



Analog, dual-channel five-band parametric equalizer

Owner's Manual V 1.4, 9/2003

Software version 240H

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Introduction

Dear customer,

thanks for using the PQ Mastering Equalizer. We wish you have as much fun working with it as we had during the development of this extraordinary equalizer.

Supplied parts

- PQ Mastering Equalizer
- External power supply transformer including both power cords
- Owner's Manual

Key features

- Pure analog, discrete Class A equalization circuitry
- Digital storability and total recall with motorized controls and 800 presets
- Constant Q and proportional Q modes, selectable per filter band
- 124 V internal operating voltage for clean, consistent audio
- Discrete SPL SUPRA op-amps with 150 dB dynamic range
- Channel link mode for stereo applications
- Master/slave unit link mode for surround applications or subgroup processing allows remote control of up to four PQs via optional remote unit (still in development)
- As with all SPL products, the PQ is conceived, designed and hand-built in Germany

Installation

BEFORE SWITCHING ON POWER SUPPLY AND PQ, THE PQ MUST BE CONNECTED TO THE POWER SUPPLY WITH THE SUPPLIED MULTICORE LEAD. PAY ATTENTION TO A SECURE CONNECTION.

The PQ and the external power supply should be situated away from heat sources and direct sunlight. PQ and power supply need sufficient air circulation. Avoid installation in environments exposed to vibrations, dust, heat, cold, moisture or electrical and magnetic fields.

Do not install the unit in proximity to power amplifiers or digital processors. You may consider placing it in a rack containing other analog gear. Such placement can prevent interference from Word Clock, Smpte, MIDI, etc.

- Do not open the case. You may risk electric shock and may damage your equipment.
- Leave repairs and maintenance to a qualified service technician. Should foreign objects fall inside the case, contact your authorized dealer or support person.
- To avoid electric shock or fire hazards do not expose your unit to rain or dampness.
- In case of lightning unplug the power supply. Please unplug the cable by pulling on the plug only; never pull on the cable.
- Never force a switch or knob.
- To clean the case use a lint-free cloth. Avoid cleaning agents as they may damage the chassis.
- Please support the back of the unit whenever it is being mounted into a 19 inch rack (especially important when touring).

Setting the appropriate supply voltage

The appropriate supply voltage (115 V/230V) must be set on the rear panel of the external power supply. The fuse block (left from the power cord socket) can be inserted in two positions to meet your country's power requirements. Refer to the marks on the fuse block (triangles for both voltages) and insert the block with the appropriate triangle pointing to the white line on the fuse block case.

The power supply is fitted with 3,5 A fuses, slow blow.

Power-up sequence

It takes about four seconds until the power-up sequence is completed. During this procedure, all potentiometers will move to the center (12 o'clock) position and a test routine checks all 32 relays (you will notice 32 clearly audible relay clicks), while the display indicates "SETP" ("setup").

After finishing the power-up sequence the display shows *AAAA* and the unit is ready to operate.

Ground Lift switch

A switch labelled „GND LIFT“ is placed on the rear panel of the power supply. It serves to eliminate hum problems. This switch physically separates chassis ground from AC ground; GND LIFT is activated (=chassis ground separated) when the switch points downwards.

SPL High Gain Technology

SPL is constantly pushing analog signal processing to its limits by combining the best possible components with perfectly optimized circuit design. As our latest achievement in this ongoing process, SPL's High Gain Series surpasses the hitherto accepted limits of audio signal processing and combines truly unparalleled analog sound quality with the control and convenience of digital units.

The first High Gain Series product, the parametric equalizer PQ, was introduced at the AES Convention 2001 in Amsterdam and will be available in summer 2002. Further High Gain projects are in planning, including a microphone preamplifier and a compressor, although no availability projections can be made for these currently.

The PQ is a fully parametric, dual-channel 5-band equalizer. As with all SPL High Gain units, the PQ has an operating voltage of 124 V and is constructed with the best analog components available.

Power for sound: SPL SUPRA components

The central component of the PQ is a fundamentally new amplification design: discrete, custom made Class A audio operational amplifiers which run on a 120V operating voltage (+/- 60 V). This amounts to over three times the operating voltage found in most high quality audio gear (+/- 15-20 V) and about twice as much as the highest voltages used in the best units currently available.

