

# SERIES TWO AUTOSOUND COMPARATORS

## SYSTEM INSTALLATION MANUAL

### Features and Capability

Series Two Comparators are designed with your needs in mind. These systems allow audio components to perform to their maximum capability in accurate and fair comparisons. Series Two Comparators are easy to use and protect equipment from inappropriate combinations of components.

#### Built-in Features

- SilenTouch™ is an exclusive system of timed audio muting circuits that suppress distracting pops and thumps, protect the display merchandise and extend the switch contact life of the comparators.
- AutoMatch™ assures that all sources and amplifiers are correctly matched to each other, regardless of input or output grounding configurations.
- Series Two Comparators employ an innovative shielding and ground design that allows preamp level and powered sources, power amplifiers, booster amps and signal processors to be demonstrated in the same system.
- Series Two Comparators, Expanders and Accessories provide great versatility for merchandising different display configurations, large and small.
- Series Two Hybrid™ 12-Volt Power Systems provide massive amounts of clean DC current to give your display products the *power* to really show their stuff at a reasonable price.
- Series Two Comparators are simple to install with easy-access circuit boards and plug-in terminal blocks that make field service a snap.

Series Two Autosound Comparators allow instantaneous A/B comparison of any product without the expected turn-on delays, thumps, and low reliability found in other systems. We provide these advantages by SWITCHING ONLY THE AUDIO SIGNAL and maintaining constant DC power. This requires increased DC power capacity, supplied easily and cost effectively by our Hybrid™ DC Power Sources.

The System will not allow more than one amplifier on each Comparator to play at a time. This prevents damage to the amplifiers.

While each Comparator allows the demonstration of high and low level components side by side, you should avoid mismatching the two types of products in a demonstration. There is no risk of damage to the head units or amplifiers if such a mismatch should occur; however, selecting a powered head unit with an amplifier that has a *lower* input sensitivity rating (e.g. preamp level of 250-500 mv) may surprise you with extremely high volume and distortion that could damage the selected speakers. We recommend that you differentiate between high and low level products by using our preamp level button labels (included).

Every Model 2/11 and Model 2/02 Comparator comes with a 2/74 Power Manager to monitor the DC system and provide a master power switch for the display. The simplicity and durability of the Series Two Comparators invites customer accessibility. However, if restricted use is desired, then your Series Two System may be secured through use of an optional key-switch or digital keypad connected to the 2/74 Power Manager.

Another important and useful feature of all of our Series Two Comparators is expandability. Starting with Model 2/02 or Model 2/11, you can add rear channels with the appropriate expander unit. Add a Model 2/61 Sub-

EXPANDERS		
<i>product capacity</i>	<i>product type</i>	<i>model number</i>
19	Sources	2/21
19	Speaker Pairs	2/31
9	Amplifiers	2/41

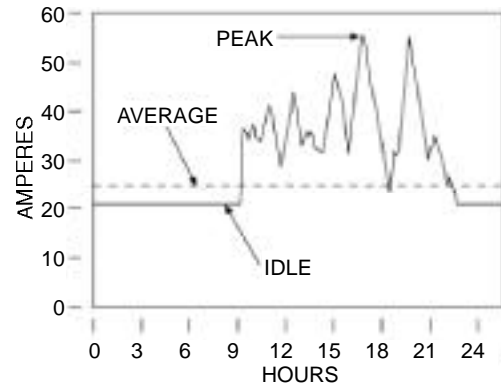
woofer System Expander and you improve flexibility by providing three dedicated sub amplifiers and up to seven positions for subwoofer drivers. If you need the capability of switching preamp level EQs with any Source Unit, add our Model 2/51 Preamp EQ Expander.

## System Planning

When planning a new demonstration system, it is best to start by considering your existing capacity requirements and also the probability of reasonable growth. Then select the Series Two Comparator and Expanders that meet those requirements.

## DC Power Requirements

The best way to demonstrate car audio equipment is in the environment for which they were designed – a car. A car battery provides continuous current - the power needed to turn on all of the audio equipment, and it also provides the “headroom” to accommodate PEAK power requirements. DC power supplies which are used to power displays have no headroom. The Audio Authority Hybrid™ 12-Volt Power System recreates a car’s electrical environment by combining a DC power supply with a car battery.



