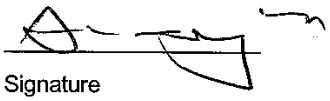
Test Report No.:	**LD89040505B**
Client	
Name :	**ADVANTECH CO., LTD**
Address :	No. 1 Alley 20, Lane 26, Rueiguang Road, Neihu District Taipei 114, Taiwan, R.O.C.
Test Item :	**INDUSTRIAL COMPUTER**
Identification :	**AWS-8100XTX-XX, AWS-8124TX-X, X can be 0-9, A-Z or blank.**
Testing laboratory	
Name :	Advance Data Technology Corporation
Address :	No. 46, Lane 504, Chung Hsiao Road, Lin Kou Hsiang, Taipei, R.O.C.
Test specification	
Standard :	**EN 60 950:1992 + A1:1993 + A2:1993 + A3:1995 + A4:1996 + A11: 1997**
Test Result :	The test item passed.
Tested By :	Signature:  Date: November 30, 2001 Angus Hsu Name in block letters
Approved By:	Signature:  Date: Dec 7, 2001 Edward Chiueh Name in block letters
Other Aspects:	
The completed test report includes the following documents:	
■ EN 60950 report (9 pages)	
The test report shall not be reproduced except in full, without written approval of the laboratory. This test report does not entitle to carry any safety mark on this or similar products.	

TEST REPORT EN 60950 Safety of information technology equipment including electrical business equipment	
Report	
Reference No. ..... :	LD89040505B
Compiled by (+ signature) ..... :	See cover sheet .....
Approved by (+ signature) ..... :	See cover sheet .....
Date of issue ..... :	See cover sheet
This report is based on a blank test report that was prepared by KEMA using information obtained from the TRF originator (see below).	
Testing laboratory	
Name ..... :	Advance Data Technology Corporation
Address ..... :	No. 46, Lane 504, Chung Hsiao Road, Lin Kou Hsiang, Taipei, Taiwan.
Testing location ..... :	Advance Data Technology Corporation
Address ..... :	No. 46, Lane 504, Chung Hsiao Road, Lin Kou Hsiang, Taipei, Taiwan.
Client	
Name ..... :	**ADVANTECH CO., LTD**
Address ..... :	No. 1 Alley 20, Lane 26, Rueiguang Road, Neihu District Taipei 114, Taiwan, R.O.C.
Test specification	
Standard ..... :	EN 60 950:1992 + A1:1993 + A2:1993 + A3:1995 + A4:1996 +A11:1997
Test procedure ..... :	This Test Report is not valid as a CCA Test Report unless signed by a CCA Testing Laboratory and appended to a CCA Test Certificate.
Procedure deviation ..... :	N/A.
Non-standard test method ..... :	N/A.
Test Report Form/blank test report	
Test Report Form No. ..... :	60950__D/97-08
TRF originator ..... :	FIMKO
Master TRF ..... :	Reference No. 60950 D, dated 97-02
Copyright reserved to the bodies participating in the Committee of Certification Bodies (CCB) and/or the bodies participating in the CENELEC Certification Agreement (CCA).	
Test item	
Description ..... :	INDUSTRIAL COMPUTER
Trademark ..... :	ADVANTECH
Model and/or type reference ..... :	AWS-8100XTX-XX, AWS-8124TX-X, X can be 0-9, A-Z or blank.
Manufacturer ..... :	ADVANTECH CO., LTD.
Rating(s) ..... :	AC Input: 100-240 Vac, 50 / 60 Hz, 3 A, DC Input: 24-48 Vdc, 7 A

Automation with PCs
ADVANTECH®

MODEL NO:
☐ AWS-8124T
☐ AWS-8124T-T
☐ AWS-8124TP
☐ AWS-8124TP-T

FCC
This device complies with the requirements in part 15 of the FCC rule: Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

警告使用者
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

檢磁

CAUTION !
To prevent electric shock. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified personnel.

S/N

ADVANTECH CO., LTD.
MADE IN TAIWAN

http:/ /www.advantech.com.tw

Particulars: test item vs. test requirements	
Equipment mobility	Movable
Operating condition	Continuous
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	N/A
Class of equipment	Class I or III
Mass of equipment (kg)	8 kgs
Protection against ingress of water	IPX0
Test case verdicts	
Test case does not apply to the test object	N(.A.)
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)
Testing	
Date of receipt of test item	November 20 , 2001
Date(s) of performance of test	November 30, 2001

General remarks

This test report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item tested.
"(see remark #)" refers to a remark appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report a comma is used as the decimal separator.

Brief description of the test equipment:

1) The equipment is an INDUSTRIAL COMPUTER, that can be install in the rack. Overall dimension: 345 by 261 by 161 mm.
2) Build-in Power Supply.
Skynet, type SNP-8086
Input: 100-240 Vac, 60/50 Hz, 3 A, Output: +5Vdc/16A, +12Vdc/1.5A
Skynet, type SNP-4081
Input: 24-48 Vdc, 7 A, Output: +5Vdc/12A, +12Vdc/2A, -12V/0.5A
3)Normal load Condition:
PC operation normally with FDD, HDD, Mother Board, Cooling Fan and two add-on dummy load card(5V: 5A, 12V: 0.5A).
4) Model different:
AWS-8100XTX-XX, AWS-8124TX-X
X will be definded A~Z, 0~9 or blank for different Power Supply, Backplane, CPU Card, CPU Speed and Touchscreen.(See Attachment)
5) Max. operation temperature: 50℃

*** This is a supplementary report of LD89040505. All is identical to original report except for adding a D/A inverter (Bright Deer, type 1254100290), a LCD Module (Tottori Sanyo, typeMXS121022010) and Model AWS-8124TX-X.**

EN 60950			
Clause	Requirement + Test	Result - Remark	Verdict

1.5.1	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	Type/model	technical data	standard	Mark(s) of conformity[1])
Power Inlet	Various	---	250V, 10A	IEC 60320	TUV
Power cord (Optional)	Various	---	0.75mm^2, 3G, H05VV-F	IEC 60227	TUV
Power Plug (Optional)	Various	---	250V, 10A/16A	IEC 60320	TUV
Power Connector (Optional)	Various	---	250V, 10A	IEC 60320	TUV
Power Switch	Various	---	250V 10A	VDE 0630	TUV
Power Supply	Skynet	SNP-8086	Input: 100-240 Vac, 50/60 Hz, 3A Output: +5Vdc: 16A +12Vdc: 1.5A	EN60950	TUV
	Skynet	SNP-4081	Input: 24-48 Vdc, 7A Output: +5Vdc: 12A +12Vdc: 2A -12Vdc: 0.5A	EN60950	TUV
D/A Inverter	TDK	1254100030	---	---	---
*	**Bright Deer**	**1254100290**	**---**	**---**	**---**
LCD Module	Toshiba	LTM10C209A	TFT	---	---
*	**Tottori SANYO**	**MXS121022010**	**12.1", TFT**	**---**	**---**
Hard Disk Drive (Optional)	Various	---	+5Vdc, 2A max. +12Vdc, 2A max.	EN 60950	TUV
Floppy Disk Drive (Optional)	Various	---	+5Vdc, 1A max.	EN60950	TUV
DC Fan	Asia Vital	C0925B12H	+12Vdc, 0.28A 59.02CFM	EN60950	TUV

EN 60950			
Clause	Requirement + Test	Result - Remark	Verdict

	Sunonwealth	KD1209PTB1-6	+12Vdc, 0.23A 59CFM	EN60950	TUV
CPU Fan	ACR-RX	ACC6060-12VHz	+12Vdc, 0.12A 8.47CFM	EN60950	TUV
RTC Battery	Various	CR2032	+3Vdc, Max. abnormal charging current: 10 mA.	---	UL
PCB	Various	---	Class V-1, 105 ℃ min.	UL94	UL
Enclosure	---	---	Metal	---	---
[1]) an asterisk indicates a mark which assures the agreed level of surveillance					

EN 60950			
Clause	Requirement + Test	Result - Remark	Verdict

1.6	TABLE: electrical data (in normal conditions)					P
Fuse #	Irated (A)	U (V)	P (W)	I (A)	Ifuse (A)	condition/status
Power Supply: Skynet, SNP-8086. D/A Inverter: Bright Deer Tec. Model: 1254100290						
N/A	---	90V/50Hz	32.4	0.590	0.590	Normal load condition
N/A	---	90V/60Hz	32.4	0.586	0.586	Normal load condition
N/A	3	100V/50Hz	32.5	0.542	0.542	Normal load condition
N/A	3	100V/60Hz	32.4	0.542	0.542	Normal load condition
N/A	3	240V/50hz	34.2	0.286	0.286	Normal load condition
N/A	3	240V/60hz	34.1	0.279	0.279	Normal load condition
N/A	---	254V/50hz	34.6	0.274	0.274	Normal load condition
N/A	---	254V/60Hz	34.2	0.271	0.271	Normal load condition

