

**OPERATING MANUAL**

**ProSwitch 24F®**



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## 1.0 SPECIFICATIONS

### OPERATIONAL CHARACTERISTICS:

#### MAC Address Table:

Filtering address Unicast/Multicast/Broadcast address  
8K MAC addresses

#### Performance:

Store and forward architecture with non-blocking switching architectures  
Supports IEEE 802.3x full-duplex flow control  
Wire speed filtering and forwarding rate  
System aggregate forwarding rate:  
    14,880 pps for Ethernet  
    148,800 pps for Fast Ethernet  
RAM buffers: 512k bytes

#### VLAN:

23 groups

#### PORTS:

Copper (RJ45) Ports: 10/100Mbps full/half duplex auto-negotiating switched ports  
24 RJ45 ports (23 RJ45 ports if fiber module is used)  
Fiber (multimode or singlemode) slot: 100Base-FX slot, full/half duplex  
Console Port: RS232  
MDI/MDI/X: Auto detect

#### NETWORK STANDARDS:

IEEE 802.3u: 100BASE-TX, 100BASE-FX Fast Ethernet  
IEEE 802.3: 10BASE-T Ethernet  
IEEE 802.3x Flow Control  
IEEE 802.1P

#### OPERATING ENVIRONMENT:

Ambient: 32° to 122°F (0° to 50°C)  
Storage: -40° to 158°F (-40° to 70°C)  
Ambient relative humidity: 5% to 95% (non-condensing)

#### LED INDICATORS:

Power status for each unit per port: Link/Activity  
Duplex/Collision status for each TP port  
Link/Activity, 100, Duplex/Collision for each fiber slot

#### NETWORK CABLE CONNECTORS:

RJ45 shielded female ports (100m maximum)  
100Mbps: CAT5  
10Mbps: CAT3, 4 or 5

#### OPTIONAL FIBER PORT:

Connectors for multimode FX – ST and SC (2km maximum)  
Connectors for singlemode FX – SC (20km)

#### POWER SUPPLY (INTERNAL):

AC Power Connector: IEC-type, male recessed, rear, ON/OFF switch  
Power Input Voltage: 100 to 240V  
Power Input Frequency: 50 to 60Hz  
Power Consumption: ProSwitch-24F – 16W

#### MECHANICAL:

Enclosure: Rugged high-strength sheet metal 19 inch 1U rack-mounting

Dimensions: 440 x 172 x 43mm  
Weight: Switch, 5.0 lbs; Fiber modules, 1.3 oz.

**AGENCY APPROVALS:**

UL 1950, CE Mark, CISPR 22 Class A  
Emissions meet FCC Part 15, Class A

**WARRANTY:**

**Limited Lifetime**

**Made in USA**

## 2.0 Package Contents - ProSwitch®

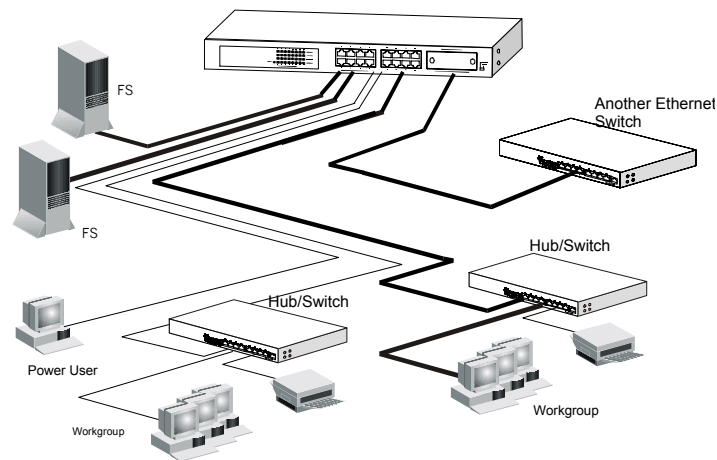
Examine the shipping container for obvious damage prior to installing this product. Notify the carrier of any damage that you believe occurred during shipment. Ensure that the items listed below are included.

