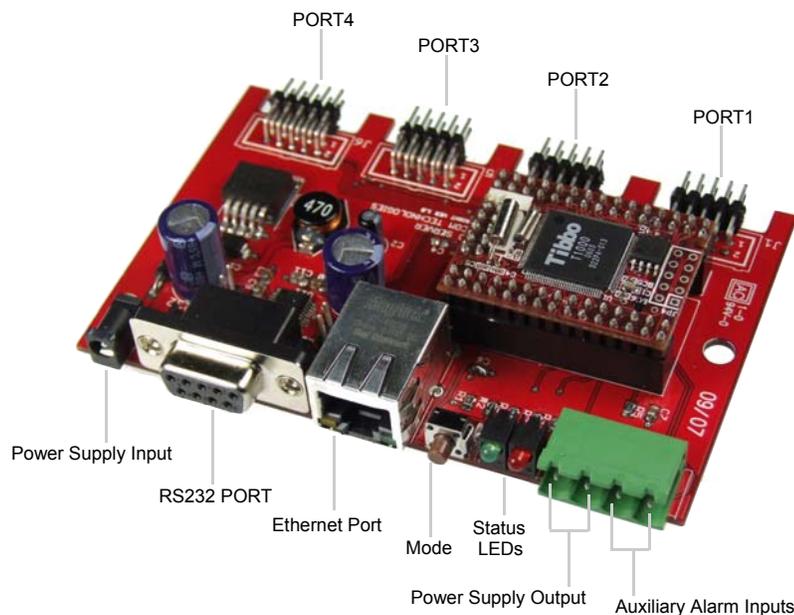




32IO SERVER Internet Remote Control & Monitoring Device

The heart of the 32IO SERVER is an embedded web server which enables the monitoring and control, via the internet or a local area network, of up to 32 devices connected to the 32IO Server's four I/O ports. All functions, including port configuration and server setup are performed from your internet browser. Multiple accessory I/O modules are available for connecting to the 32IO SERVER which greatly expands the versatility of the I/O server and gets your internet remote control and monitoring system up and running in the shortest time. Not only is the 32IO SERVER fully programmed and ready to deploy into your monitoring and control environment, the 32IO SERVER is fully user programmable, and with our free development tools, engineering a custom version is easily accomplished.



Features

- Control and Monitor up to 32 remote devices over the internet
- 4X I/O ports accept a wide variety of plug-in compatible I/O modules
- 8X (3.3v logic level) I/O lines per port
- 2 auxiliary (alarm) inputs
- Automatically sends email notification of alarm triggers and alarm resets
- Operates as a DHCP client for automatic IP address configuration by DHCP server (router)
- User configurable IP address in the absence of a DHCP server
- User configurable SMTP server and email notification addresses
- Password access protection
- Supports a wide range of our I/O modules, including wireless I/O port extension
- Wide power supply range: 8Vdc-16Vdc. 12Vdc, 500mA switching supply included.
- Power supply output connector (in parallel with supply input) for powering external devices
- Includes serial port for exchanging messages to and from a serial host
- Full user I/O control and server configuration via simple integrated website
- Fully customizable in BASIC with free IDE tools
- Customization service available for user specific requirements
- On board High current DC/DC converter for driving output loads up to 2A @ 3.3V
- PCB size: 106 mm (4.17 in.) x 68 mm (2.68 in.)
- Enclosure option available with OEM graphic overlay

Operation

Ports Description

32IO SERVER is a web based I/O (input & output) server that enables remote control and remote monitoring of 32 I/O lines over the internet or intranet. These 32 I/O lines are grouped into four ports, each of which can be configured as an INPUT port or an OUTPUT port.

- INPUT ports are used to connect compatible external devices whose ON/OFF states are to be monitored. The inputs 1 to 8 of a port are normally pulled HIGH (via weak internal pull up resistors to 3.3V) which translates to an ON condition displayed on the inputs.html web page. When an input is taken LOW (pulled down to 0V) an OFF condition will be displayed on the inputs.html web page. With no external devices connected to input ports, the states of the input port will be ON, as displayed on the inputs.html web page. The input port lines are 5V tolerant for compatibility with 5V level output devices.
- OUTPUT ports are used to drive compatible external devices for the purpose of controlling. An OFF state on the index.html web page translates to 0V on the port pin. Conversely, an ON state translates to 3.3Vdc on the output port pin. When driving high current external devices (>10mA), a suitable buffer/driver must be used.

In addition to the 8 I/O lines each port has two power supply pins (3.3Vdc and GND) which can source current of up to 2A to external devices (see port pin-out and technical specification for further details.)

Ethernet Port

Initial Communication with the 32IO SERVER:

LAN and WAN setup

The 32IO SERVER may be connected to a LAN (local area network), WAN (wide area network) or may be connected directly to a single computer that is not part of a network.

Typically, the 32IO will be connected to a LAN or WAN via a network router. For this type of installation, the included Cat. 5 cable will plug into the 32IO SERVER's ethernet port and the other end to an unoccupied port on the router or switcher. The router is usually configured as a DHCP server and will automatically assign (lease) an IP address to 32IO SERVER when the 32IOSERVER is powered up. (Note: the 32IO SERVER and router must be connected before powering the 32IO SERVER for DHCP auto configuration to take place.) To determine what IP address the DHCP has assigned to the 32IO SERVER, the user will access the router's setup and configuration interface where a list of assigned IP addresses will be displayed and from that list, determine which IP address is allocated to the 32IO SERVER. The user will need to know how to access this information for their particular router which can be obtained from the router's documentation. Once the user has determined the 32IO SERVER's IP address then communication with the 32IO SERVER can be established simply by typing in the IP address into the web browsers address field. This will allow communication with the 32IO SERVER over a LAN.

For communication with the 32IO SERVER over a WAN (the internet), the router will require the appropriate port forwarding to be set up to accept external incoming TCP/IP connection to the 32IO SERVER's private IP address on port 80. For WAN connections the user will also need to know the WAN IP address of their internet modem. This is easily determined again from within the router or by visiting <http://www.whatismyip.com>

Once the WAN IP address is determined and persistent port forwarding is correctly set up in the router, communication with the 32IO SERVER is as simple as typing the WAN (internet modem) IP address into the web browser. This can be done from any internet connection, anywhere in the world.

