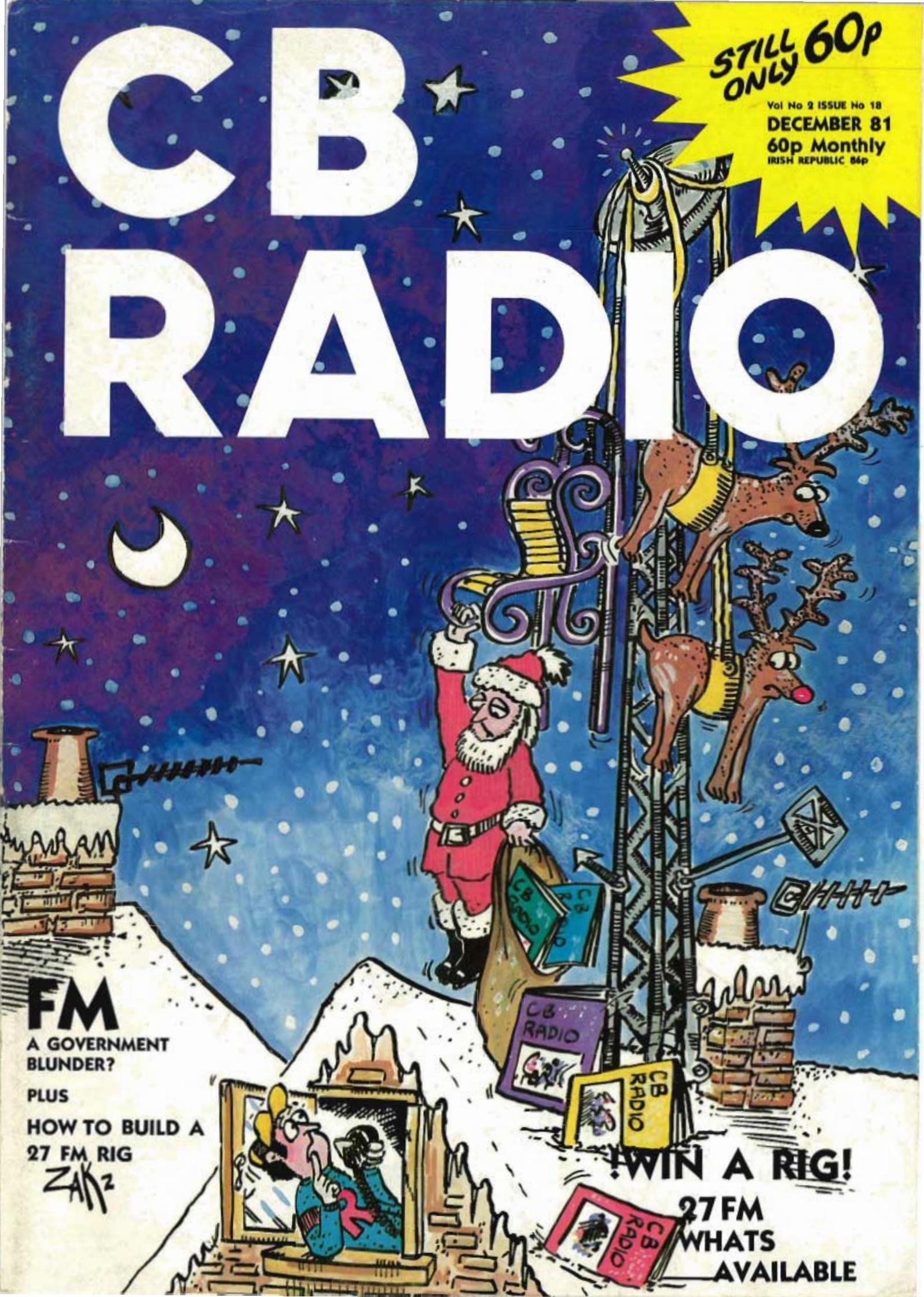


# CB RADIO

STILL ONLY 60p

Vol No 2 ISSUE No 18  
DECEMBER 81  
60p Monthly  
IRISH REPUBLIC 64p



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BLUNDER?

PLUS

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27 FM RIG

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# CB RADIO



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**DX QSL**  
The Greenpeace.....page 16



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# Merry Christmas

from us, the British  
breakers' magazine,  
to all CB'ers every-  
where.

May we wish you all the best for  
Christmas? To the new FM users,  
let's hope you enjoy your Christ-  
mas and to AM operators  
intending to try a Christmas  
DX link . . . . . Season's  
Greetings.



Christmas  
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extrordinaire and orig-  
inator of Heltek,  
who also wishes you  
a Merry Christmas on page 34.

Zakz

73 & 55 to you and yours.  
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issue to wish you all a Happy  
New Year.

From the Editor & Staff,  
QRT



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# Pan INTERNATIONAL

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Gain: 6 dB  
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 VSWR: 1,3:1 or better  
 Length: 5,50 m  
 Wind Survival: 72 mph  
 Connector: PL 259  
 Weight: 2,1 kg

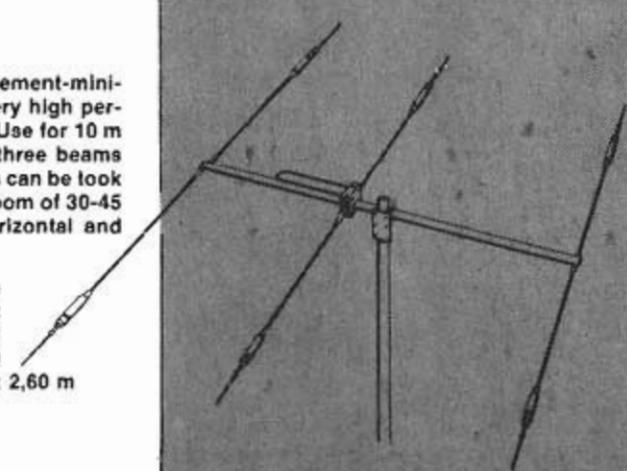
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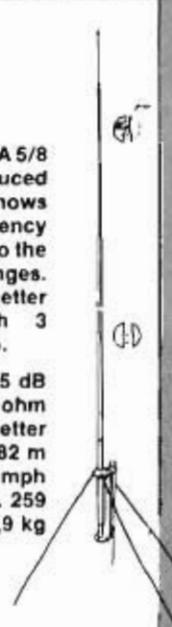


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Gain: 8,5 dB  
 Impedance: 52 ohm  
 VSWR: 1,4:1 or better  
 Length: 6,82 m  
 Wind Survival: 88 mph  
 Connector: PL 259  
 Weight: 2,9 kg

order-no. 11017

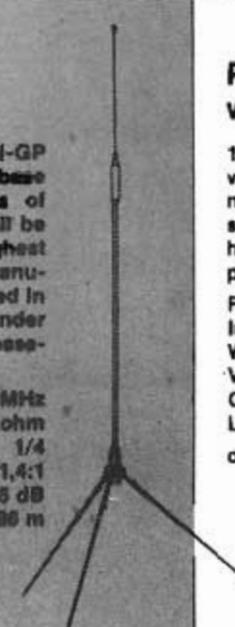


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Frequency: 27 MHz  
 Impedance: 50 ohm  
 Wave Ratio: 1/4  
 SWR: 1,4:1  
 Gain: 5 dB  
 Length: 1,86 m

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### Pan balcony and window antenna

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Frequency: 27 MHz  
 Impedance: 52 ohm  
 Wave Ratio: 1/2 vertical  
 VSWR: 1,4:1  
 Gain: 3 dB  
 Length: 2,05 m

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Length: 1,39 m  
VSWR: 1,1  
Color: silver grey  
Impedance: 52 ohm

order-no. 12038

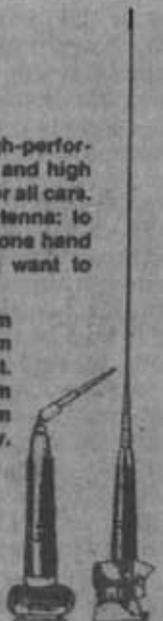


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VSWR: 1,3 m  
Color: black/met.  
Impedance: 52 ohm  
Cable-Length: 5 m  
Weight: 800 gr.

order-no. 12077



## Pan direction finding antenna

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order-no. 11087



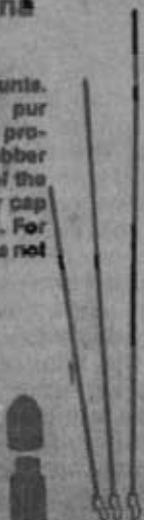
## Pan special antenna whip

Is suitable for all DV-27-mounts. The material consists of pure brass covered with weather protective black plastic. A rubber cap is fastened at the top of the antenna. Under this rubber cap is a screw to tune the SWR. For that covering this antenna is not to perceive as a CB-whip. Available in:

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128 cm order no. 12051

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Output 20 - 50 Watt

Order no. 23012

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Output 50-100 Watt

Order no. 23013

# SSB TRANS

by E. A. Rule. Part 3

This month we shall take a look at some of the problems that arise from the use of SSB. In fact most of these problems are common to all types of transmission but for reasons which it is hoped will become clearer later some of the problems are worse when SSB is used.

## Crossmodulation

Most operators have at some time or the other been in a situation where a nearby transmitter seems to put signals out on all channels at once! The first reaction is to blame the other transmitter but in fact in almost every case it's the receiver that is at fault. In locations where there are many transmitters in use the problem caused can be so bad as to prevent operation altogether with some rigs.

The most common cause of this problem is in the design of the receiver RF amplifier and mixer stages of the rig in use. The RF stage has to provide amplification to the weaker signals so that they are at the required strength for the mixer stage. It also has to reduce the strength of the very strong signals to prevent overloading of the mixer. With a good design the RF stage can handle signals over a range of 60 to 80 dB (1000 to 10,000 to 1), i.e., from around 0.5 micro volts to 5 millivolts with the top designs able to handle signals up to around 100 millivolts or so. The amount of gain produced (or attenuation) is controlled by the automatic gain control system and/or a manual RG gain control.

At 27 MHz the bandwidth of the RF stage is wide enough to cover all the channels because it is not practical to obtain enough selectivity at this frequency to select only one channel. The result of this is that all signals get amplified at the same time by the same amount (the actual selectivity to receive only one channel at a time comes later in the IF stages). The reason for the problem now begins to be seen. If, for example, you are receiving a signal on one channel and the automatic gain has adjusted for the strength of this particular signal and then a very much stronger signal comes up on another channel it will be amplified by the same amount as the weaker signal with the result that it overloads the RF stage. When this happens it will be distorted due to the non-linear operation it is causing. When a stage is operating in a non-linear manner it will MIX all the signals passing through it, thus generating many new frequencies which were not present in the first place. For example: if we take two frequencies only (in practice there would be many more), 27.305 and 27.315 (Chn 30 and 31), call these F1 and F2. Now  $2F_2 - F_1 = F_3$ . So  $27.305 \times 2 = 54.61 - 27.315 = 27.295$ , i.e., we now have a signal on channel 29 which consists of a mixture of both the channel 30 and 31 signals. Many more combina-

tions of frequencies can occur depending on the amount of overload and the design of the receiver. The problem can be reduced by always operating with the RF gain control (if fitted) at the MINIMUM possible which will still receive the wanted signal. The onset of this type of mixing is quite sudden and often a small reduction in signal or gain will produce a large reduction in interference.

For minimum cross modulation always operate with the minimum amount of RF gain and avoid the use of extra RF pre-amps which will only make the problem worse. To prevent causing the problem to others, always use the minimum amount of power to maintain the contact. Big L'iners are unsocial! If two stations are located close together their respective aerials should be as far apart as possible, possibly with a building between them. This will keep the signal strength between them to a minimum, and reduce the problem with cross modulation.

## Desensitising

This is a similar problem to crossmodulation but the effect is different. In this case the stronger signal operates the receiver automatic gain control circuits which then reduce the gain to suit with the result that the weaker signal is reduced as well. In extreme cases it can completely vanish. If the stronger signal is on another channel it can cause this effect without the operator knowing why the signal he's trying to copy keeps becoming weak or vanishing altogether. This effect is more common with the FM system. The cure is the same as for crossmodulation, although it is also dependent on the way the receiver obtains its automatic gain control voltage.

## RF feedback

This is a common problem when fitting external accessories, such as power microphones, speech processors, etc. The cause is exactly the same as interference to stereo hi-fi equipment and the same types of cures will apply. The transmitted RF gets picked up on the external audio leads and then feeds into the microphone amplifying stage. At this point it is 'detected' and converted to audio, as such it is treated just like a normal audio signal and will modulate the transmitter. When transmitted it is picked up by the external audio leads and goes around the system again, and again, and . . . the result in practice is either a slightly distorted signal where the pick-up is slight or a nasty howl where the RF pick-up is really strong. More than one cure may be required to completely get rid of the problem and the recent series of articles on interference published in CB Radio will be found helpful. RF feed-

# MISSIONS

back is one of the most common reasons why accessories often seem not to work as they should. Many rigs will not tolerate additional accessories due to the lack of internal RF filtering fitted to the rig. The later rigs are very much better in this respect.

When accessories fail to work as they should, always check for RF feedback before complaining to the supplier. Put the rig onto a dummy load and get someone closeby to monitor your signal. (A dummy load will always radiate a small amount). RF feedback is very unlikely to occur on a dummy load and the accessories should work satisfactorily under these conditions. If they do, reconnect the aerial system. If the accessories no longer work, then the problem is RF feedback. As a matter of interest, it is not unknown for RF feedback to upset the working of a stabilised power supply, so if in doubt, always check the station out using a dummy load.

## Distorted modulation

The most common cause of this problem is simply talking too loud and too close to the microphone! The average microphone supplied with the rig is designed to be used at a distance of around 4in from the mouth and with the operator speaking across not into the grill. Don't shout, a normal conversational voice is all that is required. Used like this most rigs will give a signal out of very good quality, and surprisingly, one that's easier to copy at the other end. It's not a case of the louder you shout the further you get, because the rigs have built-in limiters which REDUCE the overall level of modulation if you overdrive the audio circuits. Just the reverse to what you would expect! Power microphones can also have the same effect unless they are used correctly. A 'rule of thumb' method of setting up the modulation was given in Part 2 of this series. A correctly operated rig will have a better 'copy' than one where the modulation is distorted, it is only the distortion which makes it sound louder but when conditions are difficult it will be less easy to copy. Reverb, and similar items all make the signal LESS easy to copy. If you want to do the job correctly use one of the speech processors available which are designed to improve copy.

## Aerials

One question that has come up over and over again is: Will certain types of aerial work on FM? The answer is YES. An aerial will work on ANY MODE of transmission providing it is designed for the transmitting frequency in use. The same applies to TVI filters, etc. The new regulations concerning CB do not change the statement above. An aerial is for a given frequency of operation, the mode doesn't matter.

## SWR

Much has been written elsewhere on this subject but one point not mentioned as far as the writer knows concerns a simple check. Although meters built into rigs are not on the whole very accurate there is a way to prove your SWR and that is to note the reading you are getting on your particular meter. Then to add into the feeder an extra quarter wave length of feeder. If your original reading was correct, the new reading with the extra length of feeder *should be the same*. Do use the same type of coax, of course, for the extra length of feeder. The actual length is not critical and can be between 6 and 10 feet. Do use proper connectors at each end. If the reading changes when the extra length is added it means that your aerial is not matched and that you 'just happened' to have a feeder of a suitable length which acted as a matching stub. However, it would also mean that the feeder was radiating except by a very small amount. Changes of readings of less than 20% are in practice not worth chasing. Be sure to reset the forward reference reading each time you make a measurement.

To check the actual meter fitted to a rig, connect a dummy load directly to the rig's output socket. Do not use any coaxial cable between the two. The readings obtained will show how accurate your particular meter is. There should, of course, be no reflected power when the dummy load is used. However, most meters will show some but it should be less than 1:2 to 1 if the meter is to be of practical use.

## Received signal strength meters

In general these are not very accurate and cannot be relied upon except as a rough indication of signals. The gain of the receiver itself will vary between channels and comparisons between different channels cannot be made with accuracy. Rigs, even of the same model, will vary and quite often the reports each way will be different even when the same rig and aerial is in use. Don't panic, it's not that one rig is better than the other (although this is possible) it's more than likely that one meter is 'mean' compared with the other. The only thing that really matters after all is, 'Can you copy or not?'

However, they can be very useful devices for setting up aerials, etc., by comparing the readings obtained on the same rig and on the same channel, but they must not be used for absolute measurements unless they have been calibrated against a known reference.

Next month we shall turn attention to the FM system.

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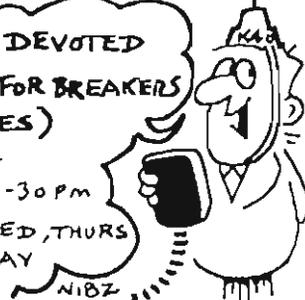
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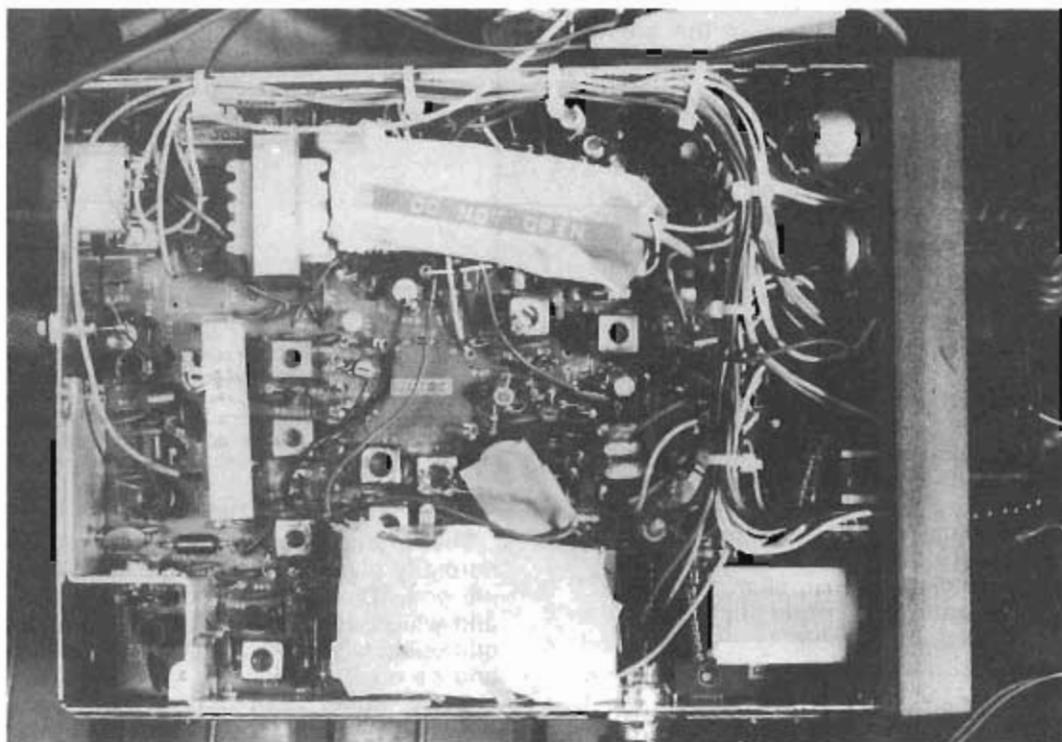
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# Antennas and Transmissions on CB Frequencies

by F. C. Judd, FISTS. MIOA. Assoc. IPRE. - Part 14

## Co-axial cables

The article previous to this (Part 13) dealt with the more technical aspects of transmission line which is the line or cable carrying power from transmitter to antenna. For CB radio, on either of the two frequency bands, 27MHz or 93.4MHz, the co-axial type of cable with an impedance of 50 ohms is most commonly used. The construction of two of the most common types of co-axial cable used for radio communications are illustrated in Fig. 1. For most 27MHz antenna installations where the cable run is relatively short, e.g., around 50 to 60 feet, the solid dielectric type of cable such as UR43 or RG58U is normally suitable, the loss or attenuation factor of these cables being in the region of 1.5dB per hundred feet (at 27MHz). By comparison, lower loss type co-axial cable such as UR67 has an attenuation factor in the region of 1dB per hundred feet. However, 'decibel' figures by themselves are meaningless unless properly applied in order to determine actual power loss due to cable attenuation.

The decibel is derived from a logarithmic ratio and when related to power the appropriate 'ratio' figure must be used. (Note: when applied to voltage or current the ratio figure is different). It must also be known whether the decibel figure to be used is indicative of loss (negative dB) or gain (positive dB). In the case of power loss in co-axial cables we are dealing with negative dB and to establish the power loss in a cable the power ratio directly related to the dB figure must be used. (See Table 1).

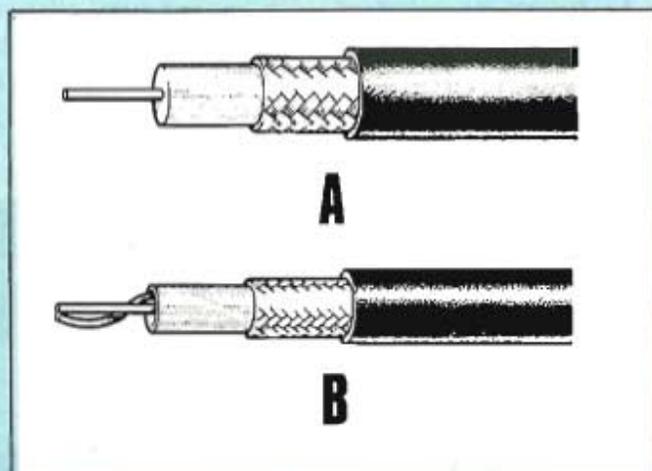


Fig. 1  
(A) Co-axial cable with single (or stranded) wire in a conductor moulded into solid polythene core. Outer conductor is braided copper with a cover of PVC. Overall diameter of these cables varies with types.  
(B) Typical low loss co-axial cable with single inner conductor entwined with polythene thread contained in a polythene tube. Outer conductor is braided copper with a cover of PVC. These cables sometimes have a stranded inner wire conductor within the polythene tube.

## Examples of cable loss

The attenuation factor for a co-axial cable is normally given in dB per unit length which may be per one, 10 or 100 metres or per foot, 10 or 100 feet and which usually only applies to specific spot frequencies, e.g., 1MHz, 10MHz, 100MHz, 1000MHz and so on. To be on the safe side the nearest frequency higher than that actually used should be taken, i.e., for 27MHz this would be 100MHz. Cable manufacturers do not normally quote attenuation factors and other performance parameters for every frequency within the normal radio spectrum.

