Datasheet

V2224G

Version 1.1

Issue History

Version	Date of Issue	Reason for Update
Version 1.0	05/2012	Initial release
Version 1.1	09/2012	Issue 2 - optional 10GbE uplink module added. - E-PON optional uplink module deleted. - removes the features not supported. (ERP, VLAN translation) - switching capacity, throughput updated.

1 Product Overview

The V2224G is a 1U height single-board Layer 2 Gigabit Ethernet switch which has been designed as ultra-compact customer premise equipment.

The V2224G provides 24-port of 10/100/1000Base-T interfaces (RJ45) with 2 mounting slots for the optional uplink modules. It also has a non-blocking architecture and interfaces providing wire-speed and full-duplex packet traffic on all ports. For the uplink interface unit, there are 1-Port 1000Base-X (SFP) / G-PON / 10GBase-R (SFP+) and 2-Port 1000Base-X (SFP) modular type unit. Each uplink module can be inserted into two front slots.

The console interface is located on the most left of the front panel with embedded LED for TX/RX indication. It is for use of equipment management via remote access or CLI.

It is an effective product to network environment of entry-level enterprise, mid-market and branch office networks, a large scale place of business and ISP (Internet Service Provider) to support high-speed internet service than existing Ethernet products. It offers flexible interface to make up diversity network services and benefit of network extension.

The V2224G is a non-blocking Layer 2 gigabit switch which helps to eliminate network traffic bottlenecks. Once more, Link aggregation via IEEE 802.3ad allows administrators to group any number of copper or fiber ports together to form an ultra-high bandwidth pipe that greatly expands bandwidth capacity to the network backbone.

Depending on a type of optional uplink modules, the V2224G can be used as PON Optical Network Unit (ONU)/Multi Dwelling Unit (MDU).

The PON technology adds new features and functionality targeted at improving performance and interoperability, and adds support for new applications, services, and deployment scenarios. Among these changes are improvements in data rate and reach performance, diagnostics, and stand-by mode, to name a few.

The V2224G introduces a point-to-multipoint concept with the PON technology, which enables a cost-effective FTTx service. The reason why PON is considered as a cost-effective solution is its usage of a passive splitter rather than an active switching system.

The benefits of the passive splitter are as follows:

- No power supply / maintenance is needed.
- The splitter does not need any fiber optic transceiver. The number of fiber optic transceivers in the network is minimized.

