Lz95D37/M

Timing Pulse Generator LSI for CCD

DESCRIPTION

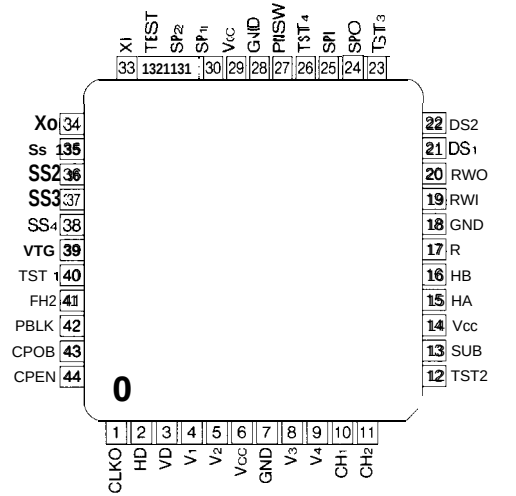
The LZ95D37/M is a CMOS timing generator LSI which provides timing pulses used to drive a CCD area sensor, in combination with the SSG LSI (LZ93N19 or LZ93B53).

FEATURES

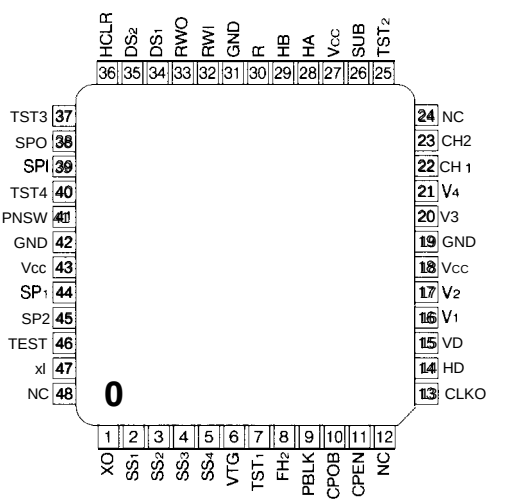
- Switchable **between 270000 pixels CCD and 320000 pixels CCD**
- Switchable **between NTSC** (EIA) **and PAL** (CCIR) **systems**
- **Internal electronic shutter :**
  Shutter speed is selectable from 1 /60 (PAL : 1 /50), 1/1 00, 1/1 25, 1 /250, 1 /500, 1/1 000, 1/2 000, 1/4 000 and 1/10 000 s, in addition to this, 1/100 s (PAL : 1/60 s) in Flicker-less mode using paral lel code or control pulse input.
- **Single + 5 V power supply**
- **Packages :**
  LZ95D37 : 44-pin QFP(QFP044-P-101 O)
  LZ95D37M : 46-pin QFP(QFP048-P-0707)

