Tandy CB guide

£1.49

WE STARTED THE WORLD TALKING

First Tandy CB Rig Sold in 1958.

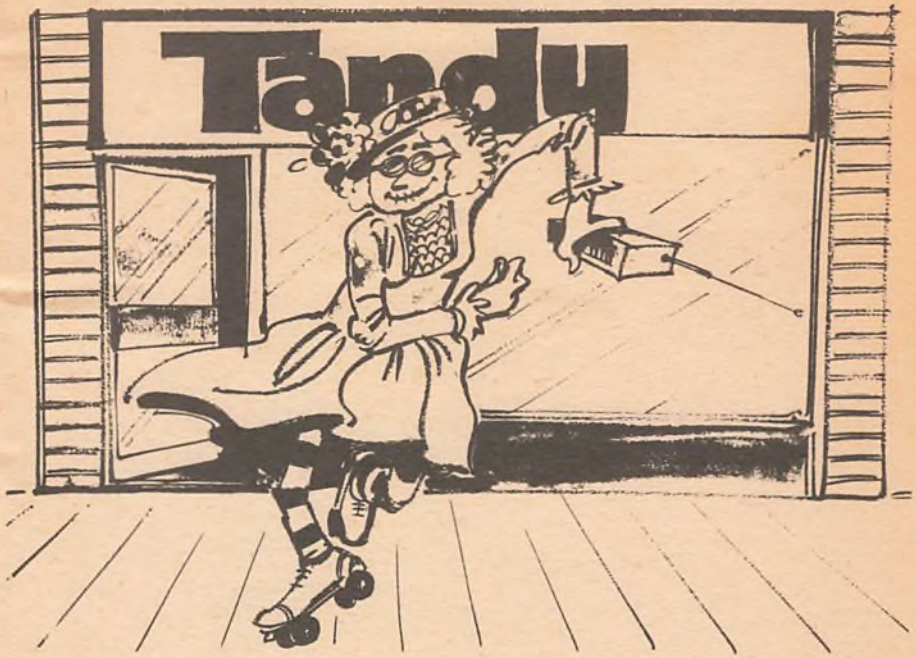
REALISTIC®

CB from Tandy

THE WORLD'S LARGEST CB RETAILER.

Tandy

CB Guide



Tandy
The World's No. 1 CB Retailer

PREFACE

From the benefit of its experience in CB retail and manufacture Tandy have produced this book as a practical guide for those already using, or considering the purchase of Tandy Realistic CB two-way radio/receivers for communication. Written in simple terms, for the CB'er with little or no technical knowledge of electronics, it explains the installation requirements and capabilities of mobile CB transceivers.

Now that 27 MHz FM has been legalised by the Home Office and recognized as *the* Citizens Band – the number of users will be growing by thousands every month – Tandy will be expanding its already considerable range (which meets all prevailing Home Office specifications) to meet every CB need! Most people who have used a CB radio in their car, van or lorry know the feeling of security that "instant communications" via CB gives them.

Tandy – with its world famous range of Realistic CB equipment and accessories – the largest retailer of CB in the world – is set to achieve phenomenal success in Britain. Manufacturing rigs, receivers, antennas, SWR meters, mounts, walkie-talkies and replacement accessories and with 8,000 retail outlets worldwide, 300 in this country, Tandy more than any other retailer, will help establish CB in Britain in a big way!

CONTENTS

CHAPTER 1

CB FOR INSTANT COMMUNICATIONS 9

Frequency Chart
The 10 Code and CB Lingo

CHAPTER 2

CB OPERATION 19

Know Your Controls
CB Talking

CHAPTER 3

CB SPECIFICATIONS AND FEATURES 25

Understand the Specifications

CHAPTER 4

TRUCK INSTALLATIONS 29

Mounting Hardware
Truck Antennas
Antenna Check

CHAPTER 5

CAR INSTALLATIONS 35

Where is the Best Place
for Your "Rig and Twig"

CHAPTER 6

CB ON BOATS 43

Avoid Interference
Make the Best of Marine Communications

CHAPTER 7

CB ACCESSORIES 51

Noise Filters
Instruments
Speakers and Microphones

GLOSSARY 55

Get to Know the Abbreviations

EXTRACTS FROM HOME OFFICE RADIO REGULATIONS 69

The Do's and Dont's of FM CB

CHAPTER 1

CB For Instant Communications

Citizens Band (CB) radio is a 40-channel communications freeway for use by the general public. The Citizens Band (CB) Radio Service has now been established by the Home Office to enable the public to use relatively low-cost equipment for personal and business two-way radio communications over short distances.

CB radio is fun to use and has proved to be invaluable as a safety communications medium. A CB radio can be used to converse about any legal activity. It is the most widely used type of communication in use by operators of recreational vessels, trucks and cars. In fact CB radio has become the national motorists' aid communications medium in other parts of the world. Truckers in other parts of the world have found that CB radio is vital to making their jobs both safe and pleasant.

In addition to the "mobile" 18-wheelers (truckers), 4 wheelers (passenger cars) and boaters, there are countless "anchored modulators" who operate base stations (Figure 1-1) at their homes and offices, motels, service stations, and transport cafes.

The Citizens Band

The Home Office authorizes the use of CB radio for personal or legitimate business communications and has divided the 27.60125–27.99125-MHz Citizens Band into the 40 frequencies listed in Table 1-1. The CB industry uses a channel

numbering system so the CB radio operator can identify the particular frequency he is using. Thus, each CB frequency is indicated by a specific channel number on the channel selector dial or channel number display of the CB transceiver.

Fig. 1-1. A typical CB base station transceiver.

However, CB radio shouldn't be confused with the automobile telephones used by business executives and the two-way radios used by business, police, fire and other municipal services. These are "private" communications compared to CB radio. Nor should CB radio be confused with amateur (ham) radio whose licences are authorized to use several different allocated bands of frequencies. Although the "ham" radio operators must pass an examination to obtain an Amateur Radio Operator licence, they still are not allowed to operate on the CB channels without having a CB station licence.

Because of the millions of CB radio operators who will be on the air, CB channels are like wireless party lines. Citizen Band operators (CBers) can operate on any of the channels.

Table 1-1. CB Radio Channels and Frequencies (MHz) for U.K. 27 MHz FM

Channel	Frequency	Channel	Frequency
1	27.60125 MHz	21	27.80125 MHz
2	27.61125 ,,	22	27.81125 ,,
3	27.62125 ,,	23	27.82125 ,,
4	27.63125 ,,	24	27.83124 ,,
5	27.64125 ,,	25	27.84125 ,,
6	27.65125 ,,	26	27.85125 ,,
7	27.66125 ,,	27	27.86125 ,,
8	27.67125 ,,	28	27.87125 ,,
9	27.68125 ,,	29	27.88125 ,,
10	27.69125 ,,	30	27.89125 ,,
11	27.70125 ,,	31	27.90125 ,,
12	27.71125 ,,	32	27.91125 ,,
13	27.72125 ,,	33	27.92125 ,,
14	27.73125 ,,	34	27.93125 ,,
15	27.74125 ,,	35	27.94125 ,,
16	27.75125 ,,	36	27.95125 ,,
17	27.76125 ,,	37	27.96125 ,,
18	27.77125 ,,	38	27.97125 ,,
19	27.78125 ,,	39	27.98125 ,,
20	27.79125 ,,	40	27.99125 ,,

Use of CB

Is CB equipment used entirely to outwit law enforcement officers? No. The majority of each day's CB communications is for the well-being of people who are away from home. Boaters, fishermen, campers and hikers (Figure 1-2) have all made much greater use of the Citizens Band Radio Service than the small business man.

Many motorists, especially truck drivers, who regularly travel back and forth on the highways, use base stations as "check points" on their route, talking to a housewife here, an invalid there, and further down the road to a house

bound person. These people, housewives, and teenagers regularly monitor the airways for their unseen passing friends who drive the motorways. In turn, the truck drivers know exactly at which mileage markers their friends are located and listening.

Fig. 1-2. Handheld CB sets extend communications to persons on foot.

On The Road

Truckers and tourists are a different type of communicator from the base station operator. When passing in opposite directions, it doesn't take long to get out of communicating range. In three minutes after passing, they can be almost 6 miles apart. That doesn't give much time for anything but "Hello, how are the roads behind you?" and you're gone. It's not much, but a few quick words can warn of icy roads, blinding fog or smoke drifting across the road, as well as stopped traffic. A friendly warning about a soft tyre can prevent a hazardous blowout. Notice of a shifting load or tottering luggage can avoid an unpleasant experience which can become a threat to following vehicles especially if traffic is heavy.

Effective Communicating Range

Many factors affect the range of CB radios. In urban areas, steel and concrete buildings may limit communications considerably in some directions because of shielding effects, yet permit transmitting over a considerable range in other directions because of radio signal reflections. Boats on large lakes, bays and the ocean are often able to communicate 20 or 30 miles and vehicles on flat land near water have similar results. Generally, however, the maximum range is some 15 miles. If there are many trees around you, or you are at the bottom of a hill, your transmitting range can be much less. At the top of a hill in open country, the range can be much greater.

The position of the antenna on your vehicle can also affect your communicating range. For example, mounting it on top of the roof, in the centre of the vehicle, will give the best range all around a car, while the oblong roof of an estate car would make communications ahead and to the rear better than communications to the side.

What other factors affect the range? The output power of the transceiver also affects range. By law, all mobile and base CB transceivers are limited to the same maximum power (4 watts) and most sets are designed to furnish the maximum power. The handheld units usually have less power than the maximum allowed although there are some walkie-talkies with the same output rating as base stations and mobile units. Handheld units usually have an output power ranging from about 2 watts up to the maximum allowable output power of 4 watts.

Brevity (Keep it short)

You can get more benefit out of your CB radio and so can everyone else, if you keep your transmissions short. You can make transmissions "crystal clear" if you use abbreviations. The Ten-Signals listed in Table 1-2 are the most commonly used, however you may encounter local variations.

Don't be Bashful

Listening in on the CB channels can be a lot of fun. However, it is even more fun to take part in the conversations. There are many new CB users who are reluctant to transmit because they are afraid they might be embarrassed if they don't say the right things on the air. But, don't be bashful. All of those on the air were also newcomers once. Now they are more experienced than you, they should not make fun of you if you make a boo-boo. Say it like you would when you first meet a stranger face to face. After talking awhile to a person on CB, he or she will no longer be a stranger.

What is the most common boo-boo made by CB beginners? It's failing to release the PTT (push-to-talk) button on the microphone when they stop transmitting (stop talking). Just remember to push to talk and then release the PTT switch so you can listen to the reply. The PTT switch, when pushed in, turns the transmitter on and then, when released, turns the transmitter off and reactivates the receiver.

Note: Any 10 code signal may be reversed by stating it as a question. For example 10-20? would mean "What is your location" or 10-36? "What is the correct time"?

Table 1-2. TEN SIGNALS

No.	Meaning	No.	Meaning
10-1	Receiving Poorly	10-33	EMERGENCY TRAFFIC AT THIS STATION
10-2	Receiving Well	10-34	Trouble At This Station. Help Needed
10-3	Stop Transmitting	10-35	Confidential Information
10-4	OK Message Received	10-36	Correct Time Is . . .
10-5	Relay Message	10-37	Wrecker Needed At . . .
10-6	Busy, Stand By	10-38	Ambulance Needed At . . .
10-7	Out Of Service, Leaving Air	10-39	Your Message Delivered
10-8	In Service, Subject To Call	10-41	Please Tune To Channel . . .
10-9	Repeat Message	10-42	Traffic Accident At . . .
10-10	Transmission Completed, Standing By	10-43	Traffic Tie-up At . . .
10-11	Talking Too Rapidly	10-44	I Have A Message For You
10-12	Visitors Present	10-45	Anyone Within Range, Please Report In
10-13	Advise Weather/ Road Conditions	10-46	Assist Motorist
10-16	Make Pickup At . . .	10-50	Break Channel . . .
10-17	Urgent Business	10-60	What Is Next Message No.?
10-18	Anything For Us?	10-62	Unable To Copy, Use Phone
10-19	Nothing For You, Return To Base	10-63	Net . . Directed To . . .
10-20	My Location Is . . .	10-64	Net . . Clear
10-21	Call By Telephone	10-65	Awaiting Your Next Message/Assignment
10-22	Report In Person To . . .	10-67	All Units Comply
10-23	Stand By	10-70	Fire At . . .
10-24	Completed Last Assignment	10-71	Proceed With Transmission In Sequence
10-25	Can You Contact . . . ?	10-73	Speed Trap At . . .
10-26	Disregard Last Information	10-75	You Are Causing Interference
10-27	I Am Moving To Channel	10-77	Negative Contact
10-28	Identify Your Station	10-81	Reserve Hotel Room For . . .
10-29	Time Is Up For Contact	10-82	Reserve Room For . . .
10-30	Illegal Use Of Radio	10-84	My Telephone No. Is . . .
10-32	I Will Give You A Radio Check	10-85	My Address Is . . .
		10-89	Radio Repairman Needed At . . .
		10-90	I Have TVI

10-91 Talk Closer To Mike
10-92 Your Transmitter Is Out Of Adjustment
10-93 Check My Frequency On This Channel
10-94 Please Give Me A Long Count
10-95 Transmit Dead Carrier For 5 Seconds
10-99 Mission Completed. All Units Secure
10-100 Time Out To Go To The Bathroom
10-200 Police Needed At . . .

CB Lingo

To make it easier for you to understand the language of CBers, study the following set of words which lists some of the CB lingo.

Base – short for CB base station at a fixed location.

Breaker – A CB operator who breaks in on a conversation.

CBer – Short for Citizens Band operator.

Eighty-Eight – Abbreviation for love and kisses.

Good Buddy – Commonly used expression for one you communicate with on the air.

Handle – The nickname used by the CB operator.

Ham – Slang expression for amateur radio operator (not a CBer).

Landline – Means regular telephone.

Mike – Abbreviation for microphone.

PTT – Abbreviation for push-to-talk (transmit-receive switch on microphone).

QSL Card – A post card some CBers send to those whom they contact on the air to confirm that they have communicated with each other.

Rig – Slang term for CB transceiver.

Seventy-three – Abbreviation for best regards.

Smokey – Affectionate term for a police officer.

Ten-four – A 10-Code signal for saying "I got you" or other acknowledgement of receipt of a message.

Twenty – Used to ask your location, by asking, "What is your twenty?". Also for saying where you are, by saying "My twenty is . . . . ." is short for saying 10-20.

CHAPTER 2

CB Operation

You don't need to be an electronics technician to operate a CB radio, but you do have to know which knobs to twiddle and turn. The basic operating controls of a CB set include the following:

On-Off Switch – This may be either a separate switch or a part of the volume control. In the ON position, the CB set is ready to use.

Volume Control – Use this knob to set the volume at the level that best suits you.

Squelch Control – This may be new to you. Without it, you will always hear a loud rushing sound whenever you are not receiving a signal from another CB station. To stop this noise, adjust (turn) the squelch to the point just beyond where the noise stops. Now, your set is "squelched", but it will "awaken" when a strong enough signal is intercepted. If you want to avoid hearing weak signals, you can vary the "effective sensitivity" by tightening (turning) the squelch control a bit further.

Channel Selector – Use this control to select any channel for which your CB set is equipped.

