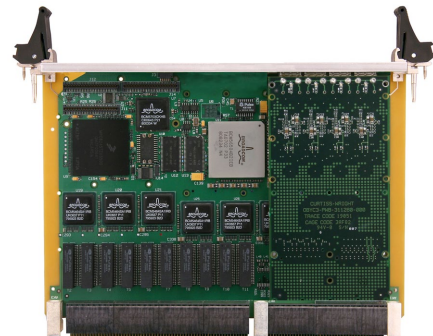




Data Sheet

# VPX6-684 FireBlade



## Features

- ◆ Managed or unmanaged intelligent multi-layer (Layer 2/3) Gigabit Ethernet switch, designed for highest port density in a 6U VPX form factor
- ◆ Supports complete range of convection and conduction-cooled formats (IEEE 1101.1, IEEE 1101.2)
- ◆ Data plane designed with Broadcom® StrataXGS® III switch chip with up to 24 wire-speed 10/100/1000MB/s non-blocking, auto-negotiating ports
- ◆ Up to four 10GbE XAUI interfaces for high-speed backbones
- ◆ Option of up to four optical Ethernet (1000Base-SX) interfaces
- ◆ Control and management functionality designed using a Freescale Power Architecture™ MPC8245 integrated system controller with 256MB SDRAM, 4MB boot flash, 128MB Flash File System Disk
- ◆ Enhanced security with the PMC-110 CryptoNet™ to provide an ICSA certified state-full firewall that protects against evasive attacks
- ◆ Supports both in-band management through any of the 24-ports, and out-of-band management through a serial EIA-232 interface
- ◆ Field upgradeable through a Serial EIA-232 Interface or a 100Base-TX debug Ethernet interface
- ◆ Fully integrated Layer 2 switching, Layer 3 routing, Quality of Service (QoS), IP multicast, security and network management
- ◆ Intuitive “Industry Standard” Command Line Interface (CLI), Web interface, SNMP interface and Telnet access for easy configuration and network management
- ◆ Rear Transition Module (RTM) with cabling to enable up to 24GbE RJ45 interfaces, one 100Base-TX debug port, two EIA-232 Serial Interfaces and four 10GbE Interfaces for easy network setup
- ◆ Front panel LED status indicator provides per port link speed (10, 100, 1000MB/s or 10GB/s) and per-port link activity (receive or transmit)
- ◆ Fits in a single VITA 46 switch slot

## Overview

Enabling the vision of Network Centric operations and extending the reach of transformational networks, the VPX6-684 FireBlade is a GbE multi-layer switch that is ideally suited for building Intra-Platform Networks (IPNs) for air, land, and sea vehicles or ground stations. VPX6-684 FireBlade enables fast, reliable forwarding (switching and routing) of control and data packets with up to 24 wirespeed 10/100/1000MB/s interfaces and up to four 10GB/s uplinks that can be used to connect multiple chassis, cards, or even processors within platform networks.



Learn More

Web / [sales.cwembedded.com](http://sales.cwembedded.com)

Email / [sales@cwembedded.com](mailto:sales@cwembedded.com)

ABOVE & BEYOND

**CURTISS  
WRIGHT** Controls  
Embedded Computing  
[cwembedded.com](http://cwembedded.com)



Using star, dual star, mesh and hybrid network topologies, the VPX6-684 FireBlade provides a flexible cost effective solution that can be used to architect reliable 1 or 10 GbE communications infrastructure for current and future networked platforms. Redundancy and fail-over can be implemented using dual star and mesh networks while investment dollars can be retained by implementing hybrid network topologies that coexist with legacy and/or next generation interconnection strategies. Ready to deploy, the Curtiss-Wright Controls Embedded Computing's VPX6-684 FireBlade allows systems integrators to reduce development costs and Time-to-Market (TTM) by simply plugging the VPX6-684 FireBlade into their 6U VPX chassis, connecting the appropriate Ethernet ports, and focusing on the optimal partitioning and segmentation of their application's network.

