

Hardware Manual
for
PMC-1553



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PMC-1553

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PMC-1553 Hardware Manual

Introduction

This manual provides detailed hardware information on the PMC-1553 interface card.

In addition to this information, the reader may also want to reference the following documents provided on the CD and our Web Site

- **AltaCore™** Specifications and User Manual: Detailed description of the 1553 protocol engine of the card. Most people do not need this detail and will mainly reference the **AltaAPI** manual for their application development.
- **AltaAPI™** User's Manual: Detailed description of the application program interface (API) and device drivers of this software package.
- **AltaView™** User's Manual: AltaView is the latest 1553 analyzer on the market and this manual details the usage of the product.
- **AltaRTVal™** User's Manual: This manual details the usage of AltaRTVal, which is an automated program to run AS4111/4112 RT Validation and Production Test Plans.
- 1553 Tutorial and Reference, and 1553B Standard. These documents provide a detailed review of the 1553 standard, which is required for proper usage of this product. **SEE THIS DOCUMENT FOR WIRE & CABLING INFORMATION OF 1553 BUSES – THIS IS REQUIRED FOR PROPER BUS OPERATIONS.**

ESD and General Handling of Computer Interface Cards

The Alta warranty requires that the product be handled with proper ESD controls. The JEDEC standard on ESD handling, JESD625-A, is available for free download at www.jedec.org. Please follow the standard's guideline for proper ESD handling methods. At a minimum the following guidelines should be followed:

- Avoid carpets in cool, dry areas.
- Leave the card in its anti-static packaging until ready to be installed.
- Dissipate static electricity before handling the card by touching a grounded metal object, such as the metal chassis of the system (the system should be plugged-in, but turned-off).
- Use antistatic devices, such as wrist straps and floor mats.
- Always hold the card by its edges. Avoid touching the components or connectors.
- Be sure to align card edge or assembly cable connector pins before installation. Misaligned connectors can cause damage to the card or system, especially at power-on.
- Take care when connecting or disconnecting cables. When disconnecting a cable, always pull on the cable connector, not on the cable itself.



PMC-1553 Description

The Alta PMC-1553 card is a standard PMC module designed for commercial and rugged, conduction cooled installations. The main difference between these two configurations is the P4 connector is not installed on standard commercial models, and for conduction cooled models, the front panel is not installed, but the P4 connector is for rear panel I/O access. The customer has various order options for commercial rear-panel (P4), extended temperature (industrial grade) components and conformal coating.

The PMC-1553 front panel models include a transition cable assembly for 1553 and general I/O connections. Rear panel (conduction cooled or special order rear panel) models do not have a transition cable assembly (the customer constructs a custom cable assembly for the backplane of their system). The cable assembly pin-outs are provided in Appendix A of this document.

Card Level Specifications

- Single-Wide PMC card
- 32-Bit PCI 33/66MHz/PCI-X Compatible
 - PCI-SIG PCI 2.1 Compliant
 - ANSI/VITA 20-2001 Compliant
- +3.3V or 5V Universal PCI Signaling
- Up to Four MIL-STD-1553 Channels
 - Transformer Coupled Stub Interface Standard
 - Direct Coupled Stub Interface available upon request
- 4 Mbytes of QDR memory
- IRIG-B Receiver (DC or AM)
- 14 Single-Ended Bi-Directional Avionics Discrettes
- Two RS-485 Discrettes
- One LVTTTL Input and Output Trigger per Channel
- External Input and Output Clocks (LVTTTL or RS-485 Selectable)
- 1760 Ext RT Addressing
- Two Temperature Sensors
- Front Panel or Rear Panel (P4) I/O Option
- 6.3 Watts Max (Four Channel @ 100% Bus Loading)
- Operating Temperature range: 0-70C Standard
 - -40 to +85C Extended Temp Parts with -E or -C Option (as applicable).
- Relative humidity: 5 to 95% (non-condensing).
- RoHS Compliant

Power Specifications

Table 1. Idle Power

IDLE			
Channel	Voltage	Amps	Total Power
N/A	3.3V	0.40A	1.32W

Table 2. 50% Bus Loading Power

50% Bus Loading			
Channel	Voltage	Amps	Total Power
CH1	3.3V	0.59A	1.98W
CH2	3.3V	0.79A	2.63W
CH3	3.3V	0.98A	3.26W
CH4	3.3V	1.15A	3.83W

Table 3. 95% Bus Loading Power

95% Bus Loading			
Channel	Voltage	Amps	Power
CH1	3.3V	0.79A	2.64W
CH2	3.3V	1.20A	3.97W
CH3	3.3V	1.55A	5.14W
CH4	3.3V	1.89A	6.26W

MTBF

Please contact your Local Sales Representative or Alta Technical Support for additional information regarding any concerns or questions that may arise regarding MTBF for this board.

