

CBI world

For Citizens Band and
two-way radio enthusiasts

December 1981 70p

**10.33 Santa
stuck on
rooftop any
breakers
with a crane?
This is not a
wind-up.**



LAB TEST
AMSTRAD CB 901
TRANSCIVER

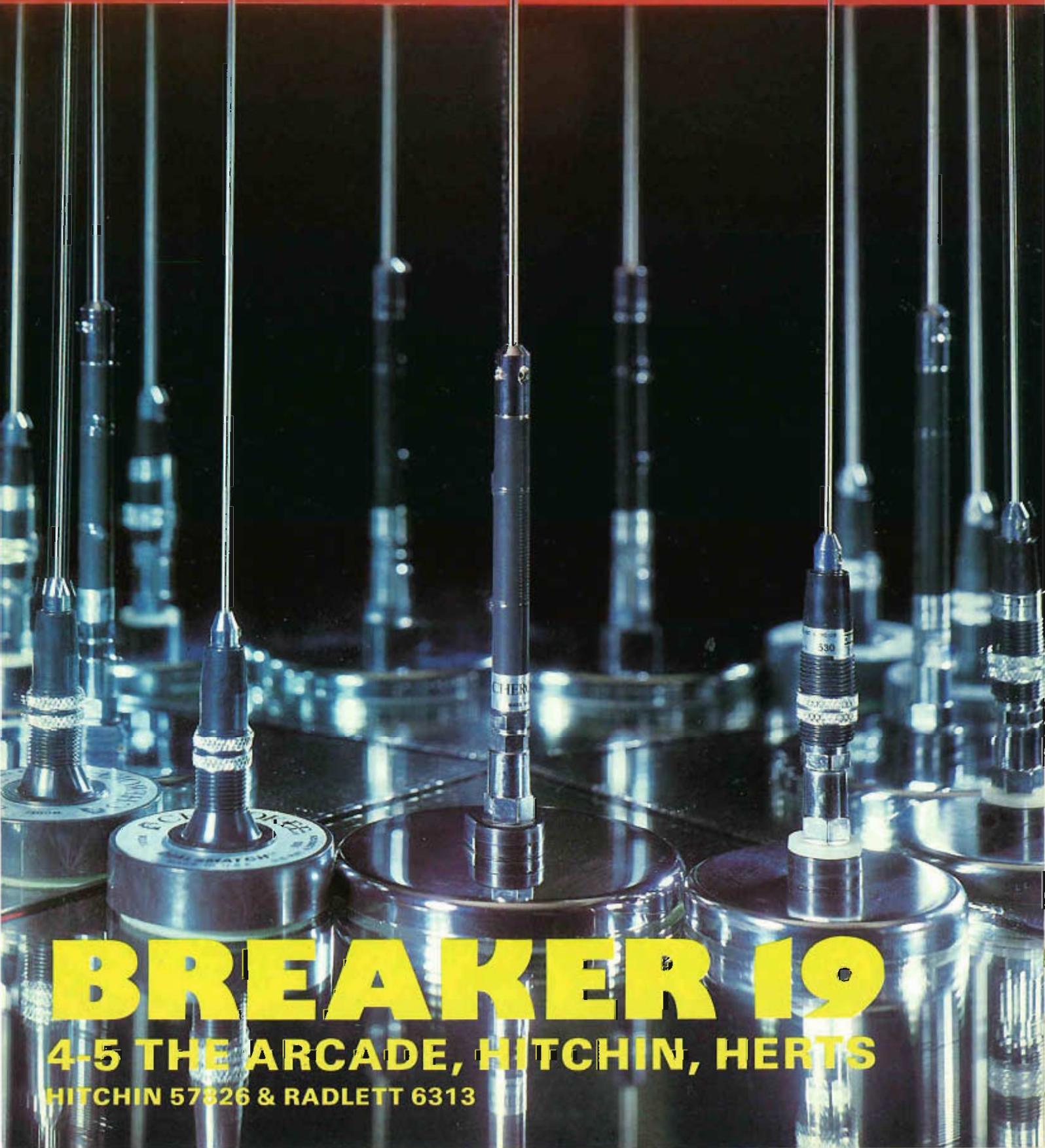
FREE CAR STICKER

Gillies Mackinnon



CHEROKEE →

A TOUGHER BREED
ANTENNA



BREAKER 19

4-5 THE ARCADE, HITCHIN, HERTS

HITCHIN 57826 & RADLETT 6313

CB world

Number 10 December 1981



With the advent of c.b. more small boat owners want to know about marine **RADIOTELEPHONY**. We start to divulge the mysteries. **p6**

The selection of c.b. sets is increasing by the week. **RIG ROUNDUP** gives the latest specifications made available to us. **p12**

Continuing our theme of CB for the **DISABLED** this month we show how easy it is to fit a rig to a **WHEELCHAIR**. **p17**

Once again we have dived into our postbag and here is the latest selection of your letters in **BRING IT BACK**. **p20**

A further selection of your **HANDLES** is published this month. **p24**

This month we look at some of the **ACCESSORIES** that have been sent to us. **p31**

Did you know that some of **FISH** are also on **CHANNEL**. Find out a little more on **p36**



One **BRITISH MANUFACTURER** is trying hard to enter the c.b. market. Others are still thinking about it. **p40**

Bored looking at TV? Why not find out about several excellent **TV GAMES**. **p44**

Sitting by a river and no rod? Here is a simple way of making a **FISHING ROD** from an **ANTENNA**. **p46**

A **CHRISTMAS TAIL** is not necessarily a moggy with a little decoration on its tail. **p48**

COMPETITION time will be found on **p59**

Our **FROM BREAKER TO HAM COURSE** continues to look at how a c.b. transceiver operates. **p62**

Heard strange noises on your radio recently? It could be **TELETYPE**. **p70**



We are always pleased to receive letters from readers and club members, but we do reserve the right to edit them. Full names and addresses will not be published.

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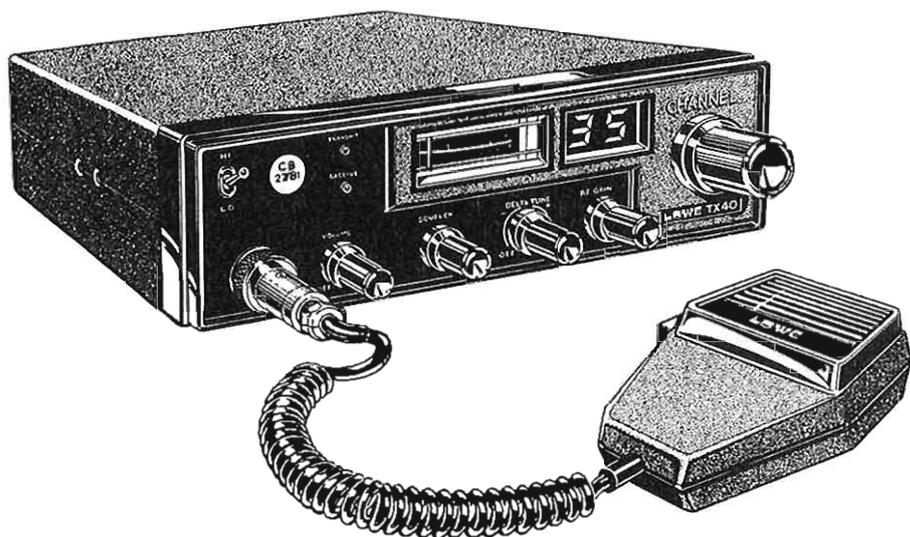
62
From Breaker to Ham

70
Teletype mysteries unfolded

The Lowe TX 40 should now be available from your local High Street CB shop at a price of around £69.50. Visit your neighbourhood CB man and pick up a rig. Once again Lowe Electronics knowledge and experience of radio communication has produced another first class transceiver.

If you can't get your hands on a "CB Video Film" then why not fill in the coupon below, mark whether you require VHS or Betamax, include £8.95 for the tape, post and packing and send it to: Tuff Video Limited, Studio C, Floral Hall, Covent Garden. See for yourself this informative full colour documentary on CB Radio.

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COME ON



Have you noticed how quiet a.m. has gone recently? This was brought to my attention the other day so I contacted clubs in various parts of the UK and I found it to be true. So what has happened to all these "I will never go to f.m. breakers"? I think that breakers, other than those who are interested in DX-ing, have had a go on f.m. and found it better than they thought it would be. Perhaps they have been converted.

Whilst on my travels I always try to have a rig on Channel 14 f.m. and I am getting a little fed up of listening to the irresponsible few whose command of the English language is confined to miow, miow, miow . . . , swear words or bad temper.

Last week many areas in Sussex had several channels blacked out by one breaker who insisted on playing records.

To those who think it clever or funny I say "Come off it you are spoiling it for those who wish to use c.b. properly".

Last month we asked you to travel down memory lane and see how many classic cars you could identify. Here are the answers.

1. Austin Healey 3000 100/4
2. Lotus Elite (1960's)
3. Sunbeam Talbot
4. Riley 1.5
5. Aston Martin V8
6. Ferrari
7. Sunbeam Tiger Mk II
8. Austin 7
9. Volvo P1800S
10. MG TD
11. Bugatti S7
12. Jaguar x K150 with Early E Type
13. Morgan and Triumph GT6

We also asked if any breakers could tell us what 10.811 represented (Page 44). Answer is — a new Dunlop truck tyre.

Brian L. Chalmers-Hunt

NEXT MONTH

IN CB WORLD next month we will be explaining that the Russian Woodpecker is not a bird but a source of interference to CB'ers. Details of the latest CB rigs will be given as well as how to SWR, overcome car electrical interference problems and also a digest of the British CB language.

There will be more on marine radio telephones plus our regular 'From Breaker to Ham' Course, Bring it Back, Club Corner, This and That, Let there be Music, Femme Scene and a selection of your handles.

Number 10 December 1981

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It is an offence to operate, import or install an unlicensed transmitter in the UK. CB WORLD realises this and points out that it is not our deliberate intention to encourage the use of illegal c.b. equipment.

Introducing Marine VHF radiotelephony



The first in a short series on how radio telephones are used in boats.

It was not so many years ago that the fitting of a radiotelephone to a small pleasure boat was considered to be the exception rather than the rule. Nowadays the lack of one, particularly to a sea going boat, should be rare.

Unfortunately the use of the word telephone is misleading because VHF is a large party line. Agreed, a radiotelephone is used as a telephone because it enables a boat crew to talk to his (or her) home or office by being connected to the national and international telephone system, but at sea VHF R/T is a complete communication system.

VHF R/T is different from other forms of radio communication in two main and important aspects:

1. It is very restricted in range, although for some applications this is an advantage because the same frequency can be shared by many operators as long as they are not too close to each other.
2. The second difference between VHF R/T and other types of radio communication is what is known as the "capture" effect. Where there are two stations transmitting simultaneously and a third is within range of both, one of the transmitters will dominate the conversation and completely over-ride the other. Therefore one conversation may be completely wiped out by another transmission cutting in. The receiving station hears one or the other but not a conglomeration of both.

VHF R/T has the advantage over other types of R/T because there is less likely to be distortion and background noise, such as skip, but the existence of this 'capture effect' makes it essential for the prescribed procedures to be strictly adhered to.

As an example, several years ago the Port of Harwich installed harbour surveillance radar which is a good example of one type of use of VHF. In foggy or dense rain conditions the port radio gives a running

commentary on activities in the harbour area. A pleasure boat crew monitoring the port radio frequency might hear that the Zeebrugge ferry is approaching Landguard Point and it is expected to pass through the entrance in fifteen minutes. Additionally Hoek van Holland ferry has just slipped her moorings and approaching the Bridge Bury.

Often the harbour radio will add information about unidentified echoes, if there are any, or report that a certain channel is clear. This all gives the listening crew a picture of what is going on.

VHF R/T may also be used in distress, for distress relay, for urgent messages, for rendering assistance to others, for security messages concerning navigational warnings; or for weather forecasts. In addition British Telecom telephone calls become one of the many facilities that are available.

There are 57 international frequencies shared by tens of thousands of users. International agreements determine the allocation of particular frequencies for specific purposes. National administrators are responsible for ensuring that equipment which could cause interference is not used and that the International agreements on the use of VHF are maintained.

There is nothing difficult or mysterious about using a VHF radio telephone but there are a number of rules and procedures which must be understood and adhered to so that the system works.

VHF Frequencies

The VHF frequencies between 156.00 MHz and 174.00 MHz are allocated by international agreement for the Maritime Mobile Service for use by craft fitted with VHF radio.

Up to 1972 this part of the band was divided into 28 channels each with a spacing or frequency separation of 50 kHz (0.05 MHz) between channels.

Improved technology has made it possible

for radio equipment which can be more accurately tuned to a specific frequency. After 1972 the spacing between channels was reduced to 25 kHz and the number of channels increased to 57.

The present channel numbering system looks odd but is the result of the additional channels which were interleaved between existing channels with channels between 29 and 59 being used for other services.

1. Intership Frequencies

(Channels 06, 08, 70, 72 and 77)

When selecting intership frequencies those allocated solely for intership use, ie. Channels 06, 08, 70, 72 and 77, should be chosen in preference to frequencies which are also designated for use for other purposes. However, please see also note 3 on other uses of channel 06.

2. Channels 15 and 17

Until 1983 the effective radiated power of ship stations on channels 15 and 17 shall not exceed 1W.

Search and Rescue Co-ordination and Anti-Pollution Operations

(Channels 06, 10, 67 and 73)

Channel 06 may be used for communication between ships and aircraft engaged in co-ordinated search and rescue operations. Intership traffic must not be exchanged on channel 06 if interference with search and rescue co-ordination might result.

Channels 10, 67 and 73 may also be used for communication between ships, aircraft and land stations for search and rescue co-ordination and for anti-pollution operations.

4. Small Craft Safety

(Channel 67)

Within the UK channel 67 may be used for

NORTH WEST EUROPEAN COAST RADIO STATIONS

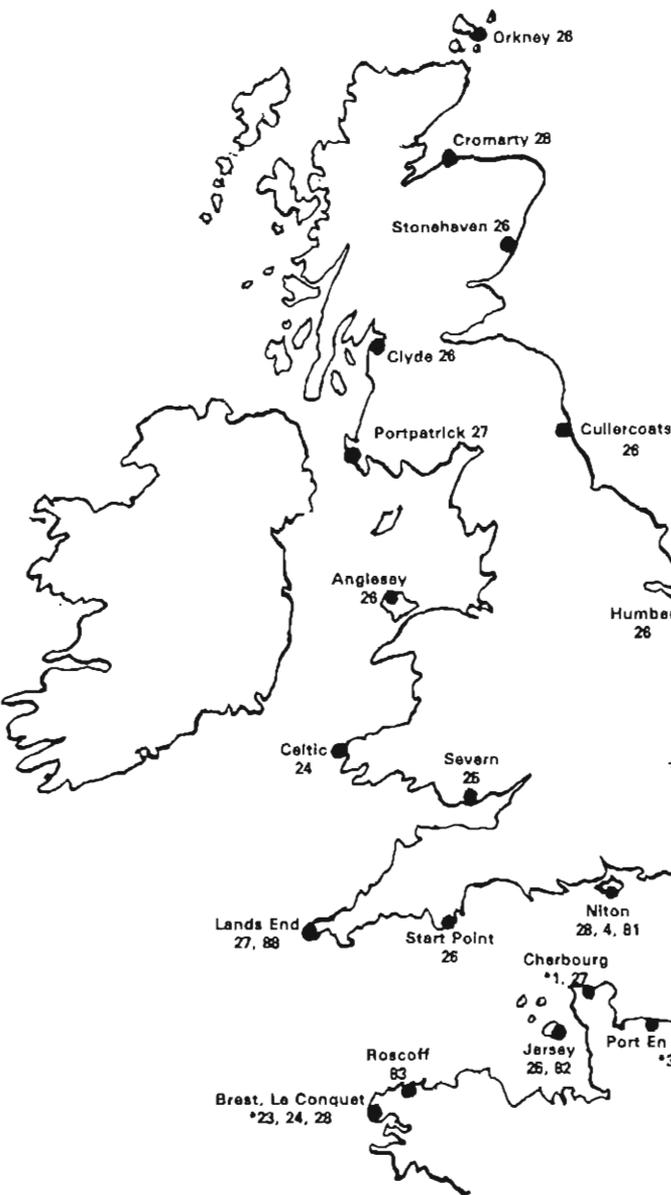
For all UK Stations, the initial call is on Channel 16.

Comarty is a provisional station.

Channels marked* at French and Belgian Coast Radio Stations at present use non-standard frequencies, workable only with French equipment. This anomaly will be phased out by 1983.

Dutch and Belgian Coast Radio Stations are controlled

Shetland (Lerwick) 27, 26



Transmission Frequencies in the 156-174 MHz Band

Channel designators	Transmitting frequencies (MHz)		Port operations		Ship movement		Public correspondence	
	Ship stations	Coast stations	Single frequency	Two frequency	Single frequency	Two frequency		
60	156.026	160.625		•		•	•	
01	156.050	160.650		•		•	•	
61	156.075	160.675		•		•	•	
02	156.100	160.700		•		•	•	
62	156.125	160.725		•		•	•	
03	156.150	160.750		•		•	•	
63	156.175	160.775		•		•	•	
04	156.200	160.800		•		•	•	
64	156.225	160.825		•		•	•	
05	156.250	160.850		•		•	•	
65	156.275	160.875		•		•	•	
06	156.300		•					
66	156.325	160.925		•		•	•	
07	156.350	160.950		•		•	•	
67	156.375	156.375	•	•		•		
08	156.400		•					
68	156.425	156.425	•			•		
09	156.450	156.450	•	•		•		
69	156.475	156.475	•	•		•		
10	156.500	156.500	•	•		•		
70	156.525		•					
11	156.550	156.550		•		•		
71	156.575	156.575		•		•		
12	156.600	156.600		•		•		
72	156.625		•					
13	156.650	156.650	•	•		•		
73	156.675	156.675	•	•		•		
14	156.700	156.700		•		•		
74	156.725	156.725		•		•		
15	156.750	156.750	•	•				
75			Guard-band 156.7625 — 156.7875 MHz					
16	156.800	156.800	DISTRESS Safety and Calling					
76			Guard-band 156.8125 — 156.8375 MHz					
17	156.850	156.850	•	•				
77	156.875		•					
18	156.900	161.500		•		•		
78	156.925	161.525		•		•	•	
19	156.950	161.550		•		•		
79	156.975	161.575		•		•		
20	157.000	161.600		•		•		
80	157.025	161.625		•		•		
21	157.050	156.050 or 161.650		•		•		

from Scheveningen and Oostende respectively. The channels to be used when calling these stations depend on the geographical position of the craft, as indicated on the map. For French and German stations the initial call should be on the appropriate working frequency. Dutch and Belgian stations will accept calls on Channel 16 but the Dutch prefer ships to call on the appropriate working frequency.



Craft used on rivers should also be fitted with radio telephone equipment.

communication between small craft and the Coastguard on matters relating to safety.

5. Special Frequencies for French and Belgian Coast Radio Stations

(Channels 01, 03, 63, 21, 23 and 83)
Until 1st January 1983 special frequency allocations are used by certain French and Belgian Coast Radio Stations. In channels 01, 03 and 63 the frequencies 156.050, 156.150 and 156.175 MHz respectively are used as ship station frequencies and in channels 21, 23 and 83 as Coast Station frequencies.

Looking at the list of channels it will be seen that many channels have two frequencies allocated to allow duplex working. Every channel is allocated for one of six specific purposes, distress safety and calling, intership, public correspondence, port operations, ship movement and yacht safety (UK only).

Channel Requirements

VHF radio telephones and VHF monitor receivers can be obtained with only three channels but commonly sets with 12, 56 and 67 (to include private VHF channels outside the International Band when licensed), are available.

Obviously the greater the number of channels the greater will be the equipment cost and also scope for the use of the set.

Distress, Safety and Calling Channel

Most calling and answering is made on VHF channel 16 (156.80 MHz) like c.b.'ers channel 14.

This channel is also the VHF International Distress Frequency and all craft fitted solely with VHF radio telephones are encouraged to maintain continuous watch on channel 16 when on the water and to listen for distress and urgent messages from the other vessels in difficulties.

The regulations state that all ship stations fitted with VHF radio telephones must be able to transmit and receive on channel 16.

Channel designators	Transmit frequencies (MHz)		Inter-ship	Port operations		Ship movement		Public correspondence
	Ship stations	Coast stations		Single frequency	Two frequency	Single frequency	Two frequency	
81	157.075	161.675			•		•	•
22	157.100	161.700			•		•	
82	157.125	161.725			•		•	•
23	157.150	156.150 or 161.750						•
83	157.175	156.175 or 161.775						•
24	157.200	161.800						•
84	157.225	161.825			•		•	•
25	157.250	161.850						•
85	157.275	161.875						•
26	157.300	161.900						•
86	157.325	161.925						•
27	157.350	161.950						•
87	157.375	161.975						•
28	157.400	162.000						•
88	157.425	162.025						•

Public Correspondence Channels

To transmit and receive radio telephone calls, and radio telegrams, ship-to-shore Channels are needed in addition to Channel 16. Sending radio telephone calls, radio telegrams or other messages on Channel 16 is not allowed. The correct procedure with UK Coast Radio Stations is to make initial contact on Channel 16 and then shift to another channel known as a 'working channel' to send or receive messages.

Some continental Coast Radio Stations prefer initial contact to be established direct on the working frequency and French stations are unlikely to answer anything other than a Distress call on Channel 16.

The map shows the working frequencies used by Coast Radio Stations around the UK and Northern Europe. Traffic can be exchanged with many of the larger stations, additional channels are needed. Also additional channels will help reduce waiting times to clear traffic at busy periods.

Port Operations Service

A number of international VHF channels are allocated exclusively for port operations use and several others are available on a shared basis. Channels 12 and 14 are the two most commonly used.

Channels are allocated to achieve minimum mutual interference between harbours which are within VHF range of each other.

Intership Channel

Channel 6 is the primary intership frequency and the regulations state that all ships equipped with VHF radio telephone equipment must be able to send and receive on channel 6. (This is in addition to Channel 16).

Channels 8, 9, 10 and 13 have been allocated as intership channels for many years and now channels 67, 69, 70, 72, 73 and 77 are also available.

To communicate with another ship, initial contact may be made on channel 16 then transferring to an intership working frequency for the exchange of traffic.

Channels 6, 8, 70, 72 and 77 are exclusively for intership use and must be used in preference to the others.

Intership channels must not be used for

idle gossip between ships and the regulations specifically forbid:

- Exchange of unnecessary signals of any kind.
- Use of the installation for other than public correspondence and communications on the business of the ship.
- Use of profane, indecent or obscene language.
- Make transmissions without identification.
- Transmit superfluous signals.
- Transmit or circulate false or deceptive distress, safety or identification signals.
- Make unauthorised use of radio apparatus for the transmission or reception of correspondence of a private nature.

UK Small Craft Safety Channel

VHF channel 67 is available in the UK for the use by small craft and HM Coastguard for the exchange of safety information in situations which do not justify the use of distress or urgency procedures. As an example, in bad weather it is permissible to obtain a weather report by calling on channel 16 and saying you have safety traffic. You will then be asked to change to channel 67 to clear the traffic.

Continued next month.

IMPORTANT

CB World as a responsible journal does not under any circumstances suggest that c.b. is used as an alternative to marine transceiver. There are however many small pleasure boats where the fitment of a marine transceiver would not be practical. Many families who own cars and trail or carry boats on their roof racks will probably have a c.b. set in them so it will be a natural progression to have one in their boat, be it a powerboat, sail boat or even canoe.

We would like to thank the Royal Yachting Association for their valuable assistance in the preparation of this first of a series of articles. Thanks are also due to VTronix Communications Equipment and Accessories (Unit 10D, Dawkins Road, Hamworthy, Poole, Dorset BH15 4JP. Tel: 02013 82844) and also Greenham Marine Ltd (Enelco House, The Quay, Poole, Dorset. Tel: 02013 6363) for the supply of marine VHF radiotelephone equipment and antennae to *CB World*. Any reader interested in further information should make contact with any of the above.

More next month.



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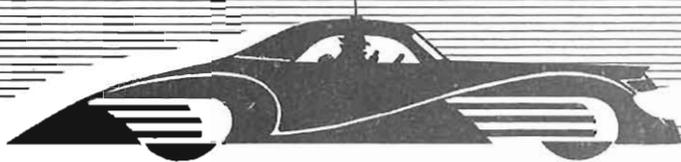
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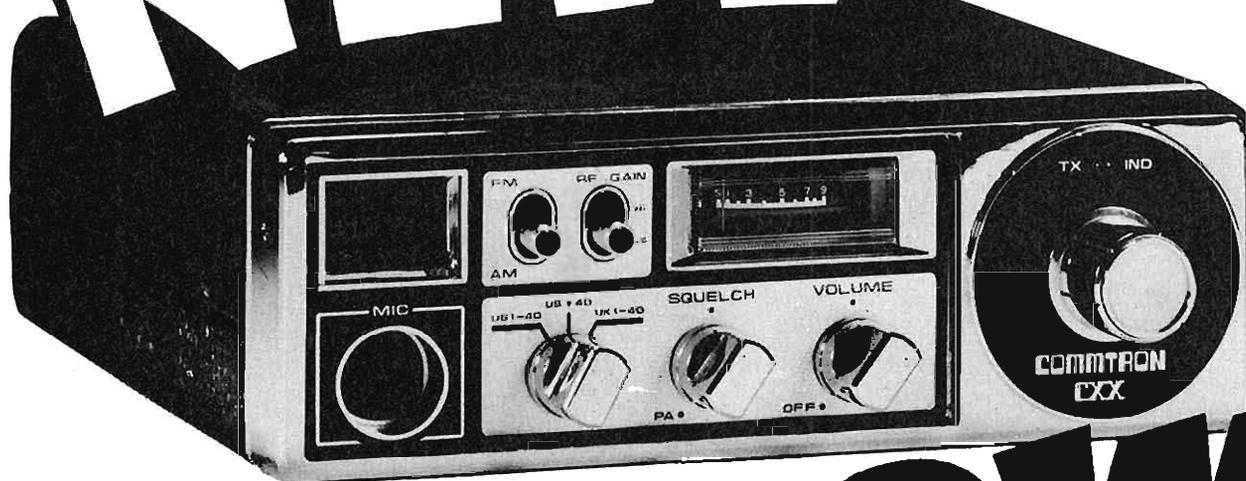


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Rig Round up

— The latest information on f.m. rigs continued from last month.

Note. All specification data is that as supplied by the manufacturer or importer.

Alba

Alba have just released details of their range of 27 MHz f.m. c.b. equipment. This includes a mobile rig and two hand-held transceivers. Sales Director Peter Balcombe told *CB World* that initially all their c.b. supplies will be flown into the country.

Model CBH1

Specifications:

- 2 channel hand-held transceiver, crystal controlled f.m.
- Antenna length 75cm., 7 sections, chromed
- Battery check indicator red LED
- Call tone
- Power source 1 × 9V battery (6F 216 size) — not included
- Dimensions 65mm long × 175mm high × 31mm deep (12½" × 7" × 1¼")
- Frequency 27 MHz (11 meter band)



Transmitter section:

- FM 3 stages crystal controlled
- RF output 200mW
- Radiated power ERP 40mW

Receiver section:

- Superheterodyne with RF amplifier
- Sensitivity better than 1.0uV for 10dB s + n/n
- IF 455KHz
- Ceramic filter. Squelch on/off switch
- Audio output 250mW
- Sensitivity: 1.0uV for 10dB s + n/n
- Approximate price: £23.00

Model CBM1

Specifications:

- 40 channel mobile c.b. transceiver, PLL controlled, manufactured in accordance with MPT 1320

- LED digital channel display, channel 9 priority switch
- 20 transistors, 3 ICs, 22 diodes, 3 LEDs 2 digits seven segment LED display
- RF meter
- S meter
- Roger bleep with indicator (yellow LED)
- RX indicator (green LED)
- TX indicator (red LED)
- RF gain control
- Squelch control
- Volume control
- Roger Bleep switch
- External antenna socket. Power source 13.2V DC
- Dimensions 155mm long × 50mm high × 165mm deep (6¼" × 2" × 6½")

Transmitter section:

- 3 stage, PLL synthesizer controlled. Frequency modulation RF
- RF output power 4W. Current drain 1A

Receiver section:

- Double super heterodyne with gain controlled dual gate mosfet RF amplifier
- Ceramic filters
- Built in 3" speaker and external speaker socket
- Audio output 2W
- Sensitivity: 0.7uV for 10dB s + n/n

Accessories

- Microphone with push to talk switch with screw lock attachment
- Mobile mounting bracket
- Approximate price: £74.00

Model CBH2

Specifications:

- ABS cabinet, 40 channel hand-held receiver, PLL controlled
- Tone call feature and channel 9 priority switch
- LED digital display with display on/off switch
- 16 transistors, 3 ICs, 21 diodes, 2 LEDs, RF meter, combined with battery check meter
- S meter
- Antenna length 150cm, 10 elements, chromed
- External antenna jack
- Power source 8 × 1.5V UM-3 size batteries or 10 × 1.2V NI-CAD AA size batteries
- External charger jack socket
- Dimensions 775mm long × 215mm high × 60mm deep (3" × 8½" × 2½")
- Complete with carrying case and strap
- Unit is supplied with 2 dummy UM3

Transmitter section:

- 3 stage, PLL synthesizer controlled. Frequency modulation F3
- Built in electret microphone
- TX indicator (red LED)
- RF output power 2 watt
- Radiated power ERP 200mW

Receiver section:

- Double super heterodyne with RF amplifier
- Sensitivity 0.7uV for 10 dB s + n/n
- Ceramic filters
- Squelch control
- Volume control
- On/off switch
- TX indicator (green LED)
- Audio output 350mW
- Approximate price: £65.00

Aiba Electronics Ltd.,
Bull Lane,
Edmonton,
London N18 1SD.
Telephone 01-803 4451



Athole Music

Athole has the U.K. distributorship for the Senfo Skyline range of 27 MHz c.b. sets manufactured by Cybernet of Japan. There will be a choice of two Home Office approved rigs — the basic 'mobile' model 2008 which retails at a basic price of £69.95, and a more sophisticated model 2010 which is a luxury specification equally suitable as a car mobile, a home base station or for boat use. Both models are fitted with green LED displays, 40 channel selector, volume squelch, and Hi/Lo tone controls. The 2010 features AC or DC operation, additional RF gain control, Delta tune, channel 9 priority, headphone socket etc. and will retail at £99.00.

