

DVDO iScan HD Serial Automation Protocol Document

This document describes the iScan HD 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 HD is used to communicate with the system controller. The DB-9 (female) connector pin-out is given below.

Pin 2 – TXD (output)
 Pin 3 – RXD (input)
 Pin 5 - GND

The iScan HD 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.

The communications (COMM) port parameters for the iScan HD are:

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

The following baud rates (bps) can be selected by the user: 1200, 2400, 4800, 9600, 14400, 19200, 38400 and 57600.

2. Protocol Summary

The system controller always initiates a transaction by sending a packet to the iScan HD, which in turn responds with a packet to the controller. The iScan HD 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
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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 HD 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 HD. If the byte following the last data value is ETX, then it is assumed that no checksum is provided. Otherwise, the iScan HD expects a checksum which is formatted into two ASCII hexadecimal characters. The iScan HD always includes a 1-byte checksum in the packet it sends to the controller.

The algorithm for the checksum will be 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.

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 HD to change a setting in the iScan HD. 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 HD settings is given in Section 4.0.

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

3.2 Response Packet (Value = 0x01)

When the iScan HD 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 HD 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 HD to read the value of a setting in the iScan HD. 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 HD'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 HD 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 HD 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 HD 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	Unterminated 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 HD. 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 HD software version

HD-5.6-1.31

4.1 Picture Controls

ID (hex)	Name	Access	Range	Factory Default
21	Brightness	R/W	-100..+100	0
22	Contrast	R/W	-100..+100	0
23	Saturation	R/W	-100..+100	0
24	Hue	R/W	-100..+100	0
25	Sharpness	R/W	-5..+7	0
26	Sharpness (Comp)	R/W	0=Off 1=On	0
27	Y/C Delay	R/W	-4..+3	0
28	CUE-Correction	R/W	0=Off 1=On 2=Auto	2

4.2 Input Adjustment Controls

ID (hex)	Name	Access	Range	Factory Default
40	Hor. Zoom	R/W	+100..+150 [%]	100
41	Ver. Zoom	R/W	+100..+150 [%]	100
42	Hor. Pan	R/W	-400 ² ..+400 ²	0
43	Ver. Pan	R/W	-400 ² ..+400 ²	0
44	Hor. Borders	R/W	0..+200	0
45	Ver. Borders	R/W	0..+200	0
46	Overscan	R/W	0..+20 [%]	0
47	SDI Line Offset	R/W	0..+30	0
48	VCR Mode	R/W	0=Off 1=On 2=Auto	2
49	Film Mode	R/W	0=Off 2=Auto	2
4A	Audio Input select	R/W	0=Off 1=Audio1 2=Audio2 3=Audio3 4=Audio4	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 DVI – Off Analog Passthru – Off SDI – Off
4B	AV LipSync	R/W	-73 ² ..+150 ²	0
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=PassThru 8=DVI 9=SDI	5
4D	Auto Input mode	R/W	0=Off 1=On	1
4E	Input Aspect Ratio	R/W	1=[4:3] 2=Letterbox 3=[16:9] 4=Preset	3
4F	Border Level	R/W	0..100	0

4.3 Output Setup Controls

ID (hex)	Name	Access	Range	Factory Default
60	Analog/Digital	R/W	1=VGA 2=DVI-Video 3=DVI-PC	1
61	Format	R/W	1=[480p] 2=[540p] 3=[576p] 27=[720p-50] 4=[720p-60] 28=[1080i-50] 5=[1080i-60] 28=[1080p-50] 6=[1080p-60] 7=[VGA] 8=[SVGA] 9=[XGA] 10=[SXGA] 11=[852x480] 12=[852x576] 13=[1366x768] 14=[1280x768] 15=[1024x1024] 16=[1024x852] 17=[1024x576] 18=[848x600] 19=[1365x1024] 20=[1400x1050] 21=[1400x788] 22=[960x540]	1

