ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Power 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	℃

DC CHARACTERISTICS

(Vcc = +5 V ± 10%, Ta=-10 to +70℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	NOTE
Low level input voltage	V_{IL}				1.5	v	1
High level input voltage	V_{IH}		3.5			v	
High level threshold voltage	V_{T+}	Schmitt buffer			3,7	v	2
Low level threshold voltage	V_{T-}	Schmitt buffer	1,0			V	
Hysteresis voltage	$V_{T+} - V_{T-}$	Schmitt buffer	0,4			v	
Low level output voltage	V_{OL1}	I_{OL} = 3 mA			0.4	v	3
High level output voltage	V_{OH1}	I_{OL} = – 1.5 mA	4.0			v	
Low level output voltage	V_{OL2}	I_{OL} = 9 mA			0,4	v	4
High level output voltage	V_{OH2}	I_{OL} = - 4.5 mA	4.0			v	
Low level input current	$\lvert I_{IL1} \rvert$	VI=o v			1.0	μA	5
Low level inout current	$\lvert I_{IL2} \rvert$	VI=0 V	8.0		60	μA	6
High level input current	$\lvert I_{IH1} \rvert$	VI= Vcc			1.0	μA	7
High level input current	$\lvert I_{IH2} \rvert$	VI= Vcc	8.0		60	μA	8

NOTES :

1. **Applied to inputs** (IC, ICU, ICD).
2. Applied to input (ICS).
3. Applied to **outputs (o).**
4. **Applied to outputs (03).**
5. **Applied to inputs** (IC, ICD).
6. Applied to **input** (ICU).
7. Applied to **inputs (IC,** ICU).
8. **Applied to input (ICD).**

PIN FUNCTION

PIN NO.	SYMBOL	I/O	POLARITY	PIN NAME	FUNCTION
1	HDI	IC		Horizontal drive pulse	Horizontal reference input. To be connected to HD pin on SSG LSI.
2	VDI	ICS		Vertical drive pulse	Vertical reference input. To be connected to VD pin on SSG LSI.
3	Do	o		Delay-line clock	1/2 frequency output of CKI (Pin 46)
4	MIR	ICU	–	MIRROR/NORMAL select	A pin to swich CCD output. L : Normal image, H : Mirror image
5	FLMD	ICU	–	Shutter speed select	This pin select the shutter spaed. L : 1/60 (1/50) s, H : 1/100 s For details, see “NOTES 2, 3“.
6	EEMD	ICU	–	EE control 1	For details, see “NOTES 2, 3“.
7	GND	–	–	Ground	Grounding pin. To be connected to the GND level.
6	ACL	ICU		Reset pulse	Reset input at power ON. For details, see “NOTE 1”.
9	EEST	ICU	–	EE control enable	EE control enable signal. L : Control is stopped. H : Control is started.
10	EEUD	IC	–	EE control 2	For details, see “NOTE 3“.
11	EENR	IC	–	EE control 3	For details, see “NOTE 3“.
12	TSTO	o	–	Test terminal	Testing output pin.
13	SP1	o		Sampling pulse 1	tiler sampling pulse. It outputs at High level of the SE (pin 17).
14	SP2	o		Sampling pulse	Color sampling pulse. It outputs at High level of the SE (pin 17).
15	SESL	ICU	–	SPI and SP2 control	Carrier phase selection input.
16	SINV	ICU	–	Carrier invert	An input pin to invert color demodulation carrier every horizontal pulse.
17	SE	o		tiler demodulation pulse	tiler demodulation carrier output.
18	TO	o		Control pulse	Calling pulse.
19	INSL	ICU	–	CCD select input	An input pin to select the CCD. L : CCD of 1/2 type, H : CCD of 1/3 type.
20	FCDS	o		CDS pulse 1	Clamp pulse.
21	FS	o		CDS pulse 2	Sampling pulse.
22	MFSI	ICU	–	FS phase control	A pin to control FS phase.For details, see “NOTE 4“.
23	MFS2	ICU	–		

