

Which Rig?

FROM THE PUBLISHERS OF
CB
Citizens' Band

Summer '82
£1.25

Detailed analysis of popular CB antennas

★
Comprehensive Checklists

All rigs and antennas listed

★
Inside CB

How it works

★
DIY Section

Build yourself simple

CB accessories

★
National Club Directory

Hundreds of clubs listed



DOZENS OF REVIEWS OF ALL THE LATEST RIGS

Shogun



Here it is –
Simply the finest . . .
the sleek, superlative
Shogun CB Radio mobile rig – made and
designed in Japan – weighing just
over 3½ lbs.

A slim highly advanced triumph of technology
measuring an amazing 6⅞" × 9½"
and less than 1½" high.

Featuring

Channel selector with LED read out. RF gain. Squelch control. Volume control. Delta tune. Tone control. PA or CB switch and noise blanker facility. Microphone and fixing bracket. 10 deciBel attenuator switch. Provision for selective calling. Antenna not supplied.

To: Sunrise Products-Japan, Colliers Farm, Frieth,
Henley-on-Thames, Oxon RG9 6NR

Please send me _____ Shogun CB mobile rig(s)
I enclose a cheque/postal order for £99 each
(including postage, packaging and VAT) made
payable to Sunrise Products-Japan
OR debit my Access/Barclaycard
no: _____

Name: _____

Address: _____

Postcode: _____

Or please send me all particulars.

Please allow 28 days for delivery.

CB3



CONTENTS

Summer 1982

Which Rig?

Editor:
Rick Maybury
Senior Art Editor:
Andrew Sawyer
Advertisement Manager:
Roy Perryment

Copyright. All material in this publication is subject to world-wide copyright protection. Permission to reproduce any material in part or whole must be sought from the publisher. All reasonable care has been taken in the preparation of this magazine to ensure accuracy, but Argus Specialist Publications cannot be held legally responsible for any omissions or mistakes that may occur. © 1982 Argus Specialist Publications.

WHICH RIG, 145 Charing Cross Road, London WC2H 0EE. 01-437-1002. Published by Argus Specialist Publications Ltd. Distributed by Argus Press Sales & Distribution Ltd., 12-18 Paul Street, London EC2A 4JS. Printed by Alabaster Passmore & Sons Ltd., London & Maidstone.

Special thanks to Mike Marks at Dixons and Sonic Sound Audio Ltd for supplying rigs for the front cover.

Contributors: Andy B Giles and Chris Peterson.

Group Art Editor: Paul Wilson-Peterson
Editorial Assistants: Tina Boylan
Roger Munford
Clifford Wilson
Managing Editor: T J Connell
Managing Director:

| | |
|---------------------------------------|----|
| Introduction | 5 |
| Anatomy Of A CB Rig | 6 |
| Buying A CB Rig | 8 |
| Fitting A CB Rig | 10 |
| How To SWR | 12 |
| Rig Reviews Introduction | 15 |
| 1. Radiomobile 201 & 202 | 16 |
| 2. York JCB 863 | 18 |
| 3. Realistic 1001, 2000, 2001 | 21 |
| 4. York JCB 861 & Fidelity 1000 | 24 |
| 5. Amstrad 901 | 27 |
| 6. Johnson | 30 |
| 7. Amstrad 900 | 32 |
| 8. Harrier | 34 |
| 9. Binatone Breakerphone | 36 |
| 10. Barracuda | 38 |
| 11. Binatone Route 66 | 41 |
| 12. Fidelity 2000 | 44 |
| 13. Transcom | 46 |
| Walkie Talkie Survey | 48 |
| Rig Checklists | 54 |
| Antenna Reviews Introduction | 59 |
| 1. K40 & Avanto Moonraker | 60 |
| 2. Bandit | 64 |
| 3. AS MR440 | 66 |
| 4. Archer 21-904 | 68 |
| 5. Ferroline 27 | 70 |
| 6. Audio King | 72 |
| 7. JWR 7166 | 74 |
| 8. Hythe Antenna Eliminator | 76 |
| Antenna Checklist | 78 |
| DIY Introduction | 79 |
| Simple SWR | 80 |
| DF Loop Antenna | 82 |
| Inside CB | 84 |
| The CB Transmitter | 86 |
| The CB Receiver | 88 |
| National CB Club Directory | 91 |

GET IT DIRECT FROM K40's

Appointed Importer and Distributor

CB CENTRE

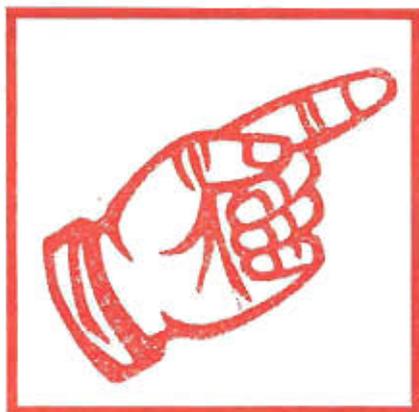
20C SELSDON ROAD, SOUTH CROYDON, SURREY
TEL: 01-680 4503



All prices include VAT & p&p



| | | |
|--------------------------------------|---------|---|
| K40 Mike/s @ £31.95 | £ | Name |
| K40 Antenna/s @ £31.95 | £ | Address |
| K40 Magamount/s @ £10.95 | £ | |
| K40 Unimount/s @ £8.65 | £ | |
| K40 Weather Cap/s @ £0.65 | £ | |
| K40 Weather Doughnut/s @ £0.65 | £ | |
| Total Sum Enclosed £ | | Please make all cheques/POs payable to: CB Centre |
| | | Access and Barclaycard orders also taken |



Introduction

Which Rig?

Which Rig is essentially an introduction to legal Citizens Band two-way radio and a buyers guide to help both newcomers and old-timers alike decide on which equipment best suits their needs.

Citizens' Band radio is arguably the largest growth industry in the UK. Almost overnight, from November 2nd 1981, literally thousands of shops up and down the country found themselves selling equipment that they had had little or no experience with before, and certainly little or no awareness of the pitfalls involved in this technologically advanced subject. The prospective CBER was left bewildered, faced with over 100 different CB rigs to choose from, literally hundreds of different CB aerials and thousands of supposedly useful accessories, it's no wonder that many would-be CBERs were put off even before they ever switched their rigs on!

Which Rig is here to help. It has been split into four sections; the first deals specifically with buying, installing and adjusting the equipment prior to use, along with a brief outline and explanation of the controls associated with CB rigs.

Section two deals with specific reviews, drawn up from hundreds of hours of comprehensive analysis, both in the lab and in the field. Both CB rigs and antennas are dealt with in a clear and easy to understand way without any confusing technical jargon. The review sections are followed by detailed checklists, listing functions and features plus a clear indication of retail prices, addresses of manufacturers and importers and all relevant data.

The third section is for the DIY enthusiast, a number of simple to build items are clearly explained, enabling virtually anyone who can solder to put together a working CB antenna or, for the more experienced constructor, a simple SWR meter to help with antenna adjustment.

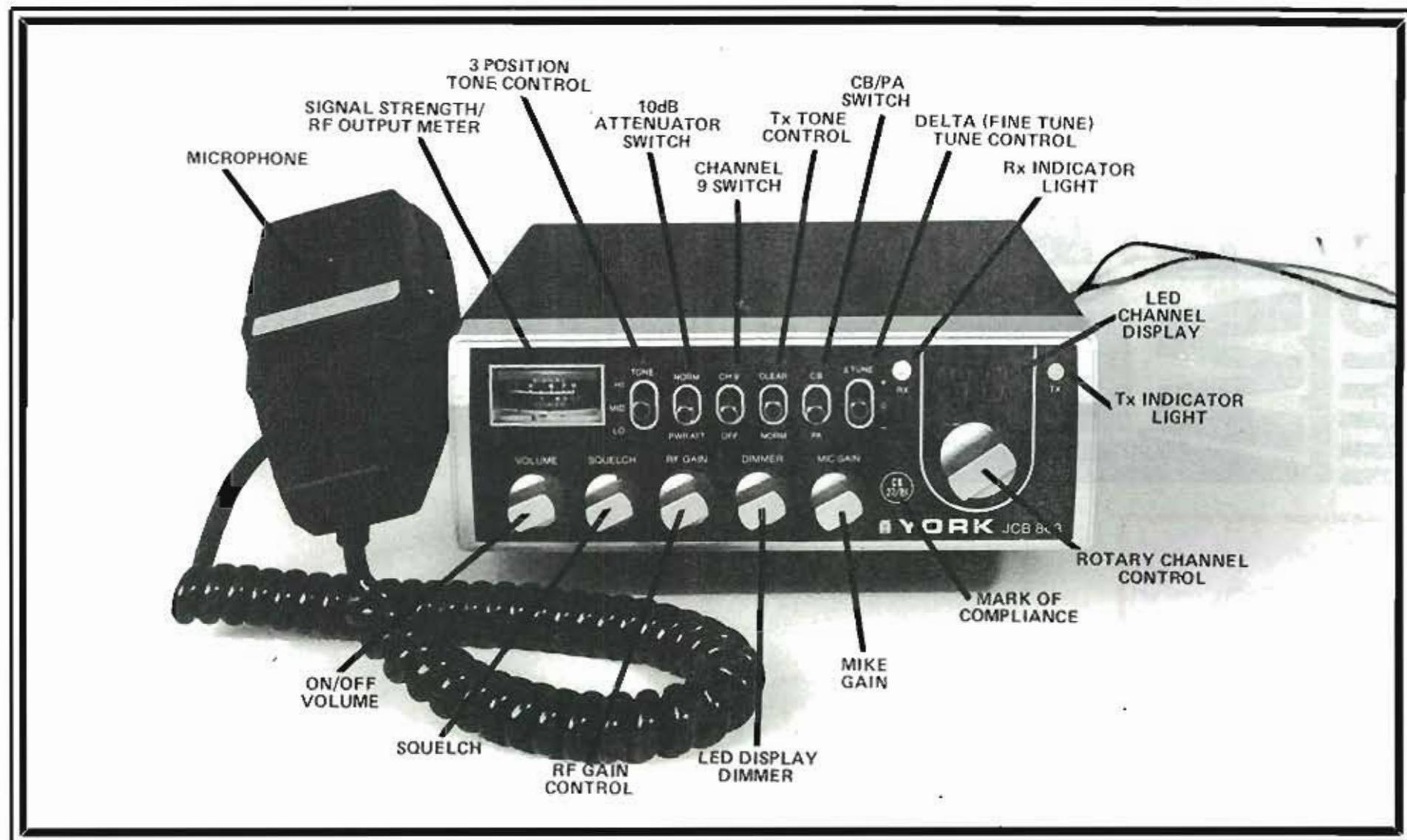
The fourth and final section explains how CB actually works. Clear, non technical explanations of the transmitter, receiver and antenna are accompanied by concise block diagrams that anyone interested in their hobby should be able to understand.

And lastly, for the dedicated enthusiast we have catalogued together hundreds and hundreds of CB clubs, from all over the country. A CB club is probably the best way to really learn about two-way radio, from the enthusiasts themselves. We give details of meetings and times for many of the clubs plus contact addresses for postal enquiries.

Which Rig is the complete guide to legal CB, it has been compiled with material from *Citizens' Band*, the country's leading CB magazine. So if you are thinking of getting into the exciting world of CB radio be sure to keep in touch by reading *Citizens' Band* every month.

RTM

Anatomy Of A CB Rig





A CB rig might look complicated but they're no harder to use than the average car radio. We explain all of the controls you're likely to find on UK CB rigs

ON/OFF/VOLUME

When this knob is in the fully anti-clockwise position, the set is turned off. Turning it clockwise will turn the set on and continuing to rotate it will increase the volume of the sound coming out of the speaker. This control only affects the volume of the incoming signal, transmissions remain unaltered.

TONE

This control alters the tone of sound coming out of the speaker, ie it adjusts the amount of bass and treble in the audio.

SQUELCH

For anyone who has never used a rig before, this is probably the control that is the most difficult to understand. It exists to remove the background noise, that hissing sound that you can hear when there isn't a signal present. Nothing happens when the squelch knob is turned slowly clockwise, until it reaches a point just above the level of the background noise. Then, suddenly, the noise will totally disappear and you will hear nothing at all until a signal that is stronger than the background noise is received. This signal will cause the squelch to *open* and you will hear it, but

as soon as it disappears, the squelch will *close* again and no sound will come from the rig. Care should be taken when adjusting this control because the higher it is set, the stronger the incoming signal has to be in order to open it. For the best results, the control should be left at the position just past the point where the background noise vanished. It will then let through any signal that is stronger than the background noise but not the noise itself.

RF GAIN

This is a variable attenuator that cuts down the amplification which is given to incoming signals and the more it is turned, the less the gain of your rig. This helps to prevent overloading when you are talking to someone who is very close by.

DELTA TUNE/CLARIFIER

This control alters the frequency of the receiver part of the rig without affecting the transmitter side. This allows you to tune into a station transmitting slightly off frequency but also allows you to continue to transmit on the correct frequency.

SIGNAL STRENGTH/RF METER

This is a dual function device that shows the relative strength of the signal you are receiving and of the signal you are transmitting. The S-Meter is usually calibrated 1-9 and the nearer to the 9 the needle is when you are receiving a signal, the stronger that signal is. If someone asks you for a signal report, all you need to do is quote the number that is indicated on your S-Meter. This will give them a good idea of how well you are receiving them but you should remember that this is a *relative* indication and another rig under exactly the same circumstances could well give a reading that is 2 or 3 points different.

The same applies to the RF Meter. It also gives a *relative* indication of the power you are putting out and it doesn't give a reading in watts. When you have properly tuned your antenna,

you should note the position of the needle when you transmit, it should be around the 8 mark. If it suddenly moves from this position when you are transmitting, you should immediately re-check your antenna as there will almost certainly be something wrong with it.

NOISE BLANKER/AUTOMATIC NOISE LIMITER

These two functions are often combined on one switch and although they operate differently, they both exist to cut down interference. Most ANL systems work reasonably well but an NB is a far more efficient device that will remove almost all of the crackles and pops that are caused by interference.

LEDS (RX TX)

The appropriate one of these light emitting diodes lights to show if you are transmitting or receiving.

PA/CB

This switch turns your rig into a low power public address amplifier when it is set to the PA position. There is a socket on the back for an extension horn type speaker to be plugged into and anything you say into the microphone will be amplified and broadcast through the speaker.

MIC. GAIN.

This control alters the amount of audio from the microphone used to modulate the outgoing signal. When it is set to minimum, you are transmitting a blank carrier regardless of whether you speak into the microphone or not but when it's set to maximum, your signal is at almost 100% modulation.

PTT

The Push-To-Talk switch turns on the transmitter part of the rig. It's located on the side of the microphone for ease of operation and whenever you want to transmit, you must press it. You must also not forget to let go when you've finished speaking or you won't be able to hear anyone else.

HI/LO

This switch cuts down the output power of your rig so that you can conform to the rule on the back of your licence that says that you must reduce your power by 10 dB if your base station antenna is more than 7 metres above ground level.

CLEAR/NORMAL

This strangely named switch is another tone control but it alters the bass and treble content of the transmitted audio so you will need to ask another station how it affects your signal as you won't be able to hear it.

CHANNEL SELECTOR

This is the knob that you use to change channels

CHANNEL INDICATOR

This window displays the number of the channel in use. Most sets use LEDs for this display but some manufacturers prefer to use liquid crystal or fluorescent type displays. Displays will normally be bright red, orange or green and visible in all but the most direct sunlight.

MARK OF COMPLIANCE

This mark shows you, and anyone else who may wish to examine your set, that it meets the specifications laid down by the Home Office and is therefore a legal British set. All legal rigs will have this mark permanently engraved on their front panels.

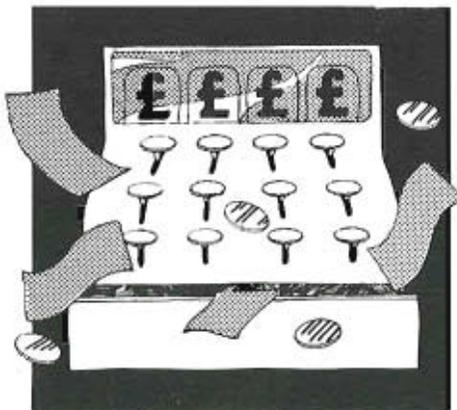
DIMMER

Some of the larger LED channel indicator displays are very bright which makes them easy to read in daylight but it also means that they are usually too bright at night. The dimmer switch reduces the brightness of the display.

CH 9 PRIORITY

This switch allows you to go immediately to channel 9 without having to use the channel selector.

Buying A CB



Legal CB in the UK is a reality but there are pitfalls. We look at some of the pitfalls concerned with buying CB equipment.



Above: The Home Office mark of compliance that will be on all legal FM CB rigs.

Buying A CB Rig

Now that CB is here you should have no trouble in finding a shop to sell you a genuinely legal rig. Virtually every big name in retailing that you can think of has rigs for sale and so there is no need for you to deal with the shady characters who have been earning some easy money from the punters who haven't really understood what's going on. If you go to a reputable dealer you will find that *all* of his rigs will have the mark of compliance permanently affixed to their front panels. This mark shows that the set that you are about to buy conforms to the specifications laid down by the Home Office and if the set doesn't have the mark, it's not a legal one, so *don't buy it*. The Home Office have laid down some quite stringent rules about how the rig must be built and they have insisted that all manufacturers put this mark on their front panels. The mark not only tells you that the set should have been made to a certain standard, it will also tell the police if the set is a legal one or not. They may have had some trouble in the past because they can't seem to be able to tell the difference between a CB rig and an amateur transceiver and we know of several CBers who have been able to bluff their way out by pretending to be radio amateurs but they will not be caught like that in future, because it's the easiest thing in the world to see if the mark is on the front panel or not. A large number of them will also be issued with small frequency counters as well, so it's no good trying to pretend you're not on the legal frequency.

When you wander into your local chain store, you will probably be surprised at the number of rigs that they have for sale and you may well wonder why the prices vary so much and what all the various buttons and knobs are for. The reason the prices vary is the same reason that applies to everything else you buy, you get what you pay for and as a general rule, the more you pay, the more you get. Just because the set has the mark of compliance on the front, it is not necessarily a good set. It may meet the standards laid down but when you think that the Titanic was also Government-approved....It's always a good idea to go to a reputable shop and buy a brand name that you are familiar with. This may seem a little hard on the smaller companies trying to establish themselves, but events in other coun-

tries have shown that the legalisation of CB tends to bring out the sort of people who are very good at separating people from their money without giving them what they asked for in return. In other words, there are so many innocents around that the con-men have a field day.

Right, so you've arrived at your local Woolies, Comets, etc, etc, etc and you're gazing at all the rigs wondering where to start. Well a good place is with one of the basic units. A basic 40 channel British specification rig will transmit and receive on the 40 channels that have been allocated by the Government, with 4 watts output (2 watts erp) using frequency modulation. Basic rigs have the absolute minimum number of controls that are necessary to operate the set. The main switch will be the ON/OFF/Volume control. This is used to turn the set on and off and to adjust the volume. The next most important control is the channel selector. The channel in use is displayed in a small window on the front of the rig and turning the channel selector will change the channel. The microphone is usually plugged into the side or the front of the rig. Some rigs have the mike socket on the left hand side of the rig (not a good idea) as the left-hand side is the one furthest away from you when you're driving. It's worth looking at the mounting position of the rig in your car before you buy a rig, as you may well find that the one you've bought won't fit into your dashboard or in the case of one with a side-mounted microphone, the lead may not reach from the rig to you.

Next to the channel indicator you'll usually find the Signal Strength/RF Power Output meter. This meter shows you the relative strength of incoming signals, relative being the operative word. It's not unusual for two cars to be parked side by side, both listening to the same signal and both getting different readings on their meters. The meter on one make of rig may well vary by as much as two S points (two divisions) from the meter on another manufacturer's rig, so don't worry too much if the person you're talking to says he's only getting a reading of 3-4 on his meter and you are getting 5-7 on yours. The same is true of the RF Power Output meter. It gives a relative reading and it is not possible for you to read off directly the number of watts that you are putting out.

The other control usually found on

basic rigs is the Squelch; a control that is often misunderstood but one that is a must on CB.

The squelch control is basically a sensitivity control, connected to the volume. To set the squelch, rotate it until you hear a loud hiss coming from the loudspeaker — that's the background noise. Now rotate the control until the hiss disappears, it should do it quite suddenly. Turn the squelch control just a little more, making sure the hiss has disappeared, and it's set. Now the rig will only respond to signals that are louder than background noise, ie CB transmissions.

On the back of a basic rig is a socket for the antenna plug to be screwed into. There's usually a jack plug socket for an extension speaker and sometimes another one for a PA speaker. The power leads sometimes go directly into the cabinet, or plug into another socket. The ones for the antenna and the power are obviously necessary and the one for the extension speaker is nice to have because the quality of most of the speakers inside rigs is not exactly wonderful. They usually point downwards which makes them more difficult to hear and so it's handy to be able to plug in another speaker and have it mounted somewhere inside the car where you can hear it.

There are dozens of sets of this type and if you are new to CB and you just want to try it out to see if you like it then one of them would be ideal for you. Prices range from £65 to £75 and you should have no trouble finding someone selling them.

Before you can go on the air with your rig, you will need to buy an antenna and here again the guys with the black shirts and white ties are making a killing. When you get your licence form you will find that it says on the back, under Section 3 (a) of the Schedule 'Antennas — 27 MHz apparatus with provision for connection of an external antenna shall be connected to a single element rod or wire antenna with a base mounted loading coil; overall length of the antenna, excluding the loading coil, shall not exceed 1.5 metres.

This means that you mustn't use helically wound antennas or ones with their loading coils in other places such as the DV 27 which has a top mounted coil. Also ruled out are all the multi-element beam antennas for base station use because they are not a single element. In the words of M. Caine Esq, 'Not many people know that', and many dealers, some of whom have warehouses full of illegal antennas are certainly not going to throw them away; it's the easiest thing in the world for the police to tell if you're using the correct antenna, they only have to look.

If you find that you like CB or if you've already decided to spend a little more money, you may want to buy something a little more sophisticated. Mid-market rigs still have an ON/OFF/Volume Control, a Squelch Control, a Channel Selector, a Channel Indicator and an S/RF Meter but they sometimes have a few extras like another knob and a few extra switches. The extra knob is often an RF gain con-

trol — a reasonably useful feature. The RF Gain Control is another type of sensitivity control, which adjusts the circuitry inside the receiver, telling it to only receive signals of a predetermined strength. This is useful, for instance when the station you're trying to copy is very close, it will reduce the sensitivity of the receiver, thus preventing swamping. In the same context it can be turned the other way to increase sensitivity to enable you to pick up on weak signals. And the extra switches will often be used for a Tone Control; which alters the tone of the audio from the rig, and the CB/PA switch allows the rig to be used as a Public Address amplifier, not the most vital of functions unless you're really keen to indulge in the dubious practise of shouting at little old ladies who are taking a bit too long to cross the road in front of you.

A set with these types of feature should start at around £85 and again they should be available from almost anywhere.

The tone control on some rigs have three positions instead of just two and there is a power attenuator switch that will insert a 10 dB attenuator into the path of your signal when you transmit. This may not sound like a good idea to you and it isn't, but Section 3 (c) of the Schedule states 'Where an antenna for use with Citizen's Band radio equipment is installed or used in or on any structure at a height above ground level exceeding 7 metres for 27 MHz equipment or 10 metres for 93.4 MHz equipment either a 10 dB attenuator shall be fitted between the transmitter output and the feeder or the integral attenuator switch provided by the manufacturer shall be used to reduce the power'.

In other words, if you put your antenna up too high in order to get a little more instance out of your rig, you'll have to flick the switch to cut down your power.

All the types of set we've looked at so far have been designed for use in a car and if you want to use one of them indoors you will have to buy a power supply and again you will get what you pay for. I would opt for one that has stabilised output of 13.8 V as most mobile rigs have been made to operate at peak efficiency at this voltage because that is the voltage given out by a car alternator or generator. If your rig is all you intend to run from the supply, then a 2 or 3 amp one should be sufficient. You could expect to pay about £20 for a good one. You could buy one for a lot less but beware; one of the most common problems that people have with unsuitable power supplies is that they tend to catch fire — not the sort of thing that I would like to happen in my home while I'm out, not that you should leave your rig on when you pop out, but who hasn't done something like that at some time or another? Look out for PSUs with the BS mark of approval. You will also need another antenna for your roof, the same rules apply so don't be tempted by those enormous base station antennas that most dealers have in stock.

If you find that your wife/husband starts complaining when you take the

rig out with you in the morning (not because she doesn't want you to go, but because she wants you to leave the rig behind) then you may want to buy a set just for use indoors. A base station rig is an example of the sort of thing that you can use at home. It has all the usual controls and then some more. As well as a S/RF meter there is often a SWR meter and knob that is used to set it. On some rigs there is a large knob labelled 'clarifier' and this I wouldn't have expected to see on an FM rig because FM signals don't usually need to be 'clarified', (a form of Delta tuning). The digital channel display is usually the channel selector and fitted next to another digital display, this time for the built-in clock. In amongst the switches under the clock display is one that is used to set the time, another that acts like a 'sleep' button on a normal transistor radio receiver, another that instructs the rig to turn on and off at pre-set times and another that turns off the internal speaker. This is so that you can listen in peace on headphones which can be plugged into the socket on the front panel. The normal fist mike is replaced with a base station one and this sometimes has adjustments on it for tone and volume and locking PTT so that you don't have to keep hold of it while you're talking.

Base station units have their own built-in power supplies and so they can be plugged straight into the mains. They can cost anything from £120 to £250 depending on the number of facilities that you want.

At the other end of the scale are the hand-held portables — the walkie-talkies. They vary in price from £30 to £100 and they may have only 1 channel, 2 channels, 6 channels or even all 40 channels and their output power could be anything from ½ watt to the full 4 watts. One model has all 40 channels, an output power of 2.5 watts, a built-in telescopic antenna and a socket on the side for an external antenna to be plugged in. Also fitted on the ON/OFF/Volume and Squelch controls as well as the sockets for an external power supply and the charger for the internal re-chargeable batteries. The S/RF meter is on the front panel and next to it is a light that shows when you are transmitting and also doubles as a battery condition indicator. This sort of rig is very useful if you go hiking or rock climbing and, of course, there's nothing to stop you plugging it into your car antenna and using it while you're driving. Some portable sets even have provision for fitting an external microphone so that you don't have to keep holding the whole thing up to your mouth whenever you want to speak — perfect for the car.

In the next few chapters we hope to be able to bring you details of just about all the rigs on the market to help you with your choice of set but in the meantime don't forget — All legal rigs have the mark of compliance on their front panels and if the rig that you are offered doesn't have the mark, DON'T BUY IT!!

CB

D.I.Y.



Installing a CB transceiver in your car is no more difficult than fitting the average car radio.

Fitting A CB Rig

Fitting a CB radio will only take you an hour or so. No need to worry any more — we show you how to do it.

You've just walked out of your local CB emporium. In one hand you have the latest *Bigtalker Mk 5* CB rig, in the other a Home Office approved 1.5 metre whip antenna with magnetic base. Now, you have a problem: all that rash expenditure has left you £70 poorer and with no money left to pay somebody to install your goodies in your car, so what to do?

Simple, you read the next few hundred words, equip yourself with a few basic tools, and do the job yourself.

Installing a CB rig is actually very simple, even simpler than installing the average car radio and providing you follow the rules it should only take you an hour or so.

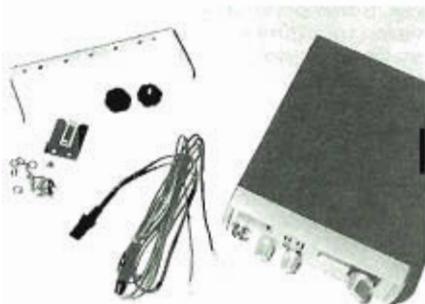
Step Number One

Easy — buy this book, instead of trying to remember all the pertinent facts while browsing through the issue at the newsagents'. Now, let's assume you've arrived home, with the rig, antenna and this copy of the mag, then what next? Open up the box containing the rig, take out all the little bags and boxes and spread them across your kitchen table (the dining room table will do but ask the wife/husband/friend first). Now take a good long look at all the little bits and pieces in front of you. There should be one big box, that's the rig, one microphone, that's the business with the curly lead, a mounting bracket, that's a U-shaped piece of metal with lots of holes in it. There should also be power leads, usually coloured black and red with an in-line fuse, and last but not

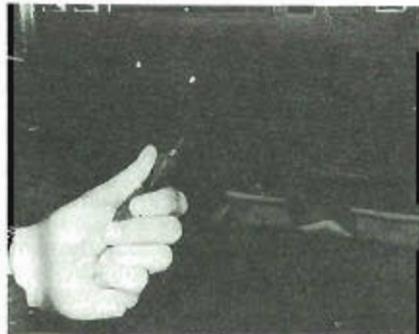
least, a plastic bag containing nuts, bolts and funny shaped metal things.

Now you will need a car, preferably your own, in which to install the aforementioned CB rig. The position in which you will locate the rig in your car is crucial to your sanity and good health. For instance, if you put it in the wrong place you might end up having an accident one dark night, fumbling for the controls 'cos you've put the rig in an awkward position. There are three or four good places for CB rigs. The first is slung under the dashboard, over the transmission tunnel if you have one. Remember it should be within easy reach. The second place is on the transmission tunnel itself — same rules apply, you should be able to operate all the controls without taking your eyes off the road. Third possibility is in the space provided by some car manufacturers for ordinary car radios. If this is the only possibility then you might be better off having the rig installed professionally. Such installations may require the removal of a large portion of the dashboard, and *Sods Law* decrees that as soon as you start doing a big job like that you'll end up creating a whole lot of problems for yourself. So let's assume you're going to mount your CB rig on or above the transmission or dashboard.

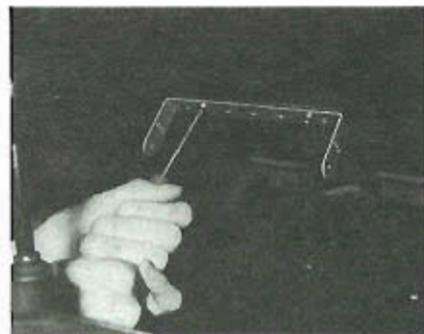
Before you drill any holes find a source of power. That's right, CB needs electricity — 12 volts DC (13.8 volts if you're really fussy). You need to connect up the red and black wires to + and - 12 volts respectively. Hopefully your car will be negative earth chassis so the black wire should be easy to connect. Simply look for any piece of metal, near



Typical CB rig and fixing kit.



Drilling a hole for the power leads.



Fixing the mounting bracket.

In one year our **K40**™ antenna has become the largest selling CB antenna in the world!

1. It's more expensive ...

£32.50 suggested retail
vat included

And when you pay more, you expect more!

MORE PERFORMANCE:

The K40 is guaranteed to transmit further or receive clearer than any antenna it replaces. We know it will. We've tested it with 771 CB'ers just like you for one year.

MORE FLEXIBILITY:

You can fit your K40 to any mounting surface. It will fit any vehicle you'll ever own! That includes choppers, dune buggies, gutters, mirror mounts, luggage racks, trunks, hatchbacks, through roofs, semis, pick ups and RV's.

MORE QUALITY:

It's not imported. It's not made in Taiwan, Korea or Japan. It's American made in an American town. It's made with better materials that cost more and by professional people we pay more. And we designed it in the U.S.A.

*Including optional mounts at extra cost.

... This Antenna is so DYNAMITE you receive a ...

DOUBLE GUARANTEE

GUARANTEE I: The K40 will transmit further and receive more clearly than the antenna it replaces or the customer will receive a pro-rata and full refund from the Registered K40 Dealer who installed and tuned it.

GUARANTEE II: Unconditionally guaranteed for 12 months. Guaranteed against cracking, chipping, or rusting. Guaranteed against mechanical failure. Guaranteed against electrical failure. Guaranteed against accidental breakage. No exclusions for gimmicks. For a full 12 months.

2. It's made better...



3. It's proven best!

...Here's what the leading U.S.A. CB publications said.

CB TIMES: "... it's not often that a product bursts onto the market scene, dominates and improves CB'ing for everyone. American Antenna and the K40 are doing it—repeated tests showed the K40 could out-perform the major competitive brands."

RADIO ELECTRONICS: "The results of our tests showed that, in three different positions of the monitoring receiver, the model K40 equaled or out-performed the competitive antenna. Apparently, American Antenna's advertising is not merely Madison Avenue showmanship."

PERSONAL COMMUNICATIONS: "... an impressive 95% of the trials, the K40 out-performed the existing mobile antennas. We had to try one for ourselves. ... in every case, the K40 either equaled or out-performed its competitor."

"No ifs, ands, or buts! The K40 Antenna from American Antenna would have to be just about the best antenna around."

CB MAGAZINE: "Introduced in October, 1977, the K40 quickly became the top seller and in mid 1978, became the number one selling antenna in the nation."

...Here's what CB'ers all across the U.S.A. said.

ANTENNA SPECIALISTS: "... truck driver and CB'er for 10 years ... 50% further than my M410 'Big Momma'."

—J.H. Colett, 207 McFee, Bastrop, LA

AVANTI: "I'm an electronic technician with a Second Class FCC license ... I was able to transmit 70% further and tune the SWR 75% lower than my Avanti."

—H.R. Castro, VRB, Monserrate D-67, Salinas, Puerto Rico

PAL: "... 20% better in transmission and reception than my 5/8 wave Pal Firestick."

—John A. Blum, Box 446, Zellersville, PA

SHAKESPEARE: "... I've been a CB'er for three years and the K40 is the best I've ever had. Better in reception and transmission than my Shakespeare."

—H. Bachert, Jr., 15 King Rd., Park Ridge, NJ

HUSTLER: "Compared to my Hustler XBLT-4, the K40 can consistently transmit 40% further and the reception was better. The K40 is the perfect way to complete a CB system."

—Jerome R. Brown, 7800 S. Linder, Burbank, IL

PERFECT FOR FM TOO!!

(SPECIAL NOTE) IF YOU'RE A BEGINNER:

Our K40 Dealers will be happy to sell you any of the older style and less expensive antennas that are great bargains for any beginning CB'er.

AMERICAN ANTENNA
ELGIN, IL 60120 U.S.A.
COPYRIGHT AMERICAN ANTENNA 1979



K40
POWER!

... Sold exclusively by 5000 K40 dealers throughout the U.S., Canada & U.K.

to where the rig is to be mounted, then drill a hole, fit a connector to the black wire and screw it to the metal with a self-tapping screw. Now for the red wire. This needs to go to a source of +12 volts. If you're lucky you may already have a car radio connected to 12 volts so connect the red wire to the same point. If you haven't, look for a fuse box or junction box. A small 12 volt light bulb and two wires might come in handy. One end connects to the metalwork and the other lead is bared so that you can prod around. This will help you find a source of volts. What you're looking for is a live circuit that's connected across the ignition/auxiliary circuit. That means that your rig will come on with the ignition and you won't be able to leave it on all night, running down your battery.

OK, you've found a suitable source of volts, now connect the red lead up to it. Many CB power leads will be terminated with spade connectors: if you can use the connectors provided so much the better. Try and avoid the situation where you just wrap the lead around a convenient terminal. It is inevitable that sooner or later it will become unwrapped — maybe at a crucial point in your conversation, or when you need to make a distress call. Pound to a penny it'll happen at night too.

Next stage is to mount the mounting bracket, so let's have a new paragraph heading.

Step Number Two

That's better. Right, this is the part where you have to make holes in your lovely car. It's important, therefore, to make sure you get it right first time, and do not spend hours drilling holes which don't line up. Get the wife/boy-friend/husband/next-door neighbour to hold the bracket in position. Stand back and see if it looks right? Will it take a layer of skin off your knee? Will you be able to operate the controls? If the answer to these questions is yes, then get a pen or pencil and mark the positions of the holes.

Now, with the trusty Black & Decker in one hand and a small crucifix in the other, drill your holes. The size of the holes will depend on how large are the self-tapping screws supplied with the rig. Your local hardware shop may help you in deciding, but the easiest way is to look in the instruction book, which should tell you the size of the holes.

Drilled the holes yet? Good, now screw the bracket to the metalwork and give it a good hard wiggle to see if it's firm. Having satisfied yourself that all is hunky-dory go in your house and have a cup of tea... That's better, now you're ready for stage three. Let's have a new heading to celebrate.

Step Number Three

You'll like this one, it's the last. This is the point where you screw up all your screws and try it all out.

But hold on, how about the antenna? You'll likely blow up your rig if it isn't connected up to the antenna. Plonk it on the roof and screw the connector into the back of your rig; (like the way we neatly avoided that one?)

Now for the big test (at this point you can have another cup of tea if you like and take it out to the car and have one last look at your installation). Here's a checklist for you to mentally tick off:

- Does the black wire go to the car's metalwork?
- Does the red wire go to +12 volts, preferably on the ignition circuit?
- Is the bracket located in a sensible place, and can you operate the controls without taking your eyes off the road?
- Is the bracket secure?
- Is your car insured against fire?
- Do you suffer from a weak heart?

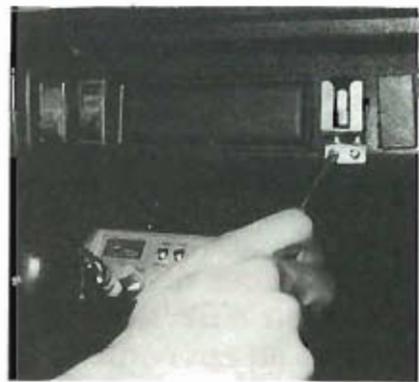
If it's all yesses (except for the last one) then you're ready. Take a deep breath and turn on the rig. If all's well, then you will be confronted with a working rig that may or may not make noises. If it does, then you're excused from reading the rest of this piece. If not, then here are a few tips and hints to locate the problem:

- Check that power is actually present — use your light bulb to check.
- Check the fuse that should be fitted in the power leads — you can use the bulb check again for this.
- If power is getting up to the rig then check all your knobs.
- Look out for silly things like PA/CB switches in the PA position. Some rigs don't light up in this position.
- If the power is missing then check the car's main fuses. Also make sure the ignition switch is on and nobody's nicked your battery.

If it's still dead and power is getting through you might have a duff rig. The only way to make certain is take it all back to your dealer and let him check it out. That's where we came in.



Fixing the rig to its mounting bracket.



Fixing the microphone bracket.



The rig and mike installed.

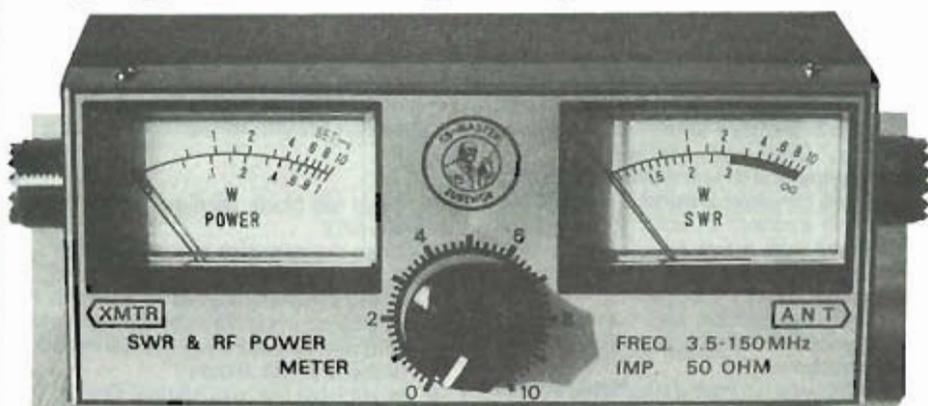


Complete in-dash mounting.

CB



One of the most mysterious rituals in CB operation is SWARING. It is an apt name for a technique that can involve a lot of swearing. Find out how to avoid trauma and keep your antenna in tune



One of the first things the newcomer to CB will discover is a strange ritual called *Swaring*. To the uninitiated it all sounds quite daunting. It involves a mystical rite that necessitates a great deal of shouting. Phrases like, 'up a bit', 'key the mike' and 'tighten the nut' are chanted with monotonous regularity whenever two or more CBers indulge in this ritual. The ultimate goal for the participants is to attain the euphoric state known as 'one to one'. In practice few CBers ever reach this state. Those that do, or claim to have done at a previous ceremony, are revered by their fellows and are often called upon by their less fortunate colleagues to officiate at other swaring functions.

If all this sounds like some kind of obscure black magic communion then you couldn't be further from the truth. Swaring, or to give it its correct name, Standing Wave Ratio (SWR) measurement is a technique used to ensure that a radio transmitter is efficiently coupled and tuned to an antenna. If that sounds even more complicated than the first paragraph please read on and I'll try to dispell some of the mystery that surrounds this very basic (but very essential) procedure.

Strange Waves

Radio waves, as you will doubtless discover, are very strange things. They are basically composed of very high frequency electrical vibrations that can travel around in a variety of differing mediums. If, for instance you pass radio waves down a screened wire going to an antenna, then most of the radio waves will pass out through the antenna and into the air. If the antenna has a relationship in length to the wave length of the radio waves it is carrying (ie it is $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, etc wavelength long) then almost all of the radio waves in the wire will end up going out through the antenna. We can describe the antenna in this case as being 'tuned' to the output frequency. If we now look at the reverse situation, ie the antenna's length bears no relationship to the wavelength of the transmitted signal, a number of interesting things happen.

The radio waves coming out of the transmitter find that the antenna produces a kind of barrier, not all of the radio waves can get out. A proportion of these waves are *reflected* back down the coaxial lead and interact with new ones coming out of the transmitter. Two things happen; firstly a stationary or standing wave that can go nowhere is set up inside the cable. This is rather like the wave motion produced when you wiggle a long length of string or rope. As a result of this wave some rather unhealthy high voltages are also produced inside the cable. They are unable to get out through the antenna so the only place for these high voltages to go is back inside the transmitter. This is where the problem arises, once inside the transmitter they come into contact with the output transistor. Output transistors are quite delicate components and do not take too kindly to these high voltages. In short, if the voltages are high enough and are around for long enough the transistor will expire irreparably.

Match Box

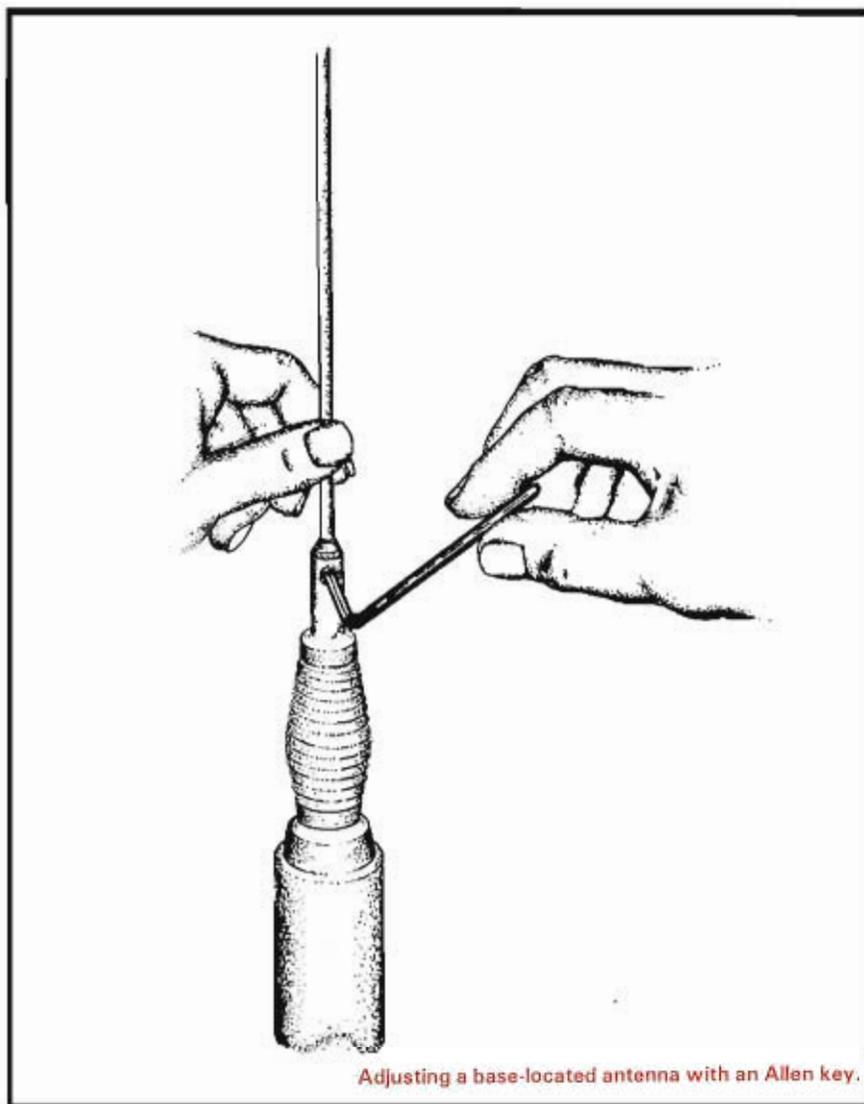
We measure the quality of match between a transmitter and antenna in the form of a ratio, the Standing Wave Ratio in fact. The perfect match has a ratio of 1:1, that means that all the radio waves leaving the transmitter end up on the antenna and are radiated into the air. In practice such perfection is impossible. Resistance in the cable, physical variations in the size of the antenna and inaccuracy in the equipment used to measure the SWR mean that perfection cannot be attained. In the real world a ratio of 1.5:1 is about as near as you could hope to get. A ratio of up to 2:1 is still okay, above 3:1 things could get awkward, not only are you losing some of your power but the high voltages previously mentioned begin to rear their destructive heads. Damage will almost certainly occur above 4:1, 5:1 and above is certain death to output transistors.

To get around this problem the obvious thing is to physically alter the length of an antenna until it becomes a fraction of the wavelength of the

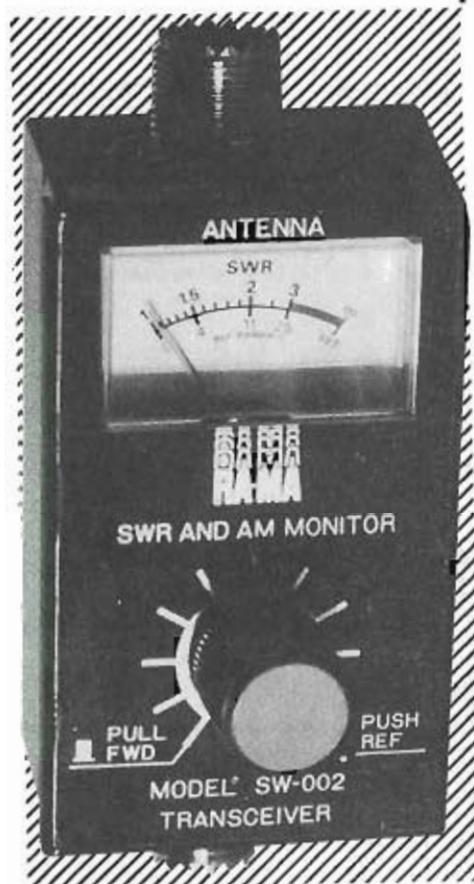
transmitted signal. Luckily for us provision is usually made by the antenna manufacturers. In cases where it is not a device known as an ATU (antenna tuning unit) can be used to electrically alter the length on an antenna. An example of an ATU appeared in last month's CB magazine as a Channel Check. But back to more pertinent matters with a few words on how to SWR.

How To Do It

The first thing you will need, apart from the obvious things like a rig and antenna, is an SWR meter. They can be obtained from most accessory shops for a few pounds, or, if you are feeling adventurous, you could build the one we featured as a project in this book. You will also need a short patch cable, this consists of a short length of RG58 coaxial and two PL259 plugs. ON the back of your SWR meter will be two sockets marked **antenna** or just **ANT** and **transmitter** or **TX**. The lead from your antenna goes into one socket and your patch cable connects between the rig and the meter. Now, let us assume you wish to adjust the SWR of an antenna fitted to your car. The first thing you do is select the mid channel on your rig. If it is a 40 channel transceiver (for instance) then switch to channel 20. Make sure no-one else is on that channel before you start. On the front of your meter should be a switch marked **FWD** (or **forward**) and **REV** (or **reverse**) (sometimes this is marked **reflected** or **REF**). There should also be another con-



Adjusting a base-located antenna with an Allen key.

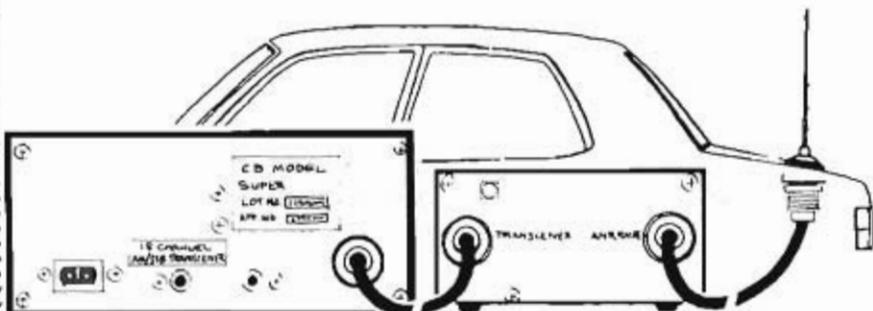


rol usually marked **sensitivity**. Right-ly, we're ready to get swaring. The first thing to do is to look at your antenna. We're trying to find the SWR adjustment on your particular specimen. Most antennas have a small allen screw in the base of the whip so that it can be moved up and down. Alternatively there might be a little box on the end of the connecting cable with an adjusting screw marked **tune**. Some older antennas have no visible adjustment whatsoever, they are deliberately manufactured a little too long so that SWR'ing involves cutting a short piece off of the top of the antenna.

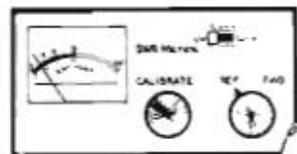
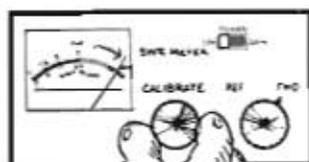
In this case no more than 1 millimetre at a time should be removed.

Now that we have found our SWR adjustment set it so that it is in the centre of its travel or if you have an antenna that has to be cut to size, wait a minute or two till we get to the next part.

Your SWR meter should now be placed in front of you. Set the switch on the front panel to **FWD** (or **forward**). Now key the mike and observe the meter on the front panel. With your free hand, or your helpers free hand twiddle the sensitivity control until the meter reads **zero** (or **set** or **minimum**). This operation



Above: Connecting a SWR meter to a CB rig.



Above: Switch positions when making SWR adjustments.

should only take a second or two. If your antenna is badly out of alignment you could do some damage if you transmit for too long. Now switch the switch to REV or reverse etc and key the mike again. Look carefully at your meter and

see what it says. If your antenna is from a reputable manufacturer it should be in the region of 2:1 to 3:1. If it is more, then let go of the mike key double quick. If you are extremely lucky it might read less than 2:1. I would advise you to leave it alone and go and have a cup of tea. If you feel that some adjustment is required then this is what you do: Slacken off the adjusting screw, clamp, knob or whatever and decrease the length by no more than 1 millimetre at a time. If you are one of those people with a non-adjustable antenna then you are permitted to remove 1 millimetre as well. Next step. After having made your adjustment go back to the beginning and switch the SWR meter to forward again. Re-adjust the sensitivity control for a minimum reading again and switch back to REV. Key the mike and look at the meter. If the reading has decreased then you know you are going in the right direction. Continue to decrease the length by 1mm at a time until the reading starts to rise again. If your first adjustment caused the meter to rise then you should start to increase the length of your antenna in 1mm steps until the reading drops. What you are aiming for in any case is a reading of 1.5:1 or less. It's really not worth knocking yourself out trying to get 1:1, your meter will only be 5% or 10% accurate

anyway. Once you're satisfied that your antenna is as good as it will ever be, tighten the clamp and re-check your reading and *LEAVE IT ALONE*. Now for those of you with non-adjustable antennas (no I haven't forgotten you). When you get to an SWR of below 2:1 STOP. If you go any further you will almost certainly pass the point of no return.

