

AHA4540 TPC EVB

TPC EVALUATION BOARD

INTRODUCTION

The AHA4540-EVB is an evaluation board that can be integrated into a communications system for evaluation of the AHA4540 Turbo Product Code encoder/decoder device at real system speeds. Alternatively, it can be connected to a Bit Error Rate Tester (BERT) for evaluating the performance of the AHA4540 with a user supplied communications channel.

The evaluation board includes one AHA4540 device supporting full duplex encoding and decoding of a serial data stream, I and Q symbol data, or soft metrics using Turbo Product Codes. The EVB supports standalone encoding or decoding as well as full duplex simultaneous encoding/decoding. The AHA4540 device is fully programmable to cover a wide range of configurations. All registers in the AHA4540 device are programmable and readable through an RS-232 serial port connection to a PC. Communication software is provided with the evaluation board for configuration and control from the host personal computer.

AHA4540 EVB also supports numerous self-test modes that allow loop back tests at different stages and BERT-like tests where the board generates pseudo random test patterns.



FEATURES

PERFORMANCE:

- 148 MHz maximum clock input (S_UCLK, S_CCLK)
- 148 Mbits/sec maximum serial data rate
- Simultaneous independent TPC encoding and decoding
- Access to registers in the AHA4540 device
- Up to 4 bit soft decision input to TPC decoder
- On-board synchronization in the AHA4540
- On-board AHA4540 includes CRC insertion and detection

INTERFACE:

- SMA connectors for all clock and data signals on/off board
- 2 frequency synthesizers on board generate payload side clocks at frequencies up to 60 MHz
- User can supply payload and channel side bit clocks up to 148 MHz max frequency
- RS-232 control interface for board configuration and monitoring

GENERAL:

- PCB form factor (5.30" x 8.80")
- On board LED status indicators
- Requires 5V power supply @ 2.0 A
- Requires Windows PC for configuration control via RS-232 port
- SMA connectors are used for inputs and outputs for all high speed serial interfaces

CONNECTORS

Data I/O

SMA connectors are used for Inputs and outputs for all high speed serial clock and data interfaces. The payload side SMA connectors may connect directly to a BERT transmitter and receiver. The channel side connections would normally be through the parallel flat cable connectors. The parallel connections for the three parallel ports other than the USER_CDATAB use 50 pin twisted pair flat cables with every other conductor grounded.

Control Port

RS232 connection to the host PC is through a 9-pin DC shell connector located on the back of the board. Configuration and monitoring of the EVB operation is done through this port. A pentium class PC running Windows OS is required.

Power

5.0V Power is supplied by the user's power supply. Maximum current required is 2.0 Amps.