			23=[1280x960] 24=[1440x960] 25=[1440x1152] 26=[User]	
62	Hor. Size	R/W	640..1920	720
63	Hor. Front Porch	R/W	Integer	16
64	Hor. Sync Width	R/W	Integer	63
65	Hor. Back Porch	R/W	Integer	59
66	Ver. Size	R/W	480..1080	480
67	Ver. Front Porch	R/W	Integer	6
68	Ver. Sync Width	R/W	Integer	6
69	Ver. Back Porch	R/W	Integer	33
6A	Aspect Ratio	R/W	1=[4:3] 2=[16:9] 3=[5:4]	2
6B	Sync Type	R/W	1=Bi-Lev 2=Tri-Lev 3=Comp 4=H+V+ 5=H+V- 6=H-V+ 7=H-V-	1
6C	Color Space	R/W	1=RGB 2=YCbCr	1
6D	Frame Rate [50Hz]	R/W	0=UnLock 1=50Lock 2=75Lock	1
6E	Frame Rate [60Hz]	R/W	0=UnLock 1=60Lock 2=48Lock 3=72Lock	1
6F	Unlocked Frame Rate [50Hz]	R/W	30.00 ² ..75.00 ² [Hz]	50.00
70	Unlocked Frame Rate [60Hz]	R/W	30.00 ² ..75.00 ² [Hz]	59.94

4.4 Configuration Controls

ID (hex)	Name	Access	Range	Factory Default
80	Test Patterns	R/W	1..27	1
81	Auto Priority	R/W	1..9 (1=highest, 9=lowest)	Depends on input. Default Video 1 – 5 Video 2 – 6 S-Video 1 – 3 S-Video 2 – 4 Component 1 – 1 Component 2 – 2 DVI – 7 Analog Passthru – 9 SDI – 8
82	DVI Input	R/W	1=Auto	1

			2=Passthrough	
83	Auto Standby	R/W	0=Off 1=On	0
84	Power LED	R/W	0=Off 1=On 2=Auto	2
85	User Mode	R/W	1=Normal 2=Advanced	1

4.5 Miscellaneous Controls

ID (hex)	Name	Access	Range	Factory Default
A0	Test Patterns On/Off	R/W	0=Off, 1=On	0
A1	Power On/Off	R/W	0=Off, 1=On	1
A2	Remote Control codes	W	1-byte value See Remote Control Codes in Section 4.6	not applicable
A3	Serial Number	R	Value1 = Serial Number Value2 = Event Mask	Value1 = 00000000
D0	Input Signal Type	R	0=NoSignal 1=Unknown 2=NTSC 3=PAL 4=SECAM 5=PAL_M 6=480i 7=576i 8=480p 9=576p	not applicable

4.6 Remote Control Codes

Code (hex)	Label
08	CURTAIN
40	INFO
41	TEST PATTERNS
42	POWER
0E	OUTPUT SETUP
12	CONFIG
1A	PICTURE CONTROL
00	INPUT ADJUST
1B	1
15	2
11	3
16	4
19	5
17	6
1F	7
1E	8
1D	9
0F	0
43	MENU
01	▲
44	EXIT
05	◀
0B	ENTER
13	▶
02	▼
0C	ZOOM
07	PAN
45	4:3
46	LBX
47	16:9
48	PRESET
10	SDI
0A	VID 2
04	S-VID 2
14	COMP 2
49	PASSTHRU
4A	VID 1
4E	S-VID 1
4F	COMP 1
4C	DVI
4B	AUTO

5. Command Packet Examples

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

Notes:

- These commands are generated without checksums.
- '\x' denotes a hexadecimal number. Otherwise the number is ASCII. See Section 6 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.

