

# THE FIDELITY GUIDE TO LEGAL CB

BY BILL  
CURTIS

## Gets you on the air and keeps you there!



- Uses of CB
- Choosing a rig
- How it all works
- How to modulate
- Installation
- Fault finding
- SW Ring
- Jive talk
- Many, many more topics

95p

# **THE FIDELITY GUIDE TO LEGAL CB**

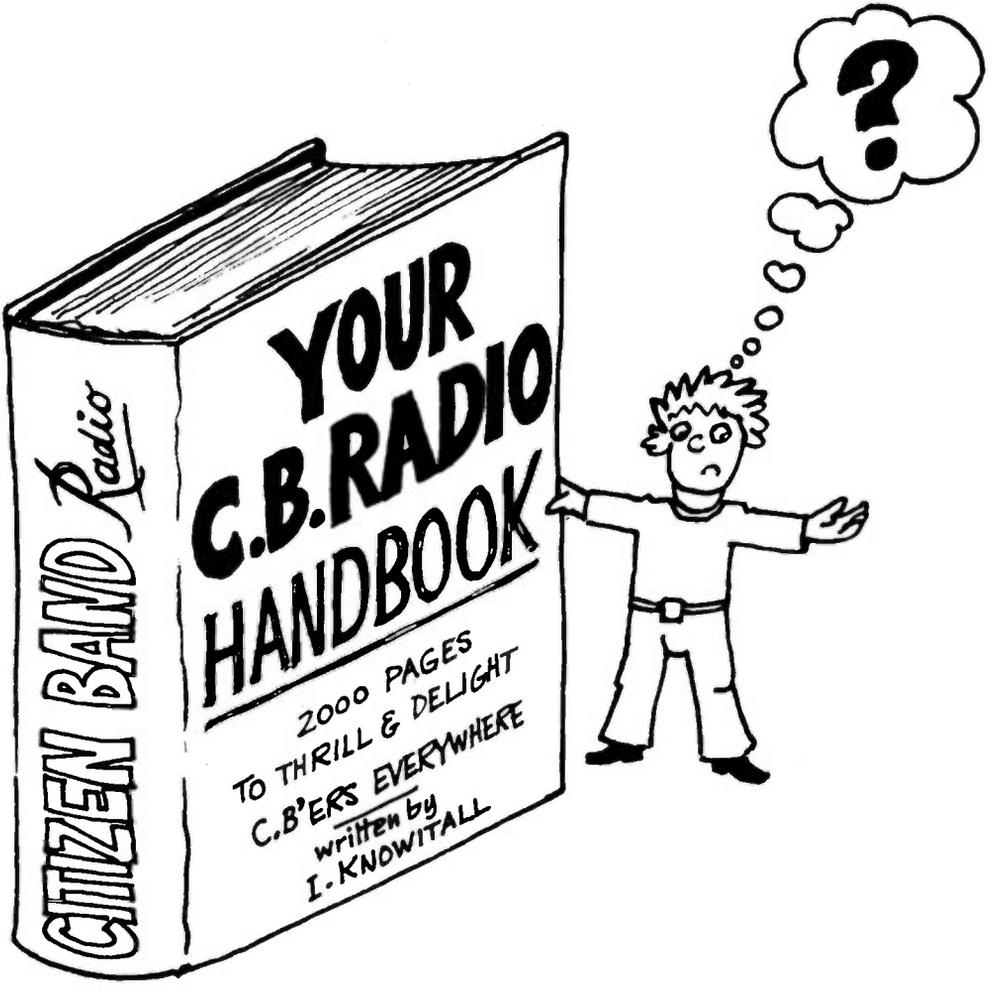
**BILL  
CURTIS**

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# CONTENTS

1. Introduction & The Uses of CB .....	3
2. History of CB .....	5
3. Choosing a rig .....	9
4. What do all the knobs do? .....	12
5. How it all works .....	15
6. On the air or how to modulate .....	22
7. Installation (Mobile) .....	24
8. Are you being interfered with? .....	30
9. Installing a Home Base* .....	31
10. The mystical art of S.W.R.-ing .....	36
11. Basic fault finding .....	41
12. Bolt on Goodies .....	45
13. Jive talk .....	48
14. The 10 Code .....	50
15. Technical Glossary .....	51
16. Technical Specification of legal 27 MHz system .....	54
17. Phonetic Alphabet .....	55
18. Legal Channels/Frequencies .....	56
19. Illegal Channels/Frequencies .....	57
20. Log Book .....	58

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## INTRODUCTION & THE USES OF CB

Welcome to the wonderful world of CB. It's been around in the States and most of Europe for some years now, and this adds up to many millions of dedicated users. Prior to legalization, there were approximately 1/2 million illegal operators in the U.K. alone. Despite heavy fines, adverse press publicity and harassment by Buzby, the police and customs, nothing could stop it becoming a reality in this country.

### **So what can CB do for you?**

Lots. It's probably the most exciting motoring accessory since the invention of the reclining seat! With a CB set in your car, you are part of a nationwide traffic information service, which is both instant and accurate, because one call from a motorist surveying the scene, advises all other breakers where the hold up is, and how to avoid it.

If you are looking for an address in a strange town, any local breaker (CB operator) can direct you to your destination using his local knowledge of the area. If you break down late at night, miles from civilization, you can call for help—and get it too!

But CB isn't just a useful tool, it's enormous fun as well. You will talk, and eventually make friends with people you have never met. CB will do wonders for your social life.

Then CB has its responsible side. It helps the old and lonely keep in touch. It keeps the house-bound in contact with those who care. It provides a quick and reliable method of contacting the emergency services (via a special channel 9 service) which is monitored in most areas 24 hours a day.

### **Consider the business uses**

Farmers, service engineers, driving schools, journalists, the list is endless, all will find CB indispensable. Don't forget boats, and other small pleasure craft cruising the rivers and coasts whose operators find the cost of expensive ship to shore equipment prohibitive.

So once more, welcome to the wonderful world of CB. Whether you are a newcomer or an experienced breaker, I am certain you will find this booklet an essential aid to getting you on the air, and keeping you there.

Keep modulating—Bill Curtis.



## THE HISTORY OF CB

The roots of British CB are intertwined with successive Government's unsuccessful attempts to silence independent radio of any kind. I suppose it all started in Europe with 'Radio Veronica'. 'Veronica' was launched onto an unsuspecting Dutch Government by a group of entrepreneurs, who realised that what the people needed was far from what the Dutch Government was dishing out. The problem was, (you've guessed it), that commercial broadcasting was illegal, so they fitted out a ship with studios, transmitter etc. anchored just outside territorial waters and started to transmit non-stop pop to see what happened.

The response was enormous. People loved the station and advertising revenue simply poured in. In Britain we had 3 radio services, none of which entirely catered for the pop fraternity, Radio 1 had not even been thought of and commercial radio was dismissed as unnecessary. But, following the success of Veronica, it took little time for British 'ship-born' Pirate stations to appear. The first, and amongst the most successful was Radio Caroline. Within months, literally dozens of pirate ships ringed the U.K. beaming out all kinds of popular music. The British Government had been caught out. People loved the stations and refused to stop listening to them, despite dour warnings of prosecution by the Home Office. An interesting point to note, is that the same excuses used against the Pirate Radio ships were later used against CB. These were interference, lack of radio space and cost of policing etc.

Meanwhile in the good old U.S.A. where commercial radio had been operating since Marconi was a lad, CB radio was already a fact. The Government introduced it as a matter of course. They argued that CB was harmless and furthermore, it might prove popular (the understatement of the year) so why not let the people use it?

Now at that time silicon chips were only a dream, the only frequency that was both available and just technically feasible was 27 MHz. Right from the very start it was appreciated that this was a compromise decision as far as frequency was concerned. The problem with 27 MHz is that during certain times of the day and particularly during the eleven year sun spot maximums, transmissions intended for only a few miles away have a habit of turning up thousands of miles away. Although this can be good fun on occasions, as more and more people switched onto CB in the States, it became a nightmare. Channels became blocked and people resorted to boosting their output to blast their signals through. This of course created even more interference.

However, despite its technical drawbacks, 27 MHz became internationally accepted as the CB Band and presently we are stuck with it.

It was when the energy crisis struck the States that CB really took off. Suddenly gas became hard to find even in Texas!

The American Government introduced a mandatory 55 m.p.h. speed limit. Immediately CB became a useful tool not only for locating garages for gas, but for dodging those 55 m.p.h. speed traps.

Meanwhile back in the U.K. the British Government not noted for its

liberality in broadcasting matters, promptly banned CB. This curious piece of legislation made it illegal to use sets, but perfectly legal to own, or sell them. So around the mid 70's the odd CB set began to get smuggled from across the Atlantic and women with curiously shaped square breasts began hopping off Jumbos from the States.

In those days getting a reply from anyone in the U.K. was actually harder than D.X.ing to the States. But gradually the build-up began. Generally speaking the police had better things to do than chase illegal CB breakers around the country, and as they had to catch them in the act (so to speak) left them alone. Although CB was growing fast, the band of illegal users was still small and most people didn't know it existed.

Programmes on British TV emanating from the States built up the British public's awareness of the subject. But still only a small band of breakers enjoyed their illicit fruits.

That was until two things happened. Firstly came a record called 'Convoy' by C. W. McCall.

The language was weird, the song a little weak, but boy, did it do a great P.R. job for CB. Suddenly the media started talking about 'Cab—over—pete' and explained that the 'reefer' he had on, had nothing to do with drugs, but was CB lingo.

The media became interested in CB, and a whole new sub culture caught the imagination of the British youth. Overnight everyone wanted CB, everyone, except of course the British Government. They quickly dusted down the familiar excuses that were used against commercial radio, but it was too late. By the early 80's there were already around a million breakers on the air and once again the Government had been caught.

Despite screams of anguish from the Post Office and even bigger screams from the Home Office, the Government instructed the Civil Service to "look into the matter" and announced that they would circulate draft regulation shortly.

Naturally everyone started buying rigs like mad, and CB shops started springing up all over the place. Although supposedly selling accessories only, many were offering a vast array of American rigs under the counter.

The Home Office's draft, issued in a green paper which came out late 1980 entitled "Open Channel—a discussion document" came as a big shock to everyone. They suggested a frequency that was so high, most manufacturers didn't even know it existed.

The cost of producing rigs on the suggested frequency 934 MHz would be around £200-£300 and as the range would be little further than shouting distance, rallies were organised, demonstrations ensued and questions were asked in the House.

Finally after wavering around 22 channels  $\frac{1}{2}$  watt, they announced the system as we know it now. To save face they suggested the 27 MHz system should run in tandem with the higher, far more costly 934 MHz system.

To be fair as the silicon chip explosion continues, with its simplification of circuits, 934 will eventually become feasible and doubtless when technically possible, will offer a first class service.

**Table giving a comparison between various UK, European & USA CB Specifications**

	UK	USA	Denmark	France	Germany	Holland	Norway	Spain	Sweden	Italy
<b>No of Channels</b>	40	40	23	22	22	22	22	10	24	.
<b>Max. permitted RF Power</b>	4W	4W	0.5W	2W	0.5W	0.5W	0.5W	0.5W	3.5W	.
<b>Frequency Band MHz</b>	27.60— 28.0	26.965— 27.405	26.96— 27.23	26.96— 27.23	26.96— 27.23	26.96— 27.23	26.96— 27.23	27.035— 27.205	26.96— 27.26	.
<b>Channel Spacing</b>	10 KHz	10 KHz	10 KHz	10 KHz	10 KHz	10 KHz	10 KHz	10 KHz	10 KHz	.
<b>Max radiated RF Power Int. Antenna</b>	2W	—	0.1W	0.4W	0.1W	0.1W	0.1W	0.1W	0.7W	.
<b>Frequency Tolerance</b>	±1.5 KHz		±1.5 KHz	±1.5 KHz	±1.5 KHz	±1.5 KHz	±100 Hz A3A ±1.5 KHz	±1.5 KHz	±1.5 KHz	.
<b>Modulation Method</b>	FM	AM SSB	AM FM	FM	FM	FM	AM FM SSB	AM FM (AM recommended)	AM FM SSB	.

The benefits of FM as against the American AM system are overwhelming. Apart from producing better sound quality than AM, interference is virtually eliminated and most of the crackle and buzzing that spoiled the AM system is cured by FM. Furthermore, breakers can share the same channel at the same time without causing interference to each other.

\*Anything Goes

I'LL HAVE THE ONE  
WITH THE PRETTY  
SILVER KNOBS...



## CHOOSING A RIG

Buying a CB rig is not like buying a hi-fi unit. Unlike hi-fi units which all vary in their output, your CB unit is legally governed to 4 watts. So most rigs will transmit the same power. Therefore the choice must depend on reliability, ease of use, price and cosmetic appeal. However, there are a few fundamental points you must get right.

