DATA SHEET

HX8218-A

960CH TFT LCD Source Driver with
Built-in T-CON
Preliminary version 01January, 2005

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960CH TFT LCD Source Driver with
Built-in T-CON

Himax
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Preliminary Version 01

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1. General Description

HX8218-A is a 960-channel output Source Driver with built-in TCON and DAC. The interface follows digital 8-bits serial/24-bits parallel RGB, or CCIR601/656 input signals and digital control timing signals. The DAC supports transferring digital RGB data to analog RGB data for the internal Source Driver. The TCON generates the 960x240 resolution timing to Source driver and Gate Driver.

The Source Driver implements 2 lines of sample and hold circuits. While sampling video signals, the previously sampled data can be output synchronously through driver output channels. And simultaneous or sequential sampling can be chosen for matching the pixel array type.

The timing controller provides horizontal and vertical control timing to source and gate drivers. With built-in DAC and operational amplifiers, the gamma correction can be performed and digital data is converted to analog signal and sends to source driver.

2. Features

T-CON

- Support display resolution 960x240.
- Support digital 8-bits serial/24-bits parallel RGB and CCIR601/656 input mode.
- Support two types of panel group.
- Operation frequency: 30 MHz max.
- Support NTSC/PAL TV system.
- Built-in zoom in/out function in CCIR601/656 input mode.
- OSD overlay supported in CCIR601/656 input mode.
- Line inversion driving scheme.
- Provide source and gate drivers control timing.
- Provide flip and mirror scan control.
- Operation Voltage Level 3V~3.6V.

Source Driver

- 5V analog power supply.
- Dynamic range: 0.1 ~ 4.9V.
- Voltage deviation of outputs: ±20mV.
- 960 channels output source driver for TFT LCD panel.
- Applicable to stripe and delta pattern color filter.
- Simultaneous or sequential sampling is selectable as matching pixel array type.
- Include 2 lines of sample and hold circuit.
- Right and left shift capability.
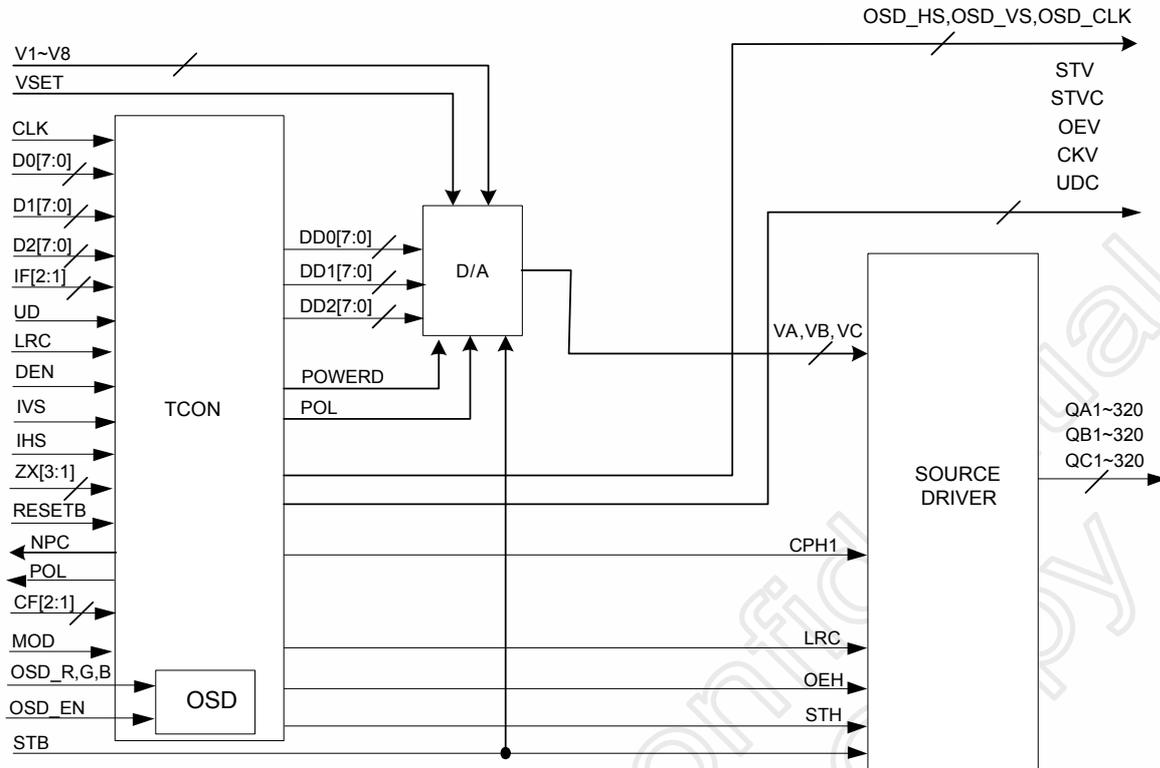- LCD power: 3.8~5.5V.

DAC

- Support 8 bits Digital Data Input (RGB), and output the analog RGB.
- 5V Operation voltage.

Package

- Bare chip with gold bumper for COG solution.

3. Block Diagram

3.1 Whole chip block diagram

3.2 Timing controller block diagram
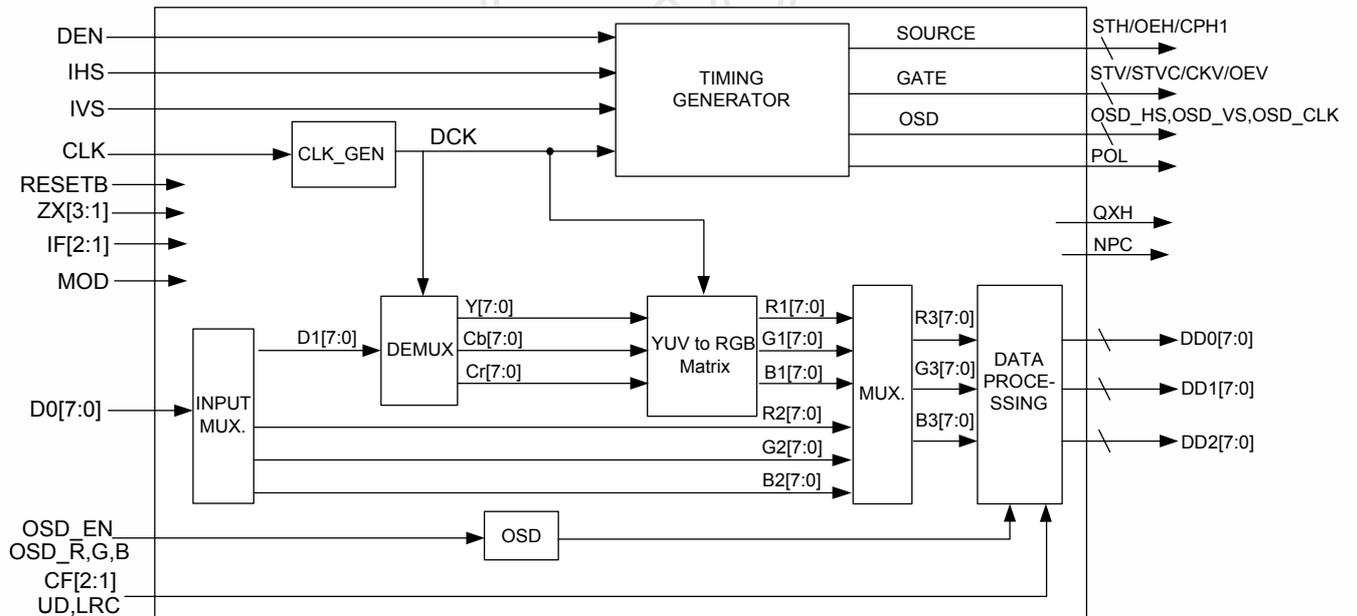
3.3 Source driver block diagram

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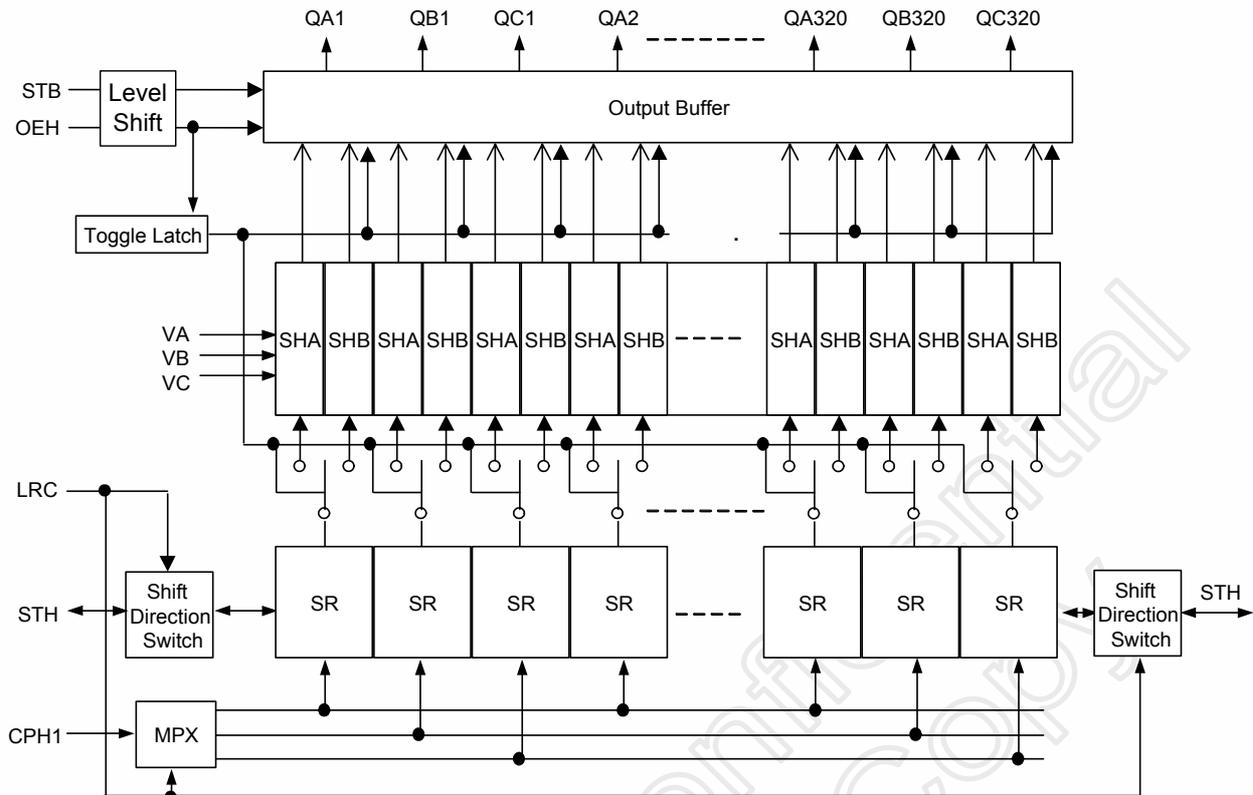
4. Pin description

Pin name	I/O	Description
CLK	I	Clock signal. Latching data at the rising edge.
D07~D00 D17~D10 D27~D20	I	Digital data input. DX0 is LSB and DX7 is MSB. 1. If parallel RGB input mode is used, D0X, D1X, and D2X indicate R, G, and B data in turn. 2. If serial RGB or CCIR601/656 input mode is selected, only D07~D00 are used, and others short to GND.
IHS	I	Horizontal sync input in digital RGB mode. Or HREF input in CCIR601 mode. (Short to GND if not used)
IVS	I	Vertical sync input in digital RGB mode. Or V123 input in CCIR601 mode. (Short to GND if not used)
DEN	I	Input data enable control. Normally pull low.
LRC	I	The shift direction of device internal shift register is controlled by this pin as shown below: LRC=H: STH→OUT1→・・・→OUT480→STHO LRC=L: STH→OUT480→・・・→OUT1→STHO
POL	O	Polarity select for the line inversion control signal. When POL=L, output voltage is negative polarity. When POL=H, output voltage is positive polarity.
STB	I	Standby mode control. Normally pull high. When STB="L", source driver and DAC are off. All outputs are shorted to VSS. When STB="H", source driver and DAC are on.
RESETB	I	Hardware global reset. Low active. Normally pull high.
NPC	O	NTSC or PAL mode auto detection result. When NPC="H", NTSC mode is selected. When NPC="L", PAL mode is selected.
UD	I	Up/down scan setting. When UD="H", reverse scan. When UD="L", normal scan.
V1~V8	I	Gamma correction voltage for DAC.
VSET	I	Gamma correction voltage is set internally or externally. Normally pull high. VSET="L", internally. VSET="H", externally.
IF1, IF2	I	Control the input data format. <table><tr><td>IF2, IF1</td><td>Input data format</td></tr><tr><td>L, L (default)</td><td>Serial RGB</td></tr><tr><td>L, H</td><td>Parallel RGB</td></tr><tr><td>H, L</td><td>CCIR601</td></tr><tr><td>H, H</td><td>CCIR656</td></tr></table>
CF1	I	Define the input data sequence in serial RGB mode. Please reference section5.5. Only effective when MOD="L". Normally pull low.
CF2	I	Define the used delta type color filter. Please reference section5.5. Only effective if MOD="L". Normally pull low.
MOD	I	Define the color filter type. Normally pull low. When MOD="L", delta type. When MOD="H", stripe type.
ZX1~3	I	Zoom in/out modes setting pin. Zoom function is only active in CCIR601/656 input mode. Normally pull high. Reference 5.7.

Pin name	I/O	Description
QXH	O	Reference signal for video decoder to arrange data sequence.
CKV	O	Gate driver clock.
OEV	O	Output enable control of gate driver.
STV	O	When UD="L", STV is output. When UD="H", STV is Hi-Z.
STVC	O	When UD="L", STVC is Hi-Z. When UD="H", STVC is output.
OSD_HS	O	OSD Hsync output.
OSD_VS	O	OSD Vsync output.
OSD_CLK	O	OSD clock output.
OSD_R	I	OSD red data input. Normally pull low.
OSD_G	I	OSD green data input. Normally pull low.
OSD_B	I	OSD blue data input. Normally pull low.
OSD_EN	I	OSD enable input. Normally pull low.
VDD	I	Analog power. 4.5V ~ 5.5V.
VSS	I	Analog ground.
VCC	I	Digital power. 3V ~ 3.6V.
GND	I	Digital ground.
QA1~320 QB1~320 QC1~320	O	Output driver signal.
SPCK	I	Serial port Clock. Normally pull high.
SPDA	I/O	Serial port Data input/output.
SPENA	I	Serial port Data Enable Signal. Normally pull high.
UDC	O	Reverse of UD.
UDP	O	Internal link to UD.
TP[13:0]	I/O	Test pins. They must be OPEN.
PASSR11 PASSR12	-	Internal link together.
PASSR21 PASSR22	-	Internal link together.
PASSR31 PASSR32	-	Internal link together.
PASSR41 PASSR42	-	Internal link together.
PASSR51 PASSR52	-	Internal link together.
PASSL11 PASSL12	-	Internal link together.
PASSL21 PASSL22	-	Internal link together.
PASSL31 PASSL32	-	Internal link together.
PASSL41 PASSL42	-	Internal link together.
PASSL51 PASSL52	-	Internal link together.

5. Operation description

5.1 Relationship between input data and output channels

● **Source Driver:**

LRC	First					→			Last		
H	QA1	QB1	QC1	QA2	‥‥	‥‥	‥‥	QA320	QB320	QC320

LRC	Last					←			First		
L	QA1	QB1	QC1	QA2	‥‥	‥‥	‥‥	QA320	QB320	QC320

5.2 Relationship between gamma correction and output voltage

The output voltage is determined by the digital input data if digital RGB or CCIR601 /656 input mode is selected. The 8 gamma correction reference voltages can be set externally or generated internally. If VSET="H", the gamma correction voltage is generated externally. If you want to set these voltages internally, set VSET="L" and the default voltage is as below table.

	V1	V2	V3	V4	V5	V6	V7	V8
Default voltage (V)	4.29	3.73	3.33	2.94	2.62	2.22	1.51	0.48

Gamma correction characteristic curve:

gamma curve

Legend: postive curve, negtive curve

X-axis: voltage
Y-axis: CODE
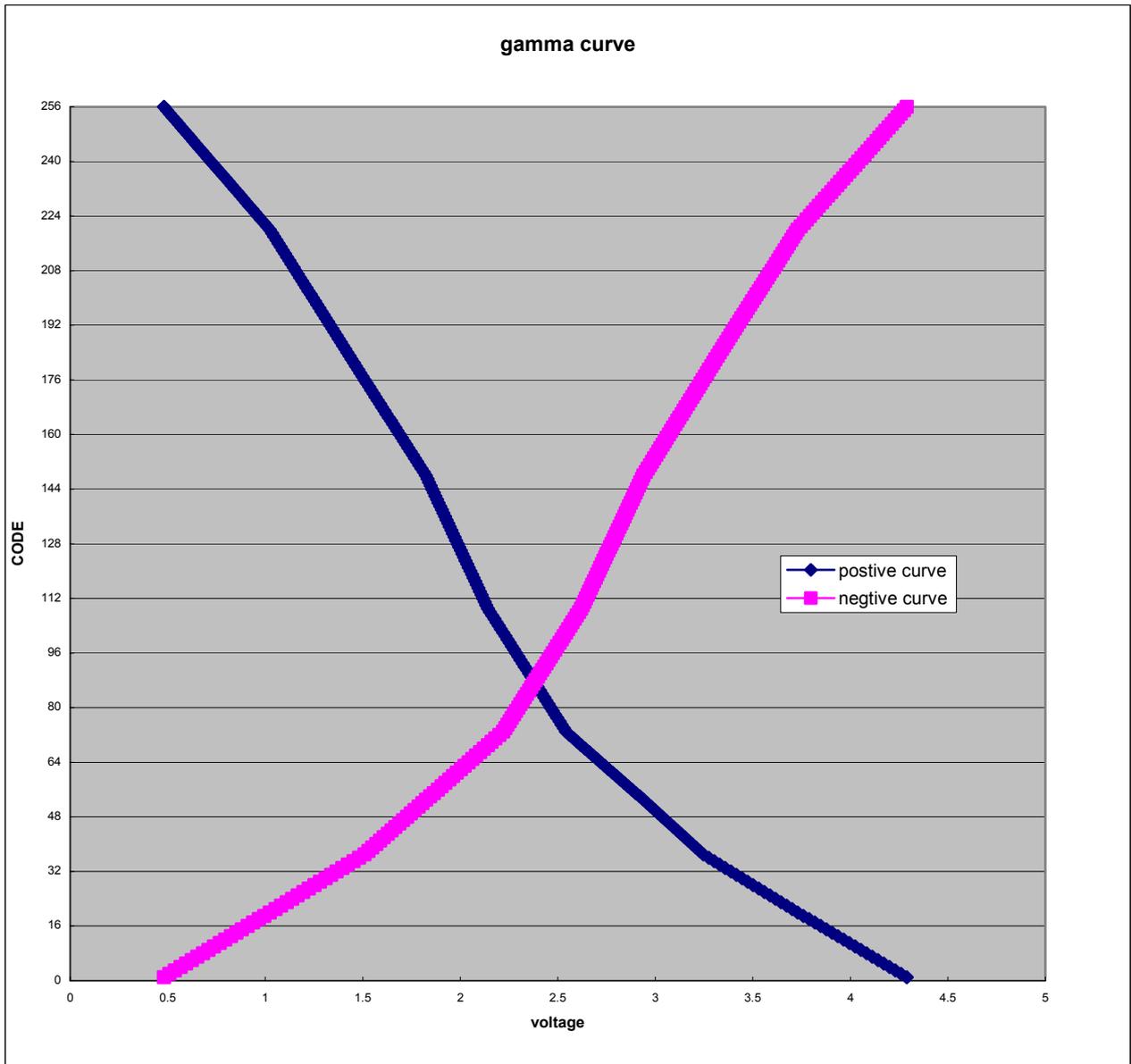
Relationship between input data and output voltage

