Hands Free Chip for Car Kit and all Digital Telephone Answering Devices with Speech Recognition, True FULL Duplex SpeakerPhone®, and Caller ID Detection

General Description

The D6487A 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 D6487A 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.

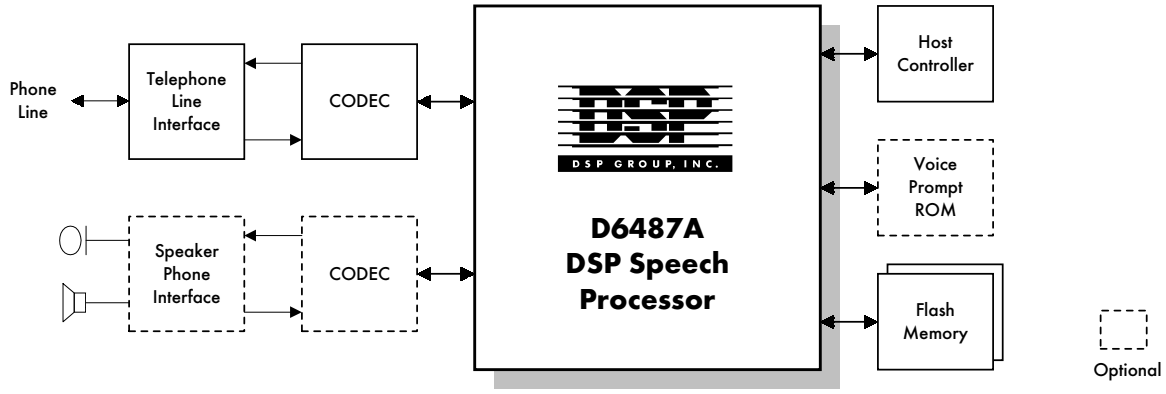

Figure 1. D6487A System Block Diagram

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 and KM29N1600
- True FULL Duplex SpeakerPhone with both acoustical and near-end echo cancellation
- Speaker-dependent speech recognition, supports multiple users in noisy environments with high recognition rate (>97%; eight speakers)
- Caller ID, CID on call waiting (Bell 202 and V.23)
- Programmable sensitivity of the DTMF, VOX, CAS, and CPT detectors
- Digital volume control
- Selectable Slave or Master Codec mode, 8 KHz sampling rate
- µ-law and A-law codec support
- Extended DTMF detection (A, B, C, D)
- 3.3V or 5V operation
- Supports time stamp (message tag) modification
- DTMF, CPT, and CAS detection in SpeakerPhone mode

Device Configuration and System Components

STANDARD COMPONENTS

- D6487A-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 KM29N1600 (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 D6487A, without Flash.

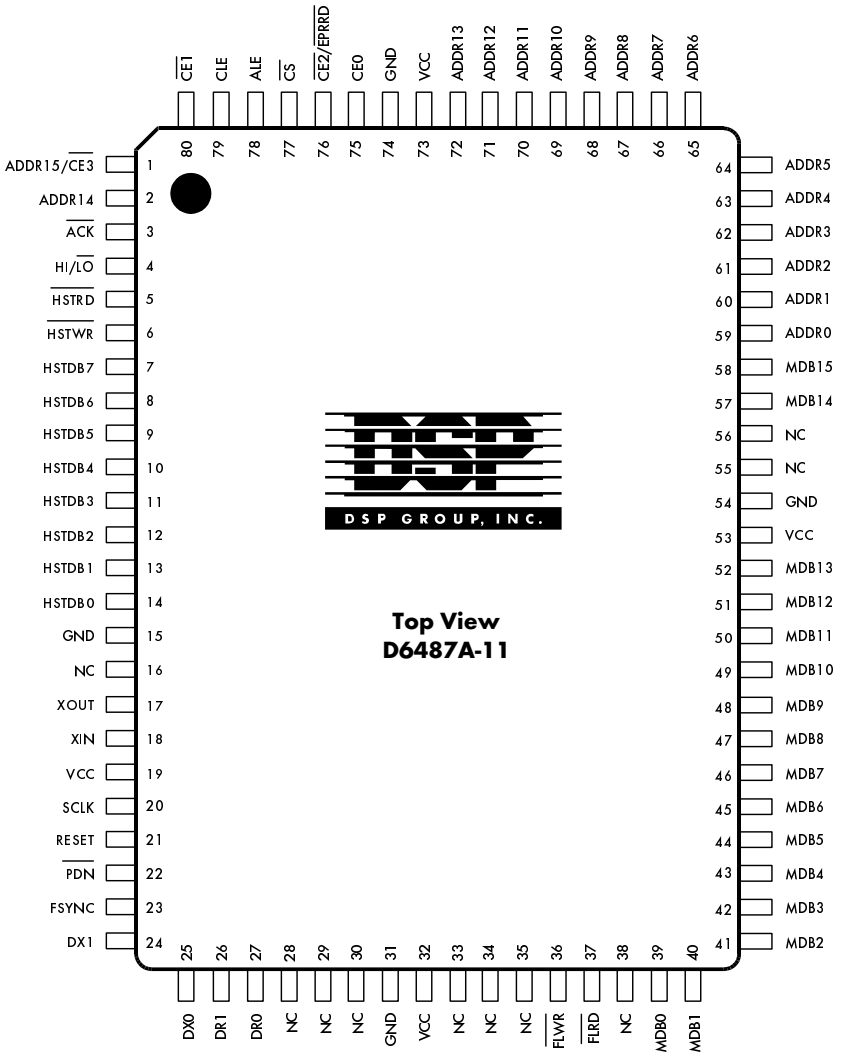

Figure 2. D6487A-11 Pin Diagram

System Functions

All of the speech and signal processing tasks are done by the D6487A. 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 D6487A 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 D6487A and Host Controller are shown in Figure 3, below.

