POWER-TECH™ .1 Series

REFERENCE MANUAL

Models:
Power-Tech 1.1, 2.1 & 3.1

Some models may be exported under the name *Amcron*®

Obtaining Other Language Versions:
To obtain information in another language about the use of this product, please contact your local Crown Distributor. If you need assistance locating your local distributor, please contact Crown at 219-294-8200.

Note: The information provided in this manual was deemed accurate as of the publication date. However, updates to this information may have occurred. To obtain the latest version of this manual, please visit the Crown website at www.crownaudio.com.

A Harman International Company

132800-1
6/01

THREE YEAR FULL WARRANTY

WORLDWIDE

SUMMARY OF WARRANTY

The Crown Audio Division of Crown International, Inc., 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown[1] product, for a period of three (3) years from the date of purchase by the original purchaser (the "warranty period") that the new Crown product is free of defects in materials and workmanship, and we further warrant the new Crown product regardless of the reason for failure, except as excluded in this Crown Warranty.

[1] *Note: If your unit bears the name "Amcron," please substitute it for the name "Crown" in this warranty.*

ITEMS EXCLUDED FROM THIS CROWN WARRANTY

This Crown Warranty is in effect only for failure of a new Crown product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, accident, negligence, or loss which is covered under any of your insurance contracts. This Crown Warranty also does not extend to the new Crown product if the serial number has been defaced, altered, or removed.

WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers. We will remedy the defect and ship the product from the service center within a reasonable time after receipt of the defective product at our authorized service center.

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service not later than ninety (90) days after expiration of the warranty period. All components must be shipped in a factory pack. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by our authorized service center. If the repairs made by our authorized service center are not satisfactory, notify our authorized service center immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE NEW CROWN PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT.

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this Crown Warranty. This Crown Warranty is not extended by the length of time which you are deprived of the use of the new Crown product. Repairs and replacement parts provided under the terms of this Crown Warranty shall carry only the unexpired portion of this Crown Warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

No action to enforce this Crown Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS.

9/90

Telephone: 219-294-8200. Facsimile: 219-294-8301

NORTH AMERICA

SUMMARY OF WARRANTY

The Crown Audio Division of Crown International, Inc., 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown product, for a period of three (3) years from the date of purchase by the original purchaser (the "warranty period") that the new Crown product is free of defects in materials and workmanship. We further warrant the new Crown product regardless of the reason for failure, except as excluded in this Warranty.

ITEMS EXCLUDED FROM THIS CROWN WARRANTY

This Crown Warranty is in effect only for failure of a new Crown product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, accident, negligence, or loss which is covered under any of your insurance contracts. This Crown Warranty also does not extend to the new Crown product if the serial number has been defaced, altered, or removed.

WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at the factory. We will remedy the defect and ship the product from the service center or our factory within a reasonable time after receipt of the defective product at our authorized service center or our factory. All expenses in remedying the defect, including surface shipping costs in the United States, will be borne by us. (You must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other customs fees for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service not later than ninety (90) days after expiration of the warranty period. All components must be shipped in a factory pack, which, if needed, may be obtained from us free of charge. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by us or our authorized service center. If the repairs made by us or our authorized service center are not satisfactory, notify us or our authorized service center immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE NEW CROWN PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT. **SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.**

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this Crown Warranty. This Crown Warranty is not extended by the length of time which you are deprived of the use of the new Crown product. Repairs and replacement parts provided under the terms of this Crown Warranty shall carry only the unexpired portion of this Crown Warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

THIS CROWN WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. No action to enforce this Crown Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS.

Telephone: 219-294-8200. Facsimile: 219-294-8301 9/90

The information furnished in this manual does not include all of the details of design, production, or variations of the equipment. Nor does it cover every possible situation which may arise during operation or maintenance. If you need special assistance beyond the scope of this manual, please contact your authorized Crown representative or our Technical Support Group.

Crown Technical Support Group

Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, Indiana 46517 U.S.A.

Phone: **800-342-6939** (North America, Puerto Rico and Virgin Islands) or 219-294-8200

Fax: 219-294-8301 Internet: http://www.crownaudio.com

IMPORTANT

THE POWER-TECH 1.1 AND 2.1 REQUIRE CLASS 2 OUTPUT WIRING. THE POWER-TECH 3.1 REQUIRES CLASS 1 WIRING IF USED IN THE BRIDGE MONO OR PARALLEL MONO MODES.

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

TO PREVENT ELECTRIC SHOCK DO NOT REMOVE TOP OR BOTTOM COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. DISCONNECT POWER CORD BEFORE REMOVING BACK PANEL COVER TO ACCESS GAIN SWITCH.

AVIS

RISQUE DE CHOC ÉLECTRIQUE N'OUVREZ PAS

À PRÉVENIR LE CHOC ÉLECTRIQUE N'ENLEVEZ PAS LES COUVERTURES. RIEN DES PARTIES UTILES À L'INTÉRIEUR. DÉBRANCHER LA BORNE AVANT D'ENLEVER LA COVERTURE EN ARRIÈRE.

WARNING

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE!

Magnetic Field

CAUTION! Do not locate sensitive high-gain equipment such as preamplifiers or tape decks directly above or below the unit. Because this amplifier has a high power density, it has a strong magnetic field which can induce hum into unshielded devices that are located nearby. The field is strongest just above and below the unit.

If an equipment rack is used, we recommend locating the amplifier(s) in the bottom of the rack and the preamplifier or other sensitive equipment at the top.

Lightning Bolt Symbol:

This symbol is used to alert the user to the presence of dangerous voltages and the possible risk of electric shock.

Exclamation Mark Symbol:

This symbol is used to alert the user to refer to the instruction manual for important operating or maintenance instructions.

Printed on recycled paper.

Important Safety Instructions

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 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 is 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 a cart, stand, 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) To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

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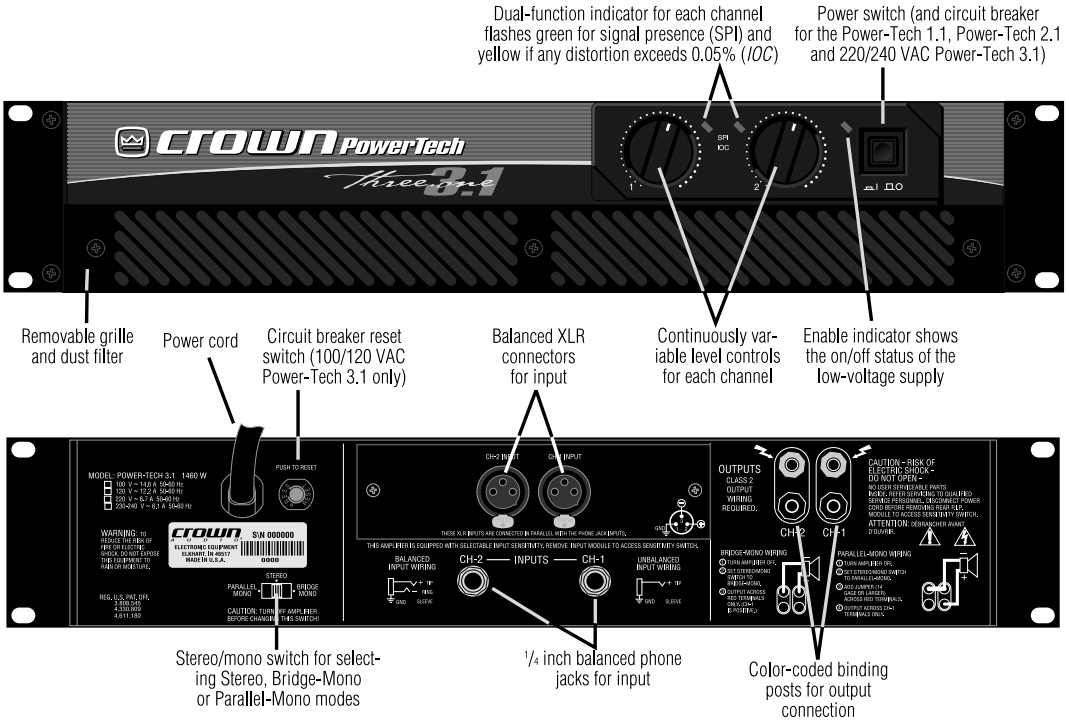
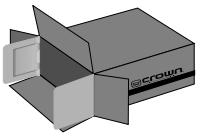


