

DVDO iScan VP30 Serial Automation Protocol Document

(Consistent with software version 1.06 and later)

This document describes the iScan VP30 operation when it is connected to an automation system controller through the serial port.

1. Connection

The RS-232 interface port at the rear panel of the iScan VP30 is used to communicate with the system controller. The DB-9 (female) connector pin-out is given below.

Pin 2 – TXD (output)	Pin 5 – GND	Pin 8 – RTS (Flow Ctrl In)
Pin 3 – RXD (input)	Pin 7 – CTS (Flow Ctrl Out)	

The iScan VP30 uses a standard RS-232 1:1 (extension) DB9 Male to DB9 Female cable to connect to the system controller. Hardware handshaking is not required for communications – but recommended when used with multiple successive commands in place of a command delay.

The communications (COM) port parameters for the iScan VP30 are:

Baud Rate	19200 (default)
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Hardware

The following baud rates (bps) can be selected by the user: 4800, 9600, 14400, 19200, 38400 and 57600.

2. Protocol Summary

The system controller always initiates a transaction by sending a packet to the iScan VP30 which, in turn, responds with a packet to the controller. The iScan VP30 never initiates a transaction to the system controller.

The protocol is based on ASCII characters. Three ASCII control characters are used.

ASCII	HEX
NULL	\x00
STX	\x02
ETX	\x03

Other ASCII characters can be generated from a standard PC keyboard. The list of ASCII characters used in the protocol and their hexadecimal equivalent values is given in Section 7.

Each packet from either the system controller or the iScan VP30 has the following format.

STX	CMD1	CMD2	DCNT1	DCNT2	D0	...	Dn	CS1	CS2	ETX
start	command		data count		data			checksum (optional)		end

The components of the protocol are described below.

STX

Start of Transmission

Each packet starts with this value.

CMD1/CMD2

The numeric value of a command/query, formatted into a two ASCII character hexadecimal value. Any value that is less than 0x10 must have a leading zero to make it two characters.

DCNT1/DCNT2

The number of data bytes in the packet, formatted into a two ASCII character hexadecimal value. Any value that is less than 0x10 must have a leading zero to make it two characters.

D0 – Dn

Data section of the packet. The contents depend on what kind of packet is being sent. Typically this section consists of the ID of the setting to be changed followed by a NULL character, the value to be changed and terminated with a NULL character.

CS1/CS2

Checksum of the packet. The checksum is optional for packets sent from the controller to the iScan VP30. If the byte following the last data value is ETX, then it is assumed that no checksum is provided. Otherwise, the iScan VP30 expects a checksum which is formatted into two ASCII hexadecimal characters. The iScan VP30 always includes a 1-byte checksum in the packet it sends to the controller.

The algorithm for the checksum is given below.

The maximum packet size is calculated from the 255 possible data characters, plus the maximum of 8 bytes of packet overhead.

The algorithm for the checksum is as follows:

```
byte Accum = 0;
unsigned Count = 5 + DataChars;
unsigned Index = 0;
while (Index < Count)
    Accum += Buffer[Index++];
```

ETX

End of Transmission. All packets end with this value. If no checksum is provided, then this value will follow the data values.

2.1 RS-232 Automation “Best Practices”

When communicating with a complicated device such as this video processor, you must first realize that this device is perfectly capable of exceeding the abilities of the other equipment in your system - if not careful. Also, the RS-232 communications are not the primary function of the device – and full use of the two communications (command/response) is suggested to ensure the device is controlled correctly and accurately. Some desired functions may require multiple control actions in order to carry out the desired effect. Here are some key points to remember when using the RS-232 functions of the slave (VP30):

- When multiple commands are required to be sent to the iScan, it is best to send one command at a time – and a complete response should be received by the Master before sending the next command.
- If more than one command is sent, without waiting for a response, hardware handshaking should be used to prevent buffer overflow and data loss.
- Some control functions are dependant on the prior setting of other values. For instance if you are setting the output video levels – this will first require setting (correctly) the output interface to “Analog”. If the output is not set to the correct interface, your video levels command will respond with an error (even if the command was formatted correctly).
- Anytime communications are used, there is a possibility that an error may occur in the transmission. By requiring that a response the slave sends (following a valid command) is verified as a “Command Successful” response - not an error, this will give the Master a chance to retry the command. Also, due to EMI/RFI some commands may be corrupted to the point that the slave may not understand a command at all. If the data is unrecognizable – the slave may not send a response at all. Thus, one can assume that if no response from the slave is detected within 1 second, something went wrong, and a retry should be initialized.

3.0 Packet Types

There are several types of packets. The most commonly used packets are described in this section.

3.1 Command Packet (Value = 0x30)

The controller sends a Command packet to the iScan VP30 to change a setting in the iScan VP30. The Command packet has the following format.

STX	3	0	DCNT1	DCNT2	ID1	ID2	NULL	VAL1..VALn	NULL	CS1	CS2	ETX
command packet		data count		setting ID		value		checksum (optional)				

Example 3.1: Set brightness ('21') to '1' (no checksum)

STX	3	0	0	5	2	1	NULL	1	NULL	ETX
		data count		brightness		value				

The complete list of iScan VP30 settings is given in Section 4.0.

