FCC Certifications

This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

CE Mark Warning

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class A for ITE, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Company has an on-going policy of upgrading its products and it may be possible that information in this document is not up-to-date. Please check with your local distributors for the latest information. No part of this document can be copied or reproduced in any form without written consent from the company.

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Document Version: 2.0

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6. Product Specifications

1. Overview

The **Gigabit Managed Cluster** is a powerful, high-performance, high port-density networking system, which can upgrade and integrate your existing network from 10/100Mbps to a simplex, efficient, centralized management environment and very high-speed network architecture. As all members operate as teamwork, all connected members of the family are treated as a Single-Managed device.

With its built-in rich, various and advanced management functions, system administrator can monitor and control the whole system or individual port of any members easily and remotely.

The members of the **Gigabit Managed Cluster** are:

- **24F.E.+2G.E Gigabit Clustering Switch**
- **14+2G.E. Gigabit Clustering Switch**
- **16V+2G.E. VDSL Clustering Switch**

14G.E.+2G.E. Gigabit Switch
Management Stack
Trunk Line
Management Stack
Trunk Line
Gigabit Server
Uplink Line
Workgroup
Workgroup
Management Stack
Trunk Line
Gigabit Server
Management Stack
Trunk Line
(Master Device)
Management Station

2. Unpacking Information

Thank you for purchasing the 24F.E.+2G.E. Gigabit Clustering Switch. Before you start, please check all the contents of this package.

The product package should include the following:

1. One 24F.E.+2G.E. Gigabit Clustering Switch
2. One power cord
3. Rubber foot and screws
4. Rack-mount brackets
5. User's Manual

3. Introduction to 24F.E.+2G.E. Gigabit Clustering Switch

3.1 General Description

The device is a 24+2-port 10/100/Gigabit Ethernet clustering switch with twenty-four 10/100Mbps RJ-45 ports and two Gigabit slide-in slots on the rear panel for optional fiber/copper Gigabit modules.

Compare to the traditional 10/100Mbps Ethernet, the switch delivers a dedicated 10/100Mbps connection to every attached client with no congestion issue. The gigabit ports also provide the fat pipe to the server or backbone connectivity for boosting the total system performance. Moreover, the NWay auto-negotiation operation automatically negotiates with the connected partners on the network speed and duplex mode; that provides an easy way to integrate 10 / 100 / 1000Mbps networks with no pain. It is ideal for micro-segmenting large networks into smaller, connected subnets for improved performance, enabling the bandwidth demanding multimedia and imaging applications.

Out of the ordinary dumb switches, the 24F.E.+2G.E. Gigabit Clustering Switch embedded advanced management capability; that the device can be remote managed by Telnet, SNMP manager and Internet browser. This is much useful for system manager to monitor and control the system efficiently.

Store-and-forward switching mode promises the low latency plus eliminates all the network errors, including runt and CRC error packets. To work under full-duplex mode, transmission and reception of the frames can occur simultaneously without causing collisions as well as double the network bandwidth.

The switch is plug-n-play without any software to configure and also fully compliant with all kinds of network protocols. Moreover, the rich diagnostic LEDs on the front-panel provide the operating status of individual port and whole system.

3.2 Key Features

- Complies IEEE 802.3, IEEE 802.3u, IEEE802.3x, IEEE 802.3z / ab standards
- Complies with IEEE802.1Q VLAN tag (IVL)
- Complies with IEEE802.1p CoS with 2-level priority
- The whole management stack can stack up to 8 sets
- 24 * RJ-45 ports for 10 / 100Mbps
- 2 * 1000Mbps Copper / Fiber slide-in slots
- 1 * 100Mbps Fiber slot (Alternative to copper port-1)
- Proprietary management bus extend up to 800 meters for management stacking
- Every switching port is automatically cross-over detection (MDI / MDI-X auto-detected)
- Supports real-time clock (optional)
- Supports IGMP snooping
- Supports MIB counters
- Supports port sniffering
- Supports Port Aggregation and up to 7 groups
- Supports port group VLAN and up to 255 groups
- Supports 802.1Q VLAN and up to 255 groups
- Supports 802.1D Spanning Tree
- One RS-232 female console connector
- Supports 8MB SDRAM for run time data storage
- Supports 2MB Flash EPROM for cooperation and configuration data storage
- Supports 6K MAC entries
- Supports 3Mbit packet switching
- 19” rack mountable
- Internal universal switching power supply
- FCC Class A, CE

3.3 The Front Panel

The front panel of the switch is shown as below

Port Operation

There are 24 * 10/100Mbps RJ-45 (copper) ports with 1 * 10/100Mbps fiber optical slide-in slot (Alternative to copper port-1).

--*10/100Mbps Fiber SC*

The auto-negotiation feature of the switch allows each port of the device running at one of the following operation modes:

Port	Media	Speed	Duplex Mode
10/100Mbps	10/100Mbps fiber optical SC (Alternative to copper port-1)	10Mbps	Full Duplex
			Half Duplex
		100Mbps	Full Duplex
			Half Duplex
	10/100Mbps RJ-45 (copper)	10Mbps	Full Duplex
			Half Duplex
		100Mbps	Full Duplex
			Half Duplex

All copper ports supports MDI/MDI-X **auto crossover** capability that is the port can connect either the PC or hub without crossover cable adjustment.

