ACC-300 Interface Board

The Measurement Computing ACC-300 interface board allows you to preserve your field wiring as you transition from PCI-DAS1xxx Series hardware to PCI-DAS6000 Series hardware.

PCI-DAS6000 Series Overview

The PCI-DAS6000 series provides most of the same features and functionality of the PCI-DAS1xxx series products. Other capabilities include an additional eight programmable digital I/O lines and the ability to configure all 16 analog inputs as non-ground referenced single-ended inputs that share a common signal reference. PCI-DAS6000 series products also have a common set of control inputs and outputs (AUXIN<0..5> and AUXOUT<0..2>) that can be configured or programmed to provide the same control signal I/O available on the PCI-DAS1000/1200/1600 product families. Configuring these programmable I/O lines in InstaCal, or by writing the proper values to the hardware configuration registers, provide the same external clock and trigger signals as the PCI-DAS1000/1200/1600 product families. The ACC-300 is designed to route these control lines to the same connector pins that are used by the PCI-DAS1000/1200/1600 product families.

Migrating PCI-DAS1000/1200/1600 Series applications to the PCI-DAS6000 Series

The PCI-DAS6000 series is a full line of multifunction products that offer 12- and 16-bit analog I/O, digital I/O, and counter/timer I/O. Below are some recommendations to consider when choosing a product to replace a PCI-DAS1000/1200/1600 series product. Because application requirements vary considerably, take care when choosing a replacement product that provides the functionality your application requires. Please review all product specifications when choosing a PCI-DAS6000 series product.

PCI-DAS1000 and PCI-DAS1200/JR products

These products can be replaced with a PCI-DAS6025. In addition, two analog outputs and an additional eight bits of DIO are available. For applications that don't require digital I/O a PCI-DAS6023 could be considered.

PCI-DAS1001, PCI-DAS1002 and PCI-DAS1200 products

These products can be replaced with a PCI-DAS6025. An additional eight bits of DIO are available. The PCI-DAS6040 is an alternative for applications that do not require more than eight bits of digital I/O. For applications that don't require digital I/O a PCI-DAS6023 could be considered.

PCI-DAS1602/12 and PCI-DAS1602/16 products

When replacing the PCI-DAS1602/12 board, consider the PCI-DAS6070 and PCI-DAS6040 for applications that require higher A/D input sampling rates and don't require more than eight bits of digital I/O. When replacing the PCI-DAS1602/16 board, the PCI-DAS6052 board provides 16 high speed 16-bit analog inputs and two 16-bit analog outputs.

InstaCal Configuration and Programming

For some applications it will be necessary to change some default settings of the PCI-DAS6000 series AUXIN and AUXOUT control I/O lines in InstaCal for applications that were developed using the Universal Library (UL). Using the ACC-300 will require the following changes to the default InstaCal settings. These same changes will be required for custom drivers or register level application programming.

PCI-DAS1000 and PCI-DAS1200 products

Pin 77, 10MHz OUT requires that AUXOUT0 be set to CTR2_CLK and the CTR2 source must be set to 10 MHz. UL code accessing CTR4 and 5 must now reference CTR1 and 2.

PCI-DAS1602/12 and PCI-DAS1602/16 products

Pin 49, SSH OUT requires that AUXOUT2 be set to ADC_SSH – Inverted. UL code accessing CTR4 must now reference CTR1.

TP1 and TP2 Jumper Settings

There are two 2-position jumper blocks on the ACC-300. **TP1** is used to choose between A/D EXTERNAL PACER or ANALOG TRIGGGER IN. For applications that require both functions, other AUXIN inputs could be used for A/D EXTERNAL PACER.

TP2 is used to optionally connect the A/D EXTERNAL TRIGGER to both the A/D START TRIGGER and the A/D STOP TRIGGER inputs for applications that require both functions (A/D pre- and post trigger functions), at the same input pin.

PCI-DAS1000/1200/1600 and PCI-DAS6000 comparisons

The table below lists the recommended PCI-DAS6000 series products for replacing a PCI-DAS1000/1200/1600 series product and the common features they share.

