

USER MANUAL

MODEL 2113A CopperLINK™ E1 Extender



REGULATORY MODEL NUMBER:
03340D4-001

CE This is a Class A device and is not intended for
use in a residential environment.

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Let's Connect![™]



An ISO-9001 Certified
Company

Part# 07M2113A-UM
Rev. A
Revised 2/2/12

SALES OFFICE
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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 2113A components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of the shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

Note Conformity documents of all Patton products can be viewed online at www.patton.com under the appropriate product page.

1.1 REGULATORY INFORMATION

EMC Directive:

- FCC Part 15, Class A
- EN55022, Class A
- EN55024

Low-Voltage Directive (Safety):

- UL 60950-1/CSA 22.22 NO. 60950-1
- IEC/EN60950-1, 2nd Edition
- AS/NZS 60950-1

1.2 RADIO AND TV INTERFERENCE (FCC PART 15)

This device generates and uses radio frequency energy, and if not installed and used properly-that is, in strict accordance with the manufacturer's instructions-may cause interference to radio and television reception. The device has been tested and found to comply with the limits for a Class A computing device in accordance with specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the device does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.3 CE DECLARATION OF CONFORMITY

Patton Electronics, Inc declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2004/108/EC relating to electromagnetic compatibility and Directive 2006/95/EC relating to electrical equipment designed for use within certain voltage limits. The Declaration of Conformity may be obtained from Patton Electronics, Inc at www.patton.com/certifications.

The safety advice in the documentation accompanying this device shall be obeyed. The conformity to the above directive is indicated by CE mark on the device.

1.4 AUTHORIZED EUROPEAN REPRESENTATIVE

D R M Green, European Compliance Services Limited.
Avalon House, Marcham Road, Abingdon, Oxon OX14 1UD, UK

1.5 SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Services at:

- Tel: **+1 (301) 975-1007**
- Email: **support@patton.com**
- URL: **<http://www.patton.com>**

1.6 SAFETY WHEN WORKING WITH ELECTRICITY



- This device contains no user serviceable parts. This device can only be repaired by qualified service personnel.
- Do not open the device when the power cord is connected. For systems without a power switch and without an external power adapter, line voltages are present within the device when the power cord is connected.
- For devices with an external power adapter, the power adapter shall be a listed Limited Power Source. The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker in compliance with local regulatory requirements.
- For AC powered devices, ensure that the power cable used meets all applicable standards for the country in which it is to be installed.
- For AC powered devices which have 3 conductor power plugs (L1, L2 & GND or Hot, Neutral & Safety/Protective Ground), the wall outlet (or socket) must have an earth ground.
- For DC powered devices, ensure that the interconnecting cables are rated for proper voltage, current, anticipated temperature, flammability, and mechanical serviceability.
- WAN, LAN & PSTN ports (connections) may have hazardous voltages present regardless of whether the device is powered ON or OFF. PSTN relates to interfaces such as telephone lines, FXS, FXO, DSL, xDSL, T1, E1, ISDN, Voice, etc. These are known as “hazardous network voltages” and to avoid electric shock use caution when working near these ports. When disconnecting cables for these ports, detach the far end connection first.
- Do not work on the device or connect or disconnect cables during periods of lightning activity.



In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.



This device contains no user serviceable parts. This device can only be repaired by qualified service personnel.



This device is **NOT** intended nor approved for connection to the PSTN. It is intended only for connection to customer premise equipment.



Electrostatic Discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. Do the following to prevent ESD:

- Always follow ESD prevention procedures when removing and replacing cards.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground.
- To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for one year for parts and labor. If any questions or problems arise during installation or use of this product, contact Patton Electronics Technical Support at +1 (301) 975-1007.

Note The 2113A includes software developed under third party licenses. Contact Patton for more information.

2.1 FEATURES

- Easy-to-install E1 Extender—*no configuration required*
- Data rate set to 2.048 Mbps on an unframed E1
- Plug 'n' Play for easy installations
- LED indicators for Power, Ethernet Link, and Frame
- CE marked

2.2 DESCRIPTION

The Patton Electronics Model 2113A CopperLink provides high speed 2-wire E1 extension connectivity to ISPs, PTTs, and enterprise environments using binder group friendly TC-PAM modulation.

Line connection is made with an RJ-45 jack. The Model 2113A is powered by an 100/230 VAC (Universal) supply. The E1 Extender features externally-accessible DIP switches, loopback diagnostics, and CopperLink Plug 'n' Play.

3.0 INSTALLATION



The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

To install the 2113A E1 Extender, do the following:

1. Connect the line interface (refer to section 3.1, "Connecting the Line Port" on page 9)
2. Connect the E1 interface (refer to section 3.2, "Connecting the E1 Interface" on page 10).
3. Connect the power plug (refer to section 3.3, "Connecting Power" on page 10).

