WIFI008 - 8 Relays at 16A
Technical Documentation

Overview

The WIFI008 provides 8 volt free contact relay outputs with a current rating of up to 16Amp each, the module is powered from a 12vdc supply which can be regulated or unregulated. The DC input jack is 2.1mm with positive core polarity, DC supplies are required to supply at least 1A at 12vdc. The relays are SPCO (Single Pole Change Over) types. The normally open, normally closed and common pins are all available on the screw terminals.

The Relays on the WIFI008 can be controlled from the inputs on the WIFI484. This offers the opportunity to construct a system where an input can control an output anywhere on the earth provided both locations are connected to the network/internet.
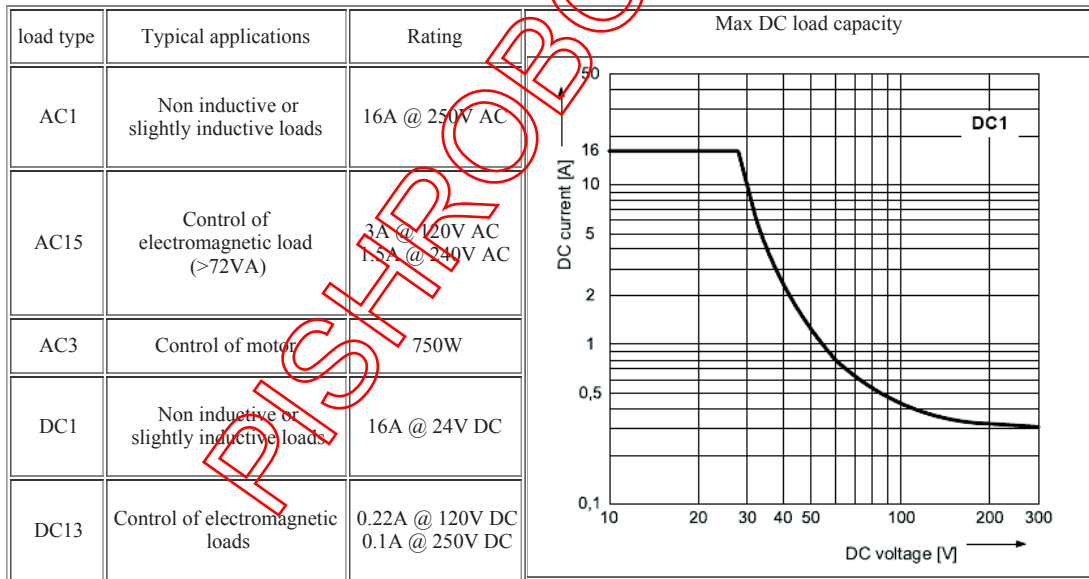
Operating Temperature
-20C to +70C

LED Indication
The WIFI008 provides an LED to indicate each of the relay states and three for board status, these are:
Board power - red LED
WIFI connected - yellow LED
USB connected - green LED

Relay Power Rating
If the contact load voltage and current of the relay are in the region enclosed by the solid and dotted lines in the figure below, the relay can perform stable switching operation. If the relay is used at a voltage or current exceeding this region, the life of the contacts may be significantly shortened.

load type	Typical applications	Rating	Max DC load capacity
AC1	Non inductive or slightly inductive loads	16A @ 250V AC	
AC15	Control of electromagnetic load (>72VA)	3A @ 120V AC 1.5A @ 240V AC	
AC3	Control of motor	750W	
DC1	Non inductive or slightly inductive loads	16A @ 24V DC	
DC13	Control of electromagnetic loads	0.22A @ 120V DC 0.1A @ 250V DC	

A full datasheet for the relays used on the WIFI008 is here: HF115FD datasheet

Connections

12v dc 2.1mm jack (+ve core)

Factory reset jumper
Bottom pair - normal mode
Top pair - Reset board

16A Volt Free Contacts
NC - Normally Connected
C - Common
NO - Normally Open

USB CONNECTOR AB MINI

Connection of the WIFI008 to your network
The WIFI008 is configured to connect to your network by means of a USB connection and configuration program.
For Windows the guide page and program is here
An Apple Mac version is also available here

First Test
Having plugged in your 12vdc power supply and Ethernet connection, start up your web browser and type **http://WIFI008** into the address bar, please note this only works in windows. You will be prompted for a password as shown below:

The default login is:
Username: admin
Password: password

The ability to change these settings is shown in the configuration section

You should now see the following web page:

This web page will allow you to switch the relays on and off by clicking the relay buttons (the red/gray circles). It also contains a link to this technical documentation page.

