



Rail & Transit Connectivity Quick Reference Guide

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Switches, Media Converters, Ethernet Extenders

Because railway systems generate a great deal of electromagnetic interference, proper standards are required for railway applications. For example, devices installed in rolling stock should comply with the EN 50155 standard, and wayside devices should comply with the EN 50121-4 standard. This Quick Reference Guide lists EtherWAN's best-selling network connectivity products for railway applications. Through a few simple steps, you'll be able to select the right EtherWAN product according to your requirements. If you need further assistance, please don't hesitate to contact our sales department.

Information needed to select the proper PoE (Power over Ethernet) or non-PoE switch:

1. Differentiate rolling stock and wayside applications.

- a. Rolling stock should comply with EN 50155 standard.
- b. Wayside devices should comply with EN 50121-4 standard.

2. How many devices are you connecting?

3. Are the devices 10/100 Fast Ethernet (FE) or 10/100/1000 Gigabit Ethernet?

4. Will you need room for additional devices (expansion) in the future?

- a. It's always a good practice to have some extra ports available for future expansion.

5. Do you require Fiber Optic connectivity?

- a. If so, what type of fiber optics will be used? Single Mode (SM), Multi Mode (MM), or Wavelength-division Multiplexing (WDM)?
- b. What speed (FE/GE) and distance? What type of connectors (SC, ST, LX, LC, SFP, etc..) are needed?
 - i. 100M Fiber
 - SFP mode for variable distance
 - 2Km Multi mode (MM)
 - 10Km Single mode (SM)
 - 20Km Single mode (SM)

- ii. 1000M fiber
 - SFP mode for variable distance
 - 550m Multi mode (SX)
 - 10Km Single mode (LX)
 - 20Km Single mode (LX)

6. Are you connecting a network uplink to a central office and downlink to next switch?

- a. If yes, you need two extra ports for network uplink & downlink. Calculate total bandwidth for all devices in order to choose uplink & downlink ports bandwidth.

7. Does your network application require redundancy?

- a. If, yes, choose a managed switch that supports the EtherWAN Alpha-Ring protocol, RSTP, or STP.

8. Are you connecting devices that require active PoE (802.3af or 802.3at), such as Wireless AP (WAP), IP cameras, digital displays or VoIP phones?

- a. If yes, what is the maximum power draw (wattage) of each PoE device? Refer to the datasheet for the camera or the manufacturer's website.
- b. If the wattage of all devices is below 15.4W, then an IEEE802.3af PoE switch should be sufficient.
- c. If the wattage of any connected device is greater than 15.4W, then choose an IEEE802.3at PoE switch.
- d. If the wattage of any device is greater than 30W, then consider purchasing an ultra-PoE switch.
- e. Add up total wattage from all cameras. This figure will be used to determine the required PoE power budget.

9. Make sure you select a switch that has a large enough PoE Power Budget to cover the total power draw calculated in #8-e above. It is a good practice to allow for 20% overage on the power budget.

Example: Each camera draws 12 Watts x 8 cameras = 96W. After adding a 20% margin, a 115.2W minimum PoE budget is recommended.

10. Managed vs. Unmanaged switch? We always recommend at least Web-Smart management, as this allows for troubleshooting as well as remote power cycling of individual devices. A managed switch is also required if VLAN, QoS, Redundancy, or Security is required.

11. Installation Location:

- a. Outdoor Deployment : Operating Temperature -40 ~ 75°C (-40 ~ 167°F).
- b. Indoor deployment with air conditioning: Operating Temperature 0 ~ 45°C (0 ~ 113°F).
- c. Indoor Deployment without air conditioning: Operating Temperature -10 ~ 60°C (14 ~ 140°F).

12. S Consider purchasing a surge protector if the Ethernet cables will be run outside of a building.

13. In addition, you can use this web page to easily search:

<http://www.etherwan.com/product-selector/ethernet-switches>

Hardened EN50155 M12 Switches (-40~75 °C) Note:

Part #	Ports	Description
ER59402-201T0	16 TX M12 + 2 GT	Managed 16 10/100TX M12 + 2 GT , 12 – 48VDC Power Input, with IP67
ER59402-201GT	16 TX M12 (8 x PoE+), + 2 GT	Managed 16 10/100TX M12 (8x PoE+ 30W), +2 GT , 240W Power Budget , 52 – 57VDC Power Input, with IP67
ER58802-201HT	8 TX M12 PoE+, + 2 GT M12	Managed 8 10/100TX M12 PoE+(30W), 2 GT M12, 120W Power Budget , 24 – 48VDC Power Input
ER52082-I	8 TX M12 PoE+, + 2 GT M12	Unmanaged 8 10/100TX M12 PoE+(30W) + 2 GT M12, 120W Power Budget, 110VDC Power Input