### Designed for Maximum Performance

Allowing system integrators to develop and deploy switch-fabric based architectures today, the VPX6-684 FireBlade provides a completely integrated and unified management, control, and data plane solution for wire-speed performance of switched GbE traffic. Whether it is small, medium or larger IPNs, the VPX6-684 provides unique port combinations that scale from 12, 20 and 24GbE port versions.

The VPX6-684 FireBlade is comprised of a basecard (Figure 1) with 24x 1GbE and 4x 10GbE interfaces routed to the backplane with an option of four optical 1GbE ports that are routed to the front for air-cooled environments or can be routed to the back using flexible pigtail connectors. Table 1 lists the various port types supported by the VPX6-684.

Table 1: Port Type Specification

Port Type	Specification
10Base-T	802.3 standard
	Automatic (MDI/MDIX) crossover
	EIA Category 3, 4, or 5 unshielded twisted pair cabling
	Maximum of 100 meters per segment length
100Base-TX	802.3u standard
	Automatic (MDI/MDIX) crossover
	EIA Category 5 unshielded twisted pair cabling
	Maximum of 100 meters per segment length
1000Base-T	802.3ab standard
	Automatic (MDI/MDIX) crossover
	EIA Category 5E unshielded twisted pair cabling
	Maximum of 100 meters per segment length
1000Base-SX	Front panel LC connectors or flexible pigtails with LC terminations that can be routed to the back
	Full duplex or simplex optics with separate Tx/Rx interfaces
	Multi-mode support
	Core/cladding: 62.5/125 or 50/125
	IEEE 802.3z
10GbE XAUI	Signaling supports 10GBASE-CX4
	IEEE 802.3ae

Other components of the VPX6-684 include an optional PMC-110 CryptoNet Security module, a Rear Transition Module (RTM) for easy RJ45 connectivity in the lab, and an LED front panel indicator for port status and activity.

Based on the industry leading Broadcom® StrataXGS® III multi-layer switch, the VPX6-684 FireBlade is capable of providing up to 24 10/100/1000MB/s Ethernet ports with 64 million packets/second (line rate) aggregate switching capacity. The key features at the core of each Broadcom® StrataXGS® III that facilitate low latency wire-speed performance include 1MB of high-speed fully integrated on-chip packet buffer memory, Fast Filter Processors (FFP) per port, and advanced packet flow control capability per port. The four 10GbE XAUI ports can be used to stack routers to enable higher port counts, or they can be used to create high-speed 10GbE backbones.

