Datavideo SE-650 Ethernet Control

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1. INTRODUCTION

This document describes how to control the SE-650 Switchers over Ethernet, using the TCP/IP protocol.

This Control Protocol has much in common with the SE-1200 Control Protocol
- with difference in terms of number of sources & keyers available.

The SE-650 provides two control channels which are used to control the SE-650

- Command Channel
  - Uses the Command Protocol
- Real-Time Channel
  - Uses the Real-Time Protocol

1.1 Command Protocol & Real-Time Protocol Overview

The Command Protocol allows access to the full control set for the SE-650 and operates in a simple Command-Response manner. This operates in a non-Real-Time manner, as is asynchronous to the field-processing of the SE-650. It is generally used for commands that may take more than one field to execute, but can also handle high-rate of command through put limited by the processing speed of the either Controller, the SE-650, and the network

The Real-Time Protocol is a field synchronous protocol, which is primarily intended for real-time, field synchronous exchange of parameters between the SE-650 and the Controller.

- Using this protocol ensures that the parameter updates happen at field-rate, and allow for smooth T-Bar and Joystick control, for example.
- A Key feature of the Real-Time protocol is that any changes to the SE-650 state are automatically sent to the Controller.
- If multiple Controllers are attached, the SE-650 automatically ensures that all controllers are kept up-to-date with changes from any of the other controllers. This is a key function of ensure that multiple controllers can operate together smoothly and

cleanly.

The full control system should implement both of these protocols, but for simple applications, the Command Protocol may be sufficient.

1.2 General Connection Information

By default, the SE-650 is configured to operate at a fixed IP address (192.168.100.101).

Please consult with Datavideo support for applications that require configurable IP addresses, or multiple SE-650s on a common network, or DCHP etc.

- These are supported through host configuration files, which are not normally made available to the user.

1.3 Software Version

This document refers to software version v1.3.3.5.

1.4 Connection

The SE-650 software supports up to four controlling devices (Controllers). Each Controller uses two ports to communicate with the SE-650.

- RealTime Port
- Command Port

Port	Port Number	Normal Use
RealTime Port 1	5001	Control Panel
Command Port 1	5002	Control Panel
ReaTime Port 2	5003	PC Controller #1
Command Port 2	5004	PC Controller #1
RealTime Port 3	5005	PC Controller #2
Command Port 3	5006	PC Controller #2
ReaTime Port 4	5007	PC Controller #3
Command Port 4	5008	PC Controller #3

- If the Control Panel is not used, then RealTime Port1 & Command Port 1 can also be used by an external Controller
- Future versions of software may support more controllers. Please consult with Datavideo Support for information about this.

1.5 Connection Request Channel

In addition to the 8 ports used for the four Controlling devices, Port 5009 can be used to request a free Control Port Channel

2. Command Protocol

2.1 Making the Connection

In an environment where there are multiple possible controlling devices, using the Connection Request Channel allows any controlling device to determine which ports are available.

In an environment where all the controlling devices are known (or there is just one controlling device), there is no need to use the Connection Request protocol, and any of the available port pairs can be used for the connection

2.1.1 Using the Connection Request Channel

The Connection Request Channel (Port 5009) uses a simple protocol, as follows:

1) Open Port 5009
2) Send Connection Request Packet

Connection Request Packet:

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x08
1	Connection Request Command	0x55aa0001

3) Receive Connection Info packet:

Connection Info Packet:

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x08
1	Connection Info	See below:

Where **Connection Info** is:

Dword (32-bits)	Description
0xaa55ffff	No Connection available
0xaa55xxxx	Xxxx – port available (e.g. 5001)
0x55aa0000	Packet size error
0x55aa0001	Unknown Command

The SE-650 returns a free Port number for the Real Time Channel

- The associated Command Channel is also available for use
- Add +1 to the Real Time Port Number to get the Command Port number

2.1.2 Connection to the Control Channel

To connect to the SE-650, using the Command Protocol, perform a 'connect' to the device using the designated IP address (e.g. 192.168.100.101), and use Port 5004 for Command Port 2.

The SE-650 is now ready to accept commands

Command Packets use a simple packet structure as follows:

Dword (32-bits)	Description
0	Packet size (bytes)
1	Command
2	Parameter1
3	Parameter2
	etc

Only 1 command is allowed in each packet

- However the Set & Get Control Commands can set & get multiple control values per command.

All values in the packet are stored as 32-bit ints or floats.

Note:

- *When connecting using the Command protocol, be sure to use even port numbers (5002, 5004, 5006, 5008)*
- *Connecting to the Real Time ports (5001 etc), but using the 'Command Protocol' can actually appear to work ok initially, but the system will eventually cease to work, as the protocols will eventually get out of sync!*

2.2 Commands

The following Commands are available:

Command	DWORD	Description
DV_COMMAND_GET_CONTROL	0	Get a Control Value from SE-650
DV_COMMAND_SET_CONTROL	1	Set a Control Value on the SE-650
DV_COMMAND_OPEN_STILL_FILE	2	Open Still File
DV_COMMAND_OPEN_MINI_PIC_FILE	3	Open Mini Pic File
DV_COMMAND_CLOSE_DATA_FILE	4	Close Data File
DV_COMMAND_GET_FILE_DATA	5	Get File Data
DV_COMMAND_STORE_FILE_DATA	6	Store File Data
DV_COMMAND_STILL_EVENT	7	Still Event
DV_COMMAND_GET_MINI_PIC	8	Get Mini Pic
DV_COMMAND_GET_INPUT_NAME	9	Get Input Name
DV_COMMAND_SET_INPUT_NAME	10	Set Input Name
DV_COMMAND_GET_FILE_NAME	11	Get File Name
DV_COMMAND_SET_FILE_NAME	12	Set File Name
DV_COMMAND_GET_USER_MEM	13	Get User Memory
DV_COMMAND_STORE_USER_MEM	14	Store User Memory
DV_COMMAND_STREAMER_CONTROL	15	Streamer Control
DV_COMMAND_OPEN_SOFTWARE_FILE	16	Open a software file for writing
DV_COMMAND_INSTALL_SOFTWARE	17	Install software
DV_COMMAND_OPEN_NAMES_FILE	18	Open names file
DV_COMMAND_RECORDER_CONTROL	19	Recorder Control
DV_COMMAND_CHROMA_KEYER_AUTO	20	Chroma Keyer Auto

2.3 Command Description

2.3.1 DV_COMMAND_SET_CONTROL

This Command allows access to nearly all the SE-650's control variables

The table below shows a typical example of setting the Program Source to Input 1

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10
1	Command	DV_COMMAND_SET_CONTROL
2	Parameter1 (Section / Control)	DV_CONTROL_SECTION_SWITCHER DV_CONTROL_SWITCHER_PGM_SRC
3	Parameter2	DV_SRC_INPUT_01

The DV_COMMAND_SET_CONTROL command gives access to over 300 SE-650 variables

- See **Section 4** Get & Set Control Commands for full description of these commands.

2.3.1.1 Parameter 1 Coding

	Bits [31:16]	Bits [15:0]
Parameter 1	Section Num	Control Num

Parameter 1 comprises two 16-bit words

- High 16-bits are the 'Section'
- Low 16-bits are the 'Control' within the section

e.g. in the example above:

Parameter 1 = (DV_CONTROL_SECTION_SWITCHER << 16) |
DV_CONTROL_SWITCHER_PGM_SRC

2.3.2 DV_COMMAND_GET_CONTROL

This Command reads control values back from the SE-650

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0c
1	Command	DV_COMMAND_GET_CONTROL

2	Parameter1	DV_CONTROL_SECTION_SWITCHER DV_CONTROL_SWITCHER_PGM_SRC

This example shows how to request the SE-650 to send back the value of the PGM_SRC variable.

The SE-650 will respond with a corresponding SET_CONTROL message

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10
1	Command	DV_COMMAND_SET_CONTROL
2	Parameter1	DV_CONTROL_SECTION_SWITCHER DV_CONTROL_SWITCHER_PGM_SRC
3	Parameter2	DV_SRC_INPUT_01

2.3.3 DV_COMMAND_OPEN_STILL_FILE

Opens a still file on the SE-650

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10
1	Command	DV_COMMAND_OPEN_STILL_FILE
2	Parameter1	Still Number
3	Parameter2	Mode (0 – Read, 1 – Write)

2.3.4 DV_COMMAND_OPEN_MINI_PIC_FILE

Opens a Mini-pic file on the SE-650

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10
1	Command	DV_COMMAND_OPEN_MINI_PIC_FILE
2	Parameter1	Still Number
3	Parameter2	Mode (0 – Read, 1 – Write)

2.3.5 DV_COMMAND_CLOSE_DATA_FILE

Closes a data file (ie. Still or Mini-pic) on the SE-650

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x08
1	Command	DV_COMMAND_CLOSE_DATA_FILE

2.3.6 DV_COMMAND_GET_FILE_DATA

Gets a packet of data from the open data file (Still or Mini-pic)

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0c
1	Command	DV_COMMAND_GET_FILE_DATA
2	Parameter1	Num bytes

2.3.7 DV_COMMAND_STORE_FILE_DATA

Stores data on the SE-650

- Also, this command is used for data return from a DV_COMMAND_GET_FILE_DATA command

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + data size
1	Command	DV_COMMAND_STORE_FILE_DATA
2	Parameter1	Length of chunk
3	Parameter2	Chunk number
4 … n	Data	Bytes of data

2.3.8 DV_COMMAND_STILL_EVENT

Not currently supported

2.3.9 DV_COMMAND_GET_MINI_PIC

Gets a Mini-Pic from the SE-650

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C
1	Command	DV_COMMAND_GET_MINI_PIC
2	Parameter1	Num

The packet returned from the SE-650 is:

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + Mini Pic size
1	Command	DV_COMMAND_RESULT_MINI_PIC
2	Parameter1	Mini Pic Version Num
3 … n	Data	Mini Pic data

Note:

- The Mini-Pic is 96 (H) x 54 (V) pixels in size
- Each pixels is 32-bits
    - Pixel format is: R: [7:0], G:[15:8], B:[23:16]

2.3.10 DV_COMMAND_GET_INPUT_NAME

Gets the Input Name for a Multiviewer source.

