



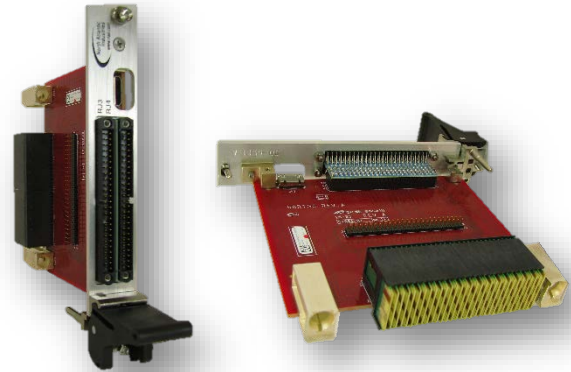
Accelerate Your Time-to-Mission™

Model 68RTG5

3U, OpenVPX Rear Transition Card

Function/Features

- High density connectors mimic 68G5 front panel I/O
- OpenVPX 0.8" (or 1.0" option) pitch rear chassis I/O panel with locking extractor
- Optimized for NAI 68G5 multifunction rear I/O
- Mini-HDMI interface receptacle (utility interface)



Description

The 68RTG5 3U OpenVPX Rear I/O Transition Card (RTC) (also may be referred to as Rear Transition Module or RTM) is for use in OpenVPX systems/chassis that require reliable interconnection between the rear I/O P1 & P2 OpenVPX connectors and the 'outside world'. The rear I/O P1 & P2 connectors are terminated in two Harwin 50-pin Datamate connectors and a mini-HDMI-type receptacle located on a 0.8" (or 1.0" option) pitch OpenVPX panel. The rear chassis panel has an extractor to latch or eject the card from the rear backplane access panel of the chassis. The 68RTG5 can be used with any 3U OpenVPX card, but pin-outs are optimized for use with, and also mimic, the front panel pin-out of the OpenVPX NAI Model 68G5 Multifunction I/O (MFIO) card. The mating panel I/O connector(s) may be mechanically secured using a screwdriver.

Specifications

Operating Temperature:	0° C to 70° C
Storage Temperature:	-40° C to 85° C
Humidity:	95% RH, non-condensing
Protective Covering:	Both sides of the board are protected/covered with solder mask (Conformal coat available on special order – Contact Factory)
I/O Connector Configuration:	Two rear panel I/O connectors (RJ3, RJ4), Harwin Datamate, male 50-pin type; One mini-HDMI-type rear panel receptacle (JP3) (Gig-E Port 1, serial RS-232 debug) One inboard I/O connector (JP2), 2x25 2 mm header (extended I/O)
Size:	3U height, 4HP width (100 mm H x 20.3 mm W x 80 mm D) / 5HP (1.0") width option
Weight:	4 oz. (113 g) (approx.)
RTM I/O Connectors:	Harwin Datamate 50-pin male connectors, 2 mm, Harwin P/N M80-5415022
RTM External I/O Mate Kit:	Two I/O mating connector set(s) for the Harwin 50-pin connectors are supplied with this card. Includes: connector housing, large-bore pins (suitable for 22AWG) cable and backshell assembly (Harwin M80-486 product family mating connector kit Harwin P/N M80-9415005).
	Additional mating connector kit(s) may be purchased separately under NAI P/N 05-0118 (Contact Factory).
Mini-HDMI Panel Receptacle:	Mini-HDMI (19 position) type-A receptacle (MHDMP-19-02-H-TH-L-TR, Samtec).
Mini-HDMI Mate Kit:	Cable assembly/breakout board adapter kit (not supplied – optional): May be purchased separately under NAI P/N 75SBC4-BB (Contact Factory). 75SBC4-BB Includes: a. MHDMP-USB-ETH-SER-B003 breakout board b. NAI P/N 07-0030 (Cable Assy. (@ 1 m), (MHDMP to MHDMP))

