

# Operating Manual Clipperton QRO

Includes 10 Meter mod sheets.

AMP MODIFIED FOR OPERATION

ON 28-30 MC ON JULY 2, 1984

BY

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**DENTRON**



**DENTRON**  
DISCOVERING VAST NEW HORIZONS



CLIPPERTON QRO WITH TUNED INPUT ON THE SIDE PANEL BOARD  
MODIFICATION FOR 10 METERS.

\*\*\*\*\* W A R N I N G \*\*\*\*\*

AFTER COMPLETELY REMOVING ALL POWER FROM THE CLIPPERTON "L", WAIT 30 MINUTES FOR THE ELECTROLYTICS TO DISCHARGE THROUGH THE BLEEDER RESISTORS.  
\*\*\*\*\*

Using the allen hex wrench supplied, remove the top of the cabinet by removing the top row of three screws on each side of the cabinet.

1. Refer to Figure #1,
2. Using a pair of needle nose pliers, carefully bend tab A out of the way of the switch rotor.
3. Locate the side panel board, This is a large printed circuit board which holds the tube sockets. It is mounted vertically.
4. Locate the small yellow core toroid on the left side of the board.
5. Unsolder the small yellow core toroid remembering where it was connected.
6. Take two turns off the toroid, It had 10 turns and will now have 8.
7. Remember to scrape the enamel off the wire so it can be soldered.
8. Resolder the toroid to where it was originally.

THIS COMPLETES THE 10 METER MODIFICATION.

NOTE: When using the Clipperton "L" on 10 meters, keep the load control above #5 at all times.

AND THIS  
Thus allowing  
switch to  
to the 10 meter position.

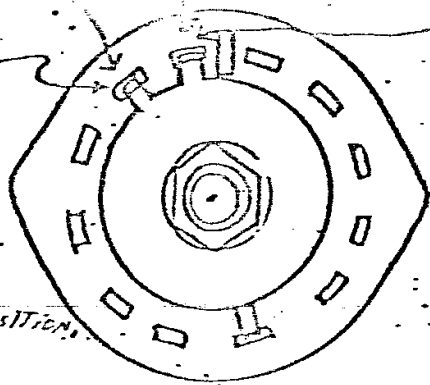


FIGURE - 1

As viewed from the  
FRONT of the Switch.

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# Introduction

The Dentron Clipperton QRO linear amplifier was designed to provide maximum legal power input for all modes in the amateur service. It has a full complement of controls and metering functions. The unit is housed in a low profile cabinet of all metal construction. Forced air cooling is used to cool four tough but economical 572-B triode tubes operating in a grounded grid configuration. The power supply will operate from either a 120 volt or 240 volt AC source. Dual secondary taps allow peak performance at either the 1000 watt CW or 2000 watt PEP SSB power level.

The Clipperton QRO requires between 65 and 150 watts of driving power for full power input, making it compatible with virtually any exciter. An output is provided to supply ALC voltage back to the exciter. The level is adjustable from the rear panel. The Clipperton QRO meets or exceeds all FCC specifications for amateur service from 160 to 15 meters. It adds the heritage of quality and performance that Dentron products are known for to the modern styling of the new generation of Dentron amateur gear.

## **!! Warning !!**

**MAKE NO ATTEMPT TO PUT THE AMPLIFIER IN SERVICE OUTSIDE OF THE CABINET!  
CONTACT WITH VOLTAGES IN THIS AMPLIFIER CAN BE FATAL!**

# Specifications

## FREQUENCY COVERAGE

160 meter band	1.8 to 2.3 Mhz
80 meter band	3.45 to 4.6 Mhz
40 meter band	6.0 to 9.0 Mhz
20 meter band	11.0 to 16.0 Mhz
15 meter band	20.0 to 23.0 Mhz

MODES OF OPERATION SSB, CW, RTTY, SSTV

POWER REQUIREMENTS 120 or 240 VAC, 50/60 Hz

RF DRIVE REQUIREMENTS 65 watts minimum, 100 watts nominal, 150 watts max.  
for 1 kilowatt DC input.

