

## 8 Hex Table

Table 5 lists the Hex values (which the protocol in section 9 describes in more detail) for the **VP-23xl** 4x1 Presentation Switcher:

Table 5: VP-23xl Hex Table

Inputs		Composite Video OUT and Audio OUT CV	s-Video OUT and Audio OUT s-Video	VGA OUT and Audio OUT VGA
Group	#			
Composite Video	In 1	01 81 81 81		
	In 2	01 82 81 81		
	In 3	01 83 81 81		
	In 4	01 84 81 81		
s-Video	In 1		01 81 82 81	
	In 2		01 82 82 81	
	In 3		01 83 82 81	
	In 4		01 84 82 81	
VGA	In 1			01 81 83 81
	In 2			01 82 83 81
	In 3			01 83 83 81
	In 4			01 84 83 81

Master Audio Selector (Group Audio OUT)	Audio Master OUT
Composite Video Audio OUT	02 81 81 81
s-Video Audio OUT	02 82 81 81
VGA Audio OUT	02 83 81 81
Microphone	02 84 81 81
Disconnect All	02 80 81 81

## 9 Communication Protocol

This protocol, which enables RS-232 communication between the **VP-23xl** and the PC, uses 4 bytes of information, and data is at 9600 baud, no parity, 8 data bits and 1 stop bit.

Table 6: Protocol Definitions

MSB		INSTRUCTION						LSB	
DESTINATION									
0	D	N5	N4	N3	N2	N1	N0		
7	6	5	4	3	2	1	0		
1st byte									
		INPUT							
1	0	0	0	0	I2	I1	I0		
7	6	5	4	3	2	1	0		
2nd byte									
		OUTPUT							
1	0	0	0	0	0	O1	O0		
7	6	5	4	3	2	1	0		
3rd byte									
		MACHINE NUMBER							
1	0	0	0	M3	M2	M1	M0		
7	6	5	4	3	2	1	0		
4th byte									

1st BYTE:

Bit 7 – Defined as 0.

D – “DESTINATION BIT”.

This bit is always low, when sending from the PC to the switchers, and high for information sent to the PC.

N5...N0 – “INSTRUCTION”.

These 6 bits define the function that is to be performed by the switcher(s). Similarly, if a function is performed via the machine’s keyboard, then these bits are set with the INSTRUCTION NO, which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5...N0).

2nd BYTE:                    Bit 7 – Defined as 1.  
                                   Bits 3 – 6 - Defined as 0.  
                                   I2... I0 – “INPUT”.

For disconnect, set as 0. For other operations, these bits are defined according to Table 7.

3rd BYTE:                    Bit 7 – defined as 1.  
                                   Bits 2-6 defined as 0.  
                                   O1, O0 – “OUTPUT”

For operations, these bits are defined according to Table 7.

4th BYTE:                    Bit 7 – Defined as 1.  
                                   Bits 3-6 Defined as 0.

M3... M0 – “MACHINE NUMBER”.

MACHINE NUMBER = (DIPSWITCH CODE) + 1.

*Table 7: Instruction Codes*

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET MACHINE	0	0	1
1	SWITCH GROUPS	1-4 Set equal to video and audio inputs to be switched for the relative group	1-3 Set equal to group to which output is to be switched	2
2	SWITCH AUDIO OUTPUTS	1-4 * Set equal to audio output to be switched to Master Audio out	1	2
5	REQUEST GROUP STATUS	0	1-3 Set equal to the group of which status is required	3
6	REQUEST STATUS OF MASTER AUDIO OUTPUT	0	1	3
8	BREAKAWAY SETTING	0	0 – Audio-follow-video 1 – Audio breakaway	2
11	REQUEST BREAKAWAY SETTING	0	0	3
16	ERROR	Don't care	0 – Invalid instruction 1 – Out of range	4
18	RESET MACHINE	0	0	1
22	SET AUDIO GAIN OF MASTER AUDIO OUTPUT	1	gain value	7
24	INCREASE/DECREASE AUDIO GAIN	1	0 – Increase gain 1 – Decrease gain	8
25	REQUEST GAIN	1	0 – Video gain 1 – Audio gain	3, 9
30	LOCK FRONT PANEL	0 – Panel unlocked 1 – Panel locked	0	
31	REQUEST WHETHER PANEL IS LOCKED	0	0	3
57	SET AUTO SAVE	1 – Autosave 2 – No save	Don't care	5
61	IDENTIFY MACHINE	1 or 2 – Machine name 3 or 4 – Program version	Don't care	6
62	DEFINE MACHINE	1 – Number of inputs 2 – Number of outputs	1 – For video 2 – For audio	3