Fig. 1.1 Power-Tech .1 Series Front and Back Panels

1 Welcome

Congratulations on purchasing a Crown *Power-Tech™ .1 Series* amplifier. Power-Tech .1 Series amplifiers are compact, professional stereo power amplifiers engineered to meet the most demanding sound reinforcement needs. They compare very favorably to more expensive amplifiers, providing uncolored sound and signal-to-noise ratios commonly associated with recording studios.

This manual will help you successfully install and use your amplifier—we strongly recommend you read all instructions, warnings and cautions. If you plan to operate in one of the two mono modes, be sure to read the Mono section. Also for your protection, please save your bill of sale since it is your **official proof of purchase.**



1.1 Unpacking

Please unpack and inspect your new amplifier for any damage that may have occurred during transit. If damage is found, notify the transportation company immediately. Only you may initiate a claim with the carrier for shipping damage. Even if the unit arrived in perfect condition, as most do, save all packing materials so you will have them if you ever need to transport the unit. **NEVER SHIP THE UNIT WITHOUT THE FACTORY PACK.**

1.2 Features

- ❏ Rugged, professional power amplifier built for the road. Mounts in EIA standard 19-inch (48.3-cm) rack.
- ❏ Quick-access front panel power switch and level controls. Turn-on delay for loudspeaker protection.
- ❏ The patented *ODEP®* circuitry and *Grounded Bridge™* design combine to provide performance and reliability that surpass all traditional designs.
- ❏ Easy to read signal presence (SPI) and distortion (*IOC®*) indicator for each channel.
- ❏ High damping factor provides superior control over low-frequency drivers for a clean, accurate low end.
- ❏ Safe with any load. Bridge-Mono and Parallel-Mono modes make it easy to optimize the amplifier's performance for a wide range of loads.
- ❏ Complete protection against shorted outputs, mismatched loads, overheating, input/output DC and high-frequency overload; full internal fault protection.
- ❏ Balanced phone jack inputs in parallel with XLR input connectors. Barrier block input connectors are optional.
- ❏ Efficient heat sinks and self-contained forced-air cooling system dissipate heat quickly and evenly for extra amplifier protection and greater output power.
- ❏ The ONLY three-year, no-fault, fully transferrable warranty.

2 Installation

Always remove power from the unit and turn the level controls off (fully counterclockwise) when making or breaking connections. This reduces the chance of blasts that can cause loudspeaker damage.

The guidelines below are provided to help you quickly get your amplifier installed and ready to go. Be sure to follow the instructions in Sections 2.1 and 2.2 for the selected mode of operation. Additional information on input sensitivity, load protection and required AC mains is provided in Sections 2.3, 2.4 and 2.5.

1. Install the amplifier in an EIA standard 19-inch (48.3-cm) rack or place it on a stable surface. Your amplifier is 19 inches (48.3 cm) wide, 3.5 inches (8.9 cm) tall and 16 inches (40.6 cm) deep behind the mounting surface. **IMPORTANT: Make sure the unit has adequate ventilation.**

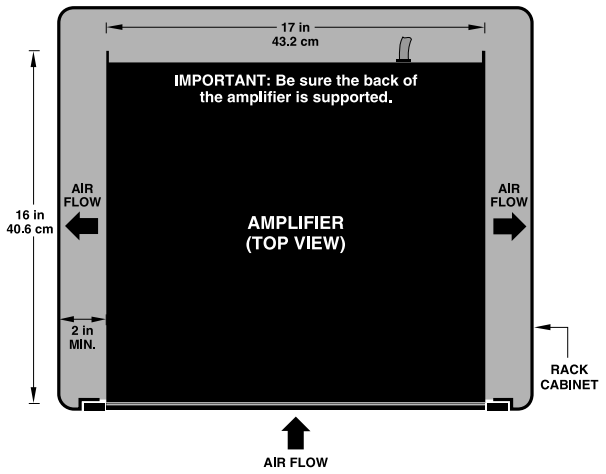


Fig. 2.1 Do NOT Block Air Flow

2. Use high-quality loudspeaker cables to connect the load to the amplifier's outputs. Do not use shielded cable.
3. Use shielded cables to connect audio sources to the amplifier inputs. Either balanced or unbalanced wiring and ¼-inch phone or XLR connectors can be used as shown below. Note that unused input connector pairs can be used to daisy chain an input signal from one amplifier to another.

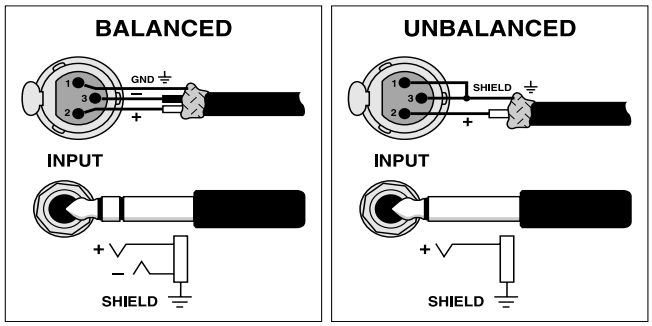


Fig. 2.2 Power-Tech .1 Series Input Wiring

2.1 Stereo Mode

1. Turn down the level controls (fully counterclockwise) and turn off the amplifier.
2. Set the back panel stereo/mono switch to Stereo.
3. If present, remove the Parallel-Mono jumper.
4. Connect the input and output cables as shown in the first example in Figure 2.3.
5. Turn on the amplifier and adjust the level for each channel with the front panel controls.

CAUTION: Never parallel the two outputs by directly tying them together, and never parallel them with the output of another amplifier.

2.2 Mono Modes

Your amplifier's mono modes provide double the power of Stereo mode in a single channel. In Bridge-Mono mode, the outputs are wired in series for twice the output voltage. In Parallel-Mono mode, the outputs are paralleled for twice the current capacity.

Bridge-Mono mode is provided for loads with an impedance greater than 4 ohms. Parallel-Mono mode should be used with loads of 4 ohms or less.

