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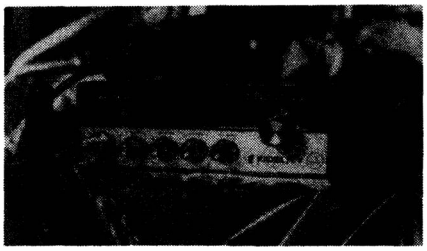

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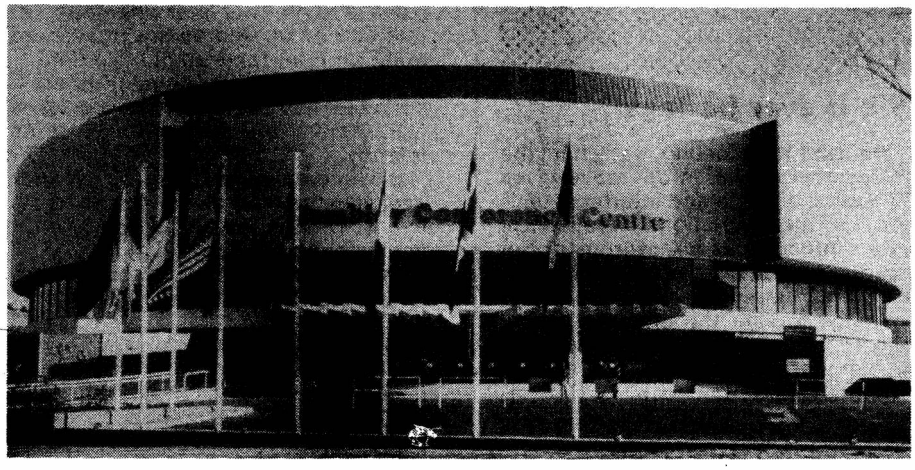

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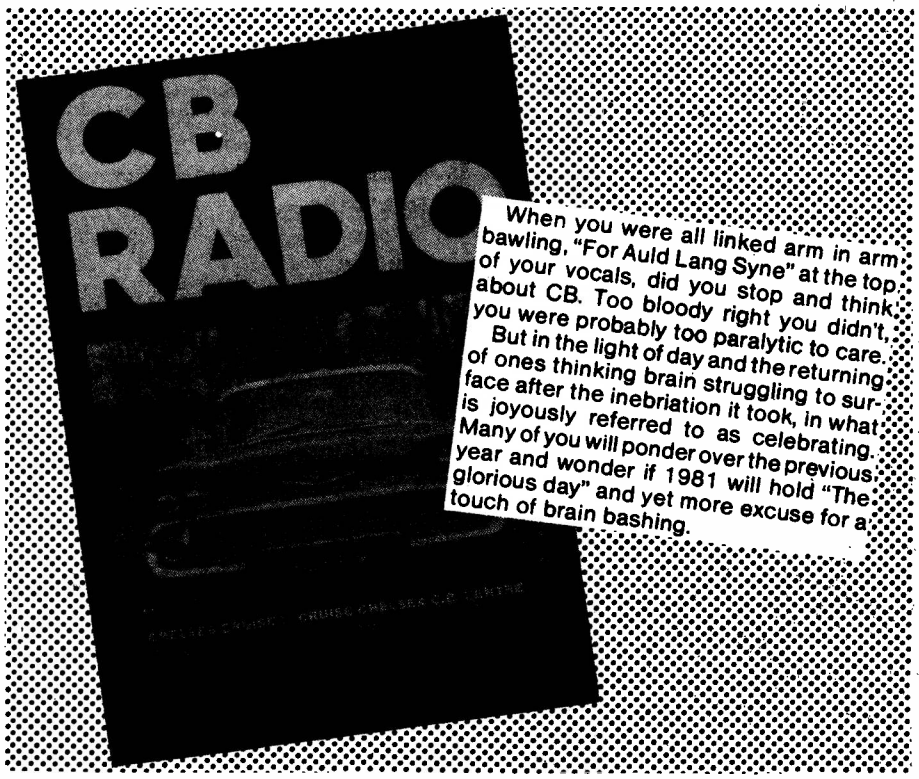
The Legal Illegal

CB RADIO MAGAZINE WISHES ALL ITS READERS A HAPPY NEW YEAR

A further look at legal FM



Ah, the Glorious Day. Well, that bright new year of 1981 has now departed and 1982 is upon us. We now know that 1981 did hold the "Day", 2 November.

But was that day really as glorious as everyone hoped?

Following up from our article last month debating the actual amount of legal FM use, we decided to look further at the legal or, if you prefer, legal-illegal FM system.

Without doubt citizens' band radio is proving to be one of the most controversial subjects in years. Many users of AM in past months have turned to FM and the security or peace of mind it offers the user. Some are taking on new FM handles. Does this mean a new start or that they will use both AM and FM?

Equally, many more have purchased FM only to hear of the previous illegal AM use that was and still is widespread throughout Britain. Will they now show more interest in AM?

With the new system now two months old and well under way, we pose a few questions and offer one or two suggestions.

Will it ever be legal?

We can't help feeling that whilst the FM system works, is operable, gives comparable range and interferes less, some of the restrictions imposed are either intended as a Government get out quotable in the event of misuse or are simply unenforceable.

Firstly, to limit the antenna usable only to a base loaded single wire rod or element ground plane variety not exceeding 1.5 metres (4ft. 11in.) is somewhat ridiculous for the user efficiency is lost.

Secondly, to enforce a 10dB attenuation for operators using antennae (or living) higher than 7 metres (23ft.) above the ground is impossible. Who will observe this restriction? Answer – NO ONE!

Your choice

At present the new CB system has as far we know not had any flak from the authorities as regards misuse.

In all honesty, the Government are probably greatly relieved if anyone and everyone uses FM. At this time the more people using legal FM the better.

It is doubtful if the police or any other body will be called upon to search for or charge an FM operator for the offence of having an illegal antenna or not using the attenuator.

The question that you must ask yourself is simple: If you use FM, will you comply with all the legal requirements necessary to remain within the law?

If your answer is "Yes", then I am sure the Government hopes you are not alone.

If your answer is "No" or "How can I and still enjoy legal FM?" then consider this. In the future will you be facing a possible fine for disregarding those requirements, or do you believe the licencing conditions were printed for the hell of it and will never be enforced?

A suggestion

With legal FM recently introduced, if the system has faults in licencing or usability the time to point out those flaws is NOW – not later when the system can be quoted as having worked quite all right for x amount of time.

The time to ask or demand or pressurise for any change or concession is NOW, whilst the system is still in its infancy.

If you feel that anything, now matter how trivial it may seem to others, is wrong with the British CB system, now is your time to act.

Your course of action should take the form of two letters, which should be followed up.

1) Write to your local MP. To find out his name if you don't already know it phone 01-219 3000 between 9.30am and 5.00pm Monday to Friday. Write to him care of The House of Commons, London, SW1.

2) Write to the Home Secretary, Mr. William Whitelaw, The House of Commons, London, SW1.

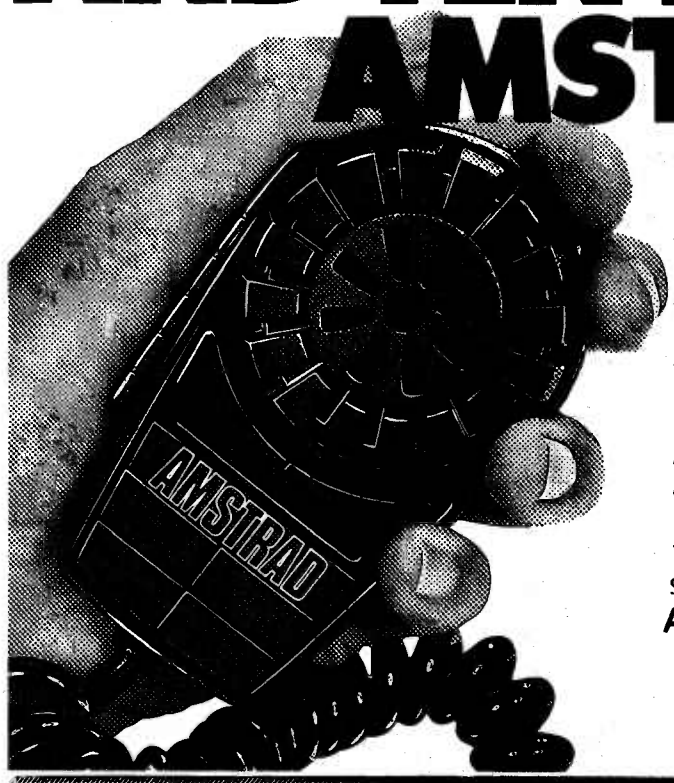
Don't let apathy rule

Regardless of what you think, your letters will receive the attention they demand.

If you feel that British CB should be free from unenforceable entanglements, do something. Catch some of that New Year spirit and write.

JOH

'WALL TO WALL AND TEN FEET TALL, AMSTRAD!



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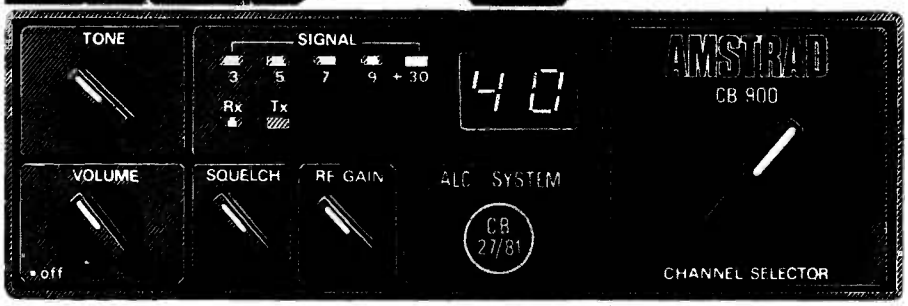

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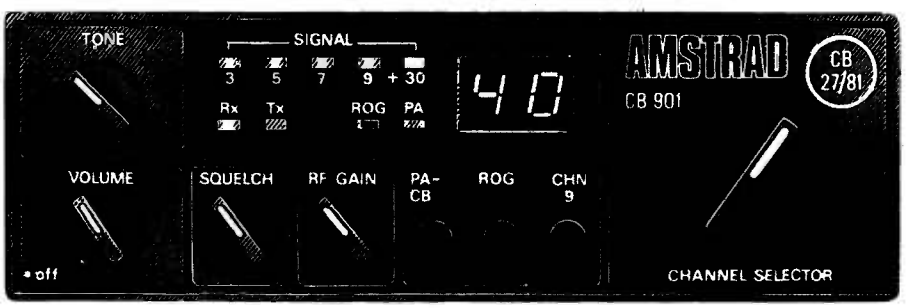

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LOOK FOR THE SIGN OF THE CB LEADERS

Antennas and Transmissions on CB frequencies

The Home Office specified antenna for 27MHz CB FM
by F. C. Judd, FISTC, MIOA, Assoc. IPRE - Part 14

It is now well and truly known that the only antenna that can be used legally for operation on the 27MHz UK CB radio FM band must consist of a single rod or wire element 1.5 metres long and loaded at the base only (schedule 3 (e) CB Licence). The loading coil at the base serves only to obtain resonance and matching to the transmitter and *plays no part whatsoever in the radiation from the antenna itself.*

The original specification contained in the draft issue of MPT 1320 was dealt with to some extent in part 11 of 'Antennas and Transmissions on CB Frequencies' published in the September issue of CB Radio.

There is no doubt that the HO specified antenna for 27MHz and the limitation imposed upon the height at which it may be used was intended to and does indeed limit the range over which CB operators can establish contact. In fact this is exactly what carefully controlled tests have now proved. Moreover owing to the high angle of radiation and therefore the best receiving properties also being from high angles, the specified antenna lends itself extremely well to picking up the high powered continental SSB CB transmissions that are swamping practically every UK FM channel throughout daylight hours. The Home Office certainly chose the wrong band for CB on FM in the UK.

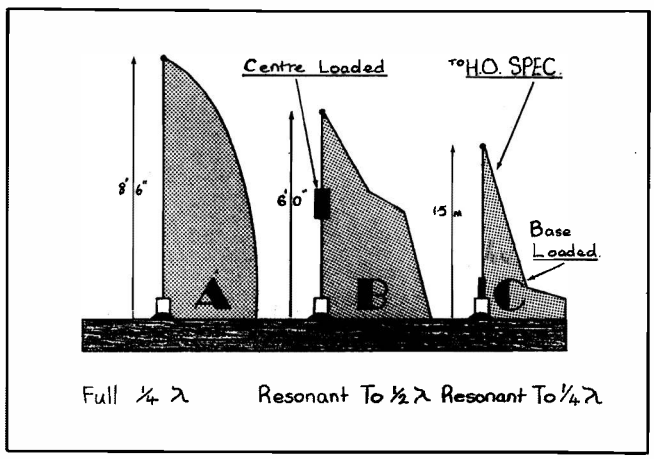


Fig. 1
(A) All the current supplied is fully distributed along the radiating section. Antenna efficiency in the region of 75%.
(B) Centre loaded 6 foot long antenna. Full current distribution in lower section of radiator, still insures acceptable degree of efficiency at about 50%.
(C) Base loaded only and with radiating element only 1.5 metres (4ft. 11ins.) long. Low amplitude of current in radiating element produces small radiation field and therefore low efficiency in the region of 5%.

Efficiency and antenna length

As the length, or what is more technically known as *effective height*, of a vertical antenna is reduced, i.e., made shorter than a natural resonant length, so its efficiency becomes reduced. A short antenna must still be resonant of course in order to achieve radiation any way, but the amount of power it will actually radiate becomes less as the radiating portion is reduced in length. At the same time the *radiation resistance*, which is the only component that determines how much power is actually radiated, is also reduced. Ideally the radiation resistance should be more or less equal to the impedance of the antenna in which case almost 100% of the power supplied to the antenna would be radiated. However, there are always additional losses due to the pure self resistance of the conducting elements, dielectric (insulation) losses and feed cable losses. There is also what is called ground resistance loss, the amount of which depends on the conductivity of real ground beneath the antenna, or any artificial ground-plane that may be used. Such losses are inherent in virtually all antennas but when the radiation resistance (Rr) starts to become smaller then the other resistive losses begin to assume larger proportions by comparison. Such losses can be resolved as follows:-
(a) Ground loss (Rg) and (b) pure DC resistive loss (Rdc) due to loading coils, etc. The antenna efficiency can be derived from:-

$$\frac{Rr}{Rr + Rdc + Rg}$$

But let us take as an example a base antenna for 27MHz and construct it according to the CB licence schedule 3(e) specification. The design is base loaded and has a radiating element of 1.5 metres in length for operation at 27MHz. The approximate *effective height* will be about 1 metre and the radiation resistance (Rr) will be in the region of 0.5 ohms. With a typical ground-plane (car body or radial ground-plane) the ground resistance loss can be taken as about 5 ohms and we can allow about the same for DC resistance loss in the loading coil, etc. The radiation efficiency will be:-

$$\frac{Rr}{Rr + Rg + Rdc} = \frac{0.5}{0.5 + 5 + 5} = \frac{0.5}{10.5}$$

which is an efficiency of approximately 4.7%. This means that out of 4 watts supplied to such an antenna the effective radiated power will be only 4.7% or 0.188 of a watt. This is a long way below even the permitted 2 watts ERP allowed by the Home Office specifications. To actually achieve an ERP of 2 watts the antenna would need to be much longer, or alternatively centre loaded and made resonant to a half-wavelength. This would produce an increase in the radiation resistance (Rr) to at least 10 ohms. Assuming the same ground and DC (coil) losses of 5 ohms for each, this would give

$$\frac{10}{10 + 5 + 5} = \frac{10}{20} = 50\% \text{ or}$$

2 watts radiated out of 4 watts supplied.

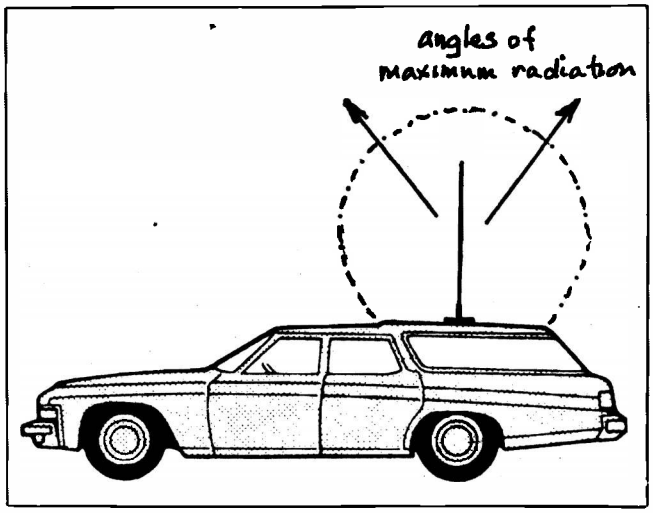


Fig. 2
Short vertical antenna for mobile operation and to Home Office Specification for 27MHz produces high angle radiation which severely limits ground path working distance.

Radiation due to current flowing in the radiating element

There is an alternative way of determining antenna efficiency by finding the product of I^2Rr which gives the power actually radiated. If we take Rr as 0.5 ohms and Rr + Rdc + Rg as 10 ohms as before, for the 1.5 metre base loaded antenna, then the total resistive load is 10.5 ohms. The current (I) due to the 4 watts dissipated in the load is

$$\frac{4}{10.5}$$

which is 0.61 amps. Therefore the power actually radiated and due to the radiation resistance only is I^2Rr which is $0.61^2 \times 0.5 = 0.186$ watts. This is very close to the power level of 0.188 watts obtained by simply calculating the percentage of efficiency as shown previously.

It may be realised from the above that the greater the current that can be made to flow in the straight portion of a radiating element, which represents the radiation resistance, the greater will be the strength of the radiation field. If we take a full length quarter-wave antenna as in Fig. 1 (A) then all the current supplied is flowing in the radiator thus creating the largest possible radiation field. The antenna is therefore functioning at the highest possible efficiency. In the short antenna Fig. 1 (B) centre loading has been introduced but a large amount of current is still able to flow in the straight portion of element beneath the centre coil. Efficiency is still relatively high and the radiation field is of at least acceptable strength. With antenna (B) in Fig. 1 which is to the Home Office specification, practically all the current is flowing in the loading coil at the base and which contributes nothing whatsoever to the radiation field. Only the minimal amount of current actually flowing in the radiating element produces the otherwise very limited radiation field. This also produces another undesirable factor. The radiation field is only strongest at high angles as shown by Fig. 2 and Fig. 3. This greatly reduces the working range over ground but allows strong reception of signals arriving under short skip conditions from high angles. Hence the problem of severe interference from high powered continental SSB transmissions.

Trials of the Home Office specified antenna by comparison with others

Firstly a number of well known commercially available base loaded only antennas were given general tests for overall efficiency. Although these complied physically and electrically with the Home Office specification none were found to be better than others and each rated an efficiency of little more than 4 or 5%. These antennas had radiating elements of 1.5 metres long and either shunt fed or series fed base loading coils. Only one type proved even more inefficient and this employed an adjustable but closed ring over the loading coil in order to effect tuning and VSWR. A closed single turn ring or loop around a loading inductance behaves as a short circuited turn and absorbs a very large amount of the power flowing in the inductance. It can be safely said otherwise that any antenna made by any manufacturer to meet the Home Office specification for 27MHz antennas will be unable to perform any better than one made by any other manufacturer to the same specification.

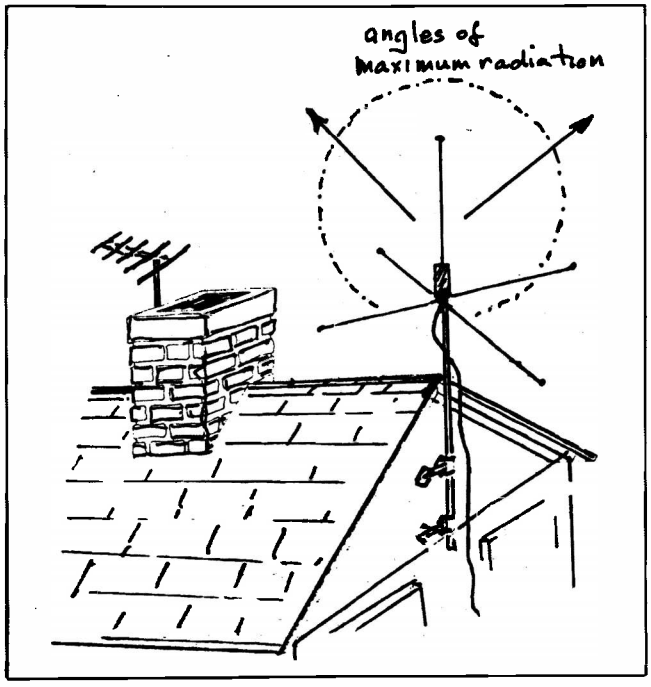


Fig. 3
Short antenna 1.5 metres in length base loaded to HO specification and used for base station with four radials. Also exhibits high angle radiation and thus severely limits ground path working distance.

Antennas and Transmissions on CB frequencies

Field trials

To show just how poor the results will be from a so called 'legal' 27MHz antenna the graphs in Fig. 4 need little explanation, in fact they speak for themselves. Each antenna was set up at a height of 21 feet in clear surroundings to operate as a base station antenna.

The mobile field measuring equipment was operated up to distances of 16 miles across flat country. The received signals were continuously plotted on a pen chart recorder. Taking a signal strength of S1 as minimum for readability it will be seen from the graphs that the full length half-wave 17 feet long antenna was providing a readable signal at almost 14 miles, the centre loaded nine foot antenna at nine miles, the centre loaded six foot antenna at 6.5 miles, whilst the specified Home Office 1.5 metre base loaded antenna was producing an S1 signal at only two to three miles. *These tests were carried out during normal daylight hours and in dry weather when attenuation over a ground path is at its lowest.*

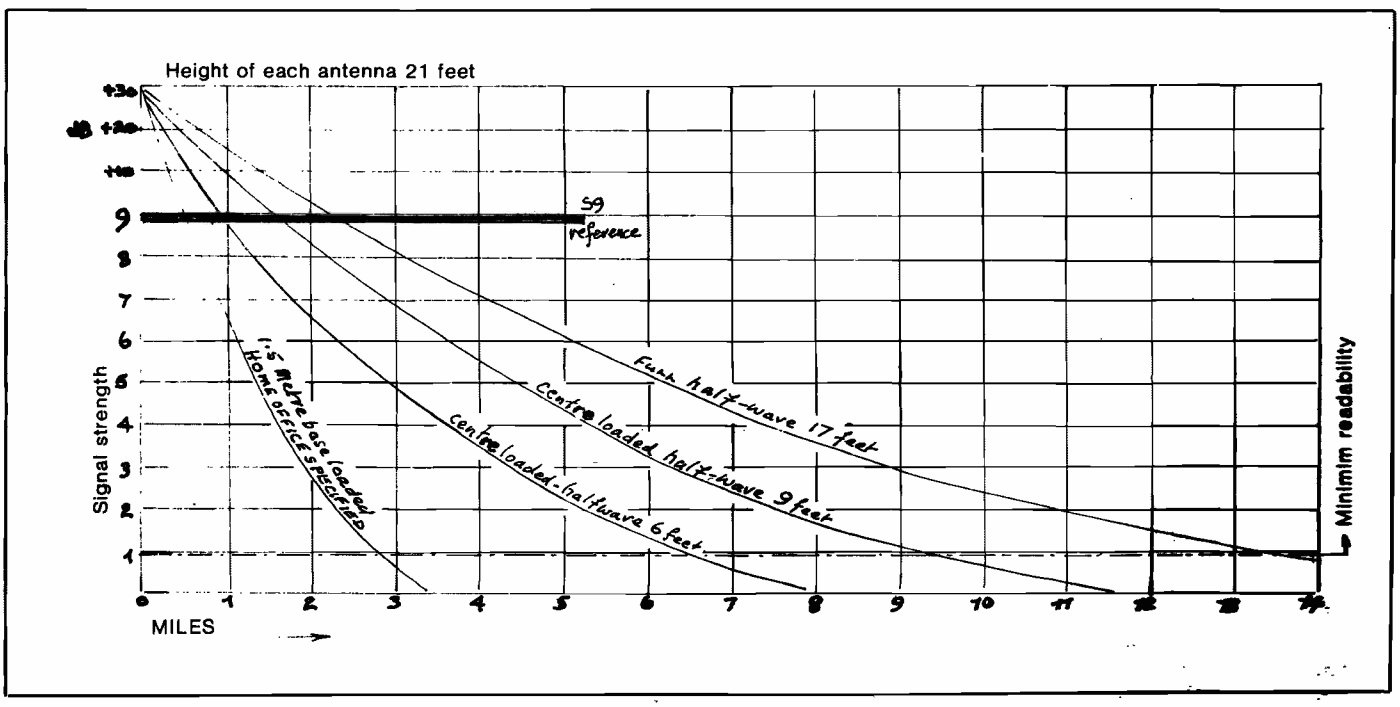
The power fed to each antenna was 4 watts measured at the input to the antenna itself so as to eliminate feed cable losses. The receiver used mobile was a conventional 20 channel FM set with a sensitivity of approximately 0.5 micro-volts for 20dB S/N and operated from a centre loaded mobile antenna 1.5 metres long.

Other observations concerned with the FM CB band revealed that with short skip conditions prevailing almost constantly during daylight hours, it was impossible at times to use any of the 20 available FM channels even at short range, e.g., two or three miles, owing to the high levels of interference and channel capturing caused by continental CB stations in Italy, Spain, France and Germany, etc., using high power SSB (single side band) transmitters and undoubtedly very efficient antennas. Many reports from UK operators on the FM band have confirmed this and indeed many have announced a return to the lower (illegal) frequencies and the use of AM.

Some of the FM transceivers that were used for continuous monitoring of the 27MHz FM band were found to be widely adrift on performance as laid down in MPT 1320 despite being decorated with the CB 27/81 label. The following performance factors were found to be poor. *Sensitivity:* With some not better than 1 micro-volt for 10dB S/N. *Selectivity:* So poor that separation of strong signals on adjacent channels was virtually impossible. A local transmission could capture two or three channels simultaneously. *Frequency stability:* Individual channels completely off frequency and therefore impossible to use. *Harmonic and spurious radiation:* Some sets producing second, third and fourth harmonics strong enough to obliterate various VHF frequencies used by other services and also causing severe TVI. *Power output:* Some sets not producing 4 watts from a nominal regulated 13.8 volt supply. Power output down to as little as 3 watts on a 12 volt supply, i.e., car battery without engine running. *Power attenuation:* The switch provided for this should reduce the nominal output power of 4 watts (by 10dB) to 0.4 watts. On some the reduction was to as low as 0.1 watts due to an attenuation factor of 16dB!

As the sets tested were all of Japanese manufacture one wonders whether the MPT 1320 performance requirements have either been ignored or just not understood. And what has happened to all the British manufacturers who were going to produce first class CB sets and thereby find jobs for some of the few million at present unemployed?

Fig. 4
Results of tests carried out on the UK CB FM band with different antennas. The poor results obtained with the 1.5 metre base loaded antenna as specified by the HO speak for themselves.



