A9-CNTL

DDR5 Controller User Manual

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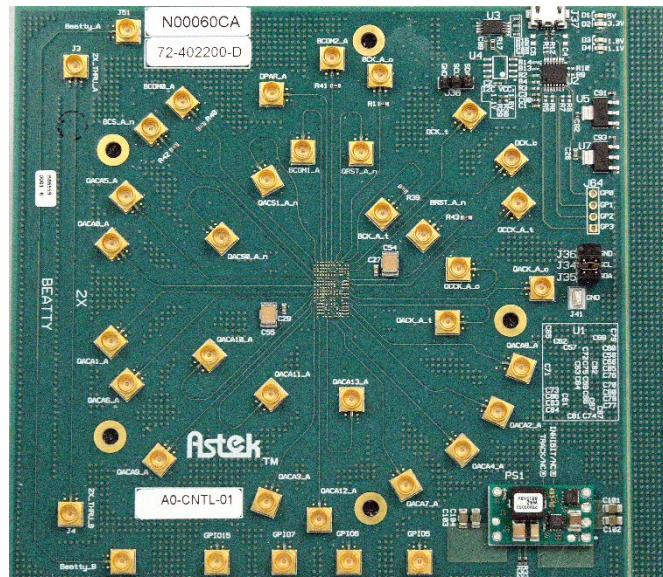
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