Quickstart Setup

Power Adapter

The SmartRelay Controller requires a 9v DC power source at a minimum of 500mA of current. A compatible adapter is included with most packages. If another adapter is going to be used there is no need to be concerned about polarity, the Controller board is protected and will run in either polarity.

Data Cable

Serial:

The Controller is configured as a DCE device. A simple straight through DE-9 terminated serial cable will function to communicate with the board from a computer or other DTE device. The only connections used are RxD, TxD and Gnd.

Ethernet:

Standard Cat5/5e/6 cable with RJ45 ends is used to connect the Controller board to an Ethernet network. For connecting the board to a network switch, use a simple straight through Ethernet cable. To connect directly to a computer a cross-over cable will be required. Ethernet cables are inexpensive and can be found at most local electronics stores.

Communication Parameters

Serial:

To communicate with the SmartRelay Controller via serial once the cable is connected, configure your terminal program, or your own software to 9600 baud, 8 data bits, no parity, and 1 stop bit.

Ethernet:

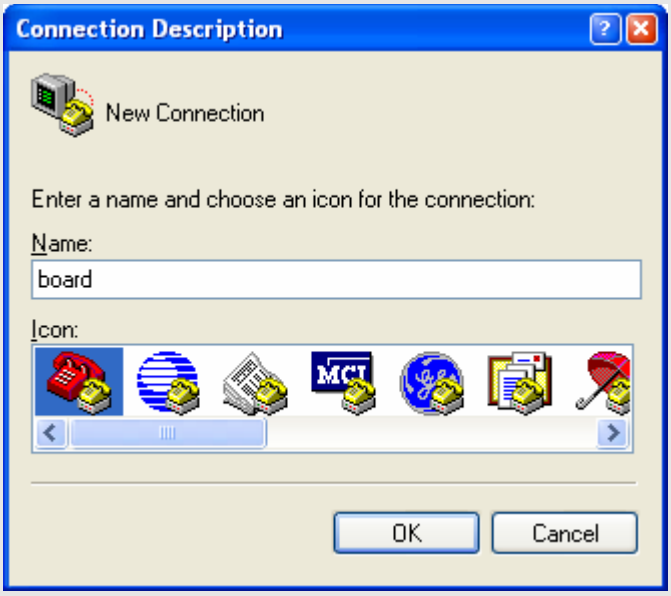
The SmartRelay Controller is 10/100 Mb compatible and will auto-negotiate the data rate with the hardware it is connected to. For the purpose of this quick start guide we assume that there is a DHCP server on your subnet and that the SmartRelay Controller has been assigned an IP Address in your subnet range. For information on manually setting an address see the configuration section.

The Controller can be reached on port 10001 by IP Address directly, or it defaults to having a hostname of the last 3 octets of it's MAC Address. Eg. If the MAC Address is 00-20-4A-81-EC-87 the devices default host name would be 81EC87. The hostname will only work if your DHCP server automatically creates host entries for clients such as Microsoft's DHCP/DNS server.

