5. SERIAL CONTROL OF THE ROUTERS

5.1. GVG TEN-XL ASCII PROTOCOL

The following sections are provided as a technical reference for programmers who want to write their own software to control the Evertz X1200 series routers using the GVG TEN-XL ASCII command protocol. There are some hardware differences between the X1200 series routers and the Grass Valley TEN-XL routers which have required differences in implementation of the protocol for the X1200 series routers.

The GVG Ten XL protocol allows multiple devices to be addressed on a multi-drop serial connection. The GVG TEN-XL protocol was originally designed to control 10 x 1 routers, therefore each video buss (with its associated audio busses) in the X1200 routers has its own address. In the X1202 routers, these addresses are the one set in the *Serial Address* menu item and the next high number. (i.e. if the *Serial Address* menu item is set to 10, then address 10 will correspond to video buss 1 and its associated audio busses, and address 11 will correspond video buss 2 and its associated audio busses. In the X1201 routers only the serial address set in the *Serial Address* menu is used.

Some implementations of the GVG Ten XL protocol only allow one device to be addressed on a single-drop serial connection. These implementations use address 0 only. When controlling X1201 routers from single drop GVG protocol, set the *Serial Address* to 0. In the X1202 routers, special provisions have been made to override the programmed *Serial Address* and re-direct the control to either video buss. Setting one or two of the GPI Inputs to one of the 10XL Redirect GPI Input functions can accomplish this. When one GPI is pulled to ground, all serial commands to address 0 will control the respective video buss, regardless of the setting of the *Serial Address* menu item. To control the other video buss, ground the other GPI input. If both GPIs are active at the same time the higher GPI number will have priority. If you set the *Serial Address* to 0, and one GPI is programmed to the *10XL redirect V2* function, serial commands will control V1 buss when the GPI is inactive, and the V2 buss when the GPI is active.

When the X1200 series router is operating in the *master* mode, it will send out commands to the router that matches its *serial addresses*. When the X1200 series router is operating in the *slave* mode, it will only respond to commands that match its *serial addresses.* If two X1200 series routers are connected in a master/slave configuration, then the addresses of both routers must be set the same.

The *Setup Menu* in the router must be used to configure the **REMOTE CTL** port. See section 3.14 for information about configuring the serial port.

5.1.1. Serial Data Format

In GVG's TEN-XL ASCII protocol all words sent and received use the following format:

Standard: RS-232 (Can be set to RS-422 by changing internal Jumpers (See section 2.4.2)
Data Rate: Default 38400 Baud (Can be set using the *Baud Rate* menu item)
Data Format: Default 8 data bits, even parity, 1 stop bit (Can be set using the *Serial Format* menu item)

5.1.2. Definitions

1 GVG's TEN-XL ASCII protocol uses standard ASCII hex codes for the transmission of commands. Programmers must use the hex equivalent code in order to successfully convey commands from their controlling software to the X1200 series router. Hexadecimal [hex] numbers are represented with the prefix "0x."

i.e. decimal "14" = "0x0E."

2. There are two reserved words in GVG TEN-XL ASCII Protocol. They are illustrated in the table below.

Reserved Word	Hexadecimal Equivalent	Control Character
STX	0x02	^B
ENQ	0x05	^E

3. Internal crosspoint numbers are 'zero-based', meaning that crosspoint number 1 is accessed as source 0. Since GVG TEN-XL protocol is based on 10 internal crosspoints and the Evertz 12 x 1 router family contains 12 internal crosspoints it was necessary to extend the protocol to include crosspoint #11 and #12. Valid sources range from 0 to 11 decimal or 0x00 to 0x0B as shown in Table 5-1.

Data Byte		Corresponding Source
Hex Value	ASCII Character	
0x30	0	1
0x31	1	2
0x32	2	3
0x33	3	4
0x34	4	5
0x35	5	6
0x36	6	7
0x37	7	8
0x38	8	9
0x39	9	10
0x41	A	11*
0x42	B	12*

*- Not found in regular GVG TEN-XL protocol.

Table 5-1: Crosspoint numbers and their Internal Source Numbers

5.1.3. Command Formats

Commands are issued by concatenating a sequence of hex codes or parameters as shown in Table 5-2. All codes are adjacent to each other with no spaces in between bytes.

Parameter	Definition
[STX]	ASCII hex code for Start of Transmission
[ENQ]	ASCII hex code for Inquiry
[HI ADDR]	ASCII hex code for the High byte of the address
[LO ADDR]	ASCII hex code for the Low byte of the address
[XPT(V)]	ASCII hex code for Video crosspoint (i.e.0..9, A, B)
[XPT(A)]	ASCII hex code for Audio crosspoint (i.e.0..9, A, B)
[PSUPP]	ASCII hex code for the Power Supply Status (i.e.0x31 = active, 0x30 = either inactive)

Table 5-2: ASCII Command Definitions

5.1.3.1. Write or Take Command

This command is used to switch the active crosspoint in the router.

[STX][HI ADDR][LO ADDR][XPT(V)][XPT(A)]

5.1.3.2. Read or Query Command

This command is used to read back the status of the router.

[STX][HI ADDR][LO ADDR][ENQ]

5.1.3.3. Reply Command String

This reply is sent back from the router in response to the Write or Read command. It indicates which audio and video crosspoints are active, and the current status of the power supplies.

[XPT(V)][XPT(A)][PSUPP]

5.1.4. Command Examples:

The following are examples of the GVG's TEN-XL ASCII protocol write and read commands controlling a X1202S-AES model router. The *Serial Address* menu item is assumed to be set to 01 so video Buss 1 will be addressed as 01 and video buss 2 will be addressed as 02.

5.1.4.1. Input Selection – Audio Follow Mode

Switch the video 1 buss and its associated audio busses to video input 4 (crosspoint # 3)

ASCII string: ^B0133 [^B = control+B which is the STX code]
Hex string: [0x02][0x30][0x31][0x33][0x33]
This will cause the router to switch the video to input 4 or video crosspoint #3, and both audio channels of the audio to input 4 or audio crosspoint #3, and then reply with:

ASCII string: 331
Hex string: [0x33][0x33][0x31]

to indicate that the router has switched and that the power supply is active. Note-The router will always respond to a valid request.

5.1.4.2. Input Selection – Breakaway Mode

Switch the video 2 buss to video input 2 (crosspoint # 1).
Switch the audio associated with the video 2 buss to audio input 4 (crosspoint # 3)

ASCII string: ^B0213 [^B = control+B which is the STX code]
Hex string: [0x02][0x30][0x32][0x31][0x33]

This will cause the router to switch the video 2 output to input 2 or video crosspoint #1, and the audio 2A and 2B busses to input 4 or audio crosspoint #3, and then reply with:

ASCII string: 131
Hex string: [0x31][0x33][0x31]

to indicate that the router has switched and that the power supply is active.

5.1.4.3. Router Status Request

Request the crosspoint settings of the video 2 buss and its associated audio busses.

ASCII string: ^B02^E [^B = control+B which is the STX code]
[^E = control+E which is the ENQ code]
Hex string: [0x02][0x30][0x32][0x05]

This will cause the router to respond with the current crosspoint status:

ASCII string: 131
Hex string: [0x31][0x33][0x31]

to indicate that the router video 2 buss is set to video input 2 or crosspoint #1 and the associated audio busses are set to audio input 4 or crosspoint #3. It also indicates that the power supply is active.