



Low Voltage Adapter

Low Voltage Adapter Boundary-Scan Interface

User's Manual

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Chapter 1

Product Overview

Introduction

The Corelis Low Voltage Adapter (or simply adapter hereafter) provides an easy-to-use method for enabling the various Corelis Scan Controllers to interface with target UUTs whose JTAG signals operate at very low voltages. This includes signal levels as low as 0.4V. This adapter connects between one scan controller from the Corelis family via a standard test cable, and plugs directly into the target having the appropriate mating JTAG TAP socket. It senses the operating signal voltage reference level from the target as detected on a dedicated socket pin, adjusting its drive/sense levels accordingly.

The adapter converts 3.3V TTL signals at the scan controller end to the target determined voltage level (sensed by the above reference level input), and visa-versa. It is designed to operate at high TCK rates such that the performance is generally limited to that of the target or scan controller, and not the adapter itself. It is also designed to drive 50 ohm terminations on the target.

The adapter requires its own power source, which is supplied by plugging in the included 9VDC brick supply.

Features of the Low Voltage Adapter

- Converts JTAG signal levels between a TTL scan controller and a low voltage target.
- Mates with any Corelis Scan Controller which supports a standard 20 pin target cable (supplied with that product, not included here).
- Mates with a 60 pin BSH 50 mm socket (Samtec™ or equivalent) on the target, per the Agilent™ Logic Analyzer Test Point standard using direct plug-in.
- Target reference voltage level (0.4 to 2.5V) is detected from its connector pin (buffered) and automatically determines the drive/sense level at that end.
- 9VDC (500 mA) power supply provided.
- LED indicates power status.
- Operates up to 100 MHz.
- Capable of driving 90 mA into target (50 ohm loads readily accommodated).
- ESD protected pins.
- Compact Bare PCB form-factor.

See Figure 1-1 for the top and bottom view of the adapter.

