PGE 2™

TWO CHANNEL PROGRAMMABLE GRAPHIC EQUALIZER

PRELIMINARY
OPERATING MANUAL

TOM SCHOLZ
STUDIO SERIES

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General Operating Instructions

These general operating instructions will get you started your PGE 2 right away. We urge you to read the rest of this manual soon, so you will fully understand and be able to enjoy all of the capabilities of this sophisticated signal processor.

1. Make sure PGE 2 is off. Connect the power cord of the PGE 2 to an AC outlet. CAUTION : Line voltage must match the voltage requirement printed on the rear panel of the unit.

2. Connect an audio cable from you input source (instrument, effects, tape deck, mixer or effect loop send) to the rear input jack of the PGE 2. Set GAIN switch accordingly. Connect another cable from the rear panel output jack of the PGE 2 to your amplification system or effect loop return. (See the rest of this manual for more details on hook-ups).

3. Push the PGE 2 power button ON.

4. Select either the right or left channel by pressing the CHANNEL DISPLAYED button.

5. Select either ±6dB in 1dB steps or ±12dB in 2dB steps by pressing the STEP SIZE button.

6. Select which frequency band you want to adjust by pressing the button below the column of LED's for any of the 14 frequency bands. Overall output volume can be changed by selecting the button under the VOL column. Cut or boost your selection by using the UP and DOWN buttons marked with arrows just to the right of the VOL column. Repeat until you have achieved the EQ curve you desire for both channels.

7. Save those settings as a Program Number by holding in the red RECORD button until the Program Number display flickers then remains steady.

OR:

Save those settings as a different Program Number by holding in the COPY button and pressing the Program UP or DOWN buttons (just right of the Program display) until you're at the Program Number you desire. Release the COPY button. Hold in the red RECORD button until the Program Number display flickers then remains steady.

Equalizers and the PGE 2

As the name implies, an equalizer is supposed to make things equal. But what will be equal to what? Let's start with the basics. The sounds we hear are the result of something vibrating the air which then vibrates our eardrums. Our brain then tells us what those vibrations are; a flute, a guitar amplifier or a door slamming.

Our ears can detect things that vibrate at rates between 20 and 20,000 times per second. That's the **frequency** of the sound. The "A" note just below Middle C on a piano vibrates at a rate of 440 times per second. But other frequencies are also generated by a string being hit by a piano hammer or a guitar pick, they're called **harmonics**.

Sometimes the clarity of a sound can be enhanced by increasing the volume of its higher harmonics. We turn up the **treble frequencies** (5,000 to 20.000 cycles per second) on the radio and it becomes easier to distinguish speech. We turn up the bass frequencies (20 to 200 cycles per second) so we can hear the kick drum or bass guitar better. The frequencies between 200 and 5,000 are generally considered **mid-range** sounds. Most musical instruments generate mid-range frequencies.

A home hi-fi system usually has 3 tone control **bands**: bass, mids and treble. If we take the entire range of our hearing and divide it into ten bands which are one octave wide, you can see that we would have even more control of the tonal balance. If we had a sound with too much bass, we could add mid-range volume until it was EQUAL to the bass volume. (Of course we could reduce some of the bass bands to achieve the same result) If we divided our hearing range into 1/2 octave bands, we'd have twice as many bands and even more control of our sound.

If we name each band for the frequency in the exact **center** of that band, we should be able to keep track of which band will effect which part of the sound.

The word **"graphic"** with respect to equalizers refers to the actual knobs or indicators for the bands that are arranged like a bar graph. A graphic layout like that makes it easy to see the overall **curve** formed by the levels of each band. You can see an EQ curve that is set to be a **peak** or **notch** or **shelf**.

The **PGE 2** is 2 fourteen band equalizers in one box. The eight mid-range bands are 1/2 octave apart for more control where it's needed. The three bass and two treble bands are one octave apart for smoother tone shaping. Fourteen columns of LED's give a **graphic** indication of the tone changes you've made. Instead of using 28 columns of LED's to display both channels at once, we've designed the PGE 2 to share the LED window. The DISPLAY button chooses which channel will be viewed and active (ready to accept any changes). We designate the channels as **LEFT** and **RIGHT**, but they are completely independent and can be used in any way that two separate equalizers could be used.

