

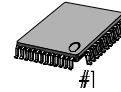
**GENERAL DESCRIPTION**

KS7214 is Timing control IC for generating timing signal & sync signal which required camera system using monochrome CCD Image sensor.

**FUNCTIONS**

- EIA/CCIR STANDARDS TIMING MODE
- HI-BAND/NORMAL TIMING MODE
- FRAME/FIELD ACCUMULATION MODE
- INTERLACE/NON-INTERLACE MODE
- EXTERNAL SYNCHRONIZATION MODE
- ELECTRONIC IRIS (ELECTRONIC SHUTTER)
- SYNC SIGNAL GENERATION
- OSCILLATION FREQUENCY :
  - EIA NORMAL MODE : 19.06992 MHz
  - CCIR NORMAL MODE : 18.93750 MHz
  - EIA HI-BAND MODE : 28.63636 MHz
  - CCIR HI-BAND MODE : 28.37500 MHz

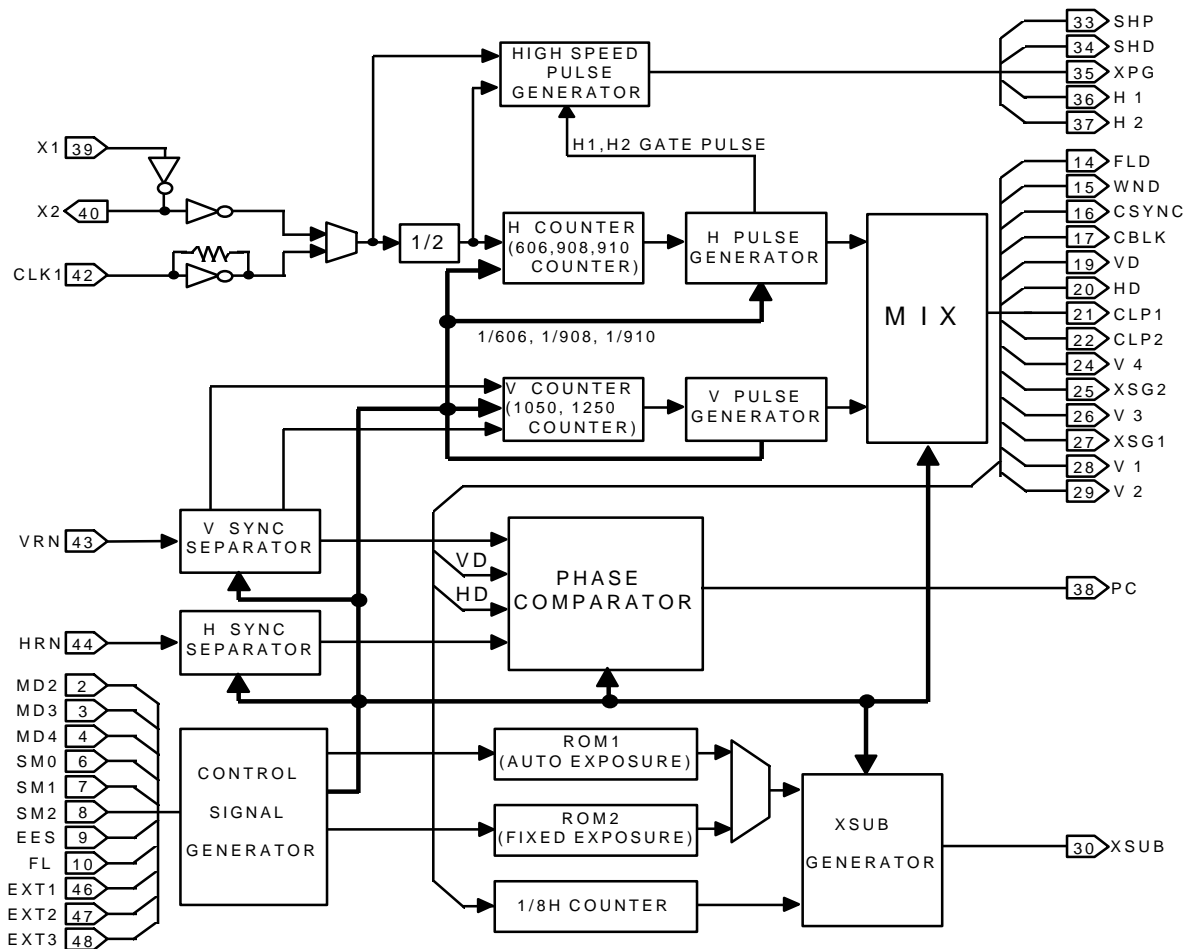
48 - QFP - 0707



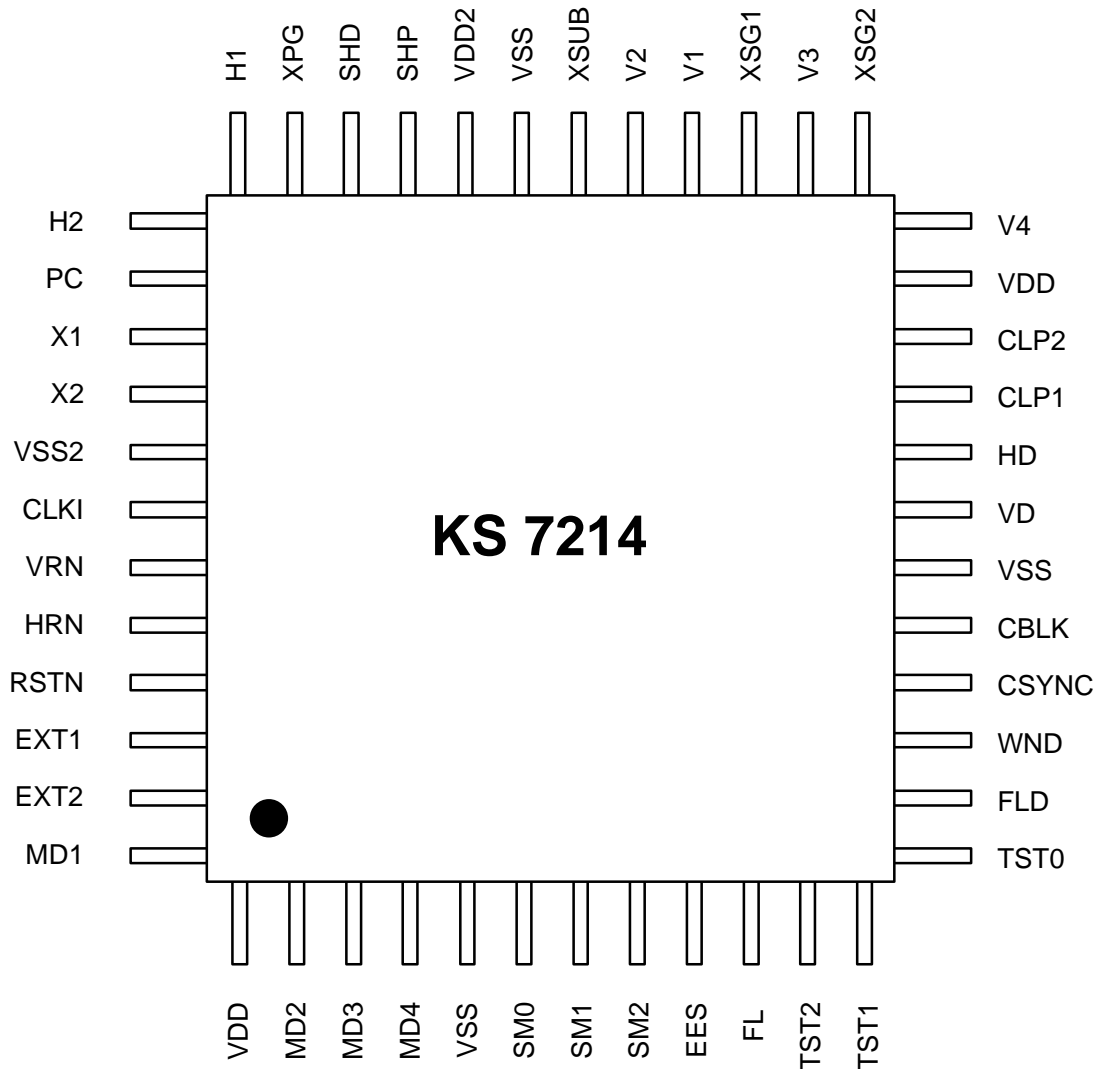
**ORDERING INFORMATION**

Device	Package	Operating Temperature
KS7214	48-QFP-0707	- 20°C ~ +75 °C

**BLOCK DIAGRAM**



PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	Pin Name	I/O	Pin Description
1	VDD	-	Power Supply
2	MD2	I	Mode Switching; HI-Band: High, Normal: Low (with Pull-down)
3	MD3	I	Mode Switching; Non - Interlace: High, Interlace: Low (with Pull-down)
4	MD4	I	Mode Switching; Frame : High, Field: Low (with Pull-down)
5	VSS	-	Ground
6	SM0	I	Shutter Speed Control (with Pull-down)
7	SM1	I	Shutter Speed Control (with Pull-down)
8	SM2	I	Shutter Speed Control (with Pull-down)
9	EES	I	Electronic Shutter Mode; Auto Mode: High, Fixed Mode: Low (with Pull-down)
10	FL	I	Flickerless Shutter Mode; Flickerless Mode: High (with Pull-down)
11	TST2	I	Test Mode Select 2 (with Pull-down)
12	TST1	I	Test Mode Select 1 (with Pull-down)
13	TST0	I	Test Mode Select 0 (with Pull-down)
14	FLD	O	Field Separation Pulse
15	WND	O	Window Pulse
16	CSYNC	O	Composite Sync Pulse
17	CBLK	O	Composite Blank Pulse
18	VSS	-	Ground
19	VD	O	Vertical Drive Pulse
20	HD	O	Horizontal Drive Pulse
21	CLP1	O	Clamp Pulse 1
22	CLP2	O	Clamp Pulse 2
23	VDD	-	Power Supply
24	V4	O	CCD Vertical Register Drive Pulse 4

**PIN DESCRIPTION** (Continued)

Pin No.	Pin Name	I/O	Pin Description
25	XSG2	O	CCD Sensor Read Out Pulse 2
26	V3	O	CCD Vertical Register Drive Pulse 3
27	XSG1	O	CCD Sensor Read Out Pulse 1
28	V1	O	CCD Vertical Register Drive Pulse 1
29	V2	O	CCD Vertical Register Drive Pulse 2
30	XSUB	O	CCD Discharge Pulse
31	VSS	-	Ground
32	VDD2	-	Power Supply 2
33	SHP	O	Precharge Sample & Hold Pulse
34	SHD	O	Data Sample & Hold Pulse
35	XPG	O	CCD Reset Gate Pulse
36	H1	O	CCD Horizontal Register Drive Pulse
37	H2	O	CCD Horizontal Register Drive Pulse
38	PC	O	Phase Comparator Output
39	X1	I	Oscillator Input
40	X2	O	Oscillator Output
41	VSS2	-	Ground 2
42	CLKI	I	Clock Input For EXT. Sync Mode
43	VRN	I	Vertical PLL Reference For External Sync Mode (Schmitt Pull-up)
44	HRN	I	Horizontal PLL Reference For External Sync Mode (Schmitt Pull-up)
45	RSTN	I	System Initialization Pulse (Schmitt Pull-up)
46	EXT1	I	External Sync Mode Select (with Pull-down)
47	EXT2	I	External Sync Mode Select (with Pull-down)
48	MD1	I	Mode Switching; CCIR: High, EIA: Low (with Pull-down)

**ABSOLUTE MAXIMUM RATINGS** (Ta = 25 °C)

PARAMETER	SYMBOL	CONDITION	UNIT
SUPPLY VOLTAGE	VDD	VSS - 0.3 ~ + 7.0	V
INPUT VOLTAGE	VI	VSS - 0.3 ~ VDD + 0.3	V
OUTPUT VOLTAGE	VO	VSS - 0.3 ~ VDD + 0.3	V
OPERATING TEMP.	T <sub>opr</sub>	0 ~ + 70	°C
STORAGE TEMP.	T <sub>str</sub>	- 40 ~ + 125	°C
LATCH-UP CURRENT	I <sub>LU</sub>	100	mA

**DC CHARACTERISTICS** (Ta = 25 °C)

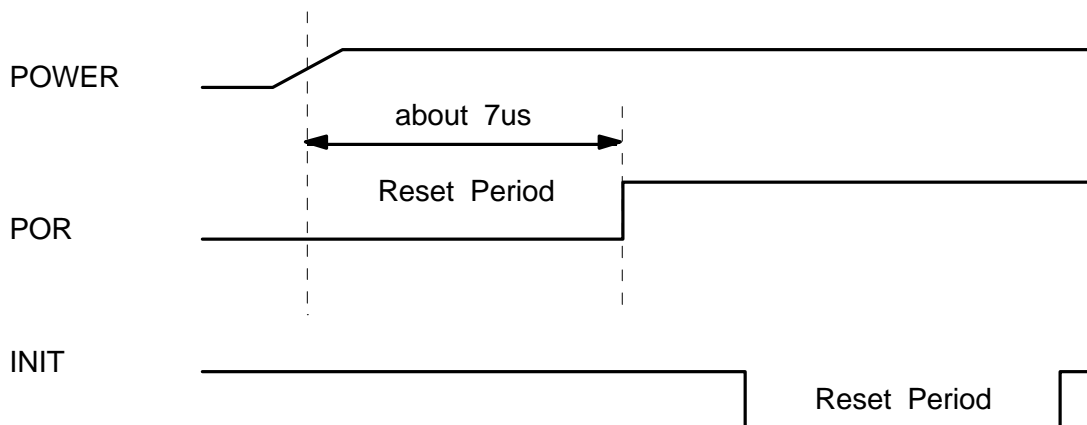
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	VDD	-	4.75	5.00	5.25	V
Input voltage1 (Normal input)	VIH 1	CMOS Level Interface	0.7VDD	-	-	V
	VIL 1	CMOS Level Interface	-	-	0.3VDD	V
Input voltage2 (Pin 43, 44, 45)	VIH2	CMOS Level schmitt trigger	0.8VDD	-	-	V
	VIL2	CMOS Level schmitt trigger	-	-	0.2VDD	V
Input Current 1(With pull-down)	IIH1	VI = VDD	50	-	200	uA
	IIL1	VI = VSS	-10	-	10	uA
Input Current 2 (With pull-up: Pin 43, 44, 45)	IIH2	VI = VDD	-10	-	10	uA
	IIL2	VI = VSS	-200	-	-50	uA
Input Current 3 (Normal Input: Pin 42)	IIH3	VI = VDD	-40	-	40	uA
	IIL3	VI = VSS	-40	-	40	uA
Output voltage 1(Normal output)	VOH1	IOH = -2mA	2.4	-	-	V
	VOL1	IOL = 2mA	-	-	0.4	V
Output voltage 2 (Pin 33, 34, 35)	VOH2	IOH = -4mA	2.4	-	-	V
	VOL2	IOL = 4mA	-	-	0.4	V
Output voltage 3 (Pin 36, 37)	VOH3	IOH = -16mA	2.4	-	-	V
	VOL3	IOL = 16mA	-	-	0.4	V
Output voltage 4 (Pin 40)	VOH4	IOH = -1mA	2.4	-	-	V
	VOL4	IOL = 1mA	-	-	0.4	V
Operating current	IDD	VDD = 5.25V	-	25	50	mA
Static current	I <sub>ST</sub>	VDD = 5.25V	-	420	-	uA

**OPERATION EXPLANATION**

INTERNAL RESET OPERATION

\* Including power on reset. (Typ. 7us)

\* Rstn low active reset at the internal mode



**EXTERNAL SYNCHRONIZATION OPERATION**

EXT 1	EXT 2	MODE
0	0	Internal Sync. Mode
1	1	External Composite Sync. Mode
1	0	Line Lock Sync. Mode
1	1	Separate Sync. Mode

**HD PHASE SELECTION**

TST 2	TST 1	TST0	MODE
0	0	0	NORMAL HD
1	1	1	REVERSED HD
ELSE			REVERSED

**ELECTRONIC SHUTTER**

There are two electronic shutter modes in KS7214.

