

DATA GENERAL
INTERCONNECTION/INTERPOSITIONING
DIGITAL AND ANALOG DATA TRANSMISSION SYSTEMS

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1. GENERAL

1.01 This section provides information for the interconnection and interpositioning of customer-provided equipment (CPE) to 3002-type private line voiceband data channels, to the Message Telecommunication System (MTS), and to Switched Services Networks (SSN). Examples and definitions of interconnection, interpositioning, and associated applications and terms are provided for quick reference.

1.02 When this section is reissued, the reason for reissue will be given in this paragraph.

1.03 This section contains required information for the use of Bell operating company (BOC) personnel. It is important that BOC personnel understand the difference between interconnection and interpositioning and when one is applicable and the other is not. This section specifically addresses these and associated terms as they pertain to the maintenance and installation of data services on private line (PL) service, MTS, and SSN. This section supplements Sections 309-XXX-YYY, 314-205-XXX, and 314-410-XXX.

2. INTERCONNECTION

2.01 Interconnection is the connection of CPE to Bell System facilities or terminal equipment for either PL service or MTS. The connection could be independent facilities if in independent company (ICO) territory. The Federal Communication Commission (FCC) requires all station terminal equipment connected to the MTS to be either grandfathered or registered, or if not, the equipment must be connected via a grandfathered or registered protective circuitry (eg, a protective connecting arrangement [PCA]).

2.02 Registered Equipment: Registered equipment complies with Part 68 of the FCC rules and regulations and has been granted a registration number.

2.03 Grandfathered Equipment: Grandfathered equipment is nonregistered equipment that was either directly connected to telecommunications facilities without a telephone company (TELCO)-provided PCA or data access arrangement (DAA) as of October 17, 1977 (grandfathered eligibility date for telephone, data, and ancillary equipment). Grandfathered equipment is also "of a type" that was directly connected as of the grandfathered eligibility date **and** has been directly connected for the first time between the grandfathered

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eligibility date and July 1, 1979 (register-only date). These connections must have been legal connections in accordance with the then current tariffs (Bell or independent).

2.04 Any piece of nonregistered equipment, even though identical to a grandfathered device, which was not connected to TELCO facilities by the register-only date, can only be connected through either customer-provided grandfathered or registered protective circuitry.

2.05 Data services that include interconnection may be classified as either systems or assemblies. The specific responsibilities and requirements associated with systems or assemblies are given in Section 314-010-102.

3. INTERPOSITIONING

3.01 Interpositioning is where BOC terminal equipment accesses BOC facilities [eg, exchange CO, wide area telecommunications service (WATS), PL services, SSN] through CPE. Typical applications involve customer-provided data sets interpositioned between Bell-provided DATASPEED® terminals and Bell facilities and customer-provided patch panels or diagnostic units interpositioned between Bell-provided data sets and Bell facilities (Fig. 1).

3.02 It is the Bell System policy to satisfy service needs involving interpositioning of terminal equipment when all of the following conditions are met:

- The interconnection of Bell-provided facilities and terminal equipment and customer-provided terminal equipment conforms to the FCC registration program rules, or to applicable tariffs.
- Standard interfaces exist for the Bell facilities and Bell and customer-provided terminal equipment to be interconnected.
- Additional costs, if any, incurred by the Bell System in providing such arrangements will be recovered in appropriate rates.

The Bell System has taken the position of being as cooperative as possible. However, our technical involvement is limited to assuring that Bell equipment functions properly.

Interfaces

3.03 One of the key provisions of the interpositioning policy is the requirement that standard interfaces be used to connect BOC facilities with BOC and customer-provided terminal equipment. This means that both the line side and the drop side of interpositioned customer-provided equipment must connect via standard jack and plug interfaces. These interfaces must conform to recognized standards, such as Electronic Industries Association (EIA) RS-232C or RS 449/423 and those found within FCC rules, Part 68 where applicable. An additional category of acceptable standard interfaces are comprised of those published in Bell System technical references which states that the interfaces are of jack and plug design, are uniform in their application to customer-provided and BOC-provided equipment, and describe connections to Bell facilities or equipment. The AT&T Company has approved the 829-type interface to be used to interconnect with 3002-type PL circuits. The FCC rules, Part 68 govern those interfaces used to interconnect with the MTS.

3.04 The data auxiliary set (DAS) 829-type is a channel interface unit. It is designed for use on 3002-type 4-wire PL data channels and can be used in the data only mode, voice alternate mode, and/or dial backup mode (Fig. 2). It is the Bell System's standard interface for use between the BOC facility and the interpositioned CPE. The actual connection is the miniature 50-position ribbon plug and jack. The DAS 829 is described in Section 598-082-100.

3.05 Because there are length limitations on cabling between the DAS 829 and Bell data sets, close coordination between the BOC and the customer is necessary. The total length of the cable on the line and the drop sides of the interpositioned CPE to the DAS 829 and the Bell data set must not exceed the maximum distances given in Section 598-082-200.

