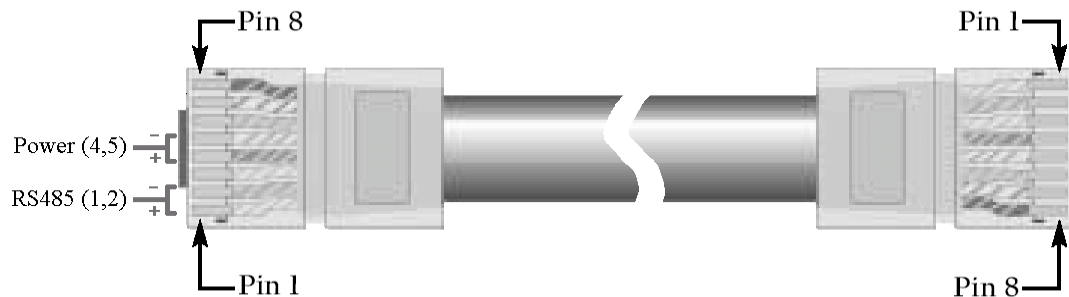


Serial Control Hardware (RS-485)

The RS-485 port is available on either of the RJ45 connectors on the back panel of the unit. The 485 network operates at 19.2 kbaud, 8 bits, 1 stop bit/no parity/no hardware control. The pin designations are described below:



RJ45 Connector

Pins [1,2] = RS-485 [pos, neg]

Pins [4,5] = DC Power [pos, gnd]*

Pins [3, 6] and [7, 8] are reserved pairs

*Note the Digitool can provide up to 250 mA for power powering external controllers.

Network Power

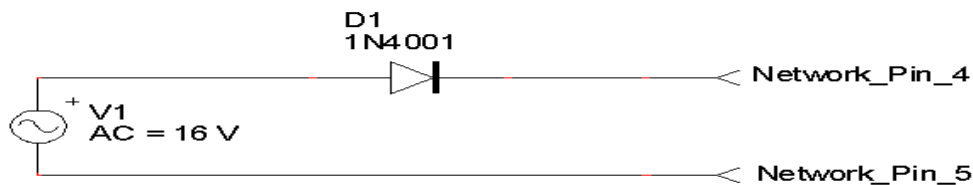
The D1V and D4S wall controllers require D.C. power source, supplied via pins 4 and 5 of the network.

Custom Power

If power is to be supplied using a third party product, then the minimum product specifications should be as follows:

Current: 15 mA per wall controller (the Digitool does not load the supply).

Voltage: 10 ~ 16 V AC or DC, transformer isolated and diode coupled to the network as shown below:



Note that if the combination of cable distance and loading causes a significant voltage drop across the network, a second supply can be connected at the far end of the cable.

D1V and D4S Serial Controller setup

The Digitool uses ID numbers, which are a sort of address, to link external serial controllers to audio controls in the Digitool. Use the Digitool front panel user interface or Digitool HD GUI to configure selected ID numbers to control specific target controls in the Digitool. Switches on the D1V or D4S set the controller to the corresponding ID numbers.

The D1V has a rotary encoder that sends set commands with a value. By pressing the encoder, the user can select one of the 4 consecutive device ID #s for control. An LED lights to indicate the selection and the LEDs around the knob indicate its current setting.

To prepare the D1V for installation, the switches on the rear must be set. These switches establish the unit as a D1V, set the Base address (the group of 4 device ID #s) and engage a termination resistor if the last controller on the line.

D1V operation:
 Set Switch 1 to ON
 Set Switch 2 to OFF

D4S Switch mode:
 Set Switch 1 to ON
 Set Switch 2 to ON
 In switch mode, each button operates independently to mute or unmute a signal for example.

D4S Trigger mode:
 Set Switch 1 to OFF
 Set Switch 2 to On
 In Trigger mode the 4 switches work together. Pressing one switch cancels the previous selection. With the Digitool, this is used to recall presets. With the Base address set for ID #s 1 to 4, presets 1 to 4 can be recalled. Likewise if the base address is set to 5-8 allows recall of presets 5-8. Using two controllers together allows recall of presets 1 to 8.

Setting the base Address.
 Switches 3 to 7 set the base address.
 All switches (3,4,5,6 &7) off sets the base address to 1 for ID #s 1 to 4.

The table below shows the switch settings on the D1V and D4S to set the ID address range. A "0" for a switch is off and a "1" indicates on.

So for serial IDs 17 to 20 the switches 3 to 7 would be off, off, on, off, off respectively.

