

FEATURES

■ Video Decoder

- Supports NTSC, PAL and SECAM video input formats
- 2D NTSC and PAL comb-filter for Y/C separation of CVBS input
- Multiple CVBS and S-video inputs
- ACC, AGC, and DCGC (Digital Chroma Gain Control)

■ Analog Input

- Supports RGB input format from PC, camcorders and GPS
- Supports YCbCr inputs from conventional video source and HDTV
- Supports video input 480i, 480p, 576i, 576p, 720p, 1080i; 1080P; RGB input resolution in 640x480, 800x480, and 800x600, 1024x768, 1280x1024
- 3-channel low-power 10-bit ADCs integration for YCbCr and RGB
- Supports RGB composite sync input (CSYNC), SOY, SOG, HSYNC, and VSYNC
- On-chip clock synthesizer and PLL
- Auto-position adjustment, auto-phase adjustment, auto-gain adjustment, and auto-mode detection

■ Color Engine

- Brightness, contrast, saturation, and hue adjustment
- 9-tap programmable multi-purpose FIR (Finite Impulse Response) filter
- Differential 3-band peaking engine
- Luminance Transient Improvement (LTI)
- Chrominance Transient Improvement (CTI)
- Black Level Extension (BLE)
- White Level Extension (WLE)
- Favor Color Compensation (FCC)
- 3-channel gamma curve adjustment

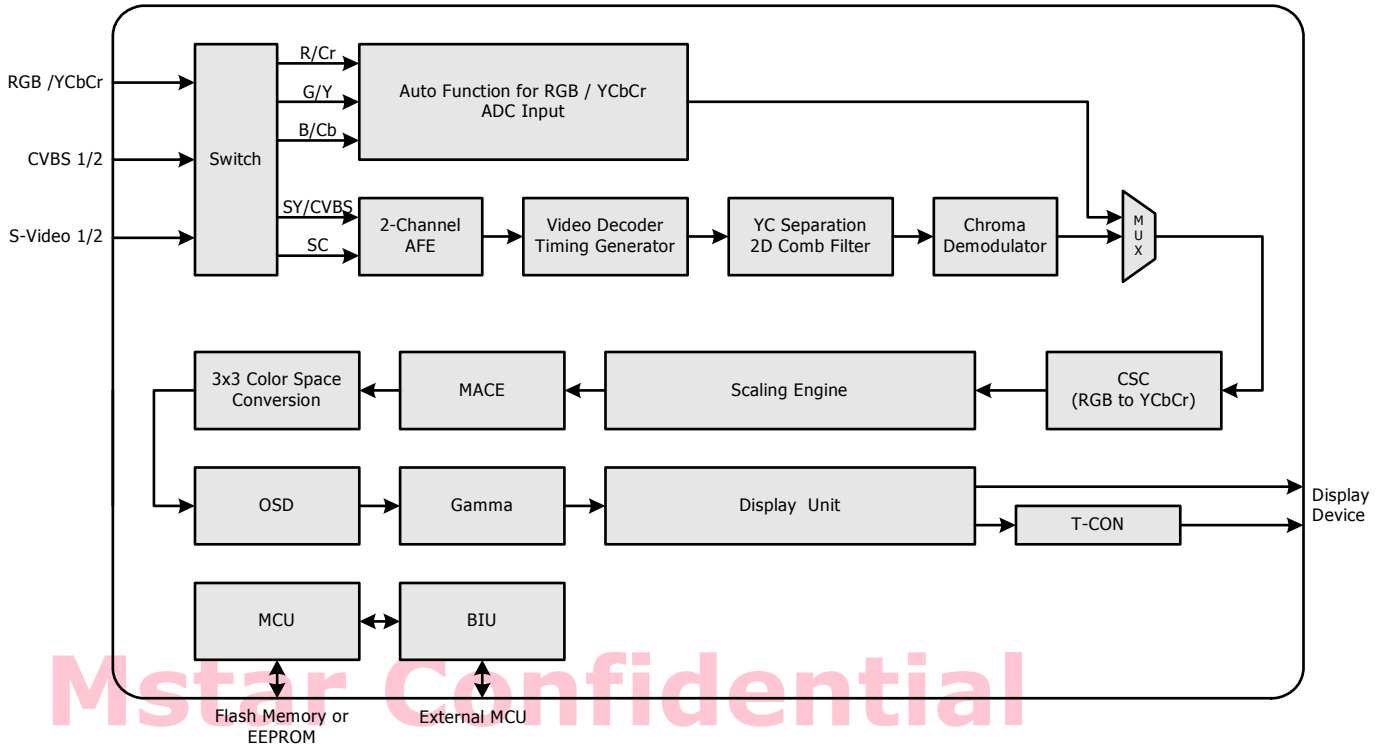
■ Scaling Engine/Panel Interface

- Supports TTL/TCON and analog TCON panel
- Supports single 8-bit TTL panel output
- Supports various displaying modes
- Supports horizontal panorama scaling

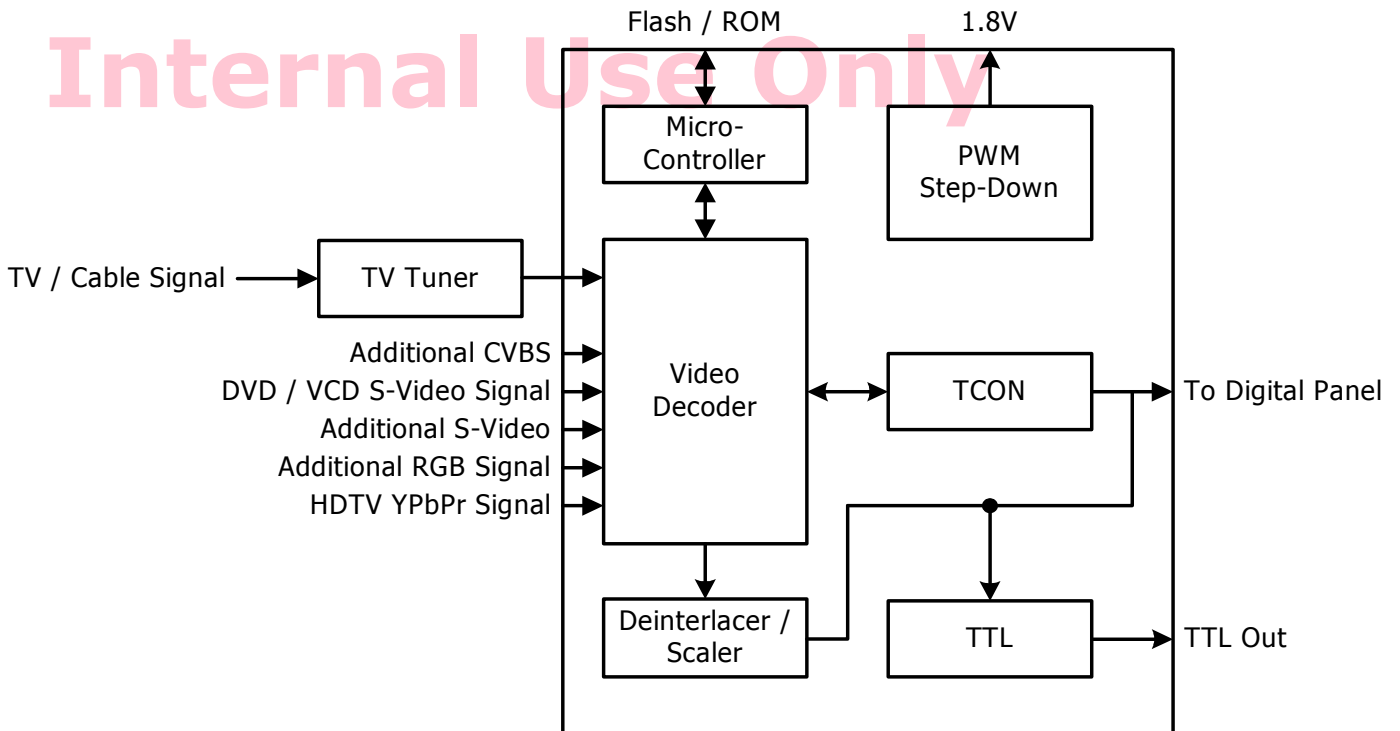
■ Miscellaneous

- Built-in MCU
- Supports CCIR656 digital input
- Built-in internal OSD with 256 programmable fonts, 16-color palettes, and 12-bit color resolution
- Spread spectrum clocks
- 3.3V output pads with programmable driving current
- 100-pin LQFP package

BLOCK DIAGRAM



SYSTEM APPLICATION DIAGRAM

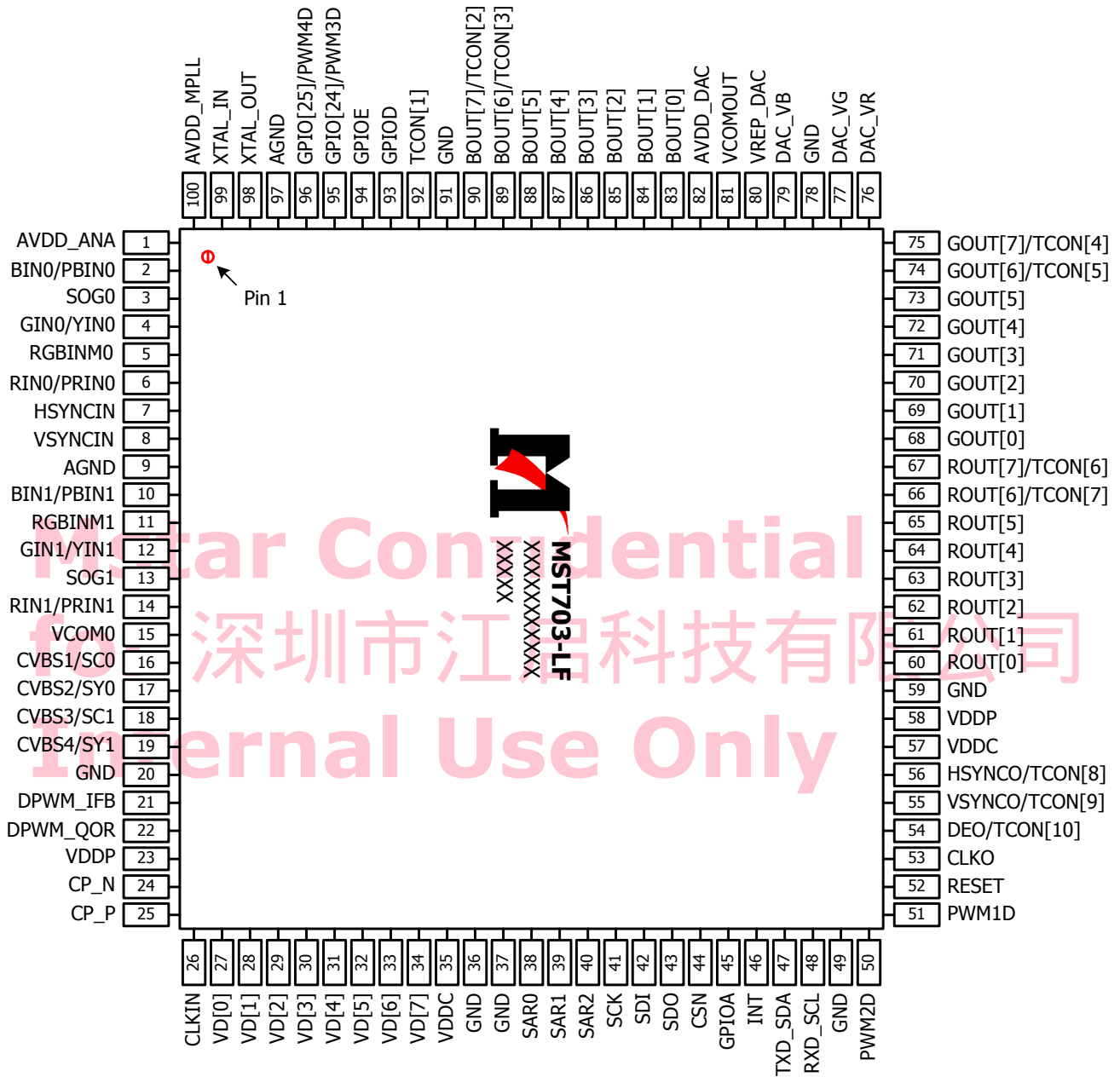


GENERAL DESCRIPTION

The MST703 is a high quality ASIC for NTSC/PAL/SECAM car TV application. It receives analog NTSC/PAL/SECAM CVBS and S-Video inputs from TV tuners, DVD or VCR sources, including weak and distorted signals, as well as analog YCbCr input from HDTV/SDTV systems. Automatic gain control (AGC) and 10-bit 3-channel A/D converters provide high resolution video quantization. With automatic video source and mode detection, users can easily switch and adjust variety of signal sources. Multiple internal adaptive PLLs precisely extract pixel clock from video source and perform sharp color demodulation. Built-in line-buffer supports adaptive 2-D comb-filter, 2-D sharpening, and synchronization stabler in a condense manner. The output format of MST703 supports 6-bit TTL/TCON digital TFT-LCD modules.

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only

PIN DIAGRAM (MST703)



PIN DESCRIPTION

Analog Panel Output Interface

Pin Name	Pin Type	Function	Pin
DAC_VR	Analog Output	Red Channel Output 3.0 Vp-p	76
DAC_VG	Analog Output	Green Channel Output 3.0 Vp-p	77
DAC_VB	Analog Output	Blue Channel Output 3.0 Vp-p	79
VREP_DAC	Analog Input	DAC Top Reference Voltage Decoupling Cap. 1uF to Ground	80
VCOMOUT	Analog Output	Pulse Output for Common Voltage.	81

Analog Interface

Pin Name	Pin Type	Function	Pin
BIN0/PBIN0	Analog Input	Analog Blue Input from Channel 0	2
SOG0	Analog Input	Sync On Green Signal Input from Channel 0	3
GIN0/YIN0	Analog Input	Analog Green Input from Channel 0	4
RGBINM0	Analog Input	Reference Ground for Analog Green Input from Channel 0	5
RIN0/PRIN0	Analog Input	Analog Red Input from Channel 0	6
HSYNCIN	Schmitt Trigger Input w/ 5V-tolerant	HSYNC / Composite Sync for VGA Input	7
VSYNCIN	Schmitt Trigger Input w/ 5V-tolerant	VSYNC for VGA Input	8
BIN1/PBIN1	Analog Input	Analog Blue Input from Channel 1	10
RGBINM1	Analog Input	Reference Ground for Analog Green Input from Channel 1	11
GIN1/YIN1	Analog Input	Analog Green Input from Channel 1	12
SOG1	Analog Input	Sync On Green Signal Input from Channel 1	13
RIN1/PRIN1	Analog Input	Analog Red Input from Channel 1	14
VCOM0	Analog Input	Common Analog Input Reference Ground 0	15
CVBS1/SC0	Analog Input	CVBS0 or S-Video (Y/C) Input Channel 0	16
CVBS2/SY0	Analog Input	CVBS1 or S-Video (Y/C) Input Channel 0	17
CVBS3/SC1	Analog Input	CVBS2 or S-Video (Y/C) Input Channel 1	18
CVBS4/SY1	Analog Input	CVBS3 or S-Video (Y/C) Input Channel 1	19

Switching Power and PWM Interface

Pin Name	Pin Type	Function	Pin
CP_N	Output	Charge Pump Negative Pulse for DC-DC Positive Voltage Converter	24
CP_P	Output	Charge Pump Positive Pulse for DC-DC Positive Voltage Converter	25

Internal MCU Interface with Serial Flash Memory

Pin Name	Pin Type	Function	Pin
SAR2	Analog Input	SAR Low Speed ADC Input 2	40
SAR1	Analog Input	SAR Low Speed ADC Input 1	39
SAR0	Analog Input	SAR Low Speed ADC Input 0	38
SCK	Output	SPI Interface Sampling Clock	41
SDI	Output	SPI Interface Data-In	42
SDO	Input w/ 5V-tolerant	SPI Interface Data-Out	43
CSN	Output	SPI Interface Chip Select	44
INT	Input	Interrupt Input for IR Receiver	46
TXD_SDA	I/O w/ 5V-tolerant, w/ pull-up resistor	Serial Bus Data	47
RXD_SCL	Input w/ 5V-tolerant	Serial Bus Clock	48
PWM2D	Output	Pulse Width Modulation Output; 4mA driving strength	50
PWM1D	Output	Pulse Width Modulation Output; 4mA driving strength	51
GPIO[25]/PWM4D	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	96
GPIO[24]/PWM3D	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	95

Digital Panel Output Interface

Pin Name	Pin Type	Function	Pin
CLKO	Output	Display Clock Output	53
DEO/TCON[10]	Output	Display Enable Output	54
VSYNCO/TCON[9]	Output	Vertical Sync Output / TCON Output[9]	55
HSYNCO/TCON[8]	Output	Horizontal Sync Output / TCON Output[8]	56

Pin Name	Pin Type	Function	Pin
ROUT[7]/TCON[6]	Output	Red channel Output [7] / TCON Output[6]	67
ROUT[6]/TCON[7]	Output	Red channel Output [6] / TCON Output[7]	66
ROUT[5]	Output	Red channel Output [5]	65
ROUT[4]	Output	Red channel Output [4]	64
ROUT[3]	Output	Red channel Output [3]	63
ROUT[2]	Output	Red channel Output [2]	62
ROUT[1]	Output	Red channel Output [1]	61
ROUT[0]	Output	Red channel Output [0]	60
GOUT[7]/TCON[4]	Output	Green channel Output [7] / TCON Output[4]	75
GOUT[6]/TCON[5]	Output	Green channel Output [6] / TCON Output[5]	74
GOUT[5:4]	Output	Green channel Output [5:4]	73, 72
GOUT[3]	Output	Green channel Output [3]	71
GOUT[2]	Output	Green channel Output [2]	70
GOUT[1]	Output	Green channel Output [1]	69
GOUT[0]	Output	Green channel Output [0]	68
BOUT[7]/TCON[2]	Output	Blue channel Output [7] / TCON Output[2]	90
BOUT[6]/TCON[3]	Output	Blue channel Output [6] / TCON Output[3]	89
BOUT[5:0]	Output	Blue channel Output [5:0]	88-83
TCON[0]	Output	TCON Output[1]	92

Digital Video Input Interface

Pin Name	Pin Type	Function	Pin
CLKIN	Input w/5V-tolerant	Sample Clock ITU656 Video Input	26
VD[7:0]	Input w/5V-tolerant	ITU656 Video Data bus	34-27

Switching Power and PWM Interface

Pin Name	Pin Type	Function	Pin
CP_N	Output	Charge Pump Negative Pulse for DC-DC Positive Voltage Converter	24
CP_P	Output	Charge Pump Positive Pulse for DC-DC Positive Voltage Converter	25

GPIO Interface

Pin Name	Pin Type	Function	Pin
GPIOA	I/O w/ 5V-tolerant	General Purpose Input Output; 4mA driving strength	45
GPIOD	I/O w/ 5V-tolerant	General Purpose Input Output; 4mA driving strength	93
GPIOE	I/O w/ 5V-tolerant	General Purpose Input Output; 4mA driving strength	94

Digital PWM Interface

Pin Name	Pin Type	Function	Pin
DPWM_IFB	Analog Input	Input for DPWM Feedback Loop	21
DPWM_QOR	Output	DPWM Output	22

Misc. Interface

Pin Name	Pin Type	Function	Pin
RESET	Schmitt Trigger Input w/ 5V-tolerant	Hardware Reset; active high	52
XTAL_IN	Analog Input	Crystal Oscillator Input	99
XTAL_OUT	Analog Output	Crystal Oscillator Output	98

Power Pins

Pin Name	Pin Type	Function	Pin
AVDD_ANA	3.3V Power	Analog ADC Power	1
AVDD_DAC	3.3V Power	Voltage DAC Power	82
AVDD_MPLL	3.3V Power	MPLL Power	100
VDDC	1.2V Power	Digital Core Power	35, 57
VDDP	3.3V Power	Digital Input/Output Power	23, 58
AGND	Ground	Analog Ground	9, 97
GND	Ground	Ground	20, 36, 37, 49, 59, 78, 91

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

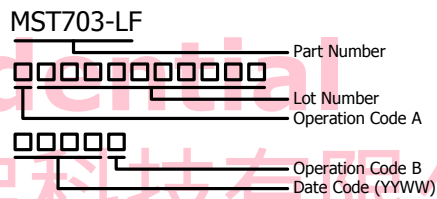
Parameter	Symbol	Min	Max	Units
3.3V Supply Voltages	V_{VDD_33}		3.63	V
1.2V Supply Voltages	V_{VDD_12}		1.32	V
Input Voltage (5V tolerant inputs)	$V_{IN5Vtol}$		5.0	V
Input Voltage (non 5V tolerant inputs)	V_{IN}		V_{VDD_33}	V
Ambient Operating Temperature	T_A	0	70	°C
Storage Temperature	T_{STG}	-40	125	°C
Junction Temperature	T_J		125	°C

Note: Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and does not imply functional operation of the device. Exposure to absolute maximum ratings for extended periods may affect device reliability.

ORDERING GUIDE

Part Number	Temperature Range	Package Description	Package Option
MST703-LF	0°C to +70°C	LQFP	100

MARKING INFORMATION



DISCLAIMER

MSTAR SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. NO RESPONSIBILITY IS ASSUMED BY MSTAR SEMICONDUCTOR ARISING OUT OF THE APPLICATION OR USER OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

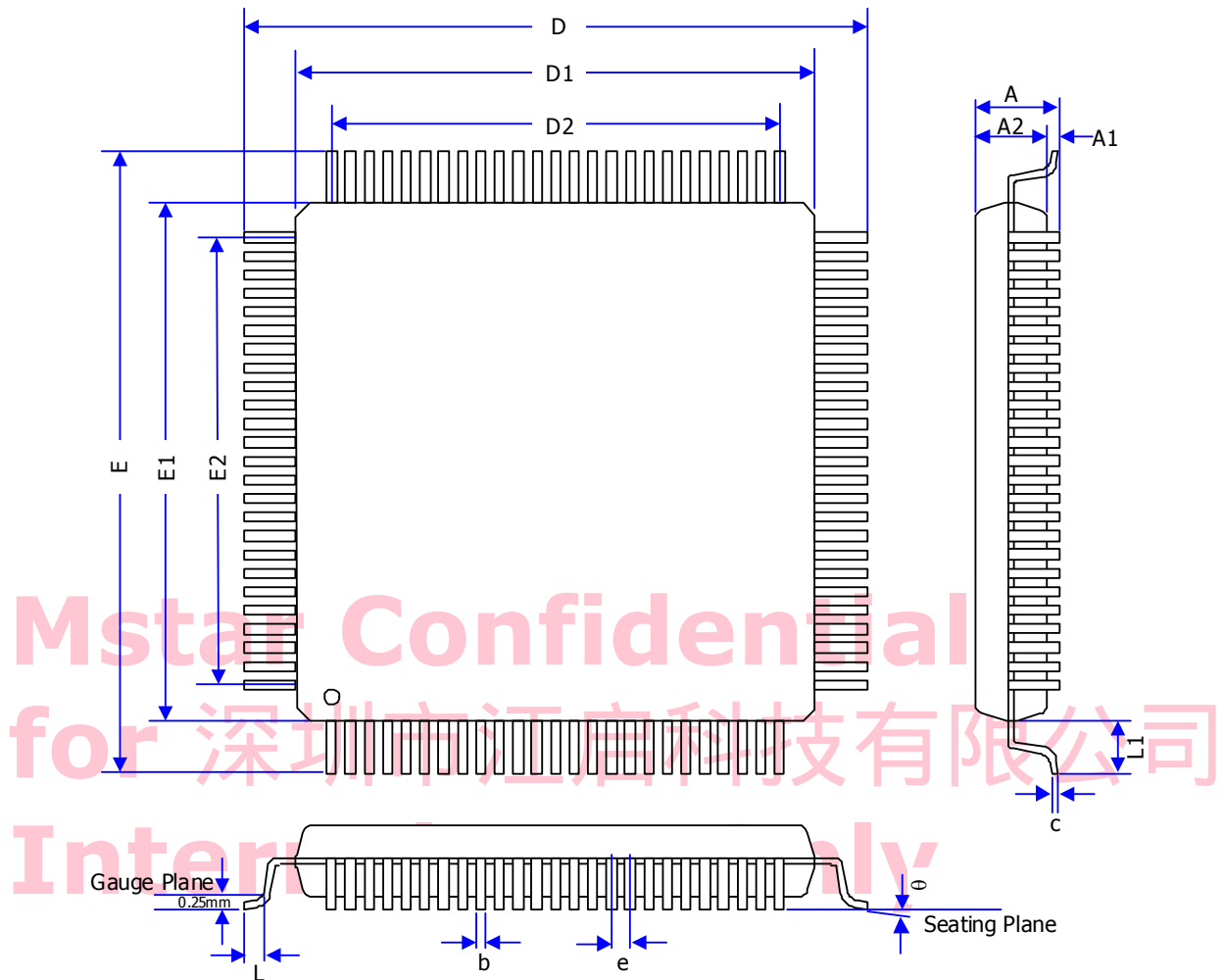


Electrostatic charges accumulate on both test equipment and human body and can discharge without detection. MST703 comes with ESD protection circuitry; however, the device may be permanently damaged when subjected to high energy discharges. The device should be handled with proper ESD precautions to prevent malfunction and performance degradation.

REVISION HISTORY

Document	Description	Date
MST703_ds_v01	• Initial release	Nov 2010

MECHANICAL DIMENSIONS



Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.60	-	-	0.063
A1	0.05	-	0.15	0.002	-	0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
D	16.00 BSC.			0.630 BSC.		
D1	14.00 BSC.			0.551 BSC.		
D2	12.00			0.472		
E	16.00 BSC.			0.630 BSC.		
E1	14.00 BSC.			0.551 BSC.		
E2	12.00			0.472		

Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
θ	0°	3.5°	7°	0°	3.5°	7°
b	0.17	0.20	0.27	0.007	0.008	0.011
c	0.09	-	0.20	0.004	-	0.008
e	0.50 BSC.			0.020 BSC.		
L	0.45	0.60	0.75	0.018	0.024	0.030
L1	1.00 Ref			0.039 Ref		

REGISTER DESCRIPTION

General Control Register

General Control Register			
Index	Name	Bits	Description
00h	REGBK	7:0	Default : 0x00 Access : R/W
	XTAL_OK (RO)	7	Crystal ready.
	MCU_SEL (RO)	6	0: Embedded MCU. 1: External serial bus interface.
	-	5:4	Reserved.
	AINC	3	Serial bus address auto Increase. 0: Enable. 1: Disable.
	-	2	Reserved.
	REGBK[1:0]	1:0	Register Bank Select. 00: Register of scaler. 01: Register of ADC/ACE/MCU. 10: Register of Video Decoder Front End (VFE). 11: Register of Video Decoder 2D Comb Filter (VCF).
REGBK[2:0]	2:0	Register Bank Select. 000: Register of scaler. 001: Register of ADC/ACE/MCU. 010: Register of Video Decoder Front End (VFE). 011: Register of Video Decoder 2D Comb Filter (VCF). 100: Register of LVDS/DPWM.	
01h ~	-	7:0	Default : - Access : -
FFh	-	7:0	Reserved.

Scaler Register (Bank = 00, Registers 01h ~ 9Fh)

Scaler Register (Bank=00, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
01h	DBFC	7:0	Default : 0x80	Access : R/W
	-	7:3	Reserved.	
	DBL[1:0]	2:1	Double Buffer Load. 00: Keep old register value. 01: Load new data (auto reset to 00 when load finish). 10: Automatically load data at VSYNC blanking. 11: Reserved.	
	DB_EN	0	Double Buffer Enable. 0: Disable. 1: Enable.	
02h	ISELECT	7:0	Default : 0x00	Access : R/W
	NIS	7	No Input Source. 0: Input source active. 1: Input source inactive, output is free-run.	
	STYPE[1:0]	6:5	Input Sync Type. 00: Auto detected. 01: Input is separated HSYNC and VSYNC. 10: Input is Composite sync. 11: Input is sync-on-green (SOG).	
	COMP	4	CSYNC/SOG select (only useful when STYPE = 00). 0: CSYNC. 1: SOG.	
	ICS	3	Input Color Space. 0: RGB. 1: YCbCr.	
	IHSU	2	Input Sync Usage. When EXTVD=0: 0: Use HSYNC to perform mode detection, HSOUT from ADC to sample pixel. 1: Use HSYNC only. When EXTVD=1: 0: Normal. 1: Output black at blanking.	
	BYPASSMD	1	By-Pass Mode for interlace-input-interlace-output.	
	EXTVD	0	0: Select analog input (CVBS/S-Video/RGB/YCbCr). 1: Select digital input (CCIR656).	
03h	IPCTRL2	7:0	Default : 0x18	Access : R/W

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	VDS_EN	7	Input data double sample In CCIR input mode, 0: for horizontal output resolution less than 720 pixels. 1: for horizontal output resolution more than 720 pixels. In analog input mode, 0: half sample of input data. 1: original sample of input data.
	VDS_MTHD	6	Input data double sample Method. 0: Using average. 1: Using advance GT filter.
	IVDS	5	Input VSYNC Delay Select. 0: Delay 1/4 input HSYNC (recommended). 1: No delay.
	HES	4	Input HSYNC reference Edge Select. 0: From HSYNC leading edge, default value. 1: From HSYNC tailing edge.
	VES	3	Input VSYNC reference Edge Select. 0: From VSYNC leading edge, default value. 1: From VSYNC tailing edge.
	ESLS	2	Early Sample Line Select. 0: 8 lines. 1: 16 lines.
	VWRP	1	Input image Vertical Wrap. 0: Disable. 1: Enable.
	HWRP	0	Input image Horizontal Wrap. 0: Disable. 1: Enable.
04h	ISCTRL	7:0	Default : 0x10 Access : R/W
	DDE	7	Direct DE mode for CCIR input. 0: Disable direct DE. 1: Enable direct DE.
	DEGR[2:0]	6:4	DE or HSYNC post Glitch removal Range.
	HSFL	3	Input HSYNC Filter. 0: Filter off. 1: Filter on.

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	ISSM	2	Input Sync Sample Mode. 0: Normal. 1: Glitch-removal.
	MVD_SEL	1:0	MVD mode Select 0: CVBS. 1: S-Video. 2: YCbCr. 3: RGB.
05h	SPRVST_L	7:0	Default : 0x10 Access : R/W, DB
	SPRVST[7:0]	7:0	Image vertical sample start point, count by input HSYNC (lower 8 bits).
06h	SPRVST_H	7:0	Default : 0x00 Access : R/W, DB
	-	7:3	Reserved.
	SPRVST[10:8]	2:0	Image vertical sample start point, count by input HSYNC (higher 3 bits).
07h	SPRHST_L	7:0	Default : 0x01 Access : R/W, DB
	SPRHST[7:0]	7:0	Image horizontal sample start point, count by input dot clock (higher 8 bits).
08h	SPRHST_H	7:0	Default : 0x00 Access : R/W, DB
	-	7:3	Reserved.
	SPRGST[10:8]	2:0	Image horizontal sample start point, count by input dot clock (lower 3 bits).
09h	SPRVDC_L	7:0	Default : 0x10 Access : R/W, DB
	SPRVDC[7:0]	7:0	Image vertical resolution (vertical display enable area count by line; lower 8 bits).
0Ah	SPRVDC_H	7:0	Default: 0x00 Access : R/W
	-	7:3	Reserved.
	SPRVDC[10:8]	2:0	Image vertical resolution (vertical display enable area count by line; higher 3 bits).
0Bh	SPRHDC_L	7:0	Default : 0x10 Access : R/W
	SPRHDC[7:0]	7:0	Image horizontal resolution (horizontal display enable area count by pixel; lower 8 bits).
0Ch	SPRHDC_L	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	SPRHDC[10:8]	2:0	Image horizontal resolution (horizontal display enable area count by pixel; higher 3 bits).

Scaler Register (Bank=00, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
0Dh	LYL	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	LYL[3:0]	3:0	Lock Y Line.	
0Eh	INTLX	7:0	Default : 0x00	Access : -
	ITU_EXT_FIELD	7	Using External FIELD for ITU interface. 0: Using EAV/SAV. 1: Using external FIELD.	
	ITU_EXT_HS	6	Using External HSYNC for ITU interface. 0: Using EAV/SAV. 1: Using external HSYNC.	
	ITU_EXT_VS	5	Using External VSYNC for ITU interface. 0: Using EAV/SAV. 1: Using external VSYNC.	
	VDOE	4	Video reference Edge (for non-standard signal).	
	INTLAC_LOCKAVG	3	Averaging Locking timing.	
	LHC_MD	2	Long Horizontal Counter Mode. 1: On. 0: Off.	
	-	1:0	Reserved.	
0Fh	ASCTRL	7:0	Default : 0x90	Access : R/W
	IVB (RO)	7	Input VSYNC Blanking status. 0: In display. 1: In blanking.	
	DLINE[2:0]	6:4	Line buffer read delay in number of lines.	
	INTLAC_MANSTD	3	NTSC/PAL Manual Mode	
	INTLAC_SETSTD	2	NTSC/PAL Setting in manual mode under run status. 0: NTSC. 1: PAL.	
	UNDER (RO)	1	Under run status.	
	OVER (RO)	0	Over run status.	
10h	COCTRL1	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	AVI_SEL	5	Analog Video Input Select. 0: PC. 1: Component analog video.	

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	DLYV	4	Analog Delay line for component analog Video input. 0: Delay 1 line. 1: Do not delay.
	CSC_MD	3	Composite SYNC Cut Mode. 0: Disable. 1: Enable.
	EXVS	2	External VSYNC polarity (only used when COVS is 1). 0: Normal. 1: Invert.
	COV_SEL	1	Coast VSYNC Select. 0: Internal VSEP. 1: External VSYNC.
	CADC	0	Coast to ADC. 0: Disable. 1: Enable.
11h	COCTRL2	7:0	Default : 0x00 Access : R/W
	COST[7:0]	7:0	Front tuning. 00: Coast start from 1 HSYNC leading edge. 01: Coast start from 2 HSYNC leading edge, default value. ... 254: Coast start from 255 HSYNC leading edge. 255: Coast start from 256 HSYNC leading edge.
12h	COCTRL3	7:0	Default : 0x00 Access : R/W
	COEND[7:0]	7:0	End tuning. 00: Coast end at 1 HSYNC leading edge. 01: Coast end at 2 HSYNC leading edge, default value. ... 254: Coast end at 255 HSYNC leading edge. 255: Coast end at 256 HSYNC leading edge.
13h	VFAC_OINI	7:0	Default: 0x00 Access : R/W
	VFACOINI[7:0]	7:0	Vertical Factor Odd Initial value.
14h	VFAC_EINI	7:0	Default: 0x80 Access : R/W
	VFACEINI[7:0]	7:0	Vertical Factor Even Initial value
15h	-	7:0	Default : - Access : -
	-	7:0	Reserved.
16h	INTCTROL	7:0	Default : 0x00 Access : R/W

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	CHG_HMD	7	Change H Mode for INT. 0: Only in leading/tailing of CHG period. 1: Every line generating INT pulse during CHG period.
	-	6:4	Reserved.
	IVSI	3	Input VSYNC interrupt generated by: 0: Leading edge. 1: Tailing edge.
	OVSI	2	Output VSYNC interrupt generated by: 0: Leading edge. 1: Tailing edge.
	TRGC	1	Trigger Condition. 0: Active low for level trigger/tailing edge trigger. 1: Active high for level trigger/leading edge trigger.
	INT_TRIG	0	Interrupt Trigger. 0: Generate an edge trigger interrupt. 1: Generate a level trigger interrupt.
17h	INTPULSE	7:0	Default : 0x0F Access : R/W
	INTPULSE[7:0]	7:0	Interrupt Pulse width by reference clock.
18h	INTSTA	7:0	Default : 0x00 Access : R/W
	INTSTA[7:0]	7:0	Interrupt Status byte A. Bit 7: MVD input NOT "no signal". Bit 6: MVD "HSYNC lock". Bit 5: MVD NOT "no color". Bit 4: MVD degree error. Bit 3: MVD input "no signal". Bit 2: MVD NOT "HSYNC lock". Bit 1: MVD "no color". Bit 0: MVD HSYNC change.
19h	INTENA	7:0	Default : 0x00 Access : R/W
	INTENA[7:0]	7:0	Interrupt Enable control byte A. 0: Disable interrupt. 1: Enable interrupt.
1Ah	INTSTB	7:0	Default : 0x00 Access : R/W

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	INTSTB[7:0]	7:0	Interrupt Status byte B. Bit 7: MCU D2B interrupt 2. Bit 6: MCU D2B interrupt 1. Bit 5: MCU D2B interrupt 0. Bit 4: MVD CC interrupt. Bit 3: MVD SECAM detect. Bit 2: MVD PAL switch error. Bit 1: MVD "ADC7_0ACT". Bit 0: MVD NOT "ADC7_0ACT".
1Bh	INTENB	7:0	Default : 0x00 Access : R/C
	INTENB[7:0]	7:0	Interrupt Enable control byte B. 0: Disable interrupt. 1: Enable interrupt.
1Ch	INTSTC	7:0	Default : 0x00 Access : R/W
	INTSTC[7:0]	7:0	Interrupt Status byte C. Bit 7: Output VSYNC interrupt. Bit 6: Input VSYNC interrupt. Bit 5: ATG ready interrupt. Bit 4: ATP ready interrupt. Bit 3: ATS ready interrupt. Bit 2: MVD probe ready interrupt. Bit 1: MCU D2B interrupt 4. Bit 0: MCU D2B interrupt 3.
1Dh	INTENC	7:0	Default : 0x00 Access : R/C
	INTENC[7:0]	7:0	Interrupt Enable control byte C. 0: Disable interrupt. 1: Enable interrupt.
1Eh	INTSTD	7:0	Default : 0x00 Access : R/W
	INTSTD[7:0]	7:0	Interrupt Status byte D. Bit 7: WDT interrupt. Bit 6: Keypad wake-up interrupt. Bit 5: Jitter interrupt. Bit 4: Horizontal total change interrupt. Bit 3: Vertical total change interrupt. Bit 2: Horizontal lost count interrupt. Bit 1: Vertical lost count interrupt. Bit 0: Standard change interrupt.
1Fh	INTEND	7:0	Default : 0x00 Access : R/C

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	INTEND[7:0]	7:0	Interrupt Enable control byte D. 0: Disable interrupt. 1: Enable interrupt.
20h ~ 21h	-	7:0	Default : - Access : -
	-	7:0	Reserved.
22h	MPL_M	7:0	Default : 0x6F Access : R/W
	MP_ICTRL[2:0]	7:5	Charge pump current set.
	MPL_M[4:0]	4:0	MPLL divider ratio setting.
23h	OPL_CTLO	7:0	Default : 0x40 Access : R/W
	-	7:6	Reserved.
	SSC_EN	6	Output PLL spread spectrum. 0: Disable. 1: Enable.
	SD_MD	5	Output PLL spread spectrum Mode. 0: Normal. 1: Reverse for mode 1.
	-	4:0	Reserved.
24h	-	7:0	Default : - Access : -
	-	7:0	Reserved.
25h	OPL_SET0	7:0	Default : 0x44 Access : R/W, DB
	OPL_SET[7:0]	7:0	Output PLL Set.
26h	OPL_SET1	7:0	Default : 0x55 Access : R/W, DB
	OPL_SET[15:8]	7:0	See description for OPL_SET [7:0].
27h	OPL_SET2	7:0	Default : 0x24 Access : R/W, DB
	OPL_SET [23:16]	7:0	See description for OPL_SET [7:0].
28h	OPL_STEP0	7:0	Default : 0x20 Access : R/W, DB
	OPL_STEP[7:0]	7:0	Output PLL spread spectrum Step.
29h	OPL_STEP1	7:0	Default : 0x00 Access : R/W, DB
	-	7	Reserved.
	-	6	Reserved.
	-	5	Reserved.
	-	4:3	Reserved.
	OPL_STEP[10:8]	2:0	See description for OPL_STEP[7:0].
2Ah	OPL_SPAN	7:0	Default : 0x00 Access : R/W, DB
	OPL_SPAN[7:0]	7:0	Output PLL spread spectrum Span.

Scaler Register (Bank=00, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
2Bh	OPL_SPAN	7:0	Default : 0x00	Access : R/W, DB
	READ_FRAME	7	0: OPL_SET stores line-based value. 1: OPL_SET stores frame-based value.	
	OPL_SPAN[14:8]	6:0	See description for OPL_SPAN[7:0].	
2Ch ~ 2Fh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
30h	HSR_L	7:0	Default : 0x00	Access : R/W
	HSR [7:0]	7:0	Horizontal Scaling ratio (20 bits fraction) for scaling down $1/2^{20}$ to $(2^{20}-1)/2^{20}$ (lower 8 bits).	
31h	HSR_M	7:0	Default : 0x00	Access : R/W
	HSR[15:8]	7:0	Horizontal Scaling ratio (20 bits fraction) for scaling down $1/2^{20}$ to $(2^{20}-1)/2^{20}$ (middle 8 bits).	
32h	HSR_H	7:0	Default : 0x00	Access : R/W
	HS_EN	7	Horizontal Scaling Enable. 0: Disable. 1: Enable.	
	CBILINEAR_EN	6	Complemental Bi-Linear Enable.	
	FORCEBICOLOR	5	0: Chrominance using same setting as Luminance defined by CBILINEAR. 1: Chrominance always using bi-linear algorithm.	
	-	4	Reserved.	
	HSR[19:16]	3:0	Horizontal Scaling Ratio (20 bits fraction) for scaling down $1/2^{20}$ to $(2^{20}-1)/2^{20}$ (higher 8 bits).	
33h	VSR_L	7:0	Default : 0x00	Access : R/W
	VSR[7:0]	7:0	Vertical Scaling ratio (2 bits integer, 20 bits fraction) for scaling down to $1/2.9999$ (lower 8 bits). xx.xxxxxxxxxxxxxxxxxxxxxx	
34h	VSR_M	7:0	Default : 0x00	Access : R/W
	VSR[15:8]	7:0	Vertical Scaling ratio (2 bits integer, 20 bits fraction) for scaling down to $1/2.9999$ (middle 8 bits). xx.xxxxxxxxxxxxxxxxxxxxxx	
35h	VSR_H	7:0	Default : 0x00	Access : R/W
	VS_EN	7	Vertical Scaling Enable. 0: Disable. 1: Enable.	

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	VSM_SEL	6	Vertical Scaling Method Select. 0: Original. 1: New.
	VSR[21:16]	5:0	Vertical Scaling ratio (2 bits integer, 20 bits fraction) for scaling down to 1/2.9999 (higher 8 bits). xx.xxxxxxxxxxxxxxxxxxxxx
36h	VDSUSG	7:0	Default: 0x00 Access : R/W
	LBF_INCLK	7	Line-Buffer using Input Clock.
	LBF_OUTCLK	6	Line-Buffer using Output Clock.
	LBF_LIVE	5	Line-Buffer always Live.
	OUTCLK_DIV3	4	Output Clock is 1/3 frequency of OPLL output.
	EN_OFST	3	Enable Offset for even/odd scaling.
	OFST_INV	2	Offset Inverting for even/odd scaling.
	LBFCLK_DIV2	1	Line-Buffer Clock frequency is divided by 2.
	VSD_DITH_EN	0	VSD Dither Enable.
37h	DIRSCAL_CTL	7:0	Default: 0x00 Access : R/W
	-	7:3	Reserved.
	GOAL2_SEL	2	Goal2 Select.
	DITH_ON	1	Dithering control. 0: Off. 1: On.
	DIRSCAL_EN	0	Function Enable.
38h	NLDTI	7:0	Default : 0x00 Access : R/W
	NL_EN	7	Non-Linear scaling Enable.
	NLSIO[6:0]	6:0	Non-Linear Scaling section Initial Offset.
39h	NLDT0	7:0	Default : 0x00 Access : R/W
	NLIOS	7	Non-Linear scaling section Initial Offset Sign. 0: Positive value. 1: Negative value.
	NLDT0[6:0]	6:0	Non-Linear Scaling Delta for Section 0, bit 7 is sign bit.
3Ah	NLDT1	7:0	Default : 0x00 Access : R/W
	-	7	Reserved
	NLDT1[6:0]	6:0	Non-Linear scaling Delta for Section 1, bit 7 is sign bit.
3Bh	NLDC0	7:0	Default : 0x00 Access : R/W
	NLDC0[7:0]	7:0	Non-Linear scaling section 0 Dot Count/2.

Scaler Register (Bank=00, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
3Ch	NLDC1	7:0	Default : 0x00	Access : R/W
	NLDC1[7:0]	7:0	Non-Linear scaling section 1 Dot Count/2.	
3Dh	NLDC2	7:0	Default : 0x00	Access : R/W
	NLDC2[7:0]	7:0	Non-Linear scaling section 2 Dot Count/2.	
3Eh	DIRSCAL_TH1	7:0	Default: 0x80	Access : R/W
	DETH[7:0]	7:0	Threshold of maximum value for detection	
3Fh	DIRSCAL_TH2	7:0	Default: 0x80	Access : R/W
	PCTTH[7:0]	7:0	Threshold of maximum value for protection	
40h	VFDEST_L	7:0	Default : 0x01	Access : R/W
	VFDEST[7:0]	7:0	Output frame DE Vertical Start (lower 8 bits).	
41h	DEVST_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	VFDEST[10:8]	2:0	Output frame DE Vertical Start (higher 3 bits).	
42h	HFDEST_L	7:0	Default : 0x03	Access : R/W
	HFDEST[7:0]	7:0	Output frame DE Horizontal Start (lower 8 bits).	
43h	HFDEST_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	HFDEST[10:8]	2:0	Output frame DE Horizontal Start (higher 3 bits).	
44h	VFDEEND_L	7:0	Default : 0xEA	Access : R/W
	VFDEEND[7:0]	7:0	Output frame DE Vertical END (lower 8 bits).	
45h	VFDEEND_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	DEVEND[10:8]	2:0	Output frame DE Vertical END (higher 3 bits).	
46h	HFDEEND_L	7:0	Default : 0xE0	Access : R/W
	HFDEEND[7:0]	7:0	Output frame DE Horizontal END (lower 8 bits).	
47h	HFDEEND_H	7:0	Default : 0x01	Access : R/W
	-	7:3	Reserved.	
	HFDEEND[10:8]	2:0	Output frame DE Horizontal END (higher 3 bits).	
48h	SIHST_L	7:0	Default : 0x01	Access : R/W
	SIHST[7:0]	7:0	Scaling Image window Horizontal Start (lower 8 bits).	
49h	SIHST_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	SIHST[10:8]	2:0	Scaling Image window Horizontal Start (higher 3 bits).	

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
4Ah	SIVEND_L	7:0	Default : 0xEA Access : R/W
	SIVEND[7:0]	7:0	Scaling Image window Vertical END (lower 8 bits).
4Bh	SIVEND_H	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	SIVEND[10:8]	2:0	Scaling Image window Vertical END (higher 3 bits).
4Ch	SIHEND_L	7:0	Default : 0xEA Access : R/W
	SIHEND[7:0]	7:0	Scaling Image window Horizontal END (lower 8 bits).
4Dh	SIHEND_H	7:0	Default : 0x01 Access : R/W
	-	7:3	Reserved.
	SIHEND[10:8]	2:0	Scaling Image window Horizontal END (higher 3 bits).
4Eh	VDTOT_L	7:0	Default : 0x00 Access : R/W
	VDTOT[7:0]	7:0	Output Vertical Total (lower 8 bits).
4Fh	VDTOT_H	7:0	Default : 0x02 Access : R/W
	-	7:3	Reserved.
	VDTOT[10:8]	2:0	Output Vertical Total (higher 3 bits).
50h	VSST_L	7:0	Default : 0xEA Access : R/W
	VSST[7:0]	7:0	Output VSYNC start (lower 8 bits).
51h	VSST_H	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	VSRU	3	VSYNC Register Usage. 0: Registers 20h – 23h are used to define output VSYNC. 1: Registers 20h and 21h are used to define No signal VSYNC. Registers 22h and 23h are used to define minimum H total.
	VSST[10:8]	2:0	Output VSYNC start (higher 3 bits).
52h	VSEND_L	7:0	Default : 0x06 Access : R/W
	VSEND[7:0]	7:0	Output VSYNC END (lower 8 bits).
53h	VSEND_H	7:0	Default : 0x00 Access : R/W DB
	-	7:3	Reserved.
	VSEND[10:8]	2:0	Output VSYNC END (higher 3 bits).
54h	HDTOT_L	7:0	Default : 0x3C Access : R/W DB
	HDTOT[7:0]	7:0	Output Horizontal Total (lower 8 bits).
55h	HDTOT_H	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	HDTOT[10:8]	2:0	Output Horizontal Total (higher 3 bits).

