

AT89C51SND1 Development Board

User Guide





Table of Contents

Section 1

Introduction	1-1
1.1 References.....	1-1
1.2 Abbreviations	1-1
1.3 Additional Resources	1-1

Section 2

AT89C51SND1

Development Board	2-2
2.1 Board Description.....	2-2
2.1.1 Power Supply Area.....	2-2
2.1.2 AT89C51SND1 Area	2-3
2.1.3 Keypad Area	2-3
2.1.4 Display Area	2-3
2.1.5 DAC Area	2-3
2.1.6 In-System Programming (ISP) Area	2-3
2.1.7 DataFlash Area.....	2-3
2.1.8 MultiMedia Card (MMC) Area	2-3
2.1.9 USB Area.....	2-3
2.1.10 Voice Area	2-4
2.1.11 Two Wire Interface (TWI) Area	2-4
2.1.12 UART Area	2-4
2.1.13 Analog (AN) Area	2-5
2.1.14 Extension Area	2-6

Section 1

Introduction

The AT89C51SND1 development board is part of the AT89C51SND1 starter kit.

This document is the user's guide of the AT89C51SND1 development board, its goal is to give user an overview of the board's hardware.

The AT89C51SND1 development board has been designed to demonstrate the AT89C51SND1's capability to support the following features:

- MP3 song playing
- Voice recording/playing
- MultiMedia Card[®] with FAT16
- USB mass storage
- USB firmware upgrade
- Serial DataFlash[®] Storage Memory

-
- 1.1 References**
- AT89C51SND1 Complete Datasheet
 - AT89C51SND1 Summary Datasheet
 - AT89C51SND1 Errata Sheet

-
- 1.2 Abbreviations**
- MP3: MPEG layer 3
 - MMC: MultiMedia Card
 - USB: Universal Serial Bus
 - FAT: File Allocation Table
 - DataFlash[®]: Atmel on-board Flash memories

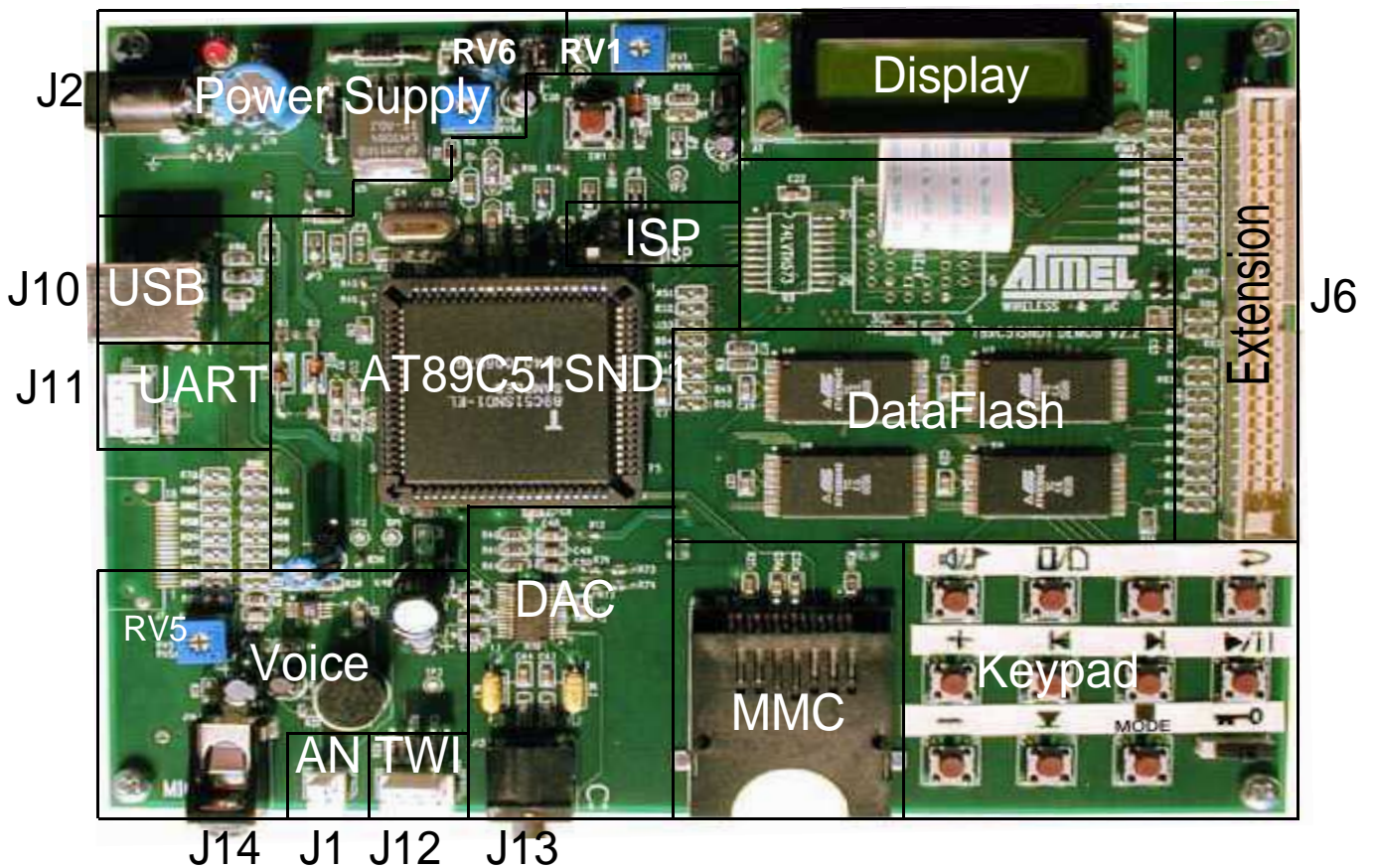
-
- 1.3 Additional Resources**
- Flexible In-System Programming (FLIP) software – FLIP software can be downloaded from Atmel site. FLIP is available for both Windows[®] and Linux[®]. FLIP allows to perform In-System Programming from a PC.
 - Updating Firmware – Firmware can be updated by contacting Atmel Technical Sales Support.
 - Product Information – All updated product information can be retrieved at the Atmel Web Site, www.atmel.com.

