Crystal Clear Technology

Product Specification

G128240x02 series

Crystal Clear Technology sdn. bhd.

1.0   Table of Contents

2.0   Record of revision

Rev	Date	Item	Page	Comment	Originator	Checked By
1.0	30/09/08			Initial Release	Syam	Azhar
2.0	10.09.09			Update Mechanical Specification	Khairiah	Azhar
3.0	10/07/12	3.0	3	Change controller/driver		
		5.0	4	Revised electrical characteristics		
		8.0	8	Interface: change controller/driver		
		9.0	9	Change the word "T6963" to "UCi6963"	Wai Hong	Azhar

3.0 General specification

Display format: Graphics, 240 (H) x 128 (W)

Pixel size: 0.40 (H) x 0.40 (W) mm

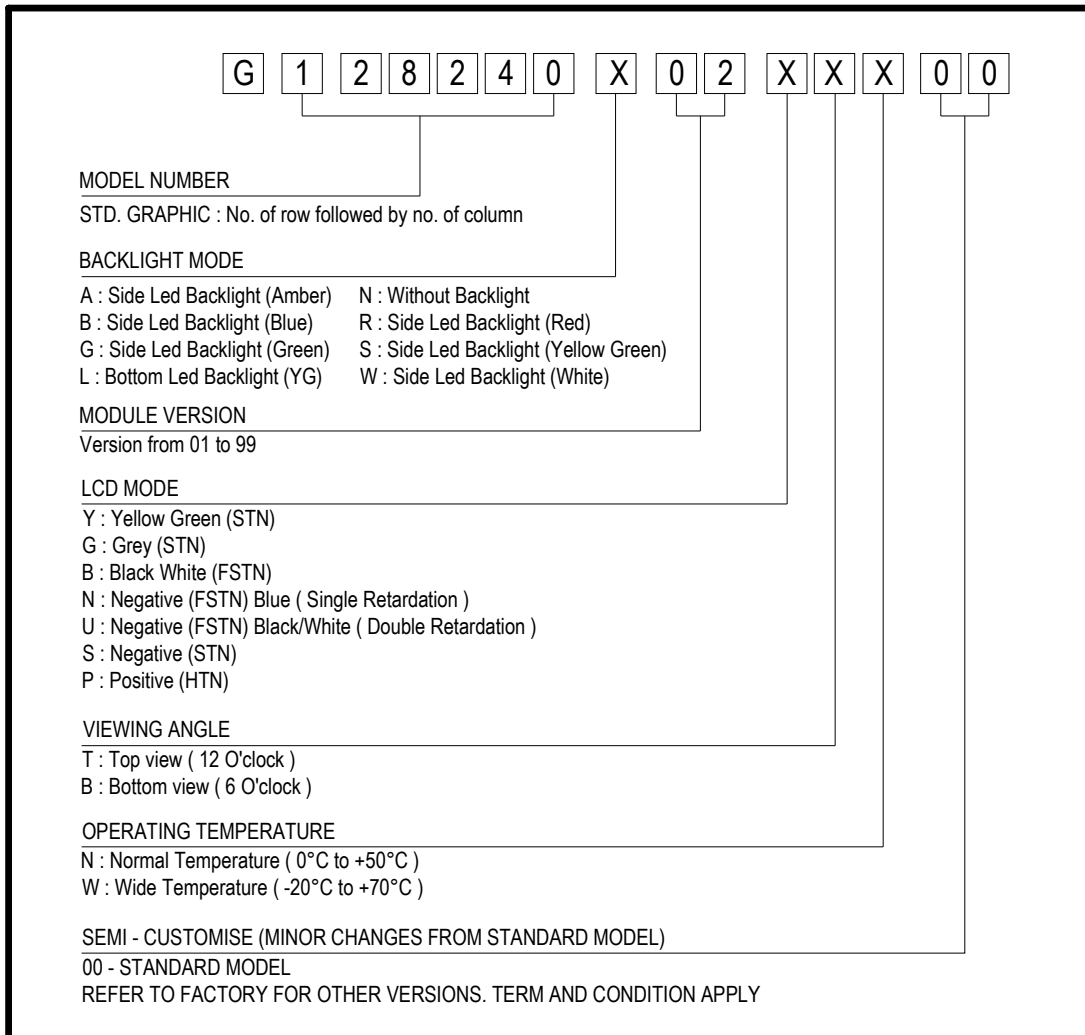Pixel pitch: 0.45 (H) x 0.45 (W) mm

View area: 64.0 (H) x 114.0 (W) mm

Active area: 57.55 (H) x 107.95 (W) mm

General dimensions: 104.0 (H) x 144.0 (W) x 13.5 max (T) mm

Controller/Driver: UCi6963 and UCi0086 or equivalent

Interface: Parallel

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G 1 2 8 2 4 0 X 0 2 X X X 0 0
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MODEL NUMBER
STD. GRAPHIC : No. of row followed by no. of column

BACKLIGHT MODE

A : Side Led Backlight (Amber)   N : Without Backlight
B : Side Led Backlight (Blue)   R : Side Led Backlight (Red)
G : Side Led Backlight (Green)   S : Side Led Backlight (Yellow Green)
L : Bottom Led Backlight (YG)   W : Side Led Backlight (White)

MODULE VERSION
Version from 01 to 99

LCD MODE

Y : Yellow Green (STN)
G : Grey (STN)
B : Black White (FSTN)
N : Negative (FSTN) Blue (Single Retardation)
U : Negative (FSTN) Black/White (Double Retardation)
S : Negative (STN)
P : Positive (HTN)

