

120 CHANNEL AM/SSB TRANSCEIVER **SUPER STAR 360**



OWNER'S MANUAL

INTRODUCTION

The SUPER STAR 360 transceiver represents most advanced AM/SSB two-way radio ever designed for mobile communications. This unit features advanced Phase Locked Loop circuitry which allows transmission and reception on all 120 channels on AM, CW, USB and LSB without the purchase of any additional crystals. The SUPER STAR 360 is completely factory aligned and quality assurance tested.

To obtain the maximum benefit and pleasure from your radio, please read the contents of this manual before attempting to install or operate the transceiver.

FEATURES

- **ALL SOLID STATE:** Transistorized construction with low current drain for a long, trouble-free life.
- **ALL 120 CHANNEL OPERATION:** PLL frequency synthesizer circuitry allows transmission and reception on all 120 channels on AM, CW, USB and LSB without the purchase of any additional crystals.
- **LARGE LED CHANNEL DISPLAY:** Channel number is displayed by use of LED (Light Emitting Diode) display for ease of channel selection.
- **CLEAN SIGNAL:** Transmitter audio processing circuitry produces a clean signal with maximum legal modulation, for best range.
- **QUIET RECEPTION:** Effective Squelch and Automatic Noise Limiter and an RF Noise Blanker for superior quieting.
- **EFFECTIVE AGC:** Receiver amplified Automatic Gain Control (AGC) reduces the effect of differences in received signal strengths. No distracting "blasting" and "fading" of signals.
- **AN EFFICIENT TRANSMITTER:** Provides 5 watt maximum power on AM mode and 12 watt maximum P.E.P. on SSB mode to the antenna.
- **CW MODE:** For Morse Code communications.
- **INSTANT CH 9 SWITCH:** This switch enables you to select channel 9 regardless of the channel selector switch setting.
- **BUILT-IN SWR CIRCUIT:** Enables you to check your Antenna System.

SPECIFICATIONS

GENERAL

Channels	120 AM, 120 USB, 120 LSB and 120 CW
Frequency Range	26.965 to 28.940 MHz
Frequency Control	Phase Locked Loop(PLL) synthesized circuitry.
Frequency Tolerance	0.005%
Frequency Stability	0.001%
Operating Temperature Range	-20°C to +50°C
Microphone	Plug-in type; dynamic with push-to-talk switch and coiled cord.
Input Voltage	13.8V DC nominal, 15.9V max., 11.7V min. (positive or negative ground).
Current Drain	Transmit: AM full mod., 3A maximum. SSB, 12 watts PEP output, 3A maximum. Receiver: squelched; 0.5A, maximum audio output 1A.
Cabinet Dimensions (WxHxD)	8" x 2-1/2" x 9-1/4"
Weight	5 pounds
Antenna Connector	UHF, SO-239
Meter	Illuminated; indicates relative RF power output and SWR on Transmit, received signal strength.
Indicators	LED display, channel, RX/TX

TRANSMITTER

Power Output	AM, 5 watts SSB, 12 watts, P.E.P.
Modulation	Amplitude Modulation.
Intermodulation Distortion	SSB: 3rd and 5th order, more than -25 dB. 7th and 9th order, more than -35 dB.
SSB Carrier Suppression	More than -45 dB.
Unwanted Sideband	More than -45 dB.
Frequency Response	AM and SSB: 350 to 2500 Hz.
Output Impedance	52 ohms, unbalanced.

RECEIVER

Sensitivity	SSB: Less than $0.25 \mu\text{V}$ for 10 dB (S+N)/N at greater than $\frac{1}{2}$ watt of audio output. AM: Less than $0.5 \mu\text{V}$ for 10 dB. (S+N)/N at greater than $\frac{1}{2}$ watt of audio output.
Selectivity	AM and SSB: $\pm 2.2 \text{ kHz}$ @ 6 dB.
Image Rejection	More than 60 dB.
I.F. Frequency	AM and SSB: 7.8 MHz
AM and SSB RF Gain Control	Adjustable for optimum signal reception.
Automatic Gain Control	(AGC): Less than 10 dB change in audio output for inputs from 10 to 500,000 μV .
Squelch	Adjustable; threshold less than $0.5 \mu\text{V}$.
Noise Blanker	RF type, effective on AM and SSB.
Clarifier Range	COARSE: $\pm 5 \text{ kHz}$ FINE: $\pm 1 \text{ kHz}$
Audio Output Power	3.5 watts minimum into 8 ohms.
Frequency Response	350 to 2500 Hz.
Distortion	Less than 10% at 2.5 watts output.
Built-in Speaker	8 ohms, round.
External Speaker (Not Supplied)	8 ohms; disables internal speaker when connected.