One is a Fixed Iris mode that controls shutter speed through parallel interface with external pin.

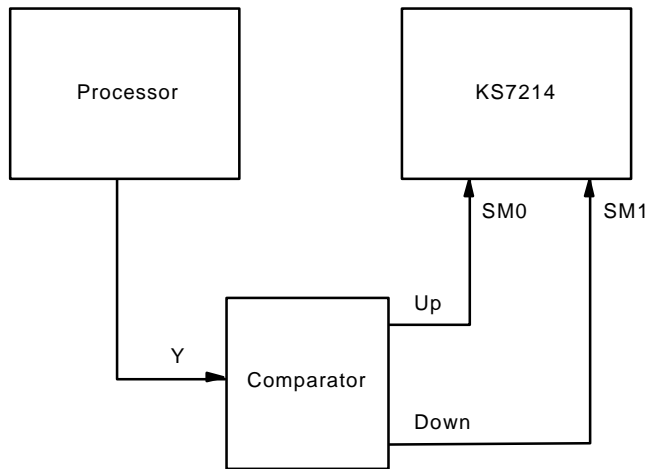
The other is a Auto Iris mode that controls electronic Iris automatically by detecting the light amount of current objects from the signal process IC.

**FIXED SHUTTER MODE**

MD1	FL	SM2	SM1	SM0	SHUTTER SPEEDB	
					STEP	REAL
L	L	L	L	L	1/60	1/60
L	L	L	L	H	1/250	1/251
L	L	L	H	L	1/500	1/513
L	L	L	H	H	1/1000	1/1006
L	L	H	L	L	1/2000	1/1936
L	L	H	L	H	1/5000	1/5034
L	L	H	H	L	1/10000	1/10489
L	L	H	H	H	1/30000	1/31469
L	H	X	X	X	1/100 *	1/101
H	L	L	L	L	1/50	1/50
H	L	L	L	H	1/250	1/249
H	L	L	H	L	1/500	1/510
H	L	L	H	H	1/1000	1/999
H	L	H	L	L	1/2000	1/1923
H	L	H	L	H	1/5000	1/5000
H	L	H	H	L	1/10000	1/10416
H	L	H	H	H	1/30000	1/31249
H	H	X	X	X	1/120 *	1/120

\* FLICKERLESS MODE

**AUTO SHUTTER MODE**



SM1	SM0	Auto Shutter Mode
0	0	Shutter Speed Hold
0	1	Shutter Speed UP
1	0	Shutter Speed DOWN
1	1	Shutter Speed Hold

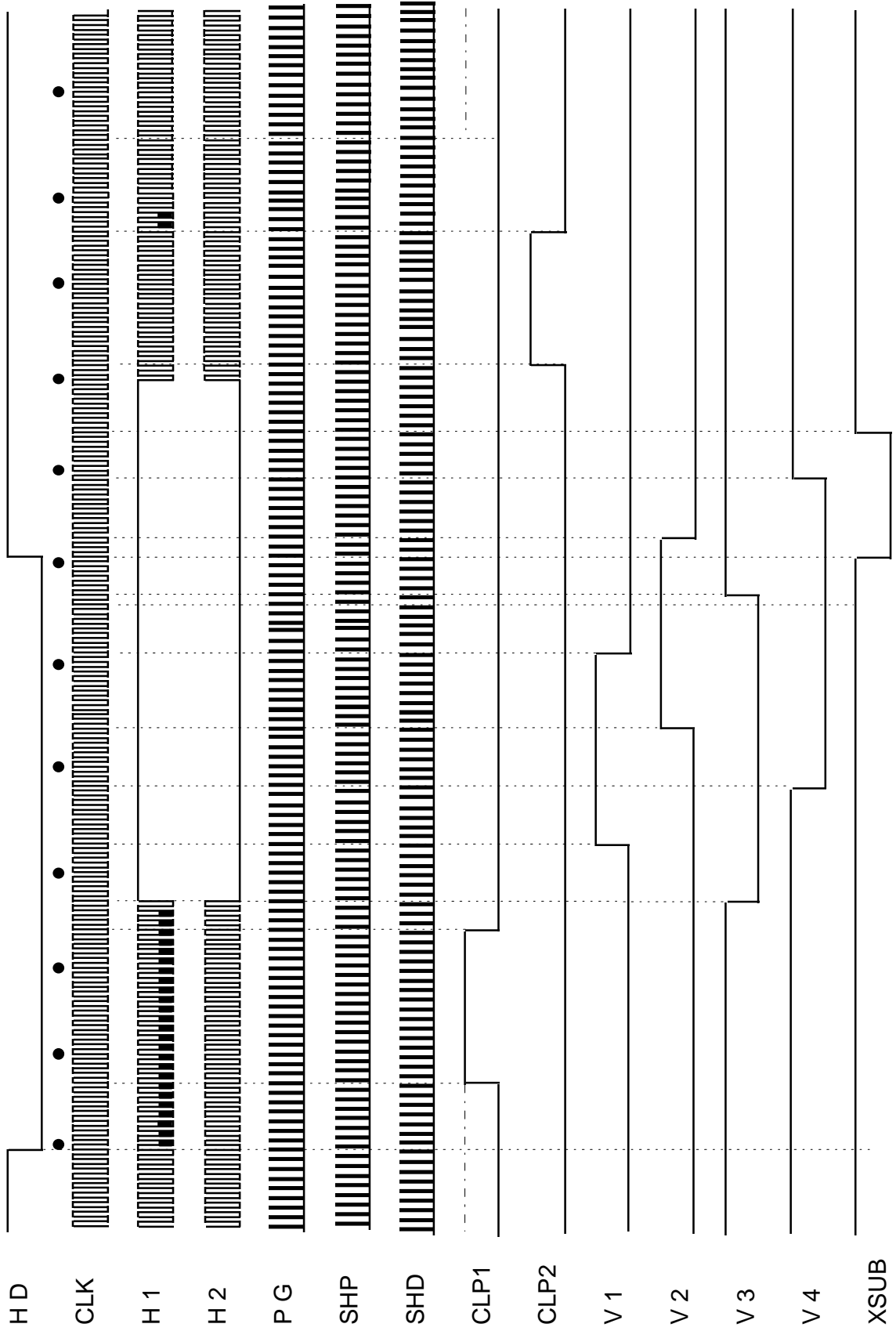
< Auto shutter application >

NO	Step Period	EIA		CCIR	
		Step	Shutter Speed	Step	Shutter Speed
1	7H	8	1/60 ~ 1/76	8	1 / 50 ~ 1 / 75
2	5H	7	1/77 ~ 1/91	7	1 / 76 ~ 1 / 91
3	4H	9	1/92 ~ 1/116	9	1 / 92 ~ 1 / 115
4	3H	12	1/117 ~ 1/157	12	1 / 116 ~ 1 / 156
5	2H	18	1/158 ~ 1/247	18	1 / 157 ~ 1 / 245
6	1H	50	1/248 ~ 1/1154	50	1 / 246 ~ 1 / 1146
7	1 / 2H	18	1/1155 ~ 1/3402	18	1 / 1147 ~ 1 / 3378
8	1 / 4H	12	1/3403 ~ 1/9682	12	1 / 3379 ~ 1 / 9615
9	1 / 8H	11	1/9683 ~ 1/125875	11	1/9616 ~ 1/124999

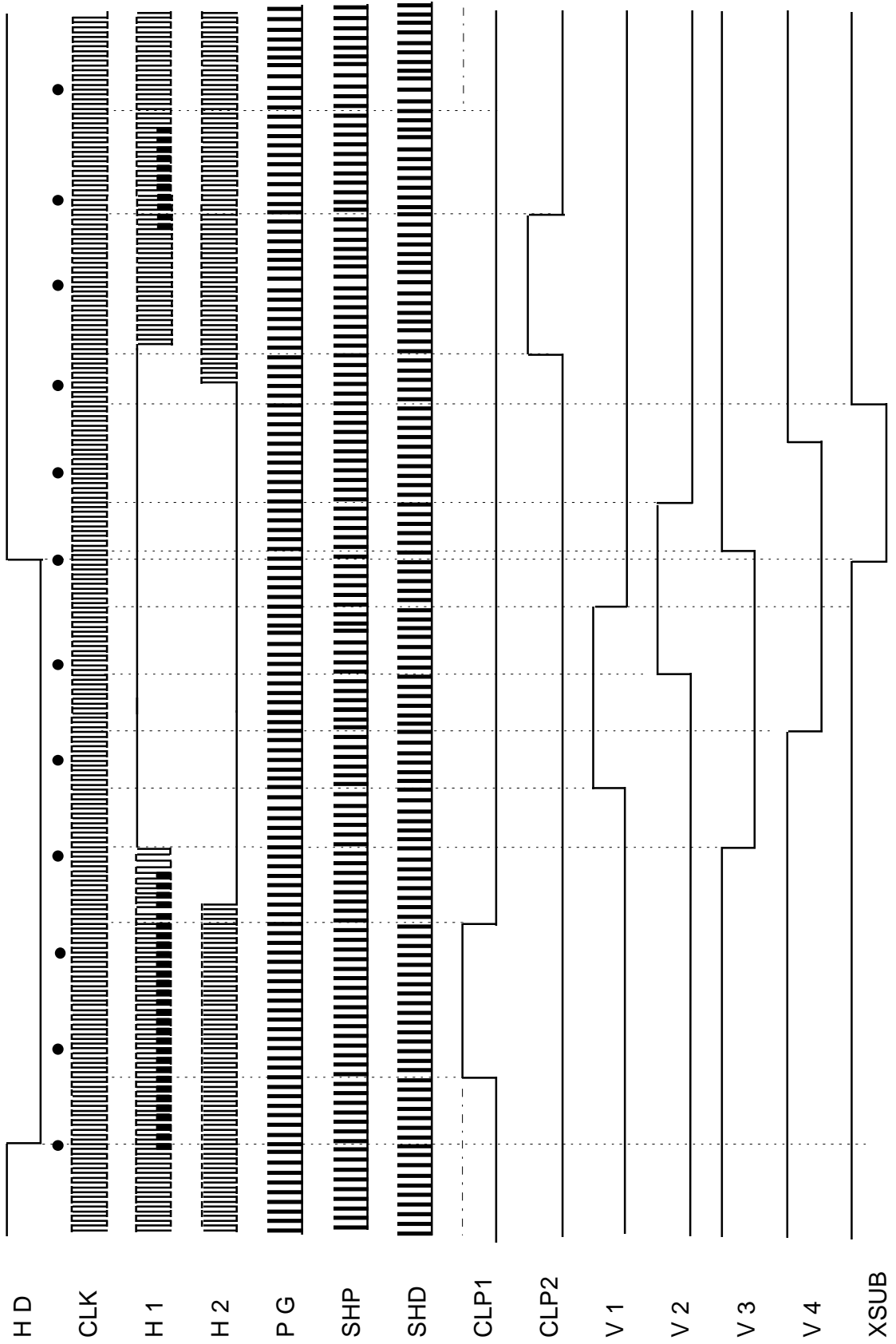
< Auto shutter speed table >



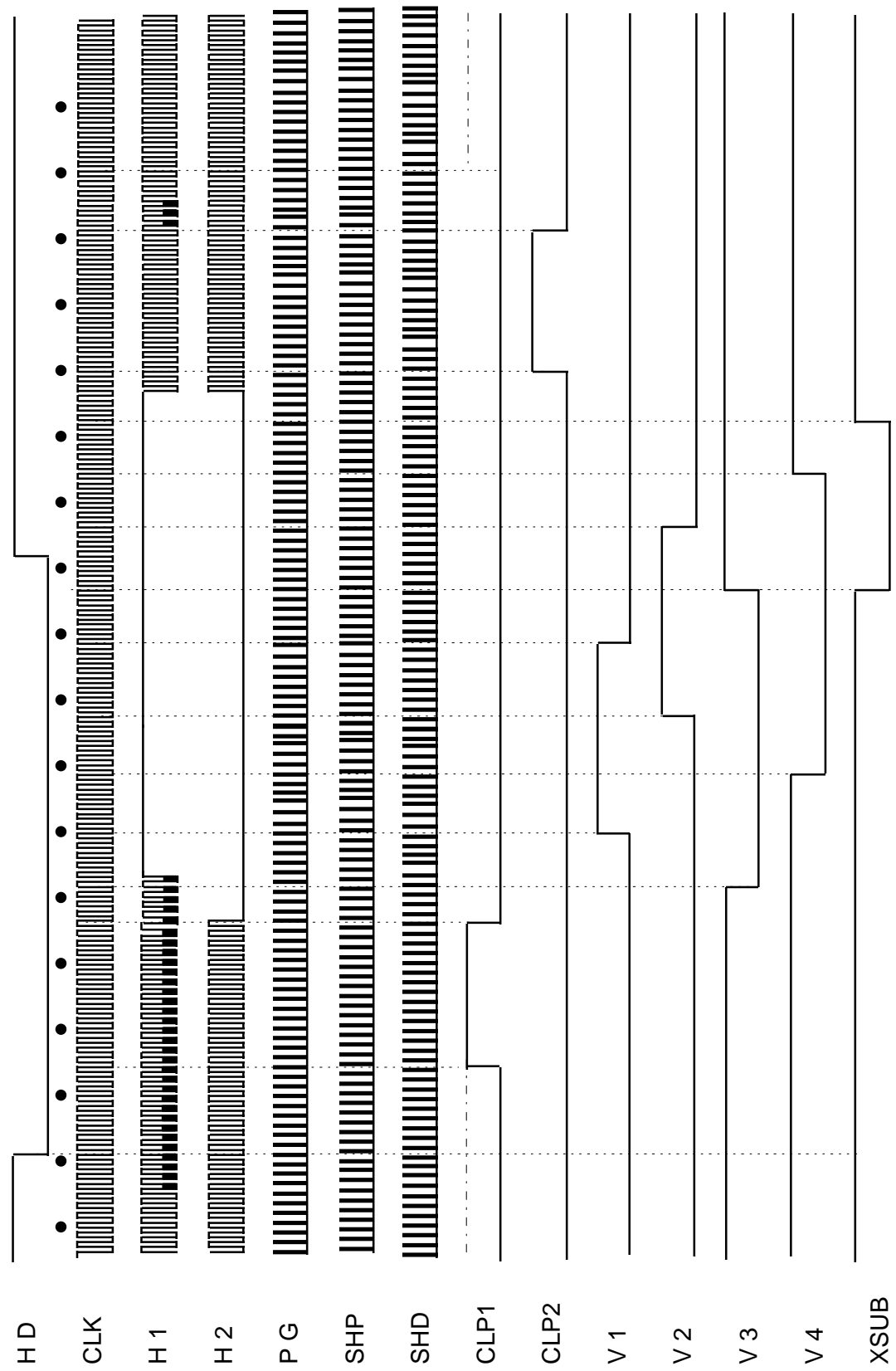
\* HORIZONTAL TIMING CHART FOR EIA NORMAL



