

## **COVER PAGE FOR TEST REPORT**

Test Item Description:	POSTerminal
Model/Type Reference:	ST-A10-XXXX-XX-X and ST-A20-XXXX-XX-X (X may be 0-9, or a-z or blank, for marketing purpose and no impact safety related critical components and constructions.)
Rating(s):	For model ST-A10-XXXX-XX-X: 100-127/ 200-240 Vac, 50/60 Hz, 2/1 A  For model ST-A20-XXXX-XX-X: 100-127/ 200-240 Vac, 50/60 Hz, 2.5/1.5 A
Standards:	IEC 60950-1:2001, First Edition
Applicant Name and Address:	TOSHIBA TEC SINGAPORE PTE LTD 2 ANG MO KIO ST 62 SINGAPORE 569138 SINGAPORE
Factory Location(s):	P T TEC INDONESIA LOT 108-110, BATAMINDO INDUSTRIAL PARK, MUKA KUNING, BATAM RIAU 29433, INDONESIA

This Report includes the following parts, in addition to this cover page:

1. Specific Technical Criteria
2. Clause Verdicts
3. Critical Components
4. Test Results
5. Enclosures
  - a. National Differences
  - b. Marking Plate
  - c. Photographs
  - d. Diagrams
  - e. Miscellaneous

The original report was modified on 2008-07-23 to include the following changes/additions:

- This Test Report shall be read in conjunction with the original report, number:

- 1.E215701-A20-CB-1, issued 2007-10-15, with CB Certificate (DK-11928), issued 2007-10-19.
- 2.E215701-A20-CB-1 with Correction 1, issued 2007-10-22.

- This report has been amended, due to employing the alternate:

1. Model designation, ST-A20-XXXX-XX-X (X may be 0-9, or a-z or blank, for marketing purpose and no impact safety related critical components and constructions.)
2. System current rating 2.5/1.5 A for model ST-A20-XXXX-XX-X.
3. Add a mainboard, a I/O board, a LCD control board and two speakers for model ST-A20-XXXX-XX-X.
4. Add a mylar sheet (only for EMI function), and a opto-coupler, type TLP781 by Toshiba Corp for the both models.
5. Add power cords

-Only limited tests, were necessary as below:

1. Input test
2. Limited power source measurements
3. Lithium battery reverse current measurement test
4. Heating test
5. Abnormal operation tests
6. Overload of operator accessible connector test

All applicable tests according to the above standard(s) have been carried out.

Test results are valid only for the tested equipment.



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	<p>Test Report issued under the responsibility of:</p> <p><b>UL International Demko A/S</b></p>	
<p><b>TEST REPORT</b> <b>IEC 60950-1, First Edition</b> <b>Information technology equipment-Safety</b> <b>Part 1: General Requirements</b></p>		
<p><b>Report Reference No</b> ..... : E215701-A20-CB-1 <b>Date of issue</b> ..... : 2007-10-15 <b>Total number of pages</b> ..... : 62</p>		
<p><b>CB Testing Laboratory</b> ..... : Underwriters Laboratories Taiwan Co., Ltd. <b>Address</b> ..... : 260 Da-Yeh Road Peitou Taipei City, Taiwan 112</p>		
<p><b>Applicant's name</b> ..... : TOSHIBA TEC SINGAPORE PTE LTD 2 ANG MO KIO ST 62 <b>Address</b> ..... : SINGAPORE 569138 SINGAPORE</p>		
<p><b>Test specification:</b> <b>Standard</b> ..... : IEC 60950-1:2001, First Edition <b>Test procedure</b> ..... : CB Scheme <b>Non-standard test method</b> ..... : N/A</p>		
<p><b>Test Report Form No.</b> ..... : IEC60950_1B <b>Test Report Form originator</b> ..... : SGS Fimko Ltd <b>Master TRF</b> ..... : dated 2003-03</p>		
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<b>Test item description</b> .....	POSTerminal
Trade Mark .....	Toshiba
Model/Type reference .....	ST-A10-XXXX-XX-X and ST-A20-XXXX-XX-X (X may be 0-9, or a-z or blank, for marketing purpose and no impact safety related critical components and constructions.)
Manufacturer .....	SAME AS APPLICANT
Rating .....	For model ST-A10-XXXX-XX-X: 100-127/ 200-240 Vac, 50/60 Hz, 2/1 A  For model ST-A20-XXXX-XX-X: 100-127/ 200-240 Vac, 50/60 Hz, 2.5/1.5 A

<b>Testing procedure and testing location:</b>	
<input type="checkbox"/> <b>CB Testing Laboratory</b>	
Testing location / address..... :	
<input type="checkbox"/> <b>Associated CB Test Laboratory</b>	
Testing location / address..... :	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
<input checked="" type="checkbox"/> <b>Testing Procedure: TMP</b>	
Tested by (name + signature) .....	Royston Ng
	
Approved by (+ signature) .....	Wisely Lin
	
Testing location / address..... :	Underwriters Laboratories Taiwan Co., Ltd. 260 Da-Yeh Road Peitou Taipei City, Taiwan 112
<input type="checkbox"/> <b>Testing Procedure: WMT</b>	
Tested by (name + signature) .....	
Witnessed by (+ signature)..... :	
Approved by (+ signature) .....	
Testing location / address..... :	
<input type="checkbox"/> <b>Testing Procedure: SMT</b>	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
Supervised by (+ signature) .....	
Testing location / address..... :	
<input type="checkbox"/> <b>Testing Procedure: RMT</b>	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
Supervised by (+ signature) .....	
Testing location / address..... :	

**Summary of Testing:**

Unless otherwise indicated, all tests were conducted at Underwriters Laboratories Taiwan Co., Ltd. 260 Da-Yeh Road Peitou Taipei City, Taiwan 112.

Tests performed (name of test and test clause)	Testing location / Comments
End Product Reference Page General Guidelines Input: Single-Phase (1.6.2) Limited Power Source Measurements (2.5) Lithium Battery Reverse Current Measurement (4.3.8) Heating (4.5.1, 1.4.12, 1.4.13) Abnormal Operation (5.3.1 - 5.3.8.2) Overload of Operator Accessible Connector (5.3.6)	
<b>Summary of Compliance with National Differences:</b>	
AR, AT, AU, BE, CA, CH, CN, DE, DK, ES, EU, FI, FR, GB, GR, HU, IL, IN, IT, JP, KE, KR, MY, NL, NO, NZ, PL, SE, SG, SI, SK, US	

**Copy of Marking Plate** - Refer to Enclosure titled Marking Plate for copy.

**Test item particulars :**

Equipment mobility .....	movable
Operating condition .....	continuous
Mains supply tolerance (%) .....	+10%, -10% (manufacturer declared)
Tested for IT power systems .....	N/A
IT testing, phase-phase voltage (V) .....	N/A
Class of equipment .....	Class I (earthed)
Mass of equipment (kg) .....	12" : 10.5 Kg, 15" : 11.5 Kg
Protection against ingress of water .....	IP X0

**Possible test case verdicts:**

- test case does not apply to the test object .....	N / A
- test object does meet the requirement .....	P(Pass)
- test object does not meet the requirement .....	F(Fail)

**Testing:**

Date(s) of receipt of test item .....	2008-07-03
Date(s) of Performance of tests .....	2008-07-03 to 2008-07-11

**General remarks:**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(see Enclosure #)" refers to additional information appended to the report.  
"(see appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

Refer to the Cover Page For Test Report for a list of all Factory Locations.

**GENERAL PRODUCT INFORMATION:**

**Report Summary**

The original report was modified on 2007-10-22 to include the following changes/additions:  
- This test Report should be read in conjunction with the original report No.:  
E215701-A20-CB-1, issued 2007-10-15, with CB Certificate No. (DK-11928), issued 2007-10-19.

- This Report were deemed to correct, due to:  
Corrected Europe's countries into this report

- No tests were deem needed.

The original report was modified on 2008-07-23 to include the following changes/additions:  
- This Test Report shall be read in conjunction with the original report, number:  
1.E215701-A20-CB-1, issued 2007-10-15, with CB Certificate (DK-11928), issued 2007-10-19.  
2.E215701-A20-CB-1 with Correction 1, issued 2007-10-22.

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2. System current rating 2.5/1.5 A for model ST-A20-XXXX-XX-X.
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4. Add a mylar sheet (only for EMI function), and a opto-coupler, type TLP781 by Toshiba Corp for the both models.
5. Add power cords

-Only limited tests, were necessary as below:

1. Input test
2. Limited power source measurements
3. Lithium battery reverse current measurement test
4. Heating test
5. Abnormal operation tests
6. Overload of operator accessible connector test

### Product Description

For model ST-A10-XXXX-XX-X:

The unit consists of non approval power supply, hard disk and SELV circuitry of main board, housed with steel and plastic enclosures. The product provided two types TFT LCD penal 12" & 15"( with or without touch function) in end used, also has a Power USB output 24Vdc.

For model ST-A20-XXXX-XX-X:

The unit consists of non approval power supply, hard disk, speaker and SELV circuitry of main board, housed with steel and plastic enclosures. The product provided two types TFT LCD penal 12" & 15"( with or without touch function) in end used, also has two Power USB output 12Vdc and one Power USB output 24Vdc.

### Model Differences

Model ST-A20-XXXX-XX-X is similar to model ST-A10-XXXX-XX-X, except for current rating, mainboard, I/O board, LCD control board and speaker.

For each model difference in model ST-A10-XXXX-XX-X, refer to enclosure 7-01.

For each model difference in model ST-A20-XXXX-XX-X, refer to enclosure 7-02.

### Additional Information

For model ST-A10-XXXX-XX-X, it has a 3.5" H.D.D or Non-H.D.D. installed inside the unit.

For model ST-A20-XXXX-XX-X, it has one 3.5" H.D.D or one 2.5" H.D.D or two 2.5" H.D.D or Non-H.D.D. installed inside the unit.

The label is a draft of an artwork for marking plate pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

### Technical Considerations



The product was submitted and tested for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 40 degree C

The means of connection to the mains supply is: Pluggable A, Detachable power cord

The product is intended for use on the following power systems: TN

The equipment disconnect device is considered to be: Appliance inlet

The following accessible locations (with circuit/schematic designation) are within a limited current circuit:  
Inverter output

The following circuit locations (with circuit/schematic designation) were investigated as a limited power source (LPS): USB and PS/2 ports

The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual

The following circuit locations (with circuit/schematic designation) were not investigated as a limited power source (LPS) : For model ST-A10-XXXX-XX-X, PowerUSB 4 (5Vdc & 24Vdc); For model ST-A20-XXXX-XX-X: +12 Vdc and +24 Vdc output of PowerUSB ports.

