

**MIDLAND**  
ELECTRONICS COMPANY

**MODEL 13-866**

**5-WATT 23-CHANNEL  
MOBILE TRANSCEIVER**

**OWNER'S GUIDE**



## FEDERAL COMMUNICATIONS COMMISSION'S REQUIREMENTS

Your new Midland 13-866 is a combination receiver-transmitter designed, built, and F. C. C. type accepted for licensed Class D operation on any of the 23 frequencies designated as citizens band channels by the Federal Communications Commission. You are required to read and understand Part 95 of the F. C. C. rules and regulations prior to operation of this unit. Part 95 regulations are available from the Superintendent of Documents, Government Printing Office, Washington D. C. 20402. You are also required to complete F. C. C. form 505 and submit it to the F. C. C. in order to receive your license to operate this unit. F. C. C. regulations will be violated if you transmit with this unit prior to receipt of your license.

### NOTE

The technical information, diagrams, and charts provided in this manual are supplied for the use of a qualified holder of a first or second class radiotelephone license in servicing this transceiver. It is the user's responsibility to see that this unit is operating at all times in accordance with the F. C. C. Citizens Radio Service regulations.

If you install or service your own transceiver, do not attempt to make any transmitter tuning adjustment. Transmitter adjustments are prohibited by the F. C. C. unless you hold a first or second class radio-telephone license or are in the presence of a person holding such a license. A Citizens Band or Amateur license is not sufficient.

When service is performed by an authorized and licensed person, care must be taken in the replacement of parts to use only authorized parts, in order not to void the type acceptance of this model.

Midland Electronics Company hereby certifies that this unit has been designed, manufactured and F. C. C. type accepted in accordance with Vol. 6, Part 95 of the current F. C. C. rules and regulations as of the date of manufacture.

### **UNDERSTANDING YOUR NEW 13-866**

#### **RECEIVER:**

Sensitive dual conversion circuit with all crystals supplied for 23-channel reception. One microvolt sensitivity, built-in controlled squelch circuit and noise limiting give noise-free operation. Active AGC circuit eliminates fading and over driving.

#### **TRANSMITTER:**

Precision crystal-controlled oscillator circuit with all 23 Citizens Band channels built in. A maximum of TVI filtering is employed. Pi-network matching for exact loading to any standard CB antenna.

#### **SIGNAL-TRANSMIT POWER METER:**

A combination meter on the front panel provides a constant visual monitor of incoming "Signal Strength" when receiving and "Relative Output Power" when transmitting.

**CONTROLS:**

A full set of controls is employed including volume ON-OFF switch 23-channel selector switch, full variable squelch, public address switch and Automatic Noise Limiter switch.

**PUBLIC ADDRESS SWITCH:**

In the "PA" position, your transceiver is converted to a public address system. A convenient pin jack on the back panel is provided for connection to any standard 8 ohm PA speaker.

**POWER SUPPLY:**

The 13-866 is designed to operate on 12 volts DC. Any 12-volt automobile system is adequate. For base station application, use Midland 18-802 (optional extra) power supply which plugs into 110 volts AC and delivers 12 volts DC to your transceiver.

**ANTENNA REQUIREMENT:**

This transceiver will operate with any standard 52 ohm ground-plane, vertical, mobile whip, or other CB antenna. A standard SO 239 type connector is provided on the back panel for use with popular PL 259 antenna plug. An adjustable loading network is provided to match antenna impedance exactly.

**FREQUENCY:**

Each unit is completely equipped with crystals for operation on any of the 23 Citizens Band channels. It is not necessary to purchase any additional crystals for this unit. Refer to part 95 of the F. C. C. rules and regulations to determine which channels may be used for various kinds of communication.

## MOBILE INSTALLATIONS

A location in the car or truck should be chosen carefully for convenience of operation and non-interference with normal driving functions. Mounting may be under the dash or instrument panel or any place a secure installation can be made.

### GROUND INFORMATION:

#### NOTE

This transceiver may be installed and used in any 12 volt DC negative or positive ground system vehicle.

Most newer U.S. and foreign made cars and small trucks use a negative ground system while some older cars and some newer large trucks may use a positive ground system.

