

Hands-On

# Digital Testing & Troubleshooting

Using T-BERD Test Sets



## Course Description

During this course Voice Frequency, DDS, ISDN, FT1, DS1-DS3, and SONET technologies are examined in detail to create a solid technical foundation. The participants are led through applications for installation and troubleshooting of these technology networks, as well as numerous Hands-On exercises using the T-BERD test sets. i.e. 211, 224, 310, 2310, etc.

BTS encourages student(s) to bring their any test-equipment, to incorporate into our Hands-On Labs to gain valuable experience by using their own equipment throughout this course.

## Students Will Learn

- Describe the purpose of the T-BERD Test Sets.
- Compare and Identify the differences of the two test sets.
- List the features of each test set.
- Identify and Explain the options available for each test set.
- Operate the T-BERD to install & maintain network services.
- Verify proper operation of network equipment during installation.
- Maintain and Troubleshoot ISDN Services.
- Maintain and Troubleshoot DS1-DS3 Services.
- Identify mis-optioned network elements.
- Perform straightaway & loopback bit error rate (BER) tests on virtual tributaries & DS3 signals within a SONET synchronous payload envelope (SPE).
- Use SONET overhead indications and direct measurements to sectionalize a SONET network and isolate defective devices.
- Identify timing problems in SONET networks.

## Target Audience

We recommend this course for anyone who will use the T-BERD Test Sets to install or maintain Telecommunication Services. This course benefits new technicians while offering substantial material to benefit those who have a basic understanding of the T-BERD Test Sets operations, functions and options.

## Prerequisites

None. A basic understanding of telecommunications transmission principles will be useful for students taking this course. This information can be obtained in our TeleCom Fundamentals, Introduction to Digital Technologies Hands-On T1 & T3 and DDS (Digital Data Services) courses.

## Course Outline

- OVERVIEW OF THE T-BERD 224 and 310 ?
  - The Purpose of the T-BERD 224 and 310
  - Compare and Identify the differences between the 224 and 310
  - Options Available
  - Setup (Configuration)
  - STATUS LEDs
  - Mainframe Specific Results?
  
- SIGNALING FUNDAMENTALS ?
  - Signaling Supervision
  - Signal Addressing
  - Trunk Types?
  
- SIGNALING APPLICATIONS ?
  - Placing a Call
  - Receiving a Call
  - Digit Analysis?
  
- DS1 FUNDAMENTALS ?
  - DS1 Network Overview
  - DS1 Interfaces
  - DS1 Framing Structure
  - Line Coding
  - Error Types/Alarms
  
- DS1 APPLICATION TESTING ?
  - Network Access Test Points
  - End-to-End Testing
  - Loopback Testing
  - Test Patterns
  
- DS3 FUNDAMENTALS ?
  - DS3 Network Overview

- DS3 Framing Structure
  - DS3 Interfaces
  - Channelized/Non-Channelized DS3 Systems
  - Test Patterns
  - DS3 Line Coding
  - Error Types/Alarms
- DS3 APPLICATION TESTING ?
    - Network Access Test Points
    - Errors, Levels, and Signal Quality
    - Monitoring DS1 Signals
    - Installation/T3 Turn-Up
    - Testing MUX/DEMUX
    - DCS/DACS Testing
- SONET FUNDAMENTALS ?
    - SONET Overview
    - Frame Structure
    - SONET Interfaces
    - Architectures and Elements
    - Overhead
    - Systems
    - Networks
- SONET APPLICATION TESTING ?
    - Qualifying the Fiber
    - Testing MUX/DEMUX and Mapping Capabilities
    - Path Continuity Checks
    - Overhead and Alarm Testing
    - Network Synchronization Testing
    - SONET Reference Documentation
      - SONET OAM&P references
    - SDH/SONET OAM&P references
    - Bellcore documents
    - SDH general references
    - SDH OAM&P references

## Equipment Requirements

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

A classroom equipped with appropriate seating, writing surface, and enough space for the class and the lab equipment including the T-BERD test sets. (preferably 1 test set per 2-3 students), access to live lines for hands-on testing purposes, data projector with screen and a whiteboard with markers provided by the client.

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