



Pretec 2.5" S-SATA SSD
Industrial Application
Product Specification

July 2008



2.5" S-SATA SSD Industrial Application

C-ONE TECHNOLOGY Corp.

Document History

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1.0	New issued	May 2008	David Wu	Matika
1.1	Modify Supported CF	May 2008	David Wu	Matika

This document provides information regarding to C-ONE's 2.5" S-SATA Flash Disk product specification and is subject to change without any prior notice. No part in this report shall be distributed, reproduced, or disclosed in whole or in part without prior written permission of C-ONE.

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1. Introduction

1.1 General Description

C-ONE's 2.5" SATA Card uses NAND-Type flash memory devices, which leads to its remarkable high performance and comes with capacities from 512MB to 48GB unformatted.

Compliant with ISA (Industrial Standard Architecture) bus interface standard, the S-SATA SSD performs sequential read/write for each sector (512 bytes) count. It also conforms to SATA Specification and is designed with precision mechanics to enable host devices to read/write from the SATA interface into Flash Media. It can operate with a 5V single power from the host side.

The card provides extraordinary memory medium for PC , C-ONE's SATA Card has been approved through various compatibility tests.



1.2 Features

- ✧ SATA interface
 - ATA command set compatible
 - Support for 8-bit or 16-bit host data transfer
 - Compatibility with host ATA disk I/O BIOS, DOS/Windows file system, utilities, and application software
- ✧ Extremely rugged and reliable
 - Advanced defect block management
 - Support background erased operation
- ✧ 5 Volt power supply, very low power consumption
 - Zero-power data retention, no batteries required
 - Internal self-diagnostic program operates at VCC power on
 - Auto sleep mode
- ✧ High reliability based on internal ECC (Error Correcting Code) function
- ✧ Mode access
 - PIO Mode 4 (Highest)
 - MDMA 2 (Highest)
 - UDMA Mode 4 (Highest)



2. Product Specification

2.1 Operation and Environment Description

Operating Voltage	DC Input Power	5V ± 10%	
Typical Power Consumptions:	5V	Read Mode: 87.4 mA(Max)	
		Write Mode: 95.5 mA(Max)	
		Standby Mode: 59.2 mA(Approach values)	
Environment conditions	Operating Temperature	Extended Temp.	-20°C to +85°C
		Industrial Temp.	-40°C to +85°C
	Storage Temperature	Extended Temp.	-40°C to +90°C
		Industrial Temp.	-50°C to +90°C
	Humidity Operation	5% to 95% (Non-condensing)	
	Humidity Non-operation	5% to 95% (Non-condensing)	
	Shock Operation	3000-G (Max.)	
	Shock Non-operation	3000-G (Max.)	
	Vibration Operation	30-G (Peak to peak to maximum)	
Vibration Non-operation	30-G (Peak to peak to maximum)		
Operation System supported Compatibility (Microsoft Product)	DOS 6.22		
	Windows 98 SE		Windows 2000
	Windows XP SP2	Windows Vista	Fedora Linux



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2.2 Physical Description

1. Measurement	2.5" S-SATA	Dimensions: Thin metal housing 69.85mm(L) x 100.2mm(W) x 5mm(H) Plastic housing 69.85mm(L) x 100.2mm(W) x 8mm(H) Thick metal housing 69.85mm(L) x 100.2mm(W) x 12.5mm(H)
2. Storage Capacities	Capacitance	1GB to 48GB (unformatted)
3. Performance:	Data Transfer Rates	Refer to speed table below 4.1
	Data Access Time	<1.5 ms
4. Reliability	MTBF	3,000,000 hours
	Error Correction	1. Error Correcting of 4 bits random error per sector 2. Automatic on-the-fly, in-buffer error correction
	R/W Test	Test disk: 3,000,000 Read/Write cycles