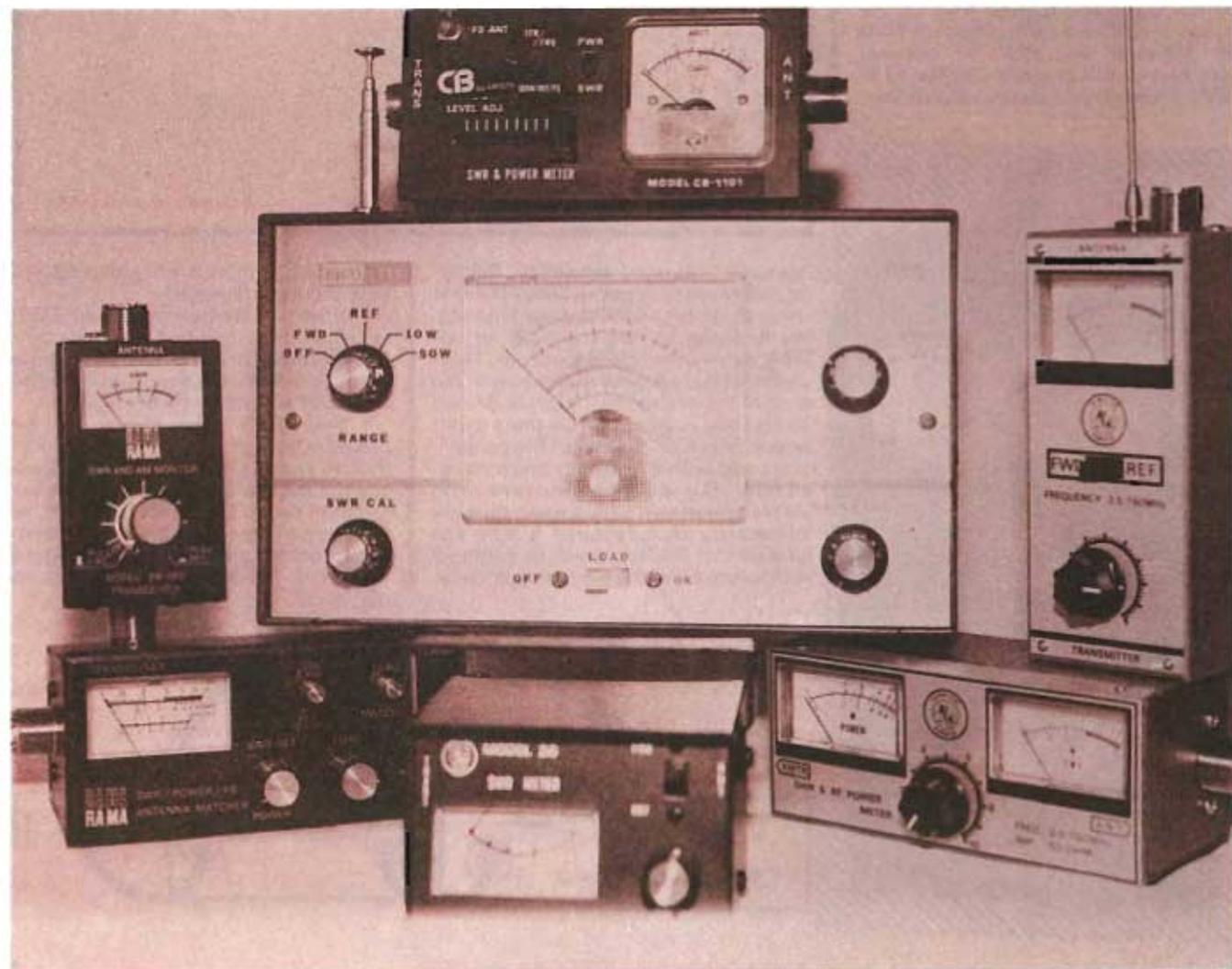
Those among you that have a tuning box fitted to the antenna will have worked all this out for themselves. The only thing that remains now is a word or two on ATU units. These are wonderful gadgets that can match an antenna to a rig without the need for swaring. The only problem with an ATU, however is that a degree of power will be lost if the SWR measurement is badly out. In general it is best not to resort to an ATU if you can help it.

Well, that's about it. If you're still no wiser then ask your friendly local CB 'know all' to give you a practical demonstration, you'll soon get the hang of it.

CB

Important: SWR adjustment is vital on any CB installation. Failure to adjust the SWR might lead to expensive damage.

Below: A selection of SWR meters.



Rig Review



Which Rig is the publication that helps you decide which rig is best for you.

Rig Review - Introduction

Are you thinking about buying a CB rig? If so then Which Rig can help you with detailed analysis of dozens of new legal CB rigs.

There are well over 100 different models of CB rig on the market complying to the UK Government specifications. Of those, perhaps only 30 or so are actually different; in one extreme case a model had 15 different names or minor cosmetic changes and priced at between £60 and £100.

At the moment only a handful of companies actually manufacture CB in any quantity, and all of them are in the far east. The major companies are not perhaps household names but are well known by CB enthusiasts, and names such as Cybernet, Uniden, Great, and AE will appear on most CB rigs, though not necessarily on the front panel.

The best advice therefore when buying a CB rig is, shop around. What may seem like a reasonable rig for £90 may be exactly the same as a rig selling for £80. Even between identical models there can be a significant variation in price, depending upon the retailer's and wholesaler's mark-ups.

The reviews that follow are representative of the models available from the different manufacturers. We've tried to incorporate as many models as possible with comprehensive details about each of the rig's performance characteristics.

Each review is carried out in three stages. First, the rig goes to our technical consultant. He subjects it to the ultimate test—the Home Office specifications. No, it isn't a virus, it is a set of parameters that any rig sold in this country must meet. Most rigs do, though some, for one reason or another fail, and we have omitted those from this review. To check that a rig complies with the Home Office regulations look out for the CB 27/81 mark on the front panel. Although this isn't a guarantee, it does at least show that it should comply. Beware rigs with compliance stamps that peel off, chances are they're not legal!

The second stage of our test is a protracted field test. Each and every rig goes into a number of different vehicles and get plugged into a wide variety of antennas. At every stage

measurements are taken and opinions noted.

The final stage is perhaps the most critical. The rigs are handed over to our merciless panel of reviewers. These include hardened CBers and novices as well as just ordinary breakers. We listen to what they have to say about the rig, how well it performs, quality of construction, ease of installation, controls, etc., etc. All the information is gathered together and correlated into the reports that follow. If there are any discrepancies we often try to obtain a rig from an independent source to verify results. We have tried to keep the reports as jargon-free as possible, we're sure you want to know how well a rig works, not its image rejection capabilities or spurious emission at 75 dB on third harmonic. If we say it meets the Government specification you can be sure that it'll be OK as far as legality is concerned. If our sample exceeds these very tight limits we'll tell you. Some rigs actually perform better than they need to, we'll tell you that too.

The final choice however is up to you. Only you can decide what meets your particular needs, and it may well be a rig that we haven't reviewed in full. For that reason we have included a comprehensive checklist and for outdoor types a short feature on walkie-talkies.

The prices quoted are in general manufacturers recommended retail prices and should be the highest price you pay. To repeat what was said earlier in this introduction — shop around, it's surprising what you can find!



Rig Review



Radiomobile 201 & 202



Radiomobile are one of the best known names in In Car Entertainment but how do they measure up with CB?

It's happening! Companies which we did not expect to venture into the once slightly dubious world of CB radio are suddenly showing off their equipment, designed specifically for the UK market. One such company is **Radiomobile** — well known for their high quality range of in-car entertainment equipment.

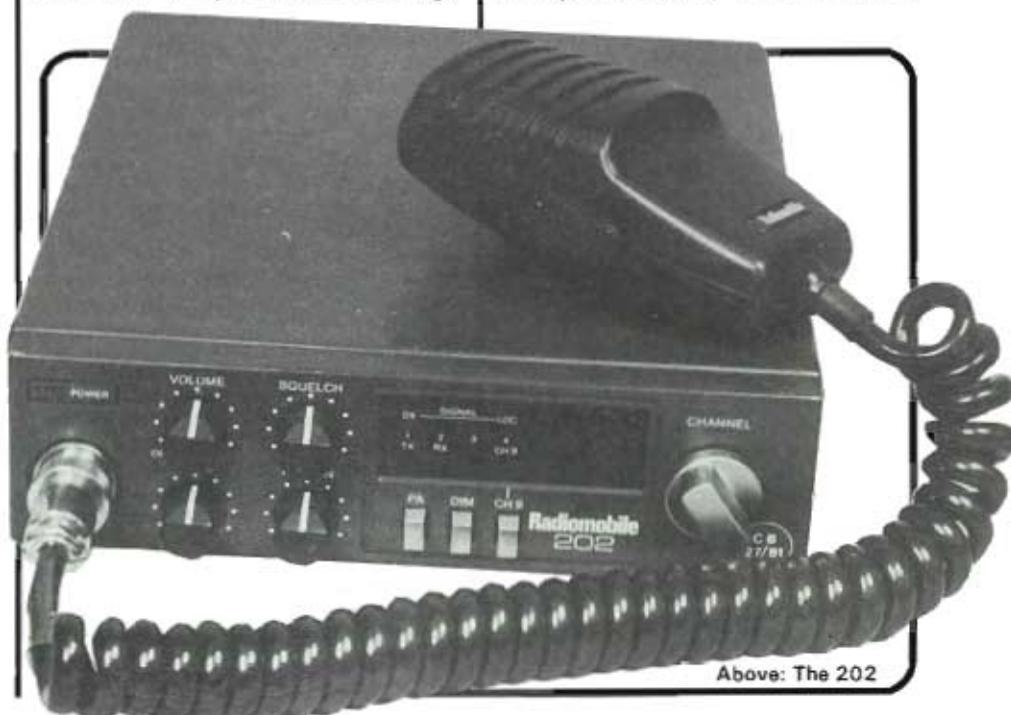
The two models shown here are half of the Radiomobile range and sit squarely in the upper end of the mobile market. The two models not shown are an as yet unnamed basic mobile rig that will sell for around £60, and a base station unit, again unnamed and as yet with no firm price.

Radiomobile 201

Starting with the 201 we have a very small and compact under-dash rig,

almost as small as a couple of packets of cigarettes and with a minimum of front panel controls. The volume and squelch controls are situated on top of each other on the left-hand side of the front panel and the rotary channel change switch on the far right. In the centre there is a green digital channel display with a rather simple S-Meter marked with the numbers 1 to 4 and (LOC-DX) local and distant. The overall size and shape of the 201 makes it ideal for mounting under the dashboard of virtually any car and although the retail price may seem a little high, it is sturdily built and if Radiomobile's other products are anything to go by, it will soon earn itself a reputation for being top quality equipment.

If there is any criticism of the 201 then it must be about the location of the microphone socket, which is on the



Above: The 202

RIG REVIEW DATA PANEL

| | |
|----------------------|-----------------|
| Model | Radiomobile 201 |
| Distributor | Radiomobile Ltd |
| Typical Price | £85 |

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | ● | | | |
| Channel Indicator Readability | ● | | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.2 VDC |
| RF Output Power | 3.9 watts |
| Frequency Stability | In Spec |
| Swamping | In Spec |
| Sensitivity (RX) | 0.3 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXXX |
| Clarity of RX | XXXX |
| Ease Of Controls | XXX |
| Ease Of Installation | XXX |
| Performance | XXXX |

We rate our samples of one to five. Five is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

American/Continental/wrong side of the rig for us stuck with right-hand drive vehicles.

Radiomobile 202

The 202 is a totally different kettle of fish. This is a top market rig with all the features you'll ever need. From left to right the controls are: volume, squelch, tone, RF Gain, PA, Display Dimmer, Ch 9 select and channel change.

The LED and S-Meter display are identical to that of the 201 with the addition of receiver and transmitter (Rx and Tx) lights and another light to show that channel 9 has been selected. Radiomobile have also included a 'power on' indicator, to confirm that the rig is still switched on in the PA mode when the channel indicator blanks out.

You can see from the picture and data panel that this is not as compact as the 201 — it's approximately as large as a conventional car radio, and it is worth pointing out that it wouldn't necessarily fit into the cut-outs provided on most cars. The most logical position for a rig of this size would be under the dashboard or on top of the transmission tunnel.

Both rigs come complete with a rather unusual looking dynamic microphone and, of course, complete fitting kit and instructions.

Specifications

As far as the specifications for these rigs are concerned we have a few vital statistics for you to consider. Frequency range and power output both conform to UK specs. Receive sensitivity for both models is 0.7 uV and the squelch operates at 0.2 uV (threshold). Operating temperature for both models is between -10°C to +55°C. Audio output is 1.8 watts with 10% distortion into an 8 ohm load. The 201 will draw 0.8 amps in transit in receive mode (max audio output on Rx) and the 202 a little more at 0.9 amps in both modes.

As we said earlier these rigs are not cheap. But if the in-car entertainment market is any kind of guide; we can expect to see many more companies like Radiomobile begin to take the subject of CB very seriously. It'll be interesting to see how many other ICE equipment manufacturers follow their lead.

Below: The 201 from Radiomobile



RIG REVIEW DATA PANEL

| | |
|----------------------|-----------------|
| Model | Radiomobile 202 |
| Distributor | Radiomobile Ltd |
| Typical Price | £120 |

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | ● | |
| Variable RF Gain | ● | |
| Mike Gain | ● | |
| Delta Tune | | ● |
| Tone Control | ● | |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | ● | | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | ● | |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | ● | | | |
| Channel Indicator Readability | ● | | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.2 VDC |
| RF Output Power | 3.9 watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.3 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXXX |
| Clarity of RX | XXXX |
| Ease Of Controls | XXXX |
| Ease Of Installation | XXX |
| Performance | XXXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

Rig Review

York JCB 863



The JCB 863 was one of the first full-function rigs on the market. How does it compare now?

The York JCB 863 is rapidly becoming one of the most popular middle-market CB rigs. This rig is available from one of the countries leading chain stores, we put it through its paces.

On opening the box, the first impression you get is one of size! This is no micro-miniature outfit! Measuring 7.1" wide 2.4" high, and 8.26" deep, you will need to find a fair bit of space on your dashboard to tuck this beauty into. Why, oh why, did they have to put the mike socket on the side? This means that you have to find an extra 1½" width-wise for installation. Still, let's move on to that impressive front panel.

Starting at the top left we find a combined signal-strength and power meter. The signal strength scale is calibrated from 0 to S9 in white, and then up to +30 dB in green. On the lower part of the scale the dial is calibrated from 0 to 5 watts. To the right of the meter is a row of switches. The first is a three-position tone switch, marked *lo*, *mid* and *hi*. In the *lo*

position the received audio quality is rather muffled and woolly, but perfectly audible. Ignition crackle, if present, is considerably reduced in this position. The *mid* position gives excellent normal audio quality, whilst the *hi* position lets even more treble through. This can be very nice when receiving a good quality solid copy, but under fluctuating or weak signal conditions the hiss tends to sound a bit sharp on the ears. For most normal circumstances, the *mid* position would be used. Next to the tone control is a power attenuator switch. Under Home Office regulations, if your antenna is more than 7 meters above ground level, you must reduce your transmitter power by 10dB. In practice we found that the '*PWR ATT*' position on this particular rig reduced the power by nearly 12dB. Better safe than sorry! This power reducing facility can be quite useful. Aside from the legal requirement, when driving in convoy some receivers overload in the presence of such a strong signal. Although this is much less of a problem with FM than it is with AM, it is nonetheless useful to be



able to reduce your transmitter power to compensate for the deficiencies of somebody else's receiver! Next along the panel is a channel 9 priority switch. Channel 9 has been designated as an emergency channel and operating this switch forces the rig onto channel 9 regardless of the setting of the main channel selector. This can be quite useful if you check channel 9 periodically as you drive along. When channel 9 is selected on this switch, the main channel indicator shows channel 9. Next along is a switch marked *normal* and *clear*. These switches modify the frequency response of the microphone amplifier in the transmit mode. In the *clear* position the low frequencies are suppressed, giving the transmitted signal a telephone-like quality. This, it is claimed, gives a more readable copy under difficult conditions. Next along is a *CB/PA* switch. With the aid of a suitable external speaker, this enables you to use the rig as a 1.5 watt public address system. Naturally, the transmitter is inhibited in this mode. Finally there is a three-position *Delta-Tune* switch. Moving this switch up or down pulls the receiver slightly high or low in frequency to aid reception of off-tune transmissions.

At the extreme right hand side is the main channel selector knob, and above it a very pleasant fluorescent green display for the channel number.

Working from left to right across the bottom of the rig, we find first the volume control and on/off switch. Next to it is the squelch control. For those unfamiliar with two-way radio systems, a squelch is a control that mutes the loudspeaker, until the received signal strength exceeds the limit set by the squelch control. This control is particularly important on FM systems. In the absence of an incoming signal, an FM receiver produces noise; *lots* of noise. The squelch control should be advanced until, in the absence of a signal, the noise stops. Advancing the squelch too far will also cut out weak incoming signals, so this control should not be advanced any more than is necessary. Next along is an *RF Gain* control. This adjusts the basic sensitivity of the receiver. Normally this control should be left fully clockwise, but, if a strong signal on the adjacent channel breaks through, backing off this control may reduce the breakthrough without reducing the wanted signal too much. Next along is a *Dimmer* control which dims the fluorescent display for night driving, and finally there is a *Mic. Gain* control which controls the level of modulation. These last two would also normally be left fully clockwise.

At the rear of the rig is a two pin power socket (for connecting to the car electrical system or other 12 volt supply), two 3.5mm jack sockets for the public address speaker and external speaker. Jacking into the external speaker socket automatically mutes the internal speaker. Finally there is a standard SO-239 socket for the antenna.

Included with the rig is a dynamic mike, fused power lead, mounting hardware and a mounting clip for the



microphone.

The instruction manual is clear and concise, and should be easily understood by newcomers. The section on SWR could, I feel, be expanded a little, though it contains a clear warning about transmitting with a broken antenna cable or no antenna at all. I was disappointed to find no circuit diagram. Although of limited use to the average purchaser, it can be extremely useful should the rig get damaged far from home!

Technicalities:

Absence of a circuit diagram makes detailed circuit analysis difficult. The handbook states that the receiver is a double superhet, with IFs of 10.695MHz and 455KHz. The other specs indicate that the rig meets Home Office spec MPT 1320. Opening up the cabinet (*not* recommended to the uninitiated!) reveals a single crystal PLL synthesiser. Who said it couldn't be done? The board is well laid out and the quality of the soldering is excellent. A glance at the back of the PCB reveals commendably few "afterthought" components tagged on the back, an indication that the basic design was thoroughly de-bugged before production began! Quite a lot of empty spaces indicate that this board is essentially a multimode design, with the AM and SSB components omitted. This should not be read as a criticism: indeed it is probably this mass production of a basically universal design which permits such comprehensive facilities at such a reasonable price.

In order to check basic compliance with the Home Office specs, the rig was checked out on a Spectrum Analyser. The specs say that spurious emissions should not exceed 0.25uW (0.25 microwatts), except in certain specified bands where they must not exceed 50nW (50 nanowatts). The third harmonic of 27MHz falls in one of these specified bands. These figures correspond to 72dB and 79dB down with respect to a 4 watt output. This is quite a tight specification. The analyser revealed a tiny second harmonic residual, about 75dB down, and no trace of the third or higher harmonics could be found! They were lost in the noise below 80dB! Thus the transmitter comfortably meets the specs with regard to harmonic contents. Since these harmonics are one of the main causes of TVI, this rig should cause your

neighbours little anguish! The manufacturer claims a receiver sensitivity of better than 1 uV. Our measurements indicated a receiver sensitivity of about 0.3 uV. This is a truly remarkable figure, and was approaching the limits of the very expensive test equipment used! It is doubtful if much professional equipment could better this performance. The power output was measured at 4 watts at 13.2 volts, and the built-in attenuator reduced this by about 12dB.

On the Road . . .

This is the crunch. No matter how good a piece of equipment may function in the lab, what really counts is how it performs in a practical application. Since this is also to some extent a test of the legal FM system as well, this rig was treated to a more thorough workout than might otherwise have been the case. The rig was tried in three separate locations: in a quiet Rover with a decent twig, in a noisy (electrically and mechanically) Imp with a tatty twig and in a home-base installation running from a stabilised power supply.

The first problem came in the Rover. As mentioned at the start of this article, this is quite a big rig. It would not fit in the central console as intended. It might have been possible to squeeze it in had it not been for that side mounted mike socket! This meant that it had to ride on the top of the dash. This has two disadvantages: it makes a very tempting target for the less honest members of the community and the mike socket being on the left hand side means that the cable has to be stretched considerably to reach the driver.

Installation in the Hillman posed no such problem. The mounting bracket was fixed under the dash and it went in with no trouble at all. Mounting it to the right of the steering wheel minimized the problem of the mike socket, but making the rig somewhat inaccessible to the passengers!

With the tone control in the mid position, the quality of contact with other legal rigs was amazing. The received audio quality was crisp and clean with a minimum of background noise. Range is obviously an extremely variable thing, depending on location, aerials, quality of the other rig, level of background noise etc. Under extremely unfavourable conditions, with one rig in an unfavourable position and very high

levels of incoming skip, ranges of 9 miles were comfortably achieved. Under slightly more favourable conditions, S3 and S4 clear copies were obtained at double this distance.

The big advantage of FM, discovered during these tests, was that the wanted signal only has to be about half an S point above the background noise to completely capture the receiver. With background skip at S2.5, and a copy at S3, better signal-to-noise was achieved than most AM systems can manage at S7 or 8. With an S7 or above signal coming in its like listening to Radio 3 on VHF! However, this capture effect can have its disadvantages as well. If the skip matches or goes over the wanted signal then the wanted signal drops out instantly. There is no gradual fading into the background as with AM. Your copy is either there or not there, and the transition from one to the other is virtually instantaneous.

This neatly raises a point about the delta-tune control. When I first acquired this set, for the life of me I could see no purpose in a fine tuning control. After all, an FM transmitter is wobbling about in frequency all the time anyway and the specs say it shouldn't be more than 1.5 KHz away from its nominal frequency (the York is only about 300Hz out at its worst!), which just goes to show how wrong you can be. First the York receiver is extremely selective. Second the UK channel frequencies are 3.75KHz below those commonly used on illegal 80 channel AM/SSB sets. If an illegal rig comes up on your channel, you can eliminate it *entirely* by pushing the delta-tune low. Yes, the wanted legal copy will now be slightly peak distorted, but still perfectly readable. But you will now be about 8KHz away from the interfering AM rig; enough for the IF filter to remove most of the interference, and the capture effect to eliminate the rest! Further, by pushing the delta tune high, it is possible to converse with illegal 80 channel rigs that have FM. Long enough to ask them to kindly vacate the legal band anyway! This 3.75KHz offset means that legal FM rigs can be clearly heard on illegal AM sets, because a substantial amount of slope detection takes place. The AM rejection of the York receiver is such that AM and SSB are virtually unreadable in the other direction. The upshot of all this is that the threatened disruption of the legal service by AM die-hards is unlikely to succeed.

Coming back to the York rig; as mentioned earlier, in the absence of an incoming signal an FM receiver produces a lot of noise. While the squelch on this rig is very smooth and progressive and thus easy to adjust, it does not contain any hysteresis. This means that when the squelch is on, its limit random noise is enough to squelch and unsquelch the receiver. This can be

irritating when trying to pull a marginal copy out of the background, or when the Italian SSB skip is high. Not that the York is any worse than most other rigs in this respect, but this is perhaps the one aspect of its performance that must be classified as average, when in all other respects it is well above average.

All of the controls have a nice quality feel about them and are smooth and progressive in action. The green fluorescent channel display is excellent. It is easily read even in bright sunlight when most LED displays become invisible. Yet at night it is not harsh on the eyes. This makes the inclusion of a dimmer control somewhat of a puzzle, especially as it does *not* affect the meter illumination, which is far harder on the eyes when driving at night. The red pointer against the black scale of the meter tends to become difficult to see at night, and there is perhaps some room for improvement here. The mic. gain seems to produce best results when fully clockwise. Perhaps in a noisy vehicle it could usefully be turned down to minimise background noise, but reception reports indicate that you would then have to bellow into the mike to make yourself heard.

The internal speaker is entirely adequate for the relatively quiet and refined interior of the Rover, but in the noisy confines of the Hillman, a bigger external speaker would be a distinct advantage. Using a large external speaker at home base provided truly excellent audio quality, but highlighted the rather uncertain transition of the squelch. Under high background noise levels hovering around the squelch level, the transition was marked by a loud 'plop', inaudible on the internal speaker because of the poorer base response.

Conclusion

In all respects the performance of this rig, both in the lab, and in field conditions, is excellent. If I seem to have been a bit hard on it over the squelch, then that is because this is the only aspect of its performance that wasn't brilliant, only average.

But please, please, can we do away with these side mounted Mike sockets? Since the dimmer control is more or less superfluous, why not eliminate it altogether and use the space created to bring the mike socket onto the front panel? This is a well made, good performance and excellent value-for-money rig, and this one simple modification would put it at the top of my list.

GB

RIG REVIEW DATA PANEL

Model York JCB 863
Distributor SulkIn UK
Typical Price £89.95

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | ● | |
| Variable RF Gain | ● | |
| Mike Gain | ● | |
| Delta Tune | ● | |
| Tone Control | ● | |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | ● | | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | | ● | |

Specifications

| | |
|----------------------------|----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 4 Watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.3µV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|-------|
| Range | ***** |
| Clarity of TX | ***** |
| Clarity of RX | ***** |
| Ease Of Controls | ***** |
| Ease Of Installation | ** |
| Performance | ***** |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.



Rig Review



Realistic TRC 1001, 2000 & 2001

Tandy are big, very big — with something like 8,000 retail outlets throughout the world they are the world's largest electronic retailer. Their formidable manufacturing abilities coupled with their numerous factories make them the force to be reckoned with in UK CB.

Tandy, or to give them their proper name, Radio Shack Corporation, are possibly the world's leading supplier of CB rigs, feeding the vast North American markets. It will therefore come as no surprise to learn that their assault on the UK market is no less devastating.

The rig we're really enthusiastic about is the TRC 1001 handheld portable, which sharp-eyed readers may recognise as the UK version of the TRC209 FCC rig, in different clothes. This rig is probably one of the most popular portable units ever made, and such is its reputation that we have seen 209s selling for up to three times their US price (about £60). The TRC 1001 is simply a development of the 209, with re-programmed synthesiser and re-designed antenna (which is a shame) and the appropriate changes from AM to FM.

The 1001 is a fully synthesised, 40 channel, full specification UK FM CB rig with numerous interesting features.



Left: The TRC 1001 40 channel portable CB transceiver. As you can see Tandy have fitted a HI/Lo power switch and external antenna, power, speaker and mike sockets — a truly versatile rig.



First, the 1001 has a full range of input and output sockets, including antenna, mike, power, ex speaker and DC charger. Put another way, the 1001 can be used in literally any situation — from simple hand-held portable to full system mobile to static base operation, just by plugging in the appropriate selection of antennas, mikes, speakers and power connections.

Second, the RF output of the rig is switchable between 3.5 watts RF and (via a 10 dB attenuator) 0.3 watts as decreed by the HO specs.

Third, the rig can be powered by rechargeable batteries — a must for continual portable use — 10 nicads can be supplied as an optional extra and for the less well off 8 AA alkaline cells will keep it fed.

Fourth, the rig has a full set of controls and displays: a two digit LED display shows the channel in use, which automatically cuts out after a few seconds to save power. There is a neat volume and squelch control and the PTT bar features a display illuminate button so you can double check you're on the right channel. The edgewise meter on the top of the rig shows battery condition and relative output power — very neat. Internally the circuitry has been extensively redesigned and provision is now made for the latest ceramic filters, making the selectivity and sensitivity of this rig ideal for hand-held work.

The only gripe with the 1001 is the antenna. The TRC 209 had a superbly long centre-loaded telescopic which unfortunately does not conform to HO spec. It's not Tandy's fault really, it's just a shame to see that this antenna wasn't used on the UK version — the price of legality!



RIG REVIEW DATA PANEL

Model TRC 1001
Distributor Tandy UK
Typical Price £119.95

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | | ● |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | ● | |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 12 VDC |
| RF Output Power | 3.8 watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.2 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXX |
| Clarity of RX | XXXX |
| Ease Of Controls | XXX |
| Ease Of Installation | — |
| Performance | XXXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

RIG REVIEW DATA PANEL

Model TRC 2000
Distributor Tandy UK
Typical Price

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | ● | |
| Mike Gain | ● | |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | | ● | |
| Mounting Bracket | | | ● | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 3.9 watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.4 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXX |
| Clarity of RX | XXXX |
| Ease Of Controls | XXX |
| Ease Of Installation | XXX |
| Performance | XXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

RIG REVIEW DATA PANEL

Model TRC 2001
Distributor Tandy UK
Typical Price

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | | ● | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 3.7 watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.3 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXX |
| Clarity of RX | XXX |
| Ease Of Controls | XXXX |
| Ease Of Installation | XX |
| Performance | XXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

Mid-range Mobiles

The two mobile rigs in the Tandy range do deserve a mention. The bottom and middle of the market is covered by the TRC 2000. The rig is fairly uninspiring as far as features and design go, which is a definite throwback to some early American designs. However as previously stated, while the cosmetics may be dated, the undoubted Tandy quality will never go out of style. The

2001 features a full range of controls, including RF and mike gain plus hi/lo switch for a centre channel selector switch is something of a departure and

may find favour among those people who gripe about the usual positioning of these controls.

CB



Above: The 2000.
Left: The 2001.

Which Video?

Having trouble getting hold of your copy of Which Video? If you are, then a swift word in your newsagent's ear will secure a regular supply of our wonderful magazine.

However, if you're addicted to the merry thump of post through the letterbox then you might like to take advantage of our super efficient subscription service. For the meagre investment of £11.95 (which isn't even enough to keep the editor in coffee) you will be the proud receiver of twelve issues of the best in video magazines. All you have to do is to send a cheque or postal order, made out to A S P Ltd, to Which Video?

Subscriptions, Argus Specialist Publications Ltd, 145 Charing Cross Road, London WC2H 0EE. Please enclose your name and address, in block capitals please, so that we can make sure we don't send the magazine to your next door neighbour by mistake. This offer is available for UK residents only. Overseas rates on application.

FACTS-FIGURES-NEWS-REVIEWS

Rig Review



York JCB 861, Fidelity 1000M



These two rigs were amongst the first basic rigs on the market after legalisation. These two rigs are ideal for first-time Cbers but how do they compare?

The majority of rigs sold at the moment are nearly all fairly basic 40 channel mobile units. All the manufacturers and importers we know of have, so far, at least one basic model in their range. We look at two such units, both with more or less the same features and both costing around the same price. What's also worth mentioning is that these rigs are both about the same size, and on paper at least, have the same to offer in terms of performance.

The two rigs in question come from *Fidelity* and *Sulkin (UK)* both are available nationally through major high street retail outlets.

First the features. Both rigs are full specification 40 channel, 4 watts RF output FM UK specification. They have basic controls like volume, on/off, squelch, rotary channel selector and Hi/Lo power output switch. Both the York and the Fidelity rigs have digital channel displays, integral loudspeaker and external microphones.

The two rigs can be mounted with a U-shaped mounting bracket that is supplied and should take only a short while to install in almost any vehicle. The positioning of the controls is a critical factor as far as comfort and safety is concerned and Fidelity fell down slightly on this point with a sidemounted mike socket. The JCB 861 has a front-mounted mike socket though it is still on the wrong side, allowing the curly mike lead to cross the front panel, possibly obscuring the controls and displays at night. The combined RF output/S-meter on both rigs are large and easy to read, the Fidelity model possibly more so as it is mounted more or less centrally on the rig's front panel.

Neither of our review samples exhibited any real vices and under our controlled test both rigs were within HO specifications MPT1320, and secondary functions like integral Hi/Lo power switches were genuine 10 dB attenuators, reducing the power output by the stipulated factor of 10.



RIG REVIEW DATA PANEL

Model York JCB 861
Distributor Sulkin UK
Typical Price £70

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | | ● |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13 VDC |
| RF Output Power | 3.9 watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.4 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXX |
| Clarity of RX | XXX |
| Ease Of Controls | XXXX |
| Ease Of Installation | XXX |
| Performance | XXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

In our range tests we used each rig in a static, base station situation and a mobile set up at various predetermined distances. Reports of signals strength, modulation and overall clarity were compared between our review rigs and our standard reference rigs.

The Results

As far as overall range was concerned the York JCB 861 appeared to be very slightly more sensitive than the Fidelity. A signal strength report on the York was generally half an S-point higher than the Fidelity. On the transmit side both of our samples were almost identical, and any differences in Tx power represented little more than a matter of yards in overall range. In both cases the results were not different enough to point to one rig outperforming the other.

The noise blanker and automatic noise limiter on the York was slightly less efficient than the Fidelity, and ignition noise was also noticeable on the on this rig, when compared with the other one in the same vehicle. The ignition noise was also noticeable on the receiving station at copies of less than S-3 when using the York. The Fidelity rig was satisfactory, as far as ignition noise suppression was concerned: our main test vehicle was only suppressed for normal AM radio and no additional suppression was needed for the Fidelity rig.



Clarity of speech and modulation were virtually indistinguishable on the Fidelity and York rigs, indeed one of our reviewers was unable to tell the difference between the two units. The case on our Fidelity test sample had an irritating habit of reverberating at certain frequencies. After opening up the 1000M we found the speaker to be slightly loose on its mounting plate. This problem disappeared after the mounting screws were tightened.

RIG REVIEW DATA PANEL

Model Fidelity 1000
Distributor Fidelity Radio
Typical Price £70

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | | ● |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | ● | |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | ● | |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 3.0 watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.3 uV |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|------|
| Range | XXXX |
| Clarity of TX | XXX |
| Clarity of RX | XXXX |
| Ease Of Controls | XXXX |
| Ease Of Installation | XXX |
| Performance | XXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.



Reports from the York rig revealed that the mike was marginally less sensitive than the other rig and it was found necessary to hold the microphone slightly closer to the mouth.

Transmission range on all our samples is evaluated using a Bandit/Dail-A-Match/Cherokee antenna on the mobile installation with a Halfbreed base antenna on the base station. Range was consistently seven miles between the two rigs, mobile to mobile at S-3 on the York and Fidelity rigs.

In all our field trials neither of our review rigs particularly outshone the other. Technically, there's not much to choose between the models, and feature wise, the Fidelity lacks any secondary functions like PA or tone control.

Cosmetically the two rigs are very different and likely to suit very different tastes. The Fidelity is clean and uncluttered and shiny, easy to use, the displays are bright and legible, and save for the mike socket on the wrong side of the case, is a delight to use. The York JCB861 is similarly uncluttered and the rather unusual angular styling on the front panel makes it very easy on the eye. The overall design, however, is little more low key. For ease of use and general performance we've rated both rigs with three stars, which to be blunt means that they're both average rigs.

Both the York and the Fidelity rigs are available from a number of major national retail outlets, and as these companies have reputations to maintain you can be sure that servicing, etc will not be a problem. Taking that into account, the £70 price seems about right. The performance is good (we managed base to mobile copies at S3 on both rigs in excess of 15 miles in a semi-built up area), and save for the irritation of the mike socket on the Fidelity rig we have no hesitation in recommending both rigs as good basic CB equipment, ideal for first timers or as secondary rigs for general workaday use.

CB



IT LIVES AGAIN!

From the past it came, growing daily, striking terror into the hearts of lesser publications, and spreading its influence across the country in its quest to infiltrate every town, every home, every mind.

Not a horror story, but a success story. And if electronics theory strikes terror into you, then you need the help of **Electronics — It's Easy**. Originally a long-running series in Electronics Today International, **Electronics — It's Easy** was printed as a set of three books. They sold out. It was reprinted as a single volume. It sold out. Now this phenomenally successful publication is available again, in its third reprint. **Electronics — It's Easy** is a comprehensive and simply-written guide which explains the theory (and the practice) of electronics step by step. Every aspect of the subject is covered, starting with the basic principles and working through to the how and why of today's technology.

You can obtain your copy of **Electronics — It's Easy** by mail order using the coupon below. Make cheques or postal orders payable to ASP Ltd; alternatively you may pay by Access or Barclaycard.

Send to: Sales Office (Specials),
Argus Specialist Publications Ltd,
145 Charing Cross Road, London WC2H 0EE.
Please send me copies of Electronics —
It's Easy. I have enclosed £ (£4.95 each
including p&p).

NAME

ADDRESS

Please debit my account
My Access/ Barclaycard No. is

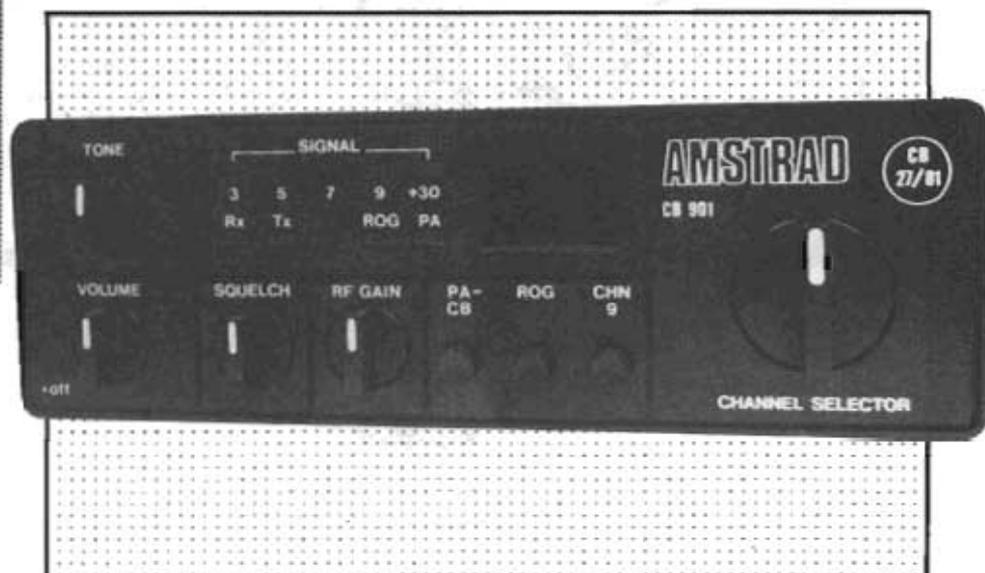
Signature



Rig Review



Amstrad CB 901



Amstrad produce some of the most stylish CB rigs around. here we look at the top-of-the-range 901.



The name of Amstrad has been well known in hi-fi circles for a number of years. They have a reputation for producing extremely good value-for-money equipment in the budget and lower-middle price ranges, though not even Amstrad would claim to have QUAD or Technics shaking in their shoes!

These new CB rigs could change Amstrad's image overnight. Clearly aimed at the upper end of the market, the performance of these transceivers could well send panic waves circulating around the big names of the industry.

The Amstrad CB transceivers are, at the time of writing, unique in a number of ways. First, they are available and that in itself is quite an achievement. Second, it is one of the first to be a purely FM design from the outset, owing nothing to previous AM designs.

The rig itself is very impressive in appearance, looking much smarter in the flesh than it does in photographs. It is also extremely compact. The basic box measures 6" wide, 2" high and 7" deep. The antenna connector and power leads require another 1/2" at the rear and the knobs protrude a further 3/8" at the front. Included with the rig is the necessary mounting hardware, microphone, a comprehensive instruction manual and a licence application form! Well done, Amstrad.

The instruction manual is particularly commendable. The operating instructions are written in clear, concise, non-technical terms and include

lots of useful background information as well. Also included is a section on REACT. Amstrad really deserve a pat on the back for this, although the section on SWR could perhaps have been expanded a bit. If all instruction manuals were as well written as this, a lot of magazine writers could find themselves unemployed

The front panel controls consist of Tone, Volume/Off, Squelch & RF Gain, plus the channel selector on the right-hand side. The 901 also has three buttons for PA/CB, Roger Bleep (if you must . . .) and Channel Nine priority. These three buttons do not appear on the slightly cheaper 900 model, which is otherwise identical.

At the top centre of the front panel is the display panel. The channel indicator is an LED display, somewhat smaller than usual, but brighter. This actually tends to make it more readable than a more conventional display. The biggest problem with LED displays is that they tend to get washed out in bright sunlight. However, being slightly smaller, but noticeably brighter than average, means that this display is less prone to the problem than some others.

To the left of the channel display is a row of five LEDs, marked 3, 5, 7, 9 and +30. The first four are red and the +30 is green. These LEDs replace the meter found on more conventional sets. In the receive mode they indicate relative received signal strength, while in transmit they indicate relative power output.

Below the meter LEDs are four ▶



On the side, great for people with LHD cars, but what about us

more LEDs to indicate Rx mode (red), Tx mode (green), Roger bleep selected, or PA selected. Operating the channel nine priority button forces the channel indicator to display nine. The choice of colours for the Rx and Tx LEDs seems a little bit weird, but otherwise it all works very well.

All the front panel controls had a very nice feel to them. The flanges on the knobs felt a little bit on the thin side, though the plastic seemed strong enough. This definitely feels more like a 'ladies rig' than a 'truckers rig'!

At the rear of the rig is the standard SO 239 antenna connector, power connector, two 3.5 mm jacks for external speaker and PA speaker (901 only) and the 10 dB attenuator switch. The power connector is a two-pin polarised connector with plastic snap-on retainers. It has a nice positive action, but is not one of the two 'industry standard' types.

The microphone connector is a standard four pin screw fitting on the left-hand side. Oh, dear! When will they learn? This rig would fit comfortably in a standard car radio slot were it not for that accursed side mounting microphone!

The microphone itself is probably the weakest link in the chain. For a start it looks like a remnant from an 'Action Man' kit, completely out of keeping with the neat modern styling of the rest of the rig. It is surprisingly heavy, although this in itself is not necessarily a bad thing. Although the review sample worked well enough, during the course of this review we came across several

other Amstrad owners who were experiencing microphone problems, of which more later.

Technically Speaking

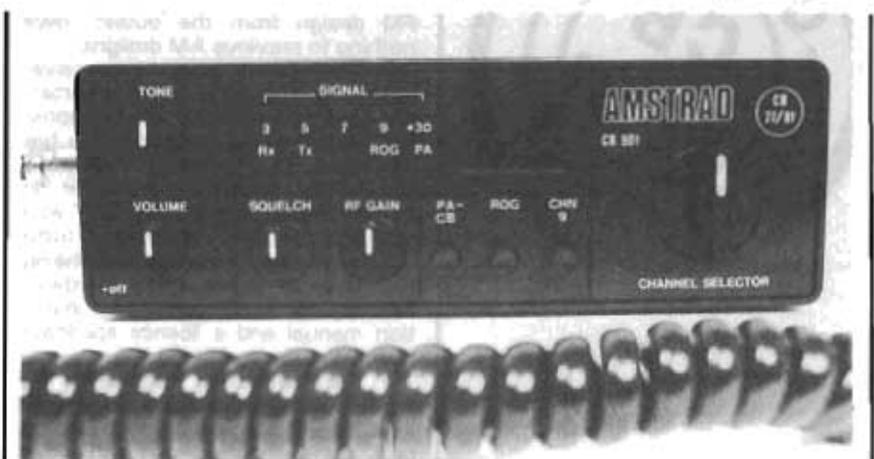
Opening up the unit revealed a neat and well-made printed circuit board. The quality of soldering was extremely high and no 'piggy-back' boards or other hasty modifications were in evidence.

The synthesiser is a single crystal type LC7136, although an external crystal reference oscillator is used, rather than the on-chip device.

The receiver is a purist's delight. The RF amplifier uses a junction FET operating in the common source mode. The gain of this stage is controlled from the front panel by varying the source

resistance. The FET is biased off during transmission. The output of the RF stage is coupled by a band-pass pair of transformers to the first mixer, which is a dual-gate MOSFET. The first IF is 10.695 MHz and is filtered by a ceramic 'roofing' filter. The second mixer is a conventional bipolar transistor and the second IF is 455 KHz. A ceramic filter provides the necessary selectivity before the signal is passed on to the final IF amplifier/discriminator.

This final stage consists of an LA1230 IC. This is the Japanese version of the CA3089, a device usually found in hi-fi stereo VHF tuners! There is no AGC anywhere in the receiver, which means that each stage can be optimised far more accurately than would be possible with an AM design. The use of



FETs at the front end produces a receiver that is almost totally immune to 'bleed-over' from strong nearby signals on adjacent channels.

The absence of an AGC line usually makes it difficult to produce a decent metering circuit. However, the LA1230 IC has a built-in metering circuit with a logarithmic response over a 70 dB range. Although on our particular example the meter calibration was no more (or less) accurate than other competitors, potentially it could be extremely accurate.

The squelch control operates conventionally on signal level, rather than on noise as in some professional FM systems, but in view of the nature of the 27 MHz band this is probably the best choice. The squelch incorporates a measure of hysteresis which minimises any tendency of the squelch to chop in and out.

On the transmit side, the microphone signal is limited, to prevent over deviation, and then passed to a very elegant filtering circuit. This neat piece of design tailors the audio frequency response as required, and leaves it with just the right amount of pre-emphasis.

The RF stages are relatively orthodox, consisting of a buffer, driver and a PA stage. The 10 dB attenuation is applied by reducing the power supply to these stages. The filtering on the output is somewhat more comprehensive than usual and this is reflected in the extremely low spurious outputs from the transmitter.

Facts And Figures

The makers claim a receiver sensitivity of 0.5 μ V. Our tests indicated that this is a conservative figure and 0.3 μ V is probably nearer the mark.

The Home Office specifications indicate that the 2nd harmonic must be suppressed to better than 72 dB and the third better than 79 dB. We couldn't find a trace of ANY spurious outputs at all on our Spectrum Analyser, a truly remarkable performance, indicating that all spurs must be suppressed to better than 80 dB. Output was the specified 4 watts and the 10 dB attenuator functioned correctly.

On The Air

The rig was used in a variety of installations over a period of several weeks.

This is definitely one of those rigs that grow on you and I, for one, shall be very sorry to return it. The squelch control worked extremely well. When mobile it could be left fully clockwise, ensuring that only worthwhile copies would open it. On those few occasions when the skip was strong enough to break through the squelch, backing off the RF gain slightly effected an immediate cure. The received audio quality was very good. The audio amplifier had adequate power to cope with noisy vehicles and the internal speaker was big enough to handle this power comfortably.

Reports from other stations were highly complimentary about the quality of the modulation. Several commented that it was the clearest copy they had heard! Similarly, the sophisticated receiver design has paid off. The receiver is almost totally immune to overloading and bleed over. The Roger beep was relatively inoffensive. Quite often they can be heard long after the voice has vanished into the noise! This one is fairly muted and shouldn't upset anyone unduly.

The review rig behaved impeccably throughout the test period. However, during the course of the tests we came upon several other Amstrad users, nearly all of whom were suffering from microphone problems. When the key is pressed two events occur. First one pair of contacts trip the rig in to the transmit mode. A second pair of contacts connect the microphone to the input amplifier. Unfortunately, unless the PTT switch on the mike is pressed fully home, this second event never takes place and consequently only a blank carrier is radiated. All the lights on the front of the rig indicate that transmission is taking place, as indeed it is. The operator can be totally unaware that he isn't modulating, until somebody tells him! This failing is rather a shame. The performance of the transceiver in all other respects is about as near to ideal as it is possible to get. The LED metering works extremely well and is much easier to read than a meter when mobile and all the controls work extremely well. So remember, really squeeze that key! Nice one, Amstrad!

CB

RIG REVIEW DATA PANEL

Model 901

Distributor Amstrad Consumer Elect.

Typical Price £95.00

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | ● | |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | ● | |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

Specifications

| | |
|---------------------|--------------------|
| Modes Of Operation | FM ONLY |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | 190 x 160 x 50mm |
| Supply Voltage | 13.8VDC |
| RF Output Power | 3.9 Watts |
| Frequency Stability | ± 1.5 kHz |
| Swamping | — |
| Sensitivity (RX) | 0.5 μ V (20dB) |
| Spurious Emissions | > 20nW |

CB VERDICT

| | |
|----------------------|---------|
| Range | * * * * |
| Clarity of TX | * * * * |
| Clarity of RX | * * * * |
| Ease Of Controls | * * * |
| Ease Of Installation | * * * |
| Performance | * * * * |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.



Rig Review



Johnson GT 868



The Johnson GT 868 is based on one of the most popular chassis. We take a brief look at this very cheap mid-range rig.

At the moment you can expect to pay around £70 for a basic rig and that is quite a bit of money for some people! Don't get us wrong, £70 buys a lot of technology if you consider the average rig is two or three times as complicated as the average car radio and has to be designed to meet stringent specifications. In the majority of cases it travels half-way round the world, yet still makes a healthy profit for the manufacturers, importers, wholesalers and retailers, so the price may not now seem quite so inexplicable. However, now that rigs are being produced in vast quantities for the UK market we can expect to see the price begin to fall, and the first rig to beat the sub-£60 price level (with room to spare) is the Johnson which should be retailing in the shops for less than £50!

The actual rig will be no stranger to sharp-eyed readers, bearing more than a passing resemblance to a couple of rigs already on sale in well-known chain stores, and not too far removed from one of the very first rigs to go on sale after L-Day. The Johnson, though not identical, is part of the same family and comes from one of the largest Far-Eastern manufacturers — Great.

Front panel controls are fairly straightforward: volume, squelch, RF

Gain, LED display dimmer and CB/PA switch, as well as rotary channel selector, LED display and RF/S meter. On the back is the obligatory Hi/Lo power switch, antenna socket and plumbed-in power leads. The case is a fairly unremarkable two-tone black and silver with a side mounted mike socket. So far so good.

In operation the rig's performance is quite satisfactory. We've handed the rig over to our independent panel for appraisal; one or two comments are worth noting. The squelch in particular caused a lot of interest, it has to be the *slowest* we've seen. That's not necessarily a criticism as a certain amount of *hysteresis* prevents strong intermittent signals from breaking through. One reviewer summed it up nicely, 'it seems very laid back'. The dimmer control caused some amusement as it dims the LED display from full brightness to absolutely nothing! When the rig was first switched on we thought the display was inoperative — well, it made us laugh anyway . . .

The Johnson looks like incredible value for money at around £50.00. The low price is surely an indicator for things to come and will certainly make one or two other companies re-think their pricing structure.

CB

RIG REVIEW DATA PANEL

Model Johnson
 Distributor Johnson Electronics
 Typical Price £50.00

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | | ● |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/Rf Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | ● | |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

Facilities

| | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | | ● | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | | | ● |

Specifications

| | |
|---------------------|------------------|
| Modes Of Operation | FM ONLY |
| No. Of Channels | 40 |
| Weight | 190 x 160 x 50mm |
| Dimensions | - |
| Supply Voltage | 13.8VDC |
| RF Output Power | 3.9 Watts |
| Frequency Stability | ± 1.5 kHz |
| Swamping | - |
| Sensitivity (RX) | 0.5µV (20dB) |
| Spurious Emissions | > 20nW |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

CB VERDICT

| | |
|----------------------|-----|
| Range | *** |
| Clarity of TX | *** |
| Clarity of RX | *** |
| Ease Of Controls | *** |
| Ease Of Installation | *** |
| Performance | *** |

BACKNUMBERS FROM CB

Are you missing out? Citizens' Band magazine has been around for eighteen months so unless you're a regular reader you might have missed some issues.

We can help. The CB Backnumber Service has a limited quantity of some issues so check first by calling 01-437-1002.

If the issue you require is in stock send a cheque or Postal Order, made out to Argus Specialist Publications to:

CB Backnumber Service,
 513 London Road,
 Thornton Heath,
 Surrey.

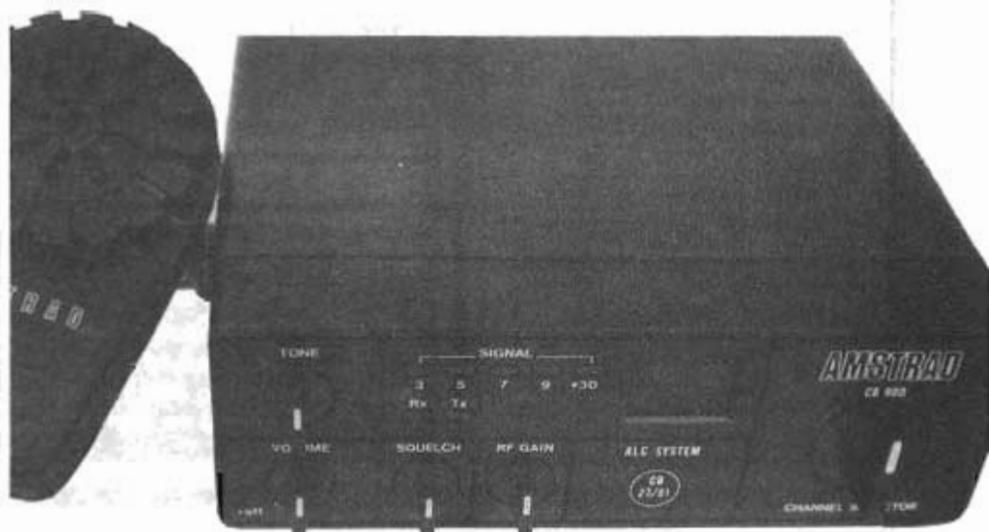
Each issue costs just £1.25 inclusive of VAT and postage and packing.



Rig Review



Amstrad CB 900



The basic rig from Amstrad shares the stylish looks of its more comprehensive stablemate — the CB901, but does it work as well?



Amstrad have two CB rigs on the market at the moment, the CB 900 and the CB 901. Both models share a common chassis, but the 900 has fewer secondary controls and facilities. As far as controls are concerned the CB 900 has volume, squelch, tone and RF Gain. The 10 dB attenuator switch is on the rear of the cabinet. Still on the back panel, there is a socket for the power leads — handy for semi-permanent installations — an S0239 antenna socket and a jack socket for an extension loudspeaker. On the front panel the channel selector switch sits under the bright red LED channel indicator. In the centre of the front panel, a bar-graph type display is marked in S-Points up to +30 dB. The display also doubles up as a relative output power meter. Below the bar-graph display are red and green LEDs to show whether the rig is in the transmit or receive mode. The microphone plugs into a socket on the left-hand side of the cabinet, a definite minus point. The actual microphone is quite an unusual design and unlike any we've seen before.

Performance

The CB 900 is a **delight to use**, particularly as the manufacturers have included the RF gain control. This is almost essential when using CB in a town or during periods of high skip activity.

Reports from receiving stations indicate that modulation, clarity of audio and interference suppression are all of a very high order. On receive the only criticism we were able to make is that the tone control is almost completely redundant as it introduces far too much bass. We found that it would normally be left at full treble all the time.

In use with our standard antenna and in contact with our reference CB rig we managed to achieve a reliable contact of S3 up to five miles in a semi built-up area and 9 miles in the open. With a base to mobile contact in a semi built-up area we managed 15 miles at S3 which compares very favourably with rigs costing up to £20 more.

Conclusion

For around £10 more than the cost of a basic rig the CB 900 has a number of very worthwhile features, notably RF Gain, bar-graph S-Meter and Rx and Tx lights. The rig performs exceptionally well and looks very good. However, one or two observers commented that the cabinet and control knobs wouldn't stand up too well to being treated roughly. On the minus side, the mike socket is in the wrong position and the 10 dB attenuator is difficult to get at once the rig is installed. To sum up, it is a very good rig, reasonably priced and a real good looker.

