

## Flash TAD Chips for all Digital Telephone Answering Devices with True FULL Duplex SpeakerPhone™ and Caller ID Detection

### General Description

The D6471A/B/C chips are digital speech/signal processing subsystems that implement all functions of TRUESPEECH® speech compression and voice prompts, telephone line signal processing, flash memory management, and True FULL Duplex SpeakerPhone for an all digital answering machine. The D6471A/B/C are fully controlled by the system Host through a simple interface protocol. The Host processor provides activation and control of all system functions, such as speech recording and playback, DTMF and call progress tone detection, DTMF and tone generation, and voice prompting.

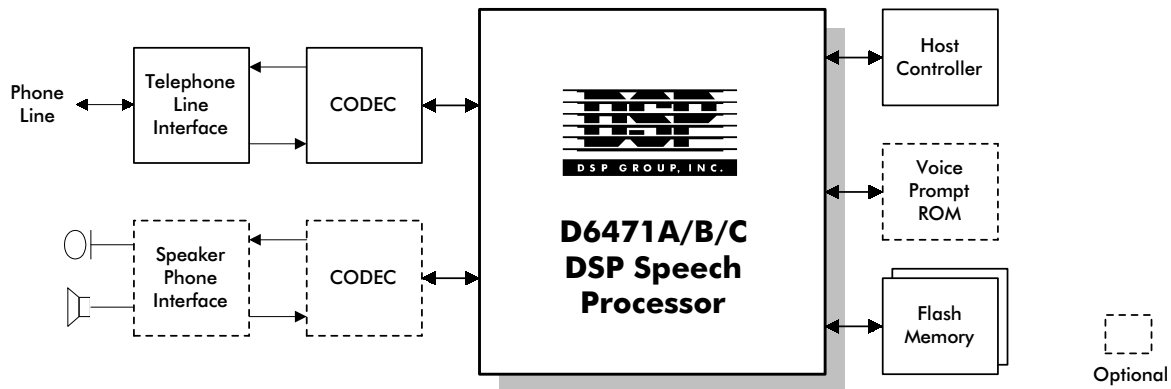


Figure 1. D6471A/B/C System Block Diagram

### Key Features

- High-quality, new super low rate TRUESPEECH digital speech compression allowing 25-27 minutes of recording time per each 4 Mbit Flash Memory
- Flexible storage of incoming messages (ICM) and outgoing messages (OGM), supporting multiple OGMs and multiple mailboxes
- TRUESPEECH natural-sound voice prompting for Day/Time stamp and voice instructions
- DTMF generation and detection with near-end echo cancellation for superior performance
- FLEXISPEECH variable speed, natural sound playback (50% - 200%)
- Supports "offset playback" for jumps within a message
- Supports 4 Mb or 16 Mb Flash Memory Devices: Samsung KM29N040\*, KM29N1600T\*\* and KM29N16TS
- True FULL Duplex SpeakerPhone with both acoustical and near-end echo cancellation
- Caller ID and Call Waiting CID detection (D6471C fully supports both Bell 202 and V.23)
- Programmable sensitivity of the DTMF, VOX, and CPT detectors
- Digital volume control
- Selectable Slave or Master Codec mode (D6471B only)
- 8 KHz sampling rate (D6471B only)
- $\mu$ -law codec support
- A-law codec support (D6471B/C only)
- Extended DTMF detection (A, B, C, D) (D6471B/C only)
- Supports time stamp (message tag) modification (D6471C only)

\* May have up to 3 bad sectors

\*\* May have up to 10 bad sectors

## Device Configuration and System Components

### STANDARD COMPONENTS

- D6471A/B/C-11 Digital Telephone Answering Device (TAD) processor (80-pin PQFP) — 1

### ADDITIONAL SYSTEM COMPONENTS

These are supplied by the customer according to DSP Group's specifications

- Codec — 1, 2 for SpeakerPhone

One of the following:

- Samsung KM29N040 (44-pin TSOP II) 4 Mb per device\*, up to four devices per system, or
- Samsung KM29N1600T (44-pin TSOP II) 16 Mb, single device, or
- Samsung KM29N16TS (44-pin TSOP II) 16 Mb, single device

\* Optionally, the system will support a 64K x 8 EPROM/ROM (access time 300 ms or less) for voice prompt storage. This option is only available in systems with a single 4 Mbit Flash memory device or, for D6471B/C, without Flash.

