5 The MIDI Interface

The MIDI interface has three facilities:

- MIDI Program Number
- MIDI Channel Number (1 - 16)
- MIDI Omni on/off.

5.1 MIDI Program Number

Through MIDI, the PPE can transmit and receive so-called program numbers (program change messages). Using an external controller (keyboard, sequencer, etc.), any preset can be recalled at will. For this purpose, each of the 64 presets of the PPE can be coupled to any of the MIDI program numbers of the MIDI controller. The coupling between MIDI program numbers and the presets is set using the <KEYPAD FUNCTION 1> (paragraph 6.1).

Now, whenever a PPE preset is recalled using the <RECALL> key, the equaliser will transmit the corresponding MIDI program number through MIDI, providing the MIDI function is activated. This facility enables synchronization to other equipment by activating PPE presets.

To enable the recall of presets by an external controller, the MIDI function must be activated. In addition, the PPE MIDI channel number must correspond with the incoming channel number.

5.2 MIDI Channel Number (1 - 16)

MIDI information can be sent over 16 channels, numbered 1 - 16. In this way, it is possible to connect 16 pieces of equipment using the same cable. Each piece of equipment is set to a unique channel number so that it receives only the information destined for it. The MIDI channel number is set using the <KEYPAD FUNCTION 2> (paragraph 6.2).

5.3 MIDI Omni on/off

Apart from receiving information from one particular channel, it is possible to receive the information from all channels, irrespective of the programmed channel number. For this purpose, the PPE has a MIDI "omni" facility. If the MIDI omni facility is off, only the information for the programmed channel will be received. If, on the other hand, the MIDI omni facility is on, the information from all channels will be received. The MIDI omni function can be switched on and off using <KEYPAD FUNCTION 3> (paragraph 6.3).

6 "Keypad" Functions

In addition to the usual equaliser functions, the PPE has eight so-called "keypad" functions. These functions are activated by pressing the relevant numeric key of the keypad (1 - 8) for 1 second. To leave a particular function, just press the <STORE> or <RECALL> key. If you press the <STORE> key for 1 second, any changes you have made will be stored. If you press the <RECALL> key, the changes will not be stored.

The keypad functions can be summarized as follows:

1 - MIDI program number - preset table editing
2 - MIDI channel number setting
3 - MIDI omni mode setting
4 - MIDI parameters reset
5 - "Preset only mode" setting
6 - Leveller adjustment
7 - Reset all presets
8 - Display of software version number and ID-code.

The eight keypad functions are described in the following Sections.

6.1 Changing the MIDI Program Number Preset Table

MIDI recognizes 128 program numbers (0 - 127). In the factory, program number 0 is coupled to preset 1-1, program number 1 to preset 1-2, program number 2 to preset 1-3, etc. Program number 63 is coupled to preset 8-8 and program number 64 is coupled to preset 1-1 again. The highest program number, 127, is coupled to preset 8-8.

NOTE: From software version 1.2 and up, the program numbers range from 0 - 127. If the software version of your PPE is 1.1 (see paragraph 6.8), the MIDI program numbers range from 1 - 128 and NOT 0 - 127. In this case, if you want to select for example MIDI program number 45, you should add a "1" and thus select program number 46.

However, you can couple the MIDI program numbers to the presets in any order you desire. Program numbers can be coupled to presets in the following manner:

Example

Assume you want to couple program number 5 to preset 3-8 and program number 31 to preset 7-2. First press numeric key "1" of the keypad for one second until the display shows:

		PrOG.	0	to	1 – 1

Press the <Q-FACTOR> <UP> key until the display shows:

		PrOG.	5	to	1 – 6

Now press the numeric keys "3" and "8" on the keypad. The display will then show:

		PrOG.	5	to	3 – 8

Then press the <Q-FACTOR> <UP> key until the display shows:

		PrOG.	31	to	4 – 8

Now press the numeric keys "7" then "2". The display will show:

		PrOG.	31	to	7 – 2

Leave the MIDI program change function be pressing <STORE> for one second. The changes just made will now be stored. The changes will be discarded if you leave the function by pressing <RECALL>.

In this way you can couple the 64 presets of the PPE to the 128 MIDI program numbers in any way desired. Because the MIDI numbering (0 - 127) is different from the PPE preset numbering (1-1 to 8-8), a table illustrating the default MIDI program number - PPE preset coupling is included on the following page.

