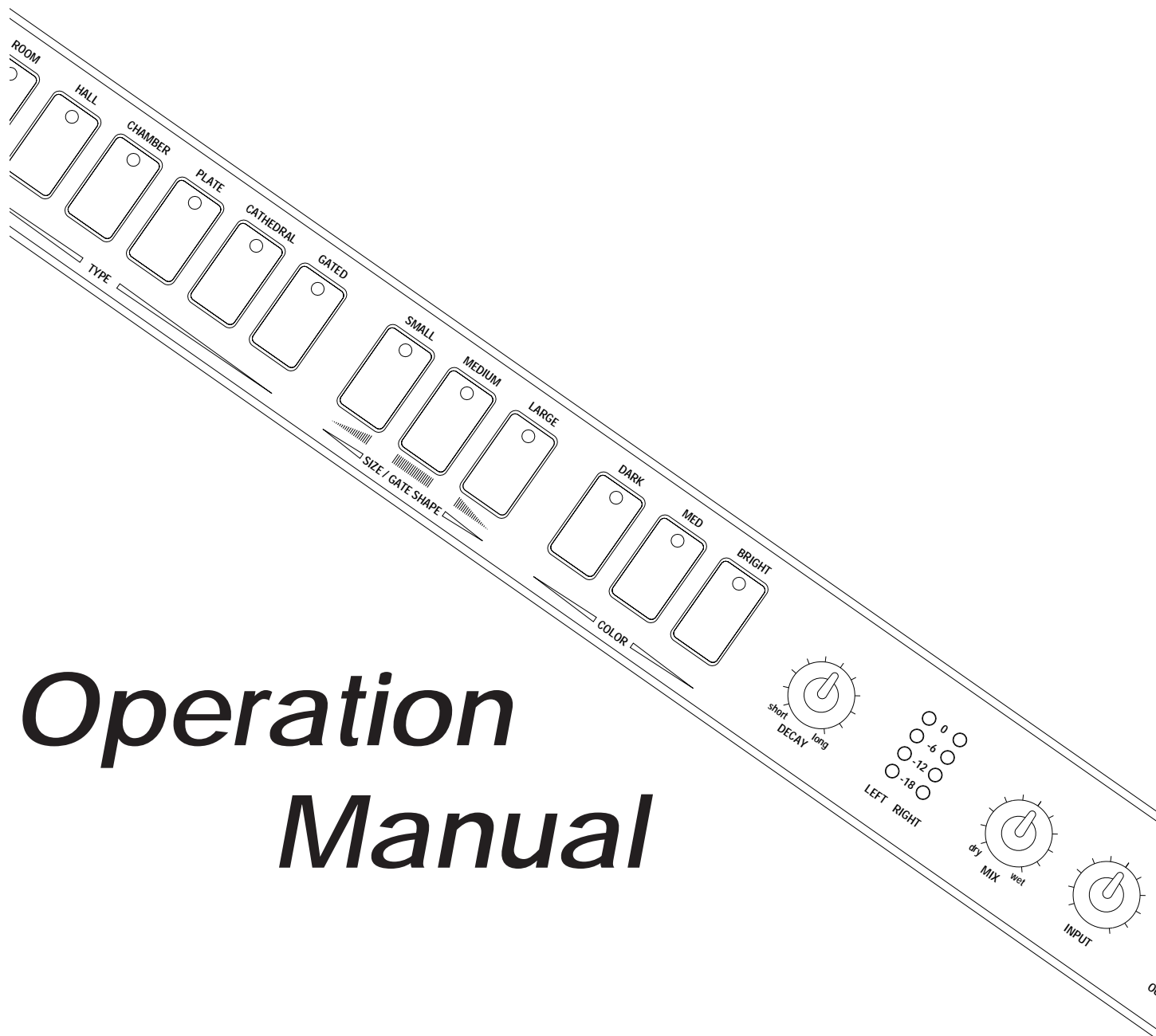


Stereo Reverb **290**



Operation Manual

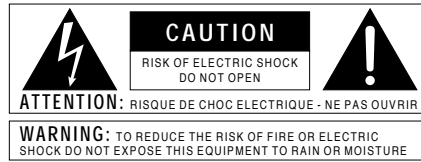


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Safety



The symbols shown at left are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrowpoint in an equilateral triangle means that

there are dangerous voltages present within the unit. The exclamation point in an equilateral triangle indicates that it is necessary for the user to refer to the owner's manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the 290 wet. If liquid is spilled on the unit, unplug it immediately and take it to a dealer for service. Disconnect the equipment during storms to prevent damage.

