
8051 Family In-Circuit Emulator

The EMUL51™-PC is a high performance in-circuit emulator specifically designed to provide an optimal environment for 8051 family microcontroller hardware and software development. The EMUL51-PC consists of a board which plugs directly into the IBM PC/XT/AT bus. An optional Trace board features advanced trace functioning with sophisticated trigger capabilities. The POD, which plugs into the target system, is connected to the emulator board with a 5 ft. ribbon cable for operating range flexibility. Optionally, an RS-232 box can be used which communicates with the PC at up to 115K baud. Yet another option, the LanICE, allows the EMUL51-PC to run on workstations such as SUN or HP.

The World's Most Popular 8051 Emulator

Since its introduction 1986, Nohau has delivered over 10,000 EMUL51-PC emulators. Each emulator is often used in several projects where different 8051 derivatives are needed. Only a change of the probe is required when a new derivative needs emulation support.

Choice of Different User Interfaces

Early in the evolution of the EMUL51-PC's user interface, it became clear that each customer has different opinions of how they would like the interface to work and what features were important to them. One of the three main user interface choices for the EMUL51-PC is Microsoft Windows 3.x. The other two are ChipView's Borland keypress compatible and Nohau's original pull-down/command line version.

Hosted on PCs and Workstations

The emulator was designed to be plugged into a full size PC/AT style slot. The optional trace needs a second slot. These same boards can also be supplied in an "RS-232 box" which communicates with the PC over a standard COM port. To use the EMUL51-PC on XWindows workstations such as SUN or HP, the Nohau LanICE is available. Because LanICE uses a high speed (10 Mbit/second) local area network, not only can it be placed far away from the workstation but it maintains the relatively high code loading speed of the Nohau emulators plugged into your PC on your desk top. LanICE also supports personal computers on a network.

Real Time Trace

The EMUL51-PC offers trace features not found in other emulators. The trace buffer can record up to 256K bus cycles with 64 bits of data. The trace can be operated "on-the-fly" which means that it can be viewed, programmed and retriggered without disturbing program execution. With the trace setup menu you can define what events are to be stored in the trace buffer. The real-time trace can be stopped (triggered) at a selected event or after a combination of multiple events.

For additional information please contact:

Nohau Corporation
51 E. Campbell Avenue
Campbell, CA 95008
TEL: 408-866-1820
FAX: 408-378-7869



