Spec No.	TQ3C-8EA00-E1DET03-00
Date	July 15, 2009

SPEC

TYPE : TCG190SX4AB-A00

< 19.0 inch SXGA transmissive color TFT
with touch panel >

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Prototype

Issued
Date: Jul 16, 2009
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

This specification is subject to change without notice.
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Original Issue Date	Designed by: Engineering dept.			Confirmed by: QA dept.	
	Prepared	Checked	Approved	Checked	Approved
July 15, 2009	S. Kojima	W. Yano	M. Fujitani	J. Sakaguchi	

Warning

1. This Kyocera LCD module has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting in any way to the use of the module in such applications.

2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera modules in applications.

Revision record

Date	Designed by : Engineering dept.			Confirmed by : QA dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev.No.	Date	Page	Descriptions

1. Application

This document defines the specification of TCG190SX4AB-A00. (RoHS Compliant)

This specification consists of LCD section and Touch panel section, and each section defines the LCD and the touch panel separately.
Please refer the corresponding section for each part.
(The product is ROHS compliant)

LCD with touch panel		LCD	
Type Spec.No.	TCG190SX4AB-A00 TQ3C-8EA00-E1DET03-00	Type Spec. No. Inspection spec. No.	TCG190SX4AA-A00 TQ3C-8EA00-E1DET04-00 -
		Touch panel	
		Type Spec. No. Inspection spec. No.	KTP190AGAC-C00 TQ3C-8EA00-E1BYI01-00 -

2. Mechanical specifications

Item	Specification	Unit
Outline dimensions 1)	396(W)× 324(H) × 20.1(D)	mm
Active area	Please refer to the LCD specification	mm
Mass	TBD	g

1) Projection not included. Please refer to outline for details.

3. Absolute maximum ratings

3-1. Electrical absolute maximum ratings

Please refer to the individual LCD and Touch Panel specifications.

3-2. Environmental absolute maximum ratings

Please refer to the individual LCD and Touch Panel specifications.

4. Electrical characteristics

Please refer to the individual LCD and Touch Panel specifications.

5. Optical characteristics

Temp. = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Brightness	-	@7.5mA	(160)	(240)	-	cd/m^2

1) Please refer to the LCD specification for measuring conditions and other optical characteristics.

6. Lot number identification

The lot number shall be indicated on the back of the backlight case of each LCD.

TCG190SX4AB-A00 - □□ - □□ - □ MADE IN □□□□□
↓↓ ↓ ↓ ↓
1 2 3 4 5

No1. - No5. above indicate
1. Year code
2. Month code
3. Date
4. Version Number
5. Country of origin (Japan or China)

Year	2009	2010	2011	2012	2013	2014
Code	9	0	1	2	3	4

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.
Code	1	2	3	4	5	6

Month	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Code	7	8	9	X	Y	Z

7. Warranty

Please refer to the LCD specification.

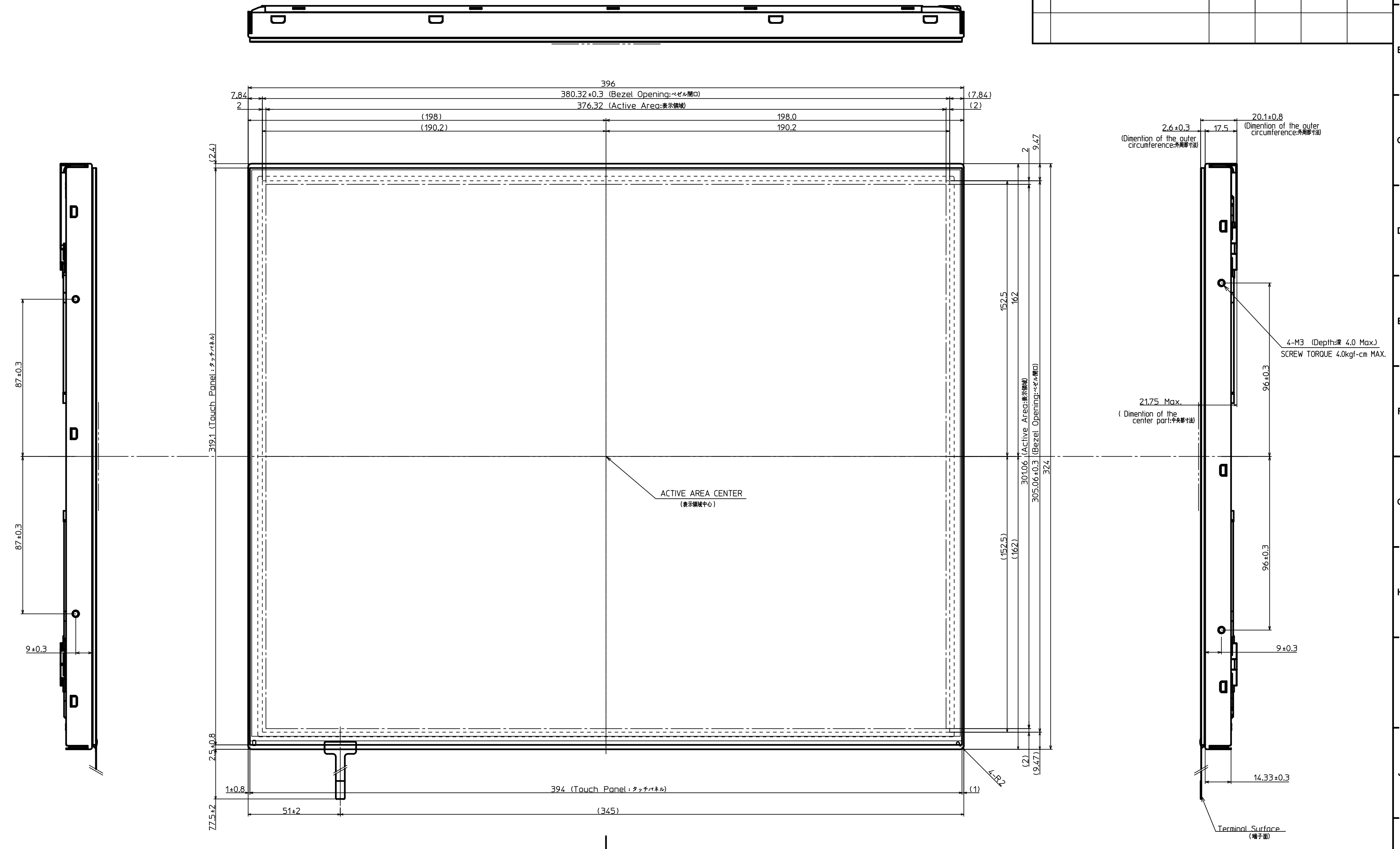
8. Reliability test data

Please refer to the LCD specification.

9. Inspection

Please refer to the individual LCD and Touch Panel specifications

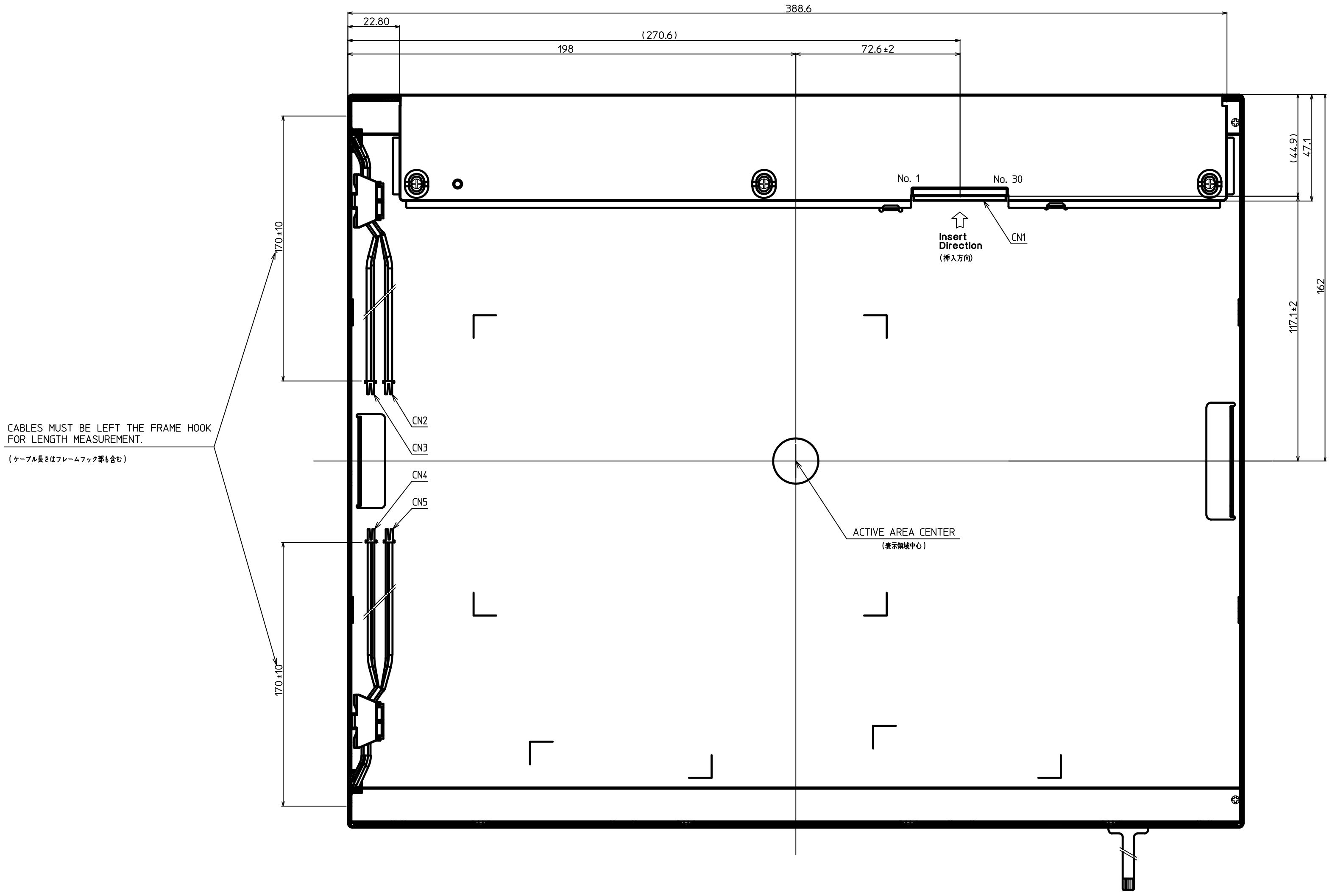
No	Description	Drawn	Checked	Checked	Approved


396
380.32±0.3 (Bezel Opening:ベゼル開口)
376.32 (Active Area:表示領域)
7.84
2
(7.84)
(2)
(198)
198.0
(190.2)
190.2
(2.4)
319.1 (Touch Panel : タッチパネル)
2.5±0.8
1±0.8
394 (Touch Panel : タッチパネル)
(1)
77.5±2
51±2
(345)
4-R2
152.5
162
(152.5)
(162)
301.06 (Active Area:表示領域)
305.06±0.3 (Bezel Opening:ベゼル開口)
324
2
9.47
(2)
(9.47)
ACTIVE AREA CENTER
(表示領域中心)
87±0.3
87±0.3
9±0.3
2.6±0.3
(Dimention of the outer circumference:外周部寸法)
17.5
20.1±0.8
(Dimention of the outer circumference:外周部寸法)
4-M3 (Depth:深 4.0 Max.)
SCREW TORQUE 4.0kgf-cm MAX.
96±0.3
96±0.3
21.75 Max.
(Dimention of the center part:中央部寸法)
9±0.3
14.33±0.3
Terminal Surface
(端子面)

1. Tolerance without indication: ±0.5
(指示無き公差)

Material 材質	Treatment 処理	Approved	Checked	Checked	Drawn	Scale	Title	KYOCERA	Year–Month–Day	Size
		'09.07.15	'09.07.15	'09.07.15		1:1	TCG190SX4AB		'09.07.09	1
Quantity 製作数	Description; 備考 RoHS	朝倉	鶴崎	倉元	宮崎		Outline Dimensions	Drawing No. 121A8001800		1/3

No	Description	Drawn	Checked	Checked	Approved


388.6
22.80
(270.6)
198
72.6±2
(44.9)
47.1
117.1±2
162
No. 1
No. 30
CN1
Insert
Direction
（挿入方向）
170±10
170±10
CN2
CN3
CN4
CN5
ACTIVE AREA CENTER
（表示領域中心）

