JMicron Technology Corporation

Product Brief

JMS581
USB 3.2 Gen2x1 to SATA 6Gb/s, PCIe G3x2 & SD Express Bridge Controller

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Revision History

Revision number	Effective date	Description of revision		Author
		Reference	Description of change	
1.00	06/01/2020	--	Initial release	Larry Chien
1.01	03/02/2020	Section 2	Minor modify the content	Katrina Mo
1.02	24/04/2020	Section 5	Modify package dimension	Katrina Mo

Table of Contents

Revision History **2**

Table of Contents **3**

1 Overview **4**

2 Features **5**

2.1 General Features 5
2.2 Universal Serial Bus 5
2.3 PCI Express 5
2.4 Serial ATA 5
2.5 SD Express 5

3 Block Diagram **2**

4 Application **8**

5 Package Dimension **9**

Figure List

Figure 1 Block Diagram – JMS581 ..... **2**
Figure 2 Block Diagram - Offline Copy Path **7**
Figure 3 Application Scenarios **8**
Figure 4 Package Outline Drawing of 144TFBGA 9x9mm2 ..... **10**

1 Overview

JMS581 is a system on chip solution which embedded with USB 3.2 Gen2x1 10Gb/s, SATA 6Gb/s, PCIe/ NVMe Gen 3x2, and SD Express interfaces while offering designated Offline File Copy and CLONE function between these interfaces. Its upstream port provides a USB which data speed can reach up to 10Gb/s. Meanwhile, its downstream port can connect to SATA/ PCIe/ NVMe/ SD Express storage devices, such as a hard drive, solid-state drive, CFast/SD Express memory card. The data speed for SATA port can reach 6Gb/s, or the data rate for the SATA III requirement. The PCIe port can reach 16Gb/s, or the data rate for the PCIe Gen3x2 requirements. The SD Express port can reach up to 985 MB/s data transfer rate and backward compatible with legacy SD cards.

Moreover, JMS581 has USB Type-C™ connectivity built in to the controller that any device using JMS581 can have a USB Type-C™ connector without adding any additional peripheral part. It can save costs to buy parts, and efforts to build inventory, and it can reduce printed circuit board area for the system designs.

JMS581 supports TRIM to the NAND flash based storages and enable transmit and receive data by both of the USB Mass Storage Class Bulk-Only Transport (BOT) and USB Attached SCSI Protocol (UASP) to and from the host respectively. The data storage devices can achieve its summit of performance by taking advantage of these built-in unmatched features.

JMS581 is well equipped for power management that it can meet a wide variety of power requirements from different scales of data storage systems: such as portable filed backup storage as well as portable storage applications.

Owing to its USB Type-C™ connectivity, JMS581 can work with some power management controllers to a USB Power Delivery (PD) enabled data storage device. The data storage devices having SSDs of large capacity can accept the electrical power from sources of energy, such as hosts acting as a power provider of USB PD to supply sufficient electricity to the device after they negotiate with each other, without plugging in.

In sum, JMS581 is a highly integrated system on chip solution which provides variable ultra-high speed removable storage interfaces to help users effectively transfer their high quality pictures/ 4K/ 8K video quicker than ever without connect to PC/Laptop anymore.

2 Features

2.1 General Features

- Design for Windows 7, Windows 10 and MAC 10.10.5 or later version
- Provide 8 hardware controlled PWMs
- Provide software utilities for downloading the upgraded firmware code under USB2.0/ USB3.2 Gen1 and USB3.2 Gen2
- Independent CLONE system operation without host computer
- 144TFBGA (9x9mm^2) package
- Support 25MHz external crystal
- Support 3.3V I/O
- 32 GPIOs for customization

2.2 Universal Serial Bus

- Comply with USB 3.2 Gen 1 and Gen 2 Specification,
- Comply with USB Mass Storage Class, Bulk-Only Transport Specification (Revision 1.0)
- Comply with USB Attached SCSI Protocol (UASP) Specification (Revision 4)
- Integrate with USB Type-C™ multiplexer & configuration channel (CC) logic
- Support USB Super-Speed/ High-Speed/ Full-Speed Operation
- Support USB2.0/ USB 3.2 Gen 1/ Gen 2 power saving mode
- Support external SPI NVRAM for Vendor VID/PID of USB2.0/USB 3.2 Gen 1/2 device controller

