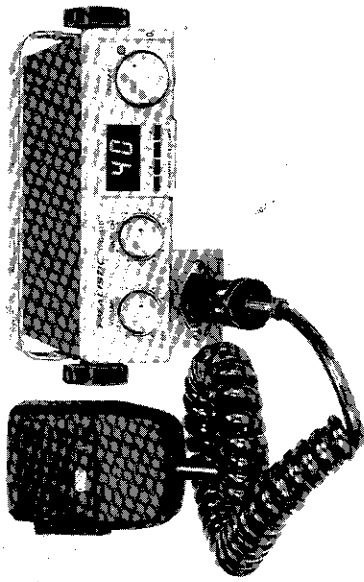


# OWNER'S MANUAL

## C.B. 40-CHANNEL TRANSCEIVER



PLEASE READ  
BEFORE USING  
THIS EQUIPMENT

TRC-415

CAT. NO. 21-1509

CUSTOM  
MANUFACTURED  
FOR RADIO SHACK  
A DIVISION  
OF TANDY  
CORPORATION

REALISTIC<sup>®</sup>

### RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 90 days from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply bring your Radio Shack sales slip as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

*We Service What We Sell*

### RADIO SHACK, A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102

CANADA: BARRIE, ONTARIO L4M 4W5

### TANDY CORPORATION

AUSTRALIA

91 KURRAJONG AVENUE  
MOUNT DRUITT, N.S.W. 2770

BELGIUM

PARC INDUSTRIEL  
5140 NAININNE (NAMUR)

U.K.

BILSTON ROAD WEDNESBURY  
WEST MIDLANDS WS107JN

Your **REALISTIC** TRC-415 is a compact 2-way 40-channel CB designed for Class D CB Mobile operation. Compact in size, it's also big in performance. It is a quality piece of electronic equipment, skillfully constructed

from the finest components. The circuitry is all solid-state, mounted on rugged printed circuit boards. It is designed for many years of reliable, trouble-free performance. Your TRC-415 has a built-in 40-channel

PLL synthesizer circuit. The Phase Lock Loop is a new technique for generating all the required frequencies with a single crystal. The result is much tighter frequency-control and superior reliability.

## FEATURES

- Phase Lock Loop circuitry for precise frequency control and stability over all 40 channels
- Two ceramic filters for superior selectivity and freedom from adjacent channel interference
- Bright red LED channel indicator
- Built-in Automatic Modulation Control
- Hysteresis-type squelch circuit automatically compensates for signal fading, to eliminate signal "chopping"
- during message reception
- Dynamic-type communications microphone with locking-type connector.
- Built-in Automatic Noise Limiting circuit
- RF output power and signal strength LED meter
- Works with negative ground 12-volt DC systems
- External speaker jack
- Coax type antenna connector
- Universal mounting bracket
- Uses 3 ICs, 21 transistors, and 18 diodes

For your own protection, we urge you to record the serial number of this unit in the space provided. You'll find the serial number on the back panel of the unit.

Serial Number:

## No FCC License Required (USA)

The FCC does not require a license for operation of this unit. However, you are required to read and

know part 95 of the FCC rules and regulations. They apply to the operation of a

class D citizen's band unit. We've provided a copy of these regulations with your unit.

## BEFORE YOU CALL FOR HELP

Our repair centers receive many returned products that are actually working perfectly. Maybe the owner just did not read the instructions, or overlooked something. Or perhaps the problem was a blown fuse that

the owner could have easily replaced. So read this manual carefully and be sure you understand all the basic features of this CB — and the special ones, too! And before you assume your

Transceiver needs repair, refer to the Service and Maintenance section of this manual, to see if the problem is something you can eliminate. Enjoy your Realistic TRC-415!