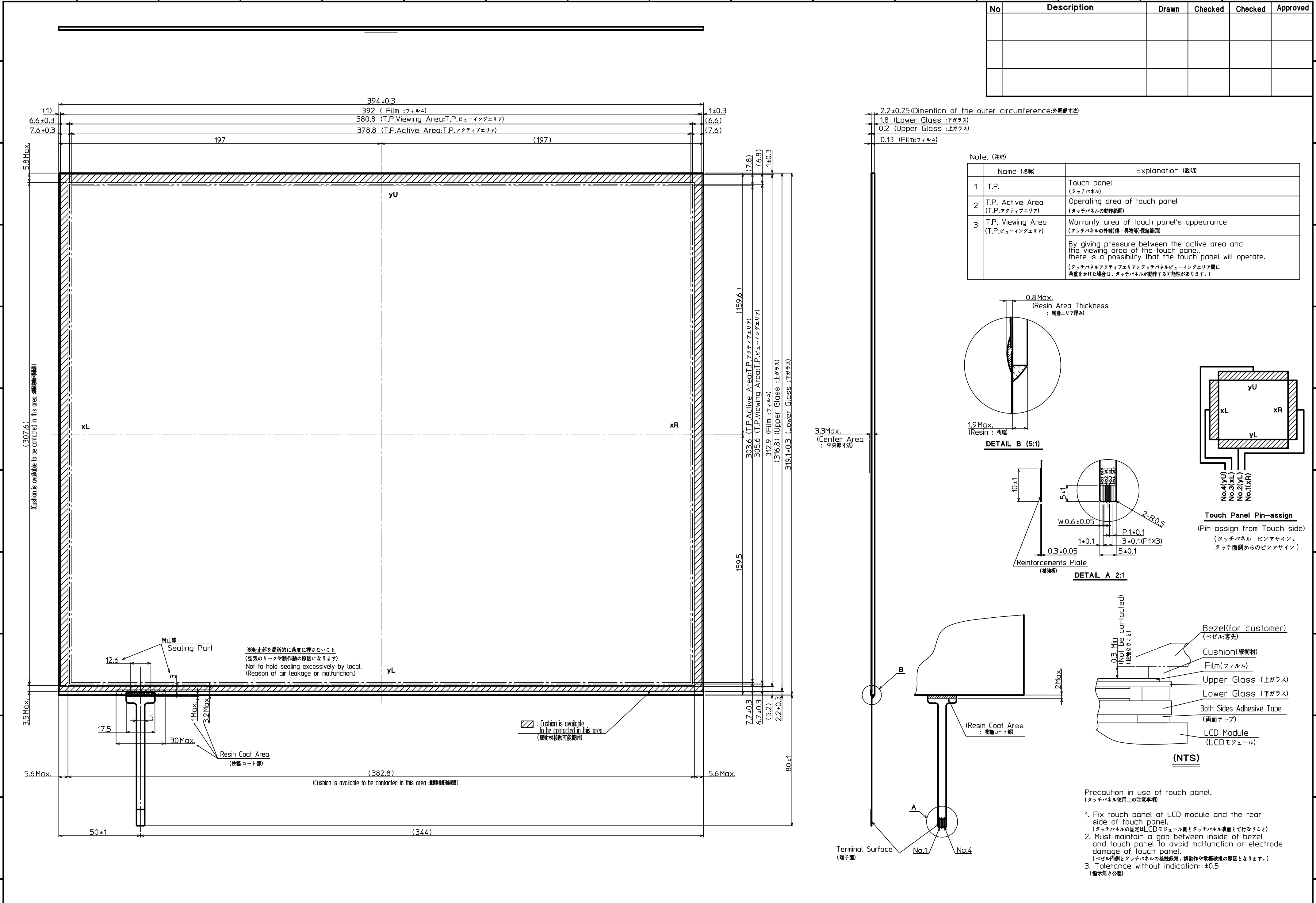
CABLES MUST BE LEFT THE FRAME HOOK
FOR LENGTH MEASUREMENT.
（ケーブル長さはフレームフック部も含む）

Note.（注記）

1. Connector　　CN1: FI-XB30SSL-HF15 (JAE) or compatible
（コネクター）　CN2,3,4,5: BHSR-02VS-1 (JST)
2. Matching Connector　CN1: FI-X30HL (JAE) or compatible
（適合コネクター）　CN2,3,4,5: SM02B-BHSS-1-TB (JST)
SM02B-BHSS-1-TB(LF)(SN) (JST)
3. Tolerance wituout indication : ±0.5
（指示無き公差）

Material 材 質	Treatment 処 理	Approved	Checked	Checked	Drawn	Scale	Title	KYOCERA	Year–Month–Day	Size
		'09.07.15	'09.07.15	'09.07.15		1:1	TCG190SX4AB		'09.07.09	1
Quantity 製作数	Description; 備 考 RoHS	朝倉	鶴崎	倉元	宮崎		Outline Dimensions	Drawing No. 121A8001800		2/3

No	Description	Drawn	Checked	Checked	Approved


394±0.3
392 (Film :フィルム)
380.8 (T.P.Viewing Area:T.P.ビューイングエリア)
378.8 (T.P.Active Area:T.P.アクティブエリア)
(1)
6.6±0.3
7.6±0.3
197
(197)
1±0.3
(6.6)
(7.6)
5.8Max.
yU
xL
xR
yL
(307.6)
(Cushion is available to be contacted in this area :緩衝材接触可能範囲)
(159.6)
159.5
303.6 (T.P.Active Area:T.P.アクティブエリア)
305.6 (T.P.Viewing Area:T.P.ビューイングエリア)
312.9 (Film :フィルム)
(316.8) (Upper Glass :上ガラス)
319.1±0.3 (Lower Glass :下ガラス)
(7.8)
(6.8)
1±0.3
7.7±0.3
6.7±0.3
(5.2)
2.2±0.3
80±1
封止部
Sealing Part
12.6
3
5
17.5
30Max.
1Max.
3.2Max
Resin Coat Area
(樹脂コート部)
※封止部を局所的に過度に押さないこと
(空気のリークや誤作動の原因になります)
Not to hold sealing excessively by local.
(Reason of air leakage or malfunction.)
▨ : Cushion is available to be contacted in this area
(緩衝材接触可能範囲)
3.5Max.
5.6Max.
(382.8)
(Cushion is available to be contacted in this area :緩衝材接触可能範囲)
5.6Max.
50±1
(344)
2.2±0.25(Dimention of the outer circumference:外周部寸法)
1.8 (Lower Glass :下ガラス)
0.2 (Upper Glass :上ガラス)
0.13 (Film:フィルム)
3.3Max.
(Center Area
: 中央部寸法)
B
2Max.
(Resin Coat Area
: 樹脂コート部)
A
Terminal Surface
(端子面)
No.1
No.4
0.8Max.
(Resin Area Thickness
: 樹脂エリア厚み)
1.9Max.
(Resin : 樹脂)
DETAIL B (5:1)
10±1
0.3±0.05
Reinforcements Plate
(補強板)
No.1 (xR)
No.2 (yL)
No.3 (xL)
No.4 (yU)
5±1
2-R0.5
W0.6±0.05
P1±0.1
1±0.1
3±0.1(P1X3)
5±0.1
DETAIL A 2:1
yU
xL
xR
yL
No.4(yU)
No.3(xL)
No.2(yL)
No.1(xR)
Touch Panel Pin-assign
(Pin-assign from Touch side)
(タッチパネル ピンアサイン、
タッチ面側からのピンアサイン)
0.3 Min
(Not be contacted)
(接触なきこと)
Bezel(for customer)
(ベゼル:客先)
Cushion(緩衝材)
Film(フィルム)
Upper Glass (上ガラス)
Lower Glass (下ガラス)
Both Sides Adhesive Tape
(両面テープ)
LCD Module
(LCDモジュール)
(NTS)

Note. (注記)

	Name (名称)	Explanation (説明)
1	T.P.	Touch panel (タッチパネル)
2	T.P. Active Area (T.P.アクティブエリア)	Operating area of touch panel (タッチパネルの動作範囲)
3	T.P. Viewing Area (T.P.ビューイングエリア)	Warranty area of touch panel's appearance (タッチパネルの外観(傷・異物等)保証範囲)
		By giving pressure between the active area and the viewing area of the touch panel, there is a possibility that the touch panel will operate. (タッチパネルアクティブエリアとタッチパネルビューイングエリア間に荷重をかけた場合は、タッチパネルが動作する可能性があります。)

Precaution in use of touch panel.
(タッチパネル使用上の注意事項)

1. Fix touch panel at LCD module and the rear side of touch panel.
   (タッチパネルの固定はLCDモジュール側とタッチパネル裏面とで行なうこと)
2. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.
   (ベゼル内側とタッチパネルの接触厳禁。誤動作や電極破損の原因となります。)
3. Tolerance without indication: ±0.5
   (指示無き公差)

Material 材 質	Treatment 処 理	Approved '09.07.15	Checked '09.07.15	Checked '09.07.15	Drawn	Scale 1:1 (2:1,5:1,NTS)	Title TCG190SX4AB	KYOCERA	Year–Month–Day '09.07.09	Size 1
Quantity 製作数	Description; 備 考 RoHS	朝倉	鶴崎	宮崎	木口		T.P. Outline Dimensions	Drawing No. 121A8001800		3/3

Spec No.	TQ3C-8EA00-E1DET04-00
Date	July 14, 2009

SPEC

TYPE : TCG190SX4AA-A00

< 19.0 inch SXGA transmissive color TFT>

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1. General Description
2. Functional Block Diagram
3. Absolute maximum ratings
4. Electrical characteristics
5. Signal characteristics
6. Connector & Pin Assignment
7. Reliability Test
8. Lot number identification
9. Warranty
10. Handing Precautions
11. Mechanical characteristics

Prototype

Issued
Date: Jul 15, 2009
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

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Original Issue Date	Designed by: Engineering dept.			Confirmed by: QA dept.	
	Prepared	Checked	Approved	Checked	Approved
July 14, 2009	Y IKEDA	S. Kojima	Y. Matsumoto	J. Sakaguchi	I. Hama

Warning

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2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera modules in applications.

Revision record

Date	Designed by : Engineering dept.			Confirmed by : QA dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev.No.	Date	Page	Descriptions

1. General Description

TCG190SX4AA-A00 is a Color Active Matrix Liquid Crystal Display composed of a TFT-LCD panel, a drivercircuit, and backlight system. The screen format is intended to support the SXGA (1280(H) x 1024(V)) screen and 16.7M colors 8-bits(6-bits+HiFRC). All input signals are LVDS interface compatible. Inverter card of backlight is not included. TCG190SX4AA-A00 is designed for a general display unit.

1.1 Display Characteristics

The following items are characteristics summary on the table under 25℃ condition:

Items	Unit	Specifications
Screen Diagonal	[mm]	482.6 (19.0")
Active Area	[mm]	376.32 (H) x 301.056 (V)
Pixels H x V		1280(x3) x 1024
Pixel Pitch	[mm]	0.294 (per one triad) x 0.294
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		Normally Black
White Luminance	[cd/m^2]	300 (center, Typ) @ 7.5mA
Contrast Ratio		2000 : 1 (Typ)
Optical ResponseTime	[msec]	8ms GTG (Avg. Typ.); 20 ms(Typ, on/off)
Nominal Input Voltage VDD	[Volt]	+5.0 V
Power Consumption	[Watt]	28 W (Typ) (w/o Inverter, All white pattern)
Weight	[Grams]	2500 (Typ) ; 2700 (Max)
Physical Size (H x V x D)	[mm]	396 (H) x 324 (V) x 17.5 (D) (Typ)
Electrical Interface		Dual channel LVDS
Surface Treatment		Hard-coating (3H), Non-Glare treatment
Support Color		16.7M colors 8-bits (6-bits+HiFRC)
Temperature Range Operating Storage (Non-Operating)	 [°C] [°C]	 0 to +50 -20 to +60
RoHS Compliance		RoHS Compliance

1.2 Optical Characteristics

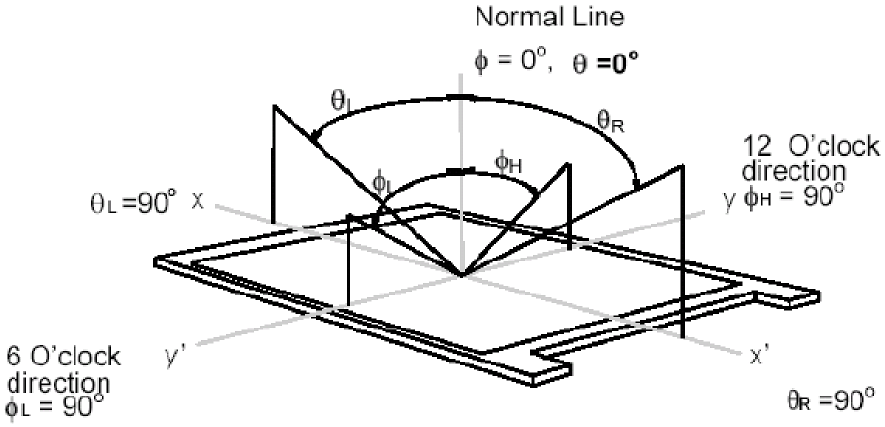
The optical characteristics are measured under stable conditions at 25℃ (Room Temperature):

Item	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing Angle	[degree]	Horizontal (Right) CR = 10 (Left)	75 75	89 89	-	1
		Vertical (Up) CR = 10 (Down)	75 75	89 89	-	
Luminance Uniformity	[%]	9 Points	75	80	-	2, 3
Response time	[msec]	Rising		15	25	4,6
		Falling		5	15	4,6
		Rising + Falling		20	40	4,6
		Grey to Grey (Avg.)	-	8	16	4,6
Color / Chromaticity Coordinates (CIE 1931)		Red x	0.617	0.647	0.677	4
		Red y	0.31	0.34	0.37	
		Green x	0.263	0.293	0.323	
		Green y	0.571	0.601	0.641	
		Blue x	0.112	0.142	0.172	
		Blue y	0.037	0.067	0.099	
		White x	0.283	0.313	0.34	
		White y	0.299	0.329	0.359	
Black Luminance (At CCFL=7.5mA)	[cd/m^2]			0.15	0.5	4
White Luminance (At CCFL= 7.5mA)	[cd/m^2]		240	300	-	4
Contrast Ratio			1000	2000	-	4
Cross Talk (At 75Hz)	[%]		-	-	1.5	5
Flicker	[dB]		-	-	-20	7
C.G.L		△u'v'	-	0.02	-	

