Datavideo SE-3200 RS-232 Control Protocol

Contents

1. Introduction

This document describes the SE-3200 External RS-232 Control Protocol for standalone main unit

- Used to communicate between the SE-3200 Main board and a custom RS-232 specific program.
    - the models below do NOT have any physical RS-232 port for device control using the RS-232 protocol so it is recommended to use the Ethernet interface instead (see Ethernet Control Protocol document for completely different control commands):
        - SE-3200 includes an external keyboard (RS-232 port available but used for connecting the keyboard)
        - HS-3200 has a built-in keyboard (RS-232 port **NOT** available)
- The protocol is loosely based on the well-known GVG100 Protocol, in order to allow for maximum code re-use, and quick development.
- The protocol is extended to allow Menus to be accessed using this protocol.
- The protocol extension commands allow Get & Set operations to any of the SE-3200 control parameters.

2. Serial Interface

The External RS-232 Control Protocol Control is available on the internal serial port connector.

2.1 Interface Format

RS-232, 8 bit DATA, 1 STOP bit, ODD parity, 19.2k baud

3. Protocol Description

3.1 The Break Character

The data transmission standard is based on the SMPTE standard. The SE-3200 does not require the use of the Break Character, but processes it in order to maintain compatibility with this standard.

It is recommended not to use the Break Character when using this protocol.

After Power-Up, the SE-3200 is set to the *SELECTED* state, rather than the standard *IDLE* state. This allows the Break-Character sequence to be omitted. However, once it has received a Break Character, it will expect them to be used in the normal way.

The SMPTE recommended standard requires protocol access as shown in Figure 1.

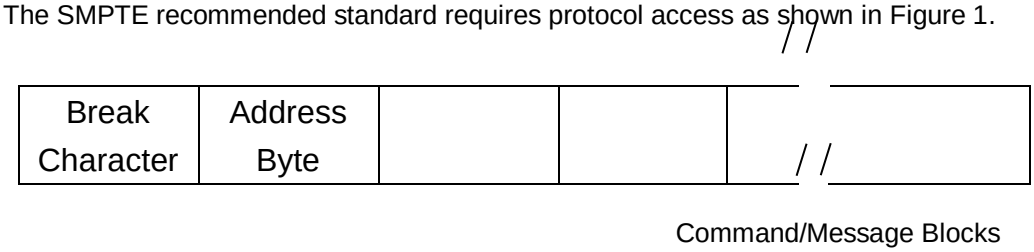


Figure 1 *SMPTE Protocol*

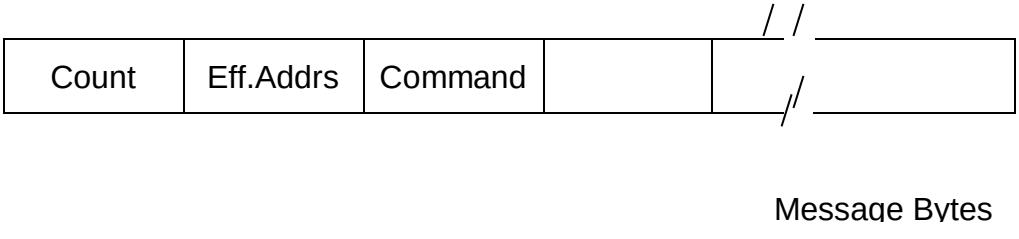
The break character is intended to wake up listening tributaries. The address byte selects the relevant tributary for the following message block. However, since the SE-3200 is designed to work on a one-to-one connection with the controller, it will accept any non-zero address as valid, and will respond with 84(Hex).

3.2 Command Format

The commands are based upon the well-known GVG100 Protocol.

Unless shown as a value, the effects address, EX, may take any value from 00H to FFH.

All messages conform to the following format, where *count* is the command byte-count, *Eff. Addrs* is the effects address byte, and *command* is the command code byte. If an invalid byte count is sent (less than 0, or greater than 142 decimal), the SE-3200 Serial Control Interface responds with 85 (Hex), to indicate an error.



However, it will remain in the 'Active' state. This differs from the standard protocol, in order to make the system more tolerant of errors from the controlling device.

3.3 Response Format

A read command is responded to by returning the corresponding write command with the data. E.g. if the SE-3200 Wipe Pattern is set for a vertical wipe, a read wipe pattern command (02 01 48) would be answered with 03 01 C8 02.

A write command is answered with a two byte status message. The first byte is the byte count (01), and the second byte indicates the status, shown in Figure 2.