Environment: Ground Benign, 25C

Table 4. MTBF Front Panel I/O

Channel Count	MTBF
1	656,594 hrs
2	640,174 hrs
4	609,681 hrs

Environment: Ground Benign, 25C

Table 5. MTBF Rear (P4) I/O

Channel Count	MTBF
1	681,151 hrs
2	663,497 hrs
4	630,798 hrs

PMC-1553 Photographs

The following pictures show the front side and back side of a standard commercial card.

Figure 1. PMC-1553 Front Side

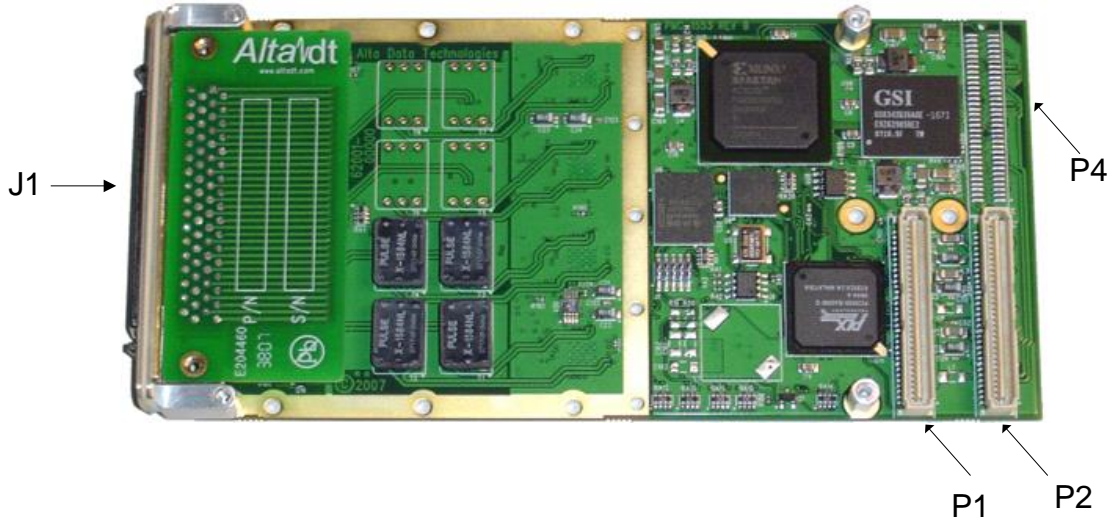
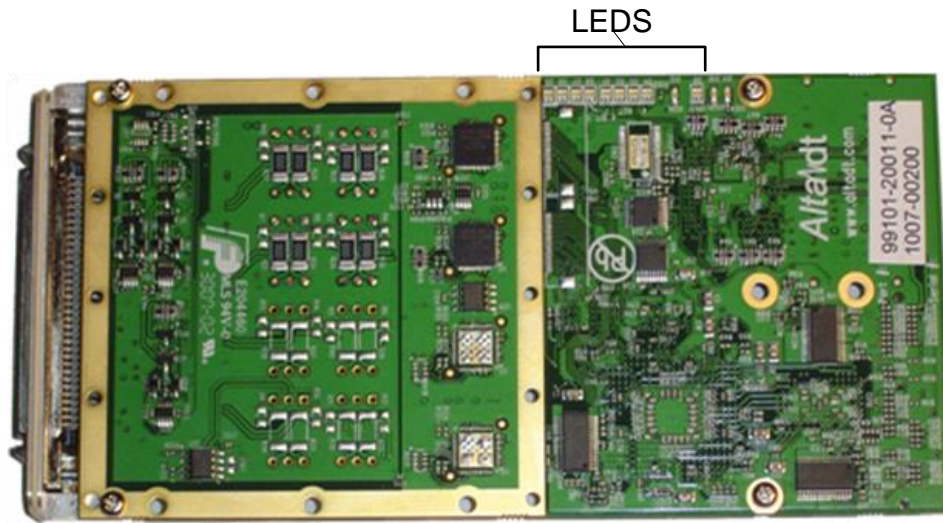