5.1 Picture Control

Start	Command		Byte Count		Setting		Value				End	Description		
\x02	3	0	0	5	2	1	\x00	1	\x00			\x03	Set Brightness to '1'	
\x02	3	0	0	6	2	1	\x00	1	0	\x00		\x03	Set Brightness to '10'	
\x02	3	0	0	7	2	1	\x00	-	1	0	\x00	\x03	Set Brightness to '-10'	
\x02	3	0	0	7	2	1	\x00	1	0	0	\x00	\x03	Set Brightness to '100'	
\x02	3	0	0	8	2	1	\x00	-	1	0	0	\x00	\x03	Set Brightness to '-100'
\x02	3	0	0	5	2	2	\x00	0	\x00			\x03	Set Contrast to '1'	
\x02	3	0	0	6	2	2	\x00	1	0	\x00		\x03	Set Contrast to '10'	
\x02	3	0	0	7	2	2	\x00	-	1	0	\x00	\x03	Set Contrast to '-10'	
\x02	3	0	0	7	2	2	\x00	1	0	0	\x00	\x03	Set Contrast to '100'	
\x02	3	0	0	8	2	2	\x00	-	1	0	0	\x00	\x03	Set Contrast to '-100'
\x02	3	0	0	5	2	3	\x00	1	\x00			\x03	Set Saturation to '1'	
\x02	3	0	0	6	2	3	\x00	1	0	\x00		\x03	Set Saturation to '10'	
\x02	3	0	0	7	2	3	\x00	-	1	0	\x00	\x03	Set Saturation to '-10'	
\x02	3	0	0	7	2	3	\x00	1	0	0	\x00	\x03	Set Saturation to '100'	
\x02	3	0	0	8	2	3	\x00	-	1	0	0	\x00	\x03	Set Saturation to '-100'
\x02	3	0	0	5	2	4	\x00	1	\x00			\x03	Set Hue to '1'	
\x02	3	0	0	6	2	4	\x00	1	0	\x00		\x03	Set Hue to '10'	
\x02	3	0	0	7	2	4	\x00	-	1	0	\x00	\x03	Set Hue to '-10'	
\x02	3	0	0	7	2	4	\x00	1	0	0	\x00	\x03	Set Hue to '100'	
\x02	3	0	0	8	2	4	\x00	-	1	0	0	\x00	\x03	Set Hue to '-100'
\x02	3	0	0	5	2	5	\x00	7	\x00			\x03	Set Sharpness to '7'	
\x02	3	0	0	6	2	5	\x00	-	5	\x00		\x03	Set Sharpness to '-5'	
\x02	3	0	0	5	2	5	\x00	0	\x00			\x03	Set Sharpness to '0'	
\x02	3	0	0	5	2	6	\x00	0	\x00			\x03	Set Comp. Sharpness to Off	
\x02	3	0	0	5	2	6	\x00	1	\x00			\x03	Set Comp. Sharpness to On	
\x02	3	0	0	5	2	7	\x00	3	\x00			\x03	Set Y/C Delay to '3'	
\x02	3	0	0	6	2	7	\x00	-	4	\x00		\x03	Set Y/C Delay to '-4'	
\x02	3	0	0	5	2	7	\x00	0	\x00			\x03	Set Y/C Delay to '0'	
\x02	3	0	0	5	2	8	\x00	0	\x00			\x03	Set CUE-Correction to Off	
\x02	3	0	0	5	2	8	\x00	1	\x00			\x03	Set CUE-Correction to On	
\x02	3	0	0	5	2	8	\x00	2	\x00			\x03	Set CUE-Correction to Auto	

