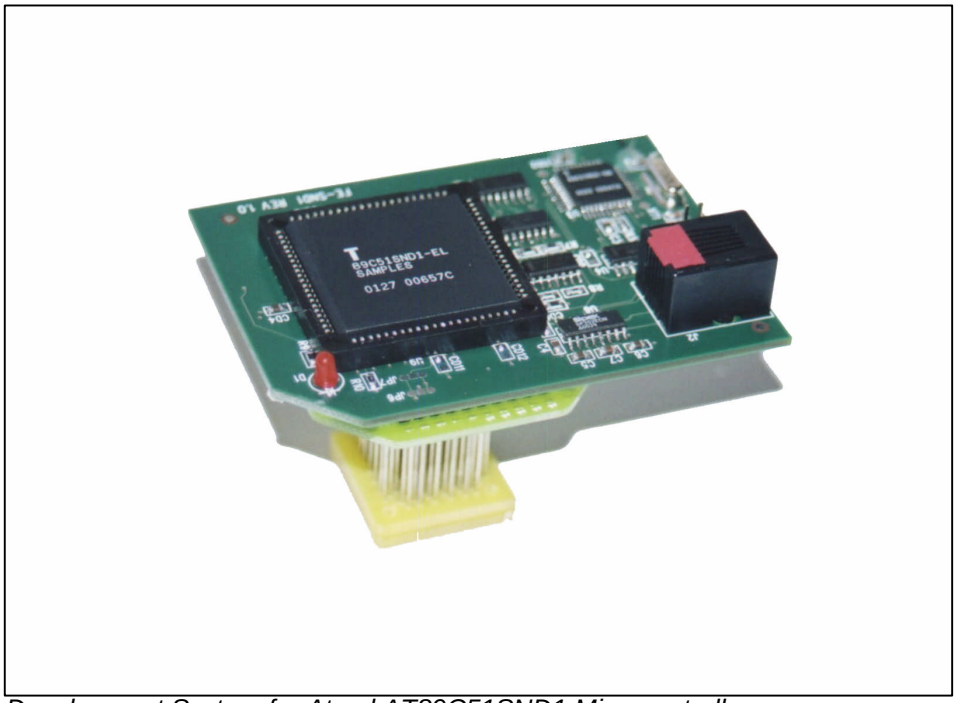
CEIBO FE-51SND1
Development System



Development System for Atmel AT89C51SND1 Microcontrollers

FEATURES

- **Emulates Atmel AT89C51SND1**
- **58K Code Memory**
- **Real-Time Emulation**
- **Frequency up to 20MHz/3V**
- **ISP and X2 Mode Support**
- **MS-Windows Debugger For C And Assembler**
- **Emulation Headers and Signal Testpoints**
- **Programmer Included**
- **Serially Linked to IBM PC at 115Kbaud**

DESCRIPTION

Ceibo FE-SND1 is a development system that supports ATMEL AT89C51SND1 microcontrollers with 6/12 clocks/cycle at any frequency allowed by the devices. It is serially linked to a PC or compatible systems and can emulate the microcontrollers using either the built-in clock generator or any other clock source connected to the microcontroller. Emulation is carried out by loading the system with the user software and an embedded monitor program. FE-SND1 locates the monitor in the upper 2K of the code memory space. Two working modes are available: real-time and simulator. In the ***real-time mode*** the user software is executed transparently and without interfering with the microcontroller speed. Breakpoints can be added to stop program execution at a specific address. The ***simulation mode does not implement all the chip options*** and it is intended only for software debugging of the basic 8051 functions. The software includes C and Assembler Source Level Debugger, On-line Assembler and Disassembler, Trace, Conditional Breakpoints and many other features. The system is supplied with Windows debugger software, RS-232 cable, QFP adapter and ISP Programmer.

The system 2 main components are:

1. FE-SND1 - In-circuit Emulator
2. QFP Adapter (PLCC optional)

SPECIFICATIONS

SYSTEM MEMORY

FE-SND1 provides 64K of code memory. However, only 58K are available for user programs while emulating because the system comes with an embedded monitor program that uses the upper 2K of the memory space, from E800h to EFFFh. The ISP routines use 4K of the memory space, from F000h to FFFFh. Code memory is mapped as belonging to the FE-SND1 Emulator.