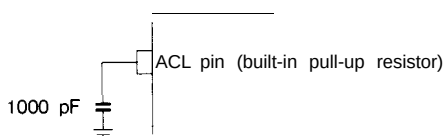
PIN NO.	SYMBOL	I/O	POLARITY	PIN NAME	FUNCTION
24	MCD_1	ICU	–	FCDS phase control	A pin to control FCDS phase. For details, see "NOTE 4".
25	MCD2	ICU	–		
26	MFRI	ICU	–	FR phase control	A pin to control FR phase. For details, see "NOTE 4".
27	MFR2	ICU	–		
28	TOSL	ICU	–	TO control	TO output control. L : TO output is stoppad, H : 10 pulses of TO are output starting at rise of TOSL.
29	IVMD	ICD	–	TV mode select	TV mode selection. L : NTSC, H : PAL
30	Vcc	–	–	Power supply	To be connected to +5 V
31	GND	–	–	Ground	Grounding pin. To be connected to the GND level.
32	OBCP	O	⎍	OB clamp	OB clamp pulse.
33	VH_{1X}	O	⎍	Read out pulse 1	An output pin to transfer the photo diode charge of CCD to the vertical shift register. To be connected to the 1 B pin of the LR36683N vertical driver LSI.
34	VH3X	o	⎍	Read out pulse 2	An output pin to transfer the photo diode charge of CCD to the vertical shift register. To be connected to the 3B pin of the LR36683N vertical driver LSI.
35	V_{1X}	o	⎍	Vertical transfer pulse 1	Vertical transfer pulse. To be connected to the 1A pin of the LR36663N vertical driver.
38	V2X	o	⎍	Vertical transfer pulse 2	Vertical transfer pulse. To be connected to the 2A pin of the LR36663N vertical driver.
37	V3X	o	⎍	Vertical transfer pulse 3	Vertical transfer pulse. To be connected to the 3A pin of the LR36663N vertical driver.
36	V4X	o	V	Vertical transfer pulse 4	Vertical transfer pulse. To be connected to the 4A pin of the LR36663N vertical driver.
39	OFDX	o	⎍	OFD pulse output	An outrput pin to sweep the photodiode charge of CCD. When FLMD = EEMD = L, a pulse becomes H level signal.
40	FR	03	⎍	Reset pulse	An output pin to reset the CCD.
41	FH_{2B}	03	⎍⎍	Horizontal transfer pulse 2B	Horizontal transfer pulse. When MIR = L, the phase is the same as at FH 2. When MIR = H, the phase is the same as at FH 1.
42	FH2	03	⎍⎍	Horizontal transfer pulse 2	Horizontal transfer pulse.

PIN NO.	SYMBOL	I/O	POLARITY	PIN NAME	FUNCTION
43	GND	–	–	Ground	Grounding pin. To be connected to the GND level.
44	FH_1	0 3	⎍⎍	Horizontal transfer pulse 1	Horizontal transfer pulse,
45	FH_{1B}	0 3	⎍⎍	Horizontal transfer pulse 1B	Horizontal transfer pulse. When MIR = L, the phase is the same as at FH_1 When MIR = H, the phase is the same as at FH2
46	CKI	OCK	MM	Clock input	A pin for oscillation inverter input, NTSC : 1212 fH, PAL : 1236 fH (fH = Horizontal frequency)
47	CKO	ICK	⎍⎍⎍	Clock output	A pin for oscillation inverter output.
48	TEST	ICU	–	Test terminal	Testing pin. Typically connected to the GND level.

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)
Ics : Input pin (CMOS level schmitt).
ICK : Input pin for oscillation.
OCK : Output pin for oscillation.
o : Output pin.
03 : Output pin.

