Ivie Technologies, Inc.

AudioNet® Programming Manual

Programming Information Manual for the Ivie *780+* and *880+* Input Expanders, the *784+, 884+, 784T+ & 884T+* Matrix Mixers and the 728PW & 730PW 1/3 Octave Equalizers

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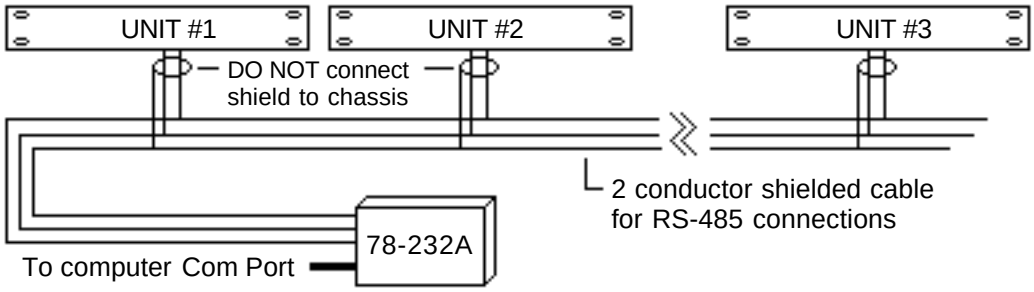
Audio Net™

Messages to and from the 784P and 784PW computer controlled matrix mixers occur over a multi-dropped RS-485 Half Duplex network. The network operates asynchronously at 9600 Baud, 8 Bit, No Parity with 1 Stop bit.



Typical Audio Net™ System Configuration

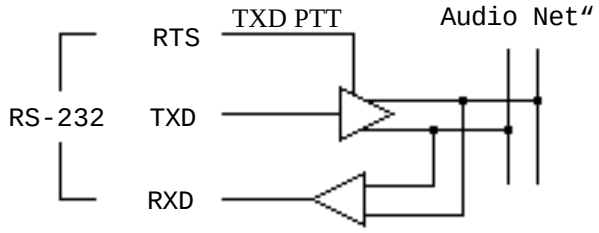
78-232A (RS-232 to RS-485 adaptor)

Please note: The "A" version of the 78-232 (78-232A) supersedes the 78-232 and DOES NOT REQUIRE RTS be set to zero in order to send data. This is now automatically controlled by the 78-232A. However RTS should be enabled to provide power to the 78-232A.
The 78-232A started shipping May of 1994.

Ivie Technologies manufactures an RS-232 to RS-485 adaptor for use with Audio Net™. A simplified block diagram of the 78-232 is shown below. Operation of the 78-232 is straightforward but there are several things you should keep in mind when programming for the 78-232.

Set RTS to "0" to transmit data.

Set RTS to "1" to receive data.



Ivie 78-232

Before any data can be transmitted, RTS must be set to zero. Upon completion of the transmission, RTS must be set to one in order to receive data on the network. In order to help prevent collisions on the network, the network should be monitored before any transmission is made. A good way to accomplish this is to establish a timer that is reset anytime data is heard on the network. Transmissions would only be allowed after the timer has timed out. The recommended period for the timer is 100 milliseconds.

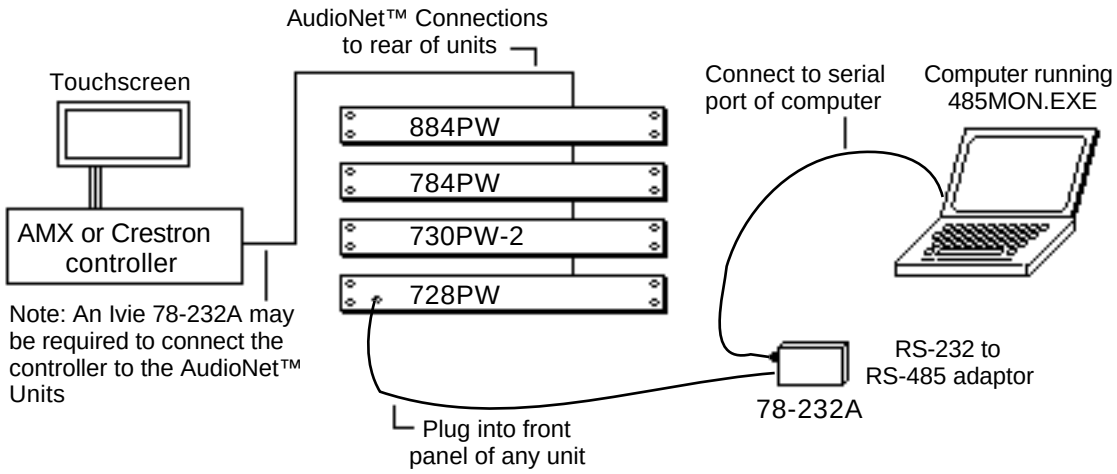
485MON.EXE Software Monitor Program

Included on every 78SW and ANSW software disk shipped since June 1, 1995 is the 485MON.EXE program. Prior to that time, the 485MON.EXE has been on the 78SW software disk only.

The 485MON.EXE is a simple monitor program designed to help programmers and installers monitor the traffic on the Audio Net™ network. The program runs under DOS and displays **ALL** traffic on the network. It displays commands to, and replies from, Ivie Audio Net™ equipment.

Typically this program is used to monitor the network traffic between Audio Net™ units and an a controller such as an AMX or Crestron.

The 485MON.EXE program can run on the simplest DOS computer. Only a serial com port is required. The computer is connnected to an Ivie Technologies 78-232A that is then connected across the network. See the typical connections diagram below.



Typical connections when monitoring the Network with 485MON.EXE

Starting the 485MON.EXE Program

This program can be run from either the floppy disk or the hard drive. The program will use COM PORT 1 (serial communications port #1) unless instructed to use COM PORT 2.

To start the progam using COM PORT 1 type the command : 484MON and press return. To have the program utilize COM PORT 2, type the command : 485MON COM2. Note that there is a space between 485MON and COM2.

Possible Problems with using the 78-232A on a COM PORT.

First of all, the 78-232A requires power in order to operate. Normally it takes power from the computer. It can also be powered from an internal nine volt battery or from an external 7 - 15 Vdc power supply. The yellow LED on the 78-232A must be illuminated, indicating that the unit is being powered. If the yellow LED blinks when the red and green LEDs blink, this may indicate that there is insufficient power to the unit. This may cause intermittent problems.

A common symptom of insufficient power is not being able to save a preset, although polling and addressing a specific unit has been successful. Much longer strings of commands are sent during a preset save and a marginal supply may "run out of gas" during these long strings.

Secondly, if the mouse has been disconnected from the COM PORT in order to allow connection of the 78-232A, the mouse driver in the computer must be disabled. Typically the mouse driver is loaded automatically by the computer whenever it is powered up. The mouse driver will confict with the 485MON software. If the program appears to work for a while but then hangs up or starts acting funny, this could be the problem. There could also be a problem if an internal modem is already assigned to the COM PORT that is being used with the 78-232A.

Thirdly, make certain that the 78-232A is connected to the correct COM PORT on the computer. With the 78-232A connected to the computer and the 485MON program running, the red and green LEDs should blink whenever a key is pressed on the computer. If this does not happen, try the other COM PORT.

485MON.EXE Hints

Not only can the 485MON program monitor the traffic on the network, it can be used to issue commands to the various units.

Any command can be typed into the keyboard followed by pressing the ENTER key to complete the command.

All commands to the units start with a asterisk " * ". All replies from the units start with a pound sign " # ". Immediately following the pound or the asterisk is the address of the unit.

When troubleshooting a complex system (multiple units on the network) it may help to disconnect all other units from the network other than the one being commanded.

Audio Net™ Message Format

Please note that throughout this document, hex numbers are denoted by the prefix 0x. Therefore a hex 23 will be shown as 0x23.

Each message consists of a Header, unit Address character, Command type character, Data field(s), and a message Terminator.

Header	Address	Command type	Data1	Data2	.....DataN	Terminator

AudioNet™ Message format

Header - There are two different headers, one for messages directed to a unit from the controller and one for messages generated by the unit directed to the controller.

"*" or 0x2A (hex 2A) is the header for messages directed **TO** the unit from the contoller.

"#" or 0x23 (hex 23) is the header for messages directed **FROM** the unit to the controller.

Address - This is the address of the unit on the network to which the command is being sent. Theoretically, the unit address may be any value other than the Header or Terminator. However, it is strongly suggested that address characters be restricted in the range of "1" to "8" (0x31 to 0x38). This provides convenience in network monitoring with simple asychronous terminals as these characters can be displayed on the screen.

Messages to a unit contain the address of that unit. When a unit transmits a message either in reply to another message or because its status has changed, it will transmit its address.