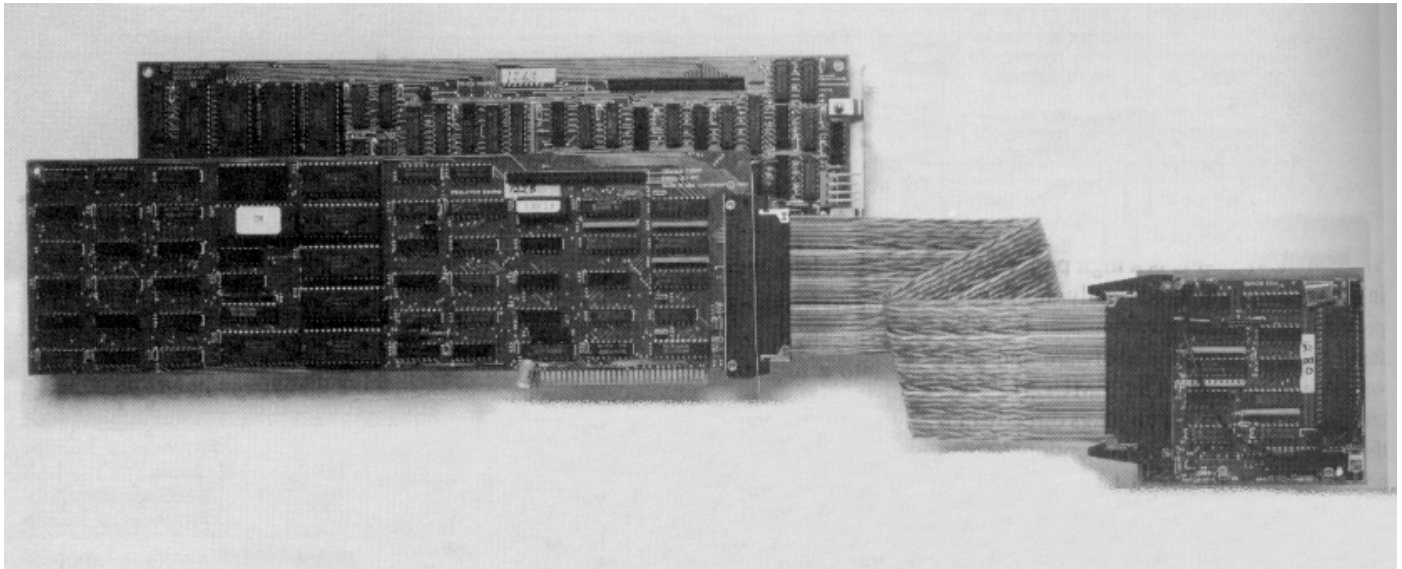
AT89 Series Development

Tools Support

0516B-A-12/97



Figure 1. EMUL51

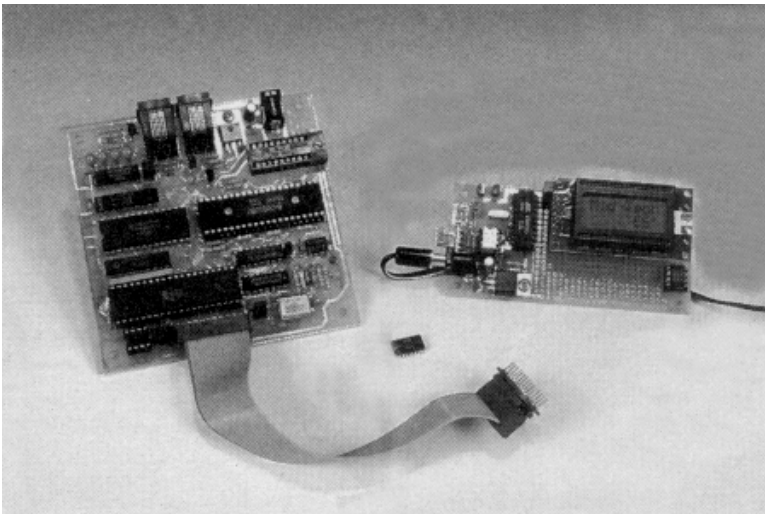


2051 Design Center

Mid-Tech's AT89C2051 Design Center includes everything you need to take your design from simulation, through target debugging, to standalone operation. Specifically designed to support Atmel's 20-pin processor family, the

2051 Design Center delivers features and capabilities normally found only in much more expensive development systems.

Figure 2. AT89C2051 Design Center



Target Debugger Board with Built-in Flash Programmer

Operating under control of a "windowed" PC control program, a high speed serial link provides nearly instantaneous communication to the target system. The result is a friendly, truly interactive, development environment. A ZIF programming site and resident flash algorithms provide full programming support for the AT89C1051 and AT89C2051.

AT89C2051 Family Simulator, Target System Debugger, and Assembler

The simulator runs stand-alone on a PC and also lets you include the target's physical I/O lines, timers, serial port, etc. in your simulation. The target system debugger gives you complete control over the system under development and features a user interface identical to that of the simulator.

Features Include:

- Single-step, multi-step, animate, and high-speed execution modes.
- Simultaneous on-screen displays of program disassembly, data memory, and CPU registers.
- Full screen editors for CPU registers, special function registers, data and program memories.
- Multiple breakpoints are transparent to the user program.
- Serial I/O may be displayed in a window on the PC or can be redirected to the target system.