To estimate your minimum DC system requirements, consider these two factors. There must be enough current available to IDLE all of the components not selected and there must be enough PEAK current available to supply that idle current plus the varying current demand required by the products being demonstrated.

To estimate the IDLE current demand, use this simple formula to determine the minimum size of your power source:

$$\left( \boxed{\phantom{00}} \times .5 \right) + \left( \boxed{\phantom{00}} \times .5 \right) + \left( \boxed{\phantom{00}} \times 2 \right) = \boxed{\phantom{00}} \text{ IDLE Current Demand}$$

Number of Sources
Number of Low Power Amps
Number of High Power Amps

For example, a system of 20 car head units, 3 booster amps and 7 power amps will require  $(.5 \times 20) + (.5 \times 3) + (2 \times 7) = 26.5$  amperes minimum of continuous current. Note that a standard 25 ampere ICS rated power supply by itself could not provide enough current to simply turn on all of the displayed products, not to mention playing a selection.

A note here about ICS rating. Most commonly used DC supplies were originally intended for applications such as amateur radio. ICS (Intermittent Communication Service) indicates a duty cycle (5 minutes at full output, 5 minutes at reduced output). Most power supplies can only continuously provide about 75% of their ICS rated output. So a 25 amp (ICS rated) supply may only provide about 19 amperes of continuous power.

Now estimate the PEAK power requirement using this formula:

$$\left( \boxed{\phantom{00}} \right) + \left( \boxed{\phantom{00}} \times 1.5 \right) = \boxed{\phantom{00}} \text{ PEAK Current Demand}$$

IDLE Current Demand
Value of Largest Fuse

For example, if the fuse in your largest amplifier is 20 amperes,  $(26.5) + (20 \times 1.5) = 56.5$  amperes.

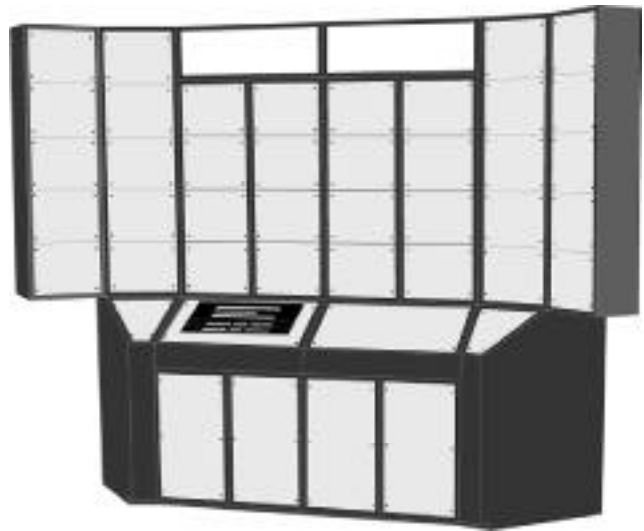
Even with a power source rated at 50 amperes *continuous*, the DC current available is borderline at best. An ICS rating of 50 amperes could only supply 37.5 amperes of continuous current, falling well short of the required 56.5 amperes. It is not too hard to imagine a display which required well over 100 amperes of peak power. Especially if your display had more merchandise, and three of your amps could play at the same time. Even a power source rated at 100 amperes *continuous* would not be adequate to deliver enough current to allow the proper performance of the selected components.

If, on the other hand, you consider the Audio Authority Hybrid™ 12-Volt Power System, notice that 50 amperes of continuous current is more than adequate to meet idle current requirements while leaving over 500 amperes for peak current demand with a battery. For larger or more demanding car audio displays, a

second Model 2/77 Hybrid™ 12-Volt Power Source may be added to load-share with the initial Model 2/77 to provide 100 amperes of continuous output current.

## Display Fixtures

There are basically three avenues in obtaining a fixture to display car audio components. There are prefab displays which are often supplied by the product manufacturers. Dealers are sometimes able to “strap” several of these displays together to form a system. There is the custom built display fixture, built by a contractor, which is usually expensive and not very adaptable to changes or growth in the future. Finally, there is the modular display fixture, a versatile product that can be configured in many ways in a cost efficient manner within a reasonable amount of time.



Standard cabinet modules bolt together forming an infinite array of semi-custom displays. You may select the display's shape, custom signage, pre-cut product mounting panels, pre-assembly, pre-wiring, and even product loading. Contact us for a brochure that will explain this modular concept in greater detail.