3.06 Added cabling is also an important factor that should be considered when interpositioning devices such as patch panels (or other similar equipment) ahead of Bell data sets. It is desirable to arrange the station cabling so that data sets can be plugged directly into the connector of the DAS 829 when the patch panel cables are removed. This enables the BOC or customer to remove the patch panel in the event of trouble so that the

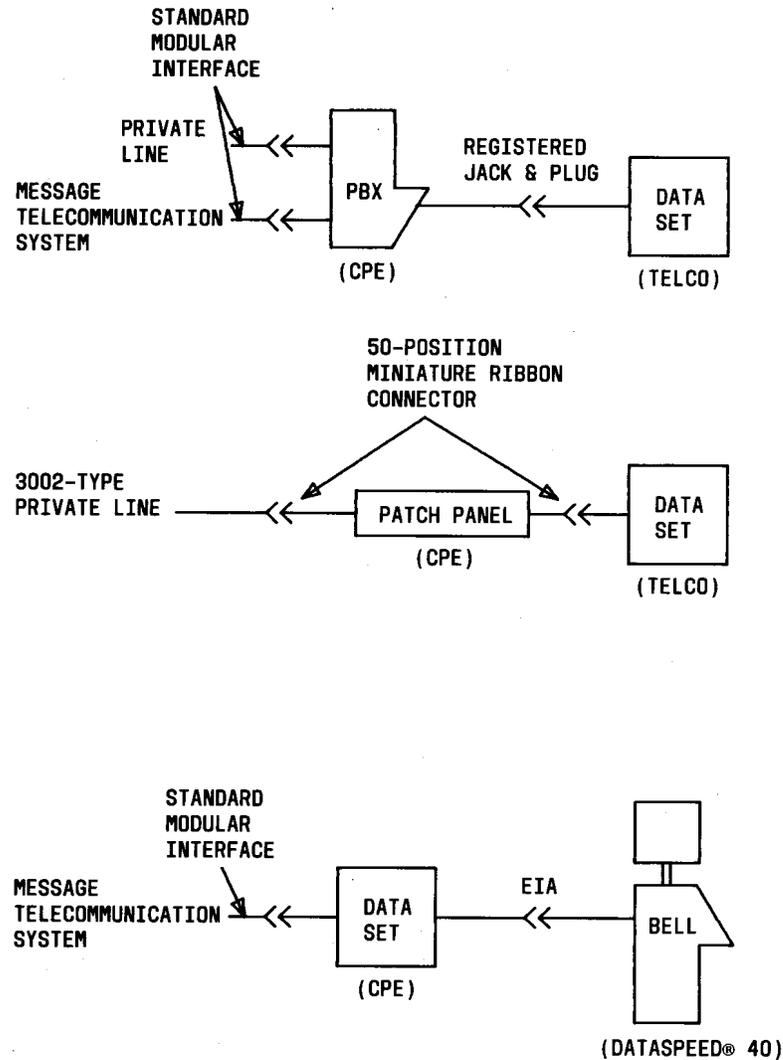


Fig. 1—Examples of Interpositioning

telecommunication facilities and data sets can be tested in the absence of the interposed equipment. This arrangement reduces maintenance time and expense. It also allows the installation of channels and data sets to be completed even if the customer's equipment is not present at the time (Fig. 3).

TELCO and Customer Responsibilities

3.07 Interpositioning involves the interconnection of CPE and therefore interpositioning arrangements are classified as either transmission systems or assemblies. It is the responsibility of the customer to ascertain the proper operation of the CPE *before* reporting a trouble to TELCO.

3.08 Efficient screening of "interpositioning" trouble reports can do much to improve TELCO productivity. A question and answer technique with the customer reporting the trouble can pinpoint the cause to the CPE without further TELCO involvement.

3.09 Testing through CPE can also be helpful in isolating trouble conditions. Testing through customer-provided patch panels is an obvious case. Obviously, for various technical reasons, BOC personnel will not always be able to test through an interpositioned CPE modem to assure proper Bell terminal operation. If, however, such a through test is possible, and it is done *with the*

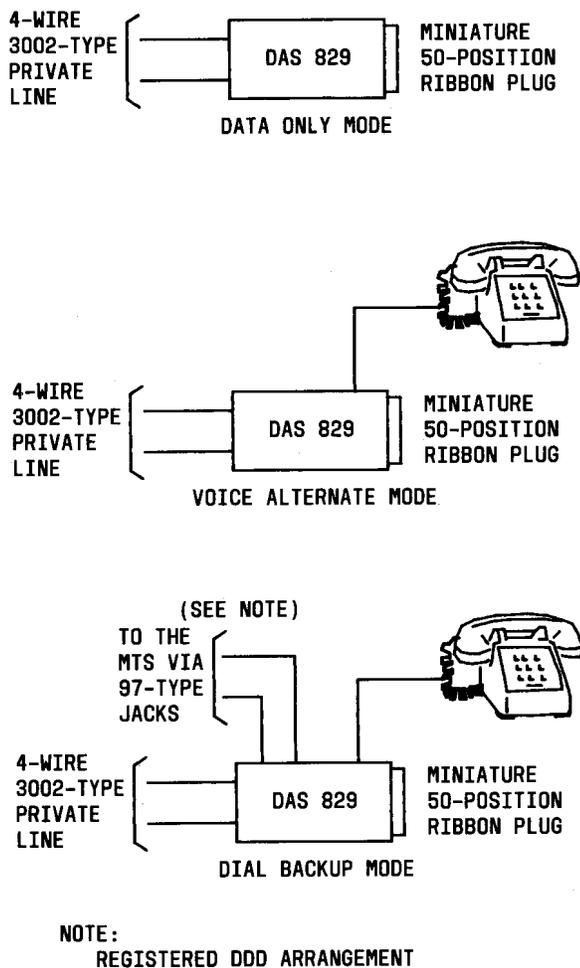


Fig. 2—DAS 829-Type Channel Interface Unit

permission of the customer, the results may determine that the Bell terminal equipment is functioning properly and save a costly craft dispatch. Should the results of a through test indicate a possibility of a Bell terminal problem, craft must be dispatched to verify the trouble condition and repair same. Before such a dispatch, the customer should be given a maintenance of service charge warning. If the craftsman on site determines that the Bell terminal is in fact functioning properly but there is a customer system problem, eg, protocol or language incompatibility, a maintenance of service charge would be applicable.