Data	Positive polarity output voltage		Ω	Data	Negative polarity output voltage		Ω
00H	VP0	V1	114	00H	VN0	V8	114
01H	VP1	V2 + (V1-V2) x 2052/2166	114	01H	VN1	V8 + (V7-V8) x 114/4104	114
02H	VP2	V2 + (V1-V2) x 1938/2166	114	02H	VN2	V8 + (V7-V8) x 228/4104	114
03H	VP3	V2 + (V1-V2) x 1824/2166	114	03H	VN3	V8 + (V7-V8) x 342/4104	114
04H	VP4	V2 + (V1-V2) x 1710/2166	114	04H	VN4	V8 + (V7-V8) x 456/4104	114
05H	VP5	V2 + (V1-V2) x 1596/2166	114	05H	VN5	V8 + (V7-V8) x 570/4104	114
06H	VP6	V2 + (V1-V2) x 1482/2166	114	06H	VN6	V8 + (V7-V8) x 684/4104	114
07H	VP7	V2 + (V1-V2) x 1368/2166	114	07H	VN7	V8 + (V7-V8) x 798/4104	114
08H	VP8	V2 + (V1-V2) x 1254/2166	114	08H	VN8	V8 + (V7-V8) x 912/4104	114
09H	VP9	V2 + (V1-V2) x 1140/2166	114	09H	VN9	V8 + (V7-V8) x 1026/4104	114
0AH	VP10	V2 + (V1-V2) x 1026/2166	114	0AH	VN10	V8 + (V7-V8) x 1140/4104	114
0BH	VP11	V2 + (V1-V2) x 912/2166	114	0BH	VN11	V8 + (V7-V8) x 1254/4104	114
0CH	VP12	V2 + (V1-V2) x 798/2166	114	0CH	VN12	V8 + (V7-V8) x 1368/4104	114
0DH	VP13	V2 + (V1-V2) x 684/2166	114	0DH	VN13	V8 + (V7-V8) x 1482/4104	114
0EH	VP14	V2 + (V1-V2) x 570/2166	114	0EH	VN14	V8 + (V7-V8) x 1596/4104	114
0FH	VP15	V2 + (V1-V2) x 456/2166	114	0FH	VN15	V8 + (V7-V8) x 1710/4104	114
10H	VP16	V2 + (V1-V2) x 342/2166	114	10H	VN16	V8 + (V7-V8) x 1824/4104	114
11H	VP17	V2 + (V1-V2) x 228/2166	114	11H	VN17	V8 + (V7-V8) x 1938/4104	114
12H	VP18	V2 + (V1-V2) x 114/2166	114	12H	VN18	V8 + (V7-V8) x 2052/4104	114
13H	VP19	V2	114	13H	VN19	V8 + (V7-V8) x 2166/4104	114
14H	VP20	V3 + (V2-V3) x 1482/1596	114	14H	VN20	V8 + (V7-V8) x 2280/4104	114
15H	VP21	V3 + (V2-V3) x 1368/1596	114	15H	VN21	V8 + (V7-V8) x 2394/4104	114
16H	VP22	V3 + (V2-V3) x 1254/1596	114	16H	VN22	V8 + (V7-V8) x 2508/4104	114
17H	VP23	V3 + (V2-V3) x 1140/1596	114	17H	VN23	V8 + (V7-V8) x 2622/4104	114
18H	VP24	V3 + (V2-V3) x 1026/1596	114	18H	VN24	V8 + (V7-V8) x 2736/4104	114
19H	VP25	V3 + (V2-V3) x 912/1596	114	19H	VN25	V8 + (V7-V8) x 2850/4104	114
1AH	VP26	V3 + (V2-V3) x 798/1596	114	1AH	VN26	V8 + (V7-V8) x 2964/4104	114
1BH	VP27	V3 + (V2-V3) x 684/1596	114	1BH	VN27	V8 + (V7-V8) x 3078/4104	114
1CH	VP28	V3 + (V2-V3) x 570/1596	114	1CH	VN28	V8 + (V7-V8) x 3192/4104	114
1DH	VP29	V3 + (V2-V3) x 456/1596	114	1DH	VN29	V8 + (V7-V8) x 3306/4104	114
1EH	VP30	V3 + (V2-V3) x 342/1596	114	1EH	VN30	V8 + (V7-V8) x 3420/4104	114
1FH	VP31	V3 + (V2-V3) x 228/1596	114	1FH	VN31	V8 + (V7-V8) x 3534/4104	114
20H	VP32	V3 + (V2-V3) x 114/1596	114	20H	VN32	V8 + (V7-V8) x 3648/4104	114
21H	VP33	V3	114	21H	VN33	V8 + (V7-V8) x 3762/4104	114
22H	VP34	V4 + (V3-V4) x 1476/1590	114	22H	VN34	V8 + (V7-V8) x 3876/4104	114
23H	VP35	V4 + (V3-V4) x 1362/1590	114	23H	VN35	V8 + (V7-V8) x 3990/4104	114
24H	VP36	V4 + (V3-V4) x 1248/1590	78	24H	VN36	V7	78
25H	VP37	V4 + (V3-V4) x 1170/1590	78	25H	VN37	V7 + (V6-V7) x 78/2808	78
26H	VP38	V4 + (V3-V4) x 1092/1590	78	26H	VN38	V7 + (V6-V7) x 156/2808	78
27H	VP39	V4 + (V3-V4) x 1014/1590	78	27H	VN39	V7 + (V6-V7) x 234/2808	78
28H	VP40	V4 + (V3-V4) x 936/1590	78	28H	VN40	V7 + (V6-V7) x 312/2808	78
29H	VP41	V4 + (V3-V4) x 858/1590	78	29H	VN41	V7 + (V6-V7) x 390/2808	78
2AH	VP42	V4 + (V3-V4) x 780/1590	78	2AH	VN42	V7 + (V6-V7) x 468/2808	78
2BH	VP43	V4 + (V3-V4) x 702/1590	78	2BH	VN43	V7 + (V6-V7) x 546/2808	78
2CH	VP44	V4 + (V3-V4) x 624/1590	78	2CH	VN44	V7 + (V6-V7) x 624/2808	78
2DH	VP45	V4 + (V3-V4) x 546/1590	78	2DH	VN45	V7 + (V6-V7) x 702/2808	78
2EH	VP46	V4 + (V3-V4) x 468/1590	78	2EH	VN46	V7 + (V6-V7) x 780/2808	78
2FH	VP47	V4 + (V3-V4) x 390/1590	78	2FH	VN47	V7 + (V6-V7) x 858/2808	78
30H	VP48	V4 + (V3-V4) x 312/1590	78	30H	VN48	V7 + (V6-V7) x 936/2808	78
31H	VP49	V4 + (V3-V4) x 234/1590	78	31H	VN49	V7 + (V6-V7) x 1014/2808	78
32H	VP50	V4 + (V3-V4) x 156/1590	78	32H	VN50	V7 + (V6-V7) x 1092/2808	78
33H	VP51	V4 + (V3-V4) x 78/1590	78	33H	VN51	V7 + (V6-V7) x 1170/2808	78
34H	VP52	V4	78	34H	VN52	V7 + (V6-V7) x 1248/2808	78
35H	VP53	V5 + (V4-V5) x 1170/1248	78	35H	VN53	V7 + (V6-V7) x 1326/2808	78
36H	VP54	V5 + (V4-V5) x 1092/1248	78	36H	VN54	V7 + (V6-V7) x 1404/2808	78
37H	VP55	V5 + (V4-V5) x 1014/1248	78	37H	VN55	V7 + (V6-V7) x 1482/2808	78
38H	VP56	V5 + (V4-V5) x 936/1248	78	38H	VN56	V7 + (V6-V7) x 1560/2808	78
39H	VP57	V5 + (V4-V5) x 858/1248	78	39H	VN57	V7 + (V6-V7) x 1638/2808	78
3AH	VP58	V5 + (V4-V5) x 780/1248	78	3AH	VN58	V7 + (V6-V7) x 1716/2808	78
3BH	VP59	V5 + (V4-V5) x 702/1248	78	3BH	VN59	V7 + (V6-V7) x 1794/2808	78
3CH	VP60	V5 + (V4-V5) x 624/1248	78	3CH	VN60	V7 + (V6-V7) x 1872/2808	78
3DH	VP61	V5 + (V4-V5) x 546/1248	78	3DH	VN61	V7 + (V6-V7) x 1950/2808	78
3EH	VP62	V5 + (V4-V5) x 468/1248	78	3EH	VN62	V7 + (V6-V7) x 2028/2808	78
3FH	VP63	V5 + (V4-V5) x 390/1248	78	3FH	VN63	V7 + (V6-V7) x 2106/2808	78
40H	VP64	V5 + (V4-V5) x 312/1248	78	40H	VN64	V7 + (V6-V7) x 2184/2808	78

Data	Positive polarity output voltage	Ω	Data	Negative polarity output voltage	Ω
41H	VP65 V5 + (V4-V5) x 234/1248	78	41H	VN65 V7 + (V6-V7) x 2262/2808	78
42H	VP66 V5 + (V4-V5) x 156/1248	78	42H	VN66 V7 + (V6-V7) x 2340/2808	78
43H	VP67 V5 + (V4-V5) x 78/1248	78	43H	VN67 V7 + (V6-V7) x 2418/2808	78
44H	VP68 V5	78	44H	VN68 V7 + (V6-V7) x 2496/2808	78
45H	VP69 V6 + (V5-V6) x 1510/1588	78	45H	VN69 V7 + (V6-V7) x 2574/2808	78
46H	VP70 V6 + (V5-V6) x 1432/1588	78	46H	VN70 V7 + (V6-V7) x 2652/2808	78
47H	VP71 V6 + (V5-V6) x 1354/1588	78	47H	VN71 V7 + (V6-V7) x 2730/2808	78
48H	VP72 V6 + (V5-V6) x 1276/1588	44	48H	VN72 V6	44
49H	VP73 V6 + (V5-V6) x 1232/1588	44	49H	VN73 V6 + (V5-V6) x 44/1584	44
4AH	VP74 V6 + (V5-V6) x 1188/1588	44	4AH	VN74 V6 + (V5-V6) x 88/1584	44
4BH	VP75 V6 + (V5-V6) x 1144/1588	44	4BH	VN75 V6 + (V5-V6) x 132/1584	44
4CH	VP76 V6 + (V5-V6) x 1100/1588	44	4CH	VN76 V6 + (V5-V6) x 176/1584	44
4DH	VP77 V6 + (V5-V6) x 1056/1588	44	4DH	VN77 V6 + (V5-V6) x 220/1584	44
4EH	VP68 V6 + (V5-V6) x 1012/1588	44	4EH	VN68 V6 + (V5-V6) x 264/1584	44
4FH	VP79 V6 + (V5-V6) x 968/1588	44	4FH	VN79 V6 + (V5-V6) x 308/1584	44
50H	VP80 V6 + (V5-V6) x 924/1588	44	50H	VN80 V6 + (V5-V6) x 352/1584	44
51H	VP81 V6 + (V5-V6) x 880/1588	44	51H	VN81 V6 + (V5-V6) x 396/1584	44
52H	VP82 V6 + (V5-V6) x 836/1588	44	52H	VN82 V6 + (V5-V6) x 440/1584	44
53H	VP83 V6 + (V5-V6) x 792/1588	44	53H	VN83 V6 + (V5-V6) x 484/1584	44
54H	VP84 V6 + (V5-V6) x 748/1588	44	54H	VN84 V6 + (V5-V6) x 528/1584	44
55H	VP85 V6 + (V5-V6) x 704/1588	44	55H	VN85 V6 + (V5-V6) x 572/1584	44
56H	VP86 V6 + (V5-V6) x 660/1588	44	56H	VN86 V6 + (V5-V6) x 616/1584	44
57H	VP87 V6 + (V5-V6) x 616/1588	44	57H	VN87 V6 + (V5-V6) x 660/1584	44
58H	VP88 V6 + (V5-V6) x 572/1588	44	58H	VN88 V6 + (V5-V6) x 704/1584	44
59H	VP89 V6 + (V5-V6) x 528/1588	44	59H	VN89 V6 + (V5-V6) x 748/1584	44
5AH	VP90 V6 + (V5-V6) x 484/1588	44	5AH	VN90 V6 + (V5-V6) x 792/1584	44
5BH	VP91 V6 + (V5-V6) x 440/1588	44	5BH	VN91 V6 + (V5-V6) x 836/1584	44
5CH	VP92 V6 + (V5-V6) x 396/1588	44	5CH	VN92 V6 + (V5-V6) x 880/1584	44
5DH	VP93 V6 + (V5-V6) x 352/1588	44	5DH	VN93 V6 + (V5-V6) x 924/1584	44
5EH	VP94 V6 + (V5-V6) x 308/1588	44	5EH	VN94 V6 + (V5-V6) x 968/1584	44
5FH	VP95 V6 + (V5-V6) x 264/1588	44	5FH	VN95 V6 + (V5-V6) x 1012/1584	44
60H	VP96 V6 + (V5-V6) x 220/1588	44	60H	VN96 V6 + (V5-V6) x 1056/1584	44
61H	VP97 V6 + (V5-V6) x 176/1588	44	61H	VN97 V6 + (V5-V6) x 1100/1584	44
62H	VP98 V6 + (V5-V6) x 132/1588	44	62H	VN98 V6 + (V5-V6) x 1144/1584	44
63H	VP99 V6 + (V5-V6) x 88/1588	44	63H	VN99 V6 + (V5-V6) x 1188/1584	44
64H	VP100 V6 + (V5-V6) x 44/1588	44	64H	VN100 V6 + (V5-V6) x 1232/1584	44
65H	VP101 V6	44	65H	VN101 V6 + (V5-V6) x 1276/1584	44
66H	VP102 V7 + (V6-V7) x 2744/2788	44	66H	VN102 V6 + (V5-V6) x 1320/1584	44
67H	VP103 V7 + (V6-V7) x 2700/2788	44	67H	VN103 V6 + (V5-V6) x 1364/1584	44
68H	VP104 V7 + (V6-V7) x 2656/2788	44	68H	VN104 V6 + (V5-V6) x 1408/1584	44
69H	VP105 V7 + (V6-V7) x 2612/2788	44	69H	VN105 V6 + (V5-V6) x 1452/1584	44
6AH	VP106 V7 + (V6-V7) x 2568/2788	44	6AH	VN106 V6 + (V5-V6) x 1496/1584	44
6BH	VP107 V7 + (V6-V7) x 2524/2788	44	6BH	VN107 V6 + (V5-V6) x 1540/1584	44
6CH	VP108 V7 + (V6-V7) x 2480/2788	32	6CH	VN108 V5	32
6DH	VP109 V7 + (V6-V7) x 2448/2788	32	6DH	VN109 V5 + (V4-V5) x 32/1248	32
6EH	VP110 V7 + (V6-V7) x 2416/2788	32	6EH	VN110 V5 + (V4-V5) x 64/1248	32
6FH	VP111 V7 + (V6-V7) x 2384/2788	32	6FH	VN111 V5 + (V4-V5) x 96/1248	32
70H	VP112 V7 + (V6-V7) x 2352/2788	32	70H	VN112 V5 + (V4-V5) x 128/1248	32
71H	VP113 V7 + (V6-V7) x 2320/2788	32	71H	VN113 V5 + (V4-V5) x 160/1248	32
72H	VP114 V7 + (V6-V7) x 2288/2788	32	72H	VN114 V5 + (V4-V5) x 192/1248	32
73H	VP115 V7 + (V6-V7) x 2256/2788	32	73H	VN115 V5 + (V4-V5) x 224/1248	32
74H	VP116 V7 + (V6-V7) x 2224/2788	32	74H	VN116 V5 + (V4-V5) x 256/1248	32
75H	VP117 V7 + (V6-V7) x 2192/2788	32	75H	VN117 V5 + (V4-V5) x 288/1248	32
76H	VP118 V7 + (V6-V7) x 2160/2788	32	76H	VN118 V5 + (V4-V5) x 320/1248	32
77H	VP119 V7 + (V6-V7) x 2128/2788	32	77H	VN119 V5 + (V4-V5) x 352/1248	32
78H	VP120 V7 + (V6-V7) x 2096/2788	32	78H	VN120 V5 + (V4-V5) x 384/1248	32
79H	VP121 V7 + (V6-V7) x 2064/2788	32	79H	VN121 V5 + (V4-V5) x 416/1248	32
7AH	VP122 V7 + (V6-V7) x 2032/2788	32	7AH	VN122 V5 + (V4-V5) x 448/1248	32
7BH	VP123 V7 + (V6-V7) x 2000/2788	32	7BH	VN123 V5 + (V4-V5) x 480/1248	32
7CH	VP124 V7 + (V6-V7) x 1968/2788	32	7CH	VN124 V5 + (V4-V5) x 512/1248	32
7DH	VP125 V7 + (V6-V7) x 1936/2788	32	7DH	VN125 V5 + (V4-V5) x 544/1248	32
7EH	VP126 V7 + (V6-V7) x 1904/2788	32	7EH	VN126 V5 + (V4-V5) x 576/1248	32
7FH	VP127 V7 + (V6-V7) x 1872/2788	32	7FH	VN127 V5 + (V4-V5) x 608/1248	32
80H	VP128 V7 + (V6-V7) x 1840/2788	32	80H	VN128 V5 + (V4-V5) x 640/1248	32