Wiring for 10/100Mbps (Fiber Optical/Copper)

Following are the summaries of cabling required:

Media	Speed	Wiring
10 / 100Mbps copper	10Mbps	Category 3,4,5 UTP / STP
	100Mbps	Category 5 UTP / STP
10 / 100Mbps Fiber SC	10 / 100Mbps	62.5 / 125 or 50 / 125μm multi-mode fiber optic

Attention：1. Category 5 cable is preferred to use with this product in structured wiring environments. This will ensure correct operation of RJ-45 ports at 10Mbps, 100Mbps or 1000Mbps.

2. The proprietary management bus (“STACK” RJ-45 ports) on the front panel is reserved for management stacking, **only straight-through UTP/STP cable can be used**. There is no Duplex Mode issue and the extended distance can up to 800 meters.

LEDs Definition

The rich diagnostic LEDs on the front panel can provide the operating status of individual port and whole system.

Power LED

This indicator lights green when the switch is receiving power; otherwise, it is off.

RTC LED

When standalone using the switch, this indicator indicates the optional Real Time Clock is functioning or not. If it does, the *RTC LED* lights green. In the management stack, the *RTC LED* blinks green to indicate management bus activity

STATUS 0 LED

When this LED steady green, it means the device acts competent leading role, an indispensable essential for system administrator to control and monitor whole system. At the time one member of the cluster disconnected or new member joined, the "STATUS 0" LED blinks. Soon, one and only one master will be raised. You can reference to "HUB ID" for relative information in the next.

STATUS 1 LED

The "STATUS 1" LED flashes green when Run Time Error occurs.

Port LEDs (10/100Mbps Copper/Fiber)

Every 10/100Mbps port relevant two LEDs (SPD/LINK/ACT; FULL/COL) for indicating the speed and connection status.

SPD/LINK/ACT LED

SPD/LINK/ACT LED	Status
Off	No Connection
Green	Connected as 100Mbps
Flashing Green	There is traffic transverses the port
Amber	Connected as 10Mbps
Flashing Amber	There is traffic transverses the port

If the port is connected but the SPD/LINK/ACT LED is dark, check the following items:

1. The switch and the connected device's power are on or not.
2. The connecting cable is good and with correct type
3. The cable is firmly seated in its connectors in the switch and in the associated device
4. The connecting device, including any network adapter is well installed and functioning

FULL/COL LED

A collision occurs when two stations within a collision domain attempt to transmit data at the same time. Intermittent flashing amber of the collision LED is normal; the contending adapters resolve each collision by means of a wait-then-retransmit algorithm. Frequency of collisions is an indicator of heavy traffic on the network.
If the FULL/COL LED lights amber, means the port is under Full-Duplex operation or dark for Half-Duplex mode.

FULL/COL LED	Status
Steady Amber	Full-Duplex mode
Dark	Half-Duplex mode
Flashing Amber	Collision

Attention：The 10/100Mbps fiber optical SC slot shares with copper port-1 in the same LED indicators

LINK/ACT LEDs (For slide-in slots on the rear panel)

The slide-in slot has a LINK / ACT LED itself. When one slide-in module is well installed and functioning, the relevant one lights green.

LINK LED ("STACK" port)

The LED lights green, when a management stack is made via the "STACK" port and negotiates with associated devices successfully.

HUB ID （Rotary Switch）

All members of the management stack are ranked according to their "HUB ID"(Device ID). There are eight degrees (0~7) in the rotary switch. The smaller number, the higher degree. Device with smallest "HUB ID" will be the "Master" device. Then, system management can perform by the way of the "Master Device".

Attention：Every device in the management stack should have a unique "HUB ID". In the meanwhile, a "HUB ID" which has been using by a device, reused by another, the management stack will fail.

RESET Button

The system will reboot when "RESET" button is pressed.

3.4 The Rear Panel

The rear panel of the switch is shown as below

Gigabit Slide-in slots

The two slide-in slots on the rear panel are reserved for following optional gigabit modules. They can provide fat pipes for up linking to backbone or connecting to servers.

--*Gigabit Fiber SC*

--*Gigabit Copper*

Gigabit Module Operation

Port	Media	Speed	Duplex Mode
Gigabit port	Gigabit RJ-45 port	10Mbps	Full Duplex
			Half Duplex
		100Mbps	Full Duplex
			Half Duplex
		1000Mbps	Full Duplex
	Gigabit Fiber SC	1000Mbps	Full Duplex

Wiring for Gigabit Slide-in Module

Following are the summaries of cabling required:

Media	Speed	Wiring
Gigabit copper	10Mbps	Category 3,4,5 UTP / STP
	100Mbps	Category 5 UTP / STP
	1000Mbps	Category 5 UTP / STP
Gigabit Fiber SC	1000Mbps	62.5 / 125 or 50 / 125µm multi-mode fiber optic

Console Port

The RS-232 console is an interface for connecting a terminal directly. Through the console port, it provides rich diagnostic information includes network statistics, link status and system setting. The operating mode of the console port is:

- DCE
- 9600 (Fix baud rate)
- n (No parity checking)
- 8 (8 Data bits)
- 1 (1 stop bit)
- None (No flow control)

You can use a normal RS-232 cable and connect to the console port on the device. After the connection, you can run any terminal emulation program (Hyper Terminal, Winterm, Telix, … and so on) to enter the startup screen of the device. All the detail software operation, please refer to “Console port (out-of-band) connection” session of chapter 5.

