TEKMOS TK9092 Codec

(v1.0) June 24, 2026 Product Brief

Description

The Tekmos TK9092 is a replacement of the Mitel MT9092. This device is a fully integrated digital telephone circuit that includes a built-in HDLC data formatter. It converts voice-band analog signals to digital PCM and back using a switched-capacitor Filter/Codec. This Filter/Codec employs a differential architecture to deliver low-noise performance across a wide dynamic range while operating from a single 5V supply.
A Digital Signal Processor (DSP) enables hands-free speakerphone functionality. The DSP also generates tones such as DTMF, ringer, and call progress signals, and manages audio gain levels. Internal registers are accessed via a serial microport compatible with Intel MCS-51™ specifications.

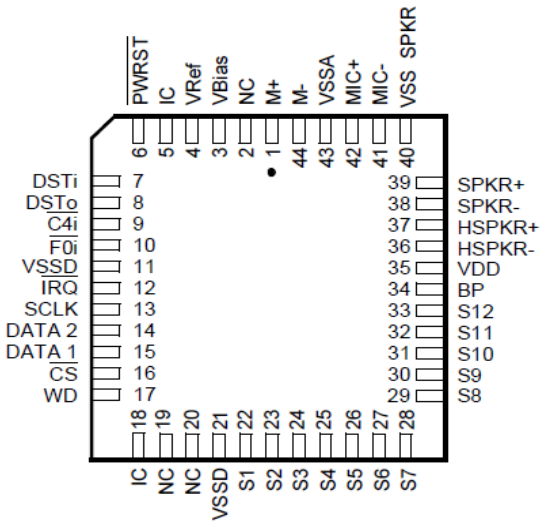
Features

- **Programmable Codec and Filters**:
  - Supports μ-Law and A-Law companding.
  - CCITT (G.711) and sign-magnitude coding options.
  - Programmable transmit, receive, and side-tone gains.
- **DSP-Based Functionalities**:
  - Speakerphone switching algorithm for hands-free operation.
  - DTMF and single-tone generation.
  - Tone ringer generation.
- **Audio and Transducer Interfaces**:
  - Differential interface to telephony transducers.
  - Differential audio paths for low noise and wide dynamic range.
- Analog/Digital and Digital/Analog conversion of audio signals.
- **Power Supply**:
  - Operates on a single 5V power supply.
- **HDLC Data Formatting**:
  - X.25 Level 2 HDLC data formatting for D-Channel operation.
  - Buffered access with 19-byte FIFOs for transmit and receive.
- **Microcontroller Compatibility**:
  - Serial microport compatible with Intel MCS-51 specifications.
  - Programmable parameters accessible via microcontroller port.
- **Additional Features**:
  - Local tone generation for network-quality DTMF and single tones.
  - LCD driver with 12 segment outputs for call progress indicators.
  - On-chip watchdog timer for program integrity.

Applications:

- **Digital Telephone Sets**:
  - Fully featured sets with speakerphone and tone generation capabilities.
- **Cellular Phone Sets**:
  - Integration of digital audio processing and HDLC data formatting.
- **Local Area Communication Stations**:
  - Suitable for proprietary signaling protocols in PABXs and key systems.

  These features and applications make the MT9092 HPhone-II ideal for modern telephony systems requiring high-quality audio processing, hands-free operation, and compatibility with digital communication protocols.