NOTES :

1. How to use **ACL** pin (Pin 8)



2. Fixed Shutter mode

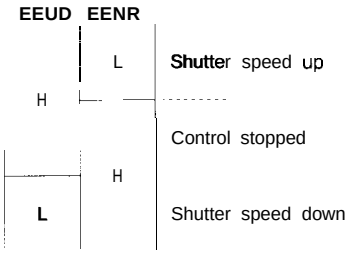
EEMD (Pin 6)= Low level

FLMD (Pin 5)	SHUTTER SPEED (s)	
	NTSC	PAL
L	1/60	1/50
H	1/100 (Flicker-less)	

3. EE Control

FEMD (Pin 6)= High level

FLMD (Pin 5)	SHUTTER SPEED (S)	
	NTSC	PAL
x	1/61-1/50000	1/51 -1/50 000



- When EENR and EEUD are H level, control is stopped.
- When either EENR or EEUD is L level, control is resumed.
- When EEST set to L level, EE control is disable.

The shutter speed changes in the table as shown below.

SHUTTER SPEED (s)					
	NTSC	1 /61 to 1 /230	to 1 /775	to 1/4 758	to 1/51 263
	PAL	1/51 to 1 /222	to 1 /701	to 1/4 733	to 1/51 915
CHANGE STEP (s)	NTSC	1/1 750	1/3 930	1/15734	1 /63 000
	PAL	1/1 740	1/5210	1/1 5625	1 /50 600

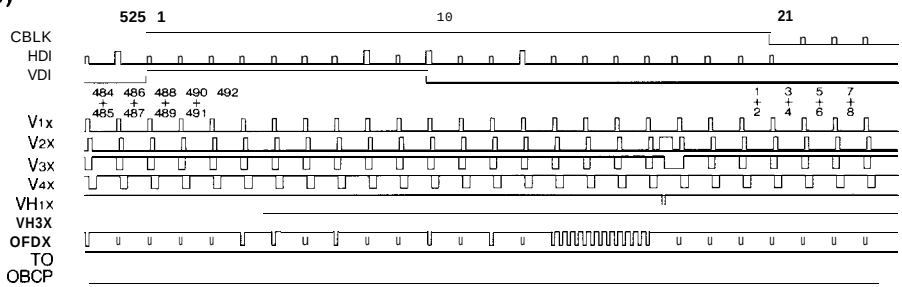
4. The phase adjustments should be made with the input combinations as shown in the table

FR PHASE		FCDS PHASE		FS PHASE		PHASE DELAY (ns)
MFR_1	MFR_2	MCD_1	MCD_2	MFSI	MFS_2	
L	L	L	L	L	L	td
L	H	L	H	L	H	td + α
H	L	H	L	H	L	td + 2α
H	H	H	H	H	H	td + 3α

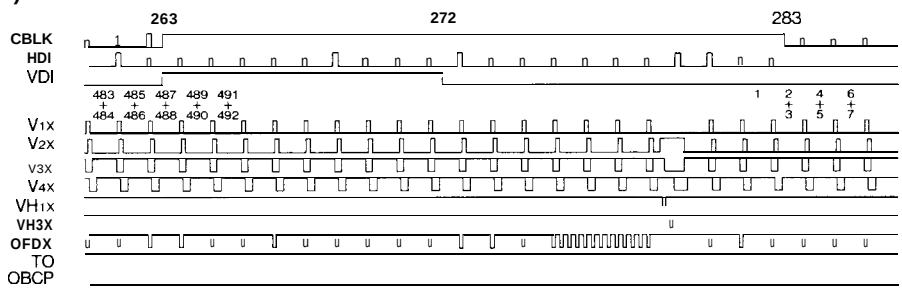
TIMING DIAGRAM

VERTICAL PULSE TIMING <NTSC, MIRROR (MIR = H) >

(ODD FIELD)