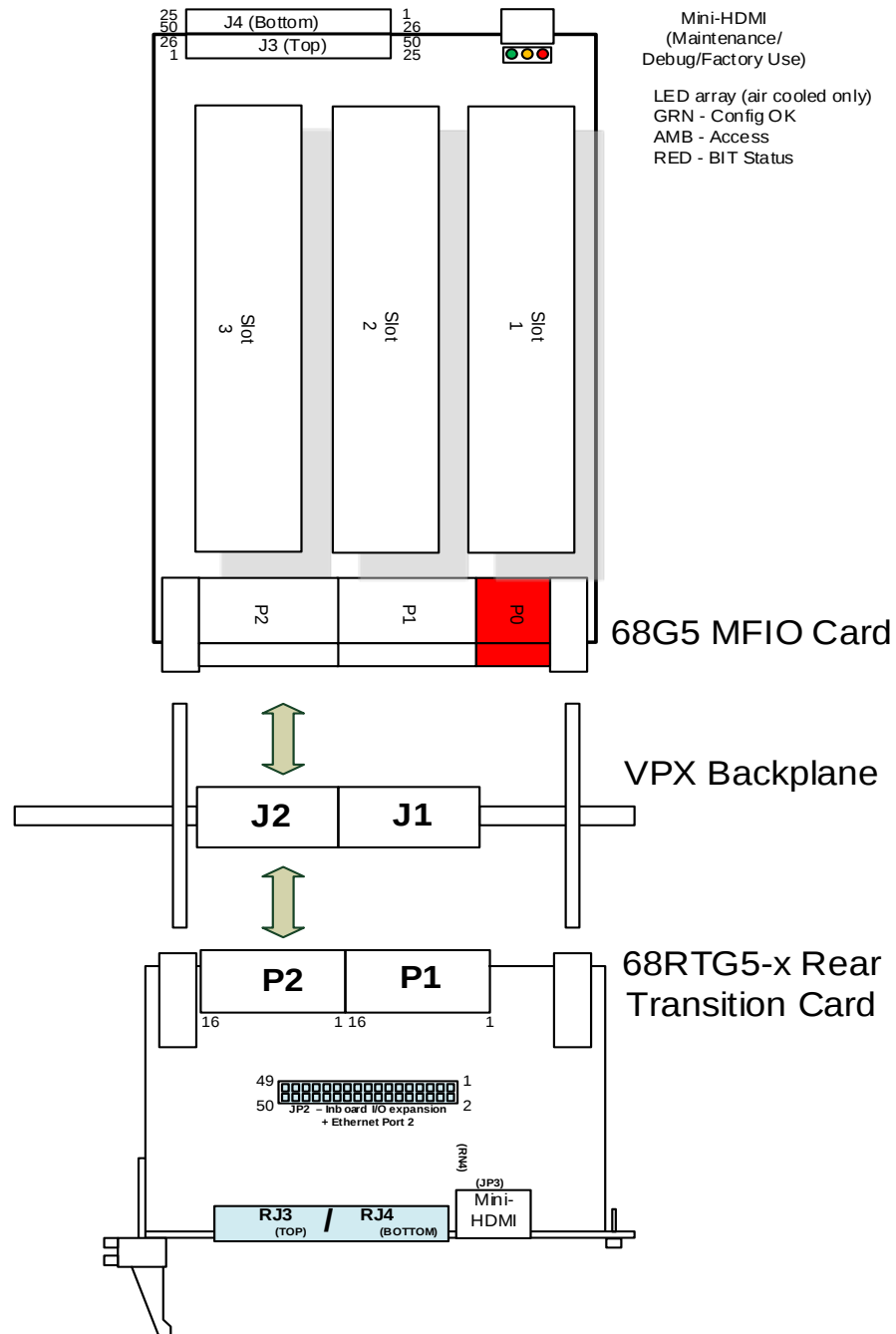
Revision History

Revision	Change	Name	Date
A1	Update COSA trademarks	MG	3/28/17
A2	Corrected a typographical error	SL	1/8/18

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68RTG5 Installation



Note: Pictorials are for reference and may not be to scale

68RTG5 Connector/Pin-out Information

I/O Connectors

User I/O is available through the panel mounted RJ3 & RJ4 RTM connectors, JP2 in-board header connector and JP3 mini-HDMI-type receptacle connector via the VPX P1 & P2 user defined rear I/O backplane connectors. The 68RTG5-x RTM is optimized for use for the 68G5 OpenVPX multifunction I/O card, reference(s) throughout this document may be made to 68G5 part number and pin-out information for the [68G5 Operations Manual](#).