VIEWING ANGLE

T : Top view (12 O'clock)
B : Bottom view (6 O'clock)

OPERATING TEMPERATURE

N : Normal Temperature (0°C to +50°C)
W : Wide Temperature (-20°C to +70°C)

SEMI - CUSTOMISE (MINOR CHANGES FROM STANDARD MODEL)
00 - STANDARD MODEL
REFER TO FACTORY FOR OTHER VERSIONS. TERM AND CONDITION APPLY

4.0   Absolute maximum rating (at Vss = 0V, ambient temperature = 25°C)

NO	ITEM	SIMBOL	MIN	MAX	UNIT
1.	Power Supply voltage (Logic)	$V_{DD} - V_{SS}$	0	7.0	V
2.	Power Supply voltage (LCD Driver)	$V_{DD} - V_0$	-	19.0	V
3.	Operating Temperature	T_{op}	Refer page 3		°C
4.	Storage Temperature	T_{st}	Refer page 3		°C

5.0   Electrical characteristics

NO	ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
1.	Power Supply voltage (Logic)	$V_{DD} - V_{SS}$	-	3.0	-	5.5	V
2.	Power Supply voltage (V_{LCD})	$V_{DD}-V_0$	25°C	17.5±5%			V
3.	Input Voltage	V_{IH}	-	$0.8V_{DD}$	-	V_{DD}	V
		V_{IL}	-	0	-	$0.2V_{DD}$	V
4.	Current Supply	I_{DD}	$V_{DD} - V_{SS} = 5.0V$	-	3.0	5.0	mA

5.1   Backlight Options

NO	COLOR	FORWARD VOLTAGE (V)			FORWARD CURRENT (mA)			MIN BRIGHTNESS (cd/m2) *
		Min	Typ.	Max	Min	Typ.	Max	
1.	Yellow Green (L)	-	4.5	-	-	180	220	30
2.	White	-	5.0	-	-	120	160	110
3	Yellow Green (S)	-	4.5	-	-	120	160	50

*Note: 1. Brightness measured at backlight surface.
         2. On LCD surface, brightness is only about 10% to 15% of backlight brightness.
         3. Lifetime of backlight: For Yellow Green = 50K hrs. For White = 20k hrs.

6.0   Environmental requirements

NO	ITEM	CONDITION
1.	Operating Temperature	Refer page 3
2.	Storage Temperature	Refer page 3
3.	Operating Humidity	5% to 95%RH
4.	Cycle Test	0 C @ 30 min to 50 C @ 30min for 1 cycle run for 10 cycles
5.	Lifetime	50000 HOURS (excluding backlight)

Note: The background on LCD has the possibility to be changed in different temperature range.
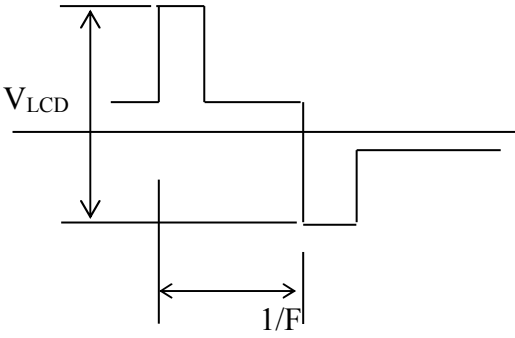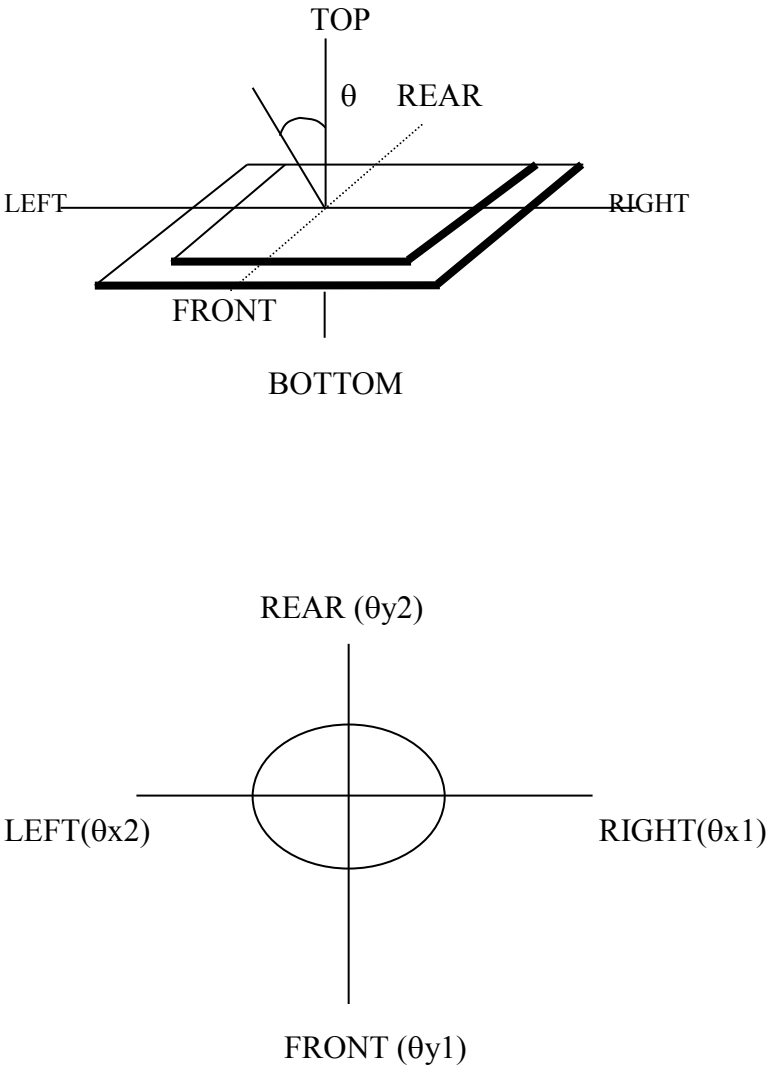
7.0   LCD specification