44 PIN PLCC

Pin Description

Pin #	Name	Description
1	M+	**Non-Inverting Microphone (Input).** Non-inverting input to microphone amplifier from the handset microphone.
2	NC	**No Connect.** No internal connection to this pin.
3	V_{Bias}	**Bias Voltage (Output).** (V_{DD}/2) volts is available at this pin for biasing external amplifiers. Connect 0.1 µF capacitor to V_{SSA}.
4	V_{Ref}	**Reference voltage for codec (Output).** Nominally [(V_{DD}/2)-1.5] volts. Used internally. Connect 0.1 µF capacitor to V_{SSA}.
5	IC	**Internal Connection.** Tie externally to V_{SS} for normal operation.
6	$\overline{PWRST}$	**Power-up Reset (Input).** CMOS compatible input with Schmitt Trigger (active low).
7	DSTi	**ST-BUS Serial Stream (Input).** 2048 kbit/s input stream composed of 32 eight bit channels; the first four of which are used by the MT9092. Input level is TTL compatible.
8	DSTo	**ST-BUS Serial Stream (Output).** 2048 kbit/s output stream composed of 32 eight bit channels. The MT9092 sources digital signals during the appropriate channel, time coincident with the channels used for DSTi.
9	$\overline{C4i}$	**4096 kHz Clock (Input).** CMOS level compatible.
10	$\overline{F0i}$	**Frame Pulse (Input).** CMOS level compatible. This input is the frame synchronization pulse for the 2048 kbit/s ST-BUS stream.
11	V_{SSD}	**Digital Ground .** Nominally 0 volts.
12	$\overline{IRQ}$	**Interrupt Request (Open Drain Output).** An active low output indicating an unmasked HDLC interrupt event. Requires 1 kΩ pull-up to V_{DD}.
13	SCLK	**Serial Port Synchronous Clock (Input).** Data clock for MCS-51 compatible microport. TTL level compatible.

Pin Description

Pin #	Name	Description
14	DATA 2	**Serial Data Transmit.** In an alternate mode of operation, this pin is used for data transmit from MT9092. In the default mode, serial data transmit and receive are performed on the DATA 1 pin and DATA 2 is tri-stated.
15	DATA 1	**Bidirectional Serial Data.** Port for microprocessor serial data transfer compatible with MCS-51 standard (default mode). In an alternate mode of operation , this pin becomes the data receive pin only and data transmit is performed on the DATA 2 pin. Input level TTL compatible.
16	$\overline{CS}$	**Chip Select (Input).** This input signal is used to select the device for microport data transfers. Active low. (TTL level compatible.)
17	WD	**Watchdog (Output).** Watchdog timer output. Active high.
18	IC	**Internal Connection.** Tie externally to V_{SS} for normal operation.
19, 20	NC	**No Connection.** No internal connection to these pins.
21	V_{SSD}	**Digital Ground.** Nominally 0 volts.
22-33	S1-S12	**Segment Drivers (Output).** 12 independently controlled, two level, LCD segment drivers. An in-phase signal, with respect to the BP pin, produces a non-energized LCD segment. An out-of-phase signal, with respect to the BP pin, energizes its respective LCD segment.
34	BP	**Backplane Drive (Output).** A two-level output voltage for biasing an LCD backplane.
35	V_{DD}	**Positive Power Supply (Input).** Nominally 5 volts.
36	HSPKR-	**Inverting Handset Speaker (Output).** Output to the handset speaker (balanced).
37	HSPKR +	**Non-Inverting Handset Speaker (Output).** Output to the handset speaker (balanced).
38	SPKR-	**Inverting Speaker (Output).** Output to the speakerphone speaker (balanced).
39	SPKR+	**Non-Inverting Speaker (Output).** Output to the speakerphone speaker (balanced).
40	V_{SS} SPKR	**Power Supply Rail for Analog Output Drivers.** Nominally 0 Volts.
41	MIC-	**Inverting Handsfree Microphone (Input).** Handsfree microphone amplifier inverting input pin.
42	MIC+	**Non-inverting Handsfree Microphone (Input).** Handsfree microphone amplifier non-inverting input pin.
43	V_{SSA}	**Analog Ground.** Nominally 0 V.
44	M-	**Inverting Microphone (Input).** Inverting input to microphone amplifier from the handset microphone.