Figure 2. PMC-1553 Back Side



LED Descriptions

Table 6. LED Descriptions

LED	Name	Description
D1	Channel One 1553 Bus Activity	Green=No Errors, Red=Errors Detected
D2	Channel Two 1553 Bus Activity	Green=No Errors, Red=Errors Detected
D3	Channel Three 1553 Bus Activity	Green=No Errors, Red=Errors Detected
D4	Channel Four 1553 Bus Activity	Green=No Errors, Red=Errors Detected
D5	Channel One BIT Status	Green=No Errors, Red=Errors Detected
D6	Channel Two BIT Status	Green=No Errors, Red=Errors Detected
D7	Channel Three BIT Status	Green=No Errors, Red=Errors Detected
D8	Channel Four BIT Status	Green=No Errors, Red=Errors Detected
D9	Board Status	Green=No Error, Red=FPGA Load Error Amber= Power Supply Failure
D10	User 1 LED	Set on or off by the User
D11	User 2 LED	Set on or off by the User
D12	FPGA Loaded	Green=FPGA Loaded, Off=FPGA Not Loaded

J1 (Front Panel) and P4 (Rear Panel) Connector Pin-Outs

The following tables provide pin-outs for the J1 Front Panel and P4 Rear Panel connectors. The P1-2 are standard VITA Pin-outs.

Table 7. J1-SCSI 3 Front Panel Connector Pin-Outs (Front Panel Models Only)

SCSI Pin#	Signal	SCSI Pin#	Signal
1	1553 SHIELD	35	GND – Connected to SCSI Hood
2	1553 CH 4B-	36	TRIG_OUT4
3	1553 CH 4B+	37	TRIG_IN4
4	GND	38	SDISC6 / RTADDR1_P
5	1553 SHIELD	39	SDISC5 / RTADDR1_4
6	1553 CH 4A-	40	DDISC2-
7	1553 CH 4A+	41	DDISC2+
8	GND	42	GND
9	~RTADDR_EN	43	TRIG_OUT3
10	1553 SHIELD	44	TRIG_IN3
11	1553 CH 3B-	45	DDISC1-
12	1553 CH 3B+	46	DDISC1+
13	GND	47	SDISC14 / RTADDR2_P
14	1553 SHIELD	48	SDISC13 / RTADDR2_4
15	1553 CH 3A-	49	GND
16	1553 CH 3A+	50	IRIGB IN GND
17	SDISC4 / RTADDR1_3	51	~AUTO_TEST
18	SDISC3 / RTADDR1_2	52	IRIGB IN
19	1553 SHIELD	53	GND
20	1553 CH 2B-	54	TRIG_OUT2
21	1553 CH 2B+	55	TRIG_IN2
22	GND	56	N/C
23	1553 SHIELD	57	GND
24	1553 CH 2A-	58	SDISC12 / RTADDR2_3
25	1553 CH 2A+	59	SDISC11 / RTADDR2_2
26	SDISC2 / RTADDR1_1	60	GND
27	SDISC1 / RTADDR1_0	61	EXT_CLOCK_I/O
28	1553 SHIELD	62	GND
29	1553 CH 1B-	63	TRIG_OUT1
30	1553 CH 1B+	64	TRIG_IN1
31	GND	65	SDISC10 / RTADDR2_1
32	1553 SHIELD	66	SDISC9 / RTADDR2_0
33	1553 CH 1A-	67	SDISC8
34	1553 CH1A+	68	SDISC7

Table 8. P4-Rear Panel Connector Pin-Outs (Rear Panel Models Only)

