

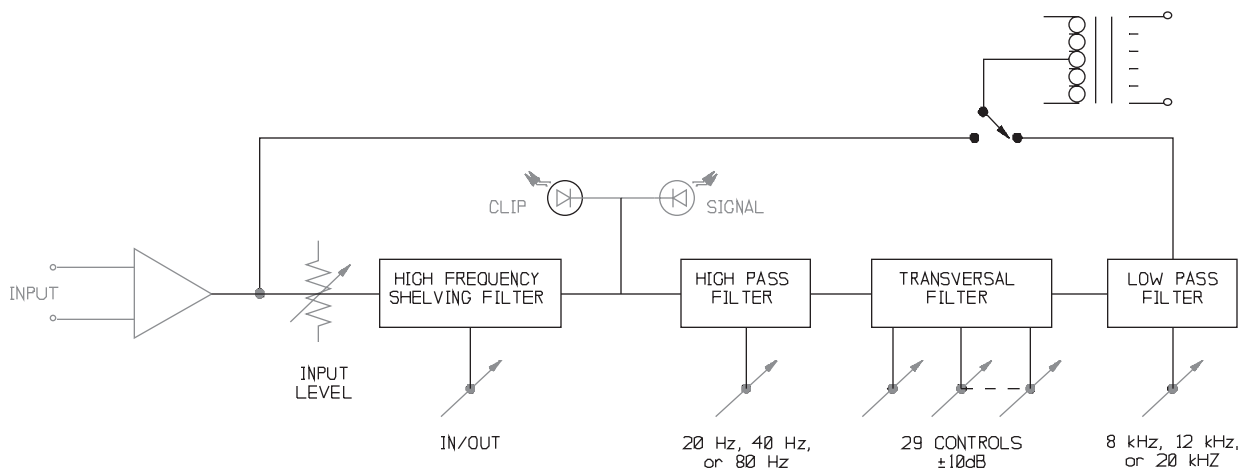
DESCRIPTION

The DG-4021 Equalizer is a compact minimum phase transversal filter system suitable for equalizing high quality sound systems. Unlike boost/cut or cut only equalizers, which use tuned (resonant) filters, the DG-4021 uses non-resonant circuits for the equalizing function. This enables the DG-4021 to produce equalization corrections without introducing extraneous frequency response ripple and unnecessary transient ringing.

The DG-4021 has twenty-nine level controls uniformly spaced on 1/3 octave ISO frequencies from 20 Hz to 20 kHz. Over a full 20dB range, these controls may be used as cut only, boost only, or cut/boost.

Input signal is applied through an active balanced input stage with 45kΩ impedance. Input level is controlled by a potentiometer. Normal signal levels are indicated by the SIGNAL LED. Clipping is indicated by the CLIP LED. High-pass Butterworth 18dB/octave filters control the low frequency cutoff with switch selected frequencies of 20 Hz, 40 Hz, or 80 Hz. The twenty-nine band controls ranging from a 32 Hz low-pass to a 20 kHz high-pass provide ± 10dB gain control in each band. Low-pass 12dB/octave Butterworth filters control the high frequency cutoff with switch selectable frequencies of 8 kHz, 12 kHz, or 20 kHz.

A high-pass shelving filter provides +10dB shelving and is +3.0dB @ 3.2 kHz, approximately 3.0dB/octave and completes the equalizing functions. This filter can compensate for high frequency loss of constant-directivity horns. The output is transformer isolated from chassis and circuit grounds and is suitable for driving 600Ω loads. Optionally, an active balanced output is available for those applications which do not require ground isolation, but which may benefit from improved frequency response and distortion. A switch enables the equalizing functions to be bypassed.



SIGNAL FLOW DIAGRAM

INSTALLATION

The DG-4021 is designed for mounting in a 19 inch rack. First, fasten to the rack by two screws, one each on diagonally opposite corners. The security panel, when used, is attached using the second set of holes. The mounting brackets supplied with the equalizer may be mounted to the chassis in either of two positions. As supplied, the controls are nearly flush with the front panel. If necessary the brackets may be moved forward by installing the two #10 screws through the rear holes of each bracket. This allows the front panel to be recessed an additional 5/8". Note that the security cover may be installed with the chassis in either position.

A temperature environment of less than 45°C (113°F) is recommended for trouble-free operation. Power line voltage of 115V AC \pm 10% @ 50/60 Hz (DG-4021A) or 230V AC \pm 10% @ 50/60 Hz (DG-4021B) is required for operation as shown on the identification tag on the rear panel. The power transformer has two input windings that are series connected for operation at 230V AC and parallel connected for 115V AC. Please consult the factory for instructions if a change is required.

Input and output connections are made on the rear of the chassis on terminal blocks. Labels on the connectors identify input, output and available ground connection points. Terminal block connections should be made with either ring tongue or split tongue (spade type) terminal lugs. The output circuit is transformer isolated from chassis and circuit grounds. Two wire shielded cables are recommended.

To avoid hum and noise, it is usually necessary to ensure that the chassis of the equalizer and associated instruments are connected to a common ground. Normally, the rack mounting screws provide common chassis grounding; however, grounding each instrument chassis with a separate wire to a common system ground point is recommended.

SET UP PROCEDURE

Any familiar method of equalization may be used for setting the band gains or attenuations. The following procedure will usually give good results in a sound system.

The method requires a pink noise source, a calibrated (preferable flat response) microphone and a 1/3 octave band analyzer. Drive the system with the pink noise source. Other system inputs should be turned off or disconnected.

1. Set all band controls to mid-range (0dB)*.
2. Set high frequency boost to FLAT position.
3. Set EQ to IN position.
4. Adjust level to cause the signal LED to light.
5. If the unequalized response gradually decreases above 3 kHz, the HI FREQ BOOST control may be set to the +10dB position.
6. The raw room response is equalized flat by using the 29 band controls in both boost and cut modes.
7. Adjust the 18dB/octave high-pass filter to reduce the low frequency response as required to eliminate reverberation and improve intelligibility and sound quality. A setting of 80 Hz is usually best for speech.
8. Move the measuring microphone to various locations and record response and/or control setting to produce an average best equalizer setting.
9. Trimming of response between the nominal control band frequencies can be easily accomplished by working adjacent controls against each other; i.e. a notch between control bands occurs when adjacent controls are equally cut. This is effective for removing room "ring" modes.
10. The INPUT LEVEL adjustment permits signal sources of varying level to be adjusted optimally into the dynamic range of the DG-4021. Signals with levels between 0.1 V_{RMS} and 10 V_{RMS} can be accommodated. Signals larger or smaller will require gain adjustment preceding the DG-4021. Proper adjustment will result in the red LED lighting only on unexpectedly high levels. The green signal LED should light on normal program material.

The BYPASS function bypasses the INPUT LEVEL control. Output levels are equal in BYPASS and in EQ IN when the 29 controls are set at 0 and the input gain control at 5.

*If cut only operation is desired, set all 29 band controls to full boost (+10dB).