Part Number	Description	Closest Replacement	Description
PCI-DAS1000	12-bit, 250 kHz, 16 channel analog input board with 24 DIO	PCI-DAS6025	12-bit, 200 kHz, 16 channel, with 2 12-bit analog outputs, 32 DIO and 2 counters
PCI-DAS1001	12-bit, 150 kHz, 16 channel analog input board with dual analog output channels and 24 DIO	PCI-DAS6025	12-bit, 200 kHz, 16 channel, with 2 12-bit analog outputs, 32 DIO and 2 counters
PCI-DAS1002	12-bit, 200 kHz, 16 channel analog input board with dual analog output channels and 24 DIO	PCI-DAS6025	12-bit, 200 kHz, 16 channel, with 2 12-bit analog outputs, 32 DIO and 2 counters
PCI-DAS1200	12-bit, 330 kHz, 16 channel analog input board with dual analog output channels and 24 DIO	PCI-DAS6025	12-bit, 200 kHz, 16 channel, with 2 12-bit analog outputs, 32 DIO and 2 counters
PCI-DAS1200/JR	12-bit, 330 kHz, 16 channel analog input board with 24 DIO	PCI-DAS6025	12-bit, 200 kHz, 16 channel, with 2 12-bit analog outputs, 32 DIO and 2 counters
		PCI-DAS6040	12-bit, 250 kHz, 16 channel, analog I/O board with 2 12-bit analog outputs, 8 DIO and 2 counter/timers
PCI-DAS1602/12	12-bit, 330 kHz, 16 channel A/D board with 3 µS burst mode and programmable gain, 2 fast D/As (250 kHz) and 24 DIO	PCI-DAS6070	16 channel, 1.25 MHz analog I/O board with 2 12-bit analog outputs, 8 DIO and 2 counter/timers
		PCI-DAS6040	12-bit, 250 kHz, 16-channel analog I/O board with 2 12-bit analog outputs, 8 DIO and 2 counter/timers
PCI-DAS1602/16	16-bit, 16 channel, 200 kHz maximum sample rate with 2 16-bit D/As (100 kHz), 6 counters and 24 DIO	PCI-DAS6052	16-bit, 333 kHz, 16 channel analog I/O board, 2 16-bit analog outputs, 8 DIO and 2 counter/timers

PCI-DAS1xxx Series pinout

Pins 1 to 50 connect to P1. Pins 51 to 100 connect to P3. The C100FF-x cable is used for PCI-DAS1xxx Series signal connections.

P1

LLGND	1	●●	2	CH0 IN
CH8 IN	3	●●	4	CH1 IN
CH9 IN	5	●●	6	CH2 IN
CH10 IN	7	●●	8	CH3 IN
CH11 IN	9	●●	10	CH4 IN
CH12 IN	11	●●	12	CH5 IN
CH13 IN	13	●●	14	CH6 IN
CH14 IN	15	●●	16	CH7 IN
CH15 IN	17	●●	18	LLGND
N/C	19	●●	20	N/C
N/C	21	●●	22	N/C
N/C	23	●●	24	N/C
N/C	25	●●	26	N/C
N/C	27	●●	28	N/C
N/C	29	●●	30	N/C
N/C	31	●●	32	N/C
N/C	33	●●	34	N/C
D/A GND 0	35	●●	36	D/A OUT 0
D/A GND 1	37	●●	38	D/A OUT 1
CTR4 CLK	39	●●	40	CTR4 GATE
CTR4 OUT	41	●●	42	A/D EXTERNAL PACER
ANALOG TRIGGER IN [1]	43	●●	44	D/A EXTERNAL PACER IN [1]
A/D EXTERNAL TRIGGER IN	45	●●	46	N/C
N/C	47	●●	48	PC +5V
N/C	49	●●	50	GND