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
56h	HSEND	7:0	Default : 0x00 Access : R/W
	HSEND[7:0]	7:0	Output HSYNC END (lower 8 bits).
57h	OSCTRL1	7:0	Default : 0x4C Access : R/W
	AOVS	7	Auto Output VSYNC. 0: OVSYNC is defined automatically. 1: OVSYNC is defined manually (register 0x50 – 0x53).
	LCM	6	Frame Lock Mode. 0: Mode 0. 1: Mode 1.
	HRSM	5	HSYNC Remove Mode. 0: Normal. 1: Remove HSYNC.
	-	4:3	Reserved.
	Scal_1	2	Scaling range add 1.
	AHRT	1	Auto H total and Read start Tuning enable. 0: Disable. 1: Enable.
	CTRL	0	ATCTRL function enable. 0: Disable. 1: Enable.
58h	BRIGHTNESS_EN	7:0	Default : 0x00 Access : R/W
	-	7:1	Reserved.
	BRI_EN	0	Brightness function Enable. 0: Disable. 1: Enable.
59h	BRI_R	7:0	Default : 0x80 Access : R/W
	BRI_R[7:0]	7:0	Brightness coefficient–Red color.
5Ah	BRI_G	7:0	Default : 0x80 Access : R/W
	BRI_G[7:0]	7:0	Brightness coefficient–Green color.
5Bh	BRI_B	7:0	Default : 0x80 Access : R/W
	BRI_B[7:0]	7:0	Brightness coefficient–Blue color.
5Ch	FRAME_COLOR_1	7:0	Default : 0x00 Access : R/W
	FCG[4:3]	7:6	Frame Color G[4:3].
	FCB[7:3]	5:1	Frame Color B[7:3].

Scaler Register (Bank=00, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
	FC_EN	0	Frame Color Enable. 0: Diable. 1: Enable.
5Dh	FRAME_COLOR_2	7:0	Default : 0x00 Access : R/W
	FCR[7:3]	7:3	Frame Color R[7:3].
	FCG[7:5]	2:0	Frame Color G[7:5].
5Eh	PATTERN	7:0	Default : 0x00 Access : R/W
	EXT_OSD	7	EXT OSD pin as GPIO.
	EXT_VD	6	EXT VD pin as GPIO.
	-	5:3	Reserved.
	PTNWT	2	Pattern White.
	PTNBLK	1	Pattern Black.
	PTNRVS	0	Pattern Reverse.
5Fh	EXT_OSD_CTRL	7:0	Default : 0x00 Access : R/W
	EXTOSD_EN	7	External OSD function Enable. 0: Diable. 1: Enable.
	DATEXTMD[1:0]	6:5	Data Extend Mode.
	CKEY_EN	4	Color Key Enable. 0: Disable. 1: Enable.
	INVCKEY_EN	3	Inverse Color Key Enable. 0: Diable. 1: Enable.
	R_KEY	2	R color Key selected.
	G_KEY	1	G color Key selected.
	B_KEY	0	B color Key selected.
	60h	DITHCTRL	7:0
DITHG[1:0]		7:6	Dither coefficient for G channel.
DITHB[1:0]		5:4	Dither coefficient for B channel.
SROT		3	Spatial coefficient Rotate. 0: Disable. 1: Enable.
TROT		2	Temporal coefficient Rotate. 0: Disable. 1: Enable.

Scaler Register (Bank=00, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
	OBN	1	Output Bits Number 0: 8-bit output. 1: 6-bit output (power on default value).	
	DITH	0	Dither function. 0: Off. 1: On.	
61h	DITHCOEF	7:0	Default : 0x2D	Access : R/W
	TL[1:0]	7:6	Top-Left dither coefficient.	
	TR[1:0]	5:4	Top-Right dither coefficient.	
	BL[1:0]	3:2	Bottom-Left dither coefficient.	
	BR[1:0]	1:0	Bottom-Right dither coefficient.	
62h	DITHCTL1	7:0	Default : 0x00	Access : R/W
	PSRD	7	Pseudo Random, resets every 4 frames. 0: Enable. 1: Disable.	
	ND_MD	6	Noise Dithering Method.	
	AUTO_DTH	5	Auto Dither.	
	PSDO_EN	4	Pseudo Enable. 0: Disable. 1: Enable.	
	DTH_MNUS	3	Dither Minus.	
	ABM[2:0]	2:0	Alpha Blending Mode. 000: No alpha blending. 001: Background alpha blending. 010: Foreground alpha blending. 011: Color key alpha blending. 100: Not color key alpha blending. 101: Entire OSD alpha blending. 11x: Reserved.	
63h	OSD_CTL	7:0	Default : 0x00	Access : R/W

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	CKIND[3:0]	7:4	Color Index of Color Key. 0000: Color index 0. 0001: Color index 1. 1111: Color index 15. When OSD register 0x10[7]=1, OSD is not backward compatible. When OSD register 0x10[7]=0, OSD is backward compatible. When 8-color palette is selected, only CKIND[2:0] are used. When 16-color palette is selected, OSD0xE0 bit[6] is color key bit[3] instead of using CKIND[3].
	NEW_BLND_MTHD	3	New Blending Level. 0: Original blending level (BLENDL=000 means 0% transparency). 1: New blending level (BLENDL=000 means 12.5% transparency).
	OSD_BLND_MD	2:0	OSD alpha blending Level. 000: 12.5% transparency. 001: 25.0% transparency. 010: 37.5% transparency. 011: 50.0% transparency. 100: 62.5% transparency. 101: 75.0% transparency. 110: 87.5% transparency. 111: 100% transparency.
64h	CM11_L	7:0	Default : 0x00 Access : R/W
	CM11[7:0]	7:0	Color Matrix Coefficient 11 (lower 8 bits).
65h	CM11_H	7:0	Default : 0x04 Access : R/W
	-	7:5	Reserved.
	CM11[12:8]	4:0	Color Matrix Coefficient 11 (higher 5 bits).
66h	CM12_L	7:0	Default : 0x00 Access : R/W
	CM12[7:0]	7:0	Color Matrix Coefficient 12 (lower 8 bits).
67h	CM12_H	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	CM12[12:8]	4:0	Color Matrix Coefficient 12 (higher 5 bits).
68h	CM13_L	7:0	Default : 0x00 Access : R/W
	CM13[7:0]	7:0	Color Matrix Coefficient 13 (lower 8 bits).
69h	CM13_H	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	CM13[12:8]	4:0	Color Matrix Coefficient 13 (higher 5 bits).

Scaler Register (Bank=00, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
6Ah	CM21_L	7:0	Default : 0x00	Access : R/W
	CM21[7:0]	7:0	Color Matrix Coefficient 21 (lower 8 bits).	
6Bh	CM21_H	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	CM21[12:8]	4:0	Color Matrix Coefficient 21 (higher 5 bits).	
6Ch	CM22_L	7:0	Default : 0x00	Access : R/W
	CM22[7:0]	7:0	Color Matrix Coefficient 22 (lower 8 bits).	
6Dh	CM22_H	7:0	Default : 0x04	Access : R/W
	-	7:5	Reserved.	
	CM22[12:8]	4:0	Color Matrix Coefficient 22 (higher 5 bits).	
6Eh	CM23_L	7:0	Default : 0x00	Access : R/W
	CM23[7:0]	7:0	Color Matrix Coefficient 23 (lower 8 bits).	
6Fh	CM23_H	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	CM23[12:8]	4:0	Color Matrix Coefficient 23 (higher 5 bits).	
70h	CM31_L	7:0	Default : 0x00	Access : R/W
	CM31[7:0]	7:0	Color Matrix Coefficient 31 (lower 8 bits).	
71h	CM31_H	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	CM31[12:8]	4:0	Color Matrix Coefficient 31 (higher 5 bits).	
72h	CM32_L	7:0	Default : 0x00	Access : R/W
	CM32[7:0]	7:0	Color Matrix Coefficient 32 (lower 8 bits).	
73h	CM32_H	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	CM32[12:8]	4:0	Color Matrix Coefficient 32 (higher 5 bits).	
74h	CM33_L	7:0	Default : 0x00	Access : R/W
	CM33[7:0]	7:0	Color Matrix Coefficient 33 (lower 8 bits).	
75h	CM33_H	7:0	Default : 0x04	Access : R/W
	-	7:5	Reserved.	
	CM33[12:8]	4:0	Color Matrix Coefficient 33 (higher 5 bits).	
76h	COL_MATRIX_CTL	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	CMRND	5	Color Matrix Rounding control. 0: Disable. 1: Enable.
	CMC	4	Color Matrix Control. 0: Disable. 1: Enable.
	-	3	Reserved.
	RRAN	2	Red Range. 0: 0~255. 1: 128~127.
	GRAN	1	Green Range. 0: 0~255. 1: 128~127.
	BRAN	0	Blue Range. 0: 0~255. 1: 128~127.
77h	FBL_CTL	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved
	ODDF	3	Shift Odd Field. 0: Shift even field. 1: Shift odd field.
	SLN[2:0]	2:0	Shift Line Number. 000: Shift 0 line between odd and even fields. 001: Shift 1 line between odd and even fields. 010: Shift 2 line between odd and even fields. 011: Shift 3 line between odd and even fields. 1xx: Shift 4 line between odd and even fields.
78h	LCK_VCNT_L	7:0	Default : - Access : RO
	LCK_VCNT[7:0]	7:0	Lock V total low byte [7:0].
79h	LCK_VCNT_H	7:0	Default : 0x00 Access : R/W
	SWCH_STS	7	Switch Status.
	-	6:3	Reserved.
	LCK_VCNT[10:8]	2:0	Lock V total high byte [10:8].
7Ah	CAP_VCNT_L	7:0	Default : - Access : RO
	CAP_VCNT[7:0]	7:0	Cap V total low byte [7:0].
7Bh	CAP_VCNT_H	7:0	Default : - Access : RO

Scaler Register (Bank=00, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
	-	7:3	Reserved.
	CAP_VCNT[10:8]	2:0	Cap V total high byte [10:8].
7Ch	CAP_HCNT_L	7:0	Default : - Access : RO
	CAP_HCNT[7:0]	7:0	Cap H total low byte [7:0].
7Dh	CAP_HCNT_H	7:0	Default : - Access : RO
	-	7:3	Reserved.
	CAP_HCNT[10:8]	2:0	Cap H total high byte [10:8].
7Eh	EST_VCNT_L	7:0	Default : - Access : RO
	EST_VCNT[7:0]	7:0	Est V total low byte [7:0].
7Fh	EST_VCNT_H	7:0	Default : - Access : RO
	-	7:3	Reserved.
	EST_VCNT[10:8]	2:0	Est V total high byte [10:8].
80h	EST_HCNT_L	7:0	Default : 0x00 Access : R/W
	EST_HCNT[7:0]	7:0	Est H total low byte [7:0].
81h	EST_HCNT_H	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	EST_HCNT[10:8]	2:0	Est H total low byte [10:8].
82h	SSC_TLRN	7:0	Default : 0x00 Access : R/W
	SSC_TLRN[7:0]	7:0	SSC Tolerance.
83h	Delta_L	7:0	Default : 0x00 Access : R/W
	DELTA[7:0]	2:0	Delta[7:0].
84h	Delta_H	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	DELTA[12:8]	4:0	Delta[12:8].
85h	SSC_SHIFT	7:0	Default : 0x00 Access : R/W
	SSC_SHIFT[7:0]	7:0	SSC Shift.
86h	FNTN_TST	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	MSK_SHRT_LN_CLK	5	Mask the Clock when in Short Line.
	-	4	Reserved.
	SYNC_GATE_MD	3	Mask HYSNC and Clock Mode.
	RB_SWAP	2	Output channel RB Swap.
	LM_SWAP_6	1	Output Channel MSB LSB Swap in 6-bit bus mode.

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	LM_SWAP_8	0	Output Channel MSB LSB Swap in 8-bit bus mode.
87h	DEBUG	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	EOCK	6	Select External ODCLK.
	-	5:4	Reserved.
	PTEN	3	PLL Test register protect bit Enable. 0: Disable. 1: Enable.
	-	2:0	Reserved.
88h	SL_CNTRL_1	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	LIM_HS	5	Limit HSYNC period enable.
	-	4:3	Reserved.
	INT_CAP_EN	2	Interlace Capture Enable.
	SHLN_FLD	1	Select Short Line Field.
	FRZ_SHLN	0	Stop Short Line Update.
89h	SL_TUNE_1	7:0	Default : 0x70 Access : R/W
	TNCOEF	7:5	Tune Coefficient.
	LCK_THRHD	4:0	Lock Threshold.
8Ah	SL_TUNE_2	7:0	Default : 0x00 Access : R/W
	LMT_D5D6D7_H	7:0	Limit PLL_SET High byte.
8Bh	SL_TUNE_3	7:0	Default : 0xC0 Access : R/W
	LMT_D5D6D7_L	7:0	Limit PLL_SET Low byte.
8Ch	TARGET_SL_L	7:0	Default : 0x00 Access : R/W
	TARGET_SL_L	7:0	Target Short Line Low byte.
8Dh	TARGET_SL_H	7:0	Default : 0x01 Access : R/W
	TARGET_SL_H	7:0	Target Short Line High byte.
8Eh ~ 8Fh	-	7:0	Default : - Access : RO
	-		Reserved.
90h	GAMMA_EN	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	ADR_INC_EN	1	Address Increase Enable. 0: Disable. 1: Enable.

Scaler Register (Bank=00, Registers 01h ~ 9Fh)

Index	Name	Bits	Description
	GAMMA_EN	0	Gamma Enable. 0: Disable. 1: Enable.
91h	GAMMA_ADR_PORT	7:0	Default : 0x00 Access : R/W
	GMA_ADR_PORT[7:0]	7:0	Gamma Address Port [7:0].
92h	GAMMA_DAT_PORT	7:0	Default : 0x00 Access : R/W
	GMA_DAT_PORT[7:0]	7:0	Gamma Data Port [7:0].
93h	R_BIAS	7:0	Default : 0x00 Access : R/W
	R_BIAS[7:0]	7:0	DC level in R channel positive part.
94h	R_RATIO	7:0	Default : 0x00 Access : R/W
	R_RATIO[7:0]	7:0	Ratio in R channel positive part.
95h	G_BIAS	7:0	Default : 0x00 Access : R/W
	G_BIAS[7:0]	7:0	DC level in G channel positive part.
96h	G_RATIO	7:0	Default : 0x00 Access : R/W
	G_RATIO[7:0]	7:0	Ratio in G channel positive part.
97h	B_BIAS	7:0	Default : 0x00 Access : R/W
	B_BIAS[7:0]	7:0	DC level in B channel positive part.
98h	B_RATIO	7:0	Default : 0x00 Access : R/W
	B_RATIO[7:0]	7:0	Ratio in B channel positive part.
99h	R_BIASN	7:0	Default : 0x00 Access : R/W
	R_BIASN[7:0]	7:0	Dc level in R channel negative part.
9Ah	R_RATION	7:0	Default : 0x00 Access : R/W
	R_RATION[7:0]	7:0	Ratio in R channel negative part.
9Bh	G_BIASN	7:0	Default : 0x00 Access : R/W
	G_BIASN[7:0]	7:0	DC level in G channel negative part.
9Ch	G_RATION	7:0	Default : 0x00 Access : R/W
	G_RATION[7:0]	7:0	Ratio in G channel negative part.
9Dh	B_BIASN	7:0	Default : 0x00 Access : R/W
	B_BIASN[7:0]	7:0	DC level in B channel negative part.
9Eh	B_RATION	7:0	Default : 0x00 Access : R/W
	B_RATION[7:0]	7:0	Ratio in B channel negative part.
9Fh	-	7:0	Default : 0x00 Access : R/W
	-	7:0	Reserved.

OSD Register (Bank = 00, Registers A0h ~ AAh)

OSD Register (Bank=00)				
Index	Mnemonic	Bits	Description	
A0h	OSDIOA	7:0	Default : 0x00	Access : R/W
	TOSB_MD	7	OSD SRAM I/O Access Burst Mode. 0: Disable. 1: Enable.	
	CLR	6	OSD Clear Bit (write only). 0: Normal. 1: Clear code with 00h, attribute with 00h.	
	-	5	Reserved.	
	RF	4	OSD RAM Font I/O Access. 0: Disable. 1: Enable.	
	DC	3	OSD Display Code I/O Access. 0: Disable. 1: Enable.	
	DA	2	OSD Display Attribute I/O Access. 0: Disable. 1: Enable.	
	ORBW_MD	1	OSD Register Burst Write Mode. 0: Disable. 1: Enable.	
	ORBR_MD	0	OSD Register Burst Read Mode. 0: Disable. 1: Enable.	
A1h	OSDRA	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	OSDRA	5:0	OSD Register Address Port.	
A2h	OSDRD	7:0	Default : 0x00	Access : R/W
	OSDRD	7:0	OSD Register Data Port.	
A3h	OSDFA	7:0	Default : -	Access : WO
	OSDFA	7:0	OSD RAM Font Address Port.	
A4h	OSDFD	7:0	Default : -	Access : WO
	OSDFD	7:0	OSD RAM Font Data Port.	
A5h	DISPCA_L	7:0	Default : -	Access : WO
	DISPCA[7:0]	7:0	OSD Display Code Address Port.	
A6h	DISPCA_H	7:0	Default : -	Access : WO

OSD Register (Bank=00)			
Index	Mnemonic	Bits	Description
	-	7:3	Reserved.
	DISPCA[10:8]	2:0	OSD Display Code Address Port.
A7h	DISPCD	7:0	Default : 0x00 Access : R/W
	DISPCD[7:0]	7:0	OSD Display Code Data Port (When write access disabled, this port report display code data).
A8h	DISPAA_L	7:0	Default : - Access : WO
	DISPAA[7:0]	7:0	OSD Display Attribute Address port.
A9h	DISPAA_H	7:0	Default : - Access : WO
	-	7:3	Reserved.
	DISPAA[10:8]	2:0	OSD Display Attribute Address port.
AAh	DISPAD	7:0	Default : 0x00 Access : R/W
	DISPAD[7:0]	7:0	OSD Display Attribute Data Port (When write access disabled, this port report display attribute data).
AEh	DISPCA_CTL	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	DISPAD_RE[8]	6	When write access disabled, this bit report display attribute data (bit 8).
	-	5	Reserved.
	DISPCD_RE[8]	4	When write access disabled, this bit report display code data (bit 8).
	-	3	Reserved.
	INS_DATA	2	OSD Code/Attribute 9th bit Data (Code (A7h)/Attribute (AAh) Data Extend bit).
	-	1	Reserved.
	CA_NO_WRITE	0	OSD Display Code and Attribute Write disable.
OSD CODE (9th bit)			
	ITALIC	8	OSD Italic Control 0: Disable. 1: Enable. (Please refer AEh bit 0 INS_DATA)
OSD Attribute (8-Color Palette)			
	HALF_TRAN	8	OSD Half-transparency Control. 0: Disable. 1: Enable. (Please refer AEh[0]: INS_DATA and 42h[2]: ALF_TRANEN)

OSD Register (Bank=00)			
Index	Mnemonic	Bits	Description
	BLNK_CTRL	7	OSD Blink Control. 0: Disable. 1: Enable.
	FGCLR[2:0]	6:4	OSD Foreground Color Select. 000: Color index 0. 001: Color index 1. ... 111: Color index 7.
	BDER_CTRL	3	OSD Character Border Control. 0: Disable. 1: Enable. (Please refer 42h[5] UNDERLINE_MD)
	BGCLR[2:0]	2:0	OSD Background Color select. 000: color index 0. 001: color index 1. ... 111: color index 7.
OSD Attribute (16 Color Palette)			
	FGCLR[3:0]	7:4	OSD Foreground Color Select. 0000: color index 0. 0001: color index 1. ... 1111: color index 15.
	BGCLR[3:0]	3:0	OSD Background Color Select. 0000: color index 0. 0001: color index 1. ... 1111: color index 15.

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
01h	OSDDBC	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	DBL[1:0]	2:1	Double Buffer Load. 00: Keep old register value. 01: Load new data (auto reset to 00 when loading completes). 10: Automatically load data at VSYNC blanking. 11: Reserved.
	DB_EN	0	Double Buffer Enable. 0: Disable. 1: Enable.
02h	OHSTA-L	7:0	Default : 0x00 Access : R/W
	OHSTA[7:0]	7:0	OSD windows Horizontal Start position (pixel) (lower 8 bits).
03h	OHSTA-H	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	OHSTA[10:8]	2:0	OSD windows Horizontal Start position (higher 3 bits).
04h	OVSTA-L	7:0	Default : 0x00 Access : R/W
	OVSTA[7:0]	7:0	OSD windows Vertical Start position (line) (lower 8 bits).
05h	OVSTA-H	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	OVSTA[9:8]	1:0	OSD windows Vertical Start position (higher 2 bits).
06h	OSDW	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	OSDW[5:0]	5:0	OSD windows Width (OSDW + 1 (column)), maximum 64 columns.
07h	OSDH	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	OSDH[5:0]	5:0	OSD windows Height (OSDH + 1 (row)), maximum 64 rows.
08h	OHSPA	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	OHSPA[5:0]	5:0	OSD windows Horizontal Space start position (OHSPA + 1 (column)).
09h	OVSPA	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	OVSPA[4:0]	4:0	OSD windows Vertical Space start position (OVSPA + 1 (row)).

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)				
Index	Mnemonic	Bits	Description	
0Ah	OSPW	7:0	Default : 0x00	Access : R/W
	OSPW[7:0]	7:0	OSD Space Width (8 * OSPW (pixel)).	
0Bh	OSPH	7:0	Default : 0x00	Access : R/W
	OSPH[7:0]	7:0	OSD Space Height (8 * OSPH (line)).	
0Ch	IOSDC1	7:0	Default : 0x00	Access : R/W
	OVS[1:0]	7:6	OSD Vertical Scaling. 00: Vertical normal size. 01: Vertical enlarged x2 by repeated pixels. 10: Vertical enlarged x3 by repeated pixels. 11: Vertical enlarged x4 by repeated pixels.	
	OHS[1:0]	5:4	OSD Horizontal Scaling. 00: Horizontal normal size. 01: Horizontal enlarged x2 by repeated pixels. 10: Horizontal enlarged x3 by repeated pixels. 11: Horizontal enlarged x4 by repeated pixels.	
	-	3:1	Reserved.	
	MWIN	0	OSD Main Window display. 0: Off. 1: On.	
0Dh	IOSDC2	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	BDC	5	OSD Character Border type select. 0: All direction font boundary (border). 1: Bottom-right direction font boundary (shadow).	
	BDW	4	OSD character Border Width control. 0: One pixel with for all scale. 1: Scale with OVS[1:0] and OHS[1:0].	
	-	3	Reserved.	
	BCLR[2:0]	2:0	OSD Border Color index. 000: color index 0. 001: color index 1. ... 111: color index 7.	
0Eh	IOSDC3	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)				
Index	Mnemonic	Bits	Description	
	SHALL	5	OSD Shadow with All Direction. 0: Shadow with Bottom-Right direction (shadow). 1: Shadow with all direction (border).	
	SDC	4	OSD Window Shadow Control. 0: Off. 1: On.	
	SCLR[3:0]	3:0	OSD window Shadow Color index. 0000: Color index 0. 0001: Color index 1. ... 1111: Color index 15.	
0Fh	OSHC	7:0	Default : 0x00	Access : R/W
	OSDSH[3:0]	7:4	OSD Shadow Height.	
	OSDSW[3:0]	3:0	OSD Shadow Width.	
10h	IOSDC4	7:0	Default : 0x00	Access : R/W
	LINE_SHIFT_EN	7	OSD line shift Enable (Please refer 45h bit 4~2 LINE_SHIFT_VAL).	
	FIELD_POL	6	OSD line shift Field Polarity.	
	-	5	Reserved.	
	EN_M4C	4	4 Color Font Enable. 0: Disable. 1: Enable.	
	F16H	3	OSD font high control. 0: Font height is 18. 1: Font height is 16.	
	PEXT	2	OSD 16 color palette extent method. 0: Extend with palette bit 3. 1: Extend with 0.	
	TRANEN	1	OSD Transparency Enable. 0: No transparency. 1: Color index which hit OSD Color index for transparency[2:0] is transparent of 8 color palette/ Color index which hit OSD Color index for transparency[3:0] is transparent of 16 color palette. (Please refer 42h bit 3~0 OSD Color index for transparency.)	
	T16C	0	OSD 16 Color Palette select. 0: 8 color palette. 1: 16 color palette.	
12h	OCBUFO	7:0	Default : 0x00	Access : R/W

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	CO_SEL	7	OSD Code buffer Offset Select. 0: Use OSDW[5:0] as offset. 1: Use OOFFSET[5:0] as offset.
	-	6	Reserved.
	OOFFSET[5:0]	5:0	OSD code buffer Offset Value.
13h	OSDBA-L	7:0	Default : 0x00 Access : R/W
	OSDBA[7:0]	7:0	OSD code Base Address (lower 8 bits).
14h	OSDBA-H	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	OSDBA[10:8]	2:0	OSD code Base Address (higher 3 bits) (Please refer 45h bit7 CCRAM608X2. When CCRAM608X2 = 0, OSDBA[10:0] is programming from 0 to 4BFh; when CCRAM608X2 = 1, OSDBA[9:0] is programming from 0 to 25fh and OSDBA[10] is programming to select low or high part code/attribute SRAM).
15h	GCCTRL	7:0	Default : 0x00 Access : R/W
	GVS[1:0]	7:6	Gradually color Vertical Scaling. 00: Vertical normal size. 01: Vertical enlarged x2 by repeated pixels. 10: Vertical enlarged x3 by repeated pixels. 11: Vertical enlarged x4 by repeated pixels.
	GHS[1:0]	5:4	Gradually color Horizontal Scaling. 00: Horizontal normal size. 01: Horizontal enlarged x2 by repeated pixels. 10: Horizontal enlarged x3 by repeated pixels. 11: Horizontal enlarged x4 by repeated pixels.
	GRAD	3	Enable OSD Gradual color function. 0: Disable. 1: Enable.
	ADC_PG	2	ADC Pattern Generator select. 0: Normal. 1: ADC.
	SVM_SEL	1:0	SVM Mask signal Select. 00: Original active signal. 01: 2T early. 10: 4T early. 11: 6T early.

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)				
Index	Mnemonic	Bits	Description	
16h	GRADCLR	7:0	Default : 0x00	Access : R/W
	FCLR	7	Gradual color by Frame Color. 0: Use RCLR, GCLR, BCLR as starting gradual color. 1: Use Frame Color as starting gradual color.	
	-	6	Reserved.	
	RCLR[1:0]	5:4	Red starting gradual Color. 00: Red color is 00h. 01: Red color is 55h. 10: Red color is AAh. 11: Red color is FFh.	
	GCLR[1:0]	3:2	Green starting gradual Color. 00: Green color is 00h. 01: Green color is 55h. 10: Green color is AAh. 11: Green color is FFh.	
	BCLR[1:0]	1:0	Blue starting gradual Color. 00: Blue color is 00h. 01: Blue color is 55h. 10: Blue color is AAh. 11: Blue color is FFh.	
17h	HGRADCR	7:0	Default : 0x00	Access : R/W
	SR	7	Sign bit of Red color. 0: Increase. 1: Decrease.	
	IRH	6	Inverse bit of Red color. 0: Normal. 1: Invert.	
	R_GRADH[5:0]	5:0	Increase/decrease value of Red color.	
18h	HGRADCG	7:0	Default : 0x00	Access : R/W
	SG	7	Sign bit of Green color. 0: Increase. 1: Decrease.	
	IGH	6	Inverse bit of Green color. 0: Normal. 1: Invert.	
	G_GRADH[5:0]	5:0	Increase/decrease value of Green color.	
19h	HGRADCB	7:0	Default : 0x00	Access : R/W

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	SB	7	Sign bit of Blue color. 0: Increase. 1: Decrease.
	IBH	6	Inverse bit of Blue color. 0: Normal. 1: Invert.
	B_GRADH[5:0]	5:0	Increase/decrease value of Blue color.
1Ah	HGRADSR	7:0	Default : 0x00 Access : R/W
	HGRADSR[7:0]	7:0	Horizontal Gradual Step of Red color.
1Bh	HGRADSG	7:0	Default : 0x00 Access : R/W
	HGRADSG[7:0]	7:0	Horizontal Gradual Step of Green color.
1Ch	HGRADSB	7:0	Default : 0x00 Access : R/W
	HGRADSB[7:0]	7:0	Horizontal Gradual Step of Blue color.
1Dh	VGRADCR	7:0	Default : 0x00 Access : R/W
	SR	7	Sign bit of Red color. 0: Increase. 1: Decrease.
	IRV	6	Inverse bit of Red color. 0: Normal. 1: Invert.
	R_GRADV[5:0]	5:0	Increase/decrease value of Red color.
1Eh	VGRADCG	7:0	Default : 0x00 Access : R/W
	SG	7	Sign bit of Green color. 0: Increase. 1: Decrease.
	IGV	6	Inverse bit of Green color. 0: Normal. 1: Invert.
	G_GRADV[5:0]	5:0	Increase/Decrease value of Green color.
1Fh	VGRADCB	7:0	Default : 0x00 Access : R/W
	SB	7	Sign bit of Blue color. 0: Increase. 1: Decrease.
	IBV	6	Inverse bit of Blue color. 0: Normal. 1: Invert.

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)				
Index	Mnemonic	Bits	Description	
	B_GRADV[5:0]	5:0	Increase/decrease value of Blue color.	
20h	VGRADSR	7:0	Default : 0x00	Access : R/W
	VGRADSR[7:0]	7:0	Vertical Gradual Step of Red color.	
21h	VGRADSG	7:0	Default : 0x00	Access : R/W
	VGRADSG[7:0]	7:0	Vertical Gradual Step of Green color.	
22h	VGRADSB	7:0	Default : 0x00	Access : R/W
	VGRADSB[7:0]	7:0	Vertical Gradual Step of Blue color.	
23h ~ 25h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
26h	TIMECTRL	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	FRG_EN	4	OSD Font Ram Gated Enable. 0: Disable. 1: Enable.	
	-	3:2	Reserved	
	VSTDLY	1	OSD Vertical Start Delay. 0: Normal. 1: Vertical Delay 1 line.	
	-	0	Reserved.	
27h	OSDRTP	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	RTPT	2	OSD Random Test Pattern Type. 0: RGB is the same. 1: RGB is different.	
	OSDRTP[1:0]	1:0	OSD Random Test Pattern. 00: Disable. 01: 1 random bit. 10: 2 random bit. 11: Reserved.	
OSD Color Palette when T16_C = 0				
28h	CLR0R	7:0	Default : 0x00	Access : R/W
	CLR0R[7:0]	7:0	Red Color Index 0.	
29h	CLR0G	7:0	Default : 0x00	Access : R/W
	CLR0G[7:0]	7:0	Green Color Index 0.	
2Ah	CLR0B	7:0	Default : 0x00	Access : R/W

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	CLR0B[7:0]	7:0	Blue Color Index 0.
2Bh	CLR1R	7:0	Default : 0x00 Access : R/W
	CLR1R[7:0]	7:0	Red Color Index 1.
2Ch	CLR1G	7:0	Default : 0x00 Access : R/W
	CLR1G[7:0]	7:0	Green Color Index 1.
2Dh	CLR1B	7:0	Default : 0x00 Access : R/W
	CLR1B[7:0]	7:0	Blue Color Index 1.
2Eh	CLR2R	7:0	Default : 0x00 Access : R/W
	CLR2R[7:0]	7:0	Red Color Index 2.
2Fh	CLR2G	7:0	Default : 0x00 Access : R/W
	CLR2G[7:0]	7:0	Green Color Index 2.
30h	CLR2B	7:0	Default : 0x00 Access : R/W
	CLR2B[7:0]	7:0	Blue Color Index 2.
31h	CLR3R	7:0	Default : 0x00 Access : R/W
	CLR3R[7:0]	7:0	Red Color Index 3.
32h	CLR3G	7:0	Default : 0x00 Access : R/W
	CLR3G[7:0]	7:0	Green Color Index 3.
33h	CLR3B	7:0	Default : 0x00 Access : R/W
	CLR3B[7:0]	7:0	Blue Color Index 3.
34h	CLR4R	7:0	Default : 0x00 Access : R/W
	CLR4R[7:0]	7:0	Red Color Index 4.
35h	CLR4G	7:0	Default : 0x00 Access : R/W
	CLR4G[7:0]	7:0	Green Color Index 4.
36h	CLR4B	7:0	Default : 0x00 Access : R/W
	CLR4B[7:0]	7:0	Blue Color Index 4.
37h	CLR5R	7:0	Default : 0x00 Access : R/W
	CLR5R[7:0]	7:0	Red Color Index 5.
38h	CLR5G	7:0	Default : 0x00 Access : R/W
	CLR5G[7:0]	7:0	Green Color Index 5.
39h	CLR5B	7:0	Default : 0x00 Access : R/W
	CLR5B[7:0]	7:0	Blue Color Index 5.
3Ah	CLR6R	7:0	Default : 0x00 Access : R/W
	CLR6R[7:0]	7:0	Red Color Index 6.

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)				
Index	Mnemonic	Bits	Description	
3Bh	CLR6G	7:0	Default : 0x00	Access : R/W
	CLR6G[7:0]	7:0	Green Color Index 6.	
3Ch	CLR6B	7:0	Default : 0x00	Access : R/W
	CLR6B[7:0]	7:0	Blue Color Index 6.	
3Dh	CLR7R	7:0	Default : 0x00	Access : R/W
	CLR7R[7:0]	7:0	Red Color Index 7.	
3Eh	CLR7G	7:0	Default : 0x00	Access : R/W
	CLR7G[7:0]	7:0	Green Color Index 7.	
3Fh	CLR7B	7:0	Default : 0x00	Access : R/W
	CLR7B[7:0]	7:0	Blue Color Index 7.	
OSD Color Palette when T16_C = 1 (16 color format: col[7:4], 4'b0 or col[7:4], {4{col[4]}})				
28h	CLR0R	7:0	Default : 0x00	Access : R/W
	CLR0R[7:4]	7:4	Red Color Index 0.	
	CLR8R[3:0]	3:0	Red Color Index 8.	
29h	CLR0G	7:0	Default : 0x00	Access : R/W
	CLR0G[7:4]	7:4	Green Color Index 0.	
	CLR8G[3:0]	3:0	Green Color Index 8.	
2Ah	CLR0B	7:0	Default : 0x00	Access : R/W
	CLR0B[7:4]	7:4	Blue Color Index 0.	
	CLR8B[3:0]	3:0	Blue Color Index 8.	
2Bh	CLR1R	7:0	Default : 0x00	Access : R/W
	CLR1R[7:4]	7:4	Red Color Index 1.	
	CLR9R[3:0]	3:0	Red Color Index 9.	
2Ch	CLR1G	7:0	Default : 0x00	Access : R/W
	CLR1G[7:4]	7:4	Green Color Index 1.	
	CLR9G[3:0]	3:0	Green Color Index 9.	
2Dh	CLR1B	7:0	Default : 0x00	Access : R/W
	CLR1B[7:4]	7:4	Blue Color Index 1.	
	CLR9B[3:0]	3:0	Blue Color Index 9.	
2Eh	CLR2R	7:0	Default : 0x00	Access : R/W
	CLR2R[7:4]	7:4	Red Color Index 2.	
	CLR10R[3:0]	3:0	Red Color Index 10.	
2Fh	CLR2G	7:0	Default : 0x00	Access : R/W

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	CLR2G[7:4]	7:4	Green Color Index 2.
	CLR10G[3:0]	3:0	Green Color Index 10.
30h	CLR2B	7:0	Default : 0x00 Access : R/W
	CLR2B[7:4]	7:4	Blue Color Index 2.
	CLR10B[3:0]	3:0	Blue Color Index 10.
31h	CLR3R	7:0	Default : 0x00 Access : R/W
	CLR3R[7:4]	7:4	Red Color Index 3.
	CLR11R[3:0]	3:0	Red Color Index 11.
32h	CLR3G	7:0	Default : 0x00 Access : R/W
	CLR3G[7:4]	7:4	Green Color Index 3.
	CLR11G[3:0]	3:0	Green Color Index 11.
33h	CLR3B	7:0	Default : 0x00 Access : R/W
	CLR3B[7:4]	7:4	Blue Color Index 3.
	CLR11B[3:0]	3:0	Blue Color Index 11.
34h	CLR4R	7:0	Default : 0x00 Access : R/W
	CLR4R[7:4]	7:4	Red Color Index 4.
	CLR12R[3:0]	3:0	Red Color Index 12.
35h	CLR4G	7:0	Default : 0x00 Access : R/W
	CLR4G[7:4]	7:4	Green Color Index 4.
	CLR12G[3:0]	3:0	Green Color Index 12.
36h	CLR4B	7:0	Default : 0x00 Access : R/W
	CLR4B[7:4]	7:4	Blue Color Index 4.
	CLR12B[3:0]	3:0	Blue Color Index 12.
37h	CLR5R	7:0	Default : 0x00 Access : R/W
	CLR5R[7:4]	7:4	Red Color Index 5.
	CLR13R[3:0]	3:0	Red Color Index 13.
38h	CLR5G	7:0	Default : 0x00 Access : R/W
	CLR5G[7:4]	7:4	Green Color Index 5.
	CLR13G[3:0]	3:0	Green Color Index 13.
39h	CLR5B	7:0	Default : 0x00 Access : R/W
	CLR5B[7:4]	7:4	Blue Color Index 5.
	CLR13B[3:0]	3:0	Blue Color Index 13.
3Ah	CLR6R	7:0	Default : 0x00 Access : R/W

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	CLR6R[7:4]	7:4	Red Color Index 6.
	CLR14R[3:0]	3:0	Red Color Index 14.
3Bh	CLR6G	7:0	Default : 0x00 Access : R/W
	CLR6G[7:4]	7:4	Green Color Index 6.
	CLR14G[3:0]	3:0	Green Color Index 14.
3Ch	CLR6B	7:0	Default : 0x00 Access : R/W
	CLR6B[7:4]	7:4	Blue Color Index 6.
	CLR14B[3:0]	3:0	Blue Color Index 14.
3Dh	CLR7R	7:0	Default : 0x00 Access : R/W
	CLR7R[7:4]	7:4	Red Color Index 7.
	CLR15R[3:0]	3:0	Red Color Index 15.
3Eh	CLR7G	7:0	Default : 0x00 Access : R/W
	CLR7G[7:4]	7:4	Green Color Index 7.
	CLR15G[3:0]	3:0	Green Color Index 15.
3Fh	CLR7B	7:0	Default : 0x00 Access : R/W
	CLR7B[7:4]	7:4	Blue Color Index 7.
	CLR15B[3:0]	3:0	Blue Color Index 15.
40h	SCRLSPD	7:0	Default : 0x00 Access : R/W
	SCRLSPD[7:0]	7:0	OSD Scroll function speed (the numbers of VSYNC).
41h	SCRLLINE	7:0	Default : 0x00 Access : R/W
	SCREN	7	OSD Scroll function Enable. 0: Disable. 1: Enable.
	VSCR_FAST	6	Scroll at every VSYNC.
	TRUC_EN	5	Truncate code/attribute Enable. 0: Disable. 1: Enable.
	SCRLLINE[4:0]	4:0	OSD Scroll function (the numbers of scan lines per scroll).
42h	UNDERLINE	7:0	Default : 0x0F Access : R/W
	UNDERLINE_1	7	OSD Underline at last line.
	UNDERLINE_2	6	OSD Underline at second last line.
	UNDERLINE_MD	5	OSD Underline Mode enable (When this bit is asserted, OSD Attribute (8 Color) bit 3. (BDER) Character Boder Control change function to OSD Character Underline Control).

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	HALF_TRANEN	4	OSD Half-Transparency Enable (When this bit is asserted, OSD Attribute (8 Color) bit 9 (HALF_TRAN) is active.).
	TRAN_INDEX[3:0]	3:0	OSD Color Index for Transparency (Define which color index is transparent).
43h	TRUNCATE	7:0	Default : 0x 1D Access : R/W
	TRUNCATENUM	7:0	OSD Truncate number (Please refer 45h bit7 CCRAM608X2. When CCRAM608X2=0, final row=(11'h4bf-TRUNCATENUM); when CCRAM608X2=1, final row=(11'h25f-TRUNCATENUM)).
44h	ITALIC	7:0	Default : 0x 00 Access : R/W
	ITALIC_OFFSET	7:6	OSD Italic right shift Offset (00: 1, 01: 2, 10: 3, 11: 4 (pixel)).
	ITALIC_1ST_LINE	5:4	OSD Italic start scan Line (00: 0, 01: 1, 10: 2, 11: 3 (line)).
	ITALIC_STEP	3:2	OSD Italic left shift Step (00: 0.001, 01: 0.010, 10: 0.011, 11: 0.100 (pixel , binary)).
	ITALIC_EN	1	OSD Italic function Enable. 0: Disable. 1: Enable.
	-	0	Reserved.
45h	MISC_CTL	7:0	Default : 0x00 Access : R/W
	CCRAM608X2	7	OSD 2 608 code/attribute SRAM (When CCRAM608X2 = 0, there is one 1216 code/attribute SRAM for using; when CCRAM608X2 = 1, there are two 608 code/attribute SRAM for using.).
	-	6:5	Reserved.
	LINE_SHIFT_VAL[2:0]	4:2	OSD Line shift value (Line shift number, 000: 1, ..., 111: 8).
	CARHG_EN	1	OSD code/attribute high part ram gated Enable. 0: Disable. 1: Enable.
	-	0	Reserved.
46h	OSD4CFFA	7:0	Default : 0x00 Access : R/W
	OSD4CFFA[7:0]	7:0	OSD 4 Color Font RAM start Address (must be even number).
47h ~ 49h	-	7:0	Default : - Access : -
	-	7:0	Reserved.
4Ah	OHVSTA-H	7:0	Default : 0x00 Access : RO
	VSCR_OPT	7	Vscroll Option. 0: Original. 1: Fixed.
	-	6	Reserved.

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	OVSTA[9:8]	5:4	OSD windows Vertical Start position (Read only).
	-	3	Reserved.
	OHSTA[10:8]	2:0	OSD windows Horizontal Start position. (Read only).
4Bh ~ 4Ch	-	7:0	Default : - Access : -
	-	7:0	Reserved.
4Dh	OSDBRI	7:0	Default : 0x00 Access : R/W
	OSDBRI_EN	7	OSD Brightness Enable. 0: Disable. 1: Enable.
	OSDBRI_DIR	6	OSD Brightness Control. 0: Add. 1: Subtract.
	OSDBRI_VAL[5:0]	5:0	OSD Brightness Value.
4Eh ~ 4Fh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
50h	CODECLRDATA_L	7:0	Default : 0x00 Access : R/W
	CODECLRDATA[7:0]	7:0	OSD Code Clear Data.
51h	ATRCLRDATA_L	7:0	Default : 0x00 Access : R/W
	ATRCLRDATA[7:0]	7:0	OSD Attribute Clear Data (lower 8 bits).
52h	OSDCLRDATA	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	ATRCLRDATA[8]	4	OSD Attribute Clear Data.
	-	3:1	Reserved.
	CODECLRDATA[8]	0	OSD Code Clear Data.
53h	OSDCLRADR_L	7:0	Default : 0x00 Access : R/W
	OSDCLR_ADR[7:0]	7:0	OSD Clear Starting address (lower 8 bits).
54h	OSDCLRADR_H	7:0	Default : 0x00 Access : R/W
	ATR1_CLREN	7	OSD Attribute High Clear Enable.
	ATR0_CLREN	6	OSD Attribute Low Clear Enable.
	CODE1_CLREN	5	OSD Code High Clear Enable.
	CODE0_CLREN	4	OSD Code Low Clear Enable.
	-	3:2	Reserved.
	OSDCLR_ADR[9:8]	1:0	OSD Clear Starting Address.
55h	OSDCLR_OFST	7:0	Default : 0x00 Access : R/W

OSD Register (Indirect mapping to Bank 00, Registers A1h/A2)			
Index	Mnemonic	Bits	Description
	-	7	Reserved
	OSDCLR_OFST[6:0]	6:0	OSD Clear Offset.
56h	OSDCLR_WID	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	OSDCLR_WID[6:0]	6:0	OSD Clear Width.
57h	OSDCLR_HIGT	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	OSDCLR_HIGT[6:0]	6:0	OSD Clear Height.
58h	OSDCLR_CTRL	7:0	Default : 0x00 Access : R/W
	-	7:1	Reserved.
	BLK_CLR_EN	0	OSD Block Clear Enable.
59h ~ 9Fh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

Mstar Confidential

for 深圳市江启科技有限公司
Internal Use Only

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)				
Index	Mnemonic	Bits	Description	
00h	Gamma_R00	7:0	Default : 0d00	Access : R/W
	Gamma_R00	7:0	Gamma_table R00 value.	
01h	Gamma_R01	7:0	Default : 0d07	Access : R/W
	Gamma_R01	7:0	Gamma_table R01 value.	
02h	Gamma_R02	7:0	Default : 0d15	Access : R/W
	Gamma_R02	7:0	Gamma_table R02 value.	
03h	Gamma_R03	7:0	Default : 0d23	Access : R/W
	Gamma_R03	7:0	Gamma_table R03 value.	
04h	Gamma_R04	7:0	Default : 0d31	Access : R/W
	Gamma_R04	7:0	Gamma_table R04 value.	
05h	Gamma_R05	7:0	Default : 0d39	Access : R/W
	Gamma_R05	7:0	Gamma_table R05 value.	
06h	Gamma_R06	7:0	Default : 0d47	Access : R/W
	Gamma_R06	7:0	Gamma_table R06 value.	
07h	Gamma_R07	7:0	Default : 0d55	Access : R/W
	Gamma_R07	7:0	Gamma_table R07 value.	
08h	Gamma_R08	7:0	Default : 0d63	Access : R/W
	Gamma_R08	7:0	Gamma_table R08 value.	
09h	Gamma_R09	7:0	Default : 0d71	Access : R/W
	Gamma_R09	7:0	Gamma_table R09 value.	
0Ah	Gamma_R10	7:0	Default : 0d79	Access : R/W
	Gamma_R10	7:0	Gamma_table R10 value.	
0Bh	Gamma_R11	7:0	Default : 0d87	Access : R/W
	Gamma_R11	7:0	Gamma_table R11 value.	
0Ch	Gamma_R12	7:0	Default : 0d95	Access : R/W
	Gamma_R12	7:0	Gamma_table R12 value.	
0Dh	Gamma_R13	7:0	Default : 0d103	Access : R/W
	Gamma_R13	7:0	Gamma_table R13 value.	
0Eh	Gamma_R14	7:0	Default : 0d111	Access : R/W
	Gamma_R14	7:0	Gamma_table R14 value.	
0Fh	Gamma_R15	7:0	Default : 0d119	Access : R/W
	Gamma_R15	7:0	Gamma_table R15 value.	

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)			
Index	Mnemonic	Bits	Description
10h	Gamma_R16	7:0	Default : 0d127 Access : R/W
	Gamma_R16	7:0	Gamma_table R16 value.
11h	Gamma_R17	7:0	Default : 0d135 Access : R/W
	Gamma_R17	7:0	Gamma_table R17 value.
12h	Gamma_R18	7:0	Default : 0d143 Access : R/W
	Gamma_R18	7:0	Gamma_table R18 value.
13h	Gamma_R19	7:0	Default : 0d151 Access : R/W
	Gamma_R49	7:0	Gamma_table R19 value.
14h	Gamma_R20	7:0	Default : 0d159 Access : R/W
	Gamma_R20	7:0	Gamma_table R20 value.
15h	Gamma_R21	7:0	Default : 0d167 Access : R/W
	Gamma_R21	7:0	Gamma_table R21 value.
16h	Gamma_R22	7:0	Default : 0d175 Access : R/W
	Gamma_R22	7:0	Gamma_table R22 value.
17h	Gamma_R23	7:0	Default : 0d183 Access : R/W
	Gamma_R23	7:0	Gamma_table R23 value.
18h	Gamma_R24	7:0	Default : 0d191 Access : R/W
	Gamma_R24	7:0	Gamma_table R24 value.
19h	Gamma_R25	7:0	Default : 0d199 Access : R/W
	Gamma_R25	7:0	Gamma_table R25 value.
1Ah	Gamma_R26	7:0	Default : 0d207 Access : R/W
	Gamma_R26	7:0	Gamma_table R26 value.
1Bh	Gamma_R27	7:0	Default : 0d215 Access : R/W
	Gamma_R27	7:0	Gamma_table R27 value.
1Ch	Gamma_R28	7:0	Default : 0d223 Access : R/W
	Gamma_R28	7:0	Gamma_table R28 value.
1Dh	Gamma_R29	7:0	Default : 0d232 Access : R/W
	Gamma_R29	7:0	Gamma_table R29 value.
1Eh	Gamma_R30	7:0	Default : 0d239 Access : R/W
	Gamma_R30	7:0	Gamma_table R30 value.
1Fh	Gamma_R31	7:0	Default : 0d247 Access : R/W
	Gamma_R31	7:0	Gamma_table R31 value.
20h	Gamma_R32	7:0	Default : 0d255 Access : R/W

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)			
Index	Mnemonic	Bits	Description
	Gamma_R32	7:0	Gamma_table R32 value.
21h	Gamma_G00	7:0	Default : 0d00 Access : R/W
	Gamma_G00	7:0	Gamma_table G00 value.
22h	Gamma_G01	7:0	Default : 0d07 Access : R/W
	Gamma_G01	7:0	Gamma_table G01 value.
23h	Gamma_G02	7:0	Default : 0d15 Access : R/W
	Gamma_G02	7:0	Gamma_table G02 value.
24h	Gamma_G03	7:0	Default : 0d23 Access : R/W
	Gamma_G03	7:0	Gamma_table G03 value.
25h	Gamma_G04	7:0	Default : 0d31 Access : R/W
	Gamma_G04	7:0	Gamma_table G04 value.
26h	Gamma_G05	7:0	Default : 0d39 Access : R/W
	Gamma_G05	7:0	Gamma_table G05 value.
27h	Gamma_G06	7:0	Default : 0d47 Access : R/W
	Gamma_G06	7:0	Gamma_table G06 value.
28h	Gamma_G07	7:0	Default : 0d55 Access : R/W
	Gamma_G07	7:0	Gamma_table G07 value.
29h	Gamma_G08	7:0	Default : 0d63 Access : R/W
	Gamma_G08	7:0	Gamma_table G08 value.
2Ah	Gamma_G09	7:0	Default : 0d71 Access : R/W
	Gamma_G09	7:0	Gamma_table G09 value.
2Bh	Gamma_G10	7:0	Default : 0d79 Access : R/W
	Gamma_G10	7:0	Gamma_table G10 value.
2Ch	Gamma_G11	7:0	Default : 0d87 Access : R/W
	Gamma_G11	7:0	Gamma_table G11 value.
2Dh	Gamma_G12	7:0	Default : 0d95 Access : R/W
	Gamma_G12	7:0	Gamma_table G12 value.
2Eh	Gamma_G13	7:0	Default : 0d103 Access : R/W
	Gamma_G13	7:0	Gamma_table G13 value.
2Fh	Gamma_G14	7:0	Default : 0d111 Access : R/W
	Gamma_G14	7:0	Gamma_table G14 value.
30h	Gamma_G15	7:0	Default : 0d119 Access : R/W
	Gamma_G15	7:0	Gamma_table G15 value.

