



ATtiny1624/1626/1627

Product Brief

Introduction

The ATtiny1624/1626/1627 microcontrollers of the tinyAVR® 2 family are using the AVR® CPU with hardware multiplier, running at up to 20 MHz, with 16 KB Flash, 2 KB of SRAM, and 256B of EEPROM available in a 14-, 20-, and 24-pin package. The family uses the latest technologies from Microchip with a flexible and low-power architecture, including Event System and SleepWalking, advanced digital peripherals, and accurate analog features such as a 12-bit differential ADC with Programmable Gain Amplifier (PGA).

Features

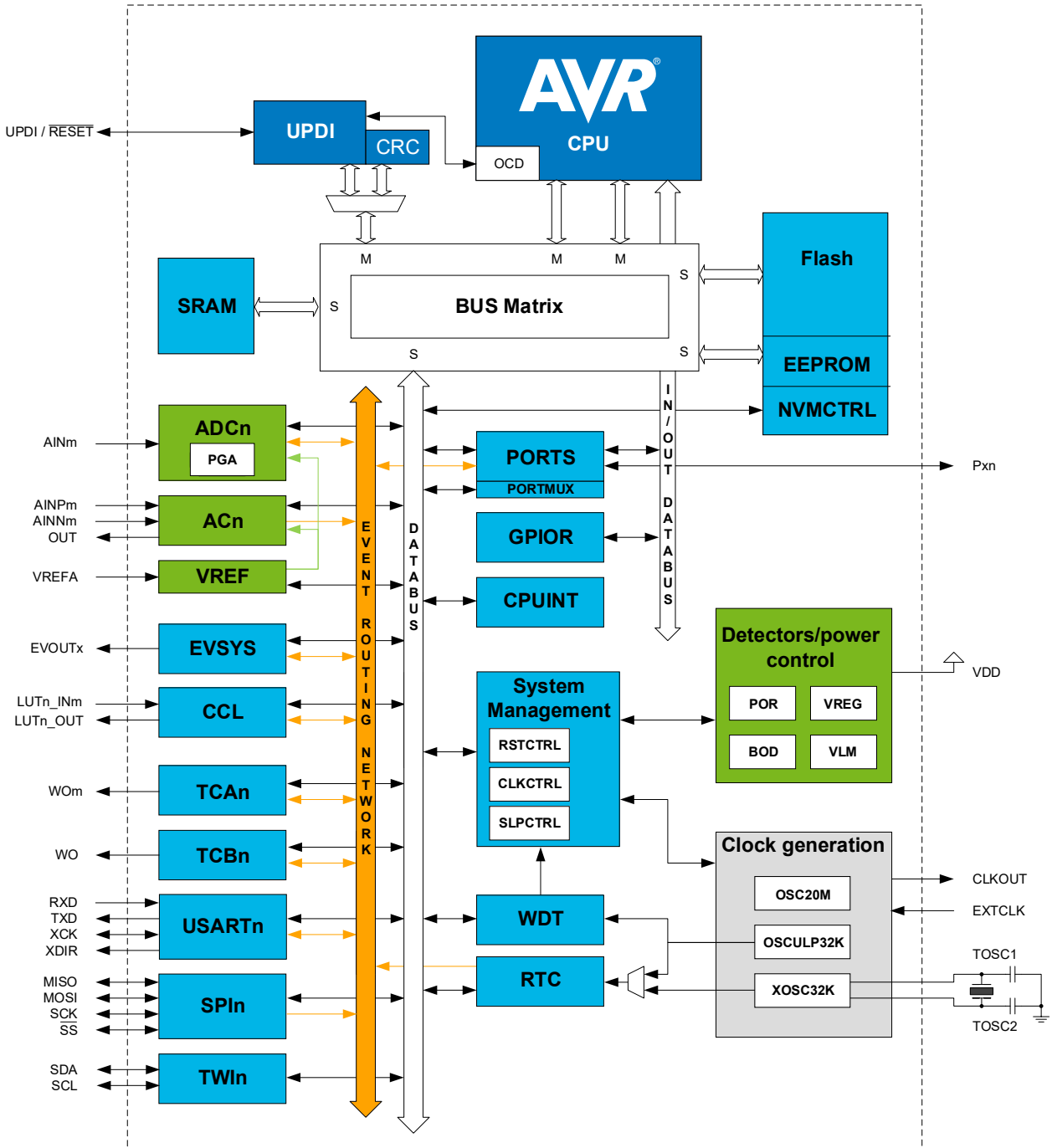
- High-Performance Low-Power AVR® CPU
 - Running at up to 20 MHz
 - Single-cycle I/O access
 - Two-level interrupt controller with vectored interrupts
 - Two-cycle hardware multiplier
 - Supply voltage range: 1.8V to 5.5V
- Memories
 - 16 KB In-System self-programmable Flash memory
 - 2 KB SRAM
 - 256B EEPROM
 - 32B of user row in nonvolatile memory that can keep data during chip-erase and be programmed while the device is locked
 - Write/erase endurance
 - Flash 10,000 cycles
 - EEPROM 100,000 cycles
 - Data retention: 40 years at 55°C
- System
 - Power-on Reset (POR)
 - Brown-out Detection (BOD)
 - Clock options
 - Lockable 20 MHz Low-Power internal oscillator
 - 32.768 kHz Ultra Low-Power (ULP) internal oscillator
 - 32.768 kHz external crystal oscillator
 - External clock input
 - Single-pin Unified Program and Debug Interface (UPDI)
 - Three sleep modes
 - Idle with all peripherals running and immediate wake-up time
 - Standby
 - Configurable operation of selected peripherals
 - SleepWalking peripherals
 - Power-Down with full data retention