[1] PCI-DAS1602/12 and DAS1602/16 only

P3

FIRSTPORTA Bit 0	51	●●	52	FIRSTPORTA Bit 1
FIRSTPORTA Bit 2	53	●●	54	FIRSTPORTA Bit 3
FIRSTPORTA Bit 4	55	●●	56	FIRSTPORTA Bit 5
FIRSTPORTA Bit 6	57	●●	58	FIRSTPORTA Bit 7
FIRSTPORTB Bit 0	59	●●	60	FIRSTPORTB Bit 1
FIRSTPORTB Bit 2	61	●●	62	FIRSTPORTB Bit 3
FIRSTPORTB Bit 4	63	●●	64	FIRSTPORTB Bit 5
FIRSTPORTB Bit 6	65	●●	66	FIRSTPORTB Bit 7
FIRSTPORTC Bit 0	67	●●	68	FIRSTPORTC Bit 1
FIRSTPORTC Bit 2	69	●●	70	FIRSTPORTC Bit 3
FIRSTPORTC Bit 4	71	●●	72	FIRSTPORTC Bit 5
FIRSTPORTC Bit 6	73	●●	74	FIRSTPORTC Bit 7
N/C	75	●●	76	N/C
10 MHz OUT [1]	77	●●	78	N/C
N/C	79	●●	80	CTR6 CLK [2]
CTR6 GATE [2]	81	●●	82	CTR6 OUT [2]
N/C	83	●●	84	N/C
CTR5 CLK [2]	85	●●	86	CTR5 GATE [2]
CTR5 OUT [2]	87	●●	88	N/C
GND	89	●●	90	+12V
GND	91	●●	92	-12V
N/C	93	●●	94	N/C
A/D INTERNAL PACER OUTPUT	95	●●	96	D/A INTERNAL PACER OUTPUT [3]
D/A EXTERNAL PACER GATE [3]	97	●●	98	N/C
EXTERNAL INTERRUPT [3]	99	●●	100	GND

[1] N/C on the PCI-DAS1000, DAS1200/JR, DAS1602/12, and DAS1602/16
[2] N/C on the PCI-DAS1602/12 and DAS1602/16
[3] PCI-DAS1602/12 and DAS1602/16 only

PCI-DAS6000 Series pinout

Pins 1 to 50 connect to P2. Pins 51 to 100 connect to P4. The C100HD50-x cable is used for PCI-DAS6000 Series signal connections.

P2

CH0 IN	2	●●	1	LLGND
CH1 IN	4	●●	3	CH8 IN
CH2 IN	6	●●	5	CH9 IN
CH3 IN	8	●●	7	CH10 IN
CH4 IN	10	●●	9	CH11 IN
CH5 IN	12	●●	11	CH12 IN
CH6 IN	14	●●	13	CH13 IN
CH7 IN	16	●●	15	CH14 IN
LLGND	18	●●	17	CH15 IN
N/C	20	●●	19	N/C
N/C	22	●●	21	N/C
N/C	24	●●	23	N/C
N/C	26	●●	25	N/C
N/C	28	●●	27	N/C
N/C	30	●●	29	N/C
N/C	32	●●	31	N/C
N/C	34	●●	33	N/C
D/A OUT 0 [1]	36	●●	35	AISENSE
D/A OUT 1 [1]	38	●●	37	D/A GND [1]
AUXOUT0 / D/A PACER OUT	40	●●	39	PC +5V
AUXOUT2 / SCANCLK	42	●●	41	AUXOUT1 / A/D PACER OUT
D/A EXTREF [2]	44	●●	43	AUXIN0 / A/D CONVERT
AUXIN2 / A/D STOP TRIGGER	46	●●	45	AUXIN1 / A/D START TRIGGER
AUXIN4 / D/A START TRIGGER	48	●●	47	AUXIN3 / D/A UPDATE
GND	50	●●	49	AUXIN5 / A/D PACER GATE