The 24F package contains the following:

- ❑ 24F switch chassis
- ❑ AC power cord
- ❑ Two rack mounting kits and screws
- ❑ Console cable
- ❑ User's manual

## 2.1 Product Description

A switch can be used to overcome the hub-to-hub connectivity limitations as well as improve overall network performance. Switches make intelligent decisions about where to send network traffic based on the destination address of the packet. As a result, the switch can significantly reduce unnecessary traffic. Figure 1 demonstrates the switch ability to segment the network. The number of nodes on each segment is reduced, thereby minimizing network collisions and boosting the available bandwidth per port.



**Figure 1: 24F Connection to Other Devices**

The 24F is a 24-port 10/100Mbps Fast Ethernet switch with an optional fiber module. The 24F will auto detect 10/100Mbps speed, full/half duplex mode, and MDI/MDI-X connection. Console management is supported in the 24F. VLAN trunking and port configuration can be configured to provide flexible network management and configuration functions. The 24F supports two priority transmit queues per port and Ethernet packets up to 1536 bytes for tagged packets. The 24F also supports CoS function for advanced network applications.

## 2.2 100Base-FX Fiber Modules

Fiber modules are available in the following configurations:

FM-100SC	1-port 100Base-FX multimode fiber module with SC connector
FM-100ST	1-port 100Base-FX multimode fiber module with ST connector
FM-100SMSC-20	1-port 100Base-FX 20km singlemode fiber module with SC connector

Any of the modules listed above can be used to:

- Connect the switch to the backbone of your network
- Connect the switch to a classroom/workgroup hub or switch
- Connect the switch to a server or workstation with a fiber NIC

## 2.3 Location of the 24F Switch

The 24F can be installed quickly and easily. However, for an installation with minimum impact on the existing network, please read the following information carefully. Installing the 24F involves three steps:

1. Choosing a location
2. Supplying power
3. Connecting the switch

Consider the following criteria when selecting a location for the switch:

- Avoid dusty locations
- Avoid electromagnetic noisy areas, such as locations close to power transformers or radio transmitters
- Avoid temperatures below 32° to 122°F (0° to 50°C)
- Allow sufficient space for proper ventilation
- Allow a clear view of the front panel LED indicators
- Allow easy access to the front panel ports and the rear panel switches

Your switch comes with two rack mounting brackets which can be used to mount the switch on an EIA 19" standard rack. Attach the brackets to the switch using the screws provided. Next, install the switch in the rack using the screws provided to attach the brackets to the rack.

### 3.0 Connecting the 24F

The 24F switch has been designed to support all standard Ethernet media types within a single switch unit. The various media types supported along with the corresponding IEEE 802.3 and 802.3u standards and connector types are as follows:

#### Fiber:

IEEE Standard	Media Type	Max. Distance	Connector Type
100Base-FX	multimode fiber	2km (6,562 ft)	SC or ST
100Base-FX	singlemode fiber	20km (65,616 ft)	SC

#### Copper:

10Base-T	CAT3, 4 or 5	100m (328 ft)	RJ45
100Base-TX	CAT5 or 5E	100m (328 ft)	RJ45

NOTE: Since dual-speed ports are auto-sensing for both 10 and 100Mbps, it is recommended that high quality CAT5 cables (which work for both 10Mbps and 100Mbps) be used whenever possible in order to provide flexibility in a mixed-speed network. Because the switch supports auto MDI/MDI-X detection, normal straight through cables for both workstation connection and hub or switch connection can be used. All 16 ports are auto MDI/MDI-X, so you can use any of the 16 ports to connect a port on another hub or switch with straight through or crossover cables.

### 3.1 Mounting the 24F

#### Table-Top or Shelf Mounting

The 24F switch can be easily mounted on a table-top or any suitable horizontal surface. There are four rubber feet provided for stability so finished surfaces won't be scratched.

#### Rack Mount Installation

Your switch comes with two rack mounting kits. You can use these brackets to mount the switch on an EIA standard 19" rack. Attach the brackets to the switch, using the screws provided. Next, install the switch in the rack using the screws provided to attach the brackets to the rack. When properly installed, the front-mounted LED status indicators should be in plain view and easy to read

### 3.2 Powering the 24F

The 24F switch is equipped with a universal power supply that accepts AC input voltages from 100 to 240VAC and 50 to 60 Hz.