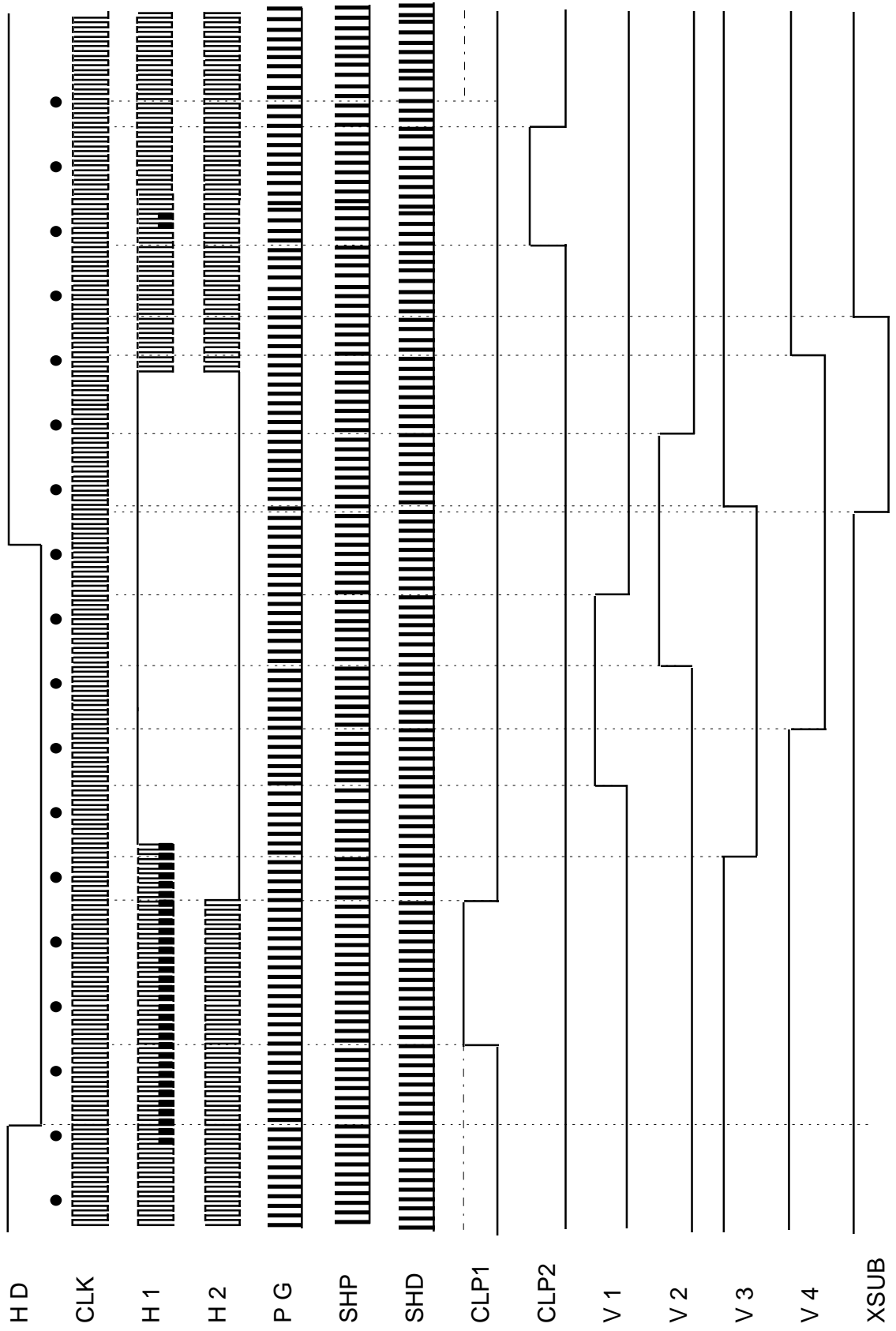
\* HORIZONTAL TIMING CHART FOR CCIR NORMAL



