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PREMIUM INTERFACE PRODUCTS

South Hackensack, New Jersey

USER MANUAL

Models:

CVG-SW61CS, 6x1 CV / s-Video / Audio Switcher



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1 Introduction

The **CVG-SW61CS** unit's front panel includes a power switch and 6 push buttons, which illuminate when pressed. The **CVG-SW61CS** unit's rear panel includes:

- 6 composite video inputs on BNC connectors, 6 s-Video (Y/C) inputs on 4 pin connectors and 6 audio L-R inputs on RCA connectors
- 1 composite video output on a BNC connector, 1 s-Video (Y/C) output on a 4 pin connector and 1 audio L-R output on a RCA connector
- A DB9M remote connector
- A DB9F RS-232 port (a Null modem adapter is supplied)
- A RS-485 terminal block connector

- A set of 8 Dipswitches
- Power connector with Fuse

The **CVG-SW61CS** unit:

- Includes non-volatile memory that retains the last setting, after switching the power off and then on again
- Switches during the vertical interval¹. This provides glitch-free switching for synchronized sources

You can use your **CVG-SW61CS** unit as a standalone unit or as one of several independent **CVG-SW61CS** units connected to a PC. You can also connect a standalone **CVG-SW61CS** unit to a PC, as section 4 describes.

2 Connecting the Remote Connector

By attaching a specific PIN to PIN 9, you can switch an input via a remote dry contact switch (and the appropriate front panel push button illuminates), as Table 1 specifies.

Table 1: Remote PIN # Settings

Attach PIN #:	To PIN 9, to switch INPUT #:
1	1
2	2
3	3
4	4
5	5
6	6

For example, to switch video and audio input # 5 to the video and audio output, attach PIN 5 to PIN 9, on the remote connector.

3 Setting the Dipswitches on a Standalone Unit

On a standalone unit, set DIPS 1, 2, 3, 4, 6, 7 and 8 OFF and set DIP 5 ON.

4 Connecting the RS-232 Port

To connect a PC to a standalone **CVG-SW61CS** unit, using the Null-modem adapter provided with the machine (recommended):

¹ Sync is derived from the CV IN 1 connector

- Connect the RS-232 DB9F port on the standalone **CVG-SW61CS** unit (defined as Master¹) to the Null-modem adapter and connect the Null-modem adapter with a 9 wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to the standalone **CVG-SW61CS** unit, without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9F port on the standalone **CVG-SW61CS** unit (defined as Master¹), as Figure 1 illustrates (depending on whether the PC has a 9-pin or 25-pin connector)

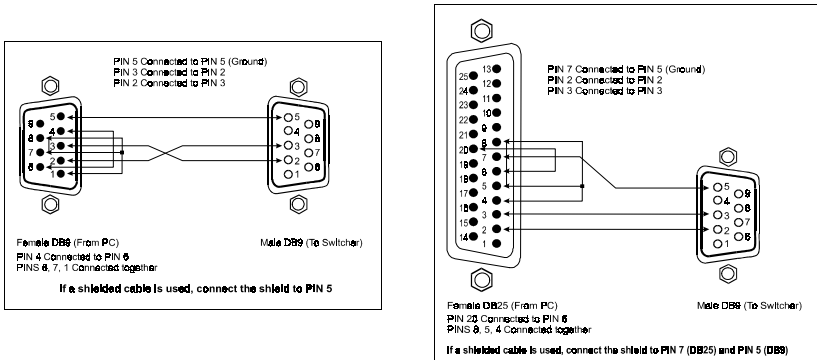


Figure 1: Connecting a PC without using a Null-modem Adapter

5 Operation

Switching an input to the output automatically switches the stereo audio signals with the video signals (audio-follow-video). All operations and status indicators relate to both the video and the audio channels.