[1] N/C on the PCI-DAS6023
[2] N/C on the PCI-DAS6023 and DAS6025

P4

FIRSTPORTA Bit 1 [1]	52	●●	51	FIRSTPORTA Bit 0 [1]
FIRSTPORTA Bit 3 [1]	54	●●	53	FIRSTPORTA Bit 2 [1]
FIRSTPORTA Bit 5 [1]	56	●●	55	FIRSTPORTA Bit 4 [1]
FIRSTPORTA Bit 7 [1]	58	●●	57	FIRSTPORTA Bit 6 [1]
FIRSTPORTB Bit 1 [1]	60	●●	59	FIRSTPORTB Bit 0 [1]
FIRSTPORTB Bit 3 [1]	62	●●	61	FIRSTPORTB Bit 2 [1]
FIRSTPORTB Bit 5 [1]	64	●●	63	FIRSTPORTB Bit 4 [1]
FIRSTPORTB Bit 7 [1]	66	●●	65	FIRSTPORTB Bit 6 [1]
FIRSTPORTC Bit 1 [1]	68	●●	67	FIRSTPORTC Bit 0 [1]
FIRSTPORTC Bit 3 [1]	70	●●	69	FIRSTPORTC Bit 2 [1]
FIRSTPORTC Bit 5 [1]	72	●●	71	FIRSTPORTC Bit 4 [1]
FIRSTPORTC Bit 7 [1]	74	●●	73	FIRSTPORTC Bit 6 [1]
N/C	76	●●	75	N/C
N/C	78	●●	77	N/C
N/C	80	●●	79	N/C
N/C	82	●●	81	N/C
N/C	84	●●	83	N/C
DIO1	86	●●	85	DIO0
DIO3	88	●●	87	DIO2
DIO5	90	●●	89	DIO4
DIO7	92	●●	91	DIO6
CTR1 GATE	94	●●	93	CTR1 CLK
GND	96	●●	95	CTR1 OUT
CTR2 GATE	98	●●	97	CTR2 CLK
GND	100	●●	99	CTR2 OUT

[1] N/C on the PCI-DAS6023, DAS6040, DAS6052, and DAS6070

100-pin connector pinout

Pin	Signal Name	Pin	Signal Name
1	LLGND	51	FIRSTPORTA Bit 0 [2]
2	CH0 IN	52	FIRSTPORTA Bit 1 [2]
3	CH8 IN	53	FIRSTPORTA Bit 2 [2]
4	CH1 IN	54	FIRSTPORTA Bit 3 [2]
5	CH9 IN	55	FIRSTPORTA Bit 4 [2]
6	CH2 IN	56	FIRSTPORTA Bit 5 [2]
7	CH10 IN	57	FIRSTPORTA Bit 6 [2]
8	CH3 IN	58	FIRSTPORTA Bit 7 [2]
9	CH11 IN	59	FIRSTPORTB Bit 0 [2]
10	CH4 IN	60	FIRSTPORTB Bit 1 [2]
11	CH12 IN	61	FIRSTPORTB Bit 2 [2]
12	CH5 IN	62	FIRSTPORTB Bit 3 [2]
13	CH13 IN	63	FIRSTPORTB Bit 4 [2]
14	CH6 IN	64	FIRSTPORTB Bit 5 [2]
15	CH14 IN	65	FIRSTPORTB Bit 6 [2]
16	CH7 IN	66	FIRSTPORTB Bit 7 [2]
17	CH15 IN	67	FIRSTPORTC Bit 0 [2]
18	LLGND	68	FIRSTPORTC Bit 1 [2]
19	AISENSE	69	FIRSTPORTC Bit 2 [2]
20	N/C	70	FIRSTPORTC Bit 3 [2]
21	N/C	71	FIRSTPORTC Bit 4 [2]
22	N/C	72	FIRSTPORTC Bit 5 [2]
23	N/C	73	FIRSTPORTC Bit 6 [2]
24	N/C	74	FIRSTPORTC Bit 7 [2]
25	N/C	75	N/C
26	DIO0	76	N/C
27	DIO1	77	10 MHz OUT [3]
28	DIO2	78	N/C
29	DIO3	79	N/C
30	DIO4	80	N/C
31	DIO5	81	N/C
32	DIO6	82	N/C
33	DIO7	83	N/C
34	N/C	84	N/C
35	D/A GND 0	85	CTR2 CLK
36	D/A OUT 0	86	CTR2 GATE
37	D/A GND 1	87	CTR2 OUT
38	D/A OUT 1	88	N/C
39	CTR1 CLK	89	N/C (GND no longer available)
40	CTR1 GATE	90	N/C (+12V no longer available)
41	CTR1 OUT	91	N/C (GND no longer available)
42	A/D EXTERNAL PACER	92	N/C (–12V no longer available)
43	ANALOG TRIGGER IN	93	N/C
44	D/A EXTERNAL PACER IN	94	N/C
45	A/D EXTERNAL TRIGGER IN	95	A/D INTERNAL PACER OUTPUT
46	A/D STOP TRIGGER (default)	96	D/A INTERNAL PACER OUTPUT [4]
47	A/D PACER GATE	97	EXTERNAL D/A PACER GATE
48	PC +5V	98	N/C
49	SSH OUT [1]	99	N/C (EXTERNAL INTERRUPT on PCI-DAS1602/12 and /16 no longer available)
50	GND	100	GND

