COMSPHERE DUALFLOW DATA SERVICE UNITS

USER'S GUIDE

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December 1996

PARADYNE™

COMSPHERE
DualFlow Data Service Units
Models 3615 and 3616

User's Guide
3615-A2-GB20-20

3rd Edition (December 1996)

Changes and enhancements to the product and to the information herein will be documented and issued as a new release to this manual.

United States
FCC Registration number: AW292J-61661-DD-N
PSTN Ringer Equivalence number (REN): DBM option 0.7B

Canada
V.32 Dial Backup Module
Certification number: 230 3684 A
DOC Load number: 7
2-Wire Switched 56 DBM
Certification number: 230 5870 A
DOC Load number: 0

Warranty, Sales, and Service Information

Contact your sales or service representative directly for any help needed. For additional information concerning warranty, sales, service, repair, installation, documentation, or training, use one of the following methods:

- **Via the Internet:** Visit the Paradyne World Wide Web site at http://www.paradyne.com
- **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
  - — Within the U.S.A., call 1-800-870-2221
  - — International, call 727-530-2340

Trademarks

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Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. This product is intended to be used with a three-wire grounding type plug – a plug which has a grounding pin. This is a safety feature. Equipment grounding is vital to ensure safe operation. Do not defeat the purpose of the grounding type plug by modifying the plug or using an adaptor.

   Prior to installation, use an outlet tester or a voltmeter to check the ac receptacle for the presence of earth ground. If the receptacle is not properly grounded, the installation must not continue until a qualified electrician has corrected the problem.

   If a three-wire grounding type power source is not available, consult a qualified electrician to determine another method of grounding the equipment.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
4. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
5. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
6. General purpose cables are provided with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.
7. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
8. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.

In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:

– Never install telephone wiring during a lightning storm.
– Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
– Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
– Use caution when installing or modifying telephone lines.
– Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
– Do not use the telephone to report a gas leak in the vicinity of the leak.

Notices

WARNING

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THE AUTHORITY TO OPERATE THIS EQUIPMENT IS CONDITIONED BY THE REQUIREMENTS THAT NO MODIFICATIONS WILL BE MADE TO THE EQUIPMENT UNLESS THE CHANGES OR MODIFICATIONS ARE EXPRESSLY APPROVED BY PARADYNE.

WARNING

TO USERS OF DIGITAL APPARATUS IN CANADA:

THE DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATIONS OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESÉNT APPAREIL NUMÉRIQUE N'ÉMET PAS DE BRUITS RADIOÉLECTRIQUES DÉPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMÉRIQUES DE LA CLASSE A PRESCRITES DANS LE RÈGLEMENT SUR LE BROUILLAGE RADIOÉLECTRIQUE ÉDICTÉ PAR LE MINISTÈRE DES COMMUNICATIONS DU CANADA.

Government Requirements

The Federal Communications Commission (FCC) requires that instructions pertaining to connection to the telephone network be included in the installation and operation manual. Specific instructions are listed in this section.

Notice to Users of the Digital Data Service

This equipment complies with Part 68 of the FCC rules. On the bottom of the equipment is a label or silk-screened text that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. If requested, please provide this information to your telephone company.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed 5. To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to ascertain the maximum REN for your calling area.

If your DSU causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

If your DSU causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If so, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.

The DBM cannot be used on public coin-operated telephone service provided by the telephone company. Connection to party-line service is subject to state tariffs. (Contact the state public utility commission, public service commission, or corporation commission for information.)

No repairs may be performed by the user. Should you experience difficulty with this equipment, refer to the *Equipment Warranty and Support* section of Chapter 1.

For Digital Data Service (DDS) installations, inform the local telephone company of the appropriate network channel interface code for the service you desire.

DDS

Interface Code	Data Rate (bps)
04DU5-24	2400
04DU5-48	4800
04DU5-96	9600
04DU5-19	19,200
04DU5-56	56,000
04DU5-64	64,000

The DDS Service Order Number is 6.0Y. The jack configurations required are RJ48S for the Model 3615 DSU and RJ48T for the Model 3616. With an RJ48T configuration, you must specify the number of data lines you require. Refer to the *Technical Specifications* section of Chapter 1 for V.32 DBM jack information.

After the telephone company has installed the requested jack, you can connect the DSU with the appropriate cable (provided). An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack that is Part 68 compliant.

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Preface

About This Guide

This user's guide provides the information needed to install and operate your COMSPHERE® Model 3615 or 3616 DualFlow data service unit (DSU), which is equipped with a dial backup module (DBM) – either a V.32 DBM, a 4-wire Switched 56 DBM, or a 2-wire Switched 56 DBM.

Be sure to read the safety and regulatory information at the beginning of this guide.

It is assumed that you are familiar with the functional operation of digital data communications equipment.

How to Use This Guide

This guide provides basic information about your DSU, how to install it and verify that it is installed and operating correctly, how to operate the unit and its options, and how to configure it.

Two installation chapters are provided, one for the Model 3615 DualFlow DSU and one for the Model 3616 DualFlow DSU. Select the chapter that applies to your DSU.

Refer to the following chapters or appendices, as needed:

Chapter 1	Provides a general overview of the DualFlow DSU, the unit's technical specifications, equipment warranty and support services information, and instructions for equipment return.
Chapter 2	Provides step-by-step instructions for installing your standalone Model 3615 DualFlow DSU.
Chapter 3	Provides step-by-step instructions for installing your carrier-mounted Model 3616 DualFlow DSU.
Chapter 4	Describes how to operate your DSU and its DBM.
Chapter 5	Presents the basics of setting and changing configuration options and provides Configuration Option Tables, which provide the default (factory-loaded) settings and describe each configuration option and its possible settings.
Appendix A	Provides a diagram for navigating the DSU's menu structure.
Appendix B	Summarizes the configuration options for you.
Appendix C	Lists the DSU's messages and identifies when they appear.
Appendix D	Shows application configurations and network hookups.
Appendix E	Provides cable and connector pin assignments.
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Related Documents

Other product documentation includes the following:

3000-A2-GA31	*COMSPHERE 3000 Series Carrier, Installation Manual*
3000-A2-GB41	*COMSPHERE –48 Vdc Central Office Power Unit, Installation Guide*
6700-A2-GB41	*COMSPHERE 6700 Series Network Management System, User's Guide, Security Manager Feature Supplement*
6700-A2-GY31	*COMSPHERE 6700 Series Network Management System, User's Guide*
6800-A2-GB31	*COMSPHERE 6800 Series Network Management System, Communications Products Support Command Reference Manual*

Contact your sales representative for additional product documentation.

Reference Documents

- AT&T Technical Reference 41458
- AT&T Technical Reference 61330
- AT&T Technical Reference 62310 – 1987
- Bell Canada DCTE Specifications
- Bell Communications Research Technical Reference Publication 41028
- CCITT V.35 (ISO 2593)
- EIA-232-D/V.24 (ISO 2110)
- Integrated Network Corporation Compatibility Bulletin CB-INC-101
- Northern Telecom NIS S204-2© 1986
- Pacific Bell PUB L-780035-PB/NB
- Pacific Bell PUB L-780036-PB/NB

About Your DualFlow DSU 1

Overview

The COMSPHERE® DualFlow data service unit (DSU) provides simultaneous digital data service (DDS) and backup connections to support Frame Relay and router-based applications.

The DDS portion provides basic non-rate adapted, non-diagnostic access using the DSU's V.35 connector. The backup portion (either a V.32, 4-wire Switched 56, or 2-wire Switched 56 DBM) provides simultaneous rate-adapted, diagnostic access to the switched network.

Two versions are available:

- The standalone Model DualFlow 3615 DSU is designed for desktop or shelf operation.
- The carrier-mounted (nest- or rack-mounted) Model DualFlow 3616 DSU is designed for operation in the COMSPHERE 3000 Series Carrier.

Each DualFlow DSU is equipped with an integral dial backup module (DBM) for operation over the Public Switched Telephone Network (PSTN), often referred to as the dial network, or the Switched 56 kbps digital service.

The following sections describe the DSU's standard features, as well as the features of the integral DBMs. Refer to the appropriate section for DBM feature information.

Technical specifications of the DSU and various DBMs are near the end of this chapter.

Standard Features

The DualFlow DSU offers the following features:

- **Multispeed operation.** The DSU operates at data rates of 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64CC kbps full-duplex over the DDS network.
- Two DTE connectors (interfaces) are provided: **EIA-232-D** and **V.35**. Use the EIA-232-D connector for router-management data or backup; use the V.35 connector for user data.
- **LADS operation.** The DSU can operate as a local area data set (LADS) (sometimes called a limited-distance modem, or LDM) at 2.4, 4.8, 9.6, 19.2, 38.4, 56, or 64 kbps.
- **NMS control.** The DSU can be controlled by COMSPHERE® 6700 or 6800 Series NMS. Both NMSs operate using Advanced Diagnostic protocol (ADp).

  The Model 3615 DSU requires a hubbing device for connection to the NMS; the Model 3616 DSU is connected to the NMS through the shared diagnostic unit (SDU) in the COMSPHERE® 3000 Series Carrier.

- **Diagnostic Control Panel control.** The Model 3615 DSU is controlled from its diagnostic control panel (DCP). The diagnostic control panel for the Model 3616 DSU, called a shared diagnostic control panel (SDCP), is installed in the 3000 Series Carrier. Both control panels display information about the DSU on 2-line, 16-character liquid crystal display (LCD) and through light-emitting diode (LED) status indicators.

> **NOTE**
>
> Except where a distinction is made, the term **DCP** refers to both types of diagnostic control panels, the *DCP* or the *SDCP*.

For more information about the 3000 Series Carrier or the SDCP, refer to the *COMSPHERE 3000 Series Carrier, Installation Manual*. For more information about the 6700 or 6800 Series NMS, refer to your NMS documentation. These documents are identified in the *Related Documents* section of the *Preface*, which also provides a telephone number you can call to order these documents.

DBM Features

DualFlow DSUs are ordered with one of the following features:

- V.32bis 14.4 kbps dial backup module (DBM)
- 2-Wire Switched 56 DBM
- 4-Wire Switched 56 DBM

Refer to the appropriate section for specific DBM features.

V.32 DBMs

The V.32bis 14.4 kbps dial backup module (referred to as *V.32 DBM* throughout this guide) is attached to the DSU. The V.32 DBM provides the following features:

- **Multispeed nondisruptive point-to-point connections.** The DBM provides point-to-point service over the 2-wire dial network. Backup rates available are 2.4, 4.8, 9.6, 12.0, and 14.4 kbps. DBM and DDS connections can be active at the same time.
- **Independent operation.** Although the DBM is installed on the DSU, the two are configured separately and most tests can be run on either independent of the other (e.g., you can run a test on the DBM while a test is running on the DSU).
- **Security.** There are four levels of call setup security: None, Password, Callback, and Alarm. With Alarm, the DBM only answers incoming calls when an alarm is detected on the DDS line.
- **Management control.** Dial backup can be initiated from a 6700 or 6800 Series NMS, the DSU's DCP, or it can be initiated automatically by the DSU-DBM.
- **DTR control setup.** When configured for DTR call control (DTRCallCon: Orig) backup, the DSU-DBM initiates dial backup when the DTE raises data terminal ready (DTR) to the DSU-DBM.
- **Rate Adaption.** With this feature, the DSU-DBM can adapt its data rate to a low-speed application while operating over a higher speed switched circuit.
- **Port Async/Sync.** The port asynchronous-to-synchronous feature makes it possible to send asynchronous data over the synchronous network.
- **Nondisruptive Diagnostics.** When set up to use nondisruptive diagnostics, the local DSU-DBM sends diagnostic data over the dial connection without interrupting or disrupting customer data.
- **Full tributary diagnostics.** The DSU-DBM supports a full complement of diagnostic tests and commands when a call is established on a backup line. Diagnostics can be addressed to and sent to a tributary from a 6700 or 6800 Series NMS workstation, or from the DCP of a control DSU.

Switched 56 DBMs

The Switched 56 DBM is attached to the DSU and offers dial backup capability through the Switched 56 kbps digital service. The Switched 56 DBM offers the following features:

- **Nondisruptive point-to-point connections.** The DBM sends its line data to the EIA-232 port, which is not used for DDS data. DBM and DDS connections can be active at the same time.
- **Independent operation.** Although the DSU and Switched 56 DBM are functionally integrated, they are configured separately and can run most tests independently (e.g., you can run a test on the DBM while a test is running on the DSU).
- **Network compatibility.** The Switched 56 DBM, either the 2-wire or 4-wire version, provides service over compatible Switched 56 kbps switched services, such as AT&T's ACCUNET® Switched 56 kbps Service, MCI's 56 kbps Switched Digital Service, Northern Telecom's DataPath™ service, and US SPRINT's VPN56 using either dedicated 2-wire or 4-wire access, or local exchange carrier 2-wire or 4-wire switched access. This DBM operates at 56 kbps full-duplex, and uses proprietary rate adaption to support data rates of less than 56 kbps.
- **Security.** The Switched 56 DBM offers four levels of call setup security: None, Password, Callback, and Alarm. Alarm allows the DBM to only answer incoming calls when there is a Facility Alarm on the DDS line.
- **DTR control setup.** When configured for DTR call control (DTRCallCon: Orig) backup, the DSU-DBM initiates dial backup when the DTE raises data terminal ready (DTR) to the DSU-DBM.
- **Management control.** Dial backup functions can be controlled from a 6700 or 6800 Series NMS, the DSU's DCP, or automatically by the DSU-DBM.
- **Rate Adaption.** With this feature, the DSU-DBM can adapt its data rate to a low-speed application while operating over a higher speed switched circuit.
- **Port Async/Sync.** The port asynchronous-to-synchronous feature makes it possible to send asynchronous data over the synchronous network.
- **Nondisruptive Diagnostics.** When set up to use nondisruptive diagnostics, the local DSU-DBM sends diagnostic data over the dial connection without interrupting or disrupting customer data.
- **Full tributary diagnostics.** The DSU-DBM supports a full complement of diagnostic tests and commands when a call is established on a backup line. Diagnostics can be addressed to and sent to tributaries from a 6700 or 6800 Series NMS workstation, or from the DCP of a control DSU.

Technical Specifications

Tables 1-1 through 1-5 list the technical specifications for the following:

- General specifications that apply to all DualFlow DSUs, regardless of the type of DBM installed (Table 1-1)
- Specifications for the Model 3615 and 3616 DSU only (Table 1-2)
- Specifications for the V.32 DBM (Table 1-3)
- Specifications for the 4-Wire Switched 56 DBM (Table 1-4)
- Specifications for the 2-Wire Switched 56 DBM (Table 1-5)

Table 1-1
General Technical Specifications

Specifications	Criteria
APPROVALS	
FCC Part 15	Class A digital device
FCC Part 68	AW292J-61661-DD-N
UL	
3615 DualFlow DSU	Listed UL 1950, second edition
3616 DualFlow DSU, 3000 Series Carrier	Recognized Component UL 1950, second edition
CSA	
Safety	
3615 DualFlow DSU	Certified CSA 22.2, No. 950-M89
3616 DualFlow DSU, 3000 Series Carrier	Certified Component CSA 22.2, No. 950-M89
Emissions	CSA 108.8 – M1983, Class A digital apparatus
Bell Canada	"DCTE Specifications," July 1989, Issue 1
AC POWER REQUIREMENTS	
3615 DualFlow DSU	24 Vac (CT), 60 HZ ± 3 (0.115 amp, 9.5 watts at 115 Vac)
3616 DualFlow DSU	24 Vac (CT), 60 Hz ±3 (0.080 amp, 8.0 watts at 115 Vac)
3000 Series Carrier (16 DualFlow DSUs, plus SDU and fan module)	90—132 Vac, 60 Hz ±3 (1.650 amp, 165 watts at 115 Vac)
DTE INTERFACE	
3615 DualFlow DSU	
25-pin D-subminiature connector 34-pin connector	EIA-232-D/CCITT V.24 (ISO 2110) CCITT V.35 (ISO 2593)
3616 DualFlow DSU with 25-Pin V.35 Interface	EIA-232-D/CCITT V.24 (ISO 2110) CCITT V.35 (ISO 2593)
Uses a Rear Connector Plate with two 25-pin D-subminiature connectors.	(A V.35 Interconnect Cable is required to use the V.35 connector. The cable provides an interface between the DSU's 25-pin D-type connector and the DTE cable's V.35 connector.)
ENVIRONMENT	
Operating Temperature	32° to 122° F (0° to 50° C)
Storage Temperature	–4° to 158° F (–20° to 70° C)
Relative Humidity	5%—95% (noncondensing)
Shock and Vibration	Withstands normal shipping and handling
HEAT DISSIPATION (MAX.) AT 115 VAC	
3615 DualFlow DSU	29.00 Btu/hr
3616 DualFlow DSU	27.30 Btu/hr
3000 Series Carrier (16 DualFlow DSUs plus SDU and fan module)	563.00 Btu/hr
NMS COMPATIBILITY	COMSPHERE® 6700 Series NMS, Release 4.0 or greater COMSPHERE® 6800 Series NMS, Release 4.1.5 or greater

Table 1-2
DSU Technical Specifications

Specifications	Criteria
APPLICATION	Full- or half-duplex data transmission via point-to-point DDS network, or local area data channel
COMMUNICATION LINE	Leased or private 4-wire DDS line
DATA RATES	
Digital Services (DDS, ASDS)	2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64CC kbps
LADS	2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 kbps
When timing is external (provided by the DTE), the DTE's clock must be within these ranges.	64 kbps ± 11 bps 56 kbps ± 9 bps 38.4 kbps ± 4 bps 19.2 kbps ± 5 bps 9.6 kbps ± 1 bps 4.8 kbps ± 0 bps 2.4 kbps ± 0 bps
DDS NETWORK INTERFACE	
3615 DualFlow DSU	8-pin modular jack, USOC RJ48S
3616 DualFlow DSU	(One or two) 50-pin connector, USOC RJ48T
DIAGNOSTIC INTERFACE	
3615 DualFlow DSU	Requires 3600 Hubbing Device which provides two 8-pin modular jacks
3616 DualFlow DSU	Via the SDU in the COMSPHERE® 3000 Series Carrier
NETWORK COMPATIBILITY	
ANSI T1.410 – 1992 and AT&T Technical Reference 62310 – 1987	2.4, 4.8, 9.6, 56, and 64CC kbps
Integrated Network Corporation Compatibility Bulletin CB-INC-101, and Pacific Bell publications PUB L-780035-PB/NB and PUB L-780036-PB/NB	19.2 kbps loop at levels of +6, 0, or –10 dBm
DSU COMPATIBILITY	
Primary Channel	All Paradyne digital products and other products that are compliant with AT&T Technical Reference 62310 – 1987

Table 1-3
V.32 DBM Technical Specifications

Specifications	Criteria
RINGER EQUIVALENCE NUMBER (REN)	DBM option 0.7B
APPLICATION	Full- or half-duplex data transmission via analog 2-wire dial network, point-to-point
MODULATION AND FREQUENCY	At 14.4 and 12 kbps: CCITT V.32bis, 1800 Hz At 4.8 and 9.6 kbps: CCITT V.32, 1800 Hz At 2.4 kbps: CCITT V.22bis, 2400 Hz
COMMUNICATION LINE	2-wire analog (PSTN) line
PORT RATES	Async or Sync rates: 14.4, 12.0, 9.6, 9.2, 8.4, 7.2, 4.8, 4.4, 4.0, 2.4, 2.0, and 1.2 kbps Other asynchronous rates (e.g., 150, 300, 600, and 1800 bps) can be obtained through oversampling Asynchronous rates support CCITT V.14 extended rate range at 8 to 12 bits per character, including the *start* and *stop* bit (+2.3, –2.5 percent overspeed/underspeed compensation at 10 bits per character)
DATA RATES	2.4, 4.8, 9.6, 12, 14.4 kbps
DBM COMPATIBILITY	If Call Setup is set for Callback or Password security, then the device is compatible with a 3600 Series V.32 DBM only. If Call Setup is set for Alarm or None, then *any* V.32 modem can be used. Also, V.22bis at 2.4 kbps can be used.
APPROVALS	
DOC	
Certification (PSTN)	230 3684 A
Load Number	7
RECEIVE VF INTERFACE	
Dynamic Range	
V.32 2-wire PSTN	–43 to –10 dBm
Impedance	600 Ω
SWITCHED NETWORK INTERFACE	
3615 DualFlow DSU	6-pin modular jack Permissive: USOC RJ11C 8-pin modular jack Programmable: USOC RJ45S
3616 DualFlow DSU	(One or two) 50-pin connector Permissive: USOC RJ21X Programmable: USOC RJ27X
TRANSMIT VF INTERFACE	
Signal Level	
V.32 2-wire Dial (PSTN)	Permissive: –9 dBm Programmable: –12 to 0 dBm (set by a resistor in the telco jack)
Impedance	600 Ω

Table 1-4
4-Wire Switched 56 DBM Technical Specifications

Specifications	Criteria
APPLICATION	Full- or half-duplex data transmission via 56 kbps switched services compatible with AT&T, MCI®, and US SPRINT® using 4-wire switched access to a local exchange carrier (LEC) or an inter-exchange carrier (IEC)
COMMUNICATION LINE	A dedicated 4-wire access or a local exchange carrier 4-wire switched access
PORT RATES	Async or Sync rates: 56, 48, 38.4, 32, 28.8, 19.2, 18.8, 18.0, 16.8, 14.4, 12.0, 9.6, 9.2, 8.4, 7.2, 4.8, 4.4, 4.0, 2.4, 2.0, and 1.2 kbps Other asynchronous rates (e.g., 150, 300, 600, and 1800 bps) can be obtained through oversampling Asynchronous rates support CCITT V.14 extended rate range at 8 to 12 bits per character, including the *start* and *stop* bit (+2.3, –2.5 percent overspeed/underspeed compensation at 10 bits per character)
DATA RATES	56 kbps *(Note that the 4-wire Switched 56 DBM or 3600 Series DBM-S uses proprietary rate adaption to support data rates of less than 56 kbps.)*
DBM COMPATIBILITY	If Call Setup is set for Callback or Password security, then the device is compatible with a 3600 Series Switched 56 DBM only. If Call Setup is set for Alarm or None, then any Switched 56 kbps terminal interface unit (TIU) can be used.
SWITCHED 56 KBPS NETWORK INTERFACE	
3615 DualFlow DSU	8-pin modular jack, USOC SJA56
3616 DualFlow DSU	(One or two) 50-pin connector, USOC SJA57
NETWORK COMPATIBILITY	AT&T Technical References 41458 and 61330

Table 1-5
2-Wire Switched 56 DBM Technical Specifications

Specifications	Criteria
APPLICATION	Full- or half-duplex data transmission via 56 kbps switched services compatible with AT&T, US SPRINT®, and MCI® using DataPath™ 2-wire switched access to a local exchange carrier (LEC) or an interexchange carrier (IEC)
COMMUNICATION LINE	A dedicated 2-wire access or a local exchange carrier 2-wire switched access
PORT RATES	Async or Sync rates: 56, 48, 38.4, 32, 28.8, 19.2, 18.8, 18.0, 16.8, 14.4, 12.0, 9.6, 9.2, 8.4, 7.2, 4.8, 4.4, 4.0, 2.4, 2.0, and 1.2 kbps Other asynchronous rates (e.g., 150, 300, 600, and 1800 bps) can be obtained through oversampling Asynchronous rates support CCITT V.14 extended rate range at 8 to 12 bits per character, including the *start* and *stop* bit (+2.3, –2.5 percent overspeed/underspeed compensation at 10 bits per character)
DATA RATES	56 kbps *(Note that the 2-wire Switched 56 DBM or 3600 Series DBM-D uses proprietary rate adaption to support data rates of less than 56 kbps.)*
DBM COMPATIBILITY	If Call Setup is set for Callback or Password security, then the device is compatible with a 3600 Series Switched 56 DBM only. If Call Setup is set for Alarm or None, then any Switched 56 kbps terminal interface unit (TIU) can be used.
SWITCHED 56 KBPS NETWORK INTERFACE	
3615 DualFlow DSU	6-pin modular jack, USOC SJA48
3616 DualFlow DSU	(One or two) 50-pin connector
APPROVALS	
DOC	
Certification Number	230 5870 A
Load Number	0
NETWORK COMPATIBILITY	Northern Telecom NIS S204-2© 1986

Equipment Warranty and Support

If you experience trouble with this equipment, please contact your sales or service representative (as appropriate) for repair or warranty information. If the product needs to be returned to the company service center for repair, contact them directly for return instructions using one of the following methods:

- **Via the Internet:** Visit the Paradyne World Wide Web site at http://www.paradyne.com
- **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
  - — Within the U.S.A., call 1-800-870-2221
  - — International, call 813-530-2340

Installing the Model 3615 DualFlow DSU 2

Overview

The Model 3615 DualFlow DSU is designed for desktop operation and is delivered ready to connect to the network. It is configured as a tributary DSU for operation at 56 kbps on a point-to-point circuit.

Installation consists of the following steps, which should be performed in the order listed.

- Physical installation
- Hardware straps
- Electrical connection
- Network diagnostic connection
- Software configuration
- DDS network (or LADS) connection
- Dial network (or PSTN) connection
- Router connection
- Verification testing

Although the Model 3615 DualFlow DSU is designed for desk or table-top operation, you can order an ACCULINK® 3100 Series CSU wall-mount adapter if you want to mount the DSU on a wall, an equipment shelf, a 19-inch RS-310-C or 23-inch AT&T DATAPHONE® equipment cabinet. Refer to Appendix F to order the adapter.

Before You Begin

Your installation site should be clean, well-lighted, well-ventilated, and free from environmental extremes.

A dedicated grounded ac outlet that is protected by a circuit breaker should be installed within 6 feet of the DSU's planned location. The outlet should be capable of supplying 90 to 132 Vac 60 Hz (U.S. and Canada). At the branch site, the circuit must be capable of supplying a minimum of 2 amperes at 115 Vac. Refer to the *Technical Specifications* section in Chapter 1 for additional power requirements.

CAUTION

The ac transformer contains a 3-wire grounding-type plug which has a grounding pin. This is a safety feature. Do not defeat the purpose of the grounding plug by modifying it or by using an adapter.

Prior to installation, use an outlet tester to check the ac receptacle for earth ground. If the power source does not provide a ground connection, consult an electrician to determine another method of grounding the DSU before proceeding with the installation.

Before connecting the DSU, you need to contact the telephone company to coordinate your installation before connecting the DSU to the DDS or Switched 56 kbps network. The DSU can only be operated at the data rate for which access to the DDS network is provided. In addition, the DSU must be connected to the dial network. *Refer to the notice at the front of this guide to ensure compliance with FCC, Bell Canada, and Canadian DOC rules.*

No on-site assembly of the DSU is required. However, installation should not proceed if any of the following is missing:

- A power cord with table-top ac transformer
- A 14-ft cable for connection to the DDS network, with an 8-pin RJ48S modular plug on each end
- A 14-ft cable for connection to the permissive dial network, with a 6-pin RJ11C modular plug on each end (feature number 3600-F3-503)

For programmable services, the following dial interface cable should have been ordered.

- Programmable (RJ45S) – an 8-pin modular plug at each end (feature number 4400-F1-54x)

For Canadian purchasers, an 8-pin RJ48S connector is on one end while a 6-pin connector is on the other is required (order feature number 3000-F1-006).

Contact your service representative if any of these items is missing from the shipping container, or to order the programmable dial interface cable.

Since your DualFlow DSU is equipped with a DBM, you may need to change the DSU's hardware straps before installing the DSU.

How to Change Hardware Straps

HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

The Model 3615 DSU has a switch located behind its diagnostic control panel (DCP). This switch contains two straps, one that controls the permissive or programmable connection for the DBM, and one that controls the frame-to-signal grounds. Table 2-1 shows the DSU's switch settings. Refer to Figure 2-1 and follow these steps if you need to change one of these straps.

☞ Procedure

1. With your thumbs under the edge of the front bezel, firmly press upward to lift the bezel from the tabs securing it in place.
2. Swing the front bezel up and set the bezel aside.
3. Refer to Table 2-1 to determine which switch needs to be changed. Then, using a small instrument, carefully change the position of the switch.
4. Reinsert the front bezel's hinge tabs into position and swing the bezel down. Snap the bezel back into place.

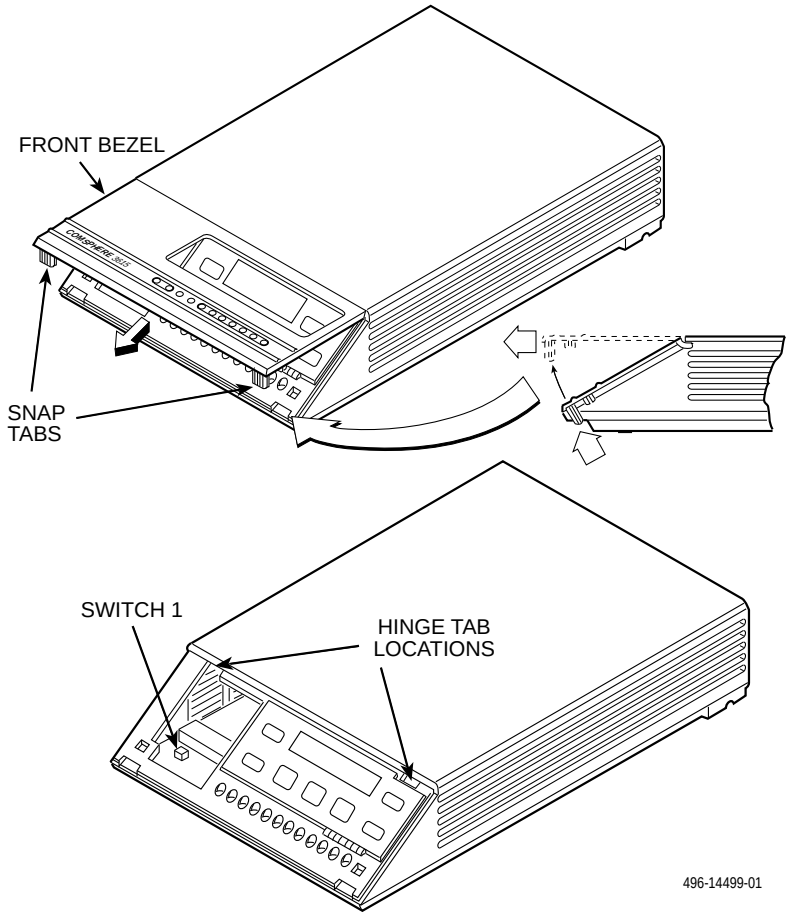


Figure 2-1. Model 3615 DSU Hardware Switch Location

Table 2-1
Model 3615 DSU Switch Settings

Switch Position	Switch Setting	Function
S1-1	ON (default)	Permissive V.32 DBM transmit output level of –9 dBm
	Off	Programmable V.32 DBM transmit level between –12 dBm and 0 dBm
S1-2	ON	Frame ground (FG) connected to signal ground (SG)
	Off (default)	FG connected to SG through 100 ohm resistor
ON is to the rear as you face the front of the DSU. Off is to the front.		

Where to Place the DSU

As mentioned earlier, the DSU must be placed within 6 feet of a dedicated grounded ac outlet that is protected by a circuit breaker.

The distance between the DSU and its DTE must be within EIA-232-D/V.24 limits, or V.35 limits if operating the DSU at speeds greater than 19.2 kbps.

- *For the EIA-232 connector*, the typical maximum distance is 50 feet at speeds less than or equal to 19.2 kbps. If a longer distance is needed, use high quality, low capacitance cable and ensure that the effective shunt capacitance of the circuit (measured at the DSU and including the capacitance of the cable and the DTE) does not exceed 2500 picofarads, as specified in EIA-232-D.
- *For the V.35 connector*, the maximum distance recommended between the DSU and the DTE is nominally 1000 feet.

Allow 1 to 2 feet of clearance around the DSU for access and cable connections during installation.

Installing the DSU

Before installing the DSU, label the circuit breaker that protects the ac wall outlet, and make sure that it is set to ON. To proceed with the installation:

☞ Procedure

1. Place the DSU in its planned location. Make sure the ventilation slots are not blocked.
2. At the rear of the DSU (Figure 2-2), insert the ac transformer, circular plug into the interface labeled **POWER**.
3. Plug the ac transformer's 3-prong plug into the ac wall outlet.

