# TFT LCD Approval Specification

# MODEL NO.: M170E5-C08

Customer : INNOLUX

Approved by : _____

Note :

| Liquid Crystal Display Division | |
|---|---|
| QRA Division. | OA Head Division. |
| Approval | Approval |
| 陳 93.1.14 永一 | 林 93.1.14 [illegible] |

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## REVISION HISTORY

| Version | Date | Page | Section | Description |
|---|---|---|---|---|
| Ver 0.0 | JUL. 14.'03 | All | All | New issue. |
| Ver 1.0 | NOV. 03.'03 | 5 | 2.2 | Modified Response time Tr(Typ.) from 4 to 4.5, Tr(Max.) from 6 to 6.5; Tf(Typ.) from 12 to 11.5, Tf(Max.) from 18 to 17.5. |
| | | 5 | 2.2 | Modified Center point Transmittance Min. from NA to 5.0, Typ. from 5.3 to 5.5. |
| | | 5 | 2.2 | Modified Transmittance Uniformity (13pts) Typ. from NA to 1.25. |
| | | 5 | 2.2 | Modified Color coordinates at center point as the contents. |
| Ver 1.1 | DEC. 19. 03 | 5 | 2.2 | Modified Viewing angle Condition from CR≧10 to CR≧5, Min from NA to 70, Typ. from 70 to 80. |
| | | 8 | Note(6) | Increased "Crosstalk is related about the Gamma curve from PCBA." |
| Ver 3.0 | DEC. 26.'03 | 5 | 2.2 | Modified Crosstalk Max. from 3.5 to 2.0. |
| | | 6 | Note(0) | Modified from "INNOLUX" to "customers". |
| | | 6 | Note(1) | Modified from "INNOLUX" to "customers". |
| | | 8 | Note(6) | Modified from "Crosstalk is related about the Gamma curve from PCBA." to "Crosstalk is based on customer's PCBA first and the final judgment is based on CMO's PCBA." |
| | | 10 | 4 | Increased "PANEL DRAWINGS" |
| Ver 3.1 | JAN. 14.'04 | 8 | Note(7) | Modified from "0.1512" to "0.1582". |

# 1. LCD CELL GENERAL SPECIFICATION

| ITEM | SPECIFICATION |
|---|---|
| Model name | M170E5-C08 |
| Vendor | CHI MEI OPTOELECTRIC CORP.(CMO) |
| Max. Glass Size (Width X Height ) | 348.32(mm)*282.69(mm) |
| Glass Size Tolerance | +/-0.2mm |
| Resolution | SXGA, 1280*1024 |
| Display mode | TN mode normally white |
| Dot Pitch | 0.264(H)mm*0.264(V) mm |
| Active Area | 337.920(H)mm*270.336(V) mm |
| Color Pixel Arrangement | RGB vertical strip |
| Surface Treatment | Anti-glare, Haze25%, 3H |
| Glass thickness | 0.7mm+/-0.07mm |
| Polarizer type | SWV-film Type |
| Main Viewing Direction | 6 o'clock |

# 2. OPTICAL CHARACTERISTICS

## 2.1 TEST CONDITIONS

| Item | Symbol | Value | Unit |
|---|---|---|---|
| Ambient Temperature | Ta | 25±2 | °C |
| Ambient Humidity | Ha | 50±10 | %RH |
| Gamma voltage 1 | | 9.8±0.02 | V |
| Gamma voltage 7 | | 5.5±0.02 | V |
| Gamma voltage 8 | | 4.5±0.02 | V |
| Gamma voltage 14 | | 0.2±0.02 | V |
| Vcom | | most suitable Vcom | |