3.10 Basically, there is no hard and fast rule that the BOC is or is not required to test through CPE equipment in an interpositioning

arrangement. Common sense should be the guide to profitable operating procedures. However, the BOC is required to maintain transmission parameters on BOC-provided facilities up to the first BOC/CPE demarc point only. The BOC equipment behind the second and any successive demarcs are tested in a stand-alone manner to assure proper functioning (Fig. 4).

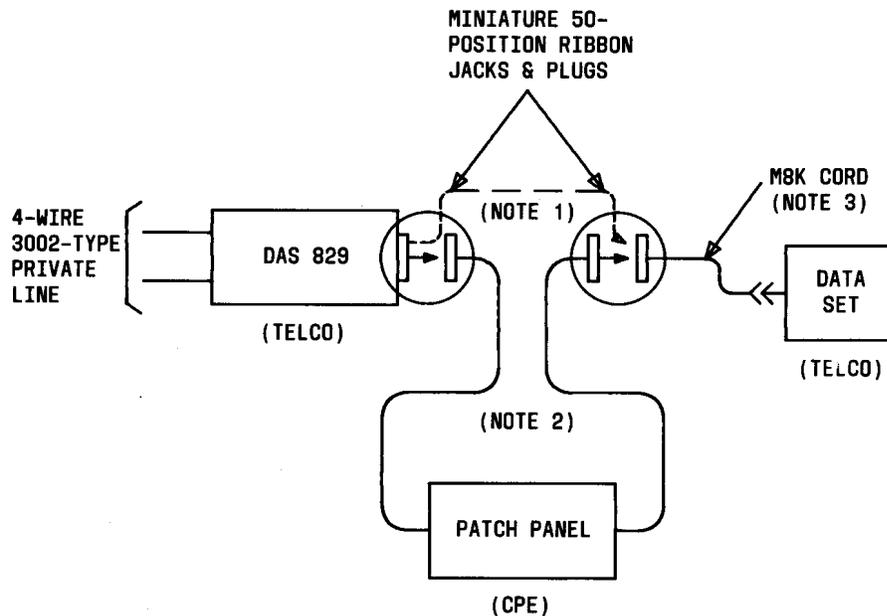
Unique Universal Service Order (USO) and Installation Procedures

3.11 Standard uniform service order codes (USOC) are used with orders involving interpositioning. However, in order to identify the position of each item, the field identifier "CPI" (CUSTOMER PROVIDED-INTERPOSITIONED), appears adjacent to the USOC for the equipment located immediately behind the CPE (Fig. 5).

3.12 Complete information to accommodate the installation of each arrangement is obtained from the customer by marketing. Information having no permanent value, ie, changeable features under the customer's control should be identified on the service order following the field identifier, RMK (REMARK).

3.13 *All jacks* associated with the CPE are to be installed prior to the BOC's due date. These jacks are the *responsibility of the customer* and *are installed at their expense*. Provision of the jack is necessary prior to BOC's visit in order to properly test the telephone company-provided equipment, so that billing may begin coincidental with the installation. All jacks must be of standard design as outlined in paragraph 3.03 and are the customer's responsibility for installation. Customers should be notified that if the appropriate jack is not in place on the agreed upon due date, the date may be changed and renegotiated. However, with customer agreement, the equipment may be installed prior to the customers completing their portion of the installation, and billing would begin immediately. Should a subsequent visit be required by BOC and the BOC-provided equipment is operating properly, a maintenance of service charge is appropriate.

3.14 Where there are limitations on the length of cable between the channel interface unit and data set, as in the case of the DAS 829 and Bell 200-type data set (paragraphs 3.05 and 3.06



NOTES:

1. CABLING SHOULD BE ARRANGED SO THAT DATA SET CABLE CAN BE WITHDRAWN FROM PATCH PANEL CONNECTOR AND PLUGGED DIRECTLY INTO DAS 829 CONNECTOR FOR TELCO TESTS (AS INDICATED BY DOTTED LINE)
2. THE MAXIMUM DISTANCE BETWEEN THE DAS 829 AND THE DATA SET (INCLUDING THE CABLING ASSOCIATED WITH THE INTERPOSITIONED CPE) MUST NOT EXCEED THE FOLLOWING:

DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400
3. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D

Fig. 3—Recommended Positioning of TELCO and CPE Equipment

and Fig. 3), close coordination is required between the customer and the BOC.