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C
1	Command	DV_COMMAND_GET_INPUT_NAME
2	Parameter1	Input Num

The packet returned from the SE-650 is:

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + Name Length (Bytes)
1	Command	DV_COMMAND_RESULT_INPUT_NAME
2	Parameter1	Name Length (UNICODE Chars)
3 … n	Data	Name (Unicode)

2.3.11 DV_COMMAND_SET_INPUT_NAME

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + Name Length (Bytes)
1	Command	DV_COMMAND_SET_INPUT_NAME
2	Parameter1	Name Length (UNICODE Chars)
3 … n	Data	Name (Unicode)

2.3.12 DV_COMMAND_GET_FILE_NAME

Gets the name for a given file

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10
1	Command	DV_COMMAND_GET_FILE_NAME
2	Parameter1	Type (0 – Mem, 1 – Still)
3	Parameter2	File Num

The packet returned from the SE-650 is:

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x2C
1	Command	DV_COMMAND_RESULT_FILE_NAME
2	Parameter1	Name Length (UNICODE Chars)
3 … n	Data	Name (Unicode)

2.3.13 DV_COMMAND_SET_FILE_NAME

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + Name Length (Bytes)
1	Command	DV_COMMAND_SET_FILE_NAME
2	Parameter1	Type (0 – Mem, 1 – Still)
3	Parameter2	File Num
4	Parameter3	Name Length (UNICODE Chars)
5 … n	Data	Name (Unicode)

2.3.14 DV_COMMAND_GET_USER_MEM

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C
1	Command	DV_COMMAND_GET_USER_MEM
2	Parameter1	Num

The packet returned from the SE-650 is:

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x08 + User Mem size
1	Command	DV_COMMAND_RESULT_USER_MEM
2 … n	Data	User Mem data

2.3.15 DV_COMMAND_STORE_USER_MEM

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + User Mem size
1	Command	DV_COMMAND_STORE_USER_MEM
2	Parameter1	Num
3 … n	Data	User Mem data

2.3.16 DV_COMMAND_STREAMER_CONTROL

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + User Mem size
1	Command	DV_COMMAND_STREAMER_CONTROL
2	Streamer Command	Command
3 … n	Any parameters	Parameter

The command control the operation of the streamer on the SE-650

The following commands are currently supported:

DV_STREAMER_LAUNCH

- Start the streamer

DV_STREAMER_STOP

- Stop the streamer.

Additional Streamer parameters are set using the Streamer Section of the control protocol

2.3.17 DV_COMMAND_OPEN_SOFTWARE_FILE

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10 + File name length (inc 0x00 terminator)
1	Command	DV_COMMAND_OPEN_SOFTWARE_FILE
2	Version	Software Version
3	Exe flag	Flag file as executable
4..n	File name	File Name (inc 0x00 terminator)

This command opens a software file to be written to the SE-650 MU.

- See Software Upgrade section

2.3.18 DV_COMMAND_INSTALL_SOFTWARE

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + User Mem size
1	Command	DV_COMMAND_INSTALL_SOFTWARE
2	Version	Software Version

This command finishes the software upgrade process.

- See Software Upgrade section

2.3.19 DV_COMMAND_OPEN_NAMES_FILE

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + User Mem size
1	Command	DV_COMMAND_OPEN_NAMES_FILE
2	Version	Software Version

This command finishes the software upgrade process.

- See Software Upgrade section

2.3.20 DV_COMMAND_RECORDER_CONTROL

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + User Mem size
1	Command	DV_COMMAND_RECORDER_CONTROL
2	Version	Software Version

This command finishes the software upgrade process.

- See Software Upgrade section

2.3.21 DV_COMMAND_CHROMA_KEYER_AUTO

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x0C + User Mem size
1	Command	DV_COMMAND_CHROMA_KEYER_AUTO
2	Version	Software Version

This command finishes the software upgrade process.

- See Software Upgrade section

3. Real-Time Protocol

3.1 Making the Connection

To connect to the SE-650 to use the Real-Time Protocol, perform a 'connect' to the device using the designated IP address (e.g. 192.168.100.101), and use the port number determined in Port 5003 for Real-Time Port 2.

3.2 Protocol Description

Once the connection has been made, the SE-650 will attempt to send a packet to the Controller every field.

This packet will either be

1. A Null Packet
2. A Packet Containing Parameter/Value pairs

3.2.1 Null Packet

A Null Packet is 8 bytes long, as follows:

Dword (32-bits)	Description
0	Packet size (bytes) i.e. 8
1	0

3.2.2 Parameter/Value Packet

The Parameter Value Packet is essentially the same as a DV_COMMAND_SET_CONTROL Command. The Command value is ignored.

The table below shows a typical example of setting the Program Source to Input 1

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x10
1	Command	0 (Ignored)
2	Parameter1 (Section / Control)	DV_CONTROL_SECTION_SWITCHER DV_CONTROL_SWITCHER_PGM_SRC
3	Parameter2	DV_SRC_INPUT_01

- As with the DV_COMMAND_SET_CONTROL Command many parameters can be updated with one packet

The table below shows a typical example of setting the Program Source to Input 1

Dword (32-bits)	Description	Value
0	Packet size (bytes)	0x18
1	Command	0 (Ignored)
2	Parameter1 (Section / Control)	DV_CONTROL_SECTION_SWITCHER DV_CONTROL_SWITCHER_PGM_SRC
3	Parameter2	DV_SRC_INPUT_01
5	Parameter1 (Section / Control)	DV_CONTROL_SECTION_SWITCHER DV_CONTROL_SWITCHER_PST_SRC
6	Parameter2	DV_SRC_INPUT_02

3.2.3 First Packet

The first packet that the SE-650 sends to the Controller will be a packet containing all the parameters.

- This allows the Controller to immediately get the complete machine state of the SE-

650

- It is assumed that the Controller will keep a copy of the complete machine state
    - Please ensure the Controller machine state copy is set to all-zeros before connection is made
- The SE-650 will send any changes to this machine state

3.2.4 Controller Reply Packet

Once the Controller has received a packet from the SE-650, it must send a reply packet to the SE-650.

The Reply packet is of the **same format** at the packet from the SE-650

So, this packet will either be

1. A Null Packet
2. A Packet Containing Parameter/Value pairs

3.2.4.1 Reply Null Packet

See **3.2.1** Null Packet

3.2.4.2 Reply Parameter/Value Packet

See **3.2.2** Parameter/Value Packet

3.2.5 Further Notes

So, as described above, once connected, the Real-Time Protocol consists of the SE-650 sending packets to the Controller at Field-Rate, and the Controller replying to each packet with it's own Reply Packet.

The SE-650 will not send another packet until it has received a reply to the previous packet.

- So the Controller must reply to every packet, even Null Packets
- However, it is permissible for the Reply Packet to take more than a field to arrive

- Of course, this will break the Real-Time, field synchronous nature of the protocol
- But this is still permissible behaviour
- Thus, this protocol can work over extended networks if desired.

Using this Field-Rate exchange of Parameters, all Controllers are kept up-to-date with any changes in the SE-650 including any changes from any other Controller.

4. Get & Set Control Commands

This section describes the Control (i.e variables) available using the DV_COMMAND_GET_CONTROL & DV_COMMAND_SET_CONTROL Commands.

The Controls for the SE-650 are divided into a number of different sections:

Control Num	Control Name	Description
0	SECTION_STATUS	Status Information
1	SECTION_SYSTEM	System Control
2	SECTION_SWITCHER	Main Switcher Controls
3	SECTION_INPUT	Input Controls (per channel)
4	SECTION_INPUT_CTRL	Common Input Controls
5	SECTION_OUTPUT_CTRL	Output Controls
6	SECTION_AUDIO_CTRL	Audio Controls
7	SECTION_TRANSITION_CTRL	Transition Engine Controls
8	SECTION_MEMORY_CTRL	User Memory Controls
9	SECTION_MEMORY_PRESENT	User Memory Present
10	SECTION_STILL_CTRL	Stills Memory Controls
11	SECTION_STILL_PRESENT	Stills Memory Present
12	SECTION_STREAMER_CTRL	Streamer Control

4.1 Control Command Descriptions

4.1.1 DV_CONTROL_SECTION_STATUS

This Section provides status information about the SE-650 State

- Writing to these values will have no effect

Control Num	Control Name	Type
0	STATUS_SYSTEM_CONNECTION_STATUS	int
1	STATUS_SYSTEM_VERSION	int
2	STATUS_MAIN_VERSION	int

3	STATUS_SOFTWARE_VERSION	int
4	STATUS_FPGA_VERSION	int
5	Not used	int
6	STATUS_BOARD_ID_VERSION	int
7..26	DV_CONTROL_STATUS_TALLY_SOURCE1 - 4	int
27	DV_CONTROL_STATUS_TALLY_PGM_SRC	int
28	DV_CONTROL_STATUS_TALLY_PST_SRC	int
29	DV_CONTROL_STATUS_TALLY_KEY1_FILL_SRC	int
30	DV_CONTROL_STATUS_TALLY_KEY1_KEY_SRC	int
31	DV_CONTROL_STATUS_TALLY_KEY2_FILL_SRC	int
32	DV_CONTROL_STATUS_TALLY_KEY2_KEY_SRC	int
33	DV_CONTROL_STATUS_TALLY_DSK1_FILL_SRC	int
34	DV_CONTROL_STATUS_TALLY_DSK1_KEY_SRC	int
35	DV_CONTROL_STATUS_TALLY_DSK2_FILL_SRC	int
36	DV_CONTROL_STATUS_TALLY_DSK2_KEY_SRC	int

