"DIMENSION*" 2000 AND "DIMENSION" CUSTOM PBXs

PREINSTALLATION AND PLANNING INFORMATION

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1. GENERAL

1.01 This section provides information, instructions, and examples of completed worksheets for use in planning a new installation for a DIMENSION 2000 PBX (up to 2000 lines) (Fig. 1) and DIMENSION Custom PBX (over 2000 lines) or in planning growth and rearrangements to an existing system. When the information is common to both DIMENSION 2000 and Custom PBX systems, the designation ***DIMENSION PBX*** is used. When it is peculiar to either system, the applicable designation is used.

1.02 This section is reissued to provide coverage for the following:

- Applications Processor (AP)
- Data Switching
- Distributed Communications System (DCS)
- Local Area Data Set (LADS)
- Add new optional circuit packs LC566, LC567, and LC568
- Current system information.

Revision arrows are used to emphasize significant changes.

1.03 Worksheets for apparatus and/or equipment interconnections are provided. Appropriate worksheets should be completed and made available at time of installation. Planning for growth and/or rearrangements to an existing system requires the availability of complete, current, and accurate system records so that new worksheets can be prepared.

1.04 A Mechanized Ordering Form (E-8124) is designed for both initial and subsequent ordering for growth and rearrangements. For orders other than minor apparatus (CPs, etc), the use of the mechanized ordering form and return of a backup copy of the program tape to Western Electric with current translations will result in a modified tape provided with new programs, including additional translations and parameters, as required. The returned program tape must reflect the latest system status (classes of service, extension numbers, trunk groups, code restrictions, etc) since the system status will be included on the modified tape from the factory.

1.05 It is recommended that fill-in worksheets and diagrams provided in this section be reproduced locally, as required, and the originals kept with the section for future use. Copies of the required worksheets and diagrams should be completed before the actual work begins on customer premises. Copies should be provided at the customer location, along with any other installation information, for use during the installation of the system. After the installation is completed, copies of these documents should be stored on customer premises for future reference.

A worksheet should be completed for each feature requiring the installation of special hardware and the worksheets arranged in the sequence in which the work is to be performed.

1.06 Items such as ducts, rails, connector cables, etc, may be shipped ahead of the cabinets to facilitate the installations. The following items should be available at the customer location before the actual installation begins:

- System cabinets and attendant console
- Auxiliary equipment (if required)

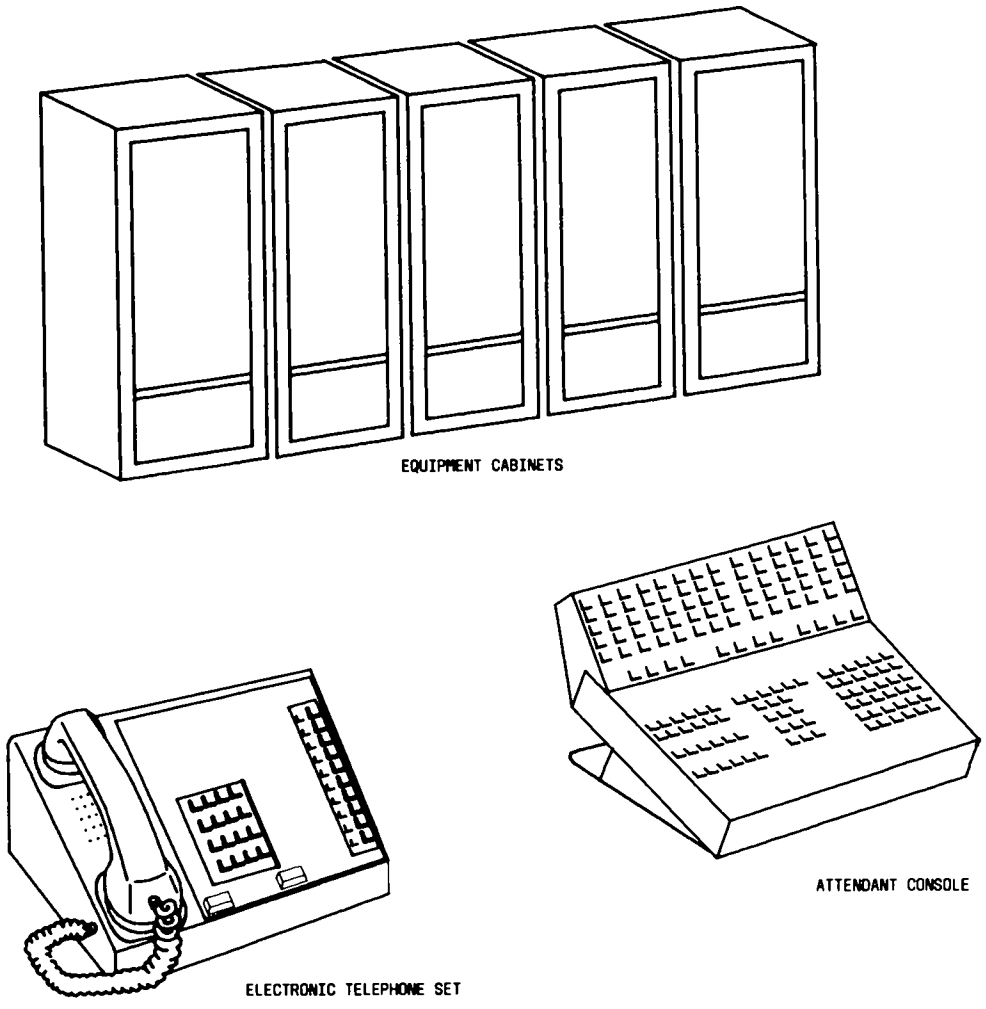


Fig. 1—DIMENSION 2000 PBX

- Ductwork
- AC power installation
- Connector cables
- Termination field materials
- Power receptacle(s)
- Working trunks
- Preinstallation worksheets completed for local minor additions or rearrangement
- Tools and test equipment
- Factory computer-generated lists (shipped with the system).

1.07 This section is based on the drawings listed in Part 9. If this section is to be used with equipment or apparatus reflecting later issue(s) of the drawing(s), reference should be made to the SDs and CDs to determine the extent of the changes and the manner in which the section may be affected.

A circuit pack is always replaced with a circuit pack having either the same or later alpha suffix as printed on the carrier designation strip. That is, an LC31 cannot be used if the designation strip specifies

LC31B. The LC31B, C, or later alpha-suffixed circuit packs are suitable replacements.

2. HOW TO USE THE SECTION

2.01 When planning a new installation, the material in Parts 4 through 8 should be reviewed to insure that all requirements for power, protection, auxiliary circuits, miscellaneous components, floor plan, etc, have been given adequate consideration.

2.02 Changes to a system may be required after the system is installed and accepted. When planning changes, obtain complete, current, and accurate system records; then provide new fill-in worksheets showing the changes to each feature.

2.03 Refer to Parts 4 through 8 and consider necessary areas such as additional cabinets, carriers, cabling, auxiliary equipment, additional power and/or grounding, etc, that are required to provide the changes.

2.04 The fill-in interconnection worksheets should be reproduced and completed as required.

2.05 Refer to the DIMENSION 2000 PBX Administration and Maintenance Manual for administration of features using the Maintenance and Administration Panel (MAAP) procedures (PROCs). This manual, with an assigned number, can be found in Section 554-000-100 (DIMENSION PBX Miscellaneous Documentation Index).

3. GENERAL METHOD OF ADMINISTERING AND ENGINEERING FEATURES

3.01 Some features require minimal planning effort while others require significant detailed planning and hardware considerations. The features presented in this part emphasize both the hardware and software considerations necessary when administering the features. A discussion of trunk groups and software records is also included. The examples are defined and administered to show as many functions as possible, but these features are not intended to be representative of actual feature implementation.

FLEXIBLE NUMBERING OF STATIONS—MIXED NUMBERING (Example)

3.02 This feature requires in-depth planning and consideration for software; no additional hardware is needed.

3.03 Flexible numbering of stations—mixed numbering and single-digit dialing features allow station numbers to be assigned to lines within the PBX, according to a particular numbering plan, such as room numbers or organizational structure. Stations in service may be reassigned at any time to allow personnel moves without requiring numbering changes.

3.04 Station number assignments can begin with any digit except star (*) and pound (#) and can vary in length from one to four digits. Mixed numbering also allows the mixing of station and trunk feature codes using the same first digit and also the same number of digits. The same first digit can also be used for trunk access and feature access codes. It is possible to use digits that are assigned as single digit trunk access codes for assignment as the first digit of multidigit room station numbers (eg, digits 8 and 9). Conflicts arising from the use of the same first digit for different length station numbers can be resolved by time-out between digits to resolve trunk access codes and station numbers. It is not necessary to administer an end-of-dial digit in FP9. To avoid time-out, a different prefix code can be used for different length station number series.

3.05 It is possible to assign dial 0 as the attendant access code and dial 0X or 0XX as feature or trunk access codes. Time-out after the digit 0 is required to resolve the conflict.

3.06 It is permissible to require that all lines receiving Direct Inward Dialing (DID) calls be fixed at 3- (or 4-) digit numbering in an installation. It is possible that some of these lines may also be accessed by a single- or 2-digit number for internal dialing.

3.07 The DIMENSION PBX offers two versions of the flexible numbering feature. The *standard fixed length* version (FP7, FP8, and FP12) allows for fixed length numbering with no time-out capability. The *mixed numbering* version provided in FP9 ◗and FP11◖ allows for varying length station numbers of up to four digits in the same installation. Time-out can be used for station numbering conflicts, or a prefix digit can be used for multidigit station numbers such as room-to-room dialing. The mixed numbering capability in FP9 ◗and FP11◖ allows the same digit to be used for both station number and trunk or feature access codes. This enables the use of digits 8 and 9 as well as direct dialing to stations on the 8th and 9th floors.

RECORDED TELEPHONE DICTATION ACCESS (Example)

3.08 This feature allows access to and control of customer-owned dictation equipment by PBX users. Hardware must be considered in addition to software when administering this feature. To determine the hardware requirements, refer to Part 5 where the feature is listed alphabetically.

3.09 The system provides optional arrangements for recorded telephone dictation access depending on customer requirements (ie, TOUCH-TONE dialing, dial pulse, voice activated, etc). If a recorded telephone dictation trunk is accessed by TOUCH-TONE dialing, external TOUCH-TONE calling signal conversion is normally not required since the system is capable of software conversion from TOUCH-TONE dialing to rotary dial pulsing. The holding time of the TOUCH-TONE dialing registers is increased as follows:

(a) A TOUCH-TONE dialing register, LC10B/LC54B, or a TOUCH-TONE dialing register and receiver LC10C, is dedicated to each dictation connection for the duration of the connection to allow TOUCH-TONE dialing signals to be converted to dial pulses internally. Therefore, where the dictation units are frequently busy, it may be necessary to increase the number of the LC10B/LC54B or LC10C circuit packs to prevent call blockage and dial tone delays.

(b) External TOUCH-TONE dialing signal conversion can be provided in the standard manner. It may be less costly to provide external equipment, if an additional cabinet is installed, to provide carrier space for the TOUCH-TONE dialing circuit packs.

3.10 The selected example (paragraph 3.09), to explain recorded telephone dictation access, makes the following assumptions:

- The system provides TOUCH-TONE dialing service.
- Traffic requirements dictate additional registers required and external TOUCH-TONE calling signal conversion should be provided.
- Recorded telephone dictation and TOUCH-TONE calling signal conversion equipment is to be mounted in an auxiliary cabinet. (See Part 5.)

3.11 The equipment required for this feature is specified in Part 5 where connections, figures, and fill-in tables are described. The equipment is as follows:

- J58827E-1, List 1, A and C, recorded telephone dictation trunk unit, wired per options outlined in Part 5. The options required for this trunk unit are dependent on specific customer requirements which should be provided at the time of installation.
- J58827E-1, List 2 and WB, recorded telephone dictation TOUCH-TONE calling signal interface unit.
- J99289A-1, List 1, A and D, TOUCH-TONE calling receiver mounting shelf. This mounting shelf is arranged to accommodate two TOUCH-TONE calling receivers.
- J99289B-1, List 1, SA and D (type A3) *or* J59204, List 1, A and B (type G1), TOUCH-TONE calling receiver unit.
- LC13 auxiliary trunk circuit pack (provides two circuits).
- J58879F-2, auxiliary cabinet equipped with power supply and frequency generator. (If recorded telephone dictation is added to an existing auxiliary cabinet, the cabinet should be checked to insure that a power supply and frequency generator are provided.)
- Miscellaneous connecting blocks and cables.

3.12 An illustration of interconnecting wiring for recorded telephone dictation is shown in Part 5. Information is furnished to show detailed wiring connections.

3.13 For administration of this feature, refer to the DIMENSION 2000 PBX Administration and Maintenance Manual in the index (Section 554-000-100), for the necessary procedures and the sequence in which they are to be administered. A list of administrative requirements for the auxiliary trunk used with the recorded telephone dictation access feature is assumed as follows:

- Assigned to trunk group 25.
- Equipment location (LC13B) is module 00, cabinet 1, trunk carrier 2, slot 06, and circuit 0.

- Assigned to trunk group restriction group 5 (class-of-service 9).
- Assigned to restricted trunk group 2 and restricted from all other trunks.
- Dial access code is 81.
- Assigned to tandem tie trunk restriction trunk group 1 and the tie trunks.

3.14 The PROC 350, WD 1, worksheet (Fig. 2) indicates that the first digit dialed for recorded telephone dictation access is 8, the number of digits is 2, and the type of call is a trunk or feature as indicated by the 2 in FLD 3. If existing trunks or features are already assigned a 2-digit dial access code beginning with 8, it would not be necessary to use this procedure. If a dial access code beginning with 8 is used, stations may not be assigned with a first digit 8, except in systems with mixed numbering (FP9).

3.15 The PROC 100, ▶Version 2,◀ worksheet (Fig. 3) shows that trunk group 25 contains trunk type 51, and is assigned dial access code 81.

3.16 The PROC 150, ▶Version 3,◀ worksheet (Fig. 4) shows that the LC13B circuit pack in module 0, cabinet 1, carrier 2, slot 6, circuit 0, is assigned to trunk group 25.

3.17 The PROC 101, ▶Version 2,◀ worksheet (Fig. 5) shows that trunk group 25 uses external TOUCH-TONE dialing conversion, requiring external hardware, and the trunk is marked for TOUCH-TONE service-out compatibility by entering a 1 in FLD 7. Alternatively, the DIMENSION PBX capability to convert TOUCH-TONE dialing signals to rotary pulses could be employed, and FLD 7 would contain a 0 to indicate rotary outpulsing. All trunk types must be the same in each trunk group.

3.18 The PROC 102 worksheet (Fig. 6) is used to assign the trunk dial access code to miscellaneous trunk restriction groups to optionally restrict station access. If the dictation trunk is not restricted from any station, this procedure need not be entered. The recorded telephone dictation trunk is shown assigned to miscellaneous trunk restriction group 5. Enter the 1-, 2-, or 3-digit dial access code in FLDs 1,

DIALING PLAN FIRST DIGIT

WORD 1	FIRST DIALED DIGIT 1	DIGITS OF 2	CALL TYPE 3		PREFIX 4	MIXED NUMBERING: TIME OUT AFTER DIGIT 1 5	2 6	3 7	4 8
	8	2	2						

ENCODES: FLD 1, * = 11, # = 12
FIELD 3: LINE EXTENSION NUMBER = 1; TRUNK OR FEATURE = 2

PROC 350

Fig. 2—PROC 350, WD 1, Worksheet

ISSUE 11 — TRUNK GROUP TRANSLATION, VER 2

TRUNK GROUP 1	DIAL ACCESS/ TRUNK ID CODE DIGIT 1 2	2 3	3 4	TRUNK TYPE 5	ROUTE ADVANCES TO: TRUNK GROUP 1 6	TRUNK GROUP 2 7	TRUNK GROUP 3 8	TRUNK GROUP 4 9	DIAL ACCESS RSTCN 10	ECTS CO LINE PICKUP 11	MODEM POOL 12	DATA PORT 13		TRUNK GROUP TRANSLATION VER 2
25	8	1		51										100

Fig. 3—PROC 100 Worksheet

ISSUE 11 — TRUNK-FEATURES, VER 3

EQUIPMENT LOCATION					TRUNK GROUP	NIGHT STATION	A.I.O.D. EQUIPMENT NUMBER	SPC TRK				TRUNKS-FEATURES VER 3
MODULE	CABINET	CARRIER	SLOT	CIRCUIT				PAGING ZONE	REMOTE ACCESS			
1	2	3	4	5	6	7	8	9	10			150
0	1	2	6	0	2 5							

Fig. 4—PROC 150 Worksheet

ISSUE 11 — TRUNK GROUP TRANSLATION, VER 2

TRUNK GROUP	BALANCE	BATT REV	DID ADDL	PAD	T. TONE		SMDR ACTIVE	A.I.O.D. BILLING NUMBER (TIE TRUNKS ONLY)	TIMED RCL		ALTERNATE ACCESS-CODE SPLIT TRUNK ACCESS			TIE TOLL	APLT FEATURES ALLOWED	DISCONNECT SUPERVISION			TRUNK GROUP TRANSLATION VER 2
					IN	OUT			TIME	LEVEL	1ST DIGIT	2ND DIGIT	3RD DIGIT						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			101
2 5						1													

Fig. 5—PROC 101 Worksheet

2, and 3, as required (eg, dial access code 81 is shown in Fig. 6).

3.19 The PROC 010, WD 2, worksheet (Fig. 7) is used to modify an existing class of service to allow or restrict stations from recorded telephone dictation. Class of service 9 is used as an example to show how any station having this class of service can be restricted from dialing recorded telephone dictation access. Other classes of service may also be restricted from dialing recorded telephone dictation. Class of service 9 may allow or restrict other miscellaneous trunk groups or features as required in PROC 010, WD 2. This procedure will not be provided as part of this example, but a new class of service may require entries in this procedure. If class of service 9 was not previously administered, PROC 010 would require a fill-in worksheet to assign station features and restrictions. Since sequence is not critical in connection with class-of-service defined assignments, separate sheets per feature are not required. If access to dial dictation is allowed to all stations, this procedure is not required.

3.20 When administering a new class of service to a station, use PROC 000, WD 1. A completed

MISC. TRUNK RESTRICTION GRPS

TRUNK DIAL ACCESS CODE DIGIT			MISC TRUNK RESTRICTION GRP								PROC 102
1	2	3	1	2	3	4	5	6	7	8	
8	1						1				

Fig. 6—PROC 102 Worksheet

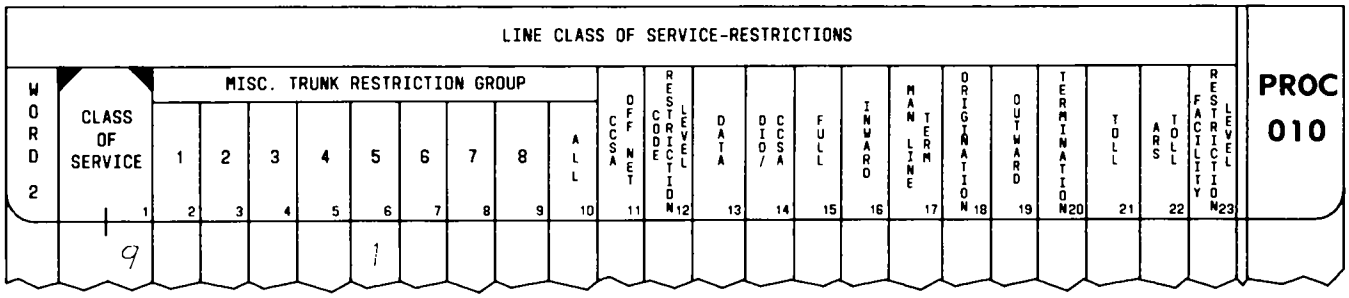


Fig. 7—PROC 010, WD 2, Worksheet

worksheet of PROC 000 is required for each station. If miscellaneous trunk restrictions are added to an assigned class of service and no station changes are involved, PROC 000 is not affected.

The CO-type trunks and dial repeating tie trunks are automatically denied access to an auxiliary trunk circuit and associated equipment by call processing routines. These administration procedures are included here only to demonstrate the use of PROC 110 and 111.

3.21 Worksheets for PROC 110 (Fig. 8) and PROC 111, ▶Version 2,◀ (Fig. 9) are used for tandem tie trunk and trunk-to-trunk restrictions. Enter a 0 for tandem tie trunk restrictions or a 1 for trunk-to-trunk restrictions in FLD 1. The example shows that the trunk group assigned dial access code 81 is also assigned restricted dial code entry number 9 in PROC 110, FLD 2. Trunk groups are denied access to the restricted trunk groups identified by the dial code entry number.

3.22 The example shows that recorded telephone dictation is assigned a restricted dial code entry number in PROC 110. Trunk group numbers and dial access codes have previously been assigned in PROC 100. To restrict tandem tie trunk group 24 (PROC 111, FLD 2) from the recorded telephone dictation feature, in PROC 110, enter a 0 in FLD 1 and the restricted dial code entry number in FLD 2. Also, in PROC 111, enter a 0 in FLD 1, a 24 in FLD 2, and a 9 in FLD 3. If the PBX has no tandem tie trunks or if the tandem tie trunks are not restricted from the feature, PROCs 110 and 111 are unaffected.

> ***Note:*** Dial codes must be assigned to entry number in PROC 110 before entry numbers can be assigned in PROC 111.

TRUNK GROUP NUMBERING AND TRUNK GROUP SOFTWARE RECORDS

3.23 Many of the administrative procedures involve trunk (software) records. There are two classifications of software records used with trunk groups. One is associated with hardware, and the other is a software record only. A software trunk group can consist of one or more records. Certain software records (trunk groups) are reserved or dedicated for specific applications while other records are

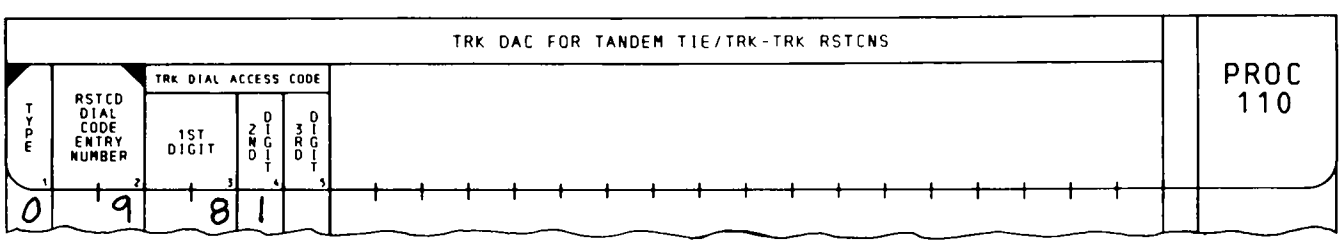


Fig. 8—PROC 110 Worksheet

ISSUE 11 — TANDEM TIE/TRK TO TRK RESTRICTIONS, VER 2

TYPE (1)	TRUNK GROUP (2)	RSTCD DIAL CODE ENTRY NUMBER (3)	DISPLAY ONLY — TRUNK DIAL ACCESS CODE: 1ST DIGIT (4)	2ND DIGIT (5)	3RD DIGIT (6)	TANDEM TIE/TRK TO TRK RSTCNS VER 2
0	24	9	8	1		111

Fig. 9—PROC 111 Worksheet

available for various optional assignments. The trunk groups are numbered sequentially, 1 through 99, and are identified as listed in Table A.

3.24 Software records are status memory words used to:

(a) Record the state of the associated physical trunk

(b) Record call status.

3.25 Trunk group 17 (originating registers) is an example of a dedicated trunk group. These software records are intended to record dialing status and are associated with TOUCH-TONE dialing signal registers.

3.26 Trunk group 8 (Outgoing Trunk Queue [OTQ] records) is an example of a software record that can be optionally assigned as a group of records to be used to record extensions which are waiting for access to some other physical trunk group. This queuing trunk group must be defined in PROC 100. ♦In FP7,♦ the number of records in this group (length of queue) must be specified. Trunk groups 18 through 99 are optionally assigned at the factory or on site via the MAAP procedures.