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)				
Index	Mnemonic	Bits	Description	
31h	Gamma_G16	7:0	Default : 0d127	Access : R/W
	Gamma_G16	7:0	Gamma_table G16 value.	
32h	Gamma_G17	7:0	Default : 0d135	Access : R/W
	Gamma_G17	7:0	Gamma_table G17 value.	
33h	Gamma_G18	7:0	Default : 0d143	Access : R/W
	Gamma_G18	7:0	Gamma_table G18 value.	
34h	Gamma_G19	7:0	Default : 0d151	Access : R/W
	Gamma_G19	7:0	Gamma_table G19 value.	
35h	Gamma_G20	7:0	Default : 0d159	Access : R/W
	Gamma_G20	7:0	Gamma_table G20 value.	
36h	Gamma_G21	7:0	Default : 0d167	Access : R/W
	Gamma_G21	7:0	Gamma_table G21 value.	
37h	Gamma_G22	7:0	Default : 0d175	Access : R/W
	Gamma_G22	7:0	Gamma_table G22 value.	
38h	Gamma_G23	7:0	Default : 0d183	Access : R/W
	Gamma_G23	7:0	Gamma_table G23 value.	
39h	Gamma_G24	7:0	Default : 0d191	Access : R/W
	Gamma_G24	7:0	Gamma_table G24 value.	
3Ah	Gamma_G25	7:0	Default : 0d199	Access : R/W
	Gamma_G25	7:0	Gamma_table G25 value.	
3Bh	Gamma_G26	7:0	Default : 0d207	Access : R/W
	Gamma_G26	7:0	Gamma_table G26 value.	
3Ch	Gamma_G27	7:0	Default : 0d215	Access : R/W
	Gamma_G27	7:0	Gamma_table G27 value.	
3Dh	Gamma_G28	7:0	Default : 0d223	Access : R/W
	Gamma_G28	7:0	Gamma_table G28 value.	
3Eh	Gamma_G29	7:0	Default : 0d232	Access : R/W
	Gamma_G29	7:0	Gamma_table G29 value.	
3Fh	Gamma_G30	7:0	Default : 0d239	Access : R/W
	Gamma_G30	7:0	Gamma_table G30 value.	
40h	Gamma_G31	7:0	Default : 0d247	Access : R/W
	Gamma_G31	7:0	Gamma_table G31 value.	
41h	Gamma_G32	7:0	Default : 0d255	Access : R/W

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)			
Index	Mnemonic	Bits	Description
	Gamma_G32	7:0	Gamma_table G32 value.
42h	Gamma_B00	7:0	Default : 0d00 Access : R/W
	Gamma_B00	7:0	Gamma_table B00 value.
43h	Gamma_B01	7:0	Default : 0d07 Access : R/W
	Gamma_B01	7:0	Gamma_table B01 value.
44h	Gamma_B02	7:0	Default : 0d15 Access : R/W
	Gamma_B02	7:0	Gamma_table B02 value.
45h	Gamma_B03	7:0	Default : 0d23 Access : R/W
	Gamma_B03	7:0	Gamma_table B03 value.
46h	Gamma_B04	7:0	Default : 0d31 Access : R/W
	Gamma_B04	7:0	Gamma_table B04 value.
47h	Gamma_B05	7:0	Default : 0d39 Access : R/W
	Gamma_B05	7:0	Gamma_table B05 value.
48h	Gamma_B06	7:0	Default : 0d47 Access : R/W
	Gamma_B06	7:0	Gamma_table B06 value.
49h	Gamma_B07	7:0	Default : 0d55 Access : R/W
	Gamma_B07	7:0	Gamma_table B07 value.
4Ah	Gamma_B08	7:0	Default : 0d63 Access : R/W
	Gamma_B08	7:0	Gamma_table B08 value.
4Bh	Gamma_B09	7:0	Default : 0d71 Access : R/W
	Gamma_B09	7:0	Gamma_table B09 value.
4Ch	Gamma_B10	7:0	Default : 0d79 Access : R/W
	Gamma_B10	7:0	Gamma_table B10 value.
4Dh	Gamma_B11	7:0	Default : 0d87 Access : R/W
	Gamma_B11	7:0	Gamma_table B11 value.
4Eh	Gamma_B12	7:0	Default : 0d95 Access : R/W
	Gamma_B12	7:0	Gamma_table B12 value.
4Fh	Gamma_B13	7:0	Default : 0d103 Access : R/W
	Gamma_B13	7:0	Gamma_table B13 value.
50h	Gamma_B14	7:0	Default : 0d111 Access : R/W
	Gamma_B14	7:0	Gamma_table B14 value.
51h	Gamma_B15	7:0	Default : 0d119 Access : R/W
	Gamma_B15	7:0	Gamma_table B15 value.

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)				
Index	Mnemonic	Bits	Description	
52h	Gamma_B16	7:0	Default : 0d127	Access : R/W
	Gamma_B16	7:0	Gamma_table B16 value.	
53h	Gamma_B17	7:0	Default : 0d135	Access : R/W
	Gamma_B17	7:0	Gamma_table B17 value.	
54h	Gamma_B18	7:0	Default : 0d143	Access : R/W
	Gamma_B18	7:0	Gamma_table B18 value.	
55h	Gamma_B19	7:0	Default : 0d151	Access : R/W
	Gamma_B19	7:0	Gamma_table B19 value.	
56h	Gamma_B20	7:0	Default : 0d159	Access : R/W
	Gamma_B20	7:0	Gamma_table B20 value.	
57h	Gamma_B21	7:0	Default : 0d167	Access : R/W
	Gamma_B21	7:0	Gamma_table B21 value.	
58h	Gamma_B22	7:0	Default : 0d175	Access : R/W
	Gamma_B22	7:0	Gamma_table B22 value.	
59h	Gamma_B23	7:0	Default : 0d183	Access : R/W
	Gamma_B23	7:0	Gamma_table B23 value.	
5Ah	Gamma_B24	7:0	Default : 0d191	Access : R/W
	Gamma_B24	7:0	Gamma_table B24 value.	
5Bh	Gamma_B25	7:0	Default : 0d199	Access : R/W
	Gamma_B25	7:0	Gamma_table B25 value.	
5Ch	Gamma_B26	7:0	Default : 0d207	Access : R/W
	Gamma_B26	7:0	Gamma_table B26 value.	
5Dh	Gamma_B27	7:0	Default : 0d215	Access : R/W
	Gamma_B27	7:0	Gamma_table B27 value.	
5Eh	Gamma_B28	7:0	Default : 0d223	Access : R/W
	Gamma_B28	7:0	Gamma_table B28 value.	
5Fh	Gamma_B29	7:0	Default : 0d232	Access : R/W
	Gamma_B29	7:0	Gamma_table B29 value.	
60h	Gamma_B30	7:0	Default : 0d239	Access : R/W
	Gamma_B30	7:0	Gamma_table B30 value.	
61h	Gamma_B31	7:0	Default : 0d247	Access : R/W
	Gamma_B31	7:0	Gamma_table B31 value.	
62h	Gamma_B32	7:0	Default : 0d255	Access : R/W

Gamma Register (Indirect mapping to Bank 00, Registers 91h/92h)

Index	Mnemonic	Bits	Description
	Gamma_B32	7:0	Gamma_table B32 value.

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only

Scaler Register (Bank = 00, Registers B0h ~ FFh)

Scaler Register (Bank=00, Registers B0h ~ FFh)				
Index	Mnemonic	Bits	Description	
B0h	LINE_SHIFT	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	SEL_V_CLR	6	Select Vcounter Clear by DOWNCNT_EQ1 or EARLY_VS.	
	-	5	Reserved.	
	VCR_FF_MODE	4	Enable output VSYNC follow input VSYNC mode.	
	FIELD_INV_VS	3	Line shift vs Field Inverse.	
	LINE_SHIFT_NUM[2:0]	2:0	Line Shift Numbers.	
B1h	SYNC_CONTROL	7:0	Default : 0x08	Access : R/W
	CLK_DLY[3:0]	7:4	Output clock delay select.	
	CLK_INV	3	Output Clock invert enable.	
	DE_INV	2	Output DE Invert enable.	
	VS_INV	1	Output VSYNC Invert enable.	
	HS_INV	0	Output HSYNC Invert enable.	
	B2h	SYNC_SEL	7:0	Default : 0x00
-		7:4	Reserved.	
SEL_VDE		3	Select VDE output to VSYNC pin.	
SEL_HDE		2	Select HDE output to HSYNC pin.	
DATA_SKEW		1:0	Bus data Skew select.	
B3h		SVM_CLK	7:0	Default : 0x10
	-	7	Reserved.	
	GB_SWAP	6	Data Bus G, B Swap.	
	RG_SWAP	5	Data Bus R, G Swap.	
	SVM_CLK_INV	4	SVM Clock Inverse.	
	SVM_CLKDLY	3:0	SVM Clock delay select.	
B4h ~ BFh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
C0h	HSPRDL_L	7:0	Default : -	Access : RO
	HSPRDL[7:0]	7:0	Number of system clock count at 512 HSYNCs.	
C1h	HSPRDL_M	7:0	Default : -	Access : RO
	HSPRDL[15:8]	7:0	Number of system clock count at 512 HSYNCs.	
C2h	HSPRDL_H	7:0	Default : -	Access : RO
	HSPRDL[23:16]	7:0	Number of system clock count at 512 HSYNCs.	

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description
C3h	YCDLYCTL	7:0	Default : 0x00 Access : R/W
	LNBF4_MD	7	Four Line Buffer Mode.
	VSD_PIPE	6	VSD Pipe select. 0: Original. 1: Early pipe 2 cycle.
	-	5:3	Reserved.
	YC_DLY_CTL	2:0	YC Delay Control. 000: Normal. 001: Y early 1 cycle. 010: Y early 2 cycles. 011: Y early 3 cycles. 100: Normal. 101: C early 1 cycle. 110: C early 2 cycles. 111: C early 3 cycles.
C4h	VTOTAL_MAX_L	7:0	Default : 0xFF Access : R/W
	TOTAL_MAX[7:0]	7:0	Vertical Max Total (lower 8 bits).
C5h	VTOTAL_MAX_H	7:0	Default : 0x07 Access : R/W
	-	7:3	Reserved.
	TOTAL_MAX[10:8]	2:0	Vertical Max Total (higher 3 bits).
C6h ~ C7h	-	7:0	Default : - Access : -
	-	7:0	Reserved.
C8h	ATGCTRL	7:0	Default : 0x00 Access : R/W
	MAXR (RO)	7	Max value flag for Red channel (read only). 0: Normal. 1: Max value (255) value when AGR = 0. Output over max value (255) when AGR = 1.
	MAXG (RO)	6	Max value flag for Green channel (read only). 0: Normal. 1: Max value (255) value when AGR = 0. Output over max value (255) when AGR = 1.
	MAXB (RO)	5	Max value flag for Blue channel (read only). 0: Normal. 1: Max value (255) value when AGR = 0. Output over max value (255) when AGR = 1.

Scaler Register (Bank=00, Registers B0h ~ FFh)			
Index	Mnemonic	Bits	Description
	AC_EN	4	ADC Calibration Enable. 0: Disable. 1: Enable.
	AGR	3	Auto Gain Result selection. 0: Output has max/min value. 1: Output is overflow/underflow.
	ATGM	2	Auto Gain Mode. 0: Normal mode (result will be cleared every frame). 1: History mode (result remains not cleared till ATGE = 0).
	ATGR (RO)	1	Auto Gain Result Ready. 0: Result not ready. 1: Result ready.
	ATGE	0	Auto Gain Function Enable. 0: Disable. 1: Enable.
C9h	ATGST	7:0	Default : - Access : R/W
	VCLP	7	Video auto gain mode. 0: RGB mode. 1: YPbPr Mode.
	-	6	Reserved.
	CALR (RO)	5	Calibration value flag for Red channel. 0: Normal. 1: Calibration result (needs to increase offset) when ACE=1.
	CALG (RO)	4	Calibration value flag for Green channel. 0: Normal. 1: Calibration result (needs to increase offset) when ACE=1.
	CALB (RO)	3	Calibration value flag for Blue channel. 0: Normal. 1: Calibration result (needs to increase offset) when ACE=1.
	MINR (RO)	2	Min value flag for Red channel. 0: Normal. 1: Min value (0) present when AGR = 0, ACE = 0. Output under min value (0) when AGR = 1, ACE = 0. Calibration result (needs to decrease offset) when ACE = 1.

Scaler Register (Bank=00, Registers B0h ~ FFh)			
Index	Mnemonic	Bits	Description
	MING (RO)	1	Min value flag for Green channel. 0: Normal. 1: Min value (0) present when AGR = 0, ACE = 0. Output under min value (0) when AGR = 1, ACE = 0. Calibration result (needs to decrease offset) when ACE = 1.
	MINB (RO)	0	Min value flag for Blue channel. 0: Normal. 1: Min value (0) present when AGR = 0, ACE = 0. Output under min value (0) when AGR = 1, ACE = 0. Calibration result (needs to decrease offset) when ACE = 1.
CAh	ATFCHSEL	7:0	Default: 0x00 Access : R/W
	-	7:6	Reserved.
	ATPCHSEL[1:0]	5:4	Auto Phase R/G/B channel select 00: R/G/B 3 channels 01: only R channel 10: only G channel 11: only B channel
	-	3	Reserved.
	ATGCHSEL[2:0]	2:0	Auto Gain R/G/B channel min/max value select. 000: R min value 001: G min value 010: B min value 011: R max value 100: G max value 101: B max value 11x: Reserved
CBh	ATOCTRL	7:0	Default : 0x00 Access : R/W
	JITLR	7	Jitter function Left / Right result for 86h and 87h. 0: Left result. 1: right result.
	JITS	6	Jitter Software clear. 0: Not clear. 1: Clear.
	-	5	Reserved.
	JITM	4	Jitter function Mode. 0: Update every frame. 1: Keep the history value.

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description
	JITR	3	Jitter function Result (Read Only). 0: No jitter. 1: Jitter present.
	ATOM	2	Auto position function Mode. 0: Update every frame. 1: Keep the history value.
	ATOR	1	Auto position result Ready (Read Only). 0: Result ready. 1: Result not ready.
	ATOE	0	Auto position function Enable. 0: Disable. 1: Enable. Disable-to-enable needs at least 2 frame apart for ready bit to settle.
CCh	AOVDV	7:0	Default : 0x00 Access : R/W
	AOVDV[3:0]	7:4	Auto position Valid Data Value. 0000: Valid if data >= 0000 0000. 0001: Valid if data >= 0001 0000. 0010: Valid if data >= 0010 0000. 1111: Valid if data >= 1111 0000.
	-	3:0	Reserved.
CDh	ATGVALUE (RO)	7:0	Default: - Access : RO
	ATGVALUE[7:0]	7:0	Auto Gain result based on 7Ah[2:0].
CEh	AOVST-L (RO)	7:0	Default : - Access : RO
	AOVST [7:0]	7:0	Auto position detected result Vertical Starting point.
CFh	AOVST-H (RO)	7:0	Default : - Access : RO
	-	7:3	Reserved.
	AOVST[10:8]	2:0	See description for AOVST [7:0].
D0h	AOHST-L (RO)	7:0	Default : - Access : RO
	AOHST[7:0]	7:0	Auto position detected result Horizontal Starting point.
D1h	AOHST-H (RO)	7:0	Default : - Access : DB
	-	7:3	Reserved.
	SPRGST[10:8]	2:0	Image horizontal sample start point, count by input dot clock.
D2h	AOVEND-L (RO)	7:0	Default : - Access : RO
	AOVEND[7:0]	7:0	Auto position detected result Vertical End point.

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description	Access
D3h	AOVEND-H (RO)	7:0	Default : -	Access : RO
	-	7:3	Reserved.	
	AOVEND[10:8]	2:0	See description for AOVEND[7:0].	
D4h	AOHEND-L (RO)	7:0	Default : -	Access : RO
	AOHEND[7:0]	7:0	Auto position detected result Horizontal End point.	
D5h	AOHEND-H (RO)	7:0	Default : -	Access : RO
	-	7:4	Reserved.	
	AOHEND[11:8]	2:0	See description for AOHEND[7:0].	
D6h	JLR-L (RO)	7:0	Default : -	Access : RO
	JLR[7:0]	7:0	Jitter function detected Left/Right most point state (previous frame) depend on Reg_7Bh[7].	
D7h	JLR-H (RO)	7:0	Default : -	Access : RO
	-	7:3	Reserved.	
	JLR[10:8]	2:0	See description for JLR[7:0].	
D8h	ANRF	7:0	Default : -	Access : RO
	-	7:6	Reserved.	
	HNEN	5	High level Noise reduction Enable. 0: Disable. 1: Enable.	
	BGEN	4	Background Noise reduction Enable. 0: Disable. 1: Enable.	
	-	3	Reserved.	
	ANLV[2:0]	2:0	Auto Noise Level, 000: Noise level = 1, 001: Noise level = 2, 010: Noise level = 4, 011: Noise level = 8, 100: Noise level = 9, 101: Noise level = 10, 110: Noise level = 12, 111: Noise level = 16.	
D9h	ATPGTH	7:0	Default : 0x01	Access : R/W
	ATPGTH[7:0]	7:0	Auto Phase Gray scale Threshold for ATPV3 when ATPN4 = 0.	
DAh	ATPTTH	7:0	Default : 0x10	Access : R/W

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description
	ATPTTH[7:0]	7:0	Auto Phase Text Threshold for ATPV4.
DBh	ATPCTRL	7:0	Default : 0x00 Access : R/W
	ATP_FLTRMD	7	0: Disable auto-position filter mode. 1: Enable auto-position filter mode.
	GRY (RO)	6	Gray scale detect (read only).
	TXT (RO)	5	Text detect (read only).
	APMASK[2:0]	4:2	Nose Mask. 000: Mask 0 bit, default value. 001: Mask 1 bit. 010: Mask 2 bit. 011: Mask 3 bit. 100: Mask 4 bit. 101: Mask 5 bit. 110: Mask 6 bit. 111: Mask 7 bit.
	ATPR (RO)	1	Auto Phase Result ready. 0: Result not ready. 1: Result ready.
	ATPE	0	Auto Phase function Enable. 0: Disable. 1: Enable.
DCh	ATPV1 (RO)	7:0	Default : - Access : RO
	ATPVALUE[7:0]	7:0	Auto Phase Value.
DDh	ATPV2 (RO)	7:0	Default : - Access : RO
	ATPVALUE[15:8]	7:0	See description for ATPVALUE[7:0].
DEh	ATPV3 (RO)	7:0	Default : - Access : RO
	ATPVALUE[23:16]	7:0	See description for ATPVALUE[7:0].
DFh	ATPV4 (RO)	7:0	Default : - Access : RO
	ATPVALUE[31:24]	7:0	See description for ATPVALUE[7:0].
E0h	PDMD0	7:0	Default : 0x00 Access : R/W
	GCLK[1:0]	7:6	Gated Clock for SRAM. 00: Normal. 01: V Blank. 10: H Blank and V Blank. 11: Reserved.

Scaler Register (Bank=00, Registers B0h ~ FFh)			
Index	Mnemonic	Bits	Description
	AUXCLK_GAT	5	0: Enable MVD MCU-support Clock. 1: Disable MVD MCU-support Clock.
	CMBCLK_GAT	4	0: Enable MVD comb-filter Clock. 1: Disable MVD comb-filter Clock.
	-	3	Reserved.
	EOCLK_INV	2	External OSD sample Clock Inverting.
	IDCLK_INV	1	Scaler input sample Clock Inverting.
	FSCCLK_INV	0	Sub-carrier Clock Inverting.
E1h	PDMD1	7:0	Default : 0x00 Access : R/W
	PDALL	7	All chip power down.
	BIUCLK_GAT	6	0: Enable register interface clock. 1: Disable register interface clock.
	OSDCLK_GAT	5	0: Enable OSD clock. 1: Disable OSD clock.
	PCCLK_GAT	4	0: Enable CRT output support clock. 1: Disable CRT output support clock.
	ADCCLK_GAT	3	0: Enable 3-channel ADC digital clock. 1: Disable 3-channel ADC digital clock.
	VDCLK_GAT	2	0: Enable CCIR and MVD interface clock. 1: Disable CCIR and MVD interface clock.
	IDCLK_GAT	1	0: Enable scaler clock. 1: Disable scaler clock.
	FSCCLK_GAT	0	0: Enable MVD digital front-end clock. 1: Disable MVD digital front-end clock.
E2h	SWRST0	7:0	Default : 0x00 Access : R/W
	REGR	7	Register Reset. 0: Normal operation. 1: Reset Register.
	ADCR	6	ADC Reset. 0: Normal operation. 1: Reset ADC.
	IPR	5	Digital Input Port Reset. 0: Normal operation. 1: Reset.
	OP1R	4	Scaler Reset. 0: Normal operation. 1: Reset.

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description
	OP2R	3	Display Port Reset. 0: Normal operation. 1: Reset.
	-	2	Reserved.
	OSDR	1	Internal OSD Reset. 0: Normal operation. 1: Reset internal OSD.
	SWR	0	Software Reset (reset All digital core except system registers). 0: Normal operation. 1: Reset.
E3h	SWRST1	7:0	Default : 0x00 Access : R/W
	VFER	7	Video Decoder Front End Reset. 0: Normal operation. 1: Reset.
	VCFR	6	Video Decoder Comb Filter Reset. 0: Normal operation. 1: Reset.
	MCUR	5	Embedded MCU Reset. 0: Normal operation. 1: Reset.
	MCUR	4	GMC digital tune Reset. 0: Normal operation. 1: Reset.
	-	3:0	Reserved.
E4h	ISOVRD	7:0	Default : 0x00 Access : R/W
	SL	7	Shift Line. 0: Shift line method 0. 1: Shift line method 1 for interlace mode.
	CSHS	6	HSYNC in coast. 0: HSYOUT (recommended). 1: Re-shaped HSYNC.
	UVSP	5	User defined input VSYNC Polarity, active when IVSJ =1. 0: Active low. 1: Active high.
	IVSJ	4	Input VSYNC polarity judgment. 0: Use result of internal circuit detection. 1: Defined by user (UVSP).

Scaler Register (Bank=00, Registers B0h ~ FFh)				
Index	Mnemonic	Bits	Description	
	UHSP	3	User defined input HSYNC Polarity, active when IVSJ =1. 0: Active low. 1: Active high.	
	IHSJ	2	Input HSYNC polarity judgment. 0: Use result of internal circuit detection. 1: Defined by user (UHSP).	
	UINT	1	User defined non-interlace/interlace, active when INTJ = 1. 0: Non-interlace. 1: Interlace.	
	INTJ	0	Interlace judgment. 0: Use result of internal circuit detection. 1: Defined by user (UINT).	
E5h	MDCTRL	7:0	Default : 0x00	Access : R/W
	IP_TEST_MD	7:6	IP Test-bus selection.	
	VERR	5	Video CCIR656 Error correct. 0: Disable. 1: Enable.	
	Field_ABSMD	4	Field Postion Absolute Value Mode.	
	VFIV	3	Video Field Inversion. 0: Normal. 1: Invert.	
	VEXF	2	Video External Field. 0: Use result of internal circuit detection. 1: Use external field.	
	INTF	1	Interlace Field detect method select. 0: Use the HSYNC numbers of a field to judge. 1: Use the relationship of VSYNC and HSYNC to judge.	
	IFI	0	Interlace Field Inverting. 0: Normal. 1: Invert.	
E6h	HSPW (RO)	7:0	Default : -	Access : RO
	HS_PW	7:0	HS Pulse Width	
E7h	VFREE	7:0	Default : 0x00	Access : R/W
	AUTOOPCOAST_CLR	7	Set Auto-Coast-for-output status.	
	AUTOOPCOAST	6	Enable Auto-Coast-for-output.	
	MIN_VTT[5:0]	5:0	Minimum VTT to free-run.	
E8h	HSTOL	7:0	Default : 0x05	Access : R/W

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description
	VS2HS (RO)	7	Input VSYNC too close to input HSYNC.
	LN4_DETMD	6	4 Line Detect Mode for Hs, DE.
	HSTOL[5:0]	5:0	HSYNC Tolerance. 5: Default value.
E9h	VSTOL	7:0	Default : 0x01 Access : R/W
	AUTONOSIGNAL_CLR	7	Set Auto-No-Signal status.
	AUTONOSIGNAL	6	Enable Auto-No-Signal function.
	HTT_FILTERMD	5	HTT Filter Mode.
	HVTT_LOSE_MD	4	HVTT Lose Mode. 0: Original. 1: New by WDT sample.
	VS_TOL[3:0]	3:0	VSYNC Tolerance. 1: Default value.
EAh	HSPRD_L	7:0	Default : - Access : RO
	HSPRD[7:0]	7:0	Input Horizontal Period, count by reference clock.
EBh	HSPRD_H	7:0	Default : - Access : RO
	-	7:5	Reserved.
	HSPRD[12:8]	4:0	See description for HSPRD[7:0].
ECh	VTOTAL_L	7:0	Default : - Access : RO
	VTOTAL[7:0]	7:0	Input Vertical Total Length, count by HSYNC.
EDh	VTOTAL_H	7:0	Default : - Access : RO
	-	7:3	Reserved.
	VTOTAL[10:8]	2:0	See description for VTOTAL[7:0].
EEh	PDMD2	7:0	Default : 0x60 Access : RW
	MCUCLK_SEL	7	MCU Clock Source Select. 0: XTAL. 1: MPLL divided.
	MCUDIV	6:4	MCU Clock divided by MPLL. 000: 4. 001: 6. 010: 8. 011: 10. 100: 12. 101: 14. 110: 16.
	-	3:1	Reserved.

Scaler Register (Bank=00, Registers B0h ~ FFh)				
Index	Mnemonic	Bits	Description	
	CC_GAT	0	Comb Clock Gating. 1: Gating mode. 0: No gating.	
EFh	STATUS2 (RO)	7:0	Default : -	Access : RO
	HTT_CHG_CS	7	Htotal change in CSOG.	
	-	6	Reserved.	
	STD_PAL	5	0: NTSC. 1: PAL.	
	CSD	4	CSYNC Detected status. 0: Input is not CSYNC. 1: Input is detected as CSYNC.	
	INTM	3	Interlace / Non-interlace detecting result by this chip. 0: Non-interlace. 1: Interlace.	
	INTF	2	Input odd/even Field detecting result by this chip. 0: Even. 1: Odd.	
	IHSP	1	Incoming input HSYNC Polarity detecting result by this chip. 0: Active low. 1: Active high.	
	IVSP	0	Incoming input VSYNC Polarity detecting result by this chip. 0: Active low. 1: Active high.	
F0h	CHIP_ID	7:0	Default : 0x00	Access : RO
	CHIP_ID[7:0]	7:0	Chip id is 70h	
F1h	CHIP_VERSION	7:0	Default : 0x01	Access : RO
	CHIP_VER[7:0]	7:0	Version is 01h	
F2h ~ F3h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
F4h	TRISTATE	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	OBBUS_TRI	4	Output bus Tristate.	
	VS_TRI	3	Output VSYNC Tristate.	
	HSY_TRI	2	Output HSYNC Tristate.	
	DE_TRI	1	Output DE Tristate.	

Scaler Register (Bank=00, Registers B0h ~ FFh)

Index	Mnemonic	Bits	Description
	CLK_TRI	0	Output CLK Tristate.
F7h ~ FFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

Mstar Confidential
 for 深圳市江启科技有限公司
 Internal Use Only

Analog Register (Bank = 01)

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
01h ~ 4Fh	-	7:0	Default : -	
	-	7:0	Reserved.	
50h	LPF_TAP1	7:0	Default : 0x00	
	ROUND_SEL	7:6	Round Select.	
	LPFTAP_1[5:0]	5:0	LPF Coefficient 1. (2's complement: -32 ~ 31)	
51h	LPF_TAP2	7:0	Default : 0x 00	
	VSD_DITH	7	VSD Dither method.	
	VSD_SEED_SEL	6	VSD Dither Seed Select.	
	LPFTAP_2[5:0]	5:0	LPF Coefficient 2.	
52h	LPF_TAP3	7:0	Default : 0x00	
	VSD_ROUND_EN	7	VSD Rounding Enable.	
	SEED_SEL	6	LPF Dither Seed Select.	
	LPFTAP_3[5:0]	5:0	LPF Coefficient 3.	
53h	LPF_TAP4	7:0	Default : 0x00	
	CSC_DITH_EN	7	CSC Dither Enable.	
	CSC_SEED_SEL	6	CSC Dither Seed Select.	
	LPFTAP_4[5:0]	5:0	LPF Coefficient 4.	
54h	LPF_TAP5	7:0	Default : 0x00	
	-	7:6	Reserved.	
	LPFTAP_5[5:0]	5:0	LPF Coefficient 5.	
55h	LPF_CTL	7:0	Default : 0x00	
	CSC_EN	7	CSC Enable. 0: Disable. 1: Enable.	
	LPFTAP_EN	6	LPFTAP Enable. 0: Disable. 1: Enable.	
56h	FCC_CB_1T	7:0	Default : 0x00	
	FCC_CB_1T[7:0]	7:0	FCC Cb 1T.	
57h	FCC_CR_1T	7:0	Default : 0x00	
	FCC_CR_1T[7:0]	7:0	FCC Cr 1T.	
58h	FCC_CB_2T	7:0	Default : 0x00	
			Access : R/W	

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	FCC_CB_2T[7:0]	7:0	FCC Cb 2T.
59h	FCC_CR_2T	7:0	Default : 0x00 Access : R/W
	FCC_CR_2T[7:0]	7:0	FCC Cr 2T.
5Ah	FCC_CB_3T	7:0	Default : 0x00 Access : R/W
	FCC_CB_3T[7:0]	7:0	FCC Cb 3T.
5Bh	FCC_CR_3T	7:0	Default : 0x00 Access : R/W
	FCC_CR_3T[7:0]	7:0	FCC Cr 3T.
5Ch	FCC_CB_4T	7:0	Default : 0x00 Access : R/W
	FCC_CB_4T[7:0]	7:0	FCC Cb 4T.
5Dh	FCC_CR_4T	7:0	Default : 0x00 Access : R/W
	FCC_CR_4T[7:0]	7:0	FCC Cr 4T.
5Eh	FCC_CB_5T	7:0	Default : 0x00 Access : R/W
	FCC_CB_5T[7:0]	7:0	FCC Cb 5T.
5Fh	FCC_CR_5T	7:0	Default : 0x00 Access : R/W
	FCC_CR_5T[7:0]	7:0	FCC Cr 5T.
60h	FCC_CB_6T	7:0	Default : 0x00 Access : R/W
	FCC_CB_6T[7:0]	7:0	FCC Cb 6T.
61h	FCC_CR_6T	7:0	Default : 0x00 Access : R/W
	FCC_CR_6T[7:0]	7:0	FCC Cr 6T.
62h	FCC_CB_7T	7:0	Default : 0x00 Access : R/W
	FCC_CB_7T[7:0]	7:0	FCC Cb 7T.
63h	FCC_CR_7T	7:0	Default : 0x00 Access : R/W
	FCC_CR_7T[7:0]	7:0	FCC Cr 7T.
64h	FCC_CB_8T	7:0	Default : 0x00 Access : R/W
	FCC_CB_8T[7:0]	7:0	FCC Cb 8T.
65h	FCC_CR_8T	7:0	Default : 0x00 Access : R/W
	FCC_CR_8T[7:0]	7:0	FCC Cr 8T.
66h	WHITE_SLOP	7:0	Default : 0x80 Access : R/W
	WHITE_SLOP[7:0]	7:0	White contrast adjust slope. >80h : slope >1. =80h : slope=1. <80h : slop <1.
67h	BLACK_SLOP	7:0	Default : 0x80 Access : R/W

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	BLACK_SLOP [7:0]	7:0	Black contrast adjust slope. >80h : slope >1. =80h : slope=1. <80h : slop <1.
68h	FCC_WIN1	7:0	Default : 0x00 Access : R/W
	CB_D1U[1:0]	7:6	Cb D1U.
	CB_D1D[1:0]	5:4	Cb D1D.
	CR_D1U[1:0]	3:2	Cr D1U.
	CR_D1D[1:0]	1:0	Cr D1D.
69h	FCC_WIN2	7:0	Default : 0x00 Access : R/W
	CB_D2U[1:0]	7:6	Cb D2U.
	CB_D2D[1:0]	5:4	Cb D2D.
	CR_D2U[1:0]	3:2	Cr D2U.
	CR_D2D[1:0]	1:0	Cr D2D.
6Ah	FCC_WIN3	7:0	Default : 0x00 Access : R/W
	CB_D3U[1:0]	7:6	Cb D3U.
	CB_D3D[1:0]	5:4	Cb D3D.
	CR_D3U[1:0]	3:2	Cr D3U.
	CR_D3D[1:0]	1:0	Cr D3D.
6Bh	FCC_WIN4	7:0	Default : 0x00 Access : R/W
	CB_D4U[1:0]	7:6	Cb D4U.
	CB_D4D[1:0]	5:4	Cb D4D.
	CR_D4U[1:0]	3:2	Cr D4U.
	CR_D4D[1:0]	1:0	Cr D4D.
6Ch	FCC_WIN5	7:0	Default : 0x00 Access : R/W
	CB_D5U[1:0]	7:6	Cb D5U.
	CB_D5D[1:0]	5:4	Cb D5D.
	CR_D5U[1:0]	3:2	Cr D5U.
	CR_D5D[1:0]	1:0	Cr D5D.
6Dh	FCC_WIN6	7:0	Default : 0x00 Access : R/W
	CB_D6U[1:0]	7:6	Cb D6U.
	CB_D6D[1:0]	5:4	Cb D6D.
	CR_D6U[1:0]	3:2	Cr D6U.
	CR_D6D[1:0]	1:0	Cr D6D.

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
6Eh	FCC_WIN7	7:0	Default : 0x00	Access : R/W
	CB_D7U[1:0]	7:6	Cb D7U.	
	CB_D7D[1:0]	5:4	Cb D7D.	
	CR_D7U[1:0]	3:2	Cr D7U.	
	CR_D7D[1:0]	1:0	Cr D7D.	
6Fh	FCC_WIN8	7:0	Default : 0x00	Access : R/W
	CB_D8U[1:0]	7:6	Cb D8U.	
	CB_D8D[1:0]	5:4	Cb D8D.	
	CR_D8U[1:0]	3:2	Cr D8U.	
	CR_D8D[1:0]	1:0	Cr D8D.	
70h	FCC_WIN9	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	CB_D9[2:0]	5:3	Cb D9.	
	CR_D9[2:0]	2:0	Cr D9.	
71h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
72h	FCC_K1K2	7:0	Default : 0xFF	Access : R/W
	FCC_K_T1[3:0]	7	FCC K T1.	
	FCC_K_T2[3:0]	0	FCC K T2.	
73h	FCC_K3K4	7:0	Default : 0xFF	Access : R/W
	FCC_K_T3[3:0]	7	FCC K T3.	
	FCC_K_T4[3:0]	0	FCC K T4.	
74h	FCC_K5K6	7:0	Default : 0xFF	Access : R/W
	FCC_K_T5[3:0]	7	FCC K T5	
	FCC_K_T6[3:0]	0	FCC K T6.	
75h	FCC_K7K8	7:0	Default : 0xFF	Access : R/W
	FCC_K_T7[3:0]	7	FCC K T7.	
	FCC_K_T8[3:0]	0	FCC K T8.	
76h	FCC_CTRL	7:0	Default : 0x00	Access : R/W
	M_FCC_T9	7	FCC T9 enable.	
	M_FCC_T8	6	FCC T8 enable.	
	M_FCC_T7	5	FCC T7 enable.	
	M_FCC_T6	4	FCC T6 enable.	

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	M_FCC_T5	3	FCC T5 enable.
	M_FCC_T4	2	FCC T4 enable.
	M_FCC_T3	1	FCC T3 enable.
	M_FCC_T1_T2	0	FCC T1 and T2 enable.
77h	APP_CTRL	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	MCME	6	CTI Median Filter Enable. 0: Disable. 1: Enable.
	MCEN	5	CTI Enable. 0: Disable. 1: Enable.
	MLME	4	LTI Median Filtler Enable. 0: Disable. 1: Enable.
	MLEN	3	LTI Enable. 0: Disable. 1: Enable.
	MPEN	2	Band1 and Band2 Peak Enable. 0: Disable. 1: Enable.
	-	1:0	Reserved.
78h	PEAK_BAND1	7:0	Default : 0x08 Access : R/W
	BAND1_STEP[1:0]	7:6	Band 1 Step Adjust. 00: 1. 01: 2. 10: 3. 11: 4.
	BAND1_COEF[5:0]	5:0	Band 1 Coefficient. (xxx.xxx)
79h	PEAK_BAND2	7:0	Default : 0x08 Access : R/W
	BAND2_STEP[1:0]	7:6	Band 2 Step Adjust. 00: 1. 01: 2. 10: 3. 11: 4.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	BAND2_COEF[5:0]	5:0	Band 2 Coefficient. (xxx.xxx)
7Ah	LTI	7:0	Default : 0x08 Access : R/W
	LTI_STEP[1:0]	7:6	LTI Step Adjust. 00: 1. 01: 2. 10: 3. 11: 4.
	LTI_COEF[5:0]	5:0	LTI Coefficient. (xxx.xxx)
7Bh	TERM_SEL	7:0	Default : 0x00 Access : R/W
	P_T1[1:0]	7:6	Peaking Term1 Select. 00, 01: Band 1. 10: Band 2. 11: LTI.
	P_T2[1:0]	5:4	Peaking Term2 Select. 00, 01: Band 1. 10: Band 2. 11: LTI.
	P_T3[1:0]	3:2	Peaking Term3 Select. 00, 01: Band 1. 10: Band 2. 11: LTI.
	P_T4[1:0]	1:0	Peaking Term4 Select. 00, 01: Band 1. 10: Band 2. 11: LTI.
7Ch	CORING	7:0	Default : 0x00 Access : R/W
	CTH_2[3:0]	7:4	Coring Threshold 2.
	CTH_1[3:0]	3:0	Coring Threshold 1.
7Dh	CTI	7:0	Default : 0x08 Access : R/W
	-	7	Reserved.
	CTI_STEP[1:0]	6:5	CTI Step Adjust. 00: 1. 01: 2. 10: 3. 11: 4.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	CTI_COEF[4:0]	4:0	CTI Coefficient. (xx.xxx)
7Eh	VIP_Y_CTRL	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	WLEEN	1	White Level Extension Enable. 0: Disable. 1: Enable.
	BLEEN	0	Black Level Extension Enable. 0: Disable. 1: Enable.
7Fh	WHITE_START	7:0	Default : 0x80 Access : R/W
	WHITE_START[7:0]	7:0	White contrast adjust starting point (must > or =80h); active range is from WHITE_START[7:0] to ffh.
80h	BLACK_START	7:0	Default : 0x00 Access : R/W
	BLACK_START[7:0]	7:0	Black contrast adjust starting point (must < 80h); active range is from 00h to BLACK_START[7:0]
81h	EGE_BAND1_POS	7:0	Default : 0x00 Access : R/W
	EGEBAND1_POS[7:0]	7:0	Edge Band 1 Coefficient (positive threshold for median filter max pixel).
82h	EGE_BAND1_NEG	7:0	Default : 0x00 Access : R/W
	EGEBAND1_NEG[7:0]	7:0	Edge Band 1 Coefficient (negative threshold for median filter min pixel).
83h	EGE_BAND2_POS	7:0	Default : 0x00 Access : R/W
	EGEBAND2_POS[7:0]	7:0	Edge Band 2 Coefficient (positive threshold for median filter max pixel).
84h	EGE_BAND2_NEG	7:0	Default : 0x00 Access : R/W
	EGEBAND2_NEG[7:0]	7:0	Edge Band 2 Coefficient (negative threshold for median filter min pixel).
85h	BRI	7:0	Default : 0x00 Access : R/W
	BRI[7:0]	7:0	Window Brightness (2's complement: -128 ~ 127).
86h	EGE_LTI_POS	7:0	Default : 0xFF Access : R/W
	EGELTI_POS[7:0]	7:0	Edge LTI Coefficient (positive threshold for median filter max pixel).
87h	EGE_LTI_NEG	7:0	Default : 0xFF Access : R/W
	EGELTI_NEG[7:0]	7:0	Edge LTI Coefficient (negative threshold for median filter min pixel).

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
88h	YC_LPF	7:0	Default : 0x00	Access : R/W
	C_LPF_MD[1:0]	7:6	C LPF mode. 00: Original. 01: 11. 10: 121. 11: 161.	
	Y_LPF_MD[1:0]	5:4	Y LPF mode.	
	B1DEN	3	Band 1 differentiate Enable.	
	B2DEN	2	Band 2 differentiate Enable.	
	-	1:0	Reserved.	
89h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
8Ah	Y_CORING_CTRL	7:0	Default : 0x00	Access : R/W
	HPS_EN	7	Coring as high pass.	
	Y_TBL_STEP	6:4	Y coring table Step.	
	PC_MODE	3	Coring in PC Mode.	
	Y_DITHER	2	Y coring dither Enable.	
	Y_CORING_BAND2_EN	1	Y coring band2 Enable.	
	Y_CORING_BAND1_EN	0	Y coring band1 Enable.	
8Bh	C_CORING_CTRL	7:0	Default : 0x00	
	-	7	Reserved.	
	C_TBL_STEP	6:4	C coring table Step.	
	-	3	Reserved.	
	C_DITHER	2	C coring dither Enable.	
	C_CORING_BAND2_EN	1	C coring band2 Enable.	
	C_CORING_BAND1_EN	0	C coring band1 Enable.	
8Ch	CORING_TBL1	7:0	Default : 0x00	Access : R/W
	CORING_TABLE1[7:0]	7:0	Coring table 1.	
8Dh	CORING_TBL2	7:0	Default : 0x00	
	CORING_TABLE2[7:0]	7:0	Coring table 2.	
8Eh	CORING_TBL3	7:0	Default : 0x00	
	CORING_TABLE3[7:0]	7:0	Coring table 3.	
8Fh	CORING_TBL4	7:0	Default : 0x00	
	CORING_TABLE4[7:0]	7:0	Coring table 4.	