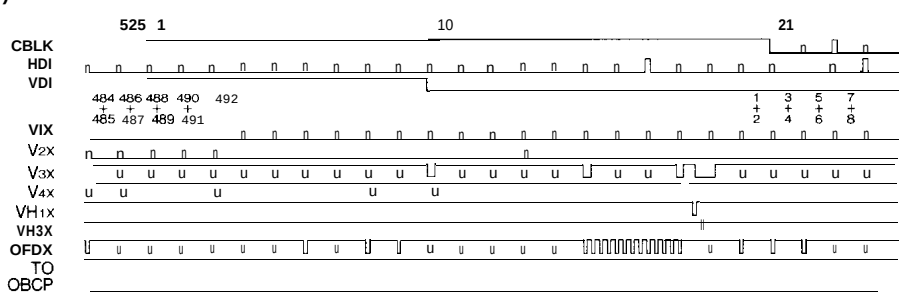


(EVEN FIELD)

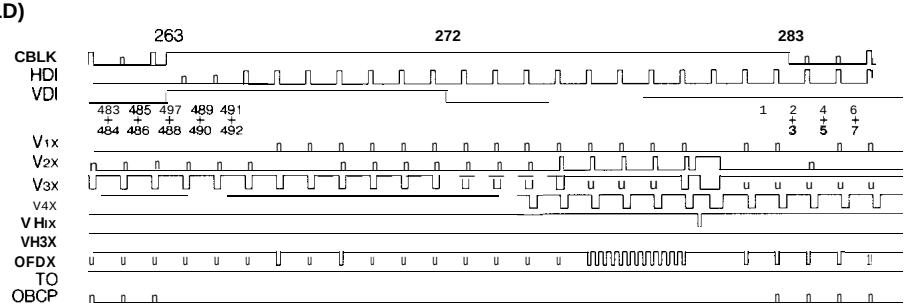


VERTICAL PULSE TIMING <NTSC, NORMAL (MIR = L) >

(ODD FIELD)

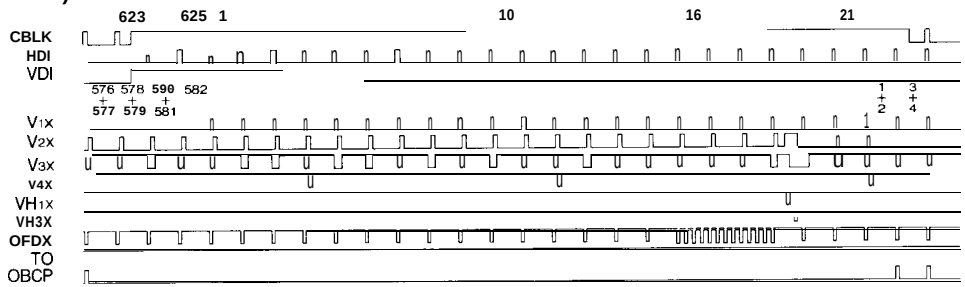


(EVEN HELD)

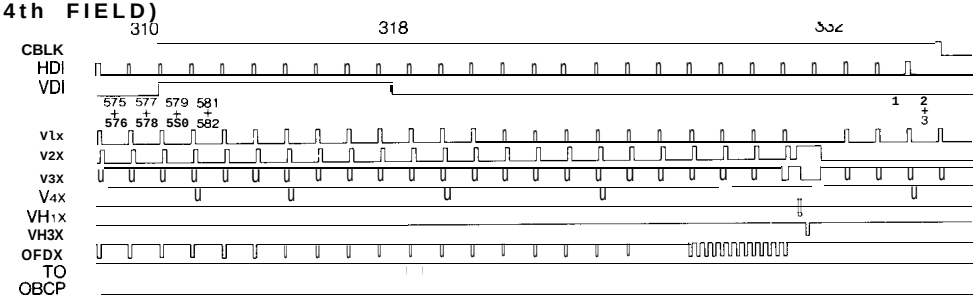


VERTICAL PULSE TIMING < PAL, MIRROR (MIR = H) >

(lst, 3rd FIELD)