ID Range	Switch 34567	ID Range	Switch 34567	ID Range	Switch 34567	ID Range	Switch 34567
1 - 4	00000	33 - 36	00010	65 - 68	00001	97 - 100	00011
5 - 8	10000	37 - 40	10010	69 - 72	10001	101 - 104	10011
9 - 12	01000	41 - 44	01010	73 - 76	01001	105 - 108	01011
13 - 16	11000	45 - 48	11010	77 - 80	11001	109 - 112	11011
17 - 20	00100	49 - 52	00110	81 - 84	00101	113 - 116	00111
21 - 24	10100	53 - 56	10110	85 - 88	10101	117 - 120	10111
25 - 28	01100	57 - 60	01110	89 - 92	01101	121 - 124	01111
29 - 32	11100	61 - 64	11110	93 - 96	11101	Invalid	11111

Serial Control Protocol (RS-485)

Warning: This section of the document describes the RS-485 communication protocol used by the Digitool and is provided for persons developing and programming new control devices. Please refer to the section above and the HELP file in the Digitool HD GUI for directions for configuration and use of Peavey serial control modules with the Digitool.

The command protocol for Digitool's RS-485 network uses ASCII-based command strings. All address and data values in the command string must be generated as hex characters. A typical command has the following form:

S802FF.

The command above has three fields plus a terminating character. They are:

Command Field - The first field is a single character and determines the type of command string. In the above example, the command type 'S' stands for 'SET'. Other command types used by Digitool are 'G' for 'GET', 'V' for 'VERIFY', 'T' for 'TRIGGER' and U for 'UNUSED'.

Address Field - The next field is a 3-character hex address that determines which serial ID within the Digitool is to be modified. This value should be the sum of the Digitool absolute address plus the Serial ID value used in the [Serial Control Settings](#) window as the offset. In the above example, the address field is the absolute address of 800 hex (2048 decimal) plus serial ID 2.

Data Field – The last field is a two-character hex value that determines the value of the target level. FFh can be thought of as full clockwise rotation of the target level, while 00h is full counter-clockwise rotation. Note that the Max and Min level settings in the assignment procedure in the [Serial Control Settings](#) window, determine what the levels will be when the serial control is fully clockwise or counter-clockwise. If the target is a mute group then hex values from 00h to 7Fh will mute the target while hex values from 80h to FFh un-mute the target.

Termination – Commands must be terminated with a period.

Digitool Response - If the above command (S802FF) is sent to the Digitool, the unit will respond with 'V802FF.' unless Serial ID 2 is not enabled in the Digitool, in which case then Digitool will respond with 'U802.' meaning that address 802h is not used.

Serial Control Application

An example application of the serial control is provided below. Suppose that the Digitool is being used as a mixer for a meeting room in which there are four microphones and a stereo audio feed from a video player. The Digitool audio inputs and outputs are described as follows:

Input channel 1 = Mic 1
Input channel 2 = Mic 2
Input channel 3 = Mic 3
Input channel 4 = Mic 4
Input channel 5 = audio feed left
Input channel 6 = audio feed right
Output channel 1 = Main output Left
Output channel 2 = Main output Right
Output channel 3 = Ceiling speaker output
Output channel 4 = Recording output

For this application we would like to remotely control each input level plus include a master level for the system. In addition we will provide a mute control for the stereo feed and a global mute for the system.

The controlling device is assumed to be a third-party ASCII text based script controller capable of communicating on an RS-485 multi-drop network (19.2 kBaud).

Assigning Serial Controls to Signal Level Targets

A third-party remote controller generates the desired level and mute commands described above. These serial commands must be assigned to targets within the Digitool before the external device can control them. This can be done from the front panel of the Digitool or from the Serial Control section of the Utilities screen in the Digitool HD GUI. To assign the first control to mic 1, go to Utilities (Audio/Utilities).

Microphone assignments

- Select ID#1 in the Serial Control panel.
- Select Control Type 'Level'.
- Using the 'Select Target' drop down list, select target 'Inx'.
- Select checkbox 1 in the 'Select channels for x' selection box.
- Use the Max and Min scaling controls to determine the limits of the control.
- Enable the control clicking the Off/On button.

Repeat the assignment described above for the remaining four input channels using ID 2 through 4, except in step 3, select checkbox 2 thru 4 respectively.

Stereo assignment

For the stereo feed assignment using serial ID 5, select target 'Inx' and check boxes 5 and 6. Select 'Level' Control Type. This allows serial ID 5 to control both input channel levels simultaneously. Adjust the level scaling as needed and enable the control.

Master level assignment

For the master level control, assign ID 6 to target 'Outx' with checkboxes 1, 2, 3 and 4 selected. Select 'Level' Control Type. Scale the max and min levels and enable the control.

Stereo Mute assignment

For the stereo feed mute control using ID 7, select target 'Inx' and check boxes 5 and 6. Select 'Mute' Control Type and enable.

