DA-681-T
Component Compatibility Guide

A list of peripheral components suitable for use with DA-681-T computers

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1. Introduction

The hardware components listed in this document have either been proven to provide up-to-spec performance when used with the Moxa DA-681-T of embedded computers, or which share basic design features with such components.

As Moxa computers come with different peripheral options and are engineered to differing hardware specifications, compatibility issues may sometimes arise. When paired with Moxa's DA-681-T of embedded computers, peripherals from one manufacturer may not work as well as those made by another. For this reason, Moxa provides this list of compatible components, so that users can be certain to get the reliability they expect from Moxa's DA-681-T.

2. Testing Methods

To validate a component as meeting Moxa standards of quality and environmental tolerances, five key compatibility tests may be run:

- Ambient Temperature Burn-In
- Low Temperature Hard Starts
- Heat/Humidity Burn-In
- Cyclic High-Low Temperature Burn-in
- Vibration Test

Ambient Temperature Burn-in

Components are mounted in an DA-681-T computer and run through a series of stress tests at an ambient temperature of around 25˚C for a specified period of time. Test periods are determined according to the class of peripherals being tested.

Low Temperature Hard Start

Components are mounted in an unpowered DA-681-T computer and then the system is booted up from an extremely low temperature. The designated temperature depends on the model being tested.

Heat/Humidity Burn-in

Components are mounted in an DA-681-T computer, placed in a temperature- and humidity-controlled enclosure, and then run through the burn-in test for a specific time. The temperature, humidity, and time targets vary depending on model specification.

Cyclic High-Low Temperature Burn-in

Components are mounted in an DA-681-T computer, placed in a temperature controlled enclosure, and then put through the burn-in test as temperatures are cycled from very high to very low and back again over a specified period of time. The target temperatures and time vary depending on model specifications.

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Vibration Test

Components are mounted in an DA-681-T computer, which is bound in an electromagnetic vibrator, and then run through random vibration tests about three axes: longitudinal, transverse, and vertical. The vibration tests are compliant with EN50155/IEC61373 vibration standards.

3. Storage Endurance

Storage media, such as SSDs, CF cards, SD cards, Disk on Module, and Cfast, are composed of different electrical components. The main components related to storage endurance and life time are NAND Flash memory and NAND Flash controller.

NAND Flash memory endurance

Any NAND Flash memory has its physical program and erase (P/E) limitation, and we can specifically use the P/E cycle as well as the so-called erase count to identify it. For instance, SLC (Single level cell) flash memory has a 60,000 P/E cycle, MLC (Multi-level cell) flash memory has a 3,000 P/E cycle, and TLC NAND Flash memory has up to a 1,000 P/E cycle. Each type of flash memory has different endurance, which is why the storage life time is based on flash memory type and storage that uses SLC type flash memory could have the best endurance compared to MLC type storage. SLC storage usually supports a 5-year OEM warranty (the actual warranty period depends on the original manufacturer). Comparatively, MLC storage only supports a 1- to 3-year warranty. The major difference between SLC and MLC is that SLC NAND Flash has around 20 times lifespan of MLC, and the price may differ by a factor of 4 to 5. For systems that are expected to be highly reliable and work without fail 24 hours a day, SLC type storage is recommended, especially when the storage is running an OS and is required to provide service for a longer time, or for applications that need to frequently write data to the storage medium.

TBW

The term TeraBytes Written, abbreviated as TBW, means something similar to endurance. TBW is defined by JEDEC based on the program unit to identify its storage life time. In actual applications, storage is used for routine operations and data access. The physical P/E cycle is not appropriate for describing total rewritable data capacity, and the management efficiency of the storage controller also affects the total rewritable data capacity result. For these reasons, JEDEC defined a standard, JESD218, for SSD endurance evaluation, and uses TBW to describe the test result. By referring to this TBW value, users can easily estimate demand and select suitable storage for real-use cases. For example, when routine operations need a maximum of 20 GB and the expected storage life time is 3 years, the total rewritable data demand would be 21.9 TBW (20GB x 365 x 3). In this case, you could choose storage that has more than 21.9 TBW to match this demand; we recommend selecting a TBW that is greater than the calculated value.

Declaration for Liability Exclusion in the CCG

The specifications, warranty terms, and liability of items listed in the Moxa Component Compatibility Guide are the sole responsibility of the original manufacturers. Moxa does not any responsibility in this regard. Please visit the manufacturers' official websites for up-to-date product information before purchasing an item.

