

# VigorSwitch G1280

Web Smart Gigabit Switch



Your reliable networking solutions partner

# User's Guide

## VigorSwitch G1280 24 Ports + 4 Combo UTP/SFP Ports Web Smart Gigabit Switch User's Guide

Version: 1.0 Firmware Version: V2.1.0 (For future update, please visit DrayTek web site) Date: December 19, 2017

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More update, please visit www.draytek.com.

## Table of Contents

Part I Introduction	1
I-1 Introduction	2
I-1-1 Key Features	2
I-1-2 Specifications	3
I-1-3 Packing List	4
I-1-4 LED Indicators and Connectors	4
I-2 Installation	6
I-2-1 Typical Applications	6
I-2-2 Installing Network Cables	10
I-2-3 Configuring the Management Agent of Switch	10
I-2-4 Managing VigorSwitch G1280 through Ethernet Port	10
I-2-5 IP Address Assignment	11
I-3 Accessing Web Page of VigorSwitch	14
I-4 Dashboard	15
I-5 Status	16
I-5-1 Port Bandwidth Utilization	16
I-5-2 LLDP Statistics	17
Part II Switch LAN	19
II-1 General Setup	20
II-1-1 IP Address	20
II-1-2 IPv6 Address	21
II-1-3 Management VLAN	22
II-2 Port Setting	23
II-3 Mirror	25
II-4 Link Aggregation	26
II-4-1 LAG Setting	26
II-4-2 LAG Management	27
II-4-3 LAG Port Setting	28
II-4-4 LACP Setting	29
II-4-5 LACP Port Setting	30
II-5 VLAN Management	31
II-5-1 Create VLAN	31
II-5-2 Interface Settings	32
II-5-3 Voice VLAN	33
II-5-3-1 Properties	
II-5-3-2 Telephony OUI Setting	
- II-6 EEE	37
II-7 Multicast	38

	II-7-1 Properties	
	II-7-2 IGMP Snooping	
	II-7-2-1 IGMP Setting	
	II-7-2-2 IGMP Querier Setting II-7-2-3 IGMP Static Group	
	II-7-2-4 IGMP Group Table	
	II-7-2-5 IGMP Router Table	
	II-8 Jumbo Frame	
	II-9 STP	
	II-9-1 Properties	
	II-9-2 Port Setting	
	II-9-3 Bridge Setting	
	II-9-4 Port Advanced Setting	
	II-9-5 Statistics	
	II-10 MAC Address Table	
	II-10-1 Static MAC Setting	
	II-10-2 Dynamic Address Setting	
	II-10-3 Dynamic Learned	
Dart I	III Security	55
raiti		
	III-1-1 Properties	
	III-1-2 Port Setting	
	III-2-1 Properties	
	III-2-2 DoS Port Setting	
Part I	IV QoS Configuration	61
	IV-1 General	
	IV-1-1 Properties	
	IV-1-1-1 QoS General Setting	
	IV-1-1-2 Trust Ports	
	IV-1-2 Port Settings	
	IV-1-3 Queue Settings	
	IV-1-4 CoS Mapping	
	IV-1-5 DSCP Mapping	
	IV-1-6 IP Precedence Mapping	
	IV-2 Bandwidth	
	IV-2-1 Ingress Rate Limit	
	IV-2-2 Egress Shaping Rate	71
	IV-2-3 Egress Shaping Per Queue	
Part V	V System Maintenance	73
	- V-1 LLDP	

V-1-1 Properties	74
V-1-2 LLDP Port Setting	75
V-1-3 LLDP Local Device	76
V-1-4 LLDP Remote Device	77
V-1-5 LLDP Overloading	
V-2 SNMP	
VI-2-1 Properties	80
V-2-2 SNMP Community	81
V-2-3 SNMP Trap Host	
V-3 Access Manager	83
V-4 Time and Date	
VI-4-1 System Time Zone	
V-4-2 Time	85
V-5 Backup Manager	
V-6 Upgrade Manager	
V-7 Account Manager	
V-8 Factory Default	89
V-9 Reboot Switch	90
Part VI Diagnostics	91
VI-1 Cable Diagnostics	
VI-2 Ping Test	
VI-3 SysLog	
VI-3-1 SysLog Explorer	
VI-3-2 SysLog Settings	
VI-3-2-1 SysLog Service	
VI-3-2-2 Local SysLog VI-3-2-3 Remote SvsLog	
Appendix: Reference	
A-1 What's the Ethernet	
A-2 Media Access Control (MAC)	102
A-3 Flow Control	106
Index	109

# Part I Introduction

VigorSwitch G1280 User's Guide

## **I-1 Introduction**

24 ports + 4 Combo UTP/SFP ports, Gigabit Ports Web Smart Switch is a standard switch that meets all IEEE 802.3/u/x/z Gigabit, Fast Ethernet specifications. The switch has 24 10/100/1000Mbps TP ports. It supports telnet, http, https, SSH and SNMP interface for switch management. The network administrator can logon the switch to monitor, configure and control each port's activity. In addition, the switch implements the QoS (Quality of Service), VLAN, and Trunking. It is suitable for office application.

Vigor switch supports IEEE 802.3az, Energy-Efficient Ethernet, and provides power saving feature. It can efficiently save the switch power with auto detect the client idle and cable length to provide different power.

1000Mbps SFP Fiber port fully complies with all IEEE 802.3z and 1000Base-SX/LX standards.



#### I-1-1 Key Features

Below shows key features of this device:

#### QoS

The switch offers powerful QoS function. This function supports 802.1p VLAN tag priority and DSCP on Layer 3 of network framework.

#### VLAN

Support Port-based VLAN and IEEE802.1Q Tag VLAN. Support 24 active VLANs and VLAN ID  $1{\sim}4094.$ 

#### Port Trunking

Allows one or more links to be aggregated together to form a Link Aggregation Group by the static setting.

#### **Power Saving**

The Power saving using the IEEE 802.3az, Energy-Efficient Ethernet to detect the client idle and cable length automatically and provides the different power. It could efficient to save the switch power and reduce the power consumption.

## I-1-2 Specifications

The VigorSwitch G1280, a standalone off-the-shelf switch, provides the comprehensive features listed below for users to perform system network administration and efficiently and securely serve your network.

#### Hardware

- ✤ 24 10/100/1000Mbps Auto-negotiation Gigabit Ethernet UTP ports
- Jumbo frame support 9KB
- ✤ 4 UTP/SFP Combo Ethernet Ports
- Programmable classifier for QoS (Layer 2/Layer 3)
- ✤ 8K MAC address and support VLAN ID(1~4094)
- Per-port shaping, policing, and Broadcast Storm Control
- Power Saving with IEEE 802.3az, Energy-Efficient Ethernet
- Full-duplex flow control (IEEE802.3x) and half-duplex backpressure
- Extensive front-panel diagnostic LEDs; Power, System
- Hardware reset button for resetting configuration to factory default by pressing over 5 seconds

#### Management

- Supports per port traffic monitoring counters
- Supports a snapshot of the system Information when you login
- Supports port mirror function
- Supports the static trunk function
- Supports 802.1Q VLAN
- Supports user management and limits three users to login
- ✤ Maximal packet length can be up to 9600 bytes for jumbo frame application
- Supports Broadcasting Suppression to avoid network suspended or crashed
- Supports to send the trap event while monitored events happened
- Supports default configuration which can be restored to overwrite the current configuration which is working on via Web UI and Reset button of the switch
- Supports on-line plug/unplug SFP modules
- Supports Quality of Service (QoS) for real time applications based on the information taken from Layer 2 to Layer 3
- Built-in web-based management and CLI management, providing a more convenient UI for the user

#### I-1-3 Packing List

Before you start installing the switch, verify that the package contains the following:

- VigorSwitch G1280
- ✤ AC Power Cord
- Quick Start Guide
- Rubber feet
- Rack mount kit

Please notify your sales representative immediately if any of the aforementioned items is missing or damaged.

## I-1-4 LED Indicators and Connectors

Before you use the Vigor device, please get acquainted with the LED indicators and connectors first. There are 8 Ethernet ports and SFP ports on the front panel of the switch. LED display area, locating on the front panel, contains an ACT, Power LED and ports working status of the switch.

#### **LED Explanation**

RJ45 LNK/ACT Port 1 to	Port 24	Combo Port 🗕	$\neg$	SFP LNK/ACT
WigorSwitch G1280 Web Struer Gige Law				20 - 10000 - 10000 - 10000

LED	Color	Explanation
	On (Green)	The switch finishes system booting and the system is ready.
SYS	Blinking (Green)	The switch is powered on and starts system booting.
	Off	The power is off or the system is not ready / malfunctioning.
D\\/D	On (Green)	The device is powered on and running normally.
FVVK	Off	The device is not ready or is failed.
RJ 45	On (Green)	The device is connected with 1000Mbps.
LNK/ACT Port 1 ~ 24	On (Amber)	The device is connected with 10/100Mbps.
	Blinking	The system is sending or receiving data through the port.
	Off	The port is disconnected or the link is failed.
Combo for	On (Green)	The device is connected with 1000Mbps.
Port 25 ~ 28	On (Amber)	The device is connected with 10/100Mbps.

(RJ 45 LNK/ACT)	Blinking	The system is sending or receiving data through the port.
	Off	The port is disconnected or the link is failed.
SFP LNK/ACT	On (Green)	The device is connected with 1000Mbps.
	On (Amber)	The device is connected with 10/100Mpps.
	Blinking	The system is sending or receiving data through the port.
	Off	The port is disconnected or the link is failed.

## **Connector Explanation**

Interface	Description
RJ 45 LNK/ACT Port 1 ~ 24	Port 1 to Port 24 can be used for Ethernet connection and PoE connection, depending on the device connected.
SFP LNK/ACT Port 25 ~ 28	Port 25 to Port 28 are used for fiber connection.
-	Power inlet for AC input (100~240V/AC, 50/60Hz).

Power Output	 IEEE 802.3af Max. 15.4W Output Supported;
·	IEEE 802.3at Max. 30W Output Supported

PoE Power Budget -- 340 Watts (Max)

## **I-2 Installation**

## I-2-1 Typical Applications

The VigorSwitch implements 24 Gigabit Ethernet TP ports with auto MDIX and four slots for the removable module supporting comprehensive fiber types of connection, including LC and BiDi-LC SFP modules. The switch is suitable for the following applications:

#### Case 1: All switch ports are in the same local area network.

Every port can access each other. (\*The switch image is sample only.)



If VLAN is enabled and configured, each node in the network that can communicate each other directly is bounded in the same VLAN area.

Here VLAN area is defined by what VLAN you are using. The switch supports both port-based VLAN and tag-based VLAN. They are different in practical deployment, especially in physical location. The following diagram shows how it works and what the difference they are.

#### Case 2: Port-based VLAN -1 (\*The switch image is sample only.)



The same VLAN members could not be in different switches.

- Every VLAN members could not access VLAN members each other.
- The switch manager has to assign different names for each VLAN groups at one switch.

# VLAN1 VLAN2 VLAN3 VLAN4

#### Case 3: Port-based VLAN - 2

- VLAN1 members could not access VLAN2, VLAN3 and VLAN4 members.
- VLAN2 members could not access VLAN1 and VLAN3 members, but they could access VLAN4 members.
- ✤ VLAN3 members could not access VLAN1, VLAN2 and VLAN4.
- VLAN4 members could not access VLAN1 and VLAN3 members, but they could access VLAN2 members.

#### Case 4: The same VLAN members can be at different switches with the same VID



#### **Case 5: Desktop Installation**

- 1. Install the switch on a level surface that can support the weight of the unit and the relevant components.
- 2. Plug the switch with the female end of the provided power cord and plug the male end to the power outlet.

#### Case 6: Rack-mount Installation

The switch may be standalone, or mounted in a rack. Rack mounting facilitate to an orderly installation when you are going to install series of networking devices.

Procedures to Rack-mount the switch:

- 1. Disconnect all the cables from the switch before continuing.
- 2. Place the unit the right way up on a hard, flat surface with the front facing 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 rack and secure with suitable screws.
- 7. Reconnect all the cables.

#### Case 7: Central Site/Remote site application is used in carrier or ISP



Case 8: Peer-to-peer application is used in two remote offices



Case 9: Office network



## I-2-2 Installing Network Cables

Crossover or straight-through cable: All the ports on the switch support Auto-MDI/MDI-X functionality. Both straight-through or crossover cables can be used as the media to connect the switch with PCs as well as other devices like switches, hubs or router.

Category 3, 4, 5 or 5e, 6 UTP/STP cable: To make a valid connection and obtain the optimal performance, an appropriate cable that corresponds to different transmitting/receiving speed is required. To choose a suitable cable, please refer to the following table.

Media	Speed	Wiring
10/100/1000	10 Mbps	Category 3,4,5 UTP/STP
Mbps copper	100Mbps	Category 5 UTP/STP
	1000 Mbps	Category 5e, 6 UTP/STP

## I-2-3 Configuring the Management Agent of Switch

Users can monitor and configure the switch through the following procedures.

Configuring the Management Agent of VigorSwitch G1280 through the Ethernet Port.

There are several ways to configure and monitor the switch through Ethernet port, includes Web-UI and SNMP.



## I-2-4 Managing VigorSwitch G1280 through Ethernet Port

Before start using the switch, the IP address setting of the switch should be done, then perform the following steps:

1. Set up a physical path between the configured the switch and a PC by a qualified UTP Cat. 5e cable with RJ-45 connector.

**Note:** If PC directly connects to the switch, you have to setup the same subnet mask between them. But, subnet mask may be different for the PC in the remote site. Please refer to the above figure about the Web Smart Switch default IP address information.

2. After configuring correct IP address on your PC, open your web browser and access switch's IP address.

Default system account is "admin", with password "admin" in default. Switch IP address is "192.168.1.224" by default with DHCP client enabled.

## I-2-5 IP Address Assignment

For IP address configuration, there are three parameters needed to be filled in. They are IP address, Subnet Mask, Default Gateway and DNS.

#### IP address:

The address of the network device in the network is used for internetworking communication. Its address structure looks is shown below. It is "classful" because it is split into predefined address classes or categories.

Each class has its own network range between the network identifier and host identifier in the 32 bits address. Each IP address comprises two parts: network identifier (address) and host identifier (address). The former indicates the network where the addressed host resides, and the latter indicates the individual host in the network which the address of host refers to. And the host identifier must be unique in the same LAN. Here the term of IP address we used is version 4, known as IPv4.



32 bits

With the classful addressing, it divides IP address into three classes, class A, class B and class C. The rest of IP addresses are for multicast and broadcast. The bit length of the network prefix is the same as that of the subnet mask and is denoted as IP address/X, for example, 192.168.1.0/24. Each class has its address range described below.

#### Class A:

Address is less than 126.255.255.255. There are a total of 126 networks can be defined because the address 0.0.0.0 is reserved for default route and 127.0.0.0/8 is reserved for loopback function.



#### Class B:

IP address range between 128.0.0.0 and 191.255.255.255. Each class B network has a 16-bit network prefix followed 16-bit host address. There are 16,384 (2<sup>14</sup>)/16 networks able to be defined with a maximum of 65534 (2<sup>16</sup>-2) hosts per network.

Bit #	01 2	15	16	31
	10			
	Net	work address	Host address	

#### Class C:

IP address range between 192.0.0.0 and 223.255.255.255. Each class C network has a 24-bit network prefix followed 8-bit host address. There are 2,097,152 (2^21)/24 networks able to be defined with a maximum of 254 (2^8 -2) hosts per network.

```
Bit # 01 2 3 23 24 31
```

Natural allows	
Network address	Host address

#### Class D and E:

Class D is a class with first 4 MSB (Most significance bit) set to 1-1-1-0 and is used for IP Multicast. See also RFC 1112. Class E is a class with first 4 MSB set to 1-1-1-1 and is used for IP broadcast.

According to IANA (Internet Assigned Numbers Authority), there are three specific IP address blocks reserved and able to be used for extending internal network. We call it Private IP address and list below:

Class A	10.0.0.0 10.255.255.255
Class B	172.16.0.0 172.31.255.255
Class C	192.168.0.0 192.168.255.255

Please refer to RFC 1597 and RFC 1466 for more information.

#### Subnet mask:

It means the sub-division of a class-based network or a CIDR block. The subnet is used to determine how to split an IP address to the network prefix and the host address in bitwise basis. It is designed to utilize IP address more efficiently and ease to manage IP network.

For a class B network, 128.1.2.3, it may have a subnet mask 255.255.0.0 in default, in which the first two bytes is with all 1s. This means more than 60 thousands of nodes in flat IP address will be at the same network. It's too large to manage practically. Now if we divide it into smaller network by extending network prefix from 16 bits to, say 24 bits, that's using its third byte to subnet this class B network. Now it has a subnet mask 255.255.255.0, in which each bit of the first three bytes is 1. It's now clear that the first two bytes is used to identify the class B network, the third byte is used to identify the subnet within this class B network and, of course, the last byte is the host number.

Not all IP address is available in the sub-netted network. Two special addresses are reserved. They are the addresses with all zero's and all one's host number. For example, an IP address 128.1.2.128, what IP address reserved will be looked like? All 0s mean the network itself, and all 1s mean IP broadcast.



In this diagram, you can see the subnet mask with 25-bit long, 255.255.128, contains 126 members in the sub-netted network. Another is that the length of network prefix equals the number of the bit with 1s in that subnet mask. With this, you can easily count the number of IP addresses matched. The following table shows the result.

Prefix Length	No. of IP matched	No. of Addressable IP
/32	1	-
/31	2	-
/30	4	2
/29	8	6
/28	16	14
/27	32	30
/26	64	62
/25	128	126
/24	256	254
/23	512	510
/22	1024	1022
/21	2048	2046
/20	4096	4094
/19	8192	8190
/18	16384	16382
/17	32768	32766
/16	65536	65534

According to the scheme above, a subnet mask 255.255.255.0 will partition a network with the class C. It means there will have a maximum of 254 effective nodes existed in this sub-netted network and is considered a physical network in an autonomous network. So it owns a network IP address which may looks like 168.1.2.0.

With the subnet mask, a bigger network can be cut into small pieces of network. If we want to have more than two independent networks in a worknet, a partition to the network must be performed. In this case, subnet mask must be applied.

For different network applications, the subnet mask may look like 255.255.255.240. This means it is a small network accommodating a maximum of 15 nodes in the network.

For assigning an IP address to the switch, you just have to check what the IP address of the network will be connected with the switch. Use the same network address and append your host address to it.

- First, IP Address: as shown above, enter "192.168.1.224", for instance. For sure, an IP address such as 192.168.1.x must be set on your PC.
- Second, Subnet Mask: as shown above, enter "255.255.255.0". Choose a subnet mask suitable for your network.

Note: The DHCP Setting is enabled in default. Therefore, if a DHCP server presented on network connected to the switch, check before accessing your switch is essential.

## I-3 Accessing Web Page of VigorSwitch

- 1. Open any browser (e.g., Firefox) and type "192.168.1.224" as URL.
- 2. Please type "admin/admin" as the Username/Password and click Login.

<b>Dray</b> Tek	VigorSwitch G1280
Login	
User	admin
Password	
	Login

3. Now, the Main Screen will appear.

n Logout : 3 min . 🕷		Admit						00.42.02	
initesiin)	2				Dashboard				
bus -	CRefresh								
itch LAN -	-	-			Contractor in			-	
unty -		mayies							
		Viged-etc: 01295	1 11/11				# <b>44</b> # <b>28</b>		
em Maintenance -								-	
nostico -		Device Information	6			Systems int	otmatian		
	Model	VigotSiwitch	61290	CPU Usage	0	Memory	Usage 47% 20%		
	Firmware	21.0			(1.)		Memory Cached		
	Loader	1.0.1			$\sim$				
	Révisión	465							
	Build Date	2017-08-31	15.02:49						
	System Time	2000-01-01	08.41:57						
	System Up Time	Ú Days Ú.41	57						
	_	_	_						
					Lonnection Blatu	5			
	IPV4 IPV5								
	System Name	Location	Contact	MAC	Protocol	IP.	Gateway	DNS	Modify
	01200	Transit	metaliti	0015440000000	DHCR	1071891150	107100110021001100	19888	1



The DHCP Setting is enabled in default. Therefore, if a DHCP server presented on network connected to VigorSwitch, checking before accessing VigorSwitch is essential.

## I-4 Dashboard

Click **Dashboard** from the main menu on the left side of the main page.