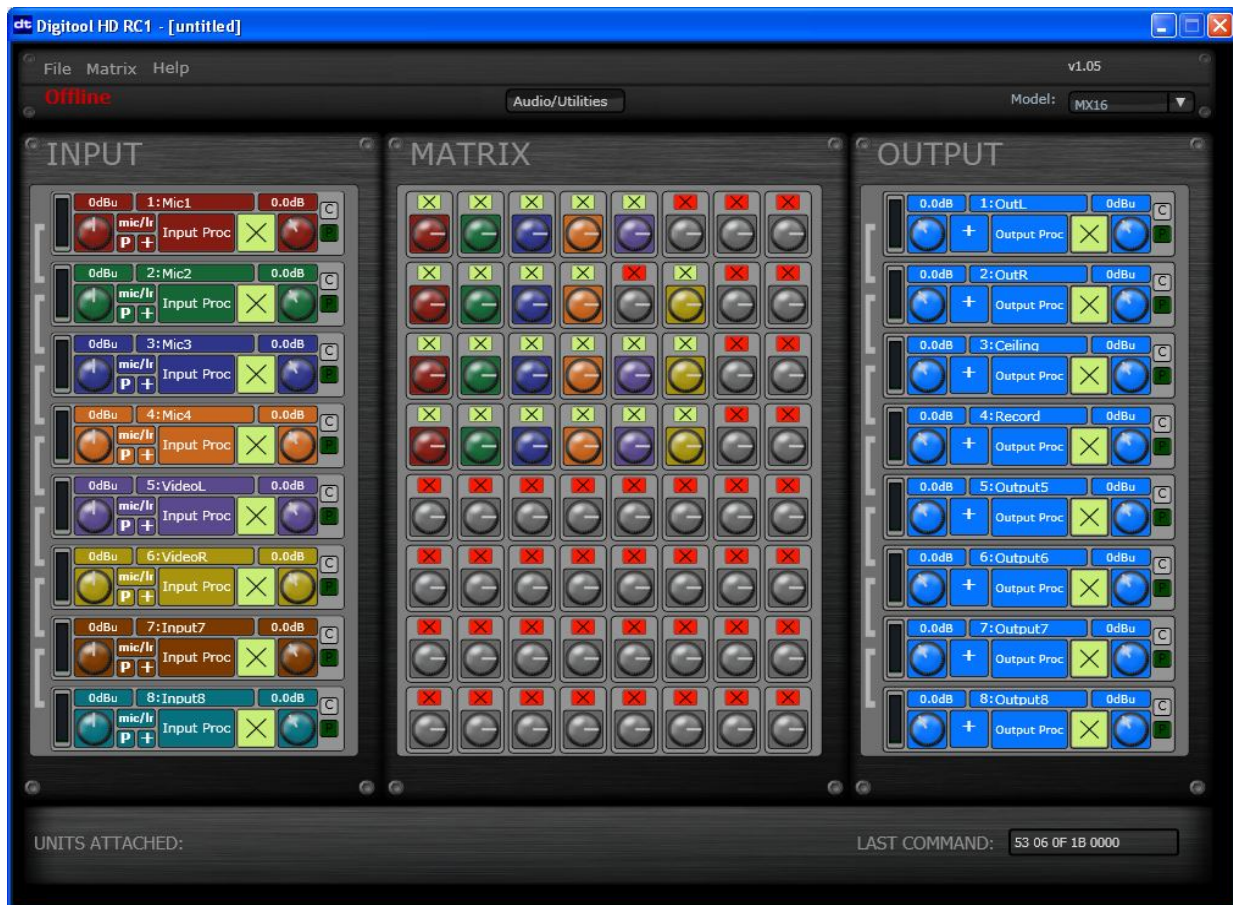
Master Mute assignment

For the master mute control using ID 8, select target 'Outx' and check boxes 1, 2, 3 and 4. Select 'Mute' Control Type and enable.

The assignments are summarized below.

ID 1 assigned to target 'Input 1'	(channel 1 input level)
ID 2 assigned to target 'Input 2'	(channel 2 input level)
ID 3 assigned to target 'Input 3'	(channel 3 input level)
ID 4 assigned to target 'Input 4'	(channel 4 input level)
ID 5 assigned to target 'Input 5,6'	(channel 5,6 stereo input level)
ID 6 assigned to target 'Output1,2,3,4'	(channel 1,2,3,4 output, Master Volume)
ID 7 assigned to target 'Input 5,6'	(channel 5,6 input, Stereo Mute)
ID 8 assigned to target 'Output 1,2,3,4'	(channel 1,2,3,4 output, Master Mute)

The associated matrix routings are shown below:



Serial Command Description

Now that the controls are assigned to targets, the actual serial command strings can be described. The following table contains sample command strings to control each of the targets in the previous example.

Command Description	Command String	Digitool Response*
Set mic 1 level to 64%	S801A5.	V801A5.
Set mic 2 level to 56%	S80290.	V80290.
Set mic 3 level to 7.4%	S80313.	V80313.
Set mic 4 level to 0 %	S80400.	V80400.
Set stereo feed level to 100 %	S805FF.	V805FF.
Set Master level to 50 %	S8067F.	V8067F.
Mute audio feed	S80700.	V80700.
Un-mute audio feed	S807FF.	V807FF.
Mute Master	S80800.	V80800.
Un-mute Master	S808FF.	V808FF.

Additional Commands

Get mic 1 level	G801.	V801A5.
Get audio feed level	G805.	V805FF.
Get Master Level	G806.	V8067F.
Trigger preset 3	T803.	V803FF.

*Response values may be truncated due to scaling. I.e. an 'A5' setting may verify as 'A2'.