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**MICROPHONES AND ELECTRONIC COMPONENTS**

# Using the P4800 with AMX / Crestron Systems

## Wiring

The P4800 uses a standard 7 wire RS-232 port for control. Crestron and AMX controllers use 5 wire RS-232. In order to use a P4800 with Crestron or AMX, a custom cable will need to be built. The following diagram shows the cable. For a 5 volt supply, the resistor should be 1kohms.
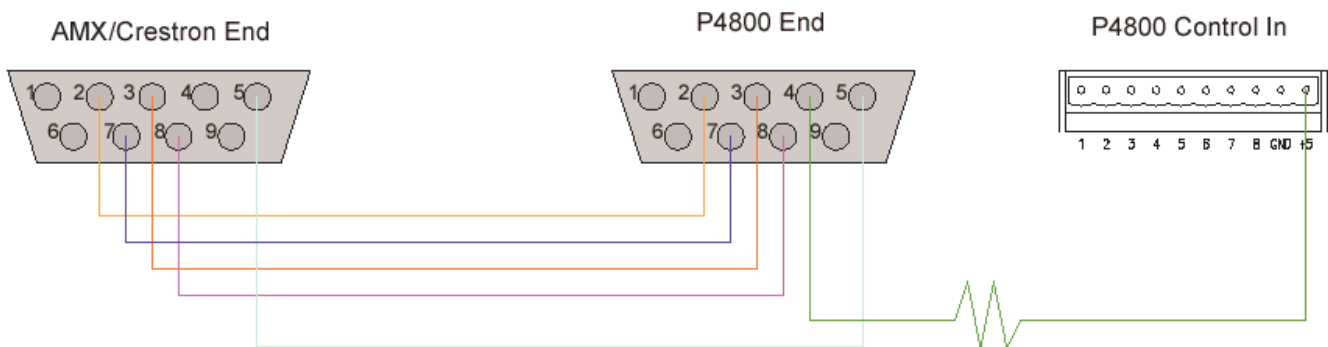


All wires are straight through. The 9 pin connectors have numbers stamped on them. Follow those stamped numbers for the pin out. Connect the RX, TX, GND, RTS, and CTS to the five wire RS-232 port on the control unit. The P4800 requires a voltage of 5 to 12 volts on the DTR line. This voltage tells the microprocessor to accept any data that it receives on the TX line.
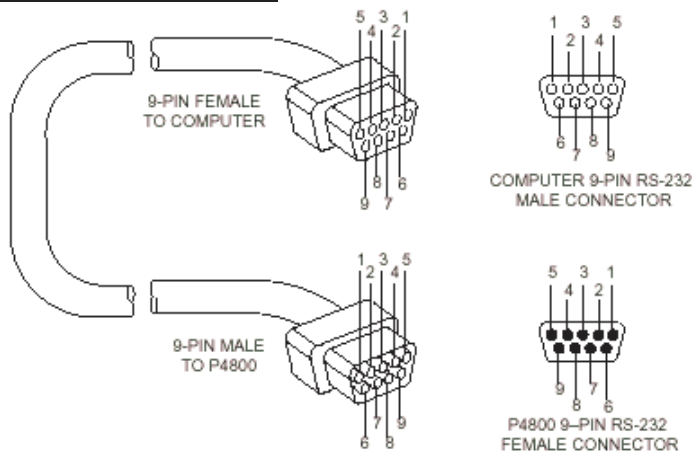
Computer Interface – RS232 Pinout



Table 1. RS-232 Pinout

| P4800 | COMPUTER | PIN # |
|-------|----------|-------|
| — | — | 1 |
| TX | RX | 2 |
| RX | TX | 3 |
| DTR | DTR | 4 |
| GND | GND | 5 |
| DSR | DSR | 6 |
| RTS | RTS | 7 |
| CTS | CTS | 8 |
| — | — | 9 |

Specifications
Baud: 19200
Data bits: 8
Stop bits: 1
Parity: none
Flow control: none

# P4800 RS232 Commands

# CHANGING PRESETS

The format to change presets is as follows:

      C*n*h **pp**h

Where **n** is the device ID set via the DIP switches on the P4800 unit (0 to 15), and **pp** is the preset number minus one. **pp** has a range from 0 to 127.

