W74110

Winbond Electronics Corp.
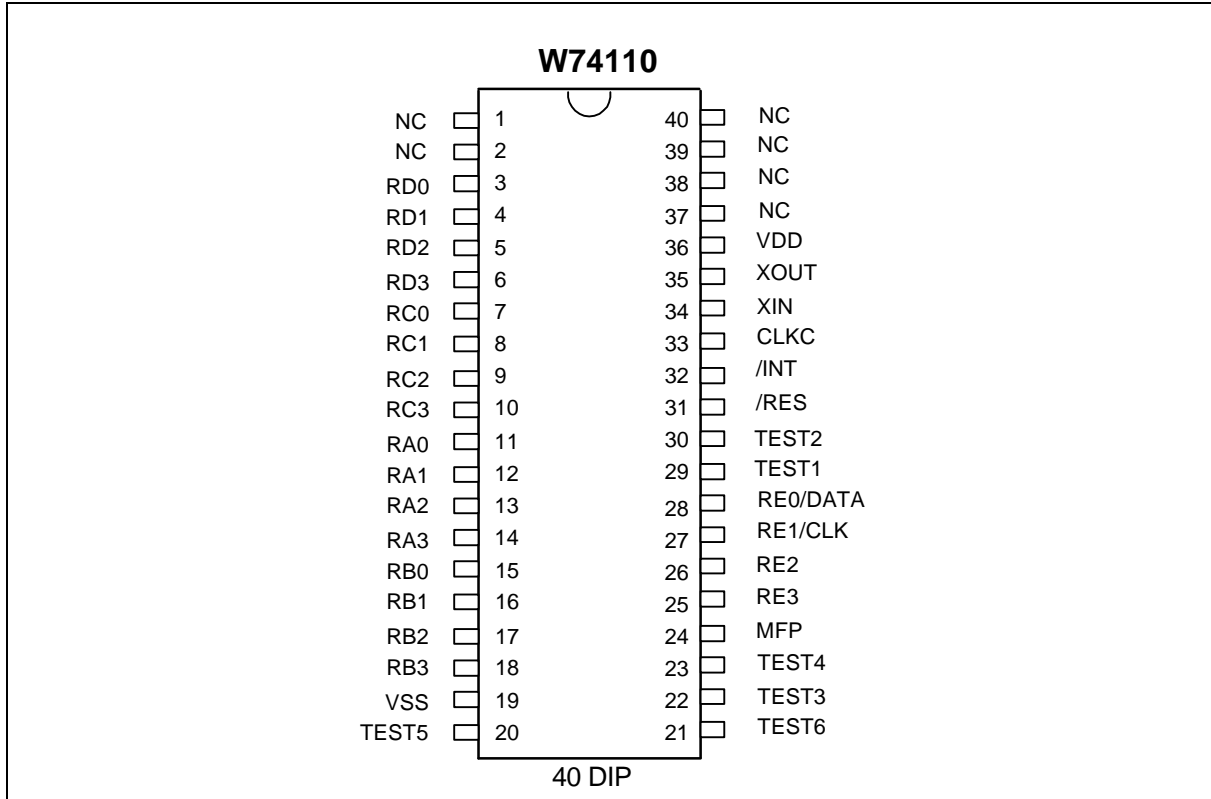
4-BIT MICROCONTROLLER

GENERAL DESCRIPTION

The W74110 is a single-chip CMOS 4-bit microcontroller (μC) that operates on low voltage and very low current. It contains a 4-bit ALU, a timers, a divider, a serial port, and five 4-bit input/output ports (including one output port for driving LEDs). There are also four interrupt sources and 4-level subroutine nesting for interrupt applications.

The W74110 has two power reduction modes—hold mode and stop mode—which help to minimize power dissipation. The product is a powerful microcontroller for remote controllers, multiple I/O products, keyboard controllers, speech synthesis LSI controllers, and other products.

FEATURES

- Operating voltage: 1.3V - 6.0V
- Operating frequency up to 1MHz for RC oscillator
- Built-in crystal or RC oscillator by pin option
- 1024 x 16 bit program ROM
- 64 x 4 bit data RAM
- 21 input/output pins:
  - Ports for input only: 2 ports/8 pins
  - Input/output ports: 2 ports/8 pins
  - Ports for output only: 1 ports/4 pins (high current for LED driving)
  - Control output pin: 1 pin (MFP)
- HOLD function: no operation (except for oscillator)
- STOP function: no operation (including oscillator)
- Four types of interrupts
  - Two internal interrupts (Divider and Timer)
  - Two external interrupts (Port RC & $\overline{INT}$ pin)
- Built-in 14-bit clock frequency divider circuit
- Built-in 8-bit programmable down-count timer
- Powerful instruction set: 83 instruction sets
- Direct and indirect addressing mode
- 4-level subroutine (include interrupt) nesting
- All instructions are executed in one machine cycle except for indirect addressing mode
- Up to 4 μS instruction cycle (at 1 MHz operating frequency)
- Internal serial transmission port RT specified by software

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PIN CONFIGURATION

W74110

NC	1	40	NC
NC	2	39	NC
RD0	3	38	NC
RD1	4	37	NC
RD2	5	36	VDD
RD3	6	35	XOUT
RC0	7	34	XIN
RC1	8	33	CLKC
RC2	9	32	/INT
RC3	10	31	/RES
RA0	11	30	TEST2
RA1	12	29	TEST1
RA2	13	28	RE0/DATA
RA3	14	27	RE1/CLK
RB0	15	26	RE2
RB1	16	25	RE3
RB2	17	24	MFP
RB3	18	23	TEST4
VSS	19	22	TEST3
TEST5	20	21	TEST6

40 DIP

PIN DESCRIPTION

PIN NO.	SYMBOL	I/O	FUNCTION
3-6	RD0–RD3	I	4-bit port for input only.
7-10	RC0–RC3	I	4-bit port for input only. Each pin has an independent debounce circuit and interrupt capability.
11-14	RA0–RA3	I/O	Input/output port. Mode can be switched by the IPA and OPA instructions.
15-18	RB0–RB3	I/O	Input/output port. Mode can be switched by the IPB and OPB instructions.
19	Vss	I	Negative power supply (-).