## INSTALLATION

### Before You Begin

Make sure the following tools are available:

- #1 Phillips screwdriver
- #2 Phillips screwdriver
- Wire cutter/stripper
- Small straight-blade screwdriver
- Note: A cordless screwdriver is

strongly recommended.

If panel mounting the switching system, the following tools will also be needed:

- Tape Measure
- Straightedge
- Portable Jig Saw
- Electric drill and 7/64 inch (2.5mm) bit.

### Special Panel Cutout Height

Inches	SMALL					
LARGE	0	1	2	3	4	5
0	---	1 $\frac{5}{8}$	3 $\frac{3}{8}$	5 $\frac{1}{8}$	6 $\frac{7}{8}$	8 $\frac{5}{8}$
1	5	6 $\frac{3}{4}$	8 $\frac{1}{2}$	10 $\frac{1}{4}$	12	13 $\frac{3}{4}$
2	10 $\frac{1}{4}$	12	13 $\frac{3}{4}$	15 $\frac{1}{2}$	17 $\frac{1}{4}$	19
3	15 $\frac{1}{2}$	17 $\frac{1}{4}$	19	20 $\frac{3}{4}$	22 $\frac{1}{4}$	24 $\frac{1}{4}$
4	20 $\frac{3}{4}$	22 $\frac{1}{2}$	24 $\frac{1}{4}$	26	27 $\frac{3}{4}$	29 $\frac{1}{2}$

As you unpack your system, check the contents of the shipping containers against the packing slip to verify that all of the system components have been included.

### Panel Mounting the Comparators

If your switching system includes a 2/02 or 2/11 and up to 2 or 3 small Expanders, simply tape the Panel Cutting Template included with the unit to the mounting surface. Then cut out the appropriate area in accordance with the instructions found on the template.

If the templates do not accommodate the units of your switching system, use the table above to determine the height of the rectangular cutout required. The width of the cutout will be 17 $\frac{3}{4}$  inches (451mm) wide. The cutout height depends on the total number of large switchers (2/11, 2/18, 2/19) and small switchers (all

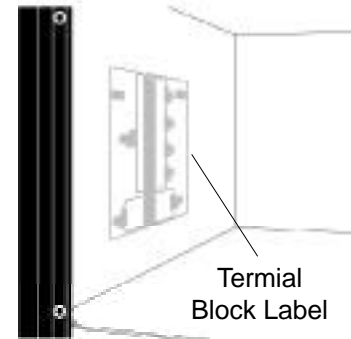
others) in the system. To find the correct height dimension, locate the number of large units in your system in the “Large” column and the number of small units in the “Small” header and read the dimension where the two intersect. For example, the panel cutout height for a 2/11, 2/19 and a 2/61 ( 2 large and 1 small) is 12 inches (305mm) high and 17¾ (451 mm) wide.

Test-fit the units in the cutout and mark the mounting screw holes, making sure the comparators are level. If your display allows rear access for wiring purposes, you may secure the units now.

### Mounting the Installation Kit Terminal Blocks

If you purchased the Installation Kit for the comparator you are installing then the terminal blocks, adhesive-backed wiring legend labels, mounting hardware & DC Scotch-lok™ connectors for every source, amp and speaker position for that specific Comparator are included.

Find the sheets of adhesive-backed labels in the Installation Kit and affix one of the appropriate kind inside the display at each product location. Position the labels where they are readable and where the terminal block will be accessible. We recommend covering the labels with clear packaging tape for extra durability.



Mount the 7 and 12 position terminal blocks at their respective locations using two screws each. Line up the screw holes in the blocks with the targets on the label and mount the screws with a #1 Phillips screwdriver.