#### **Engineering Conditions of Acceptability**

When installed in an end-product, consideration must be given to the following:

The investigated Pollution Degree is: 2

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.5.3	Thermal controls	Thermal Controls comply with Annex K, see Annex K - Thermal Controls. TH3 uses for fan speed control.	Pass
1.6.2	Input current	(see appended table 1.6.2) The steady state input current of the equipment did not exceed the RATED CURRENT by more than 10% under NORMAL LOAD.	Pass
1.7.1	Rated current (mA or A) .....	For model ST-A10-XXXX-XX-X: 100-127/ 200-240 Vac, 50/60 Hz, 2/1 A  For model ST-A20-XXXX-XX-X: 100-127/ 200-240 Vac, 50/60 Hz, 2.5/1.5 A	Pass
	Manufacturer's name or trademark or identification mark.....	Toshiba Tec Singapore Pte Ltd.	Pass
	Type/model or type reference .....	ST-A10-XXXX-XX-X and ST-A20-XXXX-XX-X (X - Represent 0-9, or a-z or blank, for marketing purpose and no impact safety related critical components and constructions.)	Pass
1.7.6	Fuse identification.....	Fuse (F1) provided with voltage, current, and special fusing characteristic marking as applicable.	Pass
2.4.2	Frequency (Hz).....	63.8 kHz.(normal) 63.2 kHz (Q1 pin1-3 short )	-
2.5	Inherently limited output		N/A
	Impedance limited output	See Table 1.5.1 for PTC specifications.	Pass
	Overcurrent protective device limited output		N/A
	Regulating network limited output under normal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	operating and single fault condition		
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition		N/A
	Output voltage (V), output current (A), apparent power (VA):..... :	<p>For model ST-A10-XXXX-XX-X,</p> <p>USB 1, 2, 3 ,Vcc to RTN Uoc, Isc, VA=5.1V, 1.8A, 7.9VA</p> <p>USB 5, Vcc to RTN Uoc, Isc, VA=5.2V, 2.2A, 9.7VA</p> <p>PS/2(keyboard) Uoc, Isc, VA=5.2V, 2A, 8.4VA</p> <p>PS/2(mouse) Uoc, Isc, VA=5.2V, 2A, 8.5VA</p> <p>For model ST-A20-XXXX-XX-X,</p> <p>USB(Right side 1,2,3): Maximum Uoc, Isc, VA=5.06V, 1.95A, 8.405VA.</p> <p>USB(Right side +12V power USB): Maximum Uoc, Isc, VA=5.06V, 1.75A, 7.735VA.</p> <p>USB(Left side +12V power USB): Maximum Uoc, Isc, VA=5.06V, 2.15A, 9.202VA.</p> <p>USB(+24V power USB): Maximum Uoc, Isc, VA=5.06V, 1.95A, 8.502VA</p> <p>USB(LCD panel 1,2,3): Maximum Uoc, Isc, VA=4.94V, 1.55A, 6.727VA</p> <p>PS/2 (Keyboard):</p>	-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
		Maximum Uoc, Isc, VA=5.09V, 2.1A, 6.342VA  PS/2 (Mouse): Maximum Uoc, Isc, VA=5.09V, 2.1A, 6.195VA	
	Current rating of overcurrent protective device (A) :		-
2.6.3.2	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG ..... :	2.5A minimum, 0.75 mm <sup>2</sup> , 18 AWG.	-
2.6.3.3	Size of protective bonding conductors		Pass
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG ..... :	2.5A minimum, 0.75 mm <sup>2</sup> , 18 AWG.	-
2.6.5.6	Corrosion resistance	No risk of corrosion. Complies with Annex J.	Pass
3.2.5	Power supply cords	See Critical Components List.  Power supply cord suitable for application and subject to country's national code and regulations to be provided by the manufacturer.	Pass
3.2.5.1	AC power supply cords		Pass
	Type ..... :	See Critical Components List.	-
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG ..... :	See Critical Components List.	-
4.2.7	Stress relief test	No indication of shrinkage or distortion on enclosures due to the stress relief test (70°C/7 h). See enclosed test record.	Pass
4.2.8	Cathode ray tubes	The equipment does not have any CRT*s	N/A
4.3.8	Batteries	Battery is protected against charging current by multiple components.  (See appended table 1.5.1)	Pass
4.3.13	Radiation; type of radiation	The equipment does not generate ionizing radiation or contain flammable liquids or	Pass

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

		gases.	
4.3.13.5	Laser (including LEDs)	This product contains only visible indicator LEDs.	Pass
	Laser class..... :	This product contains only visible indicator LEDs.	-
4.5.1	Maximum temperatures	(see appended table 4.5) The equipment and its component parts did not attain excessive temperatures during normal operation.	Pass
	Normal load condition per Annex L ..... :	Operated in the most unfavorable way of operation given in the operating instructions until steady conditions established.	Pass
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	Pass
5.3.2	Motors	Fan motor evaluated as part of component evaluation.	Pass
5.3.3	Transformers	(see appended Annex C)	Pass
5.3.4	Functional insulation ..... :	Functional insulation complies with the requirements (c).	Pass
5.3.5	Electromechanical components	The equipment does not have any electromechanical components in the secondary.	N/A
5.3.6	Simulation of faults	Transformer temperatures measured for compliance with Annex C during test.	Pass
5.3.7	Unattended equipment	Equipment is not intended for unattended use.	N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.3.8	Compliance criteria for abnormal operating and fault conditions	No fire, emission of molten metal or deformation was noted during the tests and Electric Strength tests performed after abnormal and fault tests.	Pass
B	<b>Annex B, MOTOR TESTS UNDER ABNORMAL CONDITIONS(see 4.7.2.2 and 5.3.2)</b>		Pass
B.1	General requirements	Fan motor evaluated as part of component evaluation.	Pass
	Position .....	See table 1.5.1.	-
	Manufacturer.....	See table 1.5.1.	-
	Type .....	See table 1.5.1.	-
	Rated values .....	See table 1.5.1.	-
J	<b>Annex J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)</b>		Pass
	Metal used .....	Compliance with Table J.1	-
K	<b>ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)</b>		Pass
K.1	Making and breaking capacity	Approved component.	Pass
U	<b>Annex U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)</b>		Pass
	.....	Evaluated in component approval.	-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

1.5.1	<b>TABLE: list of critical components</b>					Pass
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity <sup>1)</sup>	
1. TFF LCD monitor	AUO	G121SNYY or G150XGXX	12 or 15 inch	IEC60950-1	UL, --	
1a. TFF LCD monitor (Alternate)	TOSHIBA Matsushita Display	LTD121C32H	12 inch	IEC60950-1	UL, --	
1b. TFF LCD monitor (Alternate)	TOSHIBA Matsushita Display	LTA121C32HF	12 inch	IEC60950-1	UL, --	
2. Enclosure (For LCD monitor part)	TEIJIN CHEMICALS LTD	TN-7000	V-1, 85 degree C,  Unit consists of 2 pieces plastics housed steel chassis.  For 12 inch TFT LCD, overall measured 306 by 247 by 337 mm. minimum. 3 mm thick.  For 15 inch TFT LCD overall measured 366 by 251 by 359 mm. minimum. 3 mm thick.	UL94, UL746C	UL, --	
3. D/A inverter	--	--	--	--	--, --	
3-1. Transformer (D/A inverter T1)	Li Shin	I00079A	130degree C	--	--, --	
3-2. Wire	--	--	130degree C	UL1446	UL, --	
3-3. Output Capacitor (C3, C4)	--	--	18pF maximum	--	--, --	
3-4. Output Capacitor (C29, C30)	--	--	220pF maximum	--	--, --	
3-5. Lamp wiring	--	--	28 AWG minimum, rated VW-1, 3 KV minimum.	UL 758	UL, --	
3-6. Lamp	--	--	Rated V-2	UL498, UL1977	UL, --	

IEC 60950-1					
Clause	Requirement + Test		Result - Remark		Verdict
connector			minimum, use for connecting between CCFL Lamp and external DC to AC inverter through lamp wire.		
3-7. PWB	--	--	V-0, 105 degree C	UL796	UL, --
4. Plastic Enclosure (For main unit part)	TEIJIN CHEMICALS LTD	TN-7000	V-1, 85 degree C, Unit consists of 7 pieces plastics housed steel chassis.  For Main Unit overall measured 215 by 180 by 310 mm. 3 mm thick minimum.	UL94, UL746C	UL, --
4-1. Opening	--	--	For power supply cover: Provided numeric slot openings each 1.7 by 3 mm, apart 6.5 mm at side, covered area 58 by 30.5 mm min.  For system fan cover: Provided numeric slot opening each 4.5 by 43.5 mm, apart 2 mm at front, covered area 90 by 50 mm min.	--	--, --
5. Power Supply Unit	Toshiba TEC, PT. TEC Indonesia	PS-BRU BK-ROHS	I/P: 100~120/200~24 VAC, 2/1A, 50/60Hz. O/P: +24V/0.5 A, +12V/4.5A, -12V/0.3A,	--	--, --



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Clause	Requirement + Test		Result - Remark		Verdict
			+5V(AUX)/0.5 A, +5V/1.8A, +3.3V/4.0A		
5-1. Enclosure	--	--	Steel, overall measured 205 by 105 by 65 mm, 0.8 thickness min.	--	--, --
5-1-1. Opening	--	--	Provided numeric slot openings each 2.45 by 23.5, apart 6.5mm at side, covered 3 area each 53 by 50, 47 by 25 and 20 by 25 mm min.	--	--, --
5-2. Appliance inlet	Yamate	AP-300-3B1	15A/250VAC, 10A/250VAC	UL498, IEC 60309-2, IEC60309-1	UL, VDE, --
5-2a. Alternate	Delta Electronics Inc	SK-015K	15A/250VAC, 10A/250VAC	UL498, IEC 60309-2, IEC60309-1	UL, VDE, --
5-2b. Alternate	Nicoon	NC-174-10N-B- F4.8, NC-174- 10N	15A/250VAC, 10A/250VAC	UL498, IEC 60309-2, IEC60309-1	UL, VDE, --
5-2c. Alternate	Rong Feng	SS-7BDE-4.0	15A/250VAC, 10A/250VAC	UL498, IEC 60309-2, IEC60309-1	UL, VDE, --
5-3. Connectors and Receptacles (secondary ELV/SELV circuits)	--	Metal/ Plastic	Copper alloy pins housed in bodies of plastic rated V-2 minimum.	UL94, UL746	UL, --
5-3a. Connectors and Receptacles (secondary ELV/SELV circuits) (Alternate)	--	--	--	UL498, UL1977	UL, --
5-4. Wiring, internal (Primary)	--	--	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1; minimum 300 V, 80 degree C.	UL758	UL, --

IEC 60950-1					
Clause	Requirement + Test		Result - Remark		Verdict
5-4-1. Earthing and Bonding	--	--	Minimum No.18 AWG, insulated with green / yellow color sleeving, one end connected to the Inlet earthing terminal and mechanically secured by solder, the other end terminated with double crimp on copper ring terminal and secured by a screw.	UL758	UL, --
5-5. Wiring, internal (Secondary)	--	--	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1; minimum 30V, 80 degree C.	UL758	UL, --
5-6. DC Fan (for power supply & system)	Minebea-Matsushita Motor Corp	2410ML-05W-B50	Provide two fans, one is for power supply unit, and one is for system unit, 24Vdc, 0.13A, 0.66m3/min	UL507, IEC 60950	UL, VDE CSA, --
5-7. Fuse (F1)	Cooper Bussmann Inc	S505-5A	250 Vac T5AH	UL248, IEC 60127	UL, VDE, --
5-7a. Alternate	Little Fuse	0215005. MXP	250 Vac T5AH	UL248, IEC 60127	UL, CSA, VDE, -
5-8. X- Capacitor (C3,C4)	EVOX	PHE840M	Max. 0.47 uF, 100 degree C, Min. 275 Vac, marked with X1 or X2	UL1414, IEC 60384-14	UL, VDE, CSA, -
5-8a. Alternate	Panasonic	ECQ-UV	Max. 0.47 uF, 100 degree C, Min. 275 Vac, marked with X1 or X2 with VDE mark	UL1414, IEC 60384-14	UL, VDE, CSA, -
5-8b Alternate	OKAYA	LE 474, RE474	Max. 0.47 uF, 100 degree C,	UL1414, IEC 60384-14	UL, VDE, CSA, -