- Peripherals
 - One 16-bit Timer/Counter type A (TCA) with a dedicated period register and three PWM channels
 - Two 16-bit Timer/Counter type B (TCB) with input capture and simple PWM functionality
 - One 16-bit Real-Time Counter (RTC) running from external 32.768 kHz crystal or internal 32.768 kHz ULP oscillator
 - Two Universal Synchronous Asynchronous Receiver Transmitter (USART) with fractional baud rate generator, auto-baud, and start-of-frame detection
 - Master/Slave Serial Peripheral Interface (SPI)
 - Master/Slave Two-Wire Interface (TWI) with dual address match
 - Standard mode (Sm, 100 kHz)
 - Fast mode (Fm, 400 kHz)
 - Fast mode plus (Fm+, 1 MHz)
 - Event System for CPU independent and predictable inter-peripheral signaling
 - Configurable Custom Logic (CCL) with four programmable Look-Up Tables (LUT)
 - One Analog Comparator (AC) with scalable reference input
 - One 12-bit differential 375 ksps Analog-to-Digital Converter (ADC) with Programmable Gain Amplifier (PGA) and up to 15 input channels
 - Multiple internal voltage references
 - 1.024V
 - 2.048V
 - 2.500V
 - 4.096V
 - VDD
 - Automated Cyclic Redundancy Check (CRC) flash memory scan
 - Watchdog Timer (WDT) with Window Mode, with a separate on-chip oscillator
 - External interrupt on all general purpose pins
- I/O and Packages
 - Up to 22 programmable I/O pins
 - 14-pin
 - SOIC150
 - TSSOP
 - 20-pin
 - SOIC300
 - SSOP
 - VQFN 3x3 mm
 - 24-pin
 - VQFN 4x4 mm
- Temperature Ranges
 - -40°C to 85°C (standard)
 - -40°C to 125°C (extended)
- Speed Grades (-40°C to 85°C)
 - 0-5 MHz @ 1.8V – 5.5V
 - 0-10 MHz @ 2.7V – 5.5V
 - 0-20 MHz @ 4.5V – 5.5V
- Speed Grades (-40°C to 125°C)
 - 0-8 MHz @ 2.7V - 5.5V
 - 0-16 MHz @ 4.5V - 5.5V

Table of Contents

Introduction.....	1
Features.....	1
1. Block Diagram.....	4
2. Peripheral Overview.....	5
3. Pinout.....	6
3.1. 14-Pin SOIC, TSSOP.....	6
3.2. 20-Pin SOIC, SSOP.....	7
3.3. 20-Pin VQFN.....	8
3.4. 24-Pin VQFN.....	9
4. I/O Multiplexing and Considerations.....	10
4.1. I/O Multiplexing.....	10
The Microchip Website.....	11
Product Change Notification Service.....	11
Customer Support.....	11
Microchip Devices Code Protection Feature.....	11
Legal Notice.....	11
Trademarks.....	12
Quality Management System.....	12
Worldwide Sales and Service.....	13