PTT Switch – To transmit, apply pressure to the PTT (push-to-talk) switch on the microphone (Fig 2-1). This action causes the receiver to be disconnected and the transmitter to be turned on. At the end of your conversation, release the pressure on the PTT switch. The transmitter is automatically turned off and the receiver is turned on, so you can listen.

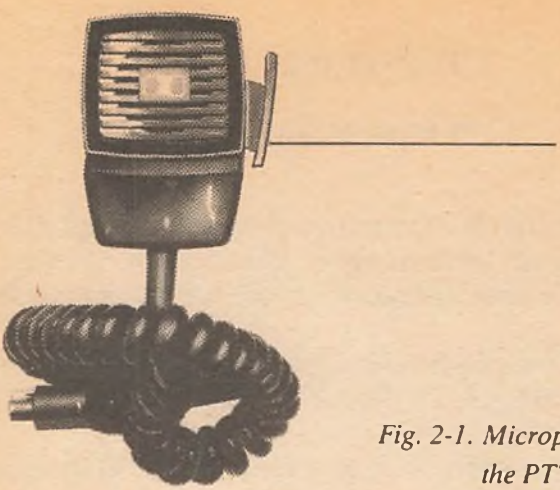


Fig. 2-1. Microphone showing the PTT Switch.

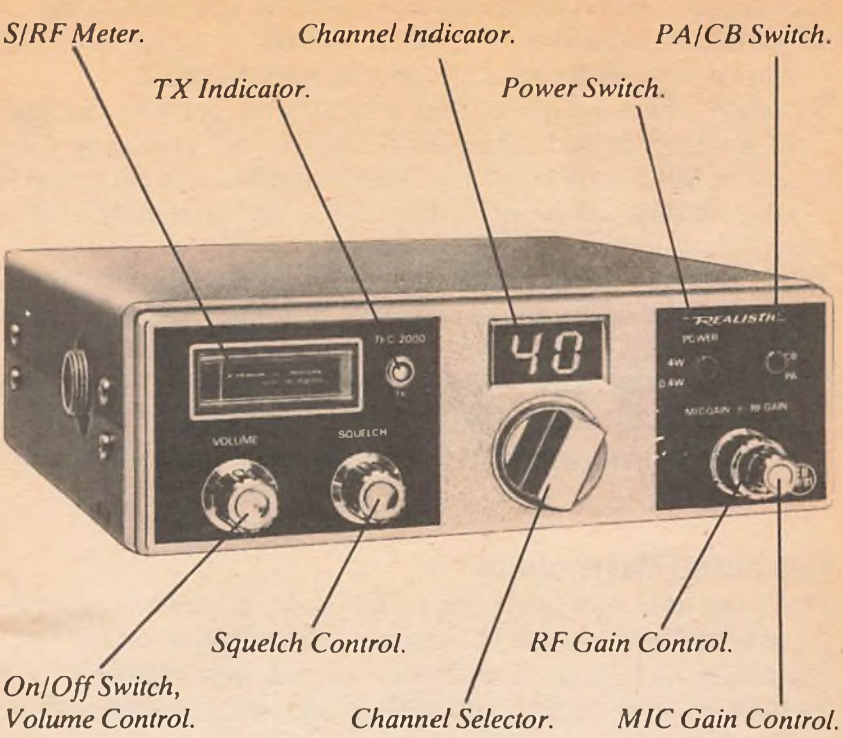
Other Controls

Some CB sets have additional controls as, for example, those shown in figure 2-2. These may or may not include the controls in the following list. Some are usually added not for necessity but for nicety.

ANL Switch – A two-position switch used to cut in or cut out the Automatic Noise limiter circuit, which helps to minimize the ignition noise picked up from nearby vehicles.

Noise Blanker – A two-position switch used to cut in or cut out the noise blanker (also called noise silencer) which minimizes ignition noise. When a set has a noise blanker, it usually also has a noise limiter.

PA/CB Switch – A two position switch that can be set so the transceiver can be used for either normal CB operation or as a mobile public address system (when an external pa speaker is connected to it).



Tone Control – a few transceivers have a variable tone control that is used to vary the frequency range of the reproduced sound.

Indicators

For operational purposes, no indicators other than a channel indicator are actually required. However, for convenience, any or all of the following indicators might be provided.

Power-On-Light – This may be a lamp or LED (light emitting diode) that glows when the transceiver is turned on.

Transmit Light (TX Indicator) – This may be a lamp or LED that glows when the transceiver is in the transmit mode.

Modulation Indicator – This is usually a lamp or LED whose brilliance varies as you talk into the mike.

S Meter – This is a meter that indicates the relative strength of an intercepted signal in terms of "S" units and "dB above S9". An S1 signal is barely audible. An S9 signal is very strong. A 30 dB above S9 is an extremely strong signal.

S/RF Meter – This meter functions as an S meter when receiving and as a power output meter when transmitting.

SWR (Standing Wave Ratio) Meter – This meter is used to check and measure SWR when transmitting. Sometimes the same meter is used as a combination S/RF/SWR meter.

Use of the Microphone

How far and how well your voice will be heard depends greatly on how you use your mike. Don't hold it too far from your mouth or shout or mumble. Instead, hold it close (1 to 2 inches) to your mouth and talk in a normal manner. Your range depends a great deal on your "talk power". But this doesn't mean you have to shout. Just speak into the mike in a normal voice while holding it close enough without smothering it. And when you have finished talking, release the PTT switch so you can hear what the other person has to say.

Courtesy

Truckers are well known for their courtesy. On the air, all should practise the same behaviour. Whenever you hear someone say "break, break", listen to the "breaker" and find out what he or she has in mind. Then, give up the channel if it

is important. After all, CB radio is for helping your fellow travellers as well as for fun and relaxtion.

Eavesdroppers and Unlawful Activities

The CB channels are the world's busiest "party lines". You have no idea who is listening to your transmissions, so watch what you say. Potential hijackers and thieves could be listening and might use the information broadcast against you.

But you can say "73" which means "best regards" or "88" which means "love and kisses" without being accused of making an illegal transmission.

CHAPTER 3

CB Specifications and Features

There will be hundreds of different models of CB sets on the market. Which is the best one for you? Here, much depends on your personal preferences. You might like one CB set over others because of it's cosmetics". You might want to select on the basis of technical "specs", or you might settle for what you can get at the lowest price.

Specifications

If you know how to read a spec sheet (see Figure 3-1), you might be able to determine which CB set (performance-wise) is best. But if you don't, use P-P-P as the criterion. The first "P" stands for price, the second for performance, and the third for personality (how you rate the brand name and the store).

The meanings for the most significant electrical specifications that you will encounter when reading a spec sheet are:

Sensitivity – the relative ability of the receiver to intercept weak radio signals. It is expressed in terms of microvolts (millionths of 1 volt) for a given effect at the receiver output (usually 20dB S+N/N). Typically, the sensitivity is better than 1μV (microvolt).

Selectivity – the ability of a receiver to pass a modulated radio signal and the relative immunity to bleedover on to other channels are expressed in dB with respect to bandwidth. Typically, the selectivity is −6 dB for ±3 kHz bandwidth, and −40 dB to −70 dB of adjacent channel rejection.

RF Output Power – The amount of radio energy generated by the transmitter is expressed in watts. It is limited by the Home Office to 4 watts. Typically, output power is within the 3-4 watt range. With the antenna permitted by the conditions of the licence for use with the equipment this provides an effective radiated power of 2 watts.

Modulation – The "Talk Power" capability of a transmitter is expressed in a percentage. Modulation in excess of 100 per cent is illegal and is seldom achieved except perhaps during very short peaks. Average modulation level is typically 70-80 per cent.

Positive/Negative Ground – Some CB transceivers can be used only in vehicles that have a negative-ground electrical system. However, many can be used in a vehicle with either a negative-ground or positive-ground electrical system.

Transceiver Types

Almost all CB transceivers now on the market are factory-equipped for operation on 40 channels. There were some that had a capacity for 5 to 12 channels. These types were usually equipped at the factory with crystals for only one channel. To activate the other channels, two crystals (one for transmit, one for receive) had to be added. You can get crystals for any of the CB channels.

Walkie-Talkie – This kind of transceiver (see Figure 1-2) is a portable hand held unit that is powered by a self-contained battery. It is available with various channel capacities and with input-power ratings of from less than 0.1 watt to 4 watts (less than 4 watts output).

Type Acceptance – All CB transceivers that are newly licenced or sold must comply with the Home Office specifications and are indicated by a mark stamped or engraved on the front panel of the equipment, see Fig. 3-2.

Figure 3-1. Specifications

Receiver	
Frequency Coverage	All 40 CB Channels 27.60125 to 27.99125 MHz
Sensitivity	0.7μV for 20 dB S+S/N
Adjacent Channel Rejection	−60 dB
Intermediate Frequency	1st IF = 10.7 MHz 2nd IF = 455 KHz
Audio Output	2 Watts
Frequency Response	400-2000 KHz
Squelch	Adjustable from 0.5μV
Transmitter	
Frequency Coverage	All 40 CB Channels 27.60125 to 27.99125 MHz
Power Output	4 Watts (Max.) Hi-Power 0.4 Watts (Min.) Low-Power
Emission	FM
Spurious Radiation	−60 dB
Frequency Tolerance	0.002%
Antenna Impedance	50 Ohms
Power Requirements	13.2 Volts DC, Positive or Negative Ground

Fig. 3-2.

CHAPTER 4

Truck Installations

Most truckers use a conventional underdash CB transceiver. Some take two CB sets along, one for use as a spare. The set is secured by its mounting bracket in a position where its controls are readily accessible. It can be mounted on the floor, under the dash or above the windshield. Special mounts are available that allow quick removal of the CB set. Then, the driver can carry the unit with him to prevent theft. Tandy catalogue number 21-0566 (figure 4-1) is an underdash mount while catalogue number 21-0568 is a floor mount.

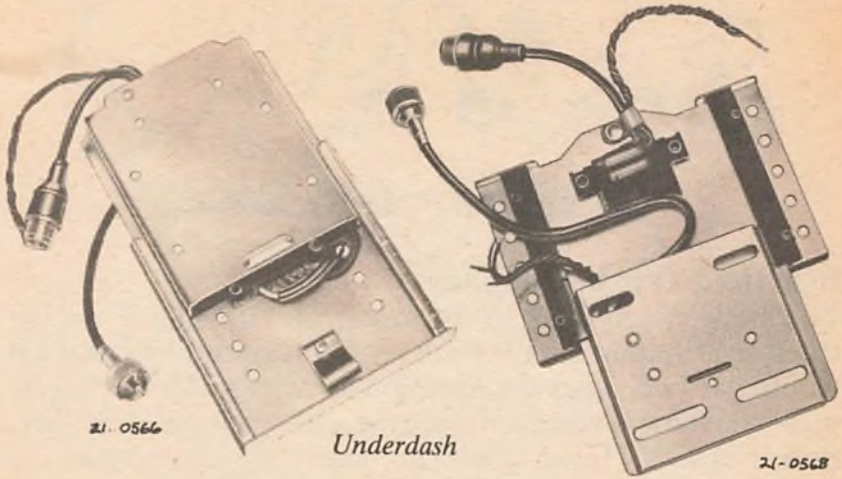
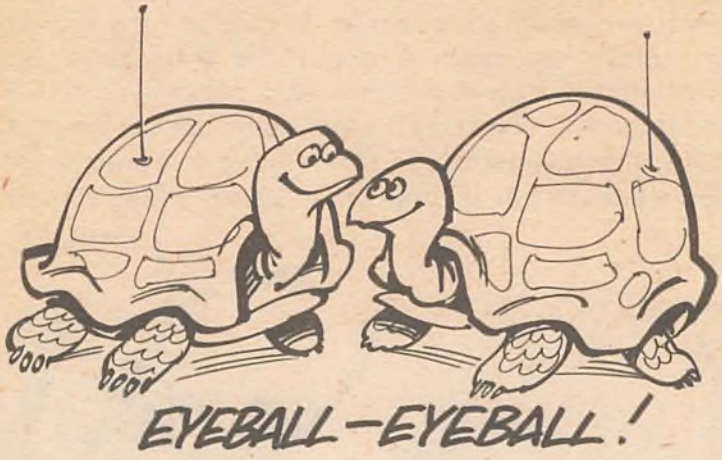


Fig. 4-1. Anti-theft quick removal mounts.

The Power Source

Electric power for the CB set is derived from the truck battery. The power cable of the CB set can be connected to a power terminal block that is located under the dash or it can be connected directly to the battery terminals. The power cable may be extended if necessary. Since some trucks have a positive-ground electrical system, caution should be exercised when making the power connections. The red wire of the cable goes to the positive side of the electrical system and the black wire to the negative terminal.



Practical Truck Antennas

The most practical place to install the antenna is on the tractor. If mounted on the cab roof, a taller trailer behind it would partially block transmission to the rear. However, the most convenient place to install the antenna is on a rearview-mirror bracket. Here, it is higher above the ground than the antenna on a 4-wheeler. But, it is not entirely in the clear. It is too close to the tractor body, and its radiation pattern is not truly omnidirectional, but it will work.

Antenna Mounts

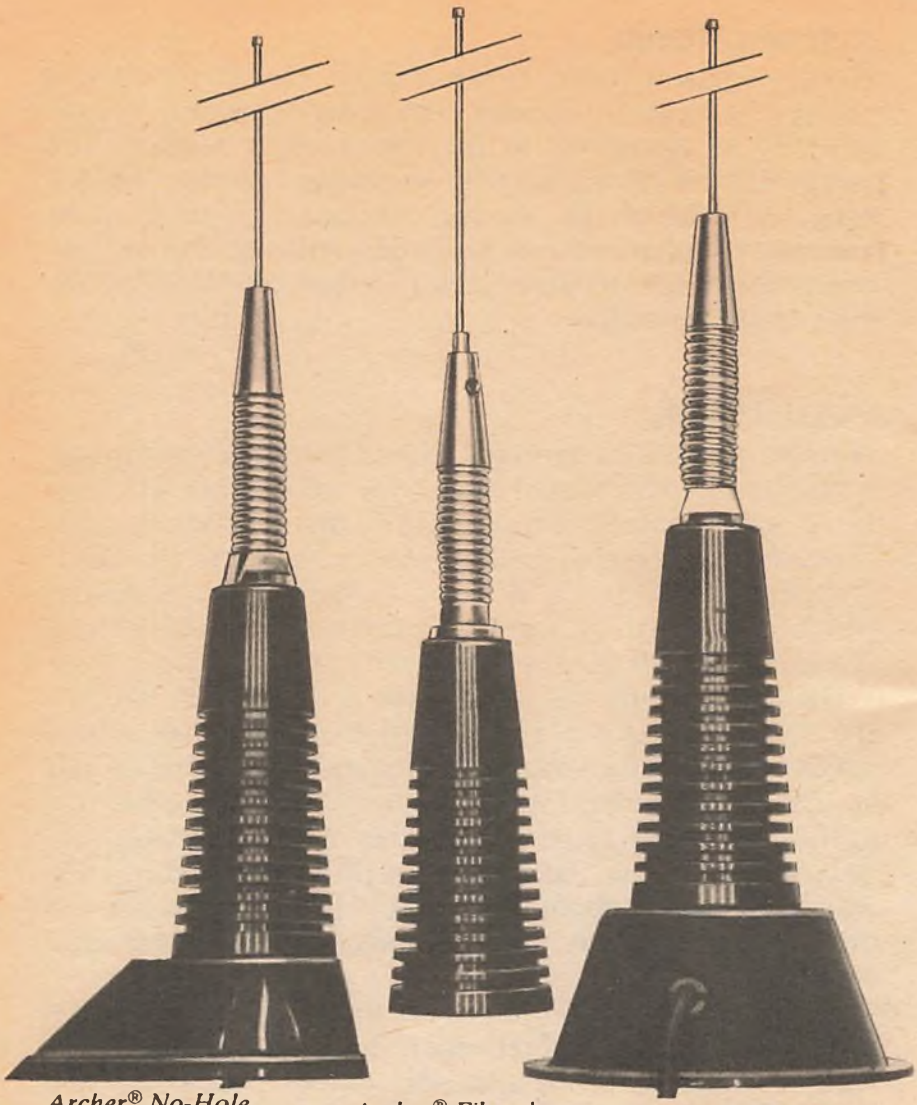
If only a single rod antenna is to be used, the antenna may be secured to a mirror bracket. The mirror mount is usually designed to clamp on to the round upper support arm (vertical) of a rearview-mirror mounting bracket. When a wing nut is used, the device can be easily installed or removed. The antenna is fastened to the device and the transmission line (coaxial cable) is then connected at the bottom of the antenna.

