
SAVE £40

TRANSCEIVER ONLY
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ALSO AVAILABLE FROM ALL SMC BRANCHES BUT ONLY WHILST STOCKS LAST

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AXMINSTER (0297) 34918

LEEDS (0532) 350606
BIRMINGHAM 021 327 1497

For full addresses see display advert
PALOMAR TUNER-TUNER™

£99.95

Do you use an antenna tuner? Then you need the new Palomar Tuner-Tuner to tune it to your operating frequency without transmitting. Just listen to the Tuner-Tuner’s noise with your receiver. Adjust your tuner for a null and presto! You have 1:1 SWR. It’s as simple as that.

PALOMAR R-X NOISE BRIDGE

£59.95

£124.95

The only meter that shows PEP output directly, accurately, instantly.

Shows power and SWR on bright red light bars. See PEP and SWR while you talk! Automatic “hands-off” SWR reading. Power ranges 20-2000 Watts. Works from 1-30 MHz. Power required 12-12 V DC.

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Can’t hear the weak ones when conditions are bad? Receiver lacks sensitivity on 20, 15 or 10? Get the world famous Palomar preamplifier. Tunes from 160 to 8 meters, gives 20 dB extra gain and a low noise figure to bring out those weak signals. Reduces image and spurious responses too.

An RF sensing circuit bypasses the preamplifier during transmit. The bypass handles 350 Watts.

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Open Mon-Fri 9am-5pm except Wed 9am-12.30pm. Sat 10am-4pm

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GOODS NORMALLY DESPATCHED WITHIN 24 HRS. — PRICES CORRECT AT TIME OF GOING TO PRESS. P&P £2.00 airmail.

24 HRS. — ORDER MUST BE RECEIVED BY 3.30PM ON THE DAY BEFORE DELIVERY.

TÉLÉPHONE

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High St, Handcross, W. Sussex.

RH17 6BW (0444) 400786

Open Mon-Fri 9am-5pm except Wed 9am-12.30pm. Sat 10am-4pm

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GOODS NORMALLY DESPATCHED WITHIN 24 HRS. — PRICES CORRECT AT TIME OF GOING TO PRESS. P&P £2.00 airmail.

24 HRS. — ORDER MUST BE RECEIVED BY 3.30PM ON THE DAY BEFORE DELIVERY.
"A DREAM COME TRUE"

TO ALL FT 290 OWNERS, OR FOR THOSE WHO WANT TO OPERATE HF FROM THEIR 2 METRE RIG——

TOKYO HI POWER HAVE PRODUCED THIS SUPERB TRANSVERTER DRIVEN FROM 144-146MHz AT 3-10W AND PRODUCING 40 WATTS OF EITHER FM OR SSB ON EITHER 10-15-20-40-80 METRES.


SO WHY NOT ENJOY THE IMPROVING CONDITIONS ON THE HF BANDS USING YOUR 2M EQUIPMENT.

£249 — CASH/ CHEQUE/ CREDIT CARD
OR 12 PAYMENTS OF £23.76

Kenwood TS440S & Auto ATU
One of the finest HF transceivers ever produced by Kenwood. Whether used as a base station or mobile — its superb specification rates it high amongst its competitors.
Special Exhibition Offer TS440S with auto ATU AND FREE Revex 30amp power supply — at list price or 48 payments of £43.08.

£1,282 WITHOUT AUTO ATU £1039

STANDARD C520
£379.00

NOW NO DEPOSIT AND UP TO 4 YEARS TO PAY

WHEN IT COMES TO BREAKING THE PRICE BARRIER WE ARE RARELY BEATEN. NOW A SUPERB DUAL BAND TRANSCEIVER FROM STANDARD AT AN AMAZING £379.00
CASH/CHEQUE/CREDIT CARD OR NO DEPOSIT AND 36 MONTHLY PAYMENTS OF £15.23 PER MONTH

Here are 25 good reasons why you should consider the new STANDARD C520

* Dual band receive
* Full duplex transmit (between 2 & 70)
* Receive coverage 130-175MHz, 330-470MHz & 820-960MHz

LICENSING CREDIT BROKERS A.P.R. 29% SUBJECT TO STATUS
Enjoy a cup of Brenda’s coffee while you browse

Brenda G4VXL

Both Brenda and Bernie will be pleased to welcome you to our stand at the N.E.C.

Bernie G4AOG

ICR7000HF Receiver
500kHz — 2GHz

YES, 500kHz to 2GHz CONTINUOUS receive in one unit. Using the ICR7000 multimode facilities, this probably makes the “2 in 1” ICR7000HF Receiver the most versatile scanner available today. Because of the enormous frequency coverage, the ICR7000HF has 200 mode sensitive channels for increased flexibility.

Now available on A.R.E. super credit terms. 48 monthly payments of £33.23 A.P.R. 29% Cash/cheque/credit card price. £989.

REMEMBER
WE SELL ALL WELL KNOWN BRANDS. LET US QUOTE FOR YOUR CHOICE KENWOOD — ICOM — STANDARD

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<td>ICOM726</td>
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<td>ICOM725</td>
<td>£23.49</td>
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4 YEARS TO PAY @ £23.49

KENWOOD TS140S
PHONE ANY OFFICIAL KENWOOD DEALER AND ASK FOR THE PRICE OF THE TS140 AND YOU WILL HEAR £862 — HE MAY OFFER YOU A DISCOUNTED PRICE OF SAY £799. BUT WE ARE OFFERING THIS SUPERB TRANSCEIVER FOR £699

WE HAVE BEEN FORTUNATE IN PURCHASING A LARGE QUANTITY OF YAESU FT 747GX TRANSCEIVERS DIRECT FROM OUR AGENT IN JAPAN AND WE ARE PLEASED TO BE ABLE TO OFFER THESE AT THE AMAZING PRICE OF £499 INC VAT.

CW & AM FILTERS ARE AVAILABLE AT £35 EACH

AVAILABLE WITH NO DEPOSIT AND 48 MONTHS TO PAY — £16.77 PER MONTH
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 ALTOGETHER A SUPER ECONOMICAL HF TRANSCEIVER

PHONE FOR DETAILS

PHONE 081-997 4476

Practical Wireless, June 1990
### ALINCO ALX2E SUPER DEAL!

**2M Handy**

£149!

- **140-150MHz**
- **3 Watts/500W**
- **Memory channel**
- **Battery save**
- **Charger**
- **Ni-cad**
- **Aerial**
- **Strap**

**Specifications**

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<tr>
<td>Matching PA</td>
<td>£10.45</td>
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</table>

**SUPER DEAL!**

- **Voice module**
- **Manual antenna tuner**
- **Mobile mount**
- **Compact nicad charger**
- **70cm handheld**
- **2m/70cms FM handy**
- **2m/70cms mobile 50W**
- **Mobile Speaker**
- **External speaker**
- **Matching PSU**

**Case & belt hook**

£375.00

**Plastic case**

£379.00

**DC cigar lead**

£26.00

**SUPER DEAL!**

- **Speaker/ mic**
- **12V charger**
- **Soft case**
- **Mains charger FNB9**
- **70cm body**
- **2m/70cm body**
- **2m/70cm mobile 50W**
- **Manual antenna tuner**
- **Mobile mount**
- **Compact nicad charger**
- **70cm handheld**
- **2m/70cms FM handy**
- **2m/70cms mobile 50W**
- **Mobile Speaker**
- **External speaker**
- **Matching PSU**

**Case & belt hook**

£385.00

**DC cigar lead**

£26.95

**SUPER DEAL!**

- **Speaker/ mic**
- **12V charger**
- **Soft case**
- **Mains charger FNB9**
- **70cm body**
- **2m/70cm body**
- **2m/70cm mobile 50W**
- **Manual antenna tuner**
- **Mobile mount**
- **Compact nicad charger**
- **70cm handheld**
- **2m/70cms FM handy**
- **2m/70cms mobile 50W**
- **Mobile Speaker**
- **External speaker**
- **Matching PSU**

**Case & belt hook**

£398.00

**DC cigar lead**

£49.95

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**MAIL ORDER OR RETAIL**

**FST, FRIENDLY EFFICIENT**

**STANDARD POST FREE THIS MONTH**

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**The VSWR “Work Horse”**

Probably in use in more stations than any other meter.

We don’t normally advertise it as it sells by word of mouth. But just in case word hasn’t yet reached you read the spec below and see why it is the “Best Seller”.

### DIAMOND SX200

- **1.8 - 200 MHz**
- **Power Range 5/20/200 W.**
- **-/+ 5% Accuracy**
- **Sensitivity 1 Watt**
- **Large Meter**

£65

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**WATERS & & STANHOPE**

**RETAIL ONLY:** 12 North Street, Hornchurch, Essex RM11 1QX Tel: (04024) 44765

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Practical Wireless, June 1990
ALINCO PRICES DOWN!
NOW EVEN BETTER VALUE

2m or 70cms!
Singlebander

Models
DR110E 2m
DR410E 70cms

- 455/5 Watts (70cms 35/5)
- 6 Frequency Steps
- Reverse Repeater
- Priority Channel
- Rotary Knob tune
- Down/Down Mic.
- Mounting Hardware
- DC Cable
- 12 Month Warranty
- 170MHz Rx Option
- Minute Dimensions

* DR410 70cms Price: £299

2m & 70cms!
Dual-Bander

Part Exchange Welcome
Extended Rx Option

DR510E
- 45/35 Watts 2m - 70cms
- Full Duplex
- Single Ant. Socket
- 14 Memories
- 4 Scanning Modes
- 6 Channel Steps
- Reverse Repeater
- Priority Channel
- Rotary Tune Knob
- Up/Down Mic

DJ - 160
2 Metre
3 Watts
Rx Option:
130 - 180MHz

Small Size:
132 x 57 x 32mm

Rotary Tuning!
- 144 - 146MHz Tx
- LCD Readout
- Key-pad Entry
- 20 Memories
- Scan/Priority
- Call Channel
- Reverse Repeater
- 5 Steps inc. 12.5kHz
- DTMF
- Battery Saver
- Auto Power Off
- Programme Offset
- Direct 12 volt
- 700mAh Ni-Cad
- AC Fast Charger

NEW!

DUAL - BAND HANDY!
2m & 70cms Full Duplex

DJ-500E
Receive Option:
140 - 170MHz
430 - 460MHz
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Keylines

One of the great pleasures that comes my way when attending rallies or junk sales, is the chance of finding a bargain. At this time of year it is possible to have an enjoyable day out, purchase all the 'best buy' components and also buy that 'value for money' piece of equipment.

No doubt, you've also found that your particular 'best buy' is often put to one side on arrival in the shack, awaiting the time it will become useful. Unfortunately, there's also no doubt that some of today's 'bargains' will be a best buy for someone else at a rally next year and so on.

In the past I hoarded items for 'rainy days' that never arrived, but nowadays I keep a look-out for gear that I particularly need. In fact I've just attended a very good 'junk' sale and have come away with some very useful 'goody bags' of components for a school radio club. As the same date I bought an excellent home-brew transceiver chassis with all the metal work (which I never very good at anyway) completed. With some re-thinking and adjustment to the chassis, the school club will eventually have an attractive c.w. transceiver for a very small outlay.

This aspect of amateur radio is an important one to me (to say the least). To purchase - at a very reasonable price - the necessary parts for equipment, meet friends and see what's on offer from the various dealers' stands - all in one day - must be one of the most valuable assets we have in our hobby.

Bring & Buy

Apart from the dealers' stands that keep me going on components until next year, the main attraction for me is the essential 'Bring & Buy' stall. Here, for a small commission, equipment is sold on your behalf. My first oscillator was purchased in this way and I'm pleased to say that it is still going strong - albeit in someone else's shack.

Unfortunately, the main rally season is limited for many of us by our time and pockets. The era has long since passed when I could afford to travel for pleasure to as many as 20 events a year, and there must be many others in the same situation.

Many attractions offered by rallies, such as the bargain stalls, can only be partly off-set by the various small display advertisements in the magazine. Still, if we can't get to the various bring and buy sales - they could perhaps come to us via PW as a page devoted to reader's 'for sale' and 'wanted' advertisements.

The Wanna Swap? page, which already caters for part of the need, would be absorbed into the new 'Bargain Basement' section. Here, reader's prepaid, strictly limited lineage advertisements would be displayed. Still, I must stress at this point that the idea is only a suggestion open for your comment. Whether we do offer this facility will depend entirely on the response from you, the reader, and I look forward to hearing from you on this matter.

Going Green

As our front cover suggests, radio enthusiasts can truthfully claim to be among the pioneers with regards to alternative technology. For many years lone enthusiasts, clubs and groups have operating amateur radio stations from many varied and interesting locations without the benefit of 'mains' electricity. Indeed it has always been a challenge for some radio amateurs, to operate under the most difficult conditions possible. Despite tremendous difficulties they've often achieved excellent DX results from small islands, reefs and even remote pinnacles of rock.

To operate from sites like those already mentioned requires a variety of alternative energy sources. Often, the power required will be supplied from a petrol-driven alternator which, over the years, has evolved into a reliable, although expensive stand-by system. But some sites demand that other, more 'neighbour friendly' methods of obtaining power be utilised so that operations can continue with the minimum disturbance to other users.

In particular I'm thinking of portable operation from the many caravan and camping sites, hilltop and off-road picnic and beauty spots that abound in the British countryside. Despite being a long-time radio enthusiast, I am not keen to find myself on a beautiful hill-top site occupied by someone using a petrol-driven alternator set. Unfortunately this is becoming a very common occurrence as many caravans and motor-caravans require an external source of 250V a.c. to power air-conditioning systems when the vehicle is stationary. So, you can easily imagine a popular location on an otherwise quiet and peaceful day, being spoilt by the sound (albeit subdued on modern machines) of these generators and their inevitable exhaust fumes.

Fortunately the 'Green' lobby has had a head start in the caravan, camping and yachting fraternity. For many years, alternative energy sources have been available from the appropriate specialist shops and chandlery. Very often the core of these alternative electrical power systems are based on the familiar workhorse of the vehicle world - 12V accumulators. In yachting circles (especially in craft not equipped with auxiliary engines) the battery will often be charged by various professionally-made wind 'turbines'. Further 'back up', for the rare windless days at sea, can be provided by small solar panels. Although having a low output, they have the advantage that they can be left to 'trickle charge' the battery during the long periods when the craft is unattended.

Ecologically Friendly

Many radio amateurs and users other than yachtsmen, caravanners and campers have found a need for these small and radiologically friendly systems. There are many remote locations in Britain where 'the mains' is not available and sometimes not wanted by the local inhabitants. They are perfectly able - unlike most of us - to live their lives without the aid of the local electricity boards. But, being many smaller they can 'reach the other parts' of our world -...to borrow a phrase!

When you consider that most amateur radio equipment is designed for operation directly from 12V d.c., most of our problems are solved and the rest can be overcome by the innovative approach that abounds in the radio enthusiast.

So, why not go green this year, rig your self up with a wind-power system consisting of a small (if you make your own), don't forget to tell PW about it) windmill-driven generator and solar-panel cell system to 'float charge' your battery. You could do it in time for the PW QRP Contest! But, be warned, don't be tempted to operate without the battery or you could disappear in mid-QSO when the wind drops or the clouds screen the sun. You could then suffer QSB of your own making!

73s DE G3XFD

Practical Wireless, June 1990
Dear Sir

I must respond and take issue with Sandy Dick GM0IRZ's letter, published in PW May 1990.

I have been a very active c.w. operator on all h.f. bands for twenty years and I do enjoy the mode. So quite obviously I am biased in favour of c.w.

I do feel however, that the requirement to confirm your ability to receive and send Morse at a rate of approximately one character per second, should not deter radio enthusiasts from operating on the h.f. bands. I do not feel the ability to send and receive Morse at twelve words a minute (or thereabouts) can be seriously considered as an imposition, neither does the ability confer elitism.

However, I am sure that serious radio enthusiasts should actually press for the maintenance of the Morse requirement nowadays more than ever. I say this because I'm sure that the average radio operator can build a very simple station for transmitting and receiving. The use of Morse is the only practical method of conveying intelligence on such simple equipment.

Following this line of thought, we must consider what justification ordinary members of the public can give to us holding a transmitting and receiving licence. Especially if we are just communicating on what justification ordinary members of the public will have to themselves, this end being achieved by a very sophisticated equipment costing a month's salary or more. This was say, thirty years or so ago when the modes most commonly used were c.w. and a.m.

Dear Sirs

I have just returned from a visit to India (again!) where I met James Kalassery VU2ARL, who runs a radio club in Cochin - The Society for the promotion of Amateur Radio, which I joined. They have considerable difficulty in obtaining technical books and magazines for teaching beginners and for more experienced Hams too. They would be most grateful if any of your readers who have redundant books, magazines, etc., would send them (by sea is cheaper) to:

The Hon Editor
Zero-Beat
PO Box 2437
Kollivattom
Cochin 682 016
INDIA

Zero-Beat is the half-monthly magazine of the Society (to which you can of course subscribe).

There are some 600-700 active amateurs in India out of about 5000 licences issued. The examinations are much like those in this country and the regulations are very obviously based on our own. I understand it is quite easy to obtain a reciprocal licence, but it is very time consuming. Two months is popular and a start is being made with packet. Large towns have repeaters, but as yet none for 432MHz. I was made to feel extremely welcome, and can thoroughly recommend a visit.

Peter Dolphin G3ELH
Hants

It seems a good idea to help in this way, and I hope the Indian club receives as much help as was achieved by the recent appeal on behalf of radio amateurs in Eastern Europe. But please send any donation direct and not to the PW office! Editor.
state or valves, only a few extra components are needed for the world of phone to be opened up using the mode of amplitude modulation.

The kind of circuit in November 1989 PW (an experimental a.m. transmitter for 1.8MHz) is a fine example of what is needed in the amateur radio press. Why the RSGB hasn’t given this mode more prominence for the Novice licensee, I can’t imagine! Using it on the crowded bands probably isn’t a good idea, but a transmitter of a few watts on 160 metres (even with only 30 feet of wire as an antenna) can be easily constructed with a range of a considerable number of miles, at least enough to take part in local a.m. nets. Ten metres is also an excellent place for a.m. As little as ten watts into a dipole will achieve very reasonable results during sunspot maxima, and this mode is becoming popular between 29 and 29.7MHz. Additionally, when the band is closed ten metres is ideal for local ‘ragchewing’, when only a few watts would suffice. Is there enough interest here to form a group to encourage the use of a.m., as is the case in the USA? I would be very interested to read others’ views on this subject. Perhaps a rekindling of the true amateur radio spirit is not far off!

I. L. Liston-Smith G4JQT
Reading

G3XFD’s reply: Despite the chance of being told I’m old fashioned, I too miss good quality a.m. — especially on 28MHz and v.h.f. G1TEX and I have recently been talking about the possibility of using simple a.m. rigs on 6 metres. We’re both aware that there’s a lot of room up there — and not much activity out of the contest and DX season. Twenty years ago, 4 metres was a joy to use with converted a.m. former p.m.r. equipment. Surely, there’s no real reason why we can’t use QRP a.m. rigs on both the lower v.h.f. bands? If anyone is interested in a revival of a.m., on 1.8, 28, 51 and 70MHz, we could soon give you suitable ideas for simple rigs!

RM

Dear Sirs

Further to your editorial in the April issue on Amateur Radio in Eastern Europe, your readers may like to correspond with a Russian Radio Amateur. He is 25 years old, likes tourism, hard rock and classical music, detective stories and science fiction. His name is Andrew S. Maluta and his address:

PO Box 13
424028
Yoshkar-Ola
USSR

I hope that you can print this information, good luck with the magazine.

O. W. Williams G7CTM
Biggleswade

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.

Back Numbers & Binders
Limited stocks of many issues of PW for the past years are available at £1.80 each including post and packing.
Binders, each holding one volume of PW, are available price £3.50 each (£1 P&P for one, £2 for two or more).
Send all orders to the Post Sales Department.

Subscriptions
Subscriptions are available both for the UK and overseas. Please see current issues for the latest prices.

Constructional Projects
Each constructional project is given a rating to guide readers as to its complexity.

Beginner: A project that can be tackled by a beginner who is able to identify components and handle a soldering iron fairly competently.
Intermediate: A fair degree of experience in building electronic or radio projects is assumed, but only basic test equipment is needed to complete any tests and adjustments.
Advanced: A project likely to appeal to an experienced constructor and often requiring access to workshop facilities and test equipment for construction, testing and alignment. Definitely not recommended for a beginner to tackle on their own.