## SPECIFICATIONS

### Receiver

#### Frequency Coverage

: All 40 CB Channels (class D)

: 26.965 to 27.405 MHz

: 0.7 $\mu$ V or better for 10dB S+N/N

: 60dB (at 10kHz)

: 1st IF = 10.695 MHz 2nd IF = 455 kHz

#### Audio Output

: 4 watts (max)

#### Frequency Response

: 450—2500 Hz

#### Cross Modulation

: 50dB (or better)

#### Squelch

: Adjustable from 0.6 $\mu$ V to 1mV

### Transmitter

#### Frequency Coverage

: All 40 CB Channels (class D)

: 26.965 to 27.405 MHz

#### Power Output

: 4 watts (maximum)

#### Emission

: 8A3

#### Modulation Capabilities

: +90%, -90%

#### Spurious Radiation

: Less than -65dB

#### Frequency Tolerance

: Better than 0.002%

#### Antenna Impedance

: 50 ohms

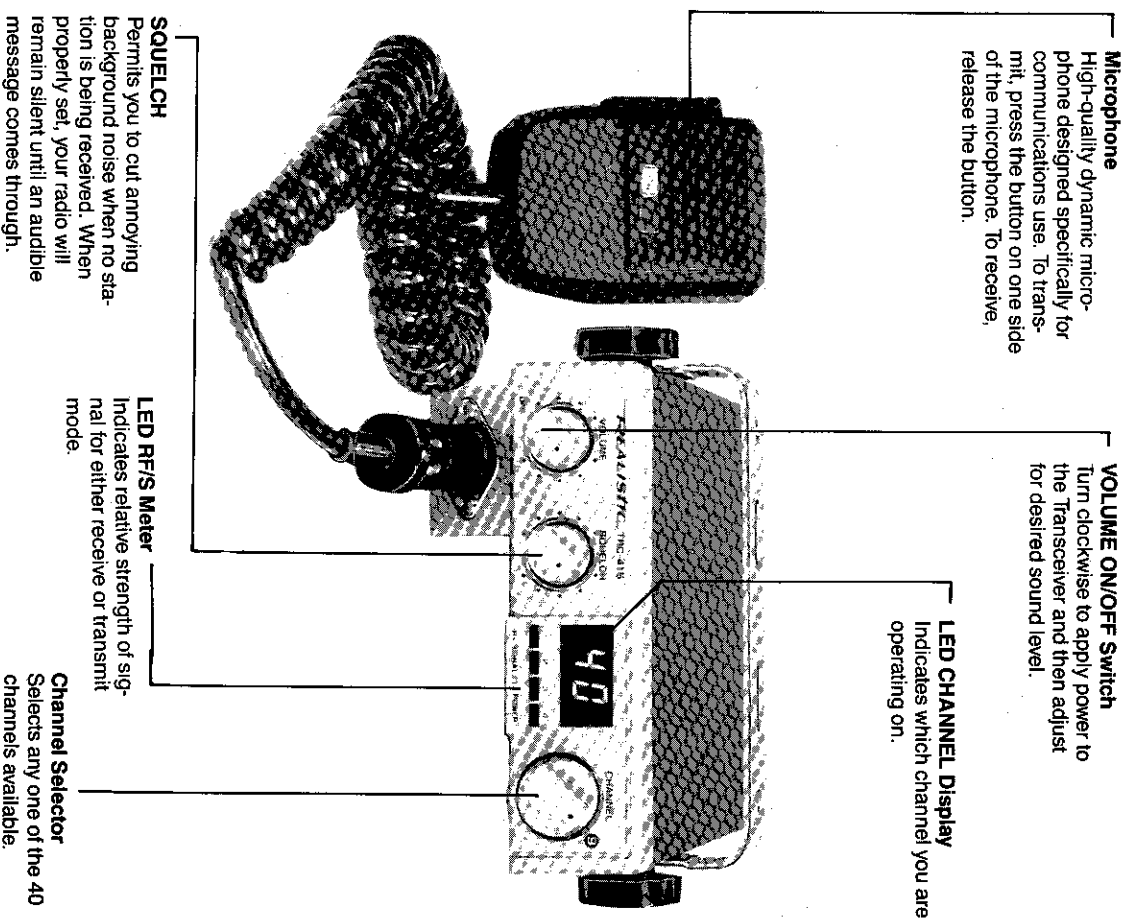
#### Current Drain (13.8 volt supply)

: 1000mA (no modulation)