### Mobile or Base?

Mobile units are designed to work off D.C. battery supplies of around 12 volts. Firstly, *the most important thing to get right is polarity*. Most units and cars are of the negative earth variety, *but not all!* Some units are switchable between negative or positive earth, or will work wired up either way, dependent on polarity of installation. But if you get it wrong, reach for your cheque book, because when you throw the switch you will get a lot of smoke, but very little sound. To check the polarity of your car, look at the battery connections. If the black terminal marked – is connected directly to the frame of the car, you have a negatively earthed vehicle. If the red terminal is connected to the frame or chassis of your vehicle, you are positively earthed. If you are in any doubt about it, then check with a garage.

*Make sure* the CB unit (rig) you are thinking of buying is compatible with the polarity of your car; the instructions or box will tell you. If you are buying a second hand rig, look on the back of it. If its says negative earth only, you will not be able to use it in a positively earthed vehicle without extensive modifications.

### Glass fibre vehicles or boats.

Generally speaking the polarity of the rig is unimportant to you because you connect it up directly to the battery.

### Base stations

Plug directly into the mains and are designed for home use only. Some base stations have a 12v D.C. socket as well as a mains socket. This can be handy if the mains supply fails to your home and you still want to stay on the air during an emergency (flooding, storm etc.) Any mobile unit can be easily converted to a home base by the purchase of a suitable power supply. (See page 31.)

Look for a brand you know and can trust. After sales service will be more important to you in five years time. Some manufacturers may not be around then! Insist on a demonstration of any unit you are thinking of buying and check the following points. Is the microphone comfortable in your hands? Some microphone buttons require quite a push to switch them on, and it can get very tiring during long modulations. Check that the mike plugs firmly into the unit and will not come loose. Better rigs will have a locking screw to stop the plug pulling out mid-modulation.

Naturally you cannot expect hi-fi sound, but check the size of the speaker by looking at the speaker grill. Cars are very noisy places and quite a lot of

volume is required to hear weak stations clearly.

The squelch control is very important, particularly on FM. As we said before it reduces unwanted noise and hiss between transmissions by blocking incoming signals until they reach a certain strength to break through. Some squelch controls have a habit of making a nasty plopping sound as they switch in and out, so check it by turning the control up and down with the volume turned off. If you hear a click through the speaker every time you vary the squelch control, be warned. After a time it can get very irritating!

## **Specifications.**

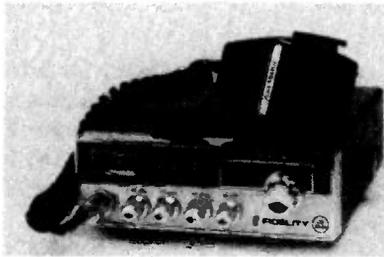
Some of the most important things to check are unfortunately “under the lid” or inside, where you can’t see them! So this is where the manufacturers specifications data becomes essential.

Spec’ data will tell you how sensitive the receiver is to weak signals, how it reacts to interference, and many other essential points, that you can’t tell by just looking at it.

All legal rigs must have the official “27/81” circular logo stamped prominently on the front panel (beware stuck-on labels). This will mean that many of the specifications on all rigs carrying this stamp are governed by law. Particularly those that deal with interference to T.V. radio etc on the transmitter side. However all the government is interested in is ensuring you don’t create a nuisance, so don’t be conned into thinking all rigs carrying the stamp are going to operate to the same standards—They don’t, some are better!

## **Understanding specifications.**

The specifications quoted here refer to the Fidelity CB 2000. Which are amongst the best you will find. (Honestly.)



## **R.F. Output power—4 Watts.**

Legally governed to a maximum of 4 watts. But watch out, some very cheap rigs may only transmit out 2 watts or less, so check it out, just in case.

## **Modulation depth (capability)—100%**

Tells you how loud the unit will sound on the air. The word “capability” is in brackets because naturally if you whisper—only a whisper will be heard.

### **Frequency stability—0.005%**

This one is governed by law, and very tight it is too. It tells you how little the set will drift off channel. 0.005% is almost nothing at all!

### **Spurious emissions—50 Nw**

Again legally governed but worth looking at, because it will tell you how much or little interference you are likely to cause to other frequencies, such as T.V. and Radio etc. The lower the quoted figure, the less it will be.

### **Sensitivity—1 microvolt @ 20 db S/N.**

Indicates the weakest signals that the set is capable of hearing. The first figure tells you how weak the signal can be, the 20 db S/N (signal to noise) tells you how loud it will sound, compared with the background noise. Thus 3 microvolts @ 20 db is not so good as the quoted figure.

### **Adjacent channel rejection—50 db.**

If you are tuned to channel 14 you do not want to hear what's going on, on channel 15. This figure will tell you how little will break through. 50 db is excellent, and better than say 40 db.

### **Audio output power—2 watts.**

Tells you how loud the rig will sound with the volume set to max. Anything less than 1.5 watts, may not be heard in some cars!

### **Squelch sensitivity—0.7 to 1000 microvolts.**

The sensitivity of the squelch control is very important. Having set it to remove all the background hiss, you don't want to miss any calls for you as you drive around, because it will not open up. Thus the lower the figure the better. Anything less than 1 microvolt is very good, anything more than 5 microvolts is undesirable.

### **Current drain @ 13.2 v—Transmit 1.5 amps/Receive 1.2 amps.**

This will give you a rough idea how much juice your rig needs to keep it alive. Most CB units use very little power. For instance, a 30 amp hour battery will run a 1.5 amp rig for around 20 hours on transmit.

### **Polarity—Reversible and protected.**

This is the type that will work either on positive or negative earth installations provided you wire it up the right way round.

Negative earth installations—black wire to ground.

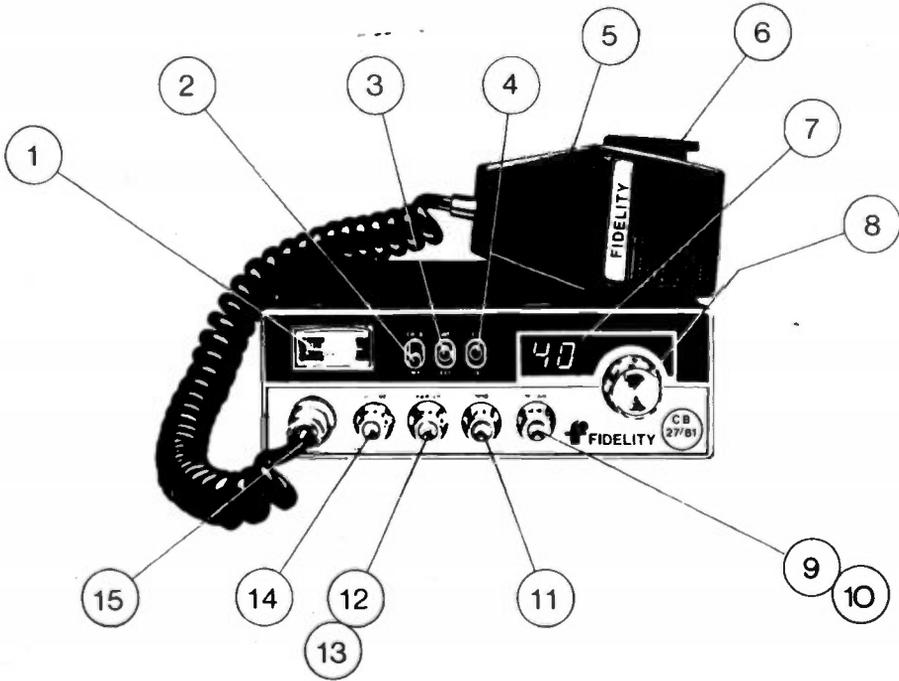
Positive earth installations—red wire to ground.

The protected bit comes in if you get it wrong!

A protected rig will not "burn out" if you make a mistake. The other type will.

## WHAT DO ALL THE KNOBS DO?

Some knobs are essential, others handy. A few, frankly, you will never need. So let's sort the wheat from the chaff.



## CONTROL IDENTIFICATION

### Control identification

- |                             |                           |
|-----------------------------|---------------------------|
| 1. Signal Strength Meter    | 9. R.F. Gain Control      |
| 2. Channel 9 Switch         | 10. Mike Gain Control     |
| 3. Internal/External Switch | 11. Tone Control          |
| 4. Dimmer Switch            | 12. Squelch Control       |
| 5. Microphone               | 13. P.A. Switch           |
| 6. P.T.T. Switch            | 14. On/Off Volume Control |
| 7. Channel Indicator        | 15. Mike Socket           |
| 8. Channel Selector         |                           |

## **Channel Selector (8)**

Dials up the channels you transmit and receive on.

## **Channel Indicator (7)**

Displays the channel number you have just dialled up! Usually an L.E.D. display (some have a manual (4) or automatic dimmer to reduce glare. Handy but not essential).

## **On/Off Volume (14)**

We have met this one before, but it is worth mentioning that turning it up has no effect on the volume of the TRANSMITTED signal.

## **Tone (11)**

Again has no effect on the transmitted signal, but can be useful for reducing whistles and crackles when receiving.

## **Squelch (12) (*what a super word!*)**

Nice one this. It reduces unwanted noise and hiss between transmissions. The further you turn the squelch up the stronger the signal will need to be to break through. (Essential).

## **R.F. Gain (9)**

R.F. stands for Radio Frequency, so this control enables you to vary the sensitivity of your receiver, to fade out distant interference. (Very handy).

## **Signal Strength Meter (1)**

Usually calibrated 0-9, it gives an indication of the strength of signal of incoming calls. Breakers call it poundage. The higher it reads the stronger the signal. Some meters also show output, when transmitting—thus giving you a rough idea of how much of the available power is leaving the rig. (All handy stuff).

## **Power Mike Gain (10)**

You will soon discover that some strong incoming signals, say 8 on your signal strength meter, may not be as loud as others that read only 2. The fact is that some people speak louder than others, so although their signal is weak, their volume is loud. Turning up your mike gain control, keeps your volume up as well, particularly on long distance calls. If you turn your mike gain up too high however, some distortion will begin to creep in. Fellow breakers will soon put you right. This is the only control that affects your transmission quality. (Very handy).

## **Deltatune/Clarifier (-)**

A kind of fine tuning control that makes the receiver drift to pick up any off channel signals. Modern technology and the system used in this country make this control virtually useless. (Give it a miss).

### **Channel 9 (2)**

Handy if you are accident prone because it switches you directly to the distress channel. (Looks good).

### **P.A. Switch (13)**

Public address switch. Pumps your signal out to an extension speaker/horn which is usually mounted under the car bonnet—thus you can yell as well as hoot. (Can be the prelude to a punch up!).

### **Internal/External Switch (3)**

Switching to an extension speaker definitely improves the clarity of received signals. (Well worth looking for).

### **Mike Socket (15)**

Some mikes (5) simply plug straight in. Better ones have a screw which stops the plug from falling out. This they have a habit of doing in mid modulation, thus cutting you off mid-stream. (Can be painful).

### **P.T.T. (6)**

Press to transmit and release for reply. (Simplicity).





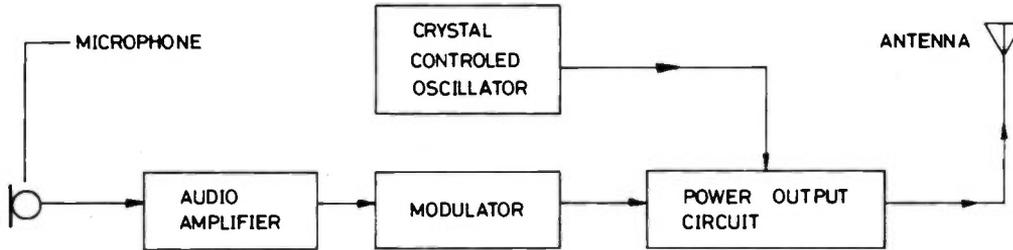
## HOW IT ALL WORKS

You don't have to understand your rig to make it work but to get the best out of it you will find it helps! So here goes—Let's start with your mike.

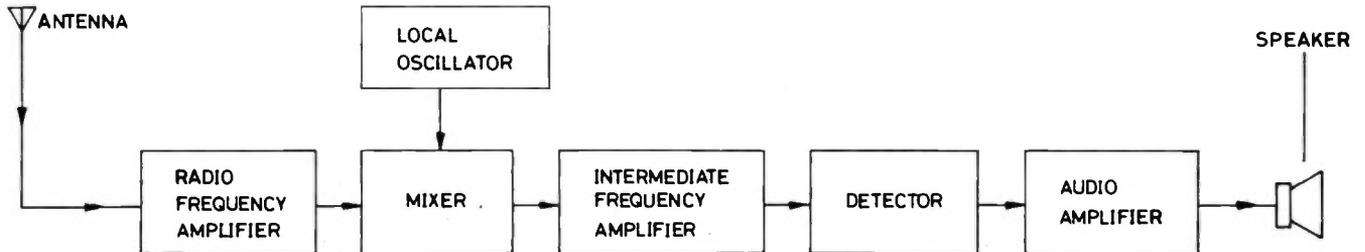
Inside is a small crystal—(we'll be meeting more later) which has the wonderful benefit that every time you clout it, out comes tiny electrical pulses. The faster you clout it, the faster the pulses come (this is handy!). The vibrations of your voice, rattle a little plate in your mike. This rattles the crystal which obligingly pulses an electrical pattern of your voice, down the wires to your rig. If you shout too hard the crystal gets punch drunk and you will sound distorted.

