

**CITIZEN**  
— OEM DIVISION —

*Liquid Crystal Displays*

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**TC-56**  
**UC-292**

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*features:*

TN colour

2.9 inch size

Integrated fluorescent backlight tube

Cased or Uncased versions

Runs from standard composite video signal

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## PAL mode display

TC56 is the cased version. UC292 is the uncased version

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1	Signal frequency:	Horizontal Vertical	15.625KHz 50Hz
2	Display type:	TN LCD (Twisted Nematic Liquid Crystal) Transmissive negative display with colour filter Optimum viewing angle: perpendicular to display	
3	Number of pixels:	640 dots (horizontal) 130 dots (vertical)	
4	Pixel shape:	Rectangle	
5	Driving method:	$\frac{1}{65}$ duty multiplex	
6	Screen size:	58.31 mm (height), 43.80 mm (vertical)	
7	Input signal:	Composite video signal, 2.0v peak-to-peak	
8	Input impedance:	75 $\Omega$ (DC)	
9	Supply voltage:	6.0V DC, $\pm 10\%$	
10	Current consumption:	Full brightness: 170mA or less	
11	Performance maintainable range:	+5 to +40°C	
12	Operating range:	0°C to +50°C	
13	Storage temperature:	-20°C to +60°C	
14	Brightness Control:	Internal or 50k $\Omega$ , B type	
15	Overall Dimensions:	Refer to mechanical drawing	
16	Weight:	Approx 82g	

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3. Performance

3-1 Measurement conditions : Supply voltage : 6.0 V  $\pm$  2.5%  
 Video signal level : 2.0 Vp-p (No loading)  
 Temperature : 25°C  $\pm$  2°C  
 Humidity : 65%RH  $\pm$  5%RH

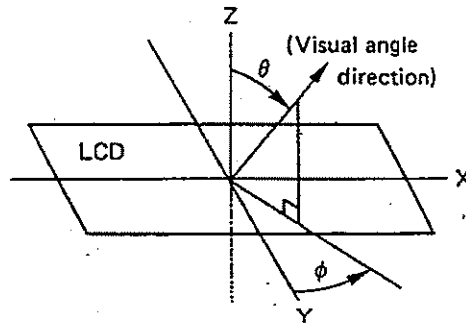
3-2 Picture display field : NTSC Horizontal 10.87 $\mu$ s  $\sim$  59.37 $\mu$ s  
 Vertical 31H  $\sim$  249H (Field)  
 PAL Horizontal 10.87 $\mu$ s  $\sim$  59.37 $\mu$ s  
 Vertical 52H  $\sim$  311H (Field)

3-3 Gradation : Displayed 6-gradation gray or over when input 8-gradation gray.

3-4 Contrast ratio : CR= 6, Standard (Measured in the condition of completed unit.)

$$CR = \frac{\text{Brightness of white level}}{\text{Brightness of black level}}$$

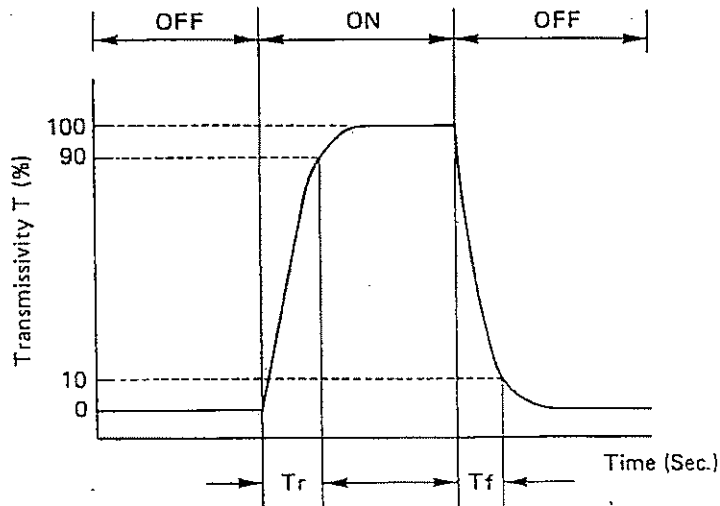
3-5 Viewing angle range :  $\theta_1 = 0 \sim -30$  deg. (Typ.,  $\phi = 0$ ,  $CR > 2$ )  
 :  $\theta_2 = -40 \sim 40$  deg. (Typ.,  $\phi = 90$ ,  $CR > 2$ )