No other technical specifications have been released yet.

Athole Music Ltd.,
62-68 Saltoun Street,
Glasgow G12 9BE.
Telephone 041-334 2215/6

Bee Ware

Bee Ware Ltd, a member of the Adam Leisure Group of Harrogate, North Yorkshire, announced their Grandstand range of c.b. transceivers. The range initially comprises of one base station, 4 mobile transceivers and 2 hand-held transceivers.

Specifications:

Grandstand Buzzing Bee Mobile Transceiver

Compact in size the Grandstand c.b. mobile transceiver is a good quality budget model featuring noise blanking and two position RF gain. It has 40 channels and 4 watt output.

Grandstand Hawk Mobile Transceiver

The Grandstand Hawk mobile transceiver is a standard model with the additional features of Delta tune and RF gain controls. It has 40 channels and 4 watt output.

Grandstand Bluebird Mobile Transceiver

The Grandstand Bluebird is a quality compact mobile transceiver. For ease of use a LED readout is provided for power and signal strengths. It has 40 channels and 4 watt output.

Grandstand Gemini Mobile Transceiver

This is a deluxe model with many extra features. The Grandstand Gemini mobile transceiver in addition to the usual controls has clarifier, RF gain, noise blanking and public address. It has 40 channels and 4 watt output.



Grandstand Base Station Transceiver

The Grandstand base station transceiver is designed for use in the home and in style is very similar to the current trends in audio equipment. Special features include a 24 hours LED clock with pre-set on or off switching and built in meters for SWR and power/signal strength. Controls include clarifier, RF gain, SWR set, squelch, tone and volume, special provision for headphones and public address. It has 40 channels and 4 watt output.

Grandstand Interceptor 2 Channel Hand-Held Transceiver

This is a simple Walkie-talkie type transceiver with 2 channels. The Grandstand Interceptor features switch squelch control and telescopic antenna. It operates from a single PP3 9 volt battery.

Grandstand Communicator Hand-Held Transceiver

This professional type Walkie-talkie transceiver has 40 channels and built in telescopic antenna. The Grandstand Communicator features large LED channel readout, built in signal/power meter and squelch. It will operate from rechargeable batteries (not supplied).

The whole Grandstand range will be backed by in-house service. It is intended that a booklet covering most aspects on c.b. transceiver use will be included with each set. Subject to availability, a licence application form will also be included.

Bee Ware Ltd.,
Ripon Way,
Ripon Road,
Harrogate,
North Yorkshire HG1 2AU.

Dixons

Dixons Photographic Ltd., the High Street consumer electronics and photographic retailer, have entered the new legal c.b. radio market with a range of own brand products under the "Harrier" name. All products listed are available from Dixons stores (over 240 throughout the U.K.)

Harrier CBX Mobile Unit

Specifications:

- 40 channels
- Microphone
- Fixing kit
- Squelch control
- Signal RF meter
- Delta tune control
- RF and Mic gain controls
- TX and RX indicator
- Channel 9 (emergency) switch
- CB/PA switch
- Tone switch
- External speaker and PA socket
- 12V (car battery) powered
- Anticipated price: £99.99

Harrier CB Mobile Unit

Specifications:

- 40 channels
- Microphone
- Fixing kit
- Squelch control
- LED channel indicator
- TX indicator
- Signal/RF meter
- External speaker socket
- 12V (car battery) powered
- Anticipated price: £69.99

Harrier C.B. — HQ Home Base Unit

This unit will be available from late December.

Specifications:

- 40 channels
- Microphone
- LED channel indicator
- Large signal/RF meter
- Squelch control
- RF gain control
- Delta tune control
- Channel 9 emergency switch
- Tone switch
- TX and RX indicators
- Headphone socket
- Mains operated
- Anticipated retail price: £129.99

C.B. Walkie-talkies — Harrier WT1

A high quality two channel hand-held walkie talkie compatible with c.bs on channels 14 and 30. Includes squelch and volume controls, channel select switch, call tone button, battery check LED,



retractable antenna. Battery powered. The anticipated retail price is £24.99 or £39.95 a pair.

Harrier WT2

A high quality 40 channel hand-held Walkie-talkie complete with case. Includes squelch control, LED channel indicator, S, RF and battery test meter, RX and TX LED indicator, call tone button, retractable antenna, external antenna jack, battery powered. The anticipated retail price is £64.99.

Accessories

The following Dixons c.b. accessories are available:

Stainless steel whip antenna — base loaded. Mounts — magnet, gutter, trunk/roof, stud. Anticipated retail price is £13.99.

Harrier SWR1 Meter — anticipated retail price is £9.99.

Lock Mount — anticipated retail price is £6.99.

Power supply — converts mains to 12V. Anticipated retail price is £16.99.

Patch lead — Connects SWR meter between c.b. and antenna.

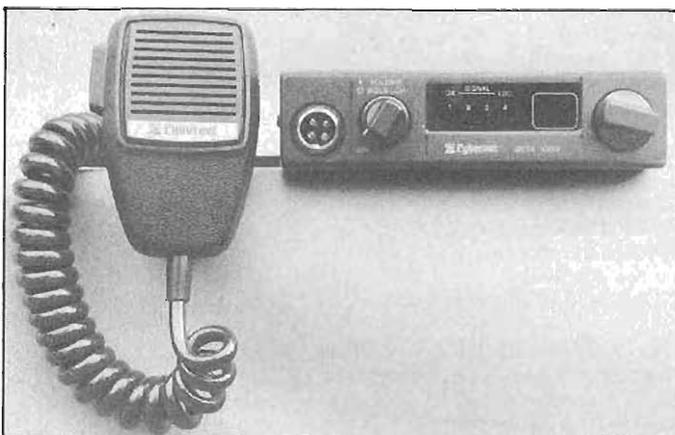
Harrier 22 Extension Speaker — anticipated retail price is £9.99.

Dixon's Big Dummy's Guide to C.B. Radio — given free with any Harrier c.b. purchased at Dixons. The leading c.b. handbook. A comprehensive manual of both the technical and non-technical aspects of c.b. Subject matter includes c.b. slang, buying and installing rigs, mobiles and base stations and procedures. The guide is available at all Dixons stores for £2.99.

**Dixons Mail Order Service,
Dixons Photographic Ltd.,
Dept. DS33,
Camera House,
Cartwright Road,
Stevenage, Herts.
Telephone: 01-581 2268 (24 hours service)**

Goodmans

Goodmans, with nearly 60 years of sound experience, have been entrusted by the Cybernet Corporation of Japan, the largest manufacturer of c.b. radios in the world, to exclusively distribute a new Cybernet range of transceivers developed and styled for the U.K. The Beta range is purpose designed — not dual standard or modified from a.m. — to maximise the superb quality available from the exciting new 27 MHz f.m. band.



Cybernet Beta 1000

A very compact transceiver with slimline styling provides all the essential requirements for personal c.b. radio contact without the need for technical knowledge. Digital indicators and click switching ensure clear definition of channel location and signal strength. A fully variable squelch control permits only wanted signals through the internal speaker, so you can leave the set on standby without annoying background noise. Just dial the channel number, adjust the volume and you are instantly available for contact.

Specifications:

- Internal speaker
- High sensitivity
- LED signal metering
- Slimline design
- Variable squelch control
- Switchable attenuator
- Station indicator
- Ergonomically designed microphone
- Extension speaker socket

Cybernet Beta 2000

Combines all the features of the Beta 1000 in the same compact size with added advanced features giving versatility and improved 'working' in extreme signal conditions. The Beta 2000 can be used as a public address amplifier at the touch of a switch using the additional external speaker socket fitted. The DX/LOCAL switch provides protection against overpowering local stations, and when receiving poor transmissions, the tone Hi/Lo control dramatically reduces high frequency noise, improving intelligibility. Transmit and receive LED indicators give clear indication of the operating condition.

Specifications:

- Internal speaker
- High sensitivity
- Slimline design
- Variable squelch control
- Switchable attenuator
- LED signal metering
- Digital station indicator
- Ergonomically designed microphone
- Extension speaker socket
- Tone hi/lo
- DX/local switching
- PA switch and extension socket

Cybernet Beta 3000

This top of the range set offers all the special features required by the most enthusiastic of c.b. operators. Volume, squelch tone and RF gain are all on infinitely variable controls, permitting precise adjustment for optimum operating. Direct access to channel 9 for emergency transmission and spot checks of this distress channel are available at the press of a switch, illuminating the channel 9 beacon LED. For night time operation the DIM switch reduces instrument light level. Maximum workable transmission range is ensured by the CLEAR switch which alters the speech bandwidth for maximum clarity of transmission.

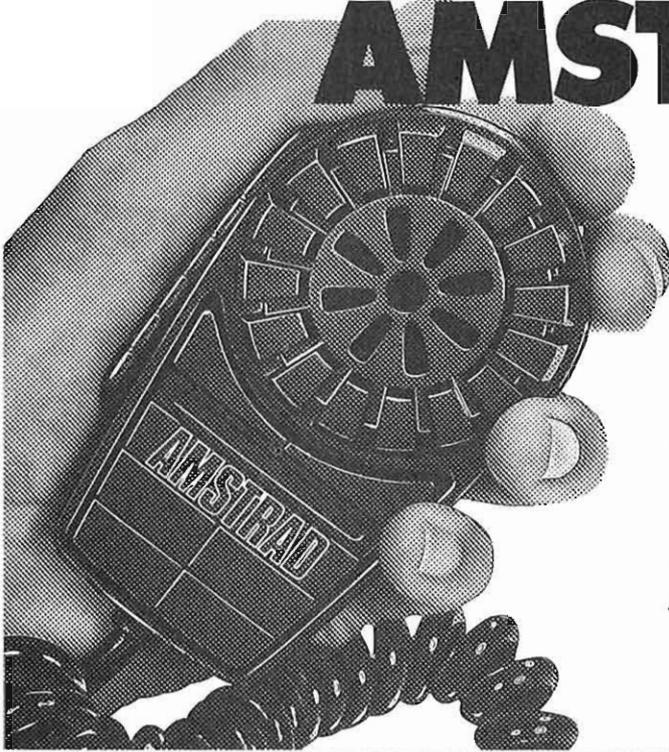
Specifications:

- Internal speaker
- High sensitivity
- Compact design
- Variable squelch control
- Switchable attenuator
- LED signal metering
- Digital station indicator
- Ergonomically designed microphone
- Extension speaker socket
- DX/Local switching
- PA switch and extension socket
- Variable tone control
- Clear control
- Dimmer switch
- Channel 9 direct access
- RF gain control

All the above transceivers are 40 channel 4 watt 27 MHz band f.m. units (27.99125 MHz) conforming fully to British specification MPT 1320.

**Goodmans Loudspeakers Ltd.,
Downley Road,
Havant,
Hampshire PO9 2NL.
Telephone: 0705 486344.**

'WALL TO WALL AND TEN FEET TALL, AMSTRAD!

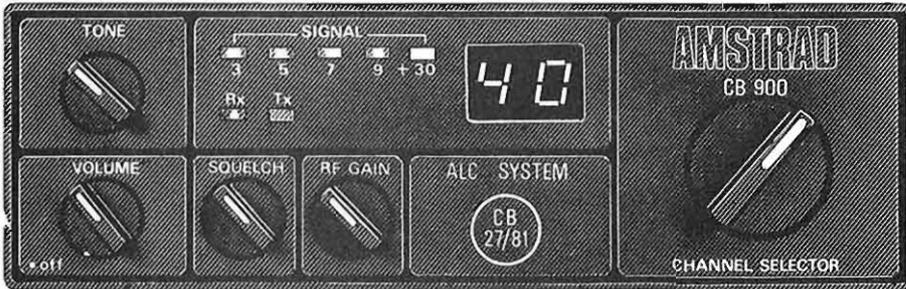


Nobody knows more about in-car electronics than Amstrad. That's why we're at the forefront of CB in the GB with everything you need for wall to wall reception. A choice of two high performance, 40-channel rigs—both designed from the ground up for the 27MHz FM band and featuring MOSFET technology. Plus a unique 1.5 metre triple-fixing antenna.

All come supplied with full fixing and mounting kits. And, with the rigs, we also give a free operating manual and CB guide.

Smokey and Buzby like Amstrad CB equipment too—it all fully conforms to the UK legal specification, MPT-1320.

Amstrad CB Rigs start from around **£79**

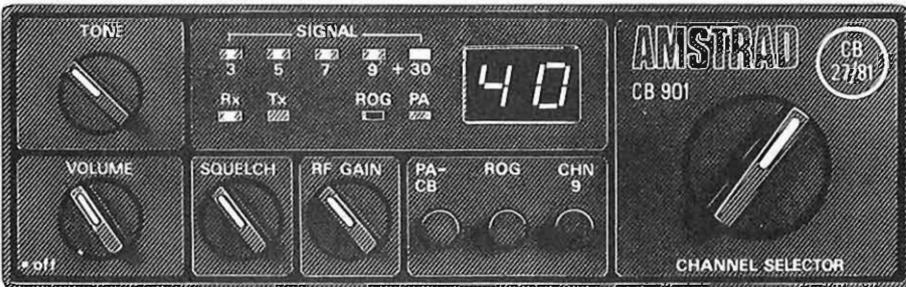


Amstrad CB900 Rig. Highly advanced rig with squelch control, RF gain, LED "pound" meter, ALC system, tone control and LED transmit/ receive displays. Note the CB 27/81 Certificate of Compliance symbol.

Around **£79**

Amstrad CB901 Super Rig. Features Roger Bleep, CB/PA, instant Channel 9 switching, squelch control, RF gain, LED "pound" meter, ALC system, tone control and LED transmit/ receive displays

Around **£95**



For full details of Amstrad Citizen Band Radio and the address of your nearest stockist, write to Amstrad Consumer Electronics Limited, (Dept) 1-7 Garman Road, London N17 0UF.

AVAILABLE AT SELECTED STORES OF:

COMET Currys HALFORDS RUMBELOWS

**PERFECT MATCH
PERFECT RECEPTION**

Ensure peak reception with the unique Amstrad CBA 1500 antenna. A 1.5 metre shock spring, base-loaded, stainless steel whip with a choice of magnetic, clip-on or hard fixing. Around **£15**

**LOOK FOR THE SIGN
OF THE CB LEADERS**



The Shape of CB rigs to come

CB is now legal in the U.K. These new rigs have been designed and produced especially to meet the needs of CB enthusiasts by Fidelity – a leader in audio systems. For performance and reliability you can really depend on Fidelity. So when choosing your rig settle on Fidelity. It's a name you know and a name you can trust.

CB1000FM



from around £70 inc. VAT.

- U.K. Spec. Compliance.
- 27MHz FM with 40 channels.
- 4 Watts Output.
- Basic Unit for first time buyers.
- Separate Rotary Volume and Squelch Controls.
- 40 channel LED Indicator.
- Signal Strength Meter.
- Built-in Speaker.
- Screw Fixing for Mic.
- Supplied with Mic., Fixing Brackets for unit and mic. Connecting Leads with fuse.

CB2000FM



from around £90 inc. VAT.

- U.K. Spec. Compliance.
- 27 MHz FM with 40 channels. ● 4 Watts Output.
- Separate Rotary Volume and Squelch controls.
- Rotary Tone Control.
- Rotary RF Gain control. ● P.A. Switch.
- Channel 9 – Emergency Channel Switch.
- External Speaker Switch.
- LED Dimmer Control.
- Power Mic – Mic Gain Control.
- 40 channel LED Indicator.
- Signal Strength Meter.
- Built-in Speaker.
- Screw Fixing for mic.
- Supplied with Mic., Fixing Brackets for unit and mic. Connecting Leads with fuse.

Fidelity

SOUND & VISION

Fidelity Radio Limited, London NW10 6ND.

CB'S • HI-FI SYSTEMS • MUSIC CENTRES • UNIT AUDIOS • TELEVISIONS • TRANSISTOR RADIOS • CLOCK RADIOS • RECORD PLAYERS

C.B. for the disabled 1. wheelchair

As promised in the August edition of *CB World*, we said we would regularly feature alternative applications of c.b. for the disabled. This month we show how simple it is to fit a rig to a wheelchair.

We would like to thank Alison for making this particular feature possible. In fact Alison gave us a few hints and tips. Alison is 18 years old and uses a wheelchair to help her with her various activities, such as working full time in an office and recently going on holiday to Bahrain. She is not wholly dependent on a wheelchair. For example, she drives her own car and with assistance can keep it filled up with petrol.

Here is our report.

1. Being an avid reader of *CB World*, Alison, on entering *CB World's* photographic

studio, asked for a copy of the latest edition. She then settled down to read it from cover to cover.

2. First we marked the fixing bracket holes on the arm rest with a pencil. Care was taken to ensure that when the set was mounted it did not interfere with the wheel assembly or handbrake.

3. Nuts and bolts should always be used and not self tapping screws which could easily tear clothing or cause deep scratches.

4. We drilled the two fixing bracket holes. (In theory one must not deface Ministry property but we thought they would not mind two small holes).

5. The bracket and transceiver were then fixed in place. (The receiver used was supplied to us by Harvard — see rig round

up for details).

6. The antenna mount decided upon was of a universal clamp and socket type as produced by Bandit. (Thanks for supplying the antenna system).

7. The antenna mount was clamped onto the right handle just forward of the grip.

8. Next the base loaded coil was fitted to the mount —

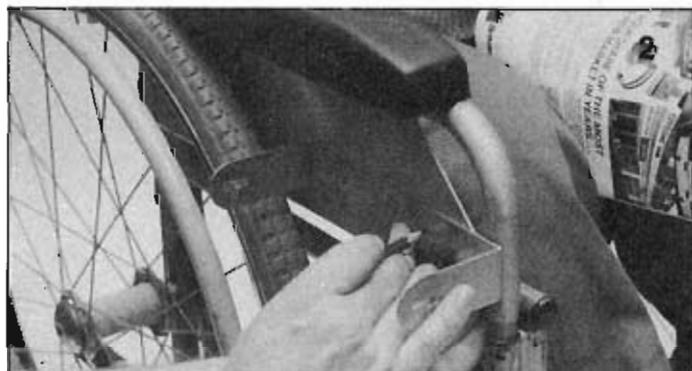
9. — and the antenna cable connector screwed into position.

10. The other end of the cable was attached to the set. (This would need to be removed later for s.w.r. checking, but it helped to show how much cable needed to be fixed to the chair).

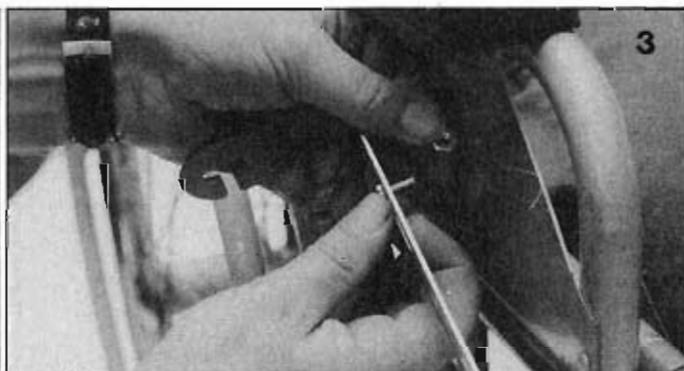
11. Next the main feed cable connector was plugged into the set. (Note clearance



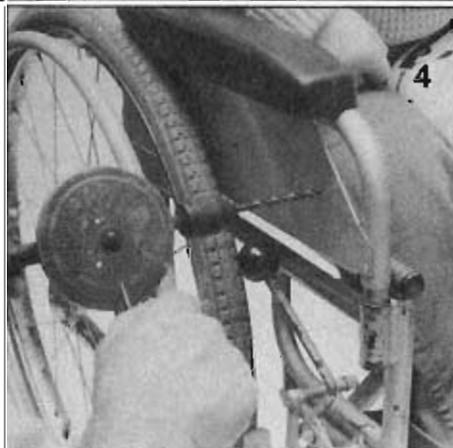
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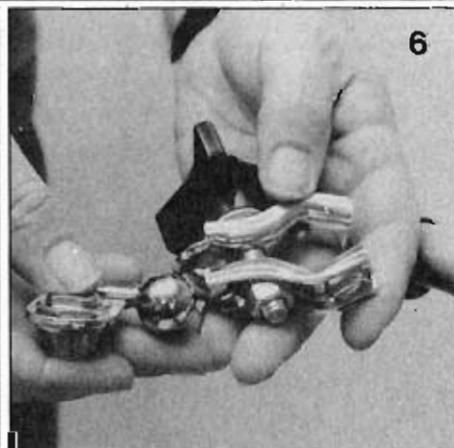
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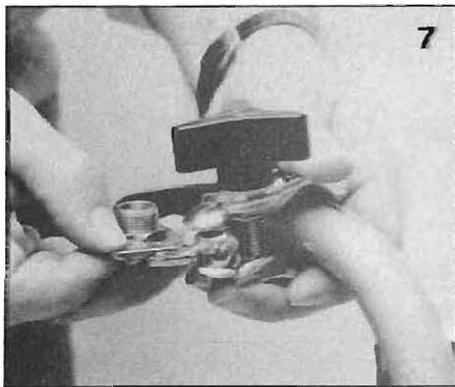
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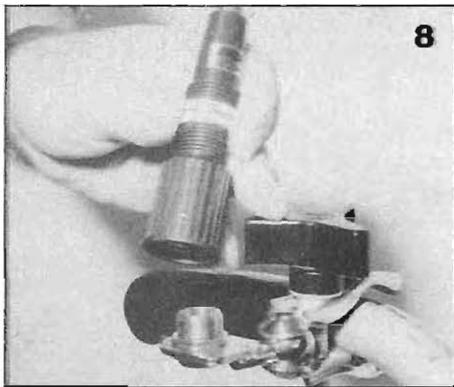
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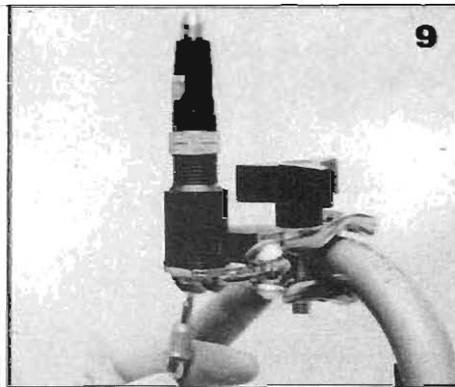
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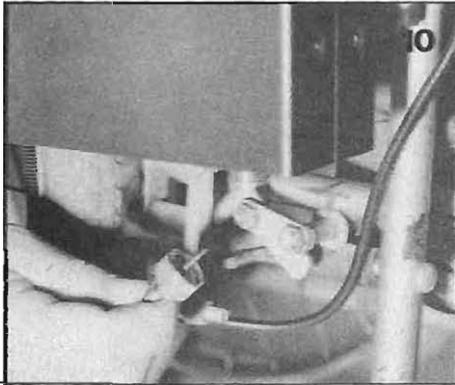
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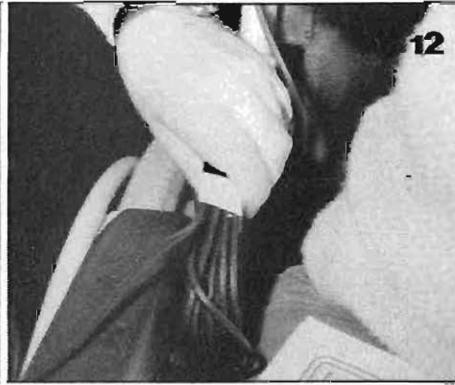
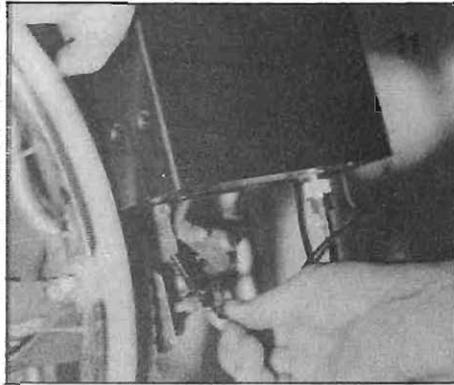
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9



10



12

between wheel, tyre, hand grip and set).

12. Spare co-axial cable was bound up and attached to the arm rest. (It should be noted that by keeping most attachments on the arm rest, the whole assembly can be lifted off for security or transportation of the wheelchair).

13. An old wooden filing tray was placed on the back frame extensions and held in place by two pins which slotted into two holes drilled vertically in the extensions. Motor cycle batteries were placed in a plastic box and the supply cables connected to the battery terminals. (Sets fitted to electric wheelchairs can use the main batteries for source of power).

14. The antenna was next inserted into the mounting bracket on the handle. (Note —

Alison is still engrossed in her *CB World*).

15. The next thing to do was to connect up an s.w.r. meter and check that all was well with the antenna and set. (See *CB World* August edition on how to s.w.r.). The Bandit was easily adjusted using the two knurled rings.

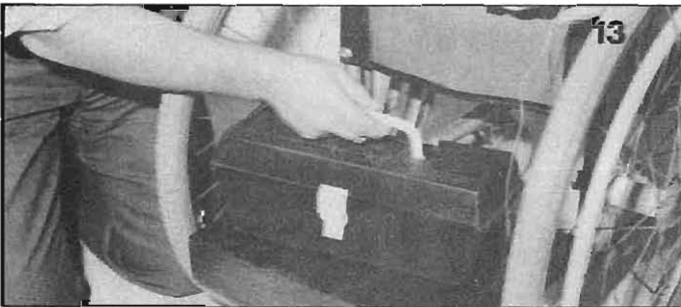
16. Alison was shown the various controls and all systems were go. Yes she can reach them. The knobs have flats which made turning easier. Nice thought Harvard. Note the pennant on the antenna to stop pedestrians poking their eyes out.

17. Under the terms of the *CB World* demonstration and evaluation licence, Alison was able to depress the mike key and make her first copy.

Should Alison wish to use her c.b. whilst out in wet weather, we did suggest that she drops a plastic bag over the set, preventing water finding its way into the set and causing a short circuit.

The whole conversion took just under half an hour and in that time *CB World* opened up a completely new method of communication for her and all disabled who use wheel chairs. We hope that this feature gives you all a few ideas.