2.3 PCI Express

- Comply with PCI Express Base Specification Revision 3.1a
- Comply with NVM Express 1.3
- Support TRIM to the SSD

2.4 Serial ATA

- Comply with SATA Specification (Revision 3.1)
- Support TRIM to SATA
- Support Native Command Queue (NCQ)

2.5 SD Express

- Support SD 3.01 UHS-1
- Support SD 7.1 SD Express (PCIe Gen3x1 NVMe 1.3)

3 Block Diagram

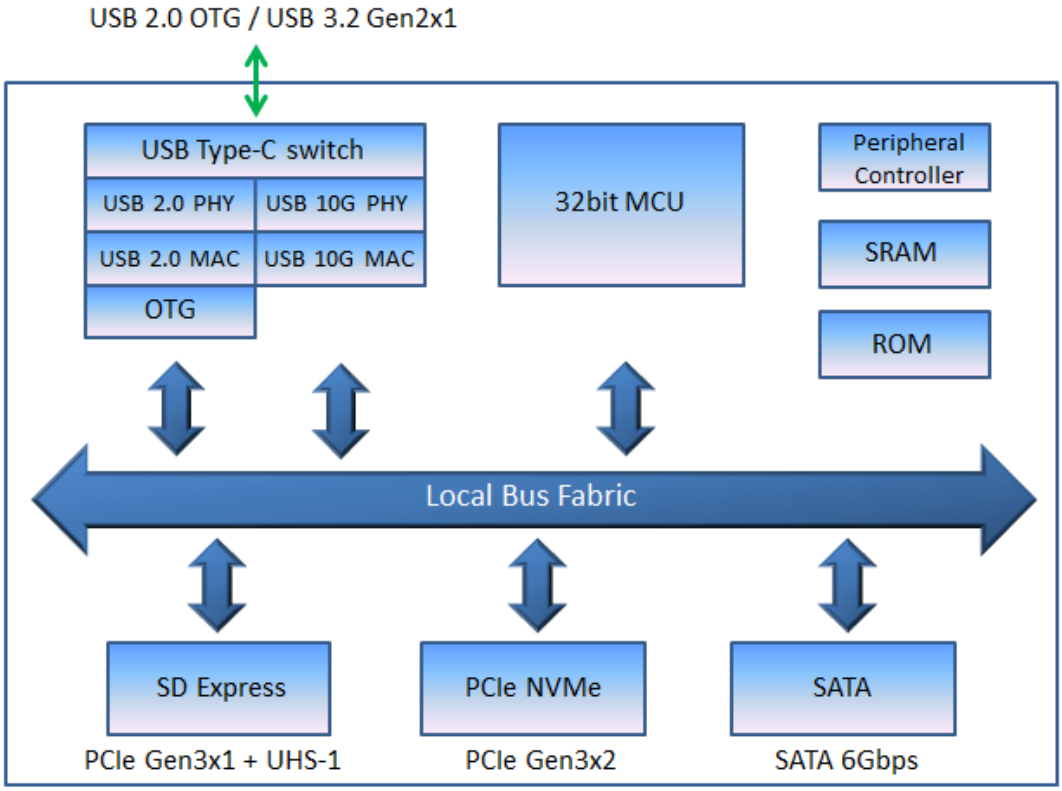


Figure 1 Block Diagram – JMS581

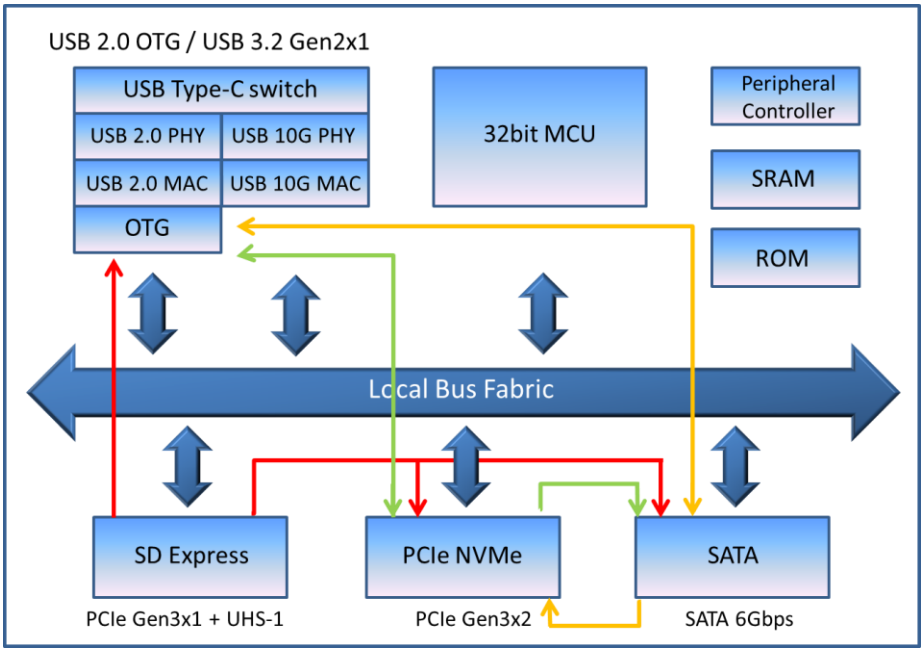


Figure 2 Block Diagram - Offline Copy Path

4 Application

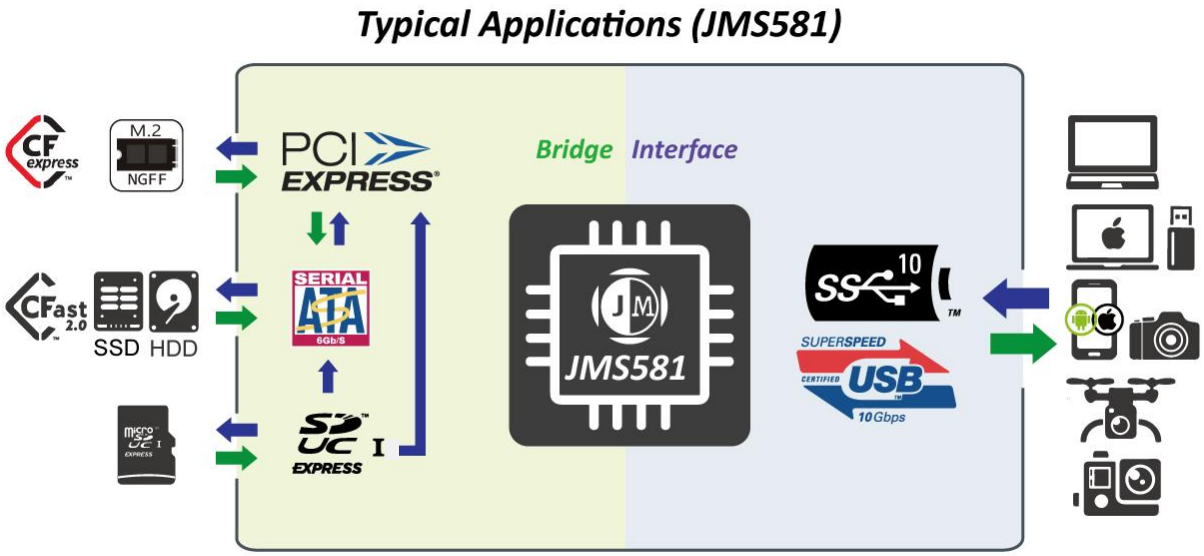
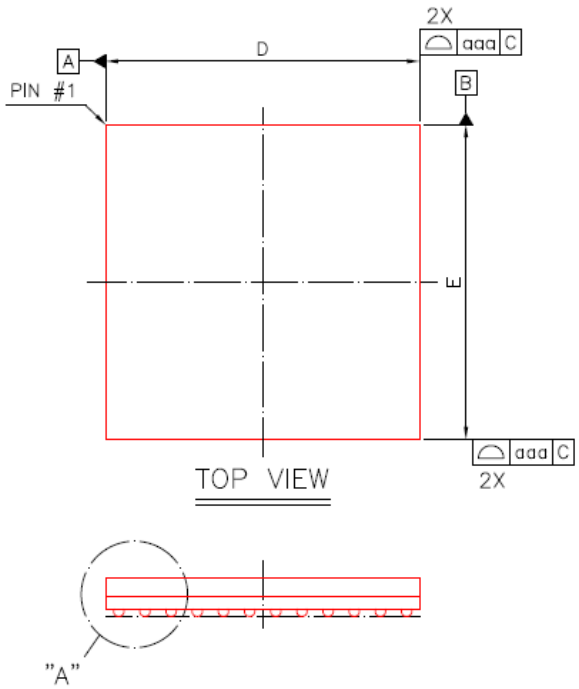