- Prototyping Board and AT89C2051 Included
- The 2051 Design Center includes an AT89C2051 prototyping board with built-in power supply and large pad-per-hole prototyping area, AT89C2051 processor included.
- Priced at \$299.95 for the full-up system.

For additional information please contact:

Mid-Tech Computing Devices
P.O. Box 218
Stafford, CT 06075
TEL: 860-684-2442

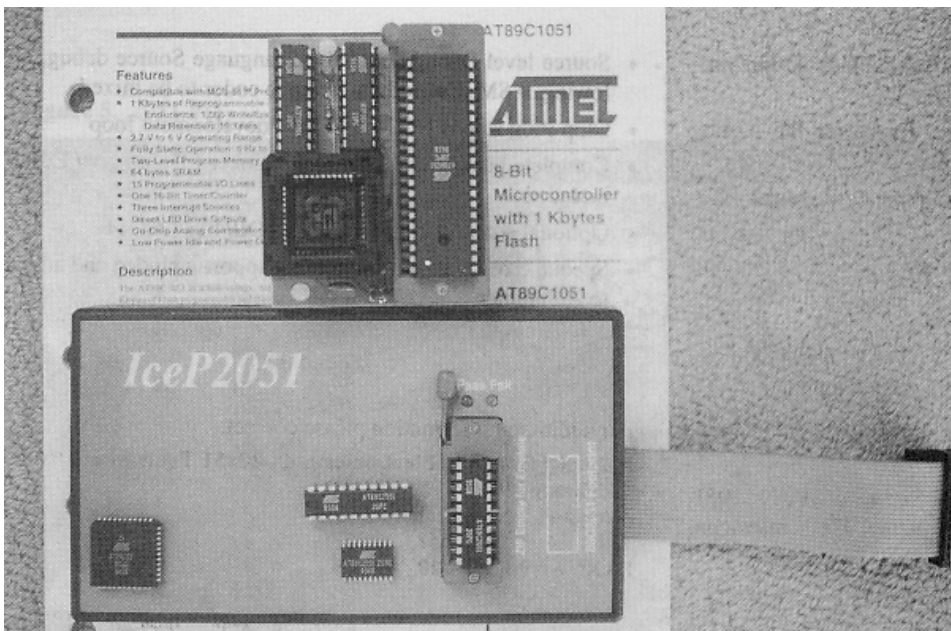
IceP2051 Emulator/Reprogrammer

The IceP2051 Emulator / ReProgrammer is a complete development station for the Atmel Flash AT89C1051 and AT89C2051 microcontrollers. It is a full speed, RAM based ICE, intended for full product developments. Unlike other systems, IceP2051 does not rely on PC Simulation, nor require you to erase/program a chip with each iteration. The Edit Assemble Debug loop takes just a few seconds.

When your code is tested/optimized, the programmer can be used for your volume production.

If you are using the older OTP technology, or a single sourced uC core, there are cross migration tools to assist porting your code.

Figure 3. IceP2051 Emulator / ReProgrammer



The DbgX51 debugger has a multi, scalable window display, and fast 'text editor' style operation. To change any location, just place the cursor, and edit.

Multiple breakpoints, and Step, Skip, GotoHere debug commands are supported. This example shows DbgX51 / IceP0251 running the optional Modula-2 compiler - code illustrated is the multi i2c library.

Dbg2051.ZIP - Demo of IceP2051 Debugger.

Env2051.ZIP - Demo of IceP2051 environment.

IceP2051.ZIP - Both of the above, full system demo.