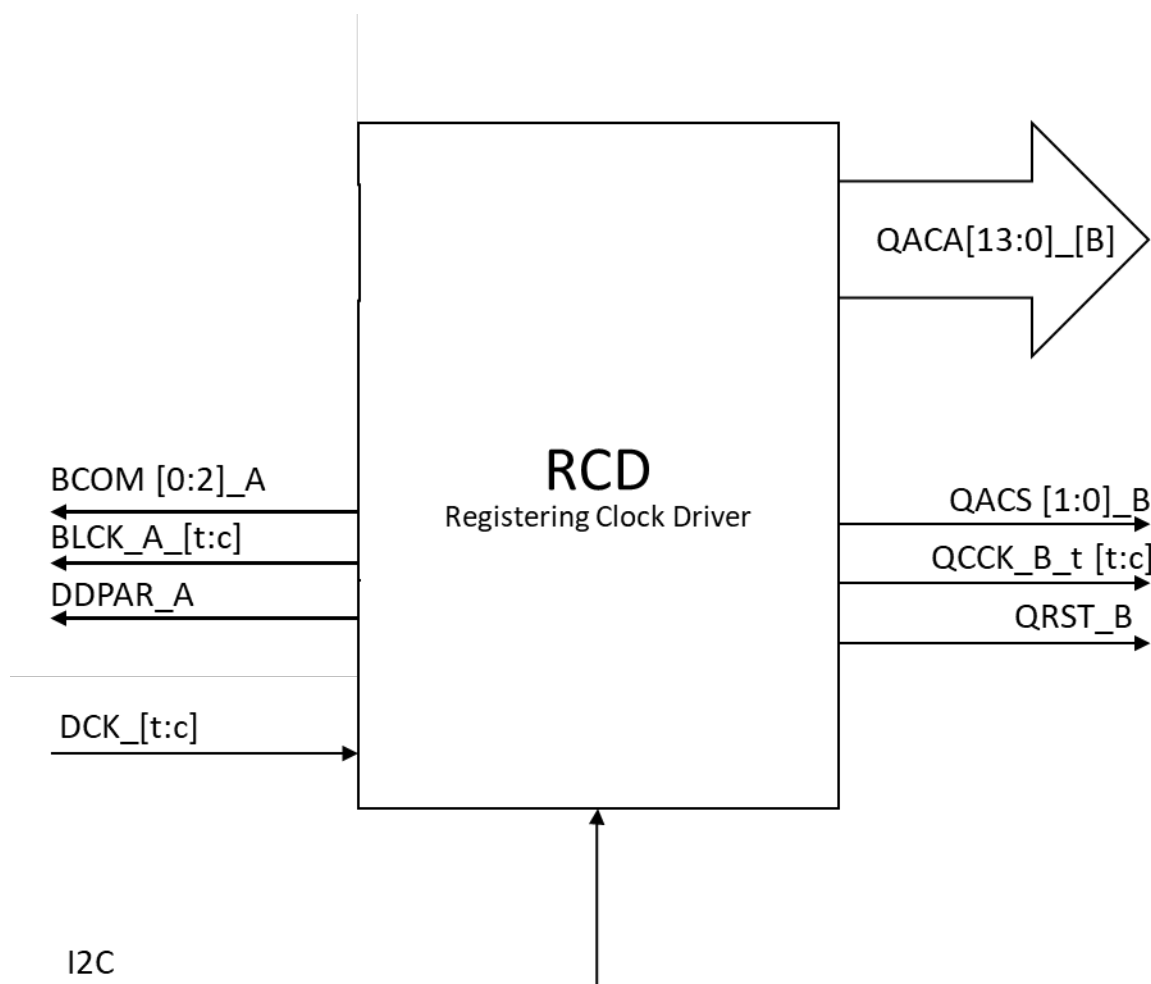
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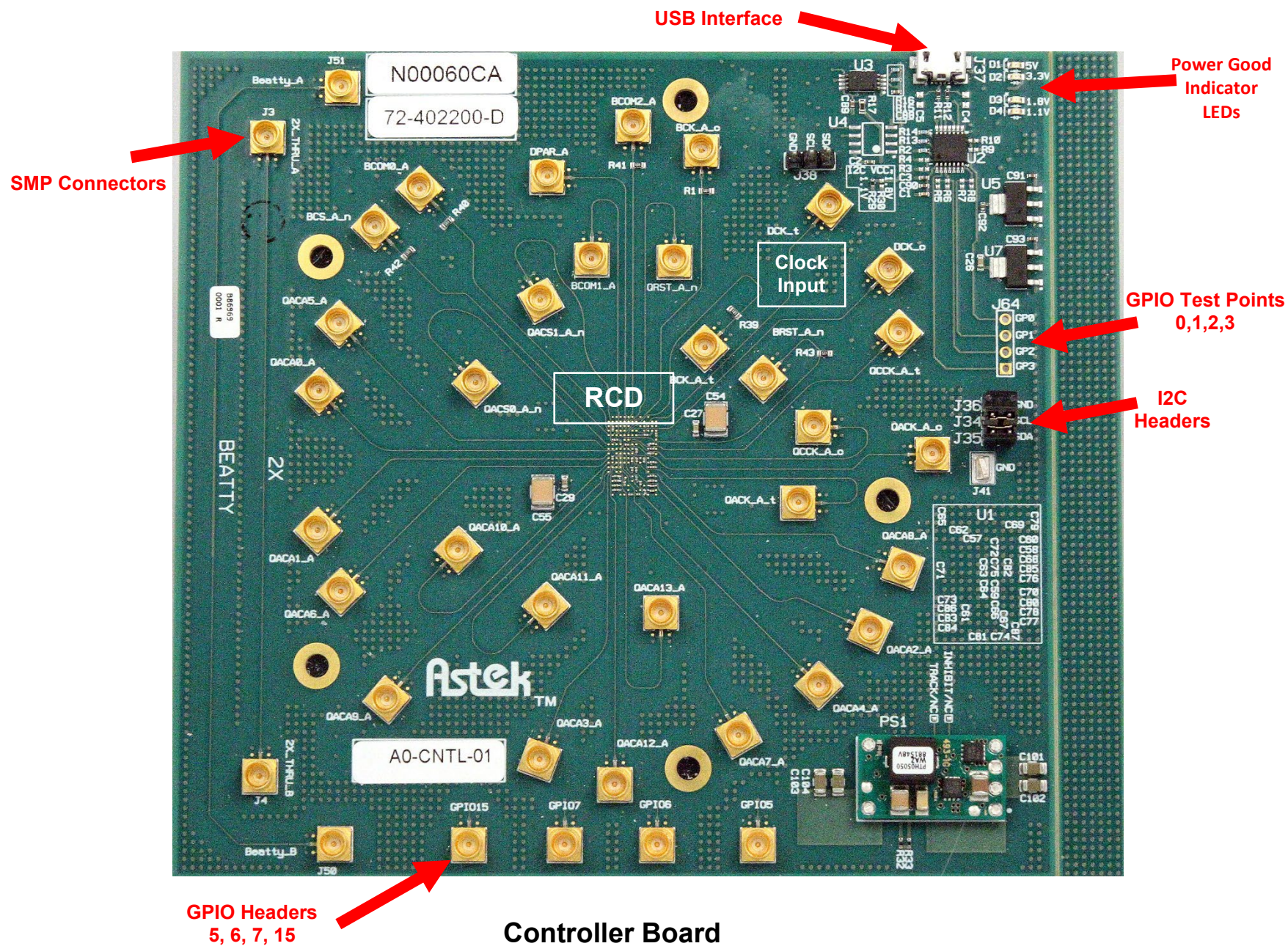
1 Introduction / Overview

