

## 3512 Manual

### Chapter 1. Introduction

Introduction .....	1-2
Features.....	1-3
Operating Modes .....	1-3
DDS-I Type Services .....	1-3
DDS-II Secondary Channel (SC) Type Services .....	1-3
64 kbps Clear Channel (64k CC) Service .....	1-3
Synchronous Data Compression (SDC) .....	1-4
DTE Ports .....	1-4
Remote Front Panel (RFP) .....	1-4
Time Division Multiplexer (TDM) and Channel Sharing .....	1-5
Multipoint Multiplexing (MP-Mux) .....	1-5
Restoral Features .....	1-6
Integral Restoral .....	1-6
Integral Single Line Restoral (SLR) .....	1-6
Integral Digital Restoral (DDS or Switched-56) .....	1-6
External (A/B) Restoral.....	1-7
Dial Line Monitor (DLM) .....	1-7
Rate Adaptation .....	1-7
Asynchronous-to-Synchronous Conversion .....	1-7
Circuit Quality Monitoring System (CQMS) .....	1-8
Tests .....	1-8
Network Management System and WANVisible .....	1-8
DualVIEW Management .....	1-9
Mini-Nest .....	1-9
Compatibility .....	1-9

### Chapter 2. Installing the 3512

Overview .....	2-2
Unpacking .....	2-2
Telephone Equipment .....	2-3
Customer-Provided Telephone Equipment .....	2-3
Telephone Company Procedures and Regulatory Requirements .....	2-4
If Problems Arise .....	2-4
Selecting a Site .....	2-4
Installing the Standalone 3512 or 3512 SDC .....	2-5
Connection to Telephone Line .....	2-6
Restoral .....	2-7
Connection to Data Terminal Equipment (DTE) .....	2-8
Connection to Network Management System (NMS) .....	2-11
Connection to Power Supply .....	2-12
Installation Checkout .....	2-13
Automatic Self-Test .....	2-13
Opening the 3512 Enclosure .....	2-13

## Contents (continued)

---

### Chapter 3. The Front Panel

---

Overview.....	3-2
Light-Emitting Diodes (LEDs) .....	3-3
Menu Structure .....	3-4
Default Display .....	3-4
Control Keys .....	3-5
Alphanumeric Entry .....	3-5
Remote Front Panel (RFP).....	3-6
RFP Operation .....	3-8
Beginning an RFP Session .....	3-8
Interrupting and Resuming an RFP Session: Escape-RFP Mode .....	3-9
Ending an RFP Session.....	3-9
Searching for a Remote Device's NC Address.....	3-10
Setting a Remote Device's NC Address Parameter .....	3-10
RFP and Restoral Operation.....	3-11
Automatic Initiation and Termination of Restoral .....	3-11
Manual Initiation and Termination of Restoral.....	3-11
RFP and Network Management .....	3-11
RFP and Link Problem Determination Aid (LPDA) .....	3-11
RFP Rules .....	3-12
Local Device Displays During an RFP Session .....	3-12
Remote Device Displays During an RFP Session .....	3-13

### Chapter 4. Configuring the 3512

---

Overview .....	4-2
Verifying Line Quality.....	4-3
Configuring the 3512.....	4-5
*MODIFY.....	4-7
MODIFY DSU Category .....	4-8
MODIFY PORT Category .....	4-17
MODIFY NETWORK Category .....	4-27
MODIFY SLV ADDR Category .....	4-31
CONFIGURATIONS Category .....	4-32
*AUXILIARY .....	4-33
PROTECTION Category.....	4-34
FRONT PANEL Category .....	4-35
RMT FRONT PANEL (RFP) Category .....	4-37
SET REMOTE ADDR (ADDRESS) Category .....	4-38
SRCH REMOTE ADDR Category .....	4-39

## Contents (continued)

### Chapter 4. Configuring the 3512 (Continued)

*RESTORAL .....	4-40
ACTIVATE RESTORAL Category .....	4-42
RESTORAL METHOD Category .....	4-42
DIAL PARAMETERS Category .....	4-43
INIT (Initialization) PARAMETERS Category .....	4-46
AUTO ANSWER Category .....	4-48
RESTORAL CONFIG Category .....	4-49
MODEM CONFIG Category .....	4-52
DIGITAL CONFIG Category .....	4-55
PHONE NUMBER Category .....	4-57
DIAL LINE MONITOR (DLM) Category .....	4-61
*DUALVIEW .....	4-63
CONFIG DUALVIEW Category .....	4-63
*COMPRESSION .....	4-66
COMPRESS CONFIG Category .....	4-66