It was a real pleasure to have Alison with us for a few hours and her final comment was . . . Is it possible to fit a c.b. to my car — unfortunately it has a lot of modifications? Our reply was — Of course it is. See you again soon. ●



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16



17



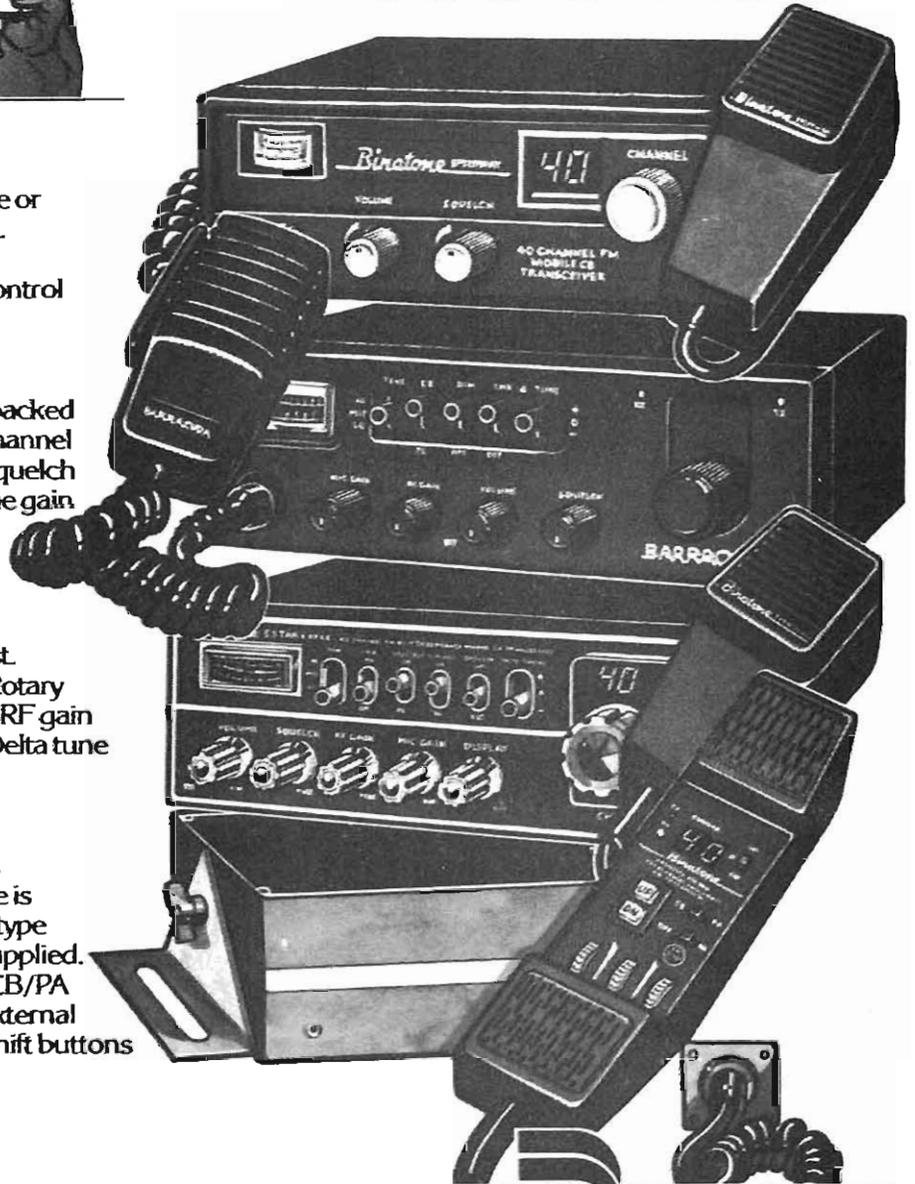
“Home in on Halfords for CB rigs and accessories”

The Binatone Speedway. A perfect budget-priced set for either the novice or CB user who requires just a basic unit.
Features • Rotary Channel Selector • On/Off volume control • Squelch control
Great value at just £69.95

The Barracuda HB 940. Real value-for-money in this feature-packed under-dash unit.
Features • Rotary Channel Selector • On/Off volume control • Squelch control • RF gain control • Microphone gain control • Delta tune
A super buy at only £89.95

The Binatone 5 Star. A superb model for the real enthusiast.
Features • On/Off volume control • Rotary Channel Selector • Squelch control • RF gain control • Microphone gain control • Delta tune • Internal/External speaker switch
A must at £99.95

The Binatone Breaker Phone. Ideal for cars where under-dash space is limited. All controls within telephone type handset with special mounting clip supplied.
Features • On/Off volume control • CB/PA switch • Squelch control • Internal/External speaker switch • Up/Down channel shift buttons
Real value at £95.45



ACCESS, BARCLAYCARD AND PROVIDENT/PRACTICAL CHEKS AND VOUCHERS ACCEPTED AT ALL MAINLAND STORES.

All offers are subject to availability and while stocks last and may not apply in N. Ireland and the Channel Islands. Prices correct at time of going to press.

HALFORDS

BRING IT BACK

Handles recorded

Your correspondent 'Lonely Hunter' of Reddington, Noits, suggests, and evidently you agree, that it would be a good idea to have a handles listing and he writes he would be prepared to pay for such entry.

The amateur Radio Call book which is issued annually would seem to suggest that it is not practicable to produce a four times a year issue — but if and when you do issue a Handles Listing, I would be willing to pay a reasonable sum for my entry in such listing. My handle has been published in your August issue as 'Three Parrots' of Woodford.

May I register the handle of 'Three Mullets' in the name of my wife, Mrs J.L. Lumley of Woodford.

I would like to see an article showing how to set up a base station with a legal specification antenna so as to comply with regulations.

Thanks for a splendid journal, especially for keeping it English style.

Three Parrots

ED. We have several features planned which cover the installation and use of home base c.b. equipment. Your comments about a national handle listing are being considered.

Quick Bust

This afternoon, I was on my way home from work carrying a bag containing a c.b. radio which was inoperable and disconnected. I was observed by two plain clothes police officers who drove around the one-way system and pounced out of their car at me like a scene from *Sweeney*. I was bundled in and carted off to Southwark (Borough) police station and was subjected to the most humiliating abuse whilst also standing accused of stealing my own radio.

When searched they attempted to place a pension book into my bag when my possessions were being documented on the charge sheet, and also claimed to the male desk sergeant that I had told three separate stories, which was a lie I quickly put right! Then I informed them that as the set was not in use they could not confiscate it, as laid down by English Law and as written advice on one's right in the *CB Guide* and that they were obliged to issue a receipt (they refused).

I was thrown into a cell and

later threatened that they could be gaining a search warrant to enter my home whilst I was detained and that before they left me alone, would I finally admit that I had stolen the radio, or believed it to be stolen. Secondly, that I could not make a telephone call to a solicitor for to retain the services of a lawyer would prove to be unnecessarily expensive.

The conclusion of this matter, it seems . . . That on the eve of legalisation of c.b.

- 1 The police have illegally stolen my set.
- 2 That I was subject to my citizen's rights being abused by officers of the law.
- 3 That it has destroyed my respect for Her Majesty's Police Force — whom I had so much regarded as superior in the past.
- 4 That as a victim of this behaviour the old saying 'A free country' and 'In England, a man is innocent until proven guilty' is perhaps, for me, but a shadow which has written it's own epitaph!

**Whitetiger,
Stockwell.**

AN APPEAL

On Friday 30th July this year my husband, Mr Ernest Stratton, left me and our daughter Naomi, promising that he would return later that evening, but unfortunately he did not. We have had no word from him in all this time and all members of the family, including his aunts and uncles, are very worried.

I do not have a c.b. rig myself and writing to you was the only way I can think of getting my message to all c.b. users. This message is please look out for Ernie and if possible ask him to phone or write to me to let me know how he is.

The last place he was known to be was Bournemouth. It is possible that he does not know the anguish he is causing back home. His mother has been on tablets because of his disappearance. Ernie (he sometimes uses the name Pat) is 23 years old, blond haired, blue eyed and has a tattoo on his left arm reading Naomi.

Naomi is only two years old and misses her daddy very much. If anybody can help trace him I will be very grateful to all concerned.
**Mrs. Lynn Stretton,
64 Henry Street,
Wykin Estate,
Hinckley, Leics.**

Grounded

A few weeks ago I was confined to bed with Asthma, but thanks to my rig I was still able to keep in touch with my good buddies: Clog Dancer and Ding Dong from Sheffield, Star May, Lamby Pie and Little Smurf from Rotherham.

Thanks to these and other local breakers I made speedy recovery. I therefore regard this as a good and useful purpose in favour of c.b.

Please include my good buddies and myself in your Handle Register and all the best to you and your excellent magazine for the future.

**Equinox,
Rotherham.**

CB lingo

Firstly, may I inform you that, from all the magazines on the market today that deal on the subject of c.b. (and I've read the lot) I have decided that yours is the best of the bunch and I have placed a regular order with my local newsagents, so congrats and all that, keep up the good work.

As with so many new mags, they start off with all the enthusiasm in the world but later, that same "get up and go" somehow wains, and lo and behold, we have a 60 page mag with 50 pages of adverts. I hope that will not be the case this time.

Will you also please remember that I, and many other people, buy *CB World* because it deals with a certain subject, namely c.b. radio and the like. Please try to stick to the subject and not drift off into other spheres such as custom cars.

I like the idea of a National Register for "Handles", (if we must have them), but I do wish people would try to be original, or even amusing, but in no way should suggestive or "naughty" handles be accepted. I for one would not respond to anyone on the airwaves with such a handle.

Finally and the most annoying thing of all, WHY? WHY? OH WHY? must we mimic the Yanks and their c.b. lingo. This is Great Britain — not the U.S.A., so let's have our own c.b. language (life would not seem the same if we were denied the use of some kind of slang). I go along with the "Q" code — that's been with us for years, and also the 10 code. The idea of these codes was to cut down the time on the air, was it not? (I hope you say yes).

Allow me to give you an example of the c.b. slang as used by Yanks. This is taken from one of the other c.b. mags, namely *CB81*. They gave a complete eight page spread of "The Language". First, let's take the subject of kids. In "The Language" they are referred to as anklebiters, carpet crawlers, carpet monkeys, crumb snatchers, curtain climbers, forty fours, kneebiters, rug rats, and so on. There are numerous examples of the senseless repetition that can be found in "The Language", so I think you must agree with me that we need our own c.b. language and bring a bit of sanity back to the airways.

Well I think I've said it all. I wonder if you will put it to print — I hope so.

**Gold Label,
Bristol.**

Crawl and Search

First of all (and most important — or I get my neck wrung!) I have enclosed a few sheets of handles for the National Register. Thanks to Margo for typing the first couple of sheets up.

I asked a few local good buddies about putting their handles down on a sheet to save postage and before long everybody was wanting their name on my list. I got the main part of it typed out (note the nice neat typing and alphabetical order), then found a few more bits of paper when I got back to the home 20 — so sorry to the ones who are not on the typed list but would you include the ones on the hand-written list too.

Crawl, crawl (but true) *CB World* is still the best mag.

To get serious for a moment — Channel 9. When we had a 10-33 over the missing girl Anne-Marie Hamilton we had a lot of confusion on channel 9. Many breakers were calling the base station monitor back to give them a 'nine' on descriptions and locations etc, despite being told to stand by and listen and only key the mike if they had any relevant info. If that didn't confuse the issue then the younger breakers calling to see if their pals were on that channel did. Could I ask all breakers using channel 9 through *CB World*, when a 10-33 is in progress listen to the base station or monitor — don't key the mike unless you have something relevant to say — the monitor will usually repeat the

message or location — don't ask him for a 'nine' or directions. This way all can get the info without having the base station getting stamped out by some turkey calling for a 'nine'. Anyway I think that gets my steam out of my system.

Once again keep up the good work. Thanks for a good mag. **Disco-Three, Brighouse.**

Point of View

I have a few points to raise regarding the legalisation of the f.m. I'm not going to criticise it, or support it as obviously not too many of us have used it yet, but to condemn the lack of attention the media have shown. How is it they always seem to ignore the war between a.m. and f.m.

Also another point, if the Home Office decide to give an amnesty to a.m. breakers by charging them to convert their rigs, what happens if you own an 80 or higher channel rig? I myself own a side-bander. Obviously, these are illegal anyway, but on it there are 120 a.m. channels, which I am not going to get changed for 40 f.m. If the money stretches I probably will acquire an f.m. rig, and good luck to all those with them. But it looks like 'rough luck' to those with 80 channels or higher.

I hope you print this letter so that anyone who would like to contradict or point something out to me may have the chance.

Creepin' Jesus, Dream City.

Is there life after Legalisation-day?

There is literally nobody in the community to whom it will never be useful to be able to use simple two-way radio in order to communicate further than they can shout. This is why, all the time we have been fighting so hard for that facility to be allowed, we in the National Committee have absolutely insisted on keeping the term *Citizen's Band*.

In America the government, through the FCC, encourages its citizens to use c.b. and the National Highway Transport Safety Authority issues public statements endorsing its usefulness. In this country, where we have had to fight governments, and when eventually the government was in favour have still had to fight the civil servants to get any facility at all, it has been very hard to establish the concept of c.b. as a service for every man, woman and child — as

universal and as versatile as pen and paper. People who will fight, even defy daft laws by breaking them, are a special breed, and at the moment both parliament, press and public tend to think of c.b. as a special cult.

The club aspects, the social uses, the fun of using c.b. — long may these continue. But the *point* of legalising will have been lost if it sells *only* to people who want it as their hobby. The idea is for c.b. to be as common in cars as an ordinary radio, enough volunteer monitors for the whole country to be in range of emergency keep, and for walkie-talkies to be used in the countryside as readily as

We would not have legal c.b. this year if it had not been for the "enthusiasts" — the law breakers even — and their clubs. But if they do not now welcome and help much greater potential numbers of new c.b. users — guide and educate them rather than scorn their ignorance — then all the groundwork will have been wasted, and the Home Office mandarins who never wanted c.b. to succeed will have won.

Volunteer monitoring organisations have already committed themselves to monitoring both illegal and legal channels after 2nd November. Many many new

c.b.'ers don't begin to understand the technical differences — why should they? We must and will go on fighting for the right to use the c.b. that is virtually a world standard but it is only the Home Office that we must treat as an enemy, not other ordinary people. With very much greater numbers, a more respective social cross-section and c.b. becoming more and more evidently *useful* as public services feel free to accept its communications, the c.b. movement can go forward into a period of negotiating from strength. It has achieved much in the face of very great difficulties and tiny resources, but 2nd November is only a beginning, not the end of the story.

Ian Leslie, Chairman, NATCOLCIBAR.

T.V. lost

I bought a receiver as advertised on pages 36 and 46 of your September issue and the tuning was crazy. C.b. and f.m. were o.k., but below on the same band as f.m. was T.V. on 87-54 but no T.V. signals were received (should BBC 1 and 2 and ITV be received?). A faint signal was received of Yorkshire TV on 176 at the top of the c.b. band!

THE PE RANGER

27FM CB PORTABLE

CB
27/81

BRITISH MADE
FOR U.K. MARKET
(Project described in
Practical Electronics, Sept
issue onwards)

THE RANGER CB rig has been designed to fit the new legal Home Office specification, and starts off as a hand held unit complete with aerial, mic., and rechargeable batteries.

★ LEGALISATION ★
SPECIAL OFFER
6CH BUILT AND TESTED
£64.95

(INC. VAT + £2.95 P.P.)

£127/matched pair

(INC. VAT + £5.90 P.P.)

This offer price includes rechargeable batteries, mic., aerial, mains lead.

Extra channels £2.25 each + 50p P.P. + VAT

Extra aeriels £3.95 each + 80p P.P. + V.A.T.
(Postage free with kit)

Tunable Whip aerial magnetic or permanent car amount (state which)

Permanent £13.95 — P.P. £1.00 + VAT

Magnetic £15.95 — P.P. £2.00 + VAT

The unit plugs into the mains, 12V car outlet, or runs on built-in rechargeable batteries (built-in charger). Up to 5 miles range in town to keep in touch with family and friends.

SPEC.

R.F. Power Output ½-1 Watt
AF (internal speaker) ¼ Watt
Modulation: FM: freq. 27.6MHz-28MHz
(CB Band) (excellent speech quality)
No. of channels (max): 6
Fully protected against bad aerial connection.

Coming soon...

Base/Mobile Add-On Unit
to give 4 Watts
— 40 channels (January 1982)

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KITS ALSO AVAILABLE 2 CH
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BRING IT BACK

In the middle of the p.b. band it was marked "Weather" and I have been told that only in America do they have a permanent weather band so it appears that this crazy tuning could be caused by it being for American transmissions. All the retailer's stock of this model were the same.

I shall appreciate your comments. When c.b. becomes legal my handle will be "Boiled Am".

Eric Darvill,
Sheffield.

P.S. These radios are made in Hong Kong.

Illegal activity

I get *CB World* every month from my local newsagent via my paperboy. I like the layout of *CB World* and all the good reading, especially 'The Case for FM — It's Good' by Bill Curtis (July edition). It gives us a lot more information on the benefits and drawbacks of f.m.

I have my f.m. rig ordered ready for the big day. Your section of the club corner is a very good thing as I am trying to keep a copy of all the good buddies handles and a map of the Breaking Channel as they are different in some Scottish, English and Welsh towns.

There is a lot of activity in this area as nearly every week a lorry comes over on the boat and is caught with illegal sets. The Red and Blue Club (in Stranraer) is still fighting for a.m.

Well I must fly — keep up the good work. And keep the National Register going as the good buddies can always give me a shout on 15 and get an eyeball if they are up here on holiday.

Fire Fly,
Stranraer.

Emergency Growth

Someone there must be congratulated. *CB World*, already the best, seems to be heading in the right direction. Interesting articles on gear and now for the more serious a lead up to Amateur Radio from c.b. — this can only be for the good of all concerned.

I honestly believe that with leadership from people like yourselves plus a good club or two c.b. can be made to work for the benefit of all. I have a health problem, but there is no doubt that a successful c.b. system will do wonders for the disabled and not so well.

I am a little worried and disappointed that my *intended*

handle "Cats Whisker" has not made it into your lists. I did write several issues back.

One thing that does concern me a little. There are some good Emergency Systems going and wonderful aid given to people and services, but aren't we getting too many? Surely a lot more could be achieved if all this effort could be harnessed into one or two regions. In this mobile era one can be across the country in hours and perhaps be unaware of the local emergency systems.

Thanks again for a good read.

Ray Williams,
Grantham.

Truce

I will not go on about how good your Mag is — I think every other breaker has already said it. The main point I wish to get on my soap box about is DX-ing. Having had a c.b. for about four years, and been DX-ing for three, I have a little knowledge of c.b. but I am still learning.

One thing that I consider good is that in a lot of countries the channels 30 to 40 are left clear for DX.

If you good buddies are on say 34 a.m. and I am on 34 u.s.b. or l.s.b. just getting the final a.d. of someone in Brazil you come on and walk all over him and the a.d. is lost forever.

Brazilians are very good at clearing the calling channel and so often say take it to the top of the shop (40). When most channels below 30 are clear it makes life a little difficult.

It also works the other way. You may be on 34 a.m. and I call out on 34 u.s.b. or l.s.b. and walk all over you. So as c.b. is here to stay (f.m. or a.m.) please let's all get along. 10.4 you stay below 30 and we will stay above.

We have at last got the Italians to keep off 14 just for us.

Bull Dog 033,
Baloo, London.

Too Technical

I found the article about 'Antennae' a bit high-brow. I am sure many readers enjoyed the technical details given, but I am also sure many readers were bemused by the majority of the article. It was also difficult to understand 'Understanding SWR!' After I read the article a few times I managed to sort out all the relevant points and instructions.

I make these points as a person who does not yet own a rig. There must be many readers like myself awaiting the great day. In the meantime all

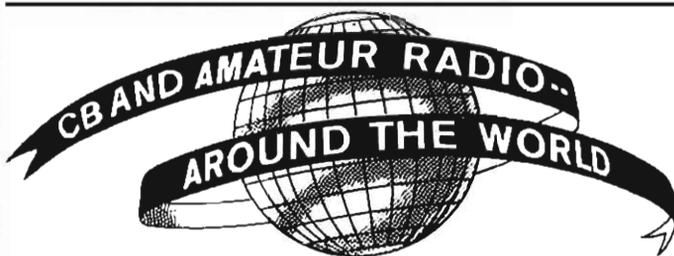
we have to keep us going are magazines like yourself, so all we ask for is detailed information explained in language we can all understand. So please make allowances for us and compromise between new and experienced c.b.ers.

I have sampled most of the c.b. mags that are now available

and yours comes out tops. I look forward to your future issues.

Malcolm McGar,
Newport Pagnell.

PS. I am going to use the handle 'Barn Owl' so please could you insert this into your National Register.



Australia

I am enclosing the latest issue of 'Two-Way' which is the official newsletter of the Victoria UHF Club.

We cater for UHF operators in the Australian Citizen's Radio Service. From the mood of our newsletter you will realise that we are not overkeen on your activists who are pushing for amplitude modulation on the 11 metre c.b. band. We have been putting up with the mess that a.m. causes and to see your enthusiasts going head on, to petition the British Government to introduce a.m. instead of the legislated frequency modulated carriers, is nothing short of saddening. Further, it is frightening to notice the adverts for linear amplifiers etc. for use on 27 MHz — it's nothing short of suicidal for the c.b. service in Britain. Yes, we realise that there are two sides to the a.m./f.m. story, but the only logical and fairminded way for all concerned is to stay with the f.m. mode *right from the start!* As an old lawyer friend said to me years ago, "It is better to be hard at the beginning than try to be hard last."

For the interest of your readers, our UHF contacts are giving us average distances of 40 miles base to base simplex. We have a repeater in Melbourne which gives the same results for mobiles. Under summer conditions we get up to about 200 mile copies. We have 40 channel rigs on 476 MHz f.m.

Congratulations and best wishes for your magazine...

Max Var 588,
P.O. Box 160,
Borrento,
Victoria 3943,
Australia.

Germany

I would very much like to tell you about how the Germans regard c.bs. Well first of all the c.bs. are totally different from most of the c.bs. I've seen before. They have only 12 CH and all of them are 2 watt output and in all the time I've been here I've not heard very many Germans on

their airways and those I have heard only stay on for a few minutes.

After listening to them I have come to the conclusion that they only use them for business purposes. But there are quite a few English Breakers (50) who have a Club but the only thing they seem to do is have a contest on homing in on some one in a mobile parked that constantly plays music over the air, and they give each other certificates and sometimes prizes for coming first. But after they've played their hunting game they hardly use the rig during the rest of the week. So all I can say is breaking in Germany is a big let down compared to England.

I hope you don't intend to come to Germany in the near future with a rig from England, because any c.b. that has more than twelve CH could cost you at least twelve thousand marks fine.

I am one breaker that can't wait to get back to UK on leave.

Tpr. Argent T.R. (Saxon),
BFPO 30,
Germany.

* * *

As from October 31 I shall be presenting a weekly programme about c.b. radio for forces and civilian listeners here in Germany.

On a recent visit to the UK I bought a copy of your magazine *CB World* and would very much like to obtain each issue. I wonder if you could tell me how best this could be arranged. Obviously I am anxious to make the programme, 'Breakers', as informative as possible and there'll be a slot devoted to UK news.

I would also be very grateful if you could mention the existence of the programme somewhere in the magazine and ask anyone with any connection with the German c.b. scene to write to me at the address below.

I realise I am asking a lot from you but I hope you will feel able to support this latest outlet for c.b.

Richard Duncan,
The British Forces
Broadcasting Service,
Germany, BFPO 19.

JUNIOR BRING IT BACK

CB is good

I am very keen on c.b. but my dad thinks it is silly but I do not think it is silly.

I have got a c.b. receiver and it picks up all 40 channels and a.m. and f.m. I think c.b. is a good thing because it can save lives.

If an old lady is in trouble you can't hear her but if she had a c.b. she could call out. I am 13 years old and all my friends have got c.b.s and one of my friends knows all about c.b. and how it works.

Barry Knight, Oxon.

PS. Do you think I can have about 50 eyeball cards. My friends have got lots of them but I have only got one.

ED. Any eyeball cards received for Barry Knight will be sent on to him.

National Registration

My good buddies and I were wondering if you would put our handles on your

national register.

First you've got me 'Baby Sitter' from Tulip Town, along with my sister 'Red Riding Hood'. Then there's 'Blue Boy', also from Tulip Town and one of our buddies 'Concrete Kid' from Concrete City. We all break on 27 and hope you carry on with your and our magazine.

Red Riding Hood, Blue Boy, Baby Sitter, Concrete Kid.

Give f.m. a chance

I have been on the air for about five to six months now and since being on the air I have seen the number of breakers rise from about 300 to 800 in our area. Around about Evesham there are three thriving clubs the Wychavon, North Cotswold and the Evesham Breakers Clubs (I am a member of the Evesham Club).

I enjoy your magazine because I think you have the right balance of news, letters, technical articles

and the less serious articles (that's the creeping over).

I would like to put my views forward about the f.m. — a.m. situation and the general argument about c.b. First of all I would like to say that I agree with the argument that says the government should have made c.b. legal two years ago back in the dark ages when the majority of us did not even know what a transceiver was and in my view it would have stopped all this arguing we are getting now.

That was the government's mistake but that is done now and they have given us an f.m. system. But what do we hear? "Breakers shall not be moved from a.m."

Most breakers, since the government's announcement of f.m., have taken every chance to run down everything about f.m. Some getting the facts completely wrong and exaggerating both over the air and in magazines.

Because as most of the sensible breakers know, f.m. is as good as — If not better

than — the present a.m. system. This is backed up by tests of the system in yours and even in the less successful magazines.

But I know with all the millions of breakers around the country there are bound to be many still on a.m. after legalisation. All I am saying is, let's give f.m. a chance instead of running it down completely before we've had a chance to try it! **Big Dipper, Age 16, Evesham.**

Picture request

I am a breaker of 14 years of age and already have over a 1,000 pictures of different rigs (some out of CB World, pity to spoil it), but there is just one picture that I would love to stick in my album. That one is of a TriStar 747 (480 channel). Please could you send me a picture or put a picture in your (great brilliant) magazine.

Mad Dog, Malvern.



And Moses took the children of Israel into the wilderness and he said...



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- VU meter for perfect modulation

+3B

- Rugged die-cast case, ceramic element and stable silicon transistors make the +3B practically indestructible

Available from all reputable CB shops



+3B



Expander 500



TURNER®

HANDLES

national register

CB World wants to apologise to those c.b.'ers who have sent in their handles and have not seen them published. We have been inundated with handles from John O'Groats to Lands End and we have enough handles to fill a telephone directory. Please be patient and bear with us, your handle will appear eventually. This service is free by the way and we would ask you to continue sending them in to us. Would you please indicate whether you are on a.m. or legal f.m.

Smiler Ewell
 Snow Tiger Worcester Park
 Swift Nick Stafford
 Syvester Quinton

Tablet Packer Newcastle
 Talgunner Windlesham
 Tallow Chesterfield
 Tallyman Ewell
 Tangerine Mickcleover
 Puppet

Tartan Terror Bedworth
 Tasmanian Walton-on-Thames
 Devil
 Tattoo St. Austell
 Tawny Oil Luton
 T. Cut New Haw
 T.D.K. Flackwell Heath

Teacher Yateley
 Tea Coscy Grimsby
 Tear Drop Chesterfield
 Teddy Bear Cheadle
 Teddy Bear Claygate
 Teddy Bear Redcar
 Teddy Bear Stamford
 Teeshirt Rushden
 Telegram Sam Mickcleover
 Telstar Weston Subedge

Thimble Head Gainsborough
 Thin Man Chesterfield
 Thor Chesterfield
 Thumper Riddings
 Thunder Child Brighton
 Tidal Wave Swansea
 Tie Wire Gainsborough
 Tiger Club Maltby
 Tiger Lilly Goole
 Tigress Berkhamstead
 Tigress Oswestry
 Time Warrior Goole
 Timid Toad Bodmin
 Tinkerbell Mickcleover
 Tiny Clanger Oxford
 Tiny Tears Woodthorpe
 Tiny Tim Market Rasen
 Tiny Tot Killamarsh
 Tipster East Kilbride
 Tired Boy Mickcleover
 Tiswas Ash Vale
 Tiswas Kettering
 Titan Luton
 Toe Cutter Runcorn
 Toffee Apple Norwich
 Tomahawk Whitton
 Tomcat West Bromwich
 Tom Thumb Gainsborough
 Tom Thumb Oswestry
 Tom Tom Kidderminster

Tool Sutton
 Tool Box Brighton
 Touchee Kidderminster
 Tow Ball Lincoln
 Town Cryer Woodthorpe
 Tramp Llanfair, Caereinion

Traveller Mersham
 Treale Hanwell
 Trebor Bolton
 Trebor Truro
 Trigger Redcar
 Trillian Swiss Cottage
 Trooper Radcliffe
 Troutman Northampton
 Tudor Rose Hereford
 Tutty Frutty Tolworth
 Twelve Bore Romney Marsh
 Heath Bracknell
 Twiggy Farnworth
 Twins Mum Leigh
 Twirly Twig Goole
 Two Stroke Luton
 Typist Bedworth

Ugly Baby Farnborough
 Unicorn Looe

Vacuum Pontefract
 Vampire Market Drayton
 Vicar Bloxwich
 Vicar Tadley
 Video Bolton
 Video Kid Southport
 Vigilante Lightwater
 Vigilante Nottingham
 Viking Warrior Penkridge
 Vodka Lass Redcar
 Voyager Tadworth
 Vulture Derby
 Vulture Scarborough

Wanderer Southport
 Wanderer Spalding
 Wanderer Walton-on-Thames

Wandsworth Culcheth
 Wall Bender Abergavenny
 War Eagle Feltham
 Wasp Spalding
 Waster Norwich
 Welsh Wizard Barnsley
 Werewolf Farnborough
 Wheels Goole
 Whipper Goole
 Snapper

Whiskey Lady Redcar
 Whiskey Mac Rochford
 Whispering Chessington
 Giant

White Knight Banbury
 White Knight Corby
 White Knight Malton
 White Guildford

Lightening
 White Paki Dumfries
 Woman-Woman Dundee
 Wombat Barnsley
 Womble Stroud
 Womble Surbiton
 Wooden Top Barnsley
 Woodpecker Sheerness
 Woodstock Ramsey, Merseyside
 Stafford

Worzel
 Gumbridge
 Wrangler Hereford
 Wrapper Man Preston
 Wully Bully Stratford-on-Avon

Wurzel Ashford, Kent

X Citer Hecnor

Yellow Peril Malton
 Yeti Ascot
 Yogi Bear Dewsbury
 Yogi Bear Maidenhead
 Yorkie Spalding

Zebedee Sutton
 Zebedee Tadley
 Zulu Warrior Woodthorpe

Action Man Kings Lynn
 Admiral Kings Lynn
 Alabama Kings Lynn
 Albear Medway
 Amazing Grace Eastham
 Ambassador Widnes
 Anchor Man Hounslow
 Angel Musselburgh
 Animal Tonbridge
 Apollo 13 Kingston
 Apple Juice Chesterfield
 Aquarius Kings Lynn
 Archer Kings Lynn
 Arcey Kings Lynn
 Artful Dodger Hereford
 Assassin Hereford
 Assassin Bolton
 Assassin Kings Lynn
 Axle Tramp Kings Lynn
 Aunt Sally