Global Address - A global address can be used to send a message to all units at the same time. The global address character is "@" or 0x40 (hex 40). The global address character would be used in place of the unit address.

Command type - The Command type specifies the action desired. Complete descriptions of all Command types are provided later in this document under the heading "Command type Summary." The following is an example of a Command type for level adjustments:

"L" or 0x4C - Level or volume adjust.

Data Fields - Data fields are dependent upon the Command type. The number of Data fields and their content will change from one Command type to another. Some Command types use Data fields that use a limited range of values (from 0 - 74 decimal). When this is the case, the data byte is sent as a single radix 75 character with an offset of 0x30. This places all values inside the printable character set. For example:

Data value Decimal	Character sent ASCII	Hex	Data Value Decimal	Character sent ASCII	Hex
0	"0"	0x30	13	"="	0x3D
1	"1"	0x31	--	-	----
2	"2"	0x32	17	"A"	0x41
-	-	----	18	"B"	0x42
-	-	----	--	-	----
9	"9"	0x39	--	-	----
10	"10"	0x3A	72	"x"	0x78
11	"11"	0x3B	73	"y"	0x79
12	"12"	0x3C	74	"z"	0x7A

If the Command type uses a data byte that is not limited in range but has a range of 0-255 then the data byte is sent as two hex characters. For example:

Data value Decimal	Character sent ASCII	Hex	Data Value Decimal	Character sent ASCII	Hex
0	"00"	0x30,0x30	17	"11"	0x31,0x31
1	"01"	0x30,0x31	18	"12"	0x31,0x32
2	"02"	0x30,0x32	253	"FD"	0x46,0x44
15	"0F"	0x30,0x46	254	"FE"	0x46,0x45
16	"10"	0x31,0x30	255	"FF"	0x46,0x46

Terminator - The Terminator is sent as a two byte carriage return, line feed sequence as shown below:

<CR><LF> or 0x0D,0x0A

PLEASE NOTE! ***All commands are CASE SENSITIVE! Sending a lower case "c" when an upper case "C" is required can and will cause the mixer to act in a strange, flakey, and unpredictable manner.***

NOTE for AMX and Crestron Programers (*Important, Read NOW!*)

When controlling Audio Net™ products from any type of controller you must issue a global off-line command (*@Z<CR><LF>)at the beginning of your code. This tells all of the units to "shut up" and not reply to any commands issued by the controller. The units will respond to commands but will not congest the network with a reply. They will simply shut up and do what they are told. This will minimize the possibility of collisions on the network.

Place Unit ON - line ("Y" or 0x59)

Any Audio Net™ unit must be "ON-line" before it **will reply** to commands. A unit **will respond** to all commands even when it is off-line. The exception to this rule is the "poll" command. An Audio Net™ unit will always respond when it has been polled. Polling is a process that is initiated by the host computer to determine what units are on the Audio Net™ network. Units will act upon commands even if they are "OFF-line". To place a unit with the address of two ON-line, issue the following command:

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	Y				<CR><LF>

*2Y<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x59				0x0D,0x0A

0x2A,0x32,0x59,0x0D,0x0A

Place Unit OFF-line ("Z" or 0x5A)

At times it is desireable to place all units OFF-line and then to place only one unit back ON-line. When a unit is ON-line it will send an update message to the host computer whenever its status has changed. Status changes occur whenever a preset is activated or a volume control is adjusted or a combine is activated or any other change is made to the mixer. You can eliminate unwanted "chatter" from all other units with the OFF-line command. Then bring only a single unit ON-line as you need to work with it. When you bring a unit ON-line you will need to request its current status. Refer to "Query" commands for more information.

To place a unit with the address of two OFF-line, issue the following command:

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	Z				<CR><LF>

*2Z<CR><LF>

Hex format

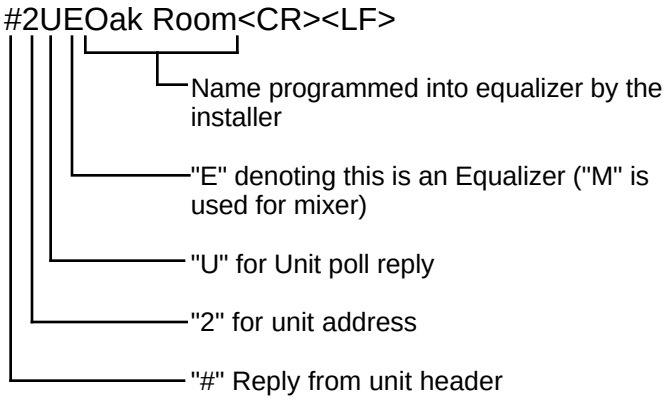
Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x5A				0x0D,0x0A

0x2A,0x32,0x5A,0x0D,0x0A

Query POLL Message ("?U" or 0x3F)

There are several Query messages. The Query command is a "?" or 0x3F. When followed by a "U" or 0x55 in the data field, a unit poll is executed. This command polls a single unit as specified by the address field of the Query command. If a unit with that address exists on the network, it will reply with a #, unit address and a "U" followed by a <CR><LF> sequence.

Some Audio Net™ units will also respond with the name that has been programed into them. For example; 728PW and 730PW equalizers will respond as follows:



The following example shows the Query POLL message for a unit with an address of two.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	?	U			<CR><LF>

*2?U<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x3F	0x55			0x0D,0x0A

0x2A,0x32,0x3F,0x55,0x0D,0x0A

Query Unit Status message ("?Z" or 0x3F)

The current status of any Audio Net™ unit can be obtained by sending the following command string to the address of the unit.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	?	Z			<CR><LF>

*2?Z<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x3F	0x55			0x0D,0x0A

0x2A,0x32,0x3F,0x55,0x0D,0x0A

The 784 will respond to a query by sending the following information sequence as shown below:

1. Level Control Range ("R")
2. Assignment Matrix ("A")
3. Remote Pot status (connected/disconnected) ("V")
5. Level Adjust ("L")
5. Gain Trim Adjust ("G")
6. Front panel volume control status (enable/disable) ("E")
7. Remote Button volume control status (enable/disable) ("B")
8. Remote Pot volume control status (enable/disable) ("T")
9. Preset and Combine status ("P")

NOTE: See other sections of this manual for specific responses by other units. For responses of the 728PW/730PW see the 728PW/730PW section of this manual.

All messages are sent using the standard message format as shown below:

Header	Address	Command type	Data1	Data2	.....DataN	Terminator

784P/PW message format

The Header will be a "#" because the message is being directed FROM the 784 to the controller. All messages will be terminated with a <CR><LF> sequence.

Level Adjust Message 784P/PW , 884PW ("L" or 0x4C)

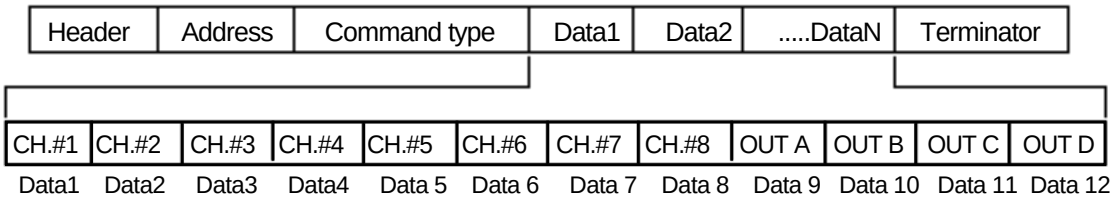
The 784P/PW & 884PW have 8 individual input level controls and 4 individual output level controls. These level controls are voltage controlled amplifiers (VCAs). These VCAs may be controlled via front panel pushbuttons (on the 784P only), remotely located 10K pots or remotely located up/down pushbuttons. The 12 VCAs may also be controlled via Audio Net™.

Each VCA has a control range of 100 dB. Each VCA follows a standard audio taper. This taper has 15 steps of 2 dB per step followed by steps of 3 dB, 4 dB, 5 dB, 8 dB, 10 dB, 20 dB and 20 dB. The tapered level adjustment therefore looks like:

Step#	Code			Step#	Code			Step#	Code		
	Level	Dec	Hex		Level	Dec	Hex		Level	Dec	Hex
0	**-0dB**	"0"	0x30	8	**-16dB**	"8"	0x38	16	**-33dB**	"@"	0x40
1	**-2dB**	"1"	0x31	9	**-18dB**	"9"	0x39	17	**-37dB**	"A"	0x41
2	**-4dB**	"2"	0x32	10	**-20dB**	":"	0x3A	18	**-42dB**	"B"	0x42
3	**-6dB**	"3"	0x33	11	**-22dB**	";"	0x3B	19	**-50dB**	"C"	0x43
4	**-8dB**	"4"	0x34	12	**-24dB**	"<"	0x3C	20	**-60dB**	"D"	0x44
5	**-10dB**	"5"	0x35	13	**-26dB**	"="	0x3D	21	**-80dB**	"E"	0x45
6	**-12dB**	"6"	0x36	14	**-28dB**	">"	0x3E	22	**-99dB**	"F"	0x46
7	**-14dB**	"7"	0x37	15	**-30dB**	"?"	0x3F				

To set the level of a 784P/PW or 884PW via Audio Net™ you must set the Level Step for each input and output VCA. Normally the audio system controller i.e. computer, keeps a table of all channels current level setting and builds a complete message whenever any channel needs changing.