Keypad

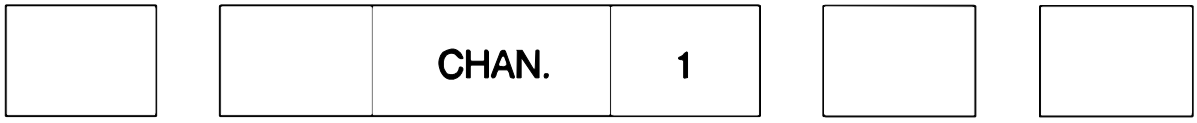
MIDI = PPE	MIDI = PPE	MIDI = PPE	MIDI = PPE	MIDI = PPE
0 = 1-1	13 = 2-6	26 = 4-3	39 = 5-8	52 = 7-5
1 = 1-2	14 = 2-7	27 = 4-4	40 = 6-1	53 = 7-6
2 = 1-3	15 = 2-8	28 = 4-5	41 = 6-2	54 = 7-7
3 = 1-4	16 = 3-1	29 = 4-6	42 = 6-3	55 = 7-8
4 = 1-5	17 = 3-2	30 = 4-7	43 = 6-4	56 = 8-1
5 = 1-6	18 = 3-3	31 = 4-8	44 = 6-5	57 = 8-2
6 = 1-7	19 = 3-4	32 = 5-1	45 = 6-6	58 = 8-3
7 = 1-8	20 = 3-5	33 = 5-2	46 = 6-7	59 = 8-4
8 = 2-1	21 = 3-6	34 = 5-3	47 = 6-8	60 = 8-5
9 = 2-2	22 = 3-7	35 = 5-4	48 = 7-1	61 = 8-6
10 = 2-3	23 = 3-8	36 = 5-5	49 = 7-2	62 = 8-7
11 = 2-4	24 = 4-1	37 = 5-6	50 = 7-3	63 = 8-8
12 = 2-5	25 = 4-2	38 = 5-7	51 = 7-4	

MIDI = PPE	MIDI = PPE	MIDI = PPE	MIDI = PPE	MIDI = PPE
64 = 1-1	77 = 2-6	90 = 4-3	103 = 5-8	116 = 7-5
65 = 1-2	78 = 2-7	91 = 4-4	104 = 6-1	117 = 7-6
66 = 1-3	79 = 2-8	92 = 4-5	105 = 6-2	118 = 7-7
67 = 1-4	80 = 3-1	93 = 4-6	106 = 6-3	119 = 7-8
68 = 1-5	81 = 3-2	94 = 4-7	107 = 6-4	120 = 8-1
69 = 1-6	82 = 3-3	95 = 4-8	108 = 6-5	121 = 8-2
70 = 1-7	83 = 3-4	96 = 5-1	109 = 6-6	122 = 8-3
71 = 1-8	84 = 3-5	97 = 5-2	110 = 6-7	123 = 8-4
72 = 2-1	85 = 3-6	98 = 5-3	111 = 6-8	124 = 8-5
73 = 2-2	86 = 3-7	99 = 5-4	112 = 7-1	125 = 8-6
74 = 2-3	87 = 3-8	100 = 5-5	113 = 7-2	126 = 8-7
75 = 2-4	88 = 4-1	101 = 5-6	114 = 7-3	127 = 8-8
76 = 2-5	89 = 4-2	102 = 5-7	115 = 7-4	

Table 6-1 MIDI program number - preset couplings.

6.2 Changing the MIDI Channel Number

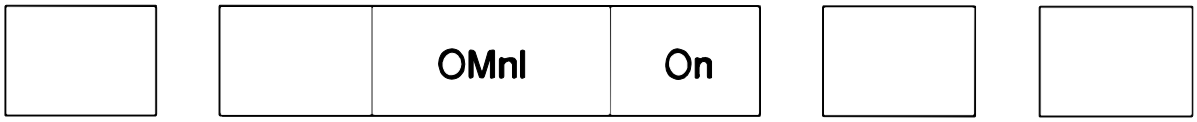
Press numeric key "2" of the keypad for one second until the display shows:



Use the <Q-FACTOR> <UP> and <DOWN> keys to change the channel number as desired. Press <STORE> to preserve any alternation or press <RECALL> to quit.