3. Product Model

3.1 Part Number Definition

X₁X₂X₃X₄X₅X₆X₇X₈X₉X₁₀X₁₁

Code	Definition	symbol	Description
X ₁ X ₂ X ₃	Interface	SAT	2.5"inch SATA
X ₄	Model series	S	S-SATA,single CF socket
		M	M-SATA,SMT flash
		Q	Q-SATA,4 CF socket
X ₅ X ₆ X ₇ X ₈	Total Capacity	512M	512MB
		001G	1GB
		002G	2GB
		004G	4GB
		008G	8GB
		016G	16GB
		024G	24GB
		048G	48GB
X ₉	Temperature Range	C	Commercial Grade 0 C~ +70C
		L	Light Grade -20 C~ +85C
		H	Heavy Grade -40 C~ +85C
X ₁₀	Housing	P	Plastic 8mm height
		M	Metal 8mm 12.5mm height
		N	PCB only, no housing
X ₁₁	CF series	N	No CF
		2	Pretec 233x CF
		3	Pretec 333x CF
		C	Cheetah Pro CF
		P	Panther CF
		T	Tiger CF



4. Support Compact Flash Card

It is compatible most CF Cards. We give priority to built-in our CF Card including Elite and Pro series which are confirmed to meet commercial specifications.

4.1 Comparison of the these series

	Performance	Capacity	Performance	Unit: KB/Sec
Elite Series	233X	Max:48GB	Write::20585	Read: 34,879
Pro Series	333X	Max:24GB	Write: 41596	Read: 51508



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4.2 Logical Format Parameters (CHS)

Unit: Bytes

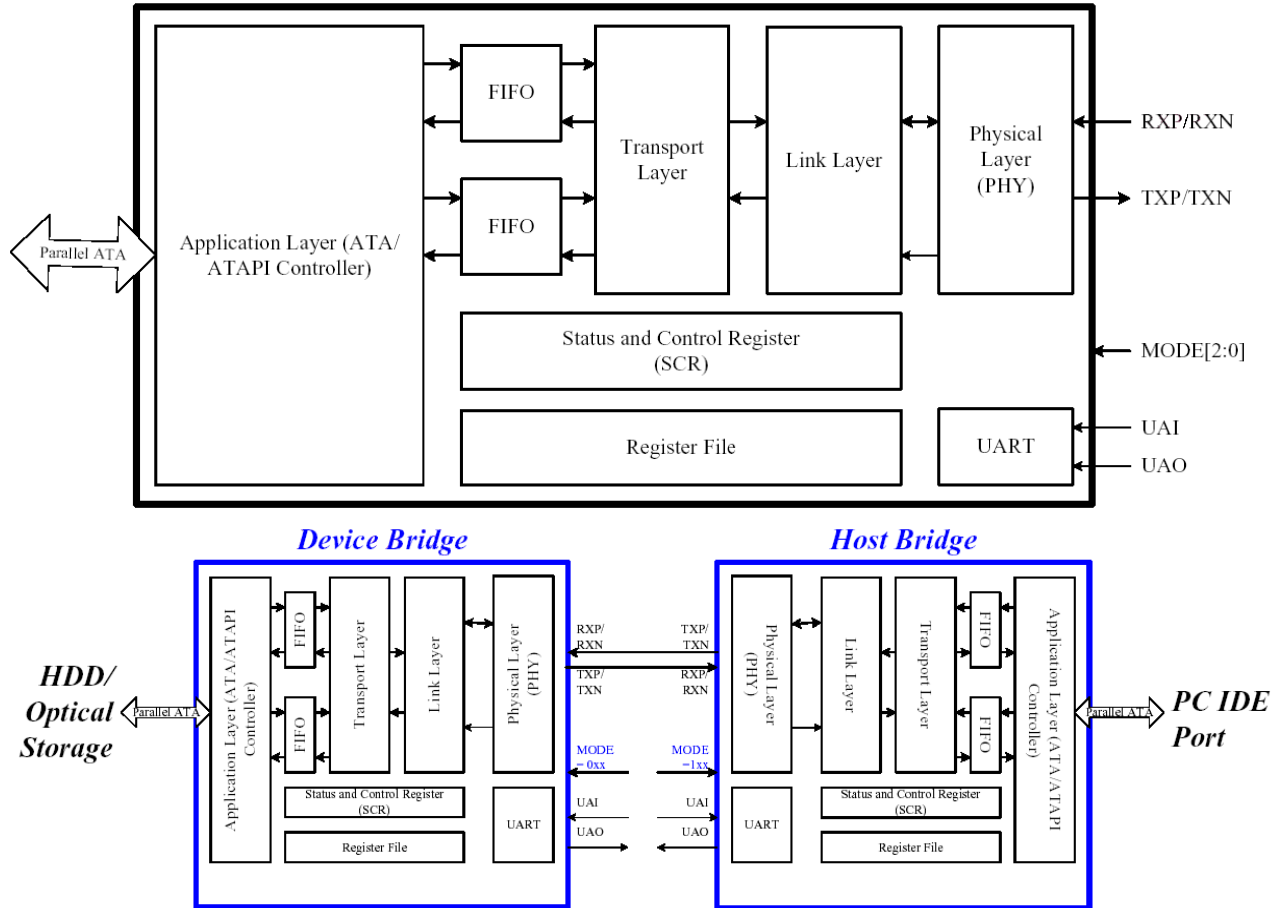
Card Density^{*4}	256M	512MB	1GB	2GB	4GB
Cylinder	503	1007	999	999	991
Heads	16	16	32	64	128
Sectors/Track ^{*2}	63	63	63	63	63
Total Sectors/Card ^{*3}	507,024	1,015,056	2,013,984	4,027,968	7,991,424
Capacity ^{*5}	259,596,288	519,708,672	1,031,159,808	2,062,319,616	4,091,609,088