# CB TRANSCEIVER BLOCK DIAGRAM

## TRANSMITTING



## RECEIVING



## **Into the rig**

Now those pulses from the mike aren't very big, so the first thing to do is to make them larger before we lose them altogether. This we do in the audio amplifier. Here, a handful of transistors, or possibly an integrated circuit, bump up the strength of the pulses but keep them the same distance apart (frequency).

If you plugged in a suitable loudspeaker just past your audio amplifier you would hear your own voice only louder. So this is where your public address picks up from.

## **The Modulator/Oscillator Sections**

The next stage is to get your pulses mixed with some very fast 27 MHz type pulses to get your voice out and on to the air. These high frequency vibes emanate from another crystal situated in your oscillator stage. Now as we know, crystals create electrical energy when vibrated. If you cut your crystal and nudge it with a burst of current, it will vibrate out exactly the frequency you wish to transmit on i.e. 27 MHz or 27 million vibes per second (some vibrator eh!)

These vibes from your oscillator section are controlled by your channel selector which uses all kinds of devious circuits to synthesise all 40 channels from as few crystals as possible.

So now you have 2 signals to mix together before despatch via your aerial; the signal from your mike and the vibes from your oscillator which represent your chosen channel for transmission. The trick is to reproduce your voice pulses as a slight variance in your transmitted frequency (page 20/21 explains this).

The first trace is the output from your microphone. The second trace is the output from your oscillator section. The fourth trace is the result of the two having been mixed together. Notice how the waves are compressed or increased in frequency as you speak, they will return to their regular carrier pattern between words. Your voice has been imprinted on the carrier wave of the frequency you wish to modulate on, by slight variances of its frequency, thus the phrase—frequency modulation.

## **Power Output**

Now all this mixing and messing about takes a lot of puff out of your signals so the next stage is very similar to the audio amp section, except that it is designed to boost up high frequency signals. These signals are really trapped radio waves looking for a means of escape so this section may have a metal screen round it to stop them leaking away. Next, the suitably boosted signals fly out of the inner contact of your aerial plug and the outer braid of your co-ax cable stops them from leaping out into space as they hurtle up to strike your aerial.

## The Aerial Concept

Houses these days are littered with aerials, TV, Radio, CB etc etc. The first thing to notice is size. TV aerials are small, radio aerials larger—why? Answer—resonance. TV signals are generally transmitted at a much higher frequency than radio, thus the aerials resonance length is less. If you take a wine glass and  $\frac{1}{2}$  fill it with water, wet your fingers and run it round the rim, eventually it will start to resonate and send out a note. What you may not have known is that if you fill another wine glass and get it to whistle at the same note, everytime you start one glass off, the other will obligingly join in.

Your aerial is the same. It has to be the same electrical length as the wave length of the signals it is designed to transmit or receive on, or a suitable fraction i.e. half wave, quarter wave etc. So when you SWR your aerial and adjust it, what you are in fact doing is fine tuning its electrical length to that of the signal it was designed to transmit and receive on.

## The Return Journey

Now our signals are out in free space radiating at the speed of light towards the person you are modulating with. Each CB aerial they pass gets a little signal induced into it. This signal passes down the inner co-ax cable and on the return trip the co-ax braid helps protect the tiny signal from any local interference. Many of the components we met going out are now re-used coming back.

We first pass into the RFA which boosts up the tiny signal. We next pass into the mixer stage.

Frequencies that vibrate at 27 million per second are pretty hard to handle so by stepping the frequency down to 455 thousand per second we can deal with them a bit easier. Once again we give them another boost in the IFA, which also filters out all the unwanted channels and frequencies that also came down your aerial.

## The Detector

Now we are nearly done. This stage discards the high vibes and allows your voice pattern only to come through to the final stage which is probably the same audio amp we met on the way out. Here your signals are beefed up once more and fed out to your loudspeaker which turns those electrical voice patterns back into sound vibrations which are detected by the most complicated circuit of all, your brain.

There are other methods of mixing your speech patterns around with the radio wave, so just to finish things off let's explain these.

## **AM**

With the FM system we saw how varying the frequency of the radio wave carried your voice patterns. On AM the frequency remains the same, but the depth of the modulation varies (see page 20).

As you can see, on the AM system, the signals stay the same distance apart (same frequency) but their strength or amplitude varies, thus the phrase amplitude modulation.

## **S.S.B.**

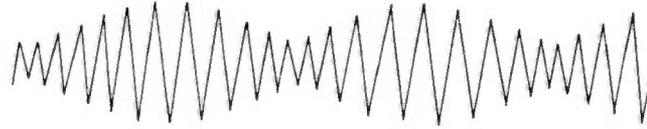
This takes the whole thing one stage further. It's pretty obvious that the bottom of each wave form (see page 20) is exactly the same as the top. So transmitting both halves i.e. top and bottom, must require more power and space in the radio spectrum. So why not suppress the bottom or top of the wave form and concentrate all the available power on only this bit. The result is called Single Side Band or Suppressed Side Band (SSB for short). Here the receiver has to add the missing side band (upper or lower) by beating another wave against the received signals, and the missing component of the waves, upper or lower, are fed in. It's called B.F.O. or Beat Frequency Oscillator.

This is why tuning SSB station is so tricky. The added B.F.O. wave form has to match the received signal exactly or else it all sounds Donald Ducky.

Both AM and SSB transmissions for CB used in this country are illegal, but you may just encounter them! (naughty, naughty)

When all is said and done FM is the better form of modulation for local communications. It is less susceptible to ignitions, static, etc. It has a better frequency response or fidelity of sound and is far less likely to produce spurious interference on nearby radio, hi-fi or TV etc. and that is why it was chosen.

### 3 AM MIX



### 4 FM MIX

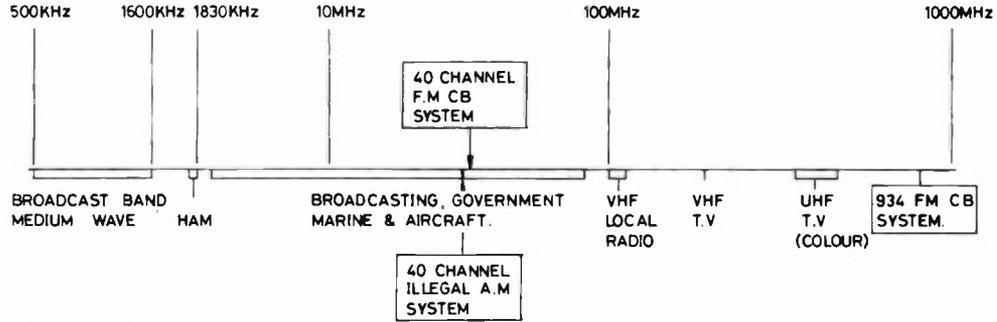


### 5 SIDE BAND TRANSMISSION (UPPER)



The audio signal trace represents the output from your microphone. The blank carrier wave is the frequency that you wish to transmit on. With the resulting AM mix a picture of the voice pattern is impressed on the carrier wave by varying its amplitude. However, the waves stay the same distance apart, thus the frequency stays the same. With FM modulation, the waves do not vary in amplitude, the microphone signal has been imprinted on to the carrier by variances of the actual transmitted frequency. The final side band trace is the same as the AM mix, but with the bottom half missing. Both AM and Side Band transmissions are illegal in the U.K. because of the interference they can cause.

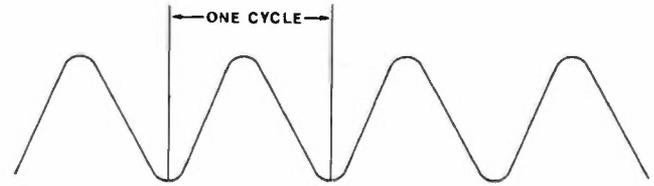
# FREQUENCY ALLOCATIONS (simplified)



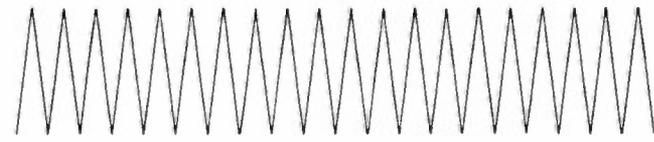
(NOT TO SCALE)

## TYPES OF MODULATION CHART

1 AUDIO SIGNAL



2 CARRIER



## ON THE AIR OR HOW TO MODULATE

The time has come to really start modulating. Now doubtless you have been listening or earwiggling around the channels for some time, but just in case you are not quite sure, here is how to get started.

Firstly—DON'T WORRY—Everyone but everyone is mike shy at first. Most breakers will be only too pleased to help you through. After all, they wouldn't be there unless they wanted to talk back to you O.K.!

If you turn your squelch just beyond the point the hiss disappears you're ready to start. Everything begins on the calling or breaking channel which is usually 19 or 14. So dial these up first and listen if you hear '19 for a copy' or '19 for Frogman' you are on the right channel. If not try 14. In which case calls will be prefixed by 14. Forget the lingo at this stage. Most people, as they progress, don't use it. Now you have a choice. You can either wait for someone to call out for a copy (a talk to anyone) and reply, or be brave and call out yourself.



Let's be brave. Clear your throat, press the mike key and say, in your normal voice "19/14 for a copy". Now don't expect an instant reply but listen out for "Breaker looking for a copy" or "Bring it back breaker". The magic moment has arrived, but don't start chatting yet, as you are still on the breaking channel. Now it is up to you to reply, suggesting a channel to talk on. For example you might say "Roger take to 25" to which the usual answer is "See you there" or "25 rolling" Now you zip up to channel 25 and say "On Channel" and you are away.

## **Courtesy**

"Breaker on the side" is the phrase you will use if you wish to interrupt or join in with an existing conversation. Wait for a natural break, before you try, or you will be ignored. Likewise if someone tries to break in on your modulation it is common courtesy to advise him to come in or stand by, rather than simply ignore him. Pests tend not to go away unless told to.

# **BASIC RULES**

- (1) Never talk on channel 9, unless you are in an emergency situation. This is reserved entirely for emergencies so KEEP OFF, if possible keep clear of 8 and 10, either side of it.
- (2) Keep the breaking channel clear. No one wants to hear your voice and especially mine droning on whilst they are waiting for someone to call them up.
- (3) Never use bad language over the air. This gives us all a bad name.
- (4) By all means give out all the details you can on radar traps, but don't go round broadcasting the position of every police car in town or else you may alert villains. The police may be stopping people to search for drugs, stolen property etc.
- (5) Do put out any information on traffic snarl ups you know about.
- (6) Finally—remember although its nice to modulate as you transportate, don't take all your concentration off the road.

Above all, remember CB is a local form of communication for fun and recreation. Don't abuse it.

## INSTALLATION (Mobile)

### Basic Requirements

- Electric Drill
- Insulation Tape
- Solder Iron
- Rubber Gromets
- Patience!

If you can fit a 13 amp plug or change a wheel, you should have no difficulty in installing your rig into your car. The first stage is to start with the aerial.

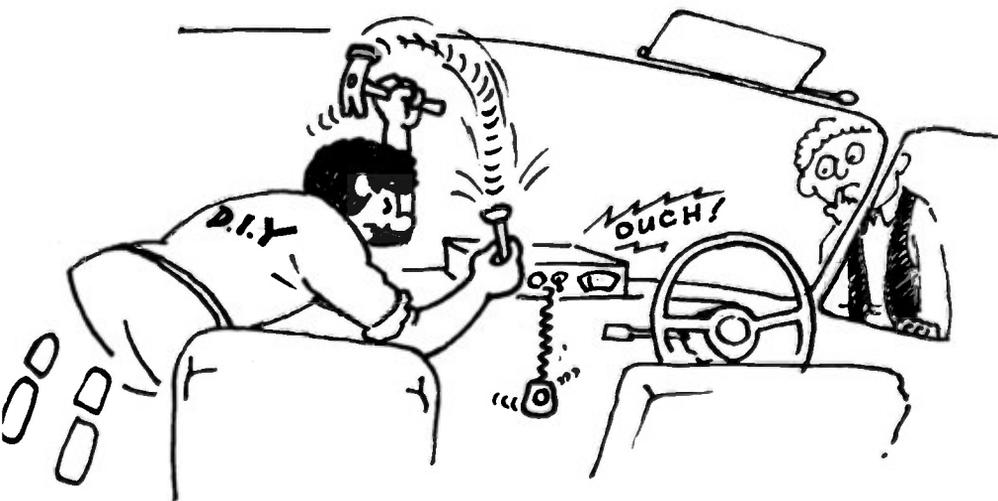
### Aerial

Check for clearance underneath siting point, work out exactly how you intend to run your co-ax cable from the aerial through to the rig.