4.1.1.1 STATUS_SYSTEM_CONNECTION_STATUS

Connection Status from the SE-650

Standard	Value	Description
DV_CONNECTION_NO_CONNECTION	0	Connection not active
DV_CONNECTION_PENDING	1	Connection
DV_CONNECTION_CONNECTED	2	1080i / 50

```
0 - DV_CONNECTION_NO_CONNECTION
    1 - DV_CONNECTION_PENDING
    2 - DV_CONNECTION_CONNECTED
```

4.1.1.2 STATUS_SYSTEM_VERSION

This is the version number of the System Header used by the SE-650 software

4.1.1.3 STATUS_MAIN_VERSION

This is the version number of the Main Header used by the SE-650 software

4.1.1.4 STATUS_SOFTWARE_VERSION

This is the version number of the Software Version of the SE-650 software

- Bits [31:24] Major Version Number
- Bits [23:16] Minor Version Number
- Bits [15:0] Build Number

4.1.1.5 STATUS_FPGA_VERSION

This is the version number of the Switcher FPGA in the SE-650

- Bit 31 - SD Mode FPGA
- Bits [30:16] - Year in Hex format (eg 2012 is 0x2012)
- Bits [15:8} - Month in Hex format (eg November is 0x11)
- Bits [7:0] - Day in Hex format (e.g. 25th is 0x25)

4.1.1.6 STATUS_BOARD_ID_VERSION

Production board ID number

4.1.1.7 Source Tallies

The Controls STATUS_TALLY_SOURCE0-19 provide Tallies for Individual Sources

- SOURCE0 is Input1
- SOURCE1 is Input2 etc

4.1.1.8 Bus Tallies

Bus Tallies are provided by the following Controls

DV_CONTROL_STATUS_TALLY_PGM_SRC

DV_CONTROL_STATUS_TALLY_PST_SRC

DV_CONTROL_STATUS_TALLY_KEY1_FILL_SRC

DV_CONTROL_STATUS_TALLY_KEY1_KEY_SRC

DV_CONTROL_STATUS_TALLY_KEY2_FILL_SRC

DV_CONTROL_STATUS_TALLY_KEY2_KEY_SRC

DV_CONTROL_STATUS_TALLY_DSK1_FILL_SRC

DV_CONTROL_STATUS_TALLY_DSK1_KEY_SRC

DV_CONTROL_STATUS_TALLY_DSK2_FILL_SRC

DV_CONTROL_STATUS_TALLY_DSK2_KEY_SRC

4.1.2 DV_CONTROL_SECTION_SYSTEM

This section provides control over the system level functions of the SE-650

Control Num	Control Name	Type
0	SYSTEM_STANDARD	int
1	SYSTEM_ASPECT	flag
2	SYSTEM_GENLOCK_ENABLE	flag
3	SYSTEM_GENLOCK_SRC	int
4	SYSTEM_GENLOCK_H_PHASE	int
5	SYSTEM_GENLOCK_V_PHASE	int

4.1.2.1 SYSTEM_STANDARD

This controls the system output standard

Standard	Value	Description
DV_STD_HD1080I_60	0	1080i / 60
DV_STD_HD1080I_59_94	1	1080i / 59.94
DV_STD_HD1080I_50	2	1080i / 50
DV_STD_HD720P_60	3	720p / 60
DV_STD_HD720P_59_94	4	720p / 59.94
DV_STD_HD720P_50	5	720p / 50

4.1.3 DV_CONTROL_SECTION_SWITCHER

4.1.3.1 Wipe Controls

Control Num	Control Name	Type	Range	Description
0	SWITCHER_WIPE_PATTERN_NUM	int	[1 -32]	Pattern num
1	SWITCHER_WIPE_LEVEL	float	[0.0 - 100.0]	
2	SWITCHER_WIPE_POSITION_X	float	[-16.0 - 16.0]	
3	SWITCHER_WIPE_POSITION_Y	float	[-16.0 - 16.0]	
4	SWITCHER_WIPE_ROTATION	float	[-16.0 - 16.0]	
5	SWITCHER_WIPE_SOFT	float	[0.0 - 100.0]	
6	Not used	float	[0.0 - 100.0]	
7	SWITCHER_WIPE_ASPECT	float	..	
8	SWITCHER_WIPE_BORDER_WIDTH	float	[0.0 - 100.0]	
9	SWITCHER_WIPE_BORDER_ENABLE	flag		
10	SWITCHER_WIPE_BORDER_HUE	float	[0.0 - 360.0]	
11	SWITCHER_WIPE_BORDER_SAT	float	[0.0 - 100.0]	
12	SWITCHER_WIPE_BORDER_LUMA	float	[0.0 - 100.0]	

4.1.3.1.1 SWITCHER_WIPE_PATTERN_NUM

Selects the current Wipe Pattern

- Range: 1 - 32

4.1.3.1.2 SWITCHER_WIPE_LEVEL

Sets the current Wipe Level

- Range: 0.0 – 100.0
- When it reaches 100.0, the SE-650 will set it back to zero, and complete the transition
- This control is also used to drive the DVE transition engine when in DVE transition mode

4.1.3.1.3 SWITCHER_WIPE_POSITION_X

Sets the X position of the centre of the Wipe

- Only applies to Wipes 29, 30, 31 (Circle & Ellipse Wipes)
- Range: -1.0 to + 1.0 (ie. +/- 1 screen width)

4.1.3.1.4 SWITCHER_WIPE_POSITION_Y

Sets the X position of the centre of the Wipe

- Only applies to Wipes 29, 30, 31 (Circle & Ellipse Wipes)
- Range: -1.0 to + 1.0 (ie. +/- 1 screen width)

4.1.3.1.5 SWITCHER_WIPE_ROTATION

Sets the Wipe Rotation

- Only applies to Wipes 29, 30, 31 (Circle & Ellipse Wipes)
- Range: -16.0 to + 16.0 rotations

4.1.3.1.6 SWITCHER_WIPE_SOFT

Sets the Wipe Softness

- Range: 0.0 – 100.0
- 0.0 is the minimum softness

- 100.0 is the Maximum softness (1 screen width)

4.1.3.1.7 SWITCHER_WIPE_SOFT_BAL

For a Wipe with Border, the sets the balance between the Leading & Trailing edge softness

- Range: -100.0 – +100.0
- 0.0 – Leading & Trailing Edges have the same softness
- +100 – Leading Edge has +100 softeness
- -100 – Trailing Edge has +100 softness

4.1.3.1.8 SWITCHER_WIPE_ASPECT

- Not used

4.1.3.1.9 SWITCHER_WIPE_BORDER_WIDTH

Sets the Wipe Border Width

- Range: 0.0 – 100.0
- 0.0 is no Border
- 100.0 is the Maximum Border (1 screen width)

4.1.3.1.10 SWITCHER_WIPE_BORDER_ENABLE

Set automatically for any non-zero Wipe Border Width

4.1.3.1.11 SWITCHER_WIPE_BORDER_HUE

Wipe Border Hue

- Range: 0.0 – 360.0 degrees

4.1.3.1.12 SWITCHER_WIPE_BORDER_SAT

Wipe Border Saturation

- Range: 0.0 – 100.0%

4.1.3.1.13 SWITCHER_WIPE_BORDER_LUMA

Wipe Border Luma

- Range: 0.0 – 100.0%

4.1.3.2 Keyer 1 Controls

Control Num	Control Name	Type
19	SWITCHER_KEY1_KEYER_ON	flag
20	SWITCHER_KEY1_KEY_SRC	int
21	SWITCHER_KEY1_SPLIT_SRC	int
22	SWITCHER_KEY1_LINEAR_OPACITY	float
23	SWITCHER_KEY1_LINEAR_LIFT	float
24	SWITCHER_KEY1_LINEAR_GAIN	float
25	SWITCHER_KEY1_LINEAR_KEY_MODE	int
26	SWITCHER_KEY1_LINEAR_KEY_INVERT	float
27	SWITCHER_KEY1_LINEAR_KEY_SEL_MODE	int
28	SWITCHER_KEY1_LINEAR_KEY_FILL_MODE	int
29	SWITCHER_KEY1_LINEAR_MATTE_HUE	float
30	SWITCHER_KEY1_LINEAR_MATTE_SAT	float
31	SWITCHER_KEY1_LINEAR_MATTE_LUMA	float
32	SWITCHER_KEY1_CHROMA_ENABLE	int
33	SWITCHER_KEY1_CHROMA_MATTE_HUE	float
34	SWITCHER_KEY1_CHROMA_MATTE_SAT	float
35	SWITCHER_KEY1_CHROMA_MATTE_LUMA	float
36	SWITCHER_KEY1_CHROMA_KEY_ACC	float
37	SWITCHER_KEY1_CHROMA_KEY_GAIN	float
38	SWITCHER_KEY1_CHROMA_KEY_LIFT	float
39	SWITCHER_KEY1_CHROMA_CHROMA_ACC	float
40	SWITCHER_KEY1_CHROMA_CHROMA_SUP	float
41	SWITCHER_KEY1_CHROMA_KEY_SOFT	float
42	SWITCHER_KEY1_CHROMA_KEY_SHRINK	float
43	SWITCHER_KEY1_CHROMA_BGND_SUPPRESS	int

44	SWITCHER_KEY1_MASK_LEFT	float
45	SWITCHER_KEY1_MASK_RIGHT	float
46	SWITCHER_KEY1_MASK_TOP	float
47	SWITCHER_KEY1_MASK_BOTTOM	float
48	SWITCHER_KEY1_MASK_ENABLE	int

