

Application	DVD
Color of Illumination #6)	GREEN (G. : x=0.250, y=0.439)

zjjszhangf@gmail.com

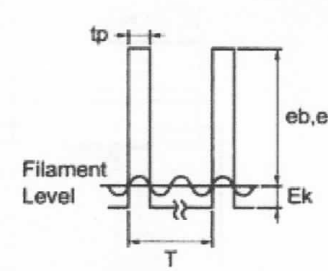
### ABSOLUTE MAXIMUM RATINGS #4)

Item	Symbol	Min.	Max.	Unit	Condition
Filament Voltage #2)	Ef	2.40	3.60	Vac	eb,ec = Typ.
Anode Voltage	eb	—	32.0	Vp-p	Ef=Typ.
Grid Voltage	ec	—	32.0	Vp-p	
Operating Temperature	Topr	-40	+85	°C	—

### RECOMMENDED OPERATING CONDITION #5)

Item	Symbol	Min.	Typ.	Max.	Unit
Filament Voltage #2)	Ef	2.70	3.00	3.30	Vac
Peak Anode Voltage	eb	24.0	27.0	30.0	Vp-p
Peak Grid Voltage	ec	24.0	27.0	30.0	Vp-p
Cut-Off Bias Voltage	Ek	5.1	—	7.7	Vdc
Duty Factor	Du	—	1/17	—	—
Pulse Width	tp	—	100	—	µs
Operating Temperature	Topr	-20	—	+70	°C
Storage Temperature	Tstg	-55	—	+85	°C

### ELECTRICAL CHARACTERISTICS

Item	Test Condition	Symbol	Min.	Typ.	Max.	Unit	
Filament Current	Ef= 3.0 Vac ,eb=ec=0	If	90	100	110	mAac	
Anode Current #1)	Ef= 3.0 Vac eb= 27.0 Vp-p ec= 27.0 Vp-p	ib	1G~5G	—	2.0	4.0	mAp-p
			6G~13G	—	3.0	6.0	
Grid Current #1)	Duty= 1/17 tp= 100 µs tb= 0 µs	ic	2G~5G	—	2.0	4.0	mAp-p
			1G	—	3.0	6.0	
			6G~13G	—	4.0	8.0	
Brightness	 <p style="text-align: center;">(All Segs are lit)</p>	GREEN	102	204	—	ft-L	
		L(Max.) / L(Min.)	—	—	2		
Grid Cut-Off Voltage #3)	Ef= 3.0 Vac Eb= 27.0 Vdc, Ec=Vary	Ecco	(-5.1)	—	—	Vdc	
Anode Cut-Off Voltage #3)	Ef= 3.0 Vac, Du= 1/17 ec= 27.0 Vp-p, Eb= Vary	Ebco	(-5.1)	—	—	Vdc	

#1. Unless otherwise specified, the anode and the grid current should be measured for each grid when all anodes turn on.

#2. AC 50~60Hz Effective Values.

#3. The cut-off voltage should be measured under the condition of the center-tab ground.

#4. Absolute Maximum Ratings : The value should not be exceeded in any conditions.

