

Signal Processor LSI for Single-Chip CCD Color Camera

Description

The CXD3141R is a signal processor LSI for Ye, Cy, Mg and G single-chip CCD color cameras. In addition to basic camera signal processing functions, it includes an AE/AWB detection circuit, a sync signal generation circuit and an external sync circuit, etc.

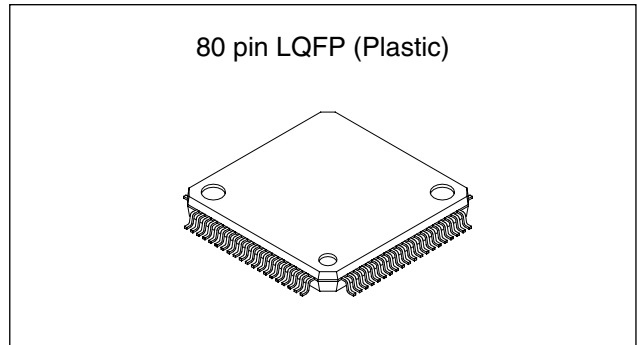
This chip also has a built-in microcontroller to realize basic camera functions such as AE/AWB without an external microcomputer.

Features

- Generates timing pulses to drive the 510H CCD image sensor
 - Sync signal generation function
 - Luminance/chroma signal processing
 - Luminance/chroma signal integral detector
 - Automatically control camera function
- Supports NTSC/PAL modes
- Supports 510H system CCD image sensor
- Built-in 9-bit A/D converter
- Analog composite output
 - Built-in digital encoder
 - 10-bit D/A converter output
- Digital output
 - YUV 8-bit multiplex output
- Supports external sync functions
- AE/AWB detector
- Block control functions with a built-in microcontroller
 - AE/AWB/YC/CLAMP/SG control functions
- Peripheral IC communication control functions
 - EVR, EEPROM communication control
- Serial communication function
 - Microcomputer (3 wires)

Absolute Maximum Ratings

• Supply voltage	V_{DD}	$V_{SS} - 0.5$ to +4.6	V
	AV_{DD}	$V_{SS} - 0.5$ to +4.6	V
• Input voltage	V_i	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
• Output voltage	V_o	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
• Operating temperature	T_{opr}	-20 to +75	°C
	T_{stg}	-55 to +150	°C



Recommended Operating Conditions

- Supply voltage V_{DD} 3.0 to 3.6 V
 - AV_{DD} (AVD1, 2, 5, 6) 3.0 to 3.6 V
 - AV_{DD} (AVD4) 3.0 to 5.5 V
- Operating temperature T_{opr} -20 to +75 °C

Applications

- Industrial CCD cameras (surveillance/FA/image input cameras)
- Multimedia CCD cameras (teleconferencing/personal computer cameras)

Applicable CCD Image Sensors*

510H color CCDs (Type 1/3, 1/4, 1/6 NTSC/PAL)

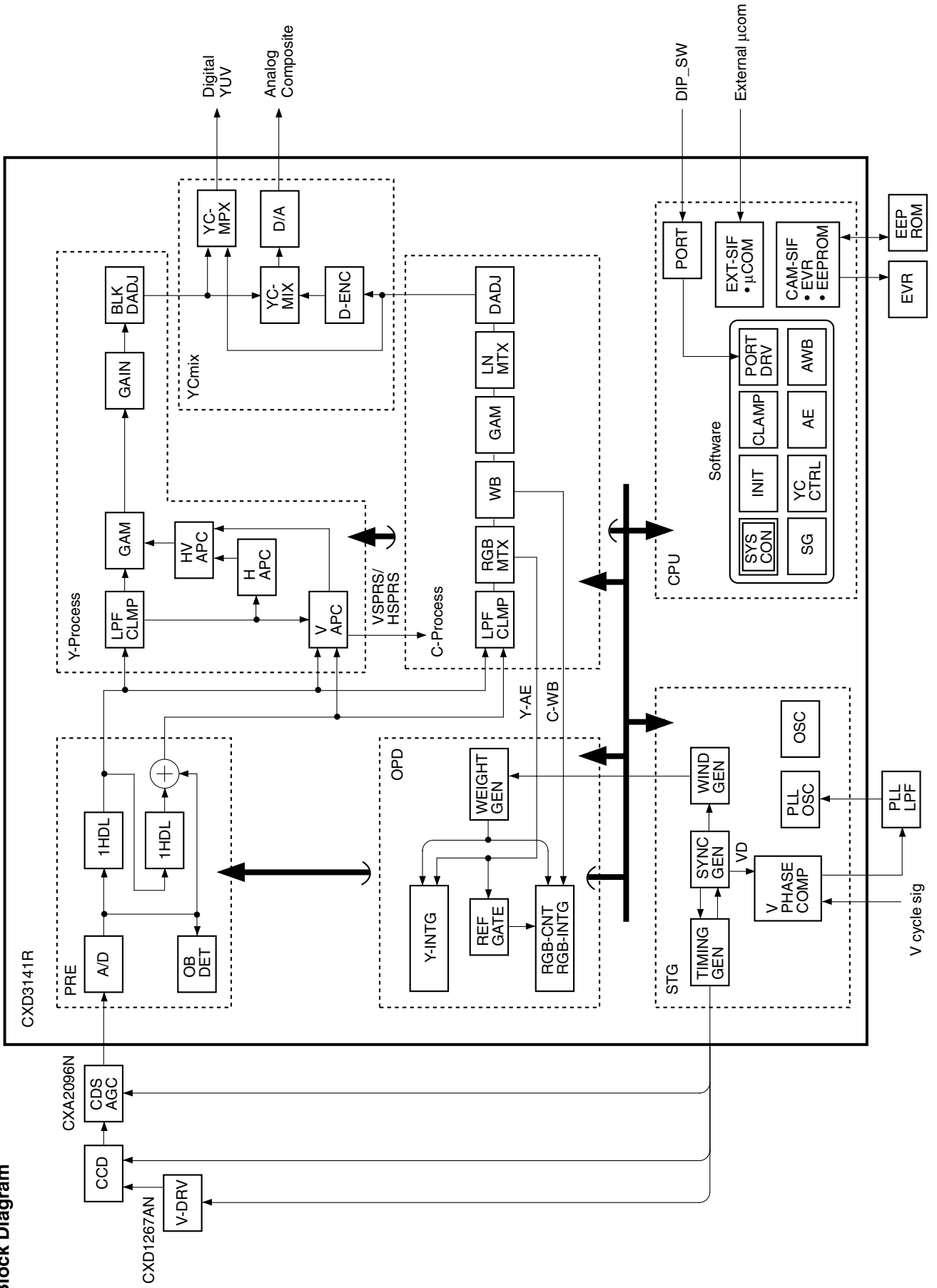
Supported Relates LSIs

- V-Driver : CXD1267AN
- AGC : CXA2096N
- EVR : MB88347 (Fujitsu Limited.)
- EEPROM : CAT64LC40JI (Catalyst Semiconductor Inc.)
- AK6420 (Asahi Kasei Microsystems Co.,Ltd.)

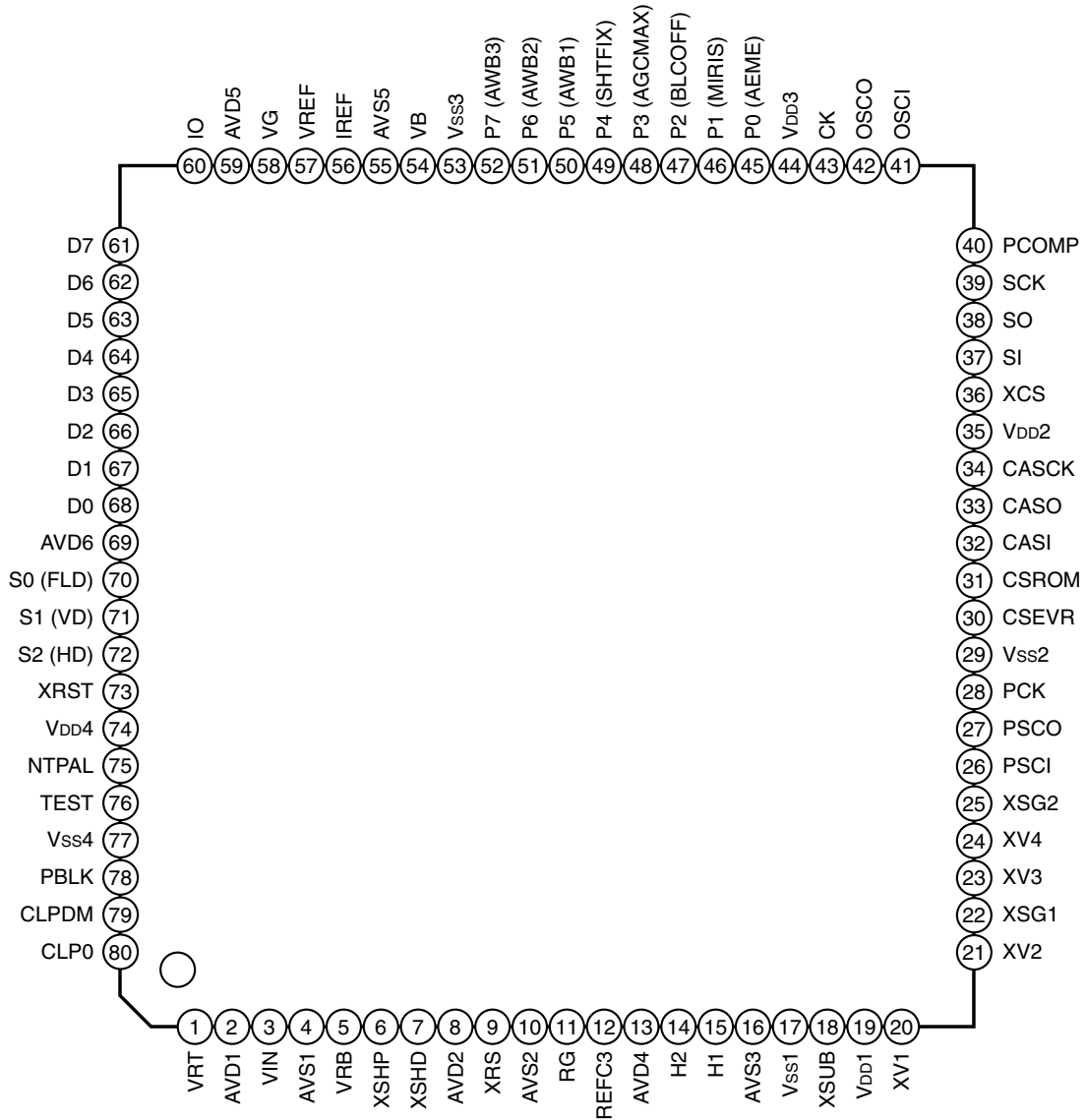
* Applicable CCD Image Sensors are applicable products as of preparing this data sheet. They may be changed according to the version up and production stop of CCD image sensor.

