Marshall
BROADCAST & **PRO AV**

VMV-402-3GSH

QUAD VIDEO SWITCH CONTROL PROTOCOL

ABOUT THIS DOCUMENT

- Commands and Responses listed below are shown in **Hexadecimal Format**
- Byte positions, and byte counts are in **decimal** format starting with 1 (not zero) as the first byte
- Text codes are **ASCII** Hexadecimal Format

Some commands are noted to be available with future firmware. Firmware updates will be posted on the Marshall-USA website on the product's landing page. Updates are installed via the Web Browser interface (see Operations Manual).

CONTROL INTERFACES

ETHERNET	
Connector	RJ-45
Protocol	TCP
Port	9760
Example:	192.168.100.110:9760

RS232 Serial	
Connector	DB-9 9-pin female
Pinout	Pin 2 Receive Data, Pin 3 Transmit Data, Pin 5 Signal Ground
Port Settings	Baud Rate 115200 Data Bits 8 Stop Bits 1 Parity Bits none

COMMAND STRUCTURE

Commands are single strings like these examples:

POSITION	FUNCTION	COMMENT
Byte 1	Byte count including checksum	
Byte 2	Command main group	typically 91 HEX
Byte 3	Command sub-group	
Byte 4 and beyond	Index, modifier or payload	
Last Byte	Checksum (sum of all bytes except the checksum itself)	Simple MOD256 sum When checksum exceeds FF, keep only least significant byte
EXCEPTIONS		
	Reset commands	Have no checksum
	Label text entry	See structure in that section

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STANDARD ACKNOWLEDGEMENTS TO COMMANDS
The product returns these code responses after a command is issued.

RESPONSES	MEANING
03 81 04	Command received
03 82 85	Command completed
03 02 05	Command Timeout
03 01 04	Checksum Error
03 04 07	Command Fail
04 12 04 1A	Communication not available

Note: Acknowledgements to control functions are normally returned in pairs as:
03 04 87 03 82 85 "received, completed"
Acknowledgements from Information requests are in the form:
"received" then "information" then "completed" as bookends around the returned data.

MAIN PROGRAM OUTPUT - SWITCHING
Note: Switching Between Inputs 1,2,3 or 4 is quick and seamless. Changing source type between HDMI and SDI takes approximately 5 seconds and is not considered seamless.

FUNCTION	COMMAND	COMMENT
Select Input 1	05 91 00 00 96	
Select Input 2	05 91 00 01 97	
Select Input 3	05 91 00 02 98	
Select Input 4	05 91 00 03 99	
Input 1 use SDI source	06 91 01 00 00 98	
Input 1 use HDMI source	06 91 01 00 01 99	
Input 2 use SDI source	06 91 01 01 00 99	
Input 2 use HDMI source	06 91 01 01 01 9A	

QUAD OUTPUT FEATURES – LAYOUT PATTERNS, BORDERS, LABEL POSITIONS

FUNCTION	COMMAND	COMMENT
Normal Pattern (Cross)	05 91 02 01 99	Default
Top Focus	05 91 02 02 9A	
Bottom Focus	05 91 02 03 9B	
Left Focus	05 91 02 04 9C	
Right Focus	05 91 02 05 9D	
Border ON	05 91 09 01 A0	
Border OFF	05 91 09 00 9F	
Labels ON / Label Update	05 91 0A 01 A1	Send after label changes
Labels OFF	05 91 0A 00 A0	