PIN CONNECTIONS

44-PIN QFP TOP VIEW



48-PIN QFP TOP VIEW



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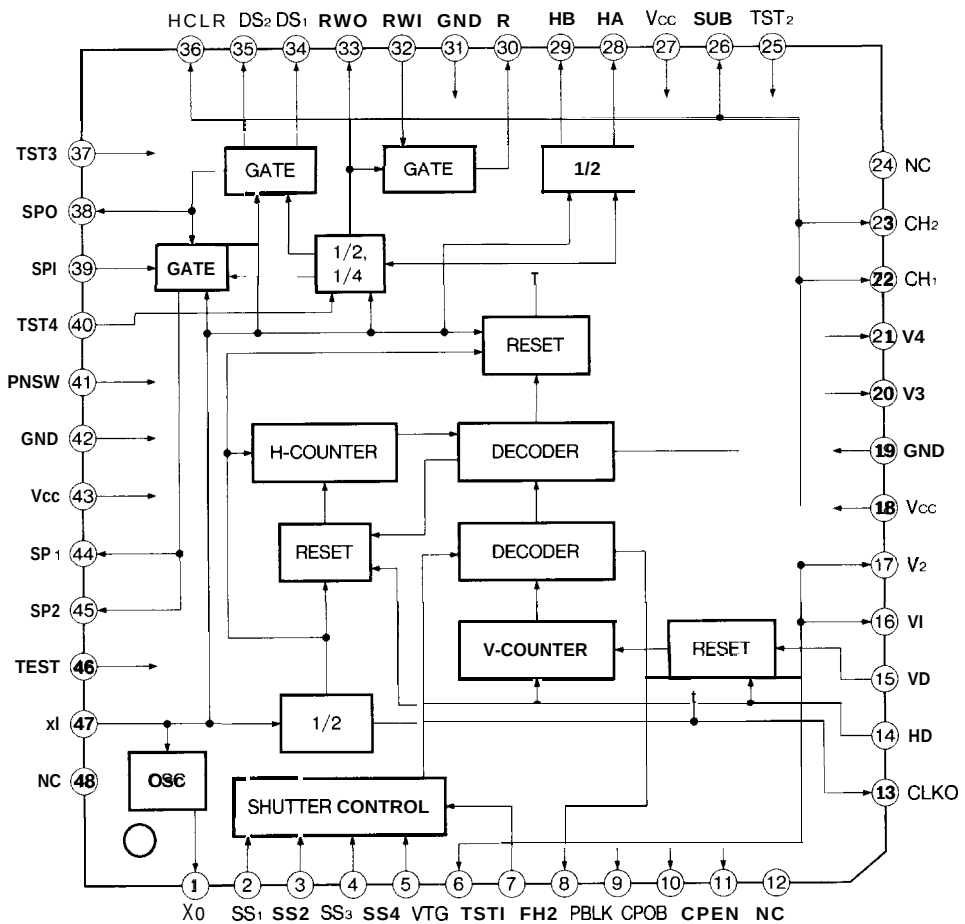
BLOCK DIAGRAM



NOTE :
Pin numbers apply to the 48-pin QFP (LZ95D37M).

ABSOULUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Supply voltage	Vcc	−0,3 to 7.0	v
Input voltage	VI	− 0.3 to Vcc +0.3	v
Output voltage	Vo	− 0,3 to Vcc +0.3	v
Operating temperature	Topr	−20 to +70	‘c
Storage temperature	Tstg	−55 to +150	°C

DC CHARACTERISTICS

(Vcc = +5 V ± 10%, Ta=−10 to +70°C)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	NOTE
Input Low voltage	V_{IL}				1.5	V	1
Input High voltage	V_{IH}		3.5			V	
Input Low current	$\lvert I_{IL1} \rvert$	VI=0 V			1.0	μA	2
	$\lvert I_{IL2} \rvert$	VI = 0 V	8.0		60	μA	3
Input High current	$\lvert I_{IH1} \rvert$	VI= Vcc			1.0	μA	4
	$\lvert I_{IH2} \rvert$	VI= Vcc	8.0		60	μA	5
Output High voltage	$V_{OH}1$	$I_{OH} = -2$ mA	4.0			v	6
Output Low voltage	V_{OL1}	I_{OL} = 4 mA			0.4	v	
Output High voltage	V_{OH2}	$I_{OH} = -3$ mA	4,0			v	7
Output Low voltage	V_{OL2}	I_{OL} = 6 mA			0.4	v	
Output High voltage	V_{OH3}	$I_{OH} = -6$ mA	4.0			v	8
Output Low voltage	V_{OL3}	I_{OL} = 12 mA			0,4	v	
Output High voltage	V_{OH4}	$I_{OH} = -12$ mA	4.0			v	9
Output Low voltage	V_{OL4}	I_{OL} = 24 mA			0,4	v	
Feedback. resister	R		600	2000	5000	kΩ	10

NOTES :

1. Applied to inputs (IC, ICD, ICU, OSCI).
2. Applied to inputs (IC, ICD, OSCI).
3. Applied to input (ICU).
4. Applied to inputs (IC, ICU OSCI).
5. Applied to input (ICD).
6. Applied to outputs (o, OSCI).
7. Applied to output (O6M).
8. Applied to output (O6M2).
9. Applied to output (O6M4).
10. Applied to input and output of the oscillator.

