

# ETH24V008H

## Technical Documentation



## Overview

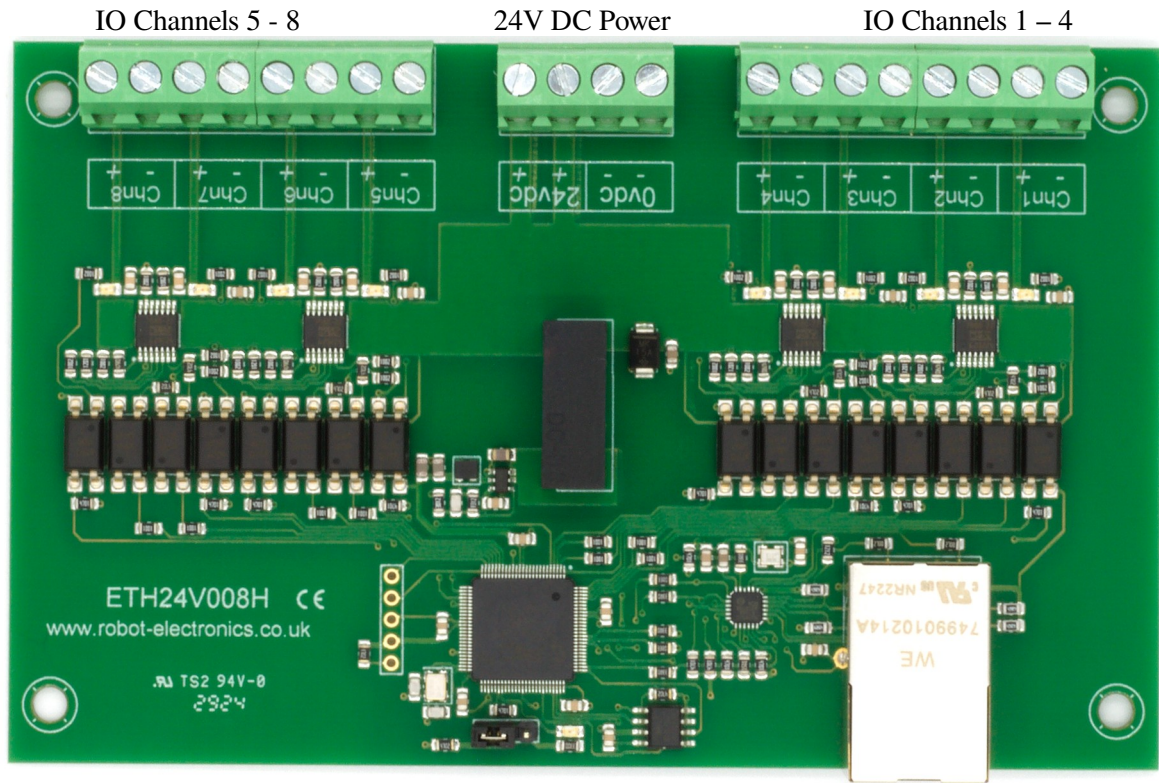
The ETH24V008H provides eight high-side switched outputs with a current rating of up to 1.5A suitable for switching resistive, inductive or capacitive loads. Alternatively the terminals can be used as 24vdc inputs.

The module is powered from a 24vdc supply capable of powering the loads plus 200mA for the module.

### Operating temperature

-40C to +70C

# Connections



Factory reset  
Left pair - run  
Right pair - reset  
Read at power up

RJ45 Ethernet

## 24vdc IOs

The 8 IO channels on the ETH24V008H can each act as a 24vdc output or a digital input.

The outputs are switched from the 24vdc power provided to the module and are capable of switching up to 1.5A. When the output is switched high the corresponding input will read high also. If the output is turned off the channel can be used as a 24vdc input.