Components for our projects are usually available from advertisers. For more difficult items a source will be suggested in the article. Kits for many of our recent projects are available from CPL Electronics and FJP kits, both of who advertise in the magazine.

The printed circuit boards are available, mail order, from the Post Sales Department.

Mail Order
All PW services are available by post or using the 24hr Mail Order Hotline (0202) 665524. Payment should be by cheque (overseas orders must be drawn on a London Clearing Bank), Access, Mastercard or Visa please.

Wireless Line
This is an information service for the radio enthusiast, updated each Friday. Calls cost 38p per minutes peak time and 25p per minute off-peak. The number to ring is: (0898) 654632.

Practical Wireless, June 1990 17
**New from Yaesu**

South Midlands Communications Ltd unveiled the new FT-650 multimode base/mobile station for 24, 28 and 50 MHz operation at the National Amateur Radio Convention in Birmingham.

The Preliminary specification for this rig looks interesting:

- **Receiving range**: 24.5 to 56 MHz
- **Transmitting range**: 24.5 to 25 MHz, 28 to 28.7 MHz & 50 to 54 MHz
- **Emission type**: s.s.b., u.s.b. (J3E), c.w. (A1A), a.m. (A3E) and f.m. (F3E)
- **Tuning steps (selectable)**: s.s.b., c.w. & a.m. - 10 Hz, f.m. - 100 Hz main dial; 2.5, 5, 10, 12.5, 20 & 25 kHz (all mode) using mem/ch
- **Voltage requirements**: 117, 220 V a.c. ±10% 50/60 Hz, 13.8 V d.c. ±10%
- **Dimensions**: 285 (w) x 110 (h) x 262 mm (d)
- **Weight (approx)**: 7 kg (d.c. type), 8 kg (a.c. type)

For more details, contact:

SMC Ltd. SM House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants SO5 3BY Tel: (0703) 255111.

**Samson Keys**

Samson electronic keys with integral paddles have been in production for over 24 years. They have a world-wide reputation for quality and reliability. They are one of the most widely used keys on ships and coast stations because being battery operated and having integral paddles they are completely portable and thus very convenient for Radio Officers to carry from ship to ship.

Of course, amateur radio is the main market for keys, but because many of the new transceivers have electronic keying circuitry built into them, Samsons decided there would be an expanding market for a high quality twin-paddle key at a reasonable price. The result is the new ETM-SQ key.

The key assembly is mounted on a heavy plated steel base giving a total weight of slightly more than 700g. This means it doesn’t slide about on the operating desk in normal use. It is fully adjustable for both spring pressure and contacts gap. Steel point pivot and cup bearings result in extremely low friction giving a very light ‘touch’. In addition, the steel bearing cups are adjustable to take up possible wear after a few years operation. The contacts are made of solid silver.

The price of the ETM-SQ Twin Paddle Key is £38 plus £2.70 post and packing (including full insurance).

**Gale Warnings**

We have all seen the images of havoc caused by the recent storms. Are you ready for the next gale, whenever that may be?

The Holtwood ground anchor is a device which can provide a strong anchorage point in almost any location in a matter of a couple of minutes. The anchor comprises a hardened steel tube which is knocked into the ground with a hammer. Inside this tube are three steel rods which are then driven out into the ground, curling like a pig’s tail as they take a firm grip of the subsoil. All that is left showing above the ground is the anchorage ring which is an integral part of the anchor.

**Cordless Soldering**

Black and Decker are adding a new Cordless Soldering Iron to their Micraft range. The new Cordless Soldering Iron (MB650) is lightweight and has a built-in stand for ease of handling and extra convenience. Powered by a screw-in butane cartridge with simple ignition, the Cordless Soldering Iron enables the user to solder anywhere. The cartridges give a minimum of three hours continuous use.

The Cordless Soldering Iron, which comes complete with a ready-to-use butane cartridge and two soldering bits, is priced at £24.99 including VAT. It is available from most hobby and craft shops.

**RAE Courses**

Fareham: The Fareham Morse Workshop at the Neville Lovett Community School starts on Monday September 24 from 7 - 9 pm. Enquiries either to the school (0329) 82471 or with the tutor G3CCB on (0329) 288139.
**Competition Corner**

**PRIZES...PRIZES...PRIZES**

**First prize** winner can choose either a one year *PW* subscription or £20 in vouchers for the book service.

**The two runners-up** can choose from either a six month *PW* subscription or £10 in book vouchers.

Circle the 12 differences, fill in the form below and send your entry to PW Publishing Ltd., June 1990 Spot The Difference Competition, Enefco House, The Quay, Poole, Dorset BH15 1PP. Closing Date 14 June 1990. The Editor's decision on the winner is final, no correspondence will be entered into.

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Cut out this coupon and bring it with you to any of the rallies that *Practical Wireless* is attending and you can save 5% on goods bought from our stand. If you collect the coupon from two separate months of *Practical Wireless* you can save 10% on goods purchased from *Practical Wireless* at the rally.

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**PW DISCOUNT VOUCHER 1 MAY 1990**
Radiation Screening

An extensive range of pre-formed and general purpose materials for efficient screening against radiated interference is now available from Anglia Microwaves Ltd.

The materials provide both electrostatic shielding and a weather-proof seal and gives a complete solution to securing access panels in sensitive equipment. Both self-adhesive strips and ready-made gaskets can be supplied to customer’s specifications.

As with the other materials, there is a choice of either a knitted mesh or a resilient cored mesh strip. The elastomer may be fitted with a self-adhesive backing for simple bonding to metal surfaces. There is a choice of silicone and neoprene elastomers, the former being preferred for longer lifetimes (10 years) and for a wide temperature range (-50° to +260°C). The knitted mesh may be manufactured from monel, tin-plated copper clad steel, aluminum or stainless steel.

ITW Switches has developed a new, low profile microswitch called the Series 45, which is half the thickness of the Series 20 that it is designed to replace. Originally produced for use in the new generations of slim telephones, the Series 45 has many other uses such as instrumentation, security equipment, lift controls, high current keypads and similar applications where its low profile of only 9.2mm gives designer more scope to be creative in product styling and construction.

The Series 45 is available in either a single- or double-pole version with a range of operating forces. The snap-action switch mechanism has silver contacts rated at 2A at mains voltages. A wide selection of different operating forces are available and there is a choice of auxiliary actuators available as standard such as 18mm straight lever and roller lever.

Special Event Stations

GB5SN: This station will be operating from the summit of Snowdon on either June 1 or 2, weather conditions permitting. The operators, G3XWH, G3YHC and G4KCR will be using a Mizuho 7MHz 2W hand-held transceiver into an end-fed Zep antenna, all supplied by Waters and Stanton. This group of Harrogate Radio Amateurs operated GB5SN from the summit of Ben Nevis on June 1 last year in arctic conditions!

GB2SEM: On May 19 and 20, this station will be running from the Old Power Station, Bargates, Christchurch, Dorset. Running on h.f. and v.h.f. bands. Colour QSL cards via the bureau or direct to G6DUN, QTHR on receipt of an s.a.e. The Old Power Station will be open to the public from 10am to 4pm both days with talk-in on S22. On show will be the Journeaus Vintage Wireless collection.

ON4WAR: May 19. The radio club of Binche (Belgium) will pay tribute to all radio amateurs who, during World War II, have operated at the hazard of their lives. They will be on the 7MHz band, alternately ‘phone and c.w. all day. A special QSL card will be sent to each correspondent.

Radio club de Binche (Belgium), Hotel de Ville de et, B-7130 Binche, Belgium.

GB2RBC: A return visit to Balmoral Castle by Royal permission will mean this station is on the air over the weekend of June 9/10. Paddy GM3MTH. PO Box 59, Hamilton, Lanarkshire ML3 6QB.

GB2SD, GB2OB, EI7M & E12WW: Are all on the air May 12/13 for the Heritage of Whisky Four Distillery Event. The locations will be, Scotland’s smallest distillery, Pitlochry, Perthshire; the Old Bushmills Distillery, Bushmills, Co. Antrim, Midleton Distillery, Midleton, Co. Cork & John Jamieson’s Distillery, Dublin respectively. A certificate is available for overseas stations if they work any of the stations or for the UK if they work any three. Annotation is available for working all four stations (the cost for the certificate is 50p, 1 dollar or equivalent). Robbie GM4UUG, PO Box 59, Hamilton, Lanarkshire ML3 6QB.

GB2STB: This station will be on the air on the final day of Beith Civic Week, Ayrshire, that’s June 16. Paddy GM3MTH. PO Box 59, Hamilton, Lanarkshire ML3 6QB.

GB2nts: This station will be on the air over the week July 15-22 for the Castle Country Four Castles Event. The castles will be Grampian Region Drum Castle, Castle Fraser, Craigievar Castle and Leith Hall. A certificate is available for overseas stations if they work any two of the stations or for the UK if they work any three. Annotation is available for working all four stations (the cost for the certificate is 50p, 1 dollar or equivalent). Robbie GM4UUG, PO Box 59, Hamilton, Lanarkshire ML3 6QB.

GB7OSIG: To celebrate the 70th Anniversary of the formation of the Royal Corps of Signals, the Scarborough Special Events Group, with members from RSARS, RNARS and RAFARS propose to run a special event station from the Royal Signals Training Centre, Burniston Barracks, Scarborough during the period June 10 to July 7.

Operation will be around 3.725 and 7.055MHz on the h.f. bands, plus 144MHz s.a.b. operation and f.m., in addition to activity on the RSARS nets. Special QSL cards will be available and further details can be obtained from: Roy Clayton G4SSH, QTHR.

GB5SN: This station will be operating from the summit of Snowdon on either June 1 or 2, weather conditions permitting. The operators, G3XWH, G3YHC and G4KCR will be using a Mizuho 7MHz 2W hand-held transceiver into an end-fed Zep antenna, all supplied by Waters and Stanton. This group of Harrogate Radio Amateurs operated GB5SN from the summit of Ben Nevis on June 1 last year in arctic conditions!

GB8FC: This station will be on the air from the Science Museum, Wroughton on May 13.

GB8FC: This time the station will be operated from RAF Cranwell from May 18 to 21.

GB2RAF: The station will be operating from RAF Henlow on June 2.

GB8FC: Now it’s the turn of the Science Museum, Wroughton on June 3.

GB4RAF: This station will be operating on June 10 from RAF Coningsby.
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Over the last few decades in the post-valve era there has been a continued trend away from building radio equipment and a shift towards using expensive commercially manufactured 'black boxes'. Many of which cost more than the price of a good second-hand car.

Although most people do not know much about amateur radio it is generally thought to be an expensive hobby, most likely because of the perceived price of the equipment. Recently in *PW* there has been a move towards putting the d.i.y. back into amateur radio.

This project is the result of deciding to have a shot at designing a 3.5MHz c.w. transceiver with the main objectives being:

a: It should be as simple and therefore as inexpensive as we could possibly achieve.

b: The component list should contain no obscure parts (e.g. no strange Venezuelan imperial thread toroids, etc.)

c: The builder can purchase ALL the necessary bits from the local electronics shop, and is able to 'get stuck into' the construction rapidly.

The result was the Peanut transmitter shown in the diagram Fig. 1.2 which was built for the enormous expenditure of £2.76. On connecting to an antenna the signal was heard at 599, two miles away across Leeds. A modest start, but a phone call to an Edinburgh station resulted in the same report from that location five minutes later.

**The Receiver**

Encouraged by this start, we attacked the design of the receive side ending up with the circuit shown in Fig. 1.3. The approach is along the lines of the 'optimist', a design used as a very simple QRP rig.

The previous design utilised a diode as mixer with limitations of being 'a little bit deaf'. Our latter-day approach uses an f.e.t. mixer, TR2 in Fig. 1.3.
1.3. Several circuits were designed and tested but were not as simple or as effective as the version shown here. To boost the overall audio level, a simple audio amplifier (Fig. 1.4) was constructed from a BC108 (TR3) and a cheap low power amplifier (IC1). This provides adequate output for either ‘phones’ or a loud speaker.

By rescuing bits and pieces from defunct radios the completed prototype has still to exceed a gross budget expenditure of £5.00. An aluminium box was purchased to house the unit, that did take it marginally over that limit.

Eager to carry out further tests the unit was quickly assembled and within the hour we had log entries from Belgium, Denmark and France, with stations in Russia, Poland and Norway being clearly heard on the band.

The enjoyment of making these contacts was only exceeded by the sheer satisfaction of having built the station. As many a QRP operator will agree, to construct as well as use your own equipment is a most rewarding experience. It is most certainly in the original spirit of experimentation associated with amateur radio.

**Circuit Description**

The circuit conveniently falls into three sections as outlined in the block diagram Fig. 1.1. The oscillator board (Fig. 1.2), the mixer board (Fig. 1.3) and the audio board (Fig. 1.4). The oscillator is crystal controlled, with L1 and C1 forming the tuned collector load for TR1. Inductor L1 consists of 50 turns, is tapped 20 turns from the collector of TR1, to provide impedance matching for the antenna circuit.

Key clicks are suppressed adequately, by the inclusion of capacitor C2 across the keying contacts. The output power available from the oscillator is in the order of 1W of r.f. when the emitter of TR1 is taken to the negative line. On receive resistor R2 allows the oscillator to run, but at a very much reduced power.

The addition of a mixer board and audio board completes the receive side of the transceiver. The mixer shown in Fig. 1.3, is of the direct conversion type. The antenna input, tuned by L3 and C18, is fed to the gate of the mixer f.e.t. TR2. The reduced output from the oscillator is fed via C6 to the source of the same f.e.t.

The resulting audio frequencies appear at the collector of TR2 and across R7 (the audio level control). The audio circuit consists simply of a pre-amplifier (TR3) followed by the power amplifier IC1 (an LM380).

An unusual volume control (R11) has been included in the circuit. This is connected between the inverting and the non-inverting inputs of the integrated power amplifier. Output may be either to headphones or an 8-16Ω loudspeaker.

The simplicity of the whole station is shown in the switching diagram Fig. 1.1, where it may be seen to revolve around a single three pole four-way switch.

...Continued on page 27
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For more information on the IC-725 budget H.F. and other ICOM amateur equipment contact your nearest authorised ICOM dealer or phone us direct.
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- 5% 0.4W Carbon film
- 2Ω 1 R12
- 100Ω 2 R6, 10
- 470Ω 1 R2
- 560Ω 1 R4
- 1kΩ 1 R5
- 3.9kΩ 1 R1
- 10kΩ 1 R9
- 100kΩ 2 R3, 8

**Capacitors**
- Ceramic
  - 47pF 1 C6
  - 330pF 1 C1
  - 100pF 1 C5
  - 2.2nF 1 C12
  - 10nF 3 C2, 7, 14
  - 0.1µF 4 C3, 4, 9, 16

- Electrolytic 16V working
  - 1µF 2 C6, 13
  - 10µF 1 C10
  - 47µF 1 C15
  - 200µF 2 C11, 17

- Compression Trimmer
  - 500pF 1 C18
  - Maplin part No.WL73Q (Trimmer 500pF)

**Coils**
- L1 50 turns of 0.25mm (32 s.w.g.) enamelled copper wire, tapped at 30 turns (20 turns from collector of TR1)
- L3 80 turns of 0.25mm (32 s.w.g.) enamelled copper wire.
- L2 5 turns of 0.25mm (32 s.w.g.) enamelled wire, wound over 'earthy' end of L3

Fig. 1.4: The audio board utilising a single pre-amp (TR3) and the familiar LM380N IC for audio output.

Cirkit, Park Lane, Broxbourne, Herts EN10 7NQ

Gollege Electronics, Merriott, Somerset TA16 5NS

Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR

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OUT NOW! OUT NOW! OUT NOW!
It's difficult to forecast where you're going to live and work when you've chosen a very specialist career, but Anglia Television weatherman Jim Bacon G3YLA was lucky. He's returned to Norfolk, and the outlook's good for his family and hobbies.

Jim took up amateur radio when his twin brother, Richard G3WRJ, was studying for his RAE. When he got his call, the new G3YLA was already heading for a career in meteorology, having taken the conscious decision of keeping hobby and work apart.

During the early 1970s amateur radio activities lessened while Jim worked at the Met. Office Headquarters in Bracknell and studied Meteorology at Reading University. He was posted to the London Weather Centre in the late 70s. It was there that Jim had his first taste of professional broadcasting. The years of 'chatting' on the amateur bands did help. Although he found the short, two and a half minute, television broadcast 'overs' a bit difficult at first!

After a spell on nationwide BBC TV as part of a regular weather forecasting team, Jim headed back to Norfolk to join Anglia Television in 1986. As one of the major Independent Television contractors, Anglia TV's weather service plays an important role in regional forecasting. Because of this, Jim and his two colleagues have a busy working schedule. Their day starts at 0730 with overnight charts analysis for the first broadcast at 1000. The chart analysis, followed by computer graphics preparation and the broadcast, sets the pattern for the lunchtime 1325 and main evening bulletin at 1825.

**Home-Brew Equipment**

Jim counts himself fortunate in starting amateur radio in the era of home-brewing the first rig. "My first rig was a design by G3OGR from Short Wave Magazine, using a 6BW6 in the p.a. stage giving about 10 watts output. The antenna was a 66 foot 'short wire'. We had quite a net in those days." Jim went on to say "there was nothing to equal the thrill of your first contact using home-brew equipment. Standards had to be met in West Norfolk." Amplitude modulation audio quality demanded that birds in your garden, and even the stirring of a cup of tea in the shack had to be clearly heard!

As you might expect with a 'weatherman', Jim developed an interest in propagation. It started with the study of 'tropo' and that drew his attention to Sporadic-E and v.h.f. Eventually he became 'hooked' on this fascinating aspect of amateur radio and it's now one of G3YLA's principal activities. Taking the opportunity provided by the interview, Jim reminds us that amateur propagation studies have been invaluable to both enthusiasts and professionals alike.

A member of the Royal Meteorological Society, Jim is also active in supporting the RSGB, and firmly believes in a strong national society. He is the Programme Secretary for the thriving Norfolk Amateur Radio Club and supports the G-QRP Club, RIG and FISTS and enjoys reading Practical Wireless and DUBUS, the latter publication being very useful for propagation reports on v.h.f.

**Projects And Plants**

Activity from G3YLA nowadays is mainly centred on c.w. and 144MHz using a home-brew synthesised rig. He'd like more time to build, but with three half-built ideas on the shelves there's plenty to do. The next job is likely to be a home-brew c.w. transceiver - when he has completed yet another unfinished project. This task will be the placing of temperature probes into the garden soil and compost heap, to enable the shack computer to evaluate the data.

Louise, Jim's wife, has yet to be converted to amateur radio but her brother is now G4JGL! Their children (they're twins of course!), four and a half year-old Richard and Holly, have already shown interest but are discouraged from trying c.w. after jamming dad's keyer paddle.

A hectic social calendar that includes talks and visits to radio clubs around the UK, doesn't leave much time, but Jim enjoys his garden. He rounds off the busy Bacon life by providing the family with vegetables grown the 'organic' way. Mind you - he points out that 'organic' is really a euphemism for much more digging!
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There was a time, back in the mid 1980s when I was ready to concede defeat. Several thousand very determined people had lobbied, protested and petitioned the Government to get an archaic law changed. Against all the odds, and much to everyone’s surprise, they succeeded. The net result was that Joe Public at last enjoyed the same basic rights of ‘free speech’ as people in many other countries, and could talk with their fellows using cheap, low powered two-way radios.

It wasn’t precisely the system that the die-hard a.m. devotees wanted. Still, despite the grumbles and complaints, CB 27/81 wasn’t half bad. Inexpensive and for the most part, well-built equipment soon became available. The fears that the range and usability of the f.m. system would be limited by technical shortcomings of the specifications were soon dispelled.

In the event, range and usability were limited by different, but not wholly unexpected, factors. The problem was that a small but vociferous minority took it upon themselves to spoil it for everyone else. Some days all 40 channels would be rendered unusable by foul-mouthed individuals, many of whom seemed convinced that they sounded more interesting through a reverberation unit. Worst, were the dangerous fools who persisted in using ridiculously high-powered, and frequently badly designed or aligned linear amplifiers or ‘burners’. They were the most destructive element and came close to wrecking the service for ever. They were responsible for wiping out huge chunks of the band and alienating everyone from air-traffic controllers to TV viewers.