CB

RIG REVIEW DATA PANEL

Model Amstrad CB 900
Distributor Amstrad Consumer Elect.
Typical Price £79.00

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | | ● |
| S/R/F Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | ● | |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | ● | |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | ● | |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|--------------------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | 1 kg. |
| Dimensions | 220 x 170 x 60 mm |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 3.5 watts |
| Frequency Stability | ± 1.5 |
| Swamping | - |
| Sensitivity (RX) | 1 µV for 10 dB |
| Spurious Emissions | Better than -45 dB |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

| CB VERDICT | |
|----------------------|---------|
| Range | * * * * |
| Clarity of TX | * * * * |
| Clarity of RX | * * * * |
| Ease Of Controls | * * * * |
| Ease Of Installation | * * * |
| Performance | * * * * |

GET A GOOD COPY— EVERY MONTH!

CITIZENS' BAND SUBSCRIPTION ORDER FORM

Cut out and SEND TO: Citizens' Band,
 513, LONDON ROAD, THORNTON HEATH,
 SURREY, ENGLAND

Please commence my personal subscription to Citizens' Band with the issue.

SUBSCRIPTION RATES

(tick as appropriate)

- £11.25 for 12 issues U.K.
- £13.35 for 12 issues overseas surface
- £26.50 for 12 issues Air Mail

I am enclosing my (delete as necessary) Cheque/Postal Order/International Money Order for



£
 (made payable to A.S.P. Ltd)
 OR



Debit my Access/Barclaycard*
 (*delete as necessary)

Please use BLOCK CAPITALS and include post codes.

Name (Mr/Mrs/Miss)
delete accordingly

Address

.....

Signature Date



Rig Review

Harrier



Dixons are one of the countries' best known electronic retailers, the Harrier rig shown here is the basic model, how does it measure up?



The Harrier mobile CB unit is the less expensive of the two models that are available from Dixons Photographic UK Ltd. It's a very basic unit and has the bare minimum number of controls. The Volume, Squelch and Channel Selector knobs are very well designed and comfortable to grip, making them easy for the mobile user to adjust while driving.

There is a Tx light to show that you are transmitting (should you be in any doubt) and an S/RF meter that gives a relative indication of the power and strength of the received signal. The meter has a black face with a white bar across it and a red needle. I found that this arrangement worked perfectly during daylight hours but as soon as it became dark I couldn't see the needle, despite the fact that the meter is illuminated. The red does not show up against the black and the white bar is far too narrow to allow the needle to be seen. The meter seemed reasonably accurate and consistent on transmit and receive.

The Volume control operated smoothly and the audio output (approx. 1.5 W into 8 ohms) was adequate in the noisy environment of a car. The internal speaker is of the usual quality — ie not very good — and as it points downwards, an extension speaker is almost a necessity. When a speaker is plugged into the extension speaker socket on the rear of the set, the internal speaker is automatically switched off.

Also on the back of the rig is the power socket that takes a two pin non-reversible plug and switch for the 10 dB attenuator that reduces the output power to 0.4 W when it is turned on.

The Squelch control worked smoothly and eliminated all of the background noise after it had been turned through approximately 50% of its travel, although this will vary with the level of the noise, of course.

The channel in use is displayed on a large bright red LED display that is very easy to read. The only problem is the one that applies to almost all LED displays; they are virtually invisible in direct sunlight. However, this is unlikely to be





a great problem in this country as we don't get that much sunshine anyway. The rotary channel selector is easy to grip and it has click stops for each channel.

A microphone is supplied with the rig and it is fitted with a four pin plug which plugs into the socket on the left-hand side of the set. This betrays the foreign origins of this model and it is hoped that, when the second generation of rigs appear, manufacturers will be able to supply sets with microphone sockets on either the front panel or on the right-hand side. This will allow British drivers to mount them in the centre consoles of their vehicles without having the lead stretched right across the car.

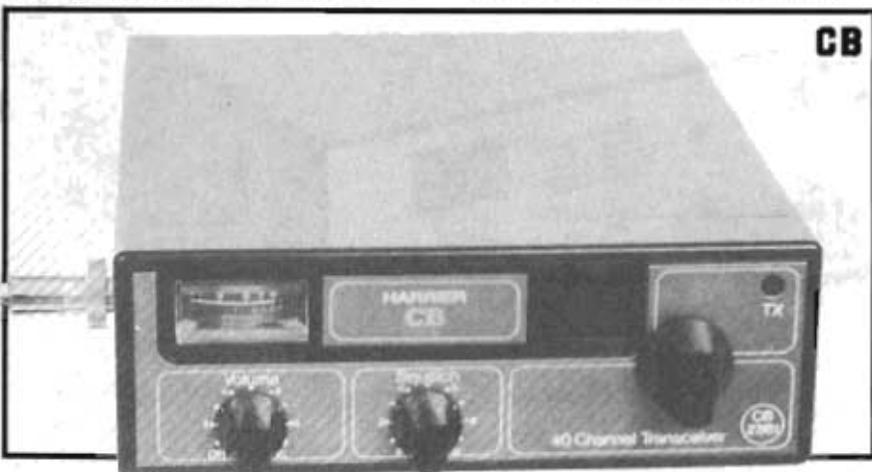
The audio is fed to the speaker via the microphone socket. This means that no sound comes out of the speaker unless the microphone is plugged in. It's very easy to think that there is something wrong with the rig when in fact it's only the absence of the microphone that is preventing the audio from being heard.

The Harrier is supplied complete with a mounting bracket (which is not very solid), a set of fixing screws and a

power lead that plugs into the socket on the back with a non-reversible two-pin plug.

Also supplied is a superb handbook. It not only gives the technical specifications of the rig and details of the controls, but also explains how to install and operate your new rig and how and where to mount your antenna — including the advantages and disadvantages of the various possible positions on your car. This section also deals with adjusting your antenna for minimum SWR and there's a table that shows how much of your output power is being transmitted for various levels of SWR, eg 1.7:1 = 93.3%, 3:1 = 75%, etc. There is also a section that deals with interference, one on basic fault finding and another listing all the British CB frequencies. I hope that some of the other manufacturers will read this handbook and use it as a model to improve their own.

My overall impression of the Harrier is that, although the price is average, £69.95, it works well, the audio quality is good on both transmit and receive and it seems to be well made. It's worth putting this rig on your short list and looking at it before you make your decision.



RIG REVIEW DATA PANEL

Model Harrier
Distributor Dixons Photographic
Typical Price £69.95

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | | ● |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | | ● |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | | ● | |
| Microphone Location | | | | ● |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | ● | | | |

| Specifications | |
|---------------------|-----------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | — |
| Supply Voltage | 13.2 VDC |
| RF Output Power | 3.9 Watts |
| Frequency Stability | In Spec |
| Modulation | Good |
| Sensitivity (RX) | In Spec |
| Image Rejection | In Spec |

CB VERDICT

| | |
|----------------------|-------|
| Range | ***** |
| Clarity of TX | ***** |
| Clarity of RX | *** |
| Ease Of Controls | ***** |
| Ease Of Installation | *** |
| Performance | ***** |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

Rig Review



Binatone are arguably the leading suppliers of legal FM rigs. Here we look at the basic Route 66 model.

Binatone Route 66

As far as appearance is concerned the Route 66 looks like a lot of rig for your money. The designers have gone to a lot of trouble to fill up the control panel with scales and legends — it looks very busy indeed. The actual controls are well set out, the mike socket is on the front panel, though still on the wrong side, but at least it's a step in the right direction. Controls include the usual volume and squelch plus power switch, CB/PA selector, channel change rotary control, TX RX indicator lights, channel display and RF/S meter.

Connection to the outside world is handled by a standard SO239 antenna socket, four-pin mike socket, jack sockets for extension speaker and PA speaker and, of course, a power lead. Fitting in the average saloon car should only take an hour or so. Full fitting kit and instructions are supplied.

In Use

When compared to our reference rig, the Route 66 showed a marginal increase in sensitivity over our standard test rig. Copies were generally half an S-Point higher, which, translated into range, would result in a copy of S3, say, being readable for a further half to three-

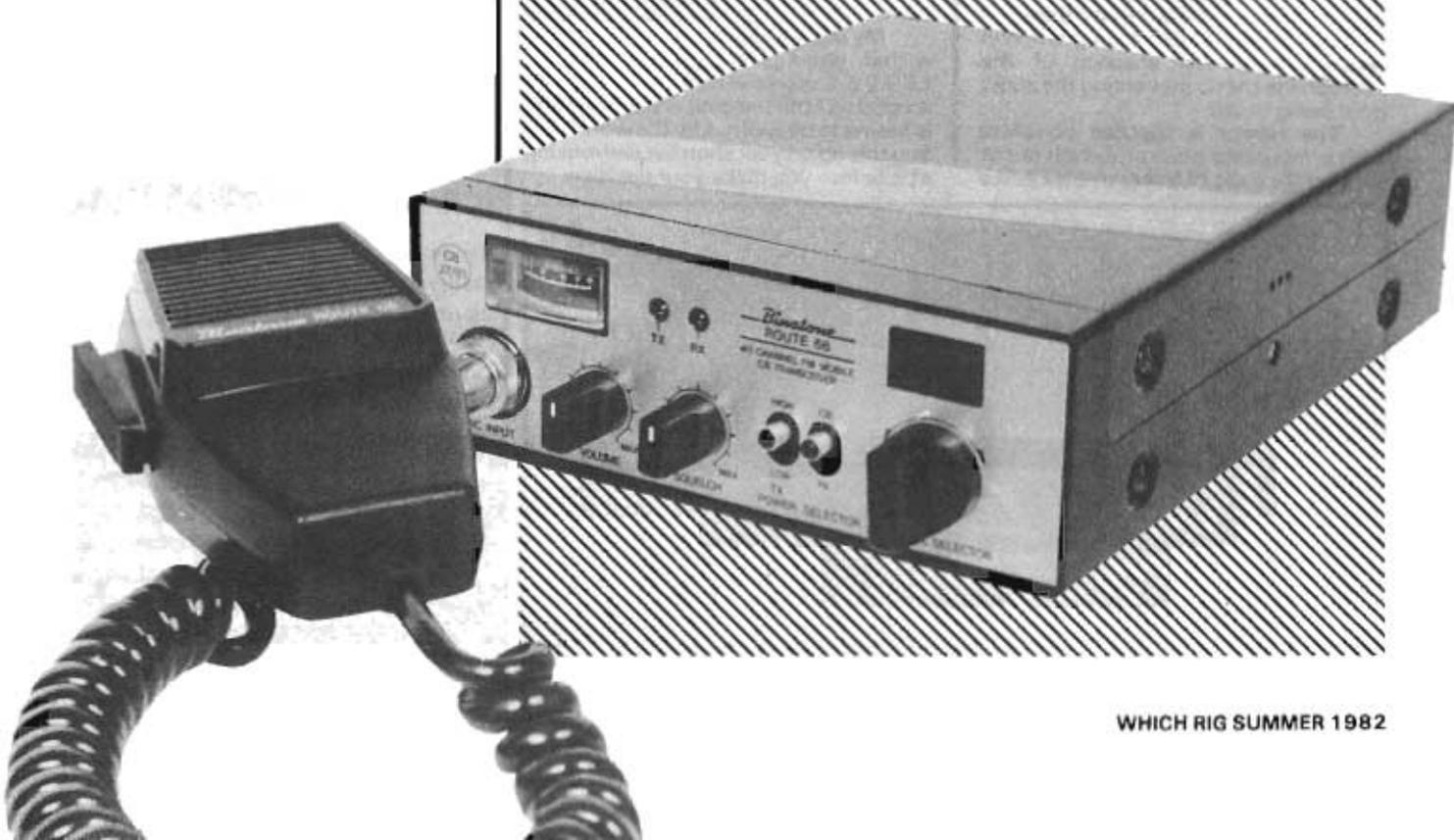
quarters of a mile in the open (half that distance in a semi-built up area).

Quality of reception was, under all but the most adverse conditions, extremely good. The audio had a strong treble and mid-range content, audible in all but the most noisy conditions. The Route 66 also had a surprisingly efficient noise blanker circuit: it managed to eliminate all the ignition noise in our test vehicle without any additional suppression being needed.

The transmission capabilities of the 66 were also very good, our tests showed that the rig was delivering 3.9 watts into our test antenna, which at just below the legal limit was marginally better than some other models we've seen. Reports from our reviewers were very enthusiastic — tonal quality on transmit was good, with plenty of treble and again, any ignition noise likely to creep into the transmission was efficiently suppressed by the NB circuitry.

The Route 66 is well designed, robustly constructed and offers just enough features to place it in the mid-range price bracket. Overall a very good rig, ideal for someone who wants a few extras, and demands a little more in terms of performance without having to resort to expensive multi-function rigs with a lot of controls you wouldn't normally need.

CB



RIG REVIEW DATA PANEL

Model Route 66
Distributor Binatone Ltd, Wembley.
Typical Price £85.90 **Midx**

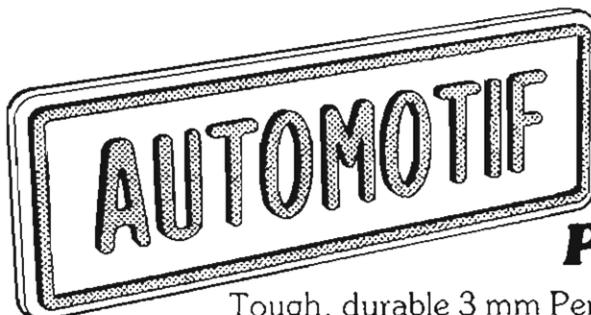
| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | | ● |
| S/Rf Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | | ● |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | | ● | |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | | ● | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|--------------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | - |
| Dimensions | 200x160x55mm |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 3.9 watts RF |
| Frequency Stability | ± 1.5 KHz |
| Swamping | 98% |
| Sensitivity (RX) | 0.5 uV |
| Spurious Emissions | In Spec |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

| CB VERDICT | |
|----------------------|---------|
| Range | * * * * |
| Clarity of TX | * * * * |
| Clarity of RX | * * * * |
| Ease Of Controls | * * * |
| Ease Of Installation | * * * |
| Performance | * * * * |



Calling all Breakers

Personalised CB Plates

NEW LOW PRICES!

Tough, durable 3 mm Perspex, raised letters and surround. Red letters on white background, each one custom made. Guaranteed fade free.

Display your own call sign with this unique, custom made CB plate.



Order Form

Up to 8 characters, only £5.69. Additional characters 40p each inclusive

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|

Available in Five Sizes:-

Don't forget to leave spaces in between words

- 4" x 2" — up to 6 characters or spaces £2.95
- 6" x 2" — up to 9 characters or spaces £3.95
- 8" x 2" — up to 13 characters or spaces £4.95
- 10" x 2" — up to 17 characters or spaces £5.95
- 12" x 2" — up to 20 characters or spaces £6.95

Name _____

Address _____

Send Cheque/Postal Order, no stamp required to:

Automotif

FREEPOST,
Sittingbourne, Kent ME10 2BR.

CB3

Rig Review



The Halfords Barracuda HB 940 is available for just under £90. Chris Peterson, our Technical Consultant, puts it through its paces and checks it against the Home Office specifications.

Barracuda 940

With CB rapidly acquiring an unaccustomed air of respectability, rigs are starting to become available from some surprising quarters. One of the most dramatic entries into the field of mass suppliers is Halfords, the car accessory suppliers. The Halfords range will be quite wide, consisting of several models from the Binatone range, plus a couple of their own. The subject of this review is the Barracuda HB 940, one of Halfords own brand models.

Currently selling for £89.95, this rig is squarely aimed at the mid-to-upper end of the market. Measuring 8.5" deep, 7.1" wide and 2.5" high, this is quite a large rig. You will need to find a reasonable amount of space under your dash to get it in! The styling is... well, er, let's be kind and call it functional! The main case is traditional crackle finish black, while the front panel is plain black plastic with white lettering. Starting at the top left hand corner of the front panel, we find a conventional illuminated **Signal/RF meter**. It is quite a large meter, calibrated from 0 to +30 on the signal strength scale and from 0 to 5 watts on the RF scale. What a pity that all this information is almost unreadable at normal viewing distances, as the red pointer is almost totally invisible against the black meter

scale! To be fair to Halfords, many other well-known rigs use identical meter movements, and suffer from exactly the same problem.

Moving along to the right, there is a bank of switches slightly recessed into the front panel. The first switch is a three position **tone control** (Hi, Med and Lo), followed by the **CB/PA changeover switch**. This permits the audio amplifier to be used as a low-powered public address system when connected to a suitable speaker. In this mode the transmitter is inhibited and the channel indicator display is blanked. Next along is a **dimmer switch** (of which more anon), followed by a **Channel 9 priority switch**. This switch forces the rig on to channel 9 (the emergency channel) regardless of the position of the channel selector switch. In this mode, the channel indicator display is also forced to read 9. The final switch is a **delta tune control**. Moving this switch away from its central position swings the receiver tuning slightly high or low in frequency to assist in receiving off-frequency transmitters. It can also be useful in minimising interference from illegal AM/SSB equipment!

Finally on the top right is the **LED channel indicator display**. This is flanked on either side by Tx and Rx indicator lights. Like most red LED displays, this is clear and easy on the eyes in normal and subdued lighting but tends to get obliterated by strong sunlight. Conse-



quently the dimmer switch is slightly superfluous. All the switches have a nice feel to them, but are somewhat close together for 'fumble-free' operation. The fact that they are slightly recessed doesn't help here either. Eliminating that dimmer switch would allow the remaining switches to be spaced a little better.

Moving to the bottom left-hand corner, we find the microphone socket. HOORAY! A microphone socket where it ought to be; on the FRONT (still the wrong side though). Award five bonus points to Halfords! The microphone connector itself is a five pin DIN connector. Many people prefer the American type four pin connectors with a locking ring but we have never found any particular advantage in either method. Moving off to the right are four knobs for Mic. gain, RF gain, Volume/ Off and Squelch. Once again all the controls feel quite nice but the order seems a little bit illogical. Trying to find the volume/on-off switch from among the others under the recesses of the dash on a dark night with a black front panel can lead to a certain amount of fumbling! On the extreme right-hand side is a large knob for channel selection.

Going round to the rear panel, we find a three pin polarised socket for the 13V2 volt DC supply and immediately under it, 3.5 mm jack sockets for extension speaker and PA speaker. In the middle is a slide switch to bring in the 10dB attenuator and finally, a standard SO 259 antenna socket.

Technicalities

Opening up the box reveals a **Cybernet 134** series chassis. This chassis is rapidly establishing itself as one of the all-time classics of RF design. It is found in a number of rigs which have already established an excellent reputation, both with suppliers and users alike. The quality of construction is well up to Cybernet's usual standards.

The synthesiser is the Sanyo 7136/7 single crystal device. This device makes generating the UK 40 channels so easy that it makes you wonder why some other manufacturers bother with anything different!

The transmitter line-up is fairly conventional. The Voltage Controlled Oscillator (VCO) is controlled by two varicap diodes, one being the PLL control element, the other providing the modulating element. The VCO output is doubled and then buffered before being fed to the driver transistor and finally the PA stage (Power Amplifier, not to be confused with the Public Address System!).

A generous amount of filtering is applied between each stage and a particularly comprehensive filter is placed between the PA transistor and the aerial socket. This is a reflection of the extremely tight Home Office specification; far tighter than is required in the USA for example. The 10dB attenuator is applied by switching in or out a pair of resistors in the emitter of the driver transistor thus varying the power out-



put.

The antenna feed to the receiver is tapped off from the Tx low pass filter and fed via a small capacitor to the receiver input tuned circuit. There is no antenna switching between Tx and Rx, protection for the receiver being provided by a pair of back to back diodes across the input-tuned circuit.

The RF amplifier consists of a bipolar NPN transistor running in the common-base mode. RF gain control is effected by varying the DC bias on the base of the transistor. Although common-base operation is quite common in communications applications, it is not very usual in CB applications and indicates that perhaps more thought than is usual has gone into the preparation of this rig! This is confirmed by the next stage, the first mixer. Instead of the usual single transistor mixer, we find a balanced mixer consisting of a pair of NPN transistors. Nice! The first IF (10.695 MHz) is double filtered in LC circuits before being fed to a ceramic roofing filter. There is no amplification of the 10.695 MHz IF, the output of the ceramic filter being fed straight to the second mixer.

The second mixer is a simple single transistor running in the common emitter mode. The second IF is 455 KHz and it is at this stage that the bulk of selectivity takes place. Selectivity is provided by a ceramic ladder filter. It is gratifying to see that the ceramic filter is properly matched by a transformer. Many designs eliminate the matching transformer in the mistaken belief that the ceramic filter will provide all the necessary selectivity. Although ceramic filters can provide excellent selectivity, they can and do suffer from spurious responses. These can be almost entirely eliminated by the proper use of matching transformers. The 455 KHz IF is amplified in two further transistor stages before being split three ways by a transformer. One feed goes to a rectifier to drive the meter. The second is rectified to provide squelch and AGC (I) feeds. The third feed goes off to an IC which appears to be a limiting amplifier and quadrature detector. The audio is fed from the

detector to an audio amp IC.

The use of an AGC is rather unusual in an FM receiver. In this instance it provides a more conventional meter display than is found in some FM receivers. The AGC is also applied to the first mixer and this probably accounts for the very high immunity to 'bleed-over' of this design. The microphone output is fed via a transistor pre-amp to the audio amp IC, the output of which is then sampled and rectified by a diode. The DC output from the diode is used to control a transistor which in turn controls the gain of the transistor pre-amp. The result of all this is that the audio circuits have an automatic gain control which holds the audio output relatively constant. This is particularly beneficial in the transmit mode as the audio fed to the modulator will be held fairly constant over a wide range of input levels. Speech processors and power mikes are unlikely to provide any benefit to this sort of circuit! In the Tx mode, two further op-amps provide additional filtering before the modulator diode.

All in all, the circuit shows evidence that a great deal of thought, not to mention practical experience, has gone into its concept and execution.

The transmitter power output was measured at 3.9 watts at 13.2 volts. The 10 dB attenuator reduced this by 12 dB, a little more than is strictly necessary but better safe than sorry! The second harmonic was 75 dB down on the fundamental, 3 dB better than required by HO specs. All other spurious outputs were better than 80 dB down, also better than required by the regulations. The deviation was measured as ± 1.5 KHz. However, during the course of our tests we came upon another Barracuda owner whose rig was only deviating ± 1 KHz, a little bit on the low side resulting in slightly faint modulation at the receive end. The channel frequencies were within 40 Hz of nominal in the worst case, a truly remarkable achievement!

The receiver sensitivity measured about 0.3 μ V which was beginning to approach the limits of the test equip- ▶

RIG REVIEW DATA PANEL

Model Barracuda 940
Distributor
Typical Price £89.95

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | | ● |
| S/RF Meter | ● | |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CH9 Switch | ● | |
| Variable RF Gain | ● | |
| Mike Gain | ● | |
| Delta Tune | ● | |
| Tone Control | ● | |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | | | ● |
| Built In Speaker | | ● | | |
| Microphone Location | | | ● | |
| Cabinet Construction | | ● | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | ● | | |
| Mounting Bracket | | ● | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|-------------------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | |
| Dimensions | 215 x 180 x 65 mm |
| Supply Voltage | 13.2 VDC |
| RF Output Power | 3.9 Watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.3uV 10dB |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|-------|
| Range | ***** |
| Clarity of TX | ***** |
| Clarity of RX | ***** |
| Ease Of Controls | ** |
| Ease Of Installation | *** |
| Performance | ***** |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.



ment used to measure it! S9 on the meter measured about 60 uV and with both squelch and RF gain set at maximum, the squelch opened at 18 uV.

On The Road

The Barracuda was run through our usual selection of test vehicles plus a spell running as a Home Base installation.

As stated earlier, this is quite a large rig, requiring a fair bit of space for installation. Many modern European cars have fully enclosed dashes which don't leave a lot of room for bulky accessories! The Barracuda comes complete with all necessary mounting hardware, so there are no problems here.

The switches are a little too close together for comfort and placing the volume/on-off switch in the middle of the row makes blind operation while mobile a little bit fiddly. However, the controls are smooth and progressive in action which helps considerably. The microphone gain control produced the best results when left fully clockwise and it was left in this position throughout the tests. The receiver was extremely sensitive as the earlier measurements had indicated. Nevertheless, it proved remarkably immune to 'bleed-over'. In our data panel you will find a section marked 'swamping'. This covers not only immunity to bleed over from nearby transmitters but also immunity from cross-modulation. Cross-modulation is an effect which can occur when several powerful transmissions arrive simultaneously at the receiver input. If these transmissions are spaced just the right amount either side of the receiver frequency, they can mix together in the receiver front end and produce an output that

will be detected by the receiver. The end result is that under some conditions you can clearly hear conversations several channels away. The clue that you are suffering from cross-mod is that, although the recovered audio is clear, the signal-strength reading is zero! This has nothing to do with the selectivity of the receiver but is due to shortcomings in the design of either the RF stage or one of the mixers.

The Barracuda is extremely good in this respect. Throughout our tests it never exhibited any tendency to suffer cross-mod. Under very strong signal conditions there was a slight amount of de-sensitising but the interference had to be within a few yards to produce this effect! When running in our electrically noisy test vehicle, a small amount of ignition crackle was noticeable but not sufficient to cause any serious problems.

The quality of transmission was good and clear and many of the signal reports received were very complimentary. The internal speaker was quite good and coped well even in a noisy vehicle, although better results were obtained with a larger external speaker.

The squelch worked well, though with no hysteresis. When operating into a large external speaker as a home-base, this resulted in a pronounced rumbling when the squelch was on the verge of operating. This effect cannot be heard on the internal speaker because of the poorer bass response. Despite this, the Barracuda makes an excellent base station rig, the good performance and comprehensive controls combining to provide a fine overall balance.

In conclusion then, the Barracuda is something of a rough diamond: excellent performance in a somewhat plain wrapping.

CB

Rig Review

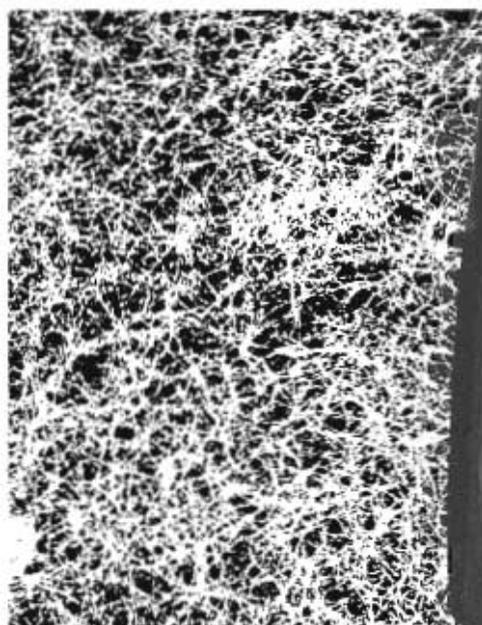


Looking for something unusual? The Breakerphone is probably one of the most original rigs on the market.

Binatone Breakerphone

There are something like one hundred UK FM rigs on the market at the moment. In truth, though, of those rigs up to half of them are 'badge engineered' versions of the other half. Of the fifty or so original rigs, most of them fall into one of three categories — mobile rigs, handheld rigs and base station rigs; to be blunt, with only one or two exceptions, most of them are all pretty much the same — cosmetically at least. So, it was with some interest that we unpacked the latest carton from Binatone, containing what promises to be one of the most intriguing rigs to come on the UK FM market — the Binatone Breakerphone.

The Breakerphone falls into the mobile transceiver category, it is designed to fit into a car and needs to be con-



nected to a source of power (13.8 VDC) and an external antenna. Where it differs from the majority of other mobile CB rigs is in its design concept. Rather than fit all the controls to the transceiver cabinet, Binatone have left all the electronics in a rather plain-looking box and brought out all the controls on to a telephone-type handset which has both microphone and speaker built into it. This type of rig is commonly known as a *one-hander* and, in theory at least, this makes it easier to use as the need to grope around for controls is removed and the unit can be hidden from view.

Other manufacturers have tried the one-handed concept in the past, with varying degrees of success; the most frequent problem being the multi-cable needed to connect the handset to the electronics. Sod's law decrees that the failure rate of multi-way cables is directly proportional to the number of connections required and the Breakerphone has a twenty-way connector! In fairness to Binatone though, the connectors and cable they use are industrial quality and should be able to stand up to the rigours of heavy-handed CBers — we shall have to see.

As far as the rig itself is concerned, a lot of thought has gone into its design. The controls are well laid out and easy to use. The three rotary controls for Volume, Squelch and Mike Gain look a bit gaudy as they are constructed from brightly chromed plastic; however, that's a matter of personal taste. The channel selector comprises two buttons marked UP and DN — up and down to non-dyslexic readers. One press of either button shifts the channel up or down and holding a button down sets the channel changer scanning at the rate of about three or four channels a second. The red LED readout in the centre of the handset. On the right-hand side of the display is a two position switch for selecting internal or external speaker. To the left of the display are two LEDs, one green, to show the rig is in the receive mode and one red, to show when the rig is transmitting. Next to the channel selector buttons are two further switches, one for the CB/PA facility and the other for switching the rig on and off. On the left-hand side of the body of the handset is the PTT switch which is comfortably placed and recesses into the handset when pressed.

The actual electronics are housed in the die-cast aluminium box with a fairly hefty heatsink moulded onto one of the sides. All the connecting leads pass out through the sides of the case and are well anchored by metal plates. In all, six leads come out from the box, these are: the antenna lead; the multi-way connector; power leads and two flying jack sockets; one for external speaker and one for the PA speaker. The only control on the case is the 10 dB attenuator switch.

In Action

A delight, that's the only way to



Above: Note the Hi/Lo attenuator switch on the main unit.

describe the Breakerphone. It makes CB fun again, and a real boon for posers who want to pretend that their CB is really a car telephone. There are one or two problems, however. For instance, the connecting leads supplied with the unit are pitifully short. In particular, the multi-way cable — being only 18 inches long — prevents installation of the actual rig in the boot of the car, unless that is, you invest in a rather expensive extension cable. This is around 15 feet long and costs £14.00. The power leads are also very short, no more than nine inches long. You'll have to extend these if you want to mount the rig more than nine inches from a source of power. However, on the plus side, the fitting kit is very comprehensive and well thought out and should ensure a rigid and secure installation.

With everything connected up and ready to go, modulations can proceed. We discovered very early on how useful the mike gain control is. If you elect to use the handset like and

ordinary mike, with an extension speaker fitted, you'll have to turn up the mike gain as your mouth will be more than a couple of inches from the mouthpiece of the handset. Should you use the handset like a telephone, then the mike gain has to be backed down a long way as you'll soon get reports of muffled copy. The same problem arises with the volume; it has to be almost right down if you use it as a handset otherwise you deafen yourself everytime the squelch opens. There is no provision for a signal strength or relative power meter, though you won't really miss it unless your contacts happen to be the sort of breakers who continually ask 'how am I hitting you good buddy?'

Signal strength reports confirmed that our review sample was pushing out a good 3.9 watts into our reference antenna and recieved copy was both clear and loud, though we did find that volume could be doubled by connecting up an extension speaker. Selectivity on this rig was good, not marvellous, and



Above: An extension cable is available to allow you to mount the transceiver in the boot.

receiver sensitivity was again not outstanding but quite good enough. Overall performance on this rig is good, we have seen better, but it would be unfair to criticise it unduly as we may have been spoilt in the past by one or two rigs with exceptional performance. It's certainly a lot better than some rigs costing considerably more. Overall, the Breakerphone wins

hands down on styling. The rig is a joy to use, gets attention everytime you use it and creates a lot of interest, even with the most die-hard AM breakers. One comment from a member of the ASP staff summed it all up nicely — Even if you're not into CB it would get you interested and it wouldn't look out of place in any car. Well done Binatone!

RIG REVIEW DATA PANEL

Model Binatone Breakerphone
Distributor Binatone International
Typical Price £109.95

| Features | Yes | No |
|-----------------------|-----|----|
| PA Facility | ● | |
| External Speaker Jack | ● | |
| TX Indicator Light | ● | |
| RX Indicator Light | ● | |
| PA Indicator Light | ● | |
| S/RF Meter | | ● |
| Hi/Lo Power Switch | ● | |
| ANL/NB Switch | | ● |
| CHB Switch | | ● |
| Variable RF Gain | | ● |
| Mike Gain | ● | |
| Delta Tune | | ● |
| Tone Control | | ● |
| LED Channel Readout | ● | |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------|------|------|------|
| Ease Of Controls | | ● | | |
| Built In Speaker | | ● | | |
| Microphone Location | | ● | | |
| Cabinet Construction | ● | | | |
| Quality Of Control Switches | | ● | | |
| Channel Indicator Readability | | | ● | |
| Mounting Bracket | ● | | | |
| Hand Book/Instructions | | ● | | |

| Specifications | |
|---------------------|--------------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | — |
| Dimensions | 180x90x60 mm |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 3.9 Watts |
| Frequency Stability | Good |
| Swamping | Good |
| Sensitivity (RX) | Good |
| Spurious Emissions | Good |

CB VERDICT

| | |
|----------------------|------|
| Range | *** |
| Clarity of TX | *** |
| Clarity of RX | **** |
| Ease Of Controls | **** |
| Ease Of Installation | **** |
| Performance | **** |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

Rig Review



Fidelity were one of the first companies to market CB equipment in this country. Their rigs are still market leaders, we look at the top-of-the-range 2000 M.

Fidelity 2000M

After only a couple of months, one or two names have become synonymous with UK CB. Probably the first and still one of the most popular makes of FM CB rigs is Fidelity, a good solid name from a good solid British company — though Fidelity are the first to admit that their CB rigs are far from British. Thus far, Fidelity have two UK FM rigs on the market, the unremarkable, though well received and very popular, CB 1000FM and the up-market CB2000FM. The latter being the subject of this month's Rig Check.

The CB 2000FM weighs in at around £90; a reasonable price for a rig of this class, though be warned, we have seen 2000FMs selling for upwards of £150 and at that price it's a

speaker, PA speaker and power lead, plus a slider switch for 10dB attenuator.

So far so good. The styling on the 2000 is a fairly distinguished mixture of chrome knobs and black/grey panels and certainly wouldn't be mistaken for anything other than a CB rig. The rig comes complete with fitting kit and very comprehensive instructions, plus of course, the manual microphone and PTT switch, but we shouldn't have to tell you that these should be standard fitting on all mobile CB rigs.

In Action

Contrary to many unsubstantiated rumours, Fidelity have had no more problems than any other manufacturer.



Of course rigs fail, it is only to be expected with such complicated technology. However, Fidelity have taken no chances with the 2000, every single unit is tested prior to dispatch and it seems to have paid off. Our review samples we're treated to the kind of abuse in just a couple of weeks that most rigs might never suffer in a whole lifetime and we're happy to report our 2000s came through unscathed. Reports from other breakers confirmed that transmitted copy was both clear and well modulated. Signal strength reports back up our power readings of a true 4 watts RF from the antenna socket. The

rip-off! The rig has eight front panel controls; three switches control channel 9 priority, tone control and LED display dimmer. Rotary controls include Volume-On/Off, Squelch/PA, Microphone Gain, RF Gain and Channel Selector. The two displays are red LED channel display and S/RF edgewise meter. The microphone socket is half right, it's on the front panel, which is more than can be said for a lot of other rigs. On the back, there are the usual sockets for antenna, extension





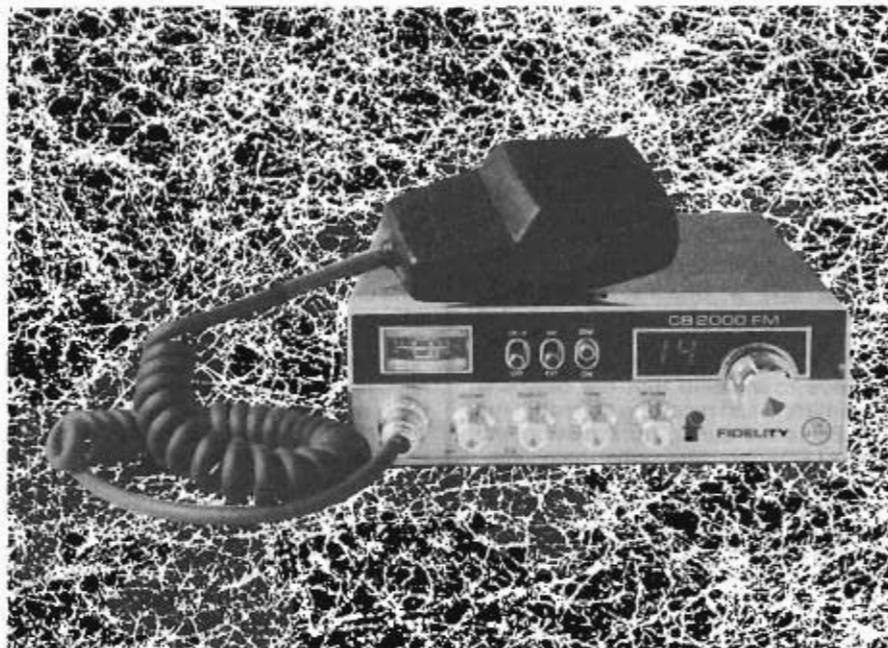
Above: The Fidelity 2000 FM with fixing kit, power leads and screws. As this is a fairly large rig you should ensure you've enough space to install it properly.

receiver section of the rig was both sensitive and highly selective, able to reject strong transmissions on adjacent channels. We have yet to put the 2000FM through our complete workshop tests but if the field test results are anything to go by, the 2000FM is a very capable rig, reasonably priced and very well built.

For around £90 the 2000FM is a worthy competitor to our current

favourite middle-market rig, the York JCB 863. We were particularly impressed with the 2000's ruggedness and uncluttered control panel. If there is any criticism of this rig then it has to be the badly sited mike socket, but to be fair to Fidelity, this is not a crime in which they are the only guilty party. To date only two manufacturers have got it right, and their rigs cost significantly more than £90.

CB



RIG REVIEW DATA PANEL

Model Fidelity 2000FM
Distributor Fidelity Radio, London
Typical Price £89.95

| Features | Yes | No |
|-----------------------|-------------------------------------|-------------------------------------|
| PA Facility | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| External Speaker Jack | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| TX Indicator Light | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| RX Indicator Light | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| PA Indicator Light | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S/RF Meter | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Hi/Lo Power Switch | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ANL/NB Switch | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| CH9 Switch | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Variable RF Gain | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Mike Gain | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Delta Tune | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Tone Control | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LED Channel Readout | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|
| Ease Of Controls | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Built In Speaker | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Microphone Location | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cabinet Construction | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Quality Of Control Switches | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Channel Indicator Readability | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mounting Bracket | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hand Book/Instructions | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Specifications

| | |
|---------------------|-----------------|
| Modes Of Operation | FM ONLY |
| No. Of Channels | 40 |
| Weight | |
| Dimensions | 215x 175x 60 mm |
| Supply Voltage | 13.8 VDC |
| RF Output Power | 4 watts |
| Frequency Stability | In Spec |
| Modulation | Good |
| Sensitivity (RX) | 0.3uV 10dB |
| Image Rejection | Good |

CB VERDICT

| | |
|----------------------|-------|
| Range | ***** |
| Clarity of TX | ***** |
| Clarity of RX | ***** |
| Ease Of Controls | ***** |
| Ease Of Installation | **** |
| Performance | ***** |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

Rig Review



Transcom GBX 4000



Transcom may have only been around a short while but their stylish and good looking rigs are rapidly becoming very popular.

One look at the Transcom International GBX 4000 is probably all you'll need to realise that this is a very fine rig indeed. For me, it was love at first sight.

And what a first sight. Small, light and compact, this 40-channel FM rig certainly looks impressive. That basic chassis measures 6 1/4" wide, 2" high and 7 1/4" deep although you'll have to allow a further 1/2" at the rear of the unit to accommodate the antenna connector and the power leads. If you're thinking that those specifications sound familiar, look no further than the two Amstrad rigs.

Moving on to the front panel . . . aah, the front panel. Lovely bit of class this, fashioned in metal with a smooth matt finish — no plastic in sight. Nice touch Transcom.

A comprehensive array of controls grace the front panel, Volume/Off, Squelch, Tone and RF Gain plus the channel selector. On the left-hand side of the panel are two switches, a PA/CB control and a Channel-Nine priority (pretty strange this — it's labelled 'monitor'). Above the channel selector, to the right of the panel, are two LED displays to indicate that the device is transmitting and receiving correctly; the Tx LED is red during transmission and the Rx LED lights green when receiving.

Sited in the middle of the panel are two display windows side by side; the display on the left is the S/Rf meter and the one on the right is the channel indicator.

Both meters are pretty exceptional — you can actually read them . . . easily! The S/Rf meter has a

red needle across a black strip all on a white background which is illuminated when the unit is switched on. The channel indicator displays the channel number in large green characters.

Tested in the pitch dark (when the S/Rf meter can never usually be read) and in the bright sunlight (when the LED channel display usually washes out), both meters were highly legible. Rig manufacturers take note.

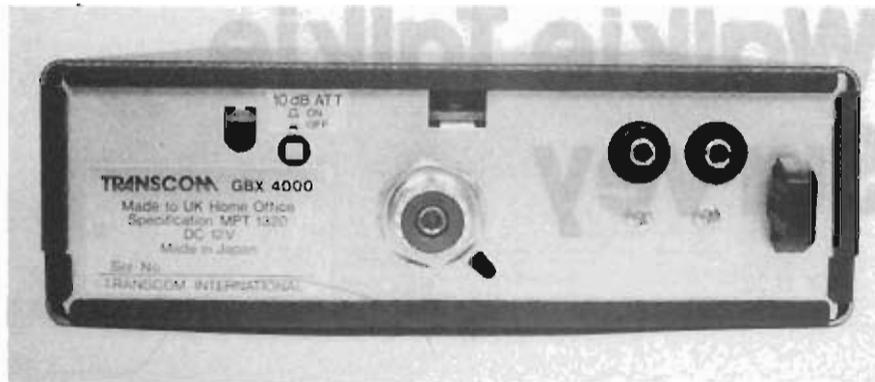
Back to the controls, let me say they are a pleasure to adjust. The control knobs are serrated and all have a very positive feel to them making fine adjustments very easy. The Volume/Off knob switches on with a good healthy 'click' and the volume increases as the control is advanced clockwise. The RF Gain control works efficiently as does the Squelch control that eliminates all background noise.

One small complaint though, if a Tone control is going to be included, why not have one that actually does something? It's not as if we're talking about studio-quality hi-fi, this is CBI! I fiddled for a couple of minutes with the tone control and could make hardly any difference to the tonal quality of the output. However, this minor point is made up for by the channel selector. Here is a nice, chunky control that, accompanied by a series of clicks, is simple to adjust.

The microphone supplied with the rig is fairly unidistinguishable, though competent and plugs into the socket on the . . . yes, you've guessed, the left-hand side of the unit. You've all heard it before I know but why on earth do the manufacturers insist on doing this for a country with right- and drive vehicles.

Also included on the GBX 4000 is a Roger Bleep facility.





Back panel showing sockets and attenuator switch.

We did a brief test square-wheeled in the office and it worked very well indeed. The audio quality was good and both Squelch and RF Gain controls operated satisfactorily. Reports from local stations were highly complimentary and further tests indicated that there was no bleed-over between adjacent channels.

More comprehensive tests were carried out on mobile locations including roll of drums . . . the research team's noisy car. All to no avail though, the Transcom rig won through; the audio amplifier coped with the noise

adequately and made no great demands on the internal speaker. The Roger Bleep wasn't too bad either — which is lucky because you can't turn it off!

The GBX 4000 comes complete with mounting bracket and fixing screws and fairly comprehensive owner's manual. This handbook includes good explanations of the controls but I would have liked a little more to the 'understanding SWR' chapter.

The price of the Transcom International GBX 4000 is very competitive — at £59.95, this rig is definitely one for the short list.

CB



The Transcom GBX 4000 complete with fixing kit.

RIG REVIEW DATA PANEL

Model Transcom GBX 4000
Distributor Transcom Ltd, Berks
Typical Price £90

| Features | Yes | No |
|-----------------------|-------------------------------------|-------------------------------------|
| PA Facility | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| External Speaker Jack | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| TX Indicator Light | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| RX Indicator Light | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| PA Indicator Light | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S/R/F Meter | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Hi/Lo Power Switch | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ANL/NB Switch | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| CH9 Switch | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Variable RF Gain | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Mike Gain | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Delta Tune | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Tone Control | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| LED Channel Readout | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

| Facilities | Superb | Good | Fair | Poor |
|-------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| Ease Of Controls | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Built In Speaker | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Microphone Location | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Cabinet Construction | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Quality Of Control Switches | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Channel Indicator Readability | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mounting Bracket | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hand Book/Instructions | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

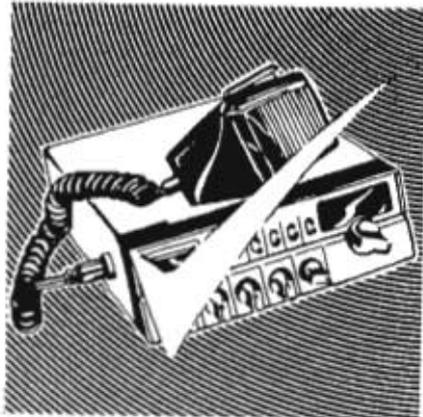
| Specifications | |
|---------------------|------------|
| Modes Of Operation | FM Only |
| No. Of Channels | 40 |
| Weight | |
| Dimensions | |
| Supply Voltage | 13.2 VDC |
| RF Output Power | 3.9 Watts |
| Frequency Stability | In Spec |
| Swamping | Good |
| Sensitivity (RX) | 0.3uV 10dB |
| Spurious Emissions | In Spec |

CB VERDICT

| | |
|----------------------|---------|
| Range | * * * * |
| Clarity of TX | * * * * |
| Clarity of RX | * * * * |
| Ease Of Controls | * * * * |
| Ease Of Installation | * * * |
| Performance | * * * * |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.

Rig Checks



Portable or hand-held CB rigs have a multitude of uses. We look at some of the portables on the market at the moment.

Walkie Talkie Survey

CB

rigs usually fit into one of three categories, mobile, portable or base station. The mobile category is by far the biggest. CB users are drivers and they tend to be the ones who derive the most benefit from CB. A lot of people do operate from their home base, but they don't use a base station rig, they use a mobile one and a 12 volt power supply instead. That's why the base station category is probably the smallest. By a process of elimination this probably means that portables are the second most popular type of CB rig.

Some of the very basic hand-helds are not much more than toys. They are slightly better than those ubiquitous 49 MHz gadgets but they are not really of much interest to anyone over the age of 15. At the other end of the scale, some of the better rigs are full function 40 channel sets that have all the features and output power of a full size set.

A basic problem with all portables is the fact that they have to carry their own source of power with them. A mobile rig can draw all the power that it needs from your car's battery but a walkie-talkie has to supply its own power. That's why some of the better ones (the ones with the higher output power) tend to be a bit bulky — they contain a lot of batteries.

There are numerous groups of people who would like to be able to keep in touch with each other while they are outdoors; hikers, cyclists, climbers, picnickers, pot-holers, etc. A portable CB not only helps such people to enjoy their hobby, it could also save their lives. It's not unusual for a climber to die simply because he can't contact the rescue services. Hopefully this will change with CB freely available.



(NOTE: The CTVR-AM version is not licensable for use in the UK.)

The Harvard 020

This is a small unit that has only two channels, 14 and 19. As it is crystal controlled it should be possible to change these channels by changing the appropriate crystals for the ones that you want. The rotary volume/off control operates normally but the Squelch control is a little unusual — it's a switch and not a rotary control. The Squelch level is preset internally and operating the switch turns it either fully on or fully off. The only other control on this very basic set is the transmit button. This rig does not have many features and it's hardly likely to appeal to the serious CB'er, but it does cost a mere £20. It could make the ideal gift for a youngster who is looking for his first taste of CB.

The Harvard 410

This is a full-function hand-held portable CB rig. It has an LED display that shows which of the channels is in use; the set covers all 40 of them. It also has a S/RF meter which gives a relative indication of both the received signal strength and RF output power. The maximum RF output of this rig is 2.5 W and the power supplied by eight AA pen cells.

There are three rotary controls, the volume/off, the Squelch and the channel selector. There is also a pushbutton that will make the set jump to channel 9 instantly. Two small lights are provided, one to indicate that you are receiving and another to show that you are transmitting.

The Harvard 410 is supplied complete with a telescopic antenna and a leatherette pouch and costs £80.00.



The CTVR

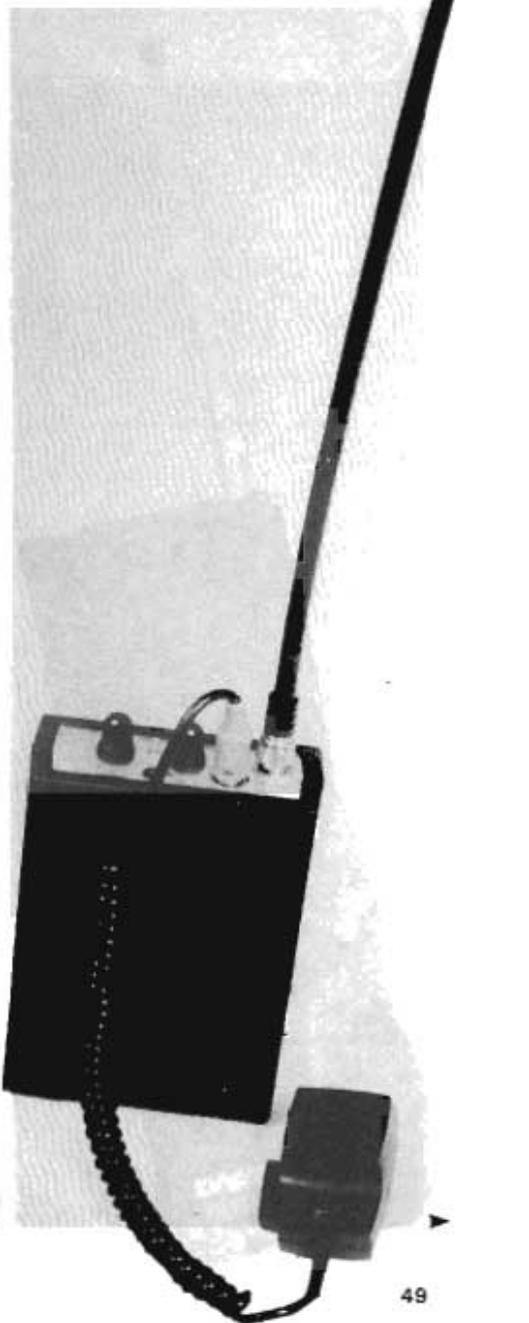
The CTVR hand-held rig has only six channels but it does have five watts of output power. In the middle of the front panel is a large signal strength/RF meter to be used to indicate the condition of the internal batteries. The second switches the output power from high to low (to conserve battery power) and the third switches the microphone gain from high to low. On the top panel there are two rotary controls, the Squelch and the volume/off. There is also a built in thirteen section telescopic antenna. On the left-hand side of the case is the push-to-talk bar and on the right-hand side there are two sockets. The top one is where the battery charger plugs in and the lower one is for an external power supply so that the set can be powered externally when used as a base station. On the back of the rig there is a spring clip that allows the unit to be clipped on to a belt. A licensable FM version of the CTVR should be available shortly.

The CTVR is available from CTVR Ltd (Dept CB), 64 Castlegate, Grantham, Lincs, and it should cost about £49.95 per unit.

The Ranger

The Ranger started life as a constructional project in an Electronics magazine. It's a fairly large six channel hand-held portable unit that is supplied in either kit form or ready-built. The top of the case houses the two rotary controls, the volume/off and the channel selector. The Squelch is preset internally and it is activated by a switch on the top panel. Immediately below this switch is a light that glows whenever you transmit. It can also be used to check on the condition of the internal rechargeable batteries. There are two sockets on the top panel, one for the external microphone that is supplied as standard and one for the helically wound external antenna that is also supplied.

If you feel confident enough to try and build this set for yourself it will cost you £49.95 in kit form. If you don't think that you could cope with making this rather advanced project, it will cost you £64.95 ready-built from Autumn Products Ltd, Park Drive, Baldock SG7 6EW.



The Grandstand Interceptor

The Grandstand Interceptor is a simple two channel walkie-talkie that operates on channels 5 and 14. It has an edgewise-on rotary volume control on the right-hand side of the case just above the push-to-talk switch. There are two switches on the front panel. One selects the channel and the other turns the preset Squelch on and off. This unit has a built-in five section telescopic antenna and it is powered by a PP3 9 volt battery.

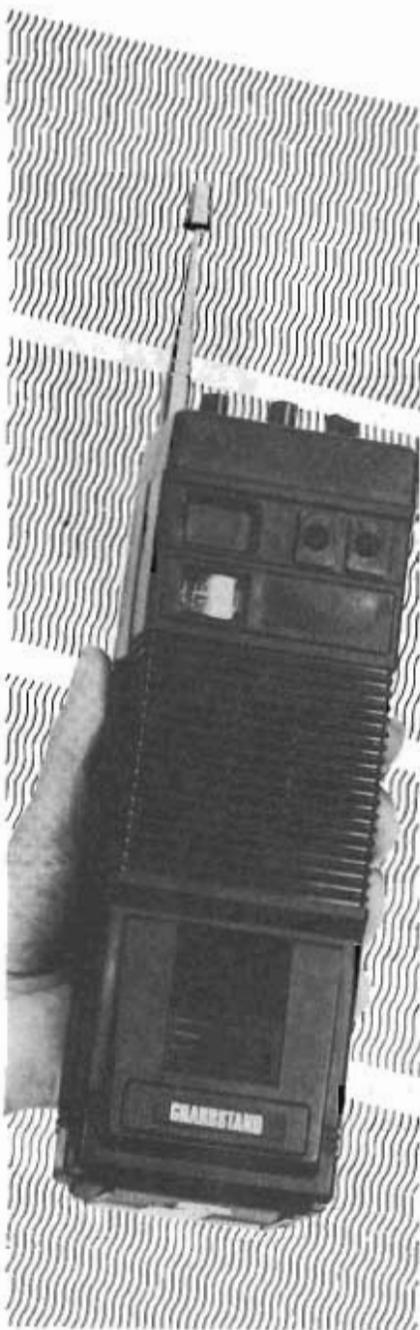
It should be available from various retailers for about £25.