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FM TRANS

by E. A. Rule.

This month we are starting a series of articles about FM transmissions. During the past year, many words have been printed and spoken regarding the FM system compared with AM or SSB. Much of what has been written is misleading and the writer wonders if the anti FM group have a warehouse full of SSB and AM equipment which they feel may not sell. The fact of the matter is, FM has been around in one form or another since the early 30's and is now in use throughout the world for high power, high quality transmissions for domestic consumption. It was even in use on 27MHz during world war two! It is also used for the UHF TV service to provide the sound system. All these users do not specify a system that isn't any good, especially in view of the costs involved in commercial radio installations. FM is also the choice of many of the police and service users around the world who all want a reliable and trustworthy communication system. If AM or SSB is that good why don't they use it? The reason is that they all want point to point communication and are not interested in DX contacts. FM can provide noise and interference free communications under conditions where AM or SSB would be next to useless.

This is not intended to say that SSB or AM are no good, just that every system has special advantages that the others haven't under certain conditions. But, and this is the heart of the matter, CB is intended for reliable point to point communication and NOT for chasing DX signals beneath loads of noise and interference. If you want to do that, become a radio amateur who is licensed for all modes of transmission and has a wide choice of transmitting frequencies which can be used, including their own satellite and TV frequencies. Having said that, let us now look at the FM system.

The first thing to notice about the FM system is that the CARRIER remains constant in amplitude but the frequency varies with modulation. The exact opposite of AM and SSB. Now, almost all forms of interference are AMPLITUDE in nature so if the FM receiver is correctly designed to only respond to FM signals, it follows that it will not respond to AM and therefore will not respond to the bulk of interference either. This then is the first advantage of FM over the other systems. Fig. 1 shows the difference between the AM and FM carriers when modulated. Fig. 2 shows block diagrams of typical FM and AM receivers, note the extra stage in the FM receiver. This is the LIMITER stage and will be dealt with in some detail later. For the moment it is enough to know that this stage removes any AMPLITUDE modulation which may be on the received signals, including interference. Fig. 3 shows what happens in simple form to a signal which has amplitude modulation on it as it passes through the two types of receiver. In the case of the AM receiver the interference is 'detected' along with the modulation, whereas in the FM receiver the amplitude variations are removed, resulting in little if any output

Showing the main difference between the AM and FM modulated carriers.

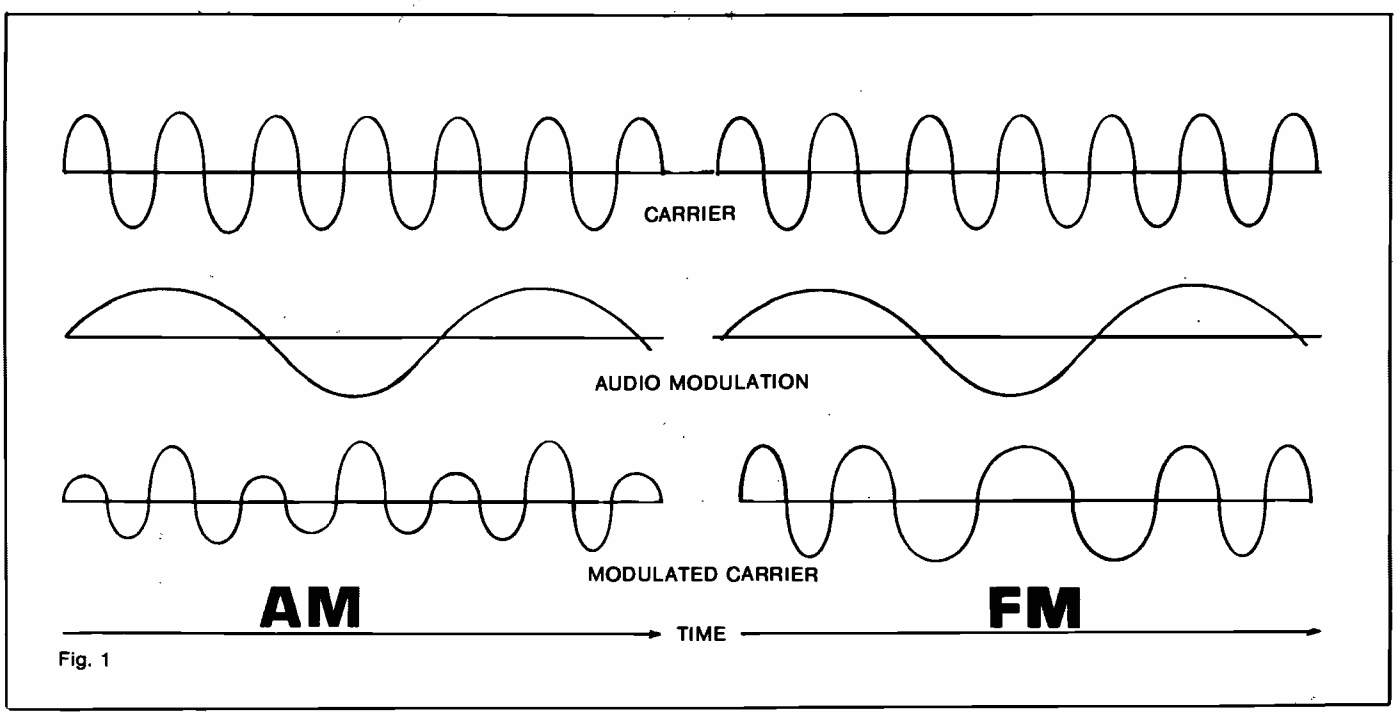


Fig. 1

MISSIONS

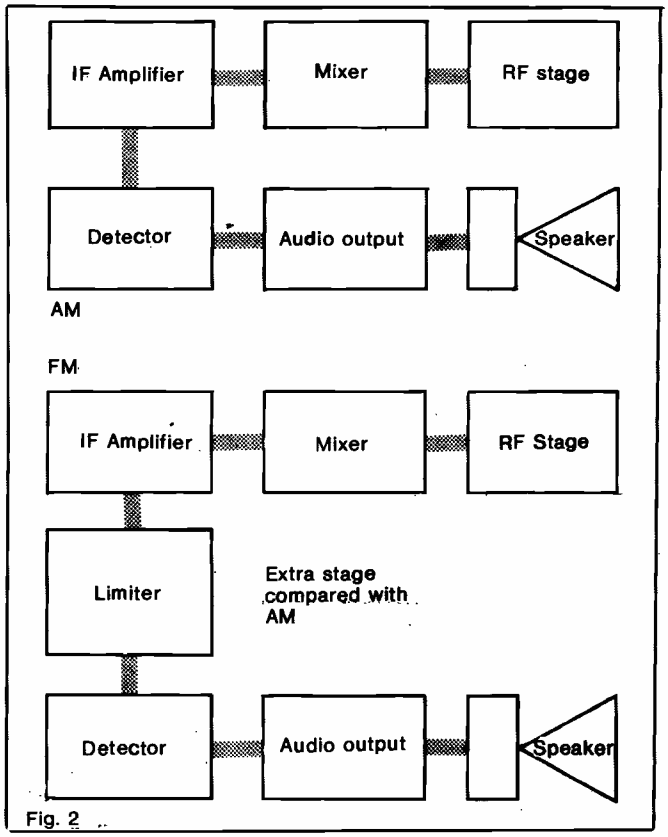


Fig. 2

Block diagrams of typical FM and AM receivers.

from the detector. Now Fig. 4 shows what happens when an FM signal is passed through each receiver. In the case of the AM receiver, although the FM is not detected the interference is and results in noise being produced at the output. In the case of the FM receiver, the modulation is detected and passed onto the output but the amplitude modulation due to the interference is rejected. The ratio between the wanted FM detected modulation and the unwanted AM can be as high as 40dB or more (100 times), in other words any interference is likely to be rejected over 100 times better with the FM system compared to AM, PROVIDED the receiver is correctly designed. More about this later.

Now, because the FM receiver has a LIMITER stage which removes variations in amplitude of the incoming signal, it follows that all signals, irrespective of their actual strength, will be reproduced at the same audio level at the output of the receiver. On the AM receiver, if you were listening to a weak signal and had all the gain controls set for a comfortable volume, and then a strong signal came on channel, you would most likely be subjected to a signal far too loud for comfort. Whereas on FM it would still be at the same volume as the weaker one. This may not seem much of an advantage at first, but consider, if you are searching the channels on an AM set you would be constantly adjusting the RF and/or volume controls to maintain a reasonable output level from the speaker. Only those of you who have been working late at night and trying not to wake up the household will know the problem that can cause! On FM the volume control can be set to a suitable sound level and the channels searched without worry as the various signals will all be reproduced at the same level. (Late night bliss!)

The FM receiver also has another feature absent on AM. This is the CAPTURE effect. On AM if you are receiving a station on channel and another one (or more) comes on, the result is a hetrodyne (whistle) whose frequency and amplitude will depend on the strength of the stations involved. Now on FM this effect is greatly reduced due to the capture effect. This will also be dealt with later but briefly the detector used in an FM receiver will give priority to the stronger signal and suppress the weaker. In other words, it 'captures' the stronger signal. In practice this means that if you are receiving a station at a certain strength and one which is stronger comes on channel, you will only hear the stronger station.

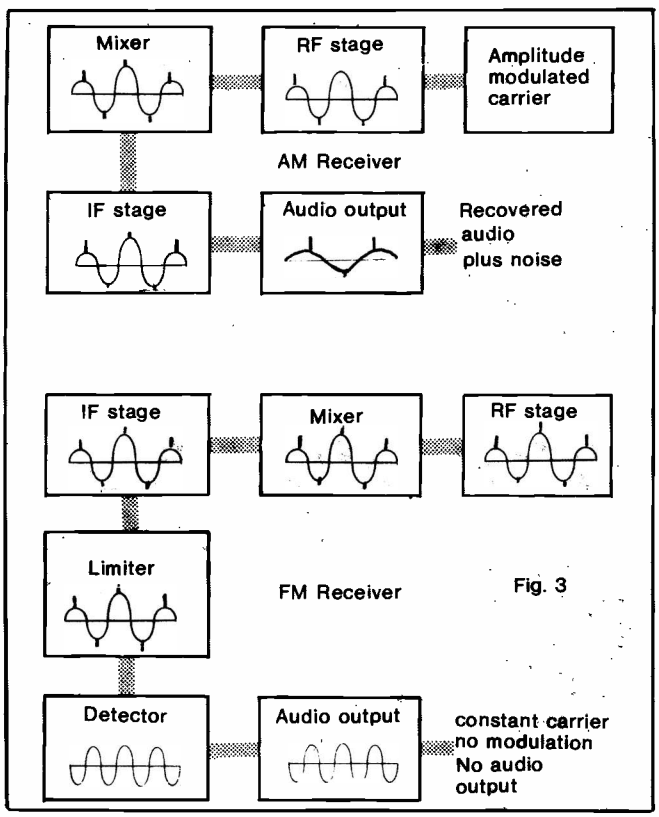


Fig. 3

This shows how an amplitude modulated signal is handled by an FM or AM receiver. Note how the limiter stage on FM removes the noise pulses.

FM TRANSMISSIONS

The weaker one is suppressed. This means no hetrodynes, etc. It also means that several different nets can operate on the same channel without mutual interference providing they are below the 'capture' range of the receiver. Fig. 5 shows how this works in

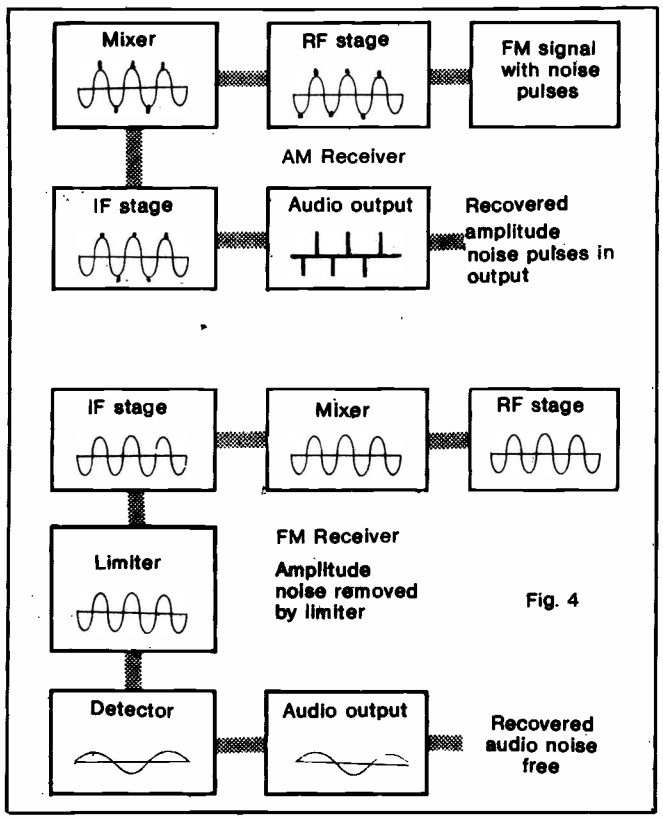


Fig. 4

Similar to Fig. 3 but showing what happens when an FM signal is handled by both types of receiver. In this case the AM receiver only reproduces the noise pulse. The FM receiver removes the noise pulse and reproduces 'clean' audio. Compare with the AM output in Fig. 3.

practice. Group A are outside the range of groups B and C, and likewise group B is outside the range of group A and C, and so on. Because of the capture effect, only your own net would be heard. However, if your net closed down, you would then hear the stronger station in the other nets and in fact could join in. However, you would have to wait for a break in transmission before calling in. Because of this capture effect you cannot 'break in' like you can with

point where signals from each area are of equal strength. The signals within a given aea will be 'Captured' as they are stronger than the signal reaching it from an adjacent area.

Signal strength from a given transmitter will fall off in amplitude inversely to the square of the distance; i.e., each time the distance is doubled the signal will fall by a factor of four.

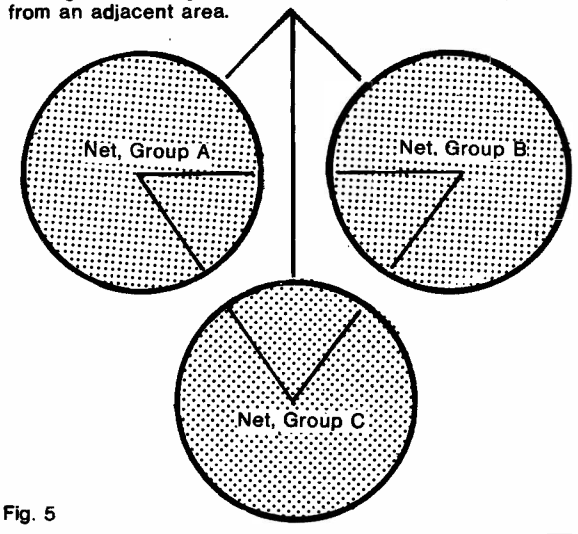


Fig. 5

This diagram shows the effect of 'Capture'. This effect only occurs with the FM system. There is no counterpart of this effect on either AM or SSB. Each group can operate on the same channel without causing mutual interference to other groups outside their 'capture' signal strength. With good receivers the difference between a signal 'captured' and one that is not may only be 2 or 3dB in strength.

AM, you just would not be heard under the stronger station captured at the receiving end. Mind you, if you happened to be stronger, then they would only hear you! (Linears are illegal!)

In general the circuits required for an FM transceiver are less complicated than the SSB or AM ones and this is reflected in the overall price of rigs. With SSB, a very good IF filter is required in order to remove the unwanted sideband whereas on FM this can be a simple ceramic type costing only around 10 to 15% of the SSB type. Only simple modulator stages are required on FM compared with either the balanced modulator required for SSB or the power output audio stage and expensive modulating transformer used on AM. This simpler approach not only means cheaper rigs, but also more reliable ones. The less components used, the less there are to break down. This also keeps servicing costs down. Taking all these things into account, the FM system has a lot to offer in its favour compared with SSB or AM.

Rig Test

AMSTRAD

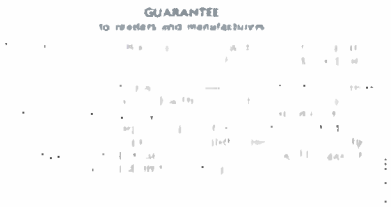
Amstrad CB 901

We originally tested the Amstrad CB 901 in November 1981 but only in an operational mode rather than actually putting it on the test bench. On the first test we achieved some pretty impressive copies but time was limited because our prototypes were required by other publications.

When the first production models of the Amstrad rigs became available, one phone call secured a CB 900 and a CB 901 for our rigorous test procedures. A point worth making is that some manufacturers are very reluctant to let us get our hands on their sets. Some are wary that their sets will get lost in transit or badly mauled by our testers. Others are loath to give reasons for their reluctance.

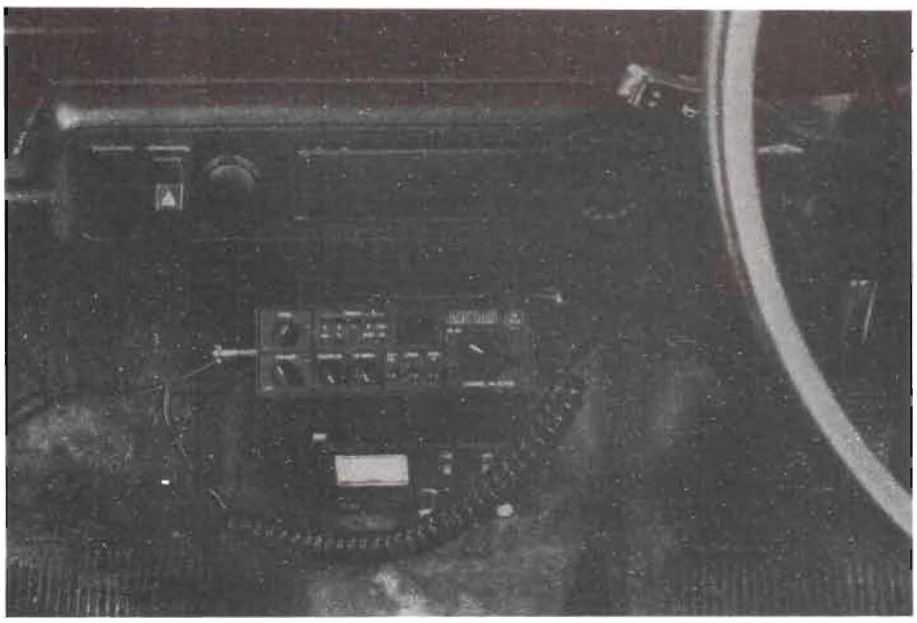
Proper test procedures

To dispel any fears, we are scrupulously fair when testing rigs sent to us. Our testers are fully qualified electronics engineers who are completely independent from ourselves. If, for any reason, the first set supplied to us does not come up to specification, the company who supplied it gets every opportunity to replace it with another one BEFORE WE PRINT THE RESULTS. Let's be fair, everybody in the electronics industry is allowed the occasional hiccup; we give them the chance to rectify it. Lastly, all tests are carried out on professionally calibrated and manufactured test equipment. Any manufacturer who is unwilling to supply us with rigs under these conditions is either out of stock or ashamed of the stock he's got.



Amstrad

Amstrad have achieved a good reputation for producing audio equipment at a reasonable price. The company's growth has been somewhat staggering and much has been written and broadcast on the way in which such a small firm grew into a public company with a turnover in the millions. Amstrad's step into CB was quite expected as they have always been amongst the first to take new ideas on board. Vast quantities of Amstrad rigs have already been sold through both CB specialists and multiple stores.

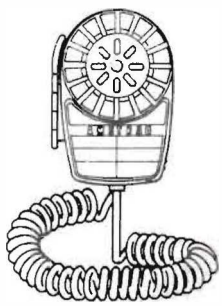


Amstrad CB 901 on the bench

Constructed in Japan, the casing of the rig is made out of steel coated in black plastic. The front panel controls are modern in design and include volume, tone, squelch, RF gain and channel change. PA, Roger bleep and channel 9 facilities are on push button controls. Signal, RX, TX, ROG, PA and channel are all indicated by LED's. The rig control which is slightly difficult to operate is the attenuator which is a push button located on the rear of the set. The loudspeaker is situated on the underside of the set.

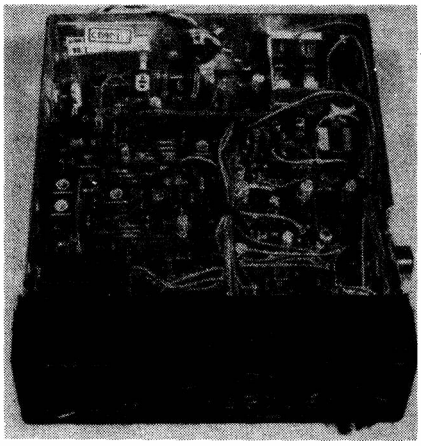
Microphone

The Amstrad microphone is different in looks to anything that we have previously seen. It is also different to the picture on the box that the set comes in. The mic socket is a screw type of the more popular four-pin variety which is on the left hand side of the rig. When using this microphone the PTT (push to talk button) needs to be depressed quite firmly to remain in the transmit mode.



Internal construction

The 901 is constructed to very high standards. The soldering and cutting of leads was obviously carried out on well adjusted machinery. Only one modification was evident and that was a fixed resistor mounted on the underside of the circuit board which gives a different adjustment range to the squelch control. The power output transistor is mounted to its heatsink by a metal nut and bolt, which is different to other equipment which uses a plastic screw for this purpose which can get rather hot during a prolonged transmission.



Transmitter test

The major equipment used to conduct this test was

Racal 9081 and 9082 signal generators

Marconi TF 42F distortion meter

Marconi TF 340 audio power meter

Racal 9916 frequency meter

Racal 9101 and Bird 43 power meters

Racal 9009 modulation meter

Levell TG 150D audio generator

Solartron AS 1412 power supply unit.

Power output

The power output of the transmitter is good when measured at normal battery levels, giving an output of just under the 4 watts maximum allowed by law when powered at 13.8 volts. The 10dB attenuator switch, which has to be operated when using the rig as a home base with an antenna mounted more than 7 metres high, is 100% accurate giving the maximum allowed power output.

Power Output and Attenuation

Atten.	Supply Voltage		
	10.8v	13.2v	14.5v
Hi	2.2W	3.4W	4.0W
Lo	0.19W	0.34W	0.4W

Frequency

The channel spacing was measured at 10KHz within a few Hz across the whole range. Purpose designed FM transceivers such as the Amstrad 901 seem to be very accurate on this point because all the frequencies are locked to one quartz crystal which is adjustable to very fine limits.

Stability within differing temperatures is very good with a maximum drift of only 40Hz being found.

Temperature Stability

Temp.	CH1 (MHz)	CH40 (MHz)
48°F (cold morning)	27.60128	27.99128
68°F (room temp.)	27.60123	27.99123

Modulation

The 901 achieved a good modulation limiting level with a slightly wider response than some other sets that have been tested. The result of this is that the transmitted signal could be a little more natural sounding.

Modulation

Level Input	Input Frequency 500Hz	1125Hz	2500Hz
0.5mV	0.25KHz	0.70KHz	0.29KHz
1.0mV	0.30KHz	0.80KHz	0.32KHz
2.0mV	0.6KHz	1.10KHz	0.80KHz
50mV	1.20KHz	1.50KHz	1.20KHz
200mV	1.25KHz	1.50KHz	1.20KHz

Receiver test

Audio output

Measured into an 8 ohm load at 13.2 volts supply which is the resistance of the speaker fitted to the set. Overall distortion figures are good with quite a low level being measured at 3.5 watts which when mounted in a car 18% would be barely audible.

Measured Distortion

1.5 watts	2.3% distortion
2.2 watts	10.0% distortion
3.5 watts	18.0% distortion

Squelch level

Threshold – 0.09uV (microvolts).

Fully muted – 0.5uV (microvolts).

The squelch was found to be rather sensitive when fully muted. However, a simple internal adjustment could easily rectify this to eliminate some of the more inaudible or distant stations.

Receiver sensitivity

A very good result was achieved and in the absence of interference will enable a good reception of the weaker transmitted signals.

Sensitivity

10dB quieting	0.09uV
20dB quieting	0.25uV
30dB quieting	0.85uV

AM rejection

To test for AM rejection a fully limited FM signal (10uV) is fed into the receiver and modulated with a 1KHz tone (1.5KHz deviation). The receiver audio output is then noted. The FM modulation is then changed to AM still with a 1KHz tone but at 30% modulation, the audio output from the receiver is then measured. In the case of the Amstrad 901 AM rejection was measured at 34dB which is considered to be a good result. It should be noted that this rejection is only true for signals that are exactly on the received frequency and that if the AM signal is slightly off frequency then a completely different result would occur.

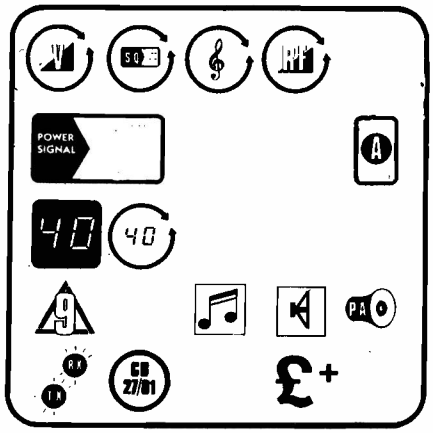
Adjacent channel rejection

Two signal generators are fed through a combining network into the equipment and are set to adjacent channels on the rig (i.e., 19 and 20). Both are modulated with 1KHz tone at 1.5KHz deviation and one is set to 1uV output. The receiver is set to this channel and the audio output adjusted to read 10mW. Now the output of the second generator is increased slowly until the receiver degradates the wanted signal by 3dB. The output from the second generator is noted and gives the relative indication of rejection.

The result achieved on the Amstrad 901 was 285uV for 3dB degradation. Once again this is considered to be a good result.

Summary

What more can we say? The Amstrad 901 that we tested was a production model, not a prototype, and as such has come out with flying colours. Only slight deviations to the manufacturer's specifications were noted.



Manufacturer's Specifications

Channels	40
Frequency range	27.60125-27.99125
Type of emission	F3
Channel spacing	10KHz
Frequency composition	PLL Synthesizer
Power source	12V DC negative or positive earth (nominal)
Operating temperature range	–5°C–+45°C nominal
Electric Specifications	
Receiver section	
a Receiver system	Dual conversion superheterodyne
b Intermediate freq.	1st IF 10.695MHz 2nd IF 455KHz
c Sensitivity	0.5uV (20dB S/N) nominal
d Adjacent channel	45dB for standard
Selectivity (@ +10KHz)	less than –10dB NQ level
e Squelch threshold sensitivity	(approx. 0.15-0.2uV) 50uV maximum
f Squelch tight sensitivity	60dB nominal
g Spurious response attenuation	45dB nominal
h Image rejection	less than 20nW
i Receiver spurious emissions	4 watts at 4 ohm
j Audio output power (@ 10% THD at 1KHz)	2 watts at 8 ohm +2/–8dB per 6dB/ OCT at 0.3–3KHz
k Audio freq. response	Stand-by 0.25A nominal
l Current drain	Receiving max. 0.8A nominal
Transmitter section	
a RF output power	4 watts (MPT-1320)
b Freq. deviation (@ 1KHz)	±2.5KHz max.
c Audio freq. response	+2/–5dB per 6dB/ OCT at 0.3-3.0KHz pre-emphasise
d Spurious emission 80-85MHz 87.5-118MHz 135-136MHz 174-230MHz 470-862MHz	less than 50nW
Other freqs.	less than 0.25uW
e Adjacent channel power	less than 10uW
f Current drain @ 12.0V	2A nominal

DX QSL INTERNATIONAL CLUB SPOT

Are you a QSLholic?