Warranty



1. The warranty registration card must be mailed within 30 days after purchase date to validate this warranty and proof-of-purchase is considered to be the burden of the consumer.
2. dbx warrants this product, when bought and used solely within the U.S., to be free from defects in materials and workmanship under normal use and service.
3. dbx liability under this warranty is limited to repairing or replacing defective materials that show evidence of defect, provided the product is returned to dbx WITH RETURN AUTHORIZATION from the factory, where all parts and labor will be covered up to a period of two years. A Return Authorization number may be obtained from dbx by telephone. The company shall not be liable for any consequential damage as a result of the product's use in any circuit or assembly.
4. dbx reserves the right to make changes in design or make additions to or improvements upon this product without incurring any obligation to install the same on products previously manufactured.
5. The foregoing is in lieu of all other warranties, expressed or implied, and dbx neither assumes nor authorizes any person to assume for it any obligation or liability in connection with the sale of this product. In no event shall dbx or its dealers be liable for special or consequential damages or from any delay in the performance of this warranty due to causes beyond their control.

Introduction

We congratulate and thank you for your purchase of the dbx 290 Stereo Reverb. The 290 is a true stereo, dedicated reverb processor designed for the professional who needs high quality results without the challenges of complex programming. Whether used in the recording studio or in live sound situations, world class reverbs are just a button press away. The 290 also includes unheard of signal to noise specifications for products in its price range along with a digital noise gate that pushes unwanted noise even further out of the audio picture. Some of the 290's features include:

- True stereo reverb processing
- Signal to noise ratio of greater than 90dB (w/o noise gate)
- 40kHz sampling rate, 18 bit DACs, full bandwidth response
- Balanced Stereo Inputs and Outputs
- Hundreds of professional quality reverb possibilities
- Receives MIDI program changes

Although the dbx 290 was designed to be the easiest reverb on the market to use, we suggest that you read this operation manual to fully understand the 290's power. We have kept the manual simple and easy to read so that you can get back to work quickly.

We know you'll enjoy your 290 and thanks again for purchasing a quality dbx product.



Inspection

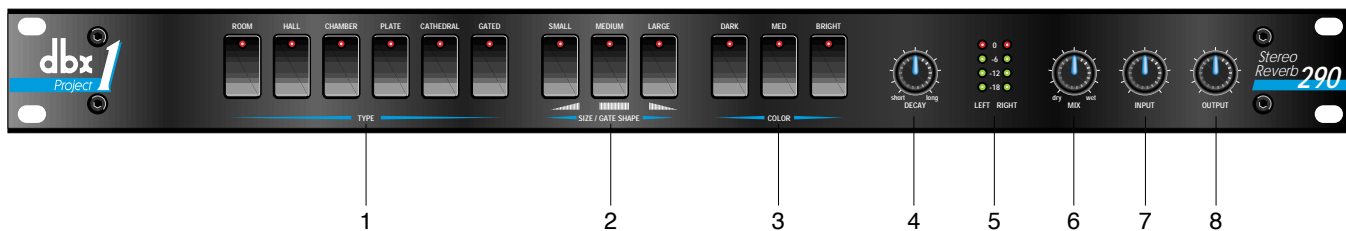
Before continuing any further, please inspect the contents of the dbx 290 box to be sure that the following items are included:

- dbx 290 Stereo Reverb
- External power supply
- Operation Manual (yes, you are already reading it)
- Registration/Warranty card

If anything is missing, please notify your dealer.

