



義隆電子股份有限公司

ELAN MICROELECTRONICS CORP.

EM78808

8-BIT MICRO-CONTROLLER

Version 2.5

ELAN MICROELECTRONICS CORP.

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I. General Description

The EM78808 is an 8-bit CID (Call Identification) RISC type microprocessor with low power, high speed CMOS technology. Integrated onto a single chip are on chip watchdog (WDT), RAM, program ROM, data ROM, programmable real time clock/counter, external/internal interrupt, power down mode, LCD driver, FSK decoder, Call waiting decoder, DTMF receiver, Programming Tone generator, build-in KEY TONE clock generation, Comparator and tri-state I/O. The EM78808 provides a single chip solution to design a CID of calling message display.

II. Feature

➤ CPU

- Operating voltage range : 2.2V~5.5V(Normal mode), 2.0V~5.5V(Green mode)
- 32K × 13 on chip Program ROM
- 256K × 8 on chip data ROM (2.5V ~ 5.5V for main clock 3.5826MHz)
- 8K × 8 on chip data RAM
- 144 byte working register
- Up to 51 bi-directional tri-state I/O ports (32 shared with LCD Segment pins)
- IO with internal Pull high, wake-up and interrupt functions
- STACK: 32 level stack for subroutine nesting
- TCC: 8-bit real time clock/counter (TCC) with 8-bit prescaler
- COUNTER1: 8-bit counter with 8-bit prescaler can be an interrupt source
- COUNTER2: 8-bit counter with 8-bit prescaler can be an interrupt source
- Watch Dog : Programmable free running on chip watchdog timer
- CPU modes:

Mode	CPU status	Main clock	32.768kHz clock status
Sleep mode	Turn off	Turn off	Turn off
Idle mode	Turn off	Turn off	Turn on
Green mode	Turn on	Turn off	Turn on
Normal mode	Turn on	Turn on	Turn on

- 13 interrupt source , 8 external , 5 internal
- Key Scan : Port key scan function up to 16x4 keys
- Sub-Clock: 32.768KHz crystal
- Main-clock: 3.5862MHz multiplied by 0.25, 0.5, 1 or 3 generated by internal PLL
- Key tone output :4KHz, 2KHz ,1KHz (shared with IO)
- Comparator: 3-channel comparators: internal (16 level) or external reference voltage. (shared with IO)
- Serial Peripheral Interface (SPI): Interrupt flag available for the read buffer full, Programmable baud rates of communication, Three-wire synchronous communication. (shared with IO)
- An OP inside (shared with IO)

➤ Current D/A

- Operation Voltage : 2.5V~5.5V
- 8-bit resolution and 3-bit output level control
- Current DA output can drive speaker through a transistor for sound playing. (shared with IO)

➤ Programmable Tone Generators

- Operation Voltage 2.2V~5.5V
- Programmable Tone1 and Tone2 generators
- Independent single tone generation for Tone1 and Tone2
- Mixed dual tone generation by Tone1 and Tone2 with 2dB difference
- Can be programmed for DTMF tone generation
- Can be programmed for FSK signal (Bell202 or V.23) generation

➤ CID

- Operation Voltage 2.7V~5.5V for FSK
- Operation Voltage 2.7V~5.5V for DTMF receiver
- Compatible with Bellcore GR-30-CORE (formerly as TR-NWT-000030)



- Compatible with British Telecom (BT) SIN227 & SIN242
- FSK demodulator for Bell 202 and ITU-T V.23 (formerly as CCITT V.23)
- **CALL WAITING**
 - Operation Voltage 2.6V~5.5V
 - Compatible with Bellcore special report SR-TSV-002476
 - Call-Waiting (2130Hz plus 2750Hz) Alert Signal Detector
 - Good talkdown and talkoff performance
 - Sensitivity compensated by adjusting input OP gain
- **LCD (8x80, 9x80, 16x80, 24x72)**
 - Maximum common driver pins : 16/24
 - Maximum segment driver pins : 80(SEG0..SEG79)/72(SEG8..SEG79)
 - Shared COM16 ~ COM23 pins with SEG0 ~ SEG7 pins
 - 1/4 bias for 8, 9 and 16 common mode and 1/5 bias for 24 common mode
 - 1/8, 1/9, 1/16, 1/24 duty
 - 16 Level LCD contrast control (software)
 - Internal resistor circuit for LCD bias
 - Internal voltage follower for better display
- **Package type**
 - 136 pin Chip : EM78808AH
 - 128 pin QFP : (EM78808AAQ , POVD disable) (EM78808ABQ , POVD enable)

III. Application

1. adjunct units
2. answering machines
3. feature phones