Single Computer setup

If the 32IO SERVER is not connected to a network, but directly to a single computer's ethernet port, a Cat.5 CROSSOVER cable is used, and, because the single computer does not have a DHCP server, the IP address of the computer may need be changed to be on the same subnet as the 32IO SERVER's in order to establish initial communication with the 32IO SERVER. The 32IO SERVER's default IP address is 192.168.2.107. This may be changed in the Server_Setup.html page later if an alternate IP address is preferred.

If the IP address of the single computer happens to be on the same subnet as the 32IO SERVER, then no IP ad-

dress changes are necessary and communication with the 32IO SERVER is established by simply typing `http://192.168.2.107` in the internet browser's address field. (Note the single computer cannot have the same ...107 IP address as the 32IO SERVER)

If the IP address of the single computer is not on the same subnet as the 32IO SERVER, then the computer's IP address will need to be changed. The IP address of the computer can be determined through the START_RUN window in Windows® operating system

To retrieve the IP address of the computer :

- Click START menu
- Select RUN
- Enter "command"
- At the command prompt enter IPCONFIG

The computer's IP address will be returned. If 192.168.2.xxx (where xxx is not 107) is returned, then no further configuration will be required and the 32IO SERVER should be accessible. If an IP address other than the above is returned, then the IP address of the computer requires reconfiguration.

Reconfiguration of the computer's IP address is performed by accessing your network interface card properties (NIC) settings for TCP/IP connections. Enter the new static IP address for the computer. This can be 192.168.2.xxx where xxx is any number up to 255 (excluding 107 which belongs to 32IO SERVER). Once the computer is rebooted, the newly configured IP address will be active and communication with the 32IO SERVER can be established as described above. (For further details on configuring static IP address, see appendix A)

Power Supply Input

The 32IO SERVER accepts a dc power supply that produces an output voltage of between 8Vdc and 16Vdc with a centre positive 1.3mm dc plug. The included 12Vdc switching power supply is able to supply current up to 2A to facilitate powering other external devices (such as 32IO compatible I/O accessory modules) via the Power Supply output connector and/or the 4 port's 3.3Vdc power pins. The 32IO SERVER without any other devices connected draws 110mA.

A few seconds after applying power to the 32IO SERVER, with the Cat. 5 ethernet cable connected to the network router, the green Mode LED and the communications LED's on the ethernet connector will illuminate, indicating the 32IO SERVER is ready. (Note: If power is applied before the ethernet cable is connected to the router, the 32IO SERVER will default to Static IP mode. To ensure DYNAMIC IP configuration by the DHCP server, have the cable connected before power-up)

RS-232 Port

The 32IO SERVER features a 9 Pin serial port for communication with serial devices. The serial port is configured as DTE and therefore will connect to DCE configured serial devices with a straight through serial extension cable. Connecting to DTE serial devices will require a null modem serial cable, usually, with female connectors at each end.

32IO SERVER's serial.html page permits the sending and receiving of serial messages to a serial connected devices.

AUX (Alarm) Inputs 1&2

The 32IO SERVER includes two AUX (Alarm) inputs which are special inputs, that, when triggered and when reset, automatically send an email notification of the event to the email address that has been configured in the 32IO SERVER configuration page. These inputs are active LOW. When the input is taken LOW by an external event, the ALARM is condition is displayed as ON on the inputs.html, otherwise the alarm is displayed as OFF.

To test the AUX inputs and to confirm email notification/configuration settings, each AUX input can be shorted to the POWER SUPPLY GND pin on the (green) connector. When grounded, the email should be received of the event and when the ground is removed a second email will be received of the "reset" event. The emails sent will also contain the status of the four ports at the time of the alarm event.

Mode Pushbutton Switch (next)

Mode Pushbutton Switch

The mode pushbutton switch resets the 32IO SERVER to default configuration settings. The configuration settings that are RESET to default parameters are:

- Password Protection (OFF)
- User Name (admin)
- Password (admin)
- Static IP address (note: if the 32IO SERVER is connected to the DHCP server the Dynamic IP address will be retained)
- Subnet Mask(255.255.255.0)
- Default Gateway (192.168.2.1)
- Outgoing Server User Name (blank)
- Outgoing Server password (blank)
- SMTP Server IP (0.0.0.0)
- Outgoing Port (25)
- Email Address From (32IOSERVER@yourdomain.com)
- Email Address To (USER@yourdomain.com)

The following 32IO SERVER configuration settings are not affected by RESET:

- Ports 1,2,3,4
- Outputs at Power Up
- Email Report Upon Alarm

To apply a RESET, the Mode button is pressed for 10 seconds and then released. The Red LED comes on to indicate the reset mode is active. Power is cycled to complete the reset. The 32IO SERVER server_setup.html page will require setting up to of the restored default settings to gain the desired operation.