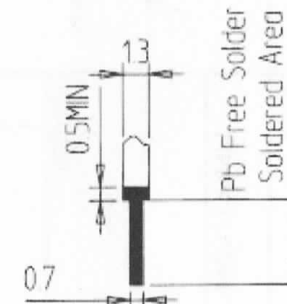
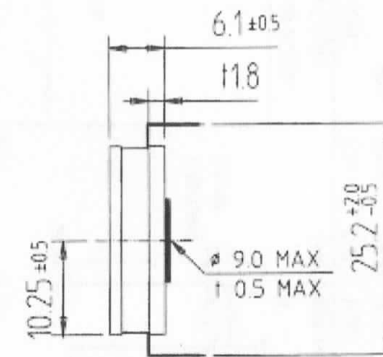
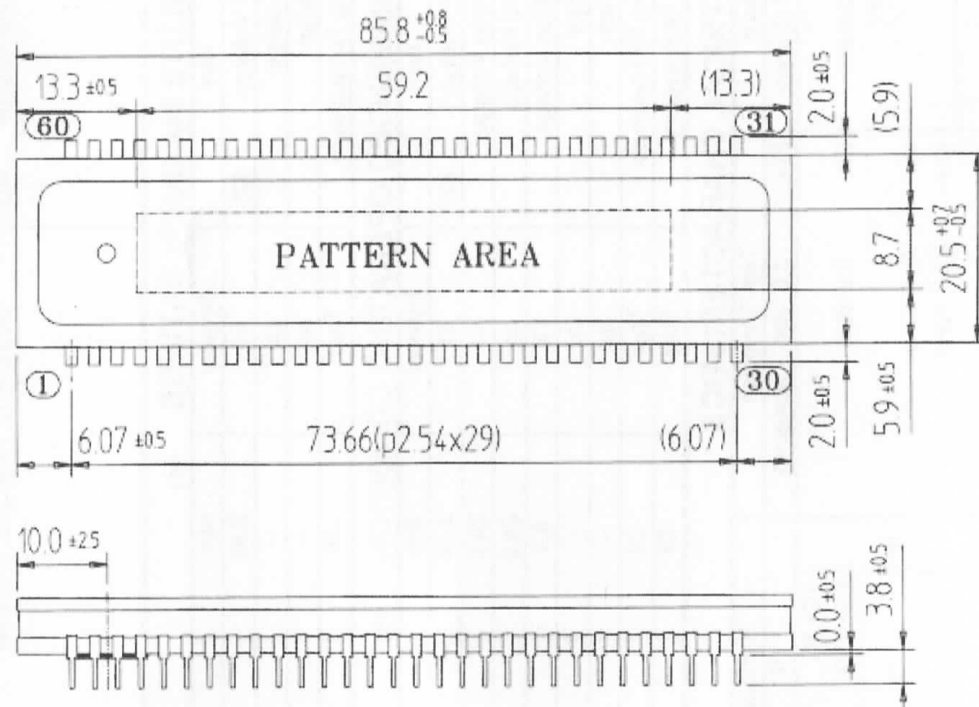
If a user don't keep this condition, then VFD may be permanently damaged.

#5. Recommended Operating Condition : Quality can be assured within this condition.

Typical rating is the most optimized value on the life time

#6. All phosphor is Cd-free phosphor.

## OUTER DIMENSIONS



LEAD DETAILS

## PIN CONNECTION

PIN NO.	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
CONNECTION	F1	F1	NC (IC)	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	F2	F2

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CONNECTION	F1	F1	NC (IC)	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G	F2	F2

