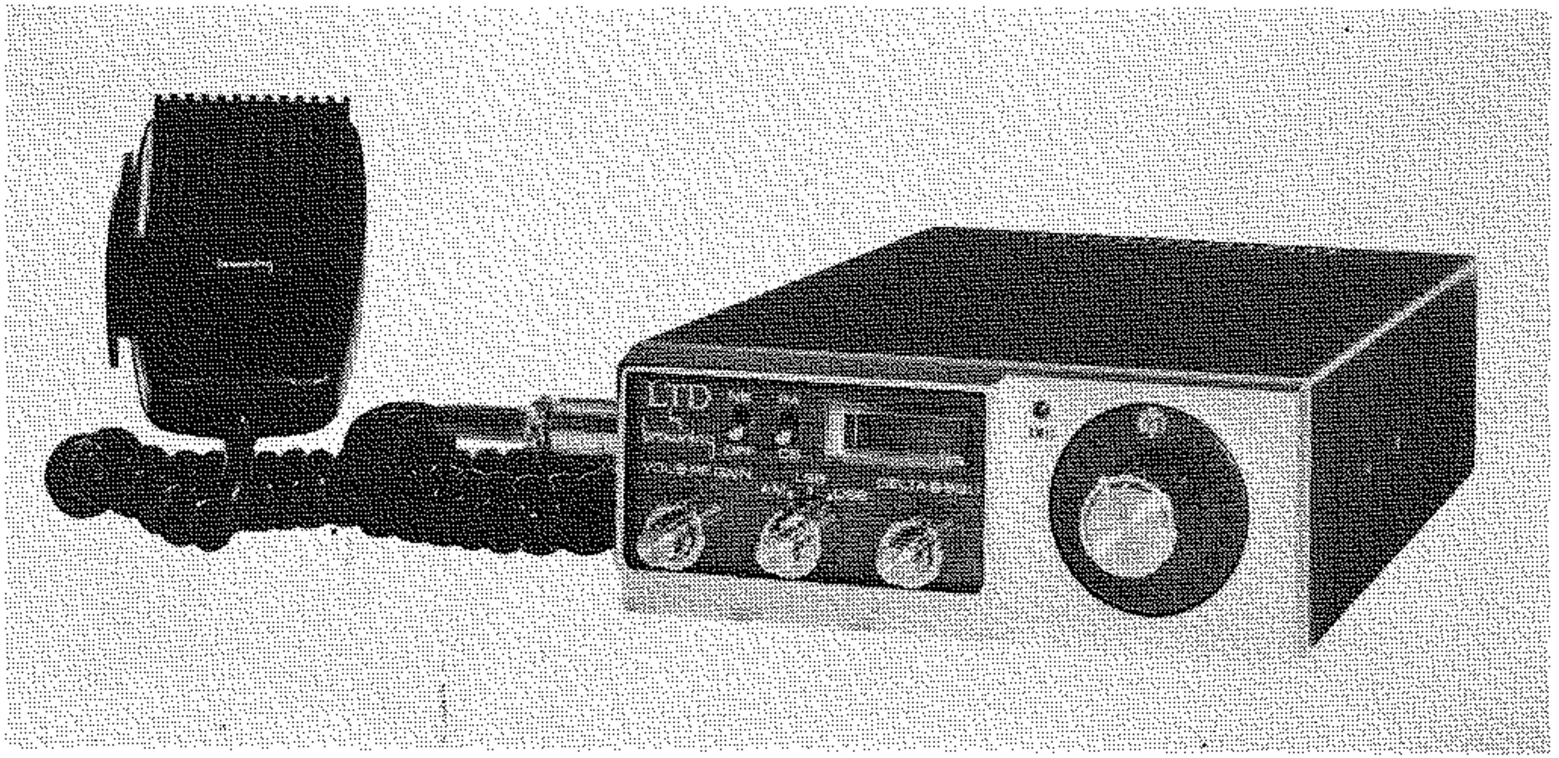
LTD SSB/AM CB TRANSCEIVER



23 CHANNEL SOLID STATE MOBILE

INSTALLATION & OPERATING INSTRUCTIONS

BROWNING LABORATORIES
1269 UNION AVENUE
LACONIA, NEW HAMPSHIRE 03246
PHONE (603) 524-5454

WARRANTY

Browning Laboratories, Inc. warrants each new inter-communicating device to be free from defective material and workmanship and agrees to remedy such defect or to furnish a new part in exchange for any part of any unit which under normal installation, use and service, discloses such defect-provided the unit is delivered by the owner to us or to our authorized distributor or dealer from whom purchased within one (1) year from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective. Labor is warranted for ninety (90) days.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect application, improper installation, or use in violation of instructions furnished by us.

