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***SYNTHESIS
S5160
POWER
AMPLIFIER
USER'S
MANUAL***



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JBL Synthesis S5160 Power Amplifier User's Manual
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Part Number: S5160/1200M

1.1 Important Safeguards For Audio Products

PLEASE READ CAREFULLY ALL THE FOLLOWING IMPORTANT SAFEGUARDS THAT ARE APPLICABLE TO YOUR EQUIPMENT

<h3>CAUTION</h3> <h4>RISK OF ELECTRIC SHOCK DO NOT OPEN</h4>	
<p>CAUTION: To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.</p>	
<p>CAUTION: To prevent electric shock, do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.</p>	
	<p>The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.</p>
	<p>The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.</p>

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, stand, tripod, bracket or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15. Do not use attachments not recommended by the product manufacturer, as they may cause hazards.

16. This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

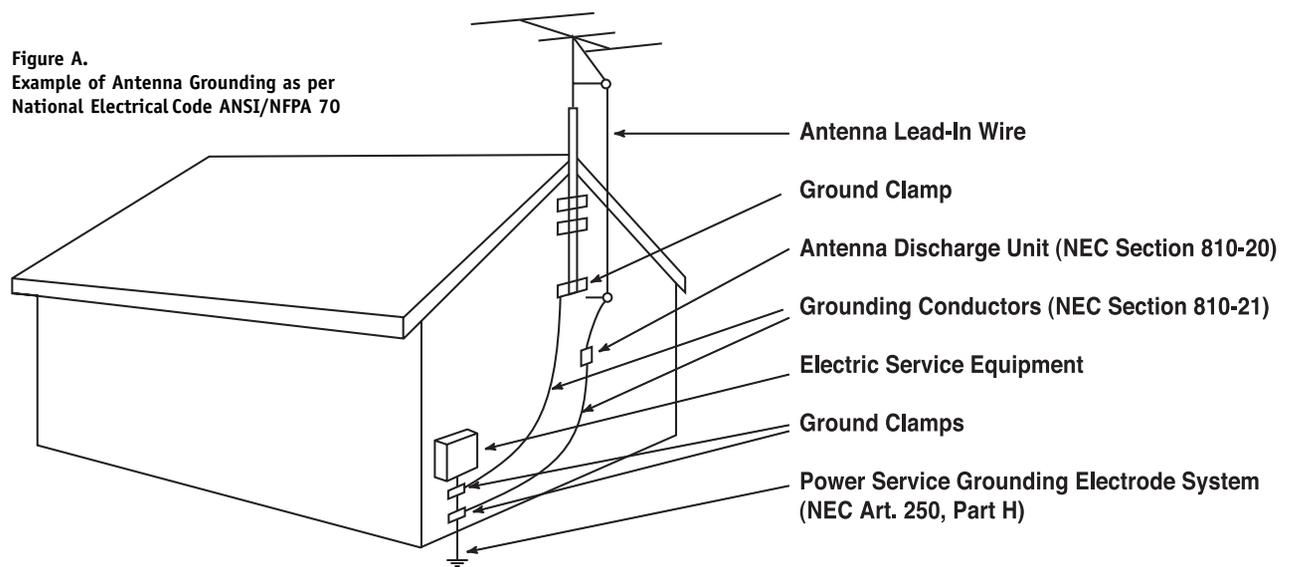
17. If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure A.

- 18. An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits, as contact with them might be fatal.
- 19. Do not overload wall outlets, extension cords, or integral convenience receptacles, as this can result in a risk of fire or electric shock.
- 20. Never push objects of any kind into this product through openings, as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
- 21. The apparatus shall not be exposed to dripping or splashing, and no objects filled with liquids, such as vases, shall be placed on the apparatus.
- 22. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

- 23. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
- 24. Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
- 25. The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

Note to CATV system installer:

This reminder is provided to call the CATV system installer's attention to Article 820-22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.



Part No. HCGUL1492/6500 04/2004 EN

Introduction

Congratulations on your purchase of this JBL Synthesis S5160 power amplifier! You have chosen a product that embodies the best of what JBL has discovered about the emotional power of audio reproduction in more than fifty years of preeminence in the field. This amplifier has been designed and crafted to provide the user with a high level of sonic performance; special attention has been paid to minimize the number of components in the audio signal path, resulting in extremely low distortion, excellent transient response and wide dynamic range. Synthesis products set new benchmarks in audio technology, and, when used as part of a complete JBL Synthesis system, will bring the ambience and acoustics of some of the world's greatest concert halls and theaters into your home.

