

ATMEL 89 SERIES CHIP PROGRAMMER

INTRODUCTION

This device is a simple but powerful programmer for the following Atmel 8051 family of microcontrollers:

- 89C1051, 89C1051U, 89C2051 and 89C4051
- 89C51, 89LV51
- 89C52, 89LV52
- 89C55, 89LV55
- 89S8252, 89LS8252
- 89S53, 89LS53
- 87F51, 87F52 (OTPs)

These devices (except 87F51/52) use flash memory to store programs. Flash memory can be electronically erased and programmed – no need for a UV eraser. The 89(L)S8252 chips has EEPROM that can also be programmed with this device. All devices have signature bytes that the programmer reads to automatically identify the chip. No need to select the device type – just plug it in and go! All devices also have a number of lock bits to provide various levels of software and programming protection. The 89x8252 and 89x53 chips have a serial programming fuse as well. All fuse and lock bits are programmable using this device. The table below shows the key differences between the various microcontrollers. Data sheets for each device can be found on the Atmel web site at <http://www.atmel.com>

	89C1051 89C1051U	89C2051	89C4051	89C51 89LV51 89F51	89C52 89LV52 89F52	89C55 89LV55	89S8252 89LS8252	89S53 89LS53
Pins	20	20	20	40	40	40	40	40
Flash	1K	2K	4K	4K	8K	20K	8K	12K
EEPROM	0	0	0	0	0	0	2K	0
RAM	64	128	128	128	256	256	256	256
I/O Pins	15	15	15	32	32	32	32	32
16-bit Timers	1	2	2	2	3	3	3	3
Interrupt Sources	3	6	6	6	8	8	9	9
On Chip Comparator	Yes	Yes	Yes	No	No	No	No	No

SPECIFICATIONS

Dimensions: 118mm x 70mm (4.7" x 2.8")

Power Supply: 12VDC 150mA "unregulated" PlugPack (16VDC minimum)

Interface: RS-232, 9-pin "D" connector

Data Speed: 9600 bps

Data format: 8 bits, no parity, 1 stop, no flow control

File format: Intel 8-bit HEX
Program Sockets: **ZIF sockets**
Program Time: About 2mS per byte

The programmer connects to a host computer using a standard RS232 serial port. For the software interface, there are two options:

1. Proload (Provided by SUNROM Technologies at www.sunrom.com)
2. Using any communications program capable of ASCII text file transfer, such as Windows 3.11 Terminal, Windows 9x HyperTerminal or DOS Telix, ProComm, etc.

The operation here is explained for Windows 9x HyperTerminal program. Proload can also be easily used to program the chips.

Four LED's are used to display the programmer's status:

- **PWR** Indicates when power is applied to the programming socket.
- **BUSY** On while programmer is executing command. Off when finished.
- **OK** Indicates if last command was successful
- **FAIL** Indicates if last command was unsuccessful

COMMAND SET SUMMARY

The programmer is controlled using a set of simple commands issued from a 'terminal program'.

Following is a brief summary of each command. A more detailed description is given later on.

- P** - Program memory
- Q** - Bulk programming (C,P,L3)
- V** - Verify memory
- R** - Read memory
- B** - Blank check
- C** - Chip erase
- Ln** - Write Lock bits (n=1,2 or 3)
- Sx** - Serial Programming (E)nable/(D)isable (89S8252/89S53 only)
- F** - Address Flash memory
- E** - Address EEPROM memory
- M** - Manual device selection
- A** - Automatic device selection (default)
- H** - Help (prints menu)

CIRCUIT DESCRIPTION

The 78L05 regulator provides a stable 5V supply for the ICs. Diode D5 protects the kit against reverse polarity of the power supply. LED D7 indicates power on. Transistors Q1, Q2 and Q3 are used to control the programming voltage. Q3 switches the programming voltage on or off and is controlled via Q1. Transistor Q2 controls the programming voltage level. With Q2 on, zener Z1 conducts and 5.6V is applied to the base of Q3, giving a 5V programming voltage. With Q2 off, zener Z2 conducts via diode D4 and

12.6V is applied to the base of Q3. The programming voltage is now 12V. Resistor R8 limits the current supplied to the programming pin. Transistor Q4 switches the supply voltage to the programming socket. The "PWR" LED indicates when power is applied to the programming socket. The control software is contained in IC1, a preprogrammed 89C51. It controls all the functions for reading, verifying and programming the 89Cxxx chips, including EEPROM, lock and fuse bits. IC2 latches the low order address bits when programming the 40 pin devices. IC4 takes care of the TTL - RS232 level conversions.