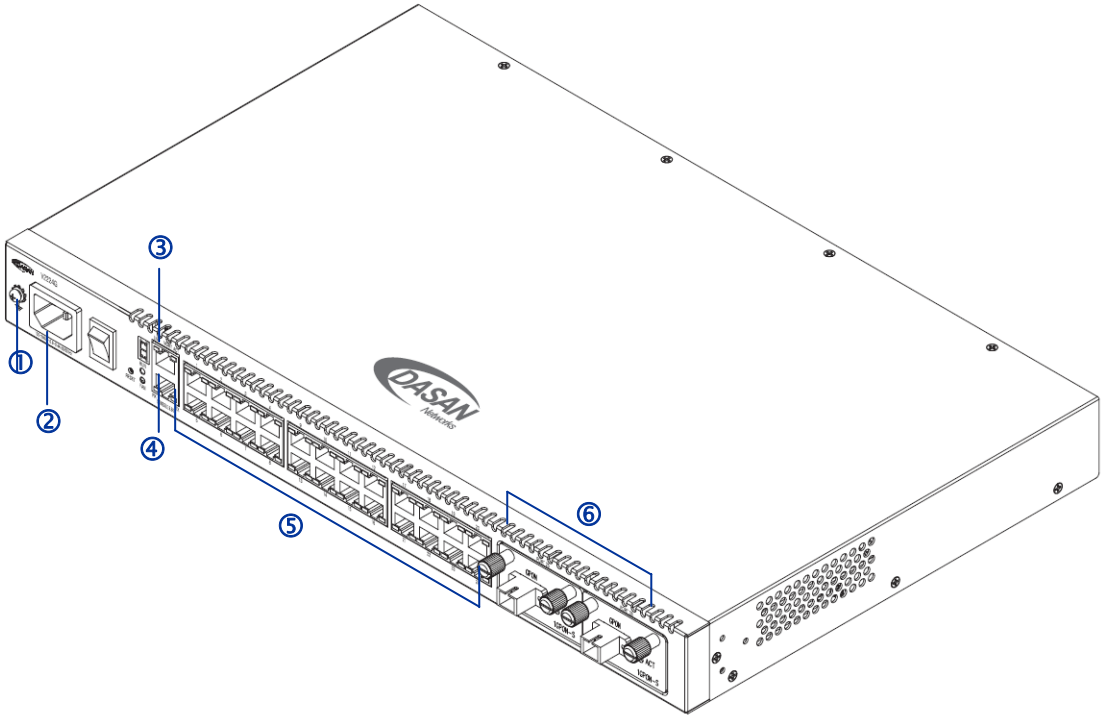

Figure 1 Front View of V2224G

Name	Function	Connector Type
① Ground Terminal	Grounding the switch to avoid electric shock	-
② Power Connector	Connects to AC power cable	-
③ MGMT	Out-of-band TMN-OS Interface	RJ45
④ CONSOLE	CLI access to configure the functions for system operation	RJ45 (RS232)
⑤ Service GE i/f	24 x 10/100/1000Base-T interfaces	RJ45
⑥ Uplink i/f slot	2 x Mounting slots for optional uplink unit	1-Port of 1000Base-X (SFP) G-PON (SC/APC type) 10GBase-R (SFP+) 2-Port of 1000Base-X (SFP)

Table 1 Front Access Interfaces of V2224G

The V2224G has one reserved slot on the rear panel for the fan unit.

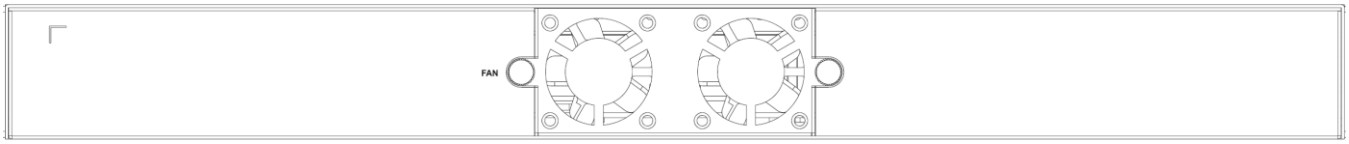

Figure 2 Rear View of the V2224G

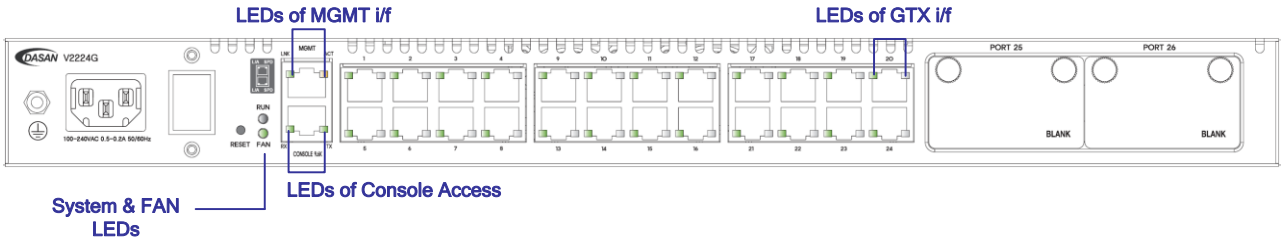

Figure 3 LEDs on the V2224G

Label	Color	Status	Description
RUN	Green	On	The system is starting up to boot.
		Blinking	The system is running with no errors.
		Off	The system is turned off.
	Amber	Blinking	CPU load is high.
FAN	Green	On	FAN is in the normal operating condition.
		Off	FAN is failed.
RS232 TX	Green	Blinking	A transmit activity is present on the console.
		Off	No transmit activity is present on the console.
RS232 RX		Blinking	A receive activity is present on the console.
		Off	No receive activity is present on the console.
MGMT LNK	Green	On	Link is up
		Off	Link is down
MGMT ACT	Amber	On	A transmit or receive activity is present on the MGMT interface.
		Off	No transmit or receive activity is present on the MGMT interface.