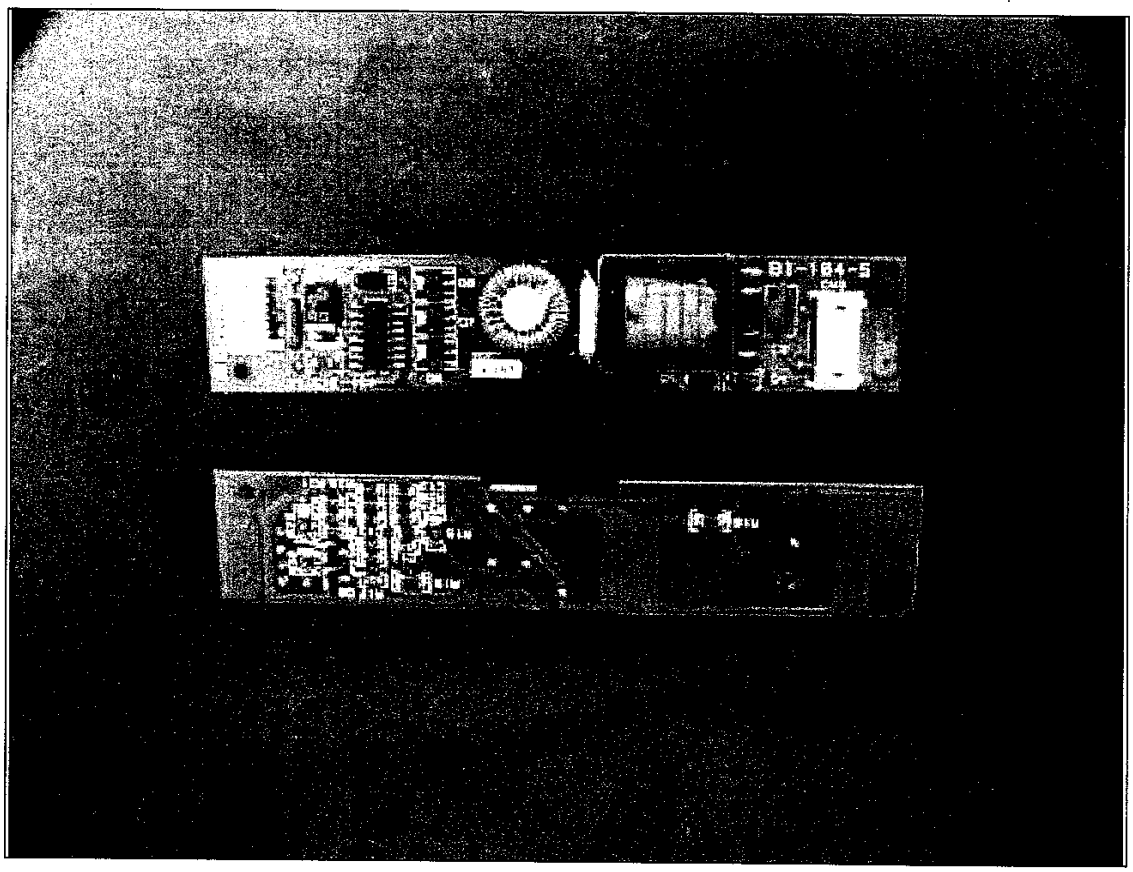
2.4	TABLE: limited current circuit measurement		
Location	Voltage (V)	Current (mA)	Comments
Inverter: Bright Deer Tec. Model: 1254100290			
normal condition			
CN3, Pin 1 to Earth	20.8	10.4	F=42.8KHz, Limited current : 29.96 mA
CN3, Pin 2 to Earth	0.0	0.0	0.0
CN3, Pin 1 to Pin 2	19.4	9.7	F=43.3KHz, Limited current : 30.31 mA
single fault condition (C8 short)			
CN3, Pin 1 to Earth	27.6	13.8	F=128.9KHz, Limited current : 70.0 mA
CN3, Pin 2 to Earth	0.0	0.0	0.0
CN3, Pin 1 to Pin 2	28.0	14.0	F=128.6KHz, Limited current : 70.0 mA

EN 60950			
Clause	Requirement + Test	Result - Remark	Verdict

single fault condition (LI short)			
CN3, Pin 1 to Earth	25.2	12.6	F=44.5KHz, Limited current : 31.15 mA
CN3, Pin 2 to Earth	0.0	0.0	0.0
CN3, Pin 1 to Pin 2	25.6	12.8	F=43.9KHz, Limited current : 30.73 mA
single fault condition(Q1 C-E short)			
CN3, Pin 1 to Earth	37.6	18.8	F=43.9KHz, Limited current : 30.73 mA
CN3, Pin 2 to Earth	0.0	0.0	0.0
CN3, Pin 1 to Pin 2	37.2	18.1	F=43.9KHz, Limited current : 30.73 mA

EN 60950			
Clause	Requirement + Test	Result - Remark	Verdict

Appendix Photos – Overall view of D/A inverter



File No: E
Project No: 01NK

ADT CORP.
INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

Issued Date: 05-10-92
Revised: 10-31-01

Test	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
Heating / Abnormal	1. HT900876	0-400Vac, 20A	Power Meter	Chitai	2402A	Feb-15-2001	Feb-14-2002
	2. HT900803	0-400Vac, 20A	Power Meter	Chitai	2402A	Dec-11-2000	Dec-10-2001
	3. HT900765	0-400Vac, 20A	Power Meter	Chitai	2402A	Oct-29-2001	Oct-28-2002
	4. HT900767	0-400Vac, 20A	Power Meter	Chitai	2402A	Oct-29-2001	Oct-28-2002
	5. HT900768	0-400Vac, 20A	Power Meter	Chitai	2402A	Dec-11-2000	Dec-10-2001
	6. 981703	0-300Vac, 20A	Power Meter	Topward	1301	Jan-10-2001	Jan-09-2002
	7. 667214	0-300Vac, 20A	Power Meter	Topward	1310	Feb-16-2001	Feb-15-2002
	8. 667215	0-300Vac, 20A	Power Meter	Topward	1310	Feb-16-2001	Feb-15-2002
Input / Leakage	9. 53BT9495	300V / 5A	Power Meter	Yokogawa	2534	Feb-15-2001	Feb-14-2002
Electric Strength	10. 13050	5KV	Withstanding Voltage Tester	Tamadensoku	TP-515ADZ	Feb-15-2001	Feb-14-2002
Heating	11. 41VA0567	Type T AWG26	Hybrid Recorder	Yokokawa	HR 2500E/ 3882E	Feb-20-2001	Feb-19-2002
	12. 42VB0170	Type T AWG26	Hybrid Recorder	Yokogawa	DR 230	Feb-20-2001	Feb-19-2002
	13. 43VH0086	Type J AWG26	Hybrid Recorder	Yokogawa	HR 1300	Feb-20-2001	Feb-19-2002
	14. 48JE0043	Type J AWG26	Hybrid Recorder	Yokogawa	DR130-00-24-1D	Oct-31-2001	Oct-30-2002
	15. 42VF0429	Type T AWG26	Hybrid Recorder	Yokogawa	HR 2300	Oct-31-2001	Oct-30-2002
Leakage Current	16. 61NJ0375	0.1 - 10 mA	Leakage Meter	Yokogawa	3226	Feb-16-2001	Feb-15-2002
	17. 20983	0.1 - 10 mA	Leakage Meter	Simpson	228	Jan-11-2001	Jan-10-2002
Earthing	18. 12911	30A	Earth Tester	Tamadensoku	TEC-1225A	Feb-17-2001	Feb-16-2002
Input / Leakage /	19. 3303A-80501A019	60V/ 60A, 300W *4	Electric Load	Prodigit 3321	3301A	Aug-30-2001	Aug-29-2002
Heating / Abnormal	20. 3301A-80501A020	60V/ 60A, 300W *4	Electric Load	Prodigit 3321	3301A	Aug-30-2001	Aug-29-2002
	21. 3302-805020221	250V/10A, 300W *1	Electric Load	Prodigit 3322	3302	Aug-30-2001	Aug-29-2002

File No: E
Project No: 01NK

ADT CORP.

INSTRUMENTATION RECORD DATA SHEET

TEST INSTRUMENTS

Issued: 05-10-92
Revised: 10-31-01

The following instruments were used in tests on the the attached data sheets.

Test	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
Input / Leakage Heating / Abnormal	22. 3302-805020222	250V/10A, 300W *1	Electric Load	Prodigit 3302	3322	Oct-30-2001	Oct-29-2002
	23. 3302-805020223	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Aug-30-2001	Aug-29-2002
	24. 3302-805020220	150V/8A, 300W *1	Electric Load	Prodigit 3302	3251	Feb-21-2001	Feb-20-2002
	25. 308010158	60V/60A, 300W *2 60V/30A, 150W *2	Electric Load	Prodigit 3301	3301	Jun-4-2001	Jun-4- 2002
Discharge / voltage measurement	26. B036089		Oscilloscope	Tektronix	THS 720A	JUN-07-2001	JUN-07-2002
	27. B011484	100V, 100mS/10mS	Digital Storage Oscilloscope	Tektronix	THS720A	Feb. 19, 2001	Feb. 18, 2002
X-Radition / Abnormal X-Radition	28. 1126	1mR / hr	X-Ray Survey Meter	Victoreen	440RF / D	Jun-04-2001	Jun-04-2002
Humidity	29. 80100301	25℃, 95% RH	Humidity Chamber	Taichy	MHD-800L	Dec-18-2000	Dec-17-2001
Mold Stress Relief	30. 80100300	70℃	Oven Chamber	Taichy	FH-480	Jun-03-2001	Jun-02-2002
Stress Relief	31. 80353	0 - 30 Kg.	Push - Pull Meter	Aikoh	AE-30	Jan-11-2001	Jan-10-2002
Electric Strength	32. 815312	60kV	High Voltage Generate	Gotech	KT-7058	Monitor by H. V. Meter	
Heating / Input	33. 801081	0-150V, 150-300V	2 KVA	Extech	CFC-120	Monitor by Power Meter	
	34. 831211	0-150V, 150-300V	1 KVA	Extech	CFC-110	Monitor by Power Meter	
	35. 801174	0-150V, 150-300V	500 VA	Extech	CFC-105	Monitor by Power Meter	
	36. 770232	0-150V, 150-300V	500 VA	Extech	CFC-105	Monitor by Power Meter	
General	37. 3146A02019	R, V, A. Full Range	Digital Multimeter	HP	34401A	Dec-12-2000	Dec-11-2001
	38. 6961003	R, V, A. Full Range	Digital Multimeter	Fluke	45	Jan-09-2001	Jan-08-2002
	39. 70360742	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Jan-10-2001	Jan-09-2002
	40. 70360755	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Feb-15-2001	Feb-14-2002

File No: E
Project No: 01NK

ADT CORP.