Note: New signal required for pretrigger may be shorted to A/D EXTERNAL TRIGGER IN via board jumper.
[1] Requires setting AUXOUT2 to ADC_SSH – Inverted.
[2] Digital ports are present on PCI-DAS1xxx Series, PCI-DAS6023 and PCI-DAS6025 boards. N/C on all other PCI-DAS6000 boards.
[3] Requires setting AUXOUT0 to CTR2 CLK, and the CLK2 source to 10 MHz. PCI-DAS1001/1002/1200 only.
[4] Requires setting AUXOUT0 to D/A PACER OUT.

Signal mapping between the PCI-DAS1xxx and PCI-DAS6000

The table below lists how the signals are mapped between the board connector on PCI-DAS1xxx Series hardware and the board connector on PCI-DAS6000 Series hardware.

PCI-DAS6000 signal name	PCI-DAS6000 pin number	PCI-DAS1Xxx pin number	Signal name
LLGND	1	1	LLGND
CH0 IN	2	2	CH0 IN
CH8 IN	3	3	CH8 IN
CH1 IN	4	4	CH1 IN
CH9 IN	5	5	CH9 IN
CH2 IN	6	6	CH2 IN
CH10 IN	7	7	CH10 IN
CH3 IN	8	8	CH3 IN
CH11 IN	9	9	CH11 IN
CH4 IN	10	10	CH4 IN
CH12 IN	11	11	CH12 IN
CH5 IN	12	12	CH5 IN
CH13 IN	13	13	CH13 IN
CH6 IN	14	14	CH6 IN
CH14 IN	15	15	CH14 IN
CH7 IN	16	16	CH7 IN
CH15 IN	17	17	CH15 IN
LLGND	18	18	LLGND
AISENSE	35	19	NEW - AISENSE INPUT formerly N/C
D/A GND	37	35	D/A GND0
D/A OUT0	36	36	D/A OUT0
D/A GND	37	37	D/A GND1
D/A OUT1	38	38	D/A OUT1
PC +5V	39	48	PC +5V
AUXOUT0 / CTR2_CLK	40	77	10 MHz OUT
AUXOUT0 / D/A PACER OUT (default)	40	96	D/A INTERNAL PACER OUTPUT
AUXOUT1 / A/D PACER OUT (default)	41	95	A/D INTERNAL PACER OUTPUT
AUXOUT2 / SSH_OUT	42	49	SSH OUT
AUXIN0 / A/D CONVERT (default)	43	42	A/D EXTERNAL PACER
AUXIN0 / ATRIG	43	43	ANALOG TRIGGER IN
AUXIN1 / A/D START TRIGGER (default)	45	45	A/D EXTERNAL TRIGGER
AUXIN2 / A/D STOP TRIGGER (default)	46	46	NEW - AUXIN2 INPUT formerly N/C
AUXIN3 / D/A UPDATE (default)	47	44	D/A EXTERNAL PACER IN
AUXIN4 / D/A START TRIGGER (default)	48	97	EXTERNAL D/A PACER GATE
AUXIN5 / A/D PACER GATE (default)	49	47	NEW - AUXIN5 INPUT formerly N/C
GND	50	50	GND
FIRSTPORTA Bit 0	51	51	FIRSTPORTA Bit 0
FIRSTPORTA Bit 1	52	52	FIRSTPORTA Bit 1
FIRSTPORTA Bit 2	53	53	FIRSTPORTA Bit 2
FIRSTPORTA Bit 3	54	54	FIRSTPORTA Bit 3
FIRSTPORTA Bit 4	55	55	FIRSTPORTA Bit 4
FIRSTPORTA Bit 5	56	56	FIRSTPORTA Bit 5
FIRSTPORTA Bit 6	57	57	FIRSTPORTA Bit 6