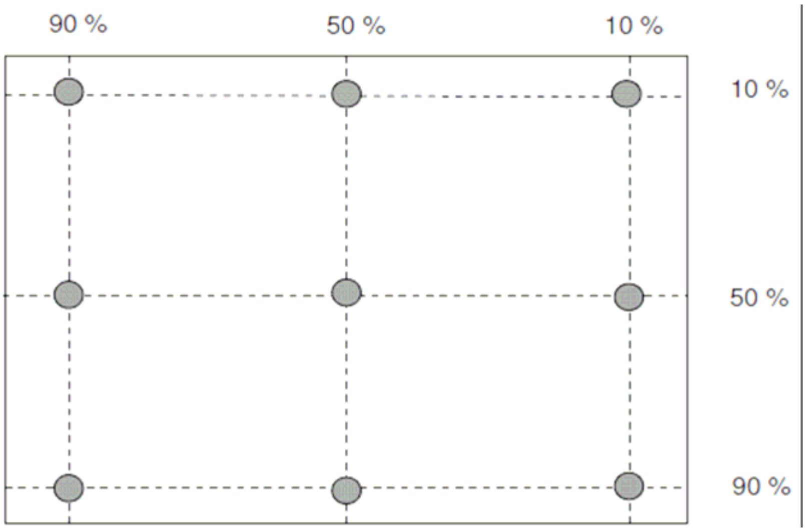
Optical Equipment: BM-5A, PR880, SR3, CS1000 or equivalent.

Note 1: Definition of viewing angle

Viewing angle is the measurement of contrast ratio≧10, at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 90° (θ) horizontal left and right and 90° (Φ) vertical, high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated about its center to develop the desired measurement viewing angle.


Normal Line
ϕ = 0°, θ =0°
θL
θR
ϕH
ϕL
12 O'clock direction
y ϕH = 90°
θL =90° x
6 O'clock direction
ϕL = 90°
y'
x'
θR =90°

Note 2: 9 points position


90 %
50 %
10 %
10 %
50 %
90 %

Note 3: The luminance uniformity of 9 points is defined by dividing the maximum luminance values by the minimum test point luminance

$$\delta_{W9} = \frac{\text{Minimum Luminance of 9 points}}{\text{Maximum Luminance of 9 points}}$$

Note 4: Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room.

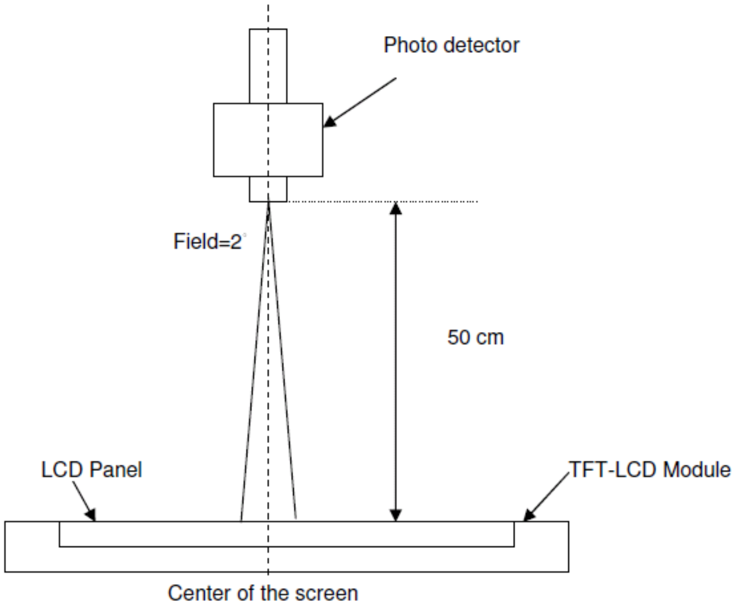


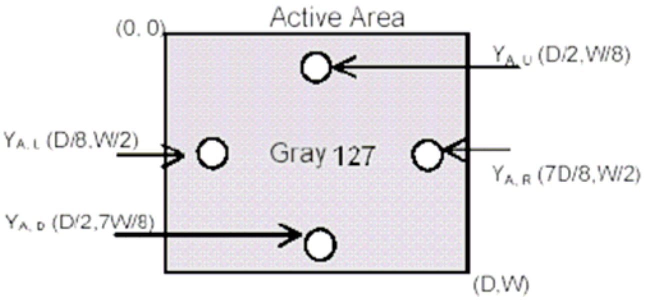
Photo detector
Field=2°
50 cm
LCD Panel
TFT-LCD Module
Center of the screen

Note 5: Definition of Cross Talk (CT)

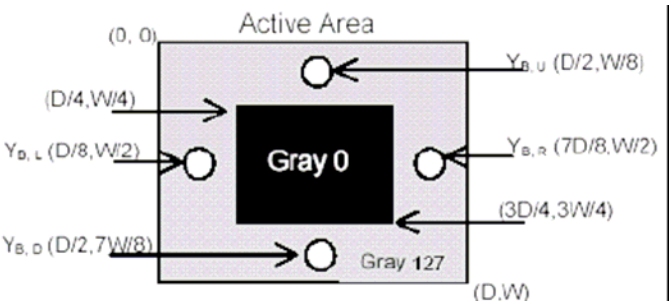
CT = | YB – YA | / YA × 100 (%)

Where

YA = Luminance of measured location without gray level 0 pattern (cd/m2)
YB = Luminance of measured location with gray level 0 pattern (cd/m2)

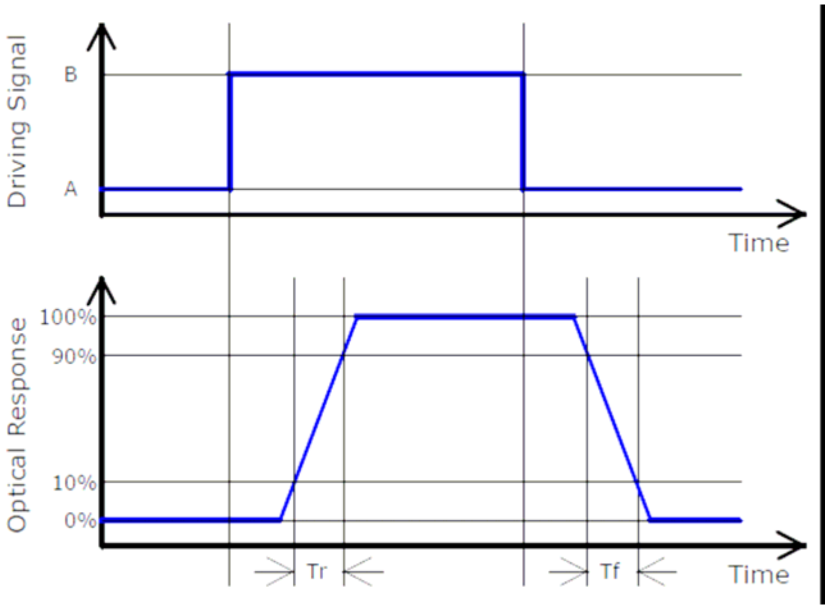


(0, 0)
Active Area
YA, U (D/2,W/8)
YA, L (D/8,W/2)
Gray 127
YA, R (7D/8,W/2)
YA, D (D/2,7W/8)
(D,W)



(0, 0)
Active Area
YB, U (D/2,W/8)
(D/4,W/4)
YB, L (D/8,W/2)
Gray 0
YB, R (7D/8,W/2)
(3D/4,3W/4)
YB, D (D/2,7W/8)
Gray 127
(D,W)

Note 6: Definition of response time:

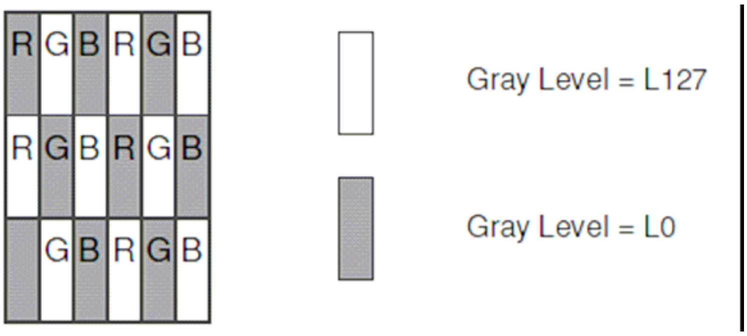


Algorithm:

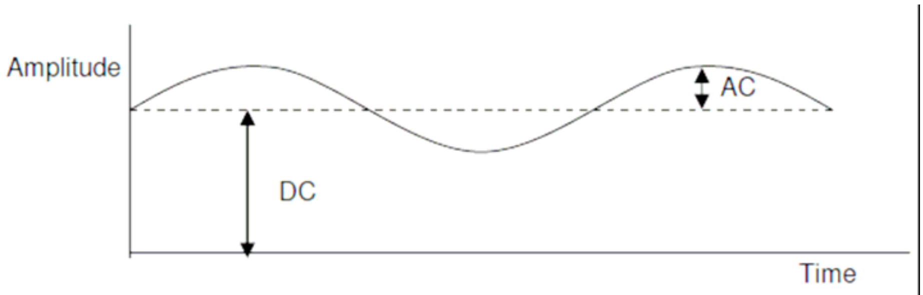
| Level A - Level B | ≧16 then the average of Grey-to-Grey response time is 8ms. (F= 60 Hz).

T_{rR}(rising time; from "All Black" to "All White") + T_{rF}(Falling time; from "All White" to "All Black") = 20ms(typ)

Note 7: Subchecker Pattern


R G B R G B
R G B R G B
G B R G B
Gray Level = L127
Gray Level = L0

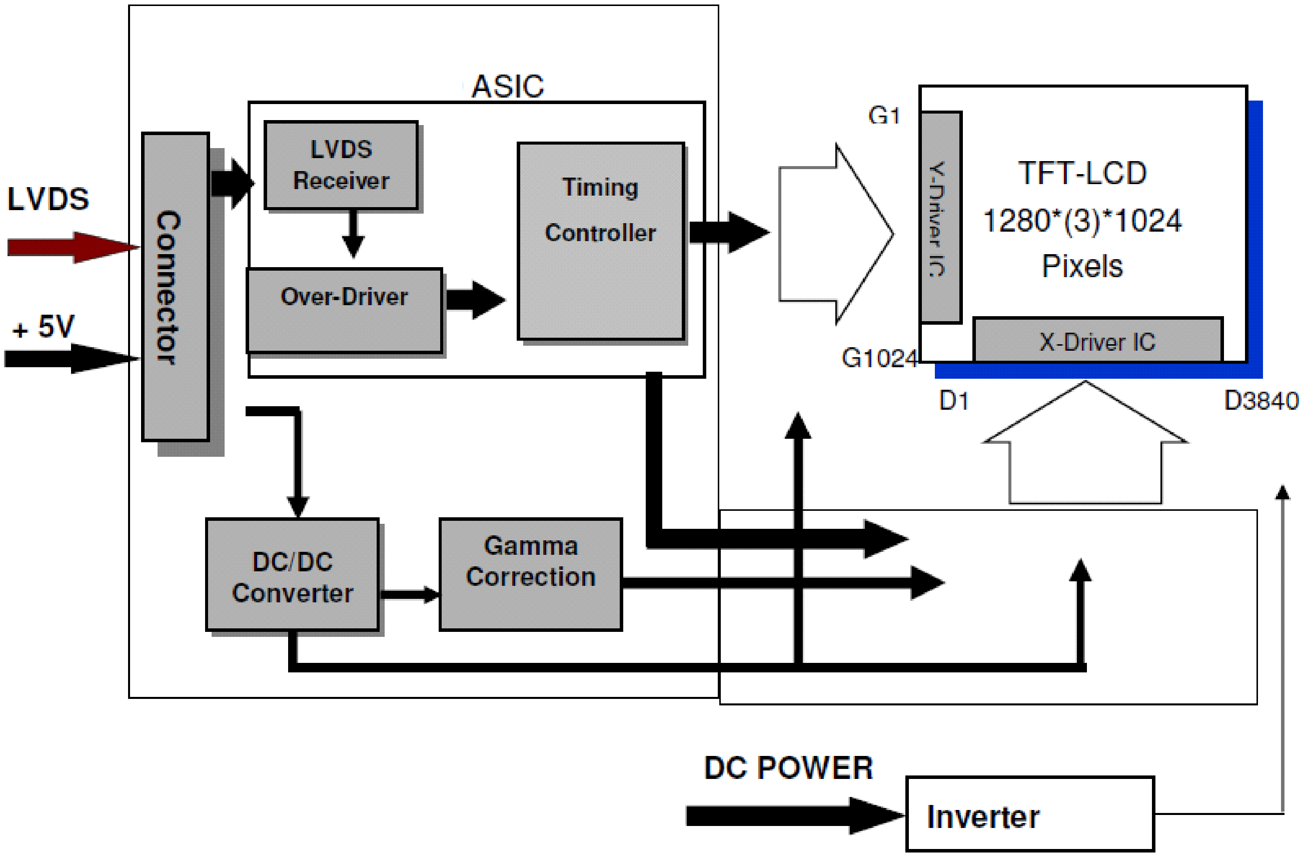
Method: Record dBV & DC value with (WESTAR)TRD-100