Now it has to be said that for obvious reasons these problems were most noticeable in cities and large towns. Still, London is where I live and work, and the lack of anyone sensible to talk with meant that my interest waned in direct proportion to the number of ‘bucket-mouths’ and ‘burners’ abusing the system.

After spending some time living in East Anglia, my faith was eventually restored about three years ago. There, the flat terrain, coupled with a small and widely-dispersed population meant that CB really stood a chance; centre-loaded antennas on tractors and home-base masts on nearby farmhouses showed that not only was CB alive and well but was doing a worthwhile job! The service was, and I believe still is, used by some cab firms in the area as well as by delivery drivers, truckers, emergency-monitoring teams and of course for leisure and pleasure purposes.

Widespread Pattern

This pattern of use extends across the whole country, but there have been changes in the last couple of years. The reduction in misuse has been widespread, and in some places has been dramatic. Perhaps the idiots became bored talking to each other - their conversations, when intelligible, were hardly inspiring. Maybe additional channel allocations in 1987 diluted their influence. It could just be that they have all bought themselves cellular telephones. Whatever the reasons, CB has again become a usable communications facility, even in densely-populated areas. So, what does this portend for the future?

It probably won’t mean a sudden upsurge in interest amongst commercial users, which is probably just as well as there is limited channel space. The on-going limitations of range and lack of privacy haven’t changed either, but it does mean that those who want to use the service for legitimate purposes can do so again.

Leisure Pursuits

In particular there are the growing number of leisure pursuits where CB has a real role to play. Boating springs immediately to mind as marine radio equipment is expensive. Specialised marine radio is often inappropriate for small craft or vessels used exclusively on inland waterways. CB is the ideal alternative. Walkers and climbers go missing, or get lost with monotonous regularity - portable CB rigs take up little space and could be real life savers in an emergency.

Motor-sports enthusiasts have long recognised the need for efficient two-way communications. A growing number of rally, stock and formula racing teams now rely on CB systems to provide a link between the driver and the pits. Marshalls at outdoor events, fete organisers and rallies, all use CB and the list goes on - but the common thread is the need for cheap and simple two-way voice communications. The dark days of CB are now behind us, the future looks promising - let’s hope it stays that way.
AOR 20021 Regency MX8000 Scanner; (less PLL & Rs) ideal for refurb., early model upgrade, new cabinet, subframe and complete MPU PCB & LCD display, front panel and keyboard for Public Address, boosting audio from handholds; new, assembled PCB, full circuit data £9.95.

10 watt add-on PA, high quality audio unit by famous R.7 maker, useful for noisy areas, very high quality PTT base mikes 600 or 2.4k ohm (state which).

Data

Frequency conversion: 10-11 MHz output. Full gear, re-wired & tidied up to make a free-standing unit, no expensive cabinet, just basic other VHF satellites.

VISA

12V operation, handles 50 watts up to 200 MHz 24V versions to order.

24V versions to order.

12V DC input, 250V 150mA DC output

A popular line for many years. Economy package: chassis section cut from commercial R1T Miniature 138.18.10mm xtal controlled 1750Hz GES-filled relays as used in preamp f39.95 as assembled PCB Stock versions: Bm, 4m, 2m & 137MHz (W-SAT).

A simple but versatile design capable of covering spot frequencies in the range 25-200 MHz; NOAA 5 channel VHF Receiver Meteosat Preamp 15dB gain 0.6dB NF GaAs FET Complete system: Meteosat antenna, preamp, receiver, interface, software & cables (state which) £458.85 Upgrade software for Animation, NOAA, VGA & Paint available.

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Upgrade software for Animation, NOAA, VGA & Paint available.
A good frequency counter is a valuable asset to any shack, and attractively priced equipment such as the MF-1000 counter from Maplin makes this possible for many amateurs, says John Bird.

Maplin MF-1000 Multi-Function Counter

Before operating any piece of test equipment, it’s a good idea to read the manual. With the MF-1000, this is a ten-page booklet measuring about 185 x 240mm. The manual is fairly basic in its content with just three chapters covering Specification, Operation and Calibration.

The most important section is, of course, the operation and this is well covered. There are examples of how to use each main function and I found the standard of English better than many other Oriental imported products. The calibration section of the manual is obviously very useful, but should be used with great caution.

The whole accuracy of the counter is controlled by the crystal oscillators. These should only be calibrated if you have access to a suitably accurate measurement system. Other than the reference frequencies, the only other adjustment described is the trigger level. This only requires a 10MHz, 25mV r.m.s. signal.

Connecting-Up

As with most counters there are very few external connections on the MF-1000. The mains is fed via a 3-pin IEC connector that is mounted immediately below the voltage selector. This allows the selection of 115V or 230V supplies. The main measurement inputs are located on the front panel and these are standard 50Ω BNC sockets. The conflicting design requirements for the large frequency range covered by the MF-1000 mean that it isn’t practical to use just one input socket for all frequencies.

The solution is to use one socket for the lower frequencies of 10Hz through to 100MHz and a separate socket for the 100MHz to 1GHz range. The final external connection is another BNC socket on the rear panel that is fed by the internal 10MHz time-base oscillator. This is useful as a signal source for checking other counters or the calibration of other equipment such as receivers, oscilloscopes, etc.

Operation

The designers of the MF-1000 have included a good range of options, making the counter very versatile. One basic requirement of a counter is a clear and well-placed display. The MF-1000 provides this by using a full eight-digit I.e.d. display with 7mm high-brightness devices. This display dominates the front panel and is covered by a plastics protective cover. The choice of measurement mode is selected by a row of fourteen push buttons immediately below the front panel.

The most obvious use of the MF-1000 is as a straightforward frequency counter. This is done by connecting the signal to the appropriate input, according to whether the signal is above or below 100MHz. There is another selection to be made, the appropriate range. There are just two ranges for the I.f. input - 10Hz to 10MHz and 10MHz to 100MHz and these are selected using push buttons on the front panel. This selection may seem a little odd but it is necessary to switch in a divide by 10 prescaler as the main counter module is a 10MHz unit.

The next option is the gate time, this sets the period that the counter operates over and so effectively sets the resolution of the instrument. The gate time options are 1 second, 0.1 second and 0.01 second. That gives resolutions of 1Hz, 10Hz and 100Hz on the 10MHz range and 10Hz, 100Hz and 1kHz on the 100MHz range. The 1GHz range is also selected from the front panel push buttons, though on this range the gate times give a resolution of 100Hz, 1kHz and 10kHz.

Besides the frequency counting options, the MF-1000 can be used to measure the period of a signal. This is particularly useful for accurately measuring low frequency signals. You will have noticed that the maximum resolution on the low frequency range is 1Hz and this uses a gate time of 1 second. In practice this means that the display is only updated every second. Although this may seem fast, this isn’t the case when you’re using the counter to aid the adjustment of a variable oscillator.

The solution, however, is to select the period measurement option. This works by reversing the connections of the internal clock and the signal to be measured resulting in the gate being opened by the measuring signal. When used in this way, the MF-1000 shows the period of the signal in us and so allows very accurate measurement of low frequency signals. The resolution in this mode is 10', 10" or 1'9 depending on the range selected.
Using the MF-1000 as an event timer.

The MF-1000 has two features coupled with the low frequency input designed to process the incoming signal. The first is an attenuator that provides a x20 reduction of the signal input and prevents overload of the input stages. The second is a low pass filter with a cut-off frequency of 100kHz. This is ideal for eliminating high frequency garbage from audio signals that can affect the accuracy of the measurement.

One problem with digital instruments is that they tend to encourage the user to believe the readout, simply because it seems so precise. Still, these instruments sometimes lie and the reason is often a problem with the input signal.

The MF-1000 has two features coupled with the low frequency input designed to process the incoming signal. The first is an attenuator that provides a x20 reduction of the signal input and helps prevent overload of the input stages. The second is a low pass filter with a cut-off frequency of 100kHz. This is ideal for eliminating high frequency garbage from audio signals that can affect the accuracy of the measurement.

When using the MF-1000 as an event counter, there are a couple of useful display options. The first is a reset button that resets the display to zero, as you would at the start of a count. The second is called hold, and this freezes the display reading. The important point is that the count continues during the hold operation although the display reading is held. This option is useful for checking the total during a count operation. Both of the display options could be started during any of the MF-1000’s operation, but they are only normally of use when using the MF-1000 as an event timer.

---

**Specification**

**Channel A**
- **Range**: 10Hz to 1MHz direct; 10MHz to 100MHz prescaled
- **Resolution**: 1Hz, 10Hz and 100Hz direct; 1Hz, 10Hz and 1kHz prescaled
- **Input Impedance**: 50Ω
- **Input Sensitivity**: 15μV to 35pF

**Channel B**
- **Range**: 100MHz to 1GHz
- **Input Sensitivity**: 20mV r.m.s.
- **Input Impedance**: 50Ω

---

I should stress at this point that this use of a counter is not specific to the MF-1000 but used by many other units.

Another mode that can prove helpful is the totalise mode. This, as the name suggests, simply counts the number of input cycles and is useful as a simple event counter. As with the period measurement, this is only available on the 10MHz input range. This isn’t really a limitation as this option would normally be used to count comparatively slow events.

One problem with digital instruments is that they tend to encourage the user to believe the readout, simply because it seems so precise. Still, these instruments sometimes lie and the reason is often a problem with the input signal.

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---

**Under the Bonnet**

As the supplied manual contained very little detail on the circuit configuration used by the MF-1000, I looked inside for myself. The main functional block comprised an Intel large scale integration I.C. This device handles all the main counting and display driving functions up to 1GHz. All the higher frequency ranges are handled by switching in prescalers.

The most crucial area of any counter is the clock accuracy and the MF-1000 uses two crystal oscillators running at 10.0MHz and 3.90625MHz. I was pleasantly surprised to find that both oscillators are ovened, that is a great help in improving the immunity to external temperature variations. The mains power unit is mounted on the rear panel, well away from the counter electronics.

---

**In The Shack**

The proof of the pudding is in the eating, so I used the MF-1000 in the shack to see how it performed under typical amateur operating conditions. The first and important point is that the display is clear and easy to read from a wide range of viewing angles. Performance as a frequency counter is very good, and the input sensitivity is excellent.

I found that the MF-1000 could be used to monitor the transmit frequency of my station off-air with just a 150mm wire from the input socket. This worked both on h.f. and v.h.f. without any problems. As the input impedance of the 10Hz to 100MHz range is 1MΩ/35pF, standard oscilloscope probes could be used, and that made connections a little simpler.

The event counter facility can be useful. I found that the high sensitivity, combined with the fast response of the counter, meant if there is a dirty contact in the counting chain, large erroneous counts can be generated. The solution is simple and involves making sure that the count signal is well damped electrically, so minimising any switching problems.

---

**Summary**

I found the MF-1000 to be a very effective and easy to use instrument. With its wide range of 10Hz through to 1GHz and its versatile measurement options, it covered all the frequency measurement requirements of the shack.

Overall then, a very useful item of test equipment that I’m sure will be in great demand. The MF-1000 is available from Maplin Electronics, PO Box 3, Rayleigh, Essex. Tel: (0702) 554161 and costs £174.95. Thanks to Maplin for the loan of the review model.

---

**Table:**

<table>
<thead>
<tr>
<th>Specification</th>
<th>MF-1000 Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>100Hz, 1kHz and 10MHz</td>
</tr>
<tr>
<td>Gate Time</td>
<td>0.27s, 0.27s, 2.7s</td>
</tr>
<tr>
<td>Input Sensitivity</td>
<td>20mV r.m.s.</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>50Ω</td>
</tr>
<tr>
<td>Range</td>
<td>10Hz to 2.5MHz</td>
</tr>
<tr>
<td>Resolution</td>
<td>10-7s, 10-8s, 10-9s</td>
</tr>
<tr>
<td>Input Sensitivity</td>
<td>+/- 1 count +/time-base error x frequency</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>20MΩ, 80MΩ, 100MΩ</td>
</tr>
</tbody>
</table>

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**Dimensions:**

- **Weight:** 2.15kg
- **Dimensions:** 205mm wide, 78mm high, 287mm deep

---

**Weight:** 2.15kg

---

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- Nicads, charger & BNC whip antenna included in the price

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- 20 memories
- Measures only 2.5" x 5.5"
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£169.50
The G4XBY Six-Element Yagi for 430MHz

All the parts for this experimental antenna are easy to source and the finished article is designed to be used in the attic, or if varnished will be suitable for short periods outside.

Construction

The overall dimensions are shown in Fig. 1. Start by cutting the boom to length, 15mm square is recommended but 12mm square will do almost as well. Cut the various elements to length as shown in the diagram. Hard drawn copper wire is preferable as the softer 8 s.w.g. wire is more prone to bending and sagging.

Starting 20mm from one end mark the position of Director 4, then backwards at 165mm interval the positions of Ds 1-3 and the driven element. A further 140mm behind this last mark is the position of the reflector.

Taking each element of the antenna in turn, indicate its exact centre with an indelible mark. A fine saw or file is probably the best way of achieving this mark, if using the preferred wire. Carefully, using a protractor to ensure squareness of each element, mount the wires on the correct places on the boom. On the prototype small saddle staples were used, these being cheap and easy to find in hardware shops. Take great care to ensure that each element is square to, centred on, and in the correct place on the boom.

When this has been done, look along the length of the boom to make sure that all the elements are central and in their correct places, and that the are all in the same plane. If this is not the case then gently bend them until they all line up.

Gamma Match

The Gamma match can now be added behind the driven element. A small piece of single sided p.c.b. material forms the most convenient mounting method for the trimmer capacitor C1. An off-cut of 40 x 20mm should be ideal. Make a small cut in the copper to produce two lands, then fix the board to the boom using a small wood screw so that the Gamma match wire may be attached to it about 15-20mm spaced from the driven element. Bend the 100mm length of wire at right angles some 20mm from one end. Solder the right angled section onto the driven element 85mm from the mid point, and keeping the wire parallel to the element, solder it to the board.

Bare back about 20mm of the coaxial cable and arrange that the screening copper is rolled into a
tight twist. This end of the coaxial connects to the centre point. The driven element and the inner wire should be soldered to the other land of the copper board. Finally tape the coaxial wire to the boom with a loop as shown in Fig. 1, the antenna is now ready to adjust.

Tune Up

Connect a 430MHz transmitter to the coaxial cable via an s.w.r. meter capable of accurate indications at these frequencies. Apply low power and check forward and reflected power readings. Adjust C1 to give the lowest v.s.w.r. and then apply a little more power and re-adjust as necessary for the lowest reflected power reading (lowest v.s.w.r.).

Note that a 4-20pF capacitor is OK, but sometimes 2-16pF variables are sometimes to be found at ‘junk’ stands at rallies.

Comments

The antenna is not designed as an all-weather job, although I have had one outside for a week or two without undue problems. A plastics surround for the p.c.b. and one or two good coats of yacht varnish are advisable in this case though.

The antenna in this article is experimental and no claims are made for it, other than it works in my case and a novice constructor should have few problems making it. As it is experimental more directors could be added, each one 10% shorter than its predecessor and the spacing kept at 165mm. Construction and tune-up are as before. Those having difficulties obtaining hard drawn copper wire should ask in their local amateur radio emporium as it is normally used to make wire antennas.

*Practical Wireless and Short Wave Magazine in attendance.

Shoppping list

<table>
<thead>
<tr>
<th>C1</th>
<th>4-16pF variable capacitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>10mm</td>
<td>8 s.w.g. copper wire</td>
</tr>
</tbody>
</table>
| 2m of hard drawn copper wire cut into various lengths as shown below:
| Reflecter         | 365mm                     |
| Driven            | 330mm                     |
| Director 1        | 295mm                     |
| Directors 2-4     | 270mm                     |

* May 12: The VHF Convention will take place at Sandown Park Racecourse, Esher, Surrey.

*May 13: The Yeovil Amateur Radio Club will be holding its 6th QRP Convention in the Preston Centre, Monks Dale, Yeovil. D.J. Bailey G1MNM, 7 Thatcham Close, Yeovil, Somerset BA21 3BS.

May 19: The Swindon Radio Rally will be held in the Oasis Centre, Swindon. J Broadfoot. Tel: (0793) 611859.

*May 20: The 33rd Northern Mobile Rally will be held at the Great Yorkshire Show Ground, Harrogate. Mike G0MKB. Tel: (0423) 564353/507653.

May 20: The 7th National Amateur Radio Car Boot Sale will be held at the new venue of Stockwood Park, Luton. This is easier to get to (not far from junction 10 on the M1). Private sellers £7 in advance or £9 on the day, traders £20. The proceeds of this rally go to the Stanley Eakins Memorial Fund at Parkanor near Dungannon. Jim Lappin G1YGS. Tel: (0762) 851179.

*May 20: The Parkanor Amateur Radio Rally will be held at the Silverwood Hotel, Lurgan, Co. Armagh. Doors open at 12 noon and the entrance fee is £1. There will be the usual trade stands, Bring & Buy, bookstand, OSL bureau, etc. Talk-in on S22. The proceeds of this rally go to the Stanley Eakins Memorial Fund at Parkanor near Dungannon. Jim Lappin G1YGS. Tel: (0762) 851179.

May 20: The Cambridge & District ARC are holding their 5th Annual Rally & Radio Car Boot Sale at Coleridge Community Centre, Radegund Road, Cambridge. Doors open at 10.30pm. Brian G4TRO. Tel: (0223) 353664.

May 27: The 14th annual East Suffolk Wireless Revival will be held at the Civil Service Sportsground, Straight Road, Buckleisham, Ipswich. There will be a Bring & Buy, Car Boot Sale, a transceiver clinic, 50MHz demo station, all the usual traders and lots more including a children's play area. Paul Whitely G4YQC. Tel: (0473) 642595.

May 27: The Plymouth Radio Club are holding their annual Radio & Electronics Fair in Plymstock School, Church Street, Plymstock, Plymouth. The doors open at 10am with all the usual attractions - traders, Bring & Buy, raffle and a licenced bar and refreshments. There will also be an RSGB Zonal meeting and lecture along with Morse tests. Jan Fisher. Tel: (0752) 340946.

May 28: The 1990 Bircotes Radio Rally will be held near Bawtry, Doncaster. Doors open at 11am (10.30am for the disabled). Talk-in on S22. Details and or booking forms from: Pat Smith, 23 Florence Avenue, Balby, Doncaster. Tel: (0302) 857526.

June 2: The first Belfast Amateur Radio Convention, organised by the RAIBC (Northern Ireland Area), is being held in the Ormeau Park Recreation Centre, Ormeau Embankment, Belfast. All the usual convention attractions will be there plus demonstrations and talks on the hobby by local well-known amateurs. They are also trying to cater for the XYLs by having demonstrations on microwave cookery, crafts and art aid. The special event station operating on the day will be GB2BRC David Caldwell G1HOW. Tel: (0232) 471370.

June 3: The Southend & District Radio Rally and Boot Sale will be held at the Rocheway Centre, Rocheway, Rochford, Essex. There will be the usual trade stands plus a Bring & Buy, licensed bar and coffee bar. Doors open 10am with talk-in on S22. John Stone G0OFE. Tel: (0702) 202216.

June 10: The Mid Lanark ARS Annual Open Day will be held at Newarthill CE Centre, High Street, Newarthill Doors open 11am. There will be the usual traders, a Bring & Buy, demonstrations of packet radio, a talk by John Brangegan GM4HJ on his experiences with satellites, demonstrations of equipment and the annual award of their EHI Trophy. Catering will be provided. David Williams. Tel: (0698) 732403.

Practical Wireless, June 1990
What is Propagation?

The diagram of the atmosphere which I produced for our May issue showed that the first 8km above the earth’s surface is called the troposphere and it is this region which has a great influence over the line-of-sight paths of v.h.f., u.h.f. and microwave signals.

Weather

The troposphere is the home of the earth’s weather and for many years most of the world’s inhabitants have been kept well informed about the complex movements of weather fronts by the media’s numerous outlets. This subject effects our daily lives so much that, in the UK for example, weather reports and forecasts, immediate and long range, appear in the national and local press and almost hourly via the nationwide radio and television networks of the BBC and the IBA. These broadcasters achieve this in conjunction with the Meteorological Office and by transmitting regular bulletins, emergency flashes, special items for the farmers and shipping and updating CEEFAX and ORACLE their respective TELETEXT services. Although we have the benefit of all this information promptly to hand, it’s more fun, as scientifically minded people, to have a few instruments ourselves and keep our own weather records. This certainly applies to the radio enthusiast whose particular interest lies with one or more of the dedicated wavebands above 80MHz.