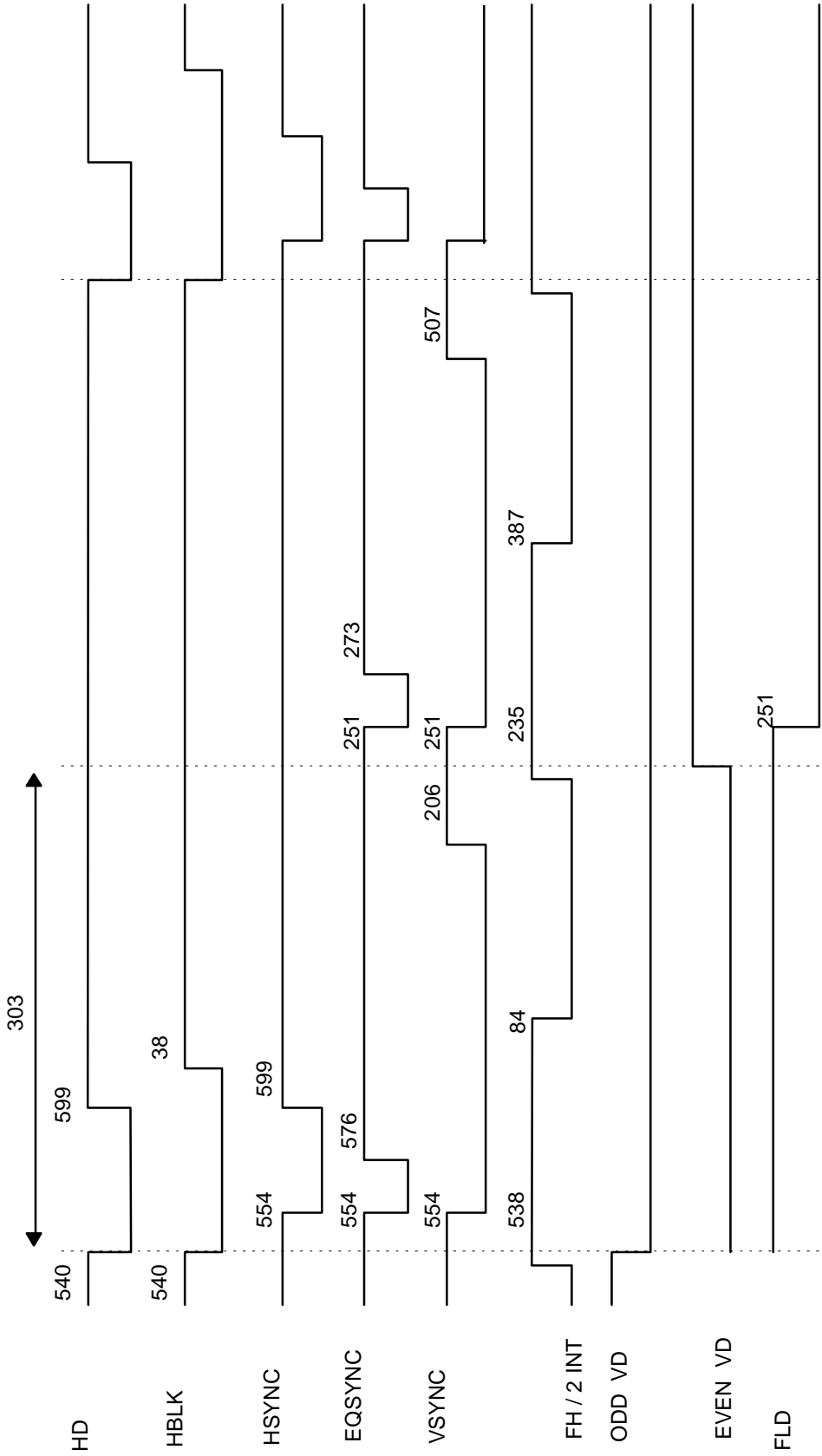
\* HORIZONTAL TIMING CHART FOR EIA HI8



\* HORIZONTAL TIMING CHART FOR CCIR HI8

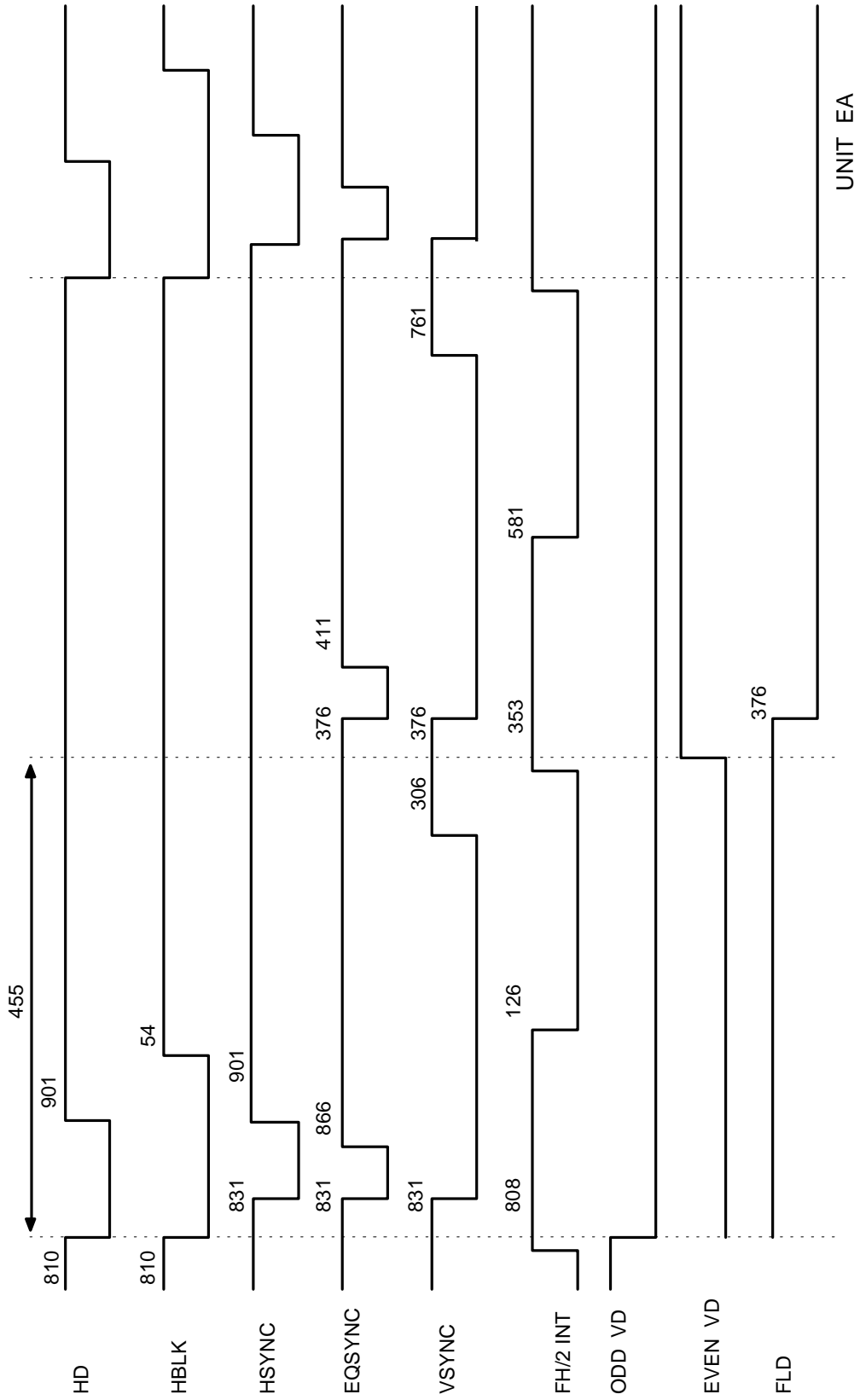


\* HORIZONTAL TIMING CHART FOR EIA NORMAL



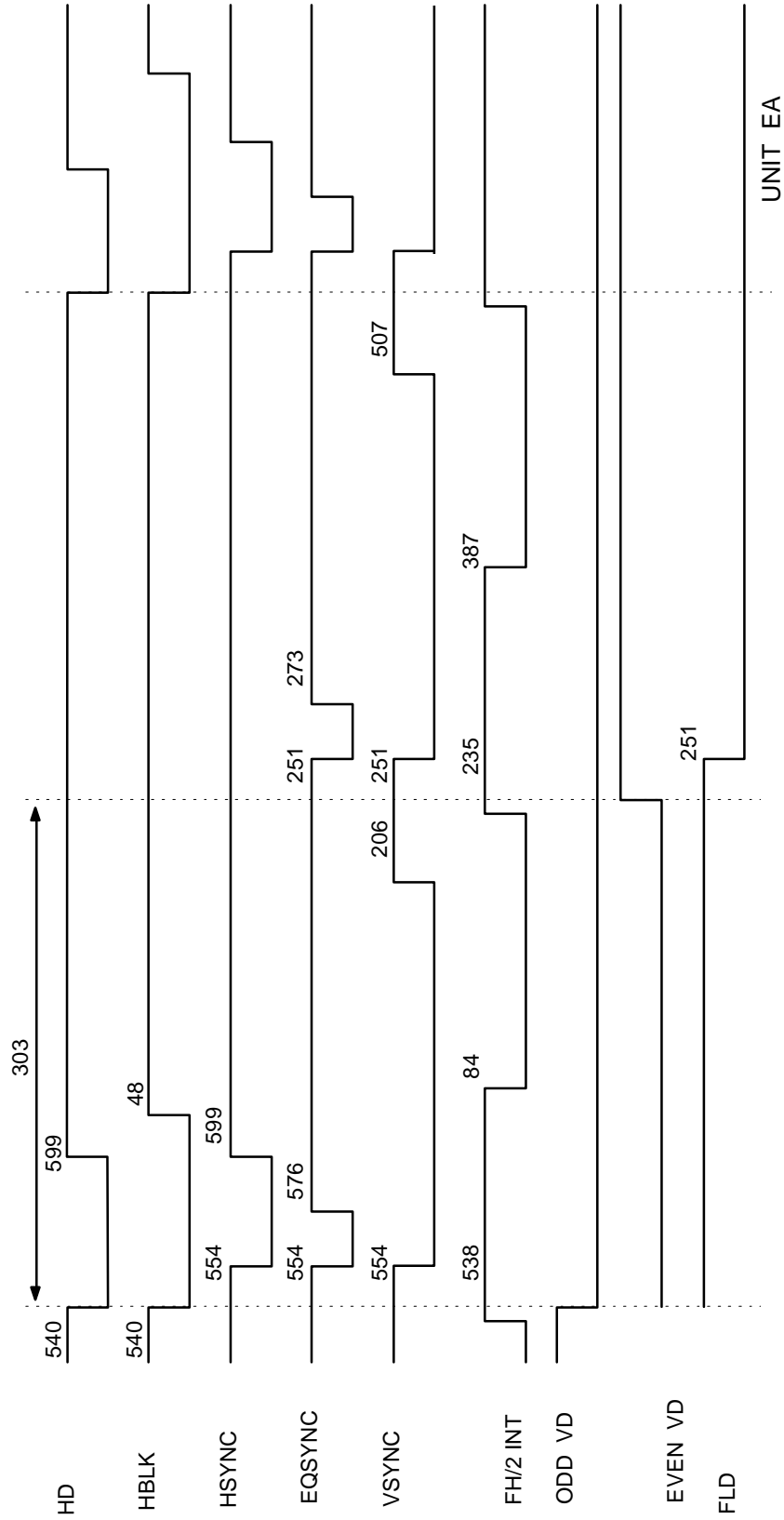
UNIT EA

\* HORIZONTAL TIMING CHART FOR EIA H18

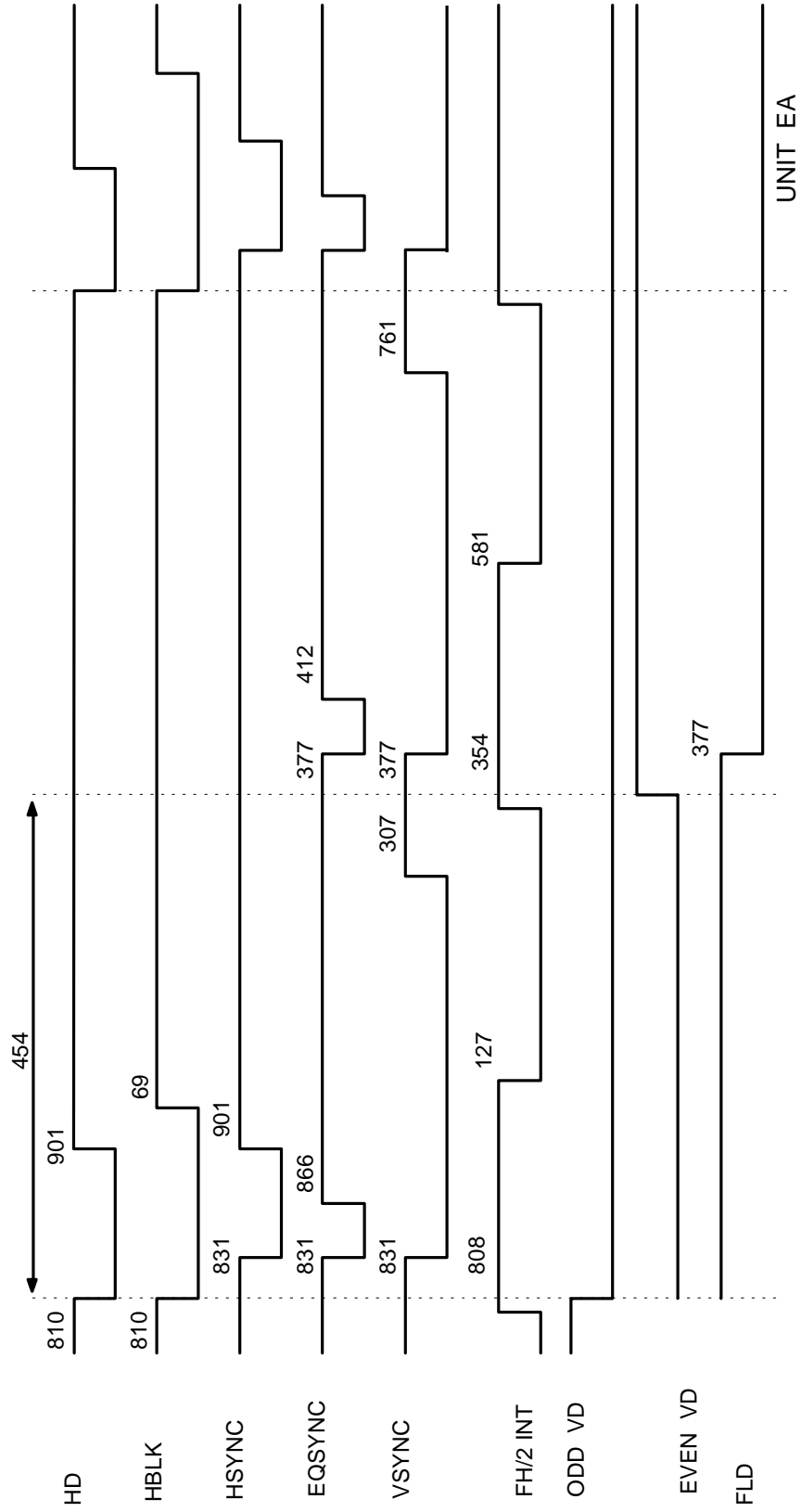


UNIT EA

\* HORIZONTAL TIMING CHART FOR CCIR NORMAL

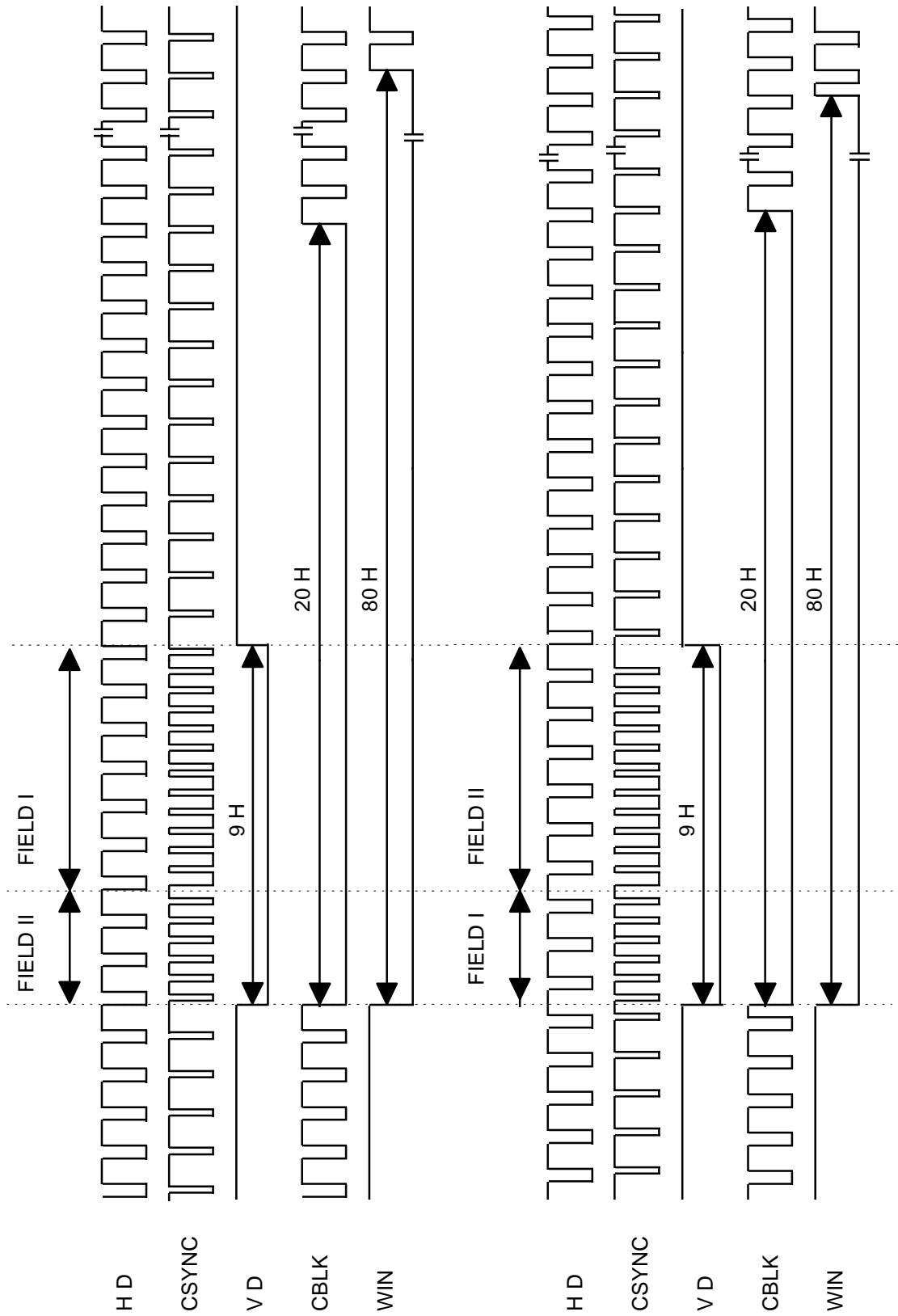