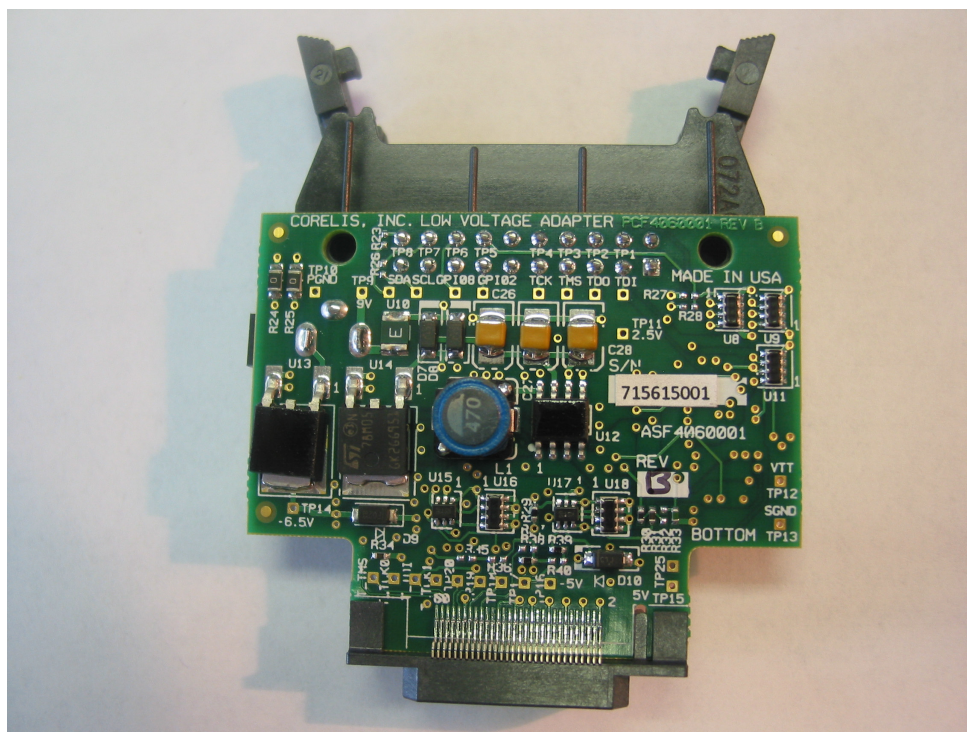
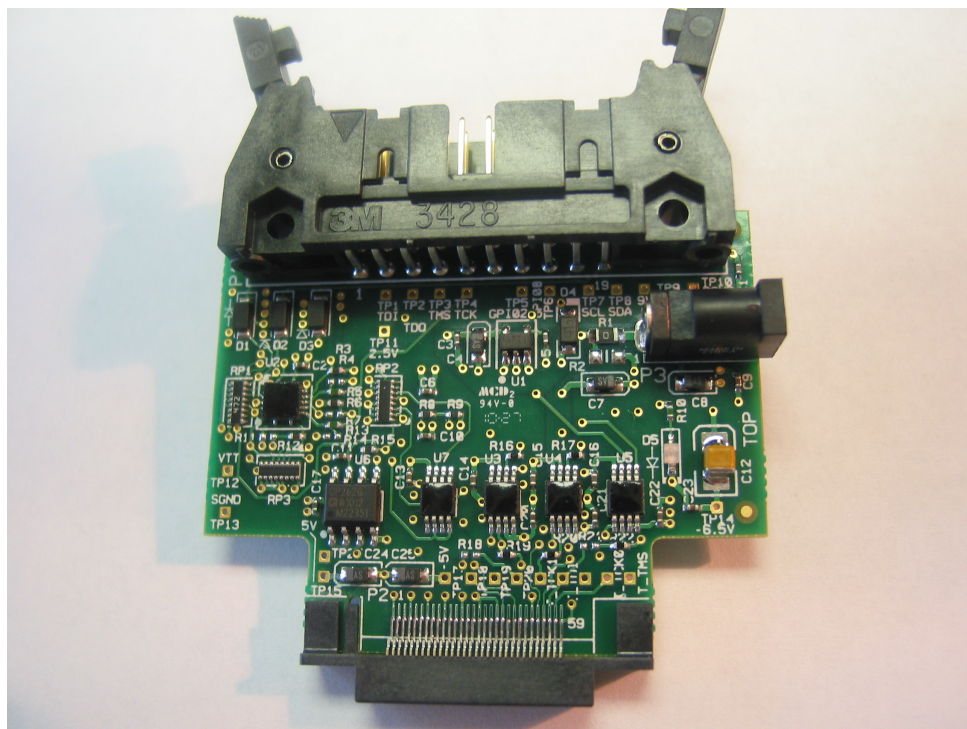


Figure 1-1. Low Voltage Adapter top and bottom

Specifications

Size and Form Factor

PCB dimensions	50x30x2.52 mm
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Maximum Test Clock (TCK) Frequency

Maximum TCK Frequency	100 MHz (may be limited by target, scan controller, and/or its cable)
-----------------------	---

LED (red)

PWR	Indicates the 9VDC power source is plugged-in
-----	---

Scan Controller Signals Characteristics

JTAG and GPIO signals	Compatible with all Corelis Scan Controllers (at 3.3V i/o settings).
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Scan Controller Connector (P1)

JTAG and GPIO signals	20-pin Dual Row 0.100-in. spacing, with latch/ejector (3M 3428-5302 or equivalent) mates with Corelis ribbon cable.
-----------------------	---

Target Connector (P2)

JTAG, GPIO and test signals	60-pin Dual Row 0.05-in. spacing (Samtec BTH-030-01-L-D-EM2 or equivalent, mates with board-mounted Samtec BSH-030-01 family, or equivalent)
-----------------------------	--

Power Requirements (P3)

9VDC	0.500 A (maximum), 1.3mm center + barrel connector.
------	---

Target Electrical I/O (relative to adapter) Interface

VT (ref. V input current)	0.4 to 2.5V, 600 nA max.
TARG_TDO (signal input current)	40 uA max.
JTAG output signals drive voltage	0 to 2.5V (based on VT sensed).
JTAG output max. drive current	90 mA min.