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

			Min. 275 Vac , marked with X1 or X2 with VDE mark		
5-8c. Alternate	Pilkor	PCX2_337	Max. 0.47 uF, 100 degree C, Min. 275 Vac , marked with X1 or X2 with VDE mark	UL1414, IEC 60384-14	UL, VDE, CSA, - -
5-9. Bleeder resistor (R1,R3)	--	--	Each in series, 150 Kohm, 1/4 W	--	--, --
5-10. Varistor (Z1)	Joyin Co Ltd	JVR10S471K87 PRYU5-L	470Vac	UL1449,	UL, --
5-10a. Alternate	Fuji Electric Device Technology Co Ltd	ENE471D-10A	470Vac	UL1449,	UL, --
5-10b. Alternate	Avx Corp	VF10M10471K	470Vac	UL1449,	UL, --
5-10c. Alternate	Panasonic	ERZV10D471	470Vac	UL1449,	UL, --
5-10d. Alternate	Chemicon	TNR10V471K	470Vac	UL1449,	UL, --
5-11. Choke (L1, L2, L3)	--	--	Min. 130 degree C. L1 see enclosure ID4-03 for the details; L2 see enclosure ID4-04 for the details; L3 see enclosure ID4-05 for the details.	--	--, --
5-11-1. Core	--	--	Ferrite	--	--, --
5-11-2. Coil	--	--	Copper magnet wire, minimum 130 degree C,	UL1446	UL, --
5-12. Bridge Capacitor (C26)	Panasonic	ECKATS222ME	Max. 2200 PF, Min. 250 Vac , marked with Y1.	UL1414, IEC 60384-14	UL, VDE, --
5-12a. Alternate	MURATA	DE2E3KY222M A3BM02, DE1E3KX222M N5AA01, DE2E3KH222M A3B	Max. 2200 PF, Min. 250 Vac , marked with Y1.	UL1414, IEC 60384-14	UL, VDE, --
5-13. Bridge diode (DB1)	--	--	Min. 600 V, 6 A	--	--, --
5-14 Transformer (T1)	Li Shin	TF-BRU-Main-02	Class B, See enclosure ID4-01	UL1446	UL, --

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Clause	Requirement + Test	Result - Remark	Verdict

			for the details.		
5-14a Alternate	PT Samhwa	TF-BRU-Main-01	Class B, See enclosure ID4-01 for the details.	UL1446	UL, --
5-14-1. Core	--	--	Ferrite core	--	--, --
5-14-2. Coil (primary and secondary)	--	--	Min. 130 degree C.	UL1446	UL, --
5-14-3. Bobbin	Chang Chun Plastics Co., Ltd	T375J	Phenolic, V-0, min.0.71mm thick	UL94, UL746C	UL, --
5-14-4. Insulation tape	3M Company	1350F-1	130 degree C	UL510	UL, --
5-14-4a. Alternate	Jingjiang Yahua Pressure Sensitive Glue Co., Ltd.	CT	130 degree C	UL510	UL, --
5-14-4b. Alternate	Symbio Inc	35660	130 degree C	UL510	UL, --
5-14-5. Tubing	Great Holding Industrial Co., Ltd.	TFS	130 degree C	UL224	UL, --
5-14-6. Margin tape	Symbio Inc	35661	130 degree C min. Min. 4.3 mm width wound on both side of bobbin.	UL510	UL, --
5-14-6a. Alternate	Jingjiang Yahua Pressure Sensitive Glue Co., Ltd.	WF	130 degree C min. Min. 4.3 mm width wound on both side of bobbin.	UL510	UL, --
5-14-6b. Alternate	3M COMPANY	44	130 degree C min. Min. 4.3 mm width wound on both side of bobbin.	UL510	UL, --
2-15. Transformer (T2)	Li Shin	TF-BRU-5VAUX-02	Class B, See enclosure ID4-02 for the details.	UL1446	UL, --
5-15-1. core	--	--	Ferrite	--	--, --
5-15-2. coil (primary and secondary)	--	--	Min. 130 degree C.	UL1446	UL, --
5-15-3. bobbin	Sumitomo Bakelite Co Ltd	PM-9820	Phenolic, V-0 , min.0.71mm thick	UL94, UL746C	UL, --

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Clause	Requirement + Test		Result - Remark		Verdict
5-15-4. insulation tape	Duck Sung Tape	DTS-204	130 degree C	UL510	UL, --
5-15-4a. Alternate	Hyun Dai Industrial	#800	130 degree C	UL510	UL, --
5-15-4b. Alternate	Jingjiang Yahua Pressure Sensitive Glue Co., Ltd.	CT	130 degree C	UL510	UL, --
5-15-5. Triple Insulated Wire	Furukawa Electric Co Ltd	TEX-E	Copper magnet, 130 degree C	UL2353	UL, --
5-15-5a. Alternate	Dong Yang Elect.	1UEW	Copper magnet, 130 degree C	UL2353	UL, --
5-16. Photo-coupler (PC1,PC2, PC3)	Toshiba Corp, Semiconductor Co Discrete Semiconductor Div	TLP421	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL,TUV, VDE, --
5-16a. Alternate	Nec Electronics Corp Compound Semiconductor Device Div	PS2561L1-1-V-A	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL,TUV, VDE, --
5-16b. Alternate	Sharp Corp Electronic Components Group	PC123FY2J000 F	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL,TUV, VDE, --
5-16c. Alternrate	Nec Electronics Corp Compound Semiconductor Device Div	PS2561AL1-1-V(W)-A	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL,TUV, VDE, --
5-16d. Alternate	Nec Electronics Corp Compound Semiconductor Device Div	PS2561	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL, --
5-16e. Alternate	Nec Electronics Corp Compound Semiconductor Device Div	PS2561A	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL, --
5-16f. Alternate	Sharp Corp Electronic Components Group	PC123	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL, --
5-16g. Alternate	Toshiba Corp, Semiconductor Co Discrete Semiconductor Div	TLP781	Insulation voltage 5000 Vac minimum	UL1577, IEC 60747-5, VDE 884	UL, --
5-17. Y-Cap.	Murata Mfg Co	DE2E3KY222M	Max. 2200 PF,	UL1414,	UL, VDE, --

IEC 60950-1					
Clause	Requirement + Test		Result - Remark		Verdict
(C1,C2,C5,C6)	Ltd	A3BM02, DE1E3KX222M N5AA01, DE2E3KH222M A3B	Min. 250 Vac , marked with Y1 or Y2.	IEC60384-14	
5-17a. Alternate	Matsushita Electric Industrial Co Ltd *Panasonic Corp of North America	ECKATS222ME	Max. 2200 PF , Min. 250 Vac , marked with Y1 or Y2	UL1414, IEC60384-14	UL, VDE, --
5-18. PWB	--	--	V-0, 105 degree C	UL796	UL, --
5-19. Heat-sink for D12, D11	--	--	Aluminum, Measured 80 by 50 by 3mm thick	--	--, --
5-20. Heat-sink for Q2, Q4, D5	--	--	L-shaped, aluminum, overall 80 by 50 by 35 mm, minimum 3mm thickness	--	--, --
5-21 Transistor (Q2,Q4)	--	--	8A, 500V	--	--, --
5-22. Thermistor (TH3)	Murata Mfg Co Ltd	PRF21BE471++ +++ (+ = Can be any letter or numeral)	32 Vdc, 85 degree C.	UL1434	UL, --
5-24. Mylar sheet (Between primary and metal enclosure)	Mitsubishi Plastic Industries Ltd	C-850	V-2 minimum, See enclosure ID4-10 for the details.	UL746C, UL94	UL, --
5-25. Mylar sheet (In secondary side) (Only for EMI function)	--	--	V-2 minimum, Provided on secondary circuit. Only for EMI function. Secured by glue See enclosure ID3-23 and 3-24.	UL746C, UL94	UL, --
5-26. Glue	--	--	V-2 minimum	UL746C, UL94	UL, --
6. Motherboard (For model ST- A10-XXXX-XX- X)	--	--	--	--	--, --
6-1. PWB	--	--	V-0, 105 degree C	UL796	UL, --
6-2. PTC Polyswitch	Tyco Electronics Corp Raychem	MiniSMDC110, NANOSMDC110	It 2.2A, I <sub>max</sub> 40A, (CA:3)	UL1434, IEC60730	UL,, --

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

(TH9, TH1, TH2, TH3, TH4)	Circuit Protection Div	F			
6-2a. Alternate	Tyco Electronics Corp Raychem Circuit Protection Div	MiniSMDM150/24	It 3A, I <sub>max</sub> 20A, (CA:3)	UL1434, IEC60730	UL, --
6-2b Alternate	Tyco Electronics Corp Raychem Circuit Protection Div	SMD030	It 0.6A, I <sub>max</sub> 10A, CA:3	UL1434, IEC60730	UL, --
6-2c Polyswitch (TH1)	Tyco Electronics Corp Raychem Circuit Protection Div	SMD260	It 5.2A, I <sub>max</sub> 40A,	UL1434, IEC60730	UL, --
6-2d Polyswitch (TH2)	Tyco Electronics Corp Raychem Circuit Protection Div	SMD200	It 4A, I <sub>max</sub> 40A,	UL1434, IEC60730	UL, --
6-3. RTC Lithium Battery (Protected circuit by CR3 and R306 (1kohm) circuit	--	CR2032	3 Vdc, Max Abnormal Charging Current, 10 mA	UL1642	UL, --
7. Motherboard (For model ST-A20-XXXX-XX-X)	--	--	--	--	--, --
7-1. PWB	--	--	V-0, 105 degree C	UL796	UL, --
7-2. RTC Lithium Battery (Protected circuit by diode CR6H2 and resistor R6H9 (1kohm) circuit	--	CR2032	3 Vdc, Max Abnormal Charging Current, 10 mA	UL1642	UL, --
7-3. Polyswitch (TH2) (for PS/2 port)	Tyco Electronics Corp	nanoSMDC110F	6.0Vdc, I <sub>h</sub> =1.1A, I <sub>t</sub> =2.2A.	UL1434, IEC60730	UL, --
8. I/O board (For model ST-A20-XXXX-XX-X)	--	--	--	--	--, --
8-1. PWB	--	--	V-0, 105 degree C	UL796	UL, --
8-2. Polyswitch (TH5, TH6)	Tyco Electronics Corp	MINISMDC150/24	24.0Vdc, I <sub>h</sub> =1.5A, I <sub>t</sub> =3.0A.	UL1434, IEC60730	UL, --
8-3. Polyswitch	Tyco Electronics	nanoSMDC110F	6.0Vdc, I <sub>h</sub> =1.1A,	UL1434,	UL, --

IEC 60950-1					
Clause	Requirement + Test		Result - Remark		Verdict
(TH1, TH2, TH3, TH4, TH9, TH10) (For USB port)	Corp		It=2.2A.	IEC60730	
9. LCD control board (For model ST-A20-XXXX-XX-X)	--	--	--	--	--, --
9-1. PWB	--	--	V-0, 105 degree C	UL796,	UL, --
9-2. Polyswitch (TH3, TH4, TH5) (For USB ports on the panel)	Tyco Electronics Corp	nanoSMDC110F	6.0Vdc, Ih=1.1A, It=2.2A.	UL1434, IEC60730	UL, --
10. Cable (host to monitor and main unit)	--	--	Style 2919, 30V, 80 deg C	UL758	UL, --
11. H.D.D. (Optional)	--	--	Generic.  For 3.5 inch H.D.D., 5Vdc, 0.45A; 12Vdc, 0.5A. For 2.5 inch H.D.D., 5Vdc, 1.0A.  For ST-A10-XXXX-XX-X, One 3.5 inch H.D.D is provided.  For ST-A20-XXXX-XX-X, One 3.5 inch H.D.D or one 2.5 inch H.D.D or two 2.5 inch H.D.D is (are) provided.	UL60950-1 or UL60950	UL, --
12. Connectors and Receptacles (secondary ELV/SELV circuits)	--	Metal/ Plastic	Copper alloy pins housed in bodies of plastic rated V-2 minimum.	UL94, UL746	UL, --
12a. Connectors and Receptacles (secondary	--	--	--	UL498, UL1977	UL, --



IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

ELV/SELV circuits) (Alternate)					
13. Speaker (Optional) (For model ST-A20-XXXX-XX-X)	--	--	Two speakers provided. Maximum 1W, Minimum 8 Ohm.	--	--, --
14. Power Supply Cord (Optional)	--	--	Type SVT or SPT-2, min 125 V, 10 A with NEMA 5-15P, Other end connected to unit, with cord-connected body, grounding type, suitable for cord size, rating not less than that of attachment plug.	UL62, UL498	UL, --
<sup>1)</sup> an asterisk indicates a mark which assures the agreed level of surveillance					

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

1.6.2	TABLE: electrical data (in normal conditions)						Pass
fuse #	I rated (A)	U (V)	P (W)	I (mA)	I fuse (mA)	condition/status	
For model ST-A10-XXXX-XX-X	--	--	--	--	--	--	
TFT LCD 12 inch	--	--	--	--	--	--	
F1	--	90Vac/50Hz	49.3	550	550	Max. Normal Load	
F1	1	100Vac/50 Hz	49.1	500	500	Max. Normal Load	
F1	1	120Vac/50 Hz	48.9	420	420	Max. Normal Load	
F1	--	132Vac/50 Hz	48.7	380	380	Max. Normal Load	
F1	--	180Vac/50 Hz	47.7	280	280	Max. Normal Load	
F1	2	200Vac/50 Hz	47.5	260	260	Max. Normal Load	
F1	2	240Vac/50 Hz	47.2	240	240	Max. Normal Load	
F1	--	264Vac/50 Hz	47.2	270	270	Max. Normal Load	
F1	--	90Vac/60Hz	49.2	550	550	Max. Normal Load	
F1	1	100Vac/60 Hz	49.0	500	500	Max. Normal Load	
F1	1	120Vac/60 Hz	48.8	410	410	Max. Normal Load	
F1	--	132Vac/60 Hz	48.6	380	380	Max. Normal Load	
F1	--	180Vac/60 Hz	47.7	280	280	Max. Normal Load	
F1	2	200Vac/60 Hz	47.5	260	260	Max. Normal Load	
F1	2	240Vac/60 Hz	47.2	240	240	Max. Normal Load	
F1	--	264Vac/60 Hz	47.2	280	280	Max. Normal Load	
TFT LCD 15 inch	--	--	--	--	--	--	
F1	--	90Vac/50Hz	58.5	650	650	Max. Normal Load	

IEC 60950-1						
Clause	Requirement + Test			Result - Remark		Verdict
F1	1	100Vac/50 Hz	58.2	590	590	Max. Normal Load
F1	1	120Vac/50 Hz	57.9	490	490	Max. Normal Load
F1	--	132Vac/50 Hz	57.9	440	440	Max. Normal Load
F1	--	180Vac/50 Hz	56.9	330	330	Max. Normal Load
F1	2	200Vac/50 Hz	56.6	300	300	Max. Normal Load
F1	2	240Vac/50 Hz	56.2	260	260	Max. Normal Load
F1	--	264Vac/50 Hz	55.8	300	300	Max. Normal Load
F1	--	90Vac/60Hz	57.8	560	560	Max. Normal Load
F1	1	100Vac/60 Hz	57.6	580	580	Max. Normal Load
F1	1	120Vac/60 Hz	57.3	480	480	Max. Normal Load
F1	--	132Vac/60 Hz	57.2	440	440	Max. Normal Load
F1	--	180Vac/60 Hz	56.4	330	330	Max. Normal Load
F1	2	200Vac/60 Hz	56.1	300	300	Max. Normal Load
F1	2	240Vac/60 Hz	55.6	270	270	Max. Normal Load
F1	--	264Vac/60 Hz	56.3	310	310	Max. Normal Load
For model ST-A20-XXXX-XX-X	--	--	--	--	--	--
TFT LCD 12 inch with two 2.5" H.D.D	--	--	--	--	--	--
F1	--	90Vac/50Hz	106.1	1166	1166	Max. Normal Load
F1	2.5	100Vac/50 Hz	103.6	1039	1039	Max. Normal Load
F1	2.5	127Vac/50 Hz	102.4	807	807	Max. Normal Load
F1	--	135Vac/50	102.5	761	761	Max. Normal Load

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

		Hz				
F1	--	140Vac/50 Hz	101.9	732	732	Max. Normal Load
F1	--	180Vac50 Hz	100.7	572	572	Max. Normal Load
F1	1.5	200Vac/50 Hz	100.6	520	520	Max. Normal Load
F1	1.5	240Vac/50 Hz	100.2	444	444	Max. Normal Load
F1	--	254Vac/50 Hz	99.4	428	428	Max. Normal Load
F1	--	264Vac/50 Hz	99.3	428	428	Max. Normal Load
F1	--	90Vac/60Hz	104.7	1166	1166	Max. Normal Load
F1	2.5	100Vac/60 Hz	103.9	1044	1044	Max. Normal Load
F1	2.5	127Vac/60 Hz	102.4	813	813	Max. Normal Load
F1	--	135Vac/60 Hz	102.2	761	761	Max. Normal Load
F1	--	140Vac/60 Hz	101.8	733	733	Max. Normal Load
F1	--	180Vac60 Hz	101.1	572	572	Max. Normal Load
F1	1.5	200Vac/60 Hz	100.7	523	523	Max. Normal Load
F1	1.5	240Vac/60 Hz	99.7	448	448	Max. Normal Load
F1	--	254Vac/60 Hz	100.0	431	431	Max. Normal Load
F1	--	264Vac/60 Hz	99.5	427	427	Max. Normal Load
TFT LCD 12 inch with one 3.5" H.D.D	--	--	--	--	--	--
F1	--	90Vac/50Hz	104.5	1162	1162	Max. Normal Load
F1	2.5	100Vac/50 Hz	103.6	1039	1039	Max. Normal Load
F1	2.5	127Vac/50 Hz	102.1	804	804	Max. Normal Load
F1	--	135Vac/50 Hz	102.1	759	759	Max. Normal Load
F1	--	140Vac/50	102.2	733	733	Max. Normal Load

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

		Hz				
F1	--	180Vac/50 Hz	101.2	572	572	Max. Normal Load
F1	1.5	200Vac/50 Hz	100.3	519	519	Max. Normal Load
F1	1.5	240Vac/50 Hz	99.7	446	446	Max. Normal Load
F1	--	254Vac/50 Hz	99.4	431	431	Max. Normal Load
F1	--	264Vac/50 Hz	99.1	440	440	Max. Normal Load
F1	--	90Vac/60Hz	104.7	1161	1161	Max. Normal Load
F1	2.5	100Vac/60 Hz	104.4	1040	1040	Max. Normal Load
F1	2.5	127Vac/60 Hz	103.1	807	807	Max. Normal Load
F1	--	135Vac/60 Hz	102.2	760	760	Max. Normal Load
F1	--	140Vac/60 Hz	101.9	731	731	Max. Normal Load
F1	--	180Vac/60 Hz	100.9	574	574	Max. Normal Load
F1	1.5	200Vac/60 Hz	100.3	521	521	Max. Normal Load
F1	1.5	240Vac/60 Hz	99.6	446	446	Max. Normal Load
F1	--	254Vac/60 Hz	99.5	432	432	Max. Normal Load
F1	--	264Vac/60 Hz	99.1	442	442	Max. Normal Load
TFT LCD 15 inch with one 3.5" H.D.D	--	--	--	--	--	--
F1	--	90Vac/50Hz	112.1	1250	1250	Max. Normal Load
F1	2.5	100Vac/50 Hz	111.3	1125	1125	Max. Normal Load
F1	2.5	127Vac/50 Hz	110.1	867	867	Max. Normal Load
F1	--	135Vac/50 Hz	110.7	826	826	Max. Normal Load
F1	--	140/50Hz	109.5	787	787	Max. Normal Load
F1	--	180/50Hz	109.3	618	618	Max. Normal Load
F1	1.5	200/50Hz	108.4	560	560	Max. Normal Load

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Clause	Requirement + Test	Result - Remark	Verdict

F1	1.5	240/50Hz	107.7	479	479	Max. Normal Load
F1	--	254/50Hz	107.4	467	467	Max. Normal Load
F1	--	264/50Hz	107.3	476	476	Max. Normal Load
F1	--	90/60Hz	112.4	1253	1253	Max. Normal Load
F1	2.5	100/60Hz	112.1	1114	1114	Max. Normal Load
F1	2.5	127/60Hz	110.2	870	870	Max. Normal Load
F1	--	135/60Hz	110.1	818	818	Max. Normal Load
F1	--	140/60Hz	110.0	787	787	Max. Normal Load
F1	--	180/60Hz	109.1	621	621	Max. Normal Load
F1	1.5	200/60Hz	108.7	560	560	Max. Normal Load
F1	1.5	240/60Hz	107.8	480	480	Max. Normal Load
F1	--	254/60Hz	107.6	468	468	Max. Normal Load
F1	--	264/60Hz	107.1	473	473	Max. Normal Load

supplementary information:

"Maximum normal load" was defined as follows: For model ST-A10-XXXX-XX-X: Operated with full raster, maximum brightness, contrast, and USB ports loads each 500mA maximum, power USB load one provided, rating 24 Vdc, 3A maximum continuously. For model ST-A20-XXXX-XX-X: Operated with full raster, maximum brightness, contrast and speaker's output, USB ports loads each 500mA maximum, two power USB(+12) ports load 1.5A totally, one power USB(+24) port connects to receipt printer, cash drawer port connects to cash drawer, RIU and BIU connectors connect to display unit, MCR connector connects to Card reader, VGA port connects to a monitor, Ethernet connect to LAN, COM ports send and receive signal, PS/2 ports connect keyboard and mouse, drums provided in each slot, H.D.D exercises, and system operated continuously.