Instruments

The basic requirements for a home weather station are a rain gauge and an outdoor minimum/maximum thermometer, both of which can be purchased from a good ironmonger or garden supplier for less than £20. In my case the rain gauge, Fig. 1, mounted on a waist-high pole in the middle of our garden cost about £5 and the thermometer, Fig. 2, housed on a tree and away from direct sunlight, was £8.95. These are read daily by Joan or myself and the recorded information is available for our own work and anyone else who needs it. Both instruments were photographed after the overnight period of 6/7 January 1990 when the rain fall was 0.78in and the temperature ranged between 38 and 50° Fahrenheit. Obviously other measuring devices such as a hygrometer and a wind speed and direction indicators are fine additions to the observatory but, high on the list must come a good barometer or a recording barograph, especially if the changes in atmospheric pressure are to be linked with tropospheric DXing.

Most of my readers know that I have used a Short and Mason Barograph continually since 1962, Fig. 3 and several years ago I installed an ex-RAF altimeter in my car, Fig. 4. The former provides a permanent and sometimes dramatic record of the prevailing pressure and the latter gives the height above sea level on the outer dial and a pressure reading on the lower scale. The altimeter in Fig. 4 is showing 994mb (29.4in) at 200ft a.s.l.

The Vulnerable Bands

Whatever your particular interest, be it amateur radio, broadcast DXing or CB operating a disturbance in the troposphere will, in some way, effect you. The amateurs use their 144, 432 and 1296MHz bands, the broadcast enthusiasts can listen and look in Bands II (87.5 to 108MHz), III (175 to 230MHz), IV (471 to 608MHz) and V (615 to 856MHz) and the citizen band operators have an allocation at 934MHz. Under normal conditions radio signals in this part of the spectrum have a limited range which means that frequency sharing, relay stations and repeaters can be employed to increase the number of stations on the air and get greater coverage in both the amateur and broadcast bands. However, when the atmospheric pressure is high and about to fall and the prevailing weather conditions are right the range of these signals is greatly enhanced resulting in continental and UK DX for the enthusiasts and misery for the domestic viewers whose normal crisp picture is covered in lines and patterns or totally disappears. Next time I plan to tell you about some of the big tropo-openings of the past.

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* Reverse repeater mode

* Priority Channels available on both bands

* Each band has 10 memories for frequency and repeater offset

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* Dimensions: 173mm H x 60mm W x 34mm D

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PacketCluster. This software is not common in the UK as yet, in fact I think there is only one station running Cluster software and that is Ian G4LJF. It can be a very useful addition to the packet network, especially for the contester or avid DX-chaser. A write-up of this has been prepared for me by Peter Smith N4ZR.

The Packet Cluster Advantage by Peter G. Smith N4ZR, 2003 Sarazen Place, Reston, Virginia 22091, USA.

Have you noticed recently how quickly the US pileups on rare DX stations form these days? Did you wonder how many stations got the word on when a new one shows up, and where?

Secret Weapon

Well, the Americans have a secret weapon - or at least one that has not yet reached the UK. (It has now!!!) It is the first application of packet radio technology to really enhance other aspects of amateur radio - specifically DXing and contesting. It's called PacketCluster. To be precise (and legally correct) PacketCluster is really the name of a software package that is the brainchild of Dick Newell AK1A, and is marketed by his company, Pavilion Software. I think the first PacketCluster system was set up in 1986 and belonged to the famous Yankee Clipper Contest Club. In its simplest form, a PacketCluster system can be a single packet station, running the software, in lieu of the more usual terminal or BBS program, on an IBM or compatible computer. It provides most of the usual packet bulletin-board capabilities, but the difference lies in its DX and contest-related services. First, and most important, any station connected to the station running PacketCluster can report a DX 'spot' (Callsign, frequency and miscellaneous information, such as QSL manager) to the host station or 'node', which then automatically relays it to all other connected stations. The node also maintains a database of past 'spots', so that one does not have to be connected continually. Information can be recalled by band, prefix or specific callsign, for a number of days in the past.

In addition, the PacketCluster software provides for the posting of propagation information from the U.S. WWV and WWVH stations, with the same facility for recall of recent historical data. The propagation data is also used by a routine that will calculate the m.u.f. (Maximum Usable Frequency) and l.u.f. (Lowest Usable Frequency) from the users' station to any other place (identified by prefix). Similarly, you can look up the beam heading to, and the sunrise and sunset times at, any DX location (the latter for the low-banders among us).

The reason for the PacketCluster name is that the software is really designed not to be used by a single stand-alone packet system, but by a 'cluster', covering a wide geographic area. Let's take a practical example. The PacketCluster to which I belong (a yearly subscription helps defray the cost of equipment, software upgrades and maintenance) is run by members of the Potomac Valley Radio Club and the National Capital DX Association. It currently has 105 members from Maryland, Virginia and the district of Columbia. There are five geographically-separated stations operating as 'nodes' of the cluster on four different two-meter frequencies chosen to avoid the busy packet frequencies, as well as interference with traditional repeater operation. Each of these nodes is cross-connected with each other one, so that a DX 'spot' reported to one is relayed to all stations connected to all six of them. All nodes use the same frequency, and inter-node relays were handled on the same frequency, but as activity increased it became too congested, throughput fell dramatically, and it was necessary to move the inter-node links to 440MHz. The nodes are distributed to cover the whole area, so that each individual station can find a node to connect to that he can hear well, without for the most part requiring elaborate two-meter equipment - in fact, many stations are using 'dumb' RS-232 terminals and old crystal-controlled transceivers with omni-directional antennas to link to the nearest cluster node.

The PacketCluster advantage is obvious - instead of relying on one's own ears alone, or even a two-meter voice repeater, everyone connected to the cluster can listen for everyone else. To date, we have had a maximum of 62 users connected to our cluster at one time, and 35-45 is more usual for an average week-end. And ours, believe it or not, is only a medium-sized cluster. The Southeast PacketCluster Network consists of seven nodes in six States, also linked to other locations by NETROM/THENET relays - this network has had as many as 135 stations connected simultaneously! To make things worse for the non-networked, local clusters are beginning to link to one another, so, for example, I now see DX 'spots' on our system from as far away as the Tri-State cluster in southern New England.

The PacketCluster is transforming DXing and contesting in the United States. Modest stations like mine, with limited time on the air, can benefit just as much as the most formidable. I typically connect to my nearby node as soon as I sit down for an operating session. If there is an active DXpedition or a rare station that I want to work, I can check quickly to find out the times and frequencies where the station has been operating over the last few days, and whether it is on now. Propagation information tells me whether to look to the high bands or a wide area, so that I can check my BBS mail at the same time, all the while being alerted to each new DX 'spot' that comes along.

Rule Changes

In contests, of course, use of spotting assistance usually puts you into a multi-operator category. This year, though, the CQWW contest will have a Single-Operator Unlimited (SOU) category, a specific response to the rise of PacketCluster popularity, and the ARRL is considering a similar change for its DX contest. For many like me, SOU is a great way to add to my country total and contribute points to my club at the same time.

As in the case of any fundamental improvement, PacketCluster has spun off additional advances. K1EA's excellent IBM PC contest logging software, CT, is integratedly designed to work with PacketCluster, including reporting of DX 'spots' to the cluster by pressing a single function key and
moving to the frequency of a 'spotted' station (with one of the newer transceivers) by another one-key command. K1GW has developed an every:gy logging and DX award tracking program called EASYDX, that works with PacketCluster in a diabolically clever way. Connect to your local node through EASYDX, and every 'spot' is cross-checked with your personal DX database. A message appears on the screen to advise you if you still need either to work or to confirm the 'spotted' country on that band or mode, and it can be told optionally to flag new countries by sending a ringing 'DX' in Morse from your computer's speaker, so that you don't even have to be at the rig when a spot comes in.

I hope this has whetted your appetite. Who will be next in the UK to join the PacketCluster revolution?

For further information on the PacketCluster software itself, write Pavillion Software, Box 803, Hudson, Massachusetts 01749, USA.

K1EA's CT can be obtained from Bill McGowan, KC1EQ, 33 Truell Road, Hollis, New Hampshire 03049, USA. When I last checked, the price of a registered copy was US$25, including one free upgrade.

K1GW's EASYDX is now distributed by MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762, USA.

The second program is written by Joe Kasser G32ZCZ, Editor of The Ansatz Journal, resident in the USA.

LAN-LINK

LAN-LINK is a packet-radio and AMTOR terminal program that runs on IBM PCs or clones and provides a window into the Local Area Network (LAN) for the AEA PK-232s, Kantronics KAMS, TNC Is and TNC 2s. It uses menus and function keys that allow the user to communicate, rather than play with TNC parameters which he doesn't understand. Some of its features follow:

(i) Recognises your call sign in a PBBS mail beacon, then automatically connects and downloads your messages.

(ii) Automatically requests bulletins from the PBBS on subjects that interest you.

(iii) Provides a conference mode for multi-connect situations.

(iv) Provides split-screen operation for incoming and outgoing text, as well as for terminal status information.

(v) Alerts you when a predetermined call sign shows up in a packet header on frequency.

(vi) Automatically captures to disk a recording of all connections. Indicates number of packet radio connections.

(vii) Provides 'smart' packet mode printer control that turns off upon disconnection.

(viii) Indicates that a specified station has connected while you were away.

(ix) Automatically sets NET/ROM and KA-Node paths from its call/path file.

(x) Stores and forwards LAN messages.

(xi) Automatically connects and downloads messages from other LAN-LINK stations.

(xii) Determines paths to DX stations.

(xiii) Provides AMTOR/packet-radio MSO and Selective Automatic Answering Machine function that displays a message or calls CQ repetitively and alerts you when a reply is received.

(xiv) Provides RTTY SELCAL mode.

(xv) Supports RTTY Navy MARS File Transfer Protocols (PK-232 only).

(xvi) Contest mode sends standard message and automatically increments QSO count.

(xvii) Provides single keystroke set-up to receive UnSAT-OSC AR 9 and Phase III RTTY telemetry (PK-232 only).

LAN-LINK is distributed as shareware, ie, the user can try the program and, if he wishes to keep it, he registers his copy by sending $35 to its author. Registration entitles the owner to upgrades and full support. Users of earlier versions of LAN-LINK and of PK3223COM Version 1.48 may upgrade by sending the author a blank, formatted diskette and s.a.s.e.

LAN-LINK is written, maintained and upgraded by Joe Kasser G32ZCZ, POB 3419, Silver Spring, MD 20901, Tel: 301-593-6236 from Joe Kasser G32ZCZ.

The SAREX part of Lan-link was designed for both the space segment and the ground segment. The ground segment part is also useful in copying the MicroSats.

LAN-LINK has a number of features specially designed for SAREX, the MicroSats and other special activities as described below.

The Attack or 'go for it' Mode. If the Attack Mode is set, LAN-LINK will issue a connect request to the SAREX Call whenever a packet sent to or from it is heard. Be careful using this feature, as it has the potential to cause a great deal of QRM. It can also be cleared by another station connecting to you and telling you to ':QRT:'.

Blind Connect Scheduler

In case you think that the Robot may be turned on in the beginning of a pass before you hear a packet, you can give LAN-LINK the start time and the end time of the pass and the time interval between the connect/call attempts. At the given time, LAN-LINK will issue a connect request, and keep trying till either it succeeds or the pass ends. The first connect that goes through will inhibit the scheduler.

Telemetry Capture

You can also configure LAN-LINK for telemetry reception so as to capture-to-disk any packets addressed to or from the SAREX callsign. The capture-to-disk file is opened by a packet header containing the SAREX call, and closed by another packet header not containing the call. Packet headers are considered to be lines with a '>' character in them. LAN-LINK thus considers both of the lines below as packet headers.

N4QQ> G32ZCZ
N4QQ BBS>

You may also use these features for copying telemetry from the MicroSats.

Just enough space left to mention that by the time you read this, Sir Ranulph Fiennes should be on his way to the North Pole, walking in aid of Multiple Sclerosis. At this time, callsigns of the packet stations have not been decided, but GB4MSS is one that will be used with a UA0 suffix. This is too long for packet though! Communications back to the UK are being routed via my HF port, GB7LDI. Hopefully propagation will be favourable.

That's about it again, news, comments, etc., to G3LDI @ GB7LDI or Tel: (0508) 70278, or snailmail-QTHR. 73 and happy packeting.
Many radio amateurs have used alternative power-generation techniques. Wyn Mainwaring G8AWT, joined a course at the Centre for Alternative Technology in North Wales and now shares the experience with us!

On Course

A four-day course on ‘wind power-generation’ lay before us, with a broad hint that ‘camp-followers’ could enjoy the scenery and even allay boredom by giving a hand with some chores. As obligations, arising from the increasing numbers of day visitors and school/college groups were stretching the ‘facilities’, help was needed in the reception kiosk, the shop and the vegetarian restaurant. Even a casual walk along the maze of paths and narrow gauge railway, watchful for lost or ‘malfunctioning’ personnel, gave a sense of purpose to casual sight-seeing.

During the initial welcome given by the Centre’s Director, a cri de coeur for an ‘early bird’ willing to tackle technological problems to the accompaniment of the noisy ‘dawn chorus’, was made. I - ever ready for an early cuppa - willingly volunteered. My duties were to start the electronically controlled and automatically topped-up boiling water installation in the restaurant. I also had to switch off the few night lights, thus saving the batteries as the whole site was electrically powered by 24 volt batteries!

As recycling is an important aspect of ecological thinking, ex-GPO telephone exchange lead-acid batteries have been given a new duty, by becoming part of the energy cycle in a locally generated electricity system.

The other methods of generating the power were provided by water turbines, windmills, solar panels, wood-gas-plant fired engine-driven dynamo, or a vertical-boiled steam-powered dynamo. A last resort was an ancient Morris Minor engine-powered generator, fuelled by the same ‘bottled’ liquid gas that cooked the first-class food in the kitchen.

Power Control

All the various power sources fed their coulombs into a small wooden shed packed with several ‘strings’ of deep-cycling lead-acid accumulators.

The individual cells were carefully labelled in dozens, with the electrolytic levels and state of charge being carefully checked in an almost loving way to maintain their reserve capacity of 2000Ah.

Although not part of the syllabus of our course, the Centre’s upper water turbine was still of interest.

We were also given a little information on the arrays of solar panels. Most were statically mounted on roof tops at the optimum angle and bearing to catch the sunlight, but one group of panels were mounted on a sun-seeking tracking frame.

The various engine-driven generators on the site were reserved for those who were equally happy wielding spanner or shovel! All those power sources had the common ability to be controlled or even stopped.
When the Wind Blows

Wind-free days are comparatively rare in Britain, but it frequently blows with variability of strength and direction. Wind-driven generator designs are needed that will make use of light airs, with the ability to direct the machine to the best direction from whichever way the wind is blowing. As the energy level in wind rises with the cube of the velocity, gusts and gales call for very secure construction. 'Feathering' or wind spilling arrangements need to be fool-proof, otherwise blades that break off overspeeding 'windmills' are likely to scythe through anything within reach.

There is a wondrous selection of windmills arranged both around the perimeter of the quarry, and more conveniently within the centre for the visitor and student alike. Most have propellers and rudders, but a few were mounted on a vertical axis. This particular design suffers from problems caused by the considerable lateral forces of winds.

Third World

Some of the 'windmills' were traditional designs, using locally available materials. The traditional approach is particularly suitable for 'third world' situations where there is a real 'life and death' need for water, and pumping action has to be guaranteed.

The pumps must work well, despite the gritty nature of the water to be drawn to the surface from considerable depths. Such machines need to have high starting torques to move heavy wooden rods against the large static loads of long water columns. As a matter of fact, tribute is paid to one such design - the ancient 12-spoke wood and canvas Cretan windmill - in the Centre's impressive logo.

Batteries

Modern requirements favour the generation of electricity, with the generated d.c. being chemically stored in accumulators. Lead-acid accumulators have advantages over the nickel-cadmium-iron-alkali types in terms of both electro-chemical efficiency, and the required minimum potential for initial charging currents.

The considerable weight of large capacity lead-acid cells, calls for appreciable civil-engineering to ensure safe use. They need to be regularly inspected under natural lighting conditions, and need reasonably pure (distilled or de-ionised) water to be available for 'topping up'. This is particularly important in hot climates. Batteries must also be housed in well ventilated, rain and dust proof buildings away from any source of spark or flames.

Supervision

Moderately powered installations are likely to have users on hand, and can have daily supervision, but remote units would need to be self-caring for considerable periods of heat, drought or even extreme cold.

Part of the on-going commitment of the Machynlleth Centre concerns evaluation of potential sites by year-long observations of winds, in terms of strength and duration. To help in this work the Centre's resident experts have evolved an unceasing 'laboratory assistant' in the form of an automatic recording system. It's capable of 'living' on some lonely, inhospitable and wind-swept site, carefully noting and storing all the data on the forces of the wind. The modest power requirement for such faithful service is provided by a large, self-maintaining, battery which is trickle-charged by solar panels.

Wind-Driven Generators

Manufacturers of various designs of wind-driven power generators have entrusted the staff of the Centre with the care and evaluation of their products. These include a 0.25kW rotating permanent-magnet unit (used to charge batteries); 1, 2 and 3kW dynamos that are turned by two or three-bladed, horizontal-axis propellers on lattice towers; and one 15kW a.c. machine on a hefty steel tube that looked like a lighthouse to me.

Ensuring a permanent load for such an alternator, meant installing a bank of 3kW immersion-heater elements in a large water tank. This not only prevented runaway revolutions by the three-bladed propeller, but produced a useful store of hot water for the residents to use in windy weather, or shortly after!

Stationary 'windmill' propellers need to 'catch' the slightest breath of air. They should be able to turn into the wind by means of a rudder or fan-tail to produce a justifiable output at moderate wind speeds. They must also be able to cope with wind speeds up to the rated power limits of the generator and structure. Quite a tall order!

Material Choice

The choice of material for such a wide ranging task came back to the age-old choice...wood. The material is carefully selected for uniformity from wood known to be weather and stress resistant and able to accept preservatives and protective coatings. Modern materials, although capable of being moulded, seem to be liable to creep at high revolutions or distort in high winds. One-piece, two-bladed, propellers seemed to be favoured, giving higher speeds than multi-bladed designs. Another...
Climbing the tower to check that all is well with the three bladed generator.

advantage of wooden blades is that they are more economical to transport. A six foot type has proved to be a good size to send out to isolated farms and cottages, for installation or replacement.

Electrics

Among the various discoveries made from the studies undertaken at the Centre, has been the revelation of how little electrical power is really needed! Surprising perhaps to the young graduate and ‘hi-tech’ folk from big cities, but it serves as a reminder to us ‘old timers’ who have lit (and broken) a few gas mantles.

All the electrics on the site were wired through a tiny (and well packed) control room, enabling monitoring of every outlet and isolation if needed. The control-room doubled as a projection facility into the adjacent lecture-theatre, which also had a video display unit. There’s also a library stocked with books covering ecologically appropriate topics, and an overhead projector, obviously constructed from re-cycled parts.

All the lighting on the site is provided by 24V bulbs. Experience, backed up by observations and enquiries have proved how efficient - in terms best described as physiological rather than lumens - this method is for practical purposes.

Saving Energy

Obviously, if energy is saved, stored, and used more efficiently then less would be needed in the first place. As the energy required for heating purposes is becoming a heavy burden in temperate regions, staff at the Centre are studying a wide range of alternatives. Many of the ideas could be seen undergoing evaluation in terms of £kWyear. There were d.i.y. water storage tanks and exotic tubes with alternating silvered and blackened surfaces, mounted in evacuated glass tubes on combined shock and thermal collars. All were mounted in suitable situations for visitors and students to see for themselves.

Solar Success

In early summer 1989, the rainfall had been almost zero for several weeks, this severely limited the water power available. There was very little wind, even up on the ridge of the mountain. The brilliant sunshine not only made it possible to have lessons out in the shade of the trees, but enabled the solar panels to generate a kilowatt directly into the batteries, making it necessary to run an engine only occasionally to re-charge batteries.

Most lectures over-ran with both enthusiasm and because of the many questions from the floor. Nominated lecturers were readily helped by visiting experts in the ever widening field of ecological engineering.