DC PLATE VOLTAGE 2600 volts in SSB mode, 1700 volts in CW mode

DUTY CYCLE 100% in normal amateur service

INPUT IMPEDANCE 50 Ohms nominal

INPUT VSWR 1.5 to 1 typical

OUTPUT IMPEDANCE 50 Ohms nominal

ANTENNA LOAD VSWR 2.0 to 1 maximum

ALC OUTPUT Negative polarity, level is rear panel adjustable

## SPURIOUS OUTPUTS

Intermodulation	30 db or more below peak output
Harmonic output	40 db or more below peak output

SIZE 14.7" wide, 6.08" high, 16.6" deep

WEIGHT 48 pounds net, amplifier 50 pounds gross, tube  
carton 5 pounds gross

## **!! Warning !!**

TO TAKE FULL ADVANTAGE OF THE CLIPPERTON COOLING SYSTEM, IT IS HIGHLY RECOMMENDED THAT THE UNIT BE RAISED UP WITH THE PROVIDED BAIL UNDER NORMAL OPERATING PROCEDURES.

# Theory of Operation

AC power is applied to the Clipperton QRO through a fuse, cabinet safety interlock, and the AC line switch. A terminal block is provided on the rear panel to properly interconnect the power transformer to operate the unit from either a 120 volt or 240 volt power source.

Power is applied to the fan and all transformer secondary windings whenever the AC line switch is activated. A filament winding of 6.3 volts at 17 amperes operates the tube filaments. This winding is center tapped to provide a balanced return for the direct current high voltage circuit. A second winding provides a nominal 12 volts to a half wave rectifier and filter. This supply is used to light the pilot and transmit lamps behind the meter, and to power the transmit-receive antenna relay. The third winding is a tapped high voltage winding. It drives a conventional full wave doubler circuit to produce the high voltage DC potential required by the 572-B tubes. Six heavy duty electrolytic capacitors are series connected to filter the high voltage. Each is shunted with 100 K ohm, 2 watt resistor to equalize the voltage appearing across each capacitor, and to bleed down the power supply when the amplifier is turned off.

A meter is available to measure either plate voltage or plate current during tuning and operating of the amplifier. The meter is a precision one milliamperere taut band movement; it is shunted to read 1.2 amperes full scale in the current mode, and has a string of three 1.0 megohm precision resistors in series to read 3000 volts full scale in the voltage mode, or when the amplifier is in the standby mode. The combination meter/standby switch also interrupts the 12 volt power supply to the transmit-receive relay in the standby mode.

When the unit is turned off, or in the standby mode, the relay will bypass the RF Input jack directly to the RF Output jack. When the unit is energized and placed in the operate mode, the relay closes whenever the keying jack center conductor is grounded. This causes the RF input to be routed to the tuned input portion of the tube board. Here, a combination of three relays select the proper input circuit components for the band in use. The relays are controlled by the front wafer of the band switch. A pi network is used on the 80, 40, 20, and 15 meter bands. On the 160 meter band, the filament choke is tuned to resonance and acts as a low Q parallel tuned circuit. The filament choke isolates the RF energy from the DC power circuitry and the filament transformer winding. RF power is coupled from the tuned input circuit to the tube filaments through a DC isolating capacitor. The DC return from the cathode/filament circuit is connected to the center tap on the filament winding. This eliminates hum modulation of the RF output by the filament potential. The circuit is completed through the relay. In the standby or receive modes, the relay selects a 47 K ohm resistor to ground, providing cutoff bias to the 572-B tubes. In the transmit mode, approximately 10 volts of bias is developed

across a zener diode-transistor combination. The transistor amplifies the regulating effect of the zener diode, and eliminates the need for a costly high wattage zener diode by acting as the principle dissipating element.