CAUTION

Do not connect to any undesignated or N/C pins.

Notes

The following notes apply unless otherwise specified:

1. Maximum ratings for the Tyco MultiGig-RT2 type rear I/O connectors are as follows (per Tyco 108-2072):
 - 50 V peak AC or 50 VDC
 - 1A @ 30 deg.
2. Signal names are provided for reference (referenced to 68G5 signal names) only.

RTM Panel Connector System Ground Pins

Panel: RJ3 pin 1, 26
RJ4 pin 25, 50

RTM Panel Connector Chassis Ground Pins

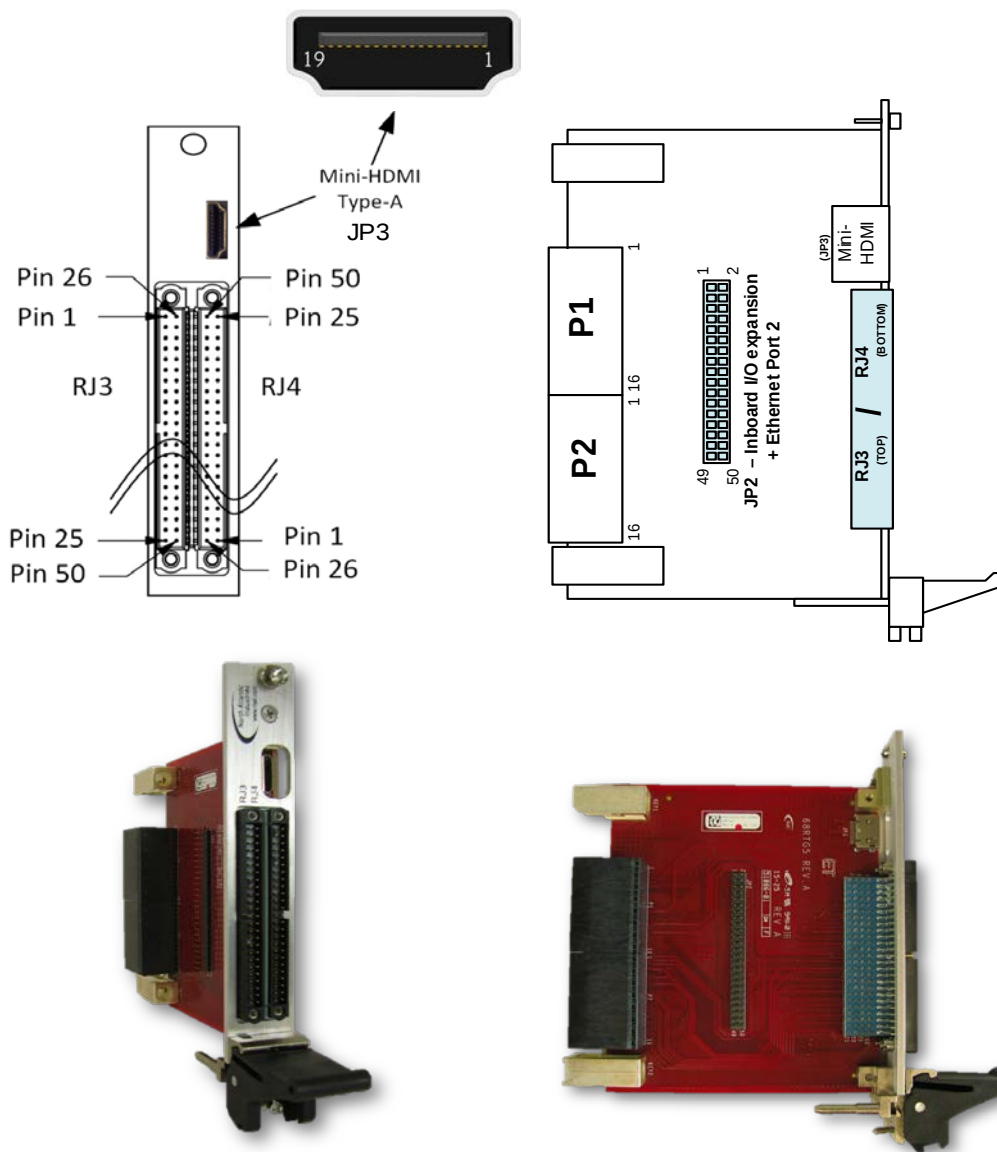
Panel: No dedicated chassis GND pins available.