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Block Diagram



Pin Configuration



Note) Symbols in parentheses are the signal names when the LSI is switched by the serial communication settings.

All pin symbols (pin names) for the CXD3141R are the names next to the pin No. (outside the parentheses).

Pin Description

Pin No.	Symbol	I/O	Description		Power supply
1	VRT	I (A)	A/D converter reference voltage (top) input.	A/D	AVD1
2	AVD1	—	Power supply for A/D converter. (+3.3V)		
3	VIN	I (A)	A/D converter analog signal input.		
4	AVS1	—	GND		
5	VRB	I (A)	A/D converter reference voltage (bottom) input.		
6	XSHP	O	Precharge level sample-and-hold pulse output.	S/H	AVD2
7	XSHD	O	Data sample-and-hold pulse output.		
8	AVD2	—	Power supply for sample-and-hold pulse driver. (+3.3V)		
9	XRS	O	Resampling pulse output.		
10	AVS2	—	GND	CCD	AVD4
11	RG	O	Reset gate pulse output.		
12	REFC3	I	Reference capacitor connection pin.		
13	AVD4	—	Power supply for H driver. (+3.3V/+5.0V)		
14	H2	O	CCD horizontal register transfer pulse output.		
15	H1	O	CCD horizontal register transfer pulse output.		
16	AVS3	—	GND		
17	V _{ss1}	—	GND		
18	XSUB	O	CCD electronic shutter pulse output.		
19	V _{DD1}	—	Power supply for Logic. (+3.3V)		
20	XV1	O	CCD vertical register transfer pulse output.	OSC2	V _{DD}
21	XV2	O	CCD vertical register transfer pulse output.		
22	XSG1	O	CCD sensor readout pulse output.		
23	XV3	O	CCD vertical register transfer pulse output.		
24	XV4	O	CCD vertical register transfer pulse output.		
25	XSG2	O	CCD sensor readout pulse output.		
26	PSCI	I	Oscillation cell input. (slave)		
27	PSCO	O	Oscillation cell output. (slave)		
28	PCK	I	System clock input. (slave)		
29	V _{ss2}	—	GND		
30	CSEVR	O	Chip select output for camera peripheral ICs. (to EVR)	Peripheral communication	
31	CSROM	O	Chip select output for camera peripheral ICs. (to EEPROM)		
32	CASI	I	Serial data input for camera peripheral ICs. (from EEPROM)		
33	CASO	O	Serial data output for camera peripheral ICs. (to EVR, EEPROM)		
34	CASCK	O	Serial clock output for camera peripheral ICs. (to EVR, EEPROM)		

Pin No.	Symbol	I/O	Description		Power supply
35	V _{DD2}	—	Power supply for Logic. (+3.3V)		V _{DD}
36	XCS	I	Chip select input for microcomputer communication.	External communication	
37	SI	I	Serial data input for microcomputer communication.		
38	SO	O	Serial data output for microcomputer communication.		
39	SCK	I	Serial clock input for microcomputer communication.		
40	PCOMP	O/Z	Phase comparator output for PLL.		
41	OSCI	I	Oscillation cell input. (master)	OSC1	
42	OSCO	O	Oscillation cell output. (master)		
43	CK	I	System clock input. (master)		
44	V _{DD3}	—	Power supply for Logic. (+3.3V)		
45	P0 (AEME)	I	Port 0 input for mode switch. (AE mode switching)	SW	
46	P1 (MIRIS)	I	Port 1 input for mode switch. (Iris mode switching)		
47	P2 (BL COFF)	I	Port 2 input for mode switch. (Backlight compensation off)		
48	P3 (AGCMAX)	I	Port 3 input for mode switch. (AGC maximum gain switching)		
49	P4 (SHTFIX)	I	Port 4 input for mode switch. (SHUT FIX mode switching)		
50	P5 (AWB1)	I	Port 5 input for mode switch. (AWB mode switching)		
51	P6 (AWB2)	I	Port 6 input for mode switch. (ATW/push lock switching)		
52	P7 (AWB3)	I	Port 7 input for mode switch. (Push lock signal input)		
53	V _{SS3}	—	GND		
54	VB	I (A)	Capacitor connection pin. (about 0.1μF)	D/A	
55	AVS5	—	GND		
56	IREF	O (A)	Reference current setting pin.		
57	VREF	I (A)	Reference voltage setting pin.		
58	VG	I (A)	Capacitor connection pin. (about 0.1μF)		
59	AVD5	—	Power supply for D/A converter. (+3.3V)		
60	IO	O	Composite signal (current) output.		
61	D7	O/Z	Digital signal output.	Digital output	V _{DD}
62	D6	O/Z	Digital signal output.		
63	D5	O/Z	Digital signal output.		
64	D4	O/Z	Digital signal output.		
65	D3	O/Z	Digital signal output.		
66	D2	O/Z	Digital signal output.		
67	D1	O/Z	Digital signal output.		
68	D0	O/Z	Digital signal output.		
69	AVD6	—	Power supply for A/D converter. (+3.3V)		

Pin No.	Symbol	I/O	Description		Power supply
70	S0 (FLD)	O/Z	Sync signal output 0. (FLD signal)	Sync signal	V _{DD}
71	S1 (VD)	O/I/Z	Sync signal output 1. (VD signal)/VD signal input for LL		
72	S2 (HD)	O/Z	Sync signal output 2. (HD signal)		
73	XRST	I	Reset input. (Low: reset, High: normal operation)	S/H	
74	V _{DD4}	—	Power supply for Logic. (+3.3V)		
75	NTPAL	I	TV mode switching. (Low: NTSC, High: PAL)		
76	TEST	I	Chip test input. Low fixed at normal operation.		
77	V _{SS4}	—	GND		
78	PBLK	O	Preblanking pulse output.		
79	CLPDM	O	Dummy data clamp pulse output.		
80	CLP0	O	Optical black clamp pulse output.		

- I : CMOS level input
- O : CMOS level output
- I/O : Bidirectional input/output
- O/Z : Tri-state output
- I (A) : Analog input
- O (A) : Analog output
- O/I/Z : Bidirectional input/output with Tri-state

Electrical Characteristics

DC Characteristics

(Within recommended operating range)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	$V_{DD1, 2, 3, 4}$		3.0	3.3	3.6	V
	$AVD1, 2, 6$		3.0	3.3	3.6	V
	$AVD5$	D/A output amplitude = 1Vp-p	3.0	3.3	3.6	V
	$AVD4$		3.0	—	5.5	V
Output voltage	V_{OH1}^{*1}	$I_{OH} = 4mA$	$V_{DD} - 0.4$			V
	V_{OL1}^{*1}	$I_{OL} = 4mA$			0.4	V
	$V_{OH2}^{*2, 6}$	$I_{OH} = 1mA$	$V_{DD} - 0.4$			V
	$V_{OL2}^{*2, 6}$	$I_{OL} = 1mA$			0.4	V
Input voltage	$V_{T+}^{*2, 3, 4, 5}$		$0.7V_{DD}$			V
	$V_{T-}^{*2, 3, 4, 5}$				$0.2V_{DD}$	V
Hysteresis	$V_{T+} - V_{T-}^{*2, 3, 5}$			0.5		V
Input leak current	I_{IH}^{*7}	$V_{IN} = V_{DD}$	40	100	240	μA

