

BF-450(M)/BF-430/431

RS232 / RS485 to TCP / IP Converter Module

User Guide

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1. **1. Getting to Know your BF-450(M)/BF-430/431**
2. **1.1 Introduction**

The BF-450(M)/BF-430/431 is a RS232/RS485 to TCP/IP converter integrated with a robust system and network management features designed for industrial equipment to be accessed and controlled via Intranet or Internet. By integrating RTOS (Real Time Operating System) and complete TCP/IP protocol stack capability, the BF-450(M)/BF-430/431 provides not only a robust and high performance system to make your device connecting to Network, but also ease installation and Internet access. The BF-450(M)/BF-430/431 Web Configurator is a breeze to operate and totally independent of the operating system platform you use.

1.2 Main features

The following are the main features of BF-450(M)/BF-430/431

► TCP/UDP server/client support

The BF-450(M)/BF-430/431 support four types of connection: TCP server, UDP server, TCP client and UDP client, user can select one of types to meet application requirement.

► DHCP Client

DHCP (Dynamic Host Configuration Protocol) client obtains the TCP/IP configuration at start-up from a centralized DHCP server, which means it can get IP address, an IP default gateway and DNS server.

► PPPoE Over Ethernet

PPPoE is a protocol for connecting remote hosts to the Internet over DSL connection by simulating dial-up connection.

► Dynamic DNS

With dynamic DNS support, you can have a static hostname alias for a dynamic IP address, allowing the host to be more easily accessible from various locations on the Internet.

► Auto-negotiating 10/100Mbps Ethernet

The Ethernet interface automatically detects if it is on a 10 or a 100 Mbps Ethernet.

► Full Network Management via Web

This feature allows you to access or manage device through IE or Netscape on any platform. The firmware also can be upgraded via Web browser.

► Backup and Restore configuration

This feature allows you to backup system configuration to a file and restores it, for the security issue, the file which backup from system is an encryption format.

► IO Controller(BF-450 Only)

The BF-450 supports 3 DI/3 DO totally; 3 DI with any combination rule can trigger each DO. By providing a smart and easily setup way via Web, user doesn't need to have any programmer background. Besides,

► Alarm Generation(BF-450 Only)

With SMTP client support, you can set system to trigger alarm message via e-mail or SMS (Short Message System) to your mobile phone.

1.3 Application examples for BF-450(M)/BF-430/431



Figure 1 Standalone BF-450/BF-430/431's application through Internet

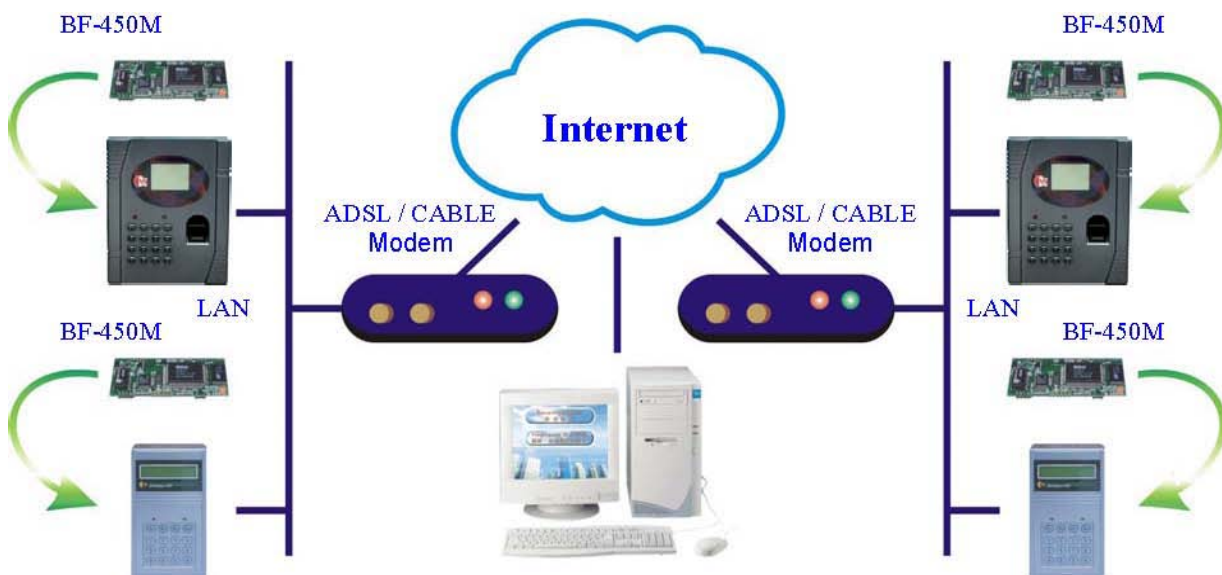
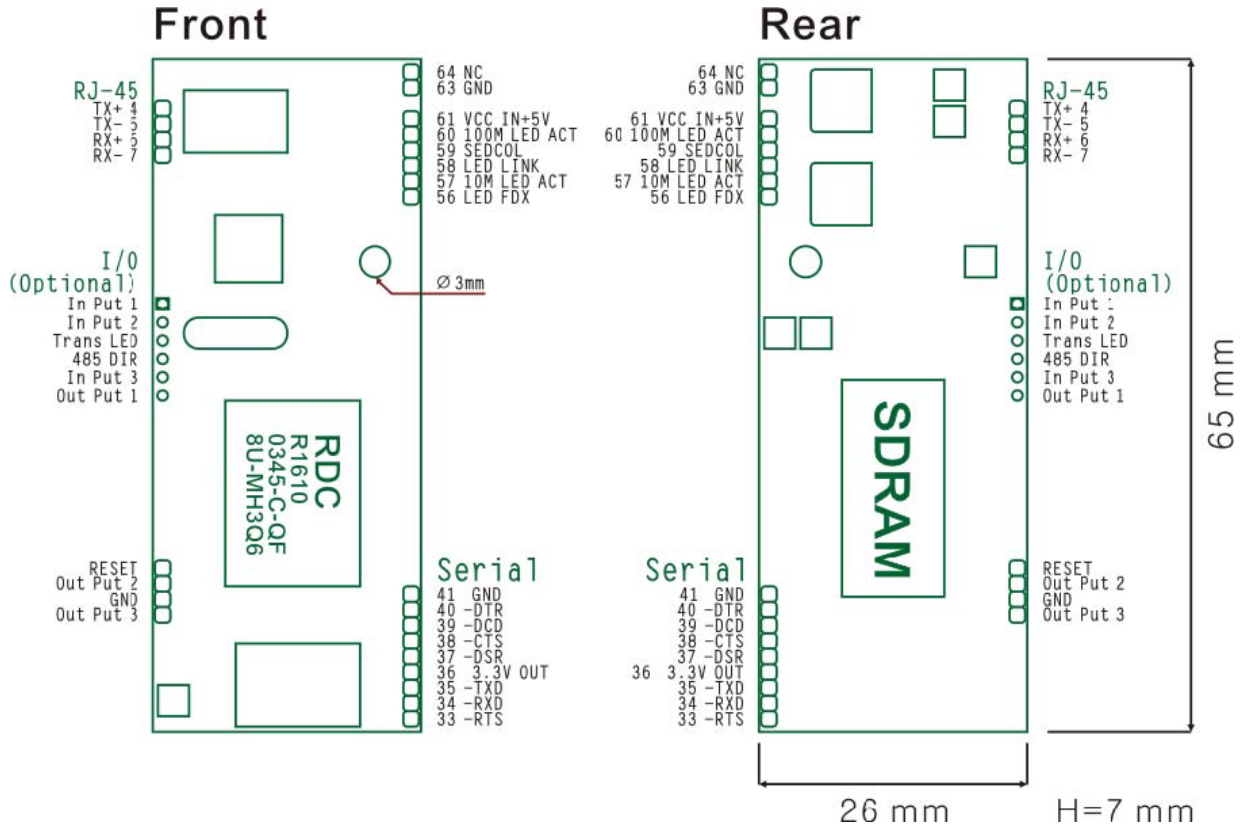


Figure 2 Socket-Type BF-450M's application through Internet

2. Hardware Installation & Initial Setup

2.1 Hardware Installation



RS232 Pin Form		
Pin	Acronym	Sense
Pin 1	CD	Carrier Detect
Pin 2	RXD	Receive
Pin 3	TXD	Transmit
Pin 4	DTR	Data Terminal Ready
Pin 5	GND	Ground
Pin 6	DSR	Data Set Ready
Pin 7	RTS	Request to Send
Pin 8	CTS	Clear to Send
Pin 9	RI	Ring Indicator

2.2 LED status

LED	Color(s)	Activity	Desc.
POWER	Red	Off	Power OFF
		On	Device Ready
LINK	Red	Off	No Ethernet Link
		On	Ethernet Link established
100M	Red	Off	10 Mbps
		On	100 Mbps
TRANS	Green	Off	No TCP/IP session link
		On	TCP/IP session link established
		Blinking	Bootting/System Self-Test Data Sending/Receiving between Serial and Ethernet

2.3 Initial Setup

Use this section to set up your computer to assign it a static IP address in the 192.168.168.1 to 192.168.168.254 range with a subnet mask of 255.255.255.0. This is necessary to ensure that your computer can communicate with your BF-450(M)/BF-430/431. Your computer must have an Ethernet card and TCP/IP installed. TCP/IP should already be installed on computer using Windows 98/2000/XP and later operating systems.

Note: *If connecting a computer directly to the BF-450(M)/BF-430/431 Ethernet port you must use a crossover Ethernet cable. If connecting through a hub/switch you must use a straight-through Ethernet cable.*

2.3.1 Installing the TCP/IP Protocol

Details refer to BF-450(M)/BF-430/431 Quick Start guide.

2.3.2 Fixed IP Addresses Configuration

Details refer to BF-450(M)/BF-430/431 Quick Start guide.

2.3.3 Configure your BF-450(M)/BF-430/431

Details refer to BF-450(M)/BF-430/431 Quick Start guide.

3. BF-450(M)/BF-430/431 Basic Configuration Setup

This chapter will show the basic configuration of BF-450(M)/BF-430/431 to connect your device through Intranet or Internet.

