

AquaTronics[®]

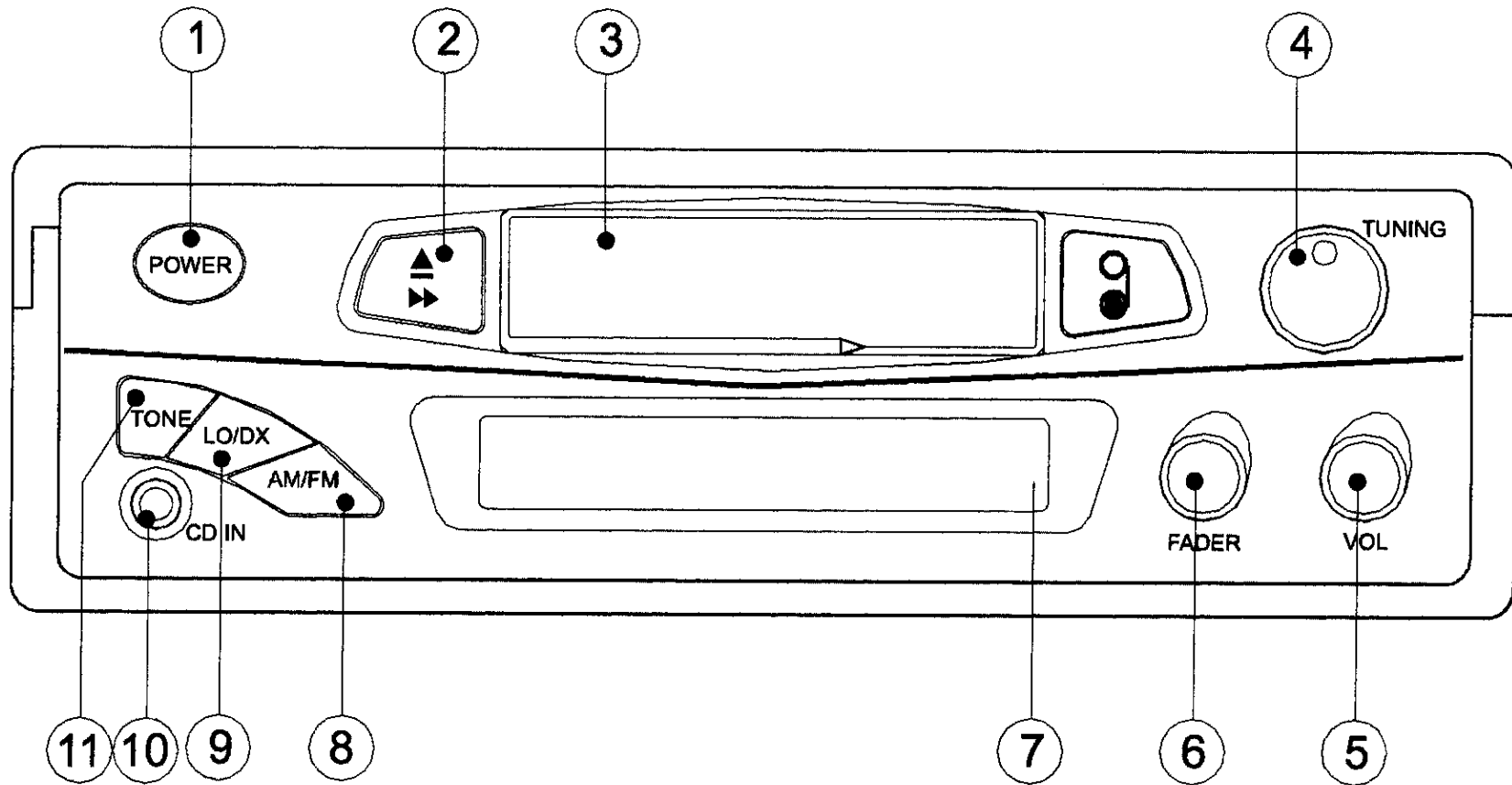
Owner's Manual

***AM/FM STEREO RADIO
WITH AUTO STOP CASSETTE PLAYER***

**Designed Specifically for