For example, if the P4800 is set to device ID 15 and preset #3 is desired, the string would look like:

      AMX:
```
SEND_STRING P4800,"$CF,$02"
```

      Crestron (SIMPL):
```
\xCF\x02
```

Once the command is sent, the P4800 will echo the command and then send a return string to acknowledge the change.

# CHANGE SETTINGS ON P4800

Note: <Device ID> is a hexadecimal number ranging from 00h to 0Fh. This number should match the DIP switch setting on the back of the P4800. Once a command is sent, the P4800 will echo the command and then send a return string to acknowledge the change. The return strings can be seen in the Query section of this white paper.

## <u>Inputs – Change Setting</u>

## <u>Mute</u>

### Toggle Mute

Input 1:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 04h 00h F7h
Input 2:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 05h 00h F7h
Input 3:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 06h 00h F7h
Input 4:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 07h 00h F7h

### Force Mute

Input 1:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 04h 7Fh F7h
Input 2:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 05h 7Fh F7h
Input 3:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 06h 7Fh F7h
Input 4:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 07h 7Fh F7h

### Force Unmute

Input 1:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 04h 00h F7h
Input 2:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 05h 00h F7h
Input 3:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 06h 00h F7h
Input 4:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 07h 00h F7h

## <u>Polarity</u>

### Toggle Polarity

Input 1:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 08h 00h F7h
Input 2:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 09h 00h F7h
Input 3:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 0Ah 00h F7h
Input 4:     F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h 0Bh 00h F7h

### Force Polarity (+)

Input 1:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 08h 00h F7h
Input 2:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 09h 00h F7h
Input 3:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 0Ah 00h F7h
Input 4:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 0Bh 00h F7h

### Force Polarity (-)

Input 1:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 08h 7Fh F7h
Input 2:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 09h 7Fh F7h
Input 3:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 0Ah 7Fh F7h
Input 4:     F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h 0Bh 7Fh F7h

## +4/-10 scaling

### Toggle

Input 1:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 06h 00h 0Ch 00h F7h
Input 2:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 06h 00h 0Dh 00h F7h
Input 3:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 06h 00h 0Eh 00h F7h
Input 4:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 06h 00h 0Fh 00h F7h

### Force +4 dBu scaling

Input 1:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Ch 00h F7h
Input 2:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Dh 00h F7h
Input 3:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Eh 00h F7h
Input 4:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Fh 00h F7h

### Force –10 dBV scaling

Input 1:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Ch 7Fh F7h
Input 2:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Dh 7Fh F7h
Input 3:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Eh 7Fh F7h
Input 4:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 01h 00h 0Fh 7Fh F7h

## Volume control

### Set volume to a specific value

Input 1:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 00h 00h 00h &lt;VA&gt; F7h
Input 2:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 00h 00h 01h &lt;VA&gt; F7h
Input 3:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 00h 00h 02h &lt;VA&gt; F7h
Input 4:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 00h 00h 03h &lt;VA&gt; F7h

where, &lt;VA&gt; = [ 2 * (Control Setting) ] & 7Fh
        i.e., multiply the control setting by 2 and then logically AND that product with 7Fh.

The valid range for "Control Setting" is (-30) to (30). Each integer increase (or decrease) in the Control Setting is equal to 1 dB change.