PIN FUCTION

PIN NO. 17M	PIN NO. 37	SYMBOL	I/O	POLARITY	PIN NAME	FUNCTION
1	34	Xo	Osco	–	Clock output	An output pin for reference clock oscillation. The output is the inverse XI.
2	35	SS1	ICD	–	Shutter speed select input 1	An input pin to control the electrical shutter speed. For details, see "SHUTTER SPEED CONTROL",
3	36	SS_2	ICD	–	Shutter speed select input 2	An input pin to control the electrical shutter speed. For details, see "SHUTTER SPEED CONTROL"
4	37	SS3	ICD	–	Shutter speed select input 3	An input pin to control the electrical shutter speed. For details, see "SHUTTER SPEED CONTROL"
5	38	SS_4	ICD	–	Shutter speed select input 4	An input pin to control the electrical shutter speed. For details, see "SHUTTER SPEED CONTROL"
6	39	VTG	o	–	Shutter speed control output	A triger pulse for continuous variable shutter operation.
7	40	TSTI	ICD	–	Test pin	A pin to effectuate the VTG. It take effect to connect to High level,
8	41	FH2	o	n	Line index pulse	The pulse is used in color separator. The signal switches between H and L at every line. It resets at the 274th line when in NTSC mode, and at the 326th line when in PAL mode.
9	42	PBLK	o	n	Pre-blanking pulse	Equivalent to CBLK pulse except for shorter pulse width with cut-off trailing edge.
10	43	CPOB	0	n	Optical black clamp pulse	A pulse to clamp the optical black signal. The output stays Low during the absence of effective pixels within the Vertical blanking, otherwise is continuos at Horizontal cycle.
11	44	CPEN	o		Encoder DC clamp	A clamp pulse that is used for recovering DC level. The repetition is horizontal frequency.
12	–	NC	–	–	No connection	A pin for no use.
13	1	CLKO	0 6 M		1/2 dividing	The frequency is 1/2 dividing pulse of a reference clock XI. Connect to clock input terminal of SSG LSI.
14	2	HD	IC		Horizontal reference	An input pin for the horizontal reference signal. Connect to HD pin of SSG LSI.
15	3	VD	IC		Vertical reference	An input pin for the vertical reference signal, Connect to VD pin of SSG LSI.
16	4	V_1	o		Vertical transfer pulse 1	A Vertical transfer pulse for CCD. Connect to the 1A pin of the V-driver LSI.
17	5	V_2	o		Vertical transfer pulse 2	A Vertical transfer pulse for CCD. Connect to the 2A pin of the V-driver LSI.
18	6	V_{CC}	–	–	Power supply	Supply +5 V power.

PIN NO. 7M	PIN NO. 37	SYMBOL	I/O	POLARITY	PIN NAME	FUNCTION
19	7	GND	–	–	Ground	A grounding pin.
20	**8**	**V3**	**O**	⊔	Vertical transfer pulse 3	A vertical transfer pulse for CCD. Connect to the 3A pin of the V-driver LSI.
21	9	V4	O	⊔	Vertical transfer pulse 4	A vertical transfer pulse for CCD. Connect to the4A pin of the V-driver LSI.
22	10	CH_1	o	⊔	Read out pulse 1	A pulse that transfers the charge of the photodiode to the vertical shift register. Connect to the 1B pin of the V-driver LSI.
23	11	CH2	o	⊔	Read out pulse 2	A pulse that transfers the charge of the photodiode to the vertical shift register. Connect to the 3B pin of the V-driver LSI.
24	–	NC	–	–	No connection	A pin for no use,
25	12	TST2	ICD	–	**Test** pin 2	A test pin. Set open or to L level in the Normal mode.
26	13	SUB	o	⊔	OFD pulse output	A pulse that sweeps the charge of the photodiode for electrical shutter. It is **held at** H level in **Normal mode.**
27	**14**	V_{CC}	–	–	Power supply	Supply +5 V power.
28	15	HA	06M4	⊓⊔	Horizontal transfer pulse A	A horizontal transfer pulse for CCD. Connect to ϕ_{H1} of CCD without inverting driver.
29	16	HB	06M4	-u-l	Horizontal transfer pulse B	A horizontal transfer pulse for CCD. Connect to ϕ_{H2} of CCD without inverting driver.
30	17	R	06M2	⊓	Reset pulse	A reset pulse for CCD. Connect to ϕ_R **of CCD through the DC offset circuit.**
31	**18**	GND	–	–	Ground	A Grounding pin.
32	**19**	**RWI**	IC	–	R phase control input	**An input pin to set the falling edge of reset pulse R. It** inputs the signal from RWO through the RC integral circuit.
33	20	RWO	06M	⊓⊔	R phase control output	A pulse to set the falling edge of reset pulse R. It is input to RWI through the RC integral circuit.
34	21	DS I	06M	⊓	**CDS pulse 1**	**A pulse to clamp the feed-through level from CCD.**
35	**22**	DS_2	06M	⊓	**CDS pulse 2**	**A pulse to sample-hold the signal from CCD.**
36	**–**	**HCLR**	o	⊓	**Horizontal cleaning** pulse	**A pulse is** eaqual **to the cease period of horizontal** transfer pulse, (This pin is not applied to the LZ95D37.)
37	23	TST3	ICD	–	Test **pin**	**A test pin. Sat open or to L level in the** Normal mode.
38	**24**	SPO	06M	⊓⊔	**SPI, SP2 phase control output**	**A pulse to control the phase of color sampling pulses SP 1and SP2 It is input to SPI through the RC integral circuit.**