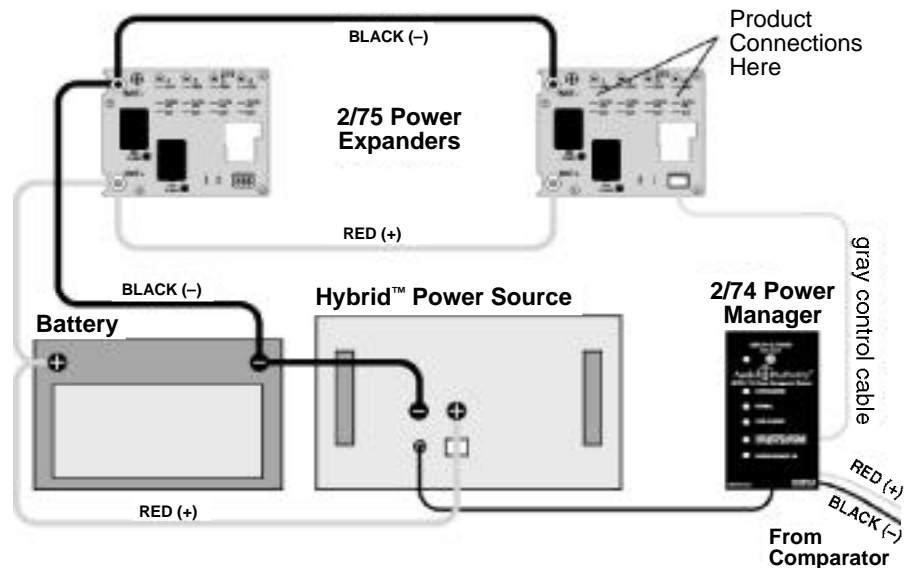
### Installing the DC System Components

Choose a suitable mounting location for the Model 2/74 Power Manager Control Panel near the comparators or in a more remote location on the display. A key switch, digital keypad or a hidden single-pole switch may be used in conjunction with the Model 2/74 to restrict operation of the system if desired. To panel mount the 2/74, cut an opening 2 3/8” (60mm) wide, 4 1/4” (108mm) high.

*DO NOT remove plastic front panel from Control Unit.*

The Model 2/74 serves as a master ON/OFF switch and diagnostic tool for the entire DC distribution system. Connect the red and black leads from the Comparator(s) to the screw down terminals marked RED, BLK (Comp) located on the right side of the Control Unit. Connect the gray control cable from the Control Unit to the nearest 2/75 DC Power Expander. The connector on the 2/75 Power Expander is located on the lower right corner of the board.

Connect the power supply monitor cable (an RCA plug) to any Audio Authority Hybrid™ 12-Volt Power Source that is equipped with a monitor jack.



Using the front of the 2/74 Control Panel as a template, drill two 1/8” (3mm) holes for mounting screws. Mount the 2/74 Control Panel using the two supplied black screws.

*Caution: Carefully tighten screws until just snug to avoid cracking the front panel.*

If your switching system has multiple switchers, then two or more 2/75 DC Power Expanders are used. Each power Expander has four output terminals. Each terminal is protected by its own 40 amp automatic resetting circuit breaker. Each output terminal block can power up to 20 source units or preamp equalizers or up to 10 power amplifiers. It is extremely important that the amplifiers to be demonstrated at the same time be on separate output terminals. For example, front amps should be connected to one output terminal, rear amps to a second output terminal and sub amps to third output terminal. If you have more than one DC Power Expander you may elect to split each amp group into smaller groups.

It is also recommended that large amps (over 200 watts) be dedicated to individual output terminals. In some cases, additional Model 2/75 Power Expanders may be required to meet the power consumption requirements of your display. If you need assistance, please call our factory to determine your system requirements. Refer to the separate instructions that are provided with each Model 2/74 shipped with a Model 2/02 or Model 2/11 Comparator. These instructions provide additional information for designing DC harnesses, mounting Power Expanders and operating the DC system. Install all trunk cables and branches up to each terminal block.

Note: If your Series Two Comparator System is an older version, it may utilize a Model 2/72 Power Management System. This system may be identified by its use of a fuse panel, about 4 by 12 inches. Contact the factory for additional information on this product.

## **DC Testing**

After completing the DC distribution system, select a source unit and an amplifier for testing. Connect the power wires of the source unit to Source Terminal #1 and the amp to Amplifier Terminal #1 according to the legend on the terminal labels.

*Please note the legend on the amplifier label. The position printed “CURRENT SENSING (turn-on B)” is rarely used with today’s amplifiers. If you believe you have an amplifier that requires this circuit being connected, call the factory before installing.*

Press the red power button on the Model 2/74 Control Panel. The Power LED, the source unit and the amplifier will all come on indicating a working DC distribution system. If the source unit or the amplifier fail to come on, check for reversed wires or a blown fuse in the unit that did not power up.