the
Marine and RV Environment**

MS-220

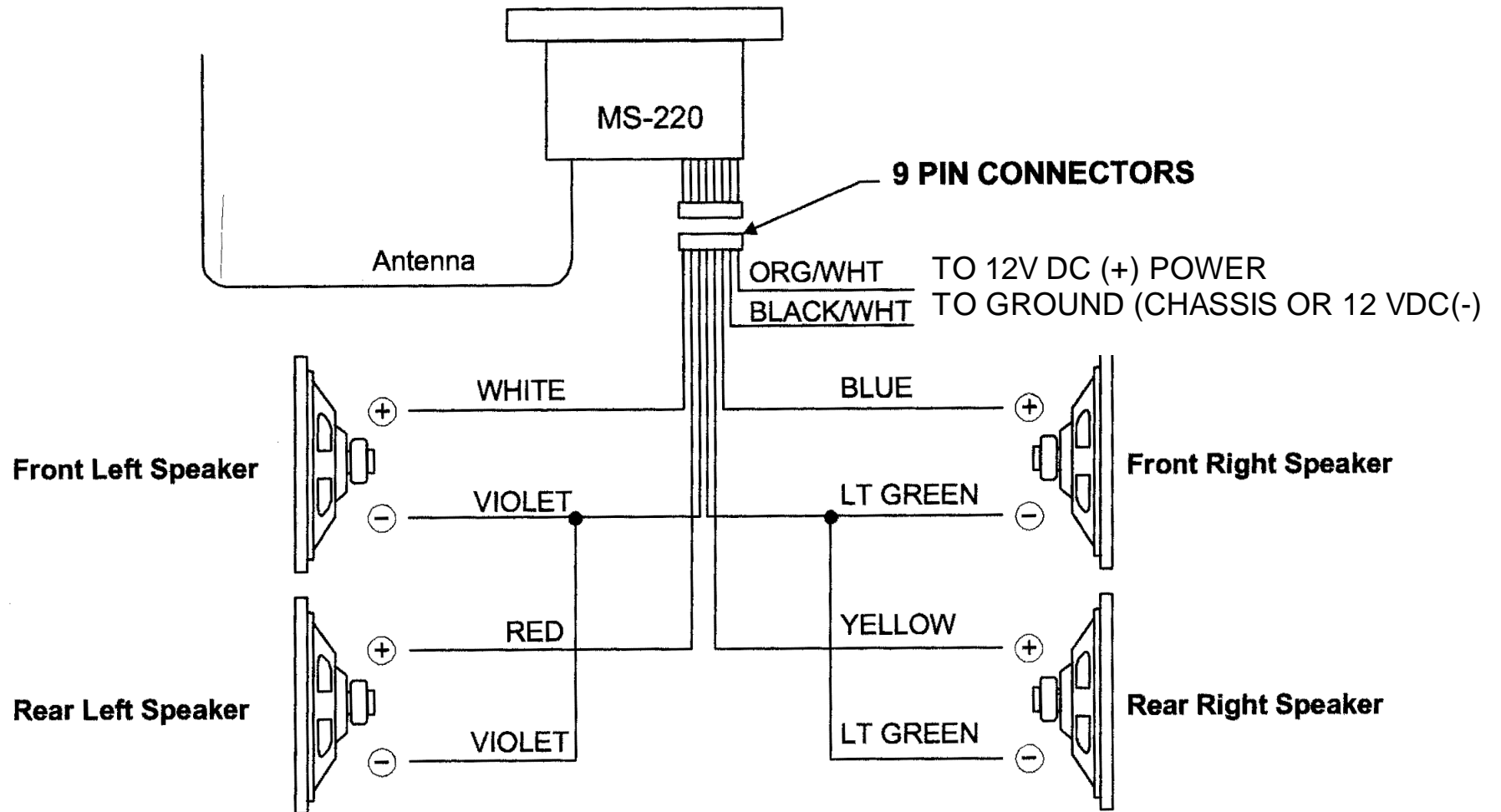
FACEPLATE CONTROLS DIAGRAM (Figure 1)



CONTROL DESCRIPTION (see figure 1)

