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T R A I N I N G O U T L I N E

IMUX 2000 T1 LINEAR OUTLINE

1 INTRODUCTION

1.0 Course Overview

1.0.1 Day One

1.0.2 Day Two

2 T1 CARRIER THEORY

2.0 T-1 Basics

2.0.1 What is T-1

2.0.2 Why T-1

2.1 How T1 Works

2.1.1 Pulse Code Modulation

2.1.2 Time Division Multiplexing

2.1.3 Understanding and calculating the 1.544 Mb/s T-1 Rate

2.1.4 Signal Regeneration

2.1.5 Optical Span

2.2 THE DS-1 Signal Format

2.2.1 Alternate Mark Inversion

2.2.2 B8ZS, Signal Timing, and Ones Density

2.3 DS-1 Framing

2.3.1 The D1 Frame

2.3.2 D4 Framing/SuperFrame (SF)

2.3.3 Extended SuperFrame (ESF)

2.3.4 CRC-6

2.3.5 The ESF Data Link

2.3.6 ESF's Enhanced Signaling Capability

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3 MULTIPLEXER FEATURES

- 3.0 Synchronous Data
- 3.1 Asynchronous Data
- 3.2 Control Signal
- 3.3 Network Timing
- 3.4 Drop and Insert
- 3.5 Fallback Timing
- 3.6 Electrical or Fiber Optic T-1 Carrier System
- 3.7 Automatic Fiber Optic Gain Control
- 3.8 24 Channel Capability
- 3.9 Modular Construction
- 3.10 Substation Hardened (SWC/Fast Transient/EMI)
- 3.11 Network Capability
- 3.12 Universal Time Slots
- 3.13 Remote Monitoring
- 3.14 S/W and DIP Switch Programmable
- 3.15 Upward compatible to SONET/SHD
- 3.16 Self Testing Diagnostics
- 3.17 Redundant Power Supplies

4 MULTIPLEXER RELIABILITY

- 4.0 Average Reframe Time
- 4.1 Robustness
- 4.2 Through Channel Delay
- 4.3 Fallback Timing

5 MULTIPLEXER DIAGNOSTICS

- 5.0 Status Monitoring
- 5.1 Test Jacks
- 5.2 Loopbacks

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6 MULTIPLEXER ALARMS

6.0 Major Alarm Conditions

6.1 Minor Alert Conditions

7 IMUX 2000 MULTIPLEXER

7.0 IMUX System Specification

- 7.0.1 Power Supply
- 7.0.2 Optical Interface Adapters
- 7.0.3 Alarms And Diagnostics
- 7.0.4 Remote Access And Control
- 7.0.5 Inputs
- 7.0.6 T-1 Outputs
- 7.0.7 Timing
- 7.0.8 Environmental

7.1 Main Shelf

7.2 Expansion Self

7.3 T-1 Common Module (**CM-3R**)

- 7.3.1 Theory of Operation
- 7.3.2 Set Up And Configuration
- 7.3.3 Block Diagram

7.4 Common Module Interface Adapters **(MA210, MA215, OIA's)**

- 7.4.1 Theory of Operation
- 7.4.2 Set Up And Configuration
- 7.4.3 Block Diagram

7.5 Power Supply Modules (**48Vdc, 125Vdc, 250Vdc, 120Vac**)

- 7.5.1 Theory of Operation
- 7.5.2 Set Up
- 7.5.3 Block Diagram

7.6 Power Supply Alarm I/O Modules **(DC Input, AC Input, DC/AC Input)**

- 7.6.1 Theory of Operation

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10 IMUX 2000 CUSTOMER EQUIPMENT

- 10.0 Customer Block Diagram
- 10.1 Set-Up and Configuration of IMUX2000 Multiplexer
- 10.2 System Performance Test
  - 10.2.1 Channel Modules Test
  - 10.2.2 Alert & Alarm Test
  - 10.2.3 Power Supply Redundancy Test
- 10.3 Troubleshooting
- 10.4 Maintenance
- 10.5 Question And Answer

11 OVERVIEW OF IMUX2000 MANUAL

- 11.0 Manual has 19 sections
- 11.1 Introduction Section contains safety summary info, table of contents, list of illustrations and tables.
- 11.2 Section 1 contains product information on the Multiplexer, ILS, Mini-DACS and IMUX modules.
- 11.3 Section 2 contains the Multiplexer functional description.
- 11.4 Section 3 contains functional description for the ILS
- 11.5 Section 4 contains functional description for the DACS.
- 11.6 Section 5 contains overview of the Multiplexer channel modules.
- 11.7 Section 6 contains the configuration and setup for the T1 through the CM-3B/C.
- 11.8 Section 7 contains Network Management Software Information.
- 11.9 Section 8 contains remote configuration for the modules
- 11.10 Section 9 contains installation and check-out information
- 11.11 Section 10 contains information on troubleshooting
- 11.12 Section 11 contains Power Supply and Power Supply alarm I/O information
- 11.13 Section 12 contains information on the OIA
- 11.14 Section 13 contains reference data information
- 11.15 Section 14 contains the Index
- 11.16 Section 15 contains the Asynchronous Data Channel modules info
- 11.17 Section 16 contains the Synchronous Data Channel modules info
- 11.18 Section 17 contains the voice modules information

11.19 Section 18 contains the DS-TT Transfer Trip Module info
11.20 Section 19 has the customer system drawings and other customer's document.

12 GENERAL QUESTION AND ANSWER

12.0 Multiplexer
12.1 NMS
12.2 Application

13 CONCLUSION