INSTRUMENTATION RECORD DATA SHEET

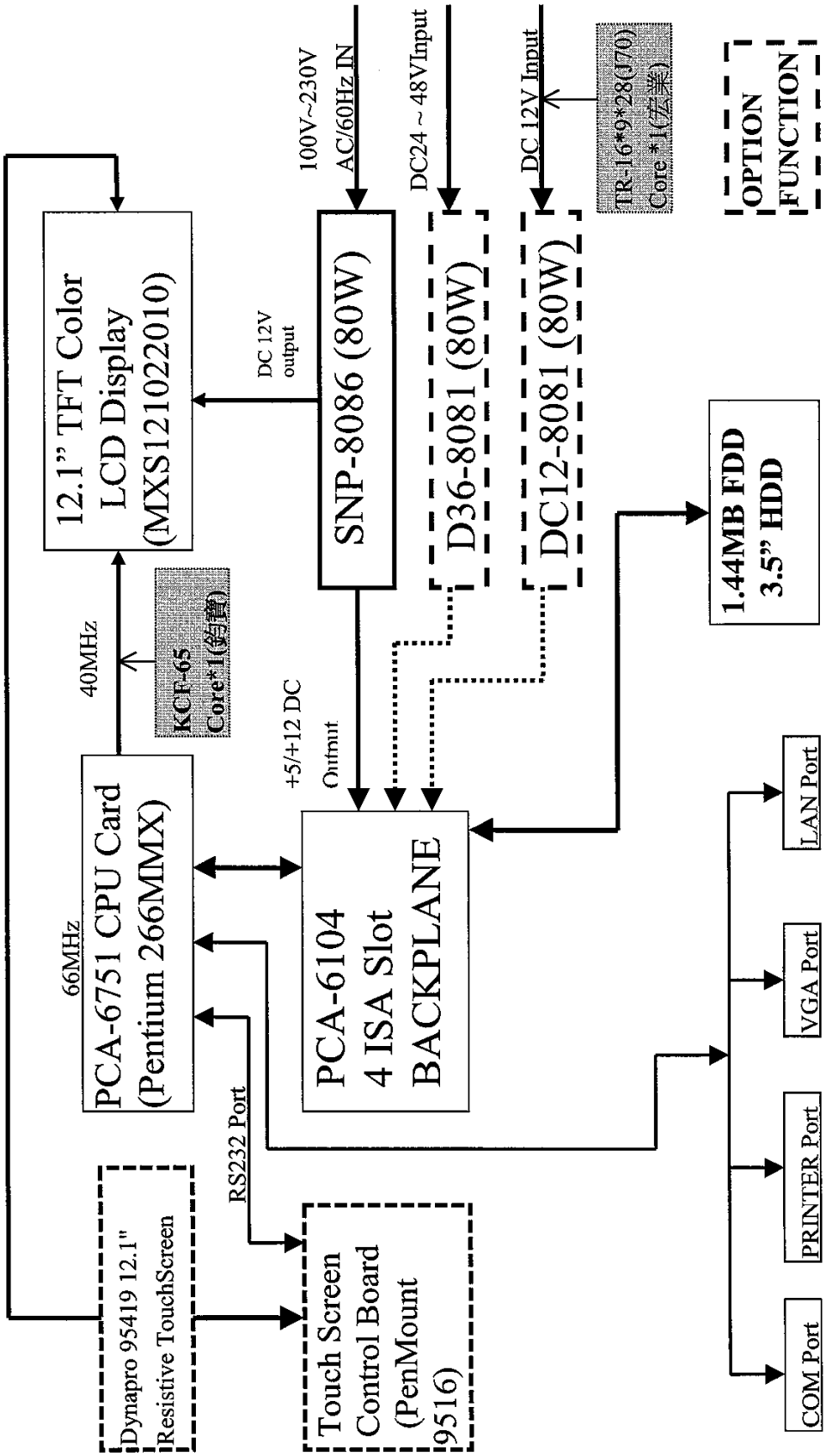
TEST INSTRUMENTS

Issued: 05-10-92
Revised: 10-31-01

The following instruments were used in tests on the the attached data sheets.

Test	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
General	41. 40CB0797	R, V, A. Full Range	Digital Multimerter	Yokogawa	755201	Oct-30-2001	Oct-29-2002
	42. 667527	1Hz - 2MHz, 5mV - 20Vpp	Function Generator	Topward	8120	Monitor by Scope	
	43. 0009834	0-200 cm	Digimatic Multimeter	Mitutoyo	500-197 CD-8"CS	Jan-11-2001	Jan-10-2002
	44	24 hrs	Timer (Stop Watch)	Sports Timer		Jan-09-2001	Jan-08-2002
	45. 030808	60kg x 200 g	Weight Scale			Apr-25-2001	Apr-24-2002
	46	Real Time	Clock	Chyau Jye	Chyau Jye	Oct-31-2001	Oct-30-2002
Impact / Opening / Ball Pressure	47. 10294	Steel Ball / Tesr Pin or Finger / Ball Pressure	FIMKO (TEST BOX)			Jan-11-2001	Jan-10-2002
X-Radiation /	48. 466081	R, V, A. Full Range	Digital Multimeter	Fluke	8050A	Oct-30-2001	Oct-29-2002
Abnormal X-Radiatio	49. 382846	40KV, 1:1000	H. V. Probe	Fluke	80K-40HV	Dec. 11, 2000	Dec. 10, 2001
Ambient Monitor	50. 70860282	Temp. : -20~40 DegC Humi.: 0~100%	Thermo-Hygro Grapg	Isuzs	3-3122	Dec-11-2000	Dec-10-2001
Discharge	51. B043126	10Mohm, 1000X	Probe	Tektronix	P6015A	Aug-02-2001	Aug-01-2002
Stability	52. S1010023	10 degree	Bevel Protractor	Mitutoyo	187	Sep-11-2001	Sep-10-2002
Input / Leakage /	53. S101011-13057		Insulation Tester	TAMA	I-808	Sep-11-2001	Sep-10-2002
	54.3301A-00901A029	60V/ 60A, 300W *4	DC Electronic Load	Prodigit	3301A	JUN-04-2001	Jun-03-2002
	55.3301A-00901A028	60V/ 60A, 300W *4	DC Electronic Load	Prodigit	3301A	JUN-04-2001	Jun-03-2002
	56.TD-30K-00L010		Torque Screwdriver	KILEWS	TD-30K	Jun-05-2001	Jun-04-2002
	57.DR230-12WB22613		Recorder	YOKOGWA	DR230	JUN-04-2001	Jun-03-2002
Abnormal X-Radiatio	58.9606869	40KV, 1:1000	H. V. Probe	Fluke	80K-40HV	Jun-05-2001	Jun-04-2002
	59.9906204		Spring Hammer	PL	F22.50	Sep-17-2001	Sep-16-2003

AWS-8124T & AWS-8124TC Series System Block Diagram



采鹿科技有限公司 BRIGHT DEER

FOR APPROVAL

Customer:	ADVANTECH
Item :	Inverter
Part no :	1254100290 (IV-12A)
Description:	12.1”
Date :	**05/02/2001**

Authorized Signature		
1	2	3

BRIGHT DEER TEC.

DC-AC INVERTER UNIT SPECIFICATION (IV-12A for 12.1)

[1] 用途

APPLICATION:

THIS IS A DC-AC INVERTER UNIT TO DRIVE CCFT BACKLIGHT (TFT LCD TWIN CCFL)

[2] 端子接線

PIN ASSIGMENT:

INPUT: CN1
MODEL NO: 2505-WR-4
SUPPLIER: 何迪

PIN	SYMBOL	REMARK
1	VIN	10V-16V
2	VRMT	ON(5V)/OFF(0V)
3	GND	
4	Vbr	0.3-3.5V

OUTPUT: CN3
MODEL:SM02(8.0)B-BHS-1-TB
SUPPLIER:JST

PIN	SYMBOL	REMARK
1	HIGHT	HIGH VOLTAGE
2	LOW	LOW VOLTAGE

[3] 各種試驗

RELIABILITY TEST

FOLLOWING TEST ITEMS ARE ASSURED

Items	Conditions	Judgement
Low temp. storage	-30 c 500h	Electric & appearance should be in the spc. *See next table
Low temp. operating	0 c 500h	
High temp. storage	85 c 500h	
High temp. operating *** ***	58 c 1000h	
Temp. cycles	-30 c---80 c 30min Each 100 cycles	
Humidity operating.	50 c 90-95%RH 500h	
Vibration	X. Y. Z. 30min. Each	
Mechanical shock	100G 6ms Half Sinusoid wave x. y. z. 3 Times Per Each	

High temperature operating function inspection:

Test oneTime/10 Hours each

Item	Temperature	Conclusion	Dynamic testing
ON&OFF	58 C	OK	1200 Times continue
Noise	60 C	OK	Vin low noise also
P.W.M.	58 C	OK	Include brightness adjust
I in	58 C	OK	----------
Frequency	58 C	OK	---------- -
Sinusoid wave	60 C	OK	AC in & out
Brightness control	60 C	OK	Without flash

*Low temperature (0 C) : Power ON/OFF test 20 sec. Each 1000 times continue

[4]電氣特性(IV-12A for 12.1)

ELETRICAL CHARACTERI STICS

ITEMS	SYMBOL	MIN	TYP	MAX	UNIT	RE. MARK
Input v	Vin	11	12	13	V	
Input C	I in	500	600	700	MA	
Frequen-cy	F	40	50	60	Khz	
IUTPUT C	I out	5	6	7	MA	Brightness max.
Open V	V open	1000	1200	1400	V rms	
Output V	V out	700	800	900	Vrms	

WEIGHT: Approximate 20Gms

[5] 測定儀器
TEST EQUIPMENT

1(Vin):Digital Mutil-mater
GPC-3030DQ-GW

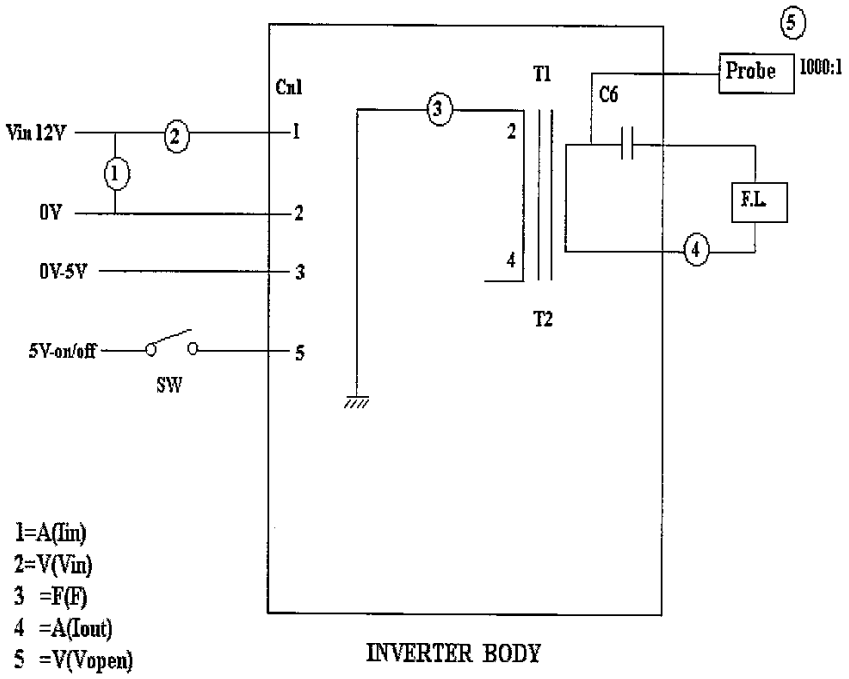
2(Iin): DC Current Mater
DMM-93B-DHA

3(F) : Frequency Counter
GOS-622G-GW

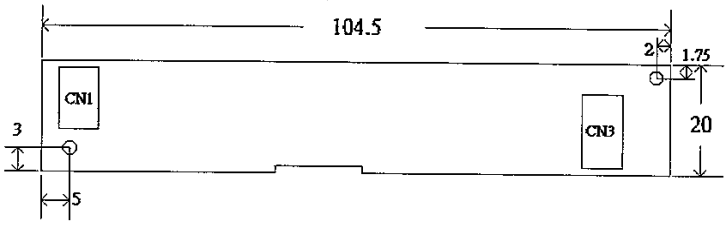
4(IL): High Frequency Current Mater
87IV-FLUKE

5(VL):Rms Voltage Mater
SS-7810-IWATSU

[6] TEST CIRCUIT



OUTLINE DIMENSIONS(unit:mm)+-0.2mm

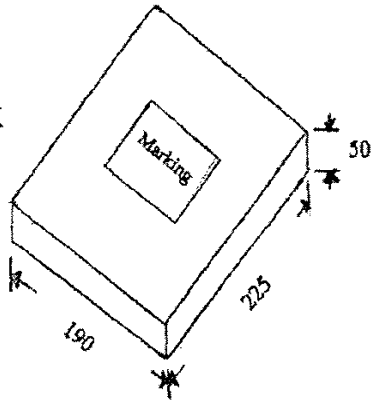


IV-12A

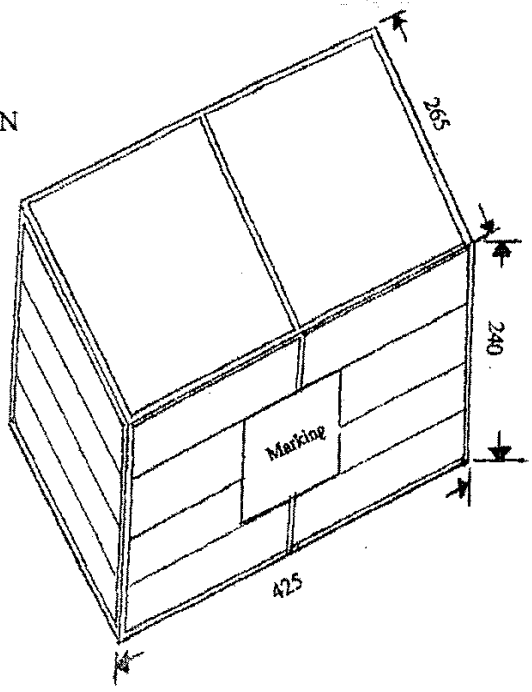
[８]梱包型態

PACKING

INNER BOX



CARTON



PACKING DETAILS

Inner box

This box made of waterproof paper board

20 Pcs in one inner box

Weight: Approximate: 750Gms

Carton

8 Inner box in one carton

160 Pcs /carton

Weight: Approximate 7Kgs

Marking

Inner box

Item
Model no.
Customer name
Customer parts no.
Inspect mark
Quantity
BALLYTEC

Carton

Customer parts no.
Quantity
BALLYTEC
MADE IN TAIWAN

[9]其他
OTHERS

1.Test Condition

A normal test condition: Temperature +5 c Humidity + 10%

2.Warranty

1 year after shipment this covers detects in material or workmanship
Defects until will be replace at no charge

3. Material list for UL and safety see material table

Material table

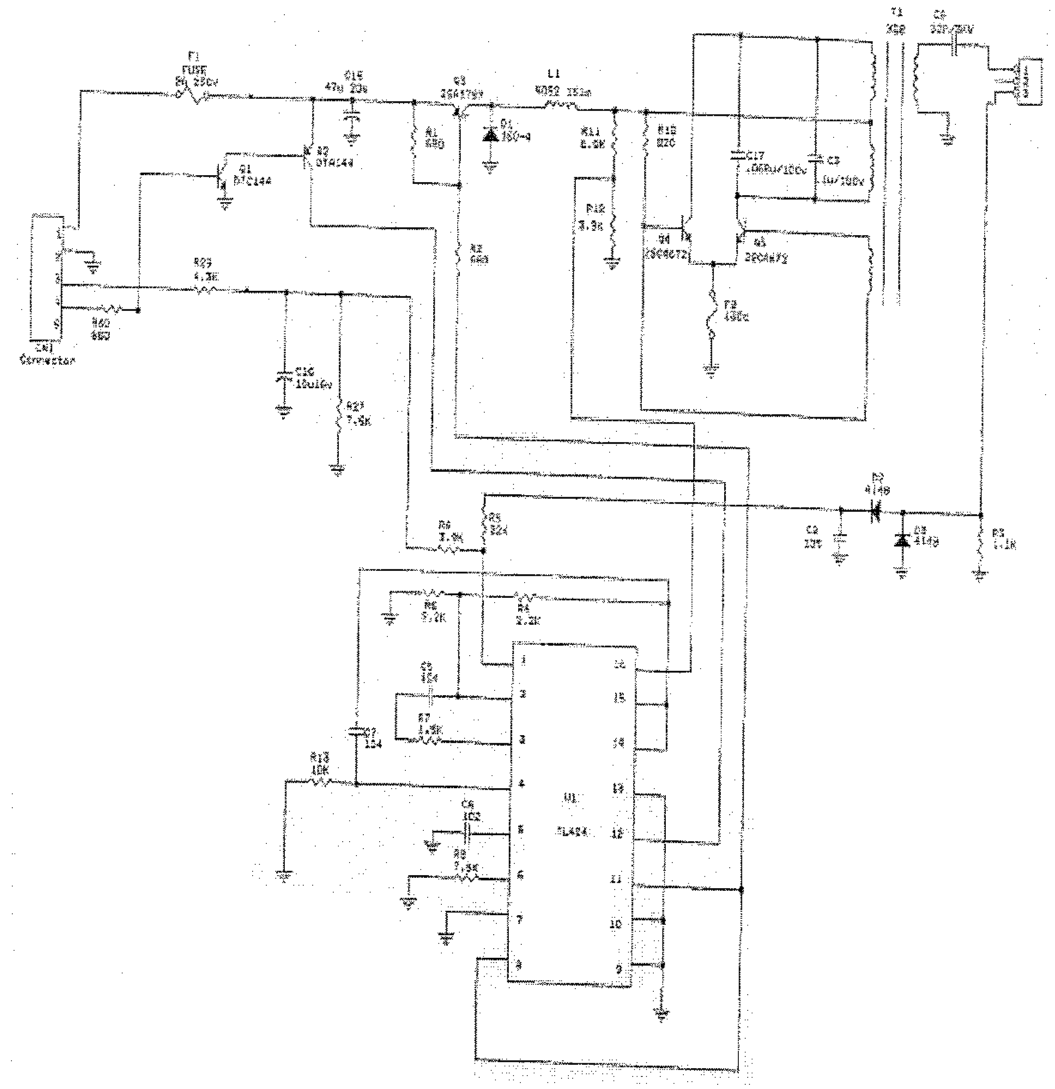
Part No.	Parts	Material	Applicant	Page
Cn1	Connector	Connector body	J.S.T.	A1
Cn2	"	"	"	A2
L1	Inductor	Wire	TATUNG	A3
"	"	Tape	MINNESOTA	A4
"	"	Glue	LI-BONE	A5
F1	Fuse	Fuse body	UCHIHASHI	A6
T1	Transformer	Wire	TATUNG	A3
"	"	Core	NICERA	A7
"	"	Bobbin	HO-JINN	A8
"	"	Polyester tape	MINNESOTA	A4
P.C.B.	P.C.B.	P.C.B.	CKC	A9
Others	X`mer. .			A10~14