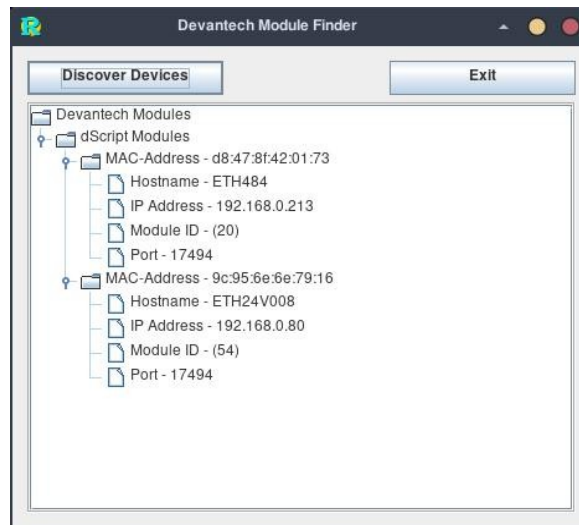
# Network connection

Once you have connected the Ethernet cable and turned on the power you will need to obtain your modules IP address.

## With a DHCP Server

The easiest way to use the ETH24V008H is to connect it to a network with a DHCP server. In this case the ETH24V008H will have its IP address assigned automatically by the DHCP server.

To find the IP address of your module you can check in your routers settings for the list of devices connected to your network. Alternatively we also provide a Devantech Module Finder application that will scan your network and report with any modules on your network that your computer can talk to.



[Download the Devantech Module Finder](#)

## With a Fixed IP

If there is no DHCP server a fixed IP address of 192.168.0.200 is used.

Your computer must be on the same subnet as the module. Set your computers IP address to 192.168.0.X where X is in the range of 1 to 255, but not 200 (the ETH24V008H is there!) or any other IP addresses in use on the network.

Set your computers subnet mask to 255.255.255.0 so it can talk to any module with an IP address of 192.168.0.x.

Set your computers default gateway to the IP address that the internet connection is located at. This is most likely the address of your router.

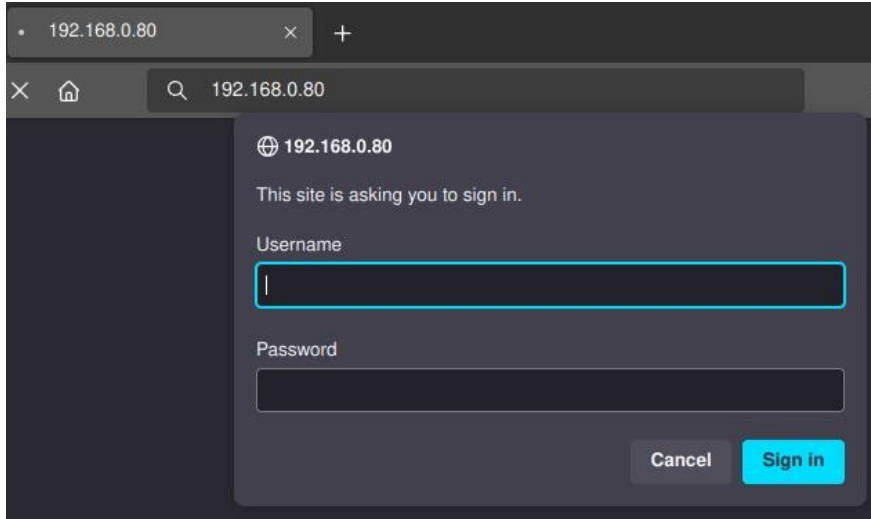
Set your computers DNS server to either your router address, or a free DNS service such as Google DNS at 8.8.8.8 or Cloudflare DNS at 1.1.1.1

Example computer network settings:

**IP address:** 192.168.0.104  
**Subnet mask:** 255.255.255.0  
**Gateway:** 192.168.0.1  
**DNS server:** 192.168.0.1

# Accessing the ETH24V008H from your browser

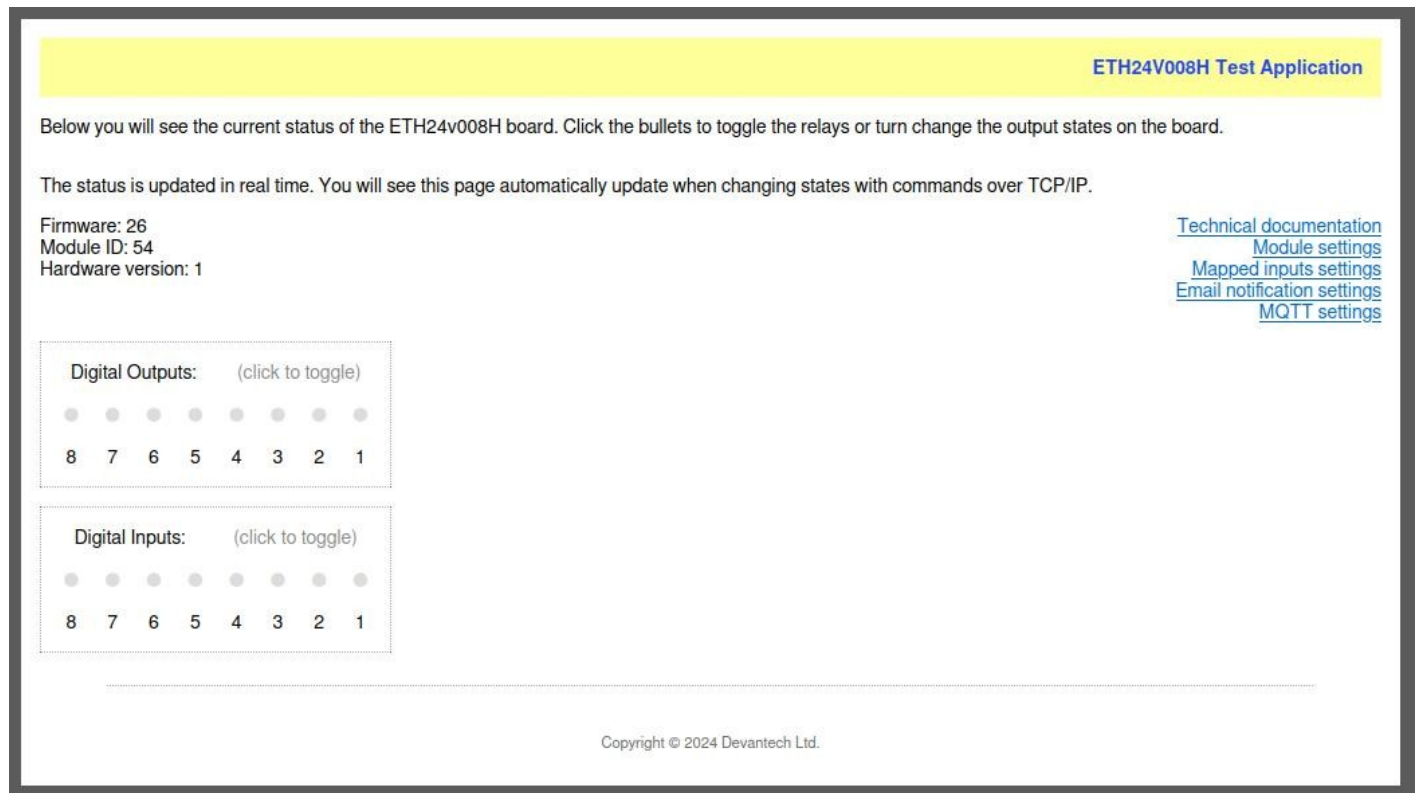
Start up your web browser and type the IP address of your module into the address bar (in this example 192.168.0.80) and you will be prompted for a password, as shown below:



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 outputs on and off by clicking the output buttons (the red/gray circles), and also view the states of the inputs. It also contains a links to this technical documentation and configuration pages.

## Access from the Internet

The ETH24V008H 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 ETH24V008H 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 DG834 router.

### Add Services

#### Service Definition

Name:	<input type="text" value="ETH008"/>
Type:	<input type="text" value="TCP"/>
Start Port:	<input type="text" value="17494"/>
Finish Port:	<input type="text" value="17494"/>

After logging on to your routers setup page, the first thing to do is create a new service. Click on the "Services" menu then "Add Custom Service". Enter a name for the service, select TCP and enter the ETH24V008H's port address for both the start and finish ports. Click "Apply".

### Inbound Services

Service	<input type="text" value="ETH008(TCP:17494)"/>
Action	<input type="text" value="ALLOW always"/>
Send to LAN Server	<input type="text" value="192"/> . <input type="text" value="168"/> . <input type="text" value="0"/> . <input type="text" value="99"/>
WAN Users	<input type="text" value="Any"/>
start:	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
finish:	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
Log	<input type="text" value="Always"/>

Now go to the "Firewall Rules" menu and click "Add" in the Inbound services section. Select the ETH24V008H service and ALLOW always. The "Send to LAN Server" IP address is the ETH24V008H's IP address, 192.168.0.96 in the example above but check what it is on your network. Click "Apply" and that's it. The ETH24V008H is now accessible over the internet. Before you close the routers setup pages, go to the "Router Status" menu and make a note of its ADSL port IP address. This is the routers internet facing IP address.