\* HORIZONTAL TIMING CHART FOR CCIR HI8

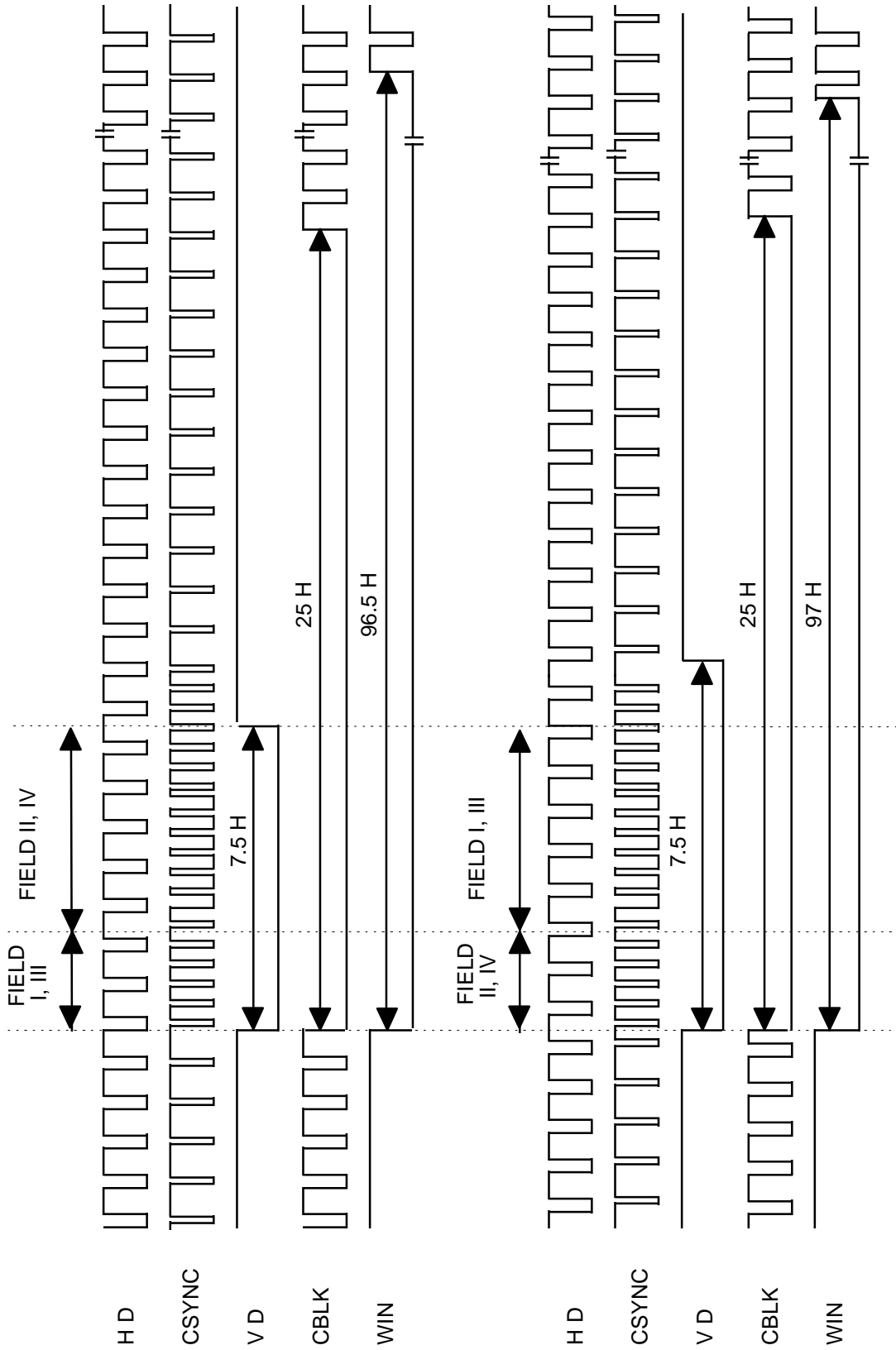




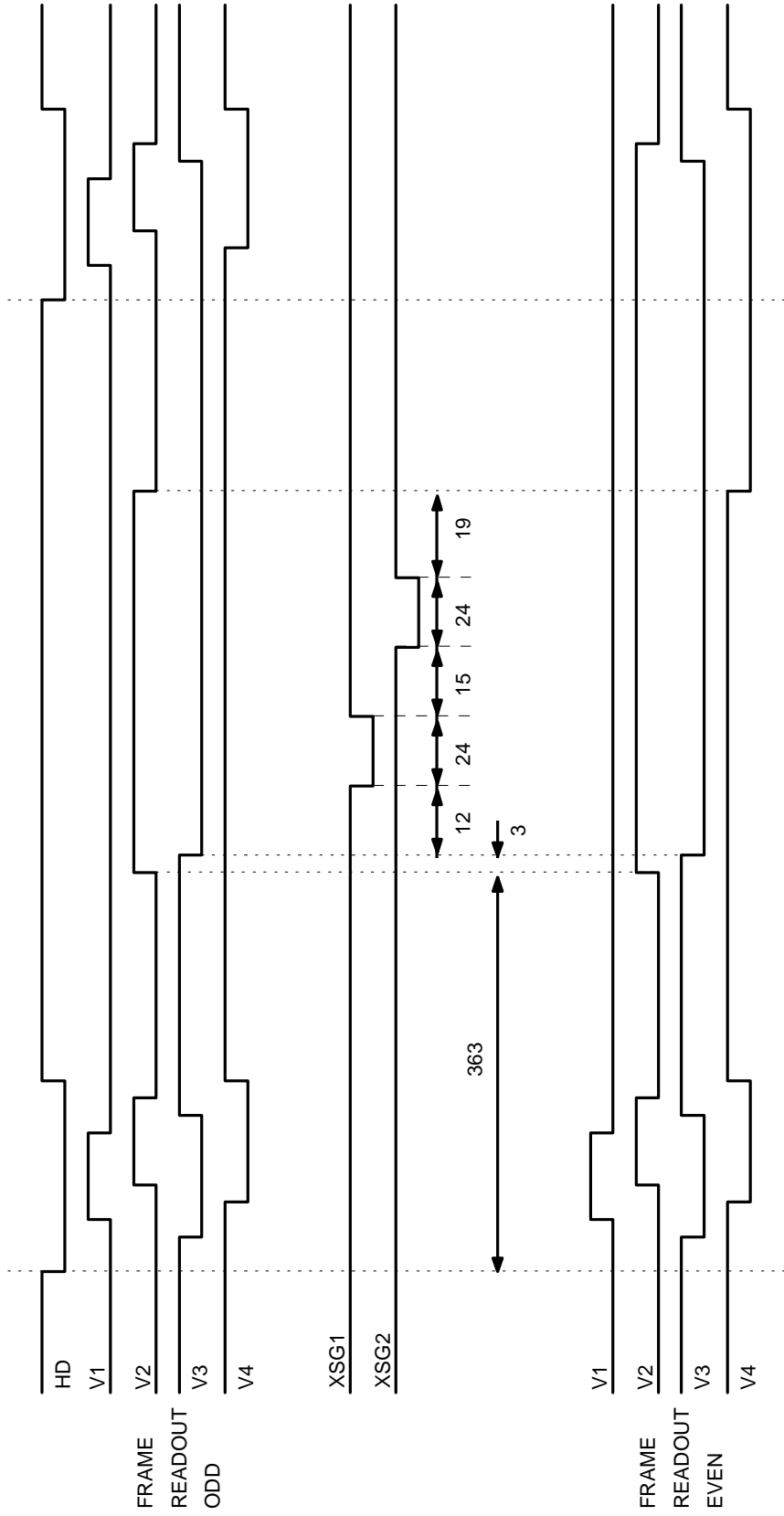
\* VERTICAL TIMING CHART FOR EIA



\* VERTICAL TIMING CHART FOR CCIR

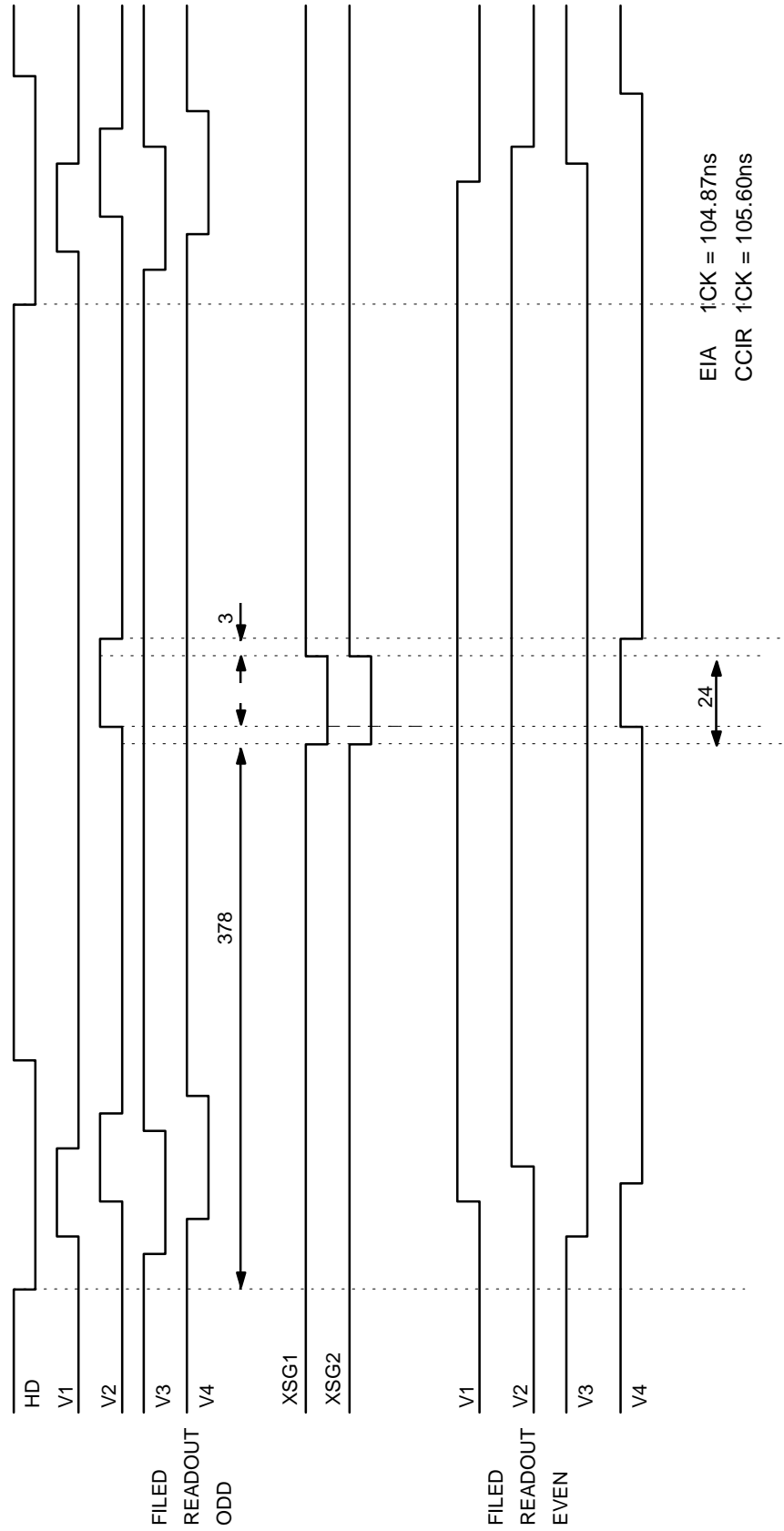


\* VERTICAL CCD REGISTER DRIVING PULSE TIMING CHART FOR NORMAL EIA AND CCIR



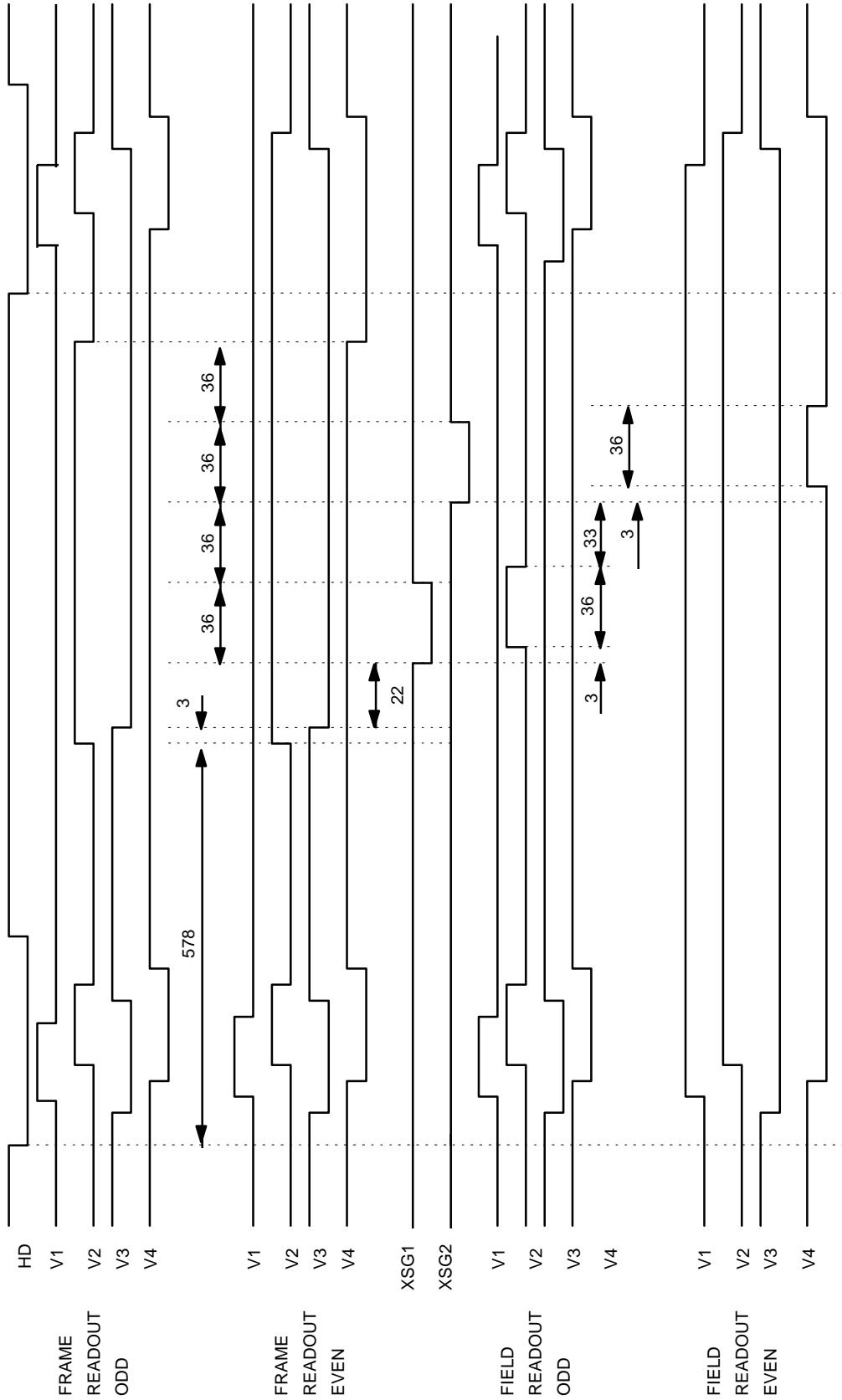
EIA 1CK = 104.87ns  
 CCIR 1CK = 105.60ns