CAUTION

Only use the power transformer designed for the Model 3615 DSU. Using other transformers may result in personal injury or damage to the equipment.

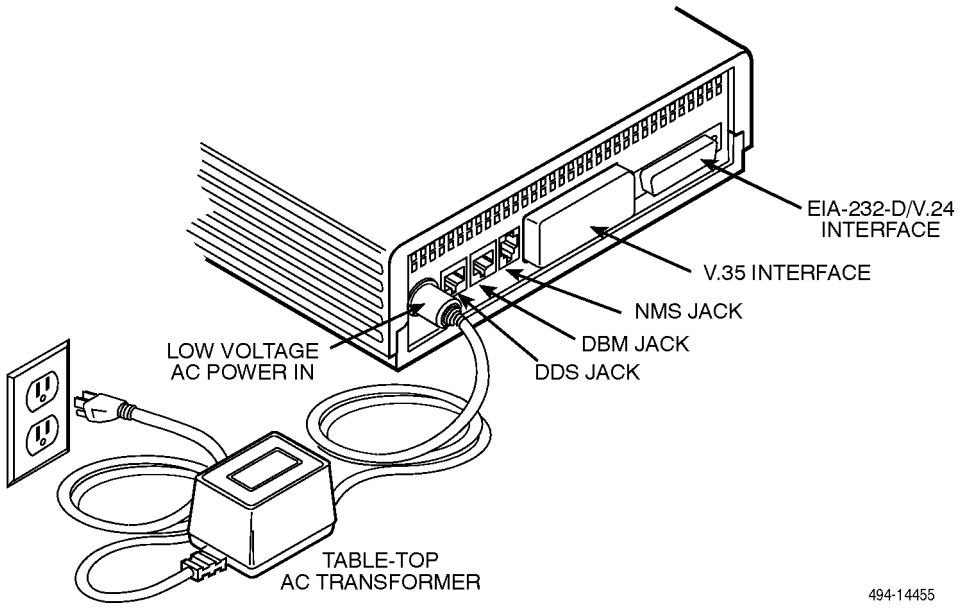


Figure 2-2. Model 3615 DSU Electrical Connection

Power-Up Routine

When power is applied, the DSU:

- Runs a Device Test on itself and the DBM.

  During the tests, all indicators on the DCP light briefly and the message **Power-Up Tests** appears on the liquid crystal display (LCD).

- Displays the results of each test momentarily as **Pass**, **Fail**, or **Abrt**. *(*Abrt indicates that the Device Test was aborted because a network loopback was in progress during the power-up procedure.) These tests take about 20 seconds to complete.

If the DSU or DBM fails this test, follow these steps. Refer to Appendix A as you perform the procedures described in this guide. Refer to Chapters 4 and 5 for additional examples and procedures.

☞ Procedure

1. Press the ⏢ key to return to the top-level menu.
2. Select **Local** (F1 key).
3. Press the ▻ key to scroll the *Confg* (Configuration) branch into view.
4. Press the function key directly below **Confg**.
5. Press the F1 key to select **Opts** (Configuration Options).

   The *Load from* screen appears.
6. Press the ▻ key to bring the factory-loaded unit configurations into view, and select the appropriate configuration.

   - **SyBC** (Synchronous Backup for a Control DSU) for a control when the router controls backup.
   - **SyBT** (Synchronous Backup for a Tributary DSU) for a tributary when the router controls backup.
   - **DiDg** (Dial Diagnostics) for asynchronous router-management data to be sent over the EIA-232 port via the DBM connection and user data over the V.35 port via the DDS connection.
7. Press the F1 key to **SAVE** the selected configuration.

   The *Save to* screen appears.
8. Save the selected configuration to **Activ** (F1 key).
9. Press the ⏢ key to return to the top-level menu, then select **Local** again.
10. Select **Test** (F3).

    The *Run Test on* screen appears.
11. Select the device that Failed: the DSU or DBM.
12. Press the F2 key to run the Device Test again.

    The device should pass.
13. Should the device fail, contact your service representative (see *Equipment Warranty and Support* section in Chapter 1).

Connecting to the Network

The DSU provides three interfaces (often called *jacks*). One jack connects the DSU to the 6700 or 6800 Series NMS, one connects the DSU to the dial (or public switched telephone network – PSTN) network, and one connects the DSU to the DDS network. Follow the appropriate procedure when making your network connections.

Connecting to the NMS

A 3600 Hubbing Device is required to connect the control DSU to the 6700 or 6800 Series NMS. When connected to the NMS, the DSU can be controlled and configured from the NMS rather than from the DCP alone.

☞ Procedure

1. Plug the 4-pin modular plug of the 3600 Hubbing Device (Figure 2-3) into the DSU jack labeled **CC/DC**.
2. Plug one end of an M6BJ cable into the hubbing device jack labeled **CC IN/DC OUT**.
3. Plug the other end of the 6-pin M6BJ cable into the 6-pin end of the 873A adapter.
4. Plug the D-type end of the 873A adapter into the appropriate 6700 or 6800 Series NMS jack.

Refer to your COMSPHERE 6700 or 6800 Series NMS documentation to control and configure the DSU from the NMS.

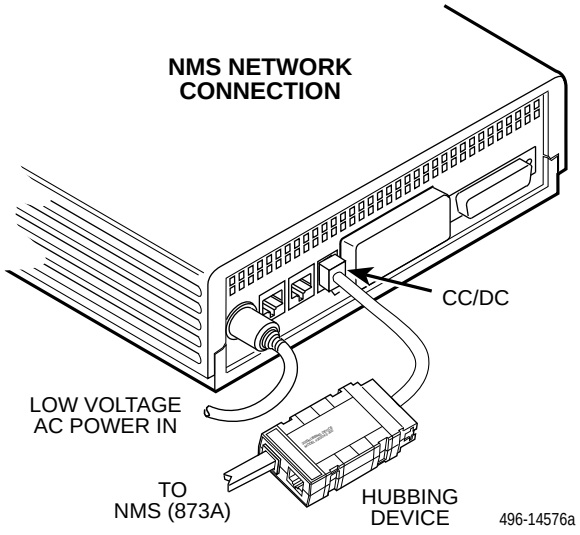


Figure 2-3. Model 3615 DSU NMS Connection

Connecting to the Dial (or PSTN) Network

If your DSU is equipped with a V.32 DBM, refer to Figure 2-4 as you follow these steps.

☞ Procedure

1. Plug either end of the dial (analog) interface cable into the DSU jack labeled **BACKUP**.
   - *Permissive service* – telephone cord with 6-pin modular RJ11C plug
   - *Programmable service* – telephone cord with 8-pin RJ45S plug
2. Plug the other end of the cable into the modular jack provided by the telephone company, USOC RJ11C (permissive) or USOC RJ45S (programmable).
3. If your site has programmable service, verify that the DSU's hardware strap S1-1 is switched to the OFF position.

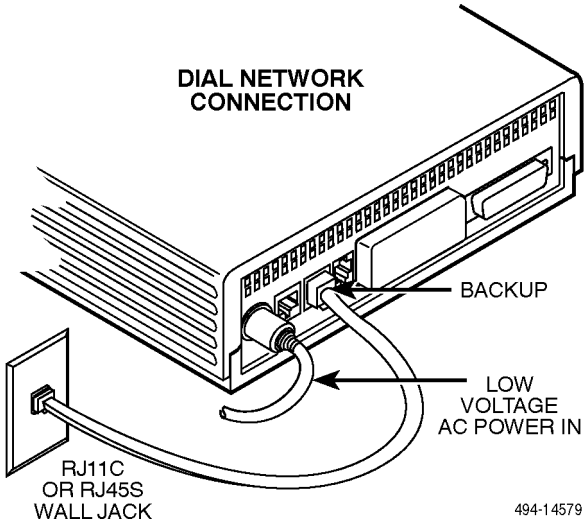


Figure 2-4. Model 3615 DSU Dial (PSTN) Network Connection

Connecting to the Switched 56 kbps Network

NOTE

Before connecting the DSU to the Switched 56 kbps network, ensure that approved primary protectors have been installed on the circuit in accordance with Article 800 of the National Electric Code, NFPA 70, in the United States and Section 60 of the Canadian Electric Code, Part 1, in Canada.

If the DSU is equipped with a 4-wire Switched 56 DBM, an 8-pin cable is provided; if a 2-wire Switched 56 DBM, a 6-pin cable is provided.

WARNING

Do not insert the 2-wire Switched 56 kbps plug into an RJ11C jack. This type of jack is intended for analog public switched telephone network (PSTN) devices. Doing so may cause equipment damage and harm to the telephone network.

To make a physical connection to the Switched 56 kbps network, refer to Figure 2-5 as you follow these steps.

Procedure

1. Plug either end of the Switched 56 kbps network interface cable into the DSU jack labeled **BACKUP**.
   - *For the 2-wire Switched 56 DBM,* use the 6-pin cable.
   - *For the 4-wire Switched 56 DBM,* use the 8-pin cable.
2. Plug the other end of the cable into the modular jack provided for the Switched 56 kbps network connection.

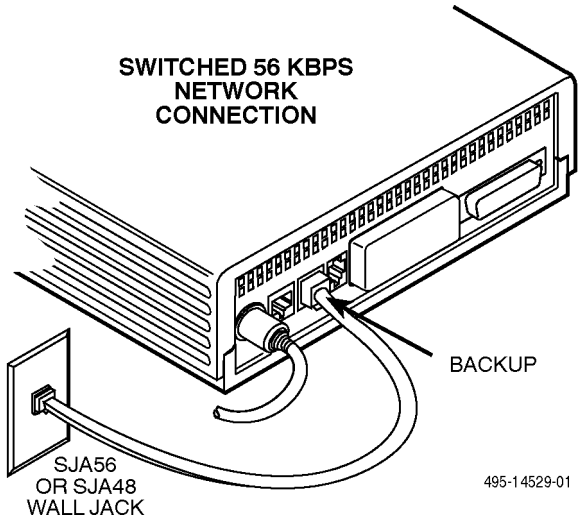


Figure 2-5. Model 3615 DSU Switched 56 kbps Network Connection

Connecting to the DDS (or LADS) Network

NOTE

Before connecting the DSU to the DDS network, ensure that approved primary protectors have been installed on the circuit in accordance with Article 800 of the National Electric Code, NFPA 70, in the United States and Section 60 of the Canadian Electric Code, Part 1, in Canada.

Refer to Figure 2-6 as you follow these steps.

☞ Procedure

1. Plug the DDS network interface cable into the DSU jack labeled **LINE**.
   - U.S. – select either end of the cable
   - Canada – select the 8-pin end
2. Plug the other end of the cable into the modular jack (USOC RJ48S) provided by the circuit provider.

If the remote DSU is also connected to the network, the DSU's green **OK** indicator lights and the **Alrm** indicator goes off. The Health and Status screen no longer displays a *No Signal* message.

If connecting the DSU to a LADS network, there are distance limitations that govern the use of DSUs on the network. Table 2-2 summarizes these limitations.

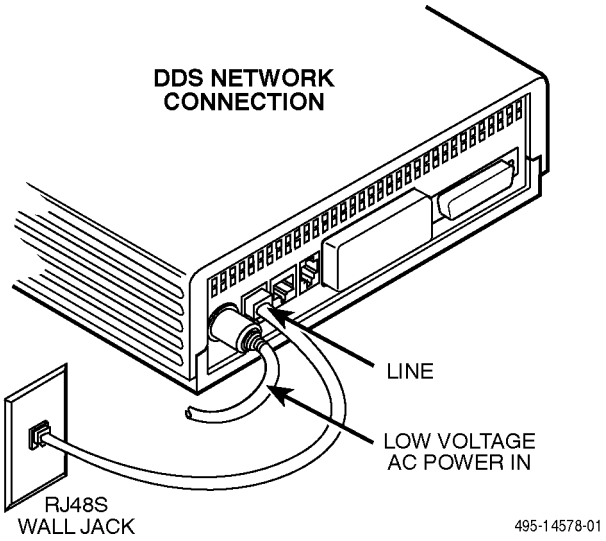


Figure 2-6. Model 3615 DSU DDS (LADS) Network Connection

Table 2-2
LADS Connection Distances

Data Rate (kbps)	Wire Gauge (AWG)			
	19	22	24	26
2.4	20.0 mi (32.2 km)	16.6 mi (26.7 km)	12.7 mi (20.5 km)	9.4 mi (15.1 km)
4.8	19.4 mi (31.2 km)	12.7 mi (20.5 km)	9.6 mi (15.4 km)	7.1 mi (11.5 km)
9.6	15.2 mi (24.5 km)	9.7 mi (15.6 km)	7.3 mi (11.7 km)	5.6 mi (9.0 km)
19.2[1]	11.8 mi (19.0 km)	7.5 mi (12.1 km)	5.7 mi (9.2 km)	4.2 mi (6.8 km)
38.4	11.2 mi (18.0 km)	6.5 mi (10.5 km)	4.6 mi (7.4 km)	3.2 mi (5.1 km)
56	9.2 mi (14.8 km)	5.4 mi (8.7 km)	3.8 mi 6.2 km)	2.8 mi (4.5 km)
64	9.2 mi (14.8 km)	5.4 mi (8.7 km)	3.8 mi (6.2 km)	2.8 mi 4.5 km)

[1] Power level is –10 dBm.

Connecting the DSU to a Router

The DualFlow DSU transmits user data through its V.35 interface and diagnostic or user data through its EIA-232-D/V.24 interface. Cabling is based upon the preset configuration (SyBC, SyBT, or DiDg) selected in the Opts subbranch (Config branch).

Figure 2-7 shows the DualFlow DSU's rear panel. Refer to this figure as you connect the DSU to the router. Appendix E shows examples common to the DSU-to-router application configurations.

☞ Procedure

1. Connect the plug end of the router's V.35 cable to the DSU's V.35 connector.

   Tighten the two holding screws.

2. Connect the other end of the router's V.35 cable to the router's primary serial port.

   Tighten any holding screws.

3. Connect the plug end of the router's EIA-232 cable to the DSU's EIA-232-D/V.24 connector.

   Tighten any holding screws.

4. Connect the other end of the router's EIA-232 cable to the router:

   - *If the DSU is to be configured using the SyBC or SyBT configuration*, connect to the router's secondary serial port.
   - *If the DSU is to be configured using the DiDg configuration*, connect to the router's console port.

   Tighten any holding screws.

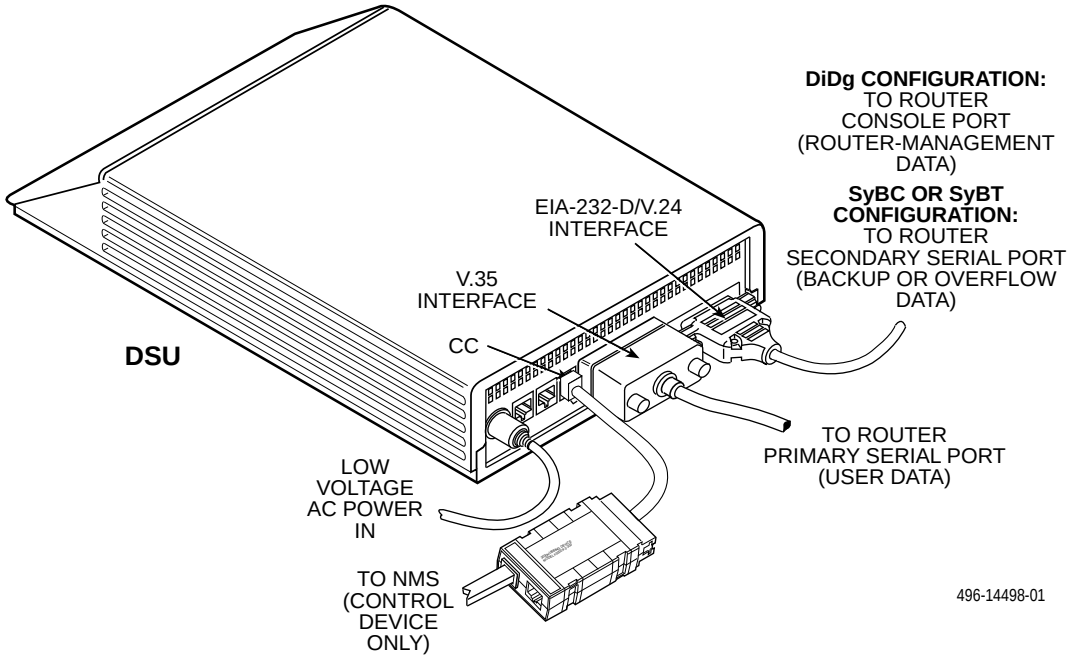


Figure 2-7. Router Connection

Addressing the Unit

A unique address must be assigned to each control and tributary DSU in your network. You can assign an address within the range of 1 through 255.

> **NOTE**
>
> Do **not** assign the number **192** as a network address. This number is reserved as a broadcast address.

The DBM requires a separate address, which is automatically assigned by the DSU. The address assigned a DBM is the DSU's address, plus 1 (e.g., if the DSU's address is 1, the assigned DBM address will be 2).

> **NOTE**
>
> The numbers **191** and **255** cannot be assigned to a DSU that has a DBM. However, addresses can be assigned in any order; they do not have to be sequential.
>
> It is recommended that only *odd-numbered* addresses be assigned to DSUs so that *even-numbered addresses* are reserved for DBMs.

Tributary DSU Addressing

Tributary DSU addresses are user-definable. The control DSU accesses its tributary via an active backup connection by specifying the tributary's address.

The 6700 or 6800 Series NMS accesses the DSU via its network address. *To access a tributary DSU*, the NMS first addresses the control, then the tributary. An address issued from the NMS takes the format of control channel/control DBM network address/tributary network address. This is called *link-level network addressing*.

Figure 2-8 shows an example of DSU and DBM addressing, as well as link-level network addressing.

Refer to Chapter 4 to learn how to set the DSU's network address.

Verifying Operation and Testing Connections

Verification testing should be performed after any installation.

After installing and configuring the circuit (including control and tributary DSUs, the DDS network, the DBMs and their dial connections), perform the following series of tests *from the control DSU* to verify network operation (using either the DCP or NMS).

Next, test the tributary DBM for dial tone, and verify that the DSU can place and receive calls.

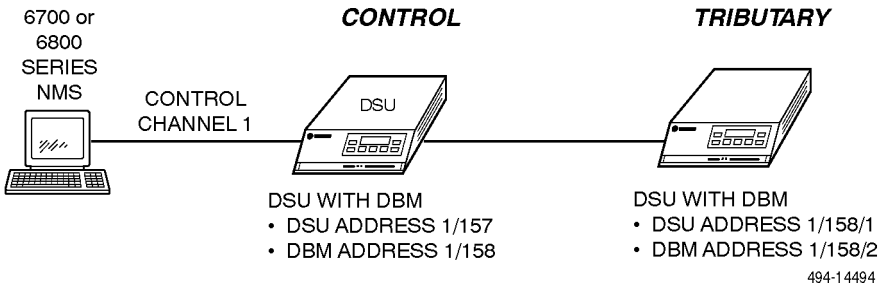


Figure 2-8. Addressing Example

Verifying DBM Operation

A backup connection must be established to verify that the switched network is functioning. Then, perform the Digital Test by selecting the DBM path.

☞ Procedure

1. Select **Local** (F1).
2. Select **Bckup** (F2).
3. Select **Dial** to establish a dialed call to the tributary.

   Refer to Chapter 4 for the procedure for entering telephone numbers.
4. Press the △ key, then select →**Cnnct** to switch to the dial circuit.
5. Press the △ key twice.
6. Select **Test** (F3).
7. Select **DBM** (F2).
8. Select **DT** (F3).
9. Select **Start** (F1).
10. Select the amount of time you want the test to run in hours: minutes: seconds (hh:mm:ss).
    - Press the ◁ or ▷ key to move the blinking cursor to the digit to be changed.
    - Press the F1 (↑) key to increment the digit (1 through 9).
    - Press the F2 (↓) key to decrement the digit.
11. Select **Enter** (F3). *Please wait* appears as the DBM runs the test.
12. When *Command Complete* appears, press the △ key.
13. Select **Displ** (F1) to display the results of the test.
14. Press the ▷ key to scroll through the test results.

Verifying Network Addresses

Access the DSU's identity (ID) subbranch *for the tributary DSU* to ensure that the DSU is properly addressed. Refer to Chapter 5 for an example using the DCP, if needed.

☞ Procedure

1. Select **Remot** (Remote branch).
2. Enter the tributary's network address.
3. Select **Stat** (Status branch).
4. Press the ▷ key until *ID* appears.
5. Select **ID**.
6. Press the ▷ key until *Network Addr* appears.
7. Verify that the correct address has been entered.

Verifying the Network

Perform a Health and Status check on the DDS circuit to ensure that the network is functioning.

☞ Procedure

1. Select **Local** (F1).
2. Select **Stat** (F1).
3. Select **H/S** (F1).
4. Select **Devic** (F1).
5. Press the ⏏ key to return to the top-level menu.
6. Select **Local** (F1).
7. Select **Bckup** (F2).
8. Select **DrBU** to drop the backup call.

No error messages should appear. Refer to Appendix C, the *Device Health and Status Messages* section, should there be a problem with the DDS Line.

Other Tests

The following lists the tests available on your DSU. Refer to the *Test Branch* section of Chapter 4 for further test information, as well as more detail on how to configure and operate the DSU. Refer to Appendix A to determine how best to access each test.

- **Device Test** (Devic)
- **Local Loopback** (LL) – DSU only
- **DTE Loopback** (DTE)
- **Digital Loopback** (DL)
- **Remote Digital Loopback** (RL) – DBM only
- **Bilateral Loopback**
- **Digital Test** (DT) – DBM only
- **End-to-End Test** (EE) – DBM only
- **Bit Error Rate Test** (BERT)
- **Lamp Test** (Lamp)

Installing the Model 3616 DualFlow DSU 3

Overview

A Model 3616 DualFlow DSU is designed for installation in a COMSPHERE 3000 Series Carrier, which supplies power and provides the interfaces for connecting to the DDS or dial networks. Up to 16 DSUs can be installed in the carrier. Refer to the *COMSPHERE 3000 Series Carrier, Installation Manual* for additional carrier and installation information.

The DSU is delivered ready to install in the carrier. It is configured as a control DSU for operation at 56 kbps on a point-to-point circuit.

A rear connector plate, shipped with the DSU, is installed onto the rear of the carrier. The rear connector plate contains two connectors: a 25-pin EIA-232-D/V.24 connector and a 25-pin V.35 connector. Once installed, the DSU can be removed from the front of the carrier without disconnecting the DTE cables.

Installation of the DSUs and carrier-related equipment consists of the following steps, which should be performed in the order listed.

- Hardware straps
- DSU physical installation
- Network diagnostic connection
- Software configuration
- DDS network (or LADs) connection
- Dial network (or PSTN) connection
- Router connection
- Verification testing

Before You Begin

The COMSPHERE 3000 Series Carrier should already be installed properly and be operational, with a functioning shared diagnostic control panel (SDCP). An SDCP (installed in the carrier) is required for installation and maintenance of the Model 3616 DSU. For installation information, see the *COMSPHERE 3000 Series Carrier, Installation Manual.*

A fan module may also be needed to dissipate heat. Refer to the *Fan Module Installation* section in Chapter 3 of the *COMSPHERE 3000 Series Carrier, Installation Manual* to determine whether a fan is required.

The distance between your DTE and the DSU must be within EIA-232-D/V.24 or V.35 limits.

- *For the EIA-232 connector,* the maximum recommended distance is 50 feet. If operating at 56 kbps the maximum distance is 34 feet for shielded cable, and 68 feet for unshielded cable. When a Switched 56 DBM is installed, ensure that the effective shunt capacitance of the circuit (measured at the DSU and including the capacitance of the cable and the DTE) does not exceed 1250 picofarads.
- *For the V.35 connector,* the recommended maximum distance between a DTE and DSU is nominally 1000 feet.

Contact the telephone company to coordinate your installation before connecting the DSU to the DDS, Switched 56 kbps, or dial network. The DSU can only operate at the data rate for which access to the DDS or dial network is provided. *Refer to the notice at the front of this guide to ensure compliance with FCC, Bell Canada, and Canadian DOC rules.*

How to Change Hardware Straps

HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

The Model 3616 DSU has several hardware straps that control the permissive or programmable connection when a DBM is installed, the Test Mode Indication leads, and the external interface leads (used with a −48 Vdc Central Office Power Unit).

Refer to Figure 3-1 to locate the switch and jumper locations. If a V.32 DBM is installed, refer to Table 3-1 to determine which switch needs to be changed, if any. Refer to Table 3-2 to determine whether these jumper straps need to be changed.

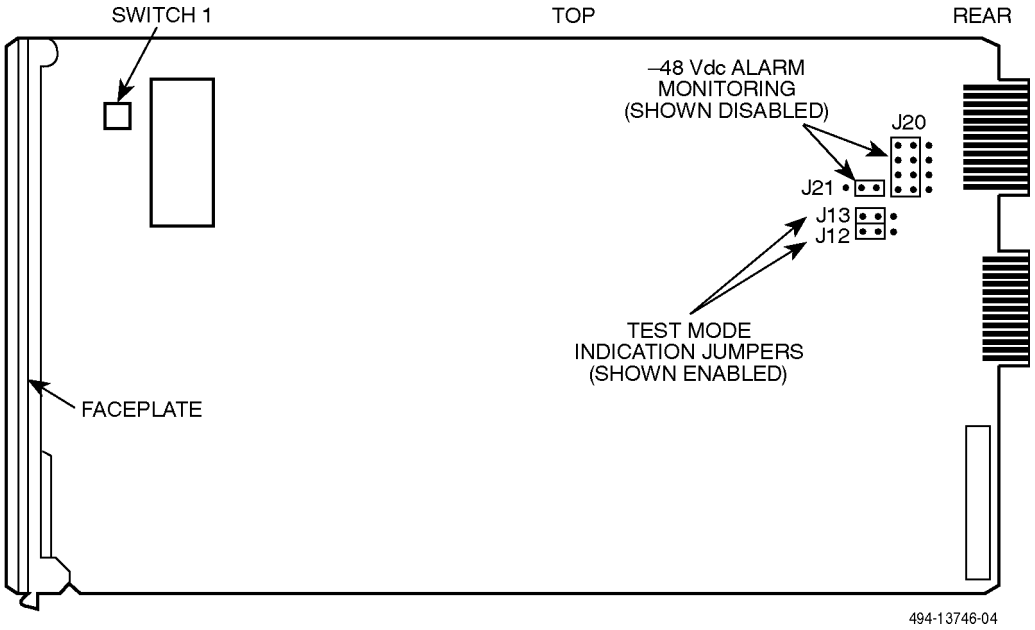


Figure 3-1. Model 3616 DSU Switch and Jumper Locations

Table 3-1
Model 3616 DSU Switch Settings

Switch Position	Switch Setting	Function
S1-1	ON (default)	Permissive V.32 DBM transmit output level of –9 dBm
	Off	Programmable V.32 DBM transmit level between –12 dBm and 0 dBm
S1-2	ON	Frame ground (FG) connected to signal ground (SG)
	Off (default)	FG connected to SG through 100 ohm resistor
ON is to the rear as you face the front of the DSU. Off is to the front.		

Table 3-2
Model 3616 DSU Jumper Straps

Strap Designation	State of Jumper Strap	Function
J12	Left	V.35 Test Mode Indication: *Left* — Enables V.35 Test Mode Indication (Pins 1 and 2). *This is the factory default.* *Right* — Disables V.35 Test Mode Indication (Pins 2 and 3).
J13	Left	EIA-232-D Test Mode Indication: *Left* — Enables EIA-232-D Test Mode Indication (Pins 1 and 2). *This is the factory default.* *Right* — Disables EIA-232-D Test Mode Indication (Pins 2 and 3).
J20	Left	Alarm Monitoring (used with the –48 Vdc Central Office Power Unit): *Left* — Disables the –48 Vdc alarm monitoring function (Pins 1 and 2). *This is the factory default.* *Right* — Enables the –48 Vdc alarm monitoring function (Pins 2 and 3); the NMS adapter cable is being used for alarm monitoring.
J21	Right	Alarm Monitoring (used with the –48 Vdc Central Office Power Unit): *Left* — Enables control of alarm monitoring via the NMS adapter cable (Pins 1 and 2); the NMS adapter cable is being used for alarm monitoring. *Right* — Disables control of alarm monitoring via the NMS adapter cable (Pins 2 and 3); a standard EIA-232 cable or the NMS adapter cable is being used for the diagnostic channel. *This is the factory default.*

Installing the DSU

Prior to installing the Model 3616 DualFlow DSU, install a rear connector plate onto the rear of the COMSPHERE 3000 Series Carrier (Figure 3-2). Only after this procedure can the DSU be installed or de-installed by simply removing it from the carrier.

☞ Procedure

1. At the rear of the carrier, set the tab on the rear connector plate into one of the slotted grooves on the carrier's backplane. Loosely fasten the screws. Make sure the rear connector plate uses the same slot position intended for the DSU.
2. Loosely fasten the screw attached to the rear connector plate, allowing for slight adjustment that may be needed when installing the DSU.
3. Change any default hardware strap settings that may be required before installing the DSU.

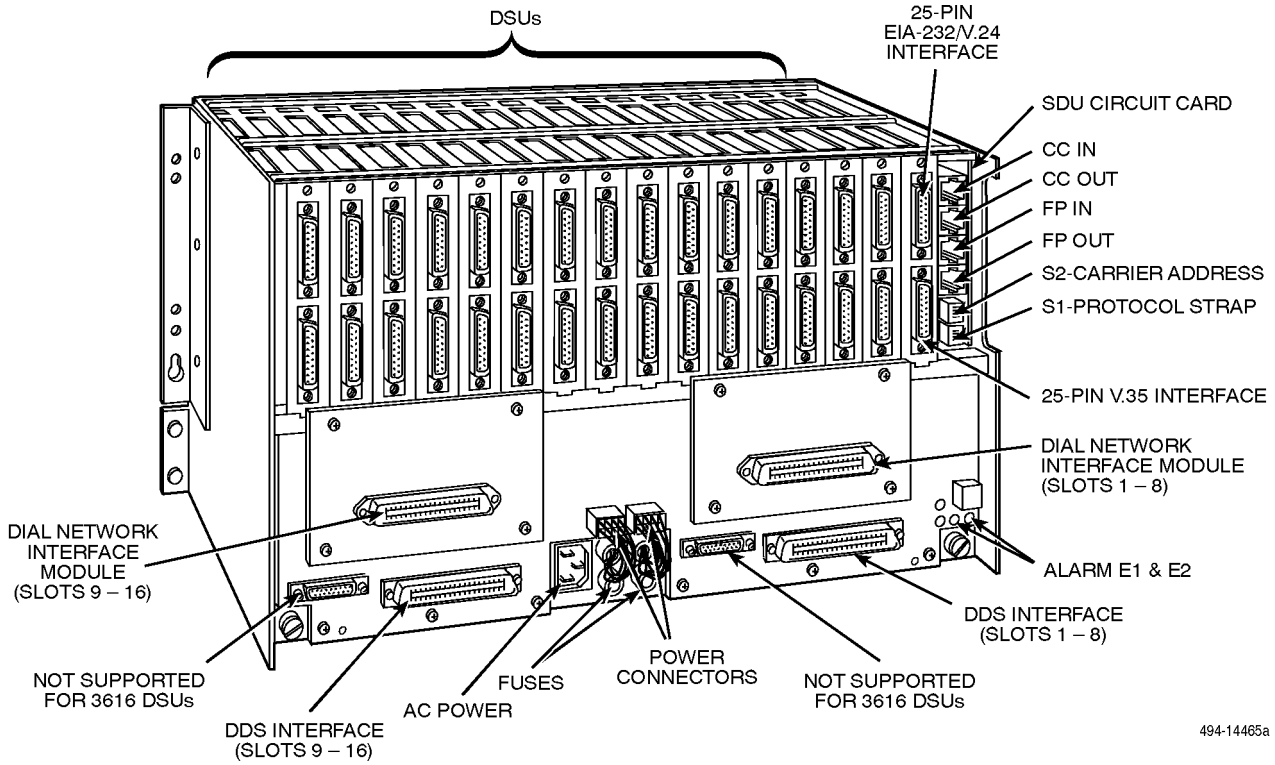


Figure 3-2. COMSPHERE 3000 Series Carrier, Rear View

4. Using a Phillips screwdriver, loosen the screw holding the circuit pack lock and rotate the lock to the open position (Figure 3-3). Open the latch.
5. At the front of the carrier, hold the DSU vertically with the latch on its faceplate in the open position. Then, insert the circuit card into the top and bottom circuit card guides for the slot that contains the rear connector plate.