4. Compatible Components

Check the following table for validation condition codes and their description.

Test Code	Description
A	The component passed ambient temperature verification
B	The component passed low temperature verification
C	The component passed heat/humidity verification
D	The component passed cyclic high-low temperature verification
E	The component has not been tested, but shares materials and design with another component that has been verified.
F	The component passed vibration verification

The following list shows which peripherals have been tested, and for what specifications, on Moxa's embedded computers.

DOM

Vendor	Size	Moxa's PN	Vendor's PN	Flash Brand	Flash Spec	Controller	Firmware	Warranty years	Warranty exclusion	Test Codes
InnoDisk	1 GB	N/A	DE4H-01GD31W1D-A31	Samsung	SLC	N/A	N/A	5 years	Endurance > 60,000	B, C, D
InnoDisk	1 GB	N/A	DE4H-01GD31W1DR-A31	Samsung	SLC	N/A	N/A	5 years	Endurance > 60,000	B, C, D
InnoDisk	2 GB	N/A	DE4H-02GD31W1D-A31	Samsung	SLC	N/A	N/A	5 years	Endurance > 60,000	B, C, D
InnoDisk	2 GB	N/A	DE4H-02GD31W1DR-A31	Samsung	SLC	N/A	N/A	5 years	Endurance > 60,000	B, C, D
InnoDisk	4 GB	N/A	DE4H-04GD31W1DR-A31	Samsung	SLC	N/A	N/A	5 years	Endurance > 60,000	B, C, D
InnoDisk	8 GB	N/A	DE4H-08GD31W1DT-A31	Micron	SLC	N/A	N/A	5 years	Endurance > 60,000	B, C, D
Memoright	1 GB	N/A	MRDEM2B001GB7P1A0	Samsung	SLC	N/A	N/A	5 years	N/A	B, C, D
Memoright	16 GB	1352020162020	MRDEM2B016GN4P1IA0	Micron	SLC	N/A	N/A	5 years	N/A	B, C, D
Memoright	2 GB	N/A	MRDEM2B002GB8P1IA0	Samsung	SLC	N/A	N/A	5 years	N/A	B, C, D
Memoright	4 GB	N/A	MRDEM2B004GB0P1IA0	Samsung	SLC	N/A	N/A	5 years	N/A	B, C, D
Memoright	8 GB	1352020082040	MRDEM2B008GN2P1IA0	Micron	SLC	N/A	N/A	5 years	N/A	B, C, D
Transcend	1 GB	N/A	TS1GDOM44V-S	N/A	SLC	N/A	N/A	2 years	N/A	B, C, D
Transcend	2 GB	N/A	TS2GDOM44V-S	Samsung	SLC	N/A	N/A	2 years	N/A	B, C, D

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CF										
Vendor	**Size**	**Moxa's PN**	**Vendor's PN**	**Flash Brand**	**Flash Spec**	**Controller**	**Firmware**	**Warranty years**	**Warranty exclusion**	**Test Codes**
Transcend	128 MB	N/A	TS128MCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	256 MB	N/A	TS256MCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	512 MB	N/A	TS512MCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	1 GB	N/A	TS1GCF133	SanDisk/ Micron	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	1 GB	N/A	TS1GCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	2 GB	N/A	TS2GCF133	SanDisk/ Micron	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	2 GB	N/A	TS2GCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	4 GB	N/A	TS4GCF133	SanDisk/ Micron	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	4 GB	N/A	TS4GCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	A
Transcend	8 GB	N/A	TS8GCF400	SanDisk/ Micron	MLC	SM2236AC	N/A	2 years	N/A	E
Transcend	8 GB	N/A	TS8GCF133	SanDisk/ Micron	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	8 GB	N/A	TS8GCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	16 GB	N/A	TS16GCF1000	SanDisk/ Micron	MLC	SM2232ENAC	N/A	2 years	N/A	E
Transcend	16 GB	N/A	TS16GCF400	SanDisk/ Micron	MLC	SM2236AC	N/A	2 years	N/A	E
Transcend	16 GB	N/A	TS16GCF133	SanDisk/ Micron	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	16 GB	N/A	TS16GCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	32 GB	N/A	TS32GCF1000	SanDisk/ Micron	MLC	SM2236AC	N/A	2 years	N/A	A
Transcend	32 GB	N/A	TS32GCF400	SanDisk/ Micron	MLC	SM2236AC	N/A	2 years	N/A	A
Transcend	32 GB	N/A	TS32GCF133	SanDisk/ Micron	MLC	SM2232AD	N/A	2 years	N/A	E
Transcend	32 GB	N/A	TS32GCF200I	Samsung	MLC	SM2232AD	N/A	2 years	N/A	A

