TDM EC 5510

TDM Echo Canceller Chip Application

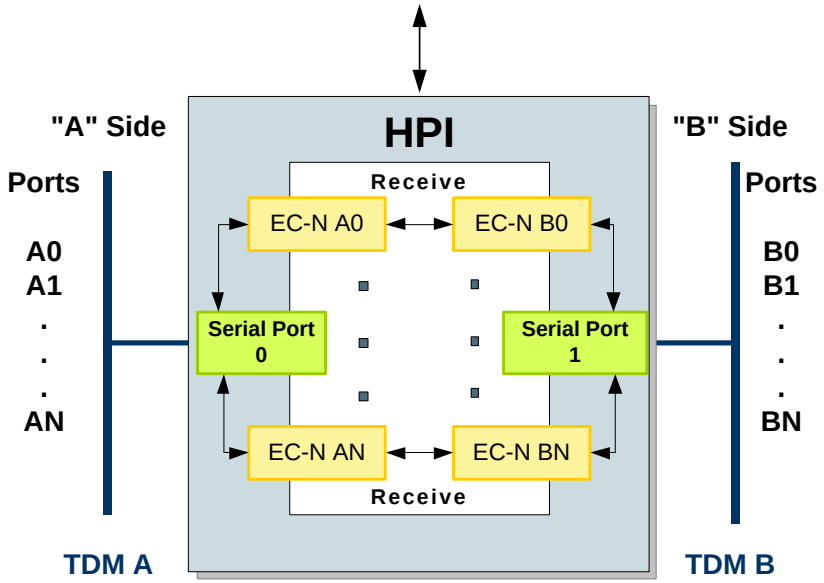
TARGET APPLICATIONS

TDM Time Slot Interchanging

TDM Echo Canceller

OVERVIEW

Adaptive Digital's TDM EC C5510 product combines Adaptive Digital's G.PAK DSP software plus host API along with Texas Instruments TMS320C5510 DSP to form a turnkey soft-chip used as the line/network echo canceller equipment.



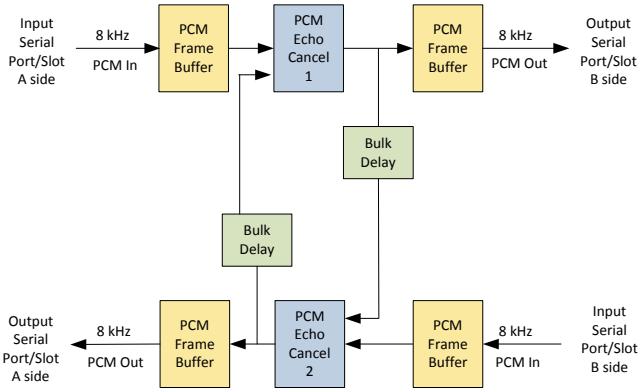
EC Chip Block Diagram

SOFTWARE FEATURES

- Bi-directional TDM-to-TDM channels
- G168 Echo Cancellers(AT&T Certified)
- McBSP port configuration

Optional Software Features

- Tone Detection
- Tone Generator

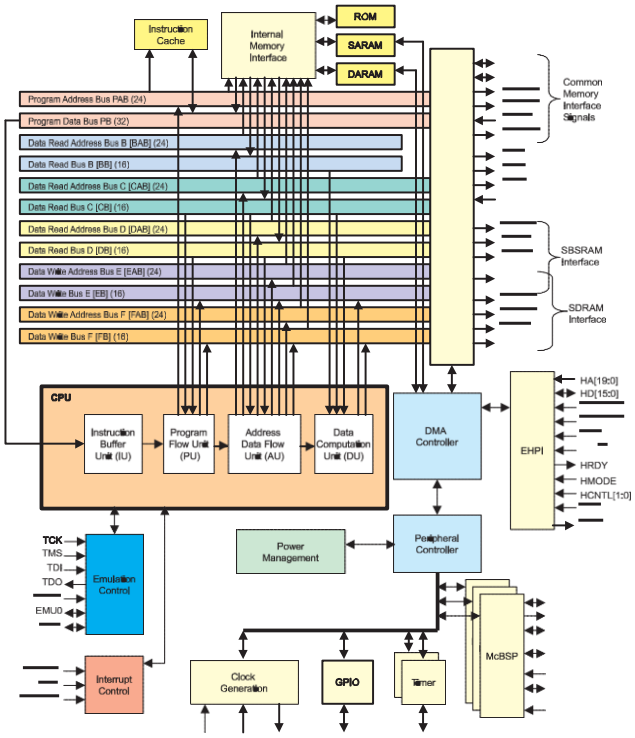


TDM to TDM channel Diagram

HARDWARE FEATURES

The TMS320VC5510/5510A (5510/5510A) fixed-point digital signal processors are based on the C55x DSP generation CPU processor core, with high performance and low power through increased parallelism and total focus on reduction in power dissipation.