Auto Logout :	3 min	×	
Dashboard			I
Status		*	Ľ
Switch LAN		*	
Security		Ŧ	

A web page with default selections will be displayed on the screen. Refer to the following figure:

				Dashboard						
C Refresh										
	Dray Tek VigorSwitch G1280 Web Sever Cap Switch	-1			19 19 29 27 24 19 19 19 20 19 14 19 19 21 29 19 17 19 21 29		<ul> <li>Normal</li> <li>Normal</li> </ul>			
	Device Information	n			System In	formation				
Model	VigorSwitc	h G1280	CPU Usage		Memory	Usage 47% 20%				
Firmware	2.1.0			(1%)		Memory Cached				
Loader	1.0.1									
Revision	455									
Build Date	2017-08-3	1 18:02:49								
System Time	2000-01-0	1 08:41:57								
System Up Time	0 days 0:41	1:57								
				Occurrent on Otob						
				Connection Statu	8					
IPv4 IPv6										
rstern Name	Location	Contact	MAC	Protocol	IP	Gateway	DNS	Modify		
1280	Default	Default	00:1D:AA:00:00:00	DHCP	192.168.1.129	192.168.1.1 192.168.1.254	8.8.8.8	•		

## I-5 Status

#### I-5-1 Port Bandwidth Utilization

This page offers the traffic statistics inlcuding data information and data of interframe gap for each port (GE1 to GE28). In which, data of interframe gap can be displayed or hidden by choose Enable / Disable for IFG.

Auto Logosti : Um 38						admin																				-0314	6)64	G	
Dashboard	O 80	du i -	PortBa	and and	en Ohio	novon -	PortB	ARCHI	sth Vris	Dano(-		-																	
dbale?	Port	Gender	NIN LUIS	Police																									
You Barowork Millouler					-	-			-	_	_	-	_				_	_	_	_		_	_	_		-			-
LLDP Statistics	Auto R	tefrest	12 2	z Sec			- 1	FG:	Enab	08		-																	
Switch LAN																													
Security -	•	7bps		TUOM	bps	• 31	Mbps		Link D	0WD																			
QnS -	10%														AN .														
System Maintenance -	30% - 70%																												
Disposities -	50% 50% 40% 30% 30% 30% 10% 0%																												
	20% 70% 30% - 70% 50% 40% 70% 70% 10% 0%	967	£3.	63	Sec	022 2	QE0-	62	89°	969	E.o.	"IN	Cete.	CE 13	Per.	CEIG	Reto.	CE17	Rens.	CE10	- Co.	10	ġ.	63	En.	E.	69.	Ø	
	6.6.2	130	ġ.	es.		100	Gee.	6	. 830	3	SELO.	1130	Cele.	Gen3	SEN.	Sere.	OEle-	1/30	Gene-	GE13	Co.	8	S.	2	Ser.	100	En.	ŝ	Pee.

## I-5-2 LLDP Statistics

This page offers the statistics of LLDP packets (in, out and error) of each port (GE1 to GE28).

Auto Logosals 🛛 🖉 🖉	-	_	(anifa)					DIL 47 46	
Dashboard	O Etalius	= LLOP Ristration = 1	I L P Stanson	1				0.00	
Shalary F		in the second							
Port Bandwidth Utilization	CLUP SI8	ninta							
11 D.F. Stalinhing	1				LLDP Global Stalis	lies			
Switch LAN	-								
Becurity +	Retret	sh OClear All							
205	Insertions		_						_
lystem Maintenance -	Deletions								
Disgnostics -	Drone								
	Anno Ouder								
	Age Outs								
					LLDP Port Statisti	ĊĠ			
	Port	TX Frames Total	RX Frames Total	RX Frames Discarded	RX Frames Errors	RX TLVs Discarded	PX TLVs Unrecognized	RX Ageouts Total	
	GE1	Ū	U	U.	ū.	ū	Ū.	ū.	
	GE2	84	93	U.	a	ū	ū	ū.	
	GE3	0	n	D	0	n	0	0	
	OE4	Û.	0	0	ø	0	0	0	
	OE5	D.	0	U .	U .	u .	U	U	
	0E6	0	0	п	0	n	0	a.	
	057	0	D	5	D.	0	n	a	

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# Part II Switch LAN

VigorSwitch G1280 User's Guide

## **II-1 General Setup**

General setup is used to configure settings for the switch network interface and offers how the switch connects to a remote server to get services.

#### II-1-1 IP Address

Use the IP Address screen to configure the switch IP address and the default gateway device. The gateway field specifies the IP address of the gateway (next hop) for outgoing traffic.

The switch needs an IP address for it to be managed over the network. The factory default IP address is 192.168.1.224. The subnet mask specifies the network number portion of an IP address. The factory default subnet mask is 255.255.255.0.

1

Info

If VigorSwitch has connected to Vigor router, it will use the IP address obtained from the DHCP server on Vigor router. Thus, the user must type the assigned IP as URL for accessing into the web user interface of VigorSwitch. If not, 192.168.1.224 shall be the default IP.

Anto Logout : 🛛 🖉	eumin		(1) 28 21 🕞
Dashboard Status -	<ul> <li>General Sature &gt; IP Address &gt; IF Address</li> </ul>		
Switch LAN	Mode:	Static O DHCP	
IP Aldana	IP Address:	192.165.1.10	
IPI6 Address	Subnet Mask:	255 256 256 0	
Port Setting Million	Gateway: DNS Server 1:	192 168 1.4	
Link Aggregation VLAN Management	DNS Server 2:		
EEE Multicest	- Antion -		
Jumbo Frame			
MAC Address Table			
Security - QoS -			

Item	Description
Mode	Select the mode of network connection. Static- Use static IPv4 address. DHCP Use DHCP provisioned IP address and Catoway if
	feasible.
IP Address	It is available when <b>Static</b> is selected as <b>Mode</b> . Enter the IP address of your switch in dotted decimal notation for example 192.168.1.224. If static mode is enabled, enter IP address in this field.
Subnet Mask	It is available when <b>Static</b> is selected as <b>Mode</b> . Enter the IP subnet mask of your switch in dotted decimal

	notation for example 255.255.255.0. If static mode is enabled, enter subnet mask in this field.
Gateway	It is available when Static is selected as Mode. Enter the IP address of the gateway in dotted decimal notation. If static mode is enabled, enter gateway address in this field.
DNS Server 1	It is available when Static is selected as Mode. If static mode is enabled, enter primary DNS server address in this field.
DNS Server 2	It is available when <b>Static</b> is selected as <b>Mode</b> . If static mode is enabled, enter secondary DNS server address in this field.
Apply	Save the settings or changes to the switch.

## II-1-2 IPv6 Address

Use the IPv6 Address screen to configure the switch IPv6 address and the default gateway device. The gateway field specifies the IPv6 address of the gateway (next hop) for outgoing traffic.

Auto Logout : 👌 🦉	Sdmin				01,24:65	B
Dashboard	🗿 General Belup. «TPVL Address. » IPvG Address	0				
Status	IPv6 Address;					
Switch (1974)	A State and a	and the second				
Seneral Setup	Auto Cunfiguration:	Trable Obisable				
IP Address	IPv6 Address:	2001 b031 7008 mi0 21d autraintic	4	D.4		
IPv8 eindurm	Link Local Address:	fe60.:21 d:saff.fe00.0	4	54		
Management VLAN	Gatewayc.					
Port Setting	DHCPv6 Client:	OEnable @Disable				
Mirror		and the second				
Link Aggregation	ADDM					
VLAN Management						
EEE						
Multicast						
Jumpo Frame						
STP						
MAC Address Table						
security						
onS .						
System Maintenance						
Jiagnostice						

Item	Description
Auto Configuration	Enable - Check it to let switch automatically configure IPv6 address.
IPv6 Address	It is available when Auto Configuration is Disable. Enter the IPv6 address of your switch. If auto configuration mode is disabled, enter IPv6 address in this field.
Link Local Address	It is available when <b>Auto Configuration</b> is <b>Disable</b> . Type
Gateway	It is available when Auto Configuration is Disable.

	Enter the IPv6 address of the router as your default IPv6 gateway to access IPv6 Internet or other IPv6 network.
DHCPv6 Client	Enable this feature if there is a DHCPv6 server on your network for assigning IPv6 Address, instead of using Router Advertisement.
Apply	Save the settings or changes to the switch.

## II-1-3 Management VLAN

This page allows users to change the VLAN ID of management access. Management access protocols such as http, https, SNMP and etc., are only accessible from the VLAN specified as management VLAN.

Auto Logout : 🛛 🕅 🦉	Admin		11.34.45 🕞
Dashboard	General Satup > Management VLAN > Man	angeweent VI.AN Selfing	
Status	Management VLAN Setting		
General Setup	Management VLAN:	default(1)	
IF Address	Annie	default(1)	
IPV6 Address	- Andrew -		
Port Setting			
Mirror			
Link Aggregation			
VLAN Management			
EEE			
Multicast			
Jumbo Frame			
STP			
MAC Address Table			
Security	*		
QoS-	-		

Item	Description
Management VLAN	Select the VLAN ID as management VLAN. You can create additional VLAN profiles by Switch LAN>>VLAN management>> Create VLAN.
Apply	Save the settings or changes to the switch.

## **II-2 Port Setting**

Port Setting is used to configure settings for the switch ports, trunk, Layer 2 protocols and other switch features.

Auto Logout : 02	1								nizitzi 🕒
Dashboard		Switch LAN - Port Se	may - Post Selling						
Status		Part Damas							
Switch LAW	+	Furtheanig							
General Setup		Ports:		Hatting available a				+	
		Enable	State:	Enable      Disable					
Mirror		Speed:		Auto				1.4	
Link Aggnegation		Duplex	0	Auto				3.1	
A.AN Management		Flow Co	ontrol:	OEnable ODisable					
EE				Grand Grand	Annie				
Multicast					Charles	¢			
Jumbo Frame		Port Descriptio	n Enable State	Link Status	Speed	Duplex	FlowCtrl Config	FlowCtrl Status	Modify
ste		GE1	Enabled	Dident	Auto	Buto	Enabled	Disabled	0
MAC Address Table		GE2	Enabled	Up	Auto(1000M)	Auto(Full)	Enabled	Enabled	0
ecurity	÷	9E3	Enabled	Down	Auto	Auto	Enabled	Disabled	0
08		GE4	Enabled	Down	Auto	Auto	Enabled	Disabled	0
ystem Maintenance	÷	QE5	Enabled	Down	Auto	Auto	Enabled	Disabled	
lagnostics	-	QE6	Enabled	Down	Auto	Auto	Enabled	Disabled	۲
		GE?	Enabled	Down	Auto	Auto	Enabled	Disabled	0
		GES	Enabled	Down	Auto	Auto	Enabled	Disabled	0
		0E9	Enabled	Down	Auto	Auto	Enabled	Disabled	0
		GE10	Enabled	Dawn	Auto	oluA	Enabled	Disabied	0

Item	Description
Ports	Use the drop down list to select one or more LAN port(s).
Enable State	Enable -Click it to enable the port.
	Disable - Click it to disable the port.
Speed	Port speed capabilities:
	• Auto: Auto speed with all capabilities.
	• Auto-10M: Auto speed with 10M ability only.
	• Auto-100M: Auto speed with 100M ability only.
	• Auto-1000M: Auto speed with 1000M ability only.
	• Auto-10/100M: Auto speed with 10/100M ability.
	• 10M: Force speed with 10M ability.
	• <b>100M</b> : Force speed with 100M ability.
	• <b>1000M:</b> Force speed with 1000M ability.
	Selecting Auto (auto-negotiation) allows one port to negotiate with a peer port automatically to obtain the connection speed and duplex mode that both ends support. When auto-negotiation is turned on, a port on the switch negotiates
	with the peer automatically to determine the connection speed and duplex mode. If the peer port does not support auto-negotiation or turns off this feature, the switch determines the connection speed by detecting the signal on
	the cable and using half duplex mode. When the switch's auto-negotiation is turned off, a port uses the pre-configured speed and duplex mode when making a connection, thus requiring you to make sure that the settings of the peer port are the same in order to connect.

	For SFP fiber module, you might need to manually configure the speed to match fiber module speed.
Duplex	<ul> <li>Port duplex capabilities:</li> <li>Auto: Auto duplex with all capabilities.</li> <li>Half: Auto speed with 10/100M ability only.</li> <li>Full: Auto speed with 10/100/1000M ability only.</li> </ul>
Flow Control	A concentration of traffic on a port decreases port bandwidth and overflows buffer memory causing packet discards and frame losses. Flow Control is used to regulate transmission of signals to match the bandwidth of the receiving port. The switch uses IEEE802.3x flow control in full duplex mode and backpressure flow control in half duplex mode. IEEE802.3x flow control is used in full duplex mode to send a pause signal to the sending port, causing it to temporarily stop sending signals when the receiving port memory buffers fill. Back Pressure flow control is typically used in half duplex mode to send a "collision" signal to the sending port (mimicking a state of packet collision) causing the sending port to temporarily stop sending signals and resend later. Enable - Click it to enable such function. Disable - Click it to disable such function.
Apply	Save the settings or changes to the switch.

## **II-3 Mirror**

This section provides ability to mirror packets coming in or going out on any port to a destination port. Through the packet duplication in the destination port, this feature is convinent for system administrator to monitor / understand the traffic operation.

Auto Logout : Or 🛛 🗶 -		Aatrin			01:27.37	Ð
Dashboard	O BWICH LAN	Maren + Mara				
Status -	Mittor					
TelepLA1	-					
iGeneral Setup		Session ID:	4		•	
Port Setting		Monitor Session State:	Disable			
Mirror .	N 1	Destination Port:	061		1.4	
Link Aggregation		Allow Operation as Normal Port:	Desable			
VLAN Management		Soft Ports/RXI:	Nobility invicted		14	
EEE		Said Dante (This	During sailers of		1.1	
Multicarit		Shill Ports(TA):	consult connected			
Jumbo Frame	_		a ngui			
STP	Constant ID	Destination Dark	Personal Designation	Colle Hand college	Court Hand and Str.	
MAC Address Table	Sessionity	Destination Purt	Allow ingress	Shift Polits(PA)	Sold Ports(1A)	
Security *	-	NIA	NA	108	10A	
Qu\$ -	*	nem Alla	Pain	have been	100	
System Maintenance -	3	144	- NAA	Testa Auto	100	
Diagnostics -	1	PAR.	1404	Fain	PPA	

Session ID 1 to 4 can be enabled simultaneously and operate independently.

Item	Description
Session ID	Select the session ID (profile 1 to 4) of mirror operation you wish to configure.
Monitor Session State	Enable - Enable specified mirror session.
	Disable - Disable specified mirror session.
Destination Port	Specify the port where you wish to observe the mirrored packets.
Allow Operation as Normal Port	<ul><li>Enable - The destination port is able to function as a port connecting to network, communicating with other network devices.</li><li>Disable - Only observe the mirrored packets.</li></ul>
Sniff Ports (RX) / (TX)	Select the port(s) which you wish to mirror the traffic, Rx for mirror the packets into the port, Tx for mirror the packets going out from the port.
Apply	Save the settings or changes to the switch.

## **II-4 Link Aggregation**

LAG means Link Aggregation Group which groups some physical ports together to make a single high-bandwidth data path. Thus it can implement traffic load sharing among the member ports in a group to enhance the connection reliability.

## II-4-1 LAG Setting

This page allows to configure Load Balance Algorithm for Link Aggregation.

Auto Logout : Citr •	Admin		(11.67.0) C+
Dashboard	O Los Apprention > LAG Setting > LAG Setting	u.	
Status	-		
	Christian (		
General Setup	Load Balance Algorithm:	Mac Address	•
Port Setting	Apply	Mac Address	
Mirtor		IP/Mac Address	
Link Aggregation			
UAG Setting			
LACI Management			
LAG Port Setting			
LACP Setting			
LACP Port Selling			
VLAN Management			
EEE			
Multicast			
Jumbo Frame			

Item	Description
Load Balance Algorithm	Select your Load balance algorithm. MAC address - Aggregated group will balance the traffic based on different MAC addresses. Therefore, the packets from different MAC addresses will be sent to different links. IP/Mac Address - Aggregated group will balance the traffic based on MAC addresses and IP addresses. Therefore, the packets from same MAC addresses but different IP addresses will be sent to different links.
Apply	Save the settings or changes to the switch.

## II-4-2 LAG Management

There are eight LAG profiles allowed to group different physical ports (GE1 to GE28). The system will assign certain port(s) as Active Member and Standby Member according to the GE selections.

Auto Logout: Off	Ad	min				oejosie 🕞
Dashboard	O Link Aggregation - LAG Ma	nagement - LAG Manage	ement			
Status	-					
	ries are relieven.	_				
General Setup	LAG Description	Port Type	Link Status	Active Member	Standby Member	Modify
Port Setting	LAG1	4	Not Present			0
Mirror	LAG2	-	Not Present			0
Link Aggregation	LAG3	-	Not Present			0
LAG-Setting	LAG4	-	Not Present			0
	LAG5	-	Not Present			0
LAG Port Setting	LAG6	-	Not Present			0
LACP Setting	LAG7	-	Not Present			0
LACP Port Setting	LAGB	-	Not Present			0
VLAN Management						-
EEE						
Mutticast						
(manufactoria)						

Item	Description				
Description	Display the port description.				
Port Type	Display the type of the LAG.				
Link Status	Display LAG port link status.				
Active Member	Display active member ports of the LAG.				
Standby Member	Display inactive or candidate member ports of the LAG.				
Modify	It is used to edit the name, type and port number for each link aggregation profile.				
	<ul> <li>A G Description</li> <li>Edit LAG LAG1</li> <li>France</li>     &lt;</ul>				

## II-4-3 LAG Port Setting

This page defines port setting for each LAG profile (LAG1 to LAG8), including data speed and enabling/disabling the flow control.

Auto Logout : 211	Aamin						ayarsa 🕞
Dashboard	🕑 Link Aggregation is LAG Bork Setting is LAG P	w) Betting					
Status	-						
weith's LAS	LAU Port Setting						
General Setup	LAG:	LAG1, LAG2,	LAG3, LAG4, LAG5			•	
Port Setting	Enable:	Ename					
Mirror						81	
Link Aggregation	Speed:	Auto	Auto				
LAG Selling	Flow Control:	Enable				· ·	
LAG Management			Apply				
LACP seeing	LAG Description Port Type	Enable State	Link Status	Speed	Duplex	Flow Control C	Flow Control S
LACP Port Setting	LAG1 test1 Ethernet 1000M	Enable	Down	Auto(All)	Auto	Disable	Disable
VLAN Management	LAG2	Enable	Down	Auto(All)	Auto	Disable	Disalve
EEE	LAG3 -	Enable	Down	Auto(All)	Auto	Desable	Disable
Muticast	LAG4	Enable	Down	Auto(All)	Auto	Disable	Disable
Jumbo Prame	(465	Enishio	Down	AUTO(AID	Alen	Disable	Dicable

Item	Description
LAG	Use the drop down list to select one or more LAG profiles.
Enable	Enable -Click it to enable the profile. Disable - Click it to disable the profile.
Speed	<ul> <li>Port speed capabilities:</li> <li>Auto: Auto speed with all capabilities.</li> <li>Auto-10M: Auto speed with 10M ability only.</li> <li>Auto-100M: Auto speed with 100M ability only.</li> <li>Auto-1000M: Auto speed with 1000M ability only.</li> <li>Auto-10/100M: Auto speed with 10/100M ability.</li> <li>10M: Force speed with 10M ability.</li> <li>100M: Force speed with 100M ability.</li> <li>100M: Force speed with 100M ability.</li> <li>1000M: Force speed with 100M ability.</li> <li>Selecting Auto (auto-negotiation) allows one port to negotiate with a peer port automatically to obtain the connection speed and duplex mode that both ends support. When auto-negotiation is turned on, a port on the switch negotiates with the peer automatically to determine the connection speed and duplex mode. If the peer port does not support auto-negotiation or turns off this feature, the switch determines the connection speed by detecting the signal on the cable and using half duplex mode. When the switch's auto-negotiation is turned off, a port uses the pre-configured speed and duplex mode when making a connection, thus requiring you to make sure that the settings of the peer port are the same in order to connect.</li> <li>For SFP fiber module, you might need to manually configure the speed to match fiber module speed.</li> </ul>

Flow Control	A concentration of traffic on a port decreases port bandwidth and overflows buffer memory causing packet discards and frame losses. Flow Control is used to regulate transmission of signals to match the bandwidth of the receiving port. The switch uses IEEE802.3x flow control in full duplex mode and backpressure flow control in half duplex mode. IEEE802.3x flow control is used in full duplex mode to send a pause signal to the sending port, causing it to temporarily stop sending signals when the receiving port memory buffers fill. Back Pressure flow control is typically used in half duplex mode to send a "collision" signal to the sending port (mimicking a state of packet collision) causing the sending port to temporarily stop sending signals and resend later. Enable - Click it to enable such function. Disable - Click it to disable such function.
Apply	Save the settings or changes to the switch.

