TFT LCD Approval Specification

MODEL NO.: N164O1-C01

Customer: SHARP Co. Ltd. Mobile LCD

Approved by: _____

Note :

記錄	工作	審核	角色	投票
2008-08-22 15:39:32 CST	PMMD II Director	kevin_wu(吳柏勳 /56520/54894)	Director	Accept

- CONTENTS -

REVISION HISTORY

Version	Date	Section	Description
Ver. 2.0	Aug. 05 '08	-	N164O1-C01 Approval specification was first issued.
Ver. 2.1	Aug. 19 '08	2.1	Modify from (MODULE) to (SHARP MODULE WITH CMO's CELL).
		7	Add 7.Date(packing) & 8.Grade(shipping) notification on carton label.
			Modify from RLCDD020ITPZZ to RLCDD0201TPZZ

1.GENERAL DESCRIPTION

1.1 OVERVIEW

The N164O1-C01 is a 16.4-inch wide LCD cell with thin film transistors as active elements and contains 1600x900 pixels. Each pixel is divided into red, green and blue dot, which are arranged in vertical stripe. The cell is normally white mode, and can be applied to the transmission type display. Backlight unit (BLU) and circuit board for the cell are not built in.

1.2 FEATURES

- 16:9 (1600 x 900 pixels) resolution
- RoHS Compliance

1.3 APPLICATION

- LCD Monitor
- LCD Notebook

1.4 GENERAL SPECIFICATIONS (Cell with Polarizer)

Item		Specification	Unit
Panel Dimension (TFT)		371.2 x 212.8	mm
Glass thickness (TFT/ CF)		0.6/0.6	mm
Active Area		363.2 (H) ×204.3(V) (16.4” diagonal)	mm
Driver Element		a-si TFT active matrix	-
Pixel Number		1600x R.G.B x 900	pixel
Pixel Pitch		0.227 (H) x 0.227 (V)	mm
Pixel Arrangement		RGB vertical stripe	-
Transmissive Mode		Normally white	-
Surface Treatment		Hard-coating 3H (Upper Polarizer) Hard-coating HB (Lower Polarizer)	-
Polarizer Type		Glare (Upper Polarizer) APCF (Lower Polarizer)	-
Polarizer Dimension	TFT	368.6 x 210.2	mm
	CF	368.6 x 210.2	mm
Polarizer Thickness	TFT	0.245±0.03	mm
	CF	0.215±0.03	mm
Weight		291+-20	g

Note: Please refer chapter 9 panel drawing

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT (SHARP MODULE WITH CMO's CELL)

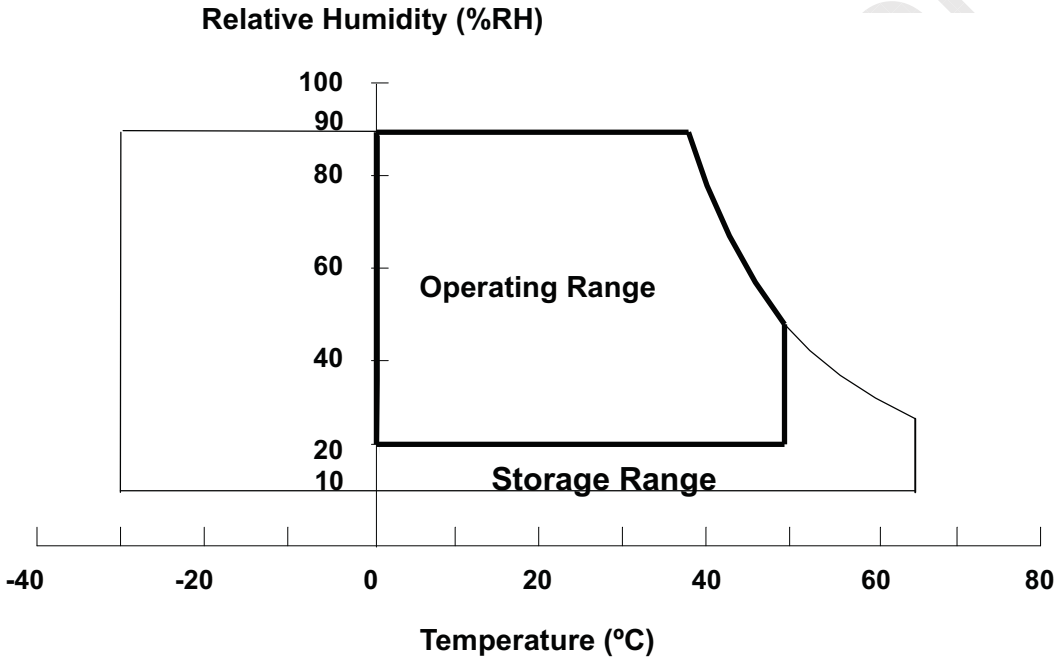
Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-30	65	ºC	(1)
Operating Ambient Temperature	T_{OP}	0	+50	ºC	(1), (2)

Note (1) (a) 90 %RH Max. (Ta ≦ 40 ºC).

(b) Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).

(c) No condensation.

Note (2) The temperature of panel display surface area should be 0 ºC Min. and 60 ºC Max.



2.2 ABSOLUTE RATINGS OF ENVIRONMENT (CELL)

High temperature or humidity may reduce the performance of panel. Please store LCD panel within the specified storage conditions without unpacking.

Storage Condition: With packing.

Storage temperature range: 18~27 ºC.

Storage humidity range: 50%~85%RH.

Shelf life: 30days from Arrival.

