RAPTOR® SERIES

PRODUCT BOOKLET

iS5 COMMUNICATIONS

SERVICES • SUPPORT • SECURITY • SOLUTIONS • SYSTEMS

THIS PAGE INTENTIONALLY LEFT BLANK

R A P T O R ®

RAPTOR® iMX350/iMX950 (IEC 61850)

Intelligent 28 Port L2/L3 cyber secure platform, IEC 61850 Ed. 2, IEEE 1613 standards compliant
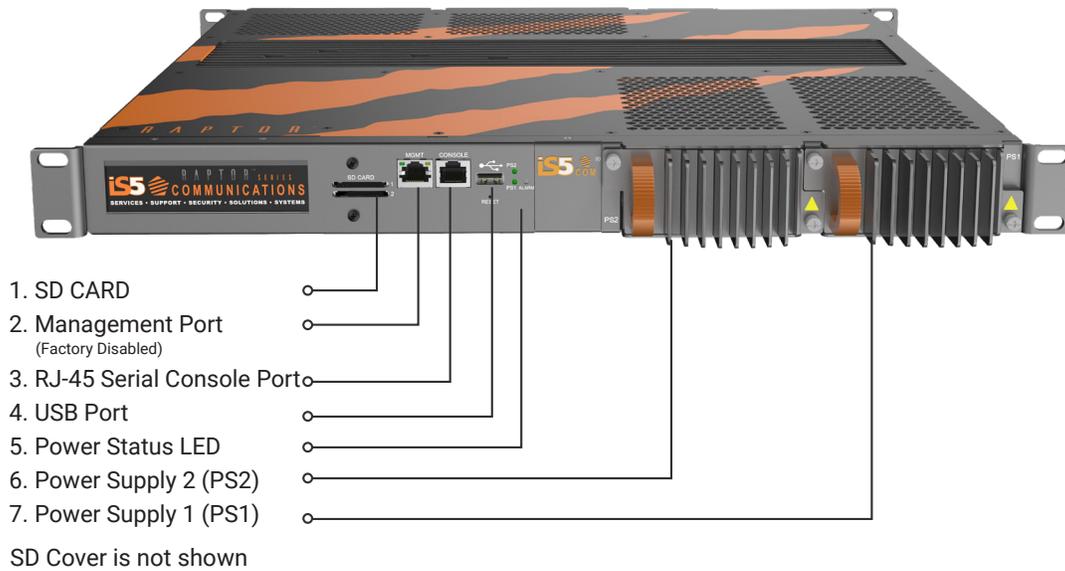
The RAPTOR® iMX350 and iMX950 are Intelligent Cyber Secure Platforms running the iBiome® OS. The iBiome is an all-encompassing operating system that supports switching and routing on a single platform.

The RAPTOR has been designed for future scalability. Its modular system of field replaceable modules, hot-swappable power supplies, and its ability to run third party software applications makes it a very flexible platform for today and the future. The iMX350 and iMX950 have been specifically designed to protect and secure critical infrastructures in the harsh environments found in utility and substation applications. It meets or exceeds the standards set out in IEC 61850-3 and IEEE 1613 for utility communication equipment in substation environments.
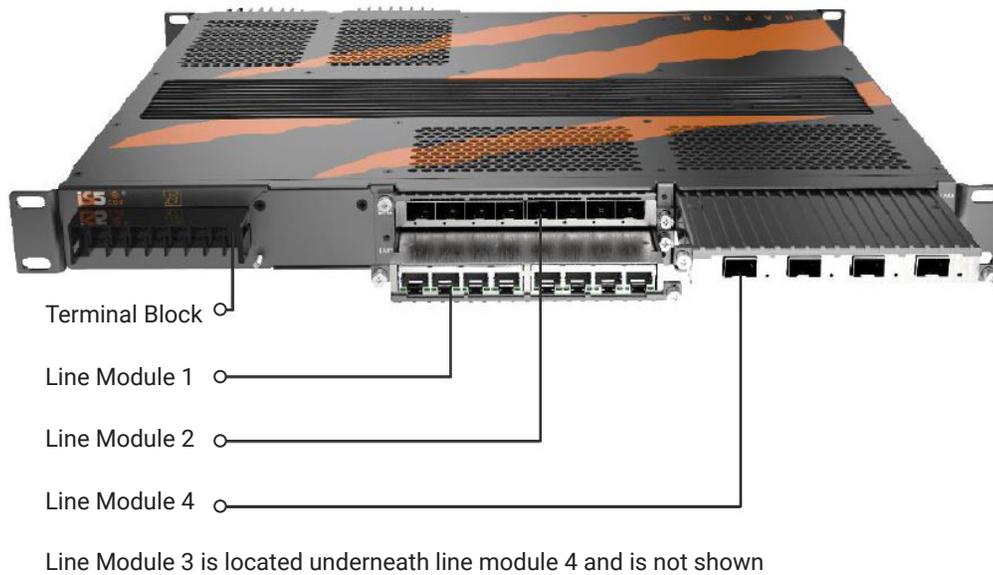
In addition to the switching and routing software capabilities found in the iMX350, the iMX950 supports a stateful firewall, NAT and IPSec capabilities.