Coaxial Cable

A single antenna is connected to the CB transceiver through a length of 52-ohm coaxial cable (type RG-58/U or RG-58A/U). It is not the resistance of the cable that is 52 ohms; it is its characteristic. Coaxial cable consists of a centre conductor (copper wire) within a dielectric (polyethylene insulation) which is covered by the outer conductor (metallic-braid shield) and which, in turn, is covered by a protective jacket.

Radio energy travels through the coaxial cable (which is the equivalent of a 2-wire circuit) to the antenna system which consists of the antenna and the tractor body, which acts as the ground plane for the antenna. Since no cable is a perfect conductor, some of the energy is lost in the cable. In a 16 foot length cable, the attenuation (loss) is around 0.34 dB, which means that about 7 per cent of the energy is lost and only 93 per cent gets to the antenna system, under ideal conditions.

But, ideal conditions do not exist. Thus, some additional energy is lost because of reflection and ground losses. Under ideal conditions, the transceivers output impedance, the cable impedance, and the antenna impedance should all be 52 ohms. Then, the SWR (standing wave ratio) would be 1 : 1, but, this is never the case in practice. When the antenna



Archer® No-Hole Trunk-Mount Antenna.

Archer® Fibreglass Roof-Mount Antenna.

Archer® Base-Loaded Magnetic Mount Antenna.

Fig. 4-2.

impedance is not exactly 52 ohms, some of the energy is reflected back to the transceiver. Invisible standing waves are formed along the cable. If the SWR is less than 2:1, the additional loss due to SWR is insignificant. If the SWR is higher, it is the fault of the antenna.

When feeding a single antenna, the cable length is not critical. It can be cut to the desired length. When doing so, the PL-259 plug at the transceiver end of the cable must be reinstalled. If you're not handy with small tools, you can use a solderless type PL-259 plug.

A Temporary Antenna

If you don't own the vehicle you drive and the owner objects to the permanent installation of an antenna system, you can use an Archer® magnetic-mount antenna such as Tandy, catalogue number 21-0940, shown in figure 4-3.

Antenna Check

You can measure the standing wave ratio of your antenna by connecting an SWR meter in series with the coaxial cable, as shown in figure 4-4. In addition to the SWR meter, you will need a coaxial patch cord (Tandy, catalogue number 278-0968) which consists of a 2-foot RG-58/U cable with a PL-259 connector at each end.

Once the SWR meter is hooked up, set the transceiver to Channel 20. Then, key the transmitter to ON and adjust the meter as explained in its instruction book. If the SWR is 1.5:1, the antenna system is apparently functioning properly. Repeat the SWR measurement on Channels 1 and 40. If the reading is higher than 2:1, adjust the antenna (if it is

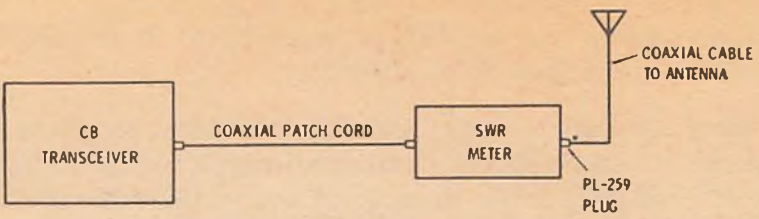


Fig. 4-4. Hookup of SWR Meter for Testing Antenna.

adjustable) to reduce SWR so that the SWR is the same on both Channels 1 and 40.

In addition to measuring SWR, you can use a field strength (FS) meter to measure the intensity of the radio energy – set the meter several feet away from the tractor. (Catalogue number 21-0525 is a Micronta® combination FS/SWR meter). A technician often tunes a transmitter for the maximum output power, then measures the SWR, and the radiated field strength.

Transmitting Range

A two-way radio communicating range is greatly affected by the antenna system and its location. In flat, barren country, a truck-to-truck range of 5-7 miles is considered normal. However, when you are on the crest of a high hill, your range can be considerably greater.

During some hours of the day, when sunspot activity is strong, you might hear or be heard by CBers hundreds of miles away. This is called "skip" transmission. The signals travel upward at an angle to the ionosphere and are reflected back to earth at a distant point, hundreds of miles away.

CHAPTER 5

Car Installations

Never before has there been such a wide selection of CB transceivers for use in cars. All the new mobile transceivers that can be legally sold are equipped for operation on all 40 CB channels.

Underdash Transceivers

The most popular type of mobile CB transceiver is designed to be mounted under the dash of a vehicle or on the floor or transmission hump, through a special mounting bracket. The Realistic® TRC-2000 (shown in figure 5-1) is a deluxe 40-channel mobile CB transceiver employing a phase-locked loop (PLL) synthesizer for ultra-precise frequency control. Its dual-conversion receiver with ceramic filters helps minimise adjacent channel interference (bleedover).

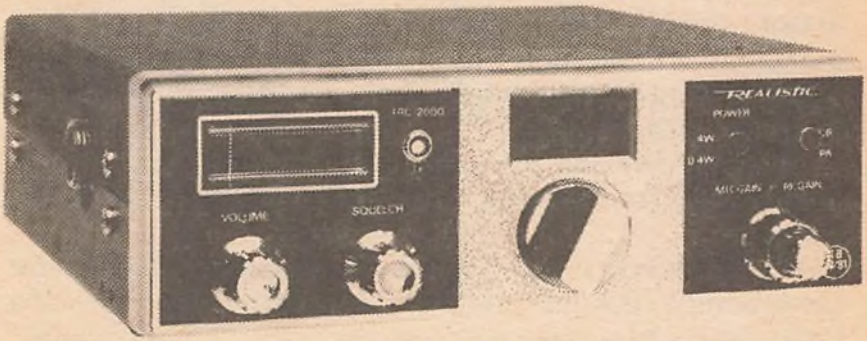


Fig. 5-1. A 40-Channel Mobile Transceiver. (27 MHz FM) TRC-2000.

Although all our CB transceivers employ an ANL (automatic noise limiter), the TRC-2000 also employs a built-in noise blanker (NB) that reduces impulse-type noise to an absolute minimum. The selected channel is displayed by an easy to read 7-segment LED display. In addition to an S/RF meter, this unit has a TX indicator LED to confirm it's transmitting. An RF gain control on the front panel allows for sensitivity adjustment of the receiver to minimise overload interference or distortion from very strong nearby stations. The set also has a MIC gain control.

FM

CB transceivers in use in the United Kingdom are of the 27 MHz FM type only. They transmit and receive frequency or phase modulation radio signals. This is the type of modulation used by many radio broadcasting stations. It is effective and easy to use.

Antennas for Cars

If you have ever driven a car with the radio antenna built into the windshield, you know that reception is marginal. An external antenna is more satisfactory. The problem is analogous to the question posed by a photographer, "why doesn't my CB walkie-talkie work as well inside my car as outside?" His question was answered by another question, "when taking a picture of the dining room, would you fire a flash gun in the bedroom?"

An ideal antenna for an automobile would be a 4-foot stainless steel or fibreglass whip mounted in the centre of the car roof.

The antenna is most effective when located as high above the ground as possible and when mounted in the centre of a large flat metal surface which serves as the "ground plane". Then the antenna will be able to radiate and pick up radio

Fig. 5-2. CB/Scanner Extension Speaker.

Fig. 5-3. A Roof-Mount Antenna.

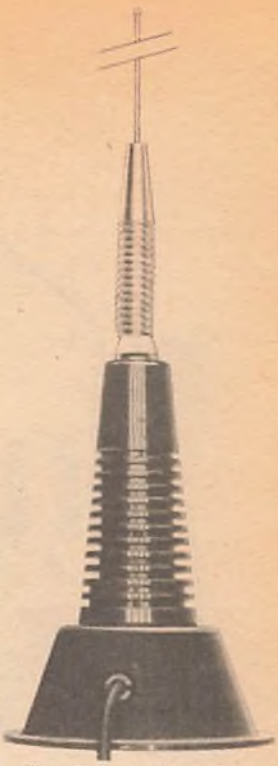


Fig. 5-4. A fibreglass No-Hole Trunk-Grip Antenna.

Fig. 5-5. An Archer® Trunk-Mount Antenna.

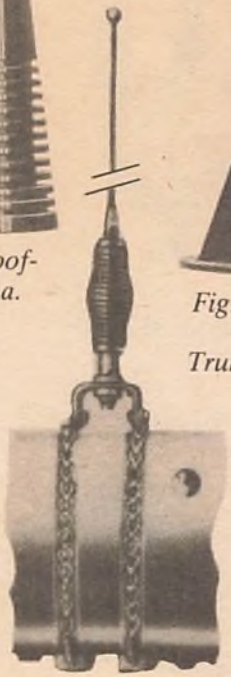


Fig. 5-6. A Bumper-Mount Fibreglass Antenna.

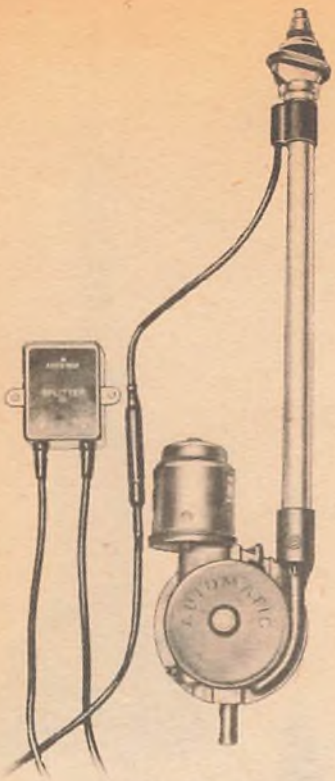


Fig. 5-8. A Retractable Antenna.

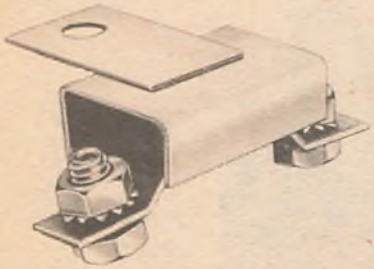


Fig. 5-9. An Alternator/ Generator Noise Filter.

Fig. 5-10. Deluxe Filter for Attenuating Ignition/Alternator Noise.

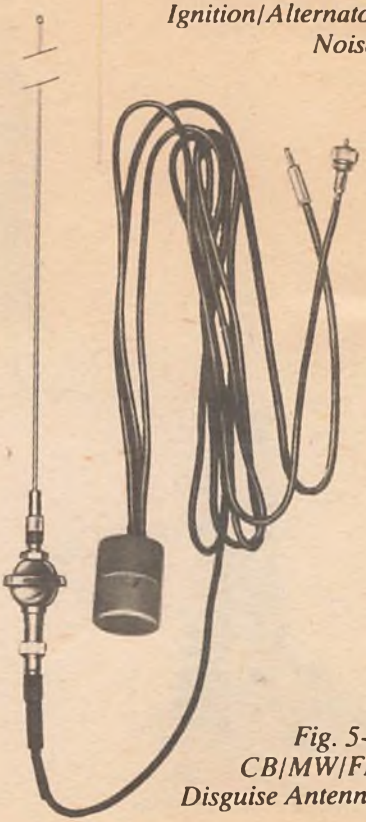


Fig. 5-7. CB/MW/FM Disguise Antenna.

energy in all directions. Throw a rock into a still pond and note how the waves travel in all directions from the point where the rock entered the water. That's the way radio waves should travel from a vehicle. We must remember that if an antenna is mounted at a height exceeding 7M, the licence will require a reduction of 10 dB in transmitting power.

In spite of the better efficiency of a roof-top antenna, most people prefer one that is mounted on the boot lid. Because of this, there is a wide selection of antennas for mounting on the boot. Tandy catalogue number 21-0926 shown in figure 5-4 is an Archer® fibreglass antenna that can be mounted in the centre or on either side of the boot lid without having to drill any holes. The Archer® graphite boot-grip antenna shown in figure 5-5 combines the best features of stainless steel and fiberglass (catalogue number 21-0975). It remains more vertical at high speeds for a more uniform signal pattern. It can be mounted in the centre or on either side of the boot lid without drilling any holes.

Tandy offers three different types of "disguised" antennas for CB operation. Archer® cowl-mount CB/FM/MW antenna with no visible load coil (catalogue number 21-0990) has a sealed loading coil and a stainless steel whip (fig. 5-7). The ball-mount assembly allows mounting on any surface with a maximum slant of 35° from horizontal. The Archer® side-mount combination CB/MW/FM antenna (catalogue number 21-0930) is a "disguised" CB antenna that is also a replacement for an auto radio antenna. This 50-inch telescoping antenna can be used for an in-dash set or will serve both an auto radio and a CB transceiver equally well.

Interference

The noise generated by the ignition system of a nearby car can often be heard on the CB transceiver, and little can be done about it. A transceiver with an automatic noise limiter (ANL) circuit is less susceptible to this type of noise. A transceiver with both ANL and NB (noise blanker) is even more immune to ignition noise.

However, when your own car generates the noise you pick up, steps should be taken to minimise the noise radiation at the source of the noise. To determine if your car is the source of the noise, set the CB transceiver to receive a very weak signal, and start the car engine. If the noise is then heard but disappears when your turn the engine off, it is your car that is at fault.

Your first step is to install ignition noise-suppressors.

If a whining sound is heard in your CB receiver while the engine is running, it could be coming from the alternator or generator that charges the battery. This kind of interference can be eliminated by installing a Tandy noise filter, like the one shown in figure 5-9 (catalogue number 21-0509). This filter is attached to the generator/alternator. Installation instructions are supplied with it. A heavy duty deluxe filter

for ignition/alternator noise (catalogue number 270-0050) is shown in figure 5-10.

CHAPTER 6

CB on Boats

More than a million CB sets are in use on boats in other parts of the world. They far outnumber VHF marine radios. There are many boating areas where CB is the only type of radio communication used on boats. For safety, no boat should be sailed beyond hailing distance of the shore without a two-way radio on board, even if it is only a CB walkie-talkie.