To obtain the best performance from this amplifier, please be sure to completely read this user's manual and use the S5160 only in accordance with its instructions.

Features

The JBL Synthesis S5160 power amplifier features the following:

THX Ultra™ Specifications

This amplifier meets or exceeds the stringent specifications, including those for power handling, total harmonic distortion, frequency response, signal-to-noise ratio, slew rate, and crosstalk, set by the THX Ltd. Audio division in their specifications for "Ultra"-class certification. When incorporated into a complete THX® system, you will hear in your home what the director and sound engineer heard in the recording studio.

Full Five-Channel Operation

The S5160 has been designed to integrate well into the world of multichannel audio. It is designed to reproduce the front left and right, center and side channels, to produce a truly enveloping sound field. When coupled with a high-quality subwoofer amplifier, such as the S800, it is a solid foundation on which to build a high-performance home cinema system that will astound the listener with its power and realism. The S5160 is specially designed for use with a Synthesis One system in which the front left, right and center speakers are bi-amplified for smoother and more accurate reproduction of every nuance of a movie soundtrack or musical selection. Two S5160

amplifiers may be used, in conjunction with two S800 subwoofer amplifiers, to power a complete 7.1-channel home theater system. Alternatively, a single S5160 may be used with one S800 subwoofer amplifier to power a 5.1-channel system.

High Power Capability

The S5160 provides a satisfying 160 watts per channel of distortion-free audio (<0.03% THD) into 8 ohms. Because of their power capabilities, all Synthesis amplifiers have an extremely wide dynamic range, an element critical to realistic home cinema. Sound levels equal to those at original performances are easily re-created in even the largest of home listening environments.

Auto Turn-On and Power Sequencing Circuitry

When used in a JBL Synthesis system, the S5160 can be turned on automatically whenever the surround processor is activated. No longer do you have to get out of that chair to turn on the various pieces of equipment in your entertainment system; just one touch on the remote control of the surround processor, and you're a few seconds away from a truly impressive audio presentation!

Modern amplifiers produce more power per channel (and frequently have more channels) than those of the traditional two-channel stereo era. Due to the high current demands of power amplifiers at the instant of turn-on, the S5160, S7150 and S800 amplifiers and the SDEC digital equalizer are equipped with power sequencing circuits that turn on each unit in sequence, avoiding the large instantaneous current demand (and possible house circuit breaker tripping) that would occur should they all turn on at the same instant.

Quiet Cooling

The S5160 utilizes a fan to cool the amplifier channels, ensuring long-term reliability. To reduce fan noise to an absolute minimum, a thermal sensing and control circuit that senses increases in temperature within the amplifier and powers a fan at a speed proportional to that temperature increase has been incorporated in the S5160. When the S5160 is used at lower volume levels, the fan turns very slowly – and quietly. At high listening levels (and the higher operating temperatures this creates within any amplifier), the sensing circuitry causes the fan to turn faster, producing increased cooling. As a result, the fan is never turning faster than necessary, and most of the noise that is generated is masked by the program being listened to.

Comprehensive and Isolated Circuit Protection

The S5160 amplifier employs sophisticated protection circuitry (one for each channel) that senses many possible fault conditions, such as shorted loudspeaker wires or excess power demand, and turns the affected channel(s) and their blue front-panel indicators off until the fault condition is removed, at which time normal operation is automatically restored. While protection of this sort is not uncommon in today's well-designed amplifiers, a remarkable feature of the S5160's protection circuitry is that it is optically coupled to the signal circuit; there is no direct electrical connection between the signal path and the protection circuitry.

As a result, there can be no coloration of the music, no interaction between protection and amplification, until certain thresholds are exceeded, at which point the channel(s) turn off completely.

2.1 Included

Each S5160 amplifier includes the following items packed in the carton. If any of these items is missing, please contact your JBL Synthesis dealer or distributor, or visit our Web site at www.jblsynthesis.com.