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
90h	SARADC_CTRL	7:0	Default : 0x40	Access : R/W
	SAR_SNGL_CHNL	1:0	Channel selection in Single Channel mode.	
	-	3:2	Reserved.	
	SAR_SNGL	4	Single channel mode enable. Only sample channel at bit[1:0]	
	SAR_FREERUN	5	SARADC sample mode. 1: Freerun mode. 0: One shot mode.	
	-	6	Reserved.	
	SAR_START	7/W	SARADC sample Start.	
	SAR_RDY	7/R	SARADC sample Ready.	
91h	SARADC_SAMPRD	7:0	Default : 0x20	Access : R/W
	CKSAMP_PRD	7:0	SARADC input Sample Period in one shot mode. Real_SAMP_PRD = CKSAMP_PR x 4	
92h	SARADC_AISEL	7:0	Default : 0x00	Access : R/W
	SAR_AISEL	3:0	SAR_AISEL[3:0]: Input select of PAD_SAR_GPIO SAR_AISEL[i]=1b'0: Digital GPIO Input SAR_AISEL[i]=1b'1: SAR ADC Analog Input	
	-	7:4	Reserved	
93h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
94h	SAR_CH1_UPB	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	REG_SAR_CH1_UPB [5:0]	5:0	The voltage Upper Bound in MCU sleep mode for Channel 1 keypad wake up.	
95h	SAR_CH1_LOB	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	REG_SAR_CH1_LOB [5:0]	5:0	The voltage Lower Bound in MCU sleep mode for Channel 1 keypad wake up.	
96h	SAR_CH2_UPB	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved	
	REG_SAR_CH2_UPB [5:0]	5:0	The voltage Upper Bound in MCU sleep mode for Channel 2 keypad wake up.	
97h	SAR_CH2_LOB	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved	

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	REG_SAR_CH2_LOB [5:0]	5:0	The voltage Lower Bound in MCU sleep mode for Channel 2 keypad wake up.
98h	SAR_CH3_UPB	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved
	REG_SAR_CH3_UPB [5:0]	5:0	The voltage Upper Bound in MCU sleep mode for Channel 3 keypad wake up.
99h	SAR_CH3_LOB	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	REG_SAR_CH3_LOB [5:0]	5:0	The voltage Lower Bound in MCU sleep mode for Channel 3 keypad wake up.
9Ah ~	-	7:0	Default : - Access : -
9Bh	-	7:0	Reserved.
9Ch	ADC_MD_CTRL	7:0	Default : 0x00 Access : R/W
	ADC_DCTRL	7:6	Reserved for ADC DCTRL.
	GSHIFT_R	5	1: Enable ADC R Gain Range Shift for VD Mode.
	GSHIFT_G	4	1: Enable ADC G Gain Range Shift for VD Mode.
	GSHIFT_B	3	1: Enable ADC B Gain Range Shift for VD Mode.
	ADC_VCTRL	2:0	ADC Voltage Control (Recommend Setting = 3'b011).
9Dh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
9Eh	CAL_CTRL3	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	CAL_STSWEN	6	1: Enable Write to Internal CAL Registers through STATUS_CAL.
	CAL_SWOV	5:4	00: Normal Mode. 01: Switch ADC Input to Offset CAL Reference Voltage. 10: Reserved. 11: Reserved.
	CAL_HOLD	3	1: Hold Current CAL Result for Display.
	CAL_INPUT	2	0: CAL to Internal Offset Reference Voltage. 1: CAL to ADC Input.
	CAL_HYS	1	1: Enable CAL Update Hyteresis.
	DOFFS_EN	0	1: Enable Digital Offset Adjustment.
	9Fh	ADCTOUT	7:0
-		7:4	Reserved.
ADCTOUT_SYNC		3	1: Enable ADC Test Out Sync to CKEXT.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	ADCTOUT_DIV	2:0	Select ADC Test Out Decimation Ratio (1~8).
A0h	RG_DRV	7:0	Default : 0x55 Access : R/W
	G[7:6]_DRV[1:0]	7:6	Pad G[7:4] Driving select.
	G[5:4]_DRV[1:0]	5:4	Pad G[3:0] Driving select.
	R[3:2]_DRV[1:0]	3:2	Pad R[7:4] Driving select.
	R[1:0]_DRV[1:0]	1:0	Pad R[3:0] Driving select.
A1h	RG_DRV	7:0	Default : 0x55 Access : R/W
	HS_DRV[1:0]	7:6	Pad Hsync Driving select.
	VS_DRV[1:0]	5:4	Pad Vsync Driving select.
	B[7:4]_DRV[1:0]	3:2	Pad B[7:4] Driving select.
	B[3:0]_DRV[1:0]	1:0	Pad B[3:0] Driving select.
A2h	RG_DRV	7:0	Default : 0x55 Access : R/W
	PWM2_DRV[1:0]	7:6	Pad PWM2 Driving select.
	PWM1_DRV[1:0]	5:4	Pad PWM1 Driving select.
	CLK_DRV[1:0]	3:2	Pad CLK Driving select.
	DE_DRV[1:0]	1:0	Pad DE Driving select.
A3h	EPD_R	7:0	Default : 0x00 Access : R/W
	EPD_R[7:0]	7:0	Enable Pull Down in R channel.
A4h	EPD_G	7:0	Default : 0x00 Access : R/W
	EPD_G[7:0]	7:0	Enable Pull Down in G channel.
A5h	EPD_B	7:0	Default : 0x00 Access : R/W
	EPD_B[7:0]	7:0	Enable Pull Down in B channel.
A6h	EPD_R	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	EPD_PWM2	5	Enable pull down in PWM2 pad.
	EPD_PWM1	4	Enable pull down in PWM2 pad.
	EPD_CLK	3	Enable pull down in CLK pad.
	EPD_DE	2	Enable pull down in DE pad.
	EPD_HS	1	Enable pull down in HSYNC pad.
	EPD_VS	0	Enable pull down in VSYNC pad.
A7h ~ AAh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
ABh	VDAC_ADJ2	7:0	Default : 0x00 Access : R/W

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	-	7:5	Reserved.
	ED[4:0]	4:0	Testing control for voltage DAC.
ACh ~ AFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
B0h	SVMCTL0	7:0	Default : 0x50 Access : R/W
	SMEN	7	SVM Main window Enable.
	SMTE	6	SVM Main window Tap Enable.
	SMFT[1:0]	5:4	SVM Main window Filter Tap. 00: 2 tap. 01: 3 tap. 10: 4 tap. 11: 5 tap.
	-	3:0	Reserved.
B1h	SVMCTL1	7:0	Default : 0x08 Access : R/W
	OSDY	7	OSD color Space. 0: OSD color space. 1: OSD is YUV color space.
	SINV	6	SMV polarity Invert. 0: Normal. 1: Invert.
	SVMBYS[1:0]	5:4	SVM Bypass Y Select. 0x: SMV data. 10: Original Y data. 11: Y with tap filter.
	SCORING[3:0]	3:0	SVM Coring.
B2h	SVMLMT	7:0	Default : 0x70 Access : R/W
	SVMLMT[7:0]	7:0	SVM Limit.
B3h	SMSG	7:0	Default : 0x4A Access : R/W
	-	7	Reserved.
	SMSTEP[2:0]	6:4	SVM Main window Step. 000: 1 step. 001: 2 steps. ... 111: 8 steps.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	SMGAIN[3:0]	3:0	SVM Main window Gain. 0000: 1/16/ 0001: 1/8. 0010: 1/4. 0011: 3/8. 0100: 1/2. 0101: 5/8. 0110: 3/4. 0111: 1. 1110: 9/8. 1001: 5/4. 1010: 3/2. 1011: 2. 1100: 3. 1101: 4. 1110: 5. 1111: 8.
B4h	SVMADJ	7:0	Default : 0x26 Access : R/W
	-	7	Reserved.
	SVMPIP[1:0]	6:5	SVM pipe adjust.
	SVM DLY[4:0]	4:0	SVM Delay adjust. 00000: 8 clocks ahead. 00001: 7 clocks ahead. ... 11111: Delay 23 clocks.
B5h	OVERLAP_SEL	7:0	Default : 0x00 Access : R/W
	SVM_SEP_DLY	7	SVM Separate Delay Enable.
	OVERLAP_SEL[1:0]	6:5	Overlap Select. 00: Average. 01: No Action. 10: Keep slow down result. 11: Keep speed up result.
	SVM_SD_DLY[4:0]	4:0	SVM Slow down delay.
B6h	LCK_THR_FPLL	7:0	Default : 0x03 Access : R/W
	LCK_THR[7:0]	7:0	Lock Threshold.
B7h	LMT_LPLL_OFST_L	7:0	Default : 0xF0 Access : R/W
	LMT_LPLL_OFST[7:0]	7:0	Limit LPLL Offset Low byte.
B8h	LMT_LPLL_OFST_H	7:0	Default : 0xFF Access : R/W

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	LMT_LPLL_OFST [15:8]	7:0	Limit LPLL Offset High byte.
B9h	COEF_FPLL	7:0	Default : 0x50 Access : R/W
	TUNE_COEF[3:0]	7:4	Tune Coefficient.
	TUNE_COEF_RK[3:0]	3:0	Tune Coefficient RK.
BAh	RK_HOLD_GAIN_L	7:0	Default : 0x00 Access : R/W
	RK_HOLD_GAIN[7:0]	7:0	RK Hold Gain Low byte.
BBh	RK_HOLD_GAIN_H	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	RK_HOLD_GAIN [11:8]	3:0	RK Hold Gain High byte.
BEh	LPLL_STLMT_L	7:0	Default : 0x00 Access : R/W
	LPLL_STLMT[7:0]	7:0	FPLL Set Limit Low byte.
BFh	LPLL_STLMT_H	7:0	Default : 0x00 Access : R/W
	LPLL_STLMT[15:8]	7:0	FPLL Set Limit High byte.
C0h	TUNE_FRAME_NO	7:0	Default : 0x00 Access : R/W
	BND_OVWR_EN	7	Bonding Over-Write Enable.
	-	6:2	Reserved.
	TUNE_FRAME_NO	1:0	Frame pll tune per tune_frame numbers
C1h	BND_RST	7:0	Default : 0x7F Access : R/W
	MCU_SEL_OVWR	7	Select Internal MCU Disable.
	BND_RST[6:0]	6:0	Bonding Reset.
C2h	LMT_ADD_NMB	7:0	Default : 0x17 Access : R/W
	LMT_ADD_NMB[7:0]	7:0	Limit adjust Number in ACC_FPLL mode.
C3h	IVS_DIFF_THR	7:0	Default : 0x03 Access : R/W
	IVS_DIFF_THR[7:0]	7:0	Input v.s. Different Thresholds.
C4h	IVS_STALBE_THR	7:0	Default : 0x03 Access : R/W
	IVS_STB_THR[7:0]	7:0	Input v.s. Stable Thresholds.
C5h	CH_CH_MODE	7:0	Default : 0x02 Access : R/W
	-	7:6	Reserved.
	CH_CH_MD1	5	ACC FPLL Mode 1.
	-	4	Reserved.
	FPLL_DIS	3	FPLL Stop.

Analog Register (Bank = 01)

Index	Name	Bits	Description
	-	2	Reserved.
	ADD_LINE_SEL	1	Select Add Line into frame or pixel into line.
	CH_CH_MD0	0	ACC FPLL Mode 0.
C6h	ACC1_SEL	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	TUNE_CLK_FF	4	Tune Clock Enable when FF Mode.
	-	3:2	Reserved.
	ACC1_SEL[1:0]	1:0	Select modify numbers. 00: 3/4 diff numbers. 01: 1/2 diff numbers. others:1/4 diff numbers.
C7h	IVS_PRD_NUM_L	7:0	Default : 0x03 Access : R/W
	IVS_PRD_NUM[7:0]	7:0	Count Number per Input v.s Low byte.
C8h	IVS_PRD_NUM_H	7:0	Default : 0x03 Access : R/W
	-	7:4	Reserved.
	IVS_PRD_NUM[11:8]	3:0	Count Number per Input v.s 4 High bytes.
CAh	POL_SET0	7:0	Default : 0x00 Access : R/W
	POL_OUT_INV	7	POL Output Invert.
	POL_TP	6:0	POL Transition Point.
CBh	POL_SET1	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	POL_SEL	4	0: VSYNC Frequency POL. 1: HSYNC Frequency POL.
	POL_PVI_10IN	3	POL Output to SEQ_MOD Pin if EFh[7] = 0.
	-	2:0	Reserved.
CCh	SCAL_ACT	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	TC_CLK_DIV2	5	TC Clock Divide 2.
	-	4	Reserved.
	LINE_ACT_D1L	3	Line Active Delay One Line time.
	LINE_ACT_EN	2	TCON Line_Extract Mode work with Digital V_Scaling.
	-	1:0	Reserved.
CDh	GPO_OEV2_WIDTH	7:0	Default : 0x54 Access : R/W
	GPO_OEV2_DIS	7	OEV2 Disable.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	GPO_OEV2_WIDTH [6:0]	6:0	OEV2 Pulse Width.
CEh	GPO_OEV3_WIDTH	7:0	Default : 0x54 Access : R/W
	GPO_OEV3_DIS	7	OEV3 Disable.
	GPO_OEV3_WIDTH [6:0]	6:0	OEV3 Pulse Width.
CFh	GPO_OEV_DELTA	7:0	Default : 0x54 Access : R/W
	-	7:4	Reserved.
	GPO_OEV_DELTA[3:0]	3:0	Adjust OEV distance.
D0h	PTC_MODE1	7:0	Default : 0x8C Access : R/W
	TC_MD	7	TC signal output enable. 0: Disable set low. 1: Enable.
	OEV_DELTA_EN	6	OEV distance adjust Enable.
	DOU_EXTR_MD[1:0]	5:4	00: Normal mode. 01: Paranoma extract mode. 10: Full extract mode. 11: Line duplicate mode.
	FRAME_INV_EN	3	0: Disable. 1: Enable.
	EARLY_VS	2	Early vs.
	FIELD_SEL	1	Select field inverse from IP.
	LN_SHIFT	0	Field Line Shift enable.
D1h	PTC_MODE2	7:0	Default : 0x3E Access : R/W
	TCCLK_CONF[1:0]	7:6	7: 13 CLK swap. 6: 3 CLK inverse.
	SEQ_MD	5	0: Single clock output mode. 1: Three clock output mode.
	TCCLK_MD	4	Select 3TC CLK or 1 TC CLK.
	STHLR_SEL	3	0: STHR. 1: STHL.
	STVLR_SEL	2	0: STVR. 1: STVL.
	L_R	1	0: L_R equal 0. 1: L_R equal 1.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	U_D	0	0: U_D=0. 1: U_D=1.
D2h	PTC_MODE3	7:0	Default : 0x84 Access : R/W
	SET_TCCLK23_VALUE	7	Set TCCLK23 High/Low.
	LG_MD	6	LG_panel Mode enable.
	DF_EXT_LN	5	Different frame, Different Extract Line mode. 0: Disable. 1: Enable.
	LN_DUP_MD[1:0]	4:3	Duplicate 2/3 Line Mode. 4: OEV3 enable. 3: OEV2 enable.
	FIELD_IN_SEL	2	Select Field source from OP2 or free-run.
	LINE_INV_DIS	1	Line Inverse Disable. 0: Enable. 1: Disable.
	FRP_VCOM_INV	0	VCOM Inverse to FRP.
D3h	LN_EXTR_CNT_LMT	7:0	Default : 0xDD Access : R/W
	LN_EXTR_CNT_LMT2	7:4	Line Extract/duplicate Counter 2.
	LN_EXTR_CNT_LMT1	3:0	Line Extract/duplicate Counter 1.
D4h	LN_EXTR_SET1_H	7:0	Default : 0x2F Access : R/W
	LN_EXTR_SET1[7:0]	7:0	Line Extract/duplicate set 1 High byte.
D5h	LN_EXTR_SET1_L	7:0	Default : 0xEF Access : R/W
	LN_EXTR_SET1[15:8]	7:0	Line Extract/duplicate set 1 Low byte.
D6h	LN_EXTR_SET2_H	7:0	Default : 0x1F Access : R/W
	LN_EXTR_SET2[7:0]	7:0	Line Extract/duplicate set 2 High byte.
D7h	LN_EXTR_SET2_L	7:0	Default : 0xE7 Access : R/W
	LN_EXTR_SET2[15:8]	7:0	Line Extract/duplicate set 2 Low byte.
D8h	EXTR_STT_LN1	7:0	Default : 0x02 Access : R/W
	EXTR_STT_LN1[7:0]	7:0	Line Extract/duplicate Start Line 1.
D9h	EXTR_END_LN1	7:0	Default : 0x30 Access : R/W
	EXTR_END_LN1[7:0]	7:0	Line Extract/duplicate End Line 1.
DAh	EXTR_STT_LN2	7:0	Default : 0x50 Access : R/W
	EXTR_STT_LN2[7:0]	7:0	Line Extract/duplicate Start Line 2.
DBh	EXTR_END_LN2	7:0	Default : 0x77 Access : R/W
	EXTR_END_LN2[7:0]	7:0	Line Extract/duplicate End Line 2.

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
DCh	GPO_FRP_TRAN	7:0	Default : 0x13	Access : R/W
	OUT_INV	7	Output Inverse.	
	GPO_FRP_TRAN_MULT [1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_FRP_TRAN[4:0]	4:0	FRP Transition position.	
DDh	GPO_STH_STT	7:0	Default : 0x46	Access : R/W
	OUT_INV	7	Output Inverse.	
	GPO_STH_STT_MULT [1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_STH_STT[4:0]	4:0	STH pulse Start position.	
DEh	GPO_STH_WIDTH	7:0	Default : 0x01	Access : R/W
	-	7:6	Reserved.	
	GPO_STH_WIDTH_MULT [1:0]	5:4	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_STH_WIDTH [3:0]	3:0	STH pulse Width.	
DFh	GPO_OEH_STT	7:0	Default : 0xA3	Access : R/W
	OUT_INV	7	Output Inverse.	
	GPO_OEH_STT_MULT [1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_OEH_STT[4:0]	4:0	OEH pulse Start position.	
E0h	GPO_OEH_WIDTH	7:0	Default : 0x0B	Access : R/W
	-	7:6	Reserved.	
	GPO_OEH_WIDTH_MULT [1:0]	5:4	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_OEH_WIDTH [3:0]	3:0	OEH pulse Width.	

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
E1h	GPO_OEV_STT	7:0	Default : 0x01	Access : R/W
	OUT_INV	7	Output Inverse.	
	GPO_OEV_STT_MMULT [1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_OEV_STT[1:0]	4:0	OEV pulse Start.	
E2h	GPO_OEV_WIDTH	7:0	Default : 0x6D	Access : R/W
	-	7:6	Reserved.	
	GPO_OEV_WIDTH_ MULT[1:0]	5:4	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_OEV_WIDTH [3:0]	3:0	OEV pulse Width.	
E3h	GPO_CKV_STT	7:0	Default : 0x2D	Access : R/W
	OUT_INV	7	Output Inverse.	
	CKV_STT_MULT[1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_CKV_STT[4:0]	4:0	CKV pulse Start.	
E4h	GPO_CKV_STT2	7:0	Default : 0x04	Access : R/W
	-	7:6	Reserved.	
	CKV_STT2_MULT [1:0]	5:4	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_CKV_ST2[3:0]	3:0	CKV pulse Start 2.	
E5h	GPO_CKV_WIDTH	7:0	Default : 0x5F	Access : R/W
	-	7	Reserved.	
	CKV_WIDTH_ MULT[1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_CKV_WIDTH[4:0]	4:0	CKV pulse width.	

Analog Register (Bank = 01)				
Index	Name	Bits	Description	
E6h	GPO_STV_LN_TH	7:0	Default : 0x46 Access : R/W	
	-	7	Reserved.	
	GPO_STV_1LN	6	STV width is 1 Line.	
	GPO_STV_LINE_TH	5:0	STV line position	
E7h	GPO_STV_STT	7:0	Default : 0x29 Access : R/W	
	OUT_INV	7	Output Inverse.	
	STV_STT_MULT[1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_STV_STT[4:0]	4:0	STV pulse Start.	
E8h	GPO_STV_WIDTH	7:0	Default : 0x00 Access : R/W	
	-	7:6	Reserved.	
	STV_WIDTH_MULT [1:0]	5:4	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_STV_WIDTH [3:0]	3:0	STV pulse Width.	
E9h	GPO_OEV2_STT	7:0	Default : 0x04 Access : R/W	
	OUT_INV	7	Output Inverse.	
	OE2_STT_MULT [1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_OEV2_STT[4:0]	4:0	OE2 pulse Start.	
EAh	GPO_OEV3_STT	7:0	Default : 0x04 Access : R/W	
	OUT_INV	7	Output Inverse.	
	OE3_STT_MULT [1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.	
	GPO_OEV3_STT[4:0]	4:0	OE3 pulse Start.	
EBh	HSTT_DLY_L	7:0	Default :0x04 Access : R/W	
	HSTT_DLY[7:0]	7:0	H Start Delay numbers Low byte.	
ECh	HSTT_DLY_H	7:0	Default :0xA4 Access : R/W	

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	EXT_DIS_RNG	7:4	Extraction start point in line extraction mode.
	-	3	Reserved.
	HSTT_DLY_EN	2	H Start Delay Enable.
	HSST_DLY[9:8]	1:0	H Start Delay numbers High byte.
EDh	CLK_DLY_SYNCOUT	7:0	Default : 0x00 Access : R/W
	FRPSETH	7	Set High to Invert RGB Data when FRP Disable (BK1_D2[1]=1).
	-	6	Reserved.
	TC_GPIO_SEL	5	0: TC function. 1: GPIO function.
	OEV_MD_SEL	4	0: Normal mode. 1: Special mode.
	CLK_DLY_SEL_TC [3:0]	3:0	TCCLK Delay Select.
EEh	GPO_CKV_END2	7:0	Default : 0x28 Access : R/W
	CKV2_EN	7	CKV2 Enable.
	CKV_END2_MULT[1:0]	6:5	00: x1. 01: x4. 10: x8. 11: x16.
	GPO_CKV_END2	4:0	CKV2 End point.
EFh	Q1H_SETTING	7:0	Default : 0x08 Access : R/W
	Q1H_ENABLE	7	Q1H output from SEQ_MODE pin, toggle point is using OEV3 signal start point.
	TCCLK_INV_MODE	6:3	0001: TCCLK invert every field. 0011: TCCLK invert when Q1H is high. 0101: TCCLK invert when Q1H and field are high. 1001: TCCLK invert when Q1H is low and field is high.
	-	2	Reserved.
	INTOUT_OEN	1	Testmode. PAD_INTOUT output enable control. 0: Output. 1: Input.
	CLKIN_SEL	0	Testmode External Clock Select. 0: PAD_INTOUT. 1: PAD_CLKIN.
F0h	WDT0	7:0	Default : 0x00 Access : R/W
	WDT_TESTMD	7	CSOG test mode for WDT counter.

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	WDT_LD	6	Watch Dog Timer Load Value by SW.
	WDT_EN	5	Watch Dog Timer Enable Bit.
	-	4:0	Reserved.
F1h	WDT1	7:0	Default : 0x00 Access : R/W
	WDT_WIDTH	7:0	Watch Dog Timer Width.
F2h	WRLOCK0	7:0	Default : 0x00 Access : R/W
	WRLOCK0	7	Register lock (work with WRLOCK1). Register access is disabled when WRLOCK0 and WRLOCK1 are HIGH. Register access is enabled when WRLOCK0 and WRLOCK1 are LOW.
	-	6:0	Reserved.
F3h	PWMCLK	7:0	Default : 0x00 Access : R/W
	DB_EN	7	Double Buffer Enable. 0: Disable. 1: Enable.
	P2REN	6	PWM2 Reset every frame Enable. 0: Disable. 1: Enable.
	P1REN	5	PWM1 Reset every frame Enable. 0: Disable. 1: Enable.
	P2POL	4	PWM 2 Polarity when enhance PWM2 enable.
	EP2EN	3	Enhance PWM2 Enable. 0: Disable. 1: Enable.
	P1POL	2	PWM1 Polarity when enhance PWM1 enable.
	EP1EN	1	Enhance PWM1 Enable. 0: Disable. 1: Enable.
	PCLK	0	PWM1/2 base Clock select. 0: 14.318MHz. 1: 14.318MHz / 4.
F4h	PWM1C	7:0	Default : 0x00 Access : R/W
	PWM1_POL	7	PWM1 polarity.
	PWM1_CTUN[6:0]	6:0	PWM1 Coarse adjustment.
F5h	PWM2C	7:0	Default : 0x00 Access : R/W

Analog Register (Bank = 01)			
Index	Name	Bits	Description
	PWM2_POL	7	PWM2 polarity.
	PWM2_CTUN[6:0]	6:0	PWM2 Coarse adjustment.
F6h	PWM1EPL	7:0	Default : 0x00 Access : R/W
	EPWM1P[7:0]	7:0	Enhance PWM1 Period.
F7h	PWM1EPH	7:0	Default : 0x00 Access : R/W
	EPWM1P[15:8]	7:0	Enhance PWM1 Period.
F8h	PWM2EPL	7:0	Default : 0x00 Access : R/W
	EPWM2P[7:0]	7:0	Enhance PWM2 Period.
F9h	PWM2EPH	7:0	Default : 0x00 Access : R/W
	EPWM2P[15:8]	7:0	Enhance PWM2 Period.
FAh	PWM5L	7:0	Default : 0x00 Access : R/W
	PWM5[7:0]	7:0	PWM5 Period.
FBh	PWM5H	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	PWM5[12:8]	4:0	PWM5 Period.
FCh	PWM6L	7:0	Default : 0x00 Access : R/W
	PWM6[7:0]	7:0	PWM6 Period.
FDh	PWM6H	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	PWM6[12:8]	4:0	PWM6 Period.
FEh ~	-	7:0	Default : - Access : -
FFh	-	7:0	Reserved.

Video Decoder Register (Bank = 02)

Video Decoder Register (Bank = 02)				
Index	Name	Bits	Description	Access
01h	STATUS1	7:0	Default : -	Access : RO
	READBUS1	7:0	Test bus 1.	
02h	STATUS2	7:0	Default : -	Access : RO
	READBUS2	7:0	Test bus 2.	
03h	STATUS3	7:0	Default : -	Access : RO
	READBUS3	7:0	Test bus 3.	
04h	STATUS_MUX	7:0	Default : 0x00	Access : R/W
	READBUS_CTRL	7:0	VIPTTESTMUX Address Control of READBUS1, READBUS2, and READBUS3.	
05h ~	-	7:0	Default : -	Access : -
06h	-	7:0	Reserved.	
07h	DSP_ADD_PRT	7:0	Default : 0x00	Access : R/W
	DSP_ADD_PRT[7:0]	7:0	DSP register Address Port.	
08h	DSP_WDAT_PRT	7:0	Default : 0x00	Access : R/W
	DSP_WDAT_PRT[7:0]	7:0	DSP register Write Data Port.	
09h	DSP_RDAT_PRT	7:0	Default : -	Access : RO
	DSP_RDAT_PRT[7:0]	7:0	DSP register Read Data Port.	
10h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
11h	COMB_LL_EN	7:0	Default : 0x00	Access : R/W
	-	7:1	Reserved.	
	APL_COMB_LL_EN	0	1: Mux to select Com Line Lock mode.	
12h ~	-	7:0	Default : -	Access : -
13h	-	7:0	Reserved.	
14h	SOFT_RST	7:0	Default : 0x10	Access : R/W
	SOFT_RST	7	1: Softrest AFEC modules.	
	-	6:0	Reserved.	
15h	FPGA_CTRL	7:0	Default : 0xA8	Access : R/W
	FPGA_CTRL	7:0	Reserved for FPGA control.	
16h	REG_SOFT_RST2	7:0	Default : 0x00	Access : R/W
	REG_SOFT_RST2	7:0	Reserved for HW testing.	
17h	CLK_CTRL	7:0	Default : 0xC9	Access : R/W

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	FSCPLL_MODE	7	0: External FSC Clock Mode. 1: Internal FSC Clock Mode.
	ADC_DOUBLE	6	ADC Double Sample Rate Option.
	REG_CLK_VD_VIP	5:4	00: 4 Fsc Clock on Digital. 11: 8 Fsc Clock on Digital.
	REG_VCO_TYPE	3:2	10: VCO 16 Fsc. 01: VCO 8 Fsc. 00: VCO 4 Fsc.
	REG_ADC_CLK_LAG	1:0	CLK_CC / CLK_ADC Phase Diff.
18h	CSTATE_CTRL	7:0	Default : 0x86 Access : R/W
	CTRL_MD	7:5	Default: 100b, Auto control mode.
	-	4	Reserved.
	CTRL_STATE	3:0	State Stable State Value; default: 0110b.
19h	MVDET_EN	7:0	Default : 0xC0 Access : R/W
	MV_DETEC_EN	7	Microvision Detect Enable. 0: Disable. 1: Enable.
	-	6:5	Reserved.
	DSP_SYNC_ALW	4	Allow DSP to Control SYNC_FOUND.
	DSP_APL_ALW	3:2	0: Allow DSP to Control APL_FREQ_IDEAL (Center Frequency).
	SECAM_MD	1:0	1: Allow DSP to Control APL_FREQ and APL_PHS (Full frequency/PHS control).
1Ah	SVD_EN	7:0	Default : 0x40 Access : R/W
	SVIDEO_EN	7	0: Chroma Source from CVBS-Channel Input. 1: Chroma Source from C-Channel Input.
	ADC_C_ALWY_ON	6	Chroma ADC 16Fsc-to-4Fsc Down-Sampling is Enabled.
	CLAMDMSM_CTRL[15:10]	5:0	Clamping 12-bit Control code; integer parts.
1Bh	BKLV_L_FORCE1	7:0	Default : 0x80 Access : R/W
	DISCLAMP3	7	HW Clamping frozen 3 times if SYNC magnitude is small.
	CLMP_FREZ_ZERO	6	HW Clamping set to Zero when Frozen.
	CLAMDMSM_CTRL[9:4]	5:0	Clamping 12-bit control code; fractional parts.
1Ch	BKLV_L_FORCE2	7:0	Default : 0xFF Access : R/W
	CLMFZE_VRGE	7:0	Clamp Freeze of V Range.
1Dh	VCR_VLSHT	7:0	Default : 0xFF Access : R/W
	CLMFZE_HRGE	7:0	Clamp Freeze of H Range.

Video Decoder Register (Bank = 02)

Index	Name	Bits	Description	Access
1Eh	DSP_EN	7:0	Default : 0x80	Access : R/W
	DSP_EN_SYS	7	1: Enable SW DSP Function.	
	-	6:0	Reserved.	
1Fh	CLMP_C_EN	7:0	Default : 0x60	Access : R/W
	CLMP_C_EN	7	2nd ADC Chroma Clamping Enable.	
	CLMP_K1_INI	6:0	HW Clamping K1 when system not stable.	
20h	APLL_CTRL1	7:0	Default : 0xBC	Access : R/W
	APL_EN	7	Analog burst-lock PLL Enable.	
	APL_TYPE	6:4	APL Type.	
	-	3:2	Reserved.	
	APL_EN2	1	No state 7, when no bust.	
	CLMP_6B_FORCE	0	Clamp value 6-bit test mode enable.	
21h	APLL_CTRL2	7:0	Default : 0x18	Access : R/W
	CLMP_2DSM	7	Second order Clamp method.	
	APL_COMB_LL_TST[1]	6	0: Comb-Line-Lock Disabled if VCR. 1: Com-Line-Lock Enabled even for VCR.	
	APL_COMB_LL_TST[0]	5	0: Fractional SYNC Phase is used. 1: Integer PD from Comb.	
	DPL_PHS_CAL	4	DPL Phase Calibration.	
	APL_CEZANNE	3	For CEZANNE FPGA Test.	
	PALSWH_MODE	2:1	PAL Switch Mode control.	
	APL_COMB_LL_EN	0	Comb Line-Locked mode Enable.	
	22h	APL_FREQ_MD	7:0	Default : 0x61
APL_FREQ_MD[7:5]		7:5	APL Freq Mode.	
-		4:3	Reserved.	
ACLpz_WIDTH		2:0	Clamping Width.	
23h	APLL_TRANGE	7:0	Default : 0x40	Access : R/W
	APL_FREQ_LMT	7:5	Burst PLL Frequency Limitation. 0: 125ppm. 2: 250ppm. 4: 500ppm. 6: 1000ppm.	
	-	4:1	Reserved.	
	APL_K_FORCE	0	APL K value Force enable.	
24h	APL_K1_NOISY	7:0	Default : 0x04	Access : R/W

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	APL_K1_NOISY[7:0]	7:0	APLL phase tracking coefficients for Noisy broadcast.
25h	APL_K2_NOISY	7:0	Default : 0x02 Access : R/W
	APL_K2_NOISY[7:0]	7:0	APLL frequency tracking coefficients for Noisy broadcast.
26h	APL_K1_NORM	7:0	Default : 0x10 Access : R/W
	APL_K1	7:0	APLL phase tracking coefficients for normal condition.
27h	APL_K2_NORM	7:0	Default : 0x08 Access : R/W
	APL_K2	7:0	APLL frequency tracking coefficients for normal condition.
28h	APL_K1_VCR	7:0	Default : 0x02 Access : R/W
	APL_K1_VCR	7:0	APLL phase tracking coefficients for VCR.
29h	APL_K2_VCR	7:0	Default : 0x01 Access : R/W
	APL_K2_VCR	7:0	APLL frequency tracking coefficients for VCR.
2Ah	MODE_PFSC	7:0	Default : 0x20 Access : R/W
	MD_PFSC[7]	7	0: Auto Fsc. 1: Manual Fsc.
	MD_PFSC[6:4]	6:4	When bit[7]=1, 000: fsc=4.43361875 MHz. 001: fsc=4.406 MHz. 010: fsc=3.579545 MHz. 100: fsc=3.57561149 MHz. 110: fsc=3.58205625 MHz.
	VDFD_ASWFSC	3	Internal blind FSC try.
	VDFD_ASWFSC1	2	Internal blind FSC try1.
	HALFWIN_OP	1	Half Window period Option. 0: Asserted between 1/4 to 3/4 line period. 1: Asserted between 1/2 to 1 line period.
	OEINV_MD	0	ODD_EVEN_INVERT bit inversion Mode. 0: Directly bypass. 1: Inverse.
2Bh	VDFD_CTRL1	7:0	Default : 0x7E Access : R/W
	VDFD_FD_L	7:4	Fast attack frequency tracking time period.
	VDFD_PHSSTD_L	3:0	Monitor Phase tracking time period.
2Ch	VDFD_CTRL2	7:0	Default : 0x67 Access : R/W
	PHS_DIFF_THRD	7:4	Phase tracking deviation large Threshold.
	PHS_STD_RANGE	3:0	Phase tracking deviation small threshold.
2Dh	FD_K	7:0	Default : 0xC0 Access : R/W

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	FD_K	7:4	Fast Attack Frequency Tracking Coefficient.
	APL_PHS_OFST[11:8]	3:0	Preferred Phase Offset of the Analog Burst-locked PLL.
2Eh	APL_PHS_OFST	7:0	Default : 0x00 Access : R/W
	APL_PHS_OFST[7:0]	7:0	Preferred Phase Offset of the analog burst-locked PLL.
2Fh	BLACK_SEL	7:0	Default : 0x24 Access : R/W
	SETUP_YES	7:5	0x: Based on confirm mode auto determine. NTSC: setup. PAL: no setup. 10: Force no setup for NTSC. 11: Force setup for PAL.
	-	4:2	Reserved.
	-	1:0	Reserved.
30h	CLAMP_CTRL	7:0	Default : 0x01 Access : R/W
	CLAMPDAC_CTRL[7:6]	7:6	00: Auto clamping control. 01: Auto clamping control, but polarity inverted. 10: Force clamping control by bit[5:0]. 11: Auto clamping control.
	CLAMPDAC_CTRL[5:0]	5:0	Clamping control value.
31h	CLAMP_COEF1	7:0	Default : 0x40 Access : R/W
	CLMP_TYPE_ST3BOT	7	CLMP_BOT function enable in STAE3.
	CLMP_K1	6:0	Clamping speed; the larger the faster. 7'b101_1000 suggested for 1.00 uF. 7'b100_0000 suggested for 0.10 uF. (default) 7'b010_1000 suggested for 0.01 uF.
32h	CLAMP_COEF2	7:0	Default : 0xA0 Access : R/W
	CLMP_TYPE	7	Back-porch clamping enable (default =1).
	CLMP_K2	6:0	Leakage current tracking speed. Smaller value is preferred. 7'b001_0000 suggested for 1.00 uF. 7'b010_0000 suggested for 0.10 uF. (default). 7'b011_0000 suggested for 0.01 uF.
33h	CLAMP_COEF3	7:0	Default : 0x00 Access : R/W
	CLMP_LKG_MODE	7:4	Leakage control Mode.
	ADCLOSS_CNT	3:0	Count value of ADC Loss status.
34h	CLAMP_COEF4	7:0	Default : 0x82 Access : R/W
	CLMP_BOTSPD	7:6	Bottom reference LPF selection.
	CLMP_DLKG_MAC	5:0	Delta leakage is bounded by +- (CLAMP_DLKG_MAX/512).

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
35h	CLAMP_REF_SEL1	7:0	Default : 0x0A Access : R/W
	BLANKLVL_CTRL	7	Blank Level Control.
	BLANK_LVL[8]	6	Blank Level bit[8].
	CLMP_LKG	5:0	If CLAMP_LKG_MD = 1011, leakage is forced by CLAMP_LKG[4:0] * sign; where, sign=+1 if bit[5]=1, and sign=-1 if bit[5]=0. Default: 6'd10.
36h	CLAMP_COEF5	7:0	Default : 0x45 Access : R/W
	CLMP_BOTSEL	7:5	Clamp Bot Selection enable.
	CLMP_ERR_MAX	4:0	Back porch level Error for clamping is bounded by +- CLMP_ERR_MAX*8 (Default: 5'd25).
37h	CLAMP_REF_SEL2	7:0	Default : 0xF0 Access : R/W
	BLANK_LVL[7:0]	7:0	Blank Level.
38h	VSTROBE_LIMIT	7:0	Default : 0x13 Access : R/W
	BLACKLVL_CTRL	7	Black Level Control.
	BLACK_LVL[8]	6	Black Level bit[8].
	HV_VCNTSEL	5	1: Enable 2 nd Integration Protection for V Extraction.
	HV_VLINPROT	4	0: Enable Next V Extraction after 50 Lines. 1: Enable Next V Extraction after 200 Lines.
	BOTAV_INSEL	3	Bottom of active video Input Selection.
	BOT_INSEL	2:0	Bottom of whole line Input Selection.
39h	VSTROBE_PROTECT	7:0	Default : 0x6C Access : R/W
	WP_INSEL	7:5	Sync Input LPF BW Selection.
	HV_INSEL	4:2	HSYNC/VSYNC slicer level Selection.
	TOP_INSEL	1:0	Top level Input Selection.
3Ah	BLACK_LVL	7:0	Default : 0xCC Access : R/W
	BLACK_LVL[7:0]	7:0	Black Level value.
3Bh	HV_VEXTH	7:0	Default : 0x7D Access : R/W
	HV_VEXTH	7:0	0: V Extract by Line Length Unit. 1: V Extract by Manual Pixel Length Units.
3Ch	HV_C TRL1	7:0	Default : 0x2A Access : R/W
	HV_VSEL	7:6	00: V Extract native. 01: V Extrat Native Synchronize to next line start/middle. Other reserved.

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	HV_VTHRDSEL	5:4	00: 3/8 line. 01: 6/8 line. 10: 1.25 line. 11: 1.75 line. As Threshold for V Extract.
	HV_INTCNT	3:0	Composite SYNC Pixel Lengths Filter for V Extract.
3Dh	V_POSTCOAST	7:0	Default : 0x00 Access : R/W
	VCOST_FEXT	7:6	Coast forward control.
	VCOST_BEXT	5:0	Coast Backward control.
3Eh	HV_SLICTRL	7:0	Default : 0x0C Access : R/W
	HV_SLICTRL	7:0	HSYNC/VSYNC Slicer Control.
3Fh	HV_HSLIOFSTHYS	7:0	Default : 0xC0 Access : R/W
	HV_HSLIOFSTHYS	7:4	HSYNC slicer line Offset.
	AGC_FINE_LSB	3:0	AGC Fine gain (lower 4 bits).
40h	PGA_CTRL1	7:0	Default : 0xC1 Access : R/W
	PGA_AUTO	7	0: Manual PGA set by AGC_COARSE[1:0]. 1: Auto PGA switch.
	PGA_FSWT	6	0: PGA switch in VSYNC. 1: PGA switch in HSYNC.
	AGC_COARSE	5:4	00: PGA x 1. 01: PGA x 2.
	FREZ_CLMPDISBK	3	Freeze Clamp Function; VSYNC selection.
	SYNC_MAG_LOW_TH	2:0	If SYNC Magnitude is Low, Freeze HW Clamping 3 times.
41h	PGH_TOP_TH	7:0	Default : 0xDA Access : R/W
	PGA_TH_TOP	7:0	If AGC_FINE[11:0] >= 16*PGA_TH_TOP[7:0], use smaller PGA and 16*PGA_H2L[7:0].
42h	PGA_BOT_TH	7:0	Default : 0x40 Access : R/W
	PGA_TH_BOT	7:0	If AGC_FINE[11:0] <= 16*PGA_TH_BOT[7:0], use larger PGA and 16*PGA_L2H[7:0].
43h	AGC_CTRL1	7:0	Default : 0x14 Access : R/W
	-	7	Reserved.

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	AGC_MD	6:5	00: Auto, REG_AGC_K used for both search and lock. 01: Auto, REG_AGC_K used for search, clipping delta-gain=-1, 0, +1 for lock. 10: Freeze gain. 11: Load gain=AGC_FINE*16. Default=1.
	AGC_LOCK_CTRL	4	AGC Lock Control.
	AGC_TYPE	3:2	00: Sync. 01: Sync. 10: Color burst. 11: Hybrid of 1 and 2. Default=1, HSYNC as primary reference, color burst is for ACC.
	AGC_LOWTH_PGA	1:0	During PGA switching, PGA must be larger than AGC_LOWTH_PGA.
44h	AGC_FINE	7:0	Default : 0xC0 Access : R/W
	AGC_FINE	7:0	Used when AGC_MODE=11.
45h	AGC_CTRL2	7:0	Default : 0x42 Access : R/W
	AGC_AVGL	7:5	AGC average lines= $2^{AGC_AVGL + 1}$.
	-	4	Reserved.
	AGC_WAITL	3:1	Lines to wait for analog settling down= 2^{AGC_WAITL} after each gain update.
	-	0	Reserved.
46h	AGC_K_CTRL	7:0	Default : 0x73 Access : R/W
	AGC_K_FAST	7:4	Fast-attack AGC update speed. $\Delta_gain = \pm (AGC_K_FAST * 4 + 3) / 256 * gain_true$.
	AGC_K	3:0	Sync magnitude AGC update speed. $\Delta_gain = \pm amp_err / 256 * (1 + AGC_K) / 32 * gan_true$.
47h	AGC_CTRL3	7:0	Default : 0x3F Access : R/W
	AGC_BKLCLIP	7:5	AGC Black level Clip enable.
	AGC_CLIP	4:0	The sync magnitude error for AGC is bounded by $\pm 4 * REG_AGC_CLIP$.
48h	PGA_SWTICH_TH1	7:0	Default : 0xC0 Access : R/W
	PGA_L2H	7:0	Used when $AGC_FINE \leq PGA_TH_BOT * 16$. Default: $3072 / 16 = 8'd192$.
49h	PGA_SWCH_TH2	7:0	Default : Access : R/W
	PGA_H2L	7:0	Used when $AGC_FINE \leq PGA_TH_BOT * 16$. Default: $1238 / 16 = 8'd64$.

Video Decoder Register (Bank = 02)				
Index	Name	Bits	Description	
4Ah	AGC_LOWTH	7:0	Default : 0xA0	Access : R/W
	AGC_LOWTH	7:0	When PGA=AGC_LOWTH_PGA, AGC_FINE[11:0] must be smaller than 16*AGC_LOWTH.	
4Bh	PGA_OFST	7:0	Default : 0x40	Access : R/W
	PGA_OFST	7:0	ADC VREF offset=VREF_min/(VREF_max-VREF_min)*4096/16.	
4Ch	BRST_WINDOW1	7:0	Default : 0x62	Access : R/W
	BRST_MASK_0	7:5	HSYNC trailing edge transition region Maskout for Burst Calculation.	
	BRST_BEG	4:0	Burst window Beginning position; move to SW.	
4Dh	BRST_WINDOW2	7:0	Default : 0x40	Access : R/W
	BRST_END	7:0	Burst window End position; move to SW.	
4Eh	BK_WINDOW1	7:0	Default : 0x05	Access : R/W
	BKPRH_CTR[8]	7	Back-Porch Window Center Position.	
	BKPRH_SEL	6	Back-Porch Selection.	
	BKPRH_AUTSW	5:4	Back-Porch Auto Switch.	
	BKPRH_WIN	3:0	Back-porch Window width=($*4+4$).	
4Fh	BK_WINDOW2	7:0	Default : 0x68	Access : R/W
	BKPRH_CTR[7:0]	7:0	Back-Porch Window Center Position.	
50h	BRST_TH	7:0	Default : 0x80	Access : R/W
	BRST_THRD	7:4	Burst Threshold.	
	BRST_AMP_THRD	3:0	Burst found Amplitude Threshold.	
51h	BRSTMAG_CTRL	7:0	Default : 0x38	Access : R/W
	BRSTMAG_CTRL	7	Burst Magnitude Control.	
	BRST_MAG[8:2]	6:0	Burst Magnitude value.	
52h	COMB_LL_CTRL	7:0	Default : 0x04	Access : R/W
	BRST_MAG[1:0]	7:6	Burst Magnitude value.	
	-	5:4	Reserved.	
	PAL_BLIND_PD_EN	3	NTSC; 180 degree Phase Detection Enable.	
	BRST_PHS_CHK_MAG	2	Burst Phase of the current line is ignored if BRST_MAG<BRST_MAG_AVG/8.	
	-	1:0	Reserved.	
53h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
54h	BRST_WINDOW3	7:0	Default : 0x23	Access : R/W
	FSC_THRD_LINES	7:5	FSC Threshold Lines.	

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	-	4:3	Reserved.
	FSC_TST_TRY[2]	2	Fsc selection 1.25*Fsc and 0.8*Fsc BPF magnitude type.
	FSC_TST_TRY[1]	1	Fsc selection 1.0*Fsc BPF magnitude type.
	FSC_TST_TRY[0]	0	Fsc selection BPF magnitude snapshot taken at the end of the burst window.
55h	COLOR_OFF	7:0	Default : 0x08 Access : R/W
	KILL_CSPOUT	7:6	00 or 01: Auto Color Kill. 10: Force Show Color. 11: Force Kill Color.
	-	5	Reserved.
	PAL_LINES_TH	4:0	Lines for PAL/NTSC detection=64 * PAL_LINES_TH.
56h	FSC443/357 DECT1	7:0	Default : 0x18 Access : R/W
	-	7:6	Reserved.
	FSC_THRD1_PASS	5:0	FSC Threshold1 Pass.
57h	FSC443/357 DECT2	7:0	Default : 0x28 Access : R/W
	-	7:6	Reserved.
	FSC_THRD1_FAIL	5:0	FSC Threshold1 Fail.
58h	FSC443/357 DECT3	7:0	Default : 0x10 Access : R/W
	-	7:6	Reserved.
	FSC_THRD0_PASS	5:0	FSC Threshold0 Pass.
59h	FSC443/357 DECT4	7:0	Default : 0x20 Access : R/W
	-	7:6	Reserved.
	FSC_THRD0_FAIL	5:0	FSC Threshold0 Fail.
5Ah	BRST_UNKNOW_TH	7:0	Default : 0x10 Access : R/W
	-	7	Reserved.
	FSC_TST_MASK	6:4	HSYNC trailing edge Transition region Maskout for Fsc selection filters.
	FSC_THRD_NO_BRST	3:0	FSC Threshold for No Burst detection.
5Bh	FSC443/357 DECT5	7:0	Default : 0x98 Access : R/W
	FSC_THRD_MAG_HYST[3:2]	7:6	FSC Threshold Magnitude of HSYNC start.
	FSC_THRD_MAG_443	5:0	FSC Threshold Magnitude of 4.43 MHz.
5Ch	FSC443/357 DECT6	7:0	Default : 0x98 Access : R/W
	FSC_THRD_MAG_HYST[1:0]	7:6	FSC Threshold Magnitude of HSYNC start.

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	FSC_THRD_MAG_358	5:0	FSC Threshold Magnitude of 3.58 MHz.
5Dh	ACC_CTRL	7:0	Default : 0x08 Access : R/W
	ACC_CTRL	7:6	Auto Chroma Control. 01: Reset Chroma_Gain=1. 11: Load Chroma_Gain=ACC_GAIN[13:0]/64.
	ACC_GAIN[5:0]	5:0	Auto-Chroma-Control Gain.
5Eh	ACC_GAIN	7:0	Default : 0x20 Access : R/W
	ACC_GAIN[13:6]	7:0	Auto-Chroma-Control Gain.
5Fh	AGC_DELTA	7:0	Default : 0x28 Access : R/W
	AGC_DELTA[7:5]	7:5	AGC Delta value.
	WP_SIM_SPD	4:3	WP Simulation Speedup.
	WP_LVL_SPD	2:0	WP Level Speedup.
60h	WP_CTRL1	7:0	Default : 0x15 Access : R/W
	ACC_C_PEAK_LPF	7:6	Chroma Peak Detection Update Speed. 00: Slow, Narrow-Band-Width. 11: Fast, Wide-Band-Width.
	-	5	Reserved.
	WP_TH[8]	4	Desired white level=512+REG_WP_TH.
	AGC_K_WP	3:0	White peaking AGC update speed. Delta_gain=white_err/256*(1+REG_AGC_K)/ 32*gain_true.
61h	WP_THRD	7:0	Default : 0x24 Access : R/W
	WP_THRD[7:0]	7:0	White Peak Threshold value.
62h	AP_SYNTHRD2REAGC	7:0	Default : 0x78 Access : R/W
	WP_SYNTHRD2REAGC	7:0	WP Sync Threshold of AGC.
63h ~	-	7:0	Default : - Access : -
64h	-	7:0	Reserved.
65h	AGC_CTRL4	7:0	Default : 0x55 Access : R/W
	-	7:2	Reserved.
	WP_WAITTH	1:0	Number of sync-mag AGC operations before WP mode. 00: 255 operations. 01: 127 operations. 10: 63 operations. 11: 31 operations.

Video Decoder Register (Bank = 02)

Index	Name	Bits	Description
66h	WP_CTRL2	7:0	Default : 0x70 Access : R/W
	WP_MODE	7:5	0xx: Internally automatic white-peaking control. 100: Disable white-peaking. 101: Hold sync magnitude AGC if white level is too high. 110: Reserved. 111: Normal white-peaking AGC.
	WP_MONTR_SPD	4:2	WP Monitor Speed.
	ADCOVSLE_THRD	1:0	WP Threshold Selection.
	WP_REDO	7:0	Default : 0x17 Access : R/W
67h	ROUND_CTRL	7:5	AFEC signal rounding selection.
	REMOV_HF_NOISE	4	Enable 13-tap CVBS low-pass filter to Remove High-Frequency Noise.
	ROUND_CTRL[3:2]	3:2	7-tap chroma-trap filter, CCTRAP, Rounding. 00: Truncate. 01: Round. 10: Dither.
	ROUND_CTRL[1]	1	AFEC self-test 1D luminance Rounding. 0: Truncate. 1: Round.
	ROUND_CTRL[0]	0	AFEC self-test 1D chroma Rounding. 0: Truncate. 1: Round.
	CLK_CTRL1	7:0	Default : 0x45 Access : R/W
68h	ADC_84_ROUND	7:6	Round control for 8Fsc-to-4Fsc downsampling. 0: Truncate. 1: Round.
	DAC_LATCH_INV	5	Option for Datalatch from 4Fsc to 8Fsc.
	3DAC_EN	4	Enable AFEC Data Output to DAC.
	FILSEL	3:2	Filter Selection.
	ADC_168_ROUND	1:0	Round Control for 16Fsc-to-8Fsc Downsampling. 0: Truncate. 1: Round.
	SRC_CTRL1	7:0	Default : 0x00 Access : R/W
69h	SELYC	7	0: YC Source from AFEC for Testing Purpose. 1: YC Source from Comb for Display.
	-	6:5	Reserved.
	BYPASS_Y	4	Bypass CVBS Source for Testing purpose.

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	COMB601H_SYNC	3	1: Use the HS444 as the MVDA_HS Output.
	COMB601V_SYNC	2	1: Use the VS444 as the MVDA_VS Output.
	COMB601F_SYNC	1	1: Use the Fld444 as the MVDA_F Output.
	COMBPASS_SYNC	0	1: The HS444 and VS444 as the Bypass SYNC. 0: AFEC_HS and AFEC_VS as the Bypass SYNC Output.
6Ah	VCR_DETECT1	7:0	Default : 0x51 Access : R/W
	VCR_MODE	7:6	VCR Mode enable.
	VCR_HD_DLY	5:4	VCR Head switch number.
	-	3	Reserved.
	VS_STB	2:0	VS Strobe.
6Bh	VCR_DETECT2	7:0	Default : 0xAA Access : R/W
	VCR_LDT	7:4	VCR Line Margin.
	FAST_VT_DET	3	Fast Vertical Line Detection.
	VCR_THRD	2:0	VCR Threshold.
6Ch	VCR_PRECOAST	7:0	Default : 0xF0 Access : R/W
	VCR_PRECOAST	7:4	Pre-Coast value for VCR mode.
	HV_HSLISEL_VCR	3:2	HSYNC Slicer Selection for VCR mode.
	HV_SLILOW_SEL	1:0	HSYNC/VSYNC slicer Low Selection.
6Dh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
6Eh	VCR_VLSET	7:0	Default : 0x14 Access : R/W
	VCR_VLSET	7:0	PAC/NTSC VLine tuning.
6Fh		7:0	Default : Access :
	RST_AFEC_SEL	7	0: Partial reset AFEC. 1: Global reset AFEC.
	-	6:4	Reserved.
	DPL_DDE_EN	3	DPL double DE Enable.
	DDE_EN	2	Double DE Enable.
	DPL_HS_EN	1	DPL HS Enable.
	DPL_DE_EN	0	DPL DE Enable.
70h	INI_CTRL1	7:0	Default : 0x84 Access : R/W
	FSTAGC_EN	7	Fast AGC mode.
	-	6	Reserved.
	CLMP_BOTMD	5:4	Clamp on Bottom Mode.