## II-4-4 LACP Setting

This page is used to enable or disable the LACP function.

Auto Logout : Off	kamin		09.04.42 🕞
Dashboard	O Link Appreciation + LACP Setting + LAC	P Setting	
Status	·		
	-	A LOUGH TO MANY	
General Setup	LACP:	Enable Disable	
Port Setting	System Priority;	32768	(1-65538)
Mirror	-		
Link Aggregation	- ALIAN		
LAG Setting			
LAG Management			
LAG Port Setting			
LACP Port Salbing			
VLAN Management			
EEE			
Mullicast			
Jumbo Frame			

Item	Description
LACP	Enable - Click it to enable such function. Disable - Click it to disable the function.
System Priority	The priority is used to determine which switch (local or remote) on the LAG connection is able to decide LACP activities. The lower the number is, the higher the priority for Vigorwitch will be. Therefore, the switch with the highest system priority (e.g., 1) can make decisions about which ports actively participate in LAG at a given time.
Apply	Save the settings or changes to the switch.

## II-4-5 LACP Port Setting

This section provides few detailed configuration regarding to Ports under LACP protocol.

Auto Lognal : 🖉 🗎	No.	Aamio			окрале 🕞
Dashboard	O LINN Apgregation	A FLACP Post Setting - LACP Ports	etteg		
Status	·				
Switch CAM	Ever Port Saming	-			
Serveral Setup	Por	ts:	Potrong strented	*	
Port Setting	Pric	orityc	1	ă	(1-65535)
ditror	Tim	eout:	Long		
ink Aggregation					
LAG Setting			POUR )		
LAG Management	1.0				
LAG Post Sation	Port	Priority	Timeout	IT Modify	
LACK Setting	OE1	3.	Long	0	
DACP PARt Setting	062	1	Long	0	
A atl Manacament	GE3	1	Long	0	
rere management	GE4		Long	0	
	GE5	t	Long	0	
Multicast	OE6	1	Long	0	
lumbo Frama	OE7	1	Long	0	
ste	0E8	1	Long	0	
MAC Address Table	OE9	3	Long	0	
ecurity	GE10	3	Long	0	
loß	· OE11	1	Long	0	
System Maintenance	·		1000		

Item	Description
Ports	Use the drop down list to specify LAN Port.
Priority	Enter a port priority number for the port.
Timeout	The timeout option decides how local switch of LAG connection determines connection to be lost. Switch would also notify the remote switch about this setting value, so that remote switch can send LACP PDU in correct timing.
	Long - LACP PDU will be sent every 30 seconds. If port member is not seen over 90 seconds, it will cause port member timeout.
	Short - LACP PDU will be sent per second. If port member is not seen over 3 seconds, it will cause port member timeout.
Apply	Save the settings or changes to the switch.
# **II-5 VLAN Management**

A virtual local area network, virtual LAN or VLAN, is a group of hosts with a common set of requirements that communicate as if they were attached to the same broadcast domain, regardless of their physical location. A VLAN has the same attributes as a physical local area network (LAN), but it allows for end stations to be grouped together even if they are not located on the same network switch. VLAN membership can be configured through software instead of physically relocating devices or connections.

#### II-5-1 Create VLAN

Auto Logout : Og 💌		٨	dmin				08.35.65 [	э
Dashboard	O VLAN MA	nagement + Create V	LAN = Greate VLAN					
Status	Tunda'M M							
SWIRIN LAW								
General Setup		Action:		⊛Add ⊜Delete				
Port Setting		VLAN ID:		10 9+19,20 0+10-20				
Mirror		VLAN Name:						
Link Aggregation					Appy			
VLAN Management								
	WAND.		12 MAN Narray		U M AN Turns	11 Monthly		
Interface Sollings	1		default		Default	0		
Valor VLAN								
EEE								
Mutticașt								
Jumbo Frame								
STP								
MAC Address Table								
Security								
005 -								
System Maintenance								
antochance								

This page allows a user to add, edit or delete VLAN settings.

Item	Description	Description			
Add / Del	Select which action to perform, add VLANs or delete VLANs. Add - Create a new VLAN profile. Delete - Delete an existed VLAN profile.				
VLAN ID	Enter the r want to cre multiple VI ID using hy	Enter the number as VLAN ID to be created or deleted. If you want to create / delete multiple VLAN profiles, simply enter multiple VLAN ID separated by comma, and/or range of VLAN ID using hyphen.			
VLAN Name	Enter the prefix you wish to add followed by VLAN ID as VL name. Leave it empty for using default "VLAN". After clicking Apply, you will see:				
	1	default	Deraut	(Noury	
	2	marticling0002	State	00	
	3	marketing0003	Stabo	00	
Apply	Save the se	ettings or change	es to the switch.		

Modify	Modify the name of the selected VLAN ID.      Edit name of VLAN 1      Old name: default
	New name:
	New Name - Type a name for such VLAN profile. OK - Save the settings or changes to the switch. Cancel - Close the page and return to previous page.

## II-5-2 Interface Settings

This page allows a user to configure interface setting related to VLAN.

Auto Logout : 🕅 🔹			09(171) 🕒
Dashboard	VLAR Management = Interrace setting: +	nternoje bezi nga	
status -	and the second se		
MIRTY LAT	internace seturigs		
General Setup	Port Select:	Indiana articles -	
fort. Setting	Interface VLAN Mode:	- Hybrid Access Trunk	
Alezor	PVID:		(1 - 4094)
Ink Aggregation	1.		
LAN Management	Accepted Type.	e All Tag Only Untag Only	
Create Visit	Ingress Filtering:	Enabled Disabled	
mentace Settings	Tagged VLAN:	itamiho poletesi	
VOICE VLAN	Untagged VLAN:	Walking reserved -	
:EE	Forbidden VLAN:	tamog asertas	
fullicast		August 1	
umbo Frame			
TP.	Port Interface VLAN PVID	Tagged VLAN Untagged VLAN Forbidden VLAN Accept Frame	Ingress Filtering

Item	Description
Port Select	Select LAN ports to configure VLAN Settings.
Interface VLAN Mode	Select the VLAN mode of the interface.
	Hybrid - Support all functions as defined in IEEE 802.1Qspecification.
	Access - Accepts only untagged frames and join an untagged VLAN.
	<b>Trunk</b> - An untagged member of one VLAN at most, and is a tagged member of zero or more VLANs.
PVID	A PVID (Port VLAN ID) is a tag that adds to incoming untagged frames received on a port so that the frames are forwarded to

	the VLAN group that the tag defines.
	For port under Access Mode, VLAN ID provided as PVID would automatically be selected as the untagged VLAN.
Accepted Type	Specify the acceptable-frame-type of the specified interfaces. It's only available with Hybrid mode.
	All - Accept frames regardless it's tagged with 802.1q or not.
	Tag Only - Accept frames only with 802.1q tagged.
	Untag Only - Accept frames untagged.
Ingress Filtering	Enable the ingress filtering to filter out any packets not belong to any VLAN members of this port. It is enabled automatically while operating in Access and Trunk mode.
	Enabled - Click it to enable the function.
	Disabled - Click it to disable the function.
Tagged VLAN	Specify the VLAN profile tagged in the VLAN.
Untagged VLAN	Specify the VLAN profile untagged in the VLAN.
Forbidden VLAN	Specify the VLAN profile forbidden in the VLAN.
Apply	Save the settings or changes to the switch.

#### II-5-3 Voice VLAN

With such feature, a VLAN will be created temporarily and when the specified OUI device delivers protocol packets related to "VoIP", VigorSwitch will guide these packets into the specified Voice LAN with specified priorioty tag to speed up the packet transmission. Such voice VLAN is only active inside VigorSwitch for packet transmission. After these packets leave VigorSwitch, the Voice VLAN tag will be removed immediately.

#### II-5-3-1 Properties

This page allows a user to configure global and per interface setting of voice VLAN.

Auto Logout: 00	Admin		as is ol 🕞	
Dashboard	O VLAW Management + Voice VLAN > Property	2		
Status -	Parameters Tolestone Dill Colline Deal	Falling		
Sealt/11.416	Pupering Temphony Out Second Pup	seum		-
General Setup	Voice VLAN State:	Enabled - Disabled		
Port Setting	Voice VLAN Id:	and the second second	Enable	
Mirror	Remark CoS/802.1p:	🕘 Enabled 💌 Disabled		
Link Aggregation	Remark Value:	6	41	
VLAN Management	Aging Time:	1440	(30-65536 min)	
Create Vian				
Interface Rebings	-Propiv			
EEE				
Multicast				
Jumbo Frame				
STP				
MAC Address Table				

Item	Description
Voice VLAN State	Enabled - Click it to enable Voice VLAN.

	Disabled - Click it to disable Voice VLAN.	
Voice VLAN Id	Check the box of Enable first and then select Voice VLAN ID profile.	
Remark CoS/802.1p	k CoS/802.1p Click Enabled / Disabled to enable or disable 1p remarking. enabled, qualified packets will be remarked by this value.	
Remark Value	Specify the number of packets to be remarked. Specify the CoS/802.1p number you wish ingress VoIP packets be tagged with, so that QoS can prioritize it correctly.	
Aging Time	Select value of aging time (30~65536 min). Default is 1440 minutes. A voice VLAN entry will be age out after this time if without any packet pass through.	
Apply	Save the settings or changes to the switch.	

#### II-5-3-2 Telephony OUI Setting

This page allows a user to add, edit or delete OUI MAC addresses. Default has 8 pre-defined OUI MAC.

Auto Logout : 08	Aamin		09 17 25	Ð
Dashboard	VLAN Management > Voice VLAN	Terephany Dut Setting		
Status	Television Television Coll Company	Dan Férrer		
	recently of acting	Puri seming		
General Setup	OUI Address:	1 30 30 St		
Port Seturig	Description:			
Mirror				
Link Aggregation				
VLAN Management	OULAddress	Description	It Edit	
Create Vian	DIFERER	BOOM	20	
Interface Settings	002000	SCOM-		
MOICE YEAN	00:03:6B	Cispa		
EEE	00.E0.75	Ventel Description	00	
Multicast	00 D'0 1E	Pingtel Stamons	00	
Jumbo Frame	00:01 E3	Stemens	00	
ath	00,60 89	NEOPhilips	00	
MAC Address Table	00.05.53	197-		

Item	Description		
OUI Address	ype OUI address.		
Description	nter a description of the specified MAC address to the voice LAN OUI table.		
Add	Click it to create a new voice OUI based on the settings configured above.		
Edit	Click Edit for one entry to modify OUI setting for voice VLAN.		
Delete	Click it to remove the selected OUI entry.		

#### II-5-3-3 Port Setting

This page allows a user to specify LAN port(s) as Voice LAN port.

Auto Logout : Off	•	Aumo		09 20.50	Ð
Dashboard	O WAN Manager	ment > Voice VLAN > Port Setting			
Status	-	alexalization of the California			
	Properbes	elebriony conserving			
General Setup	Por	t	GEI	*	
Port Setting	Stat	te:	Enabled . Disabled		
Mimbr	Con	Mode:	All * Src		
Link Aggregation			Apply		
VLAN Management					
Create Vian	Port	State	Cos Mode	Edit	11
Interface Settings	GE1	disable	src	0	
Voice VLAN	GE2	disable	src.	0	
EEE	GE3	disable	src	0	
Motocast	GE4	disable	SIC.	0	
Jumbo Frame	GE5	disable	\$rt;	0	
STP	GE6	disable	SIT.	0	
MAC Address Table					

Item	Description					
Port	Use the drop down list to specify one or more LAN ports.					
State	Enabled - Click it to enable the port settings for Voice LAN. Disabled - Click it to disable the port settings for Voice LAN.					
Cos Mode	If Remark CoS/802.1p is enabled in Voice VLAN>>Properties settings in this page shall be applied. Otherwise, this option will not take effect.					
	All - Once this port is identified as voice VLAN by frame with matched OUI, remark CoS/802.1p shall tag for all ingress frame regardless of remarked frame matched with pre-configured OUI or not.					
	<b>Src (Source)</b> - Once this port is identified as Voice VLAN by frame with matched OUI, remark CoS/802.1p shall tag for only the matched ingress frame with pre-configured OUI.					
Apply	Save the settings or changes to the switch.					
Edit	Click Edit for one entry to modify port settings (State, Cos Mode) for voice VLAN.					
	VOUI Setting Port Setting Edit port GE1 State: Enabled Cos Mode: Src With Cancel Ubdule State					

# II-6 EEE

Auto Logout : Off 🛛 😒			Amatan					uestas 🕒
Dashboard		Switch LINN - BEE - EEE SI	et ip					
Status	3	EDE SANIN						
		EEE Seidh	_					
General Sclop		Port			Naming 9 Alastics		-	
Port Setting		Enables			OEnable  ODisable			
Mirror						ADDIV		
Link Aggregation								
VLAN Management		Part	10	Enable		Status	Modify	U.
		GÊN		Disable		Disable	0	
Multicast		GE?		Disable		Disable	ø	
Jombo Frame		GE3		Disable		Desable	0	
STP		GE4		Disable		Disable	0	
MAC Address Table		OES		Disable		Disable	0	
Security	-	GE6		Disable		Disable	0	
005	-	GE7		Disable		Disable	0	
System Maintenance		GES		Disable		Disable	0	
Diagnostics		GE9		Disable		Disable	0	
		GE10		Disable		Disable	0	
		GE11		Distable		Disable	0	
		GE12		Disable		Decable	0	
		GE13		Disable		Disable	0	

This page allows a user to enable or disable port EEE (Energy Efficient Ethernet) function.

Item	Description		
Port	Select one or multiple ports to configure (GE1 to GE28).		
Enable	Enable -Click it to enable the EEE function. Disable - Click it to disable the EEE function.		
Apply	Save the settings or changes to the switch.		

# **II-7 Multicast**

IP multicast is a technique for one-to-many communication over an IP infrastructure in a network.

To avoid the incoming data broadcasting to all GE ports, multicast is useful to transfer the data/message to specified GE ports for IGMP snooping. When VigorSwitch receives a message "subscribed" by the client, it must decide to transfer the data to specified GE ports according to the location of the client (subscribed member).

#### **II-7-1** Properties

For the multicast packets, this page allows the administrator to choose actions for processing the unknown multicast packets and for handling known packets with MAC address, IP address and VLAN ID.



Available settings are explained as follows:

Item	Description
Unknown Multicast Action	Select an action for switch to handle with unknown multicast packet.
	Drop: Drop the unknown multicast data.
	Flood: Flood the unknown multicast data.
	Forward to Router port: Forward the unknown multicast data to router port.
IPv4 Forward Method	Set the IPv4 multicast forward method.
	<b>Dst. MAC &amp; VID:</b> Forward using destination multicast MAC address and VLAN IDs.
	<b>Dst. IP &amp; VID:</b> Forward using destination multicast IP address and VLAN ID.
Apply	Save the settings or changes to the switch.

#### II-7-2 IGMP Snooping

IGMP snooping is the process of listening to Internet Group Management Protocol (IGMP) network traffic. The feature allows a network switch to listen in on the IGMP conversation between hosts and routers. By listening to these conversations the switch maintains a map of which links need which IP multicast streams. Multicasts may be filtered from the links which do not need them and thus controls which ports receive specific multicast traffic.

#### II-7-2-1 IGMP Setting

This page allows you to enable/disable IGMP function, select snooping version, and enable/disable snooping report suppression.

Anto Legout : Off	Admir	ana 🕒
Dashboard	O HUMICASE = IGHIP Shooping -> IGHIP Settion	
Status ·	ISIME Stating ISIMP Guener Setting ISIMP Static Group ISIMP Endup Table ISIMP Router Table	
General Setup	Glopal Setting	
Port Setting Mirror Link Aggregation	IGMP Snooping State: = Enable © Disable IGMP Snooping Version: = v2 = v3 (BISS)	
VLAN Management	IGMP Snooping Report Suppression: * Enable Disable	
Multicast.	VLAN Setting	
	Entry No.   VLAN ID   IGMP Snoopl.,   Router Ports   Query Robust   Query Interva   Query Max Re	Last Member
Jumbo Frame STP MAC Address Table		
and off yould's	Contraction of the second s	

Item	Description
IGMP Snooping State	Enable - Click it to set enabling IGMP function.
	Disable - Click it to disable IGMP function.
IGMP Snooping Version	Set the IGMP snooping version.
	v2 - Only support process IGMP v2 packet.
	v3 - Support v3 basic and v2.
IGMP Snoopign Report Suppression	Click Enable to allow the switch to handle IGMP reports between router and host, suppressing bandwidth used by IGMP.
АррІу	Save the settings or changes to the switch.
Edit	Click it to modify IGMP settings for selected VLAN profile.

	Edit V	LAN ID 1					
	IGMP Sr	ooping State					
Disa	ble		•				
_	Router Po	orts Auto Learn					
Ena			•				
2	Query Robustn	ess (Operationa	efault 2)				
2	Outours Interne	V (I-r, d	05)				
125	Query Interva	Sec (30-18000)	25) default 125)				
	uen/Response ir	terval (Operatio	nal: 10)				
10	uery response in	Sec (5-20,	, default 10)				
La	st Member Querv	Counter (Opera	tional: 2)				
2	,	\$ Sec (1-7,	default 2)				
La	st Member Query	Interval (Opera	tional: 1)				
1		🗘 Sec (1-25	i, default 1)				
	Immed	liate Leave:					
Ena	ole		•				
	OK_	Cancel _					
uncti oute outer	on. on. r Ports Auto port learni	ate -Choos o Learn - S ng. Choose	e <b>Enable</b> Set the e Enable	e to e nabli to le	enable ng stat arn rou	IGMP sno us of IGI iter port	ooping MP by
oute oute outer outer outer outer outer	r Ports Auto port learni query. Robustnes ted packet	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su	e Enable Set the e Enable umber w ubnet.	e to e nabli to le hich	enable ng stat arn rou allows	IGMP sno us of IGI iter port tuning fo	ooping MP by or the
uncti oute outer outer outer outer outer uery uery	r Ports Auto port learni query. Robustnes ted packet l Interval - S	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su Set the inte	e Enable Set the e Enable umber w ubnet. erval of e	e to e nabli to le hich queri	enable ng stat arn rou allows er senc	IGMP sno us of IGI iter port tuning fo genera	ooping MP by or the I
ncti ncti uter MP iery pec iery iery ne t con	r Ports Auto port learni query. Robustnes ted packet 1 Interval - S Response 1 pefore sendi d.	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su Set the inte Interval - I ng a respon	e Enable Enable Umber w Ubnet. Erval of o t specific nding rep	e to e nabli to le hich queri es th port i	enable ng stat arn rou allows er senc e maxi n units	IGMP sno us of IGI iter port tuning fo genera mum allo s of 1/10	ooping MP by or the I owed
functi functi Router GMP Query Query Query Query Query Query Query Cuery	r Ports Auto port learni query. Robustnes ted packet l Interval - S Response l before sendi d. Iember Que (defined he bscribed me o the relate	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su Set the inte Interval - I ng a respon ery Counte re) and stil ember, Vig ed GE port(	e Enable Enable Enable umber w ubnet. erval of o t specifie nding rep or - After Il not rec orSwitch s).	e to e nabli to le hich queri es th port i ceivir will	enable ng stat arn rou allows er senc e maxi n units ring for ng any f stop tr	IGMP sno us of IGI iter port tuning fo genera mum allo of 1/10 rspecifie response ansmitti	ooping WP by or the I owed efrom
functi functi Route router IGMP Query expec Query query Query time k secon Last N times the su data t Last N betwe respon	r Ports Auto port learni query. Robustnes ted packet l Interval - S Response l before sendi d. Iember Que to the relate lember Que en counting uses from ar	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su Set the inte Interval - I ng a respon ery Counte re) and still ember, Vig ed GE port( ery Interva g each men by subscribe	e Enable Set the e Enable umber w ubnet. erval of o t specifi- nding rep r - After ll not rec orSwitch s). I - The n nber que ed mem	e to e nabli to le hich queri es th port i quei ceivir will maxin cry mo	enable ng stat arn rou allows er senc e maxi n units ring for ng any stop tr num tir essage	IGMP sno us of IGI iter port tuning fo d genera mum allo s of 1/10 response ransmitti me inter with no	ooping by or the l owed e from ing val
Couter GMP GMP Query Query Query Query Query Query Query Query Query Query Query Query Query Query Mecone Last M he su lata t cast M petwe he po here Puero Query Duery Query Duery Query Duery Query	r Ports Auto port learni query. Robustnes ted packet l Interval - S Response l efore sendi d. Iember Que (defined he bscribed me o the relate lember Que en counting ases from ar diate Leave rt & VLAN v is still a sub Fastleave	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su Set the interval - I ng a respon ery Counter re) and still ember, Vig ed GE port ( ery Interva g each mem hy subscribe e - Leave the where leave function.	e Enable Set the e Enable umber w ubnet. erval of o t specifi- nding rep r - After II not rec orSwitch s). II - The n her que ed member e multice ember or	e to e nabli to lea hich queri es th port i ceivir a will maxin ry me ber. cast g ge is s	enable ng stat arn rou allows er send e maxi n units ring for ng any stop tr num tir essage group ir sent fro Click I	IGMP sno us of IGI iter port tuning fo d genera mum allo s of 1/10 response ransmitti me inter with no nmediat om, rega	ooping VIP by or the I owed from ing val ely or ordless o
inite incti pute uters (pec uery uery uery uery uery uery uery inte to ast M mes ue su ast M ast M e su ast M e su A ast M e su Ast M ast M Ast	r Ports Auto port learni query. Robustnes ted packet l Interval - S Response l before sendi d. lember Que (defined he bscribed me o the relate lember Que en counting ises from ar diate Leave ort & VLAN v is still a sub e Fastleave ave the set	ate -Choos o Learn - S ng. Choose s - Set a nu loss on a su Set the interval - I ng a respon ery Counter re) and still ember, Vig ed GE port( ery Interva g each mem hy subscribe e - Leave the where leave function.	e Enable Set the e Enable umber w ubnet. erval of o t specific nding rep r - After II not rec orSwitch s). I - The n he multic e message ember or	e to e nabli to lea hich queri es th port i ceivir will maxin cry mo ber. cast g ge is s	enable ng stat arn rou allows er send e maxi n units ring for ng any i stop tr num tir essage group ir sent fro Click I	IGMP sno us of IGI iter port tuning fo genera mum allo of 1/10 specific response ransmitti me inter- with no mmediat om, rega Enable to	oopin MP by or the I owed fron ing val ely o ordles o

Cancel - Close the page and return to previous page.

