

Hands-On Nokia GTD-5 Advanced Support Course



Course Description

As OEM-support options dwindle, it has become more important than ever for telco personnel to resolve network faults on their own, even the most difficult ones. BTS recognizes the challenges of finding affordable, support-level training, and has worked hard to provide you with no-compromise, expert-led courses at the support level.

The Nokia (formerly AG Communication Systems) GTD-5 Support Course provides a detailed support-level course with updated, full-color block diagrams and images. This course was designed to bring students with a general, maintenance-level competency on the GTD-5 to a considerably more advanced understanding of the system, including its backplane and cabling. This will help the understanding of inter-module connections, so that almost any fault can be traced and corrected. The microprocessor (MP) front-end and Common Memory Units (CMU) are looked at in detail, with an emphasis on the APC and its connections to the ACDC. Important interfaces like the Operations Gateway (OG), LCDT, RCDT, and AMA equipment are explained and accessed, as available. The role and variations of MDC & CPX are also discussed.

The course also looks further at the PCM network, and studies how the SIC, SSW, and BUNW are interconnected. Superordinate and Subordinate status are explained, and how they relate to the BUNW, TSW, and PCUs. Various failing diagnostic examples from previous BUNW/TSW faults are reviewed and decoded, including recovery messages such as SMA syndromes and diagnostic fault printouts. In particular, the 1.019 Non-Maskable Interrupt, 3.059 PCM Trace, and 3.028 Executive Reset SMA Syndromes are studied, along with the typical craftsperson action for each.

System database is also looked at in some detail, to help students understand what may be a hardware problem, and what may be a database problem. Control parameters, system module engineering, and other commands are used to understand what the system is doing, what certain error messages mean, etc.

Finally, documentation such as the UG, CRL and EL are used to trace cabling, and look at the layout of the backplane of key frames. Troubleshooting techniques are taught pro-actively, including Maintenance-window procedures. Time is allotted to work on troubles which students have encountered and want to discuss. Almost any type of hardware or software fault can be reviewed, with an explanation of the typical steps needed for resolution.

Students Will Learn

- Review all primary modules of the GTD-5 EAX switch
- Understand the different versions of hardware for memory & switching
- How system modules are cabled, and how to look-up cabling information
- Understand how a call is made through the system
- Predict common points of failure
- Understand what is system control and what is PCM hardware
- Break-down SMA syndrome data
- Decode diagnostic output data in either binary or hexadecimal format
- Know how to find additional information using IO commands

- **Implement FACT traces to verify hardware or database status**
- **And much more...**

Target Audience

Technical staff such as those in the NOC/SCC, Central Office Technicians, and certain management personnel, or any others involved with troubleshooting of complex faults in the GTD-5 switch.

Prerequisites

Students should have previously taken the GTD-5 Maintenance And Troubleshooting course, or have a good working knowledge of the modules and operation of the GTD-5 switch and its IO commands.

Course Outline

Module 1 : GTD-5 Theory of Operation - Review

- Front End: APC, TPC plus DM/CMU
- CPX, DISK, IROC
- IOU, FTU
- Extension Complex
- PCM Network: BUNW, TSW, PCU plus NCU & SSW/SIC
- Lines: ALU, ELU, SLU, XAIU
- Trunks: DCU, EDCU, DS3
- Remotes: RSU incl. RSNW, RLU incl. RLNW, 914 MXU
- Remotes: GR-303 Compliant RDT
- Remotes: SLC-5, SLC-96
- PCM Overview
 - Frequency sampling
 - Binary
 - Frames - DS0, DS1
 - PCMX, PCMR
 - TSC
- Time-Space-Time
- A Phone Call

Module 2 : Front-End Hardware

- Microprocessor Architecture
 - Intel 8086/80386SX
 - Upper & Lower Echelons
 - DUBE
 - Address & Data Busses

- Dedicated Memory (DMEM) incl. Page Access
- MPCC, ADDR, MPBC, CFCA functions
- Alarm Registers
- REPO LOAD INFO
- Common Memory
 - CMU (CCM, COM, CMX, CM4X, CM8X)
 - EXAM CONT PARA
- APC & Peripherals
 - IOU0 & 1
 - FTU
 - MTU/mte
 - ACD, ACDC, LCDT, RCDT
 - ICIC/Terminals, TERM7
- TPC
 - D4MW-DM32 Versions
- MDC
 - Groups 0-2
 - APC, TPC, TCU Interfaces
 - MDCM, MDDI Card Optioning Issues
- SIC
 - SIC (8 BPC)
 - SCX (16 BPC)
- CPX
 - CST/SS7 - incl. DSC Modems
 - DSUB - DISK - 300MB & 1GB
 - IROC - GR-303 Function
 - LANI - OG, Ethernet Connections
- OG
 - IOMM - GTD-5 IO Terminal
 - UNIX - UNIX Terminal
 - BI - Batch Interface Terminal
 - AMA - Connectapp AMA