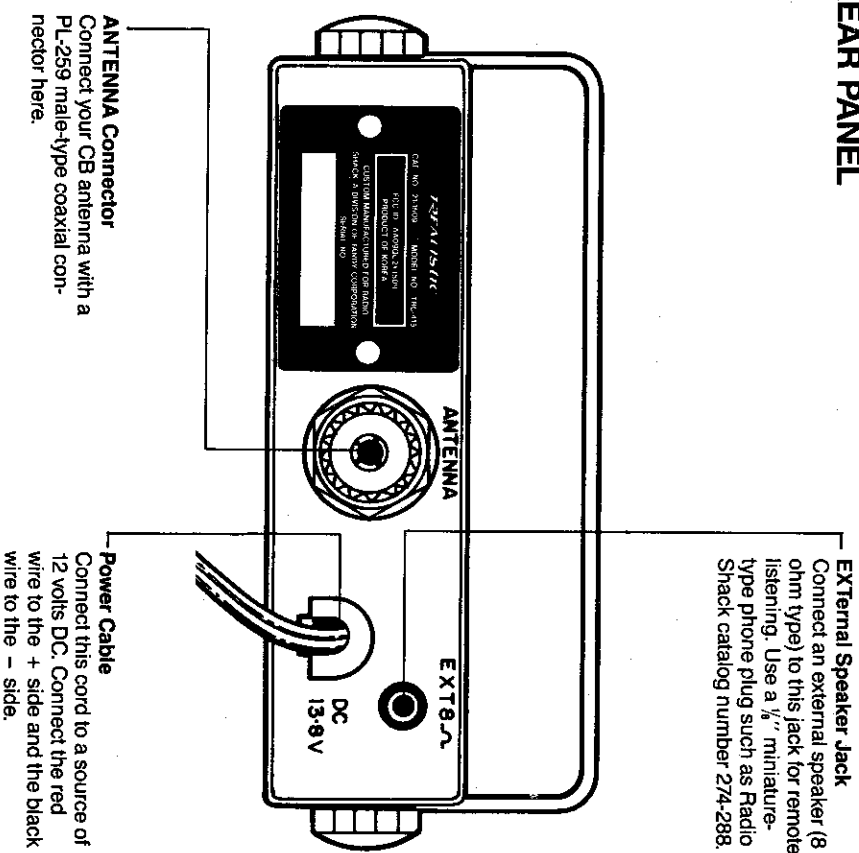
: 1500mA (full modulation)

# CONTROLS AND THEIR FUNCTIONS

## FRONT PANEL



## REAR PANEL



## INSTALLATION

Safety and convenience are the primary considerations for mounting any piece of mobile equipment. All controls must be readily available to the operator of the vehicle. Be sure all cables are clear of the brake, clutch and accelerator. Also consider the convenience and comfort of passengers (for example, will they have adequate leg room?). Consider also how easy installation and removal will be (for service and maintenance). Mount the Transceiver so it can be slipped in and out very easily.

The most common mounting location for a Transceiver is under the dashboard directly over the driveshaft hump. Do not mount the Transceiver in the path of the heater or air conditioning air stream.

When you have determined the best location for mounting, use

the mounting bracket as a template to mark mounting holes. Take care when you drill holes that you do not drill into wiring, trim or other accessories. Mount with bolts, lock-washers and nuts or self-threading screws.

You can install this Transceiver in any

location where 12 volts DC is available, connected to a negative ground system. Be sure you connect the red wire to the (+) terminal and the black wire to the (-) terminal.