So keen were we that after the evening sessions and films had finished, many pots of tea were brewed as we chatted into the early hours. It was so warm that we were able to stay out on the terrace between the students’ common room and the dormitories and enjoy our conversation to the full.

Services

I soon realised that the place had none of the ‘local authority style’ services that are taken for granted these days, even in remote hamlets. Such things as drains, piped, treated and purity-guaranteed water at a pressure that fills cisterns, flushes ‘loos’, fills kettles, baths and showers weren’t available. At this ‘Green Oasis’ these services need to be continually provided by the labour from a rota of the residents!

Occasionally we were reminded of the limitations of the system. It brought home to us the high reliability level of the national electricity grid with its careful frequency control and steady voltage and associated benefits.

Being no more than an enthusiastic amateur at gardening or civil engineering, I could only look in awe at the vegetable plots, growing prolifically from beds of slate waste. This miracle was provided by the effluent, discharged from the modern flush...
toilets. This material was recycled in carefully controlled stages, to yield odorless compost that could have been bagged and sold, at garden centres or in general stores.

**Scenic Environment**

Water had been used to create scenic areas that yielded a different food chain. Birds and animals (wild and domesticated) were finding the environment to their liking. So do fifty thousand folk each year, who often try to return, over-subscribing the wide variety of residential courses that the Centre offers.

The course we attended was so well time-tabled, that only early in the morning was it really possible to explore. We browsed in the bookshop, followed the narrow gauge railway track, and peered down the pit of the 'third-world' type wooden water wheel. We also 'played' with the many exhibits (intended for the thousands of day visitors) and chatted to the goats!

Only once was it possible (in daylight) to negotiate the steep incline down to the former narrow gauge railway station and on to the main road and mingle with local people. After the course finished, only those who really had to rush off to Machynlleth Station to catch a train actually did so. Others lingered, browsing amid the books or searching for elusive staff members to say goodbye, but not really wanting to leave the place.

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Anyone interested in home construction of amateur radio equipment will soon discover that the vast majority of kits on the market only support c.w., a.m. and double sideband operational modes. That has now changed with the release of the HTX-10 s.s.b. and c.w. exciter. In fact the HTX-10 is the vital ingredient in a line of kits from Howes, which form the essential elements of a complete 21MHz and 28MHz transceiver. So let’s take a closer look at the HTX-10 kit.

Instructions

Kits can make a great introduction to home construction and are often very cost effective, but a poor kit can be a nightmare. Probably the most important item in any kit, at least as far as newcomers are concerned, is the instructions. Howes have had plenty of experience in the kit business and as a result can produce detailed but simple to follow instructions. One useful offer they do make is that if, after receiving the kit, you think it’s beyond your capabilities you can send it back and on payment of the difference they will exchange the kit for an assembled p.c.b.

One point to note about the HTX-10 kit is that it is NOT for beginners, you need to be comfortable working with high density p.c.b.s and integrated circuits. The instructions supplied with the HTX-10 comprised 11 A4 sheets. The first three sheets covered the construction order of the kit, and also included some useful diagrams illustrating how the components should be mounted on the p.c.b.

The following section was a detailed parts list which included the full component marking details. An example of this was where the appropriate colour code was printed next to each resistor, so making identification as easy as possible.

This same technique was used for all the other components. The remaining sections covered the alignment, interconnections and circuit diagrams. I thought the level of detail provided was just about right for this type of kit.

Construction

The HTX-10 was assembled on one p.c.b. and was of good quality glass fibre and screen printed with the component overlay. With any kit of this complexity it’s important to keep to the recommended assembly order which in this case started with the resistors. I don’t expect I’m alone in having difficulty with resistor colour codes, so I usually set up a digital multimeter on the bench and use it to check resistor values during construction. This simple precaution can save a lot of time later on.

There were approximately 80 resistors in the kit, so checking them was quite a time consuming task. I completed fitting the resistors in two sessions with a total time of about 1.5 hours. The next step was to fit the diodes followed by the fixed capacitors.

The total assembly time for the review p.c.b. was approximately 2.5 hours. Although the kit could be constructed in one session, I would strongly recommend that this is broken up into at least two parts, for the sake of accuracy! The supplied instructions were issue 1, and I only found one mistake which was that a 100µF capacitor, C17 was missing from the components list.

I have contacted Howes regarding the error, and...
they will no doubt put things right with the next issue. With the p.c.b. complete, the next stage was to mount it in its proposed enclosure, check that all was basically ok and carry out the alignment procedure.

Alignment

The first part of the alignment procedure was to set all the variable components close to their expected final position. This procedure was clearly covered in the instructions. This method helps, and goes a long way to overcoming many of the problems traditionally associated with the alignment of a complex module such as the HTX-10.

Hows had obviously put a lot of thought into the alignment procedure to make it as practical as possible, bearing in mind the type of test equipment available to the average amateur. It's very easy to write alignment instructions if a full range of test equipment is available, but Howes have managed to limit the requirements to a general coverage receiver and a frequency counter!

In addition to the counter and receiver, you will also need to have a working v.f.o. for 21MHz and 28MHz. The first stage in the process was to set up the carrier oscillator. This was achieved by tuning the receiver to 11.995MHz and adjusting an inductor for maximum received signal on the receiver. It was at this point that the frequency counter was required, to accurately set the carrier frequency for s.s.b. and c.w.

The next stage was to align the 21MHz and 28MHz band pass filters, which again was achieved by using the receiver to monitor the output signal. The final adjustments covered the carrier suppression and microphone gain settings. As you can see from this description, the alignment really has been made extremely simple and is well within the capabilities of most amateurs.

With the alignment complete, I was able to confirm that the suggested starting point for the adjustments was very close indeed to the final settings. This of course meant that the alignment really was very quick - about 20 minutes in the case of the review model!

Circuit Description

I'll give an outline description of the circuit rather than full details as that would warrant an article in itself! Starting with the microphone input. This signal is first amplified by a two transistor circuit and subsequent active low-pass filter.

The resultant filtered signal is applied to an MC1496 double balanced modulator. Here, a double sideband signal is produced by combining the audio signal and the 11.995MHz crystal controlled local oscillator. The next process is to convert the d.s.b. signal into a s.s.b. signal using filter technique.

Rather than use a standard commercial filter, Howes have produced their own crystal filter which has the advantage of precisely matching their requirements. The resultant s.s.b. signal is fed to a SL6440C double balanced mixer where it is combined with the v.f.o. for conversion to the final operational frequency.

The next stage comprised two banks of relay switched band pass filters - one for 21MHz the other for 28MHz. These provided a significant reduction in out-of-band signals. The final, broad band, stages were required to bring the signal up to 50mW p.e.p. It was at this point that provision for automatic level control (a.l.c.) was provided. One notable point about these power amplification stages is that they all run in Class A to minimise harmonic distortion.

Transceiver

As you can see from the description so far, the HTX-10 is the heart of an s.s.b. transceiver, but cannot be used on its own. So for the 'on air' tests it was necessary to interface the HTX-10 with a number of other modules to form a working unit. This job was made somewhat easier as Howes supplied a complete transceiver for me to evaluate.

Before I cover the on-air performance of the unit I ought to describe the modules used in the transceiver. The heart of the unit was the HTX-10 exciter, but this was interconnected with a v.f.o., receiver and frequency display. The receiver module used was the DFD-10 direct conversion unit, with a coverage from 21MHz to 28MHz. This receiver normally operates using its internal v.f.o. but in this case the VF-10 dual band v.f.o. is used.

The v.f.o. was also used for the HTX-10 exciter, thus ensuring that the transmit and receive frequencies were the same. The VF-10 included a few useful refinements such as a clarifier (r.i.t.) which could be disabled by the p.t.t. line. The final module was the DFD-1 digital frequency display which was fed from the HTX-10 to give a readout of the operating frequency.

There was one other module mounted in the review transceiver, and that was a final r.f. power amplifier. However, the details of this module have yet to be finalised and it was not connected in circuit. The housing used for the transceiver review model, comprised a very smart two section steel case which provided excellent r.f. screening in addition to the mechanical protection.

On Air

For the acid test I set the Howes transceiver up in the shack in place of my own equipment. My first impressions were very favourable indeed and it was difficult to believe I was listening to a comparatively simple direct conversion receiver. The audio quality of the receiver was also good, and there was plenty of power to drive the shack speaker.

Frequency stability of the v.f.o. is obviously an important point in any receiver, and is often an area where performance is lacking in home
constructed units. The VF-10 did very well here and once past the initial warm-up period proved to be perfectly satisfactory for its intended s.a.b. and c.w. operation. Being keen on data communications myself, I connected up my packet and RTTY equipment to see how it performed. I was again delighted to find that it proved very successful with no problems at all. In fact, the continuous tuning of the v.f.o. meant that it was better that some synthesised receivers.

If you intend to use the receiver for packet operation on one frequency for long periods of time, you will however, find that the v.f.o. needs adjustment from time to time. I found the frequency display to be very clear and there were no signs of any interference breaking through into the receiver. The ability to set the counter resolution to 100Hz was also very useful.

Moving on to the HTX-10 exciter itself, it seemed obvious that with only 50mW of r.f. output available, it was going to be difficult to make any real contacts. I overcame this problem by carrying out my tests between the HTX-10 and my home transceiver. The main object being to evaluate the signal quality, so the use of a receiver of known quality was essential.

The overall quality of any transmitter is greatly affected by the microphone, and in this case I used a low impedance Trio model which was supplied by Howes. This microphone produced excellent results on the Icon with a very well balanced audio quality.

I would have liked to have put the transceiver through its paces in the lab, but unfortunately there just wasn't time.

Conclusion

The HTX-10 is a very welcome addition to a well established range of high quality kits from C. M. Howes. The performance of the HTX-10 was well up to the expected standard and provides the foundation for a fine transceiver when combined with the other Howes modules. The HTX-10 is available from C. M. Howes price £49.90 in kit form or £74.90 ready assembled, add £1 p&p. My thanks to C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel: (0327) 60178 for the loan of the review kit and transceiver.

Reg Ward & Co. Ltd.
1 Western Parade, West Street, Axminster, Devon, EX13 8NY.
Telephone: Axminster (0297) 34918

Antennas

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Stocks usually dispatched within 48 hrs.
Low Voltage Warning Alarm

Have you ever 'cooked' or damaged a power supply because the output has been accidentally short circuited without you realising it? This handy little gadget is very easy to make and gives an audible warning when the voltage falls below 3V. Another plus is that it's so small that you can fit it into a variety of amateur radio gear.

The alarm can also help where the loading on the power supply is not enough to blow fuses, but can still overheat transformers and other expensive components. In this age of fully rated equipment there's often not much of a margin for overloads and any extra form of protection could save you money.

The circuit for the low-voltage warning unit is shown in Fig. 1, and is based on a 4093 device. In operation the alarm is very simple to install and is connected either side of the existing regulator in the power supply to be protected. The alarm is shown connected this way in the block diagram in Fig. 2, where it can obtain its power supply from point A and most effectively monitor any dramatic drop in voltage at point B.

How It Works

The supply for the low voltage warning alarm, obtained from point A, is regulated down to 5V to supply the 4093. Transistor TR1 has a base reference voltage set by the 5.6V Zener diode, D1.

Providing the sensing input to the alarm from the equipment to be protected is simplicity itself. The sensing voltage is applied to IC1a via R2. This input is connected to the output of the p.s.u. at point B in Fig. 2. The -V connection of the alarm is then connected to the -V supply of the p.s.u. as shown.

To prevent the gate input voltage exceeding both supply rails and possibly causing damage to IC1, the input voltage from the p.s.u. is applied via R2. It is then clamped by the Zener diode, D2.

When the alarm is working and the p.s.u. is 'healthy', pins 1 and 2 on IC1a are high and pin 3 is low. A low frequency oscillator, operating at about 3Hz, is provided by IC1d and another oscillator is provided by IC1c. The IC1c oscillator runs at a higher frequency than IC1d, and can be adjusted by R4. Both oscillators are inhibited by a low state on pins 12 and 9.

When the input to pins 1 and 2 goes low (when a short circuit of the p.s.u. occurs) pin 3 goes high, starting both the oscillators. The outputs of the oscillators are added in IC1b, which then provides the necessary drive for the piezoelectric buzzer.

Construction and Setting Up

The alarm can be built to best advantage on a small p.c.b., the layout of which is shown in Fig. 3. You should first mount all the components on the
p.c.b, taking care to place IC1, TR1, D1 and D2 correctly before soldering them into position.

It's a good idea to mount the piezoelectric buzzer on stand-off bolts on the p.c.b track side. This will make it easier to check and replace other components should the unit goes wrong.

Checking

After completing the board and carrying out the usual checks for solder-bridging and other potential problems, the alarm can be connected into circuit as shown in Fig. 2. Once you've done this, temporarily connect the sensing lead (this connection leaves the p.c.b from the unconnected end of R2) to the -Ve line and adjust R4 for maximum output from the piezoelectric buzzer. As R4 is adjusted, you should notice a significant increase in the audio output as the oscillator drive approaches the buzzer's resonant frequency.

Finally

After this final test, the sense connection can be soldered onto the output terminal of the p.s.u. to be protected, as shown in Fig. 2. You can then sit back and relax in the knowledge that your p.s.u. is that much better protected than before and has that hidden extra!

PW

Shopping List

**Resistors**

0.25W 5% Carbon film

10kΩ 2  R1, R2
3.3MΩ 1  R3

Potentiometer rotary p.c.b. mounting

50kΩ 1  R4

**Capacitors**

Plastics cased miniature metallised polyester film

22nF 1  C2
220nF 1  C1

**Semiconductors**

Integrated Circuits

4093 1  IC1 (Maplin QW53H)

Transistors

BC237 1  TR1 (Cirkit 5B-00237)

Diodes

BZY88C 1  D1  5.6V (Maplin QH08J)
BZY88C 1  D2  4.7V (Maplin QH06G)

Buzzer

piezoelectric 1  9V encased element (Cirkit PKM29-3AO)

Miscellaneous

Connecting wire, p.c.b, stand-off bolts and nuts for buzzer mounting, double-sided adhesive pads for attaching alarm in p.s.u.

**HOW MUCH?**

£ 8.00

**HOW DIFFICULT?**

Intermediate

Component layout and track pattern for the printed circuit board available from the PW p.c.b. service.
In this second part of the NiCad Recycler, Peter A. Lovelock looks at building and setting the unit up for everyday use.

The unit is built on a p.c.b. that holds most of the main components. The case that houses the NiCad Recycler should be provided with adequate ventilation holes to ensure a good air-flow.

By allowing a good flow of air over the transformer and other components you should get a long and trouble-free life from the Recycler. The importance of this factor should not be overlooked, especially when you consider the long cycle times needed for some larger capacity batteries.

A suitable enclosure for the project is a steel case, such as the Maplin type 2108. This case provides a sturdy enclosure and has the advantages that the front and back panels are detachable. Also more than adequate ventilation holes are provided in the design.

Layout

With the recommended lay-out, the mains transformer and the p.c.b. are arranged so that there are gaps between them. This will aid cooling and will also allow the large computer-type electrolytic capacitor for the 'Zapper' facility to be suitably placed. The suggested front panel layout is shown in Fig. 2.1. I recommend that you stick to this layout, as it seems to work well in practice. Power for the Recyler is provided from a 24V secondary transformer with a 1A rating. Again, in practice this rating has proved to be perfectly acceptable. The transformer fitted into the PW prototype only became barely warm to the touch after many hours of use.

In the prototype this electrolytic capacitor was held in place by double-sided adhesive tape. A spring-clip type of holder is perfectly acceptable if you don’t mind the extra drilling required for the necessary fixing bolts.

Heat Dissipation

The case has ventilation holes provided in the bottom plate and a further series along the top cover. These inbuilt holes should be more than adequate and no further holes will be needed for the unit in normal use.

Heat sinks for IC1 and IC2 are essential for reliable operation. For the most efficient transfer of heat, silicone grease may be applied between each i.c. and its heat sink. The rear panel provides an excellent heat sink for the only other high-dissipation components. These are 15W wire-wound 10Ω resistors R20 and R21. Neither of these resistors require heat-sinking compound as they bolt directly onto the rear panel, which provides a large heat dissipating area. The p.c.b., track and component overlay are shown in Fig. 2.2. The heaviest gauge wire possible should be used for the on-board connections to C3 and S5b. A short thick wire should also be connected from the negative of the capacitor C3, to socket SK2. High current pulses are carried in this area of the circuit and its efficiency depends on the lowest series resistance in circuit.

To build the unit, follow the layout shown, there’s no special order of fitting components to the board. You should also examine the p.c.b. for solder-bridges and poor connections or wrong component placing.

Calibration and Adjustment

If everything is okay the Recyler will be ready for initial calibration. To calibrate the charge voltage limit, connect an accurate voltmeter (preferably a digital type) between the wiper of R1 and ground. Adjust R1 for each end charge voltages while logging the potentiometer dial setting. Table 1 shows the ideal end charge voltage for one to ten cells. If using the switch option as outlined in the last part then check that...
the correct voltages are as shown for the appropriate cell count (see Table 1).

To calibrate the deep discharge limit, set the charge maximum to 8.4V (6-cells). Connect the voltmeter to the wiper of R3 and ground. Adjust the level, using R3, to 6.0V (1V per cell). No further adjustment of R3 is required since it automatically tracks the setting of R1.

The discharge load resistor in the prototype is made up from two 10Ω 15W resistors (mounted on rear panel) that suits the requirements of recycling 12V transceiver battery packs. A 10-cell, 12.5V

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<td>2.8V</td>
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<td>3</td>
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<td>4</td>
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<td>9</td>
<td>12.6V</td>
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500mAh pack discharges at 625mA in about an hour. However, a single 1.25V 500mAh size AA cell will discharge 62.5mA in about 8 hours. The extreme case,
a single 4000 mAh D cell will take 64 hours to discharge fully, which is time consuming for recycling. If you expect to recycle high capacity cells, you will need to select appropriate loads for maximum permissible discharge rates to speed up the process. Maximum discharge current should not discharge a cell in under one hour. Load resistor values may be calculated using Ohm’s law (R = V/I) for the total voltage and maximum discharge current for each combination.

DO NOT FORGET that high levels of heat can be generated during discharge.

**General**

When first recycling a ‘memorised’ battery best results are obtained by using a low charge rate of one tenth of the ampere hour rate (e.g. 50mA for 500mAh AA cells). Remember that charge and discharge values may be altered to suit your requirements. Don’t forget that low capacity battery packs should not be subjected to heavy discharge current. This could lead to a state of insufficient discharge and cause the cycling to be less effective than it might be.

**Individual Cell Records**

Many NiCad users will have a multiplicity of cells. In fact, it is very easy to lose track of each individual cell. How about keeping tags on them? One method is to give each cell a number and keep a record on each. You could then have a very useful record as to how individual cells have fared. More importantly perhaps, it may show if one brand of cell is proving to be more reliable than others. Together your NiCad Recycler and cell-log could save you a great deal of money and time!

PW

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ADDRESS

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Distributed by Seymour

Practical Wireless, June 1990
The new HOWES HTX10 is an SSB and CW exciter for the 10 and 15M bands. It has been designed to be the heart of a transceiver for these bands, or as part of a “tunable I.F.” for driving transverters.

SSB generation is by the filter method using a double balanced modulator and crystal filter. The onboard microphone amplifier is designed for low impedance microphones, and the key input accepts straight or electronic keys. Relay switched band filters, PTT switching, and ALC input facilities are amongst the technical features provided.

Perhaps the most important feature of the HTX10 is that it is a HOWES KIT. This means that the module has been designed specifically for home construction, with ease of building and set-up in mind. Our high grade signal generators, spectrum analyzer etc. are used in the development to produce a level of cost effective, repeatable performance, that frankly we doubt could be achieved by the amateur designer lacking these professional facilities. However, no fancy equipment is needed to get your kit up and running.

There is an expanding range of interlinking, companion kits for you to use with the HTX10 if you wish. The DXR10 receiver and VF10 VFO kits are available now, and there are matching transverter and PA kits under development. Our other accessory kits such as the DF08 Digital Frequency Readout, AP3 Automatic Speech Processor etc. can also be used in conjunction with the other kits to help build yourself a really super rig with excellent performance and features.

**SOME TECHNICAL DETAILS**

- 2.8kHz SSB crystal filter with 80dB stopband
- 8 pole band filters
- All carrier, spurious and harmonics at least 40dB down
- MC149S6 double balanced modulator
- SL6440 double balanced mixer
- Broad-band, class A output stages designed for exceptional linearity
- Variable CW power control, full key click suppression
- 50mW PEP output to drive transverter or PA board

If you fancy the challenge of building something a little more “upmarket” than a simple QRP CW rig, then the HTX10 may well prove of interest.

