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DATA SUBSCRIBER INTERFACE DESCRIPTION AND LINE ASSIGNMENT LOCAL AREA DATA TRANSPORT NETWORK NETWORK ADMINISTRATION

CONTENTS PAGE

CONTENTS PAGE

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CONTENTS PAGE

Tables

1. GENERAL

1.01 This section provides Network Administration with a general description of the Data Subscriber Interface (DSI) of the Local Area Data Transport (LADT) network, and provides assignment techniques and considerations to be used for the line administration of a DSI.

1.02 Whenever this section is reissued, the reason(s) for reissue will be listed in this paragraph.

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 The terms and specifications provided in this document are relative to LADT Generic 1, Release 1A. Any references to the No. 1 Packet Switching System (PSS) packet switch relate to Version 2.0, Release 2.0.

1.05 It should be noted that the components for service offerings similar to LADT may have different names but perform like functions. This document is generally based on the LADT service offering implemented in the Florida area, which employs AT&T Technologies, Inc. products.

2. NETWORK OVERVIEW

2.01 The LADT network is a premises-to-premises, optional data service that provides for the transmission of customer data messages. This system uses packet switching technology to provide an end-to-end connection between subscribers in a local serving area and the data service vendor(s), and to provide an effective means of transmitting the data between these two types of customers. Customers served by the LADT network can be described as residential subscribers, businesses, and those data service vendors providing data service systems to the residence and business subscribers.

2.02 The LADT network provides an efficient method of data transmission between the subscribers and the information service providers (data service vendors) by supporting three primary functions:

- Originating access to the network via dial-up and direct access facilities
- Statistical multiplexing whereby bursty data from many customers are combined onto a single high-speed data stream
- Packet switching whereby data packets from one customer are routed to other customers.

NETWORK ARCHITECTURE

2.03 The Generic 1, Release 1A LADT network is comprised of three basic components:

- Access Concentrator (AC)
- Packet Switch (PS)
- Administrative Processor (AP).

2.04 A diagram of the basic architecture of the LADT network is provided in Fig. 1. The AC used for initial service is called a DSI. The packet switch employed is from the No. 1 PSS. Figure 1 depicts these network components and their relationships to each other as well as to the customers (subscribers and data service vendors). A brief description of the individual components is provided in the following paragraphs.

2.05 The DSI planned for initial service is a statistical multiplexor that terminates customer lines on one side and the LADT network links on the other. The function of a DSI is to accept data from these terminals and to transmit the data to the packet switch. The DSI performs various operations to communicate with the subscribers and to multiplex up to 124 (physical line capacity when 100 percent equipped with dial-up circuit packs) customer lines onto a single 56 kb/s data facility, which interconnects with a packet switch.

2.06 The No. 1 PSS packet switch is the network component used for the routing and transport of data packets. In addition, this component provides direct terminations and billing for the service vendor lines. The packet switch functions much like a central office; it switches the data packets within the LADT network. The packet switch also has the capability to set up and tear down calls within the LADT network. In the future the packet switch will also provide a gateway function to a Long-Haul Packet Network (LPN). The LPN will provide an interconnection between local serving areas as well as access to data service systems

not connected to LADT.

2.07 The AP contains the programs that are responsible for the LADT network integrity, network management, network service (such as billing and traffic measurement) and network maintenance of the DSIs. These functions will eventually become centralized and, with a new generic, will be included in the packet switch as an AP feature.

ACCESS ARRANGEMENTS

2.08 Local LADT subscribers access the network by establishing a connection to a DSI. The method by which a subscriber gains access to a DSI is dependent upon customer needs, the physical distance from the appropriate central office housing a DSI, and the physical characteristics of the exchange cable pair. Customer access can be via one of the following methods:

- Dial-up access
- Direct access.

A. Dial-up Access

2.09 In the case of dial-up access, a customer must establish a connection to a DSI dial-up port. The connection is initiated when the customer's telephone goes off-hook, and, after receiving a dial tone, the customer dials a telephone number assigned to the LADT network. If the customer's terminal is provided with an automatic dialer, once the terminal is turned on and the DIAL button depressed, the terminal will automatically dial the network number. In either case, once a dial-up port at a DSI answers, the connection is established. The customer can then begin to use the LADT network to gain access to a data service vendor.

2.10 The dial-up access ports used when these calls are initiated are a group of shared ports that terminate on one or more central office hunt groups. These multiline hunt groups (MLHGs) are established at the time the DSIs are installed. Uniform call distribution (UCD) and circle hunt should both be assigned to the MLHGs.

2.11 A sample configuration of one type of dial-up access is provided in Fig. 2. In this sample, the orginating customer is a subscriber to a central office equipped with a DSI. By using the customer's local telephone service jointly with a data terminal, the customer dials a dedicated number to the MLHG. The local switching machine treats the call like any other POTS call, but rather than switching it to another local subscriber, it switches the call to an available DSI dial-up port.

2.12 Figure 3 provides another type of arrangement for dial-up access. In this type of configuration, the customer's local telephone service is provided by a central office that is not equipped with a DSI. In this case the placement of a call to the LADT network is, from the subscriber's vantage point, the same. However, the call must be routed to a central office that is equipped with a DSI. This is accomplished by routing the call over an interoffice trunk terminating in a DSI-equipped distant central office. The call becomes an incoming call into the distant central office and is then terminated on a DSI dial-up port via the MLHG.

2.13 The establishment of a dial-up call to the network requires joint use of the local telephone service and a data terminal. It is for this reason that a dial-up customer cannot use voice and data services simultaneously.

B. Direct Access

2.14 Direct access to a DSI is through the use of a voice/data multiplexing device called a data SLC*carrier system. With this facility, a permanent connection exists between the customer's data terminal and a data SLC carrier system port on a DSI. To establish a connection to the LADT network, the customer need only turn the terminal on.

2.15 Direct access is available only to those customers who subscribe to local service in a central office equipped with a DSI. Data SLC carrier system facilities are physically restricted to nonloaded loops generally less than 18 kilofeet in length.

2.16 As shown in Fig. 4, the multiplexing device allows both voice and data to be transmitted over customer telephone lines simultaneously. The data and voice are then at the central office, so that telephone traffic is passed to the central office equipment, while data is passed to a DSI. With this type of multiplexing, the customer has the freedom to use telephone and data service concurrently or independantly; one service does not preclude the use of the other service.

*Trademark of AT&T Technologies, Inc.

3. DATA SUBSCRIBER INTERFACE

3.01 The DSI provides points of access to the LADT network for dial-up and direct access customers. It provides communications between the line subscribers and a single packet switch. This is accomplished by multiplexing the up to 124 subscriber lines onto a single 56 kb/s data link to the packet switch. All customer data to and from the LADT network and the required network control information pass over the DSI to packet switch data link. An illustration of a DSI and its interaction with LADT subscribers and the packet switch is shown in Fig. 5. In this figure all three types of subscriber access are shown:

- Dial-up access where the subscriber's local central office **is not** equipped with a DSI
- Dial-up access where the subscriber's local central office **is** equipped with a DSI
- Direct access through the use of a data SLC carrier system device.

