This protocol, which enables RS-232 communication between the VP-25xl and the PC, uses 4 bytes of information, and data is at 9600 baud, no parity, 8 data bits and 1 stop bit.

Protocol Definitions

MSB   **LSB**

	DESTINATION	INSTRUCTION					
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 the INSTRUCTION CODES Table.

3rd BYTE: Bit 7 – defined as 1.

                         Bits 2-6 defined as 0.

                         O1, O0 – "OUTPUT"

For operations, these bits are defined according to INSTRUCTION CODES Table.

4th BYTE: Bit 7 – Defined as 1.

Bits 3-6 Defined as 0.

M3… M0 – "MACHINE NUMBER".

MACHINE NUMBER = (DIPSWITCH CODE) + 1.

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	2
				1 – audio breakaway	
9	VIDEO TYPE SETTING	0 – for video		0 – CV	2
				1 – YC	
				6 – VGA	
		2 - for VGA scaler		1 – Resolution 640x480	
				2 – 800x600	
				3 – 1024x768	
11	REQUEST BREAKAWAY SETTING	0		0	3
12	REQUEST VIDEO TYPE SETTING	0		0 – for video	3
				2 – for VGA scaler	
16	ERROR/OUT OF RANGE	0		0 – error	4
				2 – out of range	
18	RESET MACHINE	0		0	1
22	SET AUDIO GAIN OF MASTER AUDIO OUTPUT	1		Gain value	7
23	INCREASE/DECREASE VIDEO PARAMETER	4		2 – increase contrast	2
				3 – decrease contrast	
				4 – increase bright	
				5 – decrease bright	
				6 – increase color	
				7 – decrease color	
				8 – increase hue	
				9 – decrease hue	
				16 – increase hPhase	
				17– decrease hPhase	
				18 – increase vPosition	
				19 – decrease vPosition	
24	INCREASE/DECREASE AUDIO GAIN	1		0 – increase gain	8
				1 – decrease gain	
25	REQUEST GAIN	1		0 – video gain	3, 9
				1 – audio gain	
30	LOCK FRONT PANEL	0 – panel unlocked		0	
		1 – panel locked			
31	REQUEST WHETHER PANEL IS LOCKED	0		0	3
57	SET AUTO SAVE	1 – autosave		Don't care	5
		2 – no save			
61	IDENTIFY MACHINE	1 or 2 – machine name		Don't care	6
		3 or 4 – program version			
62	DEFINE MACHINE	1 – number of inputs		1 – for video	10
		2 – number of outputs		2 – for audio	

* # 4 - for microphone

NOTES:

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

To 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 from 6.0 dB to -48.0 dB; or 1.0 dB from -49.0 dB to -78.0 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