Test Communications

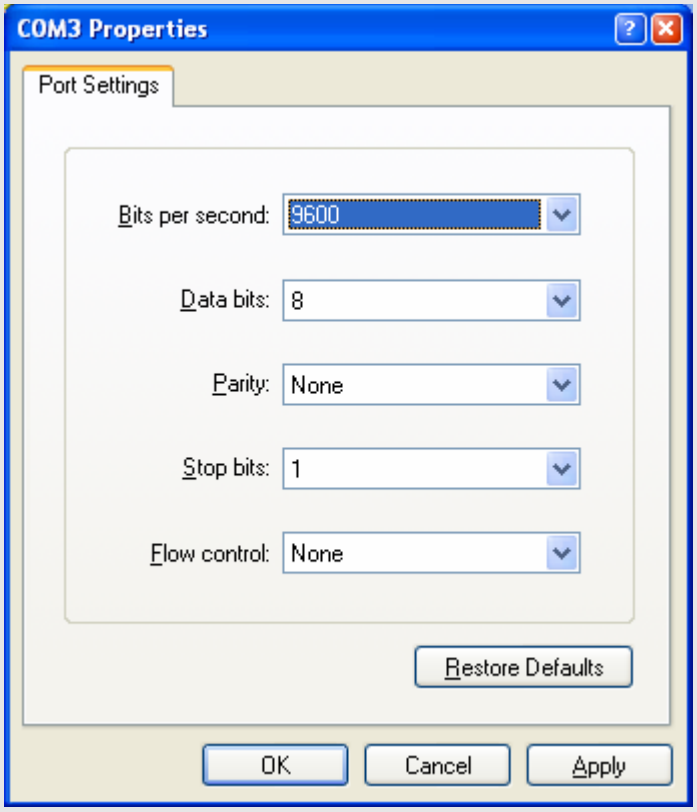
On Windows, the program Hyperterminal can be used to test both the Serial and the Ethernet version of the Controller. Hyperterminal is located in the Start button under
All Programs→Accessories→Communications→Hyperterminal

Serial Connection:



When you start Hyperterminal, this is the window that you will first see. Just type in a name for your connection and choose an icon.

Next, choose which serial port that the Controller is connected to on your computer.

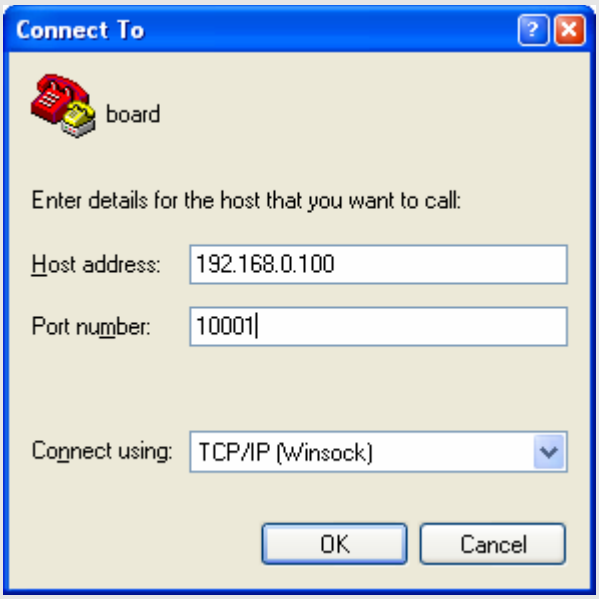


This next window is where you enter the communication settings for the serial port. Make your settings match what is shown here, 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control.

Ethernet Connection:

When you start Hyperterminal, this is the window that you will first see. Just type in a name for your connection and choose an icon.

Next, enter the IP Address or Host name of the Controller and the port number. The default port number is 10001.



Testing the Connection:

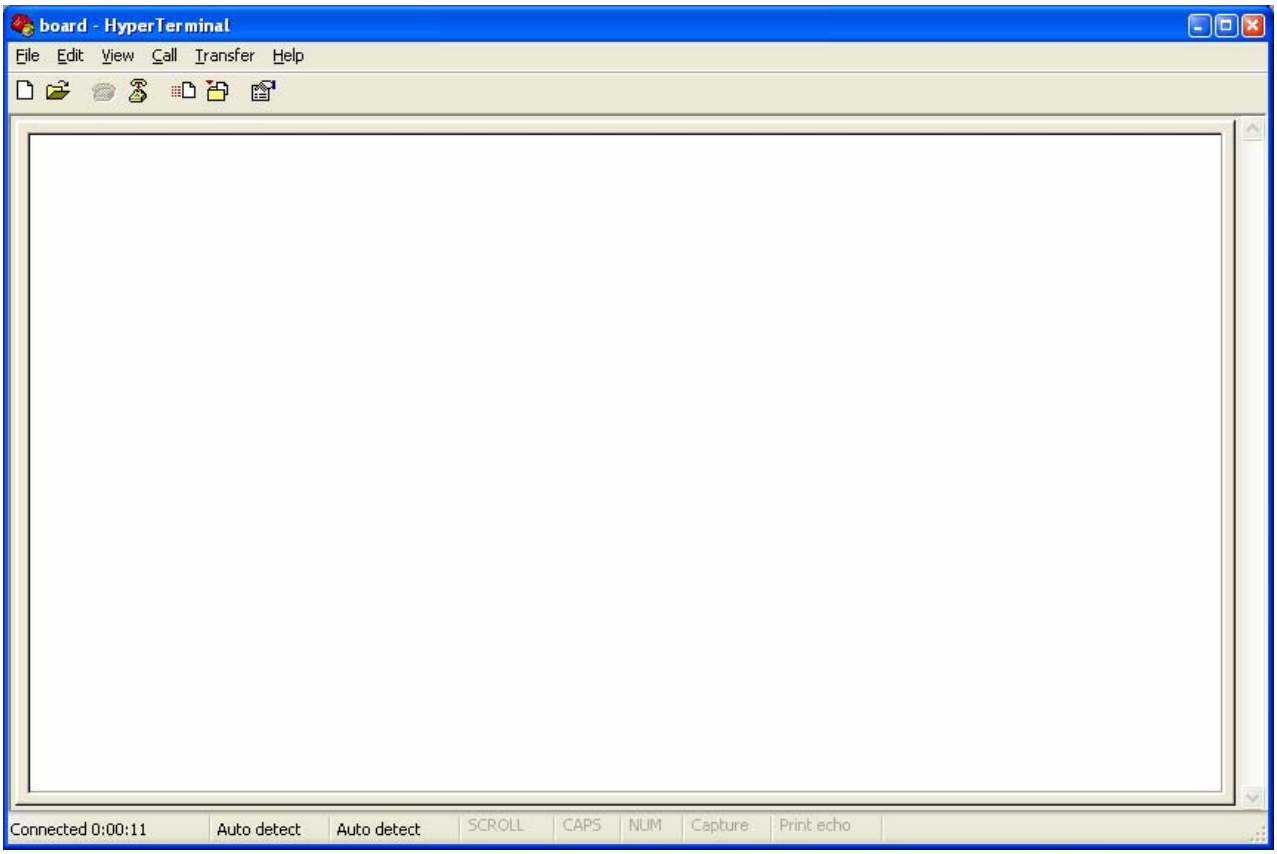
Now that the connection to SmartRelay Controller has been made, commands can by typed directly into the terminal window, and the responses from the Controller can be seen in the same window.

Commands typed to the board will not show up as they are typed unless you turn on local-echo in the HyperTerminal preferences. Once the board executes the typed command successfully it will echo the command it successfully executed. If the board did not understand the command it will echo a question mark.