Card Density^{*4}	8GB	12GB	16GB	24GB
Cylinder	995	1493	1949	2986
Heads	255	255	255	255
Sectors/Track ^{*2}	63	63	63	63
Total Sectors/Card ^{*3}	15,984,675	23,985,045	31,310,685	47,970,090
Capacity ^{*5}	8,184,153,600	12,280,343,040	16,031,070,720	24,560,686,080

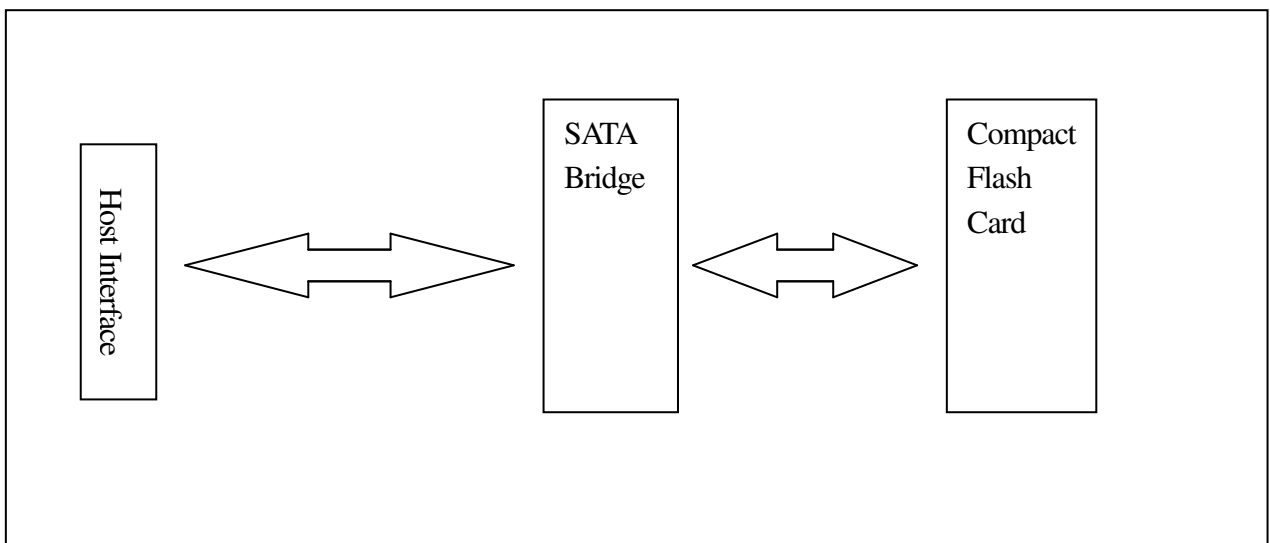
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5. Block Diagram

5.1 Controller Archive



5.2 Flash Card Archive



6. Specification and Features

6.1 Electrical Specification

6.1.1 Absolute Maximum Ratings

SYMBOL	PARAMETER	RATING	UNITS
V _{CC}	Power supply	-0.3 to 6	V
V _{IN}	Input voltage	-0.3 to V _{CC} + 0.3	V
V _{OUT}	Output voltage	-0.3 to V _{CC} + 0.3	V
T _{STG}	Storage temperature	-50 to 90	°C
T _{opr}	Operating temperature	-40 to 85	°C