The Grandstand Communicator

The Grandstand Communicator is a full 40 channel walkie-talkie. It has a built in 10 section telescopic antenna and a large red LED digital display on the front panel just above the signal strength/RF Output Power meter. On the top panel

there are three rotary controls, the volume/off, the Squelch and the channel selector.

This model should also be readily available and it will cost around £60.



Binatone

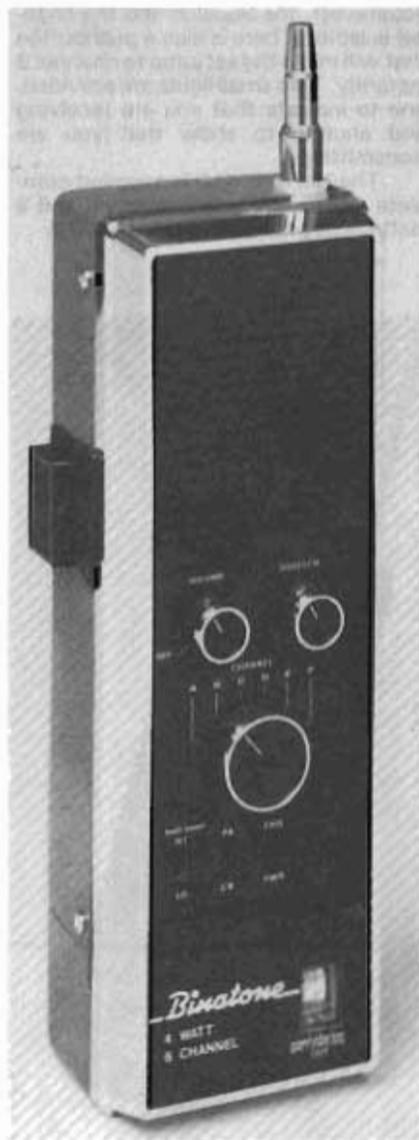
The basic walkie-talkie from Binatone has only six channels but it has a RF output power of 4 Watts. The push-top-talk is situated on the left-hand side of the case and the built-in telescopic antenna comes out of the top panel. In the middle of the front panel is the rotary channel selector. Just above it are the volume/off and Squelch controls. Below it there are three switches. One is the battery saver that reduces the output power. Another is the on/off switch for the public address facility and the third switches the set from the charging

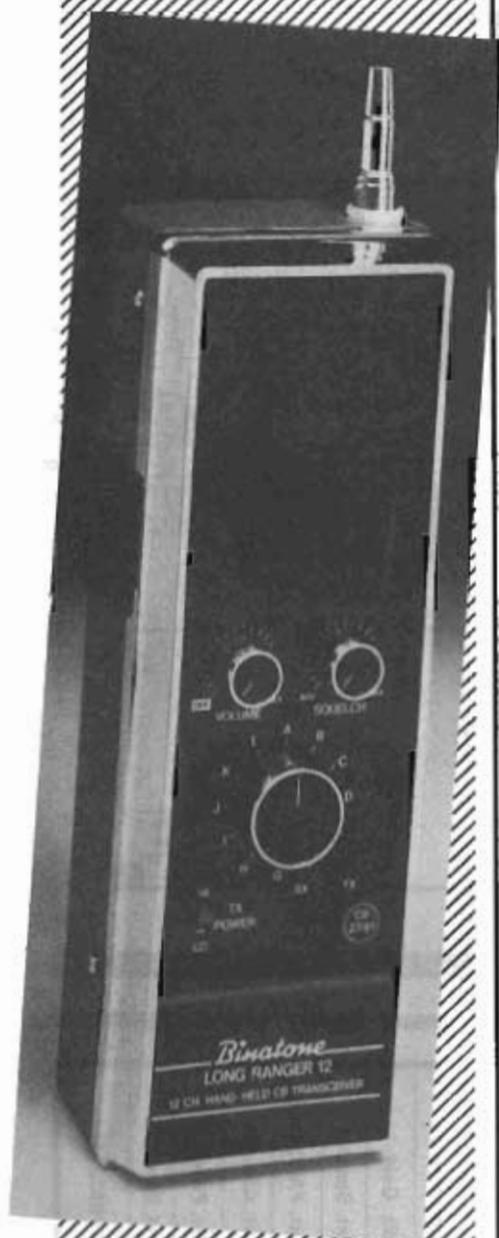
mode to the power one. In the bottom right-hand corner there is a meter that can be used to show the strength of incoming signals, the RF output power or the condition of the internal batteries. On the right-hand side of the case are sockets for an external power supply and an external speaker.

This set should be available from various sources for about £30.40.

Binatone Long Ranger 12

This is the other walkie-talkie from Binatone. It also has a PTT on the left-hand side of the channel selector on the front panel but this one has 12 channels to choose from. The volume/off and Squelch controls are also situated just above the channel selector. Just underneath it is a high/low RF output power switch and two small lights. One glows on transmit and the other on receive. The rig also has a built-in telescopic antenna and it should also be readily available. It is expected to sell for approximately £50-60.





The Realistic TRC 1001

The Realistic 1001 is quite a large 40 channel hand-held portable rig from Tandy. The top panel is used to the full. It contains the rotary volume/off and Squelch controls and the channel selector, as well as the battery condition/RF output power meter. Also on the top panel is the built-in telescopic antenna and two sockets — one for an extension speaker.

On the back of the case is a carrying strap and on the right-hand side panel there is a high/low power output switch

and three more sockets. One is for an external antenna, another is for a charger for the Ni-cads and the third one is for an external power supply. All of the five sockets have tight fitting plastic caps that keep them free from dust when they are not in use. The push-to-talk bar is on the right-hand side of the case and at the top of the front panel is the red LED digital display that shows which channel you are on.

The Realistic TRC 1001 is available from any of the many Tandy branches and it will cost £119.00.



The dnt HF 12/3

The dnt HF 12/3 is a small three channel hand-held walkie-talkie. It has a built-in telescopic antenna and an RF output of 2 Watts. The PTT is on the left-hand side of the case and the rotary volume/off and Squelch controls are on the right-hand side, along with the Channel Selector switch. The rotary controls have been set edgewise-on into the side of the case to make them easier to operate.

The HF 12/3 retails for £47.50.

The dnt HF 13/40

The dnt HF 13/40 is a full 40 channel hand-held unit. The rotary channel selector is on the right-hand side of the case. Immediately above it is the socket for a battery charger for the Ni-cads and immediately above that is the external battery socket that allows the set to be run from an external power supply. Also on the right-hand side of the case are the edgewise mounted volume/off and Squelch controls. On the front panel is a small light that shows when you are transmitting. Next to it is a signal strength/RF output power meter that can also be used to check on the condition of the batteries. The push-to-talk switch is on the left-hand side of the rig. Extending from the top is a 13 section telescopic antenna.

The dnt HF 13/40 retails for approximately £82.



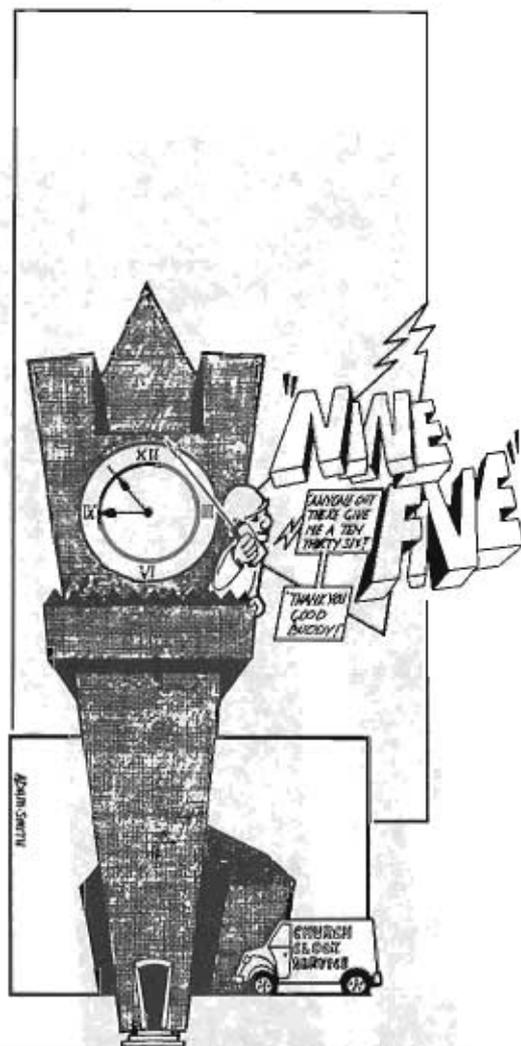


The Harrier WT-1

This is a small two-channel unit that will operate on either channel 14 or 30. It has a built-in telescopic antenna and there are two switches on the front panel. One is the channel selector and the other turns the preset Squelch on and off. The push-to-talk bar is on the left-hand side of the case, alongside the rotary Volume control. There is also a call-tone button. The Harrier WT-1 is available from Dixon's Photographic Ltd where it will cost £24.99.

The Harrier WT-2

The Harrier WT-2 will also be available from any of Dixon's 240 retail outlets. It's a full 40 channel hand-held walkie-talkie and is supplied complete with a case. It has volume/off control, Squelch and a channel selector. It also has a large, bright red LED digital display that shows the channel which is used. There is also a signal strength/RF power output meter that can be used to check on the condition of the batteries. There are two small LEDs, one that lights on transmit and one that lights on receive. The WT-2 has its own built-in telescopic antenna and there is also a socket for plugging in an external antenna. As well as the push-to-talk bar there is a call tone button. The retail price of the Harrier WT-2 is £64.99.



Portable Checklist

| MAKE & MODEL | Squelch-Rotary | Squelch-Switch | No. of Channels | LED display | Ch. 9 Button | Hi-Lo switch | Telescopic Ant. | LED - Rx | LED - Tx | S/RF meter | Battery check | Call Tone | Mic. Gain | Ext. Speaker | Ext. PA Speaker | Ext. Antenna | Ext. Power | Ext. Batt. Ch. | £ PRICE (Appx) |
|-------------------------|----------------|----------------|-----------------|-------------|--------------|--------------|-----------------|----------|----------|------------|---------------|-----------|-----------|--------------|-----------------|--------------|------------|----------------|----------------|
| HARVARD 020 | | ● | 2 | | | | ● | | | | | | | | | | | | 20 |
| HARVARD 401 | ● | | 40 | ● | ● | | ● | ● | ● | ● | | | | | | | | | 80 |
| CTVR | ● | | 6 | | | ● | ● | | | ● | ● | | ● | | | | ● | ● | 50 |
| P.E. RANGER | | ● | 6 | | | | | | ● | | ● | | | | | | | ● | 65 |
| GRANDSTAND INTERCEPTOR | | ● | 2 | | | | ● | | | | | | | | | | | | 25 |
| GRANDSTAND COMMUNICATOR | ● | | 40 | ● | | | ● | | | ● | | | | | | | | | 60 |
| BINATONE (Basic) | ● | | 6 | | | ● | ● | | | ● | ● | | | | ● | | ● | ● | 40 |
| BINATONE LONG RANGER 12 | ● | | 12 | | | | ● | ● | ● | | | | | | | | | | 50 |
| REALISTIC TRC 1001 | ● | | 40 | ● | | ● | ● | | | ● | ● | | | ● | | ● | ● | ● | 120 |
| dnt HF 12/3 | ● | | 3 | | | | ● | | | | | | | | | | | | 48 |
| dnt HF 13/40 | ● | | 40 | | | | ● | | ● | ● | ● | | | | | | | ● | 80 |
| HARRIER WT-1 | | ● | 2 | | | | ● | | | | | ● | | | | | | | 25 |
| HARRIER WT-2 | ● | | 40 | ● | | | ● | ● | ● | ● | ● | ● | | | | | | | 65 |

**If you find
an ad
unacceptable,
don't turn
the page:
turn to us.**

Every week, millions of advertisements appear in the press, on posters and in the cinema.

Most of them comply with the rules contained in the British Code of Advertising Practice and are legal, decent, honest and truthful.

But if you find one that, in your opinion, is wrong in some way, please write to us at the address below.

We would like you to help us keep advertising up to standard.

The Advertising Standards Authority. ✓
If an advertisement is wrong, we're here to put it right.

A.S.A. Ltd., Brook House, Torrington Place, London WC1E 7HN.

RIGS & ACCESSORIES from the name you know



**Available at your local
C.B. stockists or
direct from J.W.R.**



Send £2.95p + 75p p&p U.K. only, for our new Automotive Accessory Catalogue which includes CB rigs and accessories. A £2.95 voucher is enclosed and this is redeemable at Woolfe House with purchases of £10 or more.



John Woolfe Racing Ltd.,
Woolfe House, Norse Road,
Bedford, MK41 0LF England.
Tel: 0234 41449 Telex: 825483.



BRITISH FM

As you can see, the Which Rig checklist contains nearly 100 models of legal FM CB rigs, but how many of them are actually different?

You can see from the checklists on the following four pages that there are nearly one hundred models of CB rigs on the market. It would be tempting to surmise that all the models are different, unfortunately this is not the case, probably only thirty or so of all the rigs on the market are actually unique. The other seventy are all cosmetic variations or badge engineered versions of the original thirty.

This situation is hardly surprising when you consider that there are only four major manufacturers of CB rigs in the whole world, plus only a handful of other companies producing rigs in any real quantity.

The big four are probably all familiar to you by now, they are: Cybernet, Uniden, Great and AE. Between them they manufacture something like 80% of all the CB rigs in the world.

Many of the rigs designed for use with UK FM CB are not actually all that new, in fact some of the basic chassis designs have been around for some years; this is well illustrated by the positioning of the microphone socket, intended mainly for the American, Australian and European markets where driving on the right-hand side of the road is the norm.

Buying a CB rig at the moment can be a real headache. A couple of months ago it was simple, the choice was limited and the prices were all fairly similar. In the past few weeks the initial supply problems have all been resolved and many rigs are now selling at up to £20 below their pre-Christmas price.

Much has been written in the national press about CB being a commercial disaster — this is just not true. However, there has been a few surprises. First: CB never assumed 'cult' status as many had predicted. Instead, we estimate that around 75% of all new CB rigs are being sold to ex-AM Cbers. We are in effect preaching to the converted. The newcomers, around 25% of the market, are discovering CB for themselves, indeed it is a sad fact that many potential Cbers are being put off by the general assumption that CB can only be used by people prepared to assume pseudo-American accents and long vocabularies of jargon and slang.

This is simply not so. Anyone can use CB and providing they follow the commonsense rules, can speak in English, American, even Chinese, providing it is in plain speech.

| NAME | ADDRESSES | MODEL |
|-------------|--|---------------|
| AMSTRAD | Amstrad Consumer Electronics, 1-7 German Road, London N17. | CB 900 |
| AMSTRAD | | CB 901 |
| BARRACUDA | Halfords Motor Accessory Shops. | GT 868 |
| BARRACUDA | | HB 940 |
| BEAR | Air Bear (UK) Ltd, Wortley, Sheffield. | RHB35 |
| BINATONE | Binatone House, Bereaford Avenue, Wembley, Middx HA0 1YX. | BREAKER PHONE |
| BINATONE | | BEAM BREAKER |
| BINATONE | | ROUTE 66 |
| BINATONE | | LONGRANGER |
| BINATONE | | POWER BASE 5 |
| BINATONE | | SPEEDWAY |
| COBRA | Mura (UK) Ltd, High Rd, Willesden, London NW10. | 21XFM |
| COLT | Shellpost, 183 The Rock, Bury Lance. | 295 |
| COMMTRON | ADS Ltd, Blackpool, Lancs. | CB40F |
| CYBERNET | Goodmans Loudspeakers Ltd, Downley Road, Havant, Hants PO9 2NL | BETA 1000 |
| CYBERNET | | BETA 2000 |
| CYBERNET | | BETA 3000 |
| DNT | Radiorotechnic, Jersey, Channel Islands. | B40FM |
| DNT | | HF12/3FM |
| DNT | | HF13/40FM |
| DNT | | M40 FM |
| EUROCOMM | Zycomm Electronics, Ripley, Derby. | EURO 40 |
| FIDELITY | Fidelity Radio Ltd, Victoria Road, London NW10. | CB 1000M |
| FIDELITY | | CB 2000M |
| GRANDSTAND | Bee-Ware Ltd, Ripon Way, Harrogate, North Yorkshire. | BLUEBIRD |
| GRANDSTAND | | HAWK |
| GRANDSTAND | | GEMINI |
| GRANDSTAND | | BASE |
| GREAT | Britannia Trading, Northern Road, Sudbury, Suffolk. | GT-858B |
| HAM INT. | 25 Buckland Road, Leicester | EXPLORER |
| HAM INT. | | MARINER |
| HAM INT. | | HERCULES |
| HARRIER | Dixons Photographic Ltd. | CB HQ |
| HARRIER | | CB MOBILE |
| HARRIER | | CBX |
| HARRIER | | WT1 |
| HARRIER | | WT2 |
| HARVARD | Harris Overseas Ltd, Harvard House, 14-16 Thames Road, Barking, Essex. | 400 M |
| HARVARD | | 402 MPA |
| HARVARD | | 420 M |
| HARVARD | | 020 |
| HARVARD | | 410 T |
| INTERCEPTOR | Chelsea CB Centre, 73-77 Britannia Road, London. | INTERCEPTOR |

RIG CHECKLIST



| TYPE: M, B or P | NO. OF CHANNELS | SQUELCH | NB SWITCH | ANL SWITCH | MIKE GAIN | RF GAIN | STONE CONTROL | S/RF METER | S/RF LED R/O | HI/LO OUTPUT | PA FACILITY | EX. SPEAKER JACK | TX IND. LIGHT | RX IND. LIGHT | CH 9 SWITCH | SUPPLY VOLTAGE | RETAIL PRICE | |
|-----------------|-----------------|---------|-----------|------------|-----------|---------|---------------|------------|--------------|--------------|-------------|------------------|---------------|---------------|-------------|----------------|--------------|-------------|
| M | 40 | • | | | | • | • | | • | • | | • | • | • | | 13.8VDC | £79 | AMSTRAD |
| M | 40 | • | | | | • | • | | • | • | • | • | • | • | • | 13.8VDC | £96 | AMSTRAD |
| M | 40 | • | | | | • | | • | | • | | • | • | • | | 13.8VDC | £70 | BARRACUDA |
| M | 40 | • | | | • | • | • | • | | • | • | • | • | • | • | 13.8VDC | £86 | BARRACUDA |
| P | 3 | • | | | | | | | | | | | • | | | BATTERIES | £44 | BEAR |
| M | 40 | • | | | • | | | | • | • | • | • | • | • | | 13.8VDC | £99 | BINATONE |
| M | 40 | • | • | | | | | • | | • | | • | • | | | 13.8VDC | £79.96 | BINATONE |
| M | 40 | • | | | | | | • | | • | • | • | • | • | | 13.8VDC | £79.96 | BINATONE |
| P | 12 | • | | | | | | | | • | | | | | | BATTERY | £60 | BINATONE |
| B | 40 | • | | | | • | • | • | | • | | • | • | • | • | 240VAC | £99 | BINATONE |
| M | 40 | • | | | | | | • | | • | | • | • | | | 13.8VDC | £69.96 | BINATONE |
| M | 40 | • | | | | | | • | | • | • | • | • | | | 13.8VDC | £79.00 | COBRA |
| M | 40 | • | | | | • | | • | | • | • | • | • | | | 13.8VDC | £TBA | COLT |
| M | 40 | • | | | | | | • | | • | | • | • | • | • | 13.8VDC | £70 | COMMTRON |
| M | 40 | • | | | | | | | • | • | | • | | | | 13.8VDC | £80 | CYBERNET |
| M | 40 | • | | | | • | • | | • | • | • | • | • | • | | 13.8VDC | £90 | CYBERNET |
| M | 40 | • | | | | • | • | | • | • | • | • | • | • | • | 13.8VDC | £100 | CYBERNET |
| B | 40 | • | | | | • | | • | | • | | • | • | • | | 240VAC | £96.50 | DNT |
| P | 3 | • | | | | | | | | | | | | | | BATTERY | £41.36 | DNT |
| P | 40 | • | | | | | | • | | | | • | • | | | BATTERY | £70.82 | DNT |
| M | 40 | • | | | | • | | • | | • | | • | • | | | 13.8VDC | £85.43 | DNT |
| M | 40 | • | | | | | | • | | • | • | • | • | • | • | 13.8VDC | £69 | EUROCOMM |
| M | 40 | • | | | | | | • | | • | | • | | | | 13.8VDC | £70 | FIDELITY |
| M | 40 | • | | | • | • | • | • | | • | • | • | | | • | 13.8VDC | £90 | FIDELITY |
| M | 40 | • | | | | | | • | | • | | • | • | | | 13.8VDC | £89.96 | GRANDSTAND |
| M | 40 | • | | | | • | | • | | • | | • | • | • | | 13.8VDC | £79 | GRANDSTAND |
| M | 40 | • | • | | | • | | | • | | | • | • | • | | 13.8VDC | £122 | GRANDSTAND |
| B | 40 | • | | | | • | | • | | | | • | • | • | | 240VAC | £226 | GRANDSTAND |
| M | 40 | • | | | | | | • | | • | • | • | | | | 13.8VDC | £66 | GREAT |
| M | 40 | • | | | | | • | • | | • | • | • | • | • | | 13.8VDC | £76 | HAM INT. |
| M | 40 | • | | • | • | • | • | • | | • | • | • | • | • | | 13.8VDC | £110 | HAM INT. |
| B | 40 | • | | • | • | • | • | • | | • | • | • | • | • | | 240VAC | £170 | HAM INT. |
| B | 40 | • | | | | • | • | • | | • | | • | • | • | • | 240VDC | £130 | HARRIER |
| M | 40 | • | | | | | | • | | • | | • | • | | | 13.8VDC | £70 | HARRIER |
| M | 40 | • | | | • | • | • | • | | • | • | • | • | • | • | 13.8VDC | £100 | HARRIER |
| P | 2 | • | | | | | | | | | | | • | | | BATTERY | £26 | HARRIER |
| P | 40 | • | | | | | | • | | | | | • | • | | BATTERY | £66 | HARRIER |
| M | 40 | • | | | | • | | • | | • | | • | • | • | • | 13.8VDC | £80 | HARVARD |
| M | 40 | • | | | | | | • | | • | • | • | • | | | 13.8VDC | £80 | HARVARD |
| M | 40 | • | | | | • | • | • | | • | • | • | | • | | 13.8VDC | £100 | HARVARD |
| P | 2 | • | | | | | | | | | | | • | | | BATTERY | £20 | HARVARD |
| P | 40 | • | | | | | | | | | | | • | • | • | 8xAA Cell | £80 | HARVARD |
| M | 40 | • | | | | • | | • | • | • | | • | • | • | | 13.8VDC | £80 | INTERCEPTOR |

BRITISH FM

The unique CB FM rig checklist has nearly 100 entries, detailing functions, price and availability. Who said no-one would bother producing UK CB rigs?

Second: before Christmas rigs were scarce and expensive, enough reason to put anyone off during a recession.

Third: the absurd rumour that AM was going to be legalised and that AM rigs were being returned with seals on the controls and antenna socket saying 'do not open until April' or similar. It was a hoax on the grand scale and did a lot of damage to the CB industry.

Fourth: we hope to help people understand that CB is not just for talking to other breakers, yes, of course that is the main use but we hope to show people that CB has literally thousands of other uses. These range from business use to marine use; it can be used on the farm; at outdoor events for crowd control; marshalling — the list is endless. Until the full potential of CB has been explored the level of interest will remain fairly low and very much the province of the dedicated enthusiast.

And lastly, now that rig prices are coming down to a realistic level we hope to see a gradual increase in the numbers of newcomers. It is a fact of life that the severe weather conditions earlier this year prompted many people to go out and buy rigs not just for pleasure but as devices that one day may save their lives. These people will discover the value of CB and we hope that by offering a complete run down of all the currently available rigs, people will be able to make their selections wisely.

| NAME | ADDRESSES | MODEL |
|-------------|--|-------------|
| INTERCEPTOR | | TC400 |
| INTERCEPTOR | | ONE HANDER |
| INTERCEPTOR | | HB800 |
| JOHNSON | Star Warehouse, Chalk Farm Road, London. | JOHNSON |
| JWR | John Woolfe Racing, Woolfe House, Norse Road, Bedford MK41 0LF. | MI |
| JWR | | M2 |
| JWR | | M3 |
| KAISER | Kaiser Electronics, Neuwottrasse 21-25, Waldorf, Baden, W Germany | UK40 |
| KAISER | | CBX40 |
| LAKE | ADS Ltd, Blackpool, Lancs. | MANXMAN B50 |
| LAKE | | MANXMAN 950 |
| LCL | LCL Imports Ltd, 101 Dixons Green, Dudley, W. Midlands. | CB401 |
| LCL | | 440DX |
| LOWE | Lowe Electronics, Matlock, Derbyshire. | TX40 |
| MAJOR | Unit 2, Station Yard, Willbraham Road, Fulbourn, Cambs. | 3000 |
| MAJOR | | MAJOR 2000 |
| MAJOR | | MAJOR 4000 |
| MAJOR | | MAJOR 5000 |
| MICROLINK | Wazman-Freed Ltd, 82 Golders Green Rd, London NW11. | CB401 |
| MIDLAND | Plustronix Ltd, Hempstalls Lane, Newcastle-under-Lyme, Staffs. | 2001 |
| MIDLAND | | 3001 |
| MIDLAND | | 4001 |
| MIDLAND | | 75-72 |
| MIDLAND | | 77-810 |
| MIDLAND | | HHP |
| OSCAR | South Midlands Communications, Osborne House, Totton, Southampton. | OSCAR 1 |
| RADIOMOBILE | Goodwood Works, North Circular Road, London NW2 7JS. | 201 |
| RADIOMOBILE | | 202 |
| RANGER | Modus Systems Ltd, 29a Eastcheap, Letchworth, Herts SG8 3DA. | RANGER |
| REFTEC | RF Technology Ltd, Leyton Avenue Ind Est, Mildenhall, Suffolk | 934 |
| ROTEL | Rotel Hi-Fi, 2-4 Emca Road, Stacey Bushes, Milton Keynes. | RVC 220 |
| ROTEL | | RVC 230 |
| ROTEL | | RVC 240 |
| S & M | S & M Ltd, Haverhill Suffolk. | ANGLIA |
| SAPPHIRE | Marginplan Ltd, Hope Road, Leeds. | 2000X |
| SIRTEL | 24 Alfie Square, Off Maxwell Road, Woodston Ind Est, Peterborough. | SEARCHER |
| STEEPLETONE | Steepletone Ltd, Park End Works, Croughton, Nr Beccles, Northants. | SCBIFM |
| SUNRISE | 8a West Smithfield, London EC1 | SAMURI |
| TANDY | Tandy Corporation, Tame Way Tower, Bridge St., Walsall, W. Midlands WS1 1LA. | TRC 1001 |
| TANDY | | TRC2001 |
| TANDY | | TRC 2002 |
| TANDY | | TRC 2000 |
| TENVOX | Voxen Audio Ltd, Abingdon, Oxon. | TENVOX |



RIG CHECKLIST



| TYPE: M, B or P | NO. OF CHANNELS | SQUELCH | NB SWITCH | ANL SWITCH | MIKE GAIN | RF GAIN | STONE CONTROL | S/RF METER | S/RF LED R/O | HI/LO OUTPUT | PA FACILITY | EX. SPEAKER JACK | TX IND. LIGHT | RX IND. LIGHT | CH 9 SWITCH | SUPPLY VOLTAGE | RETAIL PRICE | |
|-----------------|-----------------|---------|-----------|------------|-----------|---------|---------------|------------|--------------|--------------|-------------|------------------|---------------|---------------|-------------|----------------|--------------|-------------|
| M | 40 | • | | • | • | • | • | • | | • | | • | • | • | | 13.8VDC | £95 | INTERCEPTOR |
| M | 40 | • | | | • | • | • | | • | | | • | • | • | | 13.8VDC | £100 | INTERCEPTOR |
| B | 40 | • | | | • | • | • | • | | • | • | • | • | • | | 240VAC | £180-200 | INTERCEPTOR |
| M | 40 | • | | | | • | | • | | • | • | • | | | | 13.8VDC | £50 | JOHNSON |
| M | 40 | • | | | | | | • | | • | | • | • | | • | 13.8VDC | £66 | JWR |
| M | 40 | • | | | | | | • | | • | | • | • | | | 13.8VDC | £60 | JWR |
| M | 40 | • | • | | | • | | • | | • | | • | • | • | | 13.8VDC | £90 | JWR |
| M | 40 | • | | | | | | • | | • | • | • | • | • | | 13.8VDC | £TBA | KAISER |
| P | 40 | • | | • | | | | • | | • | | • | • | | | BATTERY | £TBA | KAISER |
| M | 40 | • | | | | | | • | | • | | | | | | 13.8VDC | £88 | LAKE |
| M | 40 | • | | | | • | | • | | • | • | • | | | • | 13.8VDC | £95 | LAKE |
| M | 40 | • | | | | | • | • | | • | | | • | • | | 13.8VDC | £TBA | LCL |
| M | 40 | • | | | | • | • | • | | • | | • | • | • | | 13.8VDC | £TBA | LCL |
| M | 40 | • | | | | • | | • | | • | | • | • | • | | 13.8VDC | £70 | LOWE |
| M | 40 | • | | | | | | • | | • | | • | | | | 13.8VDC | £76 | MAJOR |
| M | 40 | • | | | | • | | • | | • | • | • | • | | | 13.8VDC | £69 | MAJOR |
| B | 40 | • | | | | | • | • | | • | | • | • | • | • | 240VAC | £120 | MAJOR |
| M | 40 | • | | | • | • | • | • | | • | • | • | | | • | 13.8VDC | £89 | MAJOR |
| M | 40 | • | | | | • | | • | | • | • | • | • | • | | 13.8VDC | £116 | MICROLINK |
| M | 40 | • | | | | | • | • | | • | | | • | | | 13.8VDC | £76 | MIDLAND |
| M | 40 | • | • | | | • | | • | | • | • | | | | • | 13.8VDC | £80 | MIDLAND |
| M | 40 | • | • | | | • | | • | | • | • | | • | | | 13.8VDC | £90 | MIDLAND |
| P | 3 | • | | | • | | | | | | | | • | | | BATTERIES | £60 | MIDLAND |
| M | 40 | • | | | | | | • | | • | | • | • | | • | 13.8VDC | £73 | MIDLAND |
| P | 3 | • | | | | | | | | | | | • | | | BATTERY | £TBA | MIDLAND |
| M | 40 | • | | | | | | • | | • | | • | | | • | 13.8VDC | £85 | OSCAR |
| M | 40 | • | | | | | | | • | • | | • | | | | 13.8VDC | £80-90 | RADIOMOBILE |
| M | 40 | • | | | | • | • | | • | • | • | • | • | • | • | 13.8VDC | £120 | RADIOMOBILE |
| P | 8 | • | | | | | | | | | | | • | • | | 12VDC | £80 | RANGER |
| M | 20 | • | | | | | | • | | | | • | • | | | 13.8VDC | £TBA | REFTEC |
| M | 40 | • | | | | | | • | | • | | • | • | | | 13.8VDC | £70 | ROTEL |
| M | 40 | • | | | | • | • | • | | • | • | • | • | • | | 13.8VDC | £80 | ROTEL |
| M | 40 | • | | | • | • | • | • | | • | • | • | | | | 13.8VDC | £90 | ROTEL |
| M | 40 | • | | | | • | | • | | • | • | • | • | • | | 13.8VDC | £68 | SAPPHIRE |
| M | 40 | • | | | | • | | • | | • | • | • | • | • | | 13.8VDC | £TBA | S & M |
| M | 40 | • | | | | | | • | | • | • | • | • | | | 13.8VDC | £TBA | SIRTEL |
| M | 40 | • | | | | | | | • | • | | • | • | • | | 13.8VDC | £103 | STEEPLETONE |
| M | 40 | • | | | | • | • | | • | • | • | • | • | | | 13.8VDC | £99 | SUNRISE |
| P | 40 | • | | | | | | • | | • | | • | | | | 12VDC | £119 | TANDY |
| M | 40 | • | | | | | | • | | • | • | • | • | | | 13.8VDC | £80 | TANDY |
| M | 40 | • | | | | | | • | | • | • | • | • | | | 13.8VDC | £TBA | TANDY |
| M | 40 | • | | | • | • | | • | | • | • | • | • | | | 13.8VDC | £TBA | TANDY |
| M | 40 | • | | | | | | | • | • | | • | • | | • | 13.8VDC | £100 | TENVOX |

BRITISH FM RIG CHECKLIST



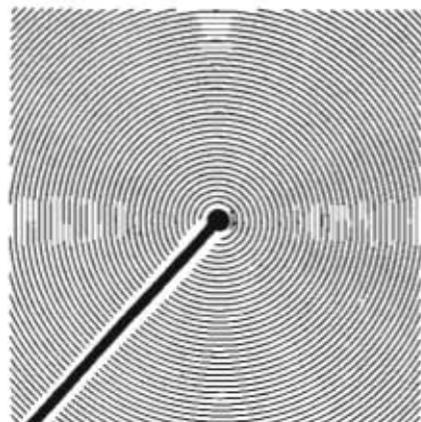
The unique CB FM rig checklist now has nearly 100 entries, detailing functions, price and availability. Who said no-one would bother producing UK CB rigs?

| NAME | ADDRESSES | MODEL |
|---------------|---|------------|
| TRANSCOM | Trecom Ltd, Market St, Bracknell, Berks | GBX 2000 |
| TRANSCOM | | GBX 4000 |
| TRINITY | EMU Systems Ltd, Huntingdon, Cambs. | EMU |
| UNIDEN | | UNIACE 100 |
| UNIDEN | | UNIACE 200 |
| VIPER | Radio 88, Barking, Essex. | VIPER 88 |
| WR ELECTROTEK | 25 Court Road, Bristol. | COMPANION |
| YORK | Sulkin (UK) Ltd, 73 Grosvenor Street, London W1X 9DD. | JCB 861 |
| YORK | | JCB 863 |

| TYPE: M, B or P | NO. OF CHANNELS | SQUELCH | NB SWITCH | ANL SWITCH | MIKE GAIN | RF GAIN | STONE CONTROL | S/RF METER | S/RF LED R/O | HI/LO OUTPUT | PA FACILITY | EX. SPEAKER JACK | TX IND. LIGHT | RX IND. LIGHT | CH 9 SWITCH | SUPPLY VOLTAGE | RETAIL PRICE |
|-----------------|-----------------|---------|-----------|------------|-----------|---------|---------------|------------|--------------|--------------|-------------|------------------|---------------|---------------|-------------|---------------------|--------------|
| M | 40 | • | | | | • | | • | | • | • | • | | | | 13.8VDC | £70 |
| M | 40 | • | | | | • | • | • | | • | • | • | • | • | • | 13.8VDC | £90 |
| M | 40 | • | | | | | | | • | | | | | | • | BATTERY/ 13.8VDC | £179 |
| M | 40 | • | | | | | | • | | • | • | • | • | • | | 13.8VDC | £97 |
| M | 40 | • | | | • | • | | • | | • | • | • | • | • | | 13.8VDC | £120 |
| M | 40 | • | | | | • | | • | | • | | • | • | • | | 13.8VDC | £85 |
| M | 40 | • | | | | | | • | • | | | • | • | • | | 13.8VDC | £TBA |
| M | 40 | • | | | | | • | • | | • | | • | | | | 13.8VDC | £69 |
| M | 40 | • | | | • | • | • | • | | • | • | • | • | • | • | 13.8VDC | £89 |



Antenna Review



We have put some of the most popular mobile rigs through the gruelling Which Rig antenna test to see if they shape up. See what you think!

Antenna Review - Introduction

No matter what rig you've got, it will only perform as well as the antenna allows. Government restrictions have limited the number of different types of antenna available, and, to be frank, the base loaded stainless steel whip, not more than 1.5 metres long can never be more than 25 to 30% efficient. In fact many antennas are not much more than 10% efficient so choosing an antenna can be a tricky business.

The question of what is and is not legal can be confusing, and may change before long. But until then a legal antenna should not be more than 1.5 metres long, and must be a single element rod or wire with a loading coil fitted to the base of the whip. All the reviews that follow are of legal antennas (with one possible exception) and the associated checklist details the 50 or so other antennas that also meet the government regulations. Remember that the same restrictions also apply to home base antennas and these are open to even more 'loose' interpretation.

The reviews themselves are conducted in a similar way to the rig reviews. The antennas are first subjected to an electrical and mechanical test in our lab, then fitted to a test vehicle and reference rig and a series of copies sent and received over a number of different terrains under controlled conditions. Finally, as with the rigs, we let the CBers have the last word they'll be the ones who spend the money so we take their opinions seriously. All of these results are put together into the reports that follow.

A word or two about the maps wouldn't go amiss either. Each map is drawn up from the results we obtain from the static and mobile tests. The map shown is purely arbitrary, purely to give an idea of scale. In fact we use a number of different locations, representing the different conditions a CB antenna will be used in, ie city, town, suburban, and open country. The pattern and range is given as a guide only as individual results will vary considerably, depending upon the vehicle in question, the rig used and the terrain it is tested in.

In general though it should serve as a guide and at least show you what to expect.

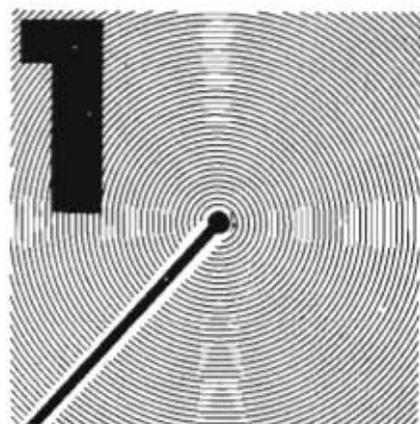
Each of our review antennas undergoes one final test — durability. Each antenna is subjected to a number of different weather conditions, usually by being left in position on the test vehicle for a couple of weeks or sitting on the ASP roof whilst it is being tested. Most, if not all of our antennas have survived the corrosion tests, though some better than others. However, ingress of moisture into an antennas loading coil can wreak havoc with the SWR; this is a factor we comment on very strongly as it has a more significant effect upon performance than the efficiency of an individual antenna in the long run. The SWR adjustment itself is another factor we look at, though this will vary considerably, depending upon the type of vehicle or installation adopted. All of our review antennas SWRed in satisfactorily, and all managed to maintain their setting under normal operation conditions.

The final choice of antenna will largely depend upon the type of car you drive (or house you live in) and whether or not you are willing to drill holes in your car or not. As a general rule though, the higher up and more centrally you mount the antenna the better you'll get out. Therefore it follows that a mag-mount in the middle of your car roof is better than a wing mounted antenna. For this reason, and due to the fact that many people are reluctant to drill holes in their car roof, this is the most common type of antenna and these will feature most prominently in the following reports.



CB

Antenna Review



The first of our Antenna Reviews looks at the famous K40 and Avanti Moonraker.

K40, Avanti Moonraker

Here we have two of the most popular CB antennas up against each other. How does the chunky K40 compare with the smooth Moonraker.

One of the drawbacks of fitting CB to a car is the need to install a specialised CB antenna. This can be especially irritating if your car already has a normal car radio. In cases like these you have two choices. You can scrap your existing car aerial and fit a proper CB antenna and splitter box, or, you can fit a temporary CB antenna like a gutter or magnetic mount.

We decided to put two very popular mag mount antennas against each other. The two we have chosen are the K40 antenna (made by the microphone people, American Antenna) and the Avanti Moonraker. The review is unique in that both manufacturers have claimed that their antennas are both the best in the world. Bold claims indeed!

The concept behind magnetic mount is two-fold: Firstly it enables an antenna to be temporarily installed on to a vehicle, no holes are required because it sticks onto the car with a magnetic base; and secondly, the position usually adopted for mag mount antennas, on the centre of the roof, is potentially the best position with regard to radiation pattern. Put another way, the signal will spread out from the antenna in a more or less circular pattern. A CB antenna fitted to the wing of a car will produce a distinctly lobal radiation pattern creating areas of reduced sensitivity.

There are of course drawbacks to mag-mount antennas; because there is no electrical connection between the antenna base and the car body is reduced. The manufacturers get round this by capacitively coupling the magnet to the metal beneath it. In practice this is nearly as good as an electrical connection to the car body, providing that the area of the magnet is large enough to ensure a good coupling. One other thing worth bearing in mind with mag-mount antennas is the strength of the actual magnet. If it is too weak it will fall off when the car is moving at high speed, if it is too strong it will scratch the paintwork when it is removed.

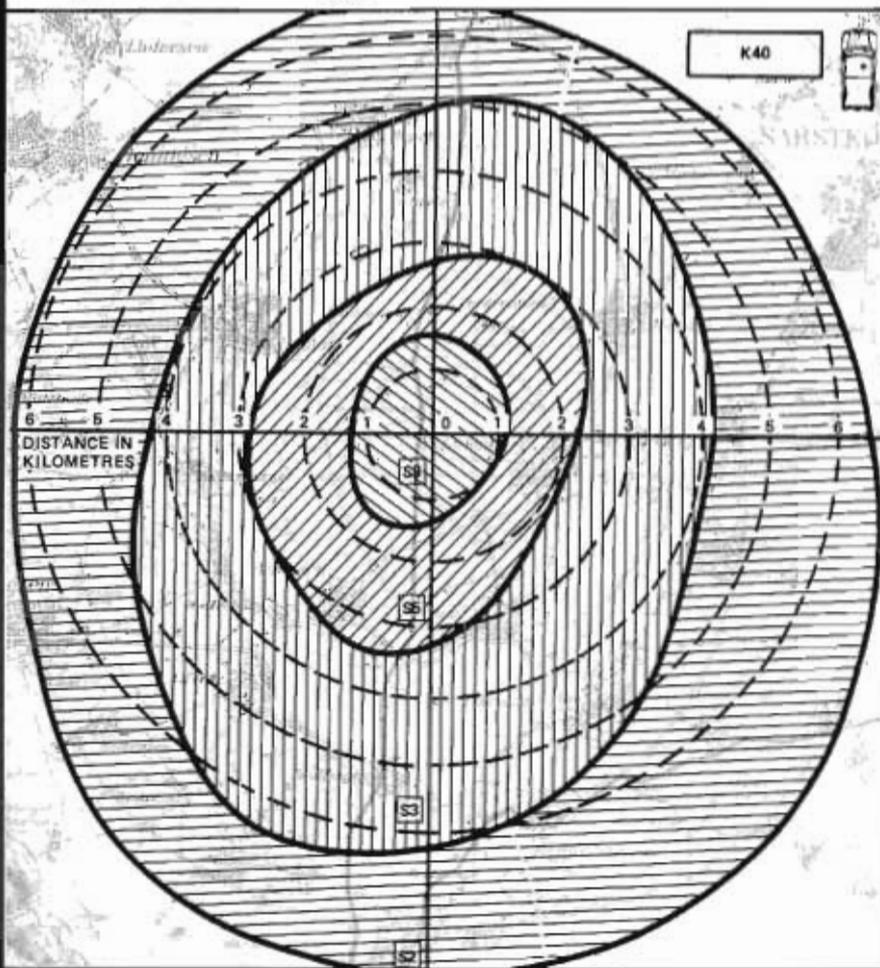


The K40 mag mount

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|--------------------|---------------------------------|
| Model | K40 |
| Type | Bas loaded stainless steel whip |
| Length | 1.4 watts |
| Frequency Range | 26.9-27.9 MHz |
| Max Power Handling | 500 watts |
| Impedance | 50 ohms |
| Cable Supplied | |
| Mounting Details | Various |
| Supplier | Various |
| Typical Price | £30 |



REVIEW VERDICT

| | | | |
|----------------|-------|--------------|------|
| Performance | XXXX | Installation | XXXX |
| SWR Adjustment | XXX | Instructions | XXX |
| Construction | XXXXX | Value | XXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests; one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.



The Avanti Moonraker

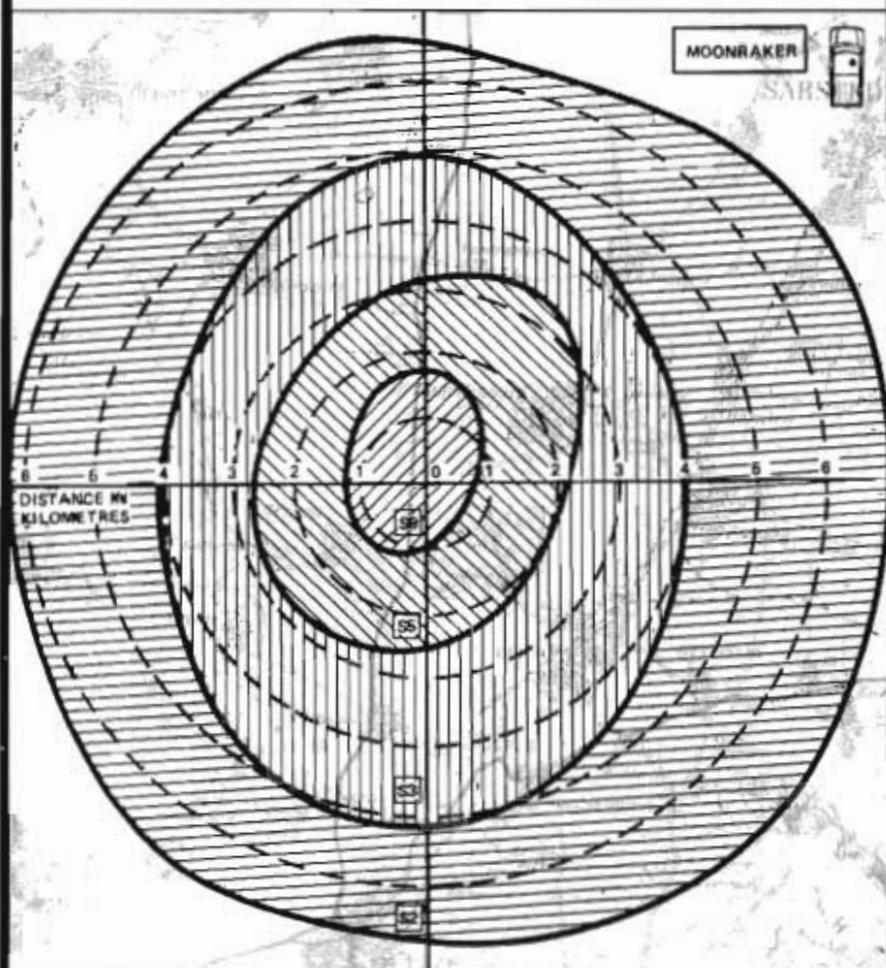
Results

As you can see from the radiation patterns there is virtually nothing to choose between the two antennas. The Moonraker did manage marginally better results at copies of S2 and less but the differences are so small that they could be attributed to local conditions, etc and in any case represent distance of a few yards. Both antennas have very strong magnets and Avanti claim that theirs has been tested on a vehicle moving at over 160 mph. K40 make no similar claims but the strength of their magnets are about the same. We have no doubts that there would be no problem with either antenna at speeds in excess of 100mph. (You would get done for speeding long before you got caught for using an illegal transmitter.) Performance wise the K40 is slightly more sensitive to strong localised signal, the Avanti has better DX characteristics, probably due to the longer whip.

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|--------------------|----------------------------------|
| Model | Avanti Moonraker |
| Type | Base loaded stainless steel whip |
| Length | 1.2 metres |
| Frequency Range | 26.9-27.9 MHz |
| Max Power Handling | 1000 watts |
| Impedance | 52 ohms |
| Cable Supplied | - |
| Mounting Details | Various |
| Supplier | Various |
| Typical Price | £28 |



REVIEW VERDICT

| | | | |
|----------------|------|--------------|------|
| Performance | XXXX | Installation | XXXX |
| SWR Adjustment | XXX | Instructions | XX |
| Construction | XXXX | Value | XXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests; one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of Cbers for comment.

Both antennas are extremely well constructed and should withstand years of harsh treatment. Great care has been taken by Avanti to make the Moonraker completely weather proof. A useful plastic cap enables the mag mount to be left in place if the car is taken through the carwash, etc. The K40 is also sealed against the ingress of moisture. The stumpy look of the K40 is very distinctive and the sturdy construction make this antenna very popular. The Avanti on the other hand is a little more discrete in appearance so may be favoured by the less flamboyant breakers.

In conclusion the K40 does look to be slightly better value if you shop around. The lower power handling of the K40 should not be a problem though the bulky appearance of this antenna is worth bearing in mind if you are worried about appearance. The slightly better sensitivity of the Avanti coupled with the marginally higher prices sets this antenna squarely in the 'dedicated enthusiasts' bracket.



CB

AT YOUR NEWSAGENTS NOW!
ONLY £1.60!

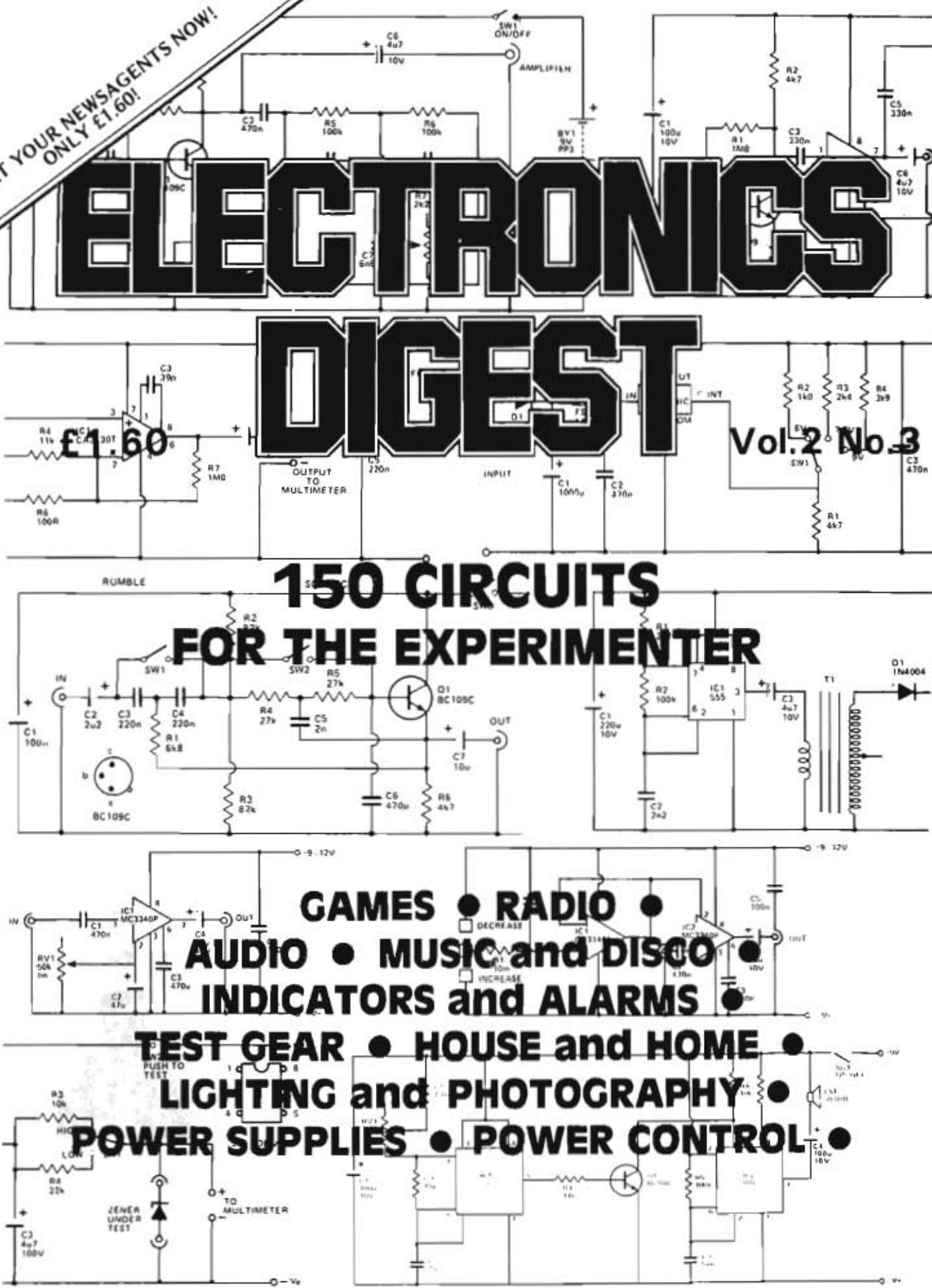
ELECTRONICS

DIGEST

Vol. 2 No. 3

£1.60

150 CIRCUITS FOR THE EXPERIMENTER



GAMES • RADIO •
AUDIO • MUSIC and DISCO •
INDICATORS and ALARMS •

TEST GEAR • HOUSE and HOME •
LIGHTING and PHOTOGRAPHY •
POWER SUPPLIES • POWER CONTROL •

Antenna Review

Bandit B50



The unique SWR adjusting rings on the Bandit and Dial-A-Match antennas make SWR adjustment child's play.

SWR adjustment on any CB antenna is very important. We look at the Bandit, one of the most novel CB antennas on the market.

The Bandit range of CB antennas has only been in the UK, for a short while but sharp-eyed readers may have noticed certain similarities between the Bandit and another well-known antenna.

There are several interesting features to note on this antenna, not least its versatility in that it can be mounted in a variety of different ways — a number of different bases will be available from Bandit stockists. The second noteworthy feature is the delightfully simple SWR adjustment. No messing around with Allen keys, spanners or hacksaws, SWR is set by moving two threaded rings up and down on the outside of the coil body.