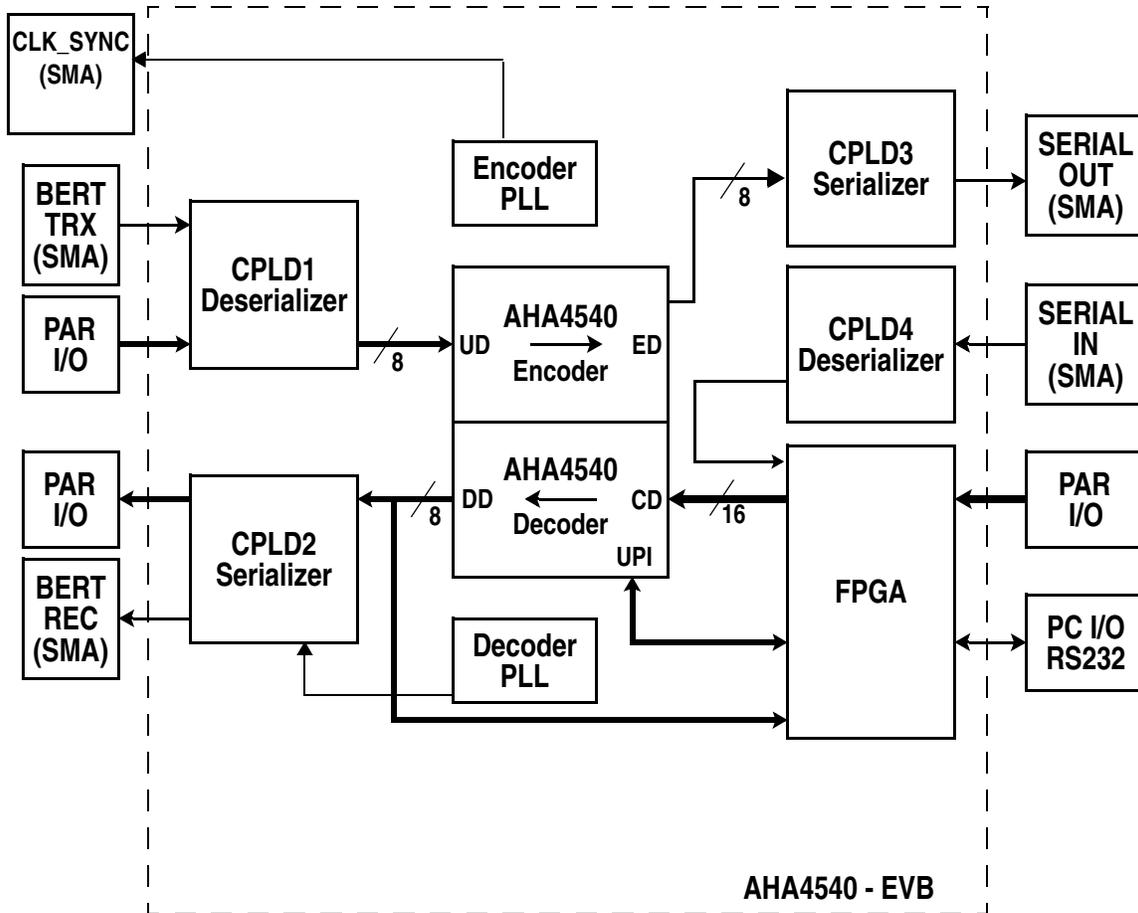
FUNCTIONAL OVERVIEW

The AHA4540 simultaneously encodes and decodes user provided data using Turbo Product Codes (TPCs). User provided data is clocked into the EVB serially using signals S-UCLK and S_UDATA from coaxial SMA connectors, or with parallel 8-bit transfers using USER_UDATA from the parallel connector JP3 and ready/accept handshake signals. In Figure 1, CPLD_1 contains the multiplexor that selects either serial data with clock, or parallel data from the USER_UDATA bus. Control of this multiplexor is via the AHAESB Windows software provided. The TPC encoder in the AHA4540 device encodes the data, adds FEC bits, then outputs the data to CPLD_3 where the data gets serialized and transmitted to the channel along with the clock, S_EDATA and S_ECLK, and also driven out in 8-bit wide format to the USER_EDATA bus on JP4.

Once the data is output from the evaluation board on either the serial or parallel encoded data interfaces, it is transmitted through an external channel where the data is corrupted by the addition of noise resulting in data bit errors. This corrupted data is clocked into the evaluation board serially using S_CCLK and S_CDATA or using the USER_CDATAB 16-bit wide parallel input bus on JP5.

The S_CDATA signal is useful for wrapping around hard decision channel data back into the AHA4540 TPC decoder. For soft decision data the 16-bit parallel port must be used. The CDATAB port of the AHA4540 accepts up to 16-bits per clock transfers of received channel data. This data may be I,Q data or soft metrics. The chip can accept up to four I,Q pairs or four soft metrics per transfer. In serial streaming mode the received serial channel data is deserialized into four soft metrics with the lower 3 bits of each metric forced to zero in the FPGA. The TPC decoder in the AHA4540 corrects the data errors and outputs the corrected blocks through CPLD_2 in both serialized clock and data format, S_DDATAB, S_DCLK, and parallel format to the USER_DDATAB bus on JP2.

Figure 1: Block Diagram



USER INTERFACE SOFTWARE

Configuration of the board is through the Windows Graphic User Interface software included with the evaluation board. The software allows the user to configure the encoder and decoder operations in terms of type of TPC codes used, synchronization word, framing, and other control parameters. The software also allows the user to monitor the evaluation board for error correcting status information via the RS232 port connection.

LOOP BACK TEST MODES

Built in loop back modes are provided that internally connect the encoded output data to the decoder input interface. This loop back testing allows on-board BERT testing with random data pattern generation.

ABOUT AHA

Comtech AHA Corporation (AHA) develops and markets superior integrated circuits, boards, and intellectual property core technology for communications systems architects worldwide. AHA has been setting the standard in Forward Error

Correction and Lossless Data Compression technology for many years and provides flexible, cost-effective solutions for today's growing bandwidth and reliability challenges. Comtech AHA Corporation is a wholly owned subsidiary of Comtech Telecommunications Corp. (NASDAQ: CMTL). For more information, visit www.aha.com.

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
AHA4540-EVB	AHA4540 Evaluation Board



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