#### II-7-2-2 IGMP Querier Setting

This page allows a user to configure querier settings on specific VLAN of IGMP Snooping.

Auto Logout : Otto		Admin			11 19:41 🕞	
Dashboard	Mumcast >	GMP Shooping > IGMP Quener 3	setting			
Status -	ICAN Patton	Internet Contract Contract	MD State Carries Table	ICMD Clouder Table		
Settin LAN -	Come-adumy	Service Granitic Transition	Ne State Group	NUMP PROMIES CADIO		-
General Setup		VLAN ID:	Notaring Live deal		-	
Port Setting		Querier State:	Disable Enable			
Mirror		Querier Version:	* v2 🗇 v3 (BISS)			
Link Aggregation			Арри			
VLAN Management						
EEE	VLAN ID	Querier State	Querier Status	Querier Version	Querier IP	3
Multicast	1	Disabled	Disabled			
Properties						
IGMP Streeping						
Jumbo Frame						
STP						
MAC Address Table						
192 Tes 1 TOWED BEAC						

Item	Description
VLAN ID	Use the drop down list to specify a VLAN profile as IGMP Snooping querier.
Querier State	Enable - Click Enable to set the enabling status of IGMP Querier on the chosen VLAN profile. Disable - Click it to disable the function.
Querier Version	Set the query version of IGMP Querier Election on the chosen VLANs. v2: Querier version 2. v3: Querier version 3. Note: For maximum compatibility, it is suggested to use querier version lower than IGMP snooping version, for there is possibile network mixed with IGMP v2/v3 client and v2 query message is widerly understandable for those clients.
Apply	Save the settings or changes to the switch.

#### II-7-2-3 IGMP Static Group

The IGMP static group is allowed to assign a VLAN/port as a specific IPv4 multicast member. Every IPv4 multicast stream that belongs to the specified group IP address will be forwarded to the specified port/VLAN member.

Auto Logout : O#	Admin		1115.05
Dashboard	Mullicast = IGMP Snoeping > IGMP Static G	irrap.	
Status •	ICME Setting	DAD STREE Convert - KOND CONVERTING	
Sweet LNI	iower ocarry	and and charp the charp table table	
General Setup	VLAN ID:	Technysee 20	<u>+</u>
Port Setting	Group IP Address;		
Mirror	Member Ports:	Diction warrand	-
Link Aggregation			
VLAN Management		without a	
EEE		the state of the second second	in the second
Multicast.	VLAN ID Group IP	Address Member Ports	Modiry
Properties		No data available in table	
3MP Bhooping			
Jumbo Frame			
STP			
MAC Address Table			
(a) per ( tempi ada)			

Item	Description
VLAN ID	Use the drop down list to specify a VLAN profile as IGMP Static Group.
Group IP Address	Specify the IPv4 multicast address you wish to assign for the static group (defined in VLAN ID).
Member Ports	Specify the port(s) that static group with given IPv4 multicast address shall include.
Apply	Save the settings or changes to the switch.

#### II-7-2-4 IGMP Group Table

This page shows currently known and dynamically learned by IGMP snooping or shows the assigned IPv4 multicast address group in operation.

Auto Longent : Com 🛛 😹	1	Admin			106945-20	Ð
Dashboard	O Mullicast - OM	(P Snumping ~IGMP Grown Table				
Status -	IGMP Semon	IGMP Quarter Patting	IGNP Device Table			
Boden ( Ab)	Town Searry	Town Stratter security	TOMP Router Lable			
Beneral Solop	VLAN ID	Group IP Address	Member Ports	Турв	Life(sec.)	
Port Setting			No data avaitable or table			
Mirror						
Link Aggregation						
VLAN Management						
EEE						
Multicast						
Properties						
Intel Anonorp						
Jumbo Frame						
STP						
MAC Address Table						
Security -						
005 ·						
System Maintenance						
Diagnostics -						

Item	Description
VLAN ID	Display the VLAN of this multicast group belongs to.
Group IP Address	Display the multicast address of this multicast group.
Member Ports	Display the port(s) where subscribing member of this multicast group belongs to.
Туре	Display if it is dynamically learned or statically assigned.
Life(sec.)	Display the life time of this multicast member left if no membership report sent again.

#### II-7-2-5 IGMP Router Table

This page shows the IGMP querier router known to this switch.

Auto Logout ; Or 💌		Agmin					0	8:46:15	Ð	
Dashboard	O Multicast - 7	GMP SneepingGMP Ro	user Taule							
Status	IGMP Setting	(OMP Quener Setting	IGMP Static Group	IGMP Group Table	LUMP Router Table					
Switch Left			The second s		Constitution of Constitution o					-
General Setup	VLAN ID		Port		Expiry Time(sec.)	)				11
Part Setting				No	data available in table					
Mirror										
Link Aggregation										
VLAN Management										
EEE										
Mullicard										
Properties										
IGME Seapping										
Jumbo Frame										
STP										
MAC Address Table										
Security	-									
OnS	ę.									
System Maintenance	*									
Diagnostics										

Item	Description
VLAN ID	Display the VLAN profile that the IGMP querier belongs to.
Port	Display the uplink ports where querier router exists.
Expire Time (sec.)	Display the time before querier is considered no longer existed.

# II-8 Jumbo Frame

Auto Lonout : Off 🛛 🛸	Aamin		08047/11
Dashboard	🕑 Switch LAN + Jumbo Framo + Jumbo Frame Se	Ging	
Status	Jumpo Frame Setting		
		00	
General Schop	Journo Hame (Overs):	1578	(1520-9210)
Port Setting	Apply		
dittor			
link Aggregation			
/LAN Management			
EE			
Autocast			
ete .			
MAC Address Table			
ecunty			
10S			
ystem Maintenance	1.0		
Siagnostics			

This page allows a user to configure switch port jumbo frame settings.

Item	Description
Jumbo Frame (Bytes)	Enter Jumbo frame size. The valid range is 1526 bytes - 9216 bytes.
Apply	Save the settings or changes to the switch.

## II-9 STP

The Spanning Tree Protocol (STP) is a network protocol that ensures a loop-free topology for any bridged Ethernet local area network.

Bridge Protocol Data Units (BPDUs) are frames that contain information about the Spanning Tree Protocol (STP). Switches send BPDUs using a unique MAC address from its origin port and a multicast address as destination MAC (01:80:C2:00:00:00, or 01:00:0C:CC:CC:CD for Per VLAN Spanning Tree).

For STP algorithms to function, the switches need to share information about themselves and their connections. What they share are bridge protocol data units (BPDUs).

BPDUs are sent out as multicast frames to which only other layer 2 switches or bridges are listening. If any loops (multiple possible paths between switches) are found in the network topology, the switches will co-operate to disable a port or ports to ensure that there are no loops; that is, from one device to any other device in the layer 2 network, only one path can be taken.

#### **II-9-1** Properties

This page allows a user to configure and display STP property configuration.

Auto Logout : Off	Aunin	P8 47 54 🕒
Dashboard	O Switch Law + STP + Properties	
Status	Properties Part Sotting Bridge Setting Prel Advancent Sotting Statistics	
Burnin Levit General Setup Port Sketing Mirror Link Appregation VLAN Management EEE Multicad Jumba Framin STP MAC Address Table	STP Motio: ©Discabled OSTP ORSTP 69:00 Forward: ©Flooding Offlering PathCash Meshani: OShart ©Long Form	
Security	·	
008	-	
System Maintenance	*	
Diagnostics	*	

Item	Description
STP Mode	Set the operating mode of Spanning Tree (STP).
	STP Enable the Spanning Tree (STP) operation
	<b>RSTP</b> - Enable the Rapid Spanning Tree (RSTP) operation.
BPDU Forward	Specify the BPDU forward method when the STP is disabled. Filtering - Filter the BPDU when STP is disabled. Flooding - Flood the BPDU when STP is disabled.
PathCost Method	Specify the path cost method. Long - Specifies that the default port path costs are within the

	range: 1~200,000,000. Short - Specifies that the default port path costs are within the range: 1~65,535.
Apply	Save the settings or changes to the switch.

## II-9-2 Port Setting

This page allows the user to configure and display STP port settings.

Auto Logout : Or	1		Admin				00:49:29 🕞
Dashboard		O Switch LA	N = STF = Fort Setting				
Status		Generation	Part Sulling Dridge Sulling	Rod Advanced Softing Stylicity	de l		
	4	richarden	r on cleanog	T out required containing			
General Setup			Ports:	Matterg webbled			-
Port Setting			Path Cost (0 - Auto):	0			6
Mirror			Edge Port:	OYes ONo			
Link Aggregation			P2P Option:	⊙Auto ⊖Yes ⊖No			
VLAN Management			Migrate:	[]Yes			
EEE					Adipty		
Multicast							
Jumbo Frame		Port	Admin Enable	Path Cost	Edge Port	P2P Option	17 EM 17
STP		0E1	Enable	0	Na	Auto	0
MAC Address Table		OE2	Enable	0	Na	Auto	0
Becunity		0E3	Enable	0	Na	Auto	0
QoS	7	GE4	Enable	0	Na	Auto	0
System Maintenance	1	0E5	Enable	0	Na	Auto	0
Diagnostics		0E6	Enable	0	140	Auto-	0
		GE7	Enable	Ŭ.	Na	Auto	0
		0E8	Enable	U.	t¥0	Auto	0
		GE9	Enable	U U	Na	Pluto	0
		GE10	Enable	U	No	Auto	0

Item	Description
Ports	Use the drop down to specify the interface ID or the list of interface IDs.
Path Cost (0=Auto)	Path cost is the cost of transmitting a frame on to a LAN through that port. It is recommended to assign this value according to the speed of the bridge. The slower the media, the higher the cost. Entering 0 means the switch will automatically assign a value.
Edge Port	In the edge mode, the interface would be put into the Forwarding state immediately upon link up. If the edge mode is enabled for the interface and there are BPDUs received on the interface, the loop might be occurred in the short time before the STP state change. Yes - Enable the function. No - Disable the function.
P2P Option	Yes - It means the STP of link type on this port is full-duplex and directly connect to another switch or host. No - It means the STP of link type on this port is "not" full-duplex and "does not" directly connect to another switch or host.
Migrate	Yes - Check it to force the specified port to send one RSTP BPDU (Rapid Spanning Tree Protocol Bridge Protocol Data Unit).

Арріу	Save the settings or changes to the switch. After clicking it, the settings configured above will be shown on the table below.			
Admin Enable	Enable - Such port is managed by VigorSwitch.			
Edit	Click it to r Pors: Park Cost (I - Autor: Edge Port: 1929 MACS Migrates Migrates Enable Enable	Modify the settings for t Edit Port GE1 Path Cost (0 = Auto) d Edge Port No P2P MAC Yes Migrate:Yes	the sel	lected GE port.

## II-9-3 Bridge Setting

This page allows you to configure required information to negotiate with other VigorSwitch for determining the bridge switch.

Auto Logool : Off. 🔗	Namin			109/11/40 De
Dashboard	🕑 Bwillin (All - BIP - Builge Bolling			
Status	Properties Port Setting Bridge Getting	Port Advanced Setting Sitability		
	Personal Property in the second			
General Setup	Priority:	32768	+	
Port Setting	Forward Delay:	15	0	(4-30)
Mintar	Max Age:	20	6	(6-40)
Link Aggregation	Tx Hold Count:			(1.10)
VLAN Management	italia Timar			(1.10)
EEE	neno nime:	1		(1-10)
Multicast		Mage		
Jumbo Frame	Bridge Identifier	32788/000 (D) 44-08-01-22		
678	Designated Root Bridge	0/000/00/00/00/00/00		
MAC Address Table	Root Path Cost	0		
Security	Designated Bridge	0/ 0/ 00 00 00 00 00 00		
005	Root Port	0/0		
System Maintenance	Max Hops.	20 -		
Diagnostics	Remaining Hops	٥		
	Last Topology Change	a .		

Item	Description
Priority	Specify the bridge priority. The valid range is from 0 to 61440, and the value should be the multiple of 4096. It ensures the probability that the switch is selected as the root bridge, and the lower value has the higher priority for the switch to be selected as the root bridge of the topology.
Forward Delay	Specify the STP forward delay time, which is the amount of time that a port remains in the Listening and Learning states before it enters the Forwarding state. Its valid range is from 4 to 10 seconds.

Max Age	Specify the time interval in seconds for a switch to wait the configuration messages, without attempting to redefine its own configuration.
Tx Hold Count	Specify the tx-hold-count used to limit the maximum numbers of packets transmission per second. The valid range is from 1 to 10.
Hello Time	Specify the STP hello time in second to broadcast its hello message to other bridge by Designated Ports. Its valid range is from 1 to 10 seconds.
Apply	Save the settings or changes to the switch.

## II-9-4 Port Advanced Setting

This page allows user to edit general setting of STP CIST port and browser CIST port status.

Auto Logout : 🛛 🖂	*			Admin								Ð
Dashboard		O Switz	IN LAN - OTP + P	ort Advanced Ser	ming							
Status		Terrar	Dard Come	Delman C	and a stand of the second of	Challenter						
swittin UANI.		r.tóbeis	ida Loui senu	ng bridde br	ennig Pontwoyanced t	Semula Standord						
General Setup			Indentifier	Path Cost				Edge Port	P2P Option			
Port Setting		Pert	(Prior#y/ID)	Conf.Oper	Designated Roo	Root Path Cost	Designated Brid	Conf/Oper	Conf/Oper	Port Role	Port State	Edit
Airror		GE1	128/1	0/20000	010000000000000	0	0/00:00:00:00:00:00	No/No	Auto / No	Disabed	Disabled	0
Jnk Aggregation		062	128/2	0/2000/	010000000000000000000000000000000000000	0	0/00/00/00/00/00/00	No / No	Auto / Yes	Disabed	Forwarding	0
AN Management		683	128/3	0/20000	010000000000000	0	0100:00:00:00:00:00	No / No	Auto / No	Desabed	Disabled	0
ee.		GE4	128/4	0720008	00.00.00.00.00.00.00	0	0100-00-00-00-00-00	N0 / N0	Auto / No	Desabed	Dreabted	0
		065	128/5	0/20000	010000000000000	0	0/00/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
lunicast		066	128/8	0770000	0100.00.00.00.00.00	0	0700.00 00.00 00.00	NotNo	Auto / No	Disabert	Disabled	0
umbo Frame	_	GE7	128/7	9720000	0/00/00/00/00/00	0	0/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
तरः		069	128/8	0/20000	070000000000000	0	8/00/00/00/00/00	NoTNo	Auto / No	Disabed	Disabled	0
AC Address Table		GES	128/9	0/20000	0/00/00/00/00/00	0	0/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
ecunity		GE10	128/10	0/20000	0/00/00/00/00/00/00	0	0/00/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
05		OE11	120/11	0/20000	0/00/00/00/00/00	0	0/00:00:00:00:00:00	No/No	Auto / No	Disabed	Disabled	0
rstem Maintenance	-	6E12	120/12	0/20000	0/00/00/00/00/00/00	0	0/00/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
agnostica	-	0613	120/13	0/20000	0/00/00/00/00/00/00	0	0/00/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
		GE14	128/14	0/20000	0/00/00/00 00 00:00	0	0/00/00/00/00/00/00	No/No	Auto / No	Disabed	Disabled	0
		OE15	128/15	0/20000	0100000000000000	0	0/00/00/00 00/00/00	No/No	Auto / No	Disabed	Disabled	0
		0516	128/16	0120000	0.00.00.00.00.00.00	0	0100.00.00.00.00.00	NoTNo	Audo Chio	Disabed	Direblad	0
		0010	140/10	0720000	0100000000000000		010000000000000	THO FREE P	majo / 140	Chendold .	Crisabled	0
		QE17	126/17	0/20000	0100.00.00.00.00.00	0	0100.00.00.00.00.00	No/No	Auto / No	Disabed	Disabled	

Item	Description
Port	Display the interface number for GE and LAG.
Indentifier(Priority/ID)	Display the spanning tree port identifier.
Path Cost Conf/Oper	Display current path cost of given port.
Designated Root Bridge	Display the identifier of designated root bridge.
Root Path Cost	Display the operational root path cost.
Designated Bridge	Display the identifier of next bridge on this port.
Edge Port Conf/Oper	Display if this port is configured as Edge of STP network, for speed up link up.
P2P Option Conf/Oper	Display if this port is configured as point to point link to another switch or host.
Port Role	Display current port role on the specified port. The possible values will be: "Disabled", "Root", "Designated",

	"Alternative	"Alternative", and "Backup".							
Port State	Display current port state on the specified port. The possible values will be: "Disabled", "Discarding", "Learning", and "Forwarding".								
Edit	Click it to modify the settings for the selected GE port / LAG port.								
	Indentifier (Priority/ID) 賃	Path Cost Conf/Oper []	Designated 🚦	Root Path Cost 🎼	Designated 🏦	Edg Con			
	128 / 1	0 / 20000			×	No			
	128/2	0 / 20000	Ed	it Port GE1		No			
	128/3	0 / 20000		Priority		No /			
	128/4	0 / 20000	128		•	No			
	128 / 5	0 / 200000				No			
	128/6	0 / 20000	O	< Cancel		No			
	128 / 7	0 / 20000	0700:00:00:00:0	U	0700:00:00:00:00:0	No			

### II-9-5 Statistics

This page displays STP statistics.