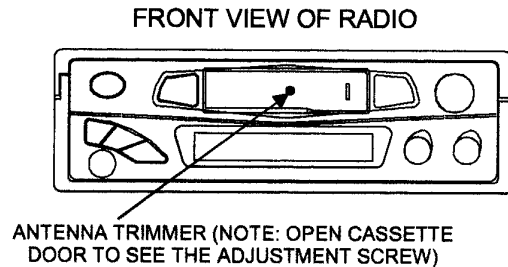
1. **POWER BUTTON**
Press to turn the unit ON or OFF.
2. **EJECT BUTTON**
Press this button in half way to fast-forward the tape, and fully in to eject the tape.
3. **TAPE DOOR**
4. **TUNING KNOB**
Rotate the knob to tune the desired broadcast frequency.
5. **VOLUME KNOB**
Rotate the knob to increase or decrease the volume level.
6. **FADER KNOB**
Rotate this knob to left or right for desired sound balance from front to rear speakers.
7. **DISPLAY**
8. **AM/FM BUTTON**
Press this button to change from AM to FM band.
9. **LO/DX BUTTON**
Press this button to change between local (LO) and distant (DX) reception. In some cases, changing the LO/DX setting will allow clearer reception of a desired station.
10. **CD IN JACK**
Jack is for use with an external program source, such as a portable tape or CD player.
11. **TONE BUTTON**
Press this button to adjust for high or low tone.

WIRING DIAGRAM (Figure 2)



AM ANTENNA TRIMMER ADJUSTMENT

The antenna trimmer can be accessed through the small hole behind the cassette door (see diagram below). Tune to a weak station between 1200 and 1400 KHz AM. (If you cannot find a weak station in this range, tune to any other strong station, and adjust tuning slightly off station). Adjust trimmer for maximum volume.



SPECIFICATIONS

Size:	7" (W) x 2" (H) x 6-5/8" (D) 178mm x 50mm x 150mm
Operating Voltage:	12 VDC, Negative Ground
Output Power:	50 Watts Max. Stereo Power
Output Wiring:	Floating Ground type designed for 4 speaker use. May also be used with 2 speakers.
Output Impedance:	Compatible with 4 or 8 Ohm speakers
Tuning Range:	(AM) 530-1710KHz (FM) 88-108MHz
Sensitivity:	(AM) less than 25uV (FM) less than 5uV
FM Stereo Separation:	More than 23dB
Frequency Response:	50-10000Hz
Wow & Flutter:	Less than 0.3%

CARE & MAINTENANCE

Cassette

Always check that the tape is tightly wound inside the take-up spool on the cassette. If the tape is loose, wind it with a six-sided pencil. Never use C-120 (120 minute) cassettes in this player. Never use cassette player when vehicle temperature is near or below freezing.

Cleaning of tape Head & Capstan

Since tapes contain oxides, you will find a black residue builds up on the tape head and drive capstan (inside cassette door). These residues should be cleaned after 50-100 hours of accumulated tape operation. You can use a cassette cleaning cartridge available where ever stereos are sold.

De-Magnetizing

The movement of the magnetic tape head and metal parts cause a magnetic field to develop. We recommend you have the tape player demagnetized at least twice annually. You can purchase an inexpensive tape head demagnetizing tool to do this yourself.

TROUBLESHOOTING CHART AM/FM RADIOS

Symptom	Cause	Possible Solution
No Power	No 12VDC	Check circuit fuse at source Check in-line fuse on power lead Power lead disconnected Ground connection disconnected
Power indicated; No audio output or very distorted sound	No 12VDC to memory lead (electronically tuned units only)	Circuit fuse at source In-line memory lead fuse
	Speaker Output shorted	Check for shorting of speaker leads to ground
	Speaker out cross channeled	Check for proper speaker wiring. Note: Radios have a sticker on them explaining wiring color code.

Only one channel (right or left side)	Radio Balance	Check radio function
	Speaker Disconnected	Check speaker connection at radio and/or speaker
	Speaker lead shorted or grounded	Check speaker wiring continuity to ground w/tester or meter
Popping in one or both channels	Speaker wiring shorted or positive lead grounded	Leads from speaker cone to terminal touching metal basket or speaker
	Speaker terminals grounded or shorted	
No AM Reception	Antenna disconnected	Connect antenna
	Antenna mast grounded or shorted	Check antenna or substitute with antenna known to be good
	Antenna center lead broken	Check antenna or substitute with antenna known to be good
	Note: Antenna leads can be tested with continuity or multi-tester. Some may have electronic component (capacitor) built in which will not allow it to be tested.	

APPLICATION NOTES

AM/FM RECEPTION

Some boats have more than one AM/FM radio. The best way to insure good reception is to supply a separate antenna for each radio. Other options available to supply adequate AM/FM reception to these radios are listed below, along with some general information in regards to radio reception.

“Y” ADAPTERS

The “Y” adapters used to connect one antenna to two radios will only provide AM reception to one of the radios and will compromise both AM and FM reception.