Operating Environment

Temperature	0°C to 55°C
Relative Humidity	10% to 90%, non-condensing

Storage Environment

Temperature	-40°C to 85°C
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Target Clearance Around JTAG Connector

See Figure 1-2.

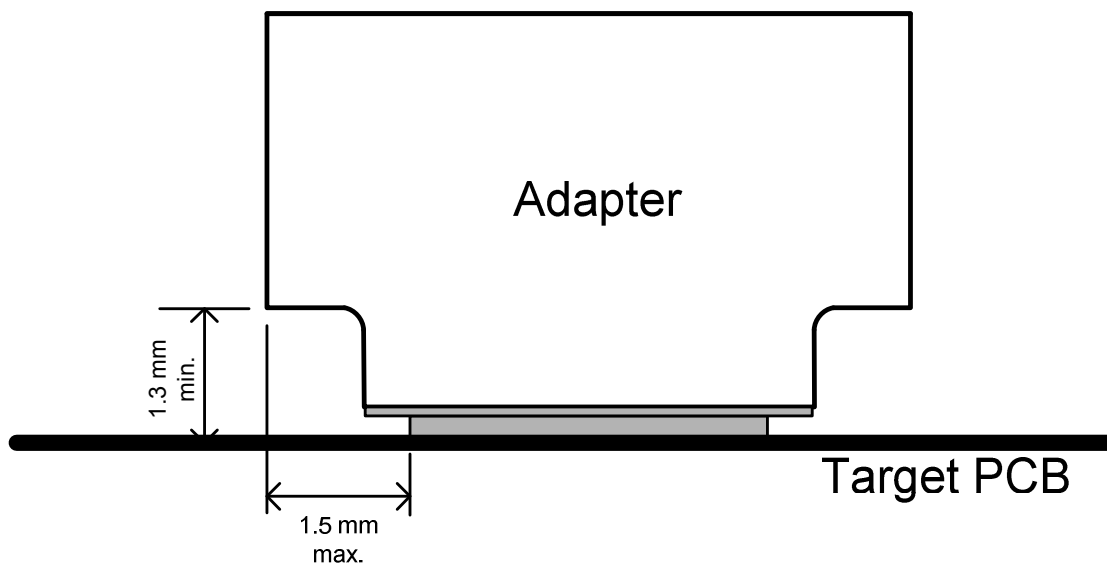


Figure 1-2. PCB clearance requirements

Chapter 2

Installation

The Low Voltage Adapter product consists of the following components:

- Low Voltage Adapter board
- 9VDC Power Brick
- User's Manual

This product is intended to be operated by a Corelis Scan Controller, which is supplied with a 20 pin standard JTAG ribbon cable. One end of such cable is plugged in the scan controller while the target end plugs into P1 of the adapter. The host PC should be set up with s/w installed to operate the scan controller of choice (see relevant user's manual).

The adapter should be plugged into the target via P2, directly to the board.

Plug in the supplied 9VDC power supply into an AC outlet and plug its 1.3 mm barrel power connector into P3 of the adapter. The adapter's LED should become lit up red (near P3).

When the target is powered up, the host PC may now be operated using the installed scan controller and its Corelis s/w tools.

See Figure 2-2 showing the Low Voltage Adapter as connected to the target, and the Corelis scan controller (in turn connected to its host PC), ready for operation.

See Figure 2-3 blocking out the Low Voltage Adapter connection setup.

The ScanExpress Runner tool on the test PC operates all Corelis Scan Controllers and should be configured according to the one selected. See Figure 2-1 showing the Configuration screen (from the main screen: Setup->Controller) assuming a USB-1149.1/E is being used. Note how that Controller is highlight selected, along with the other settings: Voltage = 3.3V, TCK Frequency = 20.000 MHz, Delay Compensation = Automatic, and TAP Off State = Active.

