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102/21, /D6, /D7 Parametric Equalizer with Remote Controls

Description, Features

The /21 Parametric Equalizer module is a two channel six band EQ with four parametric bands plus low and high cut filters. The module is controlled by the /D6 Master Remote Control plus optionally the /D7 Slave Remote Control which gives the convenience that both channels are accessible and displayed at the same time without need for switching the controls/display to either channel A or channel B. An alternative to the /D6 and /D7 panels is the PENGUIN system which is described elsewhere.

Operation

Before plugging in the /21 EQ processor module, the rotary switch on the last PCB has to be set of the proper position. This controls the device address which allows the Remote Control to communicate with this module. Usually only one EQ module is used within a system. Then this switch must be on position 0 (zero).

If more than one /21 is going to be used in a system then each of them has to be set to a different device address, starting with 0, 1, 2 etc.

The /D6 Master Remote Control has two DIP switches on the bottom right corner of the base board which set the mode of operation of the /D6. One /D6 can control one or two /21. If more than two /21 are used in a system then more than one /D6 is required.

The two DIP switches on the /D6 are set as follows:

Single Master Remote Control, single EQ Processor: DIP1 = on, DIP2 = off

Single Master Remote Control, two EQ Processors: DIP1 = off, DIP2 = don't care
allows to switch the Remote Control between EQ#1 and EQ#2

Two Master Remote Controls, two EQ Processors: 1st Remote: DIP1 = on, DIP2 = off
2nd Remote: DIP1 = on, DIP2 = on
gives the convenience of two Remote panels for two EQs

Two Master Remote Controls, four EQ Processors: Both Remotes: DIP1 = off,
DIP2 = don't care

The operation of the Remote Control is straightforward. Select the parameter to be changed with the appropriate switch so that the cursor points to the parameter and then turn the knob to change the parameter.

The 6 blue switches are explained under the "Technical Data of the /D6...." title.

Technical Data of the /21 Parametric Equalizer

Input Format: up to 24 bits internal format

Input Wordlength: up to 24 bits

Output Format: up to 24 bits internal format

Sampling Frequency: 44.1 kHz or 48.0 kHz

The EQ filter coefficients are switched depending on the sampling frequency to conserve the proper frequency response.

Processing precision: 32 bit floating point

Filter architecture: IIR type filter implemented in a very low noise filter architecture
Frontpanel elements: - 3 LEDs for sampling frequency display (invalid / 44.1k / 48.0k)
On board controls: - 1 rotary switch to set the device address of this particular module (see operation)
Power-up default: depends on remote control setting
Width of module: 60 mm (2 2/5 inch)

Technical Data of the /D6, /D7 Parametric Equalizer Remote Controls

Frontpanel elements:

Four rotary encoders (digital potentiometers) which control:
- first encoder: high frequency, high gain, high Q, high cut frequency, overall gain
- second encoder: mid1 frequency, mid1 gain
- third encoder: mid2 frequency, mid2 gain
- fourth encoder: low frequency, low gain, low Q, low cut frequency
Two switches control the low cut slope and the high cut slope
Two switches control the mid1 Q and the mid2 Q
One switch selects the variable input gain or reset to 0dB
Four switches assign the four encoders to the various parameters as given above
A block of six blue switches (on the /D6 Master Remote only) for the following functions:
EQ on bypass switch for the whole EQ, output is 24 bit clone of the input.
EQ # 1/2 Selects which EQ processor (/21) in the Main Frame is controlled, i.e. up to two /21 processors can be controlled from one remote control
CH# 1/2 Selects which of the channels is going to be controlled and displayed. This control is locked to channel # 1 when the Remote Control is switched to "ganged" (see below).
reset Resets the EQ to the default values
ganged if active, both channels 1 and 2 have the same settings and are controlled at once in parallel
safe when active all controls are locked

Parameter ranges:

Low, Mid1, Mid2, High frequency in Hertz: 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1.00k, 1.25k, 1.60k, 2.00k, 2.50k, 3.15k, 4.00k, 5.00k, 6.30k, 7.20k, 8.00k, 9.00k, 10.0k, 11.2k, 12.5k, 14.0k, 16.0k, 18.0k, 20.0k

High Cut frequency in Hertz: 1.25k, 1.60k, 2.00k, 2.50k, 3.15k, 4.00k, 5.00k, 6.30k, 7.20k, 8.00k, 9.00k, 10.0k, 11.2k, 12.5k, 14.0k, 16.0k, 18.0k, 20.0k

Low Cut frequency in Hertz: 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1.00k

High Cut, Low Cut slope: off, 6dB per octave, 12dB per octave

Low, Mid1, Mid2, High boost / cut in dB: -18, -16, -14, -12, -11, -10, -9, -8, -7, -6, -5.5, -5.0, -4.5, -4.0, -3.5, -3.0, -2.5, -2.0, -1.5, -1.0, -0.5, 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18