## 2.2 OPTICAL SPECIFICATIONS

| ITEM | | Symbol | Condition | MIN. | TYP. | MAX. | UNIT | NOTE |
|---|---|---|---|---|---|---|---|---|
| Contrast Ratio | | CR | θx=θy=0° | 300 | 400 | -- | % | 4,1 |
| Response Time (Black/White) | | Tr | θx=θy=0° | -- | 4.5 | 6.5 | ms | 5,1 |
| | | Tf | θx=θy=0° | -- | 11.5 | 17.5 | ms | |
| NTSC | | C.G. | θx=θy=0° | -- | 66 | -- | % | 7,0 |
| Center point Transmittance | | T% | θx=θy=0° | 5.0 | 5.5 | -- | % | 9,1 |
| Transmittance uniformity (13pts) | | δT% | θx=θy=0° | -- | 1.25 | 1.4 | -- | 8,1 |
| Cross Talk | | CT | θx=θy=0° | -- | -- | 2.0 | % | 6,1 |
| Viewing Angle | Horizontal θx (θy=0° ) | Right | CR≧5 | 70 | 80 | -- | Deg | 2,3,1 |
| | | Left | | 70 | 80 | -- | Deg | |
| | Vertical θy (θx=0° ) | Up | | 70 | 80 | -- | Deg | |
| | | Down | | 70 | 80 | -- | Deg | |
| Color Coordinates at center point | Red | Rcx | θx=θy=0° | Typ -0.03 | 0.645 | Typ +0.03 | | 2,0 |
| | | Rcy | θx=θy=0° | | 0.346 | | | |
| | Green | Gcx | θx=θy=0° | | 0.271 | | | |
| | | Gcy | θx=θy=0° | | 0.590 | | | |
| | Blue | Bcx | θx=θy=0° | | 0.134 | | | |
| | | Bcy | θx=θy=0° | | 0.101 | | | |
| | White | Wcx | θx=θy=0° | | 0.313 | | | |
| | | Wcy | θx=θy=0° | | 0.346 | | | |
| | Red | Rx | θx=θy=0° | Typ -0.03 | 0.645 | Typ +0.03 | -- | 2,1 |
| | | Ry | θx=θy=0° | | 0.353 | | -- | |
| | Green | Gx | θx=θy=0° | | 0.285 | | -- | |
| | | Gy | θx=θy=0° | | 0.608 | | -- | |
| | Blue | Bx | θx=θy=0° | | 0.142 | | -- | |
| | | By | θx=θy=0° | | 0.070 | | -- | |
| | White | Wx | θx=θy=0° | | 0.329 | | -- | |
| | | Wy | θx=θy=0° | | 0.349 | | -- | |

**Note ( 0 ) :**

**Light source is the standard light source "C" which is defined by CIE and driving voltages are based on CMO's recommending value. The calculating method is as following :**

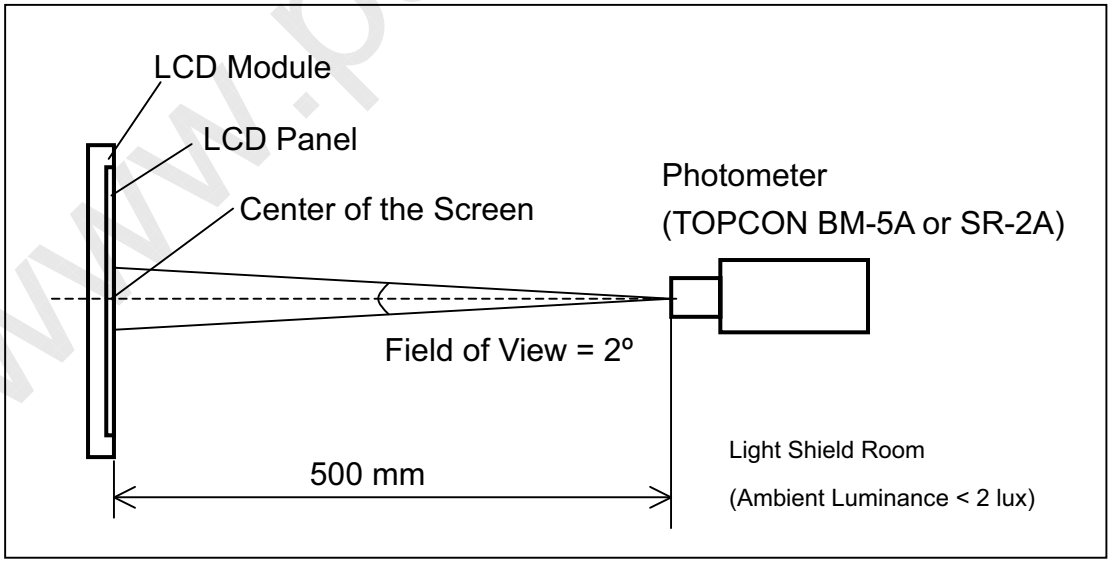
1. **Measure Module's and BLU's spectrums. White is without signal input and R, G, B are with signal input. BLU is supplied by customers.**
2. **Calculate cell's spectrum.**
3. **Calculate cell's chromaticity by using the spectrum of standard light source "C"**

