

2801Prog Rev. 1 User and Service Manual

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Overview:

The 2801Prog Rev. 1 is a compact, low-cost programmer for the Motorola® MCM2801P (2801) EEPROM. The 2801 is a first-generation EEPROM requiring a high voltage (+25V) for programming and thus is not supported by commercial programmers. However, it was widely used in its day and thus a reliable method of reading and programming it is required for the maintenance of legacy equipment. For example, the 2801 is used to store the model differentiation and calibration data for the Mettler® PE series of laboratory balances that are still widely used in laboratories around the world. The new Rev. 1 version moves the ZIF socket to the edge of the board for easier access to the release lever as well as other minor improvements.

Installation

Preparing the 2801Prog Rev. 1 for use:

- 1) Connect the DB9 RS-232 connector to a standard PC serial port using a DB9 male to DB9 female straight-through (not null-modem) cable.
- 2) Plug the included power adapter into a 120VAC electrical outlet.
- 3) Plug the included power adapter into the 2801Prog.
- 4) Insert the MCM2801 IC to be read or programmed into the programmer socket such that pin 1 of the IC is oriented toward the top of the programmer (the end with the power and RS-232 connectors.) Note that the 2801Prog includes internal protection circuitry to avoid damage to either the programmer or the chip in the event that the 2801 is inserted backwards.

Using the 2801Prog with a standard terminal emulator

The 2801Prog is designed to allow use on any platform with a standard RS-232 port and terminal emulation software and does not require any special software or drivers. It has been tested in this mode with Minicom on Linux and Mac and with HyperTerminal on Microsoft® Windows® but should work with a wide variety of similar software. Furthermore, for ease of use a GUI based software driver package is provided. See the next section for usage directions for this GUI software.

To use the 2801Prog with any standard terminal emulator, configure the terminal as follows:

```
BAUD: 9600
Data Bits: 8
Parity: None
Stop Bits: 1
Hardware Flow Control: Off
Software Flow Control: Off
```

When power is applied to the 2801Prog, the following text should appear:

```
2801Prog Rev. 1 MCM2801 EEPROM Reader and Programmer
(c)2015 Matthew D'Asaro under the terms of the GPL
Type 'h' for help
2801Prog>
```

This indicates that the 2801Prog is correctly connected and ready for use. If trouble is encountered, recheck the serial port settings and connections, then disconnect and reconnect power to the MCM2801 to reset it.

The 2801Prog accepts the following commands. Note that only the first letter of each command is used to differentiate it from other commands, so ‘e’ ‘erase’ and ‘elkfdgljhsq’ will all erase the EEPROM.