Module 3 : PCM & Peripheral Hardware

- BUNW
 - Time Switch - TSW, TSWE, and TSC
 - PCU - ACU, CCU, DCU, EDCU
 - PIU - ALU, ATU, SPAN
 - NCU - incl. BITS, master timing signal (MTS), oscillator issues
- SSW
 - Large SSW
 - Expanded SSW (SSWE or XSS)
 - Cable & Frame Differences
 - SIC connections
 - TCU connections - Rail A&B/C&D
- RSNW incl. Survivability, FIU0-3 & FIU4-7
- RLNW
- MXU
- FTU
 - KA & KG varieties, Small (Remote)
 - Functional Block Diagram

Module 4 : Documentation

- Users Guides - 4008, OG, AMA, XLMF, etc.

- GTD-5 Engineering Documents - how to use:
 - FA - Functional Assembly
 - FB - Functional Block
 - FE - Functional Explanation
 - EL - Electronic Locator (wiring planes, cable pinouts)
 - ECD - Equipment Configuration Document
 - CRL - Cable Running List
 - PLRG - Product Line Reference Guide
 - HDWM - Hardware Matrix Report
- Tracing a Lead
 - Using the EL
 - Using the FB
- Cabling
 - Reading Labels
 - Using the CRL
 - Using the EL
- Practice

Module 5 : Binary & Hexadecimal

- Binary to Decimal
- Hexadecimal to Decimal
- Hex Words, Bytes, Nibbles
 - DIAG PRIN4 vs. PRIN3
 - Convert Hex to Bin
- Advantages to Each Format
- DIAG FTU PHAS30,31 example
- DIAG MRCC PRIN3.3 EPAR2 example
- Practice

Module 6 : System Malfunction Analysis (SMA)

- SMA Classes - priority through deferred
- SMA lookup in UG
- Recognizing Patterns
- SMA Breakdown
 - Hex & Binary fields
 - Part 16 Messages
 - Craftsperson Action
- 1.019 NON-MASKABLE INTERRUPT
 - Key Fields
 - Examples
- 3.059 PCM TRACE
 - Meaning of Fields
 - Enabling
 - Examples
- 3.028 EXECUTIVE RESET
 - Meaning of Fields
 - Interpreting the Messages, Associated Messages
 - Craftsperson Action

Module 7 : Diagnostics

- Diagnostics
 - PRIN3.3 vs PRIN4.4

- Part 15 - Repair Manual
 - Level 1 Card Repair - card level repair
 - Level 2 Card Repair - diagnostic info, options
 - Level 3 Card Repair - diagnostic breakdown, backplane
 - Practice
- Using System Malfunction Analysis (SMA)
- DIAG vs ROUT
- RUN and ITER
- Execution Parameter (EPARM)
- PUT vs FORC

Module 8 : Practical

- ACU Fault
- BUNW Fault
- FIU Outage - Encapsulated State
- MP Fault - local copy
- MP Fault - cross copy
- DLNK Fault - remote impact
- CMU Fault
- Exercises - by student request

Module 9 : System Database

- Control Parameters
 - CONT PARA, BILL PARA
- Engineering Parameters
 - Processors (i.e. EXAM TCU, TSW vs. TSWE, etc.)
 - Memory (i.e. EXAM CMU, REG BLOC)
 - Ringing (i.e. EXAM RGG, EXAM FREQ ASSI)
 - Testing (i.e. EXAM FTU)
 - Power (i.e. EXAM IOU, ROUT PS)
 - Alarms (i.e. EXAM AUX, AUXC, AUXS)
- Tracing with FACTS

Notes

5 Day & 10 Day Versions

The course length is flexible at 5-10 days, with the longer version intended for NOC and key COT personnel who work more frequently on difficult problems. A shorter version is helpful for persons working with either the NOC or TAC, while still allowing them to understand and handle many problems independently.

Delivery Method

Instructor-Led with numerous exercises throughout.

Equipment Requirements

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

BTS always provides equipment to have a very successful Hands-On course. BTS encourages students to bring their own equipment to the course, such as laptops and documentation. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their own equipment.

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Course Length

5 Days