Relationship of VCA channels to DATA channels



Alternatively you can effect a level change to specific channel(s) by filling the message with a "no change" code for all channels that are to remain unchanged. The "no change" code is "z"(lower case "z") *or 0x7A.*

In the following example we will set each of the input levels to -10dB (Step #5) and the four output levels to -2dB (Step #1). We will be addressing unit number 2.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	L	555555551111			<CR><LF>

*2L555555551111<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x4C	0x35, 0x35.....0x31			0x0D,0x0A

0x2A,0x32,0x4C,0x35,0x35,0x35,0x35,0x35,0x35,0x35,0x35,0x31,0x31,0x31,0x31,0x0D,0x0A

Using the "no change" code, the following command (in hex format) will only set the level of input channel #3 to -10dB (on unit #2), all other channel levels will remain unchanged. You will notice that all Data fields with the exception of field D3 are filled with the "no change" code which is "z"(lower case "z") or 0x7A.

D1 D2 **D3** D4 D5 D6 D7 D8 D9 D10 D11 D12

0x2A,0x32,0x4C,0x7A,0x7A,**0x35**,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x0D,0x0A

Reply to Level Adjust Messages

Whenever a Level Message is issued to a mixer and that mixer is currently "ON - Line", the mixer will send a reply message back to the controller. It will respond with a "V" message followed by a "L" message.

The "V" message will give you the current status of Remote Pots. This is not to be confused with the status of the Remote Pot (RP) enable/disable switch. The RP enable/disable switch enables the mixer to respond to a Remote Pot if two conditions are met. First, the RP switch must be enabled and second, the Remote Pot must be physically connected to the mixer. The "V" message will tell you which Remote Pots are physically connected to the mixer.

If a Remote Pot is enabled and is physically connected to the mixer, then any level message that you send it will have no effect. The volume for a particular channel will ALWAYS be determined by the Remote Pot if the RP button is enabled and the Remote Pot is physically connected to the mixer.

When is a Remote Pot not physically connected to the mixer? When the Remote Pot is part of a portable remote control head that can be plugged and unplugged to and from a connector mounted on a wallplate. If the Remote control head is disconnected you may set levels via the controller. As soon as the Remote control head is connected, assuming that the RP button is activated, the settings on the Remote will be in effect.

Level Adjust, INDIVIDUAL Message 784P/PW , 884PW ("l" or 0x6C) (lower case "L")

Set individual level to a specific step
Increment an individual level up one step
Decrement an individual level down one step

The 784P/PW & 884PW have 8 individual input VCA level controls (1-8) and 4 individual VCA output level controls (A,B,C,D). These 12 VCAs may also be controlled via Audio Net™.

Each VCA has a control range of 100 dB. Each VCA follows a standard audio taper. This taper has 15 steps of 2 dB per step followed by steps of 3 dB, 4 dB, 5 dB, 8 dB, 10 dB, 20 dB and 20 dB. The tapered level adjustment therefore looks like:

Step#	Code			Step#	Code			Step#	Code		
	Level	Dec	Hex		Level	Dec	Hex		Level	Dec	Hex
0	**-0dB**	"0"	0x30	8	**-16dB**	"8"	0x38	16	**-33dB**	"@"	0x40
1	**-2dB**	"1"	0x31	9	**-18dB**	"9"	0x39	17	**-37dB**	"A"	0x41
2	**-4dB**	"2"	0x32	10	**-20dB**	":"	0x3A	18	**-42dB**	"B"	0x42
3	**-6dB**	"3"	0x33	11	**-22dB**	";"	0x3B	19	**-50dB**	"C"	0x43
4	**-8dB**	"4"	0x34	12	**-24dB**	"<"	0x3C	20	**-60dB**	"D"	0x44
5	**-10dB**	"5"	0x35	13	**-26dB**	"="	0x3D	21	**-80dB**	"E"	0x45
6	**-12dB**	"6"	0x36	14	**-28dB**	">"	0x3E	22	**-99dB**	"F"	0x46
7	**-14dB**	"7"	0x37	15	**-30dB**	"?"	0x3F				

There are three different commands that control the level of an **individual** input or output VCA. The "l" command sets the level to a step that the programmer specifies. The "l" command followed by the "u" command increments the level up by one step from the current level. The "l"command followed by the "d" command decrements the level down by one step from the current level. The "u" and "d" commands will not exceed the range limit set for the individual control.

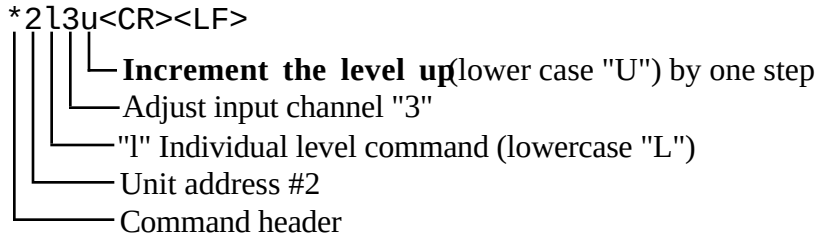
EXAMPLES

To set an individual input or output VCA to a specified level

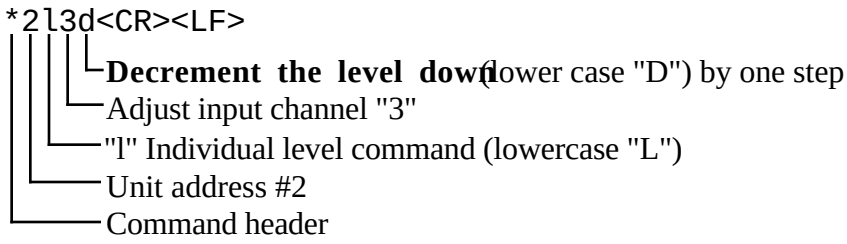
```
*2l4A<CR><LF>
```

- A — Set to level step "A" which is -37dB
- 4 — Adjust input channel #4
- l — "l" Individual level command (lowercase "L")
- 2 — Unit address #2
- * — Command header

To INCREMENT an individual input level up one step.



To DECREMENT an individual input level down one step.



Gain Trim Adjust Message 784P/PW & 884P("G" or 0x47)

Each of the 12 VCAs has a Gain Trim adjustment. The Gain Trim adjustment range for the 8 inputs is from +10dB to -72dB in 2dB steps. The four outputs, "A", "B", "C", and "D" have a Gain Trim control range of +0dB to -72dB. The Command type for a Gain Trim Adjust message is "G" or 0x47 in hex.

To set the Gain Trim of an input or an output via Audio Net™ you must set the Gain Trim Step for each input and output VCA. Normally the audio system controller i.e. computer, keeps a table of all channels current level setting and builds a complete message whenever any channel needs changing.

The table shown below displays the Gain Trim Steps for the inputs and outputs.

CAUTION- *The input and output Gain Trim ranges are different. Inputs have a range from +10dB to -72dB and use Step numbers 7 through 48. Outputs have a range from -0dB to -72dB and use Step numbers 12 through 48.*

Step#	Code			Step#	Code			Step#	Code		
	Level	Dec	Hex		Level	Dec	Hex		Level	Dec	Hex
*7	**+10dB**	"7"	0x37	21	**-18dB**	"E"	0x45	35	**-46dB**	"S"	0x53
*8	**+8dB**	"8"	0x38	22	**-20dB**	"F"	0x46	36	**-48dB**	"T"	0x54
*9	**+6dB**	"9"	0x39	23	**-22dB**	"G"	0x47	37	**-50dB**	"U"	0x55
*10	**+4dB**	":"	0x3A	24	**-24dB**	"H"	0x48	38	**-52dB**	"V"	0x56
*11	**+2dB**	";"	0x3B	25	**-26dB**	"I"	0x49	39	**-54dB**	"W"	0x57
12	**-0dB**	"<"	0x3C	26	**-28dB**	"J"	0x4A	40	**-56dB**	"X"	0x58
13	**-2dB**	"="	0x3D	27	**-30dB**	"K"	0x4B	41	**-58dB**	"Y"	0x59
14	**-4dB**	">"	0x3E	28	**-32dB**	"L"	0x4C	42	**-60dB**	"Z"	0x5A
15	**-6dB**	"?"	0x3F	29	**-34dB**	"M"	0x4D	43	**-62dB**	"["	0x5B
16	**-8dB**	"@"	0x40	30	**-36dB**	"N"	0x4E	44	**-64dB**	"\"	0x5C
17	**-10dB**	"A"	0x41	31	**-38dB**	"O"	0x4F	45	**-66dB**	"]"	0x5D
18	**-12dB**	"B"	0x42	32	**-40dB**	"P"	0x50	46	**-68dB**	"^"	0x5E
19	**-14dB**	"C"	0x43	33	**-42dB**	"Q"	0x51	47	**-70dB**	"_"	0x5F
20	**-16dB**	"D"	0x44	34	-44**dB**	"R"	0x52	48	**-72dB**	"`"	0x60

* Steps 7 through 11 cannot be used to set output Gain Trims. Also Steps 1 through 6 are not used at all with any Gain Trim.