### Chapter 5. 3512 Status

Overview .....	5-2
*STATUS .....	5-2
3512 e f r c (Default Display) Category .....	5-4
Default Display Examples .....	5-4
LINE SELECT Category .....	5-5
e ALARM STATUS Category .....	5-5
e CQMS Category (where e specifies the line) .....	5-8
e LINE STATISTICS Category (where e specifies the line) .....	5-9
PORT STATUS Category .....	5-10
COMPRESS STATUS Category .....	5-11
RESTORAL STATUS Category .....	5-12
NETWORK MESSAGE Category .....	5-13
Ser # nnnnnnnn.....	5-13
SWREV n.n c .....	5-13
SDC SWREV # n.n .....	5-13
*STATUS and Remote Front Panel (RFP) .....	5-13

### Chapter 6. 3512 Operation

Introduction .....	6-3
System Applications .....	6-3
Operating Modes and Network Management Overview .....	6-3
DDS-I Service .....	6-4
Transmission Modes: Overview .....	6-4
Main Channel Transmission Mode Over Point-to-Point Circuits .....	6-5
Main Channel Transmission Mode Over Multipoint Circuits .....	6-7
Derived Secondary Channel Transmission Mode, Bitstealing .....	6-7
Derived Secondary Channel Transmission Mode, Muxed .....	6-9

## Contents (continued)

---

### Chapter 6. 3512 Operation (Continued)

---

DDS Secondary Channel (DDS-II SC) Services .....	6-11
DDS-II SC Transmission Service on Point-to-Point Circuits .....	6-11
DDS II SC Transmission Service Multipoint Circuits .....	6-12
64k Clear Channel (64k CC) Service .....	6-13
Time-Division Multiplexing (TDM) .....	6-14
TDM and Channel Sharing .....	6-14
TDM and Port-to-Channel Mapping .....	6-15
Point-to-Point TDM on DDS-I Type Service .....	6-18
Point-to-Point TDM & Channel Sharing with DDS-I Service .....	6-18
Multipoint TDM and Channel Sharing on DDS-II SC Type Service ..	6-19
Mixed TDM - Channel Sharing Applications .....	6-20
Multipoint TDM and MP-Mux .....	6-21
MP-Mux with Non-interruptive Network Management .....	6-22
MP-Mux with Circuit Consolidation .....	6-23
MP-Mux with Automatic Channel Rate Configuration .....	6-24
MP-Mux with Rate Adaptation .....	6-24
MP-Mux with Mixed TDM and Channel Sharing .....	6-25
TDM and Tail Circuits .....	6-26
Tail Circuit off 3512 TDM Trunk .....	6-26
Tail Circuit Off 3512 TDM in Channel Sharing Mode—DDS-I .....	6-27
Tail Circuit Off 3512 TDM in Channel Sharing Mode—DDS-II SC...	6-27
Restoral Operation .....	6-28
Restoral Timing Considerations .....	6-28
Analog Restoral Timing .....	6-28
Digital Restoral Timing .....	6-29
Initiating and Terminating Restoral .....	6-29
Integral Analog Dial Restoral .....	6-30
SLR Automatic Rate-Negotiation Feature .....	6-30
Sample SLR Applications .....	6-31
Integral Digital Restoral .....	6-34
Integral Digital Dial Restoral .....	6-34
Switched-56 and Leased 56k Integral Digital Restoral .....	6-35
External (A/B) Restoral (Analog and Digital) .....	6-36
External Restoral Tips and Considerations .....	6-36
External Restoral Sample Applications .....	6-38
Limited Distance Modem (LDM)/Private Wire Applications .....	6-43
LDM Timing Considerations .....	6-43
Tail Circuit Considerations .....	6-44
LDM Tail Circuits - DDS-I.....	6-44
LDM Tail Circuits - DDS-II SC .....	6-45
LDM Tail Circuits - 64k .....	6-46
DSU/CSU and Port Timing .....	6-46
DSU Timing Options .....	6-46
Network Timing Option.....	6-47
Internal Timing Option .....	6-47
External Timing Option .....	6-48

## Contents (continued)

---

### Chapter 6. 3512 Operation (Continued)

---

Port Timing.....	6-48
Synchronous/Internal Timing Option .....	6-48
Synchronous/External Timing Option .....	6-49
Synchronous/Station Timing Option .....	6-50
Asynchronous Data Timing Option .....	6-50