iMX350	iMX950
L2	L2
L3	L3
REDUNDANT POWER SUPPLIES	REDUNDANT POWER SUPPLIES
128 BIT AES ENCRYPTION	128 BIT AES ENCRYPTION
1588 V2 TRANSPARENT CLOCK	1588 V2 TRANSPARENT CLOCK
X	IPSEC/VPN
X	STATEFUL FIREWALL
X	NAT

1. SD CARD
2. Management Port
   (Factory Disabled)
3. RJ-45 Serial Console Port
4. USB Port
5. Power Status LED
6. Power Supply 2 (PS2)
7. Power Supply 1 (PS1)

SD Cover is not shown

BACK VIEW

Terminal Block

Line Module 1

Line Module 2

Line Module 4

Line Module 3 is located underneath line module 4 and is not shown

DESCRIPTION

NUMBER OF SLOTS	Up to 4 slots

PORTS

ETHERNET NETWORK PORTS	Slot #1- 3—supports up to 8 x 10/100/1000 RJ45s, or 8 x 100/1000 SFPs, up to 24-ports may be configured to support PoE, see below for details Slot #4—supports up to 4 x 10GB Base-X or 4x1GB Base-X Uplinks
SERIAL CONSOLE PORT	RS-232 in RJ-45 connector with console cable. 115200bps, 8, N, 1
USB PORT / SD CARD	USB 2.0 for software and configuration update
OTHER HARDWARE FEATURES	Modular chassis with hot-swappable modules Redundant hot-swappable power supplies
ALARM	Fault Contact: relay output to carry capacity of 1A at 24VDC

PRODUCT SPECIFICATIONS

TECHNOLOGY

MAC TABLE	16K
PRIORITY QUEUES	8
PROCESSING	Store-and-Forward
SWITCH PROPERTIES	Switching latency : 7 µs Switching bandwidth: 128 Gbps
JUMBO FRAME	Up to 9216 bytes
IEEE 1588 PTP	IEEE 1588 precision timing protocol v2 with Power Profile, in transparent clock mode. Supported in slots 1,2 and 3.

PHYSICAL CHARACTERISTICS

ENCLOSURE	IP40 Satin Coat Steel
DIMENSIONS	486.15 (W) x 446.65 (D) x 44.36(H) mm (19.14 x 17.58 x 1.75 inches)
WEIGHT	9.8 kg (21.6 lbs.)

POWER

REDUNDANT INPUT POWER	Dual Power Supplies available in any combination of 24VDC (Nom.), 48VDC (Nom.), and 100-240VAC/VDC (Nom.)
POWER CONSUMPTION	60 Watts
OVERLOAD CURRENT PROTECTION	Fast Acting Fuse 3.15A (can only be replaced in the factory)

POWER OVER ETHERNET (AVAILABLE ON PoE CONFIGURED iMX350/iMX950)

MAX PoE POWER FROM iMX350 SWITCH	720 Watts
MAXIMUM PoE POWER FROM 8GRJ45P LINE MODULE	240 Watts
POWER LEVELS AVAILABLE PER PORT	Default up to 30 Watts per port Two adjacent RJ45 ports may draw up to 60 Watts. For 60 Watt PoE, disable PoE on the neighboring port.
SLOTS WHERE PoE IS SUPPORTED	Slots 1, 2, and 3
NOTES	Power over Ethernet is a factory configured option on the iMX350/iMX950. It requires an external power supply to supply the power to PoE ports.