Stand by for a new word to be introduced into the English language! Do you recall my request for someone to tell me what a QSL card collector is called?

Unfortunately the response was pretty poor and I was giving up hope, when suddenly, I received a message from Peter Van Zoggel (Clog) of Auckland, New Zealand.

And lo and behold, the mystery has been solved. We're all QSLholics (suffering no doubt from QSLaholism). Simple and obvious, innit? Why did I not think of it?

Speaking of New Zealand, there's a good CB magazine down there called CEE BEE World.

At the moment, CEE BEE World, in conjunction with CB Radio and EIDXC, is running a QSL competition. Basically what is happening is that the first reader of CEE BEE World to collect a QSL card from 15 different English counties is the winner. The winner's name and AD plus his or her photograph will be reproduced here in CB Radio. Naturally, we are reciprocating at this end, so for anybody interested in a nice and easy QSL competition, here goes:

CB operators in New Zealand are all allocated a licence number and call sign, e.g., WN 4636, WG 1869 and so on. In all, New Zealand has 17 different call sign prefixes.

We'll be using the call signs at our end in the competition in much the same way as down under they're looking for different counties. What we are looking for is the first QSLholic who can produce 10 cards, all having different call sign prefixes. Nice 'n' easy 'n' straightforward.

The only stipulation is that these are dated from 1 January onwards. Earlier cards won't count. Naturally, I'm not expecting you to send me the cards. A photostat will suffice.

Remember, send your entries to me, not to CB Radio.

As a point of interest, as far as I know, this is the first ever International QSL competition. If nothing else all entrants will be making a wee bit of QSL history. I will try and reply personally to all entrants but give me time. I'm only human!

The winner will be notified immediately and will receive his or her prize of a . . . ? You'll just have to wait and see for that one. As with CEE BEE World, the winner of our first International QSL competition, at this end, will have their name, AD plus photograph published so get QSLing NZ way and smile for the birdie.

EIDXC membership is rapidly approaching the 1,000 mark. To mark this special event, EI Unit 1,000 will receive a special package plus free membership to Big Ben DX Club. A nice gesture by Jim Glavin which is appreciated. By the same token, when Big Ben reaches the 1,000 mark, BB Unit 1,000 is to receive a special Big Ben package plus free membership to Eng. Int.

Listen in to 27.585 LSB and there's a chance that you may hear a Woodpecker. Not the infamous Russian Woodpecker signal but a member of a DX club operating out of Hereford known as the Woodpecker DX Club.

No delusions on SSB

Woodpecker? Check out Bulmers Ciders and you'll see the connection.

As you may have guessed, 27.585 is the monitoring frequency of the Woodpecker DX Club, who can be contacted via PO Box 22, Hereford HR4 0UH. I must warn you that the Woodpeckers are not a QSL club but a 100% DX outfit, so please do not send a QSL to this AD if you just want to swop.

The Woodpecker information has been supplied to me by Ken, Unit 44 mobile, so I could do worse than to use mostly Ken's own words to explain the existance and aspirations of the Woodpecker DX Club.

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Rep of South Africa

Tony Campbell
94 Drumnagoon Rd
Portadown
Craigavon
Co Armagh
N Ireland
BT63 5RF

Mike Weaver
(Crossbow)
31 Queen Alexandra Rd
Goldington
Bedford
MK41 9SE

Worldwide DX'ers

Well, we're back again with a lot more addresses and cards. I can't say that you will get a lot of returns from these addresses but if you send an International Reply Coupon your chances are better. As you know, some of these countries have not legalised CB radio yet, so I try to give you their names for the envelopes. Keep the mail coming in. I enjoy hearing from all of you. If you would like to swap cards, please enclose an International Reply Coupon. Send to: Ian Shrader, PO Box 167, Pacific Beach, Washington 98571, USA.

Joaquin Duran
(SC 497)
PO Box 12
Santa Ana
El Salvador
Central America

Osamu Kikuchi
(SC 500)
PO Box 3
Ryuo
Yamanashi 400-01
Japan

Ray Wong
(Charlie Tango)
Box 8547
Shum Shui Po
Hong Kong

Jan Spijksma
(Dicso Elvia)
Tegelseweg 193
5912 BE Venlo
Holland

Mabrouk Hohamed
Shihab
Box 1359
Jeddah
Saudi Arabia

Abdussalam Homsi
PO Box 1169
Tripoli
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Sandy McKenzie
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Kaye Harrison
1820 25th Ave South
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Washington 98144
USA

Helmut Neubuser
Wiesenweg 3
3181 Barwedel
West Germany

At the moment they are 25 members strong, all of whom are commited sideband owners and users. Further membership is restricted to invitation and the majority vote of the current members. The club is not involved in any way with the AM/FM arguments nor the legal manoeuvrings. As Ken succinctly puts it "We have no delusions about the continuing illegality of SSB on our frequency range". Sad but I reckon true.

Although the club members use 27.585 LSB as a local calling frequency, anyone is welcome to call for them. All Woodpeckers QSL 100% on QSO when asked and there is a good balance between overseas DX'ers and long distance UK stations (weekend nights mainly).

The main aim of the club is to try and improve the general standard of courtesy and skill within their range, hopefully by maintaining a high standard themselves and leading by example.

Any clubs with an interest in SSB/DX and interested in setting up a meeting between themselves and the Woodpeckers are invited to get in touch with Ken at the above AD. This invite applies to local or distant, UK or overseas clubs, so if you're interested try for that 27.858 QSO. Failing that, do it the easy way – write a letter.

The Woodpeckers don't just talk about DX. They work it and very successfully too. Here's a couple of tasty examples.

Ken himself recently linked up with Bush Ranger 02 in NSW, Australia. That tickled Ken, as he thought his old AM handle of Ranger was unique. Small world innit, Ken?

Woodpecker Unit 15, Frank, has been getting very friendly with the Honky Tonk Lady in Trinidad on two separate occasions each lasting nearly half an hour. Hope she isn't married. Frank could well find himself on the wrong side of the Honky Tonk Man! Well, there you have it. An exceptionally informative and well run club. Aspiring local DX'ers looking for guidance and good sideband technique would be well advised to get in touch with the Woodpeckers. You may not be able to join but I know Ken will help you all he can and will give you some excellent tuition.

Flying Tiger QSL Swap Club

And now for a club which I should have wrote about ages ago but due to an unfortunate oversight did not. My apologies to Lester and Joan Froelich, the hardworking President and Vice-President of The Flying Tiger QSL Swap Club of PA.

Flying Tigers QSL Swap Club, Pennsylvania					
	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	12	3		5

The full AD of the Flying Tigers is 356 Walnut Street, Coatsville, Pennsylvania, USA, Zipper 19320.

There's quite a nice story behind this rather unusual club name.

Around about 1978, Lester and Joan got the QSL bug. Lester's AM handle was Flying Tiger II and his card portrayed a mean-looking Flying Tiger. (A Flying Tiger was a very fast, very effective prop-driven USAF fighter from early 40s to early 50s).

Well, anyway, one day, a lady asked Lester if he used to fly Flying Tigers. The reason she was asking was that her brother had flown Flying Tigers way back in the war days. A conversation ensued and Lester eventually found out that her brother had actually been killed while flying a 'Tiger' over in Burma.

This sparked off a reaction in Lester and within a very short period both he and Joan had formed The Flying Tiger QSL Swap Club in honour of all the men in W.W.II and after who had fought for honesty, fairness and for the freedom of others. As Lester and Joan say, "This club is dedicated in respect to the memory of those men who were great men and will always be so".

Corny? Well, you may think so, but I respect Lester and Joan for putting their beliefs and ideals on the line.

At the moment, there are about 450 Flying Tiger units distributed throughout the States, Canada and most of Europe.

Although the Flying Tigers don't specify any particular frequency as a club channel, hang on in there and have a search for Flying Tiger II Unit 1 and Little Queen Unit 2. Lester and Joan haven't given up their radios completely in favour of QSL swaps.

Lester's radio equipment is pretty smart, he runs a Cobra 189 XLR base hooked up to a D-104 mike. This is run through a Super Scanner antenna. As it happens, Lester and Joan tell me that they regularly enjoy QSO's with other Flying Tiger units.

Membership to the Flying Tigers is US$3.00 plus 15 of your QSL cards. For this you will receive a very nice five-colour certificate displaying once again the mean Flying Tiger, an ID card plus your unit number. The same set up can be had for XYL for an additional US$1.50. The club roster (which is getting to be pretty bulky) is an additional US$2.00. Club rubber stamp?

Well now, you have a choice of three. Two at US$3.00 each or a real big super duper one at US$4.00. I couldn't recommend either one against the others because they're all great. If you can afford it, get all three, you won't be disappointed with any of them.

Foreign members, i.e., us in the UK, have to tack on US$3.00 for First Class Air Mail.

If any of you are contemplating joining the Flying Tigers, stop thinking about it and do it. Have no worries, you'll be joining a genuine and sincere club run by two great warm-hearted people.

That's about it for this month. Hope you all got the pressies that you wanted and that you didn't suffer too much the morning after the night before!

My best regards to you all. Take care and remember: if you can't use the mike – use the pen.

Charlie Hotel Echo India Unit 25 – Clear.

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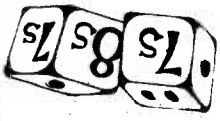

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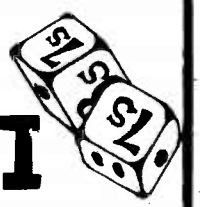

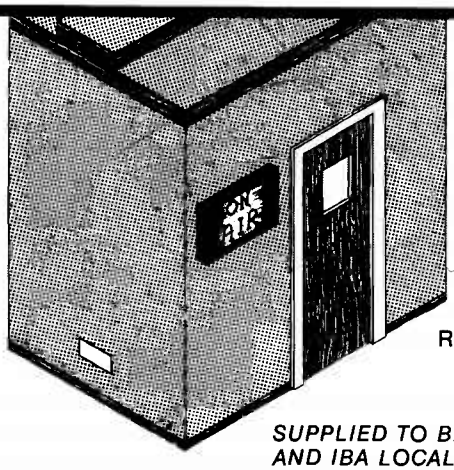

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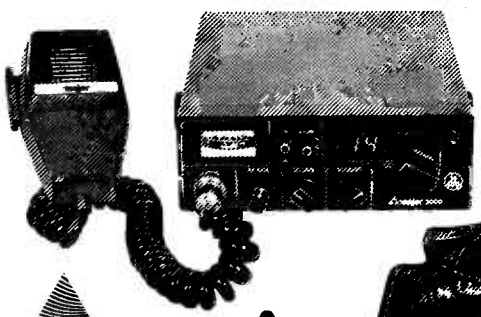

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NEWS REVIEW

'Rubber Ducky' journalism and funny language

It would appear that the surge of press coverage given to CB radio due to last month's legalisation has been reduced to a moderate flow. Although some local press publications still take a great pleasure in writing 'Rubber Ducky' waffle to enlighten their supposedly uninformed readers – who in turn write back to say how uninterested they are in "CB radio and how they don't understand why they use that 'funny language'." After having put these articles to one side, a small amount of relevant, interesting articles are left, some of which are brought to your attention on these two pages.

Yorkshire Post

CB clean up puts Outlaw in court

An enthusiastic Citizens' Band radio user became a 'bad buddy' when he tried to clean up the airwaves. A midnight search for bucket mouths ended with him assaulting the wrong person. Seventeen-year-old Paul Elliot from York pleaded guilty to charges of assault and driving a car without the owner's permission at York Magistrates Court. The magistrates heard that he went out looking for General Lee. Mr. Elliot, who uses the handle Outlaw, found a man who answered to General Lee's description in a parked car. Outlaw hit the man, who then ran out of the car park. Outlaw then drove his sports car out of the car park. The case was adjourned for reports.

Birmingham Post

Car phone move for Securicor

Securicor have moved into the retailing side of the growing in-car communications market. They opened a car telephone showroom in Birmingham earlier this month, which they claim has the largest display of in-car communications equipment in Britain. In addition to radio telephones and paging systems, CB radio transceivers and accessories are also on display. A spokesman said, "This is a new departure for us. It is a pilot operation but if it goes well consideration may be given to opening centres in other parts of the country". Securicor, who claim to operate the largest private vehicle two-way radio network in Britain, also said that with more than 10 years of experience they saw a section of the market where they could succeed. Visitors to the showroom will be able to try out the equipment and receive impartial advice on the system best suited for their needs.

Western Mail

Rush to buy those legal radios

The great CB rush is on in the High Streets of Wales – but stockists are being left wondering if they can obtain sufficient supplies to meet the demand. The trouble stems from the fact that most of the new legal CB sets are imported and those shops which have been able to obtain stocks are worried that they will be left high and dry. A spokesman for Dixons in Cardiff said that the demand for CB sets had been enormous and far exceeded their original expectations.

Although a great demand for legal transceivers has arisen, Cardiff Crown Offices said that they had issued only six licences!

Birmingham Evening Mail

No CB bungle, says Minister

Home Affairs Minister, Mr. Timothy Raison, hit back in a Midlands speech at critics who said that the introduction of CB radio had been bungled.

Speaking at a Coventry meeting, he claimed that Government moves to legalise CB had been misrepresented. The first complaint from the breakers arose when the Government ruled against the use of AM equipment. The breakers claimed that they had exaggerated the amount of interference caused by AM sets.

Mr. Raison said that home entertainment equipment was considerably more susceptible to interference from 27MHz AM than from 27MHz FM. Complaints of interference by illicit CB equipment had been running at over 1,000 a week.

Sunday Mirror

Thugs force CB 'spy' off the air

Radio investigator Gerald Openshaw received the message loud and clear

CB priest silences too-blue buddies

THE CB airwaves have suddenly become cleaner since a new recruit joined the ranks of the Good Buddies.

Sunday Mirror Reporter

For Father Tony Grimshaw has had one of the recently - legalised sets installed in his Morris Minor.

And he chats away to the area's "breakers" as he cruises round his parish in Collyhurst, Manchester.

His first message was to stop "bucket mouthing" — the use of obscene language over the air.

He's already persuaded two of the main offenders in the area to stop turning the CB air blue.

But the 44-year-old priest does not intend to use his CB set as a pulpit.

And he has banned politics, religion and sex in his talks.

Father Grimshaw, who sprinkles his sermons with snippets of CB jargon, installed his set after a message from the Pope.

He said: "The Pope sees it as a great unifying force around the world. That's why I became interested."

● CB-users in Carlisle have been invited to night classes in a bid to clean up the airwaves after reports of foul language and prostitutes using the sets to ply for trade.

when he tried to track down illegal CB operators. The breakers warned him "Lay off it or it will be the worse for you and your family". The threats have caused 61-year-old Gerald to quit his job as a detector agent for British Telecom. Gerald, who has opted for early retirement, said that he could put up with personal abuse and threats but when they start menacing his family he feels it is time to go. The wartime radio expert said that the last straw came when his 15-year-old daughter, Louise, was approached on the school playground and warned that her father's detector van would be smashed up if he parked it in a certain place. "We used to be friends of the public," he said. "Now the job has become more like a war."

● Salesgirl Sally Jackson with the last "rig" in Dixon's Cardiff store after the rush for CB sets.

Eastern Daily Press

Police give warning on two-way sets

Norfolk police are warning parents who are thinking of buying walkie-talkies for their children at Christmas to think again. The sets, which work on 49MHz, are illegal to use regardless of their popularity.

Chief Inspector John Curson, a police communications officer, said that it was quite legal to buy or sell 49MHz walkie-talkies but anyone buying them will be breaking the law if they use them to transmit. This could result in the sets being confiscated and a substantial fine being imposed. Legal walkie-talkies are available and bear the CB 27/FM mark.

Rush to buy those legal CB radios

By BILL BALDOCK

THE great CB rush is on in the high streets of Wales — but stockists are being left wondering if they can get sufficient supplies to meet the demand.

Citizen Band radio became legal in Britain from yesterday and the high street stores are moving in on what could be one of the most lucrative businesses.

The Government have legalised CB radio on a frequency of 27 MgHrz FM as opposed to the illegal 27 MgHrz AM frequency which has been used by an estimated 500,000 breakers in the United Kingdom for a number of years.

But all the new legalised FM sets are imported and even those shops which have been able to obtain supplies fear that they will be left high and dry when present stocks run out.

The massive demand has arisen as a result of more people wanting CB radio now that it is legal as well as many breakers wanting to change their outlawed AM sets for the new legal ones.

A spokesman for Dixon Photographic in Cardiff said that the demand for CB sets had been enormous and far exceeded their original expectations.

A similar story was being told at other stores such as Currys, Halfords and the Comet Discount Centre, where yesterday they had only one set in stock.

But while the High Street shops are moving in, the demand for sets and the switch to FM could hit the smaller breaker shops who have been supplying the illegal AM sets.

Under the legislation which came into force yesterday CB operators now have to buy a £10 licence, which covers them for three sets, but a spokesman for the Post Office said that only six licences had been issued at Crown Offices in Cardiff yesterday.

Anyone thinking of buying a CB "rig" — as sets are known in CB jargon — will need something in the region of £100 or more to get on the air.

A transceiver can cost anything between £60 and £100; an aerial from between £11 and £20 and other bits and pieces around £10 and £20, apart from the essential literature such as a CB dictionary.

Daily Mirror

Dying baby ignored by CB dad

A father was so busy listening to the CB radio that he ignored his baby daughter's screams of agony as she was plunged into a bath of scalding water. Judge Donald Herrod was told at Wakefield Crown Court that 22-month-old Donna Sykes's five-year-old sister, Kirsty, was told to bath the baby because the children were getting on her father's nerves while he listened to his CB radio. When he heard the screams of the child, who died two days after the accident, he did not go himself to investigate. He sent a 14-year-old neighbour to see what had happened. When asked if he was interested in the children, he said that as long as they didn't bother him, they were all right.

His wife, Karen, who admitted responsibility, said that Kirsty treated the younger children like dolls and had undressed and bathed them a number of times. The couple admitted wilful neglect and were remanded in custody until the judge passes sentence.

Birmingham Post

Club fund

An appeal for funds has been launched by the Evesham CB Radio Club to buy a car for a girl who has no arms or legs. Members of the club were so impressed by 16-year-old Sally Hall, who joined them on a club outing earlier in the year, that they plan to have a specially adapted car waiting for her when she passes her driving test soon after her 17th birthday.

Sunday Mirror

CB priest silences too-blue buddies

The CB airwaves have suddenly become cleaner since a new recruit joined the ranks of the good buddies. Father Tony Grimshaw has had a CB radio installed in his Morris Minor and chats to the local breakers as he cruises round his Manchester parish. His first objective was to persuade some of the local bucket mouths to moderate their language. Although the 44-year-old priest does not intend to use his rig as a pulpit, he does insist that religion, politics and sex are not brought up in his conversations. Father Grimshaw had his rig installed after receiving a message from the Pope, who sees CB as a great unifying force around the world.

The Times

CB warning of the rent man

Councillors at Droitwich, Worcestershire, say that tenants are using CB radios to warn each other of the rent man's approach. Mr. David Feathers, chairman of Wychavon District Council's housing committee, said that the tenants call the rent collector Yogi Bear on their radios and that many of the consistently bad payers have CB antennas on their homes. The council is now considering issuing the rent man with radios to intercept the calls.

CLUB SPOT

The NWLBC

North West Leicestershire Breakers Club (NWLBC) covers the area of Coalville, Ashby and surrounding villages. The club was started in September 1980, with 60 members. This number has now risen to 750. The committee has basically two sides; one organising the weekly club nights and monthly eyeballs, the other actively engaged in the campaign for 27MHz AM. Re. the latter, we are members of NATCOLCIBAR and the AMBC representatives attend meetings of these two on a monthly basis.

Like many other clubs, we spend a lot of time raising money for charity. To date, a total of £650 has been raised and donated to various charities and more fund-raising activities are planned.

J. Allsop (Speedbird) (Secretary)

Carpet Town Breakers Club

We are a new CB club based in Kidderminster. We call ourselves Carpet Town Breakers Club and meet every Sunday night at 8.00pm at the Bay Horse pub. If anyone would like to come down for an eyeball they will be made very welcome. I would also like to hear from any clubs in the Midland area who would like us to visit them. Please write to me giving details of your club nights. My address is 2 Claines Crescent, Comberton Estate, Kidderminster, Worcs DY10 3BX.

Angela Whatmore (Crazy Lady) (Secretary)

West Coast Breakers

I would like to take this chance to tell all of the existence of our wee club, West Coast Breakers. We have 481 members who are all very active in the club's interests; mainly for charity and education in various topics.

At present we are working to buy an electric wheelchair, approximate cost £900. So far we have collected £600 by means of disco's, walks, direct donations (of which £160 was collected at a meeting of the breakers, to which the committee added £100 out of club funds) and also guessing the mileage of an estate car.

Recently we were of assistance to a distress signal from a capsized boat, to which two good buddies, The Puma and Urban Spaceman, rendered assistance directly to the police and Clyde Coastguards.

This shows how a CB carrier can be a life saver. We also have members of the club who monitor the emergency channel 24 hours a day and we are in contact with the REACT (UK) group for any help we require. We have our monthly eyeball in The Gantoch Hotel, Goorock, to which new members are cordially invited.

Best wishes to all club members.

Keep the good work going, 73's, 88's.

Tristar (Secretary)

Road Apple DX Club UK

This club originated in the Nevada Desert, California, USA in 1947. In February 1981, Colin, now RA65, had a good DX copy with Fred, RA1, and it was arranged that Colin would start a branch of this club over here.

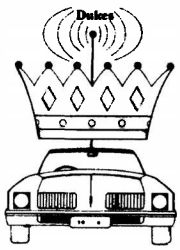
We now have a membership of 236, RA65-RA301. It is intended that we keep the membership to a reasonably low number, thus keeping the club fairly exclusive.

The breaking channel is 80 USB 27.85MHz.

I would be grateful if you would give us a mention in your next publication and pass the information to any serious DX'ers that they can write to me c/o Top Ear, London Road, Eaton Socon, Hunts, Cambs. Please enclose a stamped addressed envelope.

Wishing you all the 51's-73's, good DX'ing.

Robert Watton (RA68) (Secretary)



Dukesville Breakers Association

We meet on Thursday evenings at 8.00pm at the Co-op Restaurant, Eastgate, Worksop, where one meeting a month is given over to a disco and we try to organise a film for one of the remainder. Everyone is welcome.

Our sports section is developing rapidly with trips out ten-pin bowling, inter club sports evenings, etc., against other clubs. We have a junior football team and have just formed a ladies' team and would be delighted to find someone brave enough to play us!

We break on 14 around here and are always pleased to ratchet and eyeball anyone passing through.

So 'till we do it again, 10-10.

All the high numbers,

Petticoat (Secretary)

Shaw and District Breakers Club

We hold our eyeballs every fortnight and have a membership so far of 200. We hold raffles and have entertainment after the ratchet at the eyeballs. We've started a junior breakers club and we are also looking for a suitable charity to donate our proceeds to. Our breaking channel is 14, so if any of you come through our area, give us a shout, there is always someone waiting for a good ratchet.

73's and 88's to you all.

Bye, bye, we're gone.

JB (Secretary)

Central 27 Breakers Club

As press secretary and on behalf of Central 27 Breakers Club, I would like to advise you of our existence since being formed over six months ago.

We are located in Stirling. Indeed there are various handles for Stirling but at present the majority would prefer the Silver City. Our breaking channel is 16, mainly because we are rather close to the superslab and we didn't like blowing over the truckers' national channel. A considerate bunch, aren't we?

We started with just over 60 members when registration began in mid February and now have grown to almost 300 registered members. I estimate there are in fact presently about 350 breakers in the Stirling area and it is growing by about at least one new breaker a day.

Our meetings are held on alternate Tuesdays. Visitors are welcome provided they are accompanied by a member. Sorry but we just can't find a large enough space to fit everyone!

Well, I've jaw ratcheted long enough now, so this is Mickey Finn going down, 10-10, 3-2-1, I'm gone, breaker break and all that jazz.

Mickey Finn (Press Secretary)

Marshland Breakers Club

We are a newly formed club for Terrington St Clement and its surrounding villages. We meet fortnightly for social eyeballs at The Oddfellows Hall, Terrington St Clement or The Woolpack public house at Walpole X Keys. Although we are a new club, we have an excellent entertainment committee who work very hard and enjoy every minute of it providing treasure hunts, soap box derbys, etc., for its members. Forthcoming events for the club involve a camping week-end, a bus trip and a beach party. We welcome eyeballs with other clubs passing through the AM on convoys.

73's and 88's to all good buddies.

Rebel Lady (Secretary)

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Readers Write

Mozart replies!

Dear Sirs,

I was pleased to see that my earlier letter provoked the predictably hysterical responses from certain factions. Who were those people? Were they people who REALLY NEED CB radio, such as the disabled, lonely or housebound? I doubt it. They certainly didn't seem to be people who could see much further than the ends of their K40's. For example, Mr. D. Rhind (Oct.) says the new legalised 27MHz FM system is "neither use nor ornament to man or monkey". Try switching the thing ON, Mr. R. and you'll find it works quite well!

I note also that many AM breakers are determined not to change to FM. Well done, lads! There has been, over the past few years, a lobby of honest and sincere people battling away to get a viable CB system for the UK – well, now we've got one (and only the bloody-minded or misinformed would say we haven't) and all the AM wallies can do is provide a vicious stab in the back for those who have sweated blood on their behalf. Whether UKCB is FM or AM is now a totally trivial issue now that CB is legal. People who are really serious about SSB can always get a radio amateur's licence if they want, and let the rest of us get on with the non-technical business of CB (i.e., two-way radio for *everyone*).

I was most amused to read that the excuse for using American-based slanguage in British CB is the 'fact' we are using a system "developed in American TV and films". Rubbish! We can watch Kojak or Spiderman but we don't have to shave our heads or wear red-and-blue long-johns!

The Americans had CB first, then the language/jargon developed. In Britain, we started by importing the language first, then the rigs, and only as an afterthought is the system being developed!

I'm as much of a sucker for Americana as anyone, if not more so, but I'm much afraid that many people for whom CB would be of great social benefit, for example the old or the shy and insecure, may be put off by excessive use of Citizens' Bandeze.

To summarise, and hopefully avoid any future unpleasantness, let me say this

1) I am not anti-CB. I am deeply and most passionately pro-CB in the broadest possible sense.

2) Because of this, I absolutely abhor anything which tends to trivialise CB radio. The (s)language and the AM/FM battle are prime examples of this.