The four parallel connected 572-B tubes operate in a grounded grid configuration. Drive is applied between the filaments and ground. A major portion of the drive power feeds through the tubes and adds to the power output of the stage. The plates of the triode amplifier tubes are shunt fed through a large plate choke. Signal is taken from the plates through a DC blocking capacitor. A conventional pi network coupling circuit is used to transform the plate impedance of the tubes down to a nominal 50 ohms. The bandswitch, in addition to selecting the proper relays for the input circuit, selects the proper coil tap for the band in use. Separate sections of the bandswitch add additional loading capacitance to the 800 picofarad loading capacitor when operating on the 40, 80, and 160 meter bands. Also, additional capacity is added to the 250 picofarad tuning capacitor on 160 meters only, to maintain a circuit Q of at least 6. The additional capacity consists of two 200 picofarad high voltage capacitors in parallel. The operational Q of the output tank circuit varies from approximately 8 to 15, depending upon the band in use.

In the event of arcing or tube failure, the power supply is protected by two parallel connected 1 ohm, 1 watt resistors in series with the high voltage feed to the plate choke. These resistors will open in the event of a shorted tube or plate circuit component. A 2.4 millihenry choke is used across the output of the pi network output circuit to prevent any DC potential from appearing at the output connector.

ALC voltage is developed by a diode sampling circuit in the input circuit. Normally, a negative going voltage is produced. The polarity may be reversed by reversing the diode.

The DENTRON service department is prepared to provide any technical assistance you may require in the operation or maintenance of your new Clipperton QRO amplifier.



## **Cautions**

1. Make no attempt to put the Clipperton QRO in service outside of the cabinet. Contact with voltages in this amplifier can be fatal to the human body.
2. Never attempt to operate the Clipperton QRO with drive power of more than 150 watts!
3. Never attempt to operate the Clipperton QRO without first connecting it to an antenna with an SWR of less than 2:1, or a 50 Ohm dummy load of sufficient power handling capacity or serious damage may result to the amplifier.
4. Never run the amplifier from an extension cord.
5. Do not attempt to change jumper connections on back of the amplifier without first removing the line cord from the AC supply.
6. Do not cover the top of the Clipperton QRO with books, papers or other pieces of equipment or overheating may result.
7. Do not use tuning procedures other than indicated in this manual.
8. When cleaning the Clipperton QRO, never blow high pressure air directly into the fan blades. Spinning the fan at high speeds than it was designed for can cause damage and freeze the rotor assembly of the fan. Use a brush in cleaning the fan assembly.

### **!! Warning !!**

IF ANY PROBLEMS OCCUR THAT ARE NOT EASILY REPAIRED IN THE FIELD, PLEASE CONTACT DENTRON RADIO COMPANY FOR TECHNICAL ASSISTANCE.

### **!! Warning !!**

TO TAKE FULL ADVANTAGE OF THE CLIPPERTON L COOLING SYSTEM, IT IS HIGHLY RECOMMENDED THAT THE UNIT BE RAISED UP WITH THE PROVIDED BAIL UNDER NORMAL OPERATING PROCEDURES.

# !! Warning !!

MAKE NO ATTEMPT TO PUT THE AMPLIFIER IN SERVICE OUTSIDE OF THE CABINET!  
CONTACT WITH VOLTAGES IN THIS AMPLIFIER CAN BE FATAL!

## Unpacking Instructions

Carefully remove your Clipperton QRO from its packing carton making sure there is no damage evident from shipping. If there is any damage, notify the delivering shipper immediately, fully describing the damage.

Fully complete the Dentron Registration card included in the information package and return it to Dentron. Do not destroy the packing material, since it will be usable later should you require factory service or need to transport the amplifier for any other reason.

In general, the location of your new Clipperton QRO is not critical. Be certain, however, to leave enough room behind the unit to allow for proper air flow over and under the unit, as well as behind it.

## Installation

The Clipperton QRO is factory wired to operate from a 120 VAC line. If 240 VAC is desired, you will have to rewire the power transformer primary per the schematic diagram. The terminal block is located on the rear panel, under the cover box.

1. Position the Clipperton QRO so that the rear, sides, and the top of the unit are clear of all obstructions. This will assure adequate air circulation.
2. Connect a wattmeter and a 50 ohm load (such as a Dentron Big Dummy), to the output connector using RG8 or its equivalent.
3. Connect the Clipperton keying lead to your transmitter using shield cable (See the interconnect diagram.) The Clipperton requires closed contacts on transmit. The DC potential at the keying jack is positive with the amplifier unkeyed.
4. Connect the RF input jack to the transmitter RF output using 50 ohm coax.
5. Connect the Clipperton ALC output to the transmitter ALC input using shielded cable. (See your exciter owner manual.)
6. Connect as short a ground lead as possible from a good earth ground to the unit's rear panel GRD terminal.