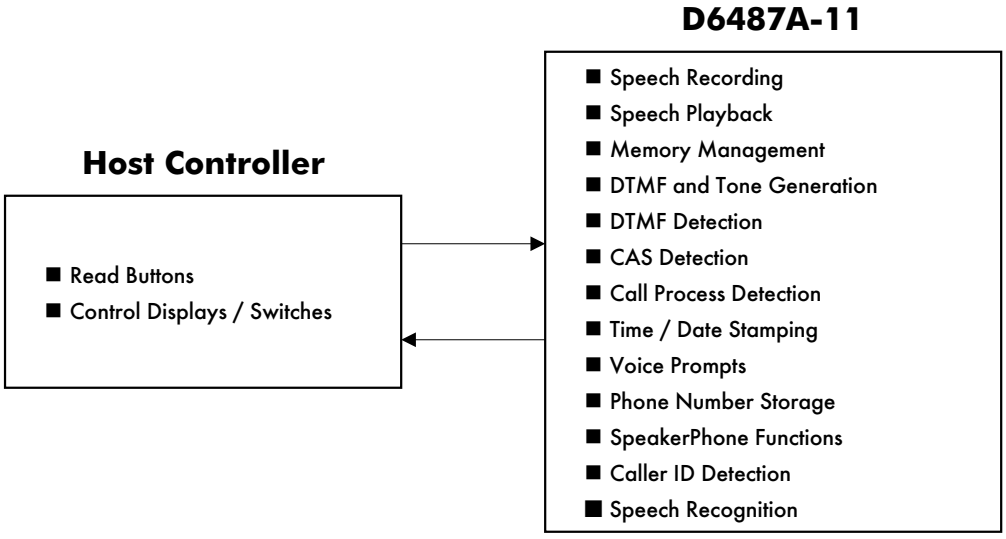

Figure 3. System Functions

Simple Hardware Interface

The hardware interface between the D6487A 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 D6487A, and the D6487A responds with status information. Once a command is issued, the D6487A uses the ACK pin to acknowledge the command and indicate that the status is available to be read. The hardware interface between the D6487A and Host is shown in Figure 4 below.

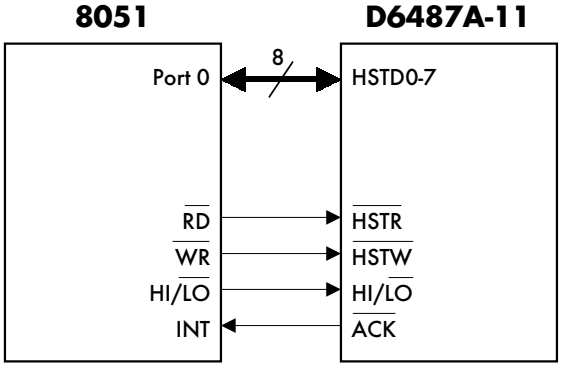

Figure 4. D6487A - Host Interface

Benefits of the D6487A

- 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, CAS, and CPT detectors makes for flexibility in design for various countries and different applications.
- The Caller ID and Caller ID on Call Waiting features eliminates the need for any extra components to include these increasingly important feature in your design.
- Speaker Dependent Speech Recognition
  - — Allows totally "hands free" voice activated systems for car kits, telephone answering machines, hand held devices.
  - — Unique combination of speech recognition, full duplex speaker phone and other telephony functions on a single chip.
  - — Robust recognition in car, home and office environments.
- 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.

DSP Group, Inc.:
3120 Scott Boulevard
Santa Clara, CA 95054
Tel: (408) 986.4300
Fax: (408) 986.4490
http://www.dspg.com

DSP Group Europe:
18 rue de l'effort mutuel
91300 Massey
France
Tel: (33) 6.0768.6754
Fax: (33) 1.6010.5187

Nihon DSP Group, K.K:
Yasuda Kasai Building – 2nd Floor
2-3-1 Higashi Gotanda
Shinagawa-Ku, Tokyo 141
Japan
Tel: (81) 3.3449.7851
Fax: (81) 3.3449.8006

DSP Solutions, LTD:
Unit 1923, 19/F Metro Centre 1
32 Lam Hing Street, Kowloon Bay
Kowloon, Hong Kong
Tel: 852.2750.7325
Fax: 852.2305.0640

DSP Technology, LTD:
#A-1216, Champs-Elysse Center
889-5, Daechi-Dong, Kangnam-Ku
Seoul, 135-280, Korea
Tel: 822.554.7494
Fax: 822.554.7495

DSP Application, LTD:
12F-12, 79, Hsin Tai Wu Road, Sec. 1
Hsi Chih, Taipei Hsien
Taiwan, R.O.C.
Tel: 886.2.698.4320
Fax: 886.2.698.4133

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