BREAKPOINTS

Breakpoints allow real-time program execution until an opcode is executed at a specified address.

WINDOWS DEBUGGER

The FE-SND1 software includes a source level debugger for Assembler and high-level languages C and others with the capability of executing lines of the program while displaying the state of any variable. The debugger uses symbols contained in the absolute file generated by the most commonly used Assemblers and High Level Language Compilers. The CEIBO Windows Debugger runs under Windows 95 or later and also under Windows NT.

KEIL μVISION2 DEBUGGER
This debugger may also be used to operate the emulator. Some files have to be added to the original Keil software and those can be downloaded from **www.ceibo.com**.

SUPPORTED MICROCONTROLLERS
The system supports ATMEL AT89C51SND1 microcontrollers and other derivatives that will be announced in the future. The standard supported package for emulation is QFP-80.

FREQUENCY
FE-SND1 runs from the clock source supplied by the user hardware. The minimum and maximum frequencies are determined by the emulated chip characteristics, while the emulator maximum frequency is 40MHz.

HOST CHARACTERISTICS
PC or compatible systems with 8 MByte of RAM, one RS-232C interface card for the PC, Windows 95 or later.

INPUT POWER
3V, 0.5A power supply not supplied.

MECHANICAL DIMENSIONS
4cm x 7cm.

ITEMS SUPPLIED AS STANDARD

Development system including emulator, ISP programmer and development board, QFP emulation header, Windows software with source level debugger, on-line assembler and disassembler, user's manual and RS-232 cable.

OPTIONS
84-PLCC adapter and termination board.

HARDWARE DESCRIPTION

FE-SND1 EMULATOR
The first step required to work with the FE-SND1 board is to be able to identify its different parts and to understand how the electronics function. This will help you to take full advantage of all the FE-SND1 capabilities. On the bottom side of the FE-SND1 you will see a phone jack. It is used to serially link the FE-SND1 to your computer and to utilize the software in emulation mode instead of just the simulator. The emulation mode is used to interact with the hardware while the simulator is independent of any hardware connection. The RS-232 cable connections are given separately. On the right side of the RS-232 connector you will see a POWER LED indicating whether or not the power is applied to the system. ***The emulator must be connected to a target to be powered and to receive the clock input otherwise it will not work.*** If you do

not have a target ready, ADP-84P/SND1-3V adapter can be used (this adapter provide a clock source, connector to a 5V power supply and 5V to 3.3V DC convertor). U1 is the microcontroller used for your emulation. It is placed on an 84-PLCC socket. On the other side of the board there are row of pins that you must connect to a target board. ***Make sure that pin #1 of the QFP or PLCC adapters are aligned to pin #1 of the emulator and to pin #1 of your target***. The emulator and adapters are clearly marked and have the same direction as U1.

