

EM78F651N Errata document

Specification Revision History

Doc. Version	Revision Description	Date
1.0	Initial version	2006/09/20
1.1	<ol style="list-style-type: none"> 1. Modified the General Description, Pin Assignment and Features sections. 2. Added green product information. 3. Modified the Functional Block Diagram. 	2006/10/20

Version 1.0 to Version 1.1

A. attached items

N.A.

B. modified items

1	Page 1~3	<ol style="list-style-type: none"> 1 General Description 2 Features 	Modified the General Description, Pin Assignment and Features sections.
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1 General Description

The EM78F651N is an 8-bit microprocessor designed and developed with low-power, high-speed CMOS technology and high noise immunity. It has an on-chip 1K×13-bit Electrical Flash Memory and 128×8-bit in system programmable EEPROM. It provides three protection bits to prevent intrusion of user's Flash memory code. Twelve Code option bits are also available to meet user's requirements.

With its enhanced Flash-ROM feature, the EM78F651N provides a convenient way of developing and verifying user's programs. Moreover, this Flash-ROM device offers the advantages of easy and effective program updates, using development and programming tools. User can avail of the ELAN Writer to easily program his development code.

2 Features

- CPU configuration
 - 1K×13 bits on chip ROM
 - 80×8 bits on chip registers (SRAM)
 - 128 bytes in-system programmable EEPROM
*Endurance: 100,000 write/erase cycles
 - More than 10 years data retention
 - 5-level stacks for subroutine nesting
 - Less than 2 mA at 5V/4MHz
 - Typically 20 μA, at 3V/32kHz
 - Typically 2 μA, during sleep mode
- I/O port configuration
 - 2 bidirectional I/O ports
 - Wake-up port : P6
 - 8 Programmable pull-down I/O pins
 - 8 programmable pull-high I/O pins
 - 8 programmable open-drain I/O pins
- Fast set-up time requires only 2ms in high Crystal and 32 CLKS in IRC mode from wake up to operating mode
- Peripheral configuration
 - 8-bit real time clock/counter (TCC) with selective signal sources, trigger edges, and overflow interrupt
 - Power down (Sleep) mode
*Vdd power monitor and supports low voltage detector interrupt flag
 - 4 programmable Level Voltage Detector (LVD)
 - Three security registers to prevent intrusion of Flash memory codes
 - One configuration register to accommodate user's requirements
 - 2/4/8/16 clocks per instruction cycle selected by code option
 - High EFT immunity
- Single instruction cycle commands
- Four Crystal range in Oscillator Mode



<ul style="list-style-type: none"> ● External interrupt : P60 ■ Operating voltage range: <ul style="list-style-type: none"> ● Operating voltage: 2.2V~5.5V at -40°C ~85°C (Industrial) ■ Operating frequency range (base on two clocks): <ul style="list-style-type: none"> ● Crystal mode: <ul style="list-style-type: none"> DC ~ 20MHz @ 5V DC ~ 8MHz @ 3V DC ~ 4MHz @ 2.2V ● ERC mode: <ul style="list-style-type: none"> DC ~ 16MHz @ 5V DC ~ 8MHz @ 3V DC ~ 4MHz @ 2.2V ● IRC mode: <ul style="list-style-type: none"> DC ~ 16MHz @ 4.5V~5.5V DC ~ 4MHz @ 2.2V~5.5V ■ All these four main frequencies can be trimmed by programming with five calibrated bits in the ICE652N Simulator. Flash is auto trimmed by ELAN FWriter. ■ Three available interrupts: <ul style="list-style-type: none"> ● TCC overflow interrupt ● Input-port status changed interrupt (wake-up from sleep mode) ● External interrupt 	Crystal Range	Oscillator Mode
	20MHz ~ 6MHz	HXT
	6MHz ~ 1MHz	XT
	1MHz ~ 100kHz	LXT1
32.768kHz	LXT2	

<ul style="list-style-type: none"> ■ Programmable free running watchdog timer ■ Package type: <ul style="list-style-type: none"> ● 14-pin DIP 300mil : EM78F651NAPS/J ● 14-pin SOP 150mil : EM78F651NAMS/J ● 16-pin DIP 300mil : EM78F651NBPS/J ● 16-pin SOP 150mil : EM78F651NBSMS/J ● 18-pin DIP 300 mil : EM78F651NCPS/J ● 18-pin SOP 300mil : EM78F651NCMS/J ● 20-pin DIP 300mil : EM78F651NDPS/J ● 20-pin SSOP 209mil : EM78F651NDKMS/J

Green products do not contain hazardous substances.