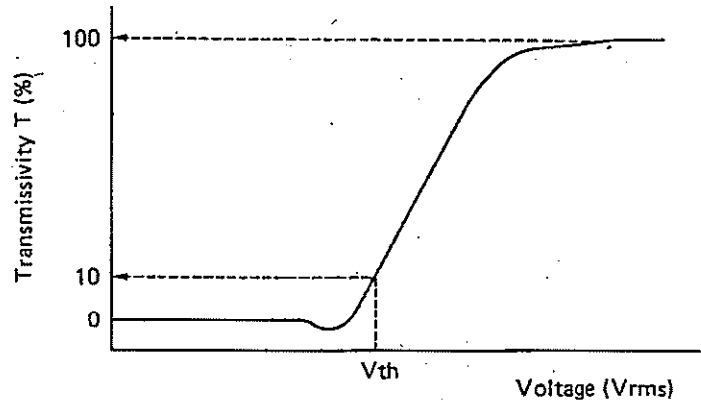
3-6 Response time

$T_r$  = or less 120ms (Typ.,  $\phi = 0$ ,  $\theta = 0$ )  
 $T_f$  = or less 120ms (Typ.,  $\phi = 0$ ,  $\theta = 0$ )

$T_r$  = A time in which transmissivity changes to 90% when applied voltage has been changed from  $V_{off}$  to  $V_{on}$



3-7 Threshold voltage :  $1.83V \pm 0.1V$  (Typ.,  $\phi = 0, \theta = 0$ )



3-8 Illumination : Measurement shall be made 5 minutes after lighting.

Average brightness : 4000nit (Standard)

Uneven brightness : -70 ~ +70%

Tube life : Over 1500 hrs to 2000 hrs. (Standard).

When one of more conditions of the following ones have arisen, the tube life shall be regarded as being over :

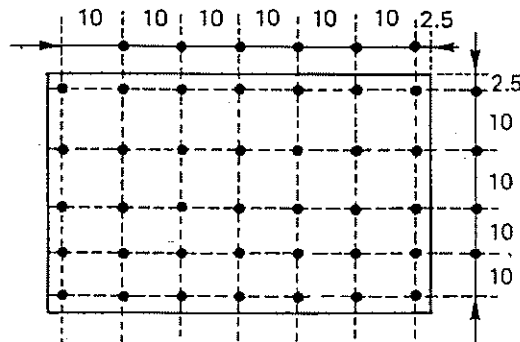
1) Uniform light emitting length has reached 80% of specified value (51mm).

2) Brightness has reached 70% of initial value.

Chromaticity :  $x = 0.293 \pm 0.03$   $y = 0.333 \pm 0.03$

Measurement of brightness shall be made at the measuring points shown in the drawing below on a diffuser surface.

Average brightness is measured with the average data of 35 points below.



