



SSB/AM 2-Way Transceiver.

**CITIZENS BAND
SOLID STATE**



MODEL 13-893

OWNER'S GUIDE

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FEDERAL COMMUNICATIONS COMMISSION REQUIREMENTS

Your new Midland 13-893 is a combination receiver-transmitter designed and built 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. 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 users 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 radiotelephone license or are in the presence of a person holding such a license. A Citizens Band or Amateur license is not sufficient.

MIDLAND INTERNATIONAL CORPORATION HEREBY CERTIFIES THAT THIS UNIT HAS BEEN DESIGNED, MANUFACTURED AND TYPE ACCEPTED IN ACCORDANCE WITH VOL. 6, PART 95 OF THE CURRENT F.C.C. RULES AND REGULATIONS AS OF THE DATE OF MANUFACTURE.

OWNERS GUIDE

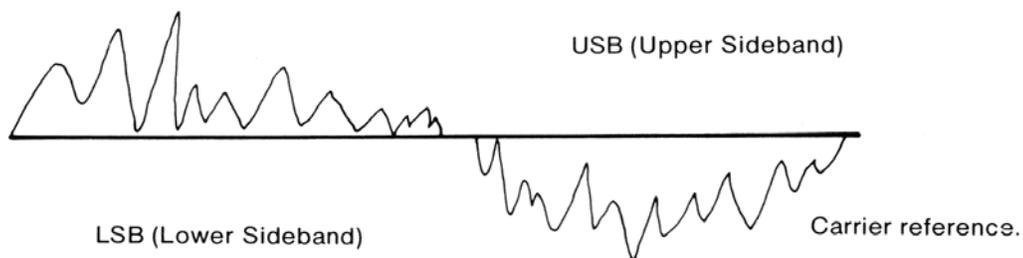
Your 13-893 is a versatile, professional quality transceiver and we strongly suggest that you read this Owner's Guide carefully before operation so that you may receive full benefit from its many features.

SINGLE SIDEBAND:

SSB (Single Sideband) is relatively new in Citizens Band Communications but has been highly effective in commercial amateur and military usage for many years. It is a superior means of wireless communications allowing transmissions of greater distances with a minimum amount of interference and noise.

There are two types of single sideband transmissions, USB (Upper Sideband) and LSB (Lower Sideband). These might be described as half signals and due to the narrow bandwidth required, will travel over greater distances at lower power than ordinary AM signals. Figure 1 below illustrates USB and LSB signals and the reference carrier line.

FIGURE 1



In the actual transmission of either USB or LSB, the carrier is removed. All of the modulation for a transmission is concentrated in either the Upper or Lower Sideband. In the receiver, the carrier is reconstructed and the intelligence or modulated voice is then detected, amplified and converted into an audible sound heard at the speaker.

AM (Amplitude Modulation) has been the standard method of Citizens Band reception and transmission for many years and most of the existing transceivers being used today are AM. Technically, Amplitude Modulation is Double Sideband (DSB). In this method of operation, a carrier is transmitted which is modulated or interrupted by voice on both positive and negative sides as represented by figure 2.



FIGURE 2

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 13-893. Do not attempt to operate this transceiver by connecting it directly to 110 volts AC.

ANTENNA INSTALLATIONS

BASE STATION:

When 13-893 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. Generally a maximum of lead-in cable should be used due to line losses. However, a desirable antenna location may justify the loss in longer cable runs.

MOBILE ANTENNAS:

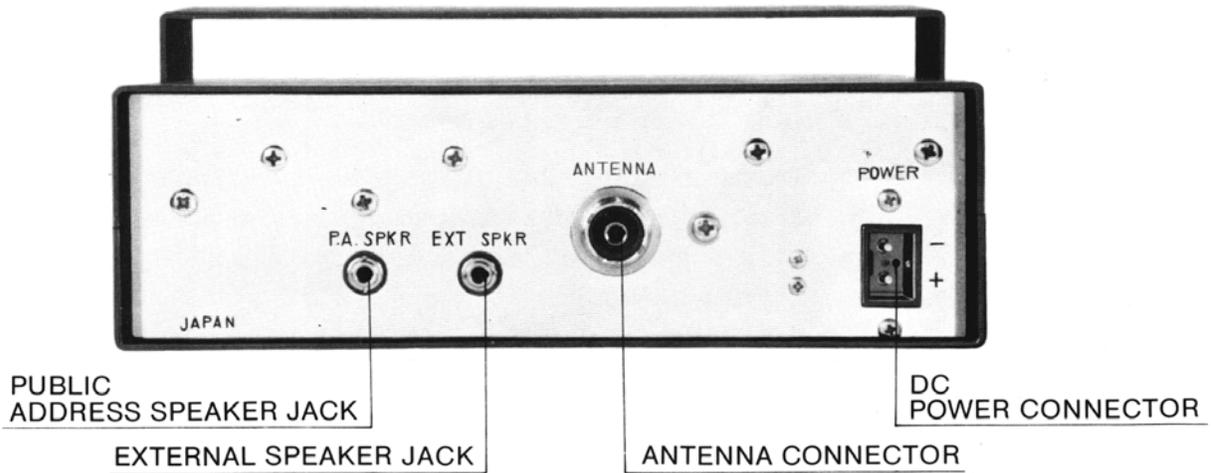
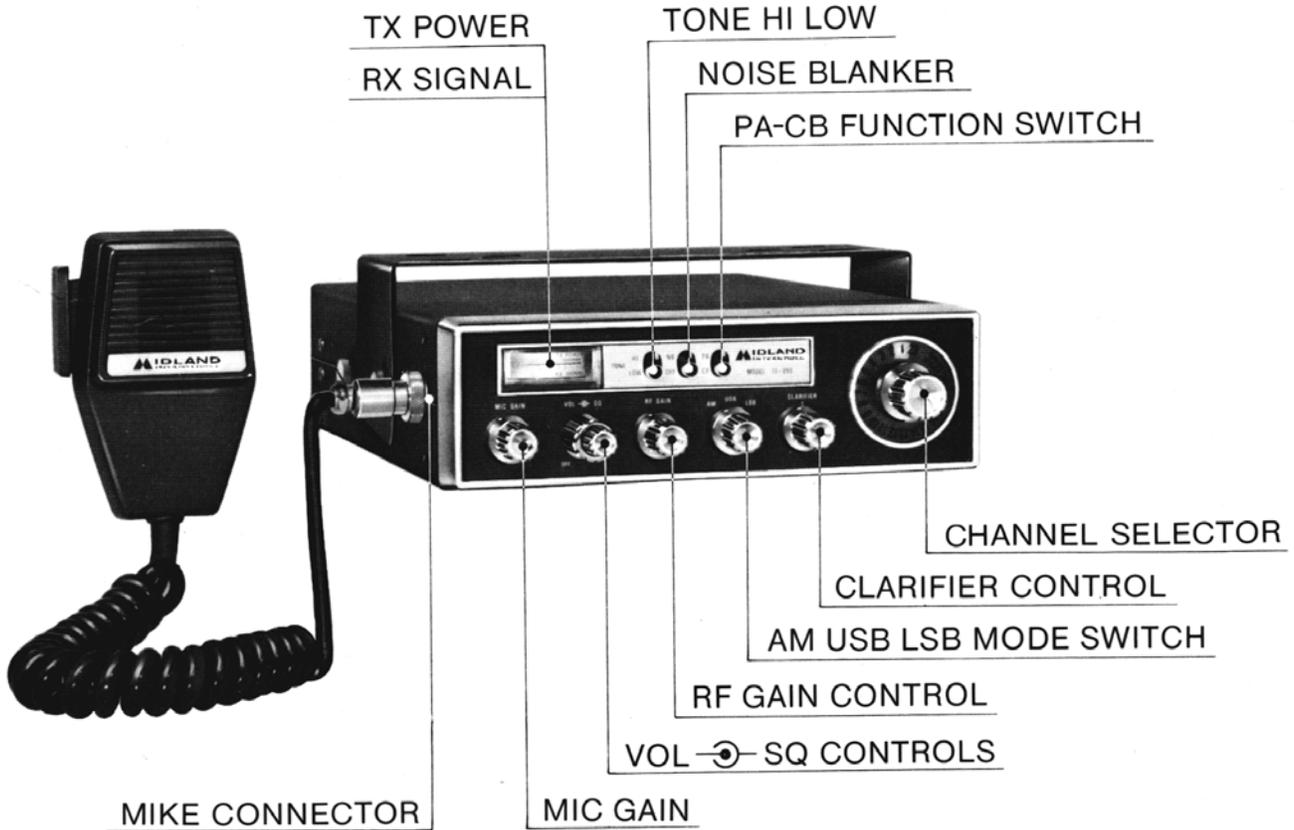
A vertical whip antenna is best suited for mobile use. A non-directional antenna should be used for best results in any case. The base loaded whip antenna will normally provide effective communication. For greater range and more reliable operation, a full quarterwave-whip should be used.

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.

COMPATIBILITY:

The 13-893 is designed to be completely compatible with all current modes of Class D operation, including single sideband, (upper or lower), double sideband, or conventional AM and is equipped with separate modulation circuitry to provide high level AM (Amplitude Modulated) transmissions and True SSB (Single Sideband) transmissions. The Receiver section is also capable of receiving AM and SSB. The mode of operation for both receiver and transmitter sections is automatically by the mode selector switch.

OPERATION OF CONTROLS



OPERATING CONTROLS, CONNECTORS AND THEIR FUNCTIONS

CHANNEL SELECTOR SWITCH:

Tuning the receiver and transmitter is simultaneous by rotating the 23 channel selector switch. Set switch to desired channel 1 to 32 as indicated directly on switch knob.

VOLUME CONTROL AND OFF-ON SWITCH:

The volume control varies the sound output of the loudspeaker. It also functions as "off-on" switch. Clockwise rotation increases volume.

MIC. GAIN CONTROL:

This control is used to vary the amount of modulation in transmit. In PA operation this control sets the PA volume.

SQUELCH:

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.

In the AM mode, the squelch is operated by the continuous carrier of the received signal. Therefore, it operates positively according to the presence of an incoming signal.