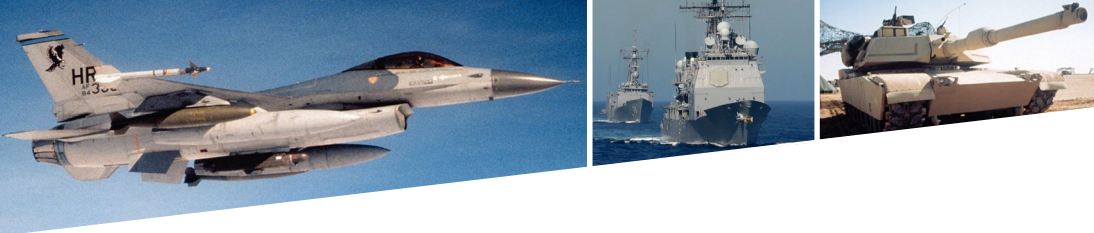
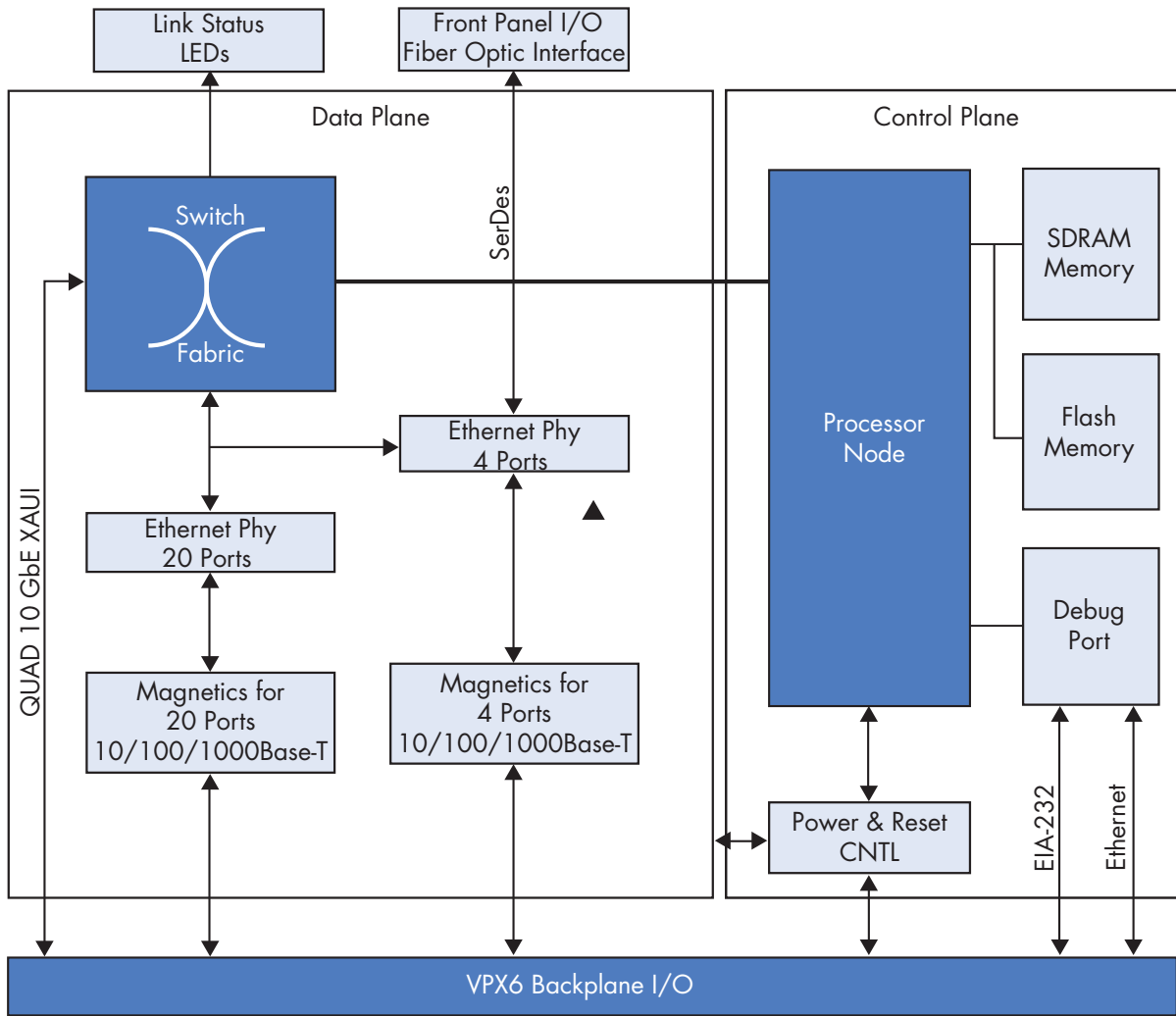


Figure 1: VPX6-684 Hardware Block Diagram



### Advanced Security

The VPX6-684 FireBlade can also be configured as a Unified Threat Management (UTM) router that is capable of strong perimeter defense through an ICISA certified firewall. This is achieved with the PMC-110 CryptoNet. This optional security PMC module provides an industrial strength statefull firewall that can protect against multiple evasive attacks.

