

8-Bit micro-controller with 660 dots LCD Driver

Features

- Single chip 8-bit micro-controller
- Operating voltage: 2.4V to 5.5V
- Memory :
 - ◆ Program ROM: 48*1024 Bytes
 - ◆ Data RAM (stack RAM included) : 3072 Bytes
 - ◆ LCD RAM : 88 Bytes
- 10 input/output pins:
 - ◆ Dedicated I/O pins: P0[5:0]
 - ◆ Share pin I/O:
 - P0[7:6]/(UART TX, RX)
 - P1[0:1]/(SCLK, SDIO)
- Half duplex UART function
- Build-in Megawin E-flash interface
- Dedicated SPK pin for tone output
- LCD driver output:
 - ◆ Max 60 segment × 11 common
 - ◆ 1/11, 1/10, 1/9 duty and 1/4, 1/5 bias driving mode
- ◆ Internal R-type VLCD divider
- ◆ 10 level programmable frame rate from 56.7Hz to 113.8Hz
- Two re-loadable 8-bit timers
- Two dividers
 - One 14-bit divider with the clock source from sub-oscillator to generate a 2-Hz interrupt
 - One 7-bit divider with the clock source from main oscillator
- Build-in dual oscillation circuit:
 - ◆ Ring oscillator up to 5MHz at 3.6V – 5.5V
 - 4MHZ at 2.4V – 3.4V for main oscillator (Fosc)
 - ◆ 32768Hz crystal oscillator for sub-oscillator (F_{x32})
- Build-in 8-level battery-low detector circuit

General Description

MLC822A is a cost effective, high performance 8-bit micro-controller of MEGAWIN. It integrates an 8-bit pipeline CPU core, 48KB ROM, 3072B RAM, two 8-bit timers, 660 dots LCD driver, 10 I/O pins and other system control circuits into a single chip. MLC822A build in an UART interface circuit, which could

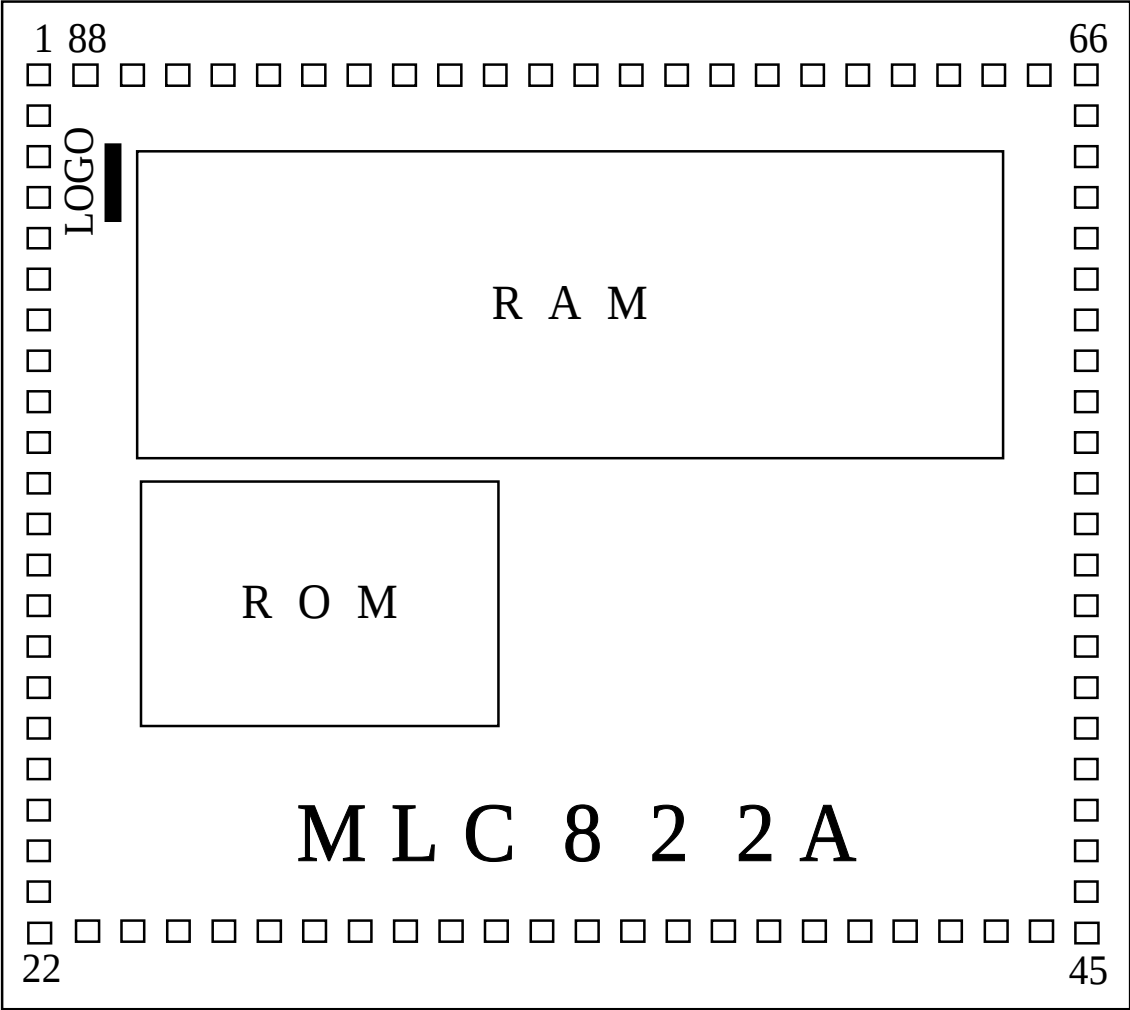
be used to system link with other devices. An e-flash interface is useful for the external memory application. The MLC822A provides a build-in oscillator as clock source. It is suitable for data bank product, hand-held game, toy controllers and other products' applications.