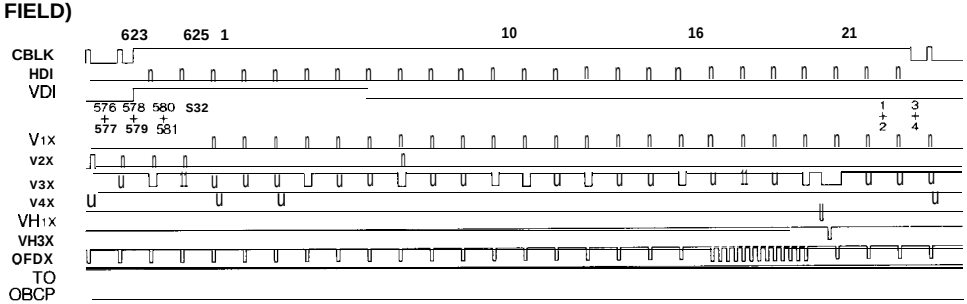


(2nd, 4th FIELD)

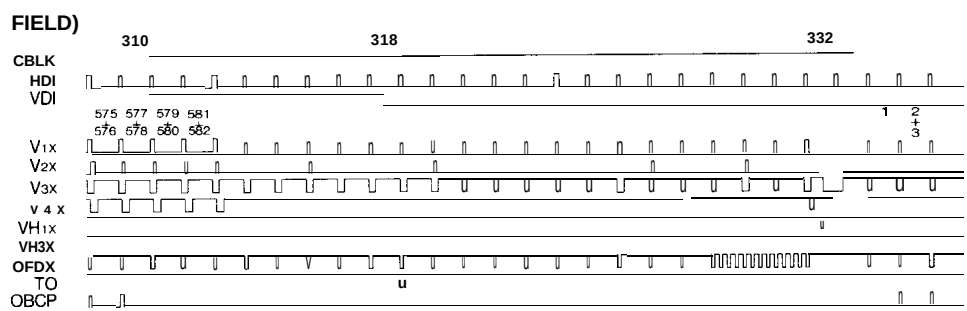


VERTICAL PULSE TIMING < PAL, NORMAL (MIR = L) >

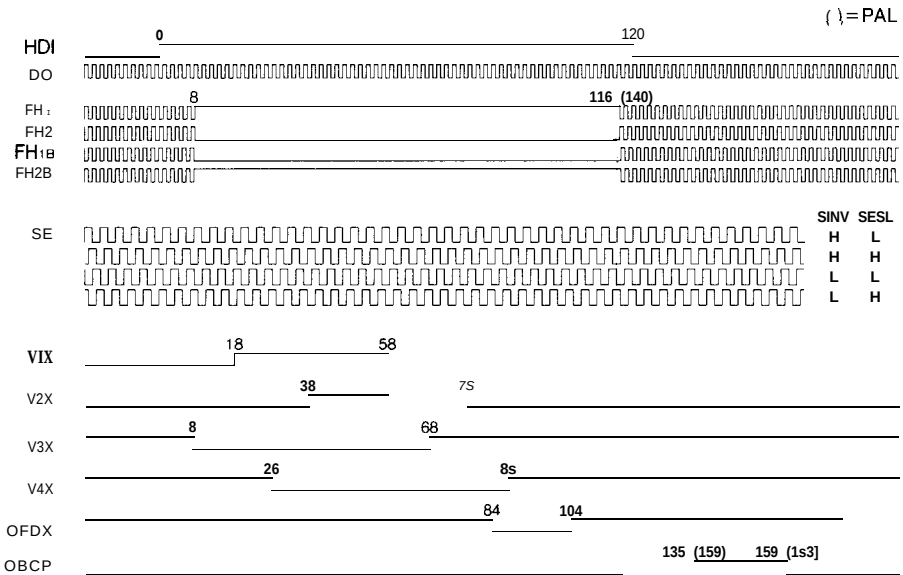
(1st, 3rd FIELD)