\* VERTICAL CCD REGISTER DRIVING PULSE TIMING CHART FOR NORMAL EIA AND CCIR

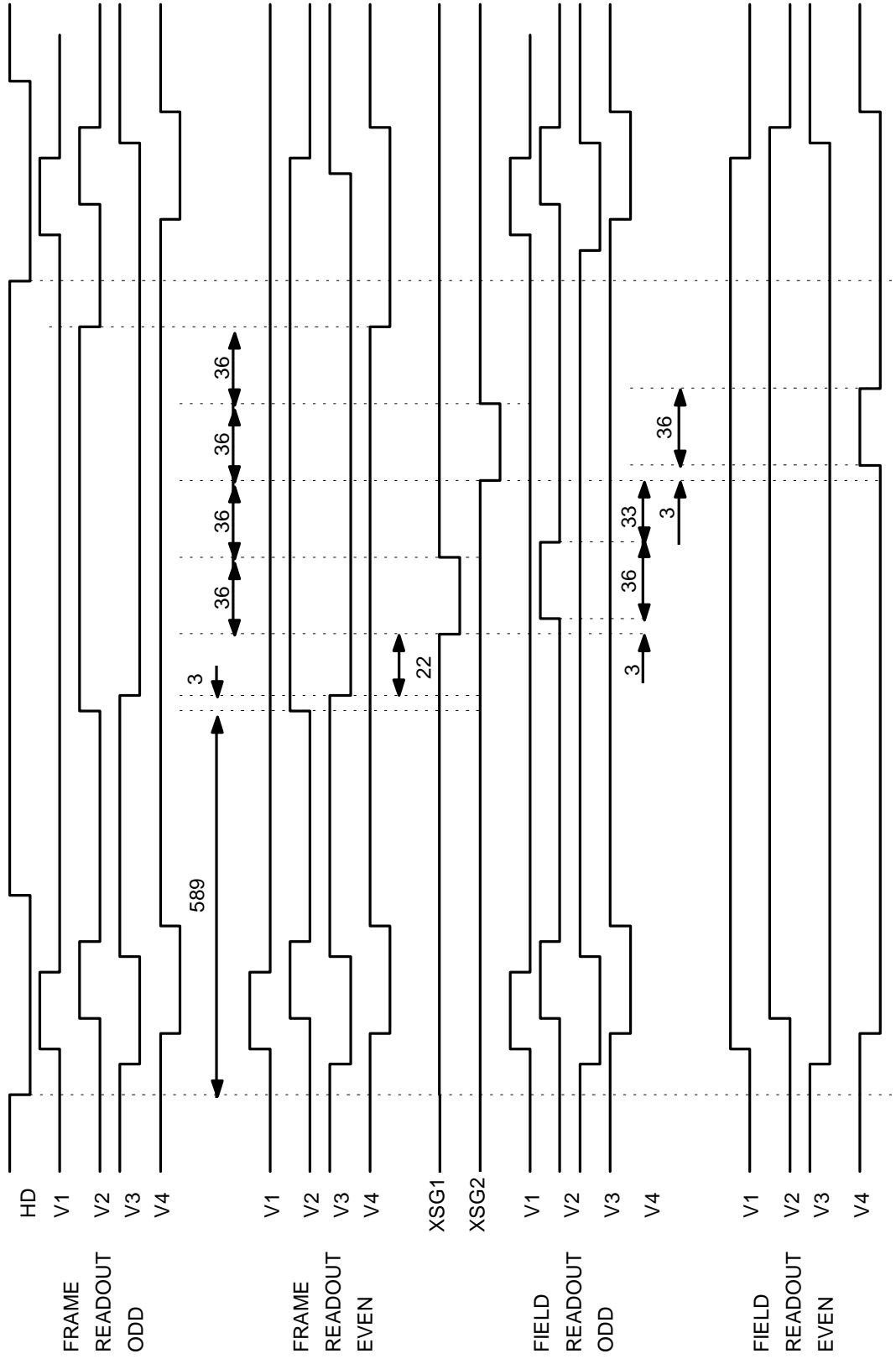


UNIT : 1CK = 69.84ns

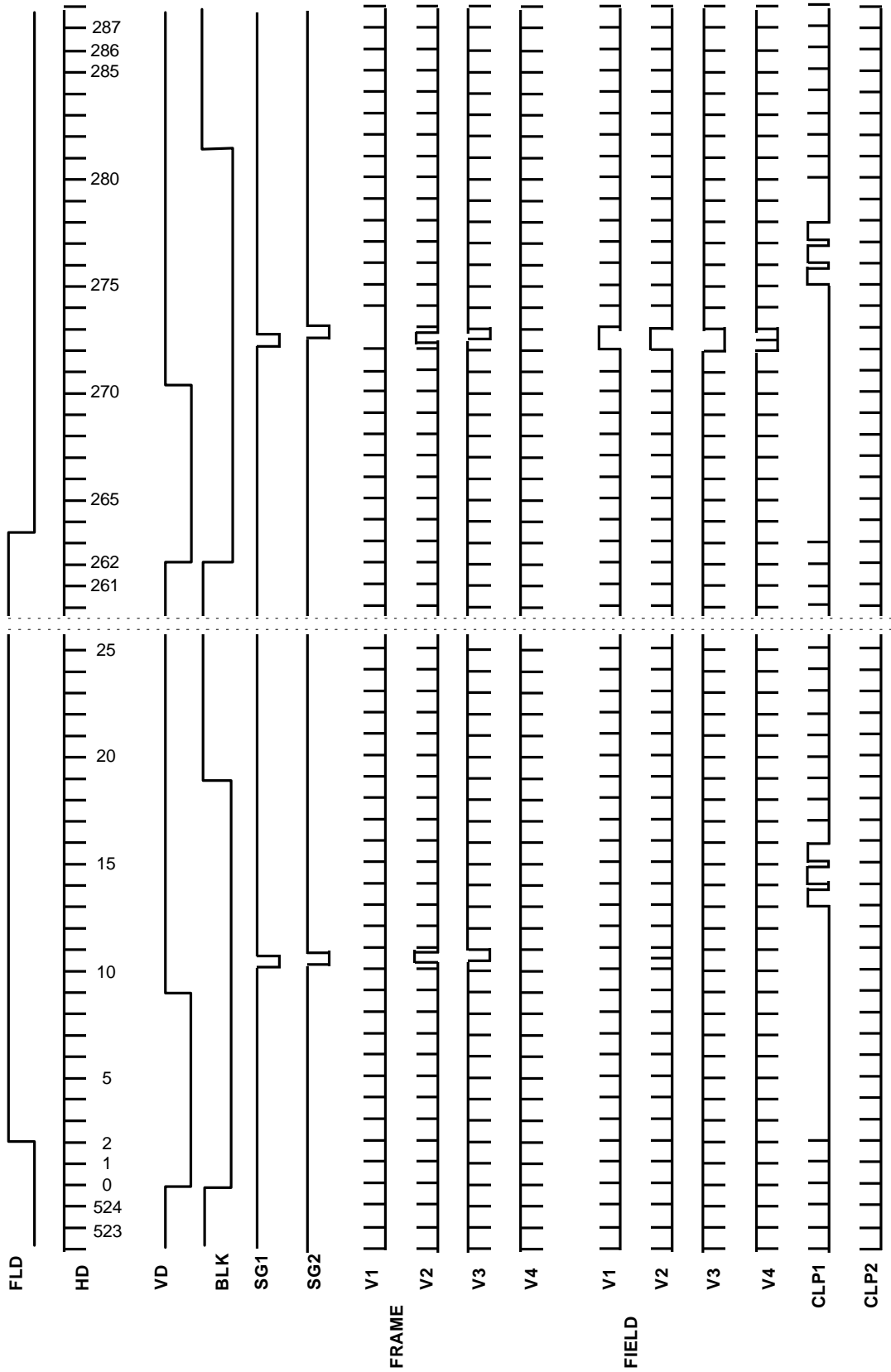
\* VERTICAL CCD REGISTER DRIVING PULSE TIMING CHART FOR H18 EIA



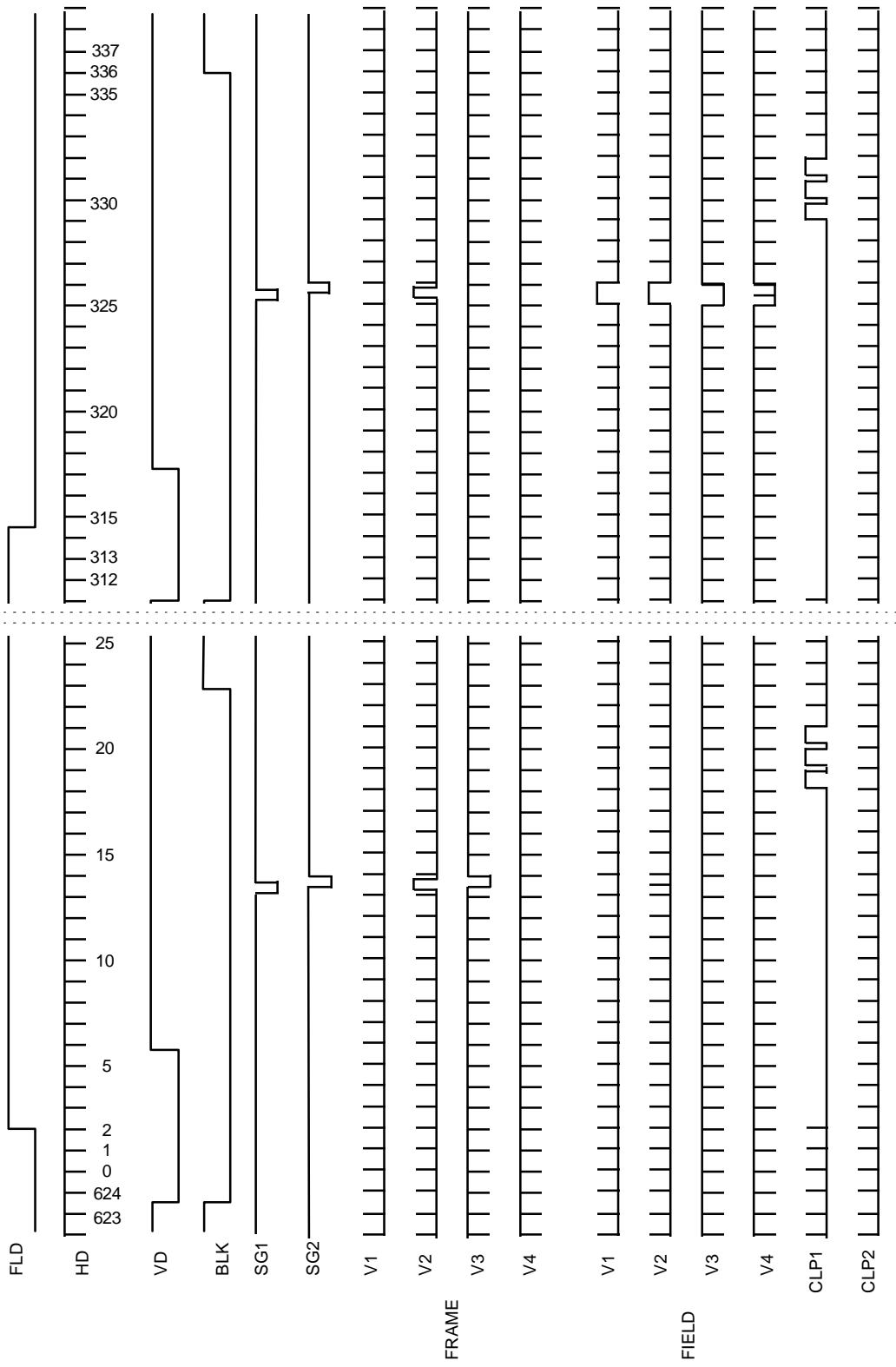
\* VERTICAL CCD REGISTER DRIVING PULSE TIMING CHART FOR HI8 CCIR UNIT : 1CK = 70.48ns



NORMAL EIA VERTICAL TIMING CHART AT INTERLACE

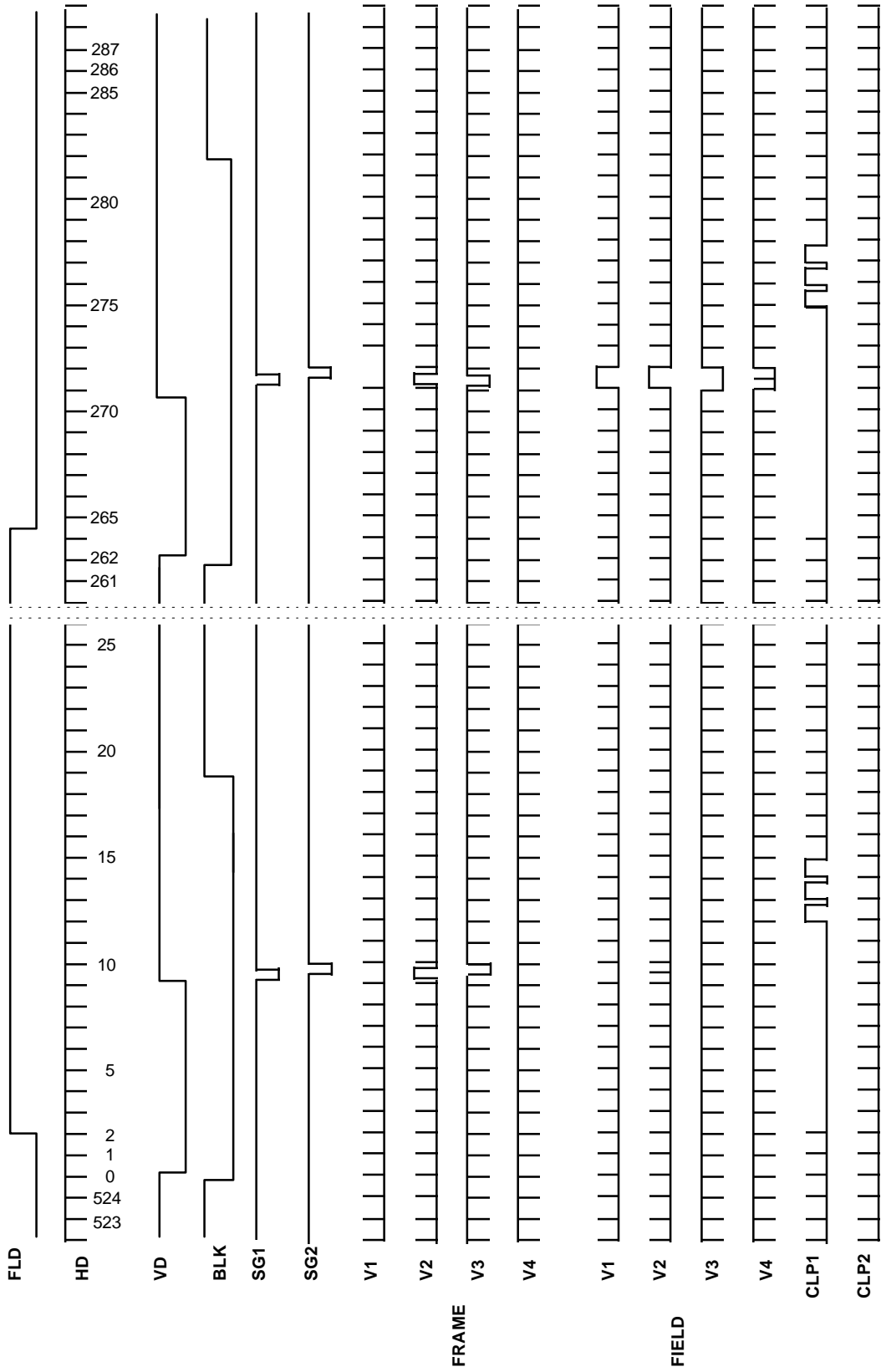


NORMAL CCIR VERTICAL TIMING CHART AT INTERLACE

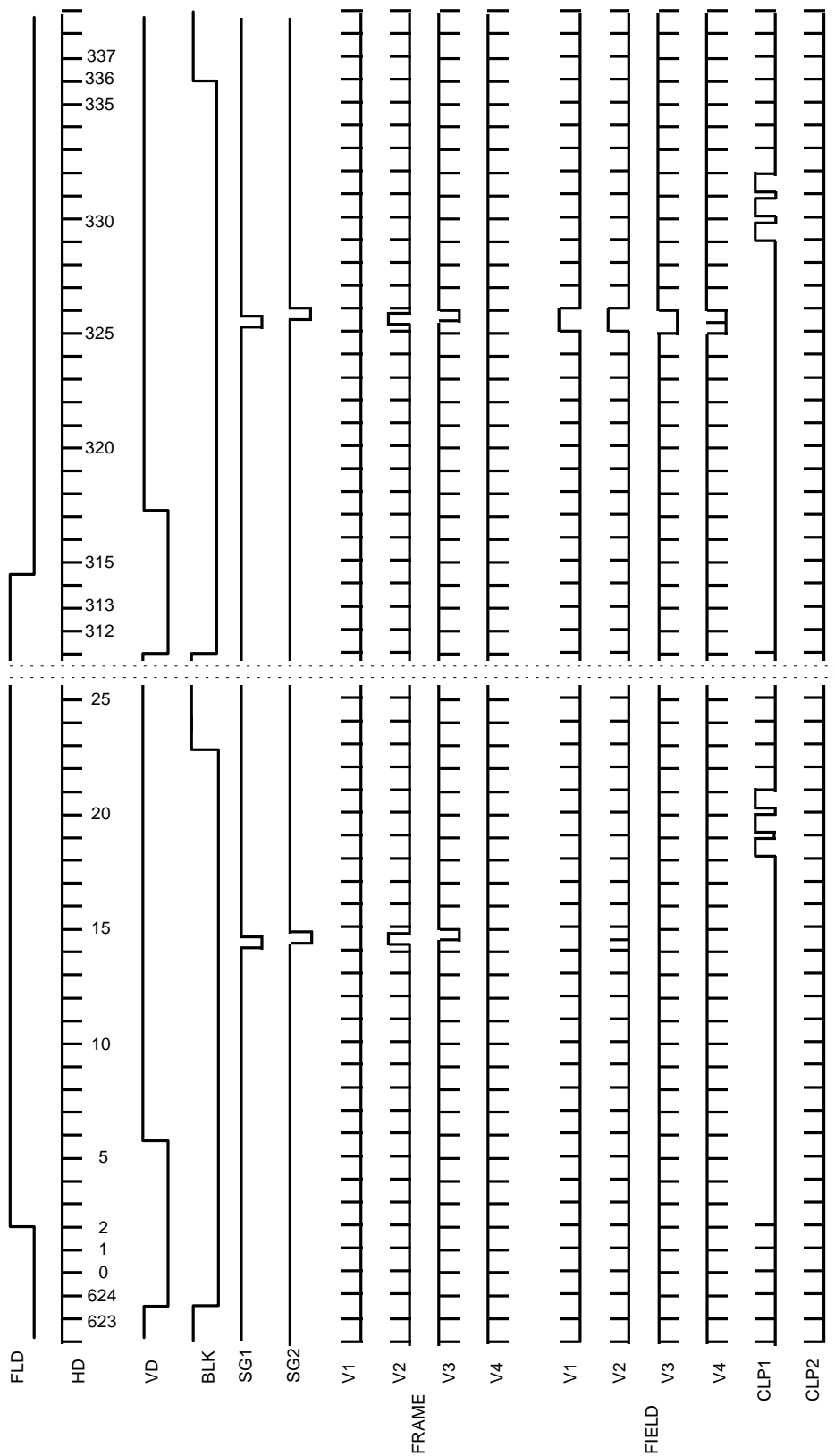




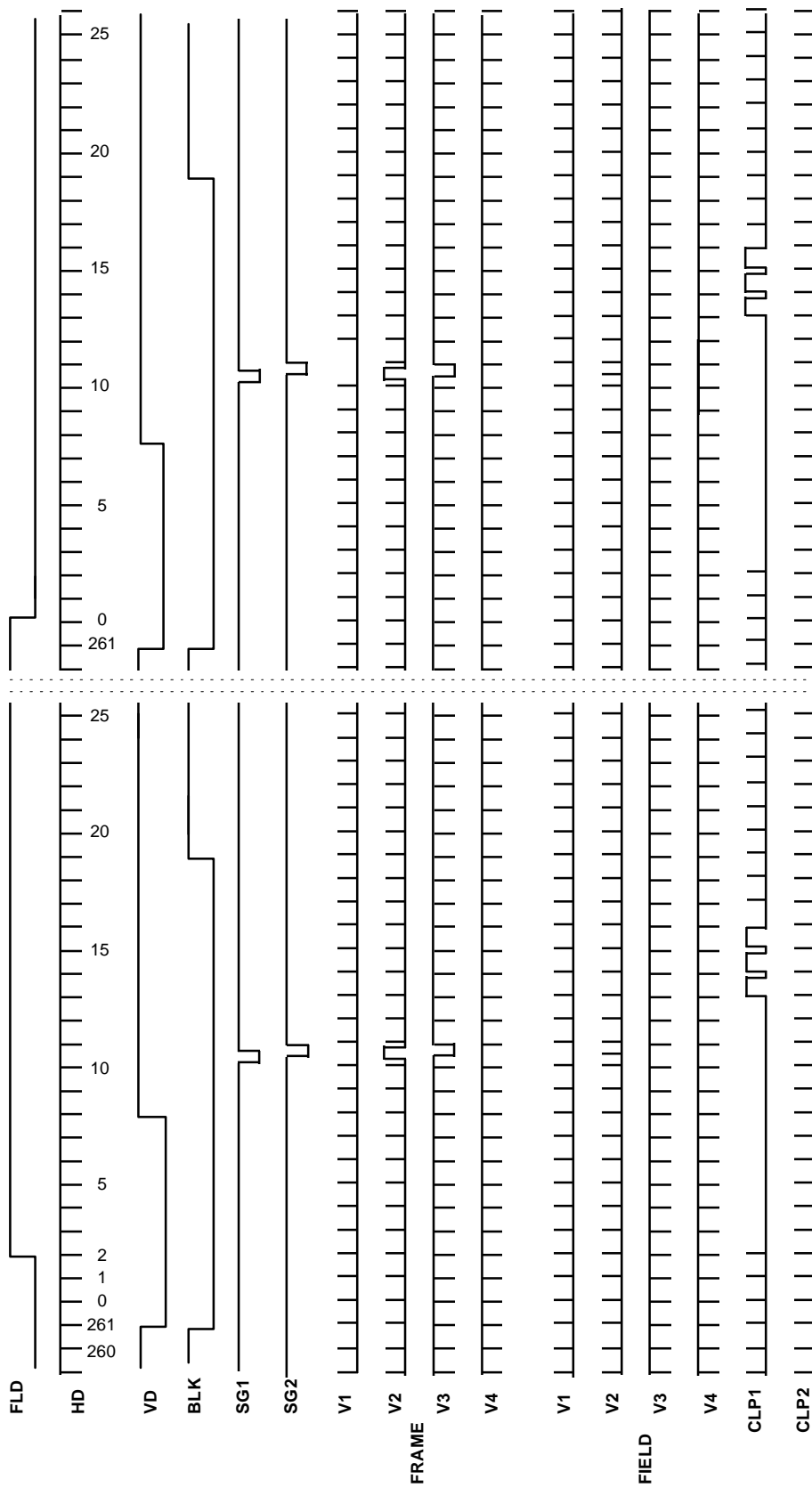
H18 EIA VERTICAL TIMING CHART AT INTERLACE