AMPLIFIED AM/FM ANTENNA

A popular second antenna that can be used is our AB-100 amplified AM/FM antenna. It is small and has a retractable mast that can be mounted vertically or horizontally. This antenna provides good FM reception, but the AM reception will be compromised to some degree because of the length of the mast.

MAST LENGTH

AM/FM antennas compromise AM reception by design. The optimum mast length for FM is approximately 30 inches which is standard for most automotive antennas. The optimum mast length for AM reception is over 100 inches which is not practical for mobile applications.

Special circuitry in electronic tuned radios or AM trimmers in mechanically tuned radios, make up for some of this difference in optimum mast length for AM reception.

ANTENNA CABLE

Increasing the antenna lead cable length (adding extensions) will reduce sensitivity of AM with electronic tuned radios.

GROUND PLANES

Ground planes are also important when considering antenna performance. Most automotive antennas are designed to be mounted on the metal body of the vehicle.

The metal body reflects the signal interference generated by the vehicle's electrical system while it also provides the ground for the antenna lead shield. All this is necessary in order to maintain a good signal, especially AM.

FM RECEPTION

FM reception can be received with a very limited antenna and strong local FM stations can be received without an antenna, depending on the circumstances.

CONCLUSION

AM/FM reception is subject to the choice of an antenna and it's application. There can also be a variety of methods used to supply signal to both primary and secondary radios, but AM performance is the ultimate "test".

It appears that consumers or end users are becoming much more critical when it comes to acceptable antenna performance. It may be necessary for manufacturers to re-evaluate what was once considered acceptable.

APPLICATION NOTES

This note will discuss DC Power sources and how they relate to 12 volt DC video products.

DC (Direct Current) Power

A large number of our products are designed for 12 volt DC applications. The power is supplied by a variety of sources i.e., the battery, converters, ignition systems and solar power.

General Specifications

Our general specification for the voltage range of operation is 10 to 16 volts DC. TV's and VCP's (video cassette players) require slightly more than 10 volts to function properly. Normally this 10.5 to 11 voltage requirement does not create a problem, but keep in mind the following points:

Voltage

The voltage of a fully charged battery (engine not running) is approximately 12.5 VDC. Once a load (items being powered represent the "load") is applied, the voltage will drop. How much the voltage is reduced will depend on the following:

1. Current draw (amount of amperage); the higher the draw the greater the voltage will drop.
2. This size and length of the conductor (wire) supplying power.

Operating these video products without the engine running will drain the battery to the point where these products will perform unacceptably in a short period of time.

Converters

Many boats incorporate converters as a source of 12VDC when connected to shore power (110-120 VAC). Some converters put out a very clean DC supply where others may have a considerable amount of AC ripple under maximum load.

This AC ripple is filtered by the boat battery when connected into the circuit, but when the battery is removed or disconnected the amount of AC ripple can create major problems for audio and video products. Noise may result and the line fuse may fail.

Ignition Systems

Unwanted noise generated from the ignition systems used to be a big problem. However, with more sophisticated filtering circuits designed into audio/video products, these problems are not as wide spread.

Changes in wire harnessing also has contributed to the decline of application problems. Use the same ground point for all related products. This will greatly reduce the potential for unwanted noise.

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ACCESSORY LIST

Description	Part Number	Price
AVT-988 9" Color Television with Remote (12V)	AVT988	\$320.00
AVT-597 5" Color Television with Remote (12V)	AVT597	\$320.00
AVT-1498 13" Color Television with Remote (12V)	AVT1498	\$350.00
AVP-7000 Video Cassette Player (12V)	AVP7000	\$270.00
BPA-501-12 4 Amp Adapter for use with AVT-988 9" and AVT-1498 13" Televisions	0891412	\$45.00
AC2A- 2 Amp Adapter for use with AVT-597 5" TV and AVP-7000 Video Cassette Player	0891436	\$35.00
Unified Remote Control	0892325	\$45.00
VAC-21- 12 Volt Corded Vacuum	VAC21	\$35.00
AVF-1 12 Volt Rechargeable Flashlight	AVF1	\$25.00
HP-175 Headphones with Pivoting Ear Cup	HP175	\$11.75
HP-275 Headphones with Volume Control on Cord	HP275	\$16.00
HP-375 Studio Quality Headphones	HP375	\$14.00

Unlike household electronics, all of our products have been specifically designed and tested for the mobile environment and are only available through ASA. To order any of these products, please contact Audiovox Specialized Applications at www.asaelectronics.com or 800-688-3135.

*Prices subject to change