32IO SERVER Webpages

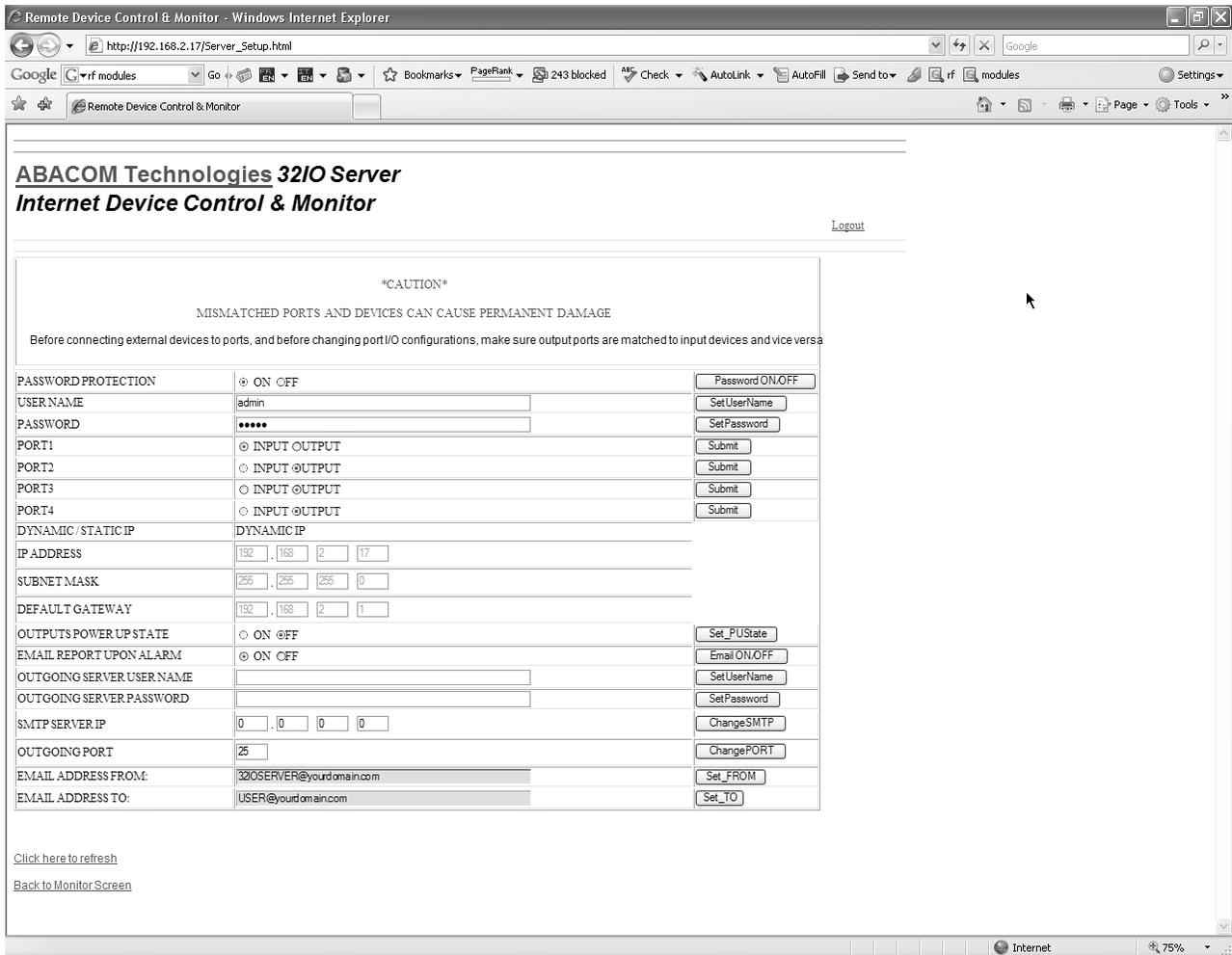
Once the 32IO SERVER has been successfully connected to the network, the server web pages can be accessed and full configuration can be performed and port monitoring and control can begin. The 32IO SERVER serves several main web pages as follows:

- /server_setup.html
- /serial.html
- /inputs.html
- /index.html

/Server_Setup.html

On initial 32IO SERVER setup, the page that is accessed to complete the functional setup, is the /server_setup.html page. This page provides a forms type interface allowing the user to select preferences and enter various setup text strings.

Following is a screenshot of the server setup page where each entry will be described. Each setting to be changed must be submitted one-at-a-time, by clicking the appropriate "submit" button". A changed setting will not be accepted without clicking the submit (or related) button.



Password Protection

When ON is selected, access to the 32IO SERVER will require a login user name and password. When OFF is selected login access is not required.

User Name

Default is admin. Enter your preferred user name. When Password Protection is ON, this is the username required to gain access.

Password

Default is admin. Enter your preferred password. When password protection is ON, this is the password required to gain access.

Port1, Port2, Port3 and Port4

(Do not connect external devices to the ports until the ports have been correctly configured.)

The port configuration depends on whether the 'port connected external device' will be CONTROLLED by the 32IO SERVER or MONITORED by the 32IO SERVER. Please make sure of this, as incorrect configuration causing mismatched devices and ports can cause permanent damage. If the port is to control (ie switch an external device ON or OFF) select OUTPUT for that particular port.

Conversely, if the port is to monitor an ON or OFF condition of an external device, select INPUT for that particular port.

Dynamic/Static IP

This is automatically set to Dynamic when the 32IO SERVER is connected to a router with its DHCP server enabled. Otherwise it is automatically set to Static.

IP Address

This is grayed out if Dynamic IP is active. For Static IP mode, the default static IP address of the 32IO SERVER is presented (192.168.2.107). This may be changed to users preference or for compatibility with a different IP subnet

Subnet Mask

This is grayed out if Dynamic IP is active. For Static IP mode, the subnet mask may be changed to suit specific network configurations. In most applications it is unnecessary to change this default setting (255.255.255.0)

Default Gateway

This is grayed out if Dynamic IP is active. For Static IP mode router connections, the router IP address is entered here. Default is 192.168.2.1.

Outputs Power Up State

This determines the state of the OUTPUT configured ports on power up. ON sets all the output ports to ON at power up. OFF sets all the output ports to OFF at power up. In the event of either a deliberate or unexpected power cycle such as a power interruption, the output port settings will assume this configured power-up state. Hence the output settings prior to the power interruption will be lost and should be manually reset to the preferred states.

Email Report Upon Alarm

To enable automatic email reporting upon alarm triggers and alarm resets present on AUX1 and AUX2, ON should be selected. In this case the email settings that follow below should all be correctly configured. When selected to ON, the 32IO SERVER will send email message to the configured address when a change in state on AUX1 and/or AUX 2 has occurred. The contents of the email will also include the state of the other 4 ports.

If email reporting is not required, then OFF is selected and the entries listed below can be ignored.

Outgoing Server User Name

Enter the user name provided by your internet service provider in the common form: username@serviceprovider.com

Outgoing Server Password

Enter the password used for your internet service provider access

SMTP SERVER IP

Enter the IP address of the internet service provider's SMTP service. This will be a string of numbers and not a translated string of characters as some internet/mail service providers use. If the service provider uses a string of characters, usually beginning with smtp.... then the actual IP address numbers must be requested from the internet/mail service provider as this format is not acceptable for the 32IO SERVER. Alternatively, the IP address can be extracted by using the ping command in the command prompt window in Windows®.