© Note ©

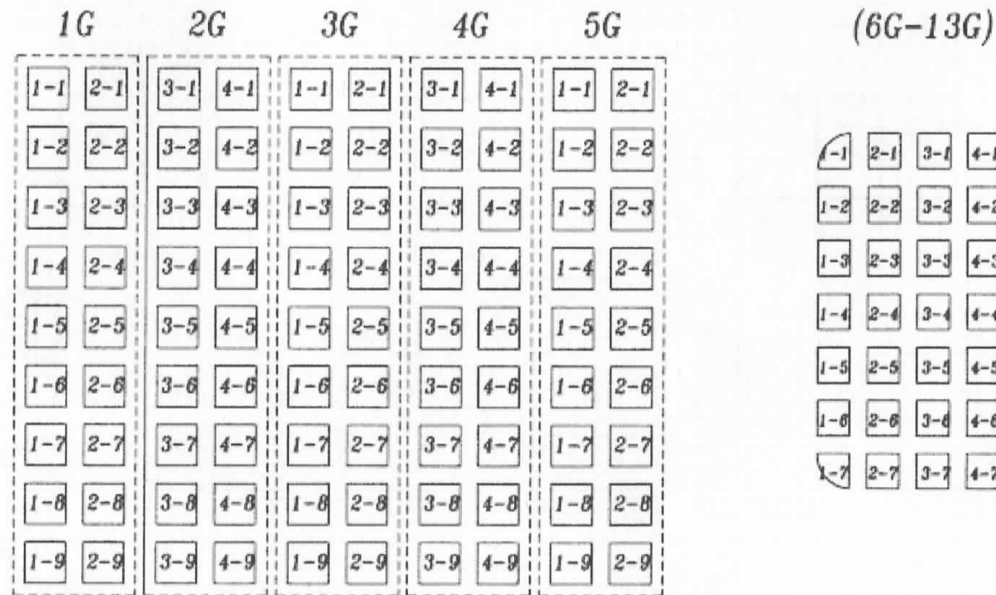
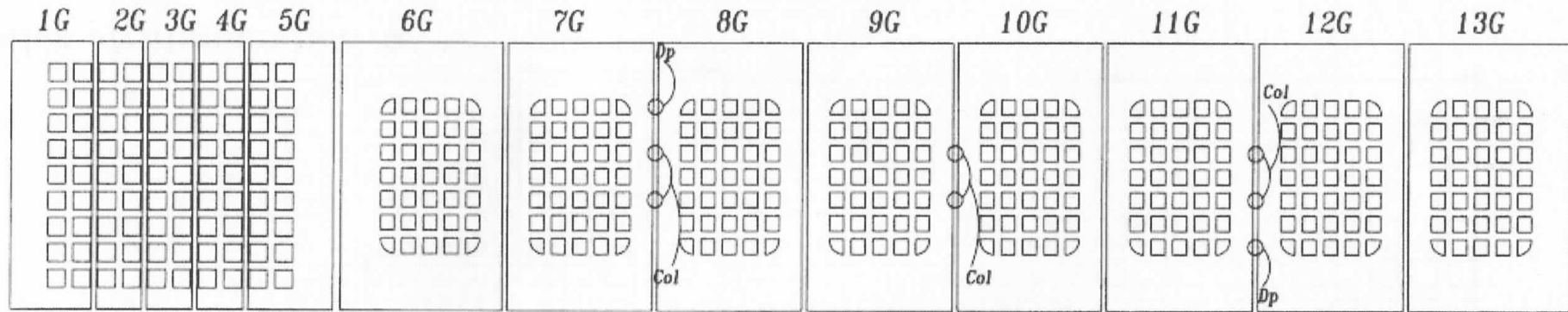
1) Fn : Filament pin

2) nG : Grid pin

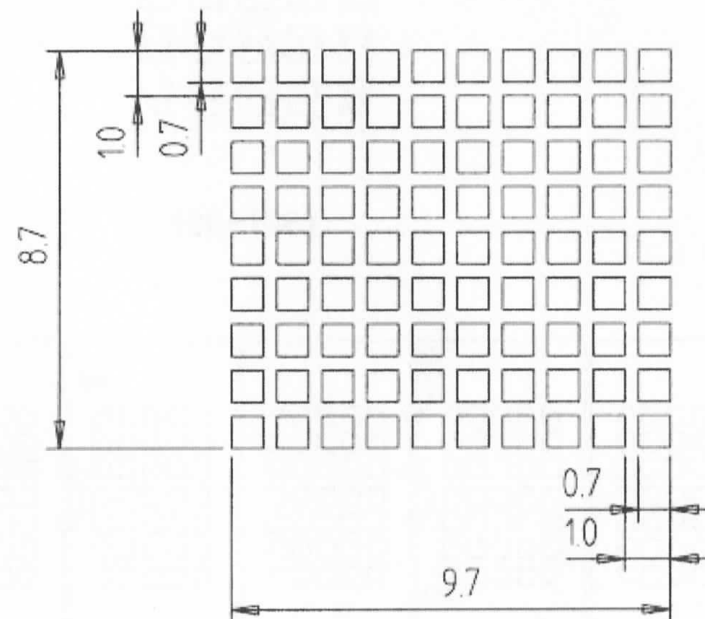
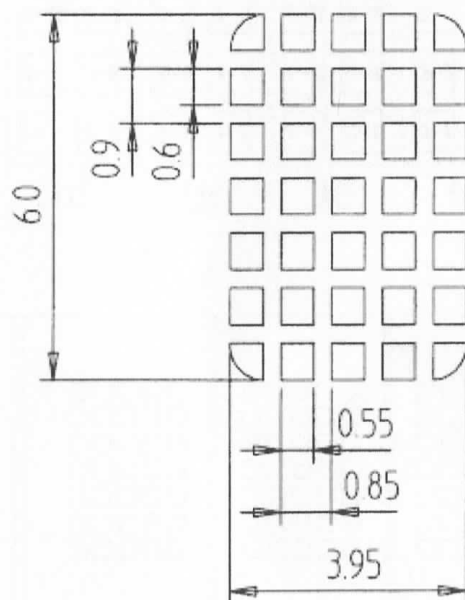
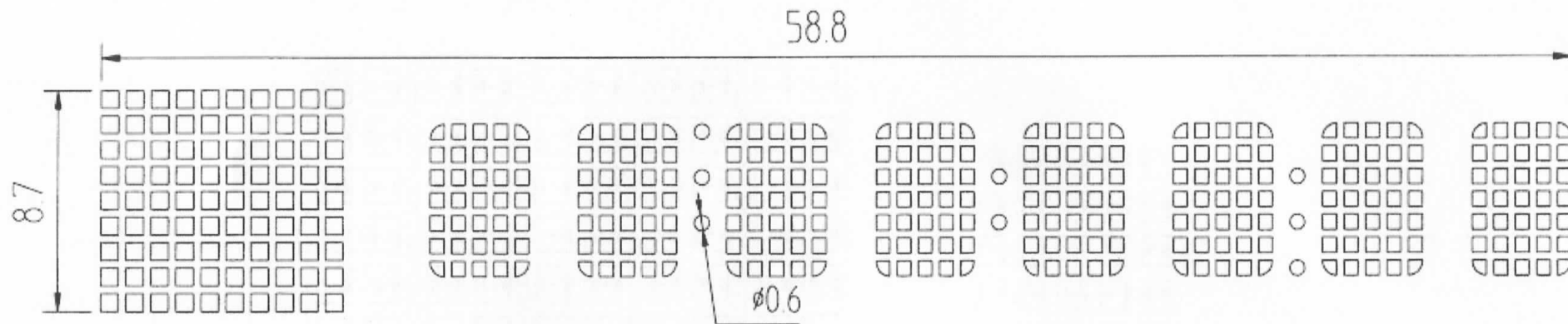
3) Pn : Anode pin