4. INTERPOSITIONING/INTERCONNECTION AND SIMILAR CONFIGURATIONS

4.01 There are several configurations that may be confused with interpositioning/interconnection. (Interpositioning is illustrated in Fig. 6 and 7.) Telephone company and customer-provided

wire, stand-alone equipment, and equipment-to-equipment configurations are discussed and illustrated to remove any confusion.

Stand-alone Equipment

4.02 The policy does not include stand-alone Bell equipment, ie, Bell terminal equipment connected to computers, other common carrier (OCC) services, or private microwave systems without connection to the Bell System network or private line services. OCC services also include

those Bell facilities which provide access to OCC services. Figure 8 illustrates stand-alone equipment and similar interpositioning configurations.

TELCO and Customer-provided Wire

4.03 Customers are required to provide the premises wiring in accordance with FCC rules, Part 68 associated with their PBX and key telephone systems. Bell System procedures presently require that whoever (the Bell System or customer) provides the PBX or key system must also provide the system premises wiring and interfaces behind that system. It is not contemplated at this time that Bell System equipment will be connected in arrangements where the customer provides wiring other than system premise wiring. Figure 9 illustrates BOC and customer-provided wire situations as compared to an interpositioning configuration.

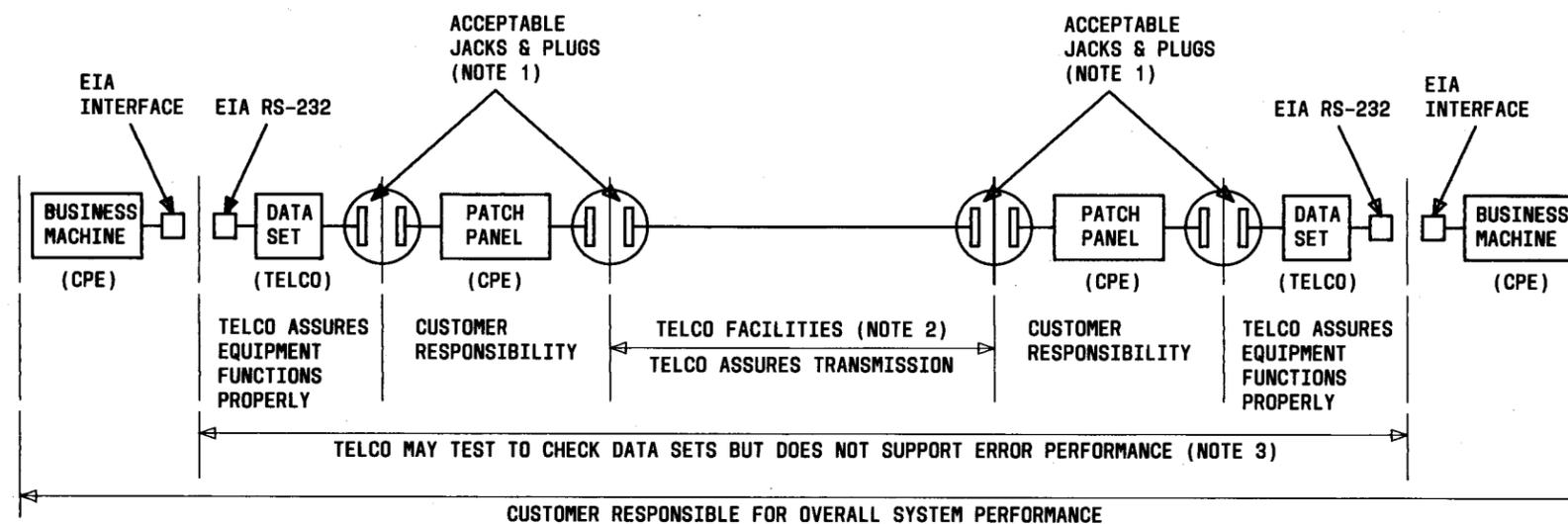
Equipment-to-Equipment

4.04 An equipment-to-equipment connection is the connection of a "secondary" piece of

terminal gear to the MTS or to a 3002-type PL channel through a "host" piece of terminal equipment involving leads in addition to or in place of the standard leads outlined in Part 68 of the FCC rules (Fig. 10). For an MTS connection, the standard leads are the T and R, and in some cases the A and A1 leads. Most equipment-to-equipment data connections are made via the standard EIA interface (RS-232C or RS 449/443).

4.05 In most cases the "secondary" piece of terminal equipment must be registered. (The "host" piece of terminal equipment must be either grandfathered or registered or connected through a registered connecting device.)