To supply power to your switch:

1. Plug the connector of the power cord into the power port on the rear panel of your switch.
2. Plug the other end of the power cord into an AC wall outlet.
3. Set the power switch to ON and verify that the Power LED is lit. If it is not, check the following:
  - The power switch is in the ON position.
  - The power cord is properly connected to the wall outlet and to the power connection on the switch.
  - The wall outlet is functional.

Note: Network cable segments can be connected or disconnected from the switch while the power is on, without interrupting the operation of the switch.

### 3.3 Module Installation

Warning: Before installing the modules into the 24F, you must disconnect the switch from the main power supply. There are three choices of modules for long distance fiber optic cable connection.

Note: If you install a fiber module, the 24<sup>th</sup> copper port will be disabled and the FX port becomes the 24<sup>th</sup> port.

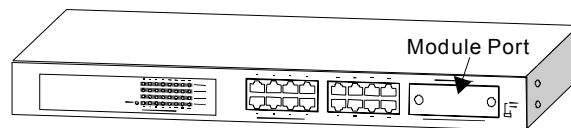
#### Handling the Modules

The module can be easily damaged by electrostatic discharge. To prevent damage, please observe the following:

- ❑ Do not remove modules from their packaging until you are ready to install it into a switch.
- ❑ Do not touch any of the pins, connections or components on the modules.
- ❑ Handle the modules only by its edges and front panel.
- ❑ Always wear an anti-static wristband connected to a suitable grounding point.
- ❑ Always store or transport modules in appropriate anti-static packaging.

#### Module Installation

1. Ensure that the switch is disconnected from the main power supply and that you are wearing an anti-static wristband connected to a suitable grounding point.
2. Place the switch on a flat surface.
3. Using a small cross-bladed screwdriver, remove the blank module plate from the front of the switch. Do not remove any other screws from the switch.
4. Keep the blanking plate and screws in a safe place. If you remove the module at any time, you must replace the blanking plate to prevent dust and debris from entering the switch and to aid the circulation of cooling air.
5. Hold the module so that the text on the front panel is oriented correctly, and insert it into the switch, ensuring the connectors are fully engaged. Tighten the two captive thumbscrews that secure the module in place.



**Figure 2: Module Installation**

#### Connecting the Modules

1. Remove the protective plastic covers from the fiber connectors on the module.
2. Plug the ST (or SC) connector on the fiber cable into the fiber socket on the module.
3. Connect the other end of the fiber optic segment to an appropriate device fitted with a 100Mbps adapter.
4. Check the LED indicators on the front of the switch to ensure that the module is operating correctly.
5. Power up the switch.

### **Module Configuration**

If you install the 100Base-FX module, the module becomes Port 24. You must hard set Port 24 to 100Mbps, Full Duplex and disable the auto negotiation. Refer to **Section 5.0 – Using the Console Port - Port Settings** to configure Port 24 to work with the installed fiber module.

### **Removing the Modules**

1. Ensure that the power supply and the backbone connection cables are disconnected from the switch.
2. Place the switch on a flat surface. Undo the two captive thumbscrews securing the module into the switch. Do not remove any other screws from the switch.
3. If you are not installing another module immediately, you must replace the blank module plate to ensure that dust and debris do not enter the switch, as well as to aid circulation of cooling air.

## **4.0 Status of LEDs**

<b>LED</b>	<b>STATUS</b>	<b>CONDITION</b>
<b>Power</b>	ON	Switch is receiving power.
<b>Link / Act</b>	ON	Port has established a valid link.
	Flashing	Data packets being received or sent.
	Green	The connection speed is 100Mbps.
	Yellow	The connection speed is 10Mbps.
<b>FDX / Col</b>	ON	The connection is Full Duplex.
	Flashing	Packet collisions occurring. Low levels of collisions are part of normal Ethernet operation.