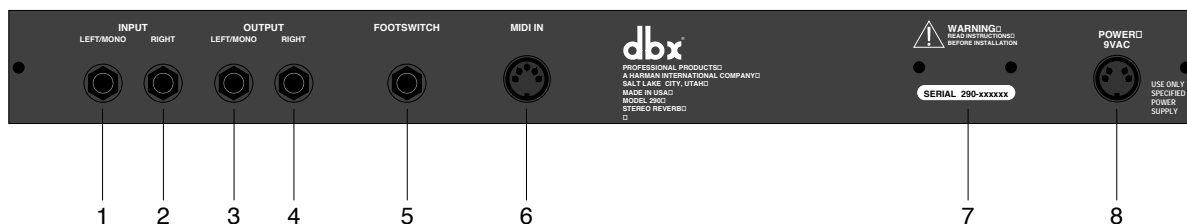
The information contained in this manual is subject to change at any time without notification. Some information contained in this manual may also be inaccurate due to undocumented changes in the product or operating system since this version of the manual was completed.

Front Panel



- 1) **Type Buttons** - Used to select one of six different reverb Types. The LED inside the selected button lights to indicate the current reverb Type being used.
- 2) **Size/Gate Shape Buttons** - Used to select one of three different reverb Sizes or Gated Shapes if the Gated reverb Type is selected. The LED inside the selected button lights to indicate the current reverb Size or Shape being used.
- 3) **Color Buttons** - Used to select one of three different reverb Colors. The LED inside the selected button lights to indicate the current reverb Color being used.
- 4) **Decay Control** - Sets the length of the reverb's decay. Turning this control clockwise increases the decay time while turning the control counter-clockwise decreases the decay time. There are 12 different times available (times are dependent on reverb Type and Size currently selected).
- 5) **Input Level Meters** - These LEDs monitor the levels of the incoming signals which can be adjusted using the Input control.
- 6) **Mix Control** - Controls the wet/dry signal ratio. Turning the control clockwise increases the amount of reverb sent to the outputs while decreasing the original dry signal heard. Turning the control counter-clockwise decreases the amount of reverb sent to the outputs while increasing the original dry signal heard.
- 7) **Input Level Control** - Adjusts the level of the sound source being fed into the 290's stereo inputs. For best signal performance, set these controls so that -0- LED on the input meter lights occasionally. If this control is set too high, unwanted distortion may be heard in the output signals.
- 8) **Output Level Control** - Sets the stereo output level of the 290. This control can be placed in a mirror setting for near unity signal gain through the processor (e.g. Input Level control set at a 2 o'clock position and the Output Level control set at a 10 o'clock position).

Back Panel



- 1) **Left/Mono Input** - This is the audio input for the left channel of the 290. It can be used in either balanced (TRS) or unbalanced (TS) applications. For mono input configurations, use the Left Input jack only and leave the Right Input jack disconnected.
- 2) **Right Input** - This is the audio input for the right channel of the 290. It can be used in either balanced (TRS) or unbalanced (TS) applications. For mono input configurations, the Right Input jack must be disconnected.
- 3) **Left/Mono Output** - This is the audio output for the left channel of the 290. It can be used in either balanced (TRS) or unbalanced (TS) applications. For mono output configurations, use the Left Output jack only and leave the Right Output jack disconnected.
- 4) **Right Output Jack** - This is the audio output for the right channel of the 290. It can be used for either balanced (TRS) or unbalanced (TS) applications. The Right Output jack is used for both stereo in/stereo out and mono in/stereo out configurations. For mono output configurations, the Right output jack must be disconnected.
- 5) **Remote Footswitch** - Allows the connection of an external momentary footswitch (Tip-Sleeve plug) for remotely placing the 290 into bypass mode (indicated by flashing the selected Type/Size/Color LEDs). A three switch type pedal (Tip-Ring-Sleeve plug) may also be used to add Program up and Program down capabilities.
- 6) **MIDI Input** - The MIDI In port allows the 290 to respond to incoming MIDI program changes.
- 7) **290 Serial Number** - This is the 290's unique registration serial number.
- 8) **AC Power Adapter Input** - This is where the AC power adapter is connected. **Warning:** Use only the Power Adapter supplied with the 290 from the factory. Using any other Power Supply may permanently damage the 290.