Hardened Din-Rail PoE and Non-PoE Switches (-40~75 °C) Note:

Power Supplies Sold Separately for Din-Rail Switches

Part #	Ports	Description
EX78931-0VB	12 GT(8 x PoE++), + 4 GE SFP	Managed 12 GT (8 PoE++ 60W), + 4 GE SFP, 240W Power Budget , 52 – 57VDC Power Input
EX78802-01B	8 TX PoE+, + 2 GT	Managed 8 10/100TX PoE+(30W), +2 GT, 180W Power Budget , 47 – 57VDC Power Input
EX78802-0VB	8 TX PoE+, + 2 GE SFP	Managed 8 10/100TX PoE+(30W), 2 GE SFP, 180W Power Budget , 47 – 57VDC Power Input
EX78602-01B	6 TX PoE++, + 2 GT	Managed 6 10/100TX PoE++ (4x 30W+2x 60W) + 2 GT, 180W Power Budget, 52 – 57VDC Power Input
EX73931-0VB	12 GT + 4 GE SFP	Managed Lite Layer 3 (LL3) Switch; 12 GT + 4 GE SFP, 12 – 48VDC Power Input
EX71802-0VB	8 TX + 2 GE SFP	Managed 8 10/100TX + 2 GE SFP, 12 – 48VDC Power Input
EX71802-0AB	8 TX + 2 GE Fiber LX 10Km SC	Managed 8 10/100TX + 2 GE Fiber Single-Mode 10Km SC, 12 – 48VDC Power Input
EX71620-10B	6 TX + 2 Fiber MM 2Km SC	Managed 6 10/100TX + 2 100FX Fiber Multi-Mode 2Km SC, 12 – 48VDC Power Input
EX71620-A0B	6 TX + 2 Fiber SM 20Km SC	Managed 6 10/100TX + 2 100FX Fiber Single-Mode 20Km SC, 12 – 48VDC Power Input
EX71440-10B	4 TX + 4 Fiber MM 2Km SC	Managed 6 10/100TX + 4 100FX Fiber Multi-Mode 2Km SC, 12 – 48VDC Power Input
EX71440-A0B	4 TX + 4 Fiber SM 20Km SC	Managed 6 10/100TX + 4 100FX Fiber Single-Mode 20Km SC, 12 – 48VDC Power Input
EX73402-01B	16 TX + 2 GT	Managed 16 10/100TX + 2 GT, 12 – 48VDC Power Input

EX73402-0AB	16 TX + 2 GE Fiber LX 10Km SC	Managed 16 10/100 TX + 2 GE Fiber Single-Mode 10Km SC, 12 – 48VDC Power Input
EX73322-1AB	12 TX + 2 Fiber MM 2Km SC + 2 GE Fiber LX 10Km SC	Managed 12 10/100 TX + 2 100FX Fiber Multi-Mode 2Km SC + 2 GE Fiber Single-Mode 10Km SC, 12 – 48VDC Power Input
EX73242-1AB	12 TX + 4 Fiber MM 2Km SC + 2 GE Fiber LX 10Km SC	Managed 12 10/100 TX + 4 100FX Fiber Multi-Mode 2Km SC + 2 GE Fiber Single-Mode 10Km SC, 12 – 48VDC Power Input
EX46908A-0-J	8 GT PoE+	Unmanaged 8 GT PoE+(30W) 120W PoE Power Budget, 18 - 57VDC Power Input
EX46928A-V-J	8 GT PoE+ , + 2 GE SFP	Unmanaged 8 GT PoE+ (30W) + 2 GE SFP, 120W PoE Power Budget, 18 - 57VDC Power Input
EX46928A-A-J	8 GT PoE+ , + 2 GE Fiber LX 10Km SC	Unmanaged 8 GT PoE+ (30W) + 2 GE Fiber Single-Mode 10Km SC, 120W PoE Power Budget, 18 - 57VDC Power Input
EX45905	5GT (4 x PoE+)	Unmanaged 5 GT (4 ports PoE+ 30W) , 120W PoE Power Budget, 24/48VDC Power Input
EX45915-V	5GT (4 x PoE+) + 1 GE SFP	Unmanaged 5 GT (4 ports PoE+ 30W) + 1 GE SFP, 120W PoE Power Budget, 24/48VDC Power Input
EX45915-A	5GT (4 x PoE+) + 1 GE Fiber LX 10Km SC	Unmanaged 5 GT (4 ports PoE+ 30W) + 1 GE Fiber Single-Mode 10Km SC, 120W PoE Power Budget, 24/48VDC Power Input
EX42305	4TX (4 x PoE+) +1 GT	Unmanaged 4 10/100TX (4 ports PoE+ 30W) +1 GT, Din-Rail, 120W Power Budget, 24/48VDC Power Input
EX42315-V	4TX (4 x P PoE+)+ 1 GT + 1GE SFP	Unmanaged 4 10/100TX (4 ports PoE+ 30W) +1 GT +1 GE SFP, 120W Power Budget, 24/48VDC