HTX10 KIT: £49.90

**VF10 DUAL BAND VFO TO SUIT HTX10**

The new VF10 has been designed to provide the VFO input to the HTX10 for operation on 10 and 15M. It has all the features normally found on our well regarded, stable VFOs: IRT (clarifier), FET oscillators, voltage regulation and separate buffered outputs for TX and RX use. Used with a 50pF tuning capacitor, the VF10 will tune the HTX10 over 28 to 28.6 and 21 to 21.45MHz. A larger capacitor can be used for wider tuning range on 10M if you wish. Circuitry includes 16 transistors (5 FETs) and 14 diodes.

VF10 KIT: £16.50

**NEW SSB EXCITER KIT!**

- **VF10 Kit**: £16.50
- **Assembled PCB**: £28.80
- **VF10 Dual Band VFO to Suit HTX10**: £16.50
- **HTX10 Assembled PCB**: £74.90
- **HTX10 Board Kit**: £24.90
- **HTX10 Assembled Board**: £36.90

**SOME INTERLINKING HOWES**

ACCESSORY KITS

- **AP3** Automatic Speech Processor: £15.80
- **CM2** Quality Mic with “VQGAD”: £15.80
- **CTU30** All Band 160 to 6M ATU 30W: £27.90
- **DCS2** “S meter” to suit receiver: £7.90
- **CSL4** Narrow SSB & CW filter for RX: £9.90
- **DF05** Digital Frequency Counter: £39.90
- **ST2** Side-tone oscillator: £8.90
- **SWB30** SWR/power indicator/food: £12.50

Please add £1.00 P&P to your total order value.

All HOWES kits include full, clear instructions, a good quality PCB with screen printed parts locations, and all board mounted components (yes, this does include the crystal filter on the HTX10). Delivery is normally within 7 days. Credit card sales and technical help are available by phone during office hours, but please send an SAE for a copy of our catalogue or data sheets on specific products.

73 from Dave G4KOH, Technical Manager.
The eighth annual PW QRP contest will again provide v.h.f. enthusiasts with a chance of some long-distance operation using low power. The 3 watt transmitter output power limit gives the user of the most simple equipment the opportunity to join in the fun and compete effectively. The high level of activity, with many groups setting up stations on the tops of hills and mountains around the UK, guarantees that the maximum DX potential of the QRP station is realised - even seasoned operators often express surprise at how far they have worked with only 3 watts.

In previous years the QRP contest has been particularly popular with newcomers, so if you have not tasted the delights of contest operation before, why not have a go? You can enter on your own, or get together with some friends to form a group. If this is your first contest, and you're not sure where to start, take a look back at the article which accompanied the rules to last year's event \textit{(PW June 1989)} for some general advice.

The winners cup and a variety of certificates are to be awarded as usual, plus the \textit{PW} Tennamast Trophy for the leading Scottish station. Good luck to all participants, and fingers crossed for a dose of good propagation conditions to really liven things up!

\textbf{Rules}

1. \textbf{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 (2m) band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1700UTC on 17 June 1990.
   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. \textbf{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. \textbf{Power}
   The output power of the transmitter final stage shall not exceed 3 watts 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 to the S02 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. \textbf{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 I081, I090, I091, I092 and J001 squares; final score = 5 \times 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 UTC (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.

6. Entries

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

(a) name of entrant (or of club, etc., in a group entry) as it is to appear in the results table
(b) callsign used during contest (including any suffix)
(c) name and address for correspondence
(d) details of location of station during contest; for portable stations, a national grid reference is preferred
(e) locator as sent
(f) whether single- or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his permanent home station or a portable station established solely by him/her; if multi-operator, include a list of operators names and callsigns
(g) total number of contacts and locator squares worked
(h) list of the locator squares worked
(i) a full description of the equipment used including TX p.e.p. output power
(j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) to measure the output power
(k) antenna used and approximate station height a.s.l.

Failure to supply the previous information may lead to loss of points or disqualification. The following declaration 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, Oxon. 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 2 July 1990. 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 6 August 1990.

7. Miscellaneous

When operating portable, obtain permission from the owner of the land before using a site. Always leave the site clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have an alternative site available in case this problem does arise.

Make sure your transmitter is properly adjusted and is not radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous very strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the receiver input. The use of a high-gain RF pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it is 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.

PRACTICAL WIRELESS 144MHz QRP CONTEST 1990

<table>
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<tr>
<th>Date</th>
<th>Callsign</th>
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Practical Wireless, June 1990
Top Band

Let's make a start with Top Band; and here it was a pleasure to receive a telephone call from "GM3JDR" (Aukengill) and to know he is still doing his thing on the band. It sounds as though Dave is maintaining his enthusiasm at the current C0. One wonders just how many homes GM4JKY has from which he managed all continents on Top Band.... I recall him doing one before going to Harlow, at Harlow, at Newport Essex, and now from Sevenoaks, which must be the first de facto marathon that he has attempted. I can only wish it had been less successful for him to know that there are a number of other mentions of the GM4JKY "expedition" which has been mentioned in this context.

Then there is the band everyone loves to hate! On 7MHz there were the odd signal put in the book: c.w. to UM8MAD, VK2XM, N4MF, W4JX, UL70D, UM1MZZ, USMLAU/UV10 (Franz Josef), KX3.JV, E3AB, H1Z2H, RO0AV; and on ssb: 4150/9 for another and JA3P. There were no really good days in the period thinks GM3GDR (Hurford); nonetheless Bob found SMDTY, GW3TII, NZ1L and DX7w3, and I must say that we can persuade the a.t.u. to turn whatever it is into something a little more to the liking of the rig. But first, to finish this column!

The 3.5MHz Band

Enter, stage right, G3NFO (Yevoll) who complains that the colonnade space isn't balanced compared with the v.h.f. boys; why the only answer to this is up to, or for less anywhere given that one is ready and willing to tackle the question of antennas and earth systems. Another rig down this band is GM3GDR who has had some good news put into the book: c.w. to UM8MAD, VK2XM, N4MF, W4JX, UL70D, UM1MZZ, USMLAU/UV10 (Franz Josef), KX3.JV, E3AB, H1Z2H, RO0AV; and on ssb: 4150/9 for another and JA3P. There were no really good days in the period thinks GM3GDR (Hurford); nonetheless Bob found SMDTY, GW3TII, NZ1L and DX7w3, and I must say that we can persuade the a.t.u. to turn whatever it is into something a little more to the liking of the rig. But first, to finish this column!

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A high-performance HF rig... with a great receiver and full-power transmitter. Light in weight and low in price.

This is Yaesu's FT-747GX.

Whether you're a beginner or a veteran, it's a great way to start. And a great way to go.

**DX Ready.** The 747 packs a full 100-watt RF punch on 160 to 10 meters, with continuous receive from 100 kHz to 30 MHz.

And its control panel is refreshingly simple. So you can hop around the band fast to nail those DX stations. While other guys are warming up their amplifiers, you can be working the DX!

**Multimode Versatility.** The FT-747GX is ready to go on LSB, USB, CW, and AM. With provision for the FM-747 FM unit.

You get 20 memories to store frequency and mode. Dual VFOs with split frequency operation for DX-pedition work. And manual band scan plus auto-resume memory scan via the microphone up/down buttons.

**Great Receiver.** Utilizing a directly-driven mixer, the FT-747GX receiver features superb overload protection. You also get factory-installed narrow CW and AM filters. A one-touch noise blanker. All-mode squelch. RIT. And a 20-dB attenuator for local QSOs.

**Lightweight Construction.** Housed in a metallized high-impact plastic case, the FT-747GX weighs in at about 7.5 pounds! With the loud-speaker mounted on the front panel for maximum audio transfer. And internal heatsinking for the transmitter, rated at full power for FM, packet, RTTY, SSTV, and AMTOR when used with a heavy-duty power supply.

**Available Options.**
- FC-1000 or FC-757AT Automatic Antenna Tuners
- FL-7000 500-watt Automatic, Solid-State Linear Amplifier
- TCXO-747 Temperature-Compensated Crystal Oscillator
- FAS 1 4R Remote Antenna Selector
- FRB-757 Amplifier Relay Box
- FP-700 Standard Power Supply
- FP-757HD Heavy-Duty Power Supply
- MMB-38 Mobile Mounting Bracket
- MH-18B & MD-18B Microphones

**Discover the Price/Performance Leader.** Check out Yaesu's low-cost FT-747GX at your Yaesu dealer today. Because now, Yaesu puts priceless DX into your price range.

South Midlands Communications Ltd
S.M. House, School Close,
Chandlers Ford Industrial Estate,
Eastleigh, Hants S05 3BY
Tel: (0703) 255111
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**INCREcBLE VALUE AT JUST**

£174.95

**1 GHz Universal Counter Timer**

This high quality, 10Hz to 1GHz multiple function counter has an 8-digit, high brightness, 7-segment LED display and a high stability crystal oscillator for maximum accuracy. The meter has six function switches – 3 Frequency Modes, Period, Totalise and Check Modes. A HOLD switch allows you to halt the display whilst the count continues. The unit has heavy-duty rubber feet and a fold-away tilt stand. Supplied with a 2m mains lead, a 1m lead with a BNC plug at one end and red and black crocodile clips at the other, plus a comprehensive operator’s manual.

**20MHz Triple-Trace Oscilloscope**

A precision laboratory 3 channel – 3 trace oscilloscope packed with features you’d expect to pay TWICE the price for:
- Sensitive vertical amplifier 1mV/div allows very low level signals to be easily observed
- 150mm rectangular CRT has internal graticule to eliminate parallax error
- X-Y mode allows Lissajous patterns to be produced and phase shift measured
- TV sync separator allows measurement of video signals
- 20ns/div sweep rate makes fast signals observable
- Algebraic operation allows sum or difference of Channel 1 and 2 to be displayed
- Stable triggering of both channels even with different frequencies is easy to achieve
- 50mV/div output from Ch 1 available to drive external instrument e.g. frequency counter
- Hold-Off function permits triggering of complex signals and periodic pulse waveforms

**Multipurpose Dip Meter**

A multipurpose transistor dip meter covering the range 1.5MHz to 250MHz in six overlapping ranges. This unit can be used as a dip meter or absorption wavemeter and an audio signal output is also provided for connection to a crystal earpiece. Battery check function. Supplied with a comprehensive operator’s manual.

**Co-Axial Cable Stripper**

This handy stripper tool will quickly become indispensable. Removes the inner and outer sheath of co-axial cables simultaneously and will accommodate cables from 4mm to 7mm diameter.
Solar Data for March 1990

During the last few days of February up until March 4 there was very little in the way of solar activity. Solar flux levels continued to drop again, declining from 233 units on February 24 to 170 on March 4. This was a 30% drop from the previous month and meant that the magnetograms for March 4 showed a quiet level of 7 units on March 4. As the solar flux levels fell so the radio quality indices improved, rising well above normal by March 3, as the 50MHz report showed. A number of 144MHz auroras were mentioned in the DX World, with the notable exceptions of stations calling. He reports that worked but it was very slow going because of the intense QRM caused by wave upon wave, even if it means arriving in the UK via an indirect route. The prevailing propagation tends to suffer from severe attenuation.

Solar activity continued to remain static during the second week of March, with the geomagnetic conditions being very unsettled, with a third new country. Endings into central and southern Africa became more common but by no means as good as many were expecting.

Geoff Brown GJ4ICD (10J) continues to report on openings that the rest of the UK operators can only dream about, with the aurora latitudes but on the other hand it was good news for the 144MHz operator as some small auroras were also reported during this period. Solar information continues to be obtained from a variety of sources. One of them is The Solar Guide broadcast on Radio Netherlands. It includes a weekly review and forecast by Mike Bird, famous for his Radio Australia broadcasts. The show to listen to is called Media Network, transmitted on Thursdays at 2150 UTC on 5955 and 8175 kHz and at 1452 UTC on 5955 kHz.

The 50MHz Band

Conditions during March saw a slight improvement over previous months, especially on the north-south route. Openings into and from southern Africa became more common but by no means as good as many were expecting.

Geoff Brown GJ4ICD (10J) continues to report on openings that the rest of the UK operators can only dream about, with the aurora latitudes but on the other hand it was good news for the 144MHz operator as some small auroras were also reported during this period. Solar information continues to be obtained from a variety of sources. One of them is The Solar Guide broadcast on Radio Netherlands. It includes a weekly review and forecast by Mike Bird, famous for his Radio Australia broadcasts. The show to listen to is called Media Network, transmitted on Thursdays at 2150 UTC on 5955 and 8175 kHz and at 1452 UTC on 5955 kHz.
Japan followed at 1010 UTC, but signals were too week to make any contacts. The TR7CA beacon became audible at 1040 UTC, with ZS1LN being worked, on c.w. at 1100 UTC. Activity was good to the south on March 2, with contacts being made from 1200 UTC with ZS6E, ZS5AW and ZS6W.

The Southern African beacons, Z3E/B, Z3W/FW and Z3W/PH were copied to the north, with ZS6E, ZS5QJ and ZS6GM being worked better on March 1, Godf claiming this as the biggest 5Z opening ever heard at his location. The first station contacted was Z3W/FW at 1000 UTC. By 1040 UTC the band was filling up, with ZS6L, ZS6UX, ZS6W, ZS6K, ZS6K and ZR6E being heard, mostly at S9. At 1050 UTC, ZS6/2E, ZS6/E in this first call area, started to come through, followed almost immediately by reception of the FRS beacon.

Stations in call ZS4 and ZS5 (KG30/50) were then worked by 1120 UTC, while Z3S/F became audible. This was followed by the peak of the auroral activity on March 11, with ZS6/1L (JF5L), located in Capetown. It is worth mentioning at this point that it is not particularly easy to work into ZS1 and ZS2 from the UK. Records kept during past solar maximum periods show that openings are very infrequent, only at the most favorable of solar maximum and generally with poor signal strength.

Following the contact with ZS6/1L, more stations were worked including ZS6E (KG32), ZS6W (KG37), ZS6/SF (KG32), ZS6/PF (KG32), ZS6/S (KG30), ZS6/BU (KG35), ZS6/S (KG30) and ZS6/S (KG33). At 1150 UTC the skip moved away with the ZS6/F, Q2 being copied with A2296 BW in Botswana. This was followed by more contacts with ZS3 and ZS6.

In total, the event lasted for over 4 hours, providing quite an impressive and truly remarkable opening. Geoff caught further Southern African openings on March 12 and March 14. The event on the 12th, between 1200 to 1300 UTC, was restricted to ZS6/W, ZS6/S and ZS6/SF. The opening then lasted on the 14th, between 1055 to 1400 UTC, and included a variety of countries, in the form of TR7CA, ZS6E, ZS6KJ and ZL1US.

The band conditions for stations located on the UK mainland have not been brilliant so far this year but by 1120 UTC on March 4, the first opening to ZS6 was made. Geoff, however, heard nothing on this opening.

Jim Smith G1DWQ (GDI) located in Winchcombe near the south coast is in a favourable location for 50 MHz work to the continent. He copied the 5L1US beacon on February 4 at 1130 UTC, working the opening on c.w. at 1200 UTC. Later in the day, at 1454 UTC, Irish television on 53.75 MHz was heard audibly although very little was heard on 50 MHz apart from a few weak GM stations. No other DX was heard on this opening apart from the beacon on the 25th, between 0915 to 1145 UTC, and the ZS3VH beacon, between 1740 to 1800 UTC on the 27th. Jim caught the Southern African opening on March 1, with ZS6W located at 1715 UTC.

A much better event occurred on the next day, contacts being made with Z3S/W (KG33/40) and ZS6/G (KG34/41). The contact with ZS6/G was made in a slightly unusual way. Inadvertently hitting the wrong button on the auto-key, the ‘QRZ 1010’ was sent on 1110 UTC. This was instantly replied to by Z3S/G, much to Jim’s surprise. At 1115 UTC, Jim copied ZS6/G with an unusual call, 3HZ. The opening on March 1 allowed contact with GM5OE/7 (IO72) working on c.w. at 1514 UTC.

I'm not sure if many operators have tried DXing via packet radio on this band and it is now crystallizing on 70/70 and 70/45 MHz. This is claimed to be the first 50 MHz African packet contact took place between Etienne ZS8E and Alain TR7C at 1900 UTC on March 11. Both stations were using Kenwood TM5x, at 300 bauds, a.f.s.k., operating on 50.105 kHz u.s.b. Re-try was set at 1200 UTC. After the initial contact, both stations moved to 50.400 MHz for a continuous two-way QSO on 2730 kHz.

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The 70MHz Band

I have received a number of letters regarding the proposal to alter the 70MHz band plan, as outlined in the April issue of the magazine. If you do have any views on this subject please put them on paper and send them to me as soon as possible.

Bob Price GW3ECS (PWS) has finished the conversion of a Dymar Lynx and is now crystallizing on 70/70 and 70/45 MHz. Bob is located 250 m up near the Brecon Beacons so stations in the west country or the Midlands should have no difficulty hearing him.

Jehan Fowler GCIJOY (DVM) is now active on the band from Bideford. Although he runs 40W of a.m. and f.m. very few contacts have been made so far.

A new station capable of running on s.s.b. and VHF is David Hall GW9XN. He is using an FT-225RD into a home-made transverter. The amplifier, also homemade, runs 80W output into a 3-element Yagi at 10m. At the present time it is fixed to the wall but David hopes to make it rotatable some time in the future.

The 144MHz Band

This band seems to have been in the doldrums for some considerable time.
The 430MHz Band

Dave Lewis G4WHK passes on news of a re-activation of Monday activity nights on 430MHz in the South Wales area. After a couple of years of no activity, Monday evening events include GZ2TH, who goes portable regularly, GW6NYB and GW4HDF, both in Mid Glamorgan and of course GW4HDF in Gwent. Dave mentions this became the 50MHz band during the course of March. A partial contact was made with PE0MPAR/1 but OS8 won on this occasion.

Rotating problems meant that GW9KM could not take part in the contacts during the 144/430MHz contest on March 3/4. All stations worked were with the u.h.f. antenna pointing due south, but even so, contacts were made with stations in Surrey, 15 km to the south, and Dorset, Hampshire, leading an overhaul of the rota, a CD call, on March 16, was answered by Don G1TEY (TWR).

VHF News

The news that West Germany obtained operating privileges for the 50MHz band, from April 1, came as a complete surprise to many, including myself. Although the German National Radio Society, DARC, had been negotiating for this facility for some time, few actually expected much to come of it.

On the other hand, very few people expected the divided nation to be brought together so dramatically and so quickly. The stumbling block had been usage of this frequency by the East Germans. This has been spent on packet radio, using an antenna! Pre-amplifier design had started in the 1960s, through to silicon transistors in the 80s. The antenna control has improved steering and pointing accuracy, allowing the operator to pick up valuable dBs, especially when using large Yagi arrays or dishes. System control has been achieved using radio control, using any of the most popular systems. New designs of high power amplifiers, using modern valves, now allow greater powers to be generated than was the case a decade ago. The antenna control antenna control has improved steering and pointing accuracy, allowing the operator to pick up valuable dBs, especially when using large Yagi arrays or dishes. System control has been achieved using radio control, using any of the most popular systems. New designs of high power amplifiers, using modern valves, now allow greater powers to be generated than was the case a decade ago.

Decline of Activity

In the March edition of PW1, I mentioned the decline of activity on the u.h.f. bands. In the following months, many benefits! The Martlesham Radio Society are to be congratulated on making this, their first v.h.f. Round Table, such a success. Further events are planned over the coming years. Make sure you get there next year.

Back-Scatter

DL3BLA, DL6X and G1BKL, all in J044 and with SM7RMX in J065. A smaller event was detected on March 26 with one solitary contact being made with GMU6XN.