Power Receptacle

For compatibility with electric service in most areas of the world, the switch's power supply automatically adjusts to line power in the range 100-240 VAC and 50-60 Hz. Plug the female end of the power cord firmly into the receptacle on the rear panel of the switch. Plug the other end of the power cord into an electric service outlet then the power will be ready.

4. Installing 24F.E.+2G.E. Gigabit Clustering Switch

This switch can be placed directly on your desktop, or mounted in a rack. If you install the device in a normal-standalone standard, the switch is an Intelligent Switch, and users can immediately use most of the features simply by attaching the cables and turning the power on. In this case, any managerial proceedings are effective only in the range of the switch. After management stacking, you can enjoy the powerful management functions and control the whole system.

4.1 Desktop Installation

For desktop installation, the switch needs to put on a clean, flat desk or table close to a power outlet. Plug in all network cables and the power cord, then the system is ready.

Before installing the switch, you must ensure:

1. It is accessible and cables can be connected easily
2. Cabling is away from:
   ＊Sources of electrical noise such as radios, transmitters and broadband amplifiers
   ＊Power lines and fluorescent lighting fixtures.
3. Keep water or moisture off
4. Airflow around the unit and through the vents in the side of the case is great for heat radiation (company recommend that you provide a minimum of 25 mm clearance)

To prolong the operational life of your units:

1. Never stack unit more than eight sets high if freestanding
2. Do not place objects on top of any unit or stack
3. Do not obstruct any vents at the sides of the case

4.2 Rack-mount Installation

The switch may standalone, or may be mounted in a standard 19-inch equipment rack. Rack mounting produces an orderly installation when you have a number of related network devices. The switch is supplied with rack mounting brackets and screws. These are used for rack mounting the unit.

Rack Mounting the Switch in the 19-inch rack:

1. Disconnect all cables from the switch before continuing.
2. Place the unit the right way up on a hard, flat surface with the front facing toward you.
3. Locate a mounting bracket over the mounting holes on one side of the unit.
4. Insert the screws and fully tighten with a suitable screwdriver.
5. Repeat the two previous steps for the other side of the unit.
6. Insert the unit into the 19" rack and secure with suitable screws (not provided).
7. Reconnect all cables.

4.3 Installing Network Cables

After placing the switch on the desktop, we need to know how to connect the device to network.

Station Connections

Reference to the wiring statement of the previous section; connect each station to the switch with correct type of cables.

Switch-to-Switch Connections

In making a switch-to-switch connection, use Gigabit ports to connect another switch or backbone is strongly recommended. The Gigabit ports provide the fat pipe to the server or backbone connectivity for boosting the total system performance. Reference to the wiring statement of the previous section; connect each station to the switch with correct type of cables.
Furthermore, as the switch supports port aggregation (port-trunk) capability and up to 7 groups, it is also great to build up switch-to-switch connectivity. For detail information, please reference to the "Management Guide" session.

4.4 Module Installation

The three slide-in slots on the front and rear panel are purposed for installing optional modules. They can be used as a network backbone or connect to a server. Follow the steps as described to install a module:

1. Power off the switch
2. Removing the two screws on the face plate of slide-in slot with a flat-head screwdriver
3. Push the module gently into the slot along the slide tracks
4. Ensuring that it firmly engages with the connector then tighten the screws to secure the module

Attention：The slide-in slots are not hot swappable, power off the switch before installing modules

4.5 Management Stack

There are two RJ-45 ports on the front panel for proprietary management stack. Only straight-through UTP/STP cable can be used.
Plug one end of the cable in the “IN” port and the other end to the ”OUT” port of next device. Repeat the step for every device in the cluster, then ending at last switch.

Attention：Before management stacking, be sure of every device uses a unique “HUB ID”, or the management stack will not work

4.6 Network Application

Bus Solution

Backbone Solution

5. Management Guide

This section instructs you how to enter and proceed the advanced management capability, which can be accessed by RS-232 serial port (out-of-band) on the rear panel or by Telnet session / Internet Browser over the network (in-band).

The management functions such as：

- Port Information / configuration / Statistic / Location Search / Duplex mode / Flow Control
- SNMP parameters
- 802.1Q / Port Group VLAN
- Upgrade system firmware
- Reboot system

5.1 Console Port (Out-of-band) connection

After attaching a RS-232 cable (Straight-through) to the serial port of a PC running a terminal emulation program, press **"Enter"** key then login screen appears. Enter your username and password to login the management console.

Note：

The management functions of console program are exactly the same with web-based management interface but in text mode. For further operation, please refer to *'Starting a Web Browser Session'*.

```
16 GIGA Management Switch
                                                    UserLevel: NONE
_____________________________________________________________________________
[Login]
 UserName : admin
 Password : *****
```

Attention： **1.** The factory default value of UserName and Password is **"admin"**
2. For detail console port configurations, please refer to "Console Port" in chapter 3
3. System configurations via the Console Port only will be allowed by the way of master device

5.2 In-Band Connections (Web Browser / Telnet)

To manage the switch through in-band access, you should configure the management station with an IP address and subnet mask compatible with your clustering switch.