In order to determine the approximate amount of power loss in a co-axial cable the following must be known. Frequency at which the cable is being used (or approximate). The TOTAL length of cable to be used and the attenuation (loss) factor for the cable. For example, at 27MHz the cable to be used (or is in use) is 60 feet long. It has an attenuation factor in the region of 2.5dB per 100 feet which is 0.025dB per foot, so the total for 60 feet is  $0.025 \times 60 = 1.5\text{dB}$ . The negative power ratio from Table 1 is 0.707. The power from the transmitter is 4 watts. Therefore, the power arriving at the antenna is  $4 \times 0.707$  which is 2.828 watts. The power lost in the cable is  $4 - 2.828$  which is 1.172 watts.

TABLE 1  
(Negative)  
DECIBEL LOSS TO POWER RATIO

-Decibel loss	Power Ratio	-Decibel loss	Power Ratio
0	1.000	6.0	0.251
0.1	0.977	7.0	0.199
0.2	0.995	8.0	0.158
0.3	0.933	9.0	0.125
0.4	0.912	10.0	0.100
0.5	0.891	11.0	0.079
0.6	0.871	12.0	0.063
0.8	0.831	13.0	0.050
1.0	0.794	14.0	0.039
1.5	0.707	15.0	0.031
2.0	0.631	16.0	0.025
2.5	0.562	17.0	0.019
3.0	0.501	18.0	0.015
4.0	0.398	19.0	0.012
5.0	0.316	20.0	0.010

## 50 OHM CO-AXIAL CABLES FOR 27MHz

CABLE TYPE NUMBER	VELOCITY FACTOR	Approximate attenuation at 27MHz		Maximum Power rating WATTS	CABLE outside diameter INCHES	NOTE ON CABLE LENGTH
		dB/100ft	dB/foot			
UR(M)74	0.664	0.45	0.0045	1900	0.870	Up to 100 feet or more
UR(M)75	0.664	0.45	0.0045	1900	0.870	Up to 100 feet or more
UR(M)4	0.666	1.00	0.01	600	0.405	Up to 100 feet
UR(M)67	0.666	1.00	0.01	540	0.405	Up to 100 feet
UR(M)43	0.674	1.5	0.015	130	0.195	For average 50-60 feet run
UR(M)76	0.674	2.5	0.025	130	0.195	For average 50-60 feet run
UR(M)115	0.674	2.0	0.02	170	0.285	For average 50-60 feet run
T(M)3234	0.820	1.2	0.012	200	0.270	Up to 100 feet
UR(M)91	0.666	1.0	0.01	1450	0.433	Up to 100 feet
UR(M)112	0.666	1.0	0.01	1450	0.433	Up to 100 feet
UR(M)115	0.666	1.95	0.09	440	0.275	For average 70-80 feet run
T(M)3319	0.686	0.625	0.0062	1400	0.53	Up to 100 feet or more
RG58U	0.659	1.5	0.015	175	0.195	For average 50-60 feet run
RG8U	0.659	0.625	0.0062	800	0.405	Up to 100 feet or more
RG17U	0.659	0.5	0.005	2300	0.87	Up to 100 feet or more
RG8AU	0.75	1.0	0.01	800	0.405	Up to 100 feet or more

TABLE 2

The cables listed above have been selected from available manufacturers' lists but may not all be stocked by CB radio dealers. UR(M) and T(M) types are from current DICC lists. Those with the prefix RG are of American origin and the most common being sold in the UK are type RG58U and RG8U. Many cables made to British Standards specification 2316 are equivalent to American RG types.

The only cables that would be suitable for 934MHz are UR(M)74 or 75, T(M)3319, RG17U, UR(M)91 and UR(M)112 which at this frequency have an attenuation factor in the region 2 to 3dB per 10 metres length.

The above example represents a fairly large power loss which can be reduced by using a cable with a lower attenuation factor. Let us say that for a total length of 60 feet an alternative cable has an attenuation factor of 0.75dB total. The power ratio for this is 0.875. The power from the transmitter is 4 watts. The power arriving at the antenna will there-

fore be  $0.875 \times 4$  which is 3.5 watts. The power lost in the cable is therefore 0.5 watts. The use of a cable with lower loss has, in this case, ensured another 1.2 watts at the antenna.

**BEWARE OF CHEAP CABLE.** Make sure that any cable you purchase is of good quality and that the real attenuation factor is what it should be. There is a lot of cheap foreign made 50 ohm cable being sold which, even though marked with a recognized type number, may have a high loss factor. The performance characteristics of various 50 ohm co-axial cables generally available in the UK are given in Table 2.

### Checking co-axial cable for loss

A method of checking co-axial cable loss was described some time ago in CB Radio (March, '81) but for the benefit of new readers can be done with reasonable accuracy with the aid of a 50 ohm dummy load and a VSWR meter used as illustrated in Fig. 2. The output from the transmitter is first connected to the VSWR meter via a very short length of co-axial cable. Set the VSWR meter control to read the power level produced by the transmitter. The VSWR itself will be 1 to 1. Now connect the length of cable to be tested between the transmitter and the VSWR meter as shown. Loss due to the cable will be indicated by the meter as a drop in the power level although the VSWR itself will remain 1 to 1. As an example, if the power from the transmitter is 4 watts direct into the dummy load but 3 watts with the cable being tested connected in, then the indicated power loss of 1 watt expressed in decibels, would be  $10 \log_{10} \frac{3}{4}$  which is 1.2dB. If the cable being tested had an impedance of other than 50 ohms then the VSWR would not be 1 to 1. For instance, if a VSWR of 1.5 to 1 were obtained then the cable impedance would be  $1.5 \times 50$ , or 75 ohms. You could have been sold a cable of the wrong impedance.

### Cable plug connections

It is very important that co-axial cable plugs are properly connected. Open or short circuits, or screening braid not in contact with the plug body will cause a very high VSWR with a reflected power level high enough to damage a transmitter output stage, especially if this is transistorized and has no overload protection.

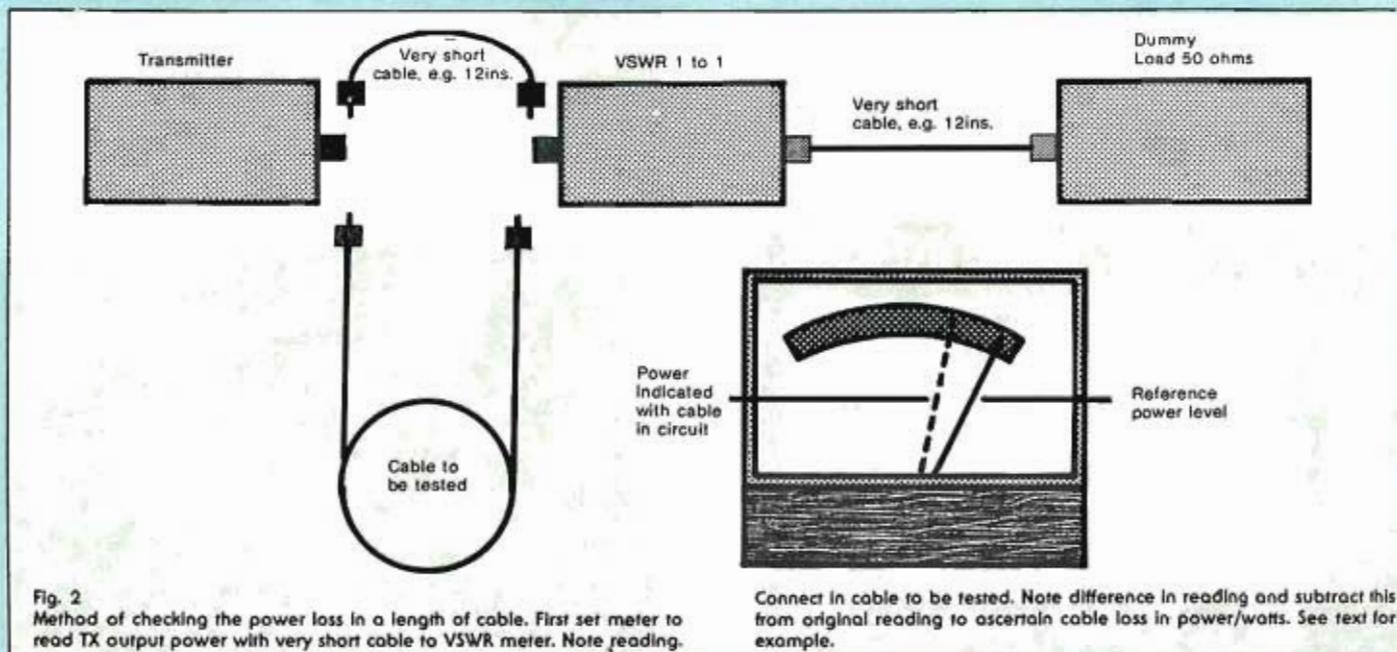


Fig. 2 Method of checking the power loss in a length of cable. First set meter to read TX output power with very short cable to VSWR meter. Note reading.

Connect in cable to be tested. Note difference in reading and subtract this from original reading to ascertain cable loss in power/watts. See text for example.

# Antennas and Transmissions on CB frequencies

The commonly used PL259 plug will take large diameter cable but may otherwise be available with an adaptor for small diameter cable. Some versions are made for one or the other only. When an adaptor is used for small diameter cable the method of connection is as illustrated in Fig. 3. The method of connection for large diameter cable is show in Fig. 4.

Co-axial cable is reasonably tough and capable of withstanding wide changes in climate. It will normally last a long time providing it is properly installed in the first place. When handling co-ax don't try to straighten out kinks by pulling on the cable as this can damage the inner conductor. Carefully 'unwind' any kinks before installation. Avoid sharp bends along the run between transmitter and antenna. A join could be made between two lengths of co-ax by means of small electrical connectors or by soldering, although a join of this nature would

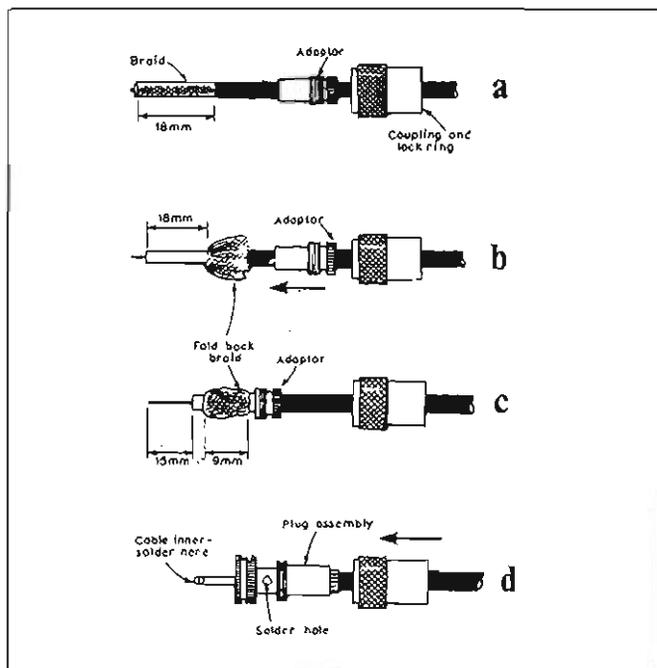


Fig. 3 Connecting a PL259 co-axial plug to a small diameter cable. (a and b) Preparation of cable. (c) Fitting adaptor if used. (d) Final connection to plug body.

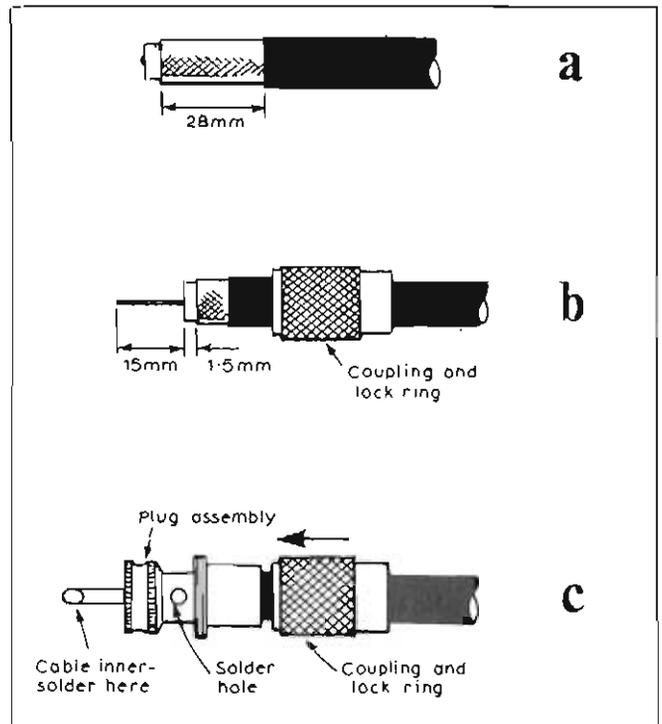


Fig. 4 Connecting a PL259 co-axial plug to a large diameter cable. (a and b) Preparation of cable. (c) Connection to plug body.

almost certainly cause an impedance change and consequent loss of power. The best way to join two lengths of co-axial cable is to use a proper 50 ohm coupler which has the equivalent of a socket entry each end to take a PL259 plug. AT 27MHz these couplers will not cause an 'impedance bump' or loss of power. If a join of this nature has to be located outdoors it must also be well taped to prevent moisture entering. In fact the most important of all precautions with the installation of co-axial cable is to prevent moisture getting into any outside connection and which will eventually find its way into the cable and ruin it completely for all time. The most common point of moisture entry is via connection at the antenna. PL259 plug to socket connections, even when tight, are by no means waterproof of their own accord and unless a weather protection sleeve of some kind is used should be well covered with adhesive insulation tape. Careless handling of co-axial cable can cause the outer cover to split and this will let moisture in which in a very short time will cause the screening braid underneath to become corroded, the result of this also being permanent damage to the cable.

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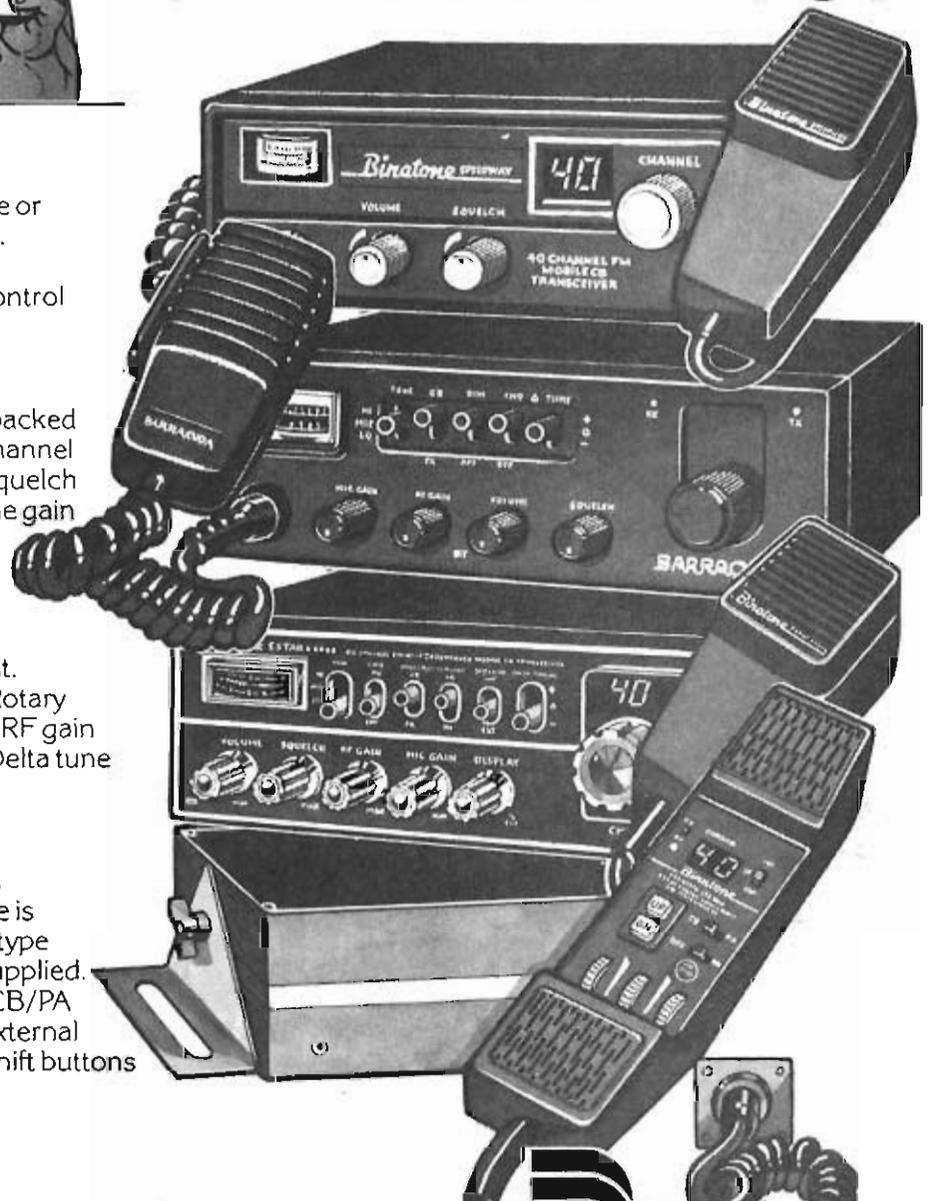
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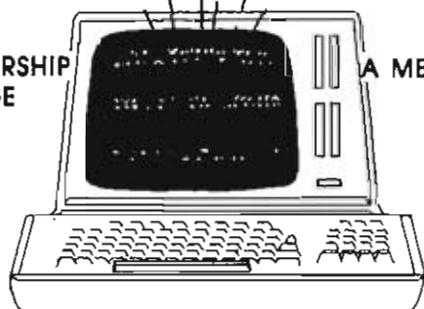
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# DX QSL

# INTERNATIONAL

# CLUB SPOT

Our regular tune round the dial for International News

Getting a new DX/QSL club off the ground and established is not the easiest nor the cheapest thing in the world, as Ken Willmott of London recently found. Undeterred, Ken bashed on and after a false start finally got the Trans-World CB-QSL-DX club badwagon rolling.

QTH of Trans-World is 13 Lord Holland Lane, London SW9 6NN. Initially, Ken was offering 13 items in the club package but after a bit of a rethink dropped the quantity to 11 items.

Apart from the usual items, Club Cert, ID Card, Rubber Stamp, etc., a new member will receive a Diary. This is a new idea to me but quite a good one.

One other item which I would like to mention is the club ID card. This just has to be the best club ID card I've ever received. Ten out of ten for that one, Ken. Cost of joining the Trans-World club is £6.00. If anybody is interested in joining, get in touch with Ken at Lord Holland Lane and he'll fix you up, no sweat.

Since last featured in CB Radio, the Happy Cobblers of Northampton have changed AD's. Their new QTH is PO Box 99, Northampton NN2 6HU. The membership figures are climbing steadily, now standing at over 150 with almost 80 International members.

Christ Darlington, HC001, told me a very interesting little tale the other week. Seems he recently got his first QSL back from USSR. The Russian QSLer, called Boris (What else?) wanted to join the Happy Cobblers but he had a bit of a problem. It is a serious crime to send money across the Russian frontier (Money coming in - OK. Money going out - salt mine job) so he was snookered. With a dashing display of Western capitalistic generosity, Chris proceeded to enroll Boris as a Happy Cobbler, but more was to follow. Boris is a hi-fi freak and he asked Chris would it be possible for him (Chris) to send across to him (Boris), Beatles LP.

Having already enrolled Boris as a Happy Cobbler and sent his package across FOC, Chris reckons he's done

his bit for our corrupt capitalistic society, so if anybody is prepared to post a Beatles LP across to Boris, get in touch with Chris at Happy Cobblers and he'll give you full details on Boris's AD. But remember that this will in all probability have to be a FOC transaction. There's very little chance that Boris can repay you apart from QSL's, viewcards, etc.

If anybody does get an LP across to Boris, perhaps they might like to write to me and I'll keep everybody informed on developments. This could well be the vital lead that's needed to help along Anglo-Soviet relationships!



## Galley Rat v Uncle Charlie

Cheese Eaters Swap Club of Virginia. Does that sound familiar? This was the free club I mentioned back in July.

Since then I've had a smashing letter from Linda "Galley Rat - Cheese Eater No. 1".

This is a straight reproduction of Linda's letter. She writes exactly as she speaks.

"You might mention Chris, that it takes the equivalent of three coupons (IRC) to return the membership pack (to the UK) but we have been footing the bill OK so far. We get 42 cents each for the coupons and it costs about 95 to 1.05 to mail it back. Some send a coupon, some send three and some don't send any at all, but we pay the postage and enroll them anyway. I first started out FREE but last June 1st we had to start charging 3 Dollars to join the club to help with this postage. (I am still enrolling FREE CE

### QSL List

Peter (Snowman 356) 35 Baker Avenue Ashby De La Zouch Leicestershire LE6 5PB	Steve Evans (Kopper Nobi) The Mire Ymaes Pwllheli, Gwynedd N Wales
Brian Warnaby (The Jackal) Rosemere Schoutouse Caicote Road Hartlepool TS25 3JL	Anthony V Campbell 94 Drumageon Road Portadown Craigavon Co Armagh BT63 5HF
Peter & Helena Van Zoggel (Crut & Wandat) Box 27226 Upper Willis Street Wellington N Zealand	

### Worldwide DXers

Hello, Ian Shreder back to you again. I'm President of the Sandcastle QSL Swap Club and I will be supplying addresses and cards to this column each month. As President of a club I come across a lot of cards but if you have any interesting cards I will be happy to use them in this column. If any of you are interested in an application to the Sandcastle Club please send me your card and one international reply coupon. Write to: PO Box 167, Pacific Beach, Washington 98571 USA.

Mark Kierle PO Box 293 AYR 4507 Queensland Australia	Yan (91 E 006) PO Box 595 Bandung Indonesia
Terry Meyers Box 105 Maitland NSW 2320 Australia	Knut Larsen PO Box 656 Oslo 1 Norway
Keyn Asada PO Box 38 Tarumi Kobe 655 Japan	Afred Puhara (SC 562) 30 Stuart Crescent Masterton New Zealand
Edoardo Gavina Jr PO Box 100497 Bogota, Colombia South America	Ron Verhaas (Stereo King) PO Box 410 5600 AK Enthoven, Holland
Michael Reyes PO Box 216 Belize City Belize Central America	Fernand (SC 509) Box 485, Batem - PA 65009 Brazil South America
Aila Jani (SC 268) Box 3 61420 Trbovlje Yugoslavia	Basil Herschel (SC 548) PO Box 1309 Bulawayo, Zimbabwe Africa
Gerardo Huerta Ave Mexico 566 NTE Tepic, Nayarit Mexico	Spencer Ford 1171 South G Street Lakeview, Oregon 97630 USA
Gene Chelberg 31900 Pudding Creek Road Fort Bragg California 95437 USA	Tom Swaden (K11 1) Box 61 Richmond Hill NY 11419 USA
Peter Ruppel (Speedy) AM Wehgraben 4 D-6303 Hungen 1 West Germany	Ruben Bakanay 2507 Oriani Street Tondo Manila Philippines

cards, tho because some people have been holding on to them like you did).