This is not an all-encompassing or performance guarantee (see instructions) and this Warranty is in lieu of all other Warranties expressed or implied; and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

Browning Laboratories, Inc. reserves the right to make any change in design, or to make additions and improvements in its products without imposing any obligation on itself to install them in its products previously sold.

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NOTE - YOUR UNIT IS NOT IN WARRANTY UNLESS THE WARRANTY CARD IS ON FILE!!
SERVICE ON SUCH UNITS WILL BE CHARGED FOR. MAIL THE CARD NOW.

GENERAL INFORMATION

The LTD Transceiver is designed to comply with necessary requirements to operate in the Class "D" Citizens Radio Service in the 27 mc (11 meter) Band. The user is required to be familiar with, and comply with, Part 95 of the FCC Rules which defines operation in this service.

A valid station license and call letters are necessary before operation is permissible. The station license is obtained by submitting a properly and fully completed Form 505, Station License Application. After receipt of the license, the user must attach to the transmitter a Form 452-C, Transmitter Identification Card. Form 452-C has been included for your convenience.

Anyone meeting FCC requirements may operate a duly licensed transmitter, but the licensee is responsible for violations or infractions of the regulations. Browning Laboratories cannot be held responsible for improper technical adjustments where any unauthorized person has performed any adjustment or used any other than our authorized crystals, components, etc.

PRE-INSTALLATION

To those readily familiar with transistorized CB radio equipment, there is a tendency to install the equipment without reading the details of the Instruction Manual. However, to avoid equipment damage, a few precautions are necessary.

DO NOT

—Attempt to connect the power cord to a primary power source with the power switch on. Determine system polarity before connection. The LTD is wired for negative or positive ground connection. MOST MODERN CARS ARE NEGATIVE GROUND. Always connect the RED wire to POSITIVE (+) and the BLACK wire to NEGATIVE (—).

DO NOT

—Connect the antenna with the power on. Accidental contact with the rear speaker jacks on the rear panel will blow the line fuse.

DO NOT

—Key the transmitter without an antenna connected.

DO NOT

—Replace the fuse with any other type (3AG-3amp.)

DO NOT

—Attempt alignment of the transmitter to the antenna. Loss of modulation power and inefficient operation possibly resulting in transistor burn-out will occur unless the factory prescribed tuning procedure is followed. Maximum efficiency of an installation will result when the antenna has a VSWR of less than 1.5:1. The antenna should be tuned, trimmed or replaced, if necessary, to achieve this.

GENERAL DESCRIPTION

The LTD incorporates the latest in high frequency transceiver design techniques. Only the most modern silicon transistors are used throughout.

The LTD is a compact SSB/AM transceiver, employing 1 FET, 2 ICs, 61 diodes, 39 transistors, and an additional 5 transistors for compression and regulation in an advanced transistor circuit, and highly sensitive double superheterodyne receiver, containing noise blanker circuitry for reduction of high-level ignition noise, using highly selective crystal filter for SSB and ceramic filter for AM with a built-in rugged speaker and complete with a dynamic microphone, which is intended to provide all channel operation in the class D citizens band service and public address paging.

