Application Note #9908

Extending TNET with Fiber Cable

Introduction

The TNET data collection network is designed to connect multiple TransTerm data terminals to a single host computer using RS-422 twisted pair cable. However, some applications require groups of additional TransTerm terminals to be installed in multiple locations or buildings connected by a fiber optic link. This application note will describe the concept of extending the TNET network over fiber and also give some specific examples.

Concept Overview

The typical TNET network includes a controller (TIM1B) with one or more RS-422 trunk lines connected to a TNET hub (TLD2) device. A fiber link can be created by inserting a pair of fiber optic drivers between the controller and a hub (see Figure 1). Using a pair of these drivers in a "point-to-point" configuration the TNET trunk line can be transparently extended to a hub using fiber optic cable.

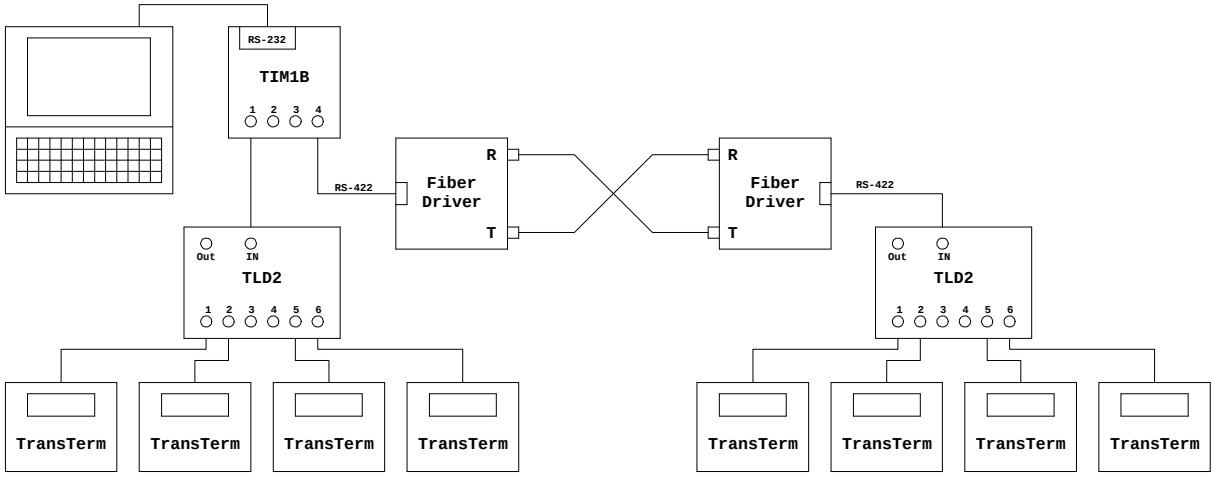


Figure 1

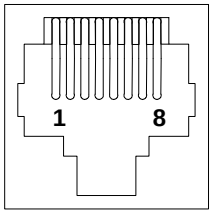
Fiber Driver

The fiber optic drivers convert the RS-422 signal to a signal that can drive a fiber optic cable. The fiber optic cables must be cross connected to create a "point-to-point" installation. That is, the fiber Transmit output of one driver must be connected to the fiber Receive input of the other.

Likewise, the RS-422 signals must be cross connected going to and from the TNET hardware. That is, the RS-422 transmit signal from the fiber driver must go to the RS-422 receive signal of the TNET hardware. The table below provides a typical signal connection for a fiber driver to the RJ-45 jacks of the TIM1B controller and TLD2 hub.

Fiber Driver Signal	TNET Signal	TIM1B Port Pin # or TLD2 Out Pin #	TLD2 RJ-45 Pin # or TTx RJ-45 Pin #
TXD+	RXD+	3	5
TXD-	RXD-	4	6
RXD+	TXD+	5	3
RXD-	TXD-	6	4
GND	GND	2 & 7	2 & 7

The RS-422 interface for the TNET hardware is made using a RJ-45 jack. The signal pin orientation is shown in Figure 2. For more details on connecting to the TNET controller (TIM1B) or hub (TLD2) refer to the specific device manual.



RJ-45 Jack

Figure 2

Black Box Model ME540A

The ME540A from Black Box is a universal fiber line driver that can be used to extend a TNET trunk line connection. It should be configured as a "Master" device using the "RS-485" interface in the "Four Wire" mode. The switch settings and jumpers should be set according to the following table.

Position	Setting (1=On, 0=Off)	Function
S1 – 1	1	Master Mode
S1 – 2	0	Master Mode
S1 – 3 and 4	0	Output Bias Off
S1 – 5 and 6	1	Input Bias On
S1 – 7 and 8	0	Unterminated
S5	B	RS-485
W4 & W5	AB	4 Wire
XW2	B	RS-485 Interface

The fiber cables should be connected between the ME540A modules as described in the manual for "Point-To-Point" operation. A four (4) position terminal block in the ME540A provides the interface for the RS-422/RS-485 signals. They should be connected to the TNET hardware according to the following table.

ME540A Terminal Position	ME540A Signal	TNET Signal	TIM1B Port Pin # TLD2 Out Pin #	TLD2 In Pin # TTx RJ-45 Pin #
3	TXD+	RXD+	3	5
4	TXD-	RXD-	4	6
1	RXD+	TXD+	5	3
2	RXD-	TXD-	6	4

S.I.Tech Model 2106

The Model 2106 from S.I.Tech is a "Point-To-Point" fiber line driver for RS-422 signals. It can be used to extend the TNET trunk line connection and is very easy to install. The fiber cables should be cross connected between the 2016 modules as described above. Connection of the 2106 to the TNET hardware is defined by the following table.

2106 Pin #	2106 Signal	TNET Signal	TIM1B Port Pin # TLD2 Out Pin#	TLD2 In Pin # TTx RJ-45 Pin #
3	TXD+	RXD+	3	5
9	TXD-	RXD-	4	6
4	RXD+	TXD+	5	3
6	RXD-	TXD-	6	4
1	GND	GND	2 & 7	2 & 7