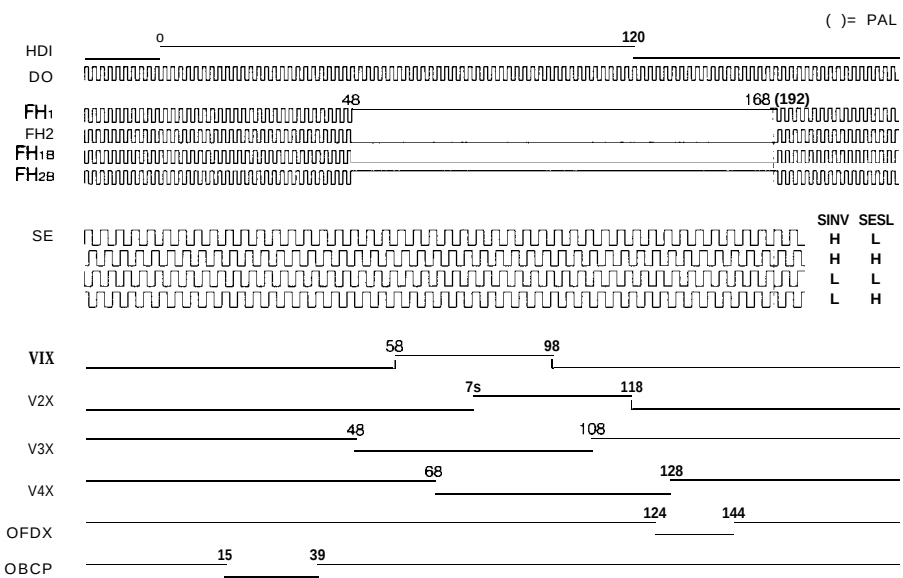
(2nd, 4th FIELD)



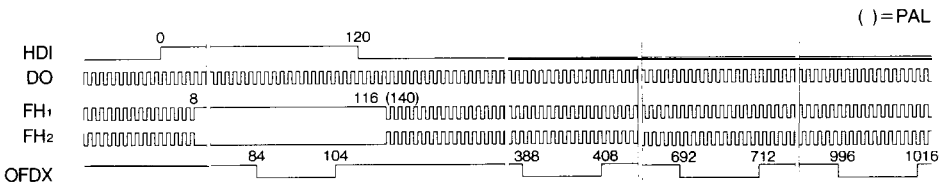
HORIZONTAL PULSE TIMING < MIRROR, (MIR = H) >



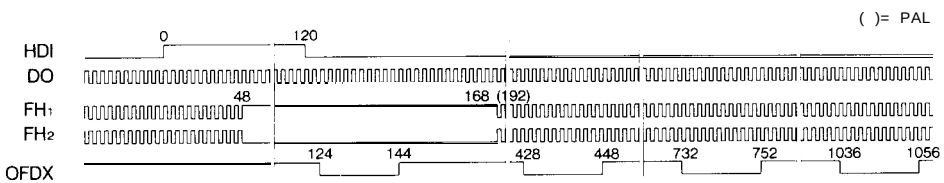
HORIZONTAL PULSE TIMING < NORMAL, (MIR = L) >