### 240 Volt Operation

### 117 Volt Operation



1  
2  
3 } Pins 3 to 4  
4  
5  
6

1  
2 } Pins 2 to 4  
3 } 3 to 5  
4  
5  
6

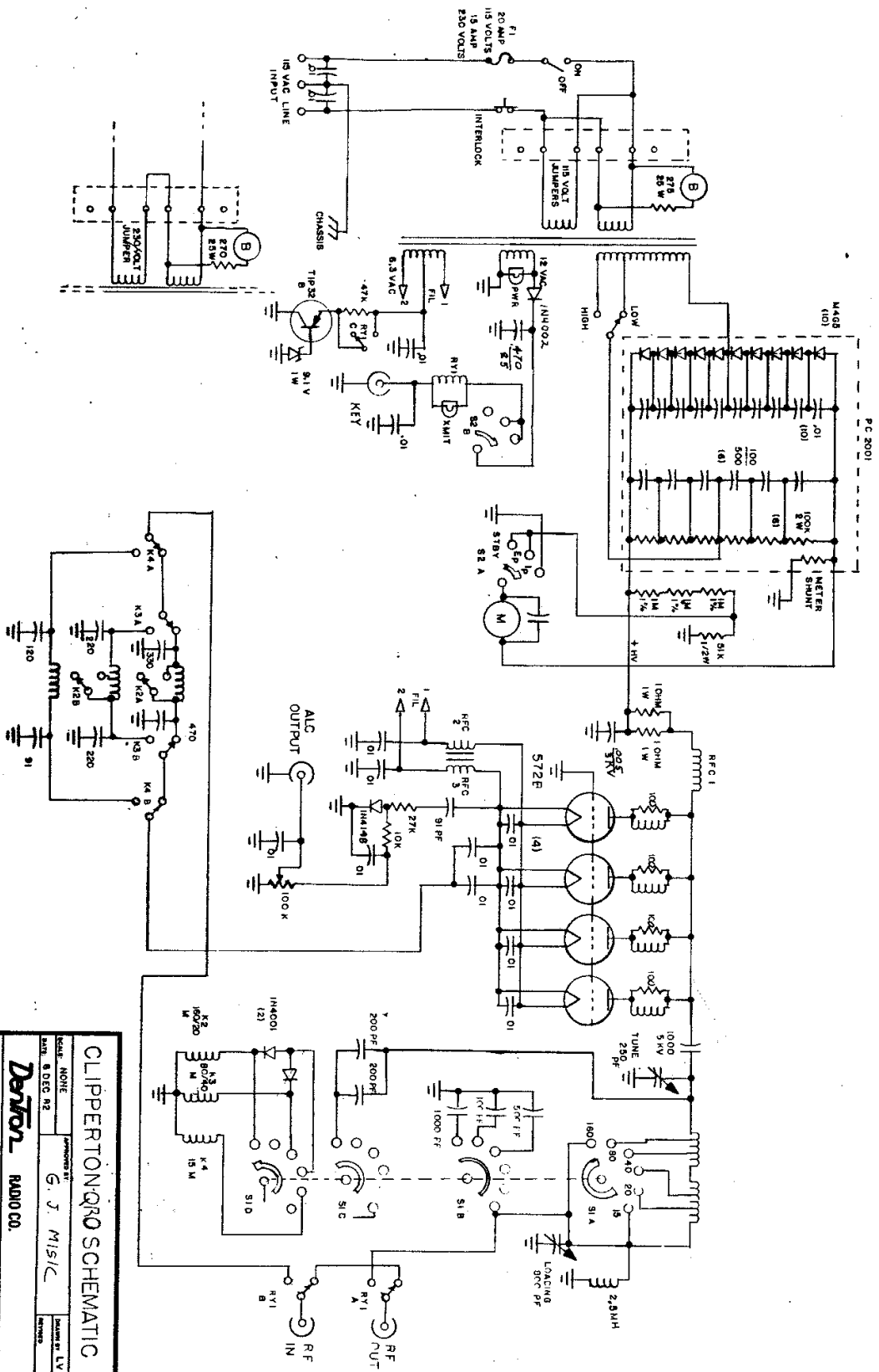
White = 1 side of 240V (120V)  
Black = other side of 240 120  
Green = Ground