4) IC : Pins are internally connected, and should be electrically opened on the PCB

# GRID ASSIGNMENT



# PATTERN DETAILS



© Color of Illumination ©

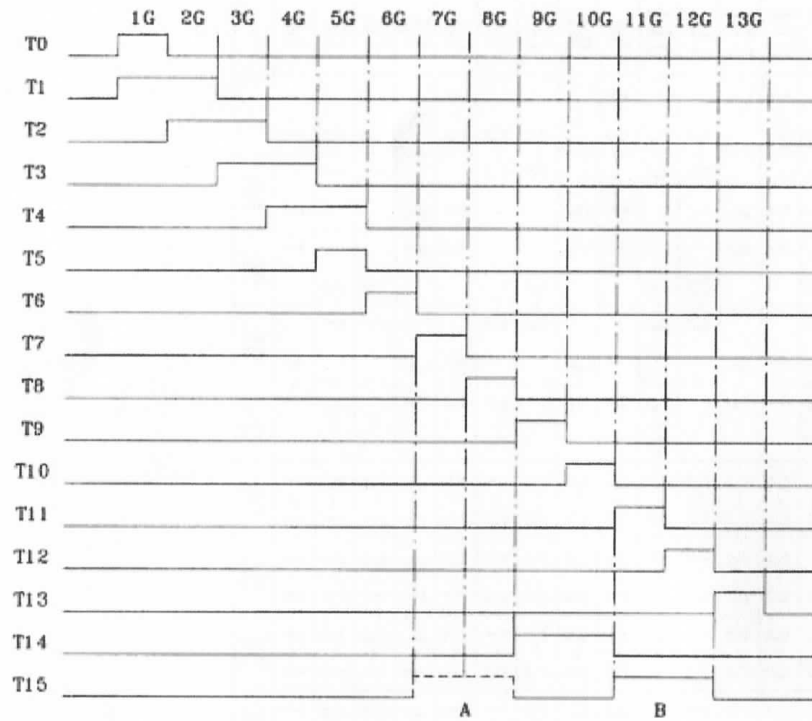
Green (G.  $x=0.250, y=0.439$ ) ----- All Patterns.

