



Simply Brighter

(In Canada)
111 Railside Road
Suite 201
Toronto, ON M3A 1B2
CANADA
Tel: 1-416-840 4991
Fax: 1-416-840 6541

(In US)
1241 Quarry Lane
Suite 105
Pleasanton, CA 94566
USA
Tel: 1-925-218 1885
Email: sales@mightex.com

Mightex Buffer USB CCD Camera Din8 Connector Description

Version 1.0.7

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Relevant Products

Part Numbers
CCN-B013-U, CCE-B013-U,CCN-C013-U, CCE-C013-U, CGN-B013-U, CGE-B013-U,CGN-C013-U, CGE-C013-U, CXN-B013-U, CXE-B013-U,CXN-C013-U, CXE-C013-U, CCN-B020-U, CCE-B020-U, CCN-C020-U, CCE-C020-U

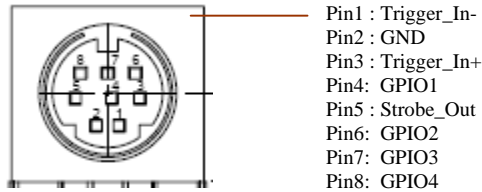
Revision History

Revision	Date	Author	Description
1.0.0	Aug. 28, 2008	JT Zheng	Initial Revision
1.0.1	Oct. 21, 2008	JT Zheng	C-Mount Modals only
1.0.2	Dec. 21, 2008	JT Zheng	Add CGX Modals
1.0.3	Jan. 16, 2010	JT Zheng	Add CXX Modals
1.0.4	Mar. 06, 2010	JT Zheng	Detailed description of Trig+/- circuit
1.0.5	Apr. 28, 2010	JT Zheng	Adding C020/B020 modals
1.0.6	Oct. 22, 2010	JT Zheng	Long Con8 Cable Description
1.0.7	Dec.24,2018	JT Zheng	New Mightex Logo

*.CCN, CCE, CXN, CXE Modules

Mightex CCN and CCE CCD camera is with two connectors, one is the standard USB 2.0 Type B connector, and the another one is a 8 pin Din connector as following:

(The following figure is the **receptacle of the 8pin connector on the camera module**)



Please pay attention that the pin layout above is for the receptacle on the module, the Din 8 connector mates with it has the reversed pin layout.

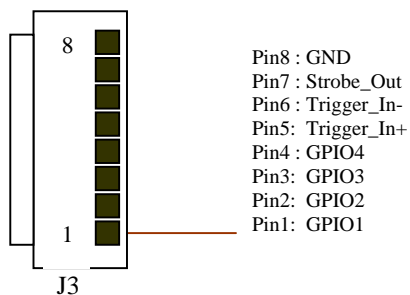
The 8pin cable provided by Mightex has the following color mark for each pin:
(Note: This 8pin trigger cable is not included in the “standard” package and needs to be purchased separately)

Pin	Signal Description	Color
Pin1	Trigger In-	BLACK
Pin2	GND	DEEP BROWN
Pin3	Trigger In+	RED
Pin4	GPIO1	ORANGE
Pin5	Strobe Out	YELLOW
Pin6	GPIO2	GREEN
Pin7	GPIO3	BLUE
Pin8	GPIO4	PURPLE

*.CGN, CGE Modules

Mightex CGN and CGE CCD camera is with two connectors, one is the standard USB 2.0 Type B mini connector, and the another one is a 8 pin connector as following:

(The following figure is the **receptacle of the 8pin connector on the camera module**)



The 8pin cable provided by Mightex has the following color mark for each pin:

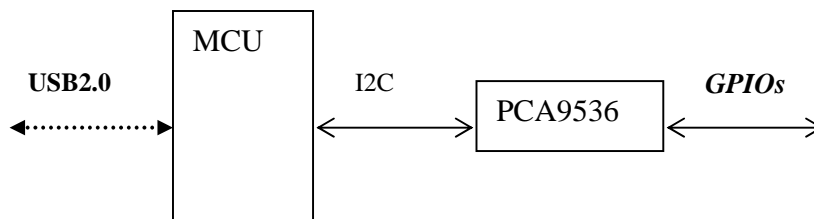
(**Note:** This 8pin trigger cable is not included in the “standard” package and needs to be purchased separately)

Pin	Signal Description	Color(Long Cable)
Pin1	GPIO1	RED
Pin2	GPIO2	BLACK
Pin3	GPIO3	YELLOW
Pin4	GPIO4	BROWN
Pin5	Trigger_In+	GREEN
Pin6	Trigger_In-	BLUE
Pin7	Strobe_Out	PURPLE
Pin8	GND	GRAY

Electrical Specifications:

GPIO:

The Buffer Camera is using PCA9536 chip on board for its GPIO extension, the circuit diagram on board is as following:



User might refer to the specification of PCA9536 for the details of the electrical spec. of the IO pins. Note that on our board, the Vdd = 3.3V. And the main I/Os spec. is listed in the table below.