In SSB operation, however, the voice composition determines the intensity of the signal. When a signal is received, the voltage is held for 1-2 seconds in the circuit, then the squelch will open and you will hear the signal. When the signal stops, the squelch will remain open for 1-2 seconds before quieting the receiver. This is normal operation.

RF GAIN CONTROL:

Adjust as required to optimize signal. This control is functional in both AM and SSB modes and is used primarily to optimize reception in strong signal areas. Gain is reduced by counter-clockwise rotation of the control.

MODE SELECTOR SWITCH:

This switch selects AM, USB or LSB mode of operation. Unless the station with which communication is desired is equipped with SSB, the AM mode is normally used. The mode selector switch changes the mode of operation of both transmitter and receiver simultaneously.

CLARIFIER:

Allows a slight variation of transmit and receive frequency above and below the actual channel frequency. This operation is similar to a fine tuning control and while it is primarily intended for SSB operation, it also allows precise adjustment in the AM mode. The setting of this control is somewhat critical in the SSB mode and if it is not properly adjusted, the signals you receive will be distorted.

PUBLIC ADDRESS:

In the "PA" position on the channel selector switch, 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.

NOISE BLANKER:

The noise blanker is designed to reduce excessive noise such as electrical interference, ignition noise, etc. To operate, simply push the switch to "NB". To turn off, push it again to "Off".

TONE CONTROL:

This control is designed to adjust Tone in either Hi or Low to your listening preference.

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. The carrying handle again serves as the mounting bracket or additional perforated straps or brackets may be used as desired.

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 consult 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.

GENERAL OPERATING INSTRUCTIONS

CAUTION:

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

Make sure the proper corrections have been made on the power cable, antenna system and microphone, and that the correct cables have been used. Be sure also that the transceiver is properly grounded (if not mounted directly to a metal surface).

To transmit, (after all controls are properly preset), press and hold the microphone push-to-talk switch. Hold the microphone about 3 to 4 inches from your mouth and speak in a normal tone of voice. Release the push-to-talk switch to receive. Talking louder than normal does not increase your transmitting power and will probably only cause distortion.