A negative ground system is generally identified by the -battery terminal being connected to the vehicle motor block, but if you cannot determine the polarity system of your vehicle, it is suggested that you contact your vehicle dealer for definite information.

### **NEGATIVE GROUND SYSTEM:**

In the case of a negative ground system connect the red DC power cord from the transceiver to the positive or +battery terminal or other convenient point and connect the black power lead to the chassis or vehicle frame or -battery terminal.

### **POSITIVE GROUND SYSTEM:**

In the case of a positive ground system connect the black DC power cord from the transceiver to the negative or -battery terminal or other convenient point and connect the red power lead to the chassis or vehicle frame or +battery terminal.

With regard to the connection of the power cords, it may be possible or desirable to connect the (red lead for negative ground system) or (black lead for positive ground system) to the ignition switch accessory terminal so that the transceiver is automatically turned off when the ignition switch (key) is turned off.

Alternately, the power lead may be connected to an available terminal on the fuse block or even to a point in the wiring harness. Care must be taken, however, to guard against a short circuit condition so when in doubt, please contact your vehicle dealer for specific information for your vehicle.

## **IGNITION INTERFERENCE:**

Engine ignition interference should not be a problem and vehicles equipped with standard broadcast radios will have enough suppression to eliminate ignition interference. If interference is present, any skilled auto radio repairman should be able to eliminate it for you.

## **BASE STATION INSTALLATIONS**

For base station use, the Midland model 18-802 power supply is recommended. When this power supply is used, simply connect the red (+) and black (-) terminals on the power supply to the (+) and (-) leads on your 13-866. Do not attempt to operate this transceiver by connecting directly to 110 Volts AC.

## ANTENNA INSTALLATION

### BASE STATION:

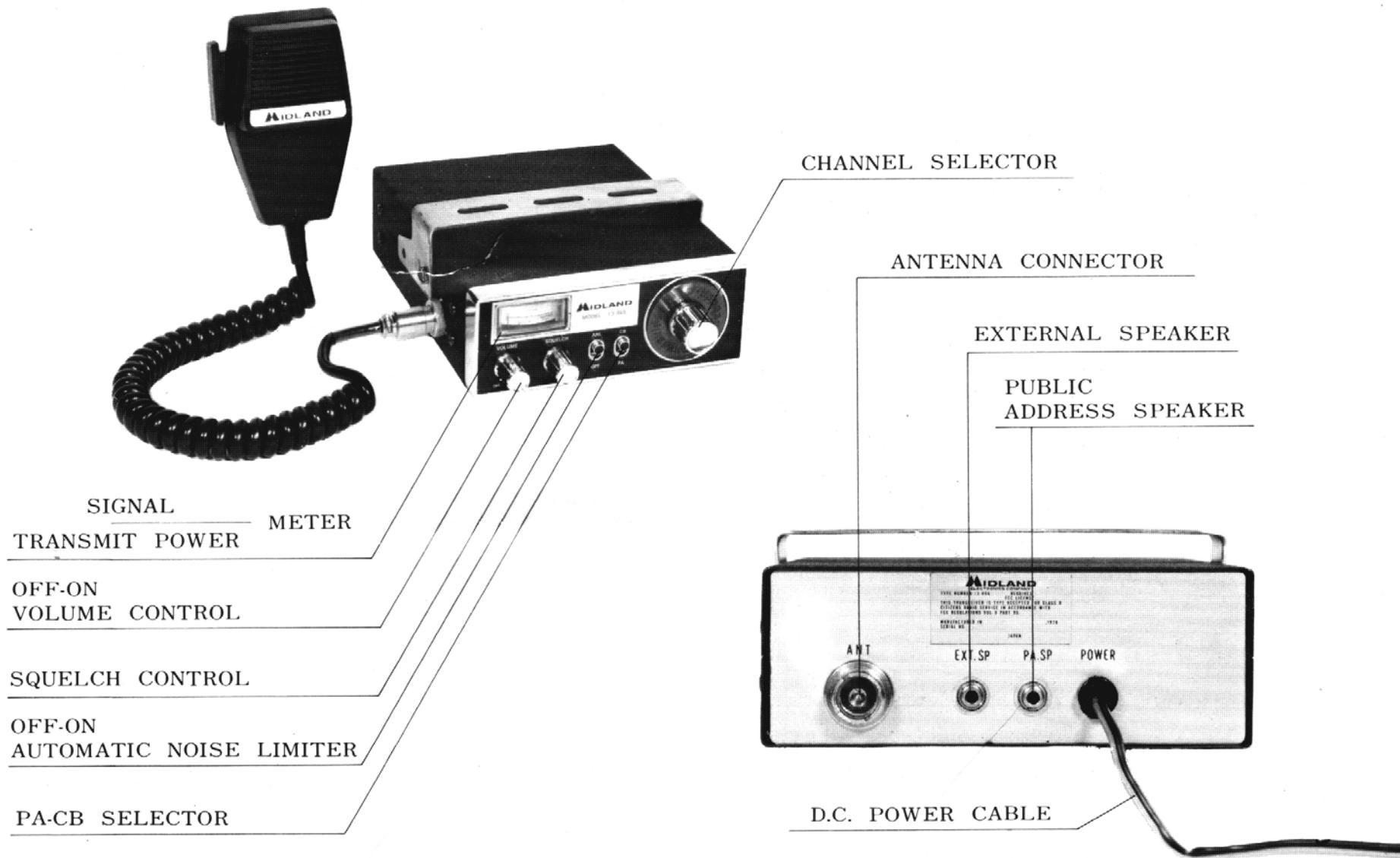
When the 13-866 is used as a base station, any Citizens Band beam, dipole, ground plane or vertical antenna may be used. A ground plane type will provide greater coverage and, since it is essentially non-directional, it is ideal in base station to mobile operation. From base station to base station, or point to point operation, a directional beam will give greater distance even under adverse conditions. The range of the transceiver depends basically on the height of the antenna and, whenever possible, select the highest location within F. C. C. limits.