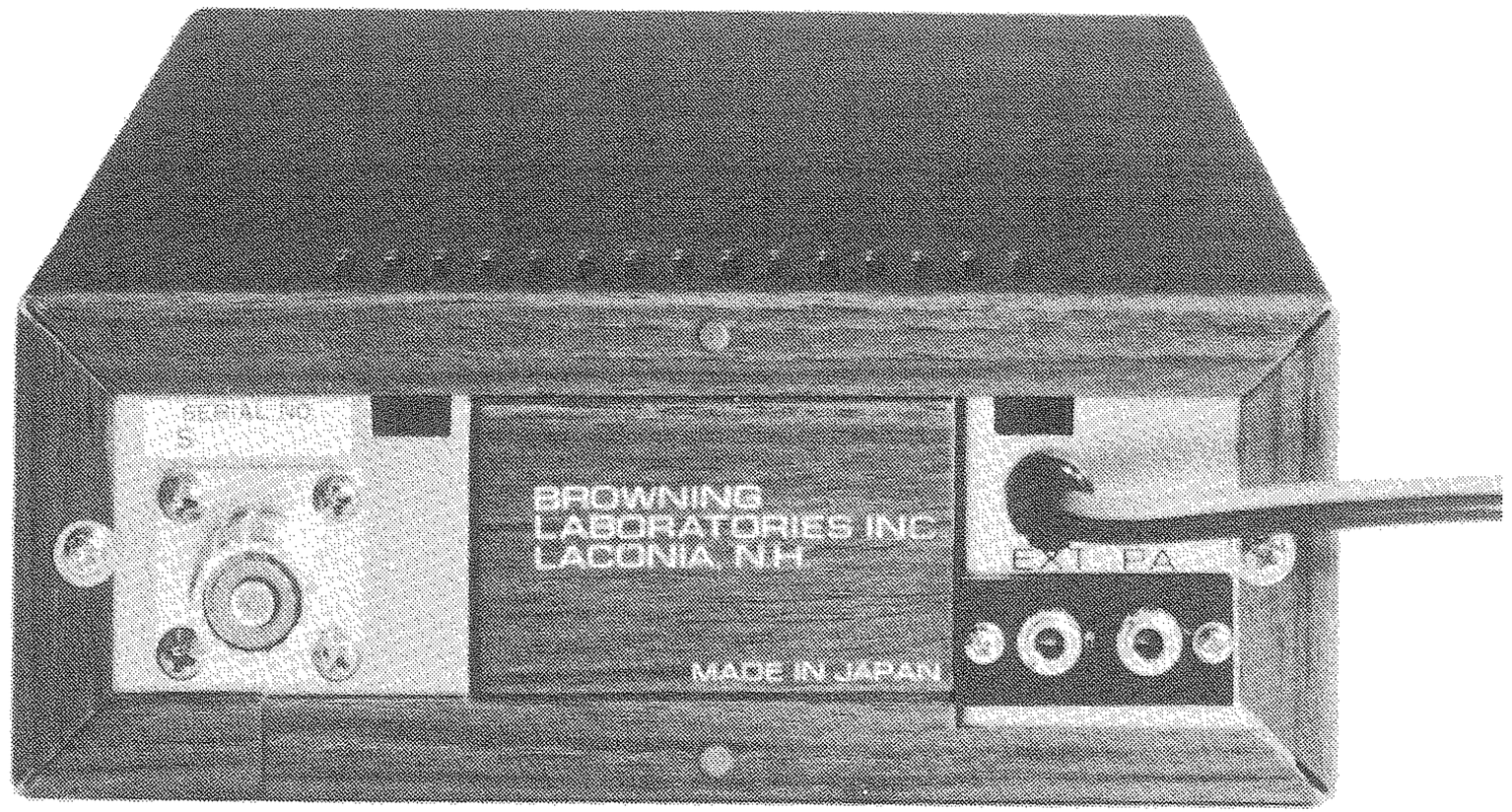
Twenty-three channel AM and forty-six channel SSB operation is made possible with 14 crystals in a highly stable synthesizing circuit.

Receiver voltages are zener regulated to maintain sensitivity and squelch operation over a wide input voltage excursion.

All transmitter transistors are oversized silicon units.

The LTD is designed to operate from a nominal 12-volt DC positive or negative ground source.

The LTD will operate over a nominal input voltage range of 11.5 to 16 volts without damage or serious loss of communication.


BROWNING
LABORATORIES INC
LACONIA, N.H.
MADE IN JAPAN

TECHNICAL SPECIFICATIONS

Receiver

Sensitivity
SSB - .25 uV for 10DB $\frac{s+n}{n}$ @ 1000 Hz
AM - .5 uV for 10DB $\frac{s+n}{n}$ @ 30% modulation @ 1000 Hz

Selectivity
SSB - 2.2 kHz @ - 6DB, 5 kHz @ - 50DB
AM - 4 kHz @ - 6DB, 20 kHz @ - 50DB

Image rejection - Better than 50DB

Squelch - minimum sensitivity-1uV, maximum signal stop, factory setting, 30 uV

Delta Tune
± 600 Hz (SSB RX, TX and AM TX)
± 1.5 kHz (AM RX only)

Noise Blanker - RF parallel gate

Audio Output - 6 watts into 8 ohm Speaker High level Class B Audio

Transmitter

Power Output
SSB - Better than 7 watts P.E.P. @ 13.8 volts
AM - Better than 3.5 watts @ 13.8 volts

Modulation - 85% minimum guaranteed sine-wave
100% average speech

Microphone

High output dynamic

Weight

6½ lbs. with microphone

Size

2⅜" H × 6½" W × 10" D

INSTALLATION

Select a suitable mounting position keeping the following in mind.