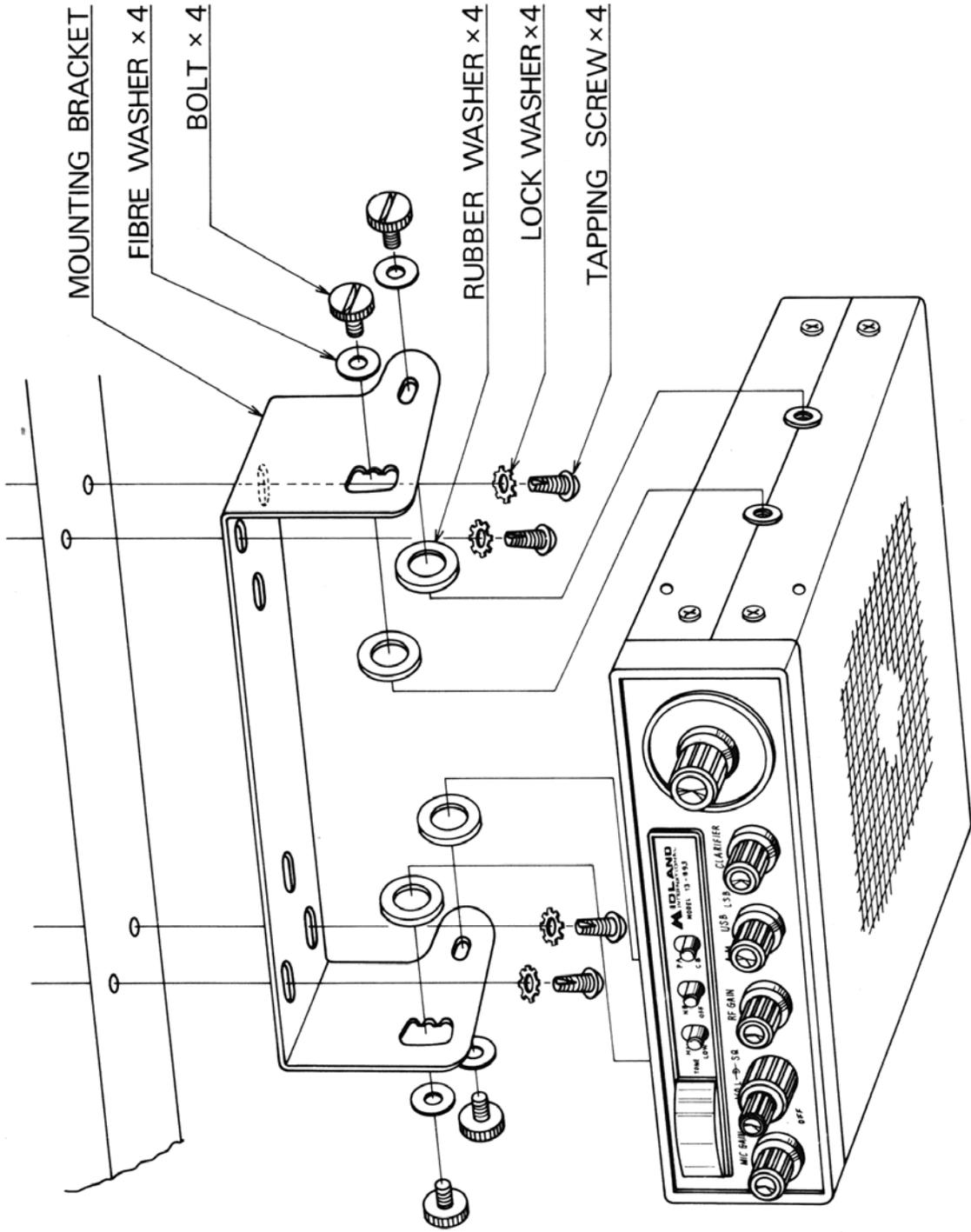
SERVICING YOUR TRANSCEIVER

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 regulation.

If you install your own transceiver, do not attempt to make any transmitter tuning adjustments as they are prohibited by the F. C. C. unless you hold or are in the presence and under the supervision of a first or second class radiotelephone licensed person. 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.

MOUNTING INSTRUCTION



SPECIFICATIONS

GENERAL:

Channels	: 23
Frequency Range	: 26.965 MHz to 27.255 MHz.
Semiconductors	: 26 TR, 2 FET, 56 Diode, 2 IC.
Microphone	: 500 ohms Dynamic Type.
Speaker	: 8 ohms 1W.
Antenna Connector	: M Type.
Meter	: RF Power, RX Signal.
Size	: (D) 10-1/2", (W) 7-1/2", (H) 2-1/2".
Weight	: 5 pounds
Jacks & Connectors:	EXT SP, PA SP = 3.5φ. Microphone = 4P, DC Power, ANT.
Controls	: Channel Selector, Mode Selector (AM-USB-LSB), ON-OFF Power Switch/Volume, Variable Squelch, RF Gain Attenuator, Mic Gain, Clarifier, Noise Blanker Switch, PA-CB Switch, Tone Switch,
Illuminations	: Channel Selector, Meter. (Yellow-RX. Red-TX).
Accessories	: DC Power Cable (Fuse Built in), Microphone, Microphone Hanger, Mounting Bracket.

TRANSMITTER

	UNIT	AM	SSB
Frequency tolerance (-30°C to +50°C)	%	±0.005	±0.005
Clarifier variable range.	Hz	±350 to ±800	±350 to ±800
RF output power at no mod (AM).	W	3.0 to 4.0	*
RF output power(SSB).	W PEP	*	12 max
Modulation distortion at 80% modulation (AM).	%	10	*
Conducted spurious emission.	dB	-50	-50
Carrier emission (SSB).	dB	*	-40
Battery drain at no modulation (AM).	mA	1600	1000
Battery drain at 80%			

	UNIT	AM	SSB
modulation (AM) 8W PEP (SSB).	mA	2300	2000
Microphone input preamp maximum sensitivity for 50% modulation (AM), 4W PEP (SSB).	mV	7	7

RECEIVER

	UNIT	AM	SSB
* Noise Blanker-ON, Tone Switch-High. Sensitivity for 10 dB S/N.	μV	1	0.5
A.G.C. figure of merit 50KμV for 10dB change in audio output.	dB	60	60
Bandwidth at 6 dB down.	KHz	3	3
Adjacent channel selectivity (10 KHz).	dB	50	50
Cross modulation.	dB	50	50
Maximum audio output power.	W	5	5
Maximum audio output power at 10% distortion.	W	3.5	3.5
RF gain attenuation, 0.5μV standard.	dB	min 50	min 50
Fidelity (1 KHz 0 dB reference) at 450 Hz.	dB	-6	-6
Fidelity (1 KHz 0 dB reference) at 2.2 KHz.	dB	-16	-6
Squelch sensitivity at maximum.	μV	500 to 4000	500 to 4000
Squelch sensitivity at threshold.	μV	0.7	0.7
S meter sensitivity for S-9, at no mod (AM).	μV	50 to 500	50 to 500
Image rejection.	dB	50	50
Frontend attenuation (7.8 MHz feed through).	dB	80	80
Hum & noise ratio below antenna input 1000 μV.	dB	30	26
Oscillator drop out voltage.	V	11	11
Battery drain at no signal.	mA	500	500

PA

Output power at 10% distortion (1 KHz).	W	3.5
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CRYSTAL FREQUENCY CHART

USB. LSB. AM TX.

