



LXT318 Long-Haul E1 Transceiver Line Interface Design Guide

Application Note

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As of January 15, 2001, this document replaces the Level One document known as AN036.



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1.0 General Description

This application note describes a standard line interface for the LXT318 transceiver in a long-haul E1 environment. The interface uses two Pulse Engineering transformers designed specifically for this transceiver.

The design is simple and robust and will reduce in-house engineering and testing time.

Refer to the current LXT318 data sheet for complete information on the LXT318 transceiver.

1.1 Transmit Line Interface

The transmit line interface uses the following parts:

1. Pulse Engineering transformer, P/N PE68646 - 1:1.58:2 (one per transceiver)
2. 15 Ω resistors (two per transceiver)

Connect them to the Transmit Tip and Ring inputs (pins 13 and 16) of the transceiver as shown above.

1.1.1 Twisted-Pair Cable (120 Ω)

For a twisted-pair cable, use the full 1:2 step-up ratio provided at the end tap. This gives the required 120 Ω impedance.

$$Z = \Omega \times (\text{step-up ratio})^2 = (15 \Omega + 15 \Omega) \times 2^2 = 120 \Omega$$

1.1.2 Coaxial Cable (75 Ω)

For a coaxial cable, connect the circuit at the transformer center tap. The 1:1.58 step-up ratio gives a value within 0.2% of the 75 Ω impedance required.

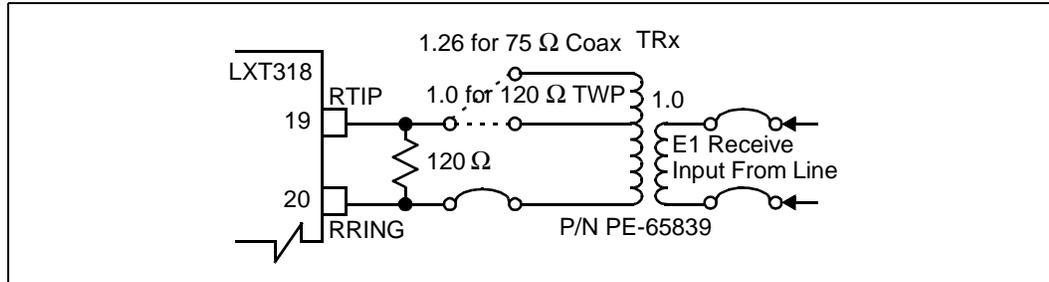
$$Z = \Omega \times (\text{step-up ratio})^2 = (15 \Omega + 15 \Omega) \times 1.58^2 = 74.89 \Omega$$

1.2 Circuit Modifications

- Provides correct impedance match for both 75 Ω coaxial and 120 Ω twisted-pair cables
- Meets 3 kV isolation requirement of many PTT ministries
- Standard interface requires one-time design
- Laboratory engineered and proven design requires minimal in-house testing
- Readily available parts make building fast and easy

1.3 Receive Line Interface

Figure 1. Receive Line Interface Diagram



The receive line interface uses the following parts:

1. Pulse Engineering transformer, P/N PE65839 - 1:1:1.26 (one per transceiver)
2. 120 Ω resistors (one per transceiver)

Connect them to the Receive Tip and Ring inputs (pins 19 and 20) of the transceiver as shown above.

1.3.1 Twisted-Pair Cable (120 Ω)

For a twisted-pair cable, use the 1:1 step-down ratio provided at the center tap. This gives the required 120 Ω impedance

$$Z = \frac{\Omega}{(\text{set-down ratio})^2(1)^2} = \frac{120 \Omega}{(1)^2} = 120 \Omega$$

1.3.2 Coaxial Cable (75 Ω)

For a coaxial cable, connect the circuit at the transformer center tap. The 1:1.26 step-down ratio gives a value within 1% of the 75 Ω impedance required.

$$Z = \frac{\Omega}{(\text{set-down ratio})^2(1.26)^2} = \frac{120 \Omega}{(1.26)^2} = 75.59 \Omega$$