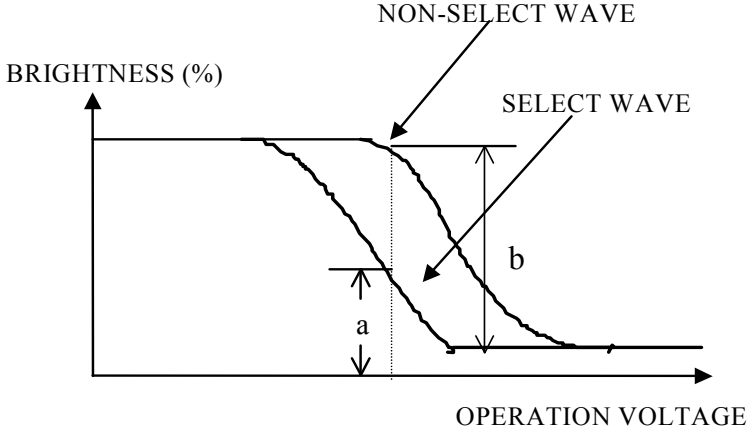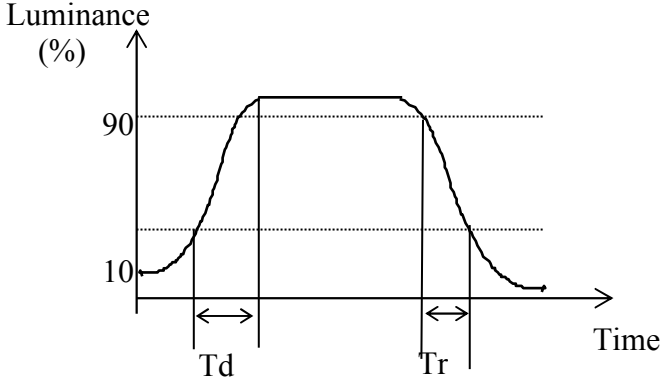7.1   Electro-optical characteristics (at ambient temperature = 25°C)

NO	ITEM	SYMBOL	CONDITION	LCD TYPE							REF.
				STN YG	STN GREY	STN -VE BLUE/ PURPLE	FSTN +VE B/W	FSTN –VE BLUE	FSTN -VE TRUE B/W	FSTN -VE TRI AXIS	
1	Operating Voltage (Volt)	V_{LCD}	θ = 0 Cr = max	17.5 ± 5%							7.1.1
2	Viewing Angle (Deg)	θ x 1	CR ≥ 2 V_{LCD} = 17.5V	+20	+15	+35	+20	+35	+30	+40	7.1.2
		θ x 2		-20	-15	-35	-20	-35	-35	-40	
		θ y 1		-25	-20	-30	-25	-30	-30	-50	
		θ y 2		+25	+20	+30	+25	+30	+30	+30	
3	Contrast Ratio	CR	θ = 0^0 V_{LCD} =17.5V	2.5	2.0	5.5	2.5	5.5	15	15	7.1.3
4	Response Time (msec)	Rise Time (Tr)	θ = 0^0	400							7.1.4
		Decay Time (Td)	θ = 0^0	400							

Note:
1. Viewing angle data is based on bottom view product by default. Should it be a top view product, values are then swap.
2. Contrast ratio is based on typical data when using white colour as backlight.
3. Equipment Used Eldim; Ez Contrast 120R , Spot Size = 2mm

NO	CHARACTERISTICS	DEFINITIONS
7.1.1	*Definition of Operating Voltage (V_{LCD})*	 V_{LCD} : Operating Voltage F : Frame Frequency
7.1.2	*Definition of Viewing Angle*	

7.1.3	*Definition of Contrast Ratio*	

NON-SELECT WAVE

BRIGHTNESS (%)

SELECT WAVE

b

a

OPERATION VOLTAGE

Contrast Ratio = <u>Brightness of non-selected state (b)</u>
Brightness of selected state (a)

Conditions

(a) Operating Voltage: V_{LCD}
(b) Temperature: 25°C
(c) Viewing Angle, $\theta = 0^o$

7.1.4	*Response Time*	

Luminance (%)

90

10

Td   Tr   Time

Tr: Measured between 10% and 90% of LCD segment maximum response with $V_{ON.}$

Td: With voltage switches to zero and the instant LCD segment reaches 10% of its maximum response.