VPX6-684 security features include:

- ◆ Statefull firewall
- ◆ Access control list (ACL) filtering
- ◆ Network Address Translation (NAT)
- ◆ Encryption/Decryption/Authentication
- ◆ Key generation/management
- ◆ Enables VPN with secure tunneling (IPSec/L2TP)



The PMC-110 CryptoNet connects to the StrataXGS® III multi-layer switch through 2GbE interfaces and can be managed through a serial EIA-232 port.

### Managed vs. Unmanaged Switches

Both managed and unmanaged versions of the VPX6-684 FireBlade are available. The unmanaged version functions only as a L2 switch with minimal software and a quick boot time. The managed version is a L2/L3 router with complete managed L2/L3 software, Quality of Service (QoS), IP multicasting, and basic security. Management interfaces include “industry standard” CLI, SNMP, and web for easy configuration and network management. (Refer to Table 2 for Management Interfaces and Connection Strategies.)

Systems Integrators can plug the VPX6-684 into their VITA 46 chassis switch slot and focus on architecting their network through one of many intuitive management interfaces.

Table 2: Management Interfaces and Connection Strategies

Interface	Connection	Client
CLI	- EIA-232/485 - Any in-band Ethernet port	Terminal Program Telnet
Web	- Any in-band Ethernet port	Web Browser
Network Management Station (NMS)	- Any in-band Ethernet port	Standard off the shelf NMS Software

### Complete Integrated Software Solution

Managed versions of the VPX6-684 FireBlade provide extensive pre-integrated software that runs on its processor. Major software components include the full suite of Layer 2/3 software protocols required for intelligent switching and routing of IP packets (Figure 3 and Figure 4). Curtiss-Wright Controls also provides extra software features such as declassification, and Built-in Tests (BIT). BIT tests include Power BIT (PBIT), Continuous BIT (CBIT), and Initiated BIT (IBIT). Declassification is a utility that erases the non-essential contents in the Flash File System. This process

deletes the routing tables, filters and purges the switch of Ethernet packets and restores default configuration files from flash. This provides an extra layer of memory protection, and the ability to recover default information in the event of corruption.

### Accessories

For building networks in the lab environment, Curtiss-Wright Controls provides a VPX6-684 FireBlade RTM that plugs into the backside of the VME64x backplane and provides up to 24-ports of RJ45 connectors, one 10/100 debug port, two EIA-232 serial interfaces and 4-ports of 10GbE.

The VPX6-684 RTM can support the 12, 20 or 24-port versions of the VPX6-684 FireBlade and provides four 10GbE ports, two EIA-232/485 ports, one 10/100 RJ45 out-of-band debug port, and a reset switch. The EIA-232/485 port is multiplexed to communicate with either the MPC8245 processor on the basecard or the MPC8555E processor on the Security PMC.

An LED front panel indicator is included in all air-cooled versions of the VPX6-684 FireBlade cards. For conduction-cooled versions, the LED front panel mezzanine connects to the outside of the thermal frame and is sold separately.