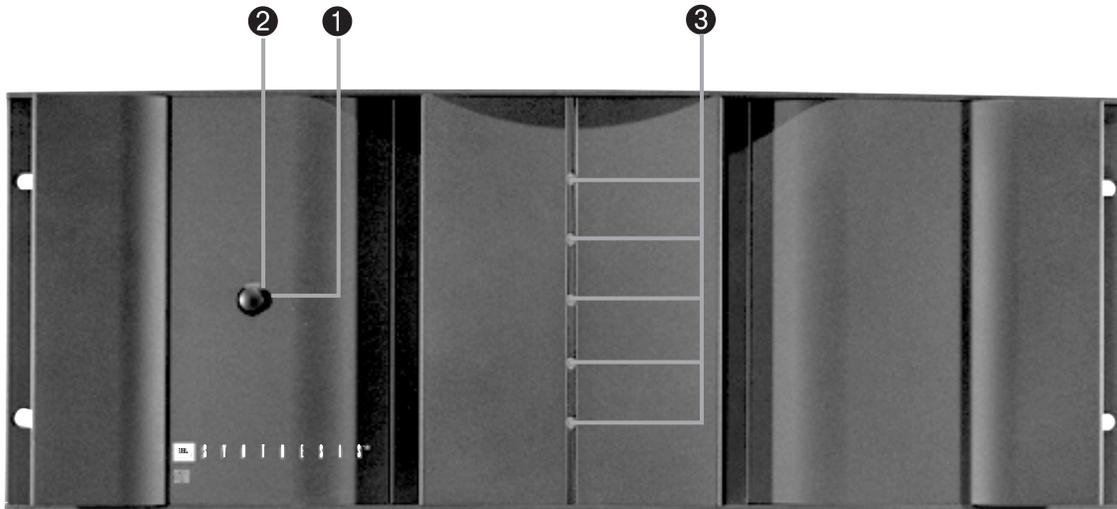
One (1) detachable power cord

One (1) 6-foot 5-pin DIN trigger cable (M/M)

Two (2) 5-pin DIN/2-pin bare wire adapters

Two (2) 2-pin bare wire plugs

Owner's manual



1. Power Switch

Pushing this button is all that is required to turn on the S5160 if it is not part of a Synthesis system and the **Manual On/Auto On** switch ⑦ (rear panel) is in the **Manual On** position. If the amplifier is used as part of a JBL Synthesis system, and the **Manual On/Auto On** switch ⑦ is in the **Auto On** position, the amplifier will turn on when the surround processor is activated. In this application, the front-panel pushbutton Power switch should be left in the **ON** (in) position. See the description of the **Manual On/Auto On** switch ⑦ for more information on turning on the S5160.

2. Standby Indicator

This indicator, immediately above the front-panel Power switch, will glow red when the amplifier is in the "standby" mode, whether operating as part of a Synthesis system or not. When the S5160 is in the "on" mode, this light will shut off and the blue "on" mode indicators will light.

3. Power Indicators (Blue)

These indicators will light up when the power amplifier is in the "on" mode. Each monitors the operation of one channel, and will be extinguished if that channel's protection circuitry is activated.

4. Input Jacks (Ch.1 Through Ch.5)

The output signals from the Synthesis digital processor and equalizer are connected to the input jacks in a Synthesis One system. We suggest that the channels be assigned as follows:

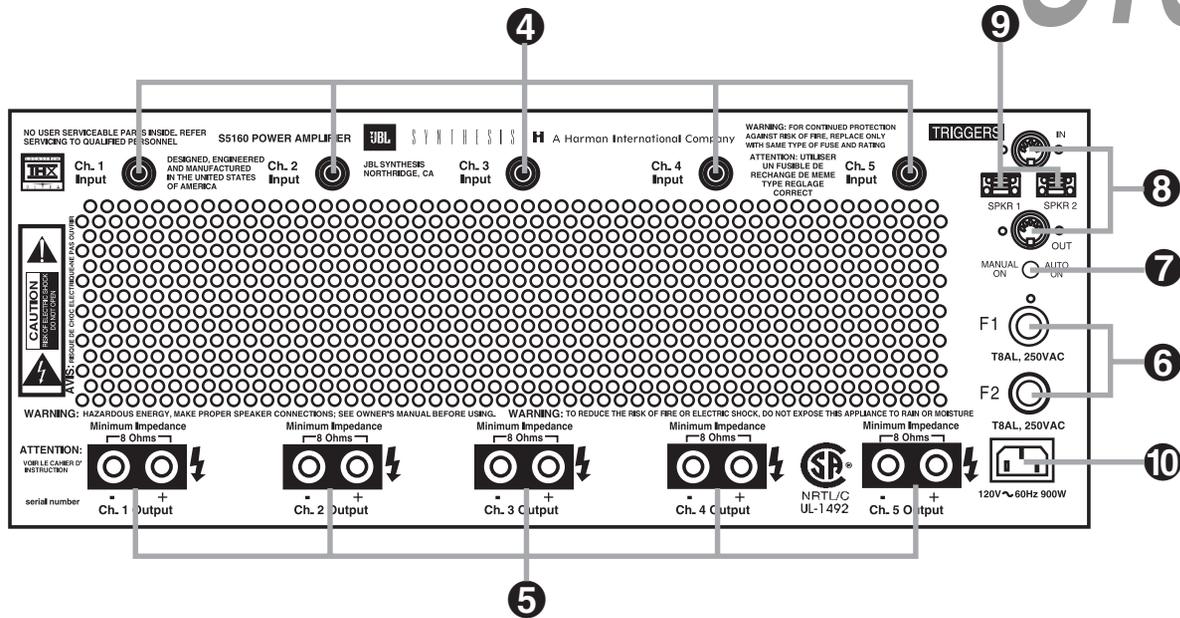
Amplifier #1:

Channel 1	Center Low-Frequency
Channel 2	Center High-Frequency
Channel 3	Right Front Low-Frequency
Channel 4	Right Front High-Frequency
Channel 5	Right Rear Surround

Amplifier #2:

Channel 1	Right Side Surround
Channel 2	Left Side Surround
Channel 3	Left Front Low-Frequency
Channel 4	Left Front High-Frequency
Channel 5	Left Rear Surround

S5160 OPERATION AND CONTROLS



5. Speaker Terminals

Connect the speakers to these terminals, following the normal convention: Wire the "+" side of the speaker to the red terminal, and the "-" side to the black terminal. Wire the speakers with the proper polarity; reversing any speaker's connections will not damage either the speaker or the amplifier, but will result in poor low-frequency performance and imprecise imaging.

WARNING: Terminals marked with the flash symbol are hazardous when live. External wiring connected to those terminals requires installation by trained personnel, and the use of ready-made lead cords. 

NOTE: The minimum load impedance that this amplifier can handle safely is 8 ohms per channel. Using lower impedance loads can damage the unit and will void your warranty!

Wire-Run Length	Minimum Gauge
Up to 20'	16
Up to 50'	14
Up to 100'	12

6. External Fuses

AC mains fuses are located on the back panel of the amplifier. These fuses will not blow unless the amplifier is asked to produce more power than its design allows for a prolonged period or to prevent excessive current draw, which could damage internal components during a fault condition.

The amplifier has been designed to operate under virtually all conditions. Even momentary short-circuiting of the output (speaker) connections will not ordinarily damage the output circuitry (although it will activate internal protection circuitry and cause one or more of the front-panel LED indicators to be extinguished until the circuit resets automatically).

Fuse Replacement

To remove the fuse, turn off the Power switch and disconnect the power plug from the AC mains. Unscrew the fuse holder cap and remove the fuse; install the new fuse and secure the holder cap; and reconnect the AC mains. If after replacing the fuse the unit is inoperative, service is required; contact your JBL Synthesis dealer.

WARNING: Always unplug the amplifier from the AC mains before removing any fuse. 

IMPORTANT: Never install a fuse that has a higher rating than that specified on the back panel of the amplifier or in the owner's manual. 

7. Manual On/Auto On Switch

Put this switch in the **Auto On** position if the amplifier is being used as part of a JBL Synthesis system. When used in this way, the S5160 will automatically turn on when the Power switch is depressed and the surround processor is activated. For other installations, or should individual control of each component be desired, put this switch in the **Manual On** position. The amplifier will then be controlled solely by the front-panel switch.