*1 XV1, XV2, XV3, XV4, XSG1, XSG2, XSUB, PBLK, CLPDM, CLP0, SO, CASCK, CASO, CSROM, CSEVR

*2 S1

*3 XRST, XCS, SI, SCK, CASI

*4 NTPAL

*5 P0, P1, P2, P3, P4, P5, P6, P7I

*6 S0, S2, D0, D1, D2, D3, D4, D5, D6, D7

*7 TEST

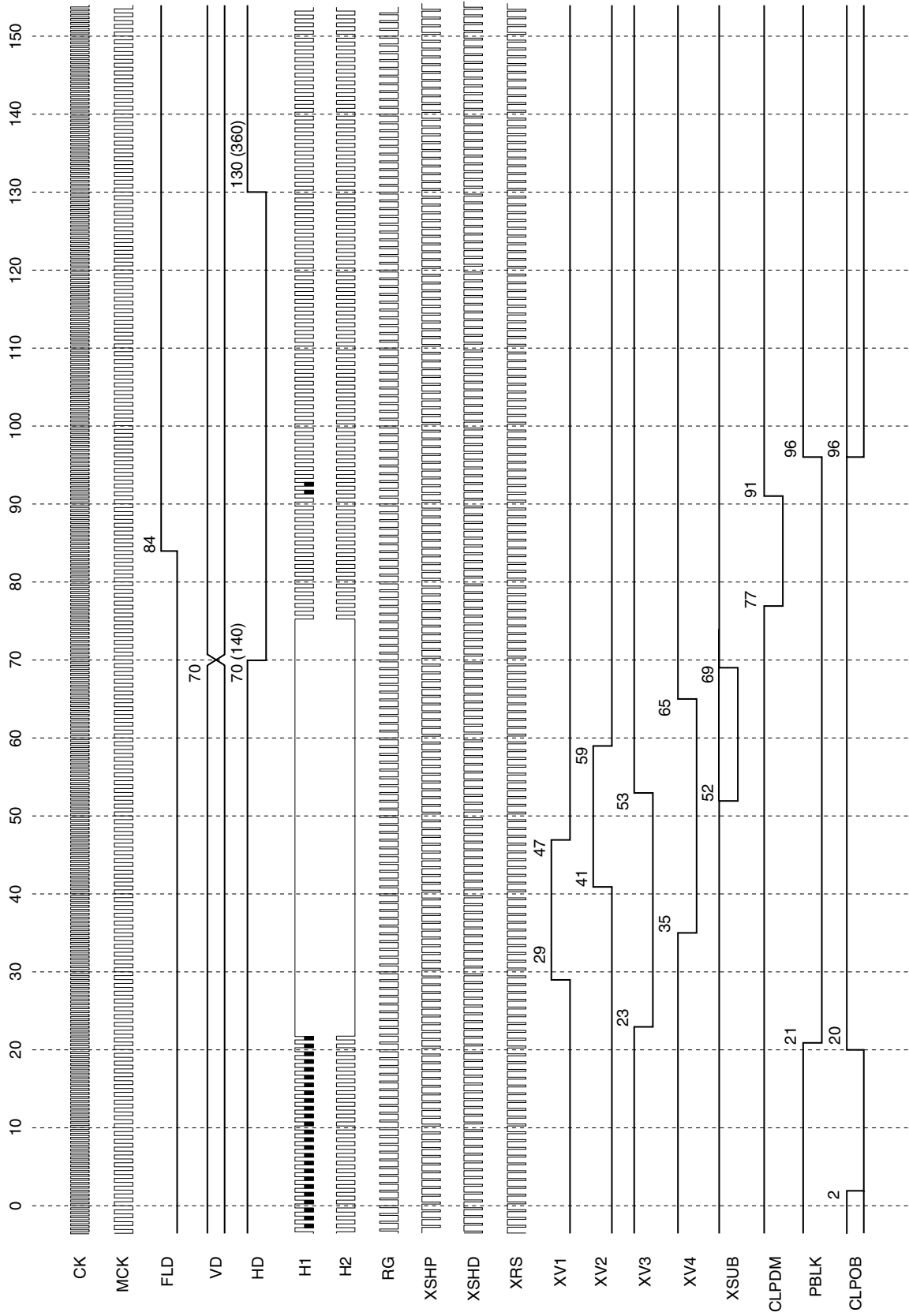
I/O Pin Capacitance

(V_{DD} = V_I = 0V, f = 1MHz)

Item	Symbol	Min.	Typ.	Max.	Unit
Input pin capacitance	C_{IN}			9	pF
Output pin capacitance	C_{OUT}			11	pF
I/O pin capacitance	$C_{I/O}$			11	PF

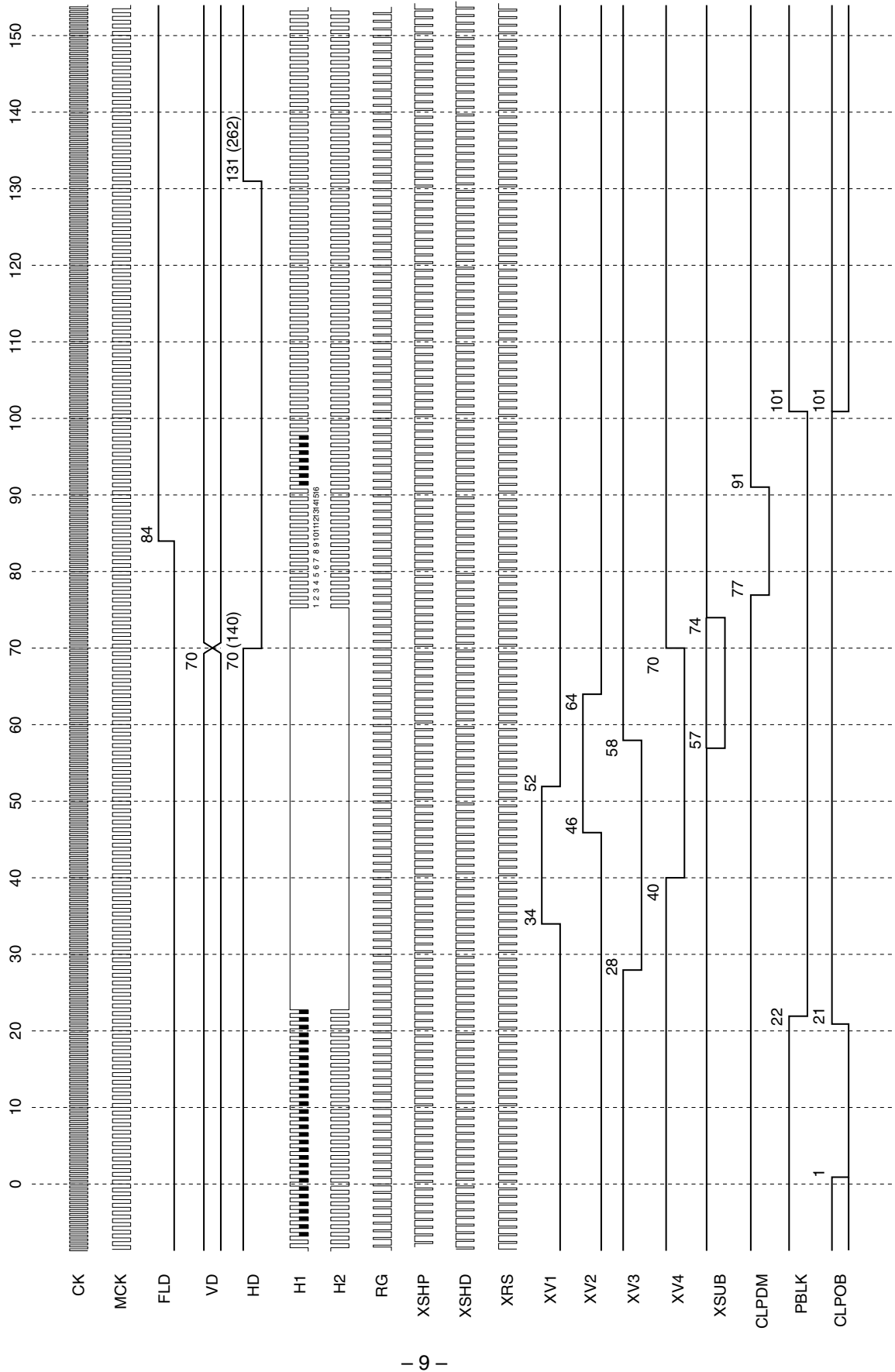
510H NTSC Horizontal Timing Chart

CK : 1212fH (19.06993MHz/52.44ns)
 MCK : 606fH (9.53496MHz/104.88ns)



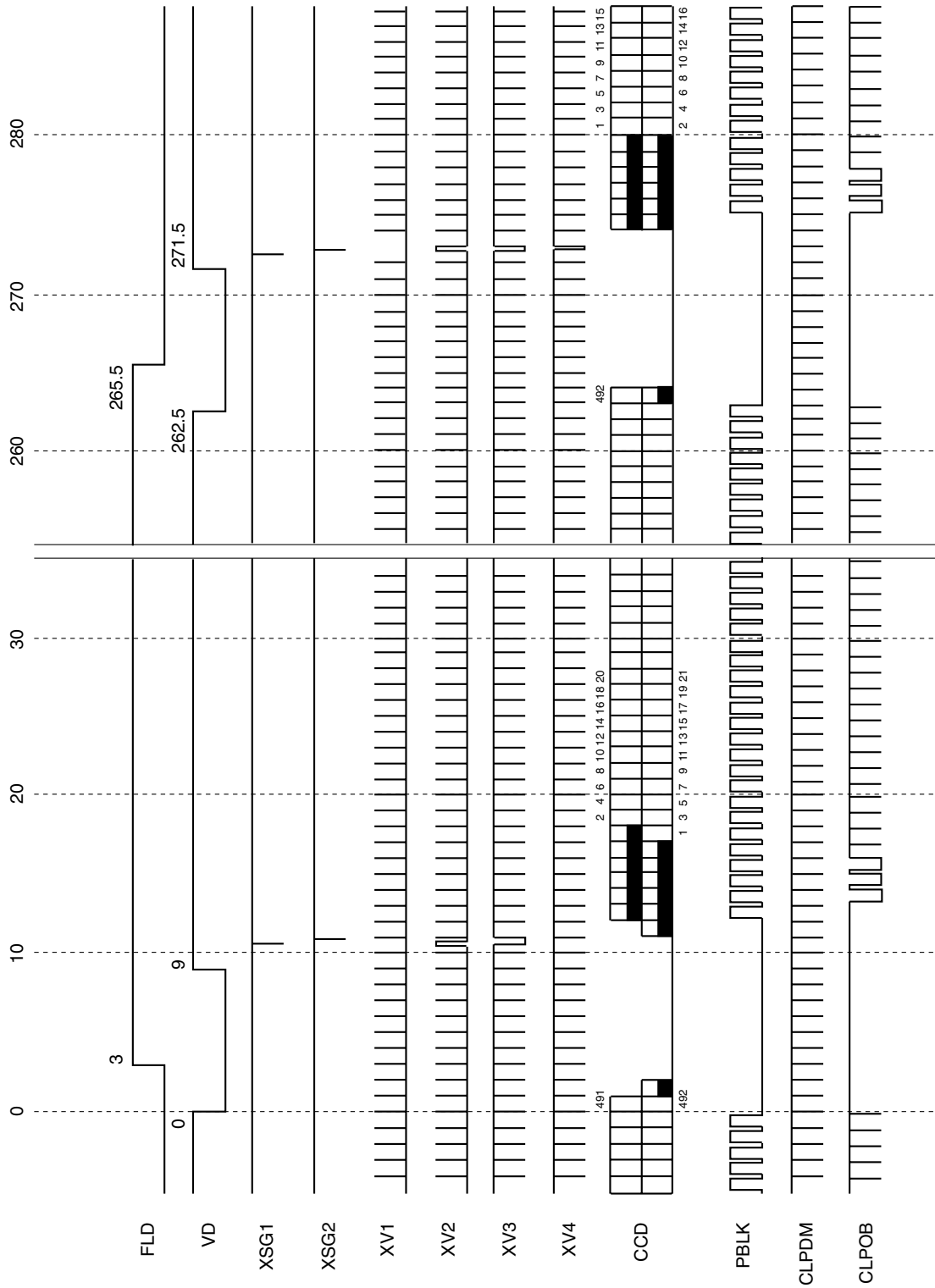
510H PAL Horizontal Timing Chart

CK : 1212fH (18.9375MHz/52.81ns)
 MCK : 606fH (9.46875MHz/105.61ns)