The iScan VP30 responds with a response packet described in the section below.

3.2 Response Packet (Value = 0x01)

When the iScan VP30 receives a Command packet, it replies with a Response packet. The general form of a Response packet is as follows.

STX	0	1	0	5	1	NULL	CMD1	CMD2	NULL	CS1	CS2	ETX
response packet		data count		acknowledge		command		checksum				

Example 3.2: After receiving a Command packet in Example 3.1, the iScan VP30 responds with this packet

STX	0	1	0	5	1	NULL	3	0	NULL	5	C	ETX
		data count		acknowledge		command		checksum				

3.3 Query Packet (Value = 0x20)

The controller sends a Query packet to the iScan VP30 to read the value of a setting in the iScan VP30. The Query packet has the following format.

STX	2	0	0	3	ID1	ID2	NULL	CS1	CS2	ETX
query packet		data count		setting ID		checksum (optional)				

Example 3.3: The controller queries the iScan VP30's brightness settings.

STX	2	0	0	3	2	1	NULL	ETX
query packet		data count		brightness setting				

3.4 Reply Packet (Value = 0x21)

The iScan VP30 responds to the Query packet with a Reply packet, shown below.

STX	2	1	DCNT1	DCNT2	ID1	ID2	NULL	VAL1..VALn	NULL	CS1	CS2	ETX
reply packet		data count		setting ID		value		checksum				

Example 3.4: The iScan VP30 response to the Query packet in Example 3.3

STX	2	1	0	5	2	1	NULL	1	NULL	5	E	ETX
		data count		brightness		value		checksum				

3.5 Error Packet (Value = 0x02)

The iScan VP30 responds to an invalid packet from the system controller with an Error packet. The Error packet has the following format.

STX	0	2	0	2	ERR	NULL	CS1	CS2	ETX
error packet		data count				checksum			

The error codes are listed in the table below:

1	Invalid check sum
2	Invalid packet id (query, command, etc...)
3	Invalid setting id (brightness, contract, etc...)
4	Range error. The command attempted to modify a device setting with a value outside the valid range for that setting.
5	Bad packet character (not STX, ETX, or legal alphanumeric or punctuation character.) or packet was used in the wrong place.
6	The last byte of the packet was not received within 100ms of the first byte.
7	Un-terminated value data. The last data byte was not a NULL character.
8	Bad data. The data value(s) passed were not correctly formatted for the setting.
9	Too many or too few data values were passed for the packet type.
10	The setting indicated in a Command packet is not a writeable setting.
11	The packet is larger than the maximum packet size.
9999	Internal. Used only within the iScan

4. Settings

The following table describes the available ID settings in the iScan VP30. When the controller sends a Query or a Command packet which address a particular setting, these values are used to indicate which setting is involved. The valid range and factory default settings are also presented here. The Access column indicates whether the setting can be read or written or both.

The settings below are consistent with the iScan VP30 software version v1.06 and later.

4.1 Input Select

ID (hex)	Name	Access	Range	Factory Default
4C	Input Select	R/W	1=Video 1 2=Video 2 3=S-Video 1 4=S-Video 2 5=Component 1 6=Component 2 7=RGBHV/Component 8=HDMI 1 9=HDMI 2 10=HDMI 3 11=HDMI 4 12=SDI 13=Auto	5
4D	Auto Input Select	R/W	0=Off 1=On	0

4.2 Input Aspect Ratio

ID (hex)	Name	Access	Range	Factory Default
4E	Frame AR	R/W	1=4:3 2=16:9	2
50	Active AR	R/W	1=1.33:1 [4:3] 2=1.55:1 3=1.66:1 4=1.78:1 [16:9] 5=1.85:1 6=2.35:1 7=User	4
40	Horizontal Zoom	R/W	0...+100 [%]	0
41	Vertical Zoom	R/W	0...+100 [%]	0
42	Horizontal Pan	R/W	-100 ² ..+100 ²	0
43	Vertical Pan	R/W	-100 ² ..+100 ²	0
44	Horizontal Borders	R/W	0..+889 (Limited by resolution)	0
45	Vertical Borders	R/W	0..+249 (Limited by resolution)	0
E1	Recall Presets	R/W	1=4:3 Full Frame 2=Letterbox 3=16:9 Full Frame 4=Preset 1 5=Preset 2 6=Preset 3 7=Preset 4 8=User	1
53	Save Presets	W	1=Preset 1	N/A

			2=Presets 2 3=Presets 3 4=Presets 4	
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4.3 Input Adjustment Controls

