

ISD-T360SB

Version B

VoiceDSP™ Digital Speech Processor with Full-Duplex Speakerphone, Master/Slave CODEC Interface and Multiple Flash Support

Note: this document is an addendum to the ISD-T360SB datasheet and only reviews the new features/enhancements provided by the ISD T-360SB(B) release. For complete product information, please refer to the ISD-T360SB datasheet dated May 2000.

The VoiceDSP™ product family combines multiple digital signal processing functions on a single chip for cost-effective solutions in telephony, automotive and consumer applications.

The VoiceDSP processor offers features necessary to modern telephony products, such as: high-quality speech record and playback, electrical and acoustic echo cancellation for full-duplex hands-free speakerphone operation.

The ISD-T360SB Version B VoiceDSP can be used in various applications:

- In digital telephony with add-on speech processing: Digital Telephone Answering Machines (DTADs), hands-free speakerphone operation for ISDN, DECT, Digital Spread Spectrum, and analog cordless applications, CT0/1Base stations.
- As an add-one chip for corded telephones featuring DTAD functions and/or full-duplex, hands-free speakerphone operation.
- In digital voice recorders (DVR) with longer duration recording.
- As a full-duplex speakerphone chip in conference room speakerphone devices and in cell phone desk top chargers/cradles.
- As an stand-alone digital answering machines with full-duplex, hands-free speakerphone operation
- Voice memo recording
- In Automotive applications employing full-duplex speakerphone operations for hands-free, in-car communications, and for car status and information announcements.

Based on ISD's unique concept, which combines 16-bit DSP (Digital Speech Processor) and 16-bit RISC core technology, the ISD-T360SB (version B) is a high-performing chip solution for various applications. To facilitate incorporating the VoiceDSP processor, it features system support functions such as an interrupt control unit, codec interface (master, slave), Microwire interface to the system microcontroller, as well as a memory handler for Flash memory devices. Design of high-end, price-optimized systems are possible with ISD's VoiceDSP flexible system interfaces (codec, microcontroller and memory management support).

The ISD-T360SB (version B) processor operates as a peripheral controlled by the system microcontroller via an enhanced, serial Microwire interface. The system microcontroller typically controls the analog circuits, buttons and display, as well as activates functions through commands. The VoiceDSP executes these commands and returns status information to the Microcontroller.

The VoiceDSP software resides in the on-chip ROM. It includes DSP-based algorithms, system support functions and a software interface to hardware peripherals.

New Features at a Glance

DTAD Management

- Up to approximately four hours speech recording on a 64-Mbit Flash (maximum of 16 hours recording using four 64-Mbit Flash devices)

Memory

- Supports up to four 4-Mbit, four 8-Mbit, four 16-Mbit, four 32-Mbit devices or four 64-Mbit Flash devices from Samsung
- Supports up to four 64-Mbit Flash devices from Toshiba

New Features in the ISD-T360 Version B

- New tunable parameters:
 - EDET_AGC_SHIFT INDEX (103)
Defines the Automatic Gain Control of the tone detection algorithm. Adding 1 to this parameter improves the tone detection dynamic range by 6dB. The default value is -37dBm level from the T360 codec inputs.

Legal values: 0 to 3
Default value: 1
 - FLASH_BLOCK_SIZE INDEX (104)
This tunable parameter is used to configure the T360SBB to work with the correct block size. When using the 4M/8M/16M flash devices, the value should be 4096. When using the 32M/64M flash devices, the value should be 8192.

Legal values: 4096 or 8192
Default value: 4096
- Changed tunable parameters:
 - NUM_OF_BLOCK_IN_MEM INDEX (62)
This tunable parameter should be used with 8M/16M/32M/64M flashes.
Legal Values:

Flash Device Size (Mbits)	Legal Values
4	128
8	256
16	512
32	512
64	1024

Default value: 128

- Updated microwire command parameter:

An internal parameter '0' was added to the PLAY command and this requires new parameters to be added to the end of the command. For example, if the current message is undefined, ERR_INVALID is reported:

P			
Byte sequence:	Microcontroller	03	00
	Voice DSP	03	00
Description:	Play the current message		

- Updated flash support:

The ISD-T360SB version B may be connected to up to four flash devices, resulting with maximum recording storage of 64-Mbit * 4 = 256M-bit (up to 16 hours of recording time).

The following flash devices are supported :

Supported Flash Devices

Manufacturer	Memory Device Name	Characteristics	Operating Voltage	Memory Size
Samsung	K9F4008W0A	512K*8	3.0V – 5.5V	4-Mbit
Samsung	K9F8008W0M	1M*8	2.7V – 5.5V	8-Mbit
Samsung	K9F1608W0A	2M*8	2.7V – 5.5V	16-Mbit
Samsung	K9F3208W0A	4M*8	2.7V – 5.5V	32-Mbit
Samsung	K9F6408U0A	8M*8	2.7V – 3.6V	64-Mbit
Toshiba	TC58V64AFT	8M*8	3.0V – 3.6V	64-Mbit

- Added new tunable parameter to configure the T360SB version B to work with the correct block size. Tunable 104: FLASH_BLOCK_SIZE and it should be used with 32Mbit and 64Mbit devices. The tunable parameter number 62: NUM_OF_BLOCK_IN_MEM should be changed when using the 8Mbit, 16Mbit, 32Mbit and 64M flash devices. Note: that tunable parameters 62 and 104 should be set to their values before sending the INIT command to the VoiceDSP processor.

The following table describes the number of blocks and block size of flash devices supported to be configured by the above tunable parameters:

Number of blocks and block size of flash devices supported

Manufacturer	Memory Device Name	Number of Blocks (Tunable # 62)	Block Size (Tunable # 104)	Memory Size
Samsung	K9F4008W0A	128	4096	4-Mbit
Samsung	K9F8008W0M	256	4096	8-Mbit
Samsung	K9F1608W0A	512	4096	16-Mbit
Samsung	K9F3208W0A	512	8192	32-Mbit
Samsung	K9F6408U0A	1024	8192	64-Mbit
Toshiba	TC58V64AFT	1024	8192	64-Mbit

The following table describes the total recording time for all flash devices supported:

Total Recording Time		
Memory Size	Compression Rate	Total Recording Time
4 Mbit	4.7 Kbit/s	14.5 Minutes
4 Mbit	6.7 Kbit/s	10.2 Minutes
4 Mbit	8.7 Kbit/s	7.8 Minutes
8 Mbit	4.7 Kbit/s	29.1 Minutes
8 Mbit	6.7 Kbit/s	20.4 Minutes
8 Mbit	8.7 Kbit/s	15.7 Minutes
16 Mbit	4.7 Kbit/s	58.1 Minutes
16 Mbit	6.7 Kbit/s	40.8 Minutes
16 Mbit	8.7 Kbit/s	31.4 Minutes
32 Mbit	4.7 Kbit/s	116.2 Minutes
32 Mbit	6.7 Kbit/s	91.5 Minutes
32 Mbit	8.7 Kbit/s	62.8 Minutes
64 Mbit	4.7 Kbit/s	232.4 Minutes
64 Mbit	6.7 Kbit/s	183 Minutes
64 Mbit	8.7 Kbit/s	125.6 Minutes

For flash memory initialization time, refer to the ISD-T360SB Version B release letter for details.

Bug fixes and Features Removed in the ISD-T360SBA Version B

- Refer to the ISD-T360SB Version B release letter for details of all bug fixes and feature removals.