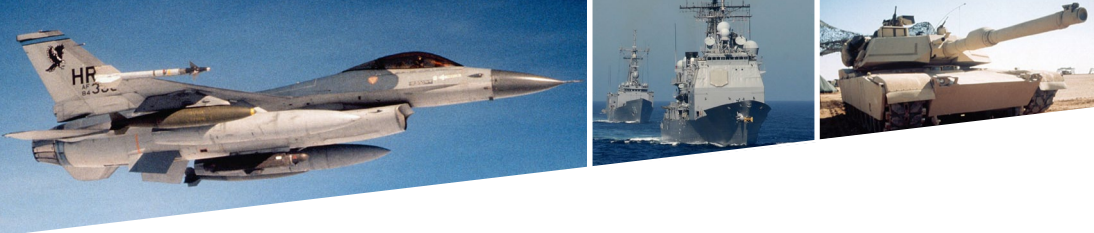
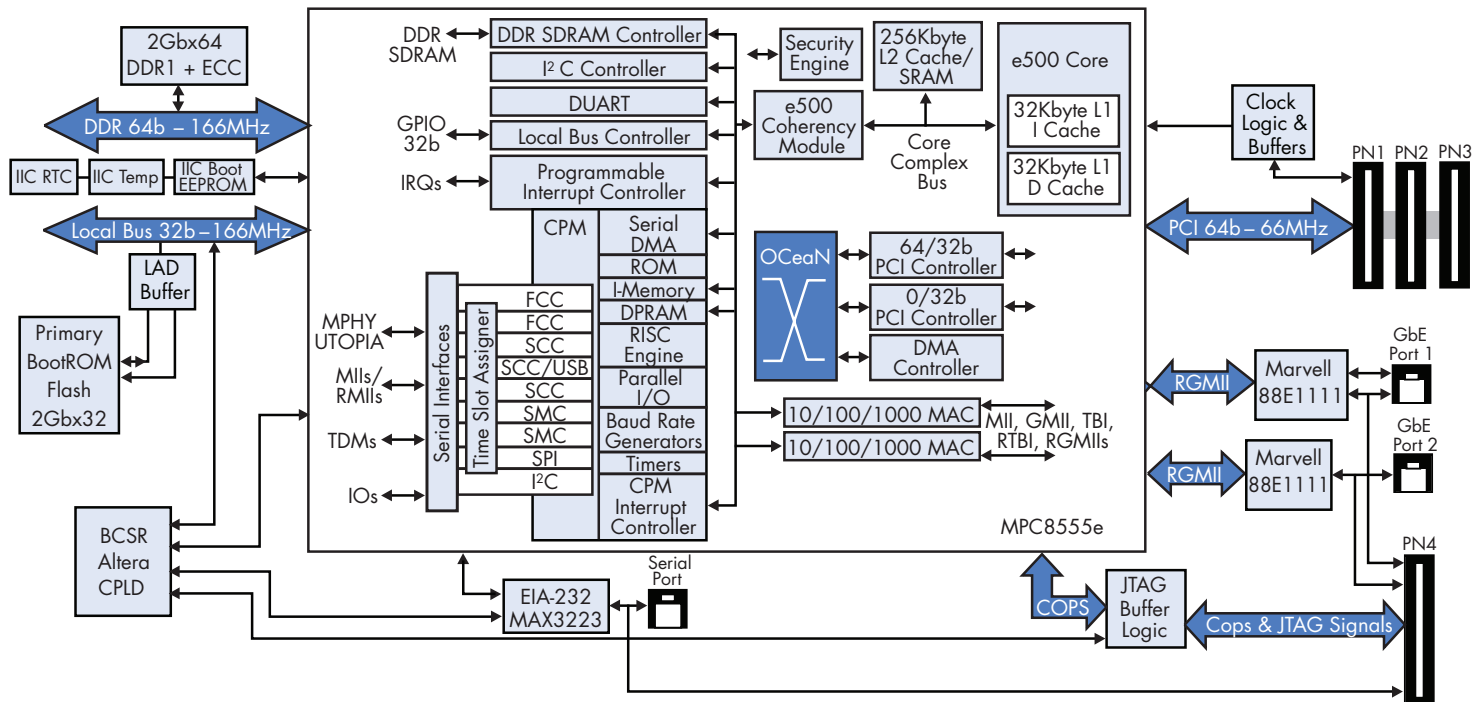
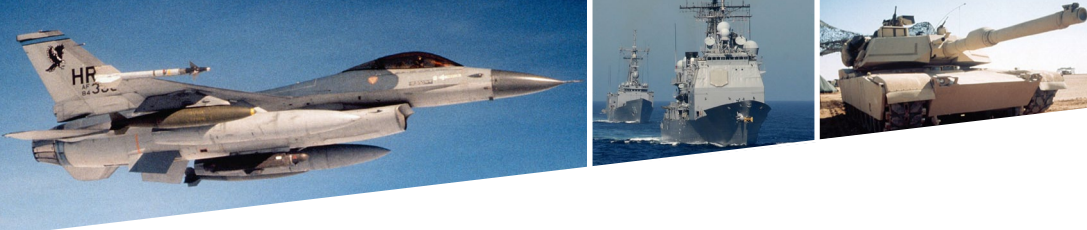