\* # 4 - for microphone

NOTES on to Table 7:

**NOTE 1**

When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

**NOTE 2**

These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if:

0000 0001 Instruction "Switch Groups"  
1000 0010 Input #2  
1000 1001 in composite video group  
1000 0001 Machine #1 (master)

Was sent from the PC, then the switcher (machine #1) will switch input 2 in composite video group to its output. If the user switched input 4 in the VGA group via the front panel keypad, then the switcher will send:

0100 0001  
1000 0100  
1000 0011

1000 0001 to the PC.

When the PC sends instruction #1 or #2 to the switcher, then, if the instruction is valid, the switcher replies by sending the same four bytes to the PC that were sent (except for the first byte, where the DESTINATION bit is set high).

**NOTE 3**

The reply to a "REQUEST" instruction is as follows: the same instruction and input codes as were sent are returned, and the OUTPUT is assigned to the value of the requested parameter. The reply to the instruction #5 (what is the status of the VGA group?):

0000 0101  
1000 0000  
1000 0011  
1000 0001  
Would be:  
0100 0101  
1000 0000  
1000 0100  
1000 0001

**NOTE 4**

An error code is returned to the PC if an invalid code was sent to the switcher (for example, when trying to switch an input or a group which is greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher will not be valid.

**NOTE 5**

Under normal conditions, the machine's present status is saved each time a change is made. The power-down save (the auto save) may be disabled using this code. Note that each time that the machine is turned ON, the auto save function is automatically set.

**NOTE 6**

This is a request to identify the switchers in a system. If the INPUT is set as 1 or 2, the machine will send its name. The reply is the decimal value of the INPUT and the OUTPUT. For example, the reply to the request to send the machine's name (for machine #001) will be:

0111 1101  
1000 0000 (i.e. 128+0)  
1001 0111 (i.e. 128+23)  
1000 0001

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number following the decimal point. For example, for version 3.5 the reply will be:

0111 1101  
1000 0011 (i.e. 128+3)  
1000 0101 (i.e. 128+5)  
1000 0001

**NOTE 7**

GAIN VALUE – Number from 0 to 127

Gain Value = 0            Mute

Gain Value = 115         $V_{out} = V_{in}$

Gain Value = 127         $V_{out} = 2V_{in}$

**NOTE 8**

One step = 0.5 dB

**NOTE 9**

Answer = Current Audio Gain (0 –127)

### Hex Table For Audio Gain Settings

Set audio gain max (6dB)	16 81 FF 81
Set audio gain = 5.5dB	16 81 FE 81
Set audio gain = 5.0dB	16 81 FD 81
:	:
Set audio gain = 1.0dB	16 81 F5 81
Set audio gain = 0.5dB	16 81 F4 81
Set audio gain = 0dB (unity gain)	16 81 F3 81
Set audio gain = -0.5dB	16 81 F2 81
Set audio gain = -1.0dB	16 81 F1 81
Set audio gain = -1.5dB	16 81 F0 81
:	:
Set audio gain = -46.5dB	16 81 A2 81
Set audio gain = -47.0dB	16 81 A1 81
Set audio gain = -47.5dB	16 81 A0 81
Set audio gain = -48.0dB	16 81 9F 81
Set audio gain = -49.0dB	16 81 9E 81
Set audio gain = -50.0dB	16 81 9D 81
:	:
Set audio gain = -76.0dB	16 81 83 81
Set audio gain = -77.0dB	16 81 82 81
Set audio gain = -78.0dB	16 81 81 81
Mute audio	16 81 80 81
Increase audio gain by 0.5dB	18 81 80 81
Decrease audio gain by 0.5dB	18 81 81 81
Request audio gain	19 81 81 81

Note: For VP-24 this table relates to the switcher mode. For scaler mode the second byte should be 84.