This document outlines the features and use model of Astek's DDR5 Controller (CNTL). The CNTL provides an RCD based interface to DRAMs and UDIMMs under test. Controller Software scripts and commands program the RCD over I2C to perform operations such as RCD register read/write, DRAM mode register read/write and multi-purpose commands.

Each signal path is 50-Ohms, and all signals are matched to within +/- 1mil tolerance. RCD signals are brought out to SMP connectors.

QACA[13:0]_[B]

RCD
Registering Clock Driver

BCOM [0:2]_A

BLCK_A_[t:c]

DDPAR_A

DCK_[t:c]

I2C

QACS [1:0]_B

QCCK_B_t [t:c]

QRST_B

Controller Block Diagram

USB Interface

Power Good Indicator LEDs

SMP Connectors

Clock Input

GPIO Test Points 0,1,2,3

RCD

I2C Headers

GPIO Headers 5, 6, 7, 15

Controller Board

2 Optional Equipment

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Astek CTC2 Channel Test Card
Astek offers a DDR5 Channel Test Card that provides an interface between a Bit Error Rate Tester (BERT), an Oscilloscopes, the CNTL and the DIMM card under test.

Astek UDIMM Riser Board
Astek provides a DDR5 UDIMM Riser that maps the CTC2 RDIMM 288 pin test connector to the UDIMM card interface.

Micro USB cable
A micro-USB cable is used to connect the CNTL to a host PC. The USB interface provides a method of configuring a CNTL card during characterization testing.

I2C host
A host PC controls the CNTL's RCD over I2C, using Astek's Controller Software, available for download at www.astekcorp.com.

SMP cabling
SMP cables are needed to connect the CNTL and CTC2 as well as other test hardware. Depending on the equipment and connectivity needs, either SMP to SMP cables or SMP to SMA cables are needed.

Power Supply
The CNTL is powered from the host PC's USB interface.

Test equipment
Depending on the characterization needs, various test equipment such as oscilloscopes, bit-error rate testers (BERTs), and pattern generators are used to drive stimulus and monitor the output of devices under test.