BRIDGE-MONO

1. Turn down the level controls (fully counterclockwise) and turn off the amplifier.
2. Set the back panel stereo/mono switch to Bridge-Mono.
3. If installed, remove the Parallel-Mono jumper wire.
4. Connect the input and output cables as shown in the second example in Figure 2.3. **Only use the Channel 1 input.**
5. Make sure the load is balanced (neither side shorted to ground) and do not use the black (–) binding posts.
6. Turn on the amplifier and adjust the level. **Only use the Channel 1 level control.**

PARALLEL-MONO

CAUTION: Parallel-Mono wiring requires installation of a jumper wire. Do not switch to Stereo or Bridge-Mono mode until this output jumper wire is removed.

IMPORTANT: The Channel 2 IOC indicator will remain lit when operating in Parallel-Mono mode.

1. Turn down the level controls (fully counterclockwise) and turn off the amplifier.
2. Set the back panel stereo/mono switch to Parallel-Mono.
3. Install a solid, 14-gauge (2-mm^2) or heavier jumper wire across the two red (+) binding post outputs.
4. Connect the input and output cables following the third example in Figure 2.3. **Only use the Channel 1 input.**
5. Turn on the amplifier and adjust the level. **Only use the Channel 1 level control.**

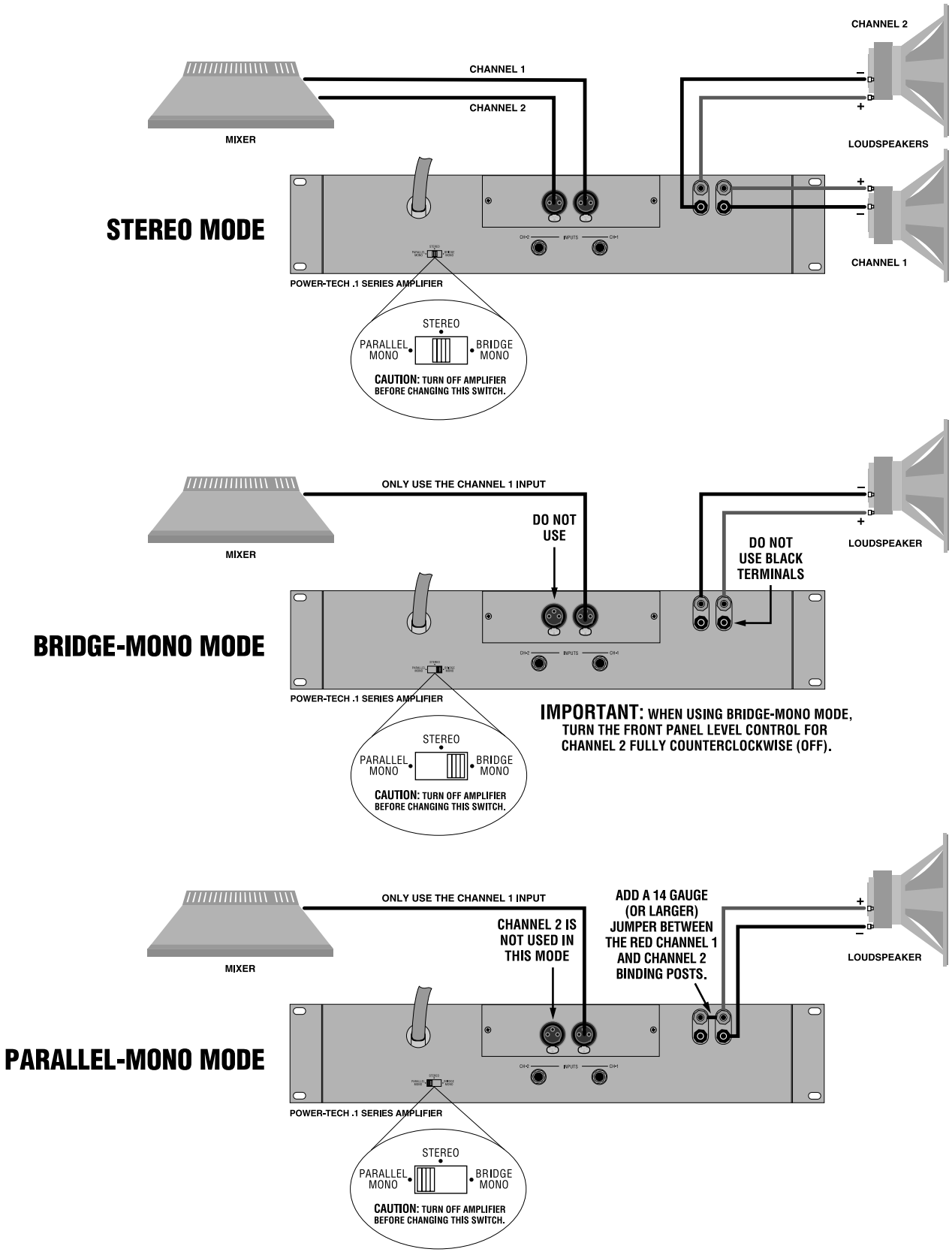


Fig. 2.3 Three System Connection Methods

2.3 Input Sensitivity Adjustment

The input sensitivity switch inside the amplifier is set to 0.775 volts RMS at the factory.* It can be changed to 1.4 volts RMS or a voltage gain of 26 dB as follows:

1. Turn off and unplug the amplifier from the AC source.
2. Remove the input module on the back panel.
3. Locate the labeled access hole for the sensitivity switch.
4. Set the switch to the desired position.
5. Replace the input module.

When set to 26-dB gain, the Power-Tech 1.1 requires a 2.1-volt input, the Power-Tech 2.1 requires a 2.6-volt input and the Power-Tech 3.1 requires a 3.3-volt input to deliver full output into an 8-ohm load.

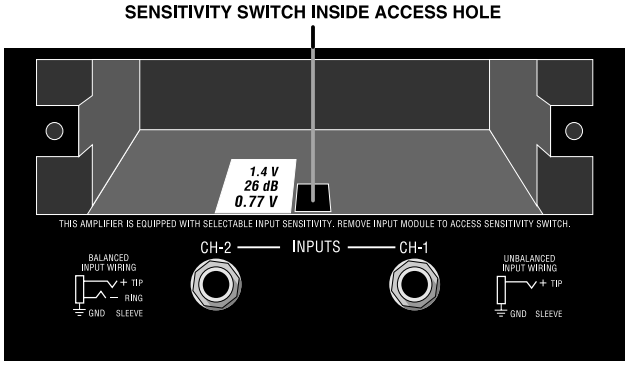


Fig. 2.4 Input Sensitivity Switch

2.4 Additional Load Protection

To protect against excessive power, a fuse can be added in series with each loudspeaker cable. A single fuse can protect the entire system, or one can be used for each driver. High-frequency drivers (tweeters) are usually more sensitive to large voltage peaks, while low-frequency drivers (woofers) are typically most sensitive to the heat from average (RMS) output power. To protect your tweeters, we recommend that you use a high-speed instrument fuse like the Littlefuse 361000 series. To protect your woofers, we recommend using a slow-blow fuse that more closely represents the thermal response of your woofer. Use Figure 2.5 to find the correct value for either type of fuse.

Example: (A) Choose the peak music power for the loudspeaker (such as 75 watts). (B) Find the loudspeaker impedance (8 ohms). (C) Draw a line between points A and B. The line intersects the middle scale at the correct fuse value (1.5 amps).

