Features

- **Compatible with Atmel Two-wire Interface Serial Memory and I²C Compatible Devices**(Note:)
- **One, Two or Three Bytes for Slave Address**
- **Sequential Read/Write Operations**
- **Master, Multi-master and Slave Mode Operation**
- **Bit Rate: Up to 400 Kbits**
- **General Call Supported in Slave mode**

Note: See Table 1-1 below for details on compatibility with I²C Standard.

1. Description

The Atmel Two-wire Interface (TWI) interconnects components on a unique two-wire bus, made up of one clock line and one data line with speeds of up to 400 Kbits per second, based on a byte-oriented transfer format. It can be used with any Atmel Two-wire Interface bus Serial EEPROM and I²C compatible device such as Real Time Clock (RTC), Dot Matrix/Graphic LCD Controllers and Temperature Sensor, to name but a few. The TWI is programmable as a master or a slave with sequential or single-byte access. Multiple master capability is supported. Arbitration of the bus is performed internally and puts the TWI in slave mode automatically if the bus arbitration is lost.

A configurable baud rate generator permits the output data rate to be adapted to a wide range of core clock frequencies.

Below, Table 1-1 lists the compatibility level of the Atmel Two-wire Interface in Master Mode and a full I^2C compatible device.

Table 1-1. Atmel TWI compatibility with i2C Standard

I2C Standard	Atmel TWI
Standard Mode Speed (100 KHz)	Supported
Fast Mode Speed (400 KHz)	Supported
7 or 10 bits Slave Addressing	Supported
START BYTE(1)	Not Supported
Repeated Start (Sr) Condition	Supported
ACK and NACK Management	Supported
Slope control and input filtering (Fast mode)	Not Supported
Clock stretching	Supported

Note: 1. START + b000000001 + Ack + Sr

32-bit Embedded ASIC Core Peripheral

Two-wire Interface (TWI2)

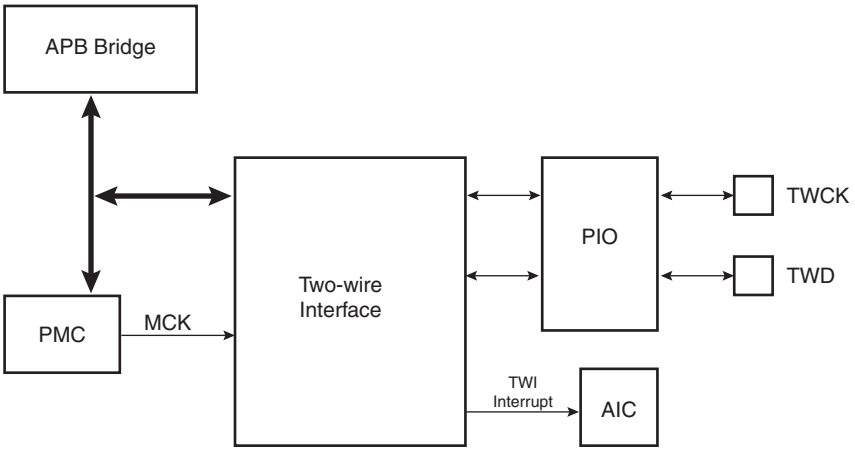
Summary

NOTE: This is a summary document. The complete document is available under NDA. For more information, please contact your local Atmel sales office.

6212BS–ATARM–21-May-07

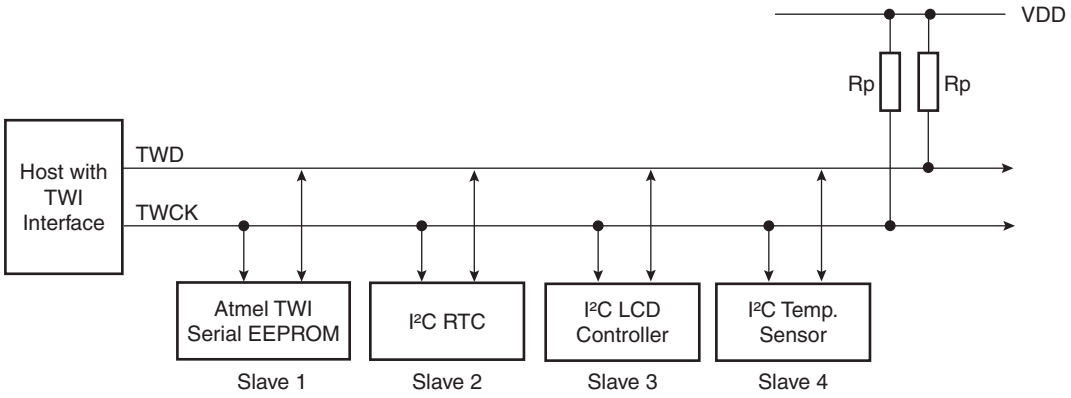
2. Block Diagram

Figure 2-1. TWI Block Diagram



3. Application Block Diagram

Figure 3-1. TWI Application Block Diagram



Rp: Pull up value as given by the I²C Standard

Revision History

Table 3-1. Revision History

Doc. Rev	Comments	Change Request Ref.
6212AS	First issue	
6212BS	"Features" on page 1, and Descriptioin updated with details on Atmel TWI compatibility with I2C standard. Figure 2-1 Block Diagram updated. Table 1-1 and Figure 3-1 Application Block added	4373

Headquarters

Atmel Corporation
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

International

Atmel Asia
Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Atmel Europe
Atmel Europe
Le Krebs
8, rue Jean-Pierre Timbaud
BP 309
78054 St Quentin-en-Yvelines Cedex
France
Tel: (33) 1-30-60-70-00
Fax: (33) 1-30-60-71-11

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

Operations

Memory
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

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
Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive
Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Biometrics
Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-47-50
Fax: (33) 4-76-58-47-60

Literature Requests
www.atmel.com/literature