Figure 4. Modula-2 compiler - code

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File      Window      Edit      Assemble  View      Break/run  Options

110      Program code

(0039)  IF Start_i2c(P8583_Wr) THEN      (* user controls R/W with LSB of Address
(003F)      Send_i2c(40H);                (* Set Address *)
(0043)      Send_i2c(IO_Value);          (* write Data to i2c RAM *)
(0047)      INC(IO_Value);
(0049)      Send_i2c(IO_Value);          (* Write to next RAM location, Autol
(---)      END;
(004D)  Stop_i2c;

DbgX51 v4.66b (c) 1994 Mandeno Granville Electronics

Registers      disasseMbly      Int. data

PC 0000 CA0RRO1P      0039 7A A0 MOV R2,#A0      06: 09 14 00 00 00 9F
PSW C0 11000000      003B 31 0A ACALL 010A      0C: 8F FF 9F 5D 00 F6
SP 26 ra:2680      003D 50 0E JNC 004D      12: 7F 5E 7F FF CF 5F
A ':00 00000000      003F 7A 40 MOV R2,#40      18: E0 F6 DF 7E 9F 6F
B 00 00000000      0041 11 B8 ACALL 00B8      1E: 1F 4F 00 F6 2F 5E
DP 0000:01 24 FF      0043 AA 22 MOV R2,22      24: 7F 80 26 3A 83 00

Sfr 89C2051

90 P1 FF 11111111 b P1.7 P1.6 P1.5 P1.4 P1.3 P1.2 P1.1 P1.0
B0 P3 FF 11111111 b -- T0 T1 INT1 INT0 TXD RXD
88 TCON 00 00000000 b TF1 TR1 TF0 TR0 IE1 IT1 IE0 IT0
89 TMOD 00 00000000 GATE1 C/T1 M1 M0 GATE0 C/T0 M1 M0

CHKI2C Cleared Buffer -> OFFH, & Downloaded HEX READY

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IceP2051

- Full ICE + ReProgrammer for the Atmel Flash 20-Pin variants (40.44 With adaptor)
- Real Time, RAM based, Emulation (including the Analog Comparitor)
- Full screen Debug, 'Borland' style interface, Multi Windowed, direct editing
- Full SFR symbolic BYTE.BIT display, for rapid learning Timer Uart Interrupt debug
- Source level Debug, and Mixed language Source debug, allowing .ASM.,C, Modula-2 source codes to be mixed
- Chip Prog step is NOT part of the development loop
- Complete package - Assembler / Linker / Debugger / Editor included
- Optional adaptors for SOL20, and DIP40/PLCC44
- Special cross platform migration support included and added to Assembler
- Options: High level languages C, Pascal, Modula-2
- Serious, but Low Cost! - Complete Development station just \$NZ975

Programmer Features

- FAST RAM based production programmer - 1.2Sec / KByte, (Erase.Vfy.Secure included!)

- Single Key, Erase Program Verify Secure of AT89C1051, AT89C2051, AT89C51, AT89C52 Atmel Flash microcontrollers
- Chips programmed counter
- Mis-socket and incorrect part detection
- Mechanically supported SOL adaptor
- Smart program algorithm, for fastest possible pgm cycle times

For additional information please contact:

Mandeno Granville Electronics Ltd:
 80x51 Tools Specialists.
 128 Grange Rd
 Auckland 3 New Zealand
 TEL: 64-9 -6300-558
 FAX: 64-9-6301-720

2051-PD Programmer Downloader & I/O Simulator

Features

- Fast, Simple, Download & Run - No Change In Characteristics - No Loss of Features

The 2051-PD offers the simplicity and speed you need for developing small programs. From the simple Command Line to seeing the results of an Intel hex file running on the Target typically takes less than 6 secs. And that includes checksum verification.

In addition, the 2051-PD follows two ideals needed for a smooth transition to stand-alone operation:

- It preserves the true characteristics and special features of the 89C2051 microcontroller
- It allows the code to run in the same memory locations as needed for the stand-alone Target system.