3.02 The DSI is configured as a simplex unit. Single failures in common equipment can affect service to all lines. However, a failure in the per-subscriber equipment will only affect the one subscriber.

PHYSICAL DESCRIPTION

3.03 To obtain convenient access to subscriber loops, DSI frames are usually installed in telephone central offices, in the quantity necessary to support customer demand. Each DSI frame is labelled with a number unique to the particular frame. As shown in Fig. 6, each DSI frame provides adequate housing for two DSI units and one -48 volt fuse panel unit. The DSI unit located at the top of the frame is labeled DSI 0, while the lower DSI unit is labeled DSI 1. The numbering of the DSI units is common in all DSI frames.

3.04 A DSI unit (hereafter referred to simply as a DSI) can be subdivided into three functional subunits. Two of the subunits are identified as line groups, and the third subunit is the processor complex. Figure 7 shows a layout of a DSI, with line group (LG) subunit 0 located in the upper housing, LG subunit 1 located in the lower housing, and the processor complex subunit housed between the two LGs.

3.05 Each LG is made up of circuit packs and power converters. The function of these subunits is to terminate the subscriber lines and to multiplex the data streams from these lines into the processor complex. A fully equipped DSI has a total of 32 slots for circuit packs, 31 of which are available for subscriber terminations. These slots are numbered from left to right, starting with zero. The LG 0 contains slots 0 to 15. Slot 0 is reserved for use as the test access circuit (TAC) for maintenance and testing of the DSI. LG 1 contains the remaining slots for the circuit pack, specifically slots 16 to 31.

3.06 The processor complex subunit controls the LG subunits. It contains the intelligence of the DSI, the communications protocol handling functions, and the network and craft interfaces for inquiry.

LINE EQUIPPAGE

3.07 To equip a DSI for customer access lines, quantities of dial-up and data SLC carrier system line cards or circuit packs must be installed in each LG. Since each LG has its own group distributor circuit (GDC) and power converters for the line cards within that group, some degree of service protection and reliability is provided. Therefore, when equipping a DSI 100 percent, the two types of customer access line cards should be spread between the two LGs.

3.08 When a DSI is less than 100 percent equipped after initial installation, the recommended circuit pack (line card) equipping sequence is different from that stated in the previous paragraph. In this case consideration is given to thermal (heat dissipation) and power realiability. Table A provides the suggested order when equipping a DSI on an as needed basis.

A. Dial-up Access Lines

3.09 Dial-up access to the LADT network is where a customer dials a specific number and is switched to a dial-up modem in a DSI. These modems are installed and wired to the switch in batches, not on a per service order basis.

3.10 Each dial-up modem port pack has a maximum of four available ports, numbered 0 to 3. Each of the four ports on a specific pack, or line card, are part of a large MLHG that serves all dial-up subscribers. The size of the MLHG could equate to the total number of dial-up line cards installed, multiplied by the four ports per line card.

B. Direct Access Lines

3.11 Direct access refers to the use of a data SLC carrier system to provide a subscriber constant access to a DSI. A data SLC carrier system device is installed at the customer premise and another one is connected at the central office. The central office devices may be installed in a DSI in batches, but are only wired to the customer's line and to the switch on a service order basis.

3.12 Each data SLC carrier system port pack can currently serve a maximum of three subscribers. The back of the DSI frame is wired for four ports so that these packs can be replaced by dial-up pack if necessary. The limitation of three direct access ports per circuit pack is, then, a physical limitation of the pack. These ports are numbered 0 to 2; port number 3 is not applicable.

3.13 Once a port on a data SLC carrier system line card is assigned to a subscriber, a Data Terminal Number (DTN) is also assigned for the identification of the customer's data terminal. This DTN is initially used for billing purposes and for routing terminal-to-data vendor calls. As the LADT service evolves, the DTN will also be used for interterminal and data vendor-to-terminal calls. Therefore, some discretion should be exercised to control the number of data SLC carrier system line cards initially installed in a DSI. Once assignments are made, any efforts to deload data SLC carrier system facilities in order to increase the size of the dial-up MLHG could result in a number change for some subscribers.

CAPACITIES

3.14 A DSI has a physical capacity of 32 line cards (0 to 15 in LG 0 and 16 to 31 in LG 1). Each line card can provide up to four access lines, or ports, for a total of 128 lines, numbered 0 to 127.

3.15 Slot 0 of LG 0 is reserved as the test access circuit (TAC). This eliminates the four ports associated with the line card for this slot in terms of availability for assignment to either the MLHG serving dial-up customers or to direct access subscribers.

3.16 The actual number of customer access lines for a specific DSI is dependent on the number of dial-up and data SLC carrier system line cards equipped. Each DSI may, then, have a unique capacity. A DSI may be equipped with a maximum of:

- 124 dial-up access lines (31 dial-up line cards multiplied by 4 ports/card)
- 93 direct access lines (31 data SLC carrier system line cards multiplied by 3 ports/card)
- Any combination of the above.

3.17 To determine the exact physical capacity of a DSI in terms of access lines, Line and Number Administration must have knowledge of the total number of line cards equipped, by type of card. A capacity determination can then be figured separately for dial-up access lines and for direct access lines as follows:

(X Line Cards) × (N Ports) = Line Access Capacity

Where X equals the total number of dial-up or data SLC carrier system line cards, and N equals four ports for dial-up line cards and three ports for the data SLC carrier system.

LINE ASSIGNMENT CONSIDERATIONS

3.18 The line and number adminstrator is responsible for all line assignments for a DSI. A line assignment is the specific determination of use for each of the maximum 124 customer access lines for a given DSI. This involves the association of dial-up lines and line cards to the MLHG and the provisioning of assignment lists for service orders for direct access lines.

3.19 In order to determine line assignment procedures, it is necessary to first understand the numbering scheme of DSI lines. The insert following this paragraph provides a complete line to line card association for a fully equipped DSI. From this it can be seen that LG 0 (line cards 0-15) are even-numbered lines, and LG 1 (line cards 16-31) are odd-numbered lines. The lines are numbered starting with port 0 of line card 0, LG 0, and then alternating to port 0 of line card 16, LG 1. The alternating between LGs until Port 0 on each line card is assigned.

LINE GROUP 0																
LINE CARD	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
PORT 0	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
PORT 1	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62
PORT 2	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94
PORT 3	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126
LINE GROUP 1																
LINE CARD	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
PORT 0	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
PORT 1	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63
PORT 2	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95
PORT 3	97	99	101	103	105	107	109	111	113	115	117	119	121	123	125	127

3.20 The first port, port 0, is numbered first, alternating between LGs until all lines for port 0 are numbered. Then port 1 for all line cards is numbered, again starting with line card 0 in LG 0, and alternating to end with line card 31 in LG 1. The same numbering scheme is used for port 2 in all line cards, and likewise for port 3, until all 128 lines have been numbered. In this way, the line numbers for each port of a specific line card have value differences of 32. For example, the DSI line number for port 0 on line card 4 is line number 8. Port 1 on the same line card is line number 40, and ports 2 and 3 are line numbers 72 and 104, respectively. All four ports on every line card are given a line number, regardless of whether it is a dial-up line card, a data SLC carrier system line card, or the line card for the test access circuit (line card 0). This procedure eliminates any confusion in the use of these ports.