PIN NO. 37M	PIN NO. 37	SYMBOL	I/O	POLARITY	PIN NAME	FUNCTION
39	25	SPI	IC	⎍	SPI, SP2 phase control input	An input pin to control the phase of color sampling pulses SP_1 and SP_2. It inputs the signal from SPO through the RC integral circuit.
40	26	TST4	ICD	–	SP_1, SP2 control input	An input pin for selecting the phase of color sampling pulses SP_1 and SP2. Open or L level : continuously H level : uncontinuous with FH2
41	27	PNSW	ICU	–	TV mode select	An input pin to select TV standards. NTSC mode : Low level PAL mode : High level
42	28	GND		–	Ground	A Grounding pin.
43	29	Vcc	–	–	Power supply	Supply + 5 V power.
44	30	SP1	06M	⎍	Color sampling pulse 1	A pin to output the color sampling pulse for color demodulation based upon the output signal from CCD.
45	31	SP2	06M	⎍	Color sampling pulse 2	A pin to output the color sampling pulse for color demodulation based upon the output signal from CCD.
46	32	TEST	ICD		Test pin	A test pin. Set open or to L level in the Normal mode.
47	33	XI	OSCI	⎍	Clock input	An input pin for reference clock oscillation. The frequencies are as follows : At NTSC mode : 19.06993 MHz (1212 fH) At PAL mode : 19.31250 MHz (1236 fH) (fH = Horizontal frequency)
48		NC		–	Non connection	A pin for no use

IC : Input pin (CMOS level).
ICU : Input pin (CMOS level with built-in pull-up resistor)
ICD : Input pin (CMOS level with built-in pull-down resistor).
O, 06M, O6M2, 06M4 : Output pin.
OSCI : Input pin for oscillation.
Osco : Output pin for oscillation

NOTE :

Shutter Speed Control

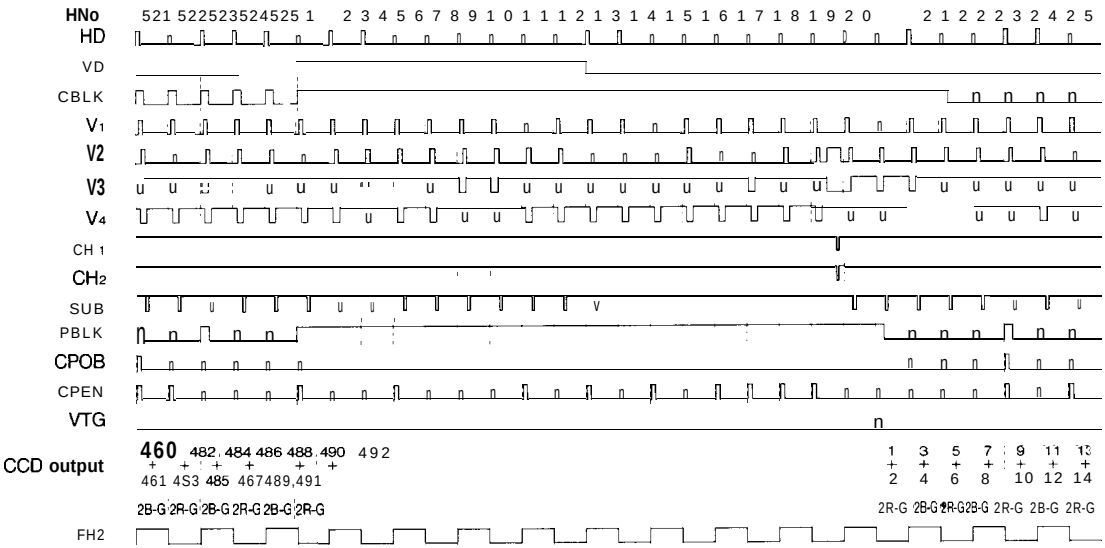
SS1 (Pin 2)	SS2 (Pin 3)	SS3 (Pin 4)	SS4 (Pin 5)	SHUTTER SPEED (S) NTSC	PAL
L	L	L	L	1/60	1/50
H	L	L	L	1/125	1/125
L	H	L	L	1/250	1/250
H	H	L	L	1/500	1/500
L	L	H	L	1/1 000	1/1 000
H	L	H	L	1/2 000	1/2 000
L	H	H	L	1/4 000	1/4 000
H	H	H	L	1/10 000	1/1 0re
			H	1/100	1/60