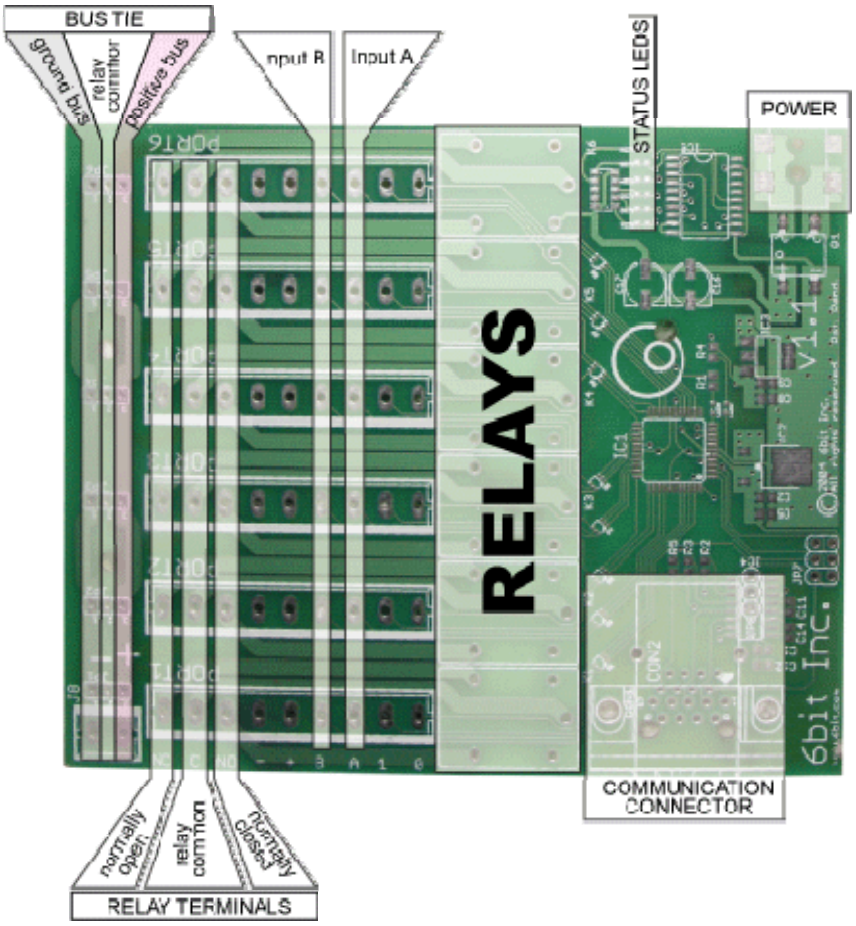
The board will know you are done typing a command when you hit the enter key, and will attempt to execute it at that time. If you mistype a command the backspace key will not work, just hit enter and the board will echo a '?', then try your command again.

For a simple test type '1R1' and hit enter, relay 1 should activate, '1R0' and enter should deactivate the relay.

Please see the command section for detailed information on all commands supported by the Controller.



Board Layout



This is the layout of the SmartRelay Controller. We will hit on each of the features one at a time.

- Bus Tie
- Relay Terminals
- Inputs
- Status LEDS
- Power Connector
- Comm Connector

Bus Tie:

The bus tie feature allows tying the relay common terminal to a discrete ground bus or positive bus. The ground bus is tied to system ground, but the positive bus is not and can be used to bus any signal to the relays with a simple jumper. To tie the relay to the positive bus move the jumper to jumper pins 2 and 3 on each relay you would like to tie. To tie the relay to the ground bus, jumper pins 1 and 2.

Relay Terminals:

Each relay is a single pole double throw, each of the 3 terminals, normally open, common, and normally closed, are brought out to the relay terminal screw down terminals. The normally closed terminal is connected to the relay common when the relay is closed. When the relay is opened, the normally open is then tied to the relay common and normally closed is now connected to nothing.

Inputs:

The inputs on the SmartRelay Controller are ground triggered. Each input is protected by a diode and is pulled high through an internal pull-up resistor. When an input is externally pulled to ground the Controller will notify any connected software of the triggered input, and will also notify when the input goes untriggered. The inputs are debounced by a 10ms timer so they can be easily used with

Inputs (cont.):
mechanical buttons or switches. These inputs can be used to trigger relay activation and deactivation, or setting timers by using the Macro command (see the commands section). Inputs can also have macros assigned to them to execute commands when any input is triggered or untriggered.

Status LEDs:
The status LEDs provide visual feedback about the state of the relays. When a relay is activated, the corresponding LED will be lit. The relay LEDs are red in color. There is also a yellow LED that pulses acting as a heartbeat to signal the healthy operation of the system firmware. Finally, a green LED shines solid to show that the system power is good.

