

# 10Gbps CE2.0 Compliant Network Interface Device



## ES Series

The ES-1440 family leverages the purpose-built silicon technologies to fulfill the needs that modern Carrier Class Ethernet services require with ultra-low power consumption. The standard compliant features bring hassle free operations with the benefits of unmatched resiliency, superb synchronization accuracy, and comprehensive OAM.

## Comprehensive Ethernet OAM Suite

As the SLA (Service Level Agreement) is at the center part of the Carrier Ethernet services, and the Ethernet OAM protocol suite is the key to enable the services. The ES-1440 NIDs embed the hardware Ethernet OAM engines for ensuring the real time monitoring can be achieved. The protocol suite covers link status, service level, network monitoring, as well as performance metrics. IEEE 802.1ag CFM, 802.3ah EFM, ITU-T Y.1731 Performance Monitoring are all included in the OAM feature suite, furthermore, both IETF RFC 2544 and ITU-T Y.1564 hardware-based tester are also in place which enables the operation center the ability of performing diagnostics and performance testing remotely. This capability effectively reduces service personnel costs and ensures outstanding user experiences.

## Nano-Second Grade Accurate Timing Performance

The PTP (IEEE 1588v2) has become the de facto synchronization solution that has been widely adopted in different application scenarios which requires precision timing mechanism. By incorporating the OCXO better than what Stratum 3 required, the ES-1440 NIDs perfectly maintain the 1588v2 accuracy within nano-second scale. The Sync-E (ITU-T G.826x) assisted 1588v2 delivers not only the accuracy, but with outstanding stability persistently. The importance of synchronization grows drastically as the mobile traffic grows with unprecedented speed. The exceptional PTP performance on ES-1440 effectively satisfies such synchronization requirements the LTE & LTE-Adv. base-stations needed. The 1588v2 capabilities delivered by ES-1440 ensure what LTE & LTE-A requested, and potentially what the 5G technology will need can be perfectly fulfilled.

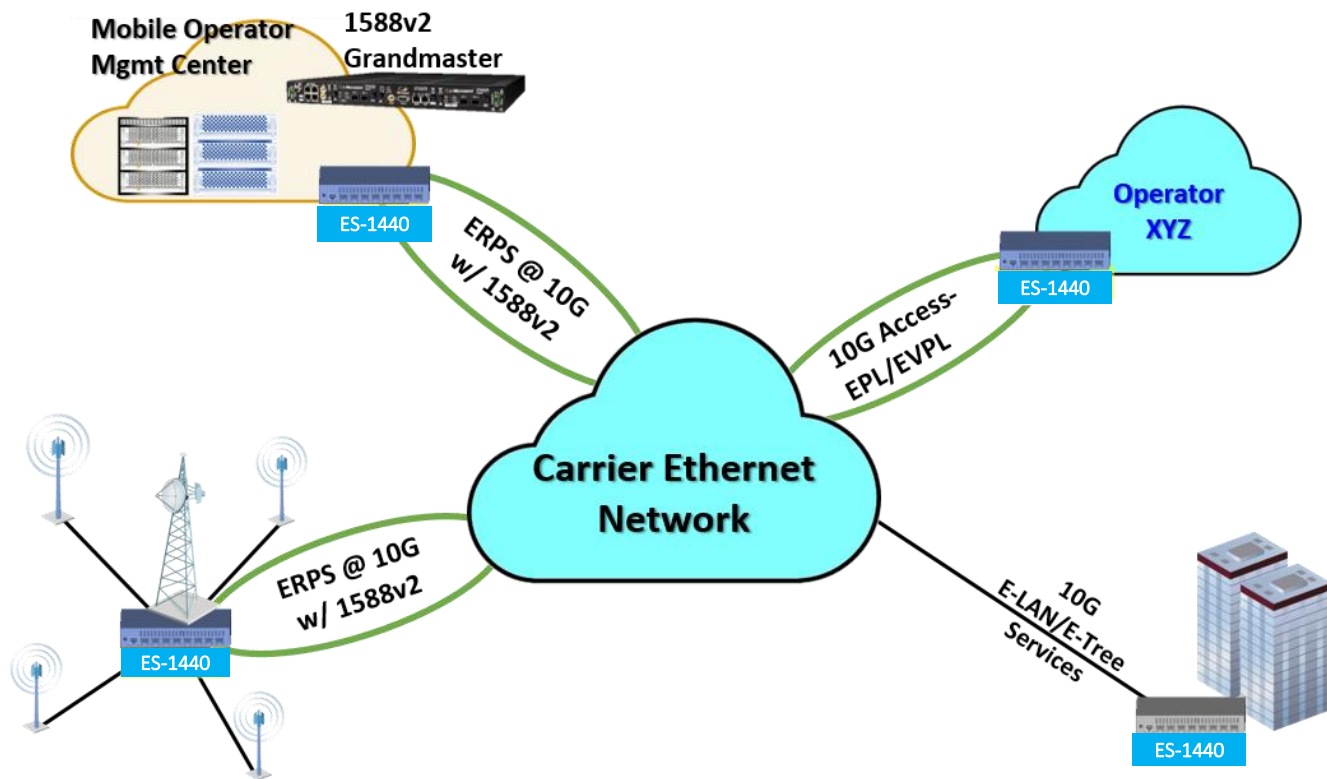
## Robust & Responsive Protection Mechanisms