Mid1, Mid2 Q value: 8.6, 4.3, 2.5, 1.3, 0.8, 0.4

Low, High Q value: 8.6, 4.3, 2.5, 1.3, 0.8, 0.4, shelving

Overall Gain in dB: -20.0, -19.5, -19.0, -18.5, -18.0, -17.5, -17.0, -16.5, -16.0, -15.5, -15.0, -14.5, -14.0, -13.5, -13.0, -12.5, -12.0, -11.5, -11.0, -10.5, -10.0, -9.5, -9.0, -8.5, -8.0, -7.5, -7.0, -6.5, -6.0, -5.5, -5.0, -4.5, -4.0, -3.5, -3.0, -2.5, -2.0, -1.5, -1.0, -0.5, 0.0

Data sheet

102/75, /D20 Hum Filter with Remote Control

Description, Features

The 102/75 Hum Filter is a notch filter to eliminate hum frequencies. Up to six harmonics of hum can be filtered. The six notches can be switched on and off individually. The base frequency can be adjusted between 44 Hz and 68 Hz in 0.1 Hz steps. The harmonics are automatically adjusted to integer multiples of the base frequency, i.e. there are notches at 1, 2, 3, 4, 5 and 6 times the base frequency.

The /75 operates in two modes: The bandpass and the notch mode. The bandpass mode allows to hear the hum harmonics individually and thus they can be notched out individually as necessary.

Operation

No switches or jumpers have to be set on the /75 module. All functions are controlled from the /D20 Remote Control.

The /D20 Remote Control has two internal trimming potentiometers, one to set the display brightness, the other to set the display contrast. There are also two internal DIP switches, DIP switch #1 is used to set the reset default value of the base frequency to be either 50Hz or 60Hz. DIP switch #2 is not used. Set DIP switch #1 as follows:

DIP switch #1: on = 60 Hz reset default
off = 50 Hz reset default

The controls on the frontpanel of the /D20 Remote Control are as follows:

- The switches to the right of the display each switch one of the notch filters on and off (harmonics 1 thru 6). In the bandpass mode these switches keep their function, i.e. if a notch is on, the corresponding harmonic can not be heard.
- The "reset" switch on top resets all parameters to a default setting.
- The "on" switch puts the Hum Filter to bypass or to on.
- The "tune" switch enables the rotary encoder to change the base frequency. This switch has been included for safety reasons.
- The "mode: BR / BP" switch toggles between band reject (notch) and band pass mode.
- The "safe" switch sets all frontpanel controls safe.
- Over LEDs are provided for the left and the right channel.
- The LCD serves as display for the status of the notch filters and for the base frequency.

Suggested setup procedure:

Switch to bandpass mode with all notch filters on. No sound will be heard. Now switch the notch filters off individually, begin with the fundamental, e.g. 50Hz, notch # 1. If a hum harmonic can be heard when switch-ing off a notch filter, then first adjust the center frequency (hit tune switch and turn knob) for maximum level and

then switch the notch on again to cancel this particular harmonic. Note: the tuning has to be done only once, because all harmonics track each other in frequency. If no hum harmonic can be heard then leave the notch filter off, as it is not required. Set all six notch filters according to this procedure.

Technical Data of the /75 Hum Filter

Input Format: up to 24 bits internal format
Input Wordlength: up to 24 bits
Output Format: up to 24 bits internal format
Output Wordlength: up to 24 bits
Sampling Frequency: 32kHz..48kHz, the displayed frequencies are calibrated at 44.1kHz and 48kHz
Number of notches: 6, individually on/off switchable
Q of notches: 18
Processing precision: 32 bit floating point with special low noise filter algorithm
Frontpanel elements: none
On board controls: none
Power-up default: depends on remote control setting
Width of module: 30 mm (1 1/5 inch)

Technical Data of the /D20 Hum Filter Remote Control

Frontpanel elements:

One rotary encoder (digital potentiometer).
One LCD display for parameter display.
Two LEDs for over indication.
Switches:
A total of 11 switches with functions as described under "Operation".
Parameter ranges:
Base Frequency: 44Hz ... 68Hz in 0.1Hz steps

Data sheet

102/59, /D21 Variable Highpass Filter with Remote Control

Description, Features

< under construction >

The 102/59 Variable Highpass Filter is a low cut filter for low frequency noise and DC elimination. The corner frequency can be quickly changed by a fader.

Data sheet

102/7 Highpass Filter

Description, Features

< under construction >

The 102/7 Highpass Filter is a low cut filter for low frequency noise and DC elimination. The corner frequency can be selected by four switches to be 1, 15, 60 or 120 Hz. A fifth switch is for bypassing.

Data sheet

102/9, /9A DeEmphasis Filter and Time Control

Description, Features

< under construction >

The 102/9A DeEmphasis Filter does deemphasize an emphasized signal. The 102/9 module has a time delay feature in addition. This allows for coincident time correction of recordings with channels offset by a constant half sampling period interval.