Although there are many international VHF marine radio channels, most are not available for use by pleasure craft. The typical VHF marine radio, used on a pleasure craft is operable on up to 12 channels, but most are equipped with crystals for operation only on six or fewer marine channels. The marine channels may not be used for chit-chat and other non-essential communications. These channels may be used legally only for communications relating to safety, navigation and operation of the vessel. This rule, of course, is violated by many. In some areas, the marine channels sound like CB channels. Even the Safety and Calling Channel, 156.8 MHz is sometimes tied up.

A boat equipped with a CB set is not subject to the same restrictive rules. The CB channels may be used to talk about any lawful activity. Therefore, some boat owners have installed both a VHF marine radio and a CB set. The former is used for safety and navigational communications and for utilising marine telephone service. The latter is used for communicating with CB stations on other boats, in motor vehicles and at fixed locations on shore. Many boat owners feel that a CB set on board is more useful than a VHF marine radio and that a CB set alone would suffice.

Transceiver Location

The CB transceiver should be installed where its controls are readily accessible to the operator. However, it should be mounted where it will not be exposed to direct sunlight and/or water spray. Sunlight can cause the temperature of the unit to rise too high, which could cause premature failure of transistors and other components. When mounted so that it is not exposed to the elements, the transceiver should also have adequate ventilation. Without adequate ventilation, the heat generated by the electric current flowing through the circuits could cause an excessive temperature rise. Exposure of the unit to salt-water spray can cause internal and external corrosion and, thus, cause short circuits. Also, on a power boat, the transceiver should be placed as far as possible from the engine, in order to minimise pickup of ignition or diesel noise.

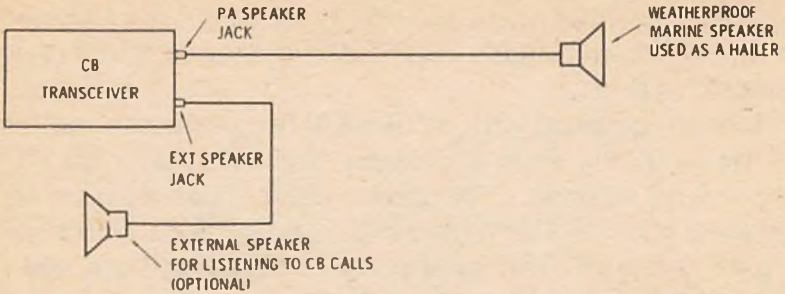


Fig. 6-2. Hook-up of a "Hailer" Speaker.

"Hailer" Feature

Many Realistic® CB sets mentioned have a public address (PA) feature. By connecting a Tandy horn speaker, catalogue number 40-1244 or 49-0500, to the PA speaker jack, the CB set can be used as a hailer. (See Figure 6-2.)

Fig. 6-1. Tandy Powerhorn® Weatherised Speakers.

Power Source

Most power boats have a 12-volt electrical system employing a 12-volt lead-acid storage battery and an alternator or generator, which is driven by the engine, for replenishing the charge in the battery. Power should be taken from a properly fused distribution point.

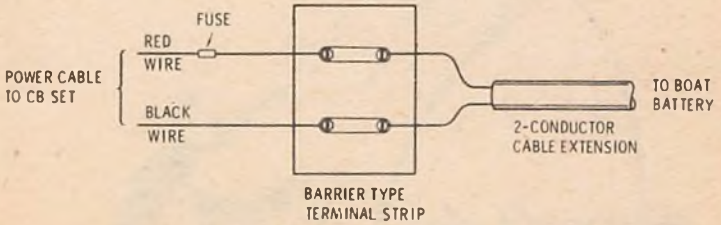
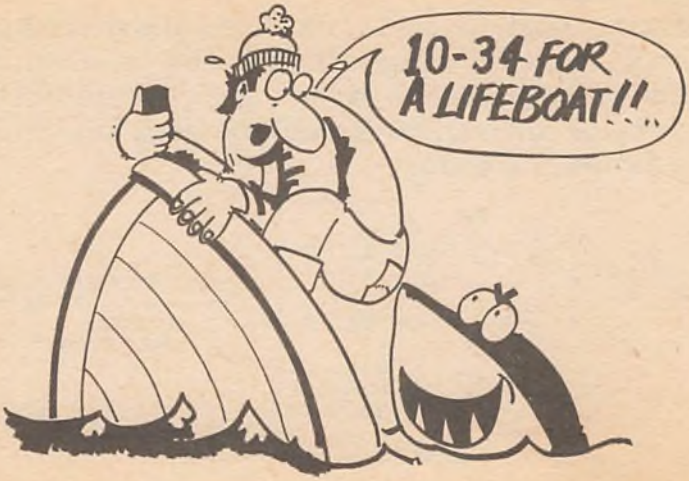


Fig. 6-3. Extending the Power Cable.

On a boat with a 24-volt electrical system, you will need a separate 12-volt battery for the CB set. It can be kept charged by floating it across the higher-voltage dc power line through a ballast resistor, as shown in Figure 6-4. To determine the resistance and power rating of the ballast resistor, consult an electrician at a marina. As a general rule of thumb, if your CB set draws an average of 0.5 ampere (average of standby, receive and transmit current per hour), and the CB set is turned on an average of eight hours per day, the ballast resistor should allow up to 0.5 ampere of charging current to flow during that eight hour period.

When the boat engine is not running and no charging current is supplied to the main battery, the auxiliary CB battery will draw current from the main battery. If there is a chance that this could run down the main battery, means should be provided for disconnecting the auxiliary battery charging circuit. A manually operated switch located on the bridge could be used for this purpose. If connected as shown in figure 6-4, a pilot lamp at the bridge would glow to indicate that the charging circuit is turned on.



On a sailboat or other vessel having no electric power source, a CB set can be operated from a freshly charged 12-volt automobile battery, which will deliver 12.6 volts. It could be taken off the boat for recharging or hooked up to a shoreside charger, when docked. When weight is a consideration, a CB set can be operated from a 12-volt portable lantern battery to deliver 12 volts to the CB set. Battery life will depend on the amount of time the CB set is in use. In the stand-by mode (squelched), current is usually a small fraction of an ampere. In the receive mode (unsquelched), current is still less than one ampere. However, in the transmit mode, current is usually between 1.5 and 2 amperes. By minimising transmit time, battery life can be extended.

A CB transceiver will deliver less audio output power and its receiving sensitivity may be less when the power source delivers less than 13.8 volts. When the battery is kept charged

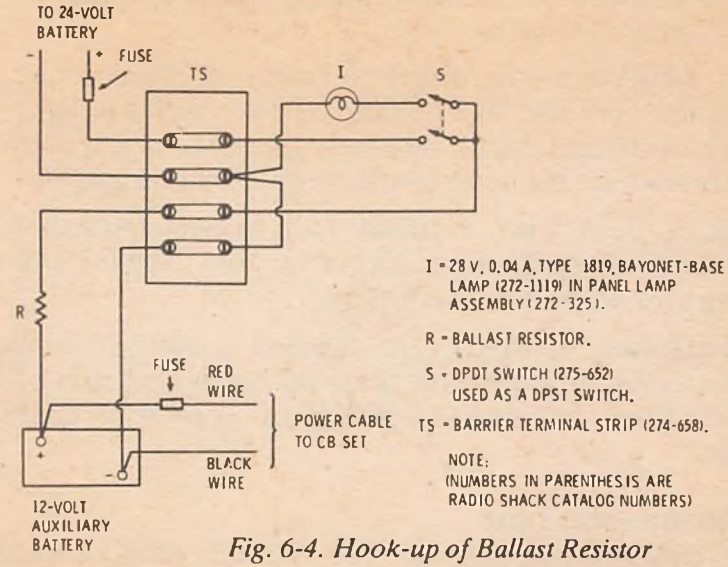


Fig. 6-4. Hook-up of Ballast Resistor and Charging Control.

by an alternator or generator, the battery delivers around 13.8 volts, while the engine is running. With the engine turned off, a fully charged lead-acid battery delivers 12.6 volts.

Interference

Ignition, alternator or diesel noise can be very severe on a power boat. Since the engine is not within a shielded compartment as in a car, the radiation from the high-voltage cables can be quite strong. However, the intensity of the radiation can be reduced by installing noise suppressors at the spark plugs, distributor and ignition coil. Great care is needed with suppressors to avoid damage to rectifying diodes.

To minimise other noises, a filter may be required at the alternator or generator. In general, the engine noise problems are the same as with a car except that they may be more difficult to solve.

In addition to the direct radiation of engine noise, re-radiation may also be a problem. Power cables to lights and other electrical devices may pick up engine noise, convey it and re-radiate the noise in areas away from the engine.

On a boat with a metal hull or superstructure, an automotive-type CB antenna can be used. The metal serves as the ground plane of the antenna system.

Regardless of which type antenna is used, it should be mounted as far as possible from the engine, when used on a power boat, to minimise pickup of ignition or alternator noise.

Transmission Line

The antenna transmission line (coaxial cable) should be secured and run to the CB set by the most direct route.

However, it should not be run close to the engine of the power boat, nor alongside any electrical wiring. Even if shielded, the cable can pick up ignition noise when close to the noise source or close to wires which might carry and re-radiate noise. When the cable supplied with the antenna is

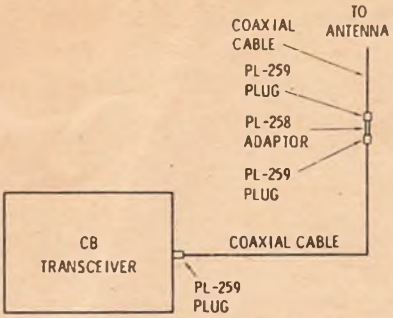


Fig. 6-5. Use a PL-258 Adaptor when extending coaxial cable.

not long enough, it can be extended, but it cannot be spliced. Instead, connect the PL-259 plug at the end of the cable leading to the antenna through a PL-258 in-line adaptor to the PL-259 plug connected to the end of the extension cable as shown in figure 6-5. The extension cable should be either type RG8/U or RG58/U. These cables are available by the foot or in 50-foot lengths with PL-259 plugs attached (catalogue numbers 278-970 and 278-971). The RG8/U cable has the lower loss. (Catalogue Number 278-972 is for 100 feet of RG8/U cable and Catalogue Numbers 278-966 and 278-967 are for 20-foot lengths of RG58/U cable.)

CHAPTER 7

CB Accessories

When you buy a CB set, you might yearn for accessories not supplied as initial equipment. For operational purposes, you may not have a real need for them. But, you would like to have at least some of them.

Noise Filters

If your CB reception is marred by electrical noise from your vehicle's battery-charging system, installing an alternator noise filter (Tandy Catalogue Number 21-509) will eliminate this kind of interference. It passes dc but shorts out the ac ripple. If your vehicle has a generator, you can add the same noise filter to the generator. Never disconnect your battery with the engine running, disconnection ruins the alternator diodes and hence the alternator itself.

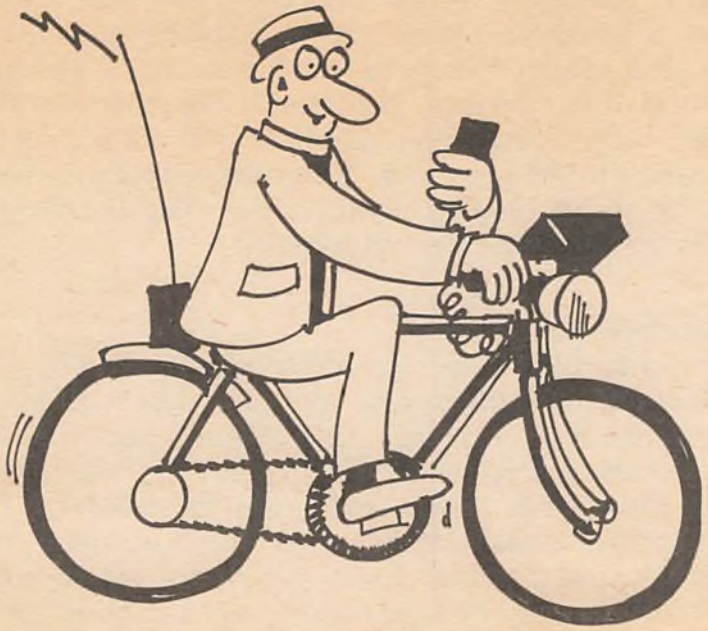
Instruments

A micronta SWR meter (catalogue number 21-525) can be installed permanently in your vehicle or boat. Connect it as shown previously in Figure 4-4 of Chapter 4. Secure the SWR meter where you can easily see it. Then, you will be able to check the output power and SWR frequently. A field strength/SWR meter (catalogue No. 21-525) can be mounted in the cab of your vehicle. It will give you an indication of the SWR and the relative output power every time you transmit.

Speakers

If you have a need for a loud hailer, you can install a marine-type horn speaker (Tandy Catalogue Number 49-500) on the roof of a truck, cab or on a bumper. When connected to the PA speaker jack on your transceiver, you will have formed a mobile public address system. To use it, flip the CB-PA switch to the PA position, operate the PTT switch and talk into the mike.

In a noisy vehicle, it might be difficult to hear the CB transmissions emitted by the tiny speaker inside your transceiver. If you need a louder sound, you can add an external speaker such as Tandy catalogue number 21-549. Connect it to the EXT speaker jack on your transceiver. When the external speaker is plugged in, the built-in speaker is automatically cut off.



Microphones

The microphone supplied with your transceiver should be adequate if used properly. However, if you want another mike, the new microphone must match the characteristics of your transceiver. If your transceiver has a plug-in mike, you can use a different mike provided the new one is terminated in a plug that fits your set and provided the plug is correctly wired.

In a noisy cab, a preamp "noise-cancelling" mike (Tandy catalogue number 21-1175) might improve your transmission. It is acoustically designed to pick up sound from the front and to cancel out sounds from other directions. It cuts road, engine and background noise so your message gets through more clearly.

One of the most popular CB accessories is a "power" mike. Tandy mobile preamp mike (catalogue number 21-9031) contains a transistor amplifier that boosts the signal developed by the mike element. It will enable you to modulate more heavily without talking loudly or more closely into the mike. An output level control is provided. It should be adjusted so that the mike doesn't overdrive the transmitter's speech amplifier. If it does your voice will be distorted. Also, if the output level is set too high, illegal overmodulation may or may not result, depending on the effectiveness of the overmodulation-prevention circuit in your transceiver.

IMPORTANT

Do not at any time transmit without making sure that your aerial is connected, or using a dummy load, this can cause serious damage to your set.

Glossary

AC – Abbreviation for alternating current. 240 VAC is 240 volts of alternating current. Normal house current.

AC/DC – Abbreviation for alternating current or direct current. Term is applied to equipment designed to operate on either kind of current such as base/mobile transceivers which may be powered from 240VAC or 12 VDC.

Align – To adjust or tune a circuit to the proper frequency.

Amateur Radio – Another radio communications service licensed by the Home Office. Amateur radio operators, also known as "Hams" must pass a test of Morse code proficiency, electronics theory and regulations in order to obtain a licence. Amateur radio is strictly for hobby and experimental purposes and may not be used for business.

Amplifier – A device or circuit which increases the strength of a signal. In CB transceivers, an amplifier is used to increase the strength of the received radio signal to an audible level. (R-F amplifiers burners are illegal in UK.)

Antenna – A metallic structure, usually an arrangement of rods or wires, used for receiving or radiating radio signals. In UK only a single rod or wire maximum length 1.5 m allowed.