1. Block Diagram



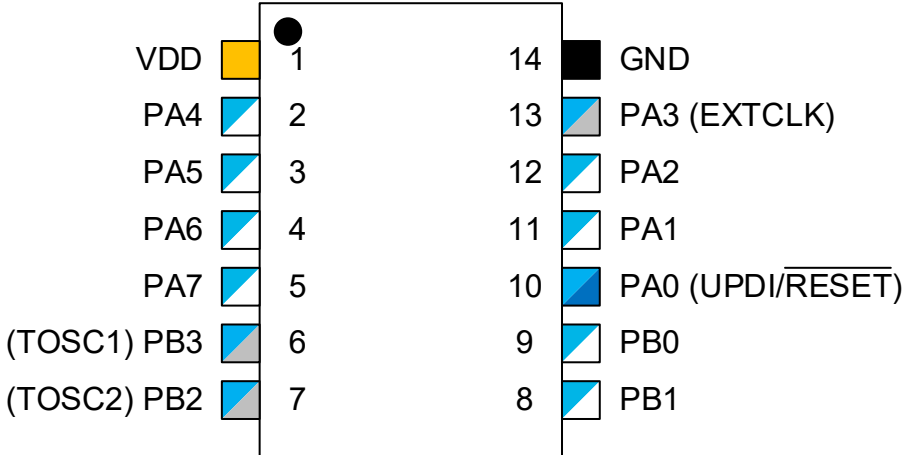
2. Peripheral Overview

Table 2-1. Peripheral Overview

Device	ATtiny1624	ATtiny1626	ATtiny1627
Pins	14	20	24
Package	SOIC	SOIC,VQFN	VQFN
Maximum frequency (MHz)	20	20	20
General purpose I/O	12	18	22
PORT	PA[7:0], PB[3:0]	PA[7:0], PB[5:0], PC[3:0]	PA[7:0], PB[7:0], PC[5:0]
External interrupts	12	18	22
Event system channels	6	6	6
CCL LUTs	4	4	4
Real-Time Counter (RTC)	1	1	1
16-bit Timer/Counter type A (TCA)	1	1	1
16-bit Timer/Counter type B (TCB)	2	2	2
12-bit Timer/Counter type D (TCD)	-	-	-
USART/SPI master	2	2	2
SPI	1	1	1
TWI (I ² C)	1	1	1
ADC (channels)	1 (9)	1 (15)	1 (15)
DAC	-	-	-
Analog Comparators (inputs)	1 (4p/3n)	1 (4p/3n)	1 (4p/3n)
Peripheral Touch Controller (PTC) (self cap/mutual cap channels)	-	-	-
Unified Program and Debug Interface (UPDI) activated by shared pin using high-voltage signal or fuse override	1	1	1