The BF-450(M)/BF-430/431 support three IP connection types: Static IP, DHCP and PPPoE. These types are listed in the drop-down menu for the IP Configuration setting. Each setup screen and available features will differ depending on what kind of IP connection types you select. Default is Static IP

3.1 One Page Quick Setup with Fixed IP

Static (or Fixed) IP

The screenshot shows the 'One Page Quick Setup (Fixed IP)' web interface. On the left is a sidebar with a 'Main Menu' containing 'One Page Setup', 'Advanced Setup', and 'Management'. The 'Main Menu' is expanded, showing sub-items like 'Operation Mode', 'Serial Type', 'Dynamic DNS', 'Device Admin', 'System Status', 'Backup & Restore', 'Upgrade Firmware', and 'Ping'. The main content area is titled 'One Page Quick Setup (Fixed IP)' and features a 'TYPE: STATIC IP' dropdown menu. Below this are several input fields: 'IP Address' (192.168.0.126), 'Subnet mask' (255.255.255.0), 'Gateway' (0.0.0.0), and 'Primary DNS' (168.95.1.1). There are three green section headers: 'Serial Port Mode' with 'Serial Type' (RS232) and 'Baud Rate' (19200), and 'Operation Mode' with 'Connection Mode' (TCP SERVER), 'Connection Port Number' (50000), and 'Remote Host IP Address (For Client Only)'. At the bottom are 'APPLY', 'CANCEL', and 'BACK' buttons.

IP Mode

IP Address: default **192.168.168.125** Subnet mask: default **255.255.255.0** Gateway: default **192.168.168.254** Primary DNS: default **168.95.1.1**

Serial Port Mode

Serial Type: RS232 Baud Rate: 19200 If no suitable Baud Rate in the drop-down menu, chose Others, input the value you want.

Operation Mode

Connection Mode: TCP Server Connection Port Number: 50000 Remote Host IP Address: Only useful in TCP Client

If you are connecting through a static or fixed IP from your network environment, perform these steps :

Step 1: Enter IP address **Step 2:** Enter Subnet mask **Step 3:** Enter Gateway IP address **Step 4:** Enter Primary DNS IP address **Step 5:** Select correct setting of Serial Port Mode and Operation Mode **Step 6:** click Apply button

3.2 One Page Quick Setup with DHCP Client

DHCP

One Page Quick Setup (DHCP Client)

TYPE: DHCP CLIENT

Host Name (optional)

Serial Port Mode

Serial Type: RS232

Baud Rate: 19200 (User Defined)

Operation Mode

Connection Mode: TCP SERVER

Connection Port Number: 50000

Remote Host IP Address (For Client Only)

APPLY CANCEL BACK

IP Mode

Host Name (Optional): default **BF430**, maximum length **15** characters

Serial Port Mode

Serial Type: RS232

Baud Rate: 19200

If no suitable Baud Rate in the drop-down menu, chose Others, input the value you want.

Operation Mode

Connection Mode: TCP Server

Connection Port Number: 50000

Remote Host IP Address: Only useful in TCP Client

If there is a DHCP Server existing in your network environment or you subscribe a CABLE service from your ISP, you can set IP configuration to DHCP to get a dynamic IP address. The **Host Name** is an *optional* item, depending on your DHCP Server setting.

Note 1: to gain CABLE service, you also need to change the MAC address of BF-450(M)/BF-430/431 to the MAC address of register in ISP. Please refer to Chapter 4 Device Admin/Mac Address Change

3.3 One Page Quick Setup with PPPoE

PPPoE

The screenshot shows the 'One Page Quick Setup (PPPoE)' web interface. On the left is a sidebar menu with 'Main Menu' (containing 'One Page Setup'), 'Advanced Setup' (containing 'Operation Mode', 'Serial Type', 'Dynamic DNS'), and 'Management' (containing 'Device Admin', 'System Status', 'Backup & Restore', 'Upgrade Firmware', 'Ping'). The 'One Page Setup' option is selected. The main configuration area is titled 'One Page Quick Setup (PPPoE)' and has a 'TYPE: PPPoE' dropdown. It contains the following fields: 'User Name' (1-47 characters), 'Password' (1-35 characters), 'Service Name (optional)' (1-47 characters), 'Close Connection when Idle Time Over' (0 seconds), 'PPPoE with Fixed IP Address' (DISABLED), 'Serial Port Mode' section with 'Serial Type' (RS232) and 'Baud Rate' (19200), and 'Operation Mode' section with 'Connection Mode' (TCP SERVER), 'Connection Port Number' (50000), and 'Remote Host IP Address (For Client Only)'. At the bottom are 'APPLY', 'CANCEL', and 'BACK' buttons.

IP Mode

User Name: no default, maximum length **47** characters Password: no default, maximum length **35** characters Service Name (optional): no default, maximum length **47** characters Close Connection when Idle Time Over (second): default **0**, range **0** to **4294967295** PPPoE with Fixed IP Address: default **DISABLE**

Serial Port Mode

Serial Type: RS232 Baud Rate: 19200 If no suitable Baud Rate in the drop-down menu, chose Others, input the value you want.

Operation Mode

Connection Mode: TCP Server Connection Port Number: 50000 Remote Host IP Address: Only useful in TCP Client

If you subscribe a DSL service with PPPoE connection from ISP, you can set IP configuration to PPPoE to get a dynamic IP address. Your ISP will provide you the **User Name** and **Password**, some ISP will also need the **Service Name** to authenticate. But this item is optional and depending on your ISP.

If you want to keep the connection always on between BF-450(M)/BF-430/431 and your ISP, then set the value of item **Close Connection When Idle Time Over** to 0, otherwise, when the idle time of no any traffic on line is over the setting value, BF-450(M)/BF-430/431 will terminate this PPPoE connection.

If your ISP can provide you fixed IP address when PPPoE connection established each time, you can select

PPPoE with Fixed IP Address as ENABLE and enter the IP address given from ISP.

4. BF-450(M)/BF-430/431 Advanced Configuration Setup

This chapter will show you how to configure BF-450(M)/BF-430/431 to function in your network and gain access to your device through Intranet or Internet.

4.1 Operation mode

The BF-450(M)/BF-430/431 support four operation mode: TCP Server, TCP Client, UDP Server and UDP Client. These modes are listed in the drop-down menu for the Operation Mode setting. Each setup screen and available features will differ depending on what kind of operation mode you select. Default is TCP Server.

TCP Server

The screenshot shows the 'Operation Mode Setup (TCP Server)' web interface. On the left is a sidebar with a 'Main Menu' and 'Advanced Setup' sections. The 'Advanced Setup' section includes 'Operation Mode', 'Serial Type', and 'Dynamic DNS'. The 'Operation Mode' is selected, showing a form with the following fields:

- Local Listen Port Number: 50000
- Close Connection When Remote Idle: 300 (seconds)
- Access Password: (maxlen 31)
- Keep Alive Check: ☒ Disable ☐ Enable
- Max TCP Connection: 1

Buttons for 'APPLY', 'CANCEL', and 'BACK' are at the bottom of the form.

Listen Port Number: default **50000**, range **0** to **65535** If your device is acted as passive to accept commands from remote and the data be guaranteed to be received by peer is your concern, then you can set BF-450(M)/BF-430/431 as TCP Server. Be sure the value of item **Listen Port Number** is same as your remote control application using.

Close Connection When Remote Idle (second): default **300**, range **0** to **32768** If you want to keep the connection between BF-450(M)/BF-430/431 and your remote control application always on, then set the value of item **Close Connection When Remote Idle** to 0, otherwise, when the idle time of no any traffic on line reach the setting value, BF-450(M)/BF-430/431 will terminate this connection.

For security concern, you can input **Access Password** to protect your device, BF-450(M)/BF-430/431 will authenticate whether this TCP connection is valid by this password.

Keep Alive Check: default **Disable** Disable: Disable the check of TCP connection is still alive or not. Enable: BF-450(M)/430/431 automatically send a Ping request to peer per each 30 seconds, the TCP connection will be terminated if no response of Ping reply from peer.

Max TCP Connection: default 1, range from 1 to 4 The allowed TCP connections accept by BF-450(M)/430/431 simultaneously. It is usually used when user needs to receive data from different hosts simultaneously. When multiple hosts establish TCP connection to BF-450(M)/430/431 at the same time, it will duplicate serial data and transmit to all hosts. When data comes from Ethernet port, it is sent on first-in-first-out basis to serial port.

TCP Client

The screenshot shows the 'Operation Mode Setup (TCP Client)' web interface. On the left is a sidebar menu with the 'Pt' logo and 'BF-430' model name. The menu includes 'Main Menu' (with 'One Page Setup' selected), 'Advanced Setup', and 'Management'. The 'Advanced Setup' section contains 'Operation Mode', 'Serial Type', and 'Dynamic DNS'. The 'Management' section contains 'Device Admin', 'System Status', 'Backup & Restore', 'Upgrade Firmware', and 'Ping'. The main content area is titled 'Operation Mode Setup (TCP Client)' and has a dropdown menu set to 'MODE: TCP CLIENT'. It contains three input fields: 'Remote Connection Port Number' (set to 50000, range 0-65535), 'Remote Host IP Address' (set to 0.0.0.0), and 'TCP Connection' (radio buttons for 'Start Up' and 'Any Character', with 'Any Character' selected). At the bottom are 'APPLY', 'CANCEL', and 'BACK' buttons.

Remote Connection Port Number: default **50000**, range **0** to **65535** Remote Host IP Address: default **0.0.0.0** If your device is acted as active to report real-time status to remote and the data be guaranteed to be received by peer is your concern, then you can set BF-450(M)/BF-430/431 as TCP Client. Be sure the value of item **Remote Connection Port Number** is same as your remote control application using and set the correct value of **Remote Host IP Address**.

TCP Connection: default **Any Character**

Start Up means BF-450(M)/430/431 attempts to establish a TCP connection as soon as powered on. Any Character means BF-450(M)/430/431 attempts to establish a TCP connection as soon as starts receiving data from serial port.

UDP Server

The screenshot shows the 'Operation Mode Setup (UDP Server)' web interface. It has the same sidebar menu as the TCP Client interface. The main content area is titled 'Operation Mode Setup (UDP Server)' and has a dropdown menu set to 'MODE: UDP SERVER'. It contains one input field: 'Local Listen Port Number' (set to 50000, range 0-65535). At the bottom are 'APPLY', 'CANCEL', and 'BACK' buttons.