Auto Logout : Cm	8						
Dashboard		Switch LAN	( = STF = Statatica				
Status	4	Descendance	Dest Collins Dellars	Dead Schemmend Culture			
Switch LAN	3	Proportion	For around Proge scaling	Pon Amanced Second			
General Setup		Port	Configure BPDUs Rx.	TCN BPDUs Rx.	Configure BPDUs Tx.	TCN BPDUs Tx.	
Port Setting		0E1	0	0	p	0	
Mirror		GE2	0	Q	0	0	
Link Aggregation		GE3	0	ő	þ.	0	
VLAN Management		GE4	0	0	0	0	-
EEE		865	u .	0	μ	a	TCN BPDUs Tx.
Multicard		006	0	0	0	0	u.
Jumbo Frame		0E7	U	0	U.	D	
977-		GER	0	n	0	0	
MAC Address Table		029	0	0	0	0	
and the second second		B€10	Ū	0	ø	0	
ecurity		OE11	0	0	0	0	
105	-	0£12	0	0	u.	0	
lystem Maintenance		GE13	0	n	D:	0	
Diagnostics		0E14	0	0	.0	0	
		0E15	D	ů.	π	0	
		QE16	0	0	a	0	
		0E17	0	U	0	0	
		GE18	0	0	Q.	0	

Item	Description
Port	Display the port number (GE / LAG).
Configure BPDUs Rx.	Display the counts of the received CONFIG BPDU.
TCN BPDUs Rx.	Display the counts of the received TCN BPDU.
Configure BPDUs Tx.	Display the counts of the transmitted CONFIG BPDU.
TCN BPDUs Rx	Display the counts of the transmitted TCN BPDU.

# II-10 MAC Address Table

This section allows user to view the dynamic MAC address entries in the MAC table, change related setting, and assign MAC address into MAC table.

#### II-10-1 Static MAC Setting

This section allows user to manually assign MAC address into MAC table. The configuration result will be displayed on the table listed on the lower side of this web page.

DrayTek								VigorSwite	n P1280 Sola
Auto Logout : 🛛 🗖 💌		3	Admm					06 10:57	Ð
Dashboard	O MAC Ad	droza Table — Static	MAC Sitting = Static N	KAC.					
Status	-								
Eviden LAN	SUSCE ARAC	-							
General Setup		MAC Address:		100000000000	άč				
Port Setting		VLAN:		default			÷.		
Mirros		Port		0F1					
Link Aggregation		T dit.		QC1	-				
VLAN Management					400				
EEE									
Multicald	NO.	MAG	Address		VLAN	Port	Delete		
Jumbo Frame	1	001	CIAA 06 CU 74		default(1)	CPU			
STP	1	00.0	5,50,E4,06,EE		datedia(1)	GED			
MAC Address Table									
State: MAC Setting									
Dynamic Address Setting									
Dynamic Learned	N								
Security -									
QoS -									

Item	Description
MAC Address	Enter the MAC address that will be forwarded.
VLAN	This is the VLAN group to which the MAC address belongs.
Port	Select the port where received frame of matched destination MAC address will be forwarded to.
Add	Click it to add any port into the static MAC table.
Delete	Click it to remove the selected port from the static MAC table.

## II-10-2 Dynamic Address Setting

This page allows a user to configure aging time for dynamic MAC address.

Anto Lougal : Off 🔗	Admin		09.16.36 🕞
Dashboard	O MAC Address Table + Dynamic Address B	nling = Dynamic #ddness Holling	
Status	Pumamic Attitises Cotting		
Switch LAV			and the advance
General Sétup	Aging Time:	360	(5.32767)
Port Setting	ADDIY		
Mirror			
Link Aggregation			
VLAN Management			
FEF			
Multicast			
Jumbo Frame			
STP			
MAC Address Table			
State MAC Setting			
Dynamic Learned			
Security			
008			
System Maintenance			
Diagnostics	*		

Available settings are explained as follows:

Item	Description
Aging Time	Enter the Dynamic MAC address aging out value (5-32767 seconds).
Apply	Save the settings or changes to the switch.

#### II-10-3 Dynamic Learned

This page displays the MAC address and port number automatically learned by VigorSwitch.

Auto Logost : 🛛 🖂 🖻	Adm				
Dashboard	🔕 MAC Address Table > Dynamic La	amed #Dimamic Luamod			
Status	- Demantic Learned				
Steelich 1.989					
General Setup	MAC Address	UT VLAN	Type	Port	= 1
Port Setting	00:08:54:74:60:7D	detaun(1)	Dynamic	GEZ	Add to Static
Mirror	00 1D AA 11 22 45	defaul(1)	Dynamic	GE2	[Add to Static]
Link Aggregation	00-1D:AA:03:32:70	default(1)	Dynamic	GE2	Aud to State
VLAN Management	00.E0:4C:00.00:10	detaut(t)	Dynamic	GE2	[Add to Static]
EEE	48 58 30 2F A8 86	default(1)	Dynamic	0E2	[Add to Static]
Motocard	C0:25:E9:0F:53:00	default()	Dynamic	GE2	Add to Static
Jumbo Framer					i a constante
STP					
MAC Address Table					
State MAG Setting					
Dynamic Address Bolling	2				
Security	*				
QeS	+				
System Maintenance	+				
Diagnostics	-				

Available	settings	are	exr	blained	as	follows	
<i>i</i> wanabic	Settings	arc	CAP	numcu	us	10110103	٠

Item	Description
MAC Address	Display the MAC address that will be forwarded.
VLAN	Display the VLAN group to which the MAC address belongs.
Туре	Display whether the MAC address is <b>Dynamic</b> (learned by the Switch) or <b>Static Unicast</b> (manually entered in the <b>Static MAC Forwarding</b> screen).
Port	Display the port to which this MAC address belongs.
Add to Static	Click this button to add any port into the static MAC table.

This page is left blank.

# Part III Security

VigorSwitch P1280 User's Guide

# **III-1 Storm Control**

Storm Control helps to suppress possible broadcast, unknown multicast or unknown unicast storm by applying a rate limit on those packets.

### **III-1-1 Properties**

This page allows a user to configure general settings for Storm Control.

Auto Logant : Off	28	Admin		08/20.38 E)
Dashboard		Starm Control + Emportant + Proportions		
Status	-	Desceller		
Switch LAN	-	Propesses		
Sécult	1	Storm Control Mode:	Packet/sec  Klints/sec	
Storm Control	1	Preamble & Inter Frame Gap:	Excluded      Oincluded	
Fronenses		Poply		
Fort Setting		_		
DeS				
QoS				
System Maintenance				
Diagnostics	-			

Item	Description
Storm Control Mode	Select the mode of storm control.
	Packet/sec - Storm control rate will be calculated by packet-based.
	Kbits/sec - Storm control rate will be calculated by octet-based.
Preamble & Inter Frame Gap	Select the rate calculation with/without preamble & IFG (20 bytes).
	<b>Excluded</b> - Exclude preamble & IFG (20 bytes) when count ingress storm control rate.
	Included - Include preamble & IFG (20 bytes) when count ingress storm control rate.
Apply	Save the settings or changes to the switch.

## III-1-2 Port Setting

This page is used to configure port settings for Storm Control. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Auto Logout : Off	8	<b>kum</b> in (1)31/38					1/10 Et	
Dashboard		O Storm Control - Part Setting +	Purt Sollings.					
Status		Port Settings						
Switch LAN		The second se						
Security	-			Port Settings.				
Storm Control								
Properties		Ports:		- (dth marke) er teid			5	
		Storm Control:		()Enable ()Disable				
Dos		Limiting Rate:		Eroadcast	10000	(Kops, 15-10000	(Kops, 18-1000000)	
0.05				Linknown Multicast	10000	(Kops, 18-1000)	0.00	
System Maintenance	÷			Dunknown Unicast	10000	00ps, 18-1000	000)	
Diagnostics	- 1	Action:		Drop      Shutdown				
				A501/				
		Port Storm Control	Broadcast (ops)	Unknow Multicast (pps)	Unknow Unicast (pps)	Action	Modify	
		GET Disable	Disable	Disable	Disable	Drop	0	
		OE2 Disable	Disable	Disable	Disable	Drop	0	
		GE3 Désable	Disable	Ditable	Disable	Drop	0	
		GEA Depable	Disable	Disable	Desable	Diap	0	
		GES Disable	Disable	Disable	Disable	Drop	0	
		GE6 Disable	Disable	Disable	Disable	Drop	0	

Item	Description
Ports	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
Storm Control	<b>Disable</b> - Disable the storm control configuration for the selected port profile.
	selected port profile.
Limiting Rate	Check the box(es) to enable strom control rate limited for Broadcast, Unknown Multicast and/or Unknow Unicast packet.
	<b>Broadcast</b> - Specify the storm control rate for Broadcast packet. Value of storm control rate, Unit: Kbps (Kbits per-second). The range is from 16 to 1000000.
	Unknown Multicast - Specify the storm control rate for unknown multicast packet. Value of storm control rate, Unit: Kbps (Kbits per-second). The range is from 16 to 1000000.
	Unknown Unicast - Specify the storm control rate for unknown multicast packet. Value of storm control rate, Unit: Kbps (Kbits per-second). The range is from 16 to 1000000.
Action	Select the state of setting.
	Drop - Packets exceed storm control rate will be dropped. Shutdown - Port exceeds storm control rate will be shutdown.
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected GE port.

# III-2 DoS

A Denial of Service (DoS) attack is a hacker attempt to make a device unavailable to its users. DoS attacks saturate the device with external communication requests, so that it cannot respond to legitimate traffic. These attacks usually lead to a device CPU overload.

The DoS protection feature is a set of predefined rules that protect the network from malicious attacks. The DoS Security Suite Setting enables activating the security suite.

#### **III-2-1** Properties

This page allows a user to configure DoS setting to enable/disable DoS function for global setting.

Auto Logost: 🛛 🐨 🕍	uma.	nin				10:30.46 EF
Dashboard	O Dollar Proposition of Proposition					
Status	2200000000					
Switch LAN	maperies					
econt			Olobal Settir	ngs		
Storm Control	1					
DioS	Dist MAC - Src MAC	© Enabled	d ODisabled			
Proventies	LAND	( ) Enables	d ()Disabled			
DoS Port Setting	UDP Blat	Enabled	d ODisabled			
03	TCP Blat	() Enabled	Disabled			
sten Maintenance	Ping of Dealth	() Enabled	d ODisabled			
annoties	IPv6 Min Fragments	fs @Enabled	d ODisabled	1240	Bytes (0-65535)	
adito 201 2	ICMP Fragments	() Enabled	Disabled			
	IPv4 Ping Max Size	e 🕢 Enabled	Disabled			
	IPv6 Ping Max Size	@Enabled	Disabled			
	Ping Max Size Sett	ting 512		Bytu:s (0-65535)		
	Smurf Attack	(j) Enabler	d ODisabled	Netmask Length: 0		(0.32)
	TCP Min Hdr Size	(j) Enabler	d ODisabled	20	Bytes (0.31)	
	TCP-SYN (SPORT	(1024) (Enabled	Disabled			
	Null Scan Attack	() Enabled	d Obisabled			
	X-mas Scan Attack	k 🛞 Fnable	d ()Oisabled			
	TCP SYN FIN Attack	k ©Enabler	Disabled			

Item	Description
Dst MAC=Src MAC	Drop the packets if the destination MAC address is equal to the source MAC address. Disabled - Disable the item function. Enabled - Enable the item function.
LAND	Drop the packets if the source IP address is equal to the destination IP address. Disabled - Disable the item function. Enabled - Enable the item function.
UDP Blat	Drop the packets if the UDP source port equals to the UDP destination port. Disabled - Disable the item function. Enabled - Enable the item function.
TCP Blat	Drop the packages if the TCP source port is equal to the TCP destination port. Disabled - Disable the item function.

	Enabled - Enable the item function.
Ping of Death	Avoid ping of death attack.
	Ping packets that length are larger than 65535 bytes.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
IPv6 Min Fragments	Check the minimum size of IPv6 fragments, and drop the packets smaller than the minimum size. The valid range is from 0 to 65535 bytes, and default value is 1240 bytes. <b>Disabled</b> - Disable the item function. <b>Enabled</b> - Enable the item function.
ICMP Fragments	Drop the fragmented ICMP packets.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
IPv4 Ping Max Size	Determine the IPv4 PING packet with the length.
	Disabled - Disable the item function.
	Enabled - Enable the item function
IPv6 Ping Max Size	Determine the IPv6 PING packet with the length.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
Ping Max Size Setting	Determine the IPv4/IPv6 PING packet with the length. Specify the maximum size of the ICMPv4/ICMPv6 ping packets. The valid range is from 0 to 65535 bytes, and the default value is 512 bytes.
Smurf Attack	Avoid smurf attack. The length range of the netmask is from 0 to 323 bytes, and default length is 0 byte.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
TCP Min Hdr Size	Check the minimum TCP header and drops the TCP packets with the header smaller than the minimum size. The length range is from 0 to 31 bytes, and default length is 20 bytes. <b>Disabled</b> - Disable the item function. <b>Enabled</b> - Enable the item function.
TCP-SYN (SPORT<1024)	Drop SYN packets with sport less than 1024.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
Null Scan Attack	Drop the packets with NULL scan.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
X-mas Scan Attack	Drop the packets if the sequence number is zero, and the FIN, URG and PSH bits are set.
	Disabled - Disable the item function.
	Enabled - Enable the item function.
TCP SYN-FIN Attack	Drop the packets with SYN and FIN bits set.
	Disabled - Disable the item function.
	Enabled - Enable the item function
TCP SYN-RST Attack	Drop the packets with SYN and RST bits set. Disabled - Disable the item function.

	Enabled - Enable the item function.		
TCP Fragment (Offset=1) Drop the fragmented ICMP packets.			
	Disabled - Disable the item function.		
	Enabled - Enable the item function.		
Apply	Save the settings or changes to the switch.		

### III-2-2 DoS Port Setting

This page allows a user to configure and display the state of DoS protection for interfaces. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Auto Logant : Off	81					10.37.26
Dashboard	4	O Los - Los Ports	letting = PortSettings			
Status	1	Dial Gullina				
Switch LAN		a meranning a				
	-	2 in such that		Port Setting		
Storm Control						
Das		Por	rts:	flotting allectar		+
Properties		Dot	S Protection:	⊗Enabled Obisabled		
DoS Port Setting				Apply		
208	-					
System Maintenarice	- 3	Port	DoS Protection		Modify	
Diagnostics	-	GE1	Dissabled		0	
		0E2	Disabled		0	
		GE3	Dissabilied		0	
		GE4	Disabled		0	
		GE5	Disabled		0	
		GE6	Dissbled		0	
		GE7	Distabled		0	
		GEO	Disabled		0	
		GE9	Disabled		0	
		GE10	Disabled		0	
		GE11	Distabilied		0	

Item	Description
Port	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
DoS Protection	<b>Disabled</b> - Disable the function of DoS Protection. <b>Enabled</b> - Enable the function of DoS Protection.
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected GE port.

# Part IV QoS Configuration

VigorSwitch P1280 User's Guide

## **IV-1 General**

QoS (Quality of Service) functions to provide different quality of service for various network applications and requirements and optimize the bandwidth resource distribution so as to provide a network service experience of a better quality.

#### **IV-1-1** Properties

#### IV-1-1-1 QoS General Setting

This page is used to specify Ingress Trust Mode for basic QoS mode.

Auto Logout : OB 🔗	Admin		(000050 Ex
Dashhoard	General + Properties + Goli Glabel Setting		
Status	One Galaxie Setting Truist Ports		
Switch LAN			
Security	OoS Mode:	⊖Basic ⊙Disable	
c.u.	Ingress Trust Mode:	©CoS.802.1p	
General	Pante		
Propetties	_		
Post Schings			
Quieue Rettings			
CoS Madping			
DBCP Milphing			
IP Procedunite Mapping			
Handwidth			
System Maintenance •			
Diagnostics			

Item	Description
QoS Mode	Disable -Disable the function of QoS mode. Basic - Enable the function of QoS mode.
Ingress Trust Mode	<ul> <li>Select the QoS operation mode.</li> <li>CoS/802.1p -Traffic is mapped to queues based on the CoS field in the VLAN tag, or based on the per-port default CoS value if there is no VLAN tag on the incoming packet.</li> <li>DSCP - All IP traffic is mapped to queues based on the DSCP field in the IP header. If traffic is not IP traffic, it is mapped to the lowest priority queue.</li> <li>CoS/802.1p-DSCP - All IP traffic is mapped to queues based on the DSCP field in the IP header. If traffic is not IP but has VLAN tag, mapped to queues based on the CoS value in the VLAN tag.</li> <li>IP Precedence - All IP traffic is mapped to queues based on the DSCP field in the IP header. If traffic is not IP but has VLAN tag.</li> <li>IP Precedence - All IP traffic is mapped to queues based on the DSCP field in the IP header. If traffic is not IP but has VLAN tag.</li> </ul>
Apply	Save the settings or changes to the switch.

#### IV-1-1-2 Trust Ports

This page is used to enable the trust mode of basic QoS on each port. Port that is trust disabled will be sent with lowest priority queue. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Aino Logoint : Or 🛛 😹	Admini		16.5446 🕞
Dashboard	General & Properties & Theil Ports		
Stalut:	OnS Global Setting		
Switch LAN	The second se		
Security		Trust Peds	
40			
General	Ports:	Subming a contract	
	Trust:	Cinable Disable	
		Amoly	
Odooe Settings			
CoS Meaping	Der .		
DSICP Mapping	POR	- Huat Seakin	
JF Procedence Manping	067	Fride	
Bandwigth	GED	Enable	
Bystem Maintenance -	GE4	Enable	
Diagnostics -	OES	Enable	
	069	Enuble	
	0E7	Ensble	
	OEØ	Enable	
	GEA	Enable	
	0E10	Enable	
	0811	Puable	4

Item	Description
Ports	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
Trust	Click Enable to make traffic follow the trust mode in general setting. Enable - Traffic will follow trust mode in general setting. Disable - No QoS service for this port.
Apply	Save the settings or changes to the switch.

## IV-1-2 Port Settings

This page is used to configure port settings for QoS. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Auto Logont : 01	1					(nasa) 🕒
Dashboard		O General	+ Flort Settings + Port Settings			
Status	+	Had Dame				
Switch LAN		Punaeun	ga			
Geoundry	-			Port Settin	iga	
NO.Fr						
General			Ports;	* Motional exercised		14
Proportion			Ingress Default CoS:	.0		
			Egress Remarking			
Goede Bellings			- Remark CoS:	⊖Enable ⊙Disable		
Ces Mapping			- Remark DSCP / IP Precedence:	ODSCP OIP Preceden	ce 🕢 Disable	
DBOP Nisping				Anioty		
e Presedence Mappen	na					
Bandwidth		Port	ingress Default CoS	Remark CoS	Remark DSCP / IP Precedence	Modify
System Maintenance		0E1	Û	Disabla	Disable	0
Nagnostics	-	OEZ	D	Dreable	Disablé	0
		063	0	Dréable	Disable	0
		OE4	D	Desable	Disable	0
		0E5	D	Draabte	Disable	0
		0E5	0	Disable	Disable	0
		OE7	0	Disable	Disable	0

Item	Description
Ports	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
Ingress Default CoS	Specify the default CoS priority value for those ingress frames without given trust QoS tag (802.1q/DSCP/IP Precedence, depending on configuration).
Engress Remarking	
Remark CoS	<b>Disable</b> - Disable CoS remarking function for outgoing packets.
	Enable - Egress traffic will be marked with CoS value according to the Queue to CoS mapping table.
Remark DSCP/IP Precedence	<b>Disable</b> - Disable DSCP/IP Precedence remarking function for outgoing packets.
	<b>DSCP</b> - Egress traffic will be marked with DSCP value according to the Queue to DSCP mapping table.
	IP Precedence - Egress traffic will be marked with IP Precedence value according to the Queue to IP Precedence mapping table.
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected GE port.

	Edit Port	GE1
	Ingress Defa	ult CoS
	0	•
	Egress Rem	arking
	Remark C	oS
der	Disable	•
	Remark DSCP / IP	Precedence
	Disable	•
	UK	Jancel

#### **IV-1-3 Queue Settings**

VigorSwitch supports multiple queues for each interface. The higher numbered queue represents the higher priority. The following lists the types of supported priority queue:

- Strict Priority (SP) Egress traffic from the higher priority queue will be transmitted first, lower priority queue shall wait until all traffic in SP queue is transmitted.
- Weighted Round Robin (WRR) The number of packets sent from the queue is proportional to the weight of the queue.