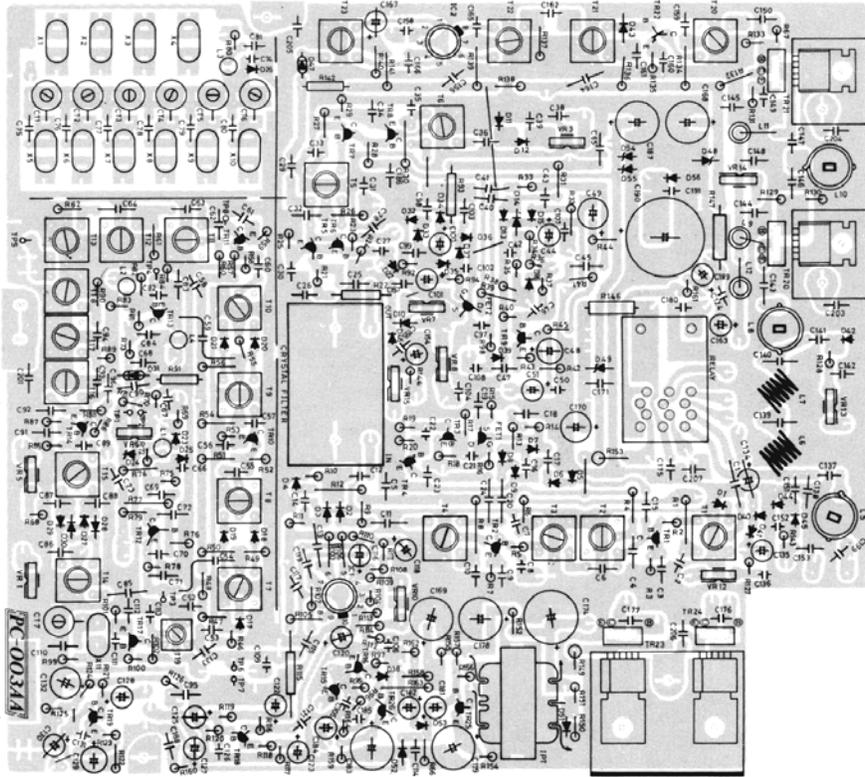
XTAL (MHz)	CHANNEL																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MASTER (USB/LSB)																							
8.1590	○	○	○	○																			
8.2090					○	○	○	○															
8.2590									○	○	○	○											
8.3090													○	○	○	○							
8.3590																	○	○	○	○			
8.4090																					○	○	○
USB																							
11.0035	○				○				○				○				○				○		
11.0135		○				○				○				○				○				○	
11.0235			○				○				○				○				○				
11.0435				○				○				○				○				○			○
7.8025	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.8025 × 2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
LSB, AM TX																							
11.0035	○				○				○				○				○				○		
11.0135		○				○				○				○				○				○	
11.0235			○				○				○				○				○				
11.0435				○				○				○				○				○			○
7.8025	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

AM RX

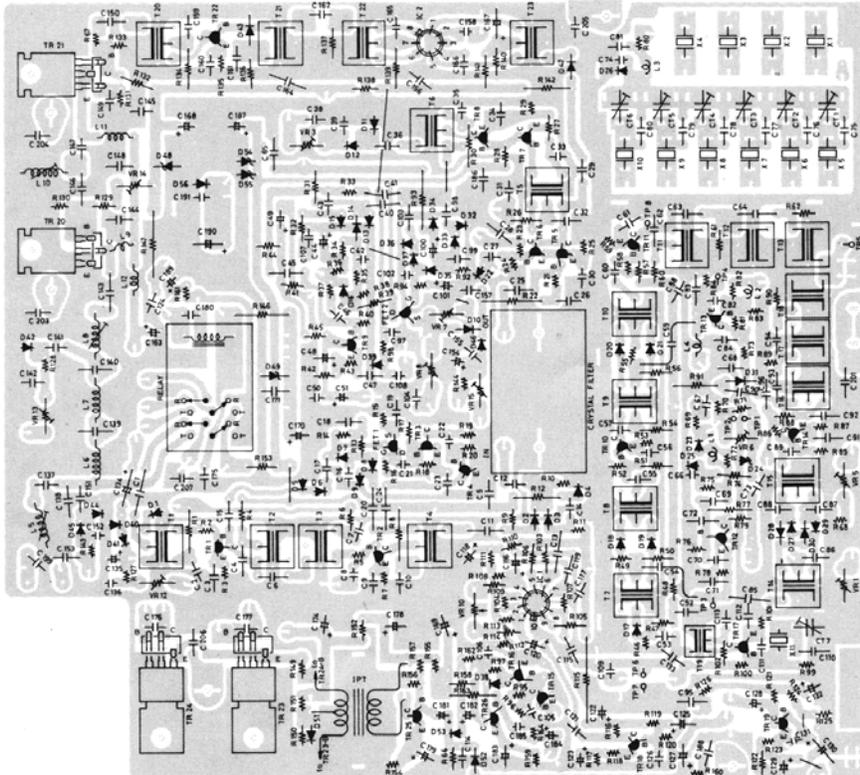
XTAL (MHz)	CHANNEL																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MASTER PLUS 2.5 KHz SHIFT																							
8.1615	○	○	○	○																			
8.2115					○	○	○	○															
8.2615									○	○	○	○											
8.3115													○	○	○	○							
8.3615																	○	○	○	○			
8.4115																					○	○	○
11.0035	○				○				○				○				○				○		
11.0135		○				○				○				○				○				○	
11.0235			○				○				○				○				○				
11.0435				○				○				○				○				○			○