# Configuration

## Module Settings

Settings changed in this page will not be applied until a module reset.

**Module Configuration**

### Network Settings

Hostname:

Module MAC address:

Enable DHCP

IP Address:

Subnet Mask:

Gateway Address:

DNS Address:

Port:

### TCP/IP Password

TCP/IP Password enable

TCP Password:

### HTTP access

HTTP Authentication

Username:

Password:

### Latched Outputs

Latched outputs enabled

### Timezone

(GMT) Western Europe Time, London, Lisbon, Casablanca

DST enabled

<b>MAC Address</b>	The unique identifier of this module.
<b>Host Name</b>	The host name of this module.
<b>Enable DHCP</b>	Enable or disable the DHCP address. When this box is checked the module will get its IP address from the DHCP server. If it is unchecked then the module will use the network settings input below.
<b>IP Address</b>	The IP address of the module. Only editable if DHCP is disabled.

<b>Subnet Mask</b>	The subnet mask. Only editable if DHCP is disabled.
<b>Gateway Address</b>	The gateway address. Only editable if DHCP is disabled.
<b>DNS address</b>	The address of the DNS server. Only editable if DHCP is disabled.
<b>Port</b>	The port number that the TCP connection listens on.
<b>TCP/IP Password</b>	Enables or disables the TCP/IP password (see TCP/IP commands section). When checked the input password will be required to change any outputs via TCP/IP commands.
<b>HTTP Authentication</b>	Enables or disables the HTTP authentication that asks for a username and password to be input for access to the control pages.
<b>Username</b>	The username to be used for HTTP authentication.
<b>Password</b>	The password to be used for HTTP authentication.
<b>Latched Outputs</b>	Sets the outputs to latching mode. This will automatically save any permanent output state changes (not pulsed) and restore them following power loss.
<b>Timezone</b>	The timezone.
<b>Enable DST</b>	Enables, or disables, daylight saving time.

## Mapped Inputs Settings

Digital inputs can be configured to remotely control outputs on another ETH series modules, this offers simple linking and versatile usage. An input in one country can control an output in another, or across a small network.

There are eight independent inputs that can be mapped to eight different outputs on the same, or different, boards.

To select which input to map click one of tabs at the top of the screen.

When you are finished save your settings by pressing the save and exit button.

Input mapping configuration

You can map an input to switch a relay over on another board using the configuration below.

INP1 INP2 INP3 INP4 INP5 INP6 INP7 INP8

### Input 1 settings

Enable Input

Choose function: Output follows the input state

### Target board settings

IP Address: 192.168.0.50

Port: 17494

TCP Password: (if required) password

Output number: 8

Pulse time: 255

Save and Exit

<b>Enable Input</b>	Enable, or disable, the input mapping for this input.
<b>Choose function</b>	Select how the input state will affect the target output.
<b>IP address.</b>	The IP address or hostname of the target module. If the module is on the local network then you can use the assigned IP address on your local network. If the board is on another network you will need to input the networks address (usually the IP address of the internet connection). The message is then sent to the router/access point and relayed by port forwarding. A more in depth description is available in the section "Access from the Internet".
<b>Port</b>	The port number the target is listening on.
<b>TCP Password</b>	The password set on the target module to allow control via TCP/IP commands.
<b>Output Number</b>	The output number to control.
<b>Pulse Time</b>	The time to pulse the output for in 100mS increments, e.g. a value of 10 will pulse the output for 1 second. The minimum pulse value is 1 and the maximum is 255. A value of zero will make the change permanent, not pulsed.