Amplitude
AC
DC
Time

$$\text{Flicker (dB)} = 20\log\frac{\text{AC Level(at 30 Hz)}}{\text{DC Level}}$$

2. Functional Block Diagram

The following diagram shows the functional block of the 19.0 inches Color TFT-LCD Module:


ASIC
LVDS
+ 5V
Connector
LVDS Receiver
Over-Driver
Timing Controller
G1
G1024
Y-Driver IC
TFT-LCD
1280*(3)*1024
Pixels
X-Driver IC
D1
D3840
DC/DC Converter
Gamma Correction
DC POWER
Inverter

3. Absolute Maximum Ratings

Absolute maximum ratings of the module is as following:

3.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	+6	[Volt]	Note 1, 2

3.2 Absolute Ratings of Backlight Unit

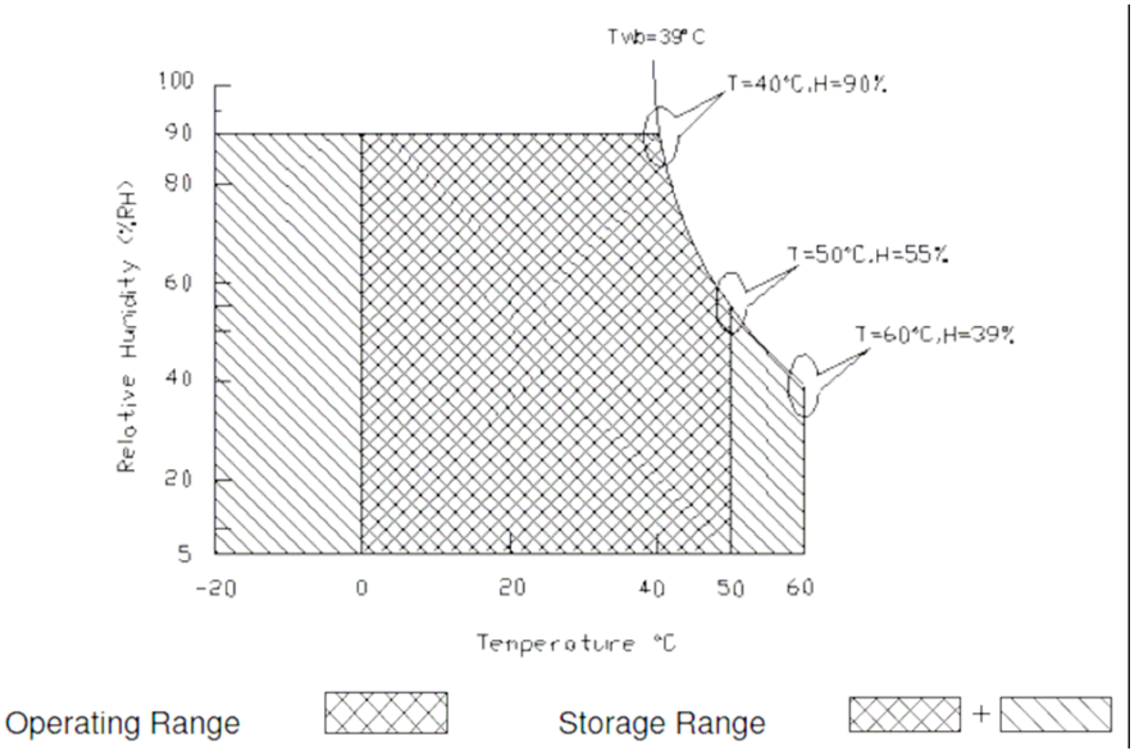
Item	Symbol	Min.	Max.	Unit	Conditions
CCFL Current	ICFL	-	8	[mA] rms	Note 1, 2

3.3 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit	Conditions
Operating Temperature	TOP	0	+50	[°C]	
Operation Humidity	HOP	5	90	[%RH]	
Storage Temperature	TST	-20	+60	[°C]	
Storage Humidity	HST	5	90	[%RH]	

Note 1: With in Ta= 25℃

Note 2: Permanent damage to the device may occur if exceed maximum values



4. Electrical characteristics

4.1 TFT LCD Module

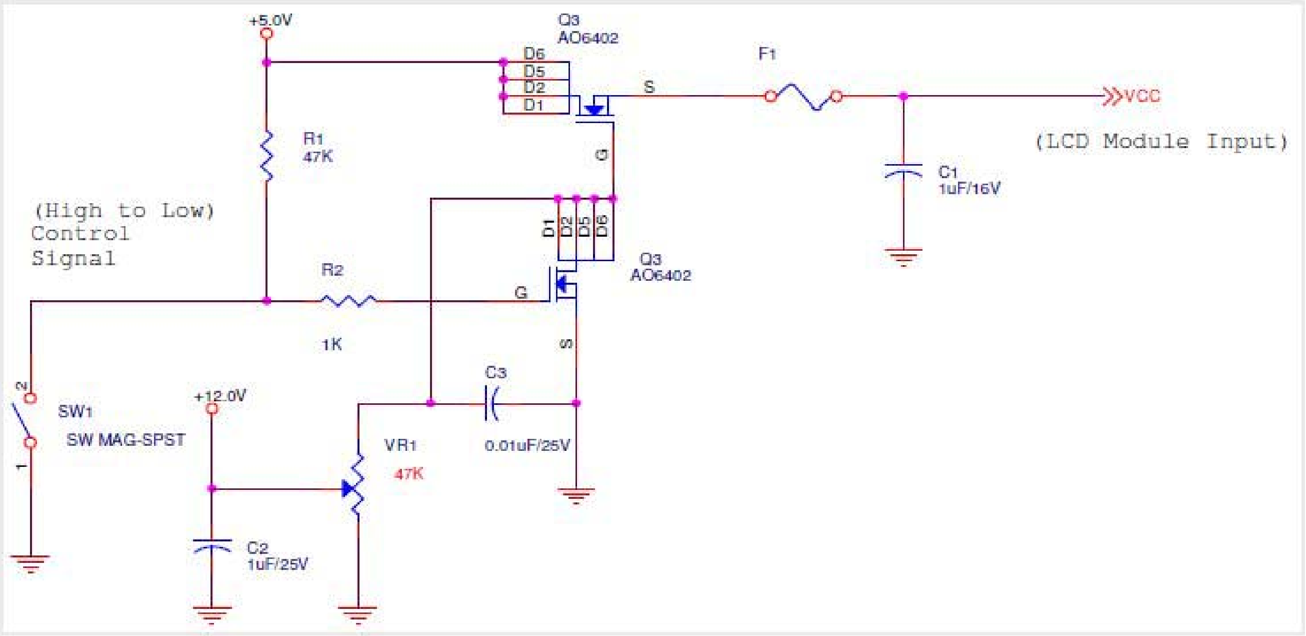
4.1.1 Power Specification

Input power specifications are as follows:

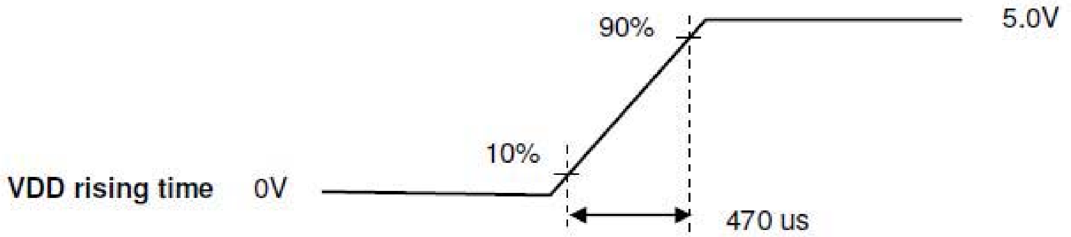
Symble	Parameter	Min.	Typ.	Max.	Unit	Condition
VDD	Logic/LCD Drive Voltage	4.5	5.0	5.5	[Volt]	±10%
IDD	Input Current	-	1.50	1.80	[A]	VDD= 5.0V, All White Pattern At 75Hz
PDD	VDD Power	-	7.5	9.0	[Watt]	VDD= 5.0V, All White Pattern At 75Hz , Note 1
IRush	Inrush Current	-	2	3	[A]	Note 2

Note 1: The variance of VDD power consumption is ±10%.

Note 2: Measurement conditions:



+5.0V
Q3
AO6402
D6
D5
D2
D1
S
F1
VCC
(LCD Module Input)
R1
47K
G
C1
1uF/16V
(High to Low)
Control
Signal
D1
D2
D5
D6
Q3
AO6402
R2
G
1K
S
C3
2
SW1
SW MAG-SPST
+12.0V
1
VR1
47K
0.01uF/25V
C2
1uF/25V



90%
5.0V
10%
VDD rising time
0V
470 us

4.2 Backlight Unit

Parameter guideline for CCFL Inverter is under stable conditions at 25℃(Room Temperature):

Parameter	Min.	Typ.	Max.	Unit	Condition
CCFL Standard Current(ISCFL)	7.0	7.5	8.0	[mA] rms	Note 2
CCFL Operation Current(IRCFL)	3.0	7.5	8.0	[mA] rms	Note 2
CCFL Frequency(FCFL)	40	60	80	[KHz]	Note 3,4
CCFL Ignition Voltage(ViCFL, Ta= 0℃)	1690	-	-	[Volt] rms	Note 5
CCFL Ignition Voltage(ViCF, Ta= 25℃)	1300	-	-	[Volt] rms	
CCFL Operation Voltage (VCFL)	-	653 @7.5mA	796 @3mA	[Volt] rms	Note 6
CCFL Power Consumption(PCFL)	-	19.6	20.56	[Watt]	Note 6
CCFL Life Time(LTCFL)	40,000	50,000	-	[Hour]	Note 7

Note 1: Recommended design points of Typ.

*1 All of characteristics listed are measured under the condition using the KC test inverter.

*2 In case of using an inverter other than listed, it is recommended to check the inverter carefully. Sometimes, interfering noise stripes appear on the screen, and substandard luminance or flicker at low power may happen.

*3 In designing an inverter, it is suggested to check safety circuit very carefully. Impedance of CCFL, for instance, becomes more than 1 [M ohm] when CCFL is damaged.

*4 Generally, CCFL has some amount of delay time after applying kick-off voltage. It is recommended to keep on applying kick-off voltage for 1 [Sec] until discharge.

*5 Reducing CCFL current increases CCFL discharge voltage and generally increases CCFL discharge frequency. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter.

Note 2: CCFL standard current is measured at 25±2℃.

Note 3: CCFL discharge frequency should be carefully determined to avoid interference between and inverter TFT LCD.

Note 4: The frequency range will not affect to lamp life and reliability characteristics.

Note 5: CCFL inverter should be able to give out a power that has a generating capacity of over 1,690 voltage. Lamp units need 1,690 voltage minimum for ignition.

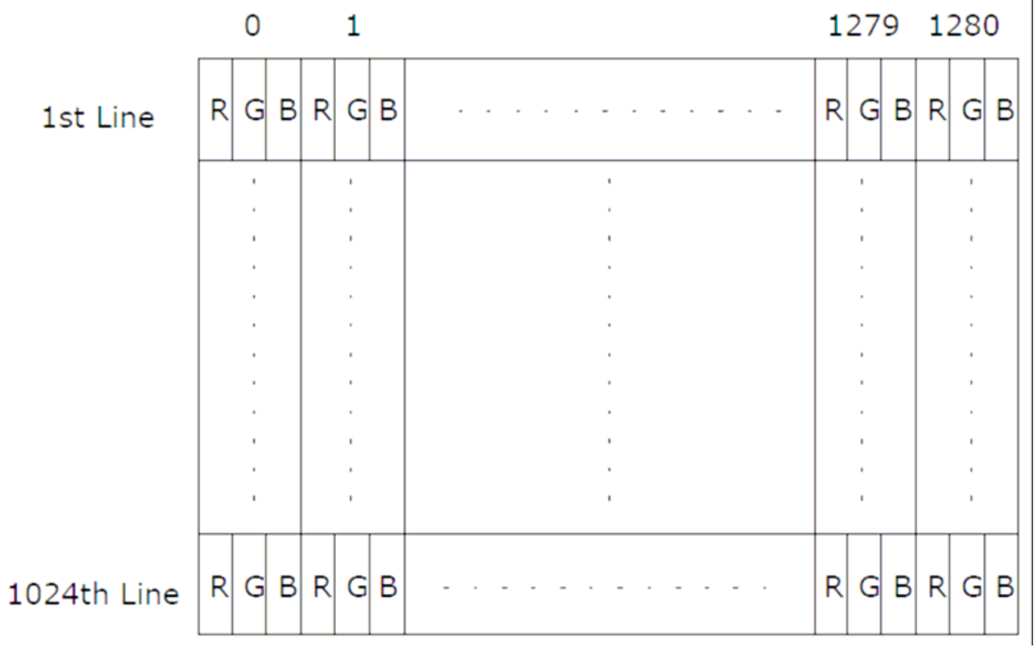
Note 6: The variance of CCFL power consumption is ±10%. Calculator value for reference (ISCFL × VCFL × 4 = PCFL)

Note 7: Definition of life: brightness becomes 50%. The typical life time of CCFL is on the condition at 7.5mA lamp current.