PARTS LAYOUT

FRONT VIEW

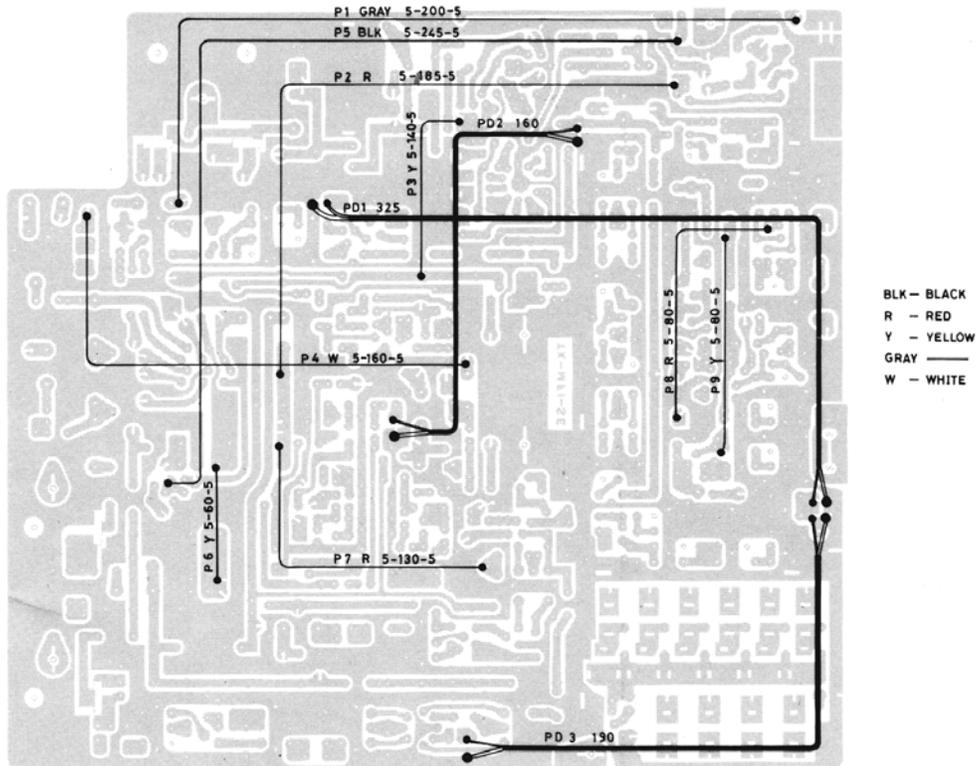


BACK VIEW

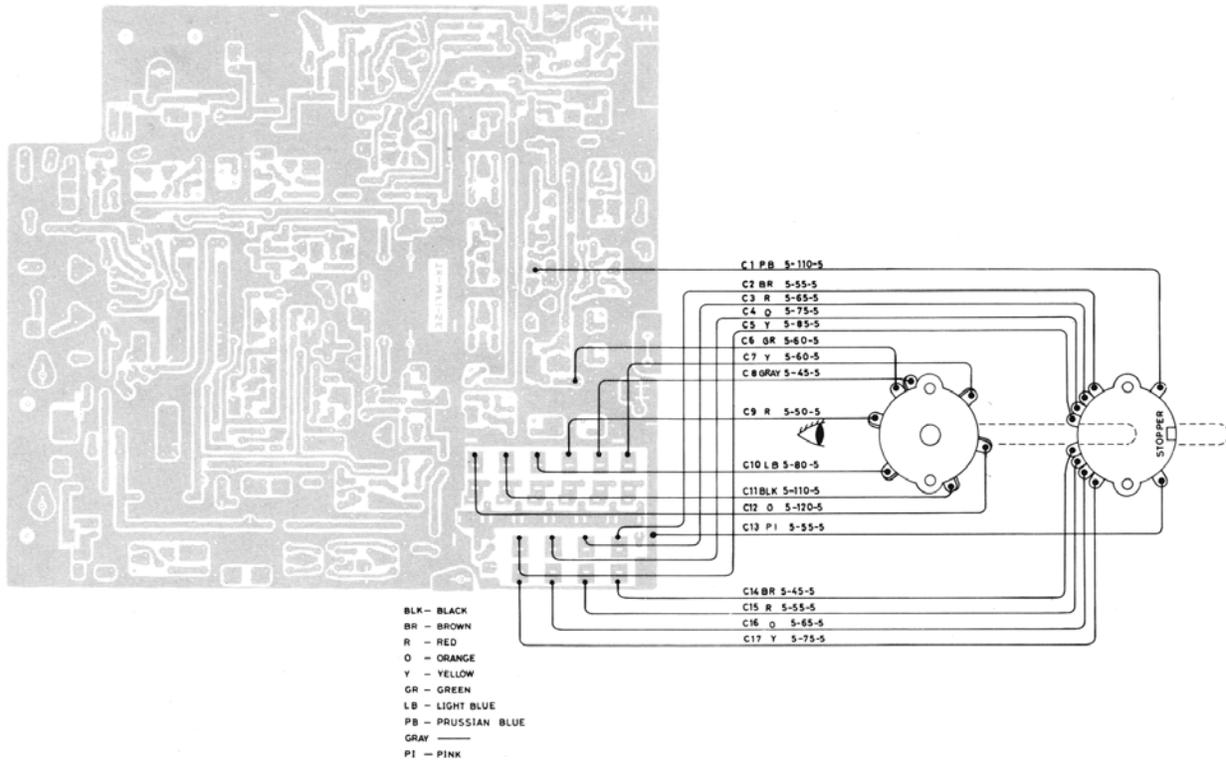


WIRING DIAGRAM

P.C.B. WIRING

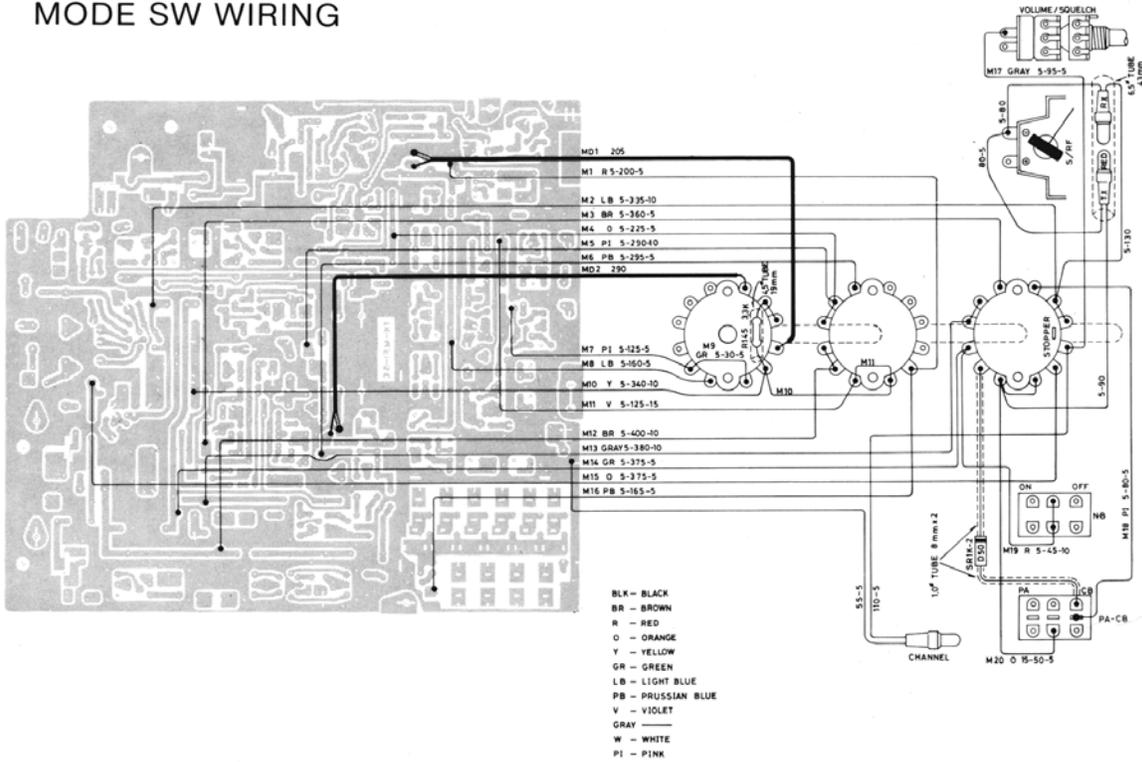


CHANNEL SW WIRING