Look out for handy holes (not rust holes) to run your cable through. Next disconnect your battery (just in case your drill slips) and prepare yourself mentally to drill lots of holes into your lovely car.

First stick two pieces of insulation tape forming an X exactly where the aerial hole is to be drilled. This stops the drill wandering all over your body work. Next select a small bit, and drill a pilot hole. Remember, not to press too hard and keep the drill straight. Now drill out to the correct size, as recommended in your aerial instruction leaflet.

Also drill any further holes for cable routing.



Now clean away any dirt that is underneath the aerial hole and sand back to the metal, so that your twig becomes well earthed. This will improve reception. Finally dig out these instructions that you put down somewhere, and bolt on the aerial. You may now stand back and admire your handiwork, but before you have a rest, route the cable through to your cab using rubber gromets, in all holes.

Tip—If you cannot find where the holes come out, shine a torch through.

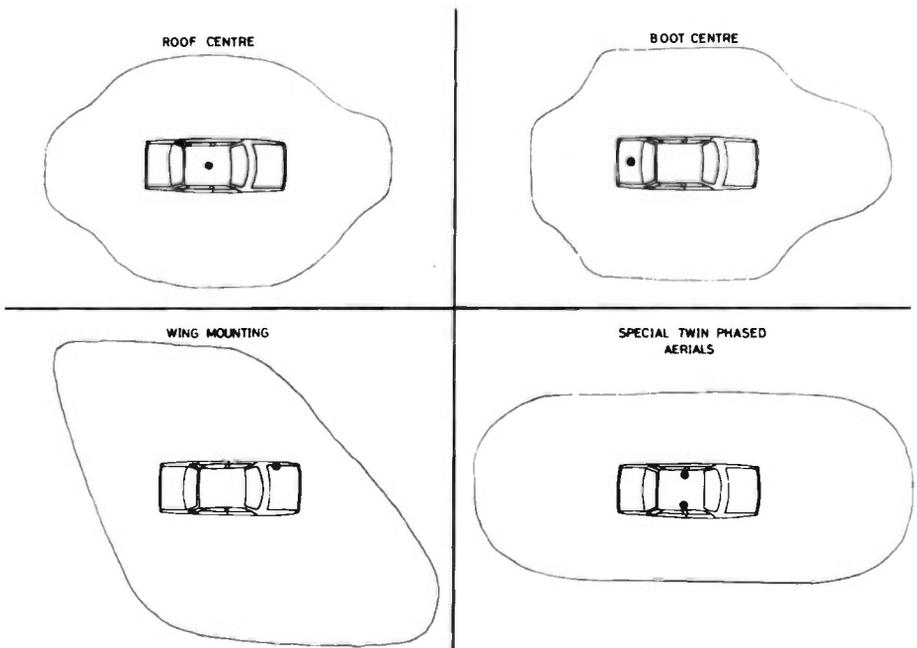
Now you have to solder your PL 259 Co-ax plug on to the end of your cable. So refer to page 26 for full instructions on this operation.

## Rig Installation

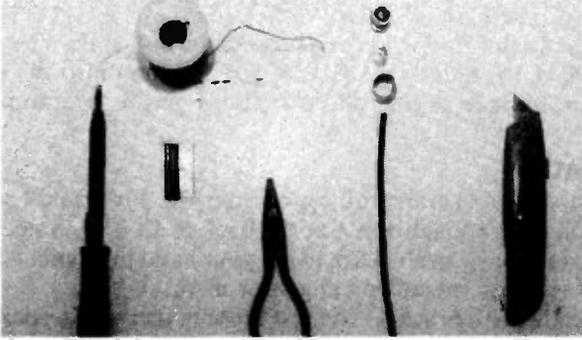
Once again, check clearance all round your rig. Fit a co-ax plug on, and make sure you have enough space at the back to fit it in. Some mikes plug into the side, so give yourself space to get your hand in. Again watch out for space on the side you intend to hang your mike.

Most rigs come with brackets and self tapping screws. So stick a length of insulation tape along your mounting point and make the drilling holes using the bracket as a template. Before drilling make sure that your battery is still disconnected. Then having completed drilling, remove the tape before screwing on the bracket. Drill no holes until you are *certain* you will cause no damage to any wiring etc. behind drilling points.

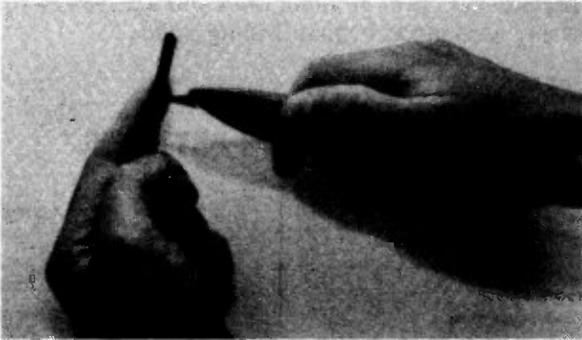
## AERIAL RADIATION PATTERNS



## FITTING A CO-AX PLUG



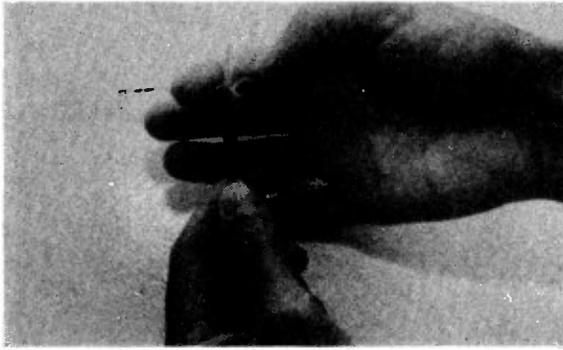
- (1) Basic tools required: Soldering Iron (20W min); Ready Fluxed Solder; Pliers; Sharp Razor Blade or Knife and small First Aid Kit.



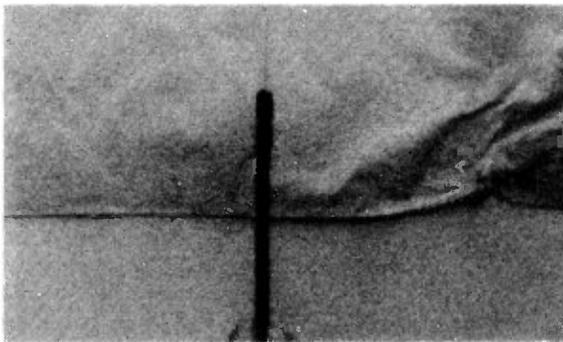
- (2) Carefully cut round outer insulation without scoring braid, approx.  $1\frac{1}{2}$ " from end of cable. Rub cable against knife to cut and watch fingers!



- (3) Peel back outer insulation.



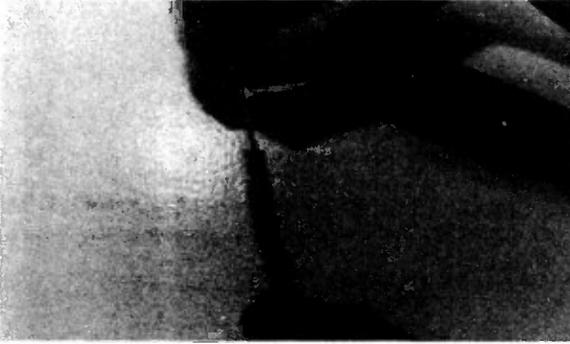
- (4) Fold back braid over outer insulation to expose . . .



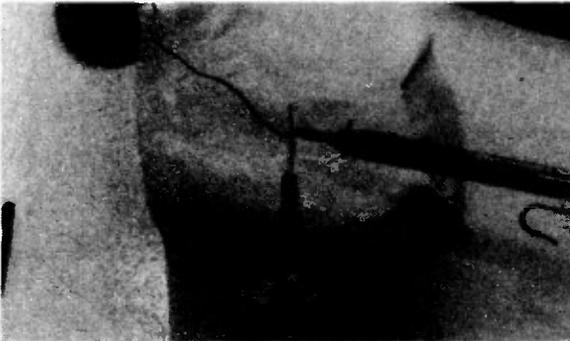
- (5) . . . inner insulated cable.



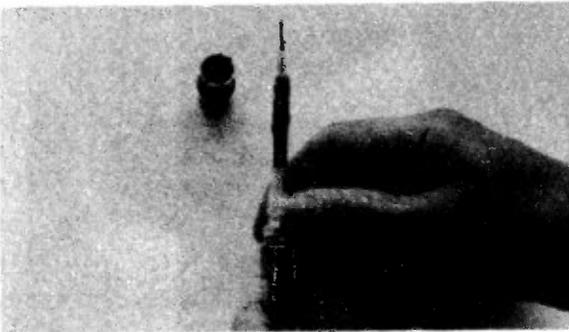
- (6) Carefully cut round inner insulation without scoring inner wire or wires.



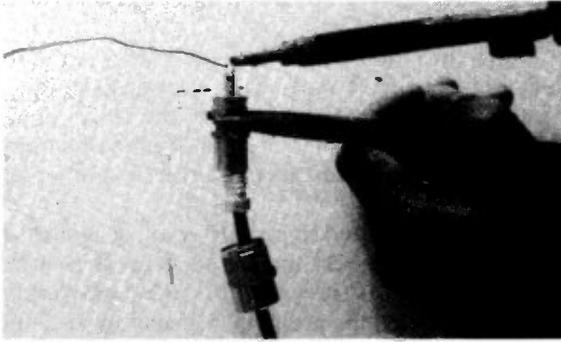
(7) Twist inner wires together.



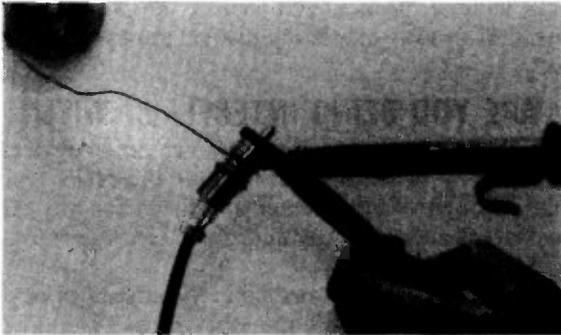
(8) Tin inner wires with solder to ensure good connection.



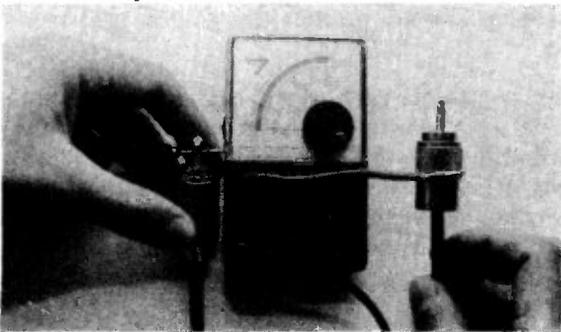
(9) Slide plug parts in correct order onto cable.



- (10) Slide inner of co-ax plug onto cable and cut off any surplus wire protruding from centre-pin, and solder.



- (11) Some co-ax plugs require additional soldering through centre holes for braid, others require a screwing action to fit first part to screen. All co-ax plugs (except pre-crimped types) *must* have the inner cable firmly soldered in place.



- (12) Check with ohm meter (if available) for shorts.

## Connection Up

**Polarity**—We discuss this one elsewhere in the book, but this is one thing you must get right. Most British cars are negatively earthed, so are most rigs, *but not all*. If you connect up your rig the wrong way round, you will almost certainly damage it. If you are in any doubt re-read the section “Choosing A Rig” first.

The electricity runs into the rig along the red wire, via the fuse, back out through the blue or black-wire. To save wire, the negative side of the battery (on most conventional cars) is wired directly to the body. Thus the negative side of your wire coloured blue or black, only needs connecting to some handy screw to complete the circuit through the car body and back to the battery.

Although an in line fuse is fitted to protect your rig against short circuits, it is usually impractical to connect up the positive wire (usually coloured —red) directly to the battery. If there is room and cable to spare, then do it if not, run your cable through the gromets to your fuse box and connect up to the accessory terminal of the fuse box.

Finally, carefully tape all aerial and power wires down, so that they cannot come loose, otherwise you will end up with an expensive barbecued rig (smoke, etc.). Double check all connections and hey presto you’ve done it—well, almost, don’t start modulating just yet until you have read the next chapter.

## ARE YOU BEING INTERFERED WITH?

Sorry—but the chances are, you are. Cars are noisy devices in the radio spectrum, so you may need suppressing (not the NHS type!) Switch on ignition and go through wipers, heater and listen for any odd buzzes and crackles. Now start the engine. Any additional crackles must be emanating from under your bonnet.

That whining, rushing sound, is probably the alternator or generator, and those prickly crackles are probably the spark plugs. Thankfully one of the many benefits of FM is that it tends to ignore this type of interference, so if the noise is only slight, say 1 or 2 on your RF meter, don’t bother about it.