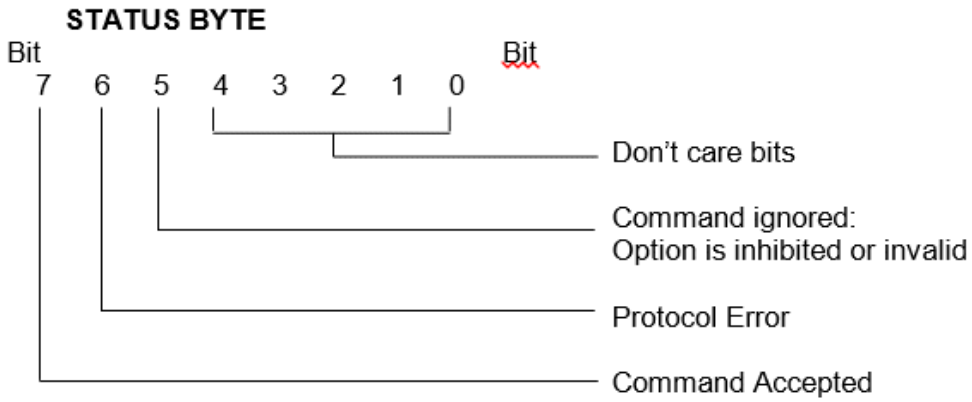


Figure 2 - *Write Command Status Response*

3.4 Message Commands

The following commands are defined:

Comand Name	Read/Write Code (Hex)	Section	Page
Crosspoint - Program	41 / C1	3.4.1	6
Crosspoint - Preset	42 / C2	3.4.1	6
Crosspoint – Key Fill Src	43 / C3	3.4.1	6
Crosspoint – Key Key Src	44 / C4	3.4.1	6
Analog Control	45 / C5	3.4.2	7
Pushbutton / Lamp On	- - / C6	3.4.3	11
Pushbutton / Lamp Off	- - / C7	3.4.3	11
Lamp Read	46, 47 / - -	3.4.3	11
Wipe Pattern	48 / C8	3.4.4	15
Transition Mode	4A / CA	3.4.5	16
Transition Rate - Auto Trans	4C / CC	3.4.6	17
Transition Rate - DSK Trans	4D / CD	3.4.6	17
Crosspoint Remap	60 / E0	3.4.10	21
Store User Memory	- - / DA	3.4.8	20
Load User Memory	- - / DB	3.4.8	20
Firmware Update	6B / EB	3.4.11	22
Software Version	- - / EC	3.4.12	23
Status Update	6E / EE	3.4.13	24
Get & Set Control Commands	70 / F0	3.4.16	28
All Stop	- - / F2	3.4.17	22
Push Button Select	- - / FB	3.4.18	29
Transition Rate - FTB Trans	7D / FD	3.4.6	17

Table 1 ***Message Commands***

3.4.1 CROSSPOINT (41, 42, 43, 44 / C1, C2, C3, C4)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Program	02	EX	41	-
Read Preset	02	EX	42	-
Read Key Fill Src	02	EX	43	-
Read Key Key Src	02	EX	44	-
Write Program	03	EX	C1	Crosspoint
Write Preset	03	EX	C2	Crosspoint
Write Key Fill Src	03	EX	C3	Crosspoint
Write Key Key Src	03	EX	C4	Crosspoint

The **Write Command** enables allocation of one of the available 'sources' to the designated bus.

The **Read Command** returns the source currently selected in the form of the corresponding **Write Command**.

The **Effects Address** is used to select Keyer (Key1, Key2, Key3, Key 4, DSK, DSK2):

Effects Addr (EX)	SE-3200 Mode
00	Key 1
01	Key 2
2	Key 3
3	Key 4
4	DSK 1
5	DSK 2

Table 2 ***Valid Effect Address values for Key Src***

The **Effects Address** is ignored for Program & Preset commands

Valid crosspoint numbers are shown in **Table 3**.

Crosspoint	SE-3200 Mode
00	Black
01	Input 1
02	Input 2
03	Input 3
04	Input 4
05	Input 5
06	Input 6
07	Input 7
08	Input 8
9	Input 9
10	Input 10
11	Input 11
12	Input 12
13	Matte
14	Pattern (Bars)
15	Still 1
16	Still 2
17	Flex Src

Table 3 ***Valid Crosspoint Numbers***

If a crosspoint number greater than 17 is specified, then Black will be selected.

3.4.2 ANALOGUE CONTROLS (45/C5)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Control	03	EX	45	Control
Write Control	05	EX	C5	Control, LSB, MSB

The **Read Command** returns the current value of the designated control. The value is returned in the form of the corresponding write command.

The **Write Command** is followed by two further bytes, the LSB, followed by the MSB. The Analogue values are either twelve bit, or eight bit values and are detailed in Figure 3, and Figure 4.

MSB								**LSB**							
Bit							Bit	Bit							Bit
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
12 bit Value								Don't Care Bits							

Figure 2 - ***Twelve Bit Analogue Value***

MSB								**LSB**							
Bit							Bit	Bit							Bit
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
8 bit Value								Don't Care Bits							

Figure 3 - ***Eight Bit Analogue Value***

Effectively these values are 16-bit unsigned/signed values with either the lower 4 LSBs, or lower 8 LSBs always set to zero.

3.4.2.1 Analog Value Scaling

The Analog values in the Serial Protocol are scaled to map onto the SE-3200 internal values

The following table defines the scaling used for each of the Analog controls available in the protocol.