The Model 2/74 when used with a Hybrid™ 12-Volt Power System will indicate the charge condition of the battery. If the green “Normal” LED is ON, then the battery is sufficiently charged. If the yellow “Low Charge” LED is on, it may indicate one of several possible conditions. (1) possible low battery voltage, (2) power source not plugged in and/or turned on, and (3) power source not functioning correctly. A flashing red “Overcharge” LED means that the power system voltage is dangerously high, possibly due to a faulty power source. A red “Low Battery Automatic Shutdown” LED indicates that the battery voltage is insufficient for proper display operation. The Power Manager will shut down the system to protect the battery from deep cycling (draining the battery low enough to damage it).

When the power distribution system has been checked out, turn off the power and continue with the next step.

## **Wiring a Basic System**

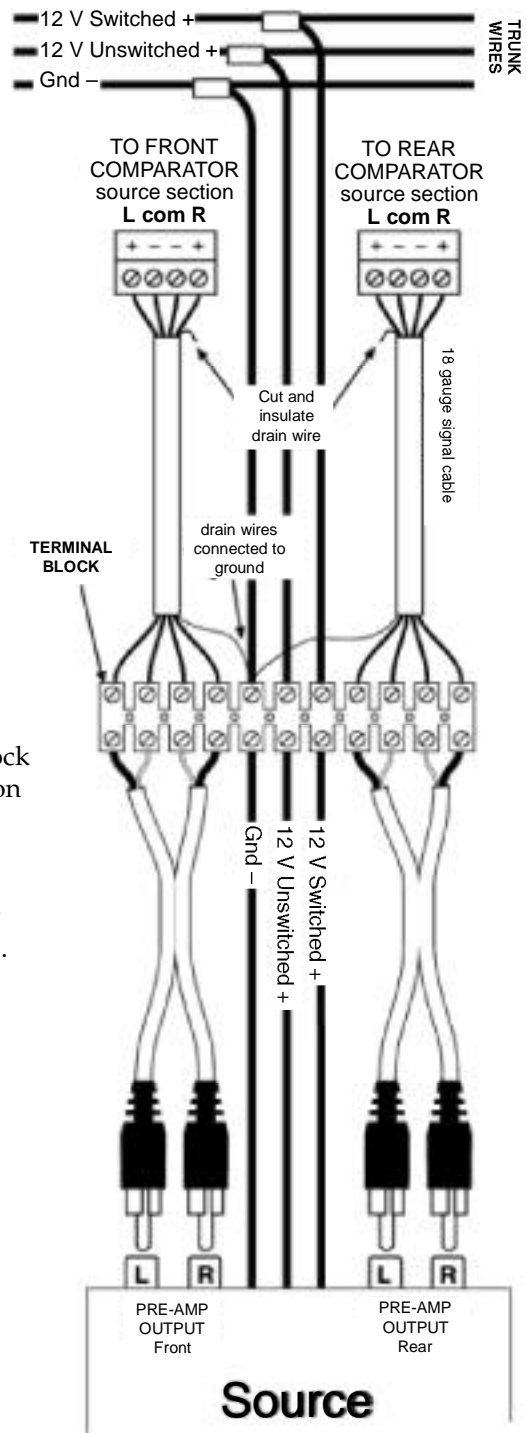
Use the Universal Hookup Wire (801-016R, available from the factory) and choose a color code system that you will use throughout the display in order to maintain proper polarity. We suggest the following color code which is used in our pre-wired displays:

Green for left positive  
White for left ground  
Gray for right ground  
Brown for right positive.

Today's high power car audio amplifiers use a variety of different grounding schemes. When installed in a car, the grounding scheme does not cause problems because the head unit and the amp are always connected. However, in a switching system, products are constantly being disconnected and reconnected. Sometimes, this can cause an amplifier to become unstable. To avoid this problem, use the universal product hookup for amplifiers and sources shown in this section. Make sure each shielded cable is connected securely to ground and a ground jumper is connected as shown.

NOTE: After completing a harness for a Source position, an Amplifier position, and pair of Speakers, test the system to make sure you have done everything correctly before duplicating the harnesses.