NOTE: Quite often it is possible to considerably reduce the interference by connecting the unit directly to the battery or through the car lighter connections and not through the ignition switch.

## Cures

Individually suppressing each wiper, heater, washer motor would be a laborious job. A hot line filter in your power lead fitted just past the fuse, will help significantly. So will a suppressor kit for your plugs and alternator (when will the expense ever end!) Simply bolt the suppressor for the alternator/dynamo, adjacent to it, and connect the flying lead to the positive connection of this noisy device, silencing it forever.

The spark plugs are even easier, usually the suppressor plugs between each lead and spark plug.

You have now got the quietest, most powerful rig for miles around, so start bragging!!!

## INSTALLING A HOME BASE

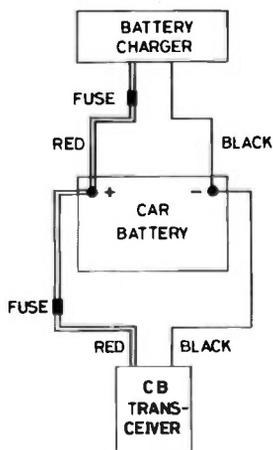
Apart from it being very convenient, you have the added comfort of being able to monitor the channels just when you feel like it. You can, on some sets, set the alarm to wake you at any time for a bout of modulating or monitoring. Being home based you have access to land lines (telephones) should you pick up a distress call and of course, being indoors, it's warmer.

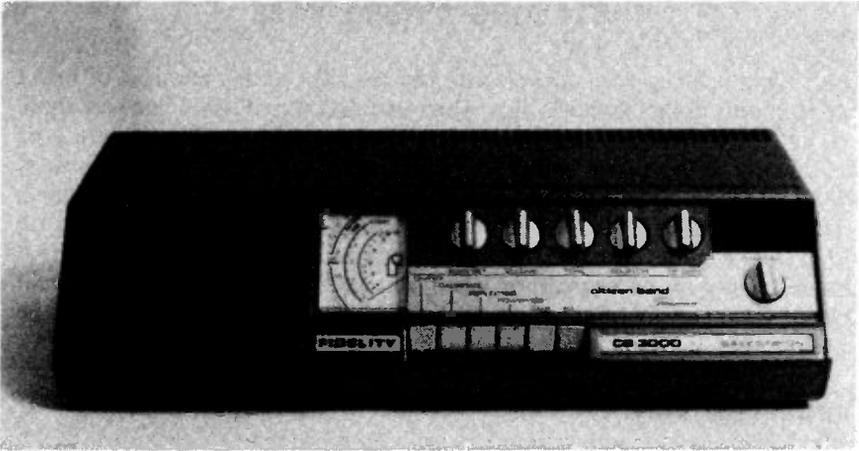
If you cannot afford two-figs, one method is to fit your skateboard rig with a slide-mount (under £5). This enables you to slide the unit out with no fuss and carry on conversations when you get in to your house. You will need a power supply of some description but do not fret—this need not be too elaborate at first.

### The Cheapo Way

The basic cheapo method requires nothing more than a car battery and a trickle battery charger. Do not ever try connecting your rig directly to the charger, they are not designed for this purpose. However, if you connect your battery charger in the usual way and connect your rig across the battery (see below) the result is clean and green. The battery acts as a reservoir and keeps both rig and charger happy. Make sure the leads (+ and -) are connected up correctly to both rig and battery: if you don't you will cause damage, fuses will go for starters. Fit an in-line fuse in both leads to your rig of a type recommended by the manufacturer. It is usually around 3 amps, but allow adequate ventilation around your battery for the hydrogen gas to escape.

### THE CHEAPO WAY





Now, if all this sounds scary, and it can be, either buy a purpose-made transformer or buy a rig with an a.c. lead that plugs straight into the mains. The Fidelity 3000 shown here has just this facility.

## **The Antenna**

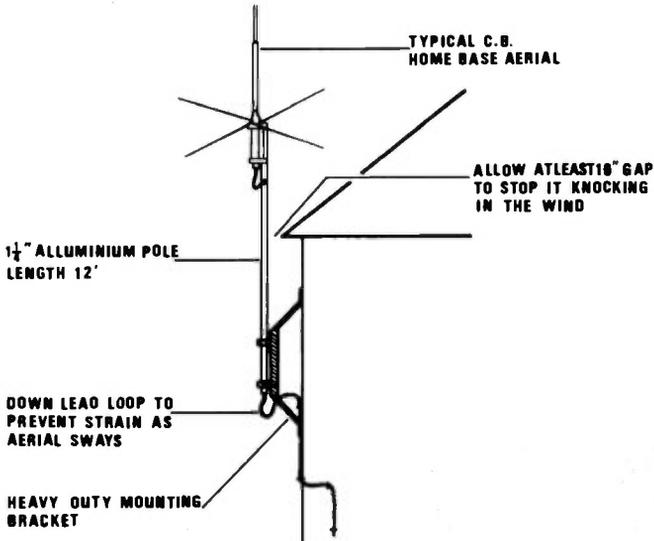
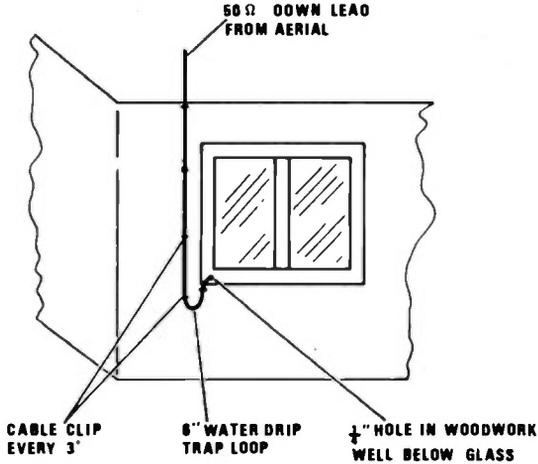
If you do not like climbing ladders and heights worry you, do not read on. The last place to feel giddy is on the roof of a house. Keep off those brown bottles and double check everything before you make one move. Make sure the ladder is safe, secure and tied down, we need our readers alive and modulating.

The golden rule with antennas is "walk tall". The higher you can safely get it, the further you will 'get out' and the wider your pick-up will be. There is a bewildering array of antennae about, so which one do you buy? CB is above all, a means of communication so do some earwiggling and ask about, even on channel. Be wary of some claims made by manufacturers. Many are true but some take a bit of swallowing. The best recommendation you can ever have is a strong signal coming in from a distant breaker. A directional antenna will concentrate your signal in one direction (see Page 35) and omni-directional antennas scatter the signal all around. If you tend to transmit in one direction, or want to range further afield, buy a directional antenna. You can buy a rotator later on and beam it wherever you like. Another way is to have an additional whip antenna for the breaking channel and local work, using an antenna switching box to hop nimbly from one to the other. NOTE: Any aerial above 1.5 metres in radiator length is illegal. Base loading is permitted.

Now decide the best place for your twig but bear in mind the following points. Keep it as far away from other antennas as possible. A big antenna will require a big pole and this means a lot of stress, so inspect brickwork for grip. Keep lead lengths as short as possible and use good quality coax. cable. If you don't you will reduce your output; so will using the wrong type of co-ax. Ordinary t.v. cable is the wrong impedance.

Next measure the cable you will require and add 10% for safety. Most home-base twigs require no adjustment. But if you want to check the s.w.r. wind the cable loosely round and round and check it before it goes up! Then re-read those instructions you've put down somewhere, and refer to your life insurance. Now comes the hairy bit.

## PUTTING UP A BIG TWIG



First place your wall bracket. You will need Rawlbolts for this, and get them tight. Ensure the roof overhang will clear your pole. If not, you will require a kinky one (no offence meant!). Connect the cable to your twig before climbing up the ladder, then bolt it on to the pole. It is helpful to have someone feeding the cable to you as you climb carefully to the heavens. Above all make sure your ladder is securely lashed to stop the whole thing sliding down as you lean for that last bolt!

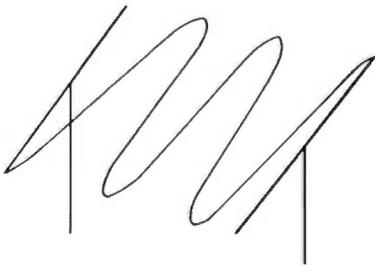
Route your down-lead well away from any other cables and avoid tight bends. Do use plenty of cable clips, but leave a few inches of cable loose at the top to take any sway in high winds. Where the cable enters the house (window or wall) drop the cable a few inches below and then bring it back up. This stops water running down the cable and into the house.

Before you start modulating, key the mike and check every piece of apparatus in the house that's fitted with a loud speaker for interference. Buzby, it seems, will ignore your mighty twig provided you do not annoy the neighbours. But be warned, if a flicker appears on "Crossroads", or a crackle on "Barry Manilow" it will be YOUR fault and that's a four for sure. So check out your own TV, in case they come a-knocking.

Finally, be a good neighbour; do not use powerful boosters, burners, etc.—they frequently produce spurious radiations that can turn up on even electric tooth brushes. This gives us all a bad name. If you must get out further put up an even bigger twig, or join the B.B.C. World Service. CB is after all a local communications thing for local chat, and America is a long way away. At all times be very careful when dealing with electrical points, terminals and mains power. Do not connect things up in a gash or temporary way. There is always someone on hand who knows what's what. Ask him first before you do anything yourself.

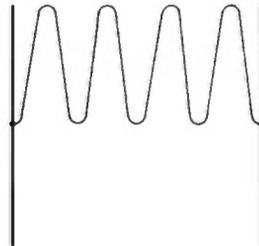
## POLARISATION

Horizontal—



The horizontally polarised aerial sends its waves out horizontally. Best reception will occur with an aerial on the same plane. A vertical aerial will tend to ignore a horizontal signal.

Verticle—

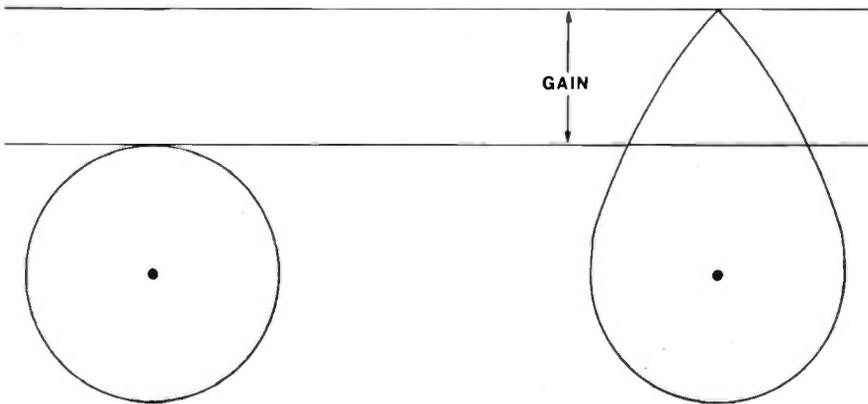


C.B. aerials are usually polarised because this is more convenient for mobile use. However, if you wished to improve reception between 2 Home Bases and reduce interference from other mobile users, horizontally polarised aerials at both sites will improve your signal considerably. This will also keep the channels clearer for mobiles as they will not pick you up so well.

## AERIAL GAIN (what it means)

Gain	Multiply by:	Gain	Multiply by:
0	1.0		
1	1.2	11	12.5
2	1.5	12	15.8
3	2.0	13	20.0
4	2.5	14	25.0
5	3.0	15	31.0
6	4.0	16	40.0
7	5.0	17	50.0
8	6.3	18	63.0
9	8.0	19	80.0
10	10.0	20	100.0

Using any aerial other than the proverbial 1.5 rod whip or wire etc, is of course, strictly illegal. However, just for interest, here are the multiplication factors for DB Gain. Multiplying your output by the factors shown, gives you the equivalent output required to match your aerial with another aerial of zero gain.



An omni-directional aerial transmits and receives equally well (or bad) in all directions.

A directional aerial concentrates its power mainly in one direction. It will also receive more strongly in this direction.