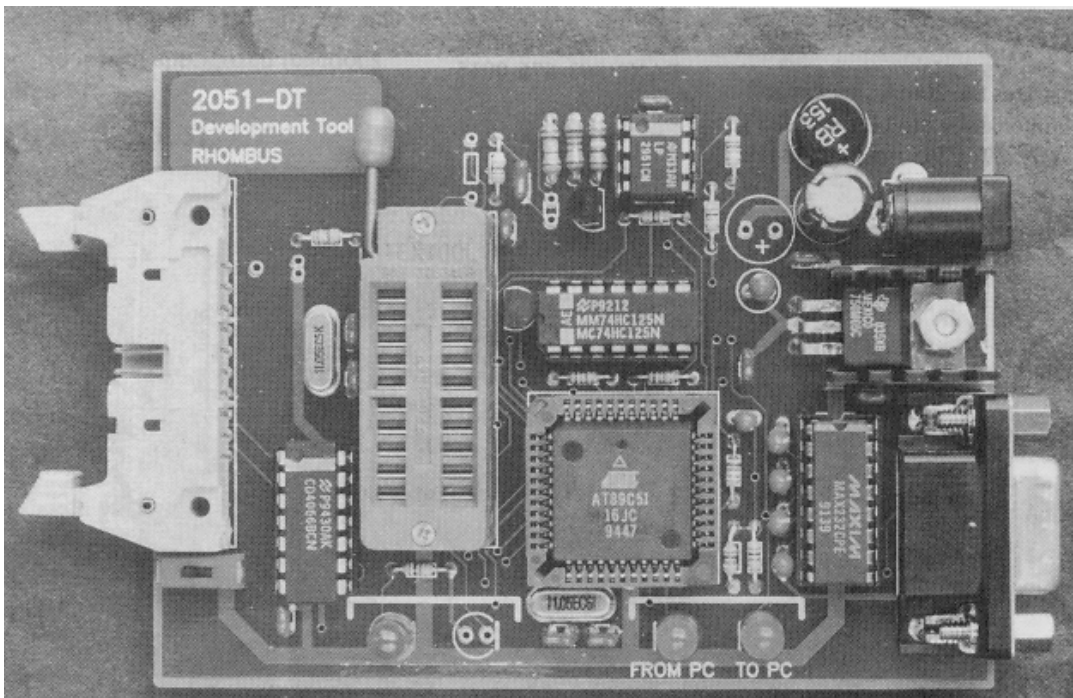
It is PC hosted through a RS232 port, and in turn it runs the Target board through its microcontroller socket. By taking advantage of the 2051's flash memory and ease of re-programming, this arrangement offers the speed and convenience of a ROM Emulator even though working with an internal memory device. In addition, once the download is

complete, a Command Line Option allows the same PC port to be automatically switched to the Target for its own use. This is especially useful if the Target board does not require an RS232 interface yet one is desired to assist in the actual development, or production testing.

Another valuable use for this existing connection to the PC, is with the optional 'Dunfield Developments' Simulator Package. This fast PC Simulator (150,000 instr/sec with 386/25) can optionally pass all I/O related instructions to the Target's 2051 for execution. This allows running the application code in a crash-proof PC environment, with all register and memory data readily available, yet still seeing the interaction with the actual Target H/W. The Dunfield S/W package also includes an Assembler, and a Monitor Debugger intended for larger memory versions of the 51. The Simulator on its own is sufficient reason for purchasing this option.

The 2051-PD comes complete with its own S/W for programming and downloading a 6 ft. 9 pin PC serial cable, a 9-25 pin adapter, Target flat cable, and power supply for shipments to the U.S. and Canada.