### MOBILE ANTENNAS:

A vertical whip antenna is best suited for mobile use.

A non-directional antenna must be used for best results in any case. The base loaded whip antenna will normally provide effective communication. For greater range and more reliable operation, a full quarter-wavewhip should be used. Either of these antennas use the metal car body as a ground plane and the shield of the base lead as well as the metal case of the transceiver should be grounded. A standard antenna connector (type SO 239) is provided on the transceiver for easy connection to a standard PL 259 cable termination.

## OPERATION OF CONTROLS



### **VOLUME CONTROL AND OFF-ON SWITCH:**

The volume control varies the sound output of the loudspeaker. It also functions as an OFF-ON switch. Clockwise rotation increases volume.

### **CHANNEL SELECTOR SWITCH:**

Tuning the receiver and transmitter is simultaneous by rotating the 23 channel selector switch. Set the switch to the desired channel 1 to 23 as indicated directly on the switch knob.

### **SQUELCH CONTROL:**

Quiets the receiver when signals are not being received and allows a quiet standby operation. It functions only in the receive mode and does not affect the receiver volume when signals are being received. To adjust: When no signals are present, rotate the squelch control clockwise until the receiver is quieted. Incoming signals will automatically release the squelch. Careful adjustment is necessary, as settings too far to the right will not allow weaker signals to release the squelch.

### **PUBLIC ADDRESS SWITCH:**

In the "PA" position, your transceiver is converted to a public address system. A convenient pin jack on the back panel is provided for connection to any standard 8 ohm PA speaker.

### **A.N.L. SWITCH**

The automatic noise limiter is designed to reduce excessive noise such as ignition, motor and electrical interference. At "ANL" position, it operates.

## **PRESS-TO-TALK MICROPHONE:**

The receiver and transmitter are controlled by the press-to-talk switch on the microphone. Press in this switch and the transmitter is activated. Release this switch to receive. When transmitting, hold the microphone 3 to 4 inches from your mouth and speak clearly and in a normal voice.

## **GENERAL OPERATIONS INSTRUCTIONS**

### **CAUTION:**

Before operating this transceiver, you are required by law to read and thoroughly understand part 95 of the F. C. C. rules and regulations.

Check to see if the proper connections have been made on power cable, antenna system and microphone and that the correct cables have been used. Be sure that the transceiver is adequately grounded (if not mounted directly to a metal surface E).