Listen Port Number: default **50000**, range **0** to **65535** If your device is acted as passive to accept commands from remote and the data be guaranteed to be received by peer is *not* your concern, then you can set BF-450(M)/BF-430/431 as UDP Server. Be sure the value of item **Listen Port Number** is same as your remote control application using.

UDP Client

The screenshot shows the 'Operation Mode Setup (UDP Client)' web interface. On the left is a sidebar menu with sections: 'Main Menu' (containing 'One Page Setup'), 'Advanced Setup' (containing 'Operation Mode', 'Serial Type', and 'Dynamic DNS'), and 'Management' (containing 'Device Admin', 'System Status', 'Backup & Restore', 'Upgrade Firmware', and 'Ping'). The main content area has a yellow background and is titled 'Operation Mode Setup (UDP Client)'. It features a 'MODE - UDP CLIENT' dropdown menu. Below this are two input fields: 'Remote Connection Port Number' with a value of '50000' and a range '(0 - 65535)', and 'Remote Host IP Address' with a value of '0.0.0.0'. At the bottom of the main area are three buttons: 'APPLY', 'CANCEL', and 'BACK'.

Remote Connection Port Number: default **50000**, range **0** to **65535** Remote Host IP Address: default **0.0.0.0** If your device is acted as active to report real-time status to remote and the data be guaranteed to be received by peer is *not* your concern, then you can set BF-450(M)/BF-430/431 as TCP Client. Be sure the value of item **Remote Connection Port Number** is same as your remote control application using and set the correct value of **Remote Host IP Address**.

4.2 Serial Type

The BF-450(M)/BF-430/431 support three serial types: RS232, RS422(optional) and RS485, These types are listed in the drop-down menu for the Serial Type setting. Each setup screen and available features will differ depending on what kind of Serial Types you select and BF-450(M)/BF-430/431 product model you buy. Default is RS232

RS232/RS485: BF-450(M)/BF-430/431

RS422: BF-431 Only

Serial Port Setup	
Serial Type	RS232
Baud Rate	19200 (User Defined)
Data Bits	8
Parity Check	None
Stop Bits	1
Flow Control	None
Force Packet Transmit Time	100 (0 - 65535)ms
Force Packet Transmit Length	0 (0 - 65535)bytes
Delimiter 1	0x00 (HEX) <input type="radio"/> Enable <input checked="" type="radio"/> Disable
Delimiter 2	0x00 (HEX) <input type="radio"/> Enable <input checked="" type="radio"/> Disable
RS485 Transmission Delay Time	0 (0 - 65535)us <i>Note: for RS485 only</i>

APPLY CANCEL BACK

Baud Rate: default **19200**, range 1200bps to 230.4Kbps, Others If no suitable Baud Rate in the drop-down menu, chose Others, input the value you want.

Data Bits: 5, 6, 7, **8** (default)

Parity Check: **None** (default), even, odd, mark, space

Stop Bits: **1** (default), 2

Flow Control: **None** (default), CTS/RTS (or Hardware), XON/XOFF (or Software)

Force Packet Transmit Time (ms): default **20**, range **0** to **65535** The timing of transmitting an Ethernet packet, in order to get the whole data in on packet, you can tune this setting value to fit the data length of your device per transmission. The more small value be set will get more less data in one packet.

Delimiter 1(00 to FF): default 0x00 Delimiter 2(00 to FF): default 0x00 Once receive delimiter 1 or both delimiters through its serial port, BF-450(M)/430/431 immediately packs all data currently in buffer and send it to Ethernet port.

Force Packet Transmit Length (bytes): default **0**, range **0** to **65535** The length of transmitting an Ethernet packet, in order to get a fix length data in on packet, you can tune this setting value to fit the data length of your device per transmission.

RS485 Only RS485 Transmission Delay Time (ms): default **0**, range **0** to **65535** Due to different device has different capability in handling data received from serial port. So you can tune this setting value to slow down the speed of BF-450(M)/BF-430/431 to fit the speed of your device handling.

Real COM mode

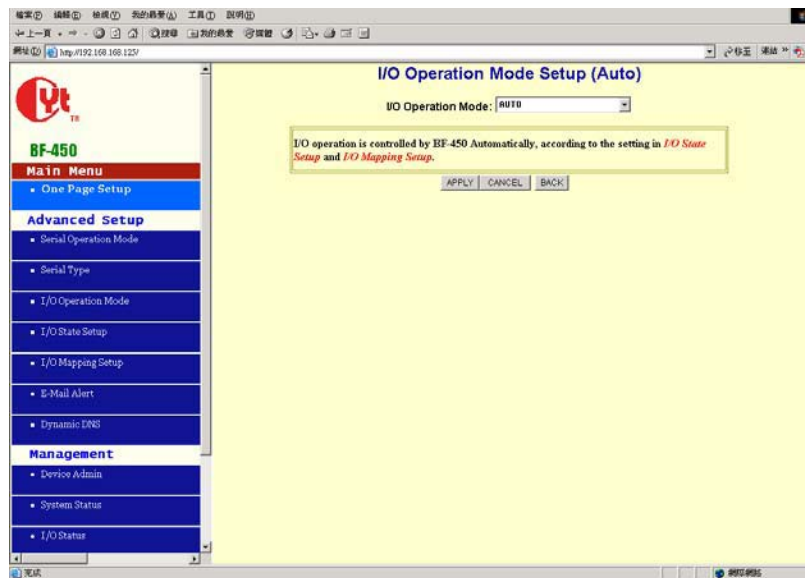
Real COM mode enables all control/handshaking lines (CTS/RTS/DSR/DTR) within the BF-430' s serial RS232 interface. In standard mode these lines are not enabled.

4.3 I/O Operation Mode (BF-450 Only)

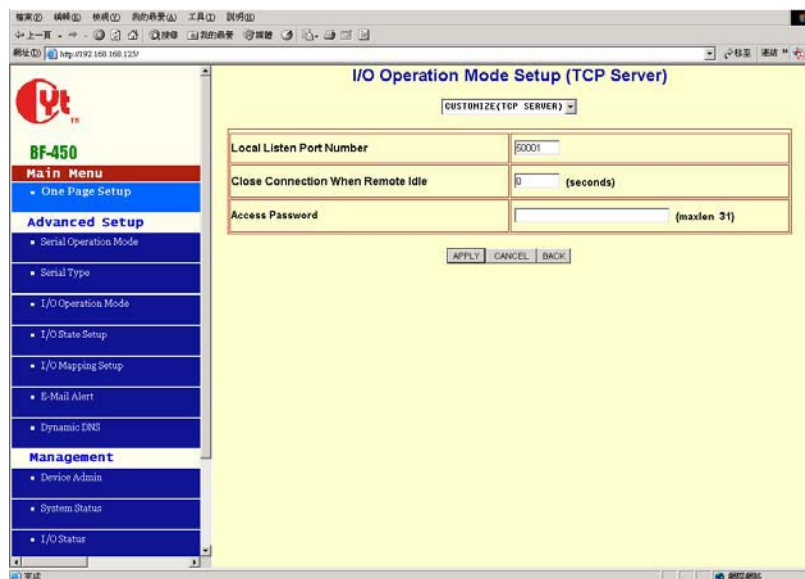
The BF-450 support 6 digital I/Os, including 3 output and 3 input with fixed setting. There are five operation modes: Auto, TCP Server, TCP Client, UDP Server, UDP Client. These modes are listed in the drop-down menu for the I/O Operation Mode setting. Each setup screen and available features will differ depending on what kind of operation mode you select. Default is Auto. It means BF-450 will monitor the state of change for all Input point automatically and trigger Output point by the setting of combination rule. Besides, BF-450 also supplies several DIO command protocols to let your remote software application fully controlling all I/O through TCP/UDP connection. Please refer to Appendix A. DIO Command Protocol for detail

Auto

Please refer to 4.4 and 4.5.



TCP Server

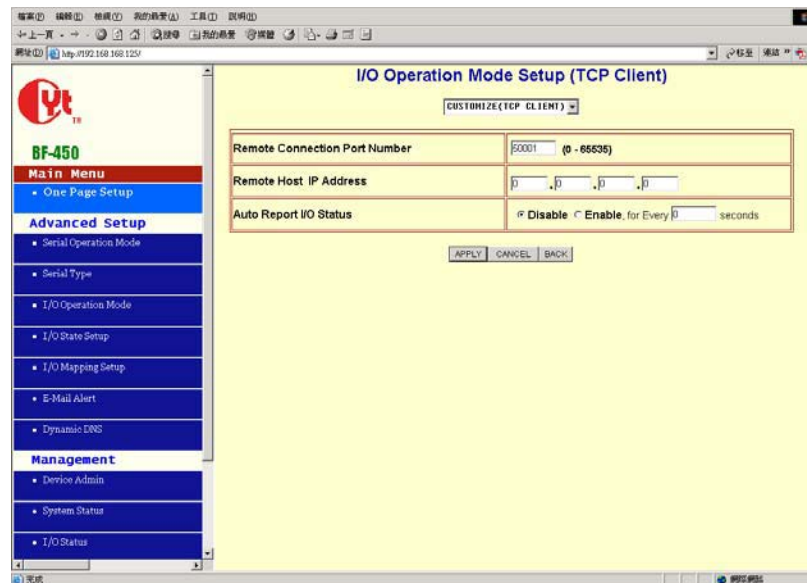


Listen Port Number: default **50001**, range **0** to **65535** BF-450 is acted as passive to accept commands from remote and report current I/O state to peer then you can set BF-450 as TCP Server. Be sure the value of item **Listen Port Number** is same as your remote control application using.

Close Connection When Remote Idle (second): default **300**, range **0** to **32768** If you want to keep the connection between BF-450 and your remote control application always on, then set the value of item **Close Connection When Remote Idle** to 0, otherwise, when the idle time of no any traffic on line reach the setting value, BF-450 will terminate this connection.