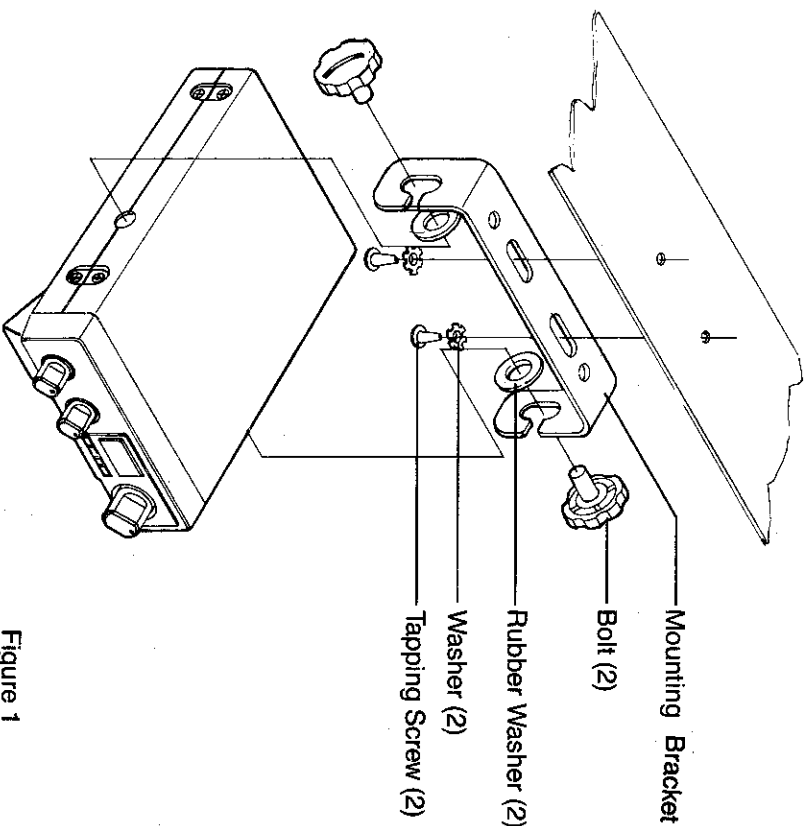


Figure 1

Connect the red wire (with in-line fuse holder) to an accessory terminal on the fuse block or ignition switch of your vehicle. Make a good mechanical and electrical connection to the frame of the vehicle for the black (negative) wire.

You can use an auto accessory plug (catalog number 274-331) to connect your Transceiver to the vehicle's cigarette lighter plug. However, it is better to connect the DC power cord directly to the accessory terminal of the ignition switch. This will prevent unauthor-

ized use of the Transceiver, and will also prevent you from leaving it on unintentionally. Connect the antenna systems to the ANTENNA coax connector. If you are using an external speaker connect it to the EXTERNAL speaker jack.

## USING YOUR TRANSCEIVER

**Do not transmit without a suitable antenna or load**

**connected to the ANTENNA connector.**

**For installation, refer to that section.**

### TO RECEIVE

**Note:** To hear receiver's sound, you must have the mic connected. (See Figure 2A)

1. Turn the SQUELCH control all the way counterclockwise.
2. Turn power on by rotating VOLUME clockwise.
3. Set the channel selector to the desired channel.
4. Adjust VOLUME for a suitable listening level.
5. Adjust SQUELCH to cut out annoying

background noise when no signal is being received. To do this, set the channel selector to a channel where no signals are present (or wait until signals cease on your channel). Then, rotate SQUELCH clockwise to the point where the background noise just stops. Now, when a signal is present, you will hear it, but you will not be disturbed by noise on the channel in between signals.

When properly set, SQUELCH will keep the receiver quiet until a signal comes in on that channel. Do not set SQUELCH too high, or weak signals will not be able to "open" the Squelch circuit. To receive weak signals, it is best to leave SQUELCH set to the minimum position (all the way counterclockwise).



**Note:** The SQUELCH circuit in your Transceiver is a special advanced development. It uses two extra transistors to accomplish a hysteresis action. The result is that when you

set SQUELCH for precise signal level, if that signal level fades (decreases or increases in strength), the squelch circuit will follow this change. Often with conventional

squelch circuitry, a signal that changes strength gets "chopped" by squelch and you lose a portion of the message; with hysteresis squelch you get it all.

## TO TRANSMIT

1. Select the desired channel of operation.
2. Press the push-to-talk button on the

microphone and hold it at an angle about 2-3" (5cm—7.5cm) from your mouth and speak in

a normal voice.

3. To receive, release the push-to-talk button.

## TO CONNECT THE MIC

Your Transceiver features a new locking type microphone connector.

This ensures that you will not accidentally pull out or loosen the plug connection

(when extending the Mic cable while moving about).

Press the small tab on the mic plug and then press the plug into the socket.