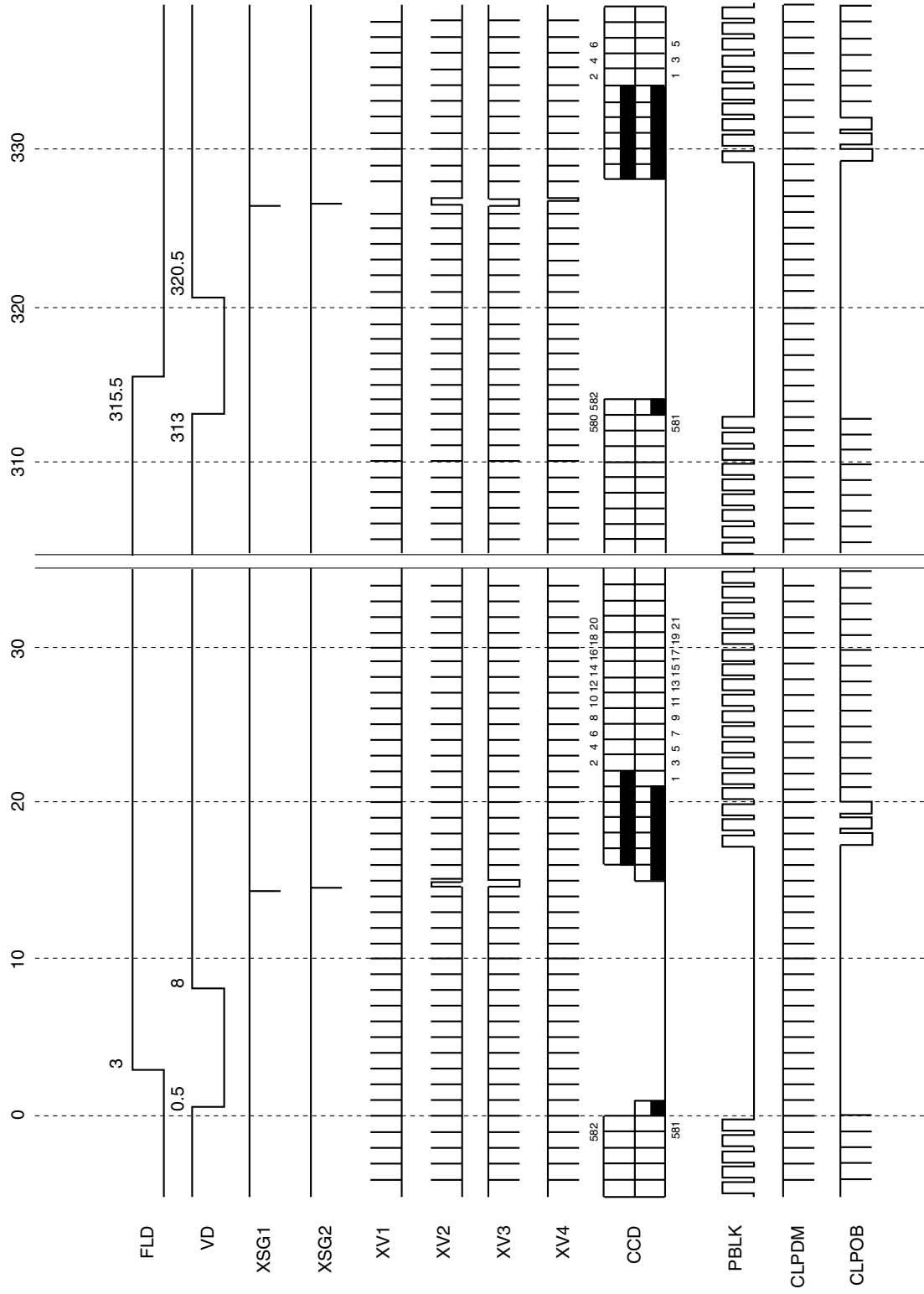
CK : 1212fH (19.06993MHz/52.44ns)
 MCK : 606fH (9.53496MHz/104.88ns)

510H NTSC Vertical Timing Chart



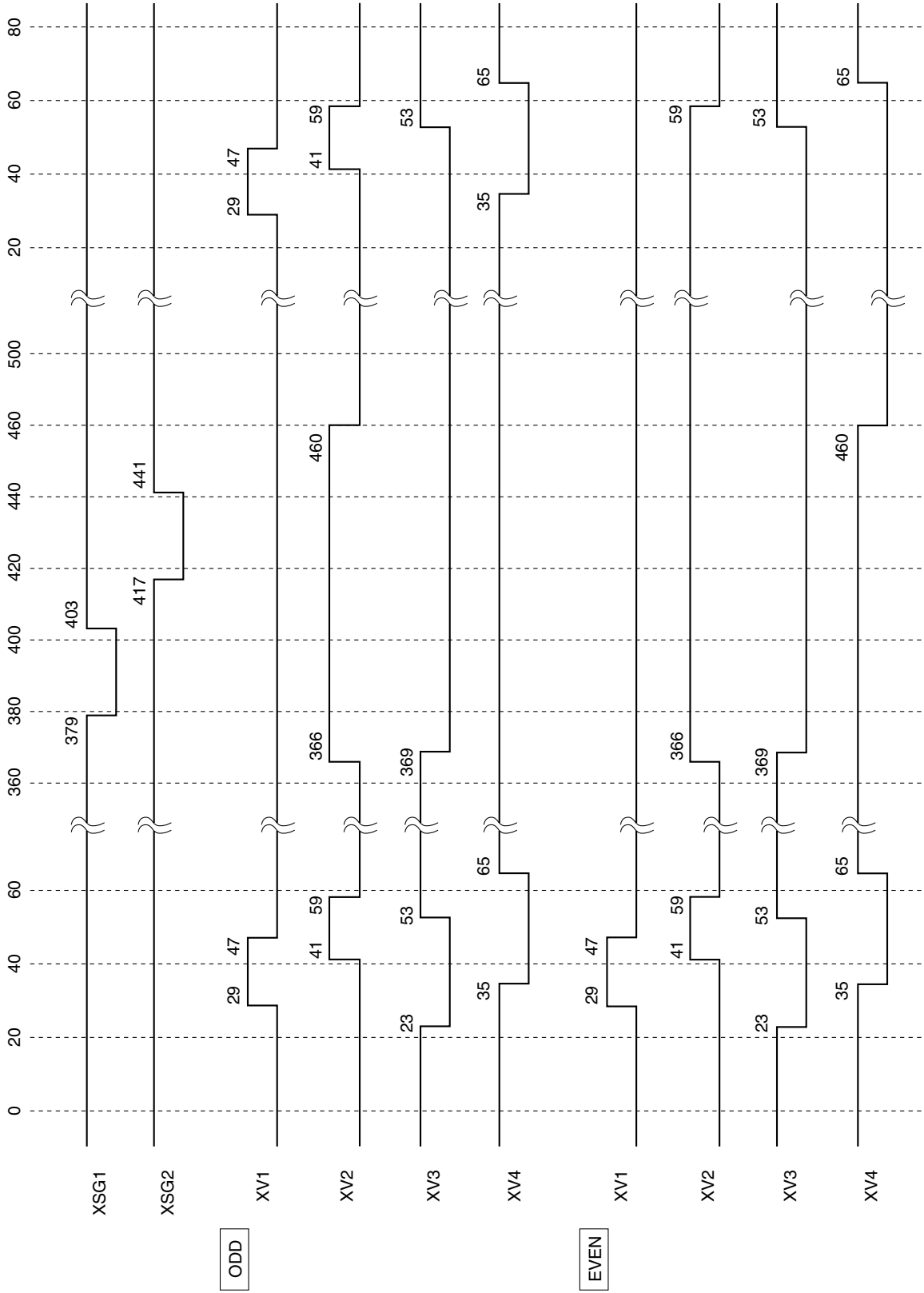
CK : 1212fH (18.9375MHz/52.81ns)
 MCK : 606fH (9.46875MHz/105.61ns)

