

## PICAXE CONTROLLER

The intention of this manual is to briefly explain the operation of the PICAXE Controller. The PICAXE controller is inspired in those expensive relay control boards out there that meet the demand of a small market. The difference between the Controller and the relay board lies in the use of an easy to use, programmable microcontroller: the PICAXE 40-X2. But the advantages don't stop on the use of a PICAXE: this device also features...

- 4 opt-isolated inputs,
- 4 extra power outputs controlled by an ULN2803 IC, and the other 4 are connected to build-in relays,
- 3 analog inputs,
- 6 inputs already prepared for direct switch or pushbutton interface,
- 4 servo controllers,
- 2 PWM outputs,
- A PS/2 keyboard input,
- 3 direct I/O pins, with protective 330 ohm resistors,
- And an RS-232 port in a platform-standard 3.5mm connector.

The device also features a 256Kbit EEPROM (using the 24LC256 IC) and a real-time clock (using the DS1307IC). These use the I2C bus, which is the main bus for communicating with other IC's. The user can use the direct I/O pins for RS-232 if needed too, thanks to the software RS-232 functions offered by the platform.

The board I attached is designed to fit in the Chameleon enclosure. A custom faceplate may do the job of protecting the board, but since Sparkfun is not the manufacturer of these products, a custom faceplate would have to be designed with CNC machines. I would suggest using Ponoko services to manufacture the faceplates.

The device was designed entirely with components available at Sparkfun. The vast majority of the components are SMD. The some only exceptions are the PICAXE (in case the user fries it), the Mini-DIN connector, the power jack, the relays and the power switch. The average hobbyist will solder these easily. That makes this viable as a semi-kit, where the user gives some final assembly to the Controller and puts it inside the enclosure.

There are also holes for optional headers and because of the enclosure's size, there's a prototyping area and breadboard area. The last two are near the sides of the board and can be removed and milled for making space for other designs or for BatchPCB, if that's the way it works.

This device was created because of the lack of good development platforms based on the PICAXE, when compared to other platforms like the Arduino development platform. I guess the retail price will end somewhere between \$80 and \$120, depending on some design seditions.

A firmware is intended to be included, along with a theory of operation manual. I would like to write both. The firmware receives via RS-232 any commands to be executed, along with the data required by them. The host can also ask for inputs' states and the time; the later for use in embedded systems with no clock. But that's only the default firmware! The user can do anything just by programming the device in BASIC, including autonomous functions.

Thanks for taking some time to evaluate my proposal.

Practical uses and ideas:

- With a PICAXE 08M you can use a TV remote, the infrain command, an RS-232 interface in one I/O pin, the relays and a little of processing and you can turn on an off anything on and off! You may want to use Power-Switch Tails for that (COM-09842).
- You can use the real-time clock and a photocell to water your plants at a certain hour. You can use one of the water valves (ROB-10456) that Sparkfun sells for that.
- You can turn on a water heater 15 minutes before you wake up so you always have hot water. The built in relays will probably not support the current, so one of those 30A relays (COM-00101) are useful.
- Use a slave microcontroller and a TLC5940 and you can have 16 PWM outputs suitable for LED's.
- Let your imagination fly!
- Any combination of the above ideas.