Analog Type	**Analog Range (Hex)**	**Control Range**	**Float Scaling**
ANALOG100	0x000 – 0xFFF	0.0 – 100.0	(65520.f / 100.0f)
ANALOG100S	0x800 – 0x7FF	-100.0 – + 100.0	(32752.f / 100.0f)
ANALOG360	0x000 – 0xFFF	0.0 – 360.0	(65520.f / 360.0f)
ANALOG16	0x000 – 0xFFF	0.0 – 16.0	(65520.f / 16.0f)
ANALOG16S	0x800 – 0x7FF	-16.0 – +16.0	(32752.f / 16.0f)

To convert from Float to 'Analog Type', multiply by the appropriate Float Scaling and mask with 0xfff0

The analogue control numbers are shown in **Table 4**.

Control (Hex)	EX	Control Name	Range (Hex)	Analog Type
08	00	DSK 1 Lift	0 - FFF	ANALOG100
09	00	DSK 1 Gain	0 - FFF	ANALOG16
0a	00	DSK 1 Matte Hue	0 - FFF	ANALOG360
0b	00	DSK 1 Matte Sat	0 - FFF	ANALOG100
0c	00	DSK 1 Matte Luma	0 - FFF	ANALOG100
08	05	DSK 2 Lift	0 - FFF	ANALOG100
09	05	DSK 2 Gain	0 - FFF	ANALOG16
0a	05	DSK 2 Matte Hue	0 - FFF	ANALOG360
0b	05	DSK 2 Matte Sat	0 - FFF	ANALOG100
0c	05	DSK 2 Matte Luma	0 - FFF	ANALOG100
00	01	Transition Arm	0 - FFF	ANALOG100
0a	01-04	Key 1 / 2 / 3 / 4 Linear Lift	0x800 – 0x7FF	ANALOG100S
0b	01-04	Key 1 / 2 / 3 / 4 Linear Gain	0 - FFF	ANALOG16
0c	01-04	Key 1 / 2 / 3 / 4 Chroma Key Fgnd	0x800 – 0x7FF	ANALOG100S
0d	01-04	Key 1 / 2 / 3 / 4 Chroma Key Bgnd	0x800 – 0x7FF	ANALOG100S
11	01	Positioner (vert)	0x800 – 0x7FF	ANALOG16S
12	01	Positioner (horz)	0x800 – 0x7FF	ANALOG16S
14	01	Bus Matte Hue	0 - FFF	ANALOG360
17	01-04	Key 1 / 2 / 3 / 4 Chroma Key Hue	0 - FFF	ANALOG360
18	01	Wipe Border Hue	0 - FFF	ANALOG360
19	01	Wipe Border Sat	0 - FFF	ANALOG100
1A	01	Wipe Border Luma	0 - FFF	ANALOG100
1B	01	Bus Matte Luma	0 - FFF	ANALOG100
1C	01	Wipe Aspect	0 - FFF	Not Supported
1D	01	Wipe Border Softness	0 - FFF	ANALOG100
1E	01	Wipe Border Width	0 - FFF	ANALOG100
1F	01	Bus Matte Sat	0 - FFF	ANALOG100

Table 4 ***Analogue Control Numbers***

3.4.3 PUSHBUTTON/LAMP CONTROLS (46, 47 / C6, C7)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read PB/L	03	EX	46/47	PB/Lamp
Write PB/L ON	03	EX	C6	PB/Lamp
Write PB/L OFF	03	EX	C7	PB/Lamp

The **Read Command** is used to determine the status of any push-button or lamp by returning the appropriate form of the write command.

The **Write Command** allows the desired lamp to be turned on or off.

This command is similar to the pushbutton/lamp select command (FB), but there are a few differences to note.

In the SE-3200 Keyboard Control Protocol there are three types of selection buttons:

- those that toggle between two states (e.g. REVERSE),
- those that are single shot (e.g. AUTO-TRANS),
- and those that select a member of a group (e.g. Program Bus).

- When writing to a toggle type lamp, this command (C6/C7) must select the correct state to have any effect, while the select (FB) command toggles the lamp to the next state.

- When writing to a single-shot type, the off (C7) command is non-functional.

- Writing an On (C6) to a group lamp is equivalent to writing a select (FB) command, while the Off (C7) command will have no effect.

Additionally, this command can force an immediate cut of the DSK or fade to black by writing an on or off to the DSK ON lamp (0D) or fade to black lamp (1F).

Note:

- The read values for the DSK FADE and FADE to BLACK lamps are as follows: the DSK FADE lamp is ON while fading or paused, and OFF otherwise, whereas the Fade-to-Black lamp is ON when faded, and off while fading or otherwise. This is to

maintain continuity with the GVG100™ protocol.

The numbers for the lamps are shown in **Table 5**.