2	Page 3	3 Pin Assignment	Modified the General Description, Pin Assignment and Features sections.
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3 Pin Assignment

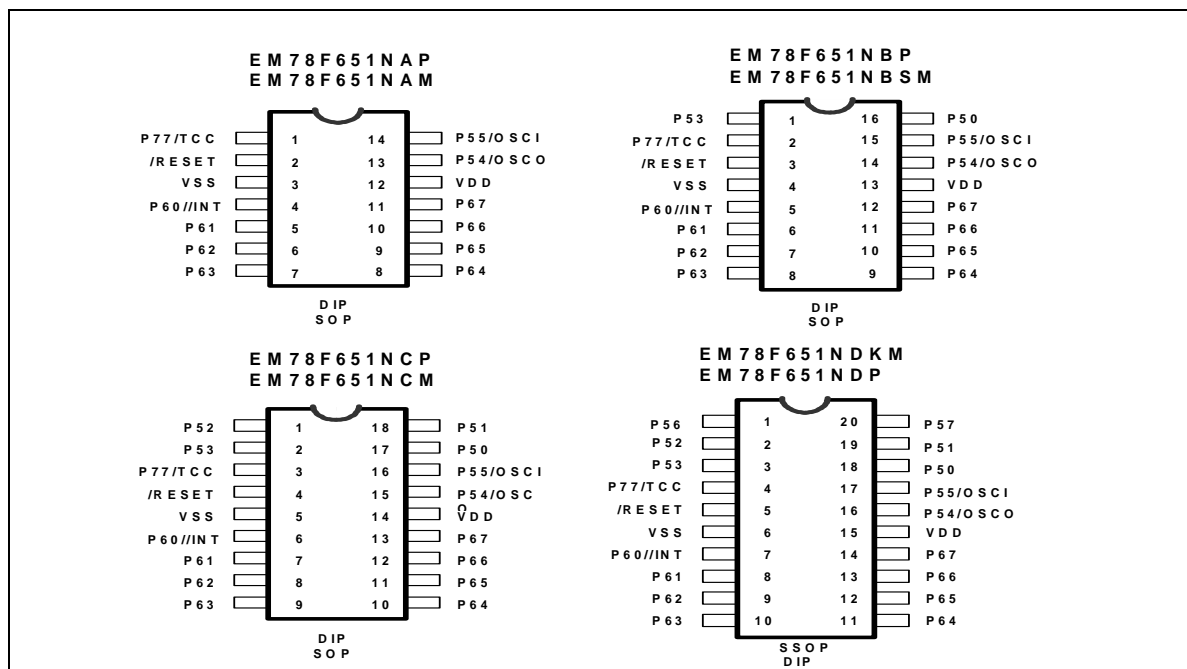


Fig. 3-1 Pin Assignment



3	Page 2 Page 57	2 Features APPENDIX A Package type	Added green product information.
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■ Package type:

- 14-pin DIP 300mil : EM78F651NAPS/J
- 14-pin SOP 150mil : EM78F651NAMS/J
- 16-pin DIP 300mil : EM78F651NBPS/J
- 16-pin SOP 150mil : EM78F651NBSMS/J
- 18-pin DIP 300 mil : EM78F651NCPS/J
- 18-pin SOP 300mil : EM78F651NCMS/J
- 20-pin DIP 300mil : EM78F651NDPS/J
- 20-pin SSOP 209mil : EM78F651NDKMS/J

A Package Type

Flash MCU	Package Type	Pin Count	Package Size
EM78F651NAP	DIP	14	300 mil
EM78F651NAPS/NAPJ	DIP	14	300 mil
EM78F651NAM	SOP	14	150 mil
EM78F651NAMS/NAMJ	SOP	14	150 mil
EM78F651NBP	DIP	16	300 mil
EM78F651NBPS/NBPJ	DIP	16	300 mil
EM78F651NBSM	SOP	16	150 mil
EM78F651NBSMS/NBSMJ	SOP	16	150 mil
EM78F651NCP	DIP	18	300 mil
EM78F651NCPS/NCPJ	DIP	18	300 mil
EM78F651NCM	SOP	18	300 mil
EM78F651NCMS/NCMJ	SOP	18	300 mil
EM78F651NDKM	SSOP	20	209 mil
EM78F651NDKMS/NDKMJ	SSOP	20	209 mil
EM78F651NDP	DIP	20	300mil
EM78F651NDPS/NDPJ	DIP	20	300mil

Green products do not contain hazardous substances.