4. INSTALLATION CONSIDERATIONS

PHYSICAL ARRANGEMENTS

4.01 The DIMENSION PBX equipment is housed in cabinets measuring approximately 1765 mm (69-1/2 inches) high by 800 mm (31-1/2 inches) wide by 610 mm (24 inches) deep. The cabinets fit through standard door openings (2134 mm by 914 mm [7 feet by 3 feet]) crated and mounted on a 178-mm (7-inch) high dolly. Each cabinet consists of a basic framework with side and front panels hinged for easy access. Carriers are mounted on the cabinet framework, and the location of the carriers varies in accordance with customer requirements. The cabinets are shipped fully equipped from the factory and rollers are provided for ease of installation and maintenance. The cabinets are installed on floor-mounted rails. A cabinet lock is supplied which utilizes the 216C tool as a key. Front panel inserts are available to blend with office decor and can be ordered in avocado, blue, gold, orange, red, teak, or walnut. A blank front panel insert is available to the customer for office decoration (customer modified). The side panels are provided in a neutral (beige) color.

4.02 A DIMENSION PBX consists of various arrangements of three basic cabinets—common control (J58882A, Fig. 10, or J58882E, Fig. 11), module control (J58882B), and line cabinet (J58882C). Auxiliary cabinets (J58879F) may be ordered, as required, for peripheral equipment. The basic cabinet arrangements form system control and system network modules. System control may consist of one or two common control cabinets per system.

4.03 The system network may consist of 1 to 15 network modules per system, depending upon traffic requirements, feature package, and memory size. A network module consists of two module control cabinets and up to three line cabinets. Trunks may appear only in the module control cabinets. Lines may appear in module control or line cabinets, but only in four cabinets per module. A line group control carrier ***is*** required in each cabinet containing one or more line carriers. There is a maximum of five cabinets per module. The cabinets in a module must be either adjacent or not farther apart than one vertical cable duct.

4.04 There is a maximum of four link carriers per module with the carriers in the module control

TABLE A

TRUNK GROUP NUMBERS AND TRUNK GROUP SOFTWARE RECORDS

TRUNK GROUP NO.	NAME OF TRUNK GROUP		NUMBER OF RECORDS IN MEMORY SIZE					ASSIGNED
			B	C	D	E	F	
1	Incoming Call Queue		Variable					Call Processing
2	Priority Queue		Variable					Call Processing
3	Interposition Queue		Variable					Call Processing
4	Attendant Queue		Variable					Call Processing
5	Attendant Originating Register	FP7	6	8	14	17	25	Dedicated
		FP8 &12	—	14	18	—	40	
		FP9	9	15	21	31	—	
		FP11	—	—	15	—	—	
6	Switched Loops	FP7	36	48	84	102	150	Dedicated
		FP8 &12	—	84	108	—	240	
		FP9	54	90	126	186	—	
		FP11	—	—	90	—	—	
7	Idle Gen Purpose Queues		Variable					
8-11	Outgoing Trunk Queues		Variable*					
12	ANI Pool Queues		6	6	6	6	6	Dedicated
13	ANI CO Queue		Variable					
14	ANI CCSA Queue							
15	Intercom Trunks		Variable*					

See footnotes at end of table.

TABLE A (Contd)

TRUNK GROUP NUMBERS AND TRUNK GROUP SOFTWARE RECORDS

TRUNK GROUP NO.	NAME OF TRUNK GROUP		NUMBER OF RECORDS IN MEMORY SIZE					ASSIGNED
			B	C	D	E	F	
16	Dial Pulse Originating Register†	FP7	24	31	70	116	178	
		FP8 &12	—	62	120	—	300	
		FP11	—	—	120	—	—	
		FP9	24	31	70	116	—	
17	TOUCH-TONE Dialing Originating Register†	FP7	24	31	70	116	178	
		FP8 &12	—	62	120	—	300	
		FP11	—	—	120	—	—	
		FP9	24	31	70	116	—	
18-99	Administered as Required for B-, C-, D-, E-, or F-Size Memory‡	FP7	242	311	602	826	1189	
		FP9	242	311	602	826	—	
		FP8 & 12	—	563	993	—	2368	
		FP11	—	—	992	—	—	

See footnotes at end of table.

TABLE A (Contd)

TRUNK GROUP NUMBERS AND TRUNK GROUP SOFTWARE RECORDS

* For example, in the B-size memory configuration, 242 records are available for assignment to specific trunk groups (including intercom, physical, and queuing trunk groups). If three records each have been assigned to outgoing trunk queuing groups 8, 9, 10, and 11 and five records have been assigned to outgoing trunk queuing group 31, the record pool will be reduced to 225 (242 less 17). There would be at least five physical trunk groups (associated with the five queuing trunk groups). These physical trunks would also use records from the pool.

Assume the groups are:

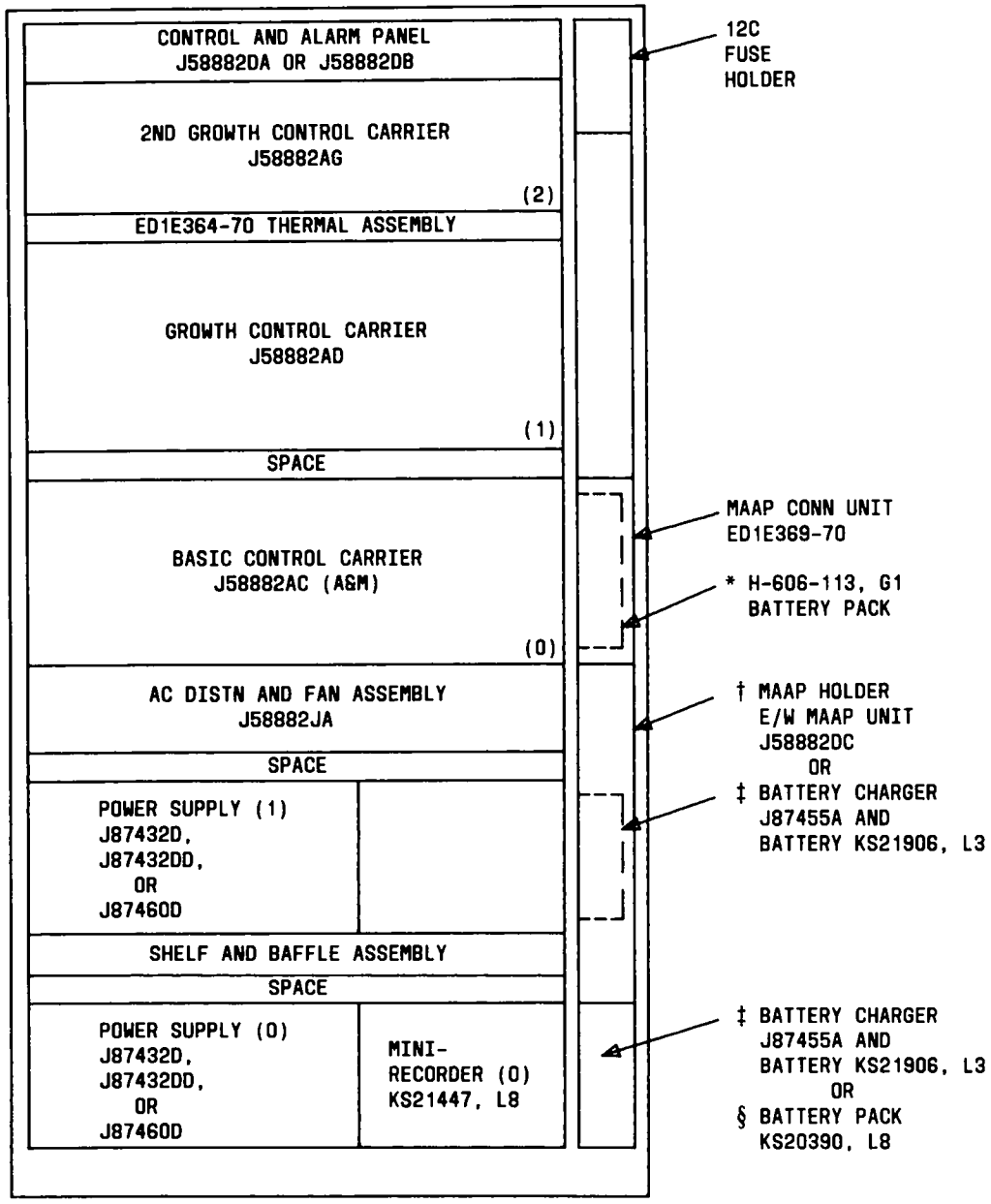
(a) CO-trunk group number 18
(b) CO-trunk group number 19
(c) FX-trunk group number 20
(d) WATS-trunk group number 21
(e) AUX-trunk group number 22.

If the five trunk groups contain a total of 90 physical trunks, the trunk records remaining in the pool would be 152 (242 less 90), of which some or all may be assigned to intercom trunks.

Traffic considerations determine how the trunk groups and trunk records may be administered for a system. Queuing trunk groups and the length of the queue (number of records in the queuing trunk groups) must be associated on a one-to-one basis with the physical trunk group for which the queue is being configured. In the example, OTQ trunk groups 8 through 11 and 31 would be associated with physical trunk groups 18 through 22, respectively. Each physical trunk group could have as many as three stations in the waiting list at any given time. (Trunk group 22 could have five stations in the queue.)

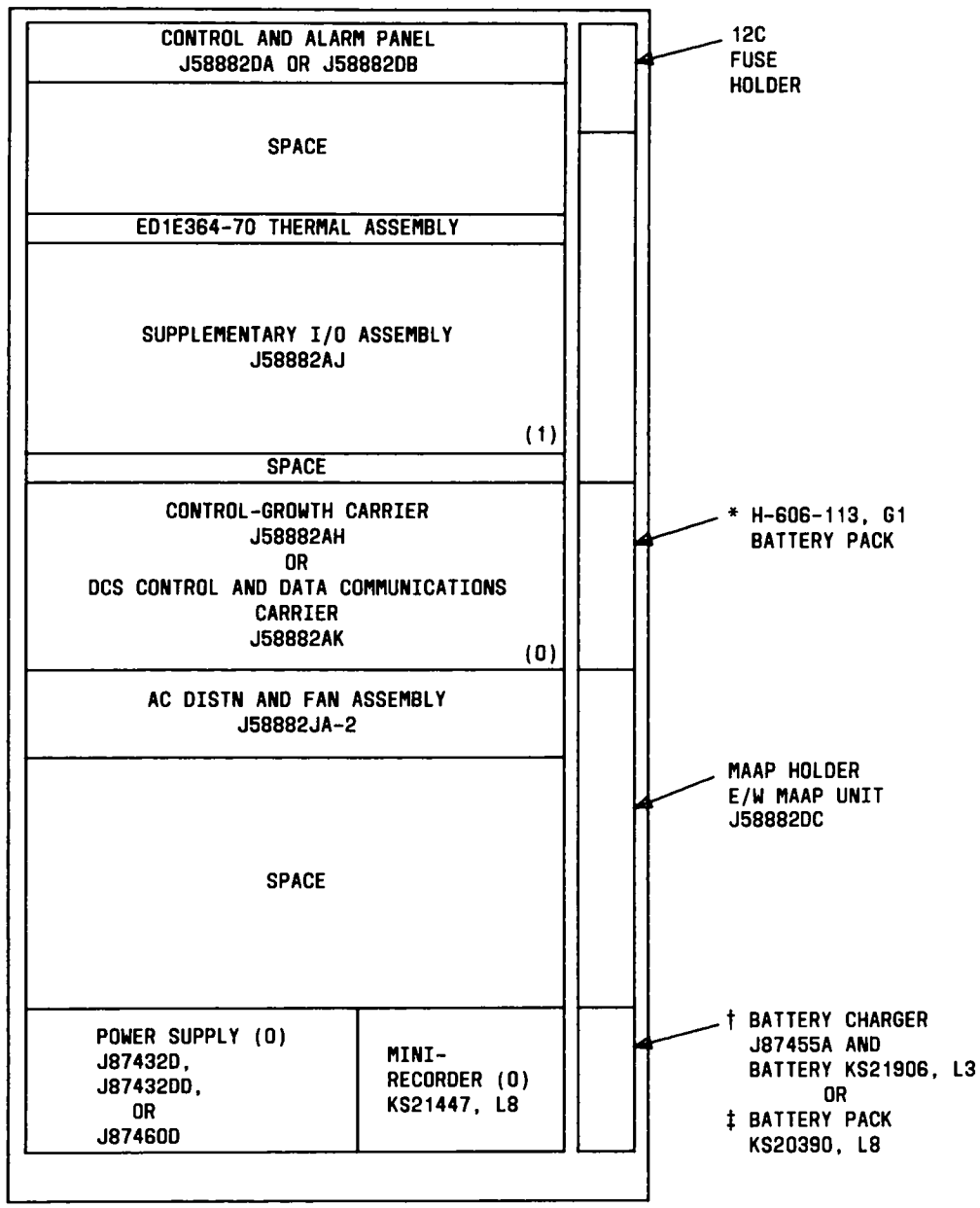
† The maximum number of combined TOUCH-TONE dialing and rotary originating register records should ***not*** exceed the number that is shown separately for each register.

‡ This is the number of trunk records available (less intercom records) to assign to physical trunk groups or queuing trunk groups. One record is automatically assigned to each physical trunk when the trunk is assigned to a group number using PROC 150 (or at the factory). The records are assigned to queuing trunk groups when the queue length is specified in PROC 100. Records are assigned to intercom trunk groups when specified in PROC 254.



* WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87432D.
† WHEN THE BATTERY CHARGER AND BATTERY ARE REQUIRED FOR THE SECOND J87460D POWER SUPPLY, THE MAAP HOLDER EQUIPPED WITH THE MAAP UNIT MUST BE MOUNTED ON AN ADJACENT CABINET.
‡ WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87460D.
§ WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87432D OR J87432DD.

Fig. 10—Common Control Cabinet—J58882A



* WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87432D
† WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87460D
‡ WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87432D OR J87432DD

Fig. 11—Common Control Cabinet—J58882E

cabinets. When two link carriers appear in a cabinet, one carrier must be in position 2 and the other carrier in position 3 or 4. Two module control cabinets are required per module, with each on a separate ac supply.

4.05 The common control cabinets contain the following carriers:

(a) J58882A common control cabinet

- Basic control carrier (J58882AC/AA)
- Growth control carrier (J58882AD/AB)

(b) J58882E common control cabinet

- Control growth carrier (J58882AH)
- ▶Distributed Communications System (DCS) Control and Data Communication Carrier (J58882AK)◀
- Supplementary I/O carrier (J58882AJ).

4.06 In the J58882A cabinet, each basic control carrier can be equipped with 18 I/O channels, and each growth control carrier can be equipped with 28 I/O data channels. The data channels are contained (two each) in LC34B circuit packs. The two data channels on each circuit pack can operate at approximately 185 kilobits per second (slow speed) or approximately 833 kilobits per second (fast speed).

4.07 In the J58882E cabinet, each control growth carrier can be equipped with ▶32◀ I/O data channels ▶if the system does not have time-of-day clock. If the system has time-of-day clock, only 28 I/O data channels are available.◀ The supplementary I/O carrier can be equipped with 28 I/O data channels. The data channels are contained (four each) in LC366B circuit packs. The first data channel (circuit 0) on each circuit pack can optionally operate at the same slow or fast speed as the LC34B. The remaining three data channels operate at slow speed only.

4.08 Each basic control or control growth carrier has a dedicated data channel for each of the following:

- Maintenance and Administration Panel (MAAP) operating at slow speed (185 kilobits per second)
- Remote Maintenance, Administration, and Traffic System (RMATS) operating at slow speed (185 kilobits per second)
- Station Message Detail Recording (SMDR) operating at high speed (833 kilobits per second).

4.09 Each basic control carrier can be equipped with 16 network data channels. Each growth control carrier can be equipped with 64 network data channels. Each control growth carrier can be equipped with 80 network data channels. The data channels are contained in the 4-MHz subchannel LC131 circuit packs (16 subchannels per circuit pack). The control for each 16 subchannels is contained in the 4-MHz channel control circuit pack LC130. One LC130 and one LC131 circuit pack are required to equip a carrier with the minimum of 16 (4-MHz) network data channels. (One network data channel is required for each network cabinet.)

> ***Note:*** The supplementary I/O carrier is not equipped with network data channels—only I/O data channels.

4.10 ▶The J58882AK-1 carrier configuration consists of a new common control processor, 256K-word Random Access Memory, Distributed Communications Interface Unit (DCIU) and minirecorder tape cartridge interface circuits. The carrier also contains associated common control and interface circuits. The carrier replaces the J58882AH-1 carrier when the DCIU function is to be provided in support of the Distributed Communications System (DCS) and/or Applications Processor (AP). The J58882AK-1 carrier not equipped with a DCIU may be used as the control carrier which replaces the J58882AH-1 carrier for single-switch customers not requiring DCS or AP functions.◀

4.11 Ringing current is supplied by frequency generators which are installed in the line and module control cabinets. Each 120A (MD) frequency generator can drive three line carriers. Each 120C generator can supply five line carriers. One 120C generator is allowed per cabinet and cannot be used to supply circuits in other cabinets.

4.12 Each module has two tone supplies (one per each time division network bus). Tone supplies consist of the LC04 paired with an LC05B, or a single supply LC204. The supply(s) is located in the line group control carrier. The test line is associated with the first tone plant.

4.13 Only one DIMENSION PBX Electronic Custom Telephone Service (ECTS) controller

(which could include a basic carrier plus a supplementary carrier) can be mounted in any one network cabinet. A maximum of two ECTS controllers can be associated with any one network module.

4.14 Empty carrier positions shall not be used to provide space to mount ▶auxiliary rack-mounted◀ equipment. The empty positions may each be optionally equipped with a no-carrier adapter (ED-1E316-70, group 3) to assist in cabinet cooling.

4.15 Refer to Section 554-111-100 for detailed information concerning physical arrangement of carriers.

4.16 The DIMENSION 2000 or Custom PBX may be configured with single or duplicate common controls. A common control cabinet with nonduplicated controls is shown in Fig. 10 or 11. Control systems that require duplication, additional slots for main memory, network module control channels, or peripheral data channels may use one or two growth control carriers. Since both common controls and the growth control carrier(s) cannot be physically located in the same cabinet, an additional cabinet (Fig. 10 or 11) must be used.

4.17 A single-cabinet configuration of a duplicated common control system is shown in Fig. 12 or 13. This arrangement furnishes two basic control or control growth carriers in a common control cabinet.

4.18 The module control cabinet (J58882B) may contain various combinations of equipment as shown in Fig. 14.

When installing a line group control carrier in a module control cabinet, the carrier must be placed adjacent to the module control and trunk port carrier.

4.19 The line cabinet (J58882C) may contain various combinations of equipment as shown in Fig. 15.

4.20 A typical DIMENSION PBX cabinet arrangement with various combinations of carriers and auxiliary cabinet and SMDR is shown in Fig. 16. Table B shows the maximum number of lines, trunks, and other system parameters available with the various feature packages and memory sizes. All maximums cannot be attained simultaneously.

ENVIRONMENTAL REQUIREMENTS

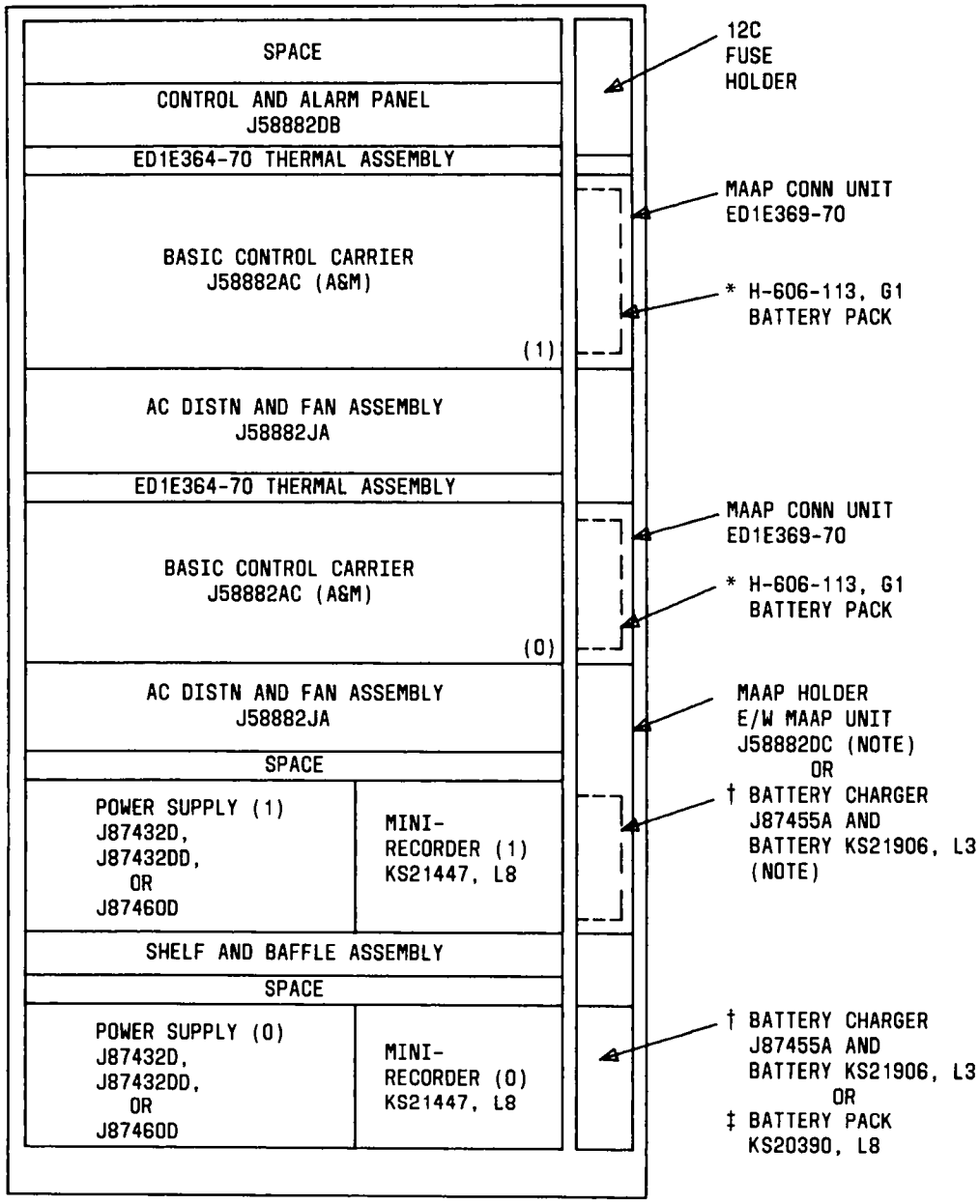
A. Atmosphere and Temperature

4.21 Extreme conditions of temperature and humidity may have damaging effects on system equipment. Exposure to extreme temperature and humidity may degrade telephone service, not only at the time of exposure but also when a normal environment is restored. Table C, which outlines the equipment room environmental requirements for the system, tabulates the data for Fig. 17. Temperature is measured by an ordinary thermometer at a location 1524 mm (5 feet) above the floor and 381 mm (15 inches) in front of a control cabinet.

4.22 The requirements presented in Table C represent the extreme limits of the equipment operating ranges. These requirements should not be construed as being desirable working conditions for minimum maintenance. Therefore, it is recommended that floor plans for customer equipment locations specify that the room ambient temperature be maintained in the range of 4.5°C to 35°C (40°F to 95°F) with a relative humidity in the range of 20 to 60 percent. Installation in undesirable areas outside these ranges will cause degradation to the extent of reducing system life. The humidity design range chart (Fig. 17) is provided to show the safe ranges for the equipment. The use of the chart requires a hygrometer or psychrometer to measure wet and dry bulb temperature and a psychrometric table to determine the relative humidity from the difference in the two measurements.

4.23 For storage and transportation environments, the permissible temperature extremes are a high of 66°C (150°F) with a minimum relative humidity of 15 percent and a low of −40°C (−40°F) with the humidity uncontrolled. Large temperature excursions, shocks, and vibrations can cause errors to data on the magnetic tape. The tape should not be loaded into the tape transport(s) during storage or shipment but, instead, should be placed in a dust-free container such as a sealed plastic wrapper.