To extract the actual IP address, ping the character string from the DOS command prompt.

To do this from Windows®:

- Click Start
- Select RUN
- Type "command", hit "enter"
- At the command prompt type: ping **{smtp.....}**
- The ping instruction should get a reply back from the actual IP address. This is the IP address that is required to be entered.

** replace with the appropriate character string . (See appendix B for a screenshot example).

Outgoing Port

This is usually 25 and in most cases need not be changed.

Email Address From

Enter the email preferred address to be displayed in the "From" field of your receiving mail program. This need not be an active email address since there is no "reply to" function.

Email Address To:

Enter a valid email address where the email notifications are to be sent.

REMINDER: Perform any of the above changes one at a time and click the "submit" button after each edit for the change to be accepted.

All the above setting will be retained in non volatile memory and are unaffected by power cycling.

Once the configuration changes made to the server_setup.html page are completed, the Back to Monitor hyperlink, is used to access the web pages related to monitoring and control. Clicking on this hyperlink will open the index.html page (outputs) or the inputs.html page. The page opened will depend on what the last page visit was.

Logout

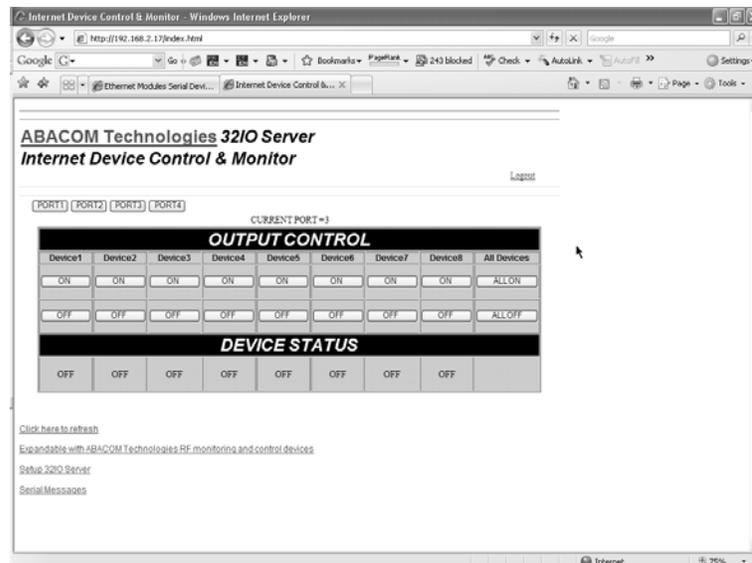
If password protection is set to ON and the logout hyperlink is clicked, the /index.html page will be opened, requiring user name and password access to log into the 32IO SERVER. If password protection is OFF clicking on logout will open the index.html page

/Index.html and /inputs.html

If password protection is ON. then the initial index.html page will display a login form where the user enters their user name and password to login. If this information is forgotten, then the 32IO SERVER must be reset to default as described elsewhere in this manual.

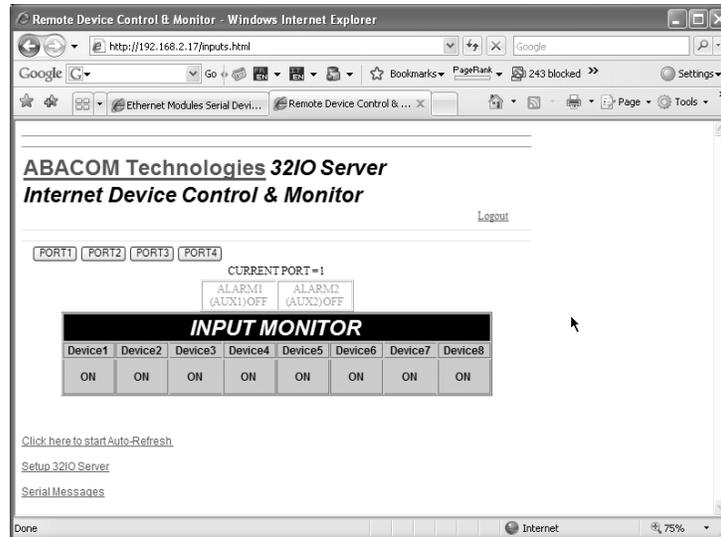


If password protection is set to OFF, then the login parameters page will not be displayed and the index.html page will display the output ports.

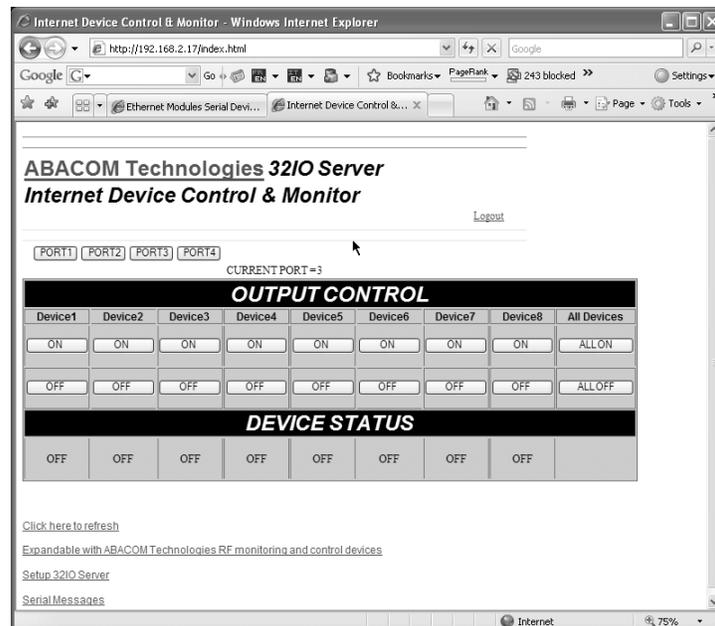


The index.html page permits the selection of each port. If the particular port is configured as an input port then the INPUT MONITOR table will be displayed on the inputs.html page. Here the status of all 8 inputs of the particular port will be displayed as well as the status of the AUX/ALARM inputs. If an AUX/ALARM input is ON (ie at GND) this will be highlighted in red and if email notification has been configured an email will have been sent to the specified email address. Otherwise it will be displayed as OFF. If no external devices are connected to the input port, the DEVICE 1-8 will display ON by default.