Configuration
By clicking the configuration link it's possible to configure the WIFI008 IP address and subnet mask together with the ability to set a password for entry to control screens.
The configuration page also offers the option to set a password that will be required to change any of the relay states or digital outputs using TCP IP commands, this is

explained in the TCP/IP password section.
All settings are saved to memory so be careful to remember the username and password! Default password settings are shown in the picture below.

Board Configuration

This section allows the configuration of the board's network settings.

CAUTION: Incorrect settings may cause the board to lose network connectivity.

MAC Address	00:1E:C0:14:A0:3E
Host Name	WIFI008
☑ HTTP authentication	
Username:	admin
Password:	password
Port	17494
☑ Enable DHCP	
IP Address	192.168.0.72
Subnet Mask	255.255.255.0
☐ TCP/IP Password	password
☐ Latched outputs	
Save Config	

Factory Reset
Should it be necessary to reset the WIFI008 to its shipped condition then there is a factory reset jumper, it is in the open position by default, if at power up it is moved to short the other end pin to the central pin a factory reset will be executed. The red LED will flash as the settings are reset, please wait until the LED finishes flashing and do not remove power during this period.

Firmware Updates
The firmware is fully updateable by re-flashing the board using our custom windows program. Section will be updated when feature updates are available.

WIFI008 Command Set
The command set designed to provide consistent expansion and new features, they are sent over TCP/IP on port 17494 (0x4456). This is the default port, it can be changed in the configuration settings.
Five connections are allowed at any one time, these are independently protected but all using the same password as defined in the board configuration.

Command		Action
dec	hex	
16	10	Get Module Info - returns 3 bytes, Module Id (28 for WIFI008), Hardware version, Firmware version.
32	20	Digital Active - follow with 1-8 to set relay on, then a time for pulsed output from 1-255 (100ms resolution) or 0 for permanent. Board will return 0 for success, 1 for failure
33	21	Digital Inactive - follow with 1-8 to turn relay off, then a time for pulsed output from 1-255 (100ms resolution) or 0 for permanent. Board will return 0 for success, 1 for failure
35	23	Digital Set Outputs - follow with a single byte, first byte will set relays 1-8, All on = 11111111 (0xFF), All off = 00000000 (0x00), Board will return 0 for success, 1 for failure
36	24	Digital get outputs - sends a single byte back to the controller, bit high meaning the corresponding relay is powered
58	3A	ASCII text commands - allows a text string to switch outputs, see section below
119	77	Get Serial Number - Returns the unique 6 byte MAC address of the module.
120	78	Get Volts - returns relay supply voltage as byte, 125 being 12.5V DC
121	79	Password Entry - see TCP/IP password
122	7A	Get Unlock Time - see section below
123	7B	Log Out - immediately re-enables TCP/IP password protection

Digital Active/Inactive Commands
These are 3 byte commands:
The first byte is the command, 32 (active means on) or 33 (inactive).
Second byte is the relay number.
Third byte is the on time. Set this to zero for un-timed operation, or 1-255 for a pulse in 100mS intervals (100mS to 25.5 seconds).
For example:
0x20 - turn the relay on command
0x02 - relay 2
0x32 (50) - 5 seconds (50 * 100ms)
Board will return 0 for success, 1 for failure
Note - All bytes in a command must be sent in one TCP/IP packet.

TCP/IP Password
If this option is enabled in the http configuration page then a password will be required to be entered before relay states can be changed. In the following example the password was set to "apple":

0x79 - 1st byte in frame sent to WIFI008 to indicate password entry

'a' (0x61) - 2nd byte in frame (ASCII hex equivalent in brackets, full table is available at http://www.asciitable.com/)
'p' (0x70) - 3rd byte in frame
'p' (0x70) - 4th byte in frame
'l' (0x6C) - 5th byte in frame
'e' (0x65) - 6th byte in frame

These 6 bytes are then transmitted in the same transaction to the WIFI008 and if the password is correct then 1 will transmitted back, a failure will send 2.
The board will now accept changes from the device that entered the password. If communication becomes idle for more than 30 seconds then the password protection is re-enabled. There is also a log-out command of 0x7B to enable the protection immediately.

Get Unlock Time
Returns TCP/IP password protection status:
0 - password protection is enabled and password entry is required before changes can be made
1 to 30 - seconds until TCP/IP password protection is re-enabled. All authorised commands set the timer back to 30 seconds (including this one).
255 - TCP/IP password is not enabled.