Once installed and secured within a VPX chassis, the panel itself, rear VPX connector key guides and mini-HDMI-type JP3 debug port receptacle shell are connected to chassis (ground).

RTM Connectors RJ3/RJ4 & JP10 Positioning and Layout

RTM Connectors RJ3/RJ4 & JP10 Positioning and Layout

Harwin Datamate 50-pin male connectors, 2 mm, Harwin P/N M80-5415022.



Note: Pictorials are for reference and may not be to scale

RTM User Defined I/O Pin-Outs

Rear VPX P1 I/O Definition (68G5 as reference)

Data Plane	Row	Row	Row	Row	Row	Row	Row
P1	A	B	C	D	E	F	G
1	PCIe / Rx0+	PCIe / Rx0-	GND	PCIe / Tx0+	PCIe / Tx0-	GND	N/C
2	GND	S-MOD-M1-DAT33	S-MOD-M1-DAT34	GND	S-MOD-M1-DAT35	S-MOD-M1-DAT36	GND
3	S-MOD-M1-DAT30	S-MOD-M1-DAT29	GND	S-MOD-M1-DAT31	S-MOD-M1-DAT32	GND	N/C
4	GND	S-MOD-M1-DAT25	S-MOD-M1-DAT26	GND	S-MOD-M1-DAT27	S-MOD-M1-DAT28	GND
5	S-MOD-M1-DAT22	S-MOD-M1-DAT21	GND	S-MOD-M1-DAT23	S-MOD-M1-DAT24	GND	N/C
6	GND	S-MOD-M1-DAT17	S-MOD-M1-DAT18	GND	S-MOD-M1-DAT19	S-MOD-M1-DAT20	GND
7	S-MOD-M1-DAT14	S-MOD-M1-DAT13	GND	S-MOD-M1-DAT15	S-MOD-M1-DAT16	GND	N/C
8	GND	S-MOD-M1-DAT09	S-MOD-M1-DAT10	GND	S-MOD-M1-DAT11	S-MOD-M1-DAT12	GND
9	S-MOD-M1-DAT05	S-MOD-M1-DAT06	GND	S-MOD-M1-DAT07	S-MOD-M1-DAT08	GND	(SER-RXD1)
10	GND	S-MOD-M1-DAT01	S-MOD-M1-DAT02	GND	S-MOD-M1-DAT03	S-MOD-M1-DAT04	GND
11	(ETH2-RXP)	(ETH2-RXN)	GND	(ETH2-TXP)	(ETH2-TXN)	GND	(SER-TXD1)
12	GND	(ETH1-RXP)	(ETH1-RXN)	GND	(ETH1-TXP)	(ETH1-TXN)	GND
13	ETH2-TP0+	ETH2-TP0-	GND	ETH2-TP1+	ETH2-TP1-	GND	GND
14	GND	ETH2-TP2+	ETH2-TP2-	GND	ETH2-TP3+	ETH2-TP3-	GND
15	ETH1-TP0+	ETH1-TP0-	GND	ETH1-TP1+	ETH1-TP1-	GND	N/C
16	GND	ETH1-TP2+	ETH1-TP2-	GND	ETH1-TP3+	ETH1-TP3-	GND

	= MODULE (1) I/O		= Port 1 / 1000Base-KX (option)		= Maintenance reserved
	= Motherboard reserved		= Port 2 / 1000Base-KX (option)		= PCIe (x1)
	= Port 1 / 10/100/1000Base-T (option)		= Port 2 / 10/100/1000Base-T (option)		

Rear VPX P2 I/O Definition (68G5 as reference)