In the following example we will set each of the input Gain Trims to +6dB (Step #9) and the four output levels to -12dB (Step #17). We will be addressing unit number 2.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	G	99999999AAAA			<CR><LF>

*2G99999999AAAA<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x47	0x39, 0x39.....0x41			0x0D,0x0A

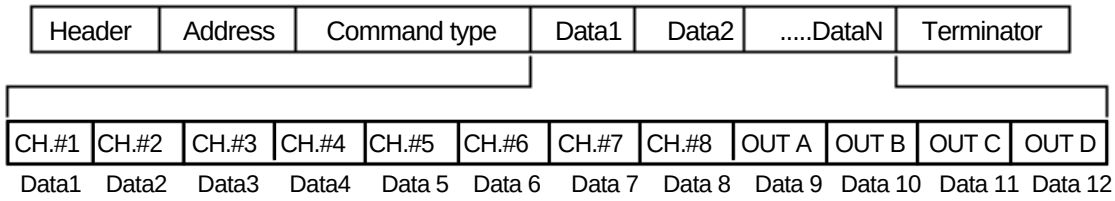
0x2A,0x32,0x47,0x39,0x39,0x39,0x39,0x39,0x39,0x39,0x39,0x41,0x41,0x41,0x41,0x0D,0x0A

Using the "no change" code, the following command (in hex format) will only set the Gain Trim of input channel #3 to -10dB (on unit #2). All other channel Gain Trims will remain unchanged. You will notice that all Data fields, with the exception of field D3, are filled with the "no change" code which is "z"(lower case "z") or 0x7A.

D1 D2 **D3** D4 D5 D6 D7 D8 D9 D10 D11 D12

0x2A,0x32,0x47,0x7A,0x7A,**0x40**,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x0D,0x0A

Relationship of VCA channels to DATA channels



Level Range Adjust Message ("R" or 0x52)

Each of the 12 VCAs has a Level Range adjustment. The Level Range adjustment for inputs and outputs is 0dB to 100dB. The Command type for a Level Range Adjust message is "R" or 0x52 in hex.

There are 23 different settings for Level Range. There is also the option of enabling a +OFF (plus off) option as well. The +OFF option adds one additional step to the Range control. That additional step is full attenuation of 100 dB. You could program a control that has a range of 20dB +OFF. This means there would be 10 steps of 2 dB per step with the 11th step changing the level from -20dB to -100dB.

As you program the Range settings you must select the control code from one of the two columns shown in the below table . You select the desired Range with or without +OFF.
As you can see, this command requires 2 bytes per data field.

Range Level Commands

Step	dB Range	Without "+OFF" Dec HEX	With "+OFF" Dec HEX
0	**0dB**	"00"(0x30,0x30)	"80"(0x38,0x30)
1	**2dB**	"01"(0x30,0x31)	"81"(0x38,0x31)
2	**4dB**	"02"(0x30,0x32)	"82"(0x38,0x32)
3	**6dB**	"03"(0x30,0x33)	"83"(0x38,0x33)
4	**8dB**	"04"(0x30,0x34)	"84"(0x38,0x34)
5	**10dB**	"05"(0x30,0x35)	"85"(0x38,0x35)
6	**12dB**	"06"(0x30,0x36)	"86"(0x38,0x36)
7	**14dB**	"07"(0x30,0x37)	"87"(0x38,0x37)
8	**16dB**	"08"(0x30,0x38)	"88"(0x38,0x38)
9	**18dB**	"09"(0x30,0x39)	"89"(0x38,0x39)
10	**20dB**	"0A"(0x30,0x41)	"8A"(0x38,0x3A)
11	**22dB**	"0B"(0x30,0x42)	"8B"(0x38,0x3B)
12	**24dB**	"0C"(0x30,0x43)	"8C"(0x38,0x3C)
13	**26dB**	"0D"(0x30,0x44)	"8D"(0x38,0x3D)
14	**28dB**	"0E"(0x30,0x45)	"8E"(0x38,0x3E)
15	**30dB**	"0F"(0x30,0x46)	"8F"(0x38,0x3F)
16	**33dB**	"10"(0x31,0x30)	"90"(0x39,0x30)
17	**37dB**	"11"(0x31,0x31)	"91"(0x39,0x31)
18	**42dB**	"12"(0x31,0x32)	"92"(0x39,0x32)
19	**50dB**	"13"(0x31,0x33)	"93"(0x39,0x33)
20	**60dB**	"14"(0x31,0x34)	"94"(0x39,0x34)
21	**80dB**	"15"(0x31,0x35)	"95"(0x39,0x35)
22	**100dB**	"16"(0x31,0x36)	"96"(0x39,0x36)

The following example shows Range adjustment settings for a mixer with an address of "2". The eight input channels are set to a range of **60dB without the +OFF option**. The four outputs are also set to a range of **60dB with the +OFF option**.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	R	14141414141414141494949494			<CR><LF>

*2R14141414141414141494949494<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x52	0x31, 0x34.....0x39,0x34			0x0D,0x0A

0x2A,0x32,0x52,0x31,0x34,0x31,0x34,0x31,0x34,0x31,0x34,0x31,0x34,0x31,0x34,0x31,0x34,0
x31,0x34,0x39,0x34,0x39,0x34,0x39,0x34,0x39,0x34,0x0D,0x0A

Using the "no change" code (0x7A), the following command (in hex format) will only affect the Range Level setting of input channel #3. It will be set to -60dB without +OFF. The Range Level settings of all othe input and output channels will remain unchanged.

Hdr Add Cmd CH#1 CH#2 **CH#3** CH#4

0x2A,0x32,0x52,0x7A,0x7A,0x7A,0x7A,**0x31,0x34**,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,

0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x7A,0x0D,0x0A

Assignment Matrix Message 784P/PW & 884PW ("A" or 0x41)

The eight inputs of the 784/884 can be assigned via a FET matrix to any or all of the eight internal mix buses. Four of the internal mix buses are then connected, via a jumper cable, to the four Master outputs "A", "B", "C", "D".

When we set the Assignmment Matrix we are specifying the assignment of an input channel to the eight mix buses. Since an input channel can feed up to eight mix buses, a byte assignment of bits is kept for each channel.

The bit format for each input channel is:

<Bus1> <Bus2> <Bus3> <Bus4> <Bus5> <Bus6> <Bus7> <Bus8>

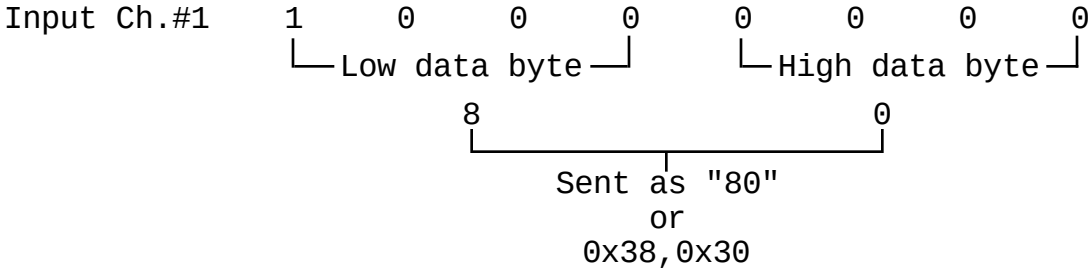
Therefore, if the Bus 1 bit is set to 1, then the input channel is assigned to mix bus 1. Since the data bytes can be any value from 0-255, the data is sent as two hex characters per channel. The data byte order is Input 1, Input 2,.....Input 8.

The example below shows the assigment of inputs 1 & 2 to mix bus 1, inputs 3 & 4 to mix bus 2, inputs 5 & 6 to mix bus 3, and inputs 7 & 8 to mix bus 4. Notice that none of the inputs are assigned to mix buses 5, 6, 7, or 8.