### Increase/Decrease volume by a relative amount

Input 1:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 04h 00h 00h &lt;VA&gt; F7h
Input 2:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 04h 00h 01h &lt;VA&gt; F7h
Input 3:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 04h 00h 02h &lt;VA&gt; F7h
Input 4:     F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 69h 04h 00h 03h &lt;VA&gt; F7h

where, &lt;VA&gt; =  [2 * (dB Change) ] & 7Fh
        i.e., multiply the amount of change (in dB) by 2 and then logically AND that product with 7Fh. For example, to decrease the volume by 2 dB:

        &lt;VA&gt; = [2 * (-2)] & 7Fh
        &lt;VA&gt; = [-4] & 7Fh
        &lt;VA&gt; = 7Ch

It is not necessary to calculate this equation by hand. Both AMX and Crestron can be programmed to calculate this equation.

**Mute**

### Toggle mute

Output 1:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 46h 00h F7h
Output 2:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 47h 00h F7h
Output 3:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 48h 00h F7h
Output 4:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 49h 00h F7h
Output 5:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 4Ah 00h F7h
Output 6:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 4Bh 00h F7h
Output 7:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 4Ch 00h F7h
Output 8:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 4Dh 00h F7h

### Force mute

Output 1:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 46h 7Fh F7h
Output 2:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 47h 7Fh F7h
Output 3:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 48h 7Fh F7h
Output 4:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 49h 7Fh F7h
Output 5:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Ah 7Fh F7h
Output 6:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Bh 7Fh F7h
Output 7:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Ch 7Fh F7h
Output 8:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Dh 7Fh F7h

### Force unmute

Output 1:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 46h 00h F7h
Output 2:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 47h 00h F7h
Output 3:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 48h 00h F7h
Output 4:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 49h 00h F7h
Output 5:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Ah 00h F7h
Output 6:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Bh 00h F7h
Output 7:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Ch 00h F7h
Output 8:    F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Dh 00h F7h

**Polarity**

### Toggle polarity

Output 1:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 4Eh 00h F7h
Output 2:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 4Fh 00h F7h
Output 3:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 50h 00h F7h
Output 4:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 51h 00h F7h
Output 5:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 52h 00h F7h
Output 6:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 53h 00h F7h
Output 7:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 55h 00h F7h
Output 8:    F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 55h 00h F7h

**Force polarity (+)**

Output 1:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Eh 00h F7h
Output 2:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Fh 00h F7h
Output 3:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 50h 00h F7h
Output 4:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 51h 00h F7h
Output 5:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 52h 00h F7h
Output 6:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 53h 00h F7h
Output 7:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 55h 00h F7h
Output 8:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 55h 00h F7h

**Force polarity (-)**

Output 1:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Eh 7Fh F7h
Output 2:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 4Fh 7Fh F7h
Output 3:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 50h 7Fh F7h
Output 4:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 51h 7Fh F7h
Output 5:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 52h 7Fh F7h
Output 6:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 53h 7Fh F7h
Output 7:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 55h 7Fh F7h
Output 8:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 55h 7Fh F7h

## +4/-10 scaling

### Toggle scaling

Output 1:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 56h 00h F7h
Output 2:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 57h 00h F7h
Output 3:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 58h 00h F7h
Output 4:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 59h 00h F7h
Output 5:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 5Ah 00h F7h
Output 6:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 5Bh 00h F7h
Output 7:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 5Ch 00h F7h
Output 8:   F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 5Dh 00h F7h

### Force +4 dBu scaling

Output 1:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 56h 00h F7h
Output 2:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 57h 00h F7h
Output 3:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 58h 00h F7h
Output 4:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 59h 00h F7h
Output 5:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Ah 00h F7h
Output 6:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Bh 00h F7h
Output 7:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Ch 00h F7h
Output 8:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Dh 00h F7h

### Force –10 dBV scaling

Output 1:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 56h 7Fh F7h
Output 2:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 57h 7Fh F7h
Output 3:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 58h 7Fh F7h
Output 4:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 59h 7Fh F7h
Output 5:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Ah 7Fh F7h
Output 6:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Bh 7Fh F7h
Output 7:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Ch 7Fh F7h
Output 8:   F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Dh 7Fh F7h