BC Haverhill
 BJ Kings Lynn
 Baby Face Coalville
 Bad Boy Wolverhampton
 Badger Redhill
 Ball point Purley
 Band Skipper Goole
 Bali High Bristol
 Baracuda Sutton Vallance
 Battle Axe Chesterfield
 Beer Belly Cheam
 Beeza Sutton
 Beachcomber Rochford
 Beach Master Kings Lynn
 Bell Fruit Tadley
 Belly Bumper Kings Lynn
 Big Apple Kings Lynn
 Big D Brownhills
 Big D Chesterfield

Big Daddy Kings Lynn
 Big Foot Cheam
 Big Ram Leeds
 Biggles Scarborough
 Billy Whiz Brownhills
 Birdman Huyton
 Black Cat Chesterfield
 Black Cat Kings Lynn
 Black Dog Wednesbury
 Black Pudding Radcliffe
 Black Knight Banbury
 Blondie Redhill

Butterkist
 Blue Band Widnes
 Blue Barry Chesterfield
 Blue Bottle Morecambe
 Blue Bunny Cheam
 Blue Cheque Kings Lynn
 Blue Nun Spennymor
 Blue Eyes Chesterfield
 Blue Jay Bolton
 Blue Boy Cobham
 Blues Breaker Carshalton
 Boatswain Gwent
 Bobcat Southport
 Bodger Dunstable
 Bogie Man Epsom
 Bomber Potters Bar
 Bomber 2 Horsham
 Bookworm Huyton
 Bookworm Audley
 Bootlegger Bolton
 Boxman Chesterfield
 Brains Chorley
 Brandy Kings Lynn
 Brewster Bradford
 Brown Bear Farnham
 Brown Lady Chesterfield
 Bubble Bath Dunstale
 Bugs Bunny Camborne
 Bulldozer Banbury
 Butcher Boy New Malden
 Butter Man Blackburn

Calamity Jane Hereford
 Cam Shaft Sutton
 Candyman Bradford
 Cannonball Kings Lynn
 Capricorn Two Bangor Co. Dn.
 Captain Eastham
 Caveman
 Captain Hook New Malden
 Captain Warrington
 Kangaroo
 Captain Morgan Kings Lynn
 Captain Caldicot
 Pugwash
 Caretaker Bromborough
 Carrott Kings Lynn
 Cruncher
 Catnip Manchester
 Cat Weasle Bromwich
 Cat Woman Hayle
 Charles Angel Stainland
 Cherokee Poole
 Chipmonk Kings Lynn

Chippy Watford
 Chopper Blade Sheffield
 Cider Glider Monmouth
 Ciderman New Malden
 Ciderman Tadworth
 Clint Eastwood Morecambe

HANDLES

Cliviger	Burnley	Driver	New Malden	Foxy Lady	Hersham	Hayburner One	Blackpool
Coal Bag	Dunstable	Drucken Duck	Huyton	Foxy Lady	Spalding	Haystacks	Culcheth
Cobra	Bromwich	Dry Ice	Chesterfield	Friar Tuck	Radcliffe	Hedge Hopper	Kings Lynn
Cockroach	Battersea	Duchess	Inverurie	Frog	Kings Lynn	Heidi Ho	Camborne
Coldstream	Goole	Duchess	Hereford	Furry Fred	Kings Lynn	Hell Raiser	Brampton
Colonel Bogey	Llandudno	Duke	Berwick.O.T			Henpecked	Goole
Commander	Loughborough	Eagle	Abergavenny	Gateman	Kings Lynn	Hercules	Sheerness
Bond		Eagle	Kings Lynn	Gay Gordon	Worcester Park	Highway Man	Cheam
Commando	Sandy	Earwig	Reigate	Gear Stick	Sheffield	Hissing Sid	Kings Lynn
Convict	Blackpool	Electric Onion	Kings Lynn	General Lee	Aberdeen	Hitchhiker	Kings Lynn
Convict	Dundee	Elgee	Kings Lynn	General Lee	Poole	Honey Monster	Kings Lynn
Country Boy	Ripon	Enforcer	Kings Lynn	General Wolfe	Kings Lynn	Honeysuckle	Lincoln
Crazy Harry	Kings Lynn	Enforcer	Musselburgh	Geronimo	Eastbourne	Horse Trader	Braintree
Crowman	Dulwich	Evil Woman	Kings Lynn	Ghost	Parkstone	Hot Dog	Ascot
Crowman	Ripon	Fagin	Helsby	Ginger Man	Chesterfield	Huggy Bear	Dover
Crystal	Ripon	Falcon	Spennymoor	Gizzard Head	New Malden		
Culpepper	Kings Lynn	Fat Lady	Chesterfield	Glowworm	Kings Lynn	Iceberg	Swansea
Cycle	Kings Lynn	Fen Master	Kings Lynn	Gold Digger	Tadley	Inch High	Kings Lynn
		Fen Mistress	Kings Lynn	Gold Digger	Nantwich	Inch High	West Vale
Dashboard	Ewell	Figaro	Brownhills	Goldie Locks	Stamford	Inky Finger	Reigate
Decca Lady	Worcester Park	Fireball	Brampton	Goldfinger	Grimsby	Irishman	New Malden
Dee Jay	Kings Lynn	Firecracker	Holytown	Golliwog	Kings Lynn	Iron Horse	Cannock
Dee Jay One	Kings Lynn	Firecracker	Hounslow	Goose	Swindon	Iron Man	Chesterfield
Deer Hunter	Kings Lynn	Firefly	Kings Lynn	Gorilla	Kings Lynn	Ivanhoe	Holyhead
Deisel Drifter	Kings Lynn	Firefox	Walsall	Grease Monkey	Kings Lynn		
Deisel Jack	Hampton	Firestick	Warrington	Green Giant	Lincoln	JPS	Ewell
Desperate Dan	Northampton	Flame Star	Kings Lynn	Green Lettuce	Brownhills	Jackknife	Chesterfield
Desperate Dan	Potters Bar	Flash	Bolton	Green Jenie	Northampton	Jack Tar	Chesterfield
Destroyer	Ratcliffe	Flash Gordon	Camborne	Gremlin	Southport	Jaffa Cake	Kings Lynn
Destiny	Abergavenny	Flintlock	Spalding	Griffin	Hereford	Jail Bird	Kings Lynn
Devil	Telford	Flipper	Addlestone	Grocer	East Kilbride	Jail Breaker	Spalding
Ding Dong	Ascot	Floyd	Caldicot	Ground Shaker	Southport	Jazzman	Tadworth
Ditch Digger	Kings Lynn	Flying J	Kings Lynn	Gruff Man	Ewell	Jenny Wren	Scarborough
Done Again	Dumfries	Flying Kettle	Eastham	Gun Runner	Potters Bar	Jenny Wren	Chesterfield
Door Knob	Brownhills	Foxglove	Pontefract	Guvonor	Kings Lynn	Jig	Southport
Double Eagle	Wolverhampton	Foxtrot	Oswestry	Guy Fawkes	Whitwell	Jigsaw	Kings Lynn
Dragline	Stamford			Guy Fawkes	Newtonmore	Joker	Kings Lynn
Drifter	Kings Lynn					Johnny Reb	Kingussie
				Haggis	Kings Lynn	Johnny The Fox	Milton Keynes
				Hammer Head	Kings Lynn	Jukebox	Kings Lynn
				Handyman	Orkney		
				Happy Jack	Runcorn	Kangaroo	Claygate
				Harley Man	Harwich	Kermit	Spalding
				Hawke Eye	Kings Lynn		

Continued next month



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THIS & THAT

Road accidents — Could You Help?

CB monitoring services can help you to call the ambulance service to the scene of an accident in the shortest possible time, but what you do during the first few minutes while you wait for help could mean the difference between life and death.

According to World Health Organisation estimates an accident victim's chances of survival are often decided within the first ten minutes before the ambulance arrives. It has also been estimated that up to 20 per cent of road deaths could have been prevented if simple life saving measures had been taken by the first person to arrive at the scene of the accident. This is normally the driver of the vehicle behind.



Vickers Medical, a leading British manufacturer of medical equipment, have launched the Motorists Emergency Kit to enable the individual to take positive action to help prevent death and disability in road accidents.

The kit was developed in Norway and is a unique combination of first aid kit and self-instructional system. Accompanying the kit is a 35-page manual providing a complete two-hour home training course for the entire family which independent studies in Norway and the U.S.A., found to be very effective.

Every component of the kit has been selected to properly equip the rescuer to carry out the skills

taught by the manual and is designed to be as easy to use as possible. The whole kit has been developed as a training aid to support the manual's instruction as well as to provide equipment for life-threatening emergencies and is attractively packaged in a high quality, soft, simulated leather cushion in black or tan.

The kit sells at £13.95, including VAT, delivery extra, and is available from Vickers Ltd., Medical Engineering, Priestly Road, Basingstoke, Hampshire RG24 9NP (Tel: 0256 29141).

Conversion

The owners of a.m. c.b. sets will be able to make them legal by converting them to the new f.m. specifications and paying £5. This was recently announced by Customs and Excise.

The conversion must meet Home Office specifications and be stamped accordingly but as yet no specific details have been released as to the mechanics of the exercise.

CB World would, for instance, like to know who will be able to carry out the conversions?, who will have the sacred stamps? and at what point does an illegal set become legal?

It is estimated that each conversion could cost £50, which would not be economically viable for the cheaper sets but only the up-market home bases.

The concession was called "a small and irrelevant carrot" by Mr Ian Leslie, Chairman of the National Committee for the legislation of c.b. radio.

For astute c.b.'ers who can get their hands on a copy of the press release, it does appear that breakers in the process of being busted will pay them to read it because they need only say "I know I am in the possession of an illegal set. I want to get it converted but am waiting to be told by yourselves where and when. Here is my £5 now."

CB World thinks that it will be difficult for the Police, Customs and Excise or British Telecom to reply provided that the set was not being used at the time of the bust.

New Satellite called Oscar

After several delays a Delta launch vehicle got off the ground at the U.S. west coast base at Vandenberg on Tuesday October 6th carrying, in addition to its NASA payload, a very precious package as far as the University of Surrey was concerned — a satellite named UOSAT built at the University by a dedicated team of students, most of them licensed radio amateurs.

Launched into a path that takes the satellite over the two poles on every orbit UOSAT separated from the second stage of the rocket going northwards over Africa and then, 16 minutes later, the ground control station at the University in Guildford was in touch with UOSAT recording telemetry information from an on-board beacon transmitting in the 2m amateur band on 145.825 MHz.

Once in orbit UOSAT became Oscar 9, the ninth in a series of such satellites (Orbiting Satellite Carrying Amateur Radio) carrying equipment operating in the amateur bands. However this time much more emphasis has been placed on the educational and engineering aspects of space flight. On-board cameras will take photographs of the earth which, with a suitable converter, can be seen on an ordinary 625-line TV set.

Incredibly, the telemetry information, instead of being a digital signal decoded on earth, will be a synthesised voice for all to hear. It will take three or four weeks for the ground control

station to activate all the systems on Oscar 9 and to ensure that they are working properly. After this details will be released of projects for schools, such as the converter previously mentioned, that will enable students to cooperate in the various programmes available from Oscar 9.

Oscar 9 should be airborne for at least five years and, if experience of the previous Oscars is anything to go by, it could be many years more. Oscars 7 and 8 are still orbiting merrily but, as is only to be expected, the on-board power supplies are the chief problem, usually batteries charged from solar panels on the sides of the satellite. Enormous changes of satellite temperature result from moving into and out of sunlight, which does not help at all.

The orbital period of Oscar 9 is 95.5 minutes and the height 350 kilometres. In the U.K. signals from the satellite can be heard on each orbit for several minutes, using conventional amateur radio equipment on the 2m band. Several amateurs take the orbital information and put it into their home computers in order to forecast future passes, and most importantly, the bearing at which the signal will be first "acquired" so that beam antennas can be aligned in good time before the next pass.

The amateurs satellite organisation AMSAT UK runs a net every evening at 7 p.m. local time on 3780 kHz in the 80m band and on 144.282 MHz in the 2m band later in the evening, both using s.s.b., to discuss and disseminate information on Oscar 9.

Pusher Tug

These two pusher tugs will be used on the river Niger and in the Nigerian delta regions.

Each tug can push a maximum of six barges each 750 ton dwt, 40 m long and 10.5 m wide.

The navigation equipment of the bridge comprises a river data set, a VHF transmitter, an RT transmitter with a range of more than 1500 km, and an echo sounder.

There is also a two way intercom system to the various stations throughout the craft.

Continued on page 28



SPECIAL ANNOUNCEMENT

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THIS & THAT

Continued from page 26

Pivoting c.b.

R & R of Redditch have diversified into c.b. accessories with a simple but effective adjustable mounting bracket for c.b. units.

The bracket, which can easily be fixed under the dashboard or parcel shelf, will pivot out on two extending arms up to 9 inches. The arms are made of ribbed steel for strength and are finished in a satin black enamel and pivot smoothly on durable nylon joints.

It is ideal for locating the c.b. unit within easy reach of the operator but allows it to be swung out of sight when not in use, for safety and security — particularly relevant when the supply of f.m. rigs will be scarce.

The 'Pivotrig' sells at £4.50, inclusive of VAT, and is simply packed in a plastic bag with header card. R & R intend primarily to market 'Pivotrig' through the trade, but welcome trade and individual enquiries.

R & R, Crescent Works, 141A

Mount Pleasant, Redditch, Worcs. B97 4JE. Tel: (0527) 42754.

Argos catalogue addition

Argos has placed orders with Amstrad for two mobile transceivers, to retail at £79.99 and £89.99; a three-way antenna (magnetic/clip/body mounted) which will sell at £13.99; and a standing wave ratio meter to be sold at £12.99.

Chairman Mr Tom McAuliffe predicted that Argos would sell its initial delivery, valued at £750,000, by Christmas. The c.b. merchandise is to be published by national newspaper advertising and leaflets in-store.

Mr McAuliffe forecast that Argos' competitively-priced c.b. range will be an 'immediate best-seller' and that because Argos was able to track daily sales within 24 hours, the company was well placed to rush further supplies into Britain as soon as demand warranted such action.

Eyeball

Looking for somewhere to eat in London whilst Christmas shopping?

The world's first restaurant rendezvous for Citizen's Band radio enthusiasts has opened in Princes Street, W1, just off Oxford Circus. The Eyeball Bistro is run by a group of c.b. enthusiasts led by David Solomons, who plan to make it the major restaurant rendezvous for the tens of thousands of British c.b. fans.

Not only will the Eyeball provide a wide choice of sensibly-priced meals and drinks, it will have the additional unique feature of enabling c.b.'ers to listen-in to their favourite channels while they eat.

A powerful receiver housed behind the bar will be tuned constantly to any broadcasting c.b. wavelength and speakers on each table will enable customers to eavesdrop. There will also be a display of the latest c.b. equipment which customers can test and, if they wish, buy there and then.

'Mine Host' at the Eyeball is the cartoon character Mike Raphone, who appears in a variety of guises in sketches displayed around the walls and, in addition, acts as 'guide' to the various dishes on the menu, many of which have been given names in c.b. slang.

A Home Office Special by any other name is a prawn cocktail, while Old Smokey (c.b.'ers term for police) is slices of smoked ham served with a slice of pineapple. Breaker Chic is the name given to chicken drumsticks served in barbecue sauce, and a Breaker on side is what other establishments would call a side salad of lettuce, tomato, cucumber, onion and celery.

Irate Trade

The Government's arrangement that c.b. radio sets could be marketed in shops from Monday October 12 caused anger with many importers and shopkeepers.

It was assumed that sales could not begin until November 2 when use of the radios in the approved waveband became legal. Marketing plans were formed around 'L' day and the announcement meant a loss of three trading weeks which could have helped recovery from the downturn in c.b. accessory sales.

Just one more bureaucratic bungle.

Once installed the sets could not be used before November 2 because, amongst other things, no licences would have been available.

One wonders how many breakers would have succumbed to the temptation and jumped the gun.

Radio Pagers Request

Radio paging system manufacturers have asked to be allowed new operating frequencies in the fear of increasing interference by c.b.'ers using a.m.

During the last four years when the Government was considering introducing c.b. in the U.K. frequency band, existing 27 MHz users such as radio modellers and paging systems realised that their days in the band were numbered.

Already radio controlled aircraft have been switched to 35 MHz.

The radio pagers have suggested a new band between 30 and 40 MHz but at present this is allocated by the Home Office for defence communications, but largely unused.

Under radio regulations this spread of bands is permitted for industrial, scientific and medical use and come well within the applications of radio paging.

Despite calls for a new frequency allocation the radio paging in industry has been told that it will have to wait until c.b. is operating on f.m. before the Home Office will consider moving the service.

The radio paging manufacturers, claiming to be plagued by interference from over one million "illegal" users, which include names such as Motorola, Pye Telecommunications, Air Call and Standard Telephones and Cables have little hope that interference will be reduced even though f.m. c.b. is legal.

The reason that selective paging operates on 27 MHz f.m. and a.m.

Selective radio paging manufacturers will be happy to leave the crowded 27 MHz band because it is important that the service they provide to hospitals for emergencies, security negotiations and large industrial concerns is free from disruptions by "outside forces".

There are, it appears, more than 4,000 radio paging systems operating in the UK with an estimated 100,000 users connected to them (compare this figure with over one million c.b.'ers).

They are used to locate personnel within a building by bleeping individually pocket worn receivers.

Being selective, up to several thousand receivers within a given building can react to a transmitter's signal.

Industrial beepers are activated by a sequence of tones or coded digital transmissions.

As c.b.'ers probably know their transmitters are usually more powerful than those used in paging systems and can mask the coded paging signals which may only last a few seconds — preventing individual pages bleeping at all. ●

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Let there be music

A regular monthly series giving the latest information on what is available in the Car Entertainment Market. All equipment described should be readily available from your local ICE specialist. If in difficulty, contact the manufacturer direct.

Hitachi

Hitachi has introduced four pairs of hi-fi speakers for use with in-car audio systems — whether stereo radios, cassette players or radio-cassette combination units.

Offering a range of power handling capabilities from 20 watts up to 30 watts per channel, the Hitachi speakers will appeal to motorists requiring high quality sound reproduction. The minimum frequency response characteristic of the speaker series, for example, is 60Hz — 15kHz.

These flush-mounting units are ideal for door installation in the majority of cars, being only 30mm, 45mm or 50mm in depth, depending on the individual speaker model selected. Speaker cone sizes are either 4½" or 5" (114mm and 127mm) in diameter, with attractively styled clip-on grill covers to complete any door trim.

Recommended retail prices range from the Hitachi ultra-slim SB 662L speakers (2 × 20 watts) at £16.95 per pair to the powerful Hitachi SB 150 model (2 × 30 watts) at £32.50 per boxed pair. All prices include VAT.

Hitachi SB 662L speaker

This 127mm free-edge drive speaker is only 30mm deep yet handles up to 20 watts input per channel, 4 ohms. It has a frequency response of 60Hz — 16kHz. Its circular grill cover has a satin finish.

RRP per pair is £16.95 including VAT.

Hitachi SB 125 speaker

The SB 125 is a 114mm dual cone unit, for handling up to 25 watts (max).

Frequency response is 60Hz to 15kHz. It has a depth of 50mm. The speakers are supplied with sturdy matt black plastic covers.

RRP per pair is £19.50 including VAT.

Hitachi SB 140 speaker

This speaker has 127mm dual-cone drive and has a power input capability of 25 watts per channel. Frequency response is 60Hz to 15kHz. The speaker is 45mm in depth, with a matt black plastic grill cover.

RRP per pair is £21.50 including VAT.

Hitachi SB 150 speaker

This top-of-the-range speaker has a co-axial cross-over unit incorporating a 127mm bass driver and a 50mm tweeter. Frequency response is 60Hz to 16kHz. The speaker depth is 45mm. Power handling is 30 watts per channel.

It has a matt black speaker grill with a satin chrome trimmed surround.

RRP per pair is £32.50 including VAT.



Two in-car stereo cassette players from Hitachi will appeal to motorists with differing audio requirements in mind.

At an RRP of £49.00 including VAT, the Hitachi CS 430 unit offers value-for-money specification and performance for the motorist with a modest budget available to spend on in-car entertainment. For the hi-fi enthusiast, the Hitachi CS 390 provides high quality sound reproduction and a host of operational features at a recommended retail price of £79.90 including VAT.

Equipped with auto-ejection at the end of tape play, the CS 430 has an audio output of 5 watts RMS per channel, with a frequency response of 50Hz to 10kHz.

The Hitachi CS 430 has an RRP of £49, including VAT, and is recommended for the motorist with a modest budget. (right).

For the hi-fi enthusiast the Hitachi CS 390 provides high quality sound reproduction and a host of optional features at a recommended retail price of £79.90 including VAT. (left).

Insertion of a cassette automatically switches on the player and a green LED light is running.

Slider controls are provided for tone, volume and balance, together with a lever for fast-forward action.

The Hitachi CS 430 has a dark brown

Continued on page 67



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Slip one of our new tapes in your cassette player and you will find yourself sitting behind the wheel of one of these amazing American Big Riggs — well, almost. With 10 tracks on each tape and such finger-snapping hits as Convoy, Phantom 308, White Knight and Little Joe, you'll soon see why trucking music has become so popular, both in the States and over here. Choose from Convoy or TEDDY BEAR.

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Slang Language is one of the all-time best selling C.B. books in America and it's now available in a new, British edition. There are 250 pages packed with C.B. slang, 10-codes, British town handles and much, much more.

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Here at last is the book that you've been waiting for. It has been written especially for the British C.B. and covers just about everything that you could ever want to know about the subject including how to buy equipment and install it, the history of C.B. in this country, C.B. and the law, etc. Over 200 pages and hundreds and photos, diagrams and cartoons showing the lighter side of C.B. radio.

£2.95 + 50p P&P

To: TRUCKERS' PARADISE, 10, Marshalsea Road, London SE1 1HL
Please send me the following goods:

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FEMME SCENE

by Smiler



"Dear Santa,
I know I usually write and ask you for a new dress, a pair of shoes, perfume, jewellery and the latest Roxy Music and Police albums, but this year my request is slightly different. I am sorry to confuse you and I do hope you have not been stocking (excuse the pun) up with the goodies you know I love, in anticipation of my letter, but a great change has come over my life during the past few months, and you are the only one I can turn to for help.

You see, I went to the *CB World Show* last April, and I met hundreds of wonderful people. They were all breakers, or c.b. radio enthusiasts, and they were so friendly that I just had to become one of them.

I bought myself a nice little straight 40 channel GEC rig, and the accessories to go with it, and since then have had a lot of fun using it to talk to all the good buddies and lady breakers in my area. I enjoyed myself so much that I went out and bought a super home base set with side bands, and learnt the art of DX-ing so that I could copy breakers in other countries.

Well, as you can imagine, I have spent an awful lot of money, although I was not too concerned as I knew the Government were talking about legalising c.b. radio towards the end of the year, and I thought it would be money well spent.

Anyway, I had an awful shock recently. C.b. has been legalised, but the Government has done the dirty on us all by legalising a form of c.b. radio which doesn't match up to the equipment already (if illegally) being used in this country.

Lots of new, legal equipment is being imported and I would just love to get my hands on it. Some of the sets I've seen look really pretty and I have heard that you can get good copies on them. (I have also heard that the Government will really be tightening the screws in order to stamp out the illegal use of c.b. and quite frankly I cannot afford to pay the fines! What a shame — no more DX-ing). All this presents two problems:

1) I have spent all my money on the illegal equipment and have not got any left with

which to buy the legal equipment.

2) After weeks of trudging round the stores trying to find a set I could have on the 'never never', I have yet to visit a store which has not just sold the last set in stock five minutes before I arrived or is still waiting for the sets to be delivered!

This is where you come in dear Santa. I am sure that the importers have made sure that your warehouse is well stocked with Christmas goodies for all those of us who have been sweet natured and well behaved during 1981. I have been the model of good behaviour and I would like the following.

- 1) A Chrome fronted, PLL controlled 40 channel transceiver with squelch control, switchable attenuator (although I don't promise to use it). RF Gain control, TX and RX indicators with different coloured LEDs, S meter, Roger Bleep and of course a channel 9 priority switch.
- 2) A new antenna for my car (the one I have at the moment is far too long).
- 3) An antenna for the new home base set I hope to receive from my boyfriend at Easter (instead of an egg).
- 4) A green microphone and lead to match my car and a tan one to match my coat.
- 5) A new navy sweatshirt with my handle on in red felt letters and my home 20 in white letters.
- 6) If you think I have been extra kind this year I could still use a new dress (and I would like to point out that I used the last of my *Je Reviens* at the weekend).

I shall hang my black silk stockings at the end of my bed as usual — a bottle of wine will be on ice by my dressing table, with the mince pies.

Love and Kisses
(or 73s and 88s as my fellow breakers would say)

Smiler (that's my Handle)

P.S. If you know where Adam Ant lives, I think he could do with a new set of make-up. I saw him on *Top of the Pops* recently and he hadn't got any make-up on. He looked absolutely dreadful without it and I can only assume that he had used it all up, forgetting he would be on T.V. If you see him please tell him I sent you and that I would love a copy of his latest album. ●



Accessory round up



Since we first started publication in December 1980 there has been a steady flow of c.b. accessories for review and in some cases laboratory testing.

We will be regularly telling you about some of these accessories which, although they may not have hit the headlines, are certainly worth considering when purchasing equipment.

For many reasons prices are not quoted, but a letter or telephone call to the supplier will soon tell you what the recommended retail price is and in the case of wholesalers, where it can be purchased locally.

TOOL KIT

A new electronics tool kit containing items suitable for work with all electronics equipment including c.b. and in car entertainment sets is now available from Toolmail.



Contents include miniature soldering iron, desolder braid, solder, soldering tools, range of screwdrivers, pliers and cutters, wire stuffers, I.C. extractor, tweezers, scissors and contact cleaners.

Toolmail Ltd., Parkwood Industrial Estate, Sutton Road, Maidstone, Kent ME15 9LR. Telephone: (0622) 672736.



CAR POLISHER

Breakers like to keep their wheels as clean as their copy so how about a Shine Master? It has been designed to take the tedium out of car polishing and buffing.

The Shine Master has a heavy duty, brushless motor operated from a car cigarette lighter



socket, via a 20ft. electric cable. It only weighs 6.5 lb. and includes an ON/OFF switch built into one of the two carrying handles.

The 10 inch oversized buffing head provides an orbital motion which reduces effort. It comes complete with a rewashable terry cloth, waxing bonnet and terry/velour buffing bonnet.

Bell Products Ltd., Coldbarbour Lane, Harpenden, Herts. Telephone: (05827) 68101



LEGAL ANTENNAE

The Bandit antenna is claimed to be a new concept to c.b. antennae and uses a variable mutual transductance coil.

According to the manufacturers, because of its straight resistive match the Bandit actually increases the power output from the antenna by as much as 2 watts without increasing the actual c.b. wattage outputs. This is particularly relevant with the small amount of wattage allowed by the Home Office together with the low output of many c.b. sets.

Other specifications include:
Triple coil design.

Coax may be cut to any length for a neat installation. No need to cut the whip to obtain a good v.s.w.r. match.

Ease of Tuning — Tuning Rings change only the magnetic field around coil; not the

physical length of the antenna.

Impedance can be controlled at 50 Ohms — shunt feed coils are always lower than the 50 Ohm optimum (c.b. sets are 50 Ohms + or -).

Wide Tuning Range with a narrow bandwidth — Tuning Range is approximately 26.500 to 28.000 MHz. Low v.s.w.r. is obtainable — 1.5-1 or less, in most applications a flat match of 1.1-1 is obtained. 3rd coil (bottom coil) is used for a D.C. ground — less interference from static electricity. Coil is completely sealed to weather — no way for the elements to get into the coil to cause problems.

Wide range of mounts available.

Bandit Antenna, Tomo Industrial Estate, Creeting Road, Stowmarket, Suffolk. Telephone: (04492) 2545



BATTERY CHARGER

The NOVA 4 battery charger is a powerful 4 amp rms Charger to meet today's demand for an economical and reliable charger. reliable charger.

Styled in a modern and eye catching design, this new British made charger is fitted with the SELMAR automatic cut-out and re-set overload protection and is double insulated for maximum safety to the latest British Electrical Standards.

The ammeter gives a clear and accurate reading allowing the charge rate to be monitored during charging.

Available as a 12 volt or 6v/12 volt model. A Hi/Lo version can be supplied.

Specification:

Input voltage: 220-240 v AC.

Output: 12 v DC.

Output current: 4 amp rms.

Dimensions: 20 x 10 x 12cms
Material of case: Shatterproof plastic.

Protection: Fully automatic and self re-setting against short circuit, reverse polarity connection and overheating.

This specification also applies to the 6v/12v output model.

Stellar Components (Sales) Ltd., The Causeway, Maldon, Essex. Telephone: (0621) 56011.





TYRE INFLATOR

Also from Bell Products Ltd. is a compact 12 volt air compressor with a built-in pressure gauge to monitor the output up to 120 p.s.i. The unit plugs into the cigarette lighter socket and comes complete with a long lead and adaptors for blowing up sports balls and small inflatables (useful for eyeballs on water). Everything is contained in a neat snap shut case.

ANTENNAE

Cherokee is a name that breakers will be seeing a lot more of in the future. It is the new brand name for the top selling range of antennae from Valor Enterprises Inc. of the U.S.

All the items in the range fall within the new legal specifications including specially modified Half Breed and Dial-a-Match antennae.