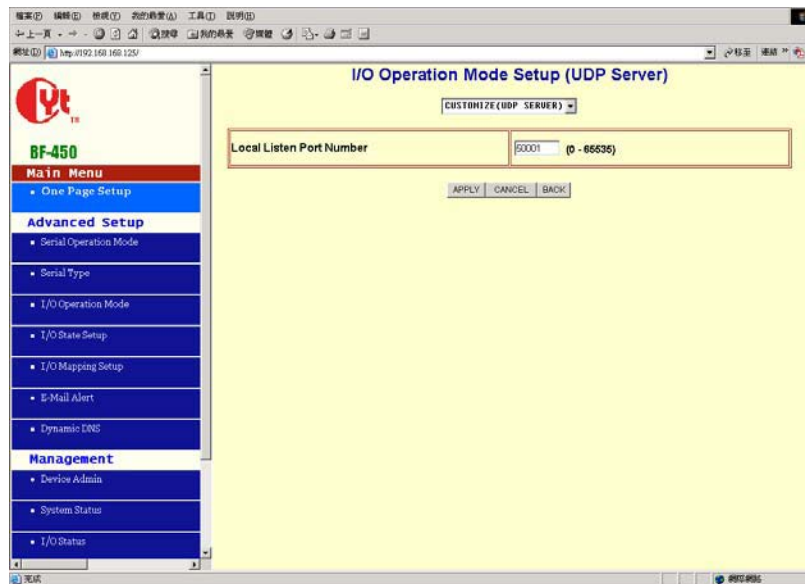
For security concern, you can input **Access Password** to protect your device, BF-450 will authenticate whether this TCP connection is valid by this password.

TCP Client



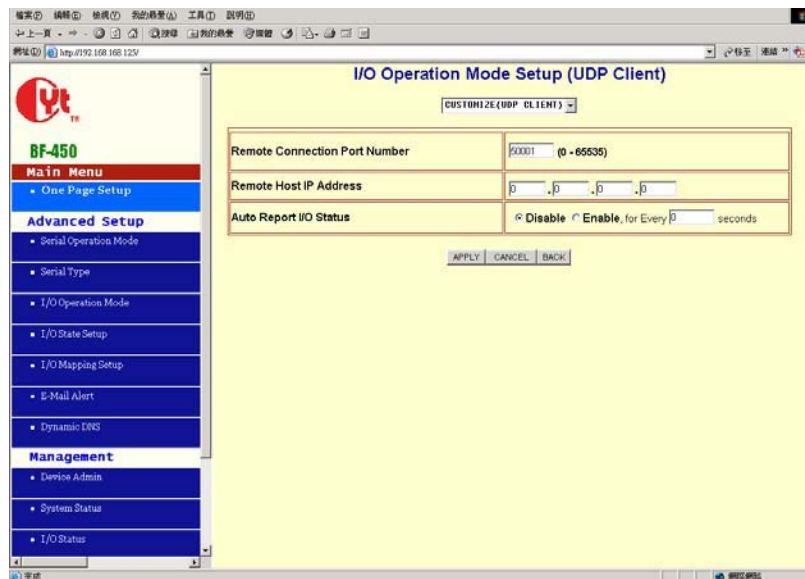
Remote Connection Port Number: default **50001**, range **0** to **65535** Remote Host IP Address: default **0.0.0.0** BF-450 is acted as active to report current I/O state to remote or accept commands from remote and report current I/O state to peer then you can set BF-450 as TCP Client. Be sure the value of item **Remote Connection Port Number** is same as your remote control application using and set the correct value of **Remote Host IP Address**.

UDP Server



Listen Port Number: default **50001**, range **0** to **65535** BF-450 is acted as passive to accept commands from remote and report current I/O state to peer then you can set BF-450 as UDP Server. Be sure the value of item **Listen Port Number** is same as your remote control application using.

UDP Client



Remote Connection Port Number: default **50001**, range **0** to **65535** Remote Host IP Address: default **0.0.0.0** BF-450 is acted as active to report current I/O state to remote or accept commands from remote and report current I/O state to peer then you can set BF-450 as UDP Client. Be sure the value of item **Remote Connection Port Number** is same as your remote control application using and set the correct value of **Remote Host IP Address**.

4.4 I/O State Setup (BF-450 Only)

This configuration is workable only in Auto I/O operation mode. The **Normal State** should be configured in advance to specify the state changing between normal and abnormal when connecting with your device. The **Device Description** is for administrator to naming the device for management purpose.

The **Output Signal** is defined to the signal state output by BF-450 to inform or trigger another device. In the meantime, you can configure the **Delay Time** in second unit to last the signal for a period time. If it is set to zero, BF-450 will latch the signal until Input state back to normal. As to the trigger conditions (rules) are defined in next section.

I/O State Setup

Channel	Normal State	Device Description
I/O IN 1	OPEN	
I/O IN 2	OPEN	
I/O IN 3	OPEN	

Channel	Output Signal	Delay Time (seconds)	Device Description
I/O OUT 1	SHORT	0	
I/O OUT 2	SHORT	0	
I/O OUT 3	SHORT	0	

APPLY CANCEL BACK

4.5 I/O Mapping Setup (BF-450 Only)

I/O Mapping Setup

Channel	Triggered Rule	Alarm Generation
I/O OUT 1	IN 1	<input checked="" type="checkbox"/> Enable <input type="checkbox"/> Disable
I/O OUT 2	IN 2	<input checked="" type="checkbox"/> Enable <input type="checkbox"/> Disable
I/O OUT 3	IN 3	<input checked="" type="checkbox"/> Enable <input type="checkbox"/> Disable

Note: The precedence of combination rule is from left to right, for example if selected rule is IN_1 or IN_3 and IN_2, then the rule will be activated as (IN_1 or IN_3) and IN_2

APPLY CANCEL BACK

The BF-450 offers a very smart and easy method to operate I/O function. You do not need to own any programming background. All you need to do is just making the relationship rules with each I/O. For example, if two devices (dev1, dev2) connected to **IN1** and **IN2**, another device (dev3) connected to **OUT1**, the trigger condition is the status change happened in both dev1 and dev2, in this case, you can select the **OUT1**'s rule as **IN1 AND IN2**. By using BF-450's logical rule to combine all condition you want.

Note: the priority of logical combination rule is from left to right, suppose the rule you select is IN1 or IN3 and IN2, the BF-450 will treat this rule as (IN1 or IN3) and IN2.

The **Alarm Generation** allows you to set enable or disable alarm generation function (detail see the 4.6 E-mail Alert).

4.6 E-Mail Alert (BF-450 Only)

The BF-450 allows you send E-Mail to alert the event of I/O state changing. This service default is disabled.

E-mail Alert: default **DISABLE**

Domain Name (optional): no default, maximum length **59** characters

SMTP Mail Server: no default, maximum length **27** characters

E-mail Alerts To: no default, maximum length **27** characters

Return Address: no default, maximum length **27** characters

Select **ENABLE** in **E-mail Alert**

Enter the **Domain Name** in this field if needed. **(this is optional)**

Enter the **SMTP Mail Server** in the field.

Enter the e-mail account you want to reach or notice in the field of **E-mail Alerts To**.

Enter the e-mail account you want to return in the field of **Return Address**.

4.7 Dynamic DNS

The BF-450(M)/BF-430/431 offers a Dynamic Domain Name System (DDNS) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP address. It is useful when you want to access your device through Internet without static IP address. Before you can use this feature, you need to sign up for DDNS service at www.dyndns.org or www.tzo.com, two DDNS service provider. This service default is disabled. If your DDNS service is provided by DynDNS.org, then select **DynDNS** in the drop-down menu. If your DDNS service is provided by TZO, then select **TZO**. The features available on the DDNS screen will vary, depending on which DDNS service provider you use. (Detail sees Appendix B)

Dyndns.org

DDNS Setup

DDNS Services: **dyndns**

Username:	<input type="text"/>	(maximum 31)
Password:	<input type="password"/>	(maximum 31)
Device DNS Name:	<input type="text"/>	(ex. hostname.dyndns.org)
Registry IP Address :	<input type="text" value="192.168.0.126"/>	
Status :	DDNS function is disabled	

User Name: no default, maximum length **31** characters Password: no default, maximum length **31** characters Device DNS Name: no default, maximum **47** characters Enter the **User Name, Password, and Device DNS Name** of the account you set up with DynDNS.org. Registry IP Address. The BF-450(M)/BF-430/431's current Internet IP Address is displayed here. Because it is dynamic, it will change. Status. The status of the DDNS service connection is displayed here.

DDNS Setup

DDNS Services: **TZO**

Email Address: (maximum 47)

Password key: (maximum 31)

Device DNS Name: (ex. hostname.tzo.com)

Registry IP Address : 192.168.0.126

Status : DDNS function is disabled

Email Address: no default, maximum length **47** characters Password key: no default, maximum length **31** characters Device DNS Name: no default, maximum **47** characters Enter the **Email Address**, **Password Key**, and **Device DNS Name** of the service you set up with TZO. Registry IP Address. The BF-450(M)/BF-430/431's current Internet IP Address is displayed here. Because it is dynamic, this will change. Status. The status of the DDNS service connection is displayed here.

5. BF-450(M)/BF-430/431 Management Setup

This chapter will show you how to manage BF-450(M)/BF-430/431's access setting as well as configure E-mail alert and firmware upgrade.

5.1 Device Admin

Device Administration Setting

Block Standard Http Port(80) Management ☒ UNBLOCK ☐ BLOCK

Device Management IP Address 192 168 200 200

Device Hostname

Device Location

Administrator Password User Name Password Change Password Confirm

Block Ping Request ☒ UNBLOCK ☐ BLOCK

MAC Address Change 00 :00 :00 :00 :00 :00

Reset System to Factory Default

Reboot System

Block Standard HTTP Port(80) Management: default **UNBLOCK** If for some reason, the HTTP (80) service is blocked in your network environment and result to fail to configure or manage BF-450(M)/BF-430/431, then you select **BLOCK** this function with using port **8080**, instead of standard port 80. So you should enter: <http://192.168.168.125:8080> in your browser.

Device Management IP Address: default **192.168.200.200**

In case, you forgot the BF-450(M)/BF-430/431's IP address you ever set, this management IP can be used to connect to BF-450(M)/BF-430/431 to figure out what's the current IP address be used.

In case, you set BF-450(M)/BF-430/431's IP Configuration as DHCP or PPPoE which will assign dynamic IP address to BF-450(M)/BF-430/431, you also can use this management IP address to find what the current working IP address in Intranet is.

Note: If you forgot the IP address setting even management IP address, please use the broadcast utility we offer in CD to search it.

Device Hostname: default **BF430**, maximum length **15** characters

To describe the name of BF-450(M)/BF-430/431 for manage purpose.

Device Location: no default, maximum length **15** characters

To describe the location of BF-450(M)/BF-430/431 for manage purpose.