8. In/Out DIN Jacks

If you are using the amplifier as part of a JBL Synthesis system, it is necessary to use these jacks to interconnect to other system components so that control signals (Power On/Off and Music/Cinema mode switching) can be transmitted from one unit to the next, starting at the surround processor, through the equalizer and amplifiers, and ending at the speakers. Follow the connection diagrams on the following pages for detailed information regarding these connections. Make connections to these jacks only as shown in the diagrams. If these jacks are used in any other manner, e.g., to control electric screens, the unit can be damaged and the warranty will be void. For specific electrical information on these jacks, contact JBL Synthesis Customer Service at 516.255.4JBL.

Do not plug anything into these jacks if you are not using the S5160 with a JBL Synthesis system.

9. Speaker Mode Control Connectors

The front left and front right speakers are switched between Music and Cinema modes by signals present at both the DIN connectors (as described in Section 8) AND the two-conductor connectors shown at 9.

The installer may find it preferable to use two-conductor wire (18-gauge recommended) rather than long multi-conductor DIN cables for the mode-switching connection between the S5160 and these two speakers. Adaptors supplied with the S5160 are used at the speaker end of the wire to allow connection to the speakers' DIN input connectors. Proper polarity must be observed, as shown in the wiring diagrams; reverse the connections at one end of the wire if the speaker(s) do not switch modes – from horn (Cinema) to tweeter (Music).

Note that five-conductor DIN cables MUST be used between all other components to allow correct power and mode switching, and that the same warning not to plug anything into these jacks if you are not using the S5160 with a JBL Synthesis system applies here; do not attempt to use these jacks to control anything other than the mode-switching function of JBL Synthesis speakers, as this may damage the S5160 and will void the warranty.

10. AC Inlet

Your S5160 is shipped with an IEC-type removable power cord that mates with the AC inlet on the rear panel. To ensure proper operation, use the supplied power cord. This amplifier is **NOT a multivoltage unit**; using a power cord that is not compatible with a 120V, 60Hz AC wall receptacle will void the warranty.

General Information

A Synthesis One installation utilizing the benefits of bi-amplification of the front speakers incorporates a total of four power amplifiers; two S5160's, and two S800's. Eight of the 10 channels on the S5160's are to be used for driving the high-frequency and low-frequency inputs on the left, center and right speakers, as well as the two side ambient speakers, as indicated in the chart on page 8. Please also refer to the connection diagram on page 14.

Use the simplified connection diagrams on the following pages to help you understand how to connect the S5160 amplifier to a JBL Synthesis system. These diagrams are intended to show the signal flow through the system. For more detail in making these connections, please refer to the JBL Synthesis Certified Dealer Installation Manual.

Connect DIN and audio cables between system components, as shown on the following pages. Make sure that on all power amplifiers the Power switches are in the depressed (ON) position and that the **Manual On/Auto On** switches **7** are in the **Auto On** position. Operated in this mode, all of the components will turn on with one touch of the Power switch on the surround processor's remote control.