Connections

Correctly connecting audio and power to any signal processor is the most important step towards successful audio processing. Please follow these steps carefully for best results:

1. Turn off all equipment before making any connections

2. Mount the 290 in a rack (optional)

The 290 requires only one standard rack space. It can be mounted above or below anything that doesn't generate excessive heat, since it requires no special ventilation. Ambient temperatures should not exceed 113°F (45°C) when equipment is powered.

3. Make audio connections via 1/4" phone jacks according to your requirements.

Although the 290 is a true stereo reverb processor, it can also be used in a mono in/stereo out or mono in/mono out configuration. The 290 configures itself by sensing whether or not plugs are inserted into the Right Input and Right Output jacks.

For mono input applications, use the Left Input jack only. For stereo input applications, use both Left and Right Input jacks.

Likewise, for mono output applications, use the Left Output jack only. For stereo output applications, use both Left and Right Output jacks.

Typically, the 290's inputs are connected to the auxiliary sends (sometimes called effect sends) of a mixing console. The 290's outputs are then connected to the effect returns on the console. For best results, a stereo effect return should be used. See figure 1-1.

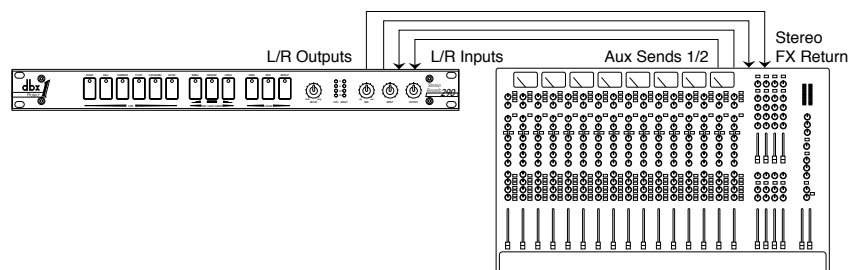


Figure 1-1

The 290 can also be used in a keyboard setup as in figure 1-2 or in a guitar rig as in figure 1-3.

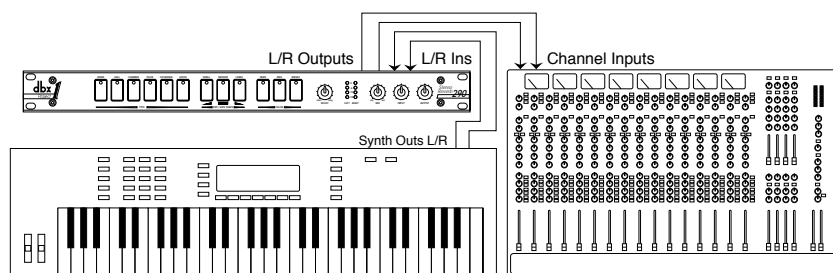


Figure 1-2

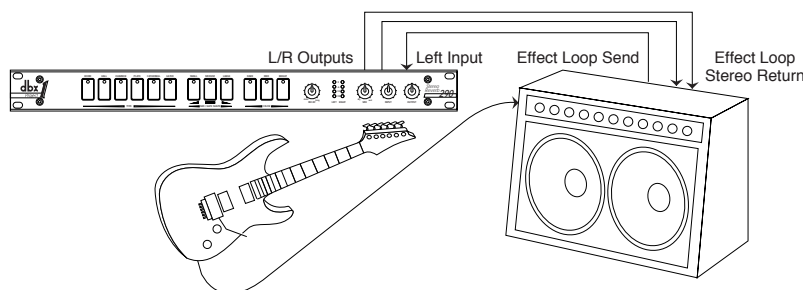


Figure 1-3

4. **Connect the AC power supply (shipped with the unit) to the rear panel jack labeled POWER and then plug the AC power supply to an appropriate AC power source.**

The 290, like any piece of computer hardware, is sensitive to voltage drops, spikes, and surges. Interference such as lightning or power "brownouts" can seriously, and in extreme cases, permanently damage the circuitry inside the unit.

- **Spike/Surge Suppressors** - This is an inexpensive solution to all but the severest of AC line dangers. Surge protected power strips usually cost only slightly more than unprotected strips, making them a worthy investment for protection of all your valuable gear.
- **AC Line Conditioners** - This is the best way to go for total protection from improper line voltages, albeit the more expensive way. Line conditioners constantly monitor for excessively high or low voltages and adjust accordingly, thus delivering consistent power levels.