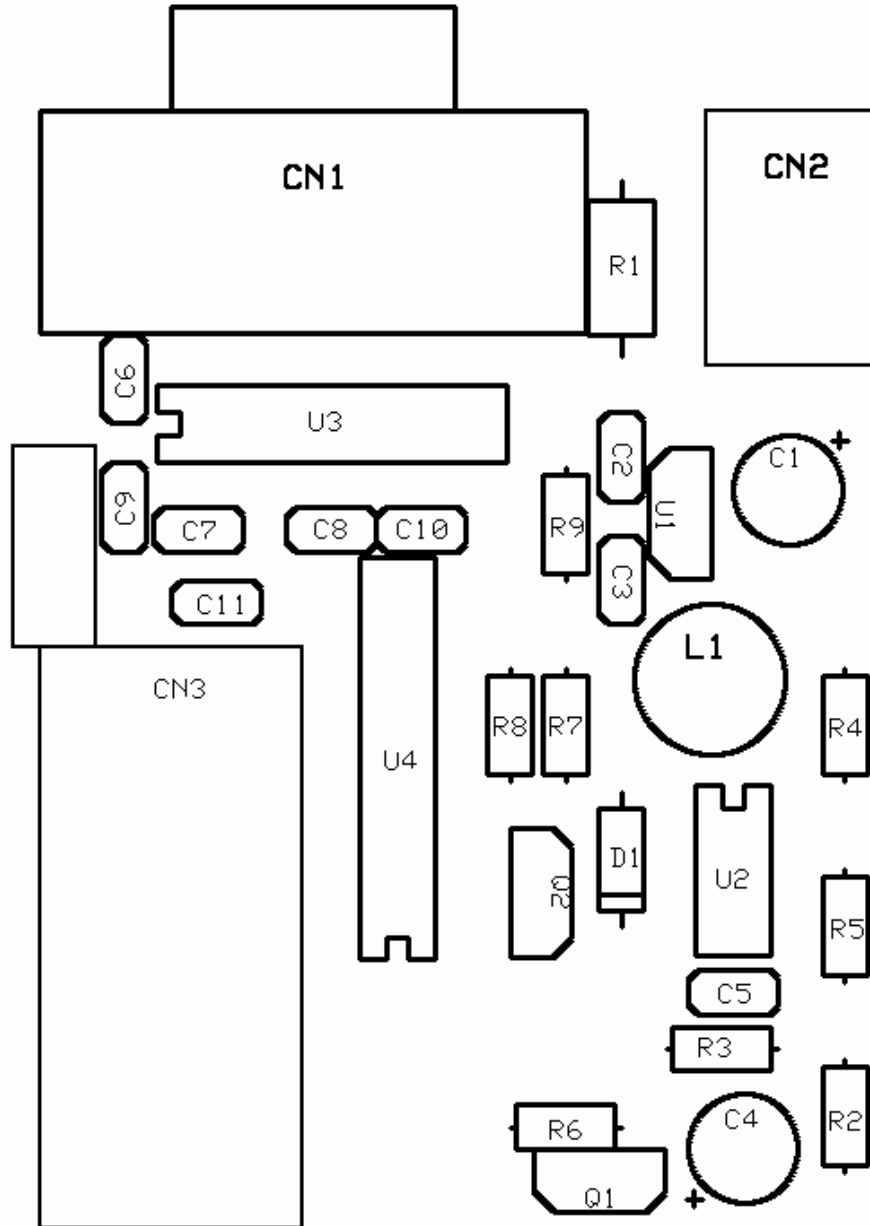
- ‘h’ or ‘help’ – Displays a list of commands and their function.
 - ‘r’ or ‘read’ – Reads the EEPROM and places its contents into the buffer.
 - ‘v’ or ‘verify’ – Verifies that the buffer contents match the EEPROM contents. In the event that they do not, the actual contents of the EEPROM are displayed. Note that this command does not modify the buffer contents in any way.
 - ‘p’ or ‘program’ – Programs the contents of the buffer into the EEPROM. Note that the 2801 does not need to be erased before programming. Verification that the EEPROM data matches the buffer after programming is not performed automatically.
 - ‘e’ or ‘erase’ – Erases the EEPROM, filling it with zeros. Note that this command does not modify the buffer contents in any way.
 - ‘d’ or ‘display’ – Displays the contents of the buffer on the screen in hexadecimal format.
 - ‘l’ or ‘load’ – Allows the buffer to be filled. Buffer contents are entered in hexadecimal starting with address zero. Invalid characters are ignored and when the buffer is full (32 bytes) this command exits and the prompt reappears. Note that text can be pasted into the terminal program from a file saved locally on the computer to load the buffer without manually typing the contents. However, be sure to configure the terminal program to allow a delay between bytes, as entering the data too fast will crash the microcontroller in the 2801Prog.
 - ‘c’ or ‘clear’ – Clears the buffer, filling it with all zeros.
 - ‘a’ or ‘automation’ – Enters automation mode. In this mode all commands are still accepted but entered characters are not echoed back. This mode is used by the GUI interface to directly control the 2801Prog. Exit this mode by resetting the system using the ESC key. Note that entering this mode preserves the buffer contents, but the buffer is cleared when this mode is exited.
- ESC – Pressing the ESC key at any time resets the system, clearing the buffer contents.