I/Os						
V _{IL}	LOW-level input voltage		-0.5	—	0.8	V
V _{IH}	HIGH-level input voltage		2.0	—	5.5	V
I _{OL}	LOW-level output current	V _{OL} = 0.5 V; V _{DD} = 2.3 V; Note 2	8	10	—	mA
		V _{OL} = 0.7 V; V _{DD} = 2.3 V; Note 2	10	13	—	mA
		V _{OL} = 0.5 V; V _{DD} = 4.5 V; Note 2	8	17	—	mA
		V _{OL} = 0.7 V; V _{DD} = 4.5 V; Note 2	10	24	—	mA
		V _{OL} = 0.5 V; V _{DD} = 3.0 V; Note 2	8	14	—	mA
		V _{OL} = 0.7 V; V _{DD} = 3.0 V; Note 2	10	19	—	mA
V _{OH}	HIGH-level output voltage	I _{OH} = -8 mA; V _{DD} = 2.3 V; Note 3	1.8	—	—	V
		I _{OH} = -10 mA; V _{DD} = 2.3 V; Note 3	1.7	—	—	V
		I _{OH} = -8 mA; V _{DD} = 3.0 V; Note 3	2.6	—	—	V
		I _{OH} = -10 mA; V _{DD} = 3.0 V; Note 3	2.5	—	—	V
		I _{OH} = -8 mA; V _{DD} = 4.75 V; Note 3	4.1	—	—	V
		I _{OH} = -10 mA; V _{DD} = 4.75 V; Note 3	4.0	—	—	V
I _{IH}	Input leakage current	V _{DD} = 3.6 V; V _I = V _{DD}	—	—	1	μA
I _{IL}	Input leakage current	V _{DD} = 5.5 V; V _I = V _{SS}	—	—	-100	μA

As for the timing specification, the PCA9536 has the following:

SYMBOL	PARAMETER	STANDARD MODE I ² C-bus		FAST MODE I ² C-bus		UNITS
		MIN	MAX	MIN	MAX	
Port Timing						
t _{pv}	Output data valid	—	200	—	200	ns
t _{ps}	Input data setup time	100	—	100	—	ns
t _{ph}	Input data hold time	1	—	1	—	μs

Note that we're using FAST MODE (400kbps).

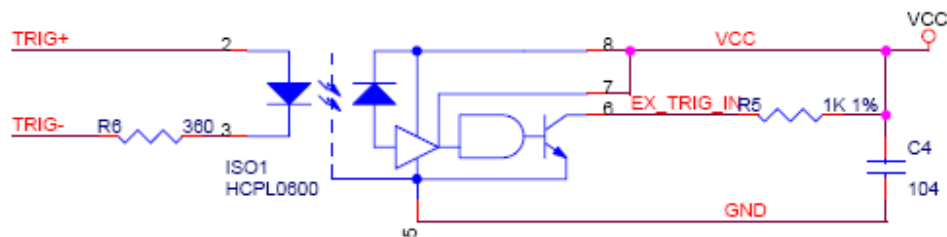
However, the above time spec. is for the PCA9536 only, as the real GPIO event is Host started, e.g. for output, it's usually:

Host →(via USB) **Camera's MCU** →(via I2C) **PCA9536**

Currently, we have a multi-thread camera engine on Host side (MS windows), so the timing for GPIO is at millisecond level and it's not undetermined. (As windows is not a RTOS).

Trigger In

The Trigger In signal is used for Synchronization of the frame grabbing with external event, there's an on camera high speed opto-coupler (HCPL0600) for signal isolation. The circuit on camera is as following:



The diode (on the Trig+/- side) is expected to be working under :

$$I_{\text{forward}} = 5\text{mA} - 25\text{mA}$$

$$V_{\text{forward}} = \sim 1.5\text{V}$$

As we have a 360ohm resistor built in, we expect 3.3 – 10.0V source with 5mA minimum current source capability to be the trigger input. (External trigger source designers might also refer to the spec. of HCPL0600 for details)

A driving pulse (it is positive edge assertion) on Trig+/- will start a frame grabbing when camera is in "TRIGGER" mode, the trigger source might be from a signal generator, or a Output Pin (with I_{source} > 5mA) from a host.

Timing Specification:

Timing	Minimum	Typical	Maximum	Time
Trigger Pulse Width	100			us
Trigger Delay		25*		us

*. Trigger Delay is defined as latency between the assertion of the trigger in signal to sensor starts to expose. It's related to the current frequency of CCD sensor, 25us is the typical trigger delay at 28MHz

CCD frequency, for lower frequency, the trigger delay is longer (proportionally).

Strobe Out

The Strobe Out Signal is used to indicate the exposure period of the sensor, so it might be used to synchronize an external lighting source. It's a positive pulse synchronized with the exposure period.

The Signal is a LVTTTL signal.