Pin#	Signal	Pin#	Signal
1	SDISC14 / RTADDR2_P	2	SDISC6 / RTADDR1_P
3	GND	4	SDISC5 / RTADDR1_4
5	DDISC1+	6	SDISC4 / RTADDR1_3
7	TRIG_IN1	8	TRIG_OUT1
9	DDISC1-	10	~RTADDR_EN
11	TRIG_IN2	12	TRIG_OUT2
13	DDISC2+	14	SDISC3 / RTADDR1_2
15	GND	16	1553 CH2A-
17	DDISC2-	18	1553 CH2A+
19	GND	20	1553 SHIELD
21	SDISC13 / RTADDR2_4	22	1553 CH2B-
23	GND	24	1553 CH2B+
25	GND	26	GND
27	1553 CH3B+	28	1553 CH3A-
29	SDISC7	30	1553 CH3A+
31	GND	32	1553 CH3B-
33	GND	34	GND
35	SDISC8	36	1553 CH1B-
37	GND	38	1553 CH1B+
39	SDISC9 / RTADDR2_0	40	GND
41	TRIG_IN3	42	TRIG_OUT3
43	SDISC10 / RTADDR2_1	44	SDISC2 / RTADDR1_1
45	TRIG_IN4	46	TRIG_OUT4
47	SDISC11 / RTADDR2_2	48	SDISC1 / RTADDR1_0
49	GND	50	1553 CH1A-
51	SDISC12 / RTADDR2_3	52	1553 CH1A+
53	~AUTO_TEST	54	IRIGB IN
55	GND	56	IRIGB IN GND
57	GND	58	EXT_CLOCK_I/O
59	1553 SHIELD	60	GND
61	1553 CH4B-	62	1553 CH4A-
63	1553 CH4B+	64	1553 CH4A+

PCI Device Information

PCI Device ID: 0x0010

PCI Vendor ID: 0xAD00

The PMC-1553 product uses the PLX PCI9056[®] device for its PCI interface. The table below explains the memory regions that should be mapped by the host.

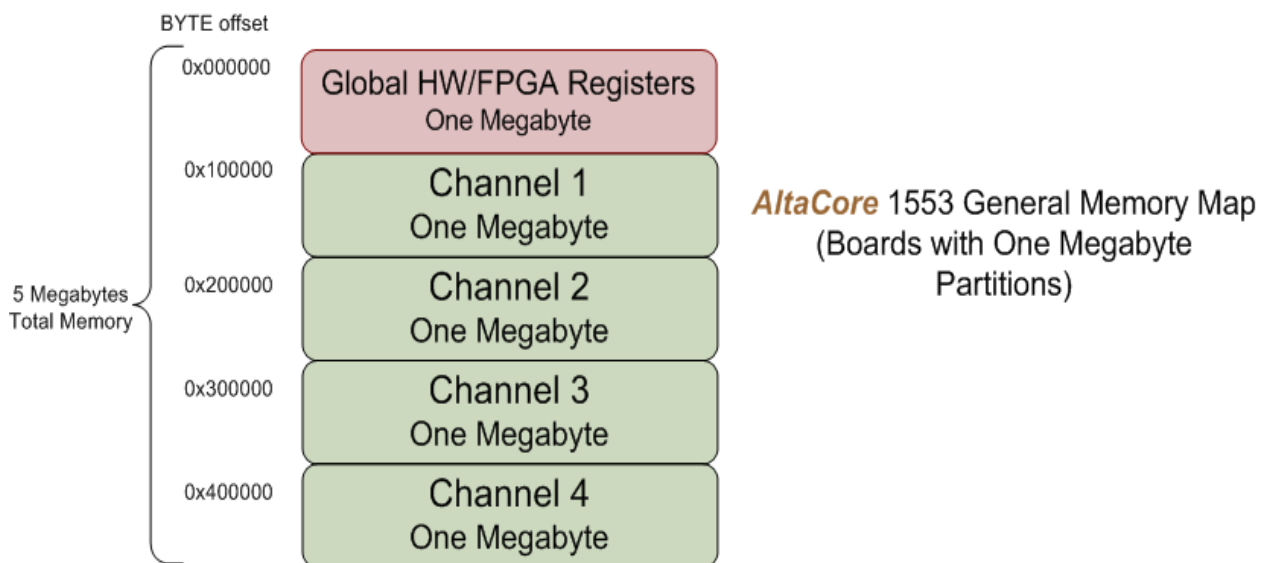
Table 9. Host Mapping

Base Address Reg	Type	Size (Bytes)	Description
BAR 0	Memory	512	Local Configuration Registers (Mapped)
BAR 1	I/O	256	This region is enabled, but should not be mapped by host applications. (Not Mapped)
BAR 2	Memory	8 Meg	User Memory Space (Mapped)
BAR 3-5	N/A		Not Used

Host Memory Map

The figure below shows the basic memory map configuration for a 4 channel PMC-1553 interface with one megabyte of RAM per channel. Special configurations may vary.

Figure 3. Basic Memory Map



PMC-1553 Global Registers

The first Megabyte of the PMC-1553 memory map contains backplane and Global card level settings and status values that affect processing for all channels. Details on Global Registers may be found in the AltaCore-1553 Spec User's manual.