TIMING DAIGRAM

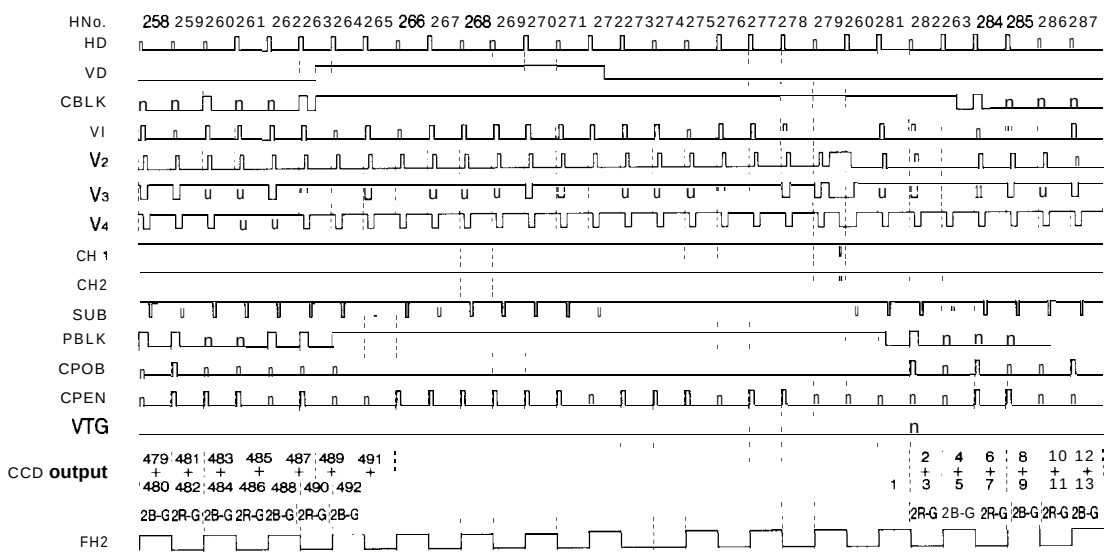
VERTICAL TIMING < NTSC >

Shutter speed
1 /2000 **s**

(ODD FIELD)



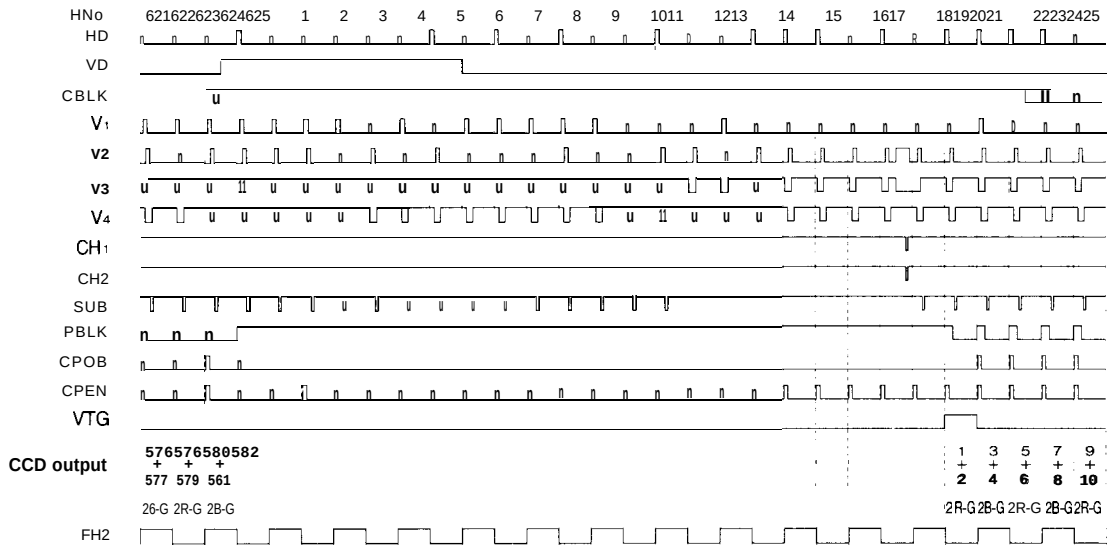
(EVEN FIELD)