ANODE CONNECTION

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G
P1	1-1	1-1		1-1		1-1	1-1	1-1	1-1	1-1	1-1	1-1	1-1
P2	2-1		2-1		2-1	2-1	2-1	2-1	2-1	2-1	2-1	2-1	2-1
P3	3-1		3-1		/	3-1	3-1	3-1	3-1	3-1	3-1	3-1	3-1
P4	/	4-1		4-1		4-1	4-1	4-1	4-1	4-1	4-1	4-1	4-1
P5	1-2	1-2		1-2		5-1	5-1	5-1	5-1	5-1	5-1	5-1	5-1
P6	2-2		2-2		2-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
P7	3-2		3-2		/	2-2	2-2	2-2	2-2	2-2	2-2	2-2	2-2
P8	/	4-2		4-2		3-2	3-2	3-2	3-2	3-2	3-2	3-2	3-2
P9	1-3	1-3		1-3		4-2	4-2	4-2	4-2	4-2	4-2	4-2	4-2
P10	2-3		2-3		2-3	5-2	5-2	5-2	5-2	5-2	5-2	5-2	5-2
P11	3-3		3-3		/	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
P12	/	4-3		4-3		2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3
P13	1-4	1-4		1-4		3-3	3-3	3-3	3-3	3-3	3-3	3-3	3-3
P14	2-4		2-4		2-4	4-3	4-3	4-3	4-3	4-3	4-3	4-3	4-3
P15	3-4		3-4		/	5-3	5-3	5-3	5-3	5-3	5-3	5-3	5-3
P16	/	4-4		4-4		1-4	1-4	1-4	1-4	1-4	1-4	1-4	1-4
P17	1-5	1-5		1-5		2-4	2-4	2-4	2-4	2-4	2-4	2-4	2-4
P18	2-5		2-5		2-5	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
P19	3-5		3-5		/	4-4	4-4	4-4	4-4	4-4	4-4	4-4	4-4
P20	/	4-5		4-5		5-4	5-4	5-4	5-4	5-4	5-4	5-4	5-4
P21	1-6	1-6		1-6		1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
P22	2-6		2-6		2-6	2-5	2-5	2-5	2-5	2-5	2-5	2-5	2-5
P23	3-6		3-6		/	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5
P24	/	4-6		4-6		4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5
P25	1-7	1-7		1-7		5-5	5-5	5-5	5-5	5-5	5-5	5-5	5-5
P26	2-7		2-7		2-7	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6
P27	3-7		3-7		/	2-6	2-6	2-6	2-6	2-6	2-6	2-6	2-6
P28	/	4-7		4-7		3-6	3-6	3-6	3-6	3-6	3-6	3-6	3-6
P29	1-8	1-8		1-8		4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6
P30	2-8		2-8		2-8	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6
P31	3-8		3-8		/	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7
P32	/	4-8		4-8		2-7	2-7	2-7	2-7	2-7	2-7	2-7	2-7
P33	1-9	1-9		1-9		3-7	3-7	3-7	3-7	3-7	3-7	3-7	3-7
P34	2-9		2-9		2-9	4-7	4-7	4-7	4-7	4-7	4-7	4-7	4-7
P35	3-9		3-9		/	5-7	5-7	5-7	5-7	5-7	5-7	5-7	5-7
P36	/	4-9		4-9		/	Col	Col	Col	Col	Col	Col	/
P37	/	/	/	/	/	/	Dp	/	/	/	Dp	/	/



# GRID TIMING CHART



Pulse marked with "A" applies to the reverse colon and dot only  
 Pulse marked with "B" applies to the reverse colon and dot only

# ANODE TIMING CHART

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G
P1	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P2	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P3	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P4		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P5	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P6	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P7	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P8		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P9	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P10	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P11	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P12		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P13	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P14	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P15	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P16		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P17	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P18	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P19	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P20		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P21	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P22	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P23	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P24		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P25	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P26	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P27	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P28		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P29	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P30	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P31	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P32		T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P33	T0	T2		T4	T6	T7	T8	T9	T10	T11	T12	T13	
P34	T1		T3	T5	T6	T7	T8	T9	T10	T11	T12	T13	
P35	T1		T3		T6	T7	T8	T9	T10	T11	T12	T13	
P36		T2		T4		T15A	T15A	T14	T14	T15B	T15B		
P37						T15A	T15A			T15B	T15B		

T15A is used when the FTD is used up-side down  
 T15B is used when the FTD is used up-right