The actual whip consists of a single length of stainless steel rod either 48 or 56 inches long. This is attached to a sturdy-looking plastic base that houses the coil and the connector that screws into any one of the different mounting components.

For our test we have elected to use the basic B50 coil and whip assembly and the B10 magmount option. However, you may like to know that there is a universal ball and socket mount, wing mount, trunk lip mount and magnetic plate mount, suitable for attaching the unit to the pole.

SWR Adjustment

This is undoubtedly the feature that sets this antenna apart from similar one-piece whips like the K40 and Moonraker. It is both simple and quick to use and is an idea that we would like to see adopted on other antennas. We were able to get the SWR on our test sample to less than 1.3:1 on all of our test vehicles. It is worth noting, however, that towards the top end of the new UK frequencies (UK FM 30-40) we did experience some problems in getting the SWR below 2:1 which might be considered a little too high. However, it would be a relatively simple task for the manufacturers to shorten the whip to accommodate the UK frequencies.

Some concern was expressed by one reviewer about the weather-proofing of the base mount, though in practice we found that these fears were unfounded as our sample has remained completely free from ingress of water and dirt through two weeks of the filthiest weather we can remember. The magnetic base could have been a little stronger, though it is possible that we have been spoiled by the incredibly strong devices attached to K40 and Firestick antennas.

The Results

The first thing we must say is that the maker's claim that this is the 'World's Best CB Antenna' is a little optimistic. That title has yet to be bestowed upon any CB antenna and is unlikely to be, due to the widely differing conditions under which most antennas are used. To date, we are able to judge the relative efficiency of magmount antennas by comparing the results of previously tested devices. So far the K40 is just about the front runner, the Bandit would come a close second, possibly joint second with the Moonraker. We can say quite safely that the Bandit is a good antenna and certainly excellent value for money.

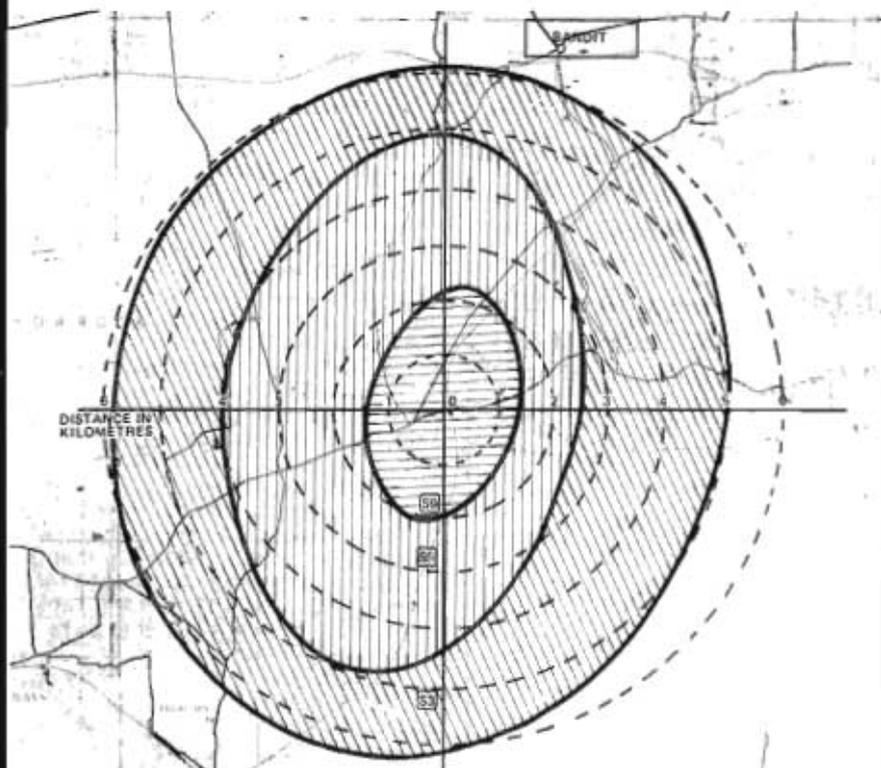


Above: Close-up of the adjusting rings.

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|---------------------------|----------------------------------|
| Model | Bandit B50 |
| Type | Base load — stainless steel whip |
| Length | 48" or 56" |
| Frequency Range | 26.9 — 27.9 MHz |
| Max Power Handling | 100 watts |
| Impedance | 50 ohm |
| Cable Supplied | 17 feet |
| Mounting Details | see text |
| Supplier | Bel Ray Lubricants (UK) Ltd |
| Typical Price | £15-20 |



REVIEW VERDICT

| | | | |
|-----------------------|-------|---------------------|-----|
| Performance | XXXX | Installation | XXX |
| SWR Adjustment | XXXXX | Instructions | XX |
| Construction | XXX | Value | XXX |

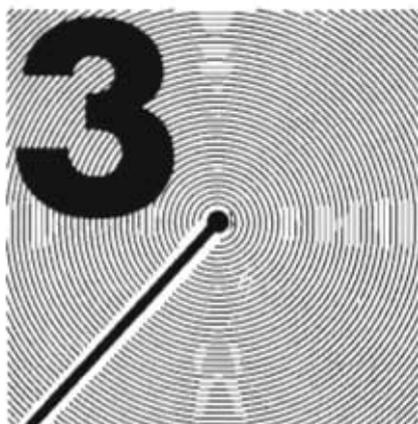
We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests; one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.

CB

Above: The Bandit B50.



Antenna Specialists are one of the world's largest antenna manufacturers. The AS MR 440 is one of the cheapest legal mag-mounts around but is it very good?

Magnetic mount antennas are probably one of the most attractive types of CB antennas due to their totally flexible mounting characteristics. The optimum position is, of course, on the centre of a metal-bodied car roof. This position allows for the classic 'doughnut' radiation pattern without the characteristic lobes that come with wing-mounted installations. The secondary bonus is that an antenna mounted on the centre of a car roof is that much higher off the ground, permitting even greater transmitting and receiving range.

The antenna under review is a fairly basic base-loaded mag-mount antenna from Antenna Specialists. AS are an American company with considerable experience and an enviable reputation in the CB market on both sides of the Atlantic. Our review antenna is designated the MR440 and consists of a single rod, stainless steel element exactly 3 feet long. This slips into the mag base which houses the loading coil and ceramic magnet. The rod is held in place by a small grub screw which can be tightened with an Allen key that is supplied with the antenna. The MR440 comes with just over 15 feet of 50 ohm co-ax and this is terminated in a standard PL259 connector plug.

Cosmetically the 440 is pretty ordinary — no unusual lumps, bumps or bulges, just a very conventional shape, well constructed and sealed against the vagaries of the British climate. The metalwork is plated to resist corrosion and the underside of the mag base is covered in a metallic material that ensures a good capacitive coupling to the car's bodywork and should not mark the paintwork if it is carelessly removed. The magnet itself is not the strongest we've seen, but was powerful enough to withstand our 'motorway' test without any mishaps at speeds in excess of 70 mph. The whip itself is possibly a little too flexible for our tastes as it does tend to flex in strong winds at high speeds, although not enough to render it liable to fall off.

SWR Adjustment

Adjusting the SWR on the 440 is carried out by slackening off the grub screw with the Allen key provided and sliding the rod up and down slightly in the top of the mag base. There is only about half an inch of movement, though this was enough to ensure an SWR of better than 1.5:1 over all the 40 channels (27.6-27.9 MHz). The

adjustment is, however, a little fiddly and it takes some time to get the SWR exactly right. This is mainly due to the rather limited movement of the rod inside the base. Once adjusted, our test sample remained below 2:1 during our field tests which were carried out over two days in a variety of differing weather conditions. We did notice, though, that the SWR crept above 2:1 during a particularly wet day a couple of weeks later, and returned to normal when it dried up.

Test Results

AS make no exorbitant claims for the 440, unlike many other antenna manufacturers who variously aspire to 'the best antenna ever made' or 'the ultimate antenna'. The 440 is neither of these: it works, and works well. It isn't as good as the K40, Moonraker, Bandit, etc, etc, but then it doesn't cost as much. The differences are small, and in any case represent distances of a matter of a few hundred yards. The 440 is a sturdy, compact and well designed antenna. It has no significant vices and no dramatic virtues: it's almost boring!

It does what it's designed to do and we can recommend it as a good general purpose mag-mount antenna at a reasonable price.

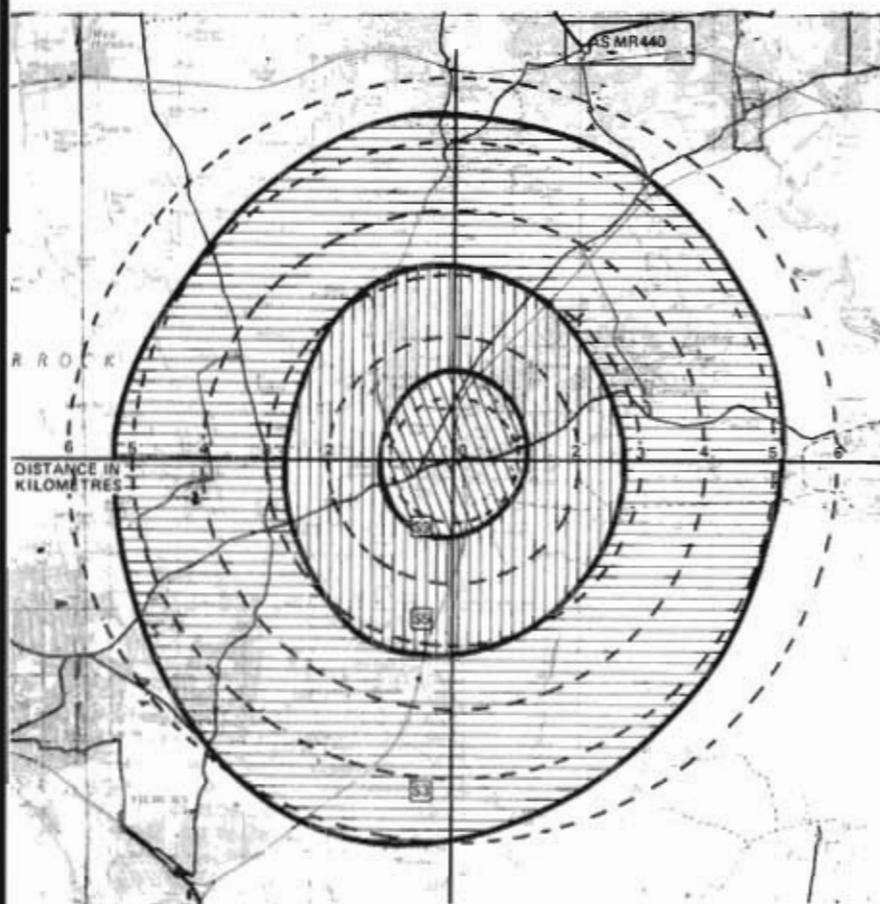


Above: Close up of the mag-base

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|--------------------|--|
| Model | Antenna Specialist MR440 |
| Type | Stainless steel, base loaded mag-mount |
| Length | 42 inches |
| Frequency Range | 26.9 — 27.9 MHz |
| Max Power Handling | 25 watts |
| Impedance | 50 ohms |
| Cable Supplied | 15 feet |
| Mounting Details | Mag-mount |
| Supplier | Various |
| Typical Price | £15.20 |



REVIEW VERDICT

| | | | |
|----------------|------|--------------|-------|
| Performance | XXX | Installation | XXXXX |
| SWR Adjustment | XXX | Instructions | X |
| Construction | XXXX | Value | XXXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

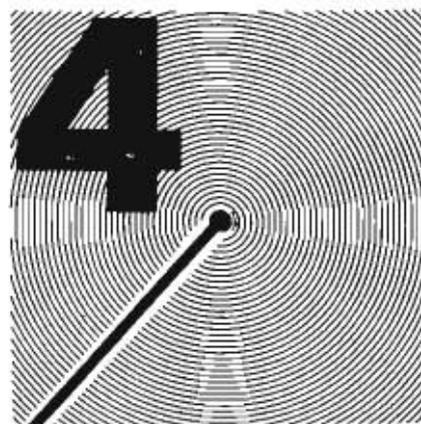
The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests, one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.

Above: The MR440 in all its glory

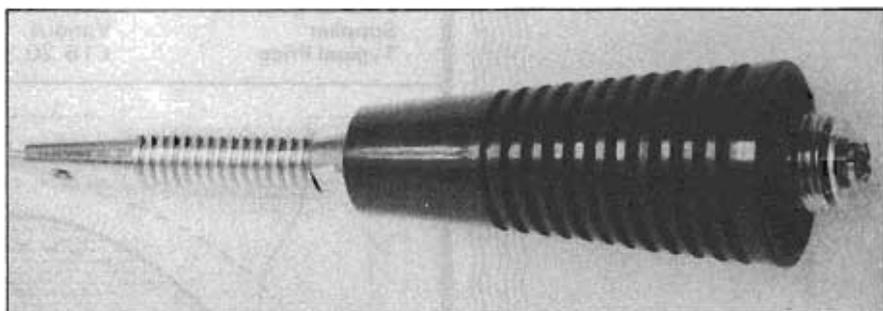
CB

Antenna Review



Archer 21-904

-5-



Here we have something a little unusual from Tandy, one of the biggest manufacturers of CB equipment.

The Archer 21-904 Rooftop Mount is basically a 3' 6" stainless steel whip with a loading coil built into the base, below a hefty steel spring. The antenna is attractively packaged in a bubble pack and comes complete with all the fitting bits and pieces, 16 feet of co-ax and an Allen key for SWR adjustment.

The antenna is primarily designed for permanent car roof installation so be warned, you have to drill a hole in the roof of your car or van if it's going to be done properly. This is obviously not a problem if you drive a panel van but things may get a bit awkward if you try to drill through the roof of the wife's new Cortina, making an ugly hole in the roof lining. You have to be committed to this type of installation and be perfectly prepared for the consequences if it goes wrong. On the other hand this type of antenna, mounted in the centre of the roof, is quite simply the best, even better than a roof-top mag-mount.

Mounting the antenna requires a 3/8" or 9.5 mm hole in the network. The mounting stub is a press fit into the hole: once it's in place the nut is tightened up and it's in forever, 'cos there's no way of getting out without resorting to major surgery — see what we mean about committing yourself to this type of antenna?

The cable supplied with the antenna should be fitted to the connector, either by soldering or relying on the press-in fittings supplied. Soldering is the safest bet if the car is likely to be left out in the rain, as water might get into the connecting stub sooner or later.

Once it's all fitted in the base coil and spring and whip assembly just screw it in. A couple of turns, and it's on. It comes off just as easily for those weekly sessions at the car wash and when putting the car into the garage. It also stops it being nicked, by the light-fingered sections of the community

who get their kicks from tying knots in car aerials.

Hooked up and ready to go, the 21-904 (what a boring name Tandy, can't you do better than that?) is easily adjusted for SWR. The rod slips in and out of the mounting spring and can be fixed in position by tightening up a small grub screw which can be adjusted by the Allen key provided. Our test samples consistently SWRed in below 1.5:1 and the adjustment was sufficiently coarse to allow a low SWR over 26.9 to 28 MHz without any problems.

In Operation

A delight! That's the only way to sum up the 21-904. It operates extremely well and passed all our mechanical and electrical tests with flying colours. The range of the antenna during our field trials was consistently well above average for a rooftop antenna, and far greater than we had expected. The reason, we felt, was the high mounting position and the direct electrical coupling through the car body to the ground plane.

It would be easy to say that virtually any type of antenna mounted in a similar fashion would perform in the same way but it became clear during the long-term field trials that the problems we normally experience with antennas just weren't happening. For instance, the metal work is extremely well protected against corrosion. The SWR stayed exactly where it was during our field trials and even managed a creditable 3:1 while bent almost double when it was carelessly parked one night in a garage.

So far, so good. It's not all praise though. The chromium-plated plastic trim supplied is a disaster. It is a cheap and nasty and not in keeping with the rest of the antenna, and that disappeared into a ditch pretty quick. The complete lack of instructions on our samples was a little puzzling. Tandy

should ensure that explicit instruction is supplied, especially when the mounting method is so potentially damaging.

In conclusion, a great antenna — a touch pricy but worth it, and a real good worker for those brave enough when it comes to mounting, or those with panel vans.

CB



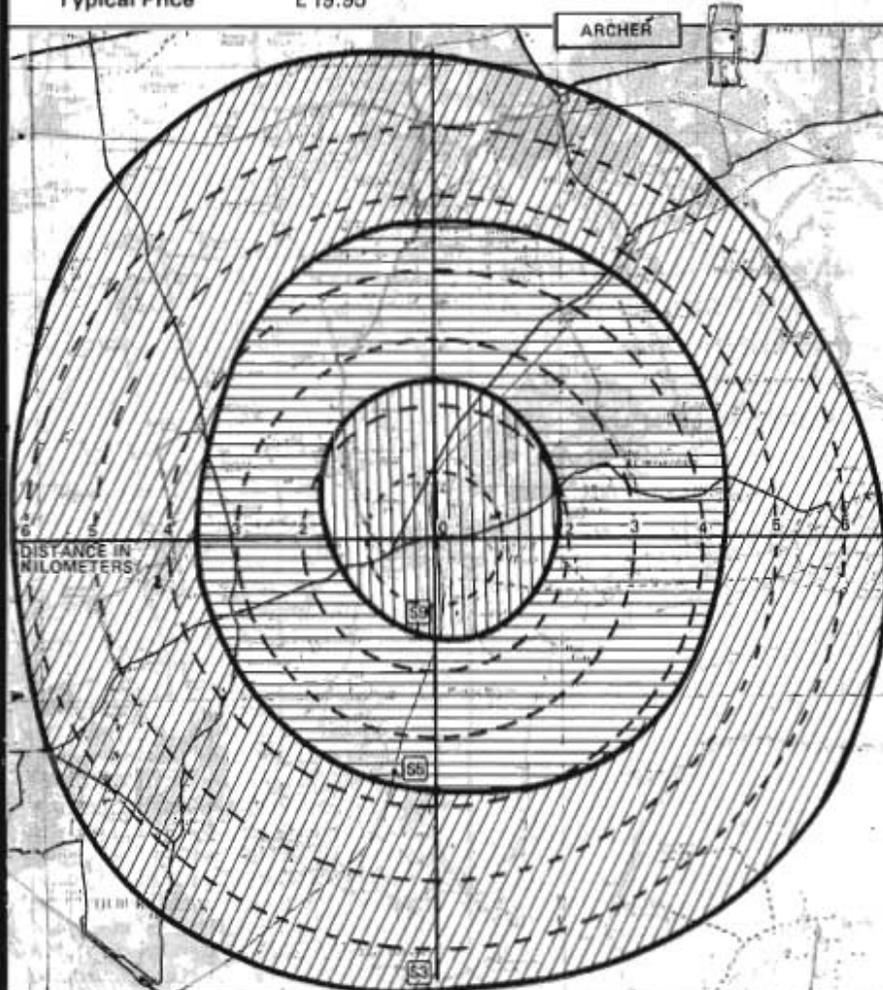
Above: The 21-904, complete with cable and fixing kit.

Right: Radiation pattern of the 21-904

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|--------------------|--|
| Model | Archer 21-904 |
| Type | Single element base located stainless steel whip |
| Length | 42" |
| Frequency Range | 26.9-28 MHz |
| Max Power Handling | up to 50 watts |
| Impedance | 50 ohms |
| Cable Supplied | 16 feet |
| Mounting Details | 3/8" snap-mount |
| Supplier | All Tandy outlets |
| Typical Price | £ 19.95 |



REVIEW VERDICT

| | | | |
|----------------|------|--------------|-----|
| Performance | XXXX | Installation | XXX |
| SWR Adjustment | XXX | Instructions | — |
| Construction | XXX | Value | XXX |

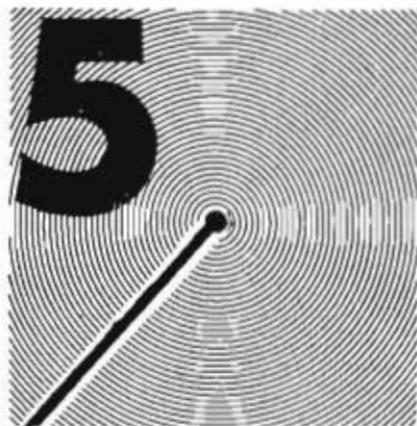
We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests: one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.

Antenna Review

Ferroline 27



Although the Ferroline 27 isn't strictly legal it was initially designed to comply with the specifications and as such deserves a mention.

Yes, we're enthusiastic about the new FM service, but as we've said on previous occasions, there problems — the antenna restrictions. In short, antennas like the one we're looking at — the *Ferroline 27* — are technically outside the HO specifications, and that's bad news.

First though, a look at the *Ferroline*. From the Cbers' point of view the *Ferroline* is important in that it does not require a ground plane. That means that it can be used in virtually any kind of installation from a motorcycle to a caravan, not forgetting fibreglass boats. Not only that, this type of antenna can be used in a base station application, and again no ground plane is needed. The ironic thing, of course, is that *Ferroline* was designed to comply with the HO specs as they were in the middle of 1981. At that time it was not exactly certain whether or not centre or top loaded antennas would be permissible. The only definite guideline was that the antenna should not exceed 1.5 metres in overall length — the *Ferroline* is within that limit. The problem arises from the centre mounted matching stub. Although not really a loading coil (that's on the base of the whip), it does divide the length of the whip into two, breaking the single element, rod or wire ruling.

On paper, the *Ferroline* design looks ideal — it should produce a flat horizontal radiation pattern, directing all the energy into the areas where it's needed and not allowing valuable watts to be projected into the sky, where they'll be wasted. So how does the *Ferroline* work in practice? We've been trying out a sample for the past few weeks and quite frankly, we're impressed.

But, before we get too carried away, let's make a few things clear: first, the antenna is made in this country by a company called **C-Brit**. It costs around £28 and in our opinion, that's a lot of money. We've only had one sample in for evaluation and the finish on our sample wasn't very good. When compared with American, Japanese and Continental antennas costing half or a quarter of the price it looks a little amateurishly made. That's not to say it isn't well designed and constructed — it

is, but the finish is dreadful (at least it was on our sample). The chromium plating and plastic trim on our sample would not have been much good against water seepage, so this is worth bearing in mind should you decide to purchase one.

So now for the nitty-gritty — how well does it work? We tried out our *Ferroline* in a variety of different locations. The majority of our tests were conducted on our mobile test vehicle, though we did try the antenna on a base station pole, a caravan and a small boat. We didn't try a motorcycle installation due to pressure of time, but the results obtained from our other tests give us good indication of how effective it would be in that situation.

The Results

By and large the *Ferroline* lives up to the manufacturer's claims. In our mobile test it consistently out-performed our standard reference antennas which, translated to signal strength, meant that the *Ferroline* would typically be one S-point more on both transmit and receive for a given distance, and in terms of range, up to a mile or so further in open country, a quarter to half mile in town. In the base station position, mounted about 30 feet above ground (above 9 metres) our reliable base to mobile range increased by three S-points or roughly another five miles in the open. This test was conducted with our reference rigs, and compared, with results obtained from our standard antennas. The tests were conducted on UK FM equipment using the 10 dB attenuator switch for comparative readings. The static caravan and boat tests confirmed the efficiency of the antenna, and its ability to work without a groundplane. The use of a metal groundplane, a car body for instance, did seem to make a slight difference to the range, and certainly to the SWRing, which is a simple length adjustment with a threaded portion of the whip screwing in and out of the base coil. With the antenna connected to a metal car body we found a copy at a given distance would be half a point higher than when connected to a non-metallic surface.

Conclusion

If it wasn't for the fairly high retail price and poor finish on our sample we would have no hesitation in recommending this antenna. It performs exceptionally well in a number of very different locations, not least in situations where there is not groundplane. However, if you can find one less than the typical price quoted, and you've examined the finish to ensure the plating is sound and the parts fit together, then it may be well worth considering. You should note that although this antenna does conform to the 1.5 metre length restriction it does fall foul of the law, with regard to the matching stub in the centre of the whip.

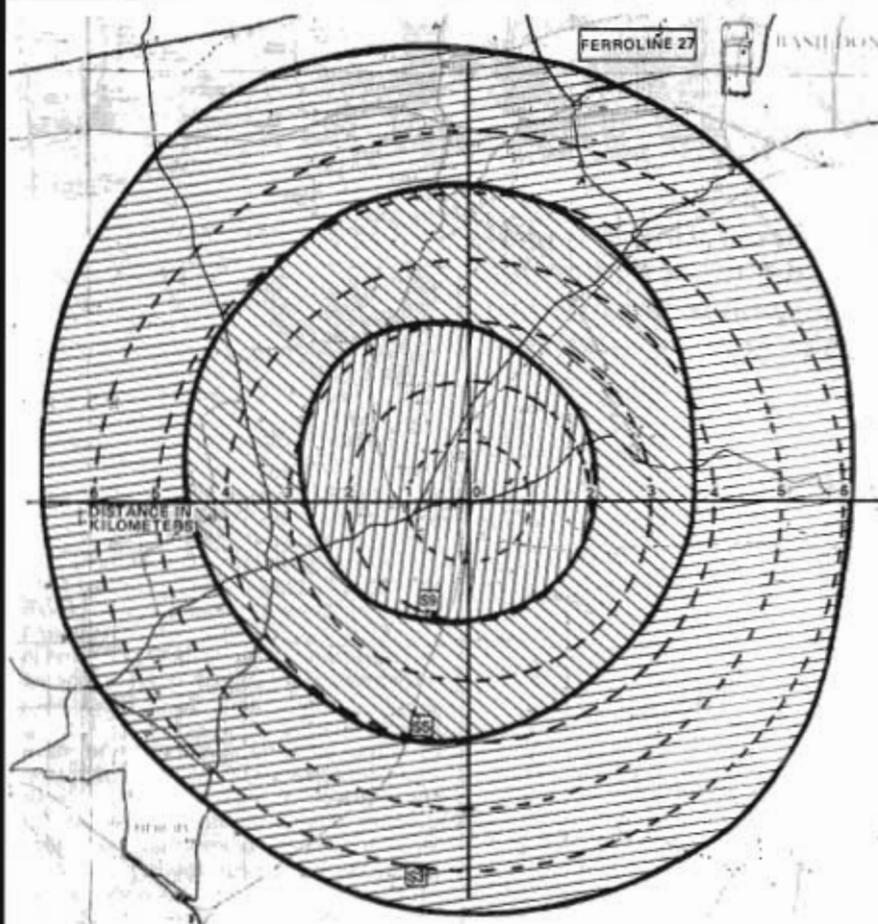
CB



ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|---------------------------|----------------------------------|
| Model | Ferroline 27 |
| Type | Resonant half wave 'free space'. |
| Length | 1.5 metres |
| Frequency Range | 0.5 MHz bandwidth over 27-28 MHz |
| Max Power Handling | 255 watts |
| Impedance | 50 ohms |
| Cable Supplied | None |
| Mounting Details | 3/8" mounting base |
| Supplier | C-Brit Ltd, Wembley, Middx. |
| Typical Price | £27.00 |



REVIEW VERDICT

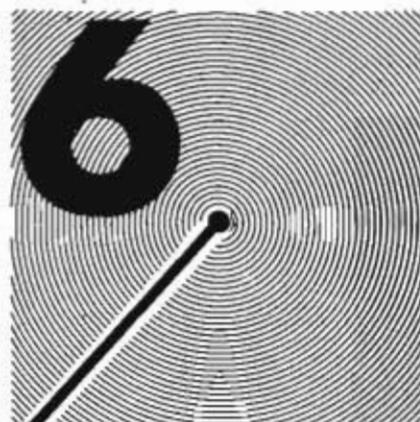
| | | | |
|-----------------------|------|---------------------|----|
| Performance | XXXX | Installation | XX |
| SWR Adjustment | XXXX | Instructions | XX |
| Construction | XX | Value | XX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average-to-good and one and two stars mean it's not doing so well.

The Tests

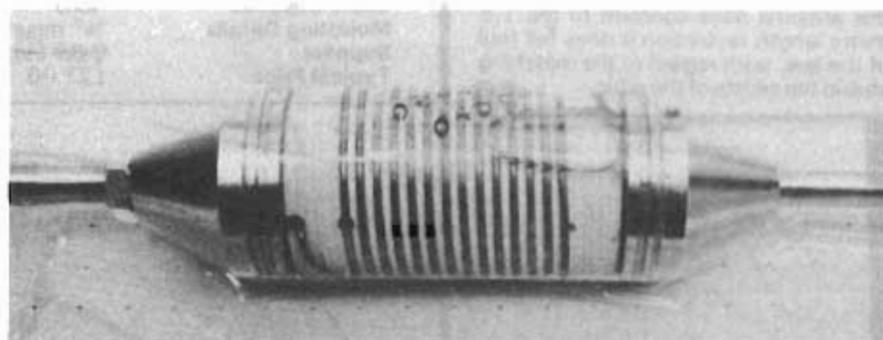
We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests: one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of Cbers for comment.

Antenna Review



The Audio King is one of the most distinctive antennas around, but looks aren't everything!

AKO-100 Audio King



Why should anyone want to design an antenna with a loading coil immersed in oil? Well, Van Ordt have done just that with a device known as the AKO-100 Audio King and if nothing else, its distinctive Looking rather like an overgrown hypodermic syringe, the oil-filled loading coil is designed to offer an absurd power handling capability (2000 watts!) and the loading coil a degree of temperature stabilisation, thus maintaining a near constant SWR in a wide range of different temperatures. The coil itself is wound in very heavy duty copper wire and encased in a transparent tube filled with transformer oil.

The antenna can be fitted to a bewildering range of mounts and it is fitted with a $\frac{3}{8}$ " thread, so it will happily fit a lot of other mounts as well. As for legality, well we reckon that this antenna is OK, it's a base loaded, stainless steel whip, just over 1.15 metres in length. The additional rod below the loading coil is one of the optional mounting fittings and Van Ordt recommend this be used in wing mounting installations, so for roof or mag mount installations this can be dispensed with.

In Use

We've tried the Audio King in a number of different set-ups and we're happy to report that it consistently SWRed in below 1.5:1. The SWR adjustment is made by slackening off a small Allen grub-screw on the top of the loading coil and sliding the whip up and down. The adjustment is a little tight on UK FM, though this wasn't a real problem and we suspect that trimming a few millimetres off the whip would make adjustment a little easier.

Of course, the most interesting claim for the oil-filled loading coil is the stability of the SWR that should be easily maintained under wide temperature

variations. The week we tried it out, the temperature variations couldn't have been more severe, from frosts in the morning to blazing sunshine in the afternoon. The results were very encouraging. Yes, the SWR did remain fairly constant at about 1.5:1, never going above 1.8:1 but we did find that if the SWR was set up in the cold it would creep above 2:1 when the weather really warmed up. And although it's to really a fair test, we tried the other extreme warming the coil up in an oven to 40°C and SWRing it up whilst hot. This gave the opposite effect, the SWR actually came down as the coil cooled off, down to 1:1 on our meter. This seems to indicate that the SWR should be set at around 1.5-2.0°C and the antenna will remain fairly stable over the whole temperature range. To compare these results we tried the same tests on a K-40 an SWR of 1.5:1 actually rose to 3:1 when hot and when set up cold, a reading of 1.5:1 rose to 2:1. So yes, the coil does seem to offer a fair degree of immunity against temperature variations.

Our operational tests carried out with our reference rigs and antennas didn't produce any real surprises. The Audio King performed very satisfactorily, nothing startling, but as good as anything we've seen in the same class and a lot better than some others. The slightly shorter whip (less than the 1.5 metre limit) did seem to make about half an S-Point difference compared with a Dial-A-Match. Returning to our temperature tests, the constant SWR meant that on a cold day, compared with a Dial-A-Match that had been SWRed in the warm weather the Audio King's greater stability enabled it to go out further because its SWR hadn't changed as much as the Dial-A-Match.

Conclusion

Without doubt the Audio King is the *butcher's* antenna we've seen. The oil-filled coil makes it look really distinctive and our endurance tests suggest that it

should be resistant to corrosion and enjoy a long and happy life. As far as the claims for temperature stability are concerned, they are justified. Performance is good (not amazing) but then there's not too much magic in a base loaded whip, especially one that is only 1.15 metres long. The Audio King is rugged, distinctive and well supported by accessories — a co-phase installation looks very promising on big trucks. If you're into power, then the Audio King can take it. The price is a little higher than we would have liked but you can spend a lot more and get a whole lot less. Certainly one for the truckers, vanners and the bolder customisers. For us in the ordinary roller skates it may be a little too hunky, but then that's a matter of personal taste.

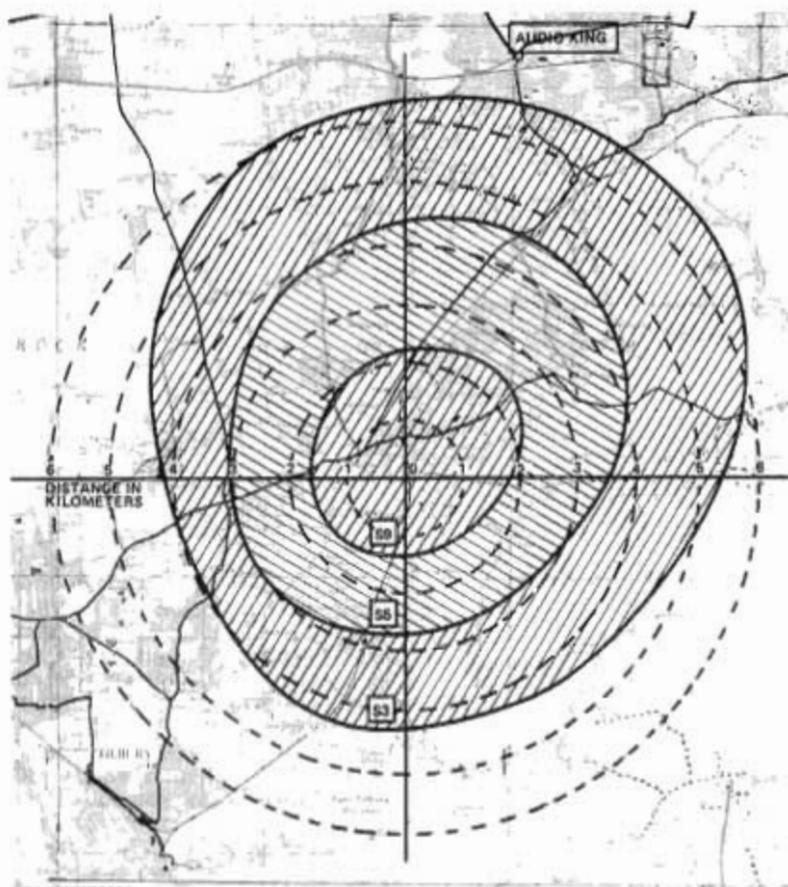
CB



ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|--------------------|---|
| Model | Van Ordt Audio King AKO-100 |
| Type | Oil-cooled base loaded stainless steel whip |
| Length | 1.5 metres |
| Frequency Range | 26.9-27.9 MHz |
| Max Power Handling | 2000 watts |
| Impedance | 50 Ohm |
| Cable Supplied | None |
| Mounting Details | 3/4" |
| Supplier | Knight CB Specialist |
| Typical Price | £30.62 + VAT |



REVIEW VERDICT

| | | | |
|----------------|------|--------------|------|
| Performance | XXX | Installation | XXX |
| SWR Adjustment | XXXX | Instructions | XXXX |
| Construction | XXXX | Value | XX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average-to-good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests: one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.

Antenna Review

JWR 7166



The JWR 7166 is a cheap, no nonsense mag mount ideal for first timers on a budget.

We've been looking at some fairly exotic antennas so it is, perhaps, a good time to come down to earth and see what's available for under £15 and is suitable for general day-to-day use.

Our review antenna is, by all standards, fairly mundane; but that should in no way be construed as a criticism. The JWR 7166 (we'll call it the 7166 from now on) is a base loaded, stainless steel whip with a magnetic base and coaxial cable fitted. The antenna is attractively bubble-packed and comes complete with an Allen key for SWR adjustment, but not (unfortunately) any instructions on how to use it — black mark to JWR.

The mag base is a fairly hefty device, shrouded in a chromium plated plastic trim. Our initial endurance tests show that it should be impervious to the British Winter and one accidental trip through the local car wash backed up our findings. The loading coil screws in to a connector on top of the magnetic base and, again, this is weatherproof. Inside the tubular coil cover we were pleased to see that the actual coil was made from heavy gauge copper wire soldered directly to the base connector, rather than the less satisfactory compression fit employed on some antennas. The whip and the coil spring screw into the top of the base coil and a pair of hefty spring washers should ensure that nothing drops off if the antenna is subjected to excess vibration.

SWR adjustment is carried out by slackening off a small Allen grub screw on the sleeve fitted to the top of the spring, the whip can then be pulled up or down and clamped in position once the SWR is low enough. The SWR on our sample consistently SWRed in below 1.5:1 on our test vehicles and if you were really determined, we're sure you could get it even lower. The adjustment is sufficiently coarse to allow a low SWR over the whole of the band, our nominal adjustment of 1.5:1 on channel 20 never went above 1.8:1 anywhere on the 40 channels.



In Use

As we've said time and time again, there's not much magic in a base loaded antenna. Our 7166 sample is no exception. It worked well, though is obviously not as efficient as a well designed top loaded or helical antenna. However, as with all mag base antennas, the usual mounting position — ie on the car roof — enables the antennas to be a good couple of feet higher than an equivalent wing-mounted antenna and that can make a lot of difference to range. Coupled with the near circular radiation pattern, the 7166 was able to transmit and receive acceptable copies of S3 over a distance of 15 miles during one of our open country tests. Of course, this is not necessarily an indicator of overall efficiency and we always subject our review samples to a whole series of tests in a number of different situations. However, it does give us a good indication of whether or not the antenna is doing its stuff.

Overall a good, reliable and solid antenna. It's not going to set the world alight, it's not particularly pretty but it gets on with what it's designed for and would certainly be OK for any

first-time CBers operating on a limited budget, or anyone not out to improve their image by investing in some of the more macho antennas the ad men seem to think we all need.

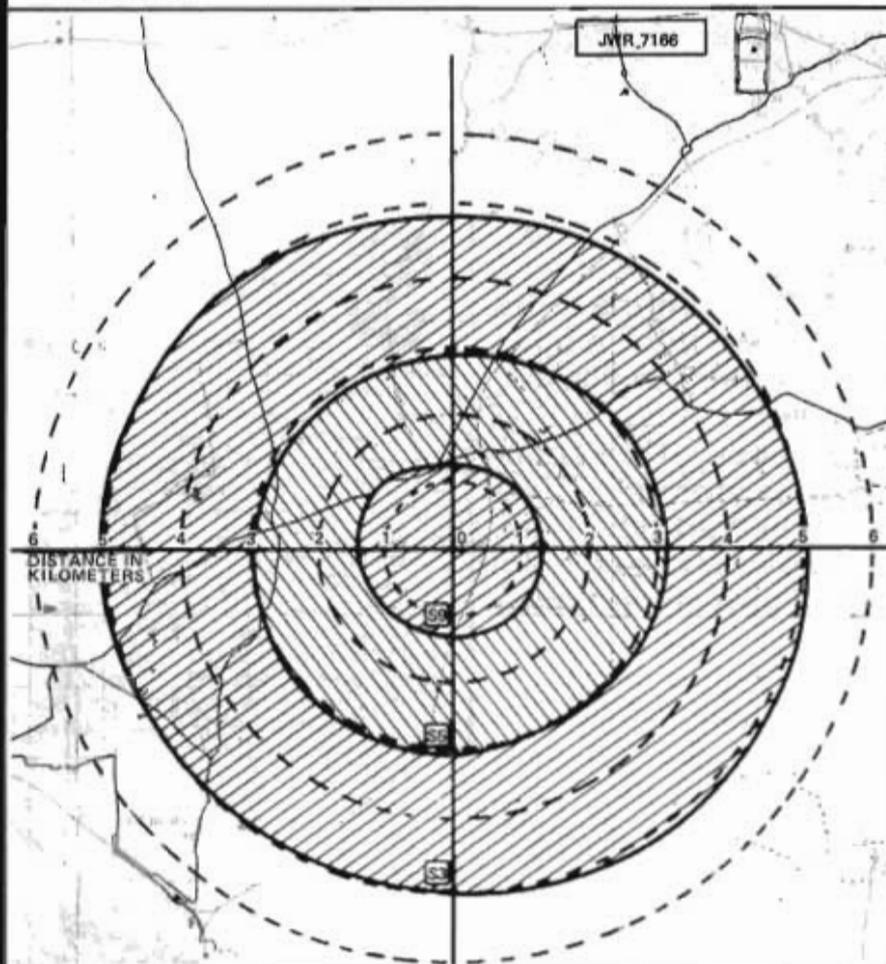


Above: The complete JWR 7166

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|--------------------|---------------------------------|
| Model | JWR 7166 |
| Type | Box loaded stainless steel whip |
| Length | 1.4 metres |
| Frequency Range | 26.9 – 27.9 MHz |
| Max Power Handling | 25 watts |
| Impedance | 50 ohms |
| Cable Supplied | 3 metres co ax |
| Mounting Details | Magnetic box |
| Supplier | John Woolfe Racing, Bedford |
| Typical Price | £13.00 |



REVIEW VERDICT

| | | | |
|----------------|-----|--------------|------|
| Performance | XXX | Installation | XXXX |
| SWR Adjustment | XXX | Instructions | X |
| Construction | XXX | Value | XXX |

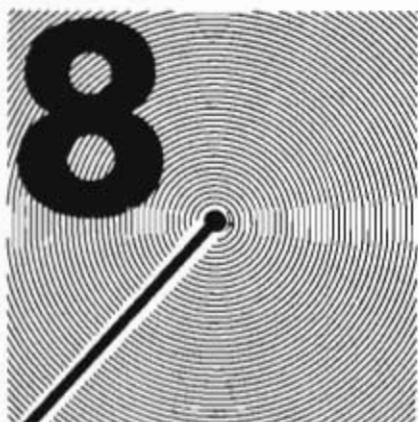
We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests; one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.

CB

Antenna Review



Worried about fitting a CB antenna to your car? Apart from the extra holes, it is an open invitation to villains, telling everyone that you have a CB in your car. This month we look at a gadget which the manufacturers claim will turn any ordinary car radio into a CB antenna — we put these claims to the test.

Hythe Antenna Eliminator

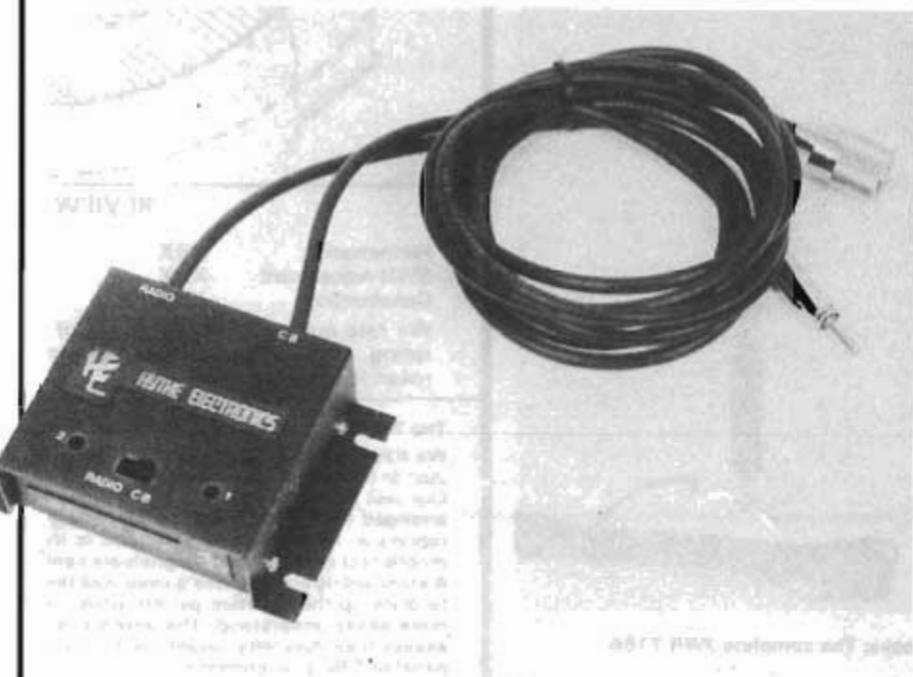
So far, Antenna Review has only been looking at purpose-built CB antennas. This month, by way of a change, we look at a device the manufacturers claim will turn any ordinary car radio aerial into a CB antenna. Bold claims. We decided to put them to the test.

The Hythe Electronics CB Aerial Eliminator is a fairly unremarkable looking black box with two cables coming out of it. The box itself is fairly featureless except for a socket, two holes and a two position slider switch marked CB and Radio. We decided to treat the unit as we would any review antenna, ie subject to our combined field and lab tests with a variety of different vehicles, rigs and locations.

Fitting the eliminator took five minutes, it bolts neatly to any conven-

nient part of the dashboard and one of the two flying leads plugs straight into the rig's antenna socket. The second flying lead plugs into the car radio aerial socket. The lead from the car aerial plugs into the socket on the top of the eliminator.

With the unit fitted into place you can carry out the SWR adjustments with a meter in-line, between the eliminator and the rig. Two adjusting screws in the unit are alternately twiddled to give progressively lower readings. We were able to get the SWR down to below 1.3:1 on channel 20 on every one of our test antennas. We did find that the SWR should be checked over the whole band as the reading could be well below 1.3:1 on channel 20 say, yet rise alarmingly above 3:1 on channel 40. Adjusting for a constant reading over the whole band



The Hythe Aerial Eliminator in all its glory.

sometimes meant that you had to settle for a higher SWR, as high as 1.8:1 in one case, but at least it was low to do any damage.

We found that the physical size of the car had a bearing on the SWR, more so than the antenna used. In general the larger the car, the lower the SWR. However, with some of the shorter car aeriels the SWR was much harder to trim, requiring repeated adjustments to the SWR adjusting screws in the unit. The moral therefore seemed to be that the eliminator was happiest with a large car and a large aerial. We suspect that a Mini and a coathanger aerial might not SWR very satisfactorily.

As far as operation was concerned, there were no real surprises. To be frank we didn't expect the unit to work as well as a purpose-built CB antenna, though the feeling was that it worked much better than some of our review team expected. In comparison to a well designed mag-mount (K40, Bandit, Dial-A-Match, etc, etc) the combination of the aerial eliminator and a basic telescopic aerial would be about two thirds as efficient. This would rise if the aerial in question was over two feet long or if it was mounted centrally on the car roof.

There are a couple of things to watch for when using this unit. First, the condition of the car aerial. A dirty, rusty or broken car aerial will produce poor results. Second, the aerial has to be fully extended each time as the SWR will vary dramatically, possibly to a dangerously high reading which could damage the rig. We thought it prudent to keep the SWR meter in circuit to remind us that the SWR should never go above 3:1.

In conclusion, the Hythe Electronics aerial eliminator is not a substitute for a well-designed CB antenna. However, if you are prepared to sacrifice a drop in range, albeit slight for local communications, then it has a lot going for it. It enables a totally discreet CB installation which will not attract light-fingered individuals; there is no way anyone would suspect that your vehicle is fitted with a CB. It is a viable and economic alternative to a CB antenna — you'll pay a few pounds more for a good CB antenna. It removes the necessity to drill extra holes in your car body. The one disadvantage is that you cannot use the car radio and CB simultaneously although we would also have liked to see some protection on the eliminator if, for instance, you key the mike with the selector switch in the car radio position. There is bound to be a degree of loss with the 75 ohm coaxial cable used on most car aeriels. Hythe Electronics now suggest that this is replaced with 50 ohm CB coaxial; it should make a significant difference.

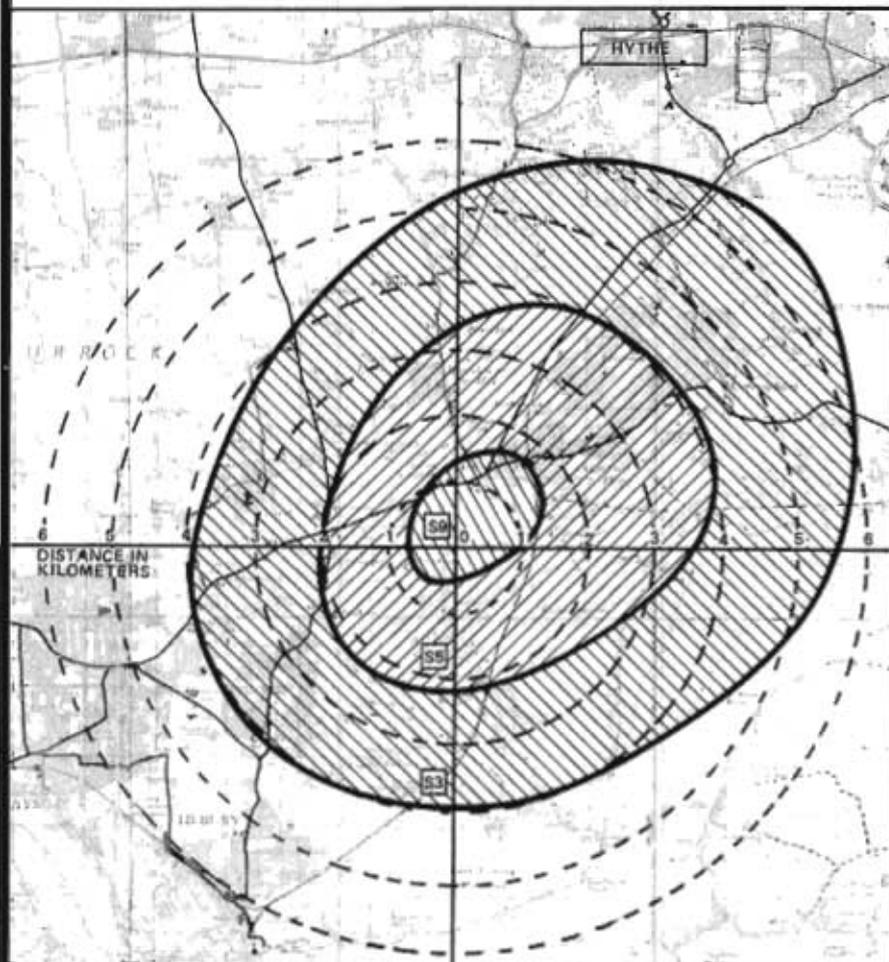
One last comment. The eliminator sent to us for review was an early design, manufactured in the Far East. Hythe now inform us that the eliminator will now be manufactured in the UK to their own specification — one up for the UK CB industry.

CB

ANTENNA REVIEW DATA PANEL

SPECIFICATIONS

| | |
|---------------------------|-------------------------------------|
| Model | Hythe Aerial Eliminator |
| Type | L/C Network matcher |
| Length | |
| Frequency Range | 26.9-27.9 MHz |
| Max Power Handling | 80 watts AM/FM, 100 watts SSB |
| Impedance | 50 ohms |
| Cable Supplied | |
| Mounting Details | Panel mounted — self-tapping screws |
| Supplier | Hythe Electronics |
| Typical Price | £19.95 |



REVIEW VERDICT

| | | | |
|-----------------------|------|---------------------|------|
| Performance | XXX | Installation | XXXX |
| SWR Adjustment | XXXX | Instructions | XX |
| Construction | XXXX | Value | XXXX |

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are average to good and one and two stars mean it's not doing so well.

The Tests

We have used our standard test procedure to assess the efficiency of this antenna. Just to bring new readers up to date this involves two tests: one static and one mobile. Our test sample is fitted to a stationary mobile and a second mobile follows a pre-arranged route that orbits the stationary test vehicle, sending and receiving signal reports at measured intervals. This is then repeated with the test antenna on the mobile test vehicle and the signals are sent and received between a stationary vehicle. A standard rig and antenna is used in all the tests. With the results obtained we are able to draw up the radiation pattern shown here. This is simplified to make the results more easily understood. The antenna is also subjected to a series of 'lab' tests to assess their durability, quality and construction, etc and finally we hand it over to a panel of CBers for comment.