ANL – Abbreviation for automatic noise limiter. An ANL circuit is used in CB transceivers to reduce noise or interference such as that caused by auto ignition systems.

Automatic Gain Control – A circuit which automatically maintains a signal at a certain desired level even though the source, or input may vary in level.

Background Noise – Noise heard along with the desired sound signal. Usually caused by atmospheric interference. On 27 MHz usually man made electrical noise from industrial and domestic electrical equipment.

Band – A range of frequencies between two definite limits. For example, the medium frequencies broadcast band includes all frequencies from 535 to 1605 kHz. Citizens Band includes the frequencies between 27.60125 and 27.99125 MHz.

Base Station – A CB radio station, usually installed in a fixed location and operated from 240 VAC. Also can be a station used as the central or control station of a group of stations.

Call Letters – The system of letters and numbers adapted by an individual CB licencee to identify his or her transmission stations.

Carrier – A radio wave of constant amplitude, frequency, and phase at a particular frequency of operation. This radio wave is altered in frequency or phase to "carry" the intelligence (voice signal) to be transmitted.

CB – Abbreviation for Citizens Band.

Channel – A specific frequency used for communication. In CB , each frequency is assigned a designated channel number. For example, channel 9 is 27.68125 MHz.

Channel Selector – Switch or dial used for selecting the specific channel being used.

Coax – Abbreviation for coaxial cable. A two-conductor cable, or transmission line, in which one conductor completely surrounds the other and acts as a shield for the inner conductor. Used for connecting the antenna to the transceiver.

Communication – The transmission of information from one point, person, or piece of equipment to another.

Communications Receiver – A radio receiver designed for reception of radio signals from stations operated primarily

in the 535 to 1605 kHz broadcast band and 1 to 30 MHz shortwave radio bands.

Crystal – In CB, a piezoelectric natural quartz or synthetic crystal that has been ground to the proper size to produce a natural vibration at the desired frequency and to produce that frequency when set into vibration. Crystals are used to control the frequency, or channel, on which a CB set operates.

Crystal Control – The use of a crystal to maintain a transmitter (or receiver) on its assigned frequency.

DC – Abbreviation for direct current. Batteries are a source of direct current, such as the 12 VDC battery used in most cars and trucks.

Dual Conversion – Type of receiver circuit design which provides greater selectivity.

Effective Radiated Power – Abbreviated ERP. The antenna input power times the gain of the antenna expressed in watts. A measurement of effective signal power being radiated from an antenna. It may be more or less than the input provided by the transmitter.

FET – Abbreviation for field effect transistor. A semi conductor whose application is similar to a vacuum tube. Typically used in high-performance receivers.

Field Strength Meter – A measuring instrument for determining the relative strength of radiated energy (field strength) from a transmitter.

FM – Abbreviation for frequency modulation, which is one of the modes used (the other being phase modulation pm) to convey voice signals in CB communications in UK.

Filter – A selective network of resistors, capacitors, crystals, inductors or combinations of these elements which allow certain frequencies or signals to pass easily while opposing the passage of others. Filters are used, for example, to block noise impulses or signals while alowing the passage

of the desired radio signals.

Frequency Synthesizer – Circuit used in CB transceivers to provide full 40-channel operation without the need for 40 separate pairs of crystals. The frequency synthesizer uses various combinations of several crystals to achieve full 40-channel capability.

Fuse – A protective device, usually a short piece of wire which melts and breaks when a current which exceeds its rated value flows through it.

Fuse Block – An insulating base on which fuse clips or other contacts are mounted.

Gain – Any increase in power.

Gain Control – A device for varying the gain of an amplifier or system.

Ground – A metallic connection with the earth to establish a zero-electrical potential.

Grounded – Connected to earth or to some conductor which takes the place of earth.

Ground-Plane Antenna – A non directional vertical antenna with metal radials which create an artificial ground, thus permitting the antenna to be mounted above the actual, or earth, ground.

Ground Wave – A radio wave which travels along the earths surface, as opposed to waves reflected from the upper atmosphere (sky waves).

Ham – Slang for amateur radio operator.

Hertz – A term meaning cycles per second. Abbreviated Hz.

High Frequency – The frequency band between 3 and 30 MHz which includes Citizens Band. Abbreviated hf.

Ignition Noise – Interference produced by sparks or other ignition discharges in a car, motor, furnace, or other type of ignition system.

Impedance – The opposition a circuit offers to the flow of alternating current.

Impedance Match – The condition in which the impedance of a component or circuit is equal to another impedance to which it is coaxial cable and transceiver of a CB station. With proper impedance match there will be maximum transfer of energy.

Input – The driving force applied to a circuit or device. Also, the terminals (or other connection) where the driving force may be applied to a circuit or device.

Input Power – The amount of DC power (wattage) applied to the final or RF power output stage of a transmitter.

Integrated Circuit – Abbreviated IC. A subminiature device which contains a combination of interconnected circuit elements. Integrated circuits are used in CB equipment for both their size and reliability.

Interference – The disturbance of reception of desired signals by undesired or stray signals. Interference may come from atmospheric conditions, electrical devices such as ignition systems or from other stations operating on the same channel.

Jack – A socket to which a wire (or wires) is connected to one end and a plug is inserted into the other. Your CB microphone has a plug which is inserted into the microphone jack on your receiver.

kHz – Abbreviation for kilohertz. 1000 cycles per second.

Kilo – Prefix meaning 1000.

Lead – A wire to or from a circuit.

LED – Abbreviation for light emitting diode. Used for panel lights and digital readouts in electronic equipment.

Line Filter – A device inserted in series with the power line to block noise or other interference from devices such as motors.

Line of Sight – The distance from an elevated point to the optical horizon, or another elevated point which may be beyond the optical horizon.

Load – Any energy of power consuming device which is connected to another device that is supplying power or energy to the first device. An antenna serves as a load for the power output of a CB transmitter.

Loading Coil – A coil of wire used in many antennas which serves to electrically lengthen the antenna while permitting it to be shorter physically.

Mega – Prefix meaning one million.

Meter – An electrical or electronic measuring device.

MHz – Abbreviation for megahertz. One million cycles per econd.

Microphone – A device for converting sound waves into an electrical signal.

Milli – Prefix meaning one thousandth.

Mobile Radio – A two way radio that is either portable or installed for use in a car, boat, truck or other vehicle.

Modulate – The placing of voice information on a radio signal.

Modulation Indicator Light – Lamp on a CB transceiver which gives a visible indication of modulation.

Multimeter – A test instrument with suitable switching facilities to measure voltage, current and resistance. Also called a volt-ohm-milliammeter (VOM).

Negative – Usually the grounded side of a battery. Also referred to as the minus or "–" side.

Nickel-Cadmium Cell – A battery cell with a positive electrode of nickel and oxide and a negative electrode of cadmium. Often used in walkie-talkies or other devices where re-chargeable batteries are desired.

Noise Blanker – A circuit which momentarily silences the receiver (without a perceptible loss of audio intelligence) during brief noise bursts. Superior in performance to an automatic noise limiter.

Noise Limiter – See ANL.

Omnidirectional Anetnna – An antenna which radiates or receives signals equally in all directions.

Phase Lock Loop – Circuit used with digital frequency synthesizers for maximum stability of frequency.

Piezoelectric – The property exhibited by the crystals used for frequency control in CB transceivers which causes a voltage to be produced when they are subjected to mechanical stress, and conversely, a mechanical stress to be produced when they are subjected to voltage.

Plug – A device attached to the end of a cord. When inserted in a jack, it establishes a connection between the conductor or conductors.

Positive – The plus "+", or usually ungrounded side of a battery.

Power Output – The power in watts delivered by a transmitter to the antenna. In CB this is limited to 4 watts maximum on FM.

Power Supply – A unit or circuit which supplies electrical power to another unit or to the balance of a circuit. In CB transceivers the power supply is an internal part of the circuitry.

PTT – Abbreviation for press-to-talk or push-to-talk. A transmit/receive switch usually a button mounted on a microphone, which when pressed puts the transceiver in the transit mode, when released in the receiver mode.

Q Signals – A system of three letter abbreviations starting with the letter Q. Each code is an abbreviation for a complete statement. For example, QRT means "stop transmitting", QRX means "stand-by". Can also be used as questions.

Radio – A general term referring to the use of electromagnetic waves. In particular, communication by electromagnetic waves transmitted through space.

Radiocommunication – A term used to denote transmission

of sound pictures, signals, writing, etc., via radio.

Radio Frequency – Any frequency between an audio sound and the infrared light portion of the spectrum. Abbreviated RF.

Radio Horizon – The line beyond which direct radio waves cannot continued along the earth's surface. This distance is affected by atmosphere refraction; hence, it is not constant and does not necessarily equal the optional horizon.

Radio Receiver – A device for converting radio waves into sound.

Radiotelephone – The complete radio receiver and transmitter (or transceiver) required at one station for voice radio communication.

Range – The maximum distance at which reliable communications may be maintained.

Receiver – A device equipped for reception of incoming electrically transmitted signals.

Regulated Power Supply – A power supply in which the output voltage is held constant as the load or source is varied.

RF – Abbreviation for radio frequency.

RIG Slang for transmitter or transceiver.

Scanner – A monitor receiver which scans or sequentially samples a number of frequencies, or channels for the presence of a signal.

Schematic Diagram – A line drawing of an electrical circuit in which the electrical connections and components are represented by graphical symbols.

Selectivity – The ability of a receiver to reject transmissions from frequencies other than the specific one to which it is tuned.

Sensitivity – In a receiver, the minimum input signal required to produce a specified output at a special signal-to-noise ratio. A more sensitive receiver circuit will be able to

detect, or receive, weaker signals than a less sensitive receiver.

Series – A way of arranging components end to end so that current flowing through one component must flow through all others.

Shielded Cable – A cable in which the insulated conductor (or conductors) is enclosed in a conducting envelope which is grounded to reduce the effect of magnetic or electrical fields.

Short Circuit – Also called just "short". An abnormal relatively low-resistance connection between two points of a circuit. Usually accidental or unintentional, as when two wires touch that should be separated.

Shortwwaves – Radio frequencies which fall above the broadcast band and are used for long-distance sky-wave communications. Typically 3-30 MHz.

Sidebands – The frequency bands on both sides of the carrier in which the voice intelligence is carried.

Signal Strength – The strength of the signal from a transmitter delivered at a specific location.

Signal-To-Noise-Ratio – A ratio of the magnitude of a signal to that of the noise.

Single Sideband – A transmission system in which only one of the sidebands produced during modulation is transmitted and the other is suppressed. The carrier wave is also suppressed.

Sky Wave – A radio wave that has been reflected from one of the layers of the ionosphere.

S-Meter – A meter used in some CB transceivers to indicate the strength of the received signal. A signal strength meter.

S/RF Meter – As above, and also provides an indication of transmitter power output.

Solid-State – Devices that control current without moving parts, heated filaments, or vacuum gaps. Semiconductors

and transistors are typical solid-state devices.

Speaker – A device which concerts electrical signals back into sound.

Speech Amplifier – A voltage amplifier between (or sometimes built-into) the microphone and the transmitter.

Squelch Circuit – A circuit in a receiver for reducing the background noise in the absence of signals.

SSB – Abbreviation for single sideband.

Static Noise heard on a radio receiver due to atmospheric electrical disturbances such as lightning or man-made interference from electric motors, lights, etc.

Static Charge – The accumulated electrical charge on an object.

Static-Charge Unit – A grounded protective device consisting of a spark gap and attached to a lead-in to allow built-up excessive static electricity on the antenna to flow across the gap to ground rather than along the lead-in to the radio equipment.

Surface Wave – A ground wave which travels along the surface of the earth.

Switch – A mechanical or electrical device which breaks or completes a path for electrical current.

SWR – Abbreviation for Standing Wave Ratio. SWR is measured to determine how well matched a CB system (transceiver, antenna, antenna cable) is. A low SWR measurement (1:5 or better) is an indication that the system is operating efficiently, with a minimum of loss.

SWR Bridge – Meter used for measuring SWR.

10 Code – Numbered abbreviations prefixed by "10" used to convey specific messages. For example, 10-20 stands for "location", 10-4 means "affirmative" or "message received". Can also be used as questions.

Terminal – A point for the connection of two or more conductors.

Traffic – Messages handled by communications stations.

Transceiver – A combination transmitter and receiver housed in a common cabinet and employing some common circuit components for both transmitting and receiving.

Transistor A solid-state device made from semiconductor material which is typically used to amplify.

Transmit – To send a message, programme or other information from one location to another.

Transmitter – The equipment used to generate and amplify an rf carrier signal and modulate this carrier with intelligence.

Tuning – The adjustment of the frequency of a circuit or system to obtain optimum performance.

TVI – Abbreviation for television interference. Usually the reception of CB or other signals on a television receiver, inferferring with TV reception. Most often the result of a poor TV design, rather than a malfunctioning CB radio.

Two-Way Communication – Communication between two radio stations, each having both transmitting and receiving equipment.

VHF – Abbreviation for very high frequencies. The band of frequencies between 30 and 300 MHz.

Volt – The unit of measurement for electromotive force.

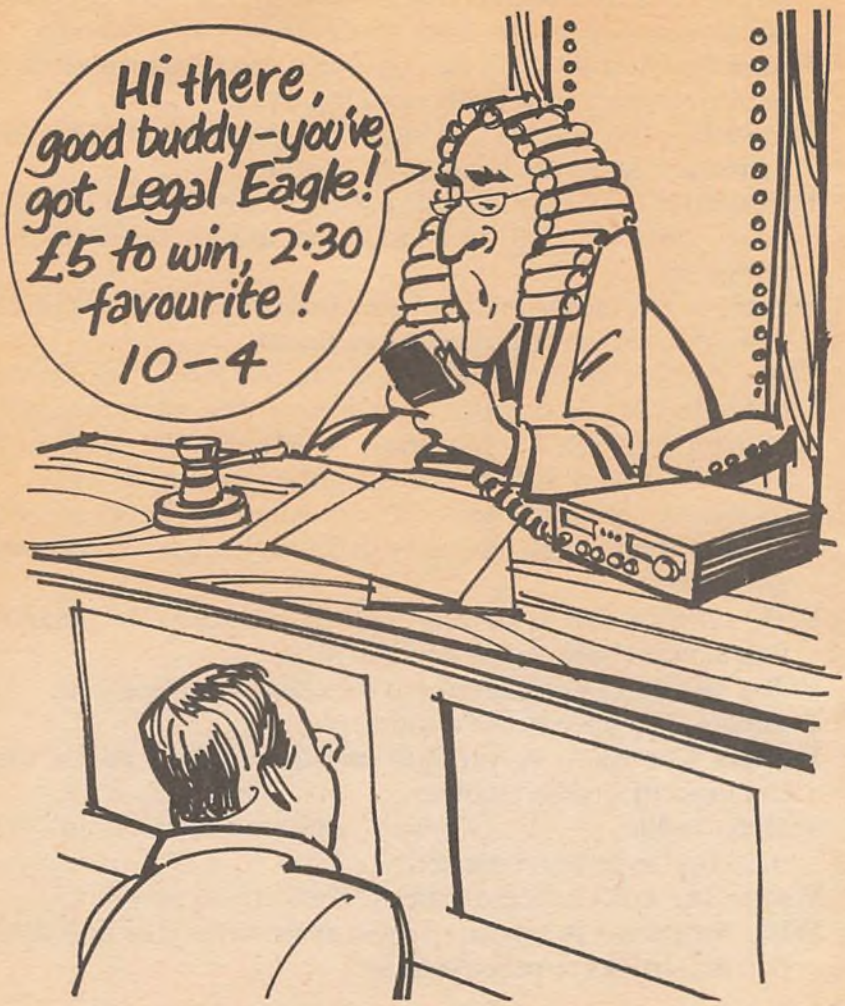
Volume – The intensity of a sound.