Table 2 Operating Status LEDs on the V2224G

Label	Color	Status	Description
LNK/ACT (L/A)	Green	On	The port link is up.
		Blinking	Transmit or receive activity is present on the service port.
		Off	The port link is down.
SPD	Green	On	The Ethernet transmit rate is 1Gbps.
	Amber	On	The Ethernet transmit rate is 100Mbps.
	Off		The Ethernet transmit rate is 10Mbps or link is down.

Table 3 Port Status LEDs of GTX Service Interfaces

1.1 FTTx Service Scenario

PON & Optical Distribution Network

A PON consists of an Optical Line Termination (OLT) located at the Central Office and a set of Multi Dwelling Units (MDUs)/Optical Network Units (ONUs) or Optical Network Terminals (ONTs) located at the customer's premises. Between them is the Optical Distribution Network (ODN) comprising of fibers and passive optical splitters or couplers. A splitter is a device that divides an optical signal into two or more signals. OLT connects the PON to the IP network, controls and manages the PON clients. MDU connects the user specific network to PON. The ONT can be occupied by a single subscriber and also can be a gateway of the local network.

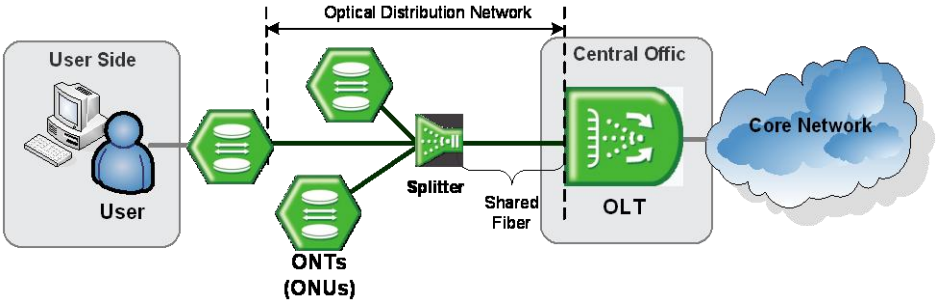

Figure 4 Optical Distribution Network by PON Architecture

G-PON MDU

When G-PON module is inserted into a mounting slot of V2224G, the system can be used as G-PON MDU compliant with ITU-T G.984 standards. As you know, G-PON technology supports upstream 1.244Gbps and downstream 2.488Gbps PON transmission rate and highly efficient bandwidth usage for Ethernet multi-services that ensure carriers to provide reliable quality of services to their customers.

There are different possible deployment topologies for G-PON networks, which differentiate each other basically from the place where the optical fiber is terminated. Depending on the subscriber type and desired topology to the network, the operator may adopt: FTTH (fiber to the Home), FTTB (fiber to the Building), FTTN (fiber to the neighborhood) or FTTC (fiber to the Curb).