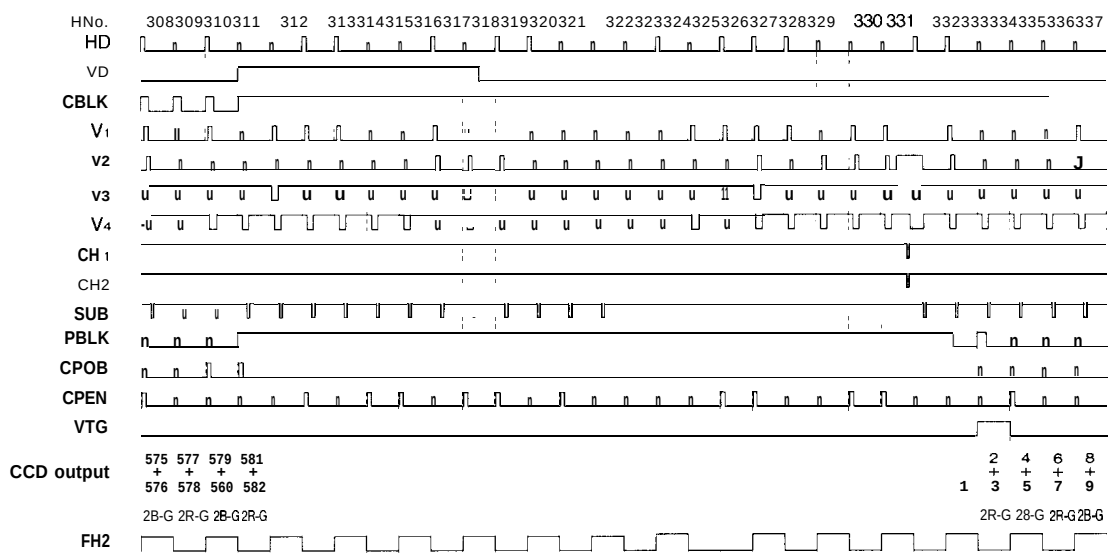
VERTICAL TIMING < PAL >

Shutter speed
1 /2000 s

(I St, 3rd FIELD)