To transmit, press the push-to-talk switch and hold it down. Speak directly into the microphone. Release this switch to receive. Actual receive and transmitting power should be monitored by watching the SIGNAL-TRANSMIT POWER METER.

Select the channel on which you wish to operate by rotating the Channel Selector Switch to the desired channel.

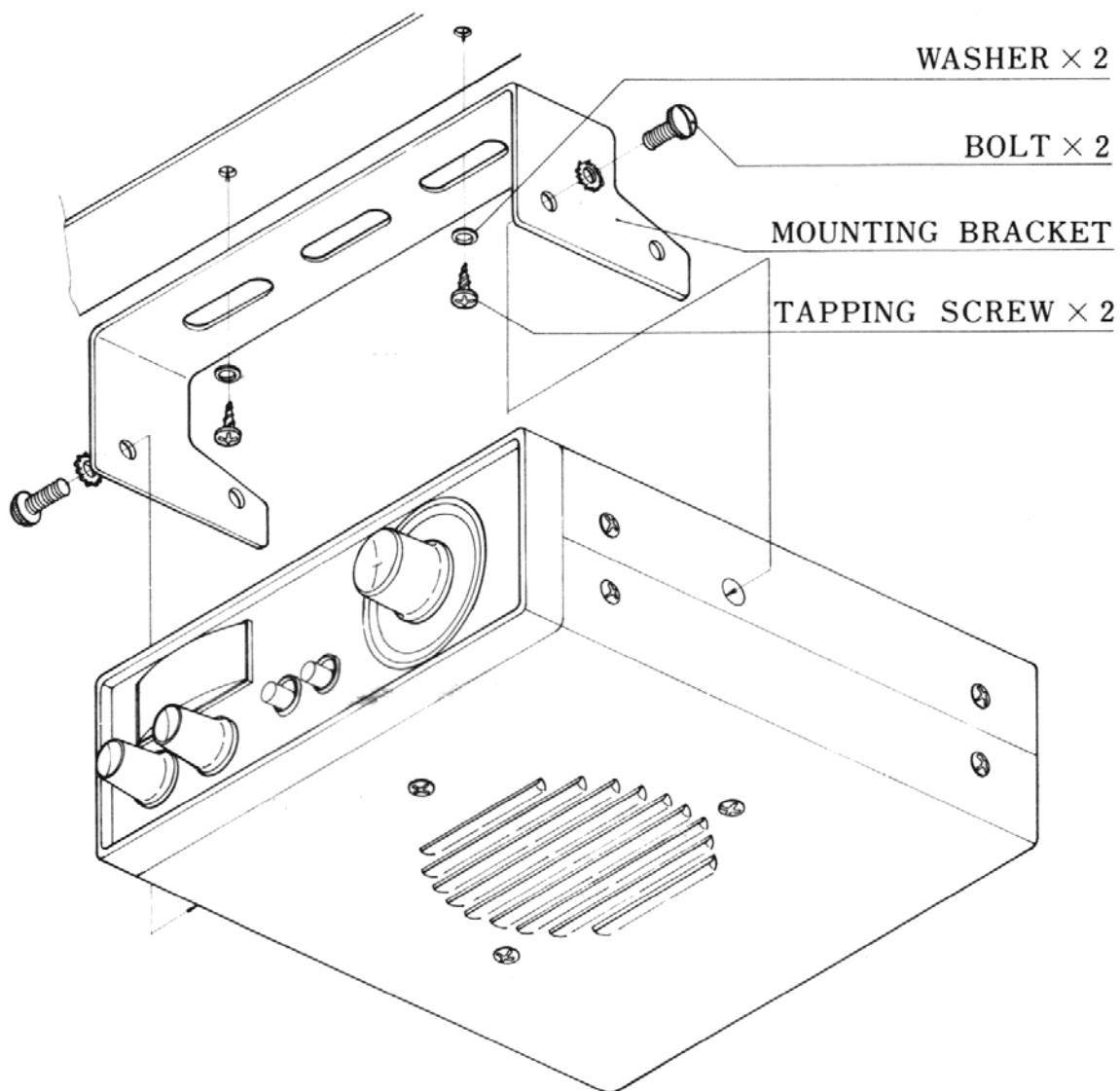
The microphone should be held approximately 3 to 4 inches away from your mouth. Use a normal speaking voice. Speak slowly and clearly. Talking louder does not increase transmitting power and may cause distortion. You will notice the SIGNAL-TRANSMIT POWER meter moving as you transmit. This indicates that you are transmitting. Always release the microphone switch when you complete your transmission.