In/out Connections

There are many points in the signal path into which you can insert the PGE 2 The 1/4" audio jacks on the back are mono and unbalanced so any standard guitar cord will work. You can plug an electric **instrument** (guitar, keyboard, etc.) directly into a PGE 2 input jack. You would then continue the signal oath with a cord from the output of the PGE 2 to the next device in your system (guitar amp, keyboard mixer, PA, etc.). The **GAIN** switch near the in/out jacks of the PGE 2 should be pushed **in** (or low level signals). It your particular instrument causes the INPUT CLIP LED on the PGE 2 front panel to blink more than just occasionally, you should set the GAIN switch out.

You can use the PGE 2 in the **Effect Loop** of most guitar amplifiers. You should watch the **INPUT CLIP** LED and set the **GAIN** switch for the least amount of clipping. If the **INPUT CLIP** LED blinks constantly in either position, you may need to reduce the signal level going into the PGE 2.

The **Effect Send and Return** of a mixer is usually not a good place to insert an equalizer. Only some of the signal will go through the equalizer so it won't have complete control of the sound.

For overall equalization of your sound, you should insert the PGE 2 just **before** the power amplifier. This will work well for PA systems or studio monitors. Do **not** insert the PGE 2 **after** the power amp (between the power amp and speakers). You could damage the PGE 2 and/or other components of your system.

Since the PGE 2 has two channels, you can use one channel in your effect loop and the other channel before the power amp. Or you could use the two channels in two completely different systems; one for your guitar and one for

The **OUTPUT CLIP** LED's should not be allowed to blink more than occasionally. If you've set the input GAIN switch correctly and the INPUT CLIP LED isn't blinking but the OUTPUT CLIP LED is, you may need to reduce the **OUTPUT VOLUME** of the PGE 2. If all of the EQ bands are set to a boost condition (+6, +8, etc.) you could reduce all bands by a step or two or three. This would maintain the same **EQ curve** but reduce the overall volume.

Use **MIDI cables** to connect the PGE 2 to any MIDI devices you wish it to work with or accept changes from. The PGE 2 MIDI IN jack should be connected to the MIDI OUT or THRU of a MIDI device that will send it PROGRAM CHANGE information. If there are other MIDI devices that need to receive MIDI information, then use a cable from the PGE 2 MIDI OUT or THRU to the MIDI IN of the next device If there's nothing else to be connected, the PGE 2 MIDI OUT and THRU jacks can remain empty.

Programming the PGE 2

The PGE 2 has been designed to make programming easy and intuitive. Every frequency band has ifs own **select button** beneath its column of LED indicators. To select a band to adjust, press the select button for that band. It's LED will start to blink to let you know that it is **active** (ready to be adjusted). Use the EQ UP and DOWN buttons just right of the LED columns to change the EO setting of the active band. Select and change any or all of the EQ bands and VOLUME band until you get the sound you want.

Look at the two digit PROGRAM window. The number in the window is the current **PROGRAM NUMBER**. If you want the EQ curve that is set on the LED's to be saved as the current PROGRAM NUMBER, just hold the red **RECORD** button in until the display flickers then remains steady. If you want this EO setting to be saved as a **different** PROGRAM NUMBER, perhaps to match the program number of another device, here's how: Hold in the **COPY** button (the COPY LED in the display window will light up) and use the **PROGRAM UP and DOWN** buttons (to the right of the PROGRAM display window) until the PROGRAM NUMBER you want is in the window. Release the COPY button. Now press in and hold the red RECORD button until the Program Display flickers then remains steady.

You may want the **same settings for both the Left and Right channels**. Set one channel (either one) the way you want for EQ and Volume. Copy its settings to the other channel by holding in the COPY button, press the Channel Display button (the LED will shift to the other channel), release the COPY button then hold in the red RECORD button until the Program Display flickers then remains steady.