The “click here to AutoRefresh” hyperlink will cause the page to continually refresh, to display updated input states every 5 seconds. Clicking the hyperlink again will stop AutoRefresh. Manual refresh is performed each time a port button is clicked.

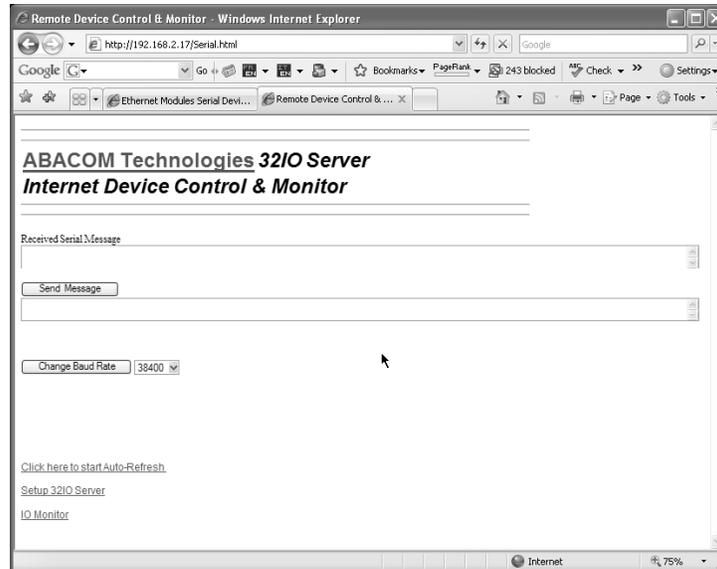


If a particular port selected is configured for OUTPUT, the OUTPUT CONTROL and DEVICE STATUS table will be displayed on the index.html page. Here the output status of each output line (device) of the port may be independently or may be collectively turned ON or OFF. In each case, the actual status of the output line will be reported in the DEVICE STATUS cells of the table. This allows the user to determine what the actual state is of the port output line.



/Serial.html

The serial.html page allows the user to send/receive serial messages to/from a serial device connected to the serial port of the 32IO SERVER. The serial baud rate is set to the same baud rate as the connected external serial device.



32IO SERVER Plug-In compatible modules

Following is a list of plug-in compatible I/O modules designed to operate as standalone devices and/or as accessories for the 32IO SERVER:

1- Relay Board

The 8 relay board connects directly to the 32IO SERVER output configured port, via the included cable. The relay board is powered externally with 12Vdc power supply or via the power pass-through (power output) connector of the 32IO SERVER. LED indicators provide visual indication each relay status.

- ◆ Plugs into 32IO SERVER output port using the included cable
- ◆ Powered via the 32IO Server power pass-through connector
- ◆ DC jack and Screw terminal power connector
- ◆ 8 Relays with Normally Open, Normally closed and Common contacts
- ◆ 8 relay status LED's
- ◆ 5Amp relay contacts
- ◆ Screw terminal relay contacts
- ◆ Size: 2.8in. x 6in. x 1in.

2- Opto Board

The optically isolated inputs board provides 8 polarity insensitive inputs for safely connecting external devices to the 32IO SERVER input configured ports. Each input status is visually represented with LED's.

- ◆ 8 Opto-isolated inputs with screw terminal blocks
- ◆ Status LED's to indicate input state
- ◆ Bi-polar inputs
- ◆ 3V-24Vdc or ac input voltage tolerant
- ◆ 32IO SERVER connection cable included

3- 125Vac wall adaptor

The 125Vac wall adapter enables remote switching of mains operated appliances over the internet via the 32IO SERVER.

- ◆ Main outlet pass-through and secondary controlled outlet
- ◆ Controlled directly via the 32IO SERVER output port
- ◆ Controlled remotely via the RF wireless accessory modules
- ◆ Surge protected secondary output
- ◆ Opto-isolated control input
- ◆ Switches loads up to 15A max.

4- Switch module

The switch module contains 8 slide switches in parallel with 8 momentary tactile pushbutton switches and board allows for manual activation of each input line of the 32io input configured port.

- ◆ Momentary or latching switches
- ◆ Plug-in compatible with the 32IO SERVER input port
- ◆ includes 32IO SERVER connection cable
- ◆ LED indication for each switch ON/OFF condition
- ◆ Powered via the 32IO SERVER port
- ◆ Dimensions: 2.83in. (72mm) x 4.3in. (110mm)

5-16IO-SSRT-09 Wireless IO Extension Modules

The 16IO-SSRT-09 wireless I/O extension modules enable the monitoring and control of remote devices that cannot be hardwired to the 32IO SERVER. The 16IO-SSRT-09 modules provide a bi-directional wireless link between remote I/O devices and the 32IO SERVER's input and output ports, over distances of several hundred feet and up to as far as 40 miles (HP Version).

- ◆ 8 discrete digital inputs, 8 discrete digital outputs and 8 open collector outputs
- ◆ Relay alarm output for communications failure
- ◆ User configurable TRUE or INVERTED outputs
- ◆ Output Status LED's, Power and RF communications LED's
- ◆ Self supervising RF link with user configurable timeout function
- ◆ 902-928MHz Spread Spectrum FM architecture
- ◆ 3 versions available to suite short range, medium and long range applications

6- 18CHTX RF Transmitter modules

The 18CHTXu plugs into the 32IO server output port to provide a wireless control link for up to eight remote devices. Remote devices may be connected to our 10R8D receiver SRX series receivers or the 16CHRX receiver. All are available in low cost AM or FM versions.

- ◆ Plug in compatibility with a 32IO output port
- ◆ Provides a short range wireless control link *from* the 32IO server *to* remote devices
- ◆ Provides a short range wireless link *from* remote devices *to* the 32IO server
- ◆ Compatible with the SRX series RF remote control receivers
- ◆ Companion to the 10R8D remote control receiver
- ◆ Typical open field range of 600ft

7-10R8D RF Receiver module

The 10R8D receiver is plug-in compatible with the 32IO server's input port to provide a wireless remote control monitor link, enabling the monitoring of remote devices that are connected to the 18CHTX transmitter. The status of up to 8 remote devices may be monitored via the 32ioSERVER with the 10R8D receiver and 18CHTX transmitter.