"OFDX" PULSE TIMING < MIRROR, (MIR = H) >

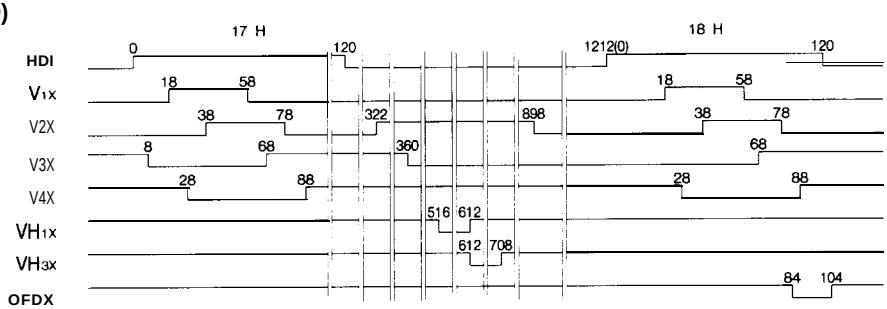


"OFDX" PULSE TIMING < NORMAL, (MIR = L) >

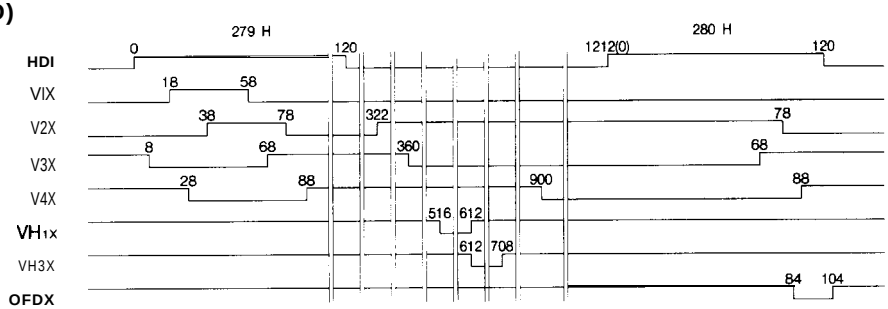


CHARGE READ TIMING <NTSC, MIRROR (MIR = H) >

(ODD FIELD)

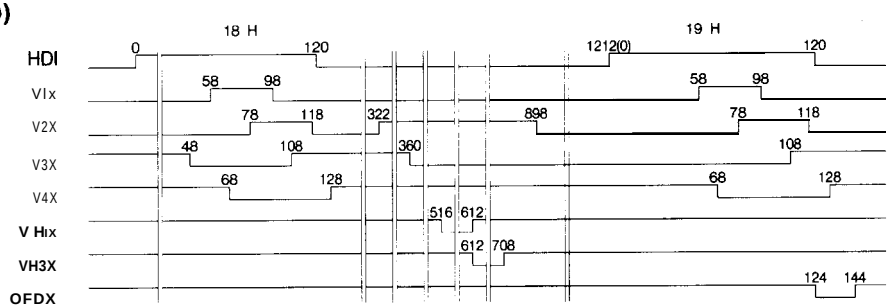


(EVEN FIELD)

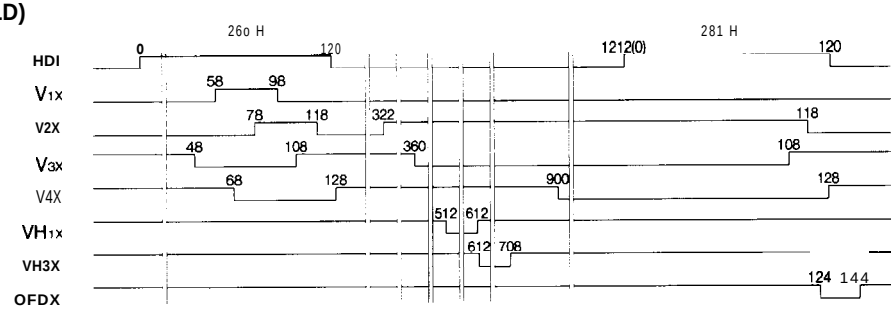


CHARGE READ TIMING <NTSC, NORMAL (MIR = L) >

(ODD FIELD)