3. Suggestive Driving Condition

Item				Min.	Typ.	Max.	Unit	Note
Driving Voltage	V_G	On		18.0	19.0	20.0	V	
		Off		-7.4	-7.1	-6.8	V	
	V_D	B	Gam1	-	8.55	-	V	
			Gam14	-	0.09	-	V	
		W	Gam7	-	5.88	-	V	
			Gam8	-	3.80	-	V	
	V_{COM}	Center		DC	DC	DC	V	(1)
	G↓-D offset			2	-	-	us	
	Charging time			-	11.4	-	us	

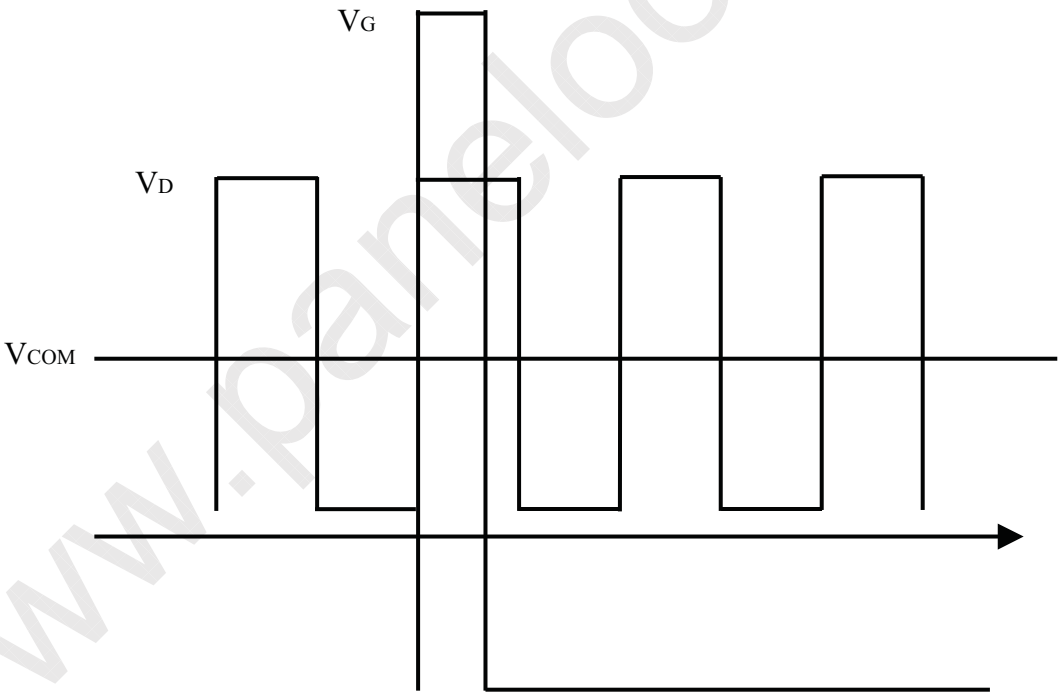
Note (1):Optimization is needed for each panel. Vcom Max – Vcom Min≦ 0.7V

B: Black pattern

W: White pattern

Gamma Voltage : Gam1 > Gam2 > Gam3 > … > Gam14 G↓: gate pulse falling edge

DRIVING TIMING DIAGRAM



4. PANEL PIN DEFINITION

4.1 DATA PIN DEFINE

Pin number	TAB1	TAB2~4	TAB5
1	YOBI6	YOBI6	YOBI6
2	YOBI5	YOBI5	YOBI5
3	YOBI4	YOBI4	YOBI4
4	YOBI3	YOBI3	YOBI3
5	YOBI2	YOBI2	YOBI2
6	YOBI1	YOBI1	YOBI1
7	VGL	VGL	VGL
8	VGL	VGL	VGL
9	VGL	VGL	VGL
10	VGL	VGL	VGL
11	Dummy	Dummy	Dummy
12	VGH	VGH	VGH
13	VGH	VGH	VGH
14	Dummy	Dummy	Dummy
15	GND	GND	GND
16	GND	GND	GND
17	VCC	VCC	VCC
18	VCC	VCC	VCC
19	BUS	BUS	BUS
20	GSP	GSP	GSP
21	GCK	GCK	GCK
22	GOE	GOE	GOE
23	RL	RL	RL
24	COMA	COMA	COMA
25	COMA	COMA	COMA
26	COMB	COMB	COMB
27	COMB	COMB	COMB
28	J1 I	J1 I	J1 I
29	J2 I	J2 I	J2 I
30	S1	S1	S1
31	S2	S2	S2
32~987	S3~S958	S3~S958	S3~S958
988	S959	S959	S959
989	S960	S960	S960
990	J3_I	J3 I	J3 I
991	J4_I	J4 I	J4 I

992	COMC	COMC	COMC
993	COMC	COMC	COMC
994	COMD	COMD	COMD
995	COMD	COMD	COMD
996	YOBI12	YOBI12	YOBI12
997	YOBI11	YOBI11	YOBI11
998	YOBI10	YOBI10	YOBI10
999	YOBI9	YOBI9	YOBI9
1000	YOBI8	YOBI8	YOBI8
1001	YOBI7	YOBI7	YOBI7

4.2 SCAN PIN DEFINE

Pin number	TAB 1	TAB 2	pin number	TAB 3	pin number	TAB 4
1	CS	CS	1	CS	1	CS
2	CS	CS	2	CS	2	CS
3	COM	COM	3	COM	3	COM
4	COM	COM	4	COM	4	COM
5	YOBI6	YOBI6	5	YOBI6	5	YOBI6
6	YOBI5	YOBI5	6	YOBI5	6	YOBI5
7	YOBI4	YOBI4	7	YOBI4	7	YOBI4
8	YOBI3	YOBI3	8	YOBI3	8	YOBI3
9	YOBI2	YOBI2	9	YOBI2	9	YOBI2
10	YOBI1	YOBI1	10	YOBI1	10	YOBI1
11	VGL	VGL	11	VGL	11	VGL
12	VGL	VGL	12	VGL	12	VGL
13	VGL	VGL	13	VGL	13	VGL
14	VGL	VGL	14	VGL	14	VGL
15	dummy	dummy	15	dummy	15	dummy
16	VGH	VGH	16	VGH	16	VGH
17	VGH	VGH	17	VGH	17	VGH
18	dummy	dummy	18	dummy	18	dummy
19	GND	GND	19	GND	19	GND
20	GND	GND	20	GND	20	GND
21	VCC	VCC	21	VCC	21	VCC
22	VCC	VCC	22	VCC	22	VCC
23	BUS	BUS	23	BUS	23	BUS
24	GSP	GSP	24	GSP	24	GSP
25	GCK	GCK	25	GCK	25	GCK
26	GOE	GOE	26	GOE	26	GOE
27	GND	GND	27	GND	27	GND
28	RL	RL	28	RL	28	RL
29	VCC	VCC	29	VCC	29	VCC
30	LBR	LBR	30	LBR	30	LBR
31	GND	GND	31	GND	31	GND
32	MODE3	MODE3	32	MODE3	32	MODE3
33	VCC	VCC	33	VCC	33	VCC
34	G1	G1(NC)	34	G1(NC)	34	G1(NC)
35	G2	G2	35	G2	35	G2
36~134	G3~G101	G3~G101	36~154	G3~G121	36~164	G3~G131