3) CB radio is now legal. The system we have, though not perfect, is quite adequate. It *will* work, and it's up to ALL of us to make sure it does – so let's stop whingeing and get on with it!

Mozart
(Nobody else wants this Handel)
(Yorkshire)

Dear Ed – Please stop this ridiculous correspondence or send me a year's free subscription.

P.S. An old Yorkshire saying:

Some folk talk to show they're born with such a lot of wit
And others talk as if to prove they haven't got a bit,
Some talk in't hope that what they say may help their fellow men
But most as talk just talk because THEY LIKE TO HEAR THER SEN!

Unless someone comes up with something really constructive, consider it closed. Ed.

Dear CBRM,

A word of warning to all intending legal FM breakers. Are you about to be ripped off?

The other afternoon I went into my local store in Bristol. I expected to be able to purchase a rig for £60 to £80 as in the USA a good Realistic rig is upwards of £45. Now according to information that I have received they have three rigs on the market in this country but once inside I found there was only one model in stock, the TRC 2001. The equivalent rig in the States retails for £70. Full of confidence, I asked the price and got one hell of a shock: "£99.95" replied the man behind the counter. He produced an English catalogue which gave the message, "Price TBA (to be announced)". So then he produced an American catalogue which stated $139.90, sort of proved my point, didn't it? "Ah, but they have had to modify them for FM," said he. "Nonsense, they already make FM for Europe and it's easier to make a clean FM transmitter than an AM. What about your other rigs?" I asked. "There's a 40-channel handheld that can be used as a mobile and also as a base station," he replied. "How much?" I asked. "£119.95." So I told he that rig sells for £60-£70 in the USA (TRC 209, I believe, here it's called the TRC 1001). "Err, well it's £119.95 here," he said. "Well, I don't think you will sell many at that price," said I, "and after Christmas you will have to drop your prices." He took my £5 bet on that one but warned me, "We are market leaders". Well, all I can say is that prices like that, in the middle of this recession, ought to put a stop to that.

It's the same old story, make a fast buck out of the Christmas shopper.

10-10 but not for long. I'm going back for my fiver and I'll 10-5 the outcome.

Wrecker One

Dear Sirs,

Hoping somewhere to receive some honest, unbiased and clear information about CB, I am writing to you.

I want to buy a *completely* legal mobile rig to fit in my open-top car. I want it for personal communication, private and business (private as opposed to non-business because I realise everybody else will hear). I would like *range* to be my most sought-after point.

I do not really need PA (Who does?), RF gain (I don't know what that is), a dimmer switch (since the rig will/must be somewhere discreet anyway) or a long (There's a CB rig here, waiting to be nicked) tell-tale antenna.

Now I know I must compromise one thing against the other. So my questions are as follows:

1. Choice of rig? I was thinking of a Radiomobile CB201. It's small, legal and of good pedigree.

2. Antenna? No idea really. I suppose what would be best for reception contradicts with my discretion criteria. I would like an automatic (i.e., motorised) retractable but I don't know if it's available and/or how it would affect performance.

Please give me some sound advice because there is *so much* bad advice around.

Yours faithfully,

W. P. Anderson

Yes, your range requirement does contradict the theft angle. However, an electric retractable works reasonably well and gives a great deal of disguise when retracted. Harada or Hy-gain models are available and have been for some time. Both are top loaded and thus illegal. So you now have a choice: run a legal set with an illegal antenna or try a simple steel whip with the loading under the metal of the car – there's a few to choose from.
Ed.

Dear CB Mag,

I note with scepticism police claims that CB'ers helped organised some of the recent rioting in Britain. My scepticism arises because of an incident occurring when the Prince and Princess of Wales visited here a week ago.

Between approximately 10.00am and 4.00pm that day, it was impossible to use an AM rig within five miles of Haverfordwest because every channel had been efficiently jammed. Since I refuse to believe this police/security facility is a recent technological breakthrough, I am led to speculate that so little 'riot organisation' went over the air on the nights in question that Smokey Bear simply didn't think it worthwhile pressing the red button.

Sincerely,

Rajah (T. M. Artingstoll)

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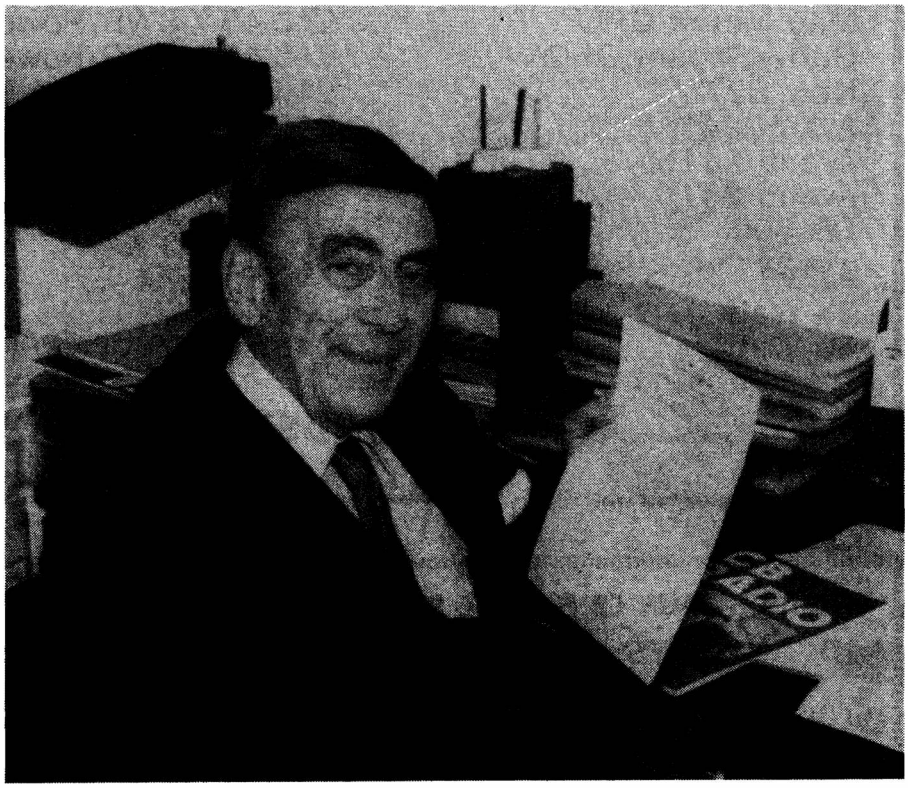
Parliamentary Review

The return of our monthly look at the House

Due to the excitement caused by legalisation, we have not been able to publish a Parliamentary Review for the last few months. This means that we have a little catching up to do. In our absence the House of Commons has been quite a hive of activity.

In an adjournment debate on 22 October, Sir Patrick Wall made a few observations about the way that legislation for the legalisation of British CB had been carried out. During his 30-minute speech, he said that although he welcomed the new service, many feel strongly that the specifications and restrictions imposed will emasculate CB for no good reason. We hope to be able to cover the debate in more detail in a later issue. Meanwhile we shall concentrate on the written and oral questions and their respective answers.



Sir Patrick Wall, with the question that gave Britain the "Yes" for FM CB.

Rigalisers

Mr. Campbell-Savours asked the Secretary of State for the Home Department whether there are any proposals to use rigalisers to monitor citizens' band radio.

Mr. Raison: No. The radio interference service of British Telecom already has adequate equipment for detecting the use of illicit citizens' band radio.

Conversion arrangements

Sir Patrick Wall asked the Secretary of State for the Home Department what is his estimate of the number of illegal 27MHz AM citizens' band sets operating in the United Kingdom at the time of the introduction of the legal citizens' band system.

Mr. Raison: The information available is insufficient to enable us to form a reliable estimate. The indications are that, while the number of users of illicit citizens' band radio has continued to increase, the rate of increase is now slower than hitherto in most parts of the country.

Sir Patrick Wall asked the Secretary of State for the Home Department what arrangements are being made for the conversion of illegal citizens' band sets to the new legal system; and if he can estimate the approximate average cost of such a conversion.

Mr. Raison: We have made it clear that we welcome the conversion of illegal CB sets, provided they are made to conform in all respects to the standards set for the legal service, and Her Majesty's Customs and Excise has made arrangements to accept a single payment on conversion to discharge outstanding liabilities for import duty and VAT. Arrangements for conversion and the costs involved are not matters for the Government.

Official report

Sir Patrick Wall asked the Secretary of State for the Home Department if he will publish in the *Official Report* the salient details of the citizens' band system that has now been legalised.

Mr. Raison: The technical requirements for equipment are set out in performance specifications MPT 1320 and MPT 1321, and conditions of use are contained in the CB licence application form. Copies of these documents are being placed in the Library. An annual licence fee of £10 will be payable for each group of up to three sets, and licences will be available at post offices from 2 November.

Common European system

Sir Patrick Wall asked the Secretary of State for the Home Department how long he estimates it will take to adjust citizens' band frequencies to a common European system.

Mr. Raison: While we know of no move as yet to establish an effective common European CB system, it remains our intention in the longer term to adopt the relevant specification recommended by CEPT. It is not at present possible to estimate when this objective might be achieved.

"Walkie talkie" radios

Miss Joan Lester asked the Secretary of State for the Home Department what steps he has taken to prevent the illegal selling in the United Kingdom of "walkie talkie" radios which operate on a frequency of 49MHz.

Mr. Raison: There is no power under the Wireless Telegraphy Acts to prohibit the sale of such equipment, although it may not lawfully be used. We hope that it will be possible to strengthen the existing legislation in this regard when parliamentary time permits.

Why FM?

Mr. Warren asked the Secretary of State for the Home Department what were the reasons for the selection of an FM frequency for citizens' band radio in the United Kingdom which is incompatible with other users in the world.

Mr. Raison: Frequency modulation was chosen to minimise the interference caused to other users of radio, and the frequency sub-band selected as being the only one which could be made available quickly. As to the compatibility of the service with those authorised by other administrations, there is no single standard for CB radio but it will be our objective in the longer term to adopt the relevant specifications recommended by the Conference of European Postal and Telecommunications Administration.

What about 27AM?

Mr. Raison: I am grateful to my hon. Friend for what he said. I thoroughly endorse it.

Mr. Miller: I congratulate my hon. Friend on opening up the freedom of the air. However, what will happen to the present users of 27MHz AM sets? How will he reconcile the difference between the wavelength selected and that adopted in the European Continental countries?

Mr. Raison: I do not think that my hon. Friend quite understands the position about the Continental wavelengths. A substantial number of different wavelengths are in use in Europe. The wavelength that we have selected offers a better service, in our view, than any of them.

As regards those who have illicit sets, I understand that in a good many cases it is possible to have them converted, and the Customs are taking a very helpful attitude towards that. But beyond that, I can only emphasise that there will be the authorised service only on 27MHz FM, as well as 934MHz FM, and I urge everyone to use that as rapidly as possible.

Licence enforcement

Mr. Campbell-Savours: Does the Minister accept that it would be very difficult to bring the one-third of a million illegal users within the law? Does he further accept that a £10 licence fee may well act as a disincentive to all those people that we want to bring within the law? If he accepts that, will he review the fee if evidence comes forward that it is acting as a disincentive?

Finally, is not the Minister aroused and annoyed by the fact that no British manufacturer of electronic products has surfaced to provide for the £30 million-a-year market that will develop in CB equipment?

Mr. Raison: Frankly, it is not our fault if it is true that no British manufacturer has surfaced, although a number of them are taking interest. As to the licence fee, I have had representations – believe it or not – suggesting that it might have been higher than £10.
than £10.

I answered the general point about existing illicit sets in response to the question by my hon. Friend the Member for Bromsgrove and Redditch (Mr. Miller).

Dr. Summerskill: Will the hon. Gentleman bear in mind that he has not really answered that question? How will he ensure that any proposal he is now making and will introduce will be legally enforceable, as hundreds of thousands of people have for a long time been illegally using CB radio? How will it be any different after his new proposals are introduced?

Mr. Raison: The first difference is that a legal service will now be available, and I believe that the majority of people would like to be within the law. Secondly, we shall continue to prosecute vigorously, and, if necessary, we shall have to take additional steps, including introducing new legislation.

Serious interference

Mrs. Dunwoody: Will the Minister monitor the results of the use of illegal sets? There is very clear evidence that National Health Service hospitals and, particularly, doctors are being affected by the illegal use of this equipment, and that it is causing serious danger and difficulty to people who are in any area in which illegal sets are being used.

Timothy Raison Secretary of State for the Home Office, in favour of the FM system

Mr. Raison: The hon. Lady is right to say that the existing use of illegal sets is causing considerable interference. The greatest interference is caused to television sets, but there are other, more serious disadvantages to using illegal sets.

Mr. Warren: Is any amnesty being offered by the Customs and Excise so that the users of illegal sets may continue operating them on the payment of a nominal fine?

Mr. Raison: The Customs and Excise have made arrangements whereby the payment of £5 on conversion of a set will discharge any outstanding liability to import duty and VAT.

How many illicit transceivers?

Mr. Colin Shepherd asked the Secretary of State for the Home Department what is his latest estimate of the number of citizens' band transmitters operating in the United Kingdom.

Mr. Raison: The information available is insufficient to enable us to form a reliable estimate. The indications are that, while the number of users of illicit citizens' band radio has continued to increase, the rate of increase is now slower than hitherto in most parts of the country.

Mr. Shepherd: Is my hon. Friend aware that estimates for the number of illegal sets have been as high as two million, although ¾ million is probably nearer the mark, and that those estimates represent a great many sets? Is it not true that the much wider variety of choice open to users of the existing 27MHz AM waveband would still make it attractive to continue to use that waveband after 2 November? What positive steps will my hon. Friend take to create a disincentive? Is not 27MHz AM equipment coming in, even now, through the Isle of Man? Does my hon. Friend intend to stop that?

Mr. Raison: There is still a possibility of equipment coming into Britain, including the possibility of it coming in through the Isle of Man. However, I stress that the service that we are offering on 27MHz FM and 934MHz is extremely good and offers a substantial number of channels. People will increasingly realise that and accept that what is lawfully on offer will prove highly satisfactory.

Licence fee review

Mr. Campbell-Savours: For the first time, the Minister referred to the need to introduce new legislation should existing legislation prove insufficient to deal with the problem. Before he considers such legislation, will he once more review the licence fee? Some feel that it is too high and that it will damage the possibility of there being a successful legal service.

Mr. Raison: It is far-fetched to talk about reviewing the licence fee 10 days before it comes into operation. If, for any reason, the licence fee proves to be wrong we might reconsider it. However, it has been set at a sensible level.

Vultures on the Side

Another unfortunate experience for an AM breaker

This month's story is about Tariq, a disabled breaker from Uxbridge (West London). Tariq's experience is perhaps sadder than some others featured in 'Vultures' as he is bound to a wheelchair and has had to take a passive role in the events surrounding his brush with the police.

Tariq has an invalid car which is his only method of transport. He has two fibre-glass whip radio antennas mounted on the car where, over the years Tariq or his family have attempted to get a listenable radio signal. As the car itself is fibre-glass they had run into all sorts of problems and in fact had given up and installed a cassette player. So neither of the antennas were connected to anything. Tariq was never really interested in CB and had dismissed it anyway because of the reception problems with the car.

One Sunday morning in October, Tariq's sister was up very early (about 5.30am) and saw a police car parked opposite the house. Two police officers left their car and looked thoroughly over Tariq's car. They also tried to open it but had no luck as it was locked.

Tariq was woken up by his sister – he was very concerned in case someone had damaged the car during the night. He rang Uxbridge Police Station to discover what was going on but they were unable to help him.

At 7.30am, a panda car arrived at the house. Two officers checked over the car again, took notes and contacted their station on their personal radios. Tariq's brother went out with the car keys and explained why there were two aerials. The officers took the keys and very thoroughly searched the car, taking out the car radio and cassette unit. At this point one officer was prepared to leave but the other officer was not satisfied and was very abrupt, although Tariq's sister also explained and confirmed the story.

The officer insisted that there was a CB somewhere and kept asking for its whereabouts. The family insisted that there was no such thing and Tariq, still in his pyjamas, made his way to the door and invited the officers to search the house to check but they refused.

The police told Tariq to take the antennas off the invalid car but he refused!

Tariq and his legal FM rig.

Tariq was pretty disgusted by the whole performance and decided that if he was already in trouble he might as well throw caution to the wind and actually buy one. He bought a rig from a friend and used it both as a base and in his car, where he eventually managed to get some sort of reception.

Some minor adjustments were necessary, such as fitting a different type of microphone, since Tariq's car needs both hands on a bar-steering mechanism. Since he is disabled and in a wheelchair, Tariq has always been apprehensive of breaking down and not being able to get help. CB made him feel very much more secure and also gave him a wider outlook. As he is not very mobile his social life is restricted but with CB he gained a lot of friends – people whom he felt on equal terms with. He was accepted for what he is – without people being discouraged or put off by his disability.

This makes it even more of a shame that Tariq only got to keep his rig for a month. He had left the rig at home one day and had gone to work as usual. Two men called at his parents in plain clothes and offering no form of identification asked for 'the radio'. Tariq's mother speaks very little English and was immediately ill at ease – she handed over the radio without really understanding what was wrong. They gave no receipt. So – were they Post Office or Customs officials acting on a report from Uxbridge police, police themselves or the irate policeman on his day off or even opportunist thieves who saw the antenna in the back garden?

Tariq hasn't heard anything further or received anything like an official notice of seizure. He feels he isn't in a position to check it further, since he wouldn't be quite sure of what he was stirring up. He's decided that he is fated with AM CB so has become a reluctant FM breaker with a Fidelity 2000. He has again run into problems with getting good reception in his car and is only using the rig as a base station. He is pleased to be back on channel but misses the atmosphere of AM.

Tariq feels he has been rather unfairly treated by the police and his parents are distressed by the incident. He has always been grateful for police help in the past if he has broken down so he has no axe to grind against them. I know we have said this before but it needs repeating – haven't the police got more important things to do?

SS

FREE RADIO

The British state of affairs

The British Government's traditional hostility to any form of informal broadcasting has always presented a challenge to the spirited radio enthusiast. For some it has been sufficient to defy that authority by just broadcasting – the content has not been important. For others, although accepting the challenge of the monopoly, it has been a matter of pride to present a proper, programmed, entertainment broadcast. Although the first group do exist, for the scope of this article and the heading "Free Radio", the second group are the most interesting.

The beginnings of pirate or private broadcasting probably go back to the beginnings of radio itself and is lost in the mists of time. Unofficial broadcasters were experimenting in the early 1920's and even before the second world war Radio Luxembourg and stations in northern France were received over a large area. In fact, the plans for offshore radio stations were suggested in 1945, although it took 20 years for the idea to come to fruition. Even Welsh and Scottish political nationalists have appeared briefly during the 50's but came and went like nomads in the night.

For practical purposes, free radio as we think of it started in the 1960's. Even from this beginning there are several distinct groups of broadcasters.

The most well known form of pirate radio is the offshore stations of the 60's. At the time there were musical tastes which just weren't catered for by Auntie BBC – particularly contemporary and rock music. Since the BBC had no real intention of covering these tastes, some enterprising businessmen and committed supporters decided to do it themselves. And their listening figures grew – and grew!

The most famous of these stations was Radio Caroline, whose checkered career finally ended last year with the ship Mi Amigo sinking in the Thames Estuary.

The original ship was built in 1921 and had a variety of names and uses before being converted into a private radio station, Radio Nord. After 1962, again with a few changes of name, she roamed around the North Sea and over to the USA making the occasional broadcast. The ship finally merged with Radio Atlanta to become Radio Caroline South in 1964, with the name of Mi Amigo.

Radio Caroline had, as did the other pirate stations like Nord See International, a novel format for the time. More adventurous music, particularly as they played album tracks and lesser known artists, instead of a selection of Top Forty hits. It appealed to a young, more aware audience and the enthusiasm of the presenters came through in the programme. The pirate stations became a training ground for aspiring disc jockeys and showed clearly the way that broadcasting should go to maintain any public response. The crew were well aware they were breaking the Wireless Telegraphy Act and the Marine and Broadcasting (Offences) Act but continued, often under the pressure of official boardings to close them down. Broadcaster and writer Ian Anderson, who worked on Caroline, captures the feeling of the day by saying that "Caroline will remain as long as young men and women are prepared to risk their professional reputations, and their lives, on an old hulk where they are permanently surrounded by the smell of oil, the roar of generators and the arcing of aerial towers – all for the cause of playing records!".

Although Caroline's philosophy changed and adapted and the station closed down for several periods, there are still people who fondly remember Caroline and look forward to her expected return in the near future.

The larger offshore stations had or have financial support and advertising backing and decried all the Government objections. Time and time again the listening public were told there were no frequencies available for such stations (Sound familiar?) and that they caused interference (Sound even more familiar?). However, the independent and BBC local radio stations can trace their existence to the pirates. Whether they deserve the comparison to the pirates is another matter!

Apart from music stations, as mentioned last month, are the political or idealogical stations that operate in Britain. These function either on financial support from the party concerned or zeal on the part of the presenter. They cover a wide range of subjects like alternative technology, ecology or plain political bias. Several stations of the last sort have operated in Ireland where the broadcasting laws differ and some political feelings run higher. These stations are not as popular in this country as in some other parts of the world. They are often infrequent and far more likely to be the subject of investigation by the authorities. For example, Radio Enoch from Birmingham with extreme racial views was located and closed down in weeks, almost days, whilst other, less subversive, stations operate for years.

The most parallel group from the CB point of view are the small stations of one or a few people who present programmes for their own and others entertainment. The origins of these stations go back a long way and include the famous Echo Charlie band who used transmitters almost like CB. A lot of these operate on the short wave band around 6-6.5MHz like Echo Charlie and are regularly listened to by European DX enthusiasts. these are often more interested in the signal strength and reception than the actual content of the programme!

The broadcasters on the SW are often the most professional of the

stations and form part of a 'listening hobby'. However, there are many stations on medium wave (between approx 600KHz and 1500KHz) that attract large audiences because of their closeness to public stations.

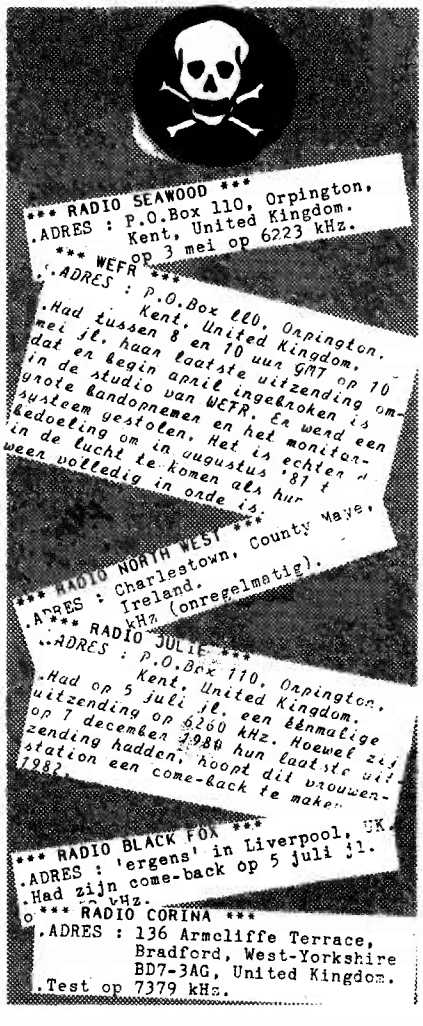
These free radio stations are usually heard on Sundays around lunch time, which is the 'traditional' spot for stations. More ambitious or affluent stations cover complete week-ends and transmit for several hours a day. Again they offer something the official services don't – like Radio Invicta in London that plays soul music throughout its transmission.

So what stations are about in Britain? As mentioned before, many are infrequent or appear once never to be heard of again. However, a conservative estimate is of 50 regular stations, including the VHF (30-300MHz approx) band who are the most imaginative and experimental of free radio stations.

A quick look through the European free radio magazines gives the names of the well-established and well-known stations:

Radio Jackie on 1331KHz
Radio Nova on 846KHz
Radio Seawood on 6223KHz
Radio Julie on 6260KHz
Radio Atlanta on 6239-6236KHz
Radio Gemini on 6230-6225KHz
Radio North Sea International on 6225KHz
Radio ABC England on 6270KHz
Radio Krypton on 6265KHz
(Frequencies can be variable!)

The list could go on and on (and is subject to continual change but illustrates the wealth of broadcasting unknown to the general public.

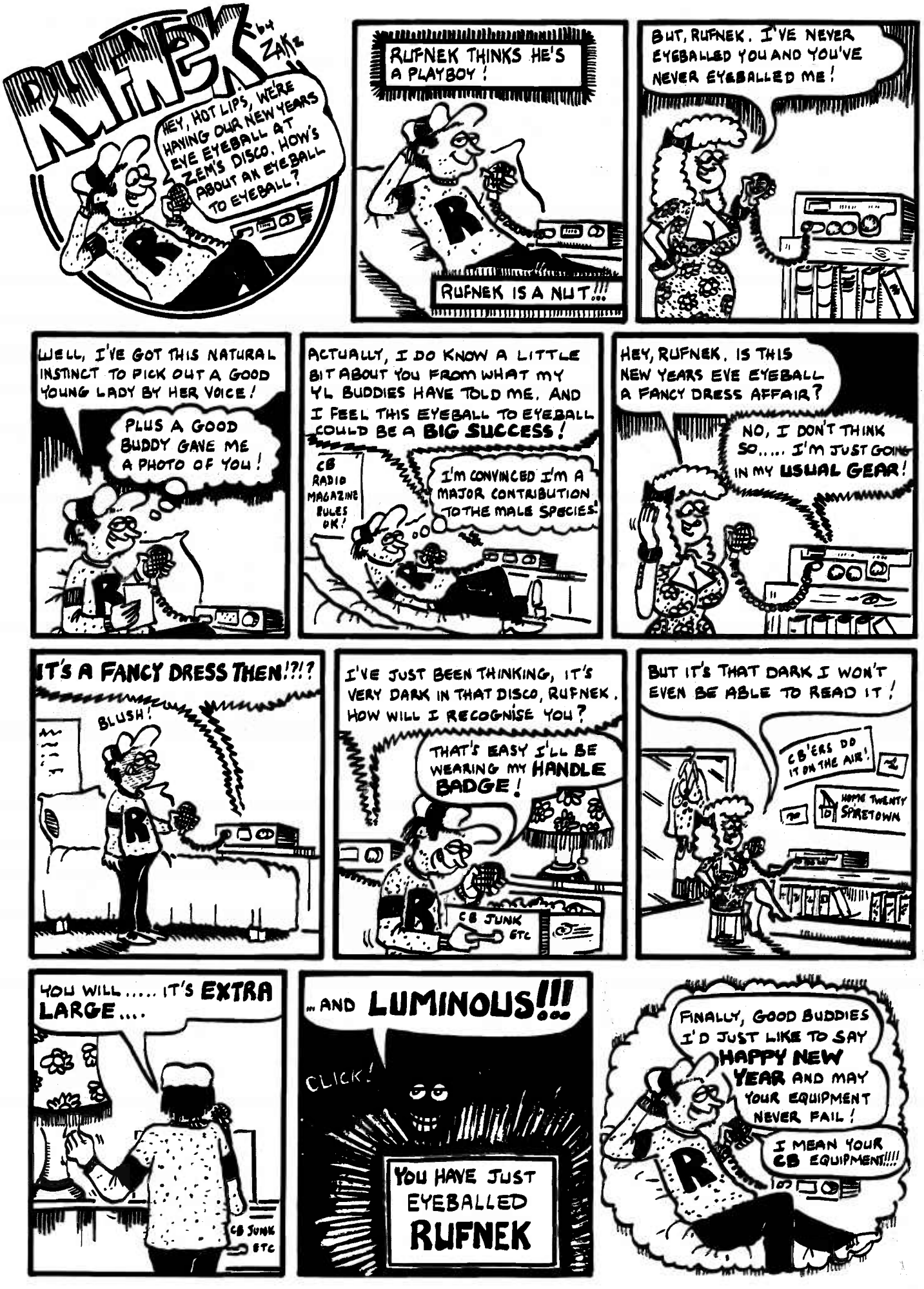


In many respects the Government are facing the same situation as they tried to resolve with CB. Britain is, generally speaking, a law-abiding country but they are faced with massive civil disobedience (albeit in a minor form) that they have no real hope of controlling. Whilst CB came to head relatively quickly, free or pirate radio has been quiet, but accepted, since the glamour days of offshore radio. Ian Anderson predicts that within a few years the situation will change again and lead to a very large and widely supported pirate radio station, which will be in blatant disregard of the current law. Whilst the BBC and local stations continue to churn out bland and saccharin music and 'waffle' the situation will only get worse.

