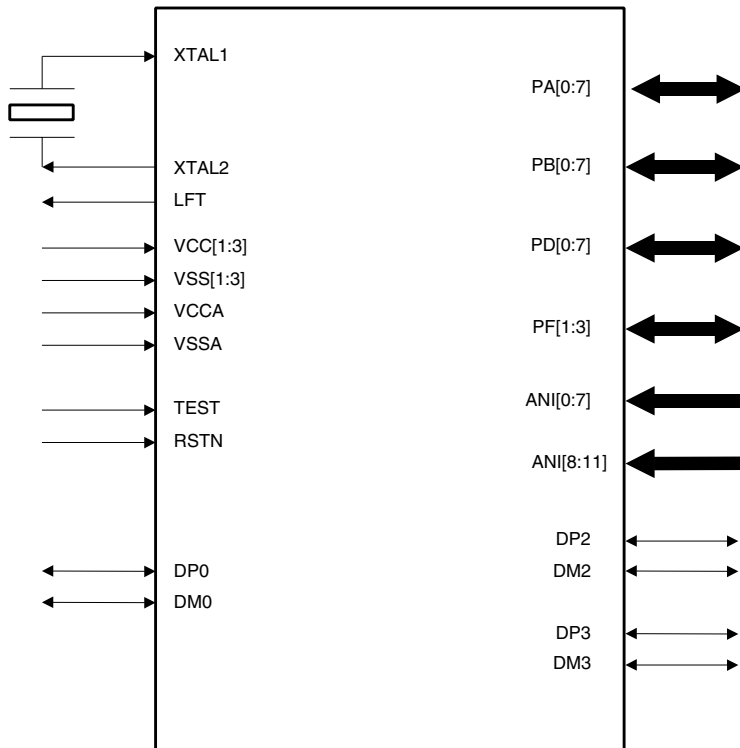


Features

- AVR[®] Microcontroller-based USB Hub and Function Controller
- Fully Programmable USB 1.1 Hub with 2 External and 1 Attached Downstream Ports
- Full Speed USB Function with 4 Endpoints
- High-performance and Low-power AVR RISC Microcontroller
- 120 Powerful Instructions – Most with 83 ns Execution Cycle Times
- 24K Bytes Program Memory in Masked ROM or Downloadable SRAM
- 1K Byte Internal SRAM
- 32 x 8 General Purpose Working Registers
- 27 Programmable I/O Port Pins
- 12 Channels 10-bit A-to-D Converter
- Programmable SPI Serial Interface
- One 8-bit Timer Counter with Separate Pre-scaler
- One 16-bit Timer Counter with Separate Pre-scaler and Two PWM
- External and Internal Interrupt Sources
- Programmable Watchdog Timer
- Low-power Idle and Power-down Modes
- 6 MHz Crystal Oscillator with PLL
- 5V Operation with On-chip 3.3V Regulators
- 64-lead LQFP Package



Full Speed USB Microcontroller with Embedded Hub, ADC and PWM

AT43USB355

Summary

Rev. 2603BS-USB-01/02





Overview

The Atmel AT43USB355 is a full speed USB AVR-based microcontroller with a USB 1.1 compliant embedded hub especially suitable for use in game controllers. The USB hub has 3 downstream ports, one of which is permanently attached to the USB function. The USB function controller has its own device address and endpoints. In game controller applications, the two external downstream USB ports can be used to connect other devices such as headphones sets for voice commands of games, Flash memory modules, or any other USB device.

The A-to-D converters have a minimum conversion time of 12 μ s that together with the 12-input channel should cover even the most demanding game controllers such as gamepads, joysticks and racing wheels. The two PWM outputs can be programmed for 8-, 9- or 10-bit resolution for applications requiring force feedback. The 27 general-purpose programmable I/O pins provide generous inputs for the various buttons and switches and LED indicators that are being used in increasing numbers in today's game controllers.

The USB hardware block consists of a USB transceiver, SIE, hub repeater, endpoint controllers, and an interface to the microcontroller. The USB hardware of the AT43USB355 supports the physical and link layers of the USB protocol while the transaction layer and hub controller functions must be implemented in the microcontroller's firmware. If the application does not require a hub, it can be disabled. The AVR architecture was developed to be programmed in C efficiently and without loss in performance.

There are two versions of the chip. The AT43USB355E has a SRAM program memory that is automatically loaded from an external serial Flash/EEPROM during power on reset. The AT43USB355M stores its firmware in a masked ROM. The two versions are pin and function compatible.