Revision Information

Date	Rev	Description
10/11/07	A0	Initial Release
12/06/07	B0	Corrected Company Address
1/19/08	C0	Updated Global Control Register Descriptions Added MTBF Numbers
8/8/08	D0	Minor Typo/Picture Clean-up
10/18/08	E0	Global Section Clean-up – Refer to AltaCore Manual
3/8/09	F0	Added Appendix A – Cable Assembly Info
7/16/09	F1	Changed Address – No Technical Changes
4/05/10	F2	Changed NAICS #
4/20/10	F3	Added Bookmark to PDF
7/22/10	F4	Updated Power Information
2/14/11	F5	Removed Global Figure's
3/9/12	F6	Added Bookmark to PDF
8/14/14	F7	Updated MTBF numbers based on new part library data.
2/24/15	F8	Updated NAICS # Added SCSI 3 Front Panel Connector Information to Appendix A
10/12/15	F9	Updated cable assembly information
01/31/17	F10	Updated cable information to include whether or not cables contain PVC
10/03/18	F11	Updated cable information to include cable length
10/01/19	F12	Updated NAICS number and % on table 3
06/30/21	F13	Corrected Appendix A to say cable assemblies are optional instead of standard
01/16/23	F14	Updated Card Level Specifications and contact info

Appendix A: Cable Assembly Information

This Information Applies for the Following 1553 Cards:

PCI-1553, PMC-1553, CPCIC3U/6U-1553 and PCIEC4L-1553

(Front Panel Information Only. See Main Section of Manual for Applicable Rear Panel Information)

Alta Cable Assembly Part Numbers (Reorder Numbers)

(The following assemblies are **optional** item shipments.

They DO NOT have the AUX DB 50 Connector)

SCSI-1553-4-01-T (four channel*)

SCSI-1553-3-01-T (three channel*)

SCSI-1553-2-01-T (two channel*)

SCSI-1553-1-01-T (one channel*)

(The following assemblies are **optional** item shipments.

They DO have the AUX DB 50 Connector)

SCSI-1553-4-AUX01-T (four channel with DB-50**)

SCSI-1553-3-AUX01-T (three channel with DB-50**)

SCSI-1553-2-AUX01-T (two channel with DB-50**)

SCSI-1553-1-AUX01-T (one channel with DB-50**)

* Does not contain PVC

** Contains PVC

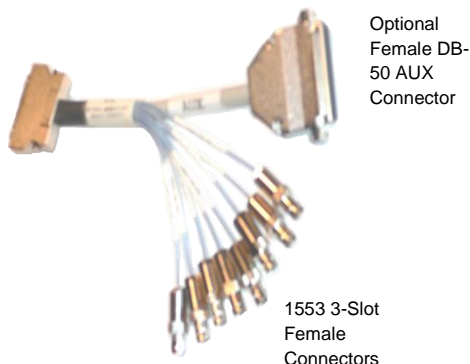
SCSI 3 Front Panel Connector Information:

- Clip Style
 - SCSI CON: AMP #1-5750913-7 (or equiv)
 - Backshell: Amp #5749195-2 (or equiv)
- Thumb Screw (-T)

CON and Backshell: Norcomp 989-068-130L121 (or equiv)

NOTE: Cables come standard with Thumb Screw option (-T). If Clip Style is needed remove the -T from Part Number when ordering.

**SCSI-1553-4-AUX01
Cable Shown**



Cables are EU and China
RoHS Compliant.



Cable Assembly Markings & Information:

- **Shrink-wrap from SCSI to 1553/Aux Cable**
 - 1" from SCSI Base label:
 - P1 - Part No: SCSI-1553-X-01-T (X=Channel Count) (T=Thumb Screw)
 - **1553 M17 Cables with 3-Slot Female Connectors**
 - 1" from base of connector labels (CH = Channel):
 - **J1 1553 CH1 A**
 - **J2 1553 CH1 B**
 - ***J3 1553 CH2 A**
 - ***J4 1553 CH2 B**
 - ***J5 1553 CH3 A**
 - ***J6 1553 CH3 B**
 - ***J7 1553 CH4 A**
 - ***J8 1553 CH4 B**
 - * Channel/Model Dependent
- NOTE for Cable Assemblies After 1 Feb 2008: For Easy Channel Identification, Each Channel Set ("A"- "B" bus set) Has a Different Color Code Shrink Tube Near the 3-Slot Male Connectors (1553 Connectors – Channels are Color Marked Above) – The **Black** Stripe Indicates the "B" Bus.
- **Optional Female DB50 AUX Connector Labeling**
 - 1" from base of connector label:
 - J9 AUX I/O
 - **24" length on 1553 cables (tip to tip – including connectors).**
 - **18" length on DB50 AUX Cable (tip to tip – including connectors).**