A. Dial-up Facilities

3.21 All dial-up access lines will be associated with MLHG terminals. Therefore, DSI ports and line numbers associated with dial-up line cards will normally be assigned during the initial installation of the DSI.

3.22 A variety of DSI line number to MLHG terminal number assignment patterns are acceptable and should be chosen to minimize local administration and maintenance concerns. Since all four ports on a dial-up line card can only be used for dial-up access, there is no need to be selective in terms of which ports (0 to 3) are to be assigned to the MLHG. All line cards identified as dial-up will have all four ports assigned to this hunt group.

3.23 Some consideration should be given to the amount of dial-up line cards installed in each of the LGs. As stated in paragraph 3.07, the optimum method to equip a DSI is to evenly spread the line cards over both LGs. When line assignments are made for the DSI dial-up lines to the MLHG, it would be appropriate to ensure that the configuration of the equipped lines will provide the maximum amount of service protection.

3.24 There is no method in which to balance the load on the four ports per dial-up line card, since any subscriber may access any DSI dial-up port. Therefore, any attempts to evenly distribute traffic must be accomplished via the MLHG assignments. This can be achieved by assigning the DSI line numbers in a numerical ascending order to the MLHG terminations. Uniform call distribution or serial hunting for the switching machine would then be employed to apportion the load over all line cards. Once traffic patterns indicate a serious load on specific DSIs within the network, load balancing can be accomplished by rehoming originating traffic from central offices that are not equipped with DSIs.

B. Direct Access Facilities

3.25 The association of DSI line numbers and ports to data SLC carrier system line cards will normally be assigned at the time of service provisioning. This assignment strictly refers to the DSI line numbers of ports 0 to 2 (port 3 is unassignable) in relationship to the locations (slots) of the data SLC carrier system line cards in a LG. The actual assignment of a direct access line to a new subscriber will occur via an assignment list at the time the service order is processed.

3.26 When compiling assignment lists for use by the Loop Assignment Center (LAC), specific assignment procedures should be determined locally to minimize local administration and maintenance concerns. From a maintenance standpoint, it may be more feasible to fill up all ports on a particular line card before moving to another line card. This may reduce the circuit pack inventory requirements for maintenance, as additional packs may be ordered as each pack (line card) becomes full. However, this method does not take into consideration the affect of imbalance in the multiplexing circuitry and will not provide the maximum amount of service protection. If a line card is taken out of service for either maintenance or provisioning purposes, it is likely that with this method of assignment a greater number of subscribers will be negatively impacted.

3.27 With consideration given to service protection and load balance, an alternative is to uniformly assign the direct access subscribers across all data SLC carrier system line cards in both LGs. This method can be accomplished by making available for assignment the DSI numbers in a numerical ascending order. A review of Table A substantiates that this method will employ a single port on each of the data SLC carrier system line cards, alternating between LGs, until port 0 on each line card is assigned.

3.28 From this point, further assignments can be made using the same method, but employing a second port (port 1) on all line cards until all lines are assigned, and then employing the third port (port 2). This assignment method provides optimum service protection and a gradual and equitable balance of subscribers on all line cards. It is imperative to attempt to balance the subscribers during the intial assignment process, as any attempt to load balance the data SLC carrier system line cards from a usage standpoint could result in a number change for a subscriber (refer to paragraph 3.13).

LINE ASSIGNMENT PROCEDURES

A. Definitions

3.29 The assignment of DSI subscriber terminations requires the association of two modules of information. Each module is made up of certain values that represent a specific, defined portion of the LADT network. The first module is the multiplexor physical (MUXP) port location. The second module is the multiplexor logical (MUXL) port location. Each of these modules is further described in the succeeding paragraphs.

Multiplexor Physical Port

3.30 The MUXP port location indicates the termination on a DSI frame of a plugged-in dial-up or data SLC carrier system line card. The MUXP port will be unique within a given central office, but will be repeated in subsequent central offices. It can be considered the "office equipment" for the LADT network.

3.31 The MUXP module is a 6-digit hyphenated number. A table for the MUXP module field identification is shown following this paragraph. The first two digits of the number represent the DSI frame number. These numbers can range from 00 to 99. The third digit represents the DSI unit number. The value for this field is either 0 or 1. The fourth and fifth numbers (the first two to the right of the hyphen) make up the number of a specific line card. Since there are 32 possible cards, the numbers will range from 00 to 31. The last number of the MUXP module is the port number. As there are 4 possible ports on a line card, the value for this field ranges from 0 to 3.

MUXP FIELD	DEFINITION	NUMBER OF CHARACTERS	VALUES
FF	DSI Frams Number	2	00 to 99
U	DSI Unit Number	1	0 or 1
CC	Line Card Number	2	00 to 31
P	DSI Port Number	1	0 to 3*

*On data SLC carrier system line cards, ports are numbered 0 to 2.

3.32 The MUXP port is the physical location of an access line termination. In the LADT network, there is a need to identify this port in terms of its logical location. A record should be maintained of each MUXP and its associated MUXL.

Multiplexor Logical Port

3.33 The MUXL port represents the software identifier of a port in the DSI recent change data base and the LADT system data base in the AP. In the voice network, an office equipment's logical location is the same as the physical location identification. However, this is not true for the LADT network, since three additional pieces of information are required that are not provided with the MUXP module.

3.34 The MUXL module is a 7-digit hyphenated number consisting of the packet switch number, the DSI identification number, and the DSI line number. Since there is a physical data link between a packet switch and each DSI, the packet switch number and the DSI identification number remain constant within a given DSI. The variable field consists of values to the right of the hyphen, specifically the DSI line number. This line number has a fixed correlation to the line card number and the port number of the MUXP port, as indicated by the line to line card association depicted in Table A. If the line card number and port number of a specific subscriber or MLHG termination is known, then the line number can be determined by referring to Table A. Likewise, if the line number is known, the line card and port numbers can be determined.

3.35 A chart showing the breakdown of the MUXL and a description of the various fields follows this paragraph. The first field consists of two characters which represents the packet switch number. Appropriate values for this field can range from 00 to 09. The second field consists of two characters, and represents the DSI identification number. This number can be considered a translation for the AP of a given DSI within the LADT network, and will usually relate to the order in which the DSIs were turned up for service. (The DSI identification number is not necessarily the same as the DSI frame number. Therefore, a local defined mapping assignment between the DSI identification number and the DSI frame/unit number should be administered and maintained manually.) Appropriate values for this field can range from 01 to 20. The third field consists of three characters to the right of the hyphen. This field represents the DSI line number, and can range from 000 to 127.

