

SOFTHARD

MU_MH Patch Cable Specification

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1 Revision History

Revision	Date	Who	What
0.10	22.12.2009	ML	Initial draft created
0.20	05.03.2010	SL	Signal description changed

2 Description

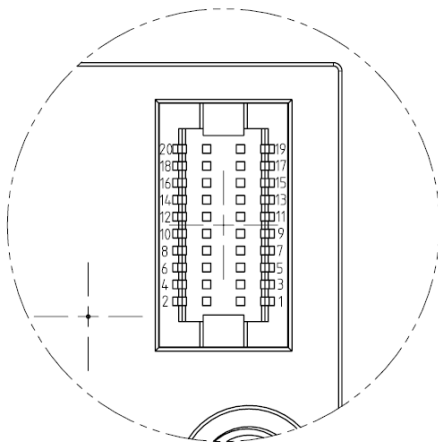
The document describes Y patch cable of MU9Px_MH family of cameras. Cable provides connection of the camera to USB port and synchronization signals on a separate connector.

3 Camera Connector type and location

Connector mounted on the camera PCB is:

HRS DF12E(3.5)-20DP or equivalent.

Schematically connector location and pin numbering shown on the image below:



Camera side connector on the cable is DF12C-20DS (J1) which is mounted on a special jumper board, from which a split flat ribbon cable goes to standard USB Series "A" plug (J2) and trigger plug (J3) Molex PN: 0510210600 Female Housing. Recommended mating part for trigger connection are Molex PNs: 0532610671 or 0510470600 or 0530470610 or 0533980671.

4 Signal descriptions

4.1 Signal and routing Table

Name	J1 pins	J2 pins	J3 pins	description	Function
GX4	1			Programmable IO	defined by user (by default input to trigger exposure)
GX3	3			Programmable IO	defined by user (by default output strobe to trigger flash, or other use)
GX2	5		1	Programmable IO	defined by user (by default input to set external event)
GX1	7		2	Programmable IO	defined by user (by default output 3.3V)
GND	9		3	Ground	Signal Ground
GND	11			Ground	Signal Ground
XX2	13			Programmable IO	defined by firmware

XX1	15			Programmable IO	defined by firmware
RX	17		5	Programmable IO	defined by firmware
TX	19		4	Programmable IO	defined by firmware (redirecting trigger input)
USB-	2	2		USB data -	USB data wire
USB+	4	3		USB data +	USB data wire
SHLD	6			Camera Shield	1M/10nF to GND
+5V	8	1		USB bus Power	Camera Power supply
GND	10	4		Ground	Signal Ground
GND	12	4		Ground	Signal Ground
GND	14			Ground	Signal Ground
GND	16			Ground	Signal Ground
+3V	18			Internal power rail +3V	No external connection allowed, used for testing purposes only
+3V	20			Internal power rail +3V	No external connection allowed, used for testing purposes only

4.2 Signal description

4.2.1 Ground

This signal connected to the internal signal ground

4.2.2 +3V

Connected internally to the camera +3V power supply. Used only for testing purposes. This pin must be left open and no load can be connected to it.

4.2.3 GX2 – Strobe Output

This pin connected to the FPGA output via serial resistor of 1KΩ. ESD protected. Normal signal functionality is to represent the camera busy state. During the exposure and readout time the signal is low and it is high all other time.

4.2.4 GX1 – Trigger Input

This pin connected to the FPGA input via serial resistor of 1KΩ. ESD protected. Normal signal functionality is to start the acquisition in triggering modes on signal edge. Software can select either positive or negative edge for triggering.

4.2.5 GX3, GX4, XX1, XX2 – Programmable IO

These pins are connected to the FPGA pins via serial resistors of 1KΩ. No additional ESD protection. Functionality of these pins is defined by firmware. Generic camera firmware puts pins into high impedance state.

4.2.6 RX, TX – Programmable IO

These pins are connected to the FPGA pins via serial resistors of 1KΩ. ESD protected. Functionality of these pins is defined by firmware. Generic camera firmware puts pins into high impedance state.

4.3 Electrical parameters

4.3.1 GXn DC characteristics

Parameter	Symbol	Min	Nom	Max	Units
Input voltage that indicates a Low logic level	V_{IL}	-	-	0.8	V
Input voltage that indicates a High logic level	V_{IH}	2.0	-	-	V
Input leakage current	I_L	-10	-	+10	μA
Input voltage extremes to avoid turning on I/O protection diodes	V_{IN}	-0.5	-	3.8	V
Output voltage that indicates a Low logic level	V_{OL}			0.4	V
Output voltage that indicates a High logic level	V_{OH}	2.9			V
Output current condition under which V_{OL} is tested	I_{OL}		0.4		mA
Output current condition under which V_{OH} is tested	I_{OH}		-1.0		mA