# BLOCK DIAGRAM

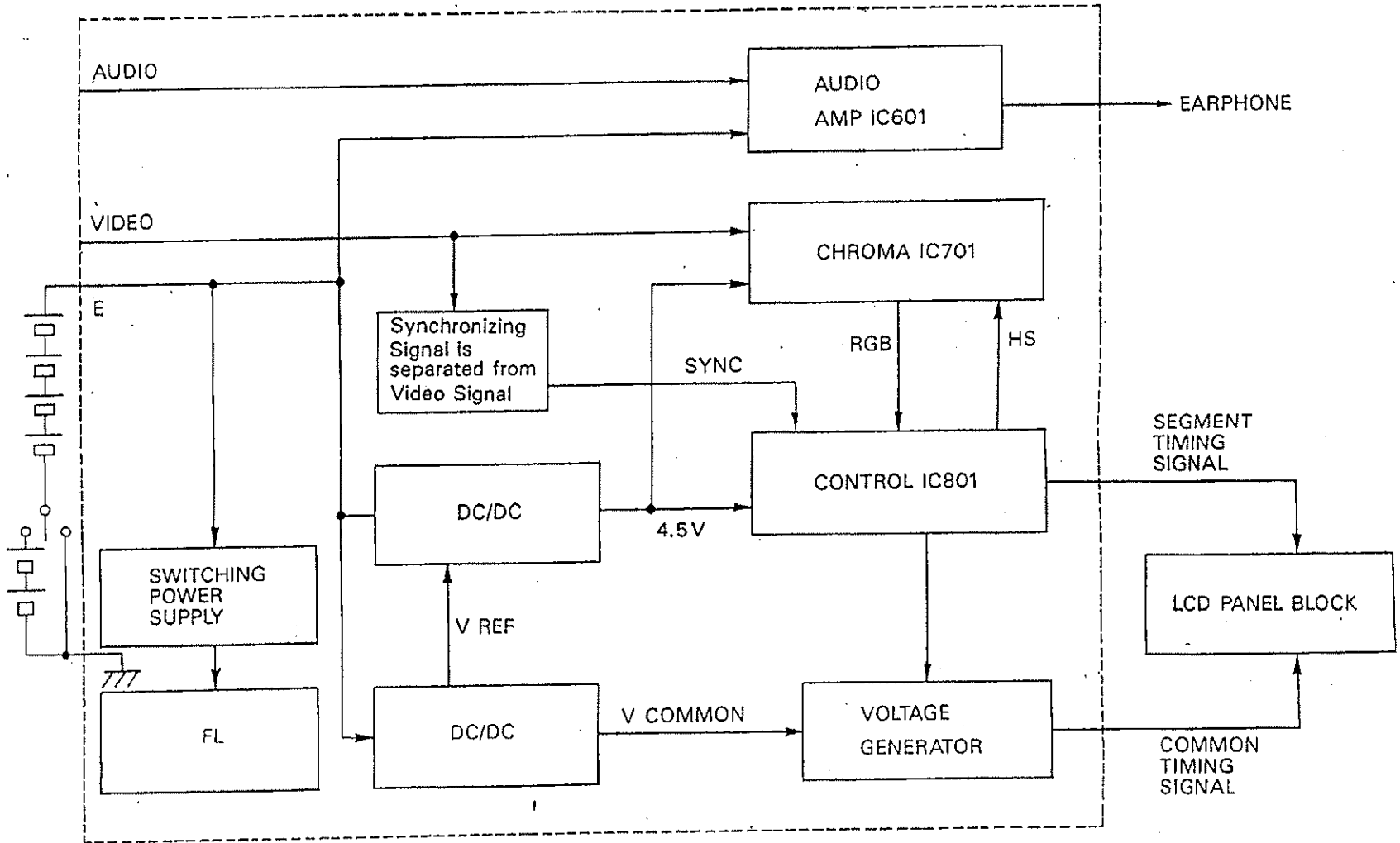


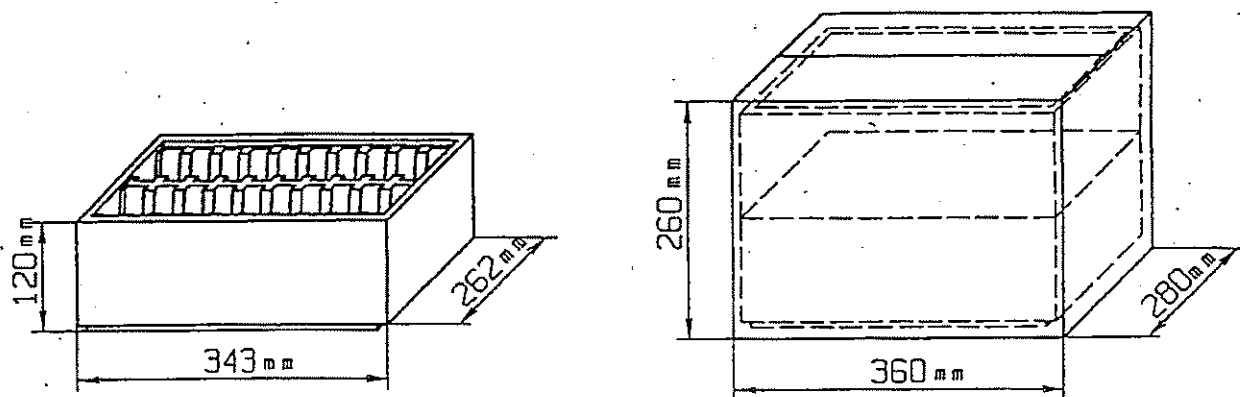
Fig. 9

5. Package specification

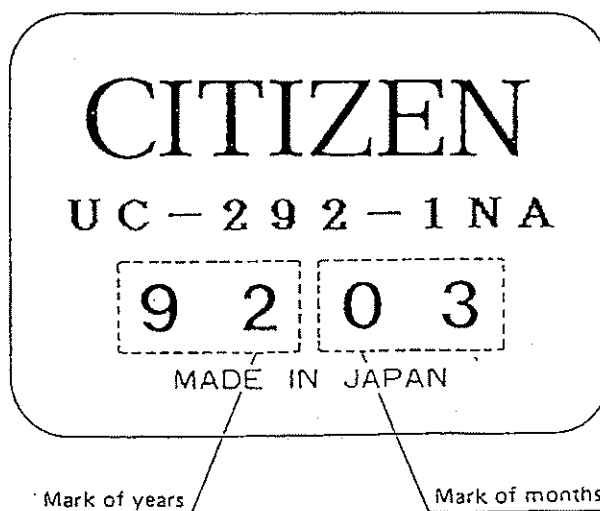
The module shall be put in a conductive polyethylene bag every unit and 20 modules shall be put vertically in one delivery case with cushion materials.

2 delivery cases are stacked and the top covered with a corrugated cardboard.

These cases shall be put in a corrugated cardboard box.



6. Lot marking



When there is a requirement for special identification on the product, the marking method will be determined by discussion between CITIZEN WATCH Co., Ltd. and the customer.

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## 7. Cautions

### 7-1 Cautions for use

- (1) A polarizer is kept mounted on the surface of LCD panel and before shipping, the polarizer at the surface side is covered with a protective sheet. Before using, take off the protective sheet. A failure to remove the sheet may result in the displayed picture taking an unnecessary color or stripes coming into view.
- (2) Before applying the supply voltage or video signal, make sure the power supply connected to the video unit and the wiring of video signal are right. If the voltage is applied without taking note of the fact that the connection is improper, the unit may break down.
- (3) A semi-fixed resistor on PCB has already been adjusted to enable the most favorable picture to be obtained. Don't touch the semi-fixed resistor anyway. For readjustment, a special measuring instrument is necessary.
- (4) Don't use this LCD video unit in a wet condition with dew ; otherwise the unit may break down.

### 7-2 Cautions in handling

- (1) Handle the polarizer with the greatest possible care since it is prone to be damage. Do not place a hard, pointed article such as metallic tweezers to the polarizer and do not push or rub the polarizer with any foreign object.
- (2) Be careful not to touch the polarizer with the bare hand. If the polarizer is found dirty, clean it with an absorbent cotton swab or a soft cloth by wiping gently with petroleum benzine. Do not use such chemicals as acetone, ethanol, toluene, isopropyl alcohol and so on for cleaning ; otherwise, a reaction phenomenon occurs and deterioration may result.
- (3) Also, if saliva or water droplets are left on the surface of the polarizer for a long time, it may become deformed or discolored. So, remove them right away.
- (4) If the LCD panel has been broken and the liquid crystal substance has leaked out, avoid inhaling or touching it. If the liquid crystal substance has contacted the skin or clothes, wash it away quickly.