ID (hex)	Name	Access	Range	Factory Default
46	Overscan	R/W	0..+96 [%] Stops at 36	0
47	Line Offset	R/W	0..+30 (requires active SDI input)	0
87	Color Space	R/W	1=RGB 2=YCbCr 3=YCbCr 4:2:2 4=YCbCr 4:4:4 5=Auto	5
F0	Input Level	R/W	1=Video 2=PC 3=Auto	3
48	VCR Mode	R/W	0=Off 1=On 2=Auto	2
49	Film Mode	R/W	0=Off 1=Bias 2=Auto	2
86	HDCP Compatibility (Not an Over-ride)	R/W	0=Off 1=On	On
81	Auto Priority	R/W	1..12 (1=highest, 12=lowest)	Depends on input. Default: 1 - HDMI 1 2 - HDMI 2 3 - HDMI 3 4 - HDMI 4 5 - SDI 6 - Component 1 7 - Component 2 8 - RGBHV/Comp 3 9 - S-Video 1 10 - S-Video 2 11 - Video 1 12 - Video 2
4A	Audio Input	R/W	0=Off 1=Audio1 2=Audio2 3=Audio3 4=Audio4 5=Stereo 6=HDMI	Depends on input Video 1 – Off Video 2 – Off S-Video 1 – Audio 2 S-Video 2 – Audio 3 Component 1 – Audio 1 Component 2 – Audio 4 RGBHV/Comp – HDMI 1 - HDMI 2 - HDMI 3 - HDMI 4 - SDI – Off
4B	AV LipSync	R/W	-73 ² ..+150 ²	0

4.4 Picture Controls

ID (hex)	Name	Access	Range	Factory Default
21	Brightness	R/W	-50..+50	0
22	Contrast	R/W	-50..+50	0
23	Saturation	R/W	-50..+50	0
24	Hue	R/W	-50..+50	0
25	Sharpness	R/W	0...+7	0
27	Y/C Delay	R/W	-50..+50	0
28	CUE-Correction	R/W	0=Off 1=On 2=Auto	2

4.5 Configuration Controls

ID (hex)	Name	Access	Range	Factory Default
A0	Test Patterns On/Off	R/W	0=Off 1=On	0
80	Test Patterns	R/W	1=Frame/Geometry 2=Brightness/Contrast 3=Checkerboard 4=Vertical Lines 5=Horizontal Lines 6=Judder 7=75% Color Bars 8=100% Color Bars 9=10 IRE Gray Window 10=20 IRE Gray Window 11=30 IRE Gray Window 12=40 IRE Gray Window 13=50 IRE Gray Window 14=60 IRE Gray Window 15=70 IRE Gray Window 16=80 IRE Gray Window 17=90 IRE Gray Window 18=100 IRE Gray Window 19=Gray Ramp 20=Coarse Cross-Hatch 21=Fine Cross-Hatch 22=Focus 23=Half-Transparent B/White 24=Half-Transparent 7-Color Bars 75% 25=Half-Transparent 7-Color Bars 100% 26=Half Transparent 8-Color Bars 75% 27=Half Transparent 8-Color Bar 100%	1
83	Auto Standby	R/W	0=Off 1=On	0
85	User Mode	R/W	1=Normal 2=Advanced	1

EC	Power LED Normal	R/W	0=Off 1=Dim 2=Medium 3=Bright	3
ED	Power LED Reduced	R/W	0=Off 1=Dim 2=Medium 3=Bright	1
A3	Serial Port Rate	R/W	1=4800 2=9600 3=14400 4=19200 5=38400 6=57600	6

4.6 Output Setup

ID (hex)	Name	Access	Range	Factory Default
60	Analog/Digital	R/W	1=BNC (Analog) 2=HDMI (Digital)	2
61	Format	R/W	1=[480p] 2=[540p] 3=[576p] 4=[720p-50] 5=[720p-60] 6=[1080i-50] 7=[1080i-60] 8=[1080p-50] 9=[1080p-60] 10=[VGA] 11=[SVGA] 12=[XGA] 13=[SXGA] 14=[852x480] 15=[852x576] 16=[1366x768] 17=[1280x768] 18=[1024x1024] 19=[1024x852] 20=[1024x576] 21=[848x600] 22=[1365x1024] 23=[1400x1050] 24=[1400x788] 25=[960x540] 26=[1280x960] 27=[1440x960] 28=[1440x1152] 29=[User]	1
62	Horizontal Size	R/W	640..1920	720
63	Horizontal Front Porch	R/W	Integer	16
64	Horizontal Sync Width	R/W	Integer	63

65	Horizontal Back Porch	R/W	Integer	59
66	Vertical Size	R/W	480..1080	480
67	Vertical Front Porch	R/W	Integer	6
68	Vertical Sync Width	R/W	Integer	6
69	Vertical Back Porch	R/W	Integer	33
6A	Display AR	R/W	1=4:3 2= 5:4 3=16:9 4=21:9 5=User 6=Auto	3
89	Screen AR	R/W	1=4:3 2=16:9 3=21:9 (2.35:1) 4=User 5=Auto	2
8B	Underscan	R/W	0..100	0
8C	Horizontal Image Shift	R/W	Integer (limited by Underscan)	0
8D	Vertical Image Shift	R/W	Integer (limited by Underscan)	0
6B	Sync Type	R/W	1=Bi-Level (Req. YUV Color Spc) 2=Tri-Level (Req. YUV Color Spc) 3=Composite 4=H+V+ (Req. RGB Color Spc) 5=H+V- (Req. RGB Color Spc) 6=H-V+ (Req. RGB Color Spc) 7=H-V- (Req. RGB Color Spc) 8=Auto	1
6C	Color Space	R/W	1=RGB 2=YCbCr 3=YCbCr 4:2:2 4=YCbCr 4:4:4 5=Auto	1
E6	Output Level (Only Applies to Digital Output)	R/W	1=Video 2=PC 3=Auto	1
6D	Frame Rate [50Hz]	R/W	0=Unlocked 1=25Hz Locked 2=50Hz Locked 3=75Hz Locked	1
6E	Frame Rate [60Hz]	R/W	0=Unlocked 1=24Hz Locked 2=48Hz Locked 3=60Hz Locked 4=72Hz Locked	1
6F	Unlocked Frame Rate [50Hz]	R/W	25.00²..75.00² [Hz]	50.00
70	Unlocked Frame	R/W	24.00²..75.00² [Hz]	59.94

