

Summary

Below is a summary of the connectors and pinouts provided by the Gen IV controller.

ARC420 timing board, Rev 1C

J41	Digital I/O and shutter control	16 pin male Harwin connector
J35	Power selection for shutter	6 pin header
J48	Timing diagnostics	10 pin header
J22	Temperature readout	20 pin male Harwin connector
J40	Synchronization of two controllers	RJ-45

ARC430 clock driver board, Rev 1C

J1	Clock driver outputs	26 pin male Harwin connector
J2	DC bias outputs	20 pin male Harwin connector
CON5, 6	High speed clock outputs	SMA coaxial connectors
J5 to J7	Timing Diagnostics	Three 10 pin headers

ARC440 video board, Rev 1D

J1	Video inputs, Ch 0 – 7	26 pin male Harwin connector
J2	Video inputs, Ch 8 – 15	26 pin male Harwin connector

Timing board pinouts, ARC420 Rev 1C

Digital I/O and shutter control

J41 Pin #	Function	J41 Pin #	Function
1	I/O bit 0	9	Controller Gnd
2	I/O bit 1	10	External shutter power, positive
3	I/O bit 2	11	Controller Gnd
4	I/O bit 3	12	Output to shutter, positive
5	I/O bit 4	13	Controller +5 V power
6	I/O bit 5	14	External shutter power, return
7	I/O bit 6	15	Controller +5 V power
8	I/O bit 7	16	Output to shutter, return

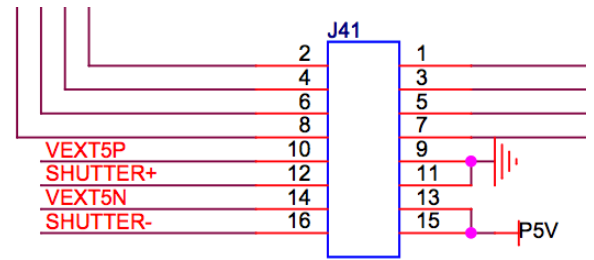
J41 is a Harwin M80-54016xx 16-pin male connector with jack screws that mates to the cable mounted M80-48016xx. xx can be either 05 (gold) or 42 (tin) plating. It is located in the middle of the ARC420 timing board.

Power Selection for Shutter

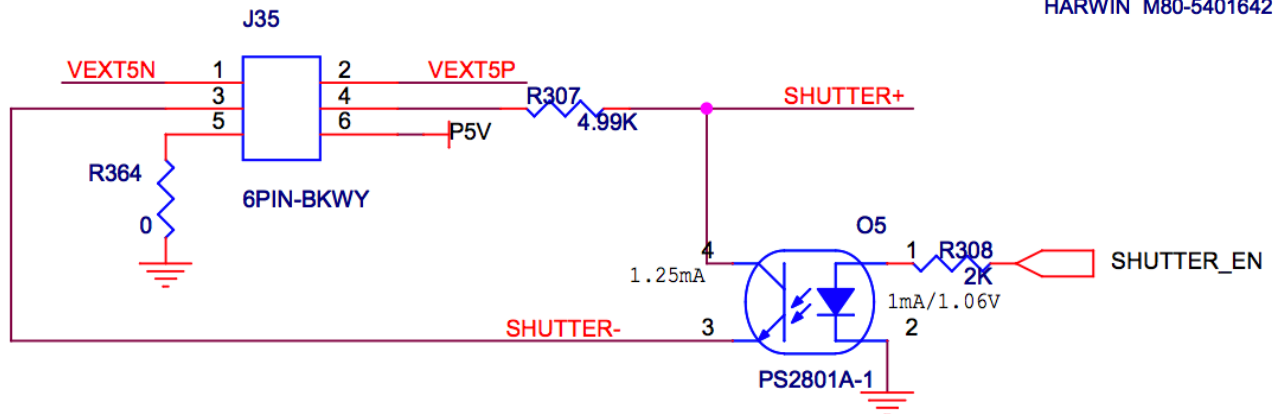
J35 Pin #	Function	J35 Pin #	Function
1	External shutter power, return	4	Shutter power, positive
2	External shutter power, positive	5	Controller Gnd
3	Shutter power, return	6	Controller power, +5V

J35 is a 6-pin header located next to the RJ-45 synchronization connector. Shutter power can be supplied externally on J41, pins 10 and 14. J35 should have jumpers between pins 1 and 3 as well as pins 2 and 4. The circuit will optically isolate the digital control signal SHUTTER_EN generated by the micro-controller and output the two shutter control signals SHUTTER+ AND SHUTTER-.

Alternatively, +5 volt controller power can be used to power the shutter, in which case J35 should have jumpers between pins 3 and 5 and between pins 4 and 6.