5.2 Input Adjustment Controls

Start	Command		Byte Count		Setting		Value				End	Description	
\x02	3	0	0	7	4	0	\x00	1	2	0	\x00	\x03	Set Hor. Zoom to '120'
\x02	3	0	0	7	4	1	\x00	1	2	0	\x00	\x03	Set Ver. Zoom to '120'
\x02	3	0	0	7	4	2	\x00	1	2	0	\x00	\x03	Set Hor. Pan to '120'
\x02	3	0	0	7	4	3	\x00	1	2	0	\x00	\x03	Set Hor. Pan to '120'
\x02	3	0	0	6	4	4	\x00	1	0	\x00		\x03	Set Hor. Borders to 10
\x02	3	0	0	7	4	4	\x00	1	0	0	\x00	\x03	Set Hor. Borders to 100
\x02	3	0	0	6	4	5	\x00	1	0	\x00		\x03	Set Ver. Borders to 10
\x02	3	0	0	7	4	5	\x00	1	0	0	\x00	\x03	Set Ver. Borders to 100
\x02	3	0	0	6	4	6	\x00	1	0	\x00		\x03	Set Overscan to 10%
\x02	3	0	0	6	4	7	\x00	1	0	\x00		\x03	Set Line Offset to 10 (SDI only)
\x02	3	0	0	5	4	8	\x00	0	\x00			\x03	Set VCR Mode to Off
\x02	3	0	0	5	4	8	\x00	1	\x00			\x03	Set VCR Mode to On
\x02	3	0	0	5	4	8	\x00	2	\x00			\x03	Set VCR Mode to Auto
\x02	3	0	0	5	4	9	\x00	0	\x00			\x03	Set Film Mode to Off
\x02	3	0	0	5	4	9	\x00	2	\x00			\x03	Set Film Mode to Auto
\x02	3	0	0	5	4	A	\x00	0	\x00			\x03	No Audio input assigned
\x02	3	0	0	5	4	A	\x00	1	\x00			\x03	Audio input 1 assigned
\x02	3	0	0	7	4	B	\x00	-	1	0	\x00	\x03	AV Lipsync = -10ms
\x02	3	0	0	6	4	B	\x00	5	0	\x00		\x03	AV Lipsync = +50ms
\x02	3	0	0	5	4	C	\x00	1	\x00			\x03	Input Select = Video 1
\x02	3	0	0	5	4	D	\x00	1	\x00			\x03	Auto active input select is On
\x02	3	0	0	5	4	E	\x00	1	\x00			\x03	Input Aspect Ratio 4:3
\x02	3	0	0	6	4	F	\x00	1	0	\x00		\x03	Set Border Gray Level to 10
\x02	3	0	0	7	4	F	\x00	1	0	0	\x00	\x03	Set Border Gray Level to 100

5.3 Output Setup Controls

Start	Command		Byte Count		Setting		Value				End	Description		
\x02	3	0	0	5	6	0	\x00	1	\x00			\x03	Select Analog output	
\x02	3	0	0	5	6	0	\x00	2	\x00			\x03	Select DVI output - Video	
\x02	3	0	0	5	6	0	\x00	3	\x00			\x03	Select DVI output - PC	
\x02	3	0	0	5	6	1	\x00	1	\x00			\x03	Select 480p format	
\x02	3	0	0	6	6	1	\x00	1	4	\x00		\x03	Select 1280 x 768	
\x02	3	0	0	7	6	2	\x00	6	4	0	\x00	\x03	Hor. Size = 640	
\x02	3	0	0	8	6	2	\x00	1	9	2	0	\x00	\x03	Hor. Size = 1920
\x02	3	0	0	6	6	3	\x00	1	6	\x00		\x03	Hor. Front Porch = 16	
\x02	3	0	0	6	6	4	\x00	6	3	\x00		\x03	Hor. Sync Width = 63	
\x02	3	0	0	6	6	5	\x00	5	9	\x00		\x03	Hor. Back Porch = 59	
\x02	3	0	0	7	6	6	\x00	4	8	0	\x00	\x03	Ver. Size = 480	
\x02	3	0	0	8	6	6	\x00	1	0	8	0	\x00	\x03	Ver. Size = 1080
\x02	3	0	0	5	6	7	\x00	6	\x00			\x03	Ver. Front Porch = 6	
\x02	3	0	0	5	6	8	\x00	6	\x00			\x03	Ver. Sync Width = 6	
\x02	3	0	0	6	6	9	\x00	3	3	\x00		\x03	Ver. Back Porch = 33	
\x02	3	0	0	5	6	A	\x00	1	\x00			\x03	Aspect Ratio = 4:3	
\x02	3	0	0	5	6	A	\x00	2	\x00			\x03	Aspect Ratio = 16:9	
\x02	3	0	0	5	6	B	\x00	1	\x00			\x03	Sync Type = Bi-Level	
\x02	3	0	0	5	6	B	\x00	4	\x00			\x03	Sync Type = H+V+	
\x02	3	0	0	5	6	C	\x00	1	\x00			\x03	Color Space = RGB	