Data Plane	Row	Row	Row	Row	Row	Row	Row
P2	A	B	C	D	E	F	G
1	S-MOD-M2-DAT29	S-MOD-M2-DAT30	GND	S-MOD-M2-DAT31	S-MOD-M2-DAT32	GND	S-MOD-M1-DAT37
2	GND	S-MOD-M2-DAT25	S-MOD-M2-DAT26	GND	S-MOD-M2-DAT27	S-MOD-M2-DAT28	GND
3	S-MOD-M2-DAT21	S-MOD-M2-DAT22	GND	S-MOD-M2-DAT23	S-MOD-M2-DAT24	GND	S-MOD-M1-DAT38
4	GND	S-MOD-M2-DAT17	S-MOD-M2-DAT18	GND	S-MOD-M2-DAT19	S-MOD-M2-DAT20	GND
5	S-MOD-M2-DAT13	S-MOD-M2-DAT14	GND	S-MOD-M2-DAT15	S-MOD-M2-DAT16	GND	S-MOD-M1-DAT39
6	GND	S-MOD-M2-DAT09	S-MOD-M2-DAT10	GND	S-MOD-M2-DAT11	S-MOD-M2-DAT12	GND
7	S-MOD-M2-DAT05	S-MOD-M2-DAT06	GND	S-MOD-M2-DAT07	S-MOD-M2-DAT08	GND	S-MOD-M1-DAT40
8	GND	S-MOD-M2-DAT01	S-MOD-M2-DAT02	GND	S-MOD-M2-DAT03	S-MOD-M2-DAT04	GND
9	S-MOD-M3-DAT29	S-MOD-M3-DAT30	GND	S-MOD-M3-DAT31	S-MOD-M3-DAT32	GND	I2C_CLK
10	GND	S-MOD-M3-DAT25	S-MOD-M3-DAT26	GND	S-MOD-M3-DAT27	S-MOD-M3-DAT28	GND
11	S-MOD-M3-DAT21	S-MOD-M3-DAT22	GND	S-MOD-M3-DAT23	S-MOD-M3-DAT24	GND	I2C_DATA
12	GND	S-MOD-M3-DAT17	S-MOD-M3-DAT18	GND	S-MOD-M3-DAT19	S-MOD-M3-DAT20	GND
13	S-MOD-M3-DAT13	S-MOD-M3-DAT14	GND	S-MOD-M3-DAT15	S-MOD-M3-DAT16	GND	N/C
14	GND	S-MOD-M3-DAT09	S-MOD-M3-DAT10	GND	S-MOD-M3-DAT11	S-MOD-M3-DAT12	GND
15	S-MOD-M3-DAT05	S-MOD-M3-DAT06	GND	S-MOD-M3-DAT07	S-MOD-M3-DAT08	GND	GND
16	GND	S-MOD-M3-DAT01	S-MOD-M3-DAT02	GND	S-MOD-M3-DAT03	S-MOD-M3-DAT04	GND

	= MODULE (1) I/O
	= MODULE (2) I/O
	= MODULE (3) I/O
	= Maintenance (reserved)