Breaker 1-9, 4 The Arcade, Hitchin, Herts.
Telephone: (0462) 57826

CAR HEATER

The basic paraffin heater for placing beneath the car on frosty nights has been around almost as long as the car itself.

Present models are safe to use in close proximity to petrol vapour and are attractively finished with red vessels and gold tops.

Desmo paraffin heaters aid the winter starting of cars, and also have secondary uses in keeping frost away from outdoor garden frames, outhouses and greenhouses, and as background heat in garages, sheds and workshops.

There are two standing under-car paraffin heaters — No 123, which has a capacity of one pint (0.55 litres) and stands 4¾" (120 mm) high, and No 126, which has a capacity of four pints (2.2 litres) and stands 5" (127 mm) high. The larger model will burn for approximately seven days at a low heat, depending on circum-

stances and quality of paraffin.

Desmo also manufacture a paraffin car heater, Model 158, with a hook attachment for hanging in a suitably effective position within the bonnet or in the outhouse. It has a capacity of one pint (0.55 litres) and is 8¾" (225 mm) high).

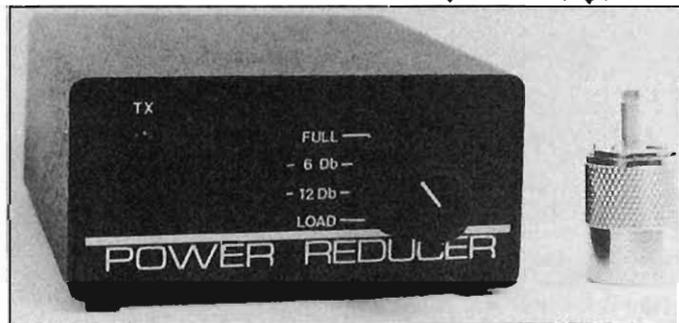
Desmo Ltd., Pensnett, Brierley Hill, West Midlands DY6 7NR.
Telephone: (03844) 3481.

POWER REDUCER

Emu Systems Ltd. has designed and are now manufacturing a Power Reducer suitable for both static and mobile application, which effectively minimises t.v.i. and swamping nearby receivers.

Due to the circuit design the signal received is not affected at any setting, when the unit is connected to a suitable D.C. source.

The facilities offered are a switchable 0dB, -6dB and -12dB attenuator, with a fourth position



marked LOAD. This enables a transmitter to be keyed with the antenna removed, for test purposes without damaging the P.A. With an input of 4 watts, 1 watt and ¼ watt.

A red light emitting diode is used to indicate transmission when fully lit, and in all modes other than full power, stays at ½ brilliance to indicate "attenuation selected". With full power selected the LED remains unlit in the receive mode.

Overall dimensions are 3.125" (w), 4.625" (depth including knob and socket) and 1.5" (h), and the case is black crackle

finished steel, with a flying PL259 lead to connect to the transceiver. The output from the Power Reducer is taken via a SO239, and low voltage D.C. feed applied by colour coded flying leads.

Emu Systems Ltd., 9A Crown Street, St. Ives, Huntingdon, Cambs. Telephone: (0480) 61071.

SWR METER

From THE LCL stable is the ACE 101 DG combined s.w.r. and power meter. It has an impedance of 50 ohms and operates over a frequency range of 1-30 MHz. S.w.r. readings of 1:1 to 1:3 are obtainable with a tolerance of ± 5 per cent. Power output is indicated within a 0-5 watt range with a tolerance of ± 10 per cent.

Full instructions on how to



s.w.r. are contained in the pack together with a small fixing bracket.

LCL Imports Ltd., 101 Dixon's Green, Dudley, West Midlands DY2 7DJ.
Telephone: (0384) 59185

TVI FILTER LEAD



Also from Emu is a t.v.i. filter lead which replaces existing aerial lead to t.v. or Video cassette recorders receiving band IV and band V frequencies. Channels 21 through 68. Suppresses aerial-borne interference from c.b., taxis, police, etc.

Filter type: Stripline constant k high pass pi-section.
Frequency response (-3dB point): 450 MHz — 950 MHz.
Impedance: 75 in pass band.
Insertion loss: 2dB max in pass band.

Frequency roll off: 18dB/octave (1000:1 attenuation at 27 MHz). Length: 1.5 metres. Colour: White

Frequency roll off: 18dB/octave (1000:1 attenuation at 27 MHz). Length: 1.5 metres. Colour: White

MOBILE ANTENNA

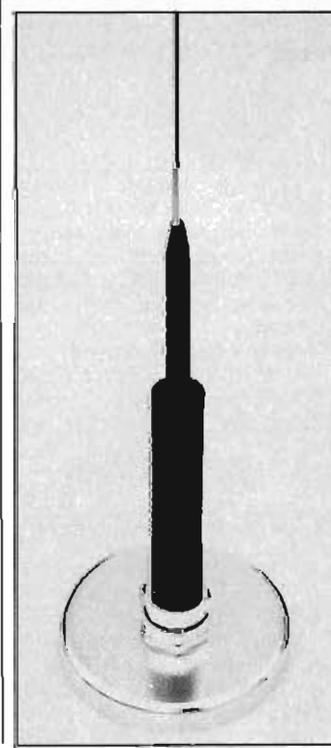
An addition to the British manufactured Big Jim range is the Whiplash mobile antenna. It has a height of 1.5 metres and an inductive matching unit at the base. It is claimed to totally conform to the c.b. licence requirements and specifically designed to work efficiently over the legal 27 MHz frequency range. VSWR is a nominal 1.1 to 1 at band centre rising to no more than 1.5 to 1 at the band ends. Impedance is 50 ohms and power handling has been safety-tested up to 100 watts.

The antenna is omni-direct-



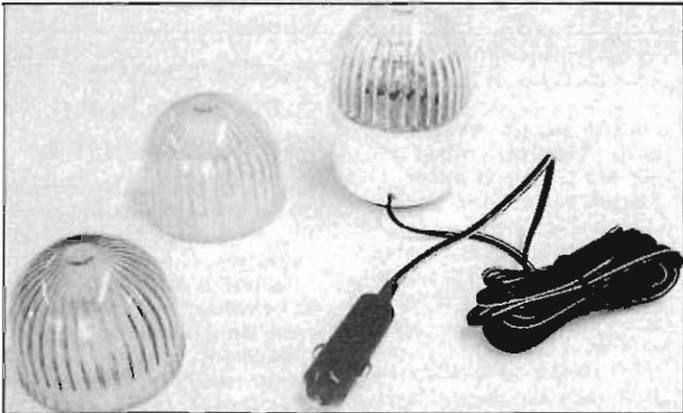
ional with vertical polarisation. The base internal winding is of large gauge double-enamelled wire. The base of the antenna is fitted with the standard 3/8 inch screw fitting.

C. Brit Ltd., Unit 3.5, Wembley Commercial Centre, East Lane, Wembley, Middx.
Telephone: 01-908 2726.



XENON FLASHER

With breakers often first at the scene of an accident, a flashing light to warn others is to be recommended. Eagle produce two versions. One for free standing or for permanent use. It has a 5 watt Xenon discharge flash unit with a frequency of about



2.5 Hz. A colourless lens is supplied as standard but red, yellow and green lenses are available.

The second version has a magnetic base and long lead fitted with a cigar lighter plug. Red, yellow and green lenses are available.

Specifications for both versions are: Power requirement 12 volts DC, Flashes/sec. 2.5 at 12 volts and output 8 watts. Eagle International Precision Centre, Heather Park Drive, Wembley, Middx. HA0 1SU Telephone: 01-901 8832

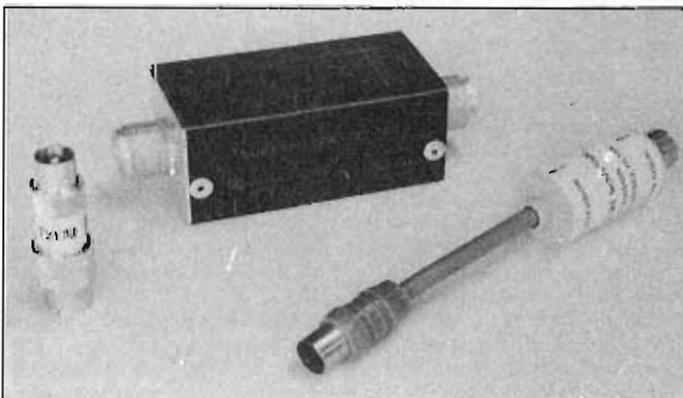


TVI FILTER

Anticipate t.v.i. problems by fitting a CTE International 27/143 filter between the transceiver and antenna. This will eliminate all problems provided that output to the antenna does not exceed 70 watts. Connections to the filter are clearly marked on the filter body. Also illustrated are two other types of t.v.i. filter that c.b.'ers can use but are not available for digital.

Digitek (UK) Ltd., Unit 3, Mitcham Industrial Estate, 85 Streatham Road, Mitcham, Surrey CR4 2AP. Telephone: 01-640 6919

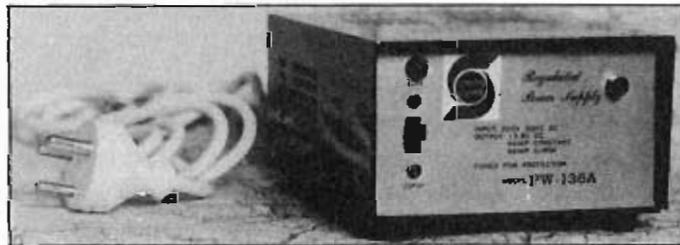
The TVI/U filter is being mark-



eted by Antiference Ltd. and claimed to eliminate all interference below 470 MHz. It is a high pass filter for UHF TV and plugs straight into the aerial socket of a t.v. or v.c.r. It is not suitable for VHF/TV or f.m. The filter has a frequency range of 470-860 MHz with an insertion loss of 1.5dB. Rejection at 27 MHz is 50dB and it has a

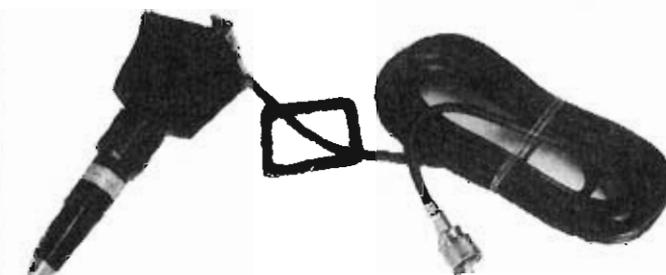
U.S.W.R. of 1.7:1. Telecommunications Accessories Ltd., Thame Industrial Estate, Bander Way, Thame, Oxon. OX9 3SS. Telephone: (084 421) 3621

The third t.v.i. filter is simply inserted between the television and aerial. Fitting instructions are clearly marked on the body. Elildee Technology, 40 Cowslip Crescent, Carlton Colville, Lowestoft, Suffolk NR33 8NY



REGULATED POWER SUPPLY

Also from LCL is a "Strong World" PW-136A regulated power supply. Although rated at 220V 5Hz AC, *CB World* are assured that it is suitable for UK voltages. It has an output of 13.8V DC with a constant current of 6 amps and surge current 8 amps. The unit is fused



for protection.



27 MHz LOW PASS FILTER

From the Emu stable also comes a 27 MHz low pass filter contained in a compact all metal unit with two UHF sockets for insertion between c.b. transceiver and aerial. Will eliminate transmission of unwanted harmonic or spurious frequencies that cause t.v. and radio interference. Filter type: 3 section low pass filter with m-derived half sections at input and output maximises pass band match. Power handling: 25 watts max. Cut off frequency: 28 MHz. Impedance: 50 in pass band. Insertion loss: less than 1dB at 27 MHz. SWR: better than 1.8:1. Harmonic attenuation: greater than 40dB (100:1 attenuation).



C.B. PHONE PATCH

This little box of electronic tricks will give any breaker with a home base access to the whole of the telephone network. It is connected between the home base and the domestic telephone and will relay incoming c.b. signals into the telephone system.

The fitment of a Phone Patch has many advantages, including being able to make calls home whilst battling with our overcrowded roads or summon help in times of emergency.

Unfortunately fitment of this c.b. accessory is illegal in the U.K. because it has not been approved by British Telecom.

Further interesting information is available from: Johnson Electronics, Star Warehouse, Camden Goods Depot, Chalk Farm Road, London NW1. Telephone: 01-485 3918



CLUB CORNER

Milktown Breakers (Huddersfield)

Members of the Huddersfield c.b. radio user's club were recently asked to assist in the location and recovery of three radio transceivers which had been stolen from a locked vehicle belonging to the Home Office.

Two of the transceivers belonged to the Home Office; the other to the police. Due to the operating frequency of the radios it was felt that the thief might attempt to sell them to a c.b. enthusiast.

The transceivers were actually located and recovered by Magnum Force, Street Fighter, Chip Buttie, Bomber, Winchester, Judge and White Lightning.

The thief, who is not a breaker, was handed over to the police along with the radios.

Brock Badger, Press Secretary of the Milktown Breakers, sent *CB World* the above information, and he would also like to point out two new eyeball 20s, which are as follows:

Milktown Breakers now meet on the first Sunday in the month at Vanity Fair, Bradford Road, Huddersfield.

The Summer Wine Breakers meet at the W.M.C., Holmfirth, on alternate Thursdays.

Associated Breakers Club (Bolton)

The Associated Breakers Club, or A.B.C., was formed in February this year. It is a serious breaker and social club, which is one reason for including 'associated' in the name — it helps the members to remain in contact with all the other clubs in the area.

Ratchets are held on Monday nights between 7.30 and 9.30 p.m. at the Aquarius Club in Bolton. Meetings begin with a news discussion and information on proposed future club events. The club is interested in doing something to alleviate t.v.i. and stop c.b. being used badly.

At 9.30 p.m. the social side of the club takes over — serious discussion stops and entertainment begins, in the form of a disco, group, singers or cabaret. Visit-

ors are charged 50p entry to cover the cost of the acts.

All newcomers are welcome but due to the venue it is stipulated that everyone who attends must be over 18.

Members are also interested in raising funds for charity. To date they have donated £200 to the Guide Dogs for the Blind Association. The money was collected by staging outdoor events, like rug-of-war and wellie throwing competitions.

The committee would be interested in meeting breakers from other clubs, in order to discuss the prospect of setting up an emergency monitoring service. Anyone who is interested should contact Diode, on Bolton 653442, or write to him at 528 Lever Edge Lane, Bolton.

The F-100 club (Farncombe)

This club started with only five members back in June. It now has 150!

Members have just acquired their own club house and it is packed every Friday night at 8.00 p.m. It is at the Squirrel Pub in Hinxton.

Members take part in 10 pin bowling outings and car rallies and The Decorator (Chairman) says that these are very successful.

Anyone in the area — including passers by — who would like to visit the club should give a shout on 14 or just drop in to the Squirrel.

10-22 Citizen's Band Association (Harritsham)

This club was formed on 9th June 1981 by Bossman and Black Magic. Although only 18 breakers turned up at that first meeting, membership now stands at 50, and between 40 and 60 members and guests meet each Monday evening at a small brown bottle shop called the Bank House in Harritsham.

Black Magic says that it is the smallest club in the Maidstone area, and he feels that this is what helps to make it so successful. He feels that people do not mix so well in the large clubs and that a small club is far more friendly.

Members take part in the same

activities as those in most large clubs. They show video films, hold fox hunts and raffles. The club has its own pool and darts teams and is holding its first big disco with a tombola competition, fairly soon. They held a sponsored walk last month to raise money for a kidney machine.

Membership to this club costs £1.50, with 40p charged at each meeting. Black Magic would like to say a big thank you to all members for making the club such a success. He says that after all, members make the club with the support they give.

Brownhill's Breakers Club (Brownhills)

Members of the B.B.C. now meet every Tuesday from 8.00 p.m. until 2.00 a.m., with regular functions such as discos, film shows and charity events.

Recent charity events include a sponsored 100 mile cycle ride from Rhyll to Brownhills — which took place in spite of pouring rain.

The committee were hoping to raise over £300.00 at the end of October when one of their number, "The Ferrett", attempted to break his world record of laying on a bed of swords for 25 hours. Any funds raised (after medical bills are paid) are to be donated to the National Children's Home.

The B.C.C.'s membership books are now open and any new breakers, whether on a.m. or f.m., are welcome to drop in to the Huntsman in Lichfield Road for an eyeball.

Club Breakaway (Sturminster Marshall)

Club Breakaway was formed last September with a membership of under a dozen, but by the second meeting, thanks to the airwaves, the membership grew, to the extent that the venue for meetings had to be altered.

The club meets weekly on Sunday evenings at 7.30 p.m., and the meetings are opened officially by the Chairman at 8.00 p.m. They are held at The Red Lion, Sturminster Marshall, and membership is 50p each

week, payable at the door. Due to the vast numbers of breakers wanting to join, a bigger and better venue is now being sought.

Members hold weekly raffles, mainly with c.b. gear as prizes, occasional discos, fancy dress balls and foxhunts. At present they are raising funds for the Poole body scanner appeal, and have already donated £200 towards this.

Earth Quake City Breakers Club (Wickersely)

The Earth Quake City Breakers Club meets at the Three Shoes in Wickersley on Mondays and Tuesdays.

Formed in May, the club has 40 members, and this figure is rising steadily each week.

Members are involved in charity work and are always willing to help other clubs trying to raise funds for charity.

At each meeting a discussion is held on a subject of interest to breakers, such as c.b., Maintenance, First Aid, DX-ing.

The club would particularly like to arrange a get-together for local clubs, so that a common policy can be arranged for all c.b.'ers.

They invite any breakers along for an eyeball.

Venue Change

The Leeds C.R.E.S.T. meetings are now being held every Tuesday at 8 p.m. at The Gate Hotel, Kentmer Avenue, Leeds 14.

Jolly Rodger Club (Kirkealdy)

The Jolly Rodger Club has been around since early 1980 and has more than 1600 members.

The J.R.C. meets every 2nd Sunday of the month and anybody interested should shout on channel 12 for any breaker in the J.R.C. and arrange for an eyeball.

Further information can be found by writing to: The Jolly Rodger Club, P.O. Box 2, Lochgelly, Fife, Scotland KY5 0BE. 10-10 (From Ethel the Frog and Royal Blue).

Chopper Town Breakers (Yeovil)

This Yeovil club was formed on 21st June by 28 breakers. Members meet every other Sunday at the Liberal Club headquarters.

Their aim is to further the cause of c.b., to assist anyone who may need help, and to promote c.b. in the family environment.

Membership of the club is on the recommendation of an existing member, but visitors are welcome.

THE BALLOON'S GONE UP.



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DID YOU KNOW...

certain species of fish are also on channel? Yes it is true. They can communicate with each other in the same manner as c.b.ers. If a particular fish wishes to make a copy with another it uses a breaking channel or frequency. If this is occupied then the fish can alter its frequency and select a new channel.

These facts have only just been brought out into the open and they answer many questions about how some species of fish are able to keep in contact with each other particularly in times of danger.

We, in C.B. World, only learned about this phenomena a few weeks ago and decided that it needed investigation. It will at least give you something to talk about.





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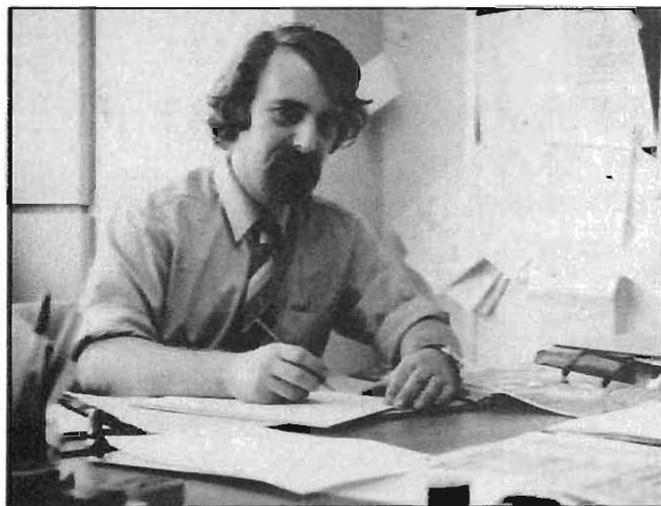
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(PAPER SCRIBE)

CB World Christmas Greeting



Kim Parkie
(SNOW TIGER)



Jan Hobbs
(SMILER)

"73's and 88's to all our readers for Christmas and the New Year from the Editorial staff of **CB World.**"



**HAPPY XMAS TO ALL
OUR GOOD BUDDIES
FROM THE I.B.C.**

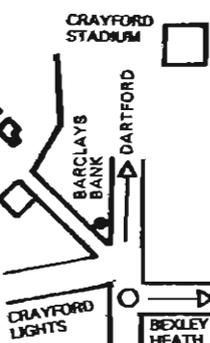
From
**THE CLUB AND
COMMITTEE OF SNOBS**
wishing all the clubs and readers of this
magazine a **VERY HAPPY CHRISTMAS**
and good modulations for the **NEW YEAR**

C.B. STOCKIST FOR SOUTH LONDON AND KENT

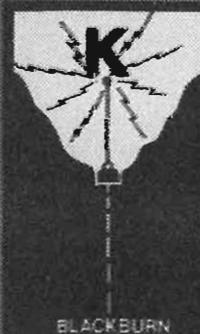
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British chips

RACE REALLY ON

are thawing.

Copyright PAUL F. BENNETT 2/8/81



Designer Paul Bennett looms out of his British designed and manufactured printed circuit to show his prototype.

CB WORLD's editorial of the August issue certainly created quite a stir.

Written in the last week of June, we complained bitterly that the UK micro chip manufacturers had not come up with the goods to supply the UK c.b. market and, in particular, to generate the funny one off British channels which no other country in the world uses.

It has now been established that we didn't get the FCC (American standard) or CEPT (European recommendation) frequencies because "other authorised users" are already on these channels.

By the beginning of July, Peter Chadwick of Plessey Semiconductors had produced an application note number AN1017 to generate the British frequencies from two of their chips, the NJ8812 and the SP8793. Full details of the internal operation of these chips appeared in the September edition of our sister journal *Wireless World*.

Paul Bennett of WR Electrotech has used these chips to produce the first British-made c.b. transceiver which goes on show shortly.

As soon as we have the first production models we will be doing a complete lab report in a forthcoming issue.

The Synthesiser — How it Does It

As Paul says "Had it not been for Plessey's last ditch effort, I would have had to have used Motorola devices using two chips, a mixer and a fast divide chain. At the time of my original work, there was nothing available from Plessey or anyone else in UK which would have done the job easily."

Let's have a quick walk around his synth circuit.

A Voltage controlled oscillator using an MC1648 has a tank circuit to set the master frequency. A varicap across the tank can run the oscillator from about 16.5 MHz through 30 MHz. Temperature stability provides a constant frequency over the range -5°C to +70°C. The MC1648 uses emitter controlled logic (ECL) to provide a hybrid Colpitts-Hartley circuit. This system is already widely in use for military equipment including instrument landing receivers.

The oscillator provides the transmitter output frequency and the receiver local oscillator frequency off-set by the intermediate frequency of 10.7 MHz. So for example if you are trying to receive on channel 1 which is 27.60125 MHz, the final synth output would be 16.90125 MHz. For transmit, its output would be the exact channel carrier, but frequency modulated.

The pre-scaler, a SP8793 operates as a divide by 40 or 41 two modulus divider. It accepts either of the two frequencies already generated before inputting into the NJ8812. This is a programmable divide with phase comparator and reference divider. This divides by a fourteen bit programme number. This number is taken from a 2K 8-bit erasable programmable read only memory (EPROM).

The NJ8812 accepts the input data in four by four bit numbers. Thus the EPROM sorts out the channel number selected into the binary data for the NJ8812.

The aim of the programmable divider is to divide the input from the SP8793 down to 10kHz which is the channel spacing.

The other input accepts 4.8 MHz from a crystal oscillator using an MC14011 CMOS chip. The 4.8 MHz is divided down to the required 10 kHz also. Both of these outputs from the dividers are fed into the phase comparator. Here, a comparison is made between the phase of the two signals and a pulsed output is turned into a d.c. level by a suitable filter. This level then drives the voltage control oscillator.

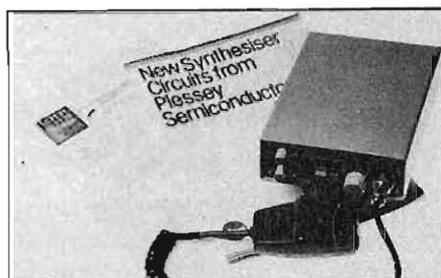
Thus the loop is completed and locked.

The final input to the Voltage control Oscillator is from an SL6270. This chip operates as a voice operated gain adjusted amplifier. This amplifies your voice from the mike, limits its level and the output is then fed into the Voltage control Oscillator to cause frequency modulation.

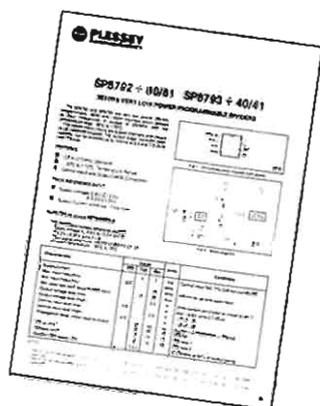
Supply lines for the VCO are filtered separately from the rest of the synthesiser logic circuit. Thus, phase noise resulting from possible supply instability is reduced. The whole circuit apart from the mike amplifier is supplied from 5 V d.c.



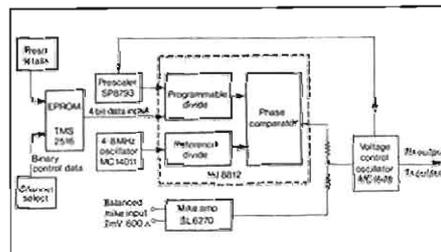
Plessey Semiconductors clever chips. Ready to do battle with the Japanese?



WR Electrotechs prototype c.b. stands proud from the Sanyo 7131 circuit notes (The LC 7131 is the chip used in the majority of FCC/CEPT sets).



A page from Plessey's circuit notes.



WR Electrotechs synthesiser, block schematic.

STOP PRESS

Irish Jobs for Irish Workers?

We understand that the Irish Development Agency has put together a package finance deal for this set. With strings of course. The main one being that WR Electrotech up sticks and transplant their entire operation to Eire. Do we at *CB World* have to start slagging off the Banks as well. Let the Bull-dog spirit get it on!!

The GBH Column



emigrating to Australia to live with her family. We wish her all the very best for the future and look forward to hearing how she enjoyed her first Christmas Aussie style. (Before I forget, Merry Christmas Grandma).

The photograph shows the Market Town Breakers cheer leaders who won the trophy for being the best cheer leaders at the Lenham Mass Eyeball. Granda was a member of the Market Town Breakers Club at the Ashford Breakers Club and no doubt will be an honorary International member.

The year of 1981 will go down in communications history as the year the UK introduced a legal citizen's band service. It could also go down as the year of lost opportunity by British manufacturers not being able to grip the c.b. business. 1982 is the year of new technology, perhaps we'll try harder next time a market presents itself. At least we had a motor cycle industry for the Far East to take from us. This time we didn't even get started.

A few years ago, I visited Korea and spent a lot of time with consumer electronics companies. In one factory, I saw thousands of colour television sets coming off an assembly line. I asked my guide what percentage of these sets were due for export. His reply was unbelievable. He said that 100% were for export — they hadn't got colour television at that time.

Imagine this country making c.b. radios for all other countries when we ourselves had not got government approval. It's hard to take in!

Talking about travel, when *CB World* visited the Eyeball at Lenham (GBH Column October) we were introduced to Grandma, a person once met never

forgotten. The other day we received a letter from her telling us that she was

WE'VE WON!



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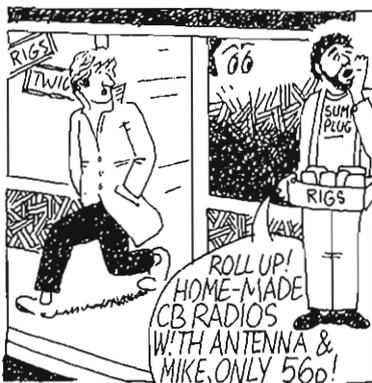
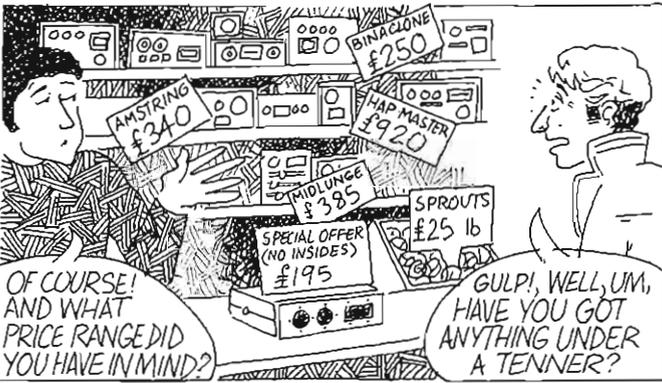
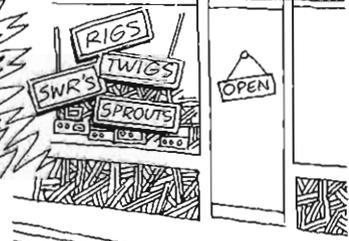
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No 9

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TO BE CONTINUED.....