Using the 2801Prog Rev. 1 with the *gEEProg* GUI interface

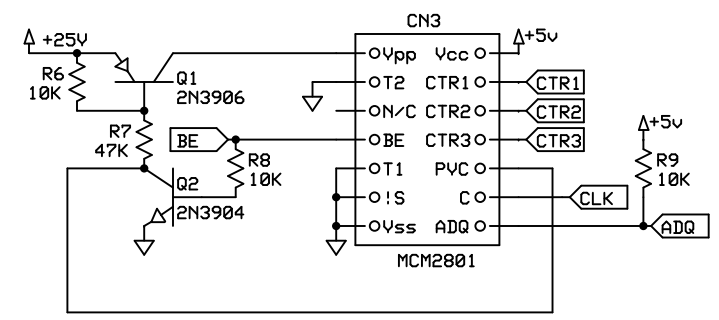
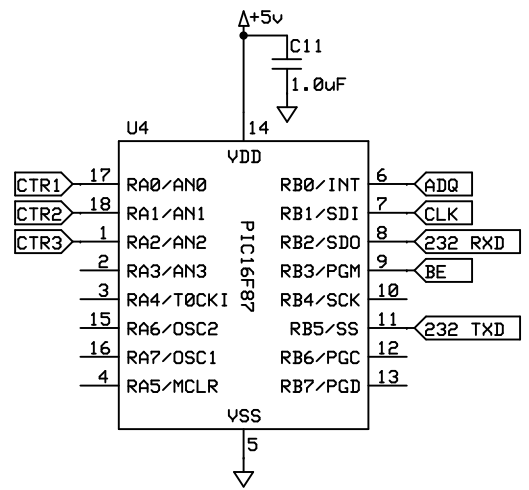
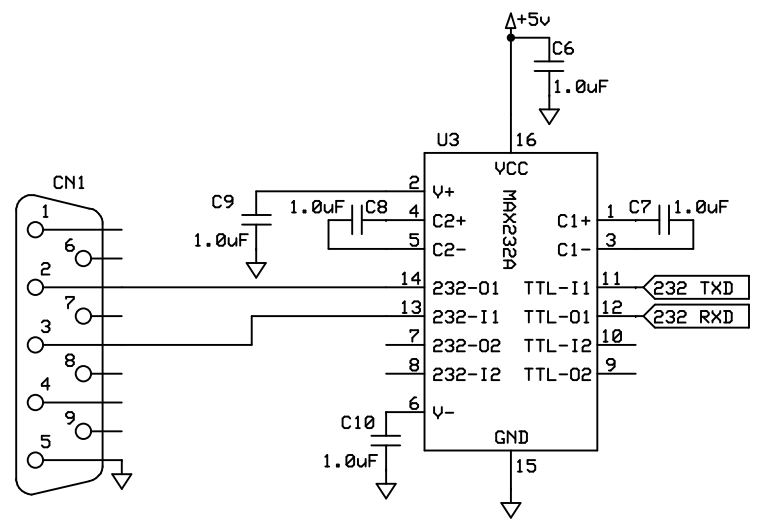
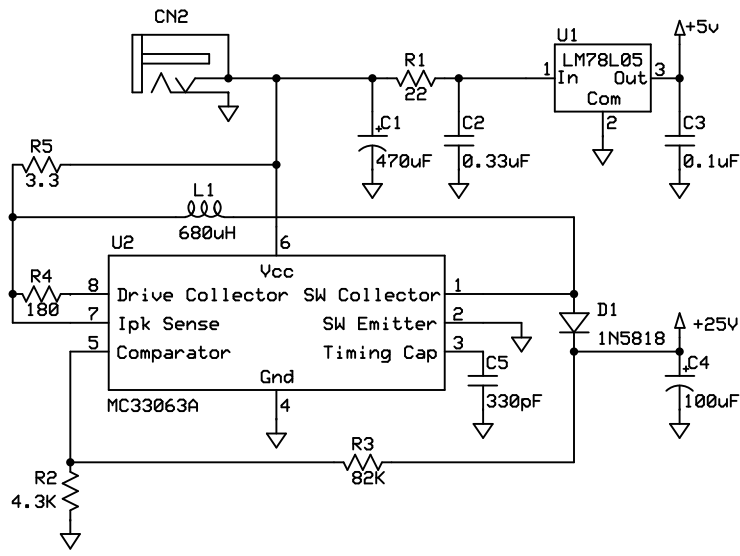
The new open-source *gEEProg* application provides a graphical interface to all of the features of the 2801Prog as well as all other programmers sold by D’Asaro Designs, including the original (Rev. 0) 2801Prog. It is written in Python so as to be cross-platform and has been tested on Windows, Linux and OS X. Compiled applications are provided for both Windows and OS X. Please read the full *gEEProg* manual available at <https://github.com/markchil/gEEProg/releases> for more information.