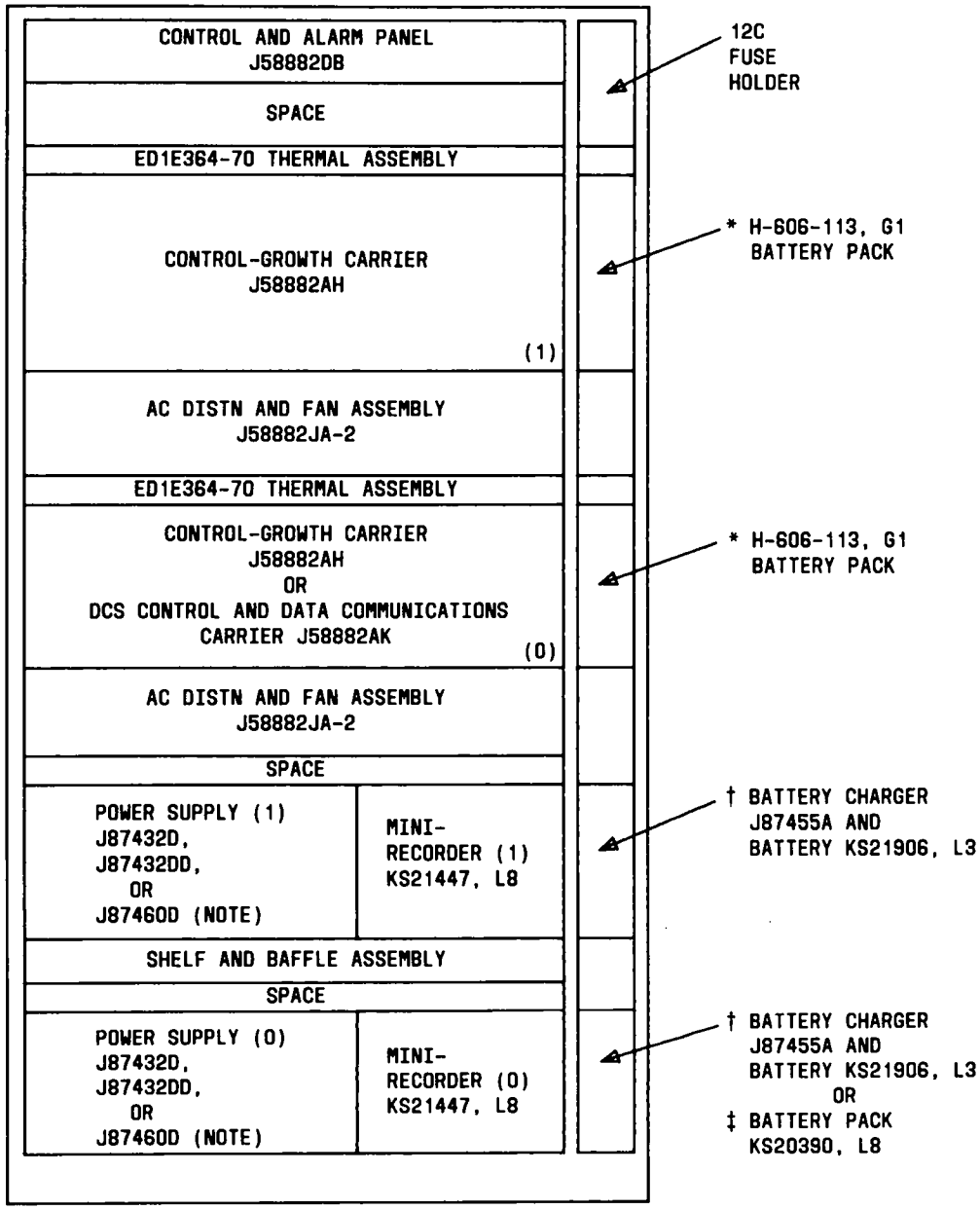
4.24 Since Table C does not provide sufficient information to select a site or to determine when fans are necessary, the following site selection guidelines should be followed.



NOTE:
WHEN THE BATTERY CHARGER AND BATTERY ARE REQUIRED FOR THE SECOND J87460D POWER SUPPLY, THE MAAP HOLDER EQUIPPED WITH THE MAAP UNIT MUST BE MOUNTED ON AN ADJACENT CABINET.

* REQUIRED WITH POWER SUPPLY J87432D
† REQUIRED WITH POWER SUPPLY J87460D
‡ REQUIRED WITH POWER SUPPLY J87432D OR J87432DD

Fig. 12—Common Control Cabinet (Duplicated Control)—J58882A



NOTE:
WHEN POWER SUPPLIES J87460D ARE PROVIDED, THE MAAP CONNECTOR BRACKET AND MAAP HOLDER EQUIPPED WITH MAAP UNIT MUST BE MOUNTED IN AN ADJACENT CABINET.

* WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87432D
† WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87460D
‡ WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87432D OR J87432DD

Fig. 13—Common Control Cabinet (Duplicated Control)—J58882E

NUMBER OF

CARRIER POSITION	ELECTRONIC LINES	STRAIGHT LINES	TRUNKS	LINKS
4	63	64	32	88
3	63	64	32	88
2		64	32	88
1		48	32	
0			22	
	126	240	150	176 (MAX)

TOTALS

* WHEN REQUIRED, PROVIDED WITH POWER SUPPLY J87460B

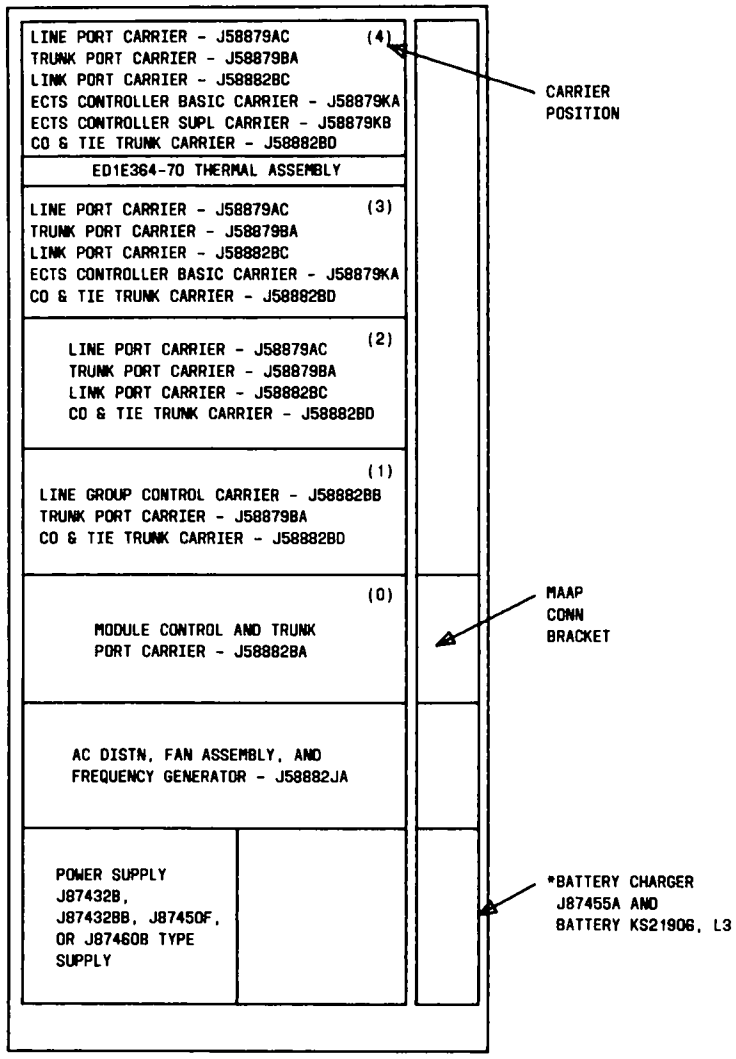


Fig. 14—Module Control Cabinet—J58882B

(a) The equipment should be installed in an air-conditioned space whenever possible. Fans will be required in each cabinet whenever:

- The equipment location attains room ambient temperature of 32°C (90°F) or above, or
- Filters are used.

(b) Environments which are not recommended for installation because of potential temperature problems include:

- Rooms in which a major heat source (ie, boiler room, furnace room, manufacturing areas using hot processes) can affect the room ambient temperature significantly.
- Areas in which the ambient temperature can become excessive, such as unventilated rooms with less than 4.6 square meters (50 square feet) of floor space, or unventilated rooms with two or more exterior walls that are frequently exposed to high ambient temperatures.

4.25 The DIMENSION PBX power dissipation rates may heat the equipment site rooms above the maximum operating temperature of equipment, if adequate air-conditioning or ventilation is not provided. The equipment engineer should check

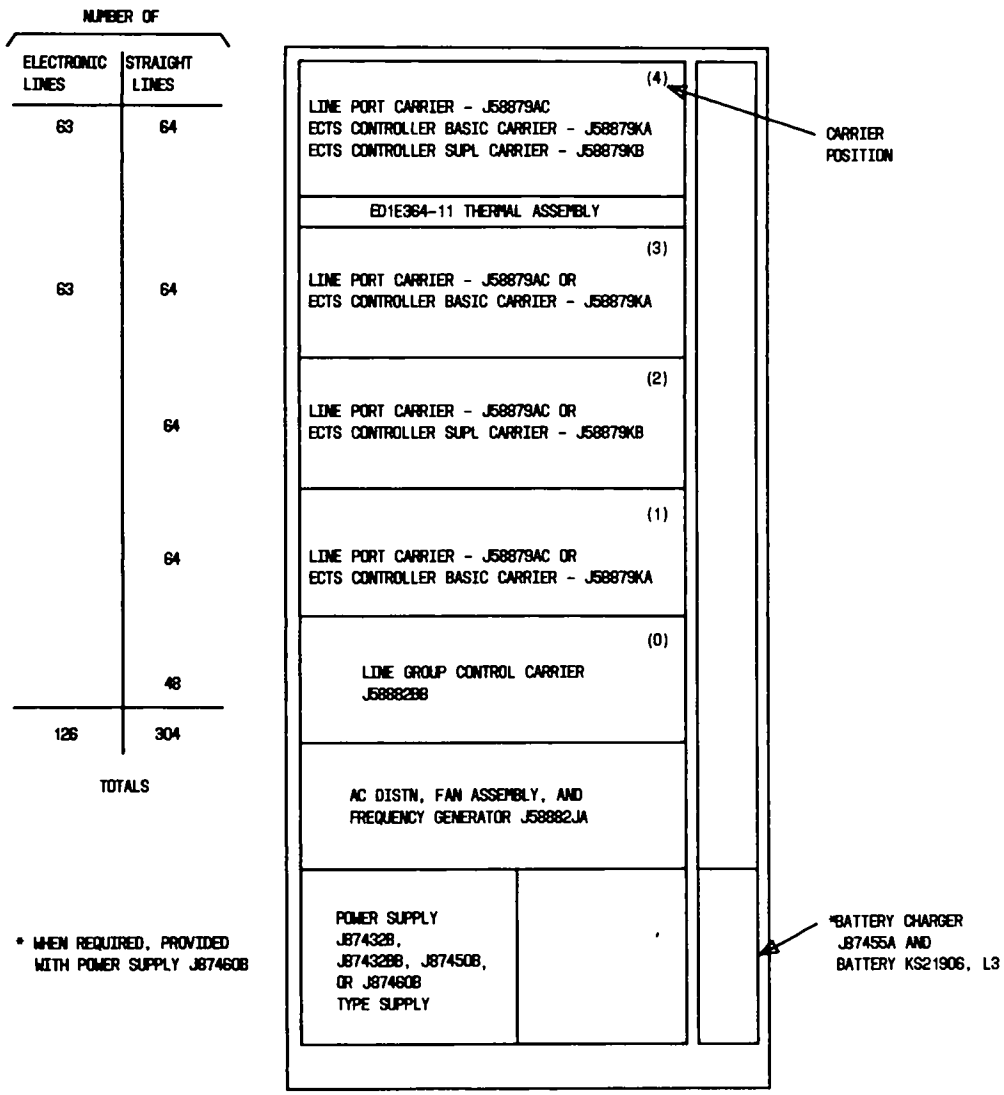
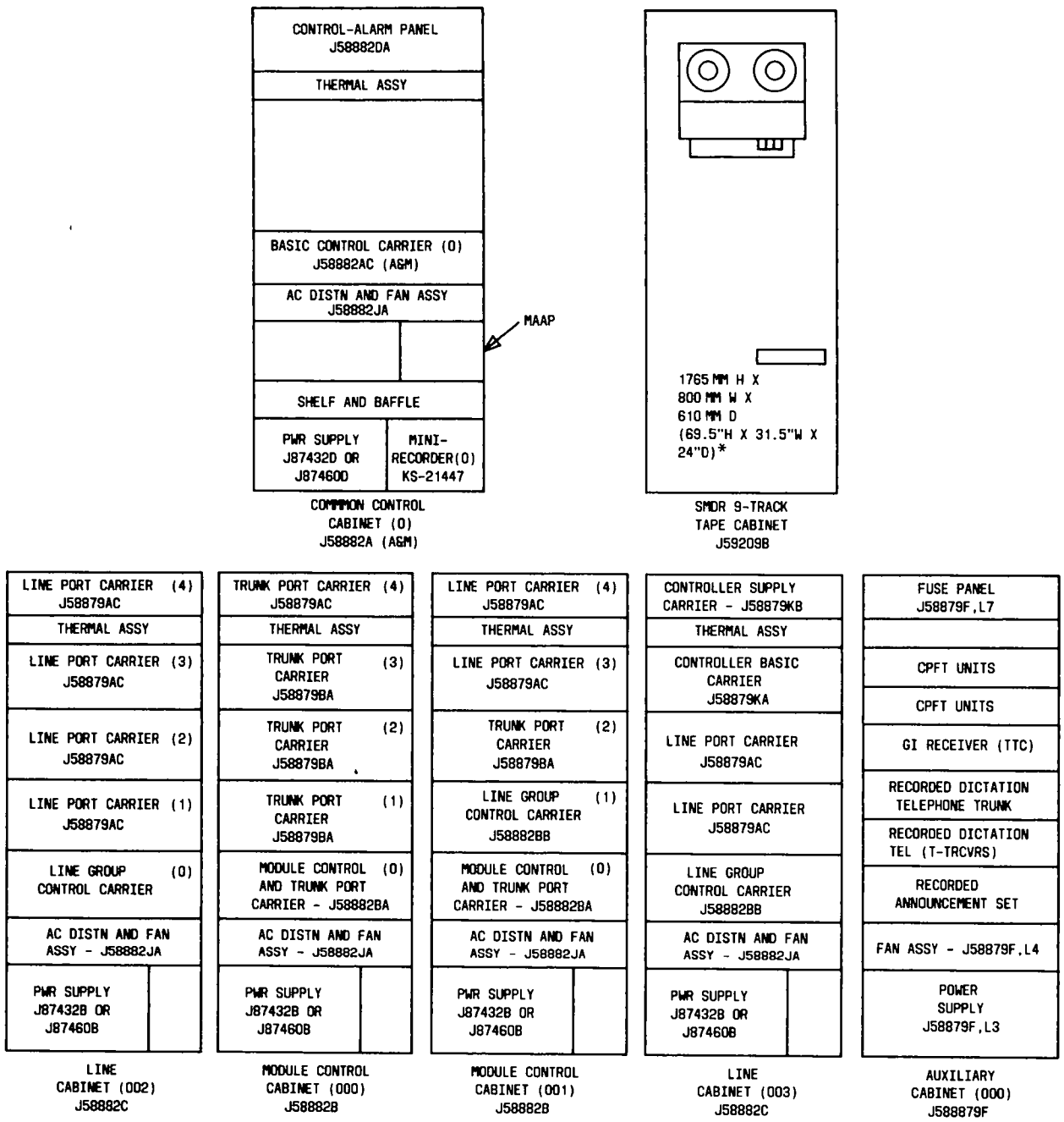


Fig. 15—Line Cabinet—J58882C

with the customer about the room ventilating and/or air-conditioning systems to ensure that the ventilating and/or air-conditioning systems are sufficient for the PBX.

4.26 To aid in determining air-conditioning requirements when space is allocated, total power dissipation of various cabinets is shown in Table D. The power dissipations shown for an auxiliary cabinet represent average values for a wide range of cabinet applications. When desired, more realistic values may be obtained by summing the individual power dissipations of the equipment in the cabinet.

4.27 When determining the air-conditioning requirements for DIMENSION PBX installations, it may be necessary to calculate the total system power from Tables E, F, G, and H. Table D may be too conservative for a multicabinet system. Tables E, F, and G show the power dissipation of various cabinet configurations under a no-traffic and a probable heavy traffic condition. Table H shows the power dissipation of individual carriers. When necessary, Table H can be used to build up cabinet configurations not shown in the previous tables. Total power can be calculated by summing the heat dissipation for a probable traffic condition of all system cabinets. Compare calculations with values shown in



* DIRECT OUTPUT VERSION SMDR CABINET IS 762 MM (30") HIGH

Fig. 16—DIMENSION 2000 or Custom PBX Equipment Cabinet Arrangement

◗TABLE B◖

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION				
			B	C	D	E	F
Equipment	Cabinets	7	5	10	25	50	70
		8 & 12	—	15	30	—	75
		9	5	10	20	40	—
		11	—	—	30	—	—
	Modules	7	1	2	5	10	14
		8 & 12	—	3	6	—	15
		9	1	2	5	10	14
		11	—	—	6	—	—
	Line Carriers	7	12	18	40	68	121
		8 & 12	—	18	40	—	112
		9	12	18	40	68	121
		11	—	—	45	—	—
	Trunk Carriers	7	6	8	25	40	56
		8 & 12	—	15	33	—	73
		9	6	8	25	40	56
		11	—	—	30	—	—
	Link Carriers*	7	0	2	10	30	42
		8 & 12	—	6	18	—	45
		9	0	2	10	30	42
		11	—	—	18	—	—

See note and footnotes at end of table.

◗TABLE B◖ (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION				
			B	C	D	E	F
System	Attendant Consoles†	7	6	8	14	17	25
		8 & 12	—	14	18	—	40
		9	9	15	21	31	—
		11	—	—	15	—	—
	Attendant Console Switched Loops	7	36	48	84	102	150
		8 & 12	—	84	108	—	240
		9	54	90	126	186	—
		11	—	—	90	—	—
	Attendant Console DSS Groups	7	18	32	64	100	100
		8 & 12	—	32	64	—	100
		9	—	—	—	—	—
		11	—	—	64	—	—
	Attendant Conference Circuits	7	2	2	6	8	13
		8 & 12	—	6	6	—	13
		9	2	2	6	8	13
		11	—	—	6	—	—
	ECTS Controllers	7	5	8	13	32	64
		8 & 12	—	8	13	—	40
		11	—	—	8	—	—
	ECTS Station Sets	7	325	500	1000	1600	3200
		8 & 12	—	500	1000	—	2800
		11	—	—	800	—	—
	Custom Intercom Numbers	7	650	1000	1280	1280	1280
		8 & 12	—	1000	1280	—	1280
		11	—	—	1280	—	—

See note and footnotes at end of table.

TABLE B (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION				
			B	C	D	E	F
System (Contd)	Station Line Records	7	712	1072	2360	3952	7184
		8 & 12	—	1032	2320	—	6552
		9	712	1072	2360	3952	—
		11	—	—	2640	—	—
	Speed Calling Numbers	7	800	1000	2000	3000	5120
		8 & 12	—	1000	2000	—	5120
		11	—	—	2000	—	—
	Calling Number Display	7	14	42	42	42	104
		8 & 12	—	6	6	—	6
		9	9	11	13	15	—
		11	—	—	13	—	—
	Long Distance Billing Journal Printers	9	9	15	21	31	—
		11	—	—	15	—	—
	Assignable Software Input/ Output Data Channels J68882AC/AJ/AK Carriers) AK-FP8, Issue 3 only	7	46/34/NA	46/34/NA	46/34/NA	46/34/NA	74/62/NA
		8 & 12	—	46/34/NA	46/34/NA	—	74/62/58
		9	46/34/NA	46/34/NA	46/34/NA	46/34/NA	—
		11	—	—	NA/34/NA	—	—
	Peripheral Interface Circuits	9	12	18	24	34	—
		11	—	—	18	—	—
	Remote Access Trunks	7	6	12	12	20	30
		8 & 12	—	30	45	—	45
		11	—	—	45	—	—
	Release Link Trunks (Outgoing)	8 & 12	—	16	16	—	16
		11	—	—	16	—	—
	Release Link Trunks (Incoming)	8 & 12	—	110	110	—	110
		11	—	—	110	—	—

See note and footnotes at end of table.

◗TABLE B◖ (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION				
			B	C	D	E	F
Traffic	Trunk Groups‡	7	99	99	99	99	99
		8 & 12	—	99	99	—	99
		9	99	99	99	99	—
		11	—	—	99	—	—
	Link Groups	7	0	1	10	45	91
		8 & 12	—	3	15	—	105
		9	0	1	10	45	—
		11	—	—	15	—	—
	Links (Audio Paths)	7	0	88	480	1280	1820
		9	0	88	480	1280	—
		8 & 12	—	204	568	—	2139
		11	—	—	568	—	—
	Message Register Trunks (LC16)	9	16	24	40	56	—
		11	—	—	24	—	—
	OTQ SMDR Digit Records	7	84	87	199	199	199
		8 & 12	—	246	382	—	844
		11	—	—	382	—	—
	Assignable Trunks§	7	242	311	602	826	1129
		8 & 12	—	563	992	—	2368
		9	242	311	602	826	—
		11	—	—	993	—	—
	SMDR Records	7	76	105	185	425	665
		8 & 12	—	298	562	—	1076
		11	—	—	562	—	—

See note and footnotes at end of table.

TABLE B (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION				
			B	C	D	E	F
Traffic (Contd)	Dial Pulse and TOUCH-TONE Calling Originating Registers	7	24	31	70	116	178
		8 & 12	—	62	120	—	300
		9	24	31	70	116	—
		11	—	—	120	—	—
	Total Originating Register Records¶	7	32	41	90	141	216
		8 & 12	—	82	144	—	353
		9	35	48	97	155	—
		11	—	—	141	—	—
	Total Trunk Records**	7	317	407	783	1076	1502
		8 & 12	—	736	1251	—	2968
		9	338	456	832	1174	—
		11	—	—	1231	—	—
	Total Memory Circuit Packs (8K/16K/64K) words each)	7	16/8/NA	18/9/3	25/13/NA	31/16/4	48/24/6
		8 & 12	—	32/16/4	40/20/5	—	NA/32/8
		9	22/11/3	24/12/3	30/15/4	36/18/5	—
		11	—	—	NA/32/8	—	—
	Quantity of Memory Words Required††	7	128K	144K	200K	256K	384K
		8 & 12	—	256K	320K	—	512K
		9	176K	192K	240K	288K	—
		11	—	—	512K	—	—

Note: Maximum capacity is shown for the five memory configurations. Maximum quantities of both lines and trunks cannot be provided in the same system.

* Quantity of physical link carriers is shown. There are two electrical link carriers per physical link carrier.

† FP8 PBXs that are equipped with deluxe queuing and interposition calling features reduce the maximum number of consoles shown in the table two.

‡ Issue 3.0 FP8 trunk groups increased from 99 to 255.

§ Assignable trunk records include physical (hardware) trunks, intercom records, and outgoing trunk queuing records.

¶ Sum of consoles, attendant conferences, and station dial records.

** Sum of ANI queue recods, assignable trunk records, attendant conference records, console swiched loop records, attendant originating register records, and dial pulse/TOUCH-TONE dialing orignating register records.

†† FP8, Issue 2.0 is equipped with 640K maximum memory capacity. FP8, Issue 3.0 is equipped with 1024K maximum memory capacity.

TABLE C

ENVIRONMENTAL REQUIREMENTS

SYSTEM	ROOM AMBIENT (DRY BULB) TEMPERATURE°C (°F)		PERMISSIBLE RANGE HUMIDITY (%)	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
Without Fans	0 (32)	27 (80)	10	95
	0 (32)	29 (85)	8	95
	0 (32)	32 (90)	7	95
With Fans	0 (32)	35 (95)	6	80
	0 (32)	39 (100)	5	70
	0 (32)	41 (105)	4	60
	0 (32)	43 (110)	4	55
	0 (32)	46 (115)	3	45
	0 (32)	49 (120)	3	40

Table D and use the lower values. The no-traffic power dissipations may be used to determine the lower limit of the cooling system requirements (ie, minimum cooling requirements during weekends or holidays).