## Output Pad (-20 dB)

### Toggle pad

Output 1:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 5Eh 00h F7h
Output 2:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 5Fh 00h F7h
Output 3:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 60h 00h F7h
Output 4:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 61h 00h F7h
Output 5:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 62h 00h F7h
Output 6:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 63h 00h F7h
Output 7:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 64h 00h F7h
Output 8:  F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 03h 65h 00h F7h

### Force pad off

Output 1:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Eh 00h F7h
Output 2:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Fh 00h F7h
Output 3:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 60h 00h F7h
Output 4:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 61h 00h F7h
Output 5:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 62h 00h F7h
Output 6:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 63h 00h F7h
Output 7:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 64h 00h F7h
Output 8:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 65h 00h F7h

### Force pad on

Output 1:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Eh 7Fh F7h
Output 2:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 5Fh 7Fh F7h
Output 3:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 60h 7Fh F7h
Output 4:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 61h 7Fh F7h
Output 5:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 62h 7Fh F7h
Output 6:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 63h 7Fh F7h
Output 7:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 64h 7Fh F7h
Output 8:  F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 03h 65h 7Fh F7h

## Volume Control

### Set volume to a specific value

Output 1:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 3Eh <VA> F7h
Output 2:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 3Fh <VA> F7h
Output 3:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 40h <VA> F7h
Output 4:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 41h <VA> F7h
Output 5:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 42h <VA> F7h
Output 6:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 43h <VA> F7h
Output 7:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 44h <VA> F7h
Output 8:  F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 03h 45h <VA> F7h

where, <VA> = [ 2 * (Control Setting) ] & 7Fh
        i.e., multiply the control setting by 2 and then logically AND that product with 7Fh.

The valid range for "Control Setting" is (-30) to (30). Each integer increase (or decrease) in the Control Setting is equal to 1 dB change.

**Increase/Decrease volume by a relative amount**

Output 1:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 3Eh <VA> F7h
Output 2:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 3Fh <VA> F7h
Output 3:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 40h <VA> F7h
Output 4:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 41h <VA> F7h
Output 5:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 42h <VA> F7h
Output 6:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 43h <VA> F7h
Output 7:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 44h <VA> F7h
Output 8:    F0h 00h 01h 00h <Device ID> 0Ah 69h 04h 03h 45h <VA> F7h

where, <VA> =  [2 * (dB Change) ] & 7Fh
        i.e., multiply the amount of change (in dB) by 2 and then logically AND that product with 7Fh. For example, to decrease the volume by 2 dB:

        <VA> = [2 * (-2)] & 7Fh
        <VA> = [-4] & 7Fh
        <VA> = 7Ch

    It is not necessary to calculate this equation by hand. Both AMX and Crestron can be programmed to calculate this equation.

## Matrix Mixer – Change Settings

The matrix mixer signal processor in the P4800 unit has 4 inputs and N outputs (NOUTPUTS). When there is no cross over processor or splitter in the preset, N is 8, i.e. a 4 x 8 mixer. If there is a cross over or splitter, N is reduced by the number of cross over/splitter channels minus one.

For example: One 3-way cross over in the preset makes the matrix mixer a 4 x 6 mixer.

NMIXPOINTS is defined as:
    NMIXPOINTS = 4 * NOUTPUTS

Therefore, a 4 x 8 mixer has 32 mixpoints (NMIXPOINTS=32), a 4x6 has 24 mixpoints (NMIXPOINTS=24).

Mix Point 1 gain is input channel 1 gain for matrix mixer output 1
Mix Point 2 gain is input channel 2 gain for matrix mixer output 1
Mix Point 3 gain is input channel 3 gain for matrix mixer output 1
Mix Point 4 gain is input channel 4 gain for matrix mixer output 1

Mix Point 5 gain is input channel 1 gain for matrix mixer output 2
Etc.