135~204	G102~G171(NC)	G102~G171(NC)	155~184	G122~G151(NC)	165~174	G132~G141(NC)
205~303	G172~G270	G172~G270	185~303	G152~G270	175~303	G142~G270
304	G271	G271	304	G271	304	G271
305	G272(NC)	G272(NC)	305	G272(NC)	305	G272
306	VCC	VCC	306	VCC	306	VCC
307	MODE2	MODE2	307	MODE2	307	MODE2
308	GND	GND	308	GND	308	GND
309	MODE1	MODE1	309	MODE1	309	MODE1
310	VCC	VCC	310	VCC	310	VCC
311	RL	RL	311	RL	311	RL
312	GND	GND	312	GND	312	GND
313	GOE	GOE	313	GOE	313	GOE
314	GCK	GCK	314	GCK	314	GCK
315	GSP	GSP	315	GSP	315	GSP
316	BUS	BUS	316	BUS	316	BUS
317	VCC	VCC	317	VCC	317	VCC
318	VCC	VCC	318	VCC	318	VCC
319	GND	GND	319	GND	319	GND
320	GND	GND	320	GND	320	GND
321	dummy	dummy	321	dummy	321	dummy
322	VGH	VGH	322	VGH	322	VGH
323	VGH	VGH	323	VGH	323	VGH
324	dummy	dummy	324	dummy	324	dummy
325	VGL	VGL	325	VGL	325	VGL
326	VGL	VGL	326	VGL	326	VGL
327	VGL	VGL	327	VGL	327	VGL
328	VGL	VGL	328	VGL	328	VGL
329	YOBI1	YOBI1	329	YOBI1	329	YOBI1
330	YOBI2	YOBI2	330	YOBI2	330	YOBI2
331	YOBI3	YOBI3	331	YOBI3	331	YOBI3
332	YOBI4	YOBI4	332	YOBI4	332	YOBI4
333	YOBI5	YOBI5	333	YOBI5	333	YOBI5
334	YOBI6	YOBI6	334	YOBI6	334	YOBI6
335	COM	COM	335	COM	335	COM
336	COM	COM	336	COM	336	COM
337	CS	CS	337	CS	337	CS
338	CS	CS	338	CS	338	CS

5. OPTICAL CHARACTERISTICS

5.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Gamma voltage	-	Refer to Item 4 Suggestive driving condition	V
Vcom	-	most suitable Vcom	V

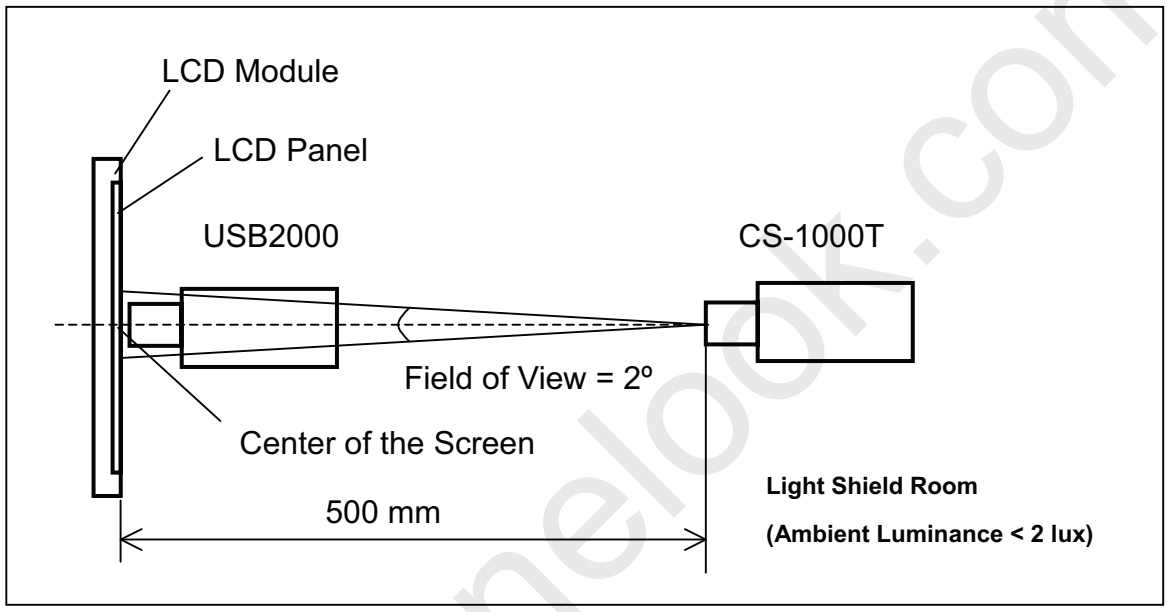
5.2 OPTICAL SPECIFICATION

ITEM		Symbol	Condition	MIN.	TYP.	MAX.	UNIT	NOTE
Average Contrast Ratio (5pts)		CR_{AVE}	θx=θy=0° CS-1000T	300	500	-	-	1,2,4,6
Optimal CR Angle		Θy-	θx=0° USB-2000		2		Deg	1,2,3,4
Average Response Time (Black/White) (5pts)		$(Tr+Tf)_{AVE}$	θx=θy=0°	---	30	40	ms	1, 5, 6
Average Transmittance (5pts)		T_{AVE}%	θx=θy=0° CS-1000T	8.1	9.0	-	%	1,2,6,7
Transmittance uniformity (5pts)		δ T%	θx=θy=0°	-	-	1.3	-	1,2,6
Viewing Angle	Horizontal θx (θy=0°)	Right	CR≧10 USB2000	45		-	Deg	1,2,3,
		Left		45		-	Deg	
	Vertical θy (θx=0°)	Up		10		-	Deg	
		Down		30		-	Deg	
Color Coordinate at center point (Use Sharp BLU)	Red	Rx	θx=θy=0°	Typ -0.03	0.596	Typ +0.03	-	1, 2
		Ry	θx=θy=0°		0.340		-	
	Green	Gx	θx=θy=0°		0.302		-	
		Gy	θx=θy=0°		0.565		-	
	Blue	Bx	θx=θy=0°		0.148		-	
		By	θx=θy=0°		0.111		-	
	White	Wx	θx=θy=0°		0.313		-	
		Wy	θx=θy=0°		0.329		-	