## THE MYSTICAL ART OF SWR-ING

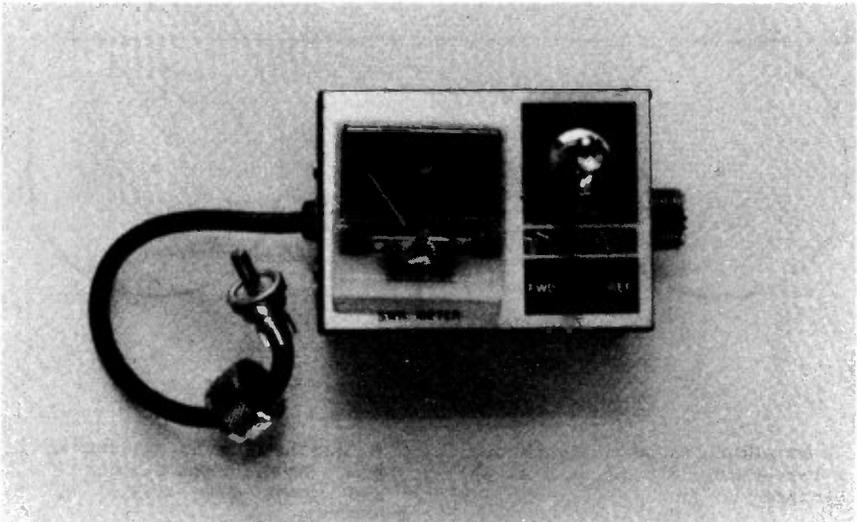
SWR stands for Standing Wave Ratio and tells you how much of your signal is being transmitted out to your 'good buddies' and how much is being reflected back down your cable to damage your rig. Obviously any reflected signal is not getting out. Therefore a good SWR reading means your signal will be stronger and go further.

First you beg, borrow, or even buy an essential gadget called an SWR Meter. This, you connect between your aerial and your transceiver via a patch cable (A patch cable is a short aerial lead with two co-ax plugs, on either end).

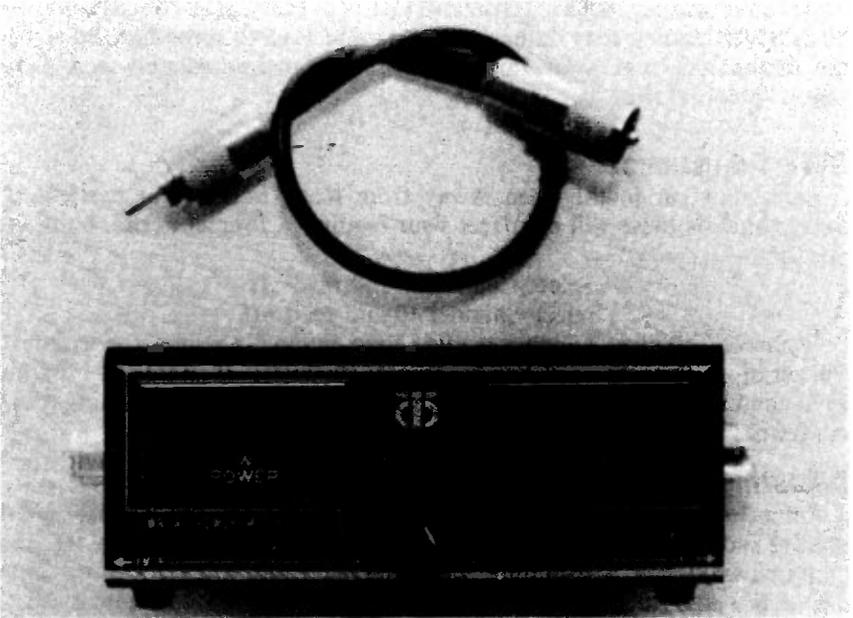
One socket on your meter will be marked 'Ant'. In here goes the lead from your aerial. The other socket usually marked 'X MTR' plugs via your patch cable into the rig. Now all meters will vary a little in how you set them (naturally), but usually there is a switch marked 'Forward' and 'Reflected' and a knob like a volume control. Flick the switch to 'Forward' and key the mike.

Suddenly the needle moves. Now all you have to do is twiddle the knob so that the needle on your meter nestles lovingly against the part marked 'Set'. Now flick the switch to 'Reflected' and with luck, the needle will drop back to give you your SWR reading.

### BASIC SWR METER



# TWIN SCALE METER



## S.W.R. Chart

SWR Reading	Output Power Transmitted
1 ..1	100%
1.3..1	98%
1.5..1	96% GOOD
1.7..1	93%
2 ..1	89%
3 ..1	75% FAIR
4 ..1	64%
5 ..1	58% POOR
6 ..1	49%
10 ..	33%

As you can see an SWR reading of under 2 or even 3 has very little effect on your signal. So unless you are a perfectionist, don't worry about it.

A reading of over 3 however, can damage your rig if used continuously on transmit.

The lower the reading, the better your performance. If you refer to the SWR Chart, you'll see that any reading below 2 is wasting virtually no power worth worrying about, but any reading above 3 may eventually roast your output stages (GOVERNMENT HEALTH WARNING — High SWR reading may damage your rig and lead to smoking). So if you are in the red, take your finger off the button immediately and allow things to cool down.

## **SWR Adjustment**

Park your car in the open, away from trees, houses and particularly power lines as these will all affect your reading. Close all doors, boot, etc and first—

Select Channel 1 and read off

Select Channel 40 and read off

If channel 40 gives a higher reading than channel 1 reduce the length of the aerial, or turn the adjusting screw anti-clockwise. If channel 1 is higher than channel 40 increase the length of the aerial or turn the adjusting screw clockwise.

## **Adjusting The Aerial**

Refer to the instructions (that just blew away) for full details. Some involve sliding a little stinger up and down, others—trimming bits off, and many in adjusting a trimming screw. In all cases when SWR on both channels 1 and 40 is the same, further adjustment will only make things worse. If you are cutting bits off, do not slice great hunks of wire away. An  $\frac{1}{8}$ " is enough to see how you are going. If the reading starts going higher, you are going the wrong way (and it is hard to stick bits back). Any reading below 1.5 is as near perfection as you are ever likely to need.

However, if you cannot get below 3, check that all connections are firm, and pay particular attention to the earthing of your aerial to the metal work of your car.

NOTE: Aerials designed for use on 27 MHz AM might require a considerable amount of the aerial to be cut off (i.e. inches) before the aerial will SWR.

## **Glass Fibre Bodies**

Got one of these smart glass fibre jobs have you? Don't worry, special aerials have been designed that require no earthing for your purpose.

If your SWR is still in the red, put a call out 'quickly' seeking assistance. You will be speedily directed to the local expert in these matters.

Virtually all high SWR reading are the result of either, a poor connection to the Car Body or a Badly Soldered P.L.259 plug. If you get a high SWR reading and the meter reads the same for both reflected and forward you can be certain that you have a bad connection probably in the P.L.259 co-ax plug. This means that either the inner wire is not making connection with the Aerial or the braid is shorting the signal out by touching the centre wire of the co-ax cable.

## S.W.R. PROBLEMS

Any reading between 1.5 to 2 is perfectly acceptable, but what do you do if your reading refuses to come out of the red?

### Tip No. 1

If your SWR meter indicates the same high reading on both reflected and forward settings (well into the red) you almost certainly have either a short circuit or open circuit in your aerial feeder cable or plug. This will mean that no power at all will be getting up to your aerial. Check the cable by waggling it about, pay particular attention to any tight bends, or plugs. Almost any aerial should read less than + 3 even without adjustment, so you must have short or open feeder interrupting the flow of power.

### Tip No. 2

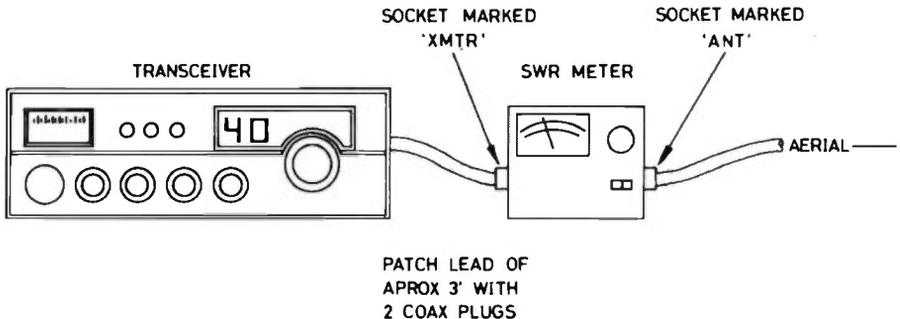
If the SWR reads around 3 but does not go into the red, and refuses to move despite aerial adjustments, check that the grounding on mobile aerials is making good contact with the body of the vehicle. With home base aerials, make sure the ground plains are really firmly connected.

### Tip No. 3

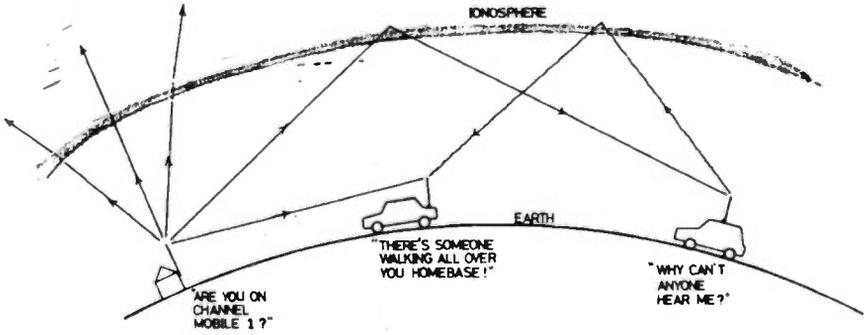
SWR should never vary with different lengths of cable. If it does alter, check all braid connections. Poor screening, caused by a bad connection, or faulty cable, will mean that the inner wire of your co-ax cable is now acting as part of the aerial and is a definite indication that your lead or plug are no longer screening the centre wire.

Some very cheap aerials just will not SWR down, so buy a reputable make, and watch out for very cheap mag. mounts. Although aerials designed for the American (illegal) AM system will work on our FM system, they will require more wire cutting off initially to bring them up to our slightly higher frequency. In some cases this may require around 1-2 inches of aerial removing.

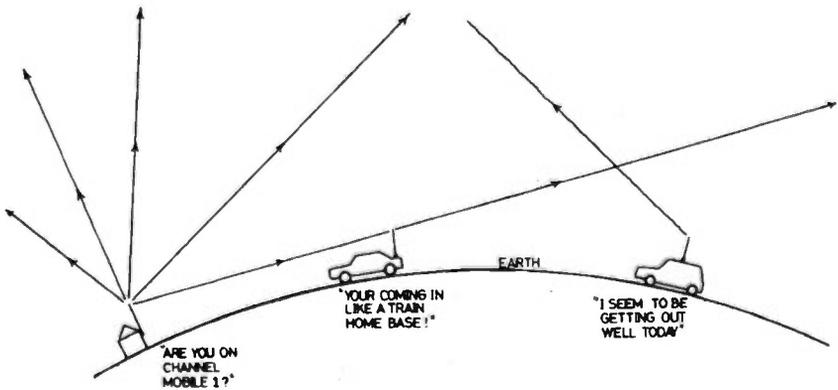
## S.W.R. METER PLACINGS



# THE EFFECT OF SKIP ON C.B. TRANSMISSION



**DAY**



**NIGHT**

## **BASIC FAULT FINDING (Help, it's gone wrong)**

Most faults connected with CB radio can be cured with a little common sense, a lot of patience AND NO TECHNICAL KNOWLEDGE AT ALL, particularly as you consider that at least 80% of the faults commonly encountered will require you to work on the outside of the rig. To be honest, most repairs never require you to look inside at all. To put it in a nutshell, most rigs are tough but even more users are duff!

