DVDO iScan HD Discrete IR Codes

1. Description

IR remotes operate by modulating (turning on and off) an infra red (IR) light source. The rate at which this occurs is called the carrier frequency (f_c).

The "information" is placed on the "carrier" using Frequency Modulation. The iScan HD recognizes five different types of period lengths called bit periods:

- Absolute Command Start bit;
- Relative Command Start bit;
- Logic '1' bit;
- Logic '0' bit.
- Stop bit;

Every discrete code sequence begins with one start bit followed by a multiple of 8-bit data (bytes) and finally ends with a stop bit. The least significant bit (LSB) is always sent first. Two different type of start bits are defined in order to differentiate between an absolute value command and a relative value command. The length of each bit time period is defined as the time difference between two successive IR emitter 'ON' events.

The first data byte represents the command ID as a hexadecimal number (see iScan HD Command table in the next section). The last byte holds a checksum value which should be the same as the truncated result of all other bytes summed together. All other bytes between the first and last byte represent an 8-bit ASCII text string holding a command value (see iScanHD Command table for all value ranges).

Finally, a stop bit follows right after check-sum's MSB bit.

Data format:

Start Bit	8-bit Control ID	Value (8-bit ASCII string)	8-bit Check Sum	Stop Bit

iScanHD discrete IR Specification:

IR carrier frequency (f_c)	: 38.38 KHz	(CCF value: 006c)
Absolute Start pulse width S_{abs}	: 200 / f_c	(CCF values: 0064 0064)
Relative Start pulse width S_{rel}	: 266 / f_c	(CCF values: 0085 0085)
Logic '1' pulse width	: 87 / f_c	(CCF values: 0016 0041)
Logic '0' pulse width	: 43 / f_c	(CCF values: 0016 0015)
Stop pulse width	: 136 / f_c	(CCF values: 0044 0044)

2. iScan HD Command Table

The settings below are consistent with the iScan HD software version

HD-5.6-1.31

2.1 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

2.2 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

2.3 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] 23=[1280x960] 24=[1440x960] 25=[1440x1152] 26=[User]	1
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=YPbPr	1
6D	Frame Rate [50H]	R/W	0=UnIock 1=50Lock 2=75Lock	1
6E	Frame Rate [60Hz]	R/W	0=UnIock 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

2.4 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 2=Passthrough	1
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

2.5 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

2.6 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

3.0 CCF Command examples

A. Power-Off:

```
0000                # always start with zero
006c                # Carrier frequency (38.38 KHz)
001b                # Number of bursts
0000
0064 0064           #start bit
0016 0041 0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0015 0016 0041 # Command = A1
0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0041 0016 0015 0016 0015 # value = 0 (ASCII)
0016 0041 0016 0015 0016 0015 0016 0015 0016 0041 0016 0015 0016 0041 0016 0041 # Check-Sum = \xD1
0044 0044 0016 0001 # Stop bit
```

B. Power-On:

```
0000                # always start with zero
006c                # Carrier frequency (38.38 KHz)
001b                # Number of bursts
0000
0064 0064           #start bit
0016 0041 0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0015 0016 0041 # Command = A1
0016 0041 0016 0015 0016 0015 0016 0015 0016 0041 0016 0041 0016 0015 0016 0015 # value = 1 (ASCII)
0016 0015 0016 0041 0016 0015 0016 0015 0016 0041 0016 0015 0016 0041 0016 0041 # Check-Sum = D2
0044 0044 0016 0001 # Stop bit
```