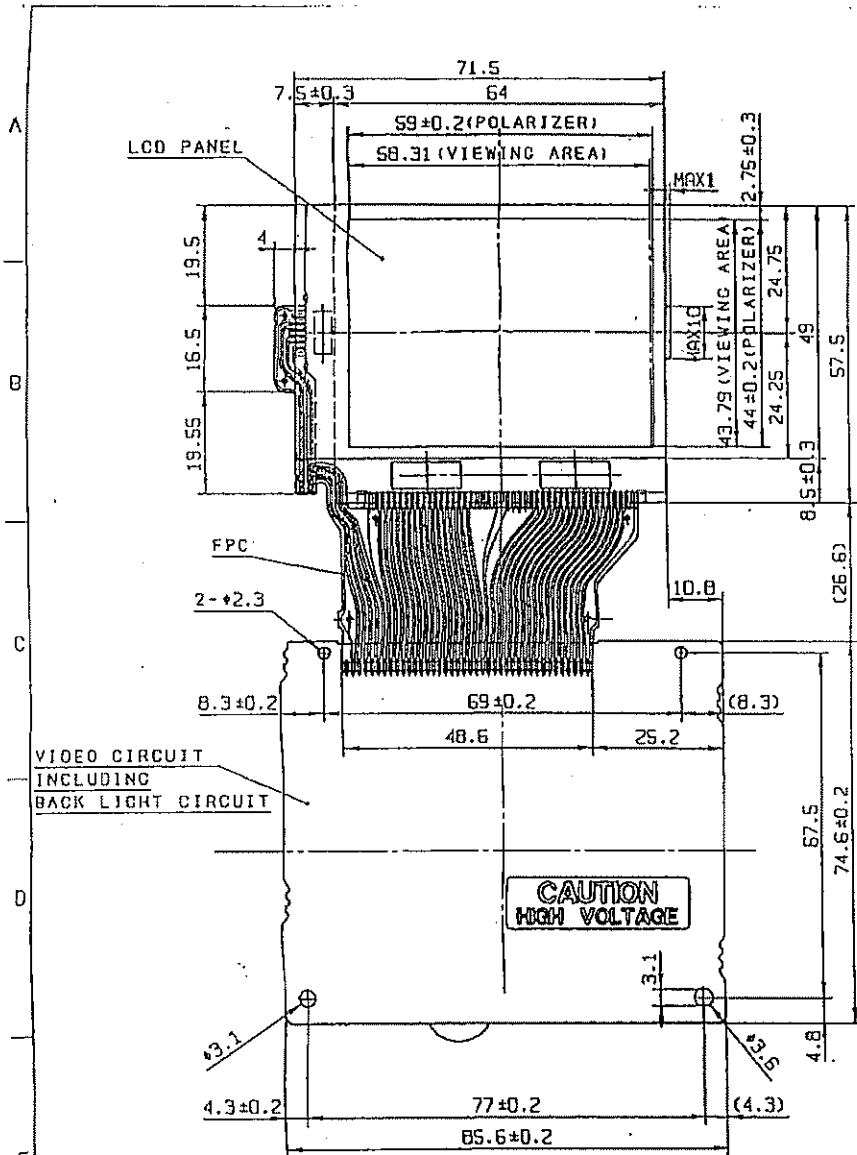
### 7-3 Cautions in mounting

- (1) The circuit substrate includes ICs which are very easily damaged by static electricity. So, handle the substrate with utmost care.
- (2) Mount being careful not to put undue bend or twist on the unit ; otherwise, LCD panel breaks or the circuit trouble as the case may be.
- (3) To protect LCD panel, especially the polarizer surface, put a transparent protective board (for example, acrylic board or glass board) on the product case.