Data	Positive polarity output voltage		Ω	Data	Negative polarity output voltage		Ω
81H	VP129	V7 + (V6-V7) x 1808/2788	32	81H	VN129	V5 + (V4-V5) x 672/1248	32
82H	VP130	V7 + (V6-V7) x 1776/2788	32	82H	VN130	V5 + (V4-V5) x 704/1248	32
83H	VP131	V7 + (V6-V7) x 1744/2788	32	83H	VN131	V5 + (V4-V5) x 736/1248	32
84H	VP132	V7 + (V6-V7) x 1712/2788	32	84H	VN132	V5 + (V4-V5) x 768/1248	32
85H	VP133	V7 + (V6-V7) x 1680/2788	32	85H	VN133	V5 + (V4-V5) x 800/1248	32
86H	VP134	V7 + (V6-V7) x 1648/2788	32	86H	VN134	V5 + (V4-V5) x 832/1248	32
87H	VP135	V7 + (V6-V7) x 1616/2788	32	87H	VN135	V5 + (V4-V5) x 864/1248	32
88H	VP136	V7 + (V6-V7) x 1584/2788	32	88H	VN136	V5 + (V4-V5) x 896/1248	32
89H	VP137	V7 + (V6-V7) x 1552/2788	32	89H	VN137	V5 + (V4-V5) x 928/1248	32
8AH	VP138	V7 + (V6-V7) x 1520/2788	32	8AH	VN138	V5 + (V4-V5) x 960/1248	32
8BH	VP139	V7 + (V6-V7) x 1488/2788	32	8BH	VN139	V5 + (V4-V5) x 992/1248	32
8CH	VP140	V7 + (V6-V7) x 1456/2788	32	8CH	VN140	V5 + (V4-V5) x 1024/1248	32
8DH	VP141	V7 + (V6-V7) x 1424/2788	32	8DH	VN141	V5 + (V4-V5) x 1056/1248	32
8EH	VP142	V7 + (V6-V7) x 1392/2788	32	8EH	VN142	V5 + (V4-V5) x 1088/1248	32
8FH	VP143	V7 + (V6-V7) x 1360/2788	32	8FH	VN143	V5 + (V4-V5) x 1120/1248	32
90H	VP144	V7 + (V6-V7) x 1328/2788	32	90H	VN144	V5 + (V4-V5) x 1152/1248	32
91H	VP145	V7 + (V6-V7) x 1296/2788	32	91H	VN145	V5 + (V4-V5) x 1184/1248	32
92H	VP146	V7 + (V6-V7) x 1264/2788	32	92H	VN146	V5 + (V4-V5) x 1216/1248	32
93H	VP147	V7 + (V6-V7) x 1232/2788	44	93H	VN147	V4	44
94H	VP148	V7 + (V6-V7) x 1188/2788	44	94H	VN148	V4 + (V3-V4) x 44/1584	44
95H	VP149	V7 + (V6-V7) x 1144/2788	44	95H	VN149	V4 + (V3-V4) x 88/1584	44
96H	VP150	V7 + (V6-V7) x 1100/2788	44	96H	VN150	V4 + (V3-V4) x 132/1584	44
97H	VP151	V7 + (V6-V7) x 1056/2788	44	97H	VN151	V4 + (V3-V4) x 176/1584	44
98H	VP152	V7 + (V6-V7) x 1012/2788	44	98H	VN152	V4 + (V3-V4) x 220/1584	44
99H	VP153	V7 + (V6-V7) x 968/2788	44	99H	VN153	V4 + (V3-V4) x 264/1584	44
9AH	VP154	V7 + (V6-V7) x 924/2788	44	9AH	VN154	V4 + (V3-V4) x 308/1584	44
9BH	VP155	V7 + (V6-V7) x 880/2788	44	9BH	VN155	V4 + (V3-V4) x 352/1584	44
9CH	VP156	V7 + (V6-V7) x 836/2788	44	9CH	VN156	V4 + (V3-V4) x 396/1584	44
9DH	VP157	V7 + (V6-V7) x 792/2788	44	9DH	VN157	V4 + (V3-V4) x 440/1584	44
9EH	VP158	V7 + (V6-V7) x 748/2788	44	9EH	VN158	V4 + (V3-V4) x 484/1584	44
9FH	VP159	V7 + (V6-V7) x 704/2788	44	9FH	VN159	V4 + (V3-V4) x 528/1584	44
A0H	VP160	V7 + (V6-V7) x 660/2788	44	A0H	VN160	V4 + (V3-V4) x 572/1584	44
A1H	VP161	V7 + (V6-V7) x 616/2788	44	A1H	VN161	V4 + (V3-V4) x 616/1584	44
A2H	VP162	V7 + (V6-V7) x 572/2788	44	A2H	VN162	V4 + (V3-V4) x 660/1584	44
A3H	VP163	V7 + (V6-V7) x 528/2788	44	A3H	VN163	V4 + (V3-V4) x 704/1584	44
A4H	VP164	V7 + (V6-V7) x 484/2788	44	A4H	VN164	V4 + (V3-V4) x 748/1584	44
A5H	VP165	V7 + (V6-V7) x 440/2788	44	A5H	VN165	V4 + (V3-V4) x 792/1584	44
A6H	VP166	V7 + (V6-V7) x 396/2788	44	A6H	VN166	V4 + (V3-V4) x 836/1584	44
A7H	VP167	V7 + (V6-V7) x 352/2788	44	A7H	VN167	V4 + (V3-V4) x 880/1584	44
A8H	VP168	V7 + (V6-V7) x 308/2788	44	A8H	VN168	V4 + (V3-V4) x 924/1584	44
A9H	VP169	V7 + (V6-V7) x 264/2788	44	A9H	VN169	V4 + (V3-V4) x 968/1584	44
AAH	VP170	V7 + (V6-V7) x 220/2788	44	AAH	VN170	V4 + (V3-V4) x 1012/1584	44
ABH	VP171	V7 + (V6-V7) x 176/2788	44	ABH	VN171	V4 + (V3-V4) x 1056/1584	44
ACH	VP172	V7 + (V6-V7) x 132/2788	44	ACH	VN172	V4 + (V3-V4) x 1100/1584	44
ADH	VP173	V7 + (V6-V7) x 88/2788	44	ADH	VN173	V4 + (V3-V4) x 1144/1584	44
AEH	VP174	V7 + (V6-V7) x 44/2788	44	AEH	VN174	V4 + (V3-V4) x 1188/1584	44
AFH	VP175	V7	44	AFH	VN175	V4 + (V3-V4) x 1232/1584	44
B0H	VP176	V8 + (V7-V8) x 4052/4096	44	B0H	VN176	V4 + (V3-V4) x 1276/1584	44
B1H	VP177	V8 + (V7-V8) x 4008/4096	44	B1H	VN177	V4 + (V3-V4) x 1320/1584	44
B2H	VP178	V8 + (V7-V8) x 3964/4096	44	B2H	VN178	V4 + (V3-V4) x 1364/1584	44
B3H	VP179	V8 + (V7-V8) x 3920/4096	44	B3H	VN179	V4 + (V3-V4) x 1408/1584	44
B4H	VP180	V8 + (V7-V8) x 3876/4096	44	B4H	VN180	V4 + (V3-V4) x 1452/1584	44
B5H	VP181	V8 + (V7-V8) x 3832/4096	44	B5H	VN181	V4 + (V3-V4) x 1496/1584	44
B6H	VP182	V8 + (V7-V8) x 3788/4096	44	B6H	VN182	V4 + (V3-V4) x 1540/1584	44
B7H	VP183	V8 + (V7-V8) x 3744/4096	44	B7H	VN183	V3	44
B8H	VP184	V8 + (V7-V8) x 3700/4096	44	B8H	VN184	V3 + (V2-V3) x 44/1584	44
B9H	VP185	V8 + (V7-V8) x 3656/4096	44	B9H	VN185	V3 + (V2-V3) x 88/1584	44
BAH	VP186	V8 + (V7-V8) x 3612/4096	44	BAH	VN186	V3 + (V2-V3) x 132/1584	44
BBH	VP187	V8 + (V7-V8) x 3568/4096	44	BBH	VN187	V3 + (V2-V3) x 176/1584	44
BCH	VP188	V8 + (V7-V8) x 3524/4096	44	BCH	VN188	V3 + (V2-V3) x 220/1584	44
BDH	VP189	V8 + (V7-V8) x 3480/4096	44	BDH	VN189	V3 + (V2-V3) x 264/1584	44
BEH	VP190	V8 + (V7-V8) x 3436/4096	44	BEH	VN190	V3 + (V2-V3) x 308/1584	44
BFH	VP191	V8 + (V7-V8) x 3392/4096	44	BFH	VN191	V3 + (V2-V3) x 352/1584	44

Data	Positive polarity output voltage		Ω
C0H	VP192	V8 + (V7-V8) x 3348/4096	44
C1H	VP193	V8 + (V7-V8) x 3304/4096	44
C2H	VP194	V8 + (V7-V8) x 3260/4096	44
C3H	VP195	V8 + (V7-V8) x 3216/4096	44
C4H	VP196	V8 + (V7-V8) x 3172/4096	44
C5H	VP197	V8 + (V7-V8) x 3128/4096	44
C6H	VP198	V8 + (V7-V8) x 3084/4096	44
C7H	VP199	V8 + (V7-V8) x 3040/4096	44
C8H	VP200	V8 + (V7-V8) x 2996/4096	44
C9H	VP201	V8 + (V7-V8) x 2952/4096	44
CAH	VP202	V8 + (V7-V8) x 2908/4096	44
CBH	VP203	V8 + (V7-V8) x 2864/4096	44
CCH	VP204	V8 + (V7-V8) x 2820/4096	44
CDH	VP205	V8 + (V7-V8) x 2776/4096	44
CEH	VP206	V8 + (V7-V8) x 2732/4096	44
CFH	VP207	V8 + (V7-V8) x 2688/4096	44
D0H	VP208	V8 + (V7-V8) x 2644/4096	44
D1H	VP209	V8 + (V7-V8) x 2600/4096	44
D2H	VP210	V8 + (V7-V8) x 2556/4096	44
D3H	VP211	V8 + (V7-V8) x 2512/4096	44
D4H	VP212	V8 + (V7-V8) x 2468/4096	44
D5H	VP213	V8 + (V7-V8) x 2424/4096	44
D6H	VP214	V8 + (V7-V8) x 2380/4096	44
D7H	VP215	V8 + (V7-V8) x 2336/4096	44
D8H	VP216	V8 + (V7-V8) x 2292/4096	44
D9H	VP217	V8 + (V7-V8) x 2248/4096	44
DAH	VP218	V8 + (V7-V8) x 2204/4096	44
DBH	VP219	V8 + (V7-V8) x 2160/4096	60
DCH	VP220	V8 + (V7-V8) x 2100/4096	60
DDH	VP221	V8 + (V7-V8) x 2040/4096	60
DEH	VP222	V8 + (V7-V8) x 1980/4096	60
DFH	VP223	V8 + (V7-V8) x 1920/4096	60
E0H	VP224	V8 + (V7-V8) x 1860/4096	60
E1H	VP225	V8 + (V7-V8) x 1800/4096	60
E2H	VP226	V8 + (V7-V8) x 1740/4096	60
E3H	VP227	V8 + (V7-V8) x 1680/4096	60
E4H	VP228	V8 + (V7-V8) x 1620/4096	60
E5H	VP229	V8 + (V7-V8) x 1560/4096	60
E6H	VP230	V8 + (V7-V8) x 1500/4096	60
E7H	VP231	V8 + (V7-V8) x 1440/4096	60
E8H	VP232	V8 + (V7-V8) x 1380/4096	60
E9H	VP233	V8 + (V7-V8) x 1320/4096	60
EAH	VP234	V8 + (V7-V8) x 1260/4096	60
EBH	VP235	V8 + (V7-V8) x 1200/4096	60
ECH	VP236	V8 + (V7-V8) x 1140/4096	60
EDH	VP237	V8 + (V7-V8) x 1080/4096	60
EEH	VP238	V8 + (V7-V8) x 1020/4096	60
EFH	VP239	V8 + (V7-V8) x 960/4096	60
F0H	VP240	V8 + (V7-V8) x 900/4096	60
F1H	VP241	V8 + (V7-V8) x 840/4096	60
F2H	VP242	V8 + (V7-V8) x 780/4096	60
F3H	VP243	V8 + (V7-V8) x 720/4096	60
F4H	VP244	V8 + (V7-V8) x 660/4096	60
F5H	VP245	V8 + (V7-V8) x 600/4096	60
F6H	VP246	V8 + (V7-V8) x 540/4096	60
F7H	VP247	V8 + (V7-V8) x 480/4096	60
F8H	VP248	V8 + (V7-V8) x 420/4096	60
F9H	VP249	V8 + (V7-V8) x 360/4096	60
FAH	VP250	V8 + (V7-V8) x 300/4096	60
FBH	VP251	V8 + (V7-V8) x 240/4096	60
FCH	VP252	V8 + (V7-V8) x 180/4096	60
FDH	VP253	V8 + (V7-V8) x 120/4096	60
FEH	VP254	V8 + (V7-V8) x 60/4096	60
FFH	VP255	V8	0

Data	Negative polarity output voltage		Ω
C0H	VN192	V3 + (V2-V3) x 396/1584	44
C1H	VN193	V3 + (V2-V3) x 440/1584	44
C2H	VN194	V3 + (V2-V3) x 484/1584	44
C3H	VN195	V3 + (V2-V3) x 528/1584	44
C4H	VN196	V3 + (V2-V3) x 572/1584	44
C5H	VN197	V3 + (V2-V3) x 616/1584	44
C6H	VN198	V3 + (V2-V3) x 660/1584	44
C7H	VN199	V3 + (V2-V3) x 704/1584	44
C8H	VN200	V3 + (V2-V3) x 748/1584	44
C9H	VN201	V3 + (V2-V3) x 792/1584	44
CAH	VN202	V3 + (V2-V3) x 836/1584	44
CBH	VN203	V3 + (V2-V3) x 880/1584	44
CCH	VN204	V3 + (V2-V3) x 924/1584	44
CDH	VN205	V3 + (V2-V3) x 968/1584	44
CEH	VN206	V3+ (V2-V3) x 1012/1584	44
CFH	VN207	V3 + (V2-V3) x 1056/1584	44
D0H	VN208	V3 + (V2-V3) x 1100/1584	44
D1H	VN209	V3 + (V2-V3) x 1144/1584	44
D2H	VN210	V3 + (V2-V3) x 1188/1584	44
D3H	VN211	V3 + (V2-V3) x 1232/1584	44
D4H	VN212	V3 + (V2-V3) x 1276/1584	44
D5H	VN213	V3 + (V2-V3) x 1320/1584	44
D6H	VN214	V3 + (V2-V3) x 1364/1584	44
D7H	VN215	V3 + (V2-V3) x 1408/1584	44
D8H	VN216	V3 + (V2-V3) x 1452/1584	44
D9H	VN217	V3 + (V2-V3) x 1496/1584	44
DAH	VN218	V3 + (V2-V3) x 1540/1584	44
DBH	VN219	V2	60
DCH	VN220	V2 + (V1-V2) x 60/2160	60
DDH	VN221	V2 + (V1-V2) x 120/2160	60
DEH	VN222	V2 + (V1-V2) x 180/2160	60
DFH	VN223	V2 + (V1-V2) x 240/2160	60
E0H	VN224	V2 + (V1-V2) x 300/2160	60
E1H	VN225	V2 + (V1-V2) x 360/2160	60
E2H	VN226	V2 + (V1-V2) x 420/2160	60
E3H	VN227	V2 + (V1-V2) x 480/2160	60
E4H	VN228	V2 + (V1-V2) x 540/2160	60
E5H	VN229	V2 + (V1-V2) x 600/2160	60
E6H	VN230	V2 + (V1-V2) x 660/2160	60
E7H	VN231	V2 + (V1-V2) x 720/2160	60
E8H	VN232	V2 + (V1-V2) x 780/2160	60
E9H	VN233	V2 + (V1-V2) x 840/2160	60
EAH	VN234	V2 + (V1-V2) x 900/2160	60
EBH	VN235	V2 + (V1-V2) x 960/2160	60
ECH	VN236	V2 + (V1-V2) x 1020/2160	60
EDH	VN237	V2 + (V1-V2) x 1080/2160	60
EEH	VN238	V2 + (V1-V2) x 1140/2160	60
EFH	VN239	V2 + (V1-V2) x 1200/2160	60
F0H	VN240	V2 + (V1-V2) x 1260/2160	60
F1H	VN241	V2 + (V1-V2) x 1320/2160	60
F2H	VN242	V2 + (V1-V2) x 1380/2160	60
F3H	VN243	V2 + (V1-V2) x 1440/2160	60
F4H	VN244	V2 + (V1-V2) x 1500/2160	60
F5H	VN245	V2 + (V1-V2) x 1560/2160	60
F6H	VN246	V2 + (V1-V2) x 1620/2160	60
F7H	VN247	V2 + (V1-V2) x 1680/2160	60
F8H	VN248	V2 + (V1-V2) x 1740/2160	60
F9H	VN249	V2 + (V1-V2) x 1800/2160	60
FAH	VN250	V2 + (V1-V2) x 1860/2160	60
FBH	VN251	V2 + (V1-V2) x 1920/2160	60
FCH	VN252	V2 + (V1-V2) x 1980/2160	60
FDH	VN253	V2 + (V1-V2) x 2040/2160	60
FEH	VN254	V2 + (V1-V2) x 2100/2160	60
FFH	VN255	V1	0

5.3 Digital RGB data input format

For digital RGB input data format, both SYNC mode and DE mode are supported. If DEN signal is fixed low, SYNC mode is used. Otherwise, DE mode is used. The zoom and OSD function is not supported in digital serial/parallel RGB mode.

5.4 NTSC/PAL mode auto detection

For NTSC/PAL mode setting, the auto-detection function is implemented. You don't have to define this setting and can use NPC pin to monitor detection result.

5.5 Input data sequence and color filter type

● CF1 defines the input data sequence in serial digital RGB mode as following tables.

1. CF1="L"

Scan direction	UD	Low	Low	High	High
Shift direction	LRC	High	Low	High	Low
Data sequence	Odd line	RGB	BGR	BRG	GRB
	Even line	BRG	GRB	RGB	BGR

2. CF1="H"

Scan direction	UD	Low	Low	High	High
Shift direction	LRC	High	Low	High	Low
Data sequence	Odd line	RGB	BGR	GBR	RBG
	Even line	GBR	RBG	RGB	BGR

● For the color filter type, set MOD="H" for stripe type and the CF1&CF2 definition will have no meaning. Set MOD="L" for delta color filter and CF2 defines which kind of delta type color filter is used.

●

1. CF2="L", delta type 1

R	G	B	R	G	B

	B	R	G	B	R	G

R	G	B	R	G	B

	B	R	G	B	R	G

2. CF2="H", delta type 2:

	R	G	B	R	G	B

G	B	R	G	B	R

	R	G	B	R	G	B

G	B	R	G	B	R

5.6 Zoom in/out display mode setting (stripe type color filter only)

The zoom in/out function is only supported in CCIR601/656 input mode. In serial or parallel RGB input mode, this function is disabled.