"Sorry a number 10 envelope is std. office size so I don't fold up stuff too much. That little CE application is gonna change considerably on the next printing because lotsa folks don't know what a No. 10 envelope is!!

"And its no longer free to join and the zip code has added four more numbers and we now have a roster and will soon have a club stamp. Maybe next year. Ya see, the club isn't even a year old yet (started last October) and we have 360 Cheese Eaters all over the World! What started out as a card collecting hobby has developed into expensive work. But I love it!! As for QSLing Stateside, Chris, from what I can understand, its kinda slow. The postage stamps costing 18c has kinda separated the men from the boys, so to speak. As for DXing, the chatter, noise level and general 'Hornets Nest' has taken all the fun outa it for me. Besides I live less than 3 1/2 miles from the FCC East Coast Headquarters for training them how to catch all those crazy DXers!! Thats the biggest reason I started this swap club I guess. I have often talked with somebody I shouldn't have been talking to only to have some 'twit' come in there and say "Hi Galley Rat", I could have murdered them!!!"

Well there's not much I can add to what Linda says other than to offer her my sympathy. Fancy living next to Uncle Charlie's training HQ. It's like having Willie Whitelaw as your next door neighbour. The Cheese Eaters have grown considerably since I first mentioned them. What was originally just a small free club has developed into a fully grown QSL club.

## Greenpeace QSL Club

Before I go on any further, I am going to admit straight off that I am 100% biased about this next club. And by a happy coincidence it has one of the highest star ratings on my chart. But bias doesn't enter into that, its just good quality, presentation and excellence. After reading about the Greenpeace QSL club of the Netherlands I think you will agree with my thoughts. By the way, the biased situation arises out of my beliefs for what Greenpeace stands for. But thats enough of that, on with the show.

The Greenpeace QSL club QTH is  
PO Box 33,  
8855 ZM Sexbierum,  
Netherlands.

The founder and president is Ben Van Popering. He was born in the Royal Resident City of Holland, The Hague, but about four years ago decided to go to the northern part of Holland (Friesland). His occupation is a maintenance carpenter but he leaves woodwork behind when he gets involved with his two big hobbies - photography and CBing.

Ben first got involved with CB about seven years ago but like most of us do sometimes, got a bit fed up with it and packed it in for a few years. About 1 1/2 years ago, the bug bit him again and he was hooked once more. It was

Greenpeace QSL Club, Netherlands					
Star Rating		Yes First Class	Fair Second Class	Third Rate	No
1	World Recognition	★			
2	Distribution	★			
3	QSL Response Time	★			
4	Club Stamp	★			
5	Club QSL Cards	★			
6	DX Unit Number	★			
7	Wall Certificate	★			
8	ID Card	★			
9	Club Roster	★			
10	Club Patch/Badge	★			
11	DX Log Book				★
12	Club Accessories				★
13	Club Information	★			
14	Tourist Information				
15	Cassette Swap				★
16	Club Postage	★			
17	Life membership	★			
18	XYL Membership	★			
19	Value For Money	★			
20	Overall Presentation	★			
Total Star Rating		16	1		3

shortly after this that the idea of the club came to him. Ben is a firm believer in Greenpeace and is a strong supporter of its aims and principles. He approached Greenpeace Amsterdam and got their approval to use the name in conjunction with the club. In March 81, Greenpeace QSL club was established and it wasn't long before the club stamp and QSL card became established on the DX/QSL scene.

The stamp features a seal with the message 'Save the Seal' around it. The ID card has a copy of the seal stamp, as has the certificate. The club QSL card is a super picture of the Greenpeace ship 'Rainbow Warrior', the patch is actually a rainbow with the word 'Greenpeace' underneath.

And last but not least, the car sticker is a drawing of 'Rainbow Warrior' with the whale message again. All, I may add, of super quality.

By the way, when you join you will notice on the certificate that you become an 'Honorary Support Member'. In other words, you haven't just joined the Greenpeace club but have supported in a small way the Greenpeace movement.

Part of the membership fee goes towards Greenpeace Amsterdam, hence the 'support member'. This is stated on the club application form and also explains the rather clever sliding scale of membership fees. On the back of the application is a world map split up into zones. Each zone represents a different mailing charge. (Everything is mailed first class air mail). We, being very close, are in zone 1, membership costs US\$14. Australia and NZ are way out in the farthest zone, a member from there will be charged US\$17. However, when the dollar is falling, new members are all requested to pay as per zone 5, which is US\$17. One thing I would stress is cash only, please don't use a

cheque. It costs money to cash a cheque and therefore it is impossible to provide a donation to Greenpeace from cheque memberships.

As is usual with most clubs, XYL receives a Unit No., ID card and certificate. But that's not all. I am 99.9% certain that Greenpeace is unique in that it actually does give something exclusively for XYL. What it is, is a beautiful silver necklace with a small silver whale's tail as the pendant. It really is a beautiful necklace. I received my Greenpeace package quite a while back and Allison was really taken with the necklace. She's never taken it off since she received it. One thing I'll say about Allison is that she has good taste. (Well, she married me and that proves it) and the necklace certainly met with her approval.

Speaking about the package, I must tell you about the smart way in which the club package is mailed. Not for Greenpeace the usual battered brown paper envelope. As I keep saying, everything about the club is quality and it's summed up in the packaging. You receive your club package in a solid heavy duty cardboard tube. Yet another Greenpeace exclusive. There's little more that I can say here about the club other than suggest you join. You'll be doing yourself a favour on two counts:

1. Joining an absolutely top quality club.

2. Supporting a movement which benefits all mankind.

Well, that's about it for this month. Next month details of the first International QSL club competition. This is being run in conjunction with English Int. DX Club, CB Radio and Cee Bee World, New Zealand.

Well, I hope Santa is good to you and you have a grand time over the hols.

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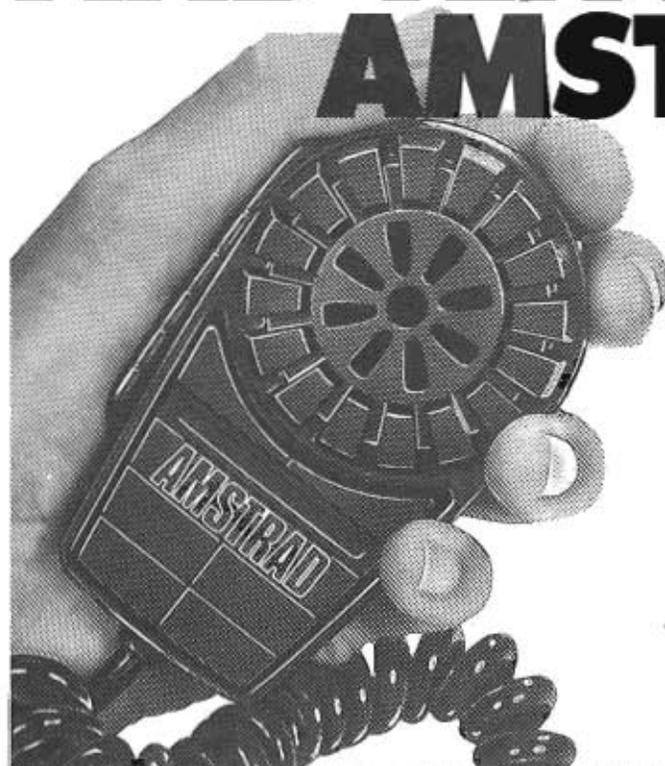
THE CHEROKEE® HALFBREED™  
IT'S LIKE MAGIC.

Conforms with legal  
requirements for New 27 FM  
Unbeatable for AM & SSB Modes



Distributed by:  
Breaker 1-9, 4-5 The Arcade, Hitchin, Herts. Tel: 0462 57826

# 'WALL TO WALL AND TEN FEET TALL, AMSTRAD!



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

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

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

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

**PERFECT MATCH  
PERFECT RECEPTION**

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

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



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

Around **£79**

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

Around **£95**



For full details of Amstrad Citizen Band Radio and the address of your nearest stockist, write to Amstrad Consumer Electronics Limited, (Dept B1) 1-7 Garman Road, London N17 0UF.

AVAILABLE AT SELECTED STORES OF:

**COMET Currys HALFORDS RUMBELOWS**

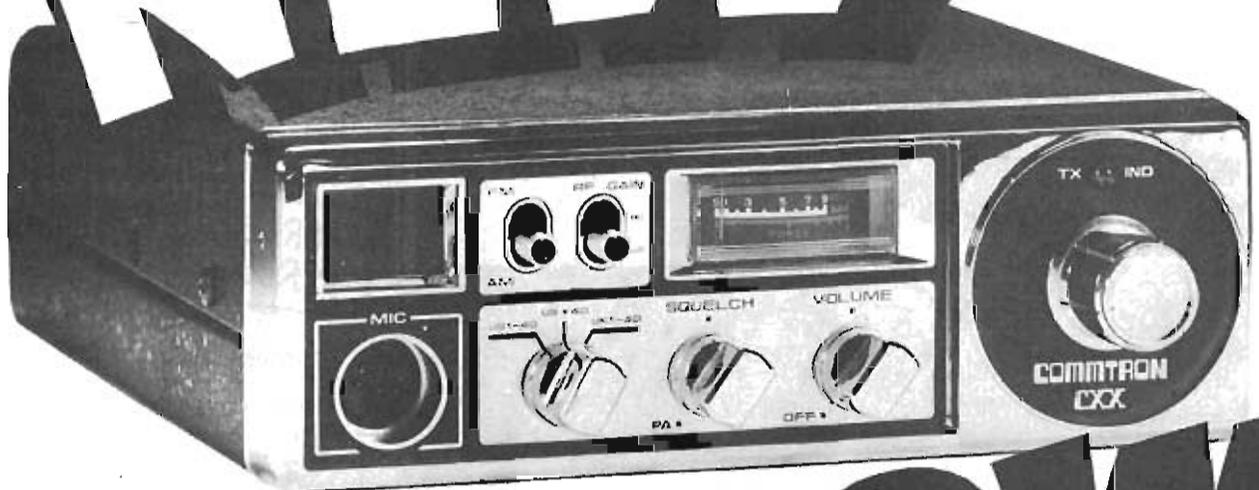
# CB

**Radio Distributors**



**Sole UK Supplier of  
the set everybody wants**

# NEW



**COMMTRON  
CX F.M. 'NATO'**

80 AM 80 FM EUROPEAN SPEC.  
40 AM 40 FM BRITISH SPEC.

# NOW WE HAVE IT

Talk to friends on the new British F.M. and breakers on the European AM spec now being used by 2½ million breakers in the UK, have the best of both worlds in one set.

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There  
are  
twigs

and  
twigs

Sure, you can buy a cheap antenna. But the whole performance and range of your rig will suffer. Far better spend that bit more and get the best. *The best?* Antenna Specialists are absolute top CB antenna choice with US fans . . . and they should know! AS make *professional* communications antennas, and their CB range gets the same components, same high-grade materials, same quality standards. They offer the highest VSWR figures . . . better than 1.5:1 across all 40 CB channels, and power handling way beyond any you'll ever need. They meet Home Office MPT 1320 spec . . . take our Antiference word for that. We've field tested them for UK use too, and as antenna makers ourselves we'll tell you now . . . AS *are* the best. And latest news, they come via Antiference, so you'll be seeing the AS 'quality stripes' everywhere now.

Go top of the  
tree.  
Sell

as

Great CB antennas by  
Antenna Specialists  
now available UK-wide  
from  
Antiference

To Antiference Ltd.,  
Aylesbury, Bucks HP19 3BJ Telephone Aylesbury 82511  
I'm sending you a large SAE.  
Send me your folder on AS mobile CB antennas, the whole range.

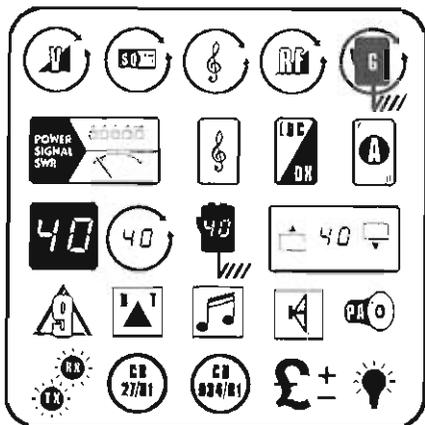
Name \_\_\_\_\_

Address \_\_\_\_\_  
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\_\_\_\_\_

# 27 FM

You may well have spent the last month trying to obtain one of those rare objects known as a 27MHz FM rig. Judging by the amount of telephone calls we receive daily, very few people have actually managed to get the rig of their choice.

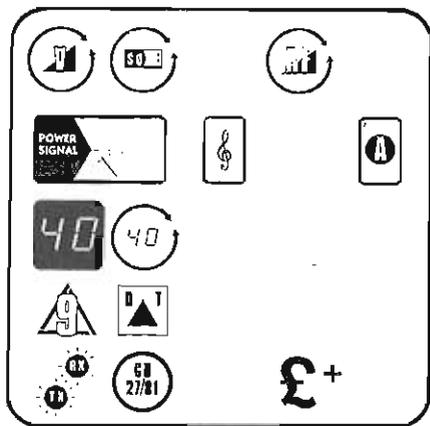
What we are doing in this look at 27MHz FM products is to inform you of what will be available very soon. What we cannot guarantee is that all of the sets on show here are obtainable now. By referring to our specially designed symbols you will be able to ascertain at a glance if the set you want has the functions you require. If you are buying to a budget, and isn't everybody these days, the £± symbol will tell you if your purchase will cost more or less than £70. However, prices can vary considerably from one shop to another and there is still no substitute for shopping around for bargains.



### GLOSSARY OF SYMBOLS

- Channel Change Push Button
- Channel 9 Select Switch
- Extension Speaker Facility
- Public Address System
- 93.4MHz UHF
- Panel Light Dimmer Switch

- Volume Control
- Sustein Control
- Tone Control
- Radio Frequency Gain Control
- Microphone Gain Control
- Signal Strength/Power/SWR Meter
- Tone Switch
- Local/Distance Switch
- Attenuator Switch: Front or Back Panel
- Amount of Channels
- Channel Change Control
- Channel Change on Microphone
- Dolbe Tone Switch
- End Transmission Signal (Roger, Etc.)
- Transmit/Receive Indicator Lights
- 27MHz FM
- Over £70/Under £70 (Retail)



### Harrier CB HQ

The Harrier brand is only obtainable from Dixons stores. Known as the photographic people, Dixons have been diversifying into hi-fi, video and televisions for some time.

The Dixons departure into CB means that both credit and good service will be available on-rigs as well as their more traditional lines. In total Dixons will have five different CB units available plus a comprehensive array of accessories including extension

speakers, patch leads, antennas and SWR meters.



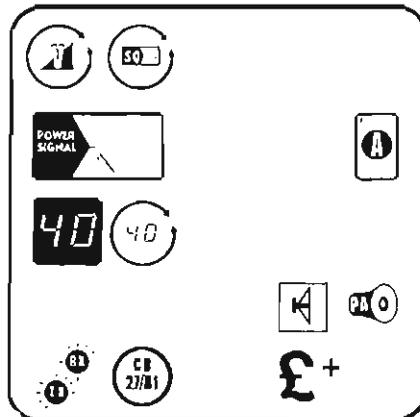
# Products



## The Binatone Route 66

Binatone's clock radios, TV games and personal hi-fi systems can be purchased in most High Streets the length and breadth of Britain and this should soon be true of their CB rigs.

Binatone have published their own guide to CB equipment which although praising the merits of their own brand does give the new breaker some very useful information on installing and using CB generally. You will also find aerials and SWR meters being sold under the Binatone name available from the Binatone rig stockist.



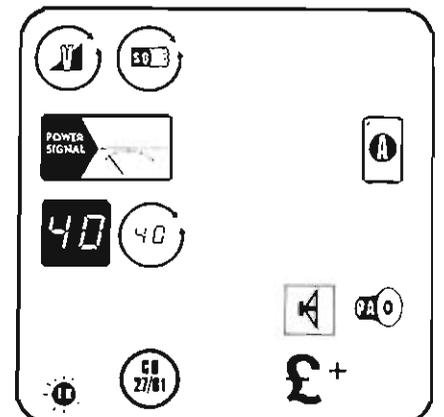
*Binatone*



## Colt 295

Both Colt Radios and HMP antennas (more about HMP later) are distributed nationally by Shellpost Ltd. Known by AM users over the world, Colt are now marketing redesigned FM sets for the UK market.

Whilst Shellpost only supply to the trade, their accessories, filters, meters, antennas, etc., are being stocked by a large number of retail stores through which the Colt FM CB sets will soon be available.



# 27 FM

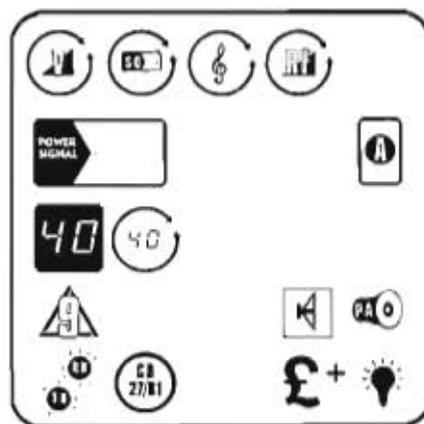


## Cybernet Beta 3000

To say that Cybernet are the world's largest manufacturer of CB rigs is no exaggeration. Cybernet produce rigs for the majority of the so-called 'British manufacturers' under a whole selection of different names.

Just to create a bit of competition, Cybernet have launched their own brand transceivers under their own name which are being marketed by Goodmans Loudspeakers Ltd. Normally Goodmans manufacture and distribute their own loudspeakers which they have been doing successfully for over 60 years. They are the largest speaker manufacturer in the UK and as such will have plenty of established retail outlets ready to

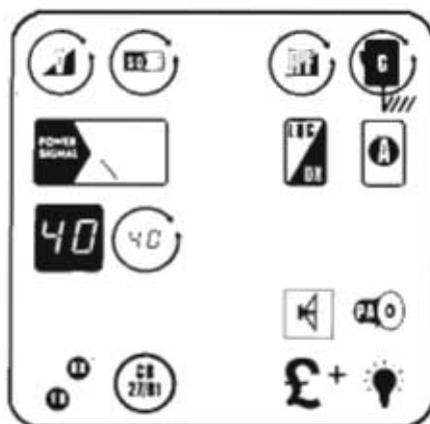
take the Cybernet CB products.



## Midland 4001

Midland have the reputation of being the No. 1 rig in America and through their distributors, Plustronics, they hope to achieve a similar position in the United Kingdom.

Although the casing of each of the Midland rigs may look familiar (they resemble Midland AM sets) the circuitry has been totally revamped to meet British specifications. Plustronics were the first importers of the 5 1/2 in colour TV, so they are not newcomers to consumer electronics.

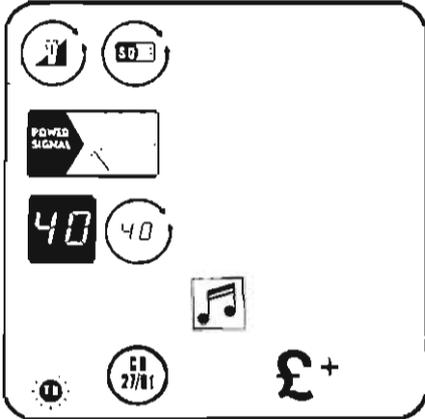


# Products

## DNT Model HF FM (Walkie Talkie)

If you've been looking around the shops for CB, the name DNT should be fairly familiar to you. Our breaker friends in Germany, Holland and France have been using DNT equipment for nearly 20 years.

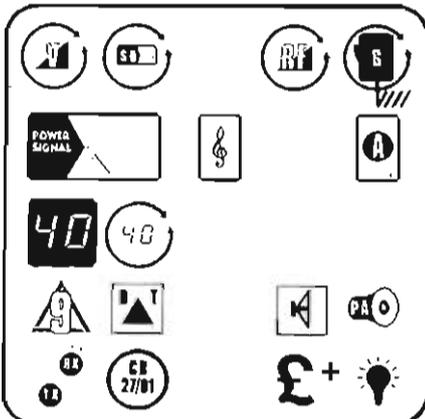
Radiotechnic of Jersey are distributing the four DNT models in the United Kingdom and although the company was originally formed with CB in mind, their combined talents will ensure that both hi-fi and CB shops will be able to sell you their products.



## Barracuda HB940

Barracuda rigs will only be available from Halfords stores. However, this should not make them difficult to find as Halfords have 360 shops in the UK selling car accessories, in-car entertainment, bicycles and much more.

Halfords will have a line up of six rigs plus aerials, SWR meters and their own book called Big Hals CB Guide aimed at the new and inexperienced breaker. In case you haven't already met Big Hal, he's big, butch and handsome and is used to promote CB in Halfords stores.

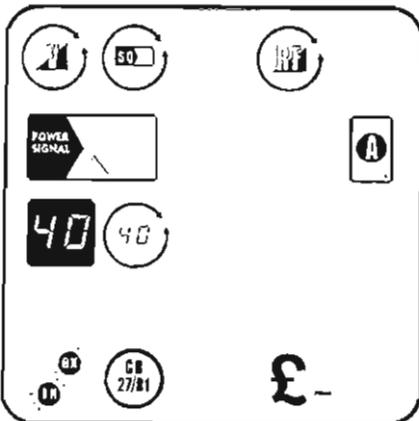
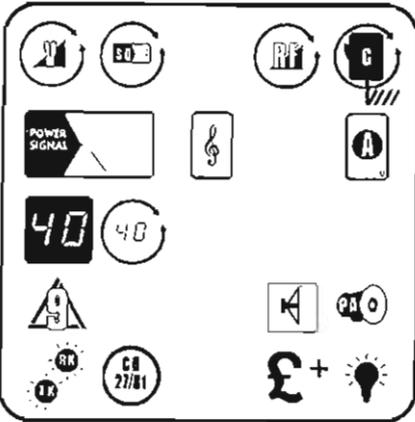
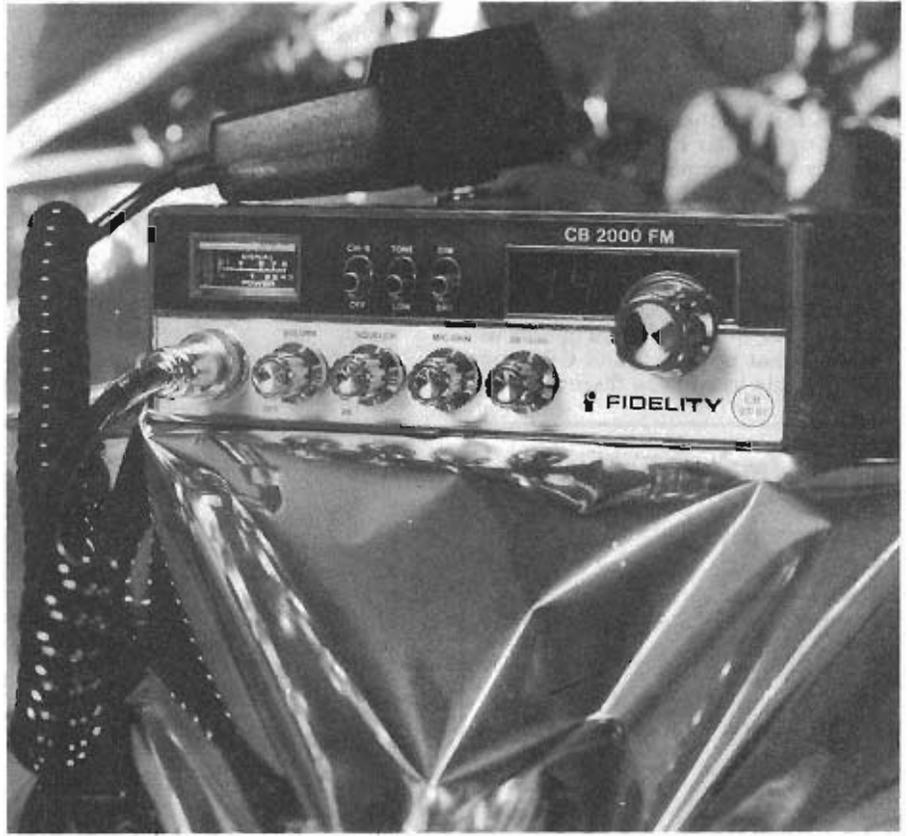


# 27 FM

## Fidelity CB 2000 FM

Hi-fi, music centres, radios and television are all amongst this company's host of products. Fidelity now have two British specification rigs available from many of their normal dealers and through the CB specialist shops.