Hardened Rackmount PoE and Non-PoE Switches (-40~75 °C) Note: Power Supplies Sold Separately for Din-Rail Switches

Part #	Ports	Description
EX76402-01TT	16 TX PoE+, + 2 GT	Managed 16 10/100TX PoE+(30W) + 2 GT, 480W PoE Budget, 48-57VDC Power Input
EX76402-0ATT	16 TX PoE+, + 2 GE Fiber LX 10Km SC	Managed 16 10/100TX PoE+(30W) + 2 GE Fiber Single-Mode 10Km SC, 246.4W PoE Budget, 48-57VDC Power Input
EX75604-04VGT	24 TX PoE+, + 4 GE SFP	Managed 24 10/100TX PoE+(30W) + 4 GE SFP, 420W PoE Budget, 48-57VDC Power Input
EX77604-00VC	24 TX + 4 GE SFP Combo	Managed 24 10/100TX + 4 GE SFP Combo, 48VDC or 90-264VAC Power Input
EX89000-00C	Up to 24 FE + 4 GE	Managed Modular 1U Chassis Switch, Modules Ordered Separately, 48VDC or 90 - 264VAC Power Input

Media Converters Note: Power Supplies Sold Separately for Din-Rail Media Converters

Part #	Ports	Description
EL100C	1 TX, 1 Fiber MM 2Km SC	Commercial Unmanaged 10/100TX to 100FX Multi-Mode 2Km SC, Power Adapter Included
EL100C-20	1 TX, 1 Fiber SM 20Km SC	Commercial Unmanaged 10/100TX to 100FX Single-Mode 20Km SC, Power Adapter Included
EX42011-1A-1-A	1 TX, 1 Fiber MM 2Km SC	Industrial Unmanaged 10/100TX to 100FX Multi-Mode 2Km SC, Power Adapter Included
EX42011-2A-1-A	1 TX, 1 Fiber SM 20Km SC	Industrial Unmanaged 10/100TX to 100FX Single-Mode 20Km SC, Power Adapter Included
EL900-A-B-1-A	1 TX, 1 Fiber MM 2Km SC	Hardened Din-Rail Unmanaged 10/100TX to 100FX Multi-Mode 2Km SC, 10-48VDC Power Input
EL900-A-N-1-A	1 TX, 1 Fiber SM 20Km SC	Hardened Din-Rail Unmanaged 10/100TX to 100FX Single-Mode 20Km SC, 10-48VDC Power Input
EM1100TLC-10	1 GT, 1 GE Fiber LX 10Km SC	Commercial Unmanaged 10/100/1000TX to GE Fiber Single-Mode 10Km SC, Power Adapter Included
EL2315	1 GT, 1 100BASE/1000BASE-X SFP	Commercial Unmanaged 10/100/1000TX to 100BASE/1000BASE-X Dual Rate SFP, Power Adapter Included
EL9100-A1B	1 GX, 1 Fiber LX 10Km SC	Hardened Din-Rail Unmanaged 10/100/1000TX to GE Fiber Single-Mode 10Km SC, 12-48VDC Power Input
EMC400-EPWS	4-Bay	Commercial 4-slot Din-Rail Media Converter Chassis with two DR-30-12 Power Supplies in the Package
EMC1600	16-Bay	Commercial Media Converter Chassis. 19" Rack Mount Redundant Power Supplies, 100VAC - 260VAC

Ethernet Extenders Note: Power Supplies Sold Separately for Din-Rail Ethernet Extenders

Part #	Ports	Description
ED3501-U	1 TX, 1 Copper pair	Unmanaged 1 10/100TX Port to 1 Copper Pair, Power Adapter Included
ED3541-00B	1 TX, 1 Copper pair	Hardened Din-Rail Unmanaged 10/100TX Port to 1 Copper Pair, PSU Sold Separately
ED3575-622	6 FE, 2 GE, 2 Copper	Hardened Din-Rail Managed 6 10/100TX + 2 GE SFP Combo + 2 Copper Pair, PSU Sold Separately
ED3238-TRU	1 TX PoE, 1 Coaxial	Unmanaged 10/100TX PoE (15.4W) Ethernet Extender over RG6, RG11, or RG59 Coaxial Cable, included one ED3238T, one ED3238R and Power Adaptor, USA Type
ED3638	1 TX PoE+, 1 Coaxial	Hardened Din-Rail Unmanaged 10/100TX PoE+ (30W) Ethernet Extender over RG6, RG11, or RG59 Coaxial Cable, included one ED3638T, one ED3638R , PSU Sold Separately
ED3538	1 TX PoE+, 1 Copper	Hardened Din-Rail Unmanaged 10/100TX PoE+ (30W) Ethernet Extender over Copper pair , included one ED3538T, one ED3538R, PSU Sold Separately