WARRANTY

WARRANTY	5 years, (extendable option with additional terms)

MICRORAPTOR®

*Micro*RAPTOR® (IEC 61850)

Compact 16 Port L2/L3 Substation Switch, IEC 61850 Ed. 2, IEEE 1613 standards compliant

The *Micro*RAPTOR® is an Intelligent Cyber Secure Platform running the iBiome OS. The iBiome® is an all encompassing operating system that supports switching and routing on a single platform.

*Micro*RAPTOR is available as a base unit with 8-ports 10/100/1000TX, and has a factory configurable second module which supports an additional 8-ports 10/100/1000TX or 100/1000Base-X SFP.

*Micro*RAPTOR supports Layer 2 and Layer 3 Switching and offers industry specific features such as IEEE 1588v2 precision timing support.

Table 1. Features and Benefits of *Micro*RAPTOR®

FEATURE	BENEFIT
FLEXIBLE COMPACT LAYER 3 SWITCH	The compact layer 3 switch supports up to 16-ports 10/100/1000TX RJ45 The *Micro*RAPTOR may also be ordered with support for 8-ports 10/100/1000TX and 8-ports for SFPs All configurations are factory configured
SIMPLIFIED GUI - EASY TO USE	Allows easy configuration and monitoring with a web-based User Interface Eliminates the need for more complex terminal emulation programs Reduced cost of deployment; one platform—multiple functions
ROBUST INDUSTRIAL DESIGN	-40°C to +85°C (-40°F to 185°F) operating temperature No fans needed Ingress Protection rating of IP40
IEEE 1588 TRANSPARENT CLOCK	All Ethernet ports on the *Micro*RAPTOR support the IEEE 1588v2 Power Profile for Transparent Clock operation.

Table 2. Common Specification

DESCRIPTION	
*Micro*RAPTOR	All *Micro*RAPTOR units come with 8-ports 10/100/1000TX with RJ45 interfaces. They are factory configurable with up to 8 additional ports: Option 1) 8-ports 10/100/1000TX with RJ45 interfaces Option 2) 8-ports 100/1000 Mbps SFP (transceivers not included)
PORTS	
SERIAL CONSOLE PORT	RS-232 with an RJ45 interface for console cable. 115200bps, 8, N, 1
USB PORT	USB 2.0 for software updates, downloading syslog files and configuration backup/restore
IEEE 1588v2 SUPPORT	IEEE 1588v2 Transparent Clock Support for all Ethernet ports
ALARM	Fault Contact: relay output to carry capacity of 1A at 24VDC
WARNING / MONITORING SYSTEM	Relay output for fault event alarming Syslog client to record and Syslog Relay to forward Syslog messages SNMP

TECHNOLOGY

MAC TABLE	16K
PRIORITY QUEUES	8
PROCESSING	Store-and-Forward
SWITCH PROPERTIES	Switching latency : 7 µs Switching bandwidth: 128 Gbps Max. number of available VLANs: 4K
JUMBO FRAME	Up to 9216 bytes

PHYSICAL CHARACTERISTICS

ENCLOSURE	Aluminum and steel enclosure
DIMENSIONS	82.72 (W) x 197.12 (D) x 188.39 (H) mm (3.26 x 7.42 x 7.76 inch)*
WEIGHT	1.9 kg (4.2 lbs)