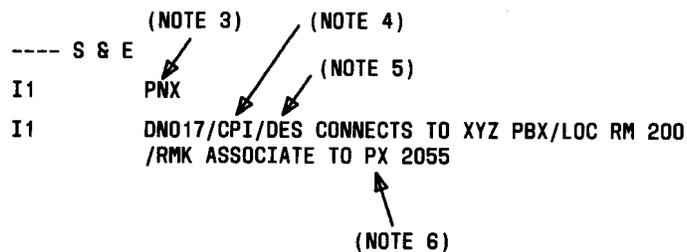
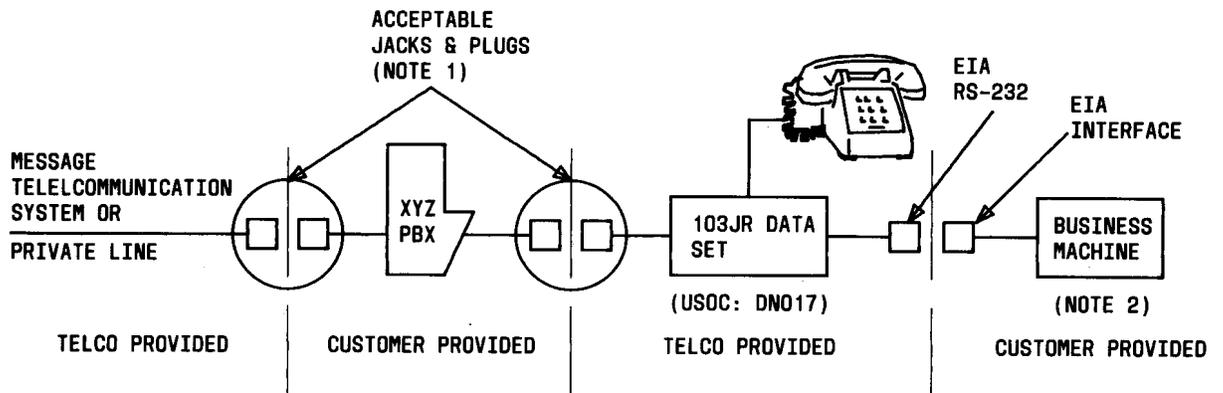
4.06 Where equipment-to-equipment and interpositioning arrangements are combined, both arrangements must meet their respective requirements.



NOTES:

1. ACCEPTABLE PER FCC RULES, PART 68 FOR CONNECTION TO THE MESSAGE TELECOMMUNICATIONS SYSTEM OR, ACCEPTABLE PER BELL SYSTEM STANDARD FOR CONNECTION TO 3002-TYPE PRIVATE LINE CIRCUIT.
2. FOR 3002-TYPE PRIVATE LINE, INCLUDES DAS 829 INTERFACE
3. MADE ONLY WITH CUSTOMER APPROVAL.

Fig. 4—TELCO and Customer Responsibilities



NOTES:

1. ACCEPTABLE PER FCC RULES, PART 68 FOR CONNECTION TO THE MTS OR, ACCEPTABLE PER BELL SYSTEM STANDARD FOR CONNECTION TO PL CIRCUIT.
2. THE CPE DATA TERMINAL IS NOT REQUIRED TO APPEAR ON THE SERVICE ORDER.
3. THE PNX USOC IS SHOWN FOR REPORTS PURPOSES. IT SHOULD BE TALLIED AS A PBX STATION.
4. CPI APPEARS WITH USOC FOR BELL DATA SET. ("CPI" INDICATES THE BELL DATA SET IS IMMEDIATELY BEHIND THE INTERPOSITIONED PBX.)
5. THE DES ENTRY IDENTIFIES THE CPE PBX WITH WHICH THE DATA SET IS CONNECTED AND THE LOC ENTRY PROVIDES LOCATION INFORMATION FOR INSTALLATION AND MAINTENANCE.
6. THE LINE NUMBER TO WHICH THE DATA SET IS ASSOCIATED IS SHOWN IN AN UNRETAINED RMK (REMARK) ENTRY. IT MUST BE RECOGNIZED THAT THE PX NUMBER MAY BE CHANGED BY THE CUSTOMER AT SOME FUTURE DATE, THEREFORE HAS NO PERMANENT VALUE.