Panel RJ3 & RJ4 I/O Connectors Pin Mapping

Harwin Datamate 50-pin male connectors,
2 mm, Harwin P/N M80-5415022

68RTG5 RJ3 (M1, M3) Panel I/O

VPX		RJ3 PANEL I/O			VPX
	GND	1	26	GND	
P2-B16	MOD3-DAT1001	2	27	MOD3-DAT1002	P2-C16
P2-E16	MOD3-DAT1003	3	28	MOD3-DAT1004	P2-F16
P2-B10	MOD3-DAT1025	4	29	MOD3-DAT1026	P2-C10
P2-A15	MOD3-DAT1005	5	30	MOD3-DAT1006	P2-B15
P2-D15	MOD3-DAT1007	6	31	MOD3-DAT1008	P2-E15
P2-B14	MOD3-DAT1009	7	32	MOD3-DAT1010	P2-C14
P2-E10	MOD3-DAT1027	8	33	MOD3-DAT1028	P2-F10
P2-E14	MOD3-DAT1011	9	34	MOD3-DAT1012	P2-F14
P1-B10	MOD1-DAT1001	10	35	MOD1-DAT1002	P1-C10
P1-E10	MOD1-DAT1003	11	36	MOD1-DAT1004	P1-F10
P1-B4	MOD1-DAT1025	12	37	MOD1-DAT1026	P1-C4
P1-A9	MOD1-DAT1005	13	38	MOD1-DAT1006	P1-B9
P1-D9	MOD1-DAT1007	14	39	MOD1-DAT1008	P1-E9
P1-B8	MOD1-DAT1009	15	40	MOD1-DAT1010	P1-C8
P1-E4	MOD1-DAT1027	16	41	MOD1-DAT1028	P1-F4
P1-E8	MOD1-DAT1011	17	42	MOD1-DAT1012	P1-F8
P1-B7	MOD1-DAT1013	18	43	MOD1-DAT1014	P1-A7
P1-D7	MOD1-DAT1015	19	44	MOD1-DAT1016	P1-E7
P1-B3	MOD1-DAT1029	20	45	MOD1-DAT1030	P1-A3
P1-B6	MOD1-DAT1017	21	46	MOD1-DAT1018	P1-C6
P1-E6	MOD1-DAT1019	22	47	MOD1-DAT1020	P1-F6
P1-B5	MOD1-DAT1021	23	48	MOD1-DAT1022	P1-A5
P1-D3	MOD1-DAT1031	24	49	MOD1-DAT1032	P1-E3
P1-D5	MOD1-DAT1023	25	50	MOD1-DAT1024	P1-E5

68RTG5 RJ4 (M2, M3) Panel I/O

VPX		RJ4 PANEL I/O			VPX
P2-B8	MOD2-DAT1001	1	26	MOD2-DAT1002	P2-C8
P2-E8	MOD2-DAT1003	2	27	MOD2-DAT1004	P2-F8
P2-B2	MOD2-DAT1025	3	28	MOD2-DAT1026	P2-C2
P2-A7	MOD2-DAT1005	4	29	MOD2-DAT1006	P2-B7
P2-D7	MOD2-DAT1007	5	30	MOD2-DAT1008	P2-E7
P2-B6	MOD2-DAT1009	6	31	MOD2-DAT1010	P2-C6
P2-E2	MOD2-DAT1027	7	32	MOD2-DAT1028	P2-F2
P2-E6	MOD2-DAT1011	8	33	MOD2-DAT1012	P2-F6
P2-A5	MOD2-DAT1013	9	34	MOD2-DAT1014	P2-B5
P2-D5	MOD2-DAT1015	10	35	MOD2-DAT1016	P2-E5
P2-A1	MOD2-DAT1029	11	36	MOD2-DAT1030	P2-B1
P2-B4	MOD2-DAT1017	12	37	MOD2-DAT1018	P2-C4
P2-E4	MOD2-DAT1019	13	38	MOD2-DAT1020	P2-F4
P2-A3	MOD2-DAT1021	14	39	MOD2-DAT1022	P2-B3
P2-D1	MOD2-DAT1031	15	40	MOD2-DAT1032	P2-E1
P2-D3	MOD2-DAT1023	16	41	MOD2-DAT1024	P2-E3
P2-A13	MOD3-DAT1013	17	42	MOD3-DAT1014	P2-B13
P2-D13	MOD3-DAT1015	18	43	MOD3-DAT1016	P2-E13
P2-A9	MOD3-DAT1029	19	44	MOD3-DAT1030	P2-B9
P2-B12	MOD3-DAT1017	20	45	MOD3-DAT1018	P2-C12
P2-E12	MOD3-DAT1019	21	46	MOD3-DAT1020	P2-F12
P2-A11	MOD3-DAT1021	22	47	MOD3-DAT1022	P2-B11
P2-D9	MOD3-DAT1031	23	48	MOD3-DAT1032	P2-E9
P2-D11	MOD3-DAT1023	24	49	MOD3-DAT1024	P2-E11
	GND	25	50	GND	

aaa	= MODULE (1) I/O
bbb	= MODULE (2) I/O
ccc	= MODULE (3) I/O
N/C	= No connect
GND	= System (card) Power Ground

Inboard JP2 Header I/O Connector Pin Mapping

2 x 25, 2mm O.C.