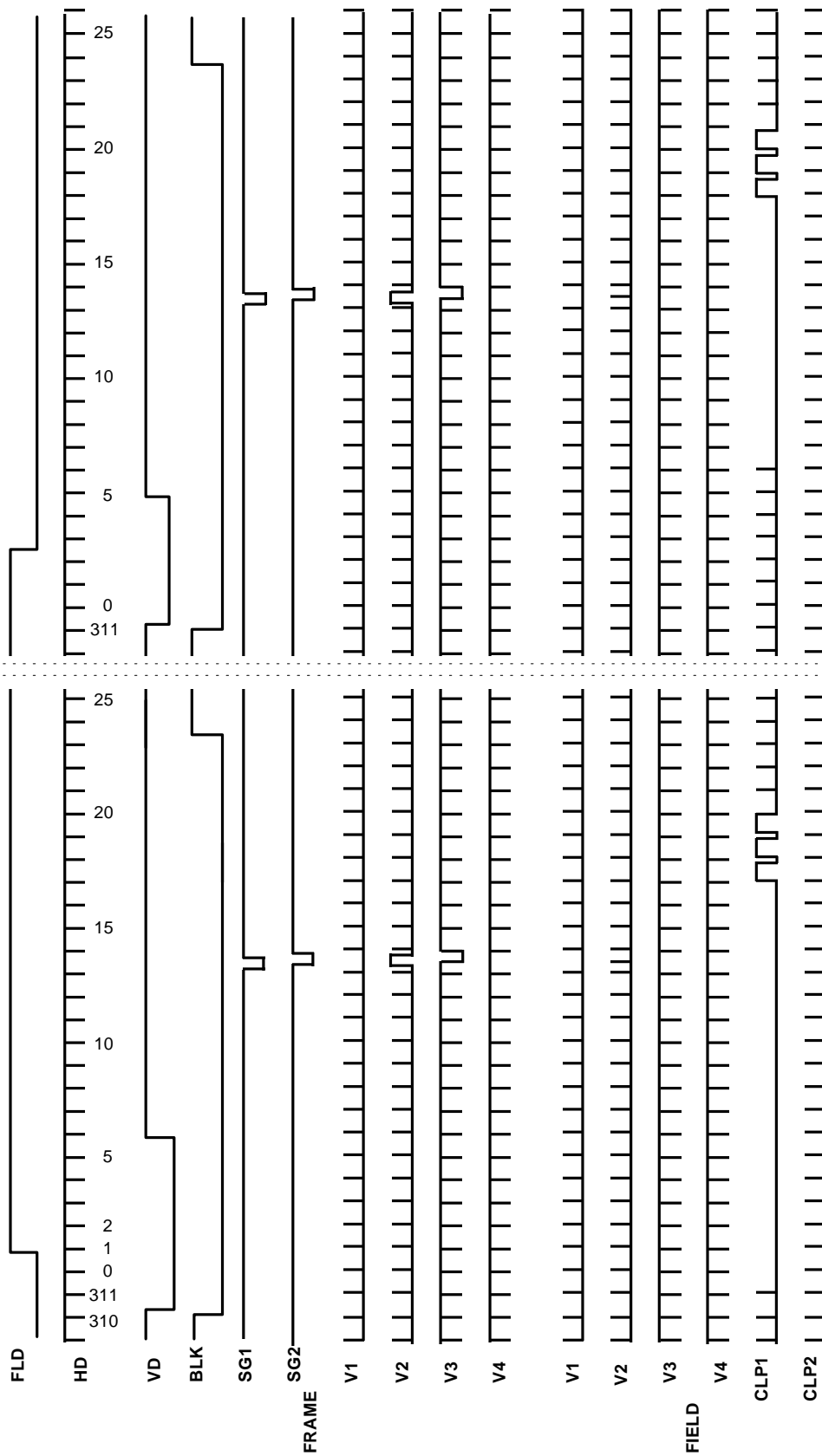
H18 CCIR VERTICAL TIMING CHART AT INTERLACE



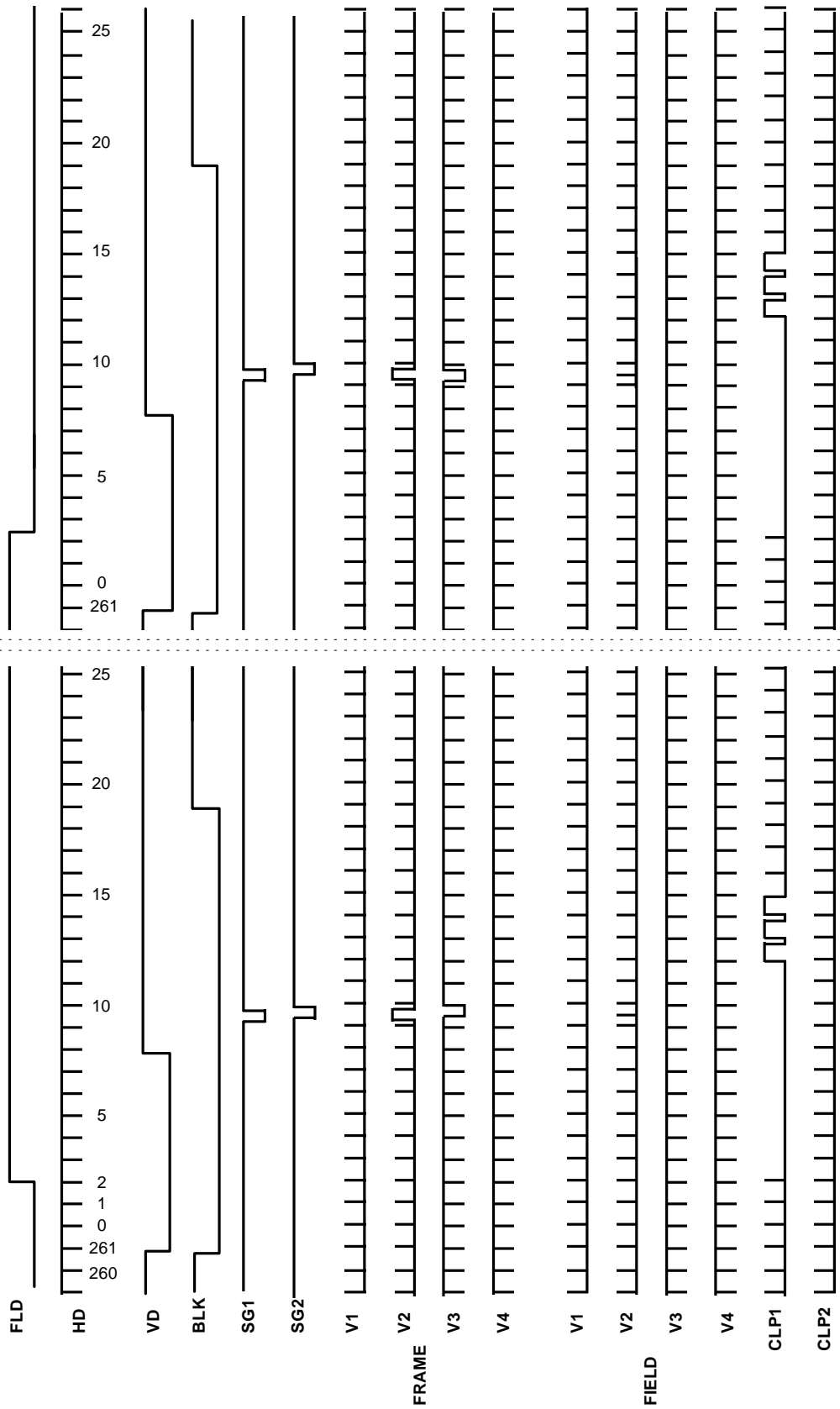
NORMAL EIA VERTICAL TIMING CHART AT NON - INTERLACE



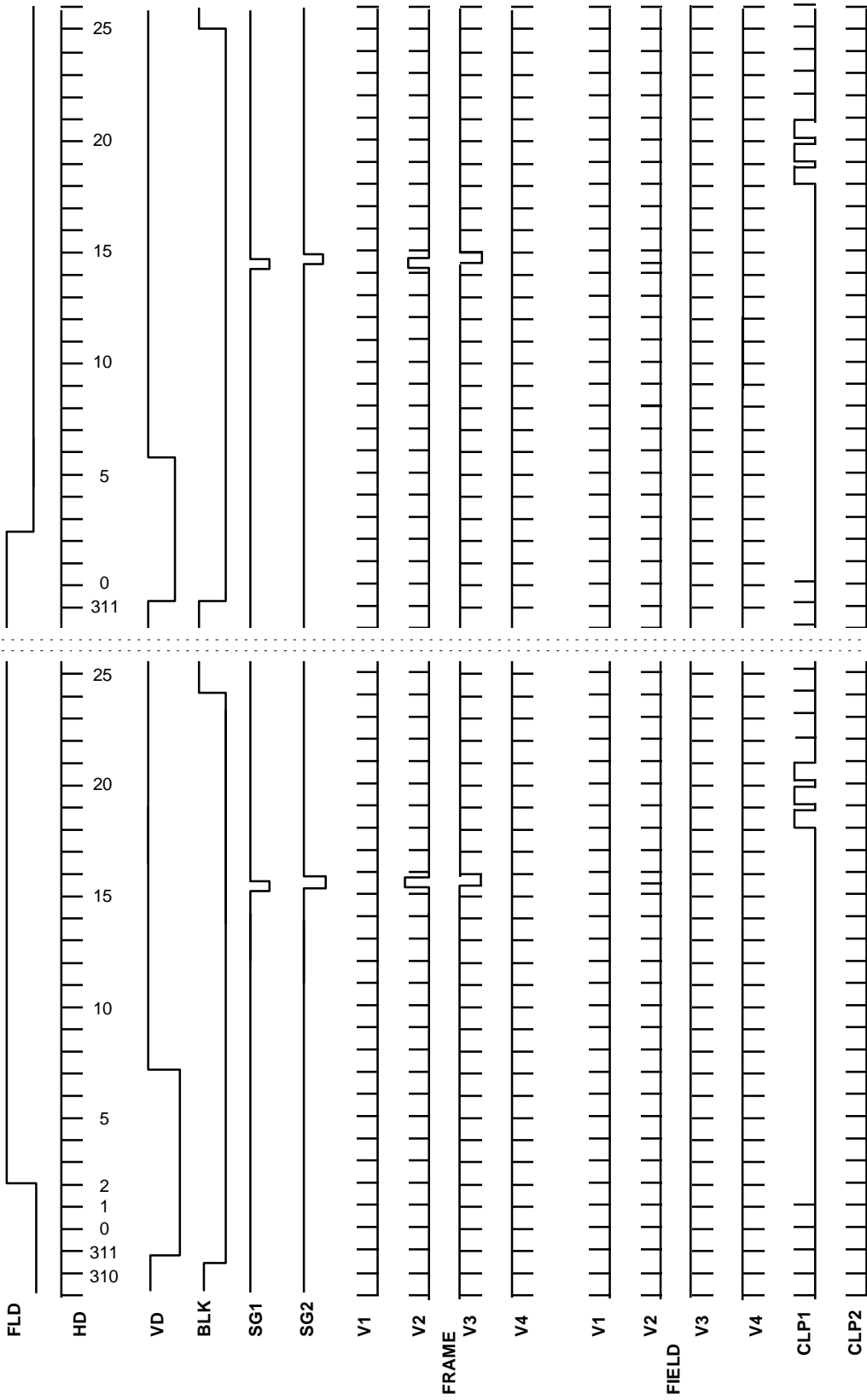
NORMAL CCIR VERTICAL TIMING CHART AT NON - INTERLACE



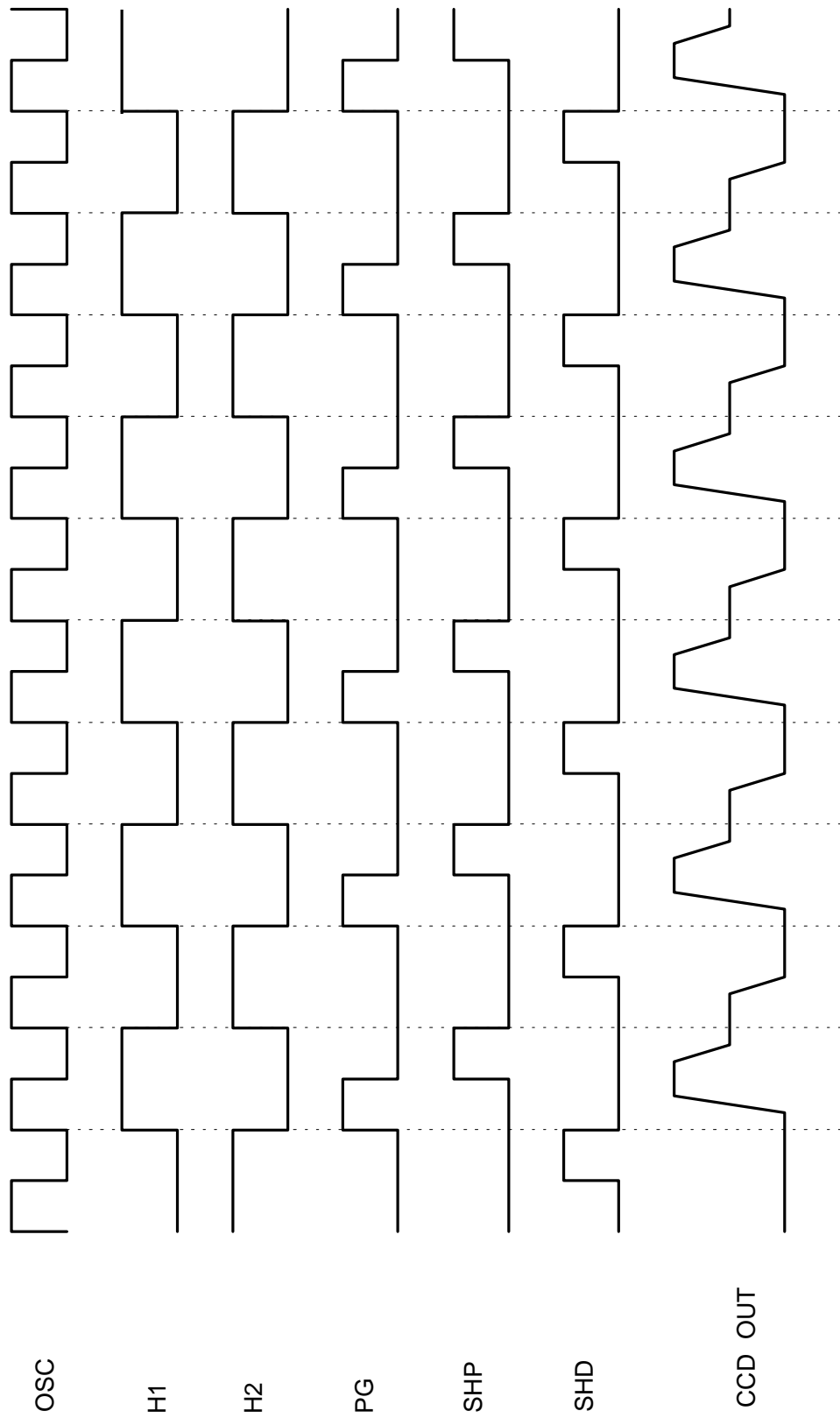
H18 EIA VERTICAL TIMING CHART AT NON - INTERLACE