	Rate [60Hz]			
4F	Border Level	R/W	-16..+100	0
EA	HDCP Display Detect (Not an Over-ride)	R/W	0=Off 1=On	1 (On)
E0	Recall Display Profile	R/W	0=User 1=Profile 1 2=Profile 2 3=Profile 3 4=Profile 4 5=Profile 5 6=Profile 6 7=Profile 7 8=Profile 8 9=Profile 9 10=Profile 10	0
52	Save Display Profile	W	0=User 1=Profile 1 2=Profile 2 3=Profile 3 4=Profile 4 5=Profile 5 6=Profile 6 7=Profile 7 8=Profile 8 9=Profile 9 10=Profile 10	N/A
E7	Auto Display Profile	R/W	0=Off 1=On	0

4.7 Miscellaneous Controls

ID (hex)	Name	Access	Range	Factory Default
A1	Power On/Off	R/W	0=Off 1=On	1
A2	Menu Navigation	W	1=Left 2=Right 3=Up 4=Down 5=MENU 6=ENTER 7=EXIT	Not Applicable
A4	Curtain Control	R/W	0=Curtain Open 1=Curtain Close	0

5. Command Packet Examples

This section provides examples of commands that the controller will generate to change the iScan VP30's settings.

Notes:

- These commands are generated without checksums.
- Values in the "ASCII" sections will need to be converted to HEX if the automation system requires HEX. See Section 8 for the ASCII to Hex conversion.
- A number with no '+' sign is treated as a positive number. '+100' = 100. The examples below omit the '+' sign.

5.1A Picture Control (ASCII)

Start	Command		Byte Count		Setting		Value				End	Description		
STX	3	0	0	5	2	1	NULL	1	NULL			ETX	Set Brightness to '1'	
STX	3	0	0	6	2	1	NULL	1	0	NULL		ETX	Set Brightness to '10'	
STX	3	0	0	7	2	1	NULL	-	1	0	NULL	ETX	Set Brightness to '-10'	
STX	3	0	0	7	2	1	NULL	1	0	0	NULL	ETX	Set Brightness to '100'	
STX	3	0	0	8	2	1	NULL	-	1	0	0	NULL	ETX	Set Brightness to '-100'
STX	3	0	0	5	2	2	NULL	0	NULL			ETX	Set Contrast to '1'	
STX	3	0	0	6	2	2	NULL	1	0	NULL		ETX	Set Contrast to '10'	
STX	3	0	0	7	2	2	NULL	-	1	0	NULL	ETX	Set Contrast to '-10'	
STX	3	0	0	7	2	2	NULL	1	0	0	NULL	ETX	Set Contrast to '100'	
STX	3	0	0	8	2	2	NULL	-	1	0	0	NULL	ETX	Set Contrast to '-100'
STX	3	0	0	5	2	3	NULL	1	NULL			ETX	Set Saturation to '1'	
STX	3	0	0	6	2	3	NULL	1	0	NULL		ETX	Set Saturation to '10'	
STX	3	0	0	7	2	3	NULL	-	1	0	NULL	ETX	Set Saturation to '-10'	
STX	3	0	0	7	2	3	NULL	1	0	0	NULL	ETX	Set Saturation to '100'	
STX	3	0	0	8	2	3	NULL	-	1	0	0	NULL	ETX	Set Saturation to '-100'
STX	3	0	0	5	2	4	NULL	1	NULL			ETX	Set Hue to '1'	
STX	3	0	0	6	2	4	NULL	1	0	NULL		ETX	Set Hue to '10'	
STX	3	0	0	7	2	4	NULL	-	1	0	NULL	ETX	Set Hue to '-10'	
STX	3	0	0	7	2	4	NULL	1	0	0	NULL	ETX	Set Hue to '100'	
STX	3	0	0	8	2	4	NULL	-	1	0	0	NULL	ETX	Set Hue to '-100'
STX	3	0	0	5	2	5	NULL	7	NULL			ETX	Set Sharpness to '7'	
STX	3	0	0	5	2	5	NULL	0	NULL			ETX	Set Sharpness to '0'	
STX	3	0	0	5	2	7	NULL	3	NULL			ETX	Set Y/C Delay to '3'	
STX	3	0	0	6	2	7	NULL	-	4	NULL		ETX	Set Y/C Delay to '-4'	
STX	3	0	0	5	2	7	NULL	0	NULL			ETX	Set Y/C Delay to '0'	
STX	3	0	0	5	2	8	NULL	0	NULL			ETX	Set CUE-Correction to Off	
STX	3	0	0	5	2	8	NULL	1	NULL			ETX	Set CUE-Correction to On	
STX	3	0	0	5	2	8	NULL	2	NULL			ETX	Set CUE-Correction to Auto	