6.1.2 General DC Characteristic

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
C _{IN}	Input capacitance				15	pF
C _{OUT}	Output capacitance				15	pF

6.1.3 DC Electrical Characteristics for 5 Volts Operation

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V _{IN}	Input voltage		0		V _{CC}	V
V _{CC}	Power supply		4.5	5.0	5.5	V
T _{STG}	Storage temperature		-50		90	°C
T _{OPR}	Operating temperature		-40		85	°C
V _{IL}	Input low voltage	CMOS			0.8	V
V _{IH}	Input high voltage	CMOS	2.4			V
V _{OL}	Output low voltage	I _{OL} =8mA			0.4	V
V _{OH}	Output high voltage	I _{OH} =-8mA	V _{CC} -0.8			V

6.1.4 DC Electrical Characteristics for 3.3 Volts Operation

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V _{IN}	Input voltage		0		V _{CC}	V
V _{DD}	Power supply		3.0	3.3	3.6	V
T _{STG}	Storage temperature		-50		90	°C
T _{OPR}	Operating temperature		-40		85	°C
V _{IL}	Input low voltage	CMOS			0.6	V
V _{IH}	Input high voltage	CMOS	2.4			V
V _{OL}	Output low voltage	I _{OL} =8mA			0.4	V
V _{OH}	Output high voltage	I _{OH} =-8mA	V _{DD} -0.8			V

6.2 Power Management

6.2.1 Normal Mode

The host can reduce the power consumption of the card by changing its status with the following Power Command.

Sleep mode consumes the lowest power. Response time for the card to change from sleep mode to the active state is about 30 ms or less.

Standby mode, the response time is about 5ms or less. This is due to the interface of the card that accepts the command although can't access the media immediately

Idle mode, the card can respond and access the media immediately. The card needs longer time in this mode than in its active mode in order to active several circuits that were not used in the active mode.

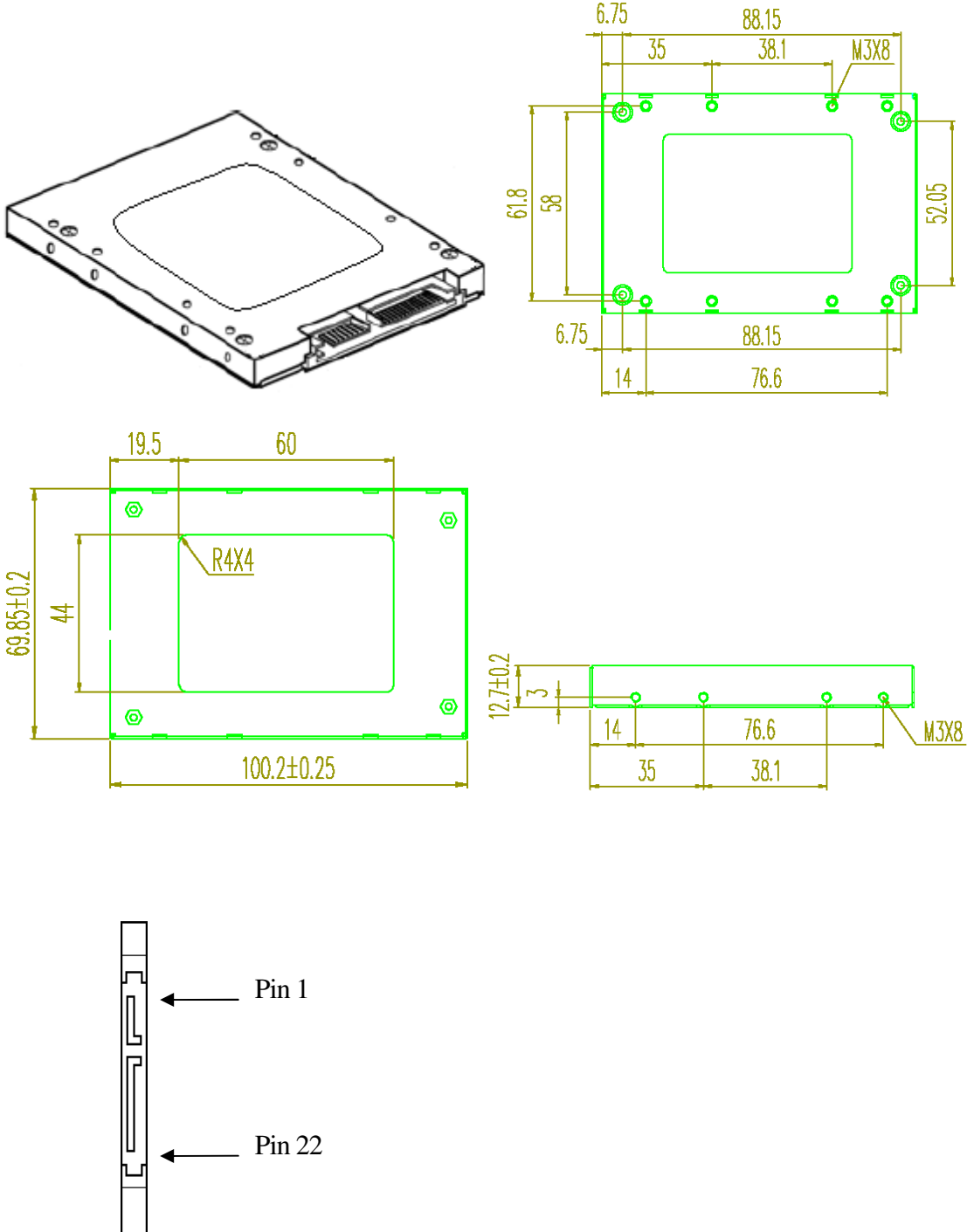
Active mode, the card can respond and access the media immediately, and the commands are processed with no delay.