5. Signal Characteristic

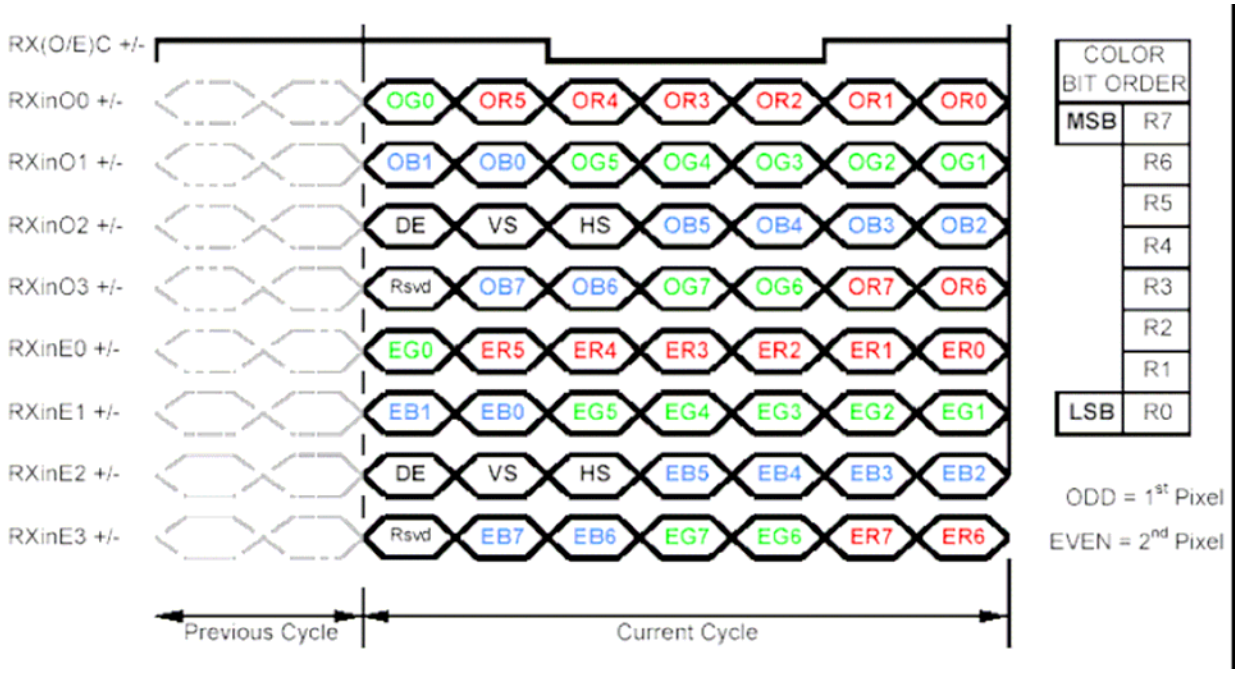
5.1 Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.



0
1
1279
1280
1st Line
1024th Line
R G B R G B
R G B R G B

5.2 The Input Data Format



RX(O/E)C +/-
RXinO0 +/-
RXinO1 +/-
RXinO2 +/-
RXinO3 +/-
RXinE0 +/-
RXinE1 +/-
RXinE2 +/-
RXinE3 +/-
OG0 OR5 OR4 OR3 OR2 OR1 OR0
OB1 OB0 OG5 OG4 OG3 OG2 OG1
DE VS HS OB5 OB4 OB3 OB2
Rsvd OB7 OB6 OG7 OG6 OR7 OR6
EG0 ER5 ER4 ER3 ER2 ER1 ER0
EB1 EB0 EG5 EG4 EG3 EG2 EG1
DE VS HS EB5 EB4 EB3 EB2
Rsvd EB7 EB6 EG7 EG6 ER7 ER6
Previous Cycle
Current Cycle
COLOR BIT ORDER
MSB R7
R6
R5
R4
R3
R2
R1
LSB R0
ODD = 1st Pixel
EVEN = 2nd Pixel

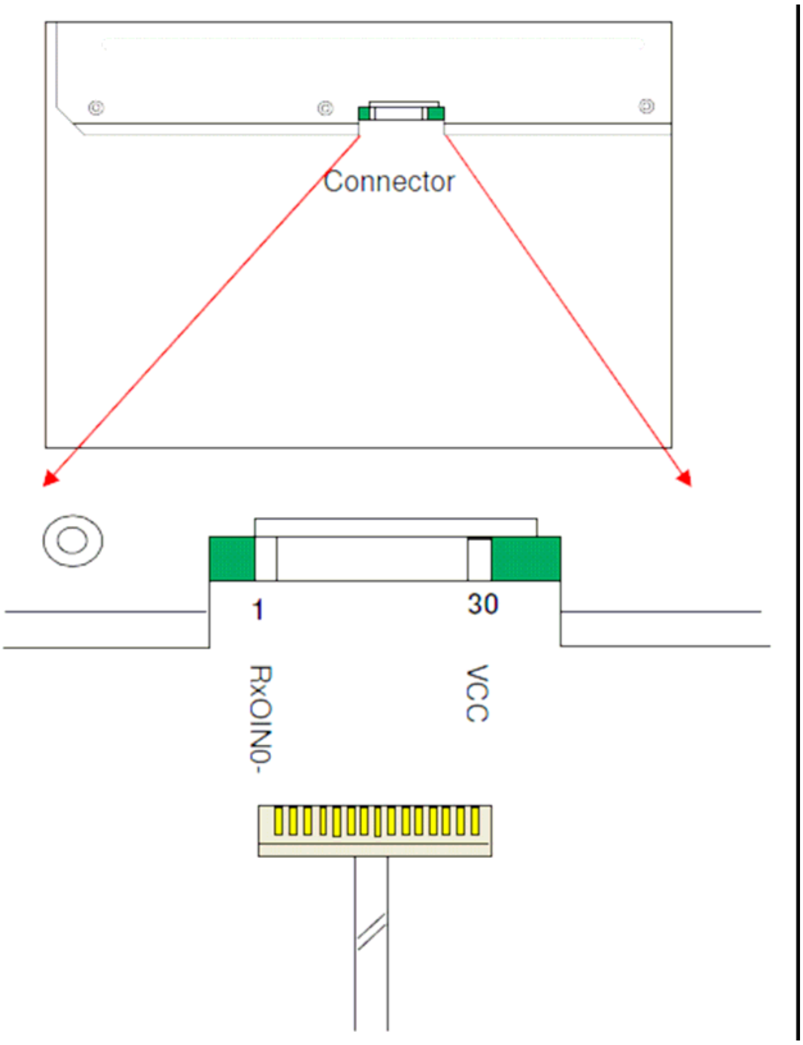
Note1: Normally, DE, VS, HS on EVEN channel are not used.
Note2: Please follow VESA.
Note3: 8-bit in

5.3 Signal Description

The module using a pair of LVDS receiver SN75LVDS82(Texas Instruments) or compatible. LVDS is a differential signal technology for LCD interface and high speed data transfer device. Transmitter shall be SN75LVDS83(negative edge sampling) or compatible. The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

PIN #	SIGNAL NAME	DESCRIPTION
1	RxOIN0-	Negative LVDS differential data input (Odd data)
2	RxOIN0+	Positive LVDS differential data input (Odd data)
3	RxOIN1-	Negative LVDS differential data input (Odd data)
4	RxOIN1+	Positive LVDS differential data input (Odd data)
5	RxOIN2-	Negative LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
6	RxOIN2+	Positive LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
7	VSS	Power Ground
8	RxOCLKIN-	Negative LVDS differential clock input (Odd clock)
9	RxOCLKIN+	Positive LVDS differential clock input (Odd clock)
10	RxOIN3-	Negative LVDS differential data input (Odd data)
11	RxOIN3+	Positive LVDS differential data input (Odd data)
12	RxEIN0-	Negative LVDS differential data input (Even data)
13	RxEIN0+	Positive LVDS differential data input (Even data)
14	VSS	Power Ground
15	RxEIN1-	Negative LVDS differential data input (Even data)
16	RxEIN1+	Positive LVDS differential data input (Even data)
17	VSS	Power Ground
18	RxEIN2-	Negative LVDS differential data input (Even data)
19	RxEIN2+	Positive LVDS differential data input (Even data)
20	RxECLKIN-	Negative LVDS differential clock input (Even clock)
21	RxECLKIN+	Positive LVDS differential clock input (Even clock)
22	RxEIN3-	Negative LVDS differential data input (Even data)
23	RxEIN3+	Positive LVDS differential data input (Even data)
24	VSS	Power Ground
25	VSS	Power Ground
26	NC	No Connection (for AUO test)
27	VSS	Power Ground
28	VCC	+5.0V Power Supply
29	VCC	+5.0V Power Supply
30	VCC	+5.0V Power Supply

Note1: Start from left side



Note2: Input signals of odd and even clock shall be the same timing.
Note3: Please follow PSWG.

5.4 Interface Timing

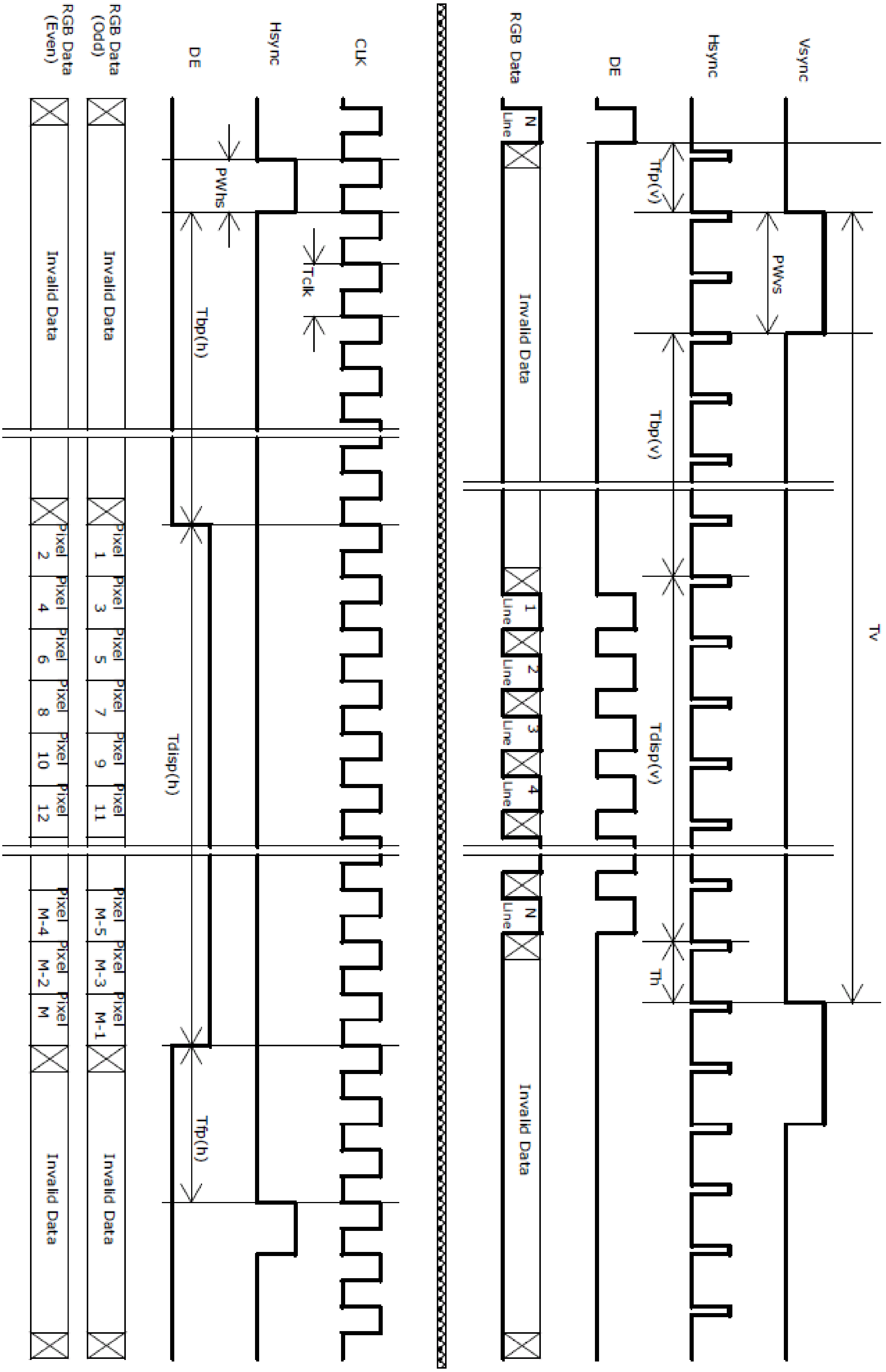
5.4.1 Timing Characteristics

Basically, interface timings described here is not actual input timing of LCD module but output timing ofSN75LVDS82DGG (Texas Instruments) or equivalent.