To connect the mic plug

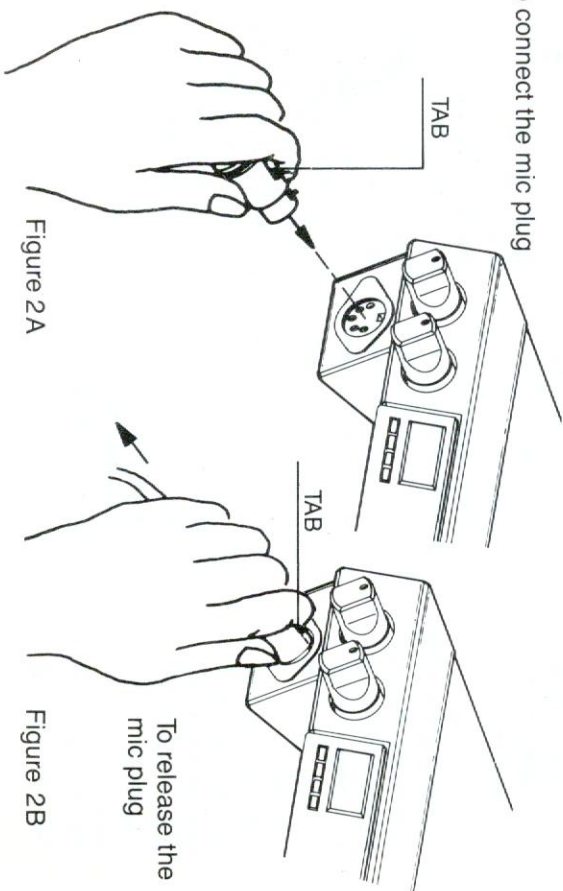


Figure 2A

Figure 2B

Press the small tab on the mic plug, push the plug in to release the lock and then pull it out.

## SPECIAL FEATURES

We have provided a few extra features that will enhance operation.

The LED S/R/F Meter gives you a relative indication of RF output power when you are transmitting (on the lower scale, any reading in the 4 areas means you have full strength output).

## CB COURTESY

- Wait for a pause in transmission before asking for a break.
- If you do not receive an answer after a second call to another station, sign off and allow others to use the channel. Wait a while, ask for a break, and try again.
- Do not dead key (hold the transmitter button in when you're not transmitting).
- Assist callers with directions, road conditions or other requested information.
- Keep harassment off the air. This is unnecessary and

When receiving, the LED Meter indicates the relative strength of the incoming signal (on the upper scale, in "S" units).

A built-in Automatic Noise Limiter (ANL) circuit helps to reduce or eliminate low-level impulse-type external noise. This special circuit is *always* active.

A Remote or external Speaker connected to the EXTERNAL speaker jack on the back will give you added versatility. When you plug a miniature jack into this connector, the internal speaker will be disconnected. Radio Shack sells a number of fine speakers for remote /extension CB use.

- causes problems for everyone including you.
- Be courteous — treat others the way you wish to be treated.

## ANTENNA SYSTEM

The antenna system includes the transmission line, and it is very important that you use the correct type of transmission line. The transmission line should be the coaxial type and should have an impedance equal to

the antenna impedance.

Since your Transceiver is designed to operate most efficiently into a 50 ohm load, it is best to use a type of coaxial cable with an impedance of 50 ohms.

We suggest type RG-58/U for short length and RG 8/U for long length — over 100' (30 m).

Generally speaking, you should keep the length of the transmission line to a minimum. Remember that transmission line losses increase with frequency. Use foam-

insulation coax for best results. Picking the right antenna is as important for reception as for transmission. If a mismatch exists between

the antenna and the receiver, the excellent sensitivity and signal-to-noise ratio of the receiver circuitry will be defeated.

## MOBILE ANTENNAS

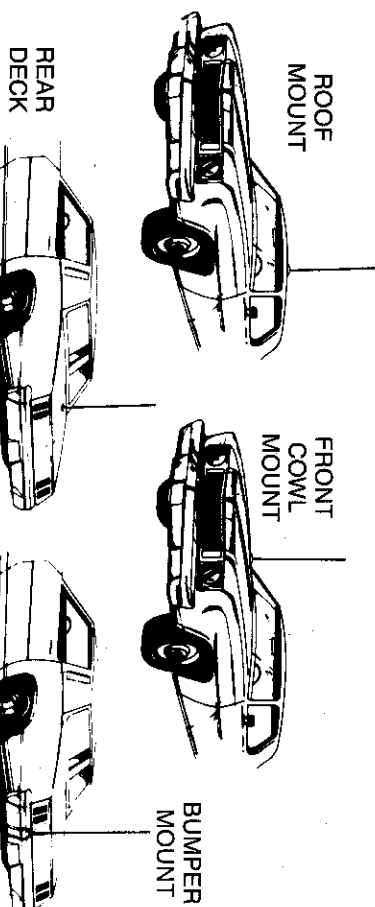
A few general rules should help you install any mobile antenna properly.