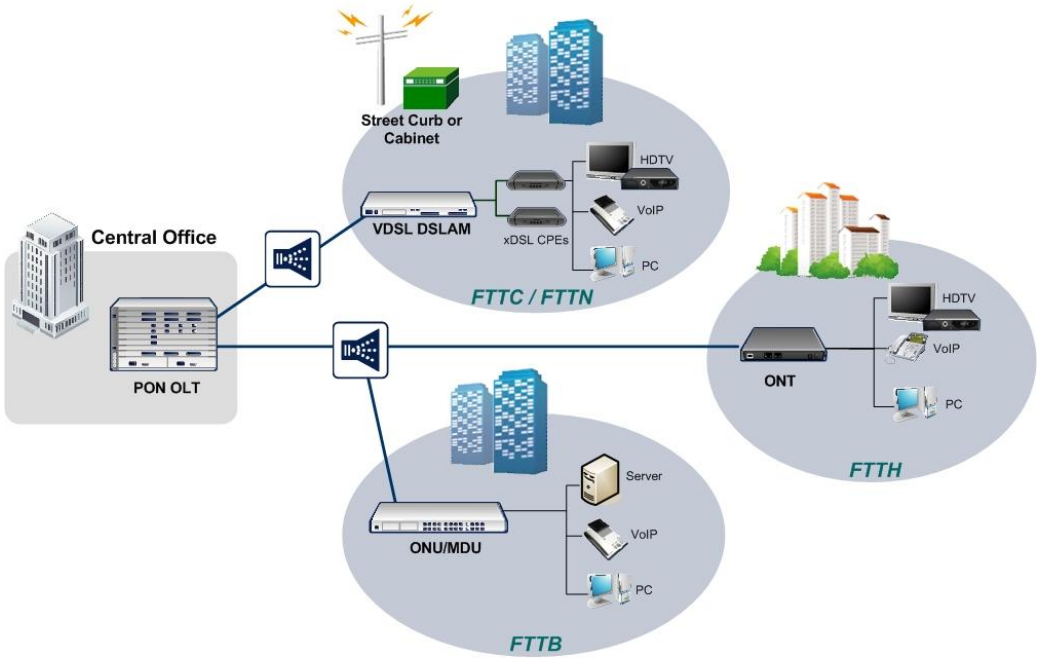

Figure 5 FTTx Service Deployments

2 Product Specification

2.1 System Feature

The V2224G supports the following system features:

- 88 Gbps switching capacity and 65.5 Mpps throughput
- 24 subscriber interface ports
  − 24-Port 10/100/1000Base-T (RJ45) Gigabit Ethernet i/f
- 2 optional expansion slots for uplink modules
  - 1000Base-X (SFP) 1-Port uplink module per slot
  - 1000Base-X (SFP) 2-Port uplink module per slot
  - G-PON (SC/APC-type) 1-Port uplink module per slot
  - 10GBase-R (SFP+) 1-Port uplink module per slot
- LED indicators
- Console command line interface (CLI) via RS232
- Out-of-band management via 10/100Base-TX
- Plug-in fan unit on the rear panel for product cooling

2.2 Functionalities

Layer 2 Switch

- Standard Ethernet Bridging
- Managing 16K MAC addresses in MAC table
- IEEE 802.1Q tagged frame supporting 4K VLANs
- Port/MAC/Subnet/Protocol-based VLAN
- VLAN stacking
- Independent VLAN learning (IVL)
- Spanning tree (STP/RSTP/MSTP/PVSTP/PVRSTP)
- 802.3ad link aggregation
- Port mirroring
- Flow control
- Jumbo frame support
- FTTx deployments for various applications with PON uplink interfaces

Multicast

- IGMP v1/v2/v3
- IGMP Snooping
- MVR

QoS

- Conditional rate limiting
- Diff Serv
- Traffic Scheduling (SP, WRR, DRR)
- 4 queues per port

Security

- SSH v1/v2
- RADIUS, TACACS+ authentication
- MAC/port based authentication according to 802.1x
- Ethernet type / L4-based ACL (Access Control List)
- Storm Control (Broadcast/Multicast/DLF)
- DHCP Filtering
- MAC Filtering

Management

- Serial/Telnet (CLI)
- SNMPv1/v2/v3
- DHCP server, client, relay agent with option82
- RMON
- Software Download/ Upgrade
- Configuration Download/ Upload
- DNS

G-PON MDU Features (optional)

G-PON uplink module of V2224G provides the following features:

- Ethernet packet transport over the PON interface through G-PON Encapsulation Mode (GEM)
- Compliant to ITU-T G.984.x
- Fiber Transceiver (SFF 2x10 SC/APC Type)
- Supports the following data rates:
  - Downstream: 2.488 Gbps
  - Upstream: 1.244 Gbps
- Configurable AES encryption on DS payload
- Configurable FEC on US and DS payload
- Packet data service
  - Downstream: 256 GEM Port-IDs filtering of ingress traffic
  - Upstream : 256 GEM Port-IDs, assigned via L2/L3/L4 classification engine
- Bridging between upstream and downstream directions and CPU
- Up to 256 GPON upstream and downstream flows