Unfortunately this has again been an article full of generalisation – as the subject is continually in a state of flux and there can be difficulties in getting exact information on what is an illegal activity. Next month, to give a more definite approach, we will concentrate on one SW radio station, Radio Krypton, who kindly let us put them under more close observation than many stations would like!

SS

We would like to point out that using or installing a radio transmitter without a licence is contrary to the Wireless Telegraphy Act, as is indeed listening to such unauthorised transmissions. As a magazine, we cannot condone such activities.


RUFNEK
by ZAK
HEY, HOT LIPS, WE'RE HAVING OUR NEW YEARS EVE EYEBALL AT ZEM'S DISCO. HOW'S ABOUT AN EYEBALL TO EYEBALL?
RUFNEK THINKS HE'S A PLAYBOY!
RUFNEK IS A NUT!!!
BUT, RUFNEK. I'VE NEVER EYEBALLED YOU AND YOU'VE NEVER EYEBALLED ME!
WELL, I'VE GOT THIS NATURAL INSTINCT TO PICK OUT A GOOD YOUNG LADY BY HER VOICE!
PLUS A GOOD BUDDY GAVE ME A PHOTO OF YOU!
ACTUALLY, I DO KNOW A LITTLE BIT ABOUT YOU FROM WHAT MY YL BUDDIES HAVE TOLD ME. AND I FEEL THIS EYEBALL TO EYEBALL COULD BE A BIG SUCCESS!
CB RADIO MAGAZINE RULES OK!
I'M CONVINCED I'M A MAJOR CONTRIBUTION TO THE MALE SPECIES!
HEY, RUFNEK. IS THIS NEW YEARS EVE EYEBALL A FANCY DRESS AFFAIR?
NO, I DON'T THINK SO..... I'M JUST GOING IN MY USUAL GEAR!
IT'S A FANCY DRESS THEN!?!?
BLUSH!
I'VE JUST BEEN THINKING, IT'S VERY DARK IN THAT DISCO, RUFNEK. HOW WILL I RECOGNISE YOU?
THAT'S EASY I'LL BE WEARING MY HANDLE BADGE!
CB JUNK ETC
BUT IT'S THAT DARK I WON'T EVEN BE ABLE TO READ IT!
CB'ERS DO IT ON THE AIR!
HOME TWENTY SPIRETOWN
YOU WILL..... IT'S EXTRA LARGE....
CB JUNK ETC
...AND LUMINOUS!!!
CLICK!
YOU HAVE JUST EYEBALLED RUFNEK
FINALLY, GOOD BUDDIES I'D JUST LIKE TO SAY HAPPY NEW YEAR AND MAY YOUR EQUIPMENT NEVER FAIL!
I MEAN YOUR CB EQUIPMENT!!!!

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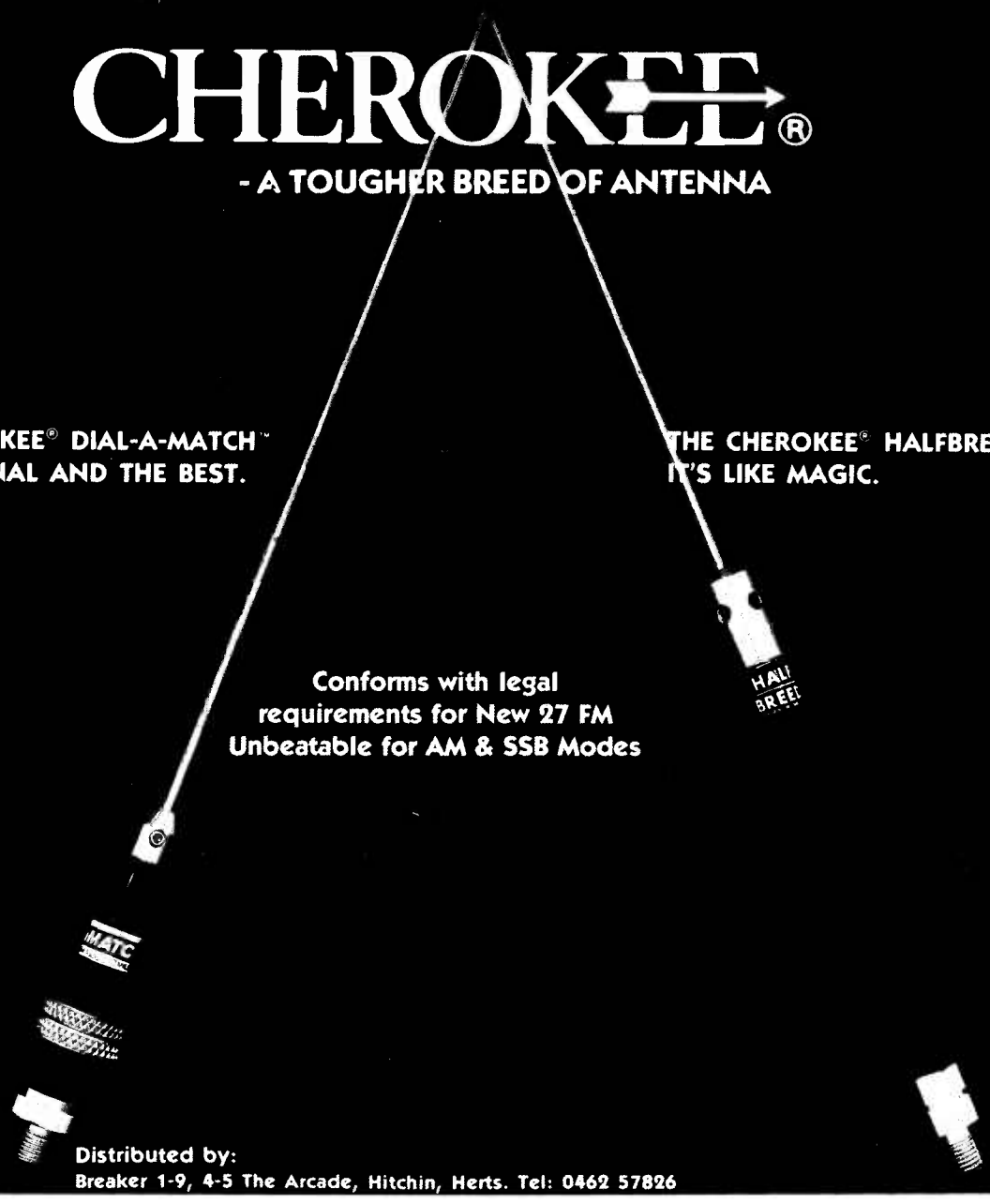

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THE LAW AND YOU

Operating a 27MHz FM transceiver at home

The CB licence is relatively simple to understand and has been kept as easy and free from complications as possible.

However, there are some points which may cause confusion to both the operator and even initially in the early days to the enforcer of the licence. This month we will deal with one aspect of the licencing conditions that could be misunderstood, Section 5.

5. *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.*

Although there has not been any official announcement, the fine for AM illegal operation must eventually be increased or at the very least the efforts to catch illegal operators stepped up. Therefore, even if you are operating a legal FM set, to know your rights can help.

Home base operation

If a member of Her Majesty's Police Force (*referred to as a 'constable' in the licence conditions, this word applies to all members of the Police Force in legal terminology and is not an implication of rank*) or a person acting under the authority of the Secretary of State, requires to inspect your licence and apparatus then your first step is to prevent them entry and ascertain their identity.

Ask to see a Police Officer's warrant card. At this point it is advisable to use common sense unless you are familiar with what a warrant card looks like. Refusal to co-operate with a member of Her Majesty's Police Force, in other words obstructing a constable in the course of his duty, is all too easy to do. Unfortunately, with CB there is a considerable history of impersonation of officials in order to steal or relieve the owner of his equipment – be careful. Consider whether the officer's card looks correct, whether his uniform looks genuine, if he is carrying a police issue lapel radio and whether or not he is actually in a genuine police car.

As we said wrongly once before, criminals rarely impersonate a police officer in such detail as to park a police car outside. It has happened, so if you are in any doubt you can always phone the police and explain your situation. They will be able to verify the officer's identity.

Right of entry

With a CB-related event, there is no right of entry for a police constable, a person acting under authority of the Secretary of State, an employee of British Telecom (the GPO), a television licence inspector or anyone else without a writ of assistance – a search warrant.

The only exception to this is a Customs and Excise Officer who has reason to suspect contraband or goods on which duty is payable, in which case he is always empowered to use any reasonable means of force to gain access. However, during the hours of darkness he must be accompanied by a police officer.

Your course of action

It cannot be over stressed that caution and a polite manner pays off if you do have any visitors requesting to see your licence and the apparatus.

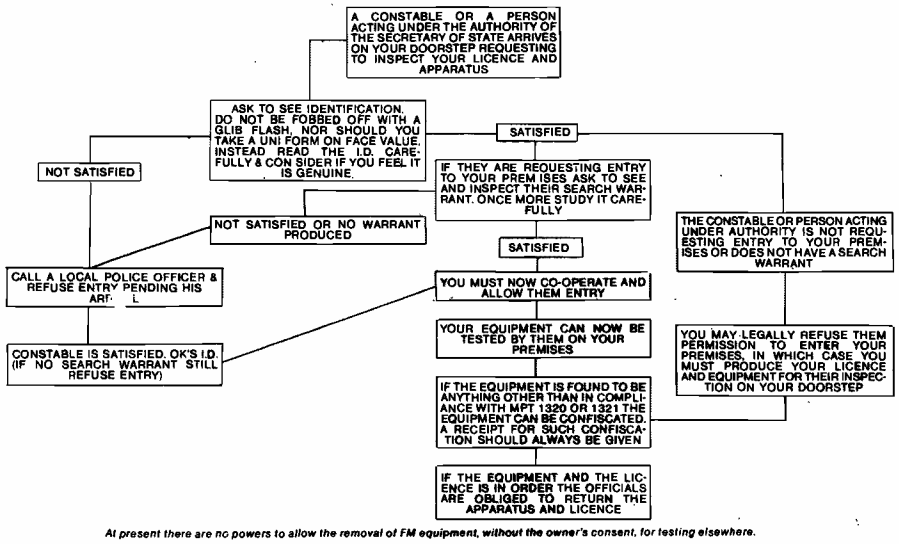
Firstly, verify or ascertain their true identity. If they are who they claim to be and are entitled to examine the licence and apparatus, you should ask if they require access to the equipment or whether they will inspect it on your doorstep.

If the answer is "Yes, we require access to inspect the equipment where it is installed," then the choice is yours. You can give your permission for them to enter or ask if they hold a search warrant.

If you do consent to allow them entry, you should make it clear, preferably with a witness present, that they are only allowed to inspect the CB installation and nothing else.

If they hold a search warrant then you must legally co-operate and offer every assistance.

In the latter instance it would still be natural to expect a request to view the licence and equipment. Without your permission to enter, you can and should close the door and bring the equipment and licence to them on your doorstep.



At present there are no powers to allow the removal of FM equipment, without the owner's consent, for testing elsewhere.

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Rig Test

FIDELITY

The Fidelity CB 2000 FM

For our second review this month we decided to look at Fidelity. Fidelity are gaining much favour and publicity, so in this issue we are looking at both manufacturers' top of the range transceivers.

Firstly, we must reiterate that as a reader and a possible purchaser of equipment reviewed, the major and most important thing when reading any rig test is to see how the test was carried out and on what equipment.

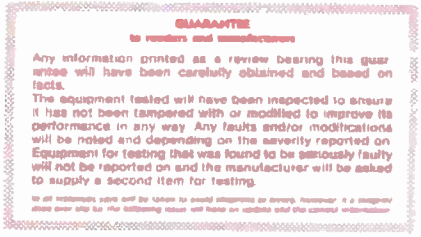
Many magazines do not actually test the equipment, thus recently we noted a review of an off-frequency rig which we were unable to test appearing with a favourable write up! Needless to say the set we had could have been a one off rogue but as the manufacturer has yet to supply us with another set capable of being tested we must conclude otherwise.

Be careful!

Our guarantee

Because any wise shopper will like to know whether the set he intends to purchase is capable of performing reasonably or well, we offer manufacturers and readers a guarantee.

Any rig test printed by us will have been carefully compiled and based on fact. The "This one's not bad" attitude must be dispelled, we will have no part of it.


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.

Fidelity are not new to the electronic consumer goods market and apart from the recent addition of citizens' band radio they carry varying items such as: portable radio cassette players, clock radios, music centres, stereo music systems, integrated hi-fi stacks, record players, black and white televisions and colour TV's.

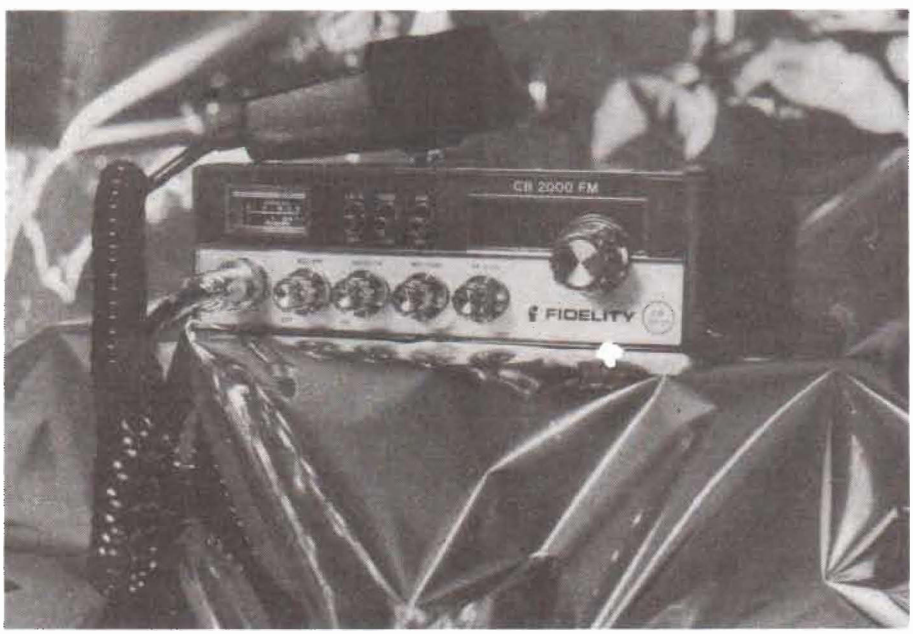
Fidelity CB is available at a wide range of multiples as well as through existing CB outlets via major regional CB distributors.

The CB 2000 FM

Once again the set is constructed in Japan by what qualifies as a well-known reliable Japanese company specialising in radio communications. Obviously, as with the world, i.e., the Volkswagen-Porsche arrangement, various CB equipment will be partially or wholly assembled with totally different extras for totally different companies by such a foreign company. In truth, there are but a handful of large radio manufacturing plants capable of supplying Britain's needs. However, so as not to confuse the issue unnecessarily, suffice to say that the Fidelity comes from a proven stable.

The exterior construction is robust, the casing is metal sprayed black and finished with a flaked plastic effect. The facing is chromed plastic with the top half matt black to highlight the signal/power meter and channel indicator.

The speaker socket is an angled, pressed grille designed to deter the dust from entering and deflect the sound waves forward.



Microphone

Mounted on the left hand side of the face, the socket is a standard four-pin screw ring type. The microphone itself is a PTT of the famous coffin shape which controls the transmit/receive switching.

Internal construction

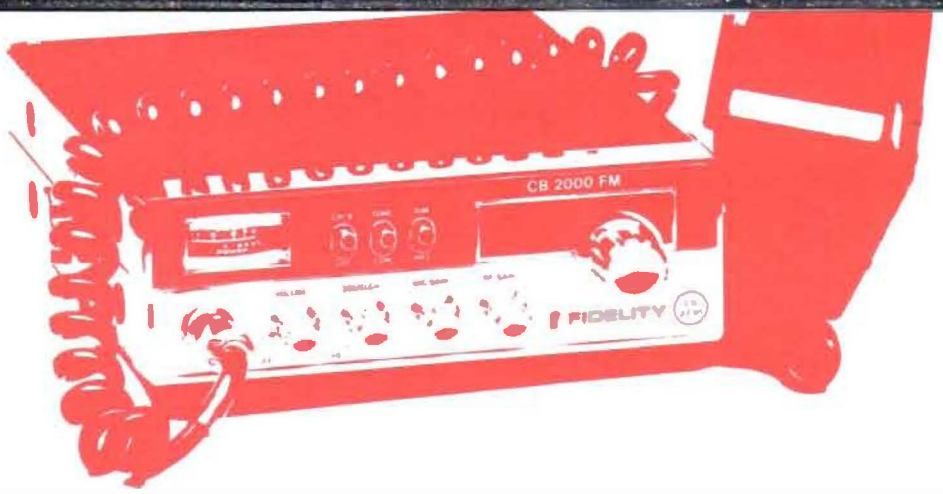
In general the soldering is good and clean with no evidence of dry joints. One component seemed to be added as an afterthought – a 47uf 25v electrolytic capacitor which was soldered between R118 and the earth. It is not the addition of this component which we found slightly shoddy but the manner of installation. About 1in. of uninsulated wire was left hanging in mid air on the earthing. This could be easily rectified and should not cause breakdown of the equipment.

The power output transistor is mounted by means of a nylon screw, as is the receiver audio output IC. This has been known to cause breakdowns on AM equipment in that the screw can melt, causing the device to come free from the heatsink. Such melting would require high temperatures and considerable use. To avoid any problems in this direction, the set could be mounted where the air circulation would prevent excessive overheating.

Transmitter test

The major equipment used to conduct this test was:

Racal 9081 and 9082 signal generators.



Marconi TF42F distortion meter.
Marconi TF34O 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

Using high power output and normal battery levels this was found to be a reasonable result. Using the lower power attenuation there was some discrepancy as the actual attenuation was not 10dB as required but was actually 12dB at 13.2 volts.

Supply Voltage

Power Switch	10.8V	13.2V	14.5V
Hi	1.9W	3.2W	4.0W
Lo	0.04W	0.2W	0.35W

Frequency

Operating at 48°F, the cold temperature, the maximum off current frequency was 100Hz. At room temperature a good result of within 100Hz was obtained.

Channel spacing was found to be correct at 10KHz across the full 40 channels.

Frequency

Temp.	CH1	CH40
48°F	27.60131	27.99132
68°F	27.60123	27.99124

Modulation

Measured with an audio tone fed into the microphone connections, this gives peak deviation.

Modulation

Input Levels	Input Frequency 500Hz	1125Hz	2500Hz
0.5mV	0.10KHz	0.25KHz	0.18KHz
1.0mV	0.25KHz	0.5KHz	0.2KHz
2.0mV	0.50KHz	1.00KHz	0.35KHz
50mV	1.20KHz	1.25KHz	0.70KHz
200mV	1.50KHz	1.4KHz	0.75KHz

The limiting is quite reasonable over the audio range, however, it could be improved which would make the signal sound more natural.

Receiver test

Audio output

Measured into an 8 ohm load at 13.2 volts supply:

Audio Output

Level	Distortion
1.5 watts	4.0%
2.15 watts	10%
3.00 watts	29%

At a rated output (1.5 watts) distortion was higher than on similar transceivers, yet at 2.15 watts this difference was totally corrected, giving a good performance figure of 10%.

Squelch level

Threshold – 0.1uV (microvolts).
Fully muted – 13.0uV.
This is actually a very wide range which is possibly more than required. However, this will have advantages as quite strong signals could be lost if required. Yet all but the very weakest stations can still be received.

Receiver sensitivity

A good result was obtained which will give fair reception of weak signals, almost to the amount of interference that is on the frequency rather than a specific range limitation.

Receiver Sensitivity

10dB quieting	0.18uV
20dB quieting	0.51uV
30dB quieting	2.10uV

AM rejection

To test for AM rejection a fully limited FM signal (10uV) is fed into the receiver and modulated with a 1KHz tone (1.5KHz deviation). The receiver audio output is then noted. The FM modulation is then changed to AM still with a 1KHz tone but at 30% modulation, the audio output from the receiver is then measured.

The CB 2000 gave us a figure of 32dB, which is a good result.

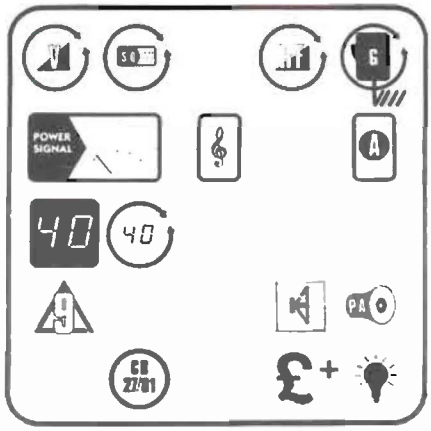
Adjacent channel rejection

To measure this, two signal generators are fed through a combining network into the equipment, these are set to adjacent channels (i.e., 19 and 20).

Both are then modulated with a 1KHz tone at 1.5KHz deviation, one is set to 1uV output. The receiver is then set to this channel and the audio output adjusted to read 10 mwatts.

Now the output of the second generator is increased slowly until the receiver degradates the wanted signal by 3dB. The output from the second generator is noted and gives a relative indication of rejection.

The Fidelity gave a result of 330uV for 3dB degradation, this result is quite reasonable.



Summary

The Fidelity is of a sound construction and gave an overall good test result. One accessory that was not mentioned earlier is the RF gain. Combined with the operation available with the squelch range, a much wider and better control can be obtained.

Manufacturer's Specifications

General	
Channels	40 digital PLL synthesised
Frequency range	See last page
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 177mm (7in) Height 55mm (2¼in) Depth 210mm (8¼in)
Transmitter	
Modulation	FM
RF power output	4W
Frequency tolerance	<±1.5KHz
RF power attenuator	>10dB
Frequency response	500 to 2,500Hz +4/-12dB
Frequency deviation	>±1.5KHz @ 1,250Hz audio
Adjacent channel power	<10 microwatt
Spurious emission	(1) <50nW within the following frequency bands– 80MHz–85MHz 87.5MHz–118MHz 135MHz–136MHz 174MHz–230MHz 470MHz–862MHz (2)<0.25 microwatt at any other frequency
Receiver	
Conversion system	Dual conversion superheterodyne
IF	10.7MHz 1st and 455KHz 2nd
Channel display	Digital 7 segment LED's
Audio output power	>1.5W into 8 ohm
Sensitivity	<1 microvolt @ 20dB NQ
Adjacent channel rejection	>50dB
Spurious emission	<20nW
Squelch sensitivity	1 to 10 microvolt

The Ranger

Part 2 of a 27FM Portable CB Transceiver

Designed by Michael Tooley, B.A. and David Whitfield, M.A., M.Sc.

Receiver

The receiver front-end employs two junction FETs, TR100 and TR101, arranged in a cascode configuration to provide a high input impedance, high gain and low noise amplifier. The cascode configuration is preferred to a comparable dual-gate MOSFET circuit due to its inherently robust performance but similar electrical characteristics. The number of passive components in both designs is identical, but the overall cost of the MOSFET design is higher and more careful handling during construction is necessary.

The aerial signal is coupled into the gate of TR100 via L100/L101. This coil, and L102/L103, has a Q of approximately 45, and the bandpass coupling between aerial and mixer input greatly enhances the rejection of unwanted signals. The amplified signal is coupled to the integrated mixer in IC100 via L102/L103.

The second input to the mixer is derived from the local oscillator. TR102 is configurated as an overtone oscillator using third overtone crystals, X100-X105, to generate a local oscillator signal at 455kHz below the channel frequency, e.g. for channel 14 (27.73125), a crystal is selected to set the local oscillator frequency to 27.27625MHz. L104/L105 forms the tuned drain load for TR102 from which the mixer drive is taken. The tuning core of this coil allows a small range of frequency adjustment should this be necessary, although the circuit will oscillate satisfactorily over a wide tuning range. The operation of the oscillator is stabilised against supply voltage fluctuations by D100.

The IF amplifier and demodulator is built around the MP5071, which is a pin-compatible and lower power version of the Motorola MC3357 low power integrated narrow band FW IF strip. This device was designed for use in FM dual-conversion communications equipment, and it includes a number of highly sophisticated features. The ic contains an oscillator, mixer, limiting amplifier, quadrature discriminator, active filter, squelch, scan control, and mute switch. A functional block diagram for the ic in its design configuration is shown in figure 8.

In the Ranger, the receiver is a single-conversion superhet design which uses a high frequency local oscillator, with overtone crystals, to avoid the need for any frequency multiplier stages, and the associated alignment problems. The MP5071's internal oscillator is, however, unsuitable for this application, and a discrete oscillator is therefore used in its place. The local oscillator signal, generated as described earlier, is ac coupled to pin 1 of IC100 via C106 because this input is tied up to the positive supply rail. The RF amplifier output is similarly coupled to the mixer input at pin 16. The input limiting voltage (–3dB limiting) at this point is typically 5uV, which gives the receiver an excellent overall sensitivity. The mixer conversion gain (a measure of the conversion of RF energy at 27MHz to IF energy t 455kHz) is similarly good at around 20dB. The mixer is double-balanced to reduce spurious responses.

The mixer output from pin 3 is filtered to remove unwanted mixing products, leaving the 455kHZ IF signal. The filter also acts to define the bandwidth of the IF strip, which would otherwise have a broadband response. The arrangement used in the Ranger is to combine a 455kHz mechanical filter, FL100, with an input matching transformer, L106/L107. A mechanical filter (here a Toko type CFM2455D) is preferred to a ceramic IF type because of its superior performance in rejecting spurii at higher frequencies, and its long term stability. The combination of a mechanical filter and an input matching transformer provides an overall response with excellent stopband characteristics, and up to approximately 80dB rejection of unwanted signals. The bandwidth of the IF is defined by the response of the filter used between the mixer and the limiting amplifier; the CFM 2455D has a bandwidth of 10kHz (min) at a centre frequency of 455 ± 2kHz. The insertion loss is a maximum of 6dB, and a typical attenuation curve characterising the filter is shown in figure 7.