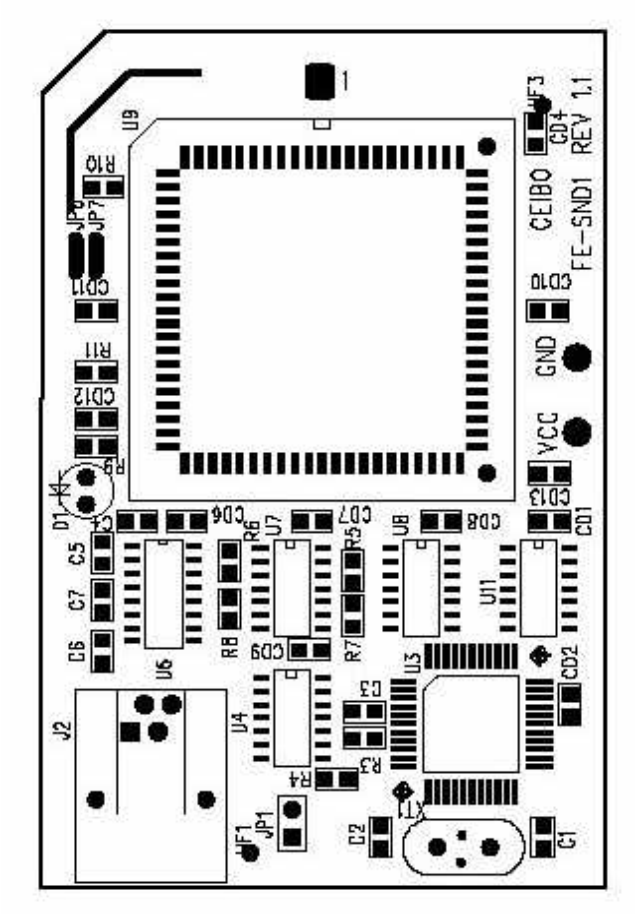


FIGURE 1: FE-SND1 Emulator

JP1 is a connector necessary only for firmware updates. Make sure that the cap is not placed on it to work properly. If any firmware update will be necessary, follow the instructions that will come with it in **www.ceibo.com**.

QFP-80 ADAPTER

This adapter has to be connected to the emulator and your target. The bottom is a soldering block that fits in the footprint of the target microcontroller. Ceibo has also PLCC-84 adapters for the additional package of the AT89C51SND1 microcontroller.



FIGURE 2: QFP Adapter

ACCESSORIES

- **ADP-84/SND1-PLCC -** Adapter for 84-PLCC derivatives, used instead of the 80-QFP soldering block.

- **ADP-84/SND1-T -** Termination board to be attached to the emulator while a target is not available, thus allowing the emulator to work in stand-alone mode. Provides connection to a power supply and crystal.

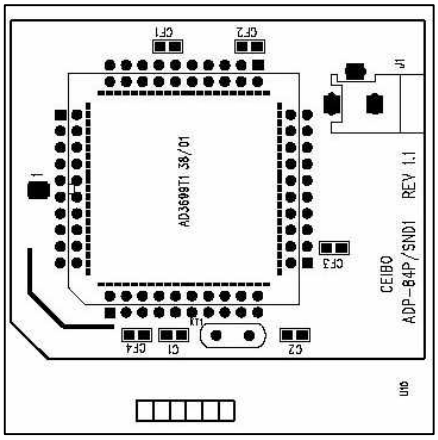


FIGURE 5: ADP-84/SND1

EMULATION RESTRICTIONS

The following restrictions are valid for FE-SND1:

1. FE-SND1 Monitor Program shares 2 KByte of the 64K memory

   programs while emulating because the system comes with an embedded monitor program that uses these 2K of the memory space, from E800h to EFFFh. The ISP routines use 4K of the memory space, from F000h to FFFFh.

2. Code memory cannot be mapped external and always belongs to the emulator system.

3. The program also uses 4 Bytes of the internal stack memory.

4. The stack pointer may not be defined below address 7.

5. The first instruction (address 0000h) must be 3-bytes long. For example: use LJMP and not SJMP or AJMP as the first instruction.

6. The UART is shared with the system and interrupts should not be disabled. Also the related timer to the serial port must not be stopped. The Halt Mechanism in the Options Menu offers other solutions in case you need these resources in your application. However, RxD and TxD cannot be used as General Purpose I/O and they are the UART Input and Output respectively.

7. Breakpoints cannot be set to the Reset Vector (address 0000h-0002h), Serial Interrupt (address 0023h-0025h) or to the 4K of the reserved memory space (address F000h-FFFFh). Any other location is allowed, included inside interrupt service routines.

8. The simulation mode supports only the basic functions of the 8051 microcontrollers. Special registers and functions of some derivatives may be not supported in the simulation modes. Use the real-time mode for fully support of dedicated functions.

FE-SND1 - ORDERING INFORMATION

Item	*Description*
FE-51SND1	Emulator for AT89C51SND1
ADP-84/SND1-PLCC	Adapter for 84-PLCC
ADP-84/SND1-T	Termination board