PB/L No	Read Function	Write Function
0x00	Program Bus Crosspoint Black	Program Bus Crosspoint Black
0x01	Program Bus Crosspoint 1	Program Bus Crosspoint 1
0x02	Program Bus Crosspoint 2	Program Bus Crosspoint 2
03	Program Bus Crosspoint 3	Program Bus Crosspoint 3
04	Program Bus Crosspoint 4	Program Bus Crosspoint 4
05	Program Bus Crosspoint 5	Program Bus Crosspoint 5
06	Program Bus Crosspoint 6	Program Bus Crosspoint 6
07	Program Bus Crosspoint 7	Program Bus Crosspoint 7
08	Program Bus Crosspoint 8	Program Bus Crosspoint 8
09	Program Bus Crosspoint Matte	Program Bus Crosspoint Matte
0A	Program Bus Crosspoint Pattern	Program Bus Crosspoint Pattern
0B	Auto Transition	Auto Transition
0C	DSK Trans	DSK Trans
0D	DSK On	DSK On
0E	Wipe Transition	Wipe Transition
0F	Mix Transition	Mix Transition
10	Preset Bus Crosspoint Black	Preset Bus Crosspoint Black
11	Preset Bus Crosspoint 1	Preset Bus Crosspoint 1
12	Preset Bus Crosspoint 2	Preset Bus Crosspoint 2
13	Preset Bus Crosspoint 3	Preset Bus Crosspoint 3
14	Preset Bus Crosspoint 4	Preset Bus Crosspoint 4
15	Preset Bus Crosspoint 5	Preset Bus Crosspoint 5
16	Preset Bus Crosspoint 6	Preset Bus Crosspoint 6
17	Preset Bus Crosspoint 7	Preset Bus Crosspoint 7
18	Preset Bus Crosspoint 8	Preset Bus Crosspoint 8
19	Preset Bus Crosspoint Matte	Preset Bus Crosspoint Matte
1A	Preset Bus Crosspoint Pattern	Preset Bus Crosspoint Pattern
1b	DSK 2 On	DSK 2 On

PB/L No	Read Function	Write Function
1C		Freeze Cap
1D	REVERSE Wipe	REVERSE Wipe
1E	DSK PVW	DSK PVW
1F	Fade to Black	Fade to Black
20	KEY1 Bus Crosspoint Black	KEY1 Bus Crosspoint Black
21	KEY1 Bus Crosspoint 1	KEY1 Bus Crosspoint 1
22	KEY1 Bus Crosspoint 2	KEY1 Bus Crosspoint 2
23	KEY1 Bus Crosspoint 3	KEY1 Bus Crosspoint 3
24	KEY1 Bus Crosspoint 4	KEY1 Bus Crosspoint 4
25	KEY1 Bus Crosspoint 5	KEY1 Bus Crosspoint 5
26	KEY1 Bus Crosspoint 6	KEY1 Bus Crosspoint 6
27	KEY1 Bus Crosspoint 7	KEY1 Bus Crosspoint 7
28	KEY1 Bus Crosspoint 8	KEY1 Bus Crosspoint 8
29	KEY1 Bus Crosspoint Matte	KEY1 Bus Crosspoint Matte
2a	KEY1 Bus Crosspoint Pattern	KEY1 Bus Crosspoint Pattern
2c	Clip Transition	Clip Transition
2d	Wipe Border On/Off	Wipe Border On/Off
2e	DSK 1 Matte Fill	DSK 1 Matte Fill
2f	DSK 1 Spit Mode	DSK 1 Spit Mode
30	Horizontal Wipe	Horizontal Wipe*SE-3200: 1)*
31	Vertical Wipe	Vertical Wipe *(SE-3200: 2)*
32	Horizontal Split Wipe	Horizontal Split Wipe *(SE-3200: 5)*
33	Vertical Split Wipe	Vertical Split Wipe *(SE-3200: 6)*
34	Left Bottom Corner Wipe	Left Bottom Corner Wipe *(SE-3200: 28)*
35	Right Bottom Corner Wipe	Right Bottom Corner Wipe *(SE-3200: 27)*
36	Left Diagonal Wipe	Left Diagonal Wipe *(SE-3200: 3)*
37	Box Wipe	Box Wipe *(SE-3200: 17)*
38	Diamond Wipe	Diamond Wipe *(SE-3200: 19)*
39	Circle Wipe	Circle Wipe *(SE-3200: 29)*
3a	Heart Wipe	Heart Wipe *(SE-3200: 32)*
3b	Cross Wipe	Cross Wipe *(SE-3200: 18)*
3c	XCross Wipe	XCross Wipe *(SE-3200: 20)*

