

Hands-On

# T1-HDSL Installation & Maintenance for Business Applications

Service to: Cell Towers, Routers, PBX/Key Systems and more...



## Course Description

A vast majority of Telecommunications companies use T1 copper and HDSL spanlines as the primary method of transporting data to a variety of business customers on their local loop therefore, having well trained technicians with the ability to install, maintain and troubleshoot these systems is vital to providing high-quality reliable service to customers in a highly competitive environment.

This 2-day class is an intense training experience that combines T1 and HDSL spanline operation with hands-on troubleshooting. For this class, BTS provides a live working classroom lab with typical spanline equipment currently deployed in the telecommunications industry. Students learn how these systems work then are required to use the knowledge to test, troubleshoot and repair the circuits using their own T1 test equipment. Troubleshooting includes equipment failures, wiring problems, field repeater problems, cable pair problems and more...



## Students Will Learn

- **Operations and Functions of T1 and HDSL Spanline Systems**
- **The Functions Of T1 Equipment Located Inside the Central Office, On the Copper Spanline and at the Customer Premise.**
- **To use T1 Test Equipment to Monitor, Troubleshoot and Repair Network Circuits.**
- **To use a Voltmeter to Test and Troubleshoot Power Problems on T1 and HDSL.**
- **T1 Signal Makeup Including Channel Bank Operation, Framing, Line Coding and Signaling and Alarm Signals.**
- **T1 Circuit Layout from the Network, Through the Central Office and T1 Span Line, To the Customer Premise.**
- **The function of T1 Spanline Repeaters, Signal Regeneration and Repeater Spacing.**
- **The function of the NIUs (Smart Jack) and CSUs at the Customer Premise.**
- **The DC Span Power System that Provides Repeater Voltage and Sealing Current.**
- **Hands-On Testing of T1 Spanlines Using Current Test Sets and Standard Test Patterns at Test Access Points.**
- **HDSL Signal (2b1q) and Function of The HTU-C, HTU-R and Doubler.**
- **Hands-On Testing Of HDSL Spanlines Using Current Test Sets.**
- **HDSL-2 and HDSL-4 Spanlines.**
- **Extensive Troubleshooting Of T1 and HDSL 1 Spanlines.**

- **And More...**

## Target Audience

This training course is intended for telecommunications technicians responsible for installation, maintenance, troubleshooting and repair of T1 and HDSL Spanlines in the Central Office, on the local loop copper spanline and at the Customer Premise.

## Prerequisites

Our Hands-On T1-T3 OMT Operations, Maintenance and Troubleshooting course and or experience is suggested but not required.

## Course Outline

Module I: T1 and Signal Characteristics

- Circuit Layout and Circuit ID Numbers
- Binary Numbers
- T1 Channel Bank Operation
- Signaling (SF and ESF)
- Line Coding (AMI and B8ZS)
- T1 Signal Specs.
- T1 Signal Errors and Alarms
- T1 Stress Test Patterns
- DSX-1 Crossconnects
- And More...

Module II: T1 Spanline Operation

- Central Office Repeater functions and signal levels
- Spanline Field Repeater functions and signal levels
- Remote Repeater functions
- NIU and CSU functions at the Customer Prem.
- Measuring signal levels on the T1 Spanline
- DC Power loop for repeater power and sealing current
- Measuring DC voltage, current and resistance on the T1 Spanline
- Troubleshooting T1Spanline signal trouble

- Troubleshooting T1 Spanline DC power loop troubles
- And More...

#### Module III: HDSL Spanline Operation

- HTU-C functions and signal levels
- HTU-R (NIU; Smart Jack) functions and signal levels
- Doubler functions and signal levels
- DC Power loop for repeater power and sealing current
- Connecting to HDSL equipment with a Laptop for analysis and troubleshooting.
- Troubleshooting HDSL Spanline signal trouble
- And More...

#### Module IV: HDSL-2 and HDSL-4 Spanline Operation

- HTU-C, HTU-R (NIU; Smart Jack), and Doubler functions and signal levels
- Connecting to HDSL-2 and HDSL-4 equipment with a Laptop for analysis and troubleshooting.
- Troubleshooting HDSL-2 and HDSL-4 Spanline signal trouble
- And More...

### Delivery Method

Instructor led with numerous Hands-On labs and exercises.

### Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

### Course Length

2 Days