Fidelity are very enthusiastic about CB and its potential uses and as a company they feel quite able to cope with the supply and service of a very large number of sets. Fidelity will be launching their base station rig during the early part of 1982.



## Grandstand Buzzing Bee Mobile Transceiver

Fairly unorthodox name for a fairly ordinary rig, this and six other models are being marketed by a company called Bee Ware Ltd. The Grandstand range will include two walkie talkies, four mobiles and a base station rig which are all covered by Bee Ware's own in-house service department.

Bee Ware Ltd. are a member of the Adam Leisure Group Ltd., who have

previously marketed TV games, audio products and general games and toys. We are assured that all their rigs will conform to the Home Office MPT 320 and carry the CB/27/81 logo.



# Products

## Your guide to legal antennas

How is it that such confusion can exist over what constitutes a legal antenna? Phone calls should not be directed to us but to 01-213 4050. These are the people who have left the matter of legal CB antennas open to much speculation and interpretation. By the way, the telephone number belongs to the Home Office. We are presenting here what we understand to be legal twigs, in other words base loaded with single elements not exceeding 1.5 metres. We believe that the same type of antenna must be used for both mobile and home base operation.

This contentious issue will only be fully resolved when a breaker gets busted for using an item which the Home Office then pronounces illegal.

## K40

Well known already as the antenna with the money back guarantee, K40 promises to refund the purchase price of the antenna if it doesn't outperform any other mobile antenna on the market. Available with a number of mounts allowing fixing to either boot lip, gutter (standard), magnetic or mirror mount (optional). Available from multiple stores and CB specialists alike.

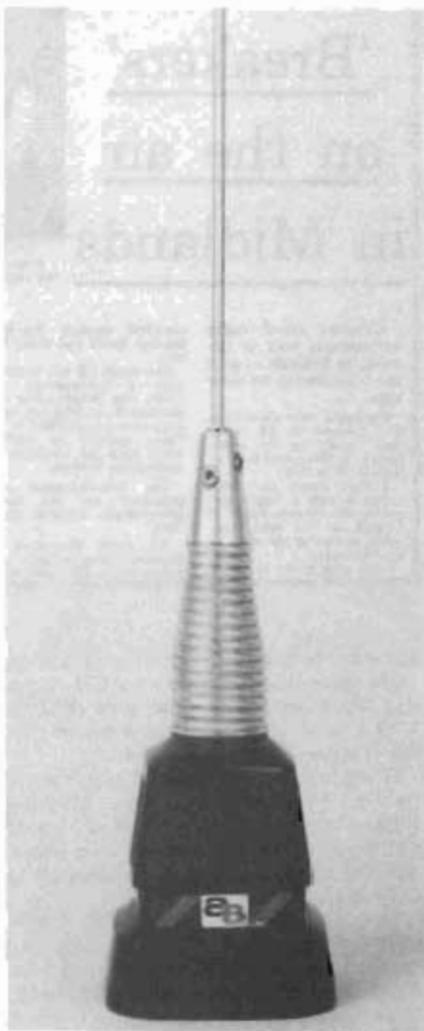


CB Radio December 81

## Antenna Specialists M2000 Super Scorpion

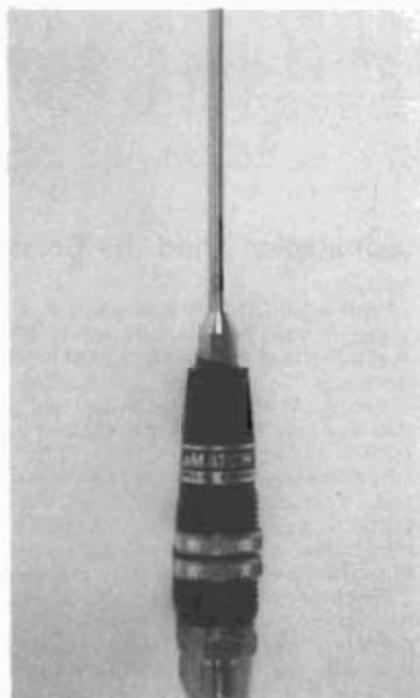
Antenna Specialists have been producing communications antennas for 25 years and at the present time seven of their models meet up to our interpretation of the Home Office requirements.

CB aerials are only one part of Antenna Specialists' total production, the other areas for which they produce equipment are marine, aviation, radio telephone and defence. Some distributors of legal CB rigs have adopted AS products as recommended for use with their sets.



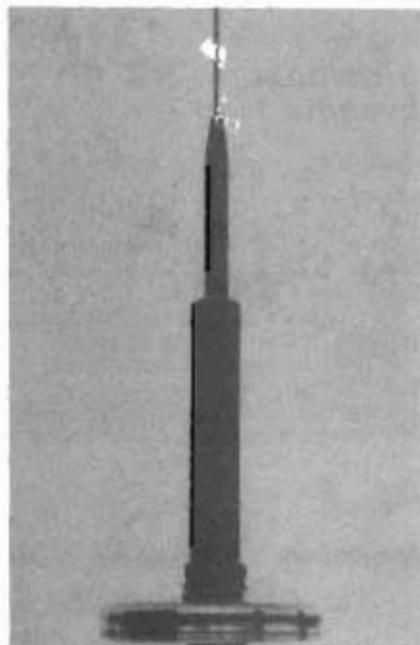
## Cherokee Dial A Match

Cherokee are well established manufacturers of CB antennas. Imported directly from the USA by Breaker 1-9 of Hitchin, Herts, Cherokee aerials are generally accepted as representing good performance antennas at a relatively low cost. Cherokee antennas are easy to spot because of their distinctive packaging which incorporates the face of a macho-looking Red Indian (Cherokee... get it!).



## Wiplash

Marketed by C. Brit of Wembley, who specialise in British-made antennas. Our technical adviser, F. C. Judd, designed this particular 'legal twig' for optimum performance at a realistic price. C. Brit have plans for a legal home base antenna in the not too distant future.



For details of how to install a rig and aerial successfully an article called "Back to Basics" in this month's magazine will be extremely useful. If you are a new breaker, please read 'Back to Basics' before doing anything with your equipment.

# NEWS REVIEW



Legalisation filled the press, but there were one or two different approaches!

With legal CB now firmly within our grasp, it does not surprise me to find that there is still a fair amount of press coverage given to CB related subjects. Although how much longer this will last is totally dependant on public reaction to the newly introduced service. 'If' CB is accepted and frequently used by a large proportion of the public, it will not be long before it becomes as much a part of our lives as roast beef on Sunday.

Whether or not it will be accepted is not something that I would be prepared to lay money on, but I think it is safe to say that there will be a rush to buy the legal rigs, if they are available in sufficient quantities to meet demands.

Another point that I would not like to gamble on is whether FM sets prove any less prone to interference than their AM counterparts, but as this is the Lark in the road as far as British CB is concerned there is bound to be a certain amount of indecision as to which road to take and indeed where it will lead us.

CPD

## Birmingham Evening Mail

### 'Breakers' on the air in Midlands

Citizens Band radio enthusiasts took to the roads in Solihull - with the Law firmly on their side.

The public were given their first glimpse of CB being used legally on the road during a demonstration at Solihull Civic Hall.

A Ford Fiesta car, fully equipped with a 'rig', took enthusiasts through roads of Solihull for the first legal public testing of CB radio in the Midlands.

## Morning Telegraph

### Coroner warns tuned-in drivers: CB user died receiver in hand

A coroner yesterday spelled out the danger of motorists using citizen's band radio while driving, following the death of a young mother.

Barbara Susan Hadfield, aged 26, who had two children, died after her

Mail Solihull reporter

Adrian Faber

looks at the CB scene

## 'Breakers' on the air in Midlands



Penny Bartlett - call sign Wicked Lady - from Shard End, talking on the legal CB radio rig from Solihull Civic Hall to reporter Adrian Faber in a car somewhere in the town.

Citizens Band radio enthusiasts took to the roads in Solihull - with the Law firmly on their side.

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A Ford Fiesta car, fully equipped with a 'rig' took enthusiasts through roads of Solihull for the first legal public testing of CB radio in the Midlands.

travelled through Knowle, Bentley Heath and along the M6.

The small CB set, smaller than a conventional car radio, was fitted under the dashboard, picking up messages and transmitting to the "base stations" at Solihull Civic Hall, as hundreds of enthusiasts listened.

The demonstration was organised by the South Birmingham Citizens Band Club.

Mr. Keith Townsend, of Yardley Wood, national secretary of the CB Association,

is one of the few people who have been granted a licence, granted by the Home Office before the official date of November 1, when CB becomes legal, so that he can put on demonstrations.

Under his licence, members of the public nominated by him are allowed to use the sets.

Mr. Townsend has written a book - Citizens Band: the FM Way - which will be published on the date CB goes legal.

The CB radio licence will cost £16. Fitting up with a

'rig' from scratch will cost between £70 and just over £100.

Then you will be all set to join the world of CB, which enthusiasts say not only provides a lot of fun and the chance of avoiding some of the worst traffic hold-ups, but is also an invaluable lifeline to disabled motorists and other people in emergencies. Some enthusiasts think too that some CB becomes commonplace, some of the special language of the "breakers" - such as calling the police "smoke" - will begin to die out.

car swerved and crashed into a lorry while she was listening to CB radio, the Chesterfield coroner was told.

She still had the receiver in her hand when she was found.

Recording a verdict of accidental death, the coroner, Mr. Michael Swanwick, said: "These radios should not be used while driving, and those who do so are putting themselves into considerable danger."

Mrs. Hadfield, of Wharfe Lane, Stonegraves, Chesterfield, had the radio hand-set fitted in her car four days before the fatal crash at Syday Lane, near Barborough.

She was driving towards Spinkhill when she collided with a National Coal Board lorry travelling towards her.

The lorry driver, Mr. Phillip Chapman, of Bainbridge Road, Boisover, said the car seemed to be travelling fast round a sharp bend. He expected it to brake but it showed no signs of slowing down and crashed into the offside of the lorry.

Mrs. Hadfield was found in the wreckage of the car by Mr. Keith Hurst, a micro-film consultant, of

Ruthyn Avenue, Barborough.

"She still had the transmitter in her hand and there were loud noises coming from it," he said. "There was also a pad with a list of call signs beside her."

## Daily Mail

### Warning: CB can damage your engine

Citizens' Band radio, which became legal on 2 November, is worrying British car development engineers and fuel economy experts because it could interfere with your engine's running efficiency, they say.

Development engineers at one of Europe's biggest car research centres say that CB radio if not properly screened inside a car could upset a modern computer-controlled engine.

The research experts say that uncontrolled transmissions from a set could upset electronic fuel injection, transistorised ignition and even cause a double spark, creating engine damage.

Modern engines on upmarket luxury cars, such as BMW and Mercedes Benz, are being equipped with computer control for engine management and maximum fuel economy. Many more cars also have fuel injection and transistorised ignition. The research experts say that radio interference from a CB set inside a car could affect electronic advance-retard systems, so affect the engine ignition sparks and in turn alter running efficiency, performance and fuel economy.

So if you decide to fit CB radio into your car make sure that you can do it properly, or have it done by experts and ask them to ensure that it is adequately screened inside.

## Daily Mirror

### Will CB come to the rescue?

Frightened tenants are asking the Home Secretary if they can form a vigilante group - using CB radio.

They claim police are not protecting them from a wave of vicious muggings and robberies on their giant housing estate.

And members of the official tenant's association at the 900 home Nightingale Estate in Lower Clapton, London are determined to take the law into their own hands.

The group, led by unemployed Ray White, had 25 people keeping watch on the tower blocks of the GLC estate for six weeks. They claim the spate of muggings and robberies halted dramatically.

"There aren't enough police," says Mr. White, "That's why pensioners are being mugged in the streets, the front doors of the flats are being kicked in and the people inside terrorised."

Mr. White says some tenants are already using illegal CB radios and a mobile base, to keep watch on the estate.

But local police are not convinced about the vigilantes. "It's true there are muggings and robberies on the estate, but taking the law into their own hands is not the way, and can only lead them into trouble," a spokesman says.

"We have a special squad able to handle this, and we are also advising tenants on extra security."



## Daily Express

### CB on the air, and it's legal

"Britain tuned in to CB radio legally - for the first on 2 November," we are told by Graeme Boyd of the Express. "As the new breakers were taking to the airways, the police were keeping a sharp eye out for those using illegal AM equipment," he said. The first 'official' call on the 2nd was made by American "Father of CB, Al Gross, who supposedly bought the first licence at Trafalgar Square Post Office. Al Gross spoke briefly from his Rolls-Royce to 'Tasmanian Devil', who was parked nearby in a Jaguar. Al, from Cleveland, Ohio, founded the American CB system back in 1947 and campaigned for many years to get it legalised. Friends who queued overnight on Al's behalf, in order to be the first into the Post Office, said that they were honoured to have queued for him as he was their hero.

## The Journal

### Invalid's lifeline saved by the Law

Invalid Noreen Makim, whose CB radio lifeline to the outside world was under threat from the authorities, has been saved by the Law. Noreen, who lives in South Shields, suffers from a crippling disease and claims that she relies on her CB friends to keep a constant watch on her condition. She said, "I can't tell you what a wonderful relief it is to know I can go on the air

legally. I was terribly worried waiting for them to take my AM set away." A strong warning was also issued yesterday by the Coastguards to any breakers intending to use CB as a substitute for the more expensive marine radio, which operates at VHF frequencies and is capable of directly contacting the Coastguard station.

## The Times

### Fading fad across the Atlantic

In the United States the CB fad has faded. From a peak of 15 million licences reported by the FCC in October 1979 the number has dropped by one third to less than 10 million. The licences are being deleted at a rate of 300,000-500,000 a month.

The CB boom in America was a result of the 55 mph speed limit introduced because of the 1973 oil embargo. The truckers, whose profitability was threatened by the limit, used their CB's to maintain speed whilst avoiding detection by 'The Smokies'.

### Alarming snore

A CB enthusiast who fell asleep beside his set started an alert in Nottinghamshire. Mrs. Ann Bonnes thought that the loud snores on her set were a distress signal. She told the police that she thought a man had suffered a heart attack, and put out an emergency call. The situation was smoothed over later on.

## CLOSE-UP

VIGILANTES

### Will CB come to the rescue?

FRIGHTENED tenants are asking the Home Secretary if they can form a vigilante group - using CB radio.

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"We have a special squad able to handle this, and we are also advising tenants on extra security."



# The Shape of CB Rigs to Come

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

## CB1000FM



from around £70 inc. VAT.

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

## CB2000FM



from around £90 inc. VAT.

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

# Fidelity i

SOUND & VISION

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# Readers Write

Dear CB Radio,

How's this for a *FIRST*?

Saturday, 3 October, purchase Avanti Moonraker, spend two or three hours fitting to Ford Capri hatchback, co-ax under carpets, etc. Looks trif on wheels. Now sit back and wait for rigs to come on sale at local emporiums.

Saturday 23 October (2.30pm) couldn't stand the sight of legal FM rigs in Dixons shop window, had to go in and eyeball a Harrier CBX 40 channel. Looks great, can't resist it, buy it with newly acquired Access card. Race home chuffed to little apples with rig (3.00pm). Proudly show it to Mum and Dad. We all sit in wheels to agree on best location. Everyone says on tunnel in front of gear lever, tilted up at an angle is ideal. Tools out of box, commence to drill holes, etc. All fixed, looks great, SWR'd - peak efficiency, no problem. (4.30pm) Go to seat cover's and show off new rig. (7.30pm) Come home, settle down to watch Wild Geese on the box.

(Midnight) Seat cover wants to go home. Pouring with rain outside, get broly and rush to Capri! 'Eillo, 'ello, wats all this then. Car door open. Quick butchers inside. Can feel brain haemorrhage about to start. Mouth all dry. Can't speak. "BLOODY RIG'S GONE!" Co-ax cut, Moonraker followed rig down road.

Inform local smokes.

Come back, Buzby, all is forgiven.

Mark Thornsbey (Sevenball)  
(Paint Town)

Dear Sir,

I'd like to start off by congratulating you on what I consider to be Britain's best CB magazine. Currently a little bit 'Good Buddy' for my personal taste, but still interesting reading. Hopefully the 'Good Buddy' style will gradually be replaced by serious hobby radio content as it was in Australian CB publications, and hopefully your readers will follow suit with their operating procedures. Nothing sounds more ridiculous than a Yorkshireman attempting to talk American CB slang in a phony Alabama accent, don't y' all know, 10-4, Rubber Duck, c'mon.

I have been writing columns and articles for Australian CB magazines for the past three or four years. (I'm commonly referred to over here as 'The Nastiest B..... on radio' and if you ever read any of my scribbblings you'll see why).

I'm all for CB radio and have been since 1965, long before it became the 'in thing'. I take no sides in the 'legal versus pirate' argument. To me, radio operators are radio operators, regardless of whether or not they hold a licence. This attitude has brought

me mountains of hate mail from the 'Good Buddy' set over the years, but the fact remains that, without the pirates of the sixties and seventies, there would be no Citizens Band Radio Service in Australia today.

Our Department of Communications saw fit to offset us from the rest of the world right from the start by cramming their 18 channel allocation down our throats in the face of opposition from practically everyone who had any interest in the matter. Now DOC has realised that the American 40 channel system is the only way to go, and this will be legalised on January 1st. next year. (We also have a 40 channel UHF-CB service on 476/477 MHz, but only a very small percentage of operators use it).

Looks like your Home Office Radio Regulatory boys are all set to make the same mistake over the 27MHz issue as our DOC made years ago. It seems a shame to me that Government Departments everywhere seem incapable of learning anything from the stuff-ups of others. Perhaps they have nothing better to do than waste their time, and our money.

I don't wish to incite anyone to break the law, but I feel that if a particular law is patently unjust then it is up to The People to have that law changed. If the only way to accomplish this task is by the pressure caused by mass defiance of that law (by operating a 27MHz CB radio illegally in this case) then piracy is the only weapon available to The People.

If British CB'ers want the American 40 channel system to be legalised then they're going to have to fight for it, just as we had to fight for it here in Australia. If they wait for a bunch of silly old poofers who ponce about in top-hats and wing-collars to get off their collective arses and hand it over on a silver platter because of a few miserable begging petitions and letters from voters they'll be waiting a long, long time.

Good luck in your second year.  
South Pacific Radio

Dear Sir,

Could you please resolve this matter for me. I have just purchased Peter Chippendale's The British CB Book the problem being Page 197 The Law. It states, it emphasized that there is no power under the W.T. Act for the Smokeys, Buzbys and Customs to detain any apparatus for evidential or any other purpose apparatus may only be removed with the owners permission, yet in your Oct. '81' edition Page 61 heading Who can detain your rig? Quote: As previously stated the customs and excise

management act 1979 empowers the police to seize or detain anything liable to forfeiture under Customs and Excise acts. The British CB Book is marked publication 1981. Could you explain the difference in facts as this could have serious effects on other good buddies.

10-10 till we do it again  
Spiderman

*The honest answer is dear old Peter doesn't know our October 81 edition contains the correct information as does the July and August, with the facts in these three issues you will know the whole situation. So will Peter and no doubt any future re-writes will be correct.*

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Unless its help you need.

German Shepherd.  
Leeds.

Dear Sir,

I am a great fan of SSB and enjoy DX'ing a great deal. The new FM system is of no use to operators like myself, as it is designed only for short range communication, many people will say 'why not become a radio amateur' well it's just not that easy if you pass the R.A.E. club test - you can use only VHF bands ie: 2 metres which is not really intended for DX'ing abroad. To get on the HF bands you have to pass the class 'A' test which involves morse code tests - I think this is ridiculous if you don't intend to operate morse equipment, - another thing is the equipment costs about 3 times as much - so why bother.

I will carry on the fight for 27MHz AM SSB to FCC spec. and I hope other breakers will carry on.

73 & 51  
Bravo Mike Oscar  
Bimbo - North B'ham

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# Rig Test

# HARRIER

# CB

## The Harrier CB from Dixons, their basic rig

Having started our legal rig tests last month with a practical look at how they perform, this month we can get right down to facts.

The first thing you should look for in any magazine review is how the test was carried out and on what equipment. When CB started in America, many magazines had no facilities to accurately test equipment, thus reports run by some magazines literally amounted to "Oh, this is a nice sort of rig (*Thinks to himself, 'They advertise with us, I'd better give it a good write up' or 'They don't advertise yet; maybe they will after this'*). Well it works and it has some lovely fiddly little knobs. I would definitely recommend this one." Then to bolster up the review and make it look good a few of the manufacturer's facts and figures were thrown in and Hey Presto one review. In some cases the magazines often printed the manufacturer's own test! Naturally this procedure was easy and a nice way out for the editorial staff but not really cricket, eh, what!

Now with our own British system this lax method of reporting or so-called testing may happen, so beware and don't accept a review on face value.