HARWIN M80-5401642



The 10-pin header J48 is installed on the bottom of the board to maintain access with a thermal plate installed on the other side. It has nine wires routed to general I/O pins on the FPGA that have been configured as diagnostic outputs for monitoring system execution. The pins are allocated as follows:

Timing Diagnostics

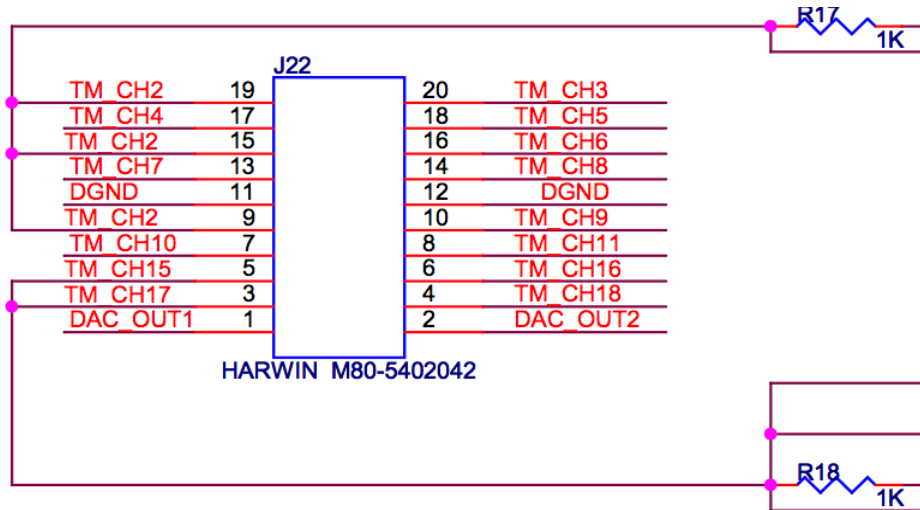
J48 pin #

- | | |
|----|---|
| 1 | The ARC420 receives a command packet over the fiber optic link |
| 2 | The ARC420 transmits either command, reply or image packets to the fiber optic link |
| 3 | The ARC420 transmits either command or reply packets to the fiber optic link |
| 4 | The micro-controller reads data from the FPGA over the 32-bit parallel link |
| 5 | The micro-controller writes data to the FPGA over the 32-bit parallel link |
| 6 | This pin follows the state of the micro-controller GPIO port 7, 21. |
| 7 | This pin follows the state of the micro-controller GPIO port 7, 22. |
| 8 | This pin follows the state of the micro-controller GPIO port 4, 0. |
| 9 | This pin is asserted high at the beginning of reading an image, and low at the end |
| 10 | Gnd |

Temperature readout

J22 Pin #	Function	J22 Pin #	Function
1	DAC Output #1	11	Gnd
2	DAC Output #2	12	Gnd
3	Thermistor 1k sense resistor	13	Ch 7
4	Ch 18	14	Ch 8
5	Thermistor 1k sense resistor	15	Ch 2, 1k RTD sense resistor
6	Ch 16	16	Ch 6
7	Ch 10	17	Ch 4
8	Ch 11	18	Ch 5
9	Ch 2, 1k RTD sense resistor	19	Ch 2, 1k RTD sense resistor
10	Ch 9	20	Ch 3

J22 is a Harwin M80-54020xx 20-pin male connector with hex jack screws that mates to the cable mounted M80-48020xx. xx can be either 05 (gold) or 42 (tin) plating. It is located near the edge of the ARC420 timing board.



The default ARC micro-controller code is written so that three RTDs can be connected to J22. The channel number is used in the G4 software to read the temperature of the indicated RTD. These wires should be connected as close to the temperature sensor as feasible to allow an accurate correction for ohmic losses in the wiring.

J22 Pin #s	Description	Channel #
19, 20	Two wires to one end of RTD1	4
17, 18	Two wires to the other end of RTD1	
15, 16	Two wires to one end of RTD2	7
13, 14	Two wires to the other end of RTD2	
9, 10	Two wires to one end of RTD3	10

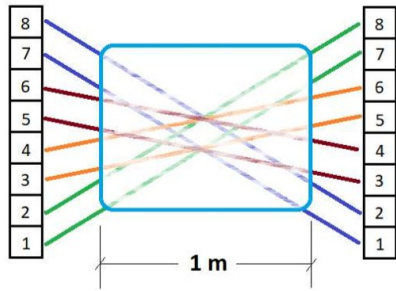
7, 8	Two wires to the other end of RTD3	
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Synchronization of two controllers

J40 Pin #	Function	J40 Pin #	Function
1	Clock Out -	5	Sync Out -
2	Clock Out +	6	Sync In +
3	Sync In -	7	Clock In -
4	Sync Out +	8	Clock In +

Connect Sync Out +/- of the master controller to Sync In +/- of the slave controller. Similarly, Connect Clock Out +/- of the master controller to Clock In +/- of the slave controller.

J40 is an RJ-45 connector mounted in a large metal shell.



Clock Driver Outputs, ARC430 Rev 1C

J1 Pin #	Function	J1 Pin #	Function
1	Clock Out 0	2	Gnd
3	Clock Out 1	4	Gnd
5	Clock Out 2	6	Gnd
7	Clock Out 3	8	Gnd
9	Clock Out 4	10	Gnd
11	Clock Out 5	12	Gnd
13	Clock Out 6	14	Gnd
15	Clock Out 7	16	Gnd
17	Clock Out 8	18	Gnd
19	Clock Out 9	20	Gnd
21	Clock Out 10	22	Gnd
23	Clock Out 11	24	Gnd
25	Gnd	26	Gnd

J1 is a Harwin M80-54026xx 26-pin male connector with jack screws that mates to the cable mounded M80-48026xx. xx can be either 05 (gold) or 42 (tin) plating. It is located on the left of the ARC430 clock board.