This extremely high voltage allows the circuitry to process an astonishing dynamic range of ca. 150 dB and an amazing +34 dB of headroom, virtually eliminating overloading of individual filter stages—even when processing extremely high-level signals.

For the first time, transistor circuits with such an impressive degree of stability and freedom from harmonic distortion can be realized. After the revival of tube units in the early '90s, we feel that the time may be ripe for a revival of the „transistor sound“ in the near future.

Additional construction features

All crucial resistors in the I/O and filter circuits are subject to ultra-tight tolerances of 0.001% to ensure clean and accurate amplifier stage performance. All circuit board tracks are double-width (1 mm) and double-thickness (70 micrometers), guaranteeing stable high-gain operation with minimum resistivity. A separate grounding track is placed between signal track pairs, virtually eliminating crosstalk for maximum signal separation.

The individually switchable filter bands are self-contained on separate circuit boards. Contrary to most conventional equalizers, the bands are not summed via a central stage, so that the signal passes only through those filter stages which are activated.

Key Functions

Constant Q and proportional Q modes

Each frequency band consists essentially of two fully parametric equalizers: one for constant Q mode and one for proportional (or variable) Q mode, selectable per band. The PQ is the first equalizer to offer both modes, endowing it with double equalization power for demanding corrective and creative applications.

In constant Q mode, the selected bandwidth remains unaffected by the amplitude setting, making it the best choice for corrective applications (e.g. to eliminate unwanted frequencies). In proportional Q mode, the amplitude is reduced as the bandwidth is raised and vice versa. With the smallest bandwidth setting, the maximum amplitude reaches +/- 11.5 dB, while it is reduced to +/- 2.5 dB with the broadest bandwidth setting. The Proportional Q mode is better suited for creative, sound-shaping applications, as a bandwidth-related amplitude allows for sensible, musically suggestive operation – with raising bandwidths, higher amplitudes are increasingly less useful.

Controls

All variable controls are motorized and all keys are digitally controlled to provide the same programmability and repeatability of digital units. Individual settings can be stored in up to 800 presets.

Link mode

Channel 1 and 2 can be linked for coherent stereo operation and either channel can be designated as master. In link mode, coupled bands can be activated/deactivated simultaneously, while single bands may also be released from link mode if required for individual adjustment.

Master/Slave (unit link) mode

The PQ offers a Master/Slave mode for surround applications or subgroup processing, in which the settings on the master unit are precisely duplicated on the slave units. Thus the PQ is the first EQ system that provides up to eight channels for coherent analog equalization of surround recordings.

Remote Control Unit

SPL offers a remote control unit with an identical user interface to the PQ, which will be able to control up to four units—individually or in common.

Display

A central display clearly indicates all information relating to preset, storage and control functions. The control logic is clear and intuitive without menu layers, guaranteeing quick and easy operation and a minimal learning curve.

Motorized potentiometers

All of the PQ's potentiometers are motorized to accommodate the channel link and unit link functions. The adjustment range of the Frequency, Bandwidth and Amplitude potentiometers is evenly dispersed throughout the 300-degree movement area, ensuring smooth and continuous adjustments and extreme operational security. The high resolution of each respective value (e.g. Q from 0.1-3.7, evenly distributed over 300 degrees) allows extremely precise adjustments as well as accurate repeatability.

We intentionally avoided unnecessary or confusing functions such as frequency range switching or frequency, bandwidth or amplitude multipliers.

Important note: The motorized potentiometers should NEVER be manually moved or held while being controlled by the motors, e.g. in channel or unit link mode.

Amplitude

Amplitude settings are freely adjustable from -11.5 to + 11.5 dB. The lower range between 0 and 2.5 dB offers extremely high resolution, allowing delicate adjustments with maximum precision.

Frequency

Each channel provides five fully parametric frequency bands covering 10 Hz to 28 kHz. Each band overlaps its neighbor by one octave and can be independently activated and deactivated.