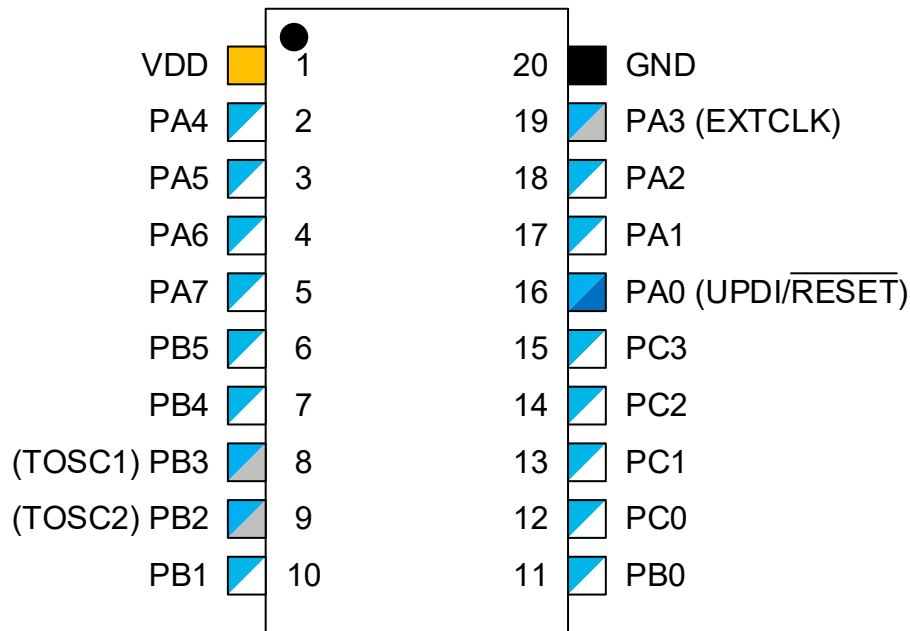
3. Pinout

3.1 14-Pin SOIC, TSSOP



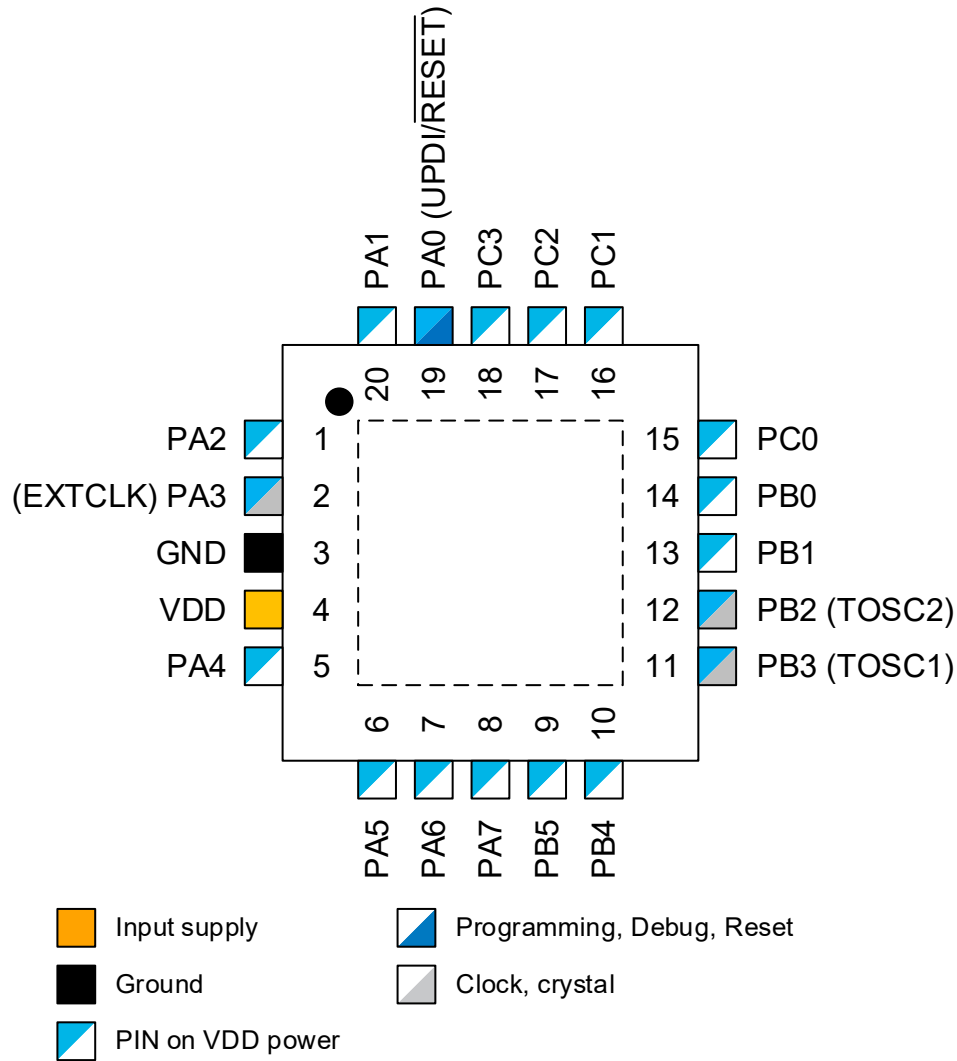
- Input supply
- Ground
- PIN on VDD power
- Programming, Debug, Reset
- Clock, crystal