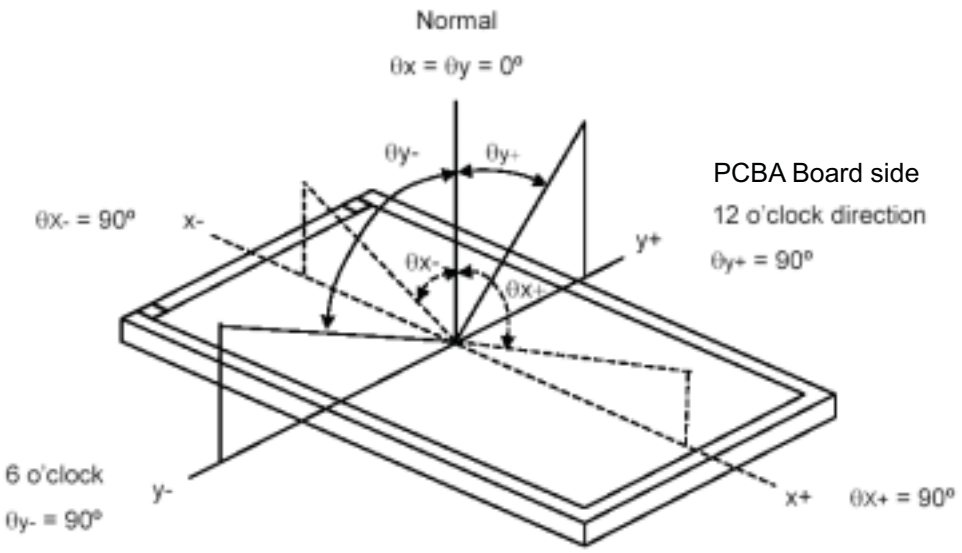
Note (1) Light source is the SHARP BLU, which is supplied by SHARP, and driving voltages are based on suitable gamma voltages. White is without signal input and R, G, B are with signal input.

Note (2) Measurement setup

The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes in a windless room.



Note (3) Definition of viewing angle (θx, θy)



Note (4) Definition of Contrast Ratio (CR)

CR_{AVE}= [CR(1)+ CR(2)+ CR(3)+ CR(4)+ CR(5)] / 5

CR_{max}=Max value of CR at whole Viewing Angle

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

$$CR = \frac{\text{Luminance with all pixel white (Gmax)}}{\text{Luminance with all pixel black (Gmin)}}$$

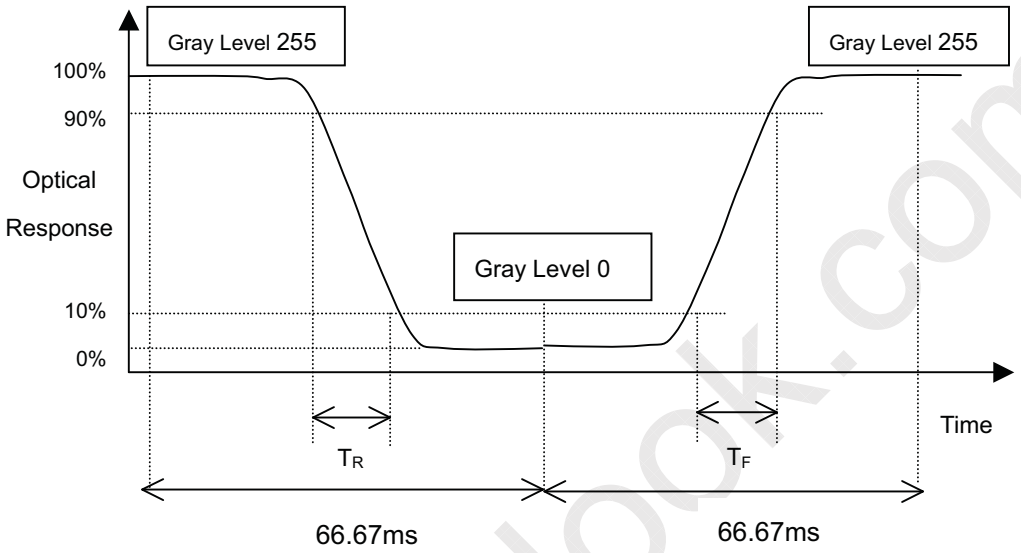
Gmax: Luminance of gray max at the center point of panel.

Gmin: Luminance of gray min at the center point of panel.

Note (5) Definition of Response Time (T_R, T_F)

$(Tr+Tf)_{AVE}$= {[Tr(1)+Tf(1)]+ [Tr(2)+Tf(2)]+ [Tr(3)+Tf(3)]+ [Tr(4)+Tf(4)] [Tr(5)+Tf(5)]} / 5

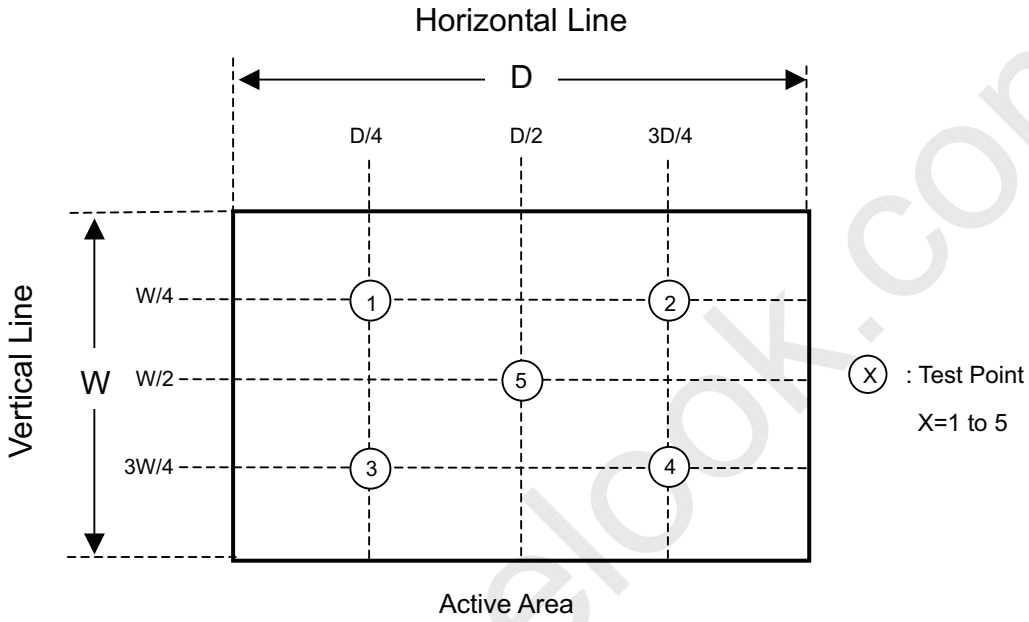
Tr(X)+Tf(X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).