Item		Symbol	Min	Typ	Max	Unit
Data CLK		Tclk	30	54	83	MHz
H-section	Period	Th	720	844	1024	Tclk
	Display Area	Tdisp(h)	640	640	640	Tclk
V-section	Period	Tv	1035	1066	2048	Th
	Display Area	Tdisp(v)	1024	1024	1024	Th
Frame Rate		F	50	60	75	Hz

Note : DE mode only

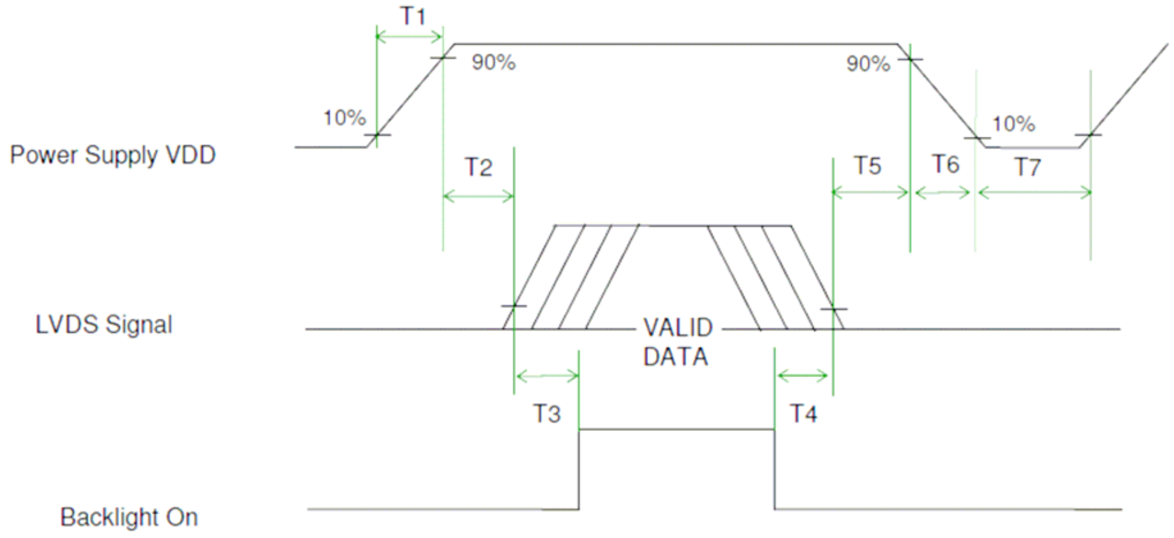
5.4.2 Timing Digram



Vsync
Hsync
DE
RGB Data
N Line
Invalid Data
1 Line
2 Line
3 Line
4 Line
N Line
Invalid Data
Tfp(v)
PWvs
Tbp(v)
Tdisp(v)
Th
Tv
CLK
Hsync
DE
RGB Data (Odd)
RGB Data (Even)
PWhs
Tclk
Tbp(h)
Tdisp(h)
Tfp(h)
Invalid Data
Invalid Data
Pixel 1
Pixel 3
Pixel 5
Pixel 7
Pixel 9
Pixel 11
Pixel 2
Pixel 4
Pixel 6
Pixel 8
Pixel 10
Pixel 12
Pixel M-5
Pixel M-3
Pixel M-1
Pixel M-4
Pixel M-2
Pixel M
Invalid Data
Invalid Data

5.5 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.


T1
90%
90%
10%
10%
Power Supply VDD
T2
T5
T6
T7
LVDS Signal
VALID DATA
T3
T4
Backlight On

Power Sequence Timing

Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	0	-	50	[ms]
T3	200	-	-	[ms]
T4	200	-	-	[ms]
T5	0	16	50	[ms]
T6	-	-	10	[ms]
T7	500	-	-	[ms]

Note: The values of the table are follow VESA.

6. Connector & Pin Assignment

Physical interface is described as for the connector on module.These connectors are capable of accommodating the following signals and will be following components.

6.1 TFT LCD Module

6.1.1 Connector

Connector Name / Designation	Interface Connector / Interface card
Manufacturer	JAE or compatible
Type Part Number	FI-XB30SSL-HF15
Mating Housing Part Number	FI-X30HL

6.1.2 Pin Assignment

Pin#	Signal Name	Pin#	Signal Name
1	RxOIN0-	2	RxOIN0+
3	RxOIN1-	4	RxOIN1+
5	RxOIN2-	6	RxOIN2+
7	VSS	8	RxOCLKIN-
9	RxOCLKIN+	10	RxOIN3-
11	RxOIN3+	12	RxEIN0-
13	RxEIN0+	14	VSS
15	RxEIN1-	16	RxEIN1+
17	VSS	18	RxEIN2-
19	RxEIN2+	20	RxECLKIN-
21	RxECLKIN+	22	RxEIN3-
23	RxEIN3+	24	VSS
25	VSS	26	NC
27	VSS	28	VCC
29	VCC	30	VCC

6.2 Backlight Unit

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

Connector Name / Designation	Lamp Connector / Backlight lamp
Manufacturer	JST
Type Part Number	BHSR-02VS-1
Mating Type Part Number	SM02B-BHSS-1-TB

6.2.1 Signal for Lamp connector

	Connector No.	Pin No.	Input	Color	Function
Upper	CN1	1	Hot1	Pink	High Voltage
		2	Cold1	Black	Low Voltage
	CN2	1	Hot2	Blue	High Voltage
		2	Cold2	White	Low Voltage

	Connector No.	Pin No.	Input	Color	Function
Lower	CN3	1	Hot1	Pink	High Voltage
		2	Cold1	Black	Low Voltage
	CN4	1	Hot2	Blue	High Voltage
		2	Cold2	White	Low Voltage

7. Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 50℃, 50%RH, 300hours	
Low Temperature Operation (LTO)	Ta= 0℃, 300hours	
High Temperature Storage (HTS)	Ta= 60℃, 300hours	
Low Temperature Storage (LTS)	Ta= -20℃, 300hours	
Vibration Test (Non-operation)	Acceleration: 1.5 G Wave: Random Frequency: 10 - 200 - 10 Hz Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G Wave: Half-sine Active Time: 20 ms Direction: ±X, ±Y, ±Z (one time for each Axis)	
Drop Test	Height: 60 cm, package test	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	1
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 8 points, 25 times/ point.	2
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 8 points, 25 times/ point.	
Altitude Test	Operation:10,000 ft Non-Operation:30,000 ft	

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

8. Lot number identification

The lot number shall be indicated on the back of the backlight case of each LCD.

TCG190SX4AA-A00 - □□ - □□ - □ MADE IN □□□□□
↓↓ ↓ ↓ ↓
1 2 3 4 5

No1. - No5. above indicate
1. Year code
2. Month code
3. Date
4. Version Number
5. Country of origin (TBD)

Year	2009	2010	2011	2012	2013	2014
Code	9	0	1	2	3	4

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.
Code	1	2	3	4	5	6

Month	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Code	7	8	9	X	Y	Z

9. Warranty

9-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

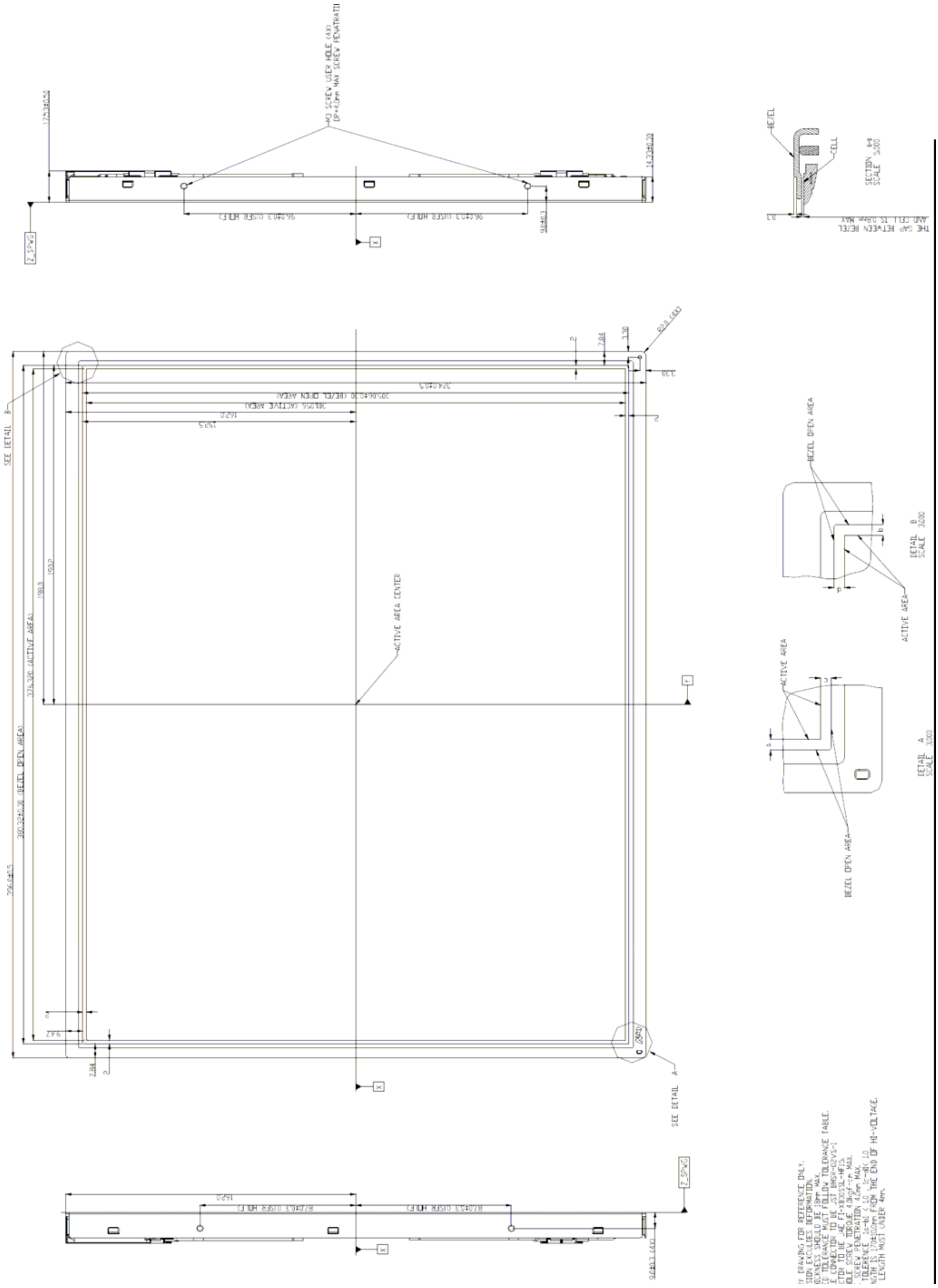
9-2. Production warranty

Kyocera warrants its LCD's for a period of 12 months from the ship date. Kyocera shall, by mutual agreement, replace or re-work defective LCD's that are shown to be Kyocera's responsibility.