SSD

Vendor	Size	Moxa's PN	Vendor's PN	Flash Brand	Flash Spec	Controller	Firmware	Warranty years	Warranty exclusion	Test Codes
Memoright	64 GB	N/A	MRSAJ6Q064GN225I00	Samsung	SLC	JMF612	MRV1.1.6	5 years	N/A	B, C, D
Transcend	16 GB	N/A	TS16GSSD500	Samsung	SLC	JM616	120820	2 years	N/A	E
Transcend	32 GB	N/A	TS32GSSD500	Samsung	SLC	JM616	120820	2 years	N/A	E
Transcend	64 GB	N/A	TS64GSSD320	SanDisk/ Micron	MLC	SF2281	N/A	2 years	N/A	E
Transcend	64 GB	N/A	TS64GSSD500	Samsung	SLC	JM616	120820	2 years	N/A	A
Transcend	128 GB	N/A	TS128GSSD320	SanDisk/ Micron	MLC	SF2281	N/A	2 years	N/A	E
Transcend	256 GB	N/A	TS256GSSD320	SanDisk/ Micron	MLC	SF2281	N/A	2 years	N/A	A
Apacer	64 GB	N/A	AP64GAS510SB	N/A	MLC	N/A	N/A	3 years	Endurance > 3,000	A

DRAM

Vendor	Size	Moxa's PN	Vendor's PN	Chip Brand	Speed	Test Codes
DSL	1 GB	1352110012031	D2SM64162XH30ABIS	Micron	667	B, C, D
DSL	1 GB	N/A	D2SP64162XH30AAIS	ProMOS	667	B, C, D
DSL	2 GB	1352110022070	D2SP28082XH30ABIS	ProMOS	667	B, C, D
DSL	512 MB	1352115121020	D2SS64161XH30AB	Samsung	667	B, C, D
InnoDisk	1 GB	N/A	M2SK-1GPF5IJ6-B	ProMOS	667	B, C, D
InnoDisk	1 GB	N/A	M2SK-1GHF5I06-J	Hynix	800	B, C, D
InnoDisk	512 MB	N/A	M2SK-12HC5I06-G	Hynix	800	B, C, D
InnoDisk	512 MB	N/A	M2SK-12HD4C07-J	Hynix	800	B, C, D
Unigen	1 GB	N/A	UG12T6408M8SU-6AS	ProMOS	667	B, C, D
Unigen	2 GB	N/A	UG25T6408M8SU-6AP	ProMOS	667	B, C, D
Unigen	512 MB	N/A	UG64T6400L8SU-6AS	Hynix	667	B, C, D
Unigen	512 MB	N/A	UG64T6408L8SU-6AS	ProMOS	667	B, C, D
Transcend	1 GB	N/A	TS128MSQ64V8U	Samsung	800	E
Transcend	2 GB	N/A	TS256MSQ64V8U	Samsung	800	A

HDD						
Vendor	**Size**	**Moxa's PN**	**Vendor's PN**	**Controller**	**Firmware**	**Test Codes**
HGST	1 TB	N/A	HCC541010A9E680	N/A	N/A	A
HGST	1 TB	N/A	HTS541010A9E680	N/A	N/A	A
HGST	1 TB	N/A	HTS721010A9E630 / 0J22423	N/A	N/A	A
HGST	500 GB	N/A	HTS725050A7E630 / 0J38075	N/A	N/A	A
HGST	1 TB	N/A	HTS541010A9E650	N/A	N/A	A
WD	750 GB	N/A	WD7500BPKT	N/A	N/A	A
WD	1 TB	N/A	WD10JUCT	N/A	N/A	A
WD	1 TB	N/A	WD10JPVT	N/A	N/A	A
WD	1 TB	N/A	WD10SPCX	N/A	N/A	A
Samsung	2 TB	N/A	ST2000LM003	N/A	N/A	A