5.1B Picture Control (Unsigned HEX)

Start	Command		Byte Count		Setting		Value					End	Description	
02	33	30	30	35	32	31	00	31	00			03	Set Brightness to '1'	
02	33	30	30	36	32	31	00	31	30	00		03	Set Brightness to '10'	
02	33	30	30	37	32	31	00	2D	31	30	00	03	Set Brightness to '-10'	
02	33	30	30	37	32	31	00	31	30	30	00	03	Set Brightness to '100'	
02	33	30	30	38	32	31	00	2D	31	30	30	00	03	Set Brightness to '-100'
02	33	30	30	35	32	32	00	30	00			03	Set Contrast to '1'	
02	33	30	30	36	32	32	00	31	30	00		03	Set Contrast to '10'	
02	33	30	30	37	32	32	00	2D	31	30	00	03	Set Contrast to '-10'	
02	33	30	30	37	32	32	00	31	30	30	00	03	Set Contrast to '100'	
02	33	30	30	38	32	32	00	2D	31	30	30	00	03	Set Contrast to '-100'
02	33	30	30	35	32	33	00	31	00			03	Set Saturation to '1'	
02	33	30	30	36	32	33	00	31	30	00		03	Set Saturation to '10'	
02	33	30	30	37	32	33	00	2D	31	30	00	03	Set Saturation to '-10'	
02	33	30	30	37	32	33	00	31	30	30	00	03	Set Saturation to '100'	
02	33	30	30	38	32	33	00	2D	31	30	30	00	03	Set Saturation to '-100'
02	33	30	30	35	32	34	00	31	00			03	Set Hue to '1'	
02	33	30	30	36	32	34	00	31	30	00		03	Set Hue to '10'	
02	33	30	30	37	32	34	00	2D	31	30	00	03	Set Hue to '-10'	
02	33	30	30	37	32	34	00	31	30	30	00	03	Set Hue to '100'	
02	33	30	30	38	32	34	00	2D	31	30	30	00	03	Set Hue to '-100'
02	33	30	30	35	32	35	00	7	00			03	Set Sharpness to '7'	
02	33	30	30	35	32	35	00	30	00			03	Set Sharpness to '0'	
02	33	30	30	35	32	37	00	33	00			03	Set Y/C Delay to '3'	
02	33	30	30	36	32	37	00	2D	34	00		03	Set Y/C Delay to '-4'	
02	33	30	30	35	32	37	00	30	00			03	Set Y/C Delay to '0'	
02	33	30	30	35	32	38	00	30	00			03	Set CUE-Correction to Off	
02	33	30	30	35	32	38	00	31	00			03	Set CUE-Correction to On	
02	33	30	30	35	32	38	00	32	00			03	Set CUE-Correction to Auto	

5.2A Input Adjustment Controls (ASCII)

Start	Command		Byte Count		Setting		Value					End	Description
STX	3	0	0	7	4	0	NULL	1	2	0	NULL	ETX	Set Horizontal Zoom to '120'
STX	3	0	0	7	4	1	NULL	1	2	0	NULL	ETX	Set Vertical Zoom to '120'
STX	3	0	0	7	4	2	NULL	1	2	0	NULL	ETX	Set Horizontal Pan to '120'
STX	3	0	0	7	4	3	NULL	1	2	0	NULL	ETX	Set Vertical Pan to '120'
STX	3	0	0	6	4	4	NULL	1	0	NULL		ETX	Set Horizontal Borders to 10
STX	3	0	0	7	4	4	NULL	1	0	0	NULL	ETX	Set Horizontal Borders to 100
STX	3	0	0	6	4	5	NULL	1	0	NULL		ETX	Set Vertical Borders to 10
STX	3	0	0	7	4	5	NULL	1	0	0	NULL	ETX	Set Vertical Borders to 100
STX	3	0	0	6	4	6	NULL	1	0	NULL		ETX	Set Overscan to 10%
STX	3	0	0	6	4	7	NULL	1	0	NULL		ETX	Set Line Offset to 10 (SDI/HDMI 480i/576i only)
STX	3	0	0	5	4	8	NULL	0	NULL			ETX	Set VCR Mode to Off
STX	3	0	0	5	4	8	NULL	1	NULL			ETX	Set VCR Mode to On
STX	3	0	0	5	4	8	NULL	2	NULL			ETX	Set VCR Mode to Auto
STX	3	0	0	5	4	9	NULL	0	NULL			ETX	Set Film Mode to Off
STX	3	0	0	5	4	9	NULL	2	NULL			ETX	Set Film Mode to Auto
STX	3	0	0	5	4	A	NULL	0	NULL			ETX	No Audio input assigned