1. Keep it as far as possible from the main bulk of the vehicle.
2. Keep as much of it as possible above the highest point of the vehicle or boat.
3. During operation, it must be vertical. It should be mechanically rigid so it will remain vertical when the vehicle or boat is in motion.
4. Mount it as far as possible from sources of noise (ignition system, gauges, etc.) and keep the transmission line away from the noise source.

An antenna mounted in a boat requires a ground. This can be either a metal hull or a ground made of tin-foil or copper sheeting.

A vertically polarized whip antenna is best suited for mobile service. It is omnidirectional and can be the loaded type or a full quarter-wave (quarter-wave being more efficient).

There are many possible antenna locations on a car. Four of the most popular are shown and discussed at the top of the next page.



**Roof Mount** — In this position the antenna radiates equally in all directions. Since the normal  $1/4$  wavelength whip antenna is too long (102" or 2.6 m) for roof mounting on a vehicle, the antenna is shortened and a loading coil is used to provide the proper electrical length. Our Fiberglass Roof-Mount is a good durable antenna.

### Front Cowl Mount

— The radiation pattern is slightly greater in the direction of the rear fender opposite the side on which the antenna is mounted. However, this position offers a number of advantages. The CB antenna can be easily mounted. It can double as both the CB

and the standard auto radio antenna by employing a two-way coupler. Ask about our Front Cowl Mount antenna which is designed for CB, AM and FM operation.

**Rear Deck** — The radiation pattern is strongest in the direction of the front fender opposite the side on which the antenna is mounted. In this position you can use a full quarter-wave antenna or a shorter, loaded whip. Here you might consider one of the full 102" (2.6 m) whips.

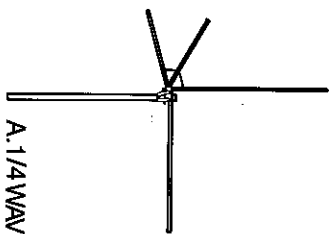
**Bumper Mount** — The antenna radiates in a pattern directly in front of and to the rear of the vehicle, with maximum radiation directly away from the vehicle, in a horizontal plane. Despite its fairly irregular pattern, a bumper-mounted full-length whip antenna will normally give the best results. Removing the antenna is simple and will leave no holes in the car. We suggest you to try our bumper-mount fiberglass whip.

## BASE STATION ANTENNAS

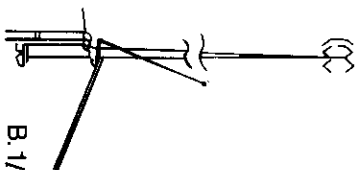
While your Transceiver is designed for Mobile operation, you might wish to use it for a base station unit, in conjunction with a 120

volt AC/12 volt DC Power Supply (available also from Radio Shack). In case you do use your Transceiver in a base station, here is

a very brief discussion about base station antennas. There are two basic types of base antennas (shown below).



A. 1/4 WAVE GROUND PLANE



B. 1/2 WAVE ANTENNA

A. The vertical 1/4 wave ground plane antenna is the most popular fixed station antenna. It is omni-directional and provides good performance for contacting other fixed and mobile stations. For medium-long range communications.

B. The 1/2 wave antenna is a high efficiency type radiator with omni-directional characteristics. It performs better in most applications than the ground plane (for medium-long range communications).

For maximum efficiency, we strongly recommend using an SWR meter to aid in the proper matching of your antenna and Transceiver. Your Radio Shack store carries a complete line of base station CB antennas and accessories.

## WARNING

When installing or removing base station CB antennas, use extreme caution. If the antenna starts to fall, let it go. It could con-

tact overhead power lines. If the antenna touches the power line, contact with the antenna, mast, cable or guy wires can

cause electrocution and death. Call the power company to remove the antenna. Do not attempt to do so yourself.