Mix Bus matrix assignments

	MB1 OutA	MB2 OutB	MB3 OutC	MB4 OutD	MB5 ---	MB6 ---	MB7 ---	MB8 ---
Input Ch.#1	1	0	0	0	0	0	0	0
Input Ch.#2	1	0	0	0	0	0	0	0
Input Ch.#3	0	1	0	0	0	0	0	0
Input Ch.#4	0	1	0	0	0	0	0	0
Input Ch.#5	0	0	1	0	0	0	0	0
Input Ch.#6	0	0	1	0	0	0	0	0
Input Ch.#7	0	0	0	1	0	0	0	0
Input Ch.#8	0	0	0	1	0	0	0	0

First two data bytes for Input Ch.#1



The complete Assignment message data string for the above example is shown below in both ASCII and Hex formats.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	A	8080404020201010			<CR><LF>

*2A8080404020201010<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x41	0x38, 0x30.....0x31,0x30			0x0D,0x0A

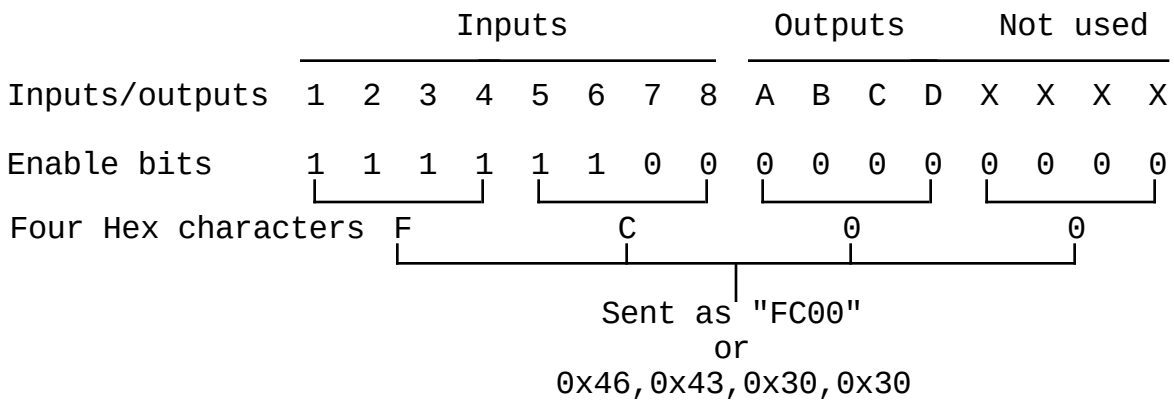
0x2A,0x32,0x41,0x38,0x30,0x38,0x30,0x34,0x30,0x34,0x30,0x32,0x30,0x32,0x30,0x31,0x30,0x31,0x30,0x0D,0x0A

Front Panel Volume Control Enable 784P ("E" or 0x45)

This message is used to specify which of the eight input channel level controls and four output level controls are enabled so that they may be controlled by the front panel pushbuttons. There is one enable bit for each of the twelve volume controls (8 inputs and 4 outputs). The two byte bit format is:

```
<Input1><Input2><Input3><Input4><Input5><Input6><Input7><Input8>
<OutA>  <OutB>  <OutC>  <OutD>  <NU>    <NU>    <NU>    <NU>
 NU=Not used
```

Since there are twelve control bits, two bytes are required to send a control message. The two byte message is sent as four Hex characters. The following example shows the bits enabled for Front Panel control of inputs 1, 2, 3, 4, 5, and 6.



ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	E	FC00			<CR><LF>

*2EFC00<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x45	0x46, 0x43, 0x30, 0x30			0x0D,0x0A

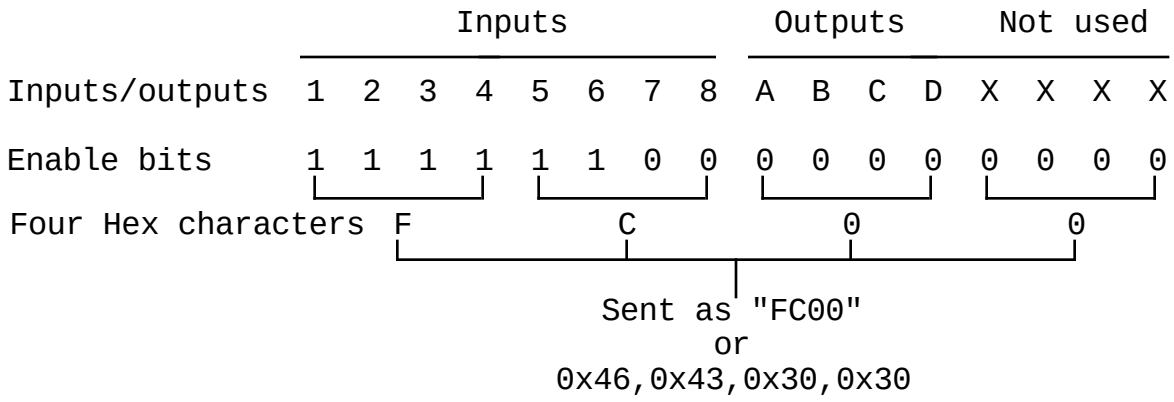
0x2A,0x32,0x45,0x46,0x43,0x30,0x30,0x0D,0x0A

Remote Button Volume Ctrl Enable 784P/PW & 884PW ("B" or 0x42)

This message is used to specify which of the eight input channel level controls and four output level controls are enabled to be controlled by remotely located up/down pushbuttons. There is one enable bit for each of the twelve volume controls (8 inputs and 4 outputs). The bit format is:

```
<Input1><Input2><Input3><Input4><Input5><Input6><Input7><Input8>
<OutA>  <OutB>  <OutC>  <OutD>  <NU>    <NU>    <NU>    <NU>
 NU=Not used
```

Since there are twelve control bits, two bytes are required to send a control message. The two byte message is sent as four Hex characters. The following example shows the bits enabled for Front Panel control of inputs 1, 2, 3, 4, 5, and 6



ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	B	FC00			<CR><LF>

*2BFC00<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x45	0x46, 0x43, 0x30, 0x30			0x0D,0x0A

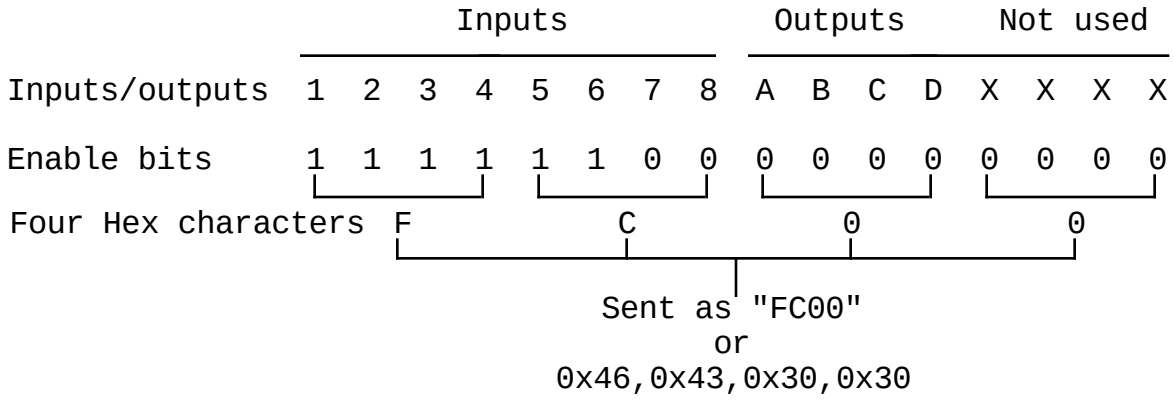
0x2A,0x32,0x45,0x46,0x43,0x30,0x30,0x0D,0x0A

Remote Pot Volume Ctrl Enable 784P/PW & 884PW ("T" or 0x54)

This message is used to specify which of the eight input channel level controls and four output level controls are enabled to be controled by remotely located potentiometers. There is one enable bit for each of the twelve volume controls (8 inputs and 4 outputs). The bit format is:

```
<Input1><Input2><Input3><Input4><Input5><Input6><Input7><Input8>
<OutA>  <OutB>  <OutC>  <OutD>  <NU>    <NU>    <NU>    <NU>
 NU=Not used
```

Since there are twelve control bits, two bytes are required to send a control message. The two byte message is sent as four Hex characters. The following example shows the bits enabled for Front Panel control of inputs 1, 2, 3, 4, 5, and 6.



ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	T	FC00			<CR><LF>

*2TFC00<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x54	0x46, 0x43, 0x30, 0x30			0x0D,0x0A

0x2A,0x32,0x54,0x46,0x43,0x30,0x30,0x0D,0x0A

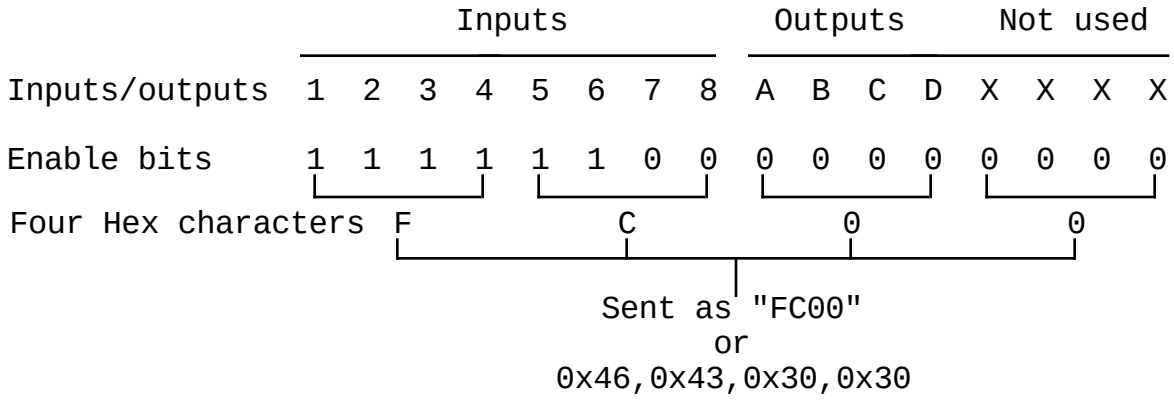
Remote Pot Volume Ctrl Enable 784P/PW & 884PW ("V" or 0x56)

This is a REPLY message. This message is sent to the controller from the mixer in reply to an "L" or level message. This message informs the controller which of the eight input channel level controls and four output level controls currently have a Remote Pot physically connected to the mixer. If a Remote Pot is currently connected to an input or output AND the RP button is activated for that channel, then that channel's level will not be affected by the LEVEL command. The level for that channel will be determined by the setting of the Remote Pot. If the Remote is disconnected or the RP button is released, then the channel's level will be set by the LEVEL command.

There is one status bit for each of the twelve volume controls (8 inputs and 4 outputs). A status of 1 = Remote Pot connected, 0 = Remote Pot disconnected. The bit format is:

```
<Input1><Input2><Input3><Input4><Input5><Input6><Input7><Input8>
<OutA>  <OutB>  <OutC>  <OutD>  <NU>    <NU>    <NU>    <NU>
 NU=Not used
```

Since there are twelve control bits, two bytes are required to send a control message. The two byte message is sent as four Hex characters. The following example shows Remote Pots connected to inputs 1, 2, 3, 4, 5, and 6.



ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	V	FC00			<CR><LF>

*2VFC00<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x56	0x46, 0x43, 0x30, 0x30			0x0D,0x0A

0x2A,0x32,0x56,0x46,0x43,0x30,0x30,0x0D,0x0A

Preset & Combine Activate/Deactivate 784P/PW & 884PW ("P"or 0x50)

This message is used to activate and deactivate the fourteen mixer presets and the four output combine functions, 1+2 through 7+8. A preset or combine function is activated by setting a bit and deactivated by clearing that bit. There is one bit for each of the presets and combines. The bit format for the three bytes is:

```
<Preset1><Preset2> <Preset3> <Preset4> <Preset5> <Preset6> <Preset7><Preset8>
<Preset9><Preset10><Preset11><Preset12><Preset13><Preset14><notused><notused>
<Cmb1+2 ><Cmb2+3  ><Cmb3+4  ><Cmb4+5  ><Cmb5+6  ><Cmb6+7  ><Cmb7+8 ><Cmb8+1 >
```

These three bytes are sent as six hex characters. In the example shown below, presets 1, 8, 9, and 10 are shown activated along with room combine 3+4. The unit address is two.

On the example below, the top line is the number of the preset or combine function. The line of ones and zeros indicates whether the preset/combine is to be activated or not. 1=activate. 0=deactivate. The three bytes are broken into six nibbles for conversion to hex. The next line down is the ASCII character that would be sent for that nibble. The bottom line shows the hex character that would be sent for each nibble. These six characters comprise the data field of the Preset message.

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 NU NU 1+2 2+3 3+4 4+5 5+6 6+7 7+8 8+1
1 0 0 0 0 0 0 1 1 1  0  0  0  0  0  0  0   0   1   0   0   0   0   0
  └─────┘ └─────┘ └─────┘ └─────┘ └─────┘   └─────┘   └─────┘
     8       1       C       0       2         0
                    OR
   0x38    0x31    0x43    0x30    0x32      0x30
```

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	P	81C020			<CR><LF>

*2P81C020<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x50	0x38, 0x31, 0x43, 0x30,0x32,0x30			0x0D,0x0A

0x2A,0x32,0x50,0x38, 0x31, 0x43,0x30,0x32,0x30,0x0D,0x0A

Preset INDIVIDUAL Activate/Deactivate 784P/PW & 884PW ("p"or 0x70)

This command allows the activation or deactivation of an INDIVIDUAL preset. Please note that the "p" used in this command is a LOWER CASE "p". The "p" command is preceeded by the command header "*" and the unit address. The "p" command is followed by the preset number in HEX, then followed by either a "1" or a "0". The "1" activates the preset and the "0" de-activates the preset.

For example, to activate preset number 4 on unit number 2 send the following command:
"*2p41" Command header, unit number 2, preset 4, activate(1).

To de-activate preset number 4 on unit number 2 send the following command:
"*2p40" Command header, unit number 2, preset 4, de-activate(0).

Please note that all examples use unit address #2.

Preset number	Preset Hex code	Activate preset	Deactivate preset
1	1	*2p11<CR><LF>	*2p10<CR><LF>
2	2	*2p21<CR><LF>	*2p20<CR><LF>
3	3	*2p31<CR><LF>	*2p30<CR><LF>
4	4	*2p41<CR><LF>	*2p40<CR><LF>
5	5	*2p51<CR><LF>	*2p50<CR><LF>
6	6	*2p61<CR><LF>	*2p60<CR><LF>
7	7	*2p71<CR><LF>	*2p70<CR><LF>
8	8	*2p81<CR><LF>	*2p80<CR><LF>
9	9	*2p91<CR><LF>	*2p90<CR><LF>
10	A	*2pA1<CR><LF>	*2pA0<CR><LF>
11	B	*2pB1<CR><LF>	*2pB0<CR><LF>
12	C	*2pC1<CR><LF>	*2pC0<CR><LF>
13	D	*2pD1<CR><LF>	*2pD0<CR><LF>
14	E	*2pE1<CR><LF>	*2pE0<CR><LF>

Special command to clear or de-activate ALL presets on a mixer: *2p00<CR><LF> De-activates ALL presets on mixer at address number 2.

Combine INDIVIDUAL Activate/Deactivate 784P/PW & 884PW ("c"or 0x63)

This command allows you to activate or deactivate INDIVIDUAL room combines. Please note that the "c" used in this command is a LOWER CASE "c". The "c" command is preceeded by the command header "*" and the unit address. The "c" command is followed by the room combine number , then followed by either a "1" or a "0". The "1" activates the combine and the "0" deactivates the combine. Of course, all command strings end with a carriage return/line feed sequence (<CR><LF>).

For example, to activate combine 4+5 on unit number 2 send the following command:

"*2c41"<CR><LF> Command header, unit number 2, combine 4+5, activate.

To deactivate preset number 4 on unit number 2 send the following command:

"*2c40 "<CR><LF> Command header, unit number 2, combine 4+5, de-activate.

Please note that unit address 2 is used in all the examples below.

Combine number	Activate combine	Deactivate combine
1(1+2)	*2c11<CR><LF>	*2c10<CR><LF>
2(2+3)	*2c21<CR><LF>	*2c20<CR><LF>
3(3+4)	*2c31<CR><LF>	*2c30<CR><LF>
4(4+5)	*2c41<CR><LF>	*2c40<CR><LF>
5(5+6)	*2c51<CR><LF>	*2c50<CR><LF>
6(6+7)	*2c61<CR><LF>	*2c60<CR><LF>
7(7+8)	*2c71<CR><LF>	*2c70<CR><LF>
8(8+1)	*2c81<CR><LF>	*2c80<CR><LF>

Special command to clear or de-activate ALL combines on a mixer: *2c00<CR><LF>" De-activates ALL combines on mixer a address number 2.

Preset & Combine Switch Type 784P/PW & 884PW ("C" or 0x43)

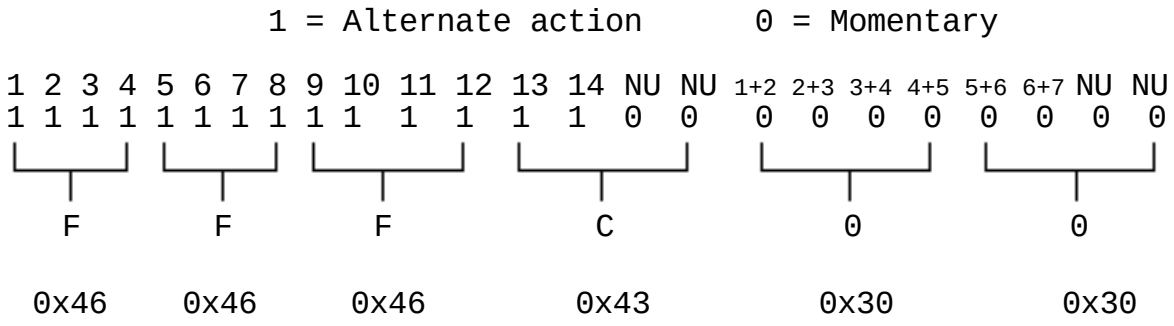
This command message allows you to setup the type of switches that will connected to the screw terminals on the back of the 784/884. The switches may be either "momentary" or "alternate action." A "momentary" switch holds it state as long as the contact closure is maintained and asserts the line. An "alternate action" switch changes state for each closure or operation of the remote switch.

There is one bit for each of the presets and combines. The bit format for the three bytes is:

```
<Preset1><Preset2> <Preset3> <Preset4> <Preset5> <Preset6> <Preset7><Preset8>
<Preset9><Preset10><Preset11><Preset12><Preset13><Preset14><notused><notused>
<Cmb1+2 ><Cmb2+3  ><Cmb3+4  ><Cmb4+5  ><Cmb5+6  ><Cmb6+7  ><notused ><notused>
```

When the bit is set to one the switch will be "Alternate action" When the bit is set to zero the switch will be "Momentary." The example below shows all of the preset switches set to "Alternate action" and the combine switches set to "Momentary." The unit address is two.

The first line of the example is the preset or combine number. The second line of ones and zeros set the switches as "Alternate action" or "Momentary." The third line shows the hex code for each of the six nibbles that would be sent as an ASCII string. The next line shows the code that would be sent as hex characters.



ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	C	FFFC00			<CR><LF>

*2CFFFC00<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x50	0x46, 0x46, 0x46, 0x43,0x30,0x30			0x0D,0x0A

0x2A,0x32,0x50,0x46,0x46,0x46,0x43,0x30,0x30,0x0D,0x0A

Sinewave Oscillator 784P/PW & 884PW ("O" or 0x45) (letter oh)

The matrix mixers have a built in sinewave oscillator that is connected to all inputs directly after the mic/line pad switch (the block diagram incorrectly shows the oscillator connection before the mic/line pad switch). This oscillator is used in facilitating production line testing at the factory. It may also be used in the field if desired. The output of the oscillator is applied to ALL inputs at the same time. Be advised that the actual level of the oscillator at any input can be affected by the impedance of the source connected to that input.

The output level of the oscillator is fixed but the frequency may be set over a range of 20Hz to 20kHz. The frequency is set by sending a frequency value to the mixer. The frequency value is determined by the following formula.

Frequency in Hertz * 2.27555 = Frequency Value

The frequency value must then be converted to HEX

Example, to generate a 1000 Hertz tone:

1000 * 2.27555 = 2,275.55
Converting 2,275 to Hex = 08E3

The command to generate a 1000 Hertz tone in unit number 2 would be: *2O08E3<CR><LF>
The command to turn off any tone on unit 2 would be: *2O0000<CR><LF>

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	O	08E3			<CR><LF>

*2O08E3<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x4F	0x30,0x38, 0x45,0x33			0x0D,0x0A

0x2A,0x32,0x4F,0x30,0x38,0x45,0x33,0x0D,0x0A

Hex codes for common frequencies

20Hz=002D 31.5Hz=0047 63Hz=008F 125Hz=011C 250Hz=0238
500Hz=0471 1kHz=08E3 2kHz=11C7 4kHz=238E 8kHz=471C
16kHz=8E38 20kHz=B1C7 OFF=0000

728PW & 730PW Equalizer Commands

Preset ("P" or 0x50) Applies only to 730PW-1 and 730PW-2

Presets are only available on the 730PW equalizers. The 728PW equalizers do not have any presets. All 730PW equalizers have a total of 9 presets (0-8) available on each channel. Only one preset can be active at any given time. The following example shows activation of Preset number 4 of the equalizer at address number 2.

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	P	4			<CR><LF>

"*2P4"<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x50	0x34			0x0D,0x0A

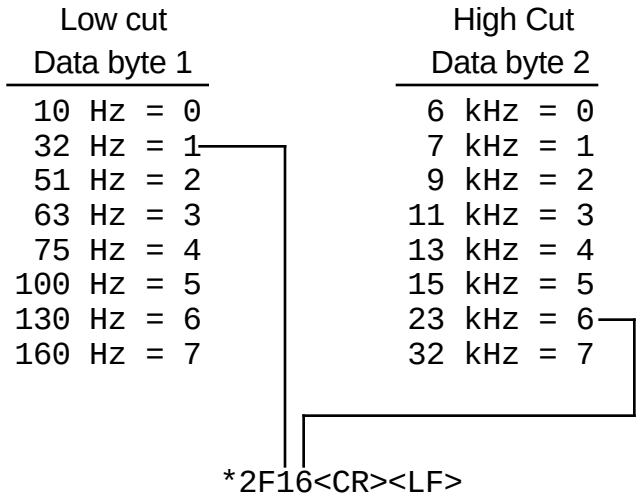
0x2A,0x32,0x50,0x34,0x0D,0x0A

Examples:

*2P0 <CR> <LF> Activates preset number 0 on EQ number 2
*2P1 <CR> <LF> Activates preset number 1 on EQ number 2
*2P2 <CR> <LF> Activates preset number 2 on EQ number 2
:
*2P8 <CR> <LF> Activates preset number 8 on EQ number 2

Low Cut & High Cut Filters 728PW & 730PW ("F" or 0x46)

The equalizers have adjustable Low and High cut filters. There are eight values selectable for each filter. The filter message contains two data bytes, one for the Low cut filter and one for the High cut filter.



Other examples:

*2F00<CR><LF> Low cut 10Hz and High cut to 6kHz
*2F77<CR><LF> Low cut 160Hz and High cut to 32kHz
*2F25<CR><LF> Low cut 51Hz and High cut to 15kHz
*2F07<CR><LF> Low cut 10Hz and High cut to 32kHz

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	F	16			<CR><LF>

*2F16<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x46	0x31,0x36			0x0D,0x0A

0x2A,0x32,0x46,0x31,0x36,0x0D,0x0A

Mute Equalizer Output 728PW & 730PW ("M" or 0x4D)

The output of the equalizer can be easily muted. This command sets the output VCA to 99 dB of attenuation. There is only one data byte for the mute command.

Mute Status	Data byte
Output Muted (off)	0 (zero)
Output not muted (on)	1

There are only two mute commands that can be sent to an equalizer and they are as follows:

*2M0<CR><LF> Mute or turn OFF the output of the equalizer

*2M1<CR><LF> Un-mute or turn ON the output of the equalizer

ASCII format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
*	2	M	0			<CR><LF>

*2M0<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x4D	0x30			0x0D,0x0A

0x2A,0x32,0x4D,0x30,0x0D,0x0A

728PW & 730PW Level Control for EQ Filters & Ouput Level ("I" or 0x49) & ("L" or0x4C)

There are 29 level controls, one for each of the 28 filters and 1 for the Output gain control. These level controls can be controlled individually, one at a time, or all 29 with one command.

