



## Expansion Modules for Matrix™ E1 Workgroup Switch and Gigabit Workgroup Switch

- Flexible, high-performance connectivity with wire-speed switching and routing on every port
- Complete range of Ethernet technology and media options that fully integrate into Matrix E1 WS and GWS switches
- Supports all Matrix E1 multilayer features and functionality to protect existing investments

- **Flexible connectivity to fit any environment**

- Wire-speed switching and routing on every expansion port
- Easy to install and user configurable

- **Choose from several technology and media options**

- Fully integrated into Matrix E1 WS and GWS switches
- Provides Fast Ethernet over copper or fiber connectivity
- Provides Gigabit Ethernet over copper or fiber connectivity

- **Investment protection for the long run**

- All Matrix E1 multilayer features and functionality supported on each expansion module
- All Matrix E1 Layer 3 routing functionality supported on each expansion module
- Any combination of modules can be installed in the base system

The Matrix E1 WS (48 10/100 ports, RJ45), the Matrix E1 GDS (6 Gigabit ports, mini-GBIC) and the Matrix E1 GWS (6 10/100/1000 ports, RJ45) offer three expansion slots, which accept a variety of copper and fiber Fast Ethernet and Gigabit Ethernet expansion modules. All features and functionality are supported on all ports, and any combination of expansion modules may be installed in the base system.

The flexibility of the Matrix E1 mixed fixed-modular platform allows network administrators to match their network media preference easily, whether fiber Fast Ethernet, high-density copper 10/100, or triple-speed 10/100/1000. The Matrix E1 switches also support a variety of fiber Gigabit Ethernet expansion modules.

### Matrix E1 Expansion Modules Fast Ethernet

**1H-16TX**—This expansion module provides 16 10/100 ports via RJ45 connectors at distances up to 100 meters.

**1H-8FX**—This expansion module provides 8 100Base-FX ports via MTRJ connectors allowing for multimode fiber optic connections (MMF). Distances can go up to 2 kilometers. MTRJ connectors are small form factor connectors for maximum port density in the smallest possible space.

### Gigabit Ethernet

**1G-2TX**—This expansion module provides 2 10/100/1000 ports via RJ45 connectors at distances up to 100 meters.

**1G-2MGBIC**—This expansion module provides 2 Gigabit Ethernet ports via 2 Mini Gigabit Ethernet interface card (Mini-GBIC) slots.

Mini-GBICs have a smaller form factor than classic GBICs, providing the ability to populate more Gigabit Ethernet ports. To meet each customer's unique needs, Enterasys offers LC and MTRJ types of fiber connectors. The following Mini-GBIC modules are supported:

- **MGBIC-02**—Mini-Gigabit Ethernet port interface with one 1000Base-T port via RJ45 connector
- **MGBIC-08**—Mini-Gigabit Ethernet port interface with one 1000Base-LX/LH port via LC connector at distances up to 70 kilometers
- **MGBIC-LC03**—Mini-Gigabit Ethernet port interface with one 1000Base-SX via LC connector at distances up to 2 kilometers
- **MGBIC-LC01**—Mini-Gigabit Ethernet port interface with one 1000Base-SX MMF port via LC connector at distances up to 550 meters
- **MGBIC-LC09**—Mini-Gigabit Ethernet port interface with one 1000Base-SX/LX MMF/SMF port via LC connector at distances up to 10 kilometers
- **MGBIC-MT01**—Mini-Gigabit Ethernet port interface with one 1000Base-SX MMF port via MTRJ connector at distances up to 550 meters

## Specifications

### MGBIC Features

Mini GBIC	Ethernet	Cable	Cable Type	Maximum Distance	Wavelength	Connector
MGBIC-02	1000Base-T	Copper	CAT-5	100 m	N/A	RJ45
MGBIC-08	1000Base-LX/LH	Single Mode Fiber	9 or 10 $\mu\text{m}$ SMF	70 Km	1550 nm wavelength	LC Connector
MGBIC-LC01	1000Base-SX	Multimode Fiber	50/125 or 62.5/125 $\mu\text{m}$ MMF	2-550 m	850 nm wavelength	LC Connector
MGBIC-LC03	1000Base-SX	Multimode Fiber	50/125 or 62.5/125 $\mu\text{m}$ MMF	2 Km	1310 nm wavelength	LC Connector
MGBIC-LC09	1000Base-LX	Multimode or Single Mode Fiber	50 or 62.5 $\mu\text{m}$ MMF, 9 or 10 $\mu\text{m}$ SMF	2-550 m (MMF) 2m-10 Km (SMF)	1310 nm wavelength	LC Connector
MGBIC-MT01	1000Base-SX	Multimode Fiber	50/125 or 62.5/125 $\mu\text{m}$ MMF	2-550 m	850 nm wavelength	MTRJ Connector