Contact your Astek representative for information and quotations for the optional equipment listed above.
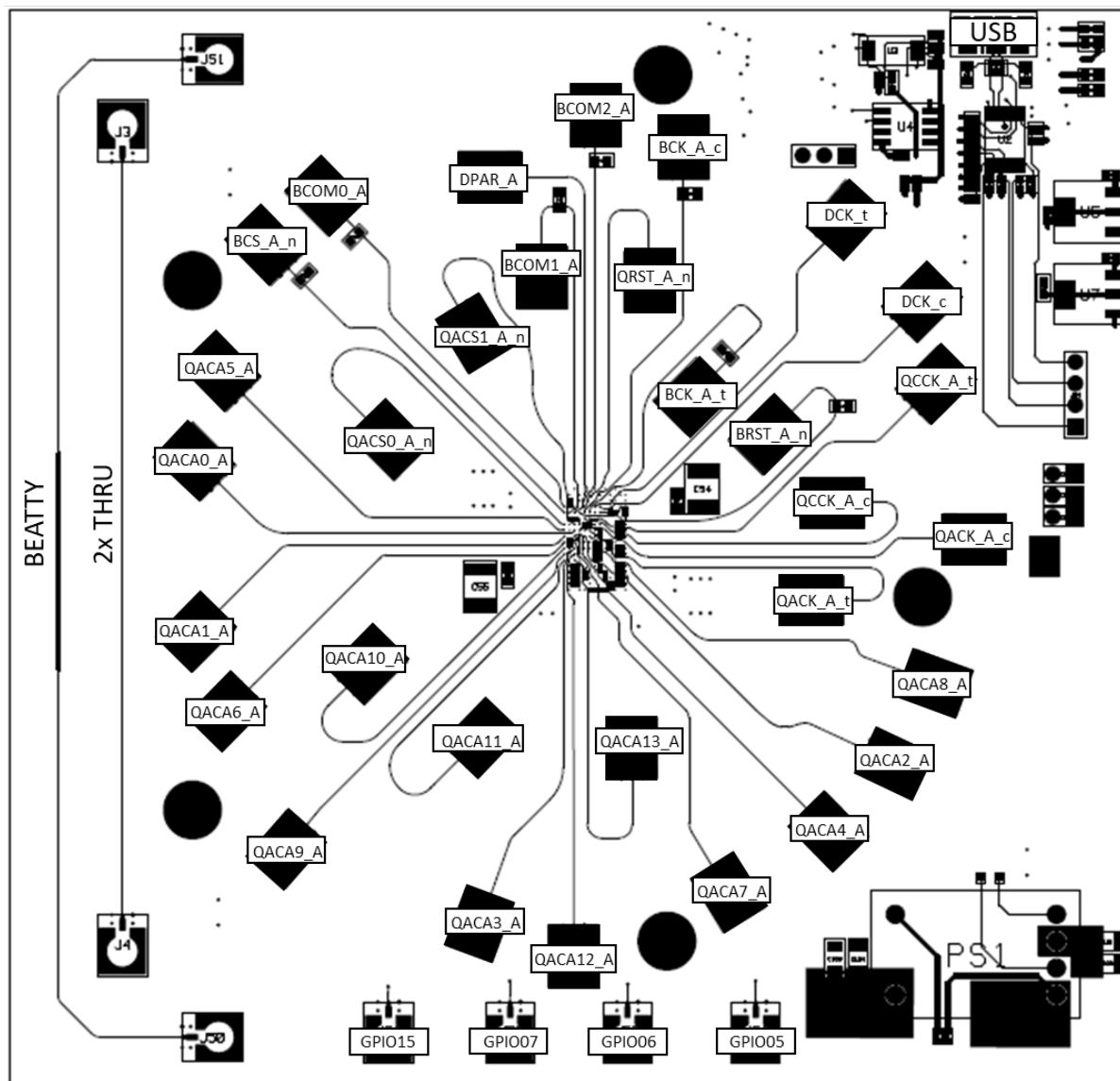
3 Powering the CNTL

The CNTL is powered from the host PC's USB interface. Power Good indicator LEDs (1.1 V, 1.8 V, 3.3 V and 5.0V) located near the micro-USB connector monitor power supply status.
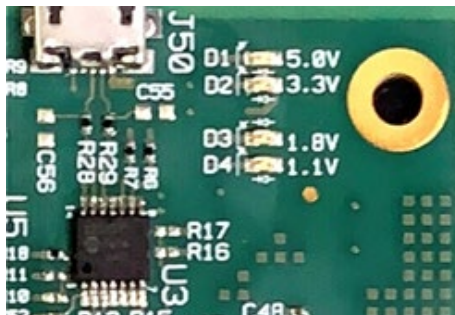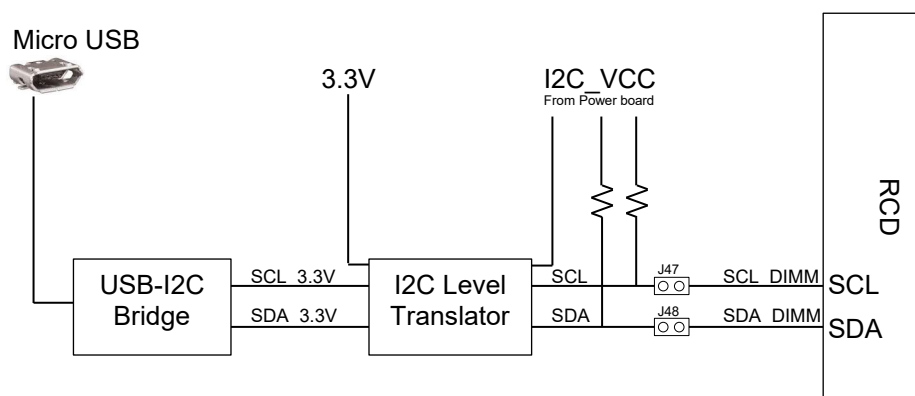