–Controls must be convenient and visible.

–The location should not interfere with driver or operator's normal functions.

–The transceiver should not be in the way of heater ducts, air conditioning outlets or direct blast air inlets.

–The transceiver should be protected from rain and spray. In some commercial vehicles and in marine applications, vertical mounting may prove more convenient. The LTD may be mounted in any position without performance change.

For a negative (–) ground vehicle, connect the red fused power cord to a well regulated source such as an ammeter terminal, ignition accessory terminal or cigar lighter.

"Tapping off" of dome or convenient light wires is not recommended as these circuits are usually wired very lightly and some power loss would be encountered. Always install the black wire from the radio to the vehicle chassis or system ground to reduce noise pickup. If the vehicle is positive (+) ground, reverse the black and red wires.

Install the radio in the mounting bracket and connect the antenna. It is essential for maximum performance that a good antenna be used. See ANTENNAS for a discussion of antenna types.

Three screw holes have been provided on the right hand side of the unit as a convenient mounting point for your mic clip.

The special spanner type screws used to mount the LTD in its bracket makes it very theft resistant as the wrench must be used to mount or dismount the unit. The wrench provides a great deal of leverage. Be careful not to damage screws by too much pressure. DO NOT KEEP THE WRENCH IN GLOVE COMPARTMENT. Leave it home-or on Key ring.

Extra wrenches $ 1.00.

OPERATION

Your LTD SSB operates on sixty-nine different channels. There are 23 AM channels, 23 upper sideband and 23 lower sideband. When in the AM mode, the LTD SSB will hear only signals being transmitted on double sideband with full carrier (AM). The unit may also receive SSB signals when on the AM mode but you will not be able to understand them. When operating in either of the SSB modes, strong AM signals may also be heard. It is recommended that you return to the AM mode if you wish to listen to these signals.

So that you will better understand the difference between AM, upperside band and lower sideband, a simplified explanation of their characteristics is in order.

An AM signal consists of a carrier frequency and two sidebands, an upper and lower. Each sideband is an exact duplicate of the other. An AM receiver, when it detects an AM signal, filters out the carrier so that you hear only the intelligence on the sideband. If you listen to an AM signal when your receiver is in the sideband mode, the receiver will not reject the carrier frequency (unless the DELTA TUNE CONTROL is tuned exactly right) and a steady tone will be heard as well as the intelligence. Therefore, for best reception of AM, your mode selector should be in the AM position.

When transmitting on single sideband, no carrier and only one sideband, either upper or lower, is being transmitted. When on AM, your receiver cannot take just this one sideband and change it into usable intelligence. You can recognize a sideband signal coming in on AM by its fluttering characteristic and its unintelligible sound. A signal transmitted on upper sideband can only be properly heard by a receiver tuned to the upper sideband. Such a siganl will not be intelligible.

When listening to a sideband signal on the proper mode, it may sound either too high pitched or too low pitched. The reason for this is that your receiver may not be tuned to the exact same frequency as the transmitter it is listening to. For this reason, LTD SSB is equipped with a DELTA TUNE CONTROL By turning this control, you slightly change the frequency of both your transmitter and receivers (within legal limits) so that reception will be in a normal tone.

Operation of the LTD Transceiver is simple and selfexplanatory to those familiar with CB equipment.

After power is connected, set the front panel switches to CB and NB Off or Down. Turn power on. With the volume at about one-half setting and the squelch control counter-clockwise, and the RF gain maximum clockwise, noise and/or signals should be heard. If the unit is inoperative, determine that the pilot lamp is on, if not, recheck power connections and line fuse.

The MODE control should be set to the desired mode.

The RF GAIN control should be rotated full clockwise for maximum RF gain.

The SQUELCH control should be rotated slowly clockwise to silence background, or weak or undesirable signals.

The DELTA TUNE control should be adjusted to clarify the SSB signals or to optimise AM signals.

When the NB switch is in the off or down position the audio noise limiter is in operation. In the NB position the audio noise limiter AND the noise blanker is in operation. The noise blanker operation greatly reduces strong ignition-type noise when receiving weak signals.

When installed in a vehicle whose ignition system proves to be an unusually noisy one, local measures can be taken on the vehicle to reduce such noise. Consult your distributor to determine the most economical method of suppressing the ignition noise. Usually simple suppression of spark plugs may suffice. However, more difficult cases may require special techniques. Sometimes generator and voltage regulator "hash" may be troublesome. Special capacitors and/or complete kits are available depending upon requirements. Little can be done to reduce noise interference from other mobile sources. Your LTD has the finest noise suppression circuitry available today regardless of cost.