\x02	3	0	0	5	6	C	\x00	2	\x00	\x03	Color Space = YPbPr			
\x02	3	0	0	5	6	D	\x00	0	\x00	\x03	Frame Rate[50Hz] = unlock			
\x02	3	0	0	5	6	E	\x00	1	\x00	\x03	Frame Rate [60Hz] = lock			
\x02	3	0	0	8	6	F	\x00	5	9	.	9	4	\x03	Frame Rate[50Hz] = 59.94 Hz
\x02	3	0	0	8	6	F	\x00	7	2	.	0	0	\x03	Frame Rate[50Hz] = 72.00Hz

5.4 Configuration Controls

Start	Command		Byte Count		Setting		Value					End	Description
\x02	3	0	0	5	8	0	\x00	1	\x00	\x03	Select Test Pattern 1		
\x02	3	0	0	6	8	0	\x00	2	0	\x00	\x03	Select Test Pattern 20	
\x02	3	0	0	5	8	1	\x00	2	\x00	\x03	Set Auto Priority to 2		
\x02	3	0	0	5	8	2	\x00	1	\x00	\x03	Set DVI Input to Auto mode		
\x02	3	0	0	5	8	3	\x00	1	\x00	\x03	Auto Standby mode is On		
\x02	3	0	0	5	8	4	\x00	2	\x00	\x03	Power LED mode is Auto		
\x02	3	0	0	5	8	5	\x00	2	\x00	\x03	User Mode is Advanced		

5.5 Miscellaneous Controls

Start	Command		Byte Count		Setting		Value					End	Description
\x02	3	0	0	5	A	0	\x00	1	\x00	\x03	Turn Test Pattern On		
\x02	3	0	0	5	A	1	\x00	1	\x00	\x03	Turn Power On		
\x02	3	0	0	6	A	2	\x00	4	3	\x00	\x03	Remote control code 'Menu'	

6. Query Packet Examples

The controller sends a query command in the following format

Start	Command		Byte Count		Setting		Value	End	Description
\x02	2	0	0	3	ID1	ID2	\x00	\x03	Query settings with ID1,ID2 (Section 4)