4.28 For refinements in determining power dissipation, the following alternate procedure should be consulted:

(a) Total Power Dissipation $= \sum_{i=1}^{M} Pi + NK$

Where:

Pi = Power dissipation of the *ith* cabinet fully equipped in idle state.

M = Total number of cabinets.

N = Total number of modules.

K = Traffic dependent dissipation at busy hour per module.

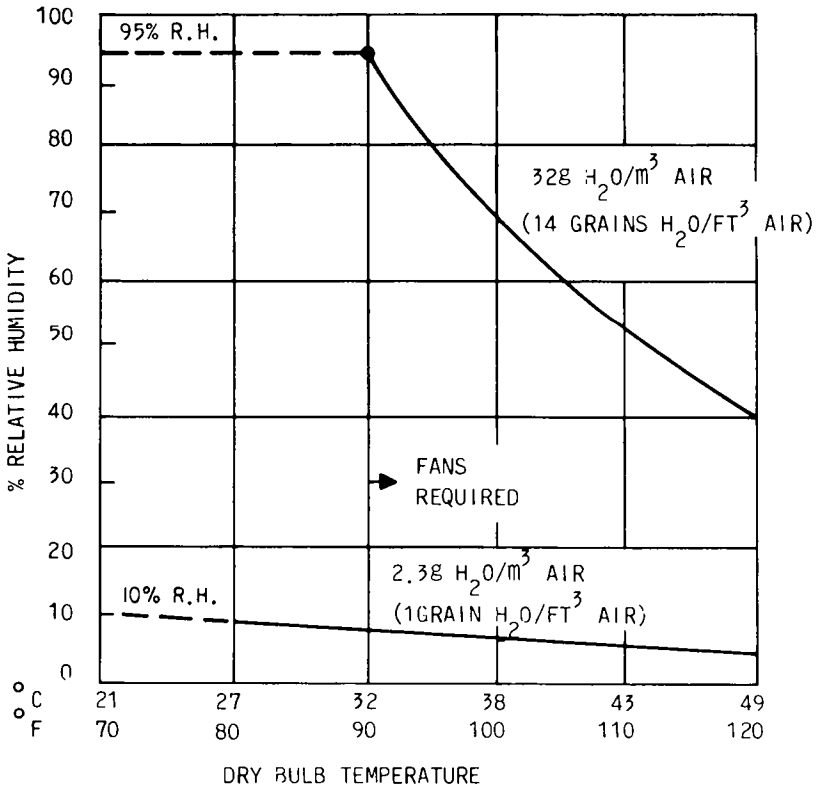


Fig. 17—Humidity Design Range

TABLE D

TOTAL POWER DISSIPATION BY CABINET

CABINET	PROBABLE HEAVY TRAFFIC (WATTS)	BTU/HR
Common Control (J58882A) (Unduplicated)	360	1604
Common Control (J58882E) (Unduplicated)	—	—
Common Control (J58882A) (Duplicated)	660	3000
Common Control (J58882E) (Duplicated)	—	—
Module Control (J58882B)	640	2833
Line (J58882C)	445	2833
SMDR	360	1797
Auxiliary	350	1365

TABLE E

COMMON CONTROL CABINET HEAT DISSIPATION

CONFIGURATION	POWER DISSIPATION CALCULATIONS USING TYPICAL COMPONENT VALUES (SEE NOTE)
One Basic Control Carrier One Power Supply	360
Two Basic Control Carriers Two Power Supplies	660
One Basic Control Carrier One Growth Control Carrier Two Power Supplies	580
One Basic Control Carrier Two Growth Control Carriers Two Power Supplies	780

Note: Power dissipations are relatively constant with traffic.

TABLE F

LINE CABINET HEAT DISSIPATION

CONFIGURATION	POWER DISSIPATION CALCULATIONS (WATTS)	
	USING A NO-TRAFFIC CONDITION	USING A PROBABLE HEAVY TRAFFIC CONDITION
One Line Group Control Carrier Four Line Port Carriers	295	445
One Line Group Control Carrier Three Line Port Carriers One ECTS Basic Carrier	350	480

(b) The value of K should be determined as follows:

- Assuming a probable heavy traffic condition per module and using a conservative estimate of time-slot division, the expected occupancy at P01 grade of service is 80 percent or 102 time slots busy. This estimate can be represented in terms of active circuits as follows:

  Lines busy per module = 170

  Trunks busy per module = 34.

- Use the following formula to calculate K:
  K = [(busy lines x watts/busy line)
  + (busy trunks x watts/busy trunk)] + 30% power supply inefficiency.

- Calculate K in accordance with the predominant trunk activity as shown in Table I.

(c) BTU/HR = 3.413 x (total power dissipation in watts).

4.29 The following example illustrates the calculation of total system power for a typical installation.

Example

A 4-module duplicated control DIMENSION 2000 PBX consists of the following:

- Two common control cabinets (J58882A); each containing one basic control, two growth controls, and two power supplies
- Eight module control cabinets; each containing one module control and trunk, one trunk, two line carriers, and one link carrier
- Eight line cabinets; each containing one line group control and four line port carriers
- One SMDR cabinet
- Two auxiliary cabinets
- Six DIMENSION PBX Electronic Custom Telephone Service (ECTS) carriers.

TABLE G

MODULE CONTROL CABINET HEAT DISSIPATION

CONFIGURATION	POWER DISSIPATION CALCULATIONS (WATTS)	
	USING A NO-TRAFFIC CONDITION	USING A PROBABLE HEAVY TRAFFIC CONDITION
One Module Control and Tie Trunk Carrier * One Line Group Control Carrier Three Line Port Carriers	370	580
One Module Control and Tie Trunk Carrier * One Line Group Control Carrier Two Line Port Carriers One Trunk Port Carrier †	365	575
One Module Control and Tie Trunk Carrier * One Line Group Control Carrier Two Line Port Carriers One ECTS Basic Carrier	430	640
One Module Control and Tie Trunk Carrier * One Trunk Port Carrier † One Link Carrier Two Line Port Carriers	320	530
One Module Control and DID Trunk Carrier ‡ One Line Group Control Carrier One Line Port Carrier Two DID Trunk Carriers ‡	410	620

* Tie trunks predominate.

† CO trunks predominate.

‡ DID trunks predominate.

TABLE H

CALCULATED POWER DISSIPATION BY CARRIER (WATTS)

CARRIER (SEE NOTE)	TYPICAL
Basic Control	192
Growth Control	159
ECTS Basic	80
ECTS Supplemental	24
Link	50

Note: For power dissipations of other carriers, use following equations with "N" equaling number of lines or trunks presently in each carrier. Maximum value of "N" is shown in parentheses.

CARRIER	POWER DISSIPATIONS (WATTS)
Module Control and Tie Trunk (22)	95 + (N × 2.43)
Module Control and DID Trunk (22)	100 + (N × 1.83)
Module Control and Trunk Port (22)	90 + (N × 0.30)
Line Group Control (48)	85 + (N × 1.508)
Line Port (64)	35 + (N × 1.508)
CO Trunk Port (32)	29 + (N × 0.30)
DID Trunk Port (32)	48 + (N × 1.83)

Other heat dissipating units that must be considered in cabinet power dissipation calculations are as follows:

Power supply inefficiency approximately 30 percent
Alarm panel
Frequency generator
MAAP
Fan assembly
Minirecorder

CALCULATION PROCEDURE

EQUIPMENT	HEAT DISSIPATION (WATTS/UNIT)	NUMBER OF UNITS	TOTAL (WATTS)
Common Control Cabinet (J58882A)	780	2	1560
Module Control Cabinet	530	8	4240
Line Cabinet	445	8	3560
SMDR Cabinet	360	1	360
Auxiliary Cabinet	350	2	700
DIMENSION PBX ECTS Carrier	80	6	480
			10,900 Watts

$$10{,}900 \text{ Watts} \times 3.413 \frac{\text{BTU/HR}}{\text{Watts}} = 37{,}202 \text{ BTU/HR}$$

Total System Power = 37K BTU/HR (approximately)

B. Filters

4.30 The use of filters in the equipment will be determined by the environment. The environment can be divided into the following air contamination classifications:

- ***Heavy Industrial:*** Space in which industrial processes or construction work act as sources of excessive dust or lint. This environment is not recommended as an installation site. However, if it is necessary to install a system in this environment, filters will be required on each cabinet.
- ***Average Industrial:*** Nonmanufacturing space in industrial areas. Filters must be used on each cabinet installed in this environment.
- ***Average Residential:*** Storage or office space which has heavy traffic or which is adjacent to building exits and entrances. In this environment, if the system is equipped with

TABLE I

TRAFFIC DEPENDENT DISSIPATION AT BUSY HOUR

PREDOMINANT TRUNK ACTIVITY	BUSY LINES X WATTS/BUSY LINE	+	BUSY TRUNKS X WATTS/BUSY TRUNK	X	POWER SUPPLY INEFFICIENCY 30%	=	K (WATTS)
CO Trunks	[(170 × 1.508)	+	(34 × 0.30)]	×	1.3	=	347
DID Trunks	[(170 × 1.508)	+	(34 × 1.83)]	×	1.3	=	414
Tie Trunks	[(170 × 1.508)	+	(34 × 2.43)]	×	1.3	=	440
Mixture of CO DID Tie Trunks	(170 × 1.508)	+	$\begin{pmatrix}(A \times 0.30)\\(B \times 1.83)\\(C \times 2.43)\end{pmatrix}$ *	×	1.3	=	

* A, B, and C equals percentage of 34, proportional to number of CO, DID, and tie trunks, respectively, to total number of trunks in module.

fans (for reasons of temperature), filters are required on each cabinet.

- ***Relatively Clean Room:*** Interior rooms in office space with little or no traffic. Filters are never required in this environment.

Filters require replacement periodically as they become laden with contaminants. The replacement interval will vary from a few weeks to a year or more, depending on the local conditions. Under average conditions, filter life can be expected to be in excess of 6 months. It is the responsibility of the telephone company to conduct periodic filter inspections and ensure replacement when deemed necessary. Filters should be inspected (preferably in conjunction with service orders) at intervals to be determined by the nature of the environment.

4.31 The basic DIMENSION PBX equipment is primarily solid state electronics. Certain features require the use of open contact relays which are mounted in auxiliary cabinets or on the wall. This equipment is susceptible to the same adverse effects from contaminants as previous electromechanical equipment. Copy machines have been identified as a potential source of contaminants which can leave deposits on, erode, contaminate, and insulate open contact relays. It is recommended that relay equipment be located away from equipment which exhibits this type of contaminant emission. If it is found necessary to locate relay equipment in such an environment, then a special PBX filtration system should be utilized. The special PBX filtration system in Section 534-367-201 should only be used in auxiliary equipment containing open contact relays. If fans are installed in this auxiliary equipment, the fans should not be operational when the special PBX filtration system is used. In severely contaminated industrial environments, other DIMENSION PBX equipment may be affected. Gold finger and connector interfaces could chemically deteriorate through the corrosive effects of gases on particle surfaces. Environments containing high concentrations of corrosive gases, such as sulfur or chlorine, should not be used as installation sites. The performance of the minirecorder may be affected if high concentrations of metallic contaminants are present. These can interfere with magnetic tape read or write operations. Dust, paper fiber, or carbon particles can also affect the tape transport operation. Industrial areas suitable for prolonged human activity (without safety protection) are not considered to be severely contaminated and can be used as installation locations.

C. Transportation

In Transit

4.32 The system should always be shipped packaged in the Western Electric-provided crates.

4.33 The packing material used for shipping cabinets from Western Electric is adequate for upright or lay-down (on-side) shipment. However, upright shipment is preferred. If cabinets are shipped on-side, installation personnel should carefully raise the cabinets to an upright position before unpacking.

4.34 When shipped, all system cabinets will be fully loaded, ready for operation, with the exception of cabling. This includes all maintenance books and manuals to be kept inside the door. This does not include the spacer assembly and floorplate which are shipped in a separate crate.

4.35 The preferred modes of transportation are in order of preference—truck, rail, and air. Air transportation is known to subject equipment to severe handling shocks. Rail transportation is less severe, but railroad car coupling shocks can be severely stressing on the system.

Handling on Site

4.36 It is recommended that the system remain packaged in its crate until it is in the room in which it is to be installed.

4.37 Forklifts and dollies are acceptable means of handling the crated system on customer premises. The pallet portion of the crate has been designed for these methods of handling.

4.38 Care should be taken to avoid dropping the system (either crated or uncrated) from any height. Under no circumstances should the system be allowed to drop from a height greater than 203 mm (8 inches) packaged or 25 mm (1 inch) unpackaged. The system should not be dropped from any height when shipped in the "lay-down" position.

D. Structural

Floor Loading

4.39 The minimum requirement found in any commercial floor loading codes is 23 kg per 0.09

square meter (50 pounds per square foot). The maximum weight of one DIMENSION PBX 5-carrier cabinet is about 340 kg (750 pounds). Thus, a free maintenance area of at least 1.4 square meters (15 square feet) per cabinet must be provided on a floor which is rated at 23 kg per 0.09 square meter (50 pounds per square foot).

4.40 The auxiliary cabinet(s) must be job engineered locally. Floor loading may be determined by adding equipment unit weights to the empty cabinet weight of 123 kg (250 pounds).

4.41 Average floor loading is determined by averaging the weights of all equipment over a particular floor area and dividing the total weight by that area. The area includes aisles and open areas around the cabinets. The average floor load must not exceed the rated floor loading of the building.

Stability and Movement

4.42 Each DIMENSION PBX cabinet is mounted on a pair of rails which must be bolted to the floor with four bolts and washers. When earthquake or disaster bracing is required by law or when local telephone service company engineers feel that it is necessary, such bracing can be provided. In established earthquake zones, six bolts, standard washers, disc-spring washers, and insulating washers are provided to be used in the predrilled holes in each pair of rails. Refer to ED-1E362-10 for additional information. Figure 18 illustrates the areas in the United States where a study of the need for bracing may be desirable.

4.43 Prior to the installation of cabinets on rails, care should be taken while moving the cabinets across deep pile carpets in order to avoid tipping. The cabinet casters are such that a force of approximately 45 kg (100 pounds) is required to start the cabinet moving on thick carpeting. Also, the placement of the casters allows a moderately rapid movement (about 610 mm per second [2 feet per second]) of the cabinets without risk of tipping when a bump or irregularity in the floor is encountered. Movement faster than 610 mm per second (2 feet per second), however, should be considered dangerous with regard to cabinet tipping. Also, when moving across floor surfaces such as soft tile or linoleum, ensure that the surface pressure rating is greater than 75 kg per 25 square millimeters (165 pounds per square inch) or caster markings may occur on the floor cover.

E. Electrical Fields

4.44 To prevent the introduction of noise in the system, power feeder(s) dedicated to the DIMENSION PBX should be used. Separate branch circuits are sufficient to serve this purpose.

4.45 Electromagnetic fields may cause noise to be introduced into the DIMENSION PBX. Care should be taken to avoid placing the system and/or cable runs in areas where high field strengths from sources such as AM radio transmitters, induction heaters, elevator motors, and similar equipment may be present. If the field strength is less than 0.05 volt per meter, interference is not likely. Between 0.05 and 1.0 volt per meter, interference may or may not occur. In systems where the field strength is greater than 1.0 volt per meter, interference is likely.

4.46 Interference usually results in audible noise on connections. In most cases, the interference is introduced into the system via trunk or station cables or both. Correction for noise in cable pairs can be obtained by installing an electromagnetic interference (EMI) filter assembly per ED-1E403-01. The Group 1 EMI filter mounting assembly includes three 1513A filter assemblies equipped with connecting cable, connector retaining bracket, and mounting assembly. The mounting assembly is capable of containing ten filter assemblies. A Group 1 assembly consists of the following:

- One EMI filter mounting panel
- Three EMI filter assemblies
- Three connecting cables (ED-1E367, Group 935)
- One filter mounting cover.

4.47 Seven additional EMI filter assemblies (Group 2) may be added to the Group 1 assembly. Each Group 2 filter assembly consists of the following:

- One EMI filter assembly
- One connecting cable (ED-1E367, Group 935).

4.48 A maximum of three Group 1 EMI filter assemblies can be mounted on the rear of a DIMENSION PBX cabinet (Fig. 19). If the cabinet

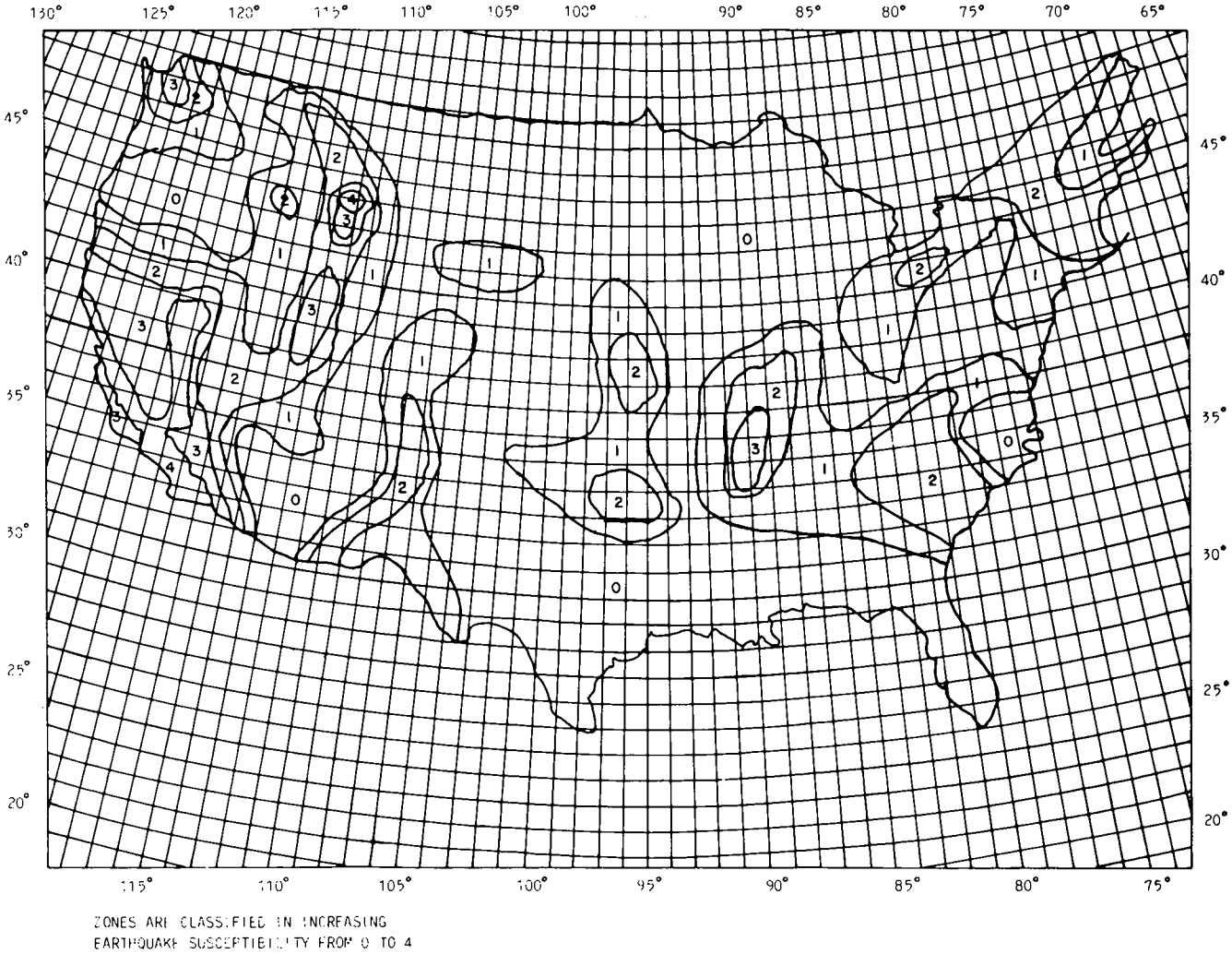
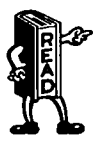


Fig. 18—Earthquake Environment (USA)

has not been modified, clearance holes must be drilled through the rear cabinet cover, and mounting holes (for 10-32 screws) must be drilled and tapped into the cabinet frame. Each filter assembly and cable should be identified with the designation of the associated line or trunk carrier connector (ie, LX01, TX01, etc).

4.49 One filter assembly and connecting cable accommodate one 25-pair trunk or line cable. The connecting cable connects from the J1 connector on the filter assembly to the cross-connect field. There are no power requirements, but a ground lead must be connected from the unit to the main ground block. Since cable pairs leaving the premises (such as trunks and off-premise station pairs) are most susceptible, these pairs should be treated first. If this treatment does not eliminate the problem of induced noise, treatment of station pairs may be required. Generally, AM stations interfere worse than FM stations (including television stations). A building may also provide considerable shielding effect, reducing the interfering capability of the radiating station. Other possibly interfering radiators include industrial RF heating equipment and welders.



The 1513A filter assemblies should not be used when the attendant console cables are suspect. Using the filters on the console cables will inhibit

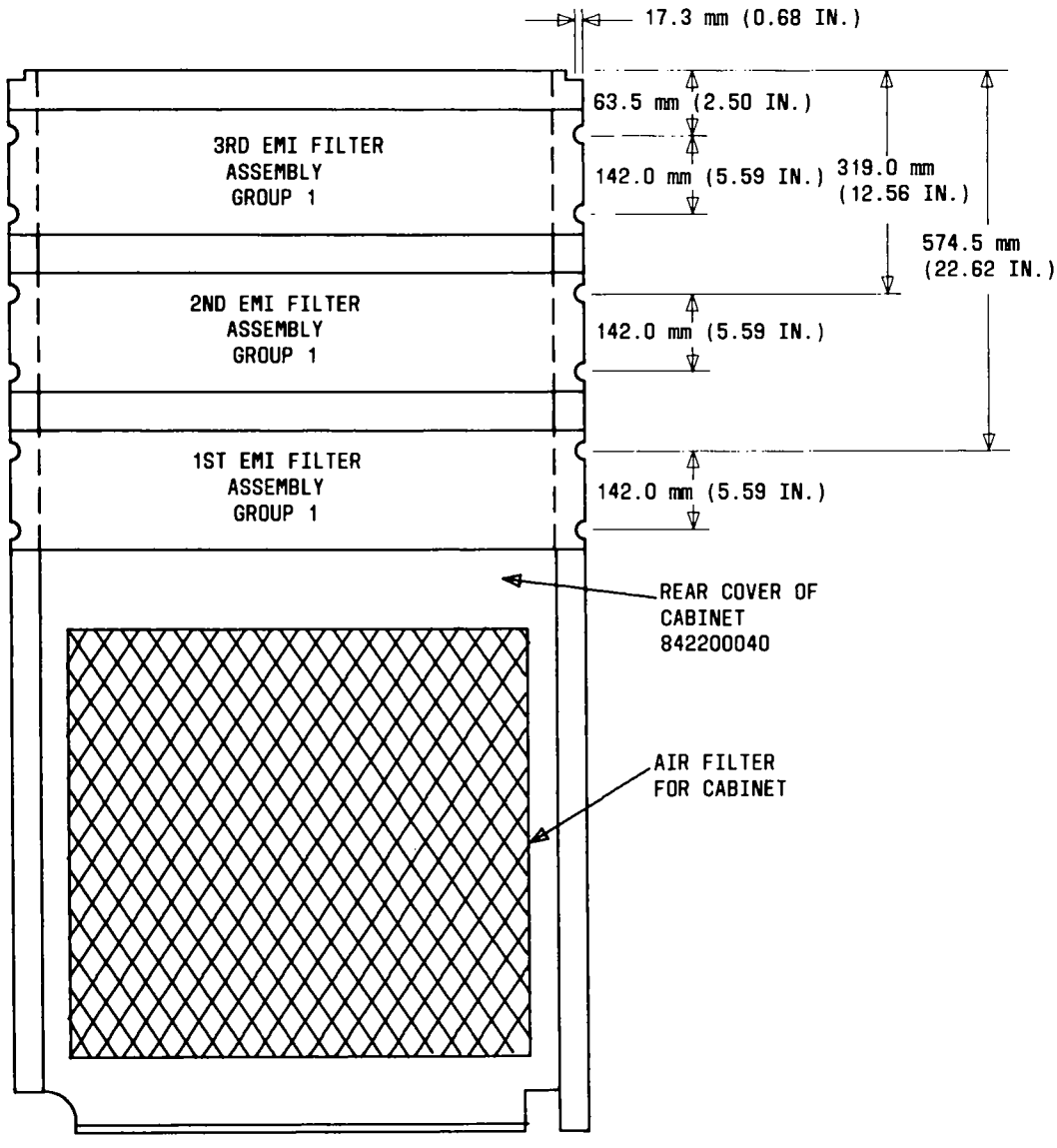


Fig. 19—EMI Filter Assembly Mounting

data transmission on the data pairs. Standard 1542AM inductors should be used to filter the console audio pairs.