Administrator Password

User Name: default **admin**

Password: default **admin**

To ensure the BF-450(M)/BF-430/431's security, you will be asked for your password when you access the

BF-450(M)/BF-430/431's Web-based Utility.

User Name: Enter the user name to one of your choice.

Password: It is recommended that you change the default password to one of your choice.

Password Confirm: Re-enter the BF-450(M)/BF-430/431's new Password to confirm it.

Block Ping Request: default **UNBLOCK**

To prevent hacker intruding your network, check the **BLOCK** option to enable this function to reject the PING requests from Internet.

MAC Address Change

The BF-450(M)/BF-430/431's MAC address can be changed from the original values if necessary. Some ISPs require users to change the MAC address to a registered one when users change their access equipment. (Detail sees Appendix D)

Reset System to Factory Default Click "**Apply**", if you want to return all the BF-450(M)/BF-430/431's current settings to its factory default. *Note: do not restore the factory defaults unless it is absolutely necessary.*

Reboot System Click "**Apply**", if you want to clear a connection, reboot, and re-initialize the unit without affecting any of your configuration setting.

5.2 Device Status

This screen shows the BF-450(M)/BF-430/431's current status. All of the information provided is read-only.

BF-430 Status Monitor

System Status	
Product Name:	BF430 232/485 TCP/IP Converter
Firmware Version:	1.03.01.Feb 18 2005
System Up Time:	0H:26M:16S

Ethernet Status	
IP Configuration Mode:	STATIC IP
Operation Mode:	TCP SERVER
Connection Port:	50000
MAC Address:	00:0e:e3:00:00:01
IP Address:	192.168.0.126
Subnet mask:	255.255.255.0
Default Gateway:	0.0.0.0
Primary DNS:	168.95.1.1
STATUS:	Up

Serial Status	
Serial Type:	RS232
Baud Rate:	19200
Data Bits:	8
Parity Check:	none
Stop Bits:	1
Flow Control:	None

Statistic	
Ethernet :	Tx Bytes: 157527 bytes
	Tx Packets: 261 packets
	Rx Bytes: 90034 bytes
	Rx Packets: 649 packets
Serial:	Tx Bytes: 0 bytes
	Rx Bytes: 0 bytes

Product Name: the product model name of this BF-450(M)/BF-430/431.

Firmware Version: the installed version of the firmware.

System up Time: the time of system from start up to current.

Management IP Address: the current setting of management IP.

Ethernet Status: the BF-450(M)/BF-430/431's IP Configuration, MAC address, IP address, subnet mask, default

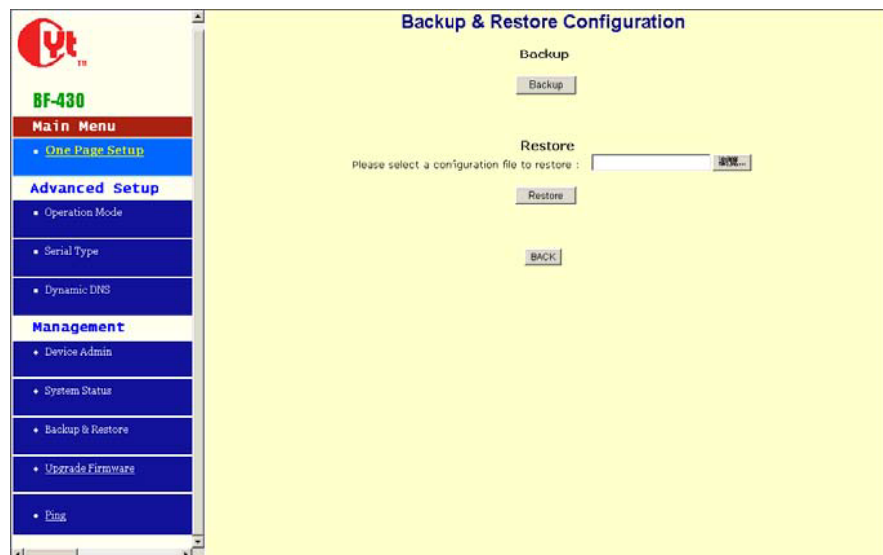
gateway IP address, primary DNS IP address and current connection status.

Serial Status: the BF-450(M)/BF-430/431's setting in serial type

Statistic: the transmission and receive bytes and packets count in Ethernet and Serial port separately.

5.3 Backup and Restore

This function allows you to save BF-450(M)/BF-430/431's configuration as backup, or retrieve the configuration file you saved before to turn the setting back.

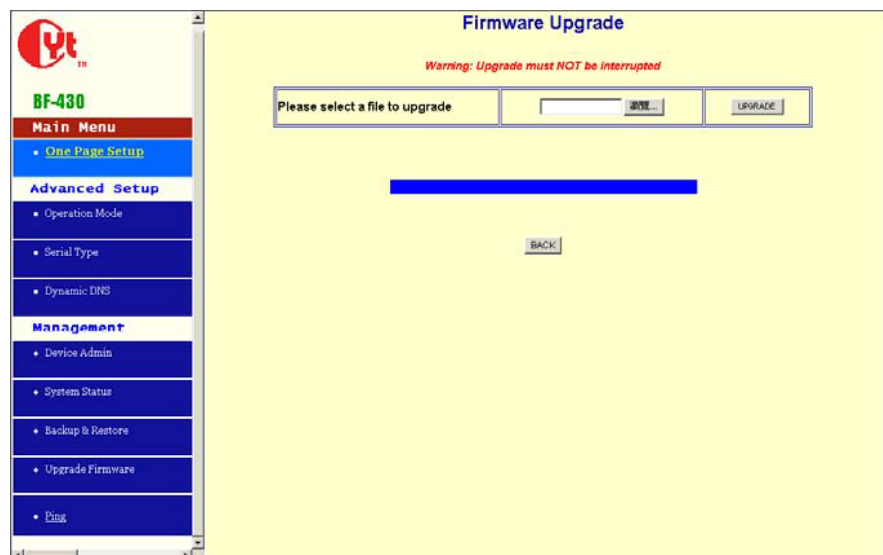


Backup: Click “Backup” button save the current configuration as a backup file in your hard disk. **Restore:** Enter path of the configuration file you saved on the PC. You can click “Browse” to view the folders and select the file. Click “Restore” to retrieve it.

Note: the sub-name of file you retrieve must be “.cfg”

5.4 Upgrade Firmware

This function allows you to upgrade the latest version firmware to keep your BF-450(M)/BF-430/431 up-to-date. Before you upgrade the firmware, you have to get the latest firmware and save it on the PC you use to configure the BF-450(M)/BF-430/431.



Browse: To select a file to upgrade, you have to enter path of the latest firmware you saved on the PC. You can choose “**Browse**” to view the folders and select the firmware. **Upgrade:** After you enter or select the path, click “**Upgrade**” to start the firmware upgrade process.

Note: don't power off the router during the firmware upgrading, otherwise the incompleteness of firmware upgrading will cause serious damage to the integrity of the BF-450(M)/BF-430/431's firmware that will lead to fail to boot the BF-450(M)/BF-430/431 again.

5.5 Ping

This function allows you to test the connection between BF-450(M)/BF-430/431 and LAN or between BF-450(M)/BF-430/431 and Internet.

Networking Diagnostic (PING)	
Source IP Address :	192.168.0.126
Destination IP Address :	0.0.0.0
Packet Number :	4 (0 - 4)
Packet Size :	60 (Maximum 1460 Bytes)
Ping Result :	
Sent Request :	0
Receive Reply :	0
PING CANCEL BACK	

Source IP Address: the current BF-450(M)/BF-430/431's IP address (Read Only).

Destination IP Address: the IP Address of destination device you want to ping.

Packet Number: the packet numbers you wish to use to ping the destination device. The maximum numbers are

4.

Packet Size: the numbers of packet size you wish to use to ping the destination device. The maximum packet sizes are 60.

Ping Result: The result will show the numbers of sending packet, numbers of packet receiving (Read Only).

6. Troubleshooting

PROBLEM	CORRECTIVE ACTION
None of the LEDs turn on when you turn on the BF-450(M)/BF-430/431	Make sure that you have correct power connected to BF-450(M)/BF-430/431 and plugged in to an appropriate power source. Check all cables connections. If the LEDs still do not turn on, you may have a hardware problem. In this case, you should contact your local vendor.
Can not access BF-450(M)/BF-430/431 from Ethernet	Check cable connection between BF-450(M)/BF-430/431 and computer or hub. Ping BF-450(M)/BF-430/431 from computer. Make sure your computer Ethernet card is installed and functioning properly.
Can not ping any computer on the LAN	If the 10/100M LED are off, check the cable connection between BF-450(M)/BF-430/431 and your computer. Verify that the IP address and subnet mask of the B-450(M)/BF-430 and computer are in the same IP address range.
Can not access BF-450(M)/BF-430/431 from Serial	Check the Serial cable connection between BF-450(M)/BF-430/431 and your device. Verify that the BF-450(M)/BF-430/431 setting of Serial type is same as your device and make sure the hardware jumper is in the correction position.

Appendix A: Product Specifications Appendix B: DIO Command Protocol

Hardware	
processor	80186
Memory	512 KB
Interface	
LAN	Auto-detection 100 Base-T(10/100 Mbps)
Serial	RS-232 、 RS-485
No. of serial interface	1
Signals	RS-232 : TxD, Rxd, RTS, CTS, DTR, DSR, DCD, GND RS-485 : data+, data-
Performance	
Speed	50 bps ~ 230 Kbps
Configuration	
Parity	None, even, odd, Mark, Space
Data bits	5, 6, 7, 8
Stop bits	1, 2(with parity setting of None)

OS Support	Windows 98/2000/XP
Protocol	TCP, IP, UDP, Telnet, RTelnet, DHCP, ICMP
Management	Serial console, Telnet console
Windows Utility	IP-Search program, Firmware Upgrade by web
Power and Environment	
Power requirements	DC 9V, 300 mA max DC 12V, 230 mA max DC 24V, 160 mA max
Operating temp.	0 ~ 55°C
Dimensions	BF-450M : 26X65X7 mm BF-450 : 81X103X30 mm BF-430 : 67X93X22 mm
Regulatory approval	FCC, CE

In this appendix the DIO command protocol is described here to let customer's remote management software to access Digital I/O state through Ethernet network by a specific TCP/UDP port(default is 50001).