## Mute – Mixpoint

Note:        <ID> = NMIXPOINTS + 15 + (Mix Point #)

**Toggle Mute**

F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h <ID> 00h F7h

**Force Mute**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h <ID> 7Fh F7h

**Force Unmute**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h <ID> 00h F7h

## Mute – Mixer Output

Note:  The <IDMSB> and <IDLSB> values must be calculated as follows:

    <IDMSB> = [((4 * NMIXPOINTS) + NOUTPUTS + 15 + (NOutput #)) >> 7] & 7Fh
    <IDLSB> = ((4 * NMIXPOINTS) + NOUTPUTS + 15 + (NOutput #)) & 7Fh

    where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

**Toggle Mute (BUG – DOES NOT WORK)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 06h <IDMSB> <IDLSB> 00h F7h

**Force Mute**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h <IDMSB <IDLSB> 7Fh F7h

**Force Unmute**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h <IDMSB> <IDLSB> 00h F7h

## Polarity – Mixpoint

Note:         <ID> = (2 * NMIXPOINTS) + 15 + (Mix Point #)

**Toggle Polarity**

F0h 00h 01h 00h <Device ID> 0Ah 69h 06h 00h <ID> 00h F7h

**Force Polarity (+)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h <ID> 00h F7h

**Force Polarity (-)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h 00h <ID> 7Fh F7h

## Polarity – Mixer Output

Note:  The <IDMSB> and <IDLSB> values must be calculated as follows:

<IDMSB> = [((4 * NMIXPOINTS) + (2 * NOUTPUTS) + 15 + (NOutput #)) >> 7] & 7Fh
<IDLSB> = ((4 * NMIXPOINTS) + (2 * NOUTPUTS) + 15 + (NOutput #)) & 7Fh

where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

**Toggle Polarity (BUG – DOES NOT WORK)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 06h <IDMSB> <IDLSB> 00h F7h

**Force Polarity (+)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h <IDMSB> <IDLSB> 00h F7h

**Force Polarity (-)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h <IDMSB> <IDLSB> 7Fh F7h

## Volume Control – Mixpoint

Note:         <ID> = (Mix Point #) + 15

**Set volume to a specific value**

F0h 00h 01h 00h <Device ID> 0Ah 69h 00h 00h <ID> <VA> F7h

where, <VA> = (Control Setting) & 7Fh
            i.e., logically AND the control setting with 7Fh.

The valid range for "Control Setting" is (0) to (127) from the following table.

| Control Setting | |
|---|---|
| <VA> | Gain value (dB) |
| 0 | -Infinity |
| 1-26 | -105 to –42.5, in 2.5 dB steps |
| 27-127 | -40.0 to +10.0, in 0.5 dB steps |

**Increase/Decrease volume by a relative amount**

F0h 00h 01h 00h <Device ID> 0Ah 69h 05h 00h <ID> <VA> F7h

where, <VA> =  [2 * (dB Change) ] & 7Fh
    i.e., multiply the amount of change (in dB) by 2 and then logically AND that product with 7Fh.

## Volume Control – Mixer Output

Note:  The <IDMSB> and <IDLSB> values must be calculated as follows:

      <IDMSB> = [((4 * NMIXPOINTS) + 15 + (NOutput #)) >> 7] & 7Fh
      <IDLSB> = ((4 * NMIXPOINTS) + 15 + (NOutput #)) & 7Fh

      where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

**Set volume to a specific value**

F0h 00h 01h 00h <Device ID> 0Ah 69h 00h <IDMSB> <IDLSB> <VA> F7h

where, <VA> = (Control Setting) & 7Fh
        i.e., logically AND the control setting with 7Fh.

The valid range for "Control Setting" is (0) to (127) from the following table.

| Control Setting | |
|---|---|
| <VA> | Gain value (dB) |
| 0 | -Infinity |
| 1-26 | -105 to –42.5, in 2.5 dB steps |
| 27-127 | -40.0 to +10.0, in 0.5 dB steps |

**Increase/Decrease volume by a relative amount (BUG – DOES NOT WORK)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 05h <IDMSB> <IDLSB> <VA> F7h

where, <VA> =  [2 * (dB Change) ] & 7Fh
    i.e., multiply the amount of change (in dB) by 2 and then logically AND that product with 7Fh.