Video Decoder Register (Bank = 02)				
Index	Name	Bits	Description	
	ADSMAL_THRD	3:0	Threshold for detecting Small AOC swing.	
71h	BOTREF_LVL	7:0	Default : 0xA0	Access : R/W
	BOTREF_LVL	7:0	Bottom Reference Level.	
72h	HV_SLC_CTRL	7:0	Default : 0x37	Access : R/W
	HV_SLCFZE	7:6	HSYNC/VSYNC Slice Freeze control.	
	HV_SLCDIF	5:4	HSYNC/VSYNC Slice Difference.	
	HV_SLCDLT	3:0	HSYNC/VSYNC Slice Limit.	
73h	INI_CTRL1	7:0	Default : 0x52	Access : R/W
	HV_VSLISEL	7:6	00: 2/8 syn_magnitude as hslice level. 01: 4/8 syn_magnitude as hslice level. 10: 5/8 syn_magnitude as hslice level. 11: 6/8 syn_magnitude as hslice level.	
	HV_HSLISEL	5:4	00: 2/8 syn_magnitude as vslice level. 01: 4/8 syn_magnitude as vslice level. 10: 5/8 syn_magnitude as vslice level. 11: 6/8 syn_magnitude as vslice level.	
	656_HDES_VCR_OFST	3:0	656 SAV Position Offset when VCR.	
74h	SLICE_MUX	7:0	Default : 0x97	Access : R/W
	SLICE_MUX	7:0	Slicer level selection.	
75h	656_OFST	7:0	Default : 0x40	Access : R/W
	-	7	Reserved.	
	656_OFST	6:0	56 SAV Position Offset in VCR mode.	
76h	656_CTRL1	7:0	Default : 0x02	Access : R/W
	-	7:5	Reserved.	
	DBCLK_TEST	4	Clock Testing.	
	-	3	Reserved.	
	656_BLNK_MD	2	656 Blank Mode.	
	656_EN	1	Enable 656 mode.	
	ABNML_CHK	0	Abnormal check enable.	
77h	656_BLNK_MAX	7:0	Default : 0x02	Access : R/W
	656_BLNK_MAX[7:0]	7:0	656 Blink Max value.	
78h	YUV	7:0	Default : 0x00	Access : R/W
	YUV[7:0]	7:0	Used as Input of the 4Fsc-to-16Fsc Up-sampling if SELUPS=3.	
79h	656_HDES1	7:0	Default : 0x18	Access : R/W

Video Decoder Register (Bank = 02)

Index	Name	Bits	Description
	656_HDES_O[9:2]	7:0	SDA start position. (656_HDESM, 656_HDESL) ITU656 SAV Position. For VCR, 656_HDES=656_HDES_o-656_HDES_VCR_OFST*4. Otherwise, 656_HDES=656_HDES_o.
7Ah	656_HDES2	7:0	Default : 0x20 Access : R/W
	656_HDES_O[1:0]	7:6	ITU656 SAV position.
	-	5:2	Reserved.
	656_INV_F	1	656 Field Inverse.
	-	0	Reserved.
7Bh	656_HDEW	7:0	Default : 0xB3 Access : R/W
	656_HDEW	7:0	ITU656 active data Width (*8+7).
7Ch	SLMIS_CTRL	7:0	Default : 0xC0 Access : R/W
	SLMIS_CTRL[7:0]	7:0	Enable Slice Miss freeze.
7Dh	NOISE_MLINE	7:0	Default : 0x04 Access : R/W
	NOISE_MLINE	7:0	Move Noise level during specify Line Number.
7Eh	656_CTRL2	7:0	Default : 0x80 Access : R/W
	656_CLKINV	7	Used for FPGA testing.
	656_CLKDLY	6:5	Used for FPGA testing.
	656_LSTSEL	4	Used for FPGA testing.
	656_TEST	3:2	Used for FPGA testing.
	TEST_MODE	1:0	Used for FPGA testing.
7Fh	444_VD_CTRL	7:0	Default : 0x62 Access : R/W
	SELDAC	7:6	Source for 3 DACs. 00: Comb. 01: AFEC Test Mode. 10: 444. 11: Upsampling Source.
	3DAC_INSHV	5	Insert HV into Display DAC Source.
	3DAC_HSEL	4	Insert H's Source Selection. 0: Window PLL. 1: Display PLL.
	3DAC_INSBLACK	3	Insert Black Level back to DAC Source.
	REG_SELFB	2	0: YCbCr Source from AFEC Test Mode. 1: YCbCr Source from Comb444.

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	REG_SELUPS	1:0	Upsampling Source. 10: Test Mode 444. 11: Comb YCbCr 444.
80h	NCO_FSC0	7:0	Default : 0x48 Access : R/W
	FSC_NCO0[23:16]	7:0	{NCO_FSC0} 4.43 MHz synthesis clock. Frequency Synthesizer 4*Fsc for 4.43361875 MHz. (For REG_FSC_TABLE[4]=0.) Synthsis-base/(4*Fsc)*2 ²² /8.
81h	NCO_FSC0	7:0	Default : 0x2D Access : R/W
	FSC_NCO0[15:8]	7:0	{NCO_FSC0} 4.43 MHz synthesis clock.
82h	NCO_FSC0	7:0	Default : 0x01 Access : R/W
	FSC_NCO0[7:0]	7:0	{NCO_FSC0} 4.43 MHz synthesis clock.
83h	NCO_FSC1	7:0	Default : 0x59 Access : R/W
	FSC_NCO1[23:16]	7:0	Frequency synthesizer 4*Fsc for 3.57954545 MHz (For FSC_TABLE[4]=0).
84h	NCO_FSC1	7:0	Default : 0x65 Access : R/W
	FSC_NCO1[15:8]	7:0	{NCO_FSC1} 3.579 MHz synthesis clock.
85h	NCO_FSC1	7:0	Default : 0x97 Access : R/W
	FSC_NCO1[7:0]	7:0	{NCO_FSC1} 3.579 MHz synthesis clock.
86h	NCO_FSC2	7:0	Default : 0x59 Access : R/W
	FSC_NCO2[23:16]	7:0	Frequency Synthesizer 4*Fsc for 3.57561149 MHz (For FSC_TABLE[4] =0).
87h	NCO_FSC2	7:0	Default : 0x7E Access : R/W
	FSC_NCO2[15:8]	7:0	{NCO_FSC2} 3.582 MHz synthesis clock.
88h	NCO_FSC2	7:0	Default : 0x74 Access : R/W
	FSC_NCO2[7:0]	7:0	{NCO_FSC2} 3.582 MHz synthesis clock.
89h	NCO_FSC3	7:0	Default : 0x59 Access : R/W
	FSC_NCO3[23:16]	7:0	Frequency Sunthesizer 4*Fsc for 3.58205625 MHz (For FSC_TABLE[4] = 0).
8Ah	NCO_FSC3	7:0	Default : 0x55 Access : R/W
	FSC_NCO3[15:8]	7:0	{NCO_FSC3} 3.576 MHz synthesis clock.
8Bh	NCO_FSC3	7:0	Default : 0x8B Access : R/W
	FSC_NCO3[7:0]	7:0	{NCO_FSC3} 3.576 MHz synthesis clock.
8Ch	REG_FSC_NCO4	7:0	Default : 0x4A Access : R/W

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	FSC_NCO4[23:16]	7:0	Requency Synthesizer 4*Fsc for 4.28515625 MHz (For REG_FSC_TABLE[4] = 0).
8Dh	FSC_NCO4	7:0	Default : 0xAD Access : R/W
	FSC_NCO4[15:8]	7:0	Requency Synthesizer 4*Fsc for 4.28515625 MHz (For REG_FSC_TABLE[4] = 0).
8Eh	FSC_NCO4	7:0	Default : 0x27 Access : R/W
	FSC_NCO4[7:0]	7:0	Requency Synthesizer 4*Fsc for 4.28515625 MHz (For REG_FSC_TABLE[4] = 0).
8Fh	FSC_TABLE	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	FSC_TABLE[4]	4	Frequency Synthesizer Control. 0: FSC_NCO0, 1, 2, 3, and 4 are used. 1: Specified by FSC_TABLE[3:2].
	FSC_TABLE[3:2]	3:2	Frequency Synthesizer Base. 00: 160MHz. 01: 15*14.31818MHz. 10: 216MHz. 11: 15*14.31818MHz. Only valid for FSC_TABLE[4] =1.
	FSC_TABLE[1:0]	1:0	Frequency Synthesizer Output. 00: 4*FSC. 01: 8*FSC. 10: 16*FSC. 11: 16*FSC.
90h	FSC_NCO_ERR_443	7:0	Default : 0x00 Access : R/W
	FSC_NCO_ERR_443 [15:8]	7:0	Frequency Synthesizer 4*Fsc Error for 4.43MHz; 2's Complement (Auto scaled internally for 3.58MHz).
91h	FSC_NCO_ERR_443	7:0	Default : 0x00 Access : R/W
	FSC_NCO_ERR_443 [7:0]	7:0	Frequency Synthesizer 4*Fsc Error for 4.43MHz; 2's Complement (Auto scaled internally for 3.58MHz).
92h	WINIIR_THRD_CTRL	7:0	Default : 0xA7 Access : R/W
	WINIIR_THRD1	7:4	IIR Window Threshold 1.
	WINIIR_THRD0	3:0	IIR Window Threshold 0.
93h	WINFIR_THRD_CTRL	7:0	Default : 0xA4 Access : R/W
	WINFIR_THRD1	7:4	IIR Window Threshold 1.
	WINFIR_THRD0	3:0	IIR Window Threshold 0.

Video Decoder Register (Bank = 02)				
Index	Name	Bits	Description	
94h	SPL_SPD_CTRL1	7:0	Default : 0x14	Access : R/W
	SPL_SPD_FORCE	7:5	Coarse HSYNC PLL Tracking Speed. Bit[2] forces using Bit[1:0]. SPL_SPD=3: Fastest. SPL_SPD=0: Slowest.	
	SPL_SPD_SRCH	4:3	Coarse HSYNC PLL tracking Speed during HSYNC-Search.	
	SPL_SPD_CLEAN	2:1	Coarse HSYNC PLL tracking Speed for Clean signal.	
	-	0	Reserved.	
95h	SPL_SPD_CTRL2	7:0	Default : 0x2A	Access : R/W
	SPL_SPD_NOISY	7:6	Coarse HSYNC PLL tracking Speed for Noisy signal.	
	SPL_SPD_VCR	5:4	Coarse HSYNC PLL phase tracking Speed for VCR outside VSYNC.	
	SPL_SPD_VCR_V	3:2	Coarse HSYNC PLL Phase Tracking Speed for VCR during VSYNC.	
	SPL_SPD_VCR_PRE	1:0	Coarse HSYNC PLL HSYNC-search lines. 00: 48. 01: 64. 10: 80. 11: 96.	
96h	EDGES_NOISY_THR	7:0	Default : 0xA0	Access : R/W
	NOISE_DC_SEL	7:6	Noise magnitude estimation DC level Selection. 00: IIR_8. 01: IIR_8. 10: CCTRAP_13. 11: CCTRAP.	
	EDGES_NOISY	5:0	Threshold of the average number of sliced Edges per Line to determine Noisy mode (/ 4).	
97h	EDGES_CLEAN_THR	7:0	Default : 0x05	Access : R/W
	SYNC_INMUX[2:1]	7:6	Slicer input pre-filter selection. 00: CCTRAP. 01: CCTRAP_13. 10: IIR_8. 11: IIR_16.	
	SYNC_INMUX[0]	5	Slicer Auxiliary Pre-Filter Selection. 0: IIR_8. 1: IIR_16.	
	-	4	Reserved.	

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	EDGES_CLEAN	3:0	Threshold of the average number of sliced Edges per line to determine Clean mode (/ 4).
98h	SYNC_WIN_CTRL1	7:0	Default : 0x43 Access : R/W
	SYNC_INMUX_VCR [2:0]	7:5	HSYNC slicer Input selection.
	-	4	Reserved.
	WIN_NOISY	3:0	Coarse HSYNC PLL PD Limitation Window Width for Noisy Mode (*8+7).
99h	SYNC_WIN_CTRL2	7:0	Default : 0x88 Access : R/W
	SYNC_WIN	7:4	Coarse HSYNC PLL SYNC-lost detection Window width (*4+4).
	SYNC_WIN_SRCH	3:0	Coarse HSYNC PLL SYNC-found detection Window width (*4+4).
9Ah	SYNC_CTRL1	7:0	Default : 0xF0 Access : R/W
	SYNC_THRD_MISS	7:4	Coarse HSYNC PLL SYNC search fail Threshold.
	-	3:2	Reserved.
	SPL_SRCH LENG	1:0	SPL Search Length.
9Bh	SYNC_CTRL2	7:0	Default : 0x10 Access : R/W
	-	7:6	Reserved.
	SYNC_THRD	5:0	Coarse HSYNC PLL SYNC search pass (SYNC Found) Threshold (*4+3).
9Ch	SYNC_CTRL3	7:0	Default : 0x1C Access : R/W
	-	7	Reserved.
	SYNC_THRD_LOST	6:0	Coarse HSYNC PLL SYNC SYNC-Lost Threshold (*16+15).
9Dh	DPL_NSPL_HIGH	7:0	Default : 0x6C Access : R/W
	DPL_NSPL[10:3]	7:0	PI-Type Display PLL Number of Samples per Line (MSB); typically 864.
9Eh	DPL_NSPL_LOW	7:0	Default : 0x00 Access : R/W
	DPL_NSPL[2:0]	7:5	PI-type Display PLL Number of Samples per Line (LSB); typically 864.
	DPLL_TRUE8FSC	4	DPLL under 8 Fsc mode.
	-	3:0	Reserved.
9Fh	SPL_K2_VCR	7:0	Default : 0x40 Access : R/W
	SPL_K2_VCR	7:6	Coarse HSYNC PLL Frequency Tracking Speed for VCR.
	SPL_NSPL_LMT	5:0	PI-type display PLL frequency coasts if the coarse HSYNC PLL deviation is larger than +/- 4*SPL_NSPL_LMT (Try).
A0h	DPL_K1_FORCE	7:0	Default : 0x20 Access : R/W

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	DPL_K_FORCE	7	Force DPL K value.
	-	6	Reserved.
	DPL_K1	5:0	PI-type Display PLL phase tracking coefficient K1.
A1h	DPL_K2_FORCE	7:0	Default : 0x60 Access : R/W
	DPL_K2	7:0	PI-type Display PLL frequency tracking coefficient K2.
A2h	DPL_K1_NOISY	7:0	Default : 0x10 Access : R/W
	-	7:6	Reserved.
	DPL_K1_NOISY	5:0	PI-type Display PLL phase tracking coefficient for Noisy broadcast.
A3h	DPL_K2_NOISY	7:0	Default : 0x04 Access : R/W
	DPL_K2_NOISY	7:0	PI-type Display PLL frequency tracking coefficient for Noisy broadcast.
A4h	DPL_K1_VCR	7:0	Default : 0x34 Access : R/W
	-	7:6	Reserved.
	DPL_K1_VCR	5:0	PI-type Display PLL phase tracking coefficient for VCR.
A5h	DPL_K2_VCR	7:0	Default : 0x6A Access : R/W
	DPL_K2_VCR	7:0	PI-type Display PLL frequency tracking coefficient for VCR.
A6h	DPL_K1_VCR_V	7:0	Default : 0x34 Access : R/W
	-	7:6	Reserved.
	DPL_K1_VCR_V	5:0	PI-type Display PLL phase tracking coefficient for VCR during VSYNC.
A7h	DPL_K2_VCR	7:0	Default : 0x2C Access : R/W
	-	7:6	Reserved.
	DPL_VCR_FADE_SPD	5:4	PI-type Display PLL PD_MAX fading speed from VSYNC to active lines. 00: Slow. 11: Fast.
	DPL_VCR_FADE_START	3:0	PI-type Display PLL PE_MAX fading Start lines (*2).
A8h	DPL_K1_FAST	7:0	Default : 0x30 Access : R/W
	-	7:6	Reserved.
	DPL_K1_FAST	5:0	PI-type Display PLL phase tracking coefficient for Fast mode and initialization.
A9h	DPL_K2_FAST	7:0	Default : 0x65 Access : R/W
	DPL_K2_FAST	7:0	PI-type Display PLL frequency tracking coefficient for Fast mode and initialization.
AAh	DPL_CTRL1	7:0	Default : 0x08 Access : R/W

Video Decoder Register (Bank = 02)			
Index	Name	Bits	Description
	-	7:4	Reserved.
	DPL_FAST_LINES	3:0	PI-type Display PLL Fast Mode Lines. (*256)
ABh	DPL_PD_MAX	7:0	Default : 0x10 Access : R/W
	DPL_PD_MAX	7:0	PI-type Display PLL Phase Detector (DPL_PD) Limit. If bit[7]=1, force using bit[6:0].
ACH	DPL_PD_MAX_VCR	7:0	Default : 0xFF Access : R/W
	DPL_PD_MAX_VCR	7:0	PI-type Display PLL phase detector (DPL_PD) limit for VCR outside VSYNC area.
ADh	REG_656_CTRL	7:0	Default : 0x3A Access : R/W
	REG_656_OPTION1	7	Line Middle Method 0 Selection.
	REG_656_OPTION0	6	Line Middle Method 1 Selection.
	REG_DPL_WAIT_LENG	5:4	DPL Wait Length.
	REG_DPL_NCO_RST	3	DPL NCO Reset enable.
	DPL_FAST_RE_DO	2	PI-type Display PLL Re-Do Fast Mode.
	DPL_NO_STOP	1	PI-type Display PLL Never Stops. (Free Run when HSYNC not found.)
	DPL_COAST_T_FORCE	0	PI-type Display PLL Frequency Frozen Always. (except when Fast Mode and Initialization)
Aeh	DPL_COAST_CTRL	7:0	Default : 0xB8 Access : R/W
	VSYNC_SEL	7	VSYNC source Selection.
	-	6	Reserved.
	COAST_V_ALWAYS	5	Always V Coast function.
	DPL_COAST_T_LINES	4:0	Lines where 656 PLL coast frequency during V. PI-type Display PLL Frequency Frozen Lines during VSYNC. (*2)
AFh	DPL_CTRL2	7:0	Default : 0x85 Access : R/W
	DPL_LOST_LINES	7:4	PI-type Display PLL Threshold on Lines to Determine Out-of-Lock. (*64).
	DPL_LOST_WIN	3:0	PI-type Display PLL HSYNC Window Width to Detect Out-of-Lock. (*8)
B0h	DPL_K1_FREE	7:0	Default : 0x86 Access : R/W
	DPL_K1_FREE	7:4	PI-type Display PLL Phase Tracking Coefficient during HSYNC not found.
	BKPRH_JUMP_MAX	3:0	Back-Porch-Jump Maximal Lines. (Try.) (Can move to SW Clmp.)
B1h	BKPRH_JUMP_CTRL	7:0	Default : 0x06 Access : R/W

Video Decoder Register (Bank = 02)

Index	Name	Bits	Description
	-	7	Reserved.
	BKPRH_JUMP_MV_EN	6:5	Back-Porch-Jump used to Pause Clamping when Macrovision found (if set 01). (Try.) (Can move to SW Clmp.)
	BKPRH_JUMP_THRD	4:0	Back-Porch-Jump Threshold. (*32+32). (Try.) (Can move to SW Clmp.)
B2h	SPL_DELAY_FIR	7:0	Default : 0x19 Access : R/W
	-	7:6	Reserved.
	SPL_DELAY_FIR	5:0	Coarse HSYNC PLL Delay with Respect to the Actual HSYNC Leading Edge if SYNC_INMUX selects CCTRAP or CCTRAP_13.
B3h	SPL_DELAY_IIR	7:0	Default : 0x1E Access : R/W
	-	7	Reserved.
	SPL_DELAY_IIR	6:0	Coarse HSYNC PLL Delay with Respect to the Actual HSYNC Leading Edge if SYNC_INMUX selects IIR_8 or IIR_16.
B4h	REG_PB_CTRL	7:0	Default : 0x00 Access : R/W
	REG_PB_EN	7	0: Hold ADC Data Probe. 1: Enable ADC Data Probe.
	REG_PB_4FSC	6	0: Probe 8Fsc ADC Data when 8Fsc Clock. 1: Probe 4Fsc ADC Data when 8Fsc Clock.
	REG_PB_LINE	5:4	1: Probe ADC Data in Next Line.
	REG_PB_YC	3	0: Probe Y(CBVS) ADC Data. 1: Probe C ADC Data.
	REG_PB_10B	2	0: Probe 8 bit Data. 1: Probe 10 bit Data.
	-	1:0	Reserved.
	B5h	PROBE_OUT	7:0
PROBE_OUT		7:0	ADC Probe Data. (RP_LSB) ? {6'b0, PROBE_OUT1[1:0]} : PROBE_OUT1[9:2].
B6h	REG_PB_HPOS	7:0	Default : 0x00 Access : R/W
	REG_PB_HPOS[7:0]	7:0	Start Probe Horizontal Position. (lower 8 bits)
B7h	REG_PB_BPOS1	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	REG_PB_VPOS[10:8]	5:4	Start Probe Vertical Position. (upper 3 bits)
	REG_PB_HPOS[10:8]	2:0	Start Probe Horizontal Position. (upper 3 bits)

Video Decoder Register (Bank = 02)

Index	Name	Bits	Description
B8h	REG_PB_VPOS2	7:0	Default : 0x00 Access : R/W
	REG_PB_VPOS[7:0]	7:0	Start Probe Vertical Position. (lower 8 bits)
B9h	REG_WP_HOVER THRD	7:0	Default : 0x1F Access : R/W
	REG_WP_HOVER THRD[7:0]	7:0	Overflow Threshold of ADC Value.
BAh	REG_WP_HUNDERT HRD	7:0	Default : 0x1F Access : R/W
	REG_WP_HUNDER THRD[7:0]	7:0	Underflow Threshold of ADC Value.
BBh ~ FFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only

Comb-Filter Register (Bank = 03, Registers 01h ~ 9Fh)

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
00h ~ 09h	-	7:0	Default : 0x00	Access : R/W
	-	7:0	Reserved.	
10h	COMBCFGA	7:0	Default : 0x12	Access : R/W
	-	7	Reserved.	
	SVDOCBP	6	Band Pass Filter for S-Video C Channel to kill the DC Level.	
	DIRADCIN	5	Direct use ADC Input (Bypass AFEC).	
	DDETSRCSEL	4	Degree Detect Source Select. 0: Without ACC. 1: After ACC.	
	MANUCOMB	3	0: Auto Select Working Mode. 1: Manual Select Working Mode.	
	WORKMD	2:0	Working Mode. 000: Off. 001: Notch. 010: 2D Comb. 011: 3D Comb. 100: 3D Comb with History.	
11h	COMBCFGB	7:0	Default : 0x00	Access : R/W
	FORCE8BIT	7	Force 8 bit.	
	GOODHS	6	Using Free Run HSYNC in Standard Input.	
	AFEC_DEM	5	Select AFEC Demodulation.	
	PALCMINV	4	PalCmpUp Inverse.	
	-	3	Reserved.	
	SYNCONY	2	SYNC on Y.	
	CRMA_OFF	1	Turn Off the Chroma of video decoder output. 0: Normal. 1: Off.	
BST_OFF	0	Turn Off the Color Burst of video decoder output. 0: Normal. 1: Off.		
12h	COMBCFGC	7:0	Default : 0x10	Access : R/W
	FREESYNC	7	H/V SYNC Free Run.	
	FREECNTMD	6	Free Run Counter Mode. 0: NTSC. 1: PAL.	

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
	SNOWTYPE	5:4	Snow Type. 00: Never snow. 01: Snow when VDOMD = 7. 10, 11: Force snow.	
	RND_MD	3:2	Rounding Mode. 00: Truncate. 01: Rounding. 10: Dithering. 11: Error Feedback.	
	-	1:0	Reserved.	
13h	YGAIN	7:0	Default : 0xC8	Access : R/W
	YGAIN	7:0	Luma Gain for U/V Demodulation. Out=In*Gain+16. 0: 0. 128: 1. 255: 1.992.	
14h	CBGAIN	7:0	Default : 0x96	Access : R/W
	CBGAIN	7:0	Cb Gain for U/V Demodulation.	
15h	CRGAIN	7:0	Default : 0x6A	Access : R/W
	CRGAIN	7:0	Cr Gain for U/V Demodulation.	
16h	DITHCTRLA	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	CTSTDITHEN	6	Dithering when Contrast Adjustment.	
	CTSTDITHPOS	5:4	Dithering Position (Offset) of Contrast.	
	-	3	Reserved.	
	SATDITHEN	2	Dithering when Saturation Adjustment.	
	SATDITHPOS	1:0	Dithering Position (Offset) of Saturation.	
17h	DITHCTRLB	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	YDEMDITHEN	6	Dithering when Demodulation Y-Gain.	
	YDEMDITHPOS	5:4	Dithering Position (Offset) of Y Gain.	
	-	3	Reserved.	
	CDEMDITHEN	2	Dithering when Demodulation C-Gain.	
	CDEMDITHPOS	1:0	Dithering Position (Offset) of C Gain.	
18h	HORSTPOS	7:0	Default : 0xC0	Access : R/W

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
	HORSTPOS[7:0]	7:0	Horizontal Starting Position. 0..255 : -128..127.
19h	FRHTOTL	7:0	Default : 0x8D Access : R/W
	FRHTOTL	7:0	Free Run HSYNC Total Low Byte.
1Ah	FRHTOTH	7:0	Default : 0x03 Access : R/W
	FRHTOTH	7:0	Free Run HSYNC Total High Byte.
1Bh	PHSDETCFG	7:0	Default : 0x83 Access : R/W
	PHSDETEN	7	Line-Lock Phase Detection Enable.
	PHSDETINV	6	Output Inverse.
	-	5:3	Reserved.
	PHSDETSFT	2:0	Shift Bit Number. 000: Only output integer. 001: Output shift right 1 bit. ... 111: Output shift right 7 bit.
	CTRLSWCH	7:0	Default : 0xF0 Access : R/W
	HSFRAFEC	7	H-SYNC from AFEC.
	VSFRAFEC	6	V-SYNC from AFEC.
	BLKFRAFEC	5	Black Level from AFEC.
	DEGFRAFEC	4	Demodulation Degree from AFEC.
	-	3:2	Reserved.
	STDSEL	1:0	NTSC/PAL Decision. 01: force NTSC. 10: force PAL. Other: Auto detect.
20h	COMB2DCFGA	7:0	Default : 0x00 Access : R/W
	-	7:0	Reserved.
21h	COMB2DCFGB	7:0	Default : 0xD4 Access : R/W
	CRMATRP_EN	7	C-Trap of C Enable.
	NCHMD_Y[2:0]	6:4	Notch Mode of Y.
	CHRMFLT_EN	3	Chroma Median Filter Enable. 0: Off 1: Enable
	NCHMD_C[2:0]	2:0	Notch Mode of C.
22h	COMB2DCFGC	7:0	Default : 0x83 Access : R/W

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
	LNENDPOS	7:4	Line End Offset. 0~15: -8~7.	
	SHARP2DMD	3:2	Sharpness Mode of 2D Comb. 00: Off. 01: Mode 1. 10: Mode 2. 11: Mode 3.	
	CDEMCHK	1	Chroma Vertical Check (dem).	
	FORCE5LN	0	Force use 5 Line even in 1D.	
23h	HDYGAIN	7:0	Default : 0x40	Access : R/W
	HDYGAIN	7:0	Gain of Chroma Trap for Hanging Dots.	
24h	HDCGAIN	7:0	Default : 0x20	Access : R/W
	HDCGAIN	7:0	Gain of Chroma Trap for Hanging Dots.	
25h	ETPREF	7:0	Default : 0x18	Access : R/W
	ETPREF	7:0	Gain of Chroma Trap for Hanging Dots.	
26h	ETPTHH	7:0	Default : 0x00	Access : R/W
	ETPTHH	7:0	Horizontal Entropy Threshold for Chroma Trap in 2D Comb.	
27h	ETPTHV	7:0	Default : 0x00	Access : R/W
	ETPTHV	7:0	Vertical Entropy Threshold for Chroma Trap in 2D Comb.	
28h	THDEM	7:0	Default : 0x10	Access : R/W
	THDEM	7:0	Thresholds for 2D Comb Filter; check separated chroma complement with up/down line or not.	
29h ~ 2Eh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
2Fh	IFCOEF	7:0	Default : 0x00	Access : R/W
	IFCOEF	7:0	If compensation Coefficient. 2-bit integer, 6-bit fraction. $Crma = C_{cn} - (Coef * (C_{left} + C_{right}))$.	
30h ~ 3Fh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
40h	HVDETCFG	7:0	Default : 0x80	Access : R/W
	SENSYNCLVL	7:5	Sensitivity of SYNC Level Detect.	
	-	4:3	Reserved.	

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
	BLNKDETM	2	Blank Level Detect Mode. 0: Either 240 or 252. 1: 230~262 is possible.
	VDETM	1:0	Vertical Timing Detect Mode. 00, 01: Auto detect. 10: force 525 line system. 11: force 625 line system.
41h	SENSSIGDET	7:0	Default : 0x08 Access : R/W
	SENSSIGDET	7:0	Sensitivity of Signal Detect.
42h	SYNCLVTLRN	7:0	Default : 0xFF Access : R/W
	SYNCLVTLRN	7:0	SYNC Level Tolerance.
43h	VCRCOASTLEN	7:0	Default : 0x60 Access : R/W
	VCRCOASTLEN	7:0	VCR Coast Length.
44h	REGHBIDLY	7:0	Default : 0x80 Access : R/W
	REGHBIDLY	7:0	Horizontal Blanking Region Delay. 0 ... 255 : Delay -128 .. 127 pixels.
45h ~	-	7:0	Default : - Access : -
47h	-	7:0	Reserved.
48h	DEGDETCFG	7:0	Default : 0x00 Access : R/W
	YPIPE	7:6	Y/C Pipe Delay.
	DEGPIPE	5:4	Degree Pipe Delay.
	DEG1LNMD	3	Using just one line's Burst Determine the Degree.
	DEGSENS	2:0	Sensitivity of Degree Detect. 000: Directly use AFEC degree. 001: Tolerate 16384 errors. 010: Tolerate 8192 errors. 011: Tolerate 4096 errors. 100: Tolerate 2048 errors. 101: Tolerate 1024 errors. 110: Tolerate 512 errors. 111: Tolerate 256 errors.
49h	THBURST	7:0	Default : 0x1E Access : R/W
	THBURST	7:0	Degree Detection Tolerance Registers.
4Ah	TLRNSWCHERR	7:0	Default : 0xC8 Access : R/W
	TLRNSWCHERR	7:0	Degree Detection Tolerance Registers.
4Bh	HSLEADRGN	7:0	Default : 0x80 Access : R/W

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
	HSLEADRGN	7:0	HSYNC Leading Edge Range, for Even/Odd Detect.
4Ch ~ 4Fh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
50h	TIMDETCFGA	7:0	Default : 0x07 Access : R/W
	-	7:4	Reserved.
	AUTOSTOPSYNC	3	Automatic Stop H/V Sync when No Input.
	LNFREEMD	2:0	Line Buffer Free Run Mode. 000: Off (always synchronize). 001: 909 return. 010: 910 return. 011: 917 return. 100: 1127 return. 101: 1135 return. 110: Decided by register. 111: Automatic.
51h	TIMDETCFGB	7:0	Default : 0x00 Access : R/W
	STBCNTMD	7:6	Stable Counter Mode. 00: div 16. 01: div 32. 10: div 64. 11: div 128.
	HSSTBDEC	5:0	HSYNC Stable Counter Decrease Speed.
52h	HRETPOSL	7:0	Default : 0x8E Access : R/W
	HRETPOSL	7:0	Horizontal Return Position in Line Buffer Free Run Mode.
53h	HRETPOSH	7:0	Default : 0x03 Access : R/W
	HRETPOSH	7:0	Horizontal Return Position in Line Buffer Free Run Mode.
54h	TILTTLRN	7:0	Default : 0x02 Access : R/W
	TILTTLRN	7:0	Line Position Tilt Tolerance.
55h	JITTLRN3D	7:0	Default : 0x08 Access : R/W
	JITTLRN3D	7:0	3D Timing Detection Tolerance.
56h	LCKSTEP	7:0	Default : 0x80 Access : R/W
	LCKSTEP	7:0	3D Lock Counter Go Back Distance when SYNC Unstable.
57h	LCK3DTHU	7:0	Default : 0x33 Access : R/W
	LCK3DTHU	7:0	3D Timing Detection Threshold.
58h	LCK3DTHL	7:0	Default : 0x11 Access : R/W
	LCK3DTHL	7:0	3D Timing Detection Threshold.

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
59h	JITTLRN1	7:0	Default : 0x08	Access : R/W
	JITTLRN1	7:0	Tolerance of H-SYNC Jitter.	
5Ah	JITTLRN2	7:0	Default : 0x20	Access : R/W
	JITTLRN2	7:0	Tolerance of H-SYNC Jitter.	
5Bh	HSLCKTHU	7:0	Default : 0x10	Access : R/W
	HSLCKTHU	7:0	Upper Bound Threshold of Hysteresis H-SYNC Lock Counter.	
5Ch	HSLCKTHL	7:0	Default : 0x08	Access : R/W
	HSLCKTHL	7:0	Lower Bound Threshold of Hysteresis H-SYNC Lock Counter.	
5Dh	HSCHGTLRN	7:0	Default : 0xFF	Access : R/W
	HSCHGTLRN	7:0	Tolerance of HSYNC Counter Change Times. Even HSYNC locked, but if timing drifted too many times, systme still should turn off 2D/3D. 00h: immediately stop 2D/3D when HsChg happen. FFh: Never stop 2D/3D if HsLock.	
5Eh	SYNCDLY	7:0	Default : 0x14	Access : R/W
	SYNCDLY	7:0	H SYNC (from Decoder to Scaler) Pipe Delay.	
5Fh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
60h	IMGCTRL	7:0	Default : 0xF0	Access : R/W
	COLKILLMD	7:6	Color Kill Mode. 00: Off. 01: Auto. 10, 11: Decided by MCU.	
	CGMODE	5:4	Auto Chroma Gain Mode. 00: Off. 01: Auto. 10, 11: Manual.	
	AC_MD	3	Auto Contrast Mode. 0: Double at most. 1: 4 times at most.	
	AUTO_CSTS	2	Auto Contrast Adjustment.	
	-	1	Reserved.	
	AUTO_SAT	0	Auto Saturation Adjustment.	
61h	RSPNTIME	7:0	Default : 0x10	Access : R/W
	RSPNTIME	7:0	Response Time of Contrast/Brightness Adjust. 0... 255 => 1... 256 field.	

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
62h	REGBSTHGHT	7:0	Default : 0x00	Access : R/W
	REGBSTHGHT	7:0	Burst Height for Auto Chroma Gain. 0: Auto, 112 for NTSC and 117 for PAL. Other: use RegBstHght/DetBstHght as C Gain.	
63h	REGCTST	7:0	Default : 0x80	Access : R/W
	REGCTST	7:0	Contrast adjustment Coefficient. 0... 255 => 0... (255/128).	
64h	REGBRHT	7:0	Default : 0x80	Access : R/W
	REGBRHT	7:0	Brightness adjustment Coefficient. 0... 255 => -128... 127 in 8-bit precision.	
65h	REGSAT	7:0	Default : 0x80	Access : R/W
	REGSAT	7:0	Saturation adjustment Coefficient. 0... 255 => (0... 255)/128.	
66h	CKTHU	7:0	Default : 0x80	Access : R/W
	CKTHU	7:0	Upper Bound Threshold of Color Kill.	
67h	CKTHL	7:0	Default : 0x30	Access : R/W
	CKTHL	7:0	Lower Bound Threshold of Color Kill.	
68h	CRMAGAINL	7:0	Default : 0x80	Access : R/W
	CRMAGAINL	7:0	Chroma Gain Value for Manu Chroma Gain.	
69h	CRMAGAINH	7:0	Default : 0x00	Access : R/W
	CRMAGAINH	7:0	Chroma Gain Value for Manu Chroma Gain.	
6Ah	MAXLUMA	7:0	Default : 0xB0	Access : R/W
	MACLUMA	7:0	Max Luminance for Auto Contrast Adjust.	
6Bh	MAXSAT	7:0	Default : 0xC0	Access : R/W
	MAXSAT	7:0	MAX Saturation for Auto Saturation Adjust.	
6Ch	MAXCRMA	7:0	Default : 0xC0	Access : R/W
	MAXCRMA	7:0	MAX Chrominance for Auto Saturation Adjust.	
6Dh	SNOWDELAY	7:0	Default : 0x80	Access : R/W
	SNOWDELAY	7:0	Latency of Snow Output after Signal Missing.	
6Eh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
6Fh	CBCRLPCFG	7:0	Default : 0x04	Access : R/W

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)				
Index	Name	Bits	Description	
	CTIIIRMD	7:6	IIR Coefficient for CTI. 00: 1/4. 01: 1/8. 10: 1/16. 11: 1/32.	
	CTIMODE	5:4	CTI Mode. 00: Off. 01: Weak. 10: Normal. 11: Strong.	
	YIPDLY	3:2	Luma Pipe Delay. 00: -1 cycle. 01: 0 cycle. 10: 1 cycle. 11: 2 cycle.	
	CBCRLPMD	1:0	Cb/Cr Low Pass Mode. 0: Off. 01: Cut off at 2.0MHz. 10: Cut off at 1.5MHz. 11: Cut off at 1.0MHz	
70h	COMBSTATUSA	7:0	Default : -	Access : Write one clear
	HSLOCK	7	HSYNC Lock Happen.	
	LOCK3D	6	Good Timing (Lock3D) Happen.	
	-	5:4	Reserved.	
	HSLOCKZ	3	HSYNC Unlock Happen.	
	LOC3DZ	2	Good Timing (Lock3D) Disappear.	
	HSCHG	1	H-SYNC Counter Change.	
	-	0	Reserved.	
71h	COMBSTATUSB	7:0	Default : -	Access : Write one clear
	-	7:6	Reserved.	
	CCHNLACT	5	C-channel Active (maybe S-Video Input).	
	CCHNLACT	4	C-channel Quiet (maybe CVBS Input0).	
	-	3	Reserved.	
	FLDCNTCHG	2	Field Counter Change.	
	PALSWCHERR	1	PAL Switch Error.	
	DEGERR	0	Degree Error (Degree Detect).	

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
72h	COMBSTATUSC	7:0	Default : - Access : RO
	LN525	7	525 Line System.
	LN625	6	625 Line System.
	F358	5	3.58 MHz System.
	F443	4	4.43 MHz System.
	NOINPUT	3	No Input.
	VDOMD	2:0	Video Mode. 000: NTSC(M). 001: NTSC(443). 010: PAL (M). 011: PAL(B,D,G,H,I,N). 100: PAL(Nc). 101: PAL(60). 110: Input without Burst. 111: Unknown.
73h	DETBANKLVL	7:0	Default : - Access : RO
	DETBANKLVL	7:0	Detected Blanking Level.
74h	CURBLANKLVL	7:0	Default : - Access : RO
	CURBLANKLVL	7:0	Detected Blanking Level.
75h	DETSYNCLVL	7:0	Default :- Access : RO
	DETSYNCLVL	7:0	Detected Sync Level.
76h	DETSYNCHGHT	7:0	Default : - Access : RO
	DETSYNCHGHT	7:0	Detected SYNC Height.
77h	DETBURSTHGT	7:0	Default : - Access : RO
	DETBURSTHGT	7:0	Detected Burst Level.
78h	DETHORTOTALL	7:0	Default : - Access : RO
	DETHORTOTALL	7:0	
79h	DETHORTOTALH	7:0	Default : - Access : R
	DETHORTOTALH	7:0	
7Ah ~ 7Ch	-	7:0	Default : - Access : -
	-	7:0	Reserved.
7Dh	COMBCTRL	7:0	Default : 0x00 Access : R/W
	COMBCTRL	7:0	Some Control Signals for FPGA.
7Eh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

Comb-Filter Register (Bank=03, Registers 01h ~ 9Fh)			
Index	Name	Bits	Description
7Fh	FPGACTRL	7:0	Default : 0xE0 Access : R/W
	FPGACTRL	7:0	Some Control Signals for FPGA.
80h ~ 9Fh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

Mstar Confidential
 for 深圳市江启科技有限公司
 Internal Use Only

SECAM Register (Bank 03, Registers A0h ~ FFh)

SECAM Register (Bank=03, Registers A0h ~ FFh)				
Index	Name	Bits	Description	
A0h	-	7:0	Default : - Access : -	
	-	7:0	Reserved.	
A1h	SCM_IDSET1	7:0	Default : 0x02 Access : R/W	
	RST_FLT	7	Filter Reset. Set to 1 to Reset the vaules of Filter Taps.	
	MIXC_EN	6	Chroma Mixing Enable. 0: Disable. 1: Enable.	
	WFUNC_ISO	5:4	Chroma Weighting Function Isolation.	
	SVEN	3	S-Video Input Enable. Set to 1 if the input is from S-Video interface.	
	ID_MODE	2	Identification Mode Selection. Set to 1 only if using frame ID for SECAM detection.	
	BS_TYPE	1	Band-Stop Filter TYPE. 0: Notch Dr Frequency. 1: Notch Db Frequency.	
	SCMID_EN	0	SECAM Identification Forced Enable. 0: Disbale. 1: Enable.	
A2h	SAMPLE_START	7:0	Default : 0x90 Access : R/W	
	SAMPLE_ST[7:0]	7:0	Start of Sample Point (lower 8 bits).	
A3h	SAMPLE_LENGTH	7:0	Default : 0x10 Access : R/W	
	SAMPLE_LEN	7:0	Length of Sample Numbers.	
A4h	LINE_START_A	7:0	Default : 0x07 Access : R/W	
	LINE_STA	7:0	Start of Line Number of Odd Filed.	
A5h	LINE_START_B	7:0	Default : 0x40 Access : R/W	
	LINE_STB[7:0]	7:0	Start of Line Number of Even Filed (lower 8 bits).	
A6h	SCM_IDSET2	7:0	Default : 0x01 Access : R/W	
	-	7	Reserved.	
	SAMPLE_ST[10:8]	6:4	Start of Sample Point (upper 3 bits).	
	CMBGCLK_OPT	3	Comb Clock Gating Option. 0: Diable. 1: Enable ClkComb gating.	
	-	2	Reserved.	

SECAM Register (Bank=03, Registers A0h ~ Fh)			
Index	Name	Bits	Description
	LINE_STB[9:8]	1:0	Start of Line Number of Even Filed (upper 2 bits).
A7h	LINE_LENGTH	7:0	Default : 0x02 Access : F/W
	LINE_LEN	7:0	Length of Observation Line.
A8h	ACT_MULTIPLE	7:0	Default : 0x96 Access : R/W
	ACT_MULTIPLE	7:0	Integer Multiple of LINE_LEN, combined to form Length of the Active Video Line.
A9h	MAG_THRSD_L	7:0	Default : 0x00 Access : R/W
	MAG_THRSD[7:0]	7:0	Magnitude Threshold (lower 8 bits).
AAh	MAG_THRSD_M	7:0	Default : 0x06 Access :
	MAG_THRSD[15:8]	7:0	Magnitude Threshold (middle 8 bits).
ABh	MAG_THRSD_H	7:0	Default : 0x40 Access : R/W
	-	7	Reserved.
	LINE_PIXNUM[10:8]	6:4	Pixel Number of Line Buffer (upper 3 bits).
	MAG_THRSD[19:16]	3:0	Magnitude Threshold (upper 4 bits).
ACH	LINE_PIXNUMBER	7:0	Default : 0x48 Access : R/W
	LINE_PIXNUM[7:0]	7:0	Pixel Number of Line Buffer (lower 8 bits). (if the number is 1097, program 11'h448)
ADh	ID_THRSD	7:0	Default : 0x06 Access : R/W
	ID_THRSD	7:0	Threshold for SECAM Identification.
AEh	SCM_THRSD	7:0	Default : 0x66 Access : R/W
	NONSCM_THRSD	7:4	Non-SECAM Decision Threshold.
	SCM_THRSD	3:0	SECAM Decision Threshold.
AFh ~ CFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
D0h	SCM_IDSTATUS	7:0	Default : - Access : R
	SCMID_DONE	7	SECAM Identification Done Indication.
	SCMID_YES	6	SECAM Signal Found Bit.
	DR_LINE	5	Dr Line Indication.
	DB_LINE	4	Db Line Indication.
	-	3	Reserved.
	SCMID_STS	2:0	SECAM ID Status. 000: Idle 001, 010, 011: ID Progress 110: SECAM 111: No SECAM Signal Discovery

SECAM Register (Bank=03, Registers A0h ~ FFh)				
Index	Name	Bits	Description	
D1h	MAG_INT_L	7:0	Default : - Access : R	
	MAG_INT[7:0]	7:0	Magnitude Accumulated Values for Observation (lower 8 bits).	
D2h	MAG_INT_M	7:0	Default : - Access : R	
	MAG_INT[15:8]	7:0	Magnitude Accumulated Values for Observation (middle 8 bits).	
D3h	MAG_INT_H	7:0	Default : - Access : R	
	MAG_INTB[19:16]	7:4	Magnitude Accumulated Values for Observation (upper 4 bits).	
	MAG_INT[19:16]	3:0	Magnitude Accumulated Values for Observation (upper 4 bits).	
D4h	MAG_INT_B_L	7:0	Default : - Access : R	
	MAG_INTB[7:0]	7:0	Magnitude Accumulated Values for Observation (lower 8 bits).	
D5h	MAG_INT_B_M	7:0	Default : - Access : R	
	MAG_INTB[15:8]	7:0	Magnitude Accumulated Values for Observation (meddle 8 bits).	
D6h	SCM_FSC	7:0	Default : - Access : R	
	-	7:2	Reserved.	
	SCM_FSC	1:0	Fsc Status from AFEC_TOP. 00: NTSC 3.58MHz 01: PAL 4.43MHz 10: SECAM 4.285156MHz	
D7h ~ F1h	-	7:0	Default : - Access : -	
	-	7:0	Reserved.	
F2h	WR_LK1	7:0	Default : 0x00 Access : R/W	
	WR_LK1	7	Register Lock (work with WR_LK0). Register access is disabled when WR_LK0 and WR_LK1 are HIGH. Register access is enabled when WR_LK0 and WR_LK1 are LOW.	
	-	6:0	Reserved.	
F3h	PWMCLK	7:0	Default : 0x00 Access : R/W	
	DB_EN	7	Double Buffer Enable. 0: Disable. 1: Enable.	
	P4REN	6	PWM4 Reset every frame Enable. 0: Disable. 1: Enable.	
	P3REN	5	PWM3 Reset every frame Enable. 0: Disable. 1: Enable.	
	P4POL	4	PWM 4 Polarity when enhance PWM4 enable.	

SECAM Register (Bank=03, Registers A0h ~ Fh)

Index	Name	Bits	Description
	EP4EN	3	Enhance PWM4 Enable. 0: Disable. 1: Enable.
	P3POL	2	PWM3 Polarity when enhance PWM3 enable.
	EP3EN	1	Enhance PWM3 Enable. 0: Disable. 1: Enable.
	PCLK	0	PWM3/4 base Clock select. 0: 14.318MHz. 1: 14.318MHz / 4.
F4h	PWM3C	7:0	Default : 0x00 Access : R/W
	PWM_14BIT_EN	7	14bit PWM Enable. 0: Disable, then PWM3C[6:0] = PWM3_CTUN[6:0]. 1: Enable, then PWM3C[3:0] = PWM_DIV.
	PWM3_CTUN[6:0]	6:0	PWM3 Coarse adjustment, when PWM_14BIT_EN = 0.
	-	6:4	Reserved.
	PWM_DIV	3:0	Clock Divider, when PWM_14BIT_EN = 1.
F5h	PWM4C	7:0	Default : 0x00 Access : R/W
	PWM4_POL	7	PWM4 Polarity.
	PWM4_CTUN[6:0]	6:0	PWM4 Coarse adjustment.
F6h	PWM3EPL	7:0	Default : 0x00 Access : R/W
	EPWM0P[7:0]	7:0	Enhance PWM3 Period, when PWM_14BIT_EN = 0.
	PWM_FINE_TUNE	7:0	Fine Tune PWM Pulse, when PWM_14BIT_EN = 1.
F7h	PWM3EPH	7:0	Default : 0x00 Access : R/W
	EPWM0P[15:8]	7:0	Enhance PWM3 Period, when PWM_14BIT_EN = 0.
	PWM_MASK_BIT	5:0	Mask PWN Period Bits, when PWM_14BIT_EN = 1.
F8h	PWM4EPL	7:0	Default : 0x00 Access : R/W
	EPWM4P[7:0]	7:0	Enhance PWM4 Period.
F9h	PWM4EPH	7:0	Default : 0x00 Access : R/W
	EPWM4P[15:8]	7:0	Enhance PWM4 Period.
FAh	PWM3C_T	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	PWM3_POL	4	PWM3 Polarity.