MUXL FIELD	DEFINITION	NUMBER OF CHARACTERS	VALUES
S	Packet Switch Number	1	0 to 9
NN	DSI Identification Number	2	01 to 20
LLL	DSI Line Number	3	000 to 127

B. Procedural Guidelines

3.36 The operations required by the line and number administrator to assign subscribers to DSI access lines are dependent on the type of access service desired (dial-up or direct). For this reason, each type of service will be treated separately.

Dial-up Assignments

3.37 Dial-up service is provided by establishing a MLHG to the directory number of the LADT network. No special network equipment is required on the customer's premises; the customer provides the data terminal.

3.38 The size of the MLHG is determined by the number of dial-up line cards installed in a DSI. However, during the initial assignment process, adequate cushioning should be provided for possible growth of the MLHG. This flexibility can be incorporated into the assignment process by placing some of the hunting lines/terminals in a reserved state. Paragraph 3.40 provides additional information on this process.

3.39 At the time of the installation of a DSI, Network Administration should determine the amount of DSI ports equipped for dial-up service. This is accomplished by multiplying the total number of dial-up line cards by the four equipped ports per card. The result is the total number of required working hunting lines/terminals.

TABLE A

CIRCUIT PACK EQUIPPING SEQUENCE WITH LESS THAN 100% EQUIPPED (NOTE)

DIAL-UP MODEM EQUIPPING SEQUENCE	LINE CIRCUIT PACK POSITION	DATA SLC CARRIER SYSTEM CIRCUIT PACK EQUIPPING SEQUENCE	LINE CIRCUIT PACK POSITION
1	15	TAC	00
2	30	1	17
3	13	2	02
4	28	3	19
5	11	4	04
6	26	5	21
7	09	6	06
8	24	7	23
9	07	8	08
10	22	9	25
11	05	10	10
12	20	11	27
13	03	12	12
14	18	13	29
15	01	14	14
16	16	15	31
17	31	16	16
18	14	17	01
19	29	18	18
20	12	19	03
21	27	20	20
22	10	21	05
24	08	23	07
25	23	24	24
26	06	25	09
27	21	26	26
28	04	27	11
29	19	28	28
30	02	29	13
31	17	30	30
TAC	00	31	15

Note: Present traffic estimates allow a maximum of 21 dial-up modems to be equipped with 0 data SLC carrier system circuit packs. However, this table shows the equipping sequence beyond 21 modems in the event that traffic estimates change.

3.40 In addition, if a DSI is 100 percent equipped with a combination of dial-up and data SLC carrier system line cards, each data-SLC carrier system port should also be assigned a hunting line/terminal, but on a reserved basis. The reserving of these lines within the hunt group provides flexibility for the growth of the hunt group by changing out data SLC carrier system line cards to dial-up line cards (with engineering concurrence), and still allows for the assignment of all DSI lines in a numerical ascending order (refer to paragraphs 3.24 and 3.27). For this reason, all four ports on the data SLC carrier system line cards must be counted, and reserved lines assigned. The limitation of three ports per DSI line card is only if a data SLC carrier system line card is actually used to provide direct access service.

3.41 Once the size of the MLHG has been determined, with a separate accounting for working versus reserved requirements, the MLHG lines/terminals to DSI ports and lines (MUXP and MUXL) assignments can be made. The first MLHG line/terminal should be assigned to the first MUXP and MUXL. For example, if the packet switch were 0, the DSI frame number were 7, and the DSI identification number were 4, and the DSI line number were 0, the MUXP and MUXL would be assigned as follows:

- MUXP = 070-000
- MUXL = 00-04-000 (TAC assignment).

3.42 Likewise, the second MLHG line/terminal would be assigned an MUXP of 070-160 and an MUXL of 00-04-001. Assignment of the DSI would continue using the same pattern until all DSI line numbers have been assigned an either working or reserved MLHG line/terminal, based on a numerical ascending order. In addition to an "assigned" or "unassigned/reserved" status, the four hunting lines associated with the TAC circuits (LG 0, line card 0, DSI lines 0, 32, 64, and 96) should be statused as "control port." This eliminates any confusion in the actual use of these four ports.

Direct Access Assignments

3.43 Terminations to the LADT network for direct access lines is provided through the service order process. In the course of service orders assignments, assignment lists with MUXP to MUXL associations must be provided.

3.44 All data SLC carrier system terminations should be made available for assignment by the numerical ascending order of DSI line numbers. This is achieved by assigning port 0 of the lowest numbered data SLC carrier system line card first, and then assigning port 0 on all other subsequent data SLC carrier system line cards, until the total number of required assignments is met. It is important for the LNA to remain aware of the remaining line capacity, therefore, only a limited number of assignments should be made available. A spare level indicator should be designated on the assignment lists, so that the LAC will notify the line and number work group when a new list is required. When the requirements for data SLC carrier system terminations expand, a new assignment list can then be issued.

3.45 If a mechanized system is used to perform line assignment functions (eg, Computer System for Mainframe Operations (COSMOS), the DSI port availability per line card should be limited to a total of three ports (0-2). Port 3 and its associated line number(s) should be eliminated from the data base or shown as unavailable for assignment for all data SLC carrier system line cards.

3.46 Two pieces of information required for data SLC carrier system line assignments are the MUXP and the associated MUXL. However, the format of the assignment list is multicolumned. One column should be identified as "MUXP" and another as "MUXL." An additional space should be left for the LAC notation of the DTN. Together these three pieces of information respresent service for one data SLC carrier system subscriber.

Maintenance of Records

3.47 The maintenance of LADT access line records should be incorporated into the current methods of line assignment administration. Where possible, mechanized systems should be updated to include data base enhancements that would provide for permanent association of the MUXP to the MUXL, as well as the MUXP and the MUXL correlations to MLHG lines or to the DTNs. Otherwise, these correlations must be maintained on a manual basis. Any changes in a DSI's configuration of equipped dial-up and data SLC carrier system line cards will also require the updating of any line equipment records.

3.48 Maintaining accurate administrative records includes not only the retention of the MUXP and the affiliated MUXL and DTN, but also requires the posting of the current status of these assignments. Status can be defined as the recent change information that is maintained at a DSI. In order to provide a subscriber with working service, the assignment details of

the direct access service order and/or of the MLHG must be updated in the AP and downloaded into a DSI. Likewise, the statuses of the nonworking but equipped MUXP(s) and MUXL(s) are also maintained within recent change.

3.49 Line and number administration should verify the accuracy of the LAC and/or MLHG assignments against the current records by ensuring that they have been reflected in the recent change data base within the DSI, via the AP. This status check is done through the LADT On-Line Data Integrity (ODIN) system, by using one of two different methods:

- Customer line inquiry
- Inquiry using the Line Card Equipment Form.