## Activate Mixpoint (route an input to an output)

Note:  The <IDMSB> and <IDLSB> values must be calculated as follows:

<IDMSB> = [((3 * NMIXPOINTS) + 15 + (Mix Point #)) >> 7] & 7Fh
<IDLSB> = ((3 * NMIXPOINTS) + 15 + (Mix Point #)) & 7Fh

where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

**Toggle Activation (BUG – DOES NOT WORK)**

F0h 00h 01h 00h <Device ID> 0Ah 69h 06h <IDMSB> <IDLSB> 00h F7h

**Force Activation**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h <IDMSB> <IDLSB> 7Fh F7h

**Force Deactivation**

F0h 00h 01h 00h <Device ID> 0Ah 69h 01h <IDMSB> <IDLSB> 00h F7h

# QUERYING THE P4800 TO FIND OUT ITS SETTINGS

The following list of commands can be sent to the P4800 to query the status of its settings. After the query command is sent, the P4800 will first send an echo of the query command and then it will send a return string with the status of the particular setting.

### Inputs – Query Settings

#### Mute

Note:     <VA> equals 00h when the input is unmuted and equals 7Fh when the input is muted.

| | | |
|---|---|---|
| Input 1: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 04h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 04h <VA> 00h F7h |
| Input 2: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 05h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 05h <VA> 00h F7h |
| Input 3: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 06h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 06h <VA> 00h F7h |
| Input 4: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 07h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 07h <VA> 00h F7h |

#### Polarity

Note:     <VA> equals 00h when the input is (+) polarity and equals 01h when the input is (-) polarity.

| | | |
|---|---|---|
| Input 1: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 08h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 08h <VA> 00h F7h |
| Input 2: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 09h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 09h <VA> 00h F7h |
| Input 3: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 0Ah F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 0Ah <VA> 00h F7h |
| Input 4: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 0Bh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 0Bh <VA> 00h F7h |

#### +4/-10 scaling

Note:     <VA> equals 00h when the input is +4 dBu scaling and equals 01h when the input is –10 dBV scaling.

| | | |
|---|---|---|
| Input 1: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 0Ch F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 0Ch <VA> 00h F7h |
| Input 2: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 0Dh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 0Dh <VA> 00h F7h |
| Input 3: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 0Eh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 0Eh <VA> 00h F7h |
| Input 4: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 00h 0Fh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h 0Fh <VA> 00h F7h |

**Volume setting**

Note:  &lt;VA&gt; equals an integer from –60 to +60. Divide &lt;VA&gt; by 2 to get to a dB scale.

| | | |
|---|---|---|
| Input 1: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 00h 00h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 00h 00h &lt;VA&gt; 00h F7h |
| Input 2: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 00h 01h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 00h 01h &lt;VA&gt; 00h F7h |
| Input 3: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 00h 02h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 00h 02h &lt;VA&gt; 00h F7h |
| Input 4: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 00h 03h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 00h 03h &lt;VA&gt; 00h F7h |

## Mute

Note: &lt;VA&gt; equals 00h when the output is unmuted and equals 7Fh when the output is muted.

| | | |
|---|---|---|
| Output 1: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 46h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 46h &lt;VA&gt; 00h F7h |
| Output 2: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 47h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 47h &lt;VA&gt; 00h F7h |
| Output 3: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 48h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 48h &lt;VA&gt; 00h F7h |
| Output 4: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 49h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 49h &lt;VA&gt; 00h F7h |
| Output 5: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 4Ah F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 4Ah &lt;VA&gt; 00h F7h |
| Output 6: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 4Bh F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 4Bh &lt;VA&gt; 00h F7h |
| Output 7: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 4Ch F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 4Ch &lt;VA&gt; 00h F7h |
| Output 8: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 4Dh F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 4Dh &lt;VA&gt; 00h F7h |