### MGBIC Power

Mini GBIC	Maximum Input Power	Transmit Power	Receive Sensitivity	Link Power Budget
MGBIC-02	N/A	N/A	N/A	N/A
MGBIC-08	-3 dBm	0 dBm, minimum +2 dBm, typical +5 dBm, maximum	-24 dBm, minimum -26 dBm, typical	23 dB 28 dB typical
MGBIC-LC01	0 dBm	-9.5 dBm minimum	-17 dBm	7.5 dB
MGBIC-LC03	-3 dBm	-9.5 dBm, minimum -3 dBm, maximum	-20 dBm, minimum -3 dBm, maximum	10.5 dB, minimum
MGBIC-LC09	-3 dBm	-9.5 dBm (SMF) -11.5 dBm (MMF)	-20 dBm	10.5 dB (SMF) 8.5 dB (MMF)
MGBIC-MT01	0 dBm	-9.5 dBm minimum	-17 dBm	7.5 dB

**Notes:** The maximum drive distance depends on the quality of the installed fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table. The input power must not exceed the maximum stated. Otherwise, saturation could occur.

## Specifications

### Physical Specifications

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#### Ethernet Expansion Modules

##### Dimensions

2.06 cm (0.81") H x 13.41 cm (5.28") W x 17.75 D cm (0.45")

##### Approximate Weight (Unit)

0.45 kg (1.0 lb)

##### Mini-GBIC Dimensions

0.86 cm (0.337") H x 1.39 cm (0.547") W x 5.35 cm (2.108") D

### Environmental Specifications

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#### Operating Temperature

5°C to 40°C (41°F to 104°F)

#### Storage Temperature

-30°C to 73°C (-22°F to 164°F)

#### Operating Humidity

5% to 90% (non-condensing)

### Regulatory Compliance

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#### Safety

UL 60950, CSA 60950, EN 60950, EN 60825 and IEC 60950

#### Electromagnetic Compatibility

47 CFR Parts 2 and 15, CSA C108.8, EN 555022, EN 55024, EN 61000-3-2, EN 61000-3-3, AS/NZS CISPR 22, and VCCI V-3

## Ordering Information

### Matrix E1 Expansion Modules

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#### 1H-16TX

16 10/100 ports, RJ45 connectors

#### 1H-8FX

8 100Base-FX MMF ports, MTRJ connectors

#### 1G-2TX

2 10/100/1000 ports, RJ45 connectors

#### 1G-2MGBIC

2 Gigabit Ethernet ports via Mini-GBICs

### Mini-GBIC Modules

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#### MGBIC-LC01

Mini-GBIC with 1000Base-SX port via LC connector

#### MGBIC-LC03

Mini-GBIC with 1000Base-SX (long-haul 2 km) over multimode fiber via LC connector

#### MGBIC-LC09

Mini-GBIC with 1000Base-LX port via LC connector

#### MGBIC-MT01

Mini-GBIC with 1000Base-SX port via MTRJ connector

#### MGBIC-02

Mini-GBIC with 1000Base-TX port via RJ45 connector

#### MGBIC-08

Mini-GBIC with 1000Base-LX/LH (long-haul 70 km) port via LC connector

## Warranty

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As a customer-centric company, Enterasys is committed to providing the best possible workmanship and design in our product set. In the event that one of our products fails due to a defect in one of these factors, we have developed a comprehensive warranty that protects you and provides a simple way to get your products repaired as soon as possible.

## Service and Support

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Enterasys understands that superior service and support is a critical component of *Networks that Know*.™ The Enterasys **SupportNet Portfolio**—a suite of innovative and flexible service and support offerings—completes the Enterasys solution. SupportNet offers all the post-implementation support services you need—online, onsite or over the phone—to maintain your network availability and performance.

## Additional Information

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For additional information on the Matrix visit [enterasys.com/products/switching](http://enterasys.com/products/switching)

## Contact Information

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Contact Enterasys Sales at **877-801-7082** or [enterasys.com/corporate/contact/contact-sales.html](http://enterasys.com/corporate/contact/contact-sales.html)

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