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 CCD Line Camera Din8 Connector Description

Version 1.1.2

Oct. 18, 2018

Relevant Products

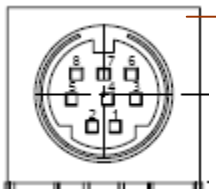
Part Numbers
TCN-1304-U, TCE-1304-U, TCE-1304-UW, TCN-1209-U, TCE-1209-U, TCE-133A-U, TCN-1024-U, TCE-1024-U, TCN-1024-UF, TCE-1024-UF

Revision History

Revision	Date	Author	Description
1.0.0	Jan. 18, 2008	JT Zheng	Initial Revision
1.0.1	Oct. 16, 2009	JT Zheng	Add TCE-133A-U
1.0.2	May. 27, 2010	JT Zheng	Add detailed description
1.1.0	Jan. 12, 2011	JT Zheng	Add TCX-1024-U/UF Modal
1.1.1	Mar. 9, 2011	JT Zheng	Add Trigger delay for TCX-1304-U
1.1.2	Oct. 18, 2018	JT Zheng	New Logo

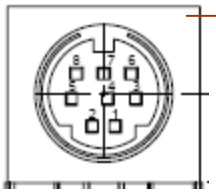
Mightex CCD Line camera is with two connectors, one is the standard USB 2.0 Type B connector, and the another one is a 8 pin Din connector as following: (The following figure is the **receptacle of the 8pin connector on the camera module**)
(**Note:** This 8pin trigger cable is not included in the "standard' package and needs to be purchased separately)

For Modal TCX-1304-U:



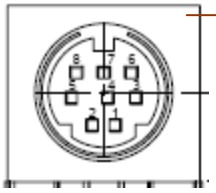
Pin1 : GPIO1
Pin2 : GPIO2
Pin3 : GPIO3
Pin4: GPIO4
Pin5 : TRIG+
Pin6: TRIG-
Pin7: GND
Pin8: GND

For Modal TCX-1209-U:



Pin1 : TRIG-
Pin2 : GND
Pin3 : TRIG+
Pin4: GPIO1
Pin5 : RESERVED
Pin6: GPIO2
Pin7: GPIO3
Pin8: GPIO4

For Modal TCE-133A-U/TCX-1024-U:



Pin1 : TRIG-
Pin2 : GND
Pin3 : TRIG+
Pin4: GPIO1
Pin5 : STROBE_OUT
Pin6: GPIO2
Pin7: GPIO3
Pin8: GPIO4

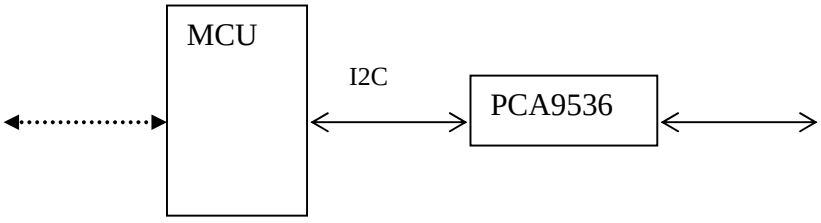
Pin	**Wire Color**
Pin1	BLACK
Pin2	DEEP BROWN
Pin3	RED
Pin4	LIGHT BROWN
Pin5	YELLOW
Pin6	GREEN
Pin7	BLUE
Pin8	PURPLE

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

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^2C-bus		FAST MODE I^2C-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).

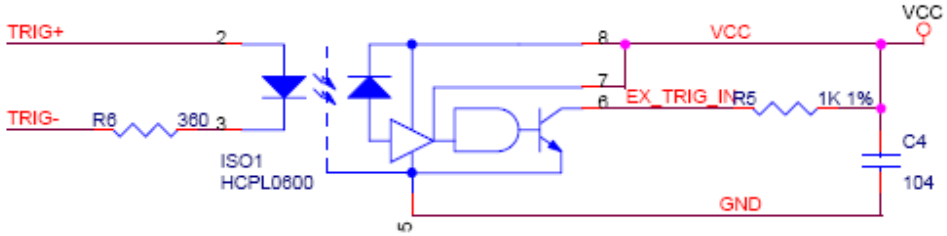
However, the above time spec. is for the PCA9536 only, as the real GPIO event is Host started, e.g. for output, it's usually:

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 :

$I_{forward}$ = 5mA – 25mA

$V_{forward}$ = ~1.5V

As we have a 360ohm resister 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's 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 Isource > 5mA) from a host.

Timing Specification:

Timing	Minimum	Typical	Maximum	Time
Trigger Pulse Width	100			us
Trigger Delay(TCX-1304-U)			100	us
Trigger Delay (TCX-1209-U)		250*		us
Trigger Delay (TCE-133A-U)		250		us
Trigger Delay (TCX-1024-U)			10	us

*. Trigger Delay is defined as latency between the assertion of the trigger in signal to sensor starts to expose.