3.50 Either inquiry requires the user to access the recent change data base using the administrative terminal associated with the AP. Once the data base has been accessed using the **CACT:LADT** command, inquiry commands are:

(a) *INQ LN (a,b):* This command allows the user to review the status of an individual customer's line. The "a" represents the DSI identification number and the "b" represents the DSI line number. Both of these assignments can be determined by reviewing the MUXL.

(b) *Line Card Equipment Form:* Once the Line Card Equipment Form is selected from the system menu, the user should use the "r" (review) processing mode. The two key fields on this form are DSI and CARD(-LINE). The DSI field requires the input of the DSI identification number (from the MUXL). The CARD(-LINE) field requires the input of the DSI line card, which can be found within the MUXP assignment. If the user prefers to use the DSI line number from the MUXL, the input would be a "-" (minus sign) followed by the DSI line number. The remaining fields on this card are mostly read only fields, and are not required to check the status of the line. The system will respond with a completed form, including

(1) The recent change status (not the maintenance status),

(2) The end point number (EPN), which is the group of the last four digits of the DTN, of either the individual direct access service or, in the case of dial-up line cards, the EPN of the MLHG,

(3) Whether any lines are associated with the MLHG.

Each card equipment form contains the information for each of the four available ports on a DSI line card. A sample Line Card Equipment Form is provided in Fig. 8. Additional information is provided in the LADT Input/Output Manual.

4. ABBREVIATIONS AND ACRONYMS

4.01 Abbreviations and acronyms used in this section are defined in the following list:

TERM	DEFINITION
AC	Access Concentrator
AP	Administrative Processor
COSMOS	Computer System for Mainframe Operations
DSI	Data Subscriber Interface
DTN	Data Terminal Number
EPN	End Point Number
GDC	Group Distributor Circuit
LAC	Loop Assignment Center
LADT	Local Area Data Transport
LG	Line Group (Subunit for the DSI)
MLHG	MultiLine Hunt Group
MUXL	Muxtiplexor Logical (Port)
MUXP	Multiplexor Physical (Port)
ODIN	On-Line Data Integrity (System)
PSS	Packet Switching System
TAC	Test Access Circuit

5. REFERENCES

5.01 The following sections should be used as references for additional information:

SECTION	TITLE
255-025-005	General Description—Local Area Data Transport Network
255-025-020	Local Area Data Transport System Administration
255-025-022	Data Terminal Numbers—Description and Assignments
255-025-023	Packet Switch—Assignment Guidelines
255-025-040	Local Area Data Transport Network—Traffic and Performance Measurements
255-025-041	Packet Switch Measurements—Description
255-093-010	Feature Document—No. 1 Packet Switching System Description
255-093-510	Feature Document—Data Subscriber Interface LADT Network

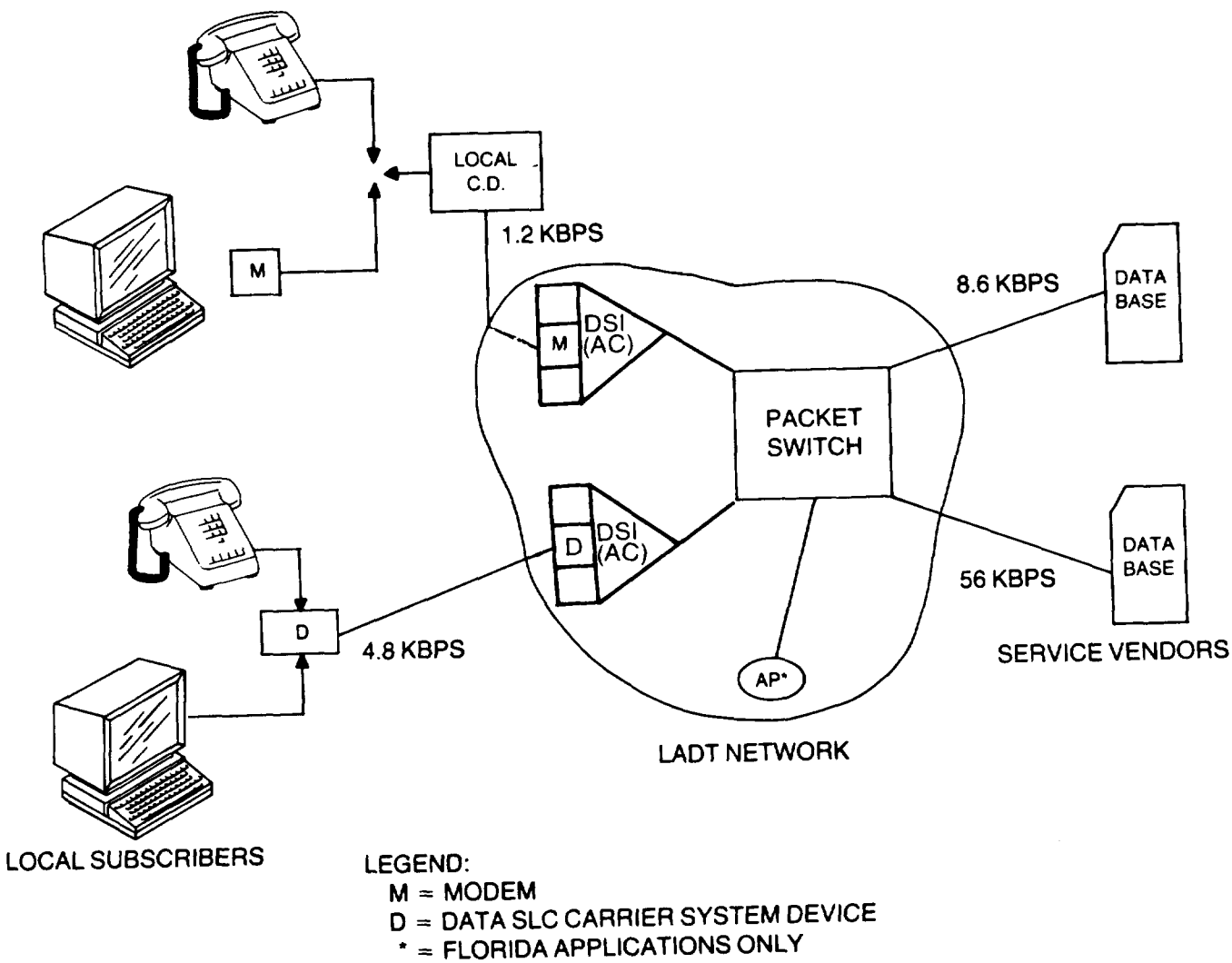
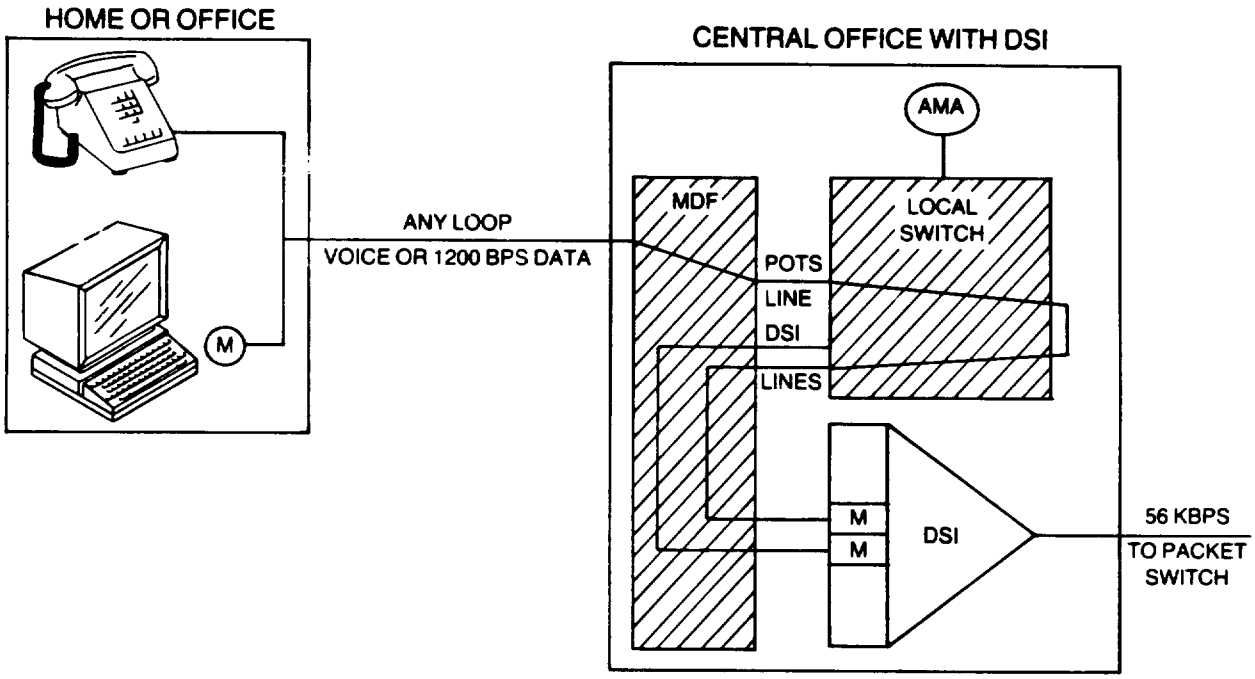