Pin description, continued

PIN NO.	SYMBOL	I/O	FUNCTION
20	TEST5	O	Test pin
21	TEST6	O	Test pin
22	TEST3	O	Test pin
23	TEST4	O	Test pin
24	MFP	O	Output pin only. This pin outputs software selectable modulating and nonmodulating signals according to the MFP instruction.
25-28	RE0/DATA RE1/CLK RE2, RE3	O	Special output port. This port can be configured by software to act as the output of internal port RT or the inverse output of external port RC.
29	TEST1	I	Test pin
30	TEST2	I	Test pin
31	$\overline{\text{RES}}$	I	System reset pin with pull-up resistor.
32	$\overline{\text{INT}}$	I	External interrupt pin with pull-up resistor.
33	CLKC	I	Clock mode control pin. CLKC = "H": Crystal mode CLKC = "L": RC mode
34	XIN	I	Input pin for oscillator. Connected to crystal or resistor to generate system clock by pin option.
35	XOUT	O	Output pin for oscillator. Connected to crystal or resistor to generate system clock by pin option.
36	V_{DD}	I	Positive power supply (+).
1,2,37,38,39,40	NC	-	No connection.

BLOCK DIAGRAM
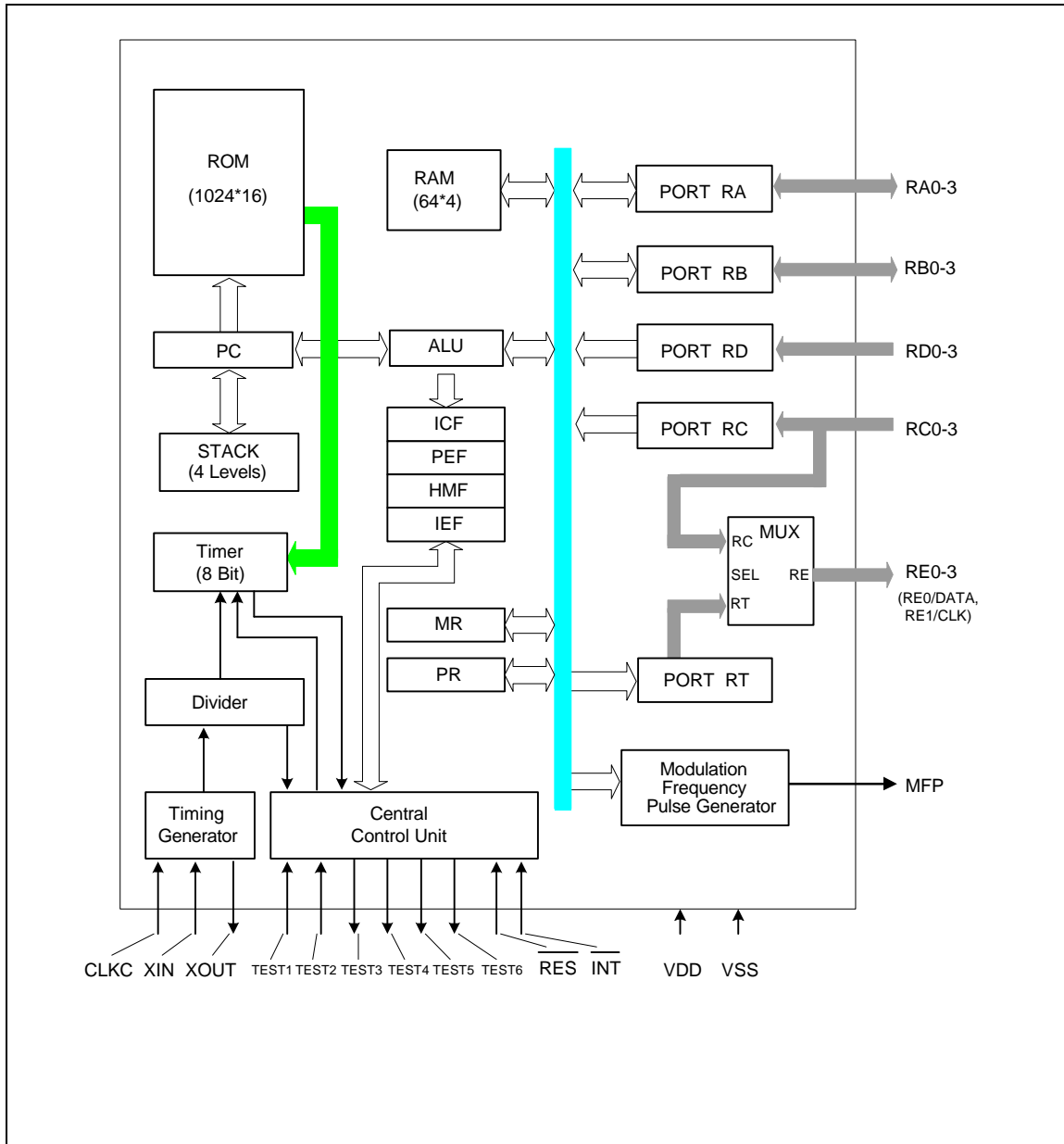
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