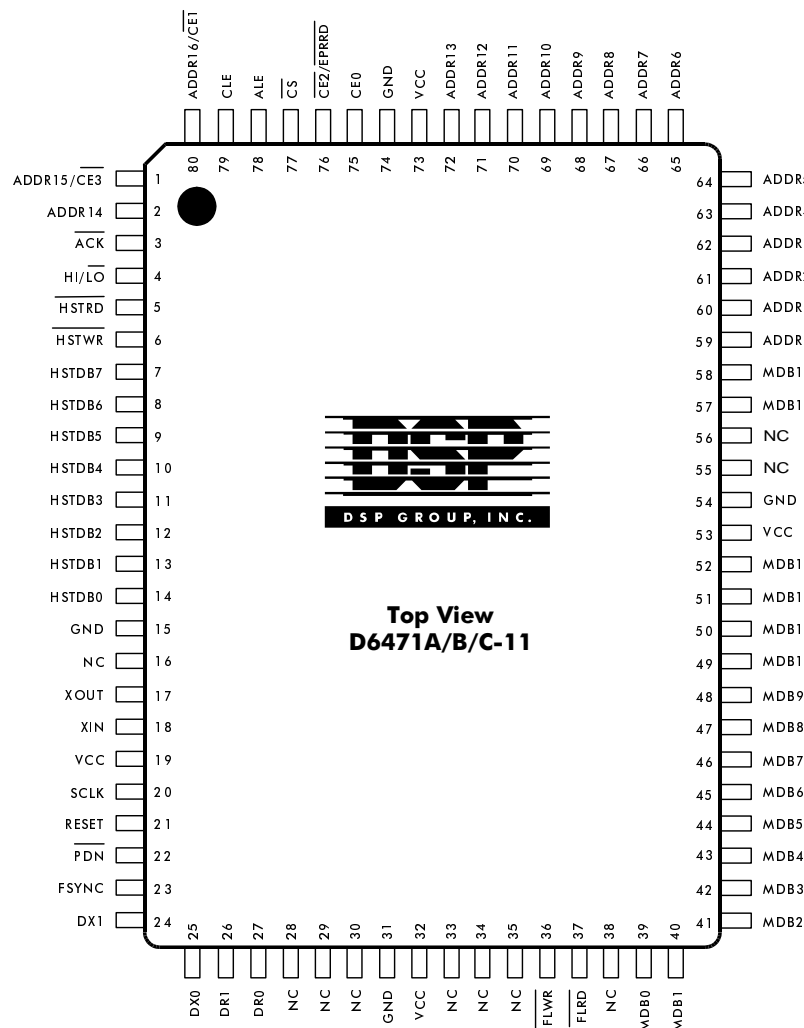


Figure 2. D6471A/B/C-11 Pin Diagram

## System Functions

All of the speech and signal processing tasks are done by the D6471A/B/C. This allows the use of a very low cost microcontroller to be used for basic control of the system. The Host needs to send high level commands to perform functions such as Record Message, Playback, or Delete Message. The operation is performed by the D6471A/B/C which reports the status of the operation to the Host. All memory interface and management is performed by the DSP, requiring the Host to only handle control functions. A summary of the functions performed by the D6471A/B/C and Host Controller are shown in Figure 3, below.