So the areas to check first, are—

### **(1) Connections**

Check—  
Power Leads  
Co-ax Leads  
Particularly Microphone Leads

### **(2) Power Supply**

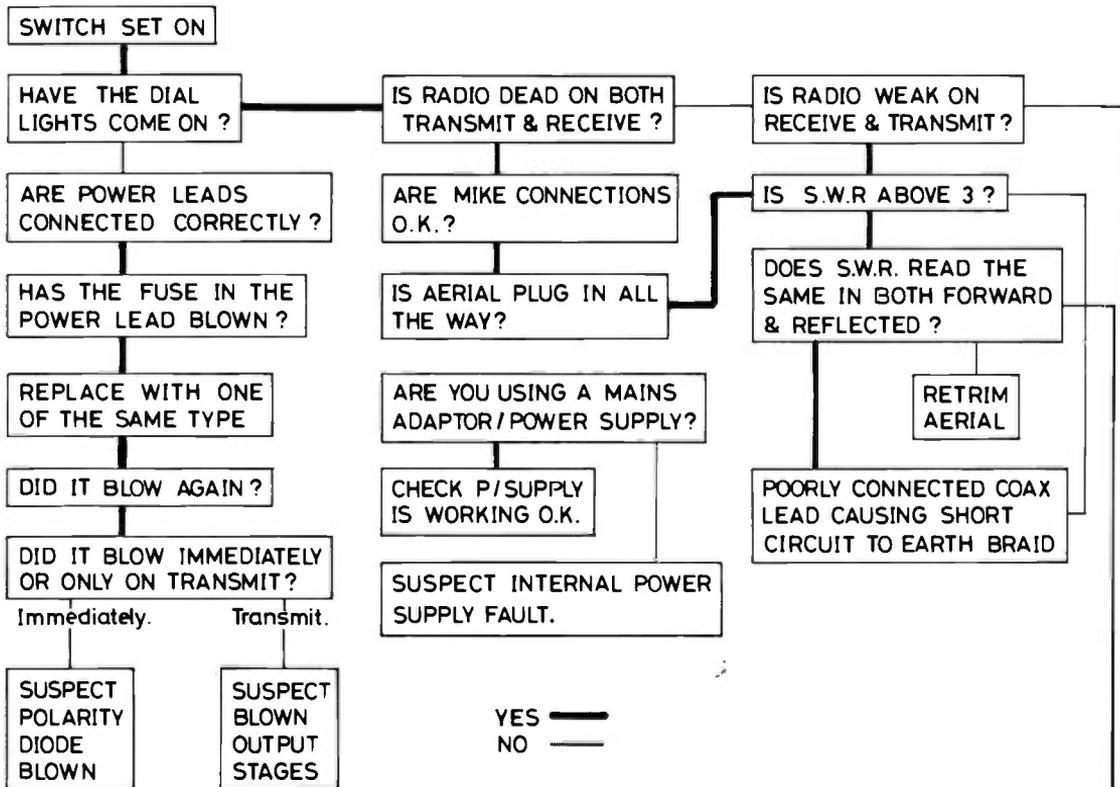
Check—  
Connections  
Shorts  
Fuses

### **(3) Aerial**

Check—  
Co-ax Plug for Shorts  
Suspect any Taped Joints

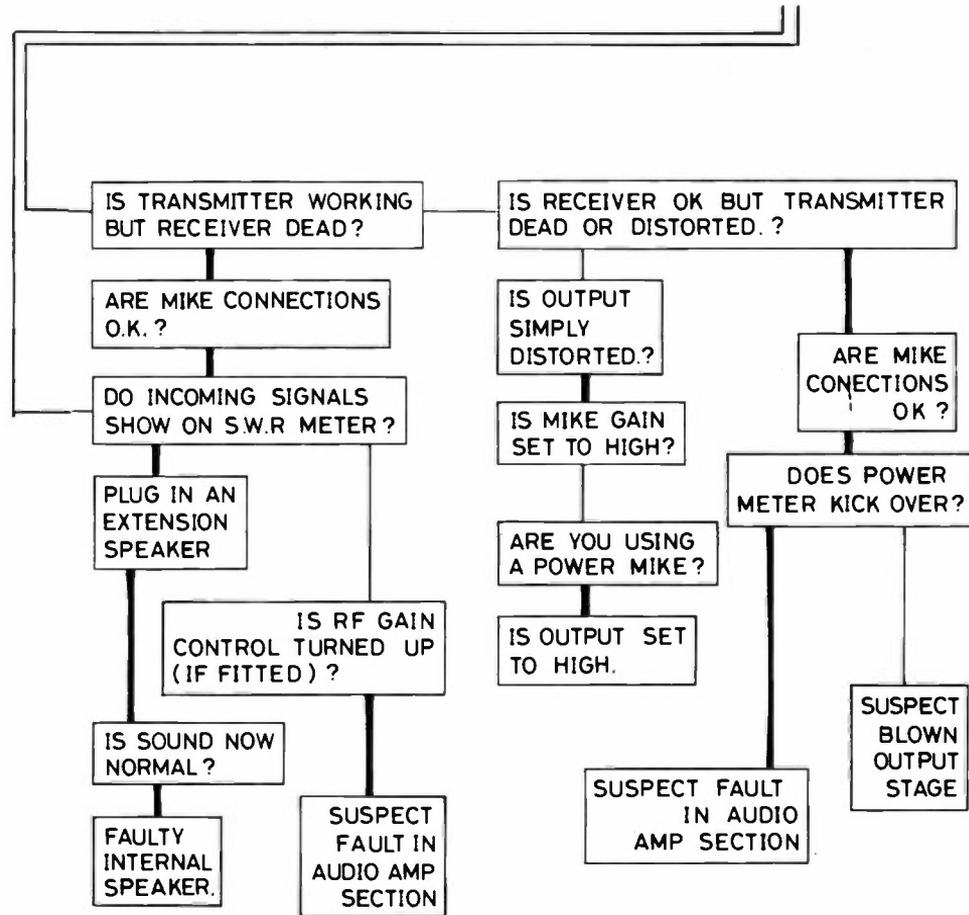
If you look at the flow chart and follow it through, carefully, you should be able to repair most of the faults that occur. If you are working on a buddies rig NEVER believe what he says about the fault. Most people have no idea how to explain what's gone wrong, always check it out yourself.

START



42

YES —  
NO —



Should you end up at the bottom of the flow chart in a box marked 'Suspect'—professional attention will be needed to effect repair.

## TROUBLE SHOOTING

### Co-ax Connections

If you are using a good aerial with a good rig, virtually all high SWR readings means a poorly connected, P.L.259 co-ax plug. It's surprising how difficult it is to connect these little devils up correctly for many lay people. Check for shorts between inner and outer braid.

The only way to connect two pieces of co-ax cable together, is to use 2 plugs and a female connector. If you attempt to twist the wires together, or even solder them together, you will upset the impedance of the cable and send the old SWR soaring.

### Mike Connections

I know it sounds silly, but is the mike plugged in properly? Carefully unscrew the plug and check for loose wires (naturally you wouldn't dream of disconnecting them before making a note of where the wires go back to). The poor old microphone connector takes a lot of bashing and lots of intermittant faults end up at its poor old tired connections.

### Power Supply

It's tempting I know to replace a faulty fuse with a slightly bigger one (just to see what happens). The rig manufacturer knows exactly the correct fuse to fit if it's blown. Replace it only with the same rating and never with one above  $2\frac{1}{2}$  amps.

If you come across a fault that requires professional attention, at least you know approximately where to point your repair agent to put it right, and *you* won't get ripped off with a big bill for a small simple repair.



## **BOLT ON GOODIES—(Accessories)**

There are a mind blowing array of bolt-on goodies (accessories) available from your local CB or Electrical store, and it's a definite fact that there is more money made on these accessories than in actually selling the rigs! So let's have a look at some of the more worthwhile goodies you can't wait to get your hands on.

### **SWR Meter**

This is not so much an accessory, as a necessity. The cheaper ones have a single dial. The dearer ones have 2 dials and are slightly easier to use, but they are not necessarily more accurate. In fact the accuracy of most SWR Meters, although good enough for the job, should never be taken as gospel. Some will give an indication of the output wattage, but this should only be taken as a guide. My advice is to steer clear of the type that are supposed to give field strength indication (these usually come with a small telescopic aerial). Although very handy, it can make the meter extremely sensitive to outside radiations, and often causes more trouble than it's worth.

### **Power Supply**

This is another handy gadget that will enable you to run the rig in the house as a home base. The average straight 40 FM rig requires about 2 amps of power at around 12 volts to make it work. What the power supply does, is convert your 240 AC mains into a 12 volt DC supply. Try and get one that can deliver at least 3 amps, don't worry if it's rated at 5 or even 10 amps, as the rig will only draw the current that it requires. Look for the words 'Regulated Power Supply'. This means that the power supply will deliver exactly the right voltage, at all times. This ensures that your signal will not weaken, as the power supply gets puffed at these very long modulations. At the very least a 2 amp in line fuse should be placed in the red lead, betwixt rig and power supply. Look also for some overload protection. This will protect your rig should the thing go wrong.

### **Power Mike**

You may have heard the odd breaker who sounds like he is talking in a dustbin or alternatively sounds very blurred. Chances are he is using a power mike, and has got it set up all wrong. You see the problem, with these little gizmos is that, only the chap who is receiving knows whether you have got it set right, so enlist the help of a local breaker to ensure you don't have it turned up too high. Having decried power mikes, let me say that used correctly, they can improve your signal, particularly on long distance copies.

## Speech Processors

Lots of people get speech processors, and power mikes mixed up, but they are as different as chalk and cheese. A mike with a speech processor added to it has the effect of compressing all your voice sounds to the same level of output. This has the effect of really punching your signal through, because you are getting the maximum output available from your rig, at all times. Although for local work it would tend to make your voice sound a little clipped, for long distance copies, it makes the difference between being heard or simply ignored.

## Pre-amplifier

This fits between the aerial and the rig. The closer you can get it to the aerial the better. What it does, is boost up the incoming signals so that you can receive them more strongly. Unless, you buy a really good one, the extra incoming signal can easily be swamped by the noise that the pre-amplifier itself produces. This is particularly true, when trying to boost up very weak signals, and as it's the weak signals you are presumably trying to boost up anyway, the advantages pre-amplifiers can offer are rather doubtful. Unless it is connected to a very good aerial.

As the pre-amp. will amplify anything it hears; ignition, wipers, generator, etc., for mobiles it has little practical use.



## **Dummy Load**

If you attempt to transmit without connecting your aerial. The result will eventually mean catastrophe for your rig. What a dummy load does, is replace the aerial with a resistor or resistors of 50 ohms impedance across the aerial socket to prevent things cooking in your rig.

You can easily make one, by simply buying a resistor of around 50 ohms (47 ohms will do), with at least 4 watts capacity, and carefully soldering one end to the braid connections of a short piece of co-ax cable, and the other end to the centre lead of the co-ax cable. Make sure the connections are firm that no shorts can occur. Connect your co-ax plug, and you may now safely test your transmitter without either damaging it or cluttering up the airwaves with the old stand-by 'testing 1234' etc.

## **Antenna Matcher**

If you have an aerial with a high SWR this little black box will help match the aerial to your rig, and prevent your output stages from cooking. It fools your rig into believing it has a perfectly matched aerial plugged in. But don't let it fool you, you are still losing the same amount of signal, but at least you are not damaging your rig.

## **Sliders**

These enable you to slide the rig out of the car without unhooking all the wires thus keeping the rig out of the way of temptation for prying eyes, when you are away from the car. Some cheap versions have very poor contacts particularly on aerial connections and can cause a high SWR reading.

## **External Speaker**

When you think about it, it's funny that most speakers talk to your knees rather than your ears first.

If you can plug in an extension speaker of around 4 ohms (usually) you'll improve the fidelity, and clarity, of incoming signals no end, as well as giving your knees a rest.

## **P.A. Horn**

This plugs into the P.A. socket of your rig (if it's got one). Flicking the P.A. switch turns your transceiver into a powerful voice amplifier. The horn or loudspeaker is usually mounted under the bonnet.

## JIVE TALK (U.K.)

You don't have to use it, but if you hear it—this is what it means, usually!

Affirmative	—Yes
Anchor man	—Base station
Back	—Reply please, as in 'bring it back', or — 'come back' etc.
Back-door	—Last vehicle in a convoy or behind you, etc.
Background	—Noise or interference.
Barefoot	—No extra power applied to rig, i.e. no burners, boosters, etc.
Basement (the)	—Channel 1
Bear (Smokey the)	—Police
Bear cage	—Police station
Bear report	—Police car location
Between sheets	—Bed
Big C (the)	—North Circular Road
Big four	—Definitely yes
Bleed over	—Transmitter causing interference on adjacent channels
Boots	—An illegal booster to increase your power
Breaker	—A CB user (you)
Brown bottles	—Booze
Bucket mouth	—A breaker whose mouth is bigger than his brains.
Burner	—See Boots
Buzby	—British Telecom
Carrier wave	—Radio transmission without speech.
Clean channel	—A channel with no interference
Come on	—Reply
Convoy	—A line of mobile CB operators heading in the same direction.
Copy	—Receive
Drop it one	—Go down one channel
Down and gone	—Clearing channel
Down and on the side	—Clearing channel but listening in
Doughnut	—Roundabout
DX	—Long-distance transmission
Ears	—CB receiver or aerial
Earwiggling	—Listening in. (My favourite occupation)
Eyeball	—A meeting face to face
Flip flop	—Return trip

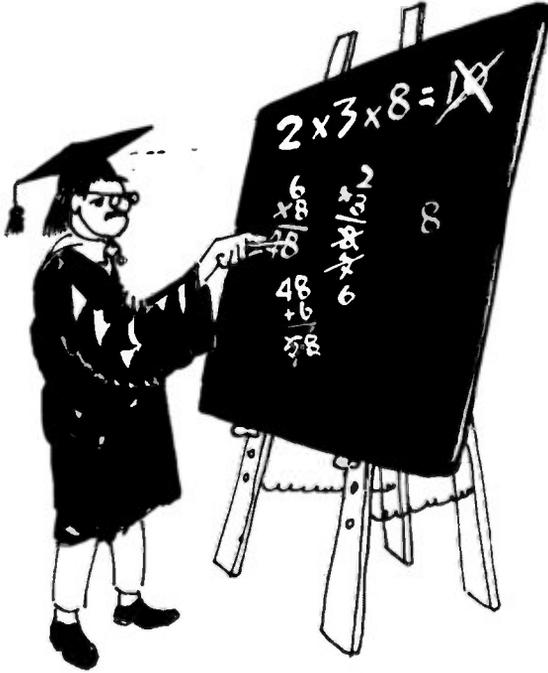
Four	—Yes
Front door	—Leading vehicle in convoy
Going down	—About to switch channels or off
Greenshields	—Cash
Hammer	—Accelerator
Handle	—CB users nickname
Hay	—Sleep
Idiot box	—TV
Juice	—Fuel
Keying the mike	—Pressing the transmit button without talking
Kicker	—Linear Amp (see also Boots)
Land line	—Telephone
Linear Amp	—Illegal booster to increase power
May Day	—International Emergency distress call
Meat wagon	—Ambulance
Modulation	—Chat
Motion lotion	—Fuel
Negatory	—No
Nine	—Say again
On channel	—Listening for you
On the side	—Listening to you, may I join in
Poundage meter	—Signal strength meter
Q.S.L. card	—Confirmation of contact (postcard)
Radio check	—Report on signal and quality of transmission
Ratchet jaw	—One who talks too much!
Roller skate	—Saloon car
Rubber bander	—Novice to CB
Seat cover	—Passengers, usually ladies
Side winder	—SSB user
Smokey	—Police
Squawk box	—CB rig
Shoe box	—Estate car
Super slab	—Motorway
Ten four	—Agreed/yes
Walked over	—Another transmission blotting out yours
Wally (a)	—A twit
XYL	—Wife (from X young lady)

## 10 CODE

It started in America with the law enforcement agencies. Most of it is now entirely inappropriate for the average user, but it still caught on. The most commonly used codes are in bold type.