Power Good Indicators

4 Signals

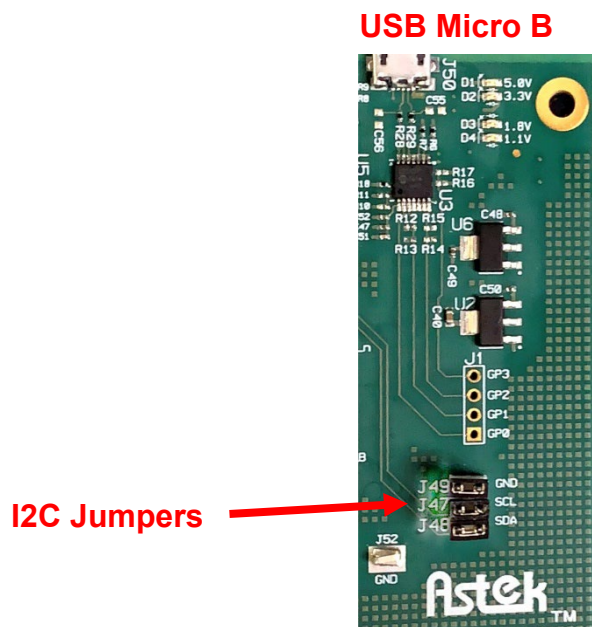CNTL's RCD signal to SMP connector map.

5 I2C

I2C Circuitry

Block Diagram of the I2C circuitry on the CNTL is shown below.

USB transactions are translated to I2C protocol, then level translated to RCD compatible voltage levels.

The location of the USB Micro B connector and I2C support circuitry is shown below.

I2C Interface

By default, the jumpers J47 and J48 are installed. When J34 and J35 are installed, the I2C bus is driven via the USB-to-I2C bridge IO.

The CNTL has four 1.1 Volt output I/O ports (SMP connectors, CNTL bd. lower edge) that are controlled over I2C. Controller Software command SETGPIO is used to set each GPIO output independently.

    SETGPIO 5 on/off
    SETGPIO 6 on/off
    SETGPIO 7 on/off
    SETGPIO 15 on/off
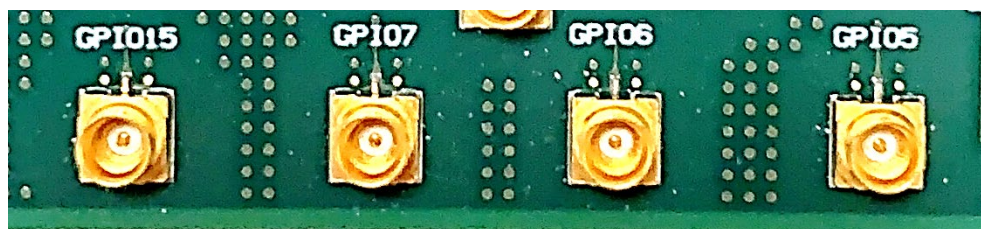
GPIO SMP

6 Ordering Information

The following part numbers may be ordered from Astek. Contact Astek representative for quoting and availability.

Controller

Part Number	Description
A9-CNTL-01	DDR5 Controller

CTC2 Configurations

Part Number	Description
A9-CTC2 -01	DDR5 CTC2 with high-performance socket installed
A9-CTC2 -02	DDR5 CTC2 with standard socket installed
A9-CTC2 -03	DDR5 CTC2 with NO socket installed
A9-AUTO-01	Reset Automation Kit. Includes GPIO cable

Additional products related to the DDR5 Test products available from Astek.

Part Number	Description
A9-DIMM-01	DDR5 Parametric Test Card
A9-WCNTL-01	DDR5 Wide-Controller Bd. w/ RCD and Reset Automation
A9-RCD-01	DDR5 Registering Clock Driver (RCD) Test Card
A9-SIT-01	DDR5 RCD Signal Integrity Test Card
A9-CMBO-01	DDR5 Combination Test Card
A9-X16 CMBO-01	DDR5 X16 Combo Card
A9-UDIMM-01	DDR5 UDIMM Riser
A9-RPLC-01	RDIMM/UDIMM Replica Channel
A9-A2PCBL-1000	SMA to SMP cable, 1.0m
A9-A2PCBL-1000P	SMA to SMP cable, 1.0m, matched pair
A9-A2PCBL-0500	SMP to SMP cable, 0.5m
A9-A2PCBL-0500P	SMP to SMP cable, 0.5m, matched pair

7 How to Contact Astek Corporation

Astek Corporation may be contacted by the following methods:

PHONE: (719) 260-1625 (USA)

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