PB/L No	Read Function	Write Function
3d	Left Top Corner Wipe	Left Top Corner Wipe *(SE-3200: 25)*
3e	Right Top Corner Wipe	Right Top Corner Wipe *(SE-3200: 26)*
3f	Right Diagonal Wipe	Right Diagonal Wipe *(SE-3200: 4)*
45	DVE Transition	DVE Transition
46	DSK1 Trans Enable	DSK1 Trans Enable
47	DSK2 Trans Enable	DSK2 Trans Enable
48	Transition Bgnd Select	Transition Bgnd Select
49	Transition Key1 (PVW)	Transition Key1 (PVW)
4a	N/A	CUT
4b	Transition Key2 (PVW)	Transition Key2 (PVW)
4c	Transition PVW	Transition PVW
4d		
4e		
4f	Grab Save	Grab Save
50	Transition Key3 (PVW)	Transition Key3 (PVW)
51	Transition Key4 (PVW)	Transition Key4 (PVW)
52	Key 1 On (PGM)	Key 1 On (PGM)
53	Key 2 On (PGM)	Key 2 On (PGM)
54	Key 3 On (PGM)	Key 3 On (PGM)
55	Key 4 On (PGM)	Key 4 On (PGM)
56		
57	Trans speed 1 Select	Trans speed 1 Select
58	Trans speed 2 Select	Trans speed 2 Select
59	Trans speed 3 Select	Trans speed 3 Select
5a	Current Keyer – P-in-P Enable	Current Keyer – P-in-P Enable
5b	Current Keyer – P-in-P Lite Enable	Current Keyer – P-in-P Lite Enable
5c	*PGM Src Still Mode (Live, Frz, Still)*	*PGM Src Still Mode (Live, Frz, Still)*
5d	*PST Src Still Mode (Live, Frz, Still)*	*PST Src Still Mode (Live, Frz, Still)*
5e	Logo 1 On	Logo 1 On
5f	Logo 2 On	Logo 2 On

PB/L No	Read Function	Write Function
60	Menu	Menu
61	Menu Up	Menu Up
62	Menu Down	Menu Down
63	Menu Left	Menu Left
64	Menu Right	Menu Right
65	Menu Enter	Menu Enter
66	Menu Normal	Menu Normal
67	--	--
68	Key 1 Select	Key 1 Select
69	Key 2 Select	Key 2 Select
6a	DSK 1 Select	DSK 1 Select
6b	DSK 2 Select	DSK 2 Select
6c	Current Keyer – Luma Mode	Current Keyer – Luma Mode
6d	Current Keyer – Lin Mode	Current Keyer – Lin Mode
6e	Current Keyer – Chroma Mode	Current Keyer – Chroma Mode

Table 5 ***Pushbutton/Lamp Numbers.***

3.4.4 WIPE / DVE PATTERN (48/C8)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Wipe Pattern	02	EX	48	-
Write Wipe Pattern	03	EX	C8	Wipe Num

The **Read Command** returns the currently selected wipe pattern in the form of the corresponding write command.

The **Write Command** will select the pattern as listed below.

Patterns 1 - 32 select SE-3200 Wipe Patterns 1-32, and select Wipe as the Transition Type
Patterns 32 - 64 Reserved for future expansion

The selected wipe can then be run using the Lever Arm control or the AUTO-TRANS Button.

3.4.4.1 DVE Transition selection

Use this command for DVE Transition selection

Numbers 100+ (recommended) are reserved for DVE Transition selection

3.4.5 TRANSITION MODE (4A/CA)[2]

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Transition mode	02	EX	4A	-
Write Transition mode	03	EX	CA	Mode

The **Read Command** returns the currently selected Transition Mode

The **Write Command** selects the Transition Mode as shown in Figure 4 *Transition Mode*

Bits [2:0]	Description
000	No Change to BKGD or KEYS
001	BKGD Unselected, Key 1 Unselected, Key 2 Selected
010	BKGD Unselected, Key 1 Selected, Key 2 Unselected
011	BKGD Unselected, Key 1 Selected, Key 2 Selected
100	BKGD Selected, Key 1 Unselected, Key 2 Unselected
101	BKGD Selected, Key 1 Unselected, Key 2 Selected
110	BKGD Selected, Key 1 Selected, Key 2 Unselected
111	BKGD Selected, Key 1 Selected, Key 2 Selected,

Figure 4 *Transition Mode*

3.4.6 TRANSITION RATE (4C,4D,7D/CC,CD,FD)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Auto-Trans Rate	02	EX	4C	-
Write Auto-Trans Rate	05	EX	CC	Rate 1,2,3
Read DSK Fade Rate	02	EX	4D	-
Write DSK Fade Rate	05	EX	CD	Rate 1,2,3
Read Fade-to-Black Rate	02	EX	7D	-
Write Fade-to-Black Rate	05	EX	FD	Rate 1,2,3

This command reads and writes the rate at which SE-3200 will perform the indicated transition, and sets the Transition Mode.