Figure 2: The Enhanced Security Software Block Diagram of PMC-110 CryptoNet Running on MPC8555E Processor





## Specifications

Table 3: Overall Feature Specifications

Feature	Specification
Number of Ports	Up to 24 1GbE ports plus up to four 10GbE ports (depending on variant purchased)
Out of Band Ports	100Base-TX Ethernet interface for software update
	JTAG support
	EIA-232 serial interface
Form Factor	Designed for convection and conduction-cooled applications compliant to IEEE 1101.1 and IEEE 1101.2
	6U slot width: 0.8" slot pitch (variants without 2LM covers); 0.85" slot pitch (variants with 2LM covers)
Throughput	64 million packets/second aggregate switching capacity (24 port version)
Capacity	Packet Buffer 2MB pool
	Support for jumbo packets up to 9KB
	Up to 16,384 Layer 2 MAC addresses
	Up to 4,096 Layer 3 IPv6 routes
	4,096 Virtual LANs supported
	1024 Layer 2 Multicast groups
	Content Aware Processor: 16 internal lookup processors; 4096 flows per processor
Layer 2 Features	Loop free, Transparent Bridging
	Rapid Spanning Tree Protocol (RSTP)
	Multiple Spanning Tree Protocol (MSTP)
	VLAN Routing and Support
	LAN information passing via GARP
	VLAN registration passing via GVRP
	Propagation of Multicast registration via GMRP
	Forwarding Multicast traffic using IGMP Snooping
	Increased Bandwidth and load sharing with Link Aggregation
	Support for Port Mirroring
	Support for Rate Limiting on each port
Layer 3 Features	Unicast routing protocols like RIP, BGP & OSPF
	Inter VLAN routing
	QoS, in the form of Differential services. Supports both: Differential Services Code Point DSCP mapping; Per Hop behavior
	Multicast route computation using PIM & DVMRP: SM - sparse mode DM - dense mode
	Redundancy and Load Sharing through VRRP

Feature	Specification
General Features	Support for DHCP Server / BOOTP server
	Switch Configuration Save and Restore
	Log file download via TFTP
	Management of Switch through: - SNMP - WebNM - CLI
	Secure management interfaces through secure http (SSL) and secure shell (SSH)
	RMON System probe for groups: - 1 Statistics - 2 History - 3 Alarm - 9 Events
	Power On Built-in Self Test

Table 4: Summary of Hardware Specifications

Feature	Description
Multi-layer switch	Broadcom® StrataXGS® III 565xx series
Management/Control Processor	Freescall™ Power Architecture™ MPC8245
Memory	- 256Mbyte SDRAM - 4Mbyte boot flash - 128MB Flash File System Disk
1GbE Ports	Up to 24
10GbE Ports	Up to 4
Serial Ports	Up to 2 EIA-232
Debug Ports	100Base-TX Ethernet port, 1 JTAG connector
Reset Switch	On RTM or via backplane
LEDS	Status an activity for each port
Power	Maximum Power required from + 5V Supply: 45W
	Voltage Tolerance on + 5V Supply: - 4.875 to 5.25V tolerance - Less than 50 mV Peak to Peak noise
Form Factor	6U VPX
Environmental	Convection or Conduction-cooled (AC0, AC100, CC200, CC300 w/2LM – see Curtiss-Wright Controls ruggedization tables)