Factory Default value:

IP： ***10.0.0.1***
Subnet Mask： ***255.0.0.0***
Default Gateway： ***10.0.0.254***

Both standalone switch and the cluster can be managed using either a standard Web Browser or a Telnet session from any computer attached to the network. The SNMP management feature also permits the switch to be managed from any SNMP network management station running a network management program.

- To manage the *Standalone switch*：
  Access the switch with its IP address "10.0.0.1" (factory default value)
- To manage any of the Clustering switch：
  Access the switch with the IP address of Master device in the management stack. Then select the switch you want to manage in the first page

Starting a Telnet Session

To access the switch through a Telnet session：

1. Sure of the switch is configured with an IP address and the switch is reachable from a PC

2. Start the Telnet program on a PC and connect to the switch

Note：

The management functions of Telnet program are exactly the same with web-based management interface but in text mode. For further operation, please refer to *'Starting a Web Browser Session'*.

Starting a Web Browser Session

This Web Browser User Interface is coded by Java Applet and running on the **Java™ Virtual Machine (JVM) version 1.3.1** platform. You should configure the management station with an IP address and subnet mask compatible with your clustering switch for accessing it. Also, the management station should be well configured and connected to Internet for automatically downloading (upgrading) the suitable JVM through Internet from "http://java.sun.com". Or you can download it yourself by the URL "http://java.sun.com/j2se/1.3/download.html" and then manually install it.

> Attention：Occasionally the newer Java™ Virtual Machine is not backward compatible, that JVM version 1.3.1 is strongly recommended to ensure properly operation

Running your Web Browser and enter the IP address "10.0.0.1" (When your switches are in a well-installed management stack, remember that the portal IP address will be vary with your actually management topology) as the URL in the "address" field. After authentication procedure, the home page shows up. In this page, you can view the management stack topology or standalone switch.

Topology

This screen displays one or more switches of the management stack. Basic properties can be read by the screen, include Hardware characteristic, Device Name, Device Up time, Master and Slave relationship. Also, by mouse clicking listed items can enter for further operation.

System Configuration

If you are managing a Master or a Standalone device, the system configuration parameters are equal to parameters of Net Configuration and Device Information in **Device** tab. For further information, please refer to **Device** statement.

After clicking the 24F.E.+2G.E. Gigabit Clustering Switch, main screen shows up.

Function	Statement
<Home>	Shortcut to back to home page
<Save>	Save the current setting to **Non-volatile Memory**. The difference between **<Save>** and **<Apply>** is that *Apply* applies settings right away but saves the values in the system memory. Every time when switch reboots, system obtains system parameters from **Non-volatile Memory** you **<Saved>** before but not buffer memory. Select the one(s) you want to save parameters, then click "Save" button to save it to **Non-volatile Memory**.

<Default>	Make the switch(es) returning to factory default value. Select the switch and click "Default" button, the selected-switch(es) will return to initial value. If you want to clear the previous value in the **Non-volatile Memory**, please **<Save>** it.

<Reboot> You can specify switch(es) and reboot it.

Warm Boot Reboot the switch in a short time.

Cold Boot Boot the switch and with fully Power On Self Test (POST). The system is completely checked but spend much time.

<Ping> The **Ping** is a commonly used tool to detect the remote host or IP address exists or not. Moreover, network status also can be known by the ratio of packets Reply and Loss.

<Telnet> By simply clicking the **<Telnet>** button, the Telnet program implements and displays login screen.

<Contact> Contact technicians for technical support by E-Mail

<Upgrade>

WEB Upload

1. Select Device ID and "WEB Upload" radio button then click OK
2. Specify the file path by clicking Browse button and click Start

TFTP Download

1. Select Device ID and "TFTP Download" radio button then click OK
2. Enter the TFTP server's IP address in Server IP field
3. Enter file name in File Name field
4. Click Start button to download the code and system update with it automatically

Local File Transfer

1. Select Device ID and "Local File Transfer" radio button then click OK
2. Click "Application" or "Java Applet" radio button

3. The system starting software synchronization from Master Device **(That the synchronized hardware should be identical to Master Device)**

Application --- System firmware
Java Applet --- Web User Interface

<Device：> The shortcut to go to another member switch in the management stack

Device

Panel Display

Port Status

Port Link Down (Black)

Port is not connected or attached device shuts down

Port Link Up (Green)

Port links up and working correctly

Port Link Up (Amber)

Port links up but in blocking mode

Port Disabled (Red)

Port has been disabled

Network Configuration

IP Address	IP address of this device
Subnet Mask	NetMask of your network
Gateway IP	IP address of Gateway

Device Information

Name	Naming the system (optional)
Contact	Who the System administrator is (optional)
Location	Where the management stack locates (optional)

Note：

The Network Configuration and Device Information of Master Device in the management stack will become system parameters automatically.

Topology Info

Information

Device ID	HW Ver	Boot-UP Ver	POST Ver.	Runtime Ver.	JAVA Applet Ver.	Agent Status	Device Name	Device Location
0	R0	2.0(8/12/20...	2.0(8/12/...	2.0(7/11/2002)	2.0(8/13/2002)	MASTER	Marketing D...	Headquarter
5	R0	2.0(8/12/20...	2.0(8/12/...	2.0(7/11/2002)	2.0(8/14/2002)	SLAVE	Manufacturi...	NONE

This page displays information about the switch(es), such as Device ID, Hardware version, Boot-Up version, POST version, Runtime version (Firmware version), JAVA Applet version (Web User Interface version), Device Name and Device Location. When management stack persist, by the Device ID, all the members are transparently listed.