Three BCD format bytes are used to set the rate:

Rate 1 - Most significant digit of rate (Range 0-9)

Rate 2 - Middle digit of rate (Range 0-9)

Rate 3 - Least significant digit of rate (Range 0-9)

Rate 1 can also be used to set the Transition Enable bits, and Trigger the transition

See Figure 5 - *Transition Rate Byte Format* (M/E Transition)

Rate Bytes	Description
Rate 1	Most significant digit of rate (Range 0-9) Bits [3:0]: Rate value in BCD (0 - 9) Bits [6:4]: 000 - M/E Trans: None 001 - M/E Trans: Key 2 Only 010 - M/E Trans: Key 1 Only 011 - M/E Trans: Key 1 & Key 2 100 - M/E Trans: BKGD Only 101 - M/E Trans: BKGD & Key 2 110 - M/E Trans: BKGD & Key 1 111 - M/E Trans: BKGD, Key 1 & Key 2 Bit 7: 0 - Update Only 1 - Update & then do transition
Rate 2	Middle digit of rate (Range 0-9) Bits [3:0]: Rate value in BCD (0 - 9) Bits [7:4]: Don't Care
Rate 3	Least significant digit of rate (Range 0-9) Bits [3:0]: Rate value in BCD (0 - 9) Bits [7:4]: Don't Care

Figure 5 - *Transition Rate Byte Format (M/E Transition)*

See Figure 5 - *Transition Rate Byte Format* (DSK Transition)

Rate Bytes	Description
Rate 1	Most significant digit of rate (Range 0-9) Bits [3:0]: Rate value in BCD (0 - 9) Bits [5:4]: 00 - DSK Trans: None 01 - DSK Trans: DSK 2 Only 10 - DSK Trans: DSK 1 Only 11 - DSK Trans: DSK 1 & DSK 2 Bit 6: Not used Bit 7: 0 - Update Only 1 - Update & then do transition
Rate 2	Middle digit of rate (Range 0-9) Bits [3:0]: Rate value in BCD (0 - 9) Bits [7:4]: Not used
Rate 3	Least significant digit of rate (Range 0-9) Bits [3:0]: Rate value in BCD (0 - 9) Bits [7:4]: Not used

Figure 7 - *Transition Rate Byte Format (DSK Transition)*

3.4.7 Save User Mem (--/DA)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Save User Mem	03	EX	DA	User Mem (0-255)

Saves the current switcher state to the User Memory selected (0-255)

3.4.8 Load User Mem (--/DB)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Load User Mem	03	EX	DB	User Mem (0-255)

Loads the selected User Memory (0-255)

3.4.9 Menu Select (--/DE)

Function	Byte Count	Effects Address	Command Code	Message
Menu Select	03	EX	DE (Hex)	Menu Num: [7:4] Sub-Menu / [3:0] Menu

Causes a menu item to be displayed on the Multiview Output

Currently defined Menus are:

Menu Num [3:0]	Menu
0	Start
1	Keyer
2	Chroma
3	P-in-P
4	Flex Src
5	Inputs
6	Outputs
7	Audio
8	Files
9	Setup

Currently defined Sub-Menus for Keyer/Chroma/P-in-P menus:

Menu Num [7:4]	Sub Menu
1	Key 1
2	Key 2
3	Key 3
4	Key 4
5	DSK 1
6	DSK 2

Currently defined Sub-Menus for File menu:

Menu Num [7:4]	Menu
1	User
2	Still
3	Clip
4	Logo
5	Ani Logo

3.4.10 Crosspoint Remap (60 / E0)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Crosspoint	03	EX	60	Crosspoint
Write Crosspoint	04	EX	E0	Crosspoint, Source

Allows control over the SE-3200 Crosspoint remapping function

The **Write Command** sets switcher 'Crosspoint' to come from Input 'Source'.

The **Read Command** returns the source currently associated with 'Crosspoint' in the form of the corresponding **Write Command**.

The **Effects Address** is ignored, and can be set to any value.

Valid Crosspoint numbers are shown in **Table 6**.

Crosspoint #	Assigned to:
01	Input 1
02	Input 2
03	Input 3
04	Input 4
05	Input 5
06	Input 6
7	Input 7
8	Input 8
9	Input 9
10	Input 10
11	Input 11
12	Input 12

Table 6 ***Valid Crosspoint Numbers***

3.4.11 Firmware Update (6B/EB)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Firmware Update Request	03	00	0x6B	0 – Open Firmware file 1 – Get Next Block of firmware 2 – Close Firmware file
Firmware Data	0x02-0x82	00	0xEB	Data Packet

The Keyboard can request a firmware update from the Main board by sending the 0x6b command to the Main board.

Message values:

- 0 – Opens the firmware file for reading
- 1 – Read the next block of data from the file
- 2 – Close firmware file

When Opening the file, (i.e. Message = 0), if file is present, then the Main board will respond with ACK (0x80). If it is not present, then a NACK (0x84) will be sent.

When reading data, (i.e. Message = 1), the main board will respond with the 0xeb Command, and upto 128 bytes of data. The length of the command packet determines how much data is being supplied with this command:

0x02: - Null packet

- No data is being supplied, either because no firmware file is available, or the end of the file has been reached

0x02 - 0x82: – Up to 128 bytes of data from the file are returned

- 128 bytes are returned if possible
- A value less than 128 bytes indicates that the end of file has been reached (i.e. there were less than 128 byte of data left to read)

3.4.12 Software Version (--/EC)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Software Version	04	00	0xEC	Version

The Keyboard can send a firmware version value to the Main board. Usually this would be done when the Keyboard first connects to the Main board.