The "I" command is an individual level command. There are two data bytes in this command message. The first byte designates which filter or ouput gain level control is to be set. The second byte is the level at which the control will be set. The Individual command format is:

"*" + "Unit Address"+"I"+"Filter to be adjusted"+"Level to be set"+<CR>+<LF>

The following example sets EQ at address number 2; 100Hz filter to -3dB:

Data byte 1 is "5" which indicates the 100Hz filter .
Data byte 2 is "N" which sets the level to -3dB.

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
"*"	2	"I"	"5 N"			<CR><LF>

"*2I5N"<CR><LF>

Hex format

Header	Address	Command type	Data1	Data2	.....DataN	Terminator
0x2A	0x32	0x49	0x35,0x4E			0x0D,0x0A

0x2A,0x32,0x49,0x35,0x4E,0x0D,0x0A

All filter values are shown on the next page.

Level Command ("L"or 0x4C)

The "L" command sends a total of 29 bytes of data in sequential order. Bytes 1 to 28 are filters 31.5 Hz to 16kHz. The 29th data byte is the Output gain control setting. The command format is :

"*"+"Unit Address"+"L"+"Data bytes 1-29" + <CR><LF>

The following example sets all filters to zero and the output gain control to +2dB:

*2LHHHHHHHHHHHHHHHHHHHHHHHHHHHHD"<CR>LF>
----------28 H's----------

H= 0dB D=+2dB

The next page shows the two charts Filter Data values and Level Data Values.

Data Byte Tables for 728PW and 730PW equalizers

Level comand format: "*"+"Unit #"+"I"+ "Data 1"+"Data2"+<CR><LF>

FILTER DATA VALUES

Freq	Data 1 value	Freq	Data 1 value	Freq	Data 1 value
31.5Hz	"0"	315 Hz	":"	3.15kHz	"D"
40 Hz	"1"	400 Hz	";"	4.0 kHz	"E"
50 Hz	"2"	500 Hz	"<"	5.0 kHz	"F"
63 Hz	"3"	630 Hz	"="	6.0 kHz	"G"
80 Hz	"4"	800 Hz	">"	8.0 kHz	"H"
100 Hz	"5"	1.0 kHz	"?"	10.0 kHz	"I"
125 Hz	"6"	1.25kHz	"@"	12.5 kHz	"J"
160 Hz	"7"	1.6 kHz	"A"	16.0 kHz	"K"
200 Hz	"8"	2.0 kHz	"B"	Output Gain	"L"
250 Hz	"9"	2.5 kHz	"C"		

Output gain control data value is "L"

LEVEL DATA VALUES

Filter Level	Data 2 Dec	Hex	Filter Level	Data 2 Dec	Hex
+**12.0dB**	"0"	0x30	**0.0dB**	"H"	0x48
+11.5dB	"1"	0x31	**- 0.5dB**	"I"	0x49
+11.0dB	"2"	0x32	**- 1.5dB**	"J"	0x4A
+10.5dB	"3"	0x33	**- 1.0dB**	"K"	0x4B
+10.0dB	"4"	0x34	**- 2.0dB**	"L"	0x4C
+ 9.5dB	"5"	0x35	**- 2.5dB**	"M"	0x4D
+ 9.0dB	"6"	0x36	**- 3.0dB**	"N"	0x4E
+ 8.5dB	"7"	0x37	**- 3.5dB**	"O"	0x4F
+ 8.0dB	"8"	0x38	**- 4.0dB**	"P"	0x50
+ 7.5dB	"9"	0x39	**- 4.5dB**	"Q"	0x51
+ 7.0dB	":"	0x3A	**- 5.0dB**	"R"	0x52
+ 6.5dB	";"	0x3B	**- 5.5dB**	"S"	0x53
+ 6.0dB	"<"	0x3C	**- 6.0dB**	"T"	0x54
+ 5.5dB	"="	0x3D	**- 6.5dB**	"U"	0x55
+ 5.0dB	">"	0x3E	**- 7.0dB**	"V"	0x56
+ 4.5dB	"?"	0x3F	**- 7.5dB**	"W"	0x57
+ 4.0dB	"@"	0x40	**- 8.0dB**	"X"	0x58
+ 3.5dB	"A"	0x41	**- 8.5dB**	"Y"	0x59
+ 3.0dB	"B"	0x42	**- 9.0dB**	"Z"	0x5A
+ 2.5dB	"C"	0x43	**- 9.5dB**	"["	0x5B
+ 2.0dB	"D"	0x44	**-10.0dB**	"\"	0x5C
+ 1.5dB	"E"	0x45	**-10.5dB**	"]"	0x5D
+ 1.0dB	"F"	0x46	**-11.0dB**	"^"	0x5E
+ 0.5dB	"G"	0x47	**-11.5dB**	"-"	0x5F
0.0dB	"H"	0x48	**-12.0dB**	"`"	0x60

Query Unit Status Message ("?Z" or 0x3F) for 728PW and 730PW

The current status of any Audio Net™ unit can be obtained by sending the following command string to the address of the unit.

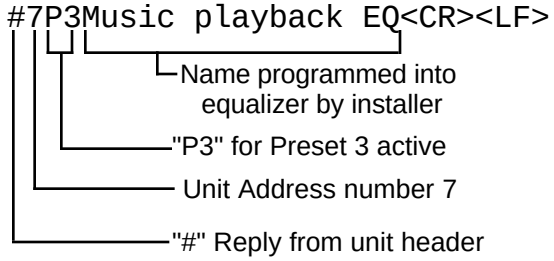
"*" + "Unit Address" + "?Z" <CR><LF>

OR

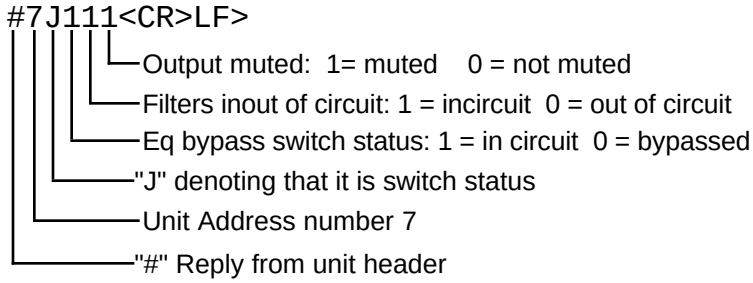
0x2A, 0x32, 0x3F, 0x55, 0x0D, 0x0A

The 728PW/730PW will respond to a query by sending the following information sequence as shown below:

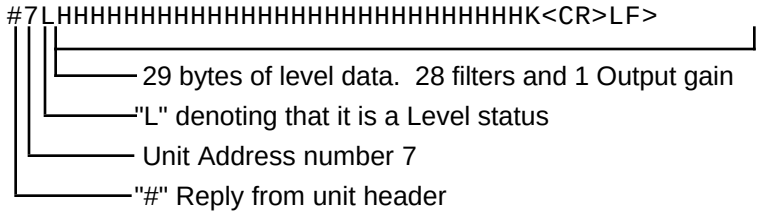
1) The currently active preset along with the name programmed into the preset



2) The status of Bypass, EQ IN/OUT, and the MUTE switch.



3) The setting of all 29 level controls. 28 filter levels and 1 Output gain level.



802A Individual Level Command ("I"or 0x49)

The 802A has seven front and rear panel level controls, inputs 1-5, master out, and Aux output. Each level control can be individually set via Audio Net™.

Each of the seven level controls are assigned a number. They are listed below:
Input #1 = 1
Input #2 = 2
Input #3 = 3
Input #4 = 4
Input #5 (Aux) = 5
Master output = 6
Aux output =7

The format is: Cmd + Address + "I" + Level control number (1-7)+ Level step(0 -I)
(The level step must be either in Ansi Char or Hex)

Example: To set the Master output on unit number 2 to level step 4(+12dB) = *2 I64

Step num	dB Lvl	ANSI Char	Hex
0	+20	"0"	0x30
1	+18	"1"	0x31
2	+16	"2"	0x32
3	+14	"3"	0x33
4	+12	"4"	0x34
5	+10	"5"	0x35
6	+8	"6"	0x36
7	+6	"7"	0x37
8	+4	"8"	0x38
9	+2	"9"	0x39
10	0	":"	0x3a
11	-2	";"	0x3b
12	-4	"<"	0x3c
13	-6	"="	0x3d
14	-8	">"	0x3e
15	-10	"?"	0x3f
16	-12	"@"	0x40
17	-14	"A"	0x41
18	-16	"B"	0x42
19	-18	"C"	0x43
20	-20	"D"	0x44
21	-25	"E"	0x45
22	-30	"F"	0x46
23	-40	"G"	0x47
24	-50	"H"	0x48
24	-90	"I"	0x49

Valid Addresses for Ivie Audio Net™ Products

Valid addresses for Ivie Audio Net™ products are from $30 - $39 and $42 - $5A. If required, additional addresses can be made available. Please contact Ivie for additional information.

Audio Net™ Address	Hex Value	Screen Character
0	$30	0
1	$32	1
2	$32	2
3	$33	3
4	$34	4
5	$35	5
6	$36	6
7	$37	7
8	$38	8
9	$39	9
10	$42	B
11	$43	C
12	$44	D
13	$45	E
14	$46	F
15	$47	G
16	$48	H
17	$49	I
18	$4A	J
19	$4B	K
20	$4C	L
21	$4D	M
22	$4E	N
23	$4F	O
24	$50	P
25	$51	Q
26	$52	R
27	$53	S
28	$54	T
29	$55	U
30	$56	V
31	$57	W
32	$58	X
33	$59	Y
34	$5A	Z