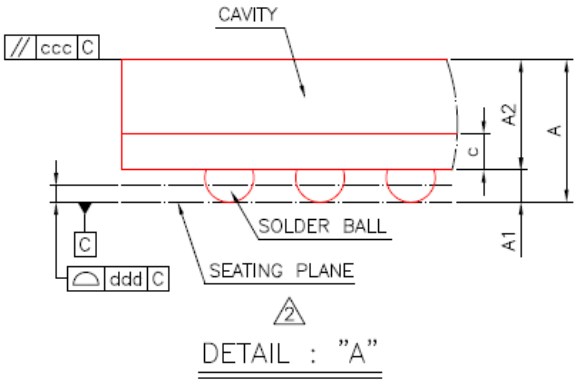
Figure 3 Application Scenarios

5 Package Dimension

Symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.03	1.10	1.17	0.041	0.043	0.046
A1	0.16	0.21	0.26	0.006	0.008	0.010
A2	0.84	0.89	0.94	0.033	0.035	0.037
c	0.32	0.36	0.40	0.013	0.014	0.016
D	8.90	9.00	9.10	0.350	0.354	0.358
E	8.90	9.00	9.10	0.350	0.354	0.358
D1	---	8.25	---	---	0.325	---
E1	---	8.25	---	---	0.325	---
e	---	0.75	---	---	0.030	---
b	0.25	0.30	0.35	0.010	0.012	0.014
aaa		0.15			0.006	
ccc		0.10			0.004	
ddd		0.08			0.003	
eee		0.15			0.006	
fff		0.08			0.003	
MD/ME	12/12					

NOTE :
1. CONTROLLING DIMENSION : MILLIMETER.
2. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
3. DIMENSION b IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C.
4. SPECIAL CHARACTERISTICS C CLASS: ccc,ddd(SPIL STANDARD)
5. THE PATTERN OF PIN 1 FIDUCIAL IS FOR REFERENCE ONLY.
6. REFERENCE DOCUMENT : JEDEC PUBLICATION 95 DESIGN GUIDE 4.5





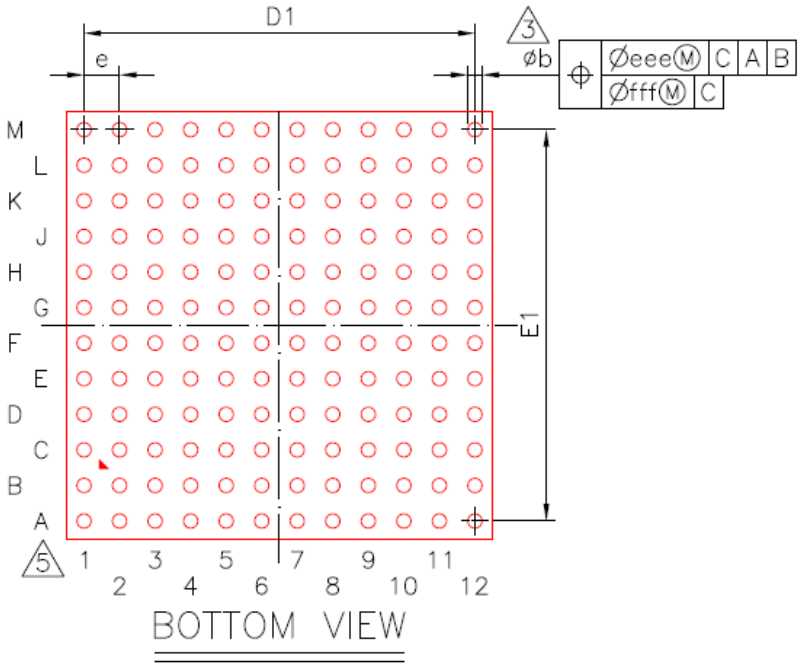


Figure 4 Package Outline Drawing of 144TFBGA 9x9mm2

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