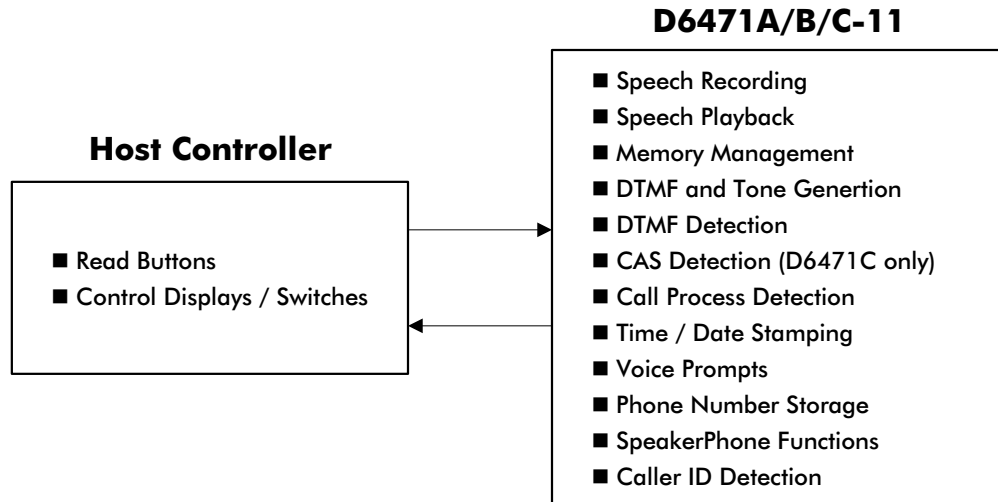


Figure 3. System Functions

## Simple Hardware Interface

The hardware interface between the D6471A/B/C and the Host Controller is simple, requiring only an 8-bit parallel port and 4 handshake lines. The Host writes high level commands to the D6471A/B/C, and the D6471A/B/C responds with status information. Once a command is issued, the D6471A/B/C uses the ACK pin to acknowledge the command and indicate that the status is available to be read. The hardware interface between the D6471A/B/C and Host is shown in Figure 4 below.

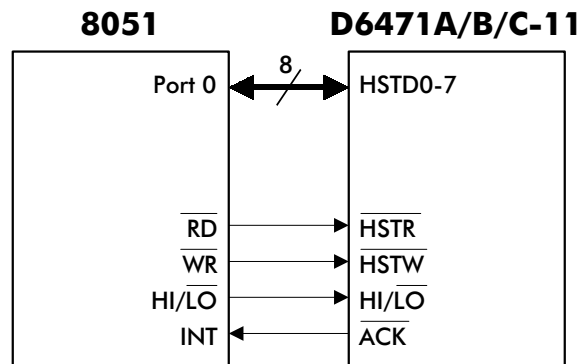


Figure 4. D6471A/B/C - Host Interface

## Benefits of the D6471A/B/C

- Super Low Rate TRUESPEECH digital speech compression reduces the memory requirement or makes more recording time available in your design.
- Flash Memory support.
  - Allows use of readily available memory.
  - Reduces the system cost by eliminating the need for battery back-up in power failure situations.
  - Allows storage of voice prompts in Flash memory eliminating the need for external ROM.
- Allows flexibility in design for features such as multiple mailboxes and multiple OGM's, enabling the design of a product that is truly a Personal Voice Mail System.
- The Host-selectable sensitivity of the DTMF, VOX, and CPT detectors makes for flexibility in design for various countries and different applications.
- The Caller ID and, in the D6471C, Call Waiting CID features eliminates the need for any extra components to include these increasingly important feature in your design.
- TRUESPEECH natural sounding voice prompts and time/date stamping allow design of a high quality and professional sounding product.
- The True FULL Duplex SpeakerPhone capability allows a professional sounding speakerphone to be added to your product with very minimal additional cost.

	D6471A	D6471B	D6471C
<b>CID</b>	■	■	■
<b>Call Waiting CID</b>			■
<b>Sampling Rate</b>	7.2	8	7.2
<b>Master/Slave</b>		■	
<b>A-law codec support</b>		■	■
<b>μ-law codec support</b>	■	■	■
<b>Record time (minutes)</b>	25-27	22-24	25-27



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