STX	3	0	0	5	4	A	NULL	1	NULL			ETX	Audio input 1 assigned
STX	3	0	0	7	4	B	NULL	-	1	0	NULL	ETX	AV Lipsync = -10ms
STX	3	0	0	6	4	B	NULL	5	0	NULL		ETX	AV Lipsync = +50ms
STX	3	0	0	5	4	C	NULL	1	NULL			ETX	Input Select = Video 1
STX	3	0	0	5	4	D	NULL	1	NULL			ETX	Auto active input select is On
STX	3	0	0	5	4	E	NULL	1	NULL			ETX	Frame Aspect Ratio 4:3
STX	3	0	0	6	4	F	NULL	1	0	NULL		ETX	Set Border Gray Level to 10
STX	3	0	0	7	4	F	NULL	1	0	0	NULL	ETX	Set Border Gray Level to 100

5.2B Input Adjustment Controls (Unsigned HEX)

Start	Command		Byte Count		Setting		Value					End	Description
02	33	30	30	37	34	30	00	31	32	30	00	03	Set Horizontal Zoom to '120'
02	33	30	30	37	34	31	00	31	32	30	00	03	Set Vertical Zoom to '120'
02	33	30	30	37	34	32	00	31	32	30	00	03	Set Horizontal Pan to '120'
02	33	30	30	37	34	33	00	31	32	30	00	03	Set Vertical Pan to '120'
02	33	30	30	36	34	34	00	31	30	00		03	Set Horizontal Borders to 10
02	33	30	30	37	34	34	00	31	30	30	00	03	Set Horizontal Borders to 100
02	33	30	30	36	34	35	00	31	30	00		03	Set Vertical Borders to 10
02	33	30	30	37	34	35	00	31	30	30	00	03	Set Vertical Borders to 100
02	33	30	30	36	34	36	00	31	30	00		03	Set Overscan to 10%
02	33	30	30	36	34	37	00	31	30	00		03	Set Line Offset to 10 (SDI/HDMI 480i/576i only)
02	33	30	30	35	34	38	00	30	00			03	Set VCR Mode to Off
02	33	30	30	35	34	38	00	31	00			03	Set VCR Mode to On
02	33	30	30	35	34	38	00	32	00			03	Set VCR Mode to Auto
02	33	30	30	35	34	39	00	30	00			03	Set Film Mode to Off
02	33	30	30	35	34	39	00	32	00			03	Set Film Mode to Auto
02	33	30	30	35	34	41	00	30	00			03	No Audio input assigned
02	33	30	30	35	34	41	00	31	00			03	Audio input 1 assigned
02	33	30	30	37	34	42	00	2D	31	30	00	03	AV Lipsync = -10ms
02	33	30	30	36	34	42	00	35	30	00		03	AV Lipsync = +50ms
02	33	30	30	35	34	43	00	31	00			03	Input Select = Video 1
02	33	30	30	35	34	44	00	31	00			03	Auto active input select is On
02	33	30	30	35	34	45	00	31	00			03	Frame Aspect Ratio 4:3
02	33	30	30	36	34	46	00	31	30	00		03	Set Border Gray Level to 10
02	33	30	30	37	34	46	00	31	30	30	00	03	Set Border Gray Level to 100

5.3A Output Setup Controls (ASCII)

Start	Command		Byte Count		Setting		Value				End	Description			
STX	3	0	0	5	6	0	NULL	1	NULL			ETX	Select Analog output		
STX	3	0	0	5	6	0	NULL	2	NULL			ETX	Select HDMI output		
STX	3	0	0	5	6	1	NULL	1	NULL			ETX	Select 480p format		
STX	3	0	0	6	6	1	NULL	1	7	NULL		ETX	Select 1280 x 768		
STX	3	0	0	7	6	2	NULL	6	4	0	NULL		ETX	Horizontal Size = 640	
STX	3	0	0	8	6	2	NULL	1	9	2	0	NULL	ETX	Horizontal Size = 1920	
STX	3	0	0	6	6	3	NULL	1	6	NULL		ETX	Horizontal Front Porch = 16		
STX	3	0	0	6	6	4	NULL	6	3	NULL		ETX	Horizontal Sync Width = 63		
STX	3	0	0	6	6	5	NULL	5	9	NULL		ETX	Horizontal Back Porch = 59		
STX	3	0	0	7	6	6	NULL	4	8	0	NULL		ETX	Vertical Size = 480	
STX	3	0	0	8	6	6	NULL	1	0	8	0	NULL	ETX	Vertical Size = 1080	
STX	3	0	0	5	6	7	NULL	6	NULL			ETX	Vertical Front Porch = 6		
STX	3	0	0	5	6	8	NULL	6	NULL			ETX	Vertical Sync Width = 6		
STX	3	0	0	6	6	9	NULL	3	3	NULL		ETX	Vertical Back Porch = 33		
STX	3	0	0	5	6	A	NULL	1	NULL			ETX	Aspect Ratio = 4:3		
STX	3	0	0	5	6	A	NULL	2	NULL			ETX	Aspect Ratio = 16:9		
STX	3	0	0	5	6	B	NULL	1	NULL			ETX	Sync Type = Bi-Level		
STX	3	0	0	5	6	B	NULL	4	NULL			ETX	Sync Type = H+V+		
STX	3	0	0	5	6	C	NULL	1	NULL			ETX	Color Space = RGB		
STX	3	0	0	5	6	C	NULL	2	NULL			ETX	Color Space = YPbPr		
STX	3	0	0	5	6	D	NULL	0	NULL			ETX	Frame Rate[50Hz] = unlock		
STX	3	0	0	5	6	E	NULL	1	NULL			ETX	Frame Rate [60Hz] = lock		
STX	3	0	0	9	6	F	NULL	5	9	.	9	4	NULL	ETX	03
STX	3	0	0	9	6	F	NULL	7	2	.	0	0	NULL	ETX	03