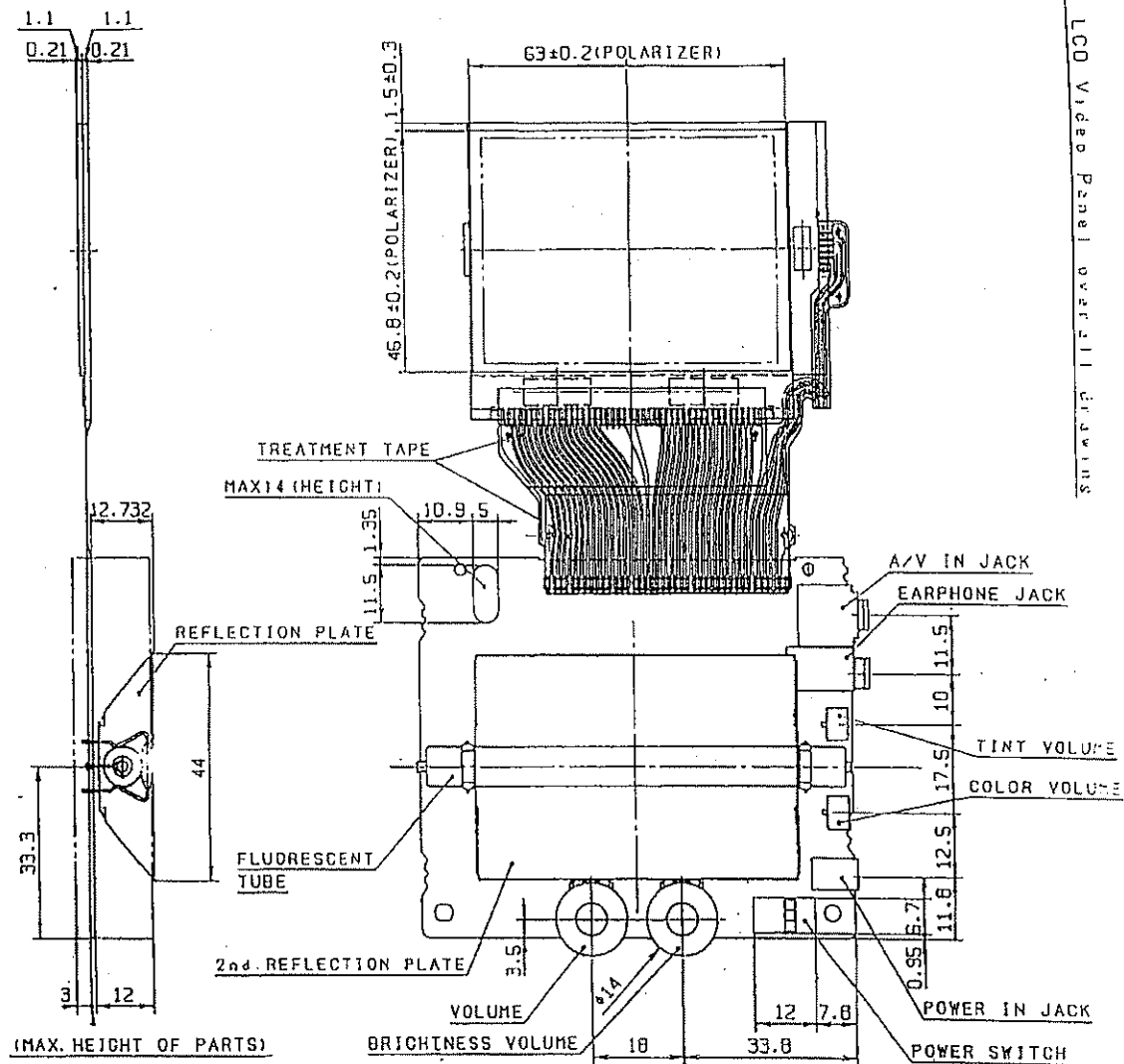


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<p>7-4 Cautions in storage</p> <ol style="list-style-type: none"><li>(1) Avoid keeping the unit in a humid place with high temperature.</li><li>(2) Do not expose the unit to direct sunlight.</li><li>(3) Take the proper steps to prevent any unnecessary pressure on the unit.</li></ol>		