8.0   Interface

8.1	*Controller*	UCi6963	
8.2	*Display Driver*	UCi0086	
8.3	*Duty Cycle*	1/128	
8.4	*Pin-out Assignments*		

|	Pin No	Symbol	Description
	1	FG	Frame ground
	2 and 27	V_{SS}	Ground terminal of module
	3 and 28	V_{DD}	Supply terminal of module
	4 and 26	V_O	Power supply for Liquid Crystal Drive
	5	/WR	Write select (active low)
	6	/RD	Read select (active low)
	7	/CE	Chip enable (active low)
	8	C/D	Command/Data High = Command register Low = Data register
	9 and 29	NC	Non connected
	10	/RST	Reset (active low)
	11 to 18	D0 to D7	Bi-directional Data Bus. Data Transfer is performed once, thru D0 to D7, in the case of interface data length is 8-bits.
	19	FS	Font selection
	20 and 25	V_{OUT}	Negative voltage from the LCD module
	21 and 24	SLA	Backlight positive voltage
	22 and 23	SLK	Backlight ground
	30	HSCP	Shift clock pulse for column driver of upper area of LCD.
	31	LP	Latch pulse for column driver. Shift clock for row driver.
	32	FR	Frame signal
	33	CDATA	Synchronous signal for row driver
	34	ED	Data input for columns driver

*Font interface format selection :

Font size	J1	J2	Pin FS
5x8	Used	NC	High
6x8	NC*	Used*	High
7x8	Used	NC	Low
8x8	NC*	Used*	Low

Note: NC = Not Connected, * = Factory default setting

9.0   Timing characteristics / Timing diagrams

9.1   Display Control Timing Waveform and Characteristics
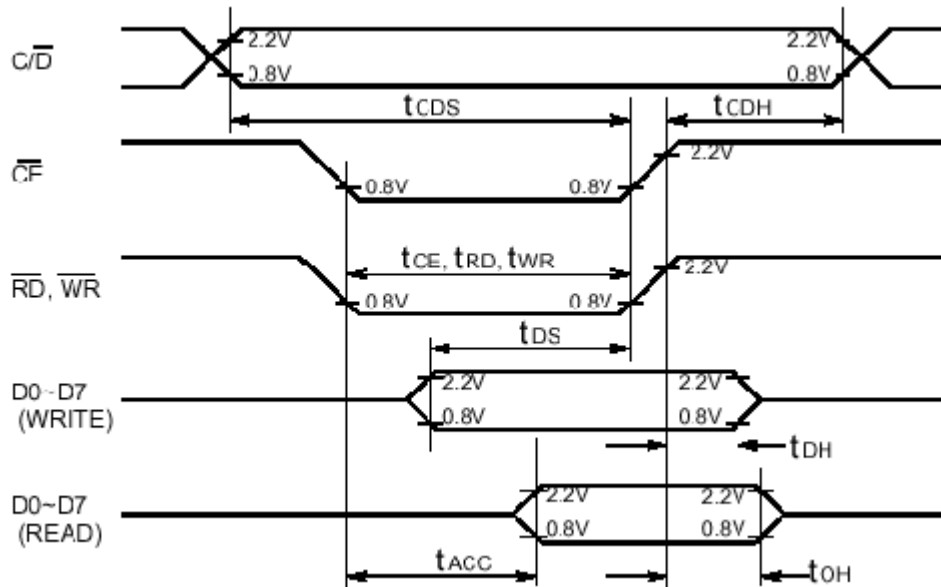
Item	Symbol	Min	Typ	Max	Unit
C/D̄ Set Up Time	t_{CDS}	100	-	-	ns
C/D̄ Hold Time	t_{CDH}	10	-	-	ns
C̄Ē, R̄D̄, W̄R̄ Pulse Width	t_{CE}, t_{RD}, t_{WR}	80	-	-	ns
Data Set Up Time	t_{DS}	80	-	-	ns
Data Hold Time	t_{DH}	40	-	-	ns
Access time	t_{ACC}	-	-	150	ns
Output Hold Time	t_{OH}	10	-	50	ns

Timing Characteristics between MPU and UCi6963

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9.2 Relationship between character code and pattern

CG ROM TYPE 0101

CG ROM TYPE 0201

10. Instruction Set

COMMAND	CODE	D1	D2	FUNCTION
REGISTER SETTING	00100001	X address	Y address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
	00100100	Low address	High address	Set Address Pointer
SET CONTROL WORD	01000000	Low address	High address	Set Text Home Address
	01000001	Columns	00H	Set Text Area
	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area
MODE SET	1000X000	-	-	OR mode
	1000X001	-	-	EXOR mode
	1000X011	-	-	AND mode
	1000X100	-	-	Text Attribute mode
	10000XXX	-	-	Internal CG ROM mode
	10001XXX	-	-	External CG RAM mode
DISPLAY MODE	10010000	-	-	Display off
	1001XX10	-	-	Cursor on, blink off
	1001XX11	-	-	Cursor on, blink on
	100101XX	-	-	Text on, graphic off
	100110XX	-	-	Text off, graphic on
	100111XX	-	-	Text on, graphic on
CURSOR PATTERN SELECT	10100000	-	-	1-line cursor
	10100001	-	-	2-line cursor
	10100010	-	-	3-line cursor
	10100011	-	-	4-line cursor
	10100100	-	-	5-line cursor
	10100101	-	-	6-line cursor
	10100110	-	-	7-line cursor
	10100111	-	-	8-line cursor
DATA AUTO READ / WRITE	10110000	-	-	Set Data Auto Write
	10110001	-	-	Set Data Auto Read
	10110010	-	-	Auto Reset
DATA READ / WRITE	11000000	Data	-	Data Write and Increment ADP
	11000001	-	-	Data Read and Increment ADP
	11000010	Data	-	Data Write and Decrement ADP
	11000011	-	-	Data Read and Decrement ADP
	11000100	Data	-	Data Write and Nonvariable ADP
	11000101		-	Data Read and Nonvariable ADP
SCREEN PEEK	11100000	-	-	Screen Peek
SCREEN COPY	11101000			Screen Copy
BIT SET / RESET	11110XXX	-	-	Bit Reset
	11111XXX	-	-	Bit set
	1111X000	-	-	Bit 0 (LSB)
	1111X001	-	-	Bit 1
	1111X010	-	-	Bit 2
	1111X011	--	--	Bit 3
	1111X100	-	-	Bit 4
	1111X101	-	-	Bit 5
	1111X110	-	-	Bit 6
	1111X111	-	-	Bit 7 (MSB)