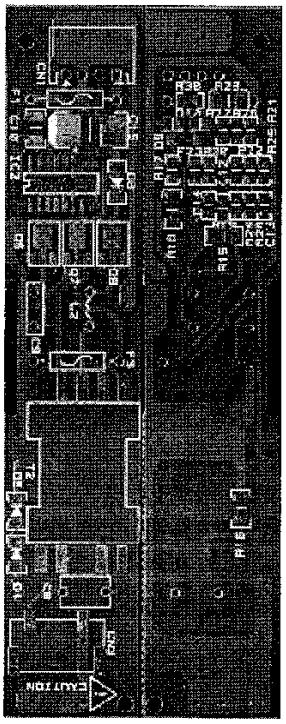
B O M

采鹿科技有限公司
TEL: (02)22443570
FAX: (02)22481158

品名:IV-12A for 12.1
客戶名稱:
日期:**90/05/02**

編號	品名及規格	用量	零件位置	備註
1	PCB IV-12A	1		
2	IC TL494	1	IC 2	
3	TR [DTA]144WK	1	Q 9	
4	[DTC]144WK	1	Q 10	
5	2SA1797	1	Q 8	
6	2SC4672	2	Q 6,7	
7	DIODE SCHOT 160-4	1	D 6	
8	1N4148	2	D 4,5	
9*	C EC 47U25V 6ϕ	1	C 15	
10	C CERAMIC 1U25V (105Z)	1	C 10	
11	C MEF 0.1u /100V	1	C 3	
12	C CERAMIC 102[.001U] 0805	1	C 14	
13	C CERAMIC 104[.1U] 0805	2	C 12,13	
14	C H-V/ 3KV 27P	1	C 9	
15	R 680 OHM 0805	2	R 17,30	
16	R 680 1206	1	R 18	
17	R 2.7K 1206	1	R 29	
18	R 2.2K 0805	2	R 22,28	
19	R 10 K 0805	1	R 24	
20	R 1.5K 0805	1	R 25	
21	R 7.5K 0805	2	R 23,27	
22	R 22 K 0805	1	R 21	
23	R 820 1206	1	R 15	
24	R 6.2K 0805	1	R 19	
25	R 3.9K 0805	1	R 20	
26	R 1.2K 1206	2	R 16	
27	R 4.7K 0805	1	R 26	
28	Fuse 250V/ 1.5A	1	F 1	
29	Fuse 115°	1	F 2	
30	Transformer X03	2	T 1	
31	Connector 2505-WR-4	1	CN 1	
32	" SM02(8.0)B	1	CN 3	
33	Inductor 電感 5052(0.5)	1	L 1	


F1
FUSE
Q1
DTC144
Q2
DTA144
L1
T1
CN1
Connector
U1



TORISAN

ENGINEERING SPECIFICATIONS

TFT COLOR LCD MODULE

MXS121022010

- 31cm (12.1 inch) diagonal
- SVGA resolution (800 × 600 pixels)
- With CFL backlight unit
- Nonglare surface type

P/N: 1331121070

(TENTATIVE)

Ver. 1 Apr. 01, 1999

Tottori SANYO Electric Co., Ltd.
LCD Division

3-201, Minami-yoshikata, Tottori, 680-8634 Japan
TEL: 81-857-21-1958
FAX: 81-857-21-2265

S. Iwasaki
Department Manager S. IWASAKI

A. Matsushita
Engineering Manager A. MATSUSHITA

■ *NOTICES*

1 .The contents stated in this document and the product may be subject to change without prior notice.

When you kindly study to use this product, please ask us or our distributor for the latest information.

2 .This product is developed and produced for usage onto normal electronic products (office automation equipments, communication peripherals, electric appliance products, game machines, etc.) and is not suitable for applications which need extremely high reliability and extreme safety (aero- or space-use machines, control equipments for nuclear power, life keeping equipments, etc.).

3 .This document shall not grant or guarantee any right to adapt intellectual property or any other patents of third party.

4 .Please use this product correctly according to operating conditions and precautions for use stated in this document.

Please install safety proof in your designing to avoid human accident, fire accident and social damage which may be resulted from malfunction of this product.

5 .This product is not designed to withstand against radiant rays.

6 .It is strictly prohibited to copy or publish a part or whole of this document without our prior written approval.

■ MECHANICAL CHARACTERISTICS

Ta=25°C

ITEM	SPECIFICATION	UNIT
Module size	275.0(W)×199.0(H)×6.9max(t)	mm
Resolution	800×R・G・B(W)×600(H)	pixel
Sub pixel pitch	0.1025(W)×0.3075(H)	mm
Pixel pitch	0.3075(W)×0.3075(H)	mm
Active viewing area	246.0(W)×184.5(H)	mm
Bezel opening area	250.0(W)×188.5(H)	mm
Weight	440 TYP.	g

■ ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN	MAX	UNIT	NOTE
Power supply voltage	V_{DD}-V_{SS}	0	4.3	V	
Logic input voltage	V_I	V_{SS}	V_{DD}	V	
CFL lamp current	I_L	-	6	mA	

■ ENVIRONMENTAL ABSOLUTE MAXIMUM CONDITIONS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN	MAX	UNIT	NOTE
Ambient temperature	T_{ST}	Storage	-20	60	°C	Note 1
	T_{OP}	Operation	0	50		
Humidity	-	Ta≦40°C		85	%RH	No condensation Note 2
Vibration	-	Storage	-	1.5	G	Note 3
Shock	-	Storage	-	50	G	XYZ 11ms/direction

Note 1) Care should be taken so that the LCD module may not be subjected to the temperature beyond this specification.

Note 2) Ta>40°C:Absolute humidity shall be less than that of 85% RH/40°C.

Note 3) 10-200Hz,30min/cycle,X/Y/Z each one cycle and except for resonant frequency.

■ ELECTRICAL CHARACTERISTICS

V_{DD}=3.3 V, fv=60Hz, f_{CLK}=40MHz, Ta=25°C

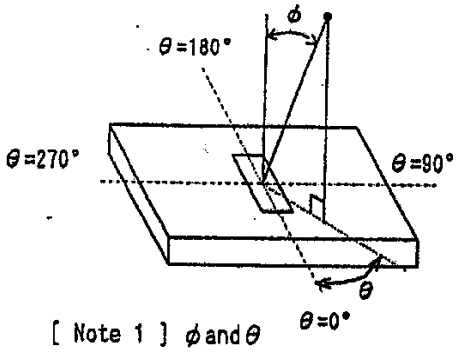
ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Power supply voltage	V_{DD}-V_{SS}		3.0	3.3	3.6	V	
Input logic voltage	V_{IH}	High level	2.0	-	V_{DD}	V	
	V_{IL}	Low level	V_{SS}	-	0.8		
Power Supply current	I_{DD}	Note 1	-	200	300	mA	

Note 1) Typ. value : display pattern is 64 gray scale bar.