4.50 Field strength can be measured using a standard field strength meter such as the Holaday Industries HI-3001, the Electric Field Sensor, Model EFS1, manufactured by Instruments for Industry, Inc., or a tunable R70 meter from Electrometrics. If the field strength from a broadcast station cannot be measured, it can be approximated by dividing the square root of emitted power in kilowatts by the distance from the antenna in 305m (1000 feet). This approximation yields the field strength in volts per meter and is relatively accurate except when very close to the antenna. In those cases, the field strength must be measured.

4.51 The PBX may be subject to noise interference from motors (having commutators) of more than 1/4 horsepower, if situated in the same or an adjacent room. Small tools with universal motors are generally not a problem, if operated on separate

power lines. Motors without commutators, whether synchronous or asynchronous, generally do not cause interference into the system.

In order to prevent or reduce electrostatic noise in the system, the frame shall be well grounded as discussed in this Part 4 (GROUNDING AND PROTECTION). Always attach authorized wrist grounding strap before working on system or handling circuit packs.

F. Acoustics

4.52 The system should be located in an acoustic environment which allows maintenance personnel to hear tones through a standard headset while performing necessary tests.

4.53 The noise levels which do not permit sound to be heard over the standard headset are about the same or greater than those specified in the Occupational Safety and Health Act (OSHA). Therefore, the OSHA requirements for sound satisfy the environmental requirements for the system, and these must be met wherever the machine is placed. Check the latest OSHA requirements for noise levels.

G. Lighting

4.54 The lighting configuration in the area of the system should allow maintenance personnel to perform their tasks. The light intensity level should be sufficient to meet the OSHA standards as measured from any of the directions necessary, ie, from the front or back of the cabinet. To obtain accurate footcandle measurement, measure level in center aisle, 1524 mm (5 feet) above the floor aiming meter upward. Measurements should be taken with a WESTON* footcandle meter, Model 614 or equivalent.

Standard 48V lamps used by craft personnel for illumination shall not be powered by DIMENSION PBX 48V taps either in the power supply or backplanes.

H. Security

4.55 The PBX cabinets have a lock on the front panel. A 216C tool is used to operate the lock. This locking arrangement is to allow access to the inside of the machine to authorized maintenance personnel only. The front panel also provides access to the wheel locks which permit or restrict cabinet movement.

*Registered trademark of Weston Instruments, Inc.

I. Insects and Rodents

4.56 The system cabinets have been designed to retard insect and rodent entry to external areas. For this reason, the provided panels and doors should be closed at all times, particularly when such pests are known to exist in the installation area.

J. Floor Plan

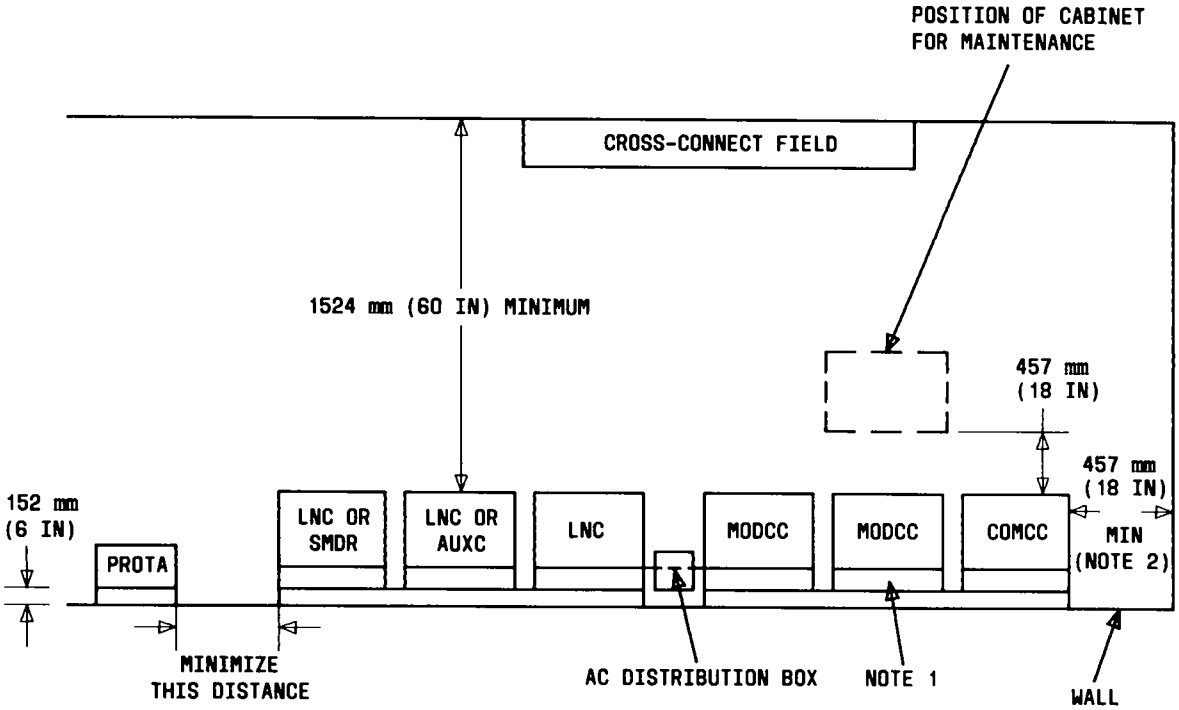
4.57 A typical floor plan layout of a single-module installation is shown in Fig. 20. Floor plan layouts for multimodule installations are shown in Fig. 21 and 22. The main cross-connect field should be located near the cabinets, if possible, to simplify testing and maintenance.

4.58 Maintenance space is required in front of and on the side of the equipment cabinets to permit access to the interior components. The following arrangements and space requirements shall be observed when placing cabinets:

- Minimum clearance in front of cabinet is 1524 mm (60 inches) when placed against the wall. When in lineups, a minimum 914-mm (36-inch) aisle is required between front of cabinet and wall, or a minimum 1067-mm (42-inch) aisle between front-to-front cabinets.

- Minimum clearance in rear of cabinet is 152 mm (6 inches) when placed against the wall. When in lineups, a minimum 787-mm (29-inch) aisle is required between rear of cabinet and wall, or a minimum 533-mm (21-inch) aisle between rear-to-rear cabinets, or a minimum 152-mm (6-inch) clearance between rear-to-rear cabinets without an aisle.

- A minimum aisle should be provided at each end of a line of cabinets. For cabinets without overhead cable ducts, a 457-mm (18-inch) minimum aisle is permissible between side of cabinet and wall ▶at one end of the line of cabinets.◀ With overhead cable ducts, the minimum aisle varies with the number of



NOTES:
1. FOR SPACE LIMITED INSTALLATIONS, WHERE NETWORK MODULES ARE TO BE MOUNTED ADJACENT TO A WALL, A MINIMUM SPACE OF 152 mm (6 IN) SHOULD BE PROVIDED FOR HAND TOOL OPERATION ON HORIZONTAL DUCT ASSEMBLY.
2. A MINIMUM OF 457 mm (18 IN) AISLE IS PERMISSIBLE AT ONE END OF A LINE OF CABINETS.

Fig. 20—Typical Floor Plan for Single-Module System

cabinets between the vertical cable duct (chimney) and the wall. When there are no cabinets between the vertical cable duct and the wall, the minimum aisle should be 787 mm (31 inches) wide. With one cabinet adjacent to the vertical duct, the minimum aisle should be 406 mm (16 inches) between the cabinet and wall. With two or three cabinets, the minimum aisle should be 686 mm (27 inches) wide, with four cabinets, the minimum aisle should be 889 mm (35 inches) wide.

- All cabinets in a module must be adjacent or no further apart than the width of a vertical cable duct. The vertical cable duct must be placed next to or between the two module control cabinets if overhead ducts are used.
- Module control cabinets in the same module must be placed adjacent to each other or separated by only a vertical cable duct.
- If two common control cabinets are used, the cabinets must be placed adjacent to each other.
- The CAC cabinet is located for use of the customer (usually away from the PBX).
- The SMDR cabinet may be placed adjacent to a wall, or placed in a normal module cabinet lineup.
- The extended memory holdover cabinet must be placed adjacent to the common control cabinet.

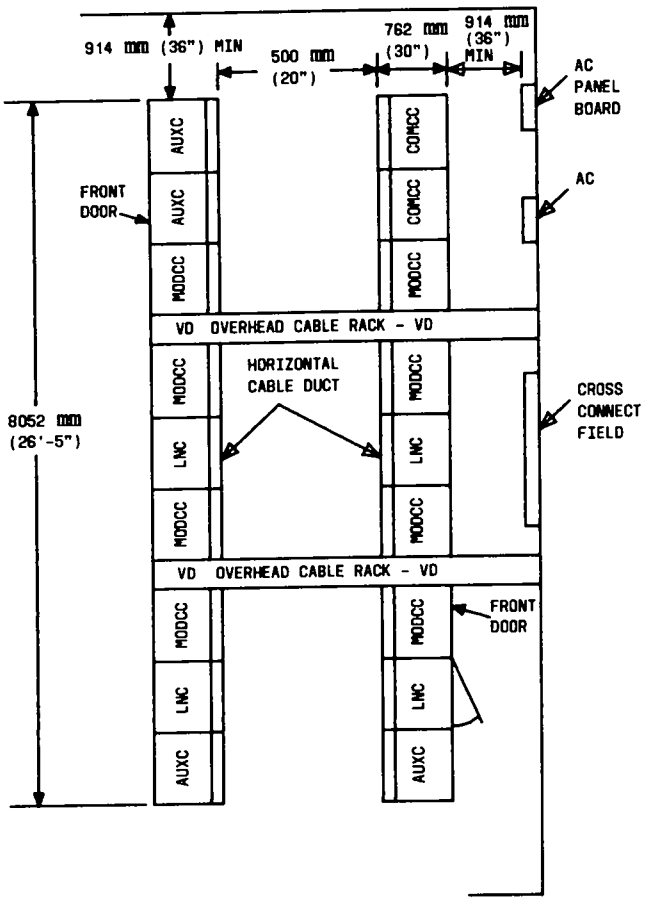


Fig. 21—Typical Floor Plan for a 4-Module System

- Module ac distribution box is placed in the center of a 6-cabinet lineup. ▶(Only one ac distribution box is required.)◀ When lineup exceeds six cabinets, one ac box is required at each end of the lineup.

- A dc protector cabinet is required with a reserve power system.

4.59 Prepare a sketch of the proposed installation similar to Fig. 20, 21, and 22 to show the desired placement of the cabinets and cross-connect fields and the location of the customer-provided ac panel. Refer to ED-1E398 for information on new cross-connect overhead cable troughs, right and left (90°) vertical duct adapters, wall mounting brackets, etc. Refer to ED-1E393, 394, and 398 for information on larger DIMENSION PBX systems.

FEDERAL COMMUNICATIONS COMMISSION (FCC) REGISTRATION REQUIREMENTS

4.60 The following paragraphs provide planning information concerning the implementation of the FCC registration program for the DIMENSION PBX.

4.61 The Commission has established a PBX register only date and a PBX grandfather date. The PBX register only date is the date by which all newly manufactured PBX systems being connected to the network must be registered. The PBX grandfather date is the date which establishes the systems that are excluded from the technical compliance regulations of the registration program. The grandfather provision of the registration program means that all PBXs that were legally connected to the network as of the grandfather date are grandfathered for life. These PBXs may remain connected; may be removed and reinstalled; and may be removed, repaired, refurbished, and reinstalled. Reinstallation of a removed PBX is not restricted to the same customer. The system may be installed for any customer.

4.62 Additions may be made to grandfathered systems using only equipment registered in configuration with the DIMENSION 2000 PBX system. The grandfathered system does not become registered but the system does retain its grandfathered status. Specifically, this means that additions to grandfathered systems can only be made using units from Class C or Chief Engineers' stock. Grandfathered status is retained if units and/or cables used for repair and/or refurbishing are of a type that were connected to the network as of the grandfather date. Therefore, orders for new units from Western Electric for grandfathered systems must be restricted to maintenance, repair, or refurbishing.

4.63 In order to comply with FCC registration requirements, a 66M3-50R connecting block(s) or a 25-pair cable(s) with an RJ21X jack(s) provided by outside plant should be mounted in close proximity of the cross-connect field. A connectorized A25D cable shall be terminated on the cross-connect field and connected to the 66M3-50R connecting block. For installations without controlled access, the cable should not be more than 7.6m (25 feet) long, but a registered 7.6-m (25-foot) extender cable may be added to extend the distance between the cross-connect field and connecting block. No length restrictions are imposed on cabling in a PBX equipment room with

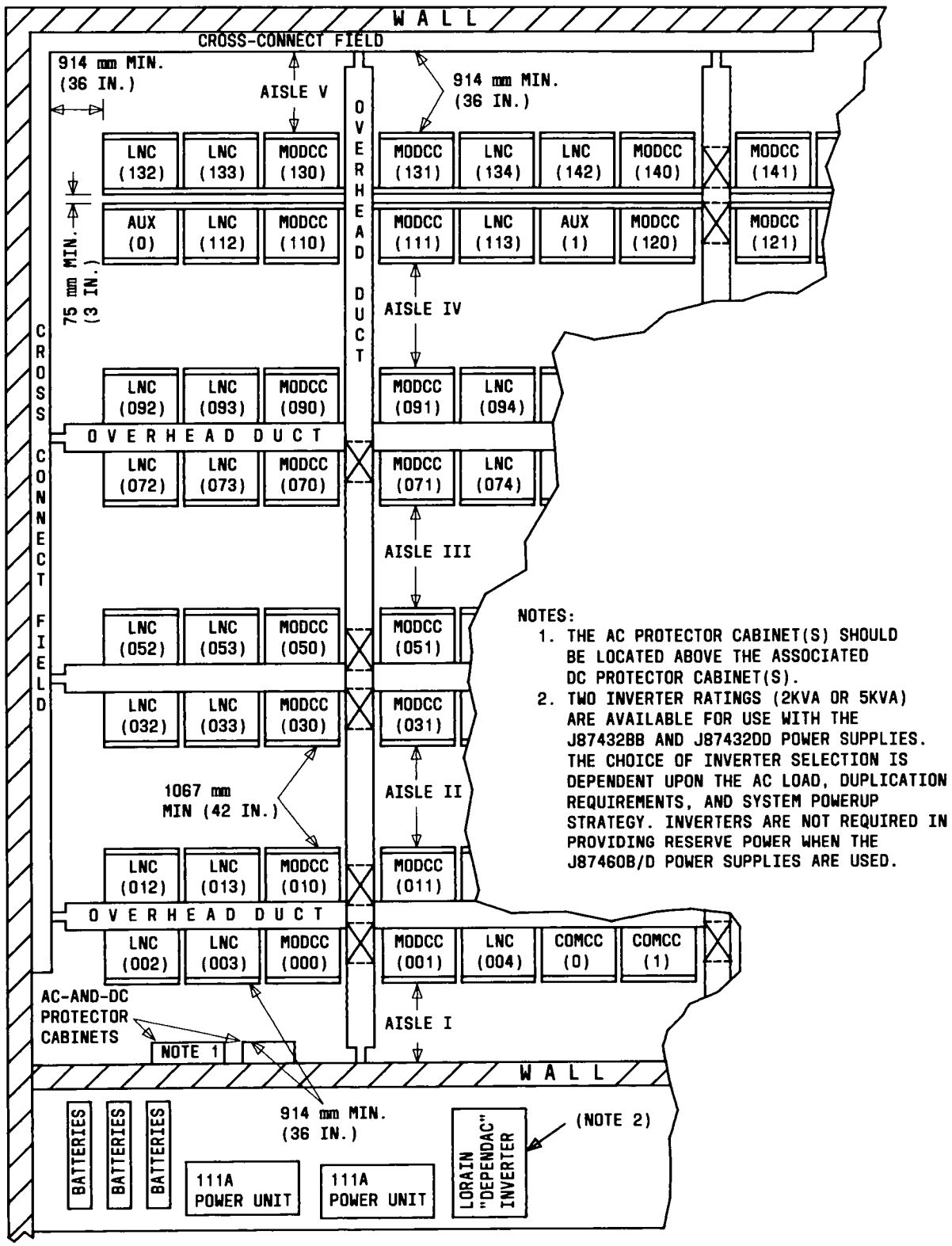


Fig. 22—Typical Floor Plan for a DIMENSION 2000 PBX—Reserve Power

controlled access. A functional block diagram of the network interface for FCC registration requirements is illustrated in Fig. 23. The only leads which are to be wired through the connecting block are tip and ring leads for central office type services (ie, CO trunks, FX, and WATS trunks). Therefore, with the DIMENSION 2000 PBX, only tip and ring leads from circuit packs LC08D (dial CO trunk circuit) and LC09D (DID trunk circuit) are to be wired to the connecting block. All other leads leaving the PBX toward the CO should be cross-connected from the appropriate color-coded field to a connecting block in the green field other than the connecting block in the green field from which the A25D connector cable originates and plugs into the 66M3-50R connecting block.

> ***Note:*** After May 1983, connections to private line network channels require a network interface connector RJ2GX for tie lines (LC11B) and connector RJ21X for off-premises station lines (LC02B).

An alternate connector (KS-16690-L1) can be used in place of the 66M3-50R. The alternate connector also supplies an RJ21X connecting jack. The FCC registration also requires that the cross-connect field either be located in a room with controlled access or be provided with a protective cover to assure that adequate insulation is present to isolate the field from commercial power, wiring, and grounding surfaces. If the PBX is in a room with controlled access, there is no cable length restriction and the cross-connect field does not have to be covered. However, the cables must remain exposed for inspection and cannot be concealed or embedded in the building structure.

4.64 To comply with FCC technical requirements, the maximum allowed loop resistance to be used serving LC02B and LC03C, excluding terminal equipment, shall be less than 950 ohms. This applies to all FCC registered terminal equipment. It is required that the LC02B, LC03C, LC09D, and LC49C or LC41B vintage circuit packs be used in order to conform to the FCC criteria. Circuit packs with earlier vintage codes cannot be substituted in registered DIMENSION 2000 PBXs. The grandfathered PBXs are not restricted by vintage of circuit pack codes. Only registered station sets, registered terminal equipment, equipment registered in conjunction with the DIMENSION PBX, or private line services may be connected to the LC02B and LC03C.

4.65 ▶Systems shipping on or after October 1, 1983, must comply with FCC regulations (Part 15) pertaining to Radio Frequency Interference (RFI). Controlled introduction of compliant systems will be made in advance of this date. The compliant systems will incorporate the following to become more resistant to RFI:

- Shielded cabinets
- Cables having drain wire shields with spade lug connectors which attach to mating connector field on back of cabinets (Fig. 24)
- RFI gasket on mating surfaces of cabinet panels which can be removed
- Conductive paint on cabinet surfaces which permanently mate
- Fasteners to secure cabinet doors in place
- Triaxial, 4-MHz, network-data cables.◀

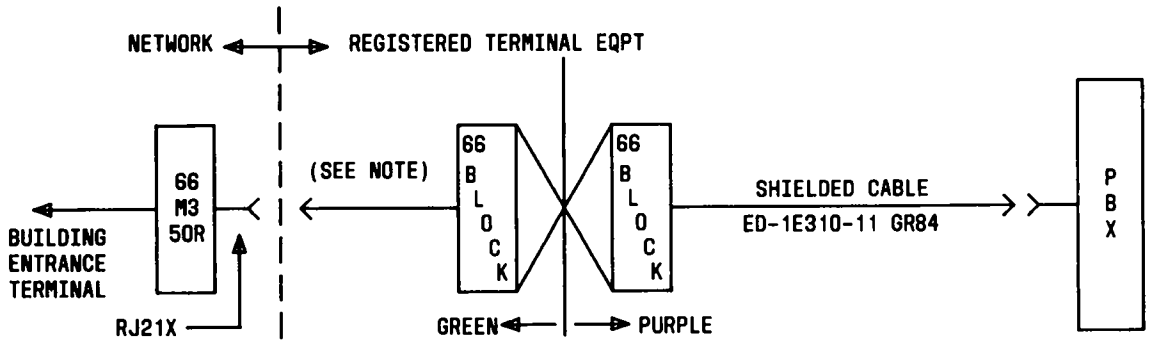
4.66 DIMENSION 2000 and Custom PBXs have a registration label affixed on the common control cabinet. Grandfathered PBXs (those FP7 machines installed before the registration requirements) do not have the registration label.

POWER

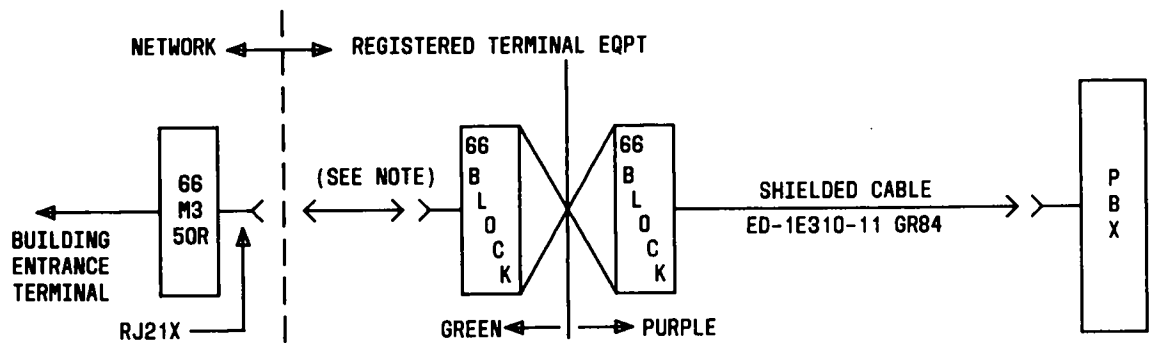
In order to maintain system integrity, dedicated power feeders must be used. Separate feeder circuits from a dedicated service panel are sufficient to serve this purpose. The feeders should not be used to power other equipment.

A. Power Requirements

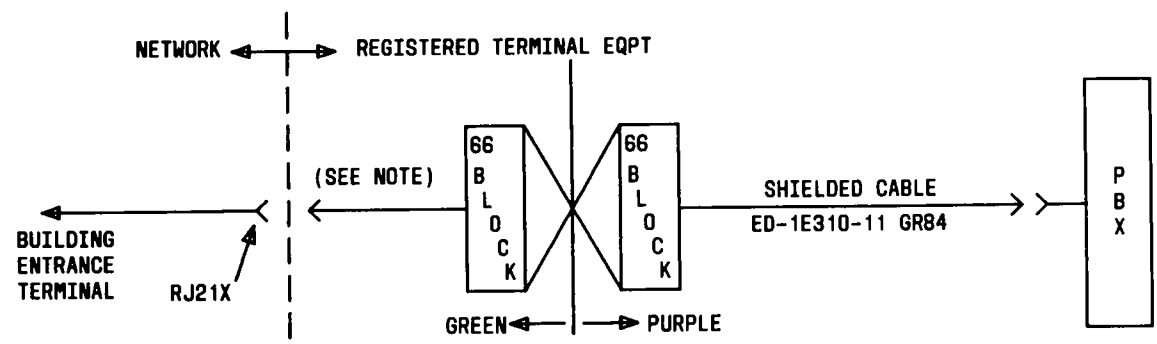
4.67 The DIMENSION PBX systems are provided with one or more 120-Vac (input) power supplies in each cabinet. The customer must furnish the main ac distribution panel (panelboard). The local telephone service company will furnish the feeder cables to the ac protector cabinet and to each module as required. The local telephone service company will also furnish all approved grounds to the single-point ground in the ac protector cabinet. The ac protector cabinet is furnished to the local telephone service company with DIMENSION PBX hardware. Because of the amount of power required and the various power sources available from the customer, each



A. WITH 66M3-50R ON THE NETWORK SIDE



B. WITH 66M3-50R ON BOTH THE NETWORK AND REGISTERED TERMINAL EQUIPMENT SIDE



C. WITH MINIATURE RIBBON CONNECTOR ENDED CABLE

NOTE:
THE DISTANCE BETWEEN THE REGISTERED TERMINAL EQUIPMENT AND THE RJ21X CONNECTOR SHALL BE A MAXIMUM OF 7620 MM (25 FEET) PLUS ONE 7620 MM (25-FOOT) REGISTERED EXTENDER.