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

6.1 Picture Control Reply Packet Examples

Start	Cmd		Byte Count		Setting		Value				Checksum		End	Description		
\x02	2	1	0	5	2	1	\x00	1				\x00	5	E	\x03	Brightness is '1'
\x02	2	1	0	6	2	1	\x00	1	0			\x00	8	F	\x03	Brightness is '10'
\x02	2	1	0	7	2	1	\x00	-	1	0		\x00	B	D	\x03	Brightness is '-10'
\x02	2	1	0	7	2	1	\x00	1	0	0		\x00	C	0	\x03	Brightness is '100'
\x02	2	1	0	8	2	1	\x00	-	1	0	0	\x00	E	E	\x03	Brightness is '-100'
\x02	2	1	0	5	2	2	\x00	1				\x00	5	F	\x03	Contrast is '1'
\x02	2	1	0	6	2	2	\x00	1	0			\x00	9	0	\x03	Contrast is '10'
\x02	2	1	0	7	2	2	\x00	-	1	0		\x00	B	E	\x03	Contrast is '-10'
\x02	2	1	0	7	2	2	\x00	1	0	0		\x00	C	1	\x03	Contrast is '100'
\x02	2	1	0	8	2	2	\x00	-	1	0	0	\x00	E	F	\x03	Contrast is '-100'
\x02	2	1	0	5	2	3	\x00	1				\x00	6	0	\x03	Saturation is '1'
\x02	2	1	0	6	2	3	\x00	1	0			\x00	9	1	\x03	Saturation is '10'
\x02	2	1	0	7	2	3	\x00	-	1	0		\x00	B	F	\x03	Saturation is '-10'
\x02	2	1	0	7	2	3	\x00	1	0	0		\x00	C	2	\x03	Saturation is '100'
\x02	2	1	0	8	2	3	\x00	-	1	0	0	\x00	F	0	\x03	Saturation is '-100'
\x02	2	1	0	5	2	4	\x00	1				\x00	6	1	\x03	Hue is '1'
\x02	2	1	0	6	2	4	\x00	1	0			\x00	9	2	\x03	Hue is '10'
\x02	2	1	0	7	2	4	\x00	-	1	0		\x00	C	0	\x03	Hue is '-10'
\x02	2	1	0	7	2	4	\x00	1	0	0		\x00	C	3	\x03	Hue is '100'
\x02	2	1	0	8	2	4	\x00	-	1	0	0	\x00	F	1	\x03	Hue is '-100'
\x02	2	1	0	5	2	5	\x00	7				\x00	6	8	\x03	Sharpness is '7'
\x02	2	1	0	6	2	5	\x00	-	5			\x00	9	4	\x03	Sharpness is '-5'
\x02	2	1	0	5	2	5	\x00	0				\x00	6	1	\x03	Sharpness is '0'
\x02	2	1	0	5	2	6	\x00	0				\x00	6	2	\x03	Comp. Sharpness is Off
\x02	2	1	0	5	2	6	\x00	1				\x00	6	3	\x03	Comp. Sharpness is On
\x02	2	1	0	5	2	7	\x00	3				\x00	6	6	\x03	Y/C Delay is '3'
\x02	2	1	0	6	2	7	\x00	-	4			\x00	9	5	\x03	Y/C Delay is '-4'
\x02	2	1	0	5	2	8	\x00	0				\x00	6	4	\x03	CUE Correction is Off
\x02	2	1	0	5	2	8	\x00	1				\x00	6	5	\x03	CUE Correction is On
\x02	2	1	0	5	2	8	\x00	2				\x00	6	6	\x03	CUE Correction is Auto

6.2 Query Serial Number

The controller can query the iScan HD to obtain information about any changes that have happened to the system since the previous communication between both devices.

The Query Serial Number packet is of the format

Start	Command		Byte Count		Setting		Value	End
\x02	2	0	0	3	A	3	\x00	\x03

query

query serial
number

The iScan HD replies with the following packet

Start	Cmd		Byte Count		Setting		Value				Checksum		End	
\x02	2	1	1	5	A	3	\x00	Serial Number	\x00	Mask Field	\x00	CS1	CS2	\x03

The Serial Number is a 32-bit number (eight hexadecimal ASCII characters) which is incremented each time a setting is changed inside the iScan HD. The Serial Number is unchanged when there are no changes and the Mask Field is zero.

The Mask Field is a 32-bit number which indicates what category of the settings has changed. The categories are defined below.

Bit31-Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved	Input Format	Misc	Output	Configuration	Picture Control	Input Adjust	Input Aspect Ratio	Input Source

Reserved

These bits are always zero.

Input Format

This bit is set (1) when the input format has changed. For example, when the input format changes from NTSC to PAL.

Misc

This bit is set (1) when the Miscellaneous controls have changed (Section 5.5).

Output

This bit is set (1) when the Output controls have changed (Section 5.3).

Configuration

This bit is set (1) when the Configuration controls have changed (Section 5.4).

Picture Control

This bit is set (1) when the Picture Control settings have changed (Section 5.1).

Input Adjust

This bit is set (1) when the Input Adjust settings have changed (Section 5.2).

Input Aspect Ratio

This bit is set (1) when the Input Aspect Ratio has changed (Section 5.2).

Input Source

This bit is set (1) when the selected input has changed. For example when the user changes input from Component 1 to DVI.

7. Error Packet Examples

Sometimes the iScan HD 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
\x02	0	2	0	2	2	\x00	F	8	\x03

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
\x02	0	2	0	2	6	\x00	F	C	\x03

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

7. ASCII to Hex Conversion

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