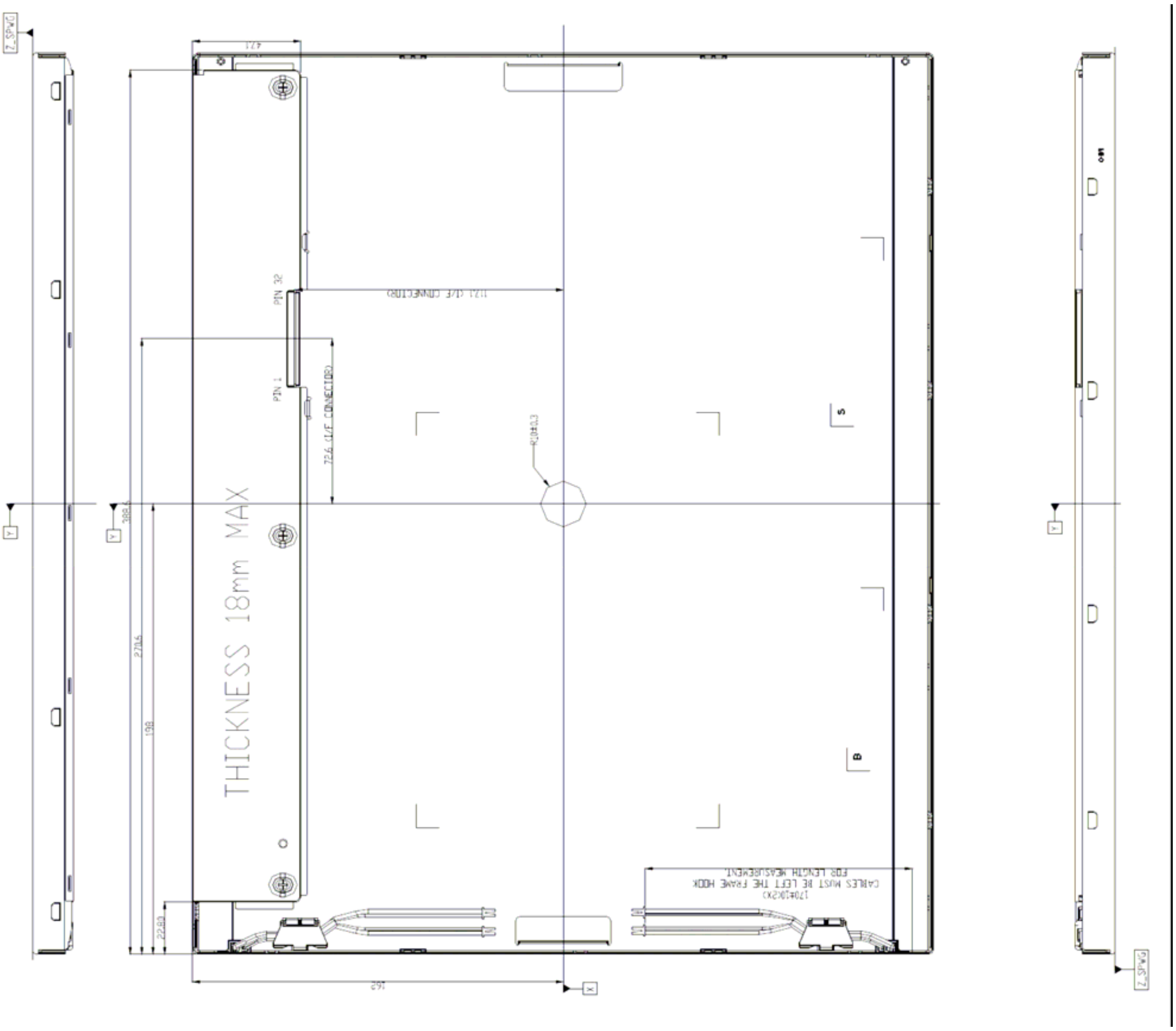
10. Handling Precautions

1) Since front polarizer is easily damaged, pay attention not to scratch it.
2) Be sure to turn off power supply when inserting or disconnecting from input connector.
3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7) Do not open or modify the Module Assembly.
8) Do not press the reflector sheet at the back of the module to any directions.
9) In case if a Module has to be put back into the packing container slot after once it was taken out from the container, do not press the center of the CCFL reflector edge. Instead, press at the far ends of the CCFL Reflector edge softly. Otherwise the TFT Module may be damaged.
10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
11) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
12) Cold cathode fluorescent lamp in LCD contains a small amount of mercury. Please follow local ordinances or regulations for disposal.
13) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 orUL1950), or be applied exemption.
14) The LCD module is designed so that the CCFL in it is supplied by Limited Current Circuit (IEC60950 orUL1950). Do not connect the CCFL in Hazardous Voltage Circuit.

12. Mechanical Characteristic



M3 SCREW USER HOLE (4X)
DP=4.0mm MAX SCREW PENATRATI
17.43±0.50
14.33±0.30
96.0±0.3 (USER HOLE)
9.0±0.3
Z_SPWG
X
Y
BEZEL
CELL
SECTION B-B SCALE 3:000
THE GAP BETWEEN BEZEL AND CELL IS 0.8mm MAX
R2.0 (4X)
324±0.5
305.06±0.30 (BEZEL OPEN AREA)
301.056 (ACTIVE AREA)
162.0
152.5
SEE DETAIL B
SEE DETAIL A
396.0±0.5
380.32±0.30 (BEZEL OPEN AREA)
376.320 (ACTIVE AREA)
198.0
190.2
ACTIVE AREA CENTER
BEZEL OPEN AREA
ACTIVE AREA
DETAIL B SCALE 3:000
DETAIL A SCALE 3:000
87.0±0.3 (USER HOLE)
9.0±0.3 (4X)


Z_SPW
42.1
PIN 32
121 (I/F CONNECTOR)
PIN 1
72.6 (I/F CONNECTOR)
R10±0.3
S
B
THICKNESS 18mm MAX
308.6
270.6
198
22.89
Y
CABLES MUST BE LEFT THE FRAME HOOK
FOR LENGTH MEASUREMENT
170±10(2X)
162
X
Y
Z_SPW

SPEC

Spec No.	TQ3C-8EA00-E1BYI01-00
Date	July 14, 2009

TYPE : KTP190AGAC-C00

< Touch panel>

CONTENTS

1. Application
2. Construction and outline
3. Mechanical specifications
4. Absolute maximum ratings
5. Electrical characteristics
6. Interface signals
7. Design guidance for analog touch panel
8. Lot number identification
9. Warranty
10. Precautions for use
11. Reliability test data
12. Outline drawing

Prototype

Issued
Date: Jul 15, 2009
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

This specification is subject to change without notice.
Consult Kyocera before ordering.

Original Issue Date	Designed by: Engineering dept.			Confirmed by: QA dept.	
	Prepared	Checked	Approved	Checked	Approved
July 14, 2009	S.Ohtaka	W. Yano	M.FujiTani	J. Sakaguchi	

Warning

1. This Kyocera touch panel has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting in any way to the use of the touch panel in such applications.

2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera touch panels in applications.

Caution

1. Kyocera shall have the right, which Customer hereby acknowledges, to immediately scrap or destroy tooling for Kyocera touch panels for which no Purchase Orders have been received from the Customer in a two-year period.

Revision record

Date	Designed by : Engineering dept.			Confirmed by : QA dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev.No.	Date	Page	Descriptions

1. Application

This document defines the specification of KTP190AGAC-C00. (RoHS Compliant)

2. Construction and outline

Touch panel : Analog type(Glass/Glass)
Surface film : Glare Anti-finger print treatment

3. Mechanical specifications

3-1. Mechanical specifications of touch panel

Item		Specification	Unit
Outline dimensions 1)		394(W)×319.1(H)×2.2(D)	mm
Active area		378.8(W)×303.6(H)	mm
Viewing area		380.8(W)×305.6(H)	mm
Mass		TBD	g
Input		Radius-0.8 stylus or Finger	-
Actuation Force		0.1～2.0	N
Operating life	Striking(Finger-input) 2)	1 million	hits
	Sliding(Stylus–input) 3)	100 thousand	characters
Transmittance		Typ.80(at full wavelength)	%
Reflectance		Typ.15(550nm)	%
Surface hardness		3H or more(Pencil hardness)	-

1) Please refer to outline drawing for details.

2) Striking test condition

Testing rod : Silicon rubber (Hardness:60°),Tip : R = 4.0,
Testing location : In active area
Input voltage : DC5V
Load : 2.94N
Cycle : 5hits/sec
Judgment : No defect in function
: No appearance defect which causes trouble to use.
*Dents, blurs and marks on surface film : neglected

3) Sliding test condition

Testing rod : Polyacetal resin, Tip : R = 0.8
Testing location : In active area
Input voltage : DC5V
Load : 2.45N
Input length : 10mm
Input speed : 50mm/sec
Sliding times : 10mm sliding (back and forth) counts as 2 times.
Judgment : No defect in function
: No appearance defect which causes trouble to use.
*Dents, blurs and marks on surface film : neglected

4. Absolute maximum ratings

4-1. Electrical absolute maximum ratings

Item	Symbol	Min.	Max.	Unit
Supply voltage for touch panel	V_{TP}	0	6.0	V
Input current of touch panel	I_{TP}	0	0.5	V

4-2. Environmental absolute maximum ratings

Item	Symbol	Min.	Max.	Unit
Operating temperature	T_{OP}	-30	85	°C
Storage temperature	T_{STO}	-40	95	°C
Operating humidity 1)	H_{OP}	10	2)	%RH
Storage humidity 1)	H_{STO}	10	2)	%RH
Vibration	-	3)	3)	-
Shock	-	4)	4)	-

1) Non-condensing.

2) Temp.≦40°C, 85%RH Max.
Temp.＞40°C, Absolute humidity shall be less than 85%RH at 40°C.

3) The touch panel is installed on the LCD using two sided tape.

Frequency	10～55 Hz	Acceleration value (0.3～9 m/s^2)
Vibration width	0.15mm	
Interval	10-55-10 Hz	1 minutes

2 hours in each direction X, Y, Z (6 hours total)
EIAJ ED-2531

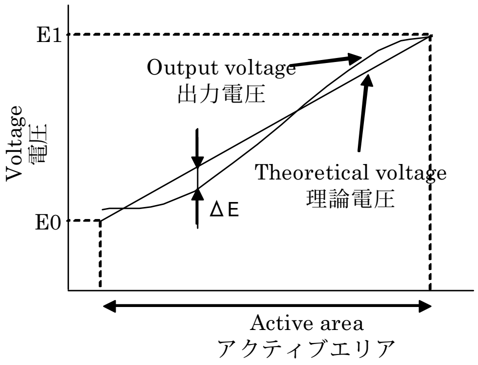
4) The touch panel is installed on the LCD using two sided tape.
Acceleration: 490 m/s^2, Pulse width: 11 ms
3 times in each direction: ±X, ±Y, ±Z
EIAJ ED-2531

5. Electrical characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage for touch panel	V_{TP}	-	-	5.0	-	V
Terminal resistance 1)	xL-xR	-	(TBD)	-	(TBD)	Ω
	yU-yL	-	(TBD)	-	(TBD)	Ω
Linearity 2)	-	-	less than ±2.5			%
Insulation resistance 3)	-	DC25V	50	-	-	MΩ
Chattering 4)	-	at ON/OFF	less than 10			ms

1) Resistance between terminal xL and xR, or between yU and yL.

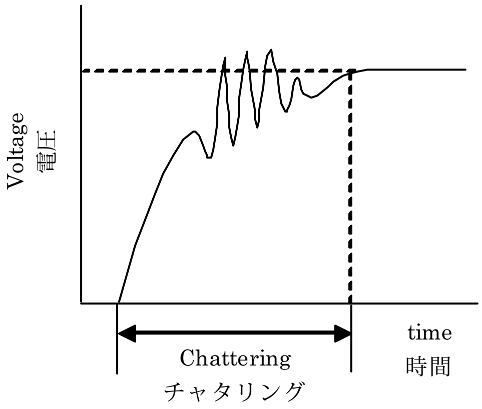
2) Apply 5VDC to the terminal xL-xR, and measure the output voltage at terminal y when a random input is applied in the active area. Measure the difference between the output and theoretical voltages. (Measure the actual voltage at the terminal using the same method.)



$$\text{Linearity リニアリティ (\%)} = \frac{\Delta \text{Emax}}{\text{E1-E0}}$$

3) Resistance between the upper and lower terminals.

4) Apply 5VDC to the terminal xL-xR, and measure the oscillation at terminal y when applying a random input in the active area. (Measure the oscillation at terminal x using the same method.)



6. Interface signals

No.	Symbol	Description
1	xR	x-Right terminal
2	yL	y-Lower terminal
3	xL	x-Left terminal
4	yU	y-Upper terminal

Touch panel side connector : 1mm pitch
Recommended matching connector : Series 9616 (IRISO)
: Series 9610 (IRISO)
: Series FMS (JST)

7. Design guidance for analog touch panel

7-1 Electrical (In customer's design, please remember the following considerations.)

1) Do not use the current regulated circuit.
2) Keep the current limit with top and bottom layer. (Please refer to “Electrical absolute maximum ratings” for details.)
3) Analog touch panel can not sense two points touching separately.
4) A contact resistance is appeared at the touch point between top and bottom layer. After this resistance has stable read of the touch panel position data.
5) Because noise of inverter or peripheral circuits may interfere signal of touch panel itself it is necessary to design carefully in advance to avoid these noise problem.

7-2 Software

1) Do the "User Calibration".
2) "User Calibration" may be needed with long term using. Include "User Calibration" menu in your software.
3) When drawing a line with a stylus, there may be a slight discontinuity when the stylus passes over a spacer-dot. If necessary, please provide a compensation feature within your software.

7-3 Mounting on display and housing bezel

1) Do not use an adhesive tape to bond it on the front of touch panel and hang it to the housing bezel.
2) This touch panel has an airtight but not watertight structure. Please not to use it for the applications requiring watertight or under the environments occurred condensation. If it is expected to be exposed to the environments that vapor, moisture or other liquids may seep inside a bezel, please be sure to take some measurements for drip-proof or waterproof by using sealing materials on the bezel.

8. Lot number identification

The lot number shall be indicated on the FPC tale.

KTP190AGAC-C00 - □□□□□□□□□ □□□

↓ ↓

1 2

No1. – No2. above indicate
1. Lot No. 9 digits
2. Serial 3 digits

9. Warranty

9-1. Incoming inspection

Please inspect the touch panel within one month after your receipt.

9-2. Production warranty

Kyocera warrants its touch panel's for a period of 12 months from the ship date. Kyocera shall, by mutual agreement, replace or re-work defective touch panel's that are shown to be Kyocera's responsibility

10. Precautions for use

10-1. Usage

1) DO NOT store in a high humidity environment for extended periods. Surface film degradation bubbles, and/or peeling off of the surface film may result.
2) Do not push or rub the touch panel's surface with hard to sharp objects such as knives, or the touch panel may be scratched.
3) When the touch panel is dirty, gently wipe the surface with a soft cloth, sometimes moistened by mild detergent or alcohol. If a hazardous chemical is dropped on the touch panel by mistake, wipe it off right away to prevent human contact.
4) Touch panel edges are sharp. Handle the touch panel with enough care to prevent cuts.
5) Always keep the touch panel free from condensation during testing. Condensation may permanently spot or stain the surface film.
6) Do not pull the touch panel FPC and do not bend the root of the wires. Housing should be designed to protect touch panel FPC from external stress.
7) This Kyocera touch panel has been specifically designed for use in general electronic devices, but not for use in a special environment such as usage in an active gas. Hence, when the touch panel is supposed to be used in a special environment, evaluate the touch panel thoroughly beforehand and do not expose the touch panel to chemicals such as an active gas.
8) The touch panel is made of glass. It may break when dropped, hit, or vibrated excessively. Please handle with care.