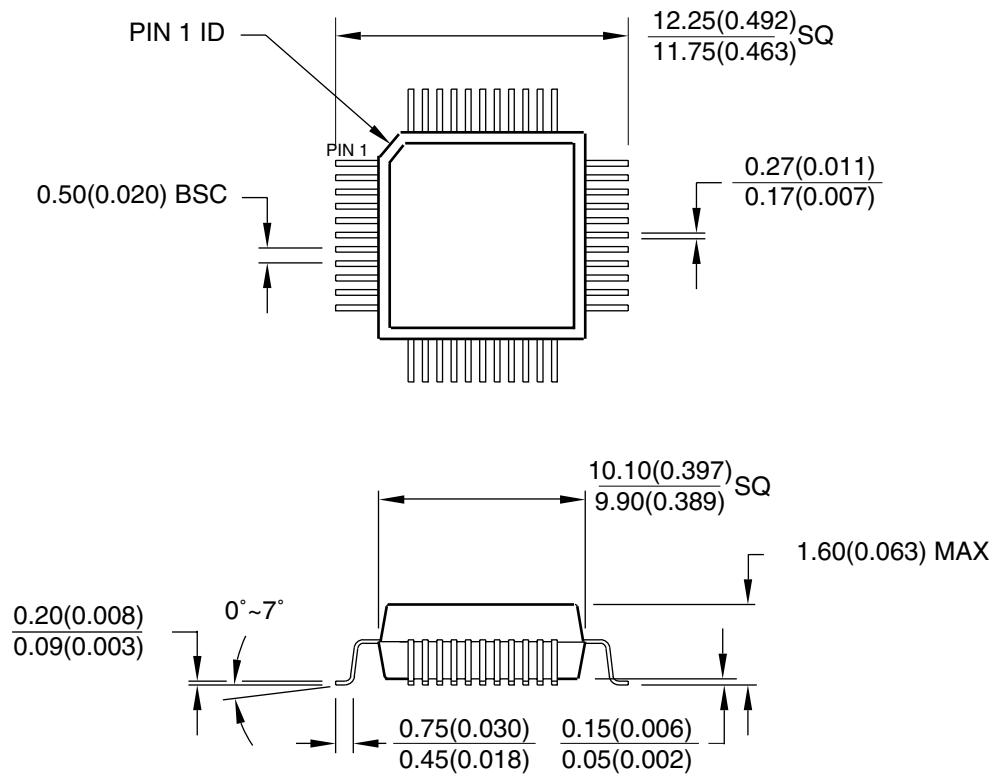
Development Support

The AT43USB355 uses the same program and development tools as the Atmel AVR microcontrollers including: C compilers, macro assemblers, program debuggers/simulators, in-circuit emulators. A development kit is also available including firmware source code for the most common USB applications.

Packaging Information

64AA – LQFP

Dimensions in Millimeters and (Inches)
 Controlling Dimensions: Millimeters
 JEDEC STANDARD MS-026 ACB



REV. A 1/15/2002



2325 Orchard Parkway
 San Jose, CA 95131

TITLE

64AA, 64-lead, Low-profile (1.4 mm) Plastic Quad Flat Package (LQFP)

DRAWING NO.

64AA

REV.

A





Atmel Headquarters

Corporate Headquarters

2325 Orchard Parkway
San Jose, CA 95131
TEL 1(408) 441-0311
FAX 1(408) 487-2600

Europe

Atmel SarL
Route des Arsenaux 41
Casa Postale 80
CH-1705 Fribourg
Switzerland
TEL (41) 26-426-5555
FAX (41) 26-426-5500

Asia

Atmel Asia, Ltd.
Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimhatsui
East Kowloon
Hong Kong
TEL (852) 2721-9778
FAX (852) 2722-1369

Japan

Atmel Japan K.K.
9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
TEL (81) 3-3523-3551
FAX (81) 3-3523-7581

Atmel Operations

Memory

Atmel Corporate
2325 Orchard Parkway
San Jose, CA 95131
TEL 1(408) 436-4270
FAX 1(408) 436-4314

Microcontrollers

Atmel Corporate
2325 Orchard Parkway
San Jose, CA 95131
TEL 1(408) 436-4270
FAX 1(408) 436-4314

Atmel Nantes

La Chantrerie
BP 70602
44306 Nantes Cedex 3, France
TEL (33) 2-40-18-18-18
FAX (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards

Atmel Rousset
Zone Industrielle
13106 Rousset Cedex, France
TEL (33) 4-42-53-60-00
FAX (33) 4-42-53-60-01

Atmel Colorado Springs
1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906
TEL 1(719) 576-3300
FAX 1(719) 540-1759

Atmel Smart Card ICs
Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
TEL (44) 1355-803-000
FAX (44) 1355-242-743

RF/Automotive

Atmel Heilbronn
Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
TEL (49) 71-31-67-0
FAX (49) 71-31-67-2340

Atmel Colorado Springs
1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906
TEL 1(719) 576-3300
FAX 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/ High Speed Converters/RF Datacom

Atmel Grenoble
Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
TEL (33) 4-76-58-30-00
FAX (33) 4-76-58-34-80

e-mail

literature@atmel.com

Web Site

<http://www.atmel.com>

© Atmel Corporation 2002.

Atmel Corporation makes no warranty for the use of its products, other than those expressly contained in the Company's standard warranty which is detailed in Atmel's Terms and Conditions located on the Company's web site. The Company assumes no responsibility for any errors which may appear in this document, reserves the right to change devices or specifications detailed herein at any time without notice, and does not make any commitment to update the information contained herein. No licenses to patents or other intellectual property of Atmel are granted by the Company in connection with the sale of Atmel products, expressly or by implication. Atmel's products are not authorized for use as critical components in life support devices or systems.

ATMEL® and AVR® are the registered trademarks of Atmel.

Other terms and product names may be the trademarks of others.



Printed on recycled paper.