MTMM-125-02-L-D-120, Samtec (or equivalent)

68RTG5 JP2 Inboard Header I/O

VPX	Signal (REF)	JP2 PANEL I/O		Signal (REF)	VPX
P1-B2	MOD1-DATIO33	1	2	MOD1-DATIO37	P2-G1
P1-C2	MOD1-DATIO34	3	4	MOD1-DATIO38	P2-G3
P1-E2	MOD1-DATIO35	5	6	MOD1-DATIO39	P2-G5
P1-F2	MOD1-DATIO36	7	8	MOD1-DATIO40	P2-G7
	N/C	9	10	N/C	
	N/C	11	12	N/C	
P2-G9	(I2C_CLOCK)	13	14	N/C	
P2-G11	(I2C_DATA)	15	16	N/C	
	N/C	17	18	N/C	
	GND	19	20	GND	
P1-B12	ETH1-RXP	21	22	ETH2-RXP	P1-A11
P1-C12	ETH1-RXN	23	24	ETH2-RXN	P1-B11
	GND	25	26	GND	
P1-E12	ETH1-TXP	27	28	ETH2-TXP	P1-D11
P1-F12	ETH1-TXN	29	30	ETH2-TXN	P1-E11
	GND	31	32	GND	
	GND	33	34	GND	
P1-A13	ETH2-TP0+	35	36	ETH2-TP2+	P1-B14
P1-B13	ETH2-TP0-	37	38	ETH2-TP2-	P1-C14
	GND	39	40	GND	
P1-D13	ETH2-TP1+	41	42	ETH2-TP3+	P1-E14
P1-E13	ETH2-TP1-	43	44	ETH2-TP3-	P1-F14
	GND	45	46	GND	
	N/C	47	48	N/C	
	N/C	49	50	N/C	



= MODULE (1) I/O
= Maintenance (reserved)



= Port 1 / 1000Base-KX (option)
= Port 2 / 1000Base-KX (option)
= Port 2 / 10/100/1000Base-T (option)

Mini-HDMI-Type JP3 I/O Connectors Pin Mapping

MHDMR-19-02-H-TH-L-TR, Samtec (or equivalent)

68RTG5 JP3 Mini-HDMI-Type receptacle I/O

VPX	Signal (REF)	MINI-HDMI-type JP3
	N/C	1
P1-A15	ETH1-TP0+	2
P1-B15	ETH1-TP0-	3
	N/C	4
P1-D15	ETH1-TP1+	5
P1-E15	ETH1-TP1-	6
	N/C	7
P1-B16	ETH1-TP2+	8
P1-C16	ETH1-TP2-	9
	N/C	10
P1-E16	ETH1-TP3+	11
P1-F16	ETH1-TP3-	12
	GND	13
	N/C	14
	N/C	15
	N/C	16
P1-G9	(SER-RXD)	17
P1-G11	(SER-TXD)	18
	GND	19

= Port 1 / 10/100/1000Base-T (option)
 = Maintenance (reserved)

Ethernet (68G5 Summary - for reference only)

For reference – available if/when the 68G5 MFIO card and the 68RTG5 is configured with the specific Ethernet options.