OPERATING PROCEDURE

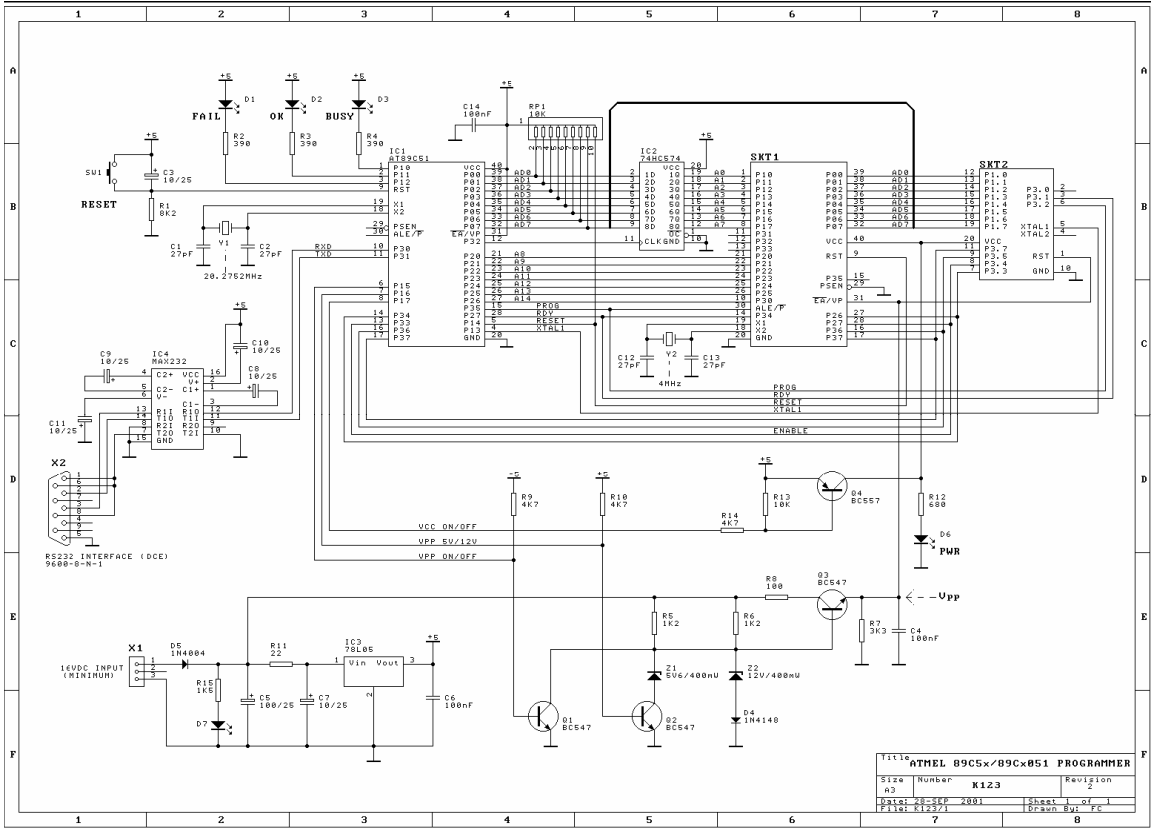
1. Connect the programmer to the serial port of a PC (or other host computer) using a straight through' cable. Start a terminal emulation program running at **9600 baud, 8 data bits, 1 stop bit and no parity bit**.
2. Apply power to the programmer. A menu will appear and all the status LEDs should be off. The programmer is ready for use.
3. Insert a chip into the programming socket and enter a command. The programmer first attempts to identify the device and prints an error message if unable to do so. If all is well the function executes and a message printed on completion. When finished the 'PASS' or 'FAIL' LED will indicate the result. Before programming a chip it should be blank checked and erased if necessary.
4. When programming or verifying, the user will be prompted to send a file to the programmer. The file must be in Intel HEX format and is transmitted using an ASCII text transfer protocol. **Note:** Verification should be done BEFORE writing the lock bits. Writing the lock bits prevents the code from being read out. All data will read as FFh and verification will fail.
5. Any error while receiving the file, such as an invalid hex character or bad checksum, will cause an error message to be printed. The programmer will stop and the user will be prompted to press 'Reset' to continue. Abort the file transfer before continuing.

REFERENCES:

Project Ideas and kits at <http://www.quasarelectronics.com>

ATMEL DATASHEETS

SCHEMATIC



Title: ATHEL 89C5x/89C051 PROGRAMMER		
Size: A3	Number: K123	Revision: 2
Part: 28-SEP 2801	Sheet: 1 of 1	Drawn: BY FC
F1101: 11/23/74		