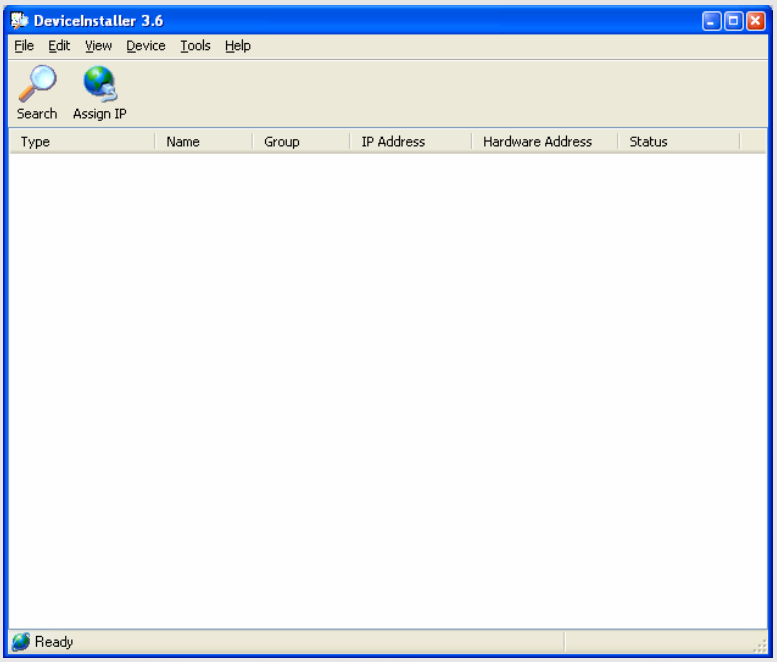
Power Connector:
The power connector is a standard 5mm barrel connector that accepts most 9v DC wall transformer plugs.

Communications Connector:
On Ethernet enabled boards, this section contains the RJ-45 connector to connect the SmartRelay Controller to an Ethernet switch. On serial controlled boards, this section is a female DE-9 connector commonly used on most serial enabled equipment.

SmartRelay Controller Configuration

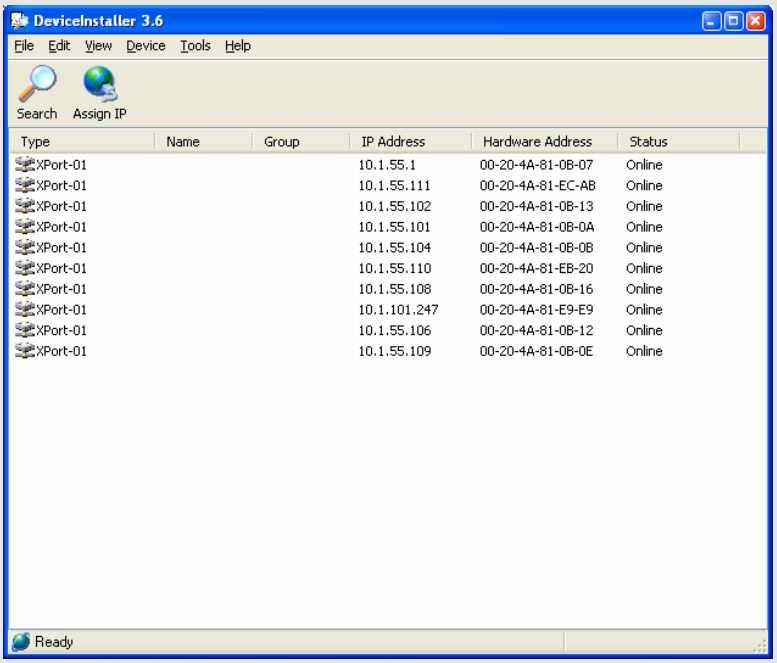
Ethernet Configuration

To manually configure the parameters on an Ethernet enabled SmartRelay controller you will need an application called DeviceInstaller. You can find the latest version of DeviceInstaller on the SmartRelay Controller product page at http://www.6bit.com/products.