510H PAL Vertical Timing Chart



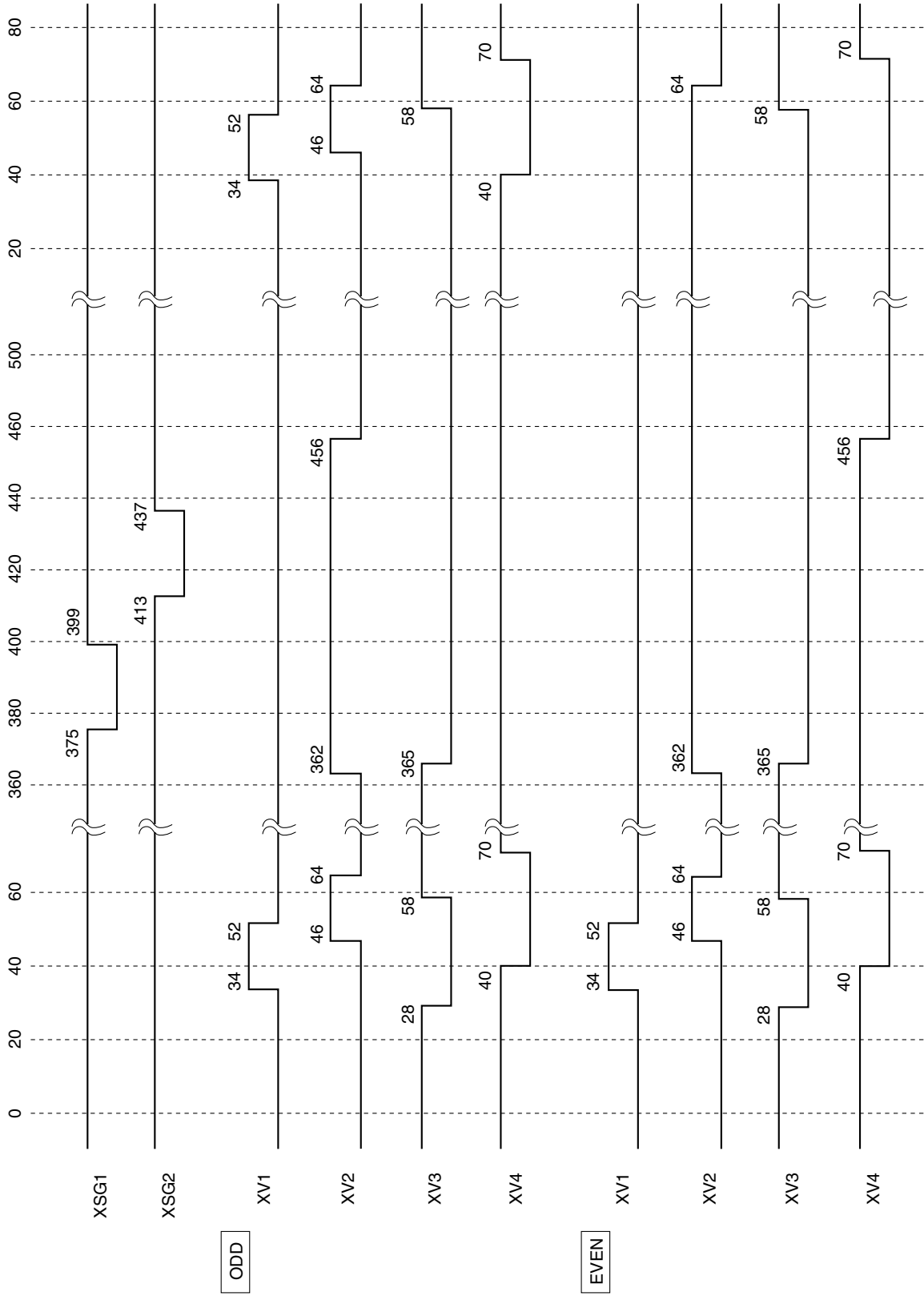
CK : 12.12fH (19.06993MHz/52.44ns)
 MCK : 606fH (9.53496MHz/104.88ns)

510H NTSC Readout Timing Chart

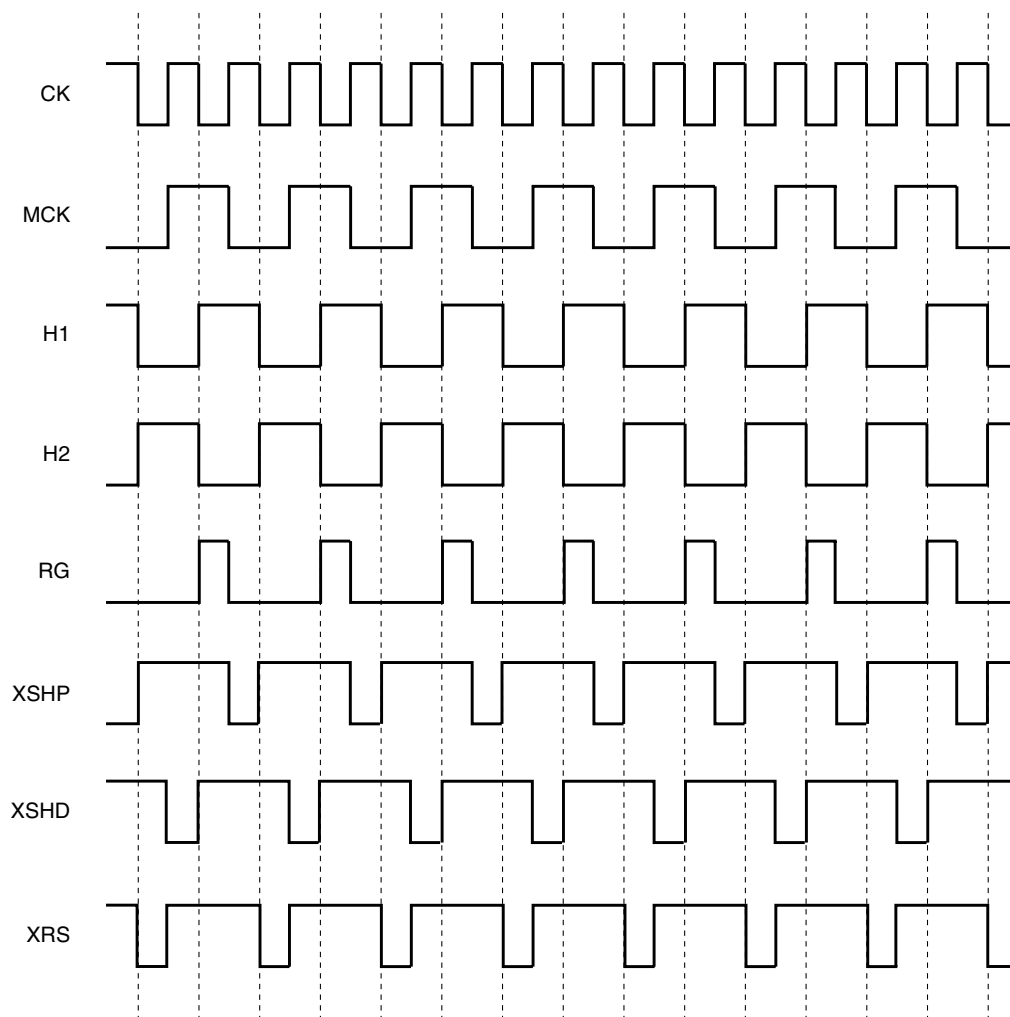


CK : 1212fH (18.9375MHz/52.81ns)
 MCK : 606fH (9.46875MHz/105.61ns)

510H PAL Readout Timing Chart



510H High-speed Clock Timing chart



Serial Communication Data

Classification of Serial Data

Category	Contents		
	I/O	Byte 0	Byte 1 to
CAT1: SYSCON	I	01h	System configuration
CAT2: CPU	I	02h	CPU configuration
CAT3: PICT	I	03h	Picture parameters
CAT4: AE	I	04h	AE USR specification
CAT5: AWB	I	05h	AWB USR specification
CAT6: ADJUST	I	06h	Adjustment
CAT7: TIMING	I	07h	Timing parameters
CAT8: SOUT	I	08h	Serial OUT setting
	O		Serial OUT data
CAT9: EXTCON	I	09h	External controller

Category 1: SYSCON

CAT1		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
0	0	CAT1	LSB	Category select code 01h: SYSCON			
	1						
	2						
	3						
	4						
	5						
	6						
	7						
1	0	NTPAL	NTSC/PAL 0: NTSC, 1: PAL	0	common	01h	
	1	OCCF	On-chip color filter 0: Type 1/4, 1: Type 1/3	0	MAIN/C		
	2	(Low)	LSB	"0" fixed	0		common
	3		MSB				
	4	OUTMODE	LSB	0x: Analog 1x: Analog and Digital	1		common
	5		MSB				
	6	(Low)	"0" fixed	0	Y/C		
7	(Low)	"0" fixed	0				
2	0	DLYH	LSB	Delay Adjustment for H1, H2 0h: +0ns, 1h: +4ns, 2h: +7ns, 3h: -8ns	0h	STG	02h
	1		MSB				
	2	DTYH	LSB	Duty Adjustment for H1, H2 0h: Norm, 1h: F + 3ns, 2h: F + 6ns, 3h: R + 3ns	0h		
	3		MSB				
	4	DLYRG	LSB	Delay Adjustment for RG 0h: +0ns, 1h: +4ns, 2h: +7ns, 3h: -8ns	0h		
	5		MSB				
	6	DTYRG	LSB	Duty Adjustment for RG 0h: Norm, 1h: F + 3ns, 2h: F + 6ns, 3h: R + 3ns	0h		
7	MSB						
3	0	IRLESS	IR less mode 1: ON	0	AWB/MAIN	03h	
	1	VIDEOAE	Video AE mode 1: ON	1	AE/MAIN		
	2	ADCKSEL	LSB	ADCK Phase Adjustment 0h: +0Tck, 1h: +1/4Tck, 2h: +2/4Tck, 3h: +3/4Tck	0h		STG
	3		MSB				
	4	(Low)	"0" fixed		0		
	5						
	6	OPBCKINV	Clock Invert for 1st FF after ADC 0: Norm, 1: INV	0	PRE		
	7	(Low)	"0" fixed	0			