## NOISE

In mobile operation, your vehicle or boat can be the cause of noise interference. Since the receiver section of your Transceiver is very sensitive, it will pick up even the smallest noise signals and amplify them. Any noise that you hear in the Transceiver is almost totally from external sources. The

receiver itself is exceptionally quiet. If the noise is continuous and fairly loud, it cannot be totally eliminated by the Automatic Noise Limiter circuit. You must solve the problem at its source. To find out if the noise is from your ignition system, try this simple

test. Turn off your ignition switch and set it to ACC (accessory). This turns off the ignition, but supplies power to the Transceiver. Most of the noise will probably disappear, indicating that the source of noise is your vehicle's ignition or other electrical systems.

## IGNITION SYSTEM

Ignition-type noise can be identified by the fact that it varies with the speed of the engine. It consists of a series of popping sounds. There are a number of things that can be done to reduce this type of noise.

2. Inspect the high voltage ignition wire and all connections made with this wire. Old ignition wire may develop leakage, resulting in hash.

Other sources of noise are: generator/alternator, regulator, gauges and static discharge. Most of these types of noise can be efficiently reduced or eliminated by using bypass capacitors at the various output voltage points. We suggest you check your Radio Shack store for a selection of noise reduction accessories.

1. Use only the radio suppression type high-voltage ignition wire. Most new cars come already equipped with this type of wire.

3. If noise persists, replace the spark plugs with spark plugs that have suppressor resistors built-in. Be sure to use the correct type for your vehicle.

## SERVICE AND MAINTENANCE

- Your Transceiver has been built in accordance with Radio Shack's exacting quality control standards. However, it should be treated with reasonable care accorded any electrical equipment. Avoid exposing it to severe shock, dirt or moisture.
- If you run into problems with the unit, we recommend you check the following:
- If you have trouble receiving:
    - Check the **VOLUME**
    - **ON/OFF** switch setting.
    - Be sure **SQUELCH** is adjusted properly. Is it over-squelched?
    - Check if the unit is switched to an active channel.
    - Mic must be plugged in to receive.
  - If trouble is experienced with transmitting:
    - Check if the transmission line is securely connected to the **ANTENNA** connector.
    - Check if the antenna is properly installed.
    - Are all transmission line connections secure and free of corrosion?
    - Make sure you are fully pressing the push-to-talk button on the mic.
    - Be sure the mic connector is firmly pressed into its jack.
  - If the Transceiver is completely inoperative:
    - Check the power cable and in-line fuse. Replace only with an identical 2-amp fuse.

If these checks do not solve the trouble, do NOT attempt repairs or adjustments yourself. The unit should be serviced only by a qualified radio technician. Whenever possible, return the unit to the store from which it was purchased.

## WARNING

**Do not open the Transceiver to make any internal adjustments.** Any internal adjustment can be made only by (or under the direct supervision of) a person holding an FCC 1st or 2nd Class Radio Operator's License. Internal adjustment and/or modifications can lead to illegal operations as defined by FCC Rules and Regulations. Such illegal operation can lead to very serious consequences.

### TO BE SAFE AND SURE:

- You should never open up the case of your Transceiver.
- Never change or replace anything in your Transceiver.

## TYPICAL APPLICATIONS FOR YOUR CB TRANSCEIVER

**Personal and family:** Keep in touch with home while driving to work, to the store or social activity. Let your family know you are a tied up in traffic or that you will stop by the market on the way home.

If you are a two-car (or more) family, CB is great for communication between members of your family while they are in their cars.

Contact friends and neighbors — find out "what's happening" or plan a get-together. You can even meet new friends this way.

Ever have car trouble or run out of gas on the highway? What an assurance it is to be able to radio for assistance.

Camping, hunting, fishing or other sports are more fun with CB. Locate a buddy or find out "what's cooking back at camp."



**Business Uses:**

Call your office or coordinate field employee activities.

Sales and service people save valuable time and cut down on missing contacts and appointments.

Doctors and nurses can call their office or hospital to check on important calls or a particular patient.

With security policemen, 2-way radio is more than a convenience; it is a must for both safety and efficiency.

