

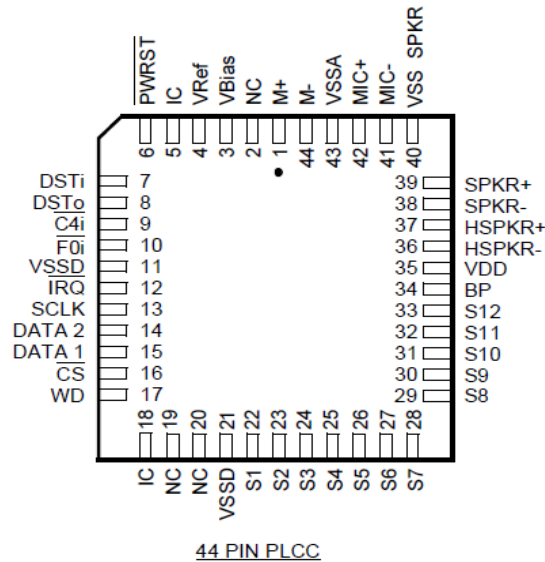
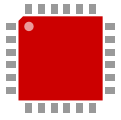
Description

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.

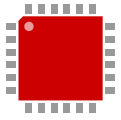
Features

- **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.



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	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	C4i	4096 kHz Clock (Input). CMOS level compatible.
10	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	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	$\overline{\text{CS}}$	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.

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 Frequency ($\overline{C4i}$)	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

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