SECAM Register (Bank=03, Registers A0h ~ FFh)

Index	Name	Bits	Description
	-	3:0	Reserved.
FBh ~ FFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

Mstar Confidential
 for 深圳市江启科技有限公司
 Internal Use Only

Embedded MCU Register (Address mapping from C000h to C0FFh)

Embedded MCU Register Bank – General Control Register				
Index	Name	Bits	Description	
00h ~ 07h	-	7:0	Default : - Access : -	
	-	7:0	Reserved.	
08h	WDT_KEY_L	7:0	Default : 0xAA Access : R/W	
	WDT_KEY[7:0]	7:0	Watchdog timer disable key low byte Watchdog timer will be enabled If (WDT_Key_L != 8'hAA) or (WDT_Key_H != 8'h55)	
09h	WDT_Key_H	7:0	Default : 0x55 Access : R/W	
	WDT_KEY[15:8]	7:0	Refer to C008h.	
0Ah	-	7:0	Default : - Access : -	
	-	7:0	Reserved.	
10h	DDC2Bi_INT_EN	6:0	Default: 0x00 Access : R/W	
	START_EN	6	DDC2Bi Start interrupt Enable.	
	STOP_EN	5	DDC2Bi Stop interrupt Enable.	
	DATR_EN	4	DDC2Bi Data Reda interrupt Enable.	
	DATW_EN	3	DDC2Bi Data Write interrupt Enable.	
	DATRW_EN	2	DDC2Bi Data Read/Write interrupt Enable.	
	WADR	1	DDC2Bi Word Address interrupt.	
	ID	0	DDC2Bi ID interrupt.	
11h	DDC2Bi_Flag	6:0	Default : 0x00 Access : R/C	
	DDC2Bi_FLAG		DDC 2Bi interrupt flag and clear	
12h	DDC2Bi_W_BUF	7:0	Default : - Access : RO	
			DDC2Bi write, MCU read buffer	
13h	DDC2Bi_R_BUF	7:0	Default : 0x00 Access : R/W	
	DDC2Bi_R_BUF[7:0]	7:0	DDC2Bi read, MCU write buffer	
14h ~ 17h	-	7:0	Default : - Access : -	
	-	7:0	Reserved.	
18h	DDC2Bi_CTRL	1:0	Default : 0x00 Access : R/W	
	-	7:2	Reserved.	
	EN_NO_ACK	1	DDC2Bi does not send ack if data buffer has not been read. 0: Disable. 1: Enable.	
	-	0	Reserved.	

Embedded MCU Register Bank – General Control Register				
Index	Name	Bits	Description	Access
19h	DDC2Bi_ID	7:0	Default : 0x00	Access : R/W
	DDC2Bi_EN	7	DDC2Bi Enable.	
	DDC2Bi_ID[6:0]	6:0	DDC2Bi ID.	
1Ah ~ 1Fh	-	7:0	Default : -	Access : -
20h	KEY_ADC1	5:0	Default : -	Access : RO
	KEY_ADC1[5:0]		Key Pad ADC channel 1 value.	
21h	KEY_ADC2	5:0	Default : -	Access : RO
	KEY_ADC2[5:0]		Key Pad ADC channel 2 value.	
22h	KEY_ADC3	5:0	Default : -	Access : RO
	KEY_ADC3[5:0]		Key Pad ADC channel 3 value.	
23h ~ 2Fh	-	7:0	Default : -	Access : -
30h	P0_CTRL	7:0	Default : 0x00	Access : R/W
	P0_CTRL[7:0]	7:0	MCU Port 0 output enable Control.	
31h	P0_OE	7:0	Default : 0x00	Access : R/W
	P0_OE[7:0]	7:0	MCU Port 0 Output Enable.	
32h	P0_IN	7:0	Default : 0x00	Access : R/W
	P0_IN[7:0]	7:0	MCU Port 0 output enable from output data.	
33h	P1_CTRL	7:0	Default : 0x00	Access : R/W
	P1_CTRL[7:0]	7:0	MCU Port 1 output enable Control.	
34h	P1_OE	7:0	Default : 0x00	Access : R/W
	P1_OE[7:0]	7:0	MCU Port 1 Output Enable.	
35h	P1_IN	7:0	Default : 0x00	Access : R/W
	P1_IN[7:0]	7:0	MCU Port 1 output enable from output data.	
36h	P2_CTRL	7:0	Default : 0x00	Access : R/W
	P2_CTRL[7:0]	7:0	MCU Port 2 output enable Control.	
37h	P2_OE	7:0	Default : 0x00	Access : R/W
	P2_OE[7:0]	7:0	MCU Port 2 Output Enable.	
38h	P2_IN	7:0	Default : 0x00	Access : R/W
	P2_IN[7:0]	7:0	MCU Port 2 output enable from output data.	
39h	P3_CTRL	7:0	Default : 0x00	Access : R/W
	P3_CTRL[7:0]	7:0	MCU Port 3 output enable Control.	

Embedded MCU Register Bank – General Control Register			
Index	Name	Bits	Description
3Ah	P3_OE	7:0	Default : 0x00 Access : R/W
	P3_OE[7:0]	7:0	MCU Port 3 Output Enable.
3Bh	P3_IN	7:0	Default : 0x00 Access : R/W
	P3_IN[7:0]	7:0	MCU Port 3 output enable from output data.
3Ch	P4_CTRL	7:0	Default : 0x00 Access : R/W
	P4_CTRL[7:0]	7:0	MCU Port 4 output enable Control.
3Dh	P4_OE	7:0	Default : 0x00 Access : R/W
	P4_OE[7:0]	7:0	MCU Port 4 Output Enable.
3Eh	P4_IN	7:0	Default : 0x00 Access : R/W
	P4_IN[7:0]	7:0	MCU Port 4 output enable from output data.
3Fh	SSPI_STS_OP	7:0	Default : 0x05 Access : R/W
	SSPI_STS_OP[7:0]	7:0	Soft-trigger SPI check status OP code.
40h	SSPI_WD0	7:0	Default : 0x00 Access : R/W
	SSPI_WD0	7:0	Soft-trigger SPI Write byte 0.
41h	SSPI_WD1	7:0	Default : 0x00 Access : R/W
	SSPI_WD1	7:0	Soft-trigger SPI Write byte 1.
42h	SSPI_WD2	7:0	Default : 0x00 Access : R/W
	SSPI_WD2	7:0	Soft-trigger SPI Write byte 2.
43h	SSPI_WD3	7:0	Default : 0x00 Access : R/W
	SSPI_WD3	7:0	Soft-trigger SPI Write byte 3.
44h	SSPI_WD4	7:0	Default : 0x00 Access : R/W
	SSPI_WD4	7:0	Soft-trigger SPI Write byte 4.
45h	SSPI_WD5	7:0	Default : 0x00 Access : R/W
	SSPI_WD5	7:0	Soft-trigger SPI Write byte 5.
46h	SSPI_WD6	7:0	Default : 0x00 Access : R/W
	SSPI_WD6	7:0	Soft-trigger SPI Write byte 6.
47h	SSPI_WD7	7:0	Default : 0x00 Access : R/W
	SSPI_WD7	7:0	Soft-trigger SPI Write byte 7.
48h	SSPI_TRIG	7:0	Default : 0x00 Access : R/W
	SSPI_START	7	Trigger soft-SPI 0: NOP. 1: Start soft -SPI.
	SSPI_CHK_BZY	6	Auto Check Busy after soft-SPI.
	SSPI_CHK_BIT	5:3	Check busy bit position

Embedded MCU Register Bank – General Control Register			
Index	Name	Bits	Description
	SSPI_Length	2:0	SSPI command length.
49h	SSPI_RD1	7:0	Default : - Access : RO
	SSPI_RD1[7:0]	7:0	SSPI read byte 1.
4Ah	SSPI_RD2	7:0	Default : - Access : RO
	SSPI_RD2[7:0]	7:0	SSPI read byte21.
4Bh	SSPI_RD3	7:0	Default : - Access : RO
	SSPI_RD3[7:0]	7:0	SSPI read byte 3.
4Ch	SSPI_RD4	7:0	Default : - Access : RO
	SSPI_RD4[7:0]	7:0	SSPI read byte 4.
4Dh	SSPI_RD5	7:0	Default : - Access : RO
	SSPI_RD5[7:0]	7:0	SSPI read byte 5.
4Eh	SSPI_RD6	7:0	Default : - Access : RO
	SSPI_RD6[7:0]	7:0	SSPI read byte 6.
4Fh	SSPI_RD7	7:0	Default : - Access : RO
	SSPI_RD7[7:0]	7:0	SSPI read byte 7.
50h	ISP_PA0	7:0	Default : 0x00 Access : R/W
	ISP_PA[7:0]	7:0	Parallel flash ISP Address[7:0].
51h	ISP_PA1	7:0	Default : 0x00 Access : R/W
	ISP_PA[15:8]	7:0	Parallel flash ISP Address[15:8].
52h	ISP_PA2	7:0	Default : 0x00 Access : R/W
	ISP_PA[17:16]	7:0	Parallel flash ISP Address[17:16].
53h	ISP_PD_W	7:0	Default : 0x00 Access : R/W
	ISP_PD_W[7:0]	7:0	Parallel flash ISP Write Data.
54h	ISP_PCtr	4:0	Default : 0x0A Access : R/W
	ISP_PMD_EN	4	Parallel flash ISP mode enable.
	ISP_PWEZ	3	Parallel flash WEZ at ISP mode.
	ISP_POEZ	2	Parallel flash OEZ at ISP mode.
	ISP_PDBUE	1	Parallel flash data bus output enable at ISP mode.
	ISP_PCEZ	0	Parallel flash CEZ at ISP mode.
55h	ISP_PD_R	7:0	Default :- Access : RO
	ISP_PD_R[7:0]	7:0	Parallel flash ISP mode read data.
56h ~ FFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

LVDS Register (Bank = 04, Registers 01h ~ 6Ah)

LVDS Register (Bank = 04, Registers 01h ~ 6Ah)				
Index	Name	Bits	Description	
01h ~ 0Fh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
10h	GPOA_CTRL	7:0	Default : 0x00	Access : R/W
	GCS	7:5	Select GPO Source.	
	GTS	4:3	Control Skip Line Number.	
	-	2	Reserved.	
	GTC	1	Select GPO_I Source.	
	GOP	0	Select GPO_I Source.	
11h	GAVST_L	7:0	Default : 0x00	Access : R/W
	GPOA_VST[7:0]	7:0	GPOA Vstar Point (lower 8 bits).	
12h	GAVST_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	GPOA_VST[10:8]	2:0	GPOA Vstar Point (upper 3 bits).	
13h	GAVEND_L	7:0	Default : 0x00	Access : R/W
	GPOA_VEND[7:0]	7:0	GPOA Vend (lower 8 bits).	
14h	GAVEND_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	GPOA_VEND[10:8]	2:0	GPOA Vend (upper 3 bits).	
15h	GAHST_L	7:0	Default : 0x00	Access : R/W
	GPOA_HST[7:0]	7:0	GPOA Hstar (lower 8 bits).	
16h	GAHST_H	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	GPOA_HST[10:8]	2:0	GPOA Hstar (upper 3 bits).	
17h	GAHEND_L	7:0	Default : 0x00	Access : R/W
	GPOA_HEND[7:0]	7:0	GPOA Hend (lower 8 bits).	
18h	GA_HEND_H	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	GPOA_HEND[10:8]	3:0	GPOA Hend (upper 3 bits).	
19h	LVDS_CTRL	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	GPOA_GATED_EN	5	Clock Gated using GPOA Singal.	
	ADD_1	4	Hard Clock Gated Pulse Width Add One.	

LVDS Register (Bank = 04, Registers 01h ~ 6Ah)			
Index	Name	Bits	Description
	T_LVDSSEL	3	LVDS Test Enable.
	CH_SWAP	2	Channel Switch.
	CH_POLARITY	1	Channel Value Invert.
	LVDS_TI	0	LVDS TI Type.
1Ah	LVDS_TEST	7:0	Default : 0x00 Access : R/W
	TESTER_PIX	7:0	LVDS Test Pixel.
1Bh	MOD_TDR0	7:0	Default : 0x00 Access : R/W
	DRVN_TTL[7:0]	7:0	Output Driving of N_channel when MOD is TTL output (lower 8 bits).
1Ch	MOD_TDR1	7:0	Default : 0x00 Access : R/W
	DRVP_TTL[5:0]	7:2	Output Driving of P_channel when MOD is TTL output (lower 6 bits).
	DRVN_TTL[9:8]	1:0	Output Driving of N_channel when MOD is TTL output (upper 2 bits).
1Dh	MOD_TDR2	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	DRVP_TTL[9:6]	3:0	Output Driving of P_channel when MOD is TTL output (upper 4 bits).
1Eh	MOD_CTRL	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	MOD_PWDN	2	MOD Power Down.
	MOD_CLK_EN	1	MOD Clock Enable.
	HALF_SWING_EN	0	LVDS_Output Swing Reduce Half.
1Fh	-	7:0	Default : - Access : -
	-	7:0	Reserved.
20h	MOD_SELO	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	SELGPO	4:0	Select GPO.
21h	MOD_SEL1	7:0	Default : 0xFF Access : R/W
	-	7:5	Reserved.
	SELTTL	4:0	Select TTL.
22h	LVDS_T0	7:0	Default : 0x06 Access : R/W
	TEST_LVDS[7:0]	7:0	LVDS Test Bits (lower 8 bits).
23h	LVDS_T1	7:0	Default : 0x00 Access : R/W

LVDS Register (Bank = 04, Registers 01h ~ 6Ah)			
Index	Name	Bits	Description
	TEST_LVDS[15:8]	7:0	LVDS Test Bits (upper 8 bits).
24h	LVDS_TRI0	7:0	Default : 0xFF Access : R/W
	LVDS_TRI[7:0]	7:0	LVDS Tri_State (lower 8 bits).
25h	LVDS_TRI1	7:0	Default : 0xFF Access : R/W
	-	7:2	Reserved.
	LVDS_TRI[15:8]	1:0	LVDS Tri_State (upper 8 bits).
26h (044Ch)	REG044C	7:0	Default : 0x00 Access : R/W
	26H_DATA[7:0]	7:0	[7:0]:Low byte of BVCOM_DC[8:0], PAD_VCOMDC voltage adjust, DC : 1.165V~2.327V.
27h (044Eh)	REG044E	7:0	Default : 0x00 Access : R/W
	27H_DATA[7:0]	7:0	[7:4]: TST_IVCOM, Vcom opamps driving strength select. [3]: Reserve. [2]: High bit of BVCOM_DC[8:0], PAD_VCOMDC voltage adjust, DC : 1.165V~2.327V. [1]: TST_VCOMBGO, VBG output to PAD_VCOMOUT. [0]: PWDN_VCOM, VCOM power down control, 1: power down.
28h (0450h)	REG0450	7:0	Default : 0x00 Access : R/W
	28H_DATA[7:0]	7:0	[7:0]: BVCOM_OUT, PAD_VCOMOUT voltage adjust, Vlow/Vhigh : 0.45V/2.55V~1.05V/1.95V.
29h (0452h)	REG0452	7:0	Default : 0x00 Access : R/W
	29H_DATA[7:0]	7:0	[7]: GCR_CAL_EN_SW, Enable software Calibration function for LVDS output. [6]: GCR_CAL_SRC_SEL, Select calibration source, 0: CH2, 1: floating. [5:4]: GCR_CAL_LEVEL_SEL, Select calibration target voltage. (may change before tape-out). 00: 250mV, 01:300mV, 10: 350mV, 11: 200mV. [3]: GCR_SEL_VDD25: MOD supply selection, 0: 3.3V, 1: 2.5V. [2:1]: GCR_SELVCM: Common-mode selection of CH[?:0]. 2.5V 00 = 1.19789 V 01 = 698.769 mV 10 = 1.19789 V 11 = 898.418 mV. 3.3V 00 = 1.58165 V 01 = 922.627 mV 10 = 1.58165 V 11 = 1.18623 V. [0]: GCR_CKEN, TX clock enable,(LVDS) This pin is used for CH0~CH4.
2Ah (0454h)	REG0454	7:0	Default : 0x00 Access : R/W
	2AH_DATA[7:0]	7:0	[7:6]: GCR_OUTCONF_CH3_BIT, Output mode configuration for channel 3.

LVDS Register (Bank = 04, Registers 01h ~ 6Ah)			
Index	Name	Bits	Description
			[5:4]: GCR_OUTCONF_CH2_BIT, Output mode configuration for channel 2. [3:2]: GCR_OUTCONF_CH1_BIT, Output mode configuration for channel 1. [1:0]: GCR_OUTCONF_CH0_BIT, Output mode configuration for channel 0. 2'b00: TTL mode/Standby mode. 2'b01: LVDS/EPI/RSDS/mini-LVDS data output mode. 2'b10: RSDS/miniLVDS clock output mode. 2'b11: Test clock output mode.
2Bh (0456h)	REG0456	7:0	Default : 0x00 Access : R/W
	2BH_DATA[7:0]	7:0	[7:6]: skew_reg_g, TTL G data channel output skew control. [5:4]: skew_reg_b, TTL B data channel output skew control. [3]: Reserve. [2]: DAC test dc level source select, 1:{G7,G4,G3,G2,R6,R2,R1,R0}, 0: htotal[7:0]. [1:0]: GCR_OUTCONF_CH4_BIT, Output mode configuration for channel 4. 2'b00: TTL mode/Standby mode. 2'b01: LVDS/EPI/RSDS/mini-LVDS data output mode. 2'b10: RSDS/miniLVDS clock output mode. 2'b11: Test clock output mode.
2Ch (0458h)	REG0458	7:0	Default : 0x00 Access : R/W
	2CH_DATA[7:0]	7:0	[7:5]: GCR_OUTSWING_CLK_BIT[2:0], swing control low bit for CH1,3 when not enable calibration. [4:0]: GCR_OUTSWING_DATA_BIT, swing control for CH0,2,4 when not enable calibration.
2Dh (045Ah)	REG045A	7:0	Default : 0x00 Access : R/W
	2DH_DATA[7:0]	7:0	[7:3]: GCR_DS_POL_CH. [2]: GCR_CAL_EN_HW, Enable hardware Calibration function for LVDS output. [1:0]: GCR_OUTSWING_CLK_BIT[4:3], swing control high bit for CH1,3 when not enable calibration.
2Eh (045Ch)	REG045C	7:0	Default : 0x00 Access : R/W
	2EH_DATA[7:0]	7:0	[7:6]: GCR_PEADJ_CH3_BIT[1:0], Differential output pre-emphasis level adjust, low bit of CH3. [5:4]: GCR_PEADJ_CH2_BIT[1:0], Differential output pre-emphasis level adjust, low bit of CH2. [3:2]: GCR_PEADJ_CH1_BIT[1:0], Differential output pre-emphasis

LVDS Register (Bank = 04, Registers 01h ~ 6Ah)			
Index	Name	Bits	Description
			level adjust, low bit of CH1. [1:0]: GCR_PEADJ_CH0_BIT[1:0], Differential output data/clock pre-emphasis level adjust, low bit of CH0. (1X means 0.25mA). 0: 0X, 1: 1X, 2: 2X, 3: 3X &.
2Fh (045Eh)	REG045E	7:0	Default : 0x00 Access : R/W
	2FH_DATA[7:0]	7:0	[7:3]: GCR_PE_EN_CH, Differential output pre-emphasis enable for channel [4:0]. [2]: GCR_PEADJ_MAX_BIT, Differential output pre-emphasis level adjust, high bit of CH0-4. [1:0]: GCR_PEADJ_CH4_BIT[1:0], Differential output pre-emphasis level adjust, low bit of CH4.
30h (0460h)	REG0460	7:0	Default : 0x00 Access : RO
	30H_READ[7:0]	7:0	[7]: Reserve. [6]: DDA_OUT, Calibration output. [5]: Reg_hw_mod_cal_ready, hardware calibration function finish. [4:0]: reg_gcr_ibcal_hw[4:0], hardware calibration function result.
31h (0462h)	REG0462	7:0	Default : 0x00 Access : R/W
	31H_DATA[7:0]	7:0	[7]: Reg_tpat_en, OP2 test pattern enable. [6]: Reg_patyuv, YUV type test pattern enable. [5]: Reg_pathd,. [4]: Reg_patint,. [3:0]: reg_patsel.
32h (0464h)	REG0464	7:0	Default : 0x00 Access : R/W
	32H_DATA[7:0]	7:0	[7:4]: reg_vpatbsize, vertical size select for test pattern. [7]: Enable down count for fix vertical bp. [3:0]: reg_hpatbsize, horizontal size select for test pattern.
33h (0466h)	REG0466	7:0	Default : 0x00 Access : R/W
	33H_DATA[7:0]	7:0	[7]: Reserve. [6:0]: reg_vsync_dcnt, down count line number for fix vertical bp.

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)			
Index	Name	Bits	Description
6Bh	PROTECT_BIT	7:0	Default : 0x00 Access : R/W
	PROTECT_BIT	7:0	Have to set as 1 in that could view all PWM register setting.
6Ch	STUS_RPRT	7:0	Default : - Access : RO
	-	7:3	Reserved.
	STUS_RPRT[2]	2	1: FAULTZ is high.
	STUS_RPRT[1]	1	1: FB2 mode is on.
	STUS_RPRT[0]	0	1: VIN is OK.
6Dh	PWM_SWCH	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	PWM_SWCH[1:0]	1:0	Control PWM on/off; must set to "00" or "11". 00: PWM off. 11: PWM on. Others: Off (not recommended).
6Eh	OP_MD	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	PWM_SWRST	6	Software-Reset bit to reset PWM. 0: No action. 1: Software reset and remain in initial state using a single pulse.
	VSYNC_PLRTY_SEL	5	VSYNC polarity setting. 0: Same polarity to VSYNC. 1: Opposite polarity.
	VSYNC_SEL	4	Use TCON's VSYNC for VSYNC-mode. 0: Use normal VSYNC. 1: Use TCON's VSYNC.
	PWM_EN	3	PWM function on/off. 0: Use external controller. 1: User internal controller.
	FAULTZ_H_MD_EN	2	FAULTZ High Mode on/off. 0: Off. 1: On.
	VSYNC_MD_EN	1	VSYNC Mode on/off. 0: Off. 1: On.

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)			
Index	Name	Bits	Description
	BRST_MD_EN	0	Burst Mode on/off. 0: Off. 1: On.
6Fh	VIN_STAB_CNT	7:0	Default : 0x0A Access : R/W
	VIN_STAB_CNT	7:0	VIN Stable Count number.
70h	VIN_OV_CNT	7:0	Default : 0x0A Access : R/W
	VIN_OV_CNT	7:0	VIN Over-Voltage Count number.
71h	VIN_UV_CNT	7:0	Default : 0x0A Access : R/W
	VIN_UV_CNT	7:0	VIN Under-Voltage Count number.
72h	VIN_WRK_H_THRD	7:0	Default : 0xC3 Access : R/W
	VIN_WRK_H_THRD	7:0	VIN Working High Threshold.
73h	VIN_STRTUP_H_THR D	7:0	Default : 0xBB Access : R/W
	VIN_STRTUP_H_THRD	7:0	VIN Startup High Threshold.
74h	VIN_STRTUP_L_THR D	7:0	Default : 0x99 Access : R/W
	VIN_STRTUP_L_THRD	7:0	VIN Startup Low Threshold.
75h	VIN_WRK_L_THRD	7:0	Default : 0x90 Access : R/W
	VIN_WRK_L_THRD	7:0	VIN Working Low Threshold.
76h	VIN_WAIT_CNT_L	7:0	Default : 0xFA Access : R/W
	VIN_WAIT_CNT[7:0]	7:0	VIN Waiting Count number (lower 8 bits).
77h	VIN_WAIT_CNT_H	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	VINWAIT_CNT[11:8]	3:0	VIN Waiting Count number (upper 4 bits)
When 6E[2] = 0, please refer to the following as register settings of 78h ~ 7Bh:			
78h	FAULTZ_H_VAL	7:0	Default : 0xAA Access : R/W
	FAULTZ_H_VAL[7:0]	7:0	FAULTZ High boundary.
79h	FAULTZ_L_VAL	7:0	Default : 0x55 Access : R/W
	FAULTZ_L_VAL[7:0]	7:0	FAULTZ Low boundary.
7Ah	FAULTZ_STB	7:0	Default : 0x0A Access : R/W
	FAULTZ_STB[7:0]	7:0	Counts for FAULTZ Stable.
7Bh	FAULTZ_DROP	7:0	Default : 0x0A Access : R/W
	FAULTZ_H_GO_LOW	7:0	Counts for FAULTZ High Go Low.
When 6E[2] = 1, please refer to the following as register settings of 78h ~ 7Bh:			

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)			
Index	Name	Bits	Description
78h	FAULTZ_H_VALUE	7:0	Default : 0xAA Access : R/W
	FB2_DET_TIME[7:0]	7:0	FB2 Detection Time after burst high when system is in FAULTZ high mode (lower 8 bits).
79h	FAULTZ_L_VALUE	7:0	Default : 0x55 Access : R/W
	-	7:2	Reserved.
	FB2_DETECT_TIME[9:8]	1:0	FB2 Detection Time after burst high when system is in FAULTZ high mode (higher 2 bits).
7Ah	FAULTZ_STB_CNT	7:0	Default : 0x0A Access : R/W
	FB2_DET_FAIL_T	7:0	Counts for FB2 failure is True.
7Bh	FAULTZ_DROP	7:0	Default : 0x0A Access : R/W
	FB2_L_FAULTZ_H_MD	7:0	FB2 Low Bound in FAULTZ High Mode.
7Ch	MSUR_OFST_L	7:0	Default : 0x0E Access : R/W
	MSUR_OFST[7:0]	7:0	Measure Offset time to get Data (lower 8 bits).
7Dh	MSUR_OFST_H	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	MSUR_OFST[9:8]	1:0	Measure Offset time to get Data (higher 2 bits).
7Eh	2US	7:0	Default : 0x48 Access : R/W
	2US_CNT	7:0	Counts for 2us.
7Fh	2US_MSUR	7:0	Default : 0x14 Access : R/W
	2US_MSUR	7:0	Counts to get Data when PWM on time ≤ 2us.
80h	FB1_COM	7:0	Default : 0xAA Access : RO
	FB1_COM[7:0]	7:0	FB1 Command.
81h	FB2_STRTUP	7:0	Default : 0xAA Access : R/W
	FB2_STRTUP	7:0	Start-up FB2 Command.
82h	FB2_SET	7:0	Default : 0xAA Access : R/W
	FB2_SET	7:0	FB2 Command; adjust for continuous output adjusting.
83h	CONT_AB	7:0	Default : 0xB7 Access : R/W
	CONT_A	7:4	A-value for Continuous-mode.
	CONT_B	3:0	B-value for Continuous-mode.
84h	BRST_AB	7:0	Default : 0xB7 Access : R/W
	BRST_A	7:4	A-value for Burst-mode.
	BRST_B	3:0	A-value for Burst-mode.

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)				
Index	Name	Bits	Description	
85h	STRK1_L	7:0	Default : 0xA9	Access : R/W
	STRK1_CNT[7:0]	7:0	1 st ignition and normal operation Count for PWM frequency; double buffer must fill-in from high to low.	
86h	STRK1_H	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	STRK1 [9:8]	1:0	1 st Ignition and normal operation count for PWM frequency; double buffer must fill-in from high to low.	
87h	STRK1_LMT_L	7:0	Default : -	Access : RO
	STRK1_LMT[7:0]	7:0	Maximum duty for 1 st ignition and normal operation; count for PWM frequency (lower 8 bits).	
88h	STRK1_LMT_H	7:0	Default : -	Access : RO
	-	7:2	Reserved.	
	STRK1_LMT[9:8]	1:0	Maximum duty for 1 st ignition and normal operation; count for PWM frequency (higher 2 bits).	
89h	STRK2_L	7:0	Default : 0xA9	Access : R/W
	STRK2_CNT[7:0]	7:0	2 nd ignition count for PWM frequency; double-buffer must fill-in from high to low (lower 8 bits).	
8Ah	STRK2_H	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	STRK2 [9:8]	1:0	2 nd ignition count for PWM frequency; double-buffer must fill-in from high to low (higher 2 bits).	
8Bh	STRK2_LMT	7:0	Default : -	Access : RO
	STRK2_LMT[7:0]	7:0	Maximum duty of 2 nd ignition; count for PWM frequency.	
8Ch	STRK2_LMT	7:0	Default : -	Access : RO
	-	7:2	Reserved.	
	STRK2_LMT[9:8]	1:0	Maximum duty for 2 nd ignition; count for PWM frequency.	
8Dh	CNT_MD	7:0	Default : 0x55	Access : R/W
	FB2_MD_CTRL	7:4	Counts for entering FB2 Mode Control.	
	FAULTZ_OVP	3:0	Counts for FAULTZ Over-Voltage Protection.	
8Eh	BRST_L	7:0	Default : 0x80	Access : R/W
	BRST_CNT[7:0]	7:0	Counts for Burst-mode frequency (lower 8 bits; filling sequence: 8Fh, 8Eh, 91h, 90h).	
8Fh	BRST_H	7:0	Default : 0x00	Access : R/W

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)			
Index	Name	Bits	Description
	-	7:2	Reserved.
	BRST_CNT[9:8]	1:0	Counts for Burst-mode frequency (higher 2 bits; filling sequence: 8Fh, 8Eh, 91h, 90h).
90h	BRST_DUTY_L	7:0	Default : 0x10 Access : R/W
	BRST_DUTY[7:0]	7:0	Counts for Burst-mode Duty (lower 8 bits; filling sequence: 8Fh, 8Eh, 91h, 90h).
91h	BRST_DUTY_H	7:0	Default : 0x01 Access : R/W
	-	7:2	Reserved.
	BRST_DUTY[9:8]	1:0	Counts for Burst-mode Duty (higher 2 bits; filling sequence: 8Fh, 8Eh, 91h, 90h).
92h	STRK1_TIME_L	7:0	Default : 0x50 Access : R/W
	STRK1_TIME[7:0]	7:0	Counts for 1 st ignition Time (lower 8 bits).
93h	STRK1_TIME_M	7:0	Default : 0xC3 Access : R/W
	STRK1_TIME[15:8]	7:0	Counts for 1 st Ignition Time (middle 8 bits).
94h	STRK1_TIME_H	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	STRK1_TIME[19:16]	3:0	Counts for 1 st ignition time (higher 4 bits).
95h	TTAL_STRK_TIME_L	7:0	Default : 0x38 Access : R/W
	TTAL_STRK_TIME[7:0]	7:0	Counts for 1 st ignition time + 2 nd ignition time (lower 8 bits).
96h	TTAL_STRK_TIME_M	7:0	Default : 0xC1 Access : R/W
	TTAL_STRK_TIME[15:8]	7:0	Counts for 1 st ignition time + 2 nd ignition time (middle 8 bits).
97h	TTAL_STRK_TIME_H	7:0	Default : 0x01 Access : R/W
	-	7:4	Reserved.
	TTAL_STRK_TIME[19:16]	3:0	Counts for 1 st ignition time + 2 nd ignition time (higher 4 bits).
98h	BRST_RAMP1	7:0	Default : 0x22 Access : Reserved
	BRST_RAMP1[7:0]	7:0	Burst-mode Ramp control (lower 8 bits).
99h	BRST_RAMP2	7:0	Default : 0x11 Access : Reserved
	PWM_MAX_DUTY	7	PWM Maximum Duty. 0: STRIKE minus 16. 1: STRIKE minus 32.
	STEPS	6:4	Counts for Steps.
	BRST_RAMP1[11:8]	3:0	Burst-mode Ramp control (higher 4 bits). Four steps: 99[3:1], {99[0], 98[7:6]}, 98[5:3], 98[2:0].
9Ah	KEY_PRTEC	7:0	Default : 0x00 Access : R/W

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)			
Index	Name	Bits	Description
	KEY_PRTEC	7:0	Key, code=CF.
9Bh	FAIL_STUS	7:0	Default : - Access : RO
	FAIL_SAFE_ON	7	Fail-Safe finds PWM is over max-on time.
	FAULTZ_H_MD_FB2_F	6	FAULTZ High-Mode, FB2 Fail.
	FB1_OVP	5	FB1 Over-Voltage Protection while FAULTZ is high.
	STRK_FAIL	4	Unable to force FAULTZ=1 after 2-step Striking.
	FAULTZ_ABNRM	3	FAULTZ accidentally goes from high to low.
	VIN_OV	2	VIN Over-Voltage.
	VIN_UV	1	VIN Under-Voltage.
	STRTUP_VIN_F	0	Startup VIN Fail.
9Ch	SAR_FB2_DAT	7:0	Default : - Access : RO
	SAR_FB2_DAT	7:0	SAR FB2 Data.
9Dh	SAR_FB1_DAT	7:0	Default : - Access : RO
	SAR_FB1_DAT	7:0	SAR FB1 Data.
9Eh	SAR_FAULTZ_DAT	7:0	Default : - Access : RO
	SAR_FAULTZ_DAT	7:0	SAR FAULTZ Data.
9Fh	SAR_VIN_DAT	7:0	Default : - Access : RO
	SAR_VIN_DAT	7:0	SAR VIN Data.
A0h	DUTY_RPRT1	7:0	Default : - Access : RO
	DUTY_RPRT1[7:0]	7:0	PWM Duty.
A1h	DUTY_RPRT2	7:0	Default : - Access : RO
	DUTY_RPRT2[7:0]	7:0	PWM Duty.
A2h	DUTY_RPRT3	7:0	Default : - Access : RO
	-	7:4	Reserved.
	DUTY_RPRT3[5:0]	5:0	PWM Duty.
A4h	SAR_SET1	7:0	Default : 0x09 Access : R/W
	FS_Q2_EN	7	Enable Q2-Fail Safe.
	FS_Q1_EN	6	Enable Q1-Fail Safe.
	SAR_CLK_SEL	5	Select SAR Clock source. 0: PWM clock. 1: MPLL_CLK_OUT.
	SAR_CLK_DIV_RATIO	4:0	Divide Ratio for SAR Clock.
A5h	SAR_SET2	7:0	Default : 0x00 Access : R/W

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)			
Index	Name	Bits	Description
	-	7:4	Reserved.
	SAR_CH_SEL	3:2	Channel Select for SAR.
	SAR_DEBUNCE_SET	1:0	De-bounce Setting for SAR.
A6h	SAR_SET3	7:0	Default : 0x0B Access : R/W
	SAR_SAMPLE_PRD	7:0	System clock counts for Sample Period.
A7h	SAR_SET4	7:0	Default : 0x30 Access : R/W
	C1_Q2	7	Setting for programmable IO.
	C1_Q1	6	Setting for programmable IO.
	C0_Q2	5	Setting for programmable IO.
	C0_Q1	4	Setting for programmable IO.
	EPD_Q2	3	Enable input PAD_Q2 pull-down (default unused).
	EPD_Q1	2	Enable input PAD_Q1 pull-down (default unused).
	EN33V_DPWM	1	Enable 3.3V supply for AVDD_SAR.
	SAR_TST	0	Set SAR ADC input to zero.
ABh	HSYNC_PLL_SET	7:0	Default : 0x93 Access : R/W
	USE_CLKDIV_EN	7	Enable Bit for using Clock Divider instead of using PLL. 0: Disable. 1: Enable.
	PLL_LOCK	6	PLL Lock.
	STRK1_SEL	5	Choose to use STRIKE1 or synchronized STRIKE1.
	CLKIN_SEL	4	Select to use MPLL_CLK_OUT/(MPLL_CLK_OUT/2).
	PLL_MODE	3:2	PLL-Mode setting.
	HSYNC_SOURCE_SEL	1	Select-bit for Selecting the Source of HSYNC.
	HSYNC_PLL_EN	0	Enable bit for HSYNC PLL.
ACh	PLL_CD	7:0	Default : 0x00 Access : R/W
	PLL_M_CD	7:4	PLL M-Code; must be>0.
	PLL_N_CD	3:0	PLL N-Code; must be>0.
ADh	PLL_STUS1	7:0	Default : - Access : RO
	PLL_STUS_RPRT	7:0	HSYNC PLL Status Report.
A Eh	PLL_STUS2	7:0	Default : - Access : RO
	HSYNC_IN	7	Monitor Input HSYNC.
	PLL_STUS_RPRT	6:0	HSYNC PLL Status Report.
AFh	DIVD_RATIO	7:0	Default : 0x30 Access : R/W
	HSYNC_DIVD_RATIO	7:0	Divide-Ratio while PLL is in divider-mode.

Digital PWM Register (Bank = 04, Registers 6Bh ~ FFh)				
Index	Name	Bits	Description	
B0h	WDT_L	7:0	Default : 0x00	Access : R/W
	WDT[7:0]	7:0	Counts for WDT; (wanted PWM maximum on-time)/(BIU Clock) (lower 8 bits).	
B1h	WDT_H	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	WDT[9:8]	1:0	Counts for WDT; (wanted PWM maximum on-time) / (BIU Clock) (higher 2 bits).	
B2h	PLL_SET	7:0	Default : 0x20	Access : R/W
	-	7:6	Reserved.	
	HSYNC_SAFE_MD	5	HSYNC Safe-Mode.	
	PLL_CLMP_RATIO	4:0	PLL Clamp Value.	
B3h ~ FFh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only

Misc Register (Bank = 05)

Misc Register (Bank = 05)				
Index	Name	Bits	Description	
00h ~ 09h	-	7:0	Default : -	Access : -
	-	7:1	Reserved.	
10h	REG_VD_10	7:0	Default : 0x69	Access : R/W
	-	7:3	Reserved.	
	REG_LSCTDIS_EN	2	White peak detect bypass the coast signal Enable.	
	REG_PREMAV_EN	1	First field macro-vision output Enable.	
	REG OSDTST_EN	0	OSD test pattern input ADC path Enable.	
11h ~ 1Fh	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
20h	REG_CALG	7:0	Default : 0x80	Access : R/W
	REG_CALG_EN	7	0: Disable. 1: Enable gain auto CAL procedure.	
	REG_CALG_TRIG	6	Write an 1 to start gain CAL procedure.	
	REG_CALG_UPD	5	1: Auto update gain cal result.	
	REG_CALG_STSSSEL	4	Select gain CAL status for CAL status reg.	
	REG_CALG_INI	3:2	Select intrinsic ADC gain for 0.7Vpp input. 00: 0x6f. 01: 0x67. 10: 0x5f. 11: 0x57.	
	REG_CALO_BLK	1	0: Use DOUT code 0 as offset CAL target. 1: Use DOUT code 16 (8-bit) as offset CAL target.	
	REG_CAL_LOCK	0	1: Ignode PLL lock for CAL.	
21h	REG_GAIN_AGC0	7:0	Default : 0x80	Access : R/W
	REG_GAIN_AGC0	7:0	PGA control for VD AGC range 0.	
22h	REG_GAIN_AGC1	7:0	Default : 0x80	Access : R/W
	REG_GAIN_AGC1	7:0	PGA control for VD AGC range 1.	
23h	REG_GAIN_AGC2	7:0	Default : 0x80	Access : R/W
	REG_GAIN_AGC2	7:0	PGA control for VD AGC range 2.	
24h	REG_ADC_OV	7:0	Default : 0x80	Access : R/W
	REG_VREF_OV	7	0: Disable. 1: Enable ADC VREF override by register.	

Misc Register (Bank = 05)				
Index	Name	Bits	Description	
	REG_GSHIFT_OV	6	0: Disable. 1: Enable ADC GSHIFT override by register.	
	REG_GAIN_OV	5	0: Disable. 1: Enable ADC gain override by register.	
	REG_OFFSET_OV	4	0: Disable. 1: Enable ADC offset override by register.	
	REG_AGC_NEWMAP	3	0: Disable. 1: Enable PGA controlled by register for VD AGC.	
	REG_GSHIFT_AGC	2:0	GSHIFT control for VD AGC range 0,1,2	
25h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
26h	REG_ADC_ICTRL	7:0	Default : 0x05	Access : R/W
	REG_ADC_ICTRL	7:0	ADC current control for pipeline stages.	
27h	REG_ADC	7:0	Default : 0x05	Access : R/W
	REG_RDAC_ICTRL	7:6	ADC R-DAC current control.	
	REG_ADC_IMODE	5:4	ADC current mode control.	
	-	3	Reserved.	
	REG_ADC_VCTRL	2:0	ADC bias voltage control.	
28h	REG_CLAMP	7:0	Default : 0x05	Access : R/W
	-	7:6	Reserved.	
	REG_REF_TST	5:4	ADC Reference circuit Test mode.	
	REG_VCLAMP_D	3:0	Select VD input Clamp voltage level.	
29h	-	7:0	Default : -	Access : -
	-	7:0	Reserved.	
30h	REG_MICROCODE_0_H	7:0	Default : 0x80	Access : R/W
	REG_MICROCODE_0_H	7:0	Microcode_0[15:8].	
31h	REG_GAIN_AGC1	7:0	Default : 0x80	Access : R/W
	REG_GAIN_AGC1	7:0	Microcode_0[7:0].	
32h	REG_MICROCODE_1_H	7:0	Default : 0x80	Access : R/W
	REG_MICROCODE_1_H	7:0	Microcode_1[15:8].	
33h	REG_MICROCODE_1_L	7:0	Default : 0x80	Access : R/W

Misc Register (Bank = 05)			
Index	Name	Bits	Description
	REG_MICROCODE_1_L	7:0	Microcode_1[7:0].
34h	REG_MICROCODE_2_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_2_H	7:0	Microcode_2[15:8].
35h	REG_MICROCODE_2_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_2_L	7:0	Microcode_2[7:0].
36h	REG_MICROCODE_3_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_3_H	7:0	Microcode_3[15:8].
37h	REG_MICROCODE_3_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_3_L	7:0	Microcode_3[7:0].
38h	REG_MICROCODE_4_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_4_H	7:0	Microcode_4[15:8].
39h	REG_MICROCODE_4_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_4_L	7:0	Microcode_4[7:0].
3Ah	REG_MICROCODE_5_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_5_H	7:0	Microcode_5[15:8].
3Bh	REG_MICROCODE_5_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_5_L	7:0	Microcode_5[7:0].
3Ch	REG_MICROCODE_6_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_6_H	7:0	Microcode_6[15:8].
3Dh	REG_MICROCODE_6_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_6_L	7:0	Microcode_6[7:0].
3Eh	REG_MICROCODE_7_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_7_H	7:0	Microcode_7[15:8].

Misc Register (Bank = 05)			
Index	Name	Bits	Description
3Fh	REG_MICROCODE_7_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_7_L	7:0	Microcode_7[7:0].
40h	REG_MICROCODE_8_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_8_H	7:0	Microcode_8[15:8].
41h	REG_MICROCODE_8_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_8_L	7:0	Microcode_8[7:0].
42h	REG_MICROCODE_9_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_9_H	7:0	Microcode_9[15:8].
43h	REG_MICROCODE_9_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_9_L	7:0	Microcode_9[7:0].
44h	REG_MICROCODE_A_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_A_H	7:0	Microcode_a[15:8].
45h	REG_MICROCODE_A_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_A_L	7:0	Microcode_a[7:0].
46h	REG_MICROCODE_B_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_B_H	7:0	Microcode_b[15:8].
47h	REG_MICROCODE_B_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_B_L	7:0	Microcode_b[7:0].
48h	REG_MICROCODE_C_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_C_H	7:0	Microcode_c[15:8].
49h	REG_MICROCODE_C_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_C_L	7:0	Microcode_c[7:0].
4Ah	REG_MICROCODE_D_H	7:0	Default : 0x80 Access : R/W

Misc Register (Bank = 05)			
Index	Name	Bits	Description
	REG_MICROCODE_D_H	7:0	Microcode_d[15:8].
4Bh	REG_MICROCODE_D_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_D_L	7:0	Microcode_d[7:0].
4Ch	REG_MICROCODE_E_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_E_H	7:0	Microcode_e[15:8].
4Dh	REG_MICROCODE_E_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_E_L	7:0	Microcode_e[7:0].
4Eh	REG_MICROCODE_F_H	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_F_H	7:0	Microcode_f[15:8].
4Fh	REG_MICROCODE_F_L	7:0	Default : 0x80 Access : R/W
	REG_MICROCODE_F_L	7:0	Microcode_f[7:0].
50h	REG_BIST	7:0	Default : 0x80 Access : R
	-	7:2	Reserved.
	ANY_BIST_FAIL	1	Any BIST Fail.
	BIST_DONE	0	BIST Done.
51h	REG_BIST_EN	7:0	Default : 0x80 Access : R/W
	-	7:3	Reserved.
	RSTPATGEN	2	Reset Pat Gen.
	BIST_EN	1	BIST Enable.
	BIST_MODE	0	BIST Mode.
52h	PATTERN[15:8]	7:0	Default : 0x80 Access : R/W
	PATTERN[15:8]	7:0	Pattern[15:8].
53h	PATTERN[7:0]	7:0	Default : 0x80 Access : R/W
	PATTERN[7:0]	7:0	Pattern[7:0].
54h	MIN_ADDR[15:8]	7:0	Default : 0x80 Access : R/W
	MIN_ADDR[15:8]	7:0	Min_Addr[15:8].
55h	MIN_ADDR[7:0]	7:0	Default : 0x80 Access : R/W
	MIN_ADDR[7:0]	7:0	Min_Addr [7:0].
56h	MAX_ADDR[15:8]	7:0	Default : 0x80 Access : R/W

Misc Register (Bank = 05)			
Index	Name	Bits	Description
	MAX_ADDR[15:8]	7:0	Max_Addr [15:8].
57h	MAX_ADDR[7:0]	7:0	Default : 0x80 Access : R/W
	MAX_ADDR[7:0]	7:0	Max_Addr [7:0].
58h	RETENTION_CNTR [31:24]	7:0	Default : 0x80 Access : R/W
	RETENTION_CNTR [31:24]	7:0	Retention_Counter[31:24].
59h	RETENTION_CNTR [23:16]	7:0	Default : 0x80 Access : R/W
	RETENTION_CNTR [23:16]	7:0	Retention_Counter[23:16].
5Ah	RETENTION_CNTR [15:8]	7:0	Default : 0x80 Access : R/W
	RETENTION_CNTR [15:8]	7:0	Retention_Counter[15:8].
5Bh	RETENTION_CNTR [7:0]	7:0	Default : 0x80 Access : R/W
	RETENTION_CNTR[7:0]	7:0	Retention_Counter[7:0].
5Ch	BIST_FAIL_BUS [31:24]	7:0	Default : 0x80 Access : R
	BIST_FAIL_BUS[31:24]	7:0	BIST_Fail_Bus[31:24].
5Dh	BIST_FAIL_BUS [23:16]	7:0	Default : 0x80 Access : R
	BIST_FAIL_BUS[23:16]	7:0	BIST_Fail_Bus[23:16].
5Eh	BIST_FAIL_BUS [15:8]	7:0	Default : 0x80 Access : R
	BIST_FAIL_BUS[15:8]	7:0	BIST_Fail_Bus[15:8].
5Fh	BIST_FAIL_BUS[7:0]	7:0	Default : 0x80 Access : R
	BIST_FAIL_BUS[7:0]	7:0	BIST_Fail_Bus[7:0].
60h	REG_IP_VSYNC0	7:0	Default : 0x80 Access : R/W
	REG_IP_VSYNC0	7:0	Reg_IP_VSYNC0.
61h	REG_IP_VSYNC1	7:0	Default : 0x80 Access : R/W
	REG_IP_VSYNC1	7:0	Reg_IP_VSYNC1.
62h	REG_IP_SC0	7:0	Default : 0x80 Access : R/W
	REG_IP_SC0	7:0	Reg_IP_SC0.