The following frequency bands are provided:

LF (Low Frequencies):	10 Hz - 235 Hz
LMF (Low Mid Frequencies):	35 Hz - 720 Hz
MF (Mid Frequencies):	330 Hz - 7.1 kHz
HMF (High Mid Frequencies):	670 Hz - 16 kHz
HF (High Frequencies):	1.2 kHz - 28 kHz

Bandwidth

Bandwidth is adjustable between 0.1 and 3.7 Q in proportional Q mode and between 0.9 and 15 Q in constant Q mode. The extremely high maximum bandwidth in constant Q mode enables tight, selective control in precision applications.

Illuminated keys

The PQ features illuminated keys that illuminate brightly when activated. The final software version will provide dimly lit keys (25% brightness) when deactivated for ease and security of operation. The current software version (240H) switches illumination off when keys are deactivated.

LF, LMF, MF, HMF and HF keys

These keys activate (key lamps lit) or deactivate (lamps off) the 10 filter bands.

Con. Q key

This key switches the 10 filter bands between proportional Q mode (lamps off) and constant Q mode (lamps on).

Please note: It is impossible to activate the "ON" for a specific band and the Con. Q button simultaneously. Please always press one of these buttons after another.

Channel Control Elements

LINK FUNCTION

The link function couples the two channels for stereo applications. In link mode, one channel's controls will control both channels simultaneously.

Note: The link function is not available in slave mode (unit link). If slave mode is activated, the link key is disabled and the Link LED is dark.

Master and slave channel

In the default state, the left channel acts as master in link mode. When the Link key is depressed (LED fully lit), the  On key blinks rapidly for about one second and then stays lit to indicate that the link function is activated with the left channel as master. In addition, the right channel's keys go dark, showing that it is being controlled by the left channel and its keys have no function.

To select the right channel as master, press and hold the Link key for two seconds. The Link,  On and On  keys blink rapidly, indicating that an entry is expected. Pressing the On  key at this time selects the right channel as master. Similarly, pressing the  On key selects the left channel. Once a channel is selected, the keys stop blinking, the Link key illuminates and the slave channel's keys go dark.

The  On and On  keys also allow you to bypass (or reactivate) the channels for monitoring purposes.

Releasing individual filter bands from channel link mode

In some cases it may be desirable to not link all filter bands, for example when processing individual stereo signals such as a wide stereo guitar signal. In such cases you may need to make separate adjustments of particular frequencies on each channel, necessitating the release of individual filter bands from link mode. To release a filter band, simply press and hold the respective filter band key on the „slave“ channel for approximately one second until the key illuminates. The filter band is now active and can be independently adjusted. To return the band to link mode, press the key again for approximately one second until it goes dark. The band will automatically assume the settings from the respective band in the master channel; any individual adjustments will be lost.

SLAVE FUNCTION

The slave function allows up to four PQs to be remote controlled by an optional remote unit (still in development) with an identical user interface. In order to activate the slave function, a Sub-D cable must be connected to the appropriate connector on the rear panel (Multi-Channel Link 1 & 2 / REMOTE) and recognized by the operating software.

MEMORY

The PQ provides 800 memory locations (presets). The presets are displayed as *AB00-AB00*.

Presets are selected via the Up/Down keys:

- Pressing the Up or Down key once steps through the presets in the respective direction.
- Holding the Up or Down key steps through the presets quickly in steps of ten.

When a preset is selected, the display indicates whether it is stored (contains data) or is empty. If an empty preset is selected, the letter „A“ in the display blinks; if a stored preset is selected, the letter „A“ does not blink:

- Preset *AB01* is empty: display shows „*AB01*“, „A“ blinks
- Preset *AB02* contains data: display shows „*AB02*“, „A“ does not blink

The currently active preset remains active until a newly selected preset is recalled (Recall key) or stored (Save key).