Fig. 1—LADT Basic Network Architecture (2.04)



- CUSTOMER DIALS 7 DIGIT NUMBER (DEDICATED POTS PREFIX)
- CALL ROUTED TO DSI
- CUSTOMER DIALS THE DATE NUMBER

Fig. 2—Dial-Up Access from Central Office With DSI (2.11)

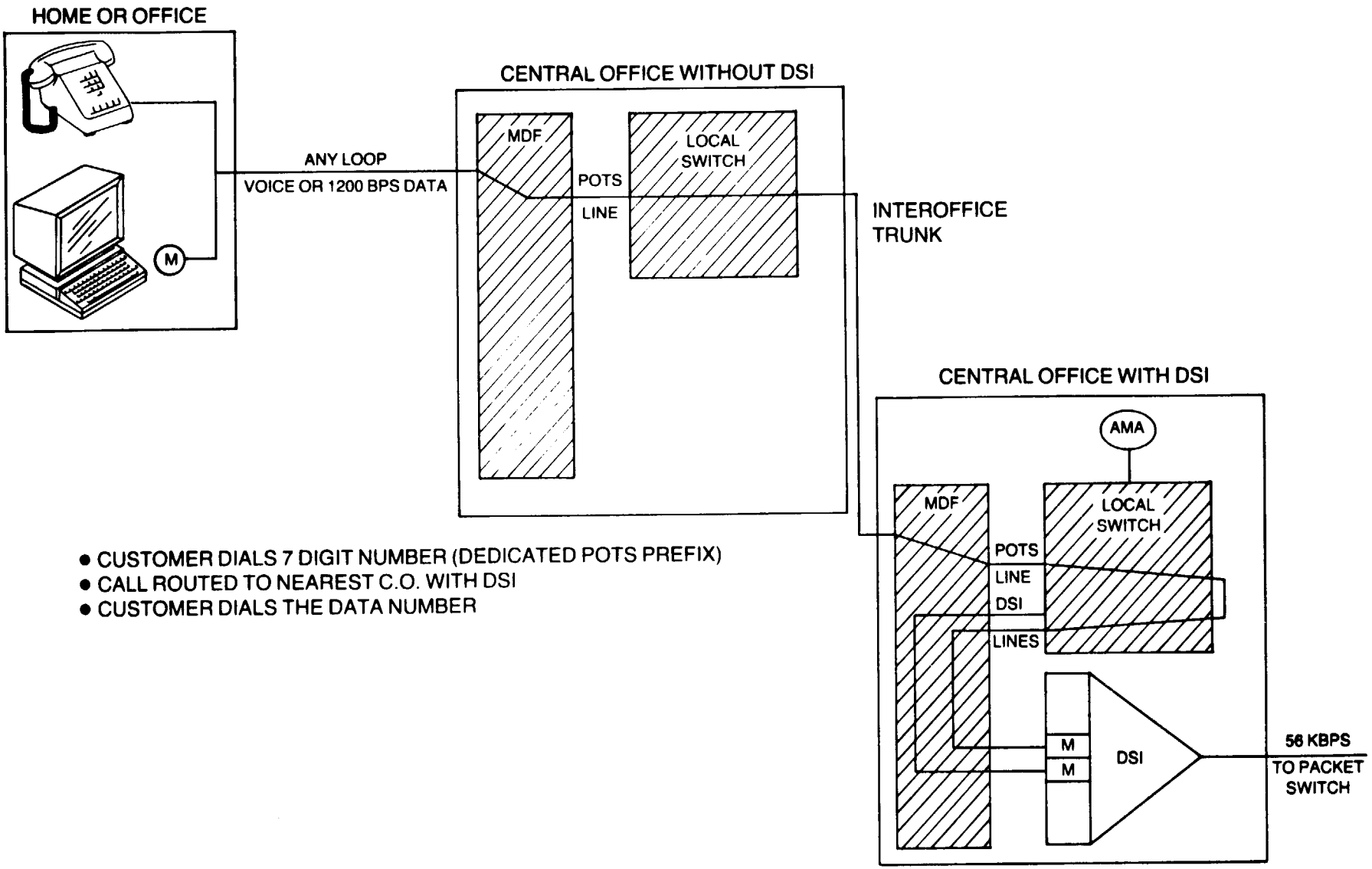
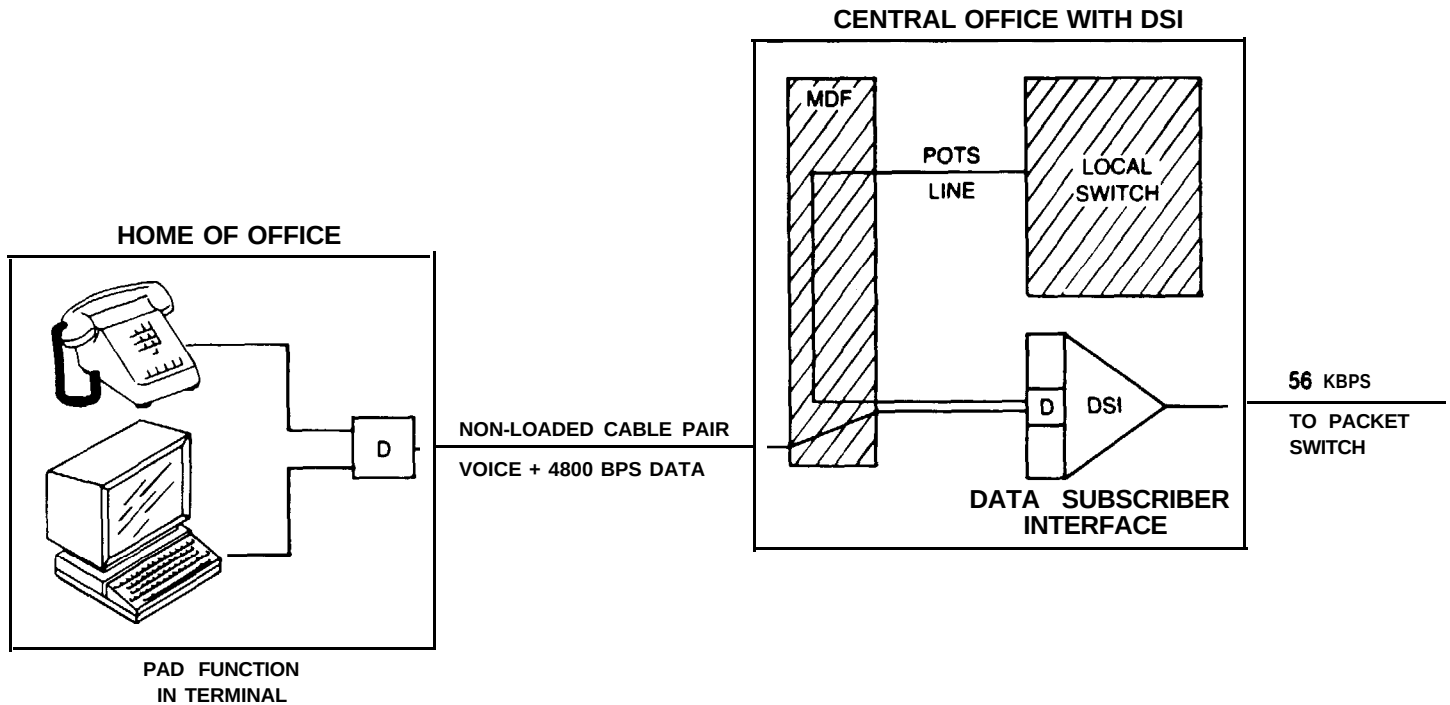