Truckdrivers and deliverymen learn road and traffic conditions and obtain assistance in locating destinations. CB is also good company on those "long hauls".

In construction crews, CB quickly pays for itself when you are calling for additional materials or coordinating the activities of various work crews.

## 10-CODES

Citizens band radio operators have largely adopted the 10-codes for standard questions

and answers. Its use permits faster communication and better intelligibility in noisy

areas. The following table lists some of the more common codes and their meanings.

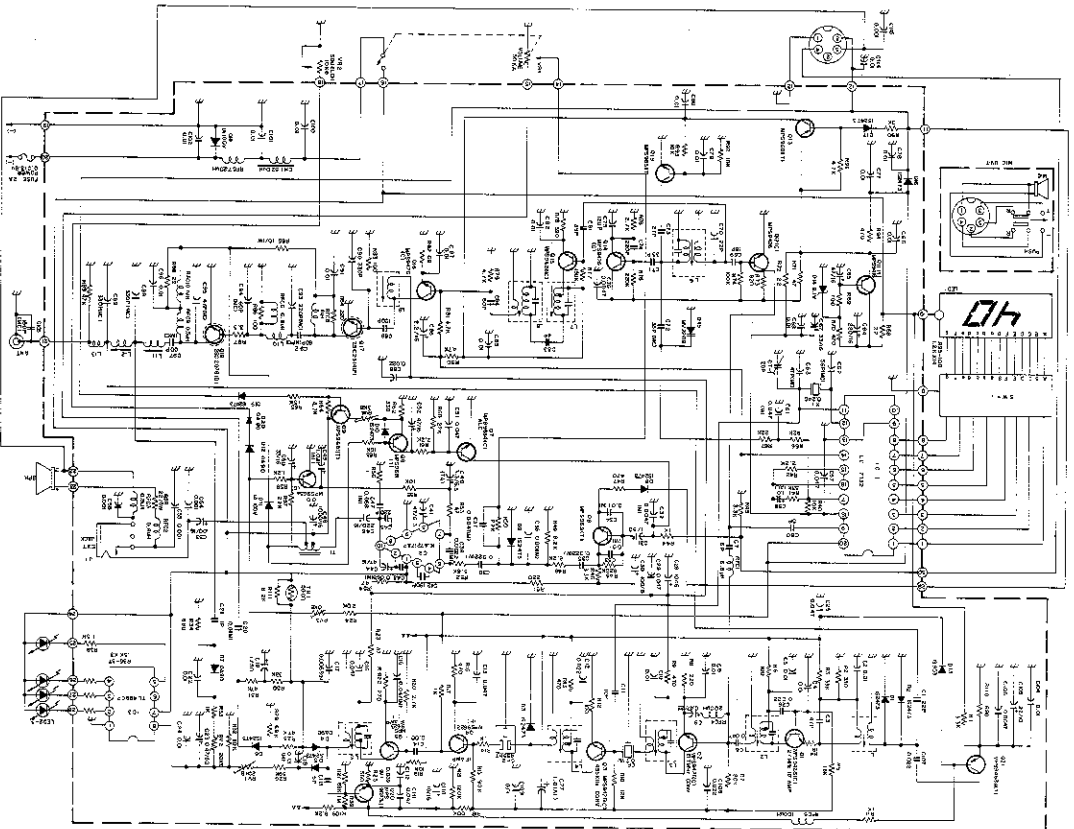
| Code | Meaning           | Code  | Meaning                        |
|------|-------------------|-------|--------------------------------|
| 10-1 | Receiving poorly  | 10-10 | Standing by                    |
| 10-2 | Receiving well    | 10-13 | Advise road/weather conditions |
| 10-3 | Stop transmitting | 10-20 | What is your location?         |
| 10-4 | OK                | 10-33 | Emergency traffic              |
| 10-7 | Out of service    | 10-36 | Correct time                   |
| 10-8 | In service        | 10-41 | Switch to channel              |
| 10-9 | Repeat            | 10-62 | Cannot copy you                |

## CITIZENS BAND FREQUENCY CHART

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

# SCHEMATIC DIAGRAM

Schematic subject to change without notice.  
For most accurate Schematic (and parts) contact Radio Shack, National Parts Dept., Fort Worth, TX 76101



# NOTES