Command Packet Format:

Length(Bytes)	2	2	32	32	2	1
Format	Start Flag	Command	Data1	Data2	End Flag	CRC

Send command to BF-450 by one of four ways (TCP Server/TCP Client/UDP Server/UDP Client)

Return Packet Format:

Length(Bytes)	2	2	32	32	2	1
Format	Start Flag	Command Status	Data1	Data2	End Flag	CRC

The BF-450 returns by Return packet. You can get command status to know the result after sending command packet and from Data1 and Data2 to know current I/O state.

Note:

Start Flag: 0xF0F0 End Flag: 0xF0F0 **Command Status:** the definition of command code is as following 0x0002 – ACK of Read Digital I/O state 0x0004 – ACK of Trigger Digital I/O 0x0006 – ACK of E-mail Alarm Trigger 0x0010 – Report current Digital I/O state (If I/O Operation Mode of BF-450 is set as TCP Client or UDP Client and Auto

Report I/O Status is enabled, you will receive this report packet from BF-450) 0xFFFC – Flag error, incorrect Start Flag or End Flag received in command packet 0xFFFD – Length error, the length of command packet is invalid

0xFFFE – CRC error, incorrect CRC value 0xFFFF – Command error, no such command

CRC value = 0 – total sum from field of ‘Start Flag’ to “End Flag”

The format of each command code is as following:

1. Read Digital I/O state

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0001	Xxx (don't care)	Xxx (don't care)	0xF0F0	CRC

Return Successful Packet

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0002	Data1	Data2	0xF0F0	CRC

Data1

Data[0]	Data[1]	Data[2]	Data[3]					Data[30]	Data[31]
IN-1	IN-2	IN-3	reserved					reserved	reserved

IN-1: state of IN1, 0 for SHORT, 1 for OPEN IN-2: state of IN2, 0 for SHORT, 1 for OPEN IN-3: state of IN3, 0 for SHORT, 1 for OPEN

26

Data2

Data[0]	Data[1]	Data[2]	Data[3]					Data[30]	Data[31]
OUT-1	OUT-2	OUT-3	reserved					reserved	reserved

OUT-1: state of OUT1, 0 for SHORT, 1 for OPEN OUT-2: state of OUT2, 0 for SHORT, 1 for OPEN OUT-3: state of OUT3, 0 for SHORT, 1 for OPEN

2. Trigger Digital I/O

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0003	Data1	Xxx (don't care)	0xF0F0	CRC

Data1

Data[0]	Data[1]	Data[2]	Data[3]					Data[30]	Data[31]
OUT-1	OUT-2	OUT-3	reserved					reserved	reserved

OUT-1: the value you want to write into OUT1, 0 for SHORT, 1 for OPEN OUT-2: the value you want to write into OUT2, 0 for SHORT, 1 for OPEN OUT-3: the

value you want to write into OUT3, 0 for SHORT, 1 for OPEN

Return Successful Packet

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0004	Xxx (don't care)	Xxx (don't care)	0xF0F0	CRC

3. E-mail Alarm Trigger

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0005	Alarm Message Description		0xF0F0	CRC

Alarm Message Description: string of alarm message by customer attach and BF-450 send this content by e-mail **Return Successful Packet**

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0006	Xxx (don't care)	Xxx (don't care)	0xF0F0	CRC

4. Report Current I/O State Packet(sending from BF-450)

Length(Bytes)	2	2	32	32	2	1
	0xF0F0	0x0010	Data1	Data2	0xF0F0	CRC

Data1

Data[0]	Data[1]	Data[2]	Data[3]					Data[30]	Data[31]
IN-1	IN-2	IN-3	reserved					reserved	reserved

IN-1: state of IN1, 0 for SHORT, 1 for OPEN IN-2: state of IN2, 0 for SHORT, 1 for OPEN IN-3: state of IN3, 0 for SHORT, 1 for OPEN

Data2

Data[0]	Data[1]	Data[2]	Data[3]					Data[30]	Data[31]
OUT-1	OUT-2	OUT-3	reserved					reserved	reserved

OUT-1: state of OUT1, 0 for SHORT, 1 for OPEN OUT-2: state of OUT2, 0 for SHORT, 1 for OPEN OUT-3: state of OUT3, 0 for SHORT, 1 for OPEN

Appendix C: DDNS

Internet actually runs on IP Addresses which are numerical order, for example “63.208.196.100”. These IP Address identify the location of each device connected to Internet. However, the human brain does not easily remember this numbering system, so a system that allocate domain name such as “www.dyndns.org” provides an easier method. If you type “63.208.196.100” or “www.dyndns.org” in the web browser’s address bar, the browser will show the same web page. This is because both methods relate to the same web server. The “**Domain Name Servers**” used to manage the Internet will translate “www.dyndns.org” into the IP Address “63.208.196.100” in order to allow your browser to find the web server and display the correct web page in your browser.

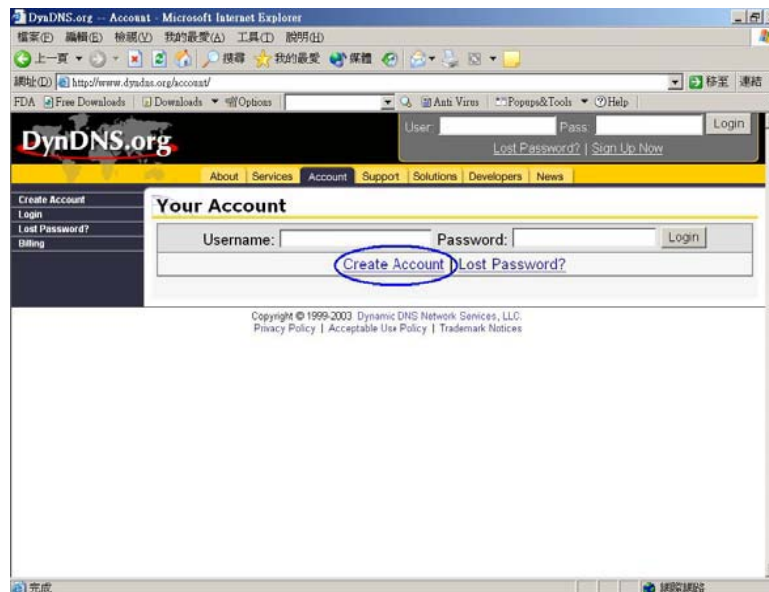
If your “IP Configuration”, as shown in 3.2 section, is “PPPoE”, or “DHCP” with dynamic IP address assigned by ISP, your IP address may change each time you initiate the connection to your ISP. The DDNS function will help to map your IP address to your domain name when your ISP assigns a new dynamic IP Address.

Note that this DDNS function acts as the client appliance of DDNS service and is only able to be use in conjunction with the service provided by DynDNS.org and TZO.com. Before you begin using this function, you will need to apply to DynDNS.org or TZO.com to be able to use the service. Please visit www.dyndns.org or www.tzo.com for further information.

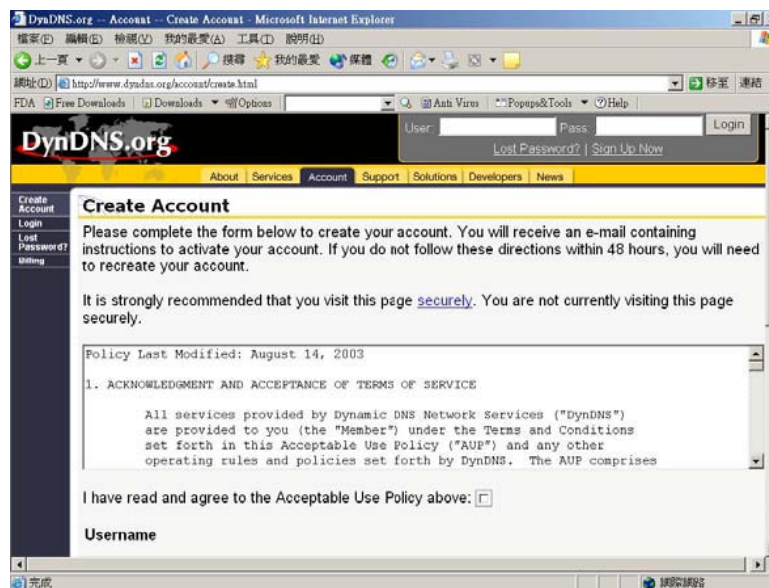
How to register from Dyndns.org Step 1: Enter the web side www.dyndns.org in Browser, click the tab of **Account**.



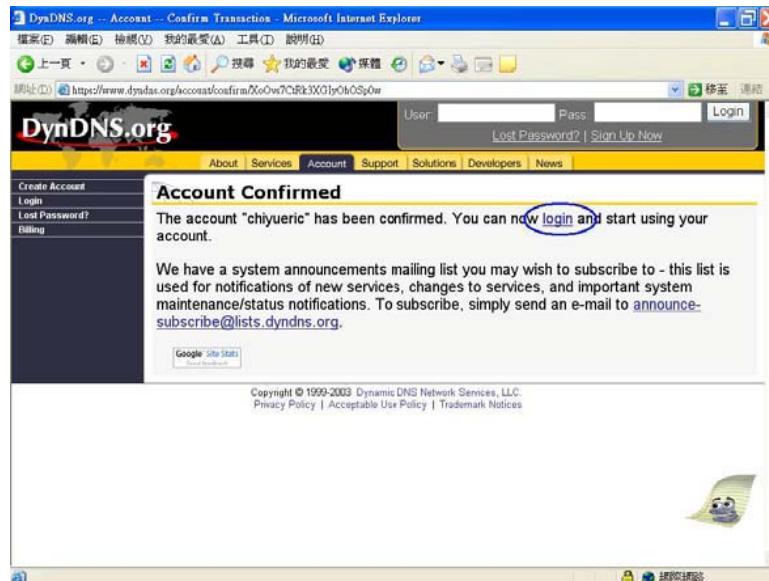
Step 2: click **Create Account**.