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QUAD OUTPUT FEATURES – LAYOUT PATTERNS, BORDERS, LABEL POSITIONS

FUNCTION	COMMAND	COMMENT
Q1 Label Top Left Position	06 91 0B 00 00 A2	Default Position
Q1 Label Top Mid	06 91 0B 00 01 A3	
Q1 Label Top Right	06 91 0B 00 02 A4	
Q1 Label Bottom Left	06 91 0B 00 03 A5	
Q1 Label Bottom Mid	06 91 0B 00 04 A6	
Q1 Label Bottom Right	06 91 0B 00 05 A7	
Q2 Label Top Left	06 91 0B 01 00 A3	Default Position
Q2 Label Top Mid	06 91 0B 01 01 A4	
Q2 Label Top Right	06 91 0B 01 02 A5	
Q2 Label Bottom Left	06 91 0B 01 03 A6	
Q2 Label Bottom Mid	06 91 0B 01 04 A7	
Q2 Label Bottom Right	06 91 0B 01 05 A8	
Q3 Label Top Left	06 91 0B 02 00 A4	Default Position
Q3 Label Top Mid	06 91 0B 02 01 A5	
Q3 Label Top Right	06 91 0B 02 02 A6	
Q3 Label Bottom Left	06 91 0B 02 03 A7	
Q3 Label Bottom Mid	06 91 0B 02 04 A8	
Q3 Label Bottom Right	06 91 0B 02 05 A9	
Q4 Label Top Left	06 91 0B 03 00 A5	
Q4 Label Top Mid	06 91 0B 03 01 A6	Default Position
Q4 Label Top Right	06 91 0B 03 02 A7	
Q4 Label Bottom Left	06 91 0B 03 03 A8	
Q4 Label Bottom Mid	06 91 0B 03 04 A9	
Q4 Label Bottom Right	06 91 0B 03 05 AA	
Tally Border	05 91 0E 00 A4	OFF
	05 91 0E 01 A5	ON
Tally Border Color	05 91 0F 00 A5	Red
	05 91 0F 01 A6	Green
	05 91 0F 02 A7	Yellow
Audio Mute	05 91 10 01 A7	Mute ON (silence)
	05 91 10 00 A6	Mute OFF (audio enabled)
Audio Source	05 91 11 00 A7	Video Input 1
	05 91 11 01 A8	Video Input 2
	05 91 11 02 A9	Video Input 3
	05 91 11 00 AA	Video Input 4
	05 91 11 00 AB	Stereo In (front panel jack)

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QUAD OUTPUT WINDOW LABELS – DETAIL

Label commands are longer and more detailed than other commands.

Label commands may be sent one at a time or pre-loaded for all windows then displayed by sending the **Label ON** command (05 91 0A 01 A1) after sending the label messages.

NOTE: Label changes will not appear until the **Label ON** command is issued.

"Quadrant" is the on-screen layout position. "Window" is the video source and associated label text.

LABEL COMMAND - EXAMPLE CODE		
Example 1	15 91 0D 00 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 00 0F	
This code puts "0123456789ABCDE" in quadrant number 00 (HDMI Input Upper Left Corner)		
Example 2	15 91 0D 05 43 41 4D 45 52 20 34 00 00 00 00 00 00 00 00 00 74	
This code puts "CAMERA 4" in quadrant 05 (SDI Input Lower Right Corner)		
NOTE: Total command length should always be 21 bytes (15h)		
Last Byte before the checksum must always be 00h (null)		
Maximum displayable message is 15 characters		
Use 00h (null) characters to pad shorter messages as in Example 2		
POSITION	**FUNCTION**	**COMMENT**
Byte 1	Byte count including checksum	Always 21 bytes (15h)
Byte 2	Command group	91h
Byte 3	Label sub-command	0Dh
Byte 4	Window number	See table below
Byte 5 to Byte 20	ASCII Text + 00h pads	16 bytes per label
Last Byte	Checksum (sum of all bytes except the checksum itself)	Simple MOD256 sum When checksum exceeds FF, keep only least significant byte
LABEL QUADRANT & WINDOW NUMBERING TABLE		
Quadrants 1 and 2 have two possible video sources. Each source is treated as a separate window.		
Window 00h Quadrant 1 with HDMI source	Window 01h Quadrant 2 with HDMI Source	
Window 02h Quadrant 1 with SDI source	Window 03h Quadrant 2 with SDI source	
Window 04h Quadrant 3 with SDI source	Window 05h Quadrant 4 with SDI source	

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RESET FUNCTIONS

FUNCTION	COMMAND	COMMENT
Reset All Menus	05 91 0C 00 23	Resets all settings except IP address allowing communication with the product to resume after the reset.
Reset Image Menus	05 91 0C 01 23	Resets window borders, labels, sets tally OFF, tally to Red, Audio Mute of OFF, Audio source, video format. System restarts after command.

INFORMATION REQUESTS

FUNCTION	COMMAND	COMMENT
Get IP Information	04 13 00 17	IP Address, Subnet Mask, Gateway
RESPONSE	MEANING	
03 81 84	Standard Acknowledgment	
Bytes 1 - 4	IP Address	
Bytes 5 - 8	Subnet Mask	
Bytes 9 - 12	Gateway Address	
03 82 85	Standard Completion	
EXAMPLE RESPONSE: Get IP Information		
03 81 84 C0 A8 44 7D FF FF FF 00 C0 A8 44 01 00 00 00 00 00 00 00 00 **03 82 85**		
Get All IP Information Code	04 13 02 19	Model number, Current IP address, Gateway Same as Get IP Information with the addition of Model #
RESPONSE	**MEANING**	**COMMENT**
03 81 84	Standard Acknowledgment	
Bytes 1 - 15	Model Number + nulls	VMV-402-3GSH
Bytes 16 - 19	IP Address	