Section 2

AT89C51SND1 Development Board

2.1 Board Description Figure 2-1 shows the V2.2 development board and its different functional areas. These areas are detailed in the following sections.

Figure 2-1. Development Board



2.1.1 Power Supply Area The board is powered by $5V \pm 10\%$. This voltage is necessary for the LCD display. An on-board regulator delivers 3V voltage, adjustable using RV6, for the rest of the board. Figure 2-2 shows the power supply connector pinout. Table 1 gives its pin assignment.

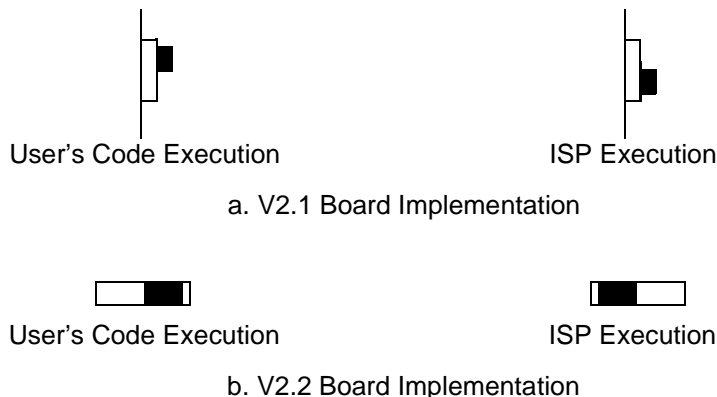
Figure 2-2. J2 Connector



Table 1. J2 Pinout

Pin Number	Pin Assignment
1	PS (+5V supply voltage)
2	GND (0V supply reference)

- 2.1.2 AT89C51SND1 Area** The AT89C51SND1 area consists of the AT89C51SND1 product along with the following items:
- Reset Circuit
 - 16 MHz Oscillator
 - PLL Filter
 - Analog Reference Circuit
- 2.1.3 Keypad Area** The keypad area consists of a 4 by 3 matrix with one key replaced by a “Keypad Lock” switch.
- 2.1.4 Display Area** The display area consists of a 2-line by 16 characters LCD display. The contrast is adjustable using RV1 variable resistor.
- 2.1.5 DAC Area** The DAC area consists of a standard audio DAC embedding the headphone amplifier. The headphone connector is standard and allows connection of all headphone types.
- 2.1.6 In-System Programming (ISP) Area** The ISP area contains a switch that allows the user to select the AT89C51SND1 hardware condition and thus execute the embedded bootloader or to run the client application. Note that on V2.1 board, the switch is located on the right side of the board near J6 connector. Figure 2-3 shows the switch position to enter ISP mode.

Figure 2-3. ISP Switch Position

- 2.1.7 DataFlash Area** The DataFlash area consists of the on-board Flash memory. It is composed of four AT45DB642 giving 32-Mb for the V2.2 board or four AT45DB321 giving 16-Mb for the V2.1 board.
- 2.1.8 MultiMedia Card (MMC) Area** The MultiMedia Card area consists of a 2-slot connector that allows the plug-in of two MMC cards simultaneously.
- 2.1.9 USB Area** The USB area consists of a standard USB type B receptacle for the V2.2 board while V2.1 is equipped with a mini but non-standard connector. USB is used for two different tasks:
- Firmware upgrade for In-System Programming.

- Mass storage for song downloading or uploading.

The board is delivered with a USB cable.