INSTALLATION

Location

Plan the location of the transceiver and microphone bracket before starting the installation. Select a location that is convenient for operation and does not interfere with the driver or passenger in the vehicle. In automobiles, the transceiver is usually mounted to the dash panel with the microphone bracket beside it.

Mounting and Connection

This radio is supplied with a universal mounting bracket. The transceiver is held in the bracket by the four thumb screws supplied, permitting adjustment to the most convenient angle. The bracket must be mounted with the screws supplied. The mounting surface must be mechanically strong. Proceed as follows to mount the transceiver:

1. After you have determined the most convenient location in your vehicle, hold the radio with mounting bracket in the exact location desired. If nothing interferes with mounting it in the desired position, remove the mounting bracket thumb screws and mark the mounting holes using the bracket as a template. Before drilling the holes, make sure nothing will interfere with the installation of the mounting screws. Drill the holes and mount the bracket and then install the radio.
2. Connect the antenna cable plug to the standard receptacle on the rear panel. Most 27 to 29 MHz antennas are terminated with a type PL-259 plug which mates with the receptacle on the rear panel.
3. Connect the DC power input wire with the fuse (red) to +12V DC. This wire extends from a plug which connects to the rear panel. In automobile installations, +12V DC is usually obtained from the accessory contact on the ignition switch. This prevents the set being left on accidentally when the driver leaves the car and also permits operating the radio without the engine running. You can locate the accessory contact on most ignition switches by tracing the power wire from the AM broadcast receiver in the car.
4. Connect the black wire to ground. This is usually the chassis of the car. Any convenient location with good electrical contact may be used. (remove paint.)
NOTE: See ground connection under INFORMATION for more detail.
5. Mount the microphone hanger on the side of the unit or near the unit, using the screws supplied.

INFORMATION

GROUND CONNECTION

This radio may be installed and used in any 12V DC negative or positive ground system vehicle. Most new cars or small trucks use a negative ground system while some older cars and some newer large trucks may use a positive ground system.

1. Negative ground system: Connect the Red power lead from the radio 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.
2. Positive ground system: In the case of positive ground system, connect the Black power lead from the radio 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.

ANTENNA

This radio is designed to operate into a 50 ohm 27 to 29 MHz antenna. Best results will be obtained from your transceiver if you use a good antenna and properly install your antenna. (Refer to the antenna installation instructions included with your antenna.)

A vertically polarized quarter-wavelength whip antenna provides the most reliable operation and greater range. The shorter loaded-type whip antennas are more attractive, compact and adequate for applications where the maximum possible distance is not required. Also, the loaded whip antennas do not present the problems of height imposed by the full quarter-wavelength whip.

When installed in a boat, the transceiver will operate most efficiently when the antenna used has been especially designed for marine applications.

Mobile whip antennas utilize the metal body of the vehicle as a ground plane. When mounted on a corner of the vehicle, they are slightly directional, in the direction of the body of the vehicle. For all practical purposes, however, the radiation pattern is non-directional. A slight directional characteristic will be observed only at extreme distances. A standard antenna connector (Type SO-239) is provided on the transceiver for easy connection to a standard PL-259 cable termination.

Before installing the transceiver in a boat, consult your dealer for information regarding an adequate grounding system and prevention of electrolysis between fittings in the hull and water.

BASE STATION OPERATION

To operate the transceiver from your home or office, using regular house current as the power source, you will require a separate power supply capable of supplying 3 amps at a 13.8V DC output.

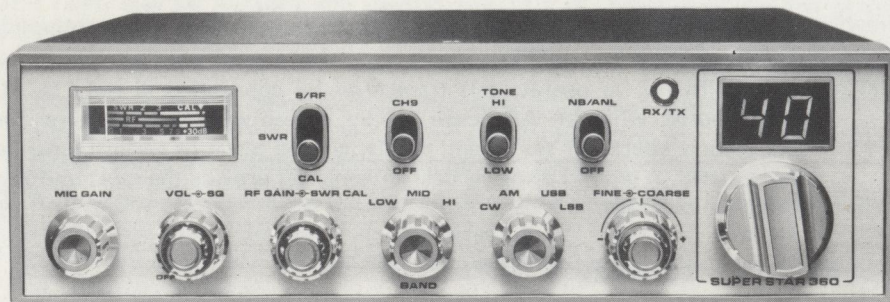
Simply connect the red (+) and black (-) leads of the transceiver to the corresponding DC terminals of the power supply.