## Polarity

Note: &lt;VA&gt; equals 00h when the output is (+) polarity and equals 01h when the output is (-) polarity.

| | | |
|---|---|---|
| Output 1: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 4Eh F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 4Eh &lt;VA&gt; 00h F7h |
| Output 2: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 4Fh F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 4Fh &lt;VA&gt; 00h F7h |
| Output 3: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 50h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 50h &lt;VA&gt; 00h F7h |
| Output 4: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 51h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 51h &lt;VA&gt; 00h F7h |
| Output 5: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 52h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 52h &lt;VA&gt; 00h F7h |
| Output 6: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 53h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 53h &lt;VA&gt; 00h F7h |
| Output 7: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 54h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 54h &lt;VA&gt; 00h F7h |
| Output 8: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 55h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 55h &lt;VA&gt; 00h F7h |

## +4/-10 scaling

Note: &lt;VA&gt; equals 00h when the output is +4 dBu scaling and equals 01h when the output is –10 dBV scaling.

| | | |
|---|---|---|
| Output 1: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 56h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 56h &lt;VA&gt; 00h F7h |
| Output 2: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 57h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 57h &lt;VA&gt; 00h F7h |
| Output 3: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 58h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 58h &lt;VA&gt; 00h F7h |
| Output 4: | Query command: | F0h 00h 01h 00h &lt;Device ID&gt; 0Ah 70h 03h 59h F7h |
| | Return string: | F0h 00h 01h 00h &lt;Device ID + 10h&gt; 0Ah 00h 03h 59h &lt;VA&gt; 00h F7h |

| Output 5: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 5Ah F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 5Ah <VA> 00h F7h |
| Output 6: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 5Bh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 5Bh <VA> 00h F7h |
| Output 7: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 5Ch F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 5Ch <VA> 00h F7h |
| Output 8: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 5Dh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 5Dh <VA> 00h F7h |

## Output Pad (-20 dB)

Note:    <VA> equals 00h when the output pad is not engaged and equals 01h when the output pad is engaged.

| Output 1: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 5Eh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 5Eh <VA> 00h F7h |
| Output 2: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 5Fh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 5Fh <VA> 00h F7h |
| Output 3: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 60h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 60h <VA> 00h F7h |
| Output 4: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 61h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 61h <VA> 00h F7h |
| Output 5: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 62h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 62h <VA> 00h F7h |
| Output 6: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 63h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 63h <VA> 00h F7h |
| Output 7: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 64h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 64h <VA> 00h F7h |
| Output 8: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 65h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 65h <VA> 00h F7h |

## Volume setting

Note:    <VA> equals an integer from –60 to +60. Divide <VA> by 2 to get to a dB scale.

| Output 1: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 3Eh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 3Eh <VA> 00h F7h |
| Output 2: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 3Fh F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 3Fh <VA> 00h F7h |
| Output 3: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 40h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 40h <VA> 00h F7h |
| Output 4: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 41h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 41h <VA> 00h F7h |
| Output 5: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 42h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 42h <VA> 00h F7h |
| Output 6: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 43h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 43h <VA> 00h F7h |
| Output 7: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 44h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 44h <VA> 00h F7h |
| Output 8: | Query command: | F0h 00h 01h 00h <Device ID> 0Ah 70h 03h 45h F7h |
| | Return string: | F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 03h 45h <VA> 00h F7h |

**Matrix Mixer – Query Settings**

**Mute – Mixpoint**

Note:    <VA> equals 00h when the mixpoint is unmuted and equals 7Fh when the mixpoint is muted.
         <ID> = NMIXPOINTS + 15 + (Mix Point #)

    Query command:    F0h 00h 01h 00h <Device ID> 0Ah 70h 00h <ID> F7h
    Return string:    F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h <ID> <VA> 00h F7h

**Mute – Mixer Output**

Note:    <VA> equals 00h when the mixer output is unmuted and equals 7Fh when the mixer output is muted.
         The <IDMSB> and <IDLSB> values must be calculated as follows:

         <IDMSB> = [((4 * NMIXPOINTS) + NOUTPUTS + 15 + (NOutput #)) >> 7] & 7Fh
         <IDLSB> = ((4 * NMIXPOINTS) + NOUTPUTS + 15 + (NOutput #)) & 7Fh

         where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

    Query command:    F0h 00h 01h 00h <Device ID> 0Ah 70h <IDMSB> <IDLSB> F7h
    Return string:    F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h <IDMSB> <IDLSB> <VA> 00h F7h

**Polarity – Mixpoint**

Note:    <VA> equals 00h when the mixpoint is (+) polarity and equals 01h when the mixpoint is (-) polarity.
         <ID> = (2 * NMIXPOINTS) + 15 + (Mix Point #)

    Query command:    F0h 00h 01h 00h <Device ID> 0Ah 70h 00h <ID> F7h
    Return string:    F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h <ID> <VA> 00h F7h

**Polarity – Mixer Output**

Note:    <VA> equals 00h when the mixer output is (+) polarity and equals 01h when the mixer output is (-) polarity.
         The <IDMSB> and <IDLSB> values must be calculated as follows:

         <IDMSB> = [((4 * NMIXPOINTS) + (2 * NOUTPUTS) + 15 + (NOutput #)) >> 7] & 7Fh
         <IDLSB> = ((4 * NMIXPOINTS) + (2 * NOUTPUTS) + 15 + (NOutput #)) & 7Fh

         where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

    Query command:    F0h 00h 01h 00h <Device ID> 0Ah 70h <IDMSB> <IDLSB> F7h
    Return string:    F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h <IDMSB> <IDLSB> <VA> 00h F7h

### Volume Control – Mixpoint

Note:   <ID> = (Mix Point #) + 15
        <VA> equals the settings in the following table.

| <VA> | Gain value (dB) |
|------|-----------------|
| 0 | -Infinity |
| 1-26 | -105 to –42.5, in 2.5 dB steps |
| 27-127 | -40.0 to +10.0, in 0.5 dB steps |

Query command:   F0h 00h 01h 00h <Device ID> 0Ah 70h 00h <ID> F7h
Return string:   F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h 00h <ID> <VA> 00h F7h

### Volume Control – Mixer Output

Note:   The <IDMSB> and <IDLSB> values must be calculated as follows:

   <IDMSB> = [((4 * NMIXPOINTS) + 15 + (NOutput #)) >> 7] & 7Fh
   <IDLSB> = ((4 * NMIXPOINTS) + 15 + (NOutput #)) & 7Fh

   where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

   <VA> equals the settings in the following table.

| <VA> | Gain value (dB) |
|------|-----------------|
| 0 | -Infinity |
| 1-26 | -105 to –42.5, in 2.5 dB steps |
| 27-127 | -40.0 to +10.0, in 0.5 dB steps |

Query command:   F0h 00h 01h 00h <Device ID> 0Ah 70h <IDMSB> <IDLSB> F7h
Return string:   F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h <IDMSB> <IDLSB> <VA> 00h F7h

### Activate Mixpoint (route an input to an output)

Note:   <VA> equals 00h when the mixpoint is not activated and equals 01h when the mixpoint is activated.
        The <IDMSB> and <IDLSB> values must be calculated as follows:

   <IDMSB> = [((3 * NMIXPOINTS) + 15 + (Mix Point #)) >> 7] & 7Fh
   <IDLSB> = ((3 * NMIXPOINTS) + 15 + (Mix Point #)) & 7Fh

   where ">> 7" means right shift by 7 bits and "&" denotes logical AND.

Query command:   F0h 00h 01h 00h <Device ID> 0Ah 70h <IDMSB> <IDLSB> F7h
Return string:   F0h 00h 01h 00h <Device ID + 10h> 0Ah 00h <IDMSB> <IDLSB> <VA> 00h F7h