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CB WORLD is available at all leading newsagents and bookshops such as W.H. Smith, John Menzies and others. However, copies sell fast and sometimes newsagents run out. We would prefer you to place a firm order with your local newsagent. If you won't or can't, send us your green stamps and leave the rest to us.

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CB World DIARY

By arrangement with Charles Letts, the famous diary people, we are to sell through *CB World* a limited number of CB Diaries. These diaries would normally be sold through bookshops and main newsagents but to introduce them for 1982, Letts have agreed that we should market them through the publication. Contents include:

- How c.b. works
- SWR your c.b. radio
- Setting up a Home Based c.b. unit
- Setting up a mobile c.b. unit
- c.b. fault finder guide
- 10-code
- Q-code
- Phonetic alphabet

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To: CB World, General Sales Dept., Room 205, Quadrant House, The Quadrant, Sutton, Surrey.

Please send me copy(ies) of *CB World* 1982 Diary at £2.45 each. My remittance is enclosed for £. made payable to IPC Business Press Ltd.

These Diaries will be available towards the end of November 1981. Please send now to avoid disappointment.

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PLAYTIME ON TV

Those who avidly watch television must be aware that there are a considerable number of American programmes on British television. Conversely one might wonder, if it was worth travelling to America to watch their television, whether they show as many British programmes there.

Having had sight of several Christmas and New Year programmes for the coming festive season, it could well be that many British people this year will be having their celebrations American style.

Very unBritish, but there is an answer and that is t.v. games. It will, however, be necessary to forget that a large number of these games come from the States.

CB World decided to pay a visit to one of their regular advertisers, Silica Shop Ltd., of Hatherley Road, Sidcup, Kent, to learn a little about electronic and t.v. games.

After perusing an area of over 2,000 square feet we felt completely bewildered by the vast selection on show. However, we sought the advice of Managing Director, Tony Deane, made a short list of games which we thought would be the salvation of our respective holidays and let our families have a go. The results will be reported during the next few editions of CB World.

One point that Tony made to us was that a modern colour t.v. will not be damaged when these games are plugged into the set, provided that the brilliance control is turned down and the colour tube is not on its way out. It will be necessary to retune one of the spare channel selectors on the t.v. set to the games frequency.

The first game we played with was Intellivision (Intelligent Television) — in fact we spent the whole of one night with this one game and surfaced rather jaded for a mixed grill breakfast the following morning.

Intellivision is considered to be the ultimate in video games and although relatively expensive, it has been designed to raise our game playing society into the world of computers in two very easy steps.

Firstly there is the "master component" which is an attractive designed cartridge programmable game system. It is comparable with the Atari Video Computer System in that pre-packaged circuits which contain game instructions for the system can be purchased separately. The circuits are in cartridge form and available from most video game specialists.

The second step enables owners of the master component to expand their systems into a complicated personal home computer system. This utilizes the keyboard component which, when connected to the master component, offers full ASCII computer input capabilities.

There is also a built-in cassette record playback unit which has been designed to allow users to store their own programmes.

Also available are 80 and 120 line printers and disc operating systems so with Intellivision the sky is the limit.

There is a wide range of cartridges available and many more to come. Currently the popular cartridges are Soccer, Armour Battle, Basketball, Sea Battle, Roulette, Tennis, Astromash, Car Racing, Horse Racing, Boxing and Draughts. For the more intellectual there is also a maths game.

All cartridges offer a three dimension colour t.v. picture and sound accompaniment for a realistic effect. Setting the game



Atari starts off as a television game but can be developed into a personal computer.

up and then operating it is simple with the electrical connections similar to many other games. The only controls on the master component are an on-off slide switch and a game reset button. These are mounted on the top panel near to the front.

Incorporated in the top cover are a pair of recesses to house the hand-held controller when not in use. These are permanently connected to the console by coiled wires. The controllers depart from the more usual joystick format and comprise a calculator type keypad, four action buttons and a circular control disc. The 12 button keypads are used in conjunction with a pair of nylon (plastic) overlays included with each Intellivision cartridge. These slip into place over the keys, creating the effect of a small keyboard tailored for each game's individual needs.

Two action buttons are located on each of the controllers, the functions being duplicated on each side.

The control disc is positioned directly below the keypad and generates a screen movement in any of sixteen directions.

Although expensive when compared with

simple hand held electronic games, Intellivision for a family is an investment and besides helping to pass many a wet winter's evening, will provide a source of entertainment for many years to come.

The second game we looked at was the Videomaster colour cartridges game. The console of this game can be compared with an audio cassette deck and is programmed to plug in cartridges. Each cartridge contains up to ten different action games and the first cartridge containing ten sports games is included free with the console (Tennis, Squash, Hockey, Solo 1, Solo 2, Football, Basketball, Gridball and Target Shooting 1 and 2).

All cartridges offer lifelike sound features to make the games even more enjoyable. There are many other cartridges available including Road Race, Superwipeout and Stunt Rider. Future games will be Tank Battle, Hunt the Sub and Target.

The games console comes complete with two removable joystick player controls to enable four directional movement. Ball save and target fire buttons are built into these controls.

This game is recommended for those who do not wish to purchase the ultimate Intellivision.

We found that even the youngest member of the family (9 years old) grasped the sports game within the first few minutes and his recent half-term holiday passed without a domestic crisis.

For those who do not have a colour t.v., the console will work on black and white sets. To save money on continually buying batteries (6 SP2) an 8V A/C mains adaptor is available.

The last game we looked at is for mums and dads and is called Backgammon Challenger. This game is self-contained so it can be played whilst the children watch t.v.

It has been designed and programmed to play precisely according to the rules of Backgammon. Being electronically controlled, it does not cheat and will provide adequate opposition for even the most experienced players. ●

More next month.



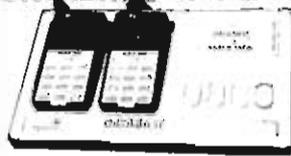
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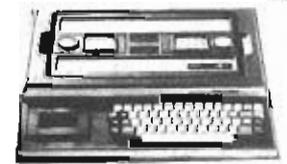
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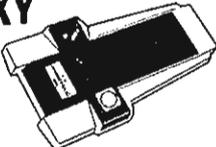
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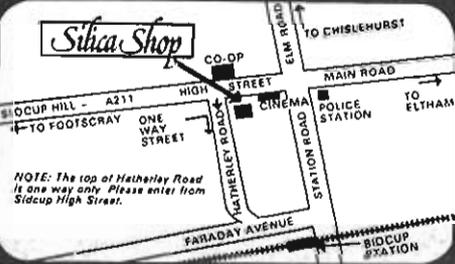


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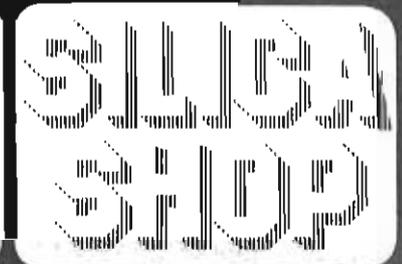
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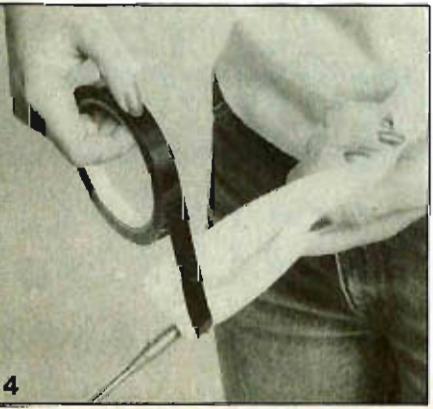
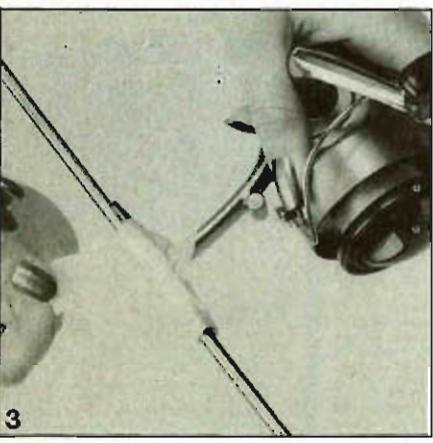
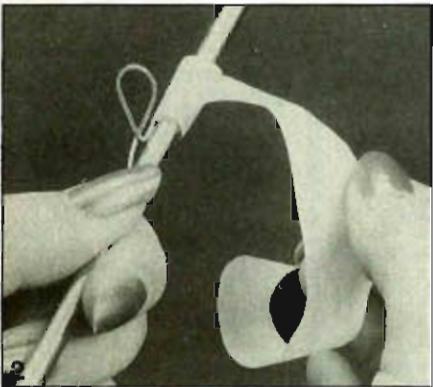
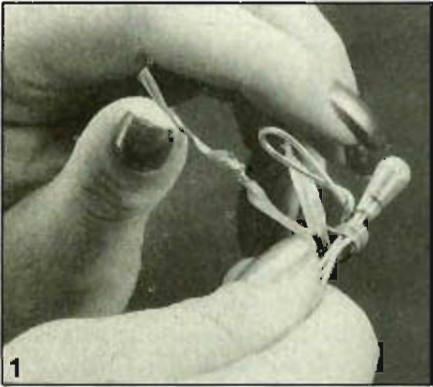
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Conversion of antenna to fishing rod on a fishy tail



Did you know that during the weekend more people are engaged in the gentle art of fishing than football? We did not until 'Electronic Eel' from the sewer 20 phoned us and asked if we could help over a problem of interference to him caused by model radio operators.

Anyway we took the *CB World* radio car to have an eyeball with Electronic Eel and found him sitting beside the river bank.

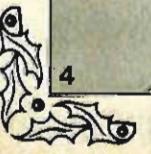
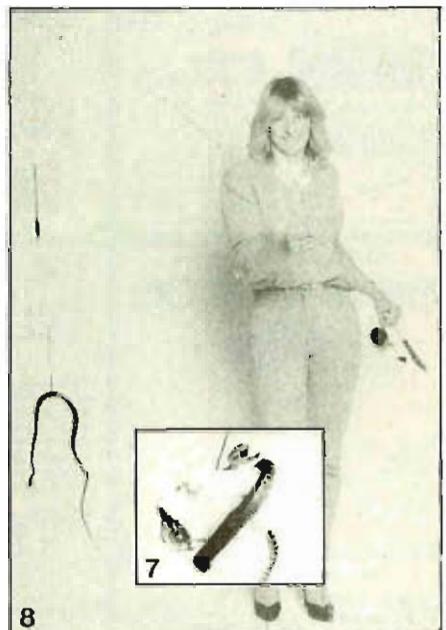
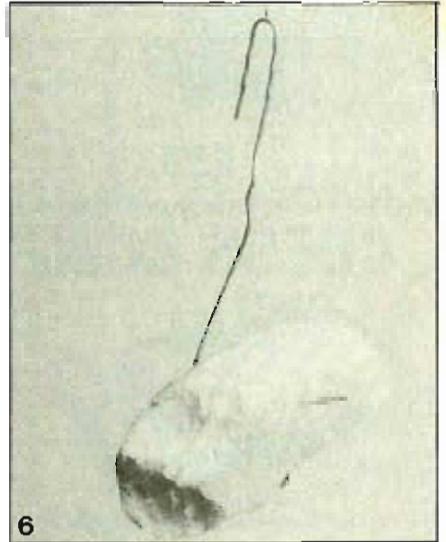
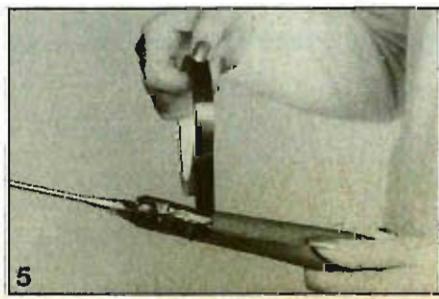
During our conversation it was brought to our attention that we were looking at one part of the Thames which was 'good for fishin'. Unfortunately we did not have a rod but, not to worry, because an inspiration came to us whilst leaning on the bar counter in the Smoke Room of the 'Trout and Sandwich'.

On the *CB World* radio car roof rack was the usual selection of antennae. We selected an eight foot steel whip Firestick as our candidate. It seemed to have a little give in it so might do the job. Next we rummaged in the glove compartment, found some plant ties, paper clips and tape. We then proceeded to make our own fishing rod.

Here is what we did:

1. We bent one paperclip to form an 'eye' and two legs and fixed it to the top of the Firestick with the plant tie. This would allow the line to flow over the top of the Firestick.
2. Five more paper clips were bent into an eye shape, the legs bent back and then taped onto the rod. These formed the line guides.
3. We borrowed an old reel from the landlord of the 'Trout and Sandwich' and taped this into position near the fatter end of the rod. The first time we got it the wrong way round. It appears there are left hand and right hand drive reels.
4. For the grip we used some black polythene bags and some foam rubber packing to give it a squishy feeling. The end was taped onto the rod and then wound round and round adding more packing until it seemed fat enough.
5. The bags were then taped into position at the top and bottom.
6. The reel, hook and float were set up and we borrowed a little of Electronic Eel's lunch for bait.
7. Electronic Eel decided to test the flavour of the bait . . .
8. . . . as well as the suitability of the hook.
9. Believe it or not we actually caught a fish.

This just goes to show that where there is a will there is a way.



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A CHRISTMAS TAIL

He was only nine inches high but, when he was alone and in charge of the house, the thud of his tiny body hitting the front door, after a twelve foot slide along the highly polished hall floor, instilled terror into the heart of many a first time caller.

So successful was this opening gambit that more than one otherwise rationally minded person had described the subsequent "Yap yap yap" as the deep throated baying of a large and ferocious hound, and of course, in the doggy mind of 'Scrap' the Yorkshire Terrier, this was an accurate description.

When Mr and Mrs Parkins (His people) invited anyone in, the illusion was soon dispelled for he was a sucker for sweets and soft talk, and visiting Breakers, of whom there were many, were quick to note the rapturous posturings of the animal when, in Mr Parkins' sanctum, the box with knobs and dials shouted canine endearments such as "Get your ears on", "This is Black Dog" and "Hot Dog stall very Smokey at Houndslow Doughnut".

One cold winter Saturday round about dusk Mr and Mrs Parkins were returning, by train, from a CB Rally. Alighting at their home station they were amused to see, boarding the train, a colourfully dressed young man with a big hole in his simulated leather trousers which revealed yet more colour. "What will they think of next?" said Mrs Parkins in a voice pitched to suit her class and immediately forgot him to consider what she would prepare for supper.

The Parkins's were gripped with horror when they arrived home two minutes later to be confronted by a wide open front door. They gazed mutely at the broken panel of glass and were suddenly aware of an awful silence.

Quietly they began to call — "Scrap, Scrap, where are you?" Then, in a panic, they rushed in shouting for the dog. The lack of response chilled them to the marrow as they switched on lights and started to search. It was in the kitchen that they found him, tail wagging furiously and mouth busily chewing at, and slobbering over, a piece of — leather?

As the adrenalin receded, ice cold decisions were taken reflecting many years of crisis-cracking team work. Mrs Parkins sank to her knees to comfort the perfectly happy and unscathed 'Scrap' while her spouse unlocked the back room, unlocked the drinks cupboard, withdrew a bottle of brandy and reached for a glass. Thus fortified he returned to the kitchen to instruct his wife to phone



the police.

He found her sitting on the floor with the dog, showing a disturbing amount of nylon clad thigh. She looked at him earnestly and said "Trousers". 'Scrap' looked at him and said "Woof". His wife then became agitated and almost unintelligible and she seemed to be burbling something about coloured underwear.

He studied her appearance for a moment, observing her big eyes, her high colour, her rucked up skirt, and concluded that her excited monologue must be a plea for matrimonial attention. Although Mr Parkins was a man of action he always got his priorities right. "Not now dear," he said, "After you've telephoned the police." His wife, now quite dumb, snatched something from 'Scrap's' paws and waved it like a flag.

Quick as a flash Mr Parkins' mind summarised events; the young person on the station had a hole in his pants and the missing portion was here, having been retained by the brave guard dog 'Scrap'.

Hurling a further exhortation to the Lady of the House to ring the police, he hurried to the back room, and went over to his newly acquired f.m. home baser's rig. Feverishly he completed the necessary preliminaries, reached for the mike and came up on channel 14.

"This is a 10.34 for mobile breakers in sight of Railway Stations Sutton to Epsom. Come back to 'Jonah' please, and quick."

Easing himself in the chair he thumbed a railway guide whilst awaiting some response. The receiver crackled briskly and a faint voice said "Hullo Jonah, Painted Lady at Epsom in two minutes — what's the prize? —

come back." Immediately a wall to wall blast announced coverage of Cheam Station by 'Fringe Boy' with a request for 'Jonah' to "Give out with the guff". This was followed by a medium signal from 'Freaky Lad' who said he could be near Leatherhead in 15 minutes if there would still be some honey in the jar.

Mr Parkins waited patiently for at least half a second, then he called "Hullo 'Painted Lady', 'Fringe Boy' and 'Freaky Lad', hear this from 'Jonah'. A house has been broken into; a stranger, a youth about nineteen with the back of his dark leather trousers torn, wearing yellow underpants and blue shirt, with short fair hair got on the 19.04 at Sutton which stops at Cheam 19.07, Ewell East 19.10, Epsom 19.13, Ashted 19.21 and Leatherhead 19.25."

"If one of you good buddies could just see this lad leaving a station it might give a lead as to where he lives. Don't know how I'd be able to use the information — got any ideas? — after all it might be nothing to do with him. Meanwhile my wife is phoning the police. Thanks for your help. I'll listen for you at 20.00 hours on channel 12. Ten ten, going down now."

Mr Parkins switched off and joined his wife who was just leaving the phone. She said "They'll be here in a few minutes — we are not to touch anything."

After the two policemen had been assured over and over again that nothing had been taken, touched or disturbed, they listened patiently as Mrs Parkins unfolded her suspicions about the boy at the station.

The young constable who was taking notes wore uniform and also a sceptical look but both men were jolted into keen interest when Mr Parkins dropped onto the table a bulldog clip which held a bedraggled piece of thin leathery material. "We think" said Mr Parkins dramatically, "that this would fit the hole in that boy's trousers!"

The plain clothes man looked at his watch. "It's 7.30 now, too late to check that train but we'll make some enquiries. Stick a bit of cardboard over that broken pane to keep the weather out but don't clean the door and keep your fingers off it. You'll be hearing from us. Goodnight Madam, goodnight Sir." As they left he indicated the bolts. "Better use those and put some obstruction against the door." He smiled sympathetically and then they were gone.

A dark articulated vehicle, proclaiming in white letters its dedication to the

transport of perishables between London and Cornwall, slowed, then pulled up gently alongside a bobby patrolling the main road in Ashted. The driver moved over to the nearside and wound down the window.

What with the low frequency throb of the engine and an over generous decibel rating from Radio One he was barely audible as he called out "Hey officer, spare us a minute." The constable turned back and responded to the friendly grin with one of his own and made signs of being deaf.

The music stopped abruptly and the driver said, sheepishly, "Sorry about that mate but it keeps you awake on these trips. Thought I ought to tell you there's a chap in the 'gents' back there at the vehicle park wearing a blue shirt and black trousers — his clothes are torn and his hand seemed to be bleeding. Dunno whether he's had a fight or been getting up to some mischief — he didn't want to talk to me — thought I should tell someone."

The policeman nodded, took out his notebook and looked at his watch. "It's 7.30 now" he said, "thanks for the tip, driver, I'll check him out, have a good journey."

With a loud rumble, quickly overpowered by music, the heavy vehicle edged away from the kerb and soon became anonymous in the stream of vehicles heading south.

Well before eight o'clock Mr Parkins and 'Scrap' had their ears on, the one eager for news, the other awaiting the magical words of unknown admirers. "This is 'Jonah' calling 'Painted Lady', 'Fringe Boy' and 'Freaky Lad', do you copy?" The windows bent as 'Fringe Boy' came in loud and clear " 'Jonah from 'Fringe Boy' — hello breaker, no luck. Train had already left Cheam. I caught up with it at Ewell East but no joy. Down and on the side." Now the Lady Breaker was heard, a little louder than before. "Hullo 'Jonah', this is 'Painted Lady', I'm afraid I drew a blank at Epsom, sorry — down now but listening." Mr Parkins' attempts to acknowledge these two breakers were dashed again as 'Freaky Lad' raised the needle and announced that he too had been unsuccessful and had seen nothing of interest at Leatherhead.

"Thanks a lot friends," said Jonah "the exercise hasn't been entirely negative as we now know our quarry must have got out at one of the other two stations. Now I must work out how to convey that information elsewhere without giving anything away. I'm out all day tomorrow but I'll come down here at 20.00 hours on Monday evening and give you any news. Would that suit you all — bring it back please?" PL, FB and FL acknowledged, agreed, and after an enthusiastic exchange of big eights, Mr Parkins switched off, and checked that the set remained out of view. The new spec. sets are scarce and worth a lot on the black market. He didn't want to lose it.

The next morning, being Sunday, the

Parkins's went to church and Mr Parkins, having considered many times during the night the Old Testament hard line of "An eye for an eye, a tooth for a tooth" was thrown into confusion by a sermon which called on all men to "Turn the other cheek". He was still in a state of bewilderment when, after lunch, he answered the telephone to hear the voice of the duty sergeant at the police station. "Good afternoon Mr Parkins, this is police sergeant Shorthorn. There have been some developments — could you call in here some



time today? About five o'clock would be very suitable, I'll have the kettle on. Mrs Parkins would be very welcome too, if you don't mind."

The young constable who had called on them the previous evening expertly set out three cups of tea and quickly withdrew. Sergeant Shorthorn beamed, pushed the sugar jar towards his guests and began to speak. "Acting on information given by yourselves we later apprehended a young person who appeared to conform with the description given.

"His answers to some of our questions were suspect and at a later interview this morning, he admitted hearing that you had a new f.m. home base. He wanted to see it but as there was no one at home he decided to enter your property without permission. He says he touched nothing because as soon as he stepped inside he was attacked by a large and ferocious dog and being allergic to animal fur he ran for his life.

"Obviously we are taking a professional interest in this young man's activities and I should like to know if you are pressing any charges." Mr Parkins thought of his eyes, his teeth and his cheeks and said he would need time to consider. Mrs Parkins gazed at the sergeant in unalloyed admiration.

"You're wonderful," she said. "How on earth did you find him so quickly? It must have been like looking for a needle in a haystack and yet you found it." "Well ma'm", said the sergeant, aware that he was blushing all the way down into his boots, "it was a bit tricky, but of course" he lowered his eyes modestly "we do have our methods."

Monday evening, just before eight o'clock, found 'Jonah' and 'Scrap' excitedly performing the clandestine ritual of switching on the home base. All

was quiet on channel 12. 'Jonah' announced his presence and asked for reports on signal strength. Almost immediately 'Painted Lady' gave him an OK, then 'Freaky Lad' likewise, quickly followed by 'Fringe Boy' who said "You're so clear we must be close neighbours."

Mr Parkins settled himself comfortably in his armchair and guardedly, but briefly, gave them the news, finishing with the observation that the local Smokey Bears were deserving of credit for moving so fast and effectively.

The resulting ratchet jawing almost got out of hand but at this stage a newcomer joined in with "Breaker on the side". "Come in Breaker", said 'Painted Lady' adopting her place in the unmentioned but definite order of speakers in the group. "What's your handle and how can we help you?" "I won't identify myself" said the newcomer, "but on Saturday I was driving my big wheels down the A24 and monitoring your chat on channel 14."

"It didn't concern me at the time but when I pulled in to the transport cafe at Ashted I saw someone resembling your man, in the toilet. He had a shifty look and there was blood on his hand. I knew I'd be out of range by eight o'clock when you were coming on channel 12 and I didn't know what to do. Anyway I saw a Bear wearing out his pads so I stopped my rig and told him about this bloke who was in a bit of a stare and acting funny. I reckon 'Jonah's' local coppers wouldn't have found out anything on their own. If I hadn't alerted my man (and I wouldn't have done if I'd not hear your Ten thirty-four), he wouldn't have had any information to pass on and that lad would never have been traced — what do you think? — come on."

"You're dead right", said 'Freaky Lad', " 'Jonah's' quick thinking enabled us all to bring off a c.b. special". "Suggest we all go now," said 'Fringe Boy', "let's arrange eyeballs sometime, Ten ten."

No one else disturbed the ether and Mr Parkins switched off, and went to the hall, with 'Scrap', to answer the telephone.

"This is 6613558." A vaguely familiar voice squawked at him. "Ah, Mr Parkins? This is Sergeant Shorthorn. I'm making out my report on your spot of bother. Would you tell me please what breed of dog you have that defended your property so successfully." "Yes Sergeant, 'Scrap' is a Yorkshire Terrier." "A Yorkshire Wolfhound Sir? New to me, big animal is he?" "No Sergeant, not a Wolfhound — a Yorkshire Terrier — about nine inches high!" The silence came through loud and clear. Eventually the Sergeant said "Thank you Sir, I do hope you are not kidding me, good night Sir."

Mr Parkins leant against the wall and laughed hysterically. 'Scrap' was laughing too, on his back, paws up, tongue out and tail wagging like an antenna. ●

Frequency synthesizer for CB

So called 'single-chip' synthesizers now in existence require a considerable number of extra circuits as they are designed for use in mixer-type synthesizer applications. This article outlines a simple single-loop type synthesizer designed with the Home Office's proposed regulations for UK citizen's bands in mind (as far as transceiver specifications and frequency allocations are concerned). At the hub of the design are two i.c.s from Plessey; the SP8793, 40/41 dual-modulus divider and the NJ8812 n.m.o.s. synthesizer controller.

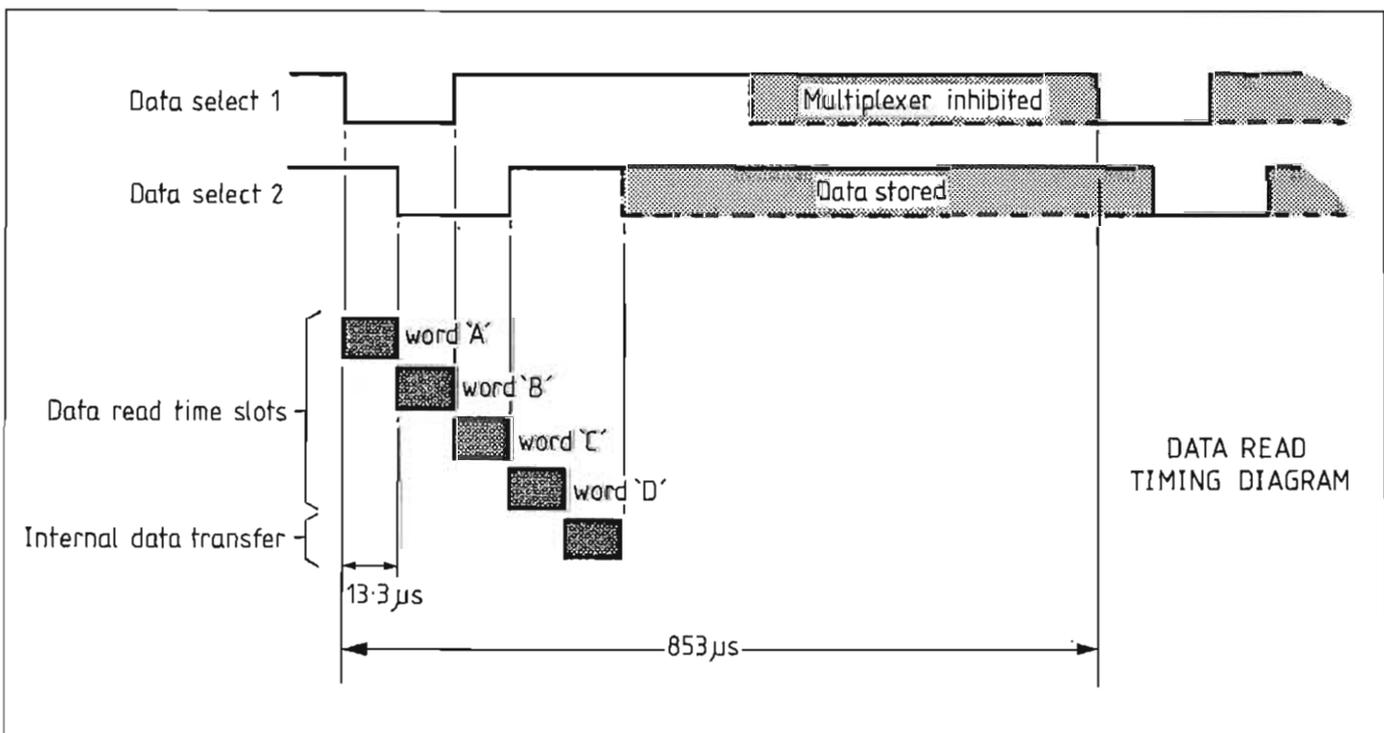
The proposed frequency allocation for citizen's band (c.b. radio) in the UK is 27.60125 to 27.99125 MHz. This band is divided into 10 KHz channels numbered from 1 to 40. A simple low-cost frequency synthesizer capable of meeting the proposed UK c.b. specifications in terms of adjacent channel noise, spurious side-bands, etc. can be made using the NJ8812 and SP8793 i.c.'s from Plessey. Frequency modulation of the synthesizer is simple but the audio response is shaped to limit adjacent channel power.