2.5 Required AC Mains

All Power-Tech .1 Series amplifiers are shipped with an appropriate line cord and plug. The standard cord and plug for each model are listed by country (or region) in Figure 2.6. When possible, use a power receptacle on a dedicated circuit, and always make sure it will provide the right voltage with sufficient current. We do not recommend operating your amplifier with voltages greater than 10% above or below the unit's rated voltage. For example, if your amplifier is rated for 120 VAC, the line voltage should not exceed 132 VAC.

* Factory setting for international models is 1.4 V.

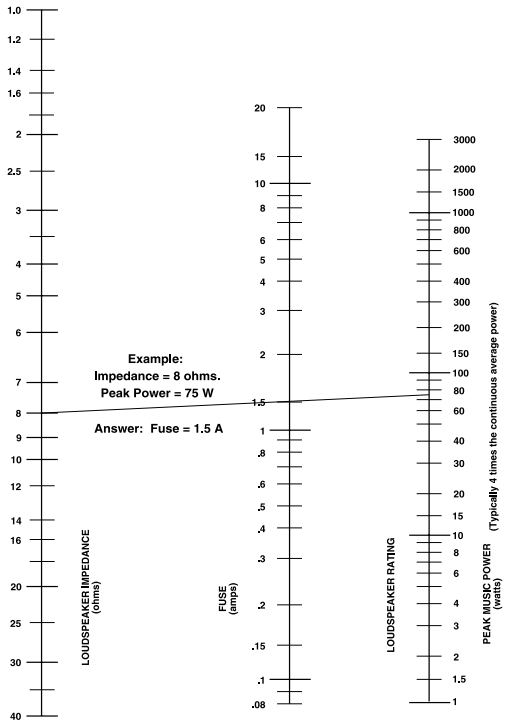


Fig. 2.5 Loudspeaker Fuse Nomograph

Country or Region	Power-Tech 1.1		Power-Tech 2.1		Power-Tech 3.1	
	Cord	Plug	Cord	Plug	Cord	Plug
Australia, New Zealand	1.5 mm²	AS 3112 10 A	1.5 mm²	AS 3112 10 A	1.5 mm²	AS 3112 15 A
Austria, China, Denmark, Finland, France, Germany, Greece, Holland, Indonesia, Italy, Korea, Malaysia, Portugal, Spain, Sweden, Switzerland,	1.5 mm²	CEE 7/7	1.5 mm²	CEE 7/7	1.5 mm²	CEE 7/7
Brazil, Central America, Guam, Hong Kong, Jamaica, Japan, North America, Peru, Phillipines, Singapore, Tahiti, Taiwan, Thailand, Venezuela	14/3 SJT	NEMA 5-15P	14/3 SJT	NEMA 5-15P	14/3 SJT	NEMA 5-15P
India, South Africa	1.5 mm²	BS 546	1.5 mm²	BS 546	1.5 mm²	BS 546
Ireland, Norway, United Kingdom, United Arab Emirates	1.5 mm²	BS 1363	1.5 mm²	BS 1363	1.5 mm²	BS 1363
Argentina	1.0 mm²	IRAM	1.0 mm²	IRAM	1.5 mm²	IRAM

Fig. 2.6 AC Mains Cords and Plugs

3 Operation

3.1 Precautions

Although your amplifier is protected from external faults, the following safety precautions are recommended:

1. There are important differences among the Stereo, Bridge-Mono and Parallel-Mono operating modes. Please refer to Section 2 for additional information.
2. **WARNING: Do not change the position of the stereo/mono switch unless the amplifier is first turned off.**
3. **CAUTION: In Parallel-Mono mode, a jumper is used to connect the red binding post outputs. Be sure to remove this jumper for Bridge-Mono or Stereo mode, or high distortion and excessive heating will occur.** Also, make sure the stereo/mono switch is set to the proper position.
4. Use care when making connections, selecting signal sources and controlling the output level. The load you save may be your own!
5. Do not short the ground lead of an output cable to the input signal ground. This will form a ground loop and may cause oscillations.
6. Operate the amplifier from AC mains of not more than 10% variation above or below the selected line voltage and only the specified line frequency.
7. **Never connect the output to a power supply output, battery or power main.** Such connections may result in electrical shock.
8. Tampering with the circuitry by unqualified personnel or making unauthorized circuit changes may be hazardous and invalidates all agency listings.

Remember: Crown is not liable for any damage that results from overdriving other system components.

3.2 Indicators

When lit, the red **enable** indicator shows that the amplifier has been turned on. It is driven only by the low-voltage power supply and does not indicate the status of the high-voltage supplies.

The **SPI/IOC** indicators flash green in sync with the audio input signal, and flash yellow if the input waveform differs from the output by more than 0.05%. IOC reports any distortion over 0.05% introduced by the amplifier including harmonic distortion, intermodulation distortion and clipping distortion.

3.3 Protection Systems

Power-Tech .1 Series amplifiers have extensive protection systems, including ODEP, ultrasonic/RF protection, drive protection, transformer thermal protection and fuses or circuit breakers to protect the power supplies.

3.3.1 ODEP

Crown invented ODEP to keep the amplifier working under demanding conditions and to increase output efficiency. To do this, Crown established a rigorous program to measure each transistor's *safe operating area* (SOA). Intelligent circuitry was then designed to simulate the instantaneous conditions of the output transistors. Its name describes what it does: Output Device Emulation Protection, or ODEP. In simple terms, ODEP compares transistor conditions to their known SOA. If more power will be asked of them than they can deliver under the existing conditions, ODEP limits the drive until conditions fall within the SOA. Limiting is proportional and kept to an absolute minimum—only what is required to prevent output transistor damage. Under normal conditions, no limiting is required and ODEP is transparent to the audio signal.

ODEP makes possible a quantum leap in output efficiency and reliability—with ODEP, the show goes on.

3.3.2 Ultrasonic and Radio Frequency Protection

An amplifier's slew rate only needs to be large enough to deliver the maximum voltage at the highest required frequency. Higher slew rates actually allow undesirable ultrasonic and radio frequencies to be reproduced. By design, Power-Tech .1 Series amplifiers have a controlled slew rate to limit the highest frequencies that they reproduce. Limiting occurs well above 20 kHz, so there is no audible effect on performance. This approach protects the amplifier from radio frequencies and can even protect some sensitive loads (including some tweeters).

3.3.3 Drive Protection

The drive protection system temporarily removes output drive to protect the amplifier and its loads. Drive protection can be activated in two situations. First, if dangerous infrasonic frequencies or direct current (DC) is detected in the amplifier's output, the unit will activate its DC/low-frequency protection circuitry which puts the amplifier in drive protection mode. This protects the loads and prevents oscillations. The unit resumes normal operation as soon as the amplifier no longer detects dangerous output. Although it is extremely unlikely that you will ever activate the amplifier's DC/low-frequency protection system, improper source materials like infrasonic square waves or input overloads that excessively clip the input signal can activate this system.

The amplifier's fault protection system will put the amplifier in drive protection mode in rare situations where heavy common-mode current is detected in the output. The unit should never output heavy common-mode current unless its circuitry is damaged. Activating drive protection helps prevent further damage.