PCI-DAS6000 signal name	PCI-DAS6000 pin number	PCI-DAS1Xxx pin number	Signal name
FIRSTPORTA Bit 7	58	58	FIRSTPORTA Bit 7
FIRSTPORTB Bit 0	59	59	FIRSTPORTB Bit 0
FIRSTPORTB Bit 1	60	60	FIRSTPORTB Bit 1
FIRSTPORTB Bit 2	61	61	FIRSTPORTB Bit 2
FIRSTPORTB Bit 3	62	62	FIRSTPORTB Bit 3
FIRSTPORTB Bit 4	63	63	FIRSTPORTB Bit 4
FIRSTPORTB Bit 5	64	64	FIRSTPORTB Bit 5
FIRSTPORTB Bit 6	65	65	FIRSTPORTB Bit 6
FIRSTPORTB Bit 7	66	66	FIRSTPORTB Bit 7
FIRSTPORTC Bit 0	67	67	FIRSTPORTC Bit 0
FIRSTPORTC Bit 1	68	68	FIRSTPORTC Bit 1
FIRSTPORTC Bit 2	69	69	FIRSTPORTC Bit 2
FIRSTPORTC Bit 3	70	70	FIRSTPORTC Bit 3
FIRSTPORTC Bit 4	71	71	FIRSTPORTC Bit 4
FIRSTPORTC Bit 5	72	72	FIRSTPORTC Bit 5
FIRSTPORTC Bit 6	73	73	FIRSTPORTC Bit 6
FIRSTPORTC Bit 7	74	74	FIRSTPORTC Bit 7
N/C	75 - 76	75 - 76	N/C
N/C	78 - 79	78 - 79	N/C
N/C	80	80	N/C (CTR6 CLK no longer supported)
N/C	81	81	N/C (CTR6 GATE no longer supported)
N/C	82	82	N/C (CTR6 OUT no longer supported)
N/C	83 - 84	83 - 84	N/C
DIO0	85	26	NEW - DIO0; formerly N/C
DIO1	86	27	NEW - DIO1; formerly N/C
DIO2	87	28	NEW - DIO2; formerly N/C
DIO3	88	29	NEW - DIO3; formerly N/C
DIO4	89	30	NEW - DIO4; formerly N/C
DIO5	90	31	NEW - DIO5; formerly N/C
DIO6	91	32	NEW - DIO6; formerly N/C
DIO7	92	33	NEW - DIO7; formerly N/C
CTR1 CLK	93	39	CTR4 CLK now connects to CTR1 CLK (pin 93)
CTR1 GATE	94	40	CTR4 GATE now connects to CTR1 GATE (pin 94)
CTR1 OUT	95	41	CTR4 OUT now connects to CTR1 OUT (pin 95)
GND	96	50	GND
CTR2 CLK	97	85	CTR5 CLK now connects to CTR2 CLK (pin 97)
CTR2 GATE	98	86	CTR5 GATE now connects to CTR2 GATE (pin 98)
CTR2 OUT	99	87	CTR5 OUT now connects to CTR2 OUT (pin 99)
GND	100	100	GND