## Mapping inputs to custom devices

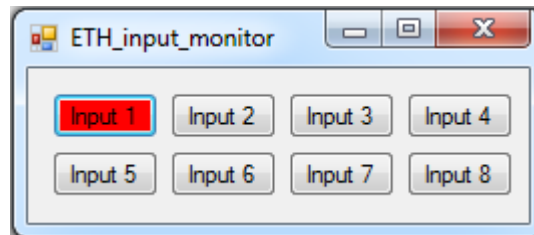
Sometimes it is useful to have a message sent on input change without the need for polling, you can use the input mapping for sending messages to an IP address. The transactions are described below along with an example of the custom device needing a password of “apple” and setting output number 1 active:

- The module sends a TCP packet with 0x79 (password entry) in the first byte, then the following bytes will be the password supplied above. So it would send 6 bytes: 0x79, 'a','p','p','l','e'
- To acknowledge a password match, respond with 1, or a 2 for failure. You reply with 1 byte 0x01
- The module then sends digital active (0x20) or digital inactive (0x21) followed by the output number, so it would send 2 bytes 0x20, 0x01
- Reply with a 0 for success, or a 1 for failure. You reply with 1 byte 0x00

Note that the complete sequence must be followed, even if the password fails. If no password is supplied in the input mapping configuration the sequence will be followed with the absence of 'a','p','p','l','e' bytes.

## Input monitoring example and source code

We have an example of mapping the inputs to a PC, it operates on the default port of 17494, the default password of "password" (although both are easily changed in the source code) and requires the modules input mapping to be pointed at the host PC IP address. As it's having to constantly listen it's a multi thread program.



The input monitor program is available as Visual C# express ready built installation files [here](#), or as project with source files [here](#).

## Email Settings

The ETH24V008H can send emails on high transition, low transition or both for any of the 8 inputs available.

To set an input to send an email, click the appropriate INP tab for that input, update the settings, and then when you are finished click the save and exit button.

Email configuration

Outgoing email server connection details:

### Email Server Settings

Server Name:

Server port:

Username:

Password:

INP1

INP2

INP3

INP4

INP5

INP6

INP7

INP8

### Send to.

Email address:

### Sent from.

Name:

Email address:

### Message.

▾

Email subject:

Message active:

Message active:

<b>Server Name</b>	The name of the outgoing mail server.
<b>Port</b>	The port number for the outgoing mail server. TLS or START TLS will be automatically switched on when port 587 or 465 is selected.
<b>Username</b>	The username for logging into the outgoing mail server.
<b>Password</b>	The password for logging into the outgoing mail server.
<b>Email Sending</b>	<p>Enable the email for this input.</p> <ul style="list-style-type: none"> <li>Disabled – No email sent.</li> <li>Send on active – email sent on transition from inactive to active input.</li> <li>Send on inactive – email sent on transition from active to inactive input.</li> <li>Send on both – email sent on any state transition of input.</li> </ul>
<b>Send Email To Address</b>	The email address to send the email to.
<b>From Name</b>	The name of the sender of the email.
<b>Sent From Address</b>	The address that the email will be sent from.
<b>Subject</b>	The subject line of the email.
<b>Message for active transition</b>	The message to be sent for an active transition.

**Message for inactive transition**

The message to be sent for an inactive transition.

**MQTT Settings**

The module can connect to an MQTT broker to publish certain status messages such as a power up message or a heartbeat. Each IO on the module can also subscribe or publish to a topic to control or monitor its state.

To configure the settings for an IO select it from the “Choose an I/O state” drop down box and fill in the required information.

Once finished save your changes by pressing the Save Config button.

<b>IP Address</b>	The IP address of the MQTT broker to connect to.
<b>Port</b>	Should be 1883 for no encryption or port 8883 for a TLS encrypted link (the ETH module will automatically use TLS for port 8883).
<b>Client ID</b>	The client name of your module.
<b>Username</b>	Username for connection to the MQTT broker.
<b>Password</b>	Optional password for connection to the MQTT broker.
<b>Enable Power Up Message</b>	Enables, or disables, the publishing of a message at power up containing the MAC address, IP address, software and hardware versions.