6.2.2 Power down Mode

This card can set itself into Power Down mode. To enable this mode, it is needed to use the Information Change command, which is a vender unique command. The advantage of using this mode is the ability to move automatically into Sleep mode after command completion.

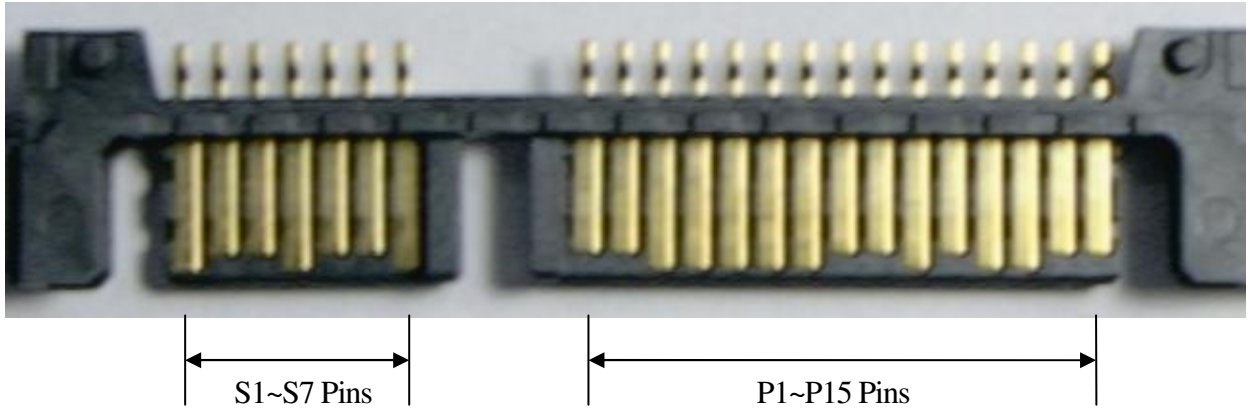
6.3 Physical Specification (List all 3 housing dimension)

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7. Pin Assignment

The SATA connector



7.1 Pin Type

The SATA connector consists of a signal segment (S1 ~ S7) and a power segment (P1 ~ P15).

7.2 Interface Description

The signal segment of the SATA connector consists of three grounds, two transmit and two receive pins. The transmit pins are S5 and S6 and the receive pins are S2 and S3.