Display Mode	ZX1	ZX2	ZX3	Display characteristics (4:3 aspect-ratio input signal)	Note
Full	H	H	H		Input video signals are displayed on full screen.
Zoom1	L	H	H		Central 3/4 lines of input video signals are displayed on full screen (Vertically extension, zoom factor=4/3)
Zoom-Wide1	H	L	H		Central 3/4 lines of input video signals are displayed on full screen (Vertically extension and different horizontal timing scaling)
Normal	L	L	H		Input video signals (4:3) are displayed on central 75% screen.
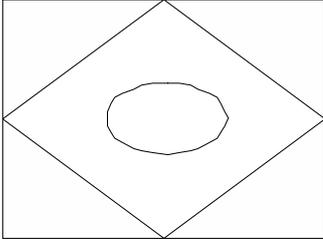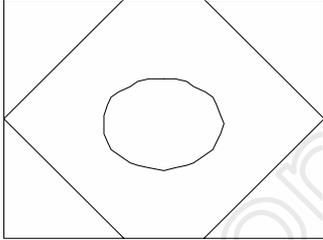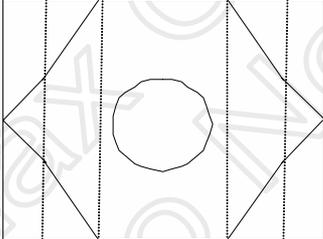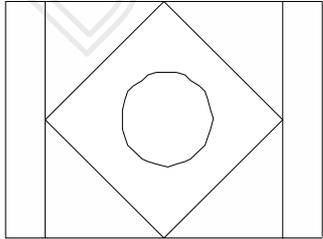
Display Mode	ZX1	ZX2	ZX3	Display characteristics (4:3 aspect-ratio input signal)	Note
Zoom2	H	H	L		Lower 7/8 lines of input video signals are displayed on full screen. (Zoom factor=8/7, vertically offset extension)
Wide	L	H	L		Input video signals are displayed on full screen. (Different horizontal timing scaling)
Zoom-Wide2	H	L	L		Lower 7/8 lines of input video signals are displayed in full screen. (Vertical extension and different horizontal timing scaling)
Zoom3	L	L	L		Central 7/8 lines of input video signals are displayed on full screen. (Vertically extension, zoom factor=8/7)
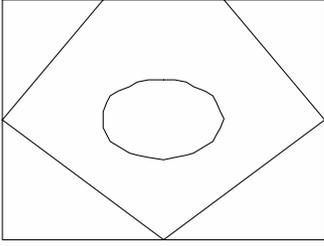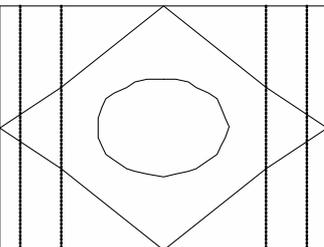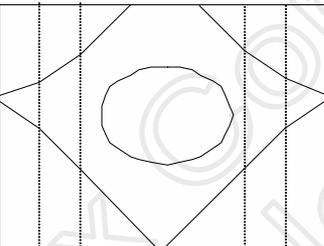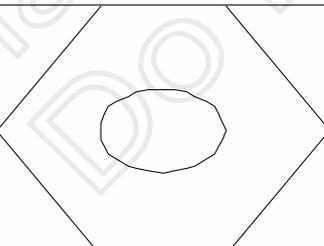
5.7 SPI Register Description

● **Register R0:**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	reserved	STHD1	STHD0	STHP4	STHP3	STHP2	STHP1	STHP0
Default	0	0	0	0	0	0	0	0

STHD [1:0]: adjust start pulse position by dot.

STHD1	STHD0	STH position adjust by dot
1	1	-1
1	0	-2
0	0	0
0	1	+1

STHP [4:0]: adjust start pulse position by pixel

STHP4	STHP3	STHP2	STHP1	STHP0	STH position adjust by pixel
1	1	1	1	1	-1
1	1	1	1	0	-2
1	1	1	0	1	-3
1	1	1	0	0	-4
1	1	0	1	1	-5
1	1	0	1	0	-6
1	1	0	0	1	-7
1	1	0	0	0	-8
1	0	1	1	1	-9
1	0	1	1	0	-10
1	0	1	0	1	-11
1	0	1	0	0	-12
1	0	0	1	1	-13
1	0	0	1	0	-14
1	0	0	0	1	-15
1	0	0	0	0	-16
0	0	0	0	0	0
0	0	0	0	1	+1
0	0	0	1	0	+2
0	0	0	1	1	+3
0	0	1	0	0	+4
0	0	1	0	1	+5
0	0	1	1	0	+6
0	0	1	1	1	+7
0	1	0	0	0	+8
0	1	0	0	1	+9
0	1	0	1	0	+10
0	1	0	1	1	+11
0	1	1	0	0	+12
0	1	1	0	1	+13
0	1	1	1	0	+14
0	1	1	1	1	+15

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● **Register R1:**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	STVP3	STVP2	STVP1	STVP0	STVNT1	STVNT0	STVPAL1	STV_PAL0
Default	0	0	0	0	0	0	0	1

STVP [3:0]: adjust first line position by line

STVP3	STVP2	STVP1	STVP0	STV position adjust by line
1	1	1	1	-1
1	1	1	0	-2
1	1	0	1	-3
1	1	0	0	-4
1	0	1	1	-5
1	0	1	0	-6
1	0	0	1	-7
1	0	0	0	-8
0	0	0	0	0
0	0	0	1	+1
0	0	1	0	+2
0	0	1	1	+3
0	1	0	0	+4
0	1	0	1	+5
0	1	1	0	+6
0	1	1	1	+7

STVNT[1:0]: When NTSC Mode, the relationship of first line in Even Field and Odd   Field
$\qquad$ 00 : First line in Even Field = First line in Odd Field
$\qquad$ 01 : First line in Even Field = First line in Odd Field + 1
$\qquad$ 10 : No Use
$\qquad$ 11 : First line in Even Field = First line in Odd Field – 1

STVPAL[1:0]:When PAL Mode, the relationship of first line in Even Field and Odd   Field
$\qquad$ 00 : First line in Even Field = First line in Odd Field
$\qquad$ 01 : First line in Even Field = First line in Odd Field + 1
$\qquad$ 10 : No Use
$\qquad$ 11 : First line in Even Field = First line in Odd Field - 1

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● **Register R2:**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	reserved	reserved	OEHCTL	VZ_MOD	HS_POL	VS_POL	NPC_IN	NPC_SET
Default	0	0	0	1	0	0	1	0

OEHCTL : PAL mode decimation line algorithm
VZ_MOD: zoom mode algorithm control.
HS_POL: HS polarity setting.
     HS_POL="L", negative polarity.
     HS_POL="H", positive polarity.
VS_POL: VS polarity setting.
     VS_POL="L", negative polarity.
     VS_POL="H", positive polarity.
NPC_IN: define the NTSC/PAL mode by SPI.
     NPC_IN="L", PAL.
     NPC_IN="H", NTSC.
NPC_SET: set the NTSC/PAL auto detection or define by NPC_IN.
     NPC_SET="L", auto detection.
     NPC_SET="H", define by NPC_IN.

- **Register R3:**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	DAC_TEST	TPOE	BA_SET2	BA_SET1	PWD_EN	reserved	OSD_VSPOL	OSD_HSPOL
Default	0	0	1	0	1	0	1	1

DAC_TEST: set test mode for DAC.
DAC_TEST="L", disable.
DAC_TEST="H", enable.

TPOE: set test pin, TP[9:0], output enable.
TPOE="L", TP[9:0] is tri-state.
TPOE="H", TP[9:0] output enable.

BA_SET[2:1]: set source driver high bias time.
BA_SET[2:1]="L, L", 100% high bias.
BA_SET[2:1]="L, H", 2/3 horizontal line period.
BA_SET[2:1]="H, L", 1/2 horizontal line period.
BA_SET[2:1]="H, H", 1/3 horizontal line period.

PWD_EN: set DAC power saving function.
PWD_EN="L", disable. The DAC is always power on.
PWD_EN="H", enable.

OSD_VSPOL: Osd_vs polarity
OSD_HSPOL: Osd_hs polarity

5.8 Power ON/OFF sequence

To prevent the device from damage due to latch-up, the power ON/OFF sequence shown below must be followed.

Power ON: VCC, GND → VDD, VSS → V1~V8
Power OFF: V1~V8 → VDD, VSS → VCC, GND

6. DC Characteristics

6.1 Absolute Maximum Rating (GND=VSS=0V)

Parameter	Symbol	Rating			Unit
Power supply voltage (1)	VCC	-0.3	to	+7.0	V
Power supply voltage (2)	VDD	-0.3	to	+7.0	V
Logic Output Voltage	V_{OUT}	-0.3	to	+7.0	V
Input voltage	Vin	-0.3	to	VDD+0.3	V
Operation temperature	T_{OPR}	-30	to	+85	℃
Storage temperature	T_{STG}	-55	to	+125	℃

Note:
(1)All of the voltages listed above are with respective to GND=VSS=0V.
(2)Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

6.2 DC Electrical Characteristics (GND=VSS=0V, TA=25℃)

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
Power supply voltage	VCC	3	3.3	3.6	V	-
Power supply voltage	VDD	3.8	5	5.5	V	-
Low level input voltage	V_{IL}	0	-	0.3xVCC	V	-
High level input voltage	V_{IH}	0.7xVCC	-	VCC	V	-
Output low voltage	V_{OL}	0	-	0.2xVCC	V	I_{OL}=400uA
Output high voltage	V_{OH}	0.8x VCC	-	VCC	V	I_{OH}=-400uA
Input leakage current	I_{IN}	-1	-	+1	µA	No pull up or pull down.
Output voltage deviation	V_{VD}	-	±20	-	mV	QA/QB/QC1 ~ 320, V_{IN}=0.1~4.9V,
DC offset	V_{OS}	-	-	±20	mV	QA/QB/QC1 ~ 320, V_{IN}=0.1~4.9V,
Output leakage current	I_O	-1	-	±1	µA	QA/QB/QC1 ~ 320 at high impedance
Pull high resistance	R_H	150	200	250	KΩ	RESETB,STB,ZX1~3, VSET
Pull low resistance	R_L	150	200	250	KΩ	DEN,IF[2:1],MOD, CF[2:1],Dx[7:0], OSD_R,OSD_G, OSD_B,OSD_EN
Output current	IOH	20	40	-	µA	QA/QB/QC1 ~ 320, V_O =4.9V v.s 4.0V, VDD=5V
Output current	IOL	20	40	-	µA	QA/QB/QC1 ~ 320, Vo=0.1V v.s 1.0V, VDD=5V
Analog operating current	I_{DD}	-	-	TBD	mA	f_{CLK}=27MHz, f_{IHS}=15.7KHz, VDD=5V, CL=60pF
Digital operating current	I_{CC}	-	-	TBD	mA	f_{CLK}=27MHz, f_{IHS}=15.7KHz, VCC=3.3V
Analog standby current	I_{VDD}	-	-	TBD	µA	All LCD outputs are High-Z.
Digital standby current	I_{VCC}	-	10	50	µA	All inputs are stopped and outputs are High-Z.

7. AC Characteristics

7.1 Input signal characteristics

7.1.1 Digital Serial RGB interface (960x240 resolution)

PARAMETER		Symbol	Min.	Typ.	Max.	Unit
CLK period		T_{OSC}	-	52	-	ns
Data setup time		T_{SU}	12	-	-	ns
Data hold time		T_{HD}	12	-	-	ns
IHS period		T_H	-	1224	-	T_{OSC}
IHS pulse width		T_{HS}	5	90	-	T_{OSC}
IHS rising time		T_{Cr}	-	-	700	ns
IHS falling time		T_{Cf}	-	-	300	ns
IVS pulse width		T_{VS}	1	3	5	T_H
IVS rising time		T_{Vr}	-	-	700	ns
IVS falling time		T_{Vf}	-	-	1.5	µs
IVS falling to IHS rising time for odd field		T_{HVO}	3	-	-	T_{OSC}
IVS falling to IHS falling time for even field		T_{HVE}	3	-	-	T_{OSC}
IVS-DEN time	NTSC	T_{VSE}	-	18	-	T_H
	PAL	T_{VSE}	-	26	-	T_H
IHS-DEN time		T_{HE}	108	204	264	T_{OSC}
DEN pulse width		T_{EP}	-	960	-	T_{OSC}
DEN-STH time		T_{DES}	-	3	-	T_{OSC}
IVS period	NTSC	-	-	262.5	-	T_H
	PAL	-	-	312.5	-	T_H

Note:
(1)When SYNC mode is used, 1st data start from 204th CLK after IHS falling

7.1.2 Digital Parallel RGB interface (960x240 resolution)

PARAMETER		Symbol	Min.	Typ.	Max.	Unit
CLK period		T_{OSC}	-	156	-	ns
Data setup time		T_{SU}	12	-	-	ns
Data hold time		T_{HD}	12	-	-	ns
IHS period		T_H	-	408	-	T_{OSC}
IHS pulse width		T_{HS}	5	30	-	T_{OSC}
IHS rising time		T_{Cr}	-	-	700	ns
IHS falling time		T_{Cf}	-	-	300	ns
IVS pulse width		T_{VS}	1	3	5	T_H
IVS rising time		T_{Vr}	-	-	700	ns
IVS falling time		T_{Vf}	-	-	1.5	µs
IVS falling to IHS rising time for odd field		T_{HVO}	1	-	-	T_{OSC}
IVS falling to IHS falling time for even field		T_{HVE}	1	-	-	T_{OSC}
IVS-DEN time	NTSC	T_{VSE}	-	18	-	T_H
	PAL	T_{VSE}	-	26	-	T_H
IHS-DEN time		T_{HE}	36	68	88	T_{OSC}
DEN pulse width		T_{EP}	-	320	-	T_{OSC}
DEN-STH time		T_{DES}	-	1	-	T_{OSC}
IVS period	NTSC		-	262.5	-	T_H
	PAL		-	312.5	-	T_H

Note:
(1)When SYNC mode is used, 1st data start from 68th CLK after IHS falling.

7.1.3 CCIR601/656 Interface

PARAMETER	Symbol	Min.	Typ.	Max.	Unit.
CLK period	T_{OSC}	-	37	-	ns
Data setup time	T_{SU}	12	-	-	ns
Data hold time	T_{HD}	12	-	-	ns

7.1.4 Hardware reset timing

PARAMETER	Symbol	Min.	Typ.	Max.	Unit.
RESETB low pulse width	T_{RSB}	10	-	-	µs

7.2 Output signal characteristics for digital input signal

PARAMETER		Symbol	Min.	Typ.	Max.	Unit.
Rising time		T_r	-	-	10	ns
Falling time		T_f	-	-	10	ns
Internal STH setup time		T_{SUS}	12	-	-	ns
Internal STH hold time		T_{HDS}	12	-	-	ns
Internal data setup time		T_{SUD}	60	-	-	ns
Internal data hold time		T_{HDD}	40	-	-	ns
OEH pulse width		T_{OEH}	-	1248	-	ns
OEV pulse width		T_{OEV}	-	4992	-	ns
CKV pulse width		T_{CKV}	-	3744	-	ns
IHS-OEH time		T_1	-	4368	-	ns
IHS-CKV time		T_2	-	2496	-	ns
IHS-OEV time		T_3	-	624	-	ns
STV setup time		T_{SUV}	-	1872	-	ns
STV pulse width		T_{STV}	-	1	-	T_H
IVS-STV time	NTSC	T_{VS1}	-	19	-	T_H
	PAL	T_{VS1}	-	27	-	T_H
OEH-STV time		T_{OES}	-	2	-	T_H
Output settling time		T_{ST}	-	12	20	µs

8. Waveform

8.1 Timing Controller Timing Chart

8.1.1 Clock and Data waveform
● **CCIR601 (HS_POL="L" in Register R2)**
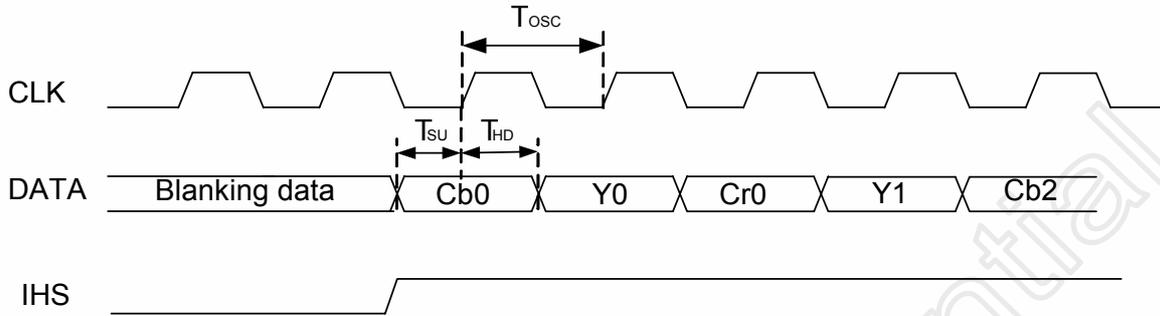
● **CCIR656**
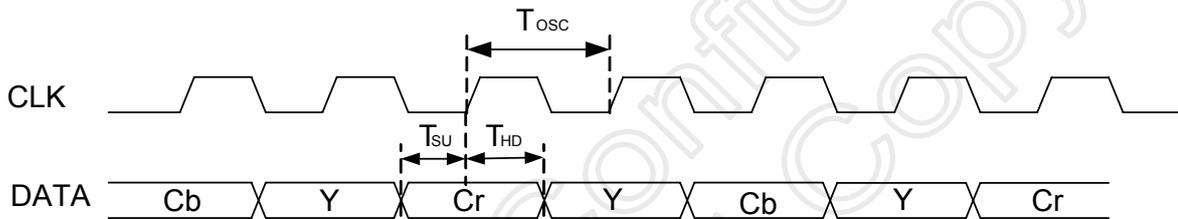
● **Digital Serial RGB**
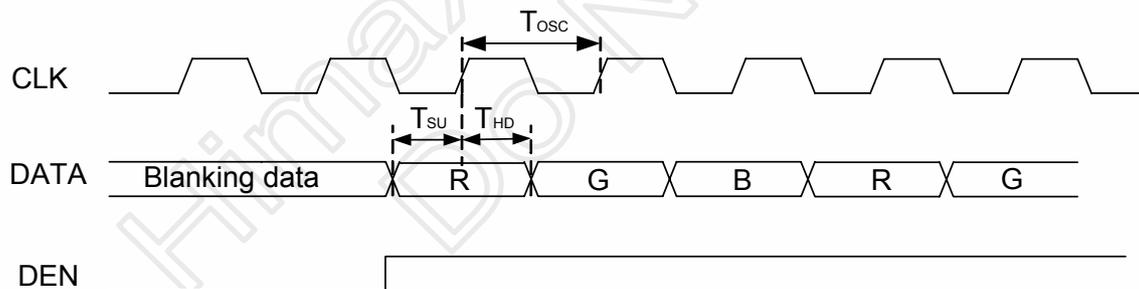
● **Digital Parallel RGB**