Auto Logout : 🛛 🚿		Annio			10:39:39 🕞
Dashboard	O General + Davas Sallings	Queue Sebrigs			
Status -	Quaue Sattings				
Switch LAN					
Security -			dueue Settings		
Get 6					
Geniiral	Queue	Schedule	Weight	% of WRR Bandwidth	
Properties	1	@Strict Priority OWRR	0		
Port Settings	2	@Strict Priority OWRR	u		
	3	Strid Prianty OWRR	0	4	
CeS Mapping	4	Strict Priority OWRR	n		
DECP Mapping	5	Strict Priority OWRR	D		
Ф Риссолносе Марріод	6	Strict Priority OWRR	U	12	
Dandwidth	7	@Strict Priority OWRR	0		
System Maintenance •	0	@Strict Priority OWRR	n		
Diagnostics -			Adabé		
	Strict Priority Queue Number				3

Item	Description
Queue	There are eight queue ID numbers allowed to be configured.
Schedule	Strict Priority - Click it to set queue to strict priority type. WRR - Click it to set queue to Weight round robin type.
Weight	If the queue type is WRR, set the queue weight for the queue.
% of WRR Bandwidth	Display the percentage of traffic which can be sent by current queue compared to total WRR queues.
Apply	Save the settings or changes to the switch.
Strict Priority Queue Number	Display the number of queues using Strict Priority method.
## IV-1-4 CoS Mapping

This section allows user to configure how ingress frames with CoS/802.1p tag map to QoS queues, and QoS queues to CoS/802.1p on egress frames.

Actual effectiveness is based on how QoS is configured in previous QoS section. This page provides settings for user to configure mapping only.

wto Engold : Off 🛛 🖉	isimin		10.41:04
ashboard	O General - Cost Mapping - Cost Mapping		
tatus -	( The second sec		
witch LAN -	Cos Mapping		
ecunty -		CoS to Comue Mapping (br. ingress)	
ei -	Class of Senarg	Duniae	
aneral	a a a a a a a a a a a a a a a a a a a	2	
roperatio	1	1 T	
ort Sultmas	2	3	
Name Collinson	3	4	
unde seamign	- 4	5	
	5	6	•
ISCP Matrping	6	7	1.43
P Freçedenre Mapping	7	0	
ndwidth		Queue to C6S Mapping (for Egress Remarking)	
stem Maintenance -	Queue	Class of Service	
gnostics =	1	1	-
	2	0	÷
	э	2	-
		a	
	5	4	-
	6	5	
	7	8	1.4
	0	7	1.4

Item	Description	
CoS to Queue Mapping (for	r Ingress) - Settings for incoming packets.	
Class of Service	Display the class of service value (0 to 7).	
Queue	Define the queue ID (level 1 to 8) for different class of service values.	
Queue to CoS Mapping (for Egress Remarking) - Settings for outgoing packets.		
Queue	Display the queue ID (level 1 to 8) for different class of service values.	
Class of Service	Define the class of service value (0 to 7).	
АррІу	Save the settings or changes to the switch.	

#### IV-1-5 DSCP Mapping

This section allows user to configure how ingress packets with DSCP tag map to QoS queues, and QoS queues to DSCP on egress packets.

Actual effectiveness is based on how QoS is configured in previous QoS section. This page provides settings for user to configure mapping only.

Auto Logout : 🖉 💌	Adminy		10.17.02 D
Dashboard	O Ganeral + D9UP Mapping - D5C9 Mapping		
Status -	Commission in the local data and		
Switch LAN	DSCH Mapping		
Security -		DECP to Queue Mapping (for Ingress)	
ūns -	DSCD	Ouene	
General	TARING Laborer		101
Properties	anomal anistration		
Part Settings	11.	Queue to DSCP Mapping (for Egress Remarking)	
Ounde Sollarge	Queue	DSCP	
CoS Mapping	4	0	2.01
	2	8	
	3	16	
IP Precedence Mapping	4	24	(•)
Bandwidth	5	32	5.41
vstern Maintenance -	6.	40	1
	7	40	1.
lagnostics	8	56	1.41
		Analy	
	DSCP II M	apping to Quesue	
	0 1	the second se	
	· ·		

Item	Description	
DSCP to Queue Mapping (for Ingress) - Settings for the incoming packets.		
DSCP	Display the DSCP value (0 to 63).	
Queue	Define the queue ID (level 1 to 8) for different DSCP values.	
Queue to DSCP Mapping (for Egress Remarking) - Settings for outgoing packets.		
Queue	Display the queue ID (level 1 to 8) for different DSCP values.	
DSCP	Define the DSCP value (0 to 63).	
Apply	Save the settings or changes to the switch.	

#### IV-1-6 IP Precedence Mapping

This section allows user to configure how ingress packets with IP Precedence tag map to QoS queues, and QoS queues to IP Precedence on egress packets.

Actual effectiveness is based on how QoS is configured in previous QoS section. This page provides settings for user to configure mapping only.

uto Logout : On 😿	Admin		10.43.04 🕞
Dashboard	O General > IP Precedence Mapping > = Precedence #	fapoling-	
Stalus -	(Protocol and a second s		
witch LAN -	er procedurer scapping		
ecurity -		IP Precedence to Queue Mapping (for Ingress)	
10 -	IP Precedence	Quarter	
eneral		1	
	i i	2	2
Port Settings	2	0.	
DUNIA BADDOS	- 3		
	- 4	5	(e)
Los Mapping	5	0	
DSCP Mapping	6	7	•
	7	8	·
andwidth	1	Queue to IP Procedence Mapping (for Egress Remarking)	
stem Maintenance -	Queue	IP Precedence	
ignostics -		0	
	2	1	
	-3	2	•
	4	3	
	5	4	• 6
	6	9	
	7	8	÷.(
	8	1	

Item	Description	
IP Precedence to Queue N	lapping (for Ingress) - Settings for the incoming packets.	
IP Precedence	Display the IP Precedence value (0 to 7).	
Queue	Define the queue ID (level 1 to 8) for different IP Precedence values.	
Queue to IP Precedence Mapping (for Egress Remarking) - Settings for outgoing packets.		
Queue	Display the queue ID (level 1 to 8) for different IP Preceden values.	
IP Precedence	Define the IP Precedence value (0 to 7).	
АррІу	Save the settings or changes to the switch.	

## **IV-2 Bandwidth**

Use the bandwidth setting pages to define values that determine how much traffic the switch can receive and send on specific port or queue.

#### IV-2-1 Ingress Rate Limit

This page allows a user to configure ingress port rate limit. The ingress rate limit is the number of bits per second that can be received from the ingress interface. Excess bandwidth above this limit is discarded. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Auto Logout : 🖉 😹		Арата		11.05/35	Ð
Dashboard	O Bandwidth - Ingr	eso, Ralle Limit - Ingneso, Ralle Limit.			
Status -	Incress Pate Limit				
Switch LAN	Ingress is allo Linnit				_
Security	- 1		Ingress Rate Limit		- 0
General	Po	rts:	A othing 1 = ected		
Bandwidth	St	ite:	O Enable @Disable		
	Ra	te (Kbps):		$  (f \hat{n}, t \hat{n} \hat{n} \hat{n} \hat{n} \hat{n} \hat{n} \hat{n} \hat{n}$	
Ecress Shaping Rate			Apply		
Egress Shaping Per Queue					
System Maintenance	Port	Rate Limit (Kbps)		II Modify	
Diagnostics	- DEI	nn		0	
	9EZ	π		0	
	GE3	aff		0	
	GE4	οπ		0	
	GES	off		0	
	0E6	aff		0	
	GE7	ait		0	
	GE8	off		0	
	GEB	nit.		0	
	GE10	nin		0	

Item	Description
Ingress Rate Limit	
Ports	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
State	Disable - Disable ingress bandwidth control.
	Enable - Enable ingress bandwidth control.
Rate (Kbps)	Enter the rate value,<16-1000000>,unit:16 Kbps.
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected GE port.

#### IV-2-2 Egress Shaping Rate

This page allows a user to configure egress port rate limit. The egress rate limit is the number of bits per second that can be received from the egress interface. Excess bandwidth above this limit is discarded.

Auto Logout : Off 🛛 🕿	Admi	n			tionin 📴
Dashboard	G Handwidth + Egress Shabing Rat	e - Egrees Shaping Rate			
Status	Tanana Chuman Pala				
Switch LAN	- growth and a sum				
Security			Egress Shaping Rate		
000					
General	Ports:		Nothing selected		
Bandwidth	State:		⊖Enable @Disable		
lognesia Frato Lamit	CIR (Kbps):			(16-1000000; n	number of 10)
			Amit		
Egress Shaping Per Queue	1				
System Maintenance	Port	CIR (Kbps)		Modify	0.00
Diagnostics	- QE1	off		0	
	GE2	nit		0	
	0E3	off		0	
	GE4	off		0	
	065	off		0	
	GE6	off		0	
	-0E7	off		0	
	GE8	off:		0	
	OE9	off		0	
	GE10	off		0	

Item	Description
Egress Shapping Rate	
Ports	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
State	Disable - Disable egress bandwidth control.
	Enable - Enable egress bandwidth control.
CIR (Kbps)	Enter the rate value,<16-1000000>,unit:16 Kbps.
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected GE port.

#### IV-2-3 Egress Shaping Per Queue

This page allows user to configure the maximum egress bandwidth not only by port but also by specific QoS queues. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Auto Logotal : 🔐 🕥	Altrait		10731 🕞
Dashboard	Bambwidth = Egress Shaping Per Queue + Ecress	- Ehaping Per Oueux	
Status -			
Switch LAN	Egress snaping ren uteue		
Security -		Egress Shaping Per Queue	
uo's	1		
General	Port:	0E1	14
Bandwidth	Queue:	Select Queue ID	(e.)
Ingress Rate Limit	State:	⊖ Enable ③Disable	
Egrees Shaping Rate	CIR (Kbps);	(18-1060006), mullipl	a: al (6)
		ROON	
System Maintenance			
Diagnostics	Queue Information of Port GE1		
	Queue ID	CIR (Khps)	
	4	off	
	2	uff	
	3	off	
	4	aff	
	6	्रम	
	6	off	
	1	m	

Item	Description
Egress Shapping Per Queu	e
Port	Use the drop down list to select the port profile (GE1 to GE28) or profiles.
Queue	Use the drop down list to select queue number for the selected GE port.
State	Disable - Disable egress bandwidth control. Enable - Enable egress bandwidth control.
CIR (Kbps)	Enter the rate value,<16-1000000>,unit:16 Kbps.
Apply	Save the settings or changes to the switch.

# Part V System Maintenance

VigorSwitch G1280 User's Guide

## V-1 LLDP

LLDP is a one-way protocol; there are no request/response sequences. Information is advertised by stations implementing the transmit function, and is received and processed by stations implementing the receive function. The LLDP category contains LLDP and LLDP-MED pages.

#### **V-1-1** Properties

Auto Logout : 🛛 💌	Admin		(1kasité Ge
Dashboard	O LLDP + Properties + LLDP Global Betting		
Status -	LLDP Global Solling		
Security - GoS -	LLDP State: Transmission Interval:	©Fnable ÖDisatile	(5-32767)
System Maintanance	Holdhime Multiplier;	4 <u>R</u>	(2-10)
LLDP	Reinitialization Delays	4	(1-10)
	Transmit Delay:	2	(1.8191)
LLDP For Softing LLDP Local Device LLDP Remote Device LLDP Ovenoading SNMP Access Manager Time and Date Backup Manager Opgrane Manager Account Manager Factory Default Prebot Device	Apply		

This page allows a user to set general settings for LLDP.

Item	Description			
LLDP State	Enable - Enable LLDP protocol on this switch.			
	Disable - Disable LLDP protocol on this switch.			
Transmission Interval	Select the interval at which frames are transmitted. The default is 30 seconds, and the valid range is 5-32767 seconds.			
Holdtime Multiplier	Select the multiplier on the transmit interval to assign to TTL (range 2-10, default = 4).			
Reinitialization Delay	Select the delay before a re-initialization (range 1-10 seconds, default = 2).			
Transmit Delay	Select the delay after an LLDP frame is sent (range 1-8192 seconds, default = 3).			
Apply	Save the settings or changes to the switch.			

## V-1-2 LLDP Port Setting

This page allows a user to select specified port or all ports to configure LLDP state.

Auto Logout - Car 🛛 💌	1	Admin				(1110-15)	Θ.
Dashboard	O LLDP + LL	DP Port Gebria = LLDP Po	n Cetting				
Status Switch LAN	LLDP Port Set	Ding					
Security		Ports:	convey a elected.				
QuS		State:	Disable				
Statum; Minuteronico	8 · · · ·	Optional ILVs:	Notling selected				
LLDP		VLAN:	Finisma asie ded		-		
Properties				Appy			
LLDP Local Donce (1) DP Remole Dovce	Port 0E1	11 State TX8RX	Selected Optional TLVs System Name, Port Description, 802.3 M	II Selected VLAN	.0	Modity	- 13
LLDP Overloading	OE2	TK&RX	System Name, Port Description, 802.3 M	IAC-PHY		0	
SNMP	GE3	TX6RX	System Name, Port Description, 802.3 M	UAC-PHY		0	
Access Manager	(3長4	TX&RX	System Name, Part Desception, 802.3 M	MC-PHY		0	
Time and Date	965	TX8RX	System Name, Port Description, 802.3 M	AC-PHY		0	
Backup Manager	026	TX6RX	System Name, Port Description, 802.3 M	IAC-PHY		0	
Upgrade Manager	0E7	TK&RM	System Name, Port Description, 802.3 M	MC-PHY		0	
Account Manager	656	TX6BX	System Name, Puri Descoption, 802.3 M	WC-PHY		0	
Factory Default	GER	TXERX	System Name, Port Description, 802,3 M	WC-PHY		0	
Reboot Switch	GE10	TKARX	System Name, Port Description, 802.3 M	IAC-PHY		0	
Diagnostics	. GE11	TKBRK	System Name, Port Description, 802.3 M	IAC-PHY		0	

Item	Description
Ports	Use the drop down list to select the port (GE1 to GE28) or ports for device check.
State	Disable - Disable the transmission of LLDP PDUs. TX&RX - Transmit and receive LLDP PDUs both. TX Only - Transmit LLDP PDUs only. RX Only - Receive LLDP PDUs only.
Optional TLVs	<ul> <li>Within data communication protocols, optional information may be encoded as a type-length-value or TLV element inside a protocol. TLV is also known as tag-length value.</li> <li>The type and length are fixed in size (typically 1-4 bytes), and the value field is of variable size.</li> <li>Select the LLDP optional TLVs to be carried (multiple selection is allowed).</li> </ul>
	Available items include System Name, Port Description, System Description, System Capability, 802.3 MAC-PHY, 802.3 Link Aggregation, 802.3 Maximum Frame Size, Management Address and 802.1 PVID.
VLAN	Select the VLAN ID number to be performed (multiple selections are allowed).
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected GE port.

## V-1-3 LLDP Local Device

This page displays information for LLDP Local Device.

Alto Logolit : Of 🛛 🖉	1	adaman	j) († 22 🕞
Dashboard	O LLDP = LLDP Local Device +	LLDP Local Device	
Status	(IDE Invest Duning		
Switch LAN			
Security	-		Device Summary
205	- Narre		II Values
Yahar Mooporparsen	Chassis ID Subtype		MAC Address
LLDP	Chatesii: ID		00 1D JA 08 C1 22
Propenies	System Name		01290
LLDP Port Setting	System Description		:24 Port 10/100/1000BaseT + 4 Port 100M/1000M Combo SFP Web Smart Switch
	Capabilities Supported		Bridge
LDP Remote Owners	Capabilities Enabled		Bridge
LLDP Overloading	Port ID Subtype		interface name
INMP			Port Cietails
Access Manager	Part	ULDP State	Defat
fime and Date	0E1	TKSRX	0
Rackup Manager	OE2	TKSRX	0
Jograde Manager	GE3	TX&RX	0
ccount Manager	GE4	TX&RX	0
actory Default	GE6	TRBHR	0
Rebool Switch	GEG	TX&RX	0
Diagnostics	- GE7	TX&RX	0

Item	Description
Device Summary	Display a summary of the LLDP information for this switch. Chassis ID Subtype - Display the type of chassis ID, such as the MAC address.
	<b>Chassis ID</b> - Display Identifier of chassis. Where the chassis ID subtype is a MAC address, the MAC address of the switch is displayed.
	System Name - Display model name of switch.
	System Description - Display description of switch.
	Capabilities Supported - Display the primary functions of the device, such as Bridge, WLAN AP, or Router.
	Capabilities Enabled - Primary enabled functions of the device.
	<b>Port ID Subtype -</b> Display the type of the port identifier that is shown.
Port Details	Display detailed information of the selected GE port.
	<b>Detail</b> - Click it to review the detailed information contained in TLVs sent out from each interface, containing MAC/PHY, 802.3, 802.3 Link Aggregation, 802.1 VLAN and Protocol for each LAN port (GE1 to GE28).

#### V-1-4 LLDP Remote Device

This page is used to view the information sent from neighboring devices by LLDP protocol.

Auto Logout : Off	-			Admin									08:51		
Dashboard		O LLDP + L	LDP R	emote Dance = LLDP	Remis	its Delvice									
Status	~	TI DP Panta	he Flows												
Switch LAN	- 2	LLDP Henry	a cen		-										_
Security		Local Port	-0	Chassis ID Subtype	0	Chassis ID	Port ID Subtype	0.	Port ID	System Name	Time to Live	11	Details	Delete	11
QoS		GE2		MAC address		001D-A411-22-44	Locally assigned		git	P2280	94		0	0	
System Mandence															
LLDP															
Properties															
LLDP Port Setting															
LLDH Local Device															
LLDP Overloading															
5NMP															
Access Manager															
Time and Date															
Backup Manager															
Upgrade Manager															
Account Manager															
Factory Default															
Report Switch															

Item	Description
Local Port	Display the number of the local port to which the neighbor is connected.
Chassis ID Subtype	Display the type of chassis ID (for example, MAC address).
Chassis ID	Display the identifier of the 802 LAN neighboring device's chassis.
Port ID Subtype	Display the type of port identifier.
Port ID	Display the number of port identifier.
System Name	Display the name of the switch.
Time to Live	Display the time interval in seconds after which the information for remote device will be deleted.
Details	Display detailed information contained in TLVs sent out from neighboring devices.
Delete	Click it to remove information of the selected port.

## V-1-5 LLDP Overloading

This page allows user to review current size, overall size of LLDP packet and whether it is to exceed maximum allowed size of single LLDP packet.

Auto Logout : 🛛 🖉 🐸			Admin								00	52,22 🕞	
Dashboard	QШ	OP + LLDP Overloading	- LLOP Part Setting										
Status Switch LAN	LLDF	Fort Setting											_
Security	Port	Total(Bytes)	Leff to Send(Bytes)	-11	Status	Mandatory TLVs	н	802.3 TLVs	ų	Optional ILVs	L	802.1 1LVs	31
008	· GE1	88	1420		Not Overloading	21(Transmitted)		11(Transmitted)		B(Transmitted)		B(Transmitted)	
Rysbere Maintetrance	GE?	88	1420		Not Overloading	71(Transtmitted)		11 (Transmitted)		9(Transmitted)		B(Transmittent)	
LLDP	060	60	1420		Not Overtoading	21(Transmitted)		11(Transmitted)		9(Transmitted)		0(Transmitted)	
Properties	GE4	60	1420		Not Overloading	21(Transmitted)		11(Transmitted)		9(Transmitted)		O(Transmitted)	
LLCP Port Setting	0E5	60	9420		Not Overloading	21(Transmitted)		11(Transmitted)		9(Transmitted)		8(Transmitted)	
LLDP Local Davice	0E0	68	1420		Not Overloading	21(Transmitted)		11(Transmitted)		H(Transmitted)		BUZ.1 ILVS	
LLOP Remote Davida	GE7	68	1420		Not Overloading	21(Transmitted)		11(Transmitted)		B(Transmitted)		BOTE - Q(TYANSmit	led)
	GEB	88	1420		Not Comilorading	21(Transmithed)		11(Transmitted)		9(Transmitted)		B(Tri S miles)	2
CE MARK	GE9	68	1420		Not Overloading	21(Transmithed)		11 (Transmitted)		9(Transmitted)		8(Transmitted)	
DIAWLE	OE10	69	1419		Not Overloading	22(Transmitted)		11(Transmitted)		9(Transmitted)		8(Transmitted)	
Access Manager	QE11	69	1419		Not Overloading	22(Transmitted)		11 (Transmitted)		9(Transmitted)		0(Transmitted)	
Time and Date	GE12	69	1419		Not Overloading	22(Transmitted)		IT(Transmitted)		9(Transmitted)		8(Transmitted)	
Backup Manager	GE13	69	1419		Not Overloading	22(Transmitted)		11(Transmitted)		B(Transmitted)		B(Transmitted)	
Jøgrade Manager	9E14	89	1419		Not Overloading	22(Transmitted)		11(Transmitted)		B(Transmitted)		B(Transmitted)	
scoont Manager	GE15	69	1416		Not Overloading	22(Transmitted)		11(Transmitted)		R(Transmitted)		B(Transmitted)	
actory Detault	9E16	89	1419		Not Overloading	22(Transamillard)		11 (Transmitted)		9(Transmitted)		B(Transmitted)	
Reboot Switch	GE17	69	1419		Not Overloading	22(Transmitted)		11(Transmilled)		S(Transmitter)		B(Transmitted)	
Jiagnostics	- GE18	69	1419		Not Overloading	22(Transmitted)		11(Transmitted)		9(Transmitted)		0(Transmitted)	

Available settings are explained as follows:

Item	Description
Port	Display the name of the port.
Total(Bytes)	Display the total number of bytes of LLDP information in each packet.
Left to Send(Bytes)	Display the total number of available bytes left for additional LLDP information in each packet.
Status	Display if LLDP TLVs has overloaded the PDU maximum size or not.
Mandatory TLVs	Display how many bytes used by mandatory TLVs.
802.3 TLVs	Display how many bytes used by 802.3 TLVs.
Optional TLVs	Displays how many bytes used by optional TLVs.
802.1 TLVs	Displays how many bytes used by 802.1 TLVs.