Note (6) Definition of Transmittance Variation (δT%)

Measure the transmittance at 5 points

$$\delta T\% = \frac{\text{Maximum [T\%(1), T\%(2), … T\%(5)]}}{\text{Minimum [T\%(1), T\%(2), … T\%(5)]}}$$



Note (7) Definition of Transmittance (T%)

$T_{AVE}\% = [T_{AVE}(1) + T_{AVE}(2) + T_{AVE}(3) + T_{AVE}(4) + T_{AVE}(5)] / 5$

$T_{AVE}(X)$ is corresponding to the Transmittance of the point X at Figure in Note (6).

Module is without signal input.

Backlight unit is supplied by SHARP.

$$\text{Transmittance} = \frac{\text{Luminance of LCD module}}{\text{Luminance of Backlight unit}} * 100\%$$

6. PACKAGING

6.1.PACKING SPECIFICATION

1. 24 pcs LCD panel / 1 Dense Box
2. Carton Dimension: 365 (L) X 305 (W) X 540(H) mm
3. Weight: Approximately 18Kg (48 cells per Carton)

6.2 PACKING METHOD

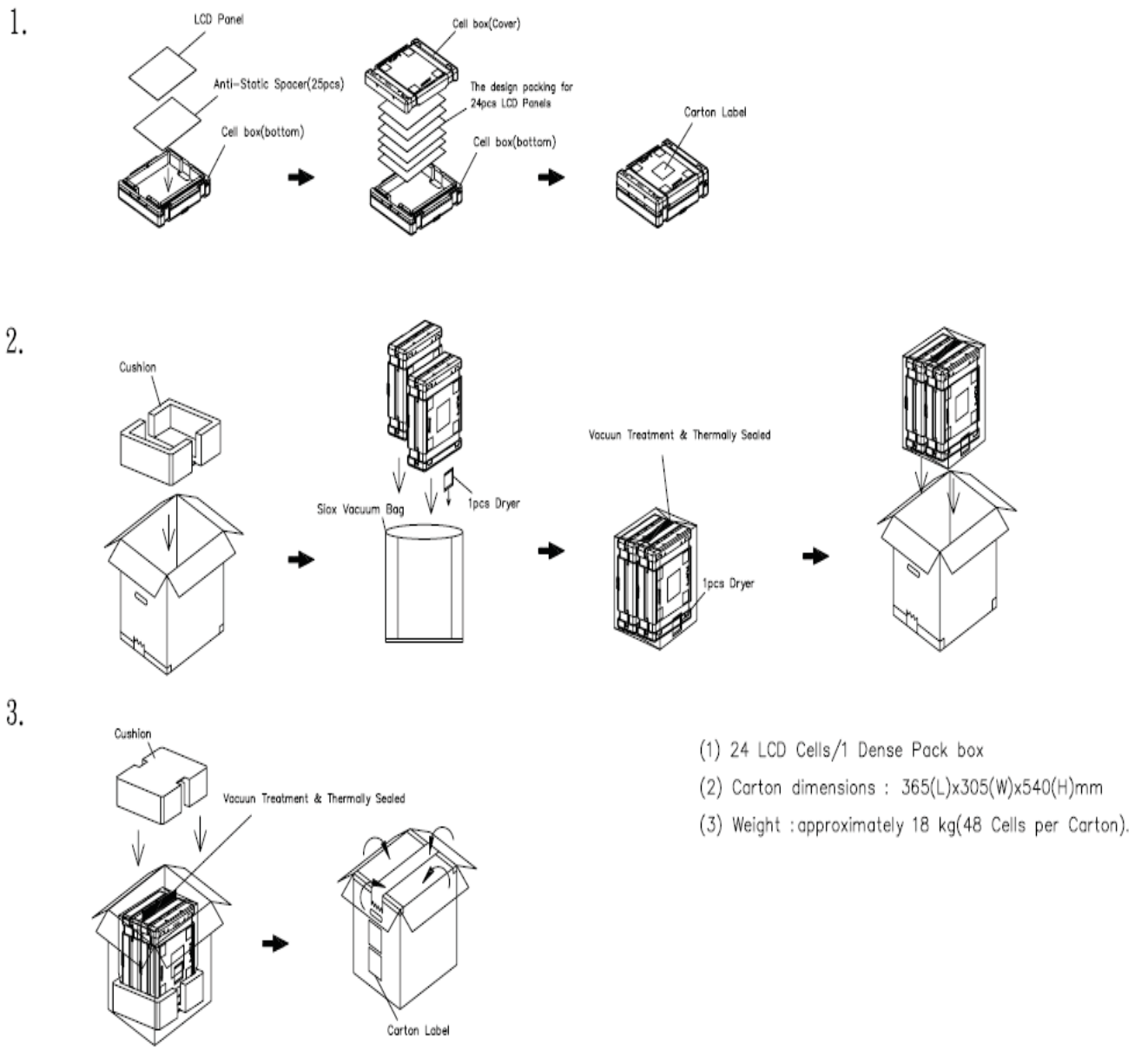
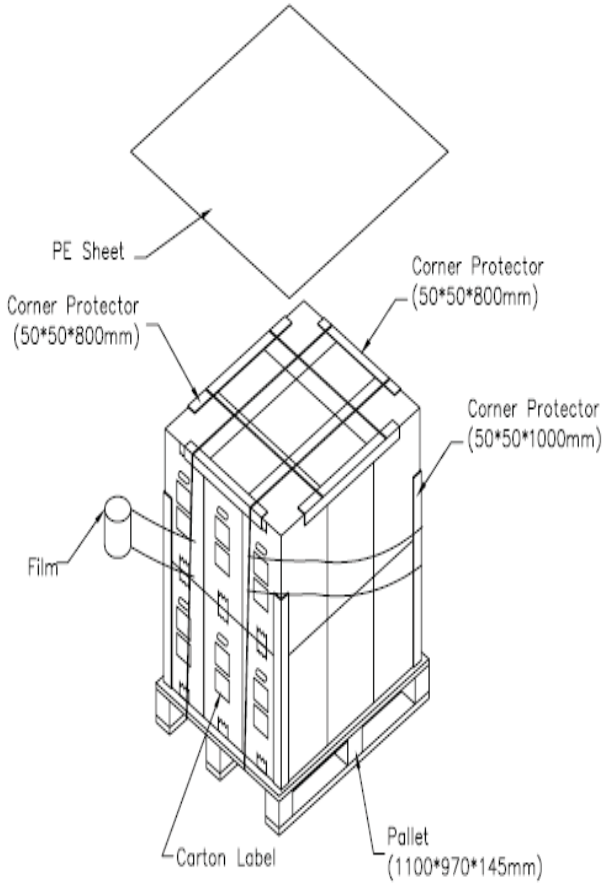