Volume Control – A variable resistor used to adjust the loudness of a radio receiver.

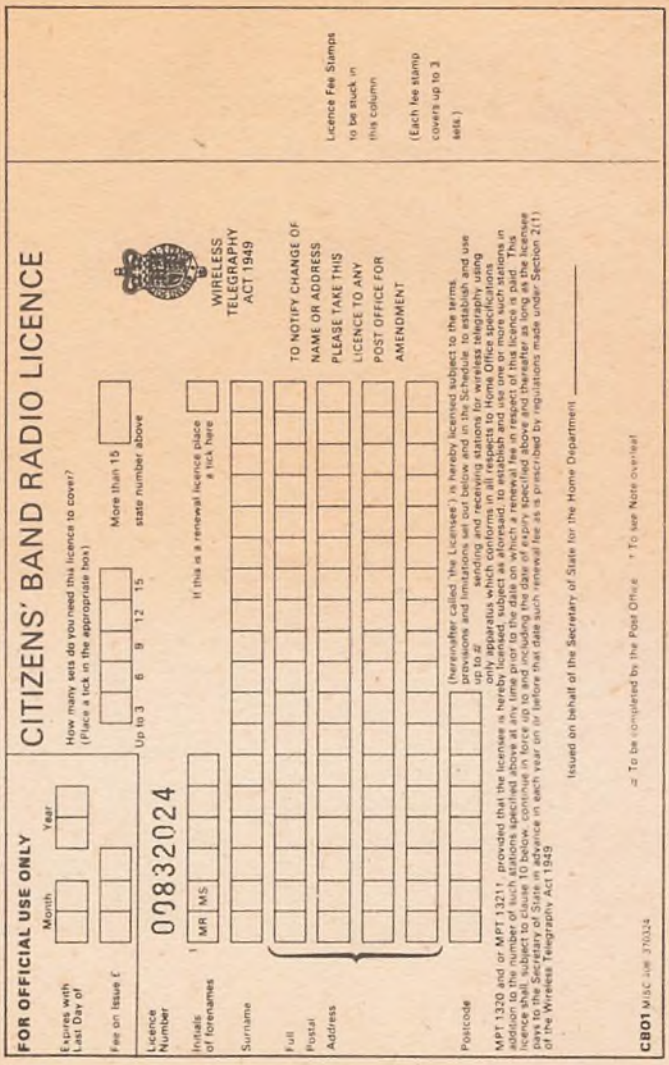
Walkie-Talkie – A two-way radiocommunication set designed to be hand carried.

Watt – The unit of measurement for electrical power.

Whip Antenna – A simple vertical antenna such as that used on cars, trucks or other vehicles.


Hi there, good buddy-you've got Legal Eagle! £5 to win, 2·30 favourite! 10-4

When you purchase a Tandy Realistic® CB radio, you are provided with a licence application. Your store manager will be happy to assist you in filling it out.



Extracts from Home Office Radio Regulations

Foreword

1 Citizen's band radio, a personal two-way radio system, is available for use throughout the United Kingdom. It operates in the 27 MHz and the 934 MHz bands.

2 The Wireless Telegraphy Act 1949 provides that no radio equipment may be installed or used except under the authority of a licence granted by the Secretary of State. All citizens band radio equipment, whether hand held, mobile or base station, must be covered by a licence; it is a condition of this that the apparatus fulfils, and is maintained to, certain minimum technical standards. This specification sets out these standards for 27 MHz FM equipment: 934 MHz FM equipment is subject to a separate specification.

3 The manufacturer, assembler, or importer of citizens band equipment is responsible for ensuring that the apparatus conforms with the specification; and any additional requirements imposed by regulations under the Wireless Telegraphy Act 1949. Conformity with the required standards may be established by tests carried out by the manufacturer, assembler or importer, or by a reputable test establishment acting on his behalf, but in neither case conformity with the specification will remain the responsibility of the manufacturer, assembler or importer.

1 General

1.1 Scope of specification
This specification covers the minimum performance requirements for angle modulated radio equipments, comprising base station, mobile and hand held transmitters and receivers or receivers only and additionally any accessories, for example attenuators, vehicle adaptors for optional use with the above for use in the Citizens Band Radio Service.
For all equipments covered by this specification, the nominal separation between adjacent channel carrier frequencies is 10 kHz.

1.2 Permitted effective radiated power
The output radio frequency power of the equipment is limited to 4W. With the antenna permitted by the conditions of the licence for use with the equipment this provides an effective radiated power of 2W. *(See note.)*
If an antenna is mounted at a height exceeding 7m the licence will require a reduction in transmitter power of 10 dB.
To enable the user to accomplish this easily, the equipment manufacturer shall provide as a standard facility on the equipment means by which the transmitter output power may be reduced by a minimum of 10 dB.

1.3 Operating frequencies
The equipment shall provide for transmission and reception only of

angle modulated emissions on one or more of the following radio frequency channels:

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

Citizens band radio equipment shall not contain facilities for transmission of radio frequencies other than those listed above, and those contained in MPT 1321.

Single channel equipment may be tested on any one of the approved channels. Multi-channel equipment shall be equipped to operate at the centre, and the upper and lower limits of the frequency range over which channel switching is possible.

Note: The licence requires that equipments which have provision for the connection of an external antenna shall not be connected to other than a single element rod or wire antenna not exceeding 1.5m in overall length.

1.4 Permitted modulation

Only equipment which employs angle modulation and has no facilities for any other form of modulation will meet the requirements of this specification.

1.5 Labelling

The equipment shall be provided with a clear indication of the type number and name of the manufacturer.

1.6 Certification of compliance

Compliance with this specification shall be indicated by a mark stamped or engraved on the front panel of the equipment.

The mark used to indicate compliance shall be as shown in Fig. 1.

1.7 Controls

Those controls, which if maladjusted might increase the interfering potentialities of the equipment, shall not be easily accessible.

2 Test conditions:
Atmospheric conditions and power supplies

2.1 General

Tests shall be made under normal test conditions (Clause 2.3) and also, where stated, under extreme test conditions (Clause 2.4).

2.2 Test power source

During tests, the power supply for the equipment may be replaced by a test power source, capable of producing normal and extreme test voltages as specified in Clauses 2.3.2 and 2.4.2.

The internal impedance of the test power source shall be low enough for its effects on the test results to be negligible.

For the purpose of tests, the supply voltage shall be measured at the input terminals of the equipment.

If the equipment is provided with a permanently connected power cable, the test voltage shall be measured at the point of connection of the power cable to the equipment.

During the tests of the power source voltage shall be maintained within a tolerance of ±3% relative to the voltage at the beginning of each test.

In equipment in which batteries are incorporated, the test power source shall be applied as close to the battery terminals as practicable.

2.3 Normal test conditions

2.3.1 *Normal temperature and humidity*

The normal temperature and humidity conditions for tests shall be any convenient combination of temperature and humidity within the following ranges:

Temperature 15°C to 35°C

Relative humidity 20% to 75%

When it is impracticable to carry out the tests under the conditions stated above, a note to this effect stating the actual temperature and relative humidity during the tests, shall be added to the test report.

2.3.2 *Normal test source voltage*

2.3.2.1 Mains voltage

The normal test source voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of this specification, the nominal voltage shall be the declared voltage or any of the declared voltages for which the equipment was designed. The frequency of the test power source corresponding to the AC mains shall be between 49 and 51 Hz.

2.3.2.2 Regulated lead-acid battery power sources

When the radio equipment is intended for operation from the usual type of regulated lead-acid battery source, the normal test source voltage shall be 1.1 times the nominal voltage of the battery (6 volts, 12 volts, etc).

2.3.2.3 Other power sources

For operation from other power sources or types of battery, either primary or secondary, the normal test source voltage shall be that declared by the equipment manufacturer.

2.4 Extreme test conditions

2.4.1 *Extreme temperatures*

For tests at extrme temperatures, measurements shall be made in accordance with the procedures specified in Clause 2.5 at an upper value of +45°C and at a lower value of −5°C.

2.4.2 *Extreme test source voltages*

2.4.2.1 Mains voltage

The extreme test source voltages for equipment to be connected to an AC mains source shall be the nominal mains voltage ±10%. The frequency of the test power source shall be between 49 and 51 Hz.

2.4.2.2 Regulated lead-acid battery power sources

When the equipment is intended for operation from the usual type of regulated lead-acid power source, the extreme test voltages shall be 1.3 and 0.9 times the nominal voltage of the battery.

2.4.2.3 Other power sources

The lower extreme test voltage for equipment with power sources using primary batteries shall be as follows:

a. For leclanche type of battery – 0.85 times the nominal voltage

b. For mercury type of battery – 0.9 times the nominal voltage

c. For other types of primary battery – end point voltage declared by the equipment manufacturer.

For equipment using other power sources, or capable of being operated from a variety of power sources, the extreme test voltages shall be those declared by the equipment manufacturer and shall be recorded with the test results.

2.5 Procedure for tests at extreme temperatures

2.5.1 *General*

Before making measurements, the equipment shall be placed in a temperature controlled chamber for a period of one hour or so for such period as may be judged necessary for thermal balance to be obtained. The equipment shall be switched off during the temperature stabilisation period. The sequence of tests shall be chosen and the humidity content in the test chamber shall be controlled so that excessive condensation does not occur.

2.5.2 *Test procedure*

For tests at the upper temperature, after thermal balance has been attained (Clause 2.5.1), the equipment shall be switched on for 1 minute in the transmit condition followed by 4 minutes in the receive condition, after which the appropriate tests shall be carried out.

For tests at the lower temperature, after thermal balance has been attained (Clause 2.5.1), the equipment shall be switched on for 1 minute in the receive condition after which the appropriate tests shall be carried out.

3 Electrical test conditions

3.1 Transmitter artificial load

Tests on the transmitter shall be carried out using a 50 ohm non-reactive, non-radiating load connected to the antenna terminals. If necessary an impedance matching device may be used for testing.

3.2 Test fixture

3.2.1 General

A test fixture will be required to permit relative measurements to be made on the sample.*

This test fixture shall preferably provide a 50 ohm radio frequency terminal at the working frequencies of the equipment.

The test fixture shall provide input and output audio coupling and a means of connecting an external power supply.

The following characteristics shall apply to the test fixture:

a. The coupling loss shall be as low as

possible, and in any case not greater than 30 dB;

b. The variation of coupling loss with frequency shall not cause errors in measurement exceeding 2 dB;

c. The coupling device shall not incorporate any non-linear elements.

3.3 Test site and general arrangements for measurements involving the use of radiated fields.

3.3.1 *Test site*

The test site shall be located on a surface or ground which is reasonably level. At one point of the site, a ground plane of at least 5 metres diameter shall be provided. In the middle of this ground plane, a non-conducting support, capable of rotation through 360° in the horizontal plane, shall be used to support the test sample at 1.5 metres above the ground plane. The test site shall be large enough to allow the erection of a measuring or transmitting antenna at a distance from the test sample of not less than half the wavelength corresponding to the lower frequency to be considered. The distance actually used shall be recorded with the results of the tests carried out on the site.

Sufficient precautions shall be taken to ensure that reflections from extraneous objects adjacent to the site, and ground reflections do not degrade the measurements.

3.3.2 *Test antenna*

The test antenna is used to detect the radiation from both the test sample and the substitution antenna, when the site is used for radiation measurements. This antenna is mounted on a support capable of allowing the antenna to be used either horizontally or vertically polarized and for the height of its centre above ground to be varied over the range 1–5 metres. Preferably test antenna with pronounced directivity should be used. The size of the test antenna along the measurement axis shall not exceed 20% of the measuring distance. For radiation measurements, the test antenna is connected to a test receiver, capable of being tuned to any frequency under investigation and to measure accurately the relative levels of signals at its input.

3.3.3 *Substitution antenna*

The substitution antenna shall be a $\lambda/2$ dipole resonant at the frequency under consideration, or a shortened dipole, calibrated against the $\lambda/2$ dipole. The centre of this antenna shall coincide with the reference point of the test sample it has replaced. This reference point shall be the point at which the external antenna is connected.

Note: Any connections provided on the equipment in order to facilitate relative measurements, shall not affect the performance of the equipment either in the test fixture or when making measurements involving the use of radiated fields.

The distance between the lower extremity of the dipole and the ground shall be at least 0.3m.

The substitution antenna shall be connected to a calibrated signal generator when the site is used for radiation measurements.

The signal generator and the receiver shall be operating at the frequencies under investigation and shall be connected through suitable matching and balancing networks.

3.4 Normal test modulation
Where stated, the transmitter shall have normal test modulation as follows: the modulation frequency shall be 1 kHz and the resulting frequency deviation shall be 60% of the maximum permissible frequency deviation (Clause 4.3.1).

4 Transmitter

4.1 Frequency error
4.1.1 *Definition*
The frequency error of the transmitter is the difference between the measured carrier frequency and its nominal value.
4.1.2 *Method of measurement*
a. The transmitter output in the case of equipment with an antenna terminal, shall be connected to an artificial load (Clause 3.1) and in the case of equipment incorporating integral antenna, shall be placed in the test fixture (Clause 3.2) connected to an artificial load. The transmitter shall be operated in accordance with the manufacturer's instructions to obtain normal output power.
b. The emission shall be monitored by a frequency counter and the carrier frequency shall be measured in the absence of modulation.
c. The measurement shall be made under normal test conditions (Clause 2.3) and repeated under extreme conditions (Clauses 2.4.1 and 2.4.2 applied simultaneously).
4.1.3 *Limits*
The frequency error, under both normal and extreme test conditions, or at any intermediate condition, shall not exceed ±1.5 kHz. If for determining the transmitter frequency use is made of a synthesizer and/or a phase-locked loop system, the transmitter shall be inhibited when synchronisation is absent.
4.2 Carrier power
The equipment manufacturer shall provide as a standard accessory an attentuator having a minimum attenuation of 10 dB, or alternatively provide a switch which can be used to reduce the power by a minimum of 10 dB, for use, where necessary, between the transmitter output and the antenna terminals of the equipment, a removable link may be necessary.
4.2.1 *Definition*
For the purpose of this specification: the carrier power shall be the value of the power of an unmodulated carrier at the output terminals of a transmitter. For equipment with an integral antenna, it is the maximum value of effective radiated power of an unmodulated carrier. The rated output power is the maximum value of the transmitter output power declared by the manufacturer, at which all the requirements of this specification are met.
4.2.2 *Method of measurement (Terminal Power)*
a. The transmitter shall be connected to a test load equal to the impedance for which it is designed.
b. With the transmitter operating without modulation in accordance with the manufacturer's instructions, the power delivered to the test load shall be measured.
c. The measurement shall be made under normal test condtions (Clause 2.3) and repeated under extreme test conditions Clauses 2.4.1 and 2.4.2 applied simulataneously.