## V-2 SNMP

Simple Network Management Protocol (SNMP) is an "Internet-standard protocol for managing devices on IP networks". Devices that typically support SNMP include routers, switches, servers, workstations, printers, modem racks and more.

SNMP is used mostly in network management systems to monitor network-attached devices for conditions that warrant administrative attention.

SNMP is a component of the Internet Protocol Suite as defined by the Internet Engineering Task Force (IETF). It consists of a set of standards for network management, including an application layer protocol, a database schema, and a set of data objects.

An SNMP-managed network consists of three key components:

- Managed device
- Agent software which runs on managed devices
- Network management station (NMS) software which runs on the manager

A managed device is a network node that implements an SNMP interface that allows unidirectional (read-only) or bidirectional (read and write) access to node-specific information. Managed devices exchange node-specific information with the NMSs. Sometimes called network elements, the managed devices can be any type of device, including, but not limited to, routers, access servers, switches, bridges, hubs, IP telephones, IP video cameras, computer hosts, and printers.

An agent is a network-management software module that resides on a managed device. An agent has local knowledge of management information and translates that information to or from an SNMP-specific form.

A network management station (NMS) executes applications that monitor and control managed devices. NMSs provide the bulk of the processing and memory resources required for network management. One or more NMSs may exist on any managed network.

## **VI-2-1** Properties

This page allows a user to enable the function of SNMP for VigorSwitch.

Auto Logout ; Off		Admin		00:59:32	Ð
Dashboard		O SHMP + Properties - ShMP Setting			
Status	~	Courte Catting			
Switch LAN		Crime Control			
Security		State:	O'Enable () Disable		
QoS		Additiv			
Svatern Maintenance	1.0				
LLDP					
SNMP					
SNMP Community					
SNMP Trab Host					
Access Manager					
Time and Date					
Backup Manager					
Upgrade Manager					
Account Manager					
Factory Default					
Reboot Switch					
Diagnostics	2				

Item	Description
State	Enable - Enable the function of SNMP. Disable - Disable the function of SNMP.
АррІу	Save the settings or changes to the switch.

## V-2-2 SNMP Community

This page allows a user to add/remove multiple communities of SNMP.

Admin		00:54:14 E	Ð.
SNMP + SNMP Community + SNMP Community			
SNMP Community			
Dame Schernany			
Community Name:	Franc Computing Cores		
Access Right:	Read Only      Read & Write		
	Add		
No. Community Name	Access Right Action		11
1 public	Read Only		
	SHAP + SHAP Community - SHAP Community      SHAP Community      Community Name:      Access Right:      No.      Community Name     public		Community Kame:     Print Community Community       Community Kame:     Print Community Community       Access Right:     © Read Only       No.     Community Name       1     public         Read Only

Item	Description
Community Name	Enter a name as community name. The maximum length of the text is limited to 23 characters.
Access Right	Read Only - It allows unidirectional access to node-specific information. Read & Write - It allows bidirectional access to node-specific information.
Add	Click it to add a new community.
Action	Delete - Remove the selectd community strings.

## V-2-3 SNMP Trap Host

This page allows user to register where the SNMP agent should send trap to when triggered.

Auto Lopout ( Cor		Admin			08:58:43	Ð
Dashboard		O SNMP + SNMP Trap Host + SIMP Trap Ho	5¥t			
Status		PLIMP True Mont				
Switch LAN	4	anami angla ang				
Security	- 4	IP Address:	Enter Protifican			
QoS.		Community Name:	public		+/	
System Maintanaince		Version:	Tv.		÷ (	
LLDP			Field			
SNMP						
Propurlies		No. Dádtrara	Community Name	Marelan	0 ottom	
BNMP Community		100, P. ORGE 665	No data available	u tahla	Action	
SNH® Trap Host						
Access Manager						
Time and Date						
Backup Manager						
Upgrade Manager						
Account Manager						
Factory Default						
Reboot Switch						
Diagnostics						

Item	Description
IP Address	Enter IPv4 address to receive the trap notification.
Community Name	Use the drop down list to select one existed community name for notification.
Version	Specify SNMP notification version. v1 or v2c - Specify the SNMP Version 1 notification or SNMP Version 2 notification.
Add	Click it to add a new community.
Action	Delete - Remove the selected community strings.

## V-3 Access Manager

This page allows users to control availability of management services such as HTTP, HTTPS, Telent and SSH.



Item	Description
HTTP Service	HTTP is the acronym of HyperText Transfer Protocol.
	Enabled -Click it to enable HTTP service.
HTTPS Service	HTTPS is the acronym of Hypertext Transfer Protocol over Secure Socket Layer.
	Enabled - Click it to enable HTTPS service.
Telnet Service	Telnet is the TCP/IP standard protocol for remote terminal service. TELNET allows a user at one site to interact with a remote timesharing system at another site as if the user's keyboard and display connected directly to the remote machine.
	Disabled - Click it for not accessing telnet service.
	Enabled - Click it to access telnet service.
SSH Service	Enabled - Enable SSH service.
Apply	Save the settings or changes to the switch.

## V-4 Time and Date

## VI-4-1 System Time Zone

This page allows a user to specify where the time of VigorSwitch should be inquired from.

Auto Logorit : Off 🛛 🕺	Minin		an ala 14 🕞
Dashboard	O System Manuerance - Time and Date - System T	Time Zone	
Status -	System Time Zone Time		
Switch LAN			
Security -		Spalern Timo Zone Selling	
005 7	Time Zone:	TwiecsTime Zone	÷-
Evalum Milioteninne	Daylight Saving Lime:	Disable	(÷
LLDP		Anot	
SNMP		System Time Zone Informations	
Access Manager	and the second s	handle a stability	
mmrund (ram	Current Date/Time	08:59:07 (UTO+0) Jan. 1 2000	
Backup Manager	Time zone	UTC+8	
Upgrade Maxager	Daylight Saving Time	Unstablieff	
Account Manager			
Pactory Detaut			
Diamostica -			
Cing into into			

Item	Description	
System Time Zone Setting		
Time Zone	Use the drop down menu to select a time zone that VigorSwitch is located.	
Daylight Saving Time	Select the mode of daylight saving time. Disable -Disable daylight saving time. Recurring - Using recurring mode of daylight saving time.	
	time. USA -Using daylight saving time in the United States that starts on the second Sunday of March and ends on the first Sunday of November	
	<b>European</b> - Using daylight saving time in the Europe that starts on the last Sunday.	
Daylight Saving Time Offse	It is available when <b>Recurring</b> is selected as Daylight Saving Time. Specify the adjust offset of daylight saving time.	
Recurring From / To	It is available when <b>Recurring</b> is selected as Daylight Saving Time. <b>From</b> - Specify the starting time of recurring daylight saving time.	

	To - Specify the ending time of recurring daylight saving time.
Non-recurring From / To	It is available when <b>Non-Recurring</b> is selected as Daylight Saving Time.
	From - Specify the starting time of non-recurring daylight saving time.
	To - Specify the ending time of recurring daylight saving time.
Apply	Save the settings or changes to the switch.
System Time Zone Informations	Display the status of system time zone.

## V-4-2 Time

shboard							
	System Mainlenence . Time and Date . Time						
tus -	System Line Zone						
tch LAN -		and .		- And - Contraction - Contract			
sunty -	Masuai Lune:	2000 +	Jan -	Day -	Hours	- D -	50 -
B		and bar					
tom Mialolotsange	Enable SNTP:	Enable Obis	able				
DP	SNTPATP Server Address:	paol.ntp.org				(XXXX) or Hostname	)
IMP -	Server Part:	123			\$	(1 65535   Default ; 1	23)
cess Manager	anoly						
ne and Dete							
ckup Manager							
igrade Manager							
count Manager							
ctory Default							
boot Switch							
gnostics -							

Available settings are explained as follows:

Item	Description
Manual Time	Specify static time (year, month, day, hours, miniutes and seconds) manually.
Enable SNTP	Enable - Click it to enable SNTP time server. Disable - Click to disable the time server.
SNTP/NTP Server Address	Enter the web site of the time server or the IP address of the server.
Server Port	Enter the port number use by the time server.
Apply	Save the settings or changes to the switch.

## V-5 Backup Manager

Backup Manager allows a user to backup the firmware image or configuration file on the switch to remote TFTP server or host file system through HTTP protocol.

Auto Logout : 🛛 🖓 🖉 🐸	Admin	09:05:00 🕞
Dashboard	🗴 System Mainlanense v Dikchup Manager v Dikchup Manager	
Status -	Rischvin Manader	
Switch LAN -		-
Security -	васкир метнов.	a history a
- QoS	Server IP: Entertained P	(IPv4 or IPv6 Address)
System Maintenance	Dackup Type: <ul> <li>① Configuration</li> </ul>	
LLDP	ADDAY	
SNMP		
Access Manager		
Time and Date		
Bortion Monodon		
Upgrade Manuger		
Account Manager		
Factory Default		
Reboot Switch		
Diagnostics -		

Item	Description
Backup Method	Select Backup method. TFTP - Using TFTP to backup firmware. HTTP - Using WEB browser to ubackup firmware.
Server IP	It is available when TFTP is selected as Backup Method. Enter the IPv4/IPv6 address for the TFTP server.
Backup Type	<b>Configuration</b> - Make a backup copy for the configurations for VigorSwitch.
Apply	Save the settings or changes to the switch.

## V-6 Upgrade Manager

Backup Manager allows a user to upgrade the firmware image or configuration file on the switch to remote TFTP server or host file system through HTTP protocol.

Auto Logout : 🛛 🔿	Admin		DH 08.17 EF
Dashboard	O Zystem Mentemence' + Upgrade Manager + Upgrade Manager		
Status	Upprade Manader		
Switch LAN .	Duerado Medirad	-	
Security -	наралистике	œ	
008 *	FilePath: [道理输来] 未说得版第		
Evolution Mundemanan	Upgrade Type: © Image O Configuration		
LLDP	(App)/		
SNMP			
Access Manager			
Time and Date			
Baslop Manager			
Opprace Monagor			
Account Manager			
Factory Default			
Reboot Switch			
Diagnostics -			

Item	Description
Upgrade Method	Select Upgrade method: TFTP - Using TFTP to upgrade firmware. HTTP - Using WEB browser to upgrade firmware.
Server IP	It is available when TFTP is selected as Upgrade Method. Enter the IPv4/IPv6 address for the TFTP server.
File Name	It is available when TFTP is selected as Upgrade Method. Enter the firmware image or configuration file name on the TFTP server.
File/Path	It is available when HTTP is selected as Upgrade Method. Choose the firmware file located in your computer.
Upgrade Type	It is available when TFTP is selected as Upgrade Method. Image - Click it to upgrade the firmware image. Configuration - Click ito to upgrade the configurations for VigorSwitch.
АррІу	Save the settings or changes to the switch.

## V-7 Account Manager

This page allows a user to add or delete local user on switch database for authentication. The configuration result for each port will be displayed on the table listed on the lower side of this web page.

Auto Logotit : 🖓 🔗	Allmin			31B707 46	Ð
Dashboard	O Statem Mandemarca - Account Maragar - Lag	seld on tolomolium			
Status -	Local Line Information				
Switch LAN.	Local Open modimasian				
Security -			Account		
Q0S -	User Name:	Enter User Name			
Syntrep Mustaparen	Password	Exter Excuseri			
LLDP	Rehme Dasswend:	Color Comment			
SNMP	the strength of the state	E Hier Pacaward			
Access Managet	Faloringia Libert.	Admin	-		
Time and Date			Ntbh		
Backup Manager	e		Local Usoris		
Upgrade Manager	User Name Pas	ssword Type	Privilege type	Meathly	1
Auctional Manager	admin End	mpted	admin	0	
Factory Default					
Rebool Switch					
Diagnostics -					

Item	Description
User Name	Enter a username for new account. If you want to modify an existed user account, simply enter the same string in this field. Then, modify the password and choose privilege level. After clicking <b>Apply</b> , the existed user name will be modified with different values.
Password	Enter a password for new account.
Retype Password	Retype password to make sure the password is exactly you typed before in "Password" field.
Privilege Level	Use the drop down list to select privilege level (Admin/User) for new account. Admin - Allow to change switch settings. User - See switch settings only. Not allow to change it.
Apply	Save the settings or changes to the switch.
Modify	Click it to modify the settings for the selected account.

# V-8 Factory Default

Click Apply to return to factory default settings for VigorSwitch.

Auto Logout :	0r	×	Admini	09/10/28 🕞
Dashboard			🕲 System Mandemance -> Factory Default -> Factory Default	
Status			Earlow Data	
Switch LAN			1310013-00100	
Security		2	Apph	
005		•		
-System Marinin	wiittek			
LLDP				
BNMP				
Access Manag	er			
Time and Date				
Backup Manag	let.			
Upgrade Mana	ger			
Account Manag	907			
Testary Definal	le.			
Report Switch	0			
Diagnostics				

## V-9 Reboot Switch

Click Apply to reboot VigorSwitch with current settings.



# Part VI Diagnostics

VigorSwitch G1280 User's Guide

## **VI-1 Cable Diagnostics**

After finished copper test, the results will be shown on the lower side of this web page.

Item	Description
Port	Use the drop down list to select the port (GE1 to GE28) or ports for performing cable diagnostics.
Start	Perform the copper test action.

## VI-2 Ping Test

Auto Logout : Off 🛛 😤	Admini	08.12.16	C+
Dashboard	O Diagnossice - Ping Test - Fing Test		
Status	Ping Test		
Switch LAN -			
Security -		Ping Test	1
- 205			
System Maintenance -	Protocol: IF	-	
	Host:	(IPv4 addmiss or hostnamo)	
Cable Diagnostics	Count:	🏩 (1-fi)	
Ping Test	Interval (sec):	2 (1-5)	
SysLog		🕤 Start 🕐 Stop	

After finished the ping test, the results will be shown on the lower side of this web page.

Item	Description
Protocol	Choose IPv4/IPv6 to specify IP address for sending ping to check if network path is ok.
Host	Enter the IP address of SNMP server based on the protocol selected above.
Count	It means how many times to send ping request packet.
	Enter a number between 1 and 5 as the count and the default configuration is 4.
Interval(sec)	Define the interval to perform ping action. For example, "1" means the ping action will be performed per second.
Start	Perform ping action.
Stop	Terminate ping action.

## VI-3 SysLog

#### VI-3-1 SysLog Explorer

After clicking View, the results will be shown on the lower side of this web page.

Auto Logost: 🛛 🕅	utmin		0410	na De
Dashboard	O Wyley -Syrley Solowr - Sisley B	lorur		
Status	SysLog Explorer			
Switch LAN				
Security			DysLog Filler	
QeS ·				
System Maintenance	Source:		Valatile Memory	*
Diagnonika	Severity		Maxing accepted	-
Cable Disgnostics	Category		Miniming vacanting	÷
Ping Test			Mew	
SvsLog				
	Source		Volatin Menory	
SysLog Settings	Seventy		enserg, alert, crit, error, warning, nelice, info, debug	
	Category		AAA, ACL, AUTHMOR, CABLE_DIAG, DAI, DHCP_SNOOPING, OVRP, IOMP_SNOOPING,	PSO, L2, LLDP, M
	Total Extres		68	
	P		SysLog Message	
	Refresh Clear All			
	No. 0 Timestamp 1 S	verity 🗌 Category	IT Message	
	1 Jan 01 2000 09:13:45 n	ite AAA	New ternet connection for user admin, source 192,168,1,1 ACCEPTED	

Item	Description
Source	Volatile Memory - Explore the logs contained in volatile memory (also known as RAM).
	Non-Volatile Memory - Explore the logs contained in non-volatile memory (also known as Flash).
Severity	Select severity (emerg, alert, crit, error, warning, notice, info and debug) of log messages which you wish to filter out for review.
Category	Select the categories (related features) of logs you wish to review.
	Category contains AAA, ACL, AUTHMGR, CABLE_DIAG, DAI, DHCP_SNOOPING, GVRP, IGMP_SNOOPING, IPSG, L2, LLDP, Mac-based VLAN, Mirror, MLD_SNOOPING, Platform, PM, Port, PORT_SECURITY, QoS, Rate, SNMP, STP, Security suite, System, Surveillance VLAN, Trunk, UDLD and VLAN.
View	Click it to display logs based on the settings configured above.
Refresh	Click it to refresh the log.
Clear All	Clear it to remove all logs displayed in this page.

#### VI-3-2 SysLog Settings

#### VI-3-2-1 SysLog Service

This page allows user to enable system logging into local syslog and specific remote syslog server for storage.



Item	Description
SysLog Service	Enable - Click it to activate function of syslog. Disable - Click it to inactivate the function.
АррІу	Save the settings or changes to the switch.

#### VI-3-2-2 Local SysLog

This page allows user to enable logging into volatile memory or non-volatile memory.

Auto Logist 1 Off	×	aan				181616 B	
Dashboard		🖸 Svilog - Syslog Sellings - Loss	I SysLeg				
Status		Systog Service Local Systag	Remote SysLog				
Switch LAN							_
Security	-			Lot a systog settings			
008		Francisco		Mellingen entre bart	1		
System Maintenance	1	Source,		summit mustan			
Diagnosiich		Severity:		emerg			
Cable Diagnostics				Apply			
Ping Test							
SysLog		Saura	Statule	Seasting		Delete	
EysiLuir Englisher		Voiatile Memory	enabled	amero alert crit error-warning notice		G	
Swilling Ballings		Agrante methols	61180164	aniary, alon, on, anal, saming house			
172.15.2.171.1250/web web/c							

Item	Description
Source	Volatile Memory - Select the volatile memory for saving local log. Volatile memory does not hold the log after reboot or power off.
	Non-Volatile Memory - Select the non-volatile memory for saving.
	If you want to modify Volatile Memory / Non-Volatile Memory, select Volatile Memory / Non-Volatile Memory in this field. Then, use the drop down list of severity to specify type of log message. After clicking Apply, the Volatile Memory / Non-Volatile Memory will be modified with new configured severity level.
Severity	Select severity (emerg, alert, crit, error, warning, notice, info and debug) of log messages which will be stored.
Apply	Save the settings or changes to the switch.
Delete	Remove all logs displayed in this page.

#### VI-3-2-3 Remote SysLog

This page allows user to enable system logging into specific remote syslog server for storage. After clicking **Apply**, the results will be shown on the lower side of this web page.

Anto Logout : 🖉 😕	Aamin			uutaa Ee
Dashboard	🗿 Systeg – Sy Log Sollingt – Hornito Sy Log			
Status	- Svet on Sanare Lacki Svet on Demote Svet on			
Switch LAN	· · · · · · · · · · · · · · · · · · ·			
Security		Remote SysLog Settings		
00S				
System Maintenance	Server Address:	Balar Sower andpens		
Diomodico	- Server Port:	514	(7 - 65635)	
Cable Diagnoptics	Severity:	amorg		
Ping Test	Facility:	localu		
SysLog		Appy		
SvsLod Explorer				
Dyston Section	Server IP(Port) Statu	is. Severity	Facility	Delete
		No data available in table		

Item	Description		
Server Address	Enter the IP address of Syslog server.		
Server Port	Specify the port that syslog should be sent to.		
Severity	Select severity (emerg, alert, crit, error, warning, notice, info and debug) of log messages which will be stored.		
Facility	One device supports multiple facilities (represented with facility ID, local0 to local7) of remote Syslog server. For each facility ID contains different syslog server configuration, please choose a facility ID for such Syslog server.		
АррІу	Save the settings or changes to the switch.		
Delete	Remove specific remote syslog entry.		