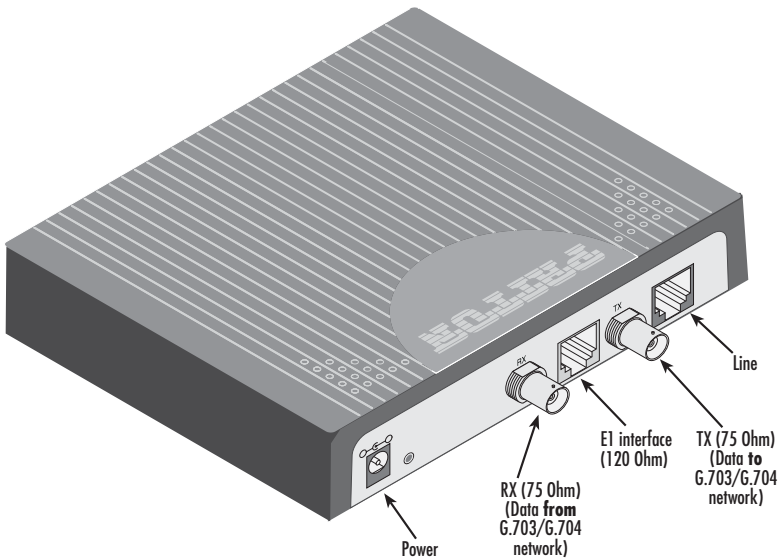


Figure 1. Model 2113A rear panel

3.1 CONNECTING THE LINE PORT



The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

Follow the steps below to connect the Model 2113A CopperLINK **Line** port.

Note The Model 2113A units work in pairs. One of the units must be configured as a (L) Local unit, and the other unit must be configured as a (R) Remote unit.

To function properly, the two E1 Extenders must be connected together using twisted-pair, unconditioned, dry, metal wire, between 19 (0.9mm) and 26 AWG (0.4mm). Leased circuits that run through signal equalization equipment are not acceptable.

Follow the steps below to connect the CopperLink line port:

1. Obtain a single-twisted pair cable with an RJ-45 plug connector at each end.
2. Plug one end of the cable into the RJ-45 socket (labeled **Line**) on the CopperLink 2113A.
3. When the remote and local extender units synchronize, the front-panel green **Line** LED will turn on.

The RJ-45 connector on the Model 2113A's twisted pair interface is polarity insensitive and is wired for a two-wire interface. The signal/pin relationship is shown in Figure 2.

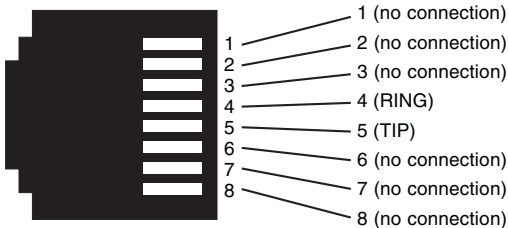


Figure 2. Model 2113A (RJ-45) twisted pair line interface.

3.2 CONNECTING THE E1 INTERFACE



The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

Your CopperLink comes with an RJ-48C and dual BNC for connection to E1. To connect the twisted pair cable to the CopperLink E1 port, attach the male connector of the twisted pair cable to the female RJ-48 connector on the CopperLink. Attach the other end of the cable to the RJ-48 connector on the local E1.

The Model 2113A is equipped with dual female BNCs (TX and RX) for connection to a 75-ohm dual coax E1 network interface. To connect the BNC connectors of the E1 interface on the Model 2113A, simply use a coaxial cable with a BNC connector at each end to connect the pair of Model 2113As.

3.3 CONNECTING POWER



The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

The Model 2113A does not have a power switch, so it powers up as soon as it is plugged in.

An external AC or DC power supply is available separately. This connection is made via the barrel jack on the rear panel of the Model 2113A. No configuration is necessary for the power supply (See Appendix B for domestic and international power supply and cord options).

DC power (supplied via the power supply jack to the 2113A) must meet the following requirements; DC power supplied must be regulated 5VDC $\pm 5\%$, 1.0A minimum. Center pin is +5V. The barrel type plug has a 2.5/5.5/10mm I.D./O.D./Shaft Length dimensions.

4.0 OPERATION

Once the Model 2113As are properly installed, they should operate transparently. No user settings required. This section describes reading the LED status monitors.

Before applying power to the Model 2113A, please review section 3.3, “Connecting Power” on page 10 to verify that the unit is connected to the appropriate power source.

4.1 FRONT PANEL LED STATUS MONITORS

The Model 2113A features five front panel LEDs that monitor power, the line connection, the E1 connection, and any signal errors.