### Our guarantee

Rig tests printed by us will be factual, based on carefully obtained data and they will be truthfull. We happen to believe that a test which could easily swing the balance and help you decide which set to purchase needs to be covered in a responsible manner and not a light-hearted, "this one's not bad", attitude. Therefore, we offer readers and manufacturers alike the following guarantee:

**GUARANTEE**  
to readers and manufacturers

Any information printed as a review bearing this guarantee will have been carefully obtained and based on facts.

The equipment tested will have been inspected to ensure it has not been tampered with or modified to improve its performance in any way. Any faults and/or modifications will be noted and depending on the severity reported on. Equipment for testing that was found to be seriously faulty will not be reported on and the manufacturer will be asked to supply a second item for testing.

In all instances there will be taken to avoid disputes or errors. However, if a dispute does arise over the following book will have to submit and the company concerned.

Now all that remains is for you to understand and get the most out of the test.

### Dixons

Dixons, that well known High Street

chain, surprised quite a few people in CB - including us. It was a foregone conclusion that CB would be covered by and retailed through the Dixons chain; the surprise really came in their announcement.

On 20 October, 14 days before legalisation, we received a phone call informing us that deliveries were taking place and most of the 240 branches would now have stocks. Prior to their call we were wondering if any shops would have stock in time for 2 November. Dixons had kept quiet and beaten everyone else.

Two transceivers are available from them, the Harrier CBX at £99.99, one penny beneath the hundred pound mark and the Harrier CB at £69.99. Obviously the 99 pence psychology plays a large part in the Dixons price structure and with Christmas almost upon us we decided to look at the less expensive of the two rigs.

### The Harrier CB

Constructed in Japan, the exterior is black plastic-coated aluminium which butts to a black plastic face plate. This has grey aluminium trim printed and designed to display the Volume, Squelch, Channel Change, Channel LED, Signal Power meter and TX light. The loudspeaker is mounted on the underneath surface and the grille is covered internally with a fine mesh to prevent dust getting inside.

### Microphone

The socket is a four-pin screw type mounted on the left hand side of the case. This would stretch the lead if the set was mounted centrally in the car and operated by the driver. All transmit and receive switching is done via the microphone so the receiver will not operate without the microphone connected. This is quite normal to most CB transmitters.

### Internal construction

On the whole this is quite good. It is not a converted or modified AM set but a purpose-designed FM unit. The soldering is generally good but the revue sample failed to work when first connected. This was found to be due to two minor faults; a dry joint on the crystal caused no TX/RX and secondly a poor solder joint on the microphone plug. Both faults were easily repaired



and we understand that the set would have been exchanged immediately by Dixons.

"However, the worst comment regarding internal assembly is that on many of the components their legs were rather long and the cutting machine had bent them over. Thus one or two of the remaining stumps were almost touching other parts of the circuit, as the printed circuit is coated then if these stumps were to touch they would be somewhat insulated. With the test set there were no cases where the circuit was bridged or touching the board.

This criticism may already not apply to sets as in all honesty time must have played a major role in their construction to meet the November legalisation deadline with the first consignment of Harriers.

### Transmitter test

The major equipment used to conduct this test was:

Racal 9081 and 9082 signal generators.

Marconi TF42F distortion meter.

Marconi TF340 audio power meter.

Racal 9916 frequency meter.

Racal 9101 and Bird 43 power meters.

Racal 9009 modulation meter.

Levell TG150D audio generator.

Solartron AS1412 power supply unit.

### Power output

The high power operation is fairly good and would give just under the legal maximum output power at the normal car voltage of 13.8 volts. But with the attenuator or low power switched in the output was 13dB, which is more of a reduction than the necessary 10dB required by law.

It is possible that this could be corrected by an internal adjustment but as the circuit of the equipment was not supplied, we were unable to determine this.

Atten.	Supply Voltage		
	10.8 volts (weak)	13.2 volts (average)	14.5 volts
Hi	1.8W	3.3W	4.0W
Lo	0.05W	0.15W	0.21W

### Frequency

The maximum amount of correct frequency is at cold temperatures. This was 110Hz.

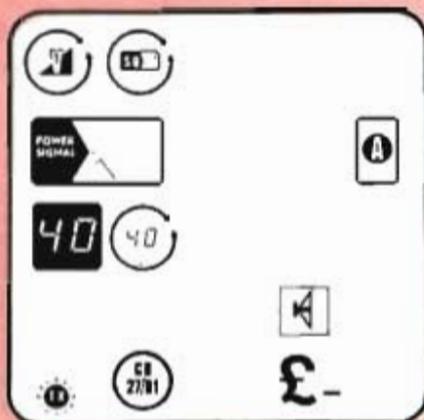
Operated at room temperature the frequency was within 100Hz, which is a very good result.

The channel spacing was 10kHz and was accurate across the full 40 channels.

Temp.	CH1 (MHz)	CH40 (MHz)
48°F (cold morning)	27.60136	27.99136
68°F (room temp.)	27.60126	27.99126

### Modulation

For this test the peak deviation is measured and an audio tone fed into the microphone connections.



Input Levels	Input Frequency		
	500Hz	1125Hz	2500Hz
0.5mV	0.2kHz	0.3kHz	0.20kHz
1.0mV	0.25kHz	0.7kHz	0.25kHz
2.0mV	0.50kHz	1.4kHz	0.60kHz
50mV	1.00kHz	1.5kHz	1.00kHz
200mV	1.00kHz	1.5kHz	1.00kHz

Modulation limiting appears to be good and confirms that FM equipment should not use 'power mics'. Full deviation is possible at normal voice levels and any increase of audio input (i.e. power mics) would probably lead to distortion.

### Receiver test

#### Audio output

Measured into an 8 ohm load at 13.2 volts supply:

1.5 watts	1.6% distortion
2.35 watts	10% distortion
3.50 watts (max)	28% distortion

At the rated output (1.5 watts) distortion is very low and totally inaudible even at 2.35 watts and 10% distortion the quality is good.

#### Squelch level

Threshold - 0.1uV (microvolts).  
Fully muted - 7.0uV.

We consider this to be a good adjustment range. It is possible to set the squelch to cut out all but the worst interference and when radio conditions are quiet, it can be set to open on the very weakest stations.

#### Receiver sensitivity

This, too, is a good result and means that the equipment is able to hear signals as weak as the radio conditions would allow, i.e. the range obtainable will not be dependent on the radio but on the amount of interference that is on the frequency at the time.

10dB quieting at 0.16uV
20dB quieting at 0.50uV
30dB quieting at 1.80uV



### Summary

Our overall impression of this set was good. Whilst some of our figures do differ from the manufacturer's, it should be noted that this set was obviously one of a batch and manufacturing tolerances do fluctuate.

Manufacturer's Specifications	
<b>General</b>	General
Channels	40 digital PLL synthesised
Frequency range	27.60125-27.99125
Operating temperature range	-5°C to +45°C
Power source	10.8 to 15.6V DC reversible ground (13.2V nominal)
Current drain	(1) Transmit, 1.5A nominal, (2) Receive, 1.2A nominal
Dimensions	Width 162mm Height 55mm Depth 201mm
<b>Transmitter</b>	6F3 (FM)
Emission	4W
RF power output	<±1.5kHz
Frequency tolerance	>10dB
RF power attenuator	500 to 2,500Hz
Frequency response	>±1.5kHz @ 1,250Hz audio
Frequency deviation	<10 microwatt
Adjacent channel power	
Spurious emission	(1) <50nW within the following frequency bands: 80MHz-85MHz 87.5MHz-118MHz 135MHz-138MHz 174MHz-230MHz 470MHz-862MHz (2) <0.25 microwatt at any other frequency
<b>Receiver</b>	
Conversion system	Dual conversion superheterodyne
IF	10.695MHz 1st and 455kHz 2nd
Channel display	Digital 7 segment LED's
Audio output power	>1.5W into 8 ohm
Sensitivity	<1 microvolt @ 20dB S/N
Adjacent channel rejection	>40dB
Spurious emission	<20nW
Squelch sensitivity	1 to 10 microvolt

### NEXT MONTH The Amstrad 901 and the Fidelity 2000

Our sincere apologies for only one rig test this month. The other rig we were given was not up to specification. Sorry.

# BACK to BASICS

Two of the most basic operations to CB are installing and SWR'ing a rig and these are the operations that cause most grief to a CB'er - and the most damage to a rig! This feature will give some basic advice on how to cope with installing and SWR'ing and we shall be repeating it regularly for new breakers.

Having purchased your rig, the next decision is the antenna. This is a personal choice (and fairly restricted if you are sticking to the legal types). From our point of view the decision you need to make is whether you want to mount the antenna on the bodywork and actually drill holes, etc., use a mag mount (an antenna with a magnetic base which will 'stick' to the metal bodywork of a vehicle) or a gutter mount which clamps on to the gutter of the car. The problem with the

last two is running the cable into the car. The location of the antenna on the car will influence the radiation of your signal - see diagrams. Location of the set is also down to you but remember you need to change gear, your passengers might want to use the set and you should be able to reach it easily to change channels without running down the pedestrian population of your area. Some breakers leave the rig loose on the parcel shelf or use a slide mount for easy access.

The basic instructions for connecting your rig and/or antenna will be included with them and you must go by their recommendations. The following points are to give some extra help but they are only general and if you really have problems then go to a professional or 'someone in the know'.

Using the patch lead connect the meter terminal marked CB or TX to the rig antenna plug.

4) Switch on the set and turn to channel 20. (It is anti-social to SWR on any of the breaking channels). Switch the SWR meter to 'Forward'. Press the transmit button. The needle on the dial will move. Adjust the knob on the meter until the needle swings over to give the maximum reading (often marked SET or CALIBRATE).

5) Now switch the meter to 'Reflected' and key the transmit button. The needle should drop back and give a reading along the marked scale. If less than 2:1 there is no real need to worry

You will find on all antennas a provision for adjusting the mast length. To find if it needs lengthening or shortening take two readings, one on channel 1 and the other on channel 40. If the reading on 40 is higher than on 1 then the antenna needs shortening. If lower on 40 than on 1 the antenna needs lengthening. MAKE VERY SMALL ADJUSTMENTS each time until the reading is satisfactory. If you need to actually trim the mast with a hacksaw, as opposed to sliding the mast up and down, cut off a minute amount each time. It is very easy to cut off/adjust too much.

SS

## Fitting the rig

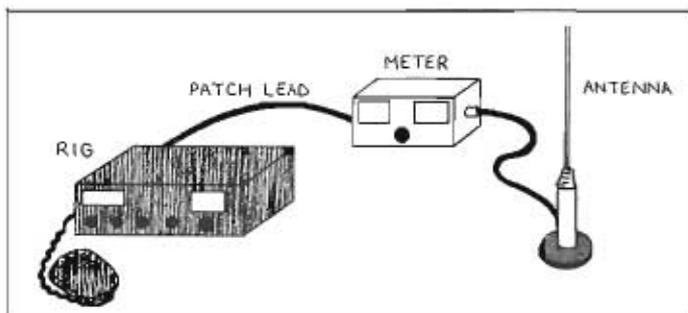
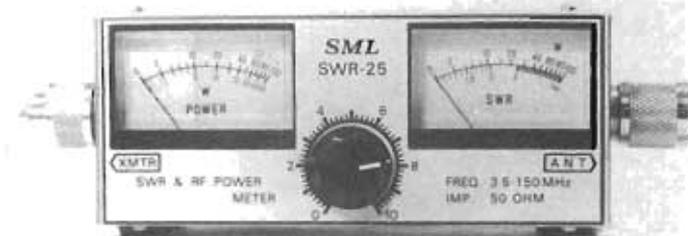
- 1) Make sure the mounting area is suitable and strong enough.
- 2) Ensure that you don't drill through the wiring or instrument panel.
- 3) Check that the wire carrying the power comes from a fused source or that an in line fuse is fitted.
- 4) Don't try putting a 12V rig in a 24V lorry or a 6V car. They don't mix!
- 5) Connections direct to the battery ensures no voltage drop and helps eliminate engine noise. You can run the feed from an ignition switched accessory terminal on the fuse box.
- 6) Check there is provision for the power lead in the bulkheads you pass through or that there is free space for a hole.
- 7) Cars are either positive or negative ground. CB's are also positive or negative earth (although some sets are dual polarity). Most modern cars are negative. Negative sets cannot be installed in positive cars and vice versa. Consider this when buying a rig.
- 8) When connected do not try to transmit without the antenna correctly installed, sited, in circuit and SWR'ed. (Transmissions whilst SWR'ing should be as brief as possible).

## SWR

SWR stands for standing wave ratio and gives a reference figure for how much of the transmitter power is actually radiated away from the antenna and how much is reflected back down the co-ax to the set. How much is radiated away depends on the physical or electrical length of the antenna and it must be tuned correctly to cover the frequency used. The figure is expressed as a ratio, i.e. 3:1, 2:1 or 1.5:1. You should concentrate your efforts into getting it as much below 2:1 and near to 1:1 as possible. If substantially higher you won't 'get out' too well and you could permanently damage your set.

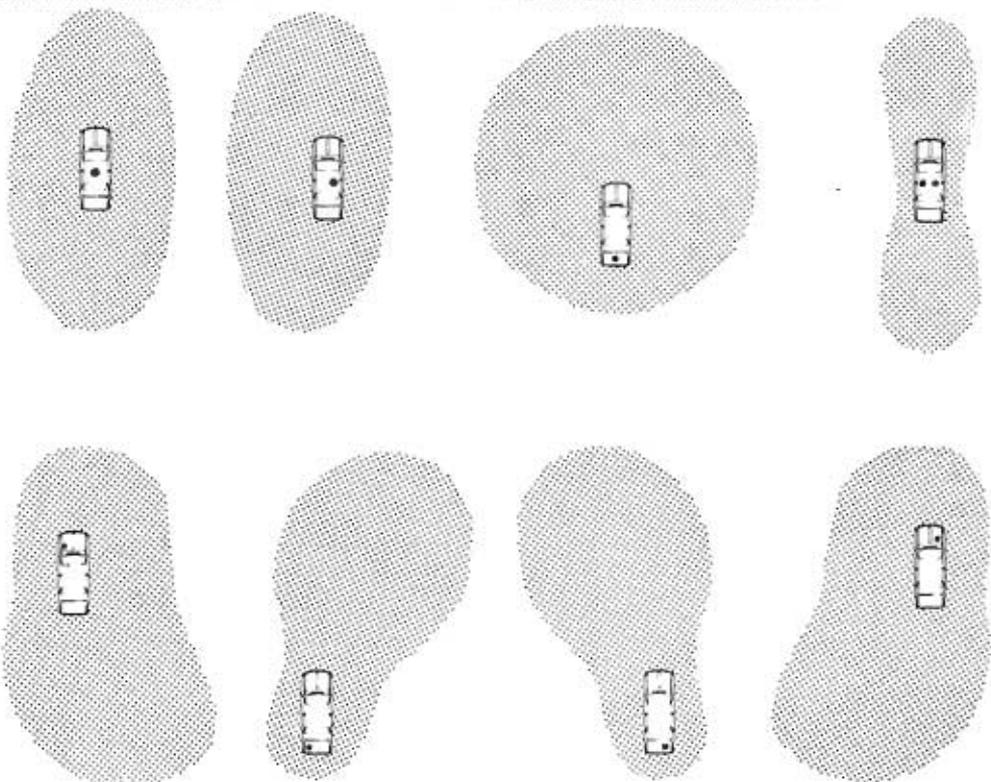
You need:  
SWR meter (some rigs have a built-in meter - instructions will come with the set); a patch lead - a short piece of cable with PL259 connectors at both ends.

- 1) Park the car in a relatively open space, away from large amounts of metal, lamp-posts, trees or buildings.
- 2) Make sure car doors, boot and bonnet are closed.
- 3) With the rig switched off, disconnect the antenna co-ax and connect it to the meter terminal marked ANT.



## Installing the antenna

- 1) The antenna should ideally be mounted as high as possible. The higher the percentage of the antenna length mounted above roof-top the better the performance.
- 2) Put the cable as far away from noise sources as possible (ignition systems, etc.).
- 3) Mount antenna with a good metal to metal ground, removing paint, mud or rust where the antenna is to be mounted.
- 4) AVOID ANTENNA CO-AXIAL CABLE DAMAGE. This is the problem with mag or gutter mounts as the cable will need to pass through the window or door opening. Shutting the window or door on the cable can cause damage to the cable and consequently to the set.
- 5) Again, before drilling, check that you aren't damaging anything (like the petrol tank!) and that there is enough free space for any mountings.
- 6) Make sure that the cable can lead to the rig without kinking, stretching or working against anything. DON'T WIND UP EXTRA CABLE INTO A TIGHT COIL. This can drastically influence the performance of the antenna.
- 7) Use proper, soldered connections and make sure that all plugs, etc., are screwed tightly. Don't leave cable and connections hanging or where they can be pulled or damaged.
- 8) If you need to lengthen the existing cable or buy new co-axial cable it must be RG58U 50 ohm cable.
- 9) Still don't transmit! Wait until you have SWR'ed and are satisfied with all the connections and installation.



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# FREE RADIO

An alternative radio or determined lawbreakers?

As a CB magazine it has always been our policy to write about just that and to not get sidetracked into other, sometimes irrelevant, subjects. However, there is a whole world of broadcasting which is very much less than legal or official and this covers many elements other than CB.

Pirate or Free Radio has a healthy tradition both in this country and Europe, and in many respects takes over where CB leaves off. So what exactly is Free Radio? (Note: I have used the term Free Radio as a courtesy to its 'members' who get very upset at being called pirates). The truly unofficial broadcast is one which is spontaneous with little or no organisation and definitely no official backing. The transmitting station is run by one person or a small group of friends who use a part of the radio frequency not permitted or licensed for them, to broadcast an almost personal programme choice.

However, some stations are unofficial but have or had a thinly disguised commercial or political backing. The pirate offshore stations of the 60's such as Caroline, Radio London and Radio City had financial support from backers and advertisers and deserve our gratitude for breaking the Government's stranglehold on entertainment broadcasting. Political stations that have flourished, for example in Spain and Ireland, have been supported financially by the political party involved. These types of stations are the exception rather than the rule.

The roots and traditions of Free Radio are very similar to illegal CB. Both use parts of the radio spectrum they are not permitted to use and incur the wrath of the authorities for doing so. Followers of both hobbies go to great pains to avoid identifying themselves too closely and share the atmosphere of friendship and almost elitism that comes from being illegal. Both have a steady stream of rumours circulating around and both crusade against what they regard as unjust laws. Free Radio broadcasters break exactly the same laws (i.e., Wireless

Telegraphy Act) as illegal breakers. The one crucial difference is that breakers use CB for their own entertainment but in addition to that, broadcasters hope to offer entertainment or enlightenment to others. The other difference is, of course, that while Britain, in common with other countries, has at least been given an official CB service, it is most unlikely that individual broadcasting for entertainment will be legalised.

Many stations depend on music presentation, often covering tastes not catered for by existing 'legal' broadcasts, e.g., advanced forms of rock and soul music. A lot of stations, however, feature more middle of the road music but feel that their presentation is less formal and more lively. They hope they are independent of the disadvantages and pressures of official radio without the

very disreputable overtones which the label 'pirate' gives. However, music or pop isn't the only subject for Free Radio. At one time Jesus Radio produced half-hour programmes combining classical music with religious services derived from the Book of Common Prayer. Unusual but compulsive listening. Political stations have their say and alternative technology is a popular subject as people have become aware of the need to conserve energy and the ecology. Radio Verte in Paris concentrated on ecological subjects and tied in with the more politically-minded supporters active in France. The Voice of Comtek (community technology) started listeners in Bath by replacing Radios 1 to 4 on the FM band and urging listeners to give up their cars in favour of bicycles.



Most stations operate on a tiny budget and at a complete loss to their organisers. They are, however, always pleased to get signal reports and will usually answer with a QSL card and more information on the station. Most stations give out regularly a contact address for signal reports, requests and general correspondence.

A lot of broadcasts are concentrated in the short wave band, especially around 6200-6300KHz, although some (particularly British) are using the medium wave to capture a large audience. Transmitting equipment is often home brew and studio equipment sparse but stations often make up in enthusiasm what they miss in gadgets.

Listening to Free Radio is as big a hobby for listeners as producers and the wave of amateurly produced magazines are obviously aimed at clandestine listeners as well as active participants. Free Radio is growing at an amazing rate and parallels the growing dissatisfaction with the government practice of licencing themselves and their 'friends'. People inside the Free Radio scene feel they are gaining support from the CB hobby as some CBers are finding that they enjoy broadcasting but are not getting enough from a 'social' CB service. Consequently they are turning to unofficial radio for the satisfaction of a more publicly entertaining service.

However, some illegal station broadcasters feel that CB has been a 'trial' for informed transmitting and has proved a failure, when, for example in the USA, the sheer number of stations has made it impractical for even the lowest of technical regulations to be enforced. They consider that by remaining unofficial they offer a challenge to political thought at the



CB Radio Magazine would like to thank 59 Hobby Radio for this cartoon portraying their view of radio piracy.

present time and that by staying illegal will maintain a self-policing system and self-enforced standards. There is, however, considerable lobby to have a part of the spectrum reserved for unofficial broadcasting.

Whilst researching this article, I became aware of a vast network of broadcasting which is largely unknown by the public but has a lot of support from its fan. Of course an article of this nature is necessarily full of generalisation and I expect we will receive mail from those who will disagree with

points raised. As Free Radio has so many similarities with CB and is a largely unreported field we will be running a series of articles to cover some subjects in greater depth. In the following months we hope to feature the British, European and American situations and a visit to a radio station. These articles are based on research and not practical experience and I would be grateful for any information or help from those more closely involved.

SS



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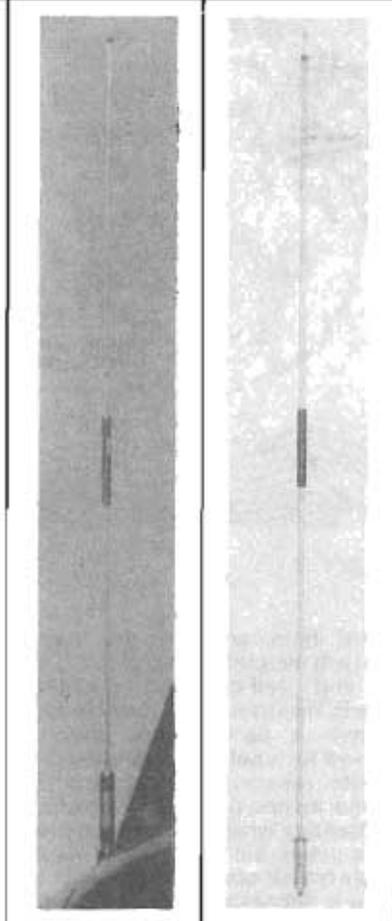


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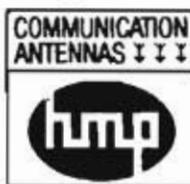
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# Round Up

## Al Gross at Trafalgar Square First licence?

It's not often that you'll find any type of reporter out on the streets before 8.00am. Yours truly is normally tucked up in bed dreaming of DV27's and multichannel rigs.