To help keep things quiet, be sure to keep audio lines as far away from power lines as possible. If it is necessary to cross audio and AC lines, cross them perpendicular to one another. As a rule, never allow parallel audio and AC lines to lie close to each other.




5. **Power may now be re-applied to your other equipment.**

Selecting Reverbs

The 290 has been designed to make reverb selection as quick and easy as possible. Reverbs are divided into four parts:

- **Type** - Six standard reverbs are available in the 290: Room, Hall, Chamber, Plate, Cathedral, and Gated. These are described further in the *Reverb Types* Section (page 12).
- **Size/Shape** - There are three possibilities available: Small, Medium, and Large. This parameter changes the overall size or *volume* (width x length x height) of the room. It also affects the reverb decay setting since smaller environments produce shorter decay times. Larger spaces typically produce longer decays.

If the Gated Reverb is selected, these buttons choose one of three different Linear reverb Types:

- 1)  - Reverse linear reverb. Gives the illusion that the signal is being played in reverse since the reverb energy builds up instead of decays.
 - 1)  - Gated linear reverb. Emulates the sound of a high energy reverb being cut off by a gate before it has a chance to decay completely.
 - 1)  - Normal linear reverb. Contains lots of energy but decays quickly, making it ideal for small live room emulation.
- **Reverb Color** - There are three ambience colors to choose from: Dark, Medium and Bright. This control does more than just make simple equalization changes to the reverb; it also changes room damping and high frequency reverb decay roll-offs. Each reverb Type uses its own set of colorations, while the Medium setting is usually considered the least colored.
 - **Reverb Decay** - Sets the decay time of the reverb and is dependent on the the reverb Size selection. Let your ears be the judge as to how much reverb decay you need for your application.

Simply press the buttons associated with the desired reverb Type, Color/Shape and Size. The reverb decay Time can be adjusted using the Decay control at any time. The 290 also remembers the last used settings even after the unit is powered down.

Bypass Mode

To place the 290's reverb into Bypass mode, press and hold the [ROOM] and [CHAMBER] reverb Type buttons simultaneously. Bypass mode is indicated by the flashing LEDs of the currently selected Type/Size/Color buttons. Pressing any button will exit the Bypass mode (along with changing the setting if a new Type/Size/Color is selected). An external footswitch can also be used to enter or exit the Bypass mode.

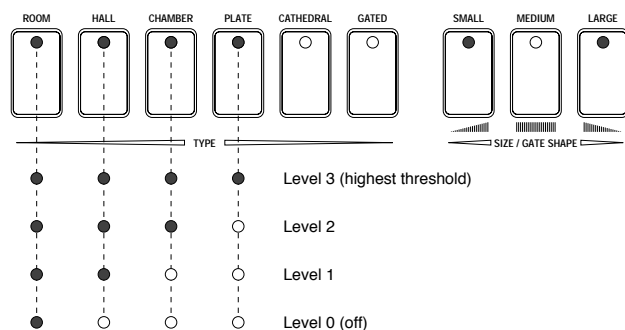
NOTE: Bypass mode affects only the wet portion of the Wet/Dry signal (this means that Bypass acts as a reverb mute).



Noise Gate

The dbx 290 includes a digital noise gate to push the noise floor down, ensuring that the 290 is at its quietest when sitting idle (the most important time to be quiet). The noise gate is located just before the 290's reverb, which means reverb's decay never gets prematurely cut off.

Threshold is the one parameter that may need adjustment in your particular application. This is the level at which the gate will open. Threshold



is set by doing the following:

- Simultaneously press and hold the [SMALL] and [LARGE] Size buttons until their respective LEDs light.
- The current threshold setting is displayed using the reverb Type LEDs in the following manner:
- To choose a new Threshold setting, simply select one of the first four Type buttons for the desired level.

The 290 pauses briefly to show your selection and then returns to normal operation mode.

The purpose of the noise gate is to eliminate unwanted noise in the absence of program material at the 290's inputs. This unwanted noise usually comes from other not-so-quiet pieces of equipment. By using

the gate, the noise can be eliminated when it is most offensive (when there is no program material to cover up the problem).