4.1 JBL SYNTHESIS ONE: SUGGESTED RACK-MOUNTING ORDER



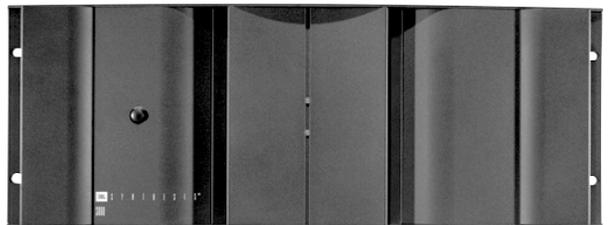
Top
 #1

SDP-40



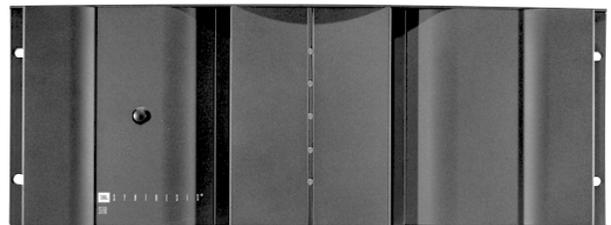
#2

SDEC-1000A



#3

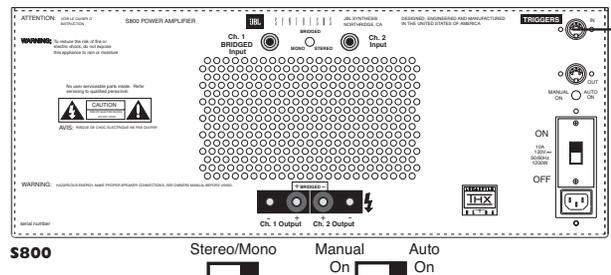
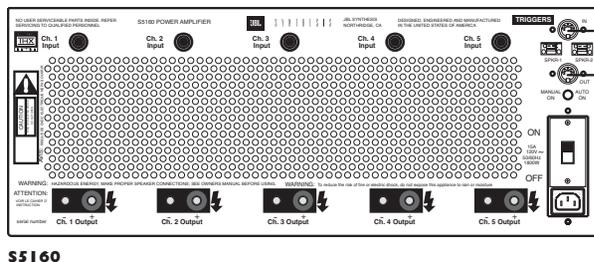
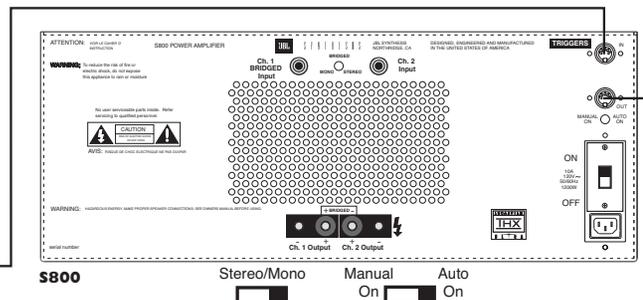
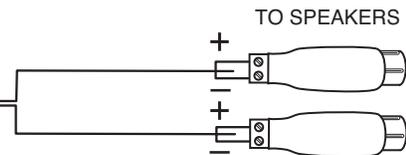
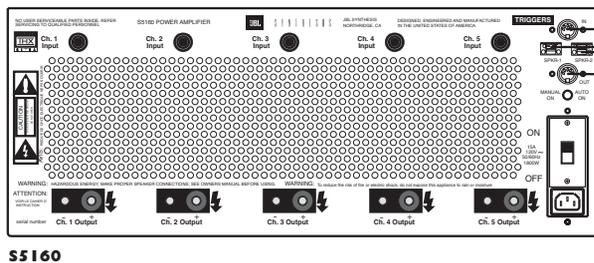
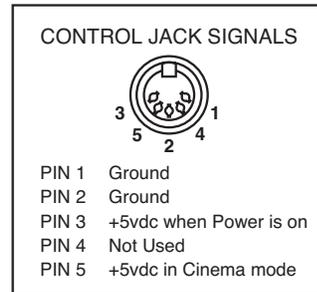
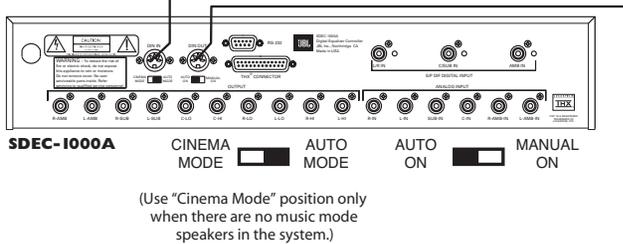
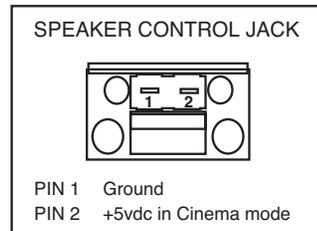
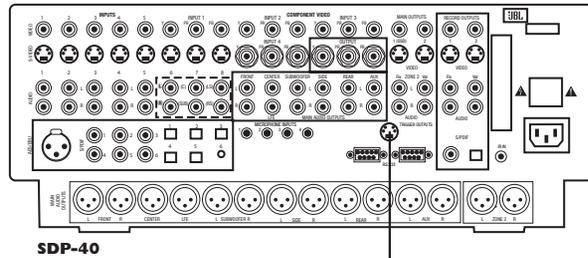
S800