SFP Modules

Part #	Ports	Description
EX-1250TSP-MB2L-AS	1 GE SFP	SFP Module, Hardened (-40°C - 85°C) Gigabit, Duplex LC, 1310nm, 2Km
EX-1250TSP-MB4L-AS	1 GE SFP	SFP Module, Hardened (-40°C - 85°C) Gigabit, Duplex LC, 1310nm, 10Km
EX-1250TSP-MB5L-AS	1 GE SFP	SFP Module, Hardened (-40°C - 85°C) Gigabit, Duplex LC, 1310nm, 20Km
EX-LS38-C3L-TI-N-CE	1 GE SFP	SFP Module, Hardened (-40°C - 85°C) GE, DDM, Single LC, TX:1310nm, RX:1550nm 40Km
EX-LS48-C3L-TI-N-CE	1 GE SFP	SFP Module, Hardened (-40°C - 85°C) GE, DDM, Single LC, TX:1550nm, RX:1310nm 40Km
EX-LS48-C3U-TI-N-EB	1 GE SFP	SFP Module, Hardened (-40°C - 85°C) GE, DDM, Duplex LC, 1550nm, 70Km

Power Supplies

Part #	Volts/Watts	Description
SDR-240-48	48-55VDC/240W	Hardened Din-Rail PSU 88-264VAC(47-63Hz) or 124-370VDC Input, 48-55VDC Output
SDR-480-48	48-55VDC/480W	Hardened Din-Rail PSU 90-264VAC(47-63Hz) or 124-370VDC Input, 48-55VDC Output

Surge Protector

Part #	Description
PD1041	Hardened RJ45 Surge Protection Device
PD3041	Hardened Copper Wire RJ11 Surge Protection Device

Why choose EtherWAN?

- ◆ Products undergo a strict quality assurance testing process to minimize failures in the field.
- ◆ Full PoE power budgets ensure sufficient power to maintain IP surveillance system reliability.
- ◆ All switches and media converters are designed, manufactured, and tested for maximum quality, minimizing troubleshooting and maintenance time.

EtherWAN — When Connectivity is Crucial

Rolling Stock Connectivity for End Device Connectivity

Number of Cameras, 1 NVR, 1 Uplink	Recommend
Up to 8 M12 end devices + 2G Uplinks	ER52082-I unmanaged 8 10/100/1000TX M12 PoE+ (30W) + 2 GT M12 (-40~75°C)
Up to 8 M12 end devices + 2G Uplinks, Redundant Path requirement	ER58802-201HT Managed 8 10/100TX M12 PoE+ (30W) + 2 GT M12 (-40~75°C)
Up to 16 M12 end devices + 2G Uplinks, Redundant Path and IP67 requirement	ER59402-201GT Managed 16 10/100TX M12 (8x PoE+ 30W) + 2GT (-40~75°C), IP67

Wayside Connectivity for End Device Connectivity

Number of Cameras, 1 NVR, 1 Uplink	Recommend
Up to 8 end devices	EX71800-00B Managed 8 10/100TX (-40~75°C)
Up to 8 end devices + 2G Uplinks	EX71802-0VB Managed 8 10/100TX + 2 GE SFP (-40~75°C)
Up to 12 GE end devices, 4G Fiber Uplink Ports	EX73931-0VB Managed 12 10/100/1000TX + 4 GE SFP Lite L3 Switch (-40~75°C)
Case I. 4 PTZ Cameras, 2-4 Non PTZ Cameras, 4 Uplinks Case II. 4 APs with heater, 4 Uplinks (Choose 60W PoE Switch for over 30W PoE PD camera or AP)	EX78931-0VB Managed 12 10/100/1000TX PoE++ (8x60W) + 4 GE SFP uplinks, 240W Power Budget (-40~75°C)
Case I. 2 PTZ Cameras + 2-4 Non PTZ Cameras, 2 Uplinks Case II. 2 APs with heater+ 2-4 Non PTZ Cameras, 2 Uplinks (Choose 60W PoE Switch for over 30W PoE PD camera or AP)	EX78602-0VB Managed 6 10/100TX PoE++(4x 30W+2x60W) + 2 GE SFP uplinks, 180W PoE Power Budget (-40~75°C)
Up to 8 Cameras or Wireless APs with PoE , 2 Uplinks	EX78802-0VB-T Managed 8 10/100TX PoE+(30W) + 2 GE SFP, 180W PoE Power Budget (-40~75°C)
Up to 4 Cameras or Wireless APs With PoE , 1 Uplink	EX45915-V Unmanaged 5 10/100/1000TX (4 x PoE+ 30W) + 1 GE SFP, 180W PoE Power Budget (-40~75°C)