NOTE: Do not attempt to operate this transceiver by connecting directly to AC power source. When an AC power supply is used with the transceiver for base station operation any beam, dipole, ground plane or vertical antenna may be used. A ground plane vertical antenna will provide the most uniform horizontal coverage.

CHANNEL VS FREQUENCY

CH	FREQUENCY IN MHZ			CH	FREQUENCY IN MHZ		
	HI	MID	LOW		HI	MID	LOW
1	28.500	28.000	26.965	21	28.750	28.250	27.215
2	28.510	28.010	26.975	22	28.760	28.260	27.225
3	28.520	28.020	26.985	23	28.790	28.290	27.255
4	28.540	28.040	27.005	24	28.770	28.270	27.235
5	28.550	28.050	27.015	25	28.780	28.280	27.245
6	28.560	28.060	27.025	26	28.800	28.300	27.265
7	28.570	28.070	27.035	27	28.810	28.310	27.275
8	28.590	28.090	27.055	28	28.820	28.320	27.285
9	28.600	28.100	27.065	29	28.830	28.330	27.295
10	28.610	28.110	27.075	30	28.840	28.340	27.305
11	28.620	28.120	27.085	31	28.850	28.350	27.315
12	28.640	28.140	27.105	32	28.860	28.360	27.325
13	28.650	28.150	27.115	33	28.870	28.370	27.335
14	28.660	28.160	27.125	34	28.880	28.380	27.345
15	28.670	28.170	27.135	35	28.890	28.390	27.355
16	28.690	28.190	27.155	36	28.900	28.400	27.365
17	28.700	28.200	27.165	37	28.910	28.410	27.375
18	28.710	28.210	27.175	38	28.920	28.420	27.385
19	28.720	28.220	27.185	39	28.930	28.430	27.395
20	28.740	28.240	27.205	40	28.940	28.440	27.405

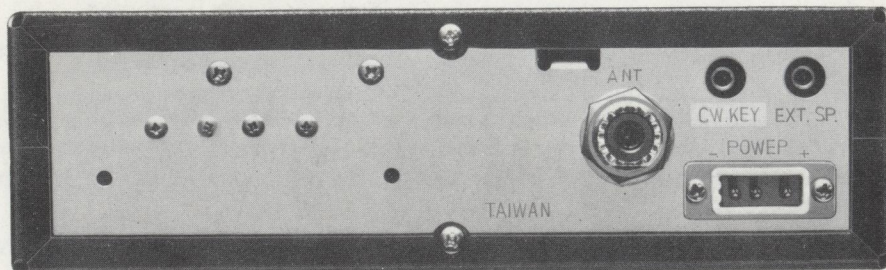
OPERATING INSTRUCTIONS



FRONT PANEL

1. **OFF/VOL/SQ:** To turn the transceiver on, rotate inner knob clockwise past click. Rotate the control clockwise for a comfortable audio level. The outer control is the squelch control which is normally set to a position where undesired background noise is eliminated with no signal present; Rotate the squelch control clockwise to the point where the sound from the speaker is cut off. In this position, there will be no sound from the speaker until a signal is received. In order to hear weak signals, it may be necessary to rotate the squelch control counterclockwise, allowing some background noise to be heard.
2. **MIC GAIN:** This control is used to adjust, as required, microphone input sensitivity for optimum amount of modulation in transmit.
3. **RF GAIN/SWR CAL:** The inner knob is RF Gain control which is used to optimize reception in strong signal areas. Gain is reduced by counterclockwise rotation of the control. The outer knob is SWR CALibration control which is used to calibrating the SWR meter in conjunction with SWR/CAL switch. See item 13 for operation.
4. **LOW/MID/HI-BAND:** This control is used to select the desired operating band. For specific channel frequency, refer to the channel list on page 6.
5. **CW/AM/USB/LSB:** This switch selects CW, AM, USB and LSB mode of operation. This selector changes the mode of operation of both transmitter and receiver simultaneously.
6. **FINE/COARSE:** These knobs are normally set to the center position. Function of these controls changes the transceiver operating frequency; Rotate inner knob to vary the receiver frequency if desired. The outer knob changes both receiver and transmitter frequencies.