November 2 proved to be the exception to the rule. The brief from



my Editor was to be at Trafalgar Square Post Office by 7.45am. After being threatened with a whole month of 'tea-making duty', I reluctantly accepted the assignment.

When I arrived it seemed like the whole of Fleet Street had turned out of bed for this occasion and I was dazzled by floodlights from TV crews and continually prodded by large microphones being wielded by the corresponding sound men.

Oh yes, I almost forgot, we'd all gone along to see Al Gross (Father of CB) obtain the first legal CB licence for British FM sets. Al had been flown in from the States especially for the big day and on purchasing his licence he looked somewhat pleased with himself and went on to say what a wonderful implement CB was.

I must confess that I felt a bit sorry for poor Al. He'd come all that way, he'd been woken up at an unearthly hour and he didn't even get the first licence! We got ours on 29 October at our local Sub Post Office and, contrary to popular belief, we didn't have to bribe the issuing officer. We are sure that ours wasn't the first and we are offering a valuable prize to the person with the 'Real First' (see The Law and You in this issue).

## Rigs and chips

Opening its doors on 'Legal Day' was Microchip Electronics Ltd, down in Warsash, Hants. A new company, they are hoping to expand into a network of CB shops in the south of England.

They will be stocking a large range of rigs and accessories, including rigs by Fidelity, Sirtel, Uniden and LCL.

Where they really seem to have done their homework is in the advisory and repair field. They realise that although a lot of their customers will already be familiar with CB, a similar number will need help and advice. So Microchip will be running a free advisory and demonstration service, install mobile or base stations and have full repair workshop facilities. (In fact they already do contract repair work for

several very large companies.

The store is at 23-24 Shore Road, Warsash, Hants.

**microchip**  
electronics limited

## More of a sigh than a gasp

As mentioned in Round Up last month, the Last Gasp Rally took place in Chesterfield on 25 October. It was hoped that a large rally would prove to the Government and media that there are still many breakers who feel

strongly about the legal FM CB system.

Unfortunately, although well organised and publicised, it didn't get the turnout needed to prove their point. However, the people there were adamant with their hostile opinion of FM and were determined to fight on for AM CB. Mr Kite, of the North East Derbyshire 10-4 Club, spoke well and kept everyone's attention. He was followed by several other speakers, who, although well intentioned, could not match Mr Kite. This was not the case for Cliff Fox, Labour Leader of the NE Derbyshire Council, who was very eloquent, if not totally familiar with CB.

Police presence was nil, since the Chesterfield marathon was being run on the same day and they were fully involved in controlling that.



P.S. Many, many thanks to Stingray, Skywave, Steam Leak and Rectangle for their quick and effortless change of my (flat) rear tyre. Ladies might make good reporters but this one's useless at changing wheels (especially when she hasn't got a jack!).

## The happy sound of motoring?

Tony Blackburn had a rig fitted at Hammersmith CB Centre bright and early at 9.30 on Friday morning (30 October) ready for legalisation on the following Monday. Tony's metallic blue Datsun 280ZX sports car was fitted with an LCL (alias DNT) rig manufactured in West Germany and adorned with a K40 antenna mounted on the hatchback. Tony is a new-



comer to CB, legal or otherwise, although he will be featuring a regular CB spot on his Friday afternoon programme on Radio London.

During the conversation I had with Tony whilst his rig was being fitted, he told me that although he considered CB a very good idea and that its benefits are many and varied (especially for the disabled and handicapped) he did not agree with the CB slang used on AM and hoped that it will not carry over onto FM.

## The Supernational Custom Car Show

The Grand Hall, Olympia was the venue, as before, for the 'Supernational' Custom Car Show from 30 October to 1 November. The usual array of chopped, jacked, airbrushed and plushlined cars were present, along with a handfull of customised American rigs (the type with wheels). Side stalls were selling everything from paint to turbo chargers. Radio London were providing some of the noise whilst transmitting live at the mercy of Tony Blackburn. The rest was supplied by the many in-car entertainment stands, a few of which were displaying and, indeed, selling FM rigs. Binatone, Amstrad, Fidelity were prominent. Attendance, as usual, was good and interest was centred, as can be expected, around those stands displaying an alternative form of bodywork, not to mention those who specialise in lubricating tonsils.

## Motorfair '81

Fed up with your old banger? Fancy swapping that Escort for a De Lorean? The Motorfair exhibition was the place to look if the bank balance could stand it. Held at Earls Court from 20-30 October, it was a positive delight for anyone who enjoys casting an envious eye on the latest offerings from the motor world. Gleaming examples of current British and Continental models (or cars and womanhood) were displayed in elegant surroundings. And since CB was going respectable there were some stands for CB too.

The big name present was Binatone, with working sets on display at their stand. Halfords were also there with lots of sales literature to give away but alas - no rigs. (Mind you, since they will be stocking Binatone anyway you only had to cross to that stand to see them). Apart from stands with T shirts and badges there were no other real CB goodies on sale. But it goes to show how seriously CB is suddenly taken when its nearly legal.



## Germany calling . . .

The fastest growing hobby amongst British servicemen in Germany just has to be CB, according to one of our 'spies' abroad. There has apparently been great opposition from high ranking officers but the CBers have persevered and forged a lasting relationship with the local Germans (far more effectively than the organised Army events).

Even military intelligence were involved in trying to stamp out CB two years ago. However, the servicemen have been operating within the wierd and wonderful confines of German CB law.

## CB from the 'Top Peoples' Store'

Years of selling caviar and fur coats to the nobility certainly didn't help Harrods on 2 November, for amongst the Steinway pianos and Bang and Olufson hi-fi, legal CB rigs went on sale at 9.00am.

# Harrods

Two minutes past nine and Mr A. F. Brown (Buyer of radio and TV) had just finished briefing his staff on the intricacies of this new and bewildering subject when they all rushed off to try and sell their first rigs, or 'transceivers' in Harrods's terminology. Two major problems prevented Harrods from selling their stock. None of Harrods's clientele either cared or were aware of legalisation day and to cap it all the merchandising stand for their rigs had not arrived.

Five minutes past ten it was discovered that the men's gift department were also selling CB rigs (much to the horror of the radio and television department) and men's gifts being situated on the ground floor it

The British Forces Radio network have started a regular CB programme and helps the multitude of clubs keep in touch with forthcoming events and local news, interesting points raised by CBers themselves and news from home.

The presenters of the programme have introduced a Golden Microphone Award, which is presented to a breaker or club each fortnight for either helping to save a life or improved Anglo-German relationships. They have already presented several of these awards.

The legal CB in Germany bears no resemblance at all to the illegal American AM CB and soldiers using AM in Germany have faced fines between £1,500 and £2,250 if caught. Buzby seems quite mild in comparison!



looked like they would get all the business.

Legal rigs on sale normally creates queues of people clamouring to get them. By 12 o'clock Harrods hadn't sold a single set. If you've been



rushing around trying to get your hands on either a Uniden or DNT rig, get the chauffeur to drop off in Knightsbridge, I'm absolutely certain that they'll still have them.

## Blunders Dept.

In Septembers magazine one of our advertisers, Simply CB on page 46 were surprised to find they were open for a 'limited period only' and this has caused great problems for them and confusion amongst local breakers.

Of course Simply CB are open for business as usual and have no intention of closing.

Many apologies to Simply CB, the production assistant has been put on bread and water for a month. We all make mistakes or so I keep telling the Editor.

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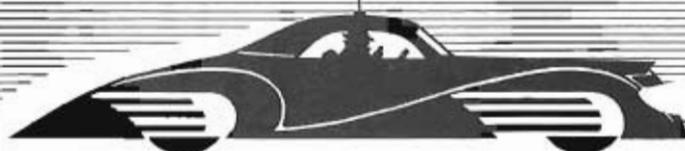
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### GENERAL CONDITIONS

- (1) It is a condition precedent to consideration of a claim for Theft hereunder that the Assured shall have reported the circumstances to the police within 24 hours of such Theft.
- (2) Cover may be cancelled by Assured or Underwriters by giving 15 days notice in accordance with NMA355, plus Terms, Exclusions and Conditions of Lloyds Standard D Form NMA2001.

*Note: Confiscation Cover is not provided by Lloyds of London but a Swiss reinsurer.*

If you require this insurance please complete below and send to the above address with cheque for the correct amount. A Certificate of Insurance will be issued upon acceptance.

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Signed ..... Date .....

**NOTE** — The information contained in this proposal will be treated in the strictest of confidence between the Brokers and Lloyd's Underwriters ONLY.

# CLUB SPOT

## Diamond Breakers Club

Just a quick ratchet to inform good buddies through your magazine of CB activities in our area.

Firstly, our club which meets every Wednesday at the Diamond Jubilee Club, South Kirkby. We hold disco/buffet nights every few months which are well attended by members of other clubs as well as our own members. We recently held our first Treasure Hunt and found that it was a lot of fun for those that took part. Our latest venture is to be a Treasure Hunt on foot for the benefit of our younger members.

CB in this area is used well by most, although we do get the occasional 'head banger'. When breakers in this 10-20 want a laugh, they get it on Channel 29, which we have laid aside as our silly Channel. Most nights of the week you will find such characters as Roberto Porkino Scratchino (who breaks in from Milan and bends the needle even though he's using a DV27 on a biscuit tin lid) or Jock Strap (with his unique sawn down electricity pylon antenna). All really good clean fun.

To show his prowess in electronics one of our members has just gone mobile. He's attached his rig to the handlebars of his push bike, a DV27 to the rear and carries his power supply in a rucksack on his back. It may sound a little bit far fetched, but it actually works.

From this letter it sounds as though all our members are crazy, so if you're ever passing through our locality pop in for an eyeball and we'll prove that we really are quite sane.

10-10 Till we do it again  
Crackerjack (secretary)

## C.B. Backbackers

This is a new club that is currently being formed and will eventually be run on a nationwide basis. The idea is to use handheld walkie talkies to call up fellow breakers to try to get lifts when out hiking, camping or long distance travelling. We don't mean like a free taxi service - no way. We reel that there is enough interest in camping/hiking for this idea to be worthwhile and to try the idea, myself (Kevin Jones - Freebird) and my seatcover (Judie Stevens - Dreamweaver) intend to set out on a camping/hike from Hastings to Exeter in the near future. We shall see what the goodwill of other breakers is like. I think we'll find help on the 19. Anyway we shall see.

Anybody joining the club will receive a membership card, badge, sticker, rule book and a news sheet, which as the club grows would include

places to camp and get rooms (this might help breakers who could book in advance).



These are only a few ideas of the club and more are set out in a fact sheet currently being produced. We would like to hear from anybody that feels that they could help out as area organisers. Also people that run guest houses etc. that would put campers up for the night (even though campers carry a tent they still chicken out and get a room if its cold). It would also be interesting to know how many breakers would actually stop and give someone a lift if they heard them calling for one.

Kevin & Judie

## Hastings Breakers

This club was formed in November 1980 from an original 40 members and has now grown to over 600. The committee that started as three has now been increased to twenty. The club really has grown out of nothing. The first meetings were held in a backroom of a pub but are now held on Hastings Pier in the Ballroom.



The club has a magazine issued at each meeting, called the Hazard County Herald, and produces t-shirts, stickers, badges etc. in fact I provide these for the club. Discos etc. are regularly held and all the money goes into the club bust fund, which luckily has only been used twice. Busby activity in this area is low at the moment but things could hot up now it is legal.

Freebird & Dreamweaver

## Barry Breakers Club of Wales

Well what an exciting first year of our CB club here in Bananatown.

We began last January in a room above a local lpub that we handled 'Colditz', but as we outgrew the castle the members voted on a new venue and we now hold eyeballs at the Hotel International once a fortnight.

A breakaway club was formed at this time by some committee and club members who wanted an alternative meeting place.

Discussion in the early days consisted of busts (no not that kind) channel discipline, legislation, etc., but now the emphasis is on raising funds for club functions and local charities.

We have a close working social link with the 'Penarth Breakers Club'. Joint events included a day out for 50 O.A.P.'s at the Marconi Club where colour TV sets to view the Royal Wedding, and a meal plus drinks were enjoyed by the Senior Citizens, and of course transport was provided by breakers.

We are now looking forward to our A.G.M. and promise that the second year will be every bit as exciting and enjoyable as the first.

Golden Numbers  
Neon P.R.O.  
B.B.C.W.

## Boulevard Breakers Club

Hi, there, we down at the old 'BBC' thought that we might drop you a line to tell you about the goings on at the local CB club.

For starters the club is for anybody interested in CB who lives around the South Side of Glasgow. There are a few other clubs in other parts of the city, and if anyone wants to be put in touch with them we will be glad to oblige OK.

The club itself exists to help get a better understanding of what CB is and how to get a better idea of how to use your rig and the other bits, for example your antenna. Get the idea! We try to get a better technical understanding of the equipment and help newcomers from over spending on second rate rigs and advice on how not to annoy the neighbours with TVI.

The clubs meets every other Sunday at Corkerhill Community Centre (behind Corkerhill railway station) between 2 and 5pm. Lots more information and details so why don't you come down and see us some lazy Sunday afternoon and we'll lay an eyeball on you.

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# Vultures on the Side



## Lady Chatterley v The Post Office

To our new readers, I ought to explain that Vultures on the Side is a feature that deals with the unfortunate experiences of 'busted' AM breakers. By describing these events we hope to warn others against making the same mistakes and to show the frequent ineptitude of the authorities in dealing with CB cases. In a way it is an article we would rather not have to do - we would prefer that no one got prosecuted or harassed for CB offences. Since that isn't the case, we can only continue printing these features as a warning. Let's hope one day we don't have to.

This month we cover the story of Lady Chatterley from Dunstable and the Post Office. Final score not yet known but my money is on Lady Chatterley! A slightly different story too, as it doesn't follow the usual pattern of Vultures but still interesting reading.

A few years ago, Angela (Lady Chatterley) found herself at home on her own with two young children. Isolated and bored but full of energy and wits she bought a rig to give her other interests outside the house. As she used the rig over the months she realised the need for a monitoring service and living near the M1 and being on channel almost 24 hours a day, that's what she became. With just a basic 40 channel rig, Angela was always on channel 19 to cover emergencies and accidents. She obtained the motorway control phone number so she could ring directly for assistance with accidents and she was quickly recognised as an accepted monitor.

Angela also met, through the airwaves, the band of truckers who need CB for a living as well as a hobby and she was always on hand to talk to a trucker in danger of falling asleep or approaching bad traffic jams. Because of the 'trucker network', Angela became well known throughout the country, apart from on her stretch of the M1. This was during what many people regard as the 'golden days of CB' and everybody respected a 10-33 and breakers would always stay on the side if Angela had an emergency in progress.



### 'Get off channel or be busted'

However, these golden days were interrupted by a visit from an official from the Interference Department of the Post Office. His reason for the call was suspected TVI and he warned Angela, "Get off channel or be busted!" With the support of her trucker friends, Angela ignored the warning and stayed on. She reasoned that she had been on channel nine months without any interference problems, so why pick on her now? (Angela suspects that another CB base in the same immediate area was causing the trouble and she automatically got the blame).

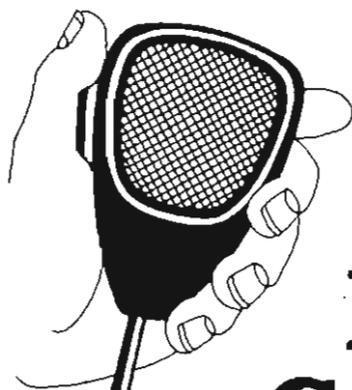
In the meantime, Angela had been steadily updating her equipment. She now had a Yaesu amateur radio set at channel 19, a scanner covering channel 9, a Stalker IV and a Sigma IV set 32 feet up. She continued to act as a monitor and made links with people doing a similar service on the M1. Angela formed part of an unorganised but effective monitoring team but found her problems increased because of the lowered standards of Cbers. Although motorway users (again particularly the truckers) are grateful for Angela's efforts, the number of Wallys has spoilt her effectiveness since they don't show the same respect for an emergency. Angela is obviously disappointed with this development and feels that too many regard CB as a toy and don't appreciate the worth of it.

Still a determined lady, Angela carried on with her service and was not altogether surprised by the next 'official visit'. This summer a GPO van arrived outside the front door. A man called and asked to speak to Angela. He showed his identification and again warned her that if she persisted she would be prosecuted. When Angela questioned him, he maintained there had not been a specific complaint. (Angela feels that the PO were under pressure to do something about her). She showed the official her transmitter and equipment, demonstrated that it was properly set up and tuned and that she didn't use a burner. She phoned the local PO department to check that the man was genuine and to see if she could obtain any more information. When pushed, they said they *did* have interference complaints.

Angela was concerned by this - so much so that she went round her entire neighbourhood and asked everyone if she was causing any interference. They all said "No" (to her relief as she was prepared to stop altogether if their answer had been "Yes") and she phoned the PO and told them so.

So, Lady Chatterley is still there. A bit disillusioned with people's behaviour on channel and a bit worried about FM but encouraged by the fact that "the police think it's great" even if they can't offer official help and describes herself as "a nutter that actually enjoys doing this". Unpaid, often unthanked, she is a true Cber as CB ought to be.

SS



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# FIVE STAR SERVICE

# The Ranger

A 27FM Portable CB Transceiver Designed by  
Michael Tooley, B.A. and David Whitfield, M.A., M.Sc.

## Design philosophy

The design of the Ranger 27FM inevitably represents an engineering compromise between the various design and performance parameters. One over-riding design constraint is, of course, the Home Office Performance Specification for "Angle modulated 27MHz radio equipment for use in the Citizens Band Radio Service". Within the limits of this specification, however, there is plenty of scope for many different practical implementations of an FM transceiver which will meet the Home Office performance requirements. Indeed, it is usually the case that there will be at least as many different designs produced as there are different designers working on a particular problem!

The main design aim was to produce a low cost, hand-portable FM transceiver suitable for personal communication. Operation from internal re-chargeable nickel-cadmium batteries, while involving a higher initial outlay than for dry batteries, was considered an essential feature for portable use. The life cycle cost of a unit powered exclusively from dry batteries will otherwise rapidly exceed the total cost of the equipment itself. To this end, the Ranger has been designed with re-chargeable batteries, a mains power supply and automatic battery charging circuits, all included inside the case. Operation from an external dc source such as a 12 volt car battery is also possible, and the NiCads may even be re-charged in this way.

The transceiver itself makes use of integrated circuits in the design wherever possible. This allows a high level of performance to be achieved at low cost in the smallest possible space, while keeping to standard constructional techniques. Wherever possible, preset adjustments are kept to a minimum, with test points provided for simplifying the alignment procedure, and readily available components are used. Careful attention to the design of the pcb ground plane and the component layout allows all of the components except the sockets and controls to be mounted on one single-sided pcb. The completed design is therefore compact, repeatable, cost-effective and straightforward to align. The robust case, flexible helical antenna, integral batteries and loud-speaker, detachable microphone, and rugged transmitter design all contribute to making the Ranger 27FM a self-contained transceiver which is suitable for a wide range of applications.

## System description

The Ranger 27FM comprises of four functional modules; transmitter, speech processor, receiver, and power supply. Figure 1 shows how these modules are arranged in the basic transceiver.

In the transmitter, a low frequency (9MHz) fundamental crystal oscillator is used to define the output frequency. The speech processor amplifies the microphone signal, provides active limiting and low pass filtering, and then adjusts the level to set the maximum transmitter deviation. The output of the speech processor is used to frequency modulate the fundamental oscillator by means of a varicap diode. The modulated 9MHz signal then drives a frequency multiplier stage to produce an output on 27MHz. This 27MHz signal then undergoes two stages of RF amplification to provide an output of around 500mW (RMS) into 50 ohms. A multi-stage output filter is included in the path between the pa stage and the aerial to provide a high rate of attenuation of unwanted spurious. The overall design of the transmitter features bandpass coupling between stages, and this assists in achieving a low harmonic content in the output. The alignment procedure is simple, with test points provided for each stage, and only a simple dc voltmeter is required to complete the alignment of the transmitter.

The receiver features a conventional superhet arrangement with an intermediate frequency (if) of 455kHz. The signal frequency is applied via the RF amplifier stage to one of the mixer inputs. The local oscillator drive for the second input is derived from an overtone oscillator running at 455kHz below the signal frequency. The 455kHz if output from the mixer is filtered to remove unwanted mixing products, amplified in a five-stage limiter, and then demodulated. The combined if amplifier and demodulator stage also provides the squelch facilities. Final audio amplification of the recovered signal is provided by an ic audio power amplifier. The use of a high gain amplifier, with its associated if filter, ensures that alignment of the receiver is a very straightforward task, with a minimum of preset adjustments.

## Specifications

In designing a piece of equipment for Citizens Band use consideration has to be given to meeting the specifications laid by the Home Office. These are primarily concerned with the following aspects of equipment



The first question asked by many would-be constructors will be, "Could I build a Ranger?". The basic requirements are: the ability to solder neatly, a few basic tools, the use of a dc voltmeter, and a complete set of components. With these requirements satisfied, the answer to the question is, "Yes".

The tools required are: a soldering iron (maximum 25W or temperature controlled) with a miniature bit, a supply of multicore solder, a pair of long nosed pliers, a pair of good quality side cutters, wire strippers (optional), a sharp knife or scalpel, a small screwdriver, a magnifying glass (optional), and a trimming tool (which may be made by filing down a plastic knitting needle to the correct dimensions). With the tools above and a set of components, it should be possible to follow the instructions given and successfully complete the Ranger 27FM without any previous experience of RF constructional projects. It cannot be stressed too greatly, however, that the recommended printed circuit board layout must be followed exactly if predictable results are to be obtained. Depending on the experience of the constructor, the Ranger may be built in two to four evenings, and the testing and alignment in a further one to two evenings, depending on the time spent and the facilities/test equipment available.

When care has been taken to check the identification and orientation of all components before soldering, and when the finished pcb has been carefully inspected after completion, few problems should be experienced; the majority of problems arise from wrongly fitted components and poor soldering (solder splashes and dry joints in particular).