CON6 HS Clock Out 0 These are coaxial SMA connectors for two high speed

CON5

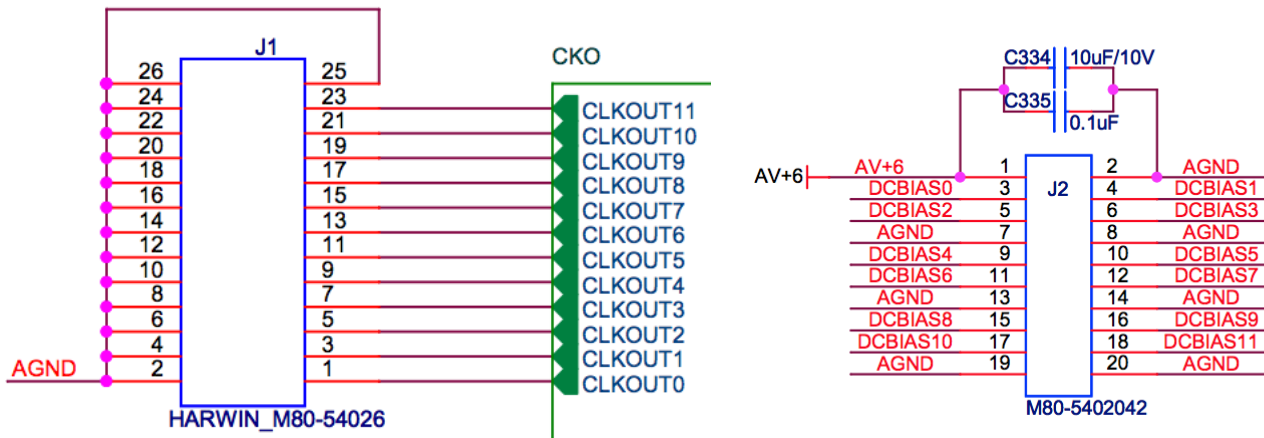
HS Clock Out 1

clocks. Their timing is the same as Clock Out #.

DC Bias Outputs

J2 Pin #	Function	J2 Pin #	Function
1	Analog Power +5.5V	2	Gnd
3	DC Bias 0	4	DC Bias 1
5	DC Bias 2	6	DC Bias 3
7	Gnd	8	Gnd
9	DC Bias 4	10	DC Bias 5
11	DC Bias 6	12	DC Bias 7
13	Gnd	14	Gnd
15	DC Bias 8	16	DC Bias 9
17	DC Bias 10	18	DC Bias 11
19	Gnd	20	Gnd

J1 is a Harwin M80-54020xx 20-pin male connector with jack screws that mates to the cable mounted M80-48020xx. xx can be either 05 (gold) or 42 (tin) plating. It is located on the right of the ARC430 clock board.



Timing Diagnostics

J5 Pin#	Function	J6 Pin #	Function	J7 Pin #	Function
1	SYS_SCLK	1	CLKOUT 0	1	CLKOUT 8
2	SYS_CS n	2	CLKOUT 1	2	CLKOUT 9
3	SYS_MOSI	3	CLKOUT 2	3	CLKOUT 10
4	SYS_MISO	4	CLKOUT 3	4	CLKOUT 11
5	ADC Start	5	CLKOUT 4	5	D_ENOUT
6	XFER	6	CLKOUT 5		
7	MASK	7	CLKOUT 6		
8	SA Start	8	CLKOUT 7		
10	Ground	10	Ground	10	Ground

J5 to J7 are 10-pin headers located towards the center of the ARC430 clock board. They are normally unpopulated and covered by the thermal plate. Motivated users may install the headers and mill out the thermal plate to gain access.

Video Processor board, ARC440 Rev 1D

J1 Pin #	Function	J1 Pin #	Function
1	Video Ch +0	2	Video Ch -0
3	Video Ch +1	4	Video Ch -1
5	Gnd 0	6	Gnd 1
7	Video Ch +2	8	Video Ch -2
9	Video Ch +3	10	Video Ch -3
11	Gnd 2	12	Gnd 3
13	Video Ch +4	14	Video Ch -4
15	Video Ch +5	16	Video Ch -5
17	Gnd 4	18	Gnd 5
19	Video Ch +6	20	Video Ch -6
21	Video Ch +7	22	Video Ch -7
23	Gnd 6	24	Gnd 7
25	-2.5 V Power	26	+5.5 V Power

J2 has the same pinout except the channel numbers go from 8 to 15.

J1 and J2 are Harwin M80-54026xx 26-pin male connectors with jack screws that mates to the cable mounted M80-48026xx. xx can be either 05 (gold) or 42 (tin) plating. J1, for channels 0 – 7, is located on the right side of the board.