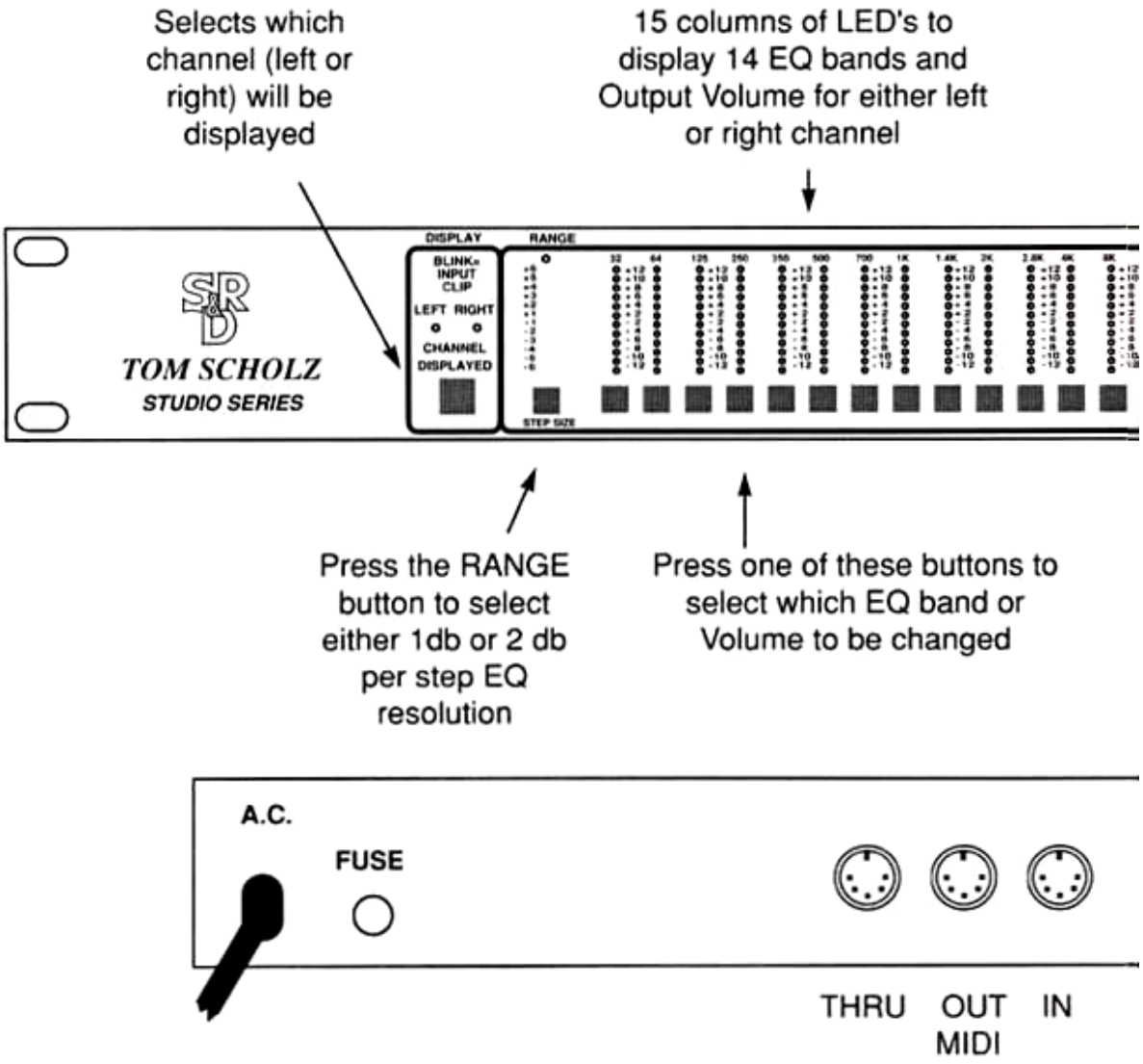
Whenever a PROGRAM has been altered by using the EQ UP and DOWN buttons, the **EDIT** LED in the display window will light up. The EDIT light will go out if you record that altered setting into memory. If you want to return to the original settings, press the PROGRAM UP button once then the PROGRAM DOWN button once. The EDIT LED will be out and you'll be back to the unaltered settings for that program.

