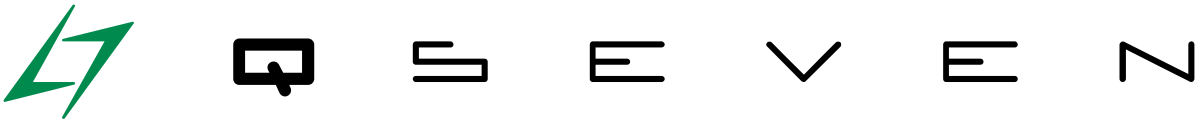
Qseven® Specification

Qseven Camera Feature Connector



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SGeT STANDARDIZATION GROUP FOR EMBEDDED TECHNOLOGIES

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Note

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Preface Qseven Consortium

This document provides information for designing a custom system carrier board for Qseven® modules. This document includes reference schematics for the external circuitry required to implement the various Qseven® peripheral functions. It also explains how to extend the supported buses and how to add additional peripherals and expansion slots to a Qseven® based system.

This design guide is not a specification. It contains additional detail information but does not replace the Qseven® specification. It's strongly recommended to use the latest Qseven® specification and the module vendor's product manuals as reference material.

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The typical application circuits described in this document may not be suitable for all applications. In particular, additional components may need to be added to these circuits in order to meet specific ESD, EMC or safety isolation requirements. Such regulatory requirements and the techniques for meeting them vary by industry and are beyond the scope of this document.

Intended Audience

This Qseven Camera Feature Connector Specification is intended for technically qualified personnel. It is not intended for general audiences.

Symbols

The following symbols may be used in this specification:



Warning

Warnings indicate conditions that, if not observed, can cause personal injury.



Caution

Cautions warn the user about how to prevent damage to hardware or loss of data.



Note

Notes call attention to important information that should be observed.

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Lead-Free Designs (RoHS)

All Qseven® designs shall be created from lead-free components in order to be RoHS compliant.

Qseven® Logo Usage

The Qseven® logo is freely available for members of the SGeT e.V.. The logo can only be applied to products that are fully compliant to the specification of the Qseven® standard.

The SGeT e.V. reserves the right to take legal action against any party that fails to comply with the rules stated above for Qseven® logo usage.

High resolution formats are available at the members area www.sget.org.

Qseven® Name Usage

The Qseven® name is freely available for members of the SGeT e.V.. The logo can only be applied to products that are fully compliant to the specification of the Qseven® standard.

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Electrostatic Sensitive Device



All electronic parts described in this design guide are electrostatic sensitive devices and are packaged accordingly. Do not open or handle a carrier board or module except at an electrostatic-free workstation. Additionally, do not ship or store electronic devices near strong electrostatic, electromagnetic, magnetic, or radioactive fields unless the device is contained within its original manufacturer's packaging.

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Key Words

- ***May*** - Indicates flexibility of choice with no implied recommendation or requirement.
- ***Shall*** - Indicates a mandatory requirement. Designers shall implement such mandatory requirements to ensure interchangeability and to claim conformance with the specification.
- ***Should*** - Indicates a strong recommendation but not a mandatory requirement. Designers should give strong consideration to such recommendations but there is still a choice in implementation.

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Optional feature connector for MIPI-CSI2 Camera Interface

applies to Qseven Specification Version.2.0 dated September 20, 2012

Motivation

Usage of cameras is getting more and more popular in industrial applications. Latest generations of ARM and x86 chipsets offers MIPI-CSI2 interfaces to enable cost-optimized high-resolution camera systems. To enable system designers to leverage this new interface, a standard feature connector is being introduced.

Cable specification

A 36-pin flatfoil cable with 0.5mm pitch and 0.3mm thickness at the ends shall be used. The cable length should not exceed 20cm for CSI2 usages.

Examples of possible flat foil cables (not a complete list):

1. FFC0.50A36-0047L-4-4-08-08 (ES&S)
2. FFC0.50A36-0092L-4-4-08-08 (ES&S)

Connector specification

A 36-pin flatfoil connector with 0.5mm pitch that accepts the above specified flat foil cables with 0.3mm thickness at the ends shall be used. These connectors are suitable for high-speed differential signaling and available from various vendors like Hirose, Tyco or FCI. The connector shall have top-side contacts.

Example of possible connectors (not a complete list):