#1: Initial setting value with Power-on

CAT1		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
4	0	(Low)	"0" fixed	0		04h	
	1	(Low)	"0" fixed	0			
	2	(Low)	"0" fixed	0			
	3	(Low)	"0" fixed	0			
	4						
	5	S2DLY	LSB Delay Adjustment for S2 MSB 0h: +0ns, 1h: +15ns, 2h: +30ns, 3h: +45ns	0h	TOP		
	6						
7	(Low)	"0" fixed	0				
5	0	(Low)	"0" fixed	0		05h	
	1						
	2						
	3						
	4						
	5						
	6						
7	SPINSW	S0, 1, 2 pin active SW	0: Active, 1: Hi-Z	0	TOP		
6	0	ESMODE	Ext Sync mode	0: INT, 1: LL	0	TOP/STG	06h
	1	(Low)	"0" fixed	0			
	2	CMPMODE	P-COMP MODE	0: Norm 1: VCOMP mode (pin release)	0	TOP/STG	
	3	(Low)	"0" fixed	0			
	4	CMPINV	P-COMP ref/var INVerse		0	STG	
	5	(Low)	"0" fixed	0			
	6						
7							
7	0	S0SEL	LSB S0 pin select 0h: FLD, 1h: SYNC, 2h: BF, 3h: DISP 4h: VD, 5h: HD, 6h: CBLK, 7h: DBLK MSB	0h	TOP/STG	07h	
	1						
	2						
	3	SSHIFT	Sync SHIFT (shiftVD/HD)		0		STG
	4	S1SEL	LSB S1 pin select 00: VD, 01: FLD, 10: HD, 11: DISP MSB ESMODE = LL: S1 = AC in	0h	STG		
	5						
	6	S2SEL	LSB S2 pin select 00: HD, 01: FLD, 10: VD, 11: DISP MSB	0h	STG		
7							

#1: Initial setting value with Power-on

Category 2: CPU

CAT2		Serial input				
Byte	bit	Name	Description	#1	Block	Address
0	0	CAT2	LSB	Category select code 02h: CPU		
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
1	0	CPUCMD	LSB	CPU Command (EEPROM, AECMD, AWBCMD)	0h	MAIN
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
2	0	CPUADRS	LSB	CPU Address	0h	MAIN
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
3	0	CPUDATA	LSB	CPU Data	0h	MAIN
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT2		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	CPUEXT	0: CPU, 1: EXT micon mode	0	MAIN	
	1	CPUAE	0: CPU, 1: AE hold (stop)	0		
	2	CPUAWB	0: CPU, 1: AWB hold (stop)	0		
	3	CPUSPRS	0: CPU, 1: SPRS hold (stop)	0		
	4	CPUDIP	0: CPU, 1: Cat2 – Byte 6, 7 (SW parameter)	0		
	5	CPUSG	0: CPU, 1: Cat 2 – Byte 7 (SW parameter)	0		
	6	—				
	7	—				
5	0	NORMFL	Normal FL (AGC + SHT) SW	1	MAIN	08h
	1	LIMFL	LIMIT FL SW	0		
	2	SFIXFL	Shutter FIX FL Control	0		
	3	LAEFL1	Link AE FL1 (NORMFL) Control	0		
	4	LAEFL2	Link AE FL2 (LIMFL) Control	0		
	5	(Low)	"0" fixed	0		
	6	LAWBFL	Link AWB FL Control	0		
	7	(Low)	"0" fixed	0		
6	0	AEME	Auto/Manual Exposure	0	AE	09h
	1	MIRIS	Mechanical IRIS	0		
	2	BLCOFF	BackLight OFF	0		
	3	AEREF	AE REFERENCE up	0		
	4	AGCMAX	AGC MAX gain	0		
	5	SHTFIX	Shutter Fix (1/100)	0		
	6	AESHUT	AE Shutter mode	0		
	7	—				
7	0	AWB	LSB AWB mode	0h	AWB	0Ah
	1		0h: ATW, 1h: IN, 2h: PUSH, 3h: USR,			
	2	MSB 4h: —, 5h: FL, 6h: HOLD, 7h: OUT				
	3	—				
	4	(Low)	"0" fixed	0		
	5	SFTUP	Shift UP	0	MAIN	
	6	SFTDWN	Shift DOWN	0	MAIN	
	7	—				

#1: Initial setting value with Power-on

CAT2		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	P0CB	LSB	46h	MAIN	0Bh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
9	0	P0M	LSB	00h	MAIN	0Ch
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
10	0	P1CB	LSB	46h	MAIN	0Dh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
11	0	P1M	LSB	01h	MAIN	0Eh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT2		Serial input				
Byte	bit	Name	Description	#1	Block	Address
12	0	P2CB	LSB	46h	MAIN	0Fh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
13	0	P2M	LSB	02h	MAIN	10h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
14	0	P3CB	LSB	46h	MAIN	11h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
15	0	P3M	LSB	04h	MAIN	12h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT2		Serial input				
Byte	bit	Name	Description	#1	Block	Address
16	0	P4CB	LSB	46h	MAIN	13h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
17	0	P4M	LSB	05h	MAIN	14h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
18	0	P5CB	LSB	47h	MAIN	15h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
19	0	P5M	LSB	00h	MAIN	16h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT2		Serial input				
Byte	bit	Name	Description	#1	Block	Address
20	0	P6CB	LSB	47h	MAIN	17h
	1		Port 6 Cat/Byte			
	2					
	3					
	4					
	5					
	6					
	7		MSB			
21	0	P6M	LSB	01h	MAIN	18h
	1		Port 6 Mode			
	2					
	3					
	4					
	5					
	6					
	7		MSB			
22	0	P7CB	LSB	47h	MAIN	19h
	1		Port 7 Cat/Byte			
	2					
	3					
	4					
	5					
	6					
	7		MSB			
23	0	P7M	LSB	02h	MAIN	1Ah
	1		Port 7 Mode			
	2					
	3					
	4					
	5					
	6					
	7		MSB			

#1: Initial setting value with Power-on

Category 3: PICT

CAT3		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
0	0	CAT3	LSB	Category select code 03h: PICT			
	1						
	2						
	3						
	4						
	5						
	6						
	7						
1	0	HAPGL	LSB	H Apcom Gain (Low Freq)	3h	Y	
	1						
	2	HAPGH	LSB	H Apcom Gain (High Freq)	1h		
	3						
	4	YLPFSW	Y-LPF SW (on/off)	1: OFF	0		
	5	(Low)	"0" fixed		0		
	6	GAMSW	Y/C GAMMA SW (on/off)	1: OFF	0		Y/C/MAIN
	7	—					
2	0	VAPG	LSB	V Apcom Gain	Ah	Y	
	1						
	2						
	3						
	4	VAPSL	LSB	V Apcom Slice Level	2h		
	5						
	6						
	7						
7	(Low)	"0" fixed		0			
3	0	VHAPG	LSB	VH Apcom Gain	6h	Y	
	1						
	2						
	3						
	4	VHAPSL	LSB	VH Apcom Slice Level	4h		
	5						
	6						
	7						
7							

#1: Initial setting value with Power-on

CAT3		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	ASPRSTA	LSB	A0h	MAIN	1Eh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
5	0	ASPREND	LSB	D0h	MAIN	1Fh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
6	0	ASPRLV	LSB	00h	MAIN	20h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
7	0	YGAIN	LSB	5Ah	Y	21h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT3		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	SETUP	LSB	Dh	Y	22h
	1		SETUP level			
	2		MSB			
	4	WCLIP	LSB	5h		
	5		White CLIP level			
	6		MSB			
	7	(Low)	"0" fixed	0		
9	0	BSTLV	LSB	NT = 12h PAL = 13h	DENC	23h
	1		Burst Level			
	2		MSB			
	3					
	4					
	5	BSTINV	Burst Inverse	1		
	6	(Low)	"0" fixed	0		
10	0	RYGAIN	LSB	2Fh	C	24h
	1		R-Y Gain			
	2					
	3					
	4					
	5					
	6					
7	MSB					
11	0	BYGAIN	LSB	1Ch	C	25h
	1		B-Y Gain			
	2					
	3					
	4					
	5					
	6					
7	MSB					

#1: Initial setting value with Power-on

CAT3		Serial input				
Byte	bit	Name	Description	#1	Block	Address
12	0	RYHUE	LSB	FFh	C	26h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
13	0	BYHUE	LSB	FEh	C	27h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
14	0	CSPRSTA	LSB	A0h	MAIN	28h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
15	0	CSPREND	LSB	D0h	MAIN	29h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT3		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
16	0	CSPRLV	LSB	C SUPPRESS LEVEL	8Ah	MAIN	2Ah
	1						
	2						
	3						
	4						
	5						
	6						
	7	MSB					
17	0	CSVLV	LSB	C Suppress V apcom Level	0h	C	2Bh
	1		MSB				
	2	CSVTH	LSB	C Suppress V apcom THreshold	1h	Y	
	3		MSB				
	4	CSHLV	LSB	C Suppress Highlight Level	0h	C	
	5		MSB				
	6	CSHTH	LSB	C Suppress Highlight Threshold	2h	Y	
7	MSB						
18	0	YSPRLV	LSB	Y Suppress Highlight Level	0h	Y/ (C)	2Ch
	1		MSB				
	2	YSPRTH	LSB	Y Suppress Highlight Threshold	0h	Y/ (C)	
	3		MSB				
	4	HLLIM	LSB	HighLight LIMiter level	0h	DENC	
	5		MSB				
	6	PEDLIM	LSB	PEDestal LIMiter level	0h	DENC	
7	MSB						
19	0	GOFGAIN	LSB	Gamma OFF Y/C GAIN	00h	MAIN	2Dh
	1						
	2						
	3						
	4						
	5						
	6						
	7	MSB					