4.1.3.2.1 SWITCHER_KEY1_KEYER_ON

This Enable Key 1 onto the PGM Output

4.1.3.2.2 SWITCHER_KEY1_KEY_SRC

This sets the Key Source for Key 1 in Split Mode, and the Video/Key Source for Key 1 in Luma mode

Key Src	Source
00	Black
01	Input 1
02	Input 2
03	Input 3
04	Input 4
17	Matte
18	Flex Src
19	Still 1
20	Still 2

4.1.3.2.3 SWITCHER_KEY1_SPLIT_SRC

This sets the Video Source for Key 1 in Split Mode

- Source selects, as above

4.1.3.2.4 SWITCHER_KEY1_LINEAR_OPACITY

This sets the Opacity of the Key1 output

- Range: 0.0 – 100.0%

4.1.3.2.5 SWITCHER_KEY1_LINEAR_LIFT

This sets the Lift applied to the Key 1 Linear Keyer Key

- Range: 0.0 – 100.0%
- 0.0 is no lift
- 100.0 is full scale lift

4.1.3.2.6 SWITCHER_KEY1_LINEAR_GAIN

This sets the Gain applied to the Key 1 Linear Keyer Key

- Range: 0.0 – 16.0
- 1.0 is unity gain

4.1.3.2.7 SWITCHER_KEY1_LINEAR_KEY_MODE

This sets the Key1 Keyer Mode

- 0 – Linear Mix Mode
    - This is called ‘Luma’ Mode on the Control Panel
    - Key shaping is also applied
- 1 – Additive Mix Mode
    - This is called ‘Linear’ Mode on the Control Panel
    - Key shaping is not applied

4.1.3.2.8 SWITCHER_KEY1_LINEAR_KEY_INVERT

When set, this inverts the Key

4.1.3.2.9 SWITCHER_KEY1_LINEAR_KEY_SEL_MODE

This is the Key Select Mode. The following modes are available:

- 0 – Self Key Mode
  - The Key Source is used for both the Key & Video
  - i.e. self key
- 1 – Split Mode
  - The Key src is used for the Key, and the Split source is used for the video src
- 2 – PIP Mode
  - This mode allows the Video & Key from the PinP to be used as the Video & Key for this keyer

4.1.3.2.10 SWITCHER_KEY1_LINEAR_KEY_FILL_MODE

This is the Key Fill Mode. The following modes are available:

- 0 – Video Fill Mode
  - The Video source is used as the Video Fill
- 1 – Matte Mode
  - The Keyer Matte generator is used as the video source

4.1.3.2.11 SWITCHER_KEY1_LINEAR_MATTE_HUE

The Keyer Matte is used in the Key Fill Matt Mode

This control sets the Hue of the Key 1 Keyer Matte

- Range: 0.0 – 360.0 degrees

4.1.3.2.12 SWITCHER_KEY1_LINEAR_MATTE_SAT

The Keyer Matte is used in the Key Fill Matt Mode

This control sets the Saturation of the Key 1 Keyer Matte

- Range: 0.0 – 100.0%

4.1.3.2.13 SWITCHER_KEY1_LINEAR_MATTE_LUMA

The Keyer Matte is used in the Key Fill Matt Mode

This control sets the Luma of the Key 1 Keyer Matte

- Range: 0.0 – 100.0%

4.1.3.2.14 SWITCHER_KEY1_CHROMA_ENABLE

This Control enables the Key 1 Chroma Keyer

- 0 – Chroma Keyer not enabled
- 1 – Chroma Keyer enabled

4.1.3.2.15 SWITCHER_KEY1_CHROMA_MATTE_HUE

The Chroma Matte defines the colour of the Background used for Chroma Keying

This control sets the Hue of the Key 1 Chroma Keyer Matte

- Range: 0.0 – 360.0 degrees

4.1.3.2.16 SWITCHER_KEY1_CHROMA_MATTE_SAT

This control sets the Saturation of the Key 1 Chroma Keyer Matte

- Range: 0.0 – 100.0%
- The control is not used in the current software

4.1.3.2.17 SWITCHER_KEY1_CHROMA_MATTE_LUMA

This control sets the Luma of the Key 1 Chroma Keyer Matte

- Range: 0.0 – 100.0%

4.1.3.2.18 SWITCHER_KEY1_CHROMA_KEY_ACC

This control sets the Key Acceptance Angle for the Chroma Keyer

- If the angle is set to 140.0 degrees, then the Key acceptance is +/- 70.0 degrees either side to the Chroma Hue
- Range: 0.0 – 180.0 degrees

4.1.3.2.19 SWITCHER_KEY1_CHROMA_KEY_GAIN

Set the Gain applied to the Chroma Key

- Range: 0.0 – 16.0

4.1.3.2.20 SWITCHER_KEY1_CHROMA_KEY_LIFT

Set the Lift applied to the Chroma Key

- Range: 0.0 – 100.0%

4.1.3.2.21 SWITCHER_KEY1_CHROMA_CHROMA_ACC

This control sets the Chroma Acceptance Angle for the Chroma Keyer

- Inside the Chroma Acceptance angle, Chroma Suppression is applied
- Outside the Chroma Acceptance Angle, the Chroma is unaltered
- If the angle is set to 140.0 degrees, then the Chroma acceptance is +/- 70.0 degrees either side to the Chroma Hue
- Range; 0.0 – 180.0 degrees

4.1.3.2.22 SWITCHER_KEY1_CHROMA_CHROMA_SUP

The Chroma Suppression angle is expressed as a percentage of the Chroma Acceptance Angle

- Low values are usually best
- Within the Chroma Suppression angle, the Chroma is fully suppressed to grey
- Between the Chroma Acceptance Angle and the Chroma Suppression Angle, the Chroma is suppressed along the hue axis.

4.1.3.2.23 SWITCHER_KEY1_CHROMA_KEY_SOFT

No function currently

4.1.3.2.24 SWITCHER_KEY1_CHROMA_KEY_SHRINK

No function currently

4.1.3.2.25 SWITCHER_KEY1_CHROMA_BGND_SUPPRESS

This control simplifies Chroma Key setup, by always fully suppressing the Background in areas of zero key value. This makes it easier to get clean backgrounds, but may introduce dark edges to the foreground

When not set, the background must be suppressed more carefully using the Luma Suppression controlled by the Luma Value of the Chroma Matte colour

4.1.3.2.26 SWITCHER_KEY1_MASK_LEFT

This control sets the Left edge of the mask

- Specifies the distance from the Screen Left Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.2.27 SWITCHER_KEY1_MASK_RIGHT

This control sets the Right edge of the mask

- Specifies the distance from the Screen Right Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.2.28 SWITCHER_KEY1_MASK_TOP

This control sets the Top edge of the mask

- Specifies the distance from the Screen Top Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.2.29 SWITCHER_KEY1_MASK_BOTTOM

This control sets the Bottom edge of the mask

- Specifies the distance from the Screen Bottom Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.2.30 SWITCHER_KEY1_MASK_ENABLE

This Control enables the Key 1 Mask

- 0 – Mask not enabled
- 1 – Mask enabled

4.1.3.3 Keyer 2 (PIP) Controls

Control Num	Control Name	Type
49	SWITCHER_KEY2_KEYER_ON	int
50	SWITCHER_KEY2_KEY_SRC	int
51	SWITCHER_KEY2_SPLIT_SRC	int
52	SWITCHER_KEY2_LINEAR_OPACITY	float
53	SWITCHER_KEY2_LINEAR_LIFT	float
54	SWITCHER_KEY2_LINEAR_GAIN	float
55	SWITCHER_KEY2_LINEAR_KEY_MODE	int
56	SWITCHER_KEY2_LINEAR_KEY_INVERT	float
57	SWITCHER_KEY2_LINEAR_KEY_SEL_MODE	int
58	SWITCHER_KEY2_LINEAR_KEY_FILL_MODE	int
59	SWITCHER_KEY2_LINEAR_MATTE_HUE	float
60	SWITCHER_KEY2_LINEAR_MATTE_SAT	float
61	SWITCHER_KEY2_LINEAR_MATTE_LUMA	float
62	SWITCHER_KEY2_CHROMA_ENABLE	int
63	SWITCHER_KEY2_CHROMA_MATTE_HUE	float
64	SWITCHER_KEY2_CHROMA_MATTE_SAT	float
65	SWITCHER_KEY2_CHROMA_MATTE_LUMA	float
66	SWITCHER_KEY2_CHROMA_KEY_ACC	float

67	SWITCHER_KEY2_CHROMA_KEY_GAIN	float
68	SWITCHER_KEY2_CHROMA_KEY_LIFT	float
69	SWITCHER_KEY2_CHROMA_CHROMA_ACC	float
70	SWITCHER_KEY2_CHROMA_CHROMA_SUP	float
71	SWITCHER_KEY2_CHROMA_KEY_SOFT	float
72	SWITCHER_KEY2_CHROMA_KEY_SHRINK	float
73	SWITCHER_KEY2_CHROMA_BGND_SUPPRESS	int
74	SWITCHER_KEY2_MASK_LEFT	float
75	SWITCHER_KEY2_MASK_RIGHT	float
76	SWITCHER_KEY2_MASK_TOP	float
77	SWITCHER_KEY2_MASK_BOTTOM	float
78	SWITCHER_KEY2_MASK_ENABLE	int

The Controls for Keyer2 follow the same pattern as Keyer1

4.1.3.4 Transition Controls

The Switcher Transition Controls control the actions of the M/E mixer

Control Num	Control Name	Type
79	SWITCHER_TRANS_BGND	flag
80	SWITCHER_TRANS_KEY1	flag
81	SWITCHER_TRANS_KEY2	flag
82	SWITCHER_TRANS_PRIORITY	flag
83	SWITCHER_TRANS_PREVIEW	flag
84	SWITCHER_TRANS_REVERSE	flag
85	SWITCHER_TRANS_NORMAL_REV	flag
86	SWITCHER_PGM_SRC	int
87	SWITCHER_PST_SRC	int
88	SWITCHER_TRANS_TYPE	int
89	Not used	int
90	SWITCHER_KEY_PRIORITY	flag