   Slide the DSU into the slot, aligning the circuit card with the rear connector plate until the connectors seat firmly into the back of the carrier. Press the faceplate latch to secure the DSU into the carrier, rotate the circuit pack lock into the closed position (Figure 3-3), and tighten the screw.
6. Return to the rear of the carrier and tighten the rear connector plate screw.

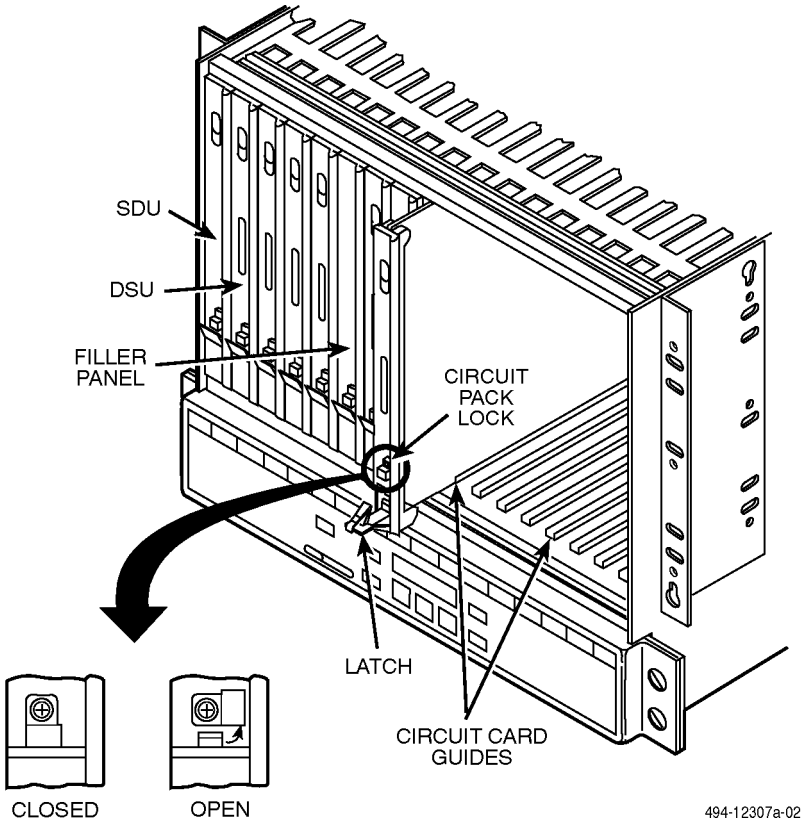


Figure 3-3. Model 3616 DSU Installation and Circuit Pack Lock

7. At the rear of the carrier, connect the appropriate router cable (EIA-232-D or V.35) to the rear connector plate. For an EIA-232-D interface cable, connect the EIA-232-D cable to the *top* DTE connector on the rear connector plate.

   For the 25-pin V.35 interface, a V.35 Interconnect Cable is shipped with the unit. *To connect a V.35 Interface Cable to the 25-pin V.35 connector*, refer to Figure 3-4 and perform the following steps:

   a. Connect the 25-pin end of the DSU's V.35 Interconnect Cable to the *bottom* DTE connector of the rear connector plate. Tighten the screws on each side of the connector.

   b. Connect the 34-pin end of the DSU's V.35 Interconnect Cable to the V.35 interface cable, then tighten the screws on each side of this connector.

8. The installed DSU is connected to the DDS network through the 50-pin connectors at the rear of the carrier. These interfaces are specified in the USOC RJ48T, and the pin assignments are shown in Appendix D. Proper network connection to the DDS facility or to the network channel-terminating equipment must be made at the far end of the cable.

9. If the network line and remote DSU are installed and tested, do a Remote Loopback – a Test Pattern test.

10. If the **Front Panel** test switch strap is to be disabled, slide the DSU slightly out of the carrier, open switch S3-1, then reseat the DSU into the carrier. Do this now.

11. Circuit ID information can be written on the cover plate under the appropriate slot number.

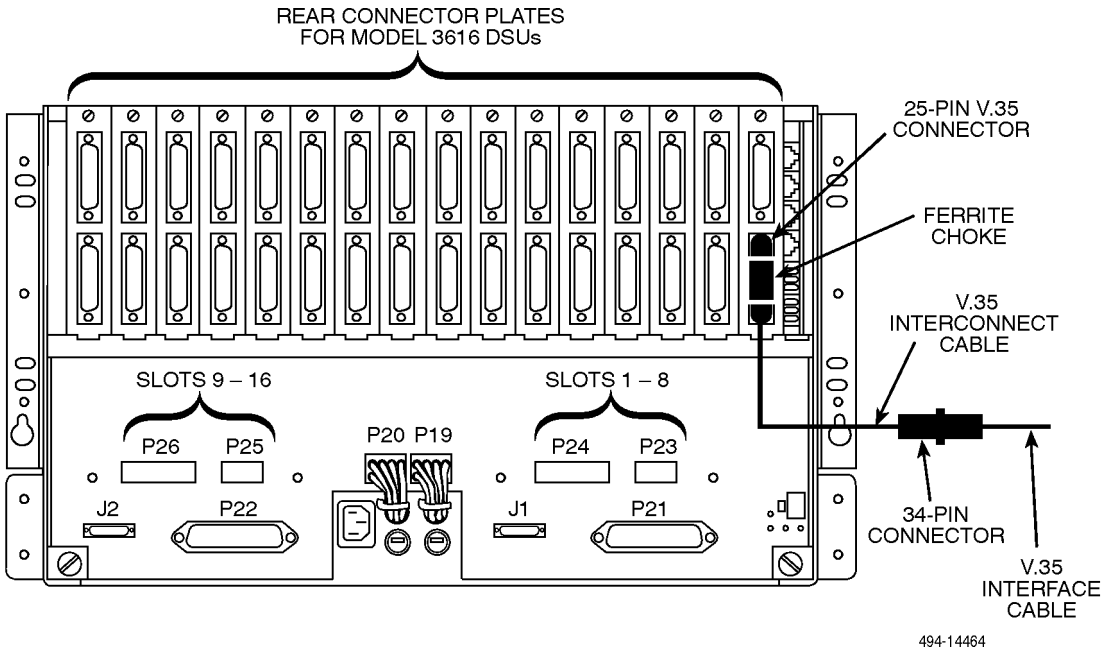


Figure 3-4. V.35 Interconnect Cable Installation

Power-Up Routine

When power is applied, the DSU:

- Runs a Device Test on itself and the DBM.

  During the tests, all indicators on the DCP light briefly and the message *Power-Up Tests* appears on the liquid crystal display (LCD).

- Displays the results of each test momentarily as **Pass**, **Fail**, or **Abrt**. *(Abrt indicates that the Device Test was aborted because a network loopback was in progress during the power-up procedure*.) These tests take about 20 seconds to complete.

If the DSU or DBM fails this test, follow the procedure below. Refer to Appendix A as you perform the procedures described in this guide. Refer to Chapters 4 and 5 for additional examples and procedures.

Procedure

1. Press the ⏢ key to return to the top-level menu.
2. Select **Local** (F1 key).
3. Press the ▻ key to scroll the Confg (Configuration) branch into view.
4. Press the function key directly under **Confg**.
5. Press the F1 key to select **Opts** (Configuration Options).

   The *Load from* screen appears.
6. Press the ▻ key to bring the factory-loaded unit configurations into view, and select the appropriate configuration.

   - **SyBC** (Synchronous Backup for a Control DSU) for a control when the router controls backup.
   - **SyBT** (Synchronous Backup for a Tributary DSU) for a tributary when the router controls backup.
   - **DiDg** (Dial Diagnostics) for asynchronous router-management data to be sent over the EIA-232 port via the DBM connection and user data over the V.35 port via the DDS connection.
7. Press the F1 key to **SAVE** the selected configuration.

   The *Save to* screen is displayed.
8. Save the selected configuration to **Activ** (F1 key).
9. Press the ⏢ key to return to the top-level menu, then select **Local** again.
10. Select the **Test** branch (F3).

    The *Run Test on* screen appears.
11. Select the device that Failed, the DSU or DBM.
12. Press the F2 key to run the Device Test again.

    The device should pass.
13. Should the device fail, contact your service representatiave. (see Chapter 1).

Connecting to the Network

Network connections are provided through the 3000 Series Carrier. Refer to Figure 3-2 as you read the following sections and set up your network connections.

Connecting to the NMS

A Model 3616 DualFlow DSU is set up for network diagnostic connection through the shared diagnostic unit (SDU), which is installed in Slot 0 of the carrier. Refer to the *COMSPHERE 3000 Series Carrier, Installation Manual* to set up the network diagnostic connection.

For connection of the DSU, see Appendix E of this guide. For pin assignments, see Appendix D.

Connecting to the Dial (or PSTN) or Switched 56 kbps Network

Connection to the dial network (or public switched telephone network – PSTN) or Switched 56 kbps network for the carrier-mounted Model 3616 DSU is through a network interface module (NIM) that is installed onto the carrier's backplane (see Figure 3-2). Refer to the *COMSPHERE 3000 Series Carrier, Installation Manual* for additional information or to install the NIM.

Connecting to the DDS (or LADS) Network

> **NOTE**
>
> Before connecting the DSU to the DDS network, ensure that approved primary protectors have been installed on the circuit in accordance with Article 800 of the National Electric Code, NFPA 70, in the United States and Section 60 of the Canadian Electric Code, Part 1, in Canada.

If connecting the DSU to a LADS network there are distance limitations that govern the use of DSUs on the network. Table 2-2 in Chapter 2 summarizes these limitations.

The DDS network interface is provided by two RJ48T 50-pin connectors on the back of the carrier (refer back to Figure 3-2, DDS Interface). Each connector serves eight contiguous slots in the carrier: one for Slots 1 through 8 and one for Slots 9 through 16.

Appendix E provides connectivity diagrams should you need further assistance in connecting the DSU to the network.

Connecting the DSU to a Router

The rear connector plate provides the router interface for the Model 3616 DSU. Each rear connector plate contains two DB25 (or 25-pin D-type) connectors. The top connector is an EIA-232-D/V.24 (ISO 2110) connector. The bottom connector is a CCITT V.35 (ISO 2593) connector.

For the 25-pin V.35 connector, use a V.35 Interconnect Cable (feature number 3000-F1-510). This cable provides the interface between the 25-pin V.35 D-type connector and a V.35 router cable.

Appendix E provides connectivity diagrams should you need further assistance.

The DualFlow DSU transmits user data through its V.35 interface, and diagnostic or user data through its EIA-232-D/V.24 interface. Cabling is based upon the preset configuration (SyBC, SyBT, or DiDg) selected in the *Opts* subbranch (Config branch).

☞ Procedure

1. Install the V.35 Interconnect Cable as described in Step 8 of the *Installing the DSU* section of this chapter.
2. Connect the plug end of the router's V.35 cable to the DSU's V.35 connector.

   Tighten the two holding screws.
3. Connect the other end of the router's V.35 cable to the router's primary serial port.

   Tighten any holding screws.
4. Connect the plug end of the router's EIA-232 cable to the DSU's EIA-232-D/V.24 connector.

   Tighten any holding screws.
5. Connect the other end of the router's EIA-232 cable to the router:
   - *If the DSU is to be configured using the SyBC or SyBT configuration,* connect to the router's secondary serial port.
   - *If the DSU is to be configured using the DiDg configuration,* connect to the router's console port.

   Tighten any holding screws.

Addressing the Unit

A unique address must be assigned to each control and tributary DSU in your network. You can assign an address within the range of 1 through 255.

> **NOTE**
>
> Do **not** assign the number **192** as a network address. This number is reserved as a broadcast address.

The DBM requires a separate address, which is automatically assigned by the DSU. The address assigned a DBM is the DSU's address, plus 1 (e.g., if the DSU's address is 1, the assigned DBM address will be 2).

> **NOTE**
>
> The numbers **191** and **255** cannot be assigned to a DSU that has a DBM. However, addresses can be assigned in any order; they do not have to be sequential.
>
> It is recommended that only *odd-numbered addresses* be assigned to DSUs so that *even-numbered addresses* are reserved for DBMs.

Tributary DSU Addressing

Tributary DSU addresses are user-definable. The control DSU accesses its tributary via an active backup connection by specifying the tributary's address.

The 6700 or 6800 Series NMS accesses the DSU via its network address. *To access a tributary DSU*, the NMS first addresses the control, then the tributary. An address issued from the NMS takes the format of control channel/control DBM network address/tributary network address. This is called *link-level network addressing*.

Figure 3-5 shows an example of DSU and DBM addressing, as well as link-level network addressing.

Refer to Chapter 4 to learn how to set the DSU's network address.

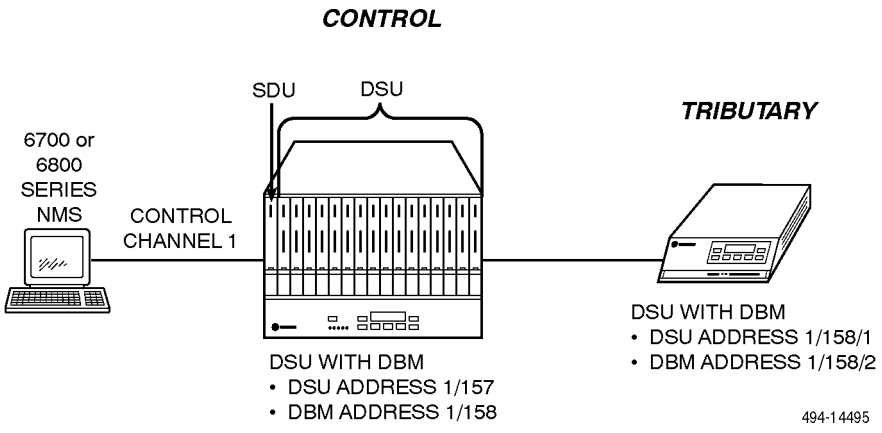


Figure 3-5. Addressing Example

Verifying Operation and Testing Connections

Perform verification testing after any installation.

After installing and configuring the circuit (including control and tributary DSUs, the DDS network, the DBMs and their dial connections), perform a series of tests *from the control DSU* to verify network operation (using either the SDCP or NMS).

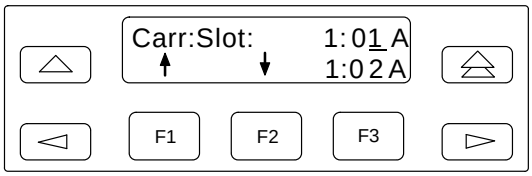
To Connect the SDCP to a DSU

For the carrier-mounted Model 3616 DSU, the SDCP must first be reconnected to the DSU. Once connected, the SDCP operates like a DCP.

Procedure

1. Press the **Select** key (refer to Figure 3-2).

   A screen similar to the following appears.



   The cursor is usually positioned under the second position of the slot number (1:01).

   In this example, the *first line* shows

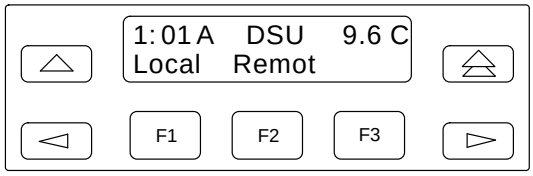
   - **1** indicates Carrier 1 (Carr)
   - **01** indicates the DSU in Slot 1
   - **A** is reserved for future use

   On the *second line*

   - Press the **F1** key (↑) to increment the number that the cursor is on.
   - Press the **F2** key (↓) to decrement the number.
   - Press the ◁ and ▷ keys to move the cursor one position to the left or right, to change either the carrier or slot number.
   - Press the **F3** key to toggle between DSUs, to switch from 1:01A to 1:02A in this example. (In our example, the previously accessed DSU was located in Slot 2 of Carrier 1.)

2. Press the **Select** key on the SDCP again.

   The SDCP accesses the DSU in Carrier 1, Slot 1. The top-level menu (your starting point) of the carrier-mounted DSU is displayed.



   From the *first line* of this example, you can see that this is a carrier-mounted DSU (1:01A instead of Port1) that is located in Carrier 1, Slot 1, is operating as a DSU (i.e., not as a DBM), at 9.6 kbps, and is configured as a control (C).

   From the second line you can see that there are no NMS messages (no *Msg* branch over the F3 key) waiting to be read and cleared.

   Also note that the SDCP indicator on the selected DSU's faceplate, **Front Panel**, is lit.

Verifying Network Addresses, the Network, and DBM Operation

Establish a backup connection and perform a Digital Test over the backup connection to ensure that the switched network is functioning. Access the DSU's identity (ID) subbranch *for the tributary DSU* to ensure that the DSU is properly addressed.

Verify that no alarms appear in the Device Health and Status subbranches. Refer to the *Verifying Operation and Testing Connections* section of Chapter 2 for procedures that lead you through each of these procedures.

Other Tests

The following lists the tests available on your DSU. Refer to the *Test Branch* section of Chapter 4 for further test information, as well as more detail on how to configure and operate the DSU. Refer to Appendix A to determine how best to access each test.

- **Device Test** (Devic)
- **Local Loopback** (LL) – DSU only
- **DTE Loopback** (DTE)
- **Digital Loopback** (DL)
- **Remote Digital Loopback** (RL) – DBM only
- **Bilateral Loopback**
- **Digital Test** (DT) – DBM only
- **End-to-End Test** (EE) – DBM only
- **Bit Error Rate Test** (BERT)
- **Lamp Test** (Lamp)

Operating the DSU 4

Overview

A DualFlow DSU can be managed from its control panel, or from a COMSPHERE® 6700 or 6800 Series NMS. This chapter describes how to manage the DSU using the control panel. Refer to the appropriate NMS documentation to understand how to manage the unit from the NMS.

The DSU's menus are organized as a branching hierarchy, sometimes referred to as a **menu tree**. Refer to Appendix A as you perform the procedures described in this guide to help you quickly learn more about your DSU.

DCP and SDCP Operation

There are two types of control panels, one for each DSU model.

- The standalone Model 3615 DualFlow DSU (Figure 4-1) is controlled from its diagnostic control panel (DCP).
- The carrier-mounted (nest- or rack-mounted) Model 3616 DualFlow DSU (Figure 4-2) is controlled from a shared diagnostic control panel (SDCP). The SDCP is mounted onto the COMSPHERE® 3000 Series Carrier to control multiple units.

NOTE

Throughout this guide, **DCP** refers to either control panel, *DCP* or *SDCP*, except where a distinction is made.

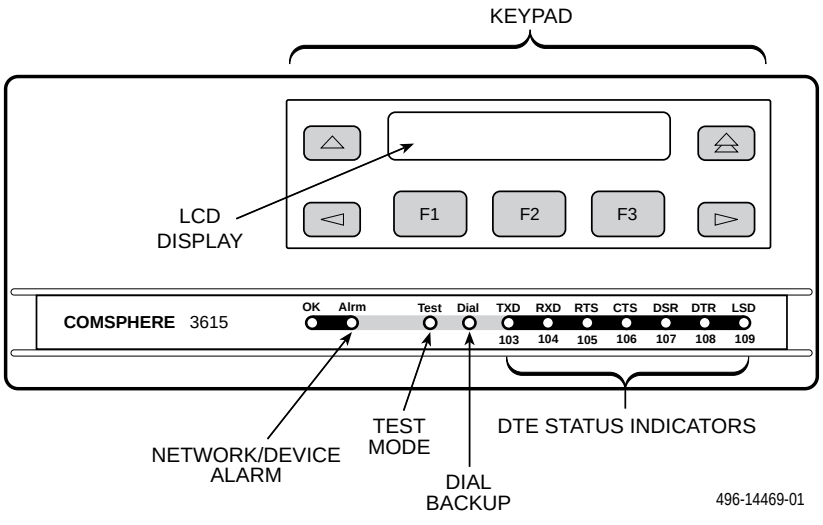


Figure 4-1. Model 3615 DCP

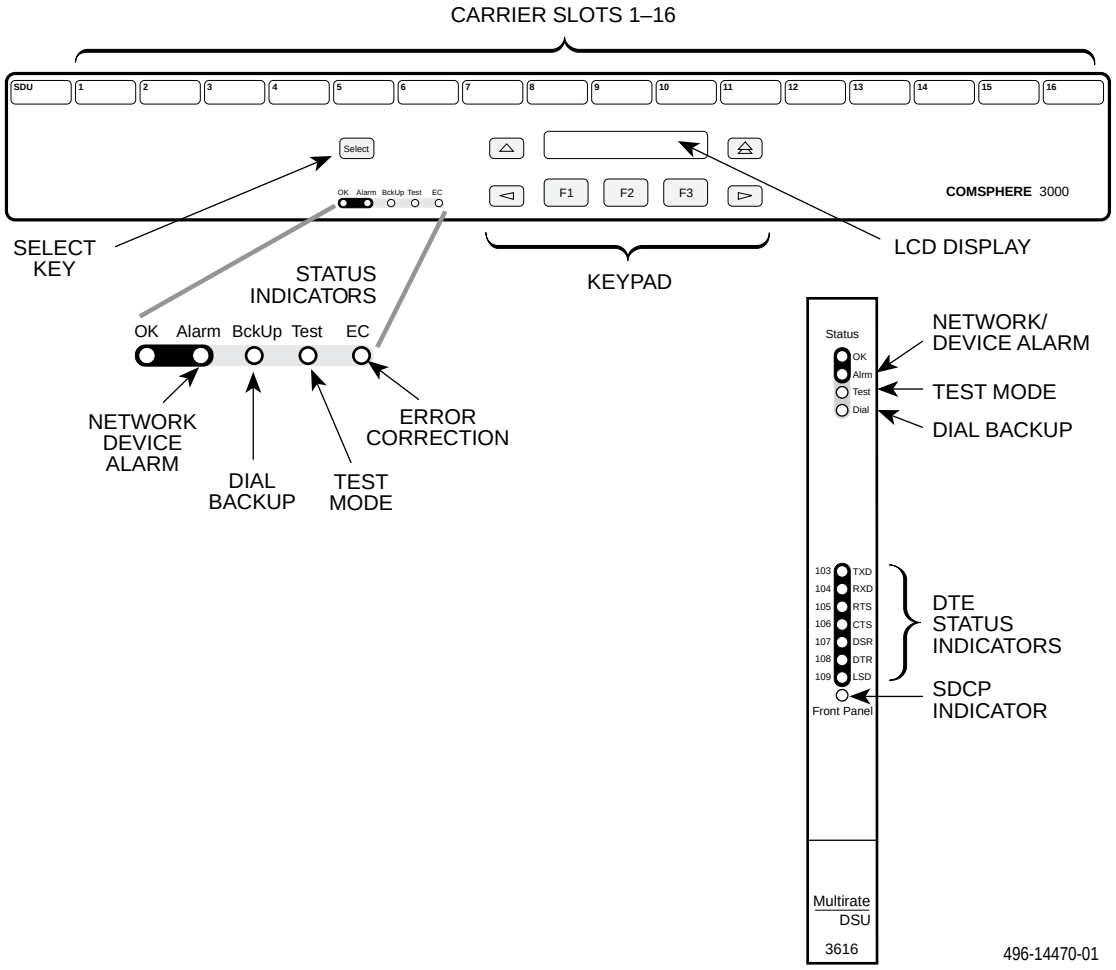


Figure 4-2. SDCP and Model 3616 DSU Faceplate

Both control panels have a 2-line, 16-character liquid crystal display (LCD) and a keypad, through which you can

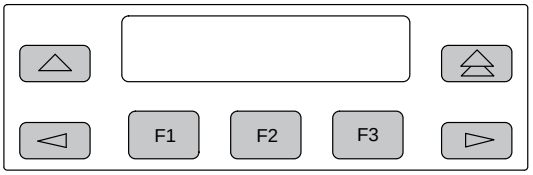
- Monitor the unit's health and status
- Initiate dial backup
- Initiate diagnostic tests
- Load or change the unit's configuration, or how it will operate
- Display or change the status of the general purpose external DTE leads.

The DCP's LCD displays the result of any command initiated from the DCP.

Refer to Appendix C to understand the meaning of DCP status indicators.

Keypad

There are seven keys on the DCP of the standalone Model 3615, and eight on the SDCP for the carrier-mounted Model 3616 DSU. The additional key, the **Selec**t key, connects the SDCP to a specific DSU located in a specific carrier and slot within the carrier.



- The ⏫ key returns you to the top-level menu, and terminates any work in progress.
- The ⏶ key returns you to the previous display, one level up from the current display. It can also be used to terminate a data entry display without making a change.
- The ◅ and ▻ keys scroll menus or other displays to the left or right, respectively.

  On status and test result displays, the ◅ and ▻ keys scroll additional information into view.

  On data entry displays, these keys move the cursor one character to the left or right to allow entry of one digit or character at a time.
- Function keys (**F1**, **F2**, or **F3**) select the item displayed directly above the key.

Additional information on operating the DSU's keypad can be found in the procedures used to install and verify operation of the DSU in Chapters 2 and 3, the procedure for editing configuration options in Chapter 5, and the various procedures scattered throughout this chapter.

Menu Structure

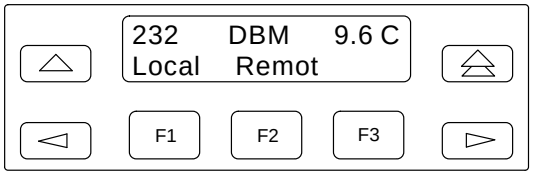
The menu is your map through the DSU's various functions. The following sections describe each branch and subbranch, and provide procedures for operating certain features. Appendix A shows the complete menu and describes the DSU's branches and subbranches. (*The menu is also included on the Reference Card that comes with this guide*.)

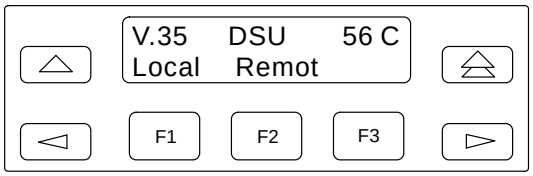
Top-Level Menu

The top-level menu is the *starting point* for all DSU operations. You can always return to this point from anywhere in the menu by pressing the ⏫ key. Pressing this key immediately terminates any operation or work in progress. Refer to Appendix A as you read about the branches and subbranches.

The standalone Model 3615 DualFlow DSU indicates whether the DDS or DBM line interface is being monitored. The carrier-mounted Model 3616 DualFlow DSU displays the DSU's carrier and slot location in the cabinet.

When there are simultaneous DSU (V.35) and Dial (232) connections (e.g., as in a Dial Diagnostic – DiDg configuration), the top-level screen toggles between two displays every 10 seconds, displaying the status of each of the two ports, the EIA-232-D port for the router management or user data and the V.35 port for the user data.





Status Branch

The Status (**Stat**) branch reports on the health and status of the DSU, DBM, the DTE interfaces, the quality of the dial connection, the identity of the DSU (model number, serial number, etc.), and the terminal's power (where it checks the presence of voltage on the DTE's RTS lead).

Health and Status

The Health and Status (**H/S**) subbranch displays the health and status of the DSU, as well as the DBM. It automatically scans for DSU and line conditions that are not within normal limits.

There are three types of Health and Status messages:

- **Devic** (Device Health and Status)
- **Expan** (Expanded Health and Status)
- **Subn** (Subnetwork Health and Status)

All alarm and status conditions are displayed for the specified DSU at the time the option is selected. *For a local DSU*, the alarm and status conditions are updated every 2 seconds; *for a remote DSU*, the alarm and status conditions are not updated.

Refer to Appendix C for a complete listing of these messages.

Device Health and Status

Device Health and Status (**Devic**) reports health and status information for a selected DSU. *If five minutes elapse without a key being pressed*, the Device Health and Status screen is redisplayed.

- When the digital circuit is the active link,
  - — The *first line* displays a running normal-operation timer (hh:mm:ss).
  - — The *second line* displays the DSU's operating rate and can also display one or more of the test or alarm messages.
- An asterisk (*) appears at the far right to indicate NMS activity.
- A right arrow (→) appears just before the asterisk if there is more than one message. Press the ▻ key to see the next message.

Expanded Health and Status

Expanded Health and Status (**Expan**) only appears during automatic dialing, and only if an expanded health and status message has been generated. It retrieves Health and Status information for the local DSU after an automatic backup or DTR-controlled backup attempt has failed, or when there is a disconnect after a successful connection.

If the right arrow (→) appears to the right of *Expanded H/S*, there is more than one message. Press the ▻ key to see the next message.

Subnetwork Health and Status

Subnetwork Health and Status (**Subn**) displays status information from a DSU's subnetwork (all DSUs and DBMs assigned to that DSU's active poll list). The downstream network addresses and current statuses are listed. To page through tributary addresses:

- Press the **F1** key (↑) for the *next highest* network address.
- Press the **F2** key (↓) for the *next lowest* network address.

No PList appears if no DSUs are being monitored downstream.

This status information is only available through the local branch and only when DBM *Diag Type* is set to NonD.

DTE Status

The **DTE** status subbranch provides a snapshot status of the local or remote unit's external DTE interface.

- *For the local DSU status*, the display is sampled and updated every 2 seconds.
- *For the remote DSU status*, only one set of states is returned based upon a monitoring period of approximately 3 seconds.

The DTE interface statuses are displayed in sets. Use the ◅ or ▻ key to scroll each set of lead statuses into view.

If both a backup connection and the DDS line are active a selection screen appears first.

- Select **V.35** to monitor the V.35 interface (for user data).
- Select **232** to monitor the EIA-232-D interface (for router-management or user data).

Circuit Quality

Circuit Quality (**CircQ**) shows the level and quality of the signal being received from the network by the DBM. *This subbranch is only available for a V.32 DBM.*

Identity

Identity (**ID**) displays a listing of the DSU's model and serial numbers, the equipment installed (DBM), software/firmware versions, the network address, the DDS or DSU's rate, and the DBM's rate.

☞ Procedure

1. Press the ▻ key to scroll *ID* into view.
2. Press the function key (**F1**, **F2**, or **F3**) directly below the selection. One field at a time is displayed.
3. Press the ▻ key to display the information, one display (screen) at a time.

Table 4-1 lists the Identity information provided about the DSU and its equipment.

Table 4-1
Identity Descriptions

Description	Information Displayed
Model:	3615 or 3616.
S#:	Unit serial number.
DSU SW ver:	Software/firmware version residing on the DSU.
Netwrk Addr:	Unit's network address.
DSU Rate:	Value set for DSU *Rate(Kbps)* configuration option; the DSU's aggregate speed. This does not appear if a DBM has its DBM *Primary Core* configuration option set to Yes.
DBM SW ver: (*Switched 56 DBM only*)	Software/firmware version residing on the Switched 56 DBM.
DBM Rate:	Value set for DBM *Rate(Kbps)* configuration option; the DBM's aggregate speed.
DBMtype: *xxx yy.y z*	Type of DBM installed: *xxx* can be either **V** (V.32 DBM), **4wS** (4-wire Switched 56 DBM), or **2wS** (2-wire Switched 56 DBM). *yy.y* indicates the DBM's maximum speed. *z* designates whether the DBM Primary Core option was enabled. (A **P** indicates Primary Core is enabled.) Only appears when a DBM is installed.
App Modul:	ASPEN. Appears when the Single-Port Async/Sync feature is installed.
App Modul:	CISC *or* 64CC. **CISC** when the Clear Channel with Integrated Secondary Channel chip is present. **64CC** when the CISC chip is not present.