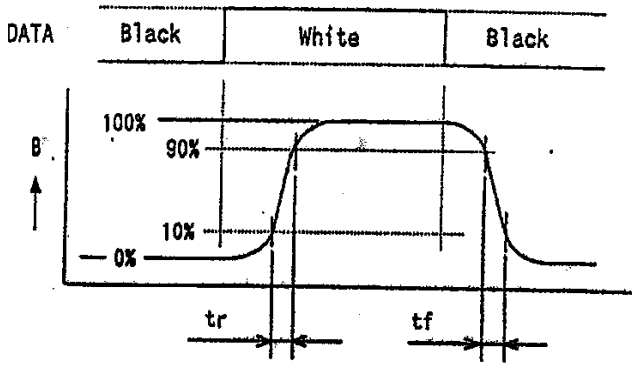
■ *OPTICAL CHARACTERISTICS*

Ta=25°C, V_{DD}=3.3V, fv=60Hz

ITEM		SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT	NOTE
Brightness		B			-	100	-	cd/m²	Note 5,7
Contrast ratio		K	φ=0°		150	-	-	-	Note 2,4,7
Viewing angle range		φ	K>10	θ= 0°	30	-	-	deg.	Note 1,2, 4,7
				θ= 90°	45	-	-		
				θ=180°	10	-	-		
				θ=270°	45	-	-		
Response time	Rise	tr	φ=0°		-	30	-	ms.	Note 3,4,7
	Fall	tf			-	20	-		
Color of CIE Coordinate	Red	x	φ=0°		-	0.58	-	-	Note 4,7
		y			-	0.34	-		
	Green	x			-	0.32	-		
		y			-	0.54	-		
	Blue	x			-	0.16	-		
		y			-	0.15	-		
	White	x			-	0.33	-		
		y			-	0.36	-		



[Note 1] φ and θ



[Note 3] Response time

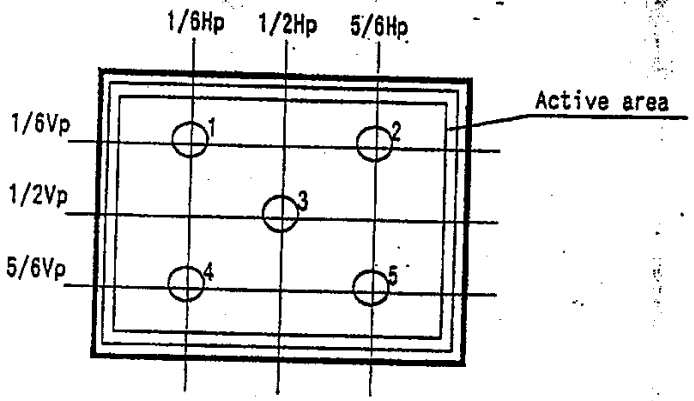
[Note 2] Contrast ratio "K"

$$K = \frac{\text{Brightness at White}}{\text{Brightness at Black}}$$

[Note 4] This shall be measured at center point ③ of Note 6.

[Note 5] The brightness shall be the average of the following 5 points of Note 6.

[Note 6] Measurement points



Vp :Total Number of Vertical pixel
Hp :Total Number of horizontal pixel

[Note 7] Measurement condition

① Measurement equipment : BM-7(TOPCON Corp.) Field=2°
② Ambient temperature : 25 ±2°C
③ LCD : All pixels are WHITE, V_{DD}=3.3V, fv=60Hz
④ Measure after 30 minutes of CFL warm up.
⑤ I_L=3.0 mArms with the CFL inverter CFP-66-5.

■ *BACKLIGHT CHARACTERISTICS*

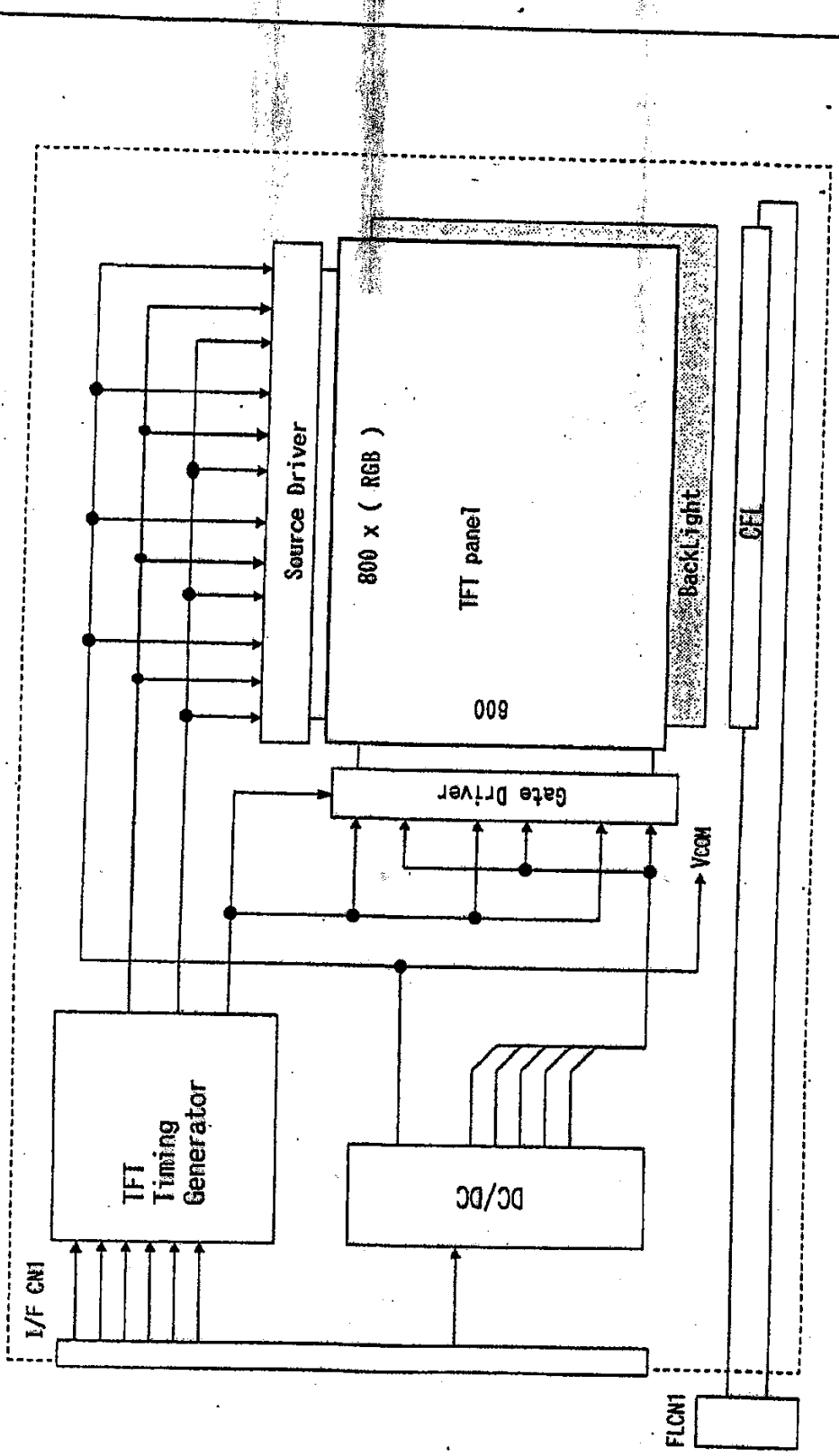
Ta=25°C

ITEM	SYM.	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Lamp voltage	V_L		-	650	-	Vrms	at I_L=3.0mArms
Lamp current	I_L		3	-	6	mArms	
Operating frequency	f_L		-	50	-	KHz	
Start up voltage	V_S		-	-	1200	Vrms	at Ta= 0°C
Operating life	t_{OL}		20000	-	-	Hours	at I_L=6.0mArms

?

at Ta = X°C

■ *BLOCK DIAGRAM*



■ *INTERFACE PIN CONNECTIONS*

LCM : I/F CN1

PIN NO.	SYMBOL	FUNCTION
1	Vss	Ground
2	DCLK	Data Clock
3	Vss	Ground
4	HSYNC	Horizontal Sync - This signal is invalid,input H or L.
5	VSYNC	Vertical Sync - This signal is invalid,input H or L.
6	Vss	Ground
7	Vss	Ground
8	Vss	Ground
9	R0	Red Data (LSB)
10	R1	Red Data
11	R2	Red Data
12	Vss	Ground
13	R3	Red Data
14	R4	Red Data
15	R5	Red Data (MSB)
16	Vss	Ground
17	Vss	Ground
18	Vss	Ground
19	G0	Green Data (LSB)
20	G1	Green Data
21	G2	Green Data
22	Vss	Ground
23	G3	Green Data
24	G4	Green Data
25	G5	Green Data (MSB)
26	Vss	Ground
27	Vss	Ground
28	Vss	Ground
29	B0	Blue Data (LSB)
30	B1	Blue Data
31	B2	Blue Data
32	Vss	Ground
33	B3	Blue Data
34	B4	Blue Data
35	B5	Blue Data (MSB)
36	Vss	Ground
37	DE	Data Enable(positive)
38	TEST	For display test, to be L.
39	V_{DD}	Power Supply - 3.3V
40	V_{DD}	Power Supply - 3.3V
41	NC	No Connection

Note) Valid synchronus signals are DCLK and DE.
CN1 : DF9B-41P-1V(HIROSE)
Suitable mating connector : DF9B-41S-1V(HIROSE)