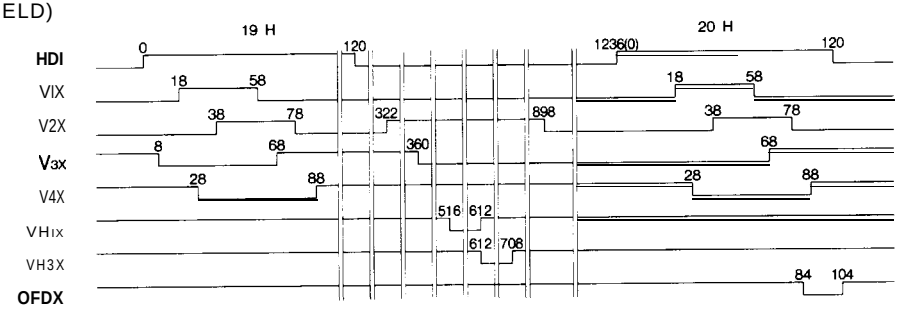


(EVEN FIELD)

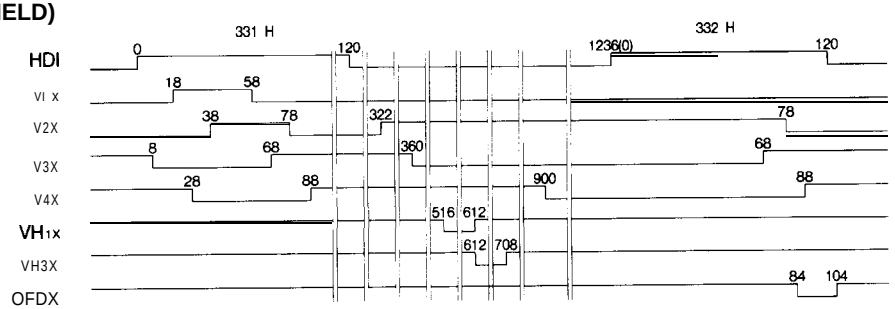


CHARGE READ TIMING < PAL, MIRROR (MIR = H) >

(1st, 3rd FIELD)

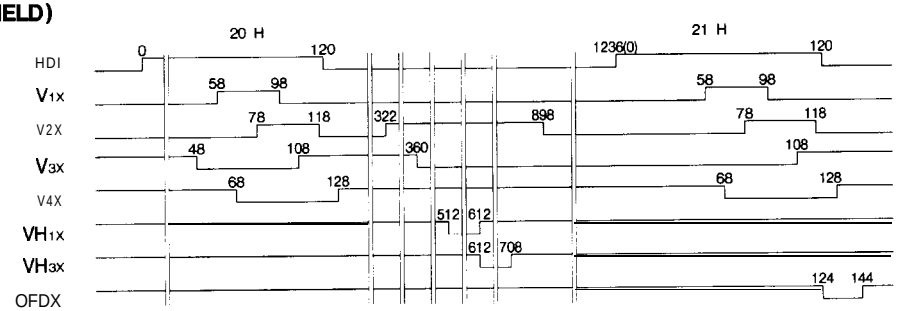
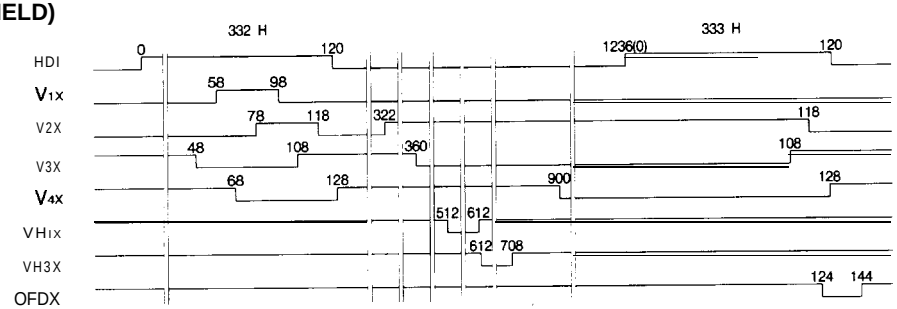


(2nd, 4th FIELD)



CHARGE READ TIMING < PAL, NORMAL (MIR = L) >

(1st, 3rd FIELD)



(2nd, 4th FIELD)