The PGE 2 will accept PROGRAM CHANGE information on all 16 **MIDI** channels, one at a time or all at once (OMNI mode). To view the current MIDI CHANNEL or change it, hold in the **MIDI CH** button to the right of the display window. A number from 1 to 16 in the window indicates which channel the PGE 2 will accept information from. The number **00** indicates OMNI mode and means that the PGE 2 will respond to information on all 16 MIDI channels. To change the MIDI Channel, hold in the MIDI CH button (the MIDI CH LED will light up) and use the Program UP and Down buttons.

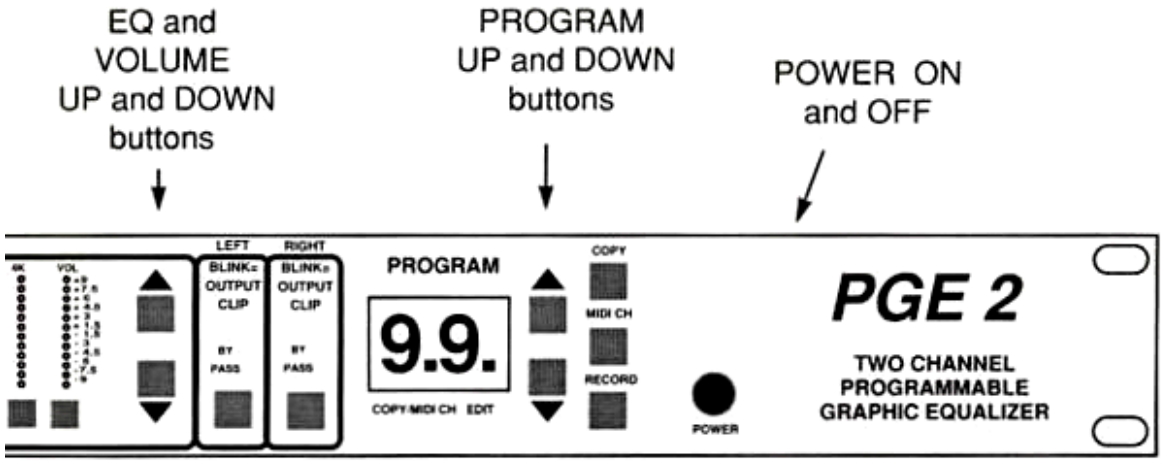
The PGE 2 is controlled by you through a microprocessor which stores its memory digitally. The actual sound that you put through the PGE 2 remains in the analog domain. It is not digitized or converted in any way.

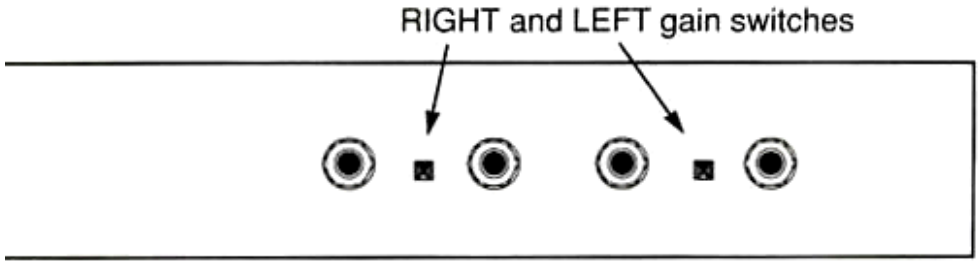
Front and Rear Panel Overview

FRONT PANEL



Front and Rear Panel Overview





REAR PANEL

Continuous Controller Functions

In the Continuous Controller Mode, each Function of PGE 2 can be assigned to a Continuous Controller Number □ thru 127. The assignable Functions include Left and Right Range, individual EQ band adjustment - 32hz thru 16khz, Volume and bypass. You can also copy the Controller number of one Function to another, or the entire Left channel Controller Number assignment to the Right channel and visa versa.

