

Hands-On

5ESS ISDN BRI Provisioning and Maintenance

Basic Rate Interface



Course Description

This Hands-On ISDN Basic Rate Interface (BRI) Provisioning and Maintenance course begins by presenting the theory and structure of ISDN BRI services. This includes ISDN Components, ISDN Connections, Basic Rate Interface versus Primary Rate Interface (PRI), Custom ISDN Versus National/Standard ISDN, ISDN Services and ISDN Features.

From this point the course presents the different 5ESS Switch Modules and Peripheral Units that provide ISDN BRI service. The Peripheral Units covered are the Integrated Services Line Unit (ISLU), Integrated Services Line Unit 2 (ISLU2), Access Interface Unit (AIU), Packet Switch Unit (PSU) and Packet Switch Unit 2 (PSU2). From here the course presents the translation Recent Change Views and fields required to provision ISDN BRI services. Next, the course presents ISDN voice and data call flow identifying the Recent Change Views used to perform call processing and control the call routing.

This is followed with a lesson presenting 5ESS Switch maintenance messages (Input and Output) used to test and verify ISDN BRI service. This includes examples of the messages and analysis of output messages from the 5ESS Switch. The course presents ISDN Protocol (Q.921 and Q.931) and their Information Elements.

The last lesson addresses ISDN BRI Protocol. This includes instruction covering the different layers, messages and elements of ISDN Protocol, how to correctly run a protocol session and how to interpret its results. 5ESS documents are extensively used and referenced through this course.

This course also provides procedures, tables, charts, case work, information on the resolution of 5ESS Switch ISDN BRI service problems and recommendations of what to do next.

The objective of ISDN Basic Rate Interface Provisioning and Maintenance is to train provisioning and maintenance personnel to build and translate ISDN BRI services along with correcting ISDN BRI service problems in a 5ESS Switch.

Students Will Learn

- **State what ISDN BRI service is**
- **Identify the 5ESS Switch Modules and Units required to provide ISDN BRI service**
- **Identify 5ESS Switch Recent Change Views and Fields needed to provision ISDN BRI service**
- **Perform verification and test procedures on ISDN BRI lines working out of a 5ESS Switch**
- **Analyze and Correct ISDN BRI service problems**
- **Perform a Protocol session on an ISDN BRI line and analyze the results**

Prerequisites

ISDN Basic Rate Interface Provisioning and Maintenance is an entry level to midlevel course covering Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) provisioning and maintenance on a 5ESS Switch. Because of the technical level of this course, students taking ISDN Basic Rate Interface Provisioning and Maintenance should have the following prerequisites

Understand the functions of the 5ESS Switches Modules and Units

- Administrative Module (AM),
- Communications Module (CM),
- Switching Module Processor (SMP) Module Controller and Time Slot Interchanger (MCTSI)
- Switching Module Peripheral Units, such as Line Unit, Access Interface Unit, Integrated Services Line Unit, Digital Line Trunk Unit, Digital Service Unit, etc.

Recognize the type of connections between 5ESS Switch Modules and Units

- Network Control and Timing (NCT/NCT2) Links and Time Multiplexed Switch (TMS) Links,
- Peripheral Control and Timing (PCT) Links,
- Peripheral Interface Data Bus (PIDB)
- Peripheral Interface Control Bus (PICB)

Familiar with using 5ESS Input Manual (235-600-700) to develop and input messages into the 5ESS Switch

Familiar with using 5ESS Output Messages Manual (235-600-750) to decipher output messages obtained from a 5ESS Switch

Ability to reference 5ESS 5ESS Dyna Text Switch documentation.

Course Outline

Lesson 1 - ISDN BRI Fundamentals

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) Fundamentals presents an overview of the functional and operational structure of ISDN BRI service. This lesson briefly defines analog line side service off of a 5ESS Switch and then compares it to ISDN line side service also off of a 5ESS Switch. The lesson addresses S, R, T and U interface points, 2 B plus D service, Custom ISDN versus National/Standard ISDN, AMI versus 2B1Q, CPE, Network Termination 1 (NT1), Network Termination 2 (NT2), Terminal Adaptor (TA), Circuit Switch Voice (CSV) and Circuit Switch Data (CSD). This lesson establishes the basic knowledge needed for the following lessons.

Lesson 2 ISDN BRI 5ESS Hardware

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) 5ESS Hardware presents the hardware equipment in the 5ESS Switch used to provide ISDN BRI service. This lesson provides a brief overview of the modules and units within a 5ESS Switch. It then presents the Integrated Services Line Unit model 1 (ISLU), Integrated Services Line Unit model 2 (ISLU2) and Access Interface Unit (AIU) in detail with emphasis to the ISDN service they provide. This lesson presents the functional and physical structure of the units, 5ESS Switch display screens, diagnostic information and Input Messages

pertinent to maintenance and customer service. This is followed by defining the functional and physical structure of the Packet Switch Unit model 1 (PSU) and Packet Switch Unit model 2 (PSU2). The PSU and PSU2 portion of this lesson includes Quarter Time Slot discussions, Integrated Services Circuit Number / Packet Office Equipment (ISCN/POE) number information, Channel Group and Channel Assignment information plus Time Slot Reservation information. The PSU/PSU2 portion of this lesson addresses where layer 2 (LAPD and Q.921) protocol is processed. It establishes the physical 5ESS Switch equipment knowledge of how an ISDN BRI operates and provides the ground work for the ISDN BRI Translation lesson. The following equipment Recent Change Views are presented in this lesson.