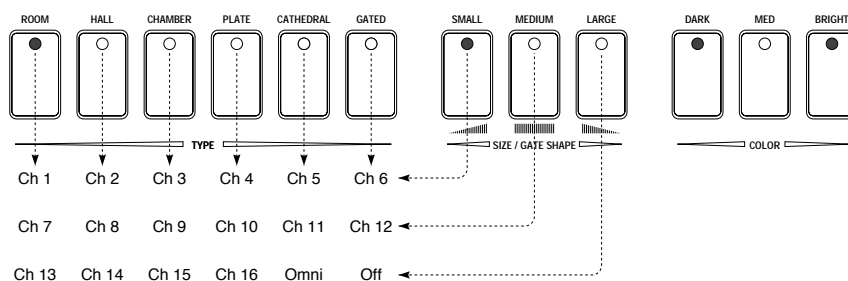
The noise gate can be disabled by choosing level 0 (off).

MIDI



MIDI program changes can be received on any MIDI channel to select different reverb settings on the 290. The 290's MIDI channel is set by doing the following:

- Simultaneously press and hold the [DARK] and [BRIGHT] Color buttons until their respective LEDs light.
- The current MIDI channel setting is displayed using the reverb Type and Size LEDs in the following manner:



To change the currently selected MIDI channel:

- Select one of the three Size buttons.
- Select one of the six Type buttons for the new desired channel.

The 290 pauses briefly to show your selection and then returns to normal operation mode.

Once the MIDI channel is correctly set, the 290 will respond to Continuous Controller and Program Change commands. To allow different reverb decay times using MIDI, the 290 responds to MIDI Continuous Controller #1 on the selected MIDI channel. The 290 has 12 different decay times (actual decay times depend on the reverb Type and Size selected) that can be selected using these specific Continuous Controller values:

| <u>CC1 Value</u> | <u>Selection</u> |
|------------------|---|
| 0-9 | Use current reverb Decay control position |
| 10-19 | Select knob position 1 |
| 20-29 | Select knob position 2 |
| 30-39 | Select knob position 3, etc... |
| ~ 111-119 | Select knob position 11 |
| 120-127 | Select knob position 12 |

The list below shows how different reverb settings can be recalled using Program Changes. Program Change command -0- toggles the 290's Bypass mode status. Program changes -1- to -54- can also be used to exit the Bypass mode and select a new reverb setting (if so desired). After responding to a valid Program Change request, the 290 will reset the decay time to the 12 o'clock position (decay setting number 5) regardless of where the reverb decay control is set. Any Program Change higher than -54- will be ignored by the 290.

| Prg # | Type | Size | Color | Prg # | Type | Size | Color |
|--------------|-------------|-------------|--------------|--------------|-------------|-------------|--------------|
| 0 | Bypass | (Toggle) | On/Off | 28 | Plate | Small | Dark |
| 1 | Room | Small | Dark | 29 | Plate | Small | Med |
| 2 | Room | Small | Med | 30 | Plate | Small | Bright |
| 3 | Room | Small | Bright | 31 | Plate | Med | Dark |
| 4 | Room | Med | Dark | 32 | Plate | Med | Med |
| 5 | Room | Med | Med | 33 | Plate | Med | Bright |
| 6 | Room | Med | Bright | 34 | Plate | Large | Dark |
| 7 | Room | Large | Dark | 35 | Plate | Large | Med |
| 8 | Room | Large | Med | 36 | Plate | Large | Bright |
| 9 | Room | Large | Bright | 37 | Cathdrl | Small | Dark |
| 10 | Hall | Small | Dark | 38 | Cathdrl | Small | Med |
| 11 | Hall | Small | Med | 39 | Cathdrl | Small | Bright |
| 12 | Hall | Small | Bright | 40 | Cathdrl | Med | Dark |
| 13 | Hall | Med | Dark | 41 | Cathdrl | Med | Med |
| 14 | Hall | Med | Med | 42 | Cathdrl | Med | Bright |
| 15 | Hall | Med | Bright | 43 | Cathdrl | Large | Dark |
| 16 | Hall | Large | Dark | 44 | Cathdrl | Large | Med |
| 17 | Hall | Large | Med | 45 | Cathdrl | Large | Bright |
| 18 | Hall | Large | Bright | 46 | Gated | Rise | Dark |
| 19 | Chmbr | Small | Dark | 47 | Gated | Rise | Med |
| 20 | Chmbr | Small | Med | 48 | Gated | Rise | Bright |
| 21 | Chmbr | Small | Bright | 49 | Gated | Flat | Dark |
| 22 | Chmbr | Med | Dark | 50 | Gated | Flat | Med |
| 23 | Chmbr | Med | Med | 51 | Gated | Flat | Bright |
| 24 | Chmbr | Med | Bright | 52 | Gated | Decay | Dark |
| 25 | Chmbr | Large | Dark | 53 | Gated | Decay | Med |
| 26 | Chmbr | Large | Med | 54 | Gated | Decay | Bright |
| 27 | Chmbr | Large | Bright | | | | |