Mortlesham, an excellent venue, as all facilities were immediately to hand. A Fortean approach to the Round Table, using a variety of f. parameters to be measured on low noise amplifiers and transceivers, was available in a large conference room. Another room, with video and audio aids, was used for the afternoon lectures. A large seating area was also available where one could meet other enthusiasts and exchange news or just gossip. Marine propagation during sunspot maximum, sunspot minimum and some were very well gathered. I was Blair G3/TLF gave a talk on radio, outlining the advances made in antennas and feeds, low-noise amplifier design and high power generation. He mentioned that during the 1960s, many operators had used World War II technique antennas, during the 1970s, operators had progressed to 6 Bhams, advancing to 13m dishes in the 1980s. The 1980s will herald the era of the half-acre antenna! Pre-amplifier design had started in the 1960s, through to silicon transistors in the 80s. The antenna control has improved steering and pointing accuracy, allowing the operator to pick up valuable dBs, especially when using large Yagi arrays or dishes. System control has been achieved using radio control, using any of the most popular systems. New designs of high power amplifiers, using modern valves, now allow greater powers to be generated than was the case a decade ago. The antenna control antenna control has improved steering and pointing accuracy, allowing the operator to pick up valuable dBs, especially when using large Yagi arrays or dishes. System control has been achieved using radio control, using any of the most popular systems. New designs of high power amplifiers, using modern valves, now allow greater powers to be generated than was the case a decade ago.
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Back-Scatter

Repeaters were to be closed down?

By way of contrast I quote a letter received from Angie Simon OGOHA. She is not too sure why activity is declining but suspects that many people require all types of v.h.f. operating with the worst that can be heard on repeaters. Perhaps also, some operators surmise they do not have the GTH for v.h.f. Angie thinks that contacts on 144MHz c.w. are very gentlemanly, and is proud to be a known as a v.h.f. operator. She quite often promotes the use of 144MHz c.w. via her 3.5/7MHz contacts and finds that an interest in v.h.f. makes an interesting QSO topic.

Angie feels there is little one doesn't know about f.h.r. or f.h.f. propagation but up on v.h.f. it is a different matter where we can use our role as experimenters during special events such as Aurora or Sporadic-E. As I see it there does not appear to be any specific reason why operators are not using the v.h.f. and u.h.f. bands as much as they used to do. I wonder if any of the f.h.f. fraternity will tell me if they have noticed a similar fall in UK activity on the lower frequency bands?

Perhaps the decline is not restricted to the UK. I would be interested to hear from other countries whether they also have a decrease in activity. You can use statistics based on contest entry or reports from f.m. repeater groups to help you in your replies.

Beacon and Repeater News

A proposal for a packet repeater on 50, 70 and 144MHz, to be placed in the Chelmsford area, has been approved by the DTI. The unit will use the calling G8PET.

Other packet radio repeaters that have recently been licensed include G87YE in Scarborough, with additional ports on 50 and 144MHz, and G8TP in Wolverhampton, on the 430MHz and 1.3GHz bands.

Site clearance has been given to a new 1.3GHz television repeater, G83TN, to be located in the Norwich area. Another television repeater, G39TV in Rugby, on channel RT2, has recently been granted permission for a site change.

The DTI have also approved a site change for a speech repeater, G9SWC on channel 1M15, to be located at Waterfield.

Expeditions

A group of US/USSR amateurs will be operating from locator square L1N3 with the call sign 4BX from May 26. They will be active on 144MHz c.w. and packet.

Two operators from the Grantham Radio Club, G1EUD and G1JME, will be active from various spots in the Outer and Inner Hebrides between May 27 to June 3. They will be active on 50MHz and 144MHz from a number of rare WAB squares. QSL cards go via G1EUD.

Beam south if you want to work Hans CT1DTS in IN56. He will be active on 144MHz from this locator square between June 6-8. In the afternoon of June 7 he will be active from the adjacent locator IN57. He is running 25W into a 9-element Yagi.

There should be a good chance of working him from the UK as the incidence of Sporadic-E around these dates is normally very high. In fact I have always made a point of taking annual leave on the Monday and Tuesday after the first weekend in June, specifically to work the Sporadic-E DX. Last year I caught two openings, to Yugoslavia and Italy on these dates. In 1988 the openings were absolutely fantastic. Try this year. You won't regret it!

Trevor Day G3ZYY will be going to Gibraltar from June 21 to July 12. He will be active on 50 and 28.885MHz at weekends, evenings and occasionally during the day, using the call sign ZB2HM. Equipment will be a modified IC-221 and a 50W amplifier.

Between June 27 to July 10, the Square Bashers will return to Gozo (JMT7) on 144 and 144MHz. If you need towards the Spanish locator square IN72, look out for DL8DBC. He will be operating, via tropo and meter scatter, from there sometime this summer.

Meteor Showers

The following data, concerning meteor showers occurring in the next few weeks, will help you determine which direction to point your antennas for specific times and when the shower is below the horizon.

The Aries shower, encountered between May 26 to June 19, peaks on both Saturday June 2 and Sunday June 3. Between May 29 to June 19, peaks on Wednesday June 6. Between 0400 to 0800UTC beam north or south, 0900 to 1300UTC beam south-west or north-east, 1400 to 1800UTC beam west or east, 1900 to 2300UTC beam north-west or south-east.

The shower is below the horizon from 1600 to 0300UTC. It should also be noted that although this is a rich shower, the particles are small and therefore any bursts are of short duration.

The Zen Perseids occur during May 23 to July 5, peaking on Thursday June 7. The beam headings are very similar to those of the Arietids shower with the exception that the west-east path is best between 0800 to 1200UTC and the north-west or south-east path is best from 1200 to 1400UTC.

QRZ Contest!

Operators on the 144MHz band should get an opportunity to work some of those wanted counties during a 24 hour contest to be held on May 19-20. There will be two sections, one for the single operator and the second for all other classes.

The Scandinavian activity contests will be run on the following dates. Microwave activity on June 4, 144MHz on June 5 and 430MHz activity on June 7.

The u.f.h. bands are sadly lacking in activity but the 430MHz contests scheduled for June 10 will hopefully rectify that. Two specialist events are planned, one for f.m. operators and the other for the c.w. expert.

Now is the time to polish up the antennas and blow the cobwebs out of your transceivers in preparation for the JW 144MHz QRZ Contest. This year's event will be run between 0900 to 1700UTC on Sunday June 17.

Deadlines

Please send your letters to me by May 28 at the very latest. The dates for the following issues are June 25 and July 30.

The annual v.h.f./u.h.f. table and the c.w. ladder are looking a little under subscribed at the moment. Can those of you that wish to participate in these tables go through your log books and send in the results as soon as possible.

This month I have received a couple of requests for assistance from readers. The first is from Stuart Risoe in Switzerland. He has recently revised his interest in amateur data and would like to utilise his Amiga 500 computer to decode c.w., RTTY and AMTOR. The program is a problem of skill and software!

So, does anyone out there know of the availability of c.w., RTTY and AMTOR software for this computer? Please send all information direct to me and I will pass on the details to Stuart and also print anything of note in this column.

My second letter comes from Milan Prostadohoffer L2ZMP [Bulgaria]. Because of the difficulties in obtaining imported equipment, Milan has had to build his own station from scratch which in no way has achieved. However he has managed to get his hands on an Apple II computer and a Dragon 32.

The Apple provides all his present data communications, but he is looking for software for his Dragon 32. In addition he would very much like to find some software with similar radio interests, both to develop his grasp of the English language and to further his knowledge of amateur data comms.

Last month I referred to the IBM PC RTTY/AMTOR Software kit mentioned in Back-Scatter. The latest release from Grosvenor Software is a full featured RTTY and AMTOR program for IBM PCs and is the subject of my review for this month. I'll start with the hardware requirements, as this determines whether or not you can use the program. BULKMULTY as the program is called, has been designed to be as versatile as possible so runs on the following PC variants: IBM-PC, XT, AT, PS/2 or fully compatible clones. A single serial port is required and this could be either COM1 or 2.

On the graphics side the program could cope Mono, CGA, EGA and VGA screen standards. However the program did include a warning that some early CGA interfaces may suffer from interference problems, but it is known that Amstrad 1512s are OK.

Installation of the program was very simple and it could either be run from floppy or transferred to a hard disk. Of course if you were running the program from a floppy disk it would be wise to make a working copy of the original disk. The manual supplied with the BULKMULTY comprised a 13-page A4 document which was stapled together.

The instructions covered all the features of the program in detail, with clear explanations of some of the more advanced features. There was a comprehensive section on interfacing, along with a very useful AMTOR tutorial contained in an appendix. My only criticism was that there was no summary of the functions and commands. This was particularly important because of the large number of commands available and I found it difficult to make my own summary sheet.

Interfacing

Like most PC RTTY programs, a terminal unit was required when using the BULKMULTY. The demands on the terminal unit were quite straightforward, though ideally it needed to be able to handle RS-232 signal levels. However the manual included details of a couple of circuits that could be built to interface between the
more common T.T.L. levels and RS-232.

One of these was for reducing the level of the transmit data from the RS-232 to a value suitable for direct connection to T.T.L. terminal units. The second circuit provided a drive for the p.t.t. line of a transceiver from the RTS (Request To Send) line of the serial port.

This p.t.t. controller used a VN10LM device as the output driver which should handle most modern transceivers. There was no additional circuitry suggested for the receive data, as most serial ports will readily interface to T.T.L. levels. With all the interfacing sorted out, the next step was to run the program and have a closer look at the available features.

Operation

Once past the copyright screen I was presented with the main operational screen and the mode was set to AMTOR. The screen controlled the receive mode, but I will start with that.

The top line was set up as the first of three status lines and presented a range of information such as AMTOR serial mode, print and a 24-hour clock. The next fourteen lines were used for the display of the received text, while a further five lines were used to show the transmitted text, after transmission. The type ahead buffer holds 1002 characters of which the last line is shown on the screen.

The second status line was used to display further information regarding the current parameters in use within the program. An additional feature on this line was a simple tuning indicator, but more of that later.

The final status line was normally left suppressed but, when activated, was used to display help information. That completes the screen layout so let's move on to the main operation of the program, starting with RTTY. As I mentioned earlier the program actually started in AMTOR mode so the first action was to change to AMTOR.

This was achieved by pressing Esc to enter command mode and typing RTTY - simple enough.

Being used for amateur operation the program started with a baud rate of 45 baud which is the most common on the h.f. bands. Changing the baud rate was achieved with the Up arrow for an increase and conversely Down arrow for a decrease. The speed steps were fixed at 5 baud and the limits were 40 baud to 100 baud, which was a usefully wide range.

The transmit and receive functions were controlled by the function keys, where there were two receive modes in addition to transmit. The default receive mode was standby which some of you may know as autoprint. This mode helped to prevent the screen filling with rubbish, either in between transmissions or when tuning around.

The more conventional receive mode could also be selected and was the best choice for difficult conditions or when trying to work some exotic DX. The transmit mode was conventional in operation and transferred all text a word at a time from the type ahead buffer. This word mode as it is called, was very useful as it allowed spelling mistakes to be corrected before the word was transmitted!

A feature not often found in RTTY programs, was the language option. This was primarily used for operators working in a language other than English and meant that the character translations could be changed.

An example of this would be to display a Lotus 1-2-3 spreadsheet instead of list mode. Switching between the standard character set and the user programmed one was achieved by entering the LANG command whilst in command mode.

Moving on to the receive side, the function keys could be used to set a number of common facilities such as unshift on space, reverse data and printer. There were some additional and very useful facilities provided.

The first was an intelligent callsign capture facility which, when enabled, stored any valid received call prefixed by /S. This turned out to be very effective in practice and didn't once capture a false call which says something for the software.

Another useful extra was the built-in disk log file. This could be set to store all data, as any occurring during an AMTOR QSO. This log could also be reviewed via a command without having to leave the program, which was handy for back checking on details that may have been missed.

The tuning indicator comprised a character in the centre of the second status line which represented reception of a high or low tone with either a vertical or horizontal line. This may sound a little odd but it was in fact quite useful.

AMTOR

The AMTOR implementation used was very good and provided a number of useful features. The AMTOR mode was selected from the command mode and incorporated all the standard options which most operators take for granted. These include ARQ, FEC and the listen mode.

Additionally all the options I described with RTTY such as QSO logging were also available. One of the slightly unusual aspects of BMKMULTY was the facility to set up a timing correction to take account of the variations between different computers. This facility is essential as timing is crucial to effective AMTOR communications. The calibration process was very easy and simply involved tuning to a good FEC station, pressing control B6 and noting the timing correction figures that appear on the screen.

The instructions claim that after calibration the residual timing error will be less than 100 parts per million which is available from the software on 3.5in media this is an extra £1.25. Don't forget more than one control file to cover a range of situations, i.e. you could have one for contest operation and another for normal use. The set up details contained in the control files also defined the various screen colours in addition to the basic program default values.

Conclusion

I found the BMKMULTY program to be very effective during the review period. Its performance decoding both RTTY and AMTOR was excellent, as was the very clear screen layout.

One notable point was that the FEC mode would synchronise to a signal without having to wait for idles, unlike most black box systems. I feel there are a couple of minor areas that need some attention, i.e. the enforced c.w. ident and the inability to change the user callsign, but these will not effect most operators.

I have spoken to Mike Kerry of Grosvenor Software who is now user controlled and he is prepared to offer copies for special event stations at a special limited use price. He has also accepted that a command summary sheet would be useful.

To conclude then, the BMKMULTY is a program that I can confidently recommend. If you would like more detail contact Grosvenor Software, 2 Beacon Close, Seaford, BN25 2AX.

The current prices are £29.50 for AMTOR only and £10.00 extra for RTTY. Post and packing is £0.50. If you need the software on 3.5m media this is an extra £1.25. Don't forget to include your callsign with the order.

DO YOU READ AND ENJOY "BACK-SCATTER"? IF YOU DO, PLEASE WRITE AND LET US KNOW. WHAT DO YOU FIND MOST INTERESTING? DO YOU FEEL THAT THE INFORMATION THAT YOU NEED IS THERE? OUR CONTRIBUTORS AND PW STAFF NEED TO KNOW YOUR NEEDS. WRITE OR PHONE (0202) 678558 (OUR ANSWERING MACHINE) TONIGHT!
Amateur Satellite Update

The microsats continue to be loaded and placed into active service, but further casualties have occurred. Whilst USAT-OSCAR-14 is making good progress, USAT-OSCAR-15 still remains silent. OSCARS 14, 16 and 18 have shown a few software protocol anomalies requiring revisions to the loaded software whilst DOVE-OSCAR-17 has suffered an on-board computer crash.

U-04 is quickly attaining stability, and computer controlled commanding of the on-board electromagnets has resulted in a spin, top and roll reduction of the satellite to a level approaching the point where the gravity gradient boom can be deployed. Work will continue in correcting pointing and placing the solar panel assembly faces at the correct position and spin rate to provide optimised battery charge.

Tests of the 9600b.p.s. f.s.k. have been proved successful, and few insurmountable problems have evolved. U-015 has had its peak (60W) local oscillator first detected by the giant telescope at Stanford on March 10 and 11 by employing DSP techniques to recover the signal. Roy Long reports that as expected from results of earlier ground tests, it was found to be even weaker than the emission from U-014. Thus, both tracking and knowledge of the potential command frequency are now firmly established. Steps are now being planned to place high power commands to the satellite to attempt to change its command receiver frequency, which will be noted by the detected local oscillator frequency changes, proving command capability.

The satellite has three command receivers, each with its own specific local oscillator signal radiating. The line-of-sight conditions are quite different, and knowledge exactly where to accurately point the big dish will be to attempt to load the necessary commands in order to try to bring USAT-E back to active life. Most of the team involved are quite optimistic, and we certainly cannot write this satellite off yet.

Both microsats OSCAR-16, PACSAT and 19.7USAT have shown that 10W to a 10 to 13dB gain antenna, tracking in small intervals of the desired frequency, was enough signal to maintain while the battery charge is being optimised for both types of satellite. Best of all were GOMRB in Lincoln and RL7GD, both OSATs 14 and 16 working RL7GD, both QSOs were provided to overcome the attenuation, which is all due to the non-linearity of the FUJI transmitters.

Many avid users enjoyed the Mode A analogue periods of super-DX provided by the satellite when it reached its apogee of 1740.435km at the furthest northerly point. David Rowan G4CUO used s.s.b. with an uplink set at 435.870 to work A7R in Idaho, W7JYH in Oregon, W8ORH in Wyoming, and W6EHP in Nebraska. WOT and WYOC were worked in North Dakota and NTZL in Washington State. GO4MRB in Lincoln was delighted to work WYOC also for his very first satellite QSO.

UQ7VW worked K7YUN (Washington) and W0CA worked R7LG2, both QSOs being at the absolute maximum range limits for the stations concerned. Best of all were G4CUO with N6ME and K8HJU in California. Heard, and almost worked, were JABISU and JAC9CD, the latter at first thought to be the very active G3CAG until the JD signal are often repeated on or just below the digital downlink, which is all due to the non-linearity of the FUJI transmitters.

The LWOW BUG

Thus quite possible to READ a file addressed to you while some people don't even know what a file is. And if you still uploading it, you receive an incomplete message, mess.

The JD- USERS (3)

Some people complain of this one. Yo everybody complains of this. Yo.

The LOGON BUG

...it is quite possible to READ a file addressed to you while some people don't even know what a file is. And if you still uploading it, you receive an incomplete message, mess.

The KILL BUG

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Back-Scatter

Amateur Satellites

Reports to Pat Gowen G3IOR
17 Heath Crescent
Hillesdon, Norwich, Norfolk NR6 6DX

Fig. 1

B1J1BS3B7HATA <RR C CR />3B1J1BS3B8NSVPV <RR C C R />3B1J1BS3B9HPAQEZ <REJ F R />3B1J1BS3BC1HPAQEZ <RR C C R />3B1J1BS3BDC1FDP <RR C C R />3B1J1BS3BD5FDP <C C S R />way through the upload. Inspection of the DDS contents later shows that 3B1J1BS3BD5FDP <C C S R />questible common when uploading a message. The DDS locks up ha 3B1J1BS3BD5FDP <C C S R />ry 100%.

PROTOCOL BUGS

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B1J1BS3B7HATA <RR C CR />3B1J1BS3B8NSVPV <RR C C R />3B1J1BS3B9HPAQEZ <REJ F R />3B1J1BS3BC1HPAQEZ <RR C C R />3B1J1BS3BDC1FDP <RR C C R />3B1J1BS3BD5FDP <C C S R />way through the upload. Inspection of the DDS contents later shows that 3B1J1BS3BD5FDP <C C S R />questible common when uploading a message. The DDS locks up ha 3B1J1BS3BD5FDP <C C S R />ry 100%.

PROTOCOL BUGS

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Many avid users enjoyed the Mode A analogue periods of super-DX provided by the satellite when it reached its apogee of 1740.435km at the furthest northerly point. David Rowan G4CUO used s.s.b. with an uplink set at 435.860 to work A7R in Idaho, W7JYH in Oregon, W8ORH in Wyoming, and W6EHP in Nebraska. WOT and WYOC were worked in North Dakota and NTZL in Washington State. GO4MRB in Lincoln was delighted to work WYOC also for his very first satellite QSO.

UQ7VW worked K7YUN (Washington) and W0CA worked R7LG2, both QSOs being at the absolute maximum range limits for the stations concerned. Best of all were G4CUO with N6ME and K8HJU in California. Heard, and almost worked, were JABISU and JAC9CD, the latter at first thought to be the very active G3CAG until
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Having made the decision to widen your antenna to 4m you will want to consider a new 4m/5m antenna. AKD can supply an array of new 4m/5m antennas ranging from £24.50 to £129.00.

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designated by <n>. When the other station recommends you first try this, e.g.,

```
8J1JBS. FO-XX/JAS-1b Mail box Ver. 1.11.
```

At this point, try the mailbox. The prompt will be transmitted.

### Mailbox Example

```
H: Show this message.
```

When writing mail, note that all ASCII data signal commands, then, every time you touch your microphone socket, the distortion will be filtered out. The exception of 'AZ' which only shows the end reached by the satellite. 

**Kopernik Elements**

<table>
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<tr>
<th>Satellite</th>
<th>NORAD 9</th>
<th>NORAD 10</th>
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For more information on the satellite elements, please refer to the original document.

**Beacon-ORG**

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Note: The beacon elements are provided for beacon tracking only. For more detailed information, please consult the original source.
No further news on the launch date of RS-12 and 13 has arrived, but RS-14 with its 435/145MHz transponder is expected to be launched in July, complete with the AMSAT-DL RUDAK, having been postponed from the originally planned 'Garmin Day' in April.

**Oscars 10 and 13**

Whilst OSCAR-10 is still suffering (at the time of writing in early April) from low battery power due to solar attitude, OSCAR-13 soldiers on. From July 14 for 11 weeks, A-13 will be further from eclipses, and will have periods of beacon operation.

