

MDGW – C6424

Medium Density Gateway

TARGET APPLICATIONS

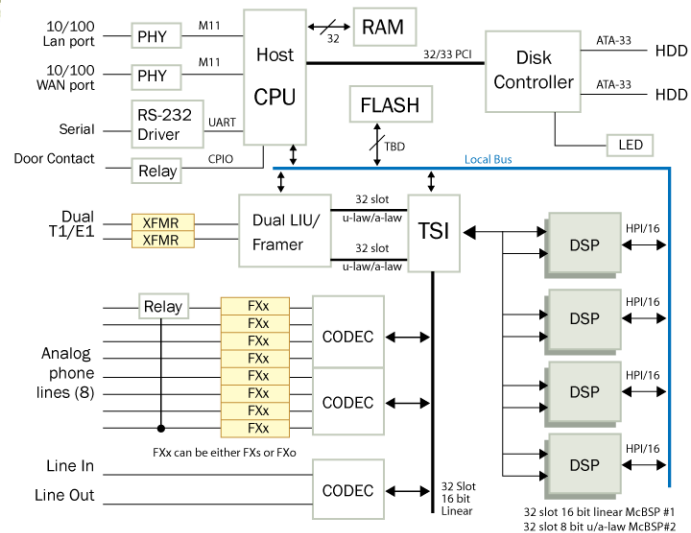
IP PBX/Gateway

*IP and/or TDM
Conferencing*

VoIP Transcoding

OVERVIEW

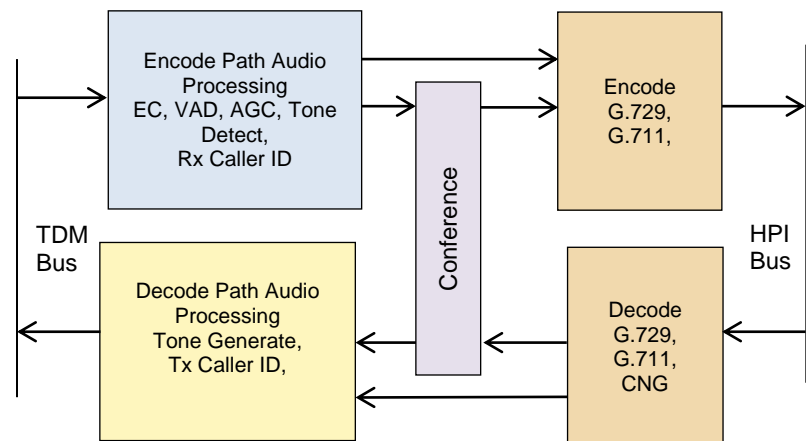
*Adaptive Digital's Medium
Density Gateway product is a
complete business telephone
system solution which
combines Adaptive Digital's
field proven DSP software with
Texas Instruments' high
performance C6472 DSP to
form a turnkey soft-chip for use
in media gateway and PBX
equipment.*



Chip Block diagram

SOFTWARE FEATURES

- G.711 with appendices 1(Packet Loss Concealment) and 2 (silence suppression, voice activity detection (VAD), discontinuous transmission (DTX), and comfort noise generation (CNG))
- G.729 AB
- DTMF, MFR1 Tone Detect
- Call Progress Tone Detect
- CED, CNG Tone Detect
- Automatic Gain Control (AGC)
- G.168 EC
- Call Progress Tone Generation
- Conference
- Tx and Rx Caller ID



Software Block diagram

Optional Software Features

- T-38 Fax Relay
- Tone Relay
- G.723.1A
- G.726
- G.728
- Conferencing
- Transcoding
- GSM AMR
- MELP
- RTP payload formatting, Jitter Buffer

HARDWARE FEATURES

- High-Performance
 - 400-/500-/600-/700-MHz, C64x+™ Clock Rate
 - Eight 32-Bit C64x+™ Instructions/Cycle
 - 2.5-, 2-, 1.67-, 1.43-ns Instruction Cycle Time
- 16-Bit Host-Port Interface (HPI)
- Enhanced Direct-Memory-Access (EDMA)

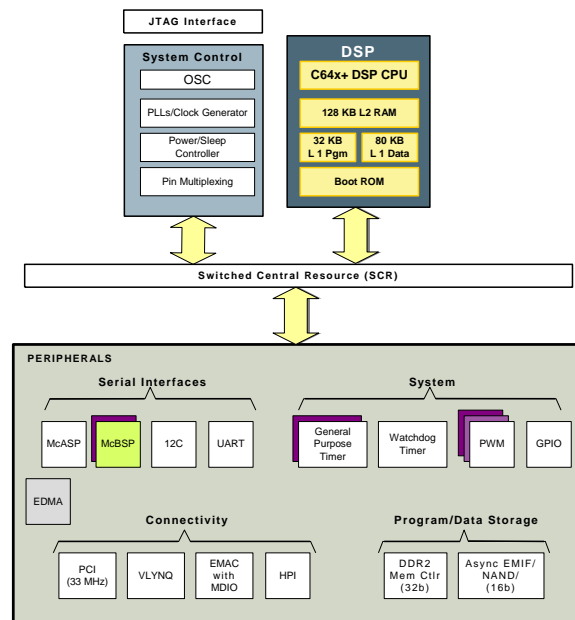
Controller

(64 Independent Channels)