Terminal Power

Terminal Power (**TPwr**) displays the status of the EIA-232 or V.35 interface (connector). The DSU checks the state of the RTS lead to determine when the DTE is ON to report the following:

- When the voltage is approximately less than –3V or greater than +3V for both the EIA-232 and V.35 interfaces.
  - — If power is detected, the second line displays **On**.
  - — If no power is detected, the second line displays **Off**.

Backup Branch

The Backup (**Bckup**) branch controls dial backup operation. The following sections explain dial backup operation.

Dial Backup Operation

The DualFlow DSU with dial backup capability can provide backup for a point-to-point circuit operating at 56 kbps or below. Appendix E shows some typical DualFlow configurations.

Backup is controlled primarily by software configuration options in the *DBM*, *DBM Port*, and *Backup* option sets. The unit can be configured so that backup can be either automatic or manual. Manual backup can be controlled from either the DSU's control panel, or a 6700 or 6800 Series NMS.

Backup begins with configuring the unit.

Configuring the Unit for Dial Backup

The following configuration options should be set, whether initiating backup manually or automatically.

DBM Option Set:

- **AutoAnswer** – Select **Enab**.

  When enabled, this option set allows the DBM to answer an incoming call. (Enab is the factory-loaded default setting.)

- **Call Setup** – Set call setup security level:

  None – No call setup security is required. (None is the default.)

  Password – Originating and receiving DBMs exchange passwords before the DBMs can complete the connection. There must be an incoming password (RxPwd) and an outgoing password (TxPwd) set up. Select Pswrd when the *DiDg* application configuration is being used.

  Callback – Both DBMs must exchange passwords and a Backup Directory pointer must be sent before a call can be initiated. There must be an incoming password (RxPwd) and an outgoing password (TxPwd) set up, and the originator's local telephone number (Phone subbranch) must be stored in the answering DBM's Backup Directory.

  Alarm – No security is to be used at the control DBM, and the DBM only answers incoming calls when there is a facility alarm.

  If the control DSU is to initiate the call, set the control for Pswrd and the tributary for Cllbk.

  If the tributary DSU is to initiate the call, set the control for Cllbk and the tributary for Pswrd.

Backup Option Set (none of these need to be set for manual backup):

- **Auto Bckup** – Select **Enab**.

  When enabled, the DSU will automatically initiate dial backup when the DDS line is down. Up to 10 attempts will be made.

  If both the control and tributary DSUs are configured for automatic backup, *NtwkTimOut* should be set to *different* values so that the control and tributary DSUs do not try to place a call at the same time.

  On a point-to-point circuit, it is best that only one end performs automatic backup. It is possible to trigger the backup for single-direction network failures only detected at the remote DSU. The remote DSU must have *RTS Control* set to FrcOn.

NOTE

Auto Backup and *Auto Restor* should not be enabled if *DTRCallCon* is enabled (set to Orig or Ansr).

- **Bckup Dir** – Select the call directory identifier (1 to 10) stored in the DBM's Backup Directory for the telephone number to be dialed.
- **AutoRestor** – Select **Enab**.

  When enabled, the DBM automatically restores data to the DDS circuit when service is restored and the amount of time set in *RestoreTimOut* has expired.
- **NtwkTimOut** – Set the amount of time that the DDS circuit must be out of service before a backup attempt is made: from 0:00 (minutes:seconds) to 29:59 (the default is 0:20).
- **RestorTimOut** – Set the amount of time that the DDS circuit must be back in service before automatic restoration is attempted: from 1 to 60 minutes (the default is 5 minutes).
- **TriesTimeOut** – Specify the overall time limit during which a DBM attempts to establish a dial backup call when *Auto Bckup* is enabled or when raising DTR initiates a call attempt: from 1 to 60 minutes (the default is 15 minutes).
- **MultiCall** – Select **Disab**.

  When enabled, instead of following the normal calling cycle, the DBM cycles through all dial strings contained in its Backup Directory until a call attempt is successful.

  Do not enable MultiCall unless more than one telephone number is in the Backup Directory and each successive (i.e., 1, 2, 3, etc.) telephone number is different from the previous entry. Directory entries should be unique.

Understanding Operating Modes

The Backup branch controls operation of the Dial Backup function. The DualFlow DBM has three modes of operation:

- In **Idle mode**, there is no dialed connection. The DDS circuit is active and carrying user data.
- In **Standby mode**, the unit has a dialed connection to another DBM or compatible dial backup unit, but has not connected line data to the DBM's DTE port.
- In **Dial Backup mode**, the dialed circuit is active and carrying user data and diagnostics.

Table 4-2 lists the Backup branch operating modes and explains the effects of each backup command.

Table 4-2
Backup Branch Menu Selections

Current Backup Mode	Backup Command	Effect
Idle	Bkup	Dial out, establish, and switch to dialed link (Dial Backup mode).
	Dial	Dial out and establish dialed link (Standby mode).
Standby	Disc	Disconnect dialed link (Idle mode).
	→Cnnct	Connect the DBM line data to DBM's DTE port (Dial Backup mode).
Dial Backup	DrBU	Disconnect dialed link and switch to private line (Idle mode).
	→StnBy	Disconnect the DBM line data from DBM's DTE port (Standby mode).

Manual Backup

You can control each step of a backup attempt by following one of these procedures.

Placing a Backup Call

To place a backup call:

Procedure

1. Go to the *Bkup* option set under the Confg branch and set *Auto Bckup* to Disab.
2. Select **Bckup** (Backup branch) to select a telephone number from the Backup Directory.
3. Select **Dial**, the *Backup Dir* screen is displayed identifying the Backup Directory indicator.

   If the telephone number in the Backup Directory is the number you want to dial, go to Step 5.
4. Select another telephone number to call:
   - Press the F1 key (↑) to increment the directory indicator (e.g., 1 to 2).
   - Press the F2 key (↓) to decrement the indicator (e.g., 2 to 1).
5. Select **Dial** (F2); the DBM places the call.
6. Once the dialed call has been established, select →**Cnnct** to switch data to the dialed connection.

Manual Dial Backup Termination

- If in Standby mode, select **Disc**.
- If in Dial Backup mode, select **DrBU**.

Test Branch

The **Test** branch provides extensive testing capabilities for the DSU, the DDS circuit, the DBM, and the backup circuit. Most tests can be run simultaneously on the DSU and DBM. When the tributary DSU receives a test request from the control DSU, it aborts any locally initiated test in progress.

Running a test can affect your application data or may cause your application session to be dropped depending upon front-end processor, time-out parameters, etc. since no data or acknowledgment messages will be transmitted while the test is in progress.

Abort

The **Abort** selection allows you to abort a test that is running. *The DSU cannot run any other test until the test in progress is aborted.*

There are two types of selections to abort a test:

- **Selective** terminates whatever test is in progress at the local DSU.
- **Subn** (Subnetwork) only displays for the DBM branch. This selection terminates all tests running on the remote DSU or DBM.

After selecting either Selective or Subn, the test is terminated and the DCP displays the message *Command Complete.*

Device Test

The Device (**Devic**) Test uses a test pattern generator built into the DSU. *When testing the DBM, the DBM must be in Idle mode, with no call in progress before running a Device Test.*

> **NOTE**
>
> On power-up, the DSU sends out polls to verify that a DBM is installed. It then initiates a Device Test on itself and the DBM. The results of the tests appear momentarily on the DCP's LCD.

Loopback

The Loopback (**Lpbk**) branch displays four loopbacks:

- Local Loopback (LL) – DSU only
- DTE Loopback (DTE)
- Digital Loopback (DL)
- Remote Digital Loopback (RL) – DBM only

Figure 4-3 shows where each loopback occurs on the circuit. Refer to the figure as you read about loopbacks.

NOTE

To abort a loopback on the tributary DSU from the NMS, establish a dial connection with the control DSU, then issue a subnetwork abort command from the NMS to the control.

Local Loopback

Only available to a DSU, Local Loopback (**LL**) is session-disruptive; that is, performing the test will disrupt data. It permits the DTE or router to run a test to determine whether the DTE or router connection to the DSU and the DSU itself are functioning properly. The DSU must be connected to the DTE or router, but the network connection to the DSU is not required.

While the DSU is in Local Loopback, any data transmission by the DTE or router is returned as received data. An operator can send a test pattern and verify correct reception of the test. The DSU does not monitor this testing.

NOTE

If the NMS is to abort the Local Loopback, the tributary's DBM must be in Standby mode. If in Dial Backup mode and the NMS issues the *Abort* command, the command will not be recognized. The loopback will have to be aborted from the DSU's control panel.

DTE Loopback

DTE Loopback (**DTE**) loops back the data path at the DTE interface without affecting operation of the other port. This loopback is used to verify that the DTE or router connection and the cable are good.

Digital Loopback

Digital Loopback (**DL**) allows manual testing of the remote end of the circuit. Data coming in is immediately transmitted back. For example, a Digital Loopback may be required in order to complete an external bit error rate test (BERT) from the remote DSU. The local DSU receives test data, loops it back to the transmitter before the DSU's DTE interface, and returns it to the network.

Digital Loopback can also be initiated by receiving a V.54 pattern to go into Digital Loopback. Enable configuration options *V.54 Lpbk* (V.54 Loopback) in the DSU option set, and *RespondRDL* (Respond to Remote Digital Loopback).

Remote Digital Loopback

Only available to the DBM, the Remote Digital Loopback (**RL**), sometimes referred to as RDL, typically supports testing using an external device, like a protocol analyzer that is connected to the local DSU's DTE interface. A test message from the external device is looped back from the receiver to the transmitter in the remote DBM and returned to the local DBM.

In Remote Digital Loopback, the local DBM (control or tributary) puts the remote DBM into Digital Loopback.

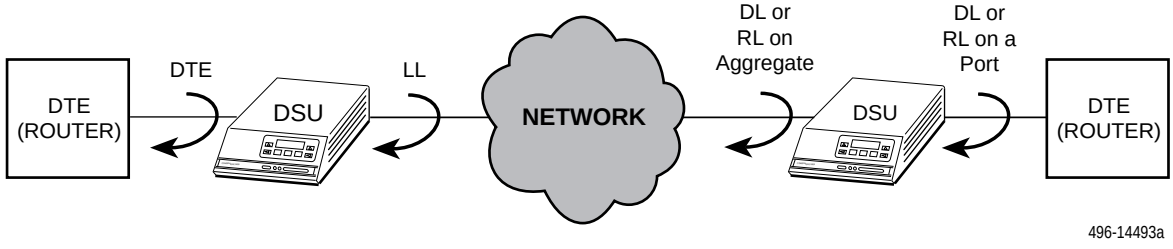


Figure 4-3. Loopbacks

When a DBM (control or tributary) originates Remote Digital Loopback, both the originating DBM and the targeted DBM enter Test mode. No other test can be run at the originating DSU or the targeted DSU until the Remote Digital Loopback is aborted.

The DBM does not generate test results.

> **NOTE**
>
> To activate a V.54 Loopback from the NMS to a DSU, first enable *V.54 Lpbk* (DSU option set) at both the control and tributary DSUs. Then, select **3600 remote-digital** at the NMS, *not* V.54-remote-digital.

Bilateral Loopback

Bilateral Loopback (Bilat Lpbk) is a combination of DTE and Digital Loopbacks operating simultaneously in the same DSU. Both Bilateral and Digital Loopbacks are selected from the *DSUpt* (DSU Port) or *DBMpt* (DBM Port) option set.

> **NOTE**
>
> If *Bilat Lpbk* is enabled, requesting a Remote Digital Loopback or Digital Test will automatically initiate a DTE Loopback, as well.

Digital Test

Only available to a DBM, the Digital Test (**DT**) checks the functionality of a pair of DBMs. This test is run on the DBM over the backup connection to a remote DBM for point-to-point testing.

The remote DBM is placed in Digital Loopback, then the local DBM transmits the 511-bit test pattern over the network to the remote DBM for an operator-specified length of time.

During the test, the TXD, RXD, and RTS LED indicators show the states of the leads at the DTE interface if the DBM port leads are being displayed. At the conclusion of the test, the local DSU releases the remote DBM from Digital Loopback.

To review the results of the test, select **Displ** (Display) and press the ▻ key to scroll through the results shown in Table 4-3.

When the test is over, the top line displays *Final* instead of *Active*.

Table 4-3
Digital Test Results

Results	Information Displayed
Time:	Running test timer. (The Clr selection resets the timer to 0:00:00.)
Tot Error:	Running count of bits in error; Max, if the maximum error count has been reached, the maximum being 64000. (The Clr selection resets the counter to 0.)
Err Secs:	Running count of errored seconds. (The Clr selection resets the counter to 0.)

End-to-End Test

Only available to the DBM, the End-to-End (**EE**) Test analyzes a control and a tributary DBM, and the network circuit between them *in both directions independently.* It transmits fixed packets (or blocks) of data between the DBMs When an End-to-End Test is run, diagnostic data may be disrupted.

To view the results of the test, select **Displ** (Display) and press the ▻ key to scroll through the results shown in Table 4-4.

When the test is over, the top line displays *Final* instead of *Active*.

Table 4-4
End-to-End Test Results

Results	Reported By[1]	Information Displayed
Time:	Local and remote DBM	Running test timer. (The Clr selection resets the timer to 0:00:00.)
Tot Block:	Local and remote DBM	Number of blocks completed. (The Clr selection resets the counter to 0.)
Rx Blk err:	Local and remote DBM	Number of incoming blocks with errors detected, indicating a fault in the incoming transmission path. (The Clr selection resets the counter to 0.)
Tx Blk err:	Local and remote DBM	Number of blocks with errors detected at the remote DSU, indicating a fault in the outgoing transmission path. (The Clr selection resets the counter to 0.)
Rx TimOuts:	Local DBM only	Number of blocks that were not received or acknowledged by the remote DSU or DBM. (The Clr selection resets the counter to 0.)

[1] *Local* refers to the test initiator.

Bit Error Rate Test

The Bit Error Rate Test (**BERT**) is a session-disruptive test that transmits a 511-bit pattern. It analyzes the network circuit. It can monitor the results by putting the remote DSU or DBM into Digital Loopback and checking the returned pattern for errors, or by simultaneously executing a BERT in the local DSU.

The test continues until aborted from the DCP or NMS.

If nondisruptive diagnostics are in effect (if *Diag Type* is set to NonD), diagnostic data can be disrupted.

To display the results of the test, press F2 to select **Displ**. The results are shown in Table 4-5. *To clear the results* of the test and clear the counters to zero, press F3 to select **Clr**.

Table 4-5
Bit Error Rate Test Results

Results	Information Displayed
Time:	Running test timer. (The Clr selection resets the timer to 0:00:00.)
Tot Error:	Running count of bits in error; Max, if the maximum error count has been reached, which is 64000. (The Clr selection resets the counter to 0.)
Err Secs:	Running count of errored seconds. Errored second is at least one error is detected during a 1-second time period. (The Clr selection resets the counter to 0.)

Lamp Test

The **Lamp** Test is a local test of the status indicators (LEDs) and liquid crystal display (LCD) on the DSU's control panel (both models). Any indicator that does not flash is not functional.

Note that if all LEDs are functioning, all the indicators on the Model 3615 DCP are flashing steadily. In a COMSPHERE 3000 Series Carrier, the indicators on the SDCP remain ON. The LCD on the DCP or SDCP alternately flashes solid blocks, moving from position to position on the display until the test is aborted.

*Pressing any key **except*** the ⏏ key will stop the LCD portion of the Lamp Test and return you to the DSU Test menu so you can abort the test. Once aborted, the LCD and LEDs stop flashing.

Configuration Branch

The Configuration (**Confg**) branch allows you to configure or customize the DSU and its DBM to fit your site's requirements, to enter and change telephone numbers, and to specify the mode for viewing or editing configuration options.

Selecting an Application Configuration

The DSU is shipped from the factory with three common applications already configured. All you have to do is select the appropriate application and load the preset configuration into the unit. These configurations include:

- Synchronous Backup for a Control DualFlow DSU (**SyBC**) – Sends user data over the DDS connection via the V.35 port, and configures the DBM for synchronous user-data transfer during Bandwidth on Demand or backup situations. This configuration also configures the DualFlow DSU to dial when DTR on the EIA-232 port transitions from inactive to active, and to disconnect when DTR transitions from active to inactive (DTRCallCon: Orig). Used for a control device.
- Synchronous Backup for a Tributary DualFlow DSU (**SyBT**) – Sends user data over the DDS connection via the V.35 port, and configures the DBM for synchronous user-data transfer during Bandwidth on Demand or backup situations. This configuration also configures the DualFlow DSU to answer calls only when DTR on the EIA-232 port is active, and to disconnect when DTR transitions from active to inactive (DTRCallCon: Ansr). Used for a tributary device.
- Dial Diagnostics (**DiDg**) – Sends user data over the DDS connection via the V.35 port, and configures the DBM for asynchronous router-management data and for disruptive diagnostics.

Select the appropriate configuration based upon how the unit will be used within your network. All configurations support simultaneous DDS and DBM connections. The difference is in how the DBM connection is used.

Refer to the *Application Configurations* in Appendix E for examples using these three configurations. Refer to the DSU's menu in Appendix A as you follow these steps.

☞ Procedure

1. Select **Confg** (Configuration branch).
2. Press the F1 key to select **Opts** (Configuration Options subbranch).

   The *Load from* screen appears.
3. Press the ◅ or ▻ key to scroll the desired configuration into view.

> **NOTE**
>
> By referencing the menu in Appendix A, you will see that pressing the ◅ key is often more efficient.

4. Make your selection: SyBC, SyBT, or DiDg, and press the function key (F1, F2, or F3) directly below the desired configuration.

   The *Edit/Save* screen appears.

To view the configuration loaded:

☞ Procedure

1. Select an **option set** (e.g., DSU – F2 key).
2. Press the F1 key (**Next**) to scroll through each configuration option's default (factory-loaded) setting.

   The option sets (DSU, DSU Port, DBM, etc.) scroll from the last to the first (e.g., Diag→ Bkup→SAVE→DSU→DSU Port, etc.).
3. Select **Prev** (press the ◁ key to display Prev, then select it).
4. Press the △ key to return to the *Edit/Save* screen.

   You can select another option set to view, or you can proceed.

   Refer to Chapter 5, *Configuring the Unit*, for an example showing you how to edit (change) configuration options.
5. Select **Save** (F1).

   The *Save to* screen appears.
6. Select **Activ** (F1).

   The selected application's configuration is saved to the DSU's Active operating area, and the *Command Complete* message appears.

Configuration Options

The Configuration Options (**Opts**) subbranch allows you to save, copy, and/or change configuration options.

Refer to Chapter 5, *Configuring the Unit*. Chapter 5 fully explains the *Opts* subbranch, and provides an example of changing configuration options.

Poll List

The Poll List (**PList**) subbranch maintains or changes the DBM's poll list. A control DBM's poll list includes the tributary DSU and DBM one level downstream, and only a control can acquire a poll list.

You can display, clear, change, or acquire a poll list. If you select **Clr** (Clear) from the *Poll List* screen, all network addresses are erased from the DBM's poll list.

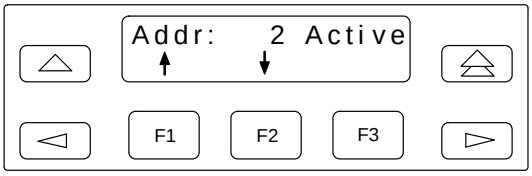
PList is *only available from the Local branch*, and only to a control DBM configured for nondisruptive diagnostics (*Diag Type* is set to NonD).

Displaying the Poll List

To display each of the network addresses included in the DSU's poll list:

☞ Procedure

1. Select **PList** (F2).
2. Select **Displ** (F1). The following screen appears:



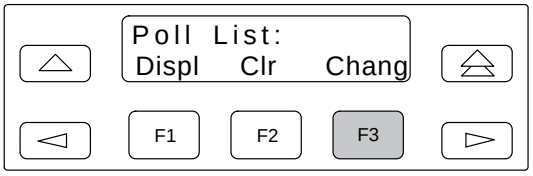
   The number after Addr (in this example, 2) is the network address of the poll list member. The member is identified as either *Active* or *Skip* (identified via the Change Poll List function).
3. Press the **F1** or **F2** key to display additional addresses.
4. Press the △ key to return to the *Poll List* screen.

Changing the Poll List

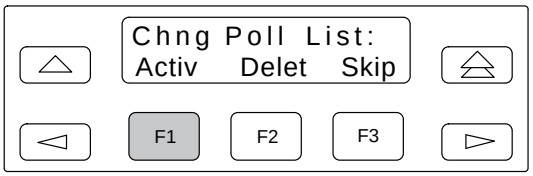
To change the poll list (e.g., add network address 3):

Procedure

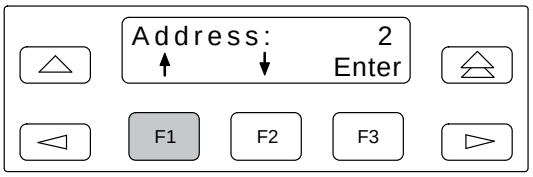
1. Select **Chang** (F3).



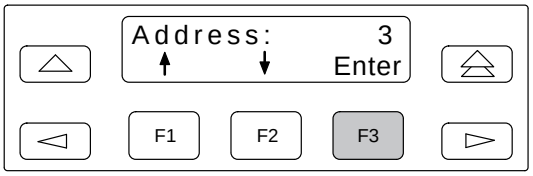
2. Select **Activ** (F1).



3. Press the **F1** key to increment network address 2.

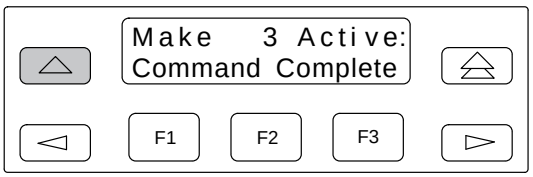


4. Select **Enter** (F3).



   The address is added to the poll list. The control determines the round trip delay, then sends that information to the tributary DSU.

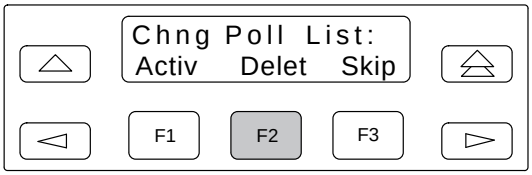
5. Press the △ key to return to the *Chng Poll List* screen.



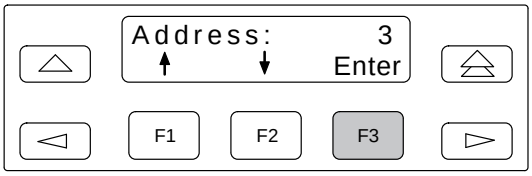
To delete a network address (e.g., 3) from the poll list:

Procedure

1. Select **Delet** (F2).

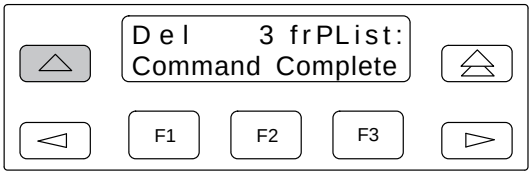


2. Select **Enter** (F3).



   In this example, 3 was just added, so it is the address displayed. If another address needs to be deleted, change the network address displayed as previously shown.

   The tributary DSU associated with the address is removed from the poll list.



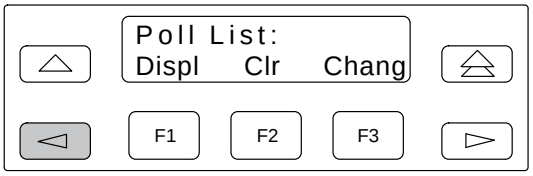
Acquiring the Poll List

A call must be established before this procedure can be performed (refer to the *Backup Branch* section earlier in this chapter).

To automatically generate a poll list if a control:

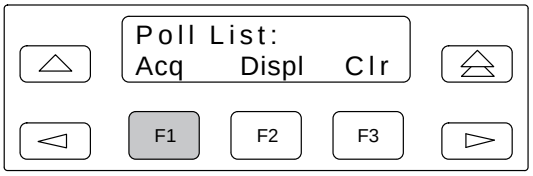
Procedure

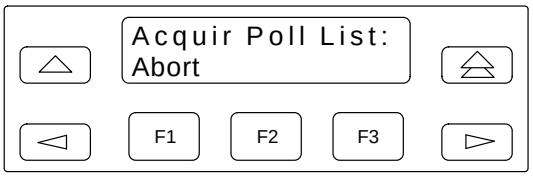
1. Press the ◁ key to display Acq.

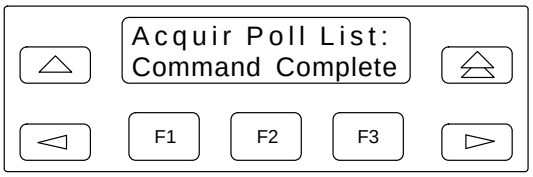


2. Select **Acq** (F1).

   You can stop the process and keep the poll list as it has been generated by selecting **Abort**.







   Otherwise, all tributary addresses have been acquired.

Directory

The DSU's dial backup Directory (**Dir**) can store up to ten telephone numbers (dial strings) so the DBM can call other DBMs. Directory entries are numbered from 1 to 10. Each dial string in the directory can be up to 36 characters in length. Refer to Table 4-6 for numbers and characters that can be used.

When the dial string or changes are complete, enter an underscore (_) to the immediate right of the last character; *this ends the dial string field*.

Table 4-6
Directory Entry and Password Characters

Character [1]	Use
0—9	Dialing digit (These are the only characters accepted by the Switched 56 DBM.)
*	Tone-dialing character *
#	Tone-dialing character #
t	Tone dial [2]
p	Pulse dial [2]
w	Wait for dial tone [2]
|	Delimiter, separating telephone number and callback directory pointer (for use with callback security)
, (comma)	In a dial string: a 2-second pause at the beginning of a password; suppresses display of all following characters (invisible mode)
( ) (space)	Space (readability character) [3]
_ (underscore)	Required character for end-of-string marker (erases end-of-line)

[1] The colon (:) character should not be entered from the NMS.
[2] Not supported by Switched 56 DBMs.
[3] Space is not used for directory entries.

NOTE

Do not load duplicate telephone numbers into the Directory; telephone numbers should be unique.

Entering a Telephone Number

For the following example, add a dial string (telephone number) to Backup Directory 1. The number to be entered is 555-1234.

To add or change a telephone number:

☞ Procedure

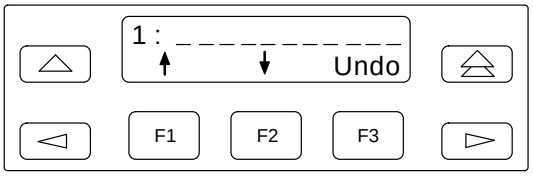
1. Select **Local**.
2. Press the ▻ key to display Confg (Configuration branch).
3. Select **Confg**.
4. Select **Dir** if entering a telephone number into the Backup Directory.

   Press the ▻ key to display then select **Phone** if entering the local DSU's telephone number. *This telephone number is entered similarly to entering a number into Dir.*
5. Select **Chang** (F1) to add or change a telephone number.

   The *Enter Dir* screen appears.

   Press the F1 key (↑) to increment the Directory entry indicator (the default is 1). For this example, assume that you are entering your first directory entry.
6. Select **Load** (F2).

   The Directory entry appears on the first line; the cursor is positioned in the first position of the currently empty Directory.



   If the number had been entered previously, that number would appear on the first line, following the colon (:).

   For numeric screens, the following applies:

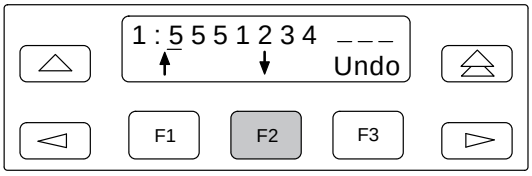
   — Press the F1 key (↑) to increment the digit.

   — Press the F2 key (↓) to decrement the digit.

   — Press the ◅ or ▻ keys to move the blinking cursor one position to the left or right.

   — Press the F3 key (Undo) to restore the number as it was first displayed so you can start over.

   Refer to Table 4-6 to see all available directory and password entry characters.
7. Press the F1 key until the number **5** appears.
8. Press the ▻ key to move to the next position.
9. Repeat the process until all numbers in the telephone number have been entered.



> **NOTE**
>
> A dial string cannot have any separating characters or spaces (i.e., 555-1234 or 555 1234). *Other valid characters* can be interspersed as needed : *, #, t, p, w, and comma (,).

10. Press the △ key to return to the *Enter Dir* screen.
11. Press the F3 key to **Save** the entry.
12. Verify that the number was loaded by pressing the △ key again and selecting **Load** (F2).

The telephone number should appear as entered, or you can repeat the procedure to edit/correct your entry.

Phone

The local telephone number (**Phone**) feature stores the local DBM's telephone number if a DBM is installed.

Refer to Table 4-6 to see all available telephone number characters.

Network Address

The network address (**Addr**) is the network address of the local DSU. *It is only available from the Local branch*. The DSU's network address is a number in the range of 1 to 254 if the DSU has a DBM installed. The DBM automatically acquires an address equal to the DSU's plus 1.

Assigning an Address

The *Addressing the Unit* sections of the installation chapters, Chapters 2 and 3, provide guidelines for assigning an address to the DSU based upon its position in the network – control or tributary. Follow the steps below to assign a network address to a DSU. Refer to the menu in Appendix A, if necessary.

Procedure

1. Press the ⩤ key to return to the top-level menu.
2. Select **Local**.
3. Select **Confg** (Configuration branch) from the menu.

   (Press the ▻ key to scroll *Confg* into view, then press the function key (F3) directly below the branch name to select it.)
4. Press the ▻ key until *Addr* (Address) appears, then select **Addr**.
5. Select **Load**.

   Net Address appears, with the current network address displayed. (The DSU is shipped with its network address set to **254**.)
6. Change the DSU's network address by moving the blinking cursor and incrementing or decrementing the digits (1 through 9).

   — Press the ▻ key – moves the cursor 1 position to the right.

   — Press the ◅ key – moves the cursor 1 position to the left.

   — Press the **F1** (↑) key – increments the digit by 1 (e.g., 1, 2, 3, ...).

   — Press the **F2** (↓) key – decrements the digit by 1 (e.g., 1, 2, 3, ...).
7. Press the ⩤ key to return to the *Net Address* screen when finished entering the DSU's address.
8. Select **Save** (F2).

   The DSU displays the address assigned along with a *Command Complete* message.

If an error was made in entering the address:

Procedure

1. Press the ⩤ key to return to the *Configure* screen.
2. Re-select **Addr**, and re-edit the address.
3. Select **Save** again.

Control Branch

The Control (**Ctrl**) branch allows you to enable or disable the DSU's transmitter, as well as the DBM's, and to display or change the status of the general purpose external DTE leads. *A DBM can be disabled if it is addressed from the Remote branch.*

Transmitter Control

The Transmitter Control (**TxCtl**) selection allows you to enable or disable the DSU's or DBM's transmitter (DDS core).

When the DSU transmitter is disabled, the following is possible:

- When a DSU is disabled, it responds to tests. Aborting a test clears the test but the unit remains disabled.
- A DSU in test clears the test when a disable (or enable) command is received.
- If an enable command is executed to a control from the NMS or the local DCP, all disabled tributaries are enabled; all tributaries in test are restored to Data mode.

When the local DBM is disabled, the DBM does not originate or answer any calls until enabled.

LEDs

The **LEDs** selection is only available from the Local branch. This selection allows you to monitor the port at any given time. When selected, the port's lead activity is reflected in the DCP circuit designation status indicators (TXD, RXD, etc.) on the faceplate of the Model 3616 DSU, or on the DCP of the Model 3615 DSU.

External Leads

The External Leads (**ExtL**) selection allows you to display the state of *four* general-purpose leads on the EIA-232-D/V.24 port interface: Pins 12 and 13 for *output* (control leads) and Pins 19 and 23 for *input* (alarm leads).

When the configuration option *Ext Leads* (External Leads) is set to ExtLd (DBM Port option set), you can change the state of the two output leads from the DCP or NMS. When *CCN by EL* (CCN by External Leads) is enabled (DBM Port option set), the control DSU reports changes in the four leads to the NMS as part of its health and status poll response.

Table 4-7 describes the meaning of the state of each input or output lead.