An n.m.o.s. synthesizer controller, the NJ8812, controls the divider. This device comprises two programmable dividers, one in the signal path and one for the reference-frequency input to the phase detector. These dividers feed a digital phase detector, the outputs of which are used to drive the frequency of the v.c.o. higher or lower as required.

An address consisting of 31/2 words, each 4-bits long, is used to program the controller. These words are multiplexed into the device under control of an internal data selector and result in two

outputs called DS1 and DS2 which form part of the program for a r.o.m. or p.r.o.m.

The controller address may be provided in a number of ways from a simple circuit with two 74153 multiplexers to a microprocessor system. A 2716 p.r.o.m. is used here. The reference divider in the controller may be set to one of sixteen division ratios using pins 8 and 9 (FA and FB). In this case FA and FB are wired to 5V and ground respectively.



Circuit description

The circuit, Fig. 1, is a simple single-loop synthesizer with two-modulus prescaling. A lower-power consumption 40/41 dual-modulus divider, the SP 8793, does the prescaling. The high-sensitivity i.c. has a t.t.l. compatible control input and divider output, and an internal voltage regulator so that it can be used with a wide range of supply voltages.

One gate of a CD4011, biased to operate in its linear region, is used for the 4.8 MHz reference oscillator. A further gate of the same i.c. buffers the oscillator signal. The ϕ/U (up) and ϕ/D (down) outputs of the NJ8812 are combined in a charge pump circuit. The ϕ/U output is inverted by a c.m.o.s. gate and fed through a diode into the loop filter so that when the ϕ/U output decreases the control line voltage increases. At the same time the ϕ/D output pulls the control voltage lower.

The loop filter, consisting of C_1 , C_2 and R_2 , integrates the pulses from the phase detector. Further filtering is provided by a low-pass filter with a -3dB point at 450Hz, C_3 and C_4 . The reference frequency fed into the phase detector is 10.000444 kHz. Because the loop locks so that the output frequency of the synthesizer is an integral multi-

kHz at all times. This means that an accuracy of ± 50 p.p.m. is needed. Through not using exactly 10 kHz as the reference frequency, an error of 0.33 p.p.m. is introduced. This error can thus be ignored. Because the required temperature is 50°C the temperature coefficient of the reference frequency crystal should not exceed 0.75 p.o.m./°C. This stability allows for some degradation of the other oscillator components.

Voltage controlled oscillator

The v.c.o. is the heart of any frequency synthesizer. It has to be carefully designed to ensure that phase noise is minimized, that the frequency/control voltage characteristic is monotonic and that the frequency range is no more than that required for the coverage so that noise modulation is minimized.

In this synthesizer the v.c.o. uses a junction f.e.t. in a Colpitts circuit. An f.e.t. was used because it does not produce l.f. noise and thus minimizes noise modulation of the signals. Tuning is done by a variable-capacitance diode and modulation is applied to the control line on transmit. For receiving, a second variable-capacitance diode is switched in

logic 1. The 14 bits that make up the address can be found using a calculator as follows. First find the program number N using the formula,

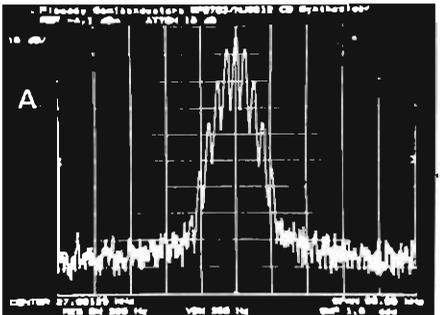
$$N = \frac{(1000 \times f)}{C} - R$$

where f is the v.c.o. frequency in MHz, C is the channel spacing in kHz and R is the divisor range number. When the controller range input is at logic 1, $R=1600$ and when at logic 0, $R=6720$.

The program number N may be converted to its decimal equivalent on a calculator using the following procedure:

- enter the number N
- divide by 640
- write down the number before the decimal point
- subtract the number before the decimal point
- multiply by 16
- write down the number before the decimal point
- subtract the number before the decimal point
- multiply by 40
- write down the nearest whole number to the one displayed.

For example, you will have an answer in the form 8, 11, 30. This result can

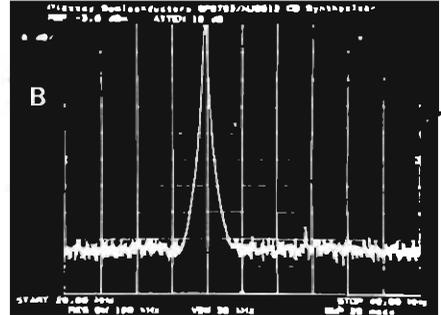


Spectral purity of the synthesizer from a spectrum analyzer.

(a) Shows response with 1 kHz sine-wave modulation in a one second sweep. The centre frequency is 27.00125 MHz and each horizontal division is 5 kHz.

(b) Is a 20ms sweep without modulation starting at the left from a frequency of 20 MHz. Each horizontal division represents 2 MHz.

(c) Is a one second sweep, also unmodulated, with a centre frequency of 27.00125 MHz and 5kHz/div horizontally. In all three cases the vertical scale is 10db/div.



parallel with the inductor. A parallel trimming capacitor allows the receive frequency range to be adjusted.

An emitter follower provides the necessary isolation between the v.c.o. and the external circuitry. In the prototype a 2N5770 was used for the follower but many other similar devices may be used. The output from this stage is at a low level and amplification is required in transmit mode. In the receive mode the output is adequate for most receiver mixers. The v.c.o. is buffered to minimize the chance of spurious modulation caused by the divider.

Programming

A 3 1/2 word \times 4-bit address programmes the divisor in the NJ8812 and hence determines the output frequency from the controller/divider phase-locked loop configuration. The controller/divider combination used here is capable of dividing by integer values between 1600 and 11839. When the range input (pin 1) of the controller is at logic 0 the divisor range is from 6720 to 16959. Divisors between 1600 and 6720 are covered when the range input is at

now be converted to binary noting that the third decimal number gives the last six bits of binary as follows: 1000, 1011, 011110, or as four binary words, 1000, 1011, XX01, 1110.

The least significant word is first entered during the data read 1 time slot via the inputs D_3 , D_2 , D_1 and D_0 and the most significant last (data read 4 time slot). The second least significant word contains only two bits entered via the inputs D_1 and D_0 . Data presented to the inputs D_2 and D_3 during the second time slot is ignored by the controller.

For example, with a v.c.o. frequency of 121.2 MHz and channel spacing of 25 kHz, $f=121.2$, $C=25$, $R=1600$ and $N=3248$.

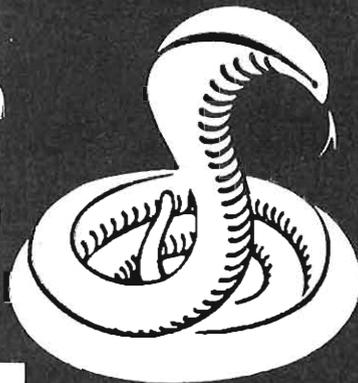
Conversion to a 14-bit binary number is performed as follows:

- Divide N by 640 5.0750
- Write down number before decimal place (word 'D') 5
- Subtract this number 0.0750
- Multiply by 16 1.2000
- Write down number before decimal place (word 'C') 1
- Subtract this number 0.2000
- Multiply by 40 8.000
- Write down nearest whole

plied by the reference frequency, exact 10 kHz steps can only be produced on channels that are an exact multiple of 10 kHz. For example, with a reference frequency of 10 kHz and a divider ratio of 2780, the output frequency is changed to produce an output of 27801.25 kHz. Thus, channel 1 will be 2760 times the reference frequency and channel 40, 2799 times. This results in small errors of +8.54 Hz at channel 40 and -8.99 Hz at channel 1.

The reference frequency input to the NJ8812 is set by means of a crystal adjusted to 4800.215 kHz. The specification requires that the transmitter frequency be controlled to within ± 1.5

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number (word 'A + B') 8

The decimal numbers obtained for words 'C' and 'D' may be directly converted to 4-bit binary words, while the decimal number for words 'A' and 'B' will convert to a 6-bit binary word. The least significant four bits of this word give word 'A' while the two most significant bits give the least significant bits of word 'B' (the two most significant bits of word 'B' having 'don't care' states). These are presented to the data inputs as follows:

DS1	DS2	D ₃	D ₂	D ₁	D ₀	
0	1	1	0	0	0	word 'A'
0	0	X	X	0	0	word 'B'
1	0	0	0	0	1	word 'C'
1	1	0	1	0	1	word 'D'

FCC specification and/or the 934 MHz UK allocation can use the spare capacity of the p.r.o.m. or r.o.m. to include the extra programming information. Selection of either UK or FCC channels can then be made by providing a link on the p.c.b. for the A10 input. For 934 MHz, A10 is either grounded or tied to +5V depending on the system (as will be described later) and A11 is tied to +5V.

Where a 455 kHz second i.f. is used in the receiver, a separate crystal is required to convert the nominal 10.7 MHz first i.f. to 455 kHz. This crystal varies between 10245.481 kHz for UK channels and 10246.968 kHz for FCC channels, and is best realised using a 10246.25 kHz crystal in a circuit which allows adjustment to either frequency.

The r.o.m./p.r.o.m. used to program the NJ8812 is addressed from the

connect point p.t.t., i.e. the point at the bottom right of Fig. 1, to 0V. Adjust the core of L₁ so that the voltage at tp₁ is 4V. Next, connect p.t.t. to +12V, i.e. in receive mode, and adjust C₁ until tp₁ is at 4V.

The specification requires that when the transmitter is modulated at 1250 Hz with a modulation level 20 dB greater than that required to produce 1500 Hz deviation, the power in an 8.5 kHz bandwidth centred 10 kHz away from the carrier frequency should be less than 10uW. This corresponds to a power of -95 dBc in a 1 Hz bandwidth for carrier separations of 5.25 kHz or greater.

NOTE

The Home Office's publications describing performance

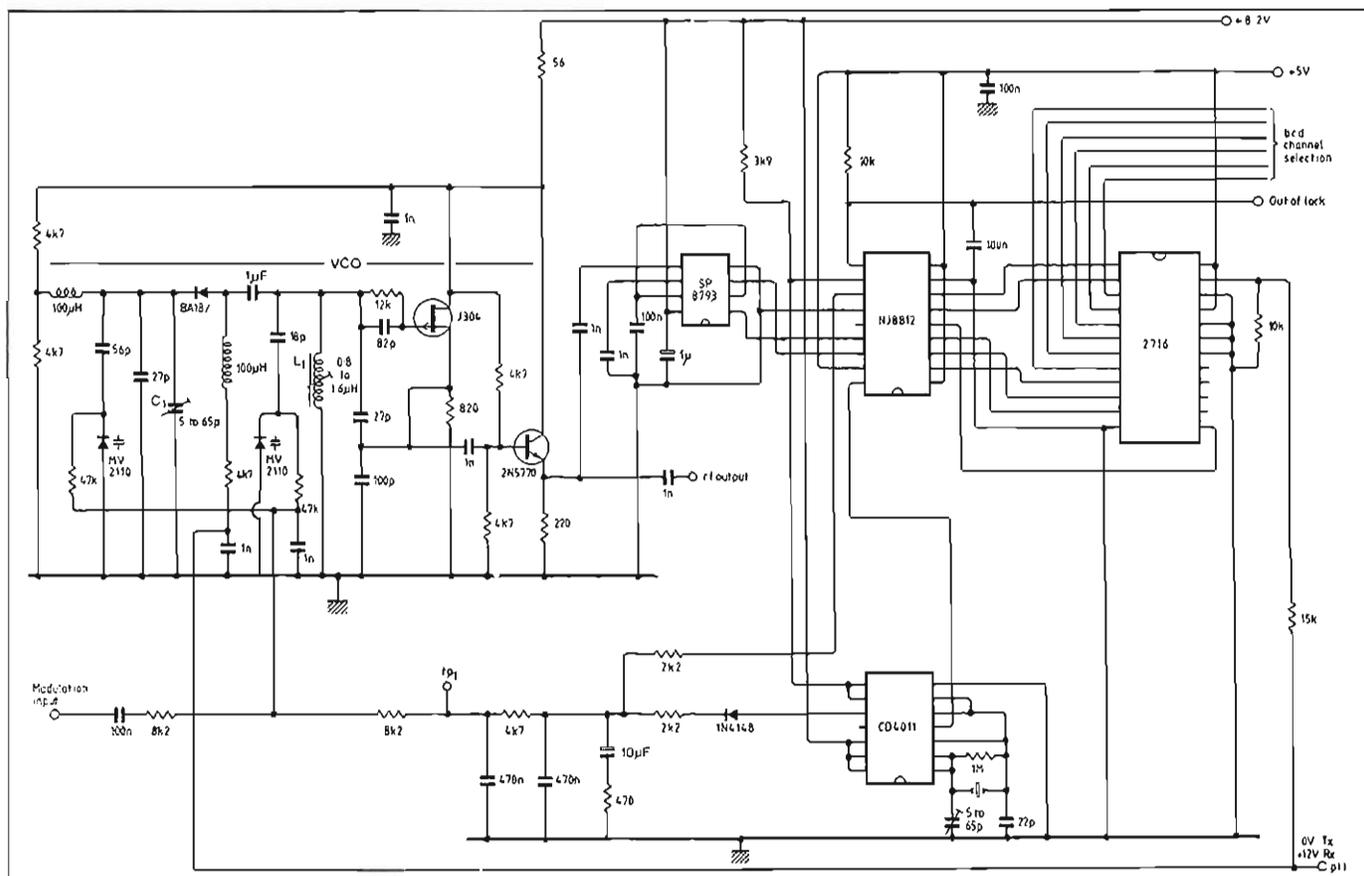


Fig 1. Single-loop synthesizer circuit diagram. Main elements are: the v.c.o. (left), reference oscillator (bottom), the SP8793 dual-modulus divider, the NJ8812 synthesizer controller and the 2716 r.o.m. i.c.

As mentioned above the NJ8812 is programmed for each channel by 31/2 words of 4 bits each. As a result 1120 bits are required to program a 40-channel synthesizer (i.e. 40 transmit and 40 receive). Because of the architecture of r.o.ms/p.r.o.ms these channels can only be satisfactorily accommodated by a 512 x 4-bit memory. Such memories are available but they are expensive. The circuit uses the common 2716 p.r.o.m., which may be replaced by a 2316 r.o.m. if required.

Manufacturers of equipment covering European channels conforming to the

channel selection mechanism of the equipment. Because the channels are numbered 1 to 40 rather than 0 to 39, additional circuitry is required to modify the display using, say, an 8-input NOR gate. The b.c.d. program input to the r.o.m./p.r.o.m. is arranged so that addresses 1 to 39 program channels 1 to 39, and address 0 programs and displays channel 40.

The NJ8812 has a "lock-detect" output which, when integrated in an RC network, provides a logic level 0 which can be used for inhibition. This flag can also be used to blank the l.e.d. display.

Setting up

Referring to the circuit diagram of Fig. 1, start by selecting channel 20 and

specifications for c.b. radio equipment are MPT1320 for 27 MHz and MPT1321 for 934 MHz. They are available from Her Majesty's Stationery Office.

Plessey Semiconductors Ltd's address is Kembrey Park, Swindon, Wilts SN2 6BA.

Double-sided glass fibre p.c.b.'s will be available for £6 inclusive v.a.t. and UK postage from M. Sagin, 23 Keyes Road, London NW2.

CB World would like to thank the editor of Wireless World for permission to reprint this technical article that was compiled by P.E. Chadwick, Plessey Semiconductors Ltd., and the staff of Wireless World.

P.E. RANGER 27 MHz. TRANSCIVER

AUTUMN PRODUCTS is one of only two or three companies actually manufacturing c.b. sets in the U.K. following the Home Office announcement that c.b. radio is to be legalised on November 2nd.

Although the sets are being made from components purchased from a number of sources, where possible parts of U.K. origin have been specified. The case, printed circuit board, specially designed components and antenna are manufactured in the U.K.

Currently the Ranger is only available in kit form but it will be available in ready built form in a short while. C.B. World has obtained a pair of ready made transceivers which are under test. Additionally we have obtained a kit and this is being built in our laboratory following the supplier's instructions. We will be featuring this fully in our January issue and letting you know how we got on.

The Ranger equipment has been designed in modular form to give the c.b. user as much flexibility as possible with this new form of legal two way, personal communication. The initial set is a hand held unit which comes complete with microphone, antenna and built in rechargeable batteries. It will operate from a 12 volt DC car outlet and 240 volts AC mains as well as from its internal power pack.

Also available in 1-2 months, will be a forty channel synthesiser that can be fitted simply to the existing Ranger's that have already been built. This will be available in kit form and Autumn Products will be providing a retro-fit service to those users who may have purchased a six channel ready-made set and wish to upgrade at a later date. Should the Home Office change the specification at a future date and add extra channels then Autumn Products will be able to provide add on units so that the Ranger will never become obsolete.

The Ranger base/mobile add on unit

To increase the power output and sophistication of the Ranger this add on unit may be fitted in the car or at home. The Ranger portable unit can then be plugged into the base/mobile unit to give a full 4 watts output and provide better audio amplification. With this unit and a properly mounted roof top or car antenna ranges of 15 to 20 miles or more can be achieved.

The serious c.b. user can have the relatively cheap base/mobile units fitted in his car, at home, in the office and in the boat and the Ranger 27FM c.b. portable can then be plugged in wherever they happen to be. There will be no need to buy several expensive sets for use in different locations and the Ranger can be simply detached and used as a hand held unit; ideal for use by

people who would like a c.b. set in their car but would like to keep in touch when they are out walking, fishing or sailing.

This approach to c.b. in the U.K. is claimed to be unique at present. In fact Autumn Products will be one of only a few manufacturers in the world marketing a full 40 channel portable c.b. set. (Not to be confused with one or two channel toy walkie talkies with a range of only a few hundred yards).

Other Ranger accessories

To go with the Ranger 27FM c.b. portable will be:

- A carrying case complete with a shoulder strap.
- A car mounted antenna is also available with either permanent or magnetic mount available on mail order at £13.95 plus postage and packing and VAT. This antenna will also be in the shops supplying Ranger units.
- Other accessories and add on units are planned for the future to give the Ranger user a complete modular c.b. communications system.

Base/mobile add on unit

Transmitter output:

Increases output to 4W giving a range of 15 miles plus

Audio output:

Increased quality and amplification

Power supply:

12V DC or 240V mains

Controls:

Meter for power output and signal strength, 10dB attenuator in/out switch (for use with high antenna), RF gain control, LED indicators for power on, TX, RX and RF drive

Ext. connections:

UHF antenna socket, RF drive in (from Ranger), Auxilliary socket.

Fitted in matching case to the Ranger.

The Ranger 27FM c.b. portable specification

Designed to conform to the Home Office specification MPT 1320.

Frequency range:

27.6 to 28MHz.

Modulation:

FM

Number of channels:

6 (max) 40 with add on synthesiser

Transmitter power:

0.5W (min) to 1W

Antenna:

Flexible plastic covered 5/8 wave helical antenna

Antenna protection:

Fully protected against faulty antenna connection or operation with no antenna fitted



Approximate range:

1.5 to 2 miles (portable to portable) 5 miles plus (portable to base/mobile station)

Audio output:

0.5W (max)

Power supply:

Internal 12V rechargeable battery (250mAh), external 12V DC (negative ground), external 240V AC 50Hz. mains

Battery life:

Approx 1.5 to 2 hours

Battery Charger:

Built in charger charges batteries when set plugged into external power supply and switched off

Controls:

On/off switch combined with volume control, squelch on/off switch, channel selector switch, transmit and battery low indicator LED.

Ext. connections:

Microphone socket (5 pin d.i.n.), mains socket (2 pin), U.H.F. antenna socket, external DC socket, earphone external loudspeaker jack socket, auxiliary socket (6 pin d.i.n.)

Dimensions:

200mm x 120mm x 40mm (antenna length 50cm)

Weight:

1.2KG

Op. temp. range:

-5°C to 45°C.

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Post Code _____

CBW1

All Major CB sets have attenuator switches, 40 channels with LED indication and 4W max output. They come complete with dynamic microphone, speaker, cables, mounting kit and instruction manual.



27MHz CB Rig

Supplier: Amstrad

Model: CB 900 & 901

The Amstrad range currently comprises the CB 900 and the 901. The 900 is a basic 40 channel 4 W RF model with RF gain, tone, squelch and volume control whilst the 901 has in addition a PA switch and Roger bleep.

The operating circuits are identical for both sets but the channel 9 priority on the 901 is useful as will also be the channel 19 priority switch facility which currently is not used.

With the cover removed there is an air of quality which confirms its Japanese rather than Taiwanese or Korean parenthood. There were no piggy back conversion boards in evidence and only one capacitor was suspended in mid air without a home on the PCB. The one piece PCB was neatly laid out and even some of the terminations were wire wrapped.

Receiver

The receiver operates in the following manner: The antenna reaches the RF stage via the low pass filter that is provided to keep the harmonics well away from model aircraft, paging systems and those who fear an intrusion into their hallowed 27 a.m. MHz. As is common in lower powered transceivers, there is no official antenna switching process, and death and destruction of the receiver input is provided by a clamp diode. RF gain is brought about by winding resistance in and out of the source of the RF JFET.

Selectivity is controlled by the T6/T7 bandpass pair, feeding the gate of a dual gate MOS FET mixer. A good design point in view of overload and intermodulation, as the shape of bipolar transistors and AGC on the RF and mixer stage.

Another bandpass pair into the IF filter which is a low cost ceramic filter for 'roofing' purposes. Those with circuit design experiences may like to use a 2 pole crystal filter (or even more) at this point, but the standard filter seemed quite adequate for the purpose. It takes it down from the first IF of 10.695 MHz to 455 kHz, and the second stage provides a little pregain at 455 kHz, after the 6 kHz bandwidth filter, and before the LA 1230 — which is Sanyo's version of the famous CA3089E series.

Gain limiting, detection, metering

and squelch functions are performed by the IC, with squelch being carrier derived. This may seem to be a compromise in achieving f.m. muting, but in practise, it works. With the tendency of some f.m. muting systems to open with low level signals even with 'tight squelch' (ie the mute sensitivity wound right back), it could be that this approach will be more able to cope with the nature of 27 MHz c.b., where there is always likely to be enough of a signal about to cause a noise squelch to open up. Existing multimode c.b. sets with f.m. have tended to use signal level derived squelch as part of their a.m. heritage.

The metering is provided by a row of LEDs. It is also surprisingly accurately logarithmic in terms of input level, since the LA1230 meter output is nearly logarithmic across the 70dB input range.

Despite the inability of the original CA3089E to provide the meter function output with input frequencies as low as 45 kHz (due to the relatively reduced coupling of the 'on-chip' integrated capacitors), the Sanyo device appears to have overcome this problem.

The audio output is correctly deemphasised, and fed to the audio IC, which includes a mute control input (pin 5).

The supply to the set is decoupled reasonably well — most interference experienced in a vehicle installation is only really curable at source anyway.

The receiver sensitivity was better

than 0.3 uV for 12dB SINAD, leaving little scope for improvement.

The Transmitter

The first aspect to consider is the synthesiser device. According to the Japanese, fabrication of this part caused them many problems — and it's the only 'custom' aspect of the entire specification. The LC7137 is derived from the LC7136 family — and appears to drop into exactly the same PC foil layout. Even the channel number program codes are identical (albeit the LC7135 is an FCC standard device).

If you have an illegal c.b. set, then this looks like a potentially instant method



to get the frequencies onto the UK channels, provided £5 to cover the import duty and VAT is paid, and the set is checked to conform with the UK specification with regard to mode and power. It seems that it will be cheaper to buy a new set with the only exception being up market home bases.

The synthesiser works well, and once the right numbers have been loaded, the VCO produces an output on half the desired transmitting frequency — due to the reduced speed of the CMOS divider. On receive, this frequency is fundamentally correct for a 10.695 MHz offset, but on transmit, it must be first doubled and then carefully filtered.

The remains of the transmitter require only 3 transistors to provide the

legal 4W, with the 10dB attenuator provided by switching to drop the supply to the first of the RF drive stages.

The output is very pure (as it needs to be to meet the specification):

Fundamental	0dB
2nd Harmonic	-83
3rd	-88
4th	-84
5th	-81
and no worse than	-81dB to beyond 500 MHz.

The modulator

The UK specifications lay down that although the deviation is nominally 1.5 kHz, 3.5 kHz peaks are permitted. With the transmitter set up to produce 1.5 kHz deviation, the audio input must then be driven up another 20dB without the deviation exceeding the 2.5 kHz limit. Some form of limiting is essential.

The technique widely employed for speech clipping in c.b. involves simply ramming the output of an op-amp mic pre-amp up and down against the supply rails. This no doubt accounts for the sales of 'power mics' which employ a little more elegance in the shape of audio derived gain control.

actually make quite a difference.

The set was a shade over sensitive on the deviation level, there is a preset control on the board and it only requires a minor adjustment to throttle it back. The adjacent channel power (+/-10 kHz) was measured as -58.9dB (upper adjacent channel), and -57.8dB (LAC) at 1.5kHz deviation, the asymmetry being due to the asymmetrical nature of the limiting at the clipper's output. The maximum permitted level is 10uW under the conditions of normal 1.5 kHz deviation '+20dB' audio input, which is probably rather academic, since any c.b. receiver close enough to be bothered with 10uW signal is almost certainly going to be utterly flattened at RF stage, mixer, IF etc.

No IF filter used in c.b. is likely to possess the sort of shape factor demanded in v.h.f. 'private mobile radio' (-90dB adjacent channel on receive), so the Home Office specification is perhaps a shade unnecessary here. However, a tight rein on adjacent channel power covers a multitude of sins, from jittery synthesisers to over deviation and bad frequency response limiting, but it is extremely complex to measure without the right (and costly) equipment. A R&S adjacent power meter which reads directly in dB was used.

The modulator deviates the VDO at half the output frequency, which means that the deviation excursions seen by the phase detector are relatively small, and the synthesiser copes without problems.

Roger Bleep

The bleep both provides a tone, and holds the transmitter on for as long as is necessary to get about 100mSec or so over the airwaves. Pressing the PTT instantly discharges the base circuit time constant which operates the main T/R receive.

The phase shift oscillator is kept quiet by the fact that a diode effectively grounds the base when the PTT is held on. Let go of the PTT, and it is held on for the charging period of the time constant on the base (thus holding and keeping the transmitter on), and is let loose to do its worst, since the diode is now reverse biased, leaving it to oscillate.

Conclusion

It is obvious from inspection that the CB 900/901 series has been well designed to comply with the new f.m. specifications. Layout is clean and tidy which is an answer to the serviceman's prayer in times of trouble.

With Amstrad promoting their sets in a £1.25 million campaign they hope that they will obtain a quarter of the UK c.b. equipment market in the pre-Christmas period. We just hope that they will have that number of sets available.



limiting in this way would produce the most amazing and unacceptable splatter through the generation of HF harmonics, so the next stage in the set is the second half of the 758 (LA6458D), which is configured as a most elegant low pass filter that results in really nice quality audio, with just the right amount of pre-emphasis, a

feature that makes this set stand out against many others. When all manufacturers are constrained to very largely the same set of 'rules', this is one optional area where a little thought in design can

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3. What does FM stand for?
4. In the phonetic alphabet, what is U?
5. Which is the only CB magazine to publish c.b. handles?
6. What is a 10.36?
7. In the 10-code, what is 'repeat message'?
8. How much is a c.b. licence?
9. What channel should be left for emergencies?
10. What was the Home Office originally going to call c.b.?



CB World will give away a 40 channel c.b. f.m. radio to the first correct solution to be drawn out of our mailbag on Friday, December 18. The Editor's decision is final. No correspondence will be entered into.

Send your entries to: *CB World*, Room 802, IPC Electrical-Electronic Press Ltd., Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

REPLIES TO CHARLIE

Readers of the October edition were invited to send in a suitable caption for the Prince Charles photograph. Here is a selection of your replies.

Could one give one a nine, please?
I've got my 'ears' on Dal.
Looks like we've got a 10-15
13.3 Good Lady

Pull the plug, Mummy — Buzby's in
the Mall

Yes, I have got my ears on!
Now hear this.

Breaker for Big Ears You've got me
Can any good buddy give me my
Rough 20

Was that Polo mint or Polo stint?
Phil the Greek d'ya copy?

High-didly-dee will somebody
copy me?

- The UKI, Cheshunt, Herts.
- G.I. Joe, Hartlepool.
- Birdman.
- Apollo from Paytown, Selby, Yorks.
- Paddington, Margate.
- Medicine Head, Birmingham.
- Cats Whisker, Grantham, Lincs.
- Sharp Shooter (Motor Town).
- Wiltshire — Moonraker, Norwich.
- Union Jack (FM2LO), Grimsby
- Union Jack (FM2LO), Grimsby
- Biscuit Tin

FATHER XMAS CAPTION

On the front cover of this issue, you can see what Father Xmas is saying. If I was answering him back, I would reply. "Yeah, O.K. Santa, this is Rudolph, pull the other antler".

Assuming you think he is winding us all up, what would be your wind-up reply. Also, what alternative caption would you give for Father Xmas in his present predicament.

Send your reply to: The Editor, *CB World*, Room 802, Quadrant House, The Quadrant, Sutton, Surrey. No prizes will be given (boo), but we will publish the funny ones (hooray).