2.1.10 Voice Area

The voice area consists of an electret type microphone along with a preamplifier to adapt the level to the AT89C51SND1 ADC input. Gain is adjustable using RV5. A mono jack connector allows connection of an external electret type microphone. Figure 2-4 shows the external microphone connector pinout while Table 2 gives its pin assignment.

Figure 2-4. J14 Male Connector

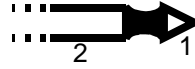


Table 2. J14 Pinout

Pin Number	Pin Assignment
1	Microphone input signal. This input is polarized through a 2.2 kΩ resistor.
2	AVREFN (Analog 0V reference signal)

2.1.11 Two Wire Interface (TWI) Area

The TWI area consists of a 4-pin extension connector implemented to support and power TWI devices. Figure 2-5 shows the external microphone connector pinout while Table 3 gives its pin assignment.

Figure 2-5. J12 TWI Extension Connector

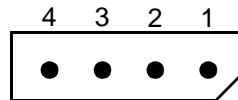


Table 3. J12 Pinout

Pin Number	Pin Assignment
1	VDD (Digital 3V)
2	VSS (Digital 0V)
3	SCL
4	SDA

2.1.12 UART Area

The UART area consists of a 4-pin extension connector implemented to support and power RS232 or other interface drivers. Figure 2-6 shows the UART extension connector pinout while Table 4 gives its pin assignment.

Figure 2-6. J11 UART Extension Connector

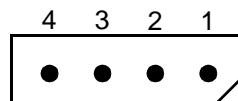


Table 4. J11 Pinout

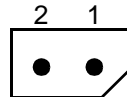
Pin Number	Pin Assignment
1	VDD (3V)
2	VSS (0V)

Table 4. J11 Pinout (Continued)

Pin Number	Pin Assignment
3	RXD (3V logic signal)
4	TXD (3V logic signal)

2.1.13 Analog (AN) Area

The AN area consists of a 2-pin analog extension connector. It allows direct connection to the AT89C51SND1 AIN0 input. It can be used, for example, to monitor a battery level or to connect a remote control located on the headphone cable. Figure 2-7 shows the UART extension connector pinout while Table 5 gives its pin assignment.

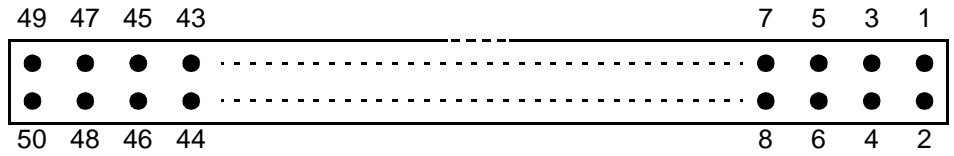
Figure 2-7. J1 Analog Extension Connector**Table 5.** J1 Pinout

Pin Number	Pin Assignment
1	3V max analog input
2	AVREFN (Analog 0V reference signal)

2.1.14 Extension Area

The Extension area consists of a 50-pin connector implemented to support extension cards such as IDE adapter.

Figure 2-8. J6 Extension Connector



Pin Number	Pin Assignment	Pin Number	Pin Assignment
1	A8	2	NC
3	A9	4	NC
5	A10	6	NC
7	A11	8	NC
9	A12	10	NC
11	A13	12	NC
13	A14	14	NC
15	A15	16	NC
17	ALE	18	NC
19	RST	20	VSS
21	NC	22	VSS
23	WR#	24	NC
25	RD#	26	NC
27	NC	28	VSS
29	CLK	30	VSS
31	NC	32	NC
33	ISP#	34	NC
35	AD7	36	NC (V2.1) / A7 (V2.2)
37	AD6	38	NC (V2.1) / A6 (V2.2)
39	AD5	40	NC (V2.1) / A5 (V2.2)
41	AD4	42	NC (V2.1) / A4 (V2.2)
43	AD3	44	NC (V2.1) / A3 (V2.2)
45	AD2	46	NC (V2.1) / A2 (V2.2)
47	AD1	48	NC (V2.1) / A1 (V2.2)
49	AD0	50	NC (V2.1) / A0 (V2.2)



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
Case Postale 80
CH-1705 Fribourg
Switzerland
TEL (41) 26-426-5555
FAX (41) 26-426-5500

Asia

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

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

Atmel Operations

Memory

2325 Orchard Parkway
San Jose, CA 95131
TEL 1(408) 441-0311
FAX 1(408) 436-4314

Microcontrollers

2325 Orchard Parkway
San Jose, CA 95131
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
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
TEL 1(719) 576-3300
FAX 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/ High Speed Converters/RF Data- com

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 DataFlash® are registered trademarks of Atmel. MultiMediaCard® is a registered trademark of MultiMediaCard Association. Windows® is a registered trademark of Microsoft Corporation. Linux® is a registered trademark of Linus Torvalds.

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



Printed on recycled paper.