<b>Power Up Publish Topic</b>	The topic that the power up message will be published to.
<b>Enable LWT</b>	Enables or disables the last will and testament. The broker will publish the message after no contact for 5 minutes.
<b>LWT Topic</b>	The topic the LWT will be published on.
<b>LWT Message</b>	The message published for the LWT.
<b>Enable Heartbeat</b>	Enable or disable the heartbeat message, publishing an incremented count once a minute, giving the active connection time, count is reset on socket loss.
<b>Heartbeat Publish Topic</b>	The topic that the heartbeat message will be published to.
<b>Enable Subscribe</b>	Enables or disables subscribing to a topic that contains a message of “1” or “0” to control the state of the selected output.
<b>Subscribe State Topic</b>	The topic to subscribe to that controls the state of the selected output.
<b>Enable Subscribe Pulse Time</b>	Enables or disables subscribing to a topic that contains a message of between “1” and “255” which will pulse the output on for that number of 100mS units.
<b>Subscribe Pulse Time Topic</b>	The topic to subscribe to that pulses the state of the selected output.
<b>Enable publish</b>	Enables or disables the publishing of a message containing a “1” or a “0” when the state of the selected IO changes.
<b>Publish Topic</b>	The topic to publish the IO state changes to.

# Control Sets

There are three command sets that can be used to control the module: TCP/IP, ASCII and HTTP.

## TCP access and commands

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.

All bytes for any command must be sent in a single transaction.

Command		Action
dec	hex	
16	0x10	Get Module Info - returns 3 bytes. Module Id (54 for ETH24V008H), Hardware version, Firmware version.
32	0x20	Digital Active – A three byte command. Follow with the output number, and then a time for pulsed output from 1-255 (100ms resolution) or 0 for permanent. Board will return 0 for success, 1 for failure  Example: 0x20 – Digital Active 0x02 – Output 2 0x32 – (50) - 5 seconds (50 * 100ms) Board will return 0 for success, 1 for failure.
33	0x21	Digital Inactive – A three byte command. Follow with the output number, and then a time for pulsed output from 1-255 (100ms resolution) or 0 for permanent. Board will return 0 for success, 1 for failure  Example: 0x21 – Digital Inactive 0x02 – Output 2 0x32 – (50) - 5 seconds (50 * 100ms)
35	0x23	Digital Set Outputs – Follow with one byte, the output states. All active = 255 (11111111) All inactive= 0. Board will return 0 for success, 1 for failure
36	0x24	Digital Get Outputs - returns 1 byte corresponding with outputs, a high bit meaning the output is active.
37	0x25	Digital Get Inputs - returns 1 byte corresponding with the digital inputs, a high bit meaning input is active.
58	0x3A	ASCII text commands - allows a text string to switch outputs, see section below
119	0x77	Get Serial Number - Returns the unique 6 byte MAC address of the module.
121	0x79	Password Entry - <i>see TCP/IP password</i> , board will return 1 for success or 2 for failure
122	0x7A	Get Unlock Time - Returns 1 byte indicating the TCP/IP password protection status: <i>0</i> - password protection is enabled and password entry is required before changes can be made <i>1-30</i> - seconds until TCP/IP password protection is re-enabled. All authorized commands set the timer back to 30 seconds (including this one). <i>255</i> - TCP/IP password is not enabled.
123	0x7B	Log Out - immediately re-enables TCP/IP password protection, board will return 0 for success

## 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 ETH24V008H to indicate password entry

*'a' (0x61)* - 2nd byte in frame (ASCII hex equivalent in brackets, <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 module, and if the password is correct then a 1 will be transmitted back, a failure will send a 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.

## 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 separated variables with the following syntax:

```
":DOA,1,50,password"
```

To break this down ":" (0x3A) 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 (50 \* 100ms) and finally the TCP password (if applicable).

If you wanted to make output 2 inactive for 3 seconds you would send:

```
":DOI,2,30,password"
```

To break this down ":" (0x3A) 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 (30 \* 100ms) and finally the TCP password (if applicable). Assuming no password is used the previous command would simply be:

```
":DOI,2,30 "
```

## HTTP Commands DOAx and DOIx

A 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
```

If you wish to pass a username and password with the request you can do so like this (example uses default credentials):