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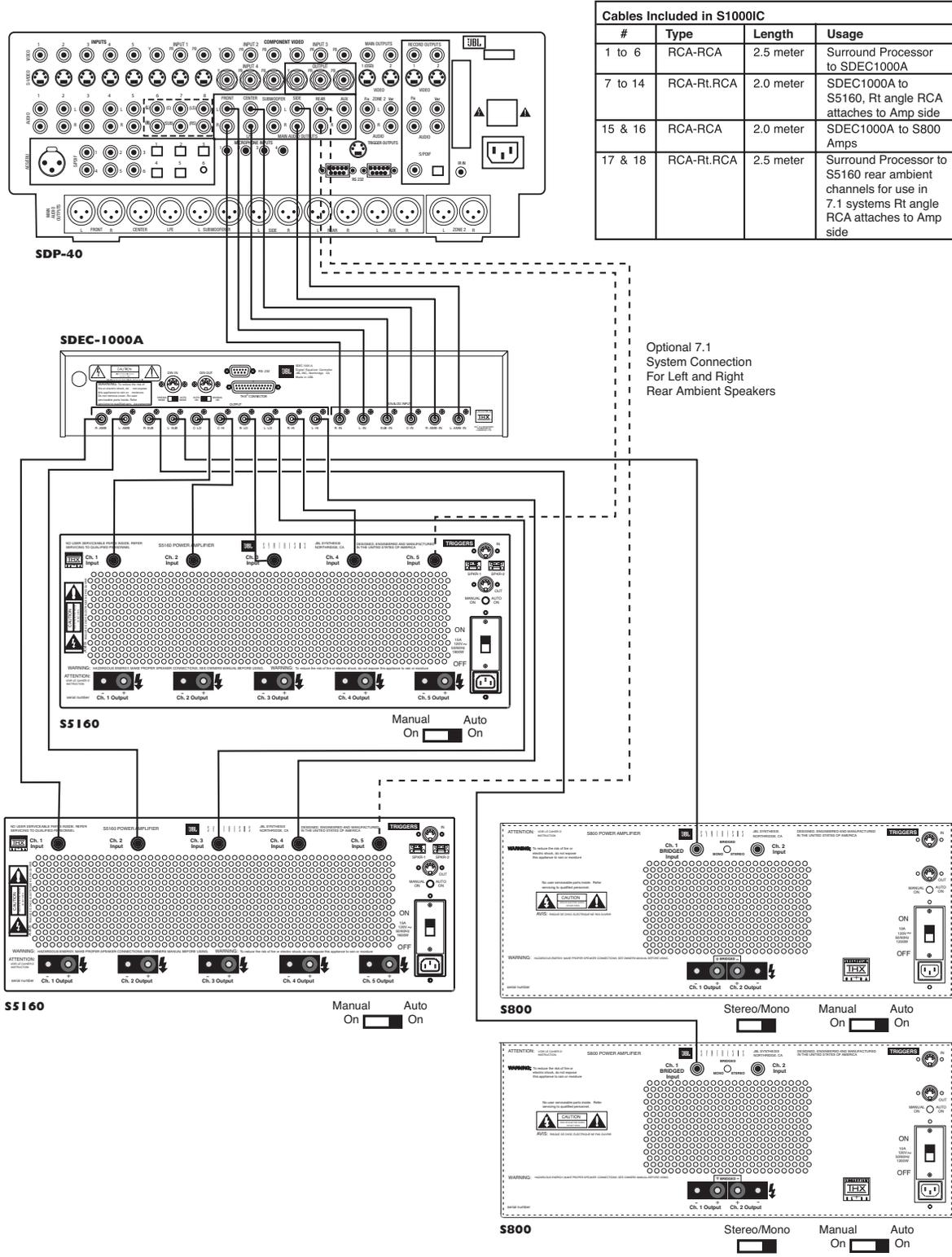
S5160

4.2 JBL Synthesis One: Control Wiring Diagram



- NOTES**
- 1) To ensure proper operation, connect the system control lines exactly as indicated.
 - 2) If any of the control lines become disconnected while the system is on, turn off all Synthesis components before reconnecting control lines. This will reset all operation.

4.3 JBL Synthesis One: Interconnection Diagram



Installation of the S5160 is a straightforward process.

IMPORTANT: The amplifier must be installed following the directions described below. To ensure adequate performance and safety, never install the amplifier with less free space around the amplifier than that specified. 