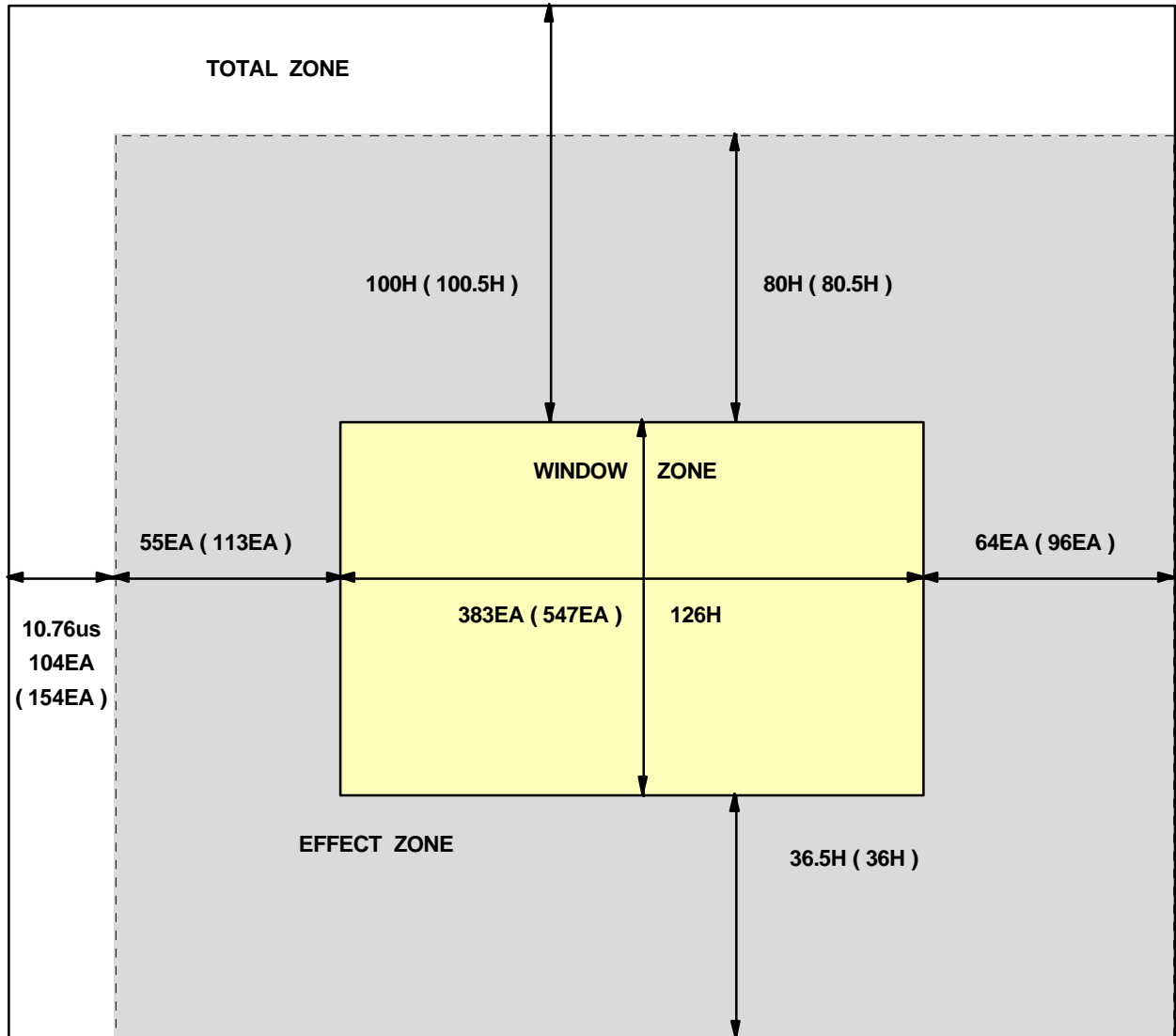
H18 CCIR VERTICAL TIMING CHART AT NON - INTERLACE



HIGH SPEED PHASE TIMING CHART

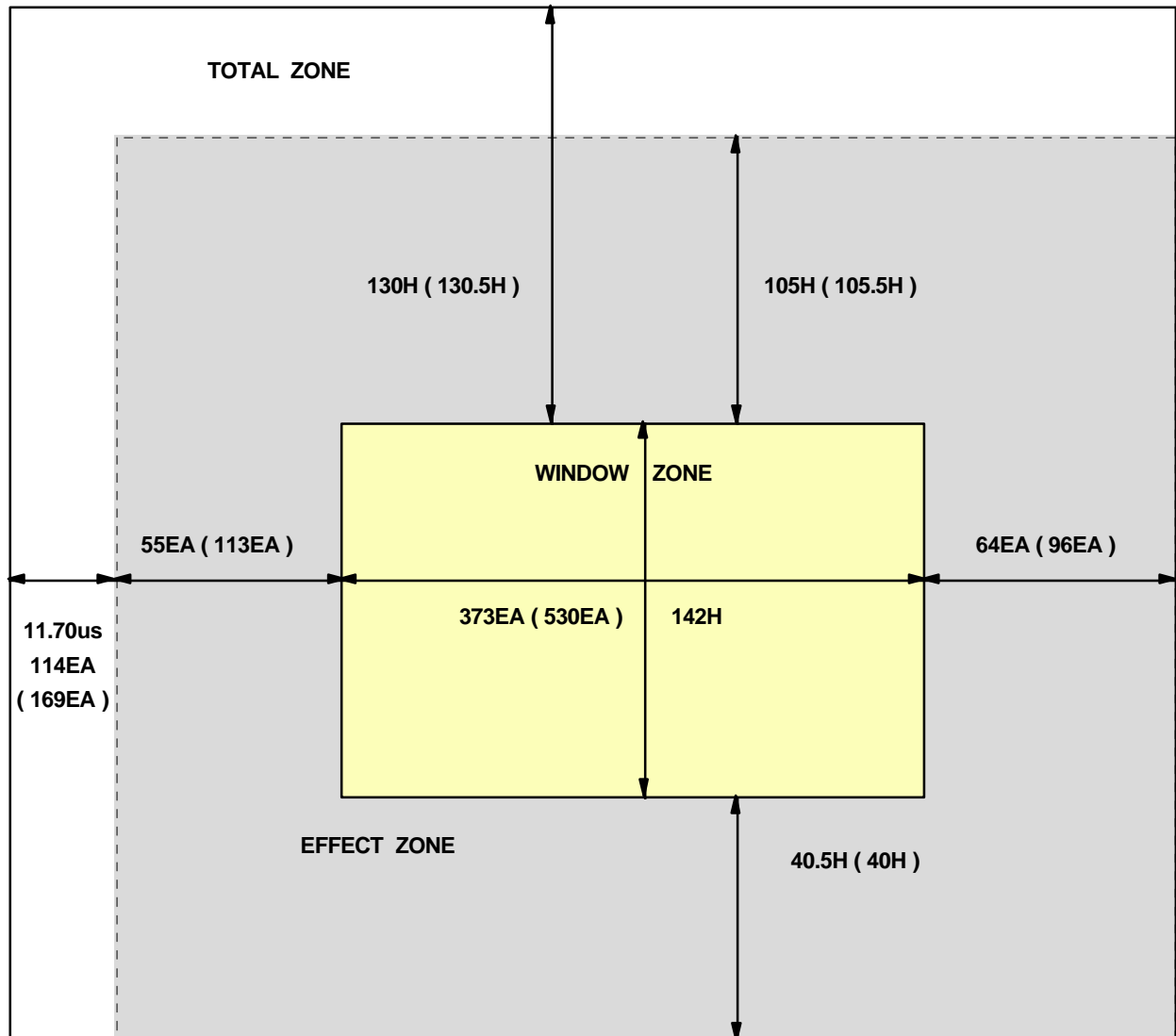


EIA NORMAL/Hi8 WINDOW AREA





CCIR NORMAL/H18 WINDOW AREA

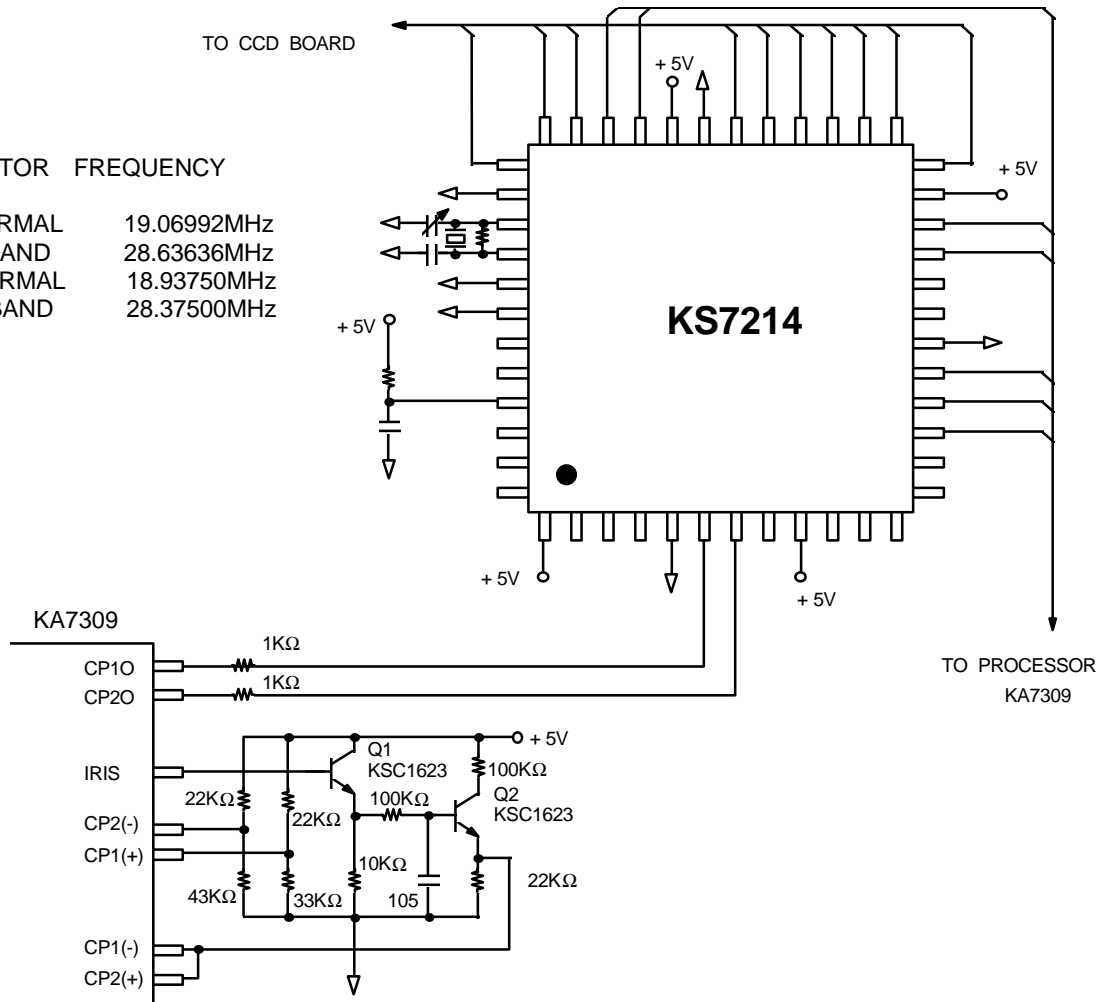


APPLIATION EXAMPLE

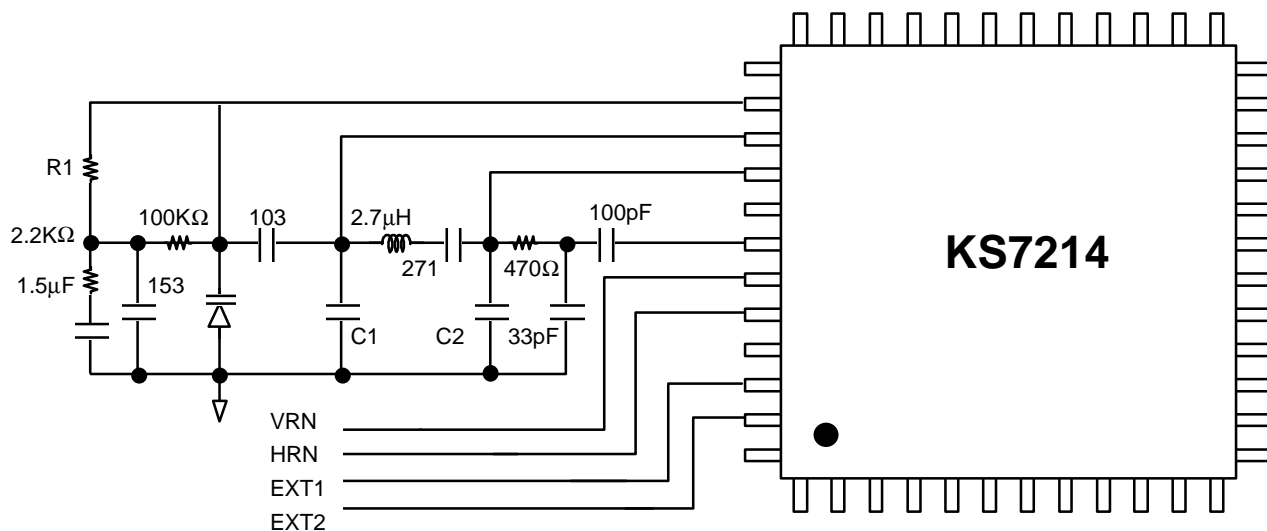
EIA NORMAL AUTO IRIS MODE APPLICATION

OSCILLATOR FREQUENCY

EIA NORMAL	19.06992MHz
EIA HIBAND	28.63636MHz
CCIR NORMAL	18.93750MHz
CCIR HIBAND	28.37500MHz



APPLICATION EXAMPLE (Continued)



MODE	EXT1	EXT2	VRN	HRN
COMP.SYNC	0	1	-	COMP.SYNC
LINE LOCK	1	0	60Hz	-
SEPA.SYNC	1	1	VD	HD

PACKAGE DIMENSION

48-QFP-0707

unit : mm