4.1.3.4.1 SWITCHER_TRANS_BGND

The Control sets the Background to be included in the next transition

- 0 – Background is not in transition
- 1 – Background is in transition

4.1.3.4.2 SWITCHER_TRANS_KEY1

The Control sets Keyer 1 to be included in the next transition

- 0 – Keyer 1 is not in transition
- 1 – Keyer 1 is in transition

4.1.3.4.3 SWITCHER_TRANS_KEY2

The Control sets Keyer 2 (PIP) to be included in the next transition

- 0 – Keyer 2 is not in transition
- 1 – Keyer 2 is in transition

4.1.3.4.4 SWITCHER_TRANS_PRIORITY

The Control sets the next transition to swap the priorities of Keyer1 & Keyer 2

- 0 – Keyer 1 / Keyer 2 priorities not swapped
- 1 – Keyer 1 / Keyer 2 priorities not swapped

4.1.3.4.5 SWITCHER_TRANS_PREVIEW

This control sets Transition Preview mode. In this mode, the transition is not performed on the Program outputs, instead it is previewed on the Preview Output

- 0 – Transition Preview Mode not enabled
- 1 – Transition Preview Mode is not enabled

4.1.3.4.6 SWITCHER_TRANS_REVERSE

This control sets Transition Reverse Mode. In this mode, the transition is performed in the reverse direction to the Normal Mode

- 0 – Transition Reverse Mode not enabled
- 1 – Transition Reverse Mode is not enabled

4.1.3.4.7 SWITCHER_TRANS_NORMAL_REV

This control sets the Transition Normal / Reverse Mode. In this mode, the state of the Transition Reverse Mode is swapped every time a transition completes

- 0 – Transition Normal / Reverse Mode not enabled
- 1 – Transition Normal / Reverse Mode is not enabled

4.1.3.4.8 SWITCHER_PGM_SRC

This control sets the M/E Program Source. The Program Source values are the same as the Keyer sources

Program Src	Source
00	Black
01	Input 1
02	Input 2
03	Input 3
04	Input 4
05 .. 16	Not used
17	Matte
18	Not used
19	Still
20	Freeze

4.1.3.4.9 SWITCHER_PST_SRC

This control sets the M/E Preset Source. The Preset Source values are the same as the Program & Keyer sources

4.1.3.4.10 SWITCHER_TRANS_TYPE

This Control sets the transition type. The following transition types are available:

- 0 – Mix
  - The Transition performs a mix between the Program & Preview Buses
- 1 – Wipe
  - The transition is performed using the Wipe Generator

4.1.3.4.11 SWITCHER_KEY_PRIORITY

This control sets the Keyer 1 / Keyer 2 Priority

- 0 – Keyer 1: Bottom, Keyer 2: Top
- 1 – Keyer 1: Top, Keyer 2: Bottom

4.1.3.5 DSK (Logo) Controls

The DSK (Logo) Controls are similar to the Keyer 1 & 2 Controls, except that the Chroma Keyer is not available

Control Num	Control Name	Type
91	SWITCHER_DSK1_KEYER_ON	flag
92	SWITCHER_DSK1_KEY_SRC	int
93	SWITCHER_DSK1_SPLIT_SRC	int
94	SWITCHER_DSK1_LINEAR_OPACITY	float
95	SWITCHER_DSK1_LINEAR_LIFT	float
96	SWITCHER_DSK1_LINEAR_GAIN	float
97	SWITCHER_DSK1_LINEAR_KEY_MODE	int
98	SWITCHER_DSK1_LINEAR_KEY_INVERT	float
99	SWITCHER_DSK1_LINEAR_KEY_SEL_MODE	int
100	SWITCHER_DSK1_LINEAR_KEY_FILL_MODE	int
101	SWITCHER_DSK1_LINEAR_MATTE_HUE	float
102	SWITCHER_DSK1_LINEAR_MATTE_SAT	float

103	SWITCHER_DSK1_LINEAR_MATTE_LUMA	float
104	SWITCHER_DSK1_MASK_LEFT	float
105	SWITCHER_DSK1_MASK_RIGHT	float
106	SWITCHER_DSK1_MASK_TOP	float
107	SWITCHER_DSK1_MASK_BOTTOM	float
108	SWITCHER_DSK1_MASK_ENABLE	flag

4.1.3.5.1 SWITCHER_DSK1_KEYER_ON

This Enable DSK 1 onto the PGM Output

4.1.3.5.2 SWITCHER_DSK1_KEY_SRC

This sets the Key Source for DSK 1 in Split Mode, and the Video/Key Source for DSK 1 in Luma mode

- Source selects, as Keyer 1 & Keyer 2

4.1.3.5.3 SWITCHER_DSK1_SPLIT_SRC

This sets the Video Source for DSK 1 in Split Mode

- Source selects, as above

4.1.3.5.4 SWITCHER_DSK1_LINEAR_OPACITY

This sets the Opacity of the DSK 1 output

- Range: 0.0 – 100.0%

4.1.3.5.5 SWITCHER_DSK1_LINEAR_LIFT

This sets the Lift applied to the DSK 1 Linear Keyer Key

- Range: 0.0 – 100.0%
- 0.0 is no lift
- 100.0 is full scale lift

4.1.3.5.6 SWITCHER_DSK1_LINEAR_GAIN

This sets the Gain applied to the DSK 1 Linear Keyer Key

- Range: 0.0 – 16.0
- 1.0 is unity gain

4.1.3.5.7 SWITCHER_DSK1_LINEAR_KEY_MODE

This sets the DSK1 Keyer Mode

- 0 – Linear Mix Mode
  - This is called 'Luma' Mode on the Control Panel
  - Key shaping is also applied
- 1 – Additive Mix Mode
  - This is called 'Linear' Mode on the Control Panel
  - Key shaping is not applied

4.1.3.5.8 SWITCHER_DSK1_LINEAR_KEY_INVERT

When set, this inverts the Key

4.1.3.5.9 SWITCHER_DSK1_LINEAR_KEY_SEL_MODE

This is the Key Select Mode. The following modes are available:

- 0 – Self Key Mode
  - The Key Source is used for both the Key & Video
  - i.e. self key
- 1 – Split Mode
  - The Key src is used for the Key, and the Split source is used for the video src
- 2 – PIP Mode
  - This mode allows the Video & Key from the PinP to be used as the Video & Key for this keyer

4.1.3.5.10 SWITCHER_DSK1_LINEAR_KEY_FILL_MODE

This is the Key Fill Mode. The following modes are available:

- 0 – Video Fill Mode
  - The Video source is used as the Video Fill
- 1 – Matte Mode
  - The Keyer Matte generator is used as the video source

4.1.3.5.11 SWITCHER_DSK1_LINEAR_MATTE_HUE

The Keyer Matte is used in the Key Fill Matt Mode

This control sets the Hue of the DSK 1 Keyer Matte

- Range: 0.0 – 360.0 degrees

4.1.3.5.12 SWITCHER_DSK1_LINEAR_MATTE_SAT

The Keyer Matte is used in the Key Fill Matt Mode

This control sets the Saturation of the DSK 1 Keyer Matte

- Range: 0.0 – 100.0%

4.1.3.5.13 SWITCHER_DSK1_LINEAR_MATTE_LUMA

The Keyer Matte is used in the Key Fill Matt Mode

This control sets the Luma of the DSK 1 Keyer Matte

- Range: 0.0 – 100.0%

4.1.3.5.14 SWITCHER_DSK1_MASK_LEFT

This control sets the Left edge of the mask

- Specifies the distance from the Screen Left Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.5.15 SWITCHER_DSK1_MASK_RIGHT

This control sets the Right edge of the mask

- Specifies the distance from the Screen Right Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.5.16 SWITCHER_DSK1_MASK_TOP

This control sets the Top edge of the mask

- Specifies the distance from the Screen Top Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.5.17 SWITCHER_DSK1_MASK_BOTTOM

This control sets the Bottom edge of the mask

- Specifies the distance from the Screen Bottom Hand edge of the mask edge
- Range: 0.0 – 100.0%

4.1.3.5.18 SWITCHER_DSK1_MASK_ENABLE

This Control enables the DSK 1 Mask

- 0 – Mask not enabled
- 1 – Mask enabled

4.1.3.6 DSK2 Controls

SE-650 does not support DSK2

4.1.3.7 Additional DSK Controls

Control Num	Control Name	Type
127	SWITCHER_DSK1_TRANS_ENABLE	flag
128	SWITCHER_DSK2_TRANS_ENABLE	flag
129	SWITCHER_DSK_TRANS_LEVEL	float

4.1.3.7.1 SWITCHER_DSK1_TRANS_ENABLE

This control enables DSK 1 in the DSK Transition

- 0 – DSK 1 is not in the DSK transition
- 1 – DSK 1 is in the DSK transition

4.1.3.7.2 SWITCHER_DSK2_TRANS_ENABLE

- The SE-650 does not support DSK2

4.1.3.7.3 SWITCHER_DSK_TRANS_LEVEL

This control is the current level of the DSK transition

- It is not normally driven by the Controlling device
- It can be examined to monitor progress of the DSK Transition
- Range: 0.0 – 100.0%

4.1.3.8 Bus Matte Controls

The Bus matte is a Matte that is available on all busses

Control Num	Control Name	Type
130	SWITCHER_BUS_MATTE_HUE	float
131	SWITCHER_BUS_MATTE_SAT	float
132	SWITCHER_BUS_MATTE_LUMA	float