2.3 Physical Specification

Mechanics

Dimensions (W x H x D)	17.3 x 1.7 x 10.5 in (440 x 44 x 266 mm)
Minimum free space above shelf	50 mm
Minimum free space below shelf	25 mm
Operating Temperature	-4 ~ 140°F (-20 ~ 60°C)
Storage Temperature	-40 ~ 158°F (-40 ~ 70°C)
Operating Humidity Range	0% to 90% Non-condensing

Power Supply

AC power voltage	100-240VAC, 50/60Hz
Maximum power consumption	40W

Operating Indicators

System LEDs	RUN, FAN
Electrical GE i/f LEDs	L/A, SPD
Console	RX, TX
MGMT	LNK / ACT

Interface Parameter

Gigabit Ethernet i/f	24 x 10/100/1000Base-T (RJ45)
Uplink i/f Slots (1-port module per slot)	2 x 1-Port 1000Base-X (SFP) G-PON (SC/APC-type) 10GBase-R (SFP+) 2-Port 1000Base-X (SFP)
Ethernet i/f for local management	10/100Base-TX
Serial i/f, Console	1-Port (RS232)

3 Uplink Module & Connector Specification

3.1 Uplink Interface Options

The following different uplink modules are available and can be inserted into the dedicated slots. Each uplink module contains one port.

Uplink Module	Description
1SFPM-1G-S	1-Port 1G SFP Uplink Module
1GPON-S	1-port GPON (SC/APC-type) Uplink Module
2SFPM-S	2-Port SFP Uplink Module DDM (Digital Diagnostic Monitoring) support for V2224G - 100/1000Base-X SFP
1SFPXM	1-Port SFP+ Uplink Module DDM (Digital Diagnostic Monitoring) support for V2208G, V2216G, V2224G - 10GBase- R SFP+
Uplink Blank Panel	Uplink Blank Panel

Table 4 Uplink Modules

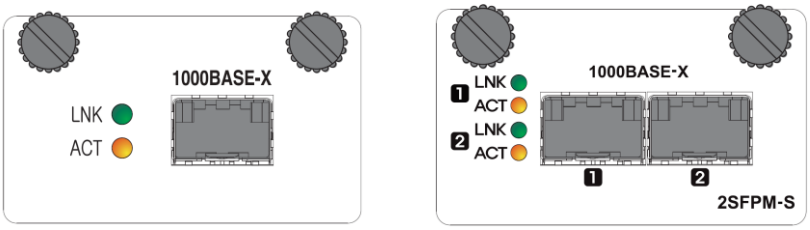

Figure 6 1G SFP uplink modules

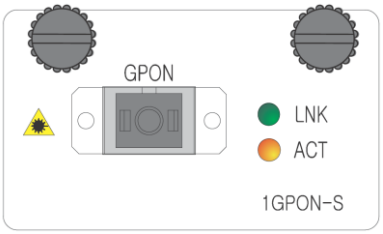

Figure 7 G-PON uplink modules

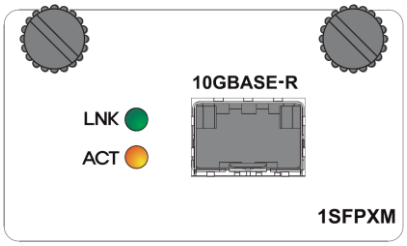

Figure 8 10GbE SFP+ uplink module

3.2 G-PON ONU Optical Transceiver

The followings are the features of G-PON MDU/ONU Transceiver.