4.5	<b>TABLE: temperature rise measurements</b>						Pass
	test voltage (V) .....	See below	--	--	--	--	—
	t1 (°C).....	--	--	--	--	--	—
	t2 (°C).....	--	--	--	--	--	—
maximum temperature T of part/at:			T (°C)				allowed Tmax (°C)
Test voltage			90 V/50Hz	90 V/50Hz	264 V/60Hz	264 V/60Hz	--
For model ST-A10-XXXX-XX-X			--	--	--	--	--
Power Supply			--	--	--	--	--
1. Ambient			25	40	25	40	105
2. L1 core			37	52	36	51	105
3. L1 coil			37	52	35	50	105
4. BD1 body			55	70	42	57	105
5. IC1 body			52	67	48	63	105
6. L3 core			54	69	50	65	105
7. L3 coil			54	69	49	64	105
8. T2 core			44	59	42	57	110

IEC 60950-1						
Clause	Requirement + Test			Result - Remark		Verdict

9. T2 coil	43	58	41	56	--	110
10. PWB near IC3	47	62	45	60	--	105
11. PWB near Q2	49	64	44	59	--	105
12. C26 body	47	62	44	59	--	85
13. T1 core	46	61	43	58	--	110
14. T1 coil	47	62	45	60	--	110
15. L4 core	51	66	48	63	--	105
16. L4 coil	48	63	45	60	--	105
17. PWB near D12	48	63	45	60	--	105
18. Metal enclosure near T1	38	53	37	52	--	70
LCD Monitor	--	--	--	--	--	--
19. LCD touch panel body	34	49	34	49	--	80
20. Inverter T1 core	70	85	69	84	--	90
21. Inverter T1 coil	61	76	60	75	--	90
22. PWB near U3	56	71	54	69	--	105
23. PWB near T1	52	67	51	66	--	105
Main Unit	--	--	--	--	--	--
24. PWB near CPU heatsink	52	67	51	66	--	105
25. PWB near U4	53	68	51	66	--	105
26. L18 coil	45	60	44	59	--	105
27. L14 coil	45	60	44	59	--	105
28. Plastic enclosure inside near power supply	36	51	35	50	--	85
29. Plastic enclosure outside near power supply	34	49	33	48	--	95
30. Plastic enclosure outside near inverter T1	35	50	34	49	--	95
For model ST-A20-XXXX-XX-X	--	--	--	--	--	--
Power Supply	--	--	--	--	--	--
1. Ambient	26.6	Shift to 40 degree	27.1	Shift to 40 degree	--	--
2. L1 core	41.6	55.0	43.9	56.8	--	105
3. L1 coil	46.4	59.8	46.4	59.3	--	105
4. C1 body	40.8	54.2	42.7	55.6	--	85
5. BD1 body	64.7	78.1	50.1	63.0	--	105
6. L2 coil	55.3	68.7	45.3	58.2	--	105
7. L3 coil	66.0	79.4	42.3	55.2	--	105
8. T2 core	48.4	61.8	45.3	58.2	--	110
9. T2 coil	55.3	68.7	51.9	64.8	--	110
10. PWB near IC3	56.9	70.3	52.5	65.4	--	105
11. PC1 body	57.2	70.6	53.9	66.8	--	100
12. PC2 body	56.5	69.9	53.2	66.1	--	100
13. PC3 body	56.6	70.0	54.2	67.1	--	100
14. PWB near heatsink HS1(Q2 and Q4)	62.9	76.3	54.3	67.2	--	105
15. C26 body	51.3	64.7	48.6	61.5	--	85
16. T1 core	57.3	70.7	53.9	66.8	--	110
17. T1 coil	50.2	63.6	48.4	61.3	--	110
18. L4 core	57.0	70.4	55.2	68.1	--	105

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

19. L4 coil	61.9	75.3	59.8	72.7	--	105
20. PWB near D12	55.8	69.2	54.2	67.1	--	105
21. Metal enclosure near T1	45.7	59.1	44.4	57.3	--	70
LCD Monitor	---	--	--	--	--	--
22. LCD touch panel body	33.2	46.6	31.2	44.1	--	70
23. Inverter T1 core	69.3	82.7	68.5	81.4	--	90
24. Inverter T1 coil	68.5	81.9	67.8	80.7	--	90
25. PWB near U3	58.8	72.2	57.8	70.7	--	105
Main Unit	--	--	--	--	--	--
26. PWB near CPU heatsink	55.2	68.6	54.1	67.0	--	105
27. PWB near U4	57.3	70.7	56.5	69.4	--	105
28. Plastic enclosure outside near inverter T1	38.8	52.2	42.4	55.3	--	95
temperature T of winding:	R <sub>1</sub> (Ω)		R <sub>2</sub> ( Ω)	T (°C)	allowed Tmax (°C)	insulation class
supplementary information:						
- Test conducted on TFT LCD 15 inch with "Maximum normal load" specified in Table 1.6.2						
- The worst case normal mode is defined with full rated load. With max. ambient temperature specified as 40°C, therefore, the maximum temperature as follows:						
- Winding components: (thermal couple used) Class B (Transformers: T1, T2 -> max. temp. of (120-10)*C = 110°C.						
- Components with: max. temp. of 105°C (Inductors: L1,L2,L3,L4,LF1,LF2 & PWB) max. temp. of 95°C (Accessible plastic parts) max. temp. of 85°C (Capacitor: C26) max. temp. of 70°C (Accessible metal parts) - when no class of insulation is given, min. insulation 105°C assumed.						

4.7	<b>TABLE: resistance to fire</b>			Pass
part	manufacturer of material	type of material	thickness(mm)	flammability class
Plastic enclosure	TEIJIN CHEMICALS LTD	TN-7000	3.0 mm minimum	V-1 minimum
PWB	--	--	--	V-1 minimum
supplementary information:				



IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	<b>TABLE: electric strength tests, impulse tests and voltage surge tests</b>		Pass
test voltage applied between:		test voltage (V) a.c./d.c.	breakdown Yes / No
For unit, model ST-A10-XXXX-XX-X:		--	--
Primary to Secondary		3000 Vac	No
Primary to Earth		2000 Vac	No
Primary to Plastic enclosure with metal foil		3000 Vac	No
Mylar Sheet		2000 Vac	No
For Transformer T1:		--	--
Two layers of insulation (Tape: Smbio, 35660Y*b; Jing jiang Yahua, No.CT 3M, No.1350F-1(b))		3000 Vac	No
Primary winding to SELV winding		3000 Vac	No
Primary winding to core		2000Vac	No
SELV winding to core		2000 Vac	No
For Transformer T2:		--	--
Two layers of insulation (Tape: Duck Sung, DTS-204 Hyun Dai, No.800 Jing Jiang Yahua, No.CT)		3000 Vac	No
Primary winding to SELV winding		3000 Vac	No
SELV winding to core		2000 Vac	No
For unit, model ST-A20-XXXX-XX-X: (Conducted after Abnormal Operation and unit is under well-heated condition)		--	--
Primary to Secondary		4242 Vdc	No
Primary to Earth		2828 Vdc	No
Primary to Plastic enclosure with metal foil		4242 Vdc	No
supplementary information:			

5.3	<b>TABLE: fault condition tests</b>					Pass
	ambient temperature (°C) .....				Same as datasheet	—
	model/type of power supply .....				PS-BRU BK-ROHS	—
	manufacturer of power supply .....				Toshiba TEC Singapore PTE Ltd.	—
	rated markings of power supply .....				I/P: 100~120/200~24VAC, 2/1A, 50/60Hz	—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
For model ST-A10-XXXX-XX-	--	--	--	--	--	--

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

X						
Component Failure Test	--	--	--	--	--	--
BD1 (+) - (-)	Short	240	1s	F1	--	NB, NC, NT, CD: F1; Unit shutdown
Q2 G - D	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
Q2 G - S	Short	240	4hr23m	F1	0.41	NB, NC, NT, CT
Q2 S - D	Short	240	1s	F1	--	NB, NC, NT, CD: F1; Unit shutdown
T1 pin 7- 8	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
T1 pin 11- 12	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
T1 pin 9 - 10	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
T2 pin 6 - 7	Short	240	3hr47m	F1	0.29	NB, NC, NT, CT
PC2 pin 1 - 2	Short	240	1s	F1	0.356	NB, NC, NT, CD (ZD3 damaged)
PC2 pin 3 - 4	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
PC3 pin 1 - 2	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
PC3 pin 3 - 4	Short	240	14hr37m	F1	0.128	NB, NC, NT, CT
IC2 pin8	Open	240	1s	F1	--	NB, NC, NT, Unit shutdown
D12 pin 1 - 2	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
IC5 pin 2 - 3	Short	240	1s	F1	--	NB, NC, NT, Unit shutdown
IC7 pin9	Open	240	14hr38m	F1	0.27	NB, NC, NT, CT
C8	Short	240	1s	F1	--	NB, NC, NT, CD: F1; Unit shutdown
Abnormal Operation	--	--	--	--	--	--
Power Supply Fan	Stalled	240	1h25m	F1	0.28	NB, NC, NT, Unit Shutdown
System Fan	Stalled	240	3h47m	F1	0.28	NB, NC, NT, CT
Ventilation openings	Blocked	240	15h47m	F1	0.27	NB, NC, NT, CT
Transformer Abnormal Operation Test	--	--	--	--	--	--
T1 pin 9 (after D11 & C32) to	Overload	240	21h47m	F1	0.76	NB, NC, NT, CT

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

pin 10						
T1 pin11 (after D12 & C33) to pin12	Overload	240	22h43m	F1	0.89	NB, NC, NT, CT
T1 pin7 (after D13) to pin8	Overload	240	21h47m	F1	0.72	NB, NC, NT, CT
T2 pin7 (after D14) to pin6	Overload	240	21h31m	F1	0.3	NB, NC, NT, CT
Overload Of Operator Accessible Connector	--	--	--	--	--	--
VGA Pin1~10, 12~14	Overload	240	--	F1	--	A
VGA Pin11, 15	Overload	240	--	F1	--	NB, NC, NT, Open circuit voltage measured 5 V, maximum available current measured 0 mA
Power USB 4 (Pin1,4,5,6, 8)	Overload	240	--	F1	--	A
Power USB 4 Pin2,3	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 24.8V, maximum available current measured 4 A
Power USB 4 Pin7	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 5.1V, maximum available current measured 2A
COM1 & 2 (Pin1~8)	Overload	240	--	F1	--	A
COM3 (Pin2~7)	Overload	240	--	F1	--	A
COM3 Pin1	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 12.3V, maximum available current measured 2.9A
COM3 Pin8	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 5.12V, maximum available current measured 2.2A
Ext VDF	Overload	240	--	F1	--	A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

(Pin2~7)						
Ext VDF Pin1	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 12.3V, maximum available current measured 2.9A
Ext VDF Pin8	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 5.12V, maximum available current measured 2.2A
DRW 1 & 2 (Pin1, 3)	Overload	240	--	F1	--	A
DRW 1 & 2 Pin2	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 24.8V, maximum available current measured 4A
DRW 1 & 2 Pin4	Overload	240	1h	F1	--	NB, NC, NT, Open circuit voltage measured 5.1V, maximum available current measured 2A
RJ45 Pin 1~8	Overload	240	--	F1	--	A
Microphone Pin 1	Overload	240	--	F1	--	NB, NC, NT, Open circuit voltage measured 2.5V, maximum available current measured 0A
Microphone Pin 2	Overload	240	--	F1	--	A
Earphone Pin 1	Overload	240	--	F1	--	NB, NC, NT, Open circuit voltage measured 2.5V, maximum available current measured 0A
Earphone Pin 2	Overload	240	--	F1	--	A
For model ST-A20- XXXX-XX- X	--	--	--	--	--	--
Openings	Block	240	--	F1	0.48->0.48	NB, NC, NT, Normal operation, T1 coil=55.4, T1 core=63.0, T2 coil=60.4, T2 core=54.7, PC1=62.9, PC2=61.8, PC3=62.5, ambient=26.3 degree C.
Power Fan	Stall	240	--	F1	0.48->0.14	NB, NC, NT, CD(Q2,IC1,R16,R26) repeat three times as the same result, Unit shutdown, T1 coil=112.5, T1