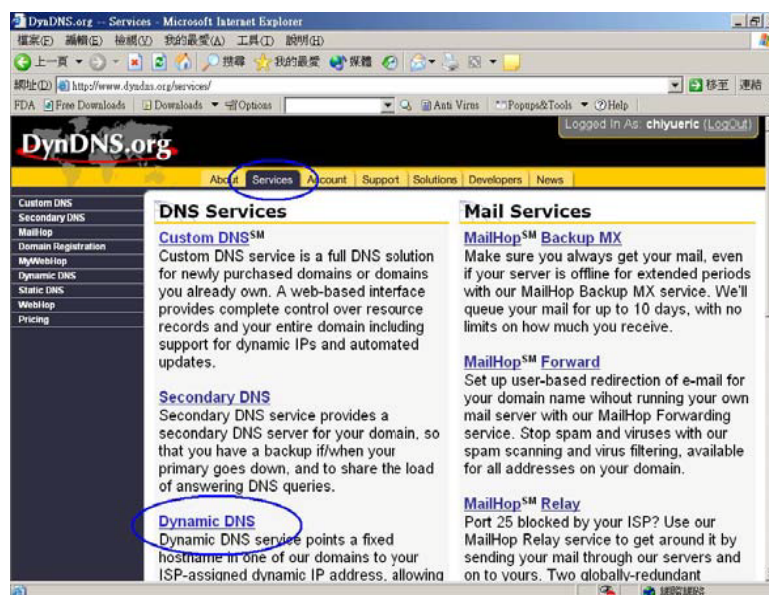
Step 3: Fill the field of Username , E-mail and Password. You will receive an e-mail containing instructions to activate your account.

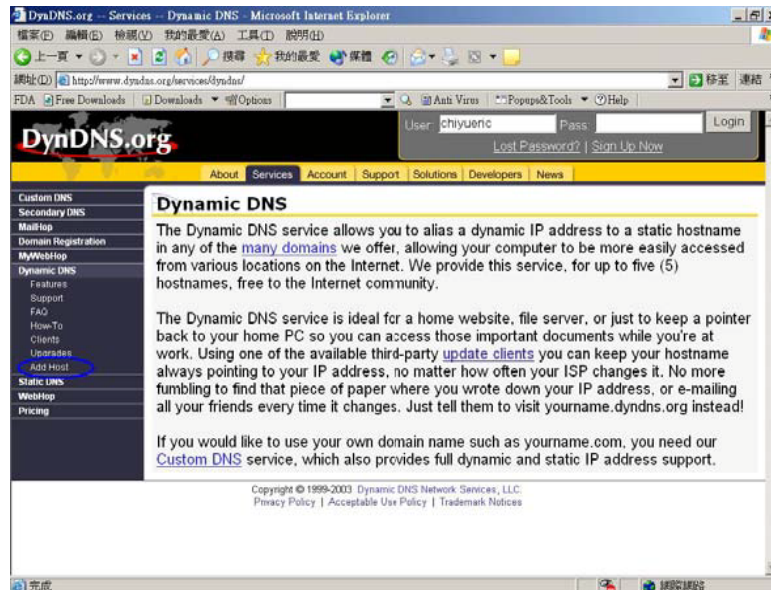


Step 4: Once you receive the confirmed e-mail, **login** with your Username and Password.

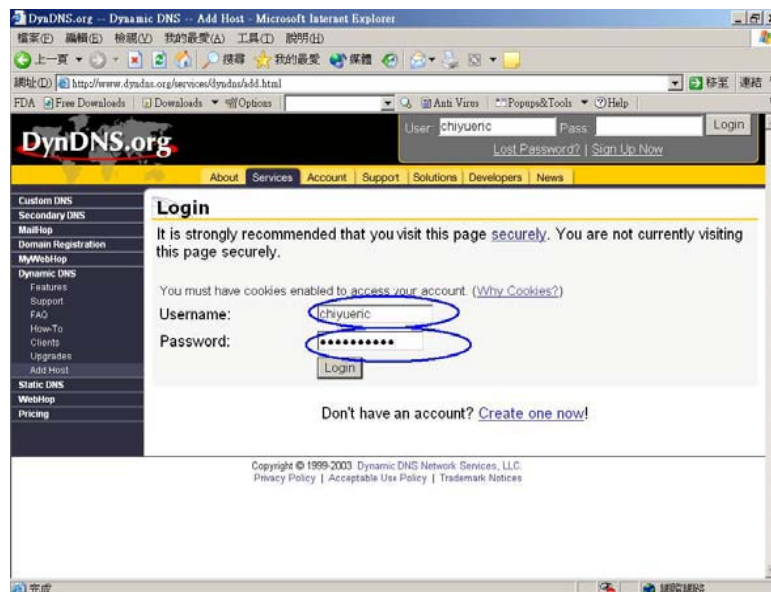


Step 5: Click the tab of **Services**, then click **Dynamic DNS**. Step 6: select **Add Host** in the left side of screen.

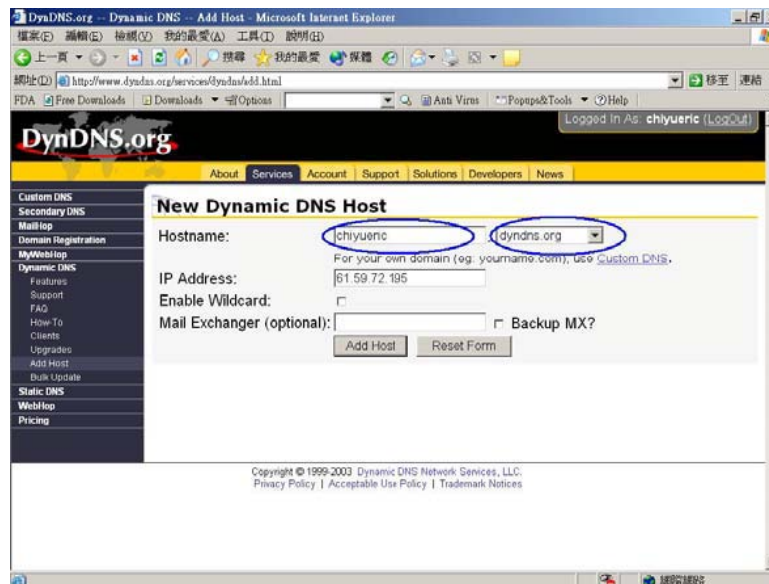




Step 7: Login again with your **Username** and **Password**.



Step 8: Enter the **Hostname** you want to use and select **dyndns.org** from the drop-down menu, click the button of **Add Host** to finish register.

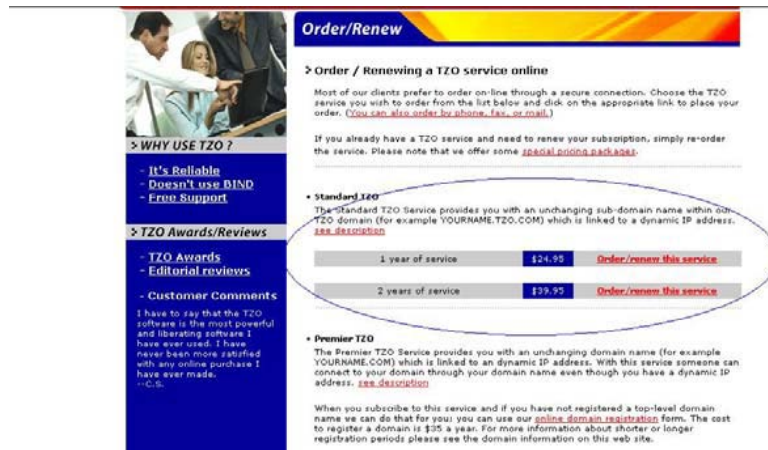


Step 9: now you should enter the Username, Password and Hostname (named Device DNS Name in BF-450(M)/BF-430/431) into BF-450(M)/BF-430/431 to enable this function.

How to register from TZO.com Step 1: Enter the web side www.tzo.com in Browser, select the **Order/Renew** from top screen.



Step 2: You can choice what's kind of service you need, here we suggest the **Standard TZO** with 1 year of service



Order/Renew

➤ Order / Renewing a TZO service online

Most of our clients prefer to order on-line through a secure connection. Choose the TZO service you wish to order from the list below and click on the appropriate link to place your order. (You can also order by phone, fax, or mail.)

If you already have a TZO service and need to renew your subscription, simply reorder the service. Please note that we offer some special pricing packages.

➤ **Standard TZO**

The Standard TZO Service provides you with an unchanging sub-domain name within our TZO domain (for example YOURNAME.TZO.COM) which is linked to a dynamic IP address. [see description](#)

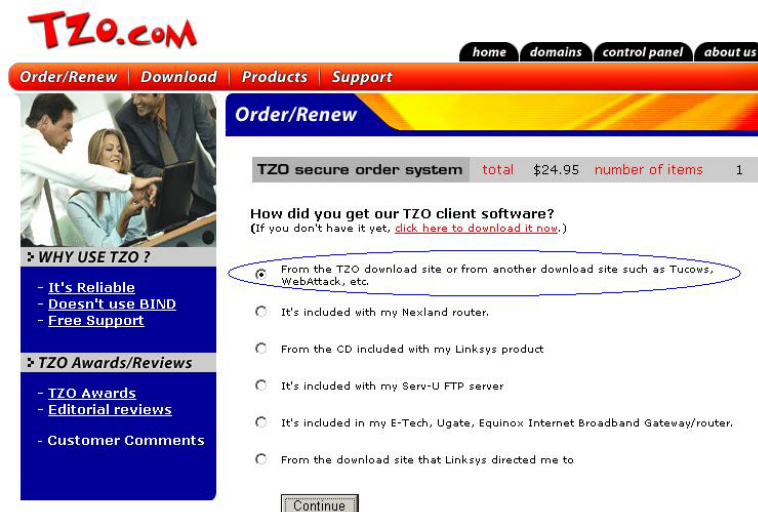
1 year of service	\$24.95	Order/renew this service
2 years of service	\$39.95	Order/renew this service

➤ **Premier TZO**

The Premier TZO Service provides you with an unchanging domain name (for example YOURNAME.COM) which is linked to an dynamic IP address. With this service someone can connect to your domain through your domain name even though you have a dynamic IP address. [see description](#)

When you subscribe to this service and if you have not registered a top-level domain name we can do that for you! you can use our [online domain registration](#) form. The cost to register a domain is \$25 a year. For more information about shorter or longer registration periods please see the domain information on this web site.

Step 3: Select the first radio button, click **Continue** button.