## SERVICING YOUR TRANSCEIVER

The technical information, diagrams and charts provided in this manual are supplied for the use of a qualified holder of a first or second class radiotelephone license in servicing this transceiver. It is the users responsibility to see that this unit is operating at all times in accordance with the F. C. C. citizens radio service regulations.

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## MOUNTING INSTRUCTIONS



## SPECIFICATIONS FOR 13-866

Circuitry : 21 transistors,  
and 11 diodes

**Receiver Section:**

Sensitivity at 10 db S/N	:	1 $\mu$ V
Image Rejection Ratio	:	40 db
1st IF Rejection Ratio at 11.275 MHz	:	45 db
2nd IF Rejection Ratio at 455 KHz	:	100 db
Squelch sensitivity at maximum	:	300 $\mu$ V
Squelch sensitivity at threshold	:	0.5 $\mu$ V
A.G.C. (input 5,000 $\mu$ V, output 10 db down)	:	75 db
IF Response at 6 db down bandwidth	:	8 KHz
Adjacent channel selectivity	:	35 db
Audio output power at maximum (input 60 db)	:	4W
Audio output power at 10% distortion	:	2.8W
Distortion at input 60 db	:	10%
Audio fidelity at 1,000 Hz 0 db (6 db down)	:	300-2,000 Hz
Current drain at no signal	:	250 mA
Current drain at maximum output power	:	900 mA

**Transmitter Section:**

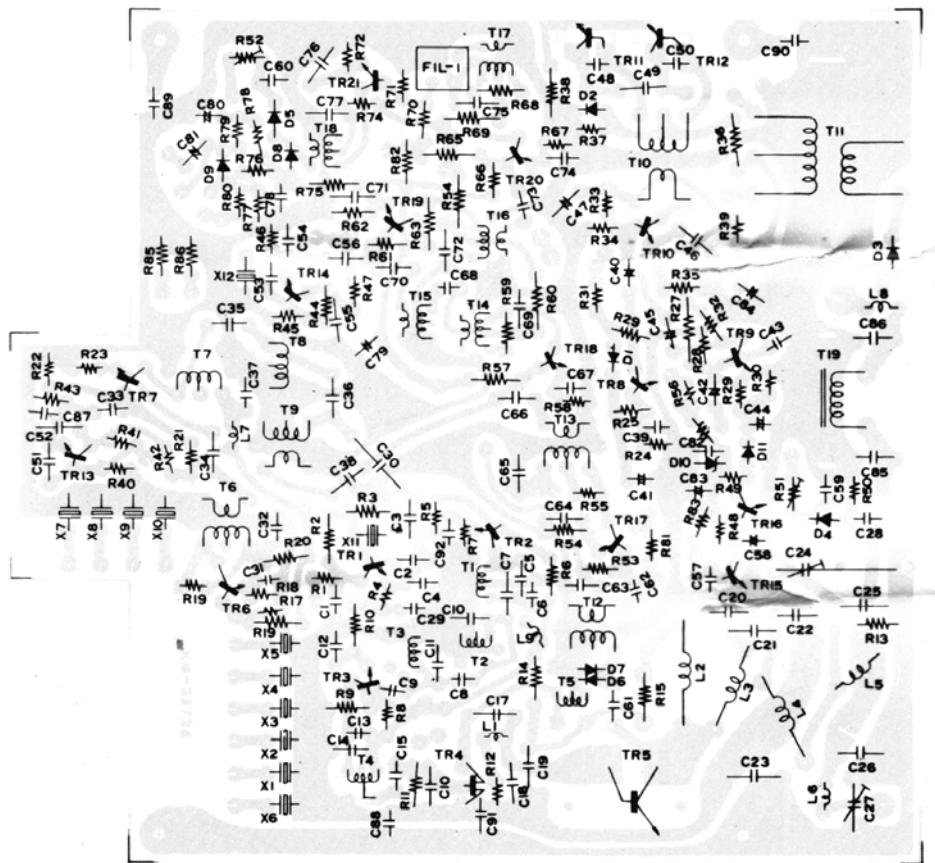
RF output power	:	4W
Modulation capability	:	85%
Frequency tolerance	:	0.005%
Spurious ratio	:	50 db
Current drain at no modulation	:	900 mA
Current drain at maximum modulation	:	1,500 mA