Fig. 5—Uniform Service Order Codes (USOC) Associated with Interpositioning

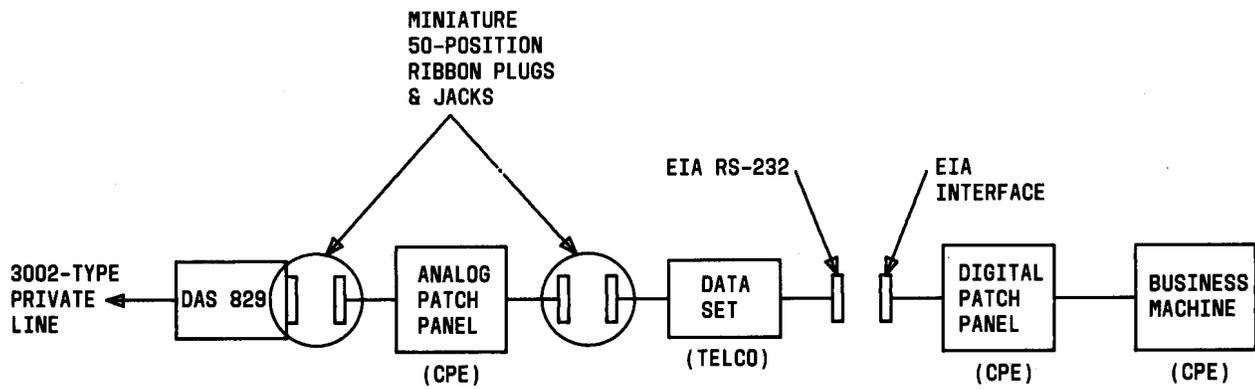


Fig. 6—Interpositioning of 3002-Type Private Line Channel