### Chapter 7. 3512 SDC Operation

---

Introduction .....	7-2
3512 SDC Configuration and Operation Notes .....	7-2
3512 SDC Application Notes .....	7-4
Data Throughput .....	7-4
Link Utilization .....	7-5
Anti-Expansion .....	7-6
Flow Control.....	7-6
Data Delay .....	7-7
Time-Division Multiplexing (TDM) .....	7-8
Network Management .....	7-8
3512 SDC System Applications .....	7-9
Configuring SDC Primary Applications .....	7-9
Compression Link Between Two Routers .....	7-9
Compression of Multiplexed Legacy and Router Traffic .....	7-10
Compression With Central-Site T1 Access .....	7-11
Configuring SDC Restoral Applications .....	7-12
Compression on a Restoral Link.....	7-12

### Chapter 8. Testing and Troubleshooting

---

Overview .....	8-2
*TEST Main Menu .....	8-3
Troubleshooting Sequence .....	8-3
Quick Checks .....	8-4
Isolating Common Problems .....	8-5
Running Tests .....	8-6
From the Front Panel .....	8-6
From the Network Management System (NMS) .....	8-6
Loopback Tests .....	8-7
Terminal Loopback/Loop 1 .....	8-7
Digital Loopback/Loop 2 .....	8-8
Remote Loopback/Loop 2.....	8-9
DSU Check/Loop 3 .....	8-10
Local Loopback/Loop 4 .....	8-11
Service-Provider (Telco)-Initiated Loopback Tests .....	8-12
CSU Loopback Test .....	8-12
DSU (RT) Non-Latching Loopback Test .....	8-12
DSU (LLB) Latching Loopback Test .....	8-13

## Contents (continued)

---

### Chapter 8. Testing and Troubleshooting (Continued)

---

Pattern Tests .....	8-14
Bit Error Rate (BER) Tests .....	8-15
Line BER .....	8-15
Device BER .....	8-15
Initiating a Line or Device BER Test .....	8-16
Retrain Test .....	8-17
Correcting Port Interference Problems .....	8-17
If You Cannot Isolate the Fault .....	8-18

### Chapter 9. DualVIEW

---

Overview .....	9-2
DualVIEW Operation: LPDA-2 and the Motorola Control Channel .....	9-2
Network Topologies .....	9-3
Preparing to Use the DualVIEW Management Feature .....	9-4
DSU/CSU Management from NetView .....	9-4
Diagnostic Commands .....	9-5
Restoral Commands .....	9-5
Netview Monitoring and Testing .....	9-6
Modem and Line Status (MLS).....	9-6
Unsolicited MLS Command.....	9-6
Solicited MLS Command.....	9-6
Digital MLS Panel (Page 1 of 3).....	9-7
Digital MLS Panel (Page 2 of 3) .....	9-9
Digital MLS Panel (Page 3 of 3) .....	9-11
Transmit and Receive (TRT) Test .....	9-13
Using Modem Control (MDMCNTL).....	9-15
MDMCNTL Syntax and Description .....	9-15
Modifying the Network Control Program (NCP).....	9-17
System Configuration .....	9-17

### Chapter 10. Specifications and Ordering

---

Physical Characteristics .....	10-2
Standalone Unit .....	10-2
Environmental Limits .....	10-2
Operating Conditions .....	10-2
Nonoperating Conditions .....	10-2
Operating Mode .....	10-3
Digital Data Services .....	10-3
DDS-I .....	10-3
DDS-II SC .....	10-3
64k CC .....	10-3
Digital Port Interfaces .....	10-3

**Chapter 10. Specifications and Ordering (Continued)**

---

Data Format ..... 10-3  
Data Encoding ..... 10-3  
Timing ..... 10-3  
DTE Port Rates ..... 10-4  
    DDS-I and DDS-II SC Point-to-Point and DDS-I Multipoint ..... 10-4  
    DDS II-SC Multipoint ..... 10-4  
    Derived Secondary Channel Mode (BitSteal) ..... 10-5  
    Synchronous Data Compression (SDC) ..... 10-5  
    Switched Digital Restoral ..... 10-5  
Network Control Channel ..... 10-5  
Receiver ..... 10-5  
Primary Power Requirements—Standalone Unit ..... 10-6  
Ordering Information ..... 10-6

**Appendix A.**

---

**Appendix B.**

---

**Appendix C.**

---

**Index**

---

**Contents (continued)**

---