Storing your settings in an empty preset

1. Select an empty preset, e.g. *AB02* („A“ blinks)
2. Press the Save key. The display shows „*SAVE*“ for approximately one second
3. The preset is now stored. The display shows „*AB02*“ („A“ no longer blinks)

Overwriting a written preset

1. Select a written preset you wish to overwrite, e.g. *P003* („P“ does not blink)
2. Press the Save key. The display shows „*OVER*“, prompting you to confirm overwrite
3. Press the Save key again. The display shows „*SAVE*“ for approximately one second
4. The preset is now stored. The display shows „*P003*“ („P“ does not blink)

Overwriting the current preset

In order to facilitate ease of operation, there is no prompt for confirmation when overwriting the currently active preset. We suggest that you select either an empty preset or one you wish to overwrite before beginning with complex adjustments. Alternatively, you may store your settings in a new preset at an early stage and continue adjustments in that preset, storing as you go. As long as you store in the same „working“ preset, the prompt will be skipped and the store command will be executed immediately.

Recalling a preset

1. Select the desired preset, e.g. *P002* (Up/Down buttons). The display shows „*P002*“ („P“ does not blink).
2. Press the Recall key. The display shows „*RCL*“.
3. While switching from one preset to another, the PQ switches to a bypass mode. During this procedure, only the (bypassed) PQ input signal is audible. Depending on the recalled preset, switches and controls change status accordingly and the preset display changes to the chosen number „*P002*“ („P“ does not blink) when the recall procedure is finished.

Note: The motorized potentiometers may automatically move to adapt to the stored parameters. NEVER manually move or hold the potentiometers while recalling a preset.

CONNECTORS (rear panel)

Audio inputs and outputs are provided as balanced XLR connectors.

Connect the included external power supply to the multi-pin socket in the upper left corner, ensuring that the connection is secure.

The Multi-Channel Link 1/2 connectors are used to interconnect up to four PQ's, which are then remote controlled via an optional „master“ remote unit (still in development). The latter is connected to the Remote connector of the first „slave“ PQ.

Please note: To ensure secure connections, stable operation and optimal audio quality, always use professional-grade cables and connectors.

Technical Specifications

Input impedance (balanced): <i>(Welwyn precision resistors; transformerless)</i>	20 kOhm
Output impedance (balanced): <i>(CMR trimmers, transformerless)</i>	< 600 Ohm
Overload resistance: <i>(Band 1-5 = ON, B/C = o)</i>	+34 dB
Harmonic distortion:	@-30 dBu: 0.2% @-20 dBu: 0.05% @0 dBu: 0.01% @+10 dBu: 0.002% @+30 dBu: 0.0005%
S/N: <i>(Band 1-5 ON, B/C = o, each Q = Q1, Band 1 = 10 Hz, Band 2 = 100 Hz, Band 3 = 1 kHz, Band 4 = 10 kHz, Band 5 = 28 kHz)</i>	-90 dBu (A-weighted; -88 dBu w/o Filter)
Transmission bandwidth: <i>(-3 dB, Band 1-5 = ON, B/C = o)</i>	10 Hz-100 kHz
Processed frequency range:	10 Hz-28 kHz
Phase:	@ 10 Hz: +5.5° @ 1 kHz: 0° @ 10 kHz: -1.23° @ 100 kHz: -8.8° @ 200 kHz: -11.25°
CMRR: <i>(Max. Gain +34 dBu, Band 1-5 ON, B/C = o)</i>	> 75 dB @ 1 kHz
Housing & mounting dimensions:	Standard EIA 19 inch rack chassis, 4 units 482 x 176 x 390 mm W x H x D ca. 189 3/4 x 69 3/10 x 153 1/2 inch W x H x D
Weight:	18,25 kg/40,15 lbs

External power supply

The PQ comes with an external linear power supply featuring a toroidal transformer for optimal audio quality and dramatically reduced inductive disturbance/interference.

Input voltage:	110-120V/60 Hz or 220-240V/50Hz
Noise:	> -100 dBu (@ +/- 60 V)
Dimensions:	Width: 15 cm (5 9/10 inch) Depth: 24,5 cm (24 1/2 inch) Height: 7 cm (2 3/4 inch)
Weight:	4,2 kg (9,24 lbs)

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- 2) resulting from abnormal use of the product or use in violation of instructions, or
- 3) in products repaired or serviced by other than authorized SPL repair facilities, or
- 4) in products with removed or defaced serial numbers, or 5) in components or parts or products expressly warranted by another manufacturer.

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