Pad Description

Pad Name	I/O	Description
P0.5~P0.0	I/O	programmable I/O ports with interrupt function
P0.7~P0.6 (TX, RX)	I/O	1. programmable I/O ports with interrupt function 2. UART interface
SPK	O	Tone output
P1.0~ P1.1/ (UCLK, SDIO)	I/O	1. Port 1 bit0 ~ bit1 2. e_flash interface
GND, VDD	P	Power pins
OSCI	I	Ring oscillator input pin. Connect to external resistor
X32I	I	32768 Hz crystal input
X32O	O	32768 Hz crystal output
/RES	I	System reset pin (low active)
COM0~ COM10	O	LCD common signals output pins
SEG0~SEG59	O	LCD segment signals output pins

Total 88 pins

Pad Assignment



Absolute Maximum Rating

PARAMETER	RATING	UNIT
Supply Voltage to Ground Potential	-0.3 to +5.0	V
Applied Input / Output Voltage	-0.3 to +5.0	V
Power Dissipation	60	mW
Ambient Operating Temperature	0 to +70	°C
Storage Temperature	-55 to +150	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.

DC Characteristics

(VDD-VSS = 3 V, FOSC = 4MHz, Ta = 25° C; unless otherwise specified)

PARAMETER	SYM.	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Op. Voltage	VDD	-	2.4	-	5.5	V
Op. Current	IOP1	Normal mode (main clock: 4Mhz sub clock: 32768 Hz CPU clock: 1Mhz LCD on no load VDD = 3V)	-	0.5		mA
	IOP2	Halt mode (Main clock: off Sub clock: 32768 Hz CPU off LCD on no load VDD = 3V		12	20	uA
	IOP3	Main clock: off Sub clock: 32768 Hz LCD off VDD = 3V		3		uA
Standby Current	ISTB	No load	-	1	3	μA
Input High Voltage	VIH	-	0.8 VDD	-	VDD	V
Input Low Voltage	VIL	-	0	-	0.4	V
Battery Low Indicate Voltage	VBL1	BL_CR.4=0, (BL_CR.3, BL_CR.2, BL_CR.1 = 100)	-	3.0	-	V
	VBL2	BL_CR.4=1, (BL_CR.3, BL_CR.2, BL_CR.1 = 100)	-	4.5	-	
Port 0, 1, 2, 3 drive current	IOH	VOH = 3.6V, VDD = 4.5V	-	1.8	-	mA
Port 0, 1, 2, 3 sink current	IOL0	VOL = 0.4V, VDD = 4.5V	-	3.0	-	mA
SEG0 ~ SEG69 drive current	IOH1	VOH = 2.4V, VLCD = 3.0V	0.3	-	-	μA
SEG0 ~ SEG69 sink current	IOL1	VOL = 0.4V, VLCD = 0.0V	0.4	-	-	μA
Internal Pull-high Resistor for ports	RPH1	VIL = 0V		55K		Ω
	RPH2	VIL = 0V		400K		

AC Characteristics

(Ta = 25° C; unless otherwise specified)

PARAMETER	SYM.	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CPU Op. Frequency	FCPU	R=740KΩ, VDD = 3.0V	-	4	-	MHz
Frequency Deviation by Voltage Drop for RC Oscillator	$\frac{\Delta f}{f}$	$\frac{f(3.6V) - f(2.4V)}{f(3.0V)}$	-	5	7	%
POR duration	TPOR	FOSC = 1 MHz	10	15	50	mS