7. **CHANNEL SELECTOR:** This switch is used to select any one of the 120 channels in conjunction with LOW/MID/HI-Band switch.
8. **LED CHANNEL INDICATOR:** Light Emitting Diode(LED) indicates the channel number in use except when the CH 9 priority switch is activated.
9. **RX/TX:** Light Emitting Diode(LED) which indicates the mode of operating. It lights green during receive and red while transmitting.
10. **NB/ANL/OFF:** When the switch is placed in the NB/ANL position, both Noise Blanker and Automatic Noise Limiter circuit are activated. The Noise Blanker reduces repetitive noise such as ignition interference, and ANL eliminates hash type noise.
11. **TONE/HI-LOW:** This switch is used to select audio tone to the operator's preference. HI position increases high pitched audio tone. In the LOW position, low pitched tone is increased.
12. **CH 9/OFF:** When placed in the CH 9 position, the receiver and transmitter are switched to channel 9 regardless of the channel selector tuning. The OFF position restores frequency control back to the channel selector switch.
13. **S/R/F-SWR-CAL:** This switch selects the meter operating mode. In the S/R/F position, the meter indicates received signal strength and transmitter RF output power level. In the SWR position, meter indicates SWR level. CAL position is used to calibrate the meter prior to read the SWR level; to read the SWR of your transceiver's antenna system, place the CW/AM/USB/LSB switch to AM position, then set the S/R/F-SWR-CAL switch to CAL position. Push and hold the microphone Press-To-Talk button(Do not speak), rotate SWR CAL control until meter pointer reaches the CAL position. The meter is now calibrated to read correct SWR level. Place S/R-F-SWR-CAL switch to SWR position, read SWR level on the meter; it should be approximately less than 1.5.
14. **METER:** This meter indicates received signal strength, transmitter RF output power and SWR level.



REAR PANEL

15. **POWER:** Accepts 13.8V DC power cable with built-in fuse (4 amp.) to be connected.
16. **EXT SP:** Accepts 4 to 8 ohm, 5 watt external speaker to be connected. When external speaker is connected to this jack, the built-in speaker is automatically disconnected.
17. **CW KEY:** This jack is for Morse code operation; To operate, connect a CW Key to this jack and place the CW/AM/USB/LSB switch in the CW position.
18. **ANTENNA:** Accepts 50 ohm coaxial cable with a type PL-259 plug to be connected.

PRESS-TO-TALK MICROPHONE

The receiver and transmitter are controlled by the press-to-talk switch on the microphone. Press the switch and the transmitter is activated. Release the switch to receive. When transmitting, hold the microphone about three inches from your mouth and speak at a normal voice level.

RECEIVE OPERATING PROCEDURE

1. Turn the set on by turning the VOLUME CONTROL clockwise, past click.
NOTE: Microphone must be plugged in for receiver to operate.
2. Set the VOLUME CONTROL to a comfortable level.
3. Select the desired operating mode and frequency by using Mode Selector, Band Selector, Channel Selector and COARSE Control.
4. Set the RF Gain Control to max. C.W. position.

5. Listen to the background noise from the speaker. Turn the SQUELCH CONTROL slowly clockwise, until the noise just disappears. The Squelch is now properly adjusted. The receiver will remain quiet until a signal is received. Do not advance the control too far, or some of the weaker signals will not be heard.
6. Adjust the FINE control to clearly receive signal.

TRANSMIT OPERATING PROCEDURE

1. Check to see the Standing Wave Ratio of your antenna with built-in SWR meter. To check, see item 3 and 13 of operating instructions. High SWR (over 2) can cause damage to the transceiver.
2. Select the desired operating mode and frequency by using the Mode Selector, Band Selector, Channel Selector and COARSE Control.
3. If the channel is clear, depress the press-to-talk switch on the microphone and speak in a normal voice.
4. Adjust Mic Gain Control if required.

PREVENTIVE MAINTENANCE

As six to twelve month intervals, the following system checks should be made:

1. Check Standing Wave Ratio (SWR).
2. Inspect all electrical connections to ensure that they are tight.
3. Inspect antenna coaxial cable for wear or breaks on shielding.
4. Inspect all screws and other mounting hardware for tightness.

SCHEMATIC DIAGRAM