Figure 5. 2051-PD



Terminology definitions for the 2051-PD

Programmer: The programming and verifying of the internal Flash memory and the setting of lock bits

Downloader: The loading and running of code at full speed on an identical uC connected through the Target socket

I/O Simulator: As for the Downloader, but with the code restricted to those instructions that operate on the uC port pins. All other instructions are simulated by the PC. The I/O code will always execute at less than full speed. Requires the optional Dunfield Simulator Package

Technical

- Measures 4" x 3"
- Accepts 13-20VDC or 10-15VAC
- 3 pin oscillator socket for Xtals or C/Resonators
- RS232 includes RTS (from PC) & CTS (to PC)
- Green Status LED signals PowerUp, Run, Program
- Red LEDs indicate To/From PC
- Cmd/Line options LB1/2, COM#, ConnPt, Vrfy, ChkS, Color

Proto/Evaluation Boards for the 2051

2051 Distinguishing Features

	Evaluate Using	
	P1	P2
Relative to other 51s		
20mA sink capability		X
Analog Comparator	X	X
Relative to other <=20 Pin uCs		
On board UART	X	X
Multiplication & Division	X	X

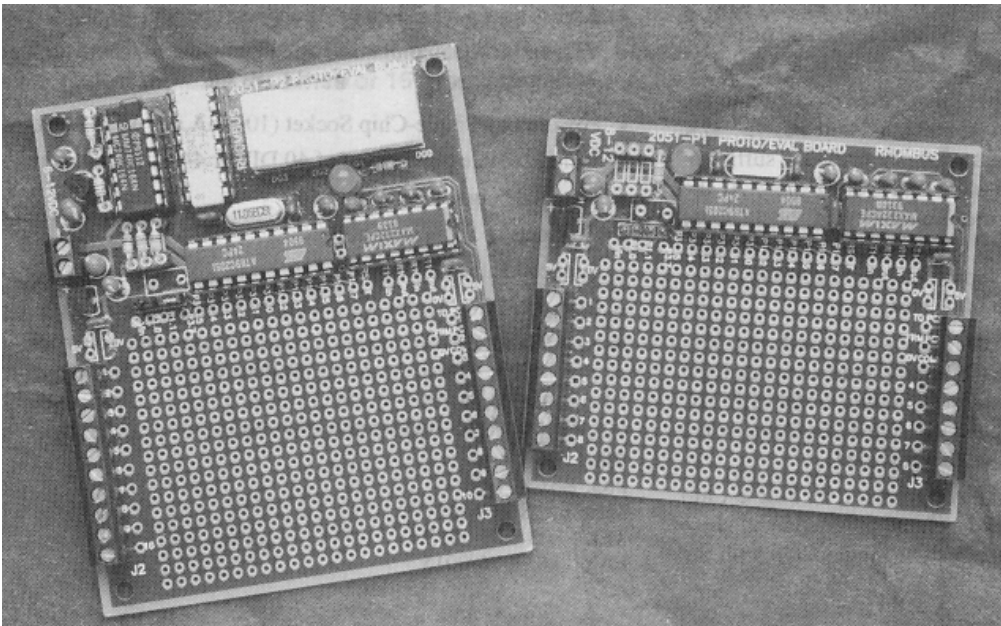
Both the 2051-P1 & P2 demonstrate a 1 capacitor 3 resistor A/D convertor using the analog comparator built into the AT89C2051. Also included are a RS-232 interface, a prototype area with screw terminals, and a precision 3 terminal voltage regulator.

Additionally, the 2051-P2 demonstrates the 20mA sink capability of the AT89C2051 with a high intensity 4 digit display using only 6 I/O pins and consuming only 2% CPU time at 11-MHz clock speed.

For additional information please contact:

Rhombus P.O. Box 871
 Mauldin, SC 29662
 TEL: 864-676-0012
 FAX: 864-676-0015

Figure 6. Proto/Evaluation Boards for the 2051



SCE-51 SingleChip Emulation

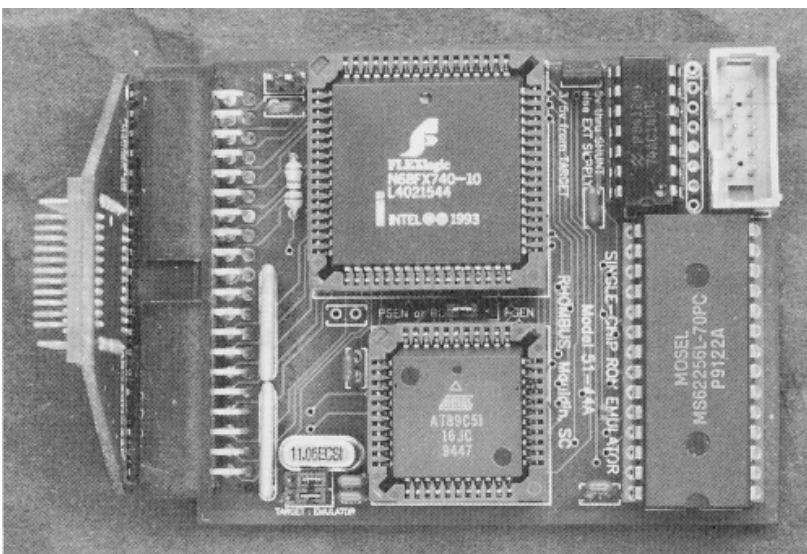
Features

- Creates ROM/RAM Emulator for 51 family single-chip micro-controllers
- Additional memory space available for debug s/w
- Works with all 51 family variants
- No loss of specialized functions

Why SingleChip?

- Gain 18 more I/O pins
- High MHz without concern for timing
- Reduce board size
- Increase reliability
- Secure proprietary code

Figure 7. SCE-51





Until now, low cost development tools such as ROM Emulators and S/W Debuggers, could only be used with 51 Family Microprocessors that were operating in expanded mode and using external memory. That has now changed thanks to SCE-51.

SCE-51 is a 2.4" by 3.2" assembly that plugs directly into the Single-Chip Micro-Controller socket and creates a 32K ROM/RAM Emulator. The extra memory provides sufficient space for both the Application code and Debug S/W. At the same time, SCE-51 maintains the availability of the 18 extra Port pins created by Single-Chip operation. Those two important functions give SCE-51 the most valuable features of a Single-Chip 'ICE', but at a fraction of its cost.

Another plus when compared to an 'ICE' is that one device covers all 40/44 pin variants of the 51 Family. And all specialized functions of each variant are retained. Simply install a PLCC version of the specific 51 to be emulated into SCE-51 and select a PLCC or DIP adapter to suit the Target socket.

Thanks to SCE-51 you no longer pay a premium for Single-Chip development, and no longer need volume production to share those costs. Make your next application Single-Chip with the help of SCE-51.

Technical

- Access time = 15 ns + SRAM access (optional 10 ns)
- TTL and CMOS compatible
- Quiet 4 layer PCB
- Powered by Single-Chip Socket (100 mA at 5 V 25 MHz)
- Includes cable plus choice of 40 DIP or 44 PLCC adapter
- Installed height 3.5" Width 2.4"
- Connects to PC printer port
- Supports Intel HEX file format
- Command line loader with memory map options

Note: The 18 Port Pins normally allocated to expanded memory will be restricted to byte wide Read & Write operations during Emulation.

For additional information please contact:

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TEL: 864-676-0012
FAX: 864-676-0015

SOIC to DIP Programming Adapter for AT89C1051/2051

The programming adapter will convert the 20-pin SOIC down to a 20-pin DIP. It is a universal adapter which works on any programmer. This adapter can be ordered as part number AS-20-20-01S-6 from Emulation Technology. For emulation purposes an adapter is available which enables usage of a 20-pin DIP to a 20-pin SOIC footprint. The surface mount adapter can be ordered as AS-DIP.3-020-5003-1.

For additional information please contact:

Emulation Technology
2344 Walsh Ave, Bldg. F
Santa Clara, CA 95051
TEL: 408-982-0660
FAX: 408-982-0664
BBS: 408-982-9044