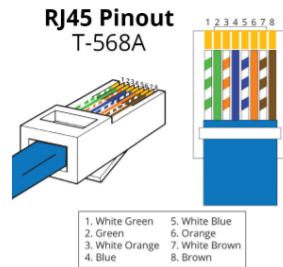
JP2 = Inboard Header

JP3 = Mini-HDMI-type

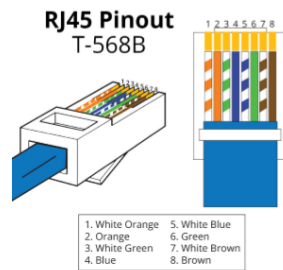
OpenVPX J2 (Row-Pin)	Connector	NAI Signal	RJ-45 Standard Ethernet (REFERENCE)
P1-A15	JP3-2	ETH1-TP0+	RJ-45 Port - 1
P1-B15	JP3-3	ETH1-TP0-	RJ-45 Port - 2
P1-D15	JP3-5	ETH1-TP1+	RJ-45 Port - 3
P1-E15	JP3-6	ETH1-TP1-	RJ-45 Port - 6
P1-B16	JP3-8	ETH1-TP2+	RJ-45 Port - 4
P1-C16	JP3-9	ETH1-TP2-	RJ-45 Port - 5
P1-E16	JP3-11	ETH1-TP3+	RJ-45 Port - 7
P1-F16	JP3-12	ETH1-TP3-	RJ-45 Port - 8
P1-A13	JP2-35	ETH2-TP0+	RJ-45 Port - 1
P1-B13	JP2-37	ETH2-TP0-	RJ-45 Port - 2
P1-D13	JP2-41	ETH2-TP1+	RJ-45 Port - 3
P1-E13	JP2-43	ETH2-TP1-	RJ-45 Port - 6
P1-B14	JP2-36	ETH2-TP2+	RJ-45 Port - 4
P1-C14	JP2-38	ETH2-TP2-	RJ-45 Port - 5
P1-E14	JP2-42	ETH2-TP3+	RJ-45 Port - 7
P1-F14	JP2-44	ETH2-TP3-	RJ-45 Port - 8
P1-B12	JP2-21	ETH1-RXP	(No RJ-45 equivalent – Backplane only)
P1-C12	JP2-21	ETH1-RXN	(No RJ-45 equivalent – Backplane only)
P1-E12	JP2-27	ETH1-TXP	(No RJ-45 equivalent – Backplane only)
P1-F12	JP2-29	ETH1-TXN	(No RJ-45 equivalent – Backplane only)
P1-A11	JP2-22	ETH2-RXP	(No RJ-45 equivalent – Backplane only)
P1-B11	JP2-24	ETH2-RXN	(No RJ-45 equivalent – Backplane only)
P1-D11	JP2-28	ETH2-TXP	(No RJ-45 equivalent – Backplane only)
P1-E11	JP2-30	ETH2-TXN	(No RJ-45 equivalent – Backplane only)

	= Port 1 / 10/100/1000Base-T (option)		= Port 1 / 1000Base-KX (option)
			= Port 2 / 1000Base-KX (option)
			= Port 2 / 10/100/1000Base-T (option)

Ethernet RJ-45 Commercial Equivalent (For reference only)



Preferred



Optional

ETH-TP0+
ETH-TP0-
ETH-TP1+
ETH-TP2+
ETH-TP2-
ETH-TP1-
ETH-TP3+
ETH-TP3-

RJ45 Pin #	Wire Color (T568A)	Wire Diagram (T568A)	10Base-T Signal 100Base-TX Signal	1000Base-T Signal
1	White/Green		Transmit+	BI_DA+
2	Green		Transmit-	BI_DA-
3	White/Orange		Receive+	BI_DB+
4	Blue		Unused	BI_DC+
5	White/Blue		Unused	BI_DC-
6	Orange		Receive-	BI_DB-
7	White/Brown		Unused	BI_DD+
8	Brown		Unused	BI_DD-

Straight-Through Cable Pin Out for T568A

ETH-TP0+
ETH-TP0-
ETH-TP1+
ETH-TP2+
ETH-TP2-
ETH-TP1-
ETH-TP3+
ETH-TP3-

RJ45 Pin #	Wire Color (T568B)	Wire Diagram (T568B)	10Base-T Signal 100Base-TX Signal	1000Base-T Signal
1	White/Orange		Transmit+	BI_DA+
2	Orange		Transmit-	BI_DA-
3	White/Green		Receive+	BI_DB+
4	Blue		Unused	BI_DC+
5	White/Blue		Unused	BI_DC-
6	Green		Receive-	BI_DB-
7	White/Brown		Unused	BI_DD+
8	Brown		Unused	BI_DD-

Straight-Through Cable Pin Out for T568B

Part Number Designation

Standard Product = 68RTG5-**X**

X	= Configuration Options
1	= Standard (as defined) pinout configuration with: • Panel, rear, 4HP, 0.8" pitch)
2	= Standard (as defined) pinout configuration with: • Panel, rear, 5HP, 1.0" pitch)
X	= Other than listed; indicates custom configuration – Contact Factory

Specifications are subject to change without notice.

NAI Cares

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