5.1 Operating via the Front Panel or Remote Control

To switch an input to the output, do one of the following:

- Press one² of the 6 front panel push buttons
The push button illuminates and switches that input to the output
- Attach a PIN³ to PIN 9 on the Remote connector
The appropriate push button illuminates and switches the input to the output

¹ Set the dipswitches as section 3 describes

² You can only press one push button at a time

³ You can only attach one PIN at a time to PIN 9

For example, to switch video input # 2 to the output, press push button # 2 or attach PIN 2 to PIN 9 on the Remote connector. If sources connect to both the composite video input # 2 and the s-Video (Y/C) input # 2, composite video input # 2 will switch to the composite video output and s-Video (Y/C) input # 2 will switch to the s-Video (Y/C) output.

6 Using Several Independent Units Connected to a PC

This section describes using several independent **CVG-SW61CS** units connected to a PC. You can connect up to 16 independent **CVG-SW61CS** units via RS-485, with control (PC) via RS-232, as Figure 2 illustrates.

6.1 Setting the Dipswitches on Several Independent Units

Set the MACHINE # via DIPS 1, 2, 3 and 4. Set the DIPS 6, 7 and 8, OFF.

Set DIP 5 ON only on the first and last **CVG-SW61CS** units. On all other **CVG-SW61CS** units, set DIP 5 OFF (DIP 5 is the RS-485 termination switch).

On the first **CVG-SW61CS** unit, set the MACHINE # as 1, on the second **CVG-SW61CS** unit, set the MACHINE # as 2, and so on, up to MACHINE # 16 for the sixteenth **CVG-SW61CS** unit, as Table 2 describes:

Table 2: Dipswitch Settings

MACHINE #	DIP 1	DIP 2	DIP 3	DIP 4
1 (Master)	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON
9	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON
11	ON	OFF	ON	OFF
12	ON	OFF	ON	ON
13	ON	ON	OFF	OFF
14	ON	ON	OFF	ON
15	ON	ON	ON	OFF
16	ON	ON	ON	ON

6.2 Connecting the RS-232 Port

To connect a PC to the Master **CVG-SW61CS** unit, using the Null-modem adapter provided with the machine (recommended):

- Connect the RS-232 DB9F port on the first (Master) **CVG-SW61CS** unit to the Null-modem adapter and connect the Null-modem adapter with a 9 wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to the **CVG-SW61CS** unit, without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9F port on the first (Master) **CVG-SW61CS** unit (depending on whether the PC has a 9-pin or 25-pin connector), as Figure 1 on page 3 illustrates

6.3 Connecting the RS-485 Port

Connect the RS-485 port on the first **CVG-SW61CS** unit to the RS-485 port on the second **CVG-SW61CS** unit and so on, connecting up to 16 of the **CVG-SW61CS** units via RS-485, as Figure 2 illustrates.

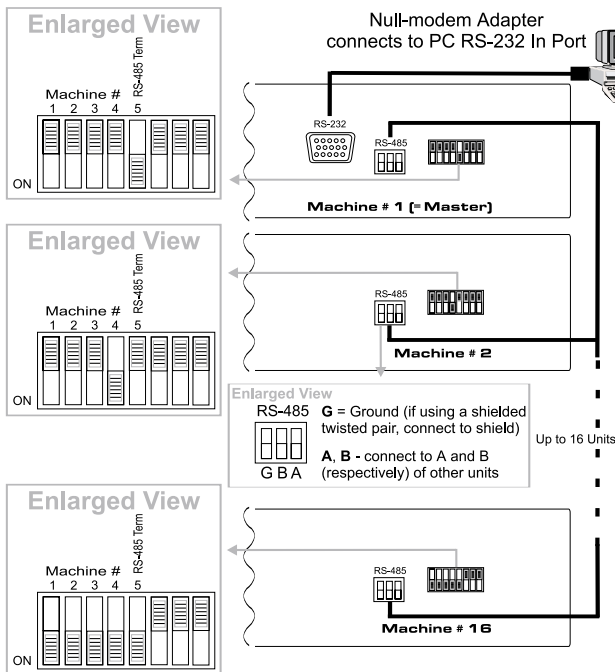


Figure 2: Connecting Several Independent CVG-SW61CS Units to a PC

6.4 Operation

You can operate several independent units that are connected to a PC via:

- A remote connector¹ or a front panel push button, as section 5.1 describes
- PC Control software or other RS-232 controller