IMPORTANT: For rack mounting, we recommend using 10-32, 1"-long screws. 

NOTE: Heavy equipment should not be supported solely by the front mounting locations. It is recommended that additional rear support be used.

- 1. The S5160 power amplifier has been designed to be mounted in EIA standard racks or stacked freestanding as long as there is 4 inches (10cm) of free space around the amplifier (top, sides and rear). If the S5160 is being mounted in a rack, it is suggested that its feet be removed prior to installation. If the S5160 will be stacked with other components, use the feet that came attached to the unit. This will ensure that there is sufficient air space underneath so that heat can be dissipated effectively.*
- 2. Make sure that the amplifiers are located in a well-ventilated, cool area. Be certain that the front and rear panels are not obstructed, as the cooling fan brings air in from the front and expels it at the rear. It is very important not to obstruct the airflow from the center front panel; heat buildup and premature failure may occur.*

Problem: Amplifier does not turn on. Neither the red nor blue indicator lights are on.

Make sure that the amplifier is plugged in, and verify that there is the proper voltage (120V) at the wall outlet.

Problem: The red indicator lights, but the blue indicators do not light up when the Power switch is depressed.

1. If the amplifier is being used in a Synthesis system, make sure that the surround processor is turned on, the Manual On/Auto On switch is in the Auto On position, and that all of the necessary DIN cables are connected between the various system components. Refer to the "CONNECTING YOUR JBL SYNTHESIS SYSTEM" section for reference.
2. If the amplifier is not being used with a Synthesis system, make sure that the Manual On/Auto On switch is in the Manual On position.

Problem: There is no sound from the speakers, but the amplifier is on (blue indicators lit).

1. Make sure that the surround processor or equalizer is on, and that the correct source has been connected and selected.
2. Make sure that the correct outputs are connected from the surround processor or equalizer to the amplifier.
3. Make sure that the speakers are connected to the correct terminals. Check for short circuits at both ends of the speaker cables.

Problem: Not all of the amplifiers turn on in a Synthesis system.

1. Make sure that all required DIN cables are connected between system components. Refer to the "CONNECTING YOUR JBL SYNTHESIS SYSTEM" section.
2. Make sure that each amplifier has its Manual On/Auto On switch in the Auto On position.

Problem: Insufficient audio from the speakers.

Check that the output levels of the surround processor or equalizer are set properly.

Problem: Insufficient bass.

Verify that the speakers have been wired to the amplifier with the correct polarity.

Problem: Front speakers do not switch from Music to Cinema mode.

1. Make sure that the screw terminal and DIN adaptor cables to speakers are correctly wired and are connected to the correct jacks on the S5160.
2. Make sure that all required DIN cables are connected between system components.

Problem: Audible hum from the speakers.

1. Check the power outlets and make sure that there is a solid earth ground present. (The services of an electrician may be required.)
2. Make sure that all signal cables are routed away from power cords.
3. If these suggestions fail, experiment by running ground wires between the rear-panel screws of the amplifiers and the other system components, such as the surround processor or signal processing package.

If you still encounter difficulty after trying the above suggestions, call your JBL Synthesis Authorized Dealer or JBL Synthesis at 516.255.4JBL, or visit our Web site at www.jblsynthesis.com, for further assistance.

SPECIFICATIONS

7.0

Rated Power Output	<i>160W per channel into 8 ohms, all channels driven</i>
THD	<i>< 0.03%, 20Hz – 20kHz</i>
Input Impedance	<i>>28k ohms</i>
Sensitivity	<i>1V in = 28.28V out (THX Level)</i> <i>1.25V in = 150 watts out</i>
Frequency Response (at 1W)	<i>20Hz – 20kHz, + 0, – 0.25dB</i>
S/N Ratio (A-weighted at rated power)	<i>≥ 100dB</i>
Damping Factor	<i>≥ 400</i>
Power Bandwidth 1% THD	<i>5Hz – 100kHz, + 0, – 3dB</i>
Intermodulation Distortion	<i>0.03%</i>
Dimensions (H x W x D)	<i>7" x 19" x 19-1/2" (178mm x 484mm x 495mm)</i>
Net Weight	<i>97 lb (44kg)</i>
Packaged Weight	<i>111 lb (50kg)</i>
All features and specifications are subject to change without notice.	



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