Ports

Information

It is a ports' configurations summary table. Via the summary table, you can know status of each port clear at a glance, like *Link Up/Link Down*, *Enable/Disable*, *Link Speed*, *Duplex mode* and *Flow Control*.

Information | Configuration | Statistic | Location Search

Port	Name	Type	Link	Admin	Speed	Duplex	Flow Ctrl
1	N/A	TX	Link Down	Enable	Auto	Auto	Disable
2	N/A	TX	Link Down	Enable	Auto	Auto	Disable
3	N/A	TX	Link Down	Enable	Auto	Auto	Disable
4	N/A	TX	Link Up	Enable	100M	Full	Disable
5	N/A	TX	Link Down	Enable	Auto	Auto	Disable
6	N/A	TX	Link Down	Enable	Auto	Auto	Disable
7	N/A	TX	Link Down	Enable	Auto	Auto	Disable
8	N/A	TX	Link Down	Enable	Auto	Auto	Disable
9	N/A	TX	Link Down	Enable	Auto	Auto	Disable
10	N/A	TX	Link Down	Enable	Auto	Auto	Disable
11	N/A	TX	Link Down	Enable	Auto	Auto	Disable
12	N/A	TX	Link Down	Enable	Auto	Auto	Disable
13	N/A	TX	Link Down	Enable	Auto	Auto	Disable
14	N/A	TX	Link Down	Enable	Auto	Auto	Disable
15	N/A	TX	Link Down	Enable	Auto	Auto	Disable
16	N/A	TX	Link Down	Enable	Auto	Auto	Disable

Note：

Also by simply clicking the port on the '**Panel Display**', the port information screen pops up

Type	100TX	Link Status	Link Down
RX Bytes	758525	TX Bytes	0
RX Frames	2302	TX Frames	0
RX BCST Frames	3538	TX Collisions	0
RX MCST Frames	856	RX CRC	0
RX Alignment	0	RX Undersize	0
RX Oversize	0	RX Fragments	0

Configuration

Port attributes can be setup in this page.

Setup Port Attributes

1. Click the "Name" column of the port. Enter a name for identification, like 'Richard'; and **press Enter**
2. Leave the "Admin" column 'Enable' value to make the port to be in operation or 'Disable' to pause it
3. Select Duplex mode---10Half / 10Full; 100Half / 100Full, 'Auto' for auto-negotiation and **1000Full auto-detection**
4. Select 'Enable' to take "Flow Control" effect
5. Select the predefined "Bandwidth Control" scale (10%~100%)
6. Click Apply button to apply settings

Note：

Also accomplished by simply mouse right-click the port on the '**Panel Display**' then select **'Configuration'**, the configuration screen pops up

Flow Control operation mode：

Speed / Duplex mode	Flow Control
10Half	Back pressure
100Half	Back pressure
1000Half	Back Pressure

Speed / Duplex mode	Flow Control
10Full	IEEE 802.3x Pause Frame
100Full	IEEE 802.3x Pause Frame
1000Full	IEEE 802.3x Pause Frame

Duplicate Port Attributes

Click “Duplicate” button, the dialogue screen appears.

1. Select Source Port (for example Port 2)
2. Select Target Port, click All for select all (for example Port 8, 9, 10)
3. Select the port attributes you want to duplicate
4. Click OK to submit values
5. Click Apply button to apply settings
6. As the following result, port 2 is duplicated to port 8, 9, 10 accompany with specified attributes.

Port	Name	Admin	Speed/Duplex	Flow Ctrl	Bandwidth Ctrl
1	Alex	Enable	Auto	Enable	100%
2	Max	Enable	10 Full	Enable	40%
3	Crystal	Enable	100 Half	Disable	100%
4	Tina	Enable	100 Full	Disable	70%
5	Jeff	Enable	Auto	Disable	50%
6	Richard	Enable	Auto	Disable	90%
7	N/A	Enable	Auto	Disable	100%
8	Max	Enable	10 Full	Enable	40%
9	Max	Enable	10 Full	Enable	40%
10	Max	Enable	10 Full	Enable	40%
11	N/A	Enable	Auto	Disable	100%

Note：

Also accomplished by simply mouse right-click the port on the ‘**Panel Display**’ then select **‘Copy Setting’** to duplicate port properties and select **’Past Setting’** when point at destination port

Statistic

Ether Like Frame Types

RX Bytes	Number of bytes received in good and bad frames
RX Frames	Number of good and bad packets received
RX crc_err	Number of CRC errors received
TX Byte	Number of bytes transmitted in good and bad frames
TX Frames	Number of good and bad packets transmitted
TX Collisions	Number of collisions on transmitted frames
TX drops	Frames dropped due to lack of receive buffer
TX underruns	Increments when packet transmission fails due to the inability of the interface to retrieve packets from the local packet buffer fast enough to transmit them onto the network