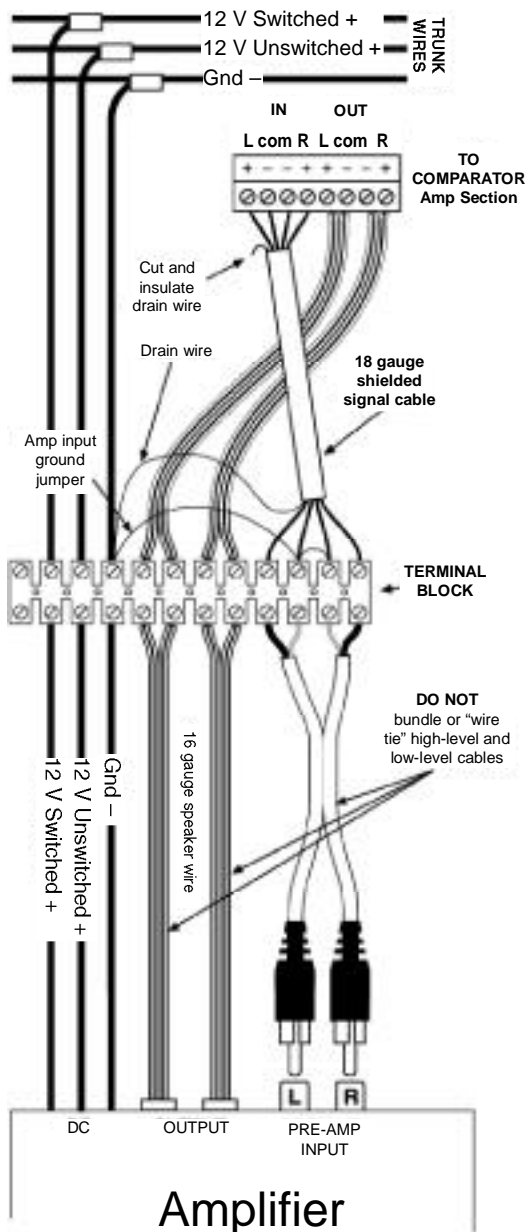
- Start with Head Units. Powered and preamp-out units can both be installed in the same switching system. Start with the source unit's terminal block for switch position #1. Strip all insulated conductors no more than 1/4" (6mm) before inserting them into the terminal block and tightening the terminal screws.
- Be sure to connect the shield (or drain) wire to the terminal block **DC ground (black)** position. Cut off and dress the drain wire on the Comparator end of the cable.
- On the Comparator end, use a 4-pin "terminal plug" for each source unit. Prepare and connect the wires to the plugs exactly as with the terminal blocks except strip the wires 3/16" (4mm).
- Using the same 10 gauge wire, connect each head unit to the terminal block DC power positions.
- Connect the terminal block input positions (#1 through 4) on the amplifier blocks to the 8-pin terminal plug for each amp exactly like the source terminal blocks (#1-4). See the amplifier hookup diagram for details. Positions #5 through #8 (amp output) should be hooked up with 16-gauge speaker wire. Remember, these position numbers correspond to both the terminal block wire location AND the wire location on the terminal plugs at the comparator end.
- Now test a system (a head unit, amp and pair of speakers) by following the instructions in the next section.



If you purchased a Model 2/91 Level Matching Attenuator, follow the instructions provided and install the 2/91 at this time.

### Audio Signal Testing

Connect a low-powered source unit to Source terminal position #1. Connect an amp to Amplifier terminal position #1 and connect a pair of speakers to Speaker terminal position #1. Make sure none of the buttons on the main Comparator are depressed except the AMP OFF button. Press the ON button on the 2/74 Power Manager. Select Source button #1 and Speakers #1. Play a CD or tune in an FM station and if everything is working properly, you should hear sound through the speakers and the balance control should function properly. If there is no sound or something else seems wrong, turn forward to the TROUBLESHOOTING section of this manual.



If the system is working properly, lower the source's volume and select amplifier #1. If the volume increases when the amp is selected and the balance control on the source unit still operates correctly, you are ready to complete the wiring. If not, turn to the TROUBLESHOOTING section.