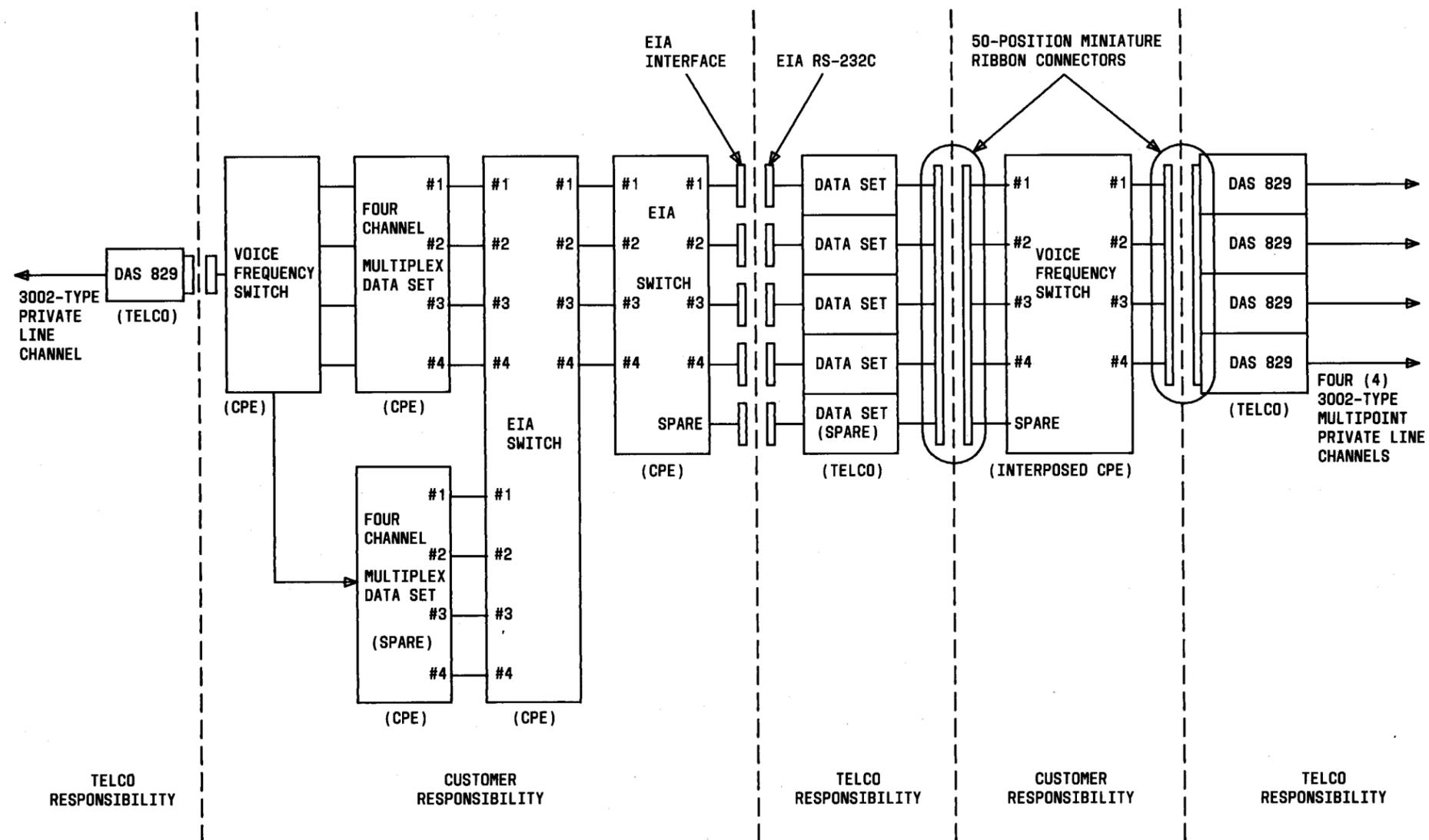


Fig. 7—Interpositioning on Multiple 3002-Type Private Line Channel Arrangement

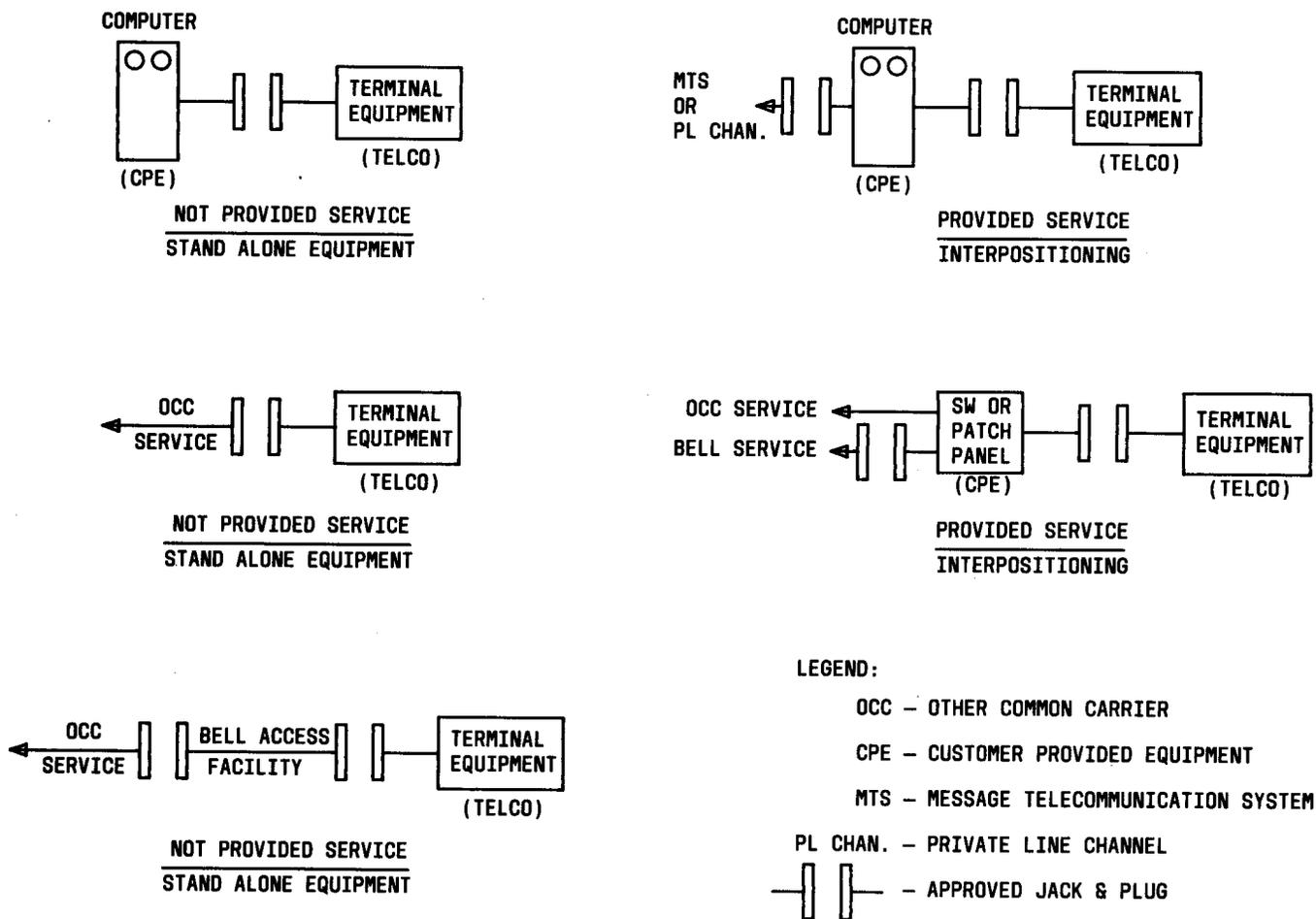
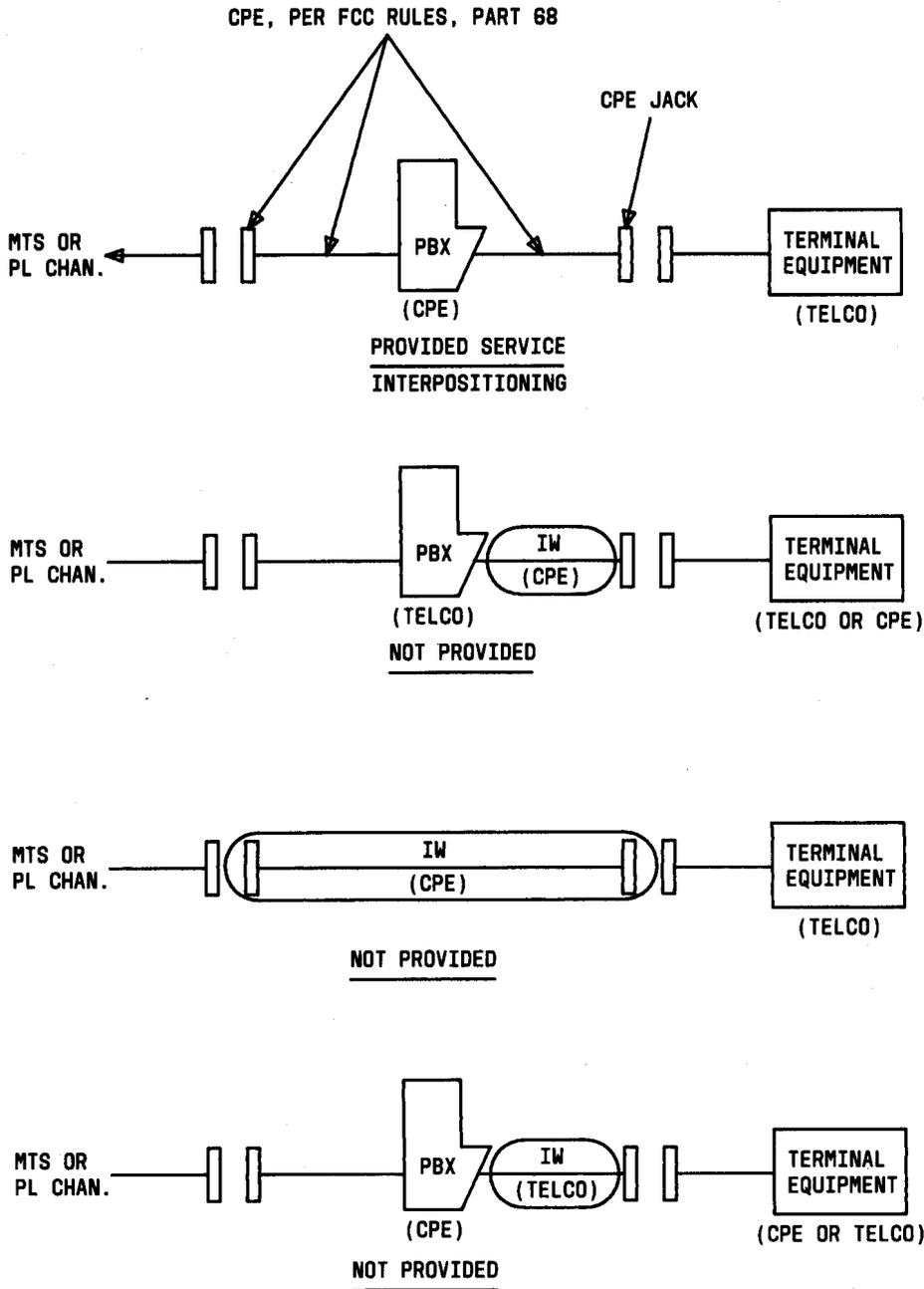