ERPS, the ITU-T G.8032 Ethernet Ring Protection Switching, is firmly built inside ES-1440 NIDs as the foundation that provides sub-50ms switching capabilities. No need to worry about incidentally operation interruptions any longer that drastically reduces the OpEx of the network operators. The ERPS feature is assisted by dedicated hardware engine embedded in the silicon; hence, it ensures the consistent performance on the switching time whenever the interruption happens. In addition to ERPS, other protection related protocols are all supported, such as IEEE 802.1d STP, 802.1w/s RSTP & MSTP, and 802.3ad LACP, etc.

## Product Highlights

- Carrier Ethernet 2.0 compliant
- 99.999% availability
- ITU-T G.8031/G.8032 protection switching
- ITU-T G.8262 Synchronous Ethernet with SSM
- IEEE 1588v2 Boundary and Transparent Clock with nanosecond accuracy
- ITU-T G.8275.x PTP Telecom Profile supported on Boundary Clock and Transparent Clock
- Comprehensive Ethernet OAM support: IEEE 802.1ag CFM, 802.3ah EFM, and ITU-T Y.1731
- Service Activation Testers incorporated: RFC2544, Y.1564
- Non-blocking wire-speed switching

## Application Diagram



## Technical Specifications

### Carrier Ethernet Services

- E-LINE, E-LAN, E-TREE, and E-Access Supported
- MEF-Compliant Dual Rate Policing and Shaping

### Carrier Ethernet OAM

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.1ag Connection Fault Management (CFM)
- IEEE 802.3ah Ethernet in the First Mile (EFM)
- IETF RFC 2544 Performance Benchmarking Test
- ITU-T Y.1564 Service Activation Test
- ITU-T Y.1731 Performance Monitoring

### Timing and Synchronization

- IEEE 1588v2 Precision Time Protocol (PTP) with One-/Two-Step Clock
  - Peer-to-Peer and End-to-End-Transparent Clock
  - Boundary Clock
  - Redundant Masters and Multiple Timing Domains
- IETF RFC 5905 NTPv4 Client
- ITU-T G.8262 Synchronous Ethernet with SSM
- ITU-T G.8275.x PTP Telecom Profile supported on Boundary Clock and Transparent Clock

### Protection

- IEEE 802.3ad LACP
- IEEE 802.1w/s RSTP / MSTP
- ITU-T G.8031 ELPS & G.8032 v1/v2 ERPS

### Quality of Service

- 8 Hardware Priority Queues
- Per-EVC QoS, Policing and Shaping for Service Isolation and Traffic Engineering
- Strict Priority and Weighted Round-Robin (WRR) Scheduling
- Per-Port/VLAN/ToS/DSCP Classification
- Per-Port/VLAN/Flow Rate Limiting

### Port Control

- Port Speed, Duplex Mode, Flow Control
- Port Frame Size (Jumbo Frames)
- Port State (Administrative Status)
- Port Status (Linking Monitoring)
- Port Statistics (MIB Counters)
- Cable Diagnostics
- On-the-Fly SFP Detection

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## Ethernet Layer 2 Switching