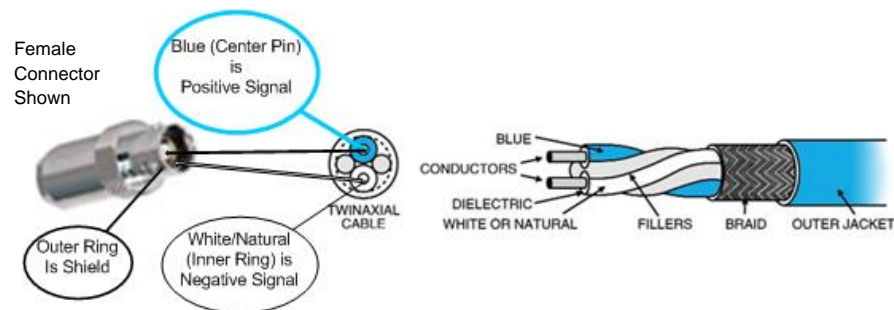


Table 10. SCSI 3 Connector Pin-Outs (* = Channel/Model Dependent)

SCSI Pin#	Signal	SCSI Pin#	Signal
1*	1553 SHIELD	35	GND – Connected to SCSI Hood
2*	1553 CH 4B-	36	TRIG_OUT4
3*	1553 CH 4B+	37	TRIG_IN4
4	GND	38	SDISC6 / RTADDR1_P
5*	1553 SHIELD	39	SDISC5 / RTADDR1_4
6*	1553 CH 4A-	40	DDISC2-
7*	1553 CH 4A+	41	DDISC2+
8	GND	42	GND
9	~RTADDR_EN	43	TRIG_OUT3
10*	1553 SHIELD	44	TRIG_IN3
11*	1553 CH 3B-	45	DDISC1- (RS-485 CLK In/Out)
12*	1553 CH 3B+	46	DDISC1+ (RS-485 CLK In/Out)
13	GND	47	SDISC14 / RTADDR2_P
14*	1553 SHIELD	48	SDISC13 / RTADDR2_4
15*	1553 CH 3A-	49	GND
16*	1553 CH 3A+	50	IRIGB IN GND
17	SDISC4 / RTADDR1_3	51	~AUTO_TEST
18	SDISC3 / RTADDR1_2	52	IRIGB IN
19*	1553 SHIELD	53	GND
20*	1553 CH 2B-	54	TRIG_OUT2
21*	1553 CH 2B+	55	TRIG_IN2
22	GND	56	N/C
23*	1553 SHIELD	57	GND
24*	1553 CH 2A-	58	SDISC12 / RTADDR2_3
25*	1553 CH 2A+	59	SDISC11 / RTADDR2_2
26	SDISC2 / RTADDR1_1	60	GND
27	SDISC1 / RTADDR1_0	61	EXT_CLOCK_IN (TTL)
28	1553 SHIELD	62	GND
29	1553 CH 1B-	63	TRIG_OUT1
30	1553 CH 1B+	64	TRIG_IN1
31	GND	65	SDISC10 / RTADDR2_1
32	1553 SHIELD	66	SDISC9 / RTADDR2_0
33	1553 CH 1A-	67	SDISC8
34	1553 CH1A+	68	SDISC7

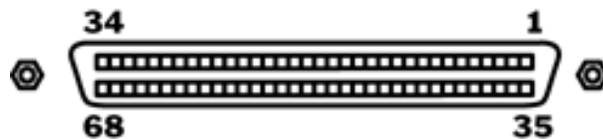


Table 11. Optional DB50 Connector Pin-Outs

(Cable Assemblies with this DB50 Auxiliary Connector are Usually Ordered Separately)