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

						core=108.1, T2 coil=80.3, T2 core=75.8, PC1=82.2, PC2=88.6, PC3=79.4, ambient=24.6 degree C.
System Fan	Stall	240	--	F1	0.48->0.13	NB, NC, NT, Unit shutdown, T1 coil=47.5, T1 core=47.2, T2 coil=84.4, T2 core=76.6, PC1=41.2, PC2=66.5, PC3=40.3, ambient=26.0 degree C.
RIU connector Pin1	Overload	240	1 hour	F1	--	NB, NC, NT Open circuit voltage measured 12.21V, maximum available current measured 3100mA.
RIU connector Pin2,5,7,9	Overload	240	--	F1	--	B
RIU connector Pin3,4,8	Overload	240	--	F1	--	A, Open circuit voltage measured -11.30V, maximum available current measured 7.96mA.
RIU connector Pin6	Overload	240	--	F1	--	A, Open circuit voltage measured 5.07V, maximum available current measured 0mA.
COM1 Pin1,4,5,6,8,9	Overload	240	--	F1	--	B
COM1 Pin2,3,7	Overload	240	--	F1	--	A, Open circuit voltage measured -11.31V, maximum available current measured 7.65mA.
COM2 Pin1,4,5,6,8,9	Overload	240	--	F1	--	B
COM2 Pin2,3,7	Overload	240	--	F1	--	A, Open circuit voltage measured -11.31V, maximum available current measured 7.78mA.
COM3 Pin1	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 12.21V, maximum available current measured 2800mA.
COM3 Pin2,5,7,9	Overload	240	--	F1	--	B
COM3 Pin3,4,8	Overload	240	--	F1	--	A, Open circuit voltage measured -11.31V, maximum available current

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

						measured 7.87mA.
COM3 Pin6	Overload	240	--	F1	--	A, Open circuit voltage measured 5.07V, maximum available current measured 0mA.
VGA Pin1,2,3,5,6,8,9,10	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 2.48V, maximum available current measured 55mA.
VGA Pin4,7,11	Overload	240	--	F1	--	B
VGA Pin12,15,14	Overload	240	--	F1	--	A, Open circuit voltage measured 3.34V, maximum available current measured 2.17mA.
VGA Pin13	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 2.96V, maximum available current measured 36.0mA.
USB (Right side 1) Pin1,2,3	Overload	240	--	F1	--	B
USB (Right side 1) Pin4	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 4.83V, maximum available current measured 1900mA.
USB (Right side 2) Pin1,2,3	Overload	240	--	F1	--	B
USB (Right side 2) Pin4	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 4.83V, maximum available current measured 1900mA.
USB (Right side 3) Pin1,2,3	Overload	240	--	F1	--	B
USB (Right side 3) Pin4	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 4.83V, maximum available current measured 1900mA.
Power USB (+12V) (Right side) Upper Pin1,2,3	Overload	240	--	F1	--	B
Power USB (+12V) (Right side)	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.71V, maximum available current

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

Upper Pin4						measured 2000mA.
Power USB (+12V) (Right side) Down Pin2,3	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 12.20V, maximum available current measured 2700mA.
Power USB (+12V) (Right side) Down Pin1,4	Overload	240	--	F1	--	B
Power USB (+12V) (Left side) Upper Pin1,2,3	Overload	240	--	F1	--	B
Power USB (+12V) (Left side) Upper Pin4	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.71V, maximum available current measured 2000mA.
Power USB (+12V) (Left side) Down Pin2,3	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 12.20V, maximum available current measured 2700mA.
Power USB (+12V) (Left side) Down Pin1,4	Overload	240	--	F1	--	B
Power USB (+24V) (Left side) Upper Pin1,2,3	Overload	240	--	F1	--	B
Power USB (+24V) (Left side) Upper Pin4	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.71V, maximum available current measured 2000mA.
Power USB (+24V) (Left side) Down Pin2,3	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 25.06V, maximum available current measured 4400mA.
Power USB (+24V) (Left side) Down	Overload	240	--	F1	--	B

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

Pin1,4						
USB (Upper one on LCD panel) Pin1,2,3	Overload	240	--	F1	--	B
USB (Upper one on LCD panel) Pin4	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.00V, maximum available current measured 1550mA.
Pin1,2,3 (Middle one on LCD panel)	Overload	240	--	F1	--	B
Pin4 (Middle one on LCD panel)	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.00V, maximum available current measured 1550mA.
Pin1,2,3 (Down one on LCD panel)	Overload	240	--	F1	--	B
Pin4 (Down one on LCD panel)	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.00V, maximum available current measured 1400mA.
Ethernet LAN Pin1,2,3,4, 5,6,7,8	Overload	240	--	F1	--	B
Audio Connector Pin1	Overload	240	--	F1	--	B
Micro Connector Pin1	Overload	240	--	F1	--	B
PS/2 (Keyboard) Pin1,2,4,6	Overload	240	--	F1	--	B
PS/2 (Keyboard) Pin3	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.09V, maximum available current measured 16mA
PS/2 (Keyboard) Pin5	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.09V, maximum available current measured 2100mA
PS/2	Overload	240	--	F1	--	B



IEC 60950-1						
Clause	Requirement + Test			Result - Remark		Verdict
(Mouse) Pin1,2,4,6						
PS/2 (Mouse) Pin3	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.09V, maximum available current measured 16mA
PS/2 (Mouse) Pin5	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.09V, maximum available current measured 2100mA
Cash Drawer 1 and 2 connector Pin1	Overload	240	1 min	F1	--	NB, NC, NT Trace damaged and opened, repeated three times, Open circuit voltage measured 24.95V, maximum available current measured 2800mA.
Cash Drawer 1 and 2 connector Pin2,4	Overload	240	--	F1	--	B
Cash Drawer 1 and 2 connector Pin3	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 5.09V, maximum available current measured 16mA
LIU connector Pin1	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured 12.20V, maximum available current measured 3100mA
LIU connector Pin2,3,4,5, 6	Overload	240	--	F1	--	B
MCR connector Pin1	Overload	240	1 hour	F1	--	NB, NC, NT, Open circuit voltage measured .4.99V, maximum available current measured 800mA
MCR connector Pin3	Overload	240	--	F1	--	A, Open circuit voltage measured -11.28V, maximum available current measured 7.96mA
MCR connector Pin2,4,5,6, 7,8	Overload	240	--	F1	--	B
supplementary information:						

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

NB: No indication of dielectric breakdown after 60 seconds; YB: Dielectric breakdown NC: Cheesecloth remained intact; NT: Tissue paper remained intact; CT: Constant temperature were obtained; IP: Internal protection operated (list component); CD: Components damaged (listed damaged components); A: Circuit measures 10 KS or more series impedance; B: Circuit measures 0 Volts; C: Other. Please explain.

## **Enclosure**

### **National Differences**

Argentina\*  
Australia / New Zealand  
Austria\*\*  
Belgium\*\*  
China\*  
Denmark  
Finland  
France\*\*  
Germany  
Greece\*\*  
Group  
Hungary\*  
India\*  
Israel\*  
Italy\*  
Japan\*  
Kenya\*  
Korea  
Malaysia\*  
Netherlands\*\*  
Norway  
Poland\*  
Singapore\*  
Slovakia\*\*  
Slovenia\*  
Spain\*  
Sweden  
Switzerland\*\*  
USA / Canada  
United Kingdom

\* No National Differences Declared

\*\* Only Group Differences

IEC 60950-1			
SubClause	Difference + Test	Result - Remark	Verdict

USA / Canada - Differences to IEC 60950-1:2001, First Edition			
2.5	Overcurrent protection device required for Class 2 and Class 3 limiting in accordance with the NEC, or for a Limited Power Source, not interchangeable with devices of higher ratings if operator replaceable.		N/A
3.2.5	Length of power supply cord limited to between 1.5 and 4.5 m unless shorter length used when intended for a special installation.		Pass
3.2.5	Conductors in power supply cords sized according to NEC and CEC, Part I.		Pass
5.3.6	Overloading of SELV connectors and printed wiring board receptacles accessible to the operator.		Pass
5.3.6	Tests interrupted by opening of a component repeated two additional times.	Repeat twice with same result.	Pass
5.3.8.1	Test interrupted by opening of wire or trace subject to certain conditions.		N/A

Issue Date: 2007-10-15  
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Report Reference #

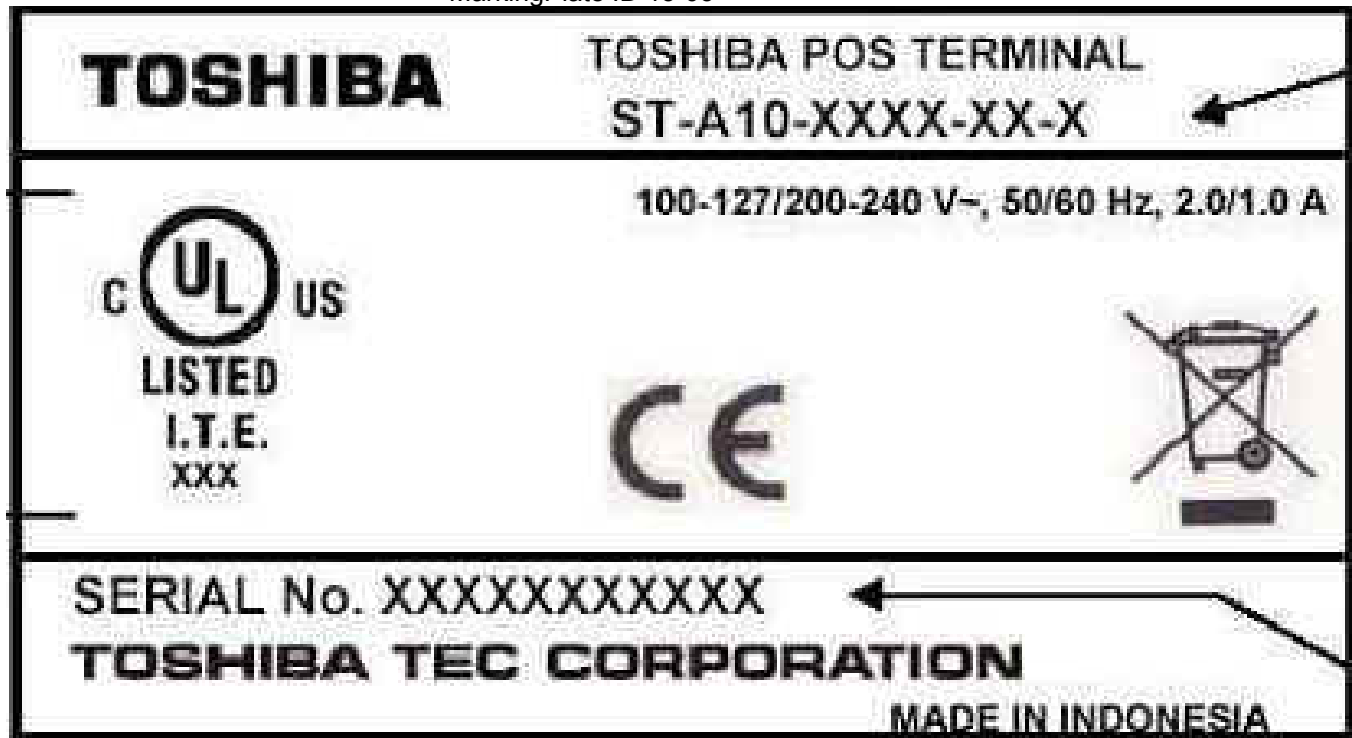
E215701-A20-CB-1

## **Enclosure**

## **Marking Plate**

Supplement Id	Description
13-03	Label for model ST-A10-XXXX-XX-X
13-04	Label for model ST-A20-XXXX-XX-X