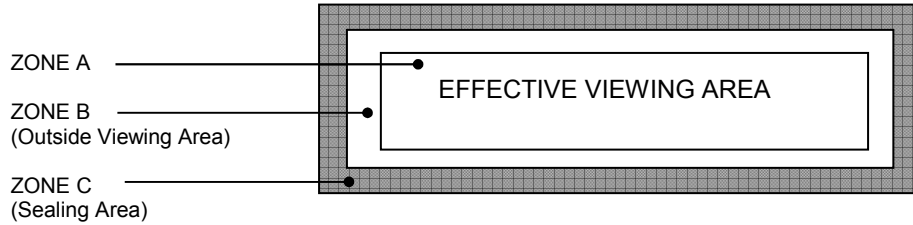## 11. Block Diagram and Power Supply
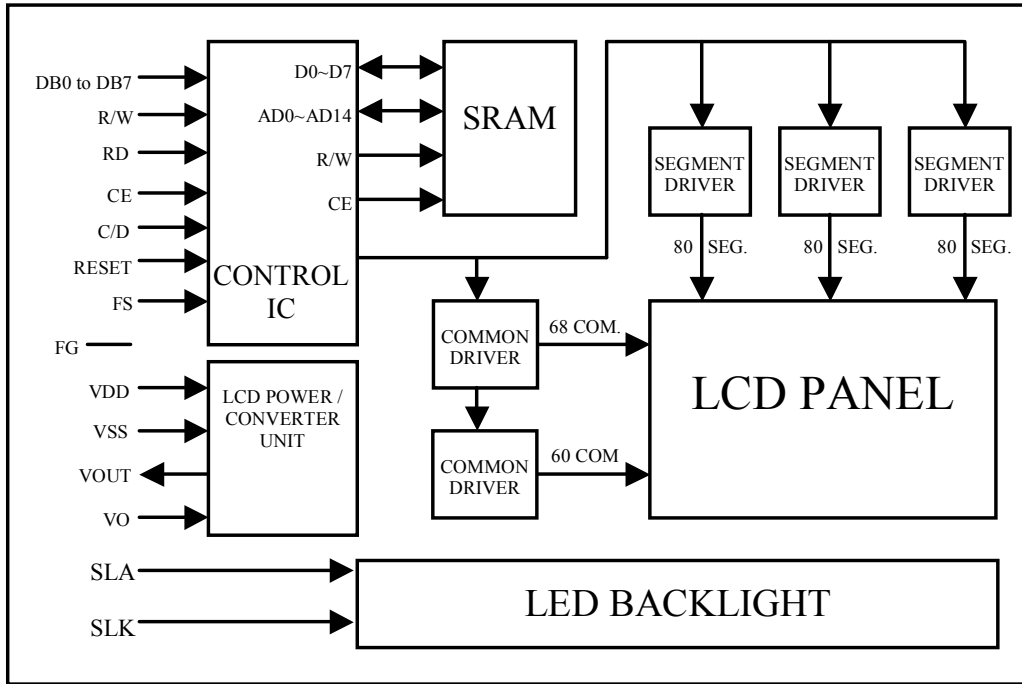
Block Diagram
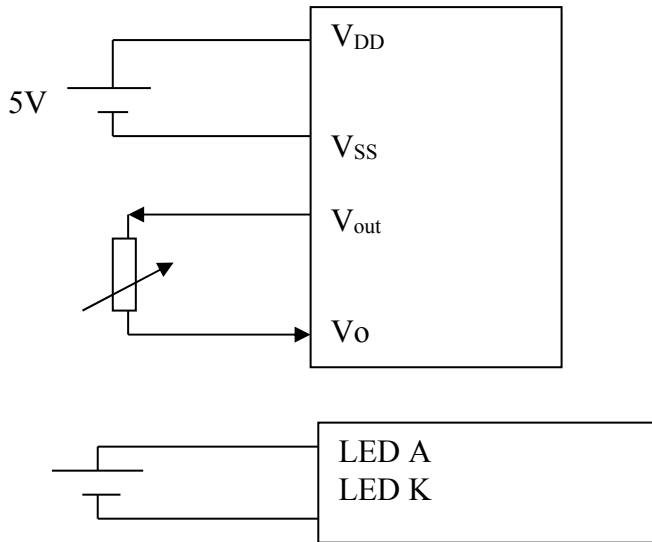
Power Supply

12.0   Quality Assurance

12.1 ZONE DEFINITION

ZONE A

ZONE B
(Outside Viewing Area)

ZONE C
(Sealing Area)

EFFECTIVE VIEWING AREA
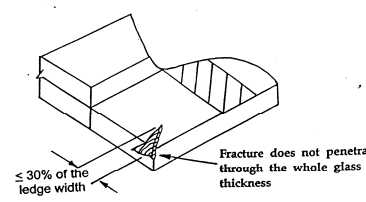
12.2   REJECTION CRITERIA

12.2.1   DIMENSIONAL DEFECTS

Defect Category	Defect Description	Criterion	Drawing Specification
Glass Size	Dimensions of LCD, do not conform to the drawing	Reject	Refer to LCD Physical Dimension Drawing
Perimeter Seal Extension	Perimeter seal epoxy enters the effective viewing area	Reject	
End Seal Size	Size of end seal does not meet drawing specification	Reject	Refer to LCD Physical Dimension Drawing