1. Hirose FH12A-36S-0.5SH(55)
2. FCI 62684-362100ALF
3. Tyco 3-1734592-6



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Pinout Definition

Pin	Signal	Description	I/O Type	I/O
1	CAM_PWR	3.3V +/- 5% supply voltage to power the camera device	3.3V Power Output	P
2	CAM_PWR	3.3V +/- 5% supply voltage to power the camera device	3.3V Power Output	P
3	CAM0_CSI_D0+	CSI2 Camera 0 Data Lane 0+	D-PHY	I
4	CAM0_CSI_D0-	CSI2 Camera 0 Data Lane 0-	D-PHY	I
5	GND			P
6	CAM0_CSI_D1+	CSI2 Camera 0 Data Lane 1+	D-PHY	I
7	CAM0_CSI_D1-	CSI2 Camera 0 Data Lane 1-	D-PHY	I
8	GND			P
9	CAM0_CSI_D2+	CSI2 Camera 0 Data Lane 2+	D-PHY	I
10	CAM0_CSI_D2-	CSI2 Camera 0 Data Lane 2-	D-PHY	I
11	CAM0_RST#	Camera 0 Reset (low active)	CMOS 1.8V	O
12	CAM0_CSI_D3+	CSI2 Camera 0 Data Lane 3+	D-PHY	I
13	CAM0_CSI_D3-	CSI2 Camera 0 Data Lane 3-	D-PHY	I
14	GND			P
15	CAM0_CSI_CLK+	CSI2 Camera 0 Differential Clock+ (Strobe)	D-PHY	I
16	CAM0_CSI_CLK-	CSI2 Camera 0 Differential Clock- (Strobe)	D-PHY	I
17	GND			P
18	CAM0_I2C_CLK	Camera 0 Control Interface, CLK. (I^2C like interface)	CMOS 1.8V OD	O
19	CAM0_I2C_DAT	Camera 0 Control Interface, DATA. (I^2C like interface)	CMOS 1.8V OD	I/O
20	CAM0_ENA#	Camera 0 Enable (low active)	CMOS 1.8V	O
21	MCLK	Master Clock may be used by Cameras to drive it's internal PLL Frequency range: 6...27 MHz	CMOS 1.8V	O
22	CAM1_ENA#	Camera 1 Enable (low active)	CMOS 1.8V	O
23	CAM1_I2C_CLK	Camera 1 Control Interface, CLK. (I^2C like interface)	CMOS 1.8V OD	O
24	CAM1_I2C_DAT	Camera 1 Control Interface, DATA. (I^2C like interface)	CMOS 1.8V OD	I/O
25	GND			P
26	CAM1_CSI_CLK+	CSI2 Camera 1 Differential Clock+ (Strobe)	D-PHY	I
27	CAM1_CSI_CLK-	CSI2 Camera 1 Differential Clock- (Strobe)	D-PHY	I
28	GND			P
29	CAM1_CSI_D0+	CSI2 Camera 1 Data Lane 0+	D-PHY	I
30	CAM1_CSI_D0-	CSI2 Camera 1 Data Lane 0-	D-PHY	I
31	CAM1_RST#	Camera 1 Reset (low active)	CMOS 1.8V	O
32	CAM1_CSI_D1+	CSI2 Camera 1 Data Lane 1+	D-PHY	I
33	CAM1_CSI_D1-	CSI2 Camera 1 Data Lane 1-	D-PHY	I
34	GND			P
35	CAM0_GPIO	GPIO for Camera 0	CMOS 1.8V	I/O
36	CAM1_GPIO	GPIO for Camera 1	CMOS 1.8V	I/O

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Feature Fill Order

Camera 0 can support up to 4 data lanes. Camera 1 can support up to 2 data lanes. If less lanes are used the lanes will be filled from the lane 0 up.

In case only one CSI link is available from the Q7 module the camera 0 pins will be used.

Electrical Specification of 3.3V Supply

The Host System (QSeven module) shall provide 3.3V +/-5% over a maximum load current of 500 mA. If a connected camera systems will draw more power, it should be supplied with an individual power-supply. In this case, supply voltage of pins 1 and 2 should not be used.

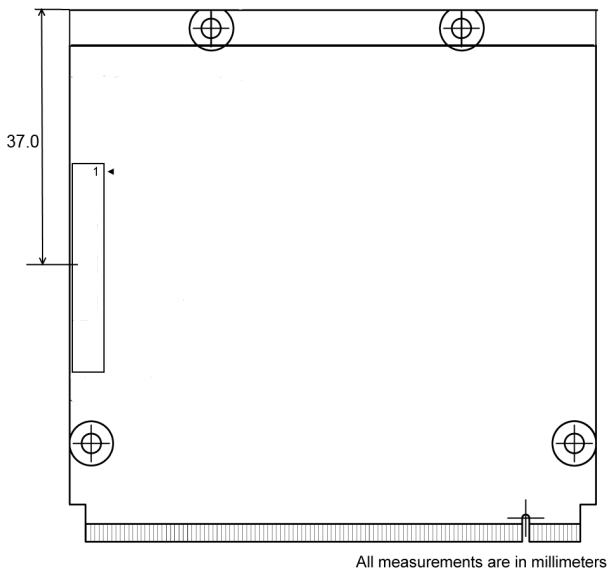
Note: The limit of the actual available current for the cameras depend on the used FFC cable! Example: It is possible that the cable allows 200mA per connection only. This would lead to a current limit of 400mA.

Connector location and pin 1 orientation

The camera feature connector is located in the optional I/O Connector area.

For best compatibility throughout multiple module vendors, the Y position of the connector's center shall be 37.0mm +/- 1mm.

The connector shald have top-side contact, so that pin 1 is located in the upper end of the connector area.



Qseven Module Top Side

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