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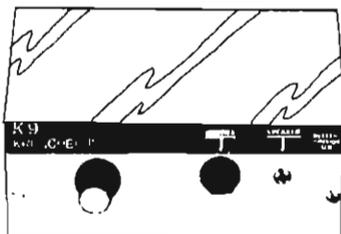
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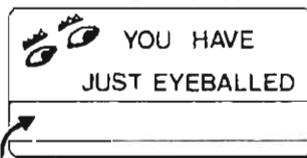


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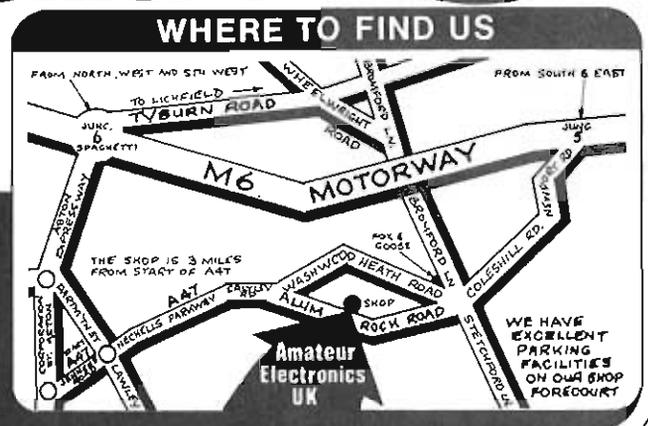
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How a transceiver works—3

Last month we looked at RF and IF amplifiers. This month we are going to develop the subject further.

The important justification for a double conversion IF strip is for the reduction of image interference. Double conversion simply explained means two frequencies. For example the 27 MHz c.b. signal might be reduced to 10 MHz and then to 455 kHz.

Most of the amplification and almost all the selectivity is contributed by the second (low frequency) IF amplifier. Refer to Fig 7 and this shows a typical double conversion IF amplifier. It will be seen that the first IF is simply a mixer. It is not even an amplifier and its function is to act as an intermediate step for the signal between the front end and

produced by beating the signals together in the mixer will be 455 kHz.

Should however a signal of 27.975 MHz also pass through the RF amplifier it will also beat with the oscillator signal in the mixer, producing a 455 kHz output for the IF amplifier. The IF amplifier cannot identify which is the desired and interfering signal, so it amplifies both. The receiver's output will be a mixture of interfering signals.

The interference signal of 27.975 MHz is called the image signal and is always separated from the desired signal by two times the IF frequency.

The interfering image signal gets through the RF amplifier because the amplifier

rejection is not outstanding near the desired frequency (27.065 MHz) it can effectively reject an interfering signal 20 MHz higher in frequency (ie 47.065 MHz). That part of the 47.065 MHz image frequency signal that does get through the RF amplifier is so sharply attenuated that it causes virtually no interference to the desired signal.

An example of typical image rejection performance specifications would nominally be 15 to 20 dB for single conversion IFs and 60 to 80 dB rejection for double conversion. Therefore double conversion IF systems offer considerable image rejection advantages.

The first mixer's output signal of 10 MHz beats against an oscillator signal of 10.455 MHz in the second mixer, producing the

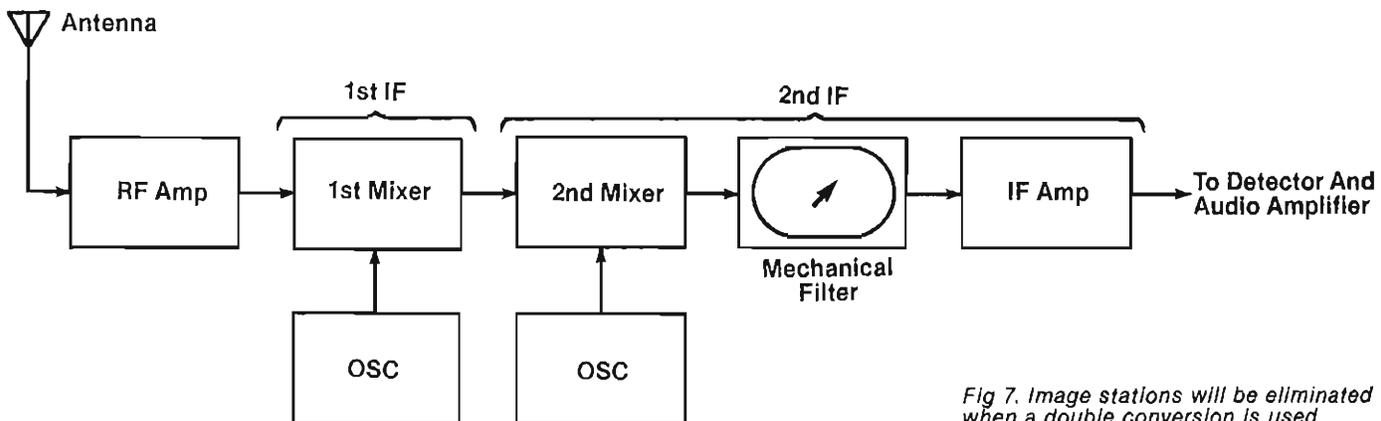


Fig 7. Image stations will be eliminated when a double conversion is used.

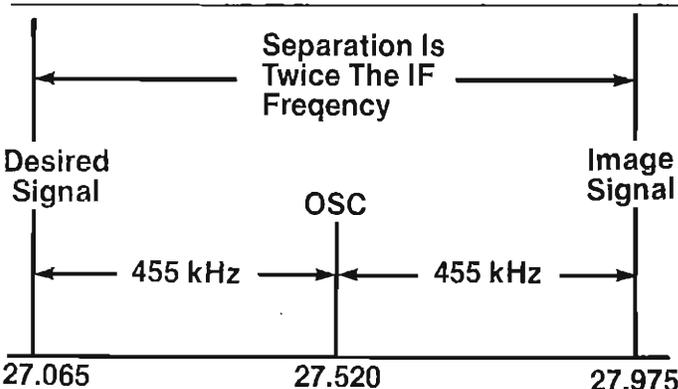


Fig 8. The relationship between oscillator, desired and image signals.

the second IF.

Now look at Fig 8 and this shows how image interference is created. It also shows why double conversion is needed if the interference is to be effectively suppressed. It has been previously said that the IF frequency — the mixer's output — was created by beating together the desired signal coming from the RF amplifier and the output of the oscillator which is lower or higher in frequency.

Again looking at Fig 8. If the desired signal is 27.065 MHz and the oscillator output is 27.520 MHz the different frequency

cannot effectively discriminate between two close frequencies, therefore practically all of the receiver's selectivity comes from the IF amplifier.

To overcome the problem of image interference it is necessary to resort to double conversion and it operates in the manner shown in Fig 9.

Referring to this illustration the input to the first mixer is 27.065 MHz; the oscillator is 37.065 MHz, producing an IF frequency of 10 MHz. The image frequency will therefore be 47.065 MHz (37.065 + 10 MHz).

Although an RF amplifier's signal

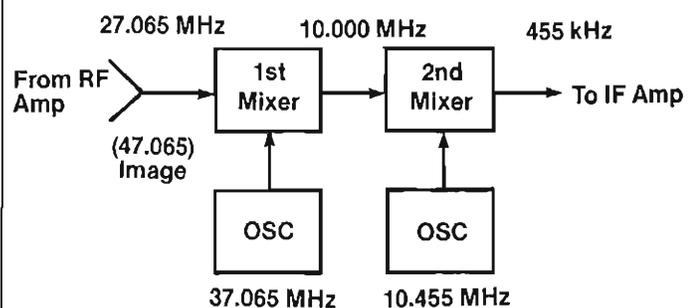


Fig 9. Double conversion is also used to extract the image from the c.b. band and into a relatively unused portion of the spectrum.

desired IF output of 455 KHz which is fed to the IF amplifier.

The receiver's adjacent channel rejection, known as selectivity, is determined by the number and type of tuned circuits, mechanical or crystal filters etc . . .

Considering a typical a.m. receiver, the carrier signal, which is the modulated IF output from the mixer, is positioned in the centre of the IF selectivity passband so the adjacent channel on each of the desired signals receives the same degree of attenuation.

Refer to Fig 10 and it also shows the selectivity curve of a typical high perform-

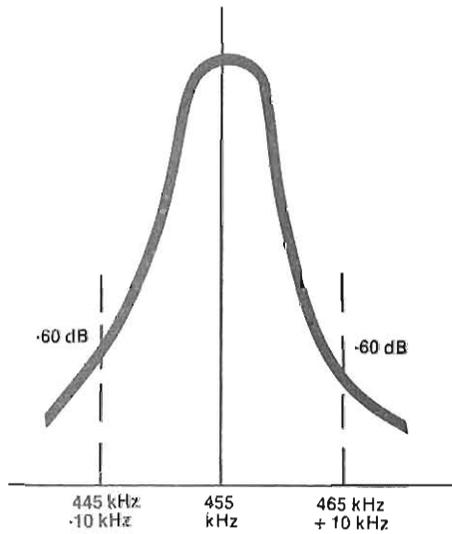


Fig 10. The IF response for a.m. reception covers both sidebands.

ance receiver. Observe that any undesirable signals ± 10 kHz from the centre IF frequency are attenuated 60 dB.

In a receiver without some form of high selectivity device such as a mechanical filter the signals from adjacent channels might be attenuated only 20 to 30 dB.

Single sideband (s.s.b.) receivers might use the type of carrier position in the centre of the IF selectivity curve (sometimes known as the passband) but they more likely will position the carrier to either side, using the entire passband for just the one sideband used.

Refer to Fig 11. The interference from higher adjacent channel has 60 dB attenuation whilst the interference from the lower adjacent channel is not even in the IF passband.

This is because the position of the s.s.b. carrier signal on the high or low side of the passband depends on whether the receiver signal is using the upper or lower sideband.

Because the IF passband accommodates only the sideband representing carrier the modulation, it is possible for another station using the same centre frequency to transmit on the opposite sideband, producing little interference.

To take an example assume that the desired signal is transmitting with the upper sideband as shown in Fig 11. Note that the entire sideband (modulation) fills the IF passband, while virtually no passband is left for a lower sideband.

Should another station using the lower sideband come on the channel very little of the lower sideband modulation will get through the IF passband. Another receiver tuned to the lower sideband will receive this second signal. Similarly, it would not receive the upper sideband signal.

Unlike receivers, which can be essentially similar up to the detector in both the a.m. and s.s.b. rigs, there is a great deal of difference between a.m. and s.s.b. transmitters and with the exception of the oscillator (remember this is the circuit which generates the crystal controlled operating frequency) there is no similarity between the two.

Amplitude Modulation (a.m.) transmitters are simple to design, line up, check and repair because there is little that can go wrong. Alarming to some but in fact between the least expensive and the most expensive c.b. transceivers there might be little, if any, difference in the transmitter circuits.

Refer to Fig 12 and it will be seen to show a block diagram for a solid state single

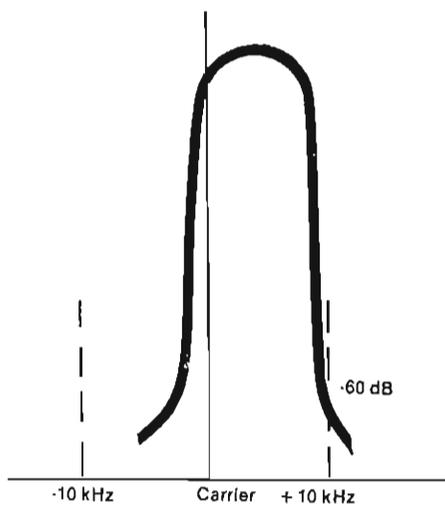


Fig 11. For s.s.b. reception the narrow curve shifts to the upper or lower sideband and can be used by another transmitter.

channel transmitter. The term single channel means a transmitter with from one to five or perhaps eight channels.

In these models the user adds channels by plugging in transmit and receive crystals for the desired channel coverage. The transmitter line up usually comprises a crystal controlled oscillator, a buffer amplifier to prevent changes in the antenna circuits from reflecting back to the oscillator, and an RF power amplifier which amplifies the minute RF drive from the oscillator feeds directly into the RF power amplifier.

High efficiency amplifiers known as class 'C' amplifiers have efficiencies in the order of 80 per cent, so if the DC power input to the RF amplifier is 5 Watts the RF output will be about 4 Watts or slightly less depending on the overall design parameters.

In to-day's c.b. transceivers the RF amplifier feeds into a bandpass, or low pass filter before the signal is fed to the antenna.

Any of these filters sharply attenuates the television interference producing harmonics caused by the distortions of class 'C' amplifiers. In addition to the harmonic attenuation

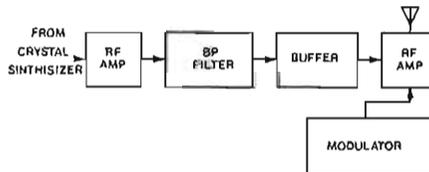


Fig 12. Basic a.m. transmitter without crystal synthesizer is used in most 3 to 6 channel sets.

of t.v.i. (our old friend Television Interference) is generally secured by placing a notch filter which is tuned to the second harmonic of 27 MHz at the transceivers output socket.

Because solid state devices are very critical with regard to tuning all modern c.b. transceivers now have factory adjusted transmitter tuning which is normally sealed or located inside the case. As a general rule the factory tuning cannot be improved and "tweaking" the transmitter tuning controls can easily result in the destruction of the RF amplifier transistor.

Now let's look at the t.v.i. filter. Maximum attenuation of harmonic interference is generally attained when the filter is specifically adjusted for the particular transmission line and antenna used. It is possible

to find a t.v.i. tuner on the rear of some c.b. transceivers.

When the transmitter has full 40 channel coverage, a crystal synthesizer is almost universal and the basic transmitter is very similar to the layout shown in Fig 12. The major difference is the synthesizer which is a device that beats the outputs from two or more oscillators so that something like half the required 80 crystals are needed for full 40 channel coverage for both the transmitter and receiver.

In the majority of modern transmitters, fewer than 30 crystals are needed for full 40 channel coverage.

The problem however with beating the outputs of two or more oscillators is that the resultant output contains the frequencies needed plus many which are not needed. These are often known as spurious signals and if these find their way through the transmitter to the antenna they will cause interference to other radio services.

The spurious signals are eliminated by passing the output of the crystal synthesizer through a bandpass or tuned filter which allows only the desired 27 MHz signals to pass on through the RF amplifiers.

A typical synthesizer transmitter layout is shown in Fig 13.

Single sideband (s.s.b.) has no resemblance to a.m. transmitters other than it is one way to carry modulation to a distant point without the need for landlines.

S.s.b. transmitters are very complicated and require many different circuits that it could appear prohibitively expensive.

However, a substantial part of the amplification required for s.s.b. transmitters involves the same type of circuitry as needed for a s.s.b. receiver. This means that in c.b. transceivers where both transmitter and receiver are in the same case it is possible for both functions to share one of the most complex and costly to produce circuits. The whole exercise can therefore be valuable.

There are several types of s.s.b. transmitter design. One of the most popular and easiest to understand is the so called filter s.s.b. generator.

A low frequency from the crystal synthesizer is fed into a balanced modulator where it combines with the modulation from an

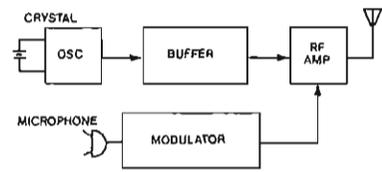


Fig 13. A filter if placed in series with the RF path removes any spurious signals produced by crystal synthesizers (the filter can be of the LC type).

audio amplifier. The balanced modulator's output consists of both modulation sidebands but virtually no carrier.

The carrier is suppressed in the modulator and this RF signal is then passed through a highly selective IF amplifier which sharply attenuates the undesired side band.

The IF amplifier might have a crystal or a mechanical filter but either type is adequate so long as the selectivity is such that only the desired sideband can pass through.

In c.b. transceivers the transmit IF amplifier is also used as the receiver IF amplifier. This is the main reason why s.s.b. transceivers have such high receiver adjacent channel rejection.

(CONTINUED NEXT MONTH)

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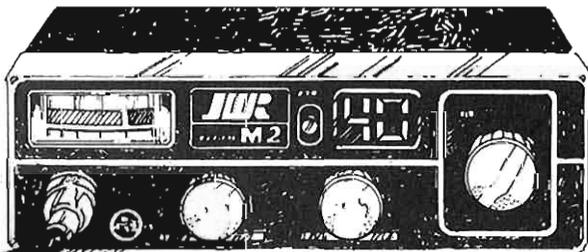
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Continued from page 29

mat finish and measures 140mm wide by 55mm high by 172mm deep. Designed for mounting beneath the dashboard, the unit is supplied complete with the standard fitting kit and comprehensive installation instructions.

A Dolby noise reduction circuit and a metal tape facility are key features of the higher-priced Hitachi CS 390 player. This powerful 6 watts RMS per channel unit automatically switches tape channels at the end of each side, to give non-stop entertainment. Manual push-button switching between tape channels is also provided.

Rotary controls ensure fine adjustment of tone and volume, plus a slider switch for balance. Fast forward and rewind with lock-on are a standard feature, and there are controls for normal or chrome and Doby circuit selection.

The satin-chrome finished CS 390 unit has a frequency response of 50Hz to 12kHz (normal tape) and 50Hz to 14Hz with chrome tapes.

This new Hitachi player measures 140mm wide by 50mm high and 189mm deep and is complete with standard fixing kit and installation instructions.

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Lucas

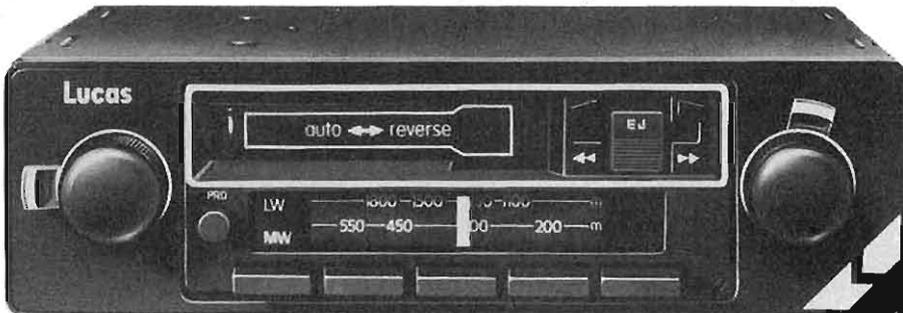
Lucas Audio-Systems now firmly established in the 'In Car Entertainment' market have announced the LS252 push button LW/MW radio/stereo cassette player.

This sophisticated combined unit designed for 'in dash' fitment is the very latest in a series of five exciting new audio product introductions, announced recently by Lucas.

The radio has five push buttons, 1 Long Wave, 4 Medium Wave for instantaneous change of station and waveband. A unique feature of the radio is that the illuminated dial changes colour with waveband selection, amber on MW and red on LW to give immediate recognition of channel selection.

The set incorporates a stereo auto reverse cassette giving automatic and manual tape reverse. An automatic radio/cassette changeover cuts out the radio automatically on cassette insertion and switches the radio back on when the cassette is ejected. The

The latest Lucas LS 252 push-button LS/MW radio/stereo cassette player is one of a series of five new audio product introductions.



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This month we will look at this "SUPERSOUND" range:

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Model 550 — Retail recommended price £271.40 including VAT.

Model 531 — 3 Band Combination Unit:

A top quality Combination Unit, with features to match in performance and reliability — 3 wave band stereo radio, 1 LW, 2 MW and 3 FM push buttons, which give a visual indication of station selected. Radio has AIR (active interference rejection) circuit on FM band. Hi-Fi stereo cassette deck, with locking fast forward and rewind controls; manual tape eject, mono/stereo switch, with stereo beacon and tape indicator light. Electric aerial feed. Frequency response 50-10,000 Hz. Power output 7.75 watts through 4 speakers.

Model 420 — 2 Band DOLBY Combination Unit:

With the feature of DOLBY noise reduction on the stereo cassette player, Hi-Fi quality is assured. A 5 medium and 1 long wave push button radio of outstanding sensitivity completes the system. All the usual features are available, together with a switchable contour enhancement circuit. Locking fast forward/rewind; manual ejection; visual and audible end-up-tape indicator and a formidable 9.5 watts per channel through 4 speakers. Tape frequency response 50-13,000 Hz (an outstanding frequency response the best in the Radiomobile range and possibly the best of any car audio products). Electric aerial feed. Model 420 £158.70 (including VAT).

Model 1537 — FMSIMW/LW Push Button Radio:

The ultimate in FM stereo radio with medium and long wave all available at the push of a button (3 FM, 2 MW and 1 LW) and full manual tuning. AIR (active interference rejection) circuit with stereo indicator beacon and automatic switching from stereo to mono on weak stations is

incorporated on the FM band. A powerful 7.5 watts per channel (available only in ALL Black styling). The 2537 has facilities for a separate cassette deck Model 306. Electric aerial feed.

Model 306 — Stereo Tape Deck:

A compact stereo tape deck designed to compliment the Model 1537 and many other manufacturers' FMS radios. Frequency response 50-12,000 Hz. The cassette deck utilises the radios' volume, tone and balance controls.

Model 306 £74.75 (including VAT).

Model 1530 — FM/MW/LW Push Button Radio:

A three wave band covering 3 FM (mono), 1 Long wave and 2 medium wave stations via six push buttons and the usual manual tuning. Variable volume and tone controls, 11 watts power output with AIR (active interference rejection) circuit on FM. Electric aerial feed.

Model 1526 — MW/LW Push Button Radio:

Selection of radio programmes is at your fingertips with six push buttons, five for medium wave and one for the long wave. Radio has variable volume and tone controls and full manual tuning. This new radio has been developed to be manufactured on the very latest production equipment which has been installed at Radiomobile's London Factory. Its design incorporates many new production techniques and its testing and inspection are computer controlled. Electric aerial feed.

Speakers:

The Radiomobile range of "SUPERSOUND" speakers is comprehensive and compliments the range of "SUPERSOUND" Radios and Combination Units. This sophisticated range features a 4½" dual cone speaker and 5½" speaker with co-axially mounted tweeter — both of these units being flush fitting. Two high power enclosures handling 45 watts and 60 watts are also available for real high power output.

All the "SUPERSOUND" speakers have high sensitivity and can be driven directly from any of the "SUPERSOUND" Radios and Combination Units, but to obtain optimum performance, Radiomobile recommend that they should be used in conjunction with the graphic equaliser GE140 or power booster PB240.

Model GE140 — Graphic Equaliser:

A five band graphic equaliser using slider controls with a 20 watt per channel power which also includes a front/rear fader control for four speaker installation. The frequency response 20-20,000 Hz giving + or 12 dB control. A special installation kit including 4 × high power speakers is available from the ROVER 3500, 2600 and 2300 (part no. SD01).

Model GE140 £67.85 (including VAT).

Part No. SD01 £181.13 (including VAT) — includes GE140 and four high power speakers.

Model PB240 — Power Booster:

This add-on power booster can be used with most negative earth Radios/Stereos. It provides additional full fidelity output with

independent controls for Bass and Treble boost, resulting in a high performance distortion free system. The unit will work with a 2 or 4 speaker system. If a 2 speaker only system is required both speakers must be high powered — we recommend our Supersound range.

In a 4 speaker system existing 4 ohm speakers can be used providing at least one pair are high powered.

Output . . . 20 watts per channel into 4 ohm speakers.

Frequency Response . . . 30Hz-20kHz.

Model PB 240 £42.09 (including VAT).

Radiomobile Limited
Goodwood Works
North Circular Road
Cricklewood
London NW2 6JN
Telephone: 01-452 3333

National Panasonic

The company produces a wide range of stereo radio and cassette players. Last month we reviewed their car speakers.

CX 1000

An easily installed stereo cassette player with high quality design features, such as convenient and safe all in one lockable fast forward and rewind with push eject. It operates an auto-replay system. The CS 1000 has separate volume, balance and tone controls and a full 5 watts per channel.

Recommended price is £49.95.

National Panasonic (UK) Ltd.
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Teletype mysteries unfolded

Legalisation day, November 2, will be remembered by c.b.'ers for many years to come and those who study the licence application form will see that there will be hardly any conditions. Once the licence has been obtained you will be able to use c.b. for anything you like, apart from bad language and business.

THE ONE regulation that *CB World* would like to find out about is whether the Home Office will be controlling the mode of operation other than by saying you must use f.m. By that we mean — will they try to limit us to speech only or will we be able to use some of the other possibilities such as morse code or slow scan television or radio teletype?

All of these are far more interesting than you would think at first glance. Admittedly morse code needs to be learned before you can use it but once it has been mastered it can't be beaten for penetrating the noise and winking out the DX.

Slow scan television is not as difficult as you may think and it's nice to be able to see the person you're talking to. Teletype (RTTY) has several advantages, not the least of which is the fact that all your incoming signals are printed out on a sheet of paper which means that not only do you have a neatly typed copy of all your calls but if you go out and leave your receiver on automatic, it will carry on printing any messages that arrive for you while you're out.

Getting started on RTTY is not expensive as ex-G.P.O. equipment is still available from several junk shops and although the terminals tend to be big and noisy, they are usually quite cheap.

The latest technique for transmitting and receiving RTTY is to use a small computer such as the TRS 80 or the Commodore PET and many radio amateurs now use this method. The letters to be transmitted are typed out on the keyboard and the received signal is decoded by the computer and the words are displayed on the screen of the monitor, silently. This does away with the need for a bulky and noisy printer but it is then not possible to have a written copy, unless you have a printer attached to your computer.

A large number of breakers have found that c.b. has awakened their interest in radio in general and the next step that they usually take is to buy themselves a full coverage (normally 1.5—30 MHz) communications receiver. If you've ever listened around on some of the other frequencies, you may have noticed a strange sound that is almost like very fast morse code but more musical as the tones vary in pitch. This is the sound of RTTY being transmitted and it can be found in almost every frequency band that you may care to listen to.

It's used by all sorts of people such as foreign embassies, the Stock Exchange and the various press agencies such as Reuters and the Press Association along with lots of others.

If you are a short wave listener, you must have



experienced the same frustration that we do when we hear strange noises and a firm in Liverpool, Microwave Modules, has obviously been thinking along the same lines because they have come up with a little black box that solves the problem.

It's the MM 2000 RTTY to t.v. converter, a small (7 3/8" x 4 1/4" x 2") box that has four leads coming out of it. Two of them are for connecting it to a 12 volt supply, another plugs into the extension speaker socket of your receiver and the other fits into the antenna socket of your television.

It has been designed to decode any RTTY signal that you may receive and then display the message on your television screen in 16 rows each of 64 characters. When the screen is full it will automatically scroll upwards.

There is a small switch on the back that allows you to choose between white letters on a black background or black letters on a white background and it should not be necessary to adjust your television in any way other than to tune it to the output from the box which is around channel 35.

This is the same sort of thing that you have to do when you plug in a t.v. game or video recorder and it's a good idea to leave a spare button permanently tuned to the same spot so that you don't have to twiddle the knob every time you want to use the MM 2000.

There are no internal connections to be made to either the television or the receiver and the MM 2000 will work with any receiver that is capable of picking up RTTY and which has an external speaker socket and it will also work with any British standard television that operates on the more modern UHF band i.e. any set that has been made in the last 15 years.

RTTY is transmitted in various different ways and at various different speeds and the MM 2000 is capable of decoding them all. The speed of the decoder can be matched to the speed of the incoming signal by pressing the appropriate speed button on the faceplate or by letting the machine do it for you; it has an automatic mode. L.E.D.s on the front of the box indicate the speed of the decoder and others show if your receiver has been tuned in correctly.

As you can see, the MM 2000 is simplicity itself to use and it can really expand the pleasure of listening on the short waves. All you have to do, after you've plugged it in, is

to tune around on your receiver until you find an RTTY signal and then using the L.E.D.s on the front panel, tune in the signal until they indicate that it is spot on.

The easiest way to adjust the speed is to put it on automatic and to let it sort itself out. When it finds the correct speed you will find that there are words appearing on your television screen.

If you're lucky it may be a Reuters news transmission containing information that is so fresh that it hasn't yet reached the television and radio news services and if you're unlucky it could be a foreign embassy contacting the homeland not only in a foreign language, but in code as well so that you will have no chance of understanding it.

The legality of listening around is not too clear and if you're unduly worried about it and if you intend to listen to the press agencies, you could always write and ask for their permission. They probably won't say no, but if you don't ask, they definitely won't.

Radio amateurs use RTTY as one of their modes and even though they usually are not as interesting as Reuters to listen to, it is at least legal for you to do so.

If you eventually become an amateur yourself, which seems quite probable when you see just how many c.b.'ers have already done so, then you may want to transmit on RTTY as well as just listening and Microwave Modules have just the gadget for that as well — the MM 4000.

This is a similar machine to the MM 2000 but it has a touch sensitive keyboard supplied with it and the letters to be transmitted are just tapped out on the keyboard. It's quite expensive at £169.00 + V.A.T. but it's a beautiful piece of equipment that works extremely well and is very easy to use.

It's as versatile as the MM 2000 and it can be used in conjunction with any transceiver operating on any frequency so if we're allowed to, it could be used on c.b. — something that we are sure hasn't even crossed Willie Whitefaw's mind.

The MM 2000 costs £299.00 + V.A.T. and it is available from most amateur radio retailers or direct from the manufacturers, Microwave Modules, of Brookfield Drive, Aintree, Liverpool L9 7AN. Tel: 051-523 4011. We would like to thank the company for the loan of our review sample ●

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