The meter has two scales the upper an S meter reading when receiving showing the relative strength of the signal being received. When transmitting the lower scale will show the relative power output on AM and will fluctuate with voice peaks on SSB. The on air light will also glow dimly increasing in brilliance in proportion to modulation applied to the signal. Together a very visual idea of the transmitter operation is obtained.

Public Address or Loud Hail Functions

Auxiliary circuitry provided in the LTD enables it to be used as a public address system or loud hailer.

A trumpet or horn speaker of 8 ohms impedance is desirable for this purpose. Connect the speaker to a suitable length of cable using a standard 9/64" plug at the radio end. The plug is inserted in the P.A. jack. Placing the "PA CB" switch in "PA" will silence the receiver. When it is desired to speak, depress the mike key. Feedback effects which cause "ringing" or "howling" are reduced by placing the P.A. speaker as far from the microphone as possible. Avoid having the speaker and microphone facing each other. The volume control also controls P.A. volume.

The EXT jack functions in the CB position and can be used to operate an external speaker for receiving purposes. Any suitable speaker of 8 ohms is satisfactory.

OPERATION

Use of Channels

In accordance with FCC regulations channels 9 through 15 and Channel 23 can be used for communication between units of different license. On the remaining channels operation is only permissible between units of the same license. Recent FCC ruling have designated that Channel 9 be reserved exclusively for emergency situations only.

The LTD also contains a blank selector position between channel 22 and 23. This position is not for citizen band use and is internally defeated.

ANTENNAS

No other single part of the system can be as significant a factor in complete success or total failure of performance as the antenna installation.

It is advisable not to experiment but rather to use performance proven antennas. Many new "miracle" antennas appear on the market from time to time, but most of them disappear after a short period.

If a shortened antenna is desirable there are several successful types that the Browning distributor will recommend. Shortened types are very successful mounted in the center of the roof and somewhat less efficient when mounted on or near the front or rear fender or rear quarter deck.

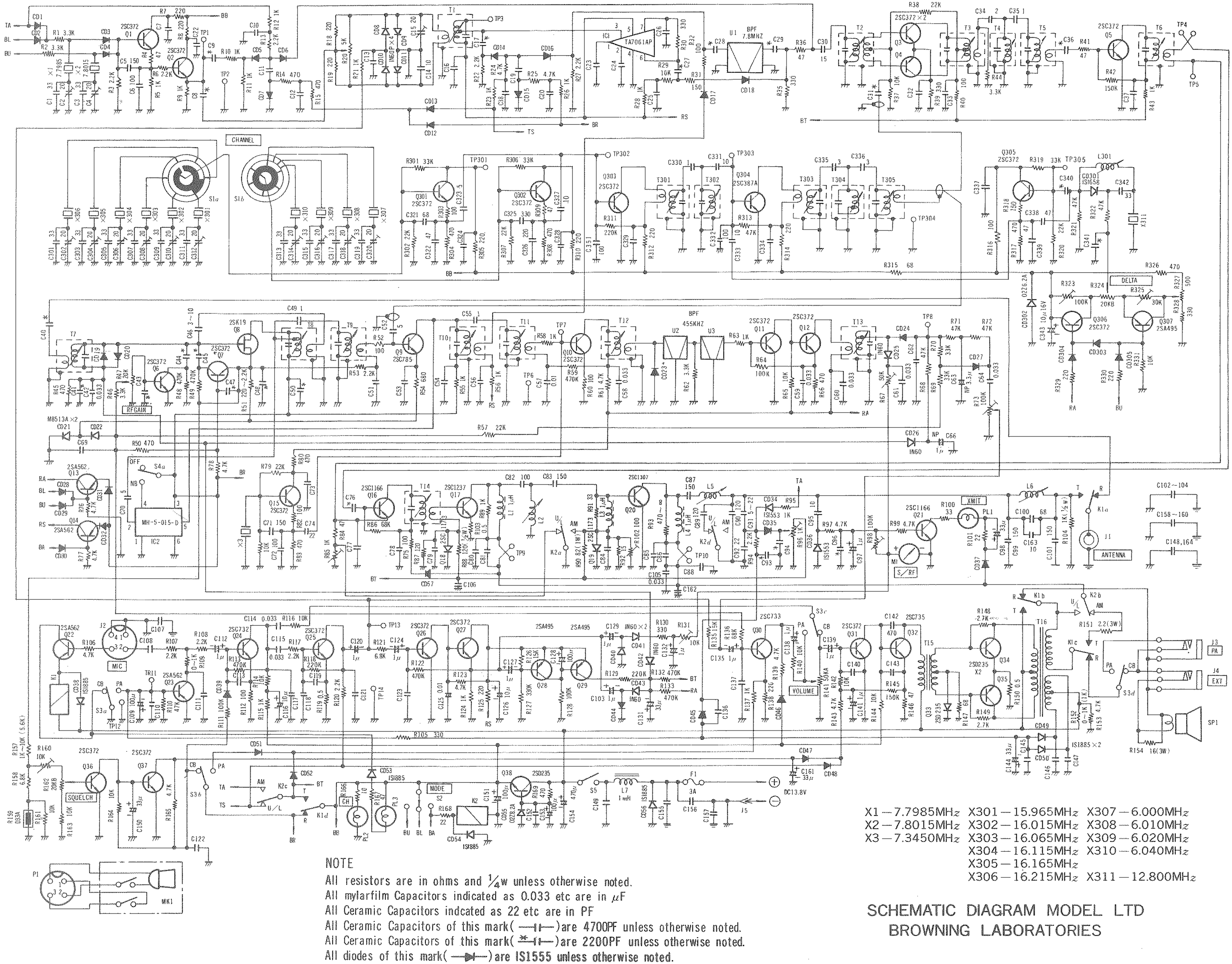
Bumper mounts are inadvisable because of their extreme directivity.