4.1.3.8.1 SWITCHER_BUS_MATTE_HUE

This control sets the Hue of the Bus Matte

- Range: 0.0 – 360.0 degrees

4.1.3.8.2 SWITCHER_BUS_MATTE_SAT

This control sets the Saturation of the Bus Matte

- Range: 0.0 – 100.0%

4.1.3.8.3 SWITCHER_BUS_MATTE_LUMA

This control sets the Luma of the Bus Matte

- Range: 0.0 – 100.0%

4.1.3.9 Fade to Black Controls

Control Num	Control Name	Type
133	SWITCHER_FTB_ENABLE	flag
134	SWITCHER_FTB_DIRN	flag
135	SWITCHER_FTB_LEVEL	float

4.1.3.9.1 SWITCHER_FTB_ENABLE

This control enables FTB function

- 0 – FTB is not enabled
- 1 – FTB is enabled

4.1.3.9.2 SWITCHER_FTB_DIRN

This control set the FTB direction

- 0 – FTB is fading down
- 1 – FTB is fading up

4.1.3.9.3 SWITCHER_FTB_LEVEL

This control is the current level of the FTB transition

- It is not normally driven by the Controlling device

- It can be examined to monitor progress of the FTB Transition
- Range: 0.0 – 100.0%
- 0.0 – Not faded
- 100.0 – Fully Faded

4.1.3.10 Flex Src Controls

The SE-650 does not have a Flex Src processor, but instead has a single 2D resizeable DVE tile (PIP)

The PIP is assigned to Keyer 2

The controls for the PIP tile are mapped onto the Flex Src DVE1 Tile

Control Num	Control Name	Type
136	SWITCHER_FLEX_SRC_BGND_SRC	int
137	SWITCHER_FLEX_SRC_DVE1_SRC	int
138	SWITCHER_FLEX_SRC_DVE2_SRC	int
139	SWITCHER_FLEX_SRC_FGND_SRC	int
140	SWITCHER_FLEX_SRC_FGND_SRC_K	int
141	SWITCHER_FLEX_SRC_FGND_ENABLE	flag

4.1.3.10.1 SWITCHER_FLEX_SRC_BGND_SRC

Not used in SE-650.

4.1.3.10.2 SWITCHER_FLEX_SRC_DVE1_SRC

Not used in SE-650.

4.1.3.10.3 SWITCHER_FLEX_SRC_DVE2_SRC

Not used in SE-650.

4.1.3.10.4 SWITCHER_FLEX_SRC_FGND_SRC

Not used in SE-650.

4.1.3.10.5 SWITCHER_FLEX_SRC_FGND_SRC_K

Not used in SE-650.

4.1.3.10.6 SWITCHER_FLEX_SRC_FGND_ENABLE

Not used in SE-650.

4.1.3.11 Flex Src DVE1 Controls

This section describes the controls available to control the Flex Src DVE 1.

Control Num	Control Name	Type
142	SWITCHER_FLEX_SRC_DVE1_ENABLE	flag
143	SWITCHER_FLEX_SRC_DVE1_POSITION_X	float
144	SWITCHER_FLEX_SRC_DVE1_POSITION_Y	float
145	SWITCHER_FLEX_SRC_DVE1_POSITION_Z	float
146	Not used in SE-650.	float
147	SWITCHER_FLEX_SRC_DVE1_SIZE_X	float
148	SWITCHER_FLEX_SRC_DVE1_SIZE_Y	float
149	SWITCHER_FLEX_SRC_DVE1_SIZE_Z	float
150	SWITCHER_FLEX_SRC_DVE1_CROP_SIZE	float
151	SWITCHER_FLEX_SRC_DVE1_CROP_LEFT	float
152	SWITCHER_FLEX_SRC_DVE1_CROP_RIGHT	float
153	SWITCHER_FLEX_SRC_DVE1_CROP_TOP	float
154	SWITCHER_FLEX_SRC_DVE1_CROP_BOTTOM	float
155	SWITCHER_FLEX_SRC_DVE1_CROP_SOFT	float
156	SWITCHER_FLEX_SRC_DVE1_BORDER_SIZE	float
157	SWITCHER_FLEX_SRC_DVE1_BORDER_LEFT	float
158	SWITCHER_FLEX_SRC_DVE1_BORDER_RIGHT	float
159	SWITCHER_FLEX_SRC_DVE1_BORDER_TOP	float
160	SWITCHER_FLEX_SRC_DVE1_BORDER_BOTTOM	float
161	SWITCHER_FLEX_SRC_DVE1_BORDER_SOFT	float
162	SWITCHER_FLEX_SRC_DVE1_BORDER_STYLE	float
163	SWITCHER_FLEX_SRC_DVE1_BORDER_HUE	float
164	SWITCHER_FLEX_SRC_DVE1_BORDER_SAT	float
165	SWITCHER_FLEX_SRC_DVE1_BORDER_LUMA	float

4.1.3.11.1 SWITCHER_FLEX_SRC_DVE1_ENABLE

Not used in SE-650.

4.1.3.11.2 SWITCHER_FLEX_SRC_DVE1_POSITION_X

Sets the X position of the centre of the PIP Tile

- Range: -16.0 to + 16.0 (ie. +/- 16 screen widths)
- 0.0 – Centred on screen
- -0.5 – half off to the Left
- -1.0 – fully off to the Left
- +0.5 – half off to the Right
- +1.0 – fully off to the Right
- (assuming Position Z is 0.0, and Sizes are 1.0)

4.1.3.11.3 SWITCHER_FLEX_SRC_DVE1_POSITION_Y

Sets the Y position of the centre of the PIP Tile

- Range: -16.0 to + 16.0 (ie. +/- 16 screen widths)
- 0.0 – Centred on screen
- -0.28 – half off to the Bottom
- -0.56 – fully off to the Bottom
- +0.5 – half off to the Top
- +1.0 – fully off to the Top
- (assuming Position Z is 0.0, and Sizes are 1.0)

4.1.3.11.4 SWITCHER_FLEX_SRC_DVE1_POSITION_Z

Sets the Z position of the centre of the PIP Tile

- Range: -16.0 to + 16.0 (ie. +/- 16 screen widths)
- 0.0 – Centred on screen plane

4.1.3.11.5 SWITCHER_FLEX_SRC_DVE1_ROTATION_Z

Not used in SE-650.

4.1.3.11.6 SWITCHER_FLEX_SRC_DVE1_SIZE_X

Sets the X Size of the PIP Tile

- Range: 0.0 to + 16.0
- 1.0 – Unity size

4.1.3.11.7 SWITCHER_FLEX_SRC_DVE1_SIZE_Y

Sets the Y Size of the PIP Tile

- Range: 0.0 to + 16.0
- 1.0 – Unity size

4.1.3.11.8 SWITCHER_FLEX_SRC_DVE1_SIZE_Z

Sets the Z Size of the PIP Tile

- Range: 0.0 to + 16.0
- 1.0 – Unity size
- Z Size is used to scale both X Size & Y Size

4.1.3.11.9 SWITCHER_FLEX_SRC_DVE1_CROP_SIZE

Sets the overall Crop Size for the PIP Tile

- Range: 0.0% to 100.0%
- Eg. A value of 10.0% will move the Left, right, top & Bottom Edges in by 10% of a screen width

4.1.3.11.10 SWITCHER_FLEX_SRC_DVE1_ CROP _LEFT

This control sets the Left Edge Crop for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Crop Size value before being applied to the Left hand edge

4.1.3.11.11 SWITCHER_FLEX_SRC_DVE1_ CROP _RIGHT

This control sets the Right Edge Crop for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Crop Size value before being applied to the Right hand edge

4.1.3.11.12 SWITCHER_FLEX_SRC_DVE1_ CROP _TOP

This control sets the Top Edge Crop for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Crop Size value before being applied to the Top edge

4.1.3.11.13 SWITCHER_FLEX_SRC_DVE1_ CROP _BOTTOM

This control sets the Bottom Edge Crop for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Crop Size value before being applied to the bottom edge

4.1.3.11.14 SWITCHER_FLEX_SRC_DVE1_ CROP _SOFT

This control sets the Softness of the PIP Tile Crop Edge

- Range: 0.0% to 100.0%

4.1.3.11.15 SWITCHER_FLEX_SRC_DVE1_BORDER_SIZE

This control sets the Size of the Border for the PIP Tile

- Range: 0.0% to 100.0%
- Eg. A value of 10.0% will set the border to 10% of a screen width

4.1.3.11.16 SWITCHER_FLEX_SRC_DVE1_BORDER_LEFT

This control sets the Left Edge Border for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Border Size value before being applied to the Left hand Border Edge

4.1.3.11.17 SWITCHER_FLEX_SRC_DVE1_BORDER_RIGHT

This control sets the Right Edge Border for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Border Size value before being applied to the Right hand Border Edge

4.1.3.11.18 SWITCHER_FLEX_SRC_DVE1_BORDER_TOP

This control sets the Top Edge Border for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Border Size value before being applied to the Top Border edge

4.1.3.11.19 SWITCHER_FLEX_SRC_DVE1_BORDER_BOTTOM

This control sets the Bottom Edge Border for the PIP Tile

- Range: 0.0% to 100.0%
- This value is added to the Border Size value before being applied to the Bottom Border Edge

4.1.3.11.20 SWITCHER_FLEX_SRC_DVE1_BORDER_SOFT

This control sets the Softness of the PIP Tile Border Edge

- Range: 0.0% to 100.0%

4.1.3.11.21 SWITCHER_FLEX_SRC_DVE1_BORDER_STYLE

Currently only two border styles are supported:

- 0 – Off
- 1 – Normal

This control is driven automatically by the SE-650 software, and so need not be driven by the controller software.