6.3 Setting the Omni Mode

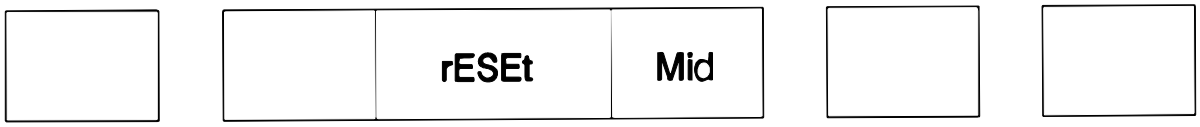
Press numeric key "3" of the keypad for one second until the display shows:



Use the <Q-FACTOR> <UP> and <DOWN> keys to turn the omni mode on or off as desired. Press <STORE> to preserve any alternation or press <RECALL> to quit.

6.4 Resetting MIDI Parameters

Press numeric key "4" of the keypad for one second until the display shows:



The "reset MIDI" function restores the program number - preset table to the system described in Section 6.1 (linear programming). The channel number is set to 1, while the omni mode is switched on.

This function (reset MIDI) is only executed if you leave this function by pressing the <STORE> key for one second. If you leave the function by pressing the <RECALL> key for one second, the MIDI parameters are not reset.

6.5 "Presets Only Mode" Adjustment

This confidential information is printed in chapter 13.1. Chapter 13 may be omitted in this manual for safety reasons.

6.6 Leveller Adjustment

This confidential information is printed in chapter 13.2. Chapter 13 may be omitted in this manual for safety reasons.

6.7 Resetting All Presets

Press numeric key "7" of the keypad for one second until the display shows:

	Pr.	rESEt			

This function resets all presets. This means that both the <INPUT LEVEL> and <OUTPUT LEVEL> controls will be set to OFF. The extra gain will be set to 0 dB. All <BOOST/CUT> parameters will be set to 0 dB. All <FREQUENCIES> will be set to the start value of the particular band (20 Hz, 60 Hz, 200 Hz and 600 Hz). All <Q-FACTORS> will be set to 1.0. The <EQ IN/OUT> functions will be switched IN and no bands will be <BYPASSED>. Furthermore, <DUAL TRACK> will be switched ON. The equaliser itself can be reset by activating a preset (for example 1-1) after executing this function.

This function (reset presets) is only executed if you leave this function by pressing the <STORE> key for one second. If you leave the function by pressing the <RECALL> key for one second, the presets are not reset.

6.8 Software Version Number, ID Code, and Filter Configuration

Press numeric key "8" of the keypad for one second until the display shows:

1.2	Id.	123			

This function displays the software version number in the left display. In addition, the ID code is displayed in the central display and the filter configuration is displayed in the right-hand display. The software version number shown here (1.2) is only an example: your software version number may be different. The ID code shown here (123) is also only an example. The ID code of your PPE can be found in the serial number on the rear of the equaliser. The last four numbers of the serial number form the ID code. The filter configuration shown here (parallel) is also an example: your filter configuration may be serial (SEr). For more information about the filter configuration, see chapter 11.

7 Special Functions

In addition to the keypad functions, the PPE has a number of special functions. These functions are described in this Chapter and comprise:

- Copying the Channel Settings
- "Presets Only Mode"
- "Leveller" Function

7.1 Copying the Channel Settings

The settings of the two channels can vary if the <DUAL TRACK> is inactive. In this case, the PPE has a function to copy the settings of channel 1 to channel 2 or vice versa. Select the number of the channel whose settings you want to copy using the <READOUT> key. Then press the <DUAL TRACK> key until both <READOUT> LEDs and the <DUAL TRACK> LED light up. Now release the <DUAL TRACK> key. The settings of one channel have now been copied to the other.

7.2 "Presets Only Mode"

In the "presets only mode" only presets can be activated. The rest of the operating functions are locked, with the exception of the readout functions. The presets only mode may be useful in situations where unauthorised alteration of preset settings is not desirable for any reason.

When the presets only mode is activated, the decimal point of the <BANK REGISTER> display travels from left to right. The display can then appear as follows:

bank-register: 1 – 3.

The presets only mode is activated using <KEYPAD FUNCTION 5>

7.3 "Leveller" Function

To help clarify the working of the PPE "leveller", the internal configuration is illustrated in the following diagram.

