

System Technician

OVERVIEW

System Technician is an indispensable guide for the field technician on how to activate, test and troubleshoot the RF trunk distribution system. It covers RF trunk and distribution amplifier theory of operation and setup procedures and introduces troubleshooting techniques for power supplies and amplifiers. It also clearly presents the FCC Technical Standards testing requirements and procedures and the NCTA Recommended Practices for system measurements, system sweeping and testing, signal leakage analysis and spectrum analyzer basics and measurements. Included are principles of amplitude, frequency and phase modulation. It also teaches techniques for underground construction. This course assumes a working knowledge of basic HFC broadband networks and electronics up to and including inductive and capacitive circuits.

Delivery Options:

📖 Learning takes place using a textbook. Lessons and final exams are taken online.

Completion Time:

Varies based on the student's self-study pace, however, the maximum time allowed is six months from enrollment.

BENEFITS

Upon completion students will:

- » understand how to correctly activate, test and troubleshoot the RF trunk distribution system
- » be able to properly apply industry and federal guidelines to system analysis, testing, measuring and sweeping
- » know how to correctly construct underground plant
- » earn four hours of college credit
- » gain 12 BICSI continuing education credits for RCDD, RCDD/LAN, RCDD/OSP, Residential Installer, Installer Level II and Technician
- » use this course to help prepare for SCTE's Broadband Distribution Specialist, Broadband Transportation Specialist and Broadband Communications Technician/Engineer Category III and IV
- » receive an industry-recognized Jones/NCTI™ certificate of graduation

Ideal for:

Personnel responsible for the operation, testing and maintenance of modern HFC broadband networks, including:

- » service technicians
- » HFC technicians
- » line technicians
- » maintenance technicians

COURSE OBJECTIVES

Upon completing this course, students will be able to:

1. understand and apply rectification and regulation in ferroresonant and switching power supplies

(Continued)

RELATED COURSES

Students completing this course should then enroll in:

- » Digital Technician
- » Fiber Installation and Activation
- » Fiber Testing and Maintenance
- » Advanced Technician
- » Effective Supervision

TRAINING FEATURES

- » Knowledge-based, broadband and job-specific content
- » Highly illustrated and easy to read course materials
- » Curriculum advising
- » 24/7 lesson feedback and progress monitoring at www.jonesncti.com
- » Online testing

Visit www.jonesncti.com/coursepolicy.htm for important information on computer hardware/software requirements and student-to-student transfer and extension limitations



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COURSE OBJECTIVES *(Continued)*

2. understand and apply basic electronic troubleshooting techniques for power supplies and amplifiers
3. understand and apply theory of operation, explain types of modules and perform setup procedures to rough balance and sweep trunk and distribution amplifiers
4. understand and apply FCC Technical Standards measurement requirements and NCTA Recommended Practices, perform FCC tests for system proof-of-performance using a system analyzer, sweep/analyzer, automated testing system and compile signal leakage data for computing CLI
5. understand and apply the principles of amplitude, frequency and phase modulation
6. understand and apply the techniques for underground construction

COURSE OUTLINE

- 1. Communications Systems**
Reviewing the history of communications, exploring the meaning of communication, examining noise as a limiting factor, exploring bandwidth and channel allocations and examining communication systems considerations
- 2. Electronic Communications**
Examining modulation and understanding multiplexing
- 3. Trunk System Overview**
Understanding system design symbols and architectures, constructing and powering the plant, examining transmission components and verifying plant reliability
- 4. Power Supply Circuits**
Examining rectifier circuits, power supply systems and filters and examining regulators and troubleshooting
- 5. Discovering Bipolar Junction Transistors**
Examining the basic types of transistors, BJT operation and characteristic curves, exploring an NPN transistor circuit model and examining BJT ratings and testing
- 6. Bipolar Junction Transistor Amplifier Circuits**
Examining the basic concepts and biasing of amplifiers, amplifier circuit configurations and exploring classifications of amplifiers
- 7. Operational Amplifiers**
Examining the basic concepts and characteristics of operational amplifiers, operational amplifier circuit configurations, operational amplifier input modes and exploring operational amplifiers for mathematics
- 8. Oscillators and Multivibrators**
Examining the basic concepts of oscillators, LC sine-wave and crystal oscillators, RC sine-wave oscillators and multivibrators
- 9. RF Amplifier Operations, I**
Examining the trunk/bridger amplifier housing, describing the trunk amplifier module and the bridger amplifier module
- 10. RF Amplifier Operations, II**
Control modules, return/reverse amplifier module, status monitoring module, fail safe module operation, DC power supply module and amplifier power distribution
- 11. Distribution Amplifier Setup, I**
Setting up C-COR FNT amplifier and Texscan FTMT amplifier
- 12. Distribution Amplifier Setup, II**
Setting up Jerrold Mini-Bridger, Philips Global Network and Scientific-Atlanta System amplifiers
- 13. Troubleshooting, Instrumentation and Msmt**
Introducing the troubleshooting process, understanding block diagrams, common test equipment and troubleshooting electronic devices
- 14. Communications Circuits**
Examining filters, tuned circuit and resonance, exploring oscillators and examining amplifiers
- 15. Amplitude Modulation**
Examining the AM signal, AM transmitters and receivers, exploring single-sideband transmission and examining single-sideband receivers
- 16. Frequency Modulation**
Examining frequency modulation, FM signal generation, exploring phase modulation, examining FM receivers and understanding phase-locked loops
- 17. Automated Spectrum Analyzer Basics**
Introducing and reviewing features of the spectrum analyzer, operating the spectrum analyzer, using the spectrum analyzer in the broadband cable system and using the digital signal analyzer feature
- 18. Analyzing Signal Leakage**
Understanding equipment requirements, calculating CLI, producing system signal leakage reports, generating signal leakage maps and implementing signal leakage maintenance programs
- 19. Cable System Sweeping**
Describing sweep and understanding sweep specifications, setting up and sweeping the forward and return paths and troubleshooting sweep response problems
- 20. Manual Spectrum Analyzer Distortion Measurements**
FCC requirements, NCTA recommended practices and testing for channel distortions using manual procedures
- 21. Constructing Underground Plant, I**
Using chain trenchers, digging trenches, burying coaxial cable directly in ground, burying conduit, pulling cable through conduit, burying preassembled cable in conduit and backfilling the trench
- 22. Constructing Underground Plant, II**
Understanding plowing, introducing dry boring and explaining fluid-assisted boring



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For more information call 866.575.7206 or email sales@jonesncti.com
9697 East Mineral Ave. • Centennial, CO 80112 • www.jonesncti.com