7 Hex Table

Table 3 lists the Hex values (which the protocol in section 8 describes in more detail) for the **CVG-SW61CS** 6x1 CV / s-Video / Audio Switcher:

Table 3: Hex Table for RS-232

IN 1	IN 2	IN 3	IN 4	IN 5	IN 6
01 ²	01	01	01	01	01
81	82	83	84	85	86
81	81	81	81	81	81
81	81	81	81	81	81

8 Protocol

The protocol that enables RS-232 communication between the **CVG-SW61CS** unit and the PC uses 4 bytes of information. Data is at 9600 baud, no parity, 8 data bits and 1 stop bit. For RS-232, a null-modem connection between the machine and controller is used.

Table 4: 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	I6	I5	I4	I3	I2	I1	I0	
7	6	5	4	3	2	1	0	
2nd byte								
	OUTPUT							
1	O6	O5	O4	O3	O2	O1	O0	
7	6	5	4	3	2	1	0	
3rd byte								
	MACHINE NUMBER							
1	X	X	M4	M3	M2	M1	M0	
7	6	5	4	3	2	1	0	
4th byte								

¹ Section 2 describes how to connect the remote connector on a unit

² You can use 02 for the switching instruction

1st BYTE: Bit 7 – Defined as 0.

D – “DESTINATION”: 0 - for sending information to the switchers (from the PC); 1 - for sending to the PC (from the switcher).

N5...N0 – “INSTRUCTION”

The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). 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. I6...I0 – “INPUT”.

When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number that is to be switched. Similarly, if switching is done via the machine’s front-panel, then these bits are set with the INPUT NUMBER that was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1. O6...O0 – “OUTPUT”.

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number that is to be switched. Similarly, if switching is done via the machine’s front-panel, then these bits are set with the OUTPUT NUMBER that was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1 Bit 6, bit 5 – Don’t care

M4...M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number.

For a single machine controlled via the serial port, always set M4...M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Note: All values in Table 5 are decimal, unless otherwise stated.

Table 5: Instruction Codes

#	INSTRUCTION DESCRIPTION	DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
		INPUT	OUTPUT	
0, 18	RESET	0	0	1
1, 2	SWITCH	Set equal to input, which is to be switched (0 = disconnect)	1	2
5, 6	REQUEST STATUS OUTPUT	0	1	3
7	VIS	0	0 – No VIS (immediate) 1 – VIS switching	
10	REQUEST VIS SETTING	0	0	3, 4
16	ERROR	0	1 - invalid instruction 2 - out of range	5

Protocol

#	INSTRUCTION DESCRIPTION	DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
		INPUT	OUTPUT	
57	SET AUTO-SAVE	0 - no save; 1 - auto-save	0	6
61	IDENTIFY MACHINE	1, 2 - Machine name 3, 4 - Internal software version	0	7
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs	1 - for video 2 - for audio	8

NOTES on Table 5 (above):

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 the HEX code:

01 85 81 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to the output.

If the user switched input 1 to the output via the front panel keypad, then the switcher will send:

41 81 81 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was 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 the value of the requested parameter. The reply to instruction 10 is as per the definitions in instruction 7. For example, if the present status of machine number 5 is input 3, then the reply to the HEX code:

05 80 81 85

would be:

45 80 83 85

NOTE 4 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code), or will not reply. If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1 (and its VIS setting cannot be programmed otherwise), the reply to the HEX code:

4A FE 80 81

(i.e. request VIS setting, with INPUT set as 126dec) would be:

4A FE 81 81

(i.e. VIS setting = 1, which is defined as VIS from input #1).

NOTE 5 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to switch an input or output greater than the highest one defined). Reception of this code by the switcher is not valid.

NOTE 6 - Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note, that whenever the machine is turned on, the auto-save function is set.

NOTE 7 – This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1 or 2, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT.

7D 80 BA 81

(i.e. 128dec+ 0dec for 2nd byte, and 128dec+ 61dec for 3rd byte).

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 after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81

(i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

NOTE 8 – For example, the reply to the HEX code for defining the machine instruction for the number of inputs:

3E 81 81 81

would be:

7E 81 86 81