# Tuning Procedure

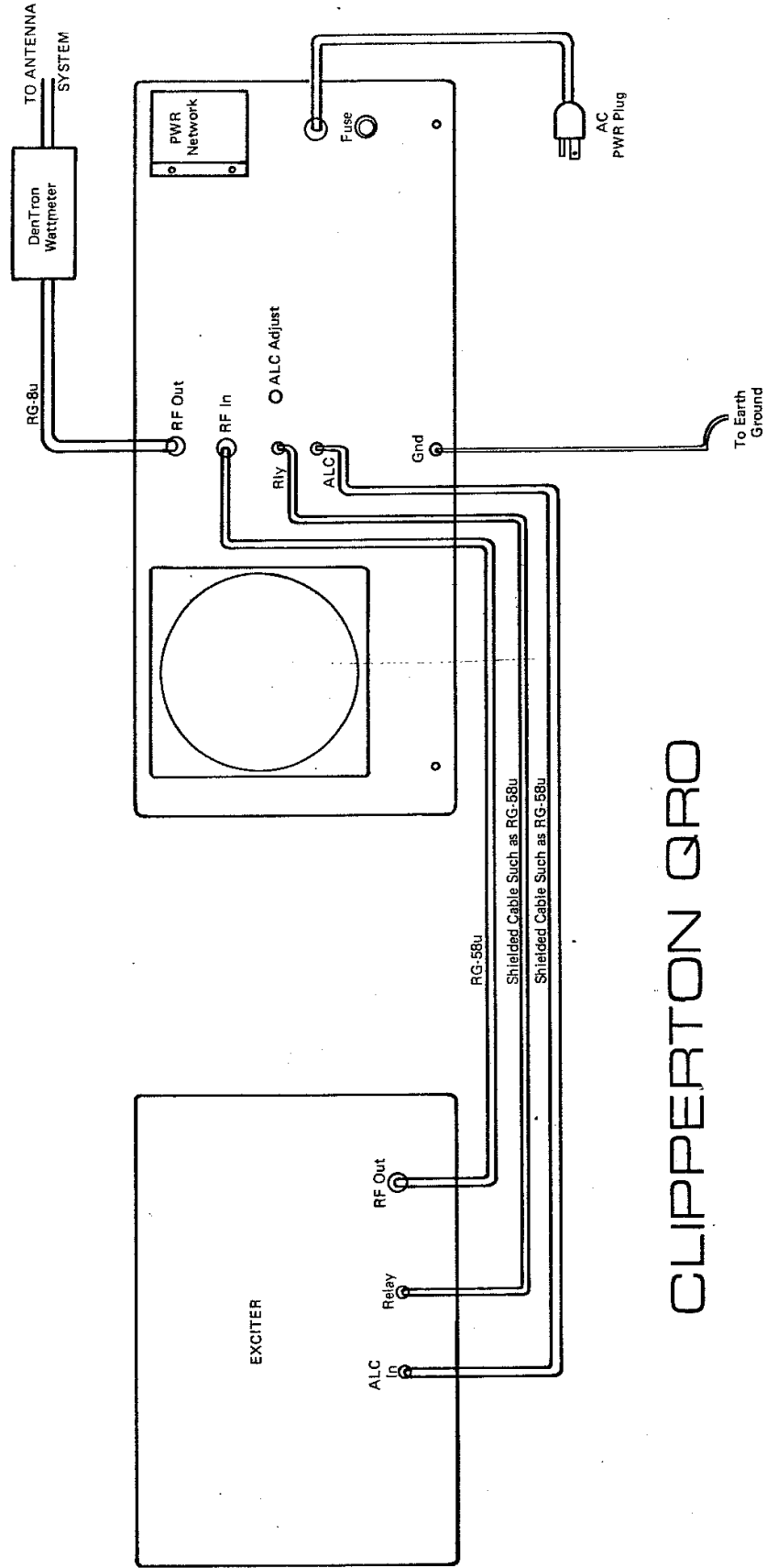
1. Position the Clipperton front panel switches as follows:  
PWR - OFF  
CW/SSB - CW  
METER SWITCH - STBY
2. Insert the AC line cord into the appropriate outlet.
3. Turn the main power switch to the "ON." Plate voltage should read approximately 1800 VDC, and plate current should read 0 MA.
4. Allow a few seconds for tube warm up.
5. (160M through 20M,) set the load control at 1. (15M), set the load control at 3.
6. Set the tune and band switch to the band being used.
7. Tune your transceiver as you normally would in the transmit position, i.e. tune for maximum power out of the transmitter and then back off to approximately 50 watt output point, (use carrier level control to set power level).
8. Set the meter switch to the current (IP) position and the CW/SSB switch to the CW position.
9. Tune the Clipperton QRO for maximum output in the CW position on a watt meter such as the Dentron W2C or W2D Wattmeter. 1 KW DC input will not be achieved at this point. Increase drive level control and retune amplifier until 1 KW DC input is achieved.  
  