**Table 5: Summary of Software Specifications**

Specification	Description
Switching Solution	Single Broadcom® StrataXGS® III
Management/Control Processor	Freescale™ Power Architecture™ MPC8245 on PMC
Memory	- 256MB SDRAM - 4MB boot flash - 128MB Flash File System Disk
Ethernet Ports	Up to 24 ports (see Table 1)
Serial Port	2 Serial COM ports
Debug Port	- 100Base-TX Ethernet port - 1 JTAG connector
Physical Interfaces	Up to 6 BCM5464
Reset Switch	Switch resettable through backplane
LEDS	Status and activity for each port
Power	- 28W (12 ports) - 37W (20 ports) - 45W (24 ports) - 57W (24 ports + security)
Form Factor	6U VPX (160 mm x 233 mm)
Ruggedization	Conduction or convection-cooled

**Table 6: Weight**

Ruggedization	Basecard Alone	Basecard with PMC
Air-cooled	785g	893g
Conduction-cooled	895g	1003g

### Ruggedization Levels

VPX6-684-Axxxx card: Available in levels 0 and 100 (required airflow is 12 CFM at sea level)

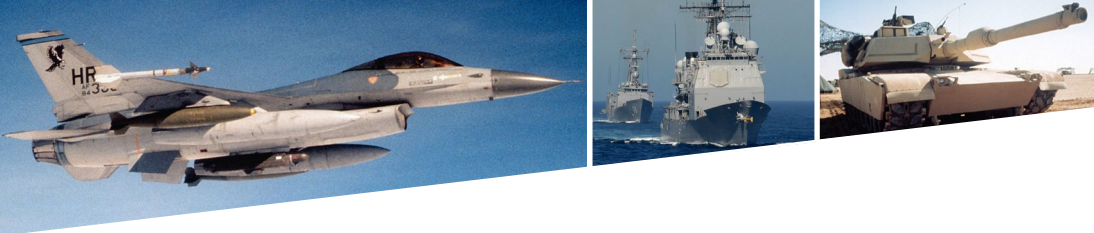
VPX6-684-Cxxxx card: Available in levels 200 and 300

Unless otherwise noted environmental tolerance is as defined in Curtiss-Wright Controls' Ruggedization Guidelines factsheet.