5.3B Output Setup Controls (Unsigned HEX)

Start	Command		Byte Count		Setting		Value				End	Description		
02	33	30	30	35	36	30	00	31	00			03	Select Analog output	
02	33	30	30	35	36	30	00	32	00			03	Select HDMI output	
02	33	30	30	35	36	31	00	31	00			03	Select 480p format	
02	33	30	30	36	36	31	00	31	37	00		03	Select 1280 x 768	
02	33	30	30	37	36	32	00	36	34	30	00		03	Horizontal Size = 640
02	33	30	30	38	36	32	00	31	39	32	30	00	03	Horizontal Size = 1920
02	33	30	30	36	36	33	00	31	36	00		03	Horizontal Front Porch = 16	
02	33	30	30	36	36	34	00	36	33	00		03	Horizontal Sync Width = 63	
02	33	30	30	36	36	35	00	35	39	00		03	Horizontal Back Porch = 59	
02	33	30	30	37	36	36	00	34	38	30	00		03	Vertical Size = 480
02	33	30	30	38	36	36	00	31	30	38	30	00	03	Vertical Size = 1080
02	33	30	30	35	36	37	00	36	00			03	Vertical Front Porch = 6	
02	33	30	30	35	36	38	00	36	00			03	Vertical Sync Width = 6	
02	33	30	30	36	36	39	00	33	33	00		03	Vertical Back Porch = 33	
02	33	30	30	35	36	41	00	31	00			03	Aspect Ratio = 4:3	
02	33	30	30	35	36	41	00	32	00			03	Aspect Ratio = 16:9	

02	33	30	30	35	36	42	00	31	00				03	Sync Type = Bi-Level	
02	33	30	30	35	36	42	00	34	00				03	Sync Type = H+V+	
02	33	30	30	35	36	43	00	31	00				03	Color Space = RGB	
02	33	30	30	35	36	43	00	32	00				03	Color Space = YPbPr	
02	33	30	30	35	36	44	00	30	00				03	Frame Rate[50Hz] = unlock	
02	33	30	30	35	36	45	00	31	00				03	Frame Rate [60Hz] = lock	
02	33	30	30	39	36	46	00	35	39	2E	39	34	00	03	Frame Rate[50Hz] = 59.94 Hz
02	33	30	30	39	36	46	00	37	32	2E	30	30	00	03	Frame Rate[50Hz] = 72.00Hz

5.4A Configuration Controls (ASCII)

Start	Command		Byte Count		Setting		Value				End	Description		
STX	3	0	0	5	8	0	NULL	1	NULL			ETX	Select Test Pattern 1	
STX	3	0	0	6	8	0	NULL	2	0	NULL			ETX	Select Test Pattern 20
STX	3	0	0	5	8	1	NULL	2	NULL			ETX	Set Auto Priority to 2	
STX	3	0	0	5	8	3	NULL	1	NULL			ETX	Auto Standby mode is On	
STX	3	0	0	5	E	D	NULL	2	NULL			ETX	Power LED Reduced Level 2	
STX	3	0	0	5	8	5	NULL	2	NULL			ETX	User Mode is Advanced	

5.4B Configuration Controls (Unsigned HEX)

Start	Command		Byte Count		Setting		Value				End	Description		
02	33	30	30	35	38	30	00	31	00			03	Select Test Pattern 1	
02	33	30	30	36	38	30	00	32	30	00			03	Select Test Pattern 20
02	33	30	30	35	38	31	00	32	00			03	Set Auto Priority to 2	
02	33	30	30	35	38	33	00	31	00			03	Auto Standby mode is On	
02	33	30	30	35	45	44	00	32	00			03	Power LED Reduced Level 2	
02	33	30	30	35	38	35	00	32	00			03	User Mode is Advanced	

5.5A Miscellaneous Controls (ASCII)

Start	Command		Byte Count		Setting		Value				End	Description	
STX	3	0	0	5	A	4	NULL	1	NULL			ETX	Close Curtain
STX	3	0	0	5	A	1	NULL	1	NULL			ETX	Turn Power On
STX	3	0	0	5	A	2	NULL	5	NULL			ETX	Remote control code 'Menu'

5.5B Miscellaneous Controls (Unsigned HEX)

Start	Command		Byte Count		Setting		Value				End	Description	
02	33	30	30	35	41	34	00	31	00			03	Close Curtain
02	33	30	30	35	41	31	00	31	00			03	Turn Power On
02	33	30	30	35	41	32	00	35	00			03	Remote control code 'Menu'

6. Query Packet Examples

The controller sends a query command in the following format (ASCII shown)

Start	Command		Byte Count		Setting		Value	End	Description
STX	2	0	0	3	ID1	ID2	NULL	ETX	Query settings with ID1, ID2 (Section 4)

The section below provides examples of the iScan VP30's response to the controller's query after the iScan VP30's picture control settings have been set in Section 5.