RCV 20.16 Access Interface Unit Pack

RCV 22.2 Equipment Unit Packet Switch Unit

RCV 22.7 ISLU Line Card

RCV 22.12 ISLU - DPIDB

RCV 22.14 Channel Group Channel Assignments

RCV 22.21 ISLU2 Line Board

RCV 22.23 ISLU2 DPIDB

RCV 22.34 AIU DPIDB

Lesson 3 ISDN BRI Translations

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) 5ESS Translations presents the 5ESS Switch Recent Change Views and translations that provide ISDN BRI service. This lesson begins with a brief overview of the 5ESS Switch Recent Change process. It then presents the following Recent Change Views and their fields:

RCV 23.2 - DSL Subscriber Line

RCV 23.8 DSL/BRCS Assignment

RCV 23.20 Primary or Secondary Only Key Systems

RCV 23.21 ISDN Terminal Type C/D Key Systems

RCV 23.22 Call Appearances and Feature Buttons

RCV 23.30 ISDN DSL/USER Copy

RCV 12.5 Configuration Group Definition

RCV 22.2 Equipment Unit Packet Switch Unit

RCV 22.12 ISLU - DPIDB

RCV 22.14 Channel Group Channel Assignments

Lesson 4 ISDN BRI Call Processing and Features

The ISDN BRI Call Processing and Features lesson presents how the 5ESS Switch processes calls, the Recent Change Views used to route the call and Feature interaction. The lesson includes a Line to Line call, Trunk to Line call and a Line to Trunk call. The purpose of this lesson is to present the Call Routing Recent Change Views and fields that affect call routing (ISDN and Analog) and how they interact with the ISDN BRI services, features and options. The Recent Change Views presented in this lesson include:

RCV 1.6, 1.8, 23.2 and 23.8 Analog Line and Digital Subscriber Line

RCV 4.1 Line Class Code

RCV 9.1 Digit Analysis Selector

RCV 9.2 Prefix/Feature Digit

RCV 9.3 Local Digit

RCV 9.7 Remaining Digit

RCV 10.3 Carrier Administration (Interconnect Carrier Form ICF)

RCV 9.7 Carrier Destination Mapping

RCV 10.10 Screening

RCV 10.11 Charge Index Expansion

RCV 8.2 Normalized Office Codes

RCV 4.14 Hundreds Group Assignment

RCV 10.2 Route Index

RCV 10.25 Alternate Route Indexes

RCV 5.1 Trunk Group

RCV 5.5 Trunk Member

RCV 9.5 Incoming Trunk Digits

Lesson 5 ISDN BRI Protocol

The ISDN Basic Rate Interface Protocol lesson begins by generally defining protocol. This includes presenting the

International Standards Organizations (ISO) Open Systems Interconnect (OSI) seven layer model and explaining where the ISDN BRI protocol fits into the model. From this point, the lesson identifies ISDN BRI Layer 1 (I.430), Layer 2 (Q.921, LAPD) and Layer 3 (Q.931) protocol along with their equipment terminations within the 5ESS Switch and at the Customer Provided Equipment (CPE). The lesson presents the function of each level of protocol, how that level of protocol becomes operational and examples of the Protocol messaging. This includes a detailed explanation of how the D Channel becomes operational. Next, the lesson presents Q.931 call processing messages. The lesson references Alcatel-Luents National ISDN Basic Rate (235-900-341) and Custom ISDN Basic Rate (235-900-343) documents.

Lesson 6 Maintenance Messages

This lesson, Maintenance Messages, presents the 5ESS Switch Input and Output messages used to maintain customer service, correct service problems, verify status and obtain information about a customers ISDN BRI line and service. The lesson also includes an explanation of the different 5ESS BRI protocol error detection schemes. It also includes a brief overview of how to use Alcatel-Luents Input and Output messages manuals. This is followed with a presentation of the following Input Messages and analyzing their associated Output Messages.

OP:STATUS (Includes Output Messages Manual Appendix Port Status)

OP:LIST

OP:CPE

TST:DSL

EXC:ALE

VFY:OFC

OP:CONV

The goal of this lesson is to provide a strategy to identify and correct ISDN BRI service problems.

Lesson 7 BRI Protocol Monitoring (EXC:PM)

This lesson, BRI Protocol Monitoring (EXC:PM), presents the 5ESS Switch BRI Protocol Monitoring feature. It provides the EXC:PM input message and defines the various options and parameters of the message. After the message has been presented, this lesson presents several protocol example session. The resulting printouts are analyzed using Alcatel-Luents National ISDN Basic Rate (235-900-341) document and their Custom ISDN Basic Rate (235-900-343) document. This lesson references Alcatel-Luents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

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

4 Days