**Measurement Condition:**

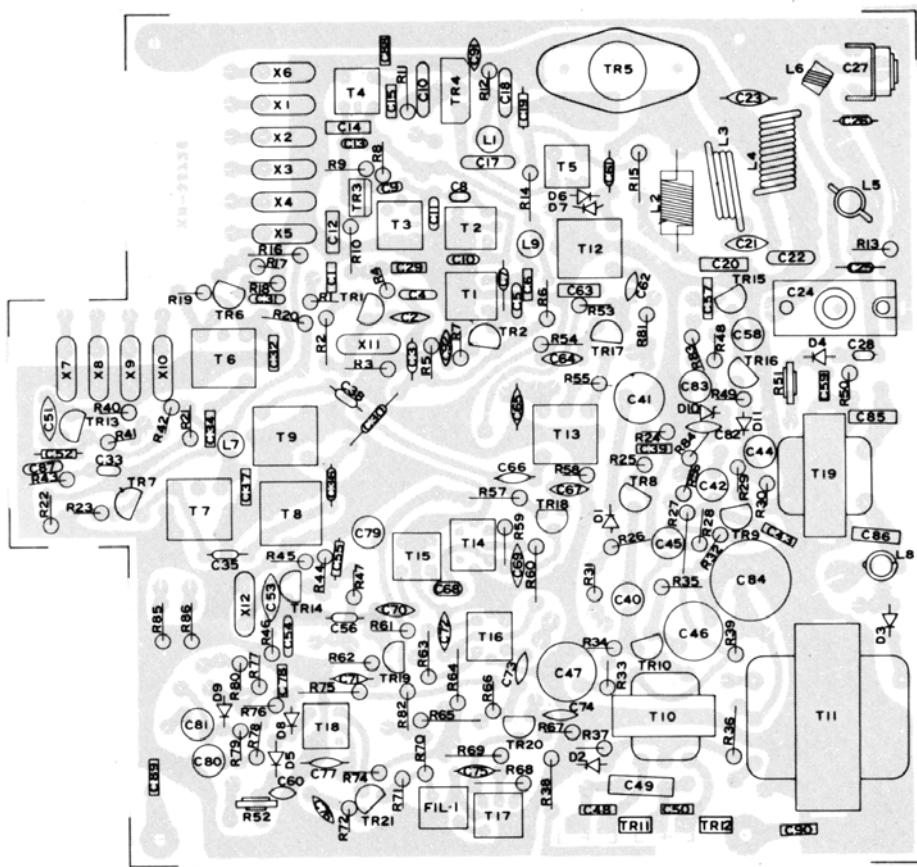
Audio output power	:	0.5W
Audio output load	:	8 ohm
Modulation frequency	:	1,000 Hz
Modulation	:	30%
Antenna impedance	:	50 ohm
Power source	:	13.8V DC