4.2.3 *Radiated Power*

4.2.3.1 Method of measurement under normal test conditions

a. On a test site fulfilling the requirements of Clause 3.3, the equipment shall be placed on the support in the following position:

i. equipment with internal antennae shall be arranged with that axis vertical which is closest to vertical in normal use;

ii. for equipment with rigid external antennae, the antenna shall be vertical;

iii. for equipment with non-rigid external antennae, with the antenna extended vertically upwards by a non-conducting support.

b. The transmitter shall be switched on, without modulation, and the test receiver shall be tuned to the frequency of the signal being measured.

c. The test antenna shall be orientated for vertical polarization and shall be raised or lowered through the Specified height range until a maximum signal level is detected on the test receiver*.

d. The transmitter shall then be rotated through 360° until the maximum signal level is received.

e. The transmitter shall be replaced by the substitution antenna, as defined in Clause 3.3 and the test antenna raised or lowered as necessary to ensure that the maximum signal is still received.

f. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the test receiver.

g. The carrier power is equal to the power supplied to the substitution antenna, increased by the known relationship is necessary.

h. Steps *a.* to *g.* shall be repeated for any alternative integral antenna supplied by the manufacturer.

j. A check shall be made at other planes of polarization to ensure that the value obtained above is the maximum. If larger values are obtained, this fact shall be recorded in the test report.

4.2.3.2 Method of measurement under extreme test conditions

a. The equipment shall be placed in the test fixture (Clause 3.2) connected to the artificial load (Clause 3.1), with a means of measuring the power delivered to this load.

b. In the absence of modulation, the transmitter shall be operated in accordance with the manufacturer's instructions. The carrier power shall then be measured.

c. The measurement shall be made under normal test conditions (Clause 2.3) and repeated under extreme test conditions (Clauses 2.4.1 and 2.4.2 applied simultaneously).

4.2.4 *Limits*

The carrier power measured under normal test conditions in accordance with Clause 4.2.2 shall not exceed 4 watts. The effective radiated power measured under normal test conditions in accordance with Clause 4.2.3 shall not exceed 2 watts.

The carrier power under extreme conditions shall not exceed by more than 3 dB that measured under normal conditions in accordance with Clause 4.2.2 or 4.2.3 whichever is applicable.

4.3 Frequency deviation

4.3.1 *Definition*

The frequency deviation is the difference between the instantaneous frequency of the modulated radio-frequency signal and the carrier frequency in the absence of modulation. For test purposes, only the maximum value of the frequency deviation available in the transmitter will be measured.

4.3.2 *Maximum permissible deviation*

4.3.2.1 Definition

The maximum permissible frequency deviation is the maximum value of deviation under any conditions of modulation.

4.3.2.2 Method of measurement

a. The equipment, if a fixed station, shall be connected to a test load equal to the impedance for which it was designed and if portable shall be placed in the test fixture (Clause 3.2).

b. The emission shall be monitored by a modulation meter capable of measuring the peak value of both positive and negative frequency deviation including that due to any harmonics and intermodulation products which may be produced in the transmitter.

c. The transmitter shall then be modulated by an audio frequency signal 20 dB above the level necessary to produce normal test modulation (Clause 3.4) and the modulation frequency varied from 300 Hz to 3 kHz.

Note: The maximum may be a lower value than that obtainable at heights outside the specified range.

d. At each test frequency, the peak deviation shall be measured.

4.3.2 *Limit*

At any modulating frequency, the frequency deviation shall not exceed ±2.5 kHz.

4.4 Adjacent channel power

4.4.1 *Definition*

The adjacent channel power is that part of the total power output of a transmitter under defined conditions of modulation, which falls within the bandwidth of a receiver of the type normally used in the system and operating on a channel either 10 kHz above or below the nominal frequency of the transmitter.

4.4.2 *Method of measurement*

For equipment with radio-frequency output terminals, the measurement shall be carried out at these terminals.

For equipment with integral antennae, this measurement shall be carried out at the output of the test fixture.

a. The equipment or the test fixture shall be connected to the power measuring receiver via a 50 ohm attenuator, set to produce an appropriate level at the receive input.

b. The transmitter shall be operated at the carrier power measured under normal test conditions in Clauses 4.2.2 or 4.2.3 as pplicable.

c. The transmitter shall be modulated at 1250 Hz at a level 20 dB greater than that required to produce 60% of the maximum permissible frequency deviation (Clause 4.3.1).

d. The test receiver shall then be tuned to the nominal frequency of the transmitter and the receiver attenuator adjusted to a value 'p' such that a meter reading of the order of 5 dB above the receiver noise level is obtained.

e. The test receiver shall then be tuned to the nominal frequency of the higher adjacent channel and the receiver attenuator re-adjusted to a value 'q' such that the same meter reading is again obtained.

f. The ratio, in decibels, of the adjacent channel power to the carrier power is the difference between the attentuator settings 'p' and 'q'.

g. The adjacent channel power shall be determined by applying this ratio to the carrier power as determined in Clauses 4.2.2 or 4.2.3 as applicable.

h. The measurement shall be repeated for the lower adjacent channel.

4.4.3 *Limits*

The adjacent channel power shall not exceed a value of 10μW.

4.4.4. *Power measuring receiver specification*

The power measuring receiver shall comprise a mixer, a crystal filter, a variable attenuator, an intermediate frequency amplifier, and a r.m.s. meter connected in cascade, using a low noise signal generator as a local oscillator. The bandwidth of the filter shall be as follows (with a tolerance of ±10%):

Bandwidth between 6 dB attentuation points
(kHz)
8.5

Bandwidth between 70 dB attentuation points
(kHz)
17.5

Bandwidth between 90 dB attentuation points
(kHz)
25

The attenuator shall cover a range of at least 80 dB in 1 dB steps. The noise factor of the amplifier shall be not worse than 4 dB. Over the 6 dB bandwidth, the amplitude/frequency characteristics of the amplifier shall not vary by more than 1 dB.

The combined response of the filter and amplifier outside the 90 dB bandwidth shall maintain an attenuation of at least 90 dB. The r.m.s. meter, if not a power meter, shall have a crest factor of at least 10 for the full scale readings. The measuring accuracy of the receiver over an input level range of 100 dB shall be better than 1.5 dB.

4.5 Spurious emissions

4.5.1 *Definition*

Spurious emissions are emissions at frequencies other than those of the carrier and sidebands associated with normal modulation. the level of spurious emissions shall be measured as:

a. Their power level in a specified load, where the equipment is fitted with output terminals and

b. Their effective radiated power when radiated by an integral antenna or from the cabinet and chassis of the equipment.

4.5.2 *Method of measurement – power level*

a. The transmitter output shall be connected to either a spectrum analyser via an attenuator, or an artificial load, with means of monitoring the emission with a spectrum analyser or selective voltmeter.

b. The transmitter shall be unmodulated and at each spurious emission in the frequency range 100 kHz to 1000 MHz, the level of the emission shall be measured relative to the carrier emission.

c. The power level of each emission shall be determined by applying the ratio measured to the carrier power level determined in Clause 4.2.3.

4.5.3 *Method of measurement – effective radiated power*

a. On a test site fulfilling the requirements of Clause 3.2 the transmitter shall be placed at the specified height on the support.

b. The transmitter shall be unmodulated and its output connected to an artificial load, where the equipment is fitted with output terminals (Clause 3.1).

c. Radiation of any spurious emissions shall be detected by th test antenna and receiver, over the frequency range 30 to 1000 MHz.

d. At each frequency at which an emission is detected, the transmitter shall be rotated to obtain maximum response.

e. The transmitter shall be replaced by a signal generator and dipole antenna and the effective radiated power of the emission determined by a substitution measurement.

f. The measurements shall be repeated with the test antenna in the orthogonal polarisation plane.

g. The measurements shall be repeated with the transmitter modulated with normal test modulation (Clause 3.4).

h. The measurements shall be repeated for any alternative integral antenna which can be supplied with the equipment.

4.5.4 *Limits*

Any spurious emission from the transmitter with and without any ancillary equipment, expressed as a power into a test load or as a radiated power, in either plane of polarisation, shall not exceed 50nW within the following frequency bands:

80 MHz – 85 MHz
87.5 MHz – 118 MHz
135 MHz – 136 MHz
174 MHz – 230 MHz
470 MHz – 862 MHz

The power of spurious emissions at any other frequency outside the above bands shall not exceed 0.25 μW.

5 Receiver

5.1 Receiver spurious emission

5.2.1 *Definition*

Spurious emissions from receivers are any emissions present at the input terminals or radiated from an integral antenna or the chassis and case of the receiver.

5.1.2 *Method of measurement for equipment with antenna terminals*

a. The methods shall be as described in Clauses 4.5.2 and 4.5.3 except that the test sample shall be the receiver.

5.1.3 *Method of measurement for equipment incorporating integral antenna*

a. The method of measurement shall be as described in Clause 4.5.3 except that the test sample shall be the receiver.

5.1.4 *Limits*

Any spurious emission from a receiver, expressed either as a power into a test load or as a radiated power, shall not exceed 20 nW on any frequency.

6 Accuracy of measurement

The tolerance for the measurement of the following parameters shall be as given below

6.1.1	DC voltage	±3%
6.1.2	AC mains voltage	±3%
6.1.3	AC mains frequency	±.5%
6.2.1	Audio-frequency voltage, power etc.	±0.5 dB
6.2.2	Audio frequency	±.001%
6.2.3	Distortion and noise etc, of audio frequency generators	1%
6.3.1	Radio frequency	±50 Hz
6.3.2	Radio-frequency voltage	±2 dB
6.3.3	Radio-frequency field strength	±3 dB
6.3.4	Radio-frequency carrier power (erp)	±2 dB
6.4.1	Impedance of artificial loads, combining units, cables, plugs, attentuators etc.	±5%
6.4.2	Source impedance of generators and input impedance of measuring receivers	±10%
6.4.3	Attentuation of attenuators	±0.5 dB
6.5.1	Temperature	±1°C
6.5.2	Humidity	±5%

7 Interpretation of this specification

7.1 Application of limits in tests for conformity with this specification. Tests shall be made

7.1.1 either on a sample of appliances of the type using the statistical method of evaluation set out in 7.1.4.

7.1.2 or for simplicity's sake on one item only. The value measured must be at least 2 dB less than the limit value.

7.1.3 Subsequent tests are necessary from time to time on items taken at random from the production especially in the case of 7.1.2. In the case of any dispute which could lead to proceedings under the Wireless Telegraphy Act, such proceedings shall be considered only after tests have been carried out in accordance with 7.1.1.

7.1.4 Statistical assessment of compliance shall be made as follows: This test shall be performed on a sample of not less than five and not more than 12 items of the type, but if in exceptional circumstances five items are not available, then a sample of three or four shall be used. Compliance is achieved when the following relationship is met:

$$\bar{x} + kS_n \leqslant L, \text{ where}$$

$\bar{x}$ is the arithmetic mean value of the interference levels on n items in the sample

Sn is the standard deviation of the sample, where

$$S_n^2 = \frac{1}{n-1} \sum (x - \bar{x})^2$$

x is the interference level of an individual item

k is the factor derived from tables of the non-central t-distribution which ensures with 80% confidence that 80% or more of the production is below the limit. Values of k as a function of n are given in the table below.

L is the limit

x, $\bar{x}$, S_n and L are expressed logarithmically [dB (uV) or dB (pW)]

n	3	4	5	6	7	8	9	10	11	12
k	2.04	1.69	1.52	1.42	1.35	1.30	1.27	1.24	1.21	1.20

7.2 For the purpose of this specification reference to manufacturers, includes importers and assemblers.

HANDLES & HOME 20

For Regular Good Buddies and Contacts

HANDLE	HOME 20 LOCATION	USUAL CHANNEL

HANDLES & HOME 20

For Regular Good Buddies and Contacts

HANDLE	HOME 20 LOCATION	USUAL CHANNEL

HANDLES & HOME 20

For Regular Good Buddies and Contacts

HANDLE	HOME 20 LOCATION	USUAL CHANNEL

HANDLES & HOME 20

For Regular Good Buddies and Contacts

HANDLE	HOME 20 LOCATION	USUAL CHANNEL

HANDLES & HOME 20

For Regular Good Buddies and Contacts

HANDLE	HOME 20 LOCATION	USUAL CHANNEL

Tandy CB Log

DATE	TIME	HANDLE	CALL SIGN	CHAN'L No.	STATION LOCATION	NEXT CONTACT DATE	NEXT CONTACT TIME	RE-CALL	MADE

Tandy CB Log

DATE	TIME	HANDLE	CALL SIGN	CHAN'L No.	STATION LOCATION	NEXT CONTACT DATE	NEXT CONTACT TIME	RE-CALL MADE	

Tandy CB Log

DATE	TIME	HANDLE	CALL SIGN	CHAN'L No.	STATION LOCATION	NEXT CONTACT DATE	NEXT CONTACT TIME	RE-CALL MADE	

Tandy CB Log

DATE	TIME	HANDLE	CALL SIGN	CHAN'L No.	STATION LOCATION	NEXT CONTACT DATE	NEXT CONTACT TIME	RE-CALL MADE


10-10
TILL WE DO IT AGAIN DOWN AT THE TANDY STORE!

Your Nearest Tandy Store

ACCRINGTON
37 Union Street.
ALDERSHOT
10 Union Street.
*C.B. City,
85 Ash Hill Road, Ash.
ALDRIDGE
15 Central Area Development,
Anchor Road.
ASHFORD
†Ashford Computer Centre,
2 Station Parade, Clarendon Road.
BANGOR
*Data Office Equipment,
84 High Street
BARNSLEY
58 Market Street.
BARROW-IN-FURNESS
*Furness Electronics, Furness House.
BASILDON
65 Southernhay
BASINGSTOKE
22 London Road.
*C.B. City (Basingstoke) Ltd.,
1 Reading Road, Chineham.
BATH
3 The Mall, Southgate Centre.
*Lewhay Radio Ltd.,
28 Shaftsbury Road, Oldfield Park.
BATHGATE
*Sangster Electronics,
82 North Bridge Street.
BEDFORD
7 Greenhill Street.
*Anglia Audio (Bedford),
31 St. Loyes Street.
BILSTON
94a Church Street.
BIRMINGHAM
*Audio & Disco, 23a Hurst Street.
†BIRMINGHAM COMPUTER CENTRE,
Unit 6, Edgbaston Shopping Centre,
Hagley Road, Edgbaston.
BIRMINGHAM CENTRAL,
80 Corporation Street.
BULL RING,
528 The Bridge, Bull Ring Shopping Centre.
*CHELMSLEY WOOD, Tomorrows World,
22 Maple Walk, Chelmsley.
Wood Shopping Centre.
DALE END, 57-58 Dale End.
ERDINGTON, 218 High Street.
HALESOWEN, 5-7 Queensway.
*HARBORNE, Sound Centre, 86 High Street,
Harborne.
NORTHFIELD, 749 Bristol Road South.
*REDNAL, Audio Four T.V. Services,
1708 Bristol Road South.
SHELDON, 2268 Coventry Road.
SMETHWICK, 44-46 Cape Hill.
SOLIHULL, 48 Drury Lane.
SUTTON COLDFIELD
176 The Parade, Gracechurch Centre.
WARD END, 867 Washwood Heath Road.
BLACKBURN 21 Stonybutts.
BLACKPOOL
*Stewarts Radio, 2-4 Caunce Street.
BLANDFORD
*O. & J. House Ltd., Higher Shaftsbury Lane,
Blandford Forum.
BLETCHLEY 20 The Concourse.
BOLTON 5 Nelson Square.
BOSCOMBE 548 Christchurch Road.
BOSTON
*Models Plus Tandy, 55 West Street.
BOURNEMOUTH
132-134 Commercial Road.
BRADFORD
†Bradford Computer Centre,
2-4 Forster Square.
9 Petergate.
BRIDGEND
*Tele Electrical Services
9 Brackla Street Centre.
BRIGHTON 70 London Road
BRISTOL
22-24 Union Street.
†Bristol Computer Centre,
Unit 3, Colston Centre.
BISHOPSTON, 13 Gloucester Road.
CLIFTON, 146 Whiteladies Road.
DOWNEND, 5 Badminton Road.
KNOWLE, Broadwalk Shopping Centre.
YATE, 4 North Parade.
BROMSGROVE 6-8 St. John's Street.
BROWNHILLS 60 High Street.
BURNLEY 91 St. James Street.
BURTON-ON-TRENT
*Bucintoro Limited, Belvedere
Filling Station, Belvedere Road.
BURY 92 The Rock.
BURY-ST-EDMUNDS
*C.B. Paradise, 69 Out Northgate Street.