ANTENNA CHECKLIST

| MAKE | ADDRESS | Name | Construction | Length | Max power | Type | Mount | Price |
|---------------------|--|---------------------|--------------|--------|-----------|------|--------------------------------|-------|
| ALLCOM | Allcom, Holland. | DPA 2UK | AL | 1.5 | 100 | M | - | E |
| ANTENNA SPECIALISTS | Antiference Ltd, Aylesbury, Buckinghamshire. | AS M125 | SS | 1.14 | 150 | M | 1/2" | C |
| | | AS M128 | SS | 1.14 | 150 | M | - | C |
| | | AS M131 | SS | 1.14 | 150 | M | gutler | D |
| | | AS MR 440 | SS | 1.2 | 100 | M | mag | D |
| | | AS MT178 | SS | 1.2 | 150 | M | mag | D |
| | | AS M610 | SS | 1.2 | 200 | M | 1/2" | D |
| | | AS M2000 | SS | 1.5 | 150 | M | 1/2" | D |
| ANTLER | Antler, USA. | AS 9812 | SS | 1.2 | 150 | M | mag | D |
| | | IC 85 | SS | 1M | - | M | mag | D |
| | | IC 80 | SS | 1M | - | M | spring-based mag | E |
| | | IC 15 | SS | 1 | - | M | trunk | C |
| | | IC 20 | SS | 1 1/2 | - | M | roof | D |
| | | IC 30 | SS | 1 | - | M | gutler | D |
| ARCHER | Tandy Corporation, Wadnesbury, Yorkshre. | IC 40 | SS | 1 1/2 | - | M | mirror | E |
| | | IC 80 | SS | 1 1/2 | - | M | mag | D |
| ARMSTRONG | | 21-904 | SS | 0.5 | 50 | M | 1/2" snap | D |
| AVANTI | Avanti, 340 Stewart Avenue, Addison, Illinois, USA. | | | 1.06 | - | M | super mag | G |
| | | AV 241 (Moonraker) | SS | 1.22 | - | M | stud | D |
| | | AV 241 T | SS | 1.22 | - | M | trunk | E |
| | | AV 241 M | SS | 1.22 | - | M | mag | E |
| BANDIT | Bandit Antennas Ltd., Roughton Industrial Estate, Bury St Edmunds, Surrey. | AV 241 MM | SS | 1.22 | - | M | super mag | G |
| | | B10 | SS | 1.22 | - | M | mag | G |
| | | B10 | SS | 1.42 | - | M | mag | G |
| | | B15 | SS | 0.81 | - | M | mag | F |
| | | B15 | SS | 1.22 | - | M | mag | F |
| | | B20 | SS | 1.42 | - | M | mirror | F |
| | | B30 | SS | 1.42 | - | M | drill-thru | E |
| | | B30 | SS | 1.22 | - | M | drill-thru | E |
| | | B40 | SS | 1.42 | - | M | various | D |
| | | B40 | SS | 1.22 | - | M | various | D |
| B50 | SS | 1.42 | - | M | various | D | | |
| B50 | SS | 1.22 | - | M | various | D | | |
| C. BRIT | C Brit Ltd., Unit 3.6, Wembley Conference Centre, East Lane, Wembley, Middlesex HA9 7XD. | Stingray | AL | 1.5 | 500 | H | pole | H |
| CT INTERNATIONAL | CTE UK (Diplex UK), Micham, Surrey. | Whiplash | SS | 1.5 | 26 | M | 1/2" | C |
| DIAL-A-MATCH | Brecker 19, Hitchin, Herts. | MG27 | SS | 0.91 | - | M | mag | C |
| | | 630 (Cherokee) | SS | 0.81 | - | M | - | C |
| | | 631 HBF | SS | 0.61 | - | M | - | C |
| | | 631 SMF | SS | 0.81 | - | M | - | F |
| | | 640 | SS | 1.22 | - | M | - | E |
| | | 641 HBF | SS | 1.22 | - | M | - | E |
| | | 641 SMF | SS | 1.22 | - | M | - | E |
| 620 (Halfbreed) | SS | 1.27 | - | M | - | C | | |
| FREEMAN & PARLOW | Tything Rd., Alcester, Warwickshire. | The Invader | AL | 1.5 | 250 | H | pole | E |
| K40 | American Antenna, Elgin, Illinois, USA. | K40 | SS | 1.4 | 600 | M | various | F |
| MID-WEST | Mid-West Electronics, Ohio, USA. | Dial-a-tune | SS | 0.81 | 600 | M | various | C |
| | | Dial-a-tune | SS | 1.22 | - | M | various | D |
| MOTOROLA | Taylor Rd., Stotsold, Hitchin, Herts. | EC108M | - | 1.5 | - | M | - | F |
| PAN INTERNATIONAL | Alpine Funk-Elektronik, (W. Germany). | Pan Mobile 280 | SS | 1.26 | - | M | clamp | - |
| PANORAMA | 73 Wadham Rd., London SW15 2LS. | CB27 | - | 1.22 | - | M | mag | B |
| PRIDOW | Pridow, Taiwan. | KT40 | SS | 1.5 | - | M | trunk | C |
| SHAKESPEARE | Performance Antennas, Beiton Rd., Market Drayton, Selop. | Knight-Stick 5054-C | FG | 1.22 | 1000 | M | - | C |
| | | Rebel 500/4 | FG | 1.22 | 350 | M | - | B |
| | | Two Load 5000-3 | FG | 1.4 | 600 | M | mag | F |
| | | VIP 173-4 | FG | 1.22 | 150 | M | ball | F |
| | | Shadow 4122-3 | FG | 1 | 26 | M | mag | E |
| Shadow 4122-1 | FG | 0.98 | - | M | trunk | D | | |
| SHIRA | Comet Warehouses. | SYS 208M | SS | 1 | - | M | mag | C |
| | | SYS 203C | FG | 0.75 | - | M | trunk | C |
| | | MA 82 | - | 0.91 | - | M | - | C |
| SIRTEL | 24 Allric Square, Woodston, Peterborough. | GP Messenger | SS | 1.5 | - | H | clamp | E |
| | | GP Signal Keeper | SS | 1.5 | - | H | tripod | F |
| SMC | SMC Ltd., SM House, Osborne Rd., Totton, Southampton. | Oscar Base CBA 11GP | SS | 1.5 | - | B | - | F |
| | | Oscar Base II/III | SS | 1.5 | - | B | - | F |
| | | Oscar IICM | SS | 1.2 | - | M | mag | D |
| | | Oscar IIIE | SS | 1.2 | - | M | foldover base | B |
| | | Oscar IIINE | SS | 1.5 | - | M | "pull-up" foldover base | C |
| | | Oscar IIIE | SS | 1.5 | - | M | "locking-collar" foldover base | C |
| Oscar TMCAS | SS | 1 | - | M | trunk | B | | |
| TAGRA | Europesonic (UK) Ltd., Manchester. | T40 | SS | 1.4 | 500 | M | various | E |
| WITCHSTICK | CJM Motor Factors, Watford, Herts. | Witchstick homebase | AL | 1.5 | - | B | - | E |
| VAN ORDT | Knight CB Specialists, 201 Dunstable Rd., Luton, Beds. | Audio King AK0-100 | SS | 1.5 | 2000 | M | 1/2" | G |

Key:

Price Bands
A:- £1 - £4.99
B:- £5 - £9.99
C:- £10 - £14.99
D:- £15 - £19.99
E:- £20 - £24.99
F:- £25 - £29.99
G:- £30 - £39.99
H:- £40 Plus

Construction
SS - Stainless Steel
AL - Aluminium
FG - Fibreglass

Application
M - Mobile
B/H - Base

Note: Prices are given as a guide only.



D.I.Y.



Building CB accessories can save you money, and it can be fun too. We show you how to construct two simple projects for both the experienced constructor and novice alike.

DIY Section Introduction

One of the most important things to remember about CB is that it is high technology, and should not be tampered with, unless you know exactly what you are doing. That said, there is no harm in having a dabble, or indeed, learning the rudiments of CB operation, and that is what this section is all about.

In the first part we show you, in clear and easy to follow steps, how to build simple CB related projects. All you will need are some basic tools and soldering iron, plus of course the ability to solder. All of the components, are constructed from easily obtained parts. The SWR meter will require some electronic components obtainable from your local radio shop. Even so, none of the projects are difficult to build, and a reasonably competent handyman can put most of them together in just a few hours.

The second part deals specifically with the operation of CB radio, how the various parts of a rig function and hopefully an insight into other forms of two-way radio. We've tried, as far as possible, to leave out over complicated technical terms, but where they're included we hope sufficient explanation follows.

Really, it would be impossible to deal with such a diverse subject as two-way radio in such a limited space, so if you feel you would like to learn more about this subject why not read some of the technical magazines on the market, and two at least are well worth reading for their technical articles. The first is Hobby Electronics, and the other, for the more advanced enthusiast is Electronics Today International, both are published monthly by Argus Specialist Publications whose address can be found on the contents page of this book.

For the serious radio enthusiast we can recommend taking a course known as the Radio Amateurs Examinations, run by most colleges as an evening class. This course leads to the actual Amateurs examination which permits an even greater degree of freedom with two-way radio. A wide spectrum of radio frequencies are made available to

radio amateurs and considerably greater output powers, enabling reliable long distance contacts over many thousands of miles. Your local technical college should be able to tell you when their next course begins.

CB



D.I.Y.

Simple SWR



SWR meters are essential for efficient CB operation. We have a design for what may be the simplest SWR ever. It can be built in an evening and should cost significantly less than commercially built models

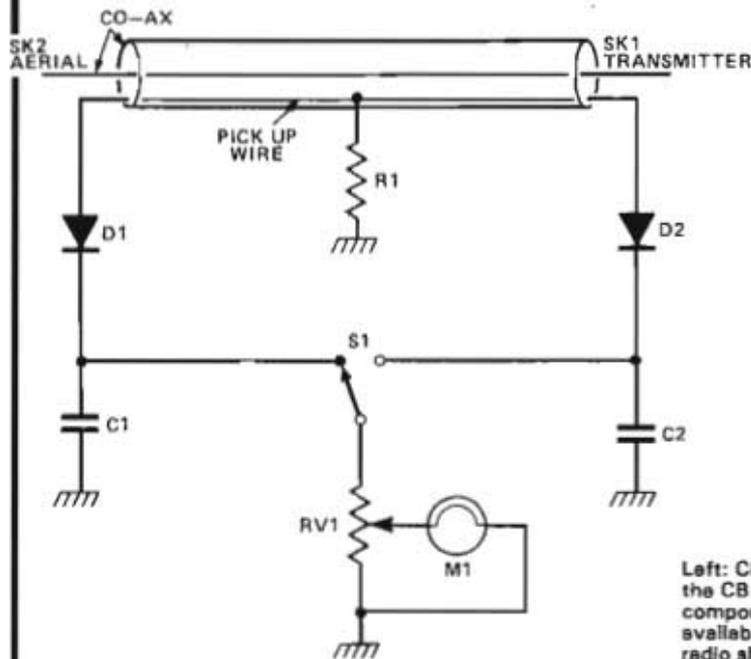
When an antenna is correctly matched to a transmitter, the impedance of the two will match. If they do not match then some of the radio energy will be reflected back from the aerial into the transmitter, cutting down its efficiency or, in extreme cases, destroying the transmitter output stage! The quality of this match is called the SWR or Standing Wave Ratio. It's a good idea therefore, to operate your rig with as low an SWR as possible, and an efficient value is 1.5:1 or less. Any value of 3:1 or greater will almost certainly damage your rig.

How it works

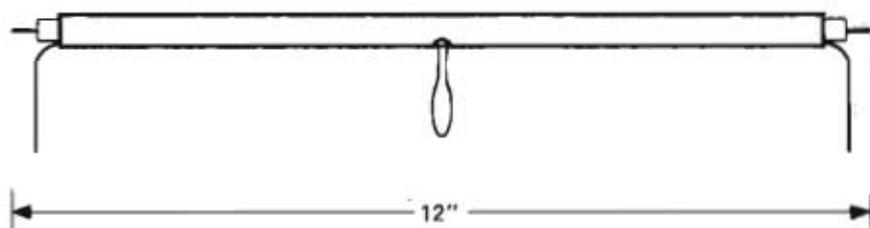
This simple unit has been specifically designed as 'easy to construct' and can be built in just one evening. It uses a piece of 50 ohm co-axial cable with a pick-up wire threaded inside the braiding. The radio waves are picked up in the wire, rectified by diodes and flow through the meter giving an indication of reflected or forward power, depending on the position of the switch.

The unit, like most electronic gear, will only perform as well as it is constructed. The moral, therefore, is quite obvious — make it well and it will work well.

Mark and carefully drill the box to accommodate:



Left: Circuit diagram for the CB Simple SWR. All components should be available from your local radio shop.

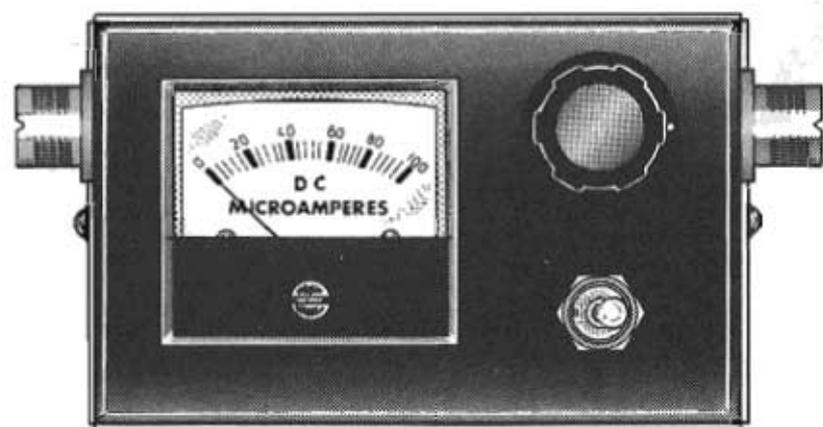


Above: Dimensions for the coaxial cable, showing pick-up wire.

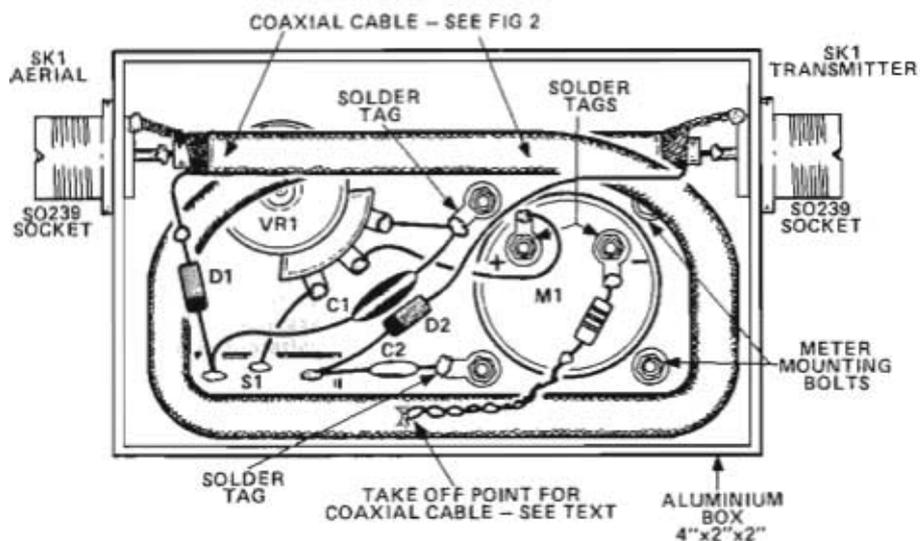
- Meter — M1, 0-100 uA (microamp) moving coil meter.
- Switch — S1, Single-pole changeover toggle switch.
- Potentiometer — VR1, 25K ohm potentiometer.
- Sockets — SK1 and SK2, SO 239, chassis mounting sockets.

Next, remove the outer plastic sheath from a 12 inch length of flexible 50 ohm coaxial cable. Bare the ends of the co-ax as in fig.2. Separate the braid at the middle of the co-ax. The thin enamelled wire must now be threaded inside the braid. This is best accomplished by squeezing the braiding towards the middle of the wire. The coax and pick-up wire should now look similar to fig. 3. Take care not to force the pick-up wire through the braiding as it may scrape the enamel off and ruin the unit.

The enamel covering on the exposed pick-up wire should now be removed back to within 1/4" of the co-ax. If you do not completely remove the enamel you will not be able to solder the wires! Install the switch S1, Potentiometer VR1, meter M1 and sockets SK1 and SK2 in the box. See fig.4.



Below: Internal wiring for the CB Simple SWR.



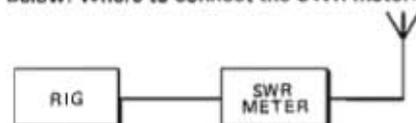
The cable should now be securely soldered to SK1 and SK2. These joints are important, otherwise you may end up with a very expensive rig repair.

Solder the connecting wires, capacitors and diodes in place as in fig.4. Do not overheat the diodes D1 and D2 as the excessive heat will destroy them. Also make sure that they are put in the right way round. Carefully inspect all joints for good soldering and check the wiring for any mistakes before screwing on the back cover. If any of the exposed wiring looks as though it may touch other wires, then simply cover them in insulating tape.

How to use it

The unit should not need any setting up, but will need calibrating. It is connected up as in fig.5. Place the switch in the calibrate position, key the mike and turn the knob on the front until the needle shows 100 on the scale. Flick the switch and key the mike again. You will now be measuring SWR.

Below: Where to connect the SWR meter.



How to Calibrate it

The simplest way to calibrate your SWR meter is with another one — however, if carefully constructed the following table should be fairly accurate.

| Meter Reading | Approx SWR |
|---------------|------------|
| 50 | 3:10 |
| 40 | 2.5:1 |
| 30 | 2:1 |
| 20 | 1.5:1 |
| 10 | 1.25:1 |
| 0 | 1:1 |

Parts List

- D1, D2 0A95 Diode
- C1, C2 .001 uF Disc Ceramic
- R1 68 ohm 1/4 Watt resistor
- VR1 25K Potentiometer
- S1 Single Pole C/Over toggle switch
- M1 0-100 uA Meter moving coil
- SK1, SK2 SO 239 sockets cup

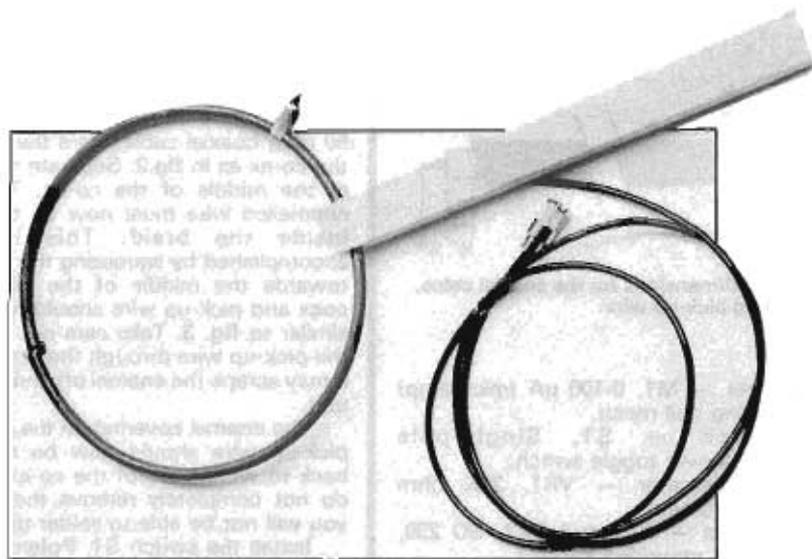
MISC

- 12" 50 Flexible Co-Axial Cable
- Plastic covered hook-up wire
- Metal Box 4"x 2 1/2"x 2" (to suit meter)
- Knob
- Approx. 18", 26-30 swg Enamelled Copper Wire

All of the parts needed for the simple SWR should be available from most electrical and radio shops. You should be able to buy most of the parts from mail order companies, many of whom advertise in our sister magazine Electronics Today International and Hobby Electronics.

CB

DF Loop



Build in this simple DF antenna and track down that CBer. Just a joke, actually this antenna can be the basis for some interesting outdoor fun and games.

At first glance you could be pardoned for asking why you should need such a strange looking antenna. Under normal circumstances you wouldn't but let's look at a few of the tricks this device can do.

- Find the compass bearing of a transmission.
- Play 'Fox Hunting' games.
- Check radiation patterns of antennas.

The antenna is made up from a 31 inch length of $\frac{3}{8}$ inch copper tubing bent into a loop, (refer to figs 1, 2 and 3 for mechanical details). The tubing is relatively easy to bend around a solid former. The trick is to bend it little and often otherwise it may collapse. Choose a rigid tubular former about two or three inches in diameter. Fix the former to a bench and place the tubing against it. Then, with a very slight pressure bend the tubing from the centre outwards. Aim for a very slight bend each time and repeat the process several times until you formed a circle. You should then be able to correct any abnormalities in the circle with a gentle twist.

Once you are satisfied that it is as near circular as you will get, screw the tubing into a wooden handle as shown in fig. 3. Now, by gently twisting the tubing, close the gap in the top of the loop so that you can solder on the trimmer capacitor C1. Now all you have to do is fix the co-ax cable to the handle, leaving a 6 inch length of inner conductor free for the crocodile clip.

The last step is to adjust the SWR of the antenna by sliding the crocodile clip along the tube and adjusting C1 (see the feature on 'How to SWR'). Once you're satisfied you are ready to DF.

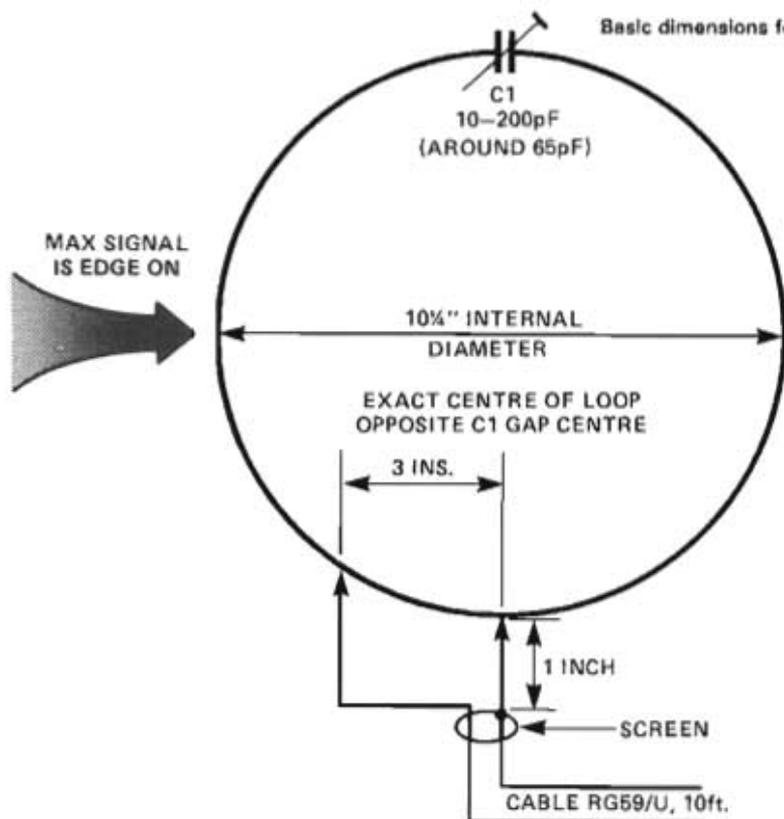
How to DF

This antenna is designed to operate in one plane only, it will be most sensitive to signals that strike it edge on. It is therefore possible to determine the bearing from which the signal originates. With the aid of a compass and a good map (an Ordnance Survey Map is best) you can take two bearings about half a mile apart and, by drawing two lines, plot the exact position of the transmission. Amateur radio enthusiasts use similar antennas for 'Fox Hunting' games whereby a number of contestants race to locate a hidden radio transmitter that can be either stationary or mobile.

Under most signal conditions (up to S6, say), the antenna is rotated and a rise in the signal level (ie peak) denotes the direction. If the signal is over S6 it is easier to use the antenna to look for a dip or null, in which case you will get the bearing by taking the direction from the face of the antenna. Bearings should be taken with a compass relative to magnetic North and this can be drawn on your map as a straight line. If the same transmission is then received at another location about half a mile away the two lines drawn on your map should cross at the point from where the transmitter is located. This type of antenna will pin-point a transmission to within 5 degrees or less. If a number of bearings are taken at different locations it should be possible to fix the position to within a few yards.

This antenna will only work outdoors as large metal objects, water pipes, etc, will produce misleading readings.

Basic dimensions for our loop antenna. These sizes are critical and should be adhered to as closely as possible.



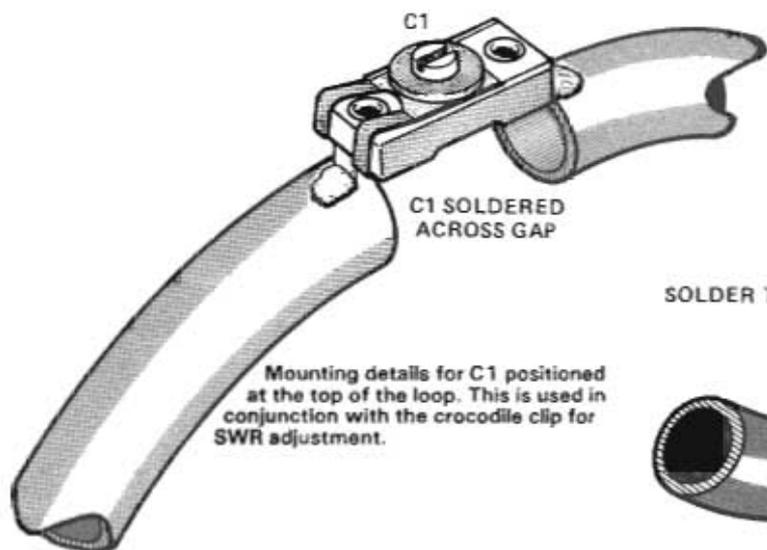
ADJUST C1 AND 3 INS. TAP ON LOOP FOR BEST S.W.R.

PARTS LIST

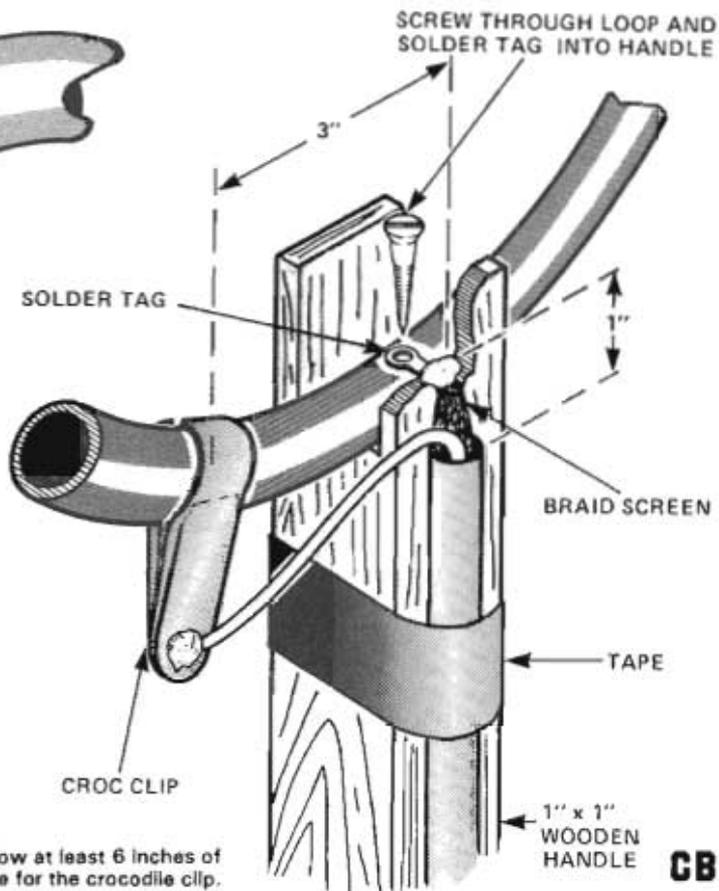
C1 10 to 200 pF postage stamp trimmer (non critical value)
 31 inches of 3/8 inch diameter copper tubing.
 10 feet of RG 59/U Coaxial cable.
 1 x 1 x 12 inch softwood for handle.
 Large crocodile clip.

BUYLINES

Almost all of the items for this antenna can be found in your local hardware and radio shops.



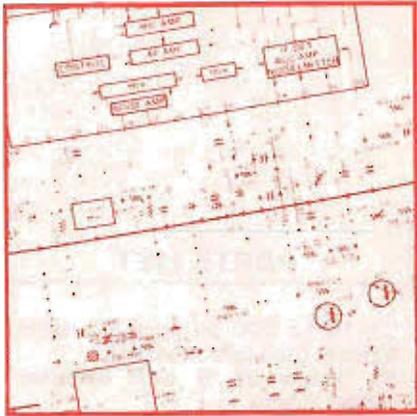
Mounting details for C1 positioned at the top of the loop. This is used in conjunction with the crocodile clip for SWR adjustment.



How the DF loop is mounted on to the wooden handle. Allow at least 6 inches of free cable for the crocodile clip.

CB

Inside CB



Christ Peterson, the Technical Consultant for Citizens' Band and Which Rig looks at how CB works in clear and easy to understand terms.

Inside CB

You may have wondered, as you sit having a ratchet, by what miracle you are able to talk to someone miles away, without, any physical connection.

Radio waves apparently have the property of being able to travel through an absolute vacuum, ie nothing at all, with little or no difficulty. The precise mechanism which allows this mysterious phenomena is still being argued over by some of the world's greatest minds. The practical application, however is well enough understood, and the principles are relatively easy to grasp.

At sometime or other you have probably witnessed someone bring a microphone too close to the amplifier to which it is connected. The result is an ear-splitting whistle. This is a practical demonstration of *positive feedback* and is frequently witnessed at rock concerts! In essence, a tiny noise has been picked up by the microphone, amplified, radiated from the loudspeaker, where it is picked up by the microphone . . . etc, etc. This results in a runaway situation, and the earsplitting whistle. This sort of oscillation is not confined to audio circuits, but can occur in any system containing an amplifier.

An ordinary transistor is just such an amplifier. If we connect it such as to cause positive feedback, it too will oscillate. Of course, unless we connect it to a speaker you won't hear it, but we could detect it with an oscilloscope.

The sort of feedback outlined above is very unstable. As the microphone is moved about the whistle will go up and down in frequency. However, if we were to include some sort of filter in the circuit, we can control the oscillation. If the filter only allows one particular frequency to pass, then the oscillations will only occur at that specific frequency. In a transistor oscillator a *quartz crystal* is frequently used for this purpose.

Quartz crystals are relatively easy to manufacture, and can be cut to a very high degree of accuracy. A digital watch, which is regulated by a crystal can be accurate to a few seconds a month! This same accuracy can be obtained when the crystal is used to govern a radio oscillator.

The Transmitter

If we take a crystal oscillator, and hang a bit of wire on it at an appropriate point, we will have a transmitter. A very weak

one, but nonetheless a transmitter. If we wish it to be detectable at a distance of more than a few inches, we need more power. Unfortunately, crystals are rather fragile devices. Try and feed too much power through them and they initially lose their accuracy, and then breakdown altogether. Therefore, if we are going to get a reasonably powerful transmitter, we will need to follow the oscillator with an amplifier. Indeed because crystal oscillators work best at very low power levels, we will need several stages of amplifications.

Now this is all very well, but so far all we have done is produce a carrier wave. Somehow we have to get our speech signal imposed on it. Also we have to ensure that we can't over-modulate it, upsetting the people on the next channel, and that the higher audio frequencies are removed for the same reason.

Speech is picked up by the microphone, and amplified to a suitable level to drive the modulator. At some stage in this amplifier, the signal will be limited to prevent over-modulation. This limiting will distort the speech signal, so there is not point in shouting into the mike! Far from making it easier to copy you, you will make it more difficult! Next the signal will be filtered to remove unnecessary information. The more information you attempt to transmit over a radio link, the less transmitter power is devoted to each part of it. It has been shown that for clear recognition of a speech signal, you need only transmit the audio frequencies between 300 Hz and 3 KHz. All frequencies outside this band are removed, thus devoting all the transmitter power to that band of frequencies necessary for speech. At the same time this effectively defines the channel spacing. If you want to transmit more information, then you need a wider channel to do it! Thus CB channels are 10 KHz apart, whereas VHF radio (Capital Radio, Radio 3 etc) are spaced over 200 KHz apart. A colour TV channel is over 6 MHz wide!

Coming back to our humble CB rig, we now have a carrier, and a filtered and limited audio signal. These are brought together in a *modulator*. In a simple FM system, the modulator can be the crystal oscillator! Although crystals are highly stable, they can be pulled off frequency slightly by putting a small capacitor in series with them. The amount of frequency shift depends on the size of the capacitor. Now there is a device known as a varicap diode. This

amazing piece of semiconductor wizardry acts as a voltage controlled capacitor! By placing one of these in series with the crystal, and applying the speech signal, *bingo*; we have FM! In practice, when generating FM this way it is more usual to run the oscillator at half the final output frequency, and following it by a doubler. This increases the amount of deviation obtained at the output. Fig. 1a shows a block diagram of the transmitter just described, and for the technically inclined, 1b shows a single transistor acting as oscillator, modulator and doubler!

Before leaving transmitters, notice the last box on the block diagram labelled 'matching network'. The matching network is roughly equivalent to the gearbox on a car. It doesn't contribute any power, but it does enable the output transistor to drive the appropriate load, in our case 50 ohms. It can also serve a useful function in suppression harmonic output, that is multiplies of 27 MHz. Never be tempted to tweak the output circuits of a transmitter in an attempt to get more output. You may well get more output, but not necessarily on 27 MHz!

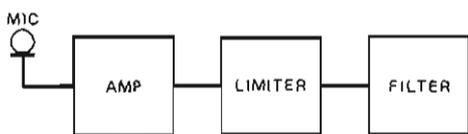
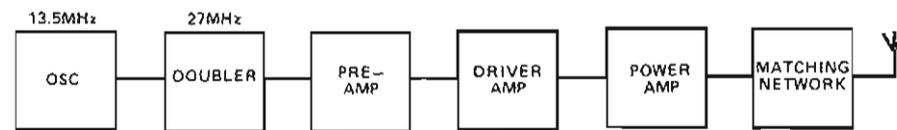


Fig. 1. (a) Above. A block diagram of a transmitter. (b) Right. A simple, single transistor oscillator, modulator and doubler.

400 KHz wide that's a selectivity of 1.5%, and reasonably achievable). The preselector may or may not contain an RF amplifier to give the signal a small boost on the way through. The next stage is the mixer. The receiver will contain a local oscillator just like the one in the transmitter, but running at a slightly different frequency. In a simple *single conversion* receiver, the oscillator will run 455 KHz below (or maybe above) the transmitter frequency. When this oscillator signal is fed into the mixer with the incoming signal a number of outputs occur from the mixer. These are the incoming signal, slightly amplified; the local oscillator signal, slightly amplified; the *sum* of the two signals (around 54 MHz); and most importantly the *difference* between the two signals. This will be around 455 KHz. This difference signal will be found to have as the



(the IF amp). In a modern receiver design, the filter will probably take the form of a ceramic block filter, followed by an integrated circuit containing an IF amplifier and FM discriminator all in one. IF goes in and audio comes out! Marvellous, isn't it? Unfortunately most existing CB rigs are a bit more old-fashioned than this and the IF amplifier and filter will be *distributed* along the board. It will probably consist of three or four transistor stages coupled by IF transformers, each contributing a bit of gain and a bit of filtering.

The audio signal leaving the discriminator will probably only be 0.25 volts at the most, so this will need to be amplified in an audio amplifier to a level suitable for driving a speaker. Fig. 2 shows a block diagram of a modern FM receiver.

When the receiver and transmitter are installed in the same box, some kind of changeover switching is needed. This must serve two purposes. One is to switch the aerial from the receiver to the transmitter or vice-versa. The other is to protect the receiver input stages from the full might of the transmitter! Failure to achieve this result in the instant destruction of the receiver! A few years ago this would have been achieved with a changeover relay, but these are now being rapidly replaced with more reliable diode switches.

The Receiver

So now we have a modulated carrier winging its way through the ether. Somehow we have to receive it, and here we have a problem. By the time the signal reaches the receiver, it may be only a microvolt or so in amplitude. (micro volt - millionth of a volt) To drive a loudspeaker we need a signal of least a volt or so. Thus we can see that the total gain needed in the receiver must be around a million times. There's a lot of gain! Further, it must select a specific channel only 10 KHz wide in 27 MHz; that's around 0.04%! That degree of selectivity is clearly impossible in one step. Firstly we must select a 27 MHz band, and then slice our 10 KHz block out of that.

The first stage we reach after the aerial is the preselector. This selects the 27 MHz band, in fact a chunk of it

original incoming signal. Now we are only trying to select 10 KHz in 455 KHz. That's 2.2% and relatively simple. The 455 KHz signal is selected by a filter (the IF or *intermediate frequency filter*) and passed on to a high gain amplifier

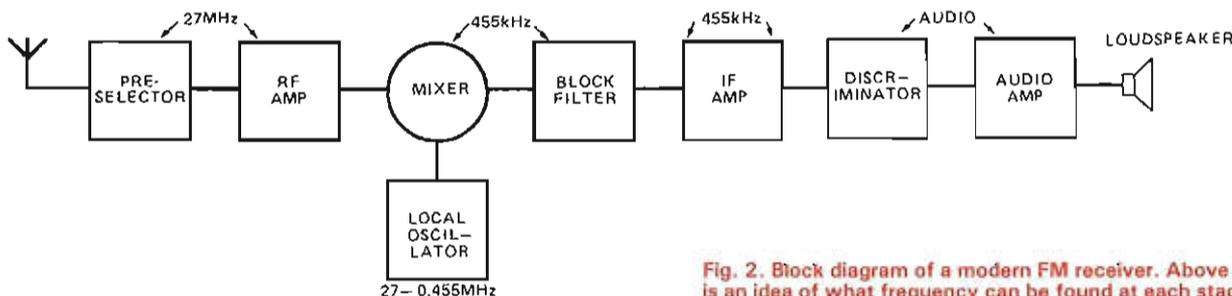
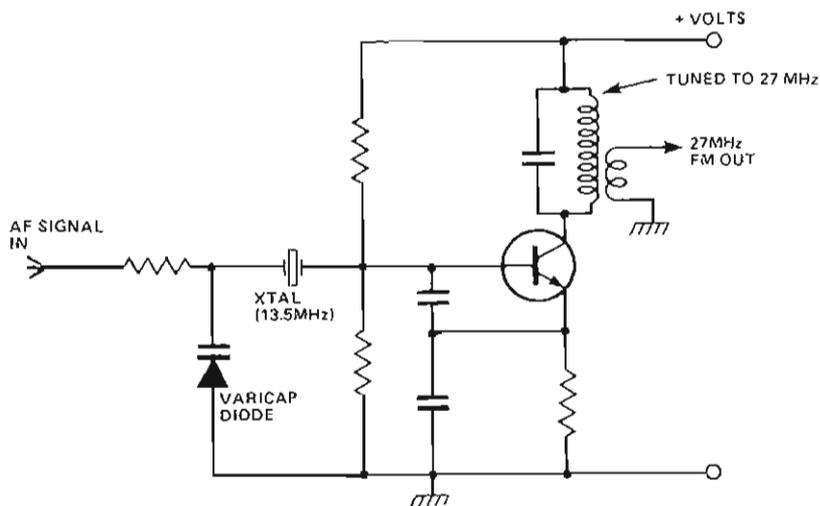
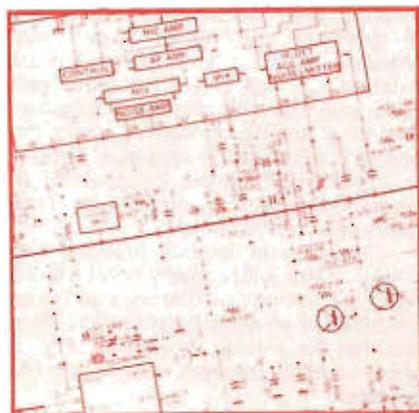


Fig. 2. Block diagram of a modern FM receiver. Above each block is an idea of what frequency can be found at each stage.

CB

The Transmitter



CB consists of both transmitters and receivers, here Chris Peterson explains how the transmitter works.

In the first part of this feature, we took a quick guided tour around the inside of a simple transceiver. While the outline principles of the system described would be adequate for a single channel 'walkie-talkie', a 40 channel rig is likely to be somewhat more complex. To see why, we will now take a slightly closer look at some of the sections of a typical transmitter.

The Transmitter

In an FM system, the bandwidth of the transmitted signal is a function of:

(A) The bandwidth of the applied audio signal, and;

(B) The amount of deviation applied to the carrier.

Since CB rigs are intended to be operated by non-technical operators, the specifications issued by respective Governments will be aimed at making them as idiot-proof as possible! That is not to say that you won't be able to burn your rig out, just that in so doing you will cause the minimum of interference to other users, both in and out of the CB band!

To prevent the transmitted signal splattering across adjacent channels, the microphone amplifier will include some form of limiter. This will prevent excessive deviation of the transmitted carrier no matter how big an overload is presented to the microphone socket. However, the overload will render the transmission unintelligible to any potential receivers. This is a point that should be borne in mind when connecting power mikes. Do not be tempted to turn the gain up too high!

Aside from this, the audio input circuits will be much as described previously, so we will now examine the next link in the chain, the crystal oscillator.

The Crystal Oscillator

The crystal oscillator section described in the first part of this feature is entirely adequate for a single-channel transmitter. Indeed, by arranging to have a small bank of crystals, and some method of switching them, several channels can be accommodated. The early American 23 channel sets had very large banks of crystals in them, but when 40 channel

working was introduced it was clear that some other method should be sought. Most modern equipment uses some form of *Phase-Locked Loop digital synthesiser*.

A basic Phase-Locked Loop (PLL) is shown in Fig. 1. A Phase detector compares two inputs, one from a reference (crystal) oscillator, the other from a voltage controlled oscillator (VCO). Provided the phase relationship between the two inputs is in a certain fixed relationship, the output from the phase comparator will be a steady DC voltage. If for some reason the VCO starts to drift slightly, the comparator will detect this and its output voltage will drive the voltage controlled oscillator in the opposite direction to its original drift, and the VCO will remain locked in the crystal reference. The loop filter is necessary to prevent the oscillator being driven so fast that it overshoots and wobbles in frequency before settling down.

So far all we have done is locked an oscillator to a crystal reference, and this may seem a bit pointless. After all, why not just use the crystal direct in the first place? Suppose however, that we now include a programmable divider in the feedback loop, as in Fig. 2. If the divider is set to divide by three, the VCO will stabilise at three times the reference frequency. If we set the divider to divide by four, the VCO will settle at four times the reference frequency in 10 kHz steps, then adjusting the divide by N will adjust the output frequency in 10 kHz steps. Starting to sound familiar? Furthermore, we can still generate our FM signal easily by feeding the modulation (your voice) into the VCO input along with the control voltage from the phase comparator. The loop filter will ensure that the comparator cannot respond quickly enough to cancel out the modulation, but will ensure that the VCO maintains its mean frequency in the long term.

Nowadays all the active circuitry for the PLL synthesiser will be contained in one chip it will also include circuitry to generate the receiver local oscillator frequencies in the same way. However, note that it will not be possible to change it away from its designed operating frequency simply by changing the crystal. While this will certainly change the operating frequency, it is likely that it will also change the channel spacing and

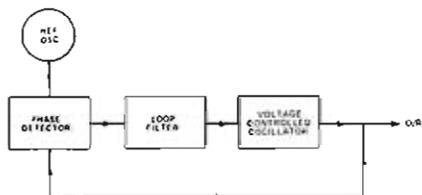


Fig. 1. Basic Phase-Locked Loop operation

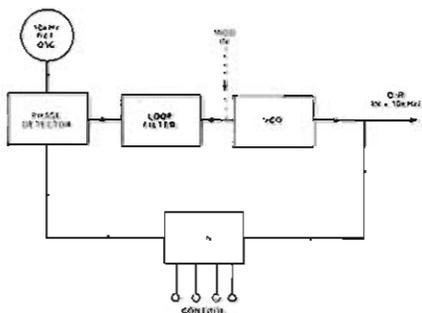


Fig. 2. A divide by 'N' PLL Synthesiser

the receiver local oscillator frequencies. In short, it won't work. The only way to change the operating frequency satisfactorily is at the design stage in the synthesiser. That is obviously a job for the manufacturer!

The output from the VCO is likely to be fairly low level, and probably at half the desired output frequency. The practical upper limit frequency response of a divider IC is usually around 20 MHz. Thus by operating the VCO at 13.5 MHz, expensive high frequency IC technology can be avoided. The 13.5 MHz signal will be fed into a doubler to get it up to 27 MHz. It will then be amplified to a level suitable to drive the output stage.

Most of these low level transistor RF amplifiers in transmitters are operated in class B or C for efficiency. In these modes the transistor operates more like a switch than an amplifier. One of the effects of this mode of operation is the generation of *harmonics*, multiples of the input frequency. Obviously the biggest output from such an amplifier will be the input frequency, but there will be smaller outputs at two and three times the input frequency. In theory the number of harmonics is infinite, but in practice they fall off fairly rapidly beyond the third harmonic. By tuning the output of such an amplifier to an harmonic, rather than the fundamental frequency, frequency multiplication can be achieved. Thus by driving the transistor with 13.5 MHz and tuning its output to 27 MHz, only the second harmonic (27 MHz) will leave the amplifier. In valve equipment it is possible to achieve up to five times multiplication by these means, but with transistors it is unusual to go beyond three. For CB usage at 27 MHz, two times is sufficient.

One or two stages of amplification are usual following the doubler, and each stage will be tuned to 27 MHz. Fig.3 shows a typical transmitter RF stage, things change somewhat. Instead of the tuned collector load used in the previous stages, an untuned collector load will be used, followed by a matching network.

It can be shown that the power output of a single transistor class C amplifier is given by the following equation:

$$R_1 = V_{cc}^2 + 2P_o$$

where R_1 is the load impedance seen by the transistor, V_{cc} is the supply voltage, and P_o is the output power.

Suppose we want 4 W output, and are running off a 12 V supply. Then

$$R_1 = 12 \times 12 + 2 \times 4 \\ = 18 \text{ Ohms}$$

Unfortunately our aerial looks like 50 ohms, so somehow this must be converted to 18 ohms before it is presented to the transistor. This could be achieved by using a transformer, as

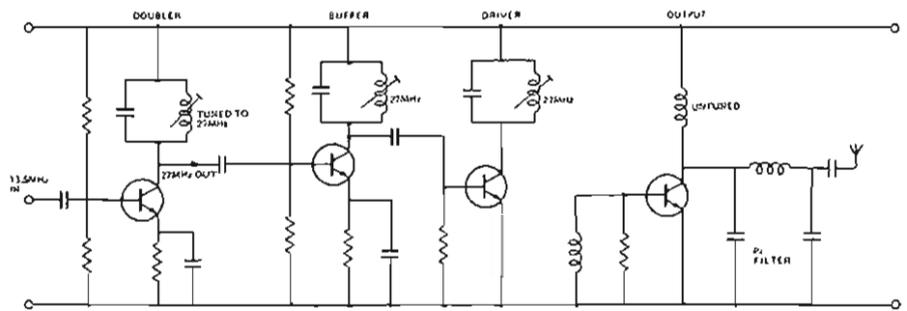


Fig.3. Basic RF stages in a transmitter

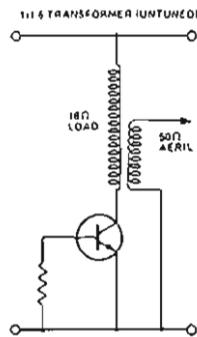
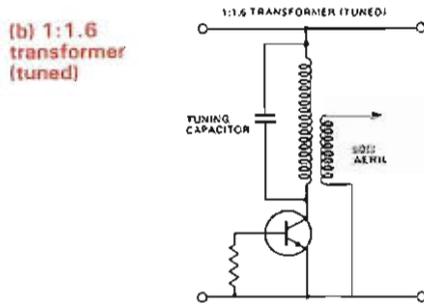
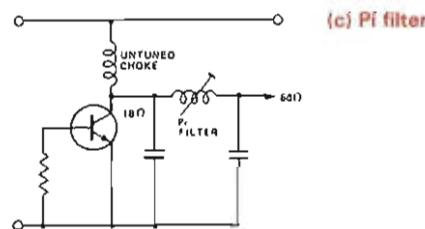


Fig.4. (a) 1:1.6 transformer (untuned)



(b) 1:1.6 transformer (tuned)



(c) Pi filter

shown in Fig. 4a. A transformer has the useful property of transforming impedances in the ratio of the square of the windings. Thus a transformer with a 2 to 1 winding ratio would transform impedances by 4 to 1. Unfortunately, a simple transformer would pass harmonics as well as the fundamental 27 MHz signal, and the resulting transmitter would not be very clean.

The situation could be improved by tuning the transformer as in Fig. 4b, but the most usual solution is to use a pi-filter as shown in Fig. 4c. The pi-filter not only produces the necessary impedance transformation, but also acts as a *low pass filter*, removing the harmonics from the transmitted signal.

In practice, a single pi-filter is insufficient to meet today's tight transmitter specifications, and is often augmented

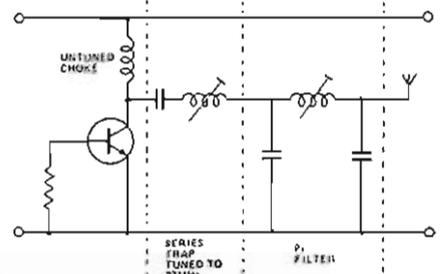
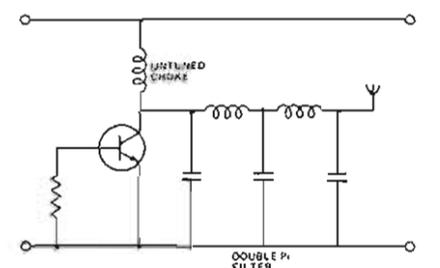


Fig.5. (a) Series Trap

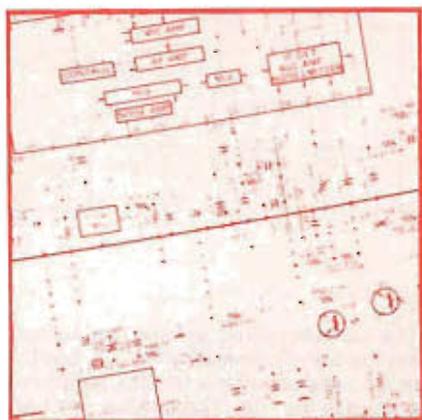


(b) Double Pi-Filter

either by a series trap, as in Fig. 5a, or by a second pi-filter as in Fig. 5b.

Provided the transmitter was properly aligned when it left the factory, it should not be possible to extract any extra power by returning the output stage. The power may appear to increase, but that may be because it is increasing on 54 and 81 MHz (second and third harmonics), but *reducing* on 27 MHz. Do not be tempted to twiddle with the output coils!

Well that just about wraps up our guided tour of a transmitter. Part three deals with the receiver..



The final part of Inside CB looks at how CB receivers work. Chris Peterson explains.

The signal level arriving at the aerial socket of a typical receiver may be as little as 1 μ V (one millionth of a volt). To drive the loudspeaker satisfactorily, a drive level of at least one volt will be necessary. This indicates that the total gain within the receiver needs to be at least *one million!* At the same time the receiver needs to be able to select a very narrow band, only 10 kHz wide, from an infinite RF spectrum.

In theory, it is possible to build a receiver that would take a 27 MHz signal, and amplify it in successive stages until it reached a level sufficient to drive a speaker directly when demodulated. However, as the early pioneers of radio discovered, this approach is not without problems.

First, the input and output of the receiver are the same frequency. Because of the high degree of sensitivity required, it is highly likely that the aerial will pick up some spurious radiation from the receiver itself. This will cause the system to 'howl round' in just the same way as a PA system, with the microphone too close to the speaker. Second, every time the frequency is changed, every stage in the receiver has to be retuned! Finally, at frequencies much higher than 1 MHz it is unlikely that adequate selectivity could be achieved.

The approach adopted almost universally for radio receiver design be it CBs, colour TVs or whatever, is that of the *superhetrodyne*, or superhet for short.

In a superhet receiver the incoming signal is mixed with a locally generated signal to produce a difference signal. This difference signal will have superimposed on it exactly the same modulation as the incoming RF (radio frequency) signal. However, it will be at a much lower frequency which makes selectivity less of a problem and, more important, the frequency is fixed, ie it does not vary with channel selection. It is at this *intermediate frequency* (IF) that the bulk of amplification takes place. Because the IF is fixed, the amplifier will not need retuning every time a different channel is selected. Further, because the amplified signal is at a different frequency to the incoming signal, the chances of instability due to a 'howl round' are drastically reduced.

Provided that the required tuning range is narrow, say 400 kHz at 27 MHz, then it is possible to design a

sensitive receiver in which the only tuning adjustment is to the local oscillator. Since in most practical CB applications the local oscillator will be the same synthesiser chip used by the transmitter, that tuning adjustment becomes the channel selector switch on the front panel.

Such a simple system has much to commend it, and this basic form is found in many hand-held sets and the cheaper mobiles. There is, as always, one slight snag. For any given receiver, there are two input frequencies that will provide the desired IF; these are:

$$F_{lo} + IF \text{ and } F_{lo} - IF.$$

Let's put some numbers in to illustrate this. A typical IF frequency in a single conversion receiver is 455 kHz. Suppose the local oscillator is running at 26.67 MHz. We have already said that the output from the mixer, the IF is equal to the difference between the input signal and the local oscillator, ie:

$$F_{in} - F_{lo} = IF$$

We can rearrange this equation, thus:

$$F_{in} = IF + F_{lo}$$

In this case,

$$F_{in} = 455 \text{ kHz} + 26.67 \text{ MHz} \\ = 27.125 \text{ MHz}$$

Unfortunately,

$$F_{lo} - F_{in}$$

also gives the correct IF. Re-arranging again,

$$F_{in} = F_{lo} - IF = 26.67 \text{ MHz} \\ - 455 \text{ kHz} = 26.215 \text{ MHz}$$

So both 27.125 and 26.215 MHz will produce the correct IF and be detected by the receiver. In this instance 27.125 is the desired frequency and 26.215 is the *image frequency*.

Image rejection is a function of the selectivity of the 27 MHz tuned circuits at the receiver input. If we make this stage more selective, we will improve the image rejection. Unfortunately these same tuned circuits must select between 26.96 MHz and 27.4 MHz without retuning. This is quite a wide band, and limits how selective it is possible to make the front end. A simple

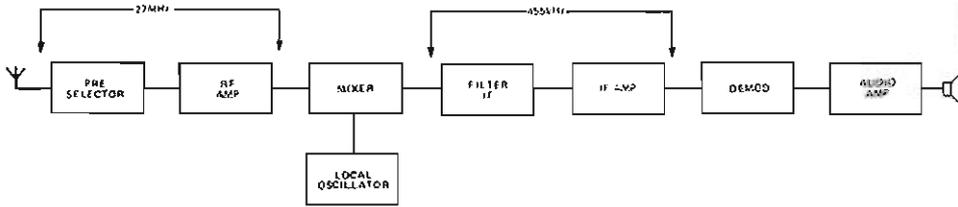


Fig. 1 Block diagram of a simple, single conversion superhet receiver.

