Course Name: Maintaining Traditional Analog Systems

Course Overview:
Analog concepts are the basis of most modern networks and this course has been designed take a practical approach to fully understanding these systems. At one time, the majority of systems were based on analog concepts. This included voice or Plain Old Telephone Service (POTS) as well as analog data. Over time, many of these systems were converted to digital or were simply phased out and concurrently, the technicians who understood and maintained the analog networks have retired creating a void when newer technicians are tasked with troubleshooting analog networks. To many, these networks are still important today and may carry mission critical information for utilities, government agencies, transportation authorities and municipalities.

This training will not only help resolve issues on traditional systems, but will also provide a strong foundation to better understand the building blocks for modern data services.

Course Length: 2 days

Who should attend?

- Technicians
- Design Engineers
- Managers/Field Supervisors
- Field Engineers
- Installers
- Project Planners
- Data Specialists

You will learn:

- Difference between 2-wire and 4-wire analog service
- Signaling concepts including: Loop Start, Ground Start and E&M
- Set up, operate and interpret results on traditional test equipment
- Ho to perform analog tests and validate service
- Verify proper configurations and equipment options
- Troubleshoot existing systems to ensure signal quality

Prerequisites: None

Customizable Course: Yes

Course Content:

Overview of Analog Services
- Background
- Relevancy Today
- Support Services
- Voice Grade
- Data Grade

Analog Architecture
- POTS
- 2-Wire
- 4-Wire
- Analog Carrier
- Analog through Digital Systems
- Regens/Repeaters
- Load Coils
- Channel Cards
- Analog Looping Devices

Signaling Concepts
- Loop Start
- Ground Start
- E&M
- Dial Pulse, MF and DTMF

Overview of Test Equipment
- Basic testers (Butt Set, Tone generators…)
- TIMS testers
- Modem Testers
- Channel Bank Analyzers

Testing Concepts
- In-Service Monitoring
- Out-of-Service Testing
- End-to-End Testing
- Loop Testing
- Test Access Points
- Transmission Level Points (TLP)

Copper Qualification
- Distance, Resistance and Gauge
- Resistance and Capacitance
- Importance of Impedance Matching

Analog Tests
- Tone Testing
- Amplitude/Level
- Frequency
- Loss, Attenuation
- Looping Tones
- Return Loss
- Slope Testing
- Envelope Delay (EDD)
- Round Trip Delay (RTD)
- P/AR
- DC Offset
- Jitter (Phase & Amplitude)

Noise/Cross-Talk/Distortion
- Filters and Measurements
- Attenuation Distortion
- Impulse Noise
- Metallic Noise
- Cross-Talk (Near & Far End)
- C-Notched Noise
- Echo and Echo Return Loss
- Gaussian Noise
- Quantizing Noise
- Intermodulation Distortion

*Extensive Hands-on