This is the main DeviceInstaller window that you will see when you first start the application.

Now click the search button.



After DeviceInstaller searches your network it will show a list of all 6bit Inc. devices on the network.

Highlight a device and click the “Assign IP” button, this will start a wizard dialog to guide you through setting up the IP Address of the device.

If you have multiple devices on your network, you can verify the correct device by the Hardware Address column in the list. This Hardware Address is printed on the Ethernet port of each device.

SmartRelay Controller Command Reference

The SmartRelay Controller has a truly easy to use command set. Here is a summary from the on-board help(use the ? command to see this from the board).

R - relay
(relay number)R(1/0)<cr>
(relay number) - 1-6 the relay number on the board
(1/0) - 1 is ON 0 is OFF

eg:
1r1<cr> turns ON the relay number 1
3r0<cr> turns OFF the relay number 3

Note:<cr> is ascii (13) a carriage return

T - timed relay
(relay number)T(1/0)(time)<cr>
(relay number) - 1-6 relay number on the board
(1/0) - 1 is ON 0 is OFF
(time) - is time in 1/10 of seconds
0-65535 are valid (+/- 1% accurate)

eg:
1t130<cr> turns on the relay on port 1 after waiting 3.0 seconds
3t0600<cr> turns off the relay on port 3 after waiting 1 minute

Note:<cr> is ascii 13 (carriage return)

M - macro command
(port number)M(A/B)(1/0)(commands)<cr>
(port number) - 1-6 port number on the board
(A/B) - input the macro is tied to, input A or B
(1/0) - which input state the macro is fired on, 1 for input triggerd 0 for input untriggered
(commands) - any number of regular relay, or timed commands seperated by the | symbol (the pipe is located just below BACKSPACE on your keboard)

eg:
1MA11R1|1T0500<cr> when input A on port 1 is triggered relay 1 turns on and a timer is scheduled to turn off the relay in 5 seconds.

S - status request
(port number)S(I|R)(A|B)<cr>
(port number) - 1-6 port number on the board
(I|R) - I requests status for an Input on the port, R requests status for the relay on the port
(A|B) - The Input on the port to get the status of (only for I requests)

The board responds to the status requests the same as if a relay or input had been actuated.

eg:
1sR<cr> the board responds with 1R1 if the relay for port 1 is currently activated or 1R0 if not.
1sia<cr> the board responds with 1A1 if input A on port 1 is activated, 1A0 if not.

You can also do a bulk status query by using SI or SR only with no port number. The board will respond with the status of every input on the board, or the status of every input on the board respectively.

eg:
sr<cr> the board would respond as follows (assuming the first 3 relays of the board are actuated):
1R1<cr>
2R1<cr>
3R1<cr>
4R0<cr>
5R0<cr>
6R0<cr>

Note:<cr> is ascii 13 (carriage return)

Events sent from the board

R - relay state set
(relay number)R(1/0)
T - timed relay set
(relay number)T(1/0)(time)
A - sensor A state change
(port number)A(1/0)
B - sensor B state change
(port number)B(1/0)

(relay number) - 1-6 relay number on board
(1/0) - 1 is on 0 is Off
(time) - is time in 1/10 of seconds

e.g.
When 1R1 (turn relay 1 on) is sent, the board responds with 1R1 when the relay is turned on

When a command 1T130 (turn relay 1 on in 30 1/10ths or 3 seconds) is sent, the board responds with 1T130 when the timer starts, then 3 seconds later 1R1 when the relay is turned on.

When a macro is set the macro command is echoed and then when the macro is executed, the results of each of the commands is sent as an event when they happen.

These events allow the controlling software to keep track of the actual state of the relay board as the state changes without the need to poll the board for it's state.

Contact Us

For any questions or comments, please feel free to give us a call or to send us an email. Also, we are always interested in the projects that our customers are using our hardware in.

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