#1: Initial setting value with Power-on

Category 4: AE

CAT4		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
0	0	CAT4	LSB	Category select code 04h: AE			
	1						
	2						
	3						
	4						
	5						
	6						
	7						
			MSB				
1	0	AEW0	LSB	AE Wind0 weight	0h	OPD	
	1						
	2	AEW1	LSB	AE Wind1 weight	0h		
	3						
	4	AEW2	LSB	AE Wind2 weight	0h		
	5						
	6	AEW3	LSB	AE Wind3 weight	0h		
	7						
			MSB				
2	0	AGCFL	AGC FL	0	AE	30h	
	1	SHTFL	Shutter FL	0			
	2	LSHTLIM	Low speed Shut Lim	0			
	3	(Low)	"0" fixed	0			
	4	EVR5V	EVR voltage select	0: 3.3V, 1: 5V			0
	5	—					
	6						
	7	AESCEV	SCALE (MSB) EVR7 out				0
3	0	AESTAB	LSB	AE Stability	0h	AE	
	1						
	2						
	3						
	4						
	5						
	6						
	7						
			MSB				

#1: Initial setting value with Power-on

CAT4		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	AEHYST	LSB	0h	AE	32h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
5	0	AEWAIT	LSB	0h	AE	33h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
6	0	AESPEED	LSB	08h	AE	34h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
7	0	AEUSR	LSB	04h	AE	35h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT4		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	AGCMAXL	LSB	CCh	AE	36h
	1					
	2					
	3		AE AGC MAX Low (normal)			
	4					
	5					
	6					
	7		MSB			
9	0	AGCMAXH	LSB	FFh	AE	37h
	1					
	2					
	3		AE AGC MAX High (SW-ON)			
	4					
	5					
	6					
	7		MSB			
10	0	MSHTLIM	LSB	7h	AE	38h
	1					
	2					
	3		AE MAX speed shut Lim			
	4					
	5					
	6					
	7		MSB			
11	0	AGCFLLL	LSB	20h	AE	39h
	1					
	2					
	3		AE AGC FL Lower Lim			
	4					
	5					
	6					
	7		MSB			

#1: Initial setting value with Power-on

CAT4		Serial input				
Byte	bit	Name	Description	#1	Block	Address
12	0	SHTFLLL	LSB	1h	AE	3Ah
	1		AE SHUTTER FL Lower Lim			
	2					
	3		MSB			
	4	SHTFLUL	LSB	Bh		
	5		AE SHUTTER FL Upper Lim			
	6					
	7		MSB			
13	0	AETHL	LSB	10h	AE	3Bh
	1					
	2					
	3		AE THRESHOLD Low			
	4					
	5					
	6					
	7		MSB			
14	0	AETHH	LSB	20h	AE	3Ch
	1					
	2					
	3		AE THRESHOLD High			
	4					
	5					
	6					
	7		MSB			

#1: Initial setting value with Power-on

Category 5: AWB

CAT5		Serial input				
Byte	bit	Name	Description	#1	Block	Address
0	0	CAT5	LSB	Category select code 05h: AWB		
	1					
	2					
	3					
	4					
	5					
	6					
	7					
1	0	AWBW0	LSB	AWB Wind0 weight	0h	OPD
	1					
	2	AWBW1	LSB	AWB Wind1 weight	0h	
	3					
	4	AWBW2	LSB	AWB Wind2 weight	0h	
	5					
	6	AWBW3	LSB	AWB Wind3 weight	0h	
	7					
2	0	AWBSEPOF	AWB light SEParate OFF		0h	AWB
	1	AWBTRIG	AWB TRIGger ON/OFF		0h	
	2	AWBHLCUT	LSB	AWB High Light CUT block	0h	
	3					
	4	AWBLLCUT	AWB Low Light integ data CUT		0h	
	5					
	6					
	7					
3	0	GGAIN	LSB	Green GAIN (push lock mode)	26h	AWB
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT5		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
5	0	AWBSPED	LSB	1h	AWB	41h
	1		AWB SPEED			
	2		MSB			
	4	AWBAJST5	LSB	0h		
	5		AWB Adjust5			
	6	AWBAJST6	LSB	0h		
	7		AWB Adjust6			
6	0	AWBFRAM	LSB	00h	AWB	42h
	1					
	2					
	3		AWB vector FRAME			
	4					
	5					
	6					
	7		MSB			
7	0	AWBRSFT	LSB	00h	AWB	43h
	1					
	2					
	3		AWB ATW R shift			
	4					
	5					
	6					
	7		MSB			

#1: Initial setting value with Power-on

CAT5		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	AWBBSFT	LSB	00h	AWB	44h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
9	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
10	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
11	0	WBUSRR	LSB	49h	AWB	47h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT5		Serial input				
Byte	bit	Name	Description	#1	Block	Address
12	0	WBUSRB	LSB	2Ch	AWB	48h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
13	0	WBRST	LSB	3h	AWB	49h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
14	0	WBBSFT	LSB	1h	AWB	4Ah
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

Category 6: ADJUST

CAT6		Serial input				
Byte	bit	Name	Description	#1	Block	Address
0	0	CAT6	LSB			
	1					
	2					
	3		Category select code			
	4		06h: ADJUST			
	5					
	6					
	7		MSB			
1	0	VSUB	LSB		00h	EVR3
	1					
	2					
	3		CCD: VSUB			
	4					
	5					
	6					
	7		MSB			
2	0	RGL	LSB		00h	EVR4
	1					
	2					
	3		CCD: RGL			
	4					
	5					
	6					
	7		MSB			
3	0	AGCMIN	LSB		11h	AE
	1					
	2					
	3		S/H: AGC MIN gain			
	4					
	5					
	6					
	7		MSB			

#1: Initial setting value with Power-on

CAT6		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	SHOFST	LSB	A0h	EVR5	4Eh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
5	0	DAVRF	LSB	58h	EVR6	4Fh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
6	0	EVRUSR7	LSB	00h	EVR7	50h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
7	0	EVRUSR8	LSB	00h	EVR8	51h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT6		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	AWBPRER	LSB	37h	AWB	52h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
9	0	AWBPRES	LSB	39h	AWB	53h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
10	0	PRERBL	LSB	00h	AWB	54h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
11	0	PRERBH	LSB	0Ah	AWB	55h
	1					
	2					
	3					
	4					
	5					
	6					
	7					

#1: Initial setting value with Power-on

CAT6		Serial input				
Byte	bit	Name	Description	#1	Block	Address
12	0	PRERBGL	LSB	00h	AWB	56h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
13	0	PRERBGH	LSB	23h	AWB	57h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
14	0	PRE2R	LSB	60h	AWB	58h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
15	0	PRE2B	LSB	20h	AWB	59h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT6		Serial input				
Byte	bit	Name	Description	#1	Block	Address
16	0	AWBAJST1	LSB	18h	AWB	5Ah
	1					
	2					
	3					
	4					
	5					
	6					
	7					
17	0	AWBAJST2	LSB	1Ch	AWB	5Bh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
18	0	AWBAJST3	LSB	00h	AWB	5Ch
	1					
	2					
	3					
	4					
	5					
	6					
	7					
19	0	AWBAJST4	LSB	00h	AWB	5Dh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

CAT6		Serial input				
Byte	bit	Name	Description	#1	Block	Address
20	0	BLOGAIN	LSB	46h	AWB	5Eh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			
21	0	INTSLICE	LSB	80h	AWB	5Fh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

Category 7: TIMING

CAT7		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
0	0	CAT7	LSB	Category select code 07h: TIMING			
	1						
	2						
	3						
	4						
	5						
	6						
	7						
1	0	WINDSEL	LSB	WIND/DISP SElect	0h	OPD	61h
	1						
	2	WINDMK	WIND MarKer on	0	Y		
	3	DEFMK	DEFect 1, 2 MarKer on	0	DLY		
	4	SVHMK	SHIFT VD MarKer on	0	Y		
	5	—					
	6						
	7						
2	0	W3STAH	LSB	Wind3 H START	5h	STG	62h
	1						
	2						
	3						
	4	W3WIDH	LSB	Wind3 H WIDTH	5h		
	5						
	6						
	7						
3	0	W3STAV	LSB	Wind3 V START	4h	STG	63h
	1						
	2						
	3						
	4	W3WIDV	LSB	Wind3 V WIDTH	7h		
	5						
	6						
	7						

#1: Initial setting value with Power-on

CAT7		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	(Low)	"0" fixed	0		64h
	1					
	2					
	3					
	4	ADCKDLY	LSB Delay Adjustment for ADCK MSB	2h	STG	
	5					
	6	(Low)	"0" fixed	0		
7						
5	0	DLYXSH	LSB Delay Adjustment for XSHP, XSHD MSB 0h: 0ns, 1h: +4ns, 2h: +7ns, 3h: -8ns	0h	STG	65h
	1					
	2	DTYXSH	LSB Duty Adjustment for XSHP, XSHD MSB 0h: Norm, 1h: F + 3ns, 2h: F + 6ns, 3h: R + 3ns	0h		
	3					
	4	DLYXRS	LSB Delay Adjustment for XRS MSB 0h: 0ns, 1h: +4ns, 2h: +7ns, 3h: -8ns	0h		
	5					
	6	DTYXRS	LSB Duty Adjustment for XRS MSB 0h: Norm, 1h: F + 3ns, 2h: F + 6ns, 3h: R + 3ns	0h		
7						
6	0	(Low)	"0" fixed	0		66h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
7	0	(Low)	"0" fixed	0		
	1					
	2	—				
	3					
	4					
	5	(Constant)	"2"h fixed	2h		
	6					
	7	—				

#1: Initial setting value with Power-on

CAT7		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	(Low)	"0" fixed	0		68h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
9	0	SFTVL	LSB	01h	STG	69h
	1					
	2					
	3					
	4					
	5					
	6					
	7					
10	0	(Low)	"0" fixed	0		6Ah
	1					
	2	SFTVM	SHIFTER V Msb 1 bit	0h	STG	
	3	(Low)	"0" fixed	0		
	4	SFTSPED	LSB	0h	MAIN	
	5					
	6					
	7					
7	(Constant)	"1" fixed	1			
11	0	DEF1HL	LSB	0h	STG	6Bh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
7		MSB				