### Completing the System Wiring

Turn off the system and continue wiring the Comparator as you did in the previous step remembering to leave some slack for strain relief and to make servicing in the future easier. Neatly bundle the wire with wires ties and number any wires that can be unplugged at the Comparator end. Bundle the shielded wires separately from the rest. Test and verify frequently and be certain to support the wiring so the weight of the wire does not make the comparators or terminal blocks bear its weight.

If your system has a Rear Channel Comparator and/or Subwoofer Expander, the technique is the same as for main Comparators. Route the wire harness from the terminal block to the Expander's proper position. To wire a four channel source, follow the label instructions. The front Comparator is always a 2/11 or 2/02 and the rear Comparator is always a Model 2/19 or 2/29.

Four channel and six channel amplifiers will install easily. After the DC power is connected to the terminal (front, rear or sub), four channel signal can be split between front and/or rear, and sub. Six channel amps will route two channels each to front, rear and sub switchers.

In switching systems that use both a front and rear switcher, a total of two Model 2/91 Level Matching Attenuators should be installed, one on the Main Comparator and one on the Rear Expander.

### Installing an Antenna System

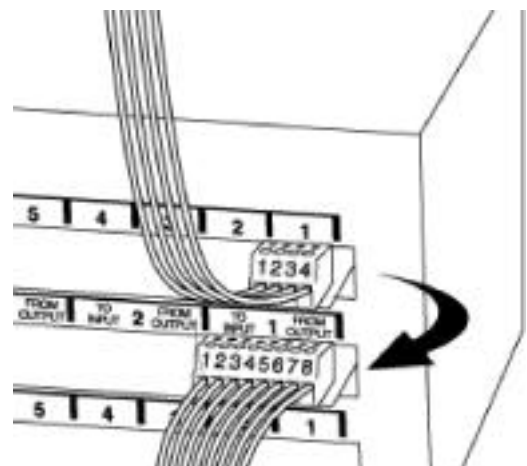
Use our KIT16 or KIT19 Antenna Distribution Kit along with a roof mounted antenna. These kits include all the F-to-F cables,

4-way Tap-offs and F-to-Motorola cables needed for a system of eight or twenty radios. Each of these antenna distribution kits can be expanded in increments of 4 source units to match your system requirements. Using RG-59 coax cable, connect the FM antenna to the input of the distribution amp included in the KIT.

## TROUBLESHOOTING

The cause of almost any problem that may arise in a Series Two system can be found by using the following test procedure. However, if the problem seems power-related, go to the "DC Testing" section in this manual first.

If there is no sound at all, move the "Source" terminal plug from its normal Source position on the back of the Comparator to an open Amplifier OUTPUT position (pins 5 through 8) as shown. Select a speaker position, and the correct button for



that amplifier position. If the selected speakers play, check the green power LED to make sure that the Comparator is receiving power; if it is receiving power the Comparator may be faulty. If the speakers do not play, check the audio wiring from the source to the terminal block and from the terminal block to the Comparator. Be certain that proper polarity is maintained (+) to (+) and (-) to (-). Check the speaker wires the same way.

If the source unit plays through the speakers but will not play with an amp, make sure the amp is powered. Then check the wiring from the Amplifier INPUT position (#1-4) on the Comparator to the Amp Terminal Block then to the inputs of the amp itself. Look for (+) and (-) wires that have been reversed. If that's not the cause, perform the test in the preceding paragraph to check the amp output section of the comparator. If you still can't get amp output signal, disconnect the wires leading to the speaker and amplifier OUTPUT (#5-8) Comparator terminal plugs. Connect these wires together temporarily, (+) to (+) and (-) to (-). If you don't get signal, the amp is defective. If you do get signal, the Comparator may be faulty.

Lack of channel balance or odd behavior of balance controls may indicate shorted wiring, out-of-phase source/amp wiring, or possibly a defective Comparator. By isolating and reporting where the problem seems to be, our Service Department will be able to help solve your problem efficiently.

## **Final Check**

Turn on the system power. Observe that the "POWER ON" LED of the 2/74 is on. If not, or if any of the red LEDs are on, find the cause of the problem using the DC Testing section of the manual.

Turn on all the head units. Check that each one powers up. Next, confirm that all memory and clock functions are retained when the system is turned off, and turned back on. Now, check to see if all amplifiers power up. If they do not, refer to the DC Testing section of the manual.