Table 4-7
Lead States

Symbol	Meaning
_	Off (below text line)
‾	ON (above text line)
↕	Changing
?	Indicates an illegal value

NOTES:

Input leads A and B:

Off (_) when voltage on lead is less than +.8V.
ON (‾) when voltage on lead is more than +2.2V.

Output leads are either ON or Off:

When output is set to Off (_), –12V is applied to lead.
When output is set to ON (‾), +12V is applied to lead.

Displaying External Leads

The Display (**Displ**) selection allows you to view the external lead states. When Display is selected, the External Leads status report appears showing the current status of the general-purpose external leads on the EIA-232-D/V.24 interface.

Changing External Leads

The Change (**Chang**) selection allows you to change the state of the two output leads (for example, to change a lead to signal a console operator or to reset a remote computer). Leads can be changed from the NMS.

After the leads are set, press the F2 key to save the leads in the specified state.

Reporting External Lead Changes to NMS

Changing either the *output leads* or the *input leads* changes the DSU's health and status message.

If the DSU is polled by the NMS, the NMS reports a change configuration notification (CCN) event. The NMS operator can then issue a **CCN Display** command to determine what caused the event.

- If the event was caused the state of the *external leads*, select **Displ** (F1) to see the current states of the leads.
- If a positive (+) voltage is detected in either one of the *input leads*, an external leads alarm is also reported.

Message Branch

The Messages (**Msgs**) branch of the top-level menu allows the DBM to receive messages from the NMS. It only appears when there is a message waiting. Both control and tributary DSUs can receive messages.

To receive messages:

☞ **Procedure**

1. Press the **F3** key (Msgs).
2. Select **Read** (F1).
3. If the message is *less than* 16 characters in length, the entire message is displayed.

   If the message is *greater than* 16 characters, press the ▻ key to scroll additional lines of the message onto the screen.

To clear (delete) messages:

☞ **Procedure**

1. Press the **F3** key (Msgs).
2. Select **Clear** (F2).

   The message is deleted, and *Msgs* no longer appears over the F3 key.

Front Panel (DCP) Security

NOTE

This page can be removed to prevent unauthorized persons from learning about the security access levels and their selection.

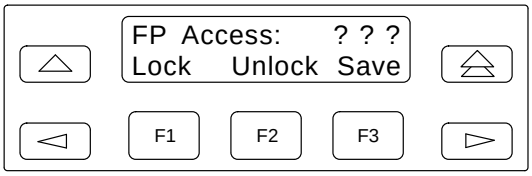
The Model 3615 diagnostic control panel (DCP) and Model 3616 shared diagnostic control panel (SDCP) have two levels of security access, as shown in Table 4-8.

Table 4-8
Security Access Levels

Security Access Level	Functions Available
Unlock	All
Lock	Local branch only: • Status branch • Configuration branch: Display only (no changes) • Control branch: Display External Leads only (no changes)

The DualFlow DSUs are shipped from the factory with the security level set to Unlock. When the DCP is locked, only the Local branch appears on the control DSU and no settings can be changed or saved.

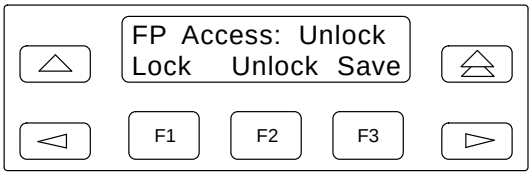
If the security has not been set on the DCP before, the following appears:



To select the security level:

Procedure

1. Press the ⏏ key to ensure that you are at the top-level menu.
2. Press the ◁ and ▷ keys simultaneously for three seconds. The following menu appears:



3. Select the security level:

   Lock – To restrict access

   Unlock – To provide full access

   Press the appropriate function key (**F1** or **F2**).
4. Select **Save** (F3).

Unit Configuration 5

Overview

After the DSU has been installed and any necessary hardware switches or jumpers have been set, the software configuration options must be set. Configuration options are set via the DCP by accessing the Configuration (Confg) branch of the menu (refer to the menu in Appendix A).

There are eight configuration option areas within the DSU:

- The Active area (**Activ**) contains the DualFlow DSU configuration options currently being used.
- The Remote area (**Remt**) allows a selected DualFlow DSU's or DBM's configuration options to be retrieved so they can be displayed, edited, and/or saved back to the selected DSU or DBM, another DSU or DBM, or the local DSU or DBM. The remote configuration option sets that can be retrieved are Activ, Usr1, Usr2, and Usr3.
- The User 1 area (**Usr1**) is a customer-defined set of stored configuration options. By having these predetermined option sets stored, they can be loaded rapidly as operating requirements change.
- The User 2 area (**Usr2**) is functionally the same as Usr1, providing further flexibility when creating configurations for various applications.
- The User 3 area (**Usr3**) is another customer-defined option set.

NOTE

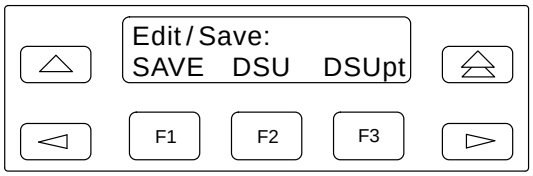
The next three option sets, SyBC, SyBT, and DiDg, are read-only storage areas; changes cannot be saved to these option sets.

- The factory-loaded configuration for the Synchronous Backup application for a control DSU is stored in the **SyBC** area.
- The factory-loaded configuration for the Synchronous Backup application for a tributary DSU is stored in the **SyBT** area.
- The factory-loaded configuration for the Dial Diagnostic application is stored in the **DiDg** area.

NOTE

A DualFlow DSU cannot configure a non-DualFlow DSU remotely.

Selection of Activ, Usr1, Usr2, Usr3, SyBC, SyBT, or DiDg from the **Load from** menu brings a complete set of configuration option into the working buffer. Once loaded, the Edit/Save submenu appears (shown below).



Using the DCP to Set Configuration Options

Any one of the following 6 configuration option sets can be selected: DSU, DSU Port, DBM, DBM Port, Diagnostic (DBM and General), and Backup. The configuration options can be edited and then saved to the Activ, Usr1, Usr2, or Usr3 storage areas.

In addition, an example is included to illustrate DCP operation.

Editing Configuration Options

To edit or change configuration options:

☞ Procedure

1. Select **Local**, or **Remot** (Remote) and the remote DSU's network address.
2. Select **Confg** (Configuration branch). Press the ▻ key until Confg appears, then press the function key (F1, F2, or F3) directly below Confg.
3. Select **Opts** (Configuration Options).
4. Select **storage area** (Activ, Remt, Usr1, etc.) from the *Load from* screen.

   If the unit is a control and you select **Remt**, enter the network address of the remote DSU.
5. Select the **option set** (e.g., DSU, DSUpt, DBM, etc.) to be edited.

   The first configuration option within that set appears. Page through each configuration option within the set as follows:

   a. Press the F1 key to go to the **Next** configuration option. These configuration options scroll or wrap around (e.g. first, then last; or last, then first).

   b. To return to the previous configuration option, press the ◅ key *instead of* selecting Next. **Prev** appears over the F1 key.

   c. Select **Prev** by pressing the F1 key.

As you edit configuration options, be aware of the following:

- The *first line* of each configuration option identifies the option and its current setting.

  If configuration data has been corrupted, **???** will appear in place of the current value. If this occurs, reset all configuration options, along with the network address. Check the Backup Directory entries, the poll list, and the DSU's local telephone number, as well.

- The *second line* displays all values that are available for selection – three at a time, one above each function key.

  — Press the ◅ or ▻ key to scroll other selections into view.

  — Press the function key (**F1**, **F2**, or **F3**) directly below a value to select it.

  — Select **Next** to proceed to the next option.

  — Select **Prev** to return to a previous option.

  — Press the △ key to return to the *Edit/Save* submenu or screen, and select the next option set to be edited.

Saving Configuration Options

CAUTION

Be extremely careful when saving configuration options to avoid saving them to the wrong location.

To save edited configuration options:

☞ Procedure

1. From any configuration option in any option set, press the △ key to return to the *Edit/Save* submenu.
2. Press the F1 key below **SAVE**.
3. Select **area** (Activ, Remt, Usr1, etc.) on the *Save to* screen.
   - *If **Activ** is selected*, your changes take effect immediately.
   - *If **Usr1**, **Usr2**, or **Usr3** is selected*, your changes are stored for future use.
   - *If the unit is a control and **Remt** is selected*, the complete set of configurations (all option sets available to the unit) are sent to the tributary and saved to its *Activ* area.

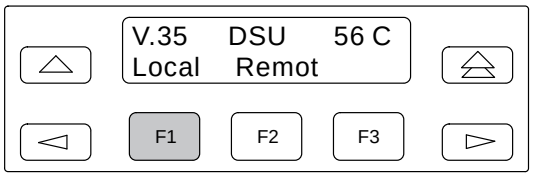
   Remember that you cannot save to the factory-loaded configuration areas.

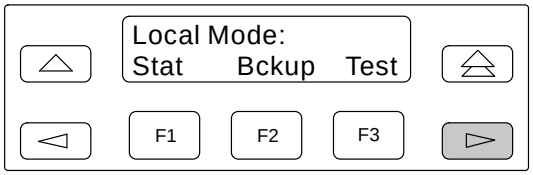
Example Using the DCP

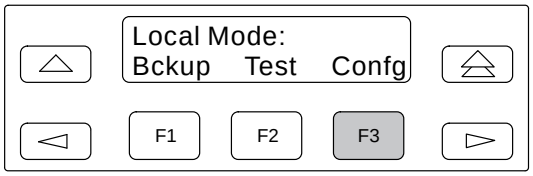
In this example, load the configuration options stored in the *DiDg* area. Change *RTS Cntrl* (in the DSU Port option set) from FrcOn to DTE. Then, save the changes to the *Usr1* area and return to the top-level menu.

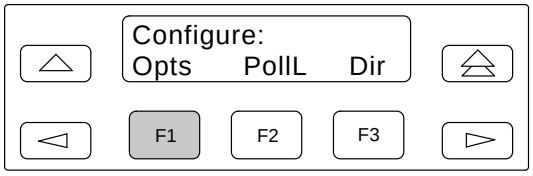
☞ Procedure

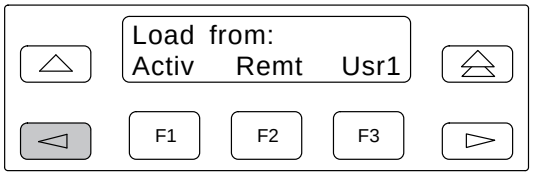
Press the DCP keys indicated by the shading.

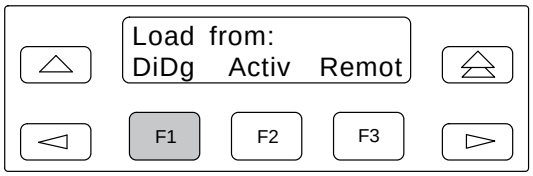


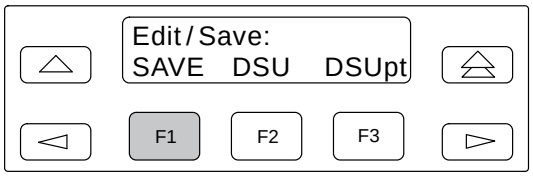


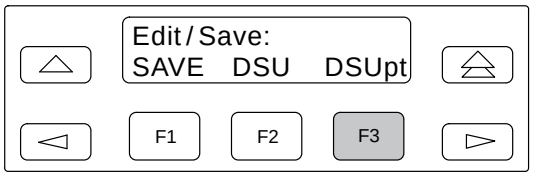


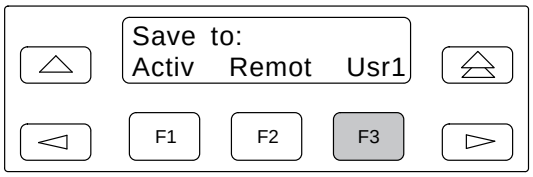


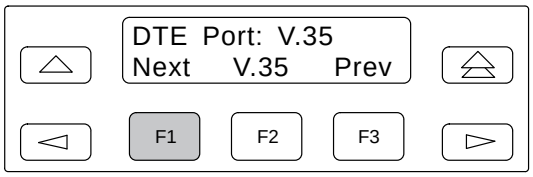


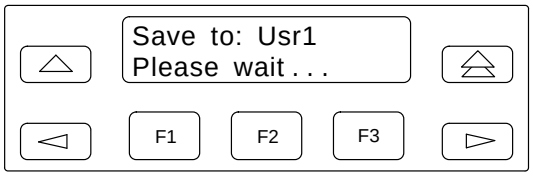

Load from:
DiDg Activ Remot
F1
F2
F3

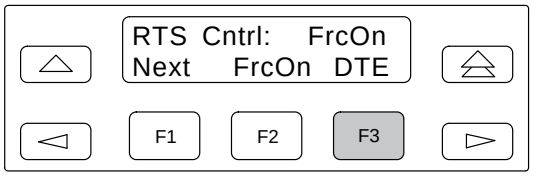

Edit/Save:
SAVE DSU DSUpt
F1
F2
F3

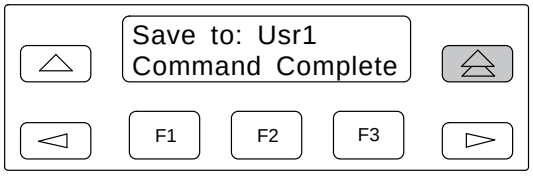

Edit/Save:
SAVE DSU DSUpt
F1
F2
F3

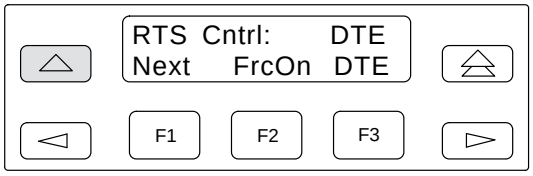

Save to:
Activ Remot Usr1
F1
F2
F3

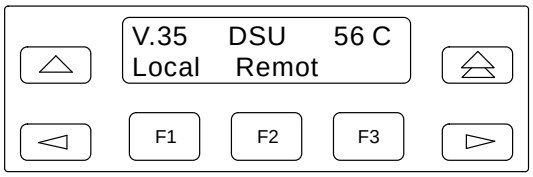

DTE Port: V.35
Next V.35 Prev
F1
F2
F3


Save to: Usr1
Please wait . . .
F1
F2
F3


RTS Cntrl: FrcOn
Next FrcOn DTE
F1
F2
F3


Save to: Usr1
Command Complete
F1
F2
F3


RTS Cntrl: DTE
Next FrcOn DTE
F1
F2
F3


V.35 DSU 56 C
Local Remot
F1
F2
F3

Configuration Option Tables

This section contains a table for each *option set* that can be found under the Configuration (Confg) branch, in the order in which it appears in the menu.

This chapter includes the following option set tables:

- DSU Configuration Options (Table 5-1)
- DSU Port Configuration Options (Table 5-2)
- DBM Configuration Options (Table 5-3)
- DBM Port Configuration Options (Table 5-4)
- Diagnostic (DBM) Configuration Options (Table 5-5)
- Diagnostic (General) Configuration Options (Table 5-6)
- Backup Configuration Options (Table 5-7)

Understanding the Tables

Refer to the appropriate tables when configuring the DSU. Each configuration option is segmented into three sections: the option as it appears on the DCP, an explanation of the option, then the values that can be selected or set.

Each table shows each configuration option as it is displayed. As you refer to these tables, be aware of the following:

- The *first line* shows each **configuration option** as it appears on the DCP, followed by a colon (:), then the **default setting** (the value set at the factory).
- The *second line* shows all selectable values, which can be viewed on the DCP by scrolling to the left or right using the ◁ or ▷ key.

  The first selection is always **Next**, which allows you to go to the next configuration option in the set.

  The last selection is always **Prev**, which allows you to go back to the previous configuration option.

  Possible selections wrap around so you can immediately press the ◁ key to display *Prev*, saving key presses.

An explanation of the configuration option and its selectable values follow, which includes:

- The full or unabbreviated name of the configuration option, followed by a brief explanation of its purpose or function.
- The selectable values for the configuration option, which are listed with guidelines for when each should be selected.

Table 5-1
DSU Configuration Options

Rate(Kbps): 56 **Next 64CC 64L 56 38.4 19.2 9.6 4.8 2.4 Prev**
DSU Rate. Data rate (in kbps) on the digital circuit. Must be set to match the speed of the DDS circuit. Both the control and tributary DSUs must be set to the same value. **64CC** — 64 kbps Clear Channel (on a 72 kbps circuit) with 3600 Series DSUs at both ends of the circuit. **64L** — 64 kbps LADS operation.
TxClkSource: DDS **Next Int RXC Ext DDS Prev**
Transmit Clock Source. Specifies the transmit timing source for the DSU. **Int** — Internal clock source. Timing is taken from the DSU. **RXC** — Receive clock source. The DSU generates its transmit timing from the receive data signal. This choice is provided for LADS configurations. It differs from the DDS selection during tests. **Ext** — External clock source. The DSU is timed by the external Transmit Timing lead. **DDS** — DDS Network. This source is used when the DSU is connected to a DDS network and the network provides the timing.
19.2 PowrLvl: +6 **Next +6 0 –10 Prev**
19.2 kbps Power Level. Selects the appropriate power level, in dBm, for operation at 19.2 kbps. This configuration option only appears when *Rate(Kbps)* is set to 19.2. **+**6 — For DDS network service. **0** — For alternate DDS service. **–10** — For LADS operation.
64KScramblng: Off **Next On Off Prev**
64 kbps Scrambling. Controls the data scrambler used with 64 kbps Clear Channel operation. Data scrambling suppresses the possible simulation of network control codes by application data. This configuration option must be the same at both the local and remote DSUs. This configuration option only appears when *Rate(Kbps)* is set to 64CC. **On** — Enables data scrambling. **Off** — Disables data scrambling.
64KLatchLpbk: On **Next On Off Prev**
64 kbps Latching Loopback. Controls the DSU's response to the network latching loopback sequence on 64 kbps Clear Channel operation. This configuration option only appears when Rate(Kbps) is set to 64CC. **On** — DSU responds to the network latching loopback command. ON is required for compliance with AT&T Technical Reference 62310 – 1987. **Off** — DSU ignores the network latching loopback command.
V.54 Lpbk: Disab **Next Enab Disab Prev**
V.54 Loopback. Enables CCITT V.54 Loopback operation. This configuration option is supported for point-to-point configurations. **Enab** — This configuration option should be enabled if the remote DTE generates V.54 loopback sequences or if the DualFlow DSU is communicating with a non-AT&T DSU that supports V.54 signaling. **Disab** — This configuration option should not be enabled if the remote DTE does not support V.54 loopback sequences or other DSUs do not support V.54 signaling.

Table 5-2
(1 of 3)
DSU Port Configuration Options

DTE Port: V.35
Next V.35 Prev

DTE Port. Forces user data over the V.35 interface.

V.35 — For all available rates at distances up to 1000 feet.

RTS Cntrl: FrcOn
Next FrcOn DTE Prev

Request-to-Send Control. This configuration option determines how the DSU will function with respect to the RTS lead. If set to FrcOn, the DSU internally forces the RTS lead ON; if set to DTE, the DSU sends control mode idle (CMI) whenever RTS is Off, and data mode idle (DMI) when RTS is ON.

For point-to-point configurations with nondisruptive diagnostics, or rate adaption, this configuration option is forced ON internally.

FrcOn — The DSU keeps the internal RTS ON continuously, regardless of whether RTS at the DTE interface is ON or Off.

DTE — The DSU responds to RTS from the DTE.

CTS Cntrl: Std
Next Std =RTS Delay FrcOn Prev

Clear-to-Send Control. Controls the behavior of the CTS lead.

Std — CTS is normally controlled by the DTE's RTS lead; however, the CTS lead can be affected by the response to abnormal conditions, such as no signal or test mode, as determined by configuration options RTS Cntrl, and Circ Assur.

=RTS — RTS Control must be forced on (RTS Cntrl is set to FrcOn). In point-to-point configurations where RTS Cntrl is forced ON, CTS Cntrl can also be forced ON if the DTE interfaces require no delay between RTS Cntrl and CTS Cntrl (0 ms), but does not require an RTS-to-CTS transition.

Delay — CTS does not go Off in response to a network alarm condition or CMI. CTS goes Off only after a successful backup connection is established.

FrcOn — Keeps CTS on as long as the DSU has power.

AntiStream:Disab
Next Chang Prev

Antistreaming. Antistreaming provides circuit protection against a streaming DTE (a defective DTE that has its RTS lead constantly turned ON) by clamping the RTS lead of the tributary DSU.

If the tributary DTE turns ON RTS longer than the time specified for the Antistreaming configuration option, the tributary DSU turns on its alarm indicator and clamps RTS to Off. Although the tributary DTE is not allowed to send, the DSU can still respond to commands and is capable of being tested or disabled.

Upon detecting that RTS is no longer turned ON, the DSU turns Off its alarm and resets the streaming timer, and allows the DTE to send data once again.

This configuration option only has an effect at a DSU configured with RTS Control set to DTE. It is disabled when RTS Control is set to FrcOn.

Chang — Set timer to Disab, or to any value from 1 to 100 second(s) in increments of 1. When Disab is selected, streaming terminal detection is not provided.

Table 5-2
(2 of 3)
DSU Port Configuration Options

LSD Lead: Std **Next Std Delay FrcOn Prev**
Line Signal Detect Lead. Controls behavior of the Line Signal Detect lead.
Std — LSD lead goes Off in response to a control mode idle (CMI) signal from the DDS network or DDS failure.
Delay — LSD does not go Off in response to a network alarm condition or CMI. LSD goes Off only after a successful backup connection is established.
FrcOn — Keeps LSD on as long as the DSU has power.
DSR FrcOn: Enab **Next Enab Disab Prev**
Data Set Ready Forced On. Provides the ability to override any other options controlling the Data Set Ready lead.
Enab — DSR remains ON as long as the device is working, regardless of tests and network alarms.
Disab — DSR functions as an active lead reflecting various test and alarm conditions and other options.
SystemStat: Enab **Next Enab Disab Prev**
System Status. Controls the behavior of the DSR lead in response to a No Signal, Out-of-Service, or Out-of-Frame alarm from the network.
Enab — Network alarm turns Off DSR.
Disab — Network alarm does not affect DSR.
DSR on Tst: Enab **Next Enab Disab Prev**
Data Set Ready On in Test. Controls the behavior of the DSR lead during testing.
Enab — DSR is ON continuously during testing, allowing a DTE that relies on DSR being ON to send test messages to the DSU.
Disab — DSR is Off during testing.
Circ Assur:Disab **Next Enab Disab Prev**
Circuit Assurance. Controls behavior of the CTS lead in response to a data signal from the network. If CTS Cntrl is set to RTS and RTS Cntrl is set to FrcOn, this configuration option is ignored. A DDS Facility Alarm condition turns Off the CTS lead, regardless of the Circuit Assurance setting.
Enab — The DSU will turn Off the CTS lead if the DSU receives control mode idle (CMI) from the network.
Disab — The DSU is not affected by the receipt of CMI.
RespondRDL:Disab **Next Enab Disab Prev**
Respond to Remote Digital Loopback. Determines whether the DSU responds to a V.54 Remote Loopback request.
Enab — Performs a Digital Loopback.
Disab — Ignores the Loopback command.

Table 5-2
(3 of 3)
DSU Port Configuration Options

LL by DTE: Disab **Next Enab Disab Prev**
Local Loopback by DTE. Controls using Pin L of the V.35 interface by the DTE to initiate a Local Loopback when the DSU is the active device. Whenever this lead is ON, the Local Loopback overrides any other diagnostic tests run by the network. **Enab** — The DTE forces the DSU into Local Loopback when the signal on Pin L is turned ON. Local Loopback ends when the signal is dropped. **Disab** — The DTE will not initiate Local Loopback in response to the signal on Pin L.
Bilat Lpbk:Disab **Next Enab Disab Prev**
Bilateral Loopback. If this configuration option is enabled, a DTE Loopback occurs when a Digital Loopback occurs. **Enab** — When enabled, DTE Loopback occurs whenever a Digital Loopback occurs. **Disab** — Disables Bilateral Loopback.
DTR Alarm: Disab **Next Enab Disab Prev**
Data Terminal Ready Alarm. Causes the DSU to generate an alarm if DTR over the V.35 port is Off for more than 30 seconds. The DCP displays *DTR Alarm* and reports the alarm to the NMS. **Enab** — If DTR lead turns Off for 30 seconds, the DSU generates an alarm. **Disab** — Regardless how long the DTR lead is Off, no alarm is generated.

Table 5-3
(1 of 4)
DBM Configuration Options

Rate(Kbps): 9.6 **Next 14.4 12.0 9.6 4.8 2.4 Prev**
DBM Rate. Initial data rate (in kbps) for dial backup calls. *Only appears for a V.32 DBM.* **14.4** — V.32bis modulation. This rate is not displayed for a 12.0 kbps DBM. **12.0** — V.32bis modulation. **9.6** — V.32bis modulation. **4.8** — V.32bis modulation. **2.4** — V.22bis modulation.
PrtSp(Kbps): 9.6 for V.32 DBM, 56 for Switched 56 DBM **Next 56 48 38.4 32 28.8 19.2 18.8 18.0 16.8 14.4 12.0 9.6 9.2 8.4 7.2 4.8 4.4 4.0 2.4 2.0 1.2 Disab Prev**
Port Speed. If this value is set to less than the DBM rate, the DBM performs rate adaption. Rates above 14.4 kbps will only be displayed when a Switched 56 DBM is installed; 14.4 kbps will not be displayed for a 12.0 kbps DBM. **56 to 1.2** — Selects the port speed. When a V.32 DBM is installed and the DiDg configuration is loaded the default is 9.6 kbps. When a Switched 56 DBM with SyBC or SyBT configuration, the default is 56 kbps. **Disab** — Sets the port speed to 0.

Table 5-3
(2 of 4)
DBM Configuration Options

TxClkSource: Int for a control DBM, RXC for a tributary DBM
Next Int RXC Ext Prev

Transmit Clock Source. Source of timing for the DBM. *Only appears for a V.32 DBM.*

Int — Internal clock source. The local DBM provides the timing. This source is used primarily in point-to-point applications.

RXC — Receive clock source. This source is used primarily in multipoint tributary applications.

Ext — External clock source. This source is used primarily in applications where the connected DTE must provide the timing, such as when a 3616 V.32 DBM with its DBM *Primary Core* configuration option set to Yes and where timing is received from the digital bridge.

CarrLossDisc: Yes
Next Yes No Prev

Carrier Loss Disconnect. Controls whether the V.32 DBM terminates a call when the receive signal carrier is lost or the signal becomes unacceptable.

Yes — Call is terminated upon loss of carrier.

No — For factory testing only. Never set Carrier Loss Disconnect to No. Doing so will cause an off-hook line condition, resulting in excessive telephone charges.

Auto Retrain:Yes
Next Yes No Prev

Automatic Retrain. Controls the automatic start of a retrain sequence by the DBM when received signal quality becomes unacceptable. *Only appears for a V.32 DBM.*

Yes — Retraining is initiated automatically.

No — Retraining is not initiated automatically; however, the DBM will respond to a retrain request from a remote modem.

Single Rate: No
Next Yes No Prev

Single Rate. Determines whether the DBM will adjust its rate to resolve a rate mismatch with a remote DBM. Single Rate must be set to Yes if rate adaption or non-disruptive diagnostics are enabled. *Only appears for a V.32 DBM.*

If Rate(Kbps) is set to 2.4, the DBM can only talk to a 2.4 kbps modem, regardless of the Single Rate setting. (Will only train at 2.4 kbps.)

Yes — The DBM operates only at the rate for which it is configured.

No — The DBM will adjust its rate downward to correct a mismatch.

AutoAnswer: Enab
Next Enab Disab Prev

Automatic Answer. Controls whether the DBM answers incoming calls.

Enab — DBM answers incoming calls.

Disab — DBM does not answer incoming calls.

Table 5-3
(3 of 4)
DBM Configuration Options

Call Setup:None
Next None Pswrd Cllbk Alarm Prev

Dial Backup Call Setup. Establishes the security level on call setup attempts. The Password and Callback security selections use a proprietary password exchange to ensure that the DBM does not route line data to the DBM's DTE interface. If security fails, the call is disconnected. These password exchanges only work between 3600 Series DBMs.

None — No security. Outgoing calls have no security. For incoming calls, if the calling device is not a 3600 Series DBM, an answering DBM with Call Setup set to None will automatically switch from Standby to Dial Backup mode after the time-out period has expired.

Pswrd — Intermediate security level. The originating and answering DBMs must exchange valid passwords to establish a call.

Cllbk — Highest security level. The originating and answering DBMs exchange passwords and disconnect; the answering DBM calls the originator back with a second exchange of passwords.

Alarm — Causes a DBM to answer incoming calls only when the DSU reports a Facility Alarm. No security checking is performed. This feature is for customers that provide data services to other customers that may not have non-3600 Series DBMs.

RxPwd:
Next Chang Prev

Receive Password. The password that the DBM expects to receive from a remote DBM (must be the same as the remote DBM's TxPwd). The maximum password length is 10 characters. The default, *, is a wildcard meaning "any character string." *When Call Setup is set to None or Alarm, this configuration option will not appear.*

Chang — Enter up to 10 characters for the receive password. An underscore (_) to the immediate right of the last password character is required for passwords of fewer than 10 characters in length. To make the password invisible to the DCP, enter a comma (,) as the first character.

TxPwd:
Next Chang Prev

Transmit Password. The password that the DBM sends to a remote DBM (must be the same as the remote DBM's RxPwd). The maximum password length is 10 characters. The default is a null password. *When Call Setup is set to None or Alarm, this configuration option will not appear.*

Chang — Enter up to 10 characters for the receive password. An underscore (_) to the immediate right of the last password character is required for passwords of fewer than 10 characters in length. To make the password invisible to the DCP, enter a comma (,) as the first character.

Dial Test:Disab
Next Enab Disab Prev

Dial Test. When enabled, the DBM periodically checks for a signal or dial tone. If the test fails, the DSU reports a Dial Test Failure alarm in its health and status. A Dial Test occurs once every 60 minutes until a failure occurs. Then, the test repeats every minute until the network recovers.

If enabled, the V.32 DBM periodically tests receipt of dial tone, the 4-wire Switched 56 DBM goes off-hook and checks for receipt of a data mode idle (DMI) signal burst (referred to as *winkback detection*), and the 2-wire Switched 56 DBM goes off-hook and checks for receipt of a proceed-to-select message from the switch.

Enab — Enables the Dial Test.

Disab — Disables the Dial Test.

Table 5-3
(4 of 4)
DBM Configuration Options

Primary Core:No
Next Yes No Prev

DBM Primary Core. When enabled, the DSU is disabled and the DBM is enabled so that it functions as a V.32 DBM or Switched 56 DBM.

Yes — Enables the Primary Core so the unit operates like a 3600 Series DBM-V, DBM-S, or DBM-D.

No — Disables the Primary Core so that the DSU function is active. *No is the factory-set (default) setting for a DualFlow DSU.*

DTRCallCon:Orig for SyBC, Ansr for DiDg and SyBT configurations
Next Orig Ansr Disab Prev

Data Terminal Ready Call Control. DTRCallCon uses the state of the DTR lead to control backup. When set to Orig, the DBM originates a backup. When set to Ansr, the DBM only answers a backup call when DTR is active. The DTR lead is ignored when DTRCallCon is disabled.

Orig — DTR lead is used for *outgoing* calls. When Orig is selected, the DBM originates (dials out) a backup call when DTR is raised based upon the number stored in the Backup Directory specified by the Backup Dir configuration option, and drops the call when DTR goes low. The DBM will try to call the number ten times, or until *TriesTimeOut* expires. If Multicall is also enabled, the DBM uses the multiple calling cycle. (*A phone number must have been entered into the Backup Directory. If a call cannot be completed, check Expanded Health and Status messages*.)

Ansr — DTR lead is used for *incoming* calls. When Ansr is selected, the DBM drops a backup call when DTR goes low or will not answer an incoming call if DTR is low.