**Note ( 1 ) :**

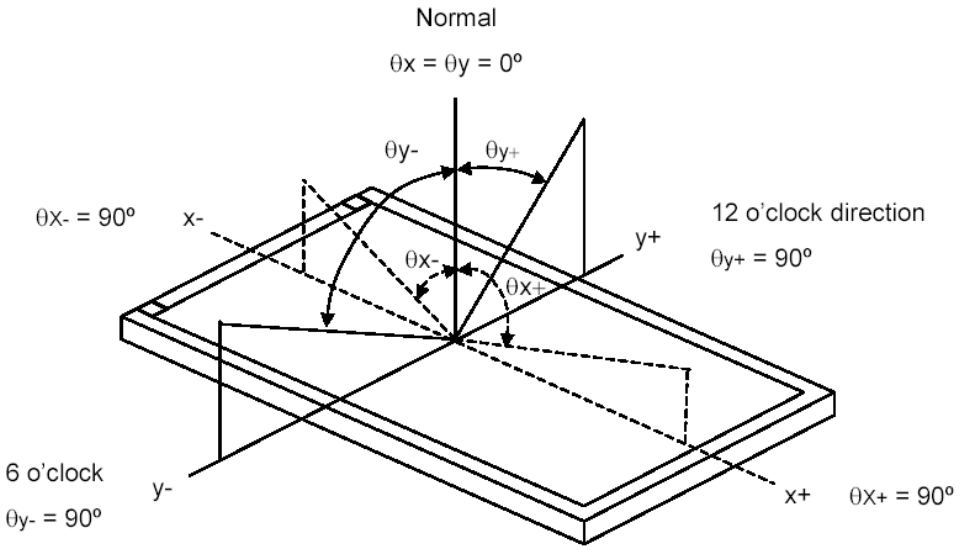
**Light source is the BLU which is supplied by customers and driving voltages are based on CMO's recommending value. White is without signal input and R, G, B are with signal input.**

**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.**



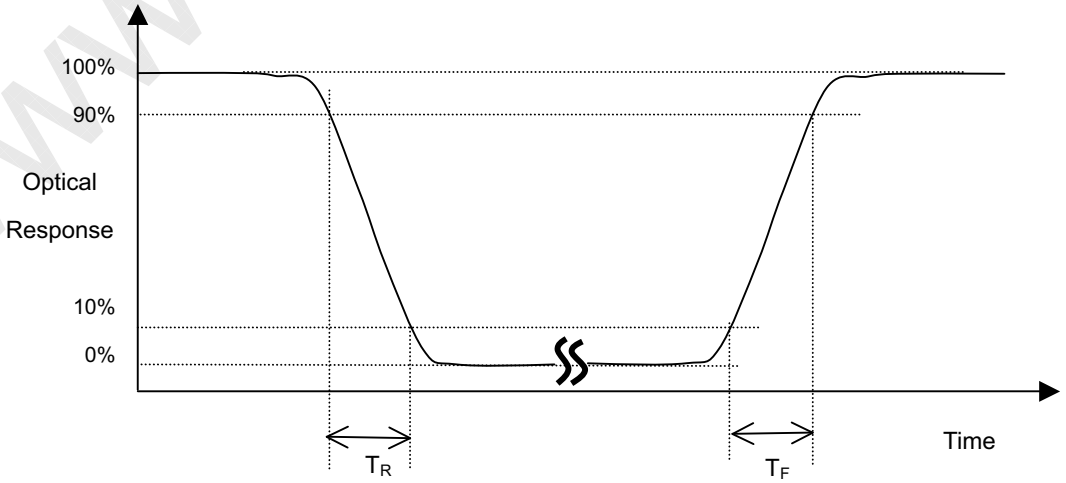
**Note ( 3 ) : Definition of viewing angle (θx ,θy):**




**Note ( 4 ) : Definition of Contrast Ratio (CR):Ratio of gray max (Gmax), gray min (Gmin), at the center point of panel.**