Fig. 23—Typical FCC Registered Equipment Interconnections

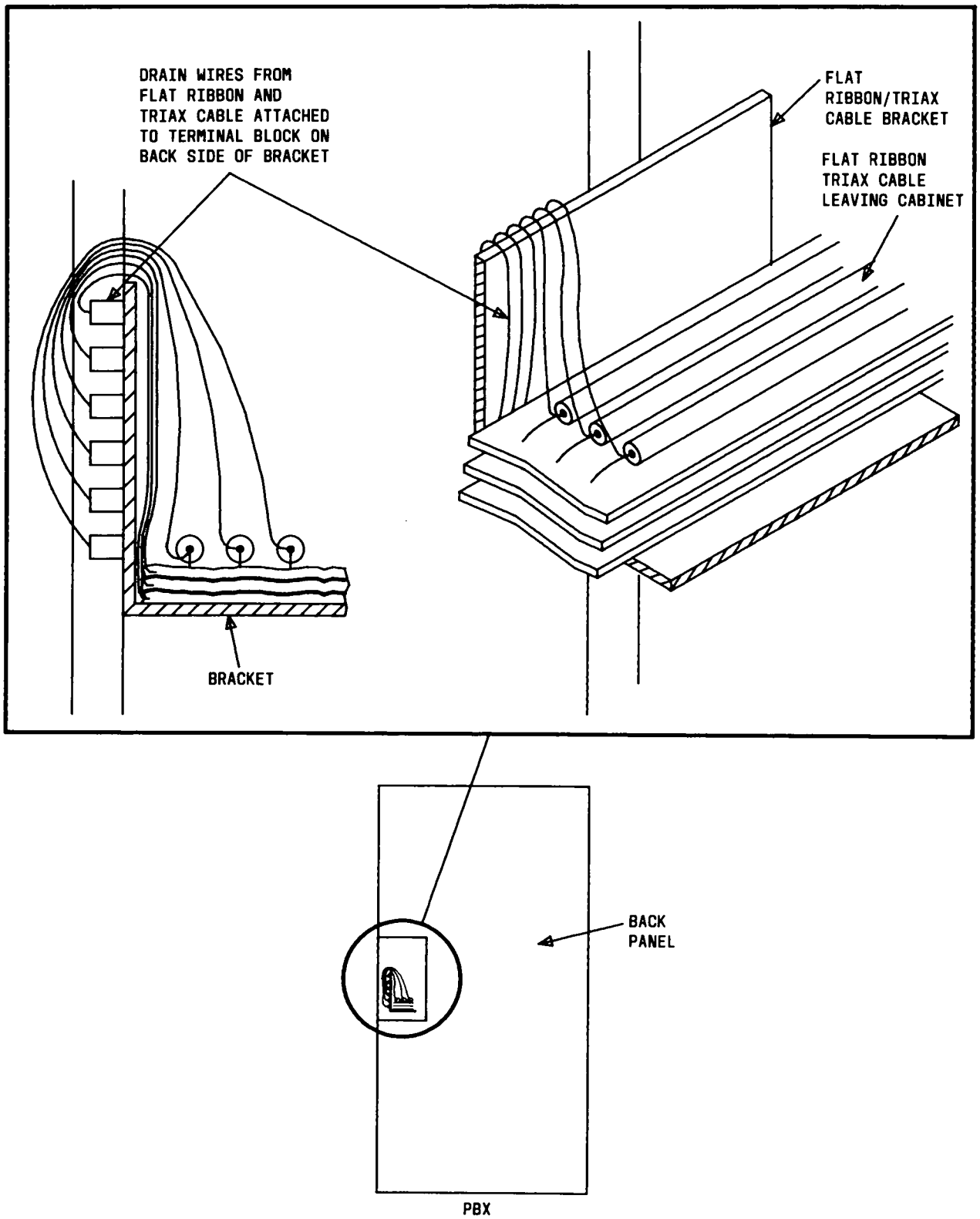


Fig. 24—Drain Wire Shield

DIMENSION PBX must be engineered for a specific power distribution. The customer may use any available power source (for a system without reserve power) as long as the phases or legs provide 120V alternating current at the required current drain. Three-phase power and a three-phase panel (customer-provided) are required for reserve power systems.

4.68 The DIMENSION PBX is equipped with six types of power supplies—*three types* for the common control cabinets (J87432D, List 1, nonreserve; J87432DD, battery reserve; or J87460D, uninterruptible power service) and *three types* for module control and line cabinets (J87432B, List 1, nonreserve; J87432BB, List 1, battery reserve; or J87460B, uninterruptible power service).

4.69 The system power supplies are capable of operating under a wide range of frequency or input ac voltage conditions, provided that both conditions do not occur simultaneously. The operating ranges are 99 volts to 129 volts, if the variation from 60 Hz is ±0.3 Hz; or 105 volts to 129 volts, if the variation from 60 Hz is ±3 Hz. There are no phase restrictions on the 120-Vac service to the system cabinets or modules. The 120-Vac feeders can be derived from three-, two-, or single-phase service to the customer panel, without regard for whether the associated cabinets share the same or different phase references.

4.70 An overall block diagram of the ac power distribution system is shown in Fig. 25. Details of the various terminal blocks and the single-point ground block feeder cables, etc, are shown in Fig. 26, 27, and 28.

4.71 Prior to the start of PBX installation, the local telephone service company engineer must arrange with the customer and an electrical contractor for the purchase, installation, and wiring of an approved panelboard (Fig. 26) equipped with FRN 35A (or 50A for inverters in battery reserve systems), 250V Fusetron overcurrent protection for module feeders, and 20A (250V) Fusetrons for utility feeders. One of the following approved panelboards, or equivalent, is to be provided for this purpose:

- QMR fusible panelboard by General Electric
- QMB fusible panelboard by Square D
- VB5 fusible panel by ITE
- FPD fusible panel by Westinghouse.

4.72 If local electrical codes allow simple alternatives to the above panelboards, less costly arrangements are then available as follows:

(a) Provide a nonfusible disconnect (safety switch) in the equipment room wired ahead of an enclosure in which are mounted cartridge fuse blocks, clips, neutral bar, and ground bar. The safety switch should be within sight and reach of the fuse enclosure in order that power cannot be restored without the electrician's knowledge. Ensure that access to enclosure contents is in accordance with the safety precautions outlined in the National Fire Protection Association (NFPA) (Quincy, MA 02269) Handbook of the National Electrical Code.

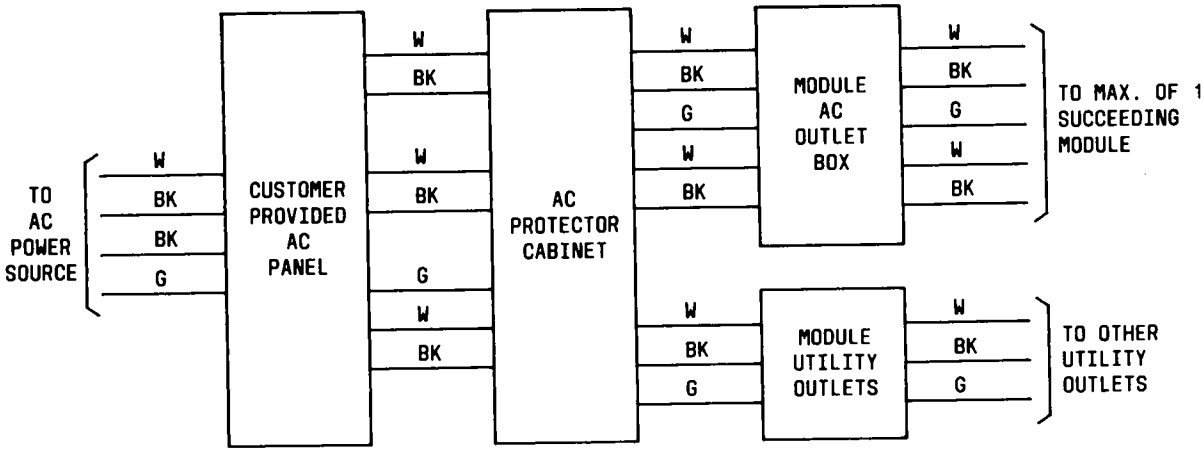


Fig. 25—Block Diagram of AC Power Distribution

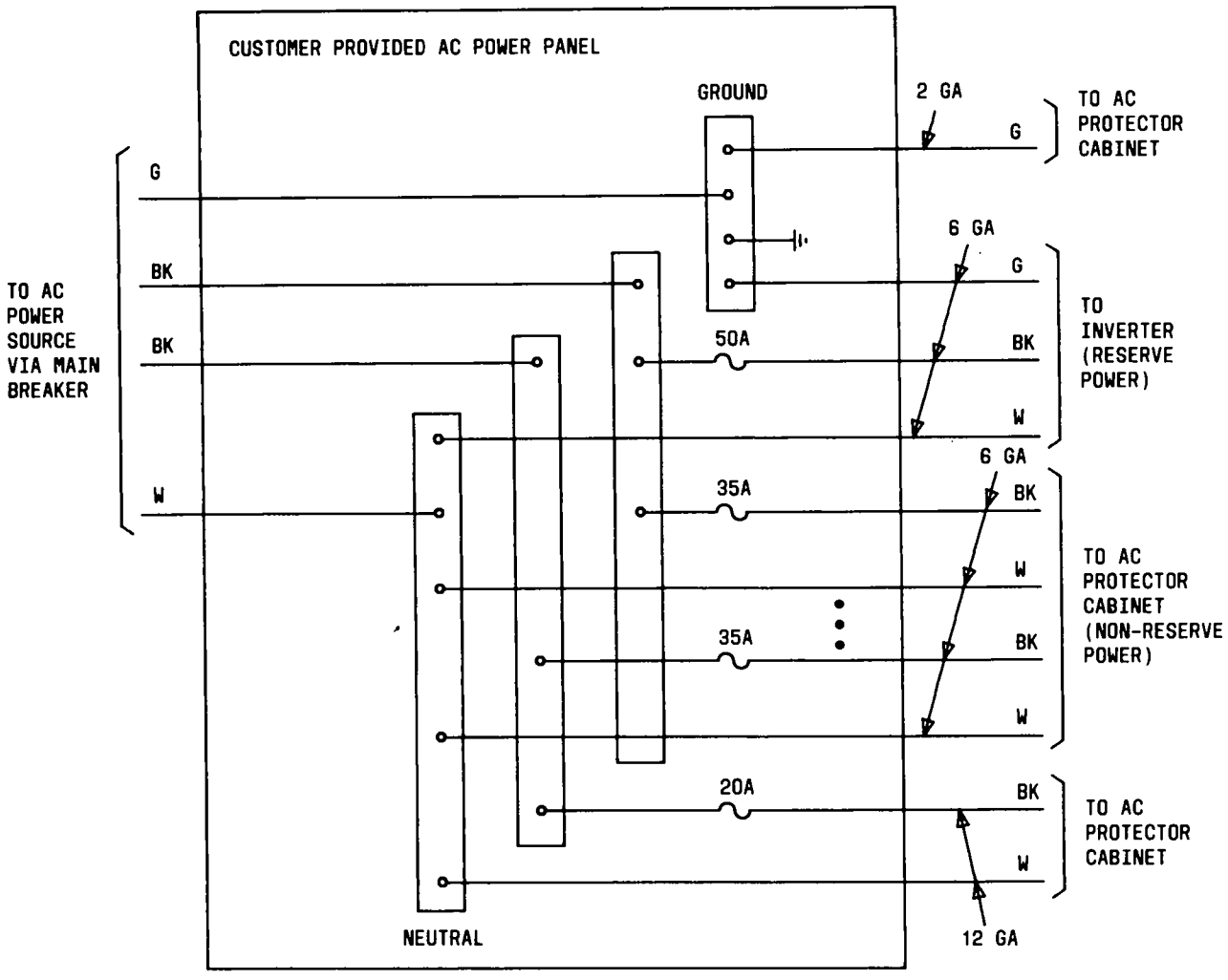


Fig. 26—AC Power Panel (Customer-Provided)

Utility feeder pairs should be AWG No. 12 with only AWG No. 2 green wire required for routing to ac protector cabinet.

(b) If a single enclosure for all fuses is not desired, one or more fusible disconnects can be provided to function as safety switch and fuse enclosure. For multimodule systems, feeder protection may be distributed over more than one fusible disconnect. If this arrangement is allowed by local code, it will be adequate for the system as long as the feeders and makeup of feeders remain as shown in Fig. 28. The D22N or D322N fusible safety switches by Square D, or equivalent, are suitable for this purpose.

(c) Arrange for the local telephone service company to obtain a wall-mounted fuse cabinet (KS-15727) from Western Electric. The cabinet should be used with a nonfusible disconnect (safety switch) wired ahead of the cabinet as described in (a) above.

4.73 Alternating current service to the customer ac panel must be capable of supplying peak demands of the PBX on a continuous basis even if the demand level occurs only under heavy traffic conditions. The system also presents a transient demand in response to power turn-on and momentary power interrupts. The worst condition occurs when power is interrupted for about 30 to 100 milliseconds. The resulting inrush can approach 260 amperes per power

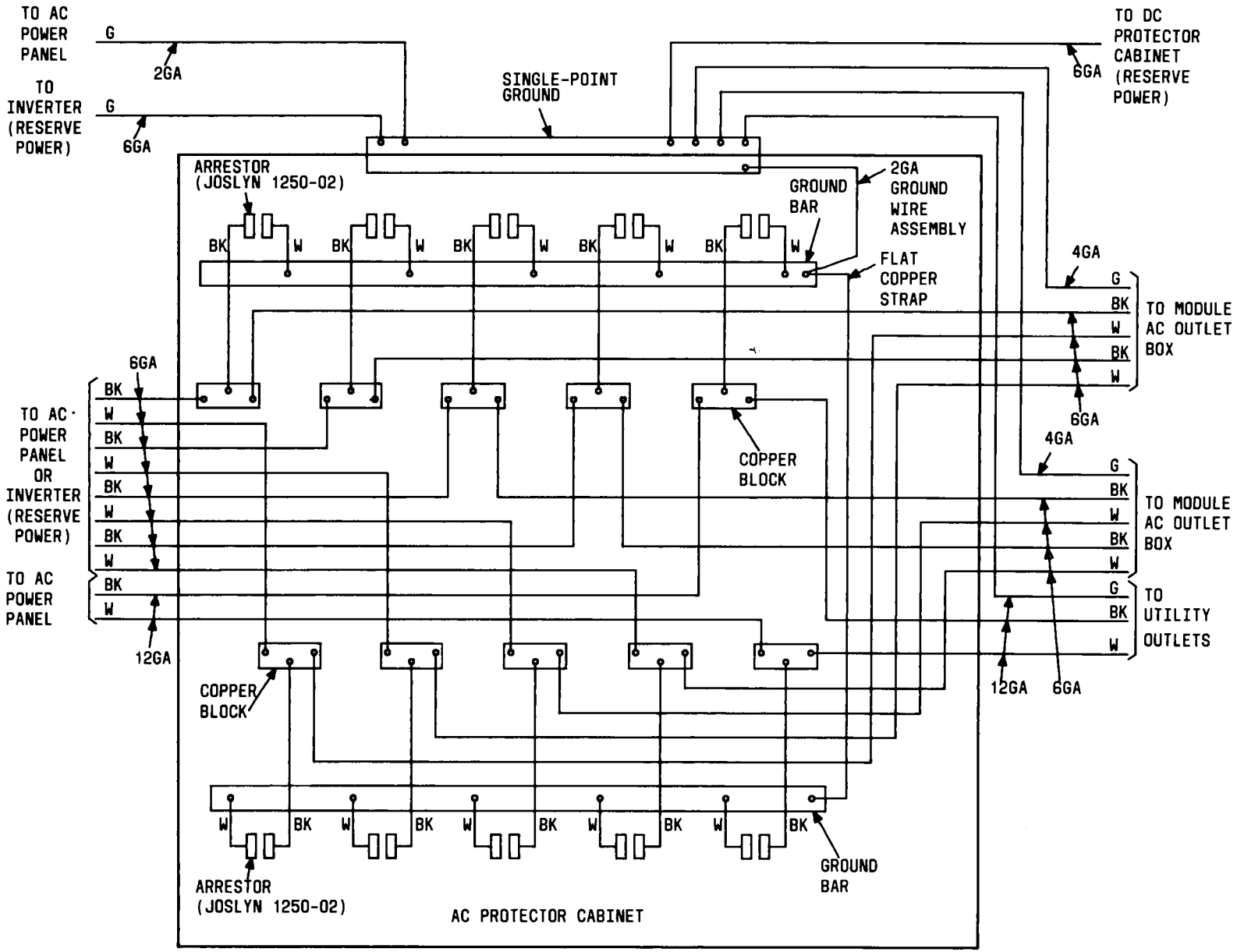


Fig. 27—AC Protector Cabinet

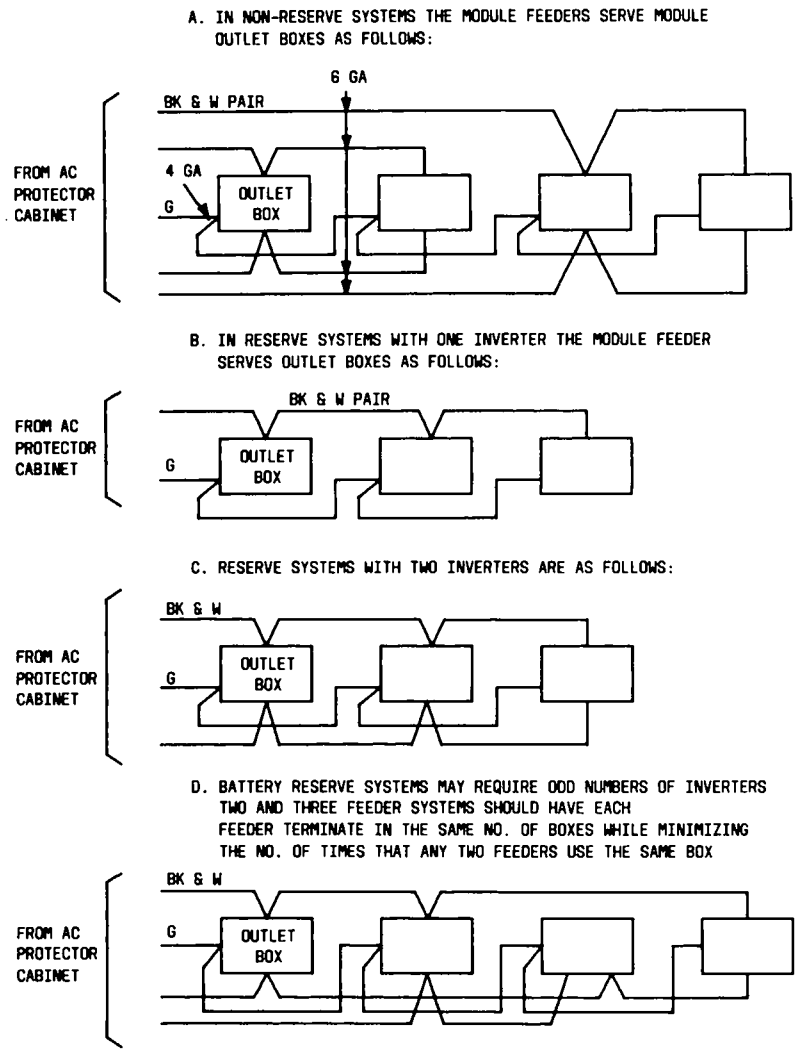


Fig. 28--Module Feeder Plan for Reserve and Nonreserve Systems

supply acting alone, or 220 amperes per supply when two or more are in parallel. The inrush of the following or later issued supplies can reach 150 amperes for one power supply or 130 amperes per supply when two or more are in parallel:

- J87432B-3, SD-82386-02, Issue 6
- J87432D-2, SD-82386-04, Issue 10
- J87460B-1, SD-82541-01, Issue 1
- J87460D-1, SD-82542-01, Issue 1.

It should be verified that the ac service to the customer panel will provide peak demands on a steady-state basis and tolerate transient inrush demand without service interruptions.

4.74 There shall be one 35A Fusetron for every module feeder and one 20A Fusetron for every utility feeder in the customer ac panel. The Fusetrons shall be connected in series with the phase (black) wire of each feeder regardless of the number of neutral wires required.

4.75 A system with two module ac outlet boxes should require only two module feeders plus one utility feeder. If 3-phase service is available for the customer panel, each of the three feeders can be

connected to a separate phase. If only two phases are available, the utility feeder will share a phase with one of the module feeders. An analysis of the system floor plan is required to evenly distribute the load over each ac service phase. This also distributes the accumulated inrush over all phases from system power supplies.

4.76 Each phase of the ac service to the customer panel must be able to provide the peak demand from all cabinets connected to that phase on a continuous basis. The peak power demand has less influence on the choice of protection for each ac phase to the panel than will the accumulated power supply inrush currents. The protection for each phase to the panel must survive these current transients.

A standard thermomagnetic circuit breaker can tolerate an inrush of 10 to 15 times its rated current. A phase protected by a 60-ampere circuit breaker could serve six cabinets and survive their inrush. If the loading is marginal, a time delay circuit breaker of the same rating is preferred to a larger breaker, and a subsequent increase in wire size. This breaker cannot be used in customer equipment; only ahead of it.

4.77 A disconnecting means shall be wired ahead of and provided near the customer ac panel. The apparatus will permit disconnecting power to the ac feeders without removing the Fusetrons.

4.78 Each module has an ac outlet box which provides six receptacles for 120-Vac power supplies (Fig. 29). Two feeder cables are run to each module. A utility feeder shall be run with the module feeders except when the feeders are provided from inverters. In this case, the utility feeder joins the module feeders of the ac protector cabinet. Utility receptacles are not powered by the inverters in a reserve power system. All electrical mains to the system shall be able to supply the full peak power demand from a dedicated branch circuit, which is protected and coordinated in an approved manner. The mains must also tolerate occasional half cycle inrush currents of 260 amperes per cabinet. The cabinets of the modules are equally divided over a minimum of two feeder cables. Dividing the cabinets within a module over two power sources allows for increased reliability in service. Refer to Fig. 28 for the module feeder-outlet box plan for reserve and nonreserve systems.

4.79 The module ac outlet box provides feeder loading versatility for growth and cabinet replacement without the need for ac rewiring. Two ac feeders tap into each module for light to medium traffic, and three ac feeders can be used for heavy traffic. The module feeder strategy must provide each feeder with the same number of taps while minimizing the number of entries of any two feeders into the same module.

4.80 The number of module feeders required from the customer-provided ac panel can be derived from the following table. An exception can occur when a system includes more than one overhead duct, with each duct serving several modules. In that case, each overhead duct must be treated as a separate system. The feeder table can be expanded to 15 modules by following the pattern.