Servicing the Hardware

The 2801Prog Rev. 1 is designed for long life and built with only top-quality components. Furthermore, it is backed by a simple lifetime guarantee – if it ever fails, just return it for a free repair. However, in the event that field service is required, a component layout diagram, schematic, and a complete parts list are included on the following pages.



2801Prog Rev. 1 Component Layout



2801Prog Rev. 1 Electrical Parts List, Page 1

Reference Designation	Quantity	Mfg.	Mfg. P/N	Mouser P/N	DigiKey P/N	Description / Notes
C1	1	Nichicon	UVZ1C221	647-UVZ1C221MED	493-1284-ND	220uF, 16V
C2	1	TDK	FK18X7R1E334K	810-FK18X7R1E334K	445-8424-ND	0.33uF, 25V
C3	1	Vishay	K104K15X7RF5TL2	594-K104K15X7RF5TL2	BC1084CT-ND	0.1uF, 50V
C4	1	Nichicon	UHV1V101MED	647-UHV1V101MED	UHV1V101MED-ND	100uF, 35V
C5	1	Vishay	K331K15X7RF5TL2	594-K331K15X7RF5TL2	BC1069TR-ND	330pF, 50V
C6 - C11	6	Vishay	K105Z20Y5VF5TL2	594-K105Z20Y5VF5TL2	BC1162CT-ND	1.0uF, 50V
CN1	1	TE Connectivity	5747844-5	571-5747844-5	A32118-ND	DB-9 Female
CN2	1	Kobiconn	163-179PH-EX	163-179PH-EX	N/A	Power Connector 2.1mm x 5.5mm
CN3	1	N/A	N/A	OBD	OBD	14-pin zif socket.
D1	1	STMicroelectronics	1N5818	511-1N5818	497-4548-3-ND	Schottky Diode, 1A, 30V
L1	1	Bourns	RLB0914-681KL	652-RLB0914-681KL	RLB0914-681KL-ND	Inductor, 680uH
Q1	1	Fairchild	2N3906TAR	512-2N3906TAR	2N3906TARFSCT-ND	PNP Transistor
Q2	1	Fairchild	2N3904TA	512-2N3904TA	2N3904TAFSCT-ND	NPN Transistor
R1	1	KOA Speer	MOS2CT52R220J	660-MOS2CT52R220J	OBD	220hms 2W 5% Metal Oxide
R2	1	KOA Speer	MF1/4DC4301F	660-MF1/4DC4301F	OBD	4.3K, 1/4W 1% Metal Film
R3	1	KOA Speer	MF1/4DCT52R8202F	660-MF1/4DCT52R8202F	OBD	82K, 1/4W 1% Metal Film
R4	1	Xicon	291-180-RC	291-180-RC	OBD	1800hms 1/4W 5% Carbon Film
R5	1	Xicon	291-3.3-RC	291-3.3-RC	OBD	3.30hms 1/4W 5% Carbon Film

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Reference Designation	Quantity	Mfg.	Mfg. P/N	Mouser P/N	DigiKey P/N	Description / Notes
R6, R8, R9	3	Xicon	291-10K-RC	291-10K-RC	OBD	10K 1/4W 5% Carbon Film
R7	1	Xicon	291-47K-RC	291-47K-RC	OBD	47K 1/4W 5% Carbon Film
U1	1	TI	LM78L05ACZ/NOPB	926-LM78L05ACZ/NOPB	LM78L05ACZNS/NOPB-ND	7805 +5V Linear Voltage Regulator in a TO-92 Package
U2	1	TI	MC33063AP	595-MC33063AP	296-17764-5-ND	Switching Regulator Controller
U3	1	TI	MAX232NE4	595-MAX232NE4	296-1402-5-ND	TTL to RS232 Converter
U4	1	Microchip	PIC16F87-I/P	579-PIC16F87-I/P	PIC16F87-I/P-ND	Microcontoller
N/A	1	3M	4818-3000-CP	517-4818-3000-CP	3M5464-ND	Socket for U4
N/A	1	Triad Magnetics	WDU6-300	553-WDU6-300	N/A	Wall Mount AC Adapters 6VDC 0.3A 4.5W 120VAC
N/A	1	N/A	N/A	N/A	N/A	DB-9 male to DB-9 female straight through