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

**Note ( 5 ) : Definition of Response Time ($T_R$, $T_F$):**



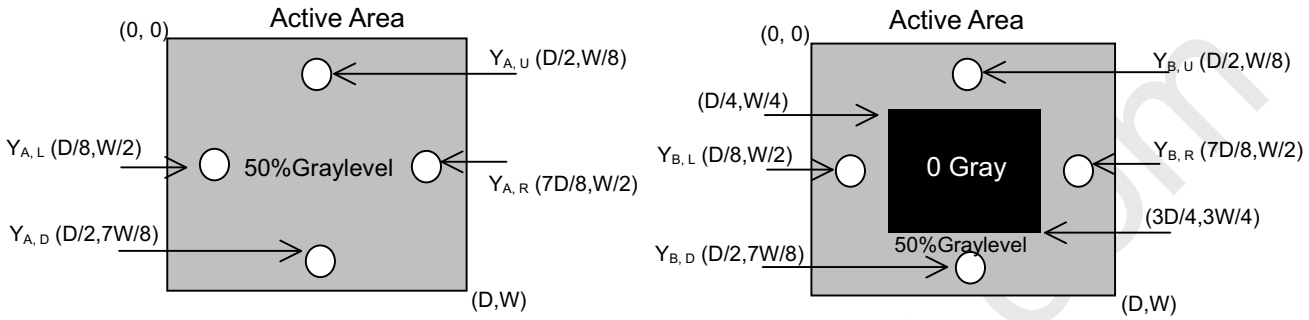
**Note ( 6 ) : Definition of Crosstalk（CT）:**

$$CT = | Y_B - Y_A | / Y_A \times 100\ (\%)$$

**Where:**

**$Y_A$ = Luminance of measured location without gray level 0 pattern ($cd/m^2$)**

**$Y_B$ = Luminance of measured location with gray level 0 pattern ($cd/m^2$)**




**Crosstalk is based on customer's PCBA first and the final judgment is based on CMO's PCBA.**

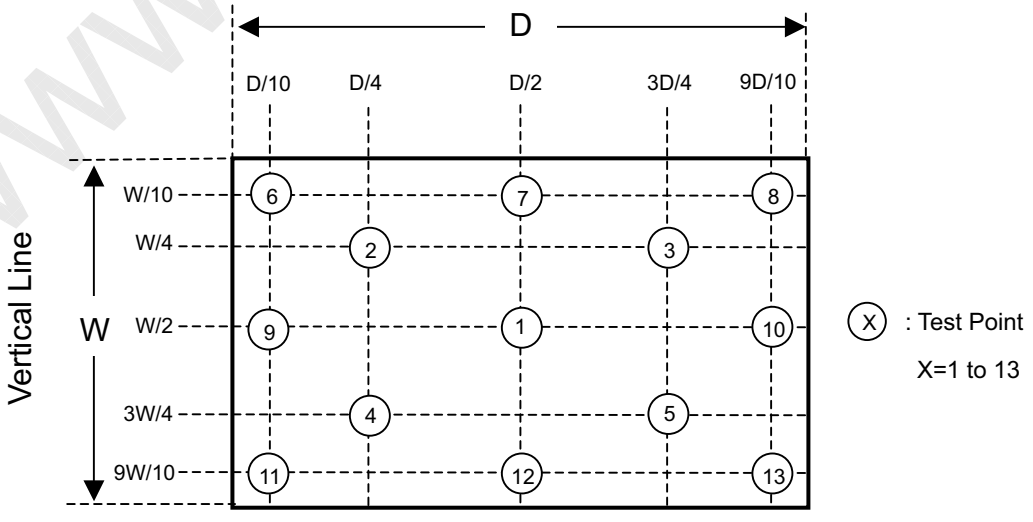
**Note ( 7 ) : Definition of NTSC(C.G.)**

$$NTSC = \frac{0.5*(RcxGcy+GcxBcy+BcxRcy-BcxGcy-GcxRcy-RcxBcy)}{0.1582} * 100\%$$

**Note ( 8 ) : Definition of Transmittance Variation (δT%):**

**Measure the transmittance at 13 points**

$$\delta T\% = \frac{\text{Maximum [T\%(1), T\%(2), … T\%(13)]}}{\text{Minimum [T\%(1), T\%(2), … T\%(13)]}}$$



**Note ( 9 ) : Definition of Transmittance(T%):**
**Module is without signal input.**

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

## 3. STORAGE CONDITIONS

**High temperature or humidity may reduce the performance of panel. Please store LCD panel within the specified storage conditions. The recommended storage conditions are 25ºC±5ºC, 50±10%RH.**