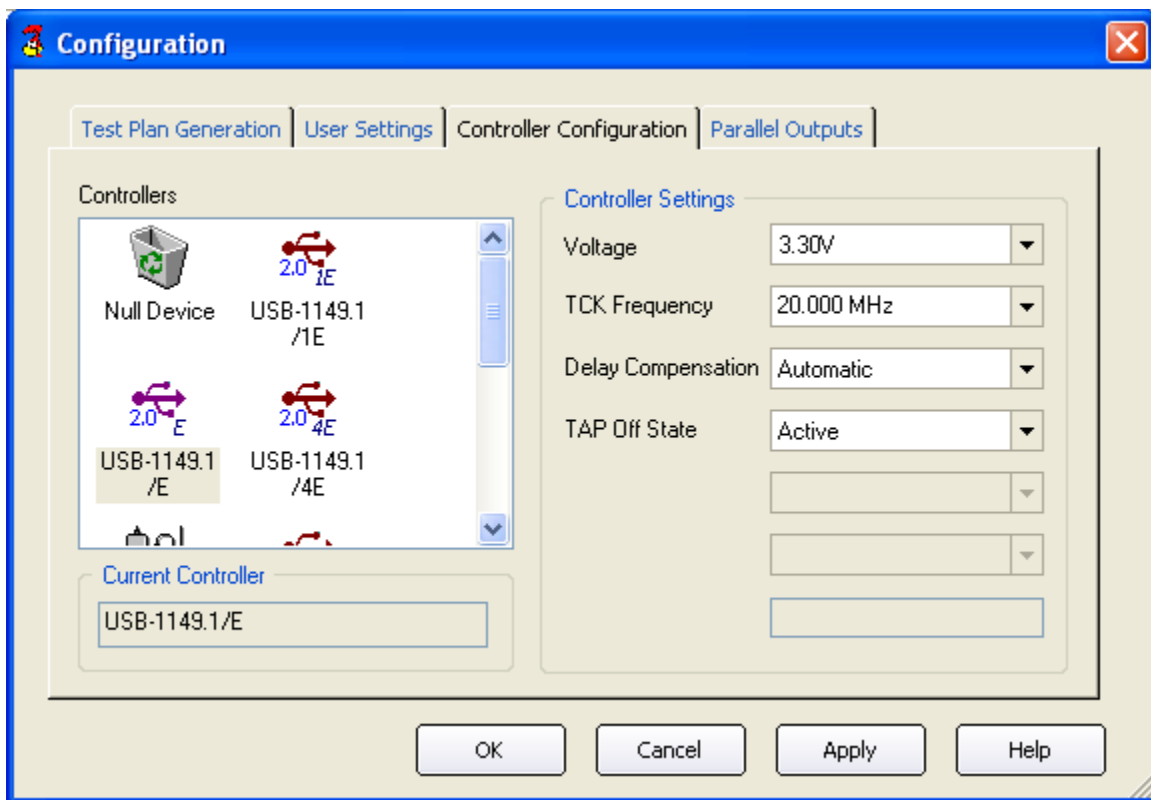


Figure 2-1. Example ScanExpress Runner Configuration Screen settings

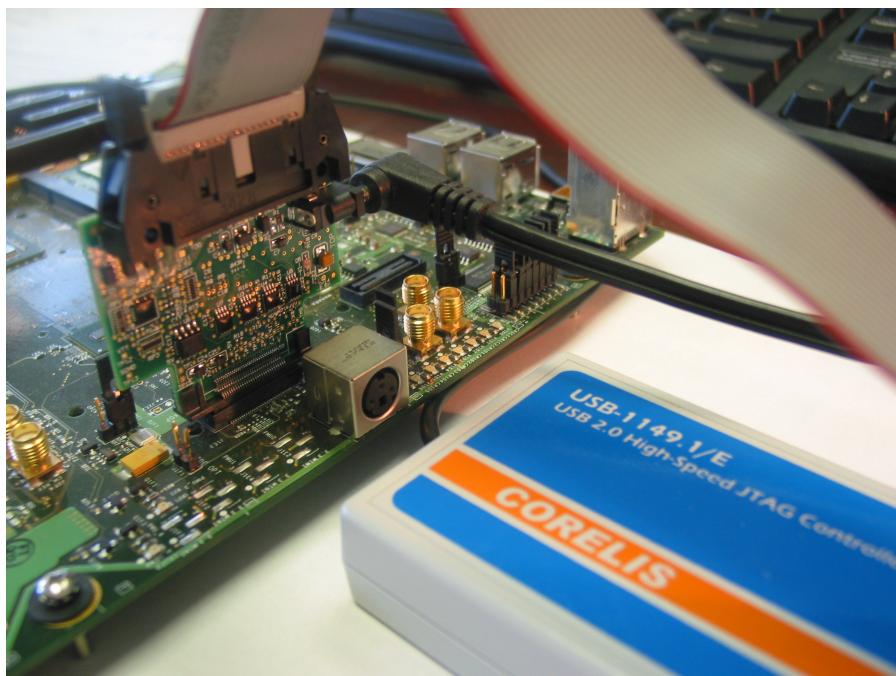


Figure 2-2. Low Voltage Adapter Plugged into Target and Scan Controller

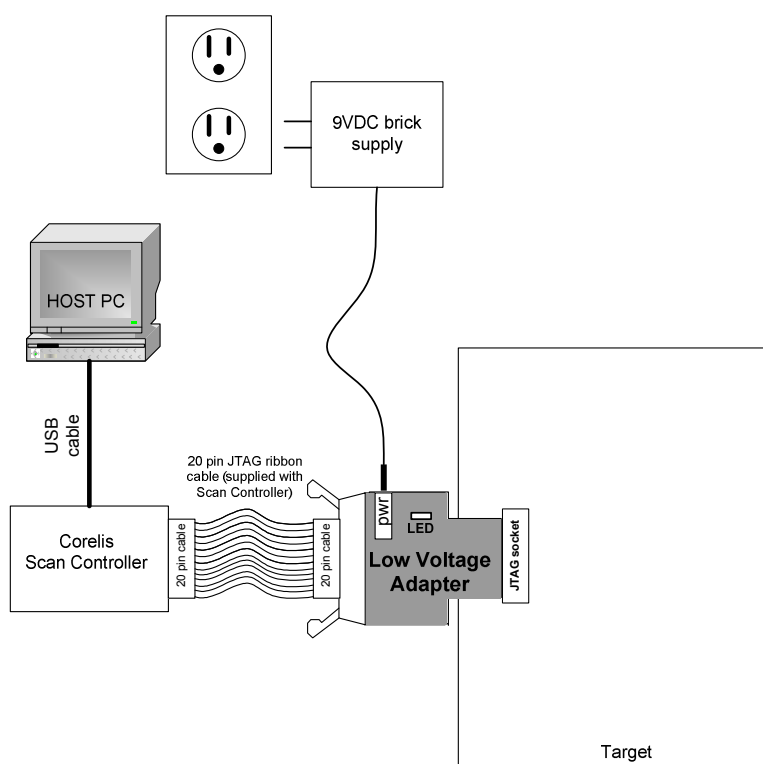


Figure 2-3. Low Voltage Adapter connection setup

The pin assignments of the connectors are shown as follows.

Pin	Signal Name	I/O	Description
1	TRST*	In	TRST*
2	GND	-	Ground
3	TDI	In	Test Data In
4	GND	-	Ground
5	TDO	Out	Test Data Out
6	GND	-	Ground
7	TMS	In	Test Mode Select
8	GND	-	Ground
9	TCK	In	Test Clock
10	GND	-	Ground
11	GPIO1	-	unused*
12	GND	-	Ground
13	GPIO2	-	unused*
14	VTT	Out	unused
15	GPIO3	Out	TARG_PWRGOOD **
16	GPIO8	-	unused*
17	GPIO4	-	unused*
18	GPIO7	-	unused*
19	GPIO5	-	unused*
20	GPIO6	-	unused*

Table 2-1. Scan Controller TAP Connection List (P1). Directions relative to adapter.