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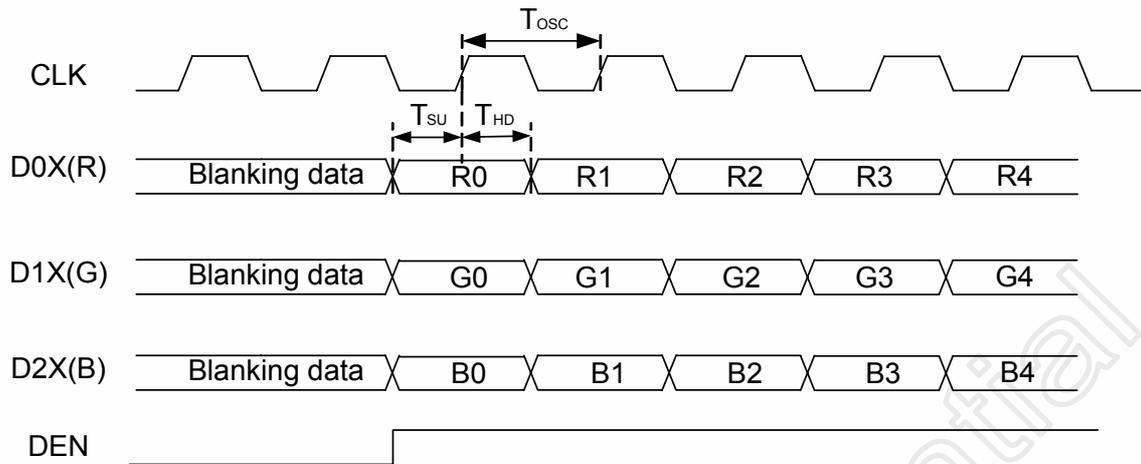
8.1.2 Digital/Analog RGB timing waveform

8.1.2.1 IHS and IVS timing

● Odd field
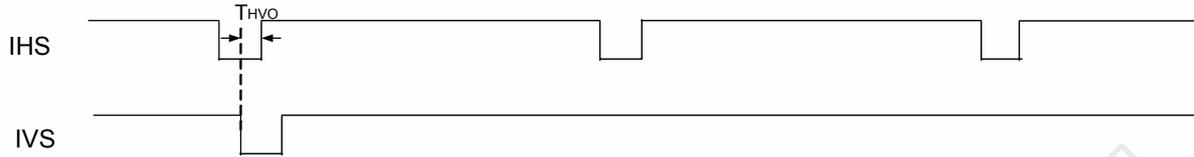
● Even field
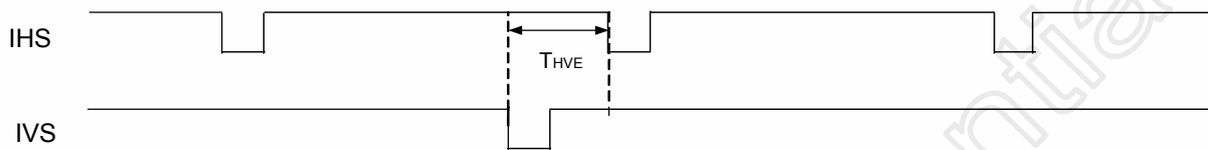
8.1.2.2 IHS and horizontal control timing waveform
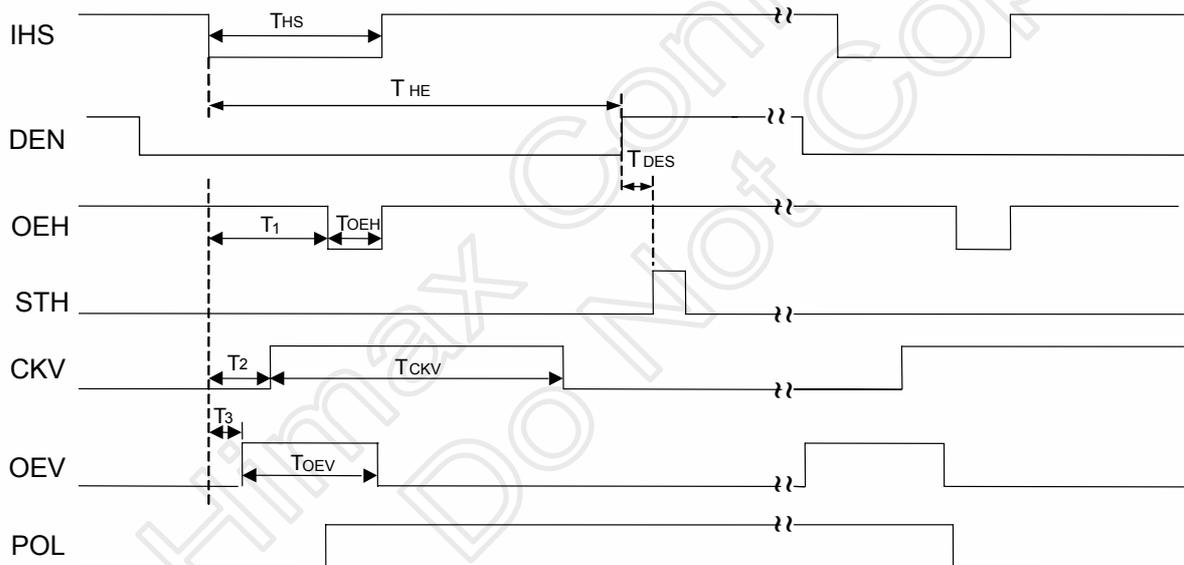
8.1.2.3 IHS and vertical shift clock timing waveform
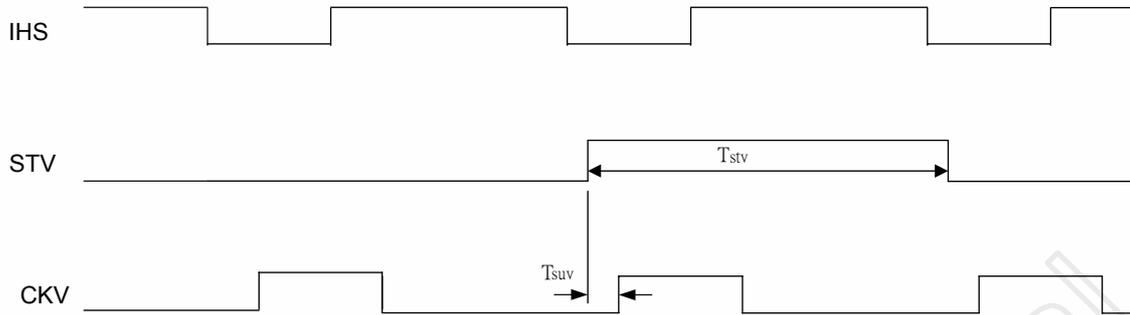
8.1.2.4 IHS and vertical control timing waveform

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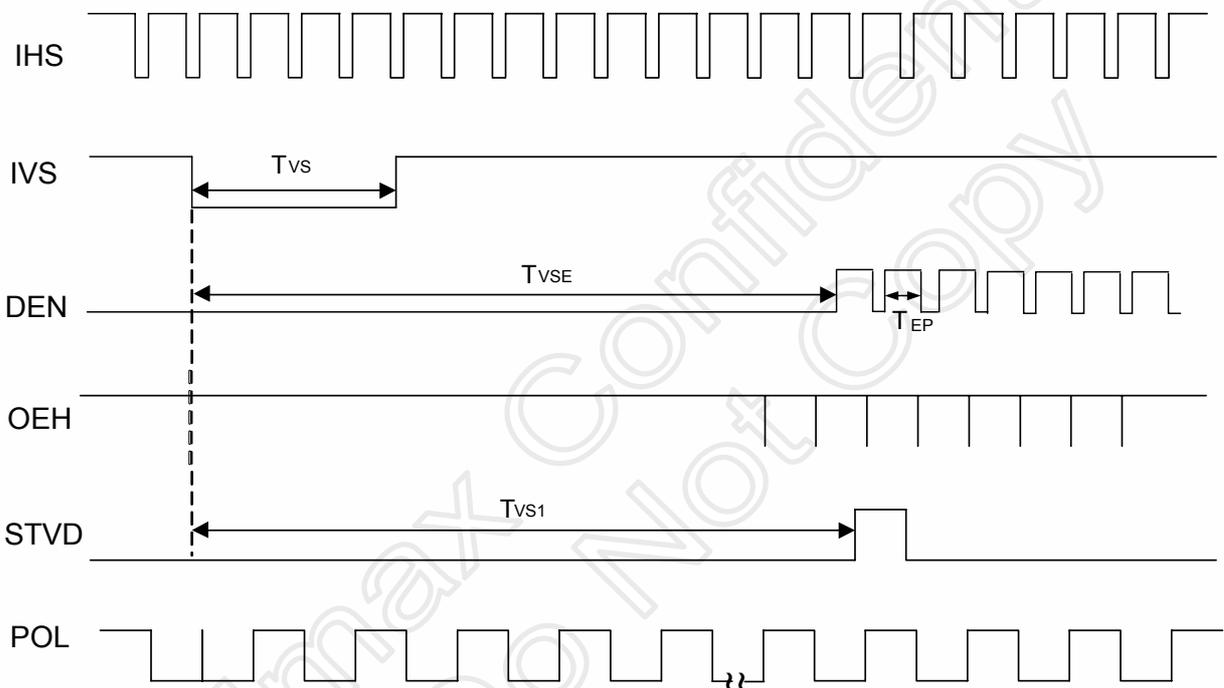
8.1.3 CCIR601 timing waveform VS_POL="H", HS_POL="L" in Register R2)
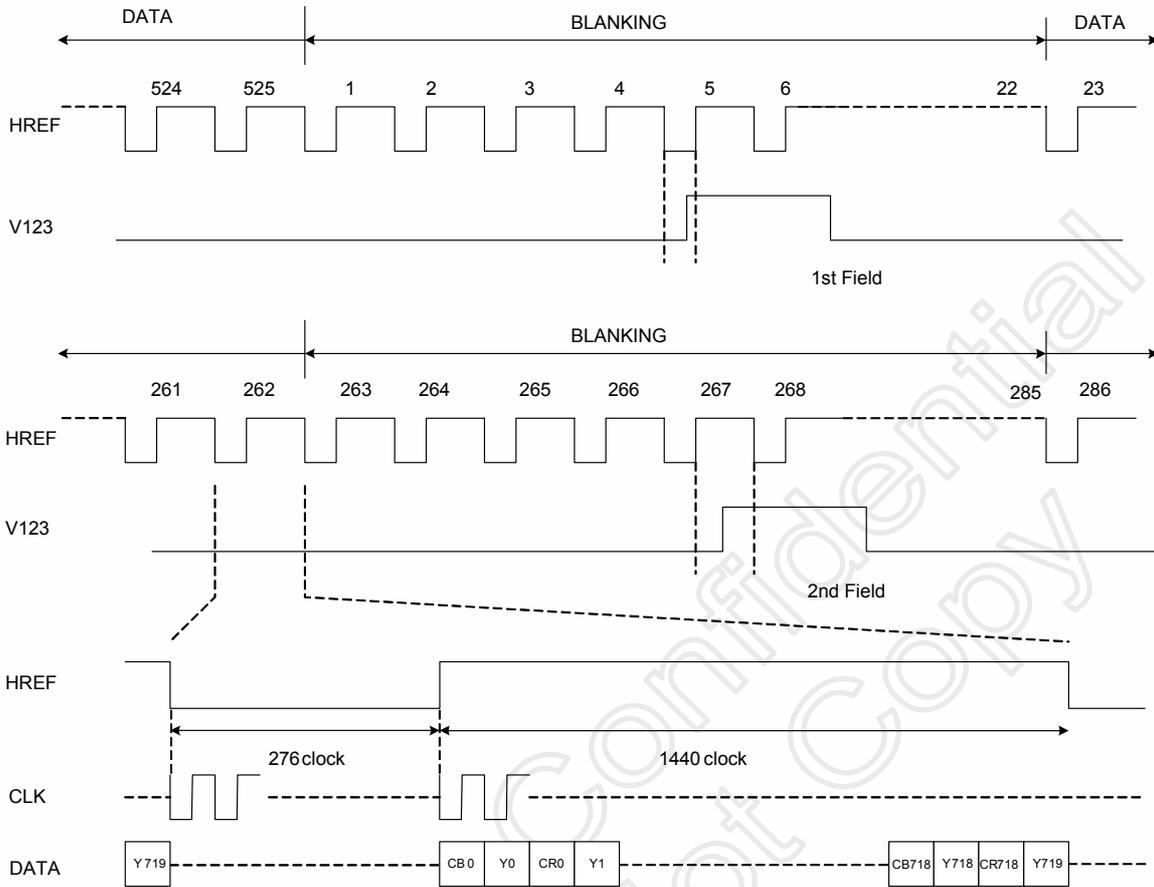
ITU-R BT. 601 NTSC Input Timing
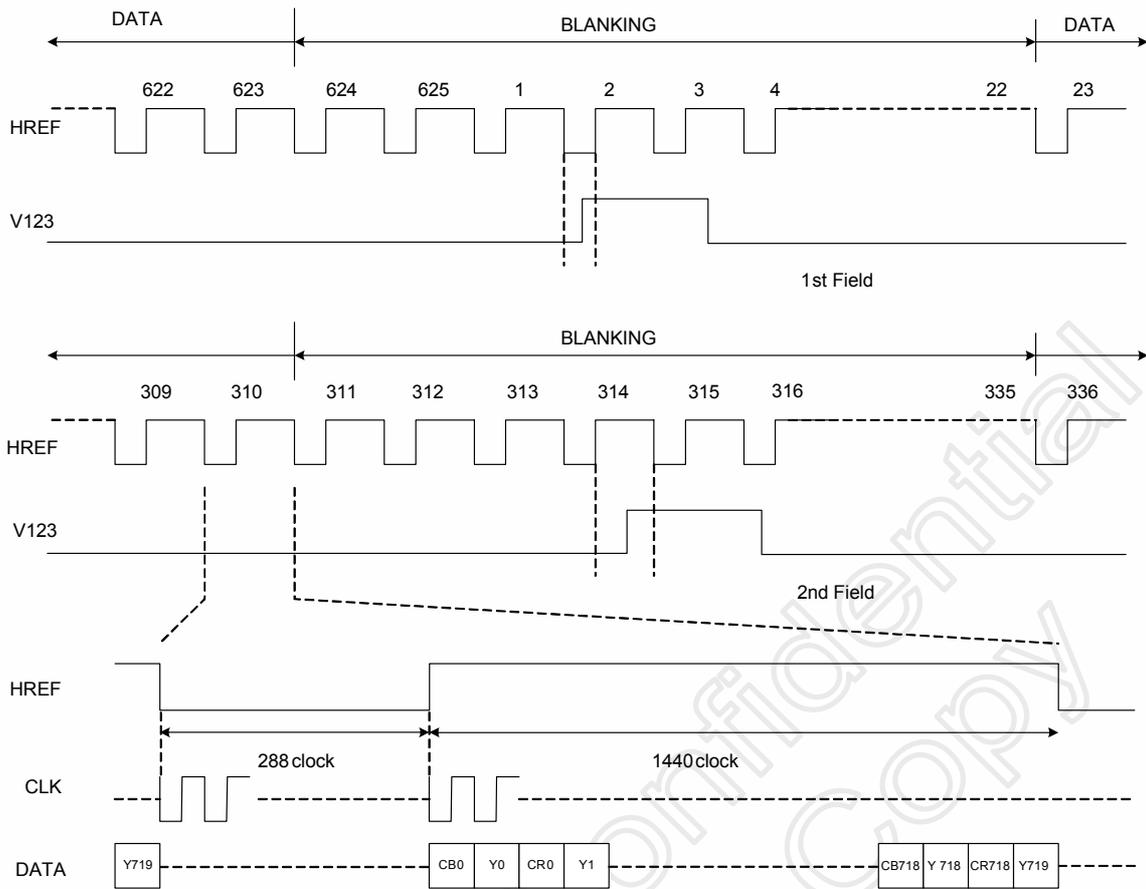
ITU-R BT. 601 PAL Input Timing

8.2 Source Driver Timing Chart

8.2.1 Clock and Start Pulse timing waveform
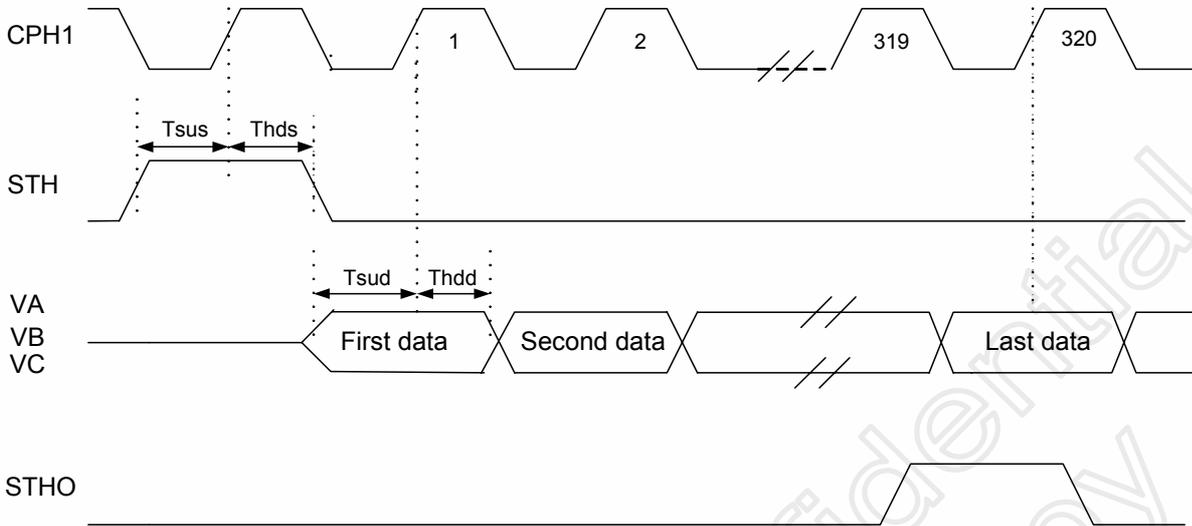
8.2.2 OEH and Data Output timing waveform

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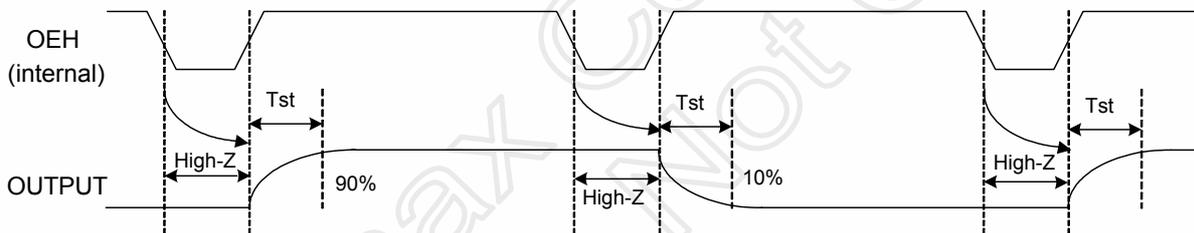
9. Analog video signal characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
Video signal amplitude (VA, VB, VC)	V_{IAC}	-	3.81	-	V
	V_{IDC}	-	2.385	-	V