ASCII text commands DOA and DOI
Following customer request we have added a feature that allows the outputs to be switched using an ASCII string, devices like a Mobotix camera can now switch relays with simple strings.
The string for activating output1 for 5 seconds is formatted using comma seperated variables with the following syntax:
":DOA,1,50,password"
To break this down ":" (hex 3A) at the start of the string indicates that there is an ASCII message to follow, "DOA" is digital output active, "1" is the output number, then "50" for 5 seconds (50x100ms) and finally the TCP password (if applicable).
If I wanted to make output 2 inactive for 3 seconds I would use:
":DOI,2,30,password"
To break this down ":" (hex 3A) at the start of the string indicates that there is an ASCII message to follow, "DOI" is digital output inactive, "2" is the output number, then "30" for 3 seconds (30x100ms) and finally the TCP password (if applicable).
Assuming no password is used the previous command would simply be:
":DOI,2,30 "

HTML commands DOAx and DOIx
Another customer requested feature, allowing the digital outputs to be switched by the http get function such as used in some voice over ip phones (VOIP). You can use the http get function to write to the io.cgi file with the following syntax:
192.168.0.200/io.cgi?DOA2=10
This would use the default address (192.168.0.200) and make output 2 active for 1 second.
Another example would be to set output 1 inactive for 10 seconds:
192.168.0.200/io.cgi?DOI1=10
You can test these functions by typing them directly into the address bar of most internet browsers. Also be aware that you may need to disable http authentication in the http configuration if your control device does not support it.

IP Addresses & DHCP Servers
The easiest way to use the WIFI008 is to connect it to a network with a DHCP server. In this case the WIFI008 will have its IP address assigned automatically by the DHCP server.

If there is no DHCP server on the network, then a fixed IP address of 192.168.0.200 is used. To control the WIFI008 using this fixed IP address your computer MUST be on the same subnet.
The next step is to set your computers IP address to 192.168.0.x where x is in the range of 1 to 255 but not 200 (the WIFI008 is there!) or any other used IP addresses on the network.
The subnet mask dictates what IP addresses the PC can communicate with, we set this to 255.255.255.0 so the PC can talk to any module with an IP address of 192.168.0.x
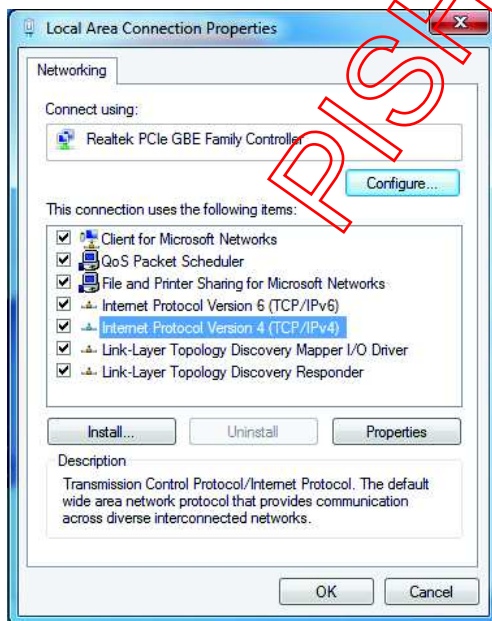
This image is for a PC running Windows 7.
To get to the TCP/IP properties screen, go to:
Control Panel->Network and Sharing Center->Local Area Connection->Properties.
Select Internet Protocol Version 4(TCP/IPv4) from the scroll box and click Properties.

That gets you to the dialog box shown left.

Test program and example source code

To get the WIFI008 up and running in the minimum amount of time we have put together an example program to demonstrate the functionality of the module. We provide the full source code for this program. You may examine this code to see how it works or use it as a starting point for your own application.

Visual studio express C# examples

The test program is available as Visual C# express ready built installation files here, or as Visual C# express project with source files here. Visual studio express is provided free from Microsoft: http://www.microsoft.com/exPress/download/

Access from the Internet (Port forwarding)

The WIFI008 can be controlled over the internet almost as easily as on your local network. Your network will most likely be connected to the internet with a broadband router. This will provide NAT (Network Address Translation) and Firewall services. To access the WIFI008 from the internet you will need to open up port 17494 (0x4456) to allow incoming TCP connections. Be careful not to open up any other ports. There are a wide variety of routers and we cannot give details for all of them. If in doubt ask your system administrator for assistance. The following shows how to open up a port on a Netgear WNR2200 router

When applied you should now be able to talk to the router over the internet at the IP address designated by your internet provider. When a data packet arrives on port 17494 the router will pass the packet on to the local address on the network (192.168.0.93) on port 17494.

To test this you will need a computer that has its own internet connection and is NOT connected to the same network as the WIFI008. Download and run the test program above and select Custom IP. In the pop-up box enter your routers internet facing IP address. Click on "Try IP" and it will connect you to the WIFI008 just as if it were on your own network.

Android & iPhone Apps.
We have a free app **IO network** available for Android and iPhone to remotely control your relays, download from Google Play or iTunes. Search for "Devantech" and you will find the app.

Board dimensions