6.1 Picture Control Reply Packet Examples (ASCII)

Start	Cmd		Byte Count		Setting		Value			Check-sum		End	Description			
STX	2	1	0	5	2	1	NULL	1	NULL		5	E	ETX	Brightness is '1'		
STX	2	1	0	6	2	1	NULL	1	0	NULL		8	F	ETX	Brightness is '10'	
STX	2	1	0	7	2	1	NULL	-	1	0	NULL		B	D	ETX	Brightness is '-10'
STX	2	1	0	7	2	1	NULL	1	0	0	NULL		C	0	ETX	Brightness is '100'
STX	2	1	0	8	2	1	NULL	-	1	0	0	NULL	E	E	ETX	Brightness is '-100'
STX	2	1	0	5	2	2	NULL	1	NULL			5	F	ETX	Contrast is '1'	
STX	2	1	0	6	2	2	NULL	1	0	NULL		9	0	ETX	Contrast is '10'	
STX	2	1	0	7	2	2	NULL	-	1	0	NULL		B	E	ETX	Contrast is '-10'
STX	2	1	0	7	2	2	NULL	1	0	0	NULL		C	1	ETX	Contrast is '100'
STX	2	1	0	8	2	2	NULL	-	1	0	0	NULL	E	F	ETX	Contrast is '-100'
STX	2	1	0	5	2	3	NULL	1	NULL			6	0	ETX	Saturation is '1'	
STX	2	1	0	6	2	3	NULL	1	0	NULL		9	1	ETX	Saturation is '10'	
STX	2	1	0	7	2	3	NULL	-	1	0	NULL		B	F	ETX	Saturation is '-10'
STX	2	1	0	7	2	3	NULL	1	0	0	NULL		C	2	ETX	Saturation is '100'
STX	2	1	0	8	2	3	NULL	-	1	0	0	NULL	F	0	ETX	Saturation is '-100'
STX	2	1	0	5	2	4	NULL	1	NULL			6	1	ETX	Hue is '1'	
STX	2	1	0	6	2	4	NULL	1	0	NULL		9	2	ETX	Hue is '10'	
STX	2	1	0	7	2	4	NULL	-	1	0	NULL		C	0	ETX	Hue is '-10'
STX	2	1	0	7	2	4	NULL	1	0	0	NULL		C	3	ETX	Hue is '100'
STX	2	1	0	8	2	4	NULL	-	1	0	0	NULL	F	1	ETX	Hue is '-100'
STX	2	1	0	5	2	5	NULL	7	NULL			6	8	ETX	Sharpness is '7'	
STX	2	1	0	6	2	5	NULL	-	5	NULL		9	4	ETX	Sharpness is '-5'	
STX	2	1	0	5	2	5	NULL	0	NULL			6	1	ETX	Sharpness is '0'	
STX	2	1	0	5	2	7	NULL	3	NULL			6	6	ETX	Y/C Delay is '3'	
STX	2	1	0	6	2	7	NULL	-	4	NULL		9	5	ETX	Y/C Delay is '-4'	
STX	2	1	0	5	2	8	NULL	0	NULL			6	4	ETX	CUE Correction is Off	
STX	2	1	0	5	2	8	NULL	1	NULL			6	5	ETX	CUE Correction is On	
STX	2	1	0	5	2	8	NULL	2	NULL			6	6	ETX	CUE Correction is Auto	

7. Error Packet Examples

Sometimes the iScan VP30 will send an Error packet in response to a packet sent from the controller. Refer to section 3.5 for a complete list of error codes.

The common error packets are described below.

7.1 Response to a Query packet (Section 6)

Start	Command		Byte Count		Error Code		Checksum		End
STX	0	2	0	2	2	NULL	F	8	ETX

This packet is sent typically when the controller is querying a setting that is not valid. For example, when the controller queries the Hue setting and the selected input is Component 1. The iScan will return this error packet because Hue control is not available for component inputs.

7.2 Response to a Command packet (Section 5)

Start	Command		Byte Count		Error Code		Checksum		End
STX	0	2	0	2	6	NULL	F	C	ETX

This packet is typically sent when the iScan VP30 does not receive the last byte of the packet within 100ms of the first byte.

8. ASCII to Hex Conversion Table

ASCII	Hex
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
A	41
B	42
C	43
D	44
E	45
F	46
-	2D
+	2B
.	2E
STX	02
ETX	03
NULL	00