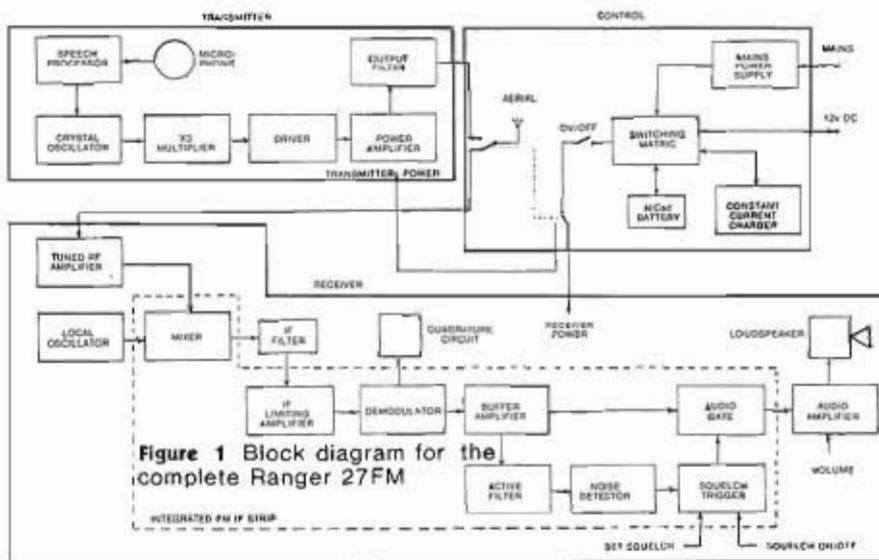


Figure 1 Block diagram for the complete Ranger 27FM

performance:-

- (a) maximum power output and effective radiated power
- (b) accuracy and stability of the transmitted frequency
- (c) frequency deviation and bandwidth of the transmitted signal
- (d) spurious radiation from the transmitter and receiver.

In each performance area limiting values are specified and these should not be exceeded under both normal and extreme conditions. To this end the Home Office require that tests be made either on a sample of the equip-

ment type or, for simplicity's sake, on one item only. In this latter case equipment manufacturers, importers or assemblers must, from time to time, carry out subsequent tests to ensure that the specifications are still being met. In the case of the Ranger it is therefore necessary to establish that not only the performance of the prototypes conform to the given specification but also that individual units be tested, after assembly, to check that they also comply with the Home Office requirements. For this reason constructors are warned that the

specifications quoted in this article are only likely to be valid for transceivers constructed

- (a) using the components, pcb and enclosure specified and
- (b) closely following the constructional details and alignment instructions given.

Any major departure from either the recommended components or alignment procedure may result in a finished transceiver which not only fails to perform to the quoted specification but fails to comply with the Home Office requirements. It should also be noted that, on any particular piece of equipment, performance specifications may be marginally different from those quoted due both to minor variations in individual components and to alignment tolerances.

### Circuit description

The complete circuit diagram for the Ranger 27FM is shown in figure 2. To assist in locating a particular component, identification symbols are allocated distinctly to the transmitter, receiver and control sections, respectively, of the Ranger. Components in the transmitter and speech processor are numbered from 1, e.g. R1, C1, IC1, etc. Receiver components are numbered from 100, e.g. R100, C100, IC100, etc. The control section numbers components from 200, e.g. R200, C200, etc.

The selection of transmit or receive is by means of the press-to-talk (PTT)

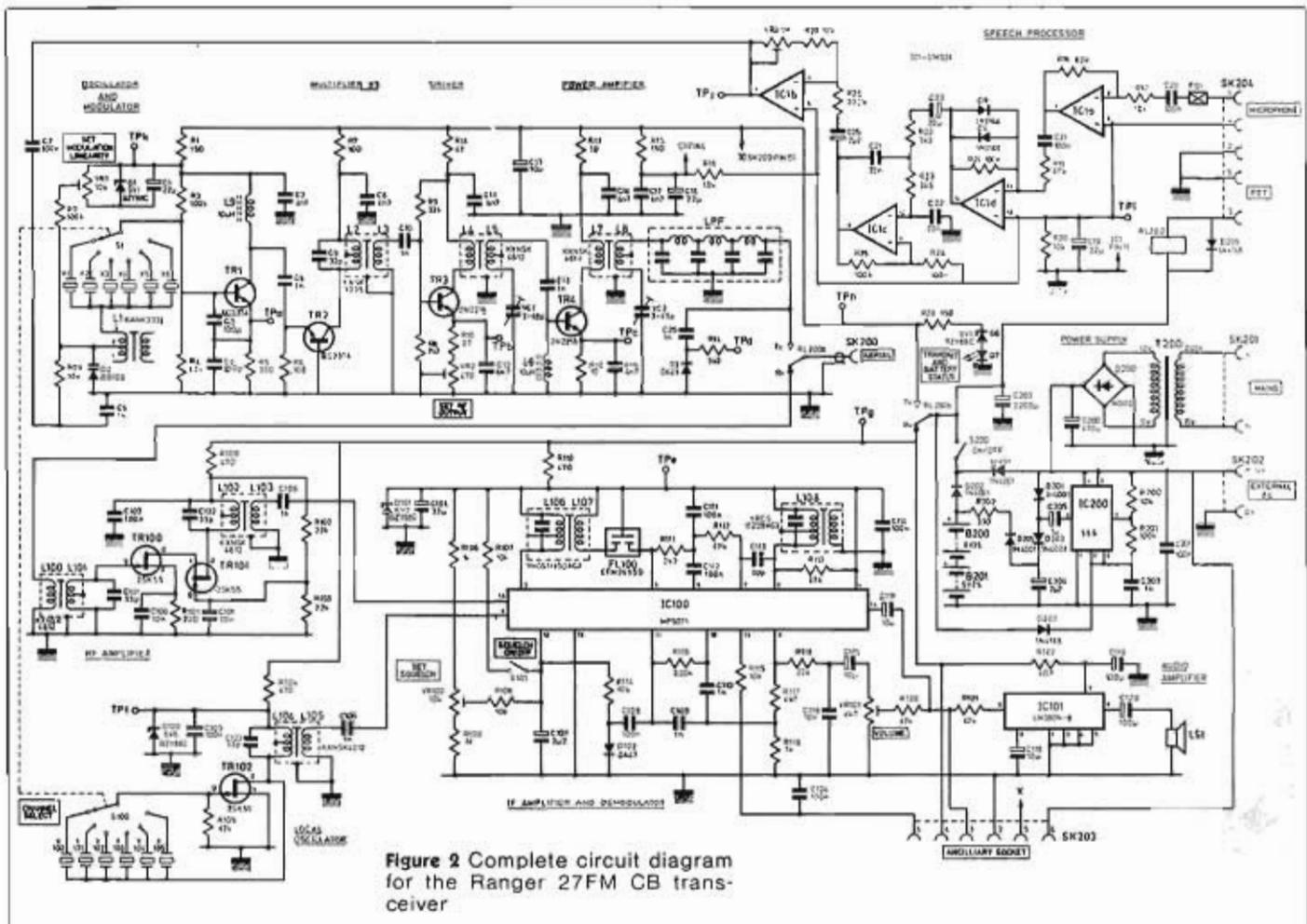


Figure 2 Complete circuit diagram for the Ranger 27FM CB transceiver

# The Ranger

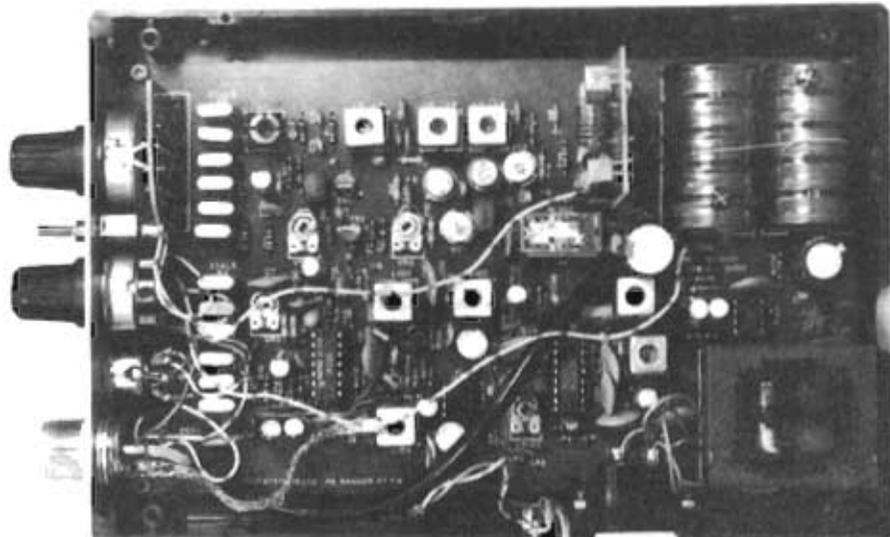
switch on the microphone. When the PTT switch is not depressed, RL200 is in the default position, and the receiver is selected. Depression of the PT switch energises the coil of RL200, causing the aerial to be re-connected to the transmitter output, and dc power to be re-directed from the receiver to the transmitter and speech processor stages.

An overall block diagram for the Ranger 27FM is shown in figure 1, and this will be used as the basis for the description of the circuit operation in the sections which follow.

## Transmitter

The transmitter output frequency is defined by a 9MHz crystal oscillator, the output of which subsequently undergoes frequency multiplication to produce a 27MHz signal on the channel frequency. Modulation is applied directly to the crystal oscillator to produce frequency modulation of the carrier.

The 9MHz oscillator stage uses a bipolar transistor, TR1, configured as a Colpitts oscillator, whose frequency is defined by the crystal selected by S1. A varicap diode, D2, is used to frequency modulate the oscillator. A varicap is a diode whose capacitance when reverse-biased varies inversely with the bias voltage, i.e. the capacitance decreases as the bias voltage is increased. Used in series with the crystal, the varicap diode increases the oscillator frequency as the bias voltage rises. This characteristic is exploited to allow the audio signal from the speech processor to modulate the carrier frequency. The deviation characteristic for the oscillator and modulator working on channel 21 is shown in figure 3. It can be seen that the overall transfer characteristic of the modulator is not quite



linear, but that the deviation available is considerably more than is required. A limited operating range may therefore be chosen over which the response is linear for the deviation required (maximum  $\pm 2.5\text{kHz}$ ). The maximum deviation allowed by the Home Office specification corresponds to a swing of  $\pm 833\text{Hz}$  on the 9MHz frequency; figure 3 indicates that the varicap bias could be set to approximately linear performance. It also becomes clear from this graph that the bias voltage for the varicap must be stabilised against supply voltage fluctuations if the carrier frequency is to be stable. VR1 provides the means of adjustment for the varicap bias voltage, and R1/D1/C1 stabilise the bias to the diode.

One result of inserting a varicap diode in series with the crystal in the oscillator is to increase the effective series capacitance. This has the effect of increasing the frequency of oscillation, and L1 is therefore included to compensate for this change by reducing the frequency. L1 also provides a fine adjustment for the zero-deviation oscillator frequency.

The oscillator output is taken from the collector of TR1 to minimise the loading effects, and the signal is used to drive the frequency multiplier stage. TR2 operates as a frequency tripler in common base configuration. This arrangement provides a high power gain and high output impedance, which is required to match to the output tuned circuit, L2/L3. The tuned circuit has a high Q factor to ensure that only the third harmonic (at 27MHz) is coupled to the driver stage.

TR3 is a tuned amplifier whose gain may be adjusted via VR2 to vary the drive level to the power amplifier. VR2 operates by varying the emitter current flowing in TR3. The tuned collector load for TR3, L4/L5, is arranged as an impedance step-up to simplify the matching arrangements; this type of arrangement is only appropriate for low power applications.

The power amplifier again uses the common emitter configuration, and TR4 provides around 10-13dB of gain. The output is coupled in a similar fashion to the driver stage, and is passed to the output filter network,

and then to the aerial. The output stage is matched to a 50 ohm impedance.

In the transmitter there is extensive decoupling of the supply rail for all of the stages. This decoupling, in conjunction with the short connections to the earth plane, is essential to ensure stability of the transmitter and to suppress the generations of unwanted spurs. On no account should the decoupling be omitted and good quality ceramic capacitors should be used throughout; the aim is to produce a supply rail which has negligible signal impedance. Test points are provided all along the transmitter chain to assist in the tuning up procedure.

## Speech processor

The purpose of the speech processor is to convert the input signal from the microphone into a form suitable for modulating the bias on the varicap diode in the transmitter oscillator circuit. As has already been seen, the deviation obtained is dependent on the amplitude of the modulating signal, e.g. figure 3 shows that a peak-to-peak signal of approximately 6 volts will produce  $\pm 2.5\text{kHz}$  deviation at 27MHz. It is important, there-

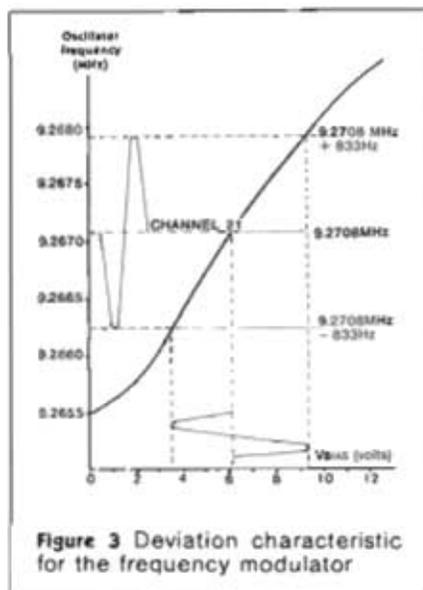


Figure 3 Deviation characteristic for the frequency modulator

fore, that the amplitude range of the modulating signal is restricted in order to prevent any undesirable over-deviation. Simple amplitude limiting, however, will result either in significant distortion, or in a low average level of the recovered audio signal. What is required, therefore, is a circuit which will compress the dynamic range of the speech signal, and limit the maximum amplitude. This will have the effect of reducing the 'peak factor' (ratio of the peak to the RMS value) of the speech waveform, thereby allowing the average level to be maintained at a higher value without the risk of over-deviation. Typically, the peak factor to be expected in speech over a period of time is around 20dB.

The speech processor in the Ranger uses an active limiting arrangement, whose overall transfer characteristic is shown in figure 4. Some distortion of the audio signal is inevitable (indeed, it is intended!) in any speech processor circuit, and is primarily due to the generation of harmonics which result from the non-linear transfer characteristic. Harmonics of the lower frequency components (say below 1kHz) in the waveform are more significant because they fall within the frequency range of normal speech. At middle and high frequencies, however, the speech waveform is filtered to limit the frequency range of the modulating signal.

The 'soft-limiting' characteristic used in the processor causes the slope of the transfer characteristic to fall progressively as the input level increases above the threshold level. This reduces the generation of unwanted harmonics of the input signal, and renders the resultant processed speech less harsh and more pleasant to listen to than it would be using a 'hard-limiting' characteristic (where there is no perceptible increase in output above the threshold input level). At maximum limiting, there is approximately 3dB change in output for 20dB change in input level. The frequency response characteristic, which together with the transfer characteristic defines the behaviour of the speech processor, is shown in figure 5.

A block diagram for the speech processor is shown in figure 6. Each of the four stages uses one of the operational amplifiers in IC1. The LM324 will operate from either differential or single-ended power supplies; the supply in the Ranger is single-ended and decoupled by R15, C17 and C18. The amplifier and limiter stages have their non-inverting inputs connected to the half empty point formed by R16 and R20, and these inputs are decoupled to signal frequencies by C19.

The first stage is a conventional inverting voltage amplifier whose gain (defined by R18/R17) is set to match the microphone being used. The gain should be set, by variation of R18, such that the output of IC1a is 600mV peak-peak when the microphone input corresponds to the level at which the onset of limiting is required.

The active limiter is formed by IC1d, D4, D5 and associated components. The limiter has a fixed gain of 2, defined by R19 and R21. Since D4 and D5 are silicon diodes, a peak-peak voltage swing of approximately 1.2 volts will cause the diodes to conduct in turn in alternate half-cycles, and this in turn will provide a low impedance shunt path across the feedback component, R21, effectively reducing the stage gain.

The third stage amplifier, IC1c, is used as a low-pass Sallen and Key active filter. This is a second order filter whose cut-off frequency is determined by R22, R23, C22 and C24, and which exhibits a roll-off at higher frequencies of 40dB/decade (12dB/octave). The response of the speech processor at low frequencies is governed by the inter-stage coupling, e.g. C20, and the mid-band gain is unity.

The final stage is a variable gain stage whose voltage gain may be varied over the range 0.1 to 10.1. The gain is determined by (R27 + VR3)/R26, thus VR3 allows the output of the speech processor to be adjusted to provide the required maximum frequency deviation. R29 provides the necessary high source impedance for applying the modulating signal to the varicap diode in the oscillator and modulator stage.

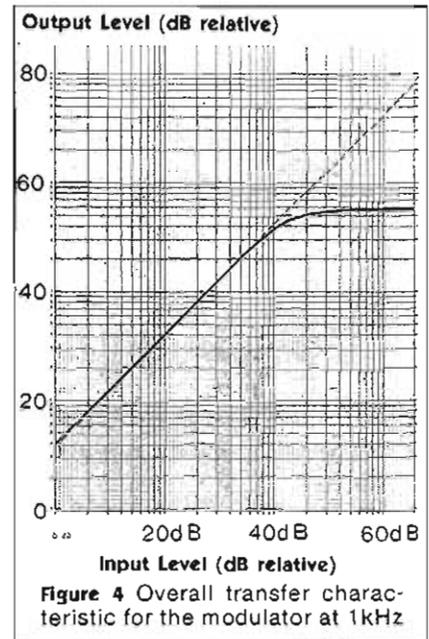


Figure 4 Overall transfer characteristic for the modulator at 1kHz

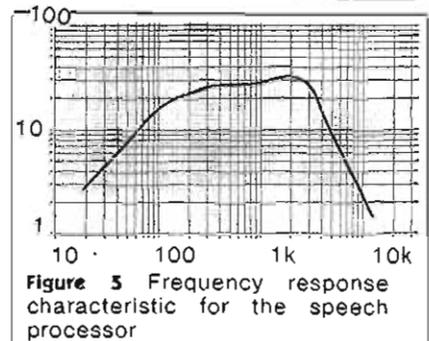


Figure 5 Frequency response characteristic for the speech processor

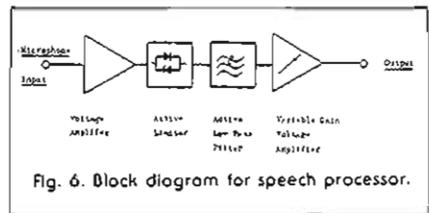


Fig. 6. Block diagram for speech processor.

The Ranger series first appeared in *Practical Electronics* (September 1981 issue) and is consequently referred to as the PE Ranger. We would like to acknowledge and thank them for their assistance in allowing the second British publication by us.

## HOW TO ORDER YOUR RANGER DIY KIT

Simply make out a cheque/PO for £49.95 (including VAT) + £2.95 p&p payable to Autumn Products Ltd, and forward it to CB Radio Ranger Offer, Tudor Works, Beaconsfield Road, Hayes, Middx UB4 0FL along with this form which you should fill out carefully.

Please send me ..... Ranger Kits @ £49.95 each + £2.95 p&p each.  
I am over 18 years of age and my address is —————→

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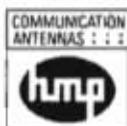
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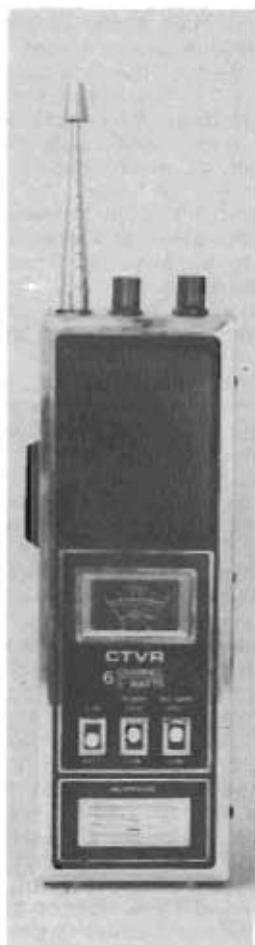
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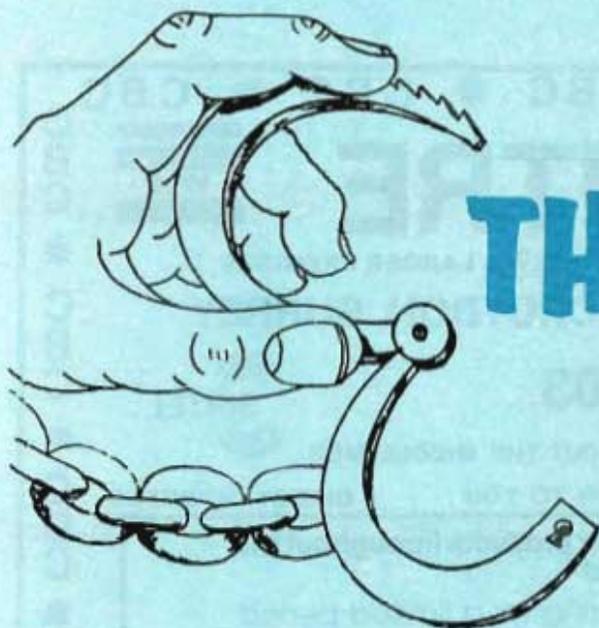
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| CB Unlimited, 1 Hamilton Court, Westbourne     | CBC, 20c Selsdon Road, Croydon               |
| 021 Radio, 590 Bristol Road, Sellyoak, B'ham   | London CB Centre, 614 Green Lane, Goodmayes, |
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How many sets are restricted this licence to cover?  
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Up to 3  4  5  6  7  8  9  10  11  12  13  14  15  More than 15  state number above

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Month  Year

Fee on issue C

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Initial of Issuance

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UB4 0FL**

Postcode **UB4 0FL**

**WIRELESS TELEGRAPHY ACT 1948**

**TO NOTIFY CHANGE OF NAME OR ADDRESS PLEASE TAKE THIS LICENCE TO ANY POST OFFICE FOR ASSIGNMENT**

License Fee Stamp to be stuck on this column

(Stick the stamp across up to 3 rows)

**THE POST OFFICE**

**Based on behalf of the Secretary of State for the Home Department**

**Yes, I agree to the conditions of this licence and to the Schedule to the Wireless Telegraphy Act 1948.**

**CB01 488 31024**

**The first British licence? Issued on 29 October to CB Radio Magazine four days before legalisation**

Yes, that's quite correct, we did cover this subject last month. However, with anything new there will always be a considerable amount of rumours spreading wildly. Like: "Clause 10 is about to be activated," or "Oh, yes, those licence things, I got one in CB Radio last month. Funny things those, I took it to the Post Office and they charged me £40. They stuck a TV stamp on it so now I don't need a TV licence. My CB one covers that as well!"

Go ahead and laugh. It could just happen to you!

## But seriously

The CB licence will cost you £10 for three sets and £10 for each additional three sets. The form has provision for up to 15 sets and then a separate box for quantities over 15.

To ensure that you receive the correct stamp on your licence check that it bears the lettering CBR1 in the centre with the wording CB LICENCE

FEE PAID curving round in a U shape. This stamp is a mustard colour with CBR1 reversed out in white and CB LICENCE FEE PAID printed in brown.

## Licence conditions

The licence covers the installation and use of FM equipment that conforms to MPT 1320 and MPT 1321. Such equipment should be recognisable by the now famous CB 27/81 or CB 934/81 circles, which should be embossed or engraved on the sets.