*these signals have alternate usages if the adapter is reconfigured by resistors populated/unpopulated (factor-only).

** TTL copy of target PWRGOOD (low voltage) signal.

Pin	Signal Name	I/O	Description
1	GND	-	GROUND
2	GND	-	GROUND
3	NO_CONNECT	-	unused
4	NO_CONNECT	-	unused
5	NO_CONNECT	-	unused
6	NO_CONNECT	-	unused
7	GND	-	GROUND
8	GND	-	GROUND
9	NO_CONNECT	-	unused
10	NO_CONNECT	-	unused
11	NO_CONNECT	-	unused
12	NO_CONNECT	-	unused
13	GND	-	GROUND
14	GND	-	GROUND
15	NO_CONNECT	-	unused
16	NO_CONNECT	-	unused
17	NO_CONNECT	-	unused
18	NO_CONNECT	-	unused
19	GND	-	GROUND
20	GND	-	GROUND
21	NO_CONNECT	-	unused
22	NO_CONNECT	-	unused
23	NO_CONNECT	-	unused
24	NO_CONNECT	-	unused
25	GND	-	GROUND
26	GND	-	GROUND
27	NO_CONNECT	-	unused
28	NO_CONNECT	-	unused
29	NO_CONNECT	-	unused
30	NO_CONNECT	-	unused
31	GND	-	GROUND
32	GND	-	GROUND
33	NO_CONNECT	-	unused

Pin	Signal Name	I/O	Description
34	NO_CONNECT	-	unused
35	NO_CONNECT	-	unused
36	NO_CONNECT	-	unused
37	GND	-	GROUND
38	GND	-	GROUND
39	PWRGOOD	In	Target power good (low voltage)
40	NO_CONNECT	-	Unused
41	NO_CONNECT	-	Unused
42	NO_CONNECT	-	Unused
43	VT	In	Target i/o reference voltage
44	NO_CONNECT	-	unused
45	NO_CONNECT	-	unused
46	NO_CONNECT	-	unused
47	NO_CONNECT	-	unused
48	NO_CONNECT	-	unused
49	GND	-	GROUND
50	GND	-	GROUND
51	NO_CONNECT	-	unused
52	TARG_TDO	In	Target TDO (low voltage)
53	NO_CONNECT	-	unused
54	TARG_TRST_N	Out	Target TRST_N (low voltage)
55	TARG_TCK1	Out	unused
56	TARG_TDI	Out	Target TDI (low voltage)
57	TARG_TCK0	Out	Target TCK1 (low voltage)
58	TARG_TMS	Out	Target TMS(low voltage)
59	GND	-	GROUND
60	XDP_PRESENT_N	Out	GROUND -Test system attached to target when low

Table 2-2. Target TAP Connection List (P2). Directions relative to adapter.

Chapter 3

Troubleshooting

Indicator LED

The LED (red) indicates that the Low Voltage Adapter module is properly powered up. If not active after plugging in the power brick, check for correct power supply and that the wall outlet is live.

Scanning Fails

To eliminate the TCK clock rate being too high as the source of failure, re-enter the Configuration screen of the ScanExpress Runner tool (from main screen: Setup->Controller). Then try setting the TCK Frequency to 1 MHz (this should always work). If OK, it confirms that clock rate is likely the source of trouble. The user can seek the best TCK rate obtainable by tweaking this rate ever higher until it fails. Further improvements might be obtained by also tweaking the Delay Compensation number of TCK clocks by manual settings. This setting attempts to account for signal travel time from the scan controller, through the Low Voltage Adapter, through the target, and all the way back again.

If the above continues to fail, run the factory ATP test using the adapter and the selected Corelis Scan Controller. This may require changing the ATP menu settings for the particular controller hooked (versus the one designated in the ATP Instructions).