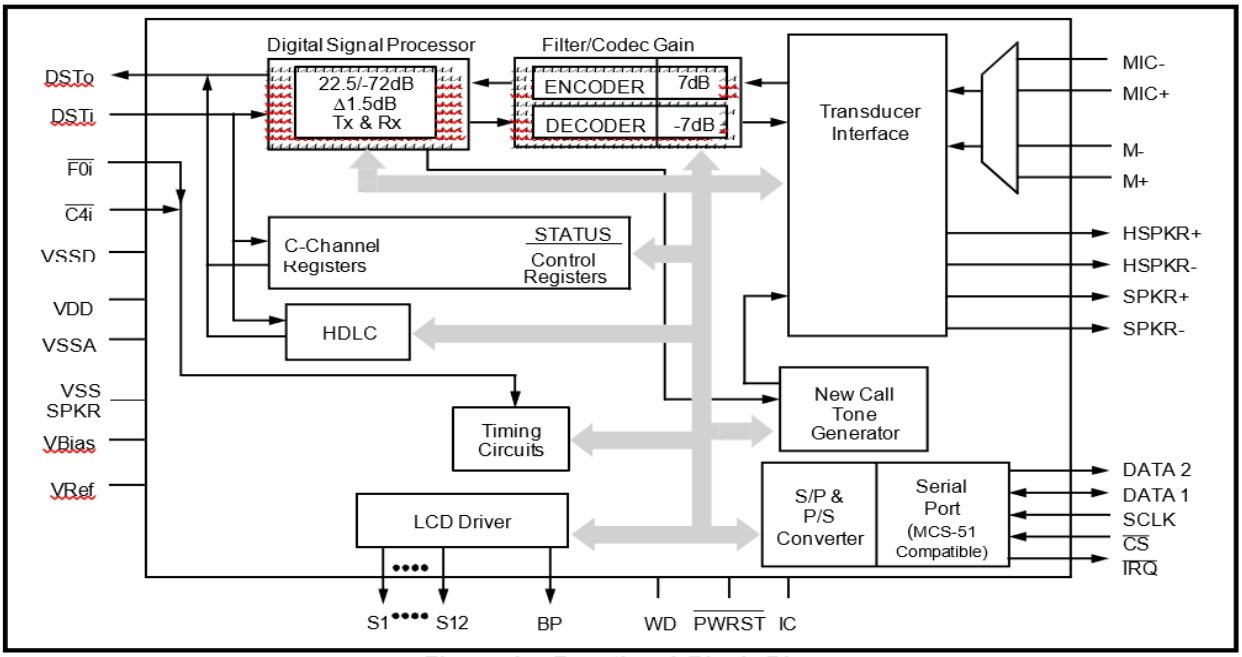


Figure 1 - Functional Block Diagram

Absolute Maximum Ratings

	Parameter	Symbol	Min	Max	Units
1	Supply Voltage	V_{DD}-V_{SS}	-0.3	7	V
2	Voltage on any I/O pin	V_I/V_O	V_{SS}-0.3	V_{DD}+0.3	V
3	Current on any I/O pin (transducers excluded)	I_I/I_O		±20	mA
4	Storage Temperature	T_S	-65	+150	°C
5	Power Dissipation (package) Plastic	P_D		750	mW
6	Static Discharge	ESD		±2.0	KV
7	Latch-up Current	I_{LU}	±100		mA

Recommended Operating Conditions - Voltages are with respect to V_{SS} unless otherwise stated.

		Characteristics	Sym	Min	Typ	Max	Units	Test Conditions
1		Supply Voltage	V_{DD}	4.75	5	5.25	V	
2		Input Voltage (high) *	V_{IH}	2.4		V_{DD}	V	Noise margin = 400mV
3		Input Voltage (low) *	V_{IL}	V_{SS}		0.4	V	Noise margin = 400mV
4		Operating Temperature	T_A	-40		+85	°C	
5		Clock Frequenecy ($\overline{C4i}$)	f_{CLK}	4092	4096	4100	kHz	

* Excluding PWRST which is a Schmitt Trigger Input.

Errata

The current revision of the TK9092 has no known errata at this time.

Ordering Information

Code	Temperature	Package	Frequency	Replaces
TK9092AP	-40 to +85	Plastic 44 PLCC – RoHS	4 MHz	MT9092AP

Contact Information

The TK80C186EB series may be ordered directly from Tekmos

Tekmos, Inc.
14121 Highway 290 West
Building 15
Austin, TX 78737

Contact Sales@Tekmos.com
www.Tekmos.com

Revision History

Date	Revision	Description
04/28/26	1.0	Initial release