**Table 7: Recommended Variants:**

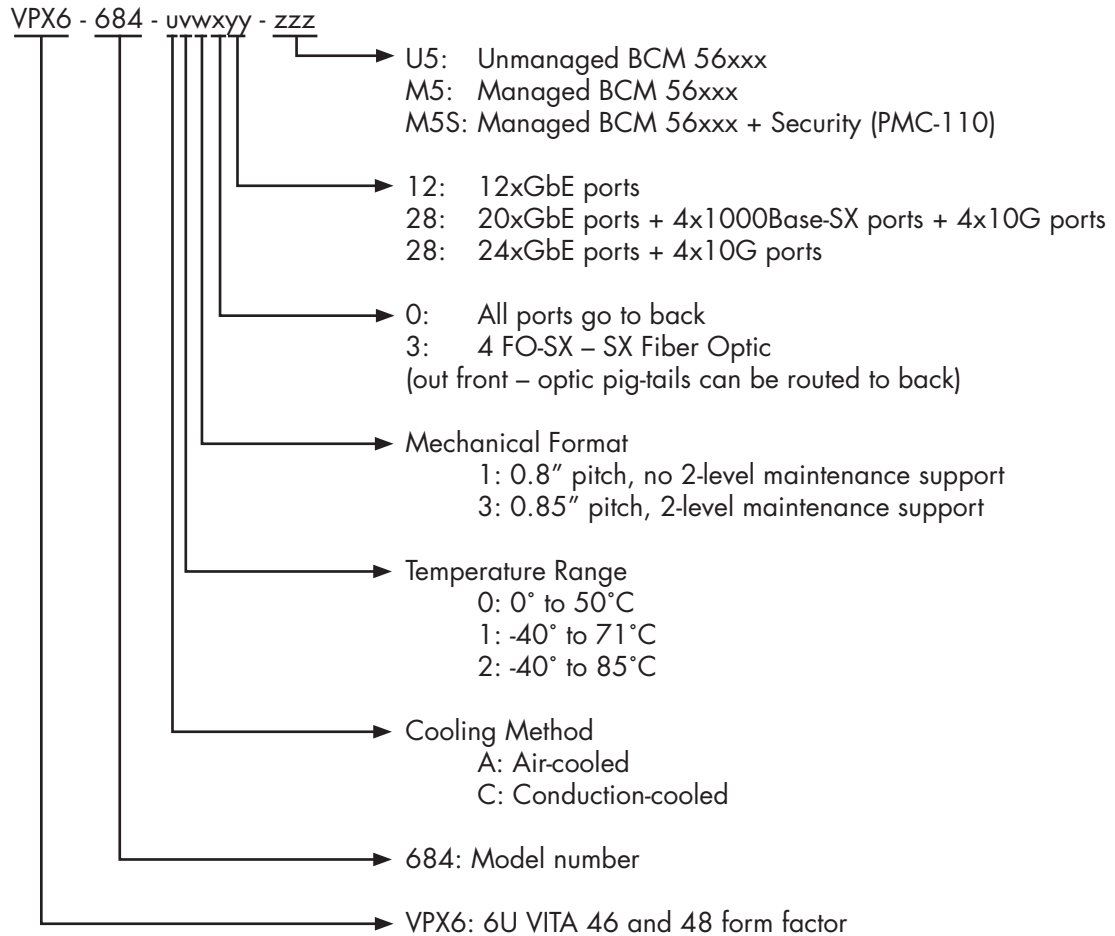
Part Number	Description
VPX6-684-A01028-M5	- Managed Router - 24 ports 1GbE + 4 ports 10GbE to rear - Layer 2/3 software - Air-cooled, L0 ruggedization - 0.8" pitch, fitted with 1" faceplate
VPX6-684-A01328-M5	- Managed Router - 20 ports 1GbE + 4 ports 1GbE optical + 4 ports 10GbE to rear - Layer 2/3 software - Air-cooled, L0 ruggedization - 0.8" pitch, fitted with 1" faceplate
VPX6-684-A11020-M5	- Managed Router - 20 ports 1GbE - Layer 2/3 software - Air-cooled, L100 ruggedization - 0.8" pitch, fitted with 1" faceplate
VPX6-684-C21028-M5	- Managed Router - 24 ports 1GbE + 4 ports 10GbE to rear - Layer 2/3 software - Conduction-cooled - L200, 0.8" pitch
RTM-684-0028	Rear Transition Module - Up to 24 GbE ports - Up to 4 10G ports - 2 serial - Out of band 10/100 debug port - JTAG, Reset
MNT-684-0000	Yearly Software Maintenance

Note other variants are also available, please check with your local sales contact.



## Part Numbers and Ordering Information

Check with your local Curtiss-Wright Controls representative for availability for specific part numbers.



### Warranty

This product has a one year warranty.

### Contact Information

To find your appropriate sales representative, please visit:

Website: [www.cwembedded.com/sales](http://www.cwembedded.com/sales)

Email: [sales@cwembedded.com](mailto:sales@cwembedded.com)

### Technical Support

For technical support, please visit:

Website: [www.cwembedded.com/support1](http://www.cwembedded.com/support1)

Email: [support1@cwembedded.com](mailto:support1@cwembedded.com)

The information in this document is subject to change without notice and should not be construed as a commitment by Curtiss-Wright Controls Embedded Computing. While reasonable precautions have been taken, Curtiss-Wright Controls assumes no responsibility for any errors that may appear in this document. All products shown or mentioned are trademarks or registered trademarks of their respective owners.