# MODEL 13-866 PARTS LAYOUT

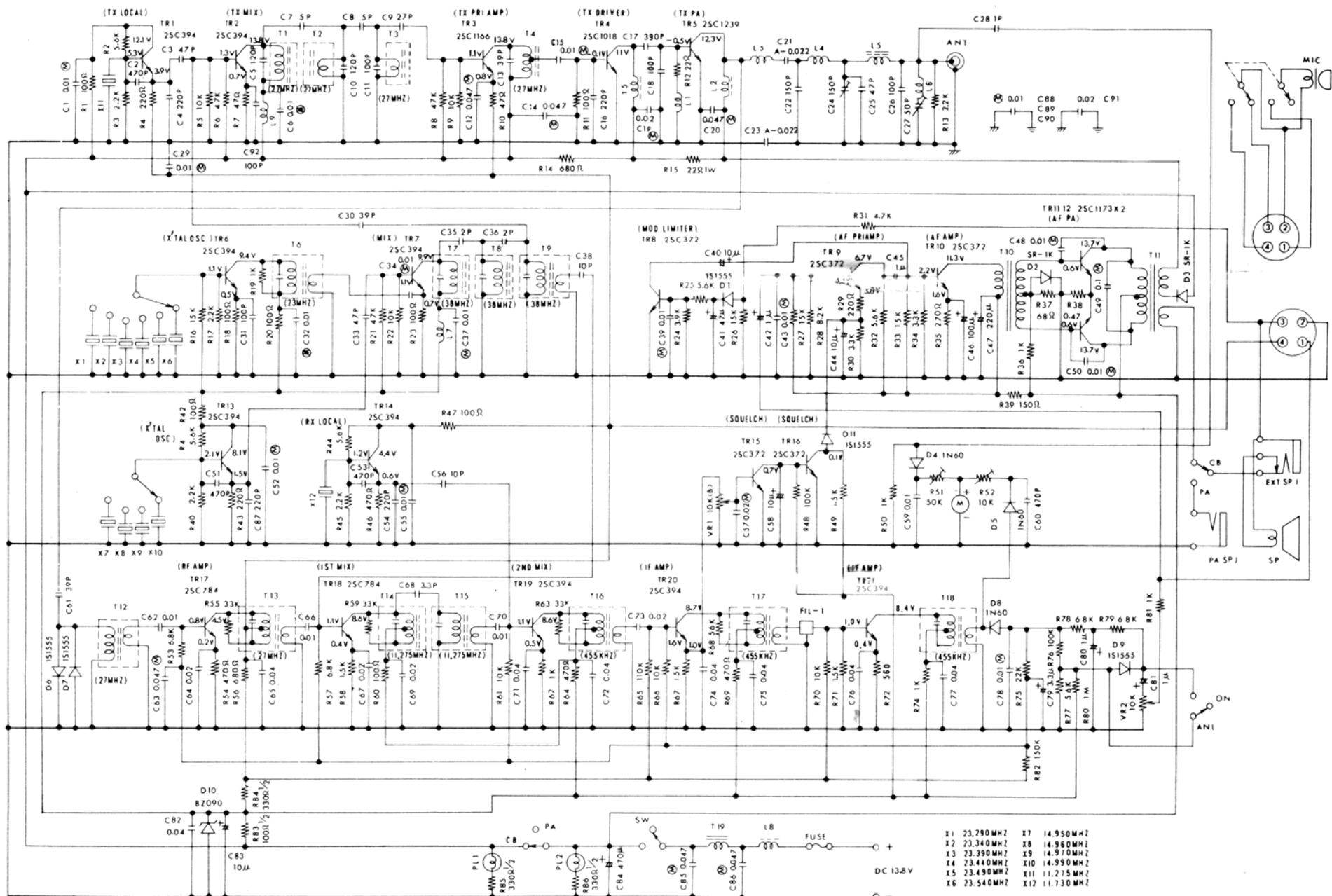
## BACK VIEW



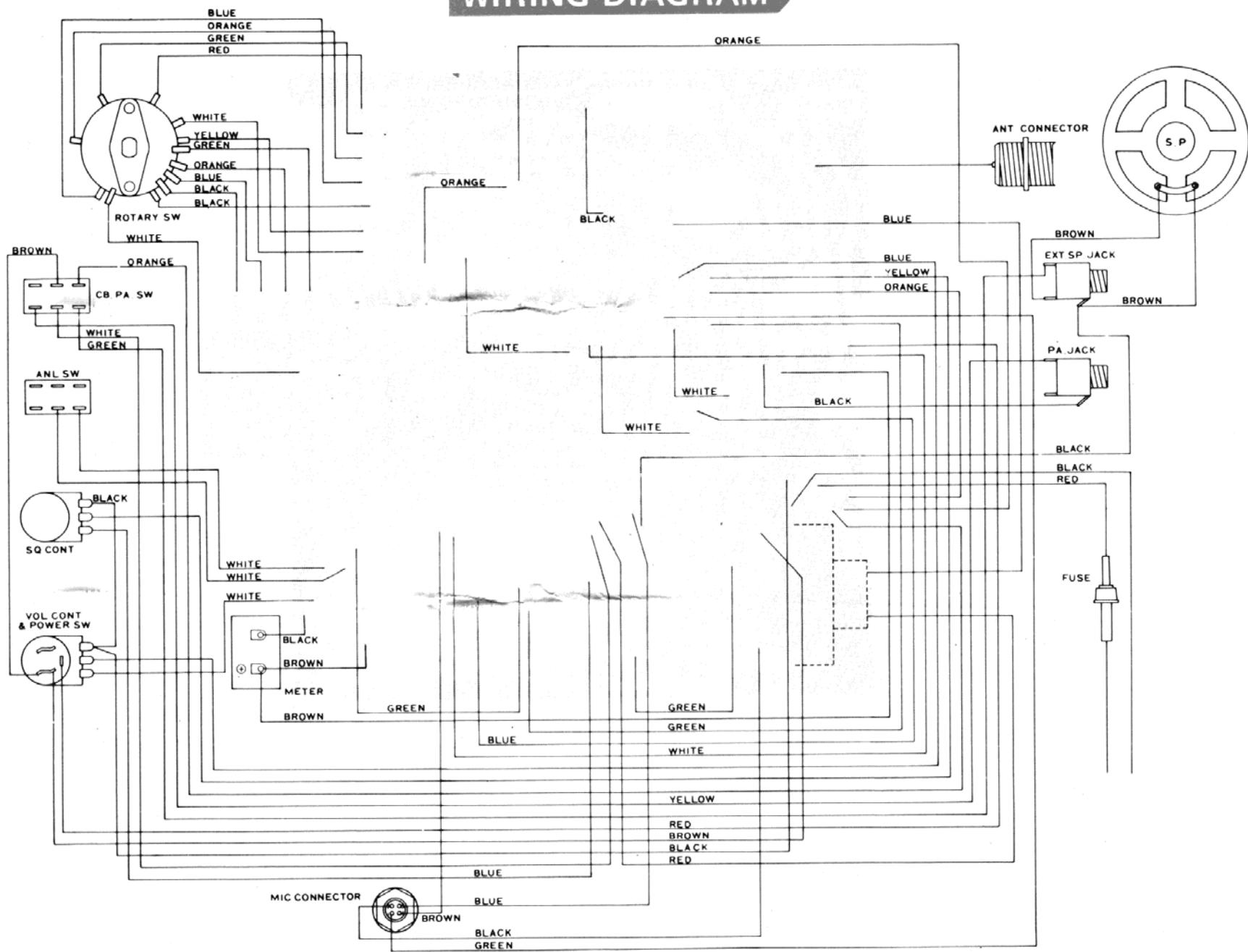
## FRONT VIEW



# MODEL 13-866 SCHEMATIC DIAGRAM



# WIRING DIAGRAM



## CRYSTAL FREQUENCY CHART

XTAL	CHANNEL																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MASTER1																							
23.290	○	○	○	○																			
23.340					○	○	○	○															
23.390									○	○	○	○											
23.440													○	○	○	○							
23.490																	○	○	○	○			
23.540																				○	○	○	
MASTER2																							
14.950	○				○			○					○			○		○			○		
14.960		○				○			○				○			○		○			○		
14.970			○				○				○				○			○			○		
14.990				○				○				○			○			○			○		
XMTR																							
11.275	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
RCVR																							
11.730	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

## **WARRANTY POLICY**

Midland Electronics Company warrants each new Midland product to be free from defects in material and workmanship under normal use and service for a period of 90 days after delivery to the ultimate user and will replace or repair the product at our option, at no charge should it become defective and which our examination shall disclose to be defective and under warranty.

This warranty shall not apply to any Midland product which has been subject to misuse, neglect, accident, incorrect wiring not of our own installation, or to use in violation or instructions furnished by us, nor extended to units which have been repaired or altered outside of our factory.

This warranty does not cover carrying cases, earphones, batteries, antenna, broken or cracked cabinets, or any other accessory used in connection with this product.

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 sales of our products.

Sales receipt must accompany product to validate the date of purchase.

## **MIDLAND ELECTRONICS COMPANY**

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