NOTE: Check the position of the CW/SSB switch to make sure it is in the CW position.
10. Use the following formula to calculate the DC input level to the Clipperton:  
PLATE CURRENT X PLATE VOLTAGE = POWER  
EXAMPLE: 1500 volts DC x .666 Amps DC = 1 kw DC input.
11. Once you have reached the 1 KW DC input level in the CW mode, you need only put the CW/SSB switch in the SSB position for voice operation.

## NOTES:

1. Remember: 1 kw DC input is the legal limit.
2. As stated in Step 7, tuning and loading the exciter to a normal power level is preferred as you can reduce the Clipperton loading to maintain 1 kw DC input. This technique helps reduce unwanted harmonics and RF distortion.



**CLIPPERTON QRO SCHEMATIC**  
 DRAWN BY: L.V.K.  
 APPROVED BY: G. J. MISIC  
 DATE: 8 DEC 42  
 SCALE: NONE  
 DEPT: RADIO CO.  
**DAVON**



CLIPPERTON QRO

## Limited Warranty

DenTron Radio is proud of the quality and workmanship of its communication equipment. If properly installed and operated in accordance with our instruction manual, it will give reliable performance. DenTron Radio extends to you as an owner of a new DenTron Radio Product the warranty set forth below:

For ninety (90) days from the date of original retail purchase, DENTRON RADIO CO. will either repair or replace, at its option, free of charge, any part or parts found to be defective in material or workmanship. Transportation charges for any parts submitted for replacement under this warranty must be paid by the purchaser.

This warranty will not apply to any part which has become inoperative due to misuse, excessive use, accident, neglect, improper maintenance, alterations, or unless the unit has been operated and maintained in accordance with the instructions furnished.

This warranty will not apply where the unit has been used commercially or when the unit has been used in conjunction with accessories not manufactured by DENTRON RADIO CO.

All implied warranties are limited in duration to ninety (90) days from the date of original retail purchase.

The provisions of this warranty specifically exclude any warranty or remedies for incidental or consequential damages.

**SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.**

In order to obtain warranty service, send written notification to the following address: DENTRON RADIO CO., Attn: Service Dept., 1605 Commerce Drive, Stow, Ohio 44224

Any written notification should include the model number of the unit, date and place of purchase, and a description of the defective part or condition. Do not return the unit or any parts unless requested to do so by DENTRON RADIO CO.

Although the return of the DENTRON Warranty Registration Card is not a condition precedent to warranty coverage and performance, the purchaser is encouraged to promptly return the Warranty Registration Card upon purchase in order to more easily facilitate the handling of any future service under these warranty provisions.

**THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.**

Serial #

4045

model

displays h

GR

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Stow, Ohio 44224

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