4.1.3.11.22 SWITCHER_FLEX_SRC_DVE1_BORDER_HUE

This control sets the Hue of the Border Matte

- Range: 0.0 – 360.0 degrees

4.1.3.11.23 SWITCHER_FLEX_SRC_DVE1_BORDER_SAT

This control sets the Saturation of the Border Matte

- Range: 0.0 – 100.0%

4.1.3.11.24 SWITCHER_FLEX_SRC_DVE1_BORDER_LUMA

This control sets the Luma of the Border Matte

- Range: 0.0 – 100.0%

4.1.3.12 Flex Src DVE2 Controls

Not used in SE-650.

4.1.4 DV_CONTROL_SECTION_INPUT

These Controls are available for each Input

Control Num	Control Name	Description
0	INPUT_PROC_AMP_BLACK_LEVEL	
1	INPUT_PROC_AMP_CHROMA_GAIN	
2	INPUT_PROC_AMP_WHITE_CLIP	
3	INPUT_INPUT_VALID	
4	INPUT_INPUT_MODE	
5	INPUT_INPUT_FREEZE_ENABLE	
6	INPUT_INPUT_FREEZE_MODE	
7	INPUT_INPUT_REMAP	

4.1.4.1 Input Channel Selection

The Input Channel to be select is also encoded into the Command code

- Command Bits [7:4]
    - 0 – Input 1
    - 1 – Input 2
    - 2 – Input 3
    - Etc

4.1.4.2 INPUT_PROC_AMP_BLACK_LEVEL

Sets the Black Level for the Input

- Range: 0.0 – 100.0%

4.1.4.3 INPUT_PROC_AMP_CHROMA_GAIN

Sets the Chroma Gain for the Input

- Range: 0.0 – 16.0

4.1.4.4 INPUT_PROC_AMP_WHITE_CLIP

Sets the WhiteClip for the Input

- Range: 0.0 – 100.0%

4.1.4.5 INPUT_INPUT_VALID

This control is set by the SE-650 to indicate that the Input is valid

- 0 – Input not Valid
- 1 – Input Valid

4.1.4.6 INPUT_INPUT_MODE

Not used in SE-650.

4.1.4.7 INPUT_INPUT_FREEZE_ENABLE

This Control Enables the Input Freeze

- 0 – Input not Frozen
- 1 – Input Frozen

4.1.4.8 INPUT_INPUT_FREEZE_MODE

This Control Enables sets the Input Freeze Mode

- 0 – Frame Mode
- 1 – Field Mode

4.1.4.9 INPUT_INPUT_REMAP

This controls sets the Input Remapping

- The sets which Crosspoint src that this physical Input is remapped to
- Range: 0 -16
    - Where 0 means ‘source not used’

4.1.5 DV_CONTROL_SECTION_INPUT_CTRL

Control Num	Control Name	Description
0	INPUT_DVI_INPUT_ENABLE	
1	INPUT_ENABLE_REMAP	

4.1.5.1 INPUT_DVI_INPUT_ENABLE

- Not supported in SE-650

4.1.5.2 INPUT_ENABLE_REMAP

This control Enables the Input Remapping

- 0 – Input Remapping not enabled
- 1 – Input Remapping

4.1.6 DV_CONTROL_SECTION_OUTPUT_CTRL

Control Num	Control Name	Description
0	Not used in Se1200	
1	Not used in Se1200	
2	Not used in Se1200	
3	Not used in Se1200	
4	OUTPUT_MULTIVIEWER_MODE	
5	OUTPUT_MULTIVIEWER_MAIN1_SRC	
6	Not used in Se1200	
7	Not used in Se1200	
8	Not used in Se1200	
9	OUTPUT_MULTIVIEWER_TRANSP_LABELS	
10	OUTPUT_MULTIVIEWER_AUTO_NUM	
11	OUTPUT_MULTIVIEWER_LABEL_INFO	
12	OUTPUT_ANALOG_OUT_SELECT	
13	OUTPUT_ANALOG_OUT_MODE	
14	OUTPUT_ANALOG_OUT_SYNC_MODE	
15	OUTPUT_DVI_OUT_SELECT	HDMI Output Select
16	OUTPUT_MULTI_OUT1_SELECT	

4.1.6.1 OUTPUT_MULTIVIEWER_MODE

Not used currently used in SE-650

4.1.6.2 OUTPUT_MULTIVIEWER_MAIN1_SRC

This control sets the Source for the Multiviewer Main1 tile

Main Src	Source
00 - 16	Black
17	Matte
18	Flex Src
19	Still 1
20	Still 2
21	Program Out
22	Preview Out
23	Program/DSK1
24	Preview/DSK1

4.1.6.3 OUTPUT_MULTIVIEWER_MAIN2_SRC

This control sets the Source for the Multiviewer Main2 tile

- Sources as per Main1 Src

4.1.6.4 OUTPUT_MULTIVIEWER_MAIN3_SRC

Not used in SE-650

4.1.6.5 OUTPUT_MULTIVIEWER_MAIN4_SRC

Not used in SE-650

4.1.6.6 OUTPUT_MULTIVIEWER_TRANSP_LABELS

This Control enables transparent backgrounds on the labels in the Multiviewer

- 0 – Label Backgrounds not transparent
- 1 – Label Backgrounds transparent

4.1.6.7 OUTPUT_MULTIVIEWER_AUTO_NUM

This Control enables Auto Numbering on the labels in the Multiviewer

- 0 – Auto Numbering not enabled
- 1 – Auto Numbering not enabled

4.1.6.8 OUTPUT_MULTIVIEWER_LABEL_INFO

This Control enables Input Status Info on the labels in the Multiviewer

- 0 – Input Status Info not enabled
- 1 – Input Status Info not enabled

4.1.6.9 OUTPUT_DVI_OUT_SELECT

This Control set the HDMI Output Source

DVI Out	Source
0	PGM
1	PVW
2	PGM DSK1
3	PVW DSK1
4	Multiviewer

4.1.6.10 OUTPUT_MULTI_OUT1_SELECT

This Control set the Multi 1 Output Source

- The same selections as DVI Out are available

4.1.7 DV_CONTROL_SECTION_AUDIO_CTRL

The Sections controls the Audio I/O Functionality

Control Num	Control Name	Description
0	AUDIO_SOURCE	
1	AUDIO_CHAN	
2	AUDIO_MODE	

4.1.7.1 AUDIO_SOURCE

In both Digital and Analog mode, this control sets the Inputs source to extract the Audio from.

Audio Src	Source
0	Audio Follow Video
1-4	Inputs 1-4

Note:

- In Analog Mode, Only Inputs 1-4 can be sent to the Analog Out

4.1.7.2 AUDIO_CHAN

Not supported in SE-650

- Audio Channels are always 1&2

4.1.7.3 AUDIO_MODE

This control sets the Audio Mode

Audio Mode	Description
0	Off
1	Digital
2	Analog
3	Test

4.1.8 DV_CONTROL_SECTION_TRANSITION_CTRL

This section Controls the three Transition Engines available in the SE-650

- M/E Transition Engine, responsible for
  - Mix Transitions
  - Wipe Transitions
    - The Wipe Pattern used is defined by the SWITCHER_WIPE_PATTERN_NUM control (Section 4.1.3.1.1).
- DSK Transition Engine, responsible for DSK Transitions
- FTB Transition Engine, responsible for FTB Transitions

Control Num	Control Name	Description
0	ME_TRANS_COMMAND	
1	ME_TRANS_TYPE	
2	ME_TRANS_STATE	
3	ME_TRANS_DURATION	
4	ME_TRANS_DIRN	
5	DSK_TRANS_COMMAND	
6	DSK_TRANS_TYPE	
7	DSK_TRANS_STATE	
8	DSK_TRANS_DURATION	
9	DSK_TRANS_DIRN	
10	FTB_TRANS_COMMAND	
11	FTB_TRANS_TYPE	
12	FTB_TRANS_STATE	
13	FTB_TRANS_DURATION	
14	FTB_TRANS_DIRN	

4.1.8.1 ME_TRANS_COMMAND

The Control sets the ME Transition Command

Transition Command	Description
0	Transition Stop
1	Transition Run
2	Transition Pause
3	Transition Continue
4	Transition Goto Start
5	Transition Goto End
6	Transition Restart
7	Transition Stop And Clear
8	Transition Ready

4.1.8.1.1 Transition Stop

This command causes the M/E Transition Engine to stop running the current transition, and the Transition Engine stops driving any controls.

4.1.8.1.2 Transition Run

This command causes the M/E Transition Engine to run in the direction specified by the Transition Direction control, and with a duration specified by the Transition Duration control.

4.1.8.1.3 Transition Pause

This is similar to 'Stop', except that the M/E Transition Engine continues to drive the controls for the transition. This means that if the Wipe Level is altered, the Transition Engine will update any controls accordingly.

4.1.8.1.4 Transition Continue

This is effectively the same as Run

4.1.8.1.5 Transition Goto Start

Caused the Transition Engine to jump to the start of the transition

4.1.8.1.6 Transition Goto End

Caused the M/E Transition Engine to jump to the end of the transition
Since this is the M/E Transition Engine, this causes the Transition to complete.

4.1.8.1.7 Transition Restart

This restarts the Transition from 0.0 position.

4.1.8.1.8 Transition Stop And Clear

This is the same as Stop

4.1.8.1.9 Transition Ready

When the Transition Engine has processed a command, it sets the Command Value to 'Ready'. It can now accept another command. The Transition State control can be examined to see check the state of the Transition Engine e.g. Running.

Since the Transition Engine only processes command at the Field Interval, it is important to

wait until a command has been processed (by checking for 'Ready') before checking the Transition State to see if the Transition Engine has finished running.