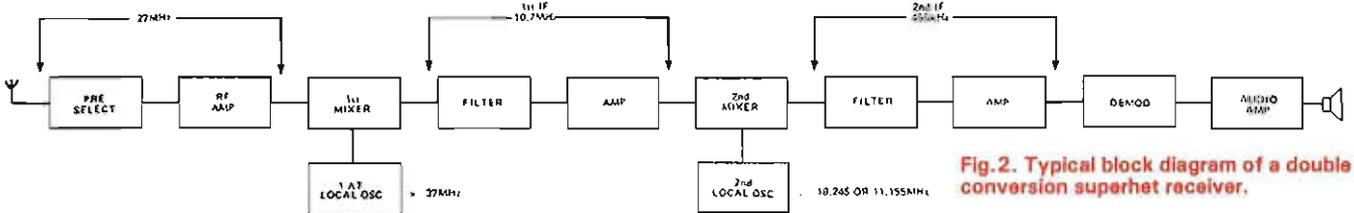


Fig. 2. Typical block diagram of a double conversion superhet receiver.

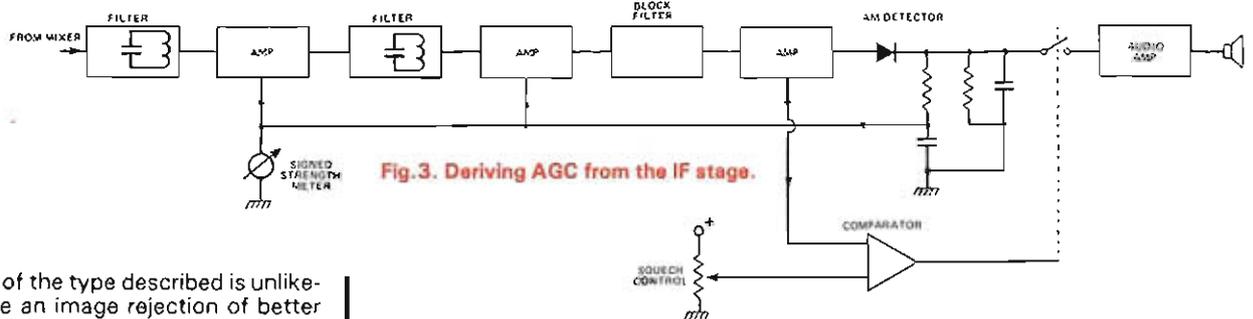


Fig. 3. Deriving AGC from the IF stage.

superhet of the type described is unlikely to have an image rejection of better than 20 dB.

Image rejection can be improved by using a higher IF. For example, suppose we chose an IF of 10.7 MHz. If the desired channel was 27.125 MHz, then the image frequency would be 5.725 MHz! Under these conditions, the image rejection is likely to be well over 60 dB. Unfortunately, the adjacent channel rejection will have deteriorated as the image rejection has improved. Indeed, unless a very expensive crystal filter were used, such a receiver tuned to channel 14 would probably respond to everything between 10 and 18 equally well!

Summing up then, in a simple superhet the choice of IF is something of a compromise. Too low a choice will result in poor image rejection, whereas too high a choice will result in poor selectivity.

Double Conversion

The answer to these problems is the *double conversion superhet*, usually known simply as a double superhet. In a double superhet, the incoming signal is mixed initially to a high first IF (typically 10.7 MHz), filtered with a relatively wide band filter, and then mixed down to a much lower second IF, typically 455 kHz, where the filtering is such as to give adjacent channel rejection. Figure 2 shows a typical double superhet. This gives good image rejection due to the high first IF, and yet good selectivity due to the low second IF. The more conversion stages you have, the more risk you run of suffering from spurious responses, but generally a well designed double superhet offers the best design compromise in the region of 27 MHz.

Although the IF frequencies quoted are typical of the bulk of the equipment

available, they are by no means the only ones in use. This can lead to problems when attempting to add 80-channel conversion boards to 40-channel receivers. Most of these boards are designed for IFs of 10.7 MHz and 455 kHz, and fitting them to transceivers that use different IFs can lead to disappointing results.

The signal-to-noise ratio of a receiver can often be improved by the addition of an RF amplifier prior to the first mixer. Sometimes the gain of this amplifier can be controlled by an external 'RF gain' control.

The performance of this RF amplifier stage is critical when strong signals are around on nearby channels. The RF amplifier will be protected against out-of-band signals by the preselector filter, but this filter will pass any signal within the CB band. In the presence of a strong nearby signal it is possible for this amplifier to be saturated by that signal. This means that it has no capacity left to amplify the signal you are trying to receive. In other words, the receiver becomes insensitive in the presence of a strong signal, which isn't on your channel. Once again com-

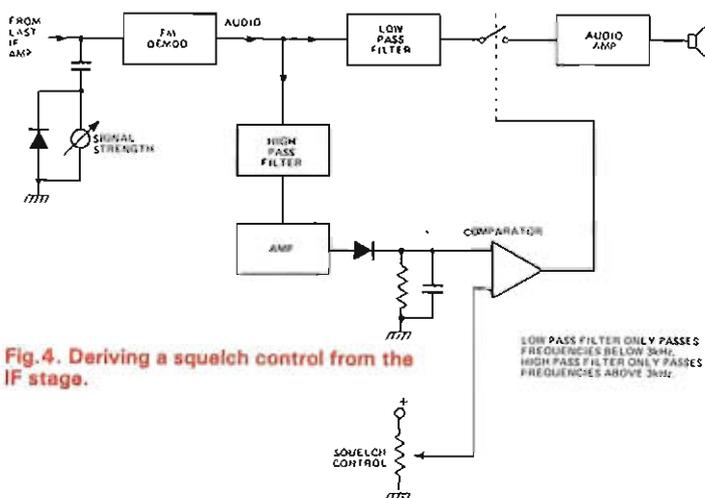


Fig. 4. Deriving a squelch control from the IF stage.

LOW PASS FILTER ONLY PASSES FREQUENCIES BELOW 300Hz. HIGH PASS FILTER ONLY PASSES FREQUENCIES ABOVE 300Hz.

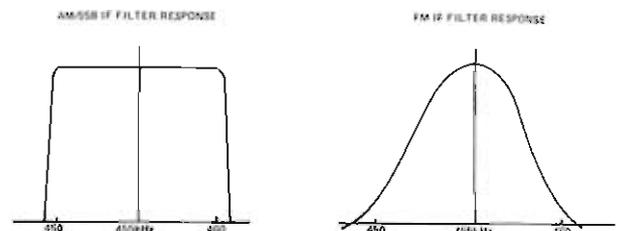


Fig. 5. (a) Ideal AM/SSB filter response. (b) Practical response on an FM receiver.

promises must be reached. As a general rule, *FETs* (field effect transistors) are more immune to this kind of swamping than ordinary *bipolar* transistors. However, *MOSFETs* don't usually like working below 12 V, mobile, while junction *FETs* tend to be variable animals, which can be embarrassing in mass production! It is possible to produce bipolar designs that can outperform *FETs*, but these are very much the exception rather than the rule. At the bottom and middle of the market, a *FET* design is likely to offer the best performance.

Gain

In an AM or SSB receiver, some means of adjusting the gain of the IF amplifier is necessary if the signal is not to be distorted when the signal level rises. Usually a small proportion of the IF is tapped from the last IF amplifier. This is rectified, and the DC voltage resulting is used to control the gain of the IF amplifier. This voltage can also be used to squelch the output of the receiver at a present signal level. It can also be used to drive a signal strength meter. Because the AGC (automatic gain control) voltage derived by this technique is non-linear, the meter can read a wide range of signal levels. Figure 3 shows the principle.

In an FM receiver, an AGC is not strictly necessary. However, since most existing CB rigs that operate on FM are

modified AM designs, there will probably be an AGC line anyway. If there is no AGC line, then a meter can still be driven by rectifying the output of the final IF amplifier stage, and using this to drive a meter. However, such a meter will have a linear response, and will swing from zero to full scale with a relatively small increase in signal level. Since an FM system is not sensitive to amplitude variations provided the signal is above a certain level, this does not matter too much. Unlike an AM system, there is no gradual fading of the signal as the incoming level reduces. The output audio signal remains virtually constant right up until the moment the signal reaches a certain minimum point, and then drops out almost instantaneously! FM tends to be either there or not there, with very little transitional period in between. So although the signal strength meter will drop out very quickly, so will the audio.

Squelch

Squelching is a little trickier without an AGC line. With little or no signal incoming, an FM receiver produces a lot of noise, far more than an AM receiver. When a correctly modulated carrier is present, all the audio signals will be below 3 kHz. However, when no signal is present, the limiting action of the IF amplifier will ensure that there are noise components above 3 kHz. By filtering the noise above 3 kHz, amplifying it and

rectifying it, it is possible to produce a squelch signal that is dependent on the amount of noise in the demodulated audio. Figure 4 illustrated the principle.

In an AGC controlled IF amplifier, the IF amplifier is usually of the *distributed* variety. This consists of several stages, each adding a bit of gain and a bit of selectivity. In a limiting amplifier, the IF amplifier will probably be a chip containing all the IF gain in one block, and also a quadrature detector to demodulate the FM signal. In either case the bulk of the selectivity is likely to come from a ceramic block filter. The bandpass characteristic of this filter will have a significant effect on the adjacent channel performance of the receiver. This ideal characteristic for an AM or SSB system will be nearly rectangular, as in Fig. 5a. Such a sharp cut-off will produce severe phase distortion and hence audio distortion in an FM system. For FM the pass band should be much smoother, with no sharp transitions as in Fig. 5b. Very few multi-mode CBs switch IF filters when on FM, and as the filters are usually compromised in favour of SSB operation, very few perform, satisfactorily on FMI

CB

CLUB REGISTRATION FORM

CITIZENS' BAND CLUB DIRECTORY REGISTRATION FORM



| | |
|-----------------------------------|---------------------------------|
| CLUB NAME | () |
| CHAIRMAN | () |
| Secretary | () |
| PR Contact | () |
| Contact Address | () |
| | (Tel No.) |
| MEETING PLACE, DAY AND TIME | () |
| | |
| No. of members | |
| Position in club | |
| Fee/sub etc | (Committee members only please) |

Please mark (*) information that may be published.



CLUB DIRECTORY

Presenting the largest CB club directory ever to be published. With over 600 entries, all with contact addresses you will be able to find which CB clubs are in your area.

AVON

BELL BREAKERS

PRO: The Rebel,
18 Hillgrove Street,
St James, Bristol,
Thurs 8pm The Bell.

BRISTOL CITIZENS BAND CLUB

1a St Peters Rise,
Headley Park,
Bristol BS13 7LU.

NATIONAL EMERGENCY SERVICE

PR: Judy Reed,
48 Holborn Close,
Stockwood,
Bristol BS14 8LX.

ROMAN CITY BREAKERS CLUB

Secretary: The Waltzer,
29 Keston View,
Whilaway, Bath,
Alt Weds, Oliver Inn.

SHANTYTOWN BREAKERS CLUB

PR: Welsh Wizard,
Clevedon,
Avon,
Ch 30 daylight hours,
Ch 14 after dusk.

WEST COUNTRY BREAKERS

Secretary: R.C. Cackle,
10 Bramley Square,
Congresbury,
Nr Bristol.

WESTON BREAKERS CLUB

Weston-super-Mare,
(Ch 30 daylight hours,
14 after dusk.)

BEDFORDSHIRE

GERONIMO CB CLUB

Chairman: Geronimo,
Luton, Beds.
Thurs, 8pm, Somerset Tavern.

LEIGHTON BUZZARD BREAKERS CLUB

Secretary: Sue Ellen,
c/o Red Lion,
Hockliffe,
Nr Leighton Buzzard,
Beds.

SATELLITE BREAKERS CLUB LUTON

PR: Geronimo,
The Plough,
Woodside,
Luton.

BERKSHIRE

BISCUIT TOWN BREAKERS

Chairman: Silver Surfer,
PO Box 123,
Reading RG3 5JW.

BRACKNELL BREAKERS ASSC

Secretary: Kestrel,
The Bridge House,
Workingham Road,
Bracknell,
Berkshire.

FINCHAMPSTEAD BREAKERS ASSOCIATION

Chairman: HI FI,
11 Whittle Close, Gorse Ride,
South Nino Mite Ride,
Nr Wokingham,
Old Leather Bottle, Barkham Ride.

MAIDENHEAD OFFICIAL BREAKERS

PR: Super Square,
129 Fane Way,
Maidenhead,
Berkshire SL6 2LX.

STEEL CITY CB CLUB

Chairman: Alan Taylor,
SSCBC,
PO Box 123,
Reading.

TWO-WAY INDEPENDENT NETWORK SYSTEM (TWIN)

Secretary: W Smith,
5 Nuthatch Drive,
Early, Reading,
Berks.

WINDSOR 20-27 CLUB

Chairman: Playboy,
Windsor Football Club,
Windsor.

WOODLEY TOWN BREAKERS

Chairman: Vee Too,
10 Crockhamwell Road,
Woodley, Reading,
Berks.
Mons, 7.30, The Good Companions.

BUCKINGHAMSHIRE

27 FM CLUB

Secretary: Red Eye,
133 Golden Drive,
Eaglestone, Milton Keynes,
Bucks.
(0908-608831)
Thurs & Sun, 7.30pm, Cosgrove Lodge.

ATTIC BREAKERS CLUB

PRO: Shy Fox,
Town Field House,
High Wycombe,
Bucks.

AYLESBURY BREAKERS ASSOCIATION

Chairman: Mickey Mouse,
Hop Pole Hotel,
Bicester Road,
Aylesbury, Bucks.
Weds.

BOURNE END BREAKERS ASSOCIATION

PR: Sly Fox,
The Firefly,
Bourne End,
Bucks.

BUCKINGHAM BREAKERS CLUB

Secretary: Mrs A Ireland,
35 Addington Road,
Buckingham.

CAMBORNE BREAKERS CLUB

Chairman: Beethoven,
The New Inn,
Park Bottom, Illogan,
Alt Mons, Tuckingmill Pavilion, Camborne.

CB MUSKETEERS

PRO: J.L. Smith,
61 Gibbwin,
Great Linford,
Milton Keynes,
Bucks.

CITIZENS RADIO ASSOCIATED BREAKERS

PR: Sly Fox,
Town Field House,
High Wycombe,
Bucks.

THE CORN GRINDERS CLUB

Secretary: Yorkie Bar,
c/o The Pheasant Inn,
Windmill Street,
Brill, Bucks.
Tues.

HILLBILLYS CBC

Secretary: Hound Dog,
Friend At Hand,
West Wycombe Road,
High Wycombe,
Fris, 8.30 pm, Friend At Hand.

MILTON KEYNES CITY BREAKERS

Chairman: W. Weir,
2 Buckfast Avenue,
West Blotchley,
Milton Keynes.

NEW CITY BREAKERS CLUB (UBA)

Secretary: Haarbrieker,
c/o CB Centre,
9 St Ledger Court,
Linford Local Centre,
Great Linford,
Milton Keynes, Bucks.

NORTH BUCKS BREAKERS

Chairman: Tiger Lilly,
c/o 3 Beech Close,
Buckingham MK18 1PG,
Mons, 8pm, Folly Inn, Adstock.

WYCOMBE FREE BREAKERS

Chairman: Ironside,
9 Ceter Road, Lane End,
High Wycombe,
Bucks HP14 3JD.
(0494-881779)
Alt Sun, The Studley Arms, Studley Green.

CAMBRIDGESHIRE

THE 27 CLUB

Secretary: Blue Mink,
90 Grounds Avenue,
March, Cambs.
Tues, 8pm, The Chequers.

BIG 'H' BREAKERS CLUB

Chairman: R W Ingle,
84 Surrey Road,
Huntingdon,
Cambs PE18 7JR.

ROAD APPLE DX CLUB

Controller: C.D Cotton,
29 Fairfields,
St Ives,
Huntingdon.

ST NEOTS BREAKERS CLUB

Secretary: Plastic Man,
58 Hardwick Road,
Eynesbury, St Neots,
Huntingdon, Cambs PE19 2UG.

WHISKEY BRAVO CLUB

Secretary: Derricke Mann,
1 Council House Burrett Road,
Walsoken, Wisbach,
Cambs.

CHANNEL ISLANDS

GUERNSEY RADIO GROUP

PO Box 264,
Guernsey,
Channel Islands.

CHESHIRE

CANAL SIDE BREAKERS CLUB

PRO: Niall Shanks,
c/o Cotebrook House,
Oughtrington Lane,
Lymm, Cheshire.

CBA MANCHESTER

Secretary: Paul Lewis,
7 Bowland Road,
Woodley, Stockport,
Cheshire SK6 1LJ.
(Please include SAE)

CHAPEL SIDE BAND GROUP

Secretary: R Shatnell,
PO Box 2,
Whaley Bridge,
Stockport SK12 7BE,
Weds, 8.00 pm, Roebuck or Packhorse Inn.

CHESHIRE BREAKERS GOOD BUDDIES

PR: The Rainmaker,
c/o 10 Bowness Road,
Coniston Park Estate,
Timperley, Cheshire.

CREWE BREAKERS CLUB

Secretary: A.J. Lockhart,
1 Main Road,
Wybunbury, Nantwich,
Cheshire CW5 7NA.

MARSHFIELDS BREAKERS CLUB

Secretary: The Pool,
8 Sparrowhawk Road,
Palace Fields,
Runcorn, Ches.
Weds, 8pm, Mersay View Cabaret Club.

MOTION LOTION BREAKERS CLUB

Secretary: Tweaky,
11 Farmstead Way,
Great Sutton,
South Wirral.

SILKTOWN BREAKERS CLUB

Secretary: Lady Godiva,
Higher Penthills Farm,
Macclesfield,
Cheshire SK11 0NJ.
Alt Weds, 8.00 pm, Silklands Suite.

STOKE MANDEVILLE AND OTHER HOSPITALS CB RADIO APPEAL

Secretary: Mrs D Smith,
The Cedars,
Bunbury Lane,
Cheshire CW6 9QU,
Cheshire CW6 9QU.

TINY TOWN BREAKERS

Secretary: Ms R Young,
The Cedars, Bunbury Lane,
Tarporley, Cheshire CW6 9QU,
Thurs, 8pm, British Legion.

CLEVELAND

21 CLUB

c/o Marine Hotel,
Seaton Carew,
Hartlepool,
Cleveland,
Wednesday.

CLEVELANDS' RADIO 16 BREAKERS

PRO: Little Mole,
PO Box 29,
Stockton-on-Tees,
Cleveland.

INVITATION BREAKERS CLUB

Secretary: Lady Bird,
Yorkshire Dragoon,
Maltby In Cleveland,
Suns, 8pm.

THE NORTH TEES BREAKERS CLUB

Chairman: John Walker,
c/o Club Fiesta,
396 Norton Road,
Stockton-on-Tees,
Cleveland,
Mons, 8pm.

SKELTON SKYLINERS BREAKERS CLUB

Chairman: Stillson,
28 Linden Road,
Brotton, Saltburn,
Cleveland TS12 2ND,
Sats, 7.30 pm, North Skelton WMC.

UK CLUB DIRECTORY

SOUTH TEES DXING CLUB
Secretary: Steven Maloney,
13 Tawney Road,
Eston,
Cleveland.

STABLE BAR BREAKERS CLUB
Secretary: Damon Female,
29 Gibe Gardens,
Easington, Cleveland TS13 4NF.
Thurs. 8pm, Stable Bar.

CORNWALL

THREE MILE BREAKERS CLUB
PR: S. Bennett,
Bendall, Carthew Way,
St Ives, Cornwall.

TRANSWORLD SIDEBANDERS
UK Controller: SID,
PO Box 8,
St Ives PE17 4JF.

CO DURHAM

5-0 BREAKERS CLUB
Chairman: Moonraker,
52 St Barbaras Walk,
Newton, Aycliffe,
Co Durham. (314571).
Alt Weds, British Legion Club.

AFFILIATED TRUCKERS CLUB
Secretary: ATC,
122 Bruce Glasier Terrace,
Shotton Colliery,
Co Durham.

BA20
PRO: Huggy Bear,
c/o BA20 CB Accessories,
Railway St, Auckland,
Co Durham.
Alt Thurs, Binchester Hotel.

DERWENT VALLEY BREAKERS
PRO: Romeo 2,
c/o 10 Prospect Terrace,
New Ky, Stanley,
Co Durham.

HAWKER CITY BREAKERS CLUB
PR: The Professor,
32 Nesbit Road,
Pateley,
Co Durham.

HUGGY SHACK BREAKERS
PRO: The Butcher,
70 Northlea Road,
Northlea Saaham,
Co Durham SR7 0DN.
Weds, 7.30, The Duke Of Wellington.

LAW BREAKER CITY CB CLUB
PR: Malcolm Proud,
43 Appleton Crescent,
Willington, Co Durham.
Alt Thurs, Crook Cricket Club.

NOISY CITY BREAKERS CLUB
PRO: Rasputin,
70 Surtees Street,
Darlington,
Co Durham DL3 6PR.

THE PROFESSIONALS (DRIVERS CLUB)
Chairman: Hedgehooper,
c/o The Turks Head,
Bondgate, Darlington.
Alt Sats, 7.30 pm.

ROCKET TOWN BREAKERS
Chairman: Bartly,
Hare & Greyhound,
Durham Road,
Bowburn, Durham.
Mons 8pm.

SEDFIELD BREAKERS CLUB
Secretary: Bill Bayston,
4 Pine Ridge Avenue,
Sedgefield,
Co Durham TS21 3EF.

WEARDALE BREAKERS CLUB
Chairman: Red Salmon,
4 Gordon Terrace,
Wolsingham,
BP Auckland, Co Durham.

CUMBRIA

BARROW CB CLUB
Chairman: G. Gordon,
Soccer Bar Social Club,
Walney Road,
Barrow-in-Furness,
Cumbria.

BORDER CITY BREAKERS
PR: P. Casoy,
PO Box 33,
Carlisle,
Cumbria.

COUNTY BREAKERS ASSOCIATION
Chairman: Gingar Tom,
12 Leconfield,
Cleator Moor,
W Cumbria.

EDEN VALLEY BREAKERS CLUB
President: Napoleon,
'Atlas', Hilton,
Appleby, Cumbria.
Alt Suns, 8pm, Grapes Inn, Appleby.

HAZARD COUNTY BREAKERS
Secretary: Rocket Man,
High Park,
Parkside Road, Kendal,
Alt Weds, Brewery Arts Centre.

JUNCTION 40 CLUB
Secretary: Nightman,
9 Penning View,
Newbiggin, Nr Penrith,
Alt Tues, RAFA.

ULVERSTON BREAKERS CLUB
Secretary: Steve Hook,
c/o The Sun Hotel,
Market Street,
Ulverston, Cumbria.

DERBYSHIRE

99 CLUB
PR: Big Foot,
c/o Shades Night Club,
Stalybridge,
Derby.

CANYON BREAKERS
Secretary: C7,
94 Houlton Road,
Bolsover,
Chesterfield,
Weds, 7.45pm, Hillstown Miners Welfare,
Hillstown.

CAPITAL BREAKERS CLUB
Secretary: Crystal,
c/o DPTA,
138 Elton Road,
Derby.

DOVE VALLEY TRUCKERS CBC
Chairman: Captain Beaky,
Sudbury Services,
Sudbury,
Derby DE6 6GX.

**GREAT BRITAIN INTERNATIONAL
DX CLUB**
Chairman: Keith Hook,
PO Box 30,
Derby DE1 1AG.

NORTH EAST DERBYSHIRE 10-4 CLUB
Vice Chairman: I.S. Buckland,
c/o The Shoulder Of Mutton,
Hardstoft, Nr Pilsley,
Chesterfield, Derby.
Weds, 8pm.

RED CAT 14 BREAKERS CLUB
Vice Chairman: T.A. Watson,
Red Lion, Derby Road,
Sandiacre,
Derbyshire.

SPA TOWN BREAKERS
Chairman: Tom Brewer,
c/o Midland Hotel,
Peak Dale,
Buxton.

WCBC
Secretary: Mrs G. Patrick,
1 Saxton Avenue,
Heanor,
Derby.

DEVON

BUNKER BREAKERS CLUB
Secretary: Saver G,
100 Babbacombe Road,
Torquay, Devon.
Weds, 8pm, Courtylands Hotel.

MOORLAND RIDERS CB CLUB
Secretary: Match Box,
Mons Cafe & CB Centre,
Liverton,
S. Devon.

**PLYMOUTH PORT CITY BREAKERS
SOCIAL CLUB**
Chairman: Neighbour,
21 Lockyer Road,
Muttley, Plymouth,
Sun, 7pm, Fiesta.

PORT CITY BREAKERS CLUB
PR: Mr D. Wood,
39 West Down Road,
Beacon Park,
Plymouth PL2 3HF.

WOOL RIDGE BREAKERS
Chairman: Peter Webster,
9 Whitehall Close,
South Molton,
Devon EX36 4EQ.

DORSET

BEACHCOMBERS BREAKERS ASSOCIATION
Secretary: A. Naughton,
c/o 3 Thursby Road,
Highcliffe, Christchurch,
Dorset BH3 5PA.

**BOURNEMOUTH INDEPENDENT BREAKERS
ASSOCIATION**
PRO: Papermate,
c/o Coach House Hotel,
Ferndown, Dorset,
Tues, Coachhouse.

CLUB BREAKERWAY
PR: Gramana,
2a Rossmore Road,
Upper Parkstone,
Poole, Dorset BH2 3NH.
Mons, 7.30pm, Flights Refuelling Sports
and Social Club,
Merley Park, Wimborne.

DORSET ASSOCIATION OF BREAKERS
PR: G. Jarratt,
c/o 123 Hester Road,
Canford Heath,
Poole, Dorset.

DORSET NOB BREAKERS CLUB
Secretary: Happy Angel,
3 Barr Lane,
Burton Bradstock,
Bridport, Dorset DT6 4PX.

PURBECK ONE-NINE CLUB
Secretary: Daphne Ferne,
134 Northmoor Way,
Wareham, Dorset BH20 4BG.

THREE COUNTIES BREAKERS CLUB
Secretary: Foxy Lady,
48 Fairay Crescent,
Gillingham,
Dorset.

WATERBABIES BREAKERS CLUB
Secretary: Twikki,
17 Furzey Road,
Upton, Poole,
Weds, 8.00 pm, Mariner, West Quay.

THE WEYMOUTH CB CLUB
Chairman: Ray Howes,
Flat 1, 29 St Thomas Street,
Weymouth, Dorset.

WEYMOUTH & DORCHESTER 40 cb CLUB
Secretary: Sue Brackley,
PO Box 13,
Weymouth,
Dorset.

ESSEX

ASSOCIATED BREAKERS CLUB
Secretary: Blue Bird,
c/o 53 Hipling Towers,
Romford, Essex.
Mons, 8.00 pm, Cricketers, Hornchurch.

BASILDON BREAKERS ASSOCIATION
Chairman: Skolar,
PO Box 20,
Basildon, Essex.
Suns, 8pm, Van Gogh.

BAT BREAKERS (USA)
Vice-President: D. Nairn,
15 South Parade,
Canvey Island, Essex.

BEECH BREAKERS CLUB
PR: Power Hammer,
123 Willingale Road,
Loughton, Essex.
Suns, 7.30pm, Blacksmiths Arms,
Thornwood Common, Nr Epping, Essex.

BRAINTREE BREAKERS CLUB
Chairman: CB One,
c/o 118 Manor Square,
Braintree, Essex.
Alt Weds, 7.30pm, Lake & Elliot Social Club.

CANVEY ISLAND BREAKERS
Vice-President: D. Nairn,
15 South Parade,
Canvey Island, Essex.

CB50
Secretary: Tool Box,
21 Rutland Road,
Chelmsford CM1 4BL.
Weds, 8.30 pm, Boreham.

CO AX MELTERS CLUB OF ENGLAND
Secretary: Dave Nairn,
150 Smallpains Avenue,
Canvey Island, Essex.

**CORRINGHAM AND STANFORD BREAKERS
ASSOCIATION**
Secretary: P. Yallop,
22 Dock Road, Tisbury,
Essex RM18 7PT.

**CRANHAM HORNCHURCH UPMINSTER
BREAKERS (CHUB)**
PR: Lazy Rider,
c/o 103 Roseberry Gardens,
Cranham, Upminster,
Essex.

EAST COAST BREAKERS ASSC
Tartan House,
Frating,
Nr Colchester.
(7.30 pm first Sunday each month)

FLEET TOWN BREAKERS CLUB
Chairman: Blue Dragon,
26 Mell Road,
Tollesbury, Essex.
2nd Thurs, 8pm, Hope Public House.

GOLDEN GATE BREAKERS CLUB
Secretary: Tim Neisbert,
c/o The Devo Restaurant,
Cliff Road, Dovercourt,
Harwich, Essex.
Tues, Devo Restaurant.

KENT & ESSEX BREAKERS ASSOCIATION
Secretary: Angel,
24 Mill Lane,
West Thurrock,
Grays, Essex.

QUAKER BREAKER CLUB
Secretary: Pinball Queen,
c/o Waggon & Horses,
East Street,
Salfron Walden, Essex.
Weds, 8pm, Waggon & Horses.

R.I.G.B.I.E.
Secretary: Golden Shot,
Meat: Railway Hotel,
Dagenham,
Tuessday Eves.

RIVER CITY BREAKERS CLUB
Chairman: Big D,
38 Worcester Road,
Burnham-On-Crouch,
Essex.

ROMFORD NET CHANNEL 39 UKFM
PR: Chris Lee,
315 High Road,
Chadwell Heath,
Romford, Essex.

SABRE JUNIOR BREAKERS CLUB
Chairman: Ian Chipperfield,
44 Highfields, Gt Yeldham,
Nr Halstead, Essex CO9 4QQ.
Fris, 7.30pm, Gt Yeldham Reading Room.

**SOUTH OCKENDON BREAKERS
ASSOCIATION**
Secretary: Wildcat,
The Troubador,
Broxburn Drive,
South Ockendon, Essex.

UBA (ESSEX)
Chairman: Ted Cheneier,
24 Bryony Close,
Wirham, Essex.

WESTCLIFF BREAKERS CLUB
Chairman: C Hull,
54 Glenwood Avenue,
Westcliff-on-Sea,
Essex.

ZEBRA COUNTY BREAKERS
PR: Winnie The Pooh,
c/o The Post Office,
Sible Hedingham,
Essex.

GLOUCESTERSHIRE

CAMELOT BREAKERS
Secretary: Free Wheeler,
87 Fairmead,
Cam,
Gloucs, GL11 5JS.

CHELTENHAM BREAKERS ASSOCIATION
Chairman: John Baxter,
c/o The Crown & Cushion,
Bath Road,
Cheltenham, Glos.

THE CITIZENS BAND ASSOCIATION (CBA)
President: James Bryant,
16 Church Road,
St Marks Road,
Cheltenham, Glos G15 1.

DEAN FOREST BREAKERS CB CLUB
PR: A.E. Griffin,
Bram Rugby & Social Club,
High Street, Bream,
Lydney, Glos.
(05941) 58230.

MALVERN BREAKERS ASSOCIATION
PR: CB Baer/The Duke,
PO Box 16,
Malvern WR14 4RR.
Weds, 8pm, Gandolfi, Henley Swan, Malvern.

TIMER TOWN BREAKERS
Chairman: Superstud 1,
Holly Hill Cottage,
Valley Road, Cinderford,
Gloucs GL14 2PA
Weds, 7.30pm, Bilson Inn.

VALLEY BREAKERS STROUD
Secretary: Hattersley,
24 Highfield Road,
Stroud GL5 1ES.

HAMPSHIRE

10-36 KETTLE KLUB
Secretary: Ivar The Engine,
PO Box 24,
Kildborough,
Hants.

40 CHANNEL BREAKERS
Secretary: Lady Talisman,
c/o 57 Bridgemary Road,
Bridgemary, Gosport,
Hants.
Weds, 7.30pm, Hoaford Inn.

AIRWAVES BREAKER CLUB BOURNEMOUTH
Secretary: Furcoat,
89 Rochester Road,
West Howe, Kinson,
Bournemouth.
Weds, 8pm, Bluebirds Social Club Longham.

BANDIT DX CLUB
President: A.G. Turnbull,
27 Bicton Walk,
Warren Park, Havant,
Hants PO9 4NA.
Fris & Suns The Hide PH, Weycock Farm,
Cowplain.

BIG A BREAKERS CLUB
c/o: Maureen and Len Cutler,
244 Lyndhurst Avenue,
Ticas Meadow,
Aldershot, Hants.

BUTSE BREAKERS CLUB
Chairman: Atomic Rooster,
52 Murray Road,
Horndaan, Portsmouth.
Mons, 8.00 pm, Red Lion Chalton.

MEON VALLEY BREAKERS CLUB
4 Lawrence Road,
Fareham, Hants.
Alt Mons, Rowner Recreation Centre.

NEW FOREST CB CLUB
Secretary: Sheila Rice,
12 Westcott Road,
Holbury, Hants.
1st Tues each month.

POPLEY BREAKERS CLUB
Secretary: Black Widow,
28 Puttenham Road,
Sherfield Park, Chisham,
Nr Basingstoke, Hants.
(0256 5481)

SOUTHAMPTON BREAKERWAY 79 CLUB
PR: J C Jordan,
93 Outer Circle Aldermeer,
Southampton,
Hants SO1 8GX.

SOUTHAMPTON CB CLUB
Chairman: Demon Driver,
497 Romsey Road,
Matbush, Southampton,
Hants SO1 9GQ.

SOUTHAMPTON CB EXPERIMENTAL CLUB
Chairman: J. Finch,
6 The Orchard,
Bassett Green Village,
Southampton.

SOUTHAMPTON CRUMB SNATCHERS
Secretary: Little Boy Blue,
7 Middle Road,
Sholing, Hants.
(Tel. 0703 446095).

TEST VALLEY BREAKERS CLUB
Secretary: Happy Devil,
PO Box 27,
Andover, Hants SP10 2NG.
Mons & Thurs, Meadow Club.

TOAD HALL BREAKERS
Chairman: Arabian Cowboy,
c/o Roundabout Hotel,
Wallington Shore Road,
Fareham, Hants.

VICTORY BREAKERS
Chairman: The Rebel,
77 Deerhurst Crescent,
Paulsgrove,
Portsmouth, Hants.

WARTER WAY BREAKERS
Chairman: Weedcutter,
84 Picket Close,
Fordingbridge,
Hants.
Churchill Arms, Alderholt.

HEREFORDSHIRE

BOOKTOWN BREAKERS CLUB
Chairman: Green Apple,
83 Wyaside,
Hay-on-Wye, Hereford.
Suns, 8.30pm, The Granary PH.

WYE VALLEY BREAKERS CLUB
Secretary: Mother Goose,
106a East Street,
Hereford HR1 2LW.
Thurs, 8pm, Priory Hotel, Stratton Sugwas.

HERTFORDSHIRE

BARNET BREAKERS CLUB
Secretary: November 1,
c/o Discount CB,
148a East Barnet Road,
New Barnet, Herts.
Sun, 8pm, Barnet Football Club.

BRICKET BREAKERS CLUB
Watford Component Centre,
7 Langley Road,
Watford, Herts.

BROWN BOTTLE BREAKERS
PRO: City Boy,
Newadesk,
c/o 18 Springfield Road,
St Albans, Herts.
Mons, Bston PH & The Hall (rear British
Legion, St Albans).

DIAMOND BREAKERS CLUB (STEVENAGE)
Secretary: Mrs P. Gregory,
16 West Close,
Stevenage,
Herts SG1 1PW.

HEMEL HEMPSTEAD BREAKERS CLUB
Secretary: Heather Rutt,
2 Crofts Path,
Hemel Hempstead,
Herts.

HERTS CITIZEN BAND RADIO
ASSOCIATION
Chairman: Keith Palmer,
P O Box 37,
Potter Bar,
Herts EN6 2AZ.
(77 44 236).

HUMBERSIDE

BEVERLEY HILLS BREAKERS CLUB
Secretary: Solitaire,
c/o Beverley Hills Discotheque,
Norwood, Beverley,
N Humberside.
Alt Mons, 8pm.

BIG TOP BREAKERS
Secretary: Milky Way,
5 Council Villas,
Halton Ross, Barnetby,
S Humberside.
Fris, 8pm, St Barnabas Church Hall,
Barnetby.

BRIDGETOWN BREAKERS
PR: Desperate Dan,
c/o Phoenix Social Club,
Hessle Road, Hull,
N Humberside.

CITIZENS' BAND BREAKERS CLUB
Chairman: Dutchy,
9 Ashtree Close,
Immingham,
South Humberside.

DAWN BREAKERS CLUB
Chairman: Dixie Rever,
c/o 44 David Street,
Grimsby,
South Humberside.

DIXIE ACTION
Chairman: Nympho,
c/o 31 Bluestone Lane,
Immingham, Grimsby,
S Humberside.

DIXIELAND BREAKERS
Secretary: Silver Bullet,
PO Box 26,
Grimsby, S Humberside.
Alt Mons, 'S & S' (S...t and Shovel),
S Killingholme.

DOWNE TOWN BREAKERS
PR: Bootlegger,
87 George Street,
Snaith, Nr Goole,
N Humberside.

EASTSIDE BREAKERS CLUB
Chairman: Pipebender,
c/o The Silver Moon Club,
Chamberlain Road,
Hull.

FISHTOWN FOXHUNTERS
Chairman: Dennis Beedham,
133 Yarborough Road,
Grimsby, South Humberside.
Alt Suns, Etherington Arms.

FISHTOWN INDEPENDENT BREAKERS
President: CU12,
c/o Lynton Hotel,
Taylors Avenue,
Cleathorpes, S Humberside.

GOOLE CB ASSOCIATION
Secretary: Wheels,
c/o Lowther Hotel,
Aire Street, Goole,
N Humberside.

LA BREAKERS
Chairman: Midget Men,
Unit 13, Carlton Industrial Estate,
Hewthorn Avenue, Hull.
(0482 227 130).
Alt Weds, Lockwood Arms.

MAYFLOWER BREAKERS
Secretary: Aunt Selly,
Immingham,
S Humberside.

STEELTOWN BREAKERS
Secretary: Suzi O,
c/o 12 Keelby Road,
Scunthorpe,
S Humberside DN17 2ND.
Mons, 8pm, The King Henry.

THE WESTPOINT BREAKERS
Secretary: Dave Kemp,
c/o The Ferryboat Inn,
Hessle,
North Humberside.

ISLE OF MAN

ISLE OF MAN CB CLUB
Secretary: J. Osllymple,
Lower Ballaclucas Farm,
Marown, Isle of Man.

ISLE OF MAN CITIZENS' BAND CLUB
Chairman: Big Daddy,
PO Box EV 77,
Douglas.

MANX CB CLUB
Chairman: K P Allison,
66 Heather Crescent,
Pulrose, Douglas

10M NORTHERN BREAKERS
Secretary: Gravedigger,
PO Box 19,
Ramsay, Isle Of Man,
Mons, 7pm, Grand Island Hotel.

KENT

ADDINGTON BREAKERS CLUB
Chairperson: Babychem,
c/o Biggin Hill Country Club,
Biggin Hill, Kent.

ECHO MIKE BREAKERS CLUB
Chairman: Builder Man,
17 Catlyn Close,
East Melling,
Kent ME19 6RX.
Sun, 8.30pm, The Rising Sun.

EAST KENT BREAKERS ASSOCIATION
PRO: A. A. Jammatt,
PO Box 81,
Canterbury,
Kent CT1 2XG.

FM EMERGENCY MONITORS (THAMES)
Coordinator: A.L. Howard,
56 Playstool Road,
Newington,
Sittingbourne, Kent.

THE GARDEN OF ENGLAND DX CLUB
Secretary: Lady Go-Diver,
The Beckets,
Southborough Lane,
Bromley, Kent.
Mons, 8pm.

GHOST TOWN BREAKERS
Chairman: Straw Dog,
33 Gooseon Road,
Herns Bay, Kent.
Mon Bun Penny.

LEMA TANGO SIDEBAND CLUB
PR: Kim Mendoza,
21 Longfield,
Tenterden,
Kent.

LILLY PAD BREAKERS CLUB
PRO: Basil Fawley,
Woodies Discotheque,
Shaerness, Kent.
Weds, 8.00 pm.

MARKET TOWN BREAKERS CLUB
Secretary: Clay Pigeon,
PO Box 2,
Ashford,
Kent.

MID KENT CB CLUB
Chairman: Colin McKay,
18 High Street, Charing,
Ashford, Kent.

MKCB
Chairman: Wheeler Dealer,
22 The Broadway,
Malden, Kent,
Mon, The Orchard Spot, Bearsted.

SOUTH LONDON ASSOCIATED BREAKERS
27 (SLAB 27)
Chairman: Clockwork Orange,
Walling.

SPIRETOWN BREAKERS
Chairman: Dusty Bin,
38 Church Lane,
Celow, Chesterfield.

STAR GATE DXers
PR: Dragonfly,
Canterbury Road,
Herne Bay, Kent.

TUNBRIDGE WELLS CB ASSOCIATION
Secretary: Polar Bear,
PO Box 38,
Tunbridge Wells,
Kent TN2 3DG.
Mons, 8pm, Robin Hood.

UNITED KINGDOM CITIZENS BAND
CAMPAIGN
Chairman: Bernie Murray,
32 Downbank Avenue,
Barnhurst, Kent DA7 6RP

UNITED KINGDOM CB FEDERATION
PR: Steve Parry,
97 Hook Lane,
Walling, Kent.
(Tel. 303 0979 or 868 0127).

WEST MALLING BREAKERS
Secretary: M. Woodward,
c/o The Clubhouse,
The Airfield Club,
Westmalling, Kent.

WHITE CLIFFS BREAKERS ASSOCIATION
Secretary: Blue Jon,
PO Box 13,
Dover, Kent CT16 1UA.

LANCASHIRE

99 CLUB
PR: Sea Cat 1,
Shades Night Club,
Grosvenor Street,
Stalybridge, Nr Manchester.

ABC (ASSOCIATED BREAKERS CLUB)
Chairman: Eric Openshaw,
Dill Electrics,
528 Lever Edge Lane,
Bolton, Lancs.
Mons, 7.30, Aquarius Club.

ATHERTON BREAKERS CLUB
Chairman: Handball,
11 Ramsay Close,
Atherton, Nr. Manchester,
Lancs.

BACK ROAD BREAKERS
President: Rolling Thunder,
c/o Liberal Club,
Garstang, Nr Preston,
Lancs.

BURY BREAKERS CLUB
Chairman: Cooperman,
3 Wash Lane,
Bury, Lancashire BL9 6AS.
(081 787 0799).
Tues, 8pm, Turf Hotel.

CANYON BREAKERS
Chairman: Iceberg,
25 Newchurch Street,
Rantestall,
Rossendale B8A 7QX.

CINDERELLAS BREAKERS CLUB
Chairman: Eric Harrison,
1 Nether View,
Wenningford, Nr Lancaster,
Lancashire LA2 8NP.
Alt Tues, 8.30pm, Malling Hall Hotel.

CLOGTOWN BREAKERS
Secretary: Sax Kitten,
c/o 33 Pandle Court,
Astley Bridge,
Bolton BL1 6PX.

CLOGTOWN CLAYPIT BREAKERS CLUB
Secretary: Compo,
c/o 22 Romiley Crescent,
Brightmat, Bolton,
Lancs.

UK CLUB DIRECTORY

COPY CATS CLUB
Martholme Grange,
Altham, Accrington,
Lancs.

**FLIXTON, URMSTON, & DAVYHULME
GOOD BUDDIES ASSOCIATION**
PO Box 2,
164-166 Corn Exchange Buildings,
Manchester 4.

GBA
Chairman: Bob,
Coronation Service Station,
Middleton Road,
Heywood, Lancs.

LAMBS OF PRESTON
Chairman: G. Hilton,
14 Nutter Road (77),
Preston,
Lancs PR1 8SA.

MONKEY TOWN BREAKERS
Secretary: Mermaid,
c/o Victoria Hotel,
Church Street,
Heywood, Lancs.
Weds, 8.30pm, Victoria Hotel.

MONKSVILLE BREAKERS
Secretary: Lady C.,
27 Queen Street,
Whalley, Nr Blackburn,
Lancs.
Mons. Spring Mill, Langmo.

MOON BASE ALPHA BREAKERS CLUB
PRO: Blue Can,
2 Newton Road,
Billings, Nr Wigan,
Lancashire WN5 7LA.
(0744 894882).
Alt Mon, 8.30pm, Eagle and Child.

MOONRAKER JUNIOR BREAKERS
PR: Drifter,
17 Lizmar Terrace,
Moston, Manchester M9 1WG.

NEWTOWN BREAKERS CLUB
Chairman: Tattoo,
14 Cornbrook,
Holland Moor 2,
Skelmersdale, Lancs.
Tues, 8.00pm, Quarry Bank Club.

NORTH MANCHESTER CB CLUB
Pro: Blaster Bates,
Belmont Hotel, Middleton Road,
Crumpsall, Manchester 8.
(Meet alternate Mondays, 8pm)

NORTH WEST BREAKERS ASSOCIATION
c/o 8 Longhill Walk,
Moston,
Manchester M10 9NT.

**OPEN CHANNEL CB CLUB, PRESTON AND
DISTRICT**
(Formerly Preston CB Club)
Chairman: F.W. McKeown,
Secretary: S.J. Battersby,
17 Coronation Street,
Blackburn, BB1 6BS.

OVER WYRE BREAKERS
PRO: Alligator Station,
Farnhill Hotel,
Park Lane, Peeshall,
Nr Blackpool, Lancs.
Thurs, Farnhill Hotel.

RIBBLE BREAKERS ASSOCIATION
Chairman: D. Cusack,
95 Hennial Lane,
Walton Le Dale,
Preston PR4 5LE.

SADDLESWORTH BREAKERS CLUB
Chairman: Man In A Suitcase,
51 Gladstone Terrace Road,
Greenfield, Nr. Oldham.

SOUTH MANCHESTER BREAKERS CLUB
Chairman: R2D2,
'El Pateo',
Stretford Arndale Centre,
Stretford, Manchester.

SOUTH WEST LANCS BREAKERS CLUB
PR: Dutchman,
169 Windrows,
Skelmersdale, Lancs.
Mons, 8pm, Rainford Labour Club.

TELFORD CB RADIO CLUB
Chairman: P. McGuiness,
192 Bishopdale,
Brookside, Telford.

UBA (NE)
Chairman: B.D. Low,
53 Mayfield Avenue,
Lancaster.

WEST COAST BREAKERS
Secretary: Charlie Girl,
61 Woodvale, Darwin,
Lancashire BB3 1LT
Suns, 8pm, Infirmary Pub.

WYRE BREAKERS CLUB
PR: Ironside,
Thornton Le Fyde,
Lancs. (Call Ch 27)

LEICESTERSHIRE

BIRSTALL CB SOCIAL CLUB
Chairman: Ironrose,
c/o Birstall Social Club,
Wanlip Lane, Birstall,
Leicester.
Tues, 7.30pm, Birstall Social Club.

HART OF ENGLAND CB CLUB
Secretary: Mrs S.K. Wilson,
58 Clarendon Road,
Hinckley,
Leicestershire.

HINCKLEY BREAKERS CLUB
Secretary: Miles Richardson,
6 Gladstone Close,
Swallows Green,
Hinckley, Leics.

LEICESTERSHIRE CB's
Chairman: Crapshooter,
c/o Modern Motoring Ltd.,
68 Narborough Road,
Leicester LE3 0BR.

**NORTH WEST LEICESTERSHIRE
BREAKERS CLUB**
Secretary: Speedbird,
c/o 57 Wood Street,
Ashby de la Zouch,
Leics LE6 5EL.

REYNARDS BREAKERS CLUB
PR: Rhythm Rocker,
PO Box 149,
Leicester.
Weds, 8.00pm, New Inn, Enderby.

RHUSHEY MEAD BREAKERS
Chairman: Red Hammar,
13 Selkirk Road,
Leicester.
Tues, 7.30pm, Fosse Way Hotel.

SOAR VALLEY BREAKERS
PR: D. Wiltshire,
30 Castle Road,
Mountsorrel,
Loughborough, Leics.

LINCOLNSHIRE

BATTERY TOWN BREAKERS
PRO: Knight Templar,
Market Harborough,
Channel 21.

CATHEDRAL BREAKERS CLUB
Secretary: Jim Curry,
60 Middlebrook Road,
Lincoln LN6 7JU.

CHURCH TOWN BREAKERS CLUB
Chairman: Master Builder,
Stamford,
Lincs.

**GAINSBOROUGH BREAKERS
ASSOCIATION**
Secretary: Malcolm Spencer,
c/o Marshalls Social Club,
Gainsborough,
Lincs DN21 1JU.
Alt Suns.

GRANTHAM BREAKERS ASSOCIATION
Secretary: The Listener,
8 Parklands Drive,
Harlaxton, Grantham,
Lincs LN32 1HX.

HEREWARD BREAKERS CLUB
Chairman: Douglas Hall,
South Farm Cottages,
School Lane, Edenham,
Lincs.

NATIONWIDE BREAKERS CLUB
Secretary: Yankee Doodle,
Tentercroft Street,
Lincoln.

STUMP TOWN BREAKERS
Chairman: Mike D'Arcy,
Gate House, Redcap Lane,
Boston, Lincolnshire.
(0205 60409).
Alt Fri, 8pm.

SUPERCARGER BREAKERS CLUB
Secretary: Peanuts,
17 Lancaster Drive,
Coningsby, Lincs.
Thurs, 7.30pm, Coningsby Community Hall.

TOM THUMB BREAKERS CLUB
Chairman: Black Ball,
c/o The Ship Inn,
Horncastle,
Lincolnshire.

TOYTOWN BREAKERS CLUB
Chairman: Thunderbird 2,
60 High Street,
Blyton, Gainsborough,
Lincs DN21 3JU.

VALLEY TOWN BREAKERS
Secretary: Maid Marion,
c/o The Ship & Horns,
Louth, Lincs LN9 6ET.

LONDON

10-4 CLUB
Secretary: Ian Leslie,
BN/10.4
London WC1.

A40TC
Chairman: Battery Man,
Park Royal Hotel,
Hanger Lane,
London W5.
Mons, 8pm.

ACE BREAKERS CLUB
Secretary: 240 Robert,
Pelton Arms (Wednesdays, 8pm),
Pelton Road, Greenwich,
London.

BIG E CLUB
PRO: Rubber Plant,
Devonshire Hall,
Devonshire Hill Lane,
Tottenham, London N17.

CITIZENS BAND INFORMATION CENTRE
Bill Ridgeway,
7 Sandringham Crescent,
Harrow, Middlesex HA2 9BW.

CITIZENS BAND RADIO ACTION GROUP
Chairman: Steve James,
55 Dartmouth Road,
Forest Hill SE23.

CMT DXING CLUB
PRO 8 Huldred,
PO Box 36,
Greenwich,
London SE13
Mons, 8pm, Pelton Arms.

CRIS
Director: Louise Briscoe,
55b Brook Drive,
Southwark,
London SE11 4TU.

EXCLUSIVE 32 CLUB
PR: Stateside,
129 Forest Lane,
Forest Gate,
London E7.

HARROW AND WEMBLEY CB GROUP
Secretary: David Hughes,
28 Greenway,
Kenton,
Middlesex HA3 0TT.

NORTH LONDON BREAKERS ASSOCIATION
Chairman: Paul Smith,
6 Granville Road,
Childs Hill,
London NW2 2LJ.

**NORTH LONDON BREAKERS CLUB
WILDESS BRANCH (CLUB 14)**
Chairman: Star Rider,
6 Granville Point,
Granville Road,
Childs Hill, London NW2 2LJ.
Thurs, 8pm, Spotted Dog.

SOUTH LONDON BREAKERS CLUB
Chairman: Whiskey One,
c/o The Tennessee Club,
267 The Broadway,
London SW19.
Weds, 8pm, Tennessee Club.

STREATHAM BREAKERS CLUB
Chairman: Nut Job,
133 Gleneagle Road,
London SW16 6AZ.
Yearly eyeballs, notified by post.

UNITED BREAKERS ASSOCIATION (UBA)
Chairman: Andy Donovan,
60 Gaskell Street,
Clapham SW4.

MERSEYSIDE

ALPHA BRAVO CHARLIES
PRO: ABC,
3 Valley Road,
Liverpool 4.
Weds, 8pm, Cabbage Hall.

APOLLO CB CLUB
Secretary: The Hoop,
Apollo Social Club,
Pasture Road,
Moseley Wirral,
Merseyside.
Mons, 8pm.

ASSOCIATION OF MAGHULL BREAKERS
PR: High Wire,
69 Vetch Hey,
Netherley,
Liverpool.

BOTTLE CITY BREAKERS
Secretary: Barry Hutton,
22 Robinson Place,
St Helens,
Merseyside.

GRASS COURT BREAKERS CLUB
Secretary: Small Fry,
14 Winston Avenue,
Newton-le-Willows,
Merseyside.

HEAVY LOAD BREAKERS ASSOCIATION
Hon Sec: Bobcat,
Huyton Area,
Liverpool,
(Call CH 19).

LIVERPOOL BREAKERS ASSOCIATION
Chairman: Sunseeker,
c/o 72 Ashfield,
Wavertree,
Liverpool 15.

MERSEYSIDE 27 CLUB
PRO: Golden Eagle,
c/o 34 Micklefield Road,
Liverpool 15.

ODBC
Secretary: Robot,
c/o 21 Prestbury Road,
West Darby,
Liverpool 11 3DU
Thurs, 7.30pm, Brewers Arms, Carr Lane.

ST HELENS CB CLUB
33 Broadway,
Grange Park,
St Helens,
Merseyside.

WIRRAL CB ASSOCIATION
Secretary: T. Seager,
78 Neston Gardens,
Birkenhead,
Merseyside L41 8AZ.

WIRRAL CB ASSC CLUB
Secretary: Pat Sears,
31 Belgrave Street,
Liscard, Wallasey,
Merseyside L44 1BP.