\* \* \* \* \* UC-292 #1 (01) \*\*\* 92-03-27



Dimensions of glass

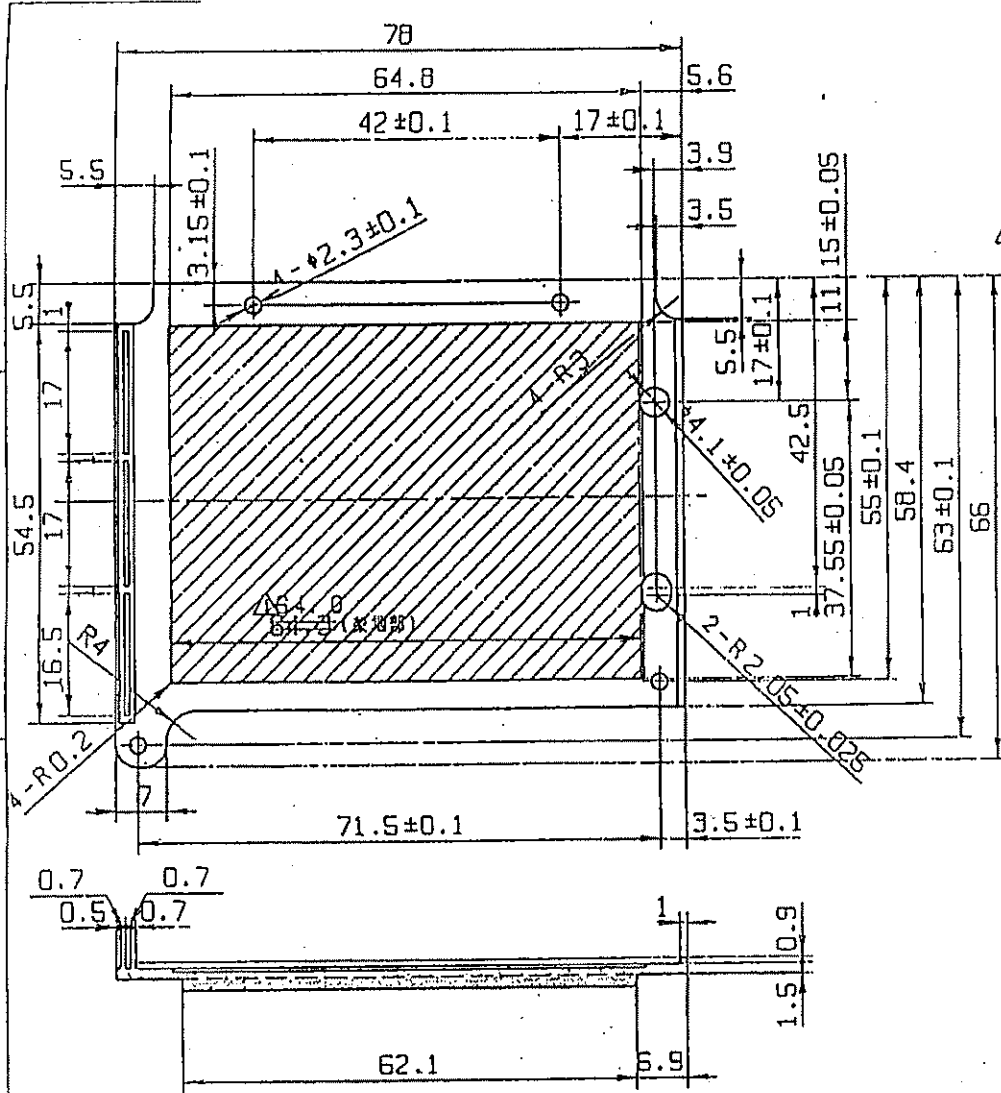


S LCD Video Panel overall drawings

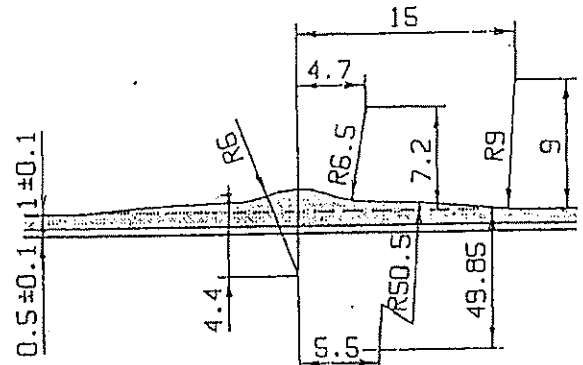
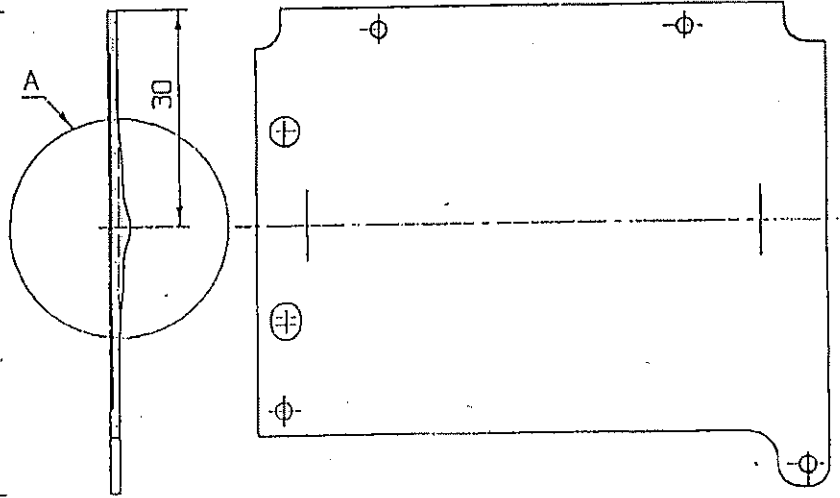
△		Quantity			Model:
△		Unit	1/1 mm		UC-292
△		Scale	1/1		Part No.:
△		Drawn	Date	Name	
△		Checked			Part Name:
△		Approved			LCD PANEL UNIT
Material					Drawing No.:
Heat Treatment		General Tolerances			
Hardness		Dimensions			
Plating		Analog			

CITIZEN CITIZEN WATCH CO., LTD. TOKYO, JAPAN

MIG VID1 56TC-1JA A13-0710 (01) \*\*\* 89-07-14



- 注記
- 01. 斜線部ハ、梨地 (ベアロン: BK-111) トスル
  - 02. 材質: アクリレツト VH-PE-105 (三菱レーヨン製) 相当トスル
  - 03. ソリ0.3以下ノコト △PW2754
  - 04. 指示ナキ外形コーナー部ハR1.5迄可トスル
  - △05. 抜き勾配ハ別途打合せニヨリ決定スル