Pin	Name	Description
S1	Ground	The second mate
S2	RxP	Differential signal pair for receive
S3	RxN	
S4	Ground	The second mate
S5	TxN	Differential signal pair for receive
S6	TxP	
S7	Ground	The second mate



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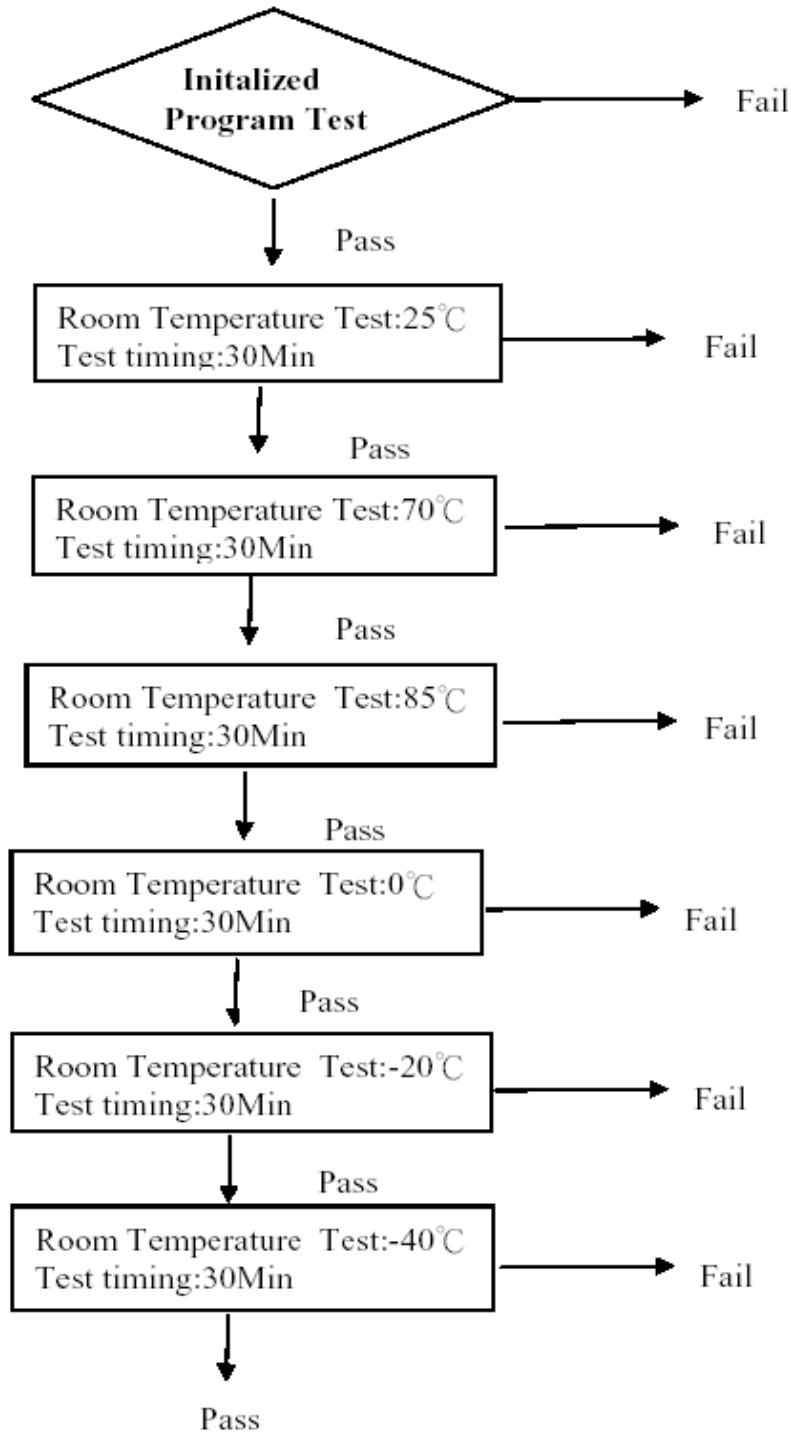
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The power segment pin has 15 pins. The system power supply must be capable of delivering 5V voltage.

Pin	Name	Description
P1	Not used (3.3V)	Not applicable
P2	Not used (3.3V)	
P3	Not used (3.3V Pre-charge)	
P4	Ground	The first mate
P5	Ground	The second mate
P6	Ground	
P7	5V Pre-charge	5V power, Pre-charge, the second mate
P8	5V	5V power
P9	5V	
P10	Ground	
P11	Reserved	
P12	Ground	The first mate
P13	Not used (12V Pre-charge)	Not applicable
P14	Not used (12V)	
P15	Not used (12V)	

8. System Environmental Specifications

8.1 Temperature Test Flow





8.2 Altitude Test

Altitude		Product
Altitude(relative to sea level)	Operating &Non- Operating	80,000 feet maximum