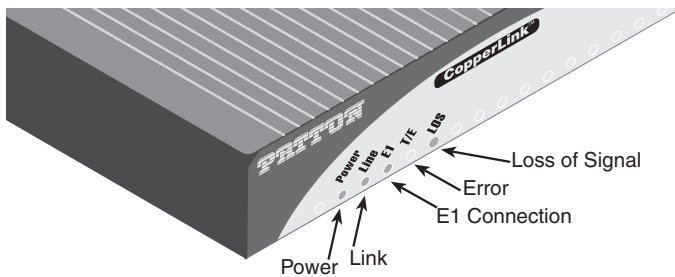


Figure 3. Model 2113A front panel

Table 1: Front panel LED description

LED	Status	Description
Power	Green	The device is powered on.
	Off	The device is powered off.
Line	Green	The port is connected.
	*Blinking Green	Linking with the other unit in the pair
	Off	No valid link on this port.
E1	Green	The interface is connected.
	Blinking Green	Data transceiving.
	Off	No valid link on this port.
T/E	Yellow	Test mode in progress
	Blinking Yellow	Test mode is starting, or errors detected.
	Off	Test mode is off/No errors present
LOS	Blinking Red	Framing errors/clock slips detected
	Off	No errors present

*. Once the unit connects to a power source, the Line LED will blink as the 2113A automatically looks for the other unit in the pair.

4.2 CONFIGURATION AND DIP SWITCHES

The CopperLink 2113A E1 Extender is Plug 'n' Play enabled and does not require any configuration by the user.

Note The user **should NOT** change any of the dip switches except for S4-1 (if necessary). If the user changes the position of any of the dip switches (except for S4-1), it **will affect** the operation of the unit.

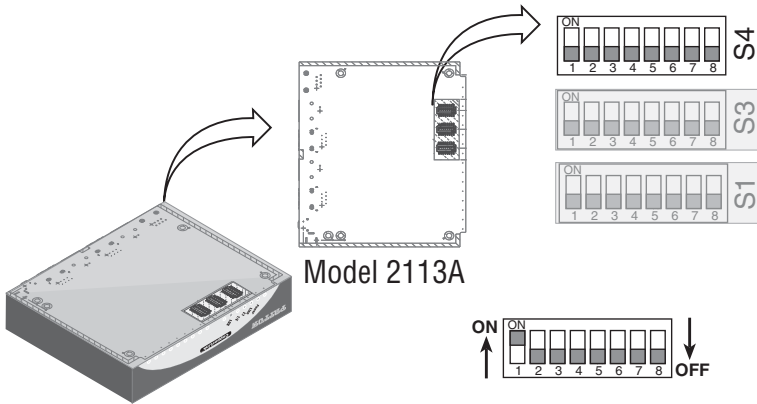


Figure 4. Model 2113A DIP Switch Location

Switch S4-1: Line Build Out

Switch S4-1 defines the shape of the waveform on the E1 line.

Table 2: S4-1 Default Position

Switch	Position	Setting
S4-1	ON	120-ohm
S4-1	OFF	75-ohm

APPENDIX A

SPECIFICATIONS

A.1 CIRCUIT RATE

- **Model 2113A** - 2.048 Mbps

A.2 CIRCUIT INTERFACE

- G.703/G.704 interface. Either 75 Ohms (unbalanced) or 120 Ohms (balanced). Pins 1 & 2 are Receive. Pins 4 & 5 are transmit.

A.3 CIRCUIT DEFAULTS

- E1 Line Coding = HDB3.

A.4 CIRCUIT CONNECTOR

- Dual BNC and RJ48C, strap selectable

A.5 LED STATUS INDICATORS

- Five LED indicators: Power, Line, E1, TM/ERR, and LOS

A.6 TRANSMISSION LINE

- Single Twisted Pair

A.7 LINE CODING

- TC-PAM (Trellis Coded Pulse Amplitude Modulation)

A.8 LINE INTERFACE

- Transformer coupled, 2500 VRMS isolation

A.9 LINE PHYSICAL CONNECTION

- RJ-45, 2-wire polarity insensitive pins 4 and 5

A.10 POWER SUPPLY

External AC and DC options:

- AC: 120 VAC, 220 VAC, and UI (120–240 VAC)
- DC: 12 VDC, 24 VDC and 48 VDC
- Power consumption: 400mA at 12VDC

A.11 ENVIRONMENTAL

- Temperature Range: 0–50°C
- Relative Humidity: Up to 90% non-condensing.

A.12 DIMENSIONS

6.22 W x 1.25 H x 4.75 D in. (157 W x 318 H x 120 D mm)

APPENDIX B
MODEL 2113A SERIES FACTORY
REPLACEMENT PARTS AND ACCESSORIES

Patton Model #	Description
Base Models	
2113A/EUI-2PK	High Speed CopperLink E1 Extender Kit (Local and Remote); RJ45 Line, 100-240VAC
07M2113A-UM	User Manual
Power Supplies	
PS-03671H1-002	100-240VAC (12V, DC/2A) Wall mount power adapter
Power Adapters	
12-130	European replacement plug
12-129	American replacement plug
12-131	United Kingdom plug
12-132	Australian/Chinese plug

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