If a firmware update is available (either at start-up, or if firmware is loaded later by the user) the Main board will assert the 'Firmware Update' Flag in the Status Packet (See 3.4.13 - STATUS UPDATE (6E/EE).)

- The keyboard can then request a Firmware update from the Main board

- See 3.4.11 - Firmware Update (6B/EB)

3.4.13 STATUS UPDATE (6E/EE)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Request Status Packet	03	EX	6E	Bit 0: 0 - No Sync 1 – Field Sync Bit 1: 0 - Always 1 – Only when changed
Status Update Data	09	EX	EE	Status Packet

The Keyboard can request a status update packet by sending the 0x6e command to the Main board

Message values:

Bit 0:

- 0 - the MU will respond with the status packet immediately
- 1 - then the MU will wait until the next field event, and then send the status packet
- This allows the Keyboard to field-synchronise to the MU.

Bit 1:

- 0 – Always
- 1 – Only when changed

3.4.13.1 SE-3200 Mode Status Packet

The format of the Status Packet in SE-3200 Mode is:

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	LED Bright2	LED Bright1	LED Bright0	PGM4	PGM3	PGM2	PGM1	PGM0
Byte 1				PVW4	PVW3	PVW2	PVW1	PVW0
Byte 2	REV	WIPES6	WIPES5	WIPES4	WIPES3	WIPES2	WIPES1	WIPES0
Byte 3	PST Src Still	DSK2 PVW	DSK1 PVW	Key4 PVW	Key3 PVW	Key2 PVW	Key1 PVW	Trans BG
Byte 4	PGM Src Still	DSK2 PGM	DSK1 PGM	Key4 PGM	Key3 PGM	Key2 PGM	Key1 PGM	FRZ/CAP
Byte 5	BDR On/Off	Grab Save	DSK Auto				Trans 1	Trans 0
Byte 6	Firmware Update	Menu	Auto	PVW TRANS		Speed1	Speed0	FTB

3.4.14 Device Type (SE-3200) (6F/EF)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Device Type	02	EX	6F	--
Write Device Type	03	EX	EF	Bit 0: 0 – SE-3200 1 – Not defined

This command allows the keyboard to detect the product type currently being run

- Currently only SE-3200 is supported

When keyboard sends the 'Read Device Type' command to the Main board, the Main board will respond with the 'Write Device Type' response, indicating the current device type.

3.4.15 AUX CROSSPOINT (61, 62, 63, 64 / E1, E2, E3, E4)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Read Aux 1	02	EX	61	-
Read Aux 2	02	EX	62	-
Read Aux 3	02	EX	63	-
Read Aux 4	02	EX	64	-
Write Aux 1	03	EX	E1	Crosspoint
Write Aux 2	03	EX	E2	Crosspoint
Write Aux 3	03	EX	E3	Crosspoint
Write Aux 4	03	EX	E4	Crosspoint

The **Write Command** enables allocation of one of the available 'sources' to the designated bus.

The **Read Command** returns the source currently selected in the form of the corresponding **Write Command**.

The **Effects Address** is ignored, and can be set to any value.

Valid Aux crosspoint numbers are shown in **Table 6**.

Crosspoint#	Assigned to:
00	Black
01	Input 1
02	Input 2
03	Input 3
04	Input 4
05	Input 5
06	Input 6
07	Input 7
08	Input 8
09	Input 9
10	Input 10
11	Input 11
12	Input 12
13	--
14	--
15	--
16	--
17	Matte
18	Flex Src
19	Still 1
20	Still 2
21	Program Out
22	Preview Out
23	Program/DSK1
24	Preview/DSK1

Table 7 ***Valid Aux Crosspoint Numbers***

3.4.16 Get & Set Control Commands (70/F0)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Get Control(s)	02 + (4 * n)	00	70	n * (4-byte Control ID)
Set Control(s)	02 + (8 * n)	00	F0	n * (4-byte Control ID + 4-byte Control Value)

These commands allow access to the full range of SE-3200 Controls

- This is achieved by wrapping the Get & Set Control Commands of the Ethernet Control Protocol inside the serial protocol format.
- This format is quite long – 8 bytes are needed to specify the parameter and value
    - Control ID (4 bytes)
    - Value (4 bytes)
        - The value field is always 4 bytes
        - Allows 32-bit floats
- Multiple Controls can be written/read with one command
    - Which improves the transmission efficiency since there is only one Command overhead, and only one acknowledge needed.
- For Get Control, the sender sends the list of Controls to be returned
    - The switcher then returns just the Set Command(0xnn, 0x00, 0xf0) + Value data (not the Control IDs)
    - This also saves re-transmitting the Control IDs, which are already known

See Section 4 of the Ethernet Control protocol for list of Control IDs available.

