

Hands-On

# DSL Comb Tech

Installation, Maintenance, Troubleshooting & Customer Support



## Course Description

This combination 3-day Hands-On course will cover the following

Hands-On xDSL Installation, Maintenance & Troubleshooting including CAT5 & CAT6 Preparation, Installation & Testing

This 2-day Hands-On course provides in-depth instruction for Installing, Maintaining and Troubleshooting DSL services for technicians. Attendees will learn the inner workings as to how the DSL works and the loop parameters required providing Uninterruptible service.

This will include residential, commercial and industrial environments. This is a Hands-On course that uses state of the art testing equipment. Meters will be used to check loop parameters and will train your technicians Line pre-qualification, line performance, DSL customer-end equipment installation and troubleshooting is the primary focus of this course.

Combined with

Hands-On xDSL for Customer Support (CS Provision, Maintenance & Troubleshooting)

This 1-day Hands-On course provides Real-World Experience for help-desk and technical support personnel to solve customer related issues relating to their DSL installation, set-up, connection and services.

This course will provide students the practical skills to solve DSL Customer Support issues, fast and effectively. Upon completion students will receive a BreakThru DSL Quick-Fix-Card that will guide you step-by-step through proven procedures that will target the specific problem whether it is a line down, incorrect PC settings, defective modem/router or just basic user difficulties, you will have the answers and skills you need to SAVE company TIME & MONEY and most of all to achieve CUSTOMER SATISFACTION!

You can't afford to operate on a "plug and pray" basis in today's competitive market. Our SMEs have the field experience to find the answers to real live scenarios, providing students with a Real-World Experience

## Students Will Learn

- **DSL Applications**
- **Cable Channels Over the Copper Pair, Internet Access,**
- **Video on Demand, Video Conferencing, Voice Over IP, more...**
- **All Types of xDSL**
- **ADSL ( + & 2 ), ISDL, HSDL, RADSL, SDSL, VDSL, VDSL2+, CDSL, UDSL**
- **DSL System Components & Configurations for Residential & Business**
- **Modems, Splitters, Filters, more**
- **Hands-on Exercises using Sunrise, Acterna, DynaTel, Sidekick, and any additional meters to synchronize**

with DSLAM, and interpret results...

- Turn up Results Margin Capacity, Upstream, Downstream, Maximum Bit rates, more...
- DSL Loop Parameters & Cable Acceptance Distances, Speeds, Cable Pair-Testing and Qualifications.
- CAT5 / CAT6 Cable Preparation, Install & Testing Latest Standards, Tools, and Techniques used for cable installations, plus Speeds, Cable Testing and Qualifications.
- Hands-On Testing & Troubleshooting DSL Circuits, Test Equipment, and more...
- Troubleshooting Identify Customers Related Problems, Defective Lines and Equipment.
- And More

## Target Audience

OSP Technicians, CO Technicians, ILEC Installation, Repair and Maintenance Technicians, CLEC/ASI ADSL Installation Technicians, CLEC/ASI Network Technicians, DSL Technical Support Technicians, DSL Group Managers Sales & Marketing Support Managers and anyone requiring Hands-On skills for supporting, installation and/or maintenance of DSL services.

## Prerequisites

Basic electrical and telephony concepts. This information can be obtained in our course(s)

-TeleCom I or II

-Basic Electricity & TeleCom Electronics

## Course Outline

Module I. Understanding xDSL

Terms and Acronyms

History of xDSL

Types of xDSL

ADSL

ADSL2/ADSL+

SDSL

HDSL

VDSL

VDSL2

IDSL

RADSL

CSDL

UDSL

xDSL and Applications

Cable Channels Over the Copper Pair

Internet Access

Video on Demand  
Video Conferencing  
Voice Over IP

#### Module II: Components of a DSL System

Modems  
Splitters  
Filters  
ATU-C/ATU-R  
DSLAMs  
    Hubs  
    Routers  
    Switches

#### Module III: Digital Transmission

Explanation of bits and bytes  
CAP/DMT line code  
Converting digital to analog  
Error detection schemes  
Frames and Superframes  
System parameters  
Design applications  
Examples of download/upload systems  
Loop parameters  
    Capacity  
    Margin  
Interpreting LINK TRUN-UP RESULTS  
    Bits Graphic  
    Explanation of all DSL connection results

#### Module IV: Loop Qualification & Testing

Distance versus bit rate  
    Gauge/quality of cable  
Bridge taps  
Load coils/Smart coils  
Power influence  
Explanation of test equipment used in ADSL  
    Acterna/Sunrise/Dynatel/Harris/Sidekick/Any type brought to class  
Complete a 10 step troubleshooting procedure  
    Field tested and proven successful  
Testing and explanation of physical faults  
    Shorts/grounds/crosses/splits/opens (high joints)  
Interferers  
    T1/AM radio/other high frequency interference issues  
Insertion loss

TDR traces and testing

\*\*\*ALL Hands-On TESTS WILL BE COMPLETED BY THE ATTENDEES USING THEIR OWN METER OR BTS WILL PROVIDE A METER FOR THEM.

#### Module V: Troubleshooting xDSL

- Common Technical Support Issues
- Step-by-step walk through
- Splitter Installation
- Modem Synchronization
- PC Installation Procedure
- Software Configuration
- Testing
  - Ping Testing
  - Trace Routs
  - Overall Factors to Consider
- Software Speed Tests ( Upload & Download Mgmt. )
- QuickCard Guide (step-by-step checklist )

#### Module VI: Case Studies & Troubleshooting Tips

- Discussion of issues associated with customers
- Aerial and buried drops
  - Twisting/bonding and grounding
  - Protectors
- Inside wire
  - Cables Cat 3/Cat 5/Cat 6
    - Building and Testing Cables
- Basic troubleshooting tips at the PC
  - Correct cords
  - Network Interface Card Installation ( NIC)
- QuickCard Guide (step-by-step checklist )
- Case Studies
- Problem Solving Techniques that Work

## Notes

### Featured Equipment

- Acterna HST3000
- Sunrise Sunset xDSL
- 3M DynaTel 965 DSP
- Tempo ( Sidekick )
- CAT5/CAT6 Cable Testers

(Other equipment i.e. Harris, Panasonic Tough book can be incorporated upon request.)  
And more...

### **Equipment Requirements**

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

Instructor led with numerous Hands-On labs and exercises.

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**

3 Days