The filter output at 455KHz is applied to the input of the IF limiting amplifier at pin 5 of IC100, where most of the amplification is performed. The signal is amplified in a five-stage limiter whose output appears at pin 7. This signal then drives a multiplier demodulator, both by a direct internal path, and externally via the quadrature coil (L108) to pin 8, to recover the FM. The output of the demodulator at pin 7 is also used to supply dc feedback to pin 5, and the other side of the first limiter stage is decoupled at pin 6.

The recovered audio at the demodulator output is partially filtered within the ic and then buffered, giving an output impedance of around 400 ohms at pin 9. The recovered audio signal at pin 9 is typically around 350mV RMS, but this signal still requires de-emphasis, volume control and further amplification before it is suitable for driving a loudspeaker.

The audio signal at pin 9 is applied to an active high pass filter, formed by the combination of an internal operational amplifier and C110, C109 and R116. The filtered output from this stage is coupled via C108 to the AM detector formed by D102, R114 and C107, which looks for the presence of noise at frequencies above the normal audio band, and the detected noise level is then applied to pin 12.

The external positive bias on pin 12 provided by R106, VR100 and R109, sets up the squelch trigger such that the audio mute on pin 14 is open circuit (typically 10M ohms). If pin 12 is pulled down to 0.7V by the noise detector, pin 14 is internally shorted to ground, and the audio signal to the amplifier is muted. There is hysteresis of approximately 100mV on the input to the squelch trigger to prevent jitter on the mute operation. The squelch may be over-ridden by holding pin 12 high, via R107 an S101, to keep the mute switch open. The output from pin 13 may be used in scanning receiver applications: the output is low (less than 0.5V) when the mute is off, and high (min +5V) when the mute is on.

The MP5071 is designed to operate from low voltage dc supplies in the range +4V to +8V, and consumes only 2-3mA under these conditions. To provide a suitable supply, the 12V receiver power rail is regulated to around +6 volts by R110, D101 and C104. This also has the effect of making the performance of the receiver substantially unaffected by variations in battery voltage, with the exception of the audio output power level.

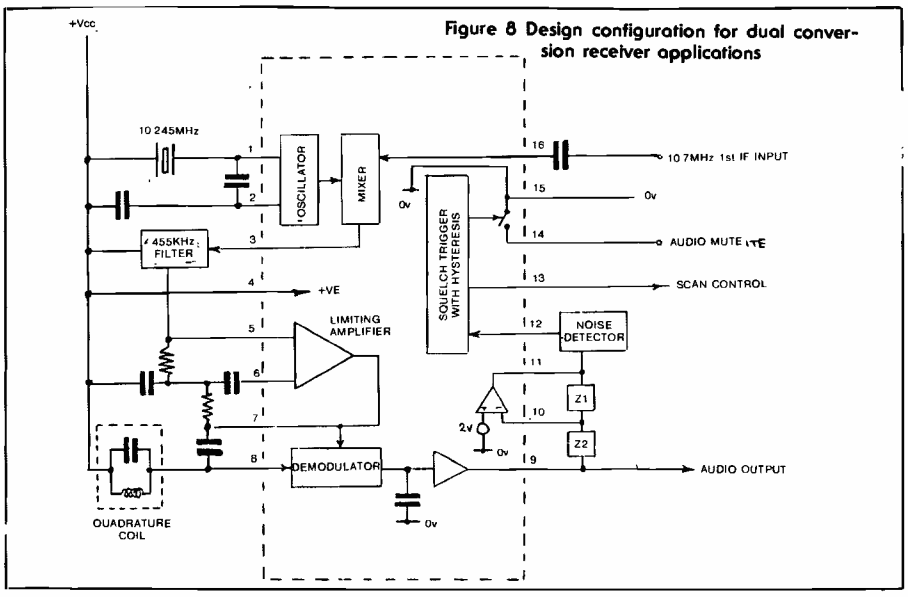


Figure 8 Design configuration for dual conversion receiver applications

In the audio section, R118 and C116 provide the de-emphasis for the recovered audio signal, and IC101 supplies amplification for driving the loudspeaker. The audio amplifier is decoupled by C118, R122 and C119.

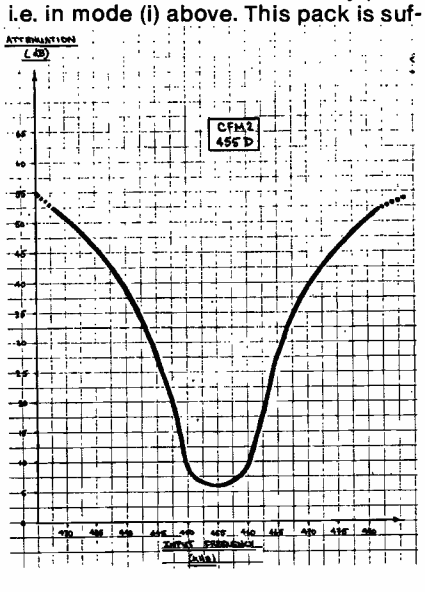
Power supply

The power supply for the Ranger allows the rig to be operated in one of five active modes:

(i) Internal NiCad battery pack
(ii) External +12V dc supply
(iii) Mains supply
(iv) Mains re-charging of the NiCad battery pack
(v) Re-charging of the NiCad battery pack from external +12 volt dc supply.

The changeover between modes is automatic. The only manual switch in the circuit, S200, is used to turn the power on to the transmitter/receiver sections. Modes (iv) and (v) are inhibited when the transmitter or receiver is active in order to prevent noise generated by the charging circuit from desensing the receiver front-end or corrupting the modulation of the transmitter.

In normal portable use the Ranger operates from its own internal 12.5V 250mAh nickel-cadmium battery pack, i.e. in mode (i) above. This pack is sufficient to allow approximately 4-5 hours' use when operated with a 10:1 receive:transmit duty cycle. The steering diodes, D201/2/5, are reverse-biased to prevent unwanted current drain to the unused sections of the power supply. The battery pack, B200/1, comprises 10 individual mass plate button cells in series, sleeved for insulation purposes. It features a high storage capacity for its size, has a low internal resistance, is resistant to extremely hostile environments, and can be stored without the need for periodic re-charging. A NiCad pack is thus an ideal choice for use in a portable rig.



Operation from an external battery supply requires that dc power is applied via SK203. A car battery or similar dc source will generally have a terminal voltage which exceeds the 12.5 volts of the internal nickel-cadmium stacks. D201 will therefore be forward-biased and D202 will be reverse-biased, causing automatic changeover from the internal batteries. With S200 in the 'off' position, the battery charging circuit formed by IC200 and its associated components will be active. The 555 timer ic in this circuit is configured as an astable multivibrator running at approximately 20kHz. The astable output is added, via the steering diodes D203 and D204, to the supply voltage to develop a suitable charging potential across C204. The NiCad cells in B200/B201 are charged at almost constant current from this source via D205 and R202. The maximum charging rate for the 250mAh cells specified is 25mA, and 14 hours of charging are required to restore the charge in a set of fully discharged cells, ie the charge:discharge ratio is 1.4:1. The charging time may be extended beyond the fully-charged point by up to 200% without risk of damage to the cells, allowing the unit to be left on charge overnight to replenish partially depleted batteries. The charging circuit is disabled when either the receiver or transmitter is active in order to avoid interference caused by harmonics of the astable output.

Ranger 27FM Specifications

General	
Modulation:	FM
Frequency Range:	27.6 to 28.0MHz (CB version)
Number of channels:	Six
Channel spacing:	10kHz
Operating temperature range:	-5°C to +45°C
Power Supply:	Internal 12V rechargeable battery 250mAh External 12V dc (nominal) negative ground External 240V ac (nominal) 50Hz
Battery drain:	Receive standby 46mA (typical) Receive average audio level 60mA (typical) Transmit 250mA (typical)
Battery charger:	Internal constant current charger operates when external supplies are connected and the transceiver is not in use. Full charge in 10 to 14 hours
Controls and external connections:	On/off switch combined with volume control. Squelch on/off. Channel selector switch. Transmit and battery condition indicator LED. Microphone socket (5-pin DIN). Mains input (2-pin). Aerial socket (UHF). Auxiliary socket (6-pin DIN)
Dimensions:	200mm × 120mm × 40mm
Weight:	1.2kg
Optional Extras:	Base and mobile station adaptor. Helical antenna. 10dB fixed attenuator
Transmitter	
Power output:	0.5W (nominal)
Output impedance:	50 ohms
Spurious output:	Less than 50nW above 90MHz Less than 250nW at all other frequencies
Frequency stability:	Better than 25 parts per million over the temperature range -5°C to +45°C and supply voltage range 9 to 14.5V
Audio response:	240 to 3.4kHz at -1dB referred to 1kHz 50Hz to 5kHz at -6dB referred to 1kHz Response falling at 12dB/octave above 2kHz
Deviation:	±2.5kHz maximum
Audio input impedance:	10k ohms
Microphone sensitivity:	Less than 10mV for rated system deviation
Speech processing:	Less than 3dB change in output for 20dB change in input level
Crystals:	9MHz fundamental HC18/U
Receiver	
Sensitivity:	1uV for 10dB quieting or better
Input impedance:	50 ohms
Selectivity:	Better than 20dB at ±10kHz
Audio output:	0.5W maximum
Audio response:	100Hz to 5kHz at -3dB referred to 1kHz
Frequency stability:	Better than 25 parts per million over the temperature range -5°C to +45°C and supply voltage range 9 to 14.5V
Intermediate frequency:	455kHz
Crystals:	27MHz third-overtone series resonant HC18/U

The Ranger

A guide to kit building

This guide is intended to provide some supplementary constructional notes for readers who are relative newcomers to practical electronics projects. A complete assembly procedure is described in detail in the Ranger article, but the series does assume that the kit builder already has some practical experience of constructional projects. The notes which follow are aimed at bridging the gap for those who are relative newcomers to this type of project. The aim is to help avoid many often-encountered problems by outlining a constructional approach which is the result of much hard-earned (and often expensive!) experience. It is not, after all, necessary to make the mistake yourself to benefit from the experience gained.

As will become clear, the point to be stressed is that the secret of success in any constructional project is to adopt a strictly methodical approach. The temptation to rush is often overwhelming, but cutting corners in the vital early stages invariably leads to time-consuming delays and frustrations later. A patient, step-by-step approach is the surest guarantee of success, and usually has the added advantage of producing the best results in the shortest overall time.

First steps

The first task on receipt of a kit of parts for the Ranger is to carefully unpack it and inspect the contents for any obvious damage in transit. After this has been done, the contents of the kit should be checked against the components list. The various different types of component should be laid out in groups to simplify this process; this will also be a great help when it comes to the actual assembly. Baking tins or egg cartons are ideal containers for this purpose.

There are many different types of component used in the design of the Ranger. In the circuit diagram, these are identified in two different ways; each type of component is depicted by a standard symbol (the symbols are joined by lines to show how they are connected together in the circuit), and each symbol has a label attached to it for identification purposes. The labels take the form of a letter (or 2-3 letters) followed by a number. The letter usually indicates the type of component (e.g., R for resistors, C for capacitors, TR for transistors, etc.), and the number is used to distinguish between components of the same type. Thus a component has a value (as required by the design of the circuit), a symbol (a standard circuit symbol used in circuit diagrams), and a label (for identification in discussing circuit operation, component layouts, etc.). Typical circuit symbols and component labels used in the Ranger series are shown in table 1. Tables 2, 3 and 4 should

Table 1 Typical circuit symbols and labels

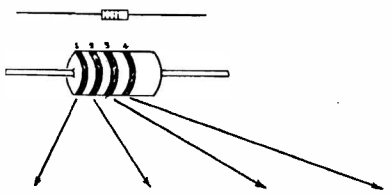
Circuit Symbol(s)	Component Type	Typical Labels
	Fixed resistor	R1, R100, R200
	Preset resistor	VR1, VR100
	Variable resistor	VR101
	Fixed capacitor	C2, C100, C201
	Electrolytic capacitor	C1, C104, C200
	Trimmer capacitor	VC1
	Diode	D3, D102, D201
	Zener diode	D1, D100
	Varicap diode	D2
	Light emitting diode	D7
	Quartz crystal	X1, X100
	Bipolar transistor (NPN)	TR1
	Field effect transistor	TR100
	Loudspeaker	LS100
	Ferrite cored inductor	L6
	Ferrite cored (tunable) transformer with screen	L2/3, L100/101
	Ferrite bead	FB1
	Bridge rectifier	D200
	Transformer	T200
	Switch	S101
	Ground (0V) connection	

Table 2 Resistor value identification table

Value (Ohms)	1st Band	2nd Band	3rd Band	4th Band
4R7	Yellow	Purple	Gold	
10R	Brown	Black	Black	
27R	Red	Purple	Black	
47R	Yellow	Purple	Black	
100R	Brown	Black	Brown	
150R	Brown	Green	Brown	
220R	Red	Red	Brown	
330R	Orange	Orange	Brown	
470R	Yellow	Purple	Brown	
1k	Brown	Black	Red	
2k2	Red	Red	Red	Gold
3k3	Orange	Orange	Red	
4k7	Yellow	Purple	Red	
10k	Brown	Black	Orange	
22k	Red	Red	Orange	
33k	Orange	Orange	Orange	
47k	Yellow	Purple	Orange	
82k	Grey	Red	Orange	
100k	Brown	Black	Orange	
220k	Red	Red	Yellow	

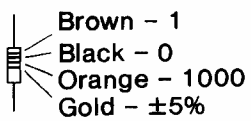
Note: Values listed with "R" are in ohms, e.g., 4R7 is 4.7 ohms, 47R is 47 ohms, 470R is 470 ohms. Values listed with "k" are in 1000's of ohms, e.g., 1k is 1000 ohms, 4k7 is 4700 ohms, 47k is 47000 ohms, 100k is 100000 ohms.

Table 3 Resistor colour coding scheme



Colour	1st Digit	2nd Digit	Multiplier	Tolerance
Black	-	0	1	-
Brown	1	1	10	±1%
Red	2	2	100	±2%
Orange	3	3	1000	
Yellow	4	4	10000	-
Green	5	5	100000	-
Blue	6	6	-	-
Violet	7	7	-	-
Grey	8	8	-	-
White	9	9	-	-
Gold	-	-	0.1	±5%
Silver	-	-	0.01	±10%
None	-	-	-	±20%

Examples:



10 × 1000 @ 10000 ohms (10k)

47 × 0.1 @ 4.7 ohms (4R7)

Table 4

Label	Value	Label	Value
6K8	6.8 pF	223	22 nF
10K	10 pF	104	100 nF
15K	15 pF		
22K	22 pF		
33K	33 pF		
47K	47 pF		
101	100 pF		
151	150 pF		
102	1 nF		
472	4.7 nF		
103	10 nF		

Note: The 'K' is sometimes omitted

Disc ceramic capacitors

Figure 1 Component leads bent slightly outwards to hold them in place prior to soldering.

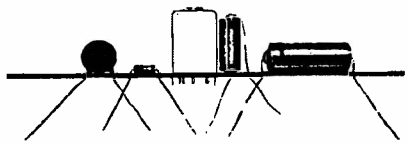


Figure 3 Step-by-step soldering technique

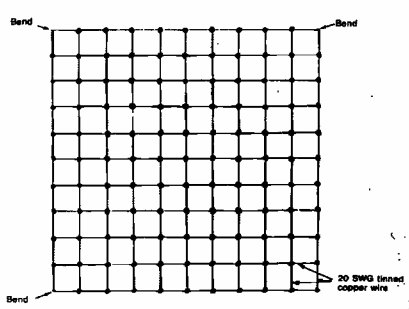
Apply the tip of the soldering iron to heat both the component lead and track.

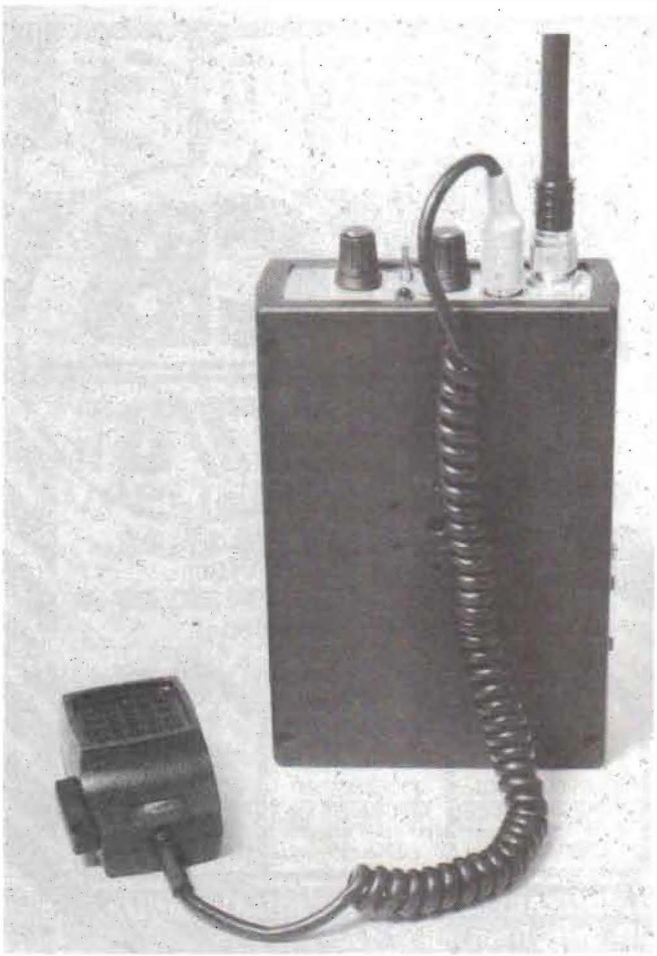
Apply solder to both the soldering iron tip and the connection.

Let the connection harden after removal of the soldering iron before moving the wire or the PCB. Check for a smooth, bright joint.

Cut off the excess lead length with side cutters.

Figure 4 Soldering practice grid (118 nodes!)





help you to identify the value and colour coding used on the components.

Soldering

Good solder connections are essential to the success of any electronics project. The Ranger uses a printed circuit board to simplify construction. This has a copper track pattern 'printed' on one side of the board, and the component layout on the component side of the board. In reality, the copper track pattern is produced by etching away the unwanted areas of copper, rather than printing with copper. In order to minimise the possibility of unwanted and inadvertent connections due to solder splashes, the copper side of the PCB has been coated with a green solder resist coating everywhere except where a soldered joint is required. This has other benefits: it is quickly obvious when connections are missing, and the track pattern is protected from the effects of moisture corrosion.

Once the components have been correctly identified and checked against the components list, construction may commence. The assembly procedure given in the Ranger article should be carefully followed. It is a good idea to install the components on the PCB in small groups, of say five or six, at a time. This helps to reduce errors and produce a neat finish. The components should be mounted tightly against the board (unless otherwise directed). The leads of each part should be inserted through the correct holes (a double check on polarity is always worth the effort!) in the circuit board, and then bent slightly outward to hold the part in place. Figure 1 shows the idea.

After a group of parts has been installed, the leads should be soldered to the copper track and the excess lead length then cut off. The golden rules to be observed when soldering are:

1. Check the components before soldering. It is much easier than trying to remove a wrongly installed part afterwards (especially if it is an IC socket!).

2. Make sure that the connection to be soldered is clean. Dirt and grease cause poor connections.

3. Keep the soldering iron tip clean. Wipe it often with a damp cloth or sponge.

4. Use only resin core (60:40 or 50:50 tin-lead content) radio type solder. Do not use acid core solder or paste fluxes.

5. Check each joint after it has been made. It is much easier to check while working, rather than have to check more than 400 joints after the job is finished. In particular, check for solder splashes between adjacent joints.

The recommended soldering technique is illustrated in figure 3. When soldering the wire links, strip the insulation back about 5mm for PCB connections and by about 8mm for connections to front panel components, etc. The wire strands should then be twisted together and, using a clean tip on the iron, tinned by heating the stripped end and applying a small amount of solder. A tinned lead should be no thicker than the original wire, but the strands should all be soldered together. This is a skill which is worth practising before starting construction. The tinned lead should pass through the holes in the PCB, and may then be treated like a component lead. For front panel components, the tinned end should be bent round the connecting tag with a small pair of pliers and crimped before soldering.

A useful practice exercise often used in industrial training courses is the manufacture of a square grid pattern using tinned copper wire as shown in figure 4. A soldered joint is required at every node in the grid, giving plenty of practice! Each joint should be neat, smooth and bright; the solder should appear to 'wet' the surface of the wire.

Finally

When the construction of the Ranger is complete, the inevitable temptation is to switch it on straight away. Don't. It could be very expensive! The last step in the construction and assembly process is to inspect the board and wiring for possible faults. The usual checks are to ensure that all polarised components (diodes, electrolytic capacitors, etc.) are correctly orientated, to ensure that all the components have been fitted (are there any left over?), and to check the soldering and wiring for 'dry' joints (not having a smooth, bright appearance) and solder splashes.

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Round Up

Happy birthday Penarth and Barry

The Penarth Marconi Town Breakers and Barry Breakers Clubs of Wales have both been going for over a year now and have close associations with each other. They have organised several events together and concentrate on fundraising and helping local charities.

Apart from arranging outings and meals for OAP's, they have presented a music centre to the Ty Dyan Old Peoples Home and two radios to The Gwalia Old People Home. Presentation ceremonies were organised for handing over the equipment to the Matrons of the Homes.

The Penarth Club are hoping to install a home base rig at a local residential school for disabled youngsters.

Both clubs have had celebration parties to commemorate their first anniversaries. Let's hope they have the same results for their second year.

Got it taped

Recently received in our office is a cassette tape marketed by Radiomobile. Available from record shops, CB stores and Radiomobile dealers, it costs £2.99.

Featuring Dave Lee Travis and someone called Richard Hudson-Evans, it lasts 60 minutes and should be of particular interest to new breakers. The producers have tried to keep a simple approach and not 'baffle' listeners who are new to CB.

Side one traces the history and development of CB both at home and abroad and explains how to get started. The second side examines more closely the types of equipment necessary and available, how to fit it and the more technical aspect of breaking.

Nice to see the "Code of Practice" printed on the cassette card.

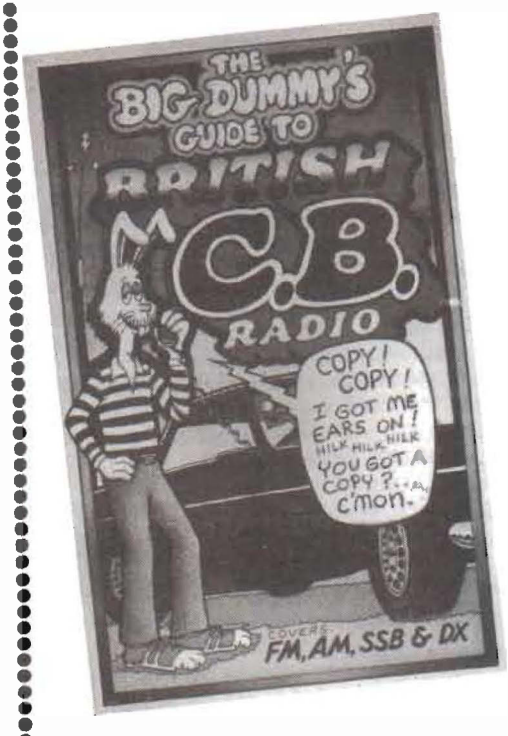
Pull power

The West End Breakers of Newcastle upon Tyne have been very busy lately and had a few pulled muscles to prove it, too, I should think. They are supporting the Charlie Bear Body Scanner Appeal and collected over £1,400, which was handed over at a presentation ceremony to Mrs. Daisy Clark, the appeal organiser.

The money was raised by a sponsored truck pull of over 12 miles from the Newbiggin Hall Hotel to the centre of Newcastle. Forty breakers had the unenviable job of pulling the 3½-ton truck (in fancy dress, too!). The weather was not entirely favourable but the rain didn't deter them.

Many services were donated free, including the truck, ropes, back-up coach and refreshments. They were also accompanied by the local Pipe and Drum band.

Big Dummy UK 10-4



That well read and always recommended Big Dummy's Guide has lost its Stars and Stripes and gained a Union Jack. The all-British version of The Big Dummy's Guide to CB Radio is now available from most CB shops and, like its American predecessor, is an invaluable informal guide to CB. It covers all subjects from getting on the air to building your own base antenna and how to cope with an emergency.

The book includes a realistic assessment of AM, SSB and FM but sensibly avoids getting involved in the argument of which is best. It is down to earth without being too basic but contains enough technical bits to keep most enthusiasts happy.

Kona, the UK distributors, are obviously worried about possible bootlegging again as the book has a watermarked end paper. Any book without the end paper is a pirate edition! The Big Dummy's Guide to British CB retails for £2.95 but may be discounted at some shops.

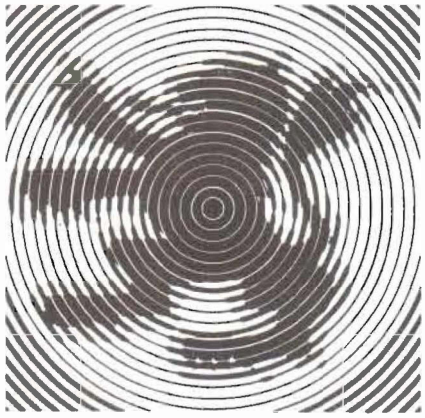
Breaker Eight-Ten

Another radio station has seen a potential audience with the legalisation of CB and has started a breakers' programme.

BBC Radio Scotland has introduced a 'Breaker 810' show on Sunday evening, starting at 5.05 for three-quarters of an hour. Hosted by Noel Cannon, the Tennessee Superpicker, the show features all the latest technical information, rig, aerial and accessory tests, legal and insurance advice and liaising between clubs and members throughout Scotland.

The station also seems to have an unofficial CB club blossoming as applications are arriving for the Breaker 810 Club (and the Breaker 810 Carpet Monkeys Club for younger listeners).

The DJ for the show, Noel, has seen CB grow in both the US (as he comes from North Carolina) and in Britain and his show is a mixture of CB and country music.



Christmas 81 DX contest

As this issue will be on the streets particularly early this month (as the festive season throws the whole production schedule out) we have time to say a quick word about the British Sideband Network Christmas DX contest. It will be open to all-comers and points will be awarded on a sliding scale for the DX contacts logged. The contest will run over four days from 12.00 noon on 24 December to 12.00 noon on 27 December. Total operating time should not exceed 24 hours over the four-day period.

It is open to clubs or individual entrants and the cost is £1.60 per operator. As well as providing some Christmas entertainment the organisers hope that the competition will help make the CB SSB DX'ers' presence felt and illustrate to the Government the need for SSB operation.

WIN A RIG

This month to win a nice new 27FM transceiver all you have to do is tell us what the deliberate mistake was in Round Up last month, "It was not fair".

As ees the normal way of things like dis, we is gona keep de rules simple, we reserve de right to decide de winner in de event of der bein more dan one correct answer. Okay.