- ◆ Plugs into the 32ioSERVER input configured port via the included cable
- ◆ Companion to the 18CHTX transmitter
- ◆ Monitors up to 8 remote devices wirelessly over a distance of up to 600ft away
- ◆ Automatic binding with the transmitter
- ◆ Momentary or latched outputs
- ◆ May be powered via the 32ioSERVER power pass-through or by a separate 7.5Vdc to 15Vdc power supply

Packaging

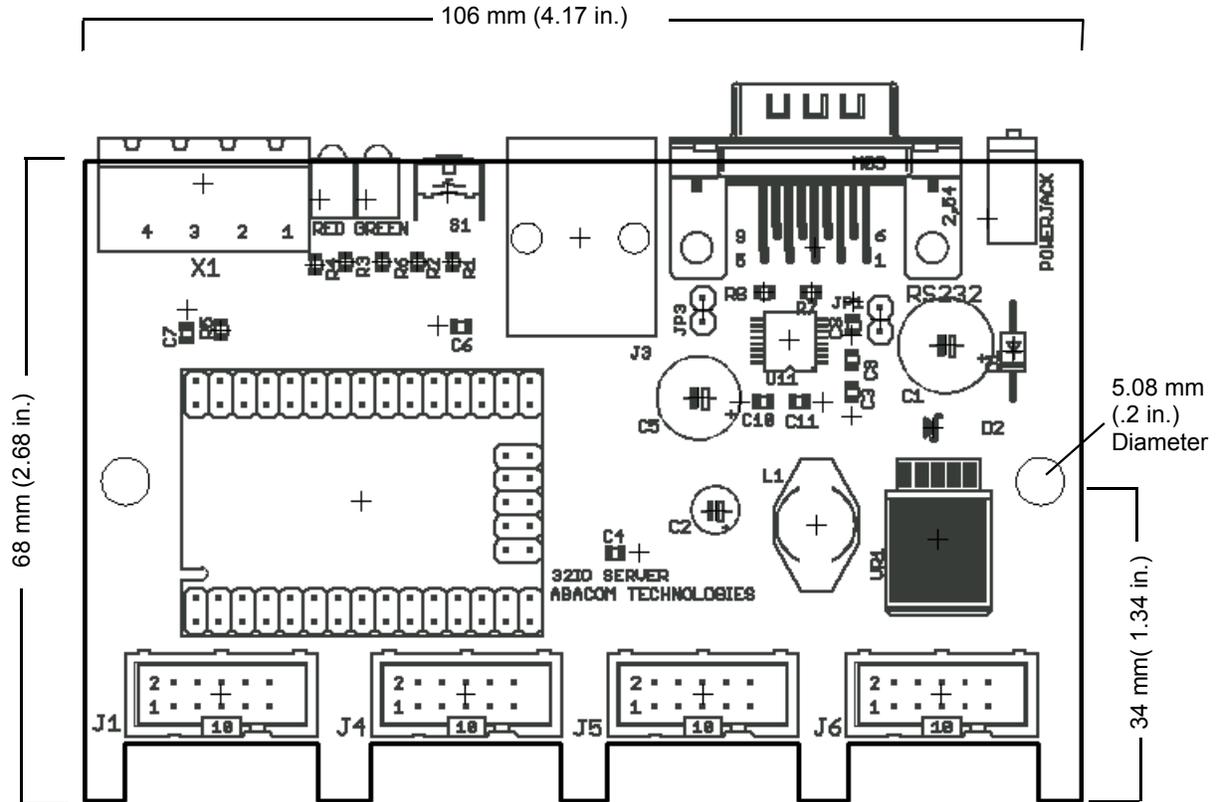
The 32IO SERVER is supplied in two form factors: either as printed circuit board subassembly without an enclosure or as housed version as shown below.



OEM Customization

We offer a customization service for OEM customers who require the housed 32IO SERVER with their own company logo or other details. We also offer custom revisions of the 32IO SERVER webpage interface to cater for customer specific requirements. Please contact us for a quote on any custom requirements.

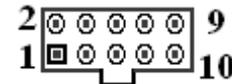
Mechanical Dimensions



Technical Specifications

Operating Voltage	8Vdc-16Vdc
Operating Current	110mA
Input Monitor AutoRefresh time	3-5 (Sec)
I/O Ports	3.3V CMOS (5V tolerant inputs)
I/O Lines Maximum Load	10mA
Total Max Port Current Sourcing (via pins 1 and 10)	300mA When using the included 500mA Power supply. This may be increased to a max of 2A when using a suitable higher current rated power supply
Suitable Port Connector Type	10 pin IDC (female) 0.1" spacing
AUX / Power Output Connector type	4 PIN Phoenix, Right Angle, 5mm spacing