Disab — Disables DTR Call Control; the state of the DTR lead is ignored.

EchoCancel:Disab
Next Enab Disab Prev

Echo Cancel. This configuration option is only displayed for a Switched 56 DBM and is required if the Switched 56 kbps network is US SPRINT® or when the network has echo cancellers. Disable this configuration option if the DBM is interfaced to an AT&T Switched 56 kbps 4-wire service facility.

Enab — Enables Echo Cancel.

Disab — Disables Echo Cancel.

Remot DBM:4-wire
Next 2-wire 4-wire Prev

Remote Dial Backup Module. Specifies the identity of the far-end Switched 56 DBM so the appropriate dial backup process completion time can be determined. This configuration option only appears for a 2-wire Switched 56 DBM with *EchoCancel* enabled. If unsure of whether the remote DBM is 2-wire or 4-wire, select 4-wire.

2-wire — Originating remote DBM is a 2-wire Switched 56 DBM, so the process completes in 460 milliseconds.

4-wire — Originating remote DBM is a 4-wire Switched 56 DBM, so the process completes in 3.85 seconds.

Msg Clamp: Enab
Next Enab Disab Prev

Message Clamping. Controls behavior of the data leads when disruptive diagnostic tests and commands are received from th**e remote DBM.**

Enab — Received Data (RXD) is held to MARK and LSD is turned Off during diagnostic exchanges. This prevents diagnostic messages from reaching the DTE interface.

Disab — DSU passes diagnostic messages to the DTE interface. Use the Disable setting if the remote DSU is configured for switched RTS (RTS Control is set to DTE).

Table 5-4
(1 of 3)
DBM Port Configuration Options

DTE Port: 232
Next 232 V.35 Prev

DTE Port. Selects which DTE port will be used for DBM data. This configuration option is forced to 232 (EIA-232) unless *Primary Core* is set to Yes.

232 — For the EIA-232-D connector, the maximum cable length from the DBM to the router is 34 feet with shielded cable and 68 feet with unshielded cable when operating at 56 kbps.

V.35 — Only appears if Primary Core (DBM option set) is set to Yes. For the V.35 connector, all rates are available for distances up to 1000 feet.

RTS Cntrl: FrcOn for DiDg, DTE for other configurations
Next FrcOn DTE Prev

Request-to-Send Control. This configuration option determines how the DBM will function with respect to the RTS lead.

FrcOn — The DBM keeps the internal RTS ON continuously, regardless of whether RTS at the DTE interface is ON or Off. FrcOn should be used when the DBM is connected to the console port of a router since the router does not support RTS signalling.

DTE — The DBM responds to RTS from the router.

CTS Cntrl: Std
Next Std =RTS FrcOn Prev

Clear-to-Send Control. Controls the behavior of the CTS lead.

Std — CTS is normally controlled by the router's RTS lead; however, the CTS lead can be affected by the response to abnormal conditions, such as no signal or test mode.

=RTS — CTS follows RTS.

FrcOn — CTS remains ON as long as the DSU has power.

AntiStream:Disab
Next Chang Prev

Antistreaming. Antistreaming provides circuit protection against a streaming DTE (a defective DTE that has its RTS lead constantly turned ON) by clamping the RTS lead of the tributary DBM.

If the tributary DTE turns ON RTS longer than the time specified for the Antistreaming configuration option, the tributary DBM turns on its alarm indicator and clamps RTS to Off. Although the tributary DTE is not allowed to send, the DBM can still respond to commands and is capable of being tested or disabled.

Upon detecting that RTS is no longer turned ON, the DBM turns Off its alarm and resets the streaming timer, and allows the DTE to send data once again.

This configuration option only has an effect at a DBM configured with *RTS Cntrl* set to DTE.

Chang — Set timer to Disab, or to any value from 1 to 100 second(s) in increments of 1. When Disab is selected, streaming terminal detection is not provided.

LSD Lead: Std
Next Std FrcOn Prev

Line Signal Detect Lead. Controls behavior of the Line Signal Detect lead.

Std — LSD lead goes Off in response to a loss of carrier or a switched network failure.

FrcOn — Keeps LSD on as long as the DBM has power.

Table 5-4
(2 of 3)
DBM Port Configuration Options

DSR FrcOn: Enab
Next Enab Disab Prev

Data Set Ready Forced On. Provides the ability to override any other options controlling the Data Set Ready lead.

Enab — DSR remains ON as long as the device is working regardless of tests and network alarms.

Disab — DSR functions as an active lead reflecting various test and alarm conditions and other options.

DSR on Tst: Enab
Next Enab Disab Prev

Data Set Ready On in Test. Controls the behavior of the DSR lead during testing.

Enab — DSR is ON continuously during testing, allowing a DTE that relies on DSR being ON to send test messages to the DBM.

Disab — DSR is Off during testing.

RespondRDL: Disab
Next Enab Disab Prev

Respond to Remote Digital Loopback. Determines whether the DBM responds to a V.54 Remote Loopback request.

Enab — Performs a Digital Loopback.

Disab — Ignores the Loopback command.

RL by DTE: Disab
Next Enab Disab Prev

Remote Digital Loopback by DTE. Allows Pin 21 of the EIA-232-D/V.24 interface or Pin N of the V.35 interface by the DTE or router to initiate a Remote Digital Loopback.

NOTE: Use of Pin 18 or Pin L is determined by the DBM's *DTE Port* configuration option.

Enab — The DTE or router forces the DBM to request a Remote Digital Loopback when the signal on Pin 21 or Pin N is turned ON. Remote Digital Loopback ends when the signal is dropped.

Disab — The DTE or router cannot initiate Remote Digital Loopback.

Bilat Lpbk: Disab
Next Enab Disab Prev

Bilateral Loopback. If this configuration option is enabled, a DTE Loopback occurs when a Digital Loopback occurs.

Enab — When enabled, DTE Loopback occurs whenever a Digital Loopback occurs.

Disab — Disables Bilateral Loopback.

Ext Leads: Rate
Next ExtLd Rate RPowr Prev

External Leads. Controls the general-purpose leads on the EIA-232-D/V.24 interface except when Rate is selected. These leads can be controlled and monitored from the DCP or a 6700 or 6800 Series NMS.

ExtLd — Enables Pins 12 and 13 as output (control) and Pins 19 and 23 as input (alarm) leads. When enabled, Pins 12 and 13 output +12V when ON and –12V when Off. Pins 19 and 23 recognize voltages from +2.2V to +12V as ON (reported as an External alarm) and –12V to +.8V as Off.

Rate — Pin 12 on the port is turned Off to indicate that the DBM is in fallback mode. If the port does not fall back and remain at the same speed, then the fallback feature in the DCE or router connected to that port should not be enabled.

RPowr — Functions similarly to ExtLd, but the inputs report power failure or fan alarms when a redundant power supply is installed in the COMSPHERE® 3000 Series Carrier.

Table 5-4
(3 of 3)
DBM Port Configuration Options

CCN by EL: Disab
Next Enab Disab Prev

Configuration Change Notification by External Leads. Controls using the general-purpose output leads to set a CCN event. This configuration option only has an effect if *Ext Leads* is set to ExtLd.

Enab — Change in state of a general-purpose lead signals CCN to the NMS.

Disab — General-purpose lead changes do not set a CCN event.

DTR Alarm: Disab
Next Enab Disab Prev

Data Terminal Ready Alarm. Causes the DSU to generate an alarm if DTR is Off for more than 30 seconds. The DCP displays *DTR Alarm* and reports the alarm to the NMS.

Enab — If DTR lead turns Off for 30 seconds, the DSU generates an alarm.

Disab — Regardless how long the DTR lead is Off, no alarm is generated.

Async→Sync: Enab for DiDg, Disab for SyBC and SyBT configurations
Next Enab Disab Prev

Asynchronous-to-Synchronous Conversion. Sets the DBM port for asynchronous or synchronous operation.

Enab — Configures the DBM as asynchronous (asynchronous-to-synchronous conversion takes place).

Disab — Configures the DBM as synchronous.

AsyncBit/Char: 8 for DiDg configuration
Next 6 7 8 9 10 Prev

Asynchronous Bits per Character. Specifies the length of a character, including the parity bit but excluding the start and stop bits. This configuration option only applies to the Dial Diagnostic (DiDg) configuration.

6 to 10 — Selects the asynchronous bits per character. When Stop Bits is set to 2, 10 will not be displayed.

Stop Bits: 1 for DiDg configuration
Next 1 2 Prev

Stop Bits. Specifies the number of stop bits in an asynchronous character. This configuration option only applies to the Dial Diagnostic (DiDg) configuration.

1 to 2 — Selects the number of stop bits to be used. When the AsyncBit/Char configuration option is set to 10, 2 will not be displayed.

Overspeed: 2.3 for DiDg, not applicable for other configurations
Next 1.0 2.3 Prev

Overspeed. Selects the overspeed range of the asynchronous-to-synchronous converter. This configuration option is only displayed when the Async→Sync configuration option is enabled.

1.0 — Selects the basic overspeed range. Basic range provides 1.0% overspeed in the DTE or router asynchronous data rate.

2.3 — Selects the overspeed percentage for extended range. Extended range provides 2.3% overspeed in the DTE or router asynchronous data rate.

Table 5-5
Diagnostic DBM Configuration Options

Diag Type: Disr
Next NonD Disr None Prev

Diagnostic Type. Defines the diagnostic interaction between the control and tributary DBMs in Backup mode. It must be set consistently for all Dualflow DBMs on the same circuit.

NonD — Nondisruptive Diagnostics. An in-band secondary channel transport is derived to carry diagnostics data between the control and the tributary DBMs.

Disr — Disruptive Diagnostics. The same (primary) channel that carries user-transmitted data between the control and the tributary DBMs also carries diagnostic data. This mode should be selected for compatibility with earlier releases that use session-disruptive diagnostics.

None — No diagnostic communications with remote devices; only local diagnostics are allowed.

2nd Ch(bps): 400
Next 100 400 800 1200 1600 Prev

In-band Secondary Channel Diagnostic Transport Speed (in bps). Determines the DBM's port speed when NonD (nondisruptive diagnostics) is selected and there is no excess bandwidth available for in-band secondary channel transport operation. (This configuration option only appears when DiagType = NonD.)

The selection entered here allocates DBM port bandwidth to the in-band secondary channel transport. For example, both the DBM port speed and the backup line speed are 9.6 kbps, and the Diagnostic Type entered is NonD and the In-band Secondary Channel Diagnostic Transport Speed entered is 400. The resulting DBM port speed is 9.2 kbps. (Refer to the following list for valid diagnostic speeds.)

If the DBM Rate(Kbps) is equal to Port Speed:	Valid diagnostic speeds are:
1.2	100, 400
2.0	100, 400
2.4	100, 400, 800
4.0	100, 400, 800
4.8	100, 400, 800, 1200, 1600
7.2	100, 400, 800, 1200
8.4	100, 400, 1600
9.6	100, 400, 800, 1200, 1600
12.0	100, 400, 800, 1200
14.4	100, 400, 800, 1200, 1600
16.8	100, 400, 800, 1200
18.0	100, 400, 1200
19.2	100, 400, 800, 1200, 1600
28.8	100, 400, 800
32	100, 400, 800, 1200
38.4	100, 400, 800, 1200, 1600
48	100, 400, 800, 1200, 1600
56	100, 400, 800, 1200

Table 5-6
Diagnostic General Configuration Options

Position: Cntrl for SyBC, Trib for DiDg and SyBT configurations
Next Cntrl Trib Prev

Network Position. Determines the DSU's position in the network, and defines its test and diagnostic capabilities.

Cntrl — Control

Trib — Tributary

RemoteDiag:Enhan
Next V.54 Enhan Prev

Remote Diagnostics. Determines the type of loopback message generated by a DBM.

V.54 — The V.32 DBM generates a CCITT V.54 loopback sequence. This selection does not appear for a Switched 56 DBM.

Enhan — The V.32 DBM uses enhanced 3600e protocol and the Switched 56 DBM uses Br56. Both the control and tributary must be set for Enhan.

Link Delay: 0s
Next 0s 1s 2s 5s 10s 20s 50s Prev

Link Delay. Controls the additional time (in seconds) that a control DBM will wait for a response from a device one level downstream. This configuration option does not appear when Diag Type (Diagnostic DBM option set) is set to Disr and Position is set to Trib (DiDg and SyBT configurations); *this configuration option only appears for a DBM configured as a control.*

NOTE: If diagnostic time-outs are occurring during polling, increase the link delay to the next higher value.

0s to 50s — Sets the time the DBM will wait for a downstream device response.

Packet Delay: 0s
Next 0s 1s 2s 5s Prev

Packet Delay. Controls the time (in seconds) that a control DBM will wait for a packet to complete from an NMS. *This configuration option only appears for a DBM configured as a control*.

NOTE: Must be used when the DualFlow DSU's diagnostic channel operates over packet switch, satellite communications, or other facilities that provide extended throughput delays.

0s to 5s — Sets the time the DBM will wait for the NMS.

Table 5-7
(1 of 2)
Backup Configuration Options

Auto Bckup:Disab
Next Enab Disab Prev

Automatic Backup. Controls automatic initiation of a call setup attempt upon failure of the DDS network, defined as detection of No Signal or Out-of-Service codes, or excessive bipolar violations. (Automatic dial attempts begin after the Network Time-out expires.)

NOTE: The backup connection is made through the EIA-232 port.

Enab — Upon detecting a failure of the DDS network, the DSU waits for a period equal to DDS Timeout, and if the DDS network is still down, it attempts to establish a dial backup connection to the number specified by the Backup Directory pointer after the Network Time-out expires.

Disab — No automatic attempt is made to establish a dial backup connection.

Backup Dir: 1
Next Chang Prev

Backup Directory. The DBM can store 10 dial strings or telephone numbers, identified by the numbers 1 through 10. This display shows the identifier of the current default dial string to be used to set up a dial backup call for automatic backup as described in the Auto Bckup configuration option, or when the backup command is received from the DCP or the NMS.

Chang — Produces a data entry display for changing the directory entry identifier.

BckupOnCMI:Disab
Next Enab Disab Prev

Backup on Control Mode Idle. This configuration option determines whether the DSU treats a control mode idle (CMI) condition as a facility alarm to trigger automatic dial backup. Configuration option *Auto Bckup* must be enabled.

Enab — Upon detecting CMI for 250 to 500 milliseconds from the network, the DSU attempts to establish a dial backup connection to the router after the DDS Time-out expires. When enabled, CMI will also generate a Facility Alarm (FA). Do not use this configuration option if the DSU is configured to generate CMI.

Disab — No attempt is made to establish a dial backup connection if CMI is detected.

AutoRestor:Disab
Next Enab Disab Prev

Automatic Restoration. Controls whether the DSU automatically terminates the dial backup call when the DSU determines that the DDS circuit has been returned to service.

When *DTRCallCon* is enabled (set to Orig or Ansr), disable *AutoRestor*.

Enab — Restoral of the DDS circuit triggers automatic restoration (after the Restoration Time-out expires).

Disab — Restoral of the DDS circuit does not trigger automatic restoration. Disable when *DTRCallCon* is enabled.

NtwkTimOut: 0:20 for a control DSU, 01:00 for a tributary DSU
Next Chang Prev

Network Time-out. Length of time the DDS network must remain out of service before the dial backup call attempt sequence is made. This configuration option only has an effect if *Auto Bckup* is set to Enab. *When configured for nondisruptive diagnostics or rate adaption, this configuration option must be set to greater than or equal to 20 seconds.*

Chang — Calls up a data entry display for changing the current value which can range from 1 second to 30 minutes. The cursor has two positions: a minutes field with a range of 0 to 29, and a seconds field with a range of 00 to 59.

Table 5-7
(2 of 2)
Backup Configuration Options

RestorTimOut: 5m
Next Chang Prev

Restoration Time-out. Length of time the DDS network must be back in service before automatic restoration is attempted. This configuration option only has an effect at a DSU configured with Automatic Restoration enabled.

Chang — Calls up a data entry display for changing the current value, with a range of 1 to 60 minutes.

TriesTimeOut:15m
Next Chang Prev

Call Attempts Time-out. Sets an overall time limit for dial backup call attempts upon failure of the DDS network. This configuration option only has an effect if *Auto Bckup* is set to Enab, or if *DTRCallCon* is set to Orig, regardless of whether MultiCall is enabled (multiple calling cycle) or disabled (normal calling cycle).

Only 10 call attempts are made for the normal calling cycle. If a call attempt is in progress and the timer expires, the call attempt will not be aborted.

Chang — Calls up a data entry display for changing the current value, with a range of 1 to 60 minutes.

MultiCall:Disab
Next Enab Disab Prev

Multiple Calls. Selects the multiple calling cycle in which the DBM steps through the Backup Directory, attempting to call each valid dial string in the directory, or selects the normal calling cycle. This configuration option only has an effect if *Auto Bckup* is set to Enab or if *DTRCallCon* is set to Orig.

Enab — The DBM makes one attempt to call the dial string in the directory pointed to in the Backup Directory configuration option (default is the first dial string in the directory). If the attempt fails, the DBM makes an attempt to call the next dial string in the directory, and so on until either a call is completed or the DBM cycles through all the dialed strings in the Backup Directory, ignoring blank entries. The DBM then waits five minutes and begins the calling cycle again until the TriesTimeOut period expires.

Disab — The normal calling cycle is used: three call attempts, a 5-minute wait, three more call attempts, another 5-minute wait, etc., until the TriesTimeOut period expires.

NOTE: Multicall must not be enabled unless successive telephone numbers in the Backup Directory are different. In addition, duplicate telephone numbers should be avoided. These precautions prevent the DBM from making excessive call attempts to the same telephone number.

DSU Menu A

Overview

This menu is your map through the DSU's various functions and pathways. Compare it against the menus that appear as you move through procedures. You will learn to quickly access where you want to go on the menu when operating the DSU. *(This menu is also included on the handy Reference Card that comes with this guide, which can be removed and placed with your DSU.)*

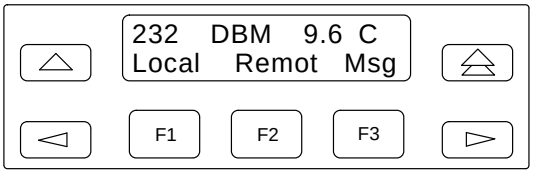
Menu Structure

The DSU's operation is represented as menu selections that branch downward from its starting point, the top-level menu, like the roots of a tree. The menu is sometimes referred to as a *menu tree*.

Top-Level Menu

The top-level menu is the starting point for all DSU operations. You can always return to this point from anywhere in the menu by pressing the ⏢ key. *Pressing this key immediately terminates any operation or work in progress.*

The following shows an example of the top-level menu for a standalone Model 3615 DSU that is configured as a control operating at 9.6 kbps, with an NMS message waiting.



The following information is displayed:

Line 1 – Source of the information being displayed

– DSU's current function or mode (In this example, the unit is operating as a DBM, not as a DSU.)

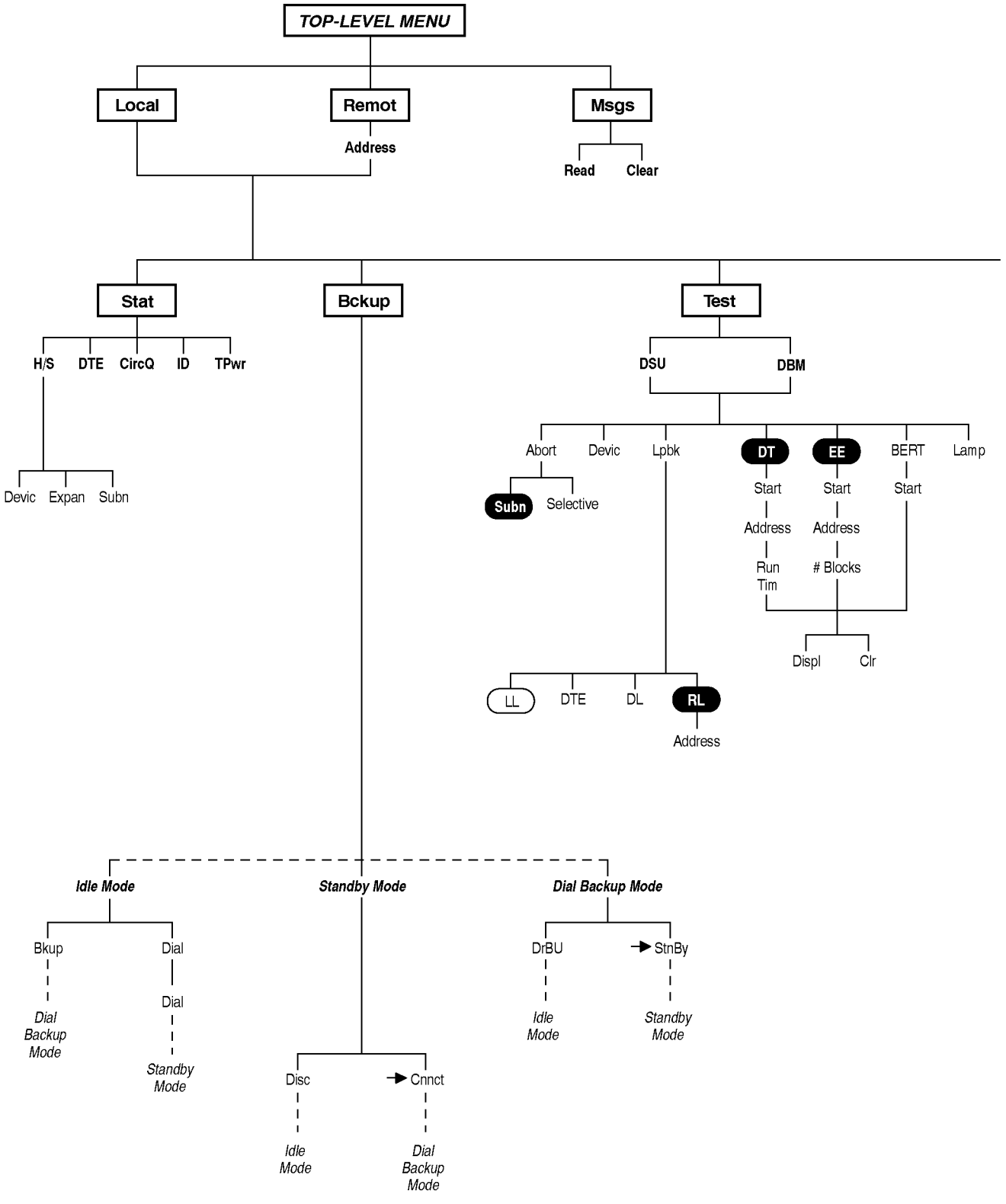
– DSU's data rate

– DSU's network designation (Here the DSU is a control.)

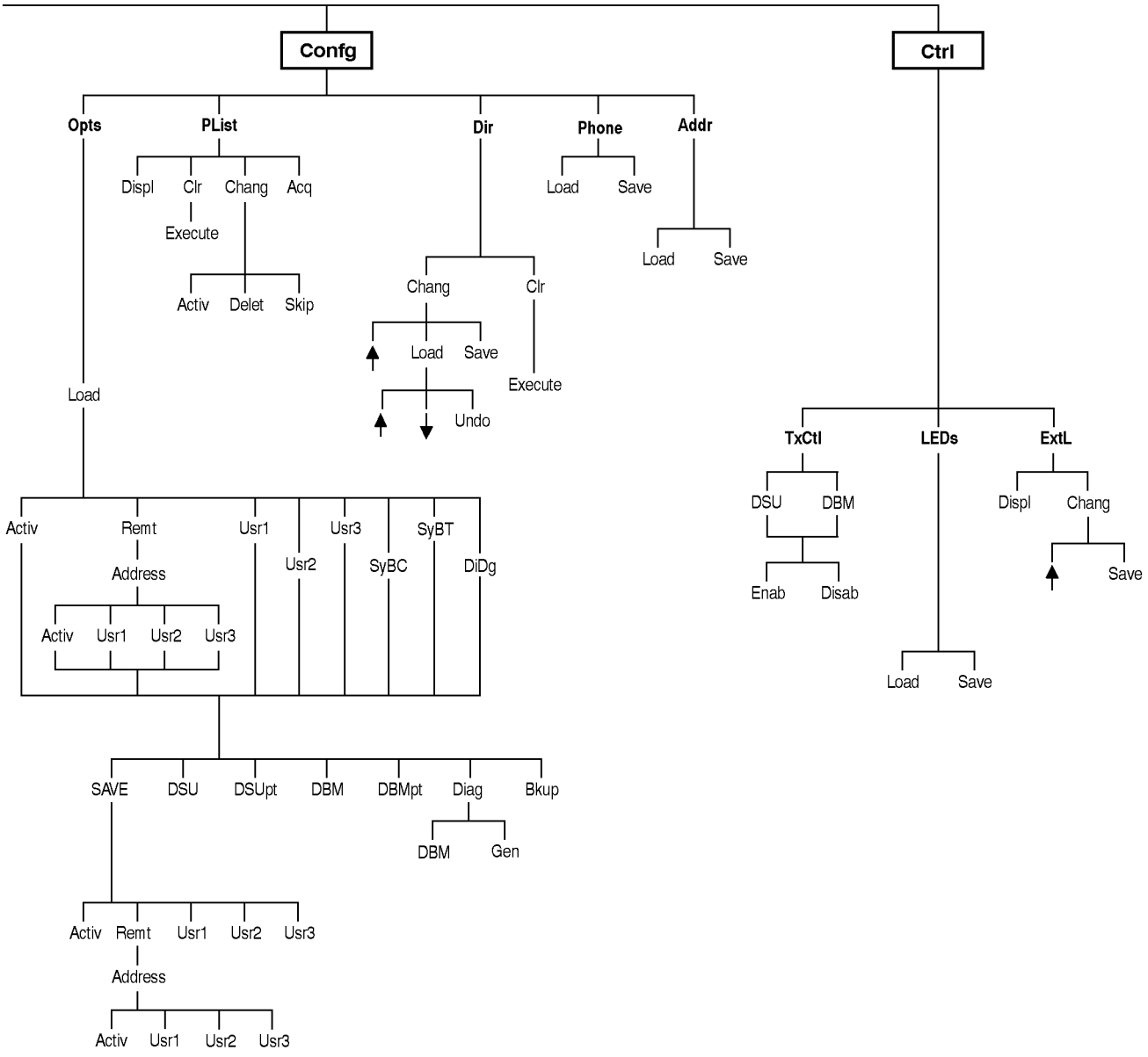
If this display was for a Model 3616 (a carrier-mounted DSU), the carrier (nest or rack) and slot numbers would appear instead of port interface (e.g., Carrier 2 and Slot 16 would appear as 2:16).

Line 2 – Menu selections, one appearing directly over each function key (F1 and F2).

Continued on Page A-4.


TOP-LEVEL MENU
Local
Remot
Address
Msgs
Read
Clear
Stat
H/S
DTE
CircQ
ID
TPwr
Devic
Expan
Subn
Bckup
Test
DSU
DBM
Abort
Devic
Lpbk
DT
EE
BERT
Lamp
Subn
Selective
Start
Address
Run Tim
Start
Address
Blocks
Start
Displ
Clr
LL
DTE
DL
RL
Address
Idle Mode
Bkup
Dial
Dial Backup Mode
Dial
Standby Mode
Standby Mode
Disc
Cnnct
Idle Mode
Dial Backup Mode
Dial Backup Mode
DrBU
StnBy
Idle Mode
Standby Mode
494-14471a

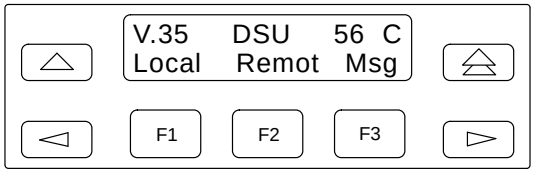
ABBREVIATIONS							
→ Cnnct	Switch to Connection	Devic	Device Test	ExtL	External Leads	Stat	Status
→ StnBy	Switch to Standby Mode	Diag	Diagnostic	H/S	Device Health/Status	SyBC	Sync Backup Control
Acq	Acquire	DiDg	Dial Line Diagnostics	ID	Identity	SyBT	Sync Backup Tributary
Bckup	Backup	Dir	Directory	LEDs	Monitor Port	TPwr	Terminal Power
BERT	Bit Error Rate Test	Disc	Disconnect	LL	Local Loopback	TxCtl	Transmitter Control
CircQ	Circuit Quality	DL	Digital Loopback	Lpbk	Loopback		
Clr	Clear	DrBU	Drop Backup	Msgs	Messages	XXX	DBM only
Confg	Configure	Dspl	Display	Opts	Configuration Options		
Ctrl	Control	DT	Digital Test	PList	Poll List	XXX	DSU only
		DTE	DTE Loopback	Remot	Remote Mode		
		EE	End-to-End Test	RL	Remote Loopback		



494-14471b

Continued from Page A-1.

If both DDS and dial connections have been made, then every 10 seconds the top-level menu screen alternates status information between the DDS and dial ports (V.35 for the DDS line and active DBM port for the dial line).



In the example above, the top-level menu is displaying the status of the DDS port interface.

Press a function key to select one of the following branches:

- **Local** branch
- **Remote** (Remot) branch – Only available to a DSU configured as a control or a point-to-point tributary with a dial connection.
- **Messages** (Msgs) branch – Only appears when a message from the NMS is waiting. Once the message is cleared, this branch no longer appears.

Local/Remote Menu Subbranches

The **Local** branch menu has *five* subbranches; the **Remote** branch menu has *four*:

- The **Status** (Stat) branch provides reports on the health and status of the DSU and DBM, the DTE interface, the identity of the DSU and DBM, the status of the connected DTE's EIA-232 and V.35 interfaces, and if there is a dialed connection, the quality of the dial network circuit.
- The **Backup** (Bckup) branch controls operation of the dial backup feature. This branch is only available from the Local branch.
- The **Test** branch provides extensive testing capabilities for the DSU; the DDS circuit; the DBM; and the backup circuit, if there is a backup call established.

NOTE

If the **Test** branch does not appear, the DSU is in Display mode (values can be read, but not changed).

Only authorized persons can change configuration option values for the DSU. Contact your *System Administrator* for further information.

- The **Configuration** (Confg) branch allows you to customize DSU software configuration options, to enter and change telephone numbers, and to change the DSU network address.
- The **Control** (Ctrl) branch allows you to display and change external leads, and enable or disable the DSU or DBM.

Each selection leads to a functional subbranch of the menu.

Only three menu selections appear at a time, one over each function (F1, F2, F3) key. Press the ◁ and ▷ keys to scroll backward or forward through menu selections.

- Press the △ key to go to the previous screen/menu display.
- Press the ⏢ key to return to the starting point – the top-level menu.

Refer to Chapters 4 and 5 for additional DCP operation information.

Configuration Worksheets B

Overview

The Configuration Worksheet summarizes the DSU's software configuration options and the selections that can be set for each. The Configuration Option Tables in Chapter 5 provide further explanation of each configuration option should you need to change settings, as well as an example showing how to change or edit these options.

Refer to the *Configuration Option Tables* section, Chapter 5, when configuring the unit, or when more detailed configuration information is needed.

Instructions

Configuration Worksheets can be used for reference, or they can be used to record changes made to the DSU's configuration options or to record the configurations saved to the Usr1, Usr2, or Usr3 storage areas.

1. Complete the information at the top of each worksheet first.

   If you have a Model 3615 (standalone) DSU, enter your site in the location field.

   If you have a Model 3616 (carrier-mounted) DSU, enter the DSU's carrier and slot location. Also, make a copy for each DSU.

2. Circle the appropriate setting(s) – either all of the configuration option changes, or only those changed from their factory-loaded (default) settings.