## 5.0 Using the Console Port

### Hardware setup

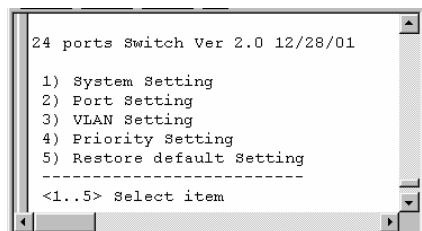
1. Connect the console port on the switch to the COM port on the PC using the console cable included with the switch.

### Software setup

1. Boot PC with MS Windows.
2. Load the **Hyper Terminal** (hypertrm.exe) program. The **Hyper Terminal** program can be found in the folder **Accessories – Communications – Hyper Terminal** from the Program menu. If you don't have the Terminal program, install it from your MS Windows installation disk.
3. If the connection file has been created, cancel the new connection request and open the connection file.

OR

4. If the connection file has not been created, follow the instructions on the screen to create a new connection named "**SW24**".
  - a. Select COM port of PC
  - b. Set COM port parameters:
    - Bits per second: *9600*
    - Data Bits: *8*
    - Parity Check: *None*
    - Stop Bit: *1*
    - Flow Control: *None*.
  - c. Select OK.
5. Power on the switch and the following screen will be displayed on your PC.



```
24 ports Switch Ver 2.0 12/28/01
1) System Setting
2) Port Setting
3) VLAN Setting
4) Priority Setting
5) Restore default Setting
-----
<1..5> Select item
```

Note: If the console screen does not display, reboot the switch or closet the terminal program and start again.

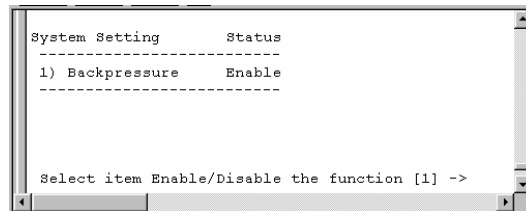
## Using the Console Menu

There are five options in the setup menu.

### System Setting

The system setting allows you to enable or disable the backpressure for half duplex. If it is enabled, packets will be prevented from being lost in half duplex mode, however, packets will be rejected when network traffic is very heavy and that may cause some network connections to fail. The default mode is *enabled*.

1. Press **1** to access the **Sytem Setting** function.

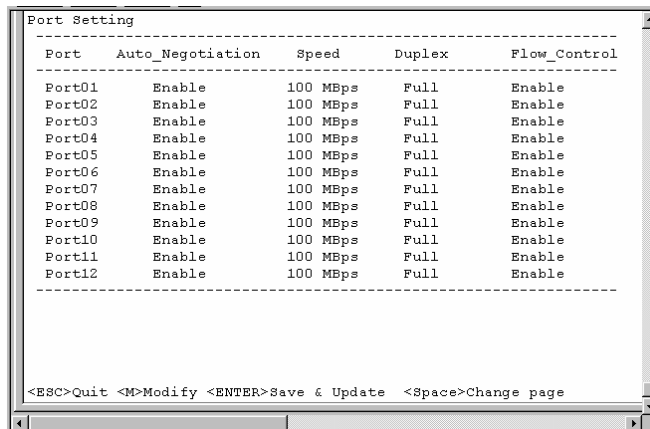


2. Press **1** to change the mode.
3. Press **Enter** to save the settings.
4. Press **Esc** to return to the Menu.

### Port Settings

The operation speed and duplex mode can be set from here for each port. If auto-negotiation is enabled, the settings for speed and duplex will be ignored. If auto-negotiation is disabled, the speed and duplex settings will be applied.