- ITU-T G.984.2 compliant GPON ONU Class B+
- Support Digital Diagnostic Monitoring Interface
- 2x10 pin SFF package with pigtail fiber and SC/APC connector
- 1310nm Transmitter, 1490nm Receiver
- Integrated with WDM filter to cut 1550nm and 1650nm optical signal off for Voice/Data FTTx ONT/ONU applications
- Single +3.3V power supply with LVTTL Bias Control input and Rx Signal Detect output
- Bellcore GR-468 compliant
- Laser class 1 product which comply with the requirements of IEC 60825-1 and IEC 60825-2

Optical Connector	Package	Wavelength	Data Rate	Rx sensitivity	Saturation Optical power	Optical Tx Power	Reach	Application code
SC/APC	SFF	1310 nm (TX) 1490 nm (RX)	1.244 Gb/s US 2.488 Gb/s DS	< -28dBm	> -8dBm	+0.5 ~ +5 dBm	20 km	Class B+

Table 5 Specification of G-PON ONU transceiver

3.3 SFP Options

The following different optical SFP modules are available and can be inserted into the dedicated modules.

SFP Module	Description
SFP-GE-SX	SFP GE SX - Wavelength: 850 nm / Distance: 550 m / Mode: multi-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C
SFP-GE-LX10	SFP GE LX10 - Wavelength: 1310 nm / Distance: 10 km / Mode: single-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C
SFP Module	**Description**
SFP-GE-LX20	SFP GE LX20 - Wavelength: 1310 nm / Distance: 20 km / Mode: single-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C
SFP-GE-LX40	SFP GE LX40 - Wavelength: 1310 nm / Distance: 40 km / Mode: single-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0°C ~ 70 °C

Table 6 SFP Modules

Other types of SFP module can be also available upon customer request.

3.4 SFP+ Options

The following different optical SFP+ modules are available and can be inserted into the dedicated modules.

SFP+ Module	Description
SFPP-10GE-SR	SFP+ 10GE SR -. Wavelength : 850nm / Distance : 300m / Mode : Multimode -. Connector: LC / Data rate: 10.3125 Gbit/s / Core type: Dual Core -. Tx Power: -5 ~ -1 dBm, Rx sensitivity: -11.1 dBm -. Operating Temperature : 0°C ~ 70 °C -. 10GBASE-SR (10G)
SFPP-10GE-LR	SFP+ 10GE LR -. Wavelength : 1310nm / Distance : 10Km / Mode :Singlemode -. Connector : LC / Data rate : 10.3125 Gbit/s / Core type : Dual Core -. Tx Power: -8.2 ~ +0.5 dBm, Rx sensitivity: -12.6 dBm -. Operating Temperature : -5°C ~ 70 °C -. 10GBASE-LR (10G)
SFPP-10GE-ER	SFP+ 10GE ER -. Wavelength : 1550nm / Distance : 40Km / Mode :Singlemode -. Connector : LC / Data rate : 10.3125 Gbit/s / Core type : Dual Core -. Tx Power: -4.7 ~ +4.0 dBm, Rx sensitivity: -14.1 dBm -. Operating Temperature : 0°C ~ 70 °C -. 10GBASE-ER (10G)
SFPP-10GE-ZR	SFP+ 10GE ZR -. Wavelength : 1310nm / Distance : 70Km / Mode :Singlemode -. Connector : LC / Data rate : 10.3125 Gbit/s / Core type : Dual Core -. Tx Power: +3 ~ +6 dBm, Rx sensitivity: -22 dBm -. Operating Temperature : 0°C ~ 70 °C -. 10GBASE-ZR (10G)

Table 7 SFP+ Modules

Other types of SFP+ module can be also available upon customer request.

4 Ordering Information

Bases
V2224G Fixed 24-Port 10/100/1000Base-TX, 2 modular uplink slot, fixed single AC Power, 32MB Flash, and 256MB SDRAM
Uplink Interface Options
1SFPM-1G-S, 1GPON-S_T, 2SFPM-S, 1SFPXM, Uplink Blank Panel
SFP Options
SFP-GE-SX, SFP-GE-LX10, SFP-GE-LX20, SFP-GE-LX40
SFP+ Options
SFP+ 10GE-SR, SFP+ 10GE-LR, SFP+ 10GE-ER, SFP+ 10GE-ZR
FAN Options
V2724G-FAN

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