10-2. Installation of the touch panel

1) The touch panel shall be installed flat, without twisting or bending.
2) Please design the housing window so that its edges are between the active area and the effective area of the touch screen. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.
3) A transparent protection sheet is attached to the touch panel. Please remove the protection film slowly before use, paying attention to static electricity.
4) Do not scratch, or put any stress outside the active area of the touch panel when you install it on to an LCD, or it may damage the ITO pattern of the touch panel.

10-3. Operation

1) The touch panel shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.
2) Do not use the touch panel in environments conducive to the formation of condensation.

10-4. Storage

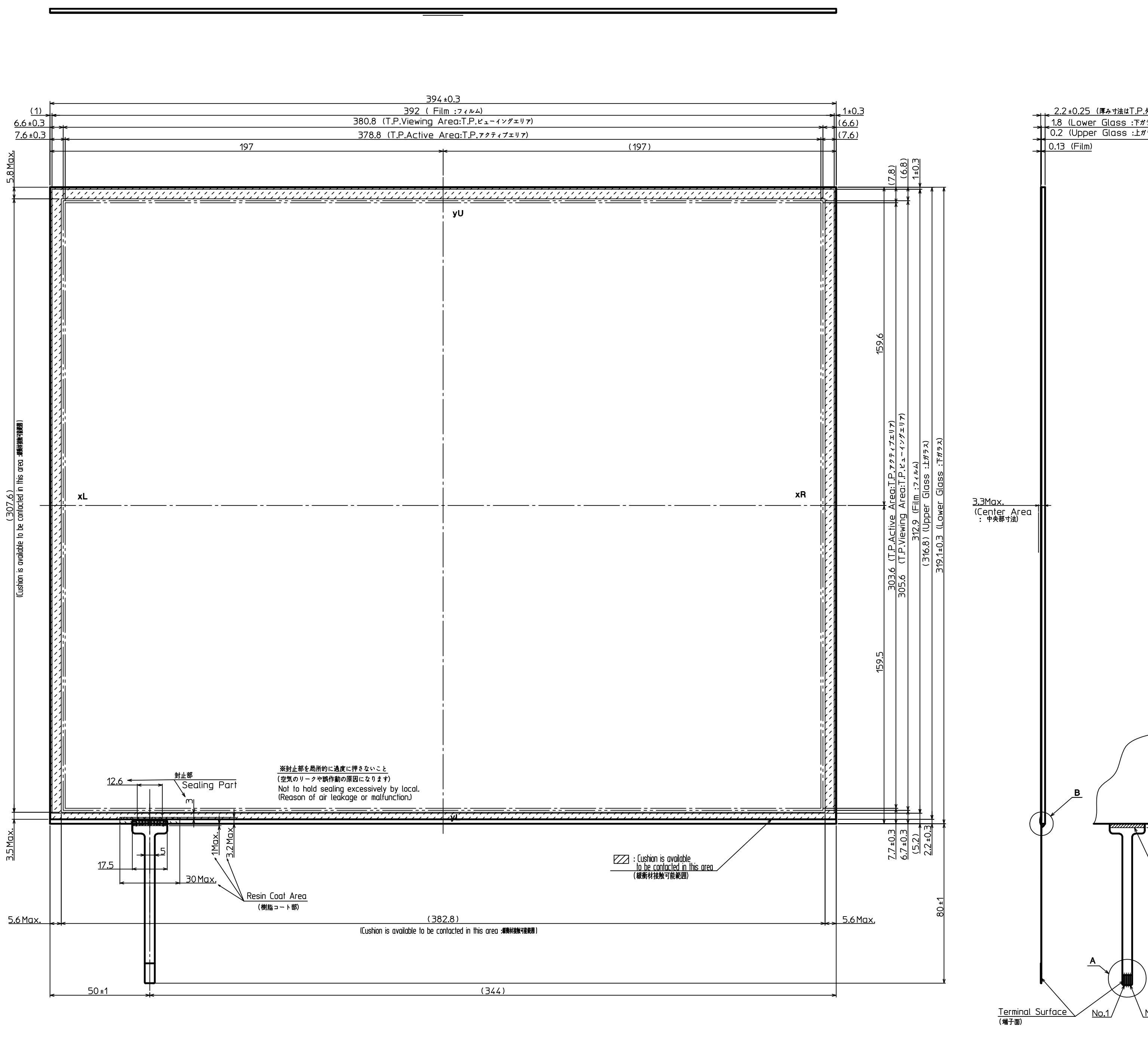
1) The touch panel shall be stored within the temperature and humidity limits specified. Store in a dark area, and protect the touch panel from direct sunlight or fluorescent light.
2) Always store the touch panel so that it is free from external pressure onto it. This will prevent the formation of Newton rings.

11. Reliability test data

Test item	Test condition	Test time	Judgement
High temp. atmosphere	(95)°C	240h	Touch panel function : No defect Touch panel quality : No defect Current consumption : No defect
Low temp. atmosphere	(-40)°C	240h	Touch panel function : No defect Touch panel quality : No defect Current consumption : No defect
High temp. humidity atmosphere	(40)°C(90)% RH	240h	Touch panel function : No defect Touch panel quality : No defect Current consumption : No defect
Temp. cycle	(-40)°C 0.5h R.T. 0.5h (95)°C 0.5h	10cycles	Touch panel function : No defect Touch panel quality : No defect Current consumption : No defect
High temp. operation	(85)°C	500h	Touch panel function : No defect Touch panel quality : No defect Current consumption : No defect
Point activation	Silicon rubber R4, Hardness 60° Hitting force 2.9N Hitting speed 5 time/s	one million times	Touch panel function : No defect Terminal resistance : No defect Insulation resistance : No defect Linearity : No defect Actuation Force : No defect No appearance defect which affects touch panel function. 2)
Sliding	Polyacetal resin, Tip : R = 0.8 Hitting force 2.9N Hitting speed 5 time/s	100 thousand times	Touch panel function : No defect Terminal resistance : No defect Insulation resistance : No defect Linearity : No defect Actuation Force : No defect No appearance defect which affects touch panel function. 2)

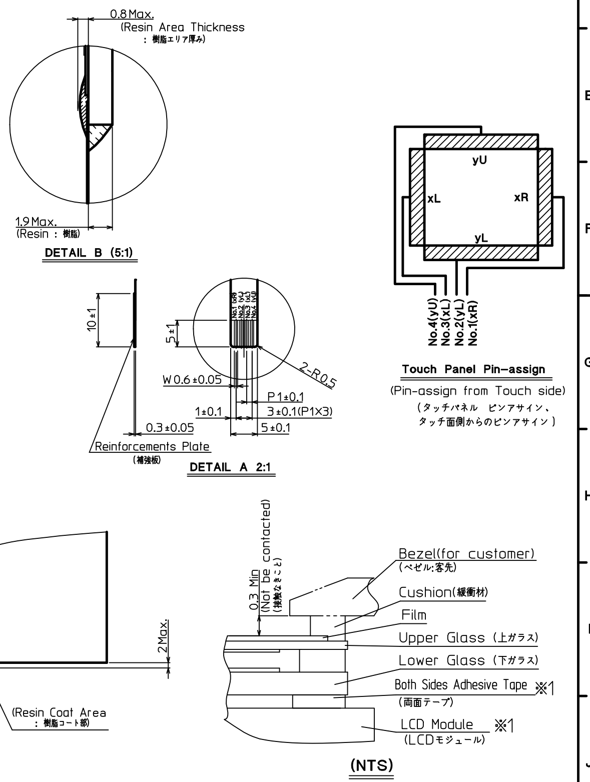
1) Test in active area.
2) Dents, blurs and marks on surface film: neglected.
3) 10mm sliding (back and forth) counts as 2 times.
4) Each test item uses a test touch panel only once. The tested touch panel is not used in any other tests.
5) The touch panel is tested in circumstances in which there is no condensation.
6) Temp. cycle test (Heat shock included): the LCD shall be tested after leaving it stabilize at room temperature for 2 hours after the last cycle.
7) An operational test was performed after the following conditions. First, the touch panel was left for a certain time under 5V voltages applied (without touch), Then it was left at room temperature (No VDC applied) for 2 hours.
8) The reliability test is not an out-going inspection.
9) The result of the reliability test is for your reference purpose only. The reliability test is conducted only to examine the touch panel's capability.

No	Description	Drawn	Checked	Checked	Approved


394±0.3
(1)
392 (Film :フィルム)
1±0.3
6.6±0.3
380.8 (T.P.Viewing Area:T.P.ビューイングエリア)
(6.6)
7.6±0.3
378.8 (T.P.Active Area:T.P.アクティブエリア)
(7.6)
197
(197)
5.8Max.
(7.8)
(6.8)
1±0.3
yU
xL
xR
yL
159.6
159.5
303.6 (T.P.Active Area:T.P.アクティブエリア)
305.6 (T.P.Viewing Area:T.P.ビューイングエリア)
312.9 (Film :フィルム)
(316.8) (Upper Glass :上ガラス)
319.1±0.3 (Lower Glass :下ガラス)
(307.6)
(Cushion is available to be contacted in this area :緩衝材接触可能範囲)
12.6
封止部
Sealing Part
3
※封止部を局所的に過度に押さないこと
(空気のリークや誤作動の原因になります)
Not to hold sealing excessively by local.
(Reason of air leakage or malfunction)
3.5Max.
1Max.
3.2Max.
5
17.5
30Max.
Resin Coat Area
(樹脂コート部)
: Cushion is available to be contacted in this area
(緩衝材接触可能範囲)
7.7±0.3
6.7±0.3
(5.2)
2.2±0.3
80±1
5.6Max.
(382.8)
(Cushion is available to be contacted in this area :緩衝材接触可能範囲)
5.6Max.
50±1
(344)
2.2±0.25 (厚み寸法はT.P.外周部に適用する
1.8 (Lower Glass :下ガラス)
0.2 (Upper Glass :上ガラス)
0.13 (Film)
3.3Max.
(Center Area
: 中央部寸法)
B
2Max.
(Resin Coat Area
: 樹脂コート部)
A
Terminal Surface
(端子面)
No.1
No.4

Note. (注記)

	Name (名称)	Explanation (説明)
1	T.P.	Touch panel (タッチパネル)
2	T.P. Active Area (T.P.アクティブエリア)	Operating area of touch panel (タッチパネルの動作範囲)
3	T.P. Viewing Area (T.P.ビューイングエリア)	Warranty area of touch panel's appearance (タッチパネルの外観(傷・異物等)保証範囲)
		By giving pressure between the active area and the effective viewing area of the touch panel, there is a possibility that the touch panel will operate. (タッチパネルアクティブエリアとタッチパネルビューイングエリア間に荷重をかけた場合は、タッチパネルが動作する可能性があります。)


0.8Max.
(Resin Area Thickness
: 樹脂エリア厚み)
1.9Max.
(Resin : 樹脂)
DETAIL B (5:1)
10±1
5±1
W0.6±0.05
2-R0.5
P1±0.1
1±0.1
3±0.1(P1X3)
0.3±0.05
5±0.1
Reinforcements Plate
(補強板)
DETAIL A 2:1
yU
xL
xR
yL
No.4(yU)
No.3(xL)
No.2(yL)
No.1(xR)
Touch Panel Pin-assign
(Pin-assign from Touch side)
(タッチパネル ピンアサイン、
タッチ面側からのピンアサイン)
0.3 Min
(Not be contacted)
(接触なきこと)
Bezel(for customer)
(ベゼル:客先)
Cushion(緩衝材)
Film
Upper Glass (上ガラス)
Lower Glass (下ガラス)
Both Sides Adhesive Tape ※1
(両面テープ)
LCD Module ※1
(LCDモジュール)
(NTS)

Precaution in use of touch panel.
(タッチパネル使用上の注意事項)

※1 In case of assemble to the LCD
(LCDに取りつける場合)

1. Fix touch panel at LCD module and the rear side of touch panel.
(タッチパネルの固定はLCDモジュール側とタッチパネル裏面とで行なうこと)
2. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.
(ベゼル内側とタッチパネルの接触厳禁．誤動作や電極破損の原因となります．)
3. Tolerance without indication: ±0.5
(指示無き公差)

Material 材質	Treatment 処理	Approved '09.07.10	Checked '09.07.10	Checked '09.07.10	Drawn	Scale 1:1(2:1, 5:1,NTS)	Title KTP190AGAC	KYOCERA	Year–Month–Day '09.07.09	Size 1
Quantity 製作数	Description; 備考 RoHS	藤谷	宮ノ原	鶴崎	木口		T.P. Outline Dimensions	Drawing No. 121A8002000		