Misc Register (Bank = 05)			
Index	Name	Bits	Description
63h	REG_IP_SC1	7:0	Default : 0x80 Access : R/W
	REG_IP_SC1	7:0	Reg_IP_SC1.
64h	REG_IP_SC2	7:0	Default : 0x80 Access : R
	REG_IP_SC2	7:0	Reg_IP_SC2.
65h	REG_CCFL_65	7:0	Default : 0x80 Access : R/W
	REG_CCFL_65	7:0	Reg_CCFL_65.
66h	REG_CCFL_66	7:0	Default : 0x80 Access : R/W
	REG_CCFL_66	7:0	Reg_CCFL_66.
67h	REG_OSD_PAD00_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD00_2ND	7:0	Reg_OSD_pad00_2nd.
68h	REG_OSD_PAD01_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD01_2ND	7:0	Reg_OSD_pad01_2nd.
69h	REG_OSD_PAD02_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD02_2ND	7:0	Reg_OSD_pad02_2nd.
6Ah	REG_OSD_PAD03_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD03_2ND	7:0	Reg_OSD_pad03_2nd.
6Bh	REG_OSD_PAD04_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD04_2ND	7:0	Reg_OSD_pad04_2nd.
6Ch	REG_OSD_PAD05_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD05_2ND	7:0	Reg_OSD_pad05_2nd.
6Dh	REG_OSD_PAD06_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD06_2ND	7:0	Reg_OSD_pad06_2nd.
6Eh	REG_OSD_PAD07_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD07_2ND	7:0	Reg_OSD_pad07_2nd.
6Fh	REG_OSD_PAD08_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD08_2ND	7:0	Reg_OSD_pad08_2nd.

Misc Register (Bank = 05)			
Index	Name	Bits	Description
70h	REG_OSD_PAD09_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD09_2ND	7:0	Reg_OSD_pad09_2nd.
71h	REG_OSD_PAD0A_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD0A_2ND	7:0	Reg_OSD_pad0a_2nd.
72h	REG_OSD_PAD0B_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD0B_2ND	7:0	reg_osd_pad0b_2nd
73h	REG_OSD_PAD0C_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD0C_2ND	7:0	Reg_OSD_pad0c_2nd.
74h	REG_OSD_PAD0D_2ND	7:0	Default : 0x80 Access : R
	REG_OSD_PAD0D_2ND	7:0	Reg_OSD_pad0d_2nd.
75h	REG_OSD_PAD0E_2ND	7:0	Default : 0x80 Access : R
	REG_OSD_PAD0E_2ND	7:0	Reg_OSD_pad0e_2nd.
76h	REG_OSD_PAD0F_2ND	7:0	Default : 0x80 Access : R
	REG_OSD_PAD0F_2ND	7:0	Reg_OSD_pad0f_2nd.
77h	REG_OSD_PAD10_2ND	7:0	Default : 0x80 Access : R
	REG_OSD_PAD10_2ND	7:0	Reg_OSD_pad10_2nd.
78h	REG_OSD_PAD11_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD11_2ND	7:0	Reg_OSD_pad11_2nd.
79h	REG_OSD_PAD12_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD12_2ND	7:0	Reg_OSD_pad12_2nd.
7Ah	REG_OSD_PAD13_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD13_2ND	7:0	Reg_OSD_pad13_2nd.
7Bh	REG_OSD_PAD14_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD14_2ND	7:0	Reg_OSD_pad14_2nd.

Misc Register (Bank = 05)			
Index	Name	Bits	Description
	REG_OSD_PAD14_2ND	7:0	Reg_OSD_pad14_2nd.
7Ch	REG_OSD_PAD15_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD15_2ND	7:0	Reg_OSD_pad15_2nd.
7Dh	REG_OSD_PAD16_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD16_2ND	7:0	reg_osd_pad16_2nd.
7Eh	REG_OSD_PAD17_2ND	7:0	Default : 0x80 Access : R/W
	REG_OSD_PAD17_2ND	7:0	Reg_OSD_pad17_2nd.
7Fh	REG_OSD_DEF_CHAR_HIGH_REG	7:0	Default : 0x80 Access : R/W
	REG_OSD_DEF_CHAR_HIGH_REG	7:0	REG_OSD_DEF_CHAR_HIGH_REG.
80h	REG_OSD_CFONT_EXT_START_ADR	7:0	Default : 0x80 Access : R/W
	REG_OSD_CFONT_EXT_START_ADR	7:0	REG_OSD_CFONT_EXT_START_ADR.
81h	REG_OSD_L_M8C_RAM_START	7:0	Default : 0x80 Access : R/W
	REG_OSD_L_M8C_RAM_START	7:0	REG_OSD_L_M8C_RAM_START.
82h	REG_PAL32_CTRL	7:0	Default : 0x80 Access : R/W
	REG_PAL32_CTRL	7:0	Reg_pal32_ctrl.
83h	REG_OP2_CTRL	7:0	Default : 0x80 Access : R/W
	REG_OP2_CTRL	7:0	Reg_OSD_pad0a_2nd.
84h	REG_OSC_SET	7:0	Default : 0x80 Access : R
	REG_BONDING_KEY	7	Bonding Key status.
	-	6:3	Reserved.
	REG_RING_OSC_SEL	2:1	Ring-Oscillator mode Selection.
	REG_RING_OSC_EN	0	Ring-Oscillator Enable.
85h ~ FFh	-	7:0	Default : - Access : -
	-	7:0	Reserved.

MGD Register (Bank = 05)

MGD Register (Bank = 05)				
Index (Absolute)	Mnemonic	Bit	Description	
48h (0590h)	REG0590	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_0_L[7:0]	7:0	Histogram threshold0 low byte.	
48h (0591h)	REG0591	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_0_H[7:0]	7:0	Histogram threshold0 high byte.	
49h (0592h)	REG0592	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_1_L[7:0]	7:0	Histogram threshold1 low byte.	
49h (0593h)	REG0593	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_1_H[7:0]	7:0	Histogram threshold1 high byte.	
4Ah (0594h)	REG0594	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_2_L[7:0]	7:0	Histogram threshold2 low byte.	
4Ah (0595h)	REG0595	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_2_H[7:0]	7:0	Histogram threshold2 high byte.	
4Bh (0596h)	REG0596	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_3_L[7:0]	7:0	Histogram threshold3 low byte.	
4Bh (0597h)	REG0597	7:0	Default : 0xFF	Access : R/W
	HISTOGRAM_THRD_3_H[7:0]	7:0	Histogram threshold3 high byte.	
4Ch (0598h)	REG0598	7:0	Default : 0xF8	Access : R/W
	FSTABLE[3:0]	7:4	DCR power on control frame count.	
	YAVG_ALPHA[3:0]	3:0	Yavg frame alpha value, 0:current yavg, f:last yavg.	
4Ch (0599h)	REG0599	7:0	Default : 0xFE	Access : R/W
	YAVG_RGB_EN	7	Select RGB max value to calculate yavg, 0:select Y for yavg.	
	YAVG_LIM_EN	6	Enable yavg_avg to limit ygain tuning step.	
	HIST_RGB_EN	5	Select RGB max value to calculate histogram.	
	HIST_121_EN	4	Histogram 121 low pass filter enable.	
	YOUT_RGB_EN	3	Select RGB max value to lookup DLC gain.	
	YGAIN_HIST_LIM_EN	2	Enable histogram to limit ygain max value.	
	DLC_GAIN_LIM_EN	1	Enable dlc gain limit function to keep detail of data.	
DCR_EN	0	Enable DCR function.		
4Dh (059Ah)	REG059A	7:0	Default : 0x80	Access : R/W
	YGAIN[7:0]	7:0	Gain for calculate YGAIN, 80->1x.	

MGD Register (Bank = 05)				
Index (Absolute)	Mnemonic	Bit	Description	
4Dh (059Bh)	REG059B	7:0	Default : 0xA0	Access : R/W
	YGAIN_STEP[7:0]	7:0	Ygain jump step. [7]: Enable different of ygain for ygain step, [6:0]:gain of ydiff, 40 -> 1x. [6:0]:ygain step x2 when [7]=0.	
4Eh (059Ch)	REG059C	7:0	Default : 0x10	Access : R/W
	YGAIN_STEP_MAX[7:0]	7:0	Max value of ygain jump step.	
4Eh (059Dh)	REG059D	7:0	Default : 0x01	Access : R/W
	YGAIN_STEP_MIN[7:0]	7:0	Max value of ygain jump step.	
4Fh (059Eh)	REG059E	7:0	Default : 0x00	Access : R/W
	YGAIN_OFFSET_L[7:0]	7:0	Offset for calculate ygain, /16.	
4Fh (059Fh)	REG059F	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	YGAIN_OFFSET_H[3:0]	3:0	Offset for calculate ygain.	
50h (05A0h)	REG05A0	7:0	Default : 0x00	Access : R/W
	DLC_OFFSET_L[7:0]	7:0	Offset for calculate DLC gain, /16.	
50h (05A1h)	REG05A1	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	DLC_OFFSET_H[3:0]	3:0	Offset for calculate DLC gain, /16.	
51h (05A2h)	REG05A2	7:0	Default : 0x80	Access : R/W
	DLC_GAIN[7:0]	7:0	Gain for calculate DLC gain, 80->1x.	
51h (05A3h)	REG05A3	7:0	Default : 0xFF	Access : R/W
	PWM_FDLY[7:0]	7:0	PWM power on control.	
52h (05A4h)	REG05A4	7:0	Default : 0xFF	Access : R/W
	PWM_PERIOD_L[7:0]	7:0	PWM period set.	
52h (05A5h)	REG05A5	7:0	Default : 0xFF	Access : R/W
	PWM_PERIOD_H[7:0]	7:0	PWM period set.	
53h (05A6h)	REG05A6	7:0	Default : 0x00	Access : R/W
	PWM_DUTY_L[7:0]	7:0	PWM duty set.	
53h (05A7h)	REG05A7	7:0	Default : 0x00	Access : R/W
	PWM_DUTY_H[7:0]	7:0	PWM duty set.	
54h (05A8h)	REG05A8	7:0	Default : 0x00	Access : R/W
	PWM_R_OFFSET_L[7:0]	7:0	Offset for calculate PWM duty, /16.	

MGD Register (Bank = 05)				
Index (Absolute)	Mnemonic	Bit	Description	
54h (05A9h)	REG05A9	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	PWM_R_OFFSET_H[3:0]	3:0	Offset for calculate PWM duty, /16.	
55h (05AAh)	REG05AA	7:0	Default : 0x00	Access : R/W
	DCR_OFFSET_L[7:0]	7:0	Offset for calculate PWM duty gain, /16.	
55h (05ABh)	REG05AB	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	DCR_OFFSET_H[3:0]	3:0	Offset for calculate PWM duty gain, /16.	
56h (05ACh)	REG05AC	7:0	Default : 0x80	Access : R/W
	DCR_GAIN[7:0]	7:0	Gain for calculate PWM duty gain, 80->1x.	
56h (05ADh)	REG05AD	7:0	Default : 0x10	Access : R/W
	PWM_HTOTAL_EN	7	Enable htotal for PWM period.	
	PWM_INV	6	Inverse PWM pol.	
	PWM_RST_SEL[1:0]	5:4	PWM reset select. 0: Period. 1: Vsync. 2: First line. 3: Vertical blanking.	
	DLC_EN	3	Enable DLC function.	
	DLC_TABLE_SEL	2	DLC table debug mode enable.	
	PWM_TABLE_EN	1	Select dcr table for PWM control.	
	-	0	Reserved.	
57h (05AEh)	REG05AE	7:0	Default : 0x00	Access : R/W
	DLC_TABLE_DIN[7:0]	7:0	DLC table debug din.	
57h (05AFh)	REG05AF	7:0	Default : 0x00	Access : R/W
	PWM_TABLE_DIN[7:0]	7:0	PWM table debug din.	
58h (05B0h)	REG05B0	7:0	Default : 0x00	Access : RO
	YAVG_OUT[7:0]	7:0	Current Frame Y Average.	
58h (05B1h)	REG05B1	7:0	Default : 0x00	Access : RO
	YAVG_PRE_OUT[7:0]	7:0	Previous Frame Y Average.	
59h (05B2h)	REG05B2	7:0	Default : 0x00	Access : RO
	YAVG_AVG_OUT[7:0]	7:0	Current and Previous Y Average by alpha.	
59h	REG05B3	7:0	Default : 0x00	Access : RO

MGD Register (Bank = 05)			
Index (Absolute)	Mnemonic	Bit	Description
(05B3h)	YGAIN_OUT[7:0]	7:0	Adjustment Frame Value.
5Ah (05B4h)	REG05B4 YGAIN_TMP_OUT[7:0]	7:0	Default : 0x00 Access : RO Adjustment Target Frame Value.
5Ah (05B5h)	REG05B5 YGAIN_HIST_OUT[7:0]	7:0	Default : 0x00 Access : RO Histogram Frame Value.
5Bh (05B6h)	REG05B6 HISTOGRAM0_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec0[7:0].
5Bh (05B7h)	REG05B7 HISTOGRAM0_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec0[15:8].
5Ch (05B8h)	REG05B8 HISTOGRAM1_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec1[7:0].
5Ch (05B9h)	REG05B9 HISTOGRAM1_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec1[15:8].
5Dh (05BAh)	REG05BA HISTOGRAM2_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec2[7:0].
5Dh (05BBh)	REG05BB HISTOGRAM2_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec2[15:8].
5Eh (05BCh)	REG05BC HISTOGRAM3_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec3[7:0].
5Eh (05BDh)	REG05BD HISTOGRAM3_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec3[15:8].
5Fh (05BEh)	REG05BE HISTOGRAM4_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec4[7:0].
5Fh (05BFh)	REG05BF HISTOGRAM4_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec4[15:8].
60h (05C0h)	REG05C0 HISTOGRAM5_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec5[7:0].
60h (05C1h)	REG05C1 HISTOGRAM5_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec5[15:8].
61h (05C2h)	REG05C2 HISTOGRAM6_L[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec6[7:0].
61h (05C3h)	REG05C3 HISTOGRAM6_H[7:0]	7:0	Default : 0x00 Access : RO Histogram Result for Sec6[15:8].

MGD Register (Bank = 05)				
Index (Absolute)	Mnemonic	Bit	Description	
62h (05C4h)	REG05C4	7:0	Default : 0x00	Access : RO
	HISTOGRAM7_L[7:0]	7:0	Histogram Result for Sec7[7:0].	
62h (05C5h)	REG05C5	7:0	Default : 0x00	Access : RO
	HISTOGRAM7_H[7:0]	7:0	Histogram Result for Sec7[15:8].	
63h (05C6h)	REG05C6	7:0	Default : 0x00	Access : RO
	HISTOGRAM8_L[7:0]	7:0	Histogram Result for Sec8[7:0].	
63h (05C7h)	REG05C7	7:0	Default : 0x00	Access : RO
	HISTOGRAM8_H[7:0]	7:0	Histogram Result for Sec8[15:8].	
64h (05C8h)	REG05C8	7:0	Default : 0x00	Access : RO
	HISTOGRAM9_L[7:0]	7:0	Histogram Result for Sec9[7:0].	
64h (05C9h)	REG05C9	7:0	Default : 0x00	Access : RO
	HISTOGRAM9_H[7:0]	7:0	Histogram Result for Sec9[15:8].	
65h (05CAh)	REG05CA	7:0	Default : 0x00	Access : RO
	HISTOGRAM10_L[7:0]	7:0	Histogram Result for Sec10[7:0].	
65h (05CBh)	REG05CB	7:0	Default : 0x00	Access : RO
	HISTOGRAM10_H[7:0]	7:0	Histogram Result for Sec10[15:8].	
66h (05CCh)	REG05CC	7:0	Default : 0x00	Access : RO
	HISTOGRAM11_L[7:0]	7:0	Histogram Result for Sec11[7:0].	
66h (05CDh)	REG05CD	7:0	Default : 0x00	Access : RO
	HISTOGRAM11_H[7:0]	7:0	Histogram Result for Sec11[15:8].	
67h (05CEh)	REG05CE	7:0	Default : 0x00	Access : RO
	HISTOGRAM12_L[7:0]	7:0	Histogram Result for Sec12[7:0].	
67h (05CFh)	REG05CF	7:0	Default : 0x00	Access : RO
	HISTOGRAM12_H[7:0]	7:0	Histogram Result for Sec12[15:8].	
68h (05D0h)	REG05D0	7:0	Default : 0x00	Access : RO
	HISTOGRAM13_L[7:0]	7:0	Histogram Result for Sec13[7:0].	
68h (05D1h)	REG05D1	7:0	Default : 0x00	Access : RO
	HISTOGRAM13_H[7:0]	7:0	Histogram Result for Sec13[15:8].	
69h (05D2h)	REG05D2	7:0	Default : 0x00	Access : RO
	HISTOGRAM14_L[7:0]	7:0	Histogram Result for Sec14[7:0].	
69h (05D3h)	REG05D3	7:0	Default : 0x00	Access : RO
	HISTOGRAM14_H[7:0]	7:0	Histogram Result for Sec14[15:8].	
6Ah	REG05D4	7:0	Default : 0x00	Access : RO

MGD Register (Bank = 05)				
Index (Absolute)	Mnemonic	Bit	Description	
(05D4h)	HISTOGRAM15_L[7:0]	7:0	Histogram Result for Sec15[7:0].	
6Ah (05D5h)	REG05D5 HISTOGRAM15_H[7:0]	7:0	Default : 0x00	Access : RO
6Bh (05D6h)	REG05D6 HACT_L[7:0]	7:0	Default : 0x00	Access : R/W
6Bh (05D7h)	REG05D7 -	7:0	Default : 0x00	Access : R/W
		7:4	Reserved.	
	HACT_H[3:0]	3:0	Horizontal Active Pixel Number[11:8].	
6Ch (05D8h)	REG05D8 VACT_L[7:0]	7:0	Default : 0x00	Access : R/W
6Ch (05D9h)	REG05D9 -	7:0	Default : 0x00	Access : R/W
		7:4	Reserved.	
	VACT_H[3:0]	3:0	Vertical Active Pixel Number[11:8].	
6Dh (05DAh)	REG05DA HBLANK[7:0]	7:0	Default : 0x00	Access : R/W
6Dh (05DBh)	REG05DB YGAIN_TMP_MIN[7:0]	7:0	Default : 0x00	Access : R/W
6Eh (05DCh)	REG05DC PWM_PERIOD_R[7:0]	7:0	Default : 0x00	Access : RO
6Eh (05DDh)	REG05DD PWM_DUTY_R[7:0]	7:0	Default : 0x00	Access : RO
70h (05E0h)	REG05E0 VIP_3D_DITHER_EN	7:0	Default : 0x19	Access : R/W
	VIP_3D_DITHER_OBN8_EN	7	3d dither enable.	
	VIP_3D_DITHER_MONO_EN	6	3d dither output bit number is 8 bits enable. 1: Output 8 bits. 0: Output 6 bits.	
	VIP_3D_DITHER_LSB_EN	5	3d dither monochrome mode enable.	
	VIP_3D_DITHER_LSB_SEL[1:0]	4	3d dither LSB dither enable.	
	VIP_3D_DITHER_LSB_SEL[1:0]	3:2	3d dither LSB dither table select.	
	VIP_3D_DITHER_MSB_SEL[1:0]	1:0	3d dither MSB dither table select.	
70h (05E1h)	REG05E1 VIP_3D_DITHER_ON	7:0	Default : 0x00	Access : R/W
	VIP_3D_DITHER_VCLR_EN	7	3d dither on.	
	VIP_3D_DITHER_VCLR_EN	6	3d dither vertical dither enable.	

MGD Register (Bank = 05)				
Index (Absolute)	Mnemonic	Bit	Description	
	VIP_3D_DITHER_VCLR_NO[1:0]	5:4	3d dither vertical dither table number.	
	VIP_3D_DITHER_LSB_VCLR_EN	3	3d dither LSB vertical dither enable.	
	VIP_3D_DITHER_10_MOD_EN	2	3d dither 10 mode detect enable.	
	VIP_3D_DITHER_LSB_VCLR_NO[1:0]	1:0	3d dither LSB vertical dither table number.	
71h (05E2h)	REG05E2	7:0	Default : 0x99	Access : R/W
	VIP_3D_DITHER_MSB_R_MASK[1:0]	7:6	3d dither MSB R channel mask.	
	VIP_3D_DITHER_MSB_B_MASK[1:0]	5:4	3d dither MSB B channel mask.	
	VIP_3D_DITHER_LSB_R_MASK[1:0]	3:2	3d dither LSB R channel mask.	
	VIP_3D_DITHER_LSB_B_MASK[1:0]	1:0	3d dither LSB B channel mask.	
71h (05E3h)	REG05E3	7:0	Default : 0x0C	Access : R/W
	VIP_3D_DITHER_DEBUG[7:0]	7:0	3d dither Debug Use.	
72h (05E4h)	REG05E4	7:0	Default : 0x27	Access : R/W
	H_DITHER_TABLE0[7:0]	7:0	3d dither Horizontal dither table0.	
72h (05E5h)	REG05E5	7:0	Default : 0x8D	Access : R/W
	H_DITHER_TABLE1[7:0]	7:0	3d dither Horizontal dither table1.	
73h (05E6h)	REG05E6	7:0	Default : 0x63	Access : R/W
	H_DITHER_TABLE2[7:0]	7:0	3d dither Horizontal dither table2.	
73h (05E7h)	REG05E7	7:0	Default : 0x9C	Access : R/W
	H_DITHER_TABLE3[7:0]	7:0	3d dither Horizontal dither table3.	
74h (05E8h)	REG05E8	7:0	Default : 0x4E	Access : R/W
	V_DITHER_TABLE0[7:0]	7:0	3d dither Vertical dither table0.	
74h (05E9h)	REG05E9	7:0	Default : 0x4B	Access : R/W
	V_DITHER_TABLE1[7:0]	7:0	3d dither Vertical dither table1.	
75h (05EAh)	REG05EA	7:0	Default : 0x93	Access : R/W
	V_DITHER_TABLE2[7:0]	7:0	3d dither Vertical dither table2.	
75h (05EBh)	REG05EB	7:0	Default : 0x39	Access : R/W
	V_DITHER_TABLE3[7:0]	7:0	3d dither Vertical dither table3.	

ADC Registers (Bank 06)

ADC_ATOP Register (Bank = 06)

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
01h (0602h)	REG0602	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	VD_YC_EN	2	1: Enable S-Video input function.	
	VD_EN	1	1: Enable VD function.	
	ADC_ENA	0	1: Enable ADC_A RGB function.	
02h (0604h)	REG0604	7:0	Default : 0x00	Access : R/W
	MUX_BSEL[1:0]	7:6	BADC mux sel, 00:RGB/YPbPr , 01:VD ,10:DVI,11:reserved.	
	MUX_GSEL[1:0]	5:4	GADC mux sel, 00:RGB/YPbPr , 01:VD ,10:DVI,11:reserved.	
	MUX_RSEL[1:0]	3:2	RADC mux sel, 00:RGB/YPbPr , 01:VD ,10:DVI,11:reserved.	
	AMUXA[1:0]	1:0	Select ADC_A RGB channel, VD FB mode RGB channel. 00: Selects input channel 0. 01: Selects input channel 1. 10: Selects input channel 2.	
02h (0605h)	REG0605	7:0	Default : 0x40	Access : R/W
	-	7	Reserved.	
	MUX_RGB_EN	6	1: Enable RGB MUX.	
	MUX_RGBSEL[1:0]	5:4	00: Channel0 , 01:channel1, 10:channel2.	
	-	3:0	Reserved.	
03h (0606h)	REG0606	7:0	Default : 0x00	Access : R/W
	MUX_VDSEL_C[3:0]	7:4	Select VD SC channel. 0000: CVBS0. 0001: CVBS1. 0010: CVBS2. 0011: CVBS3. 0100: CVBS4 (Y0). 0101: CVBS5 (Y1). 0110: CVBS6 (C0). 0111: CVBS7 (C1). 1000: R0.	

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
			1001: R1. 1010: R2. Others: None.	
	MUX_VDSEL_Y[3:0]	3:0	Select VD CVBS/Y channel. 0000: CVBS0. 0001: CVBS1. 0010: CVBS2. 0011: CVBS3. 0100: CVBS4 (Y0). 0101: CVBS5 (Y1). 0110: CVBS6 (C0). 0111: CVBS7 (C1). 1000: G0. 1001: G1. 1010: G2. Others: None.	
03h (0607h)	REG0607	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	TEST_CLKMUX_RGB_INV	5	1: Invert RGB ADC clock phase.	
	-	4	Reserved.	
	MUX_RGBVD	3	1: RGB ADC in VD mode.	
	-	2	Reserved.	
	MUX_C_EN	1	1: Enable VD-C channel mux.	
	MUX_Y_EN	0	1: Enable VD-Y channel mux.	
04h (0608h)	REG0608	7:0	Default : 0xFF	Access : R/W
	PDN_PLL	7	1: Power down ADC PLL.	
	PDN_PHD	6	1: Power down phase digitizer.	
	PDN_ADCB	5	1: Power down ADC_B.	
	PDN_ADCG	4	1: Power down ADC_G.	
	PDN_ADCR	3	1: Power down ADC_R.	
	PDN_REF	2	1: Power down all reference voltage.	
	PDN_BG	1	1: Power down bandgap.	
	PDN_REF_RGB	0	1: Power down RGB ADC reference voltage.	
04h (0609h)	REG0609	7:0	Default : 0x7F	Access : R/W
	-	7	Reserved.	

ADC_ATOP Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
	PDN_HSYNC	6	1: Power down Hsync_Cmp.
	PDN_SOG_MAIN	5	1: Power down online SOG Main.
	PDN_SOG_DAC	4	1: Power down online SOG DAC.
	PDN_PLL2	3	1: Power down VD PLL.
	PDN_ICLP_VDC	2	1: Power down I-clamp on VD-C channel.
	PDN_ICLP_VDY	1	1: Power down I-clamp on VD-Y channel.
	PDN_ICLP_RGB	0	1: Power down I-clamp on RGB channel.
05h (060Ah)	REG060A	7:0	Default : 0x07 Access : R/W
	-	7:3	Reserved.
	PDN_ADCPLA_PDAC_B	2	1= power down adcpla phase dac b.
	PDN_ADCPLA_PDAC_G	1	1= power down adcpla phase dac g.
06h (060Ch)	REG060C	7:0	Default : 0xFF Access : R/W
	PD_CLK[7:0]	7:0	Clock power down control. [0]: PD_CLKXTAL. [1]: PD_CLK200. [2]: PD_CLK400. [3]: PD_CLKPLL. [4]: PD_CLKD_R. [5]: PD_CLKD_G. [6]: PD_CLKD_B. [8]: PD_CLKD. [9]: PD_CLKD_VD. [10]: PD_DVIDETCLK.
06h (060Dh)	REG060D	7:0	Default : 0xFF Access : R/W
	PD_CLK[15:8]	7:0	See description of '060Ch'.
07h (060Eh)	REG060E	7:0	Default : 0x00 Access : R/W
	SOFRST[7:0]	7:0	1: Soft reset for ADCPLL blocks. [15:6]: reserved. [5]: Soft-reset PHASE DAC. [4]: Soft-reset ATOP. [3]: Soft-reset PLLB. [2]: Soft-reset ADCB. [1]: Soft-reset PLLA. [0]: Soft-reset ADCA.
07h	REG060F	7:0	Default : 0x00 Access : R/W

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(060Fh)	SOFTRST[15:8]	7:0	See description of '060Eh'.	
09h (0612h)	REG0612	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	ADC_PLL_PORST_EN	4	Pull the LPF of the PLL to zero. 1: Zero. 0: Normal.	
	-	3:0	Reserved.	
09h (0613h)	REG0613	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	VD_PLL_PORST_EN	4	Pull the LPF of the PLL to zero. 1: Zero. 0: Normal.	
	-	3:0	Reserved.	
0Ah (0614h)	REG0614	7:0	Default : 0xC1	Access : R/W
	-	7:5	Reserved.	
	ADC_PLL_MOD[1:0]	4:3	Select the divider number of the post divider. 00: Normal; 01: DIV2; 10:DIV4; 11:DIV8.	
	ADC_PLL_MULT[2:0]	2:0	ADC PLL clock multiplier = N+1. 000: /1. 001: /2. && 111: /8.	
0Ah (0615h)	REG0615	7:0	Default : 0xC1	Access : R/W
	-	7:5	Reserved.	
	VD_PLL_MOD[1:0]	4:3	Select the divider number of the post divider. 00: Normal; 01: DIV2; 10:DIV4; 11:DIV8.	
	VD_PLL_MULT[2:0]	2:0	ADC PLL clock multiplier = N+1. 000: /1. 001: /2. && 111: /8.	
0Bh ~ 0Dh (0616h ~ 061Bh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
0Fh	REG061E	7:0	Default : 0x00	Access : R/W

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(061Eh)	ADCPLA_PHASE_CC[7:0]	7:0	Select ADCA sampling clock phase.	
0Fh	REG061F	7:0	Default : 0x00	Access : R/W
(061Fh)	-	7:2	Reserved.	
	ADCPLA_PHASE_CC[9:8]	1:0	See description of '061Eh'.	
10h	REG0620	7:0	Default : 0x1F	Access : R/W
(0620h)	ADCPLA_PHASE_DELTA[7:0]	7:0	Select ADCA phase delta between CLKCC & CLKADC.	
10h	REG0621	7:0	Default : 0x00	Access : R/W
(0621h)	-	7:2	Reserved.	
	ADCPLA_PHASE_DELTA[9:8]	1:0	See description of '0620h'.	
11h ~ 12h	-	7:0	Default : -	Access : -
(0622h ~ 0624h)	-	-	Reserved.	
13h ~ 17h	-	7:0	Default : -	Access : -
(0626h ~ 062Eh)	-	-	Reserved.	
18h	REG0630	7:0	Default : 0x00	Access : R/W
(0630h)	-	7:2	Reserved.	
	ADCPLA_PLLDIV_DBLOAD_WAIT_VSYNC	1	1 = update plldiv during phase vsync.	
	ADCPLA_PHASE_DBLOAD_WAIT_VSYNC	0	1 = update phase during phase vsync.	
18h ~ 19h	-	7:0	Default : -	Access : -
(0631h ~ 0633h)	-	-	Reserved.	
20h	REG0640	7:0	Default : 0x00	Access : R/W
(0640h)	-	7:3	Reserved.	
	HSYNC_LVL[2:0]	2:0	Select Hsync Cmp's reference voltage. 000: REFH=1.54V, REFL=1.10V. 001: REFH=1.54V, REFL=0.88V. 010: REFH=1.76V, REFL=1.10V. 011: REFH=1.76V, REFL=0.88V. 100: REFH=1.87V, REFL=1.10V. 101: REFH=1.87V, REFL=0.88V. 110: REFH=1.76V, REFL=1.32V. 111: REFH=1.87V, REFL=1.32V.	
21h ~ 21h	-	7:0	Default : -	Access : -

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(0642h ~ 0643h)	-	-	Reserved.	
22h (0644h)	REG0644	7:0	Default : 0x30	Access : R/W
	XTAL_FREQ[7:0]	7:0	Set XTAL frequency for timing detection normalization (default: 12MHz, format: 6.2 MHz).	
22h (0645h)	REG0645	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	ADC_INMSEL	1	1: Enable one negative pin function.	
	-	0	Reserved.	
23h (0646h)	REG0646	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	YDIT_MD[2:0]	5:3	Select ADC Y dither mode for display.	
	CDIT_MD[2:0]	2:0	Select ADC C dither mode. 000: Off. 001: 1-bit noise. 010: 2-bit noise. 011: 3-bit noise. 100: Seq2 1-bit toggle noise. 101: Seq2 2-bit toggle noise. 110: Seq4 2-bit toggle noise. 111: Seq4 3-bit toggle noise.	
23h (0647h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
24h (0648h)	REG0648	7:0	Default : 0x00	Access : R/W
	BLPF_BWM[3:0]	7:4	B-channel negative input LPF bandwidth.	
	BLPF_BWP[3:0]	3:0	B-channel positive input LPF bandwidth.	
24h (0649h)	REG0649	7:0	Default : 0x00	Access : R/W
	GLPF_BWM[3:0]	7:4	G-channel negative input LPF bandwidth.	
	GLPF_BWP[3:0]	3:0	G-channel positive input LPF bandwidth.	
25h (064Ah)	REG064A	7:0	Default : 0x00	Access : R/W
	RLPF_BWM[3:0]	7:4	R-channel negative input LPF bandwidth.	
	RLPF_BWP[3:0]	3:0	R-channel positive input LPF bandwidth.	
25h ~ 27h (064Bh ~ 064Eh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
28h (0650h)	REG0650	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	VDLPGAIN_C	5	1: Gain=2 in VD-C LPF.	
	VDLPGAIN_Y	4	1: Gain=2 in VD-Y LPF.	
	-	3:2	Reserved.	
	VLPF_C_EN	1	1: Enable VD-C LPF.	
	VLPF_Y_EN	0	1: Enable VD-Y LPF.	
28h (0651h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
29h (0652h)	REG0652	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	SOG_BW[4:0]	4:0	Select online SOG filter bandwidth. 00000: 973MHz. 00001: 116MHz. 00011: 63MHz. 00111: 43MHz. 01111: 32MHz. 11111: 26MHz.	
29h (0653h)	REG0653	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	SOG_CAL_EN	5	For rising edge trigger enable of sog online calibration 0->1.	
	SOG_HYS	4	[0]: Disable online SOG comparator hysteresis function.	
	SOG_CAL	3	[0]: Enable online SOG calibration loop.	
	-	2:0	Reserved.	
2Ah (0654h)	REG0654	7:0	Default : 0x00	Access : R/W
	SOG_VCLP[3:0]	7:4	[0]: Select online SOG clamping voltage. XXX0: 1.11V. XXX1: 1.2V.	
	SOG_SW[3:0]	3:0	Select online SOG input source. XX00: SOGIN0. XX01: SOGIN1. XX10: SOGIN2. XX11: SOGIN3.	

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
2Bh (0656h)	REG0656	7:0	Default : 0x20	Access : R/W
	SOG_VCOMP[7:0]	7:0	[7:0] : Select online SOG comparator threshold voltage. $=1.08+(1.32-1.08)/256*CODES.$. [11:10] Select online SOG comparator hysteresis voltage. 00: 5mV. 01: 10mV. 10: 15mV. 11: 20mV.	
2Bh (0657h)	REG0657	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	SOG_VCOMP[11:8]	3:0	See description of '0656h'.	
2Ch (0658h)	REG0658	7:0	Default : 0x05	Access : R/W
	-	7:3	Reserved.	
	SOG_CONTROL_OFFSET	2	1=add user offset for offset code on online.	
	SOG_CONTROL_BYPASS	1	1= bypass online sog control register.	
	PDN_SOG_MUX	0	1: Power down online SOG MUX.	
2Dh (065Ah)	REG065A	7:0	Default : 0x20	Access : R/W
	SOG_INIT_WAIT_TIME[7:0]	7:0	Sog online calibration initial setup waiting time.	
2Dh (065Bh)	REG065B	7:0	Default : 0x10	Access : R/W
	SOG_SWEEP_WAIT_TIME[7:0]	7:0	Sog online calibration sweep code waiting time.	
2Eh (065Ch)	REG065C	7:0	Default : 0x08	Access : R/W
	SOG_EVA_WAIT_TIME[7:0]	7:0	Sog online calibration evaluate code waiting time.	
2Fh (065Eh)	REG065E	7:0	Default : 0x00	Access : RO
	SOG_STATUS[7:0]	7:0	Sog online calibration function test status. {SOG,CAL_EN,SOG_VCOMP}.	
2Fh (065Fh)	REG065F	7:0	Default : 0x00	Access : RO
	-	7:2	Reserved.	
	SOG_STATUS[9:8]	1:0	See description of '065Eh'.	
34h (0668h)	REG0668	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	TRIM_LDO_RGB_SEL	3	1: VCAL from LDO rstring for RGB 0: VCAL from trimming for RGB.	

ADC_ATOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
	LDO_RGB_SEL	2	1: 1.05v output voltage from LDO rstring for RGB. 0: 0.55v output voltage from LDO rstring for RGB.	
	VBG_EN	1		
	LDO_EN	0	1: Enable 1.05v and 0.55v output from LDO rstring 0:disable.	
34h ~ 39h (0669h ~ 0673h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
40h (0680h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
41h ~ 44h (0682h ~ 0689h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
45h (068Ah)	REG068A	7:0	Default : 0x01	Access : R/W
	-	7:2	Reserved.	
	HS_ADC_SEL_MUX[1:0]	1:0	CLKD_ATOP select, 00/01/10/11: R/G/B/R.	
45h ~ 47h (068Bh ~ 068Fh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
4Ah ~ 4Dh (0694h ~ 069Bh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
4Fh (069Eh)	REG069E	7:0	Default : 0x00	Access : R/W
	HSYNC_DEGLITCH_TH[7:0]	7:0	Select HSYNC deglitch pulse width threshold (step size = MPLL clock).	
4Fh (069Fh)	REG069F	7:0	Default : 0x00	Access : R/W
	SOG_DEGLITCH_TH[7:0]	7:0	Select SOG deglitch pulse width threshold (step size = MPLL clock).	
50h (06A0h)	REG06A0	7:0	Default : 0x00	Access : R/W
	-	7:6	Reserved.	
	IP_SOG_DEGLITCH	5	1: Enable SOG input deglitch for IP mode detection.	
	IP_HSYNC_DEGLITCH	4	1: Enable HSYNC input deglitch for IP mode detection.	

ADC_ATOP Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
	PLL_SOG_DEGLITCH	3	1: Enable SOG input deglitch for PLL.
	PLL_HSYNC_DEGLITCH	2	1: Enable HSYNC input deglitch for PLL.
	ADC_SOG_DEGLITCH	1	1: Enable SOG input deglitch for ADC clamp.
	ADC_HSYNC_DEGLITCH	0	1: Enable HSYNC input deglitch for ADC clamp.
60h (06C0h)	-	7:0	Default : - Access : -
	-	-	Reserved.
61h ~ 61h (06C2h ~ 06C3h)	-	7:0	Default : - Access : -
	-	-	Reserved.
70h (06E0h)	REG06E0	7:0	Default : 0x01 Access : R/W
	-	7:3	Reserved.
	MPLL_CLK_ADC216M_PD	2	1: Disable MPLL_CLK_ADC216M clock ou.
	MPLL_CLK_ADC432M_PD	1	1: Disable MPLL_CLK_ADC432M clock ou.
	MPLL_PD	0	1: Power down MPLLI.
71h (06E2h)	REG06E2	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	MPLL_DISFRUN	1	Disable VCO free-run.
	MPLL_IN_SELECT	0	Input clock selection: While TEST[5]=1'b1, 1'b0 1.0V clock input; 1'b1 3.3V clock input after internal level shift to 1.0V;.
71h (06E3h)	-	7:0	Default : - Access : -
	-	-	Reserved.
72h (06E4h)	REG06E4	7:0	Default : 0x04 Access : R/W
	-	7:4	Reserved.
	MPLL_OUTPUT_DIV[1:0]	3:2	Output-divider control: 2'b00: /1; 2'b01: /2; <-- default. 2'b10: /4; 2'b11: /8;.
	MPLL_INPUT_DIV[1:0]	1:0	Input-divider control: 2'b00: /1; <-- default. 2'b01: /2; 2'b10: /4;.

ADC_ATOP Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
			2'b11: /8:.
72h (06E5h)	REG06E5	7:0	Default : 0x12 Access : R/W
	-	7:5	Reserved.
	MPLL_LOOP_DIV[4:0]	4:0	Loop-divider control:. 5'h00: /1; 5'h01: /1; 5'h02: /2; 5'h03: /3 & 5'h1F: /31;. Others are not acceptable;.
73h (06E6h)	REG06E6	7:0	Default : 0x00 Access : R/W
	-	7:2	Reserved.
	MPLL_ICP_ICTRL[1:0]	1:0	Charge-Pump current control:. 2'h00: Icp x 4. 2'h01: Icp x 3. 2'h10: Icp x 2. 2'h11: Icp x1.
74h (06E8h)	REG06E8	7:0	Default : 0x31 Access : R/W
	-	7:6	Reserved.
	XTAL_SEL[1:0]	5:4	Xtal gain control.
	-	3:1	Reserved.
	XTAL_EN	0	Xtal enable control (active high).
75h ~ 77h (06EAh ~ 06EFh)	-	7:0	Default : - Access : -
	-	-	Reserved.
7Fh ~ 7Fh (06FEh ~ 06FFh)	-	7:0	Default : - Access : -
	-	-	Reserved.

ADC_DTOP Register (Bank = 06)

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
01h (0602h)	REG0602	7:0	Default : 0x95	Access : R/W
	PLLDIV[7:0]	7:0	ADC PLL divider ratio (Htotal-3). (Write sequence LSB -> MSB).	
01h (0603h)	REG0603	7:0	Default : 0x06	Access : R/W
	-	7:5	Reserved.	
	PLLDIV[12:8]	4:0	See description of '0602h'.	
02h (0604h)	REG0604	7:0	Default : 0x82	Access : R/W
	BWCOEF[7:0]	7:0	ADC PLL bandwidth coefficient.	
02h (0605h)	REG0605	7:0	Default : 0x09	Access : R/W
	FREQCOEF[7:0]	7:0	ADC PLL frequency coefficient.	
03h (0606h)	REG0606	7:0	Default : 0x05	Access : R/W
	DAMPCOEF[7:0]	7:0	ADC PLL damping coefficient.	
03h (0607h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
04h (0608h)	REG0608	7:0	Default : 0x05	Access : R/W
	PLL_STATUS_SEL[2:0]	7:5	Select PLL digital status.	
	PHD_CAL_DIS	4	Disable phase digitalizer calibration.	
	SETTLE_CNT[3:0]	3:0	Select phase digitalizer settling time.	
04h (0609h)	REG0609	7:0	Default : 0xC6	Access : R/W
	WDOG_TOL[1:0]	7:6	Select PLL watch dog reset tolerance.	
	IQCLR_TH[2:0]	5:3	PLL lock to unlock threshold.	
	IQSET_TH[2:0]	2:0	PLL unlock to lock threshold.	
05h (060Ah)	REG060A	7:0	Default : 0x00	Access : RO
	PLL_STATUS[7:0]	7:0	PLL digital status. 000: {LOCK, IQ, SLOW, FAST, FREERUN, 3'b000}.	
06h ~ 06h (060Ch ~ 060Dh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
07h (060Eh)	REG060E	7:0	Default : 0x8A	Access : R/W
	HSYNC_POL	7	Input HSYNC polarity. 0: Low active. 1: High active.	
	SOG_EN	6	Select PLL locking source.	

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
			0: HSYNC. 1: SOG.	
	HSYNC_EDGE	5	Select PLL locking edge. 0: HSYNC leading edge. 1: HSYNC trailing edge.	
	CLAMP_EDGE	4	Select clamp reference edge. 0: HSYNC trailing edge. 1: HSYNC leading edge.	
	CCDIS	3	1: Disable clamp during coast region.	
	WDOG_DIS	2	1: Disable ADC PLL watch dog.	
	COAST_POL	1	Select coast polarity. 0: Low active. 1: High active.	
	-	0	Reserved.	
07h (060Fh)	REG060F	7:0	Default : 0x00	Access : R/W
	HSOUT_PW[7:0]	7:0	Select extended HSOUT pulse width.	
08h (0611h)	REG0611	7:0	Default : 0x05	Access : R/W
	CLAMP_DUR[7:0]	7:0	Select clamp pulse duration.	
09h (0612h)	REG0612	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	HSOUT_GEN	1	1: Enable HSOUT pulse extension.	
	-	0	Reserved.	
09h (0613h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
0Bh (0616h)	REG0616	7:0	Default : 0x40	Access : R/W
	TIMEOUT_H[7:0]	7:0	HSYNC activity timeout period (100us).	
0Bh (0617h)	REG0617	7:0	Default : 0x64	Access : R/W
	TIMEOUT_V[7:0]	7:0	VSYNC activity timeout period (ms).	
0Ch (0618h)	REG0618	7:0	Default : 0x00	Access : RO
	-	7:6	Reserved.	
	OVF_RGB[5:0]	5:0	ADC overflow flags, { OVFB, UNFB, OVFG, UNFG, OVFR, UNFR}.	
0Ch (0619h)	REG0619	7:0	Default : 0x00	Access : RO, WO
	-	7:4	Reserved.	

ADC_DTOP Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
	SOG_TOG	3	1: Active channel SOG toggle status.
	VSYNC_TOG	2	1: Active channel VSYNC toggle status.
	HSYNC_TOG	1	1: Active channel HSYNC toggle status.
	CLROVF_RGB	0	Write a 1 to clear ADC_RGB overflow flags.
0Dh (061Ah)	REG061A	7:0	Default : 0x05 Access : R/W
	CLAMP_DLY[7:0]	7:0	Select clamp pulse start position relative to input HSYNC edge.
0Dh (061Bh)	REG061B	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	VCLAMP_EN_HACT	5	1: Enable HACT window.
	VCLAMP_HSYNC_OR_HSOUT	4	0: Use HSYNC, 1: use HSOUT.
	CLAMP_DLY[11:8]	3:0	See description of '061Ah'.
10h (0620h)	REG0620	7:0	Default : 0x24 Access : R/W
	-	7:6	Reserved.
	RGB_SWAP[5:0]	5:0	Select RGBY data to scalar. [1:0]: SEL R. [3:2]: SEL G. [5:4]: SEL B. 00: R. 01: G. 10: B. 11: Blank.
12h (0624h)	REG0624	7:0	Default : 0x00 Access : R/W
	-	7:6	Reserved.
	BMIDA[1:0]	5:4	0/1=select gnd-clamp/mid-clamp for ADC B. 00: 10h000. 01: 10h040. 10: 10h200.
	GMIDA[1:0]	3:2	0/1=select gnd-clamp/mid-clamp for ADC G. 00: 10h000. 01: 10h040. 10: 10h200.
	RMIDA[1:0]	1:0	0/1=select gnd-clamp/mid-clamp for ADC R. 00: 10h000. 01: 10h040. 10: 10h200.

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
12h (0625h)	REG0625	7:0	Default : 0x28	Access : R/W
	-	7:6	Reserved.	
	HSOUT2SC_PIPEDLY[3:0]	5:2	Hsout pipe delay 1~16=0~F.	
	SYNC_SEL_YUV	1	Yuv sync sel 1:VD 0:scalar.	
	SYNC_SEL_RGB	0	Rgb sync sel 1:VD 0:scalar.	
13h (0626h)	REG0626	7:0	Default : 0x84	Access : R/W
	-	7:3	Reserved.	
	DIT_DISP[2:0]	2:0	Select ADC RGB dither mode for display.	
13h (0627h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
14h (0628h)	REG0628	7:0	Default : 0x28	Access : R/W
	VSSEP_TH[7:0]	7:0	Select VSYNC separator threshold width (unit=XTAL period*2).	
14h (0629h)	REG0629	7:0	Default : 0x40	Access : R/W
	-	7	Reserved.	
	CAL_BW	6	1: Enable max ADC bandwidth during CAL.	
	SYNC_SEL	5	Select sync source for ADC_DIG. 0: From scalar. 1: From ADC sync process block.	
	COAST_EN	4	Enable coast generator. 0: Disable coast. 1: Enable coast.	
	COAST_HS	3	Select HSYNC sources for coast line counter. 0: PLL locked HSOUT. 1: Input HSYNC.	
	VSYNC_POL	2	Input VSYNC polarity. 0: Low active. 1: High active.	
	VS_SEL	1	Select VSYNC input source. 0: VSYNC. 1: Separated VSYNC.	
	VSSEP_SEL	0	Select VSYNC separator input source. 0: HSYNC or SOG. 1: VSYNC.	
15h	REG062A	7:0	Default : 0x00	Access : R/W

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(062Ah)	PRECOAST[7:0]	7:0	Select PRECOAST lines before VSYNC.	
15h (062Bh)	REG062B	7:0	Default : 0x00	Access : R/W
	POSTCOAST[7:0]	7:0	Select POSTCOAST lines after VSYNC.	
16h (062Ch)	REG062C	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	LAT_SYNC_DLY_SEL[2:0]	2:0	Select postcoast lines after VSYNC.	
17h (062Eh)	REG062E	7:0	Default : 0x14	Access : R/W
	ICLAMP_CLPDLY[7:0]	7:0	Register setting for delay. (to start of analog clamp).	
17h (062Fh)	REG062F	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_CLPDLY[11:8]	3:0	See description of '062Eh'.	
18h (0630h)	REG0630	7:0	Default : 0x08	Access : R/W
	ICLAMP_CALDUR[7:0]	7:0	Register setting for duration, only for 2 ^N . (of analog clamp).	
18h (0631h)	REG0631	7:0	Default : 0x04	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_VEN	3	1=enable clamp once every vsync.	
	ICLAMP_COAST_CLP_DIS	2	1 = disable clamp during COAST region (synced).	
	ICLAMP_HSYNC_OR_HSOUT	1	0: Use HSYNC, 1: use HSOUT.	
	ICLAMP_CLP_EDGE	0	1: Raising edge, 0:falling edge.	
19h (0632h)	REG0632	7:0	Default : 0x00	Access : R/W
	ICLAMP_VDLY[7:0]	7:0	Clamp pulse line delay for vsync mode.	
19h (0633h)	REG0633	7:0	Default : 0x00	Access : R/W
	ICLAMP_CLK_RATE_IN	7	Analog iclamp clk polarity, 0:pass, 1:invert.	
	ICLAMP_CLK_RATE[1:0]	6:5	00: X1 Analog ICLAMP. 01: X2. 10: X4. 11: X4.	
	ICLAMP_COAST_EXT_CNT[2:0]	4:2	Coast extend 0~7 line option.	
	ICLAMP_EN_COAST_EXT_CNT	1	1: Enable coast extend 0~7 line option.	
	ICLAMP_EN_HACT	0	1: Enable HACT window.	
1Bh	REG0636	7:0	Default : 0x80	Access : R/W

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(0636h)	ICLAMP_R_BLANK_LVL[7:0]	7:0	Blanking level = 128 (RGB).	
1Bh (0637h)	REG0637	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_R_BLANK_LVL[11:8]	3:0	See description of '0636h'.	
1Ch (0638h)	REG0638	7:0	Default : 0x05	Access : R/W
	ICLAMP_R_LOCK_LEVEL[7:0]	7:0	Lock level threshold.	
1Ch (0639h)	REG0639	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_R_LOCK_LEVEL[11:8]	3:0	See description of '0638h'.	
1Dh (063Ah)	REG063A	7:0	Default : 0xD0	Access : R/W
	ICLAMP_R_LOCK_CNT[7:0]	7:0	Match REG_ICLAMP_LOCK_LEVEL counter.	
1Dh (063Bh)	REG063B	7:0	Default : 0x07	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_R_LOCK_CNT[12:8]	4:0	See description of '063Ah'.	
1Eh (063Ch)	REG063C	7:0	Default : 0x60	Access : R/W
	ICLAMP_R_K1_STB[0]	7	$K1 = 2^{(CLMP_K1[6:3]-8-2)} * (1 + CLMP_K1[2:0]/8)$. For Stable.	
	ICLAMP_R_K1_INI[6:0]	6:0	$K1 = 2^{(CLMP_K1[6:3]-8-2)} * (1 + CLMP_K1[2:0]/8)$. For Initial.	
1Eh (063Dh)	REG063D	7:0	Default : 0x20	Access : R/W
	-	7:6	Reserved.	
	ICLAMP_R_K1_STB[6:1]	5:0	See description of '063Ch'.	
1Fh (063Eh)	REG063E	7:0	Default : 0xA0	Access : R/W
	ICLAMP_R_K1_EN	7	Clamping = leakage + err * gain_true * k1 * k1_en;.	
	ICLAMP_R_K2[6:0]	6:0	$K2 = 2^{(CLMP_K2[6:3]-8)} * (1 + CLMP_K2[2:0]/8)$;	
1Fh (063Fh)	REG063F	7:0	Default : 0x03	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_R_FREZ_CLMP[2:0]	4:2	Clamping = leakage. Leakage is frozen. (Coast). K1_en = 0 and k2_en = 0. FREZ_CLMP = FREZ_CLMP_1 FREZ_CLMP_2 FREZ_CLMP_3;.	
	ICLAMP_R_TYPE	1	0: Bottom clamping, RGB/YPbPr = 0;.	