- C64x+ L1/L2 Memory Architecture
- Two Multichannel Buffered Serial Ports
- 10/100 Mb/s Ethernet MAC (EMAC)
- Multichannel Audio Serial Port (McASP0)
- IEEE-1149.1 (JTAG™) Boundary-Scan-Compatible

- On-Chip ROM Bootloader
- Up to 111 General-Purpose I/O (GPIO) Pins
- Port count: 64
- 3.3-V and 1.8-V I/O, 1.2-V Internal
- 3.3-V and 1.8-V I/O, 1.05-V Internal
- 2 64-bit timers

The MDG-C6424 solution is based upon the TI TMS320C6424 DSP. The C6424 device is based on the third-generation high-performance, advanced VelociTI™ very-long-instruction-word (VLIW) architecture developed by Texas Instruments (TI), making these DSPs an excellent choice for digital signal processor applications.



Hardware Block diagram

ADDITIONAL HARDWARE FEATURES

- 64-bit Watchdog Timer
- 2 UARTS
- 1 I2C Bus Controller
- 1 McASP
- 32-bit PCI Interface
- 3 PWM outputs
- VLYNQ Interface

PRODUCT OVERVIEW

The MDG-C6424 is a complete business telephone system solution that provides all of the essential voice quality features needed to create sophisticated telephony equipment, including Adaptive Digital's field proven algorithms, DTMF detect, and conferencing. These features, in conjunction with our AT&T certified echo canceller ensure maximum voice quality.

SPECIFICATIONS

Application	Product Number/Silicon	Channel Count	Description
PCM VoIP Gateway / PBX	TMS320C6424V / 600 MHz	35 G.711	G.711, AGC, VAD/CNG, Tone detection, Tone Generation, G.168 EC @ 128 msec, Caller ID, 4 Conferences with up-to 30 members per conference

Application	Product Number/Silicon	Channel Count	Description
LBR VoIP Gateway / PBX	TMS320C6424V / 600 MHz	15 G.729AB, 20 G.711	G.729AB, G.711, AGC, VAD/CNG, Tone detection, Tone Generation, G.168 EC @ 128 msec, Caller ID, 4 Conferences with up-to 30 members per conference

DETAILED DESCRIPTION

A VoIP gateway acts as a bridge between traditional telephone equipment and VoIP equipment. Traditional telephone interfaces include both analog (FXS and FXO), and digital (PCM, T1/E1 DS0). These interfaces can be found in the PSTN (Public Switched Telephone Network), PBX (Private Branch Exchange) equipment in business offices, and in residential telephone equipment. Gateways enable users of traditional telephone equipment to make use of the benefits of VoIP. Without gateways, it is impossible for VoIP equipment to place calls to users of traditional telephone equipment. Stated differently, without VoIP gateways, traditional telephone equipment and VoIP equipment could not co-exist.

By performing functions such as voice and fax compression, decompression, packetization, call routing and control signaling, a VoIP gateway enables the data infrastructure to handle voice and fax applications.

A VoIP Gateway usually consists of a host control processor connected to one or more MDG-C6424 chips. The host processor typically controls the MDG-C6424 via the host port interface. Voice packets can be routed between the network and the MDG-C6424 chip via the control processor. The MDG-C6424 chip connects to the TDM interface via the chip's TDM serial port.

The major components in the Media Gateway chip include vocoders, echo cancellation, voice quality enhancement algorithms, and telephony algorithms. The MDG-C6424 chip supports a number of channel types: TDM to Packet, Packet to Packet, TDM to Conference, Packet to Conference, and Conference Composite. Channel setup (identification of input and output ports, vocoders, and voice algorithms), conference setup, and teardown operations are controlled by the host processor using a set of IPG-C6424 API functions.

Channel Types

There are several types of channels: TDM to Packet, Packet to Packet, TDM to Conference, Packet to Conference, and Conference Composite.

A TDM channel is typically associated with one of the following types of telephone interfaces:

- FXO
- FXS

- T1/E1 time slot (DS0)

Each channel in a DSP is dynamically setup as any type. Frame sizes, vocoder types, and tone detection types are selected when a channel is setup.

All channels (except for the conference composite channel type) are designed to operate as full duplex channels. A full duplex channel may be configured to operate as a half duplex by setting the end points of one-half of the full duplex channel to NULL end-points.

HOST API

The MDG-C6424 APIs are the interface between a user's application program and MDG-C6424 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 MDG-C6424 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 [PRODUCT] Users Guide
2. Texas Instruments [TMS320C6424] Fixed-Point Digital Signal Processor (literature number [SPRS347C])

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.

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