RX Good Frame Types

RX Bytes	Number of bytes received in good and bad frames
RX frames	Number of good and bad packets received
RX broadcasts	Number of good broadcasts
RX multicasts	Number of good multicasts
RX less64_pkts	Number of short frames with invalid CRC (<64 bytes)
RX 65to127_pkts	Number of 65 to 127-bytes frames in good and bad packets
RX 128to255_pkts	Number of 128 to 255-bytes frames in good and bad packets
RX 256to511_pkts	Number of 256 to 511-bytes frames in good and bad packets
RX 512to1023_pkts	Number of 512 to 1023-bytes frames in good and bad packets
RX 1024more_pkts	Number of 1024 to max-length-type frames in good and bad packets

RX Error Frame Types

RX alignment_err	Number of alignment errors received
RX crc_err	Number of CRC errors received
RX oversize_err	Number of long frames with valid CRC
RX undersize_err	Number of short frames with valid CRC
RX fragments_err	Number of short frames with invalid CRC
RX jabbers_err	Number of long frames with invalid CRC

Location Search

A denominate port can be searched by its given name. (Match whole word only)

VLAN

The VLAN is a group of ports that may spread around the network but communicate as though they belong to one subnet. By using IEEE 802.1Q compliant VLAN, all ports can be reorganized into separate broadcast domains for security reasons and reduce bandwidth occupation instead of using routers to divide whole network into subnets. It produces cleaner network environment by reducing broadcast traffic and simplify network management by allowing you to move devices to another VLAN without changing physical connections.

- **802.1Q VLAN**

Before enabling 802.1Q VLAN , pay attention to：

- All ports are default to VLAN 1 and assigned PVID 1
- All the ports of a Aggregation Group must to be treated as an integer when added to/deleted from a VLAN

VLAN Static List

This screen is used to Add / Remove / Modify VLAN and up to 255 groups. The VLAN groups that have been created are all listed here.

To create a new VLAN group

1. Specify the name for the new VLAN group (VLAN name is only used for identification)
2. Enter a number (VLAN ID) for the new VLAN group
3. Check the "**Active**" box to activate the VLAN or leave it blank and activate it afterward
4. Click <<Add button to create the new VLAN

To remove a VLAN group

1. Select a VLAN group you want to remove from the “Current” list
2. Click Remove>> button to remove it

Attention：1. If a removed port is no longer belong to any other group, it is temporarily disabled because no one can communicate with it.
2. If one port’s PVID is equal to this VLAN ID, removing this VLAN group will not allow until you change it.

To modify a VLAN group

1. Select a VLAN group you want to remove from the current list
2. Modify parameters in “New” column
3. Click Modify button to submit the new parameters

VLAN Static Table

This screen is used to Add/Remove member ports of a VLAN.

Egress Ports/Member

The ports that have been added to the displayed VLAN group

Tagged Ports/Member

The tagged ports of the displayed VLAN group

To add member port

1. Click the “VLAN ID” combo box and select a VLAN you want new ports to join in
2. Select ports (press Shift / Ctrl key for selecting multi ports) in the “Non-Member” column
3. Click <<Add button to join selected ports in

To remove member port

1. Click the “VLAN ID” combo box and select a VLAN you want to remove ports
2. Select ports (with Shift / Ctrl key to select multi ports) in the “Member” column
3. Click Remove>> button to delete selected ports

Note：

1. If a removed port is no longer belong to any other group, it is temporarily disabled because no one can communicate with it
2. The port which is assigned a PVID and the PVID is equal to VLAN ID, removing the port will not allow until you change it

VLAN Port Configuration

When the VLAN-enabled switch receives an untagged packet, the packet will be sent to the port’s default VLAN according to the PVID (port VLAN ID) of the receiving port.

Port	PVID	Ingress Filtering
1	1	Disable
2	1	Disable
3	1	Disable
4	1	Enable
5	1	Enable
6	1	Disable
7	1	Disable
8	1	Enable
9	1	Disable
10	1	Enable
11	1	Disable

To change the PVID

1. Double click the “PVID” column of a port
2. Input a new VLAN ID (1~255)
3. Press **“Enter”** to submit the value
4. Click Apply button to apply it

Note：

1. All the ports are default as members of VLAN 1 and assigned PVID 1
2. The port which was assigned a PVID and the PVID is equal to VLAN ID, removing the port will not allow until you change it
3. Automatically, a port will join the VLAN of its PVID, and if the VLAN does not exist, system will create it

To Enable / Disable Ingress Filtering

When one packet comes in from **Port X** to **VLAN Y**, but **Port X** is not a member of **VLAN Y**

Ingress Filter **Enabled**：The filter checks the packet and detects **Port X** does not belong to the **VLAN Y**, the Ingress Filter discards the packet.

Ingress Filter Disabled：All the packets destined to **VLAN Y** are all unobstructed.

Click the “Ingress Filtering” column of a port and select ‘Enable’ to activate Ingress Filter

- **Port Group VLAN**

The Port Group VLAN (Port-based VLAN) is concentrate on definite ports. The packets forwarding policies are based on destination MAC addresses or related ports by voluntary learning relationship of MAC addresses and its related ports.

All Together

Click All Together button then all the ports of the switch will be added to VLAN group 1

All Independent

Click All Independent button then all the ports will be divided into separated subnets, that are 26 subnets

Every port can belong to different Port Group VLANs simultaneously without limitation.