Cabling

PCI-DAS6000 series boards have a 100-pin shielded SCSI I/O connector. The accessory cable used with the PCI-DAS6000 series is a C100HD50-x ribbon cable which terminates in two 50-pin IDC female connectors. You can use the C100HD50-x ribbon cable with one C100FF-x ribbon cable or with two C50FF-x cables.
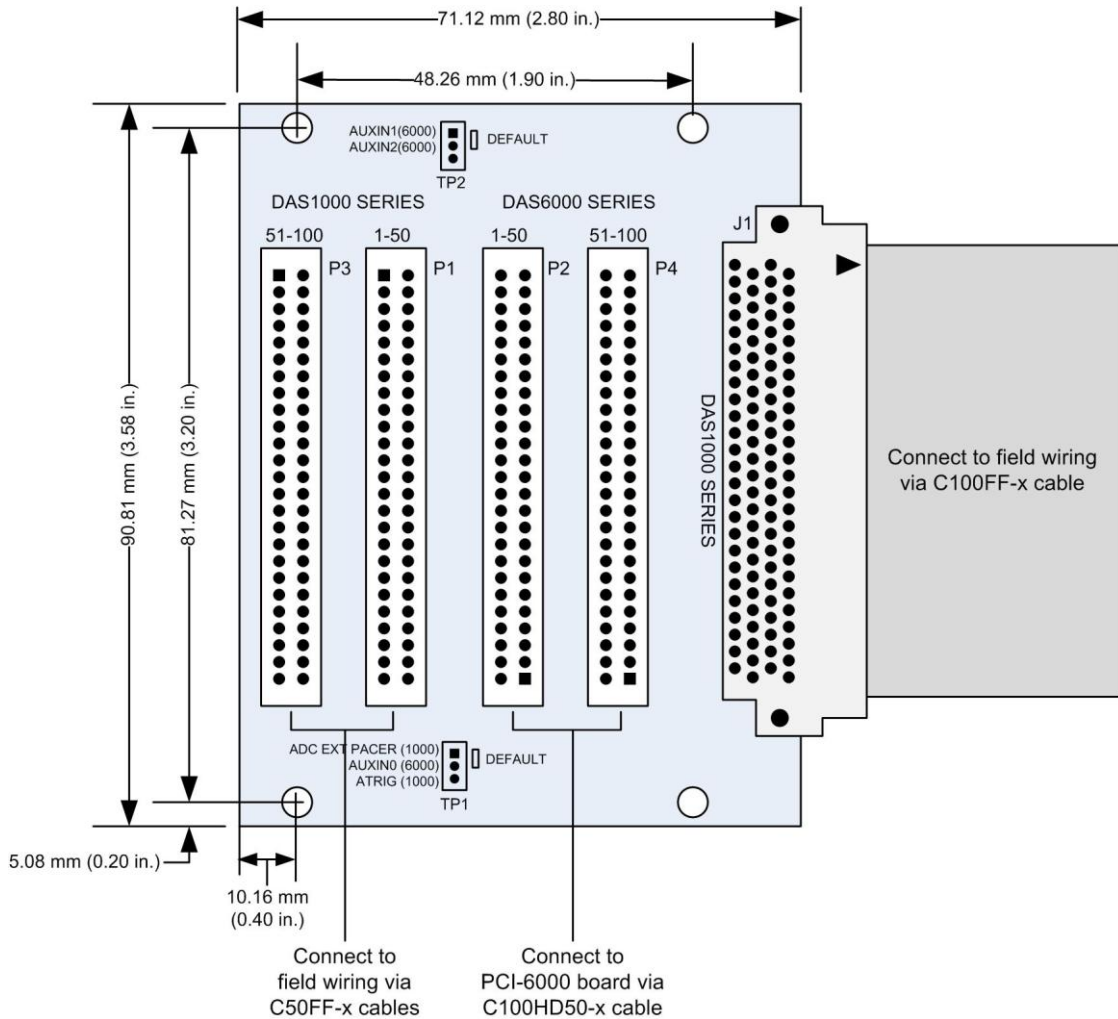

Figure 1. ACC-300 Interface board