POL

VA
VB
VC

V_{iDC}

V_{iAC}
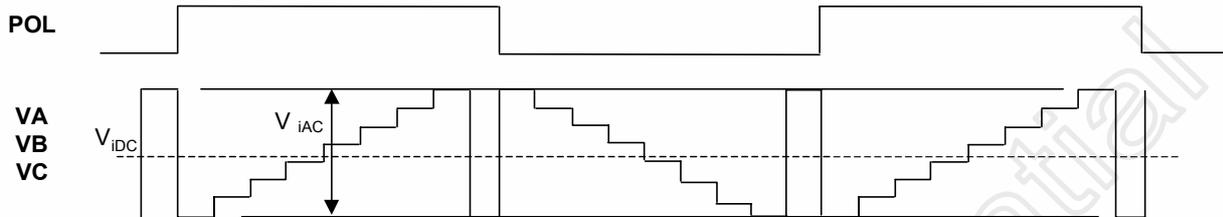
10. SPI timing characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
SPCK period	T_{CK}	60	-	-	ns
SPCK high width	T_{CKH}	30	-	-	ns
SPCK low width	T_{CKL}	30	-	-	ns
Data setup time	T_{SU1}	12	-	-	ns
Data hold time	T_{HD1}	12	-	-	ns
SPENA to SPCK setup time	T_{CS}	20	-	-	ns
SPENA to SPDA hold time	T_{CE}	20	-	-	ns
SPENA high pulse width	T_{CD}	50	-	-	ns
SPDA output latency	T_{CR}	-	1/2	-	T_{CK}

● **SPI "read" timing**
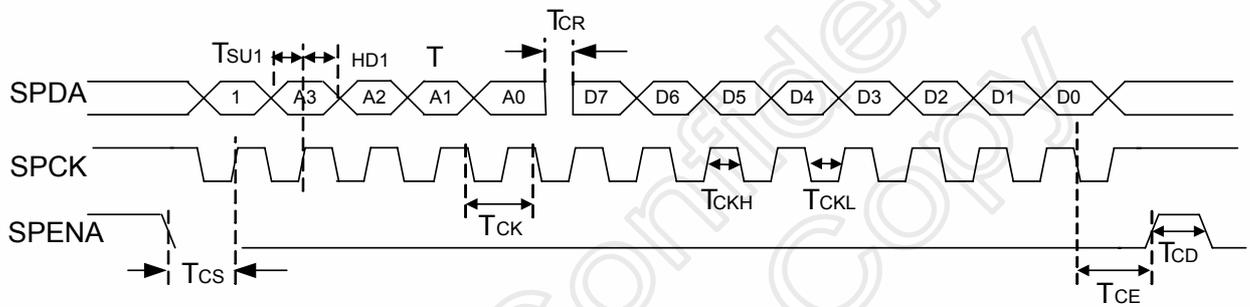
● **SPI "write" timing**
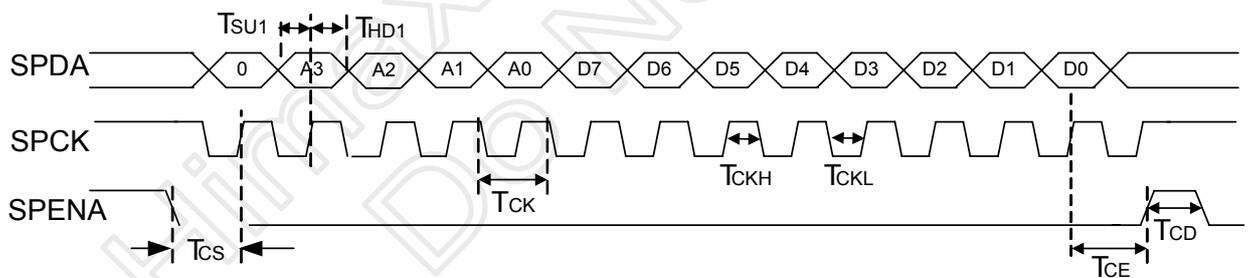
11. Bump Mask Information

- Chip size: 23573µm x 1436µm
- Bump height: 15 µm $\pm$ 3 µm
- Bump hardness: 60 H_V $\pm$ 15 H_V

HX8218-A PAD NAME
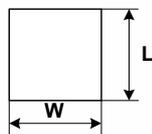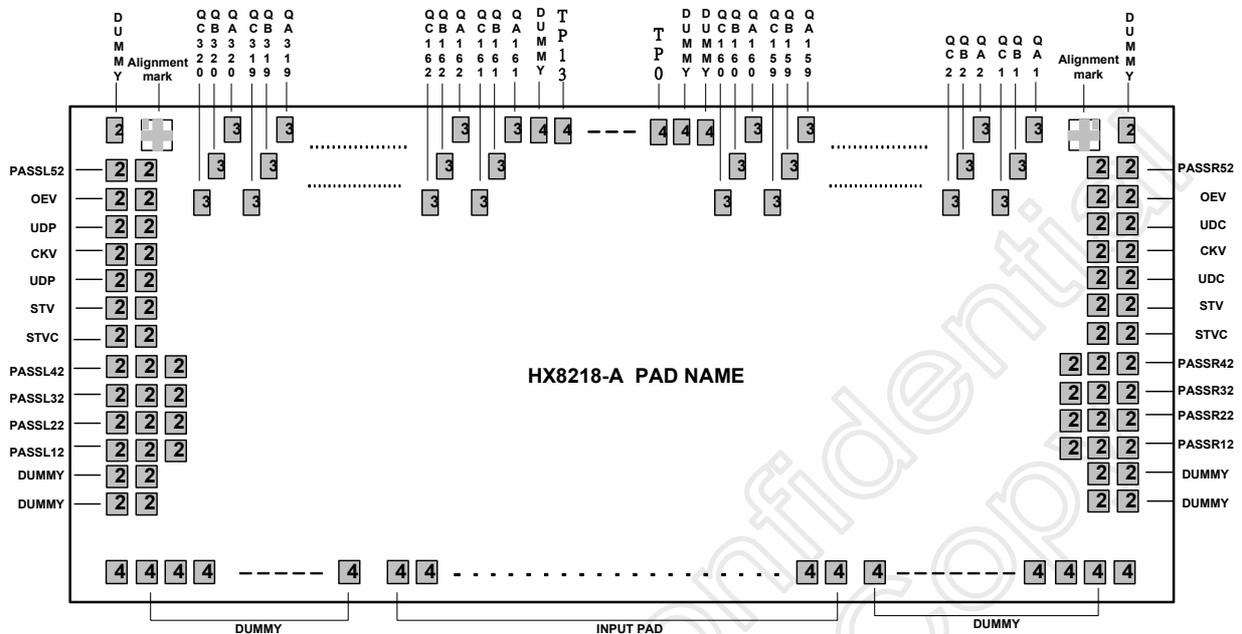
Alignment mark dimension   unit:um

Left side

Right side

2	: WxL = 50umx50um
3	: WxL = 20umx100um
4	: WxL = 50umx80um

The figure of "View Angle"

Left pin labels (top):
- DUMMY
- QA1
- QB1
- QC1
- QA2
- QB2
- QC2

Left rotated labels:
- PASSR52 (2)
- OEV (2)
- UDC (2)
- CKV (2)
- UDC (2)
- STV (2)
- STVC (2)
- PASSR42 (3)
- PASSR32 (3)
- PASSR22 (3)
- PASSR12 (3)
- DUMMY (2)
- DUMMY (2)

Left pin labels (continued):
- QA160
- QB160
- QC160
- DUMMY
- DUMMY
- TP0
- TP1
- TP2
- TP3
- TP4
- TP5
- TP6
- TP7
- TP8
- TP9
- DUMMY
- DUMMY
- TP11
- TP12
- TP13
- DUMMY
- QA161
- QB161
- QC161

Left pin labels (bottom):
- QA320
- QB320
- QC320
- DUMMY

Bottom-left rotated labels:
- PASSL52 (2)
- OEV (2)
- UDP (2)
- CKV (2)
- UDP (2)
- STV (2)
- STVC (2)
- PASSL42 (3)
- PASSL32 (3)
- PASSL22 (3)
- PASSL12 (3)
- DUMMY (2)
- DUMMY (2)

Right pin labels:
- DUMMY (40)
- PASSR11 (4)
- PASSR21 (4)
- PASSR31 (4)
- PASSR41 (4)
- PASSR51 (2)
- DUMMY
- OSD_HS (2)
- OSD_VS (2)
- OSD_CLK (2)
- OSD_R (2)
- OSD_G (2)
- OSD_B (2)
- OSD_EN (2)
- DUMMY
- VCC (4)
- DUMMY
- ZX1 (2)
- ZX2 (2)
- ZX3 (2)
- MOD (2)
- CF1 (2)
- CF2 (2)
- DUMMY
- STB (2)
- DEN (2)
- IVS (2)
- IHS (2)
- CLK (2)
- DUMMY
- D00 (2)
- D01 (2)
- D02 (2)
- D03 (2)
- D04 (2)
- D05 (2)
- D06 (2)
- D07 (2)
- DUMMY
- VSS (4)
- DUMMY
- V1 (2)
- V2 (2)
- V3 (2)
- V4 (2)
- V5 (2)
- V6 (2)
- V7 (2)
- V8 (2)
- DUMMY
- VDD (4)
- DUMMY
- D10 (2)
- D11 (2)
- D12 (2)
- D13 (2)
- D14 (2)
- D15 (2)
- D16 (2)
- D17 (2)
- DUMMY
- D20 (2)
- D21 (2)
- D22 (2)
- D23 (2)
- D24 (2)
- D25 (2)
- D26 (2)
- D27 (2)
- DUMMY
- QXH (2)
- NPC (2)
- POL (2)
- SPDA (2)
- SPCK (2)
- SPENA (2)
- DUMMY
- IF1 (2)
- IF2 (2)
- LRC (2)
- UD (2)
- TP10 (2)
- VSET (2)
- RESETB (2)
- DUMMY
- GND (4)
- DUMMY
- PASSL51 (2)
- PASSL41 (4)
- PASSL31 (4)
- PASSL21 (4)
- PASSL11 (4)
- DUMMY (47)

● PAD Coordinate

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
1	QA1	11451.8	583	61	QA21	10251.8	583	121	QA41	9051.8	583
2	QB1	11431.8	453	62	QB21	10231.8	453	122	QB41	9031.8	453
3	QC1	11411.8	323	63	QC21	10211.8	323	123	QC41	9011.8	323
4	QA2	11391.8	583	64	QA22	10191.8	583	124	QA42	8991.8	583
5	QB2	11371.8	453	65	QB22	10171.8	453	125	QB42	8971.8	453
6	QC2	11351.8	323	66	QC22	10151.8	323	126	QC42	8951.8	323
7	QA3	11331.8	583	67	QA23	10131.8	583	127	QA43	8931.8	583
8	QB3	11311.8	453	68	QB23	10111.8	453	128	QB43	8911.8	453
9	QC3	11291.8	323	69	QC23	10091.8	323	129	QC43	8891.8	323
10	QA4	11271.8	583	70	QA24	10071.8	583	130	QA44	8871.8	583
11	QB4	11251.8	453	71	QB24	10051.8	453	131	QB44	8851.8	453
12	QC4	11231.8	323	72	QC24	10031.8	323	132	QC44	8831.8	323
13	QA5	11211.8	583	73	QA25	10011.8	583	133	QA45	8811.8	583
14	QB5	11191.8	453	74	QB25	9991.8	453	134	QB45	8791.8	453
15	QC5	11171.8	323	75	QC25	9971.8	323	135	QC45	8771.8	323
16	QA6	11151.8	583	76	QA26	9951.8	583	136	QA46	8751.8	583
17	QB6	11131.8	453	77	QB26	9931.8	453	137	QB46	8731.8	453
18	QC6	11111.8	323	78	QC26	9911.8	323	138	QC46	8711.8	323
19	QA7	11091.8	583	79	QA27	9891.8	583	139	QA47	8691.8	583
20	QB7	11071.8	453	80	QB27	9871.8	453	140	QB47	8671.8	453
21	QC7	11051.8	323	81	QC27	9851.8	323	141	QC47	8651.8	323
22	QA8	11031.8	583	82	QA28	9831.8	583	142	QA48	8631.8	583
23	QB8	11011.8	453	83	QB28	9811.8	453	143	QB48	8611.8	453
24	QC8	10991.8	323	84	QC28	9791.8	323	144	QC48	8591.8	323
25	QA9	10971.8	583	85	QA29	9771.8	583	145	QA49	8571.8	583
26	QB9	10951.8	453	86	QB29	9751.8	453	146	QB49	8551.8	453
27	QC9	10931.8	323	87	QC29	9731.8	323	147	QC49	8531.8	323
28	QA10	10911.8	583	88	QA30	9711.8	583	148	QA50	8511.8	583
29	QB10	10891.8	453	89	QB30	9691.8	453	149	QB50	8491.8	453
30	QC10	10871.8	323	90	QC30	9671.8	323	150	QC50	8471.8	323
31	QA11	10851.8	583	91	QA31	9651.8	583	151	QA51	8451.8	583
32	QB11	10831.8	453	92	QB31	9631.8	453	152	QB51	8431.8	453
33	QC11	10811.8	323	93	QC31	9611.8	323	153	QC51	8411.8	323
34	QA12	10791.8	583	94	QA32	9591.8	583	154	QA52	8391.8	583
35	QB12	10771.8	453	95	QB32	9571.8	453	155	QB52	8371.8	453
36	QC12	10751.8	323	96	QC32	9551.8	323	156	QC52	8351.8	323
37	QA13	10731.8	583	97	QA33	9531.8	583	157	QA53	8331.8	583
38	QB13	10711.8	453	98	QB33	9511.8	453	158	QB53	8311.8	453
39	QC13	10691.8	323	99	QC33	9491.8	323	159	QC53	8291.8	323
40	QA14	10671.8	583	100	QA34	9471.8	583	160	QA54	8271.8	583
41	QB14	10651.8	453	101	QB34	9451.8	453	161	QB54	8251.8	453
42	QC14	10631.8	323	102	QC34	9431.8	323	162	QC54	8231.8	323
43	QA15	10611.8	583	103	QA35	9411.8	583	163	QA55	8211.8	583
44	QB15	10591.8	453	104	QB35	9391.8	453	164	QB55	8191.8	453
45	QC15	10571.8	323	105	QC35	9371.8	323	165	QC55	8171.8	323
46	QA16	10551.8	583	106	QA36	9351.8	583	166	QA56	8151.8	583
47	QB16	10531.8	453	107	QB36	9331.8	453	167	QB56	8131.8	453
48	QC16	10511.8	323	108	QC36	9311.8	323	168	QC56	8111.8	323
49	QA17	10491.8	583	109	QA37	9291.8	583	169	QA57	8091.8	583
50	QB17	10471.8	453	110	QB37	9271.8	453	170	QB57	8071.8	453
51	QC17	10451.8	323	111	QC37	9251.8	323	171	QC57	8051.8	323
52	QA18	10431.8	583	112	QA38	9231.8	583	172	QA58	8031.8	583
53	QB18	10411.8	453	113	QB38	9211.8	453	173	QB58	8011.8	453
54	QC18	10391.8	323	114	QC38	9191.8	323	174	QC58	7991.8	323
55	QA19	10371.8	583	115	QA39	9171.8	583	175	QA59	7971.8	583
56	QB19	10351.8	453	116	QB39	9151.8	453	176	QB59	7951.8	453
57	QC19	10331.8	323	117	QC39	9131.8	323	177	QC59	7931.8	323
58	QA20	10311.8	583	118	QA40	9111.8	583	178	QA60	7911.8	583
59	QB20	10291.8	453	119	QB40	9091.8	453	179	QB60	7891.8	453
60	QC20	10271.8	323	120	QC40	9071.8	323	180	QC60	7871.8	323