Port Aggregation

Port Aggregation (Port Trunk) is used to increase the bandwidth of a switch-to-switch connection and backup. This switch provides 7 port aggregation groups, which consist of 4 ports and create bandwidth up to 800Mbps per group (the group 6 consists of 2 slide-in slots and creates bandwidth up to 4Gbps) at full duplex mode. Check the box of Aggregation Group in the Status Enable column and press “Apply” then the selected Aggregation Group is activated.

Aggregation Group	Member Port	Status Enable
0	01;02;13;14	☐
1	03;04;15;16	☑
2	05;06;17;18	☐
3	07;08;19;20	☐
4	09;10;21;22	☑
5	11;12;23;24	☐
6	25;26	☐

However, before making connections between switches, pay attention to：

- The ports at both ends of a Port Aggregation connection must be configured as Aggregation Ports
- The ports at both ends of a Port Aggregation connection must have the same port properties, including Speed, Duplex mode
- All the ports of a Port Aggregation must to be treated as an integer when added to / deleted from a VLAN
- Spanning Tree Algorithm (STA) treats all the ports of a Port Aggregation as an integer.
- Before connecting cables between switches, enable the Pot Aggregation to avoid looping
- Before disabling Port Aggregation, remove the connecting cables between switches to avoid looping
- Both two slide-in slots should use the identical modules (two coppers / two fibers) otherwise the Port Aggregation connection is invalid
-

STA

The Spanning Tree Algorithm (STA) outlined in IEEE 802.1D can avoid network looping but coexist with linking backup. This feature permits STA-aware switches interact with each other. This can ensure only one route exists between any two devices on the network. If looping is detected (maybe implements on purpose for linking backup), looping ports will be blocked to discard additional route. If one using route fails, this Spanning Tree Algorithm automatically releases the blocking port and establishes connection with other devices.
Since a STA network has been established, all devices listen for Hello BPDUs (Bridge Protocol Data Units) sent from the Root Bridge. After the Max Age maximum time is up, the device supposes that the route to the Root Bridge is down. The devices initiate negotiations with each other to reconfigure the network for a valid topology.

Information

This screen displays summaries of STA information. For further configuration, please go to next session.

Spanning Tree

Name	Value
STA Bridge Protocol	IEEE802.1D
STA State	Enable
Designated Root	32768.200209181830
Bridge ID	32768.200209181830
Root Port	0

Ports

Port	Status	Priority	Path Cost	Designated ...	Forward Tra...	Designated ...	Designate ...	Designate ...
1	BROKEN	128	4	0	0	32768.200...	32768.200...	1
2	BROKEN	128	4	0	0	32768.200...	32768.200...	2
3	BROKEN	128	4	0	0	32768.200...	32768.200...	3
4	BROKEN	128	4	0	0	32768.200...	32768.200...	4
5	BROKEN	128	4	0	0	32768.200...	32768.200...	5
6	BROKEN	128	4	0	0	32768.200...	32768.200...	6
7	BROKEN	128	4	0	0	32768.200...	32768.200...	7
8	BROKEN	128	4	0	0	32768.200...	32768.200...	8
9	BROKEN	128	4	0	0	32768.200...	32768.200...	9
10	BROKEN	128	4	0	0	32768.200...	32768.200...	10
11	LISTENING	128	4	0	0	32768.200...	32768.200...	11
12	BROKEN	128	4	0	0	32768.200...	32768.200...	12

Parameter	**Description**
STA State	**S**hows if STA is enabled on the switch and participated an STA compliant network
Designated Root	**T**he unique Bridge Identifier of the Bridge recorded as the Root in the Configuration BPDUs transmitted by the Designated Bridge for the segment to which the port is attached
Bridged ID	**T**he MAC address used by this bridge when it must be referred to in a unique fashion. It is recommended that this be the numerically smallest MAC address of all ports that belong to this bridge. However it is only required to be unique
Root Port	**T**he port number of the port which offers the lowest cost path from this bridge to the root bridge
Max Age (6~40 sec)	**T**he maximum age of Spanning Tree Protocol information learned from the network on any port before it is discarded, in units of a second. This is the actual value that this bridge is currently using

Hello Time (1~10 sec)	The amount of time between the transmission of Configuration bridge PDUs by this node on any port when it is the root of the spanning tree or trying to become so, in units of a second. This is the actual value that this bridge is currently using
Hold Time	This time value determines the interval length during which no more than two Configuration bridge PDUs shall be transmitted by this node, in units of a second
Forward Delay (4~30 sec)	This time value, measured in units of a second, controls how fast a port changes its spanning state when moving towards the Forwarding state. The value determines how long the port stays in each of the Listening and Learning states, which precede the Forwarding state. This value is also used, when a topology change has been detected and is underway, to age all dynamic entries in the Forwarding Database
Root Path Cost	The cost of the path to the root device as seen from this bridge
Configuration Changes	The total number of topology changes detected by this bridge since the management entity was last reset or initialized
Last Topology Change	The time (in a second) since the last time a topology change was detected by the bridge entity

Configuration

Usage Enable / Disable this switch to join in / withdraw from a STA compliant network

Priority (1~65535) Priority is a decisive key for selecting root device, root port, and designated port. The smaller number, the higher priority. The device with the highest priority becomes the STA root device. However, if all devices have the same priority, the device with the lowest MAC address will become the root device