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
			1: Back-porch calmping.	
	ICLAMP_R_K2_EN	0	Leakage = leakage + err * gain_true * k1 * k2 * k2_en;	
20h (0640h)	REG0640	7:0	Default : 0x00	Access : R/W
	ICLAMP_R_AGC_FINE[7:0]	7:0	Agc fine gain.	
20h (0641h)	REG0641	7:0	Default : 0x1C	Access : R/W
	-	7:6	Reserved.	
	ICLAMP_R_AGC_COARSE[1:0]	5:4	Agc coarse gain.	
	ICLAMP_R_AGC_FINE[11:8]	3:0	See description of '0640h'.	
21h (0642h)	REG0642	7:0	Default : 0x40	Access : R/W
	ICLAMP_R_PGA_OFST[7:0]	7:0	Pga offset.	
21h (0643h)	REG0643	7:0	Default : 0x05	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_R_ERR_MAX[4:0]	4:0	Bac_porch_level error < +- REG_CLMP_ERR_MAX <= +-31 * 8 !!!.	
22h (0644h)	REG0644	7:0	Default : 0x4A	Access : R/W
	ICLAMP_R_LKG_MODE[1:0]	7:6	001: Adaptive leakage tracking. 001: Adaptive leakage tracking. Leakage is bounded by +- REG_ICLAMP_LKG[4:0]. 010: Freeze leakage. 011: Load leakage = REG_ICLAMP_LKG[5] * REG_CLMP_LKG[4:0]; 100: Load K1'accu into leakage for quickly 1st order update.	
	ICLAMP_R_LKG[5:0]	5:0	[5]: Sign bit. 0: Posetive. 1: Negative. [4:0] : magnitude. 0 ~ 31 LSB of +-10uA/32. See REG_ICLAMP_LKG_MODE.	
22h (0645h)	REG0645	7:0	Default : 0x08	Access : R/W
	ICLAMP_R_DLKG_MAX[5:0]	7:2	Delta_leakage is bounded by +- (REG_CLMP_DLKG_MAX / 512). +- 1/8.	
	ICLAMP_R_FREZ_ZERO	1	1: Set CLMP_DSM = 0 when FREZ. 0: Set CLMP_DSM = lkg when FREZ.	

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
	ICLAMP_R_LKG_MODE[2]	0	See description of '0644h'.	
23h (0646h)	REG0646	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	ICLAMP_R_2DSM	1	1: 2nd-order. 0: 1st-order.	
	ICLAMP_R_FREZ_DSM	0	1: Delta-sigma frozen. CLAMP_fpga/chip[5:0] = round{CLMP_DSM[15:10]+CLMP_DSM[9]}. 0: Delta-sigma on.	
23h (0647h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
26h (064Ch)	REG064C	7:0	Default : 0x80	Access : R/W
	ICLAMP_G_BLANK_LVL[7:0]	7:0	Blanking level = 128 (RGB).	
26h (064Dh)	REG064D	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_G_BLANK_LVL[11:8]	3:0	See description of '064Ch'.	
27h (064Eh)	REG064E	7:0	Default : 0x05	Access : R/W
	ICLAMP_G_LOCK_LEVEL[7:0]	7:0	Lock level threshold.	
27h (064Fh)	REG064F	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_G_LOCK_LEVEL[11:8]	3:0	See description of '064Eh'.	
28h (0650h)	REG0650	7:0	Default : 0xD0	Access : R/W
	ICLAMP_G_LOCK_CNT[7:0]	7:0	Match REG_ICLAMP_LOCK_LEVEL counter.	
28h (0651h)	REG0651	7:0	Default : 0x07	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_G_LOCK_CNT[12:8]	4:0	See description of '0650h'.	
29h (0652h)	REG0652	7:0	Default : 0x60	Access : R/W
	ICLAMP_G_K1_STB[0]	7	$K1 = 2^{(CLMP_K1[6:3]-8-2)} * (1 + CLMP_K1[2:0]/8)$. For Stable.	
	ICLAMP_G_K1_INI[6:0]	6:0	$K1 = 2^{(CLMP_K1[6:3]-8-2)} * (1 + CLMP_K1[2:0]/8)$. For Initial.	
29h (0653h)	REG0653	7:0	Default : 0x20	Access : R/W
	-	7:6	Reserved.	
	ICLAMP_G_K1_STB[6:1]	5:0	See description of '0652h'.	

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
2Ah (0654h)	REG0654	7:0	Default : 0xA0	Access : R/W
	ICLAMP_G_K1_EN	7	Clamping = leakage + err * gain_true * k1 * k1_en;.	
	ICLAMP_G_K2[6:0]	6:0	$K2 = 2^{(CLMP_K2[6:3]-8)} * (1 + CLMP_K2[2:0]/8);$.	
2Ah (0655h)	REG0655	7:0	Default : 0x03	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_G_FREZ_CLMP[2:0]	4:2	Clamping = leakage. Leakage is frozen. (Coast). K1_en = 0 and k2_en = 0. FREZ_CLMP = FREZ_CLMP_1 FREZ_CLMP_2 FREZ_CLMP_3;.	
	ICLAMP_G_TYPE	1	0: Bottom clamping, RGB/YPbPr = 0;. 1: Back-porch calmping.	
	ICLAMP_G_K2_EN	0	Leakage = leakage + err * gain_true * k1 * k2 * k2_en;.	
2Bh (0656h)	REG0656	7:0	Default : 0x00	Access : R/W
	ICLAMP_G_AGC_FINE[7:0]	7:0	Agc fine gain.	
2Bh (0657h)	REG0657	7:0	Default : 0x1C	Access : R/W
	-	7:6	Reserved.	
	ICLAMP_G_AGC_COARSE[1:0]	5:4	Agc coarse gain.	
	ICLAMP_G_AGC_FINE[11:8]	3:0	See description of '0656h'.	
2Ch (0658h)	REG0658	7:0	Default : 0x40	Access : R/W
	ICLAMP_G_PGA_OFST[7:0]	7:0	Pga offset.	
2Ch (0659h)	REG0659	7:0	Default : 0x05	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_G_ERR_MAX[4:0]	4:0	Bac_porch_level error < +- REG_CLMP_ERR_MAX <= +-31 * 8 !!!.	
2Dh (065Ah)	REG065A	7:0	Default : 0x4A	Access : R/W
	ICLAMP_G_LKG_MODE[1:0]	7:6	001: Adaptive leakage tracking. 001: Adaptive leakage tracking. Leakage is bounded by +- REG_ICLAMP_LKG[4:0]. 010: Freeze leakage. 011: Load leakage = REG_ICLAMP_LKG[5] * REG_CLMP_LKG[4:0];. 100: Load K1'accu into leakage for quickly 1st order	

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
			update.	
	ICLAMP_G_LKG[5:0]	5:0	[5]: Sign bit. 0: Positive. 1: Negative. [4:0] : magnitude. 0 ~ 31 LSB of +-10uA/32. See REG_ICLAMP_LKG_MODE.	
2Dh (065Bh)	REG065B	7:0	Default : 0x08	Access : R/W
	ICLAMP_G_DLKG_MAX[5:0]	7:2	Delta_leakage is bounded by +- (REG_CLMP_DLKG_MAX / 512). +- 1/8.	
	ICLAMP_G_FREZ_ZERO	1	1: Set CLMP_DSM = 0 when FREZ. 0: Set CLMP_DSM = lkg when FREZ.	
	ICLAMP_G_LKG_MODE[2]	0	See description of '065Ah'.	
2Eh (065Ch)	REG065C	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	ICLAMP_G_2DSM	1	1: 2nd-order. 0: 1st-order.	
	ICLAMP_G_FREZ_DSM	0	1: Delta-sigma frozen. CLAMP_fpga/chip[5:0] = round{CLMP_DSM[15:10]+CLMP_DSM[9]}. 0: Delta-sigma on.	
2Eh (065Dh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
30h (0660h)	REG0660	7:0	Default : 0x80	Access : R/W
	ICLAMP_B_BLANK_LVL[7:0]	7:0	Blanking level = 128 (RGB).	
30h (0661h)	REG0661	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_B_BLANK_LVL[11:8]	3:0	See description of '0660h'.	
31h (0662h)	REG0662	7:0	Default : 0x05	Access : R/W
	ICLAMP_B_LOCK_LEVEL[7:0]	7:0	Lock level threshold.	
31h (0663h)	REG0663	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	ICLAMP_B_LOCK_LEVEL[11:8]	3:0	See description of '0662h'.	
32h	REG0664	7:0	Default : 0xD0	Access : R/W

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(0664h)	ICLAMP_B_LOCK_CNT[7:0]	7:0	Match REG_ICLAMP_LOCK_LEVEL counter.	
32h (0665h)	REG0665	7:0	Default : 0x07	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_B_LOCK_CNT[12:8]	4:0	See description of '0664h'.	
33h (0666h)	REG0666	7:0	Default : 0x60	Access : R/W
	ICLAMP_B_K1_STB[0]	7	$K1 = 2^{(CLMP_K1[6:3]-8-2)} * (1 + CLMP_K1[2:0]/8)$. For Stable.	
	ICLAMP_B_K1_INI[6:0]	6:0	$K1 = 2^{(CLMP_K1[6:3]-8-2)} * (1 + CLMP_K1[2:0]/8)$. For Initial.	
33h (0667h)	REG0667	7:0	Default : 0x20	Access : R/W
	-	7:6	Reserved.	
	ICLAMP_B_K1_STB[6:1]	5:0	See description of '0666h'.	
34h (0668h)	REG0668	7:0	Default : 0xA0	Access : R/W
	ICLAMP_B_K1_EN	7	Clamping = leakage + err * gain_true * k1 * k1_en;	
	ICLAMP_B_K2[6:0]	6:0	$K2 = 2^{(CLMP_K2[6:3]-8)} * (1 + CLMP_K2[2:0]/8)$;	
34h (0669h)	REG0669	7:0	Default : 0x03	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_B_FREZ_CLMP[2:0]	4:2	Clamping = leakage. Leakage is frozen. (Coast). $K1_en = 0$ and $k2_en = 0$. $FREZ_CLMP = FREZ_CLMP_1 FREZ_CLMP_2 FREZ_CLMP_3$;	
	ICLAMP_B_TYPE	1	0: Bottom clamping, RGB/YPbPr = 0;, 1: Back-porch calmping.	
	ICLAMP_B_K2_EN	0	Leakage = leakage + err * gain_true * k1 * k2 * k2_en;	
35h (066Ah)	REG066A	7:0	Default : 0x00	Access : R/W
	ICLAMP_B_AGC_FINE[7:0]	7:0	Agc fine gain.	
35h (066Bh)	REG066B	7:0	Default : 0x1C	Access : R/W
	-	7:6	Reserved.	
	ICLAMP_B_AGC_COARSE[1:0]	5:4	Agc coarse gain.	
	ICLAMP_B_AGC_FINE[11:8]	3:0	See description of '066Ah'.	
36h	REG066C	7:0	Default : 0x40	Access : R/W

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(066Ch)	ICLAMP_B_PGA_OFST[7:0]	7:0	Pga offset.	
36h (066Dh)	REG066D	7:0	Default : 0x05	Access : R/W
	-	7:5	Reserved.	
	ICLAMP_B_ERR_MAX[4:0]	4:0	Bac_porch_level error < +- REG_CLMP_ERR_MAX <= +-31 * 8 !!!.	
37h (066Eh)	REG066E	7:0	Default : 0x4A	Access : R/W
	ICLAMP_B_LKG_MODE[1:0]	7:6	001: Adaptive leakage tracking. 001: Adaptive leakage tracking. Leakage is bounded by +- REG_ICLAMP_LKG[4:0]. 010: Freeze leakage. 011: Load leakage = REG_ICLAMP_LKG[5] * REG_CLMP_LKG[4:0]; 100: Load K1'accu into leakage for quickly 1st order update.	
	ICLAMP_B_LKG[5:0]	5:0	[5]: Sign bit. 0: Positive. 1: Negative. [4:0] : magnitude. 0 ~ 31 LSB of +-10uA/32. See REG_ICLAMP_LKG_MODE.	
37h (066Fh)	REG066F	7:0	Default : 0x08	Access : R/W
	ICLAMP_B_DLKG_MAX[5:0]	7:2	Delta_leakage is bounded by +- (REG_CLMP_DLKG_MAX / 512). +- 1/8.	
	ICLAMP_B_FREZ_ZERO	1	1: Set CLMP_DSM = 0 when FREZ. 0: Set CLMP_DSM = lkg when FREZ.	
	ICLAMP_B_LKG_MODE[2]	0	See description of '066Eh'.	
38h (0670h)	REG0670	7:0	Default : 0x00	Access : R/W
	-	7:2	Reserved.	
	ICLAMP_B_2DSM	1	1: 2nd-order. 0: 1st-order.	
	ICLAMP_B_FREZ_DSM	0	1: Delta-sigma frozen. CLAMP_fpga/chip[5:0] = round{CLMP_DSM[15:10]+CLMP_DSM[9]}. 0: Delta-sigma on.	
38h	-	7:0	Default : -	Access : -

ADC_DTOP Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
(0671h)	-	-	Reserved.
3Ah ~ 3Fh (0674h ~ 067Fh)	-	7:0	Default : - Access : -
	-	-	Reserved.
41h (0682h)	REG0682	7:0	Default : 0x20 Access : R/W
	HACT_DELAY[7:0]	7:0	Delay for HSOUT pulse.
41h (0683h)	REG0683	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	HACT_DELAY[11:8]	3:0	See description of '0682h'.
42h (0684h)	REG0684	7:0	Default : 0x20 Access : R/W
	HACT_DURATION[7:0]	7:0	Duration for HACT window.
42h (0685h)	REG0685	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	HACT_DURATION[11:8]	3:0	See description of '0684h'.
44h (0688h)	REG0688	7:0	Default : 0x80 Access : R/W
	UG_R_BLACK_LEVEL[7:0]	7:0	Black level(12).
44h (0689h)	REG0689	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	UG_R_PIX_SEL[2:0]	6:4	Pixel select.
	UG_R_BLACK_LEVEL[11:8]	3:0	See description of '0688h'.
45h (068Ah)	REG068A	7:0	Default : 0x00 Access : R/W
	UG_R_USER_GAIN[7:0]	7:0	User gain(14.12).
45h (068Bh)	REG068B	7:0	Default : 0x10 Access : R/W
	-	7:6	Reserved.
	UG_R_USER_GAIN[13:8]	5:0	See description of '068Ah'.
46h (068Ch)	REG068C	7:0	Default : 0x00 Access : R/W
	UG_R_USER_OFFSET[7:0]	7:0	User offset (S12).
46h (068Dh)	REG068D	7:0	Default : 0x00 Access : R/W
	-	7	Reserved.
	UG_R_DIT_MODE[1:0]	6:5	00: Round, 01:truncate, 10:dithering.
	UG_R_USER_OFFSET[12:8]	4:0	See description of '068Ch'.
47h (068Eh)	REG068E	7:0	Default : 0x80 Access : R/W
	UG_G_BLACK_LEVEL[7:0]	7:0	Black level(12).

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
47h (068Fh)	REG068F	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	UG_G_PIX_SEL[2:0]	6:4	Pixel select.	
	UG_G_BLACK_LEVEL[11:8]	3:0	See description of '068Eh'.	
48h (0690h)	REG0690	7:0	Default : 0x00	Access : R/W
	UG_G_USER_GAIN[7:0]	7:0	User gain(14.12).	
48h (0691h)	REG0691	7:0	Default : 0x10	Access : R/W
	-	7:6	Reserved.	
	UG_G_USER_GAIN[13:8]	5:0	See description of '0690h'.	
49h (0692h)	REG0692	7:0	Default : 0x00	Access : R/W
	UG_G_USER_OFFSET[7:0]	7:0	User offset (S12).	
49h (0693h)	REG0693	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	UG_G_DIT_MODE[1:0]	6:5	00: Round, 01:truncate, 10:dithering.	
	UG_G_USER_OFFSET[12:8]	4:0	See description of '0692h'.	
4Ah (0694h)	REG0694	7:0	Default : 0x80	Access : R/W
	UG_B_BLACK_LEVEL[7:0]	7:0	Black level(12).	
4Ah (0695h)	REG0695	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	UG_B_PIX_SEL[2:0]	6:4	Pixel select.	
	UG_B_BLACK_LEVEL[11:8]	3:0	See description of '0694h'.	
4Bh (0696h)	REG0696	7:0	Default : 0x00	Access : R/W
	UG_B_USER_GAIN[7:0]	7:0	User gain(14.12).	
4Bh (0697h)	REG0697	7:0	Default : 0x10	Access : R/W
	-	7:6	Reserved.	
	UG_B_USER_GAIN[13:8]	5:0	See description of '0696h'.	
4Ch (0698h)	REG0698	7:0	Default : 0x00	Access : R/W
	UG_B_USER_OFFSET[7:0]	7:0	User offset (S12).	
4Ch (0699h)	REG0699	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	UG_B_DIT_MODE[1:0]	6:5	00: Round, 01:truncate, 10:dithering.	
	UG_B_USER_OFFSET[12:8]	4:0	See description of '0698h'.	
51h	REG06A2	7:0	Default : 0x0F	Access : R/W

ADC_DTOP Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
(06A2h)	-	7	Reserved.
	UG_RGB_OV	6	Override UG_BLACK/UG_GAIN/UG_OFFSET.
	UG_RGB_LD_VD_DLY[5:0]	5:0	Delay for Load VD fine gain.
51h (06A3h)	REG06A3	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	UG_RGB_EN[2:0]	2:0	Enable UG_BLACK/UG_GAIN/UG_OFFSET register.
5Ah (06B4h)	REG06B4	7:0	Default : 0x44 Access : R/W
	ANALOG_PGA_GAIN_G[3:0]	7:4	ADC Gain control: 4'b0000 : 14/5 (Vin=0.5Vpp). 4'b0001 : 14/5 (Vin=0.6Vpp). 4'b0010 : 14/5 (Vin=0.7Vpp). . . 4'b1111 : 14/20 (Vin=2.0Vpp).
	ANALOG_PGA_GAIN_R[3:0]	3:0	ADC Gain control: 4'b0000 : 14/5 (Vin=0.5Vpp). 4'b0001 : 14/5 (Vin=0.6Vpp). 4'b0010 : 14/5 (Vin=0.7Vpp). . . 4'b1111 : 14/20 (Vin=2.0Vpp).
5Ah (06B5h)	REG06B5	7:0	Default : 0x04 Access : R/W
	-	7:4	Reserved.
	ANALOG_PGA_GAIN_B[3:0]	3:0	ADC Gain control: 4'b0000 : 14/5 (Vin=0.5Vpp). 4'b0001 : 14/5 (Vin=0.6Vpp). 4'b0010 : 14/5 (Vin=0.7Vpp). . . 4'b1111 : 14/20 (Vin=2.0Vpp).
5Ch (06B8h)	REG06B8	7:0	Default : 0x00 Access : R/W
	-	7:3	Reserved.
	FIFO_BYPASS_RGB	2	1=fifo bypass mode for rgb.
	-	1:0	Reserved.
5Dh ~ 5Dh	-	7:0	Default : - Access : -
	-	-	Reserved.

ADC_DTOP Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
(06BAh ~ 06BBh)				
60h ~ 63h (06C0h ~ 06C7h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
64h (06C8h)	REG06C8	7:0	Default : 0x05	Access : R/W
	MASK_DELAY[7:0]	7:0	Delay for HSOUT/HSYNC pulse.	
64h (06C9h)	REG06C9	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	MASK_EN	4	Enable blank ADC for CAL.	
	MASK_DELAY[11:8]	3:0	See description of '06C8h'.	
65h (06CAh)	REG06CA	7:0	Default : 0x05	Access : R/W
	MASK_DURATION[7:0]	7:0	Duration for MASK window.	
65h (06CBh)	REG06CB	7:0	Default : 0x00	Access : R/W
	MASK_COAST	7	1=enable mask data by coast.	
	MASK_CDIS	6	1=disable mask during coast.	
	MASK_HSYNC_OR_HSOUT	5	0: HSYNC, 1:HSOU.	
	MASK_EDGE	4	Select mask HSYNC start edge, 1: HSYNC rising edge, 0:falling edge.	
	MASK_DURATION[11:8]	3:0	See description of '06CAh'.	

ADC_DTOP2 Register (Bank = 06)

ADC_DTOP2 Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
01h (0602h)	REG0602	7:0	Default : 0x00 Access : R/W
	ADCB_TOGV2	7	1=ADC B channel interleaving every 2 VSYNC.
	ADCB_TOGH2	6	1=ADC G channel interleaving every 2 VSYNC.
	ADCG_TOGV2	5	1=ADC R channel interleaving every 2 VSYNC.
	ADCG_TOGH2	4	1=ADC B channel interleaving every 2 HSYNC.
	ADCR_TOGV2	3	1=ADC G channel interleaving every 2 HSYNC.
	ADCR_TOGH2	2	1=ADC R channel interleaving every 2 HSYNC.
	RGB_NO_VRAND	1	1=no ADCA interleave V dithering.
RGB_NO_RAND	0	1=no ADCA interleave H/V dithering.	
01h (0603h)	-	7:0	Default : - Access : -
	-	-	Reserved.
02h (0604h)	REG0604	7:0	Default : 0x02 Access : R/W
	-	7:2	Reserved.
	RGB_INT_V_POLARITY	1	1=ADCA interleave vsync reference pulse polarity high.
	RGB_INT_H_POLARITY	0	1=ADCA interleave hsync reference pulse polarity high.
02h (0605h)	-	7:0	Default : - Access : -
	-	-	Reserved.
03h (0606h)	REG0606	7:0	Default : 0x00 Access : R/W
	RGB_SELF_CAL_REF_CYC[7:0]	7:0	ADCA calibration trigger reference pulse cycle number.
03h (0607h)	REG0607	7:0	Default : 0x18 Access : R/W, WO
	-	7:6	Reserved.
	RGB_SELF_CAL_ALL_GAIN	5	1=ADCA calibration all gain mode enable.
	RGB_SELF_CAL_MODE[1:0]	4:3	[0]=1: ADCA linear calibration enable. [1]=1: ADCA offset/gain calibration enable.
	RGB_SELF_CAL_STOP	2	1=ADCA calibration stop in live mode.
	RGB_SELF_CAL_LIVE	1	1=ADCA calibration live mode enable.
	RGB_SELF_CAL_START	0	1=ADCA calibration start.
04h (0608h)	REG0608	7:0	Default : 0x10 Access : R/W
	RGB_SELF_CAL_DLY[7:0]	7:0	ADCA calibration delay from reference pulse to

ADC_DTOP2 Register (Bank = 06)				
Index (Absolute)	Mnemonic	Bit	Description	
			linear/offset/gain calibration state.	
04h (0609h)	REG0609	7:0	Default : 0x00	Access : R/W
	RGB_SELF_CAL_LIVE_WAIT_DLY[7:0]	7:0	ADCA claibration wait delay number of reference pulse before re-starting new calibration in live mode.	
05h (060Ah)	REG060A	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	RGB_SELF_CAL_GPUSE_SEL	3	1=ADCA SELF_CAL_G active high during linear calibration & gain calibration;. Otherwise, ADCA SELF_CAL_G active high only during linear calibration.	
	RGB_SELF_CAL_BYPASS[2:0]	2:0	[0]=1: bypass ADC R calibration. [1]=1: bypass ADC G calibration. [2]=1: bypass ADC B calibration.	
05h ~ 06h (060Bh ~ 060Dh)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
07h (060Eh)	REG060E	7:0	Default : 0x00	Access : R/W
	-	7:1	Reserved.	
	RGB_LINEAR_CAL_MODE	0	1=ADCA linear calibration long mode.	
07h (060Fh)	REG060F	7:0	Default : 0xFE	Access : R/W
	RGB_LINEAR_CAL_VREF_SEL[3:0]	7:4	ADCA VCAL setting during linear calibration.	
	RGB_LINEAR_CAL_PGA[3:0]	3:0	ADCA PGA setting during linear calibration.	
08h (0610h)	REG0610	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	ADCB_LCAL_EN	2	1=ADC B linear calibration update enable.	
	ADCG_LCAL_EN	1	1=ADC G linear calibration update enable.	
	ADCR_LCAL_EN	0	1=ADC R linear calibration update enable.	
09h (0612h)	REG0612	7:0	Default : 0x1F	Access : R/W
	RGB_LINEAR_CAL_DLY[7:0]	7:0	ADCA linear calibration delay samples after reference pulse rising.	
09h (0613h)	REG0613	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	RGB_LINEAR_CAL_DLY[11:8]	3:0	See description of '0612h'.	
0Ah	REG0614	7:0	Default : 0xFF	Access : R/W

ADC_DTOP2 Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
(0614h)	RGB_LINEAR_CAL_DUR[7:0]	7:0	ADCA linear calibration duration samples after reference pulse rising.
0Bh ~ 0Ch (0616h ~ 0618h)	-	7:0	Default : - Access : -
	-	-	Reserved.
0Dh ~ 12h (061Ah ~ 0625h)	-	7:0	Default : - Access : -
	-	-	Reserved.
13h (0626h)	REG0626	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	ADCB_OCAL_EN	3	1=ADC B offset calibration update enable.
	ADCG_OCAL_EN	2	1=ADC G offset calibration update enable.
	ADCR_OCAL_EN	1	1=ADC R offset calibration update enable.
	RGB_OFFSET_CAL_MODE	0	1=ADCA offset calibration long mode.
14h (0628h)	REG0628	7:0	Default : 0x1F Access : R/W
	RGB_OFFSET_CAL_DLY[7:0]	7:0	ADCA offset calibration delay samples after reference pulse rising.
14h (0629h)	REG0629	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	RGB_OFFSET_CAL_DLY[11:8]	3:0	See description of '0628h'.
15h (062Ah)	REG062A	7:0	Default : 0xFF Access : R/W
	RGB_OFFSET_CAL_DUR[7:0]	7:0	ADCA offset calibration duration samples after reference pulse rising.
16h ~ 18h (062Ch ~ 0630h)	-	7:0	Default : - Access : -
	-	-	Reserved.
19h ~ 1Bh (0632h ~ 0636h)	-	7:0	Default : - Access : -
	-	-	Reserved.
1Ch ~ 1Eh (0638h ~ 063Ch)	-	7:0	Default : - Access : -
	-	-	Reserved.
1Fh	REG063E	7:0	Default : 0x00 Access : R/W

ADC_DTOP2 Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
(063Eh)	-	7:5	Reserved.
	RGB_GAIN_CAL_MISMATCH_ONLY	4	1=ADCA gain calibration only calibrate channel0/channel1 mismatch.
	ADCB_GCAL_EN	3	1=ADC B gain calibration update enable.
	ADCG_GCAL_EN	2	1=ADC G gain calibration update enable.
	ADCR_GCAL_EN	1	1=ADC R gain calibration update enable.
	RGB_GAIN_CAL_MODE	0	1=ADCA gain calibration long mode.
20h (0640h)	REG0640	7:0	Default : 0x1F Access : R/W
	RGB_GAIN_CAL_DLY[7:0]	7:0	ADCA gain calibration delay samples after reference pulse rising.
20h (0641h)	REG0641	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	RGB_GAIN_CAL_DLY[11:8]	3:0	See description of '0640h'.
21h (0642h)	REG0642	7:0	Default : 0xFF Access : R/W
	RGB_GAIN_CAL_DUR[7:0]	7:0	ADCA gain calibration duration samples after reference pulse rising.
21h (0643h)	REG0643	7:0	Default : 0xFF Access : R/W
	RGB_GAIN_CAL_DUR[15:8]	7:0	See description of '0642h'.
22h ~ 25h (0644h ~ 064Ah)	-	7:0	Default : - Access : -
	-	-	Reserved.
26h ~ 29h (064Ch ~ 0652h)	-	7:0	Default : - Access : -
	-	-	Reserved.
2Ah ~ 2Dh (0654h ~ 065Ah)	-	7:0	Default : - Access : -
	-	-	Reserved.
3Fh (067Eh)	REG067E	7:0	Default : 0x00 Access : R/W
	RGB_GAIN_CAL_LVREF[3:0]	7:4	ADCA gain calibration low VCAL write value.
	RGB_GAIN_CAL_HVREF[3:0]	3:0	ADCA gain calibration high VCAL write value.
3Fh (067Fh)	REG067F	7:0	Default : 0x00 Access : R/W, WO
	RGB_GAIN_CAL_VREF_WP	7	ADCA gain calibration VCAL write enable.
	-	6:4	Reserved.

ADC_DTOP2 Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
	RGB_GAIN_CAL_VREF_WG[3:0]	3:0	ADCA gain calibration VCAL write related gain setting.
40h (0680h)	REG0680	7:0	Default : 0x00 Access : R/W
	RGB_GAIN_CAL_TARGET[7:0]	7:0	ADCA gain calibration VCAL_HIGH-VCAL_LOW target digital code write value.
40h (0681h)	REG0681	7:0	Default : 0x00 Access : R/W
	-	7:4	Reserved.
	RGB_GAIN_CAL_TARGET[11:8]	3:0	See description of '0680h'.
41h (0682h)	REG0682	7:0	Default : 0x00 Access : R/W, WO
	RGB_GAIN_CAL_TARGET_WP	7	ADCA gain calibration (VCAL_HIGH-VCAL_LOW) target digital code write enable.
	-	6:4	Reserved.
	RGB_GAIN_CAL_TARGET_WG[3:0]	3:0	ADCA gain calibration VCAL_HIGH-VCAL_LOW target digital code write related gain setting.
42h ~ 43h (0684h ~ 0687h)	-	7:0	Default : - Access : -
	-	-	Reserved.
45h ~ 4Dh (068Ah ~ 069Bh)	-	7:0	Default : - Access : -
	-	-	Reserved.
7Bh (06F6h)	REG06F6	7:0	Default : 0x00 Access : R/W
	RGB_SELF_CAL_REF_DLY[7:0]	7:0	The delay samples of ADCA calibration reference pulse after Hsync/Vsync.
7Bh (06F7h)	REG06F7	7:0	Default : 0x00 Access : R/W
	RGB_SELF_CAL_REF_SEL[2:0]	7:5	[2:0]=1xx : ADCA using VSYNC as calibration reference pulse. [2:0]=01x : ADCA using HSYNC as calibration reference pulse. [2:0]=001 : ADCA using HSOUT as calibration reference pulse. [2:0]=000 : ADCA calibration reference always high.
	RGB_SELF_CAL_REF_EDGE	4	1=ADCA calibration reference using trailing edge of hsync/vsync.
	RGB_SELF_CAL_REF_DLY[11:8]	3:0	See description of '06F6h'.
7Dh ~ 7Fh	-	7:0	Default : - Access : -

ADC_DTOP2 Register (Bank = 06)			
Index (Absolute)	Mnemonic	Bit	Description
(06FAh ~ 06FFh)	-	-	Reserved.

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only

CHIPTOP Register (Bank = 07)

CHIPTOP Register (Bank = 07)				
Index (Absolute)	Mnemonic	Bit	Description	
01h (0702h)	REG0702	7:0	Default : 0x00	Access : R/W
	SAR_CH2_LOB_LSB2[1:0]	7:6	The LSB 2-bit of voltage lower bound in MCU sleep mode for channel 2 keypad wakeup.	
	SAR_CH2_UPB_LSB2[1:0]	5:4	The LSB 2-bit of voltage upper bound in MCU sleep mode for channel 2 keypad wakeup.	
	SAR_CH1_LOB_LSB2[1:0]	3:2	The LSB 2-bit of voltage lower bound in MCU sleep mode for channel 1 keypad wakeup.	
	SAR_CH1_UPB_LSB2[1:0]	1:0	The LSB 2-bit of voltage upper bound in MCU sleep mode for channel 1 keypad wakeup.	
01h (0703h)	REG0703	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	SAR_CH3_LOB_LSB2[1:0]	3:2	The LSB 2-bit of voltage lower bound in MCU sleep mode for channel 3 keypad wakeup.	
	SAR_CH3_UPB_LSB2[1:0]	1:0	The LSB 2-bit of voltage upper bound in MCU sleep mode for channel 3 keypad wakeup.	
02h (0704h)	REG0704	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	SAR_DIVCTRL[4:0]	4:0	SAR operation clock divider selection.	
02h (0705h)	REG0705	7:0	Default : 0x00	Access : R/W
	-	7	Reserved.	
	POR_DEGLITCH[2:0]	6:4	For POR deglitch setting.	
	-	3:1	Reserved.	
SAR_ONESHOT	0	One-shot for SAR one-shot mode.		
03h (0706h)	REG0706	7:0	Default : 0x00	Access : R/W
	-	7:4	Reserved.	
	CP1_N_DRV[1:0]	3:2	Driving control for PAD_CP1_N.	
	CP1_P_DRV[1:0]	1:0	Driving control for PAD_CP1_P.	
03h (0707h)	REG0707	7:0	Default : 0x0B	Access : R/W
	TEST_9TO12_EN	7	Second test enable bit for test_bus[9:12]. (both of testmode enable and this enable are set, then just can enable test_bus[9:12]).	
	Bt656_OUT_EN	6	Bt656 out enable bit.	
-	5	Reserved.		

CHIPTOP Register (Bank = 07)				
Index (Absolute)	Mnemonic	Bit	Description	
	PWM1D_SEL	4	PAD_PWM1D output select: 0: Normal PWM1D output. 1: CABC output.	
	CP_DIV_CNTR[3:0]	3:0	CP1_P/N frequency divide counter. Freq = XIN_freq / (CP_DIV_CNTR+1).	
04h (0708h)	REG0708	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[7:0]	7:0	Gpio enable for each new gpio. [0]: PAD_CLKIN. [1]: PAD_VD0. [2]: PAD_VD1. [3]: PAD_VD2. [4]: PAD_VD3. [5]: PAD_VD4. [6]: PAD_VD5. [7]: PAD_VD6. [8]: PAD_VD7. [9]: PAD_INT. [10]: PAD_PWM1D. [11]: PAD_PWM2D. [12]: PAD_ROUT0. [13]: PAD_GOUT4. [14]: PAD_CLKO. [15]: PAD_DEO.	
04h (0709h)	REG0709	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[15:8]	7:0	See description of '0708h'.	
05h (070Ah)	REG070A	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[23:16]	7:0	See description of '0708h'.	
05h (070Bh)	REG070B	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[31:24]	7:0	See description of '0708h'.	
06h (070Ch)	REG070C	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[39:32]	7:0	See description of '0708h'.	
06h (070Dh)	REG070D	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[47:40]	7:0	See description of '0708h'.	
07h (070Eh)	REG070E	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_EN[55:48]	7:0	See description of '0708h'.	
07h	REG070F	7:0	Default : 0xFF	Access : R/W

CHIPTOP Register (Bank = 07)			
Index (Absolute)	Mnemonic	Bit	Description
(070Fh)	NEW_GPIO_EN[63:56]	7:0	See description of '0708h'.
08h (0710h)	REG0710 NEW_GPIO_O[7:0]	7:0	Default : 0x00 Access : R/W The value of gpio output for each new gpio.
08h (0711h)	REG0711 NEW_GPIO_O[15:8]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
09h (0712h)	REG0712 NEW_GPIO_O[23:16]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
09h (0713h)	REG0713 NEW_GPIO_O[31:24]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
0Ah (0714h)	REG0714 NEW_GPIO_O[39:32]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
0Ah (0715h)	REG0715 NEW_GPIO_O[47:40]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
0Bh (0716h)	REG0716 NEW_GPIO_O[55:48]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
0Bh (0717h)	REG0717 NEW_GPIO_O[63:56]	7:0	Default : 0x00 Access : R/W See description of '0710h'.
0Ch (0718h)	REG0718 NEW_GPIO_OEN[7:0]	7:0	Default : 0xFF Access : R/W The value of gpio output enable for each new gpio. 0: Gpio as output. 1: Gpio as input.
0Ch (0719h)	REG0719 NEW_GPIO_OEN[15:8]	7:0	Default : 0xFF Access : R/W See description of '0718h'.
0Dh (071Ah)	REG071A NEW_GPIO_OEN[23:16]	7:0	Default : 0xFF Access : R/W See description of '0718h'.
0Dh (071Bh)	REG071B NEW_GPIO_OEN[31:24]	7:0	Default : 0xFF Access : R/W See description of '0718h'.
0Eh (071Ch)	REG071C NEW_GPIO_OEN[39:32]	7:0	Default : 0xFF Access : R/W See description of '0718h'.
0Eh (071Dh)	REG071D NEW_GPIO_OEN[47:40]	7:0	Default : 0xFF Access : R/W See description of '0718h'.
0Fh (071Eh)	REG071E NEW_GPIO_OEN[55:48]	7:0	Default : 0xFF Access : R/W See description of '0718h'.

CHIPTOP Register (Bank = 07)				
Index (Absolute)	Mnemonic	Bit	Description	
0Fh (071Fh)	REG071F	7:0	Default : 0xFF	Access : R/W
	NEW_GPIO_OEN[63:56]	7:0	See description of '0718h'.	
10h (0720h)	REG0720	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[7:0]	7:0	The read value of for each new gpio.	
10h (0721h)	REG0721	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[15:8]	7:0	See description of '0720h'.	
11h (0722h)	REG0722	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[23:16]	7:0	See description of '0720h'.	
11h (0723h)	REG0723	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[31:24]	7:0	See description of '0720h'.	
12h (0724h)	REG0724	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[39:32]	7:0	See description of '0720h'.	
12h (0725h)	REG0725	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[47:40]	7:0	See description of '0720h'.	
13h (0726h)	REG0726	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[55:48]	7:0	See description of '0720h'.	
13h (0727h)	REG0727	7:0	Default : 0x00	Access : RO
	NEW_GPIO_I[63:56]	7:0	See description of '0720h'.	
14h (0728h)	REG0728	7:0	Default : 0x00	Access : RO
	TEST_24BIT_BUS_STATUS[7:0]	7:0	The read value of test 24bit bus.	
14h (0729h)	REG0729	7:0	Default : 0x00	Access : RO
	TEST_24BIT_BUS_STATUS[15:8]	7:0	See description of '0728h'.	
15h (072Ah)	REG072A	7:0	Default : 0x00	Access : RO
	TEST_24BIT_BUS_STATUS[23:16]	7:0	See description of '0728h'.	
20h (0740h)	REG0740	7:0	Default : 0x00	Access : R/W
	-	7:5	Reserved.	
	BT656_OUT_CLK_GATE	4	0: Enable BT656 out clock. 1: Disable BT656 out clock.	
	PWM_OUT_CLK_GATE	3	0: Enable PWM out clock. 1: Disable PWM out clock.	
	MOD_CAL_CLK_GATE	2	0: Enable MOD cal clock. 1: Disable MOD cal clock.	
	FSCCLK_DIV4_GATE	1	0: Enable MVD digital front-end divide 4 clock.	

CHIPTOP Register (Bank = 07)			
Index (Absolute)	Mnemonic	Bit	Description
			1: Disable MVD digital front-end divide 4 clock.
	FSCCLK_DIV2_GATE	0	0: Enable MVD digital front-end divide 2 clock. 1: Disable MVD digital front-end divide 2 clock.
21h (0742h)	REG0742	7:0	Default : 0x00 Access : R/W
	-	7:5	Reserved.
	BT656_OUT_CLK_INV	4	BT656 out clock inverting.
	PWM_OUT_CLK_INV	3	PWM out clock inverting.
	MOD_CAL_CLK_INV	2	MOD cal clock inverting.
	FSCCLK_DIV4_INV	1	MVD digital front-end divide 4 clock inverting.
	FSCCLK_DIV2_INV	0	MVD digital front-end divide 2 clock inverting.
22h (0744h)	REG0744	7:0	Default : 0x21 Access : R/W
	MOD_CAL_CLK_SEL[1:0]	7:6	MOD cal clock selection. 0: XIN/8. 1: XIN/16. 2: XIN/32. 3: DFT Clock.
	FSCCLK_SEL[1:0]	5:4	MVD digital front-end clock selection. 0: FSCCLK/4. 1: FSCCLK/2. 2: FSCCLK. 3: DFT Clock.
	FSCCLK_DIV4_SEL[1:0]	3:2	MVD digital front-end divide 4 clock selection. 0: FSCCLK/4. 1: FSCCLK/2. 2: FSCCLK. 3: DFT Clock.
	FSCCLK_DIV2_SEL[1:0]	1:0	MVD digital front-end divide 2 clock selection. 0: FSCCLK/4. 1: FSCCLK/2. 2: FSCCLK. 3: DFT Clock.
22h (0745h)	REG0745	7:0	Default : 0x60 Access : R/W
	BT656_OUT_CLK_SEL[1:0]	7:6	ODCLK selection. 0: IDCLK. 1: LPLL/2. 2: LPLL. 3: DFT Clock.

CHIPTOP Register (Bank = 07)				
Index (Absolute)	Mnemonic	Bit	Description	
	ODGEN_CLK_SEL[1:0]	5:4	ODCLK selection. 0: IDCLK. 1: LPLL/2. 2: LPLL. 3: DFT Clock.	
	CLK_ATOP_SEL[1:0]	3:2	MOD cal clock selection. 0: 432MHz. 1: Null. 2: 216MHz. 3: DFT Clock.	
	PWM_OUT_CLK_SEL[1:0]	1:0	MOD cal clock selection. 0: ODCLK. 1: ODCLK/2. 2: DFT Clock. 3: DFT Clock.	
30h ~ 33h (0760h ~ 0767h)	-	7:0	Default : -	Access : -
	-	-	Reserved.	
40h (0780h)	REG0780	7:0	Default : 0xFF	Access : R/W
	V_BLK_ST1_VPOS[7:0]	7:0	Bt656 v blanking 1st start v position.	
40h (0781h)	REG0781	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_ST1_VPOS[11:8]	3:0	See description of '0780h'.	
41h (0782h)	REG0782	7:0	Default : 0xFF	Access : R/W
	V_BLK_ST1_HPOS[7:0]	7:0	Bt656 v blanking 1st start h position.	
41h (0783h)	REG0783	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_ST1_HPOS[11:8]	3:0	See description of '0782h'.	
42h (0784h)	REG0784	7:0	Default : 0xFF	Access : R/W
	V_BLK_END1_VPOS[7:0]	7:0	Bt656 v blanking 1st endt v position.	
42h (0785h)	REG0785	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_END1_VPOS[11:8]	3:0	See description of '0784h'.	
43h (0786h)	REG0786	7:0	Default : 0xFF	Access : R/W
	V_BLK_END1_HPOS[7:0]	7:0	Bt656 v blanking 1st end h position.	

CHIPTOP Register (Bank = 07)				
Index (Absolute)	Mnemonic	Bit	Description	
43h (0787h)	REG0787	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_END1_HPOS[11:8]	3:0	See description of '0786h'.	
44h (0788h)	REG0788	7:0	Default : 0xFF	Access : R/W
	V_BLK_ST2_VPOS[7:0]	7:0	Bt656 v blanking 2nd start v position.	
44h (0789h)	REG0789	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_ST2_VPOS[11:8]	3:0	See description of '0788h'.	
45h (078Ah)	REG078A	7:0	Default : 0xFF	Access : R/W
	V_BLK_ST2_HPOS[7:0]	7:0	Bt656 v blanking 2nd start h position.	
45h (078Bh)	REG078B	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_ST2_HPOS[11:8]	3:0	See description of '078Ah'.	
46h (078Ch)	REG078C	7:0	Default : 0xFF	Access : R/W
	V_BLK_END2_VPOS[7:0]	7:0	Bt656 v blanking 2nd endt v position.	
46h (078Dh)	REG078D	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_END2_VPOS[11:8]	3:0	See description of '078Ch'.	
47h (078Eh)	REG078E	7:0	Default : 0xFF	Access : R/W
	V_BLK_END2_HPOS[7:0]	7:0	Bt656 v blanking 2nd end h position.	
47h (078Fh)	REG078F	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	V_BLK_END2_HPOS[11:8]	3:0	See description of '078Eh'.	
48h (0790h)	REG0790	7:0	Default : 0xFF	Access : R/W
	FLD_ST1_VPOS[7:0]	7:0	Bt656 field1 start v position.	
48h (0791h)	REG0791	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	FLD_ST1_VPOS[11:8]	3:0	See description of '0790h'.	
49h (0792h)	REG0792	7:0	Default : 0xFF	Access : R/W
	FLD_ST1_HPOS[7:0]	7:0	Bt656 field1 start h position.	
49h (0793h)	REG0793	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	FLD_ST1_HPOS[11:8]	3:0	See description of '0792h'.	

CHIPTOP Register (Bank = 07)				
Index (Absolute)	Mnemonic	Bit	Description	
4Ah (0794h)	REG0794	7:0	Default : 0xFF	Access : R/W
	FLD_ST2_VPOS[7:0]	7:0	Bt656 field2 start v position.	
4Ah (0795h)	REG0795	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	FLD_ST2_VPOS[11:8]	3:0	See description of '0794h'.	
4Bh (0796h)	REG0796	7:0	Default : 0xFF	Access : R/W
	FLD_ST2_HPOS[7:0]	7:0	Bt656 field2 start h position.	
4Bh (0797h)	REG0797	7:0	Default : 0x0F	Access : R/W
	-	7:4	Reserved.	
	FLD_ST2_HPOS[11:8]	3:0	See description of '0796h'.	
4Ch (0798h)	REG0798	7:0	Default : 0x00	Access : R/W
	MASK_Y_BLK_VA[7:0]	7:0	Bt656 mask y blk value.	
4Ch (0799h)	REG0799	7:0	Default : 0x08	Access : R/W
	-	7	Reserved.	
	BT656_8BIT	6	Bt656 8bit mode.	
	DDR_HL_SWAP	5	Bt656 ddr high low swap.	
	CRCB_SWAP	4	Swap crcb position in 422.	
	444_BYPASS	3	Enable 444 to 422 conversion.	
	MASK_Y_BLK_EN	2	Bt656 mask y blk enable.	
	MASK_Y_BLK_VA[9:8]	1:0	See description of '0798h'.	
4Dh (079Ah)	REG079A	7:0	Default : 0x00	Access : R/W
	MASK_C_BLK_VA[7:0]	7:0	Bt656 mask c blk value.	
4Dh (079Bh)	REG079B	7:0	Default : 0x00	Access : R/W
	-	7:3	Reserved.	
	MASK_C_BLK_EN	2	Bt656 mask c blk enable.	
	MASK_C_BLK_VA[9:8]	1:0	See description of '079Ah'.	

REGISTER TABLE REVISION HISTORY

Date	Bank	Register
10/28/10		Created first version.

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only

This page is intended to be left blank.

Mstar Confidential
for 深圳市江启科技有限公司
Internal Use Only