To enter Continuous Controller Mode: Depress the MIDI CH button for 3 seconds, after which, the PGE 2 will enter Continuous Controller Mode (indicated by a "CC" in the 2 digit Program Window).

To select and view a Function's Continuous Controller Number: Use the Channel Displayed button to enable Left or Right Function viewing (The Left and Right Bypass can be selected directly]. Then press any assignable Function's associated button. This will cause the LED(s] above that button to light and the 2 digit Program Window to display the selected Function's current Controller Number. You can view all of the Function to Continuous Controller Number Assignments in any order, one at a time.

To change the assigned Controller Number: While viewing a selected fFnction's Continuous Controller Number, use the program up or down buttons to index a Controller Number from 0 thru 127. Decrementing past 0 will deselect the Function from a Controller Number, indicated by "--". Every change is automatically stored into the Selected Function's Battery Sacked Up Memory location, the latest over writing the previous.

Also, while viewing a selected Function's Continuous Controller Number, any valid Continuous Controller Number received via the MIDI IN will be Assigned to that Function. Every Controller Number received is automatically stored into the Selected Function's Battery Backed Up Memory location, the latest over writing the previous.

Copying Controller Numbers: While viewing a selected Function's Continuous Controller Number, hold down the Copy button while selecting a new Function. The newly selected Function will then be assigned to the previously selected Function's Controller Number. From there, you can change the Continuous Controller Number of the newly selected Function as described previously, (note: you can copy Indivdual Continuous Controller Numbers from one Function to another only if they are both within the same channel, i,e: Right or Left. This rule,however, does not apply to the Bypass Functions.)

Channel Copying: While viewing a selected Function's Continuous Controller Number within the Channel which you want to copy, hold down the copy button while pressing the Channel Displayed button.

All Functions associated with the newly selected Channel will be assigned to the previously selected Channel's Continues Controller Numbers respectively, i.e.: Range to Range. 32Hz to 32 Hz, 64Hz to 64Hz etc...

To exit the Continuous Controller Mode, press the Midi button. The PGE 2 will return to the Normal Operating Mode.

When a Continuous Controller Number is received by the PGE 2, via the MIDI IN, in the Normal Operating Mode, each Function assigned to the received number will respond. The table below describes the response to the data in the received Continuous Controller Message.

DATA (decimal)	FUNCTION 32Hz thru 16kHz RESPONSE	FUNCTION VOLUME RESPONSE
0 thru 9	-12dB	-9dB
10 thru 19	-10dB	-7.5dB
20 thru 29	-8dB	-6dB
30 thru 39	-6dB	-4.5dB
40 thru 49	-4dB	-3dB
50 thru 59	-4dB	-1.5dB
60 thru 69	0dB	0dB
70 thru 79	+2dB	+1.5dB
80 thru 89	+4dB	+3dB
90 thru 99	+6dB	+4.5dB
100 thru 109	+8dB	+6dB
110 thru 119	+10dB	+7.5dB
120 thru 127	+12dB	+9dB

DATA (decimal)	FUNCTION RANGE RESPONSE	FUNCTION BYPASS RESPONSE
0 thru 63	±12dB mode	OFF
64thru 127	±6dB mode	ON

Specifications

INPUT IMPEDANCE 2.2M

INPUT LEVEL.....8.7 V RMS (+21dBv) max.

OUTPUT IMPEDANCE 200

OUTPUT LEVEL.....8.7 V RMS (+21dBv) max.

FREQUENCY RESPONSE at 0 .....20Hz to 20kHz ±0.5dB

FILTERING..... ±12dB at 32. 64. 125, 250. 350, 500, 1k, 1.4k, ... 2k. 2.8k, 4k, 8k, 16kHz

SIGNAL to NOISE RATIO .....92dB unweighted

HARMONIC DISTORTION.....Less than 0.03 %

POWER REQUIREMENT..... 9W, line voltage as marked on rear panel

ACCESSORIES (optional).....MIDIPedal

Specifications subject to change without prior notification

FCC Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and. it not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Warranty