MarkingPlate ID 13-03



MarkingPlate ID 13-04



## **Enclosure**

### **Photographs**

Supplement Id	Description
3-01	Overview
3-02	Overview Rearside
3-03	Interior overview rear
3-04	Interior overview front
3-05	Power Supply Board front
3-06	Power Supply Board rear
3-07	Mainboard front
3-08	Mainboard rear
3-09	I/O board front
3-10	I/O board rear
3-11	I/O board back
3-12	Power supply overview
3-13	Power supply overview rear
3-14	Power supply interior
3-15	Inverter board and LCD control board front
3-16	Inverter board back and LCD control board
3-17	Inverter location
3-18	Mainboard view
3-19	I/O board view-1
3-20	I/O board view-2
3-21	I/O board view-3
3-22	I/O board view-4
3-23	Mylar sheet secured by glue-1 (Only EMI function)
3-24	Mylar sheet secured by glue-2 (Only EMI function)
3-25	LCD control board



Photographs ID 3-18



Photographs ID 3-19





Photographs ID 3-20



Photographs ID 3-21

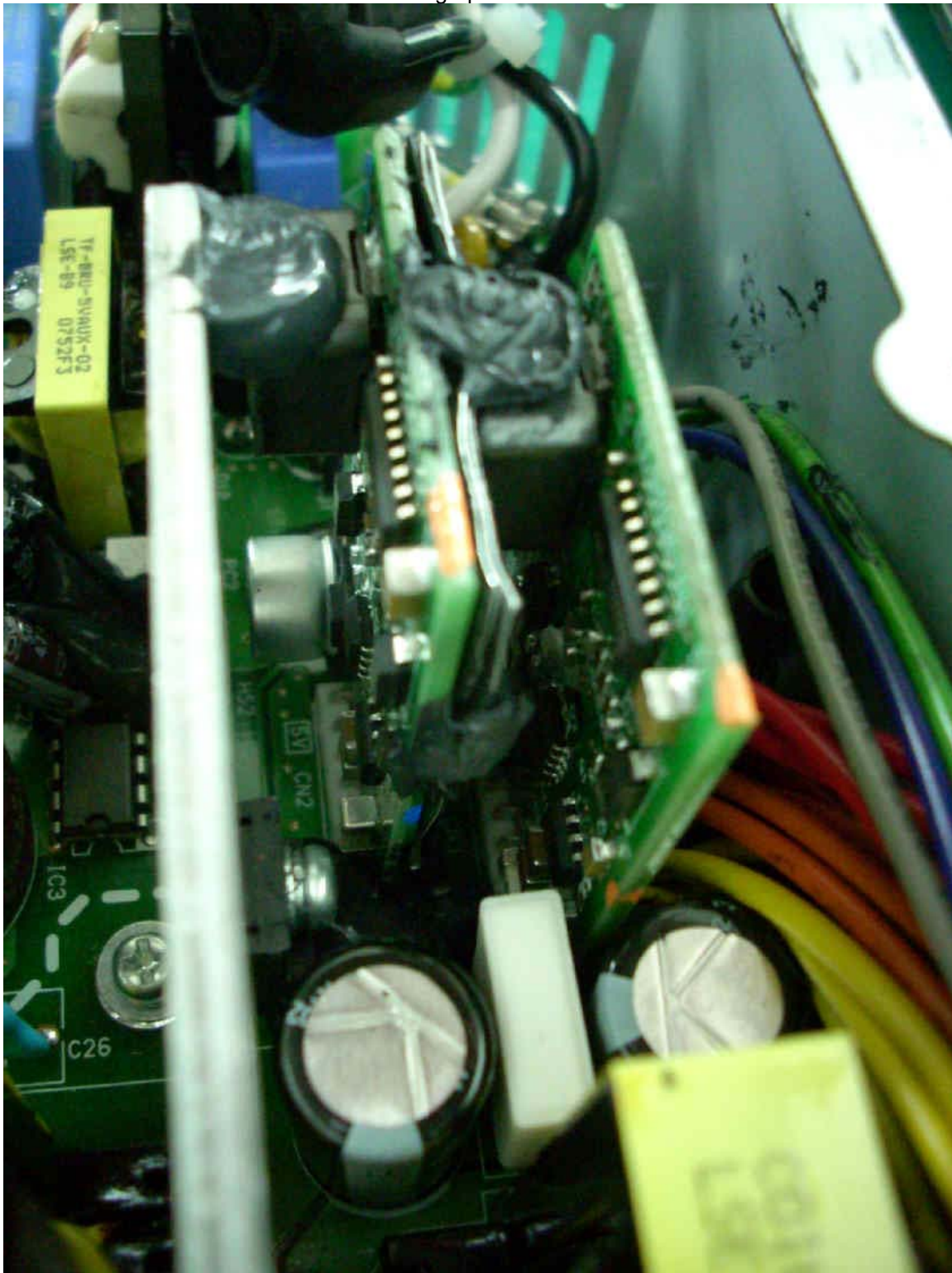


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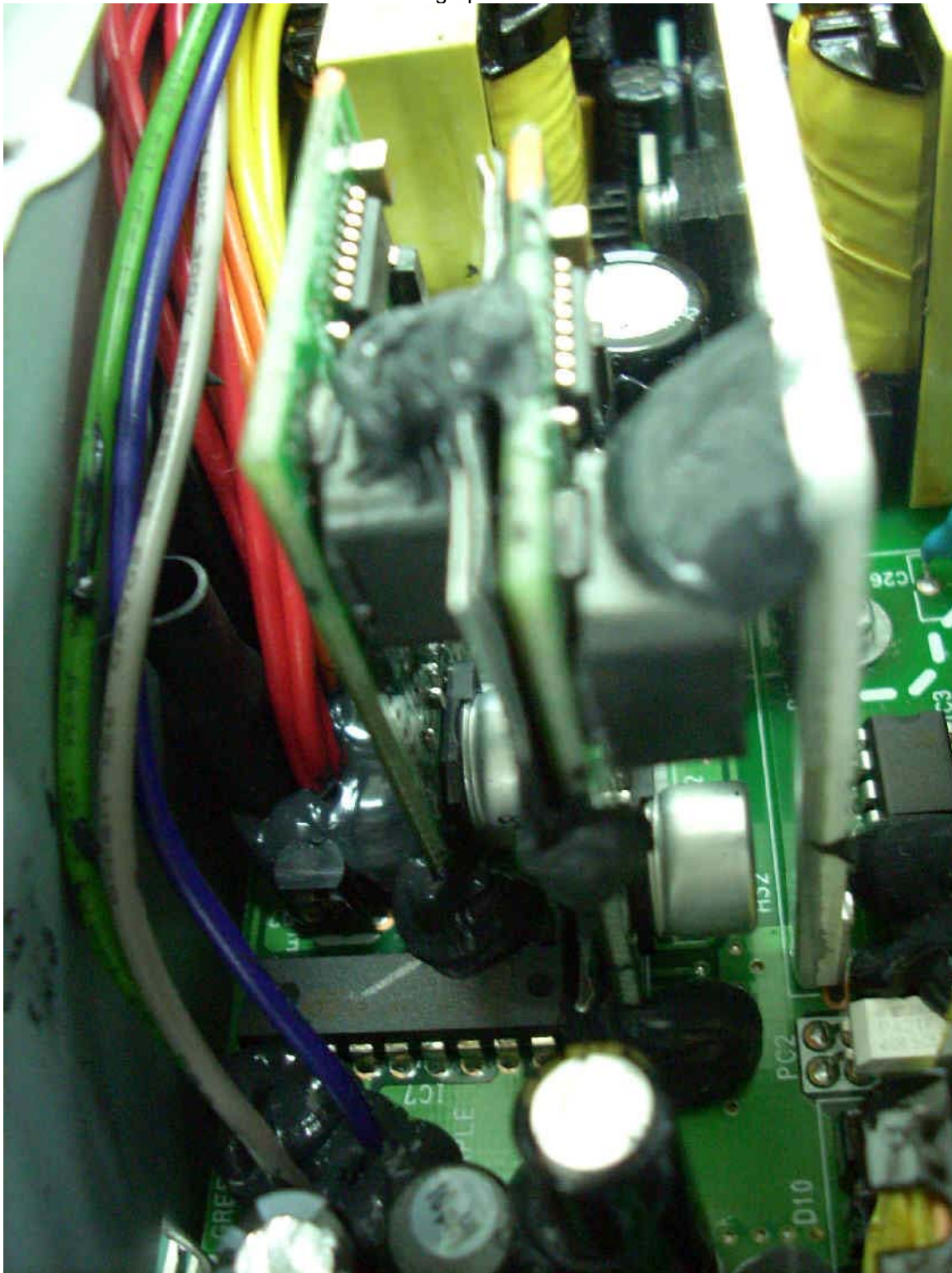




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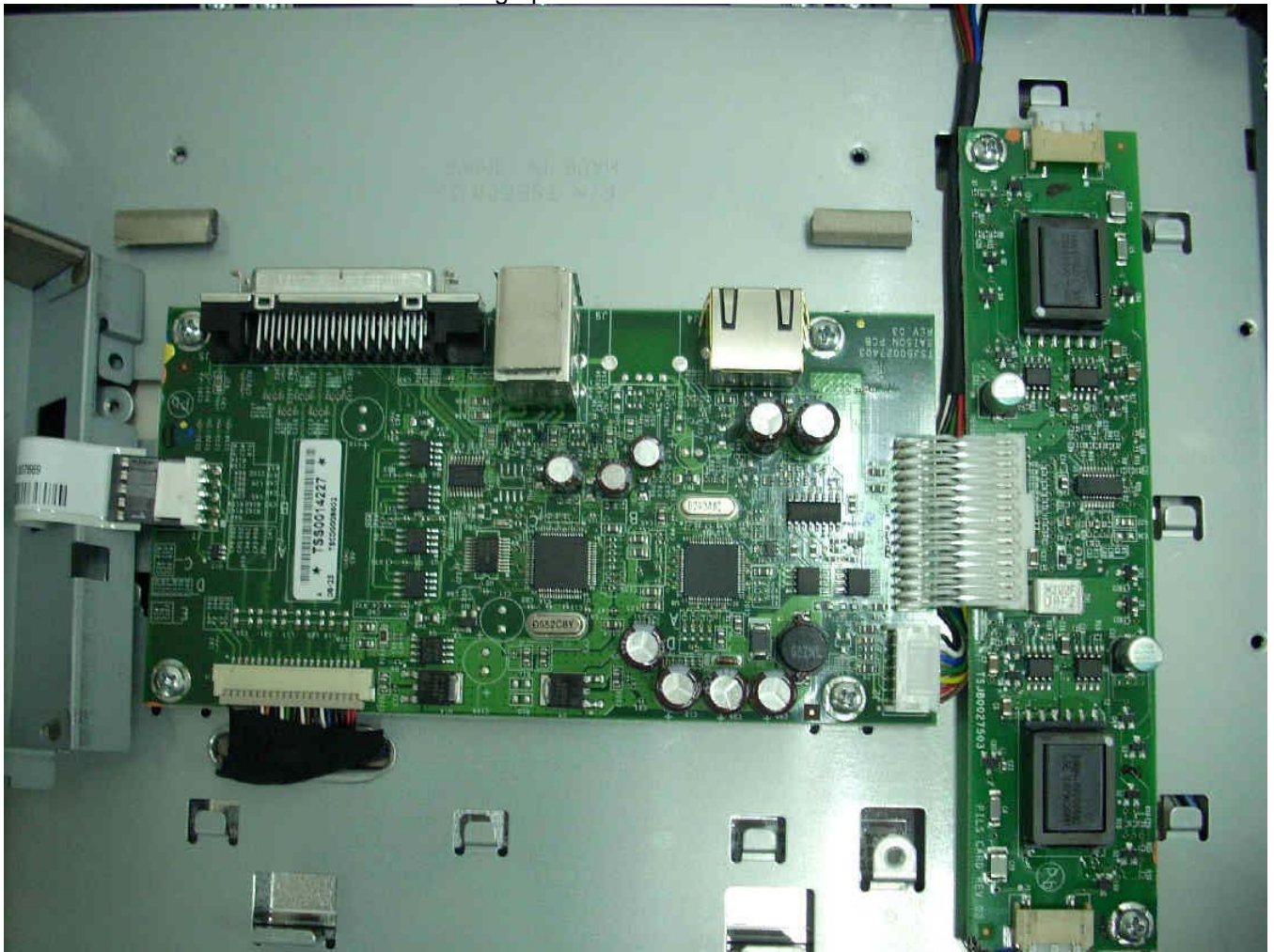