<b>10-1</b>	<b>Receiving poorly</b>	10-39	Your message delivered
10-2	Receiving well	10-41	Please change channel
10-3	Cease transmissions	10-42	Road accident
<b>10-4</b>	<b>Message received</b>	10-43	Traffic jam
10-5	Relay message on	10-44	I have a message for you
<b>10-6</b>	<b>A short break</b>	10-45	Anyone within range, report in
<b>10-7</b>	<b>Out of service</b>		
10-8	In service, open to calls	10-46	Assist motorist
<b>10-9</b>	<b>Message to be repeated</b>	10-50	Break channel
<b>10-10</b>	<b>Transmission completed</b>	10-53	Accident—road blocked
10-11	You're talking too fast	10-60	What is next message number?
10-12	Visitors present		
10-13	Advise weather/road conditions	10-62	Unable to copy, use phone
		10-63	Network directed to
10-14	A party at	10-64	Network is clear
10-15	Disturbance	10-65	Give me your next message
10-16	Make pick-up at	10-66	Cancel message
10-17	Urgent business	10-67	All units comply
10-18	Any messages for me?	10-69	Message received
10-19	Return to base	10-70	Fire at
<b>10-20</b>	<b>My location</b>	10-73	Speed trap at
<b>10-21</b>	<b>Call by telephone</b>	10-74	Negative
10-22	Report personally	10-75	You are causing interference
10-23	Stand by	10-81	Reserve hotel room
10-24	Completed assignment	10-84	My telephone number is
10-25	Can you contact	10-85	My address is
10-26	Disregard message	10-88	Advise telephone number of
10-27	I am moving to channel	10-90	I have TUI
10-28	Identify yourself	10-91	Talk closer to your mike
10-29	Time up for contact	10-92	There is a fault on your transmitter
10-30	Illegal use of radio		
10-31	Crime in progress	10-93	Please give me a frequency check
<b>10-32</b>	<b>Radio check required</b>		
<b>10-33</b>	<b>Emergency call</b>	10-94	Please give me a long count
<b>10-34</b>	<b>Trouble. Help needed</b>	10-95	Transmit dead carrier
10-35	Confidential information	10-97	Check test signal
<b>10-36</b>	<b>Give me a time check</b>	10-99	Mission completed
10-37	Breakdown at	<b>10-100</b>	<b>Nature calls</b>
10-38	Ambulance required	10-200	Police needed at

## NOW FOR THE TECHNICAL BIT



## TECHNICAL GLOSSARY

You will hear a lot of technical chat over the airwaves. Here is what it means in words of one syllable.

**A.C.**—Alternating Current as used for mains supply. Alternates at 50 cycles per second in this country, i.e., 50 Hz. See also D.C.

**A.F.T. or A.F.C.**—Auto Fine Tuning helps tune in set precisely to required frequency.

**A.G.C.**—Auto Gain Control. Adjusts receiver to strong or weak signals so volume stays constant. (AM only)

**A.M.**—Amplitude Modulation. A method of imprinting voice patterns on radio waves. (See page 17 for fuller explanation).

**A.N.L.**—Auto Noise Limiter or Blanker. Reduces interference on AM by cutting out any spiky transmissions. Not so useful on FM, because FM ignores these spikes anyway.

**Antenna**—Aerial designed to receive or transmit on a certain frequency. See page 18 for fuller explanation.

**Aerial Matcher**—Matches Aerial impedance to transmitter in case of poor SWR.

**A.B.C.**—Automatic Battery Charger. A circuit that recharges normal batteries (in walkie talkies) from the mains.

**Band**—A group of channels allotted to a particular purpose, i.e. amateur band/citizen band/broadcast band, etc.

**Base Station**—CB Station, home based.

**Beam**—Directional Aerial.

**Carrier Wave**—The radio wave that carries your voice patterns imprinted onto its signal.

**Clarifier**—A control which assists reception on SSB illegal sets.

**Co-ax Cable**—Special screened cable for carrying radio frequency signals. The outer braid is the shield. The inner conductor carries the signal. Most CB rigs use 50 ohms co-ax not TV aerial co-ax which is 75 ohms which will result in a high SWR and loss of signal.

**Crystal**—A small piece of rock that vibrates at precise frequencies.

**Directional Aerial**—An aerial that transmits and receives in one direction better than another. (See also Beam.) (Illegal)

**Decibel**—A unit of measurement for comparison purposes used in CB to measure aerial performance. The higher the number, the better the gain (see page 35).

**Ground Plain**—The ground or braid connection point for an aerial. On a vehicle the body is your ground plain. Outside aeriels may use wires or metal sticks, or coils. A good ground plain keeps your signal from flying out into space and helps it hug the ground (where most people are).

**Impedance**—A measurement of electrical resistance 27 MHz CB rigs use 50 ohms cable, not TV cable.

**Linear Amp**—It amplifies or increases transmitter power to illegal and ridiculous levels. Definitely unsociable but widely used abroad, particularly in Italy.

**Loading Coil**—A coil inserted into the construction of an aerial to increase its electrical length without making it bigger.

**MHz**—Measurement of the frequency of radio wave. Hz = frequency per second. M = 1 million. Thus 27 MHz is 27 million cycles per second. Pretty high, eh?

**Modulation**—See page 20 for full explanation.

**Ohm**—A unit of measurement of electrical resistance.

**Omni-directional (aerial)**—An aerial that transmits and receives in all directions equally well (or bad).

**R.F.**—Radio Frequency. A signal that vibrates at a high enough frequency to produce radio waves.

**Selectivity**—A measurement of the receivers ability to ignore unwanted signals on adjacent channels. Measured in many ways.

**Signal Meter**—Indicates the strength of incoming signals. They tend to vary in accuracy a lot.

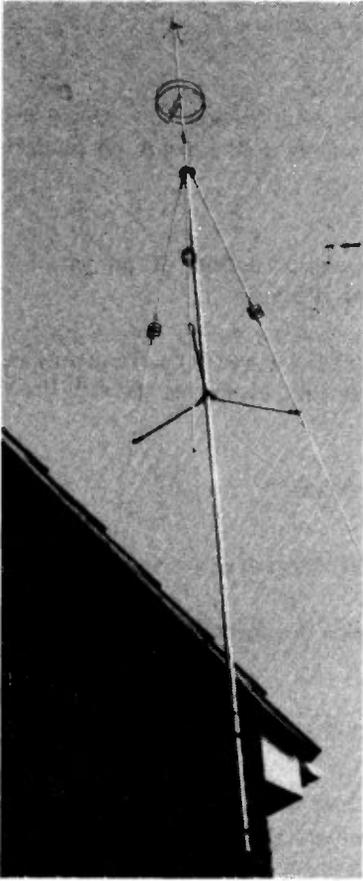
**Skip**—Foreign interference bouncing off the ionosphere.

**SWR**—Standing Wave Ratio. It tells you how much signal is being reflected back up from your aerial and failing to escape. SWR of above 3, apart from wasting power, may damage your rig!

**T.V.I.**—T.V. Interference caused by a badly sited or SWR'd aerial. T.V.I. is a big problem with AM transmitters, but virtually unheard of with FM.

**Volt**—Measurement of electrical pressure

**Watt**—Measurement of electrical power dissipation.



This is a Star Duster aerial.  
Manufactured by the A.S. Company  
of America. It is illegal because its top  
radiator has an electrical length of  
over 1.5 meters.  
It is, however, quite legal to monitor  
on this aerial, but not to transmit on.

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## **TECHNICAL SPECIFICATION OF THE NEW LEGAL SYSTEM**

### **27 MHz System**

#### **British Citizens' Band Radio Specifications**

No. of channels	— 40
Frequency	— 27.60125 to 27.99125 MHz
Channel Spacing	— 10 KHz
Modulation	— FM
Deviation	— $\pm 2.5$ KHz maximum
Frequency Accuracy	— $\pm 1.5$ KHz maximum

- Power Output — 4 watts (0.4 watts if antenna is over 7m (23') high)
- Permitted Antenna — Untuned whip or wire not more than 1.5m (59") long (base loading is permitted)

### Approximate range

- Mobile to mobile — 5-10 miles
- Mobile to base — 10-15 miles
- Base to base — 15 + miles

These range tests give a fair indication of the expected range with 100% intelligibility. Naturally range will vary according to local conditions.

## ADVANTAGES OF THE FM SYSTEM

- (1) Considerably less interference to adjacent TV's, Hi-Fi, Police, etc. (Virtually none).
- (2) Same range of transmission as AM (illegal system).
- (3) Less interference by crackles and buzzes etc.
- (4) No adjacent channel interference.
- (5) Better fidelity of sound.
- (6) Weak stations don't interfere with strong ones.

Altogether a better service than the illegal AM system.

## THE PHONETIC ALPHABET

The phonetic alphabet is in common use by all radio users, mainly for spelling complicated words under difficult conditions, letter by letter. Thus 'home' would be "Hotel, Oscar, Mike, Echo".

Alpha	November
Bravo	Oscar
Charlie	Papa
Delta	Quebec
Echo	Romeo
Foxtrot	Sierra
Golf	Tango
Hotel	Unicorn
India	Victor
Juliet	Whisky
Kilo	X-ray
Lima	Yankie
Mike	Zulu

## THE LEGAL CHANNELS

<b>Channel</b>	<b>Frequency</b>
1	27.60125
2	27.61125
3	27.62125
4	27.63125
5	27.64125
6	27.65125
7	27.66125
8	27.67125
9	27.68125
10	27.69125
11	27.70125
12	27.71125
13	27.72125
14	27.73125
15	27.74125
16	27.75125
17	27.76125
18	27.77125
19	27.78125
20	27.79125
21	27.80125
22	27.81125
23	27.82125
24	27.83125
25	27.84125
26	27.85125
27	27.86125
28	27.87125
29	27.88125
30	27.89125
31	27.90125
32	27.91125
33	27.92125
34	27.93125
35	27.94125
36	27.95125
37	27.96125
38	27.97125
39	27.98125
40	27.99125

## THE ILLEGAL AM CHANNELS (Naughty Forty!)

<b>Channel</b>	<b>Frequency</b>
1	26.965
2	26.975
3	26.985
4	27.005
5	27.015
6	27.025
7	27.035
8	27.055
9	27.065
10	27.075
11	27.085
12	27.105
13	27.115
14	27.125
15	27.135
16	27.155
17	27.165
18	27.175
19	27.185
20	27.205
21	27.215
22	27.225
23	27.255
24	27.235
25	27.245
26	27.265
27	27.275
28	27.285
29	27.295
30	27.305
31	27.315
32	27.325
33	27.335
34	27.345
35	27.355
36	27.365
37	27.375
38	27.385
39	27.395
40	27.405

These are the 40 illegal channels that are currently in use in the U.S.A. and many other countries.



HANDLE	LOCATION	SIGNAL		DATE	TIME	NOTES
		Received	Transmitted			

HANDLE	LOCATION	SIGNAL		DATE	TIME	NOTES
		Received	Transmitted			

HANDLE	LOCATION	SIGNAL		DATE	TIME	NOTES
		Received	Transmitted			

HANDLE	LOCATION	SIGNAL		DATE	TIME	NOTES
		Received	Transmitted			

HANDLE	LOCATION	SIGNAL		DATE	TIME	NOTES
		Received	Transmitted			

HANDLE	LOCATION	SIGNAL		DATE	TIME	NOTES
		Received	Transmitted			

# THE FIDELITY GUIDE TO LEGAL CB BY BILL CURTIS

## Gets you on the air and keeps you there!



- Uses of CB
- Choosing a rig
- How it all works
- How to modulate
- Installation
- Fault finding
- SW Ring
- Jive talk
- Many, many more topics