Note: Program changes 1 through 54 will also exit Bypass mode.

What is Reverb?

Reverberation, or room ambience, occurs when acoustic energy is reflected off room surfaces, materials and objects. Using reverberation in recorded program material gives the listener a sense that the material is being performed in an actual room or hall. It is this similarity to actual acoustic spaces that makes reverberation a useful tool in recorded music. The 290 also uses early reflections to get a better emulation of the natural sound of a room. Early reflections are short clusters of direct reflections from the closest walls in the room.

The 290 includes several different types of reverb. Some are very natural sounding environments, while others are not-so-natural sounding.

Room



The Room is the most basic environment because we actually hear rooms. Usually rooms are smaller environments and because their walls are closer together, early reflections are heard more prominently while the overall length of the reverb decay is quite short.

Natural small room ambiances will work wonders in trying to bring sterile, dry musical instrument samples back to life (like drum samples for example). Small rooms also help thicken up sounds without adding a lot of long decay reverberations.

Hall



Halls almost fall into the special category of *unnatural* ambiances because they are designed and treated with certain sound reflection characteristics. Performance halls are built with the goal of getting the sound off the performance stage as cleanly and loudly as possible. Early reflections are practically non-existent while the reverb decay of the environment is extremely smooth and transparent.

Halls are ideal for the instruments they were designed for like strings, pianos, orchestras, etc. The transparent quality of the decay makes halls one of the most commonly used ambiances in recording.

Chamber



Many recording studios have tried to emulate hall environments by building special sound chambers. These small rooms have unique wall angles and surfaces. Sound is fed into the room through a speaker and the reflections are retrieved with one or more microphones. Early reflections in these rooms are quite strong and even but because the room is small, the reverberation decays more quickly than in a real hall.

Although not a perfect emulation of the hall, the chamber has become a preferred ambience for multi-tracked recordings that need reverb. Since

the chamber's decay tends to get out of the way more quickly than the hall's, the chamber is ideal for vocals and/or instrumental parts that tend to get stacked during recording. Chambers are also very useful for more percussive, upbeat styles of music.



Plate

Plates are another attempt to artificially emulate natural ambiences that have instead become accepted for their own unique sound. Plate reverbs are made with large sheet of metal suspended in a box. Sound is induced at one end of the metal sheet with transducers that cause the metal to vibrate. Pickups at the other end of the metal receive the multiple reverberations.

The results are quite unique. The Plate reverb has a slight metallic quality that makes instruments and voices sound a little brighter and thus more present. Reverb plates have a very thin, smooth high end while the low end is more dense. These characteristics work well for percussion instruments.



Cathedral

The most natural and familiar environment is probably that of the cathedral or church. Often large churches are built for the purpose of housing visual ornamentation and seating large groups of people for worship. By the sheer size of these rooms and the amount of people in them (or sometimes how empty they were), cathedrals and churches all over the world have become famous for their unique sound qualities.

These large rooms usually have a great deal of early reflection energy (because of smaller pulpit areas) while the reverb itself is very rich in the lower frequencies (because of the large room's ability to sustain low frequency energy). The cathedral reverbs make anything sound big, whether it's an organ with a choir or a thunder clap.