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# **Appendix: Reference**

This chapter will tell you the basic concept of features to manage this switch and how they work.

## A-1 What's the Ethernet

Ethernet originated and was implemented at Xerox in Palo Alto, CA in 1973 and was successfully commercialized by Digital Equipment Corporation (DEC), Intel and Xerox (DIX) in 1980. In 1992, Grand Junction Networks unveiled a new high speed Ethernet with the same characteristic of the original Ethernet but operated at 100Mbps, called Fast Ethernet now. This means Fast Ethernet inherits the same frame format, CSMA/CD, software interface. In 1998, Gigabit Ethernet was rolled out and provided 1000Mbps. Now 10G/s Ethernet is under approving. Although these Ethernet have different speed, they still use the same basic functions. So they are compatible in software and can connect each other almost without limitation. The transmission media may be the only problem.



In the above figure, we can see that Ethernet locates at the Data Link layer and Physical layer and comprises three portions, including logical link control (LLC), media access control (MAC), and physical layer. The first two comprises Data link layer, which performs splitting data into frame for transmitting, receiving acknowledge frame, error checking and re-transmitting when not received correctly as well as provides an error-free channel upward to network layer.



This above diagram shows the Ethernet architecture, LLC sub-layer and MAC sub-layer, which are responded to the Data Link layer, and transceivers, which are responded to the Physical layer in OSI model. In this section, we are mainly describing the MAC sub-layer.

#### Logical Link Control (LLC)

Data link layer is composed of both the sub-layers of MAC and MAC-client. Here MAC client may be logical link control or bridge relay entity.

Logical link control supports the interface between the Ethernet MAC and upper layers in the protocol stack, usually Network layer, which is nothing to do with the nature of the LAN. So it can operate over other different LAN technology such as Token Ring, FDDI and so on. Likewise, for the interface to the MAC layer, LLC defines the services with the interface independent of the medium access technology and with some of the nature of the medium itself.

	DSAP address	S ad	SAP dress	Control	Information		
	8 bits	8 bits		8 or 16 bits	M*8 bits		
DSAP address		=	Destination service access point address field				
SSAP address		=	Source service access point address field				
Control		=	Control field [16 bits for formats that include sequence numbering, and 8 bits for formats the do rot (see 5.2)]				
Information		=	Information field				
		=	Multiplication				
М		=	An integer value equal to or greater than 0. (Upper bound of M is a function of the medium access control methodology used.)				

The table above is the format of LLC PDU. It comprises four fields, DSAP, SSAP, Control and Information. The DSAP address field identifies the one or more service access points, in which the I/G bit indicates it is individual or group address. If all bit of DSAP is 1s, it's a global address. The SSAP address field identifies the specific services indicated by C/R bit (command or response). The DSAP and SSAP pair with some reserved values indicates some well-known services listed in the table below.

0xAAAA	SNAP
0xE0E0	Novell IPX
0xF0F0	NetBios
0xFEFE	IOS network layer PDU
0xFFFF	Novell IPX 802.3 RAW packet
0x4242	STP BPDU
0x0606	IP
0x9898	ARP

LLC type 1 connectionless service, LLC type 2 connection-oriented service and LLC type 3 acknowledge connectionless service are three types of LLC frame for all classes of service. In Fig 3-2, it shows the format of Service Access Point (SAP). Please refer to IEEE802.2 for more details.



## A-2 Media Access Control (MAC)

#### **MAC Addressing**

Because LAN is composed of many nodes, for the data exchanged among these nodes, each node must have its own unique address to identify who should send the data or should receive the data. In OSI model, each layer provides its own mean to identify the unique address in some form, for example, IP address in network layer.

The MAC is belonged to Data Link Layer (Layer 2), the address is defined to be a 48-bit long and locally unique address. Since this type of address is applied only to the Ethernet LAN media access control (MAC), they are referred to as MAC addresses.

The first three bytes are Organizational Unique Identifier (OUI) code assigned by IEEE. The last three bytes are the serial number assigned by the vendor of the network device. All these six bytes are stored in a non-volatile memory in the device. Their format is as the following table and normally written in the form as aa-bb-cc-dd-ee-ff, a 12 hexadecimal digits separated by hyphens, in which the aa-bb-cc is the OUI code and the dd-ee-ff is the serial number assigned by manufacturer.

Bit 47	

1 <sup>st</sup> byte	2 <sup>nd</sup> byte	3 <sup>rd</sup> byte	4 <sup>th</sup> byte	5 <sup>th</sup> byte	6 <sup>th</sup> byte
OUI code				Serial numb	er

The first bit of the first byte in the Destination address (DA) determines the address to be a Unicast (0) or Multicast frame (1), known as I/G bit indicating individual (0) or group (1). So the 48-bit address space is divided into two portions, Unicast and Multicast. The second bit is for global-unique (0) or locally-unique address. The former is assigned by the device manufacturer, and the later is usually assigned by the administrator. In practice, global-unique addresses are always applied.

A unicast address is identified with a single network interface. With this nature of MAC address, a frame transmitted can exactly be received by the target an interface the destination MAC points to.

A multicast address is identified with a group of network devices or network interfaces. In Ethernet, a many-to-many connectivity in the LANs is provided. It provides a mean to send a frame to many network devices at a time. When all bit of DA is 1s, it is a broadcast, which means all network device except the sender itself can receive the frame and response.

#### **Ethernet Frame Format**

There are two major forms of Ethernet frame, type encapsulation and length encapsulation, both of which are categorized as four frame formats 802.3/802.2 SNAP, 802.3/802.2, Ethernet II and Netware 802.3 RAW. We will introduce the basic Ethernet frame format defined by the IEEE 802.3 standard required for all MAC implementations. It contains seven fields explained below.

PRE	SFD	DA	SA	Type/Length	Data	Pad bit if any	FCS
7	7	6	6	2		46-1500	4

**Preamble (PRE)** - The PRE is 7-byte long with alternating pattern of ones and zeros used to tell the receiving node that a frame is coming, and to synchronize the physical receiver with the incoming bit stream. The preamble pattern is:

10101010 10101010 10101010 10101010 10101010 10101010 10101010

Bit 0
**Start-of-frame delimiter (SFD)** - The SFD is one-byte long with alternating pattern of ones and zeros, ending with two consecutive 1-bits. It immediately follows the preamble and uses the last two consecutive 1s bit to indicate that the next bit is the start of the data packet and the left-most bit in the left-most byte of the destination address. The SFD pattern is 10101011.

**Destination address (DA)** - The DA field is used to identify which network device(s) should receive the packet. It is a unique address. Please see the section of MAC addressing.

Source addresses (SA) - The SA field indicates the source node. The SA is always an individual address and the left-most bit in the SA field is always 0.

Length/Type - This field indicates either the number of the data bytes contained in the data field of the frame, or the Ethernet type of data. If the value of first two bytes is less than or equal to 1500 in decimal, the number of bytes in the data field is equal to the Length/Type value, i.e. this field acts as Length indicator at this moment. When this field acts as Length, the frame has optional fields for 802.3/802.2 SNAP encapsulation, 802.3/802.2 encapsulation and Netware 802.3 RAW encapsulation. Each of them has different fields following the Length field.

If the Length/Type value is greater than 1500, it means the Length/Type acts as Type. Different type value means the frames with different protocols running over Ethernet being sent or received.

For example,

0x0800	IP datagram
0x0806	ARP
0x0835	RARP
0x8137	IPX datagram
0x86DD	IPv6

Data - Less than or equal to 1500 bytes and greater or equal to 46 bytes. If data is less than 46 bytes, the MAC will automatically extend the padding bits and have the payload be equal to 46 bytes. The length of data field must equal the value of the Length field when the Length/Type acts as Length.

**Frame check sequence (FCS)** - This field contains a 32-bit cyclic redundancy check (CRC) value, and is a check sum computed with DA, SA, through the end of the data field with the following polynomial.

```
G(x) = x^{32} + x^{26} + x^{23} + x^{22} + x^{16} + x^{12} + x^{11} + x^{10} + x^8 + x^7 + x^5 + x^4 + x^2 + x + 1
```

It is created by the sending MAC and recalculated by the receiving MAC to check if the packet is damaged or not.

#### How does a MAC work?

The MAC sub-layer has two primary jobs to do:

- 1. Receiving and transmitting data. When receiving data, it parses frame to detect error; when transmitting data, it performs frame assembly.
- 2. Performing Media access control. It prepares the initiation jobs for a frame transmission and makes recovery from transmission failure.

#### Frame transmission

As Ethernet adopted Carrier Sense Multiple Access with Collision Detect (CSMA/CD), it detects if there is any carrier signal from another network device running over the physical medium when a frame is ready for transmission. This is referred to as sensing carrier, also "Listen". If there is signal on the medium, the MAC defers the traffic to avoid a transmission collision and waits for a random period of time, called backoff time, then sends the traffic again.

After the frame is assembled, when transmitting the frame, the preamble (PRE) bytes are inserted and sent first, then the next, Start of frame Delimiter (SFD), DA, SA and through the data field and FCS field in turn. The followings summarize what a MAC does before transmitting a frame.

- 1. MAC will assemble the frame. First, the preamble and Start-of-Frame delimiter will be put in the fields of PRE and SFD, followed DA, SA, tag ID if tagged VLAN is applied, Ethertype or the value of the data length, and payload data field, and finally put the FCS data in order into the responded fields.
- 2. Listen if there is any traffic running over the medium. If yes, wait.
- 3. If the medium is quiet, and no longer senses any carrier, the MAC waits for a period of time, i.e. inter-frame gap time to have the MAC ready with enough time and then start transmitting the frame.
- 4. During the transmission, MAC keeps monitoring the status of the medium. If no collision happens until the end of the frame, it transmits successfully. If there is a collision happened, the MAC will send the patterned jamming bit to guarantee the collision event propagated to all involved network devices, then wait for a random period of time, i.e. backoff time. When backoff time expires, the MAC goes back to the beginning state and attempts to transmit again. After a collision happens, MAC increases the transmission attempts. If the count of the transmission attempt reaches 16 times, the frame in MAC's queue will be discarded.

Ethernet MAC transmits frames in half-duplex and full-duplex ways. In halfduplex operation mode, the MAC can either transmit or receive frame at a moment, but cannot do both jobs at the same time.

As the transmission of a MAC frame with the half-duplex operation exists only in the same collision domain, the carrier signal needs to spend time to travel to reach the targeted device. For two most-distant devices in the same collision domain, when one sends the frame first, and the second sends the frame, in worstcase, just before the frame from the first device arrives. The collision happens and will be detected by the second device immediately. Because of the medium delay, this corrupted signal needs to spend some time to propagate back to the first device. The maximum time to detect a collision is approximately twice the signal propagation time between the two most-distant devices. This maximum time is traded-off by the collision recovery time and the diameter of the LAN.

In the original 802.3 specification, Ethernet operates in half duplex only. Under this condition, when in 10Mbps LAN, it's 2500 meters, in 100Mbps LAN, it's approximately 200 meters and in 1000Mbps, 200 meters. According to the theory, it should be 20 meters. But it's not practical, so the LAN diameter is kept by using to increase the minimum frame size with a variable-length non-data extension bit field which is removed at the receiving MAC. The following tables are the frame format suitable for 10M, 100M and 1000M Ethernet, and some parameter values that shall be applied to all of these three types of Ethernet.

Actually, the practice Gigabit Ethernet chips do not feature this so far. They all have their chips supported full-duplex mode only, as well as all network vendors' devices. So this criterion should not exist at the present time and in the future. The switch's Gigabit module supports only full-duplex mode.

416 bytes for 1000Base-X 520 bytes for 1000Base-T								
Preamble	SFD	DA	SA	Length/type	Data	Pad	FCS	Extension*
				64 bytes				

Parameter value/LAN	10Base	100Base	1000Base
Max. collision domain DTE to DTE	100 meters	100 meters for UTP 412 meters for fiber	100 meters for UTP 316 meters for fiber
Max. collision domain with repeater	2500 meters	205 meters	200 meters
Slot time	512 bit times	512 bit times	512 bit times
Interframe Gap	9.6us	0.96us	0.096us
AttemptLimit	16	16	16
BackoffLimit	10	10	10
JamSize	32 bits	32 bits	32 bits
MaxFrameSize	1518	1518	1518
MinFrameSize	64	64	64
BurstLimit	Not applicable	Not applicable	65536 bits



In full-duplex operation mode, both transmitting and receiving frames are processed simultaneously. This doubles the total bandwidth. Full duplex is much easier than half duplex because it does not involve media contention, collision, retransmission schedule, padding bits for short frame. The rest functions follow the specification of IEEE802.3. For example, it must meet the requirement of minimum inter-frame gap between successive frames and frame format the same as that in the half-duplex operation.

Because no collision will happen in full-duplex operation, for sure, there is no mechanism to tell all the involved devices. What will it be if receiving device is busy and a frame is coming at the same time? Can it use "backpressure" to tell the source device? A function flow control is introduced in the full-duplex operation.

# **A-3 Flow Control**

Flow control is a mechanism to tell the source device stopping sending frame for a specified period of time designated by target device until the PAUSE time expires. This is accomplished by sending a PAUSE frame from target device to source device. When the target is not busy and the PAUSE time is expired, it will send another PAUSE frame with zero time-to-wait to source device. After the source device receives the PAUSE frame, it will again transmit frames immediately. PAUSE frame is identical in the form of the MAC frame with a pause-time value and with a special destination MAC address 01-80-C2-00-00-01. As per the specification, PAUSE operation can not be used to inhibit the transmission of MAC control frame.

Normally, in 10Mbps and 100Mbps Ethernet, only symmetric flow control is supported. However, some switches (e.g. 24-Port GbE Web Smart Switch) support not only symmetric but asymmetric flow controls for the special application. In Gigabit Ethernet, both symmetric flow control and asymmetric flow control are supported. Asymmetric flow control only allows transmitting PAUSE frame in one way from one side, the other side is not but receipt-and-discard the flow control information. Symmetric flow control allows both two ports to transmit PASUE frames each other simultaneously.

#### Inter-frame Gap time

After the end of a transmission, if a network node is ready to transmit data out and if there is no carrier signal on the medium at that time, the device will wait for a period of time known as an inter-frame gap time to have the medium clear and stabilized as well as to have the jobs ready, such as adjusting buffer counter, updating counter and so on, in the receiver site. Once the inter-frame gap time expires after the de-assertion of carrier sense, the MAC transmits data. In IEEE802.3 specification, this is 96-bit time or more.

## Collision

Collision happens only in half-duplex operation. When two or more network nodes transmit frames at approximately the same time, a collision always occurs and interferes with each other. This results the carrier signal distorted and undiscriminated. MAC can afford detecting, through the physical layer, the distortion of the carrier signal. When a collision is detected during a frame transmission, the transmission will not stop immediately but, instead, continues transmitting until the rest bits specified by jamSize are completely transmitted. This guarantees the duration of collision is enough to have all involved devices able to detect the collision. This is referred to as Jamming. After jamming pattern is sent, MAC stops transmitting the rest data queued in the buffer and waits for a random period of time, known as backoff time with the following formula. When backoff time expires, the device goes back to the state of attempting to transmit frame. The backoff time is determined by the formula below. When the times of collision is increased, the backoff time is getting long until the collision times excess 16. If this happens, the frame will be discarded and backoff time will also be reset.

$$0 \le r < 2^k$$

where

k = min (n, 10)

## **Frame Reception**

In essence, the frame reception is the same in both operations of half duplex and full duplex, except that full-duplex operation uses two buffers to transmit and receive the frame independently. The receiving node always "listens" if there is traffic running over the medium when it is not receiving a frame. When a frame destined for the target device comes,

the receiver of the target device begins receiving the bit stream, and looks for the PRE (Preamble) pattern and Start-of-Frame Delimiter (SFD) that indicates the next bit is the starting point of the MAC frame until all bit of the frame is received.

For a received frame, the MAC will check:

- 1. If it is less than one slotTime in length, i.e. short packet, and if yes, it will be discarded by MAC because, by definition, the valid frame must be longer than the slotTime. If the length of the frame is less than one slotTime, it means there may be a collision happened somewhere or an interface malfunctioned in the LAN. When detecting the case, the MAC drops the packet and goes back to the ready state.
- 2. If the DA of the received frame exactly matches the physical address that the receiving MAC owns or the multicast address designated to recognize. If not, discards it and the MAC passes the frame to its client and goes back to the ready state.
- 3. If the frame is too long. If yes, throws it away and reports frame Too Long.
- 4. If the FCS of the received frame is valid. If not, for 10M and 100M Ethernet, discards the frame. For Gigabit Ethernet or higher speed Ethernet, MAC has to check one more field, i.e. extra bit field, if FCS is invalid. If there is any extra bits existed, which must meet the specification of IEEE802.3. When both FCS and extra bits are valid, the received frame will be accepted, otherwise discards the received frame and reports frameCheckError if no extra bits appended or alignmentError if extra bits appended.
- 5. If the length/type is valid. If not, discards the packet and reports lengthError.
- 6. If all five procedures above are ok, then the MAC treats the frame as good and de-assembles the frame.

# What if a VLAN tagging is applied?

VLAN tagging is a 4-byte long data immediately following the MAC source address. When tagged VLAN is applied, the Ethernet frame structure will have a little change shown as follows.

Pre	SFD	DA	SA	VLAN type ID	Tag control information	Length/ type	Data	Pad	FCS	Ext	
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Only two fields, VLAN ID and Tag control information are different in comparison with the basic Ethernet frame. The rest fields are the same.

The first two bytes is VLAN type ID with the value of 0x8100 indicating the received frame is tagged VLAN and the next two bytes are Tag Control Information (TCI) used to provide user priority and VLAN ID, which are explained respectively in the following table.

Bits 15-13	User Priority 7-0, 0 is lowest priority
Bit 12	CFI (Canonical Format Indicator)
	1: RIF field is present in the tag header
	0: No RIF field is present
Bits 11-0	VID (VLAN Identifier)
	0x000: Null VID. No VID is present and only user priority is present.
	0x001: Default VID
	0xFFF: Reserved

**Note**: RIF is used in Token Ring network to provide source routing and comprises two fields, Routing Control and Route Descriptor.

When MAC parses the received frame and finds a reserved special value 0x8100 at the location of the Length/Type field of the normal non-VLAN frame, it will interpret the received frame

as a tagged VLAN frame. If this happens in a switch, the MAC will forward it, according to its priority and egress rule, to all the ports that is associated with that VID. If it happens in a network interface card, MAC will deprive of the tag header and process it in the same way as a basic normal frame. For a VLAN-enabled LAN, all involved devices must be equipped with VLAN optional function.

At operating speeds above 100 Mbps, the slotTime employed at slower speeds is inadequate to accommodate network topologies of the desired physical extent. Carrier Extension provides a means by which the slotTime can be increased to a sufficient value for the desired topologies, without increasing the minFrameSize parameter, as this would have deleterious effects. Nondata bits, referred to as extension bits, are appended to frames that are less than slotTime bits in length so that the resulting transmission is at least one slotTime in duration. Carrier Extension can be performed only if the underlying physical layer is capable of sending and receiving symbols that are readily distinguished from data symbols, as is the case in most physical layers that use a block encoding/decoding scheme.

The maximum length of the extension is equal to the quantity (slotTime - minFrameSize). The MAC continues to monitor the medium for collisions while it is transmitting extension bits, and it will treat any collision that occurs after the threshold (slotTime) as a late collision.

# Index

	А	Installation for VigorAPM, 6	
Account Manager, 88			L
	В	License Agreement, 23	
Rackup Manager 86	-	License Information, 25, 26, 31, 37, 3	38, 45, 46, 51
Bandwidth 70		Limiting Rate, 57	
Bandwidth, 70	C		Р
	C	Preamble 56	
CoS Mapping, 67		Properties 58	
	D	Topentes, 56	0
Dashboard, 15, 16			Q
Diagnostics, 91		QoS Configuration, 61	
DoS, 58			S
DoS Port Setting, 60		Security, 55	
DoS Protection, 60		SNMP, 79	
	E	SNMP Community, 81	
Faress Shaning Per Queue 72	_	Storm Control, 57	
Egress Shaping Pate 71		Storm Control, 56	
Egress Shaping Rate, 71	D	Stric Priority Queue, 66	
	F	System Configuration, 19	
Factory Default, 89		System Maintenance, 73	
	G		U
General, 62		Upgrade Manager, 87	
General Setup, 20			337
	Ι		vv
Ingress Rate Limit 70		weight, 66	
ingress Rate Linne, 70		WRR Bandwidth, 66	