12.2.2   VISUAL DEFECTS

Defect Category	Defect Description	Criterion	Drawing Specification
Fracture	A type of glass breakage containing running cracks. Inspectors should attempt to remove it with fingernail. If removed, evaluate as chip	Reject – if the size is $\geq$ 30% of the contact ledge width.	≤ 30% of the ledge width / Fracture does not penetrat through the whole glass thickness

Defect Category	Defect Description	Criterion	Drawing Specification
Chip	Chip in cross over area	1) Reject - if the chip causes crossover dot to be exposed 2) Chip on outside edge of the glass plate but is greater than 50% of glass thickness at crossover dot is reject able.	
Chip	Chip in contact pad area	Accept if:- a) X $\leq$ 2.0mm b) Y $\leq$ 0.5mm c) Z disregard	
	Chip in non-contact pad area	Accept if:- a) X $\leq$ 6.0mm b) Y $\leq$ 1.0mm c) Z disregard	
	Chip in perimeter seal area	Accept if:- a) Y $\leq$ 1/3 of perimeter seal width (W) b) X $\leq$ 3.0mm c) Z disregard d) X and Y not touch crossover dot	
Corner Chip	Corner chip within seal area	Accept if:- a) X $\leq$ 1/3 of perimeter seal width (W) b) Y $\leq$ 1/3 of perimeter seal width (W) c) Z disregard	

Defect Category	Defect Description	Criterion	Drawing Specification
	Corner chip not effecting contact pad / ITO	Accept if:- a) $XY \leq 4mm^2$ AND b) $Y \leq D$ and $X \leq 2.0mm$ c) Z disregard	
	Corner chip effecting contact pad / ITO	A) Accept if:- a) $XY \leq 4mm^2$ AND b) $Y \leq D$ and $X \leq 2.0mm$ B) Accept if:- a) $X1 \leq 2.0mm$ b) $Y1 \leq 0.5mm$ Z disregard	
Glass flare	A thin layer of glass flare at contact area	Accept if:- a) Flare thickness $\leq \frac{1}{4}$ W when $W \leq 3mm$ b) Flare thickness $\leq 1mm$ when $W > 3mm$ W: Contact ledge width	
Glass burr	A rough edge(s) left along the scribing edge (i.e. along the edges of display)	Reject – if the burr cause undersize or oversize of the LCD	Refer to LCD Physical Dimension Drawing
Rainbow	Colored ring in sharp blotches observed	Reject – if 3 or more colored rings in sharp blotches of color are observed. (Limit samples should be used when applicable)	

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Defect Category	Defect Description	Criterion	Drawing Specification
Discoloration		Reject - if the discolorations enter the active viewing area of LCD. Color of the LCD shall follow product specification as specified in the manufacturing specification	
Air Void	LC does not fulfill the display	Reject	
Fill end contamination	Discoloration at end seal area	Reject if discoloration exceeded the baffle (for display with baffle) or viewing area (for display without baffle)	

12.2.3 POLARIZER DEFECTS

Defect Category	Defect Description	Criterion	Drawing Specification
Polarizer defect	Polarizer coverage	1- Polarizer should cover effective viewing area of display. 2- It is acceptable if perimeter seal bolder at all sides could be seen. 3- It is acceptable if polarizer attaching position meeting the tolerance mentioned in the drawing. 4- It is reject able if polarizer edge jagged and not even	Refer to LCD Physical Dimension Drawing
	Polarizer Peeling / delamination	1- Reject if any edge or corner of the polarizer is lifted up or not adheres to the glass	
	Polarizer Scratches	1- Any scratch should be acceptable if it is not visible from viewing distance at head of position 2- Polarizer scratch in viewing area is reject able if it is visible from the specified viewing distance 3- Defect, which is visible under surface glare, should be disregard	

Defect Category	Defect Description	Criterion	Drawing Specification
	Polarizer damage	1-Stain mark or depression in front polarizer surface should be acceptable if it is not visible from viewing distance at head on position. 2-Defect, which is visible under surface glare, should be disregard	
	Polarizer bubble / Foreign material	(see table below)	(see drawing)

Zone / Dimension	Acceptable No.		
	A	B	C
D ≤ 0.30mm	NC	NC	NC if the Polarizer not lifted up/ peel off
D ≤ 0.50mm	2	NC	
0.50 < D ≤ 0.60mm	1	2	
D > 0.60mm	0	0	

NC: No count
D: Mean Diameter of Defect

3 are the totally permissible numbers of bubble

Drawing Specification:

$D = (A + B)/2$
(ellipse with dimensions A (horizontal) and B (vertical))

12.2.4   ELECTRICAL TEST DEFECTS
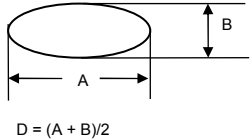
Defect Category	Defect Description	Criterion	Drawing Specification
Missing common	Part of the pattern does not light up	Reject	
Missing segment	One or few segment does not light up	Reject	
Common-common short	Common and common connected	Reject	
Segment-segment short	Segment and segment connected	Reject	
Common – segment short	Common and segment connected	Reject	
Wrong viewing angle	Wrong viewing angle	Reject if display viewing angle not conform to customer requirement	
Metal residue	Extra spot lights up at the border of the segment.	Accept if ≤ 0.20mm (mean diameter)	
Slow response	Response of the display on one side slower than the other side	Reject if it is visible at 30cm distance	