Fig. 3—Dial-Up Access from Central Office Without DSI (2.12)



- CUSTOMER DIALS DATA NUMBER

Fig. 4-Direct Access (2.16)

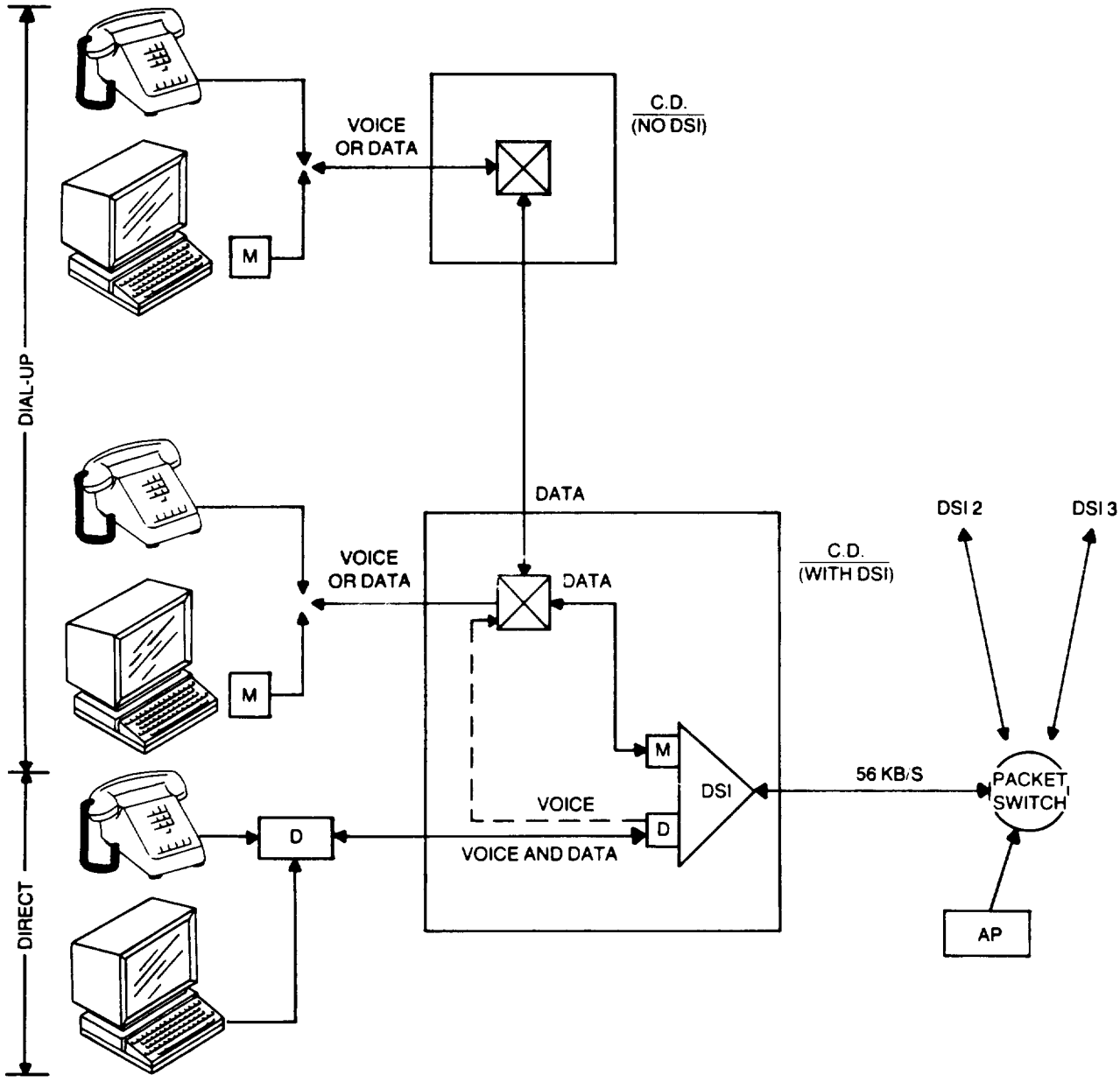


Fig. 5—Subscriber to DSI Interaction (3.01)