3.3.4 Transformer Thermal Protection

All Power-Tech .1 Series amplifiers have transformer thermal protection. This protection circuitry is activated in unusual situations where the unit's transformer temperature rises to unsafe levels. Under these abnormal conditions, the unit removes power to the high-voltage transformer. The fan will continue to run in all units except those with 220/240 VAC transformers. The amplifier will return to normal after it cools to a safe temperature.

It is very unlikely that your Power-Tech .1 Series amplifier will ever activate transformer thermal protection as long as it is operated within rated conditions. Your amplifier is designed to keep working under conditions where other amplifiers would fail. But even when you exceed the limits of a Power-Tech .1 Series amplifier, it still protects itself—and your investment—from damage.

3.3.5 Fuses and Circuit Breakers

Your amplifier's low-voltage power supply is protected by an internal fuse, and its high-voltage power supplies are protected by a circuit breaker. The circuit breaker is built into the power switch for all Power-Tech 1.1, Power-Tech 2.1 and 220/240 VAC Power-Tech 3.1 amplifiers. The circuit breaker is located on the back panel of 100/120 VAC Power-Tech 3.1 amplifiers. With rated loads and output levels, the circuit breaker will only shut down the amplifier in the incredibly rare instance of a catastrophic amplifier failure. Other protection systems such as ODEP keep the amplifier operational under most other severe conditions. The breaker can also shut down the amplifier in situations where extremely low-impedance loads and high output levels result in current draw that exceeds the breaker rating. Again, this should only be possible when *operating outside rated conditions*, like when the amplifier is used to drive a 1 ohm load, or when driving a severely clipped signal.

A Power-Tech .1 Series amplifier will not blow its fuse or trip its breaker unless something is wrong. In the rare event that an internal fuse blows, please refer the unit to a qualified technician. If a breaker trips, try to identify and correct the problem before resetting the breaker. The breaker for the Power-Tech 1.1 and 2.1 can be reset using the front panel **power switch.** The circuit breaker for a Power-Tech 3.1 can be reset using the back panel **reset switch.** If the problem persists, refer the unit to an authorized Crown Service Center.

3.4 Controls

The **power switch** and **level controls** are located on the front panel so you can easily turn the amplifier on or off and adjust the amplifier's output level. When making any setup or wiring changes, don't forget to turn the amplifier off, turn the level controls down and disconnect the power cord. The **stereo/mono switch** on the back panel is used to select Stereo, Bridge-Mono or Parallel-Mono operating modes. Be sure to leave Channel 2 turned down when using either mono mode. The **input sensitivity switch** located behind the input module is used to set the amplifier's input sensitivity (see Section 2.3 for information on changing this switch). And the Power-Tech 3.1 has a back panel **reset switch** that is used to reset the circuit breaker that protects the power supplies.

3.5 Filter Cleaning

A dust filter is provided on the unit's air intake. If it becomes clogged, the unit will cool less efficiently and may produce lower output levels. To clean the filter, use a Phillips screwdriver to remove the three screws that secure the front grille. Use mild dishwashing detergent and warm water for best cleaning results. Be sure the filter is dry before you reinstall it. Replacement filters may be ordered from the factory.

Dust filters are not 100% efficient—depending on the local environment, the internal heat sinks of the amplifier will benefit from periodic cleaning by a qualified technician. Internal cleaning information is available from our Technical Support Group.

4 Specifications

The following applies to units in Stereo mode with 8-ohm loads and an input sensitivity of 26 dB unless otherwise specified.

Standard 1 kHz Power: refers to maximum average power in watts at 1 kHz with 0.1% THD.

Full Bandwidth Power: refers to maximum average power in watts from 20 Hz to 20 kHz with 0.1% THD.

120 VAC, 60 Hz Units: refers to amplifiers with dedicated transformers for 120 VAC, 60 Hz power mains.

International Units: refers to amplifiers with special multi-tap transformers that make them configurable for several AC mains voltages and line frequencies.

Performance

Frequency Response: ±0.1 dB from 20 Hz to 20 kHz at 1 watt.

Phase Response: ±10 degrees from 10 Hz to 20 kHz at 1 watt.

Signal-to-Noise: A-weighted, better than 105 dB below full bandwidth power. Better than 100 dB below full bandwidth power from 20 Hz to 20 kHz.

Total Harmonic Distortion (THD): Less than 0.05% at full bandwidth power from 20 Hz to 1 kHz increasing linearly to 0.1% at 20 kHz.

Intermodulation Distortion (IMD): (60 Hz and 7 kHz 4:1) Less than 0.05% from less than 171 milliwatts to full bandwidth power.

Damping Factor: Greater than 1,000 from 10 Hz to 400 Hz.

Crosstalk
Power-Tech 1.1: Greater than 75 dB below full bandwidth power from 50 Hz to 2 kHz, rising linearly to greater than 60 dB at 20 kHz.
Power-Tech 2.1: Greater than 90 dB below full bandwidth power from 50 Hz to 2 kHz, rising linearly to greater than 66 dB at 20 kHz.
Power-Tech 3.1: Greater than 90 dB below full bandwidth power from 50 Hz to 4 kHz, rising linearly to greater than 70 dB at 20 kHz.

Controlled Slew Rate: Greater than 13 volts/ms.

Voltage Gain: 20:1 ±6% or 26 dB ±0.5 dB at the maximum level setting.
Power-Tech 1.1: 54:1 ±6% or 35 dB ±0.5 dB at 0.775-volt sensitivity; 30:1 ±6% or 30 dB ±0.5 dB at 1.4-volt sensitivity.
Power-Tech 2.1: 66:1 ±6% or 36 dB ±0.5 dB at 0.775-volt sensitivity; 36:1 ±6% or 31 dB ±0.5 dB at 1.4-volt sensitivity.
Power-Tech 3.1: 84:1 ±6% or 38 dB ±0.5 dB at 0.775-volt sensitivity; 46:1 ±6% or 33 dB ±0.5 dB at 1.4-volt sensitivity.

Power

Output Power: The following specifications are guaranteed minimums for standard 1 kHz power from 120 VAC, 60 Hz North American units. For international power specifications see the matrices that follow.

Power-Tech 1.1
Stereo mode (both channels driven):
305 watts into 4 ohms.
220 watts into 8 ohms.
Bridge-Mono mode:
605 watts into 8 ohms.
445 watts into 16 ohms.
Parallel-Mono mode:
605 watts into 2 ohms.
440 watts into 4 ohms.

Power-Tech 2.1
Stereo mode (both channels driven):
460 watts into 4 ohms.
325 watts into 8 ohms.
Bridge-Mono mode:
910 watts into 8 ohms.
660 watts into 16 ohms.
Parallel-Mono mode:
920 watts into 2 ohms.
655 watts into 4 ohms.

Power-Tech 3.1
Stereo mode (both channels driven):
760 watts into 4 ohms.
540 watts into 8 ohms.
Bridge-Mono mode:
1,525 watts into 8 ohms.
1,090 watts into 16 ohms.
Parallel-Mono mode:
1,530 watts into 2 ohms.
1,080 watts into 4 ohms.

Load Impedance: Safe with all types of loads. Rated for 4 to 8 ohms in Stereo, 8 to 16 ohms in Bridge-Mono and 2 to 4 ohms in Parallel-Mono mode.