```
admin:password@192.168.0.200/io.cgi?DOA1=10
```

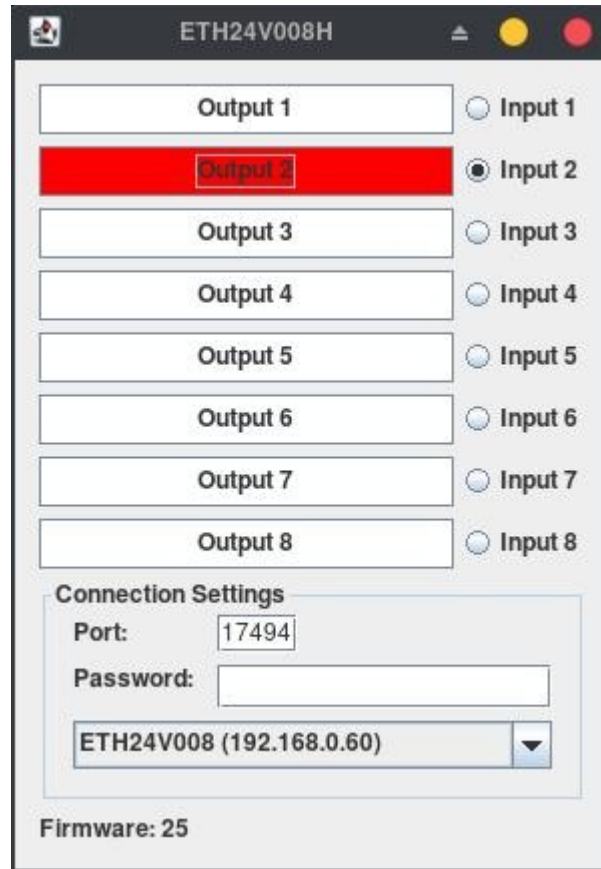
To set the relay with no timer (it will remain in state you can just pass a 0 value for the timer:

```
192.168.0.200/io.cgi?DOA1=0
```

*You can test these functions by typing them directly into the address bar of most internet browsers.*

## TCP Test program and example source code

To get the ETH24V008H up and running in the minimum amount of time we have put together an [example java program](#), and also full [source code](#) for this program. You may examine this code or use it as a starting point for your own application.

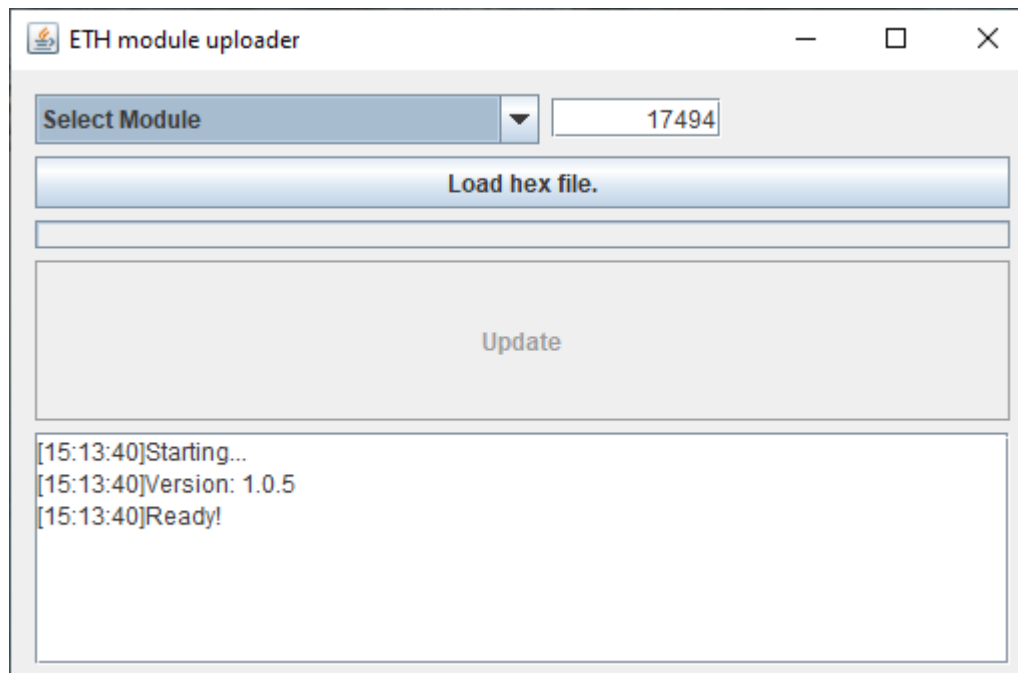


## Android & iPhone Apps

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.

# Software updates

With our [software update tool](#) you can upgrade the firmware to get the latest features



## Latest firmware.

[V27](#) – Fixes memory leak

# Board dimensions