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
181	QA61	7851.8	583	241	QA81	6651.8	583	301	QA101	5451.8	583
182	QB61	7831.8	453	242	QB81	6631.8	453	302	QB101	5431.8	453
183	QC61	7811.8	323	243	QC81	6611.8	323	303	QC101	5411.8	323
184	QA62	7791.8	583	244	QA82	6591.8	583	304	QA102	5391.8	583
185	QB62	7771.8	453	245	QB82	6571.8	453	305	QB102	5371.8	453
186	QC62	7751.8	323	246	QC82	6551.8	323	306	QC102	5351.8	323
187	QA63	7731.8	583	247	QA83	6531.8	583	307	QA103	5331.8	583
188	QB63	7711.8	453	248	QB83	6511.8	453	308	QB103	5311.8	453
189	QC63	7691.8	323	249	QC83	6491.8	323	309	QC103	5291.8	323
190	QA64	7671.8	583	250	QA84	6471.8	583	310	QA104	5271.8	583
191	QB64	7651.8	453	251	QB84	6451.8	453	311	QB104	5251.8	453
192	QC64	7631.8	323	252	QC84	6431.8	323	312	QC104	5231.8	323
193	QA65	7611.8	583	253	QA85	6411.8	583	313	QA105	5211.8	583
194	QB65	7591.8	453	254	QB85	6391.8	453	314	QB105	5191.8	453
195	QC65	7571.8	323	255	QC85	6371.8	323	315	QC105	5171.8	323
196	QA66	7551.8	583	256	QA86	6351.8	583	316	QA106	5151.8	583
197	QB66	7531.8	453	257	QB86	6331.8	453	317	QB106	5131.8	453
198	QC66	7511.8	323	258	QC86	6311.8	323	318	QC106	5111.8	323
199	QA67	7491.8	583	259	QA87	6291.8	583	319	QA107	5091.8	583
200	QB67	7471.8	453	260	QB87	6271.8	453	320	QB107	5071.8	453
201	QC67	7451.8	323	261	QC87	6251.8	323	321	QC107	5051.8	323
202	QA68	7431.8	583	262	QA88	6231.8	583	322	QA108	5031.8	583
203	QB68	7411.8	453	263	QB88	6211.8	453	323	QB108	5011.8	453
204	QC68	7391.8	323	264	QC88	6191.8	323	324	QC108	4991.8	323
205	QA69	7371.8	583	265	QA89	6171.8	583	325	QA109	4971.8	583
206	QB69	7351.8	453	266	QB89	6151.8	453	326	QB109	4951.8	453
207	QC69	7331.8	323	267	QC89	6131.8	323	327	QC109	4931.8	323
208	QA70	7311.8	583	268	QA90	6111.8	583	328	QA110	4911.8	583
209	QB70	7291.8	453	269	QB90	6091.8	453	329	QB110	4891.8	453
210	QC70	7271.8	323	270	QC90	6071.8	323	330	QC110	4871.8	323
211	QA71	7251.8	583	271	QA91	6051.8	583	331	QA111	4851.8	583
212	QB71	7231.8	453	272	QB91	6031.8	453	332	QB111	4831.8	453
213	QC71	7211.8	323	273	QC91	6011.8	323	333	QC111	4811.8	323
214	QA72	7191.8	583	274	QA92	5991.8	583	334	QA112	4791.8	583
215	QB72	7171.8	453	275	QB92	5971.8	453	335	QB112	4771.8	453
216	QC72	7151.8	323	276	QC92	5951.8	323	336	QC112	4751.8	323
217	QA73	7131.8	583	277	QA93	5931.8	583	337	QA113	4731.8	583
218	QB73	7111.8	453	278	QB93	5911.8	453	338	QB113	4711.8	453
219	QC73	7091.8	323	279	QC93	5891.8	323	339	QC113	4691.8	323
220	QA74	7071.8	583	280	QA94	5871.8	583	340	QA114	4671.8	583
221	QB74	7051.8	453	281	QB94	5851.8	453	341	QB114	4651.8	453
222	QC74	7031.8	323	282	QC94	5831.8	323	342	QC114	4631.8	323
223	QA75	7011.8	583	283	QA95	5811.8	583	343	QA115	4611.8	583
224	QB75	6991.8	453	284	QB95	5791.8	453	344	QB115	4591.8	453
225	QC75	6971.8	323	285	QC95	5771.8	323	345	QC115	4571.8	323
226	QA76	6951.8	583	286	QA96	5751.8	583	346	QA116	4551.8	583
227	QB76	6931.8	453	287	QB96	5731.8	453	347	QB116	4531.8	453
228	QC76	6911.8	323	288	QC96	5711.8	323	348	QC116	4511.8	323
229	QA77	6891.8	583	289	QA97	5691.8	583	349	QA117	4491.8	583
230	QB77	6871.8	453	290	QB97	5671.8	453	350	QB117	4471.8	453
231	QC77	6851.8	323	291	QC97	5651.8	323	351	QC117	4451.8	323
232	QA78	6831.8	583	292	QA98	5631.8	583	352	QA118	4431.8	583
233	QB78	6811.8	453	293	QB98	5611.8	453	353	QB118	4411.8	453
234	QC78	6791.8	323	294	QC98	5591.8	323	354	QC118	4391.8	323
235	QA79	6771.8	583	295	QA99	5571.8	583	355	QA119	4371.8	583
236	QB79	6751.8	453	296	QB99	5551.8	453	356	QB119	4351.8	453
237	QC79	6731.8	323	297	QC99	5531.8	323	357	QC119	4331.8	323
238	QA80	6711.8	583	298	QA100	5511.8	583	358	QA120	4311.8	583
239	QB80	6691.8	453	299	QB100	5491.8	453	359	QB120	4291.8	453
240	QC80	6671.8	323	300	QC100	5471.8	323	360	QC120	4271.8	323

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
361	QA121	4251.8	583	421	QA141	3051.8	583	481	DUMMY	1746.6	593
362	QB121	4231.8	453	422	QB141	3031.8	453	482	DUMMY	1660.6	593
363	QC121	4211.8	323	423	QC141	3011.8	323	483	TP0	1440.6	593
364	QA122	4191.8	583	424	QA142	2991.8	583	484	TP0	1370.6	593
365	QB122	4171.8	453	425	QB142	2971.8	453	485	TP1	1155.6	593
366	QC122	4151.8	323	426	QC142	2951.8	323	486	TP1	1085.6	593
367	QA123	4131.8	583	427	QA143	2931.8	583	487	TP2	870.6	593
368	QB123	4111.8	453	428	QB143	2911.8	453	488	TP2	800.6	593
369	QC123	4091.8	323	429	QC143	2891.8	323	489	TP3	585.6	593
370	QA124	4071.8	583	430	QA144	2871.8	583	490	TP3	515.6	593
371	QB124	4051.8	453	431	QB144	2851.8	453	491	TP4	300.6	593
372	QC124	4031.8	323	432	QC144	2831.8	323	492	TP4	230.6	593
373	QA125	4011.8	583	433	QA145	2811.8	583	493	TP5	15.6	593
374	QB125	3991.8	453	434	QB145	2791.8	453	494	TP5	-54.4	593
375	QC125	3971.8	323	435	QC145	2771.8	323	495	TP6	-269.4	593
376	QA126	3951.8	583	436	QA146	2751.8	583	496	TP6	-339.4	593
377	QB126	3931.8	453	437	QB146	2731.8	453	497	TP7	-554.4	593
378	QC126	3911.8	323	438	QC146	2711.8	323	498	TP7	-624.4	593
379	QA127	3891.8	583	439	QA147	2691.8	583	499	TP8	-839.4	593
380	QB127	3871.8	453	440	QB147	2671.8	453	500	TP8	-909.4	593
381	QC127	3851.8	323	441	QC147	2651.8	323	501	TP9	-1124.4	593
382	QA128	3831.8	583	442	QA148	2631.8	583	502	TP9	-1194.4	593
383	QB128	3811.8	453	443	QB148	2611.8	453	503	DUMMY	-1296.4	593
384	QC128	3791.8	323	444	QC148	2591.8	323	504	DUMMY	-1382.4	593
385	QA129	3771.8	583	445	QA149	2571.8	583	505	TP11	-1468.4	593
386	QB129	3751.8	453	446	QB149	2551.8	453	506	TP12	-1554.4	593
387	QC129	3731.8	323	447	QC149	2531.8	323	507	TP13	-1640.4	593
388	QA130	3711.8	583	448	QA150	2511.8	583	508	DUMMY	-1726.4	593
389	QB130	3691.8	453	449	QB150	2491.8	453	509	QA161	-1866.55	583
390	QC130	3671.8	323	450	QC150	2471.8	323	510	QB161	-1886.55	453
391	QA131	3651.8	583	451	QA151	2451.8	583	511	QC161	-1906.55	323
392	QB131	3631.8	453	452	QB151	2431.8	453	512	QA162	-1926.55	583
393	QC131	3611.8	323	453	QC151	2411.8	323	513	QB162	-1946.55	453
394	QA132	3591.8	583	454	QA152	2391.8	583	514	QC162	-1966.55	323
395	QB132	3571.8	453	455	QB152	2371.8	453	515	QA163	-1986.55	583
396	QC132	3551.8	323	456	QC152	2351.8	323	516	QB163	-2006.55	453
397	QA133	3531.8	583	457	QA153	2331.8	583	517	QC163	-2026.55	323
398	QB133	3511.8	453	458	QB153	2311.8	453	518	QA164	-2046.55	583
399	QC133	3491.8	323	459	QC153	2291.8	323	519	QB164	-2066.55	453
400	QA134	3471.8	583	460	QA154	2271.8	583	520	QC164	-2086.55	323
401	QB134	3451.8	453	461	QB154	2251.8	453	521	QA165	-2106.55	583
402	QC134	3431.8	323	462	QC154	2231.8	323	522	QB165	-2126.55	453
403	QA135	3411.8	583	463	QA155	2211.8	583	523	QC165	-2146.55	323
404	QB135	3391.8	453	464	QB155	2191.8	453	524	QA166	-2166.55	583
405	QC135	3371.8	323	465	QC155	2171.8	323	525	QB166	-2186.55	453
406	QA136	3351.8	583	466	QA156	2151.8	583	526	QC166	-2206.55	323
407	QB136	3331.8	453	467	QB156	2131.8	453	527	QA167	-2226.55	583
408	QC136	3311.8	323	468	QC156	2111.8	323	528	QB167	-2246.55	453
409	QA137	3291.8	583	469	QA157	2091.8	583	529	QC167	-2266.55	323
410	QB137	3271.8	453	470	QB157	2071.8	453	530	QA168	-2286.55	583
411	QC137	3251.8	323	471	QC157	2051.8	323	531	QB168	-2306.55	453
412	QA138	3231.8	583	472	QA158	2031.8	583	532	QC168	-2326.55	323
413	QB138	3211.8	453	473	QB158	2011.8	453	533	QA169	-2346.55	583
414	QC138	3191.8	323	474	QC158	1991.8	323	534	QB169	-2366.55	453
415	QA139	3171.8	583	475	QA159	1971.8	583	535	QC169	-2386.55	323
416	QB139	3151.8	453	476	QB159	1951.8	453	536	QA170	-2406.55	583
417	QC139	3131.8	323	477	QC159	1931.8	323	537	QB170	-2426.55	453
418	QA140	3111.8	583	478	QA160	1911.8	583	538	QC170	-2446.55	323
419	QB140	3091.8	453	479	QB160	1891.8	453	539	QA171	-2466.55	583
420	QC140	3071.8	323	480	QC160	1871.8	323	540	QB171	-2486.55	453

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
541	QC171	-2506.55	323	601	QC191	-3706.55	323	661	QC211	-4906.55	323
542	QA172	-2526.55	583	602	QA192	-3726.55	583	662	QA212	-4926.55	583
543	QB172	-2546.55	453	603	QB192	-3746.55	453	663	QB212	-4946.55	453
544	QC172	-2566.55	323	604	QC192	-3766.55	323	664	QC212	-4966.55	323
545	QA173	-2586.55	583	605	QA193	-3786.55	583	665	QA213	-4986.55	583
546	QB173	-2606.55	453	606	QB193	-3806.55	453	666	QB213	-5006.55	453
547	QC173	-2626.55	323	607	QC193	-3826.55	323	667	QC213	-5026.55	323
548	QA174	-2646.55	583	608	QA194	-3846.55	583	668	QA214	-5046.55	583
549	QB174	-2666.55	453	609	QB194	-3866.55	453	669	QB214	-5066.55	453
550	QC174	-2686.55	323	610	QC194	-3886.55	323	670	QC214	-5086.55	323
551	QA175	-2706.55	583	611	QA195	-3906.55	583	671	QA215	-5106.55	583
552	QB175	-2726.55	453	612	QB195	-3926.55	453	672	QB215	-5126.55	453
553	QC175	-2746.55	323	613	QC195	-3946.55	323	673	QC215	-5146.55	323
554	QA176	-2766.55	583	614	QA196	-3966.55	583	674	QA216	-5166.55	583
555	QB176	-2786.55	453	615	QB196	-3986.55	453	675	QB216	-5186.55	453
556	QC176	-2806.55	323	616	QC196	-4006.55	323	676	QC216	-5206.55	323
557	QA177	-2826.55	583	617	QA197	-4026.55	583	677	QA217	-5226.55	583
558	QB177	-2846.55	453	618	QB197	-4046.55	453	678	QB217	-5246.55	453
559	QC177	-2866.55	323	619	QC197	-4066.55	323	679	QC217	-5266.55	323
560	QA178	-2886.55	583	620	QA198	-4086.55	583	680	QA218	-5286.55	583
561	QB178	-2906.55	453	621	QB198	-4106.55	453	681	QB218	-5306.55	453
562	QC178	-2926.55	323	622	QC198	-4126.55	323	682	QC218	-5326.55	323
563	QA179	-2946.55	583	623	QA199	-4146.55	583	683	QA219	-5346.55	583
564	QB179	-2966.55	453	624	QB199	-4166.55	453	684	QB219	-5366.55	453
565	QC179	-2986.55	323	625	QC199	-4186.55	323	685	QC219	-5386.55	323
566	QA180	-3006.55	583	626	QA200	-4206.55	583	686	QA220	-5406.55	583
567	QB180	-3026.55	453	627	QB200	-4226.55	453	687	QB220	-5426.55	453
568	QC180	-3046.55	323	628	QC200	-4246.55	323	688	QC220	-5446.55	323
569	QA181	-3066.55	583	629	QA201	-4266.55	583	689	QA221	-5466.55	583
570	QB181	-3086.55	453	630	QB201	-4286.55	453	690	QB221	-5486.55	453
571	QC181	-3106.55	323	631	QC201	-4306.55	323	691	QC221	-5506.55	323
572	QA182	-3126.55	583	632	QA202	-4326.55	583	692	QA222	-5526.55	583
573	QB182	-3146.55	453	633	QB202	-4346.55	453	693	QB222	-5546.55	453
574	QC182	-3166.55	323	634	QC202	-4366.55	323	694	QC222	-5566.55	323
575	QA183	-3186.55	583	635	QA203	-4386.55	583	695	QA223	-5586.55	583
576	QB183	-3206.55	453	636	QB203	-4406.55	453	696	QB223	-5606.55	453
577	QC183	-3226.55	323	637	QC203	-4426.55	323	697	QC223	-5626.55	323
578	QA184	-3246.55	583	638	QA204	-4446.55	583	698	QA224	-5646.55	583
579	QB184	-3266.55	453	639	QB204	-4466.55	453	699	QB224	-5666.55	453
580	QC184	-3286.55	323	640	QC204	-4486.55	323	700	QC224	-5686.55	323
581	QA185	-3306.55	583	641	QA205	-4506.55	583	701	QA225	-5706.55	583
582	QB185	-3326.55	453	642	QB205	-4526.55	453	702	QB225	-5726.55	453
583	QC185	-3346.55	323	643	QC205	-4546.55	323	703	QC225	-5746.55	323
584	QA186	-3366.55	583	644	QA206	-4566.55	583	704	QA226	-5766.55	583
585	QB186	-3386.55	453	645	QB206	-4586.55	453	705	QB226	-5786.55	453
586	QC186	-3406.55	323	646	QC206	-4606.55	323	706	QC226	-5806.55	323
587	QA187	-3426.55	583	647	QA207	-4626.55	583	707	QA227	-5826.55	583
588	QB187	-3446.55	453	648	QB207	-4646.55	453	708	QB227	-5846.55	453
589	QC187	-3466.55	323	649	QC207	-4666.55	323	709	QC227	-5866.55	323
590	QA188	-3486.55	583	650	QA208	-4686.55	583	710	QA228	-5886.55	583
591	QB188	-3506.55	453	651	QB208	-4706.55	453	711	QB228	-5906.55	453
592	QC188	-3526.55	323	652	QC208	-4726.55	323	712	QC228	-5926.55	323
593	QA189	-3546.55	583	653	QA209	-4746.55	583	713	QA229	-5946.55	583
594	QB189	-3566.55	453	654	QB209	-4766.55	453	714	QB229	-5966.55	453
595	QC189	-3586.55	323	655	QC209	-4786.55	323	715	QC229	-5986.55	323
596	QA190	-3606.55	583	656	QA210	-4806.55	583	716	QA230	-6006.55	583
597	QB190	-3626.55	453	657	QB210	-4826.55	453	717	QB230	-6026.55	453
598	QC190	-3646.55	323	658	QC210	-4846.55	323	718	QC230	-6046.55	323
599	QA191	-3666.55	583	659	QA211	-4866.55	583	719	QA231	-6066.55	583
600	QB191	-3686.55	453	660	QB211	-4886.55	453	720	QB231	-6086.55	453

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
721	QC231	-6106.55	323	781	QC251	-7306.55	323	841	QC271	-8506.55	323
722	QA232	-6126.55	583	782	QA252	-7326.55	583	842	QA272	-8526.55	583
723	QB232	-6146.55	453	783	QB252	-7346.55	453	843	QB272	-8546.55	453
724	QC232	-6166.55	323	784	QC252	-7366.55	323	844	QC272	-8566.55	323
725	QA233	-6186.55	583	785	QA253	-7386.55	583	845	QA273	-8586.55	583
726	QB233	-6206.55	453	786	QB253	-7406.55	453	846	QB273	-8606.55	453
727	QC233	-6226.55	323	787	QC253	-7426.55	323	847	QC273	-8626.55	323
728	QA234	-6246.55	583	788	QA254	-7446.55	583	848	QA274	-8646.55	583
729	QB234	-6266.55	453	789	QB254	-7466.55	453	849	QB274	-8666.55	453
730	QC234	-6286.55	323	790	QC254	-7486.55	323	850	QC274	-8686.55	323
731	QA235	-6306.55	583	791	QA255	-7506.55	583	851	QA275	-8706.55	583
732	QB235	-6326.55	453	792	QB255	-7526.55	453	852	QB275	-8726.55	453
733	QC235	-6346.55	323	793	QC255	-7546.55	323	853	QC275	-8746.55	323
734	QA236	-6366.55	583	794	QA256	-7566.55	583	854	QA276	-8766.55	583
735	QB236	-6386.55	453	795	QB256	-7586.55	453	855	QB276	-8786.55	453
736	QC236	-6406.55	323	796	QC256	-7606.55	323	856	QC276	-8806.55	323
737	QA237	-6426.55	583	797	QA257	-7626.55	583	857	QA277	-8826.55	583
738	QB237	-6446.55	453	798	QB257	-7646.55	453	858	QB277	-8846.55	453
739	QC237	-6466.55	323	799	QC257	-7666.55	323	859	QC277	-8866.55	323
740	QA238	-6486.55	583	800	QA258	-7686.55	583	860	QA278	-8886.55	583
741	QB238	-6506.55	453	801	QB258	-7706.55	453	861	QB278	-8906.55	453
742	QC238	-6526.55	323	802	QC258	-7726.55	323	862	QC278	-8926.55	323
743	QA239	-6546.55	583	803	QA259	-7746.55	583	863	QA279	-8946.55	583
744	QB239	-6566.55	453	804	QB259	-7766.55	453	864	QB279	-8966.55	453
745	QC239	-6586.55	323	805	QC259	-7786.55	323	865	QC279	-8986.55	323
746	QA240	-6606.55	583	806	QA260	-7806.55	583	866	QA280	-9006.55	583
747	QB240	-6626.55	453	807	QB260	-7826.55	453	867	QB280	-9026.55	453
748	QC240	-6646.55	323	808	QC260	-7846.55	323	868	QC280	-9046.55	323
749	QA241	-6666.55	583	809	QA261	-7866.55	583	869	QA281	-9066.55	583
750	QB241	-6686.55	453	810	QB261	-7886.55	453	870	QB281	-9086.55	453
751	QC241	-6706.55	323	811	QC261	-7906.55	323	871	QC281	-9106.55	323
752	QA242	-6726.55	583	812	QA262	-7926.55	583	872	QA282	-9126.55	583
753	QB242	-6746.55	453	813	QB262	-7946.55	453	873	QB282	-9146.55	453
754	QC242	-6766.55	323	814	QC262	-7966.55	323	874	QC282	-9166.55	323
755	QA243	-6786.55	583	815	QA263	-7986.55	583	875	QA283	-9186.55	583
756	QB243	-6806.55	453	816	QB263	-8006.55	453	876	QB283	-9206.55	453
757	QC243	-6826.55	323	817	QC263	-8026.55	323	877	QC283	-9226.55	323
758	QA244	-6846.55	583	818	QA264	-8046.55	583	878	QA284	-9246.55	583
759	QB244	-6866.55	453	819	QB264	-8066.55	453	879	QB284	-9266.55	453
760	QC244	-6886.55	323	820	QC264	-8086.55	323	880	QC284	-9286.55	323
761	QA245	-6906.55	583	821	QA265	-8106.55	583	881	QA285	-9306.55	583
762	QB245	-6926.55	453	822	QB265	-8126.55	453	882	QB285	-9326.55	453
763	QC245	-6946.55	323	823	QC265	-8146.55	323	883	QC285	-9346.55	323
764	QA246	-6966.55	583	824	QA266	-8166.55	583	884	QA286	-9366.55	583
765	QB246	-6986.55	453	825	QB266	-8186.55	453	885	QB286	-9386.55	453
766	QC246	-7006.55	323	826	QC266	-8206.55	323	886	QC286	-9406.55	323
767	QA247	-7026.55	583	827	QA267	-8226.55	583	887	QA287	-9426.55	583
768	QB247	-7046.55	453	828	QB267	-8246.55	453	888	QB287	-9446.55	453
769	QC247	-7066.55	323	829	QC267	-8266.55	323	889	QC287	-9466.55	323
770	QA248	-7086.55	583	830	QA268	-8286.55	583	890	QA288	-9486.55	583
771	QB248	-7106.55	453	831	QB268	-8306.55	453	891	QB288	-9506.55	453
772	QC248	-7126.55	323	832	QC268	-8326.55	323	892	QC288	-9526.55	323
773	QA249	-7146.55	583	833	QA269	-8346.55	583	893	QA289	-9546.55	583
774	QB249	-7166.55	453	834	QB269	-8366.55	453	894	QB289	-9566.55	453
775	QC249	-7186.55	323	835	QC269	-8386.55	323	895	QC289	-9586.55	323
776	QA250	-7206.55	583	836	QA270	-8406.55	583	896	QA290	-9606.55	583
777	QB250	-7226.55	453	837	QB270	-8426.55	453	897	QB290	-9626.55	453
778	QC250	-7246.55	323	838	QC270	-8446.55	323	898	QC290	-9646.55	323
779	QA251	-7266.55	583	839	QA271	-8466.55	583	899	QA291	-9666.55	583
780	QB251	-7286.55	453	840	QB271	-8486.55	453	900	QB291	-9686.55	453