4.1.8.2 ME_TRANS_TYPE

Transition Type	Description
0	One Shot
1	Loop
2	Ping Pong

This controls sets the Transition Type

- One Shot
  - The Transition Runs to the End, and then stops
- Loop
  - The Transition Runs to the End, and then restarts
- Ping Pong
  - The Transition Runs to the End, and then Runs in the Reverse direction, continually

4.1.8.3 ME_TRANS_STATE

Transition State	Description
0	Stopped
1	At Start
2	Running
3	At End
4	Paused

The Control is set by the Transition Engine to indicate its current state

- Stopped

- The Transition Engine is stopped
- At start
  - The Transition Engine is At the Start of the transition
  - The next state will be 'running'
- Running
  - The Transition is Running
- At End
  - The Transition is at the End of the Transition
- Paused
  - The Transition Engine is Paused

4.1.8.4 ME_TRANS_DURATION

This control set the duration in of the transition in Frames

4.1.8.5 ME_TRANS_DIRN

This sets the Direction of the Transition

- 0 – Forwards
- 1 – Reverse

4.1.8.6 DSK_TRANS_COMMAND

The Control sets the DSK Transition Command

See **Section 4.1.8.1** ME_TRANS_COMMAND for description

4.1.8.7 DSK_TRANS_TYPE

This controls sets the Transition Type

See **Section 4.1.8.2** ME_TRANS_TYPE for description

4.1.8.8 DSK_TRANS_STATE

This control gives the Transition State

See **Section 4.1.8.3** ME_TRANS_STATE for description

4.1.8.9 DSK_TRANS_DURATION

This control set the duration in of the transition in Frames

4.1.8.10 DSK_TRANS_DIRN

This sets the Direction of the Transition

- 0 – Forwards
- 1 – Reverse

4.1.8.11 FTB_TRANS_COMMAND

The Control sets the DSK Transition Command

See **Section 4.1.8.1** ME_TRANS_COMMAND for description

4.1.8.12 FTB_TRANS_TYPE

This controls sets the Transition Type

See **Section 4.1.8.2** ME_TRANS_TYPE for description

4.1.8.13 FTB_TRANS_STATE

This control gives the Transition State

See **Section 4.1.8.3** ME_TRANS_STATE for description

4.1.8.14 FTB_TRANS_DURATION

This control set the duration in of the transition in Frames

4.1.8.15 FTB_TRANS_DIRN

This sets the Direction of the Transition

- 0 – Forwards
- 1 – Reverse

4.1.9 DV_CONTROL_SECTION_MEMORY_CTRL

This section is used to control the Saving and Loading of User Memories

Control Num	Control Name	Description
0	MEMORY_SELECT	
1	MEMORY_COMMAND	
2	MEMORY_STATE	
3	MEMORY_RESULT	
4	MEMORY_EVENT	
5	MEMORY_FLAGS	
6	MEMORY_LOAD_ALL_SECTIONS	

4.1.9.1 MEMORY_SELECT

This control set the User Memory to be loaded, saved or deleted

- General User Memories are numbered 0-999
- User memory 1000 is the system memory,
  - it is always loaded at boot-up
  - it defines the system standard, and other system functions
- User memory 0 is always loaded at boot-up, after the system memory has been loaded.
  - This can be used to ensure the SE-650 ends up in a known state after boot up.

4.1.9.2 MEMORY_COMMAND

The control sets the Memory command to be executed

- 0 - DV_MEMORY_READY
  - This is not a command, but indicates that the SE-650 is ready to accept a Memory Command
  - This should be checked before sending a command
- 1 - DV_MEMORY_LOAD
  - Command to load the selected user memory
- 2 - DV_MEMORY_STORE
  - Command to store the current state to the selected user memory
- 3 - DV_MEMORY_DELETE
  - Command to delete the selected user memory

4.1.9.3 MEMORY_STATE

The control is set by the Memory Command Processor to show the state of command processing

- 0 - DV_MEM_STATE_READY
    - The Memory command processor is ready to execute a command

- 1 - DV_MEM_STATE_BUSY
    - The Memory command processor is busy

- 2 - DV_MEM_STATE_ERROR
    - an error has occurred

4.1.9.4 MEMORY_RESULT

The control is set by the Memory Command Processor to show the result of command processing

- 0 - DV_MEM_RESULT_OK
    - command completed ok

- 1 - DV_MEM_RESULT_FAIL
    - general failure

- 2 - DV_MEM_RESULT_NOT_FOUND
    - file not found

- 3 - DV_MEM_RESULT_ILLEGAL_COMMAND
    - illegal command

- 4 - DV_MEM_RESULT_ILLEGAL_VALUE
    - illegal value

4.1.9.5 MEMORY_EVENT

This control is incremented by the Memory Command Processor whenever a Memory Command that effects the memory system is processed – ie. Store or Delete

- This allows a controlling device to detect that the memories have been changed by another controlling device

- This allows a memory list to be redrawn on a GUI, if necessary

4.1.9.6 MEMORY_FLAGS

This Control sets the Memory flags used to define which memory sections of a user memory are to be lo

4.1.9.6.1 Memory Flags

The memory flags are stored at 1 bit per word

- i.e. they are not packed

The following Memory Flags are defined:

0	MEMORY_FLAGS_ENABLE	
1	MEMORY_FLAGS_SWITCHER_SRC	
2	MEMORY_FLAGS_FLEX_SRC_SRC	Not used in Se1200
3	MEMORY_FLAGS_SWITCHER	
4	MEMORY_FLAGS_FLEX_SRC	
5	MEMORY_FLAGS_AUX_BUS	Not used in Se1200
6	MEMORY_FLAGS_MULTIVIEWER	
7	MEMORY_FLAGS_AUDIO	
8	MEMORY_FLAGS_INPUTS	
9	MEMORY_FLAGS_OUTPUTS	

- 0 – ENABLE
  - Enables the Memory Flags
  - If Enable is not set, then all sections will be loaded
- 1 – 9
  - These define which sections are to be loaded

- Note:
  - The flags control which sections are loaded
  - The flags are defined when the memory is saved, however.

4.1.9.7 MEMORY_LOAD_ALL_SECTIONS

Setting this flags before a User memory is loaded overrides the Memory Flags defined in the User memory

- All sections are loaded
- This allows a correction to be made to a user memory, if it has been saved with the

wrong flags

- This flag is cleared automatically after use, to avoid confusion

4.1.10 DV_CONTROL_SECTION_MEMORY_PRESENT

This section provides Memory Present Flags

The memory present flags are generated and maintained by the Memory Command Processor, and are used to indicate to a controller that a User Memory is stored for any particular Memory number.

- A 1 bit flag is generated per User Memory number
- Since there are 1000 user memories available, there are 1000 1-bit flags generated
- These 1 bit flags are packed into 32 32-bit words, in sequential order
- The Controller can examine these flags to see if any particular memory is currently available
- This is intended to help with display of lists of memories on GUIs

4.1.11 DV_CONTROL_SECTION_STILL_CTRL

This section controls the loading, saving and deleting of stills, and follows a similar pattern to the Memory Control section.

Control Num	Control Name	Description
0	STILL_SELECT	
1	STILL_BUF	
2	STILL_COMMAND	
3	STILL_STATE	
4	STILL_RESULT	
5	STILL_EVENT	

4.1.11.1 STILL_SELECT

This control set the Still to be loaded, saved or deleted

- Stills are numbered 0-100

4.1.11.2 STILL_BUF

This control selects the SE-650 Still buffer to be loaded or saved

- 8 Still Buffers are currently supported
- These are numbered 0-7

4.1.11.3 STILL_COMMAND

The control sets the Still command to be executed

- 0 - DV_STILL_READY
  - This is not a command, but indicates that the Still Command Processor is ready to accept a Still Command
  - This should be checked before sending a command
- 1 - DV_STILL_LOAD
  - Command to load a still from flashdisk to the selected still-buffer
- 2 - DV_STILL_STORE
  - Command to store the selected still buffer to flashdisk
- 3 - DV_STILL_GRAB
  - Command to grab the current program output to selected still buffer
- 4 - DV_STILL_DELETE
  - Command to delete the selected still

4.1.11.4 STILL_STATE

The control is set by the Still Command Processor to show the state of command processing

- 0 - DV_STILL_STATE_READY
  - The Still command processor is ready to execute a command
- 1 - DV_STILL_STATE_BUSY
  - The Still command processor is busy
- 2 - DV_STILL_STATE_ERROR

- an error has occurred

4.1.11.5 STILL_RESULT

The control is set by the Still Command Processor to show the result of command processing

- 0 - DV_STILL_RESULT_OK
  - command completed ok
- 1 - DV_STILL_RESULT_FAIL
  - general failure
- 2 - DV_STILL_RESULT_NOT_FOUND
  - file not found
- 3 - DV_STILL_RESULT_ILLEGAL_COMMAND
  - illegal command
- 4 - DV_STILL_RESULT_ILLEGAL_VALUE
  - illegal value

4.1.11.6 STILL_EVENT

This control is incremented by the Still Command Processor whenever a Still Command that effects the memory system is processed – ie. Store or Delete

- This allows a controlling device to detect that the still memories have been changed by another controlling device
  - This allows a Stills list to be redrawn on a GUI, if necessary

4.1.12 DV_CONTROL_SECTION_STILL_PRESENT

This section provides Still Present Flags

The Still present flags are generated and maintained by the Still Command Processor, and are used to indicate to a controller that a Still is stored for any

particular Still number.

- A 1 bit flag is generated per Still number
- Since there are 100 Still memories available, there are 100 1-bit flags generated
- These 1 bit flags are packed into 4 32-bit words, in sequential order
- The Controller can examine these flags to see if any particular memory is currently available
- This is intended to help with display of lists of memories on GUIs

4.1.13 DV_CONTROL_SECTION_STREAMER_CONTROL

Streaming is not currently supported in the SE-650

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