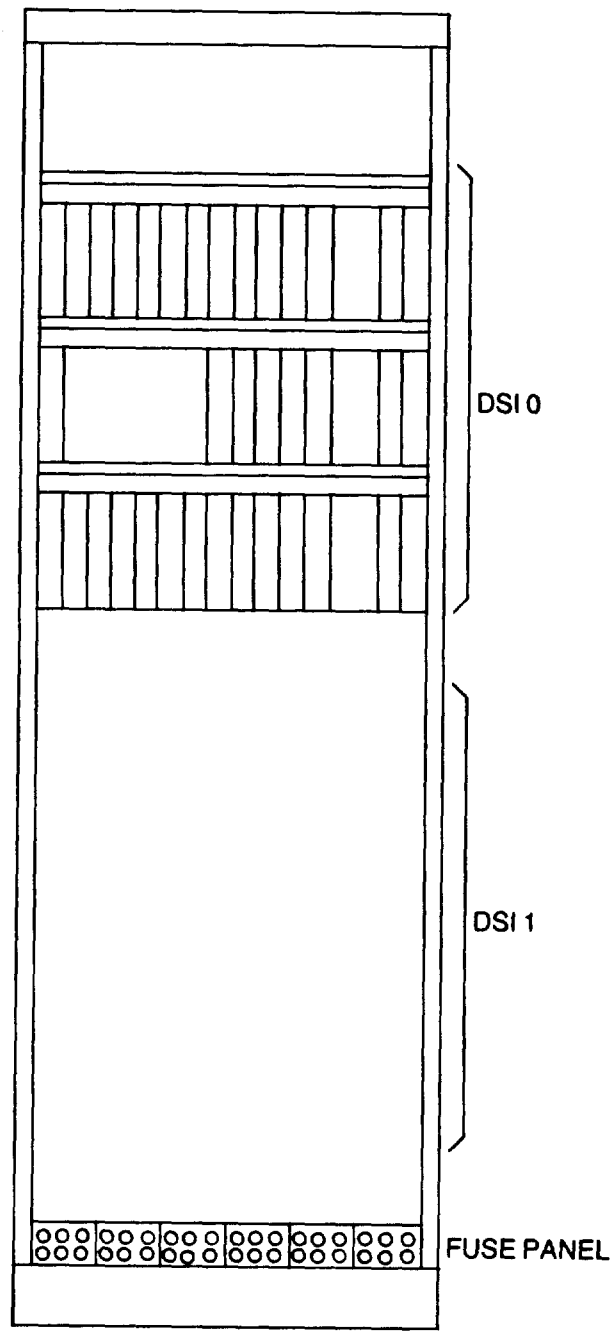
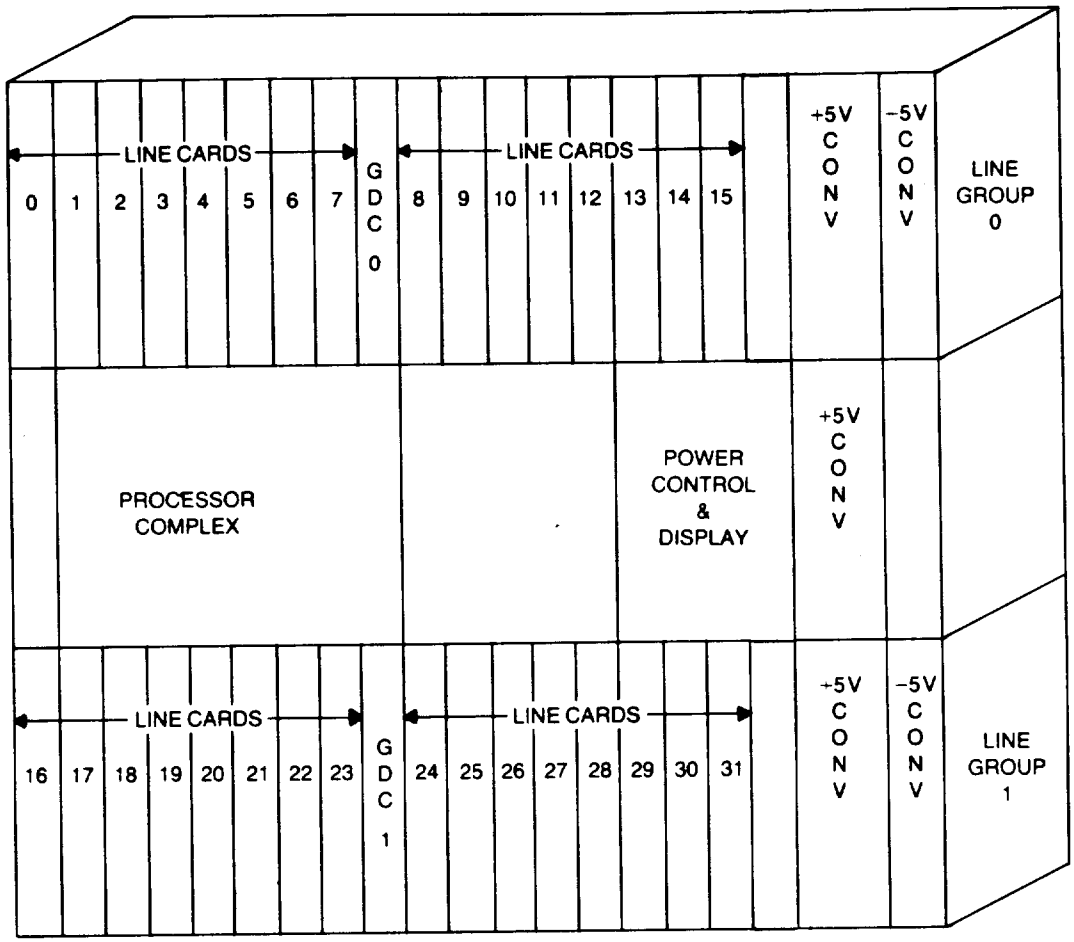


Fig. 6—DSI Frame (3.03)



LEGEND:
GDC = GROUP DISTRIBUTING CIRCUIT

Fig. 7—DSI Unit and Associated Circuit Packs (3.04)

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                    LINE CARD EQUIPMENT FORM

    *1. DSI: __    *2. CARD (-LINE): ____    3. GROUP: _
     4. DSI STATUS: ___          5. GROUP STATUS: ___
     6. SERVING REGION: ___      7. SERVING AREA: ___
     8. DIALUP EPN: ____         9. UPD TYPE: _____
10. CARD STATUS: ___    11. CARD TYPE: _____    12. CARD SPEED: ____
            13. LINE  15. STATUS  16. EPN  17. HUNTGRP
        [1]   _____     _____     _____     _____
        [2]   _____     _____     _____     _____
        [3]   _____     _____     _____     _____
        [4]   _____     _____     _____     _____
```

Fig. 8—Sample Line Card Equipment Form (3.50)