Back Light : FLCN1

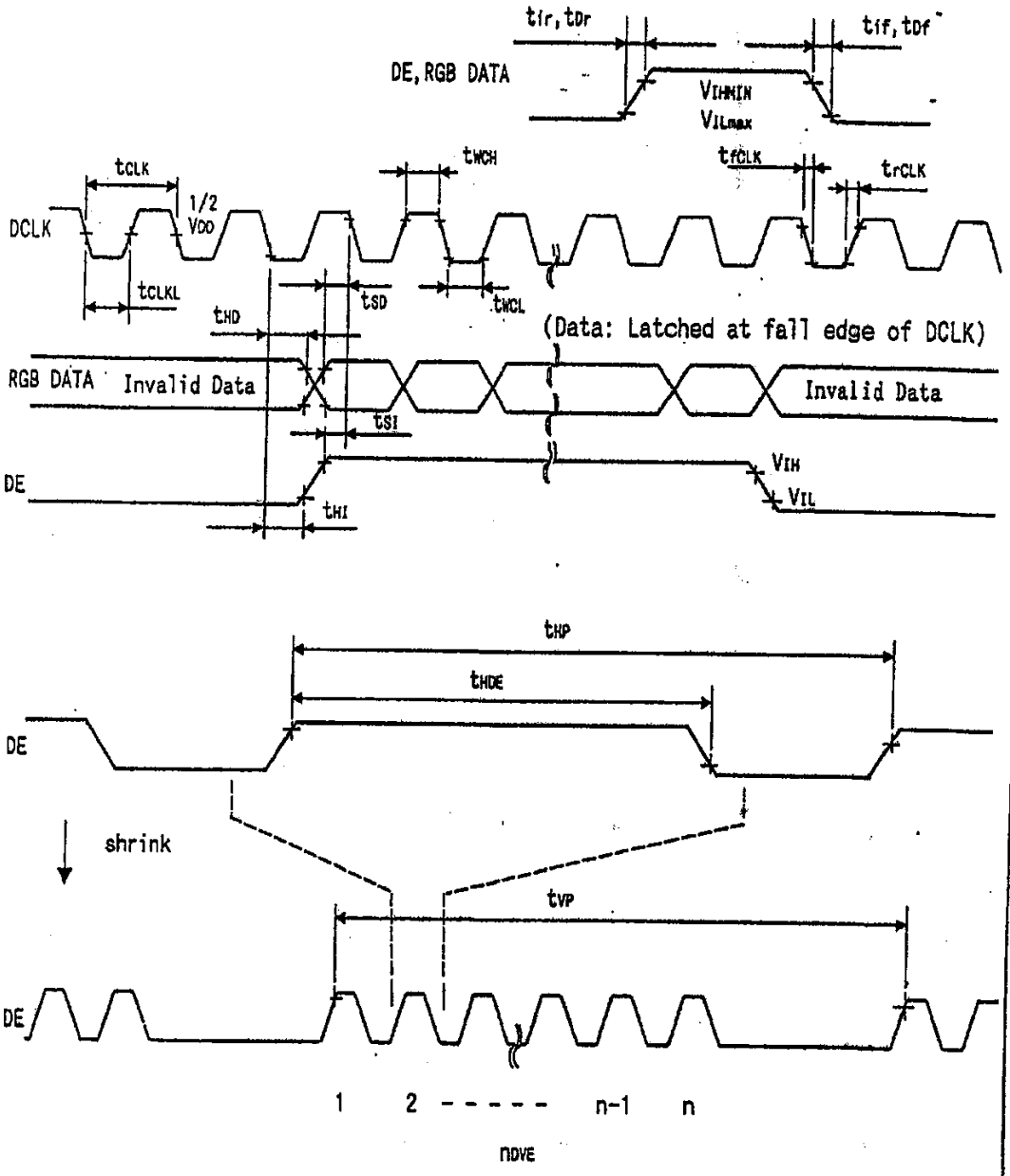
PIN NO.	SYMBOL	FUNCTION
1	H.V	High voltage for CFL
2	N.C	No Connection
3	LGND	Low voltage for CFL

FLCN1 : BHR-03VS-1(JST)
Suitable mating connector : SM02(8.0)B-BHS-1(JST)

■ *INTERFACE TIMING PARAMETERS(DE_MODE)*

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT	NOTE
DCLK	Frequency	f_{CLK}	38	40	41	MHz	$t_{CLK}=1/f_{CLK}$
	Width-Low	t_{WCL}	5	-	-	ns	-
	Width-High	t_{WCH}	5	-	-	ns	
	Rise Time	t_{rCLK}	-	-	10	ns	
	Fall Time	t_{fCLK}	-	-	10	ns	
	Duty	D	(0.40)	0.50	(0.60)	-	$D=t_{CLKL}/t_{CLK}$
DE	Setup Time	t_{SI}	3	-	-	ns	For DCLK
	Hold Time	t_{HI}	6	-	-	ns	
	Rise/Fall Time	t_{ir}, t_{if}	-	-	10	ns	
	Horiz. Period	t_{HP}	950	1056	1100	t_{CLK}	
	Horiz. DE	t_{HDE}	800	800	$t_{HP}-10$	t_{CLK}	
	Vert. Period	t_{VP}	605	628	800	t_{HP}	60.317Hz typical
	Vert. DE	n_{VDE}	600	600	$t_{VP}-5$	n	Even Number
DATA	Setup Time	t_{SD}	3	-	-	ns	For DCLK
	Hold Time	t_{HD}	3	-	-	ns	
	Rise/Fall Time	t_{Dr}, t_{Df}	-	-	10	ns	

■ *INTERFACE SIGNAL TIMING DIAGRAM (DE_MODE)*

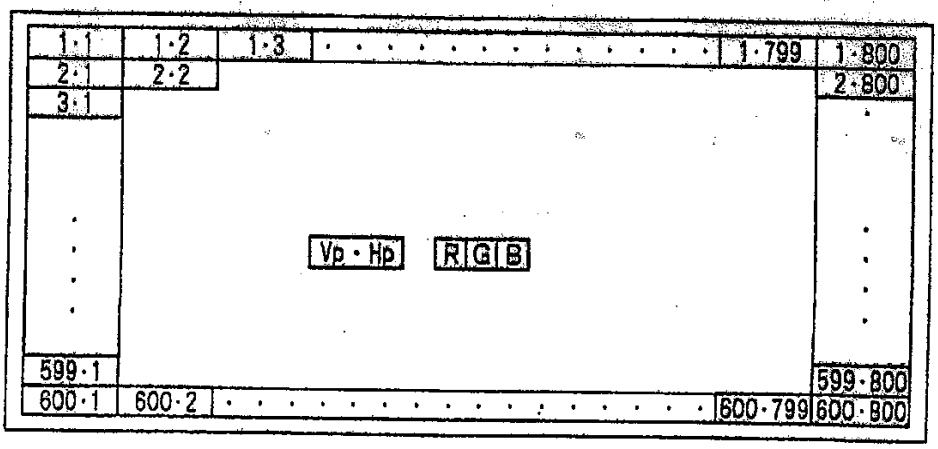


■ *RELATIONSHIP BETWEEN INPUT DATA AND DISPLAY COLOR*

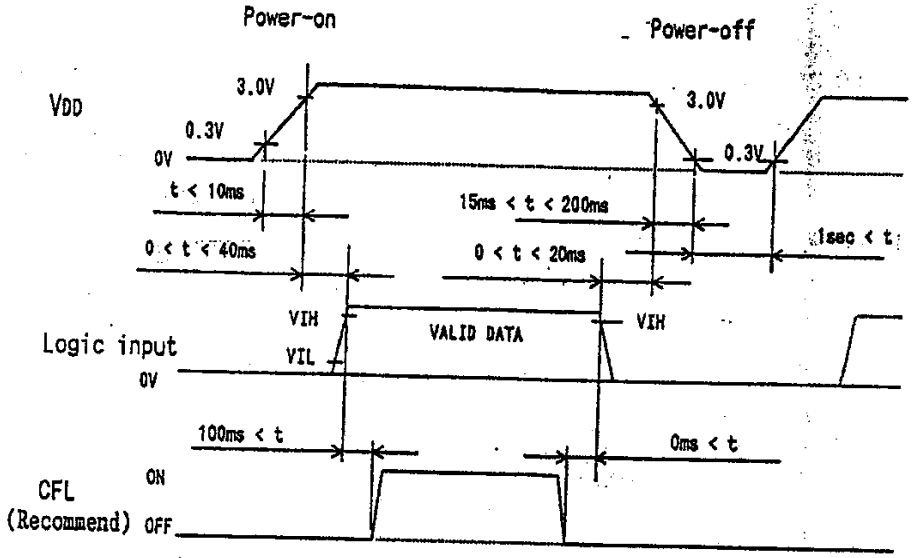
DISPLAY COLOR \ INPUT DATA		R DATA						G DATA						B DATA					
		MSB					LSB	MSB					LSB	MSB					LSB
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
BASIC COLOR	BLACK	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	RED(63)	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L
	GREEN(63)	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L
	BLUE(63)	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H
	CYAN	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H
	MAGENTA	H	H	H	H	H	H	L	L	L	L	L	L	H	H	H	H	H	H
	YELLOW	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L
	WHITE	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
RED	BLACK	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	RED(1)	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L
	RED(2)	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L
	⋮	⋮						⋮						⋮					
	RED(61)	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L
	RED(62)	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
	RED(63)	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L
GREEN	BLACK	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	GREEN(1)	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L
	GREEN(2)	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L
	⋮	⋮						⋮						⋮					
	GREEN(61)	L	L	L	L	L	L	H	H	H	H	L	H	L	L	L	L	L	L
	GREEN(62)	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L
	GREEN(63)	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L
BLUE	BLACK	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	BLUE(1)	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H
	BLUE(2)	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L
	⋮	⋮						⋮						⋮					
	BLUE(61)	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	H
	BLUE(62)	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L
	BLUE(63)	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H

Note 1) Color(n) --- 'n' indicates gray scale step.

■ *RELATIONSHIP BETWEEN INPUT DATA AND DISPLAY POSITION*



■ POWER ON/OFF SEQUENCE REQUIREMENT



When the power is off, logic input must be kept at either low level or high impedance.

CFL should be turned on after logic inputs are valid, and should be turned off before logic inputs are invalid.

When the power is on/off, the wave form of power supply voltage must be monotone increasing/decreasing respectively.

■ *PRECAUTIONS*

1 .This data sheet explains the outline of LCD module. Before designing your system with this LCD module, please ask for specification to understand our more precautions and recommendations.

2 .Please avoid disassembling or modification of this module.

3 .Since this LCD module consists of glass, dropping, pinching strongly or punching may break or result in damage. When glass breaks, please be careful not to be injured by glass piece.

