ATCW-2070: INFORMATION TRANSPORT CIRCUITS

Cuyahoga Community College

Viewing: ATCW-2070 : Information Transport Circuits

Academic Term:
Spring 2019

Subject Code
ATCW - AIT-Communication Workers

Course Number:
2070

Title:
Information Transport Circuits

Catalog Description:
Advanced course covering the functions and limitations of transmission signals and the provider equipment and hardware used for information transport. In addition, troubleshooting procedures, tools, and equipment will be discussed.

Credit Hour(s):
1

Lecture Hour(s):
1

Requisites

Prerequisite and Corequisite
Departmental approval: admission into the CWA apprenticeship program.

Outcomes

Course Outcome(s):
I. Examine the different types of transmission signals and explain the relative functions and limitations of each.

Objective(s):
1. Define the terms related to information transport circuits.
2. Contrast the different circuits used to transport voice, video and data.
3. Categorize the effects of attenuation with respect to distance and medium used for transmission.
4. Examine how the different electronic hardware interacts with different signals used.
5. Distinguish the electronic progression of voice and data circuits.
6. Differentiate between the different types and functions of circuits.

Course Outcome(s):
II. Compare the respective service provider equipment and hardware and describe the various tests required for industry compliance end user acceptance.

Objective(s):
1. Contrast the purpose of primary protection with respect to points of penetration and demarcation.
2. Support the purpose of identifying circuit numbers of respective services.
3. Differentiate between service provider tests and interconnect testing.
4. Distinguish the equipment used for circuit testing and end user acceptance.
5. Analyze the physical properties of medium used for signal and information transport.
6. Evaluate the difference between interconnects and explain the service provided by each.
7. Differentiate between service provider, hardware and equipment.
8. Describe the purpose of the points of demarcation and network interface devices.

Course Outcome(s):

III. Perform troubleshooting operations using the proper tools and equipment to diagnose and resolve information transport problems.

Objective(s):

1. Operate the tools and equipment used to troubleshoot and correct circuitry problems.
2. Value the importance of verifying testing equipment.
3. Contrast the various problems encountered with respect to transmission circuitry.
4. Illustrate the potential jobsite hazards and identify the safety regulations that must be employed for worker safety
5. Express the importance of isolating the physical faults and equipment failure to determine responsibility.
6. Create a standard flow chart to resolve diagnosed problems.
7. Arrange the procedures followed for verifying problem resolution.

Methods of Evaluation:

1. Quizzes
2. Tests
3. Class participation

Course Content Outline:

1. Transmission signals: functions and limitations
    a. Terminology
        i. Smart jack
        ii. RJ-11
        iii. Time domain relectometer
        iv. Gas tube
        v. Protection ground
        vi. 21 Block
        vii. Cat-5 Jumper
        viii. Pipe
        ix. Node
        x. Sidekick
        xi. Stress
        xii. Pulp trouble
        xiii. Burning
        xiv. Chase the cable
        xv. Voip
        xvi. Port
        xvii. Resistance fault
        xviii. Open test
        xix. Longitudinal balance
        xx. Capacitive balance
        xxi. Interconnect
        xxii. Cross connect wire
    b. Circiut type
        i. Plan Old Typical System (POTS)
        ii. Centrex
        iii. DSO
        iv. DSL
        v. ADSL
        vi. SDSL
        vii. VDSL
        viii. T-1
        ix. PR1
        x. DS-3
    c. Attenuation

i. Effects
1. Distance
2. Medium
ii. Sources
1. Noise
2. Induced
3. Physical

d. Electronic hardware
i. Types
1. Modem
2. Router
3. Communication system
4. Signal interaction
a. VOIP stations
b. Analog stations

e. Electronic progression
i. Voice
ii. Data
iii. Convergence

f. Circuit functions
i. Voice
ii. Video
iii. Data

2. Service provider: equipment and hardware
a. Equipment
i. Smart Jack
ii. Primary protection terminal

b. Hardware
i. Fuses
ii. Jacks
iii. Blocks
iv. Cross connect wire

c. Interconnects
i. Service distribution
ii. Equipment provider

d. Service provider
i. Circuit delivery
ii. Circuit provision
1. Testing
2. Compliance

e. Points of demarcation
i. Location
1. Undefined
2. Multiple termination
3. Extended
ii. Purpose
1. Location
a. Undefined
b. Multiple termination
c. Extended
2. Purpose
a. Responsibility
b. Test points

f. Primary protects
i. Purpose
1. Environmental
2. Induced
ii. Penetrations
1. Compliance
2. Distance

3. Grounding requirements
4. Fuse types

iii. Demarcation
1. Location
2. Accessibility

g. Circuit number identification
i. Purpose
1. Location
2. Cross connect
3. Troubleshooting

ii. Function

h. Tests
i. Service provider
1. Longitudinal balance
2. Capacitivie balance
3. Sycnronization

ii. Interconnect
1. Test and turn up
2. Port
3. Service verification

i. Circuit testing equipment
i. Sync meter
ii. Butt set
iii. Tone amplifier

j. Medium
i. Pysical properties
ii. Signal transport

3. Troubleshooting
a. Tools and equipment
i. Hand tools
ii. Power tools
iii. Diagnostic

b. Equipment verification
i. Purpose
ii. Diagostic

c. Typical problems
i. Circuit provisioning
ii. Physical
iii. Demarcation location
iv. Environmental
v. Human error
vi. Workmanship
vii. Standards revisions
viii. Communication

d. Jobsite hazards
i. Asbestos
ii. Elevated work
iii. Personal Protective Equipment (PPE)
iv. Electrical

e. Safety regulations
i. PPE
ii. Fall protection
iii. Electrical
iv. Telephony

f. Physical fault isolation
i. Types
1. Short
2. Ground

3. Cross
4. Open

ii. Purpose
1. Problem resolution
2. Circuit continuity

g. Flow chart resolution verification
i. Voice test
ii. Replication
iii. Data check
iv. End user satisfaction

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Resources

Independent Electrical Contractors Chesapeak and Western Electrical Contractors Association. *Electrical Pre-Apprenticeship Workforce Development.* 2013 Edition. Cengage Learning Clifton Park, NY, 2013.

BICSI. *Information Technology Systems Installation.* 6th Edition. BICSI Tampa, Florida, 2012.

Cisco Press. *Cisco Certified Network Associate.* Second Edition. Cisco Press Indianapolis, Indiana, 2002.

Resources Other

www.adtrain.com

www.circuitstoday.com

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