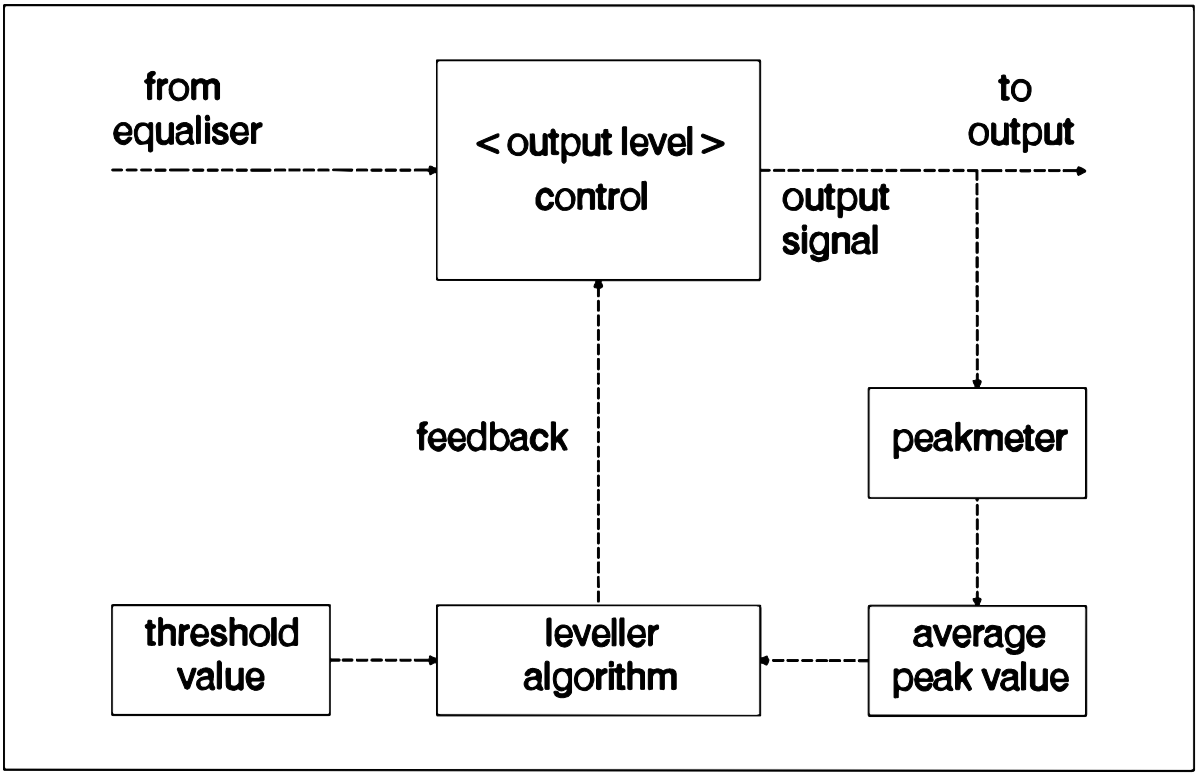


figure 7-1 Block diagram of the PPE 2410 leveller.

The peakmeter fixes the peaks of the output signal. Subsequently, the average value of these peaks is determined. This average peak value is passed to the leveller control algorithm in the microcomputer. The leveller algorithm compares the average peak value with the programmed threshold value.

The output signal is reduced via the <OUTPUT LEVEL> control if the threshold value is exceeded. When the output signal is again sufficiently below the threshold value, the signal is again amplified. The threshold value can be adjusted between 0 dBm and +15 dBm in steps of 1 dB (see paragraph 6.6). A flashing <OUTPUT LEVEL> display indicates that the leveller is active.

The speed of the output signal reduction is program dependent. This means that the attack is determined by the extent to which the threshold value is exceeded. The greater the excess, the faster the leveller reduction. This is also true for the speed with which the signal is again amplified (= release). If the output signal is small compared to the threshold value, the signal will be quickly amplified after levelling. The ratio between attack and release is 12.

The leveller can be activated using <KEYPAD FUNCTION 6> (see paragraph 6.6). The threshold value can also be set.

NOTE: Because most power amplifiers are fed with an input signal of 0 dBm to +6 dBm, it is possible that the threshold signal range of 0 dBm to +15 dBm is too high. To solve this problem, the output signal of the PPE can be reduced by 10 dB for example in the next piece of equipment. The threshold signal range is reduced to -10 dBm to +5 dBm using this method. If the PPE is used in combination with a Blue Box or PPA 1200, the reduction can take place in the input stage of the Blue Box or PPA 1200. To accomplish this, the <LEVEL> control in the Blue Box or PPA 1200 should be set to -10 dB.

8 "Power on/off" Functions

The following special functions can be activated by pressing one or more special keys while the PPE is being switched on.

- "Signal Present" Time Display
- Resetting the <LOCK> and <LOCK CODE>
- Activating the <BOOT> Mode

To deactivate these functions, switch off the PPE and then switch it on again in the normal way.