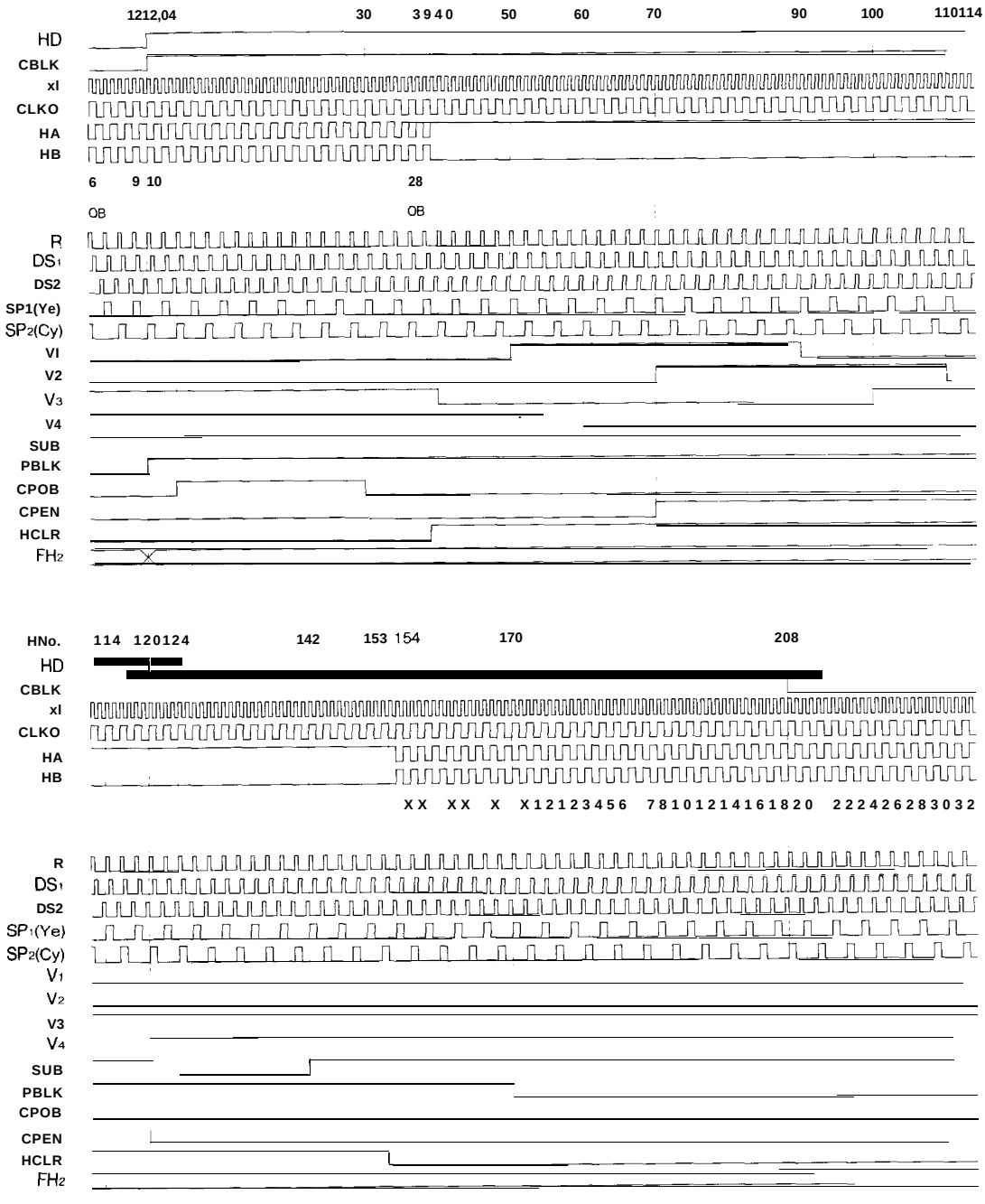


(2nd, 4th FIELD)