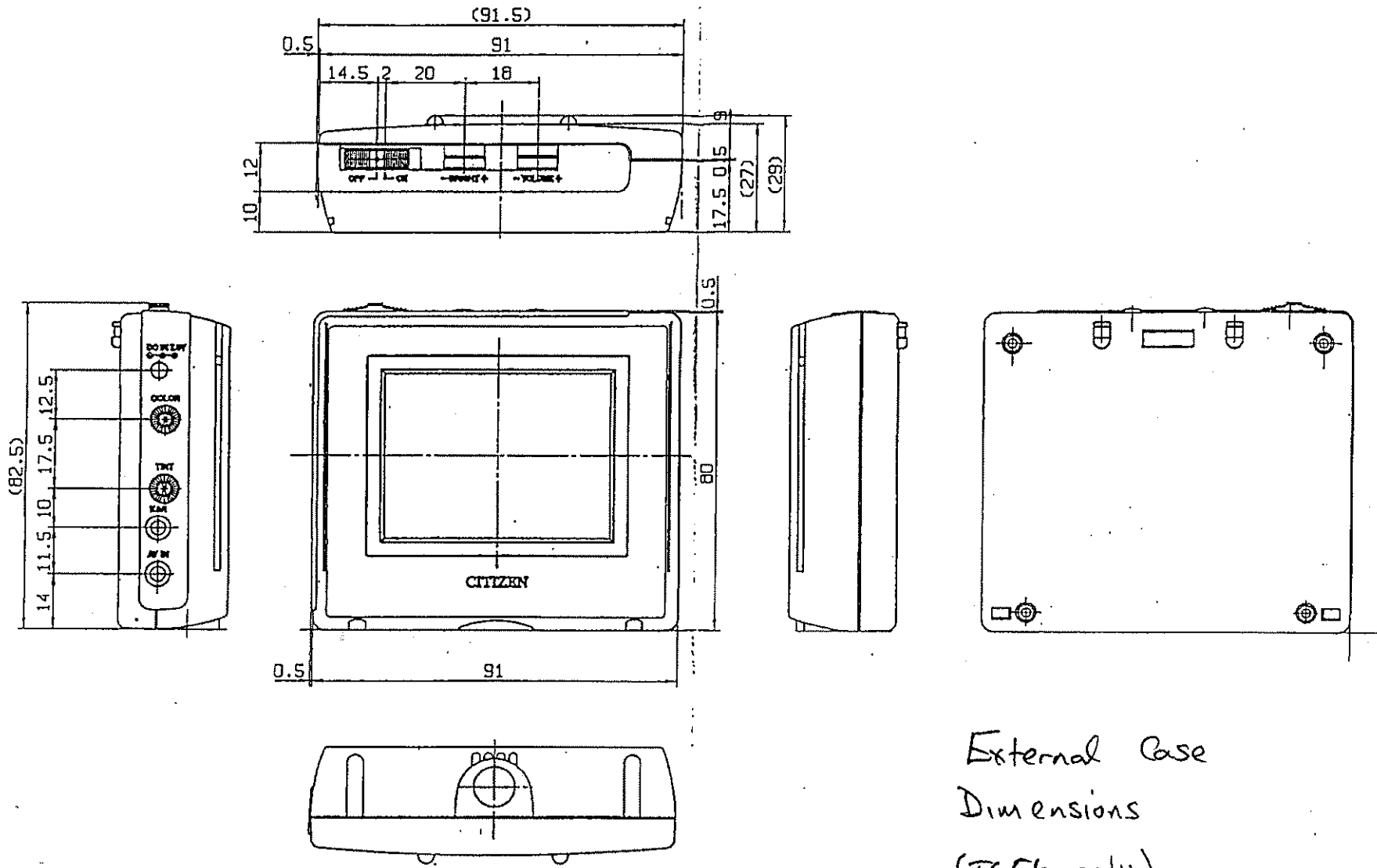


Dimensions of backlight diffuser.

部分拡大図A (2/1)

△				一般公差	寸法	±0.2	角度		熱処理		材質	注記参照	56TC-1JA		
△				承認	担当	設計	製図	検図	力		品質管理	注記参照	機名	個数	規番号
△				高田	井本	松山	井本		1				名称		
△				日付	89.5.17 (1989-034)				1				番号		
△				シチズン時計株式会社					1		表示機器部		A13-0710		
△	89.07.14	試行打正, 加工容易化	1889-048	松山					1						

47603121



External Case  
Dimensions  
(TC56 only)