Required AC Mains: Power requirements are provided on each unit's back panel. 120 VAC, 60 Hz and 100/120/220/240 VAC, 50 to 60 Hz (non-convertible) units are available. Rated AC mains voltages are ±10%. Quiescent power draw is 90 watts or less.
Power-Tech 1.1: 100 and 120 VAC units draw up to 6 amps of current; 220 and 240 VAC units draw up to 3 amps.
Power-Tech 2.1: 100 and 120 VAC units draw up to 10 amps of current; 220 and 240 VAC units draw up to 5 amps.
Power-Tech 3.1: 100 and 120 VAC units draw up to 15 amps of current; 220 and 240 VAC units draw up to 7 amps.

You must provide sufficient AC power to the amplifier. Amplifiers do not create energy—they require proper voltage and current to deliver the power you expect.

Low-Voltage Power Supply: A ±24 VDC fanformer supply (fan motor winding) regulated to ±15 VDC.

AC Connector: An appropriate AC line cord and plug are provided. North American units have a standard 3-wire, 15-amp grounded connector (NEMA 5-15P).

Controls

Power: A front panel push button switch used to turn the amplifier on and off. It is also a circuit breaker for the power supplies in the Power-Tech 1.1 and 2.1.

Level: A front panel rotary potentiometer for each channel used to control the output level.

Stereo/Mono: A three-position back panel switch used to select Stereo, Bridge-Mono or Parallel-Mono mode.

Sensitivity: A three-position switch behind the input module used to select the input sensitivity for both channels: 0.775 volts or 1.4 volts for standard 1 kHz power, or 26 dB voltage gain (see Section 2.3).

Reset (Power-Tech 3.1 only): A back panel push button used to reset the circuit breaker that protects the power supplies.

Indicators

Enable: This red indicator shows the on/off status of the low voltage power supply.

SPI*OC*: Each channel has a two color indicator that flashes green to show signal presence and yellow if the amplifier causes distortion of 0.05% or more.

Input/Output

Input Connector: Balanced 1/4-inch phone jacks and XLR connectors in parallel (refer to Section 5 for barrier block connectors).

Input Impedance: Nominally 20 K ohms, balanced; 10 K ohms, unbalanced.

Output Connector: Two sets of color-coded binding posts.

Output Impedance: Less than 10 milliohms in series with less than 2 microhenries.

DC Output Offset: Less than 10 millivolts.

Output Signal

Stereo: Unbalanced, two-channel.

Bridge-Mono: Balanced, single-channel. Channel 1 controls are active; Channel 2 controls should be turned down and not used.

Parallel-Mono: Unbalanced, single-channel. Channel 1 controls are active; Channel 2 controls should be turned down and not used.

Protection

Power-Tech .1 Series amplifiers are protected against shorted, open or mismatched loads; overloaded power supplies; excessive temperature; chain destruction phenomena; input overload and high-frequency blowups. They also protect loudspeakers from input and output DC, as well as providing protection from turn-on/turn-off transients.

If operating conditions are unreasonable, the patented ODEP circuitry proportionally limits the drive level to protect the output transistors, particularly in the case of elevated temperature. A thermal switch imbedded in the transformer protects the power supplies from overload. In the rare event that a transformer overheats, the thermal switch removes power, waits until the unit has cooled to a safe temperature and then resets itself.

Turn On: Four-second delay with no dangerous transients. Contact us if you need to change the delay.

Construction

Durable black finish on steel chassis with special "flow-through" ventilation from front to side panels.

Cooling: Internal heat sinks with forced-air cooling for rapid, uniform heat dissipation.

Dimensions: Standard 19-inch (48.3-cm) rack mount width (EIA RS-310-B), 3.5-inch (8.9-cm) height and 16-inch (40.6-cm) depth behind the mounting surface.

Approximate Weight: Center of gravity is 6 inches (15.2 cm) behind front mounting surface.

120 VAC, 60 Hz Units:
Power-Tech 1.1: 30 pounds (13.6 kg) net; 34 pounds (15.4 kg) shipping weight.

Power-Tech 2.1: 33 pounds (15.0 kg) net; 37 pounds (16.8 kg) shipping weight.

Power-Tech 3.1: 36 pounds, 8 ounces (16.6 kg) net; 40 pounds, 8 ounces (18.4 kg) shipping weight.

International Units:
Power-Tech 1.1: 31 pounds, 2 ounces (14.1 kg) net; 34 pounds, 9 ounces (15.7 kg) shipping weight.

Power-Tech 2.1: 35 pounds, 12 ounces (16.9 kg) net; 38 pounds, 13 ounces (17.6 kg) shipping weight.

Power-Tech 3.1: 37 pounds, 3 ounces (16.6 kg) net; 40 pounds, 15 ounces (18.6 kg) shipping weight.

Crown specifications are guaranteed for three years.

In an effort to provide you with as much information as possible about the high power-producing capabilities of your amplifier, we have created the following power matrices.

Minimum Power Specifications

Crown's minimum power specifications represent the absolute smallest amount of output power you can expect from your amplifier when it is driven to full output under the given conditions. Some spaces in each matrix may be left blank because the same guarantee is not provided for those conditions—however, your amplifier will perform well under all conditions listed in each matrix.

When measuring power, 0.1% THD appears to be the industry standard for distortion. Two of the maximum average power specifications shown in each minimum power matrix are measured at 0.1% THD so you can easily compare Crown specifications to those of other manufacturers. But this high level of distortion actually allows for some clipping, which is undesirable. Because of this, a maximum average power spec at 0.05% THD is included in each minimum power matrix, which represents non-clipped conditions. Although most manufacturers do not give you power specifications at 0.05% THD, we encourage them to provide these specifications so you will have a more realistic representation of the way amplifiers should be used in the real world—without a clipped output signal.

Many manufacturers publish power specs with a tolerance of ±1 dB or worse. This means their amplifier can deviate more than 20% in output! A 100-watt amplifier would meet their specification if it only produced 79.4 watts. Other manufacturers qualify their specs by saying they are "typical," "subject to manufacturing tolerances," "single channel driven" or that they are specified with "fuses bypassed." Each of these statements effectively removes any performance guarantee. In fact, some manufacturers use these tactics to generate large power numbers, and they don't even print a disclaimer. We take a different approach at Crown—our amplifiers are *guaranteed* to meet or exceed their specifications for three years. Further, because our published specs are set below our "in-house" measurements, you can expect *every* Crown amplifier to *exceed* its published minimum power specs. We believe you should get what you pay for.

Minimum Power Notes:

All minimum power specifications are based on 0.5% regulated AC mains with THD of less than 1.0% and an ambient room temperature of 70° F (21° C). Standard EIA power (RS-490) is not shown here because it is identical to FTC Continuous Average Power. International units with multi-tap transformers are specified for the worst-case transformer tap (normally 100 VAC, 50 Hz).