The third edition of Sony SS-00259 standard.

Pb contents should be less the 100ppm

Pb contents comply with Sony specs.



Part no.	EM78F651NS/J
Electroplate type	Pure Tin
Ingredient (%)	Sn:100%
Melting point (°C)	232°C
Electrical resistivity (μΩ cm)	11.4
Hardness (hv)	8~10
Elongation (%)	>50%

5 Block Diagram

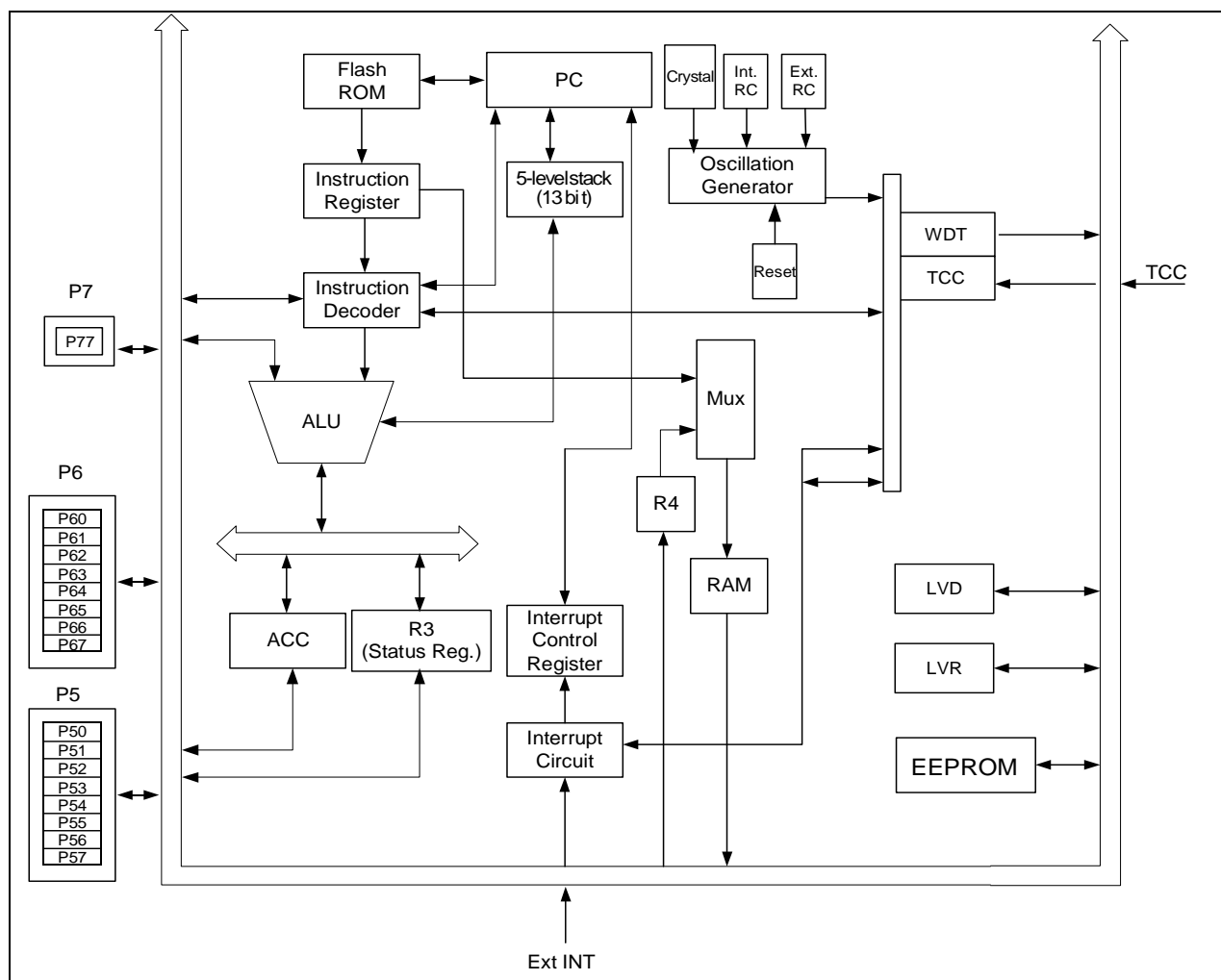


Fig. 5-1 Functional Block Diagram



C. deleted items

N.A.