- IEEE 802.1D Bridge
- IEEE 802.1Q VLAN
- VLAN Translation
- Private Static VLAN
- Port Isolation (static)
- Loop Guard
- MAC-based and Protocol-based VLAN
- Multiple Registration Protocol (MRP)
  - Multiple VLAN Registration Protocol (MVRP)
  - GARP VLAN Registration (GVRP)
- IEEE 802.1ad Provider Bridge (Native or Translated VLAN)
- IEEE 802.3ad Link Aggregation; Static & LACP
- Bridge Protocol Data Unit (BPDU)
  - Guard and Restricted Role
  - Transparency and Forwarding
- Voice VLAN & Auto VoIP
- VLAN Trunking
- DHCP Snooping
- ARP Inspection
- Port and Flow Mirroring
- Protocol-based and IP subnet-based VLAN
- Error Disable Discovery
- Classification of Layer 3 Flow

## Multicast Management

- IGMPv2 and IGMPv3 Snooping
- MLDv1 and MLDv2 Snooping
- IP Multicast (IPMC) Throttling, Filtering, Fast Leave and Leave Proxy
- Multicast VLAN Registration (MVR) and profile
- Broadcast/Multicast Storm Control
- Unknown Multicast Filtering
- Well-known Protocol Forwarding

## Ethernet Layer 3 Switching

- DHCP Option 82 Relay
- Universal Plug and Play (UPnP)
- IPv4 Unicast Static Routing

## Security

- Network Access Server
  - Port-based IEEE 802.1X
  - Single and Multiple IEEE 802.1X
  - MAC-based Authentication
  - VLAN and QoS Assignment
  - Guest VLAN
- RADIUS Accounting
- MAC Address Limit
- TACACS+
- Web and CLI Authentication
- Authorization (15 user levels)
- ACLs for Filtering, Policing, and Port Copy
- IP Source Guard
- IP MAC Binding
- IP MAC Binding Dynamic to Static

## Management

- Web Access through HTTP and HTTPS
- CLI – Console Port and Telnet
- SSHv2
- Management Access Filtering
- IPv6 Management
- System Syslog
- Software Upgrade through Web
- SNMP v1, v2c, v3
- RMON Group 1, 2, 3, and 9
- IEEE 802.1AB LLDP
- TIA 1057 LLDP-MED
- Cisco Discovery Filtering, CDP
- sFlow
- Loop Detection Restore to Default
- DNS Client, Proxy
- DHCP Server and DHCP Client
- Industry-standard CLI and configuration
- Configuration Download and Upload
- Multiple SNMP Trap Destinations

## Technical Specifications

### Power Input Options

- AC Input: 90~264V, 50/60Hz
- DC Input: -48V (36 ~ 72V)

### Environment

- Operating Temperature  
-40 to +65°C (-40 to +149°F)
- Storage Temperature  
-40 to +75°C (-40 to +167°F)
- Relative Humidity  
5% ~ 95% (Non-Condensing)

### Physical

- Mounting: Rack, Wall, Desktop
- Dimensions:
  - 218 (W) x 230 (D) x 40 (H)
  - 8.58" (W) x 9.06" (D) x 1.57" (H)
- Weight: 1.2Kg / 2.65lb

### Compliance

- FCC Part 15, CE Mark
- UL
- RoHS, REACH
- NEBS Level 3 (by Request)

## Ordering Information

*Specifications are subject to change without prior notice.*

Model	Port Configurations					Power	Sync-E
	10G SFP+	1G SFP	1G RJ-45	1G Mgmt (RJ-45)	Console (RJ-45)		
ES-1440-M01	4	4	0	1	1	AC	
ES-1440-M02	4	4	0	1	1	DC	
ES-1440-M03	4	4	0	1	1	AC	X
ES-1440-M04	4	4	0	1	1	DC	X
ES-1440-M05	4	0	4	1	1	AC	
ES-1440-M06	4	0	4	1	1	DC	
ES-1440-M07	4	0	4	1	1	AC	X
ES-1440-M08	4	0	4	1	1	DC	X
ES-1440L-M01	2	6	0	1	1	AC	
ES-1440L-M02	2	6	0	1	1	DC	
ES-1440L-M03	2	6	0	1	1	AC	X
ES-1440L-M04	2	6	0	1	1	DC	X
ES-1440L-M05	2	2	4	1	1	AC	
ES-1440L-M06	2	2	4	1	1	DC	
ES-1440L-M07	2	2	4	1	1	AC	X
ES-1440L-M08	2	2	4	1	1	DC	X

### About Giax

Giax GmbH is been providing innovative Ethernet over coaxial cable and supporting Ethernet switching solutions for service provider access networks. In close cooperation with the service provider customer we design, develop and bring to market communication equipment for service provider infrastructure.

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