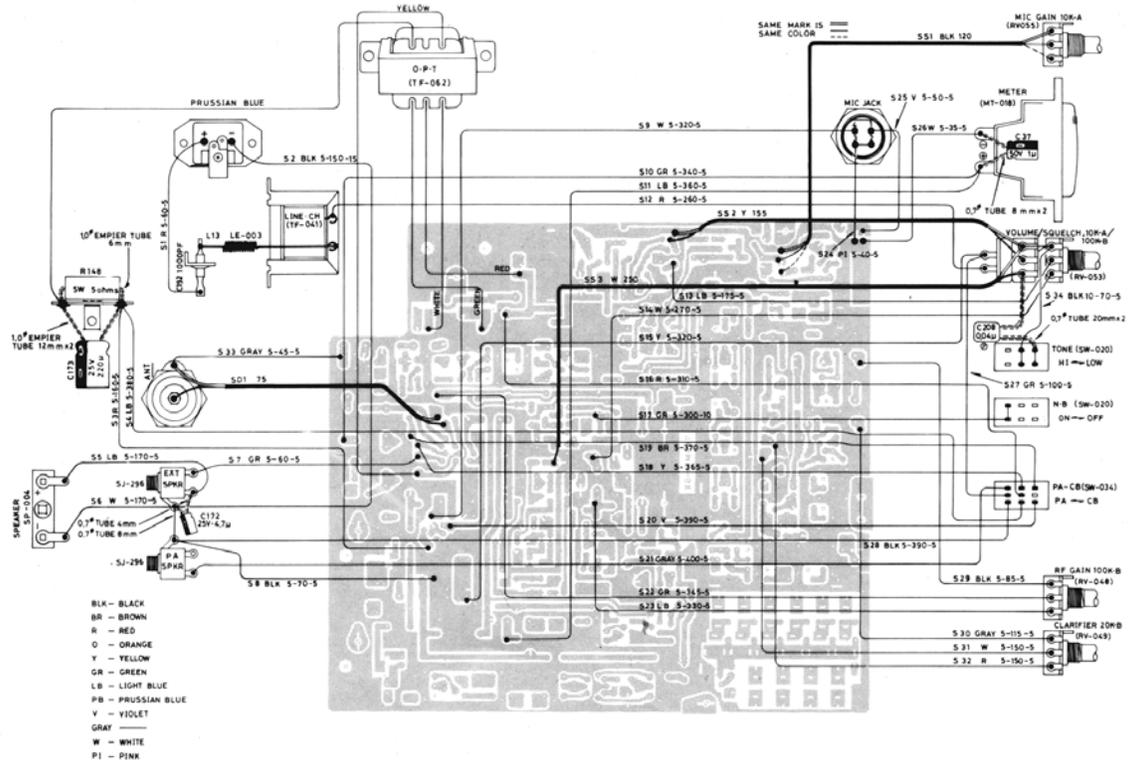


WIRING DIAGRAM

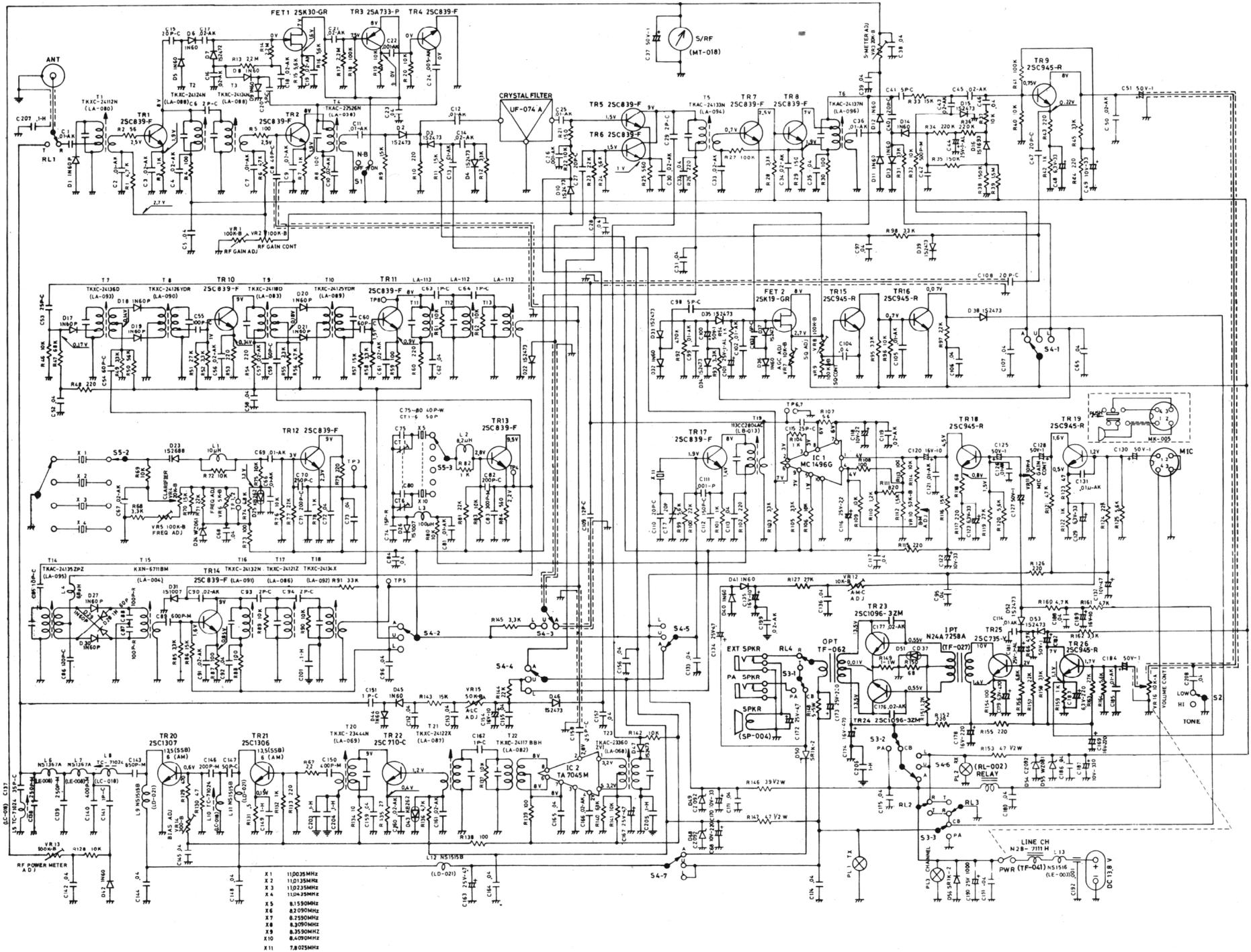
MODE SW WIRING



CHASSIS WIRING



MODEL 13-893 SCHEMATIC DIAGRAM



X1	110095MHZ
X2	110125MHZ
X3	110225MHZ
X4	110425MHZ
X5	811590MHZ
X6	820900MHZ
X7	825900MHZ
X8	830900MHZ
X9	835900MHZ
X10	840900MHZ
X11	78025MHZ

LIMITED WARRANTY

Midland International Corporation 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.

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