Photographs ID 3-24





Photographs ID 3-25



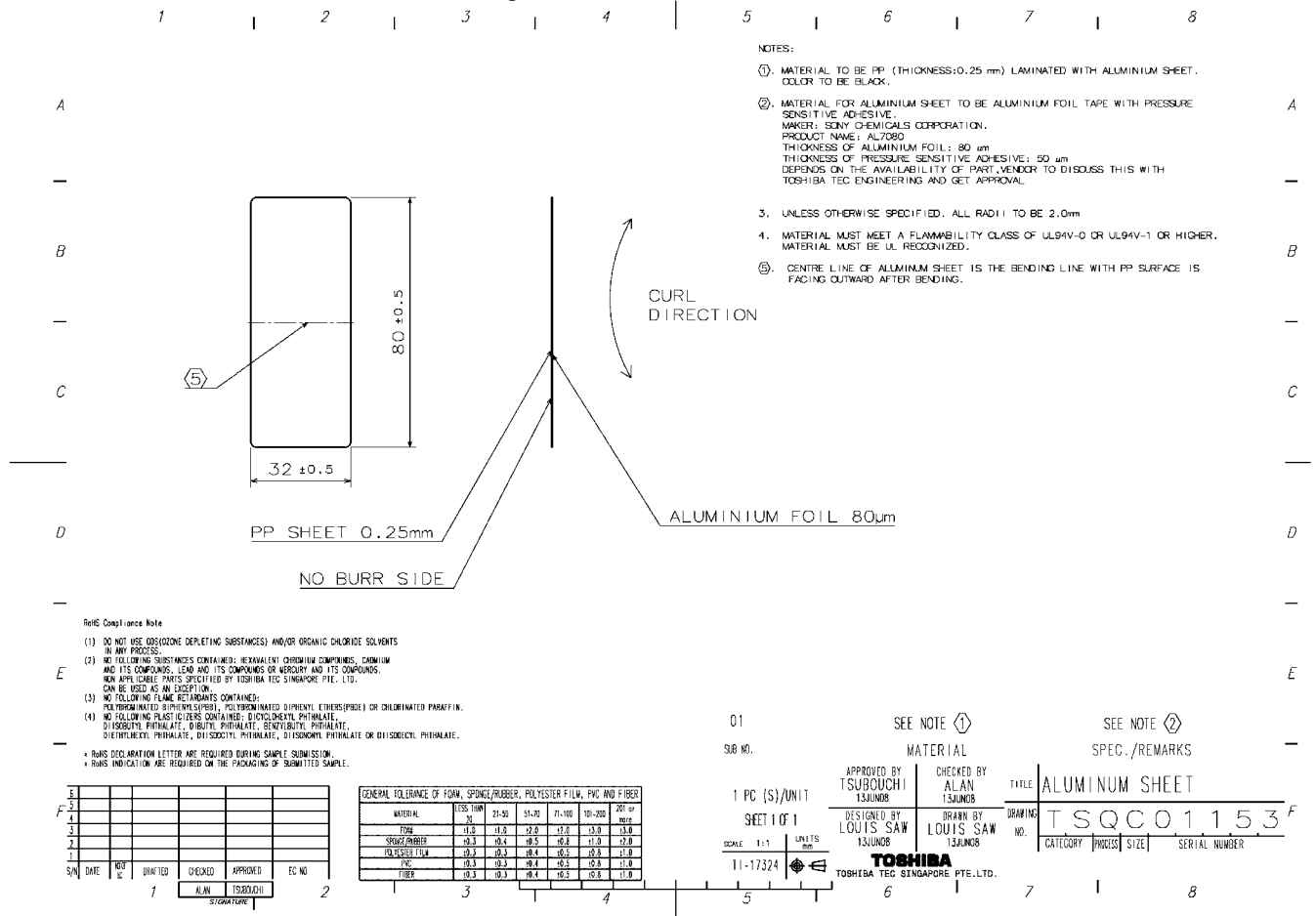


## **Enclosure**

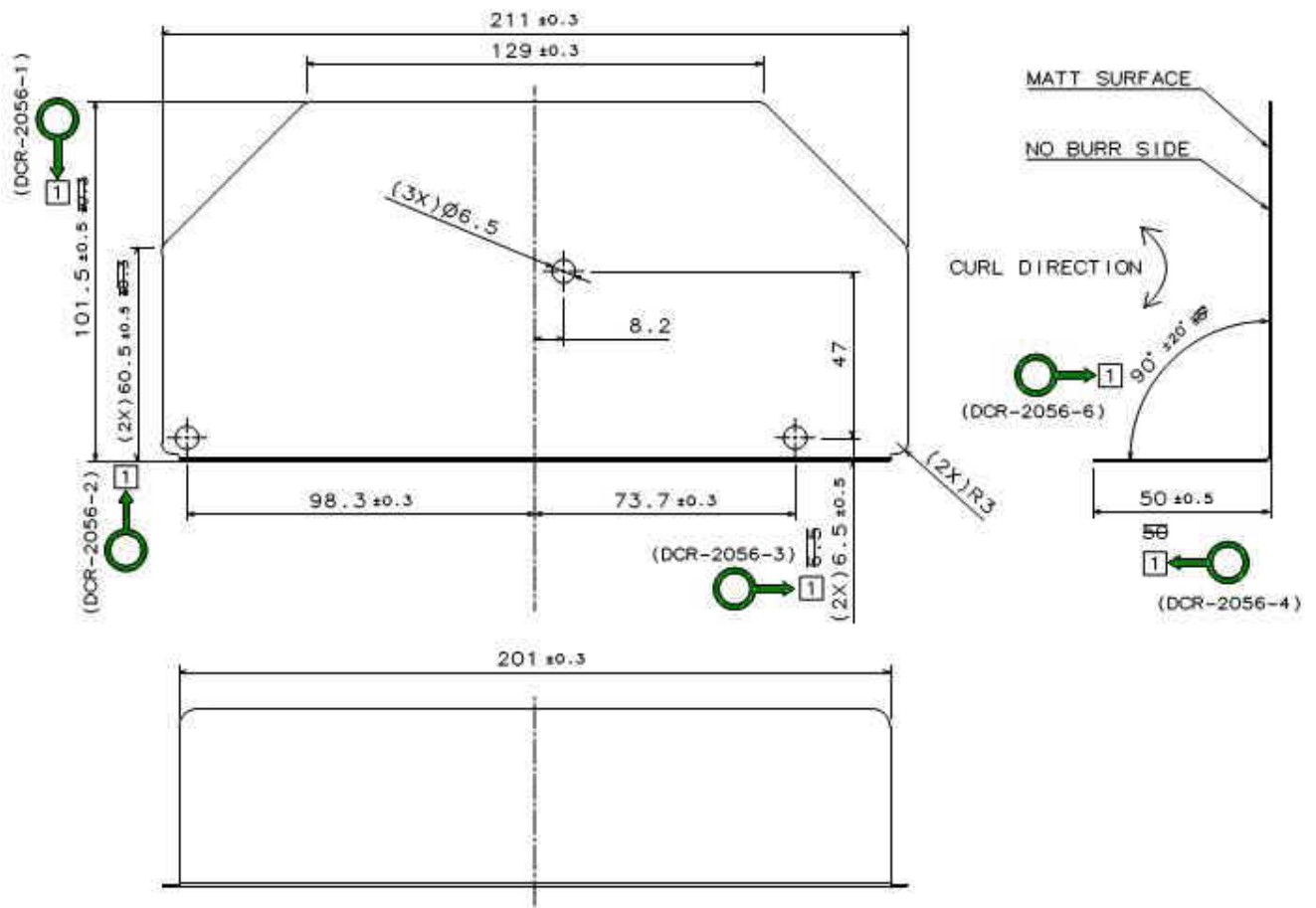
### **Diagrams**

Supplement Id	Description
4-01	Transformer (T1)
4-02	Transformer (T2)
4-03	Chock (L1)
4-04	Chock (L2)
4-05	Chock (L3)
4-06	Inverter T1
4-09	Mylar sheet drawing (Only for EMI function)
4-10	Mylar sheet drawing (Between Primary and Metal enclosure)

Diagrams ID 4-09



Diagrams ID 4-10



Issue Date: 2007-10-15  
Amendment 1 2008-07-23

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Report Reference #

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## **Enclosure**

## **Miscellaneous**

Supplement Id	Description
7-01	Model Difference of model ST-A10-XXXX-XX-X
7-02	Model Difference of model ST-A20-XXXX-XX-X

Misc ID 7-01

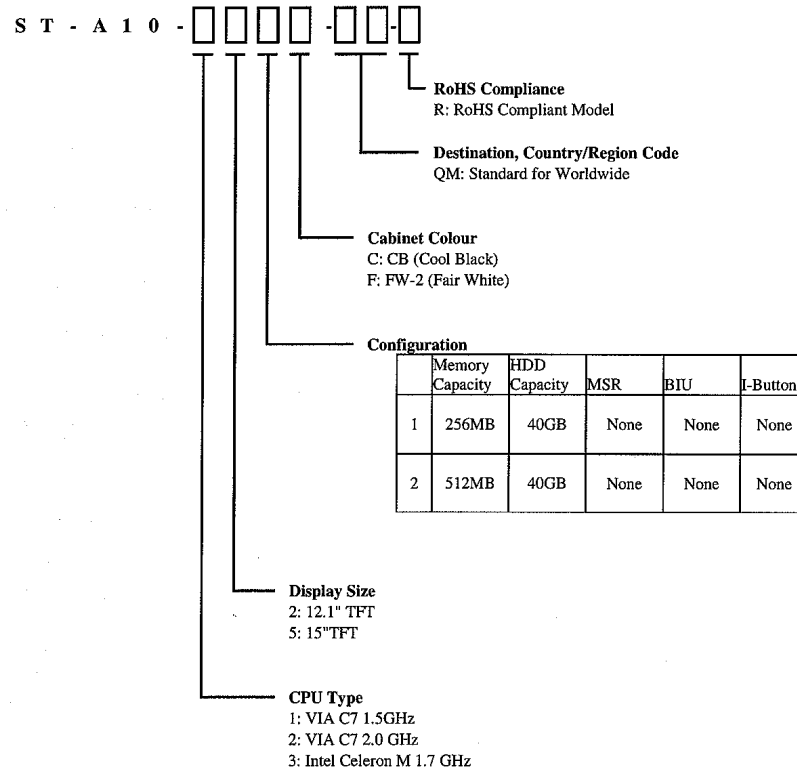
1. INTRODUCTION

SPAA-XXX-R1

1.1 Applicable Model

1.1 Applicable Model

Model name description



**NOTE:** Some combinations of the above specifications are not developed as products. For details, please refer to your nearest authorized TOSHIBA TEC representative.

Misc ID 7-02

Specification Number : SPAA-245

12. Product Structure

12.1. Model Name System