**New RS Spacecraft**

John wonders if this is a feature of the signal to noise ratio for consistent screen print copy, and suggests, as it is equally bad on low doppler spreads. GM4IHJ usually hears about 'Gagarin Day' in April.

**Keplerian Elements**

Birger Lindholm of Dalbruk, Finland, has again provided us with the elements for all the main satellites of interest, which readers will note, have grown somewhat this year. Birger uses the NASA 2-line elements as his source, relating the catalogue and object numbers to the name by which we know the satellite, he then collates them for us in a meaningful format for use in computers or with our transmitters. To relate the new microscopically to the catalogue and object numbers has not been an easy task, as a number of changes become necessary at the cluster separated, enabling individual spacecraft to be identified.

Birger calculates the nodal period and increment for the epoch day, then gives the P-Drager, i.e. the period drag, which is the nodal period decay rate per orbit. The I-Drager is also given, by which we can tell if the NASA supplied decay rate is negative, then the P-Dragers are calculated using a zero figure.

He points out that whilst the sets are well within normal amateur time and tracking limitations, they should not be used for precise scientific analysis. He points out that the actual orbit number for OSCAR-13 is the NASA orbit number minus 21. Birger welcomes queries, comments and suggestions from users and readers, and may be contacted at Hasselbacken 305, SF 29900 Dalbruk, Finland.

**Orbit Numbers**

As pointed out by Birger Lindholm, the orbit number alias revolution number of a satellite is not always agreed among the experts following them. This may seem surprising when a simple addition formula for each complete orbit from launch, is applied, but it is required to calculate the precise number of earth revolutions that have taken place.

The discrepancy evolves from a number of factors. The first is that different launch companies and agencies have adopted different systems of orbital injection. Some call the first passage orbit 0, some orbit 1. Second, sometimes the count commences from the first ascending (north bound) equator crossing immediately following launch, and sometimes commencement from the first complete orbit north bound equator crossing is counted.

A further complication arises from the fact that for the earlier circular orbit, satellites were incremented by a factor of one, each time the satellite crossed the equator on the ascending north bound pass. On the later elliptical orbiters, this no longer necessarily true, as the orbit number may increase by one each time that the satellite passes through perigee, the lowest point to earth of the orbiting craft. This perigee point swings from the southernmost extreme to the northernmost extreme with time, very slowly in the case of OSCARS 10 and 13, and relatively quickly in the case of Fujii OSCAR-20.

Thus, dependent upon the way in which your computer is programmed, for example, for equator crossing or perigee point, and the orbit number is supplied with from the Keplerian elements or reference crossing, so your orbit number supplied will vary. It thus can become rather confusing when a station makes schedules for a given orbit number, or when controllers predict happenings and changes referenced to orbit number that is not common to all users.

It is not a serious problem, and can easily be overcome by stating the activity for a given labelled UTC time and date, which would then be universally understood. If you are fortunate enough to work the new crew, send a card via the bureau, or via Boris Stepanov, UW3AX, MOS 2770, MOS 2770, USSR, with an s.a.e. and a few IRCs.

The MIR cosmonauts Alexander Viktorenko and Alexander Serebrov took a trip on the 'space bikes' in February. It was thought that they might be interested in the matter of the earlier, adjacent SALYUT-7 space station's rapidly decaying orbit.

It was assumed that they might have managed to re-fuel the motor or had arranged to make a Progress that would either enable SALYUT-7 to be boosted to a higher orbit, or, alternatively, to allow a retro-firing that would permit the large, currently unmanned, station to safely re-enter earth's atmosphere under command control.
Sunspot Cycle Z2

Over the years Cmdr. Henry Hatfield (Severnabbas) has gathered a comprehensive set of solar records derived from the observations that he made optically, through his spectrophotometer and by radio, with telescopes operating at 136 and 1297MHz. Neil Clarke G9CAS (Ferrybridge) has given readers the benefit of his computer records showing the daily variations of the solar flux compared with changes in the earth’s magnetic field. Therefore, it is important to begin this time with the current opinions of these two experienced observers about the present sunspot cycle.

"I think that there is much evidence now to indicate that the high activity we saw last spring and summer has declined. My hunch is that either we are over the 'maximum', or that it will be a 'double maximum'" said Henry. "For the first time in this cycle the smoothed sunspot number has fallen, it dropped from 158.0 for July 1989 to 157.2 for August 1989," wrote Neil and continued, "This may not be the peak for cycle 22, it could start to rise again but I think that if it did climb again it would not get much higher than the present peak." The photograph of the 'angry' sun, Fig. 1, taken at 1512 last August 31 is one of many that Henry took during the summer of 1989.

Solar Reports

In February 1990, Ron Livesey (Edinburgh) using his projection apparatus, observed 5 active areas on the sun's disc on the 21st, 5 on the 3rd, 7 on the 23rd, 8 on the 1st and 26th, 10 on the 27th and 13 on the 21st, 6 on the 3rd, 7 on the 23rd, 8 on the 18th and 28th. Ern Warwick (Plymouth) heard fluctuations in the background noise on 28MHz at 1230 on the 25th and between 1300 and 1400 on the 26th and, not surprisingly, he reports fading at 1130 on the 25th.

During March, Patrick Moore (Selsey) observed the sun as often as clear skies permitted and kindly sent the drawings which he made, with his special solar apparatus, of the sunspot positions at 1130 on the 22nd, Fig. 3, 1105 on the 25th, Fig. 4, 1250 on the 26th, Fig. 5 and 0810 on the 28th, Fig. 6. Henry Hatfield located the information shown in Table 1. In Bristol, Fred Pallam G3RNM logged a high level of noise at 1100 on the 21st.

Auroral

"There has been a lull in the aurora since the turn of the year but in February magnetometers and visual observers saw an upturn of activity," wrote Ron Livesey, the auroral co-ordinator for the British Astronomical Association and continued, "It used to be said that the number of reports on a reporting night might be an index of activity. It is good to record that we now have so many keen, active observers that there need only be a sensation of auroral light and somebody spots it." All good stuff Ron and long may there be cooperation between the optical and radio observers. By the end of February, Ron was receiving reports of 'glow or unspecified form' seen from observers in Alness on February 1, Wick on the 14th, Moorhen on the 20th, Cornwall on the 24th, Kirkwall on the 25th and St. Andrews on the 27th, 'homogenous arc or band' from Central Scotland on the 8th, Edinburgh on the 13th, Worcester on the 15th, Halifax (Nova Scotia) on the 18th and Central Scotland on the 20th, 'rayed arc or band' from Wick on the 19th, 'rays or ray bundles' from Moray on the 15th and North Scotland on the 20th and 24th, 'active form, pulsating or flickering' from Shetland on the 7th, North Scotland on the 13th, Shetland on the 18th and Kirkwall on the 19th, respectively and 'coronal structures' from North Scotland on the 15th and Shetland on the 20th.

"That 'raspy', 'ghostly' and 'watery' effect that aurora has on terrestrial radio we heard on 1010. I am very interested in the watery pre-auroral c.w. signals on 3.5 and 7MHz we hear. I recently had a report '599 but no auroral' on 7MHz from Sweden. I too give auroral reports on I.F. - why not? If one recognises the tone it is relevant to report, the other chap may be a VHF'er too and pleased to know," wrote Angie Sitton G0HGA (Stevenage) on March 27. Angie currently uses her Ten Tec Century 21 with an untuned long wire antenna because her vertical was a victim of the January 25 gales. She was enjoying a 599 contact with a station in Texas when the wind bent it to 45°.

"Angie is active on c.w. only on all bands from 3.5 to 28MHz, and has a special interest in the propagation of radio waves, especially under Ac-A conditions. History has shown that the radio observations from many enthusiasts, like Angie, have greatly advanced our knowledge of the auroral events which occur during the hours of daylight. Without such reports, these manifestations would have passed by unseen and unrecorded.

Magnetic

The various magnetometers used by Gary Hawkins (Bristol), Tony Hopwood, Ron Livesey, Dave Pettitt (Carlisle) and Doug Smitliie, between them, recorded magnetic 'storm' conditions on February 12, 15, 16 and 24 and Neil Clarke's report emphasises the peaks of 46 on the 16th and 34 on the 23rd as displayed on his chart of the Ap index, Fig. 7.

Ionosphere 'F2'

From his home in Meerut, India, Lt. Col. Rana Roy received smeared and distorted television pictures on Ch. E2 (48.25MHz) and/or Ch R1 (49.75MHz), via disturbances to the 'F2' region of the ionosphere on December 15, 17, 21, 23 and 24 and January 11 and 13. The source of some such pictures were unidentifiable but others gave clues of coming from China, Malaysia and the USSR. A typical entry in Rana's log began at 0800 on December 17, where he found a 525-line 'rolling' picture on Ch. A2 (55.25MHz) which he corrected by adjusting the vertical control. The script appeared to be S.E. Asian. Probably "Vietnam" he wrote. Around 0810, he headed "TV3" from Malaysia on Ch. E2 and remarked, "Pictures were fairly clear considering that this was an 'F2' reception, Pictures faded away at 0850.

28MHz

Firstly my thanks to the 10 Metre FM Group for a regular copy of their newsletter and their latest issue reports that, from Southern England and mainly mobile, GODWZ, G0ENJ and G4ADD between them, made contact during January and February with stations in Azores, Canada, Finland, Greece, Hungary, Iceland, Jamaica, Japan, Malta, four cell areas of the USA, the USSR and Yugoslavia. The group has around 150 members and readers wishing to know more about their work should send an s.a.e. to the membership secretary, 9 Highlands Road, Portslade, Sussex BN41 2BN.

Propagation Beacons

As usual my thanks to Mark Appleby G4XII (Scarborough) Chris vanden Berg (The Hague), Henry Hatfield, John Levesley G0JHL (Bransgore), Greg Lovelock G3H (Shipston-on-Stour), Ted...
Owen (Maldon), Fred Palliant, Ted Waring and Em Warwick for their detailed 28MHz beacon lists from which I compiled the chart in Fig. 9.

Between February 25 and March 23, Em Warwick received signals almost daily from PY2AM on 24.915MHz, 5K2B (Finland) and 2S6ON/B (South Africa) on 14.100MHz and DKOWCY (Germany) on 10.144MHz and less frequently from IK5BBAK (Italy) on 24.915MHz, JA2GY (Japan), KH62/B (Hawaii) and 4X6TU/B (Brasil) on 14.100MHz. Em also heard PY2AM on 18.100MHz on March 2, 16, 20 and 22.

Tropospheric

The slightly rounded atmospheric pressure readings for this period, Fig. 8, were taken at noon and midnight from the Short and Mason barograph installed at my home in Sussex. Although the pressure, throughout March was high and fluctuating mainly above 30.1 in (1019mb), there was surprisingly few tropospheric openings. However, for the 17th, George Garden (Edinburgh) wrote,

"The weather map showed a high of 1032mb (30.7in) over Europe with a good bit of the ridge affecting much of Scotland & UK" so, having this in mind, he drove to one of his favourite band II and TV DXing spots, high on Cairn 0' Mounth. George received signals almost daily from PY2AM (Brazil) on 24.915MHz and less frequently from OH2B (Finland) and ZS6DN/B (South Africa) on 15.915MHz, ZS6PW on 21.047MHz and 30.1 in (1019mb) there was a high of 1042mb (30.7in) over Europe. However, for the 17th, George Garden reported a high of 30.9 in (1030mb) at 1235 and 1400 on the 31st when conditions lasted," said George, who returned there around 1400 on the 31st when conditions again looked right for DX as another spell of very high pressure was rapidly ending. This time, which he cannot do often from this site, George logged strong signals from Radios Cumbria and York and TFM which is a part of IBA Radio Tests and at 0930, prior to climbing the hill, from his home in Laurencekirk, he logged the IRN Radio in Scotland & UK, so, having this in mind, he drove to one of his favourite band II and TV DXing spots, high on Cairn 0' Mounth.

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The Microreader is a small compact unit that allows anyone equipped with a suitable SW receiver, to read Morse & RTTY signals simply and without fuss. No computers, interfaces or program tapes are needed, just connect the Microreader to the ear or speaker socket & switch on. The decoded words appear on the built in 16 character LCD display screen.

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The past month has been a reasonably quiet time in international broadcasting, with little of consequence occurring, with the exception of one or two name changes by radio stations.

Radio Bucharest is no more, having been replaced by Radio Romania International (a title which does not seem to flow off the tongue quite as easily). The change happened during the first week of March, following the Namibian independence, Radio South West Africa Radio Namibia on March 1.

The Federal Communications Commission (FCC) in Washington DC, the regulatory body for broadcasting in the United States, has reduced from four to two the number of seasonal frequency changes for short wave broadcasting. From now on, changes will last six months from March and September only, displacing the May and November changes. It has always struck me that the changes at the end of September were rather unnecessary when followed six weeks later by the November alterations, so perhaps this will be adopted by other administrations as well.

Last month I reported, somewhat prematurely it seems, on the cessation of German language transmissions from Radio Canada International. The service has been granted a reprieve (this means that the new Arabic news service for the Middle East due to have started on April 2 has been delayed indefinitely.

The Voice of America was also reported as being subject to cuts which would have resulted in six of its language services being taken off the air. A review has taken place (as suggested in this column) and now all six languages, including Tajik for the Soviet Union, will continue. Funds will be diverted from other areas of the US Information Agency which is responsible for VOA.

With a continuing war of words between Lithuania and the Soviet Union following Lithuania's declaration of independence, the international service of Radio Vilnius disappeared from the airwaves in mid-March. In their place were programmes from Radio Moscow in Russian and English, on the short wave frequencies scheduled for the Lithuanian overseas broadcasts.

All short wave frequencies used by Radio Vilnius, with the exception of the 49 metre band wavelength of 6.10MHz, are broadcast from transmitters across the USSR. The station's broadcasts are part of a complex radio transmission system that relays programmes from other republics, as well as broadcasts from Radio Moscow's many services.

The Lithuanian authorities lodged a protest with the Ministry of Communications of the USSR, and after a few days received a reply which suggested that an "error had occurred whilst standby transmitters were being switched over for the shift to summer time and operating frequencies...were being changed."

Meanwhile, Lithuanian Radio's domestic service has now started 24-hour transmissions on its m.f. channels of 666kHz and 1.557MHz.

The North American service of Radio Moscow has for many years had a DX programme but this has come to an end, for the time being at least. It seems that lack of staff in Moscow is responsible.

European Stations

All times UTC (+GMT)

Radio Netherlands has dropped its early morning broadcast to the Middle east, which leaves their schedule looking like this:

0730 to New Zealand on 9.715 & 9.630MHz (via Bonnair)
0800 to New Zealand on 9.77MHz (via Bonnair)
0800 to SE Asia on 21.455 & 17.579MHz (via Madagaskar)
1030 to Australia on 11.89 & 10.2MHz (via Bonnair)
1130 to SE Asia on 21.52*, 21.46* & 17.579MHz (via Madagaskar)
1130 to Europe on 9.715 & 9.595MHz, 14.39 to SW Asia/Europe on 17.895*, 13.77*, 5.955 & 15.15MHz
1300 to SEE Africa on 15.57 & 6.02MHz (via Madagaskar)
1830 to S/C Africa on 21.685, 17.605 (via Bonnair) 15.56 & 6.02MHz (via Madagaskar)
2030 to W Africa on 15.56*, 13.70 & 6.02MHz
2030 to East N America on 11.74, 6.165 (via Bonnair) & 6.02MHz*
2330 to W South America on 9.595 & 6.165MHz (via Bonnair)

Frequencies marked * are from the relay stations indicated.

The Italian Radio Relay Service continues to broadcast from 9.8MHz on Sundays from 0800. Tests can also be heard from time to time on Sunday afternoons on 21.50MHz.

The summer schedule for Radio Sweden in English to Europe:

1530 on 21.655MHz
2030 on 9.615, 6.065 & 1.179MHz
2100 on 11.705, 9.655 & 1.179MHz
2230 on 1.79MHz

African and Middle Eastern Stations

Programmes during May in "India's English language service on from Abu Dhabi in English is heard daily at 2200 until 2400 on 13.605, 11.985 and 9.60MHz, with a relay of the Capital Radio local English language service on from Abu Dhabi between 2230 and 2300.

Asia, Pacific and the Americas

At some times in the year the Northern Territory stations on 2MHz from Australia can be heard in the early evening. The station in Katherine on 2.495MHz has now been noted on 5.025MHz at 21.30.

Radio Bangladesh transmits English to Europe at 0600 on 17.580 and 15.195MHz for 30 minutes and at 1230 on 17.85 and 15.04MHz. During the evening there is a 45 minute transmission at 1815 on 15.64 and 11.884MHz.

HCJB in Quito, Ecuador is making some changes in May. There will be a general rationalisation of English language programmes as a result of staff shortages, and all programmes produced in Quito will be consolidated into a 60 minute block called "Studio 9. Programmes during May in "India's English language service on from Abu Dhabi in English is heard daily at 2200 until 2400 on 13.605, 11.985 and 9.60MHz, with a relay of the Capital Radio local English language service on from Abu Dhabi between 2230 and 2300.

College of Agriculture as a lecturer and am also the head warden. So I am /P on a rota basis some evenings and weekends.

"Have noticed over the last few years all the new modes that have come for the Robot-type machines have tried to improve the quality of the pictures, by (1) going into slower speeds and (2) using a new higher definition mode, but what about the s.w.i.s.e.t., that have only a passing interest in SSTV and cannot afford the dedicated equipment? This is a problem several of us in the Rhyl and District ARC have discussed on many occasions. (I am the secretary of the club). There are six or seven members and several s.w.i.s.e.t.s in the Rhyl area who enjoy watching the TX between us in the valley on 144MHz f.m.

SSTV on VHf and HF

First of all a nice long letter from Mike Drew G0WHKN on the subject of slow-sc an. He is pleased to see that ATV news is now carried in the 'Back-Scatter' section of Practical Wireless' and is thus reaching a wider audience. He writes: "Have been working SSTV from my home location for several years and have had very good results with a Spectrum 454 using the CDTU program, both on 144MHz f.m. and on 148MHz. Although the Spectrum is very limited in grey scales, most people who have not used one are very surprised at the results gained from colour TX high definition modes when the Spectrum is used for RX. The colour TX from the specification is not too bad either.

Mike says, "My home location is 5 miles north-west of Wrexham at 1050ft a.s.l. on the Clwydian Mountains. Under normal conditions on 144MHz I can work stations from N. Lancs., Leed, parts of S. Yorks., Birmingham and Hereford and Worcester. Obviously enhanced conditions allow working of all the south and east coast and the near Continent. West/south-west is difficult, as I have the mountains behind me. If you are wondering, I work at the North Wales

Back-Scatter

Broadcast Round-up

Reports to

Peter Shaw

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When I am /P at work,

With this problem in mind, and as many people not now being able to use their limited systems to receive the new modes, I have asked on 144MHz and h.f. as many people as possible, if they or their SWLs would be interested in a lot more BW on the h.f. and/or v.h.f. bands. The result was a resounding YES. Owing to that fact, you may be interested in the following details about the new Black and White Net that I have started up on 3.5MHz.

Day: SUNDAY
Time: 1500 GMT
Frequency: 3.734+/-0.001 MHz
Main TX modes: 3.5MHz.

"My SSTV system is a Spectrum 48K Keyboard) with Opus Disk Drive and a digitiser from a Romantic Robot Videoface as picture/program store. Pictures are shown on this display. I have been speaking on the frequency for several months, and have had several people call me, not on SSTV. I am only too willing to start up a second mode if your interest is there. And once more that's all for this time.

The problem and the bad language that has sometimes gone with it, has driven away the very few who used the frequency for SSTV calling and working. In some areas of the country, as you have said in your column, there is good activity with no problems from the other locals, because they know the SSTV nets exist. I have worked many people from the North York Moors, to the south coast and listened to and watched much more. But I've joined in, or put a call out myself, if the frequency was not occupied when challenged or put up with the abuse, etc. when it suddenly became busy.

Pam and I started the net in early December '88, and have had several people call in. I have also had a few reports on SSTV activity from friends who have started up on 144MHz. They'll get the message eventually!

If you have news for inclusion on Wireless-Line ring W202) 678558 in the evenings and leave a message on the answering machine.

For the latest news of special event stations, rallies, etc. ring Wireless-Line on 0888 654532. Calls charged at 38p peak, 25p off peak.

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