TZO.COM

home domains control panel about us

Order/Renew | Download | Products | Support

Order/Renew

TZO secure order system total \$24.95 number of items 1

How did you get our TZO client software?
(If you don't have it yet, [click here to download it now.](#))

☒ From the TZO download site or from another download site such as Tucows, WebAttack, etc.

☐ It's included with my Nexland router.

☐ From the CD included with my Linksys product

☐ It's included with my Serv-U FTP server

☐ It's included in my E-Tech, Ugate, Equinox Internet Broadband Gateway/router.

☐ From the download site that Linksys directed me to

Step 4: Enter the TZO name you want to register, such as chiyu.tzo.com, and your E-mail address which can reach you. If you don't have a TZO name yet, please check the box under the field of E-mail address, click **Continue with order**

TZO.COM

home domains control panel about us

Order/Renew Download Products Support

Order/Renew

TZO secure order system total \$24.95 number of items 1

Please complete the first step by telling us the following information

What is your TZO name?
chiyu.TZO.com

What email address did you use when you registered your TZO name?
(Windows users can find this information in the TZO client. Linux users can look in the configuration file.)
eric@chiyu-t.com.tw

☒ I don't have a TZO name yet, or I'm not certain what it is.

PLEASE NOTE:

A TZO name is a sub-domain of TZO.COM, TZO.NET, or other domains which are listed in the TZO client. Please mail support@TZO.COM if you have questions.

If you don't have a TZO name, you should register and get a TZO name before you go any further. You can [Download TZO](#) or use the [TZO Control Panel](#) to register and get a TZO name. You'll need a TZO name to use most of our services!

Continue with order

Step 5: complete the form with your information TZO want.

Order/Renew

TZO secure order system total \$24.95 number of items 1

Please complete the first step by telling us the following information

Next, please tell us about yourself, and please include all the information. We ask you nothing more than what's necessary for us to process your order.

For your address please use your current credit card or bank billing address. (The address where your credit card or bank statements are sent each month)

Your first name:
eric

Your last name:
Chang

Your company name: (if applicable)
CHIYU Technology Co.,Ltd

Street address: (the billing address of the credit card)
No.28, Renai Road

Address 2: (the billing address of the credit card)

City: (the billing address of the credit card)
Chiayi

Step 6: TZO will send an e-mail letter to inform your TZO key, please enter these information including E-mail address, TZO key and TZO name (named Device DNS Name in BF-450M) into BF-450M to enable this service.

Appendix D: Glossary

10BaseT - An Ethernet standard that uses twisted wire pairs.

100BaseTX - IEEE physical layer specification for 100 Mbps over two pairs of Category 5 UTP or STP wire.

Adapter - Printed circuit board that plugs into a PC to add to capabilities or connectivity to a PC. In a networked environment, a network interface card (NIC) is the typical adapter that allows the PC or server to connect to the intranet and/or Internet.

Auto-MDI/MDIX - On a network hub or switch, an auto-MDI/MDIX port automatically senses if it needs to act as a MDI or MDIX port. The auto-MDI/MDIX capability eliminates the need for crossover cables.

Auto-negotiate - To automatically determine the correct settings. The term is often used with communications and networking. For example, Ethernet 10/100 cards, hubs, and switches can determine the highest speed of the node they are connected to and adjust their transmission rate accordingly.

Browser - A browser is an application program that provides a way to look at and interact with all the information on the World Wide Web or PC. The word “browser” seems to have originated prior to the Web as a generic term for user interfaces that let you browse text files online.

Cable Modem - A device that connects a computer to the cable television network, which in turn connects to the Internet. Once connected, cable modem users have a continuous connection to the Internet. Cable modems feature asymmetric transfer rates: around 36 Mbps downstream (from the Internet to the computer), and from 200 Kbps to 2 Mbps upstream (from the computer to the Internet).

CAT 5 - ANSI/EIA (American National Standards Institute/Electronic Industries Association) Standard 568 is one of several standards that specify “categories” (the singular is commonly referred to as “CAT”) of twisted pair cabling systems (wires, junctions, and connectors) in terms of the data rates that they can sustain. CAT 5 cable has a maximum throughput of 100 Mbps and is usually utilized for 100BaseTX networks.

CTS (Clear To Send) - An RS-232 signal sent from the receiving station to the transmitting station that indicates it is ready to accept data.

Data Packet - One frame in a packet-switched message. Most data communications is based on dividing the transmitted message into packets. For example, an Ethernet packet can be from 64 to 1518 bytes in length.

Default Gateway - The routing device used to forward all traffic that is not addressed to a station within the local subnet.

Download - To receive a file transmitted over a network. In a communications session, download means receive, and upload means transmit.

Dynamic IP Address - An IP address that is automatically assigned to a client station in a TCP/IP network, typically by a DHCP server. Network devices that serve multiple users, such as servers and printers, are usually assigned static IP addresses.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Has a transfer rate of 10 Mbps. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS.

DDNS (Dynamic Domain Name System) - Allows a network device with a dynamic Internet IP address to

have a fixed host and domain name, such as *myhostname.mydomainname.com*. It is useful when you are hosting your own website, FTP server, or other server behind a router, so people can find your site no matter how often the Internet IP address changes. Using DDNS requires registering with a DDNS service provider on the Internet.

DHCP (Dynamic Host Configuration Protocol) - A protocol that lets network administrators centrally manage and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network. DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses. DHCP supports static addresses for computers containing Web servers that need a permanent IP address.

DNS - The Domain Name System (DNS) is the way that Internet domain names are located and translated into Internet Protocol (IP) addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address.

Domain - A sub network comprised of a group of clients and servers under the control of one security database. Dividing LANs into domains improves performance and security.

Firmware - Code that is written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off.

Full Duplex - The ability of a device or line to transmit data simultaneously in both directions.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Half Duplex - Data transmission that can occur in two directions over a single line, but only one direction at a time.

Hardware - Hardware is the physical aspect of computers, telecommunications, and other information technology devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things. The program came to be known as the software.

Hub - The device that serves as the central location for attaching wires from workstations. Can be passive, where there is no amplification of the signals; or active, where the hubs are used like repeaters to provide an extension of the cable that connects to a workstation.

HTTP (HyperText Transport Protocol) - The communications protocol used to connect to servers on the World Wide Web. Its primary function is to establish a connection with a Web server and transmit HTML pages to the client browser.

MAC Address - The MAC (Media Access Control) address is a unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network

to identify it at the hardware level.

Mbps (MegaBits Per Second) - One million bits per second; unit of measurement for data transmission.

IP Address - In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packets across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received.

IPCONFIG - A utility that provides for querying, defining and managing IP addresses within a network. A commonly used utility, under Windows NT and 2000, for configuring networks with static IP addresses.

ISP - An ISP (Internet service provider) is a company that provides individuals and companies access to the Internet and other related services such as website building and virtual hosting.

Packet - A unit of data routed between an origin and a destination in a network.

Network Mask - Also known as the "Subnet Mask."

NIC (Network Interface Card) - A board installed in a computer system, usually a PC, to provide network communication capabilities to and from that computer system. Also called an adapter.

RJ-45 - A connector similar to a telephone connector that holds up to eight wires, used for connecting Ethernet devices.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

SMTP (Simple Mail Transfer Protocol) - The standard e-mail protocol on the Internet. It is a TCP/IP protocol that defines the message format and the message transfer agent (MTA), which stores and forwards the mail.

Ping (Packet INternet Groper) - An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Port - A pathway into and out of the computer or a network device such as a switch or router. For example, the serial and parallel ports on a personal computer are external sockets for plugging in communications lines, modems, and printers.

PPPoE (Point to Point Protocol over Ethernet) - PPPoE is a method for the encapsulation of PPP packets over Ethernet frames from the user to the ISP over the Internet. One reason PPPoE is preferred by ISPs is because it provides authentication (username and password) in addition to data transport. A PPPoE session can be initiated by either a client application residing on a PC, or by client firmware residing on a modem or router.

Subnet Mask - The method used for splitting IP networks into a series of subgroups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

TCP (Transmission Control Protocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. TCP is known as a "connection oriented" protocol due to requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet resulting in transmission control.

TCP/IP (Transmission Control Protocol/Internet Protocol) - The basic communication language or set of protocols for communications over a network (developed specifically for the Internet). TCP/IP defines a suite or group of protocols and not only TCP and IP.

Telnet - A terminal emulation protocol commonly used on the Internet and TCP/IP-based networks. It allows a user at a terminal or computer to log onto a remote device and run a program.

TFTP (Trivial File Transfer Protocol) - A version of the TCP/IP FTP protocol that has no directory or password capability.

Static IP Address - A permanent IP address that is assigned to a node in a TCP/IP network.

Appendix E: Finding the MAC Address and IP Address for Your Ethernet Adapter

This section describes how to find the MAC address for your computer's Ethernet adapter so you can use the MAC address change feature of the BF-450(M)/BF-430/431. You can also find the IP address of your computer's Ethernet adapter. This IP address is used for the BF-450(M)/BF-430/431's configuration. Follow the steps in this appendix to find the adapter's MAC or IP address in Windows 98, Me, 2000, or XP.

1. Click **Start** and **Run**. In the *Open* field, enter **cmd**. Press the **Enter** key or click the **OK** button.
2. At the command prompt, enter **ipconfig /all**. Then press the **Enter** key.
3. Write down the Physical Address as shown on your computer screen (Figure D-1); it is the MAC address for your Ethernet adapter. This appears as a series of numbers and letters.
The MAC address/Physical Address is what you will use for MAC address changing.

The example in Figure D-1 shows the Ethernet adapter's IP address as 192.168.168.100. Your computer may show something different.

```

命令提示字元
C:\Documents and Settings\Chang>
C:\Documents and Settings\Chang>
C:\Documents and Settings\Chang>
C:\Documents and Settings\Chang>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : eric
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Unknown
    IP Routing Enabled. . . . . : Yes
    WINS Proxy Enabled. . . . . : Yes

Ethernet adapter 區域連線:

    Connection-specific DNS Suffix . :
    Description . . . . . : National Semiconductor DP83815-Based
    PCI Fast Ethernet Adapter
    Physical Address. . . . . : 00-0D-9D-85-0C-E6
    Dhcp Enabled. . . . . : No
    IP Address. . . . . : 192.168.168.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

```

Figure E-1 MAC Address/Physical Address

Appendix F: Example I/O Application