- Instruction Cache (24K Bytes)
- 160K x 16-Bit On-Chip RAM
- 8M × 16-Bit Maximum Addressable
- External Memory Space (EMIF, SDRAM, etc)
- On-Chip Peripherals
    - 20-Bit Timers
    - DMA Controller
    - Multichannel Buffered Serial Ports (McBSPs)
    - 16-Bit Parallel Enhanced Host-Port Interface (EHPI)
    - Programmable DPLL Clock Generator



ADDITIONAL HARDWARE FEATURES

- On-Chip Peripherals

  Eight General-Purpose I/O (GPIO) Pins and Dedicated General-Purpose Output (XF)

PRODUCT OVERVIEW

A system built with TDM EC C5510 consists of a host control processor connected to one or more DSPs loaded with the TDM EC C5510 echo canceller firmware. The host processor controls the operation of the echo canceller DSP. The DSP supports up to 32 full-duplex TDM streams. Each TDM stream can be configured to cancel in one direction or in both directions. Furthermore, each TDM stream is independently configurable.

SPECIFICATIONS

Application	Product Number/Silicon	Channel Count	Description
Echo Canceller Chip	TMS320VC5510/200Mhz	32/24 depends on EC's configuration	G.168 EC @ 128 msec.

DETAILED DESCRIPTION

ADT TDM EC 5510 provides full duplex channels used to transfer PCM data between TDM slots. Each channel inputs 8 kHz PCM samples from a serial port time slot and buffers as many samples as needed to perform echo cancellation. When enough samples are buffered, the PCM input data is passed through the echo canceller and again buffered for output. The buffered output samples are then delivered to a TDM slot.

Although echo cancellation can be configured in both directions, most applications require echo cancellation in only one direction. This can be configured when the channel is set up.

A single-direction echo canceller is depicted in the diagram below. The Echo Canceller only runs on the direction from A to B. In this case, the signal from B to A can be routed directly around DSP by the controller, but the signal from B to A side is still fed into the B input serial port for the use by echo canceller A.

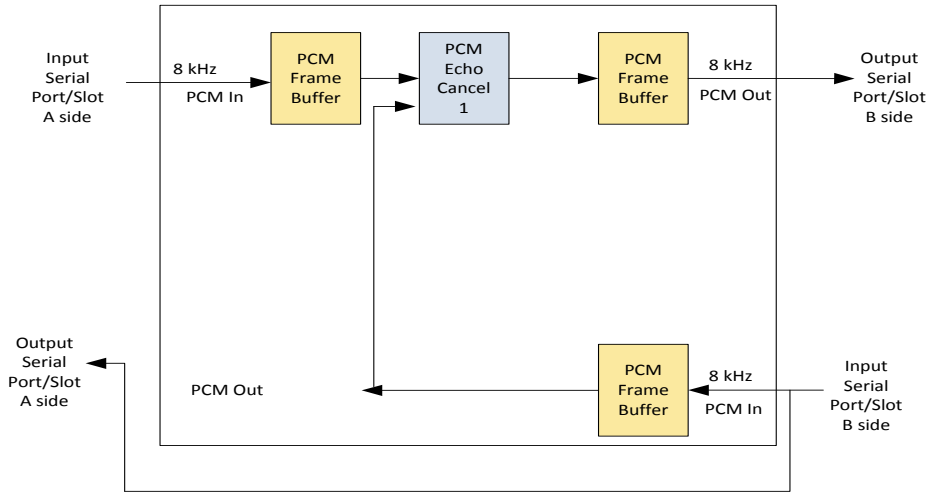


Figure 3: **TDM to TDM Channel, bypass B-to-A direction DSP' s output**

The host processor typically controls the TDM EC 5510 via either the host port interface.
The major components in the TDM EC chip 5510 include echo cancellation, voice quality enhancement algorithms, and telephony algorithms. Port Configuration, Channel setup (identification of input and output ports, and optional algorithms), and teardown operations are controlled by the host processor using a set of EC chip 5510 API functions.

Channel Types

The TDM EC 5510 software supports TDM to TDM channel type, typically associated with one of the following types of telephone interfaces:

- FXO
- FXS
- T1/E1 time slot (DS0)

HOST API

The TDM EC 5510 APIs are the interface between a user's application program and EC 5510 DSP cores. The APIs execute in a host control processor connected to the DSP via either Ethernet or the DSP's Host Port Interface (HPI). The APIs support multiple DSP cores/chips and use a DSP Identifier to select a particular core. The association between a DSP Identifier and a particular DSP core/chip is made by the user modified TDM EC 5510 support functions.

The APIs are provided as ANSI "C" source code. The APIs will work with any host application regardless of the operating system being used.

REFERENCES

1. Adaptive Digital Technologies G168_C55X_UsersGuide
2. Texas Instruments TMS320VC5510/5510A Fixed-Point Digital Signal Processor (SPRS076O)

Deliverables

The deliverable items are platform dependent. In general, there is a single DSP-downloadable binary image along with host API software in C source code format. Also included in the deliverables is product documentation, which includes a users guide and usually includes release notes. Sample/test code may be included as well.

Adaptive Digital is a member of the Texas Instruments Developer Network, and ARM Connected Community.

CONTACT INFORMATION

Web: www.adaptivedigital.com
Email: information@adaptivedigital.com
Tel: 610.825.0182 ~ Toll Free: 1.800.340.2066
Fax: 610.825.7616
Address: 525 Plymouth Road, Suite 316
Plymouth Meeting, PA 19462