8.1 "Signal Present" Time Display

The "signal present" time of the equaliser is defined as the time during which the input signal level has been greater than -20 dB. This signal present time (in hours) can be displayed by pressing the EQ IN/OUT key of channel 1 while turning on the PPE. The signal present time can only be reset by a Stage Accompany dealer via SAnet using an IBM (compatible) PC.

8.2 Resetting the <LOCK> and <LOCK CODE>

This confidential information is printed in chapter 13.3. Chapter 13 may be omitted in this manual for safety reasons.

8.3 Activating the <BOOT> Mode

The PPE 2410 is provided with an electrically reprogrammable software memory. As a result, it is possible to update the software via SAnet, without having to open the casing.

To provide the PPE with new software, the so-called <BOOT> mode has to be activated. An IBM (compatible) PC can then be used to update the software via SAnet.

On/Off Functions

To activate the <BOOT> mode, press <BAND SELECT> keys 1 and 4 while switching on the PPE until the display shows:

. . .		boot	P	

The three dots in the left-hand display flash to indicate that the <BOOT> mode is active. The "P" in the right-hand display shows that the PPE already has software installed ("P" from programmed). If the software memory is empty or defective, the display will show "E" ("E" from empty). Contact your dealer for more information about updating the PPE via SAnet using an IBM (compatible) PC.

9 Parametric Equaliser, Bandwidth and Q-Factor

A parametric equaliser makes it possible to adjust three essential parameters of an equaliser completely independently from each other. These three parameters are:

- The amount of amplification or attenuation
- The frequency whereby the amplification or attenuation is a maximum
- The frequency region influenced by the equalisation.

The frequency region influenced by the equalisation is also called the bandwidth. The bandwidth is defined as the distance between the -3 dB frequencies of a band filter. This is illustrated in the following figure.

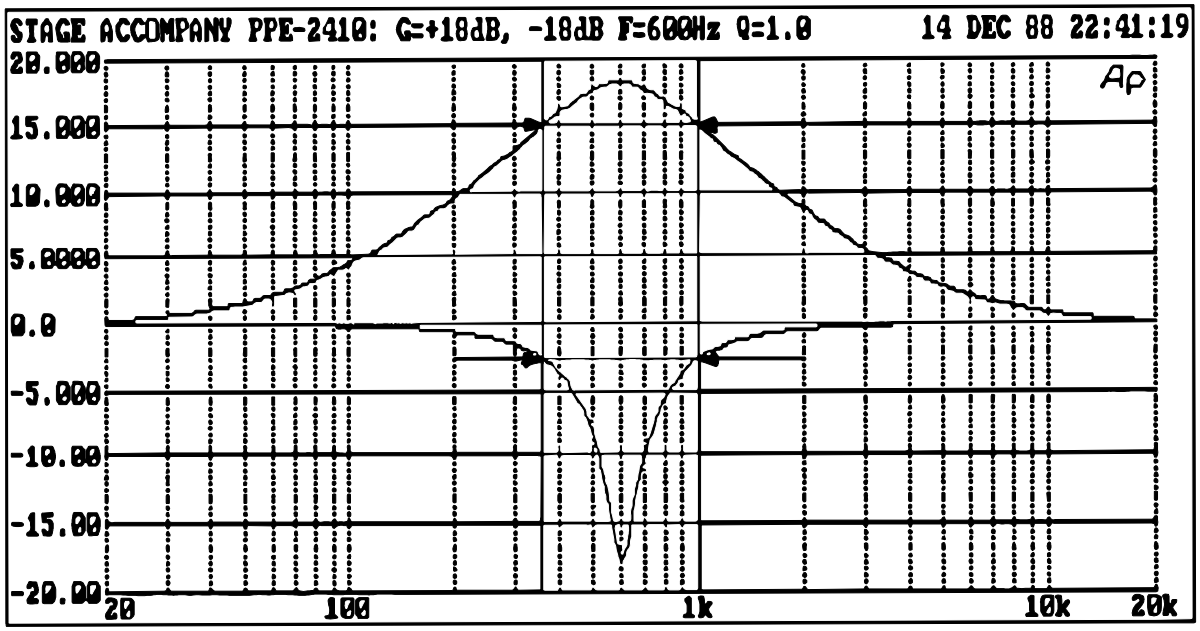


Figure 9-1 Characteristics at +/- 18 dB, 600 Hz, Q-factor = 1.0.