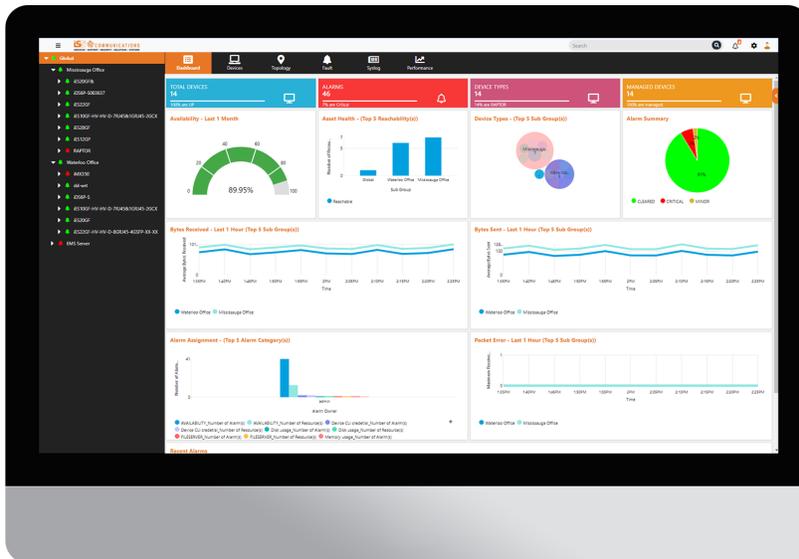## POWER

REDUNDANT DC POWER OPTION	Dual Power Supplies available in any combination of: 24VDC Nominal / 10-36VDC Operational 48VDC Nominal / 36-72VDC Operational Redundant DC power supplies are load sharing
AC POWER OPTION	Single Power Supply 100-240 VAC/VDC Nominal 88-300VDC or 85-264VAC Operational
POWER CONSUMPTION	50 Watts
OVERLOAD CURRENT PROTECTION	Fast Acting Fuse 3.15A (can only be replaced in the factory)
INSTALLATION CATEGORY	Overvoltage Category II, Pollution degree II

WARRANTY

WARRANTY	5 years, (extendable option with additional terms)

* Dimensions given are for DIN mount with lug screw terminal block configuration.

RAPTOR*Eye*®

Network Management System

RAPTOR*Eye*® is a powerful and comprehensive network management system for monitoring networks.
To simplify the management of complex networks, RAPTOR*Eye* can be configured with a full complement of Fault, Topology, Performance, and Security features.

RAPTOR*Eye* enables network administrators to efficiently monitor status and performance of all devices and pinpoint bottlenecks in real-time. With the advanced Fault Management capabilities, RAPTOR*Eye* provides alarm filtering, alarm correlation, and alarm handling features that help administrators isolate and correct problems in the network.

The RAPTOR*Eye* user interface has been designed with ease of use in mind and to simplify network administrator's tasks. Navigation between applications is simple and intuitive, with consistent access to reports and screens.

FEATURES

TOPOLOGY DISPLAY	RAPTOREye has the intelligence to automatically discover devices in a network and display network details in multiple views: 1) A geographical view using Google Maps 2) An interactive connectivity view showing all devices and the physical connections between them 3) A link view showing details of each link between devices
CHASSIS VIEW	The chassis view provides an instant physical snapshot of supported iS5Com devices with the real time chassis view. The product image provides a view of each interface, along with asset attributes such as firmware version.
FAULT REPORTING	RAPTOREye offers an intuitive GUI for tracking alarms and recording of all faults in the network. It has a built-in interface for managing the faults. RAPTOREye has a range of publishing and display tools including automatic filtering and forwarding of alarms to email for ensuring timely notification of problems.
REPORTS	RAPTOREye can monitor multiple key performance metrics continuously for each configured network element and displays the results in multiple report formats for the convenience of the administrators. It can generate reports such as Bytes Received, Bytes Sent, or other key metrics within the defined network. These reports help the administrator to identify quickly the bottlenecks and problems within a specific network.
SECURITY	RAPTOREye includes extensive security features for user and role management enabling administrators to implement fine-grained security policies with user-friendly access tools and provide appropriate controls over access to network resources. Comprehensive audit logs are built into RAPTOREye providing a detailed history of user actions and system events.
SLA ASSURANCE	RAPTOREye generates reports on availability of all configured network elements and makes that data available in intuitive report formats. These availability reports help service providers monitor the availability of all equipment within the network to offer a guaranteed SLA (Service Level Agreement) for the end-customer. To help administrators narrow down network problems related to specific equipment, RAPTOREye provides availability statistics such as MTTR (Mean time to Repair), MTTF (Mean time to Failure) and MTBF (Mean time between Failures). RAPTOREye also supports enforcing thresholds of various performance metrics. Using the threshold support, administrators can be warned of performance degradation rapidly and take necessary preventive actions to provide the guaranteed SLA.

SYSTEM REQUIREMENTS

SERVER OPERATING SYSTEM	CentOS 7 Windows Server 2019 Windows Server 2016 Windows 10
SERVER CONFIGURATION	Processor: Quad Core 2.66 GHz Memory (RAM): 8 GB Disk Space: 100 GB
CLIENT BROWSER	Mozilla Firefox Google Chrome

THIS PAGE INTENTIONALLY LEFT BLANK

iS5 COMMUNICATIONS

SERVICES • SUPPORT • SECURITY • SOLUTIONS • SYSTEMS

For more information, visit **Mega Hertz**