With the legalisation of FM CB, REACT UK are obviously building up to cover as much of the country as soon as possible with an effective emergency monitoring system.

New readers will perhaps need informing that REACT stands for Radio Emergency Action Citizens' Teams and consists of local teams who monitor the emergency channel and liaise with the emergency services to speed action in an accident or incident.

Members of the REACT UK Supporters Club are being encouraged to join a regional team and become an active member.

THE REACTer-UK

REACT UK send out a regular newsletter, called the REACTER, featuring items of news and relevant information. The last available issue had a report from 'Police Inspector Jim Campbell (Executive Director), who attended the REACT International Convention at Indianapolis, Indiana. Inspector Campbell also saw practical examples of REACT teams working in Chicago.

Securicor Airwaves

It's amazing what some companies get up to and one of the biggest surprises of last year happened when Securicor started selling and installing CB rigs.

Securicor's cash in transit service has always necessitated a high quality sophisticated two-way radio service, and Securicor have extended this service by retailing radio telephones, paging systems and now CB.

Securicor Airwaves is the name of the two rigs which the company are stocking. Whilst these sets are available under the name Uniden from other shops, few competitors will be able to match the undercover and well equipped fitting bays at Securicor. Fitting prices average out at around £20. To obtain details of your nearest Securicor CB stockist, contact Denis Norton, Dept N.M., Securicor Airwaves, 24 Gillingham Street, London SW1V 1HZ.

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Connexions

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'.

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 feed 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.

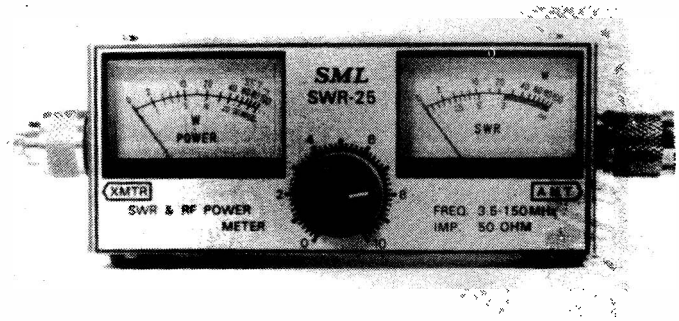
3) With the rig switched off, disconnect the antenna co-ax and connect it to the meter terminal marked ANT. Using the patch lead connect the meter terminal marked CB or TX to the rig antenna plug.

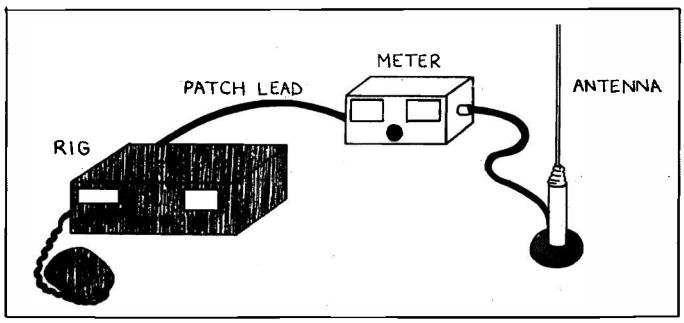
4) Switch on the set and turn to channel 20. (It is anti-social to SWR on any of the breaking channels). Switch the SWR meter to 'Forward'. Press the transmit button. The needle on the dial will move. Adjust the knob on the meter until the needle swings over to give the maximum reading (often marked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





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.

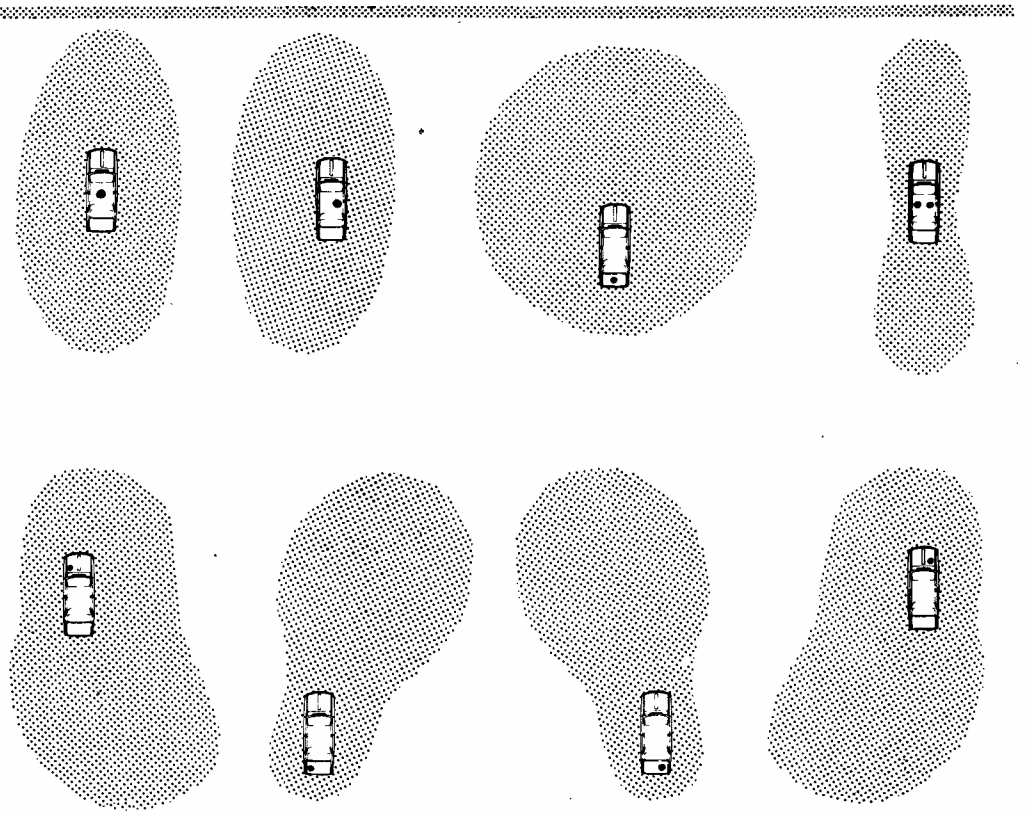
5) Again, before drilling, check that you aren't damaging anything (like the petrol tank!) and that there is enough free space for any mountings.

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.



BACK to BASICS

In an effort to aid the newcomer to CB and answer some of the more obvious questions often asked of us, this second part of Back to Basics will run for a little while.

Why do I need an antenna?

In America, as many of you will know, different words describe similar items as used in Britain. One example is what in Britain we call an aerial in America is known as an antenna. Because CB originated in the United States it has become the standard to refer to CB aerials as antennae.

To transmit the antenna used needs to match the frequency (see SWR opposite), to match the frequency the antenna used has to have an electrical length.

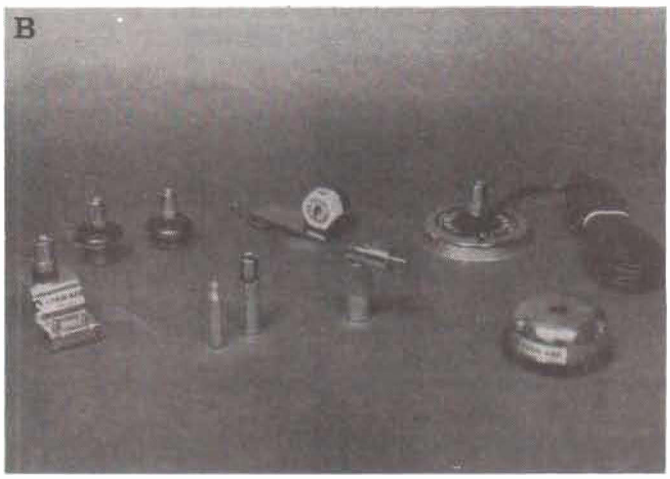
Therefore, for CB signals to transmit, the antenna used must have been specially designed to suit the frequency, i.e., 27MHz or 934MHz. Do not be mistaken or misled – an antenna is the most important part of your equipment. Forget the cost of the rig, if you cheat on the quality of your antenna the performance will be reduced.

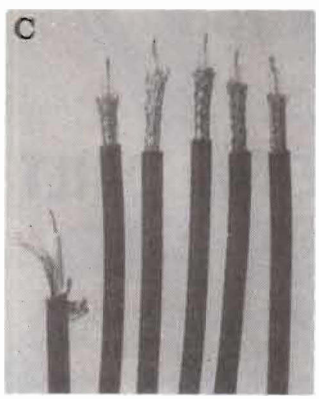
But which antenna?

OK, you now know that the antenna is vital, it must be of good quality and that it must be base loaded with a wire rod or element not exceeding 1.5 metres. But which make shall I choose?

Personal preference must really come into this choice as well as your specific requirements. For instance, do you intend to drill a hole in your vehicle or will you use one of the various other alternatives, i.e., magnetic mount, gutter clip, boot clip, bumper clip or even a mirror mount.

The reason for considering the mounting first is simple: many large shops sell only pre-packaged antennae complete with cable antenna and mount. For this reason, you should make sure the package contains the particular mount you have chosen or if not that accessory mounts are available separately.





Then in all honesty all you can judge is the quality of the goods. Look for cable which has RG58 printed on it. Various grades are available. An average or reasonable quality is RG58 C/U. Beware of coaxial bearing no identification, coaxial cable is as important as the antenna itself.

Then examine the connectors, called PL259's. They should be clean, sturdy looking and durable. With the antenna itself, look for a strong whip. If metal, look for the unmistakable sheen of steel. Well insulated connections around the loading coil are important – either heat-shrink plastic or a similar waterproof casing. If water does get into the loading coil it can affect the performance and even damage the set.

Photographs
A) Base loaded antenna
B) A selection of available bases
C) The various grades of RG58/U
D) PL259 plug
E) Ground plane antenna
F) Base station antenna with ground plane

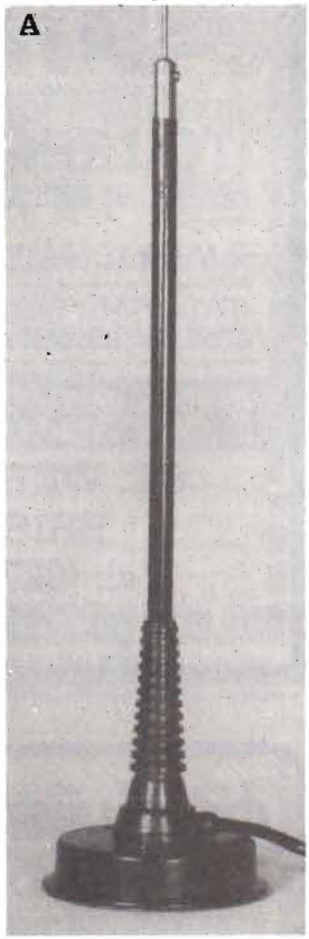
Ground plane

When sighting the antenna (see opposite for positions) ensure that you have a good connection to the metal surface (unless you are using a magnetic mount). This connection is vital. Imagine your vehicle as a mirror – it forces the signal to travel up through the antenna and out. The larger the ground plane the more effective that reflection or radiation. Without a ground plane your signal will not get out and your set could be damaged as a high VSWR will exist. All base loaded antennae are known as "ground plane antennae" because the ground plane affects their operation.

What sort of antenna?

To comply with an FM licence it must be a single wire rod or element base loaded (loading is a series of coils, wound to increase the electrical length to that required for the frequency).

The wire rod or element must not exceed 1.5 metres (4ft. 11in.). This measurement is taken from the top of the loading to the tip of the antenna, not the whole length of the antenna.



Antenna length

At this stage the 'loading' really requires a little more explanation. There are four possible lengths of antenna, full wave, ⅝ wave, ½ wave and ¼ wave.

As we have just mentioned, the frequency determines the length because the antenna must match the frequency's electrical requirements.

To determine this length there are precise mathematical formulae. For 27MHz the equation is:

$$\frac{300 \times 10^6}{27 \times 10^6} = 11.11 \text{ metres}$$

This gives you the electrical length required for a full wavelength, however, as 11.11 metres (36+ ft.) is highly impractical, not to mention illegal under present licencing, the physical length must be reduced. A half wave, therefore, would be 5.55 metres (18+ ft.) – exactly half a full wave – and ¼ wave 2.77 metres (9ft. 1in. or 109in.).

Any antenna used must be either full wave, ⅝ wave, ½ wave or ¼ wave.

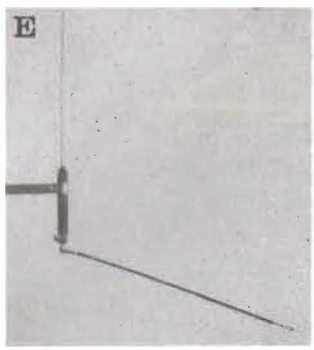
Whilst the physical length of the most practical antenna for use 'legally' is ⅝ wave, it is still too long; the licence requires a maximum length of 1.5 metres. To reduce the physical length an inductive loading is used. A loading coil is really only the extra length of wire that could not physically be used, i.e., 2.77 metres (¼ wave) minus 1.5 metres (legally allowed). In a simple antenna, 1.27 metres of wire would make the loading coil. However, in reality this can be reduced but for the purposes of this simplified explanation we will not complicate the matter.

The problem with reducing the physical length is that the efficiency is also reduced.

Home base antennae

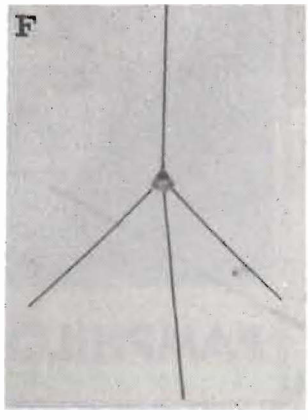
As yet very few legal FM antennae exist specifically designed for home installation.

What is more, a ground plane antenna, i.e., conforming to Home Office specification, needs exactly that – a ground plane. Very few houses have metal roofs, therefore an artificial ground plane must be used.



As can be seen from the diagrams opposite, the ground plane affects the radiation pattern of your signal. An antenna mounted on a front wing pushes the signal back and diagonally opposite to its position.

The physical length of artificial ground planes vary according to the same wavelength formulae and are dependent on the radial section, i.e., the antenna itself. With our limited ¼ wave ground plane legal obligation, the simplest form of base antenna is to mount a normal mobile antenna on an artificial ground plane of ¼ wave lengths, i.e., two lengths of metal both 109in., crossed at 90°, firmly attached and the antenna placed dead centre. Of course, other ground planes can work quite efficiently and the water-tank in the attic is not just a wind up, it can actually work.



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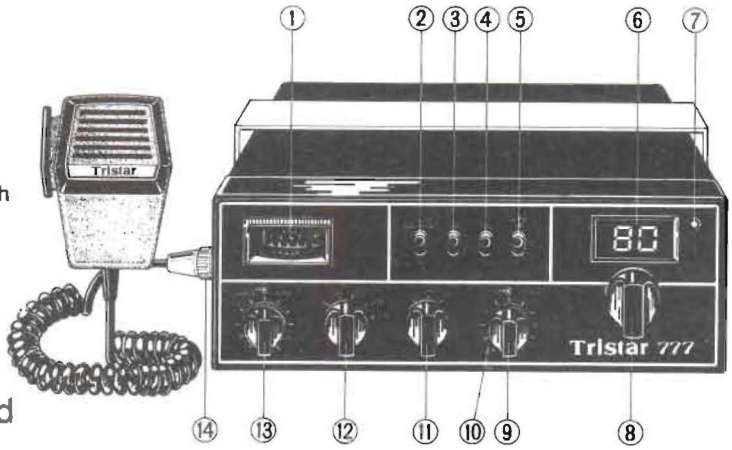

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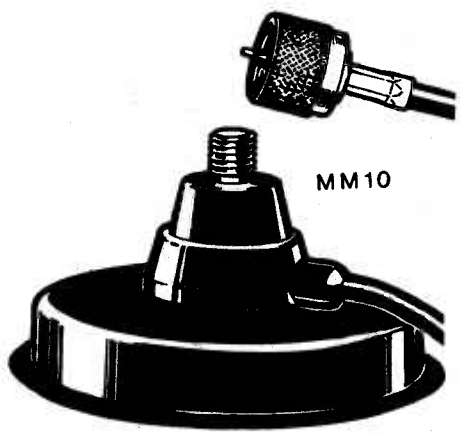

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Absolute Rumours

or how to throw a spanner in the "Legal FM" works

Despite what you may be reading in other CB publications, there is no truth in the rumour that AM CB will be legalised in this country.

A certain CB publication ran a very misleading article which began

New System 'In the balance'

The new British CB system, legalised on November 2nd, is already in the balance. According to reports we have received, a member of the House of Lords and Home Minister has said that it is the government's intention to legalise the F.C.C. frequencies in due course. The fate of the UK system is clearly now in the balance.

The article gave the impression that people in very high places had discussed and agreed on the principle of legalising the use of AM (FCC) equipment in the United Kingdom. When reading the article not one of these people in high places has been named or the times and dates of meetings supplied.

This piece of irresponsible journalism has created much confusion from both the CB'ing public and the trade. We have approached the publication who ran this article on their front page to ascertain the facts on which it was based. As they are refusing to comment and sounding very embarrassed, we can only conclude that this piece of sensationalism was based on nothing more than speculation.

To get information regarding the laws governings the use of any type of radio equipment in this country, there is only one place capable of making any official statement – The Radio Regulatory Department of the Home Office. Their reaction to this piece of news when we talked to them was a mixture of ironic mirth and displeasure. They were amused because this rumour has been going the rounds for many months and displeased by the phone calls they have been getting from people trying to verify the rumour.

The official statement from the Home Office is that "AM CB will not be legalised in this country". If they were intending to make AM (FCC) equipment legal they certainly wouldn't be hiding the fact totally, especially when you consider the revenue that could be generated with AM licencing. Besides, they wouldn't have bothered designing and implementing a new British system.

The damage

To read an article like the one mentioned only a couple of days after the legalisation of FM CB has distressed or annoyed all sections of the CB community. On a public level, we have heard of breakers trying to return their FM sets for refunds and others who are awaiting further 'developments' before buying any type of CB rig. Many AM breakers are obviously revitalised with false hopes.

The CB trade have not been amused. Millions of pounds have been committed to the purchase and importation of FM rigs over a long period of time. To be informed that all the work, time and money spent on the development of FM CB may have been wasted is regarded by the trade as some kind of sick and untimely joke. One major wholesaler talked to us about facing bankruptcy as all his money was tied up in FM rigs. Retailers have reported that this rumour has spread and most potential rig purchasers are now somewhat cynical about the whole thing.

Customs and Excise stickers

A little item which many people have seen and something which is adding fuel to the these rumours is a sticker which bears a legend "THIS RADIO IS ILLEGAL TO USE BEFORE THE 1ST APRIL 1982". Attached to the back of AM CB rigs this is giving the impression that AM will be made legal. These stickers do not come from an official source and fall into a category known as 'wind up'. They have been produced and distributed by someone with a large stock of AM 40-channel rigs which are currently difficult to give away, let alone sell. The people behind these stickers give the impression that they have come from either the Home Office or the Customs and Excise; they do not!

CB 27/81 stickers

Some companies are printing CB 27/81 stickers and advertising them for sale. Do not be misled. The attachment of one of these stickers to the front of your AM rig does not make it legal to use in this country. Prosecutions for illegal use of CB will be based on what transmission qualities a set has and not what it looks like. When buying a so-called legal set the logo must either be engraved or embossed onto the front panel and not stuck on with glue!

I hope the preceding insight into the wonders of legal CB has helped to clear up some of the misconceptions that are still clouding the CB issue. I would love to be able to write that *all* CB is legal. I doubt if that day will ever come.

ABSOLUTE RUMOURS

Mr. Mould, Financial Director of Amstrad Consumer Electronics Ltd., was also concerned by the rumours that have been circulating and wrote to the Home Office. He received the following reply:

"I can confirm that there are absolutely no plans to legalise CB radio on AM. I am aware of the sort of rumours which you have mentioned and we are doing everything in our power both in correspondence and in statements to the media to make it clear that they have absolutely no foundation."

The Home Office press department were disturbed by the amount of misinformation circulating and issued the following statement to allay any fears regarding the new system. Sorry, AM breakers, this is not good news for you.

Home Office release

"The Government has no intention of making any changes to the new legal 27MHz FM CB radio service. It's the Government's stated aim to participate in any common European standard for CB but this is essentially long term and international discussions are only just starting." This in no way implies that the present UK CB system will be discontinued.

In particular, any rumours that the use of the frequency employed by illicit AM equipment will be authorised in April 1982 are entirely unfounded. Any stickers that have been fixed to illicit equipment implying changes in the UK system are hoaxes.

ON 11 November, Mr. T. Raison, Home Office Minister of State with responsibility for CB, said "Those who continue to press for legalisation of the US equipment conveniently ignore that the complaints of interference to TV and radio reception by illicit CB equipment have been running at over 1,000 a week and we could not possibly have contemplated legalising the use of equipment which is so patently unsuitable for use in this country".

AM TO FM RIG TRANSVERSIONS
INCLUDING SPEECH PROCESSOR CIRCUITRY
AVAILABLE AT LAST FROM

MIDLANDS
Acom Trading CB Ltd.
Unit 4
Coleshill Industrial Estate
Coleshill
Birmingham
Tel: (0675) 64136

NORFOLK-SUFFOLK
Gorleston Repair Services
97 Magdalen Way
Great Yarmouth
Norfolk
Tel: (0493) 67167

SOUTH OF THE THAMES WEST TO BRISTOL DOWN TO LANDS END
Microchip
22-24 Shore Road
Warsash
Hampshire
Tel: (04895) 824488

MERSEYSIDE-WIRRAL
Multiband Radio
52-54 Harboard Street
Edgehill
Liverpool
Tel: (051 708) 7818

SOUTH WALES
Radio Repair Services
23A Bridge End Road
Llanharan
Mid Glamorgan
Tel: (0443) 22891

NORTH WALES
North Wales Telecom
Bretton Street
Llandudno
Tel: (049) 70172

NORTH-WEST SCOTLAND
Mobek
483 Main Street
Coatbridge
ML5 3AH
Tel: (0236) 22403

SOUTH-EAST SCOTLAND
Central Scotland OCT
13 Ferry Road
Leith
Edinburgh
Tel: (031 554) 3733

IF YOU RESIDE IN ANY OF THESE AREAS, PLEASE CONTACT THE APPROPRIATE DISTRIBUTORS WHO WILL INFORM YOU OF YOUR NEAREST AGENTS.
AGENCY ENQUIRIES: PLEASE CONTACT FINELMS DIRECT.

AGENTS NOT IN THE ABOVE AREAS

DFE (Electro Trading)
Eccleshall Road
Batemoor
Sheffield
Tel: (0742) 374744

Breaker 27
30 Yorkshire Street
Morecambe
Tel: (0524) 411236

East Anglia CB Service Centre Ltd
Wootton
Kings Lynn
Norfolk
Tel (055) 71845

Engineering Co. Ltd.
Claremount House
Doddington Road
Earls Darton
Northants
Tel: (0604) 810637

Geartech Ltd.
30-32 Burnley Road
Accrington
Lancs.
Tel: (0254) 392366

Hartshead Radio Repair
27 Delamere Avenue
Salford
Tel: (061) 7374685

Mobile & Home Radio Services
31-33 Station Road
Billingham
Stockton on Tees
Tel: (0642) 554921

Record Parlour
594 Kingsway Road
London
NW9
Tel: 01-204 2144

The Squawk Box
City Service Station
Histon Road
Cambridge
Tel: (022) 315378

Red Star CB North West
Royal Oak Buildings
Cooper Street
Stockport
Cheshire
Tel: (061 456) 8874, (061 494) 0924

FURTHER AGENTS REQUIRED

FINELMS ELECTROMECH
50 PARKER STREET, WARRINGTON
Tel: (0925) 574691

Clubs Unite

The response so far

Having studied the response from clubs up and down the country to our National Club Register, many things become immediately apparent. The information that you have supplied suggests that CB clubs are almost evenly divided between AM and FM with a great number happy to accept members of either persuasion. Your evidence does, however, indicate that although many of you are accepting FM members into your clubs that you are either active in or supportive of the AM system of CB. I wonder how long it will be before FM only clubs become open to AM members and how many converts to AM this will create?

SSB clubs or SSB sections within AM clubs are also immensely popular. Judging by the amount of sidebanders who have replied to the Register, sideband clubs could be the biggest CB club growth area after FM.

The need to register

In case you are a new reader and haven't got a clue what I'm talking about, it's really quite simple. We are launching a completely separate publication which will contain details of every known CB club in the United Kingdom. Read on and register.

National Club Register

Regardless of choice and frequency preference, registering your club will be important, new 27 FM clubs will spring up along with 934 clubs, each with its own aims and ideals.

Therefore we have decided to start a totally seperate publication intending to register every possible CB club, group or organisation.

FM Clubs will find it an advantage to register their name and address, it should stop confusion & identical names in the same area, it may even prevent them from choosing a similar name in the first place. It will also let other clubs know of your existence, how to contact you and what channel you break on. Being registered will also have a spin off advantage, for instance many rig insurance schemes now mail the clubs with preferential offers on rig theft insurance.

AM Clubs will find registration essential because the Government want to make you extinct. They will succeed unless you openly proclaim your support, communicate with similar active clubs and unite in any protests or demonstrations. National Club Directory will contain information that an organiser of any demonstration would need to know, how to obtain police permission and who to contact, planning the best possible route, the time scale and how to plan your support, suggested media contacts and promotional hints, tips on money saving with banners and posters, along with artwork for suggested campaign literature, (the most expensive part of any campaign). In other words everything you and your club should need to stage an effective protest or demonstration.

SSB Clubs. Amongst all the other possible clubs, Single Side Band is without doubt the major argument for AM preference. Yet to date the Home Office have never mentioned the subject and totally ignored its existance. True we all know 27AM, SSB, long distance contact is illegal the world over, but is it that far removed from 28 MHz operation that there is no argument for legalisation? Many Hams cast CB'ers aside as unlicenced pirates ,yet more and more we have noted a tendancy by some amateurs to ask why isn't the RSGB pressing to incorporate it!

Registration for the QSO Club should be an advantage, other local SSB clubs will know your frequency and either give you a clear band or be able to contact or at least try British working with you.

Information listed would be reasonably explicit, i.e. frequency, area, attitude, DX local or long distance, the membership response to QSL, if a purist QSO or DX QSL Swap considered. Whether the club is active, interested in legalisation or just simply here full stop.

DX - QSL Swap Clubs can incorporate information about themselves in a semi advertisement form and enhance their membership, listing their club package, QSL rate i.e. 100% or 1-4-1,enrolment fee and even printing in the register their Club QSL card.