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
901	QC291	-9706.55	323	961	QC311	-10906.55	323	1021	DUMMY	-11676.5	-593
902	QA292	-9726.55	583	962	QA312	-10926.55	583	1022	DUMMY	-11590.45	-593
903	QB292	-9746.55	453	963	QB312	-10946.55	453	1023	DUMMY	-11504.45	-593
904	QC292	-9766.55	323	964	QC312	-10966.55	323	1024	DUMMY	-11418.45	-593
905	QA293	-9786.55	583	965	QA313	-10986.55	583	1025	DUMMY	-11332.45	-593
906	QB293	-9806.55	453	966	QB313	-11006.55	453	1026	DUMMY	-11246.45	-593
907	QC293	-9826.55	323	967	QC313	-11026.55	323	1027	DUMMY	-11160.45	-593
908	QA294	-9846.55	583	968	QA314	-11046.55	583	1028	DUMMY	-11074.45	-593
909	QB294	-9866.55	453	969	QB314	-11066.55	453	1029	DUMMY	-10988.45	-593
910	QC294	-9886.55	323	970	QC314	-11086.55	323	1030	DUMMY	-10902.45	-593
911	QA295	-9906.55	583	971	QA315	-11106.55	583	1031	DUMMY	-10816.45	-593
912	QB295	-9926.55	453	972	QB315	-11126.55	453	1032	DUMMY	-10730.45	-593
913	QC295	-9946.55	323	973	QC315	-11146.55	323	1033	DUMMY	-10644.45	-593
914	QA296	-9966.55	583	974	QA316	-11166.55	583	1034	DUMMY	-10558.45	-593
915	QB296	-9986.55	453	975	QB316	-11186.55	453	1035	DUMMY	-10472.45	-593
916	QC296	-10006.55	323	976	QC316	-11206.55	323	1036	DUMMY	-10386.45	-593
917	QA297	-10026.55	583	977	QA317	-11226.55	583	1037	DUMMY	-10300.45	-593
918	QB297	-10046.55	453	978	QB317	-11246.55	453	1038	DUMMY	-10214.45	-593
919	QC297	-10066.55	323	979	QC317	-11266.55	323	1039	DUMMY	-10128.45	-593
920	QA298	-10086.55	583	980	QA318	-11286.55	583	1040	DUMMY	-10042.45	-593
921	QB298	-10106.55	453	981	QB318	-11306.55	453	1041	DUMMY	-9956.45	-593
922	QC298	-10126.55	323	982	QC318	-11326.55	323	1042	DUMMY	-9870.45	-593
923	QA299	-10146.55	583	983	QA319	-11346.55	583	1043	DUMMY	-9784.45	-593
924	QB299	-10166.55	453	984	QB319	-11366.55	453	1044	DUMMY	-9698.45	-593
925	QC299	-10186.55	323	985	QC319	-11386.55	323	1045	DUMMY	-9612.45	-593
926	QA300	-10206.55	583	986	QA320	-11406.55	583	1046	DUMMY	-9526.45	-593
927	QB300	-10226.55	453	987	QB320	-11426.55	453	1047	DUMMY	-9440.45	-593
928	QC300	-10246.55	323	988	QC320	-11446.55	323	1048	DUMMY	-9354.45	-593
929	QA301	-10266.55	583	989	L alignment	-11589	590.5	1049	DUMMY	-9268.45	-593
930	QB301	-10286.55	453	990	DUMMY	-11676.5	608	1050	DUMMY	-9182.45	-593
931	QC301	-10306.55	323	991	PASSL52	-11676.5	516	1051	DUMMY	-9096.45	-593
932	QA302	-10326.55	583	992	PASSL52	-11606.5	516	1052	DUMMY	-9010.45	-593
933	QB302	-10346.55	453	993	OEV	-11676.5	436	1053	DUMMY	-8924.45	-593
934	QC302	-10366.55	323	994	OEV	-11606.5	436	1054	DUMMY	-8838.45	-593
935	QA303	-10386.55	583	995	UDP	-11676.5	356	1055	DUMMY	-8752.45	-593
936	QB303	-10406.55	453	996	UDP	-11606.5	356	1056	DUMMY	-8666.45	-593
937	QC303	-10426.55	323	997	CKV	-11676.5	276	1057	DUMMY	-8580.45	-593
938	QA304	-10446.55	583	998	CKV	-11606.5	276	1058	DUMMY	-8494.45	-593
939	QB304	-10466.55	453	999	UDP	-11676.5	196	1059	DUMMY	-8408.45	-593
940	QC304	-10486.55	323	1000	UDP	-11606.5	196	1060	DUMMY	-8322.45	-593
941	QA305	-10506.55	583	1001	STV	-11676.5	116	1061	DUMMY	-8236.45	-593
942	QB305	-10526.55	453	1002	STV	-11606.5	116	1062	DUMMY	-8150.45	-593
943	QC305	-10546.55	323	1003	STVC	-11676.5	36	1063	DUMMY	-8064.45	-593
944	QA306	-10566.55	583	1004	STVC	-11606.5	36	1064	DUMMY	-7978.45	-593
945	QB306	-10586.55	453	1005	PASSL42	-11676.5	-44	1065	DUMMY	-7892.45	-593
946	QC306	-10606.55	323	1006	PASSL42	-11606.5	-44	1066	DUMMY	-7806.45	-593
947	QA307	-10626.55	583	1007	PASSL42	-11536.5	-44	1067	DUMMY	-7720.45	-593
948	QB307	-10646.55	453	1008	PASSL32	-11676.5	-124	1068	PASSL11	-7634.45	-593
949	QC307	-10666.55	323	1009	PASSL32	-11606.5	-124	1069	PASSL11	-7564.45	-593
950	QA308	-10686.55	583	1010	PASSL32	-11536.5	-124	1070	PASSL11	-7494.45	-593
951	QB308	-10706.55	453	1011	PASSL22	-11676.5	-204	1071	PASSL11	-7424.45	-593
952	QC308	-10726.55	323	1012	PASSL22	-11606.5	-204	1072	PASSL21	-7338.45	-593
953	QA309	-10746.55	583	1013	PASSL22	-11536.5	-204	1073	PASSL21	-7268.45	-593
954	QB309	-10766.55	453	1014	PASSL12	-11676.5	-284	1074	PASSL21	-7198.45	-593
955	QC309	-10786.55	323	1015	PASSL12	-11606.5	-284	1075	PASSL21	-7128.45	-593
956	QA310	-10806.55	583	1016	PASSL12	-11536.5	-284	1076	PASSL31	-7042.45	-593
957	QB310	-10826.55	453	1017	DUMMY	-11676.5	-364	1077	PASSL31	-6972.45	-593
958	QC310	-10846.55	323	1018	DUMMY	-11606.5	-364	1078	PASSL31	-6902.45	-593
959	QA311	-10866.55	583	1019	DUMMY	-11676.5	-444	1079	PASSL31	-6832.45	-593
960	QB311	-10886.55	453	1020	DUMMY	-11606.5	-444	1080	PASSL41	-6746.45	-593

No.	Name	X	Y	No.	Name	X	Y	No.	Name	X	Y
1081	PASSL41	-6676.45	-593	1141	D15	-1360.45	-593	1201	IHS	3319.55	-593
1082	PASSL41	-6606.45	-593	1142	D15	-1290.45	-593	1202	IVS	3405.55	-593
1083	PASSL41	-6536.45	-593	1143	D14	-1204.45	-593	1203	IVS	3475.55	-593
1084	PASSL51	-6450.45	-593	1144	D14	-1134.45	-593	1204	DEN	3561.55	-593
1085	PASSL51	-6380.45	-593	1145	D13	-1048.45	-593	1205	DEN	3631.55	-593
1086	DUMMY	-6294.45	-593	1146	D13	-978.45	-593	1206	STB	3717.55	-593
1087	GND	-6208.45	-593	1147	D12	-892.45	-593	1207	STB	3787.55	-593
1088	GND	-6138.45	-593	1148	D12	-822.45	-593	1208	DUMMY	3873.55	-593
1089	GND	-6068.45	-593	1149	D11	-736.45	-593	1209	CF2	3959.55	-593
1090	GND	-5998.45	-593	1150	D11	-666.45	-593	1210	CF2	4029.55	-593
1091	DUMMY	-5912.45	-593	1151	D10	-580.45	-593	1211	CF1	4115.55	-593
1092	RESETB	-5826.45	-593	1152	D10	-510.45	-593	1212	CF1	4185.55	-593
1093	RESETB	-5756.45	-593	1153	DUMMY	-424.45	-593	1213	MOD	4271.55	-593
1094	VSET	-5670.45	-593	1154	VDD	-338.45	-593	1214	MOD	4341.55	-593
1095	VSET	-5600.45	-593	1155	VDD	-268.45	-593	1215	ZX3	4427.55	-593
1096	TP10	-5514.45	-593	1156	VDD	-198.45	-593	1216	ZX3	4497.55	-593
1097	TP10	-5444.45	-593	1157	VDD	-128.45	-593	1217	ZX2	4583.55	-593
1098	UD	-5269.45	-593	1158	DUMMY	-42.45	-593	1218	ZX2	4653.55	-593
1099	UD	-5199.45	-593	1159	V8	43.55	-593	1219	ZX1	4739.55	-593
1100	LRC	-5113.45	-593	1160	V8	113.55	-593	1220	ZX1	4809.55	-593
1101	LRC	-5043.45	-593	1161	V7	199.55	-593	1221	DUMMY	4895.55	-593
1102	IF2	-4957.45	-593	1162	V7	269.55	-593	1222	VCC	4981.55	-593
1103	IF2	-4887.45	-593	1163	V6	355.55	-593	1223	VCC	5051.55	-593
1104	IF1	-4801.45	-593	1164	V6	425.55	-593	1224	VCC	5121.55	-593
1105	IF1	-4731.45	-593	1165	V5	511.55	-593	1225	VCC	5191.55	-593
1106	DUMMY	-4645.45	-593	1166	V5	581.55	-593	1226	DUMMY	5277.55	-593
1107	SPENA	-4559.45	-593	1167	V4	667.55	-593	1227	OSD_EN	5363.55	-593
1108	SPENA	-4489.45	-593	1168	V4	737.55	-593	1228	OSD_EN	5433.55	-593
1109	SPCK	-4403.45	-593	1169	V3	823.55	-593	1229	OSD_B	5519.55	-593
1110	SPCK	-4333.45	-593	1170	V3	893.55	-593	1230	OSD_B	5589.55	-593
1111	SPDA	-4247.45	-593	1171	V2	979.55	-593	1231	OSD_G	5675.55	-593
1112	SPDA	-4177.45	-593	1172	V2	1049.55	-593	1232	OSD_G	5745.55	-593
1113	POL	-3947.45	-593	1173	V1	1135.55	-593	1233	OSD_R	5831.55	-593
1114	POL	-3877.45	-593	1174	V1	1205.55	-593	1234	OSD_R	5901.55	-593
1115	NPC	-3662.45	-593	1175	DUMMY	1291.55	-593	1235	OSD_CLK	5987.55	-593
1116	NPC	-3592.45	-593	1176	VSS	1377.55	-593	1236	OSD_CLK	6057.55	-593
1117	QXH	-3377.45	-593	1177	VSS	1447.55	-593	1237	OSD_VS	6272.55	-593
1118	QXH	-3307.45	-593	1178	VSS	1517.55	-593	1238	OSD_VS	6342.55	-593
1119	DUMMY	-3092.45	-593	1179	VSS	1587.55	-593	1239	OSD_HS	6557.55	-593
1120	D27	-3006.45	-593	1180	DUMMY	1673.55	-593	1240	OSD_HS	6627.55	-593
1121	D27	-2936.45	-593	1181	D07	1759.55	-593	1241	DUMMY	6842.55	-593
1122	D26	-2850.45	-593	1182	D07	1829.55	-593	1242	PASSR51	6928.55	-593
1123	D26	-2780.45	-593	1183	D06	1915.55	-593	1243	PASSR51	6998.55	-593
1124	D25	-2694.45	-593	1184	D06	1985.55	-593	1244	PASSR41	7084.55	-593
1125	D25	-2624.45	-593	1185	D05	2071.55	-593	1245	PASSR41	7154.55	-593
1126	D24	-2538.45	-593	1186	D05	2141.55	-593	1246	PASSR41	7224.55	-593
1127	D24	-2468.45	-593	1187	D04	2227.55	-593	1247	PASSR41	7294.55	-593
1128	D23	-2382.45	-593	1188	D04	2297.55	-593	1248	PASSR31	7380.55	-593
1129	D23	-2312.45	-593	1189	D03	2383.55	-593	1249	PASSR31	7450.55	-593
1130	D22	-2226.45	-593	1190	D03	2453.55	-593	1250	PASSR31	7520.55	-593
1131	D22	-2156.45	-593	1191	D02	2539.55	-593	1251	PASSR31	7590.55	-593
1132	D21	-2070.45	-593	1192	D02	2609.55	-593	1252	PASSR21	7676.55	-593
1133	D21	-2000.45	-593	1193	D01	2695.55	-593	1253	PASSR21	7746.55	-593
1134	D20	-1914.45	-593	1194	D01	2765.55	-593	1254	PASSR21	7816.55	-593
1135	D20	-1844.45	-593	1195	D00	2851.55	-593	1255	PASSR21	7886.55	-593
1136	DUMMY	-1758.45	-593	1196	D00	2921.55	-593	1256	PASSR11	7972.55	-593
1137	D17	-1672.45	-593	1197	DUMMY	3007.55	-593	1257	PASSR11	8042.55	-593
1138	D17	-1602.45	-593	1198	CLK	3093.55	-593	1258	PASSR11	8112.55	-593
1139	D16	-1516.45	-593	1199	CLK	3163.55	-593	1259	PASSR11	8182.55	-593
1140	D16	-1446.45	-593	1200	IHS	3249.55	-593	1260	DUMMY	8268.55	-593

No.	Name	X	Y
1261	DUMMY	8354.55	-593
1262	DUMMY	8440.55	-593
1263	DUMMY	8526.55	-593
1264	DUMMY	8612.55	-593
1265	DUMMY	8698.55	-593
1266	DUMMY	8784.55	-593
1267	DUMMY	8870.55	-593
1268	DUMMY	8956.55	-593
1269	DUMMY	9042.55	-593
1270	DUMMY	9128.55	-593
1271	DUMMY	9214.55	-593
1272	DUMMY	9300.55	-593
1273	DUMMY	9386.55	-593
1274	DUMMY	9472.55	-593
1275	DUMMY	9558.55	-593
1276	DUMMY	9644.55	-593
1277	DUMMY	9730.55	-593
1278	DUMMY	9816.55	-593
1279	DUMMY	9902.55	-593
1280	DUMMY	9988.55	-593
1281	DUMMY	10074.55	-593
1282	DUMMY	10160.55	-593
1283	DUMMY	10246.55	-593
1284	DUMMY	10332.55	-593
1285	DUMMY	10418.55	-593
1286	DUMMY	10504.55	-593
1287	DUMMY	10590.55	-593
1288	DUMMY	10676.55	-593
1289	DUMMY	10762.55	-593
1290	DUMMY	10848.55	-593
1291	DUMMY	10934.55	-593
1292	DUMMY	11020.55	-593
1293	DUMMY	11106.55	-593
1294	DUMMY	11192.55	-593
1295	DUMMY	11278.55	-593
1296	DUMMY	11364.55	-593
1297	DUMMY	11450.55	-593
1298	DUMMY	11536.55	-593
1299	DUMMY	11676.5	-593
1300	DUMMY	11606.5	-444
1301	DUMMY	11676.5	-444
1302	DUMMY	11606.5	-364
1303	DUMMY	11676.5	-364
1304	PASSR12	11536.5	-284
1305	PASSR12	11606.5	-284
1306	PASSR12	11676.5	-284
1307	PASSR22	11536.5	-204
1308	PASSR22	11606.5	-204
1309	PASSR22	11676.5	-204
1310	PASSR32	11536.5	-124
1311	PASSR32	11606.5	-124
1312	PASSR32	11676.5	-124
1313	PASSR42	11536.5	-44
1314	PASSR42	11606.5	-44
1315	PASSR42	11676.5	-44
1316	STVC	11606.5	36
1317	STVC	11676.5	36
1318	STV	11606.5	116
1319	STV	11676.5	116
1320	UDC	11606.5	196

No.	Name	X	Y
1321	UDC	11676.5	196
1322	CKV	11606.5	276
1323	CKV	11676.5	276
1324	UDC	11606.5	356
1325	UDC	11676.5	356
1326	OEV	11606.5	436
1327	OEV	11676.5	436
1328	PASSR52	11606.5	516
1329	PASSR52	11676.5	516
1330	DUMMY	11676.5	608
1331	R alignment	11589	590.5

12. Revision History

Version	EFF.DATE	DESCRIPTION OF CHANGES
01	2005/01/06	New setup.