3. Store the worksheets so they will be available when needed.

DualFlow DSU Configuration Worksheet (1 of 2)

Date:_____ Location:_____ Local Phone No: ( )_____

Device:_____ Local Addr:_____

Serial No:_____ Tributary Network Addr:_____

DSU	Value
Rate(Kbps)	64CC, 64L, 56, 38.4, 19.2, 9.6, 4.8, 2.4
TxClkSource	Int, RXC, Ext, DDS
19.2 PowrLvl	+ 6, 0, –10
64KScramblng	On, Off
64KLatchLpbk	On, Off
V.54 Lpbk	Enab, Disab

Hardware Straps	Value
DDD Interface *	Permissive, Programmable
Frame Ground/ Signal Ground	Connected, Disconnected
Test Mode Indication	Enabled, Disabled

DSU Port (V.35)	Value
DTE Port	V.35
RTS Cntrl	FrcOn, DTE
CTS Cntrl	Std, =RTS, Delay, FrcOn
AntiStream *(Chang)*	Disab (1–100 sec)
LSD Lead	Std, Delay, FrcOn
DSR FrcOn	Enab, Disab
SystemStat	Enab, Disab
DSR on Tst	Enab, Disab
Circ Assur	Enab, Disab
RespondRDL	Enab, Disab
LL by DTE	Enab, Disab
Bilat Lpbk	Enab, Disab
DTR Alarm	Enab, Disab

DBM	Value
Rate(Kbps)†	14.4, 12.0, 9.6, 4.8, 2.4
PrtSp(Kbps)	56, 48, 38.4, 32, 28.8, 19.2, 18.8, 18.0, 16.8, 14.4, 12.0, 9.6, 9.2, 8.4, 7.2, 4.8, 4.4, 4.0, 2.4, 2.0, 1.2, Disab
TxClkSource†	Int, RXC, Ext
CarrLossDisc†	Yes, No
Auto Retrain†	Yes, No
Single Rate†	Yes, No
AutoAnswer	Enab, Disab
Call Setup	None, Pswrd, Cllbk, Alarm
RxPwd†† *(Chang)*	(up to 10 digits)
TxPwd†† *(Chang)*	(up to 10 digits)
Dial Test	Enab, Disab
Primary Core	Yes, No
DTRCallCon	Orig, Ansr, Disab
EchoCancel *	Enab, Disab
Remot DBM **	2-wire, 4-wire
Msg Clamp	Enab, Disab

† V.32 DBM only
†† Only if Call Setup set to Pswrd

* Switched 56 DBM only
** 2-wire Switched 56 DBM only

DualFlow DSU Configuration Worksheet (2 of 2)

DBM Port (232)	Value
DTE Port	232, V.35‡
RTS Cntrl	FrcOn, DTE
CTS Cntrl	Std, =RTS, FrcOn
AntiStream *(Chang)*	Disab (1 to 100 sec)
LSD Lead	Std, FrcOn
DSR FrcOn	Enab, Disab
DSR on Tst	Enab, Disab
RespondRDL	Enab, Disab
RL by DTE	Enab, Disab
Bilat Lpbk	Enab, Disab
Ext Leads	ExtLd, Rate, RPowr
CCN by EL	Enab, Disab
DTR Alarm	Enab, Disab
Async→Sync	Enab, Disab
AsyncBit/Char	6, 7, 8, 9, 10
Stop Bits	1, 2
Overspeed	1.0, 2.3

Diagnostic DBM	Value
Diag Type	NonD, Disr, None
2nd Ch(bps)†††	100, 400, 800, 1200, 1600

Diagnostic General	Value
Position	Cntrl, Trib
RemoteDiag	V.54 †, Enhan
Link Delay ‡‡	0s, 1s, 2s, 5s, 10s, 20s, 50s
Packet Delay ‡‡	0s, 1s, 2s, 5s

Backup	Value
Auto Bckup	Enab, Disab
Backup Dir *(Chang)*	(1–10)
BckupOnCMI	Enab, Disab
AutoRestor	Enab, Disab
NtwkTimOut *(Chang)*	min and sec (1 to 30 min)
RestorTimOut *(Chang)*	min and sec (1 to 60 min)
TriesTimeOut *(Chang)*	min and sec (1 to 60 min)
MultiCall	Enab, Disab

Backup Directory	Dial String
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

† V.32 DBM only
††† Only if Diag Type set to NonD
‡ Only if Primary Core set to Yes
‡‡ Only at the Control

Status Indicators and Control Panel Messages C

Overview

This appendix describes the status indicators on the DSU's control panel, the diagnostic control panel (DCP) for a Model 3615 and the shared diagnostic control panel (SDCP) for the Model 3616.

Informational messages that may appear on the control panel while a command is executing, or when a command is prevented from executing, are also described.

Status Indicators

Status indicators provide information on the current operating condition of the DSU. The status indicators of the Model 3615 DSU appear on the DCP's faceplate. The status indicators for the carrier-mounted Model 3616 DSU are spread across the the faceplate of the DSU, the SDCP, and the faceplate of the shared diagnostic unit (SDU), if installed. Refer to the *COMSPHERE 3000 Series Carrier Installation Manual* for SDU status indicator information. The DSU DCP and SDCP status indicators are described in Tables C-1 and C-2.

Table C-1
DSU Status Indicators

Label	Color	Description
OK	Green	Health and status indicator: DSU operation is normal. (The DSU has not detected any of the faults listed under **Alrm,** below.) This indicator flashes two times per second if a message from the NMS is present.
Alrm	Red	Health and status indicator: There is a fault in the local or remote DSU, DBM, or DDS facility, or there is a corrupted configuration. The following alarms at the local or remote DSU cause the **Alrm** status indicator on the affected DSU to light: Configuration Corrupt Device Fault Dial Tone Test Failure DTR Alarm Facility Alarm MUX Failure No Response Redundant Power Alarm Streaming Terminal Subnetwork Alarm Out-of-Frame Threshold Out-of-Service
Test	Yellow	Active device (DSU or DBM) is either performing a test or other DSUs or DBMs are in Test mode.[1]
Dial	Yellow	DBM is active Rapid flashing: Call setup in progress Slow flashing: Call established but in Standby mode Steady ON: Backup call established and active
TXD, RXD, RTS, CTS, DSR, DTR, LSD	Green	Internal lead states at the DSU/DTE interface *(circuit designations)*: Control circuit active *or* Data circuit SPACE(ing).
Front Panel (Model 3616 only)	Yellow	DSU is currently selected at the SDCP. *(The SDCP addresses one DSU at a time.)*

[1] The DSU or DBM is automatically put into Test mode when a remote DSU or DBM is performing a disruptive test (e.g., a Local Loopback (LL) at the control DSU. A DSU or DBM in Test mode has its DTE interface turned Off).

Table C-2
SDCP Status Indicators

Label	Color	Description
OK	Green	Health and status indicator for the selected DSU; mirrors the **OK** indicator on the DSU faceplate.
Alrm	Red	Health and status indicator for the selected DSU; mirrors the **Alrm** indicator on the DSU faceplate.
BckUp	Yellow	Mirrors the **BckUp** LED on the selected DSU.
Test	Yellow	Mirrors the **Test** indicator on the selected DSU.
EC	Green	Error Correction indicator is for future use by dial network modems.

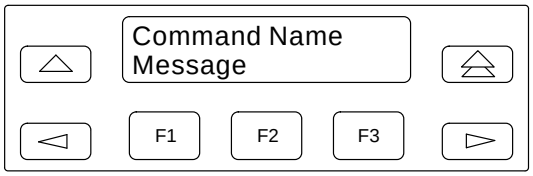
Control Panel Messages

This section shows the screen format of messages appearing on the control panel and describes the various messages.

Three types of messages are included: health and status, progress, and error messages.

Format

The format of the control panel messages is shown below.



Health and Status Messages

There are three types of health and status messages. Device Health and Status messages are described in Table C-3, Expanded Health and Status messages are described in Table C-4, and Subnetwork Health and Status messages are described in Table C-5.

Table C-3
(1 of 3)
Device Health and Status Messages

Message	Condition
CMI Fac Alarm	Facility Alarm on CMI (FacAlOnCMI) configuration option is enabled and control mode idle (CMI) is being received.
Config Corrupt	Configuration is corrupt. Reset all configuration options from one of the default (factory-loaded) option sets stored in the DiDg, SyBC, or SyBT area.
DBM:Device Fail	Internal failure is detected in the DBM.
DBM:Disable	DBM transmitter is disabled. DBM is in Idle mode, but no calls can be initiated or answered.
DBM F: *alarm*	A DBM facility alarm; *alarm* is one of the following network alarms: BiplrVio l — Excessive Bipolar Violations FDHP Lost — High-level communication over the signaling channel switch has been lost (2-Wire Switched 56 DBM only) OutofServc — Out-of-Service condition (4-Wire Switched 56 DBM only) No Signal — No signal has been received (Switched 56 DBM only)
*nn.n*DBM:*mode*	*nn.n* indicates the DBM speed; *mode* is one of the following: Standby — A dialed connection is made, but the data is still routed over the DDS circuit. The first line shows the dial backup connection time. Active — A dialed connection is made, and data has been routed over that line.
*nn.n*ExternBU	*nn.n* indicates the external DBU's speed: External Bkup — Backup is in progress on an *external* DBU. (DDS line is disabled.)
DBMTst: *test*,*init*	The DBM is running a test, initiated from *init*. *test* is one of the following tests: BERT — Bit Error Rate Test BiL — Bilateral Loopback Dev — Device Test DL — Digital Loopback DT — Digital Test DTE — DTE Loopback E-E — End-to-End Test Lamp — Lamp Test NetL — Network Loopback (Switched 56 DBM only) RL — Remote Digital Loopback TM — Test Mode *init* is one of the following initiators: DCP — Diagnostic Control Panel DTE — Data Terminal Equipment NMS — Network Management System Remt — Remote DSU

Table C-3
(2 of 3)
Device Health and Status Messages

Message	Condition
Dial Tone:Fail	Dial tone test was enabled and test failed.
DDS F: *alarm*	Digital facility alarm; *alarm* is one of the following network alarms: BiplrViol — Excessive Bipolar Violations Fac Alarm — Facility Alarm OutofServc — Out-of-Service condition No Signal — No signal has been received
DSU:Device Fail	Internal failure in the DSU is detected. (Go to the Test branch for Device Test.)
DSU:Disable	DSU transmitter is disabled. (Go to the Control branch to enable the DSU.)
DSUTst: *test*,*init*	The DSU is running a test, initiated from *init*. *test* is one of the following tests: BERT — Bit Error Rate Test BiL — Bilateral Loopback Dev — Device Test DL — Digital Loopback DT — Digital Test DTE — DTE Loopback Lamp — Lamp Test NetL — Network Loopback TM — Test Mode *init* is one of the following initiators: DCP — Diagnostic Control Panel DTE — Data Terminal Equipment NMS — Network Management System Ntwk — Network Remt — Remote DSU
External Alarm A	The DSU detects a positive voltage on Pin 23. This alarm condition is defined by the Ext Leads configuration option.
External Alarm B	The DSU detects a positive voltage on Pin 19. This alarm condition is defined by the Ext Leads configuration option.
Invalid Address	A DSU was powered up with an invalid address. Invalid addresses are: 0 — This is reserved for the SDU 192 — This is reserved for the broadcast address 191 — Invalid for a DSU with a DBM because of the reserved **192** broadcast address 255 — Invalid for a DSU with a DBM

Table C-3
(3 of 3)
Device Health and Status Messages

Message	Condition
Redun Fan Alarm	Indicates a problem with the fan on the –48 Vdc Central Office Power Unit.
Redun Pwr Alarm	Indicates a problem with the power on the –48 Vdc Central Office Power Unit.
Subnetwrk Alarm	A major alarm was set Off by one of the devices in your subnetwork. Check the Subnetwork Health and Status report.
Subtree Truncat	Downstream health and status information has been truncated because it overflowed system limits.
OutofFrameThresh	For DBMs operating on a single port (rate adaption or nondisruptive), the local DBM has detected a continuous Out-of-Frame condition. The alarm clears when a local DBM synchronizes with a remote DBM. On a point-to-point circuit, if the alarm continues and the local DSU is configured for automatic backup, the local DSU disruptively tests the DDS circuit. If the test fails, the local DSU initiates a DDS Facility Alarm and initiates dial backup.
nn.n DDS	Indicates the speed (*nn.n*) of the DSU core when there are no alarms.
nnn Disable	Transmitter at *nnn* (DSU or DBM) is disabled. (Go to the Control branch to enable the DSU or DBM.)
nnn DTR Alarm	The DTR lead at *nnn* (DSU or DBM) has been Off for more than 30 seconds.
nnn StreamTerm	Streaming terminal. DTE at *nnn* (DSU or DBM) has its RTS lead turned ON longer than the predefined time.

Table C-4
Expanded Health and Status Messages

Message	Condition
Dial Attempt:*nn*	The number (*nn*) of failures of dialing attempts since failure of private-line service. This message is cleared when the automatic backup process succeeds or the backup process is reset due to configuration option changes. When the maximum number of retries has been reached, **Max** appears.
Drop:DTR Disc	An established dialed connection fails because the DTR lead was turned Off.
Fail*n*:*reason*	Because of failure in the DDS private line, the DSU automatically originated several unsuccessful dialing attempts. The last three dial attempts are reported as Fail1 (oldest), Fail2, and Fail3 (most recent). The *reason* for failed dial attempts include: Abort Call — User aborted call. BadPermiss — A dial attempt was made, but a backup connection already exists. Bad Phone# — Unassigned number or illegal characters. Busy — Line or network busy. DBM Disab — DBM disabled; no call can be initiated or answered. DTR Discon — DTR disconnected. NetwkAbort — The network has disconnected the call. Netwk Busy — The network cannot put the call through. NetwkUnavl — The Switched 56 kbps network is incapable of passing data. No Answer — There is no answer at the remote DBM or modem. No Dial Tone — No dial tone received from the network. No Ringing — DBM is not getting ringback from the other end. Security — Originating and answering DBMs have incompatible security levels or unmatched passwords. Training — V.32 modem training failure.
No Expanded H/S	There are no Expanded Health and Status messages.
Tries Timer:*nn*	The number of minutes left in Tries Time-out Timer (1– 60) which is initially set to the time limit for dial backup call attempts. If the timer has expired, **Exp** appears.

Table C-5
Subnetwork Health and Status Messages

Message	Condition
Devic	TDM/Flex only: Device Failure. One of the following major alarms is in effect: Configuration Corrupt Device Test Failure
DialBU	Dial mode. Indicates that the DBM is active.
DialCN	Dial Connect. Indicates that the DBM is in Standby mode.
DialTn	Dial Tone Test failure.
Disab	Indicates that the DSU or DBM is disabled.
DTR	DTE alarm. Data Terminal Ready lead is Off.
ExtLd	External lead alarm A or B.
Facil	DDS facility alarm. Indicates a network facility alarm.
NoResp	The active poll list member did not respond. Probable cause: a facility problem, a remote DSU problem, or an incorrect poll list.
Normal	Active poll list member does not report an alarm or its status.
RPower	Redundant power supply alarm.
Stndby	DBM is in Dial Standby.
Stream	Streaming terminal.
SubSpd	Subnormal operating speed.
Test	Test mode. It could be a DSU or DBM test.
Thresh	Threshold is exceeded.
TribTm	Tributary time-out. Tributary is not answering polls.
Trunc	Subtree truncation. More information is being received than can be returned in the poll. You must access each tributary for its messages.

Progress Messages

Table C-6 describes the command progress messages; Table C-7 describes the dial backup progress messages.

Table C-6
Command Progress Messages

Message	Condition
Please wait . . .	Command is taking more than 2 seconds to complete.
Command Complete	Command has been completed.
Command Failed	Command was unable to be executed.

Table C-7
Dial Backup Progress Messages

Message	Condition
DBM:Answering	DBM is answering an incoming call.
DBM:Callback	Callback sequence has initiated.
DBM:Connected	DBM is connected.
DBM:Disabled	No calls can be initiated or answered.
DBM:FoundAnswTon	A 4-wire Switched 56 DBM is answering an incoming call.
DBM:Ringing	Ringing at remote DBM or *external* DBU (dial backup unit).
DBM:Standby	A connection is made but the digital circuit is still the active link.
DBM:Starting Up	The DBM is training for synchronization.
DBM:WaitForAnswr	A call has been placed and the DBM is waiting for connection.
DBM:Wait Callbck	The DBM is expecting a call back from remote DBM or *external* DBU.
DBM:WaitForSync	Call placed and waiting for connection (2-wire Switched 56 DBM only).
DBM:xxxxxxxxxxx	The last 11 digits for the telephone number that has been dialed.

Error Messages

Table C-8 describes the command error messages; Table C-9 describes the dial backup error messages.

Table C-8
Command Error Messages

Message	Condition	Action
Conflict w/Envir	Command conflicts with a test in progress, or the configuration is inappropriate for this command, etc.	1. Check for a test in progress. 2. Either wait for the test to finish or abort the test. 3. If there is no test in progress, check configuration options.
Not in Menu	Command is not in the supported set.	Use a valid command.
No Response	Invalid remote address or remote device is not powered, connected to network, or enabled.	Check remote address.
Command Failed	Command could not execute and none of the error messages above apply.	If problem cannot be corrected, call your service representative.
Inval Selection: No Valid Choices	Invalid menu selection based upon previous selections that caused a menu to display with no selectable options.	Press any key to return to the top-level menu.

Table C-9
(1 of 2)
Dial Backup Error Messages

Message	Notify NMS[1]	Condition	Action
DBM: Busy	Yes	Telephone line associated with remote DBM is busy.	Try again. Try another number if possible, or investigate why the line is busy.
DBM: Call Aborted	No	Call was aborted from the DCP.	None
DBM:Callbck Fail	No	There was a failure to connect on a callback attempt.	Make sure you have the correct call setup pointer and that remote DBM has the proper telephone number in that directory. If both are correct, attempt to place a manual call from the remote DBM.
DBM: Conflict w/Envir	Yes	DBM is not able to dial out (e.g., test is being run); there is no DBM at the far end.	Wait until the test is completed, or abort the test.
DBM:Dir Empty	Yes	An attempt was made to place a call from an empty directory.	Check Backup Directory entries and numbers.
DBM:DTR Discon	Yes	DTR has gone low, or the call did not connect.	Raise DTR at the DTE, or disable the DTRCallCon configuration option.
DBM:Illegal Char	Yes	Illegal character in the directory specified.	Check directory entry.
DBM:No Answer	Yes	There was no answer from the remote DBM or modem.	1. Check that remote DBM is configured for many calls. 2. Make sure remote DBM is properly connected to the dial (PSTN) network. 3. Check operational status of remote DSU using a Device Test. 4. Attempt to place a call from remote DBM. If it cannot be placed, replace the DBM.
DBM:NetwkAbort	No	Call was aborted by the network.	Try again.
DBM:Netwk Busy	Yes	Call was unable to place call at the time.	Try again.
DBM:NetwkUnavl	Yes	Network is incapable of passing data.	Look for line problems. If conditions are good and no problem is found, call telephone company and report the problem.
DBM:NoDialTone	Yes	No dial tone received from the network.	Check the dial (PSTN) network connections. If conditions are good and no problem is found, call telephone company and report the problem.

[1] If Yes, an error message is reported to the NMS if the NMS initiated the **dial** command.

Table C-9
(2 of 2)
Dial Backup Error Messages

Message	Notify NMS[1]	Condition	Action
DBM:No Ringing	No	DBM is not getting ringback from the other end.	Look for line problems. If conditions are good and no problem is found, call telephone company and report the problem.
DBM: NotConnected	No	Call attempt failed for unspecified reasons.	1. Check DBM for proper operation by running a Device Test. 2. Check the DBM's configuration options to ensure that DBM is enabled. 3. If you cannot correct the problem, contact your service representative.
DBM:ProtoErr*nn*	No	Protocol error (*nn* is the error number) by the 2-wire Switched 56 DBM.	1. Check the lines. Line quality has degraded. (A call to the central office to perform diagnostic tests may be required.) 2. If the line quality is good, note the protocol error number and whether the DBM was originating or answering a call, then contact your service representative.
DBM: RateMismatch	Yes	The rate in the calling and called DBM or modem are not compatible.	Check speed configured in both units.
DBM:SecurityFail	No	Passwords in calling and called DBM do not match.	1. Make sure that both DBMs have compatible security options. 2. Make sure that both DBMs have the proper password.

[1] If Yes, an error message is reported to the NMS if the NMS initiated the **dial** command.

Pin Assignments D

Overview

Pin assignments for the 3615 Series DSU connectors and interfaces are included here. Refer to them as needed.

Refer to the *COMSPHERE 3000 Series Carrier, Installation Manual* for additional pin assignments.

Network Connectors

Figure D-1 shows the Model 3615 DSU's digital network connector, which is used for DDS and the 4-wire Switched 56 kbps connection. Table D-1 provides its pin assignments. Table D-2 provides the network connector pin assignments used for the V.32 and 2-wire Switched 56 DBM, which uses a 6-pin jack (not shown in any figure).

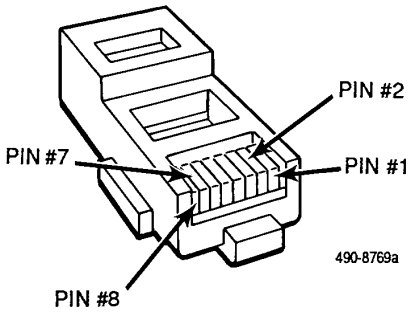


Figure D-1. Digital Network Connector

Table D-1
Model 3615 – Digital (DDS and 4-Wire Switched 56 kbps) 8-Pin Network Connector Pin Assignments

Pin	Circuit	Function
1	R1	Transmit data to local loop
2	T1	Transmit data to local loop
7	T	Received data from local loop
8	R	Received data from local loop

Table D-2
Model 3615 – Dial (Analog and 2-Wire Switched 56 kbps) 6-Pin Network Connector Pin Assignments

Pin	Circuit	Function
3	T	Tip – V.32 and 2-Wire Switched 56 DBMs only
4	R	Ring – V.32 and 2-Wire Switched 56 DBMs only

3600 Hubbing Device

Figure D-2 shows the 3600 Hubbing Device; Table D-3 shows its pin assignments. Table D-4 provides the 3600 Hubbing Device's CC IN/DC OUT jack pin assignments.

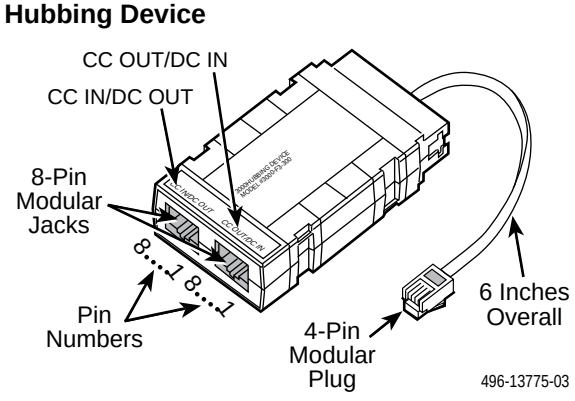


Figure D-2. 3600 Hubbing Device (3600-F3-300)

Table D-3
3600 Hubbing Device Pin Assignments

Pin #	Signal Name	Input/Output
1	+5 Vdc	Input
2	DCOSD/CCIRD	Input
3	Signal Ground	Ground
4	DCORD/CCISD	Output

Table D-4
3600 Hubbing Device CC IN/DC OUT Jack Pin Assignments

Pin #	Signal Name	In/Out	CC IN	DC OUT
1	–V Pass-Through	—	N/C	N/C
2	DCOCTS/CCIRTS	IN	RTS	CTS
3	DCORTS/CCICTS	OUT	CTS	RTS
4	DCOSD/CCIRD	OUT	RD	SD
5	Signal Ground	—	GND	GND
6	DCORD/CCISD	IN	SD	RD
7	N/C	—	N/C	N/C
8	+V Pass-Through	—	N/C	N/C

DTE Connectors

Figure D-3 shows the Model 3616 DSU's rear connector plate. Table D-5 provides the EIA-232/V.24 connector's pin assignments.

Figure D-4 shows the V.35 Interconnect Cable that is shipped with the rear connector plate; it provides the interface between the port's D-type connector and the DTE cable's V.35 connector. Table D-6 provides the 25-pin V.35 connector and the V.35 Interconnect Cable's pin assignments.

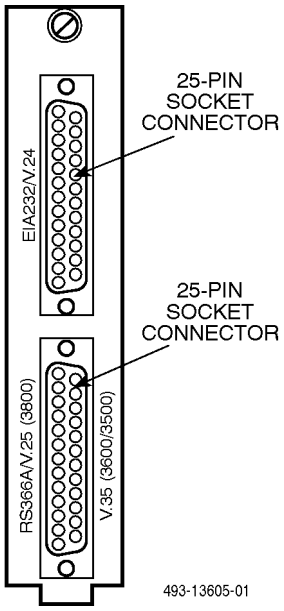


Figure D-3. Model 3616 DSU 25-Pin EIA-232/25-Pin V.35 Rear Connector Plate (3000-F1-021)

Table D-5
EIA-232/V.24 Connector Pin Assignments

Pin	Circuit Name		Function
	EIA-232	CCITT	
2	BA	103	Transmit Data (TXD)
3	BB	104	Received Data (RXD)
4	CA	105	Request-to-Send (RTS)
5	CB	106	Clear-to-Send (CTS)
6	CC	107	Data Set Ready (DSR)
7	AB	102	Signal Ground (SG)
8	CF	109	Received Line Signal Detect (LSD)
9	—	—	Positive Test Voltage
10	—	—	Negative Test Voltage
12	CI	112	Data Signal Rate Selector I – DCE Source (alternate external control lead I)
13[1]	—	—	Data Signal Rate Selector II – DCE Source (alternate external control Lead II)
14	SBA	118	Secondary Transmit Data
15	DB	114	Transmitter Signal Element Timing – DCE Source
16	SBB	119	Secondary Received Data
17	DD	115	Receiver Signal Element Timing – DCE Source
18	LL	141	Local Loopback (LL)
19[1]	—	—	Data Signal Rate Selector II – DTE Source (alternate external control alarm Lead II)
20	CD	108.2	Data Terminal Ready (DTR)
21	RL	140	Remote Digital Loopback (RL)
23[1]	CH	111	Data Signal Rate Selector I – DTE Source (alternate external control alarm Lead I)
24	DA	113	Transmitter Signal Element Timing – DTE Source
25	TM	142	Test Mode (TM)

[1] Data Signal Rate Selector function is not available at this time. These leads can be used for the External Lead functions.

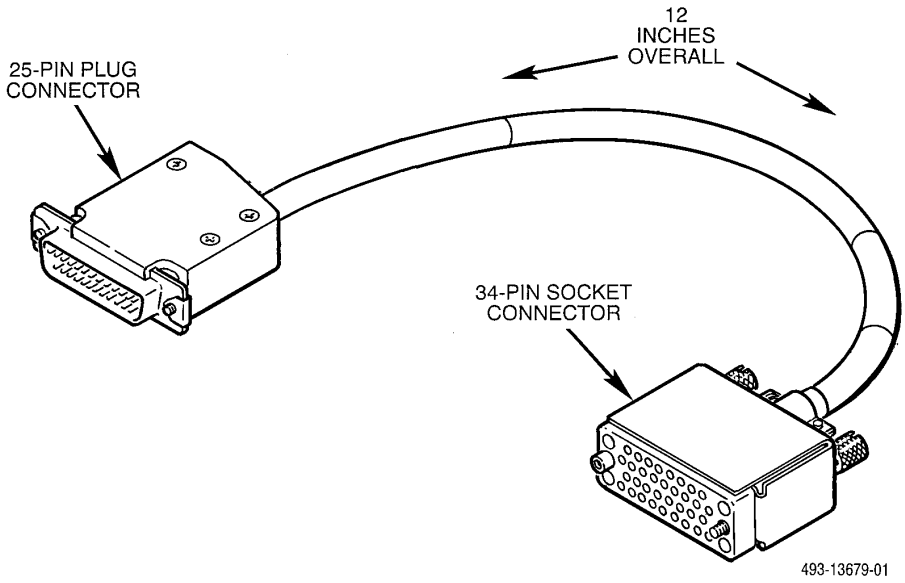


Figure D-4. V.35 Interconnect Cable (3000-F1-510)

Table D-6
V.35 Connector Pin Assignments

25-Pin Connector (Rear Connector Plate)	34-Pin Connector (V.35 Interconnect Cable)	Circuit Name
Pin Number	**Pin Number**	
7	B	Signal Ground
4	C	Request-to-Send (RTS)
5	D	Clear-to-Send (CTS)
6	E	Data Set Ready (DSR)
8	F	Received Line Signal Detect (LSD)
20	H	Data Terminal Ready (DTR)
18	L	Local Loopback (LL)
19	N	Remote Digital Loopback (RL)
24, 11	P, S	Transmit Data (TXD)
23, 22	R, T	Received Data (RXD)
15, 2	U, W	Transmitter Signal Element Timing – DTE Source
16, 3	V, X	Receiver Signal Element Timing – DCE Source
14, 1	Y, AA	Transmitter Signal Element Timing – DCE Source
9	HH	Positive DC test voltage
10	KK	Negative DC Test Voltage
25	NN	Test Mode (TM)

Crossover Cables

Figure D-5 shows the EIA-232-D crossover cable and its pin assignments, and Figure D-6 shows the V.35 crossover cable and its pin assignments.