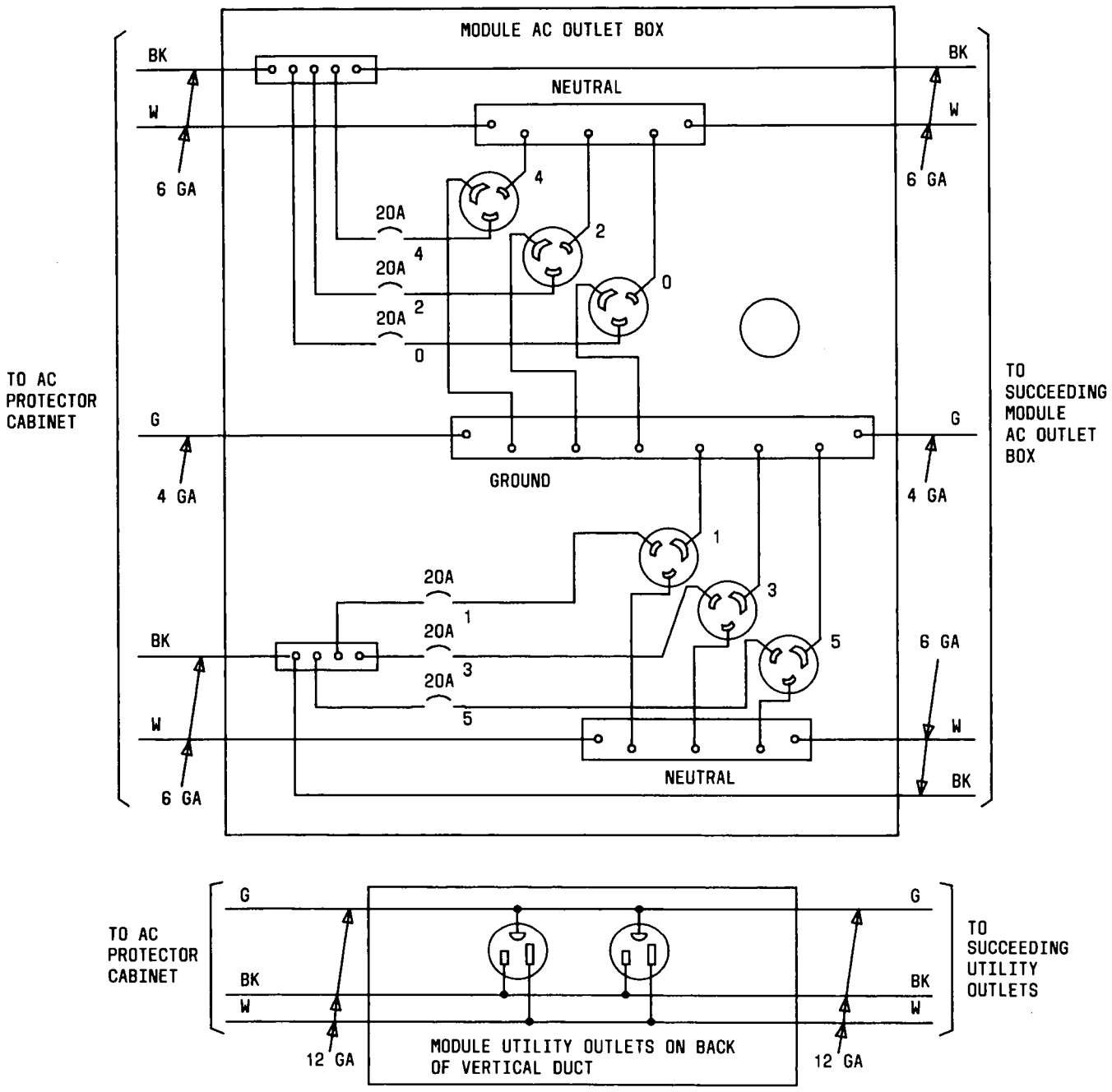


Fig. 29—Module AC Outlet Box and Utility Outlets

NUMBER OF MODULE AC OUTLET BOXES	NUMBER OF MODULE FEEDERS				
		2	4	6	8
	1	X			
	2	X			
	3		X		
	4		X		
	5			X	
	6			X	
	7				X
	8				X

4.81 Depending on the number of system cabinets, more than one overhead duct may be required to reduce cable congestion. In this case, the power and grounding plan treats each overhead duct as a separate system, resulting in as many circuit commons, utility feeders, duct entry points, etc, as there are overhead ducts. The system has an ac protector cabinet and a dc protector cabinet and one single-point ground located in the ac protector cabinet. When a system contains more than one overhead duct, the preceding table applies to each overhead duct as a separate system. The separate system approach is required with the number of outlet boxes served by the overhead duct being used to determine the number of feeders required by its module array. This module feeder evaluation should be made on the basis of expected growth. One utility feeder per overhead duct is required.

The minimum number of feeders consists of two module feeders and one utility feeder. Cabinet ac power is provided only via receptacles in the module ac box. Both module control frames shall not use the same feeder. In a duplicated common control module, both processors shall not share the same feeder. Label all outlets to identify the feeder.

4.82 The utility feeder must be routed to the ac protector cabinet in the same conduit with the module ac feeders. When reserve power is provided, the utility feeder is routed in separate conduit since the module ac feeders are directed to the inverters. Reserve power systems do not provide power backup for the utility feeder.

4.83 The utility feeder directs power from the ac protector cabinet to the utility receptacles in each system module. The two receptacles are provided for use with peripheral equipment not in a cabinet lineup or for maintenance use. The receptacles should be installed adjacent to each module ac outlet box.

4.84 A utility outlet is required near the cross-connect field to power a data set when RMATS is provided. Additional utility receptacles may be provided within the system when required.

All test equipment, data sets, or appliances should obtain power and ground reference from utility outlets mounted on the ac distribution cabinets associated with each module. Do not use utility outlets which are not referenced to the single-point ground or protected by JOSLYN* overvoltage arresters.

B. Station Message Detail Recording (SMDR)

4.85 When planning the installation of an SMDR cabinet, Section 554-010-122 should be referenced in addition to information contained in this section.

4.86 When floor plans and equipment room layout require the module ac outlet boxes and utility outlets to be mounted on the wall, the enclosures and conduits bringing power to them must be insulated from foreign grounds. Foreign grounds are those grounds which are not part of the single-point ground.

4.87 Station Message Detail Recording cabinet(s) located outside the equipment room are not powered by circuits from the ac or dc protector cabinet and require no module ac outlet boxes. The cabinet, however, must be located within 61m (200 feet) of the PBX. When SMDR cabinets are located in the

*Registered trademark of Joslyn Mfg & Supply Co.

equipment room without twist-lock plugs, these cabinets must be powered by separate utility circuits with standard utility outlets mounted on the wall and insulated from foreign grounds.

4.88 If SMDR equipment is located in the equipment room and powered from convenience outlets (not from the ac outlet box), an equalization ground should be installed. It should be connected between the ac protector-cabinet (single-point ground) and the SMDR cabinet.

C. Customer Administration Center System (CACS)

4.89 A CACS cabinet installed with the DIMENSION PBX must be powered from an outlet from the module ac outlet box.

GROUNDING

4.90 The DIMENSION PBX is equipped with a "single-point" ground located in the top of the ac protector cabinet (Fig. 30). The single-point ground is the source of all system grounds and includes a lightning protection strategy. The lightning protection strategy is intended to prevent lightning induced currents from finding a path through the PBX. This prevents incidental contact by any portion of the machine with ground sources other than the single-point ground. If a portion of the ductwork on a cabinet is touching a metallic water pipe, a lightning strike could produce a potential difference between the water pipe contact point and the single-point ground reference for the system. Any current flowing through the system would produce potential differences between system cabinets including the intercabinet cabling. The difference in potential will concentrate at signal sources and receivers in the cabinets, resulting in component damage. This is avoided when the entire PBX is referenced to the same ground point enabling the system to rise or fall in potential as a unit in response to lightning potentials on the single-point ground. Difference in potential can be hazardous to personnel in simultaneous contact with the PBX and other ground sources during a lightning strike. It is advisable that all ground sources within reach of any portion of the PBX and not referenced to the single-point ground be insulated or removed if possible. An alternate plan is to route an equalization wire from the ac protector ground to the foreign ground source. The single-point ground, or "ground-window," is the source of all system grounds. These include (1) a circuit common providing a reference for all circuitry in the system, (2) equipment ground, which is a green wire connection to the beginning of the troughs, and (3) an equalization ground to prevent large potential difference between local equipment and system cabinets.

4.91 The customer-provided ac panel must be grounded by an equipment grounding conductor in compliance with NFPA National Electrical Code. The Code requirements are based primarily on power exposure and only incidentally on lightning exposure. Bell System requirements must consider all sources of electrical disturbances or exposure, including lightning, power induction, and ground potential rise, and ensure that adequate protection is provided.

4.92 The ground provided to the ac power panel is to be routed to the ac protector cabinet from a suitable electrical mounting in the customer panel. The ground serves as the equipment grounding conductor for the PBX. All exposed noncurrent-carrying metal parts of fixed equipment that could become energized under unusual conditions must also be grounded in order to protect both craft personnel and equipment. Exposed noncurrent-carrying metal parts of cord- and plug-connected equipment, which may become energized, shall be grounded to protect the system and craft personnel working in the area. The equipment grounding conductor reduces the lightning sensitivity of the PBX and is, therefore, both a safety code and system requirement.

4.93 Although the system grounding conductor is necessary as described above, there are several ways of providing the ground. The equipment grounding conductor, running with or enclosing the circuit conductors, shall be one or more or a combination of the following:

(a) Copper, or other corrosive-resistant conductor, solid or stranded; insulated, covered, or bare; and in the form of a wire or a bus bar of any shape

(b) Rigid metal conduit

(c) Intermediate metal conduit

(d) Electrical metallic tubing

(e) Armor of type AC metal-clad cable

(f) The sheath of mineral-insulated metal-sheathed cable

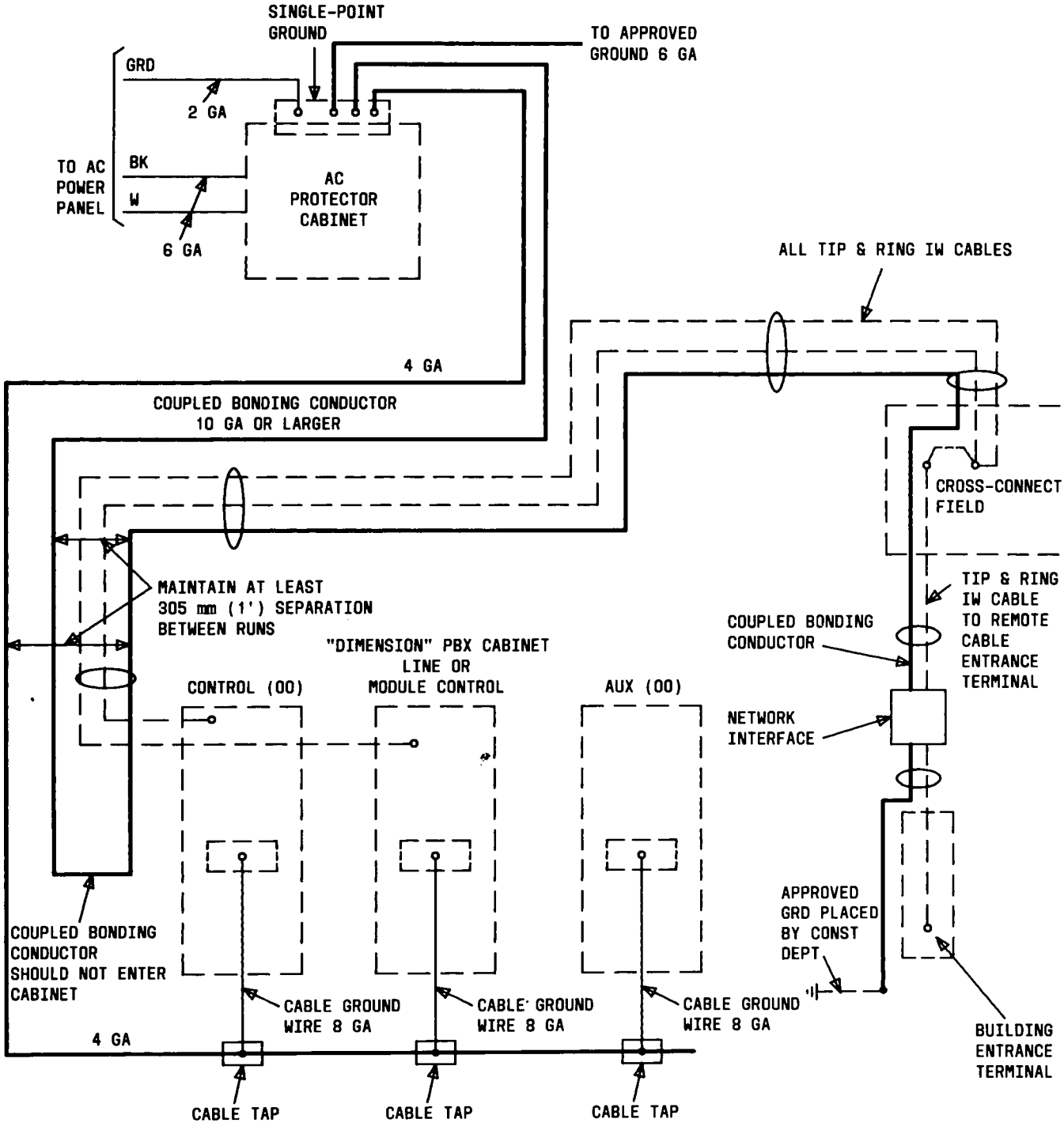


Fig. 30—Grounding for DIMENSION PBX Cabinet Arrangement

(g) The metallic sheath or the combined metallic sheath and grounding conductors of type MC cable

(h) Cable trays (if they conform to minimum cross-section/current rating requirement)

(i) The sheath of type CS copper-sheathed cable

(j) Other raceways, specifically approved.

4.94 Flexible metal conduit is allowed for grounding if the following conditions are met:

(a) Total length in any ground return path does not exceed 1829 mm (6 feet).

(b) Circuit conductors are protected by overcurrent devices of 20 amperes or less.

(c) Conduit is terminated in approved fittings.

(d) Approved, liquid-tight conduit does not exceed 32 mm (1-1/4 inches) in diameter.

4.95 The equipment grounding conductor may be a metallic conductor (green wire) running with or enclosing the circuit conductors between the building ac service entrance and the customer-provided ac panel. If both methods for grounding this route are equally reliable with age, either choice will satisfy all requirements of the National Electrical Code as well as the system requirements. Because of differences in the installation environment, the reliability of the conduit grounding method may be uncertain in some installations.

It is recommended that the equipment grounding conductor be provided by the green wire in all new installations where possible.

PROTECTION

A. General

4.96 The ac protector cabinet provides lightning overvoltage protection and the single-point ground for the PBX cabinets (Fig. 27). The ac feeders and a single green wire are directed to the ac protector cabinet from the customer ac panel. The feeders are provided via conduit or other local code-approved metallic or nonmetallic enclosure.

4.97 One JOSLYN No. 1250-02 lightning arrester (overvoltage protector) is required for each phase and each neutral wire of every module and utility feeder. The arresters are connected between each feeder wire (phase and neutral) and a ground bar in the ac protector cabinet. The ground bar is connected to the single-point ground. The number of arresters and neutral wires can be reduced if neutrals are shared. In multimodule power distribution systems, a reduction in wire count and congestion can be obtained by providing fewer than one neutral lead for each phase lead circuit leaving the customer ac panel. This reduces both the amount of wire in the conduits and the number of JOSLYN overvoltage protectors. This reduction in the number of neutral leads dictates that two or more phase circuits share the same neutral wire. The gauge of the shared neutral wire must be sufficient to handle the combined current of all phase circuits served by the same neutral wire. There are no restrictions on how the neutral bars in each module ac outlet box are combined by wiring to accommodate the reduced number of neutrals, provided each neutral bar has a return path.

4.98 Each ac protector cabinet is capable of mounting 20 ac arresters which will provide protection for 10 ac feeder lines. When system line requirements exceed 10, additional cabinets may be multiple-mounted on the wall. Each cabinet is approximately 457 mm (18 inches) wide.

4.99 The ac cabinets must be mounted adjacent to each other with the facing sides removed for cable access. Each cabinet has two side panels that are insulated from the cabinet body but grounded to the single-point ground. The cabinet body need not be isolated from ground since cable entry and exit is through the insulated side panels.

4.100 The ground bar assembly mounted in the top of the cabinet provides the single-point ground for the PBX. All PBX system grounds will terminate on the single-point ground, or additional satellite ground bar assemblies multipled off the single-point ground when multiple ac cabinets are installed. Ground leads between ground bar assemblies should be as short as possible.

B. Sneak Current Protection

4.101 Heat coils or sneak current fuses (60-type) must be installed in all central office trunks or tie trunks that are exposed to power. Exposed off-premises extensions are not required to have sneak current protection. (Refer to Section 460-100-400 for the installation of sneak current fuses.)

C. Coupled Bonding Conductor (Protection Bond)

4.102 The coupled bonding conductor provides an electrical connection between the PBX single point ground and the protector ground terminal (if protectors are provided). If protectors are not provided, the coupled bonding conductor is connected to the metallic sheath of the building entrance ground. This connection is needed to reduce the difference in (electrical) potential that can appear between tip and ring leads and the system ground as a result of lightning surges. The coupled bonding conductor must be closely coupled (to establish transformer action) to the tip and ring leads (associated with the PBX) along the entire length of the building or inside the wiring cable which is used to extend the conductors of the building entrance cable to the ⧫Network Interface (NI).◆

4.103 The coupled bonding conductor may consist of any one, or any combination, of the following:

- Continuous metallic cable sheath or shield
- Six spare (good) pairs within the cable (not less than No. 24 American Wire Gauge [AWG])
- No. 10 AWG copper conductor tie-wrapped to the cable.

4.104 The coupled bonding conductor connects the single-point ground to the protector ground located in the building entrance facility. If there is a continuous cable shield from the protector ground to the NI, the shield should be used as the bonding conductor. The No. 10 AWG or the six spare pairs, as described previously, may be used to extend the conductor to the PBX.

4.105 For methods of providing the coupled bonding conductor for an electronic PBX, see Section 876-300-100.

4.106 Figure 30 is a pictorial representation of the grounding and bonding conductors to be placed by installation personnel.

Caution: Exercise care when implementing the grounding scheme to assure ground isolation.

Warning 1: To preserve the integrity of the single-point ground arrangement, verify that neither cabinet nor framework nor any associated power feeder enclosure (ie, conduit and receptacles on the PBX side of the customer-provided load center) is connected to or may be moved to inadvertently come in contact with ground at a place other than at the single-point ground (ground window).

Warning 2: The building entrance protector must be grounded to an approved ground. If there is no protector, the shield of the building entrance cable must be grounded to an approved ground.

4.107 The first choice for approved ground is to the nearest point on the power service ground system. This may be the power service ground wire, grounding electrode, or the service entrance conduit.

4.108 Alternate choices for an approved ground are a metallic water pipe or building steel ***which are bonded to the power service ground.*** The alternate choices should be used when located closer than the power service ground because it is important to keep the protector ground wire as short as possible.

Note: Refer to Section 876-300-100 for details on approved grounds.

RESERVE POWER SYSTEMS

4.109 Two inverters (2 kVA and 5 kVA) have been specified for battery reserve systems. The choice of inverter rating and quantity to use depends upon the ac load, duplication requirements, and the system power-up strategy. Power plants of the 100-type may be used. See Section 790-100-654.

4.110 When battery reserve is required, for example, the wiring options available in the 111A power plant must be preserved. With multiple inverters, the ac bypass feeders should be distributed over the phases to prevent concentration of the load on only one or two of the 3-phase keys.

4.111 The 111A power plant requires 3-phase electrical power at one of the following voltages: 208V, 240V, or 480V. If 3-phase power is provided at 120/208 volts (*wye* system), only one set of electrical power feeders will be required. The 208 volts (between phases) will power the 111A power plant, and

each phase and the neutral will provide power to the cabinets at 120 volts. There is no phase restriction on the power to the cabinets. However, the 120 volts to the cabinets should be distributed between the 3-phase legs of the power system.

4.112 The ac and the dc protector cabinets provide the common point of contact for the PBX with ground and power utility or reserve power plants. The conduits from the customer ac panel or the inverters join the cabinets together with the overhead duct and the conduit carrying the feeders to the module ac outlet boxes. The sides of the protector cabinets are insulated from the cabinet bodies and are internally wired to the single-point ground. The cabinet bodies need not be insulated from ground since cable entry and exit are through the insulated sides. The overhead ductwork need not be insulated from the protector cabinets but must be insulated from incidental grounds. All feeder power cables should be the minimum length possible. This arrangement protects the PBX from excessive rare lightning surges.

4.113 The equipment required to provide the reserve power option consists of: Load center (QMB fusible panelboard—Square D or equivalent, equipped with Fusetrons)

- 111A power plant (Fig. 31)
- DEPENDAC inverter types (Fig. 32):

  D502 CAB 5177-314 (5 kVA) and D202 CAB 5175-320 (2 kVA).

4.114 In reserve power systems, one 48V feeder shall be provided from the power plant for each network cabinet, auxiliary cabinet, and common control cabinet. There shall be two 48V feeders required for any duplicated common control cabinet (B- or C-size memory).

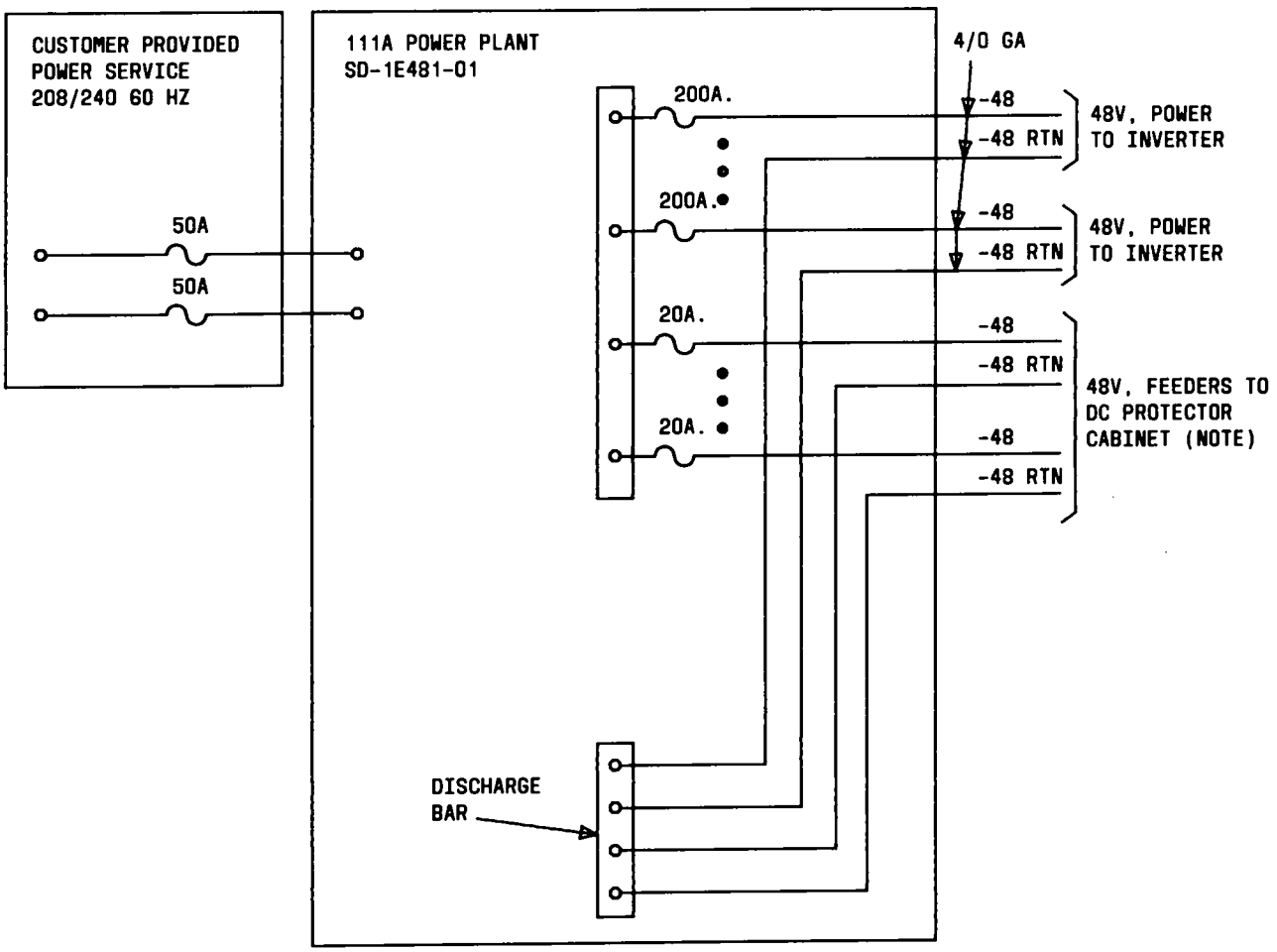
The −48V feeder gauge must be able to provide and allow a maximum 1-volt drop between the 111A plant and any cabinet with 8 amperes flowing. The positive discharge bar shall not be grounded to the 111A power platform.