1. Press **2** to access **Port Setting**.



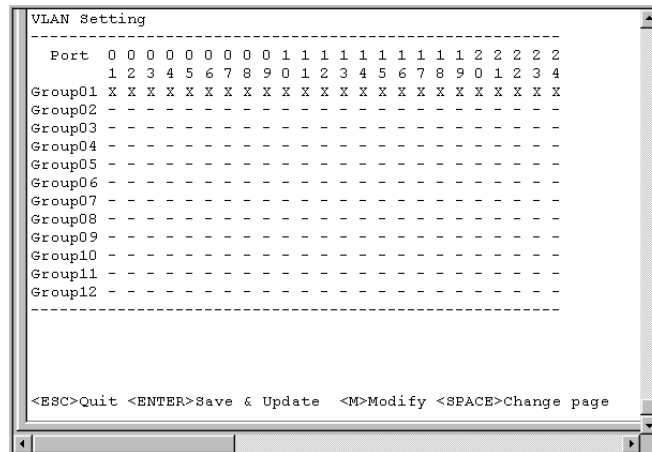
2. Use the spacebar to toggle between ports 1-12 and 13-24.
3. Press **M** to make changes.
4. Enter the port number and press **Enter**.
5. Make the necessary changes.
6. Press **Enter** to save.
7. Press **Esc** to return to the menu.

Note: To make additional port changes, press **M** again and repeat Steps 4-7.

## VLAN Setting

This setting allows you to configure VLAN groups. If you remove a port from a VLAN and don't assign it to another VLAN, the removed port will automatically be assigned to Group 24. Every port must belong to some VLAN. In this setting, VLAN groups can be overlapped on ports in the switch.

1. Press **3** to access **VLAN Setting**.



```
VLAN Setting
-----
Port  0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 2 2 2 2 2
      1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4
Group01 x x x x x x x x x x x x x x x x x x x x x x x
Group02 - - - - - - - - - - - - - - - - - - - - - - -
Group03 - - - - - - - - - - - - - - - - - - - - - - -
Group04 - - - - - - - - - - - - - - - - - - - - - - -
Group05 - - - - - - - - - - - - - - - - - - - - - - -
Group06 - - - - - - - - - - - - - - - - - - - - - - -
Group07 - - - - - - - - - - - - - - - - - - - - - - -
Group08 - - - - - - - - - - - - - - - - - - - - - - -
Group09 - - - - - - - - - - - - - - - - - - - - - - -
Group10 - - - - - - - - - - - - - - - - - - - - - - -
Group11 - - - - - - - - - - - - - - - - - - - - - - -
Group12 - - - - - - - - - - - - - - - - - - - - - - -
-----
<ESC>Quit <ENTER>Save & Update <M>Modify <SPACE>Change page
```

2. Press **M** to make changes.
3. Enter a group number and press **Enter**.
4. Enter the number and press **Enter**.
5. Continue to add ports to the group until you have configured the groups.
6. Press **Esc** when finished.
7. Save the changes.
8. Press **Esc** to return to the menu.

## Priority Settings

There are two transmit priority queues for each port. This function allows you to configure the priority settings.

Port Based: If the port is set to H, all packets received from this port will always be forwarded to a high priority queue with high priority

VLAN Based: If the setting of the port is set to **E** (enable), tagged packets received from this port will be forwarded with the priority information in the tag. If the VLAN setting is **D**, the function is disabled.

1. Press **4** to access **Priority Settings**.
2. Press **M** to make changes.
3. Select **Port Based** or **VLAN Based**.
4. Select the port number and press **Enter**.
5. Make the necessary changes.
6. Press **Esc** when finished.
7. Save the changes.
8. Press **Esc** to return to the Menu.

## **Restore Default Setup**

Use this function to restore the configuration to the default setting.

### **Exit**

1. Click **File – Exit** to leave the Terminal program.
2. Click **Yes** to disconnect.
3. Click **Yes** to save session.

## **6.0 Troubleshooting**

All Waters' switching products are designed to provide reliability and consistently high performance in all network environments. The installation of Waters' 24F switch is a straightforward procedure (See Section 3); the operation is also straightforward and is discussed in Section 4.

Should problems develop during installation or operation, this section is intended to help locate, identify and correct these types of problems. Please follow the suggestions listed below prior to contacting your supplier. However, if you are unsure of the procedures described in this section or if the Waters' 24F switch is not performing as expected, do not attempt to repair the unit; instead contact your supplier for assistance or contact Waters Network Systems' Customer Support Center at **800.328.2275** or email [carolynl@watersnet.com](mailto:carolynl@watersnet.com).