#1: Initial setting value with Power-on

CAT7		Serial input				
Byte	bit	Name	Description	#1	Block	Address
12	0	DEF1VL	LSB	0h	STG	6Ch
	1					
	2					
	3					
	4					
	5					
	6					
	7					
13	0	DEF1HM	LSB	0h	STG	2Eh
	1					
	2	DEF1VM	LSB	0h	STG	
	3					
	4	DEF1L	Large def	0	STG	
	5					
	6					
	7					
14	0	DEF2HL	LSB	0h	STG	6Eh
	1					
	2					
	3					
	4					
	5					
	6					
	7					
15	0	DEF2VL	LSB	0h	STG	6Fh
	1					
	2					
	3					
	4					
	5					
	6					
	7					

#1: Initial setting value with Power-on

CAT7		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
16	0	DEF2HM	LSB	0h	STG	60h	
	1		MSB DEFect 2 H Msb 2 bit				
	2	DEF2VM	LSB	0h	STG		
	3		MSB DEFect 2 V Msb 2 bit				
	4	DEF2L	DEFect 2 Large def	0	STG		
	5	—					
	6						
	7						

#1: Initial setting value with Power-on

Category 8: SOUT

CAT8		Serial input				
Byte	bit	Name	Description	#1	Block	Address
0	0	CAT8	LSB	Category select code 08h: SOUT		
	1					
	2					
	3					
	4					
	5					
	6					
	7					
1	0	SOBYTE	LSB	Serial Out start Byte number	00h	MAIN
	1					
	2					
	3					
	4					
	5					
	6					
	7					
			MSB			

#1: Initial setting value with Power-on

Category 9: EXTCON

CAT9		Serial input				
Byte	bit	Name	Description	#1	Block	Address
0	0	CAT9	LSB			
	1					
	2					
	3					
	4		Category select code 09h: EXTCON			
	5					
	6					
	7		MSB			
1	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
2	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
3	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					

#1: Initial setting value with Power-on

CAT9		Serial input				
Byte	bit	Name	Description	#1	Block	Address
4	0	—				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
5	0	WBR	LSB	37h	C	
	1		WB R gain			
	2					
	3					
	4					
	5					
	6					
	7		MSB			
6	0	WBG	LSB	26h	C	
	1		WB G gain			
	2					
	3					
	4					
	5					
	6					
	7		MSB			
7	0	WBB	LSB	39h	C	
	1		WB B gain			
	2					
	3					
	4					
	5					
	6					
	7		MSB			

#1: Initial setting value with Power-on

CAT9		Serial input				
Byte	bit	Name	Description	#1	Block	Address
8	0	WBYREFH	LSB	D0h	OPD	/
	1					
	2					
	3		Y slice up			
	4					
	5					
	6					
	7		MSB			
9	0	WBYREFL	LSB	04h	OPD	/
	1					
	2					
	3		Y slice down			
	4					
	5					
	6					
	7		MSB			
10	0	(Low)	"00"h fixed	00h	/	/
	1					
	2					
	3					
	4					
	5					
	6					
	7					
11	0	(Low)	"00"h fixed	00h	/	/
	1					
	2					
	3					
	4					
	5					
	6					
	7					

#1: Initial setting value with Power-on

CAT9		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
12	0	—				72h	
	1						
	2						
	3						
	4	DRSL1	LSB	Driver ability (H1, H2)	1h		TOP
	5		MSB				
	6						
	7	—					
13	0	(Low)	"0" fixed	0		73h	
	1						
	2	(Constant)	"3"h fixed	3h			
	3						
	4	(Constant)	"1"h fixed	1h			
	5	(Low)	"0" fixed	0			
	6						
	7	IDINV	ID INVerse	NT = 0 PAL = 1	C		
14	0	(Low)	"0" fixed	0		74h	
	1						
	2						
	3						
	4		MSB				
	5	DRSL2	LSB	Driver ability (RG)	1h		TOP
	6		MSB				
	7						
15	0	YDLY	LSB	Y DLY 0 – 3CK	0h	Y	
	1		MSB				
	2	CDLY	LSB	C DLY 0 – 3CK	0h	C	
	3		MSB				
	4	YDDL	LSB	Y Digital DLY 0 – 3CK	0h	DIF	
	5		MSB				
	6	CDDL	LSB	C Digital DLY 0 – 3CK	0h	DIF	
	7		MSB				

#1: Initial setting value with Power-on

CAT9		Serial input					
Byte	bit	Name	Description	#1	Block	Address	
16	0	RMATY	LSB	R matrix $R = \underline{RMATY} \times Yr + Cr + \underline{RMATC} \times Cb$	2Dh	C	76h
	1						
	2						
	3						
	4						
	5						
	6						
	7						
			MSB				
17	0	RMATC	LSB	R matrix $R = \underline{RMATY} \times Yr + Cr + \underline{RMATC} \times Cb$	00h	C	77h
	1						
	2						
	3						
	4						
	5						
	6						
	7						
			MSB				
18	0	BMATY	LSB	B matrix $B = \underline{BMATY} \times Yb + Cb + \underline{RMATC} \times Cr$	45h	C	78h
	1						
	2						
	3						
	4						
	5						
	6						
	7						
			MSB				
19	0	BMATC	LSB	B matrix $B = \underline{BMATY} \times Yb + Cb + \underline{BMATC} \times Cr$	BBh	C	79h
	1						
	2						
	3						
	4						
	5						
	6						
	7						
			MSB				

#1: Initial setting value with Power-on

CAT9		Serial input				
Byte	bit	Name	Description	#1	Block	Address
20	0	(Low)	"0" fixed	0		7Ah
	1					
	2	DRSL3	LSB	1h	TOP	
	3		H-driver ability (XSHP, XSHD)			
	4		MSB			
	5	DRSL4	LSB	1h	TOP	
	6		H-driver ability (XRS)			
7	MSB					

#1: Initial setting value with Power-on

Serial output

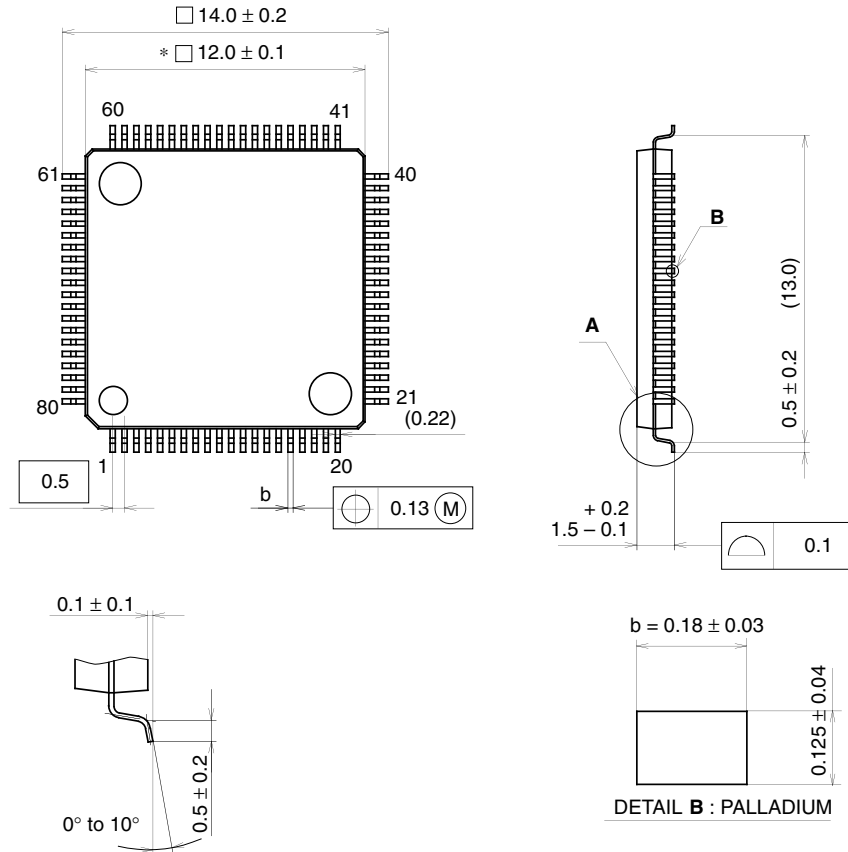
CAT8		Serial output		
Byte	bit	Name	Description	Block
1	0	—		
	1			
	2			
	3			
	4			
	5			
	6			
	7			
2	0	—		
	1			
	2			
	3			
	4			
	5			
	6			
	7			
3	0	—		
	1			
	2			
	3			
	4			
	5			
	6			
	7			
4	0	—		
	1			
	2			
	3			
	4			
	5			
	6			
	7			

CAT8		Serial output		
Byte	bit	Name	Description	Block
5	0	AWOUT1	LSB	AWB
	1		AWB OUT 1	
	2			
	3			
	4			
	5			
	6			
	7			
6	0	AWOUT2		LSB
	1		AWB OUT 2	
	2			
	3			
	4			
	5			
	6			
	7			MSB
7	0	AWOUT3		LSB
	1		AWB OUT 3	
	2			
	3			
	4			
	5			
	6			
	7			MSB
8	0	AWOUT4		LSB
	1		AWB OUT 4	
	2			
	3			
	4			
	5			
	6			
	7			MSB

CAT8		Serial output			
Byte	bit	Name	Description	Block	
9	0	E2RDATA	LSB	EEPROM ROM READ DATA	MAIN
	1				
	2				
	3				
	4				
	5				
	6				
	7		MSB		

Package Outline Unit: mm

80PIN LQFP (PLASTIC)



NOTE: Dimension "*" does not include mold protrusion.

DETAIL A

PACKAGE STRUCTURE

SONY CODE	LQFP-80P-L01
EIAJ CODE	P-LQFP80-12x12-0.5
JEDEC CODE	_____

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	PALLADIUM PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.5g