BIRDLINGTON MOSS BREAKERS
Venue: The Castle on the Hill
Birdlington Moss
Castlehill View
Birdlington
Every Tuesday 8.30 - 1.30
Contact: Meril Straight
Evlin Vaughn Green
Ridge Castle Road
Birdlington
Area: Shakey Tree Town
Break: 14
CLUB: 17
Registered: AM ACTIVE

BROOKFIELD MARSH STOMPERS
Venue: The Marsh Inn
Brookfield Marsh
Nr Broadlanders
Every Sunday
Contact: Mike Stalmond
12 The Larches
Oakfield Marsh
Broadlanders
Area: Stompers Green
Break: 14
CLUB: 11
Registered: FM

BUS STOP DX QSL
P.O. Box 32
Flanders
S. Suxeth
Personal: Mike Roger, unit 001 President
Frequency: 27.585 LSB
Registered: SSB PIRATE

The above are examples of how the listings will appear Please fill in your form with care, think of the details you wish to be printed and compare it with the above.

Certificate of Registration

In order to collate all the information we hope to receive, computer time will be booked, therefore we want to use only genuine and correct information about your club, body, organisation or group.

For this reason there will be a registration fee, this will cover collation of data, issue you with an "Official Wall Certificate" which is proof of registration made out to the registered club showing its official stance i.e. AM-FM, SSB or DX QSL Club, Organisation or fighting group. The registration fee will also allow us to send you a photo-stat of how your listing will appear. This can then be checked to ensure that all the information is correct.

The Registration fee will be £1.00 for all clubs, organisations or groups, additional space will be available for the more prominent clubs, fighting organisations or DX-QSL Clubs wishing to promote themselves.

JOH

The publication will take some time to collate but it is envisaged that it should be ready early in the new year, that will let us have a Christmas break, yes it is almost here already.

JOH

CB Radio Magazine

NATIONAL CLUB REGISTER

Please fill in details carefully and comprehensively. Print in block capitals only.

FOR OFFICE USE ONLY

NAME OF CLUB .....

VENUE .....

ADDRESS in full: .....

Day & Date .....

Contact/Personal .....

Address .....

Phone No .....

Area or County .....

Area or County Handle .....

Breaking Channel .....

Club Channel .....

(see below for choice first)

Club Registered as: .....

Club favours: .....

DX/QSL/QSO/or 1 - 4 - 1 .....
(Applies only to 100% QSL)

CLUB FAVOURS (either);

FM:	**Covers all legal FM**
AM:	**27MHz illegal**
SSB:	**Single Side Band**
ALL:	**CB illegal and legal**

CLUB REGISTERED AS (either);

ACTIVE:	**Fighting for AM or SSB**
SUPPORT:	**Interested in all demos**
LEGAL:	**Happy with the legal frequencies**
PIRATE:	**Illegal to the end**

I wish to register the above club and details:

My Name is .....

Position in club/group etc .....

Address .....

.....

Phone No .....

I understand that this information is personal and not for printing, unless it is the same as above

I enclose the registration fee of £ 1.00p Cheque or P.O. to British Breaker Productions, Tudor Works, Beaconsfield Road, Hayes, Middlesex, UB4 0FL

Certificates of registration will be despatched with a photo stat 'proof' of your insertion as it will appear, as soon as possible. Please allow for the collation time involved and expect to see this early in the New Year. If you do wish to receive your Certificate earlier enclose a large S.A.E. with this form.

FOLD ON LINES ONE, TWO, THREE AND FOUR TO MAKE AN ENVELOPE AND TUCK FLAP 'A' INSIDE POCKET 'B'.

FOLD

FOLD ONE

FOLD

PLACE STAMP HERE

FOLD FOUR

National Club Register.
British Breaker Productions,
Tudor Works,
Beaconsfield Road,
Hayes,
Middlesex,
UB4 OFL.

FOLD THREE

OPEN POCKET 'B'

CUT ALONG DOTTED LINE

FLAP 'A' TUCK INSIDE 'B' TO SEAL ENVELOPE

FOLD

FOLD TWO

FOLD

The 1982 CB Show

Where to go this Easter

With Christmas over and the ensuing hangover a mere hazy memory, it is now time to plan what you will be doing in the coming year. Before you book up for Easter, don't forget CB Radio Magazine's 1982 CB Show at the Wembley Conference Centre. The dates for your diary are 9, 10 and 11 April, which should give you every opportunity to come along.

Ninth April, 1982 is Good Friday, which for most people is a holiday. The following two days are the weekend during which we will be open as well. If you are travelling to Wembley from a long distance, Easter Monday will be an ideal day on which to return home.

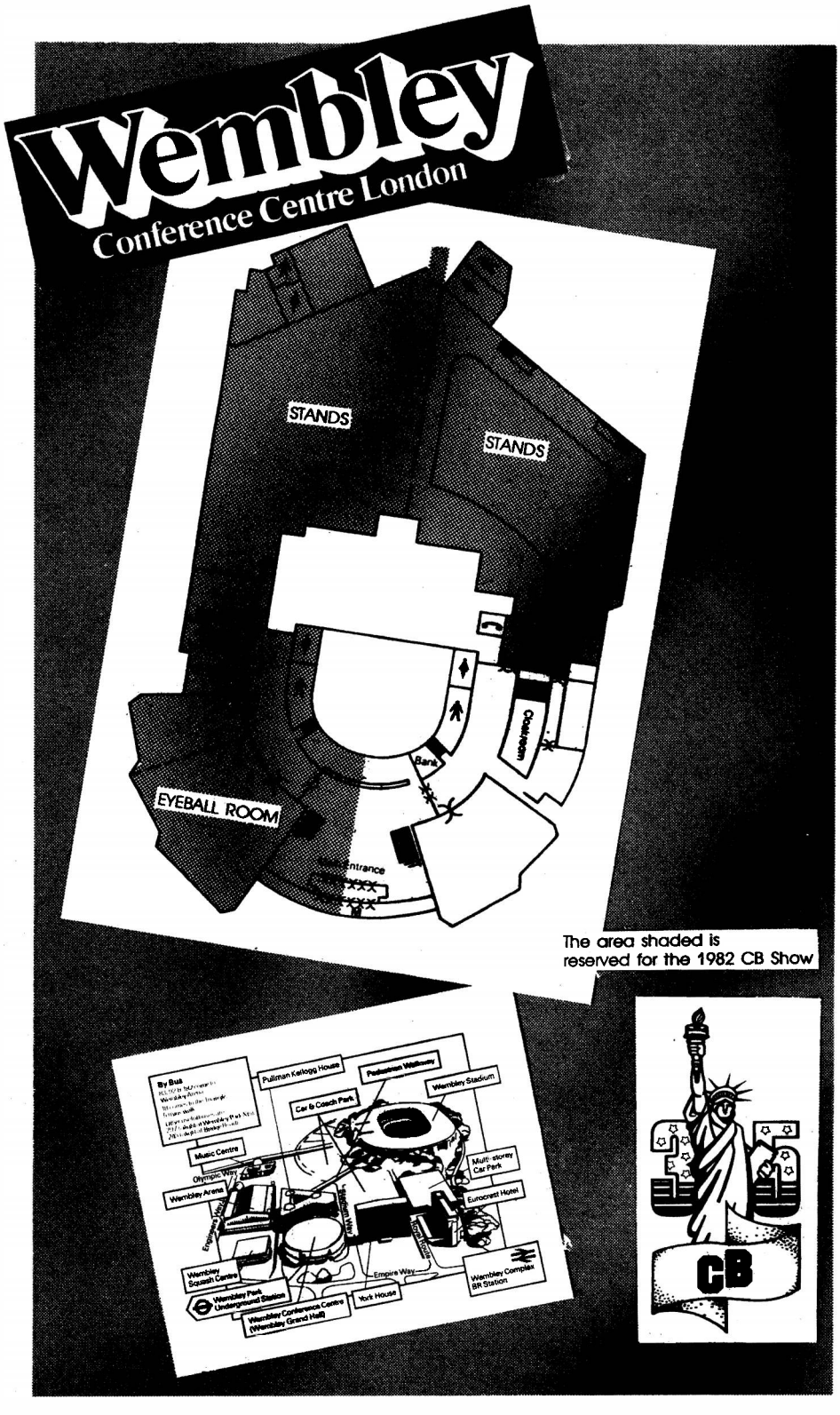
Wembley and how to get there

Wembley Conference Centre is approximately eight miles north west of central London. There are regular Underground and British Rail train links from the City to all of Wembley's four stations. If you are travelling by coach or car, Wembley town is just off the North Circular Road, which is directly linked to both the M1 and M4 motorways. Travelling from the south and east is also easy because the A3 and A11 roads converge on the South Circular Road and A1 respectively (see map).

What's at the Show

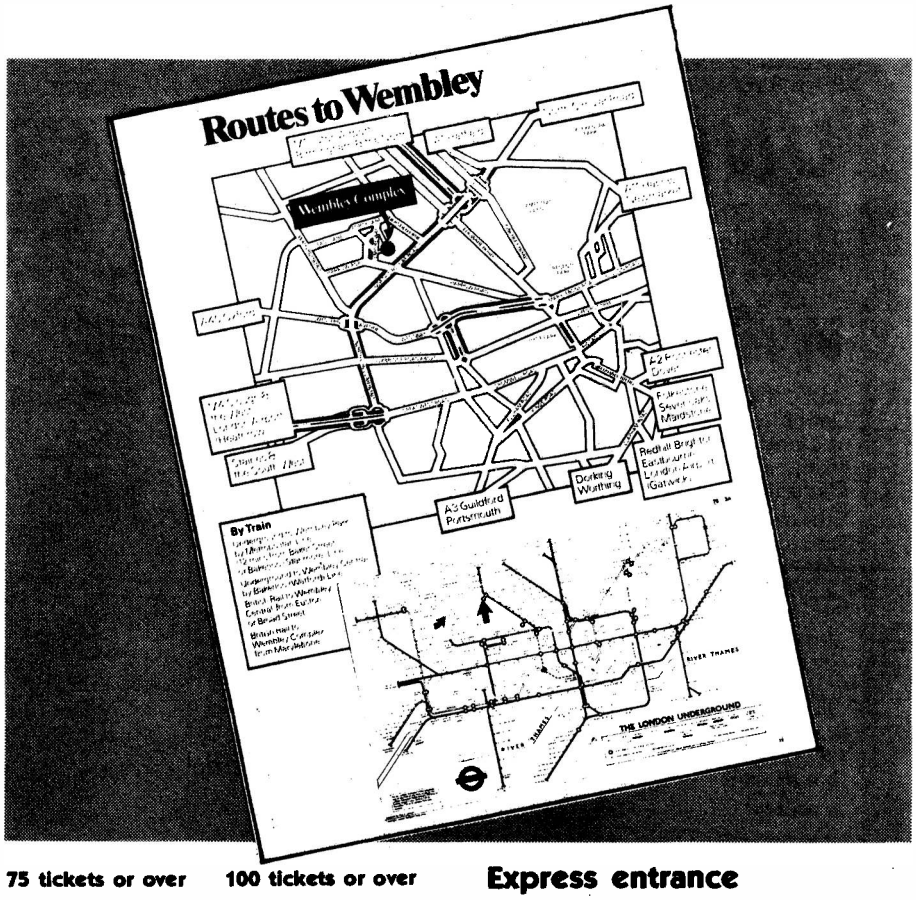
We have received numerous bookings from the CB trade, who will be exhibiting at the 1982 CB Show. There will be rigs, antennas, accessories, badges, tee shirts and much more on sale. Our Eyeball 20 is a large separate area in which you can relax and have fun and where the children can be looked after for you. If you are the thirsty type, there are bars which charge normal pub prices for drinks. *Examples:* Pint of bitter 70p, gin and tonic 85p (prices correct at time of going to press). The bars will be open for the duration of the Show (extensions applied for).

Each ticket holder will automatically have his or her name entered, free of charge, into a daily draw. The winners of these draws will receive valuable prizes.



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.

25 tickets or over	50 tickets or over
£1.75 each.	£1.50 each.

75 tickets or over	100 tickets or over
£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 Pension 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.
We are hoping to come on 9/10/11 April (delete where necessary).

Name.....

Address .....

.....

.....

Tel. No.....

I enclose a cheque/PO for £.....

Please make cheques/PO's payable to CB Radio (Exhibition).

Return to CB Radio Magazine Ltd., Tudor Works, Beaconsfield Road, Hayes, Middx. UB4 0FL.

CLASSIFIED ADVERTS

10 Pence per word. (No minimum or maximum.) Display boxes £13 per 20mm depth (maximum 50 words per 20mm depth). Payment must be sent in advance with order, along with your name and address.

BREAKER BREAK Good Buddy, 10-12. Learn CB Slang with Hypnosis, all you gotta do is get horizontal with your cassette tape and improve your memory. Other tapes available on relaxation, slimming, how to stop smoking etc. £5 each, postage inclusive. Irene Ramsden, BFT, Therapist, Bio Aid Healing Centre, 10 St Thomas Street, Penryn, Cornwall. Penryn 72411.

10/4 ROGER BLEEP latest microchip circuitry, simply fitted to any rig in minutes. Fully tested and guaranteed. £4.99 post free. Cheque/PO to AARON ELECTRONICS, 43 Gourlay Street, Kircaldy, Fife. (0592) 703401. Trade enquiries welcome.

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ONLY £16.00 per 100 INCLUDING DESIGN, ARTWORK, SETUP, PACKING, POSTAGE.

FREE SAMPLES & ORDER FORM ☎ phone 0344 - 84455

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WINSTON CB CENTRE. Everything for the CB'er. Rigs, aerials, power supplies, SWR's, mikes, printed sweatshirts and Tee shirts, button badges, etc. ALL AT SUPER PRICES. Send sae for price lists to Winston CB Centre, 9 Hatton Place, Hatton Garden, London EC1N 8RU. 01-405 0960/4127.

FLAGS, FLAGS, FLAGS. Send one with your next QSL. Union Jack, Irish tricolour, St Andrew's cross or the Welsh traditional, 1½" x 1" on sticks, 50 flags £2.90 inc p&p. Send cheque/PO to Wilcur Enterprises, 35 Woodview, Pinecroft, Douglas, Cork, Ireland.

WE MAY NOT understand what you're talking about but you're welcome at Chacewater Camping and Caravan Park, Chacewater, Truro, Cornwall. The ideal touring centre for the far west. Please send sae for brochure.

CB BREAKERS' LOG. Record you CB copies. Up to 500 entries per pad of 25 sheets £2.99 post paid. Cwo to AVS Enterprises, 238 High Street, Arlesey, Beds.

PVC CAR STICKERS and clothing badges to your own club design. Example 1 gross, 3 colours 35p each plus postage. Includes VAT and all art work. Send for sample. Riviera Displays, Marazion, Cornwall.

FLASHING EYEBALL BADGES. Send handle, £2.50 cash. Sae Rossco Enterprises, The Bungalow, Daldowie Estate, Broomhouse, Uddington, Glasgow. Please wait 31 days.

CB RF power transistors 2SC2092 by Hitachi. Universal direct replacement for 2SC1307, 2SC2029, 2SC2078, etc., 5W @ 27MHz (max 10W) AM, FM, SSB. Special offer 1 x £1.59, 5 x £7.50, 10 x £14.00, VAT inc., 50p p&p any quantity. Sae for our lists of CB transistors, IC's. CB Service Centre, Dept CBR, 245 Stourbridge Road, Halesowen B63 3QU. (021 550) 9324.

OVER 100 CHANNELS from your straight 40 rig with the amazing 'Channeliser'. Simple to fit, send circuit diagram and only £24.95 for quality unit designed for your specific rig. Goodies for multi-band rigs. Extra bands (super low, super high, etc.) £9.95. Continuous tune between channels control (shift) £9.95. Low power facility £4.95. Send diagram and exact requirements. S. Firth, 24 Grasmere Crescent, High Lane, Stockport, Cheshire.

CLUBS. ENGRAVED lapel badges. Club name. Maximum 26 letters, 2 lines, £50 per 100. Black/yellow. Cwo. Newton Engraving, 34 Mill Street, Bideford, Devon.

ACTIVE AUTHOR anticipates breakers will be bursting with funny, unbelievable, crazy stories as legal CB fills airways. Collecting now for publication. Like to hear about them. Give handle for credit. Penpusher, Box 30, CB Radio.

SEND YOUR country flag with your next QXL. Union Jack, Irish tricolour, St Andrew's cross or the Welsh flag. 1½" x 1" on sticks. 50 flags £2.90 inc p&p. Send cheque/PO to Wilcur Enterprises, 35 Woodview, Pinecroft, Douglas, Cork, Ireland.

CAR ALARM and CB protection £8.50! Latest concept in total car security utilising the voltage drop method. Each alarm includes all wire, switch and fitting instructions. Easily installed (no addition to existing car wiring). Monitors doors, ALL electrics, with separate wire to attach to rig, aerial or cassette for additional security. Pulses horn on and off for maximum audible alarm. Fully tested and guaranteed. Fitting back-up or enquiries Tamworth 280187. Send by return, send cheque/PO for £8.50 + 75p p&p to M. D. Haynes, Unit 7, Johndory, Dosthill, Tamworth B77 1NY. Money refunded within 21 days if not delighted.

QSL QTH card rubber stamps. Why buy expensive double-sided cards? With our specially made rubber stamps you can save on the cost of printing and vary the message on every card you send. Send sae for details. M & S Cooper Enterprises Ltd., PO Box 5, Horsham, West Sussex RH12 3SX.

CB TELEPHONE link £25.00. CB 27MHz FM 40 channel de luxe rigs, built to Home Office specifications, direct from factory to you £43.00 plus VAT. Sae for details. Exrental telephone answering machines £49.00. Johnson Electronics, Star Warehouse, Chalk Farm Road, NW1. 01-286 6119, 01-485 3918.

BREAKERS CLUBS: be recognised. UK-made CB club sweatshirts printed with your individual club badge or name. Black, navy, red, denim, green, S, M, L, XL only £5.95 inc. p&p. Minimum order 25. Send sketch and wording with your cheque/PO and name and address to: Burbage Textiles, Unit 1C, Stapleton Lane, Barwell, Leicestershire.

MORSE CODE TUITION AIDS. C.90 Cassette 12 w.p.m. for amateur radio examination. Morse Key and Buzzer unit for sending practice. Cassette (including booklets), £4.75. Morse Key and Buzzer, £4.75. Prices include postage etc. MH ELECTRONICS (Dept 7), 12 Longshore Way, Milton, Portsmouth PO4 8LS.

AMAZING ELECTRONIC PLANS. Laser – super powered, burning, cutting, rifle, pistol, light shows, ultrasonic force fields, satellite, TV, super giant Tesla, solid state rocket, super fireworks, surveylance, many more. Catalogue 75p. PLAN CENTRE, 16 Mill Grove, Bilbrook, Codsall, Wolverhampton.

QUALITY LEATHER belts, brown or black. Handles or slogans stamped on. Please send cheque or postal order of £6.50, stating waist measurement, to G. Haines, Compron House, Mariners Drive, Sneyd Park, Bristol BS9 1QJ.

CB RADIO REPAIRS. Repairs to most rigs, burners and accessories. We also stock rigs and accessories and offer technical advice on your needs. A good range of colour TV's are available from £60. Access and Barclaycard taken. Sydenham TV Centre, 4 Wells Parks Road, Sydenham, SE26. 01-291 1435.

EYEBALLS, EYEBALLS, EYEBALLS! Sensational new fun craze to celebrate legalised CB! Real BREAKERS' EYEBALLS car mascots! Eyeball your good buddies – surprise the seat cover! SEEIN' IS BELIEVIN'! A REAL EYE OPENER! A wunderbar Christmas gift! Exclusive to use – cannot be obtained elsewhere! Handmade, safe and hygenic. ALL colours supplied. Send only £4.50 for your pair of "BREAKER'S EYEBALLS", p&p free! State colour – Roger? Also available – hilarious "CB Cyclopse", the one-eyed wonder £3 p&p free! IT'S GOTTA BE SEEN! Discounts for CB clubs, sae for details. Trade enquiries welcome – top line for garages – toy, CB, custom stores. Everybody wants an eyeball, don't be seen without one! Fayblack Designs, 7 Balfour Road, Ilford, Essex IG1 4HP.

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27MKz CB TRANSCEIVER. Build your own five-mile range two-way transceiver (subject to Home Office licence). Printed circuit board. PCB overlay. Circuit diagram. Electronic components. Components list. Construction plans. £17.95 each + 50p p&p. Vox switch (voice operated). Ready for us. NOT A KIT. £14.50 + 35p p&p. Mike Dean CB, 29A Oakmead Road, London, SW12.

SWITCH TO FM with our add-on circuit board. Full mounting kit including switch £11.50 or sae for details from Bingham and Broadhead, 43 Station Road, Chapeltown, Sheffield S30 4XE.

EMBROIDERED CLOTH BADGES. Made to order. Suitable for any sport or activity. 3¾" diameter, black background – CB club – darts team – league, etc. (around the perimeter) – CB handle – player's name, etc. (in the centre). Top quality. Washable. No minimum quantity. Send £1.50 per badge, 2/3 weeks' delivery. Plastic pin on eyeball badge 85p. Binders Badges, 3 Abbey Passage, Spalding PE11 1DD (0775/5834).

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10p each (quantity discount available)
Suggested Retail Price 25p each.

SEND FOR DETAILS OR ORDER s/s THIS MAG.

Ten days delivery on all orders.

THE CB MODIFICATION HANDBOOK is crammed with previously unpublished up-to-date information on the world's most common CB radios. Everything from 'a few extra channels' to full-house pirate conversions covering over 5MHz. Information includes slides, broadbanding, 5KHz steps, increasing power, etc. An absolute must for any serious pirate or DX-er. Price £11 including registered airmail. The Linear Amplifier Handbook has 13 complete sets of transistor amplifier plans. HF, VHF, UHF, from 15 watts to 1,000 watts. Complete parts lists, circuit descriptions, component layouts and full-scale printed circuit negatives. £12.00 including registered airmail. This is not a rip off. We guarantee delivery. (We've been at the same address since 1969. We're not planning any sudden trips to Brazil with your money). If sending cash, use registered mail for your own protection. South Pacific Radio, PO Box 500, Fortitude Valley, Queensland, Australia 4006.

"HEY, WANT to protect your rig?" Want to protect your handle? Turn to page 15 and read about CBHR.

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Look at other importers prices, if you can buy the same product for less than our list price, PROVE IT!
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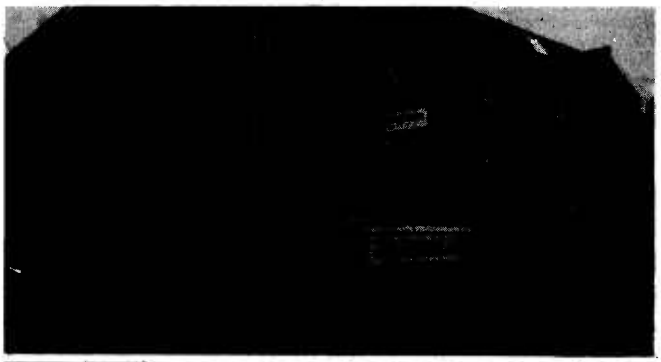
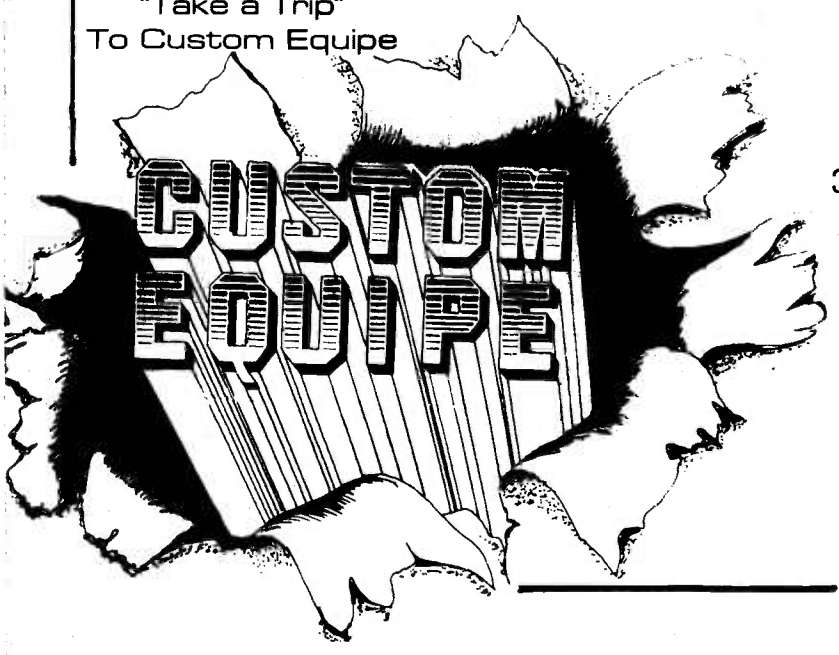
over 44,000 square feet packed with stock, at :-
38 GARDNERS CRESENT, EDINBURGH.




EXPRESS DELIVERY BY OUR OWN FLEET

"Take a Trip"
To Custom Equipe



SUPPLIERS TO THE TRADE
AT THE LOWEST UK PRICES
TRADE ENQUIRIES
TO OUR WAREHOUSE AT:-
38 GARDNERS CRESCENT,
EDINBURGH.

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

1. It's more expensive...

£29.95 suggested retail vat included

And when you pay more, you expect more!

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

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

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

*Including optional mounts at extra cost.

2. It's made better...

3. It's proven best!

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

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

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

PERSONAL COMMUNICATIONS: "... an impressive 95% of the trials, the K40 out-performed the existing mobile antennas. We had to try one for ourselves.
"... in every case, the K40 either equaled or out-performed its competitor.
"No ifs, ands, or buts! The K40 Antenna from American Antenna would have to be just about the best antenna around.

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

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

ANTENNA SPECIALISTS: "... truck driver and CB'er for 10 years ... 50% further than my M410 'Big Momma'."
—J.H. Collett, 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, Monserrante D-67, Salinas, Puerto Rico

PAL: "... 20% better in transmission and reception than my 5/8 wave Pal Firestik."
—John A. Blum, Box 446, Zelienople, PA

SHAKESPEARE: "... I've been a CB'er for three years and the K40 is the best I've ever had. Better in reception and transmission than my Shakespeare."
—H. Bachert, Jr., 15 King Rd., Park Ridge, NJ

HUSTLER: "Compared to my Hustler XBLT-4, the K40 can consistently transmit 40% further and the reception was better. The K40 is the perfect way to complete a CB system."
—Jerome R. Brown, 7800 S. Linder, Burbank, IL

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

DOUBLE GUARANTEE

GUARANTEE I: The K-40 will transmit farther and receive more clearly than the antenna it replaces or the customer will receive a prompt and full refund from the Registered K-40 Dealer who installed and tuned it.

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

(SPECIAL NOTE) IF YOU'RE A BEGINNER:

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

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

K40 POWER!

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


POWER
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LOW
HIGH
SSB
AM
ON
POWER AMPLIFIER
KLB-110
RX.
PWR. LEVEL
MODE
POWER
Linear Power Amplifier
CP-100
ON
AM/FM
HIGH
ON
AMP
ON AIR
PWR.
RX. AMP.
SSB
LOW
POWER
Linear Power Amplifier
CP-163X-II
LOW
MED
HIGH
RX AMP
ON AIR
PWR.
ON
AM/FM
ON
RF POWER LEVEL
RX. AMP.
SSB
POWER
from OCT for your nearest stockist ring 0476 76928