### **6.1 Before Calling for Assistance**

1. If difficulty is encountered when installing or operating the unit, refer back to the Installation Section of the chapter of this manual. Also check to make sure that the various components of the network are inter-operable.
2. Check the cables and connectors to ensure that they have been properly connected and the cables/wires have not been crimped or in some way impaired during installation. (About 90% of network downtime can be attributed to wiring and connector problems.)
3. Make sure that an AC power cord is properly attached to the 24F.
4. Be certain that each AC power cord is plugged into a functioning electrical outlet. Use the PWR LEDs to verify each unit is receiving power.
5. If the problem is isolated to a network device other than the Waters' 24F switch, it is recommended that the problem device be replaced with a known good device. Verify whether or not the problem is corrected. If not, go to next step. If the problem is corrected, the Waters' 24F switch and its associated cables are functioning properly.
6. If the problem continues, contact Waters Network Systems Customer Service at 800.328.2275 or email [carolynl@watersnet.com](mailto:carolynl@watersnet.com) for assistance.

### **When Calling for Assistance**

Please be prepared to provide the following information.

1. A complete description of the problem, including the following points:
  - a. The nature and duration of the problem
  - b. Situations when the problem occurs
  - c. The components involved in the problem
  - d. Any particular application that, when used, appears to create the problem

2. An accurate list of Waters Network Systems product model(s) involved. Include the date(s) that you purchased the products from your supplier.
3. It is useful to include other network equipment models and related hardware, including personal computers, workstations, terminals and printers; plus, the various network media types being used.
4. A record of changes that have been made to your network configuration prior to the occurrence of the problem. Any changes to system administration procedures should all be noted in this record.

## 6.2 Return Material Authorization (RMA) Procedure

All returns for repair must be accompanied by a Return Material Authorization (RMA) number. To obtain an RMA number, call Waters Network Systems Customer Service at 800.328.2275 during business hours in 8:00 am to 5:00 pm (CT) email [carolynl@watersnet.com](mailto:carolynl@watersnet.com). When calling, please have the following information readily available:

- Name and phone number of your contact person
- Name of your company/institution
- Your shipping address
- Product name
- Packing List Number (or Sales Order Number)
- Failure symptoms, including a full description of the problem

Waters Network Systems will carefully test and evaluate all returned products, will repair products that are under warranty at no charge, and will return the warranty-repaired units to the sender with shipping charges prepaid (see Warranty Information, Appendix A, for complete details). However, if Waters cannot duplicate the problem or condition causing the return, the unit will be returned as: **No Problem Found**.

Waters Network Systems reserves the right to charge for the testing of non-defective units under warranty. Testing and repair of product that is not under warranty will result in a customer (user) charge.

## 6.3 Shipping and Packaging Information

Should you need to ship the unit back to Waters Network Systems, please follow these instructions: Package the unit carefully. It is recommended that you use the original container if available. Units should be wrapped in a "bubble-wrap" plastic sheet or bag for shipping protection. (You may retain all connectors and this Installation Guide.)

CAUTION: Do not pack the unit in Styrofoam "popcorn" type packing material. This material may cause electro-static shock damage to the unit.

Clearly mark the Return Material Authorization (RMA) number on the outside of the shipping container. Waters Network Systems is not responsible for your return shipping charges.

Ship the package to:

Waters Network Systems  
Attention: Customer Service  
RMA Number:  
945 37<sup>th</sup> Avenue, NW  
Rochester, MN 55901

## **Warranty Statement**

### **Limited Lifetime Warranty**

Waters Network Systems warrants to the original consumer or purchaser that each of its products, and all components thereof, will be free from defects in material and/or workmanship for the lifetime of the product. Any warranty hereunder is extended to the original consumer or purchaser and is not assignable.

Waters Network Systems makes no express or implied warranties including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose, except as expressly set forth in this warranty. In no event shall Waters Network Systems be liable for incidental or consequential damages, costs, or expenses arising out of or in connection with the performance of the product delivered hereunder. Waters Network Systems will in no case cover damages arising out of the product being used in a negligent fashion or manner.