INSTALLATION ADJUSTMENTS

The output circuit of the LTD transmitter has been factory adjusted to operate into any good 52-ohm antenna. No attempt should be made to tune the transmitter to the antenna. Instead, the antenna should be adjusted to present the lowest possible SWR (Standing Wave Ratio). A very low SWR means that the antenna is operating at maximum efficiency and will also mean that it is adjusted to 52 ohms. An improperly adjusted antenna causes standing waves to appear on the feed line. Since this feed line is a fixed 52 ohms, and cannot be adjusted, this mismatch appears at the transmitter. If the transmitter is adjusted to compensate for this mismatch both it and the antenna will no longer be operating at peak efficiency. Since the transmitter has already been adjusted for 52 ohms output and the coaxial feed line has a fixed 52-ohm value, the only remaining element to be adjusted to this value is the antenna itself. When receiverd, the antenna is probably cut as near as is possible to this value. The mounting location on the vehicle or building and surrounding objects affect the antenna however, and requires that it be adjusted to compensate for them. Many of the newer Citizens Band antennas provide means of adjusting them for lowest SWR. Instructions for doing so are included with the antenna. For such antennas as the full quarter wave length whip, it is necessary to carefully vary the length until the lowest SWR is obtained. For all adjustments to the antenna, connect an SWR meter in the feed line to the antenna.
The LTD will work into an antenna system having an SWR as high as 3:1. For best communications, you will want this figure as near 1:1 as possible so that the antenna will be operating at its best efficiency.

Do not attempt VSWR checks if the vehicle is parked closer than 35 feet from a large fence, metal building, etc.

In any transistor transmitter or receiver, successive stages are interdependent on proper alignment to gain top performance. When an adjustment is made in one area, it can change the alignment in another. Our units are designed and built to accept an antenna impedance tolerance of 35 to 70 ohms. All stages are tuned to their optimum at the factory and should not be readjusted in the field.



X1 — 7.7985MHz X301 — 15.965MHz X307 — 6.000MHz
X2 — 7.8015MHz X302 — 16.015MHz X308 — 6.010MHz
X3 — 7.3450MHz X303 — 16.065MHz X309 — 6.020MHz
X304 — 16.115MHz X310 — 6.040MHz
X305 — 16.165MHz
X306 — 16.215MHz X311 — 12.800MHz

NOTE

All resistors are in ohms and 1/4w unless otherwise noted.
All mylarfilm Capacitors indicated as 0.033 etc are in μF
All Ceramic Capacitors indcated as 22 etc are in PF
All Ceramic Capacitors of this mark(—|(—)are 4700PF unless otherwise noted.
All Ceramic Capacitors of this mark(*—|(—)are 2200PF unless otherwise noted.
All diodes of this mark(—▶|—)are IS1555 unless otherwise noted.

SCHEMATIC DIAGRAM MODEL LTD
BROWNING LABORATORIES