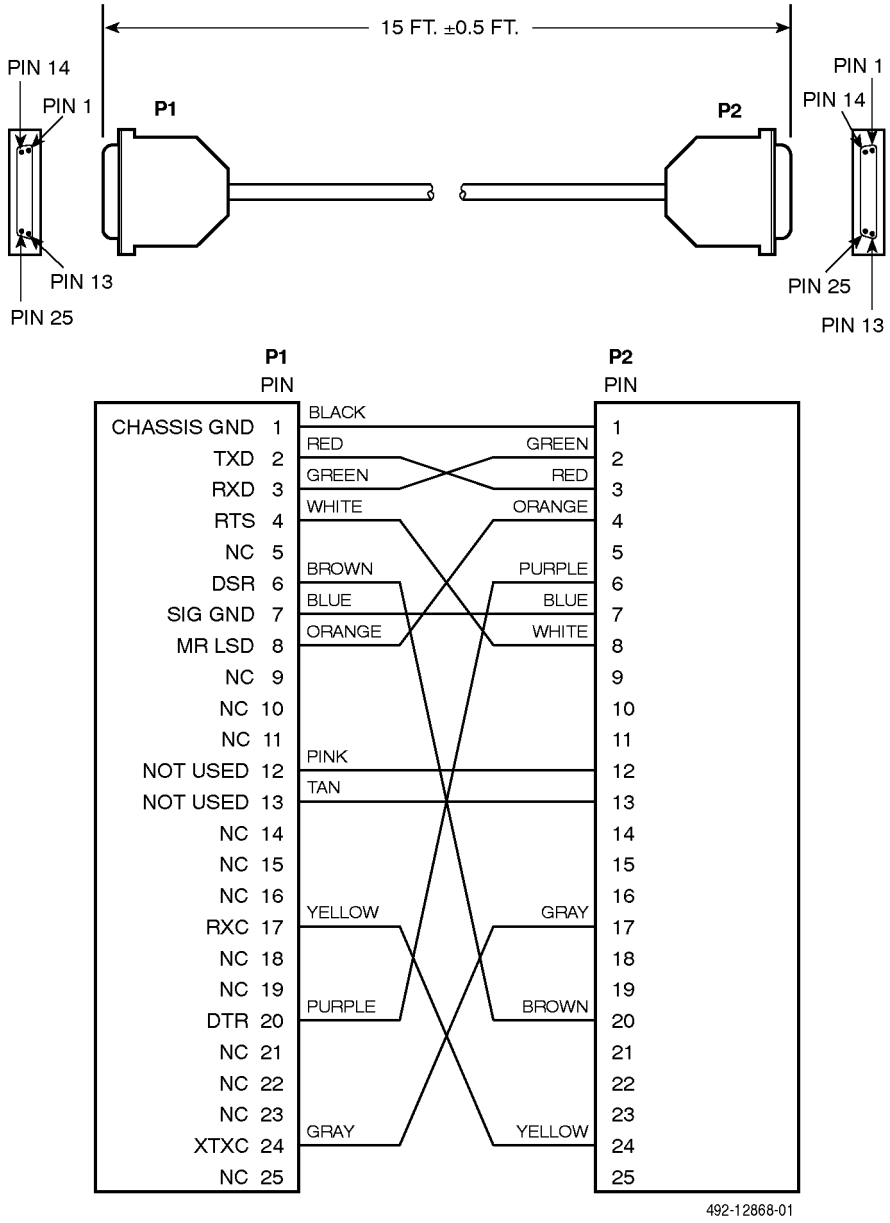


Figure D-5. EIA-232-D Crossover Cable (4951-035F)

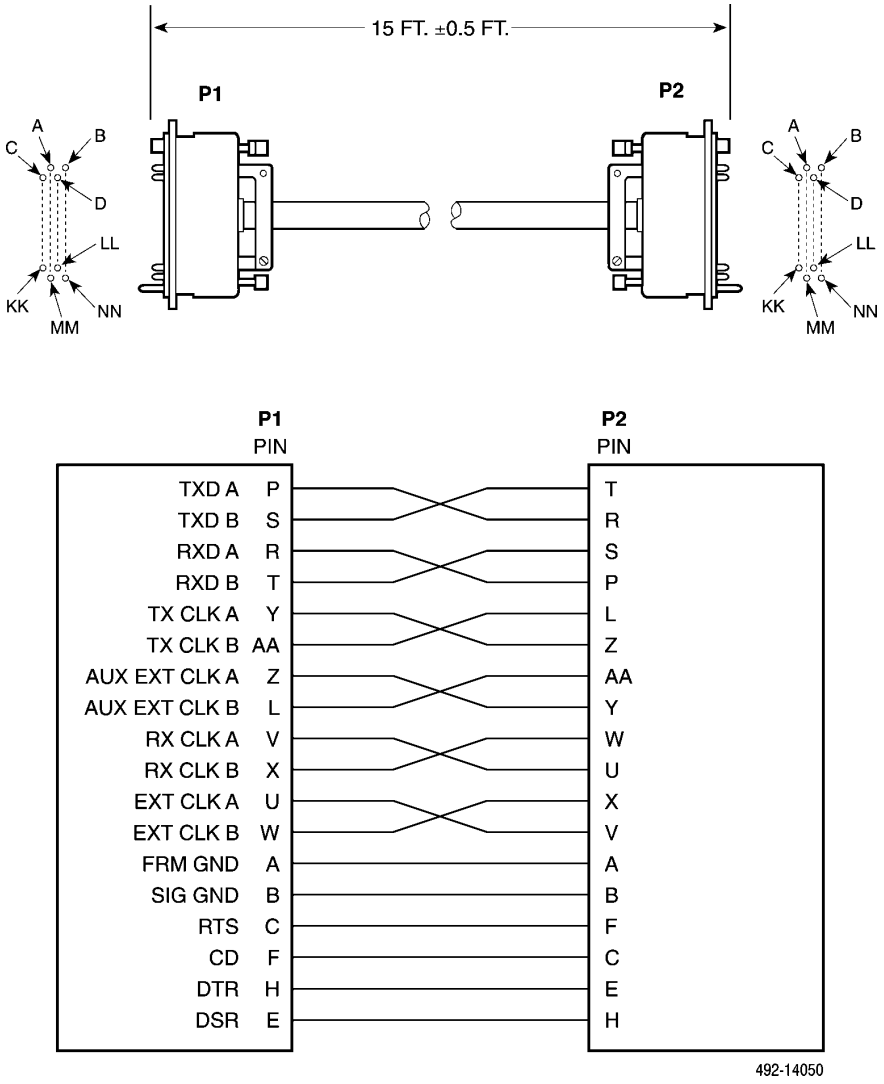


Figure D-6. V.35 Crossover Cable (3211-178F)

Application Configurations E

Overview

The DualFlow DSU supports Frame Relay and router-based applications. This appendix shows examples of typical point-to-point configurations using your DualFlow DSU. It is intended to aid you in configuring your network and selecting the appropriate operating configuration for your application.

To simplify configuring the DSU, pre-defined configurations for these applications have been provided. Once an application is loaded into the DSU, you can change or customize the DSU's configuration, as needed. Three separate user-defined storage areas for saving changed configurations are also provided. See the Configuration Options (Opts) subbranch of the Configuration (Confg) branch. Refer to Appendix A to quickly locate the branch on the DCP. Refer to Chapter 5 for detailed configuration information.

Before connecting the NMS to the circuit, refer to your 6700 or 6800 Series NMS documentation.

Dial Backup for Received Data Errors Application

In this application, the router controls backup of one drop on the Frame Relay or DDS network. When the router detects data errors, it raises DTR on its secondary port (which is connected to the DSU's EIA-232-D/V.24 interface), and lowers DTR when the DDS line is restored. The DSU monitors the DTR lead on its EIA-232 interface; it initiates backup when DTR is raised and drops backup when DTR is lowered.

Automatic DDS line restoration is supported using this configuration as long as the router's secondary port is configured for backup when data errors are received, and there is a DualFlow DSU at both the control and tributary sites. Figure E-1 shows an example of this application.

Select the Synchronous Backup for either a control or tributary (SyBC or SyBT) configuration from the preset configurations provided by the Configuration (Confg) branch, depending upon which DSU you are configuring.

User data travels through the DSU's V.35 interface and backup data travels through the DSU's EIA-232-D/V.24 interface. The DSU's V.35 interface is connected to the router's primary or active serial port, while the EIA-232 interface is connected to the router's secondary serial port.

If your DualFlow DSU is equipped with a Switched 56 DBM, the DSU must be close to the router. The EIA-232 cable length cannot exceed 34 feet using shielded cable or 68 feet using unshielded cable if backup is to be supported.

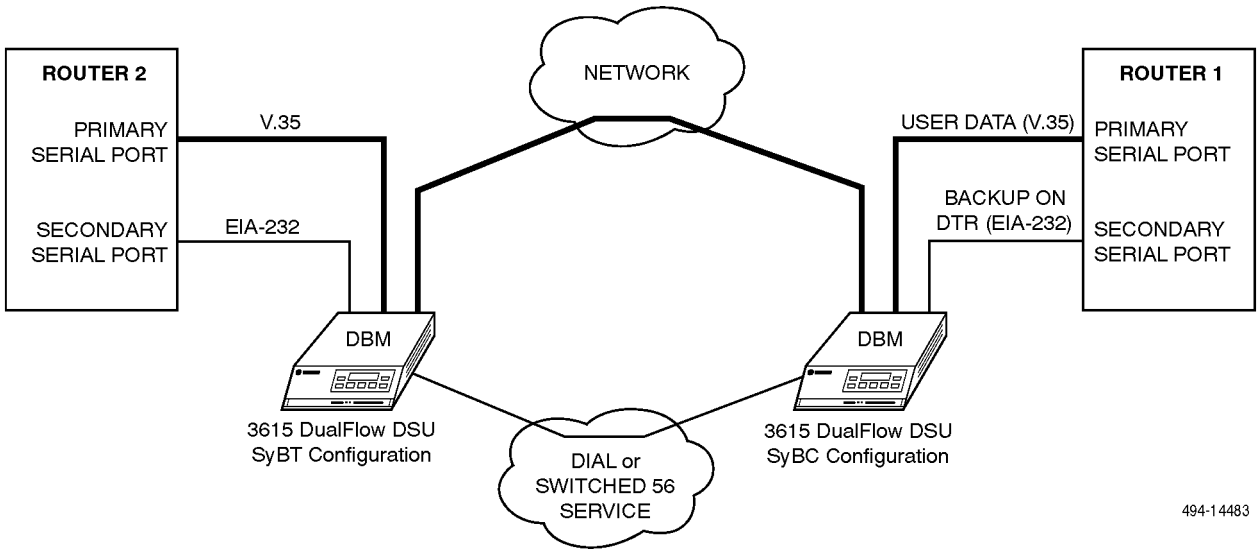


Figure E-1. Dial Backup for Received Data Errors (SyBC and SyBT) Application

Dial Backup for Exceeded Load Thresholds Application

Use the application shown in Figure E-2 when traffic loading (acquiring additional bandwidth upon demand) for the router is needed. The router must use its Backup Load option.

Using this configuration, the router enables its secondary serial port (EIA-232) by raising DTR when the transmitted and received load on the primary serial port (V.35) is greater than the value assigned for traffic-load purposes. Raised DTR signals the DSU to establish a backup connection to increase available bandwidth. When the load is within threshold limits again, the router lowers DTR, deactivating the secondary serial port. This signals the DSU to drop the backup connection.

For example, a Cisco router can be configured as follows:

```
interface serial 0
backup load 60 5
```

In this example, if traffic on the primary serial port exceeds 60%, the secondary serial port is activated by the router raising DTR. It will not be deactivated (DTR lowered) until the combined load is less than 5% of the primary bandwidth.

For this application, the DSU is configured like the application in Figure E-1. Select the Synchronous Backup for either a control or tributary (SyBC or SyBT) configuration from the preset configurations provided by the Configuration (Confg) branch, depending upon which DSU you are configuring.

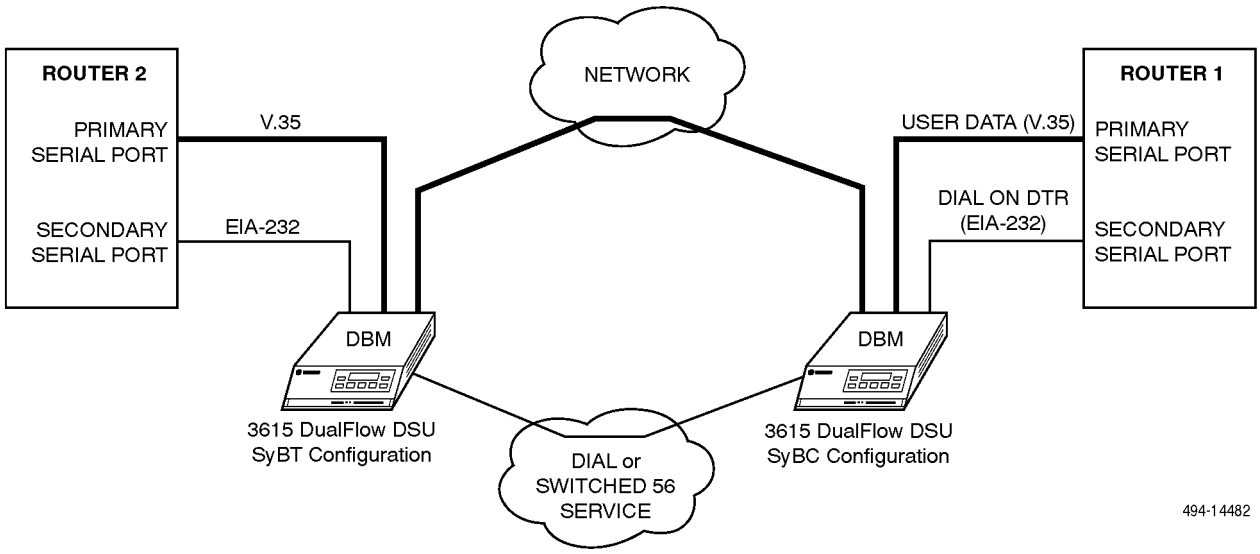


Figure E-2. Dial Backup for Exceeded Load Thresholds (SyBC and SyBT) Application

Frame Relay and Simultaneous Diagnostic Application

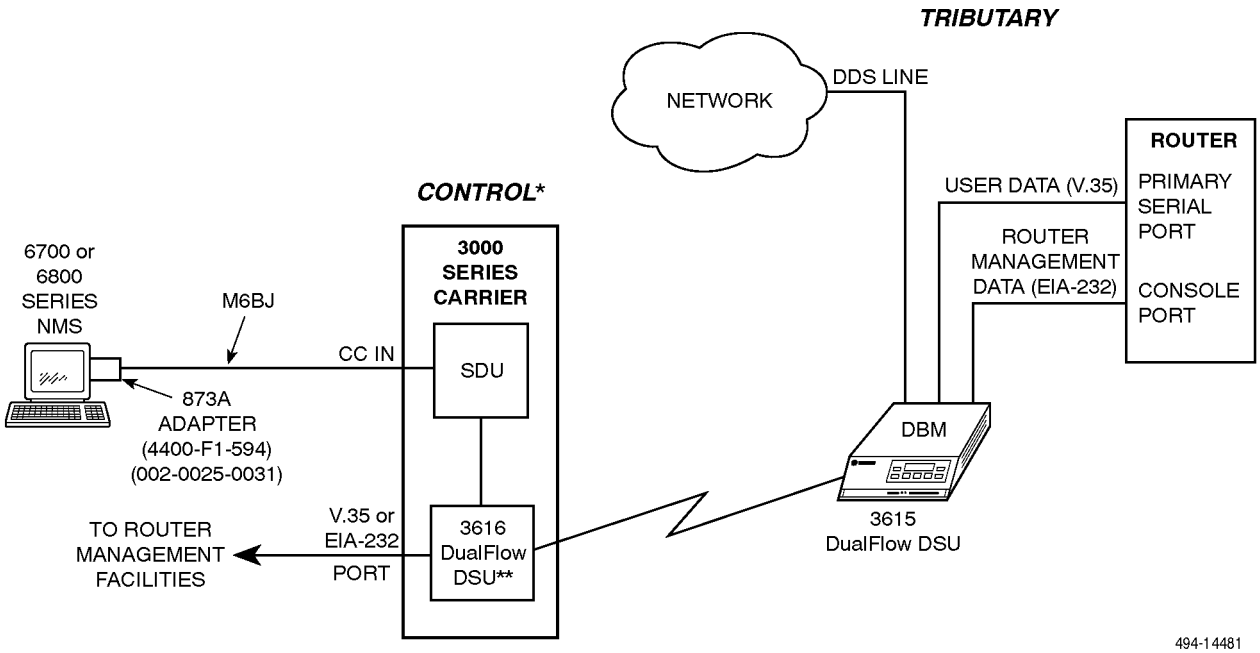
This application allows you to manage and diagnose a router remotely without interfering with the router's primary data path. This configuration involves simultaneous transmissions: user data over the DDS line to the router's primary serial port, and router-management data over a line going to the router's console interface. Use the DSU's V.35 interface for the user data, and use the DSU's EIA-232-D/V.24 interface for router-management data and DSU diagnostics.

Figure E-3 shows this type of application using a DualFlow DSU. User data is transmitted at the DDS line speed (the default setting is 56 kbps), while diagnostic data is transmitted at the dial line speed (the default setting is 9.6 kbps).

Select the Dial Diagnostic (DiDg) configuration from the preset configurations provided by the Configuration (Confg) branch. This application allows diagnostics from the COMSPHERE 6700 or 6800 Series NMS to permit communication with the DualFlow DSU, while also allowing Router Management System communication through the EIA-232-to-console connection.

When using Model 3616 DualFlow DSUs at a central site location as shown below, change *Primary Core* to Yes (DBM option set). Additionally, at the control site, change *Primary Core* to Yes, *TxClkSource* to Int (DBM option set), and *Position* (Diagnostic General option set) to Cntrl.

All calls are in one direction using this configuration – from the DBM to the router. Password (Pswrd) security should also be used. Refer to Chapter 4 for information about operating the DBM and Chapter 5 for additional information about the *Call Setup* configuration option and the Pswrd setting.



* If control is a Model 3615, install 3600 Hubbing Device (3600-F3-300) (870-1669-5000)

** Primary Core: Yes (DBM option set)

Figure E-3. Frame Relay and Simultaneous Diagnostic (DiDg) Application

Equipment List F

Equipment	Feature/Part No. G = Factory Install. F = Field Install.	Comcode
Model 3615 DSU		
With V.32bis 14.4 kbps DBM	3615-A1-002	107330078
With 4-Wire Switched 56 DBM	3615-A1-014	107330144
With 2-Wire Switched 56 DBM	3615-A1-012	107330136
Model 3616 DSU (includes rear connector plate)		
With V.32bis 14.4 kbps DBM	3616-B1-002	107330151
With 4-Wire Switched 56 DBM	3616-B1-014	107330177
With 2-Wire Switched 56 DBM	3616-B1-012	107330169
Rear Connector Plate – 25-Pin EIA-232/25-Pin V.35	3000-F1-021	106476229
V.35 Interconnect Cable (For 25-Pin V.35 Connector)	3000-F1-510	106476237
ACCULINK® 3100 Series CSU Wall-Mount Adapter (For Model 3615)	3100-F1-400	406941674
Model 3615 Digital (DDS) or 4-Wire Switched 56 kbps Network Interface Cable – RJ48S		
Network Cable (14′ cord included with Model 3615)	14′ — 3600-F3-501 25′ — 3600-F3-502	107331381 107331365
8-pin to 6-pin Modular Cable (for the Model 3615 in Canada)	7′ — 3000-F1-006	106239155
Model 3615 2-Wire Switched 56 kbps Network Interface Cable – RJ11C	14′— 3600-F3-503	107331357
Model 3615 Dial (PSTN) Interface Cable		
Telephone Cord 6-pin Modular RJ11C/ Permissive Plug	7′ — 4400-F1-531 25′ — 4400-F1-533	106472913 106472921
Telephone Cord 8-pin Modular RJ45S/ Programmable Plug	2.5′ — 4400-F1-541 14′ — 4400-F1-543 25′ — 4400-F1-544	106472947 106472962 106472970
Model 3615 25-pin Plug to EIA-232 Plug Cable for extended circuits (select one)		
EIA-232 Crossover Cable	15′ — 4951-035F	105757520
Pin-to-Pin EIA-232 Cable (straight connection)	10′ — 4951-032F	105757496
V.35 Crossover Cable	15′ — 3211-178F	106910466

Equipment	Feature/Part No. G = Factory Install. F = Field Install.	Comcode
Model 3616 Digital (DDS) Network Cables[1]		
50-pin to eight 6-pin Multiple Network Interface Adapter (Model 3616 in Canada)	1.5′—3000-F1-009	106459621
50-pin to eight 8-pin Multiple Network Interface Adapter (Model 3616 in U.S.A.)	1.5′—3600-F2-503	106303837
Model 3616 Dial (PSTN) Network Cable Adapter[1]		
50-pin to eight 6-pin RJ11C/Permissive Cable	1.5′—3600-F2-505	106459928
50-pin to eight 8-pin RJ45S/Programmable Cable	1.5′—3600-F2-504	106459548
3600 Hubbing Device	3600-F3-300	106744683
NMS Adapter Cable/Diagnostic Extension	3000-F2-510	106768690
NMS EIA-232-D Interface Connector		
Central-site 25-pin to 6-pin (873A) Adapter	4400-F1-594	106473150
Remote-site 25-pin to 6-pin Adapter	6821-F1-518	106261464
NMS 6-pin Modular Cable – M6BJ	3′—4400-F1-510 10′—4400-F1-511 25′—4400-F1-512	106472830 106472848 106472855
COMSPHERE 3000 Series Carrier, Installation Manual	3000-M3-001	—
COMSPHERE –48 Vdc Central Office Power Unit, Installation Manual	3000-A2-GB41	—
COMSPHERE DualFlow Data Service Units, Models 3615 and 3616, User's Guide	3615-A2-GB20	—
COMSPHERE DualFlow Data Service Units, Models 3615 and 3616, Documentation Replacement	3615-A2-GB21	—

[1] These cables are extended using a 3000-F1-013/014 cable.

Equipment*	Part Number
Field Service Spares	
Model 3615 DSU	870-1868-8001
Model 3616 DSU – modular CCA	870-1869-8001
Dial Backup Modules (DBMs) – Models 3615/3616	
Snaplock Posts (Core)	598-0086-0031
Standoff Posts (Line Interface)	589-0078-0031
V.32bis 14.4 kbps DBM Core	102-0144-0031
V.32bis 14.4 kbps Line-Interface	870-1571-8000
4-Wire Switched 56 DBM Core	870-1672-8xxx
4-Wire Switched 56 Line-Interface	870-1671-8xxx
2-Wire Switched 56 DBM Core	870-1758-8xxx
2-Wire Switched 56 Line-Interface	870-1759-8xxx
2-Wire Switched 56 Ribbon Cable	135-0211-0031
Rear Connector Plate – 25-Pin EIA-232/25-Pin V.35	315-0023-0131
V.35 Interconnect Cable (For 25-Pin V.35 Connector)	1′—035-0135-0031
ACCULINK® 3100 Series CSU Wall-Mount Adapter (for Model 3615 DSU)	
Wall-Mount Bracket (1)	870-1751-0014
17″ Velcro® Brand Straps (2)	870-1770-0022
RS-310-C L Bracket (1)	870-1809-0023
#6 x 1.0″ Screws (4)	870-1817-0023
#12-24 Screws (2)	506-0025-0031
#10-32 Screws (2)	503-0002-0131
Clip Nuts (2)	302-2508-0131
Ferrite Choke	175-0018-0031
LCD (16 characters by 2 lines) with Cable	153-0009-1131
Membrane Switch	631-0014-0031
Table-Top AC Transformer (included with Model 3615)	654-0099-0131
Model 3615 Digital (DDS) Network Interface Cable – RJ48S	
Network Cable (14′ cord included with 3615)	14′— 035-0267-1431 25′ — 035-0267-2531
8-pin to 6-pin Modular Cable (for the Model 3615 in Canada)	7′ — 035-0279-0031
Model 3615 2-Wire Switched 56 kbps Network Interface Cable – RJ11C	14′— 035-0266-1431
Model 3615 Dial (PSTN) Interface Cable	
Telephone Cord 6-pin Modular RJ11C/Permissive PSTN Plug – D4BU	7′ — 035-0274-0731 14′ — 035-0266-1431 25′ — 035-0274-2531
Telephone Cord 8-pin Modular RJ45S/Programmable PSTN Plug – D8W	2.5′ — 035-0116-0231 14′ — 035-0116-1431 25′ — 035-0116-2531

* For use by Field Service personnel.

Equipment*	Part Number
Model 3615 25-pin Plug to EIA-232 Plug Cable for extended circuits (select one)	
EIA-232 Crossover Cable	15′—818-2759-0111
Pin-to-Pin EIA-232 Cable (straight connection)	10′—835-4507-1011
V.35 Crossover Cable	15′—835-1092-0011
Model 3616 Digital (DDS) Network Cables	
50-pin to eight 6-pin Multiple Network Interface Adapter[1] (Model 3616 in Canada)	1.5′—035-0258-0231
50-pin to eight 8-pin Multiple Network Interface Adapter[1] (Model 3616 in U.S.A.)	1.5′—035-0256-0231
Model 3616 Dial (PSTN) Network Cable Adapter[1]	
50-pin to eight 6-pin RJ11C/Permissive Cable	1.5′—035-0255-0231
50-pin to eight 8-pin RJ45S/Programmable Cable	1.5′—035-0257-0231
3600 Hubbing Device	870-1669-5100
NMS Adapter Cable/Diagnostic Extension	1.5′—035-0173-0031
NMS EIA-232-D Interface Connector	
Central-site 25-Pin to 6-Pin (873A) Adapter	002-0025-0031
Remote-site 25-Pin to 6-Pin Adapter	035-0185-5031
10-Pin to 6-Pin Cable – M6BK	5′—035-0106-0531
NMS 6-pin Modular Cable – M6BK	3′—035-0145-0331 10′—035-0145-1031 25′—035-0145-2531
[1] These cables are extended using a 035-0254-1031/3031 cable.	

* For use by Field Service personnel.

Glossary

auto backup — A function of the dial backup module (DBM) or carrier-mounted dial backup unit, whereby the DSU activates the DBM to reestablish a line automatically when a facility alarm is detected from the DDS network.

auto restoral — A function of the DBM whereby the DSU automatically returns to the DDS network when service is restored over the private line. On point-to-point circuits, the DSU test the integrity of the DDS network before switching data back to the private line.

callback directory pointer — The directory entry in an originating DBM consists of the answering DBM's telephone number, a delimiting character, and a callback pointer. The pointer identifies the originating DBM's telephone number in the answering DBM's Backup Directory.

carrier — The DSU device for mounting circuit cards that contains 17 slots: 1 control slot for an SDU, with 16 DSUs and DBM or modem slots.

carrier-mounted — A Model 3616 DSU that is designed for installation in a COMSPHERE 3000 Series Carrier and used at central-site operations. Up to 16 DSUs can be installed per carrier, with 6 carriers per cabinet.

channel — A channel is an independent data path used for full-duplex transmission of customer data.

CMI — Control Mode Idle. A control signal sent over the DDS line to indicate that no data activity is being sent.

control — A DSU, DBM, or modem that is, for diagnostic purposes, at the logical head of a hierarchical network. It is the unit from which tests and commands are issued to other units on the same circuit. There is only one control per link.

Control Channel (CC) — The diagnostic interface between an NMS and the SDU.

core — A function of the circuit card that provides data transmission capability. With a DualFlow DSU, there are two cores – one in the DSU and one in the DBM; data can be transmitted through either. The function of the DSU that is normally running when power is supplied to the unit is the *primary core*. The core that is transmitting data is the *active core*.

CSA — Canadian Standards Association.

CTS	The state of the Clear-to-Send lead (V.24 circuit 106).
Data Service Unit (DSU)	A DCE device that interprets, interfaces, and provides timing and signal control between a DTE device and a digital network.
Data Terminal Equipment (DTE)	A computer or peripheral device, such as a terminal or printer; a data source or sink.
DBM	The dial backup module for the DualFlow DSU. This module provides an alternate data path for carrying router data. Three types of DBMs are available: V.32 DBMs (14.4 kbps) for backup through the PSTN (dial network), 4-wire Switched 56 DBMs for backup through the 4-wire Switched 56 kbps digital service, and 2-wire Switched 56 DBMs for backup through the 2-wire Switched 56 kbps digital service. (*The 4-wire Switched 56 DBMs are only available in the U.S.*)
DDS	Digital Data Service, such as ACCUNET Spectrum of Digital Services, that provides digital (not dial) communication circuits.
dedicated backup	A dial backup module (DBM) assigned to a particular DSU that is continually available for service restoral. The DBM switches to Dial Backup mode automatically if the router detects data errors; no switching is required.
Diagnostic Control Panel (DCP)	The face of the Model 3615 DualFlow DSU that continuously provides status information about the DSU's operation and allows an operator to manage its operation. This is a generic term used for both the standalone and carrier-mounted DSU models. See shared diagnostic control panel (SDCP) for the Model 3615 DualFlow DSU.
dial string	A sequence of up to 36 characters that the DBM can send into the dial network to establish a call to a remote backup device. It consists of a telephone number and may include other information, such as a callback directory pointer.
DIP switch	Dual In-line Package switch.
Direct Distance Dialing (DDD)	Telephone exchange service, the Public Switched Telephone Network (PSTN or dial network) that enables a telephone service user to access telephone lines without operator assistance.
DMI	Data Mode Idle. Refers to a sequence of 1s transmitted or received on the DDS or Switched 56 kbps network. When the DSU Port and DBM Port branch configuration option *RTS Cntrl* is set to FrcOn, the DSU will transmit DMI whenever RTS is Off. Data Mode Idle operation is recommended for point-to-point applications. and is also used for Switched 56 kbps call set up signaling.
DSR	The state of the Data Set Ready lead (V.24 circuit 107).
DTR	The state of the Data Terminal Ready lead (V.24 circuit 108).
errored second	A performance measurement reported during a Digital Test that is defined as a second in which at least one error has been detected.
Facility Alarm (FA)	A failure condition reported to the NMS when there is a break in communication with one or more tributary.

fallback	Retraining of a V.32 DBM at a lower rate or speed.
FCC	Federal Communications Commission. Board of commissioners that regulates all interstate and foreign electrical communication systems that originate from the United States.
Front-End Processor (FEP)	A communications computer associated with a host computer that manages the lines and routing of data through the network.
IEC	InterExchange Carrier. A company that provides inter-LATA (local exchange carrier) telecommunication services, like AT&T, MCI®, and US SPRINT®. Access to these services can be provided through DDS dedicated channels, a T1.5 dedicated access channel, or digital switched access (DSA) channels.
LADS	Local Area Data Set (also called a limited-distance modem or LDM). This refers to a mode of operation where the control and tributary DSUs are directly connected but not passing through a DDS network.
LATA	Local Area Transport Area. A region served by a local exchange carrier (LEC) that consists of one or more area codes.
LCD	Liquid Crystal Display. A thin sandwich of two sealed glass plates containing liquid crystal material. When voltage is applied, the amount of light able to pass through the glass plates is altered so that messages may be “written” on the display.
LEC	Local Exchange Carrier. A company that provides *intra*-LATA (local exchange carrier) telecommunication services, like NYNEX or Bell South.
LED	Light-Emitting Diode. A light or status indicator on the diagnostic control panel (DCP) that glows in response to the presence of a certain condition (e.g., Alrm).
link-level address	NMS communications are directed to a tributary via a link-level address. It takes the form of control network address/tributary network address (e.g., 157/04 – DSU control address of 157 and tributary address of 04).
LSD	The state of the received Line Signal Detect lead (V.24 circuit 109).
Network Management System (NMS)	A set of diagnostic and configuration management tools for a data communication network, consisting of software programs and dedicated computer hardware.
non-disruptive diagnostics	Diagnostics that are transmitted over the in-band secondary channel or routed through a DBM in Standby mode so that bandwidth assigned to the data is not affected.
non-disruptive session	Executing the command will not disrupt primary data.
permissive interface	A dial modem operating mode characterized by a fixed output power level of –9 dBm. It is one of two possible operating modes for a DBM connected to dial lines (see programmable interface).
option sets	Sets of configuration options that are related and fulfill a specific function. For example, the DBM option set, which allows you to configure the DBM to perform backup and restoral functions.

point-to-point circuit	A data network circuit with one control and one tributary.
rate adaption	Used when the DSU or DBM operates at a speed greater than the DTE. This capability is enabled automatically when the port speed is set lower than the line speed.
router	A device that makes decisions about the paths network traffic should take and forwards that traffic to its destination. A router helps achieve interoperability and connectivity between different vendor's equipment, regardless of the protocols used.
RTS	The state of the Request-to-Send lead (V.24 circuit 105).
RXD	The state of the Received Data lead (V.24 circuit 104).
session disruptive	Application data may be disrupted when running a test, or running the test may cause the application session to be dropped or terminated. The result depends upon the time-out parameters, etc.
session-nondisruptive diagnostics	Diagnostic messages with a duration of .5 seconds or less that are sent over the primary data channel. These messages may interrupt customer data, causing errors requiring retransmission of data blocks. They should not, however, cause termination of the communication session.
Shared Diagnostic Control Panel (SDCP)	A feature that allows carrier-mounted DSUs to share the same control panel. Installed on one COMSPHERE 3000 Series Carrier, it controls and monitors the DSUs in all the carriers in the cabinet.
Shared Diagnostic Unit (SDU)	A circuit card that plugs into a dedicated slot (slot 0) in the COMSPHERE 3000 Series Carrier to provide the shared diagnostic control panel (SDCP) and network management interfaces to the DSUs in the carrier. It translates the network management protocol to the devices in the carrier and routes incoming messages to the appropriate slots.
standalone	The Model 3615 DualFlow DSU that is designed for desktop operation. A standalone DSU can be configured as either a control or a tributary.
Switched 56 kbps digital service	A service provided by local exchange and interexchange carriers (LECs and IECs) that allow customers to use high-speed switched digital data capability without having to subscribe to private network services.
Switched mode	Used in networks containing only DualFlow DSUs, it is a mode of operation using control mode idle (CMI) and data mode idle (DMI) signaling in order to ensure protocol independence of primary data while trapping diagnostic data in the DSU.
training	The process of negotiating a communication rate between V.32 modems during call setup.
tributary	A DSU or DBM that is, for diagnostic purposes, at a logically subsidiary level in a hierarchical network. Tributary DSUs in a network receive data from the control DSU, as well as from any network management system present in the network.
TXD	The state of the Transmitted Data lead (V.24 circuit 103).

winkback detection	In telephone switching systems, a momentary signal state change from control mode idle (CMI) to data mode idle (DMI), and back to CMI (sometimes referred to as a “wink start’’).
6700 Series Network Management System (NMS)	A Paradyne automated network management system that allows an operator to monitor network conditions, analyze problems, and take restorative measures from a single personal computer (PC) workstation. This NMS operates in a Microsoft® Windows™ graphic environment.
6800 Series Network Management System (NMS)	A Paradyne automated network management system that allows an operator to monitor network conditions, analyze problems, and take restorative measures.

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