Select the first speaker level source with the Model 2/91 in the Bypass position, the amp off, and Speaker #1 selected. Play these components and diagnose any unexpected or unusual behavior using the Troubleshooting section of the manual. Select speaker-level source units one at a time until each unit's function has been verified including those connected to an Expander. Observe that the SilenTouch™ LED flashes with each selection of a source unit and the AutoMatch™ LED lights when a floating ground (high powered) source is selected. If something doesn't work, find the cause of the problem before proceeding.

Choose a preamp source unit (or a powered source with the Model 2/91 Level Matching Attenuator in the "Engage" position), turn the volume control down and select Amplifier #1. Then select each amp one at a time. Observe that the SilenTouch™ LED flashes each time you select an amp. Check the audio quality of each selection as you proceed. Use the Troubleshooting section to find and correct any problem.

While playing the source and amplifier of your choice, select each speaker pair one at a time. Observe the SilenTouch™ LED flashing and diagnose and remedy any problems as before.

Repeat this procedure on any Rear Expanders that are in your system. In order to test the parallel button function of the switching system, select from the main Comparator a source unit (amp is optional) and a pair of speakers. Then select the "PARALLEL" button and a pair of speakers on the rear Expander. If you hear signal output from the rear speakers, then the Parallel function is operating. Multiple speakers on any comparator or expander may be selected by engaging the buttons at the same time.

If all the components have operated satisfactorily and you have not already mounted the Comparator(s), do so now. If you have any other questions not covered in this manual, call Audio Authority Customer Service at 800/322-8346. An overall Series 2 system diagram may be downloaded from <http://www.audioauthority.com>.



# Index

## Numerals / Model Numbers

12-Volt Power Source...3  
2/02...7  
2/11...7  
2/19...7  
2/29...7  
2/74, panel mounting...4  
2/74 Power Manager...1  
2/75 DC Power Expander...5  
2/91 Level Matching Attenuator...6  
8-pin terminal plug...6

## A

A/B comparison...1  
amplifiers, front, rear, and sub...5  
amplifiers, protection...1  
amplifiers, wiring for...7  
Antenna Distribution Kit...7  
Antenna System...7  
Audio Signal Testing...6  
AutoMatch™, definition of...1  
AutoMatch™ LED...8

## B

balance controls, odd behavior...8  
battery voltage...5  
Bypass position...8

## C

charge condition of the battery...5  
clock functions...8  
color code...5  
Comparators, panel mounting...3  
continuous current demand,  
calculating...2  
Current Sensing (turn-on B)...5  
customer access and security...1  
cutout sizes...3

## D

DC power demand...1  
DC Power Expander...5  
DC Power Requirements,  
calculating...2  
deep cycling...5  
diagnostic tool, 2/74...4  
Display Fixtures...3

## E

expandability...1

## F

F-to-F cables...7  
F-to-Motorola cables...7  
Fixtures...3  
floating ground source...8

## G

green “Normal” LED...5  
green power LED...8  
grounding schemes and  
amplifiers...6

## H

high and low level components,  
demonstration of...1  
Hybrid™ 12-Volt Power  
Source...3

## I

idle current demand,  
estimating...2  
Installation Kit...4

## K

key-switch or digital keypad for  
security...1  
KIT16...7  
KIT19...7

## L

labels, for terminal blocks...4  
large amps (over 200 watts)...5  
Level Matching Attenuator...6, 7  
Level Matching Attenuators...7  
low and high level components,  
demonstration of...1

## M

mismatching high and low level  
components...1  
modular display fixture...3

## P

panel mounting the 2/74...4  
Panel Mounting the  
Comparators...3  
parallel button function...8  
Planning...2  
Power Manager, panel  
mounting...4  
Power On LED...8  
power source, minimum size...2  
power switch and 2/74...1  
preamp level button labels...1

## R

red “Low Battery Automatic  
Shutdown” LED...5  
red “Overcharge” LED...5  
restricted use and keyswitch...1

## S

shielded wires and wire ties...7  
SilenTouch™ definition of...1  
SilenTouch™ LED...8  
speaker damage...1  
System Wiring...7

## T

Terminal Blocks...4  
test procedures...7  
Testing audio signal...6  
tools needed for installation...3  
Troubleshooting...7

## U

unstable amplifier...6

## W

Wiring a Basic System...5

## Y

yellow “Low Charge” LED...5