3.2 20-Pin SOIC, SSOP

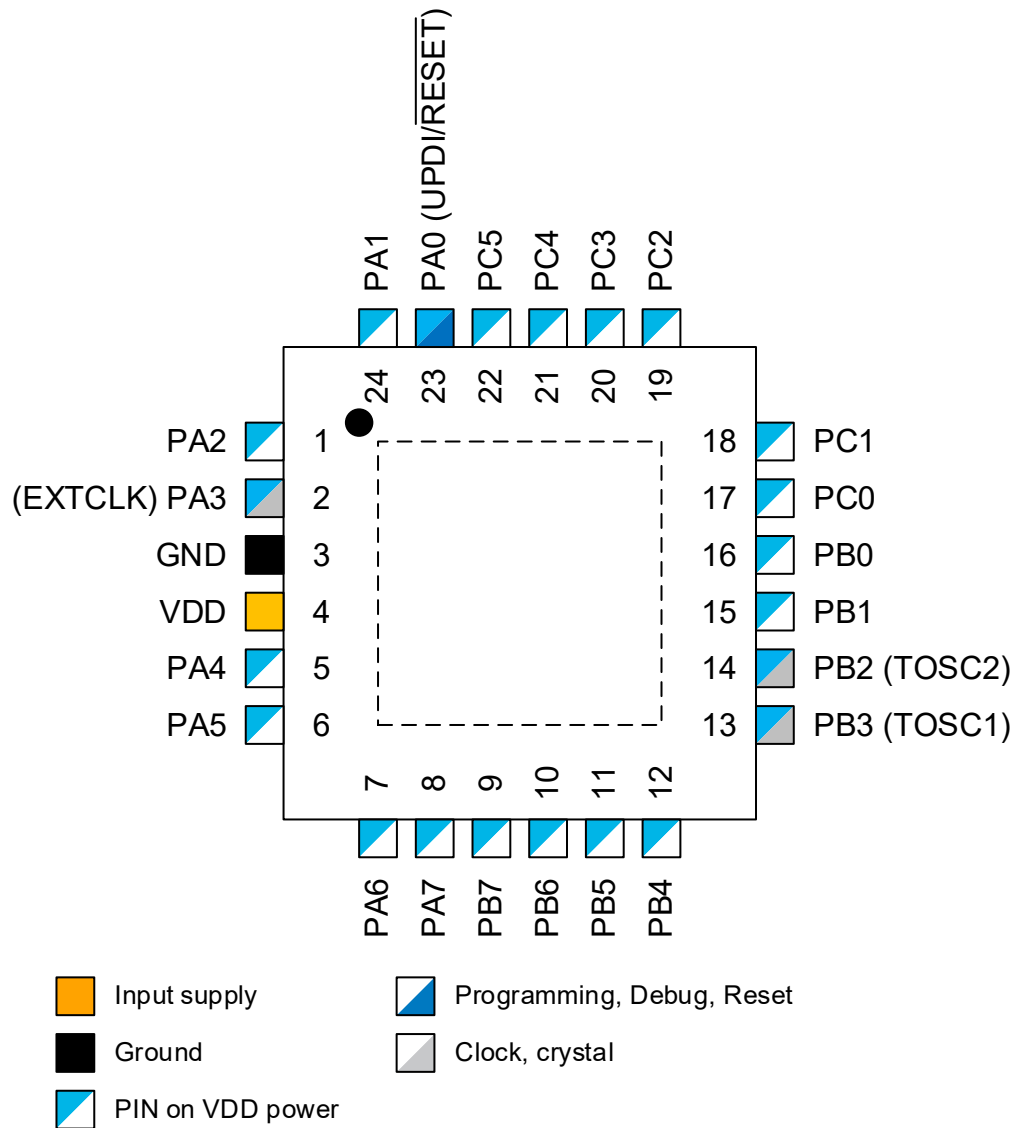


- Input supply
- Ground
- PIN on VDD power
- Programming, Debug, Reset
- Clock, crystal