Port Pinout



1	3.3Vdc
2	I/O-8
3	I/O-7
4	I/O-6
5	I/O-5
6	I/O-4
7	I/O-3
8	I/O-2
9	I/O-1
10	GND

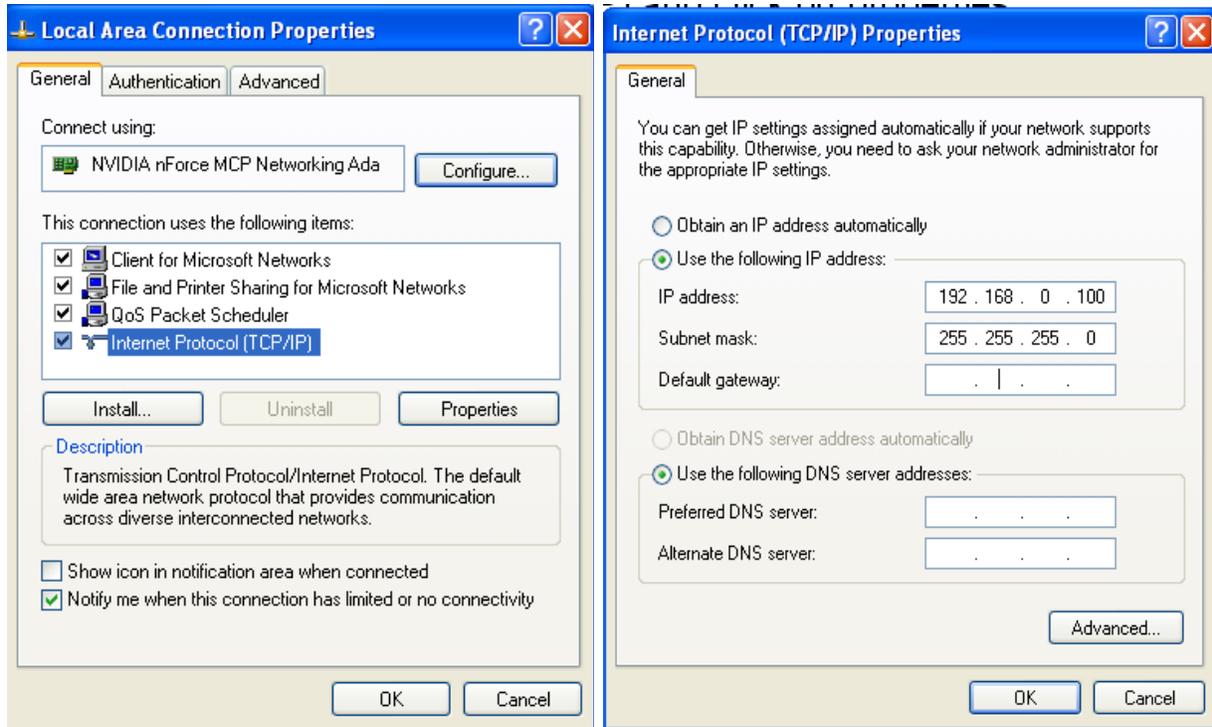
Disclaimer:

Technical specifications are subject to change without notice. Whilst every effort has been made to ensure the accuracy of the information contained in this document, ABACOM Technologies Inc. does not assume responsibility for any errors or omissions that may exist. ABACOM Technologies Inc. does not assume responsibility for any damage caused through use or misuse of their products and the onus lies entirely with the end user in determining the suitability of and use of the product for any particular application. ABACOM Technologies Inc. products are not recommended for applications where human life may be at risk.

Appendix A– To set a static IP in Windows XP

This example is to show how to setup an static IP address for Windows® XP

- 1– Right click on My Network Places and click on properties
- 2– Right Click on your in-use network card icon and select properties.
- 3– In Local Area Connection screen click on internet protocol (TCP/IP) and click on properties.
- 4– in Internet protocol (TCP/IP) properties click on use the following IP address and fill in the IP address.



Appendix B– Retrieving a SMTP IP address using the ping command

```
Command Prompt

C:\>ping smtp.etob.phub.net.cable.rogers.com

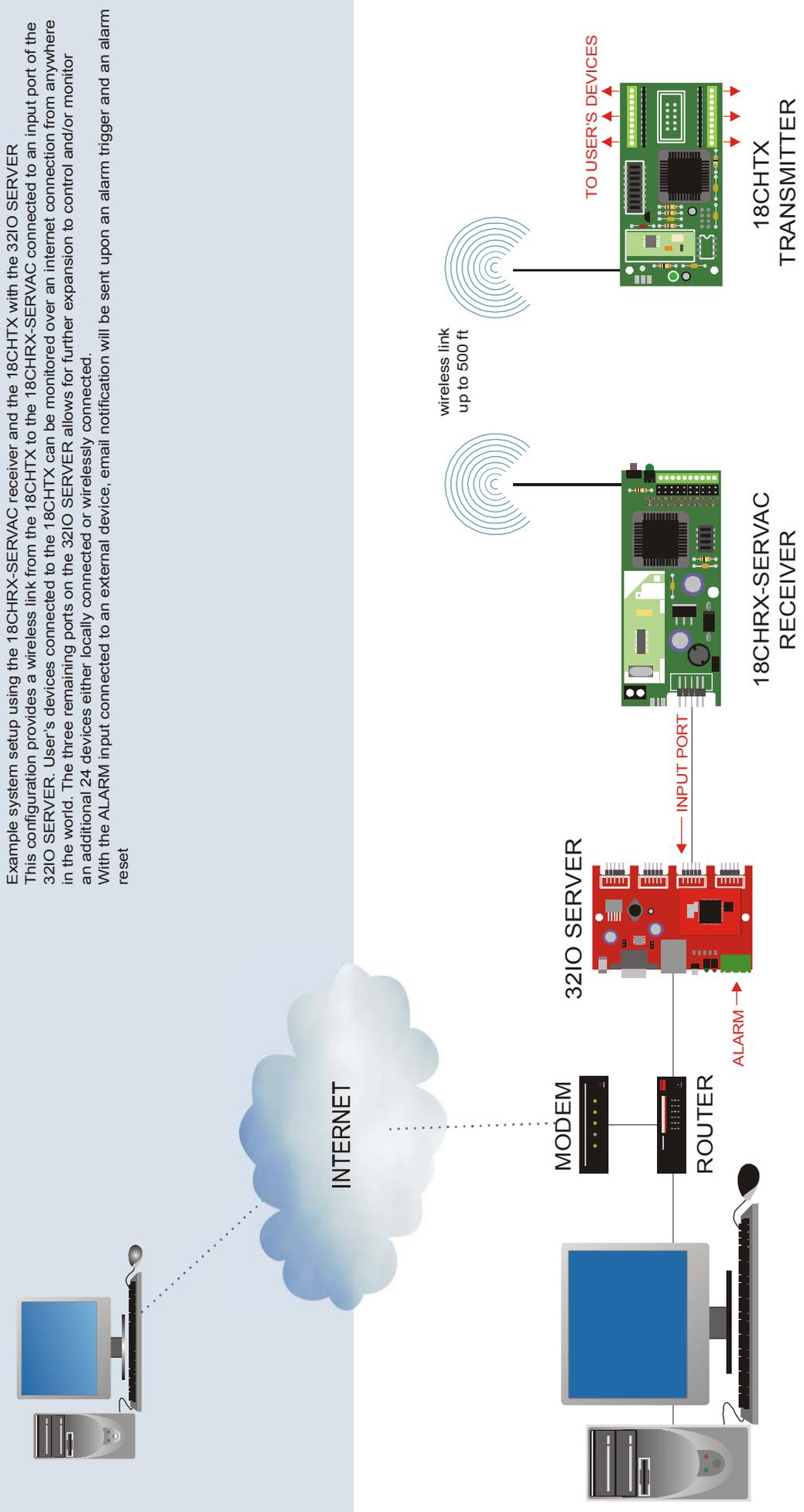
Pinging smtp-rog.mail.yahoo2.akadns.net [206.190.36.18] with 32 bytes of data:

Reply from 206.190.36.18: bytes=32 time=24ms TTL=55

Ping statistics for 206.190.36.18:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 24ms, Maximum = 24ms, Average = 24ms

C:\>_
```