Gated

Linear reverberation, or gated reverbs as they are more commonly referred to, are the most *unnatural* ambiences used on a regular basis. Originally, large dense reverbs were cut off using a noise gate. Eventually, it was discovered that using very linear reverbs with no regeneration produce the same type of sound with even more flexibility.

Since the decay is linear, the *shape* of the reverb can be changed. Using the flat setting gives you the familiar gated reverb sound. The reverse setting ramps the energy from its lowest point up, making things sound almost backwards. The normal ramp down setting can be used as stand-alone early reflections to emulate very small, intense rooms.

dbx 290 Stereo Reverb

A/D Converter: 16 bit PCM

D/A Converter: 18 bit PCM

Sampling Frequency: 40 kHz

DSP Section:

Architecture:Static-Dynamic Instruction Set Computer
(S-DISC™)

Digital Signal Path Width:24 bits (144.5 dB)

Internal Data Path Width:48 bits (289 dB)

Dynamic Delay Memory:64k x 20 bits (1.68 seconds)

Static Delay Memory:256 24-bit registers (6.55 milliseconds)

Data ALU Processing:10.0 MIPS

Address ALU Processing:.....15.0 MIPS

Multiplier Size:24 bits x 24 bits

Input Section:

Connector: 1/4" Balanced TRS

Nominal Level: +4 dBu

Maximum Level: +18 dBu

Impedance: 20 kohms

Output Section:

Connector: 1/4" TRS

Nominal Level: +4 dBu

Maximum Level: +18 dBu

Impedance: 470 ohms

General:

Frequency Response: 20 Hz. - 20 kHz. +0, -3 dB

S/N ratio: Greater than 87 dB; ref = max signal, 22 kHz measurement
bandwidth

Total Harmonic Distortion: Less than 0.02% (1 kHz.)

Power Requirements:

US and Canada:...120 V ac, 60 Hz

Japan:.....100 V ac, 50/60 Hz

Europe:.....230 V ac, 50 Hz

UK:.....240 V ac, 50 Hz

For other countries, check with local distributors

Power Consumption:15 watts

Dimensions:19" W x 1.75" H x 4.25" D
(482mm x 44mm x 107mm)

| Function... | | Transmitted | Recognized | Remarks |
|----------------------------------|---|-------------|------------|---|
| Basic <input type="checkbox"/> | Default <input type="checkbox"/> | 1-16 | 1-16 | Memorized |
| Channel | Channel | 1-16 | 1-16 | |
| Mode | Default <input type="checkbox"/> | Mode 3 | Mode 3 | |
| | Messages <input type="checkbox"/> | X | X | |
| | Altered | X | X | |
| Note <input type="checkbox"/> | True Voice | X | X | |
| Number | | | | |
| Velocity | Note ON | X | X | |
| | Note OFF | X | X | |
| After <input type="checkbox"/> | Key's <input type="checkbox"/> | X | X | |
| Touch | Ch's | X | X | |
| Pitch Bender | | X | X | |
| Control <input type="checkbox"/> | | O | O | Same as Basic Channel <input type="checkbox"/> CC#1 only |
| <input type="checkbox"/> | | | | |
| Change | | | | |
| Prog <input type="checkbox"/> | | | 0-54 | |
| Change | True # | 0-127 | 0-54 | |
| System Exclusive | | X | X | |
| System <input type="checkbox"/> | :Song Pos <input type="checkbox"/> | X | X | |
| <input type="checkbox"/> | :Song Sel <input type="checkbox"/> | X | X | |
| Common | :Tune | X | X | |
| System <input type="checkbox"/> | :Clock <input type="checkbox"/> | X | X | |
| Real Time | :Commands | X | X | |
| Aux <input type="checkbox"/> | :Local ON/OFF <input type="checkbox"/> | X | X | |
| Mes- <input type="checkbox"/> | :All Notes Off <input type="checkbox"/> | X | X | |
| sages | :Active Sense <input type="checkbox"/> | X | X | |
| | :Reset | X | X | |
| Notes | | | | |

Mode 1 : OMNI ON, POLY
Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON, MONO ☐
Mode 4 : OMNI OFF, MONO

O : Yes ☐
X : No