Hello Time (1~10sec) The amount of time between the transmission of Configuration bridge PDUs by this node on any port when it is the root of the spanning tree or trying to become so, in units of a second. This is the actual value that this bridge is currently using

Maximum Age (6~40sec) The maximum age of Spanning Tree Protocol information learned from the network on any port before it is discarded, in units of a second. This is the actual value that this bridge is currently using

Forward Delay (4~30sec) This time value, measured in units of a second, controls how fast a port changes its spanning state when moving towards the Forwarding state. The value determines how long the port stays in each of the Listening and Learning states, which precede the Forwarding state. This value is also used, when a topology change has been detected and is underway, to age all dynamic entries in the Forwarding Database

STA Port Configuration

Priority The value of the priority field which is contained in the first (in network byte order) octet of the (2 octet long) Port ID

Path Cost The contribution of this port to the path cost of paths towards the spanning tree root, which include this port. 802.1D-1990 recommends that the default value of this parameter be in inverse proportion to the speed of the attached LAN

Fast Forward The device omits from the 4 steps (Blocking-Listening-**Learning**-Forwarding) to 3 steps (Blocking-Listening-Forwarding) for speeding up specified port to be running when STA topology has been changed

Port	Priority	Path Cost	Fast Forward
1	128	19	Disable
2	128	19	Enable
3	128	19	Disable
4	128	19	Disable
5	128	19	Enable
6	128	19	Enable
7	128	19	Enable
8	128	19	Disable
9	128	19	Disable
10	128	19	Enable
11	128	19	Disable
12	128	19	Enable
13	128	19	Disable

Priority

This switch supports IEEE802.1p CoS with 2-level priority. There are 8 traffic classes and 8 Service Rules in the Priority Map. When one packet carries with priority-tag, which has specified a CoS (Class of Service) comes into the switch, the specified CoS tag will determine what priority (Low / High) will it get according to the Priority Map in the switch.

Service Rule

FIFO	The first in packet, the first out packet **(No priority)**
1：1	Send 1 high priority packet, then 1 low priority packet
2：1	Send 2 high priority packets, then 1 low priority packet
3：1	Send 3 high priority packets, then 1 low priority packet
4：1	……..
5：1	……..
6：1	……..
7：1	Send 7 high priority packets, then 1 low priority packet

Address Table

The address table is the learning table, which is composed of many entries and is the most important base to do packet filtering and forwarding.

MAC Address List

Choose the port you preferred to view the address table and click “Refresh” button, the MAC address table will be list.

Configuration

Dynamic Address Counts	Number of MAC addresses automatically learned by the current clustering switch
Static Address Counts	Number of MAC addresses manually added to the current clustering switch

To add a static address

1. Click the combo box and select a port, then the MAC address table of the port appears
2. Fill in configuration value (VLAN ID, MAC address), then click “<<Add” button (Note that ports on the switch are all default to VLAN 1)

Note：

The ports of Port Aggregation Group can not be added in Static Address table

To remove a static address

1. Click the static address in the MAC address table of the port
2. Click “Remove>>” button to remove it from MAC address table

Mirror

Port mirror is used to mirror traffic from source port to a target port for analysis. Only 2 ports can be monitored (mirrored) simultaneously to 1 sniffer port (target port). (Note that the target port must be in the same VLAN as the source port)

1. Click “Active” radio button to activate port mirror
2. Select ‘Monitored Ports’ (up to 2 ports)
3. Click ‘Sniffer Port’ combo box and select a sniffer port (target port) and click “Apply” to apply
4. This figure describes port 2 and port 3 will be mirrored to port 11

6. Product Specifications

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX / 100BASE-FX IEEE802.3x full-duplex operation and flow control IEEE802.3ab 1000BASE-T IEEE802.3z 1000BASE-SX IEEE802.1Q VLAN interoperability IEEE802.1p Priority Operation
Interface	24 * 10 / 100Mbps auto MDI / MDI-X RJ-45 switching ports 2 * slide-in slots for optional gigabit copper / fiber modules 1 * 100Mbps slide-in slot for optional fiber module and alternative to port 1 1 * RS-232 console port 1 * system reset button 2 * RJ-45 connectors for proprietary management bus 1 * HUB ID rotary switch
Cable Connections	RJ-45 (10BASE-T): Category 3,4,5 UTP / STP RJ-45 (100BASE-TX): Category 5 UTP / STP RJ-45 (1000BASE-T): Category 5, 5e UTP / STP 100Mbps fiber: 62.5 / 125 or 50 / 125µm multi-mode fiber optic 1000Mbps fiber: 62.5 / 125 or 50 / 125µm multi-mode fiber optic
Network Data Rate	10 / 100 / 1000Mbps Auto-negotiation
Transmission Mode	10 / 100Mbps Full-duplex, Half-duplex 1000Mbps Full-duplex

LED indications	System Power; RTC; Status 0; Status 1; Link (management stack) 10/100Mbps Port SEED; ACT Slide-in slot LINK; ACT
Memory	6K MAC entries 3Mbit packet switching
Emission	FCC Class A, CE
Operating Temperature	0^0 ~ 50^0C (32^0 ~ 122^0F)
Operating Humidity	10% - 90%
Power Supply	100~240 VAC, 50~60 Hz