MIDDLESEX

AIRMAN BREAKERS CLUB
President: Sidewinder,
c/o The Airmen,
Hanworth Road,
Fatham, Middx.
Mons, 8pm.

HEART OF OAK BREAKERS CLUB
Now the HOBO BREAKERS
PR: Scarlet Lady,
c/o The Albert,
Staines Road West,
Sunbury, Middlesex.

HEATHROW BREAKERS
Chairman: Captain Scarlet,
7 Rosemary Avenue,
Hounslow West,
Middlesex.

NORFOLK

BORDER BREAKERS CLUB
PR: Heathcote,
c/o Cathedral Garage,
Waybread, Harleston,
Norfolk.

CANARY CITY BREAKERS CLUB
Secretary: John Fuller,
1 Bussey Road,
Norwich NR6 6JE.
First Tues each month, Ebenezer's Freshhouse
Salhouse Road, Norwich.

KINGS LYNN BREAKERS CLUB
Chairman: Cannonball,
3 Harcroft Parade,
Kings Lynn,
Norfolk PE30 2BU.
Fris, Kings Lynn Speedway Track.

LAKENHAM BREAKERS CLUB
PRO: Yellow Crane,
c/o 18 Huxley Close,
Lakenham,
Norwich NR1 2JS.

MID NORFOLK BREAKERS CLUB
Secretary: Electric Frog,
18 Darwin Walk,
Littlefields, East Dereham,
Norfolk.
Alt Tues, Breakers Yard.

NORTH WALSHAM BREAKERS CLUB
 PRO: W.M. Hurren,
 Banks, Lower Street,
 Southreps, Norwich,
 Norfolk NR11 9UB.

NORWICH SOCIAL BREAKERS CLUB
 PR: Dragonfly,
 c/o 30 Bassingham Road,
 Norwich.

WEST NORFOLK BREAKERS CLUB
 Chairman: Moonraker,
 7 Queen Elizabeth Avenue,
 Kings Lynn, Norfolk PE30 4BY.
 Alt Fris, 8pm, Fairstead Community Centre.

NORTHANTS

BOOMERANG BREAKERS CLUB
 Chairman: Trade Prote,
 The White Lion,
 Moulton,
 Northampton.

CORBY TOWN BREAKERS CLUB
 Secretary: White Knight,
 44 Crensey Gardens,
 Corley, Northants.

DAVENTRY BREAKERS CLUB
 Chairman: Gavin Foster,
 33 The Wye,
 Daventry.

DAVENTRY BREAKERWAY RUBBER DUCKS
 Secretary: Hot Noun,
 c/o 2 Waveney Close,
 Daventry,
 Northants.

HELP 9 NORTHANTS
 PR: G.J. Austin,
 c/o 239a Wellingborough Road,
 Northampton.
 24 hrs Emergency Monitoring.

NORTHAMPTON BREAKERS CLUB
 PRO: Santa,
 400 Obelisk Rise,
 Northampton.
 (0604 36790 daytime).

NORTHUMBERLAND

CONCRETE CITY BREAKERS
 Chairman: White-Line-Willie,
 32 Exeter Close,
 Cramlington,
 Northumberland.

CRAMLINGTON BREAKERS CLUB
 Chairman: Mighty Mouse,
 c/o Shankhouse Central Social Club,
 Clifton Road, Cramlington,
 Northumberland.
 Alt Fris, 7.30pm.

SIMON SIDE BREAKERS
 Chairman: Hound Dog,
 Royal Lady Hotel,
 Rothbury, Morpeth,
 Northumberland.

NOTTINGHAMSHIRE

AIRWAVES INTERNATIONAL BREAKERS CLUB
 Secretary: Chris McGee,
 47 St Albans Road,
 Bullwall, Nottingham NG8 9JQ.
 Weds, 7.30pm, Newstead Abbey PH,
 St Albans Rd, Bullwall.

AMBER VALLEY BREAKERS CLUB
 PR: Trapper J,
 46 Market Place,
 Ironville, Notts NG16 5NJ.
 Leabrooks 602125 for details.

BREAD AND LARD ORIGINAL BREAKERS (BLOB)
 PR: Heavy Spanner,
 Test Match Hotel,
 Gordon Square,
 West Bridgeford,
 Nottingham.

BULWELL AND HUCKNALL BREAKERS CLUB
 Secretary: Mrs C. Willetts,
 14 Thorndale Road,
 Stockhill, Basford,
 Nottingham.

CARLTON & LANGOLD UNITED BREAKERS
 Secretary: Hawker 1,
 13 Craigston Road,
 Carlton-in-Lindrick,
 Nr Worksop, Notts S81 9NG.
 Weds. Costhorpe Social Club.

DIXIE TOWN BREAKERS CLUB
 PR: Valentine,
 c/o Festival Inn,
 Trowell,
 Notts.

GENERAL BREAKERS CB CLUB
 PR: Foxfur,
 15 Redmill, Randlesham Way,
 Balloon Woods, Nottingham,
 Suns, 7.30pm, The Old General,
 Radford Road.

HUCKNALL WELFARE BREAKERS CLUB
 PR: Screwdriver,
 Hucknall & Linby Miners Welfare,
 Portland Road, Hucknall,
 Nottingham.

INDEPENDENT TOP VALLEY CB CLUB
 Secretary: The Coachman,
 c/o Bestwood Lodge Hotel,
 Bestwood Lodge Drive,
 Arnold, Notts.

LEAPOOL BREAKERS CLUB
 PR: Urban Cowboy,
 c/o The Maid Marion,
 Copica Road, Arnold,
 Nottingham.

MANSFIELD EXECUTIVE BREAKERS CLUB
 Secretary: Adrian Wagstaff,
 62 Bagshaw Street, Pleasley,
 Mansfield, Notts. (M6n. 810089).
 Weds. 8.45pm, Brown Cow Pub.

NACB CLUB
 Chairman: K.J. Stabler,
 14 Wilford Crescent West,
 Nottingham.

NEWARK BREAKERS CLUB
 Secretary: Shady Lady,
 23 Wolsey Road,
 Newark,
 Notts.

NORTH NOTTS BREAKERS
 Secretary: J.H. Stanley,
 4 Farm Grove, The Paddocks,
 Thelvsdale Lane,
 Worksop, Notts.

NORTH NOTTS CHARITY BREAKERS
 Secretary: Sweezy,
 40 Eldon Street,
 Tuxford, Newark,
 Nottinghamshire.

NOTTINGHAM INDEPENDENT BREAKERS
 Secretary: Bad Hat,
 PO Box 64,
 Nottingham NG2 4DU.
 Thurs, 8pm, Wilford Moderns Rugby Club.

REDHILL RADIO BREAKERS CLUB
 PR: J. Towriess,
 c/o The Ram Inn, Mansfield Road,
 Redhill, Nottingham.

TRENT BREAKERS
 c/o Damarq Marina,
 Gunthorpe,
 Nottingham.

TV CLUB
 Secretary: Little Bo,
 PO Box 7,
 Long Eaton,
 Nottingham NG10 2DB.

OXFORDSHIRE

ABINGDON GAOL BREAKERS
 Chairman: Skywave,
 62 Woolton Road,
 Abingdon, Oxfordshire.

CHILTERN ORGANISED BREAKERS SOCIETY
 Chairman: Centipede,
 Mon, 8pm, Chilton Club, Chilton Village,
 Oxon.

QUARRY BREAKERS CLUB
 Heddington,
 Oxford.
 (Oxford 65975)

THAMES VALLEY BREAKERS
 PRO: The Trucker,
 Wheatley Bridge Hotel,
 (Thursdays, 8pm),
 Wheatley, Oxon.

WHITE HORSE BREAKERS CLUB
 Chairman: P Baily,
 c/o 51 Springfield Road,
 Wantage, Oxon OX12 8EY.
 Fris, 8.30pm, Challow Country Club.

SHROPSHIRE

BREWERY TOWN BREAKERS
 Secretary: Mrs S. Holliday,
 Flat 6, 50 High Street,
 Wem, Shropshire.

SEVERN CITY BREAKERS CLUB
 PR: Southern Comfort,
 PO Box 2,
 Shrewsbury.

SOMERSET

CATHEDRAL CITY BREAKERS CLUB
 PR: Colin Birch,
 2 Barryman Court,
 Lethbridge Road,
 Wells, Somerset.
 Thurs, Fountain Inn.

CBA SW
 Chairman: D.J. Bennet,
 7 Woakey Hole Road,
 Wells, Somerset.

CHOPPERTOWN BREAKERS
 Chairman: Flying Tiger,
 72 Rivers Road,
 Yeovil, Somerset BA12 5RJ.
 Alt Suns. Liberal Club Yeovil.

CIRCLE CITY BREAKERS CLUB
 PR: T.C. Masters,
 8 Easthams Road,
 Crewkerne,
 Somerset TA18 7AQ.

SOLE CITY BREAKERS CLUB
 Chairman: Painterman,
 c/o The British Legion,
 Farm Road, Street, Somerset.
 Alt Thurs, 7.30pm.

SOUTH SOMERSET BREAKERS (SSB)
 Secretary: Tokyo Rose,
 c/o 19 Vincent Street,
 Yeovil,
 Somerset.

WEST SOMERSET BREAKERS
 Chairman: Black Dog,
 c/o The Red Lion Hotel,
 Minehead, Somerset.
 Suns, Red Lion.

STAFFORDSHIRE

BROWNHILLS BREAKERS CLUB
 PR: Steelman,
 c/o The Huntsman,
 Lichfield Road,
 Brownhills.

BURTON AND DISTRICT RADIO CLUB
 Chairman: D. Allen,
 8 Roslinton Road, Stapenhill,
 Burton-On-Trent, Staffs.

CENTRAL ENGLAND BREAKERS ASSOCIATION
 PR: Medicine Man,
 41 Humphries Road, Low Hill,
 Wolverhampton, West Midlands.
 Tues, 8pm, Staffordshire Volunteer,
 Collinswood Road.

CHINATOWN BREAKERS
 PR: Moody Blue,
 64 Oxford Road,
 Penkhill,
 Stoke-on-Trent, Staffs.

FOREST PARK BREAKERS CLUB
 PR: Birdman,
 1 Tor Street, Sneyd Green,
 Stoke-on-Trent, Staffs.
 Alt Tues, Sneyd Arms.

FOUR ACES BREAKERS CLUB
 Secretary: Karan Laud,
 76 Riverway, Measham,
 Burton-On-Trent, Staffs.
 Mons, 7.30pm, Green Man,
 Chilton Campville.

MERCIA BREAKERS CLUB
 Secretary: Silver Lady,
 30 Madrone, Amington,
 Tamworth, Staffs.
 Alt Weds, 8.00pm, Oak Hotel, Fazeley.

QUIET BREAKERS CLUB
 Chairman: Zulu,
 Stallington Lane, Blyth Bridge,
 Stoke-on-Trent, Staffs.
 Alt Mons, 7pm, The Social Club.

SIERRA KILO
 Secretary: Dave Adams,
 7 Swallow Close,
 Rugeley,
 Staffs.

TAMWORTH AND TAME VALLEY CB CLUB
 Chairman: Pickpocket,
 Balfry Hotel, Wishaw,
 Nr Tamworth.

THREE STYX BREAKERS CLUB
 Secretary: Rommel,
 24 Ferndale Road,
 Lichfield, Staffs WS13 9DJ.
 (064 32 62978).
 Alt Thurs, 7.30pm, Enots Sports &
 Social Club.

UTTOXETER BREAKERS CLUB
 Secretary: Whisky Lady,
 26 Westlands Road,
 Uttoxeter,
 Staffs.

SUFFOLK

ANGLIA BREAKERS CLUB
 The Great White Horse Hotel,
 Traverson Street,
 Ipswich, Suffolk.
 (7.30pm, second Sunday each month)

BURY CITIZENS BAND CLUB
 Secretary: Shady Lady,
 Ripley House Hotel,
 Northgate Avenue,
 Bury St Edmunds,
 Suffolk.

CONTAINER TOWN BREAKERS CLUB
 Chairman: Bobcat,
 14 Underhill Road,
 West Felixstowe.

JOLLY BREAKERS CBC UK
 Secretary: Ely May,
 10 Viburnum Green,
 Lowestoft, Suffolk.
 Suns, 7.30pm, The Crown.

NESS POINT CEE BEE CLUB
 Chairman: M.A. Thacker,
 77 Ship Road,
 Lowestoft.
 Meet at Oulton Broad Sporting Club,
 Thursday nights.

NEWMARKET/SUFFOLK CB CLUB
 Golden Lion Hotel,
 High Street,
 Newmarket,
 Suffolk.

SUFFOLK EARS
 PRO: Mike Brabant,
 c/o Bel-Ray Lubricants,
 Tomo Industrial Estate,
 Stowmarket, Suffolk.
 24 Hrs Emergency Monitoring.

SURREY

F.100 BREAKERS CLUB
 Chairman: The Decorator,
 c/o 17 Longbourne Green,
 Farncombe, Surrey.
 Fris, 8pm, The Squirrel.

BIG BEN QSL CLUB
 President: Jim Glavin,
 14a Bridge Street,
 Godalming, Surrey GU7 4HY.

BREAKERS TOWN CB CLUB
 Secretary: Plaxton,
 c/o Stanley Club,
 Stanley Road,
 Carshalton, Surrey.

BREAKERS YARD CB CLUB
 Secretary: Lightfoot,
 Carshalton, Surrey.
 Mon, 7.30pm, The St Helier Arms.

BRITISH CONCORDE QSL CLUB
 President: Julia Newbold,
 187 Viston Road,
 East Molesey,
 Surrey KT8 0DY.

BUGS BUNNY GIVE US A NINE CLUB
 Hand In Hand,
 Boxhill Road,
 Boxhill, Surrey.
 Thursdays, 8pm.

G-FORCE
 Secretary: Judith Styles,
 273 Park Road,
 Kingston-Upon-Thames,
 Surrey KT2 5LW.
 Mon, Malden Manor Pub.

GODALMING AREA BREAKERS
 Secretary: Queen of Hearts,
 c/o The Freeholders,
 Farncombe, Godalming,
 Surrey.
 Fris, 8pm.

HAPPYTOWN BREAKERS CLUB
 PRO: Firecracker,
 146 Connaught Road,
 Brookwood, Nr Woking,
 Surrey.

KINGSTON GROUP BREAKERS
 President: Apollo 13,
 45 Portland Road,
 Kingston, Surrey.
 Mons. British Oak, Richmond Road,
 Kingston-on-Thames.

MOLESEY OPEN BREAKERS
 Royal Oak, Molesey.
 Weds, 8pm.

NORTH LEAMINGTON CB CLUB
 Chairman: Supertramp,
 c/o The New Binswood Tavern,
 Rugby Road, Milverton,
 Leamington Spa.

UK CLUB DIRECTORY

SOUTHERN BREAKERS CLUB
Secretary: Swinger,
3 Glenavon, Yateley,
Nr Camberley, Surrey.
Suns, 7.30pm, The Hawley Hotel.

WOKING CENTRE BREAKERS
Secretary: The Argonaut,
c/o The Jovial Sailor,
Ripley,
Surrey.

SUSSEX

BIG FOUR CLUB
Secretary: Steve Barker,
40 Brunswick Square,
Hove BN3 1EF,
East Sussex.

BRITISH SIDEBAND NETWORK
Chairman: A. Vickers,
15 Carman Walk,
Broadfields, Crawley,
West Sussex.

CB BACKPACKERS
Chairman: Kevin Jones,
95b Marina,
St Leonards-On-Sea,
East Sussex TN38 0BL.

COUNTY TOWN BREAKERS
Secretary: Mother Goose,
29 Hereward Way,
Old Malling Estate,
Lowes, Sussex.
Clos Club, Malling Street.

EASTBOURNE BREAKERS
PR: D. Bonnici,
c/o Wheels,
35 Clarence Road,
Eastbourne, Sussex.

GOLF LIMA MOBILE LOWBAND DX CLUB
Chairman: Streetfighter,
3 Alderbrook Cottis,
Stone Cross Road,
Crowborough, East Sussex.
Fri, Crow & Gate.

HARBOUR BREAKERS CLUB
Secretary: M.F. Lynch,
The Harbour Tavern,
Transit Road,
Newhaven, Sussex.

HASTINGS BREAKERS
Secretary: Kevin Jones,
c/o 95b Marina,
St Leonards-On-Sea,
East Sussex TN38 0BL.

SEAFORD BREAKERS
PR: Cod Catcher,
c/o The Beachcomber,
Dane Road, Seaford,
Sussex.
Alt Thurs.

SQUARE WEALD BREAKERS
PR: Wombat,
Fox & Hounds,
Haywards Heath, Sussex.
(Meet 8pm, Thursdays).

TYNE & WEAR

BEACH BREAKERS
Secretary: Calamity Jane,
147 Westoo Road,
South Shields,
Tyne & Wear.
Tues, 7.00pm, New Crown Hotel.

CB-NE
Chairman: Ian Morrison,
89 Hareydane,
Newcastle,
Tyne & Wear NE5 4QH.
0832-862900.

WEST END BREAKERS
Chairman: Night Owl,
6 Warwick Road,
West Denton,
Newcastle-on-Tyne.

WHITE CITY BREAKERS CLUB
Chairman: Misty Mover,
Rockcliff RFC,
Whitley Bay, Tyne & Wear.
Thurs, 7.30pm.

WARWICKSHIRE

EAST COVENTRY CB CLUB
Chairman: M.P. Harris,
260 Blackberry Lane,
Wyken, Coventry,
Warwickshire.

HARTSHILL CB CLUB
(Shakespeare Breakers)
Chairman: O.S. Alched,
c/o Conservative Club,
Chapel End, Nuneaton, Warks.

NEW YORK CBC
Secretary: Pigeon,
c/o The Holly Bush,
Bond Gate, Nuneaton,
Thurs, 8.30pm.

NORTH COTSWOLD CB CLUB
Secretary: Scott Lewis
25 Greenhill Street,
Stratford-Upon-Avon,
Warwickshire.

POSH TOWN BREAKERS
Secretary: Red Baron,
30 Springfield Road,
Attleborough, Nuneaton,
Warwickshire.

SHAKEY TOWN BREAKERS
Secretary: S. Collins (Miss),
The Maudslay Social Club,
Great Ave, Nr Alcester,
Stratford-upon-Avon.

SQUARE FOUR CB CLUB
Chairman: R.M. Kemp,
90 St Leonards View,
Polesworth,
Warwickshire.

**WARRINGTON & LEAMINGTON
CB ORGANISATION**
Chairman: Racer,
PO Box 6,
Leamington Spa CV32 6SB.

**WARWICK AND LEAMINGTON JUNIOR
BREAKERS ASSOCIATION**
Chairman: R. Chamberlain,
39 Millbank, Warwick,
Warks CV24 5TH.

WHITNASH AND DISTRICT CBC
Secretary: Ollie Canty,
10 The Cottage,
Tachbrook Street,
Leamington Spa, Warwick.

WEST MIDLANDS

ALPHA 5 CBRC
Secretary: P. Mason,
30 St Andrews Avenue,
Pelsall,
Walsall WS3 4EN.

ANVIL CB CLUB
Chairman: Mother's Pride,
8 Cradley Park Road,
Netherton, Dudley,
West Midlands.
Tues, 8pm, Five Ways Hotel.

BLACK COUNTRY BREAKERS
Chairman: Goldfish,
c/o 21 Spring Hill,
Birmingham B18 7BH.

BORDERLINE BREAKERS CLUB
Chairman: Serviceman,
13 York Crescent, Darlaston,
West Midlands WS10 9JJ.
Meet Moxley Arms weekly.

BROOKVALE BREAKERS CLUB
Secretary: Diane Clews,
137 Wyatt Road,
Sutton Coalfield,
West Midlands B75 7ND.
(021 329 2379).
Sun, 7.30pm, Brookvale Pub.

BSA CLUB
Chairman: Ziggy Stardust,
c/o 23 Henry Road,
Yardley,
Birmingham B25 8AH.

**CAMPAIGN FOR BRITISH CITIZENS BAND
(CBCC)**
Chairman: Keith Townsend,
1163 Yardley Wood Road,
Birmingham B14 4LE.

**CENTRAL ENGLAND BREAKERS
ASSOCIATION**
PR: Cruiser,
c/o Club Lafayette,
Thornley Street,
Wolverhampton.

CITY OF BIRMINGHAM EYEBALL CLUB
Secretary: Argonaut,
98 Bristol Street,
Birmingham 6.

FIVE POOLS BREAKERS CLUB
PR: Daytons,
Hagley And Blakedown,
Stourbridge, W Midlands.

JUNIOR BREAKERS CLUB (COVENTRY)
Chairman: Mark Cleaver,
Clifford Bridge Road Scout HQ,
Clifford Bridge Road, Coventry.

LAZY ACRE BREAKERS
Secretary: Goldfinger,
32 Ebrington Avenue,
Solihull,
West Midlands B92 8HU.

LEA ORE CB RADIO CLUB
Secretary: S.M. Highton,
c/o Ye Olde Trooper,
Hardan Road, Leamore,
Walsall, W Midlands.

MAIN LINE BREAKERS CLUB
Secretary: Speedy,
c/o Saracens Rugby Club,
Bredon Avenue,
Ernesford Grange, Coventry.

MCBC
Chairman: R. Hopkins,
85 Allans Lane,
Pelsall, Walsall,
West Midlands.

NORTH BIRMINGHAM CB CLUB
Secretary: Bob Barber,
58 Foulmère Road,
Great Barn,
Birmingham B24 2EA.

OPEN CHANNEL CLUB COVENTRY
Chairman: B.R. Glyb,
87 Sedgemoor Road,
Coventry CV3 4EA.

PELSALL GOOD BUDDYS CLUB
Secretary: Zone Master,
Old Bush, Pelsall,
Walsall.

REDHILL BREAKERS
Secretary: Linda Longhurst,
18 Redhill House,
Halecroft Square,
Northfield, Birmingham.
Weds, Athol Social Club.

SANDWELL AREA CB CLUB
PRO: Karan Hocknull,
4 Baldwin Close,
Tividale, Walsall,
West Midlands.

SKY BLUE CITIZENS BAND CLUB
Chairman: Tony Beard,
74 Hartlepool Road,
Coventry,
Mons, Coventry City Football Club.

SKY BLUE CITIZENS BAND RADIO CLUB
Secretary: Sandra Witter,
3 Howat Road,
Keresley Road,
Coventry CV7 8JN.
Mons, 8pm, Sky Blue FC Supporters Club,
Highfield Road.

SOUTH BIRMINGHAM CBC
Chairman: P. Jacques,
23 Prince Of Wales Lane,
Yardley Wood, Birmingham B14 4LB.
(021 474 6325).
Fortnightly, Solihull Civic Hall.

WEST BROMWICH CENTRAL BREAKERS
Foresters Arms,
Kelvin Way,
West Bromwich,
West Midlands.

WKCB (COVENTRY)
Chairman: M. Dunter,
125 North Street,
Coventry.

WILTSHIRE

HALFWAY BREAKERS
Secretary: Butterfly,
12 Mool Lane,
Downton, Salisbury,
Wilts.

JACKDAW CITY BREAKERS
Secretary: Pacemaker,
The Rose and Crown,
Lea, Nr Malmesbury,
Wilts.
Alt Suns, Rose & Crown.

LIDEN & ELDENE BREAKERS
PRO: Rollerskater,
26 Park Lane,
Swindon,
Wiltshire.

NORTH DORSET BREAKERS
Secretary: Aries,
c/o 1 Highworth,
Whitecross, Zeals,
Warminster, Wilts.
Monthly Mons, Hunters Lodge.

NORTH WILTS DX CLUB
Secretary: K.C. Williams,
20 Willows Avenue,
Swindon.

SWINDON CB CLUB
Chairman: Oavo Broadbridge,
23 Altack Close,
Toothill, Swindon,
Wilts SN6 8DF.

THAMESDOWN TRANSCEIVER CLUB
Chairman: D. Porter,
44 Belsay,
Toothill,
Swindon.

WESSEX OPEN CHANNEL CLUB
Secretary: Aunt Sally,
PO Box 108, Melksham,
Wiltshire SN12 7RH.
Alt Tues, Melksham House.

WHISKEY MIKE MIKE CLUB
Secretary: Babycham,
PO Box 11,
Calne,
Wilts SN11 0HD.

WORCESTERSHIRE

DROITWICH CB CLUB
Secretary: H.A. Bott,
16 Miller Street,
Droitwich,
Worcs.

KIDDERMINSTER SOCIAL BREAKERS
Chairman: G/bil,
Churchfields, Kidderminster,
Tues, 8 pm, Kidderminster Social Club.

KING CHARLES HAMMERS CBC
Secretary: Jungle Bunny,
PO Box 38,
Worcester.

NEWTON BREAKERS CLUB
Chairman: Dean The Dick,
18 Abbarley Close,
Church Hill, Redditch,
Tues, 8pm, Book & Candle.

REDDITCH AREA CB CLUB
Secretary: L. Gately,
c/o Rains Bungalow,
Oak Tree Lane,
Sambourne, Worcs.

SIERRA DELTA INTERNATIONAL DX GROUP
Founder: Gary,
PO Box 9,
Stourport-on-Severn,
Worcestershire DY13 8ON.

SQUARE WHEELS BREAKERS CLUB
Chairman: Freightier,
The Fox Inn,
Edward Street,
Redditch.

STOURPORT ON SEVERN BREAKERS CLUB
Chairman: Compass,
c/o Old Anchor, Worcester Road,
Stourport-On-Severn, Worcs.

WYE FOREST BREAKERS
Chairman: C. Cox,
19 Chowson Pleck,
Chowson Estate, Droitwich.

YORKSHIRE

AIRE VALLEY BREAKERS
Secretary: Ms C. Cardwell,
53 Albert Road,
Salthouse, Shipley,
W. Yorks.

ATTIC BREAKERS CLUB
Chairman: Rally Man,
7 Rickerby Close,
Bridlington,
East Yorks YO16 5BP.
Alt Thurs, 8pm, 'The Attic'.

BANDTOWN BREAKERS CLUB
Chairman: Gladiator,
c/o Grove Hotel,
Elland Road,
Brighouse, West Yorks.
0484 7165341.
Tues, 8.30pm.

BIG H LUDDITES
Secretary: D.A. Jappoy
6 Fieldhouse Road,
Huddersfield HD1 6NX.

BLACK HOLE BREAKERS CLUB
Secretary: Pat Olyson,
24 Abbeyfield Road,
Dunscroft, Doncaster,
S. Yorks.

BRAITHWELL RIG AND TWIG CLUB
Secretary: Wild Honey,
10 Revell Close,
Maltby S66 8BN.

BRAMLEY AND DISTRICT BREAKERS CLUB
President: Shanty Man,
201 Leeds And Bradford Road,
Bramley, Leeds 13.

CARPET BAGGERS AM & FM CLUB
Chairman: Green Man,
79 Willow Drive,
Odsal, Bradford,
West Yorkshire BD6 1EE.
0274 6725591.
Thurs, 8pm, Pile Bar.

CB & BRINSWORTH BREAKERS CLUB
 Chairman: Weather Man,
 71 Sunny Bank Crescent,
 Brinsworth, Rotherham,
 South Yorks.

CB 007 BREAKERS CLUB
 Secretary: The Kid,
 Windmill Night Club,
 Rotherham, S Yorks.
 Tues, 7.30pm, Windmill Night Club.

CB SEARCH AND RESCUE UK
 Nat Co-ordinator: Kenneth Elbourne,
 13 Hastings Road,
 Wakefield,
 W Yorks WF2 7JZ.

CHANTREY BREAKERS CLUB
 PR: Mousey,
 134 Fraser Road,
 Sheffield 8.
 Thurs, 8pm, Big Tree Hotel, Chesterfield Rd.

CIRCLE CITY BREAKERS
 PR: Silver Sixpence,
 13 Carr Hill Grove,
 Calverley,
 Leeds.

COOLAND ALBION BREAKERS CLUB
 Secretary: Big D,
 c/o Albion Club,
 Kikfeatham Street,
 Redcar, Cleveland.

CREST
 Secretary: Crest 2,
 68 Monkwood Hill,
 Leeds 14.
 Tues, 8pm, Gate Hotel.

DERWENT BREAKERS CLUB
 Chairman: J Moore,
 142 Denison Road,
 Pocklington,
 Yorks.
 Fris, 8.30pm, Squirrels.

DIAMOND BREAKERS CLUB
 Secretary: Crackerjock,
 c/o 7 Hutton Drive,
 South Elmshall,
 Pontefract, W Yorks.

**DINNINGTON AND DISTRICT
 BREAKERS CLUB**
 Secretary: Lady S,
 25 St James Avenue,
 South Anston, Sheffield.

DOCKLANDS BREAKERS CLUB
 Secretary: A. Cooke,
 8 Gifford Street,
 Middlesbrough,
 Cleveland.

DON VALLEY BREAKERS
 282 Eccleshall Road,
 Sheffield S11 8PE.

EARTH QUAKE CITY BREAKERS CLUB
 PR: Bonke Lou,
 DL 71, Rotherham Record,
 Regent House,
 Rotherham.

FIVE BRIDGES BREAKERS CLUB
 Secretary: Mrs P. Roberts,
 Heptonstall WMC,
 (Wednesdays, fortnightly),
 Hebden Bridge, W Yorks.

FRIENDLY BREAKERS FAMILY CLUB
 Secretary: Lady Rome,
 c/o North Walsall Working Mens Club,
 Essex Street, Walsall,
 Thurs, 7.30pm.

HAMLET BREAKERS
 Chairman: Green Arrow,
 24 Croft Close,
 Easingnoold, York.
 Alt Mons, Royal Oak.

HORNBLOWER OPEN CHANNEL CLUB
 PR: Red Baron,
 c/o 65 North Street,
 Ripon, Yorkshire.

JOURNEY END BREAKERS
 Chairman: Yellow Mac,
 Esrick Social Club,
 York.

**MALTBY CAMPAIGNERS FOR OPEN
 CHANNEL RADIO**
 Chairman: Mr M. Ironmonger,
 14 Shaftesbury House, St Anns Flats,
 Rotherham, S Yorks S85 1AX.

MILKTOWN BREAKERS
 Secretary: Speedbird,
 31 Kennady Avenue, Fixby,
 Huddersfield, W Yorks.
 Sun, Vanity Fair Disco, Bradford Road.

NORTHERN ASSOCIATION OF CB CLUBS
 PR: John Herdy,
 19 Lings Lane, Hatfield,
 Doncaster, S Yorks.

NORTHERN BREAKERS ASSOCIATION
 Secretary: Silver Dream,
 Low Moor Working Mens Club,
 Huddersfield Road,
 Low Moor, Bradford.
 Fris, 8pm.

PIRATES CBC
 Chairman: Monster,
 Halfway, Sheffield.
 Thurs, 8pm, The Mill.

PUDSEY FM CB RADIO CLUB
 President: R. Moneagle,
 54 Harley Drive,
 Swinnow, Leeds LS13 4QZ.

SLAB TOWN BREAKERS CLUB
 Secretary: Captain Scarlet,
 7 Parkwood Avenue,
 Beoston, Leeds 11.
 Thurs, 8pm, East & West Ardsley
 Social Club, Bradford Road.

SOUTH YORKSHIRE BREAKERS CLUB
 President: Rubber Duck,
 21 Jewitt Road,
 Kimberworth Park,
 Rotherham, S Yorkshire S61 3HQ.
 Wed, 8pm, Tiffany's.

STAG TOWN BREAKERS CLUB
 Secretary: A. Cooke,
 8 Gifford Street,
 Middlesbrough,
 Cleveland.

STAINCROSS BREAKERS CLUB
 Chairman: A. Walmsley,
 Staincross Hotel,
 Barnsley,
 Yorks.

STEEL CITY AIR PIRATES (SCAP)
 Secretary: Gas Burner,
 95 Crowder Avenue,
 Longley, Sheffield S6 7QL.
 Tues, 7.30pm, The Fairfield Inn,
 Neepson Lane.

YANGD FOXTRÖT BREAKERS
 Chairman: Signwriter,
 48 Holt Dale Lawn,
 Leeds 16, Yorkshire.
 Weds.

TRENTSIDE BREAKERS CLUB
 PR: Spangles,
 Moss Villa, Belton,
 Nr Doncaster.

**TWIN TOWN BREAKERS HIGH
 NUMBERS CLUB**
 Chairman: Red Ranger,
 3 Athol Square,
 Norton, Malton,
 Yorks.

UNITED BREAKERS NATIONAL
 PR: Boxcar Willie,
 2 Park Way,
 Kelfghley BD21 8NJ,
 W. Yorks.

VIKING BREAKERS
 PR: Hazardous Chef,
 PO Box 6,
 York,
 (0904 794609).
 Alt Sat, 12 midday, Ainsty Hotel.

WETHERBY DISTRICT BREAKERS CLUB
 Secretary: D.M. Moment,
 9 Norfolk House,
 Wetherby, West Yorks.

WHITE ROSE BREAKERS
 Secretary: Lump Hammer,
 14 Lown Hill,
 Acomb, Yorks.
 Third Thurs, 8pm, Melbourne Hotel.

WOOL TOWN BREAKERS CLUB
 Secretary: Fish tank,
 The Old Cobbler,
 Thornhill Lees,
 Dewsbury.

WORTH VALLEY BREAKERS CLUB
 Secretary: The Boast,
 25 All Saints Terrace,
 Highfield Lane,
 Kelfghley, West Yorks.
 Tues & Thurs, Irish Club.

YORKSHIRE ELITE BREAKERS
 PR: 2 Plus 2,
 Fairway Inn,
 Birtley, Shofield.

WALES

CLWYD

CLWYD VALLEY BREAKERS ASSOCIATION
 Secretary: Moonlight,
 Rose Cottage, Derwen,
 Nr Corwen, Clwyd.

27 COASTLINE BREAKERS
 PR: Mike Curris,
 PO Box 24,
 Rhyl, Clwyd,
 N. Wales.

DYFED

AMMAN VALLEY BREAKERS CLUB
 Chairman: Happy Harry,
 c/o 28a Lon-y-Folln,
 Garnswilt, Ammanford,
 Dyfed.
 Thurs, Pine Trees Country Club.

BIG A CB CLUB
 Secretary: Mystery Woman,
 1 Penglais Farm Cottage,
 Clerach Road, Aberystwyth,
 Wads, Marine Hotel.

BIG C CLUB '80
 Secretary: Unit One,
 c/o Dominix PS14,
 The Market, Carmarthen,
 Dyfed.
 First Tues, Red Lion, Llandyfaelog.

GLEDDAU BREAKERS
 Secretary: Axel Tramp,
 10 Goldwell Terrace,
 The Green, Pembroke,
 Dyfed.
 Alt Mons, 8pm, Cromwells Kitchen.

GWENDRAETH VALLY 14 CLUB
 Secretary: Silver Pearl,
 'Odin', Gorse Road,
 Upper Tumble, Llanelli,
 Dyfed.

LLANDEILO 14 CLUB
 Secretary: Curly Tops,
 Gofer-Glas,
 Maes-Y-Bont, Llanelli,
 Dyfed SA14 7HH.

LLANDYBIE BREAKERS CLUB
 Chairman: The Pipe Bender,
 90 Cascoed Llandybie,
 Ammanford, Dyfed,
 South Wales.
 Mons, 7.30pm, Red Lion.

LLANELLI CBC
 PR: Dodger,
 14 Gorsedd,
 Llwynvilwg,
 Llanelli, Dyfed.

LLANELLI & DISTRICT BREAKERS CLUB
 Secretary: Diamond Lady,
 40 Colehill Terrace,
 Llanelli, Dyfed.

MERLIN CITY BREAKERS
 Secretary: Melody Men,
 43 Ash Grove,
 Carmarthen,
 Dyfed SA13 3PZ.

MOONRAKERS BREAKERS CLUB
 Chairman: S.P. Duncan,
 40 Larch Road,
 Milford Haven,
 Dyfed.
 Mons, 7pm, The Avondale.

**SANDERSFOOT & DISTRICT
 BREAKERS CLUB (SAD)**
 Secretary: A.M. Morgan,
 14 Ryelands Place,
 Kilgetty, Dyfed SAG8 OUX.

TOMBSTONE BREAKERS
 Secretary: Cherry Brandy,
 Cefon Farm, Bleencillech,
 Newcastle Emlyn, Dyfed.
 Alt Thurs, 8pm, Blue Bell Inn,
 Newcastle Emlyn.

WHEELSPIN BREAKERS
 Chairman: Captain Birdseye,
 Croft House,
 East Williamson,
 Tenby, Dyfed.
 Alt Thurs, 8pm.

GLAMORGAN

BARRY BREAKERS CLUB OF WALES
 PR: News,
 10 Carmarthen Close,
 Menthry Dyfan,
 Barry, Glamorgan.
 Alt Suns, 7.30pm, Hotel International.

CARDIFF AND DISTRICT BREAKERS CLUB
 Secretary: G. Kemp-Phillip,
 80 Richards Terrace,
 Roath, Cardiff.

CUL-DE-SAC BREAKERS CLUB
 Chairman: J.G. Pritchard,
 18 Alexandra Road,
 Pontycymmer, Nr Bridgend,
 Mid-Glamorgan, South Wales.
 Thurs, Charter Club.

DIXIELAND BREAKERS
 Secretary: Chris Probert,
 52 Glyn Collen,
 Pontywyn,
 Cardiff.

GOWER BREAKERS CLUB
 Secretary: Robert Shefford,
 PO Box 12,
 Swansea, W Glam.
 Alt Mons, 8pm, OK Corral Surfing 20.

THE LIGHT BRIGADE CB CLUB
 Chairman: Muppet Man,
 4 Shrewsbury Avenue,
 Trebanos, Porth Rhonda,
 Mid-Glamorgan.

LOWER RHONDDA BREAKERS CLUB
 Secretary: Steve Bradshaw,
 40 Birchgrove Street,
 Porth, Rhondda,
 Mid-Glamorgan, South Wales CF39 9YA.
 Alt Tues, 7pm, RAFA Club.

MID GLAMORGAN BREAKERS
 PR: Sleeper,
 c/o Golden Numbers CB Centre,
 40 Wood Road,
 Treforest, Pontypridd.

NEATH AND DISTRICT BREAKERS
 Secretary: Cheryl Pike,
 20 Newall Road,
 Skewen, W Glamorgan.
 Mons, Highbury Club, Neath.

PENARTH BREAKERS CLUB
 Secretary: Lady Dae,
 c/o Marconi Club,
 Lavernock,
 Nl Penarth.

RHONDDA BREAKERS CLUB
 Secretary: White Lightning,
 35 Shady Road,
 Gelli, Rhondda,
 S. Wales.

SANDRINGHAM BREAKERS CLUB
 Secretary: Mr T. Morgan,
 7 Mountain View, Tynywedd,
 Traorchy, Rhondda Valley,
 Mid-Glamorgan CF42 6LU.

SOUTH WALES ACTION TEAM
 Secretary: Speedbird,
 16 Lonelley Park,
 Talbot Green,
 Pontyclun, S Wales.

SOUTH WALES BIG 10-4 CLUB
 Chairman: Mike Lambert,
 139 Manselton Road,
 Manselton, Swansea,
 West Glamorgan,
 (0792 42371).
 Weds & Thurs, Railway Club.

THREE FEATHERS SIDEBANDERS
 Chairman: Alan O'Neil,
 269 Ball Road,
 Llanrumney,
 Cardiff.

TRIPLE CROWN BREAKERS
 PR: Night Owl,
 31 Heol Llan,
 North Cornelly,
 Bridgend, Mid-Glam.
 Tues, 7.30pm.

WEST GLAMORGAN BREAKERS ASSOCIATION
 Secretary: Mrs G. Bunce,
 c/o The Dock Hotel,
 Aberavon, Port Talbot,
 West Glam.

WOOLY LAND NUTTERS CLUB
 Chairman: Shopkeeper,
 36 Aberpennar Street,
 Darran-Les,
 Mid-Glamorgan CF45 3LS.
 Thurs, 8pm, The Cefn Pennar Inn.

10-100 ARTISTS CLUB
 Chairman: Sooty,
 The Landing Strip,
 Cwmda,
 Swansea.

GWENT

GWENT BREAKERS
 Secretary: Swallowfish,
 c/o The Gladiator,
 Pilmawr Road, Malpas,
 Newport, Gwent,
 Weds, 7.30pm, The Gladiator.

PONTYPOOL BREAKERS ASSOCIATION
 Chairman: Darrick 'Evil' Hodges,
 16 Poplar Avenue,
 New-Inn, Pontypool,
 Gwent,
 (Pontypool 57317).

UK CLUB DIRECTORY

RIVERTOWN & DISTRICT BREAKERS CLUB
Chairman: Red Leader,
81 Bridge Street,
Gwent.
Alt Tues. Three Salmons Hotel.

GWYNEDD

CB CRUISERS CLUB
Secretary: H. Kendall-Jackson,
Brackenrigg, Gannock Park,
Deganwy, Llandudno,
Gwynedd, N. Wales.

CLWB TORRWYR Y DREF WLEDIG
COUNTY TOWN BREAKERS CLUB
Secretary: Magneto,
Angorfa, Baptist Street,
Penygroes, Caernarfon,
Gwynedd LL54 8NU.

DRAGON BREAKERS ASSC
PR: The Cowboy,
c/o 70 Floridd Lligwy,
Moalfre, Anglesey,
Gwynedd.

FREE BREAKERS CLUB
Secretary: Sky Walker,
PO Box 1,
Holyhead,
Gwynedd LL85 1LS.
Alt Mons, The Bull Hotel.

GWYNEDD BREAKERS CLUB
PRO: Ratchet,
8 Trinity Square,
Llandudno LL30 2RA.

HAZZARD COUNTY BREAKERS CLUB
PR: R. Grew,
88 Pondaler,
Llanfairfechan,
Gwynedd LL33 ORD.
Alt Mons, The Castle.

PEN LLEYN BREAKERS CLUB
Secretary: J. L. Court,
Llys-Y-Coed, Abersoch,
Pwllheli, Gwynedd.

POWYS

BEACON BREAKERS CLUB
Secretary: Video Star,
41 Uplands,
Bacon, Powys LD3 9HT.
(Bacon 3B15).

BULLTOWN PIRATE'S AM
Chairman: The Hustler,
The White Horse Hotel,
High Street, Builth Wells,
Mid-Wales.
Sun, 4pm.

TOADTOWN BREAKERS CLUB
Secretary: Pinguin,
29 Holcombe Drive,
Llandrindod, Wales.
Alt Suns, Llanerch Hotel.

NORTHERN IRELAND

ALIGNED CLUB OF DONERAILE
PRO: Mark Geary,
AC/DC, Creagh House,
Doneraile, Co Cork.

BRAVO DELTA INTERNATIONAL DX GROUP
Secretary: J.H. Mackey,
PO Box 3,
Ballyclare,
Co Antrim BT39 9PE.

CARLINGFORD LOUTH BREAKERS CLUB
Chairman: P.J. Rodney,
112 Clermont Gardens,
Warrenpoint BT34 3LH,
N. Ireland.

COASTLINE BREAKERS CLUB
Secretary: Texas Queen,
PO Box 4,
Carrickfergus,
Co Antrim BT38 7JA.

CRAIGAVON CB CLUB
Chairman: Steve Cairns,
Room 101, Country Club,
Craigavon.

EAST ANTRIM CB CLUB
PO Box 4,
Antrim,
Northern Ireland.

HELENS BAY CB RADIO CLUB
Chairman: Gary Jones,
10 School Avenue,
Rathgael Road,
Co Down, N. Ireland.

I-KILO AIFA INTERNATIONAL DX GROUP
President: J.A. Ward,
PO Box 1,
Kilkeel, Co Down,
Tues. 8pm, Kilkeel Town Hall.

KILO FOXTROT
Secretary: Streaker,
PO Box 8,
Carrickfergus,
Co Antrim, N. Ireland.
Alt Weds, 8.30pm, Tourist Inn.

LAGAN VALLEY CB CLUB
Poste Restante,
GPO, Lisburn,
N. Ireland.

LAZY K RADIO CLUB
PO Box 65,
Portadown,
Northern Ireland.

NORTH SIDE BREAKERS
Chairman: Live Wire,
c/o Landsdown Court Hotel,
Antrim Road,
Belfast BT14.

QUEBEC SIERRA LIMA CLUB
PR: Allan,
PO Box 18,
Lisburn BT28 2LT.

RAINBOW BREAKERS CBRC
Secretary: Harry O.,
PO Box 66, Cookstown,
BT80 8AX, N. Ireland.

SIDEWINDERS INCORPORATED
Secretary: Rita Uroy,
PO Box 24,
Coleraine,
Co Londonderry,
Alt Tues. 8.30pm, Lodge Hotel.

SMOKECITY CB CLUB
Secretary: Sid Maguire,
113 Malone Avenue,
Belfast 9 6EO.

TANGO SIERRA CB CLUB
Secretary: Blue Max,
16 Grattan Street,
Lurgan, Craigavon,
Co Armagh.

TUNNEL TOWN BREAKERS CLUB
PR: J.R. Millen,
PO Box 28,
Coleraine BT52 1NR,
Thurs, Village Tavern.

OVERSEAS

BREAKER ONE FOUR CLUB
Secretary: O.K. Corral,
Napier Barracks, BFPO 20.

HAMELN CB CLUB
Chairman: The Bodger,
Postfach 277,
3260 Hameln 1,
West Germany.

INTERNATIONAL CB CLUB OSNABRUCK
Chairman: Dave Main,
Breslauer Strasse 25,
Osnabruck, 4510,
West Germany.

RHINE CUPPERS CB CLUB
Chairman: Sundowner,
RCCBC,
JHQ Rhineland,
BFPO 40.

SANDCASTLE QSL SWAP CLUB
Ian Shrader,
Box 167, Pacific Beach,
Washington 98671, USA.

SLEEPERS UNITED
Chairman: Neil Allen,
MT Troop, MQ SON,
3 RTR, BFPO 16.

SCOTLAND

BORDERS

PEEBLES SHIRE CB CLUB
Secretary: Bill Scott,
42 Old Town,
Peebles.

ROCK BREAKERS
Secretary: Red Feathers,
2 Sunderland Avenue,
Castlehill, Dumbarton.
Alt Tues, Denny Social Club.

CENTRAL

CENTRAL 27 BREAKERS CLUB
PR: A. Robert Millner,
c/o The Bruce Inn,
Nr Landmark,
Springkerse Road, Stirling.

FALKLAND & DISTRICT OPEN CHANNEL CLUB
PR: Joseph Bruce,
PO Box 15,
Falkirk FK1 1AA.

SCOTTISH TRUCKERS CLUB
Chairman: Brown Baron,
3 Cornton Crescent,
Bridge of Allan, Stirling.
3rd Sets, Bruce Hotel.

WEE BURGH BREAKERS
Chairman: Iron Man,
PO Box 14,
Ailda, Clackmannanshire,
Scotland.

DUMFRIES & GALLOWAY

GRANITE CITY BREAKERS CLUB
PR: Boss Hogg,
c/o Burnside Hotel,
Dalboathie,
Kirkcudbrightshire,
Alt Weds.

RED AND BLUE BREAKERS CLUB
Secretary: Stephen Compton,
92 George Street,
Stranraer, Wigtownshire,
Scotland.

FIFE

AVANTI BREAKERS CLUB
Secretary: Saxon,
c/o Post Office,
Newton Of Falkland,
Cupar, Fife,
Alt Mons, Pittlesie Arms Hotel.

GOOD BUDDIES CLUB
Secretary: Gordon Grlag,
8 Gallacher Place,
Lumphinnans, Fife.

JOLLY RODGER CLUB
Secretary: Jim Thompson,
Pitcairn Road,
Cardenden, Fife,
Alt Suns, Ambassadeur Hotel.

GRAMPIAN

CHARLIE BROWN BREAKERS CLUB
Secretary: Cherry B,
17 College Bounds,
Fraserburgh,
Aberdeenshire AB4 5JQ.

GRAMPIAN BREAKERS CLUB
Secretary: R.T. Strachan,
59 Jasmine Terrace,
Aberdeen.

GRANITE CITY CB CLUB
Secretary: W.D. McBelin,
98 Forest Avenue,
Aberdeen.

MORAY BREAKERS CLUB
Secretary: Thunderbolt,
c/o Gearchange,
40-42 Moss Street,
Elgin, Moray District IV30 1LT.

HIGHLAND

COUNTY AREA BREAKERS
Vice Chairman: Tony Blues,
4 Corbett Gardens,
Ardersier,
Inverness IV1 2RY.

MAC DX CLUB OF SCOTLAND
Secretary: The Pathfinder,
PO Box 43,
Inverness.
Tues, 8pm, The Hayloft.

ROCKY MOUNTAIN BREAKERS
PR: Gareth Evans,
36 Conhill Road,
Ainass.

THE ROUND WHEEL BREAKERS CLUB
Secretary: Babychem,
39 Lady Margaret Drive,
Fort William,
Inverness.

ROYAL T BREAKERS
Secretary: The Saint,
3 Mansa Street,
Tain, Ross-shire.

LOTHIAN

CUCKOO LAND BREAKERS CLUB
Chairman: Lucky Eddie,
PO Box 2,
Penicuik,
Thurs, Navaar Hotel.

EDINBURGH BREAKERS CLUB
Secretary: Karen Mowall,
c/o Sinatra's Lounge Bar,
St James Centre,
Edinburgh.
Mon, 8pm.

EDINBURGH CB RADIO CLUB
Secretary: Jim Martin,
22 Ross Gardens,
Edinburgh, EH9 3BR.

FORTH VIEW BREAKERS & DX CLUB
Chairman: Adam Hunter,
62/63 North Gyle Loan,
Edinburgh EH12 8LD.
(031 339 2516).
Tues, 8pm, Masonic Lodge, Kirkliston.

ROMAN ROAD JUNIOR CB CLUB
Chairman: Starlighter,
Youth Club Well Wynd,
Tranent, E. Lothian.
Mon, 7pm, Youth Club Tranent.

SNOWDRIFT BREAKERS
Secretary: Maggie May,
c/o Malleny Arms Hotel,
Balerno,
Lothian Region.

WESTSIDE BREAKERS
Chairman: Mr Flixi,
4/6 Dunsyre House,
33 Calder Crescent,
Edinburgh EH11 4JJ.
(031 463 2739).
2nd Fri. 7.30pm, Community Centre, Calder.

STRATHCLYDE

21 GOLD
Chairman: Daniel Hume,
311 Fairley Road,
Fairley, Clydebank.

A 78 CB BREAKERS CLUB
Secretary: Melody Maker,
Seaview, Station Square,
Wemyss Bay, Leurgate KA30 8JJ.
(031 463 2739).
2nd Fri. 7.30pm, Community Centre, Calder.

BEARSDEN & MILGAVIE CB ASSOCIATION
PR: K. Sutherland,
16 Second Avenue,
Bearsden, Glasgow G61 2LR.

BOULEVARD BREAKERS CLUB
PR: William Snell,
96 Kirkdale Drive,
Glasgow G52 1ET.

BURNS BREAKERS CLUB
Chairperson: Snow Queen,
3 Murray Street, Ayr.
Tues, Airtongrange Hotel.

CAMPAIGN FOR 27 MHz AM CBRC
PR: The Ambassador,
10 Lochmill Road,
Dunbeg, Connel,
Argyll PA37 1QJ.

CBA SCOTTISH REGION
Ron Warbrick,
10 Menze Road,
Stone House,
Lanarkshire.

CHINA TOWN BREAKERS
PR: The Vixen,
72 Kirkland Crescent,
Dalry, Ayrshire.
Thurs, 8pm, Royal Hotel Dalry.

CLYDESIDE BREAKERS SUPPORTERS CLUB
Eyeball: Big V,
Wednesdays & Saturdays, 8pm.

COWAL BREAKERS
PR: Silver Fox,
c/o 188 Cromwell Street,
Dunoon, Argyll,
Scotland,
(0369 2347).
2nd Sun, 8pm, Kingarth Hotel.

CUMBERLAND BREAKERS CLUB
Chairman: Golden Goose,
9h Ellistend Road,
Kildrum, Cumbernauld.
Alt Suns, 7.30pm, Cumbernauld Village Hall.

EL PASO BREAKERS CLUB
Secretary: Liz Keegan,
66E Broomlands Street,
Palsley, Strathclyde PA1 2NL.
Alt Tues, 8pm, Elderslie Village Hall.

GLASGOW CB CLUB
President: Ian Patterson,
147 Trossachs Road,
Rutherglen, Glasgow.

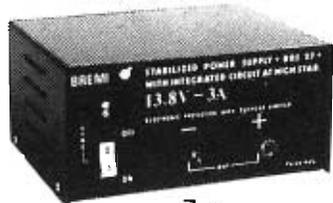
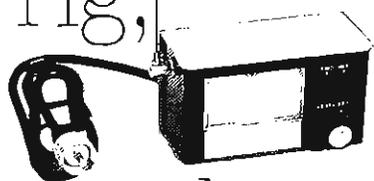
GLASGOW CB CLUB
Chairman: D. Docherty,
361 Hallhill Road,
Glasgow G33 4RY.

GLASGOW CB CLUB (CBA)
Chairman: Normund Cram,
3 Erskine Road, Whitcraigs,
Glasgow G46 8TO.

GREATER EASTERHOUSE BREAKERS CLUB
PR: J. Prow,
133 Lochand Road,
Glasgow G34 0LW.

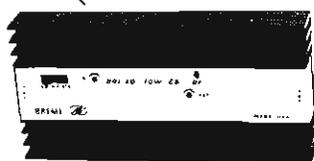
CB

If you want the best rig,
antenna, swr meter,



power supply, homebase,

linear, mike,



mount, or fitting,



our's are almost certainly the
cheapest, & better yet, there's
an **OCT** dealer within a few
miles of where you're standing

Look for this sign



in the window of any
of our **2436** dealers
throughout the U.K.,

or ring **OCT**:- 0476 76928