3.3 20-Pin VQFN



3.4 24-Pin VQFN



4. I/O Multiplexing and Considerations

4.1 I/O Multiplexing

Table 4-1. PORT Function Multiplexing

VQFN 24-pin	VQFN 20-pin	SSOP/SOIC 20-pin	TSSOP/SOIC 14-pin	Pin Name (1,2)	Other/Special	ADC0 ⁽³⁾	AC0	USART0	USART1	SPI0	TWI0	TCA0	TCBn	CCL
23	19	16	10	PA0	RESET UPDI									LUT0-IN0
24	20	17	11	PA1		AIN1		TXD ⁽⁴⁾	TXD	MOSI				LUT0-IN1
1	1	18	12	PA2	EVOUTA	AIN2		RxD ⁽⁴⁾	RXD	MISO				LUT0-IN2
2	2	19	13	PA3	EXTCLK	AIN3		XCK ⁽⁴⁾	XCK	SCK		WO3	1,WO	
3	3	20	14	GND										
4	4	1	1	VDD										
5	5	2	2	PA4		AIN4		XDIR ⁽⁴⁾	XDIR	SS		WO4		LUT0-OUT
6	6	3	3	PA5	VREFA	AIN5	OUT					WO5	0,WO	LUT3-OUT ⁽⁴⁾
7	7	4	4	PA6		AIN6	AINN0							
8	8	5	5	PA7	EVOUTA ⁽⁴⁾	AIN7	AINP0							LUT1-OUT
9				PB7	EVOUTA ⁽⁴⁾									
10				PB6			AINP3							LUT2-OUT ⁽⁴⁾
11	9	6		PB5	CLKOUT	AIN8	AINP1					WO2 ⁽⁴⁾		
12	10	7		PB4	RESET ⁽⁴⁾	AIN9	AINN1					WO1 ⁽⁴⁾		LUT0-OUT
13	11	8	6	PB3	TOSC1			RxD				WO0 ⁽⁴⁾		LUT2-OUT
14	12	9	7	PB2	TOSC2 EVOUTA			TxD				WO2		LUT2-IN2
15	13	10	8	PB1		AIN10	AINP2	XCK			SDA	WO1		LUT2-IN1
16	14	11	9	PB0		AIN11	AINN2	XDIR			SCL	WO0		LUT2-IN0
17	15	12		PC0		AIN12			XCK ⁽⁴⁾	SCK ⁽⁴⁾			0,WO ⁽⁴⁾	LUT3-IN0
18	16	13		PC1		AIN13			RxD ⁽⁴⁾	MISO ⁽⁴⁾				LUT1-OUT ⁽⁴⁾ LUT3-IN1
19	17	14		PC2	EVOUTC	AIN14			TxD ⁽⁴⁾	MOSI ⁽⁴⁾				LUT3-IN2
20	18	15		PC3		AIN15			XDIR ⁽⁴⁾	SS ⁽⁴⁾		WO3 ⁽⁴⁾		LUT1-IN0
21				PC4								WO4 ⁽⁴⁾	1,WO ⁽⁴⁾	LUT1-IN1 LUT3-OUT
22				PC5								WO5 ⁽⁴⁾		LUT1-IN2

Note:

1. Pin names are of type Pxn, with x being the PORT instance (A, B) and n the pin number. Notation for signals is PORTx_PINn.
2. All pins can be used for external interrupt, where pins Px2 and Px6 of each port have full asynchronous detection. All pins can be used as event input.
3. AIN[15:8] can not be used as negative ADC input for differential measurements.
4. Alternative pin location. For selecting alternative pin location refer to PORTMUX section.

The Microchip Website

Microchip provides online support via our website at <http://www.microchip.com/>. This website is used to make files and information easily available to customers. Some of the content available includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

Product Change Notification Service

Microchip's product change notification service helps keep customers current on Microchip products. Subscribers will receive email notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, go to <http://www.microchip.com/pcn> and follow the registration instructions.

Customer Support

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in this document.

Technical support is available through the website at: <http://www.microchip.com/support>

Microchip Devices Code Protection Feature

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Legal Notice

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with

your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackeTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TempTrackr, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, Vite, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2020, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-5934-7

Quality Management System

For information regarding Microchip's Quality Management Systems, please visit <http://www.microchip.com/quality>.

Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
<p>Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: http://www.microchip.com/support Web Address: http://www.microchip.com</p> <p>Atlanta Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455</p> <p>Austin, TX Tel: 512-257-3370</p> <p>Boston Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088</p> <p>Chicago Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075</p> <p>Dallas Addison, TX Tel: 972-818-7423 Fax: 972-818-2924</p> <p>Detroit Novi, MI Tel: 248-848-4000</p> <p>Houston, TX Tel: 281-894-5983</p> <p>Indianapolis Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380</p> <p>Los Angeles Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800</p> <p>Raleigh, NC Tel: 919-844-7510</p> <p>New York, NY Tel: 631-435-6000</p> <p>San Jose, CA Tel: 408-735-9110 Tel: 408-436-4270</p> <p>Canada - Toronto Tel: 905-695-1980 Fax: 905-695-2078</p>	<p>Australia - Sydney Tel: 61-2-9868-6733</p> <p>China - Beijing Tel: 86-10-8569-7000</p> <p>China - Chengdu Tel: 86-28-8665-5511</p> <p>China - Chongqing Tel: 86-23-8980-9588</p> <p>China - Dongguan Tel: 86-769-8702-9880</p> <p>China - Guangzhou Tel: 86-20-8755-8029</p> <p>China - Hangzhou Tel: 86-571-8792-8115</p> <p>China - Hong Kong SAR Tel: 852-2943-5100</p> <p>China - Nanjing Tel: 86-25-8473-2460</p> <p>China - Qingdao Tel: 86-532-8502-7355</p> <p>China - Shanghai Tel: 86-21-3326-8000</p> <p>China - Shenyang Tel: 86-24-2334-2829</p> <p>China - Shenzhen Tel: 86-755-8864-2200</p> <p>China - Suzhou Tel: 86-186-6233-1526</p> <p>China - Wuhan Tel: 86-27-5980-5300</p> <p>China - Xian Tel: 86-29-8833-7252</p> <p>China - Xiamen Tel: 86-592-2388138</p> <p>China - Zhuhai Tel: 86-756-3210040</p>	<p>India - Bangalore Tel: 91-80-3090-4444</p> <p>India - New Delhi Tel: 91-11-4160-8631</p> <p>India - Pune Tel: 91-20-4121-0141</p> <p>Japan - Osaka Tel: 81-6-6152-7160</p> <p>Japan - Tokyo Tel: 81-3-6880-3770</p> <p>Korea - Daegu Tel: 82-53-744-4301</p> <p>Korea - Seoul Tel: 82-2-554-7200</p> <p>Malaysia - Kuala Lumpur Tel: 60-3-7651-7906</p> <p>Malaysia - Penang Tel: 60-4-227-8870</p> <p>Philippines - Manila Tel: 63-2-634-9065</p> <p>Singapore Tel: 65-6334-8870</p> <p>Taiwan - Hsin Chu Tel: 886-3-577-8366</p> <p>Taiwan - Kaohsiung Tel: 886-7-213-7830</p> <p>Taiwan - Taipei Tel: 886-2-2508-8600</p> <p>Thailand - Bangkok Tel: 66-2-694-1351</p> <p>Vietnam - Ho Chi Minh Tel: 84-28-5448-2100</p>	<p>Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393</p> <p>Denmark - Copenhagen Tel: 45-4485-5910 Fax: 45-4485-2829</p> <p>Finland - Espoo Tel: 358-9-4520-820</p> <p>France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79</p> <p>Germany - Garching Tel: 49-8931-9700</p> <p>Germany - Haan Tel: 49-2129-3766400</p> <p>Germany - Heilbronn Tel: 49-7131-72400</p> <p>Germany - Karlsruhe Tel: 49-721-625370</p> <p>Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44</p> <p>Germany - Rosenheim Tel: 49-8031-354-560</p> <p>Israel - Ra'anana Tel: 972-9-744-7705</p> <p>Italy - Milan Tel: 39-0331-742611 Fax: 39-0331-466781</p> <p>Italy - Padova Tel: 39-049-7625286</p> <p>Netherlands - Druen Tel: 31-416-690399 Fax: 31-416-690340</p> <p>Norway - Trondheim Tel: 47-72884388</p> <p>Poland - Warsaw Tel: 48-22-3325737</p> <p>Romania - Bucharest Tel: 40-21-407-87-50</p> <p>Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91</p> <p>Sweden - Gothenberg Tel: 46-31-704-60-40</p> <p>Sweden - Stockholm Tel: 46-8-5090-4654</p> <p>UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820</p>

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Microchip:

[ATTINY1624-SSF](#) [ATTINY1624-SSFR](#) [ATTINY1627-MF](#) [ATTINY1627-MFR](#) [ATTINY1627-MU](#) [ATTINY1627-MUR](#)
[ATTINY1626-SU](#) [ATTINY1626-SUR](#) [ATTINY1626-XF](#) [ATTINY1626-XFR](#) [ATTINY1626-XU](#) [ATTINY1626-XUR](#)
[ATTINY1626-MF](#) [ATTINY1626-MFR](#) [ATTINY1626-MU](#) [ATTINY1626-MUR](#) [ATTINY1626-SF](#) [ATTINY1626-SFR](#)
[ATTINY1624-SSU](#) [ATTINY1624-SSUR](#) [ATTINY1624-XF](#) [ATTINY1624-XFR](#) [ATTINY1624-XU](#) [ATTINY1624-XUR](#)