With the licence provision is made for more than just one person to operate under its authority. Any member of the licensee's household who normally resides with the licensee at his usual place of abode may operate, or:

Any employee of the licensee acting in the course of the licensee's employment, remember this could cover 15 or more sets, or:

Any person who hires the apparatus from the licensee for a period not exceeding 28 days.

Having allowed quite a varied and possibly large amount of people to operate under the same licence, there's a little get out: "This licence is not transferable".

The apparatus shall be so designed, constructed, maintained and used that its use does not cause any undue interference to wireless telegraphy. As we said last month, this paragraph is slightly vague although most will interpret it for their own needs. Just what qualifies as undue interference will remain to be seen.

The apparatus and this licence shall be available for inspection on demand by a constable or a person acting under the authority of the Secretary of State.

I am sure that some constables and/or "persons acting under authority" will interpret this into doorstep phraseology, i.e.: "Let me in, I wish to inspect your CB equipment". However, consulting with several solicitors on this subject, it would appear that normal rights of entry to your premises will still apply. Namely, that to gain access a search warrant would still have to be obtained. Therefore anyone asking to see your licence should be made to remain on the doorstep whilst the equipment and the licence is brought out for their inspection, off your premises.

This is perhaps the most worrying terminology of the licencing conditions, as it does give an official an easy excuse to gain unauthorised entry without the licensee realising his consent or a search warrant is necessary. Equally, in reverse, how will the constable know if the set he is shown, with the licence, is the same set as is normally operated?

The next sections on the licence are relatively straightforward and do not need reiterating here. Finally, Section 10, "that rumour," states that to revoke or change the conditions of the licence or anything else pertaining to CB need only be made in an announcement to all CB licence holders. This is obviously the ultimate get out and means that absolutely anything could happen. You still would not need a new licence even if the conditions or frequency changed totally.

## The Schedule

Once more, as this was covered last month we will only pick out the important points not already mentioned in the Conditions.

Power is restricted and obviously anything other than in accordance with MPT 1320 or MPT 1321 is illegal.

The Antennae: this section is perhaps the most important. Many people are under the misconception that antennae also need to be stamped as CB 27/81 or CB 934/81. This is incorrect.

Any legal antennae shall not exceed 1.5 metres (4ft 11in) with a single wire rod or element, which is base loaded. The actual wording that practically everyone has missed is "overall length of the antenna, excluding the loading coil, shall not exceed 1.5 metres".

The next part of the Schedule will probably be the most blatantly flaunted. For 27MHz, if the antenna is over 7 metres above ground level or 10 metres for 934MHz then a 10dB attenuator shall be fitted. This must be provided by the manufacturer and is incorporated on all legal FM sets.

## Now the contest

In the first of a series of contests which, as opposed to taking up a page themselves, will be incorporated in an

article, we are offering you the chance to win a legal 27 FM transceiver.



Mr Lane, of Brixton. Could he have the first licence? So far in our book he does.

## The first British licence

On Thursday, 29 October, four days before legalisation, we took one of the hundreds of application forms from one of our mags and nipped into our local Post Office. The licence application form was neatly filled in and a crisp £10 note was handed over. It was as simple as that and there we were licenced.

**NOW** here is the chance for ardent readers of CB Radio who picked their copy up early and took the licence insert to a Post Office.

**DO** you have a duly stamped and fully paid licence issued before 29 October?

**COULD** you be in possession of the very first CB licence? If so, then send a photostat of your licence to us along with your name and address. Detail where you purchased the licence and answer these two questions.

a) What is Licence Condition 1 according to the Home Office Licence CB01?

b) According to our article last month, what possible relation to Buzby could be licenced?

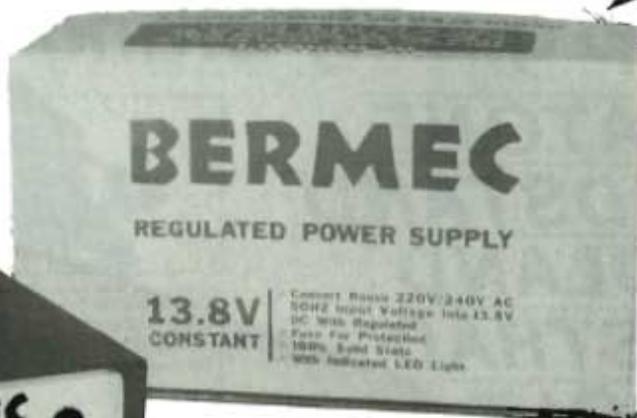
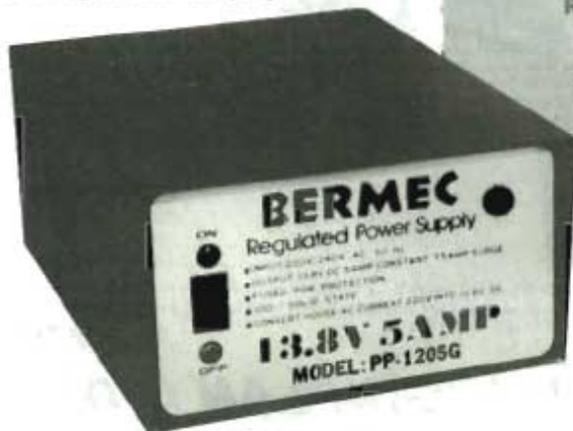
As ever the normal way of things like this, we is gonna keep de rules simple, we reserve de right to decide de winner in de event of der bein more dan one first licenced Okay.

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**MASTER TEE**  
OF LEICESTER

# Government Blunders

Now that 27FM CB is legal, will it ever really be legal?

Prior to November the 2nd and the availability of FM CB licences, CB transceivers bearing the CB 27/81 identification mark complying to MPT 1320 were openly available in more than one major high street shop, like at every Dixons throughout Britain!

With other existing CB outlets selling all the rigs that they could lay their hands on, it was soon apparent that 27FM would not be occupied only by pirates and licenced testers for long, new breakers started to appear rapidly.

Thus it came to pass that our fine upright truly British CB service that is designed to be legal, started its life, illegally!

## Bureaucratic Bungling!

All too often the Government is blamed for the mistakes of the faceless civil servants making or advising on decisions pertaining to CB, or for that matter any other subject.

These mindless morons blunder around with sheer ignorance of the task they should perform, little knowing nor caring how to research the subject or how best to judge the consequences of their suggestions.

The sad part is that they are shielded from blame, no accusing finger points directly at them and no one quotes them for their successes or their failures.

Quite honestly the whole handling of the CB subject has been bungled from start to finish.

## Political Background

Citizens Band Radio and the possibility of its inception in Britain was first discussed not long after the second world war. The answer at the time was not surprisingly no, it could be a serious breach of national security.

Much later in the mid seventies the subject was raised again and a Labour Government said no. Labour was of the opinion that CB could cause civil disorder and unrest.

Finally in 1980 a Conservative Government said yes Britain would have a public radio frequency. That was the first step, taken as a result of pressure from various members of the House. Seeking advice on the subject

the Government turned to the relevant Civil Servants, the same civil servants that were there earlier and had advised labour to say no.

It was therefore inevitable that any forth coming suggestions would be negative and thus the CB chess game started 'civil servants' v 'the public' with the Government as the players on one side and the members of Parliament on the other.



## Stale Mate?

The game is far from over and at present almost everyone is dissatisfied with the play so far. (In the following read 'civil servants' for the word Government).

**The Public** for the non CB, interference is a problem and one that will not go away. The owner of a television or stereo hi-fi that suffers from interference doesn't understand that it's not totally the CB's fault.

Now he will suffer worse for 27FM will still interfere, only now the CB'er may be perfectly legal, and within their rights to transmit.

In truth present and previous Governments are to blame for not foreseeing the possible problem, nor acting on it now and demanding that imported or manufactured consumer or industrial electronics equipment has suitable 27MHz filtering!

**The Public** Possible or future CB operators wishing to purchase or offered a set will find it hard to differentiate between 40 channels 27MHz AM, 40 channels 27MHz FM, 40 channels 27MHz with SSB, 40 channels 27MHz channels AM, 40 channels 27MHz Lo channels FM and

so on with Lo Lo channels, Hi Hi channels, Mid channels, CEPT channels 10 watts, 5 watts, 4 watts, 2 watts and half a watt, not to mention the myriad of other frequencies available with PLL adaptations.

In short all he has to go on is an unimaginative circle with CB 27/81 in a plain type style screened on the casing! For the uninformed public a CB is a CB is a CB.

Who should he blame if he unknowingly purchases a non 27MHz FM transceiver bearing a CB 27/81 mark? The Government for not being more inventive with their identification, himself for not being a technical wizard, or the opportunist who sold him the set?

The irony that follows this is that although the Government have laid down a specification that 27 FM legal transceivers 'must' comply with, the sets need not be approved, checked or tested in order to be imported, manufactured or sold. Top this with the fact that one legal transceiver we tested was transmitting 4 K.C's off frequency!!!

## The Existing CB'ers

Without him there would undoubtedly be no legal CB at all! Yet he is cast aside as a total criminal, given no incentive to hand in his existing set, no amnesty, no opportunity to export his equipment, no chance to regain any partial cost towards a legal CB and no option but to continue the fight or give his AM set a miss and turn legal. Either way it costs him more money and either way he still has an AM set to revert to if he tires of legal FM with only 40 channels.

His only crime is one of wishing to communicate via the airwaves, if FM had existed two or three years earlier he probably would have never considered AM. Who should he blame, himself for he was aware of the illegality, or the Government for imposing or not updating its outlook on the radio spectrum soon enough.

**The Police** Out of all the official bodies they have the hardest task, for they have to enforce almost unenforceable laws. Illegal CB operators mobile prior to legalisation were no real problem apart from their numbers.



Chetwynd House, Chesterfield, Derbyshire, the CB licensing offices.

Sufficient powers exist to stop a vehicle, suspect contraband and ask the owner-occupant to accompany the officer, failure to oblige and arrest for obstruction could easily follow.

Now the officer will have to decide if the CB set is a legal FM, an illegal AM or anything else.

Before legalisation this task was hard enough, after all you can't expect every officer to know the difference between a radio telephone, a private mobile radio, a commercial communications radio a citizens band radio or an amateur radio. Remember that all he has to go on is that CB 27/81 mark, or he might just be able to use a Rigalizer (it tells the difference between AM & FM) if he takes the vehicle and its occupants to the station.

Then if the officer decides it is a legal set and not just a pseudo FM with a 27/81 mark, he will have to discern as to whether the antenna in use is legal. One now has to ask if he will have a tape measure or a pre determined length of cord, for the antenna must be a base loaded single wire rod or element not exceeding 1.5 meters in length (4 foot 11 inches).

If he manages to make the correct decision and decides it is a legal set being used with a legal antenna, the officer must now ask to see the licence. This licence must be carried by the operator and available for inspection by a member of Her Majesty's police force or any other person duly empowered and acting under authority of the Secretary of State.

So far you could be forgiven for thinking the officers task is simple, but wait it gets harder!

The licence covers the use of three transceivers or multiples thereof up to fifteen by the licensee, or:

- a). *Any person who resides with the licensee at the licensee's usual place of abode.*
- b). *Any employee of the licensee acting in the course of the licensee's employment.*
- c). *Any person who hires the apparatus from the licensee for a period not exceeding 28 days.*

Now assume that as an employer I licence 15 sets and fourteen members of my staff each have a set installed, then subject to b) they will be acting in the course of the licensee's employment.

So how the hell can the licence and the apparatus be available for inspection on demand by a constable or a person acting under the authority of the Secretary of State? Confused? Not half as much as the poor constable who stops one of my employees in Scotland will be!

But wait it gets even better if the officer visits your home base if you read The Schedule No.3 Antennae section c) it states that with an antennae mounted for 27MHz in or on a structure at a height above ground level exceeding 7 meters a 10 db attenuator shall be fitted.

Apart from the fact that after switching in the 10 db attenuator all transmitting ceases! How will a constable firstly tell if your antenna is

over 7 meters (23 feet) from ground level and secondly that you did not have the attenuator switched in, or thirdly that you were even transmitting through that antennae!

**The Conservative Party** Unfortunately they are left with egg on their faces, it is the party that ends up with the backlash, loss of votes, disfavour and its the party that gets labelled as making the blunder not the civil servants.

## A Prediction for the New Year

Within 1982 ammended licence regulations will allow the use of other forms of antennae.

Within 1982 the restriction on attenuation will have to be lifted, it is unenforceable.

Within 1982 the subject of allowing an officer or person acting under the authority of the Secretary of State into a home to inspect a CB installation will cause great debate

Within 1982 the penalty for operating illegal AM equipment will be increased.

Within 1982 the interference complaints caused by 27MHz will double, these complaints will be from both AM and FM CB transceivers.

By the latter part of 1982 or during 1983 another CB service will be announced to align with the European Economic Community (assuming we are still members).

Just prior to this Britain will fight to make the European Standard Citizens Band, the new 27 FM and lose.

By the end of 1982 the whole question of public access to airwaves and transmitting will be causing great debate and interest.

At some time in 1982 the Radio Amateurs Society will denounce CB'ers and proclaim they have usurped their authority by pirating 28 to 29MHz.

At some time in 1982, 934MHz and possibly 27MHz legal FM will have additional channels added to them increasing their usership.

## Placid Acceptance?

Before you get the wrong impression it should be remembered that British FM CB does work and gives good operator usability.

It is not the CB system that is useless it is the way in which the subject has been handled and instigated.

If you have a question or a query on licencing the enquiry address is CB Licensing Unit, Chetwynd House, Chesterfield, Derbyshire S49 1PF.

If you have an opinion an argument or a conflicting point of view you should write to your local MP.

To find out his name phone 01-219 3000 between 9.30 to 5.00pm. Then address a letter to him c/o The House of Commons, London, SW1.

If you can't be bothered then placid acceptance is your choice!

JOH

# The 1982 CB Show

(National 10-4 Day) by CB Radio Magazine

Many of you will remember last year's National 10-4 CB exhibition with a mixture of horror and delight. This year we intend to make amends by offering breakers the opportunity to attend the most exciting and professional CB exhibition ever to be staged.

## Wembley Conference Centre

After trying to cram 17,000 people into a hotel room the size of an elongated matchbox we have booked the Wembley Conference Centre in London for "The 1982 CB Show" by CB Radio Magazine. The Conference Centre has excellent bar and catering facilities which will be available throughout the duration of the event. Car parking facilities are ample and the Centre itself holds up to 3,000 people at any one time (four times the capacity of last year's event). There is

room for well over 100 stands and we confidently expect exhibitors ranging from manufacturers, wholesalers and retailers of CB radio equipment, radio telephones and radio equipment.

## Eyeball 20

Not content with just presenting to you the best in equipment and accessories, we will be providing a separate events hall which will feature video games of the Invaders ilk, a bar, a separate supervised children's play area, music and plenty of room to sit and chat. This hall is approximately 5,000 square feet in area and will be totally devoted to fun and relaxation. A real day out for all the family.

Various competitions will take place on each day of the show both in the main halls and in the Eyeball 20, with valuable prizes for the winners.



Aerial view of the Conference Centre.



## 9, 10, 11 April

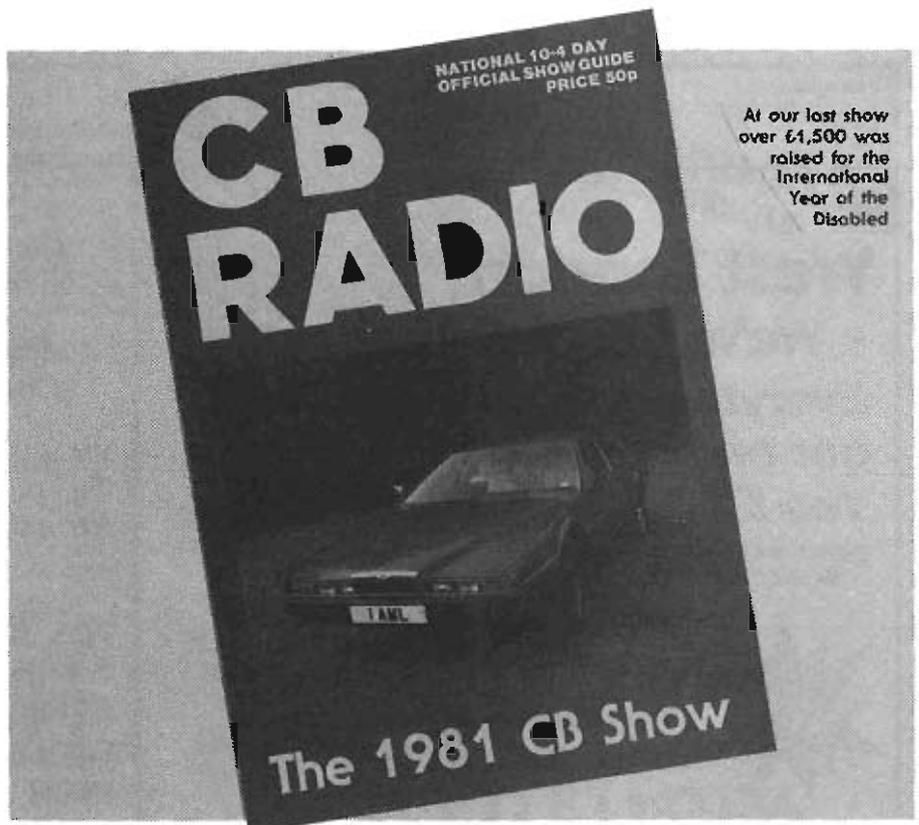
The 10th of April is the anniversary of the first legal CB transmissions being made in America on that day in 1947. Anyone quick enough mathematically will have worked out that 10 April 1982 is the 35th anniversary of that occasion. Celebrate with us, whether you be an AM or FM breaker. Come to Wembley over Easter '82.



### Entrance Charges

"The 1982 CB Show" will be good value for money. We are offering substantial discounts for group bookings made in advance. The following prices apply only to bookings made before 10 March 1982.

<b>25 tickets or over</b>	<b>50 tickets or over</b>
£1.75 each.	£1.50 each.



<b>75 tickets or over</b>	<b>100 tickets or over</b>
£1.25 each.	£1.00 each.

### Price on the day

The entrance price will be £2 per person per day on the door, so it will be beneficial for you to organise a party booking and pay in advance.

### OAP's and the disabled

People who can produce documentary evidence of either being an Old Age Pensioner or disabled will pay £1 and there is no need to book in advance.

### Facilities for the disabled

Wembley Conference Centre is a modern building and as such is well equipped with ramps, lifts and suitably designed toilets. These facilities make us able to offer a full welcome to people in wheelchairs as well as the able bodied.

### Express entrance

We will have a separate express entrance for people in possession of advance tickets which Old Age Pensioners and the disabled will be able to use. People buying tickets on the day will have to queue in the normal way.

### Children

We welcome children to the "1982 CB show" and if you are under the age of 12 you will get in for half price (£1). Infants under the age of three will get free admittance.

### Advance booking conditions

Advance tickets are sold at a flat rate regardless of the user, i.e., adult, child, etc. Therefore having purchased a discounted quantity of tickets additional children, etc., may gain entry with the party through the express entrance at the £1 rate.

Please send me.....tickets, which are valid for any one of the three days.  
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**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, Zelenovia, 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, CA



PERFECT FOR FM TOO!



**(SPECIAL NOTE) IF YOU'RE A BEGINNER:**

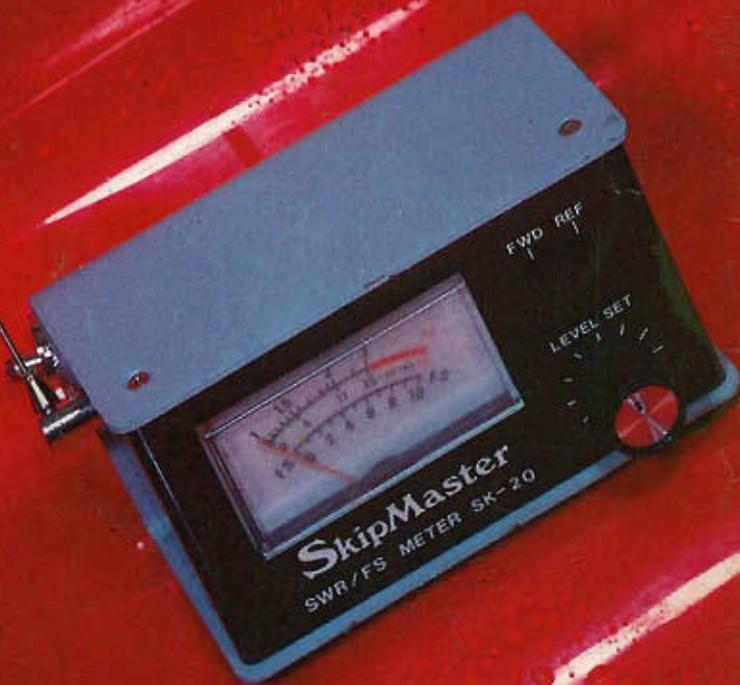
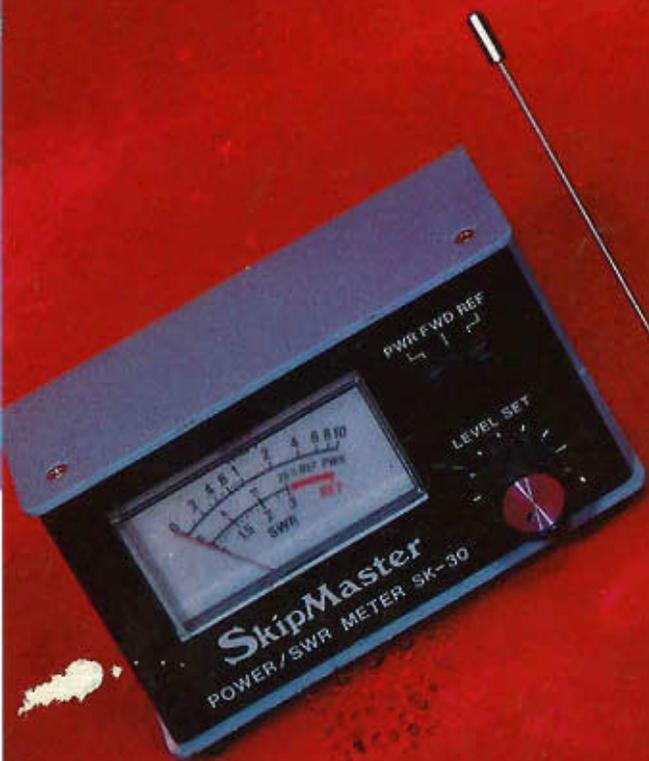
Our K40 Dealers will be happy to sell you any of the older style and less expensive antennas that are great bargains for any beginning CB'er.

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POWER!**

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

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