32IO SERVER Configuration

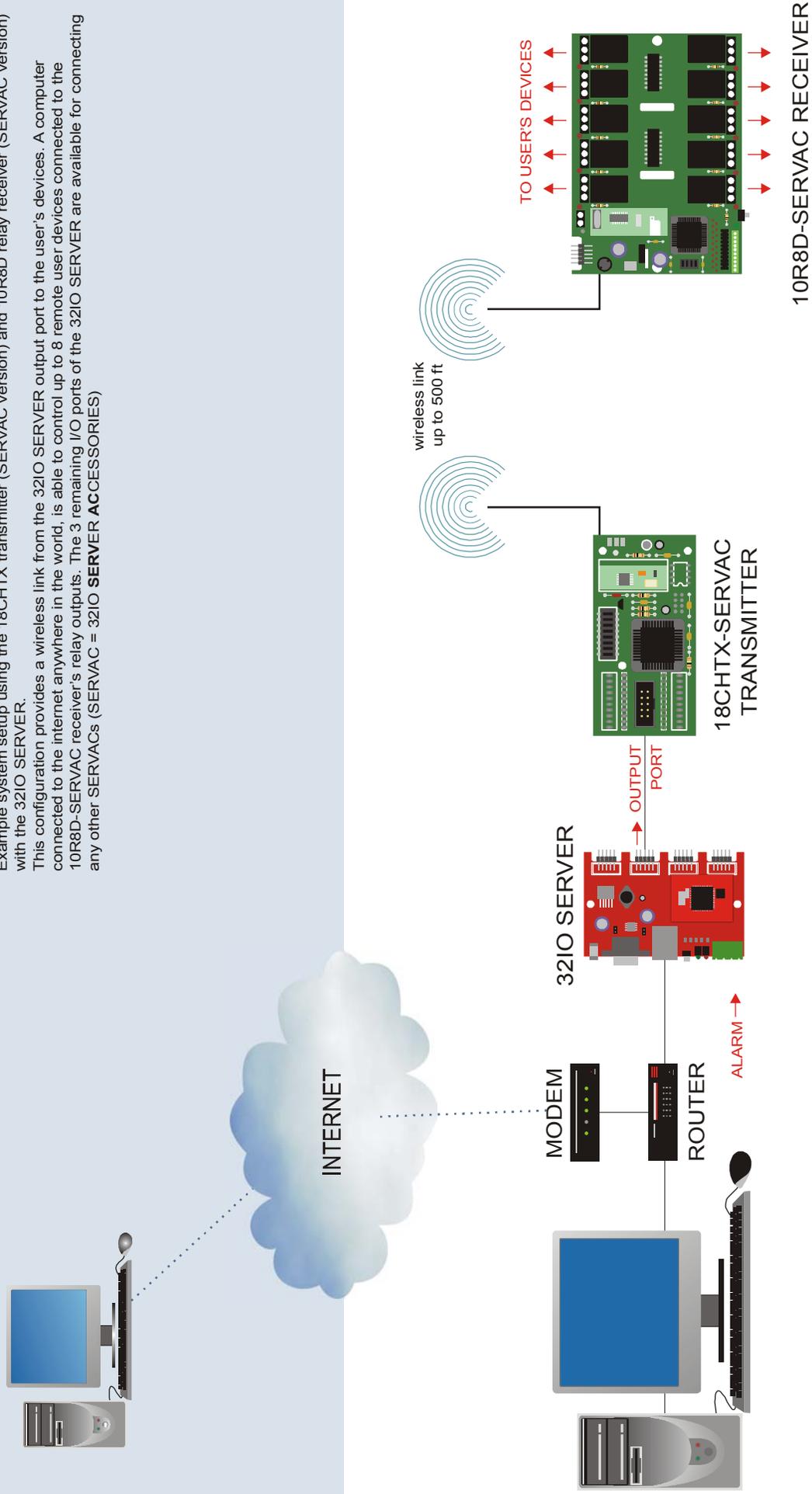


Example system setup using the 18CHRX-SERVAC receiver and the 18CHTX with the 32IO SERVER. This configuration provides a wireless link from the 18CHTX to the 18CHRX-SERVAC connected to an input port of the 32IO SERVER. User's devices connected to the 18CHTX can be monitored over an internet connection from anywhere in the world. The three remaining ports on the 32IO SERVER allows for further expansion to control and/or monitor an additional 24 devices either locally connected or wirelessly connected. With the ALARM input connected to an external device, email notification will be sent upon an alarm trigger and an alarm reset

32IO SERVER Configuration

Example system setup using the 18CHTX transmitter (SERVAC version) and 10R8D relay receiver (SERVAC version) with the 32IO SERVER.

This configuration provides a wireless link from the 32IO SERVER output port to the user's devices. A computer connected to the internet anywhere in the world, is able to control up to 8 remote user devices connected to the 10R8D-SERVAC receiver's relay outputs. The 3 remaining I/O ports of the 32IO SERVER are available for connecting any other SERVACs (SERVAC = 32IO SERVER ACCESSORIES)



32IO SERVER Configuration