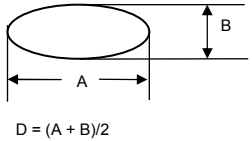| Defect Category	Defect Description	Criterion		Drawing Specification
Pin Hole	Pin hole / void at light up segment			
		Zone / Dimension	Acceptable No.	
		Located inside single pixel/dot:- $(X + Y)/2 \leq$ 0.20mm	- 1 per pixel/dot - 3 per display (Active Area)	
		Laid over the plural pixel/dots: $(X + Y)/2 \leq$ 0.20mm	- 1 per pixel/dot - 3 per display (Active Area)	
		(¾ *or larger part of dot area has to be effective for display)*		
Deformed display dot	Lacked deformation	Accept if: i) $X \leq 0.15$ and ii) $Y \leq 0.15$		
	Added deformation	Accept if: i) $X < 0.02$ and ii) $Y < 0.02$		
Reverse twist/ tilt	Segment are darker or clearer than other area of the same segment	Reject		
Misalignment	Segment fatter or smaller or extra segment	Reject if $> 10\%$ of designed segment width and visible at 30cm distance		
Segment Smearing	Light up segment smear	Reject		
Dim segment	Display shows poor contrast at pre set voltage	Reject		

12.2.5   BLACK SPOT, WHITE SPOT AND FOREIGN MATERIAL (SOLID FIGURE)

Defect Category	Defect Description	Criterion				Drawing Specification
Black Spot, White Spot and Foreign Material	Black Spot, White Spot and Foreign Material	Zone / Dimension	Acceptable No.			
			A	B	C	
		$D \leq 0.10$mm	NC	NC	NC	
		$0.10 < D \leq 0.15$mm	3	3	NC	
		$0.15 < D \leq 0.25$mm	1	2	NC	
		$0.25 < D \leq 0.35$mm	1	1	NC	
		$D > 0.35$ mm	0	0	NC	
		NC: No count				
		D: Mean Diameter of Defect				

NOTE: The 1/3 or larger parts of individual dot has to be lighted on.
The solid figure is that the defect has clear-cut outline at the optimum driving condition in both positive and negative, of which size does not change when the contrast changes.

12.2.6   BLACK SPOT, WHITE SPOT AND FOREIGN MATERIAL (FADED FIGURE)

Defect Category	Defect Description	Criterion				Drawing Specification
Black Spot, White Spot and Foreign Material	Black Spot, White Spot and Foreign Material	Zone / Dimension	Acceptable No.			
			A	B	C	
		$D \leq 0.60$mm	NC	NC	NC	
		$0.60 < D \leq 0.70$mm	3		NC	
		$0.70 < D \leq 0.80$mm	1		NC	
		$D > 0.80$ mm	0		NC	
		NC: No count				
		D: Mean Diameter of Defect				

NOTE: Faded figure means that the defects has unclear outline at the optimum driving condition in both positive and negative, of which size seems to change when the contrast changes.

12.2.7   LINE SHAPE AND SCRATCHES

Defect Category	Defect Description	Criterion					Drawing Specification
Line shape and scratches	Line shape and scratches						
		Zone /Dimension		Acceptable No.			
		X	Y	A	B	C	
		NC	≤ 0.03mm	NC	NC	NC	
		≤ 2 mm	≤ 0.05mm	1	1	NC	
		≤ 1 mm	≤ 0.10mm	1	2	NC	
		NC	≥ 0.10mm	Due to (1) round defect			

NOTE: Length is X and Width is Y.

REMARK:

i) Total amount of spot defects including round and linear – A total of 5 permissible numbers of defects in Zone A & B including above (14.2.5), (14.2.6), (14.2.7). Regardless of number of defects, the minimum distance between individual defects have to be 5mm or larger.

ii) All the other items of inspection that are not included herein must be determined by the "Limit Standard" sample, which were occasionally set up with the mutual consent of both parties. In every case of the items set up with the Limit Standard, the Limit Standard always takes precedence over the other means of definition.

13. Precaution for using LCM

1. Liquid Crystal Display (LCD)

LCD is made up of glass, organic sealant, organic fluid and polymer based polarizers. The following precautions should be taken when handling.

b) Keep the temperature within the range of use and storage. Excessive temperature and humidity could cause polarization degredation, polarizer peel off or bubble.

c) Do not contact the exposed polarizer with anything harder than HB pencil lead. To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.

d) Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or colour fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

e) Glass can be easily chipped or cracked from rough handling, especially at corners and edges.

f) Do not drive LCD with DC voltage.

2. Liquid Crystal Display Modules.

2.1 Mechanical Considerations

LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modification. The following should be noted.

a) Do not tamper in any way with the tabs on the metal frame.

b) Do not modify the PCB by drilling extra holes, changing its outline, moving its component or modifying its pattern.

c) Do not touch the elastomer connector, especially insert a backlight panel (for example, EL)

d) When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

a) Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2 Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

a) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.

b) The modules should be kept in antistatic bags or other containers to static for storage.

c) Only properly grounded soldering irons should be used.

d) If an electric screwdriver is used, it should be well grounded and shielded from commutator spark.

e) The normal static prevention measures should be observed for work clothes and working benches, the latter conductive (rubber) mat is recommended.

f) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

2.3 Soldering

a) Solder only to the I/O terminals.

b) Use only soldering irons with proper grounding and no leakage.

c) Soldering temperature: 280 °C

d) Soldering time: 3 to 4 sec

e) Use eutectic solder with resin flux fill.