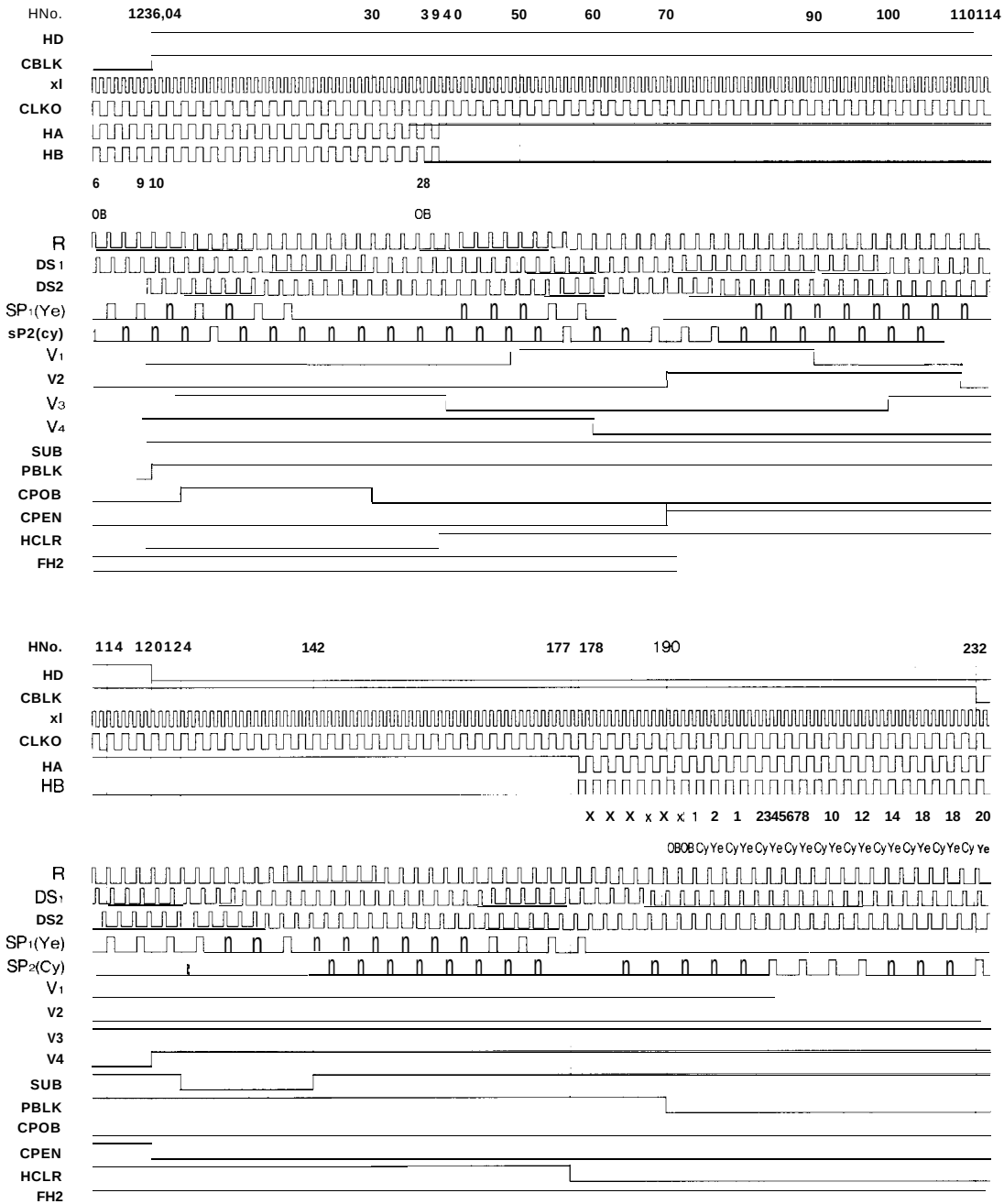
HORIZONTAL TIMING < NTSC >

TST4=L or OPEN



VERTICAL TIMING < PAL >

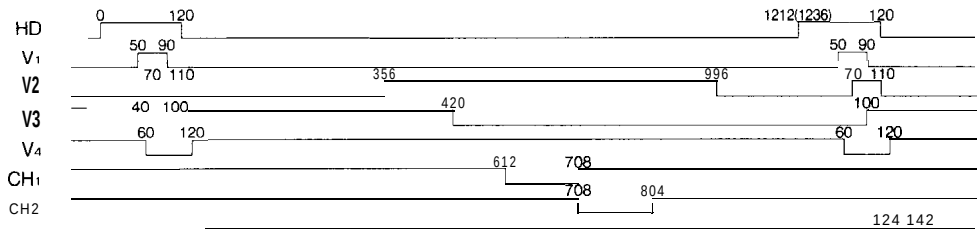
TST4 = L or OPEN



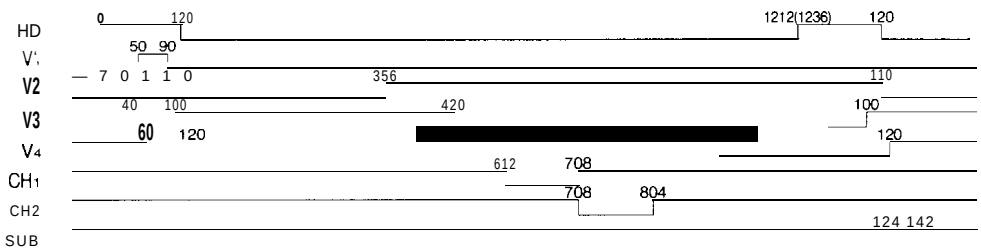
CHARGE READ TIMING

(): PAL

(ODD or Ist, 3rd FIELD)



(EVEN or 2nd, 4th FIELD)



HIGH SPEED PULSE