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INFORMATION REQUESTS

Bytes 20 - 23	Subnet Mask	
Bytes 24 - 27	Gateway Address	
Byte 28	DHCP Flag	DHCP mode selected 00 = NO
Byte 29	DHCP Status	DHCP mode active 00 = NO
03 82 85	Standard Completion	
EXAMPLE RESPONSE: Get All IP Information		
03 81 84 56 4D 56 2D 34 30 32 2D 33 47 53 48 00 00 00 C0 A8 44 7D FF FF FF 00 C0 A8 44 01 01 00 00 **03 82 85**		
Get Device Info code	04 12 04 1A	All system information
RESPONSE	**MEANING**	**COMMENT**
03 81 84	Standard Acknowledgment	
Byte 1 (after acknowledgment)	Version Main	Currently 01
Byte 2	Version Sub	Currently 27 (38 decimal)
Byte 3	Current Active Input 1,2,3 or 4	00, 01, 02, 03
Byte 4	Inputs 1, 2 Source	SDI, SDI = 00
		SDI, HDMI = 80
		HDMI, SDI = 08
		HDMI, HDMI = 88
Byte 5	Program Out Format/Frame Rate	00 – 18 **See table below**
Byte 6	Quad Out Format/Frame Rate	00 – 18 **See table below**
Byte 7	Quad Pattern	00 – 04 (5 patterns)
Bytes 8 - 15	Program Video Out Levels	All FF (128d) Mid-position
Byte 16	Quad Border Status	01 = ON 00 = OFF
Byte 17	Quad Label Status	01 = ON 00 = OFF
Byte 18	Quad 1 Label Position	00 - 05 top left to bottom rt
Byte 19	Quad 2 Label Position	00 - 05
Byte 20	Quad 3 Label Position	00 - 05
Byte 21	Quad 4 Label Position	00 - 05
Byte 22	Audio Mute	00 = unmuted 01 = muted
Byte 23	Audio Source	00, 01, 02, 03 = Video 1,2,3,4

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INFORMATION REQUESTS

		04 = Stereo Input
		05 = Program Follow
Byte 24	Waveform Mode	00 = OFF
		01 = YCbCr
		02 = RGB
		03 = Histogram
Byte 25	Tally Border	01 = ON 00 = OFF
Byte 26	Tally Border Color	00 = Red, 01 = Grn, 02 = Yel
Byte 27 – 160	Reserved	FF
Bytes 161 - 176	Label Quad Window 0	
Bytes 177 - 192	Label Quad Window 1	
Bytes 193 - 208	Label Quad Window 2	
Bytes 209 - 224	Label Quad Window 3	
Bytes 225 – 240	Label Quad Window 4	
Bytes 241 - 256	Label Quad Window 5	
03 82 85	Standard Completion	

EXAMPLE RESPONSE: Get Device Info

```
03 81 84 01 27 00 00 00 00 01 80 80 80 80 80 80 80 80 01 01 00 00 00 00 00 05 00 01
00 EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE
EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE
EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE
EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE
EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE EE 49 6E 70 75 74
20 31 20 2D 20 48 44 4D 49 00 00 49 6E 70 75 74 20 32 20 2D 20 48 44 4D 49 00 00 49
6E 70 75 74 20 31 20 2D 20 53 44 49 00 00 00 49 6E 70 75 74 20 32 20 2D 20 53 44 49
00 00 00 49 6E 70 75 74 20 33 20 2D 20 53 44 49 00 00 00 49 6E 70 75 74 20 34 20 2D
20 53 44 49 00 00 00 03 82 85
```

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TABLE OF FORMAT/FRAME RATES – FOR PROGRAM & QUAD OUTPUTS

See Get Device Info command above Meaning of Bytes 5 & 6

FORMAT/FRAME RATE	VALUE
HD 1080p 60Hz	00
HD 1080p 59.94Hz	01
HD 1080p 50Hz	02
HD 1080p 30Hz	03
HD 1080p 29.97Hz	04
HD 1080p 25Hz	05
HD 720p 60Hz	06
HD 720p 59.94Hz	07
HD 720p 50Hz	08
HD 1080i 60Hz	09
HD 1080i 59.94Hz	0A
HD 1080i 50Hz	0B
UHD 2160p 60Hz	0C
UHD 2160p 59.94Hz	0D
UHD 2160p 50Hz	0E
UHD 2160p 30Hz	0F
UHD 2160p 29.97Hz	10
UHD 2160p 25Hz	11
UHD 4096x2160 60Hz	12