1. A 1-kHz sine wave is presented to the amplifier and the output monitored for nonlinear distortion. The level is increased until the THD reaches 0.1%. At this level the average power per channel is reported.
2. A sine wave is presented to the amplifier over the range from 20 Hz to 20 kHz and the output monitored for nonlinear distortion. The level at each frequency is increased until the THD reaches 0.1%. At this level the average power per channel is reported.
3. A 1-kHz sine wave is presented to the amplifier and the output monitored for nonlinear distortion. The level is increased until the THD reaches 0.05%. At this level the average power per channel is reported.
4. A 1-kHz sine wave is presented to the amplifier and the output monitored for nonlinear distortion. The level is increased until the THD reaches 0.1%. At this level the average power per channel is reported.

Power-Tech 1.1 – Minimum Guaranteed Power (Watts)

AC Mains	Stereo/Mono Mode	Load (Ohms)	Maximum Average 0.1% THD (See note 1)	Maximum Average 0.1% THD (See note 2)	Maximum Average 0.05% THD (See note 3)	FTC Continuous Average 0.1% THD (See note 4)	
			1 kHz	20Hz-20kHz	1 kHz	1 kHz	20Hz-20kHz
120 VAC, 60 Hz Units	Stereo (both channels driven)	4	305	275	300		
		8	220	210	220	215	195
	Bridge-Mono (balanced output)	8	605	550	600		
		16	445	420	445	430	395
	Parallel-Mono	2	605		600		
		4	440		440	430	
International Units	Stereo (both channels driven)	4	290	265	285		
		8	210	200	210	205	190
	Bridge-Mono (balanced output)	8	575	530	570		
		16	430	405	420	415	
	Parallel-Mono	2	575		575		
		4	425		425	410	

Fig. 4.1 Power-Tech 1.1 Minimum Power Matrix

Power-Tech 2.1 – Minimum Guaranteed Power (Watts)							
AC Mains	Stereo/Mono Mode	Load (Ohms)	Maximum Average 0.1% THD (See note 1)	Maximum Average 0.1% THD (See note 2)	Maximum Average 0.05% THD (See note 3)	FTC Continuous Average 0.1% THD (See note 4)	
			1 kHz	20Hz-20kHz	1 kHz	1 kHz	20Hz-20kHz
120 VAC, 60 Hz Units	**Stereo** (both channels driven)	4	460	425	460	385	
		8	325	310	325	310	265
	Bridge-Mono (balanced output)	8	910	830	905	815	
		16	660	615	655	625	530
	Parallel-Mono	2	920		915	805	
		4	655		650	630	
International Units	**Stereo** (both channels driven)	4	425	390	425	395	325
		8	310	290	305	305	275
	Bridge-Mono (balanced output)	8	855	775	850	790	640
		16	620	575	615	615	545
	Parallel-Mono	2	850		845	785	
		4	620		615	610	

Fig. 4.2 Power-Tech 2.1 Minimum Power Matrix

Power-Tech 3.1 – Minimum Guaranteed Power (Watts)							
AC Mains	Stereo/Mono Mode	Load (Ohms)	Maximum Average 0.1% THD (See note 1)	Maximum Average 0.1% THD (See note 2)	Maximum Average 0.05% THD (See note 3)	FTC Continuous Average 0.1% THD (See note 4)	
			1 kHz	20Hz-20kHz	1 kHz	1 kHz	20Hz-20kHz
120 VAC, 60 Hz Units	**Stereo** (both channels driven)	4	760	715	755		
		8	540	525	540	530	495
	Bridge-Mono (balanced output)	8	1,525	1,430	1,500		
		16	1,090	1,045	1,075	1,055	985
	Parallel-Mono	2	1,530		1,520		
		4	1,080		1,080	1,065	
International Units	**Stereo** (both channels driven)	4	680	630	660	555	485
		8	510	495	505	510	470
	Bridge-Mono (balanced output)	8	1,335	1,240	1,305	1,115	1,085
		16	1,025	980	1,000	1,025	930
	Parallel-Mono	2	1,365		1,340	1,115	
		4	1,015		1,010	1,030	

Fig. 4.3 Power-Tech 3.1 Minimum Power Matrix

Maximum Power Specifications

Crown's maximum power specifications represent the largest amount of output power you can expect from your amplifier when it is driven to full output under the given conditions. These specifications can be used to prevent loudspeaker and hearing damage.

The maximum power matrices include specifications for single cycle and 40-millisecond burst sine waves. Burst signals act like large transient peaks that are present in common source signals. Loudspeakers can respond to a single cycle burst, so the single cycle burst specifications should be used to help you protect your loudspeakers. In contrast, a 40-millisecond burst represents the typical response time of the human ear. Your ear will not respond to the entire dynamic change of a burst that lasts less than 40 milliseconds.

The specifications are provided at 0.05% THD because this represents a low distortion condition. To help you operate your amplifier within these tolerances, Crown's premium amplifiers include an input/output comparator that shows when the amplifier has exceeded 0.05% THD. Operating the amplifier at levels higher than 0.05% THD can result in output power levels that are higher than those listed in the maximum power matrices.

Maximum Power Notes:
All maximum power specifications are based on 0.5% regulated AC mains with THD of less than 1.0% and an ambient room temperature of 70° F (21° C). International units with multi-tap transformers are specified for the best-case transformer tap (normally 240 VAC, 60 Hz). Although it is an unusual condition, your amplifier can function well with AC mains voltages up to 10% over the rated line voltage. With overvoltage conditions, your amplifier may be capable of delivering instantaneous power levels up to 20% greater than the specifications in the matrix. Maximum power testing conditions are very demanding and sometimes result in the activation of the amplifier's ODEP protection circuitry.

1. A single cycle sine wave is presented to the amplifier and monitored for nonlinear distortion. The average power during the burst is reported. Loudspeakers must be able to withstand this level if they are to be safely used with this amplifier.
2. A 40-millisecond sine wave burst (10 percent duty cycle) is presented to the amplifier and monitored for nonlinear distortion. The average power during the burst is reported. This power level is a measurement of the amplifier's maximum transient power that can be perceived by the human ear.

Power-Tech 1.1 – Maximum Power (Watts)

AC Mains	Stereo/Mono Mode	Load (Ohms)	Single Cycle Tone Burst 0.05% THD (See note 1)				40 Millisecond Tone Burst 0.05% THD (See note 2)		
			20 Hz	50 Hz	1 kHz	7 kHz	50 Hz	1 kHz	7 kHz
120 VAC, 60 Hz Units	**Stereo** (both channels driven)	4	345	465	590	580	385	340	355
		8	265	305	360	350	265	245	255
	Bridge-Mono (balanced output)	8	680	890	1,170	1,160	750	675	710
		16	525	605	715	695	525	490	510
	Parallel-Mono	2	740	900	1,125	1,090	740	670	690
		4	530	615	710	690	525	485	505
International Units	**Stereo** (both channels driven)	4	355	465	615	600	390	345	360
		8	260	310	365	350	270	250	260
	Bridge-Mono (balanced output)	8	700	915	1,240	1,200	785	685	715
		16	510	615	720	700	545	495	515
	Parallel-Mono	2	690	915	1,115	1,090	785	685	705
		4	505	620	720	695	535	495	510