f) If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed afterwards.
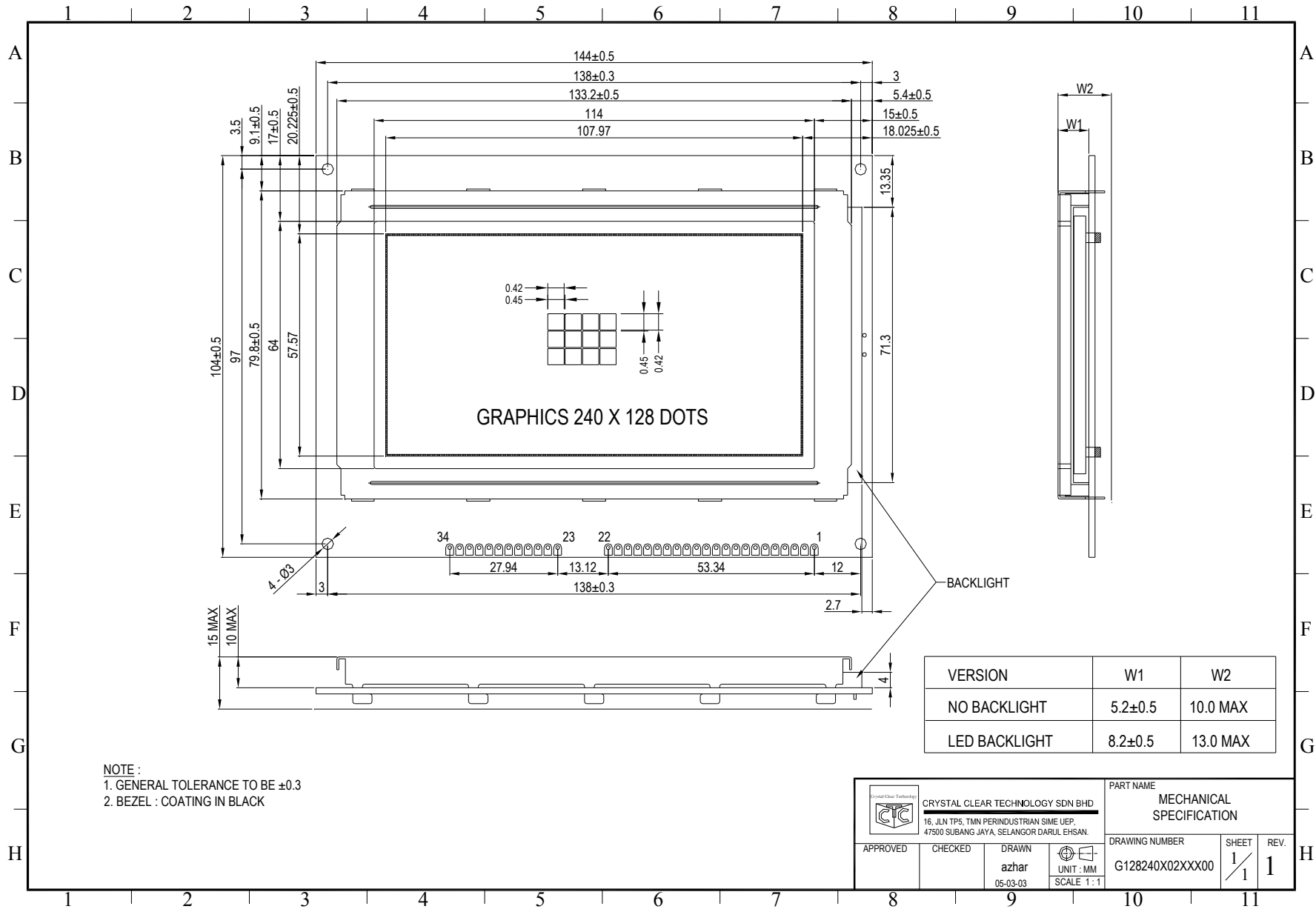
2.4 Operation

a) The contras can be adjusted by varying the LCD driving voltage V0

b) Driving voltage should be kept within specified range, excess voltage shortens display life.

c) Response time increases with decrease in temperature.

d) Display may turn black or dark blue at temperature above its operational range, this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

e) Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage

If any fluid leaks out of the damage glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 Limited Warranty

Unless otherwise agreed between Crystal Clear Technology and customer, Crystal Clear Technology will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with Crystal Clear Technology acceptance standards, for a period of one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of Crystal Clear Technology is limited to repair and/or replacement on the terms set forth above. Crystal Clear Technology will not responsible for any subsequent or consequential events.

GRAPHICS 240 X 128 DOTS

144±0.5
138±0.3
133.2±0.5
114
107.97

3
5.4±0.5
15±0.5
18.025±0.5

3.5
9.1±0.5
17±0.5
20.225±0.5

13.35

104±0.5
97
79.8±0.5
64
57.57

71.3

0.42
0.45
0.45
0.42

34   23   22   1

27.94   13.12   53.34   12

4 - Ø3
3
138±0.3
2.7

15 MAX
10 MAX

4

BACKLIGHT

W2
W1

VERSION	W1	W2
NO BACKLIGHT	5.2±0.5	10.0 MAX
LED BACKLIGHT	8.2±0.5	13.0 MAX

NOTE :
1. GENERAL TOLERANCE TO BE ±0.3
2. BEZEL : COATING IN BLACK

	PART NAME		
CRYSTAL CLEAR TECHNOLOGY SDN BHD 16, JLN TP5, TMN PERINDUSTRIAN SIME UEP, 47500 SUBANG JAYA, SELANGOR DARUL EHSAN.	MECHANICAL SPECIFICATION		
APPROVED	CHECKED	DRAWN	DRAWING NUMBER
		azhar 05-03-03	UNIT : MM SCALE 1 : 1

DRAWING NUMBER: G128240X02XXX00
SHEET 1/1   REV. 1

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