DB50 Pin#	Signal	DB50 Pin#	Signal
1	SDISC1 / RTADDR1_0	26	DDISC1+ (RS-485 CLK In/Out)
2	SDISC2 / RTADDR1_1	27	DDISC1- (RS-485 CLK In/Out)
3	GND	28	DDISC2+
4	SDISC3 / RTADDR1_2	29	DDISC2-
5	SDISC4 / RTADDR1_3	30	GND
6	GND	31	TRIG_IN1
7	SDISC5 / RTADDR1_4	32	TRIG_OUT1
8	SDISC6 / RTADDR1_P	33	GND
9	SDISC7	34	TRIG_IN2
10	SDISC8	35	TRIG_OUT 2
11	SDISC9 / RTADDR2_0	36	GND
12	GND	37	TRIG_IN3
13	~AUTO_TEST	38	TRIG_OUT 3
14	GND	39	GND
15	~RTADDR_EN	40	TRIG_IN4
16	GND	41	TRIG_OUT 4
17	N/C	42	GND
18	SDISC10 / RTADDR2_1	43	EXT_CLOCK_IN/Out (TTL)
19	SDISC11 / RTADDR2_2	44	GND
20	SDISC12 / RTADDR2_3	45	N/C
21	GND	46	IRIGB IN
22	SDISC13 / RTADDR2_4	47	N/C
23	SDISC14 / RTADDR2_P	48	IRIGB IN GND
24	N/C	49	N/C
25	GND	50	GND/SHIELD - Connected to metal DB hood (or to DB Connector if Plastic Hood)

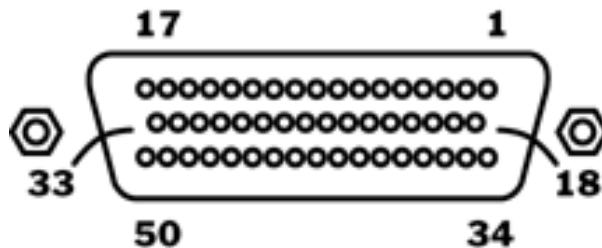


Table 12. SCSI-DB Cross Reference (NA = Not Applicable/Connected)

SCSI Pin	DB Pin	Signal	SCSI Pin#	DB Pin	Signal
1	NA	1553 SHIELD	35	50	GND – Connected to SCSI Hood
2	NA	1553 CH 4B-	36	41	TRIG_OUT4
3	NA	1553 CH 4B+	37	40	TRIG_IN4
4	3	GND	38	8	SDISC6 / RTADDR1_P
5	NA	1553 SHIELD	39	7	SDISC5 / RTADDR1_4
6	NA	1553 CH 4A-	40	29	DDISC2-
7	NA	1553 CH 4A+	41	28	DDISC2+
8	6	GND	42	42	GND
9	15	~RTADDR_EN	43	38	TRIG_OUT3
10	NA	1553 SHIELD	44	37	TRIG_IN3
11	NA	1553 CH 3B-	45	27	DDISC1-
12	NA	1553 CH 3B+	46	26	DDISC1+
13	12	GND	47	23	SDISC14 / RTADDR2_P
14	NA	1553 SHIELD	48	22	SDISC13 / RTADDR2_4
15	NA	1553 CH 3A-	49	39	GND
16	NA	1553 CH 3A+	50	48	IRIGB IN GND
17	5	SDISC4 / RTADDR1_3	51	13	~AUTO_TEST
18	4	SDISC3 / RTADDR1_2	52	46	IRIGB IN
19	NA	1553 SHIELD	53	16	GND
20	NA	1553 CH 2B-	54	35	TRIG_OUT2
21	NA	1553 CH 2B+	55	34	TRIG_IN2
22	14	GND	56	N/C	N/C
23	NA	1553 SHIELD	57	25	GND
24	NA	1553 CH 2A-	58	20	SDISC12 / RTADDR2_3
25	NA	1553 CH 2A+	59	19	SDISC11 / RTADDR2_2
26	2	SDISC2 / RTADDR1_1	60		GND
27	1	SDISC1 / RTADDR1_0	61	43	EXT_CLOCK_IN
28	NA	1553 SHIELD	62	44	GND
29	NA	1553 CH 1B-	63	32	TRIG_OUT1
30	NA	1553 CH 1B+	64	31	TRIG_IN1
31	21	GND	65	18	SDISC10 / RTADDR2_1
32	NA	1553 SHIELD	66	11	SDISC9 / RTADDR2_0
33	NA	1553 CH 1A-	67	10	SDISC8
34	NA	1553 CH1A+	68	9	SDISC7