Figure. 6-1 Packing method

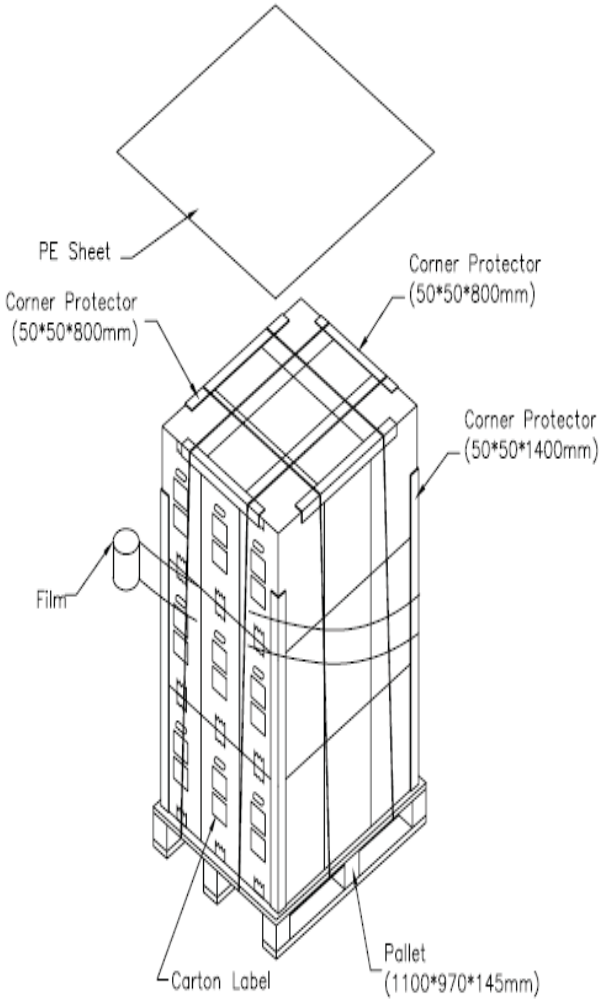
Air Transportation

Pallet: L1100*W970*H145mm
Pallet Stock Dim: L1100*W970*H1225mm
Weight: Approx 345 kg



Sea Transportation

Pallet: L1100*W970*H145mm
Pallet Stock Dim: L1100*W970*H1765mm
Weight: Approx 505 kg



Weight of Air transportation approximate 345 kg

Weight of Sea transportation approximate 505 kg

Figure. 6-2 Stacking method

7. DEFINITION OF LABEL

1. Mode Name: N164O1- C01
2. Panel Type: Version control
3. Quantity: 24pcs / PP box
4. Case ID: serial number.
5. Note1: RLCDD0201TPZZ
6. Barcode: Case ID in code 39 format
7. Date (Packing): year/month/day
8. Grade (Shipping):