3.4.17 ALL STOP (--/F2)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Write All Stop	03	EX	F2	d0

This is a write only command and performs the following operations:

Clear all active transitions.

Clear all frozen transitions.

Return transition control to lever arm.

Set transition type to MIX.

If faded to black, then bring switcher out of black.

The d0 byte is not used.

3.4.18 PUSHBUTTON/LAMP SELECT (--/FB)

Function	Byte Count	Effects Address	Command Code (Hex)	Message
Write Pushbutton	03	EX	FB	Pb #

This write only command performs a 'push' of the desired button as if it had been pushed on the front panel. Refer to **Table 5** for lamp numbers.

4. Supplementary

In the supplementary section, two examples of wrapping the Get & Set Control Commands of the Ethernet Control Protocol inside the serial protocol format will be provided.

The first example provides an illustration of setting the Flex Src sources and the second example describes the input freeze mode settings.

See Ethernet Control Protocol document for details of the Controls available for the Get & Set Control Commands. The Controls for the SE 3200 are divided into a number of different sections:

Section Num	Control Name	Description
0	DV_CONTROL_SECTION_STATUS	Status Information
1	DV_CONTROL_SECTION_SYSTEM	System Control
2	DV_CONTROL_SECTION_SWITCHER	Main Switcher Controls
3	DV_CONTROL_SECTION_INPUT	Input Controls (per channel)
4	DV_CONTROL_SECTION_INPUT_CTRL	Common Input Controls
5	DV_CONTROL_SECTION_OUTPUT_CTRL	Output Controls
6	DV_CONTROL_SECTION_AUDIO_CTRL	Audio Controls
7	DV_CONTROL_SECTION_TRANSITION_CTRL	Transition Engine Controls
8	DV_CONTROL_SECTION_MEMORY_CTRL	User Memory Controls
9	DV_CONTROL_SECTION_MEMORY_PRESENT	User Memory Present
10	DV_CONTROL_SECTION_STILL_CTRL	Stills Memory Controls
11	DV_CONTROL_SECTION_STILL_PRESENT	Stills Memory Present

4.1 Example 1: Quick Source Selection for PIP x 8

Quick PIP source selection can be achieved by using the Get & Set Control Commands (70/F0) in Section 3.4.16 of this document. Use the Ethernet Control Protocol to set the Flex Src sources.

The controls for setting the Flex Src sources are in Section Num 2, the Switcher Section (DV_CONTROL_SECTION_SWITCHER). The list below outlines the available controls in the Switcher Section:

Control Num	Control Name
198	DV_CONTROL_SWITCHER_FLEX_SRC0_BGND_SRC
199	DV_CONTROL_SWITCHER_FLEX_SRC0_DVE1_SRC
200	DV_CONTROL_SWITCHER_FLEX_SRC0_DVE2_SRC
201	DV_CONTROL_SWITCHER_FLEX_SRC0_DVE3_SRC
202	DV_CONTROL_SWITCHER_FLEX_SRC0_DVE4_SRC
203	DV_CONTROL_SWITCHER_FLEX_SRC0_FGND_SRC
204	DV_CONTROL_SWITCHER_FLEX_SRC0_FGND_SRC_K
205	DV_CONTROL_SWITCHER_FLEX_SRC0_FGND_ENABLE

4.2 Example 2: Input Freeze Mode

Input Freeze Mode selection can be achieved by using the Get & Set Control Commands (70/F0) in Section 3.4.16 of this document. Use the Ethernet Control Protocol to set the Input Freeze Mode.

The controls for setting the Input Freeze Mode are in Section Num 3, the Input Section (DV_CONTROL_SECTION_INPUT). The list below outlines the available controls in the Input Section:

Control Num	Control Name	Description
0	INPUT_PROC_AMP_BLACK_LEVEL	Input Proc Amp – Black Level
1	INPUT_PROC_AMP_CHROMA_GAIN	Input Proc Amp – Chroma Gain
2	INPUT_PROC_AMP_WHITE_CLIP	Input Proc Amp – White Clip Level
3	INPUT_INPUT_VALID	Input Valid Flag
4	INPUT_INPUT_MODE	Input Mode
5	INPUT_INPUT_FREEZE_MODE	Freeze Mode (0 – Live, 1 – Freeze, 2 – Still Mode, 3 – Clip, 4 – Capture Mode)
6	INPUT_INPUT_FRAME_MODE	Frame Mode (0 – Frame, 1 – Field, 2 – Video & Key)
7	INPUT_INPUT_REMAP	Input Remap Source
8	INPUT_FREEZE_STILL_LOAD	Still load flag

9	INPUT_FREEZE_STILL_NUM	Still to load in still mode

In order to Get & Set the Input Freeze Mode, control_id must be declared as follows:

int control_id = (DV_CONTROL_SECTION_INPUT << 16) | (input << 4) |
INPUT_INPUT_FREEZE_MODE;

where input is the physical input (not remapped).

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Jul.-09.2019
Version E1