CAMBRIDGE
*Tandy Store, 1 Emmanuel Street.
CAMBORNE
*Brewer & Bunney (ECS), 70 Union Street.
CARDIFF
Tandy In Store-Store, Evan Roberts.
CANDLERS FORD
*Television Audio Sales,
91 Bournemouth Road.
CHELTENHAM 13 Cambray Place.
CHESTER
Kwik Save Centre,
Sealand Road, Bumpers Lane.
CHORLEY
*Car Entertainment (Chorley),
193 Lyons Lane.
COLCHESTER
4-6 Short Wyre Street.
*Emprise Limited, 58 East Street
COVENTRY 4 Hales Street.
CRAWLEY
*Crawley Television Maintenance,
The Marletts.
CREWE 12 Market Street.
CROYDON
†Croydon Computer Centre,
Ryman, Wellesley Road.
*Cassdene Limited, 49 St. George's Walk.
CUMBERNAULD
33 Cumbernauld New Town.
DARLINGTON 15-16 Priestgatge.
DAVENTRY
*Rossco Limited,
"Tandy Authorised Dealer", 67 High Street.
DERBY 33 Victoria Street.
DIDCOT
*John E. Lay Limited, 103 Broadway.
DONCASTER
32-34 Kingsgate, Watergate Centre.
DORKING
*Surrey Sussex Electronics,
27 Meadowbrook Road.
DUBLIN
*Mitec Electronics Limited,
Unit 3, Fairdale Industrial Estate, Artane.
DUDLEY
Trindle Road Roundabout.
DUNDEE
Unit 29, Wellgate Centre.
EASTBOURNE
106 Kingfisher Drive, Langney.
EAST KILBRIDE
8 Princes Square.**EASTLEIGH**
11 Market Street.
EDINBURGH
8 Castle Street.
EPSOM
*Singer Co. (U.K.) Limited,
9-9a High Street.
EXETER 13 Paris Street.
EXMOUTH
44 The Parade, Magnolia Centre.
FLEETWOOD
*Micro-Chip Shop, 190 Lord Street.
FORRES
*J.M. Younie & Sons Limited,
126 High Street.
FULLWOOD
*Fulwood On Channel C.B. (North West), 111
Blackbull Lane.
GIBRALTER
*A.C.M.O.D.A. Ltd.,
4 Trafalgar Road, P.O. Box 209.
GLASGOW
28 Jamaica Street.
Unit 8, Sauchiehall Street Centre.
*V. Morris (Audio Visual), 340 Argyle Street.
NEWTON MEARNS, 7-8 McKinley Place.
GLENROTHES 18 Lyon Way.
GLOUCESTER
*Tandy Store, 13-17 Clarence Street.
GRANTHAM
*A.B.N. Electronics, 99 London Road.
GRAYS 7 North Malll.
GREENFORD
*Electronic City, 440 Greenford Road.
GRIMSBY
Riverhead Centre,
Victoria Street Entrance.
GUILDFORD
*P.J. Equipments Ltd., 3 Bridge Street.
*Basic Electronics, 18 Epsom Road.
HANLEY 16 Charles Street.
HARROWGATE
34 Oxford Street.
HARTLEPOOL
182 Middleton Grange
Shopping Development.
HASTINGS
*Tandy Store, 48 Queens Road.
HAVERFORDWEST
*Loosmore, 33 High Street.
HEREFORD
*Wallis (Hereford) Ltd.,
Sunbeam Corner, Eign Street.
HELEM HEMPSTEAD
The Marlowes.
HICKLEY *Unit 5, Brittania Centre.
HIGH WYCOMBE Octagon Road.

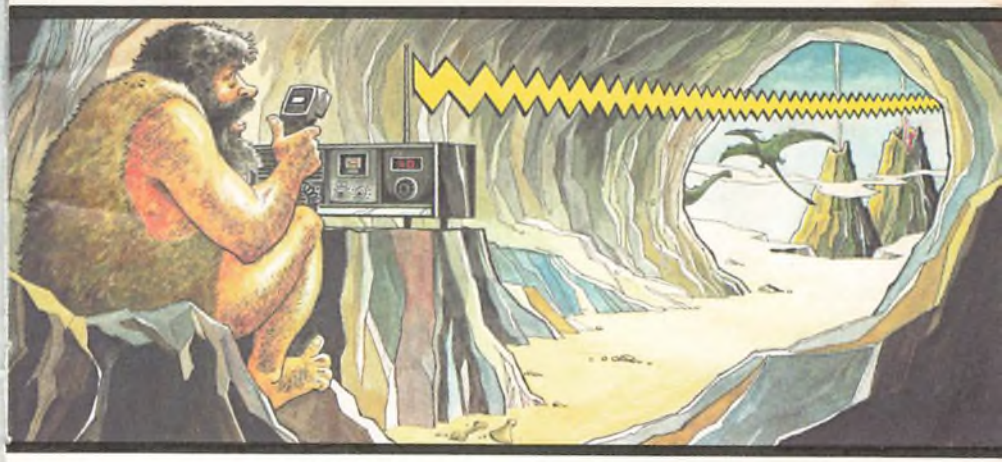
HUDDERSFIELD
16 Kirkgate, Pack Horse Shopping Centre.
HULL Status City, Clough Road.
ICELAND
*Sunnubudin, Mavahlid 26, Reykjavik.
ILFORD
*Singer Co. (U.K.) Limited,
94 High Road.
IPSWICH 40 Westgate.
KEIGHLEY
60-62 Towngate.
KIDDERMINSTER
*J. & H. Russell (Kidderminster),
21-22 Coventry Street.
KILMARNOCK
19-23 Portland Street.
KINGSTON-UPON-HULL
26 Whitefriar Gate.
KIRKINTILLOCH 3 Cowgate.
LANCASTER
17 Common Garden Street.
LEAMINGTON SPA 63 Warwick Street.
LEEDS 72 Merrion Centre.
30 Eastgate.
LEICESTER
22 Market Street.
*Leicester Electronic Market,
Unit 64, Haymarket Centre, Belgrave Gate.
LETCHWORTH
25 Commerce Way.
LICHFIELD
*Christophers (Photographers),
31 The Precinct.
LINCOLN 332 High Street.
LIVERPOOL
Classic Cinema Centre, 190 Allerton Road.
BIRKENHEAD, Kwik-Save Centre,
Woodchurch Road, Prenton.
BOOTLE, 46 Medway, New Strand Precinct.
†Liverpool Computer Centre, 16 Lord Street.
OLD SWAN, 648 Prescott Road.
RUNCORN, 120 Runcorn Shopping Centre,
16 Lord Street.
ST. JOHN'S, 168 St. John's Centre, Market Way.
WALLASEY, 3 Liscard Way.
LONDON
*Audio Electronics,
301 Edgware Road, W2.
BARKING, 8-10 North Street.
BAYSWATER
The Colonnades, Porchester Road, Queensway,
Bayswater, W2.
BECKENHAM, 144 High Street.
†172 Bishopsgate, EC2.
BRIXTON, 389-391 Brixton Road, SW2.
CATFORD, 23 Catford Broadway, SE6.
CHESHUNT, 29 Turners Hill.
CHINGFORD, 6 Hall Lane.
CLAPHAM, 84 Clapham High Street, SW4.
CROUCH END, 42 The Broadway, N8.
DAGENHAM, 297 Heathway.
*"Deans", 283 Edgware Road, W2.
"Deans", 191 Kensington High Street, W8.
*EALING, Tandy Store, 6 New Broadway, W5.
EDGWARE, 128 Burnt Oak.
234 Edgware Road.
EDMONTON, 123 Fore Street.
EDMONTON GREEN Precinct,
23 North Mall, N9.
*Electrosonic Products, 43 Grafton Way, W1.
ENFIELD, 10 Colman Parade,
Southbury Road.
FULHAM, 409 North End Road.
HAMMERSMITH, 142-144 King Street.
*HAMPSTEAD, Radio Shack Limited,
188 Broadhurst Gardens.
HENDON, 21 Sentinel Square,
Brent Street, NW4.
HOUNSLOW, 69 High Street.
*Audio Shack, 214 Great West Road.
†111 Kingsway, WC2.
ORPINGTON, 36 The Walnuts.
PALMERS GREEN, 379 Green Lane, N13.
ROMFORD, 27 Collier Row Road.
1-2 SEACOAL LANE.
STRATFORD, 34 The Broadway, E15.
STREATHAM, 1 Streatham parade, Streatham
High Road, SW16.
SUTTON, 206 High Street.
SWISS COTTAGE, 4 Harben Parade,
Finchley Road.
TOTTENHAM, 455 High Road, N17.
UXBRIDGE, 32 Chequers Square.
239 Walworth Road, SE17.
WALTHAMSTOW, 123 High Street, E17.
WANDSWORTH, 107 High Street, SW18.
WELLING, 7 Embassy Court.
WEMBLEY, 4 Park Lane.
WIMBLEDON, 124-126 The Broadway, SW19.
LUTON 157 Dunstable Road.
LYTHAM
*C.B.S. Computer Limited,
26 Clifton Street.
MAIDENHEAD 53 Nicholsons Walk.
MANCHESTER
ALTRINCHAM, 32 Stamford Road.
BRAMHALL, 14-15 The Bramhall Centre.
CHADDERTON, The New Chadderton
Shopping Centre, Middleton Road.
CHEADLE, 67 High Street. †30 Deansgate.

HYDE, 4-8 The Mall Shopping Centre.
MANCHESTER CENTRAL, Unit 71,
The Arndale Centre.
RADCLIFFE, 25 Blackburn Street.
SALE, 13-15 The Mall Shopping Centre.
STOCKPORT, 111 Princes Street, Stockport.
STRETFORD, The Arndale Shopping Precinct,
Chester Road.
MARKET HARBOROUGH
*R.D. Jeacock & Sons Limited,
20 Coventry Road.
MIDDLESBOROUGH
118-120 Linthorpe Road.
NEWARK
*Bruce & Chambers, 37-39 Cartergate.
NEWBURY
14 Bartholomew Street.
NEWCASTLE-UNDER-LYME
25 High Street.
NEWCASTLE -UPON-TYNE
184-186 Shields Road.
UNIT 19, Gosforth Centre.
NEWGATE 23 Newgate Centre.
NEWPORT 46 High Street.
NEWTOWNABBEY
*Discount Value Store,
604 Shore Road, Whiteabbey.
NORTHAMPTON
2 The Drapery.
Weston Favell Centre.
NORTHWICH
*Pooles (Electronics Specialists),
59-63 Station Road.
NORWICH
*†Anglia Computer Centre,
88 St. Benedicts Road.
*Singer Co. (U.K.) Limited,
53 St. Stephens Street.
NOTTINGHAM
ARNOLD, 126-128 Front Street.
BEESTON, 30 The Square.
101 Upper Broadwalk, Broad Marsh Centre.
18-20 Mount Street, Maid Marian Way.
NUNEATON 1 Church Street.
ORMSKIRK 7 Moor Street.
OXFORD
9-10 St. Clements, The Plain.
PAIGNTON 35 Hyde Road.
PETERBOROUGH
*The Peterborough Electronics
Store, 2 St. Martins Street.
PLYMOUTH 64 Royal Parade.
POOLE 86 High Street.
PORTSMOUTH
*R.D.S. Electrical, 157-161 Kingston Road.
PORT TALBOT Aberfan Centre.
PRESTON
*Electra Centre, 58 Lancaster Road.
READING
18 The Butts Shopping Centre.
ST. HELENS
Finger Post Centre, Higher Parr Street.
SALISBURY 22 Catherine Street.
*Sutton Hi-Fi, 3 Endless Street.
Sandy
*Electron Systems, 6 Park Road.
SCUNTHORPE 140 High Street.
SHEFFIELD
19/20 Hillsborough Shopping Centre.
44 Castle Square.
SHREWSBURY 20 Shoplatch.
SITTINGBOURNE
20 The Forum Shopping Centre.
SKETTY
*Radio Supplies, 80 Gower Road.
SLOUGH 239 High Street.
SOUTHAMPTON
East Street Centre.
SOUTHEND-ON-SEA
*Singer Co. (U.K.) Limited,
67 High Street.
STAFFORD
6 Sherridan Shopping Centre,
Gaol Square, Mount Street.
SUNDERLAND 4 Fawcett Street.
*E. & E. Services Limited,
The Green, Southwick.
SWANSEA 48 Princes Street.
SWINDON
Unit C, 202 Brunel Centre.
*Microwave & Hi-Fi Centre,
44 Havelock Street.
TAMWORTH 19 Gungate Precinct.
TELFORD
*H. Leedham, 14 the Parade,
Donnington.
TORQUAY 134 Union Street.
UTTOXETER
*Kay Jays Limited, 48 High Street.
WAKEFIELD 96 Kirkgate,
Kirkgate Shopping Centre.
WALLINGTON
*Surrey Microcomputers Limited,
53 Woodcote Road.
WALSALL
Unit 1, Saddlers Centres.
Tameway Tower, Bridge Street.
WASHINGTON
Unit 63, The Galleries.

WEDNESBURY
Hollyhead Road/Bilston Road.
WEST BROMWICH
47 Queens Square, Sandwell Centre.
WHITEHAVEN
*R.L. Brooks Limited, 97 Duke Street.
WHITSTABLE
*Technocraft Limited,
143 Tankerton Road, Tankerton.
WIDNES Albert Square.
WIGAN
*The Electric Shop (Micron),
132-134 Gidlow Lane.

WITNEY
*Witney Audio, 29 Corn Street.
WOLVERHAMPTON
1 Market Street.
Mander Centre, 7 Victoria Street.
WOLVERTON
*Hi Vu Electronics, 38-40 Church Street.
WORCESTER 8 St. Nicholas Street.
WORKSOP 7-9 Bridge Place.
WREXHAM 5 Rhosddu Road.
YORK 5 Church Street.

WE STARTED THE WORLD TALKING



REALISTIC®

CB from Tandy

THE WORLD'S LARGEST CB RETAILER.

Tandy CB guide

Cat. No.
68-9103

Tandy Corporation (Branch UK)
Tameway Tower, Bridge Street, Walsall, West Midlands.