Fig. 4.4 Power-Tech 1.1 Maximum Power Matrix

Power-Tech 2.1 – Maximum Power (Watts)									
AC Mains	Stereo-Mono Mode	Load (Ohms)	Single Cycle Tone Burst At 0.05% THD (See note 1)				40 Millisecond Tone Burst At 0.05% THD (See note 2)		
			20 Hz	50 Hz	1 kHz	7 kHz	50 Hz	1 kHz	7 kHz
120 VAC, 60 Hz Units	**Stereo** (both channels driven)	4	210	655	805	790	550	500	520
		8	400	460	525	515	400	375	395
	Bridge-Mono (balanced output)	8	430	1,410	1,850	1,805	1,190	1,090	1,125
		16	795	915	1,060	1,020	795	755	780
	Parallel-Mono	2	475	1,440	1,685	1,645	1,185	1,085	1,120
		4	800	915	1,055	1,020	805	750	775
Internatio nal Units	**Stereo** (both channels driven)	4	550	720	900	885	605	545	565
		8	385	465	530	510	410	380	395
	Bridge-Mono (balanced output)	8	1,190	1,440	1,770	1,785	1,200	1,075	1,120
		16	770	920	1,055	1,020	820	750	785
	Parallel-Mono	2	1,075	1,390	1,670	1,655	1,185	1,065	1,110
		4	760	915	1,055	1,015	820	750	775

Fig. 4.5 Power-Tech 2.1 Maximum Power Matrix

Power-Tech 3.1 – Maximum Power (Watts)									
AC Mains	Stereo/Mono Mode	Load (Ohms)	Single Cycle Tone Burst 0.05% THD (See note 1)				40 Millisecond Tone Burst 0.05% THD (See note 2)		
			20 Hz	50 Hz	1 kHz	7 kHz	50 Hz	1 kHz	7 kHz
120 VAC, 60 Hz Units	**Stereo** (both channels driven)	4	815	1,090	1,575	1,525	910	815	855
		8	625	715	870	835	610	570	595
	Bridge-Mono (balanced output)	8	1,615	2,155	3,140	3,040	1,780	1,615	1,690
		16	1,235	1,415	1,740	1,675	1,250	1,135	1,180
	Parallel-Mono	2	1,605	2,140	3,135	3,015	1,790	1,605	1,680
		4	1,215	1,420	1,735	1,665	1,225	1,135	1,170
International Units	**Stereo** (both channels driven)	4	980	1,190	1,750	1,695	970	870	920
		8	650	785	960	920	675	625	645
	Bridge-Mono (balanced output)	8	1,725	2,355	3,490	3,380	1,945	1,725	1,805
		16	1,345	1,540	1,915	1,840	1,360	1,235	1,285
	Parallel-Mono	2	1,720	2,330	3,485	3,345	1,940	1,720	1,800
		4	1,310	1,570	1,895	1,825	1,360	1,235	1,270

Fig. 4.6 Power-Tech 3.1 Maximum Power Matrix

5 Service Option Available

MT-BB

The MT-BB is an accessory panel that provides barrier strip input connectors. An MT-BB accessory might be desirable in applications requiring bare wire or spade lug connections. Like other unused input connectors on your Power-Tech .1 Series amplifier, these barrier strip connectors can be used to daisy chain an input signal from one amplifier to another.

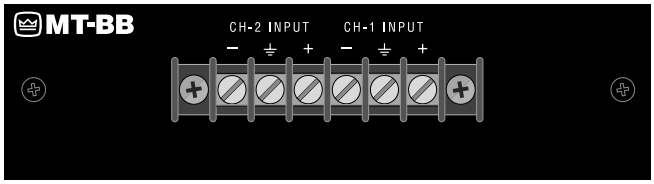


Fig. 5.1 MT-BB

Important: The MT-BB must be installed at a Crown Factory Service Center or the Crown factory.

6 Service

Crown amplifiers are quality units that rarely require servicing. Before returning your unit for servicing, please contact Crown Technical Support to verify the need for servicing.

This unit has very sophisticated circuitry which should only be serviced by an authorized Crown Service Center. This is one reason why each unit bears the following label:

CAUTION: To prevent electric shock, do not remove covers. No user serviceable parts inside. Refer servicing to a qualified technician.

6.1 Worldwide Service

Service may be obtained from an authorized service center. (Contact your local Crown/Amcron representative or our office for a list of authorized service centers.) To obtain service, simply present the bill of sale as proof of purchase along with the defective unit to an authorized service center. They will handle the necessary paperwork and repair.

Remember to transport your unit in the original factory pack.

6.2 North American Service

Service may be obtained in one of two ways: from an authorized service center or from the factory. You may choose either. It is important that you have your copy of the bill of sale as your proof of purchase.

6.2.1 Service at a North American Service Center

This method usually saves the most time and effort. Simply present your bill of sale along with the defective unit to an authorized service center to obtain service. They will handle the necessary paperwork and repair. Remember to transport the unit in the original factory pack. A list of authorized service centers in your area can be obtained from our Technical Support Group.

6.2.2 Factory Service

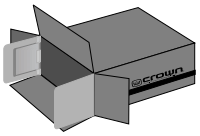
To obtain factory service, fill out the **service information page** found in the back of this manual and send it along with your proof of purchase and the defective unit to the Crown factory.

For warranty service, we will pay for ground shipping both ways in the United States. Contact Crown Factory Service or Technical Support to obtain prepaid shipping labels prior to sending the unit. Or, if you prefer, you may prepay the cost of shipping, and Crown will reimburse you. Send copies of the shipping receipts to Crown to receive reimbursement.

Your repaired unit will be returned via UPS ground. Please contact us if other arrangements are required.

Factory Service Shipping Instructions:

1. When sending a Crown product to the factory for service, be sure to fill out the service information form that follows and enclose it inside your unit's shipping pack. Do not send the service information form separately.



Always use the original factory pack to transport the unit.

2. To ensure the safe transportation of your unit to the factory, ship it in an original factory packing container. If you don't have one, call or write Crown's Parts Department. With the exception of polyurethane or wooden crates, any other packing material will not be sufficient to withstand the stress of shipping. **Do not use loose, small size packing materials.**
3. Do not ship the unit in any kind of cabinet (wood or metal). Ignoring this warning may result in extensive damage to the unit and the cabinet. Accessories are not needed—do not send the product documentation, cables and other hardware.

If you have any questions, please call or write the Crown Customer Service.

Crown Customer Service

Technical Support / Factory Service
Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, Indiana 46517 U.S.A.

Telephone: 219-294-8200
800-342-6939 (North America, Puerto Rico, and Virgin Islands only)

Facsimile: 219-294-8301 (Technical Support)
219-294-8124 (Factory Service)

Internet: http://www.crownaudio.com

Crown Factory Service Information

Shipping Address: Crown Factory Service, Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, IN 46517
Phone: 1-800-342-6939 or 1-219-294-8200 Fax: 1-219-294-8124

Owner's Name: _____

Shipping Address: _____

Phone Number: _____ **Fax Number:** _____

Model: _____ **Serial Number:** _____ **Purchase Date:** _____

NATURE OF PROBLEM

(Be sure to describe the conditions that existed when the problem occurred and what attempts were made to correct it.)

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Detach and send with unit.

Other equipment in your system: _____

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If warranty has expired, payment will be: ❑ **Cash/Check** ❑ **VISA** ❑ **MasterCard** ❑ **C.O.D.**

Card Number: _____ **Exp. Date:** _____ **Signature:** _____

ENCLOSE THIS PORTION WITH THE UNIT. DO NOT MAIL SEPARATELY.