4 .When glass breaks and fluid flows out, do not suck in, drink or touch the fluid. If the fluid should stick to hand or clothes, wipe off with soap or alcohol immediately and then wash it with water. If the fluid should get in eyes, wash eyes immediately with washing lotion for more than 15 minutes and then consult the doctor.

5 .Since high voltage is applied to CFL during lighting, please make design to avoid electric shock or take care in handling. Since poor connection of CFL connector may cause burning due to leakage of high voltage, please make sure of proper connection.

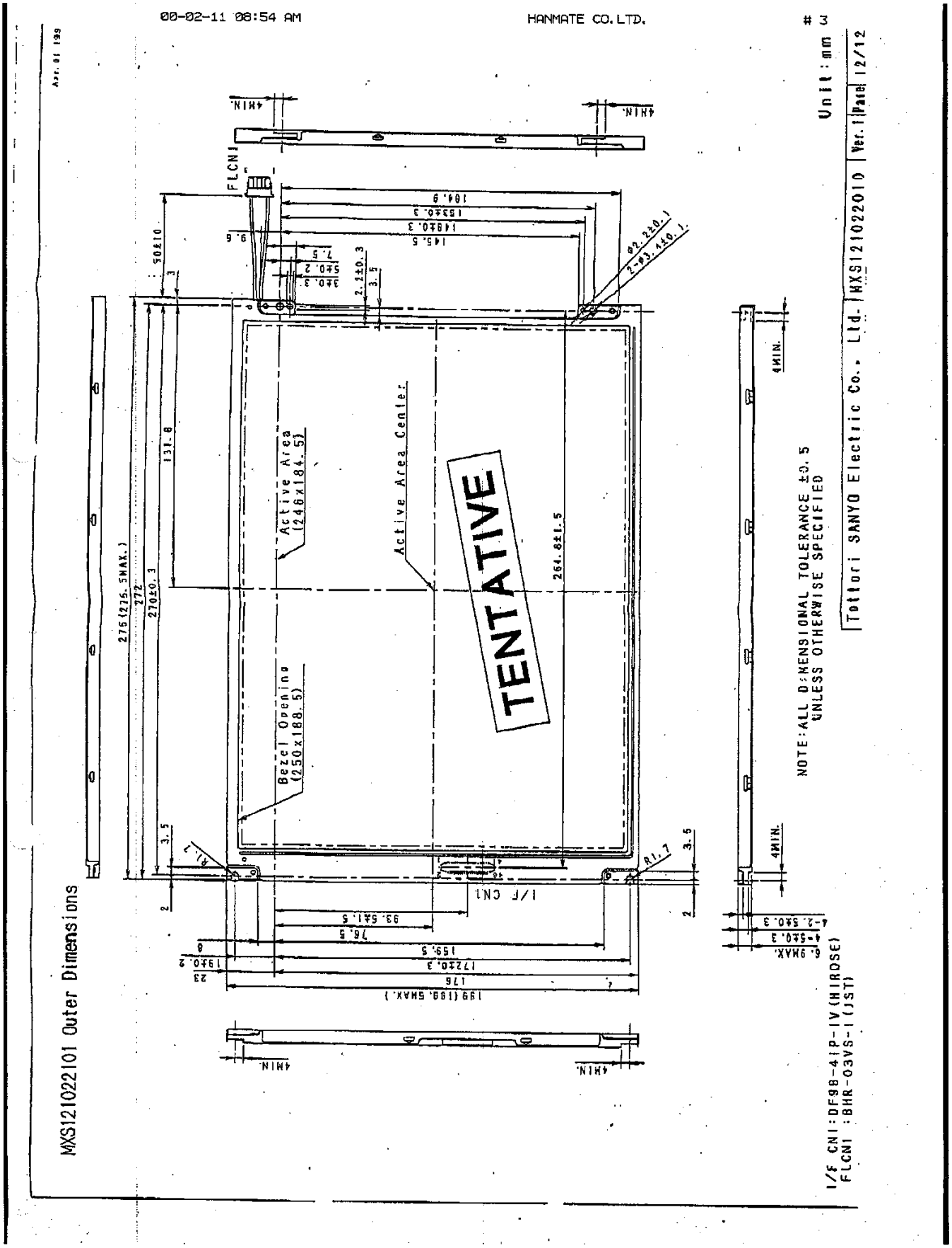
6 .CFL contains mercury inside. Please follow regulations or rules established by local autonomy at its disposal.

7 .Please do not rub, press or touch the display surface with hard material or jigs, because the polarizer at surface can be easily scratched. When the display surface gets a drop of water or contamination, wipe it off lightly with soft cloth.

8 .Since this LCD module contains semiconductors, please pay attention against static-electricity in handling.

9 .Please switch off power supply before connecting or disconnecting interface connector.

10 .For storage, please store under room temperature, low humidity and dark circumstance in original packing condition.


00-02-11 08:54 AM
HANMATE CO.LTD.
3
Unit : mm
Tottori SANYO Electric Co., Ltd. MXS121022010 Ver.1 Page 12/12
MXS121022101 Outer Dimensions
TENTATIVE
Active Area (246x184.5)
Active Area Center
Bezel Opening (250x188.5)
I/F CN1
FLCN1
4MIN.
NOTE:ALL DIMENSIONAL TOLERANCE ±0.5 UNLESS OTHERWISE SPECIFIED
I/F CN1:DF98-41P-1V(HIROSE)
FLCN1 :BHR-03VS-1(JST)

HISTORY OF CHANGES

DATE	NO.	PAGE	DESCRIPTIONS

NOTE

Inspection Standard: 12.1" SVGA TFT Module

I. Appearance inspection standard

a) Inspection term

The terms of environment is basically usual temperature (20～25℃) and humidity (65±5%RH).

Visual inspection shall be done with the distance from eyes to the sample 30cm under the condition of 300～500Lux.

Viewing angle: • $\phi \leqq 5°$ ($\theta = 0°$, 90° , 180° , 270°) when operating inspection
• $\phi \leqq 45°$ ($\theta = 0°$, 90° , 180° , 270°) when non-operating inspection

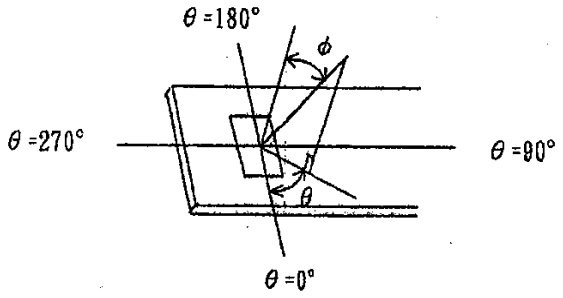


Fig.1 ϕ and θ

b) Scope of application

The appearance inspection standards shall be applied to the effective display area of the product.

c) Electrical condition

Power supply for logic	: According to specifications
DATA Clock frequency	: According to specifications
LC driving frequency	: According to specifications

d) Display pattern for inspection

* Operating inspection should be done with 8 color mode without gray scale (hereafter "raster").
* The following specifications are not applied at turn on or off.

Inspection Standard: 12.1" SVGA TFT Module

2. Quality criteria

Items to be inspected	Condition	Criteria
1. Display function	According to 12.1" SVGA TFT Module test flowchart	To be displayed properly. No short circuit or disconnection. Display shall change in accordance with test flowchart.
2. Electric characteristics a. Current consumption IDD	Power supply for logic : According to specifications DATA Clock frequency : According to specifications LC driving frequency : According to specifications Pattern : According to specifications	According to specifications
3. Bright dots	Those visible through the 5% ND-Filter are to be considered Bright dots at Black raster. Bright dots are measured while the screen is Black raster.	N≦9 Linked two dots N≦4 sets Linked three or more dots N≦0 Minimum distance between bright dots L≧5mm
4. Dark dots	Dark dots are measured while the screen is illuminated Red, Green and Blue raster.	N≦10 Linked two dots N≦5 sets Linked three or more dots N≦0 Minimum distance between dark dots L≧5mm
5. Black, white Red, Green, Blue spots	When the unit operates, black, white, red, green, blue spots appear within the viewing area.	D[mm]: Average diameter •D≦0.15 : Ignore •0.15<D≦0.3 : 3 pcs. or less •0.3 <D≦0.4 : 1 pce. or less •D>0.4 : None
6. Black, white lines	When the unit operates, black, white line appear within the viewing area.	L[mm]: Length, W[mm]: Width •W≦0.03 : Ignore •0.03<W≦0.1 and L≦2.0 : 3 pcs. or less •W>0.1 or L>2.0 : None Line width≧0.1 should be turned as spot defect.

Items to be inspected	Condition	Criteria
7. Scratch, bubble and dent on polarizer	Scratch, bubble and dent on the polarizer which can be observed in ON/OFF state.	D[mm]: Average diameter •D≦0.2 : Ignore •0.2 <D≦0.3 : 5 pcs. or less •0.3 <D≦0.5 : 2 pcs. or less •D>0.5 : None L[mm]: Length, W[mm]: Width •W≦0.03 : Ignore •0.03<W≦0.1 and L≦5.0 : 3 pcs. or less •W>0.1 or L>5.0 : None
8. Contamination on polarizer	Contamination on the surface of the polarizer	To be none except for the one, which can be easily wiped off.
9. Uneven display	Uneven contrast in the display area	Not to degrade the value of the product.
10. General appearance a. Bezel b. Model labeling	Visual inspection.	 No remarkable scratch or deformation. The label with the lot No. printed shall be put on the back plate.