Fig. 8—Stand-alone Equipment vs Interpositioning



LEGEND:
 PBX - PRIVATE BRANCH EXCHANGE
 IW - INSIDE WIRING
 CPE - CUSTOMER PROVIDED EQUIPMENT
 MTS - MESSAGE TELECOMMUNICATION SYSTEM
 PL CHAN. - PRIVATE LINE CHANNEL

Fig. 9—TELCO and Customer-Provided Inside Wire

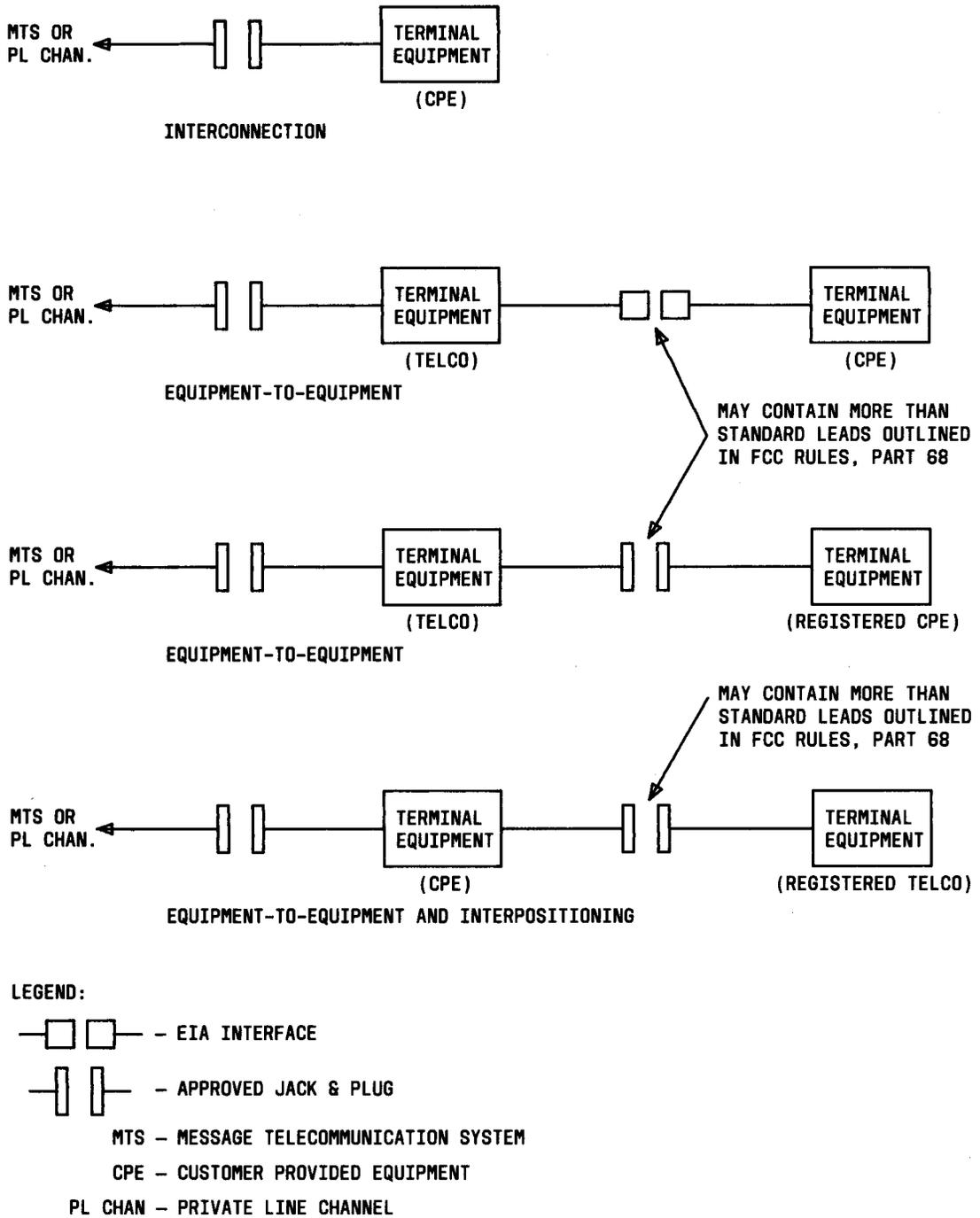


Fig. 10—Examples of Equipment-to-Equipment Connections