4.115 On reserve installations, −48V direct current is provided to the inverter from the batteries via discharge fuses. Fuse sizes are 100 ampere (2 kVA) and 200 ampere (5 kVA). The cable length between the power plant and the inverters shall not exceed 30.5m (100 feet).

4.116 Of the two inverter sizes available for reserve power systems, the choice of inverter rating and quantity depends upon ac load duplication requirements and system power-up strategy. The ***2-kVA*** inverter provides 17 amperes of alternating current at 120V ±4 percent continually, with a provision for 25 percent overloads up to 2 hours. The ***5-kVA*** inverter provides 42 amperes continually with the same overload characteristics.

4.117 For systems having ***duplicated common control***, it may be desirable to continue this duplication and redundancy into the reserve power design. In such a system, two inverters would be minimum with one inverter serving one common control and half of the network. The other inverter serves the second common control and the remaining half of the network loads.

4.118 The ***power supplies*** used in reserve power systems must be provided with a minimum current for power up. The power-up demand for network supplies (J87432BB) is 3.6 amperes, while the common control supply (J87432DD) demand is 4.7 amperes. If the supplies are powered up simultaneously, the inverter may not be able to provide the necessary initial current demand, and will default to a low voltage, high current state, or open the ac line to the load. This type of transfer is likely when the system is first energized, when power is restored after servicing, or after an ac outage which exceeds the battery holdover. In cases where transfer to a fully operational load is necessary, the 2-kVA inverter can serve three network power supplies plus one common control supply or two network supplies plus two common control supplies. The 5-kVA inverter will simultaneously power up any combination of nine power supplies, of all the possible network and common control combinations. After initial equipment turnon surges, the current demand will be below the inverter output capacities in both cases. For a more efficient design, the inverters can be loaded to their full output capacity with anticipated occasional overloads due to traffic, provided a sequential power turn-on is used. The inverter is energized with the module ac outlet box circuit breakers turned off. The circuit breakers are then operated individually, so that only one supply at a time demands more current than its steady state value.



NOTE:
THE 111A PLANT GROUND MUST BE ROUTED WITH 48V FEEDERS TO THE DC PROTECTOR CAB.

Fig. 31—Reserve Power Plant

4.119 If common control duplication is continued into the reserve power plant, the PBX requires either two 2-kVA inverters or two 5-kVA inverters, with each inverter furnishing power to half of the outlets in every module ac outlet box. If sequential equipment turnon is tolerable, the inverters can be loaded to their full capacity using the data outlined previously. An example of a fully loaded 2-kVA system includes:

- Duplicated common control without growth
- Two heavily equipped module control cabinets
- Two fully equipped line cabinets
- One auxiliary cabinet.

4.120 Since this is a single module sequential turnon PBX without reserve duplication, the typical ac values used for loading the inverter are:

2 X 2.2A AC (DUP COM CONT) + 2 X 2.5A AC (TWO MOD CONT) + 2 X 2.8A AC (TWO LINE CAB) + 1 X 0A AC (AUX) = 15A AC.

4.121 If the ac demand increases due to traffic recorded under typical load conditions, the peaks can be estimated as:

1 X .2A (MAAP) + 2 X .2A (HEAVY TRAFFIC IN MODULE CABINET) + 2 X 0.1A AC (HEAVY TRAFFIC IN LINE CABINET) = 0.8A AC.

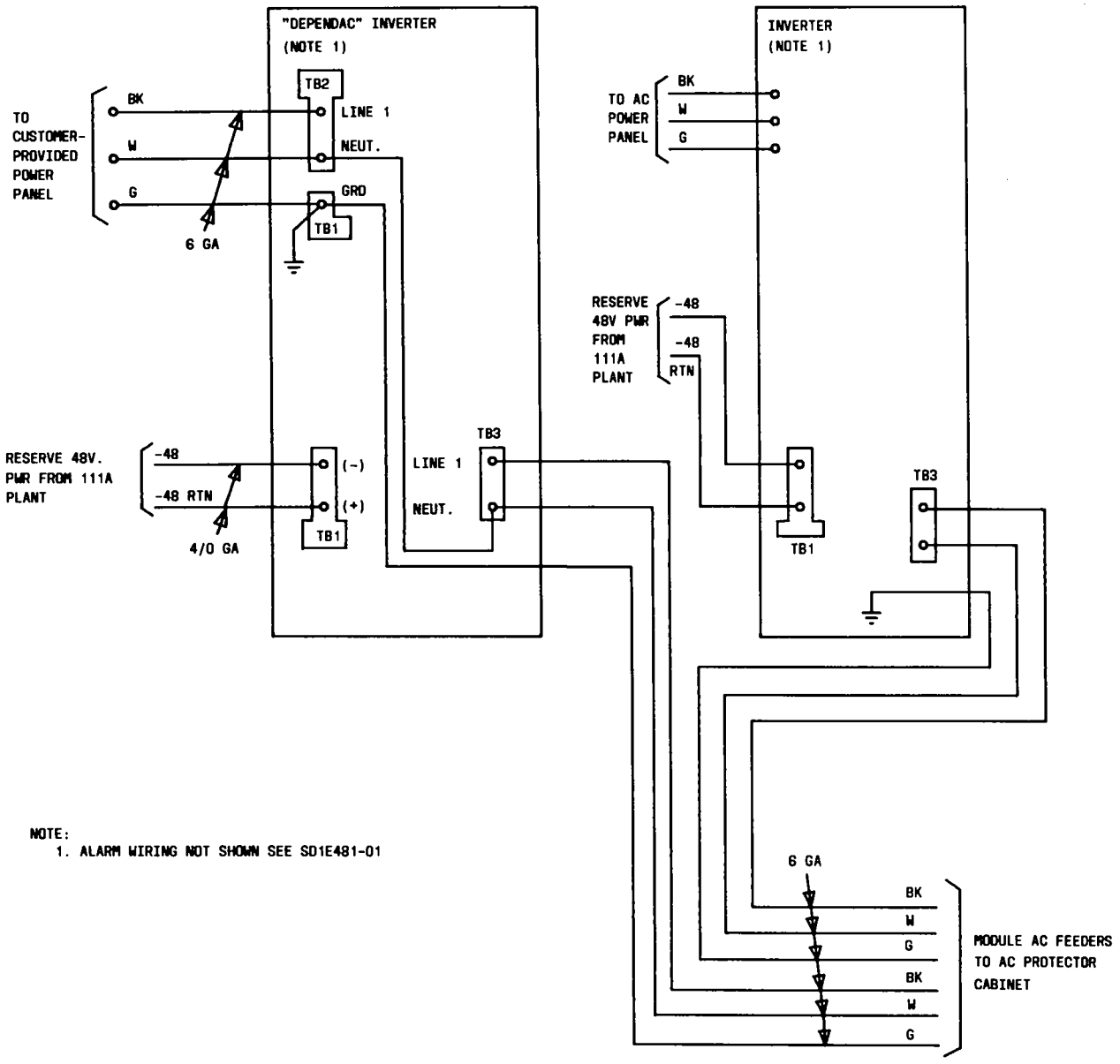


Fig. 32—DEPENDAC Inverters

This will result in a total of 15.8 amperes which may occur only two times a day for 15 minutes. No problem is anticipated with this loading.

4.122 Total battery drain for a single module system used in the example is determined by adding the dc requirements of each cabinet to the dc requirements of the inverter. This drain is normally supplied by the 111A charging rectifiers along with additional current for charging the battery plant

after a power outage. Direct current requirements are added as follows:

2 X 0.1A DC (DUP COM CONT WITHOUT 609A PANEL LOADS) + 2 X 0.1A DC (TWO 609A PANELS) + 1 X 0.1A DC (ONE 609A NIGHT TRANSFER PANEL) + 2 X 1.9A DC (TWO MODULE CONTROL CABINETS WITHOUT CONSOLE LOADS) + 2 X 0.1A DC (ONE NIGHT CONSOLE PLUS ATTENDANT CONSOLE) + 2 X 2.8A DC (TWO LINE CABINETS) + 1 X 8.0A DC (ONE AUXILIARY CABINET) = 18.1A DC (CABINET DC LOADS WITHOUT INVERTER LOADS).

4.123 The dc input requirement of the inverter is a function of its ac output current and efficiency. The input power consumed by the inverter and not passed to the ac load is a constant which is insensitive to output power. The 5-kVA inverter requires 20A dc operating current under full and no-load conditions with all remaining dc input power going to the ac load. The 2-kVA inverter requires 10A dc operating current. The 10A is added to the dc current required to match the output power. Inverter power in watts is equal to the input voltage times the total current demand obtained previously (120 VAC X 15.8A AC = 1896W).

4.124 The input current which matches the output power depends on the dc input voltage. The voltage which produces the highest input current is the lowest allowable battery voltage (43V). This includes 42V at the cabinets plus a maximum 1-volt drop in the feeder wiring. The input current without inverter losses is 1896W ÷ 43 VDC = 44.1A. When added to the operating current, it is 44.1A DC + 10A DC = 54.1A. When added to the total cabinet drain, 54.1A + 18.1A = 72.2A DC (total dc output current from the 111A plant).

4.125 There will be one 50A Fusetron for each inverter which protects the ac bypass line to the inverter. The ac output circuit breaker on the inverter protects the output lines to the ac protector cabinet. One 20A Fusetron is required for each utility feeder. The utility feeders are powered directly from the customer service panel and not by the inverters.

4.126 Each phase and neutral wire (ac feeder) requires a JOSLYN arrester (Fig. 27). For example, six arresters are needed for a 2-inverter/1-utility feeder system. There will be one dc −48V feeder, consisting of two wires, going to each module control cabinet, line cabinet, auxiliary cabinet, and common control cabinet. Two dc feeders are required for a duplicated common control. One General Electric MOV varistor is required per each 2-wire dc feeder.

4.127 One dc protector cabinet (Fig. 33) is capable of mounting 28 dc varistors. One dc varistor is required for each network cabinet and one or two for each control cabinet (two required for duplicated control). Additional dc cabinets may be multiple-mounted to provide sufficient varistors when the number of system cabinets exceeds 28.

4.128 To minimize the ground lead length, allow sufficient space on the wall area to mount the dc cabinet above the ac cabinet. Both cabinets are approximately 711 mm (28 inches) high. The ground lead from the single-point ground in the first ac cabinet terminates on the ground bar in the dc cabinet (Fig. 33). A 15.88-mm (5/8-inch) diameter hole will have to be made in one side panel or the bottom of the cabinet to accommodate the ground wire. A suitable grommet will be provided with each cabinet. A layout of ac and dc protector cabinets required for a 12-module PBX system plus the interconnecting ground wires are shown in Fig. 34.

UNINTERRUPTIBLE POWER SERVICE

4.129 Uninterruptible power service (UPS) is available for use with the DIMENSION PBX. The UPS provides power holdover to the PBX cabinets (Fig. 35) for short-term power disruptions. Whenever a commercial power failure occurs, the battery (part of the UPS unit) assumes the PBX load until the commercial power is restored or until the battery voltage drops to a predetermined level. The low voltage cutoff (about 42 volts) is provided to prevent battery damage. The PBX system operations stop when the voltage cutoff is reached. When the commercial ac power is restored, the battery will fully charge in about 24 hours. The UPS arrangements are defined as ***nominal holdover and extended holdover UPS***.

4.130 The ***UPS nominal holdover*** arrangement is completely self-contained and is installed in PBX cabinets in place of normal power supply units. During a power interruption, the nominal holdover equipment provides electrical power through a UPS rectifier/converter power supply. The power originates from a UPS battery pack which has been charged from commercial power by a UPS battery charger. The batteries provide approximately

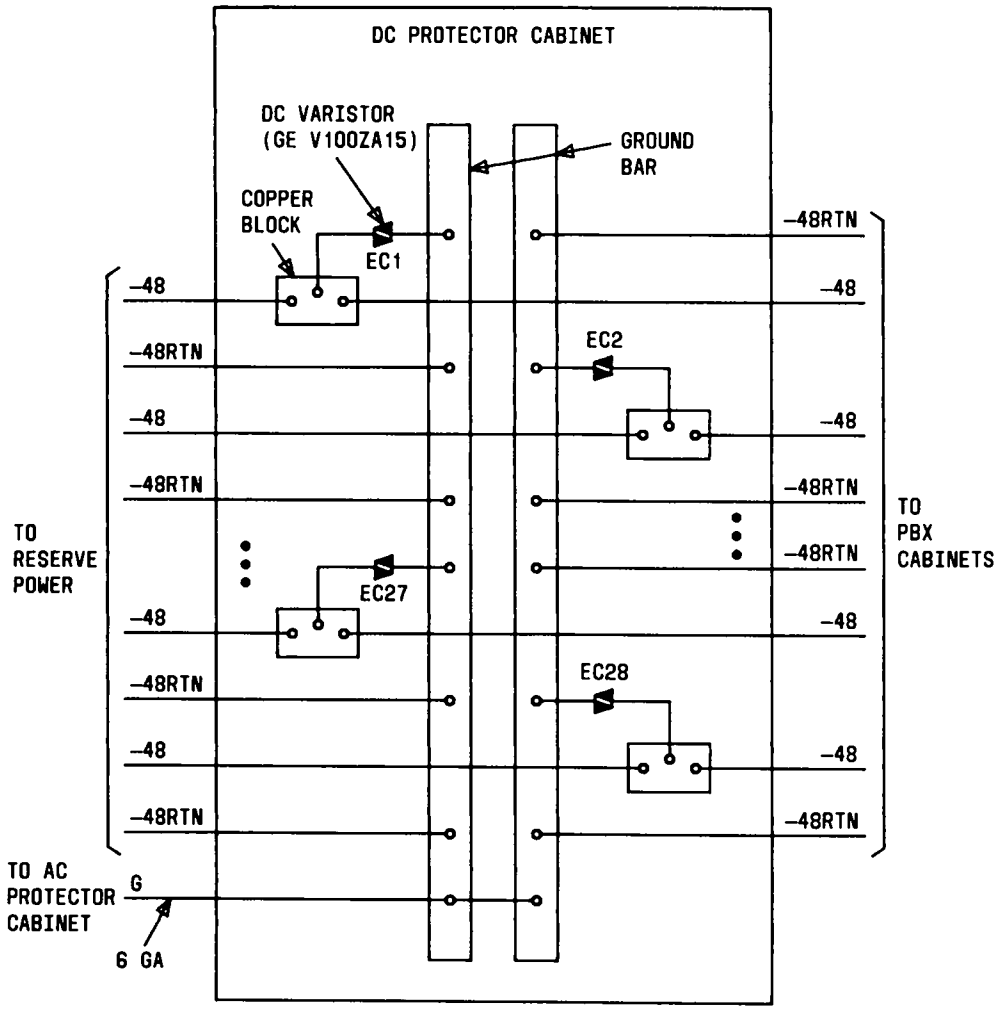


Fig. 33—DC Protector Cabinet (Reserve Power)

48V at 5 amp-hours. This permits the nominal holdover period to be around 5 minutes under a full load condition. The UPS nominal holdover equipment is listed as follows:

- J87460D rectifier/converter power supply ▶(One per control cabinet for single control and duplicate control 2-cabinet systems ***or*** two per control cabinet for duplicate control 1-cabinet)◀
- One J87460B rectifier/converter power supply (installed in each network cabinet)
- J87455A battery charger and disconnect circuit ▶(One per control cabinet for single control and duplicate control 2-cabinet ***or*** two per control cabinet for duplicate control 1-cabinet with UPS power supply)◀
- KS21906, L3, battery pack ▶(One per control cabinet for single control and duplicate control 2-cabinet ***or*** two per control cabinet for duplicate control 1-cabinet with UPS power supply)◀
- J58882JA, L2, power distribution and fan assembly equipped with a 124A ringing generator ▶(One per control cabinet for single control and duplicate control 2-cabinet ***or*** two per control cabinet for duplicate control 1-cabinet with UPS power supply).◀

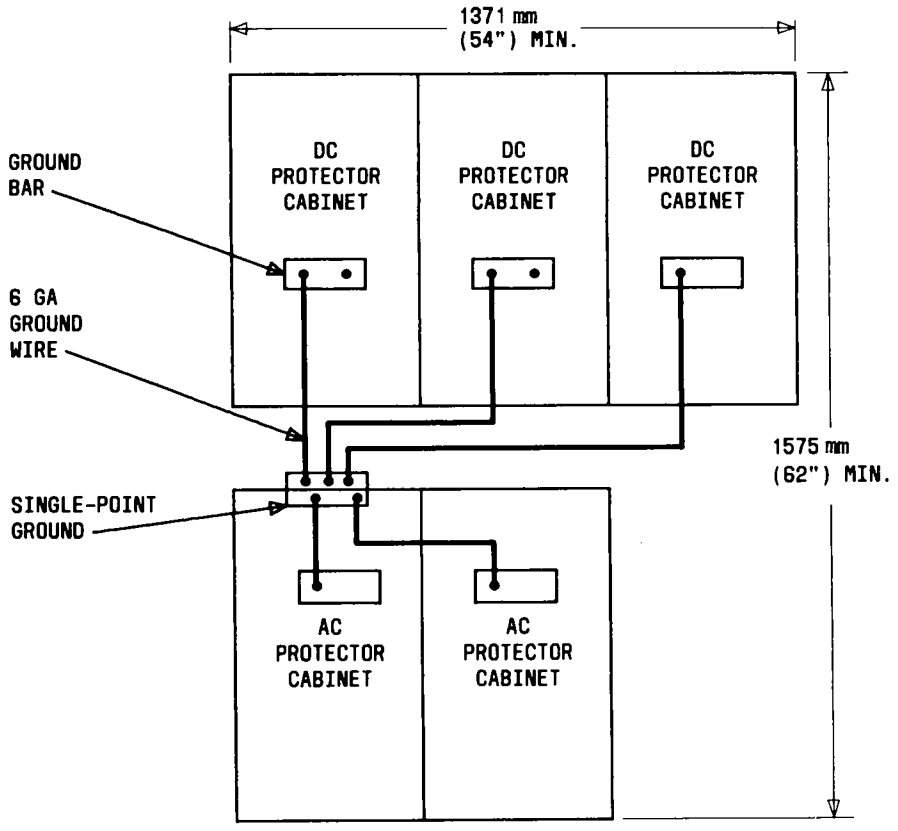


Fig. 34—Typical Layout of Multiple-Mounted AC and DC Protector Cabinets (Reserve Power)

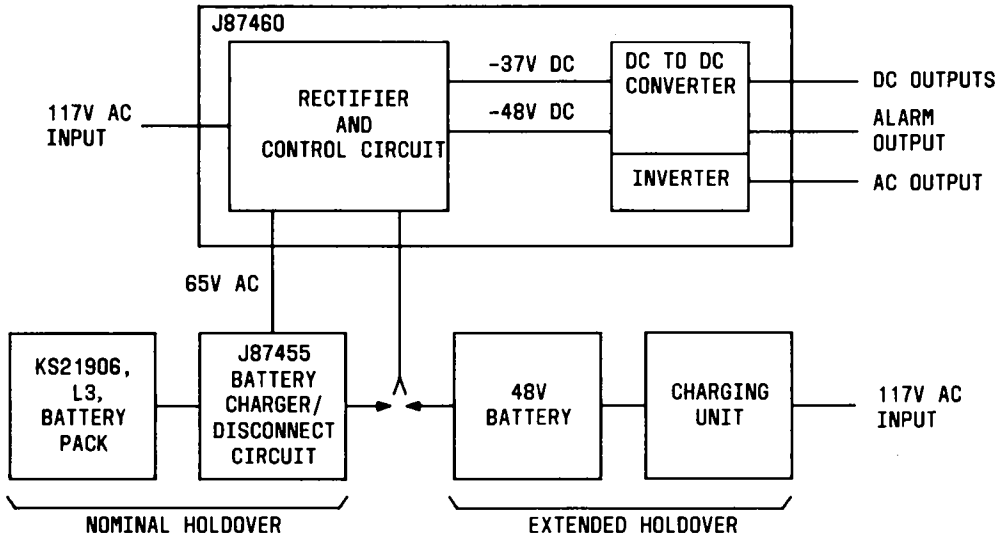


Fig. 35—UPS Unit for Control and Network Cabinets (J87460)

4.131 The ***UPS extended holdover*** arrangement increases the holdover period to approximately eight hours. The extended holdover service uses a separately housed battery plant and charging unit such as a 131A battery reserve power plant. The power plant is to be engineered locally. A cabinet-mounted dc line filter is required in the battery feed from the power plant to the UPS power supply. The UPS extended holdover equipment is listed as follows:

- One J87460D rectifier/converter power supply (installed in control cabinet)
- One J87460B rectifier/converter power supply (installed in each network cabinet)
- One J58882JA, L2, power distribution and fan assembly equipped with a 124A ringing generator (installed in cabinet with UPS power supply)
- One J58882A, L17, dc line filter (installed in cabinet with UPS power supply).

EXTENDED MEMORY HOLDOVER (FP9 AND FP11)

4.132 If extended memory holdover is provided, it will furnish all memory voltages to each basic and growth control carrier for at least 8 hours during a commercial power failure. This system would be used instead of the complete reserve power installation but does not provide system holdover for call processing. Its purpose is to maintain memory containing billing information, wakeup calls, and room status.

4.133 The 251A power unit is designed for use with the DIMENSION PBX for hotel-motel applications when the complete reserve power is not installed. The power unit provides recharging capability for 8-hour memory holdover batteries. One 251A power unit and two DELCO*-1200 batteries are required for each basic control rectifier and each growth control power rectifier in the PBX cabinet. If commercial power fails, the control circuits connect the batteries to the +12VM, +5.1VM, and −5.1VM regulators in the (J87432D) rectifier. The batteries will be disconnected by the rectifier before the terminal voltage falls to a value low enough to damage the batteries which will recharge when power is restored.

*Registered trademark of General Motors Corp.

The interconnections between the power unit and the rectifiers are shown in Fig. 36. The memory holdover cabinet holds four combinations of power units and battery-equipped shelves. The order of preference for placing each combination in one of the cabinet mounting positions is shown in Fig. 37.

4.134 When additional batteries are required, hardware (J58882D, L2) for connecting and securing the batteries within the cabinet must be provided.

4.135 A wiring diagram of the battery cabinet is shown on Fig. 38. The cabinet alarms indicate a fault condition in the batteries or charging circuitry. A charger fault results in a relay release and the reserve power major alarm lead (RRSVMJ*) being switched as shown.

DUCTING AND CABLING

A. Ducting

4.136 The cabling plan must take the following variables into consideration:

- Maximum cable lengths
- Number of cables required
- Future growth and rearrangement.

4.137 Cabling makes use of a standard A25-type cable. Standard cables are used for stations, trunks, links, consoles, etc, terminated at the cross-connect field. Some special cables (flat or shielded type) are used for high-frequency data channels and carrier-to-carrier cabling.

4.138 The ac and dc cables are routed to the DIMENSION PBX cabinets in separate cable ducts. A typical rollout cabinet floor plan is shown in Fig. 39 which also depicts the overhead and vertical cable ducts. A detailed cross-section of the overhead duct with relative cable placement is shown in Fig. 40. Maximum separation between ac power and 4-MHz cables should be maintained to reduce possible 60-Hz hum.

4.139 A side view of the horizontal cable ducts with cable placement is shown in Fig. 41. The intercabinet flat and coaxial or triaxial cable routing is shown in Fig. 42. A partial rear view of the vertical ac distribution "chimney" duct is shown in Fig. 43.