   A/C grade mixing shipping assign to C

   NA/NC grade mixing shipping assign to N

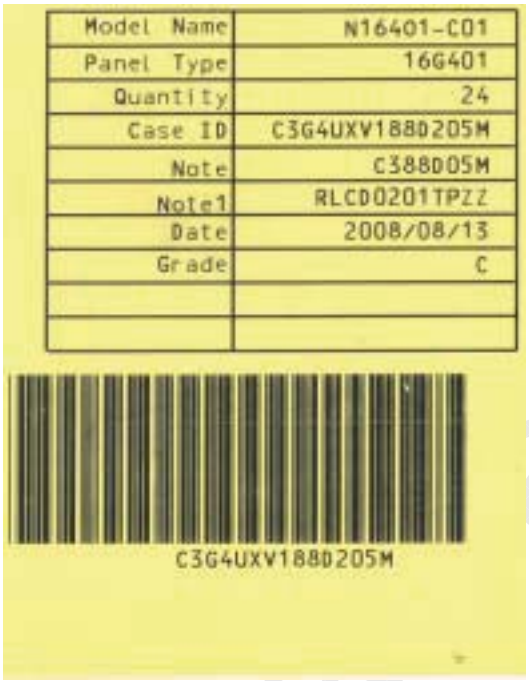


Figure. 7-1 Carton Label

8. PRECAUTIONS

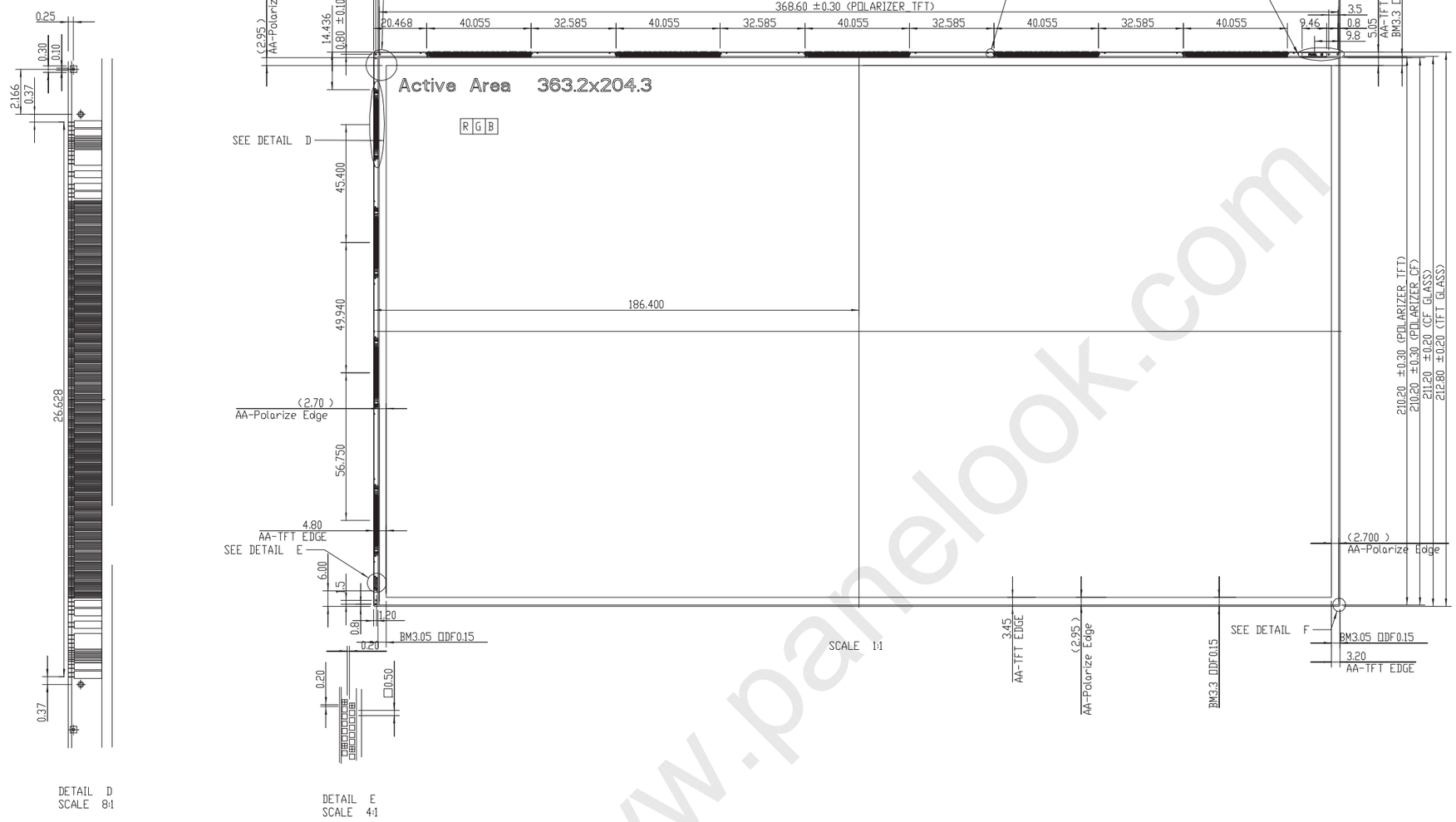
8.1 ASSEMBLY AND HANDLING PRECAUTIONS

1. Do not apply rough force such as bending or twisting to the cell during assembly.
2. To assemble or install cell into customer's module can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
3. It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
4. Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
5. It is dangerous that moisture come into or contacted the LCD panel, because moisture may damage TFT circuit.
6. High temperature or humidity may reduce the performance of cell. Please store LCD cell within the specified storage conditions without unpacking.

8.2 SAFETY PRECAUTIONS

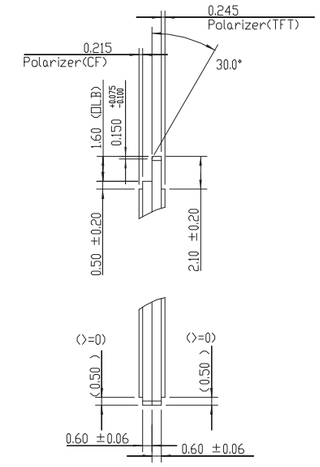
1. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

9. PANEL DRAWING

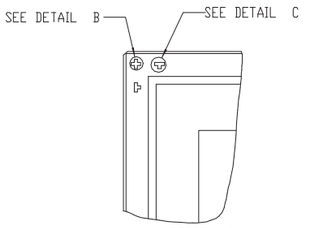


DETAIL D
SCALE 8:1

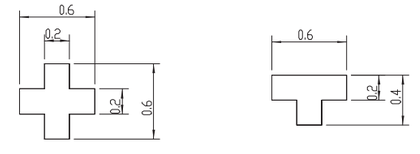
DETAIL E
SCALE 4:1



SCALE 5:1



DETAIL A
SCALE 5:1



DETAIL B
SCALE 40:1

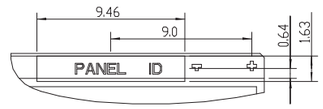
DETAIL C
SCALE 40:1

DETAIL G
SCALE 50:1

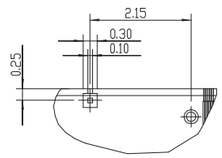
4 Places
DETAIL F
SCALE 10:1

SCALE 5:1

SCALE 8:1



DETAIL H
SCALE 5:1

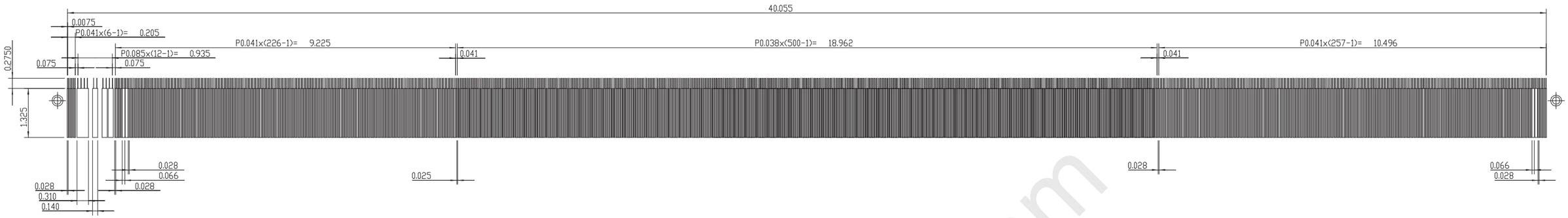


DETAIL I
SCALE 15:1

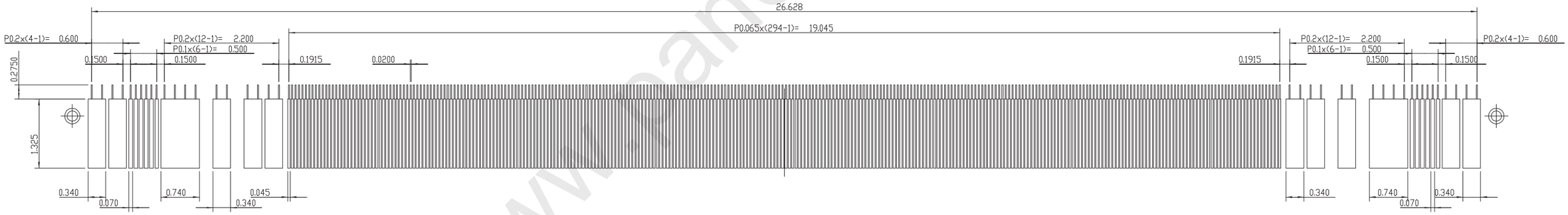
Mark	Description	Date	Changed_By	Approved_By	ECN No.	Remark

TITLE	N164C1-C01					2D REV.	03
						3D REV.	01
Approved	YULE_LIN	Drawing No.	TBD				
Checked	TIGER_CHANG	Part No.	TBD				
Drawer	TAURUS_HSIEH	Material	TBD		Sheet	1 / 2	A1
Designer	TBD	Date	21-Jul-2008	Scale	1:1	Unit:mm	

CHI MEI OPTOELECTRONICS CORP.



DATA TERMINALS
5 Places
SCALE 18:1



SCAN TERMINALS
4 Places
SCALE 25:1

Mark	Description	Date	Changed_By	Approved_By	ECN No.	Remark

TITLE	N164I1-C01				2D REV.	03
					3D REV.	01
Approved	YULE_LIN	Drawing No.	TBD			
Checked	TIGER_CHANG	Part No.	TBD			
Drawer	TAURUS_HSIEH	Material	TBD	Sheet	2 / 2	A1
Designer	TBD	Date	21-Jul-2008	Scale	1:1	Unit:mm

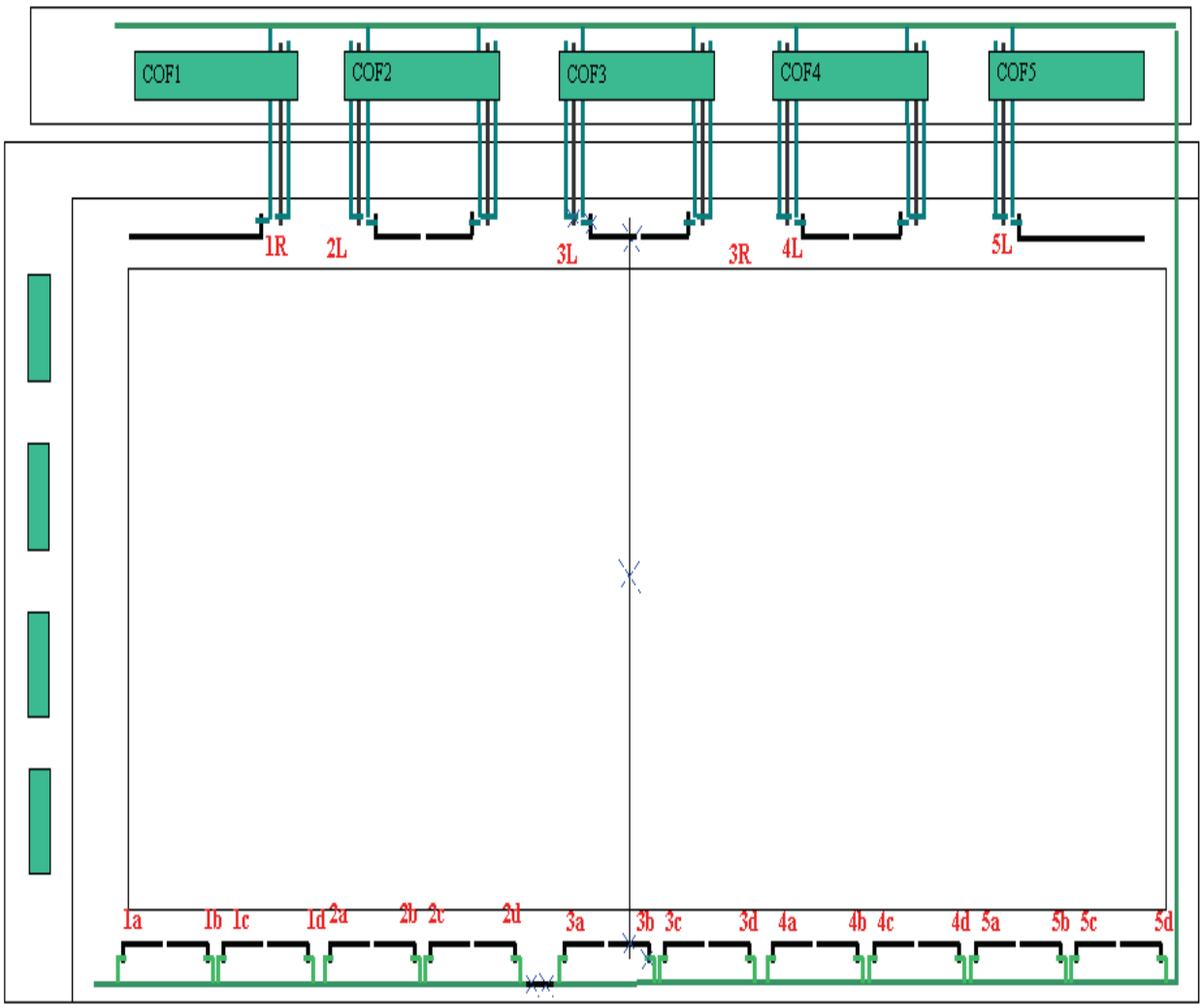
CHI MEI OPTOELECTRONICS CORP.

APPENDIX1. LINE REPAIR STRUCTURE

Repair line structure

Line Repair Table

COF	1				2				3				4				5			
Data Line (from)_UP	1				961		1441		1921		2401		2881		3361		3841			
Data Line (end)_UP	960				1440		1920		2400		2880		3360		3840		4800			
Data Line (from)_Down	1	241	481	721	961	1201	1441	1681	1921	2161	2401	2641	2881	3121	3361	3601	3841	4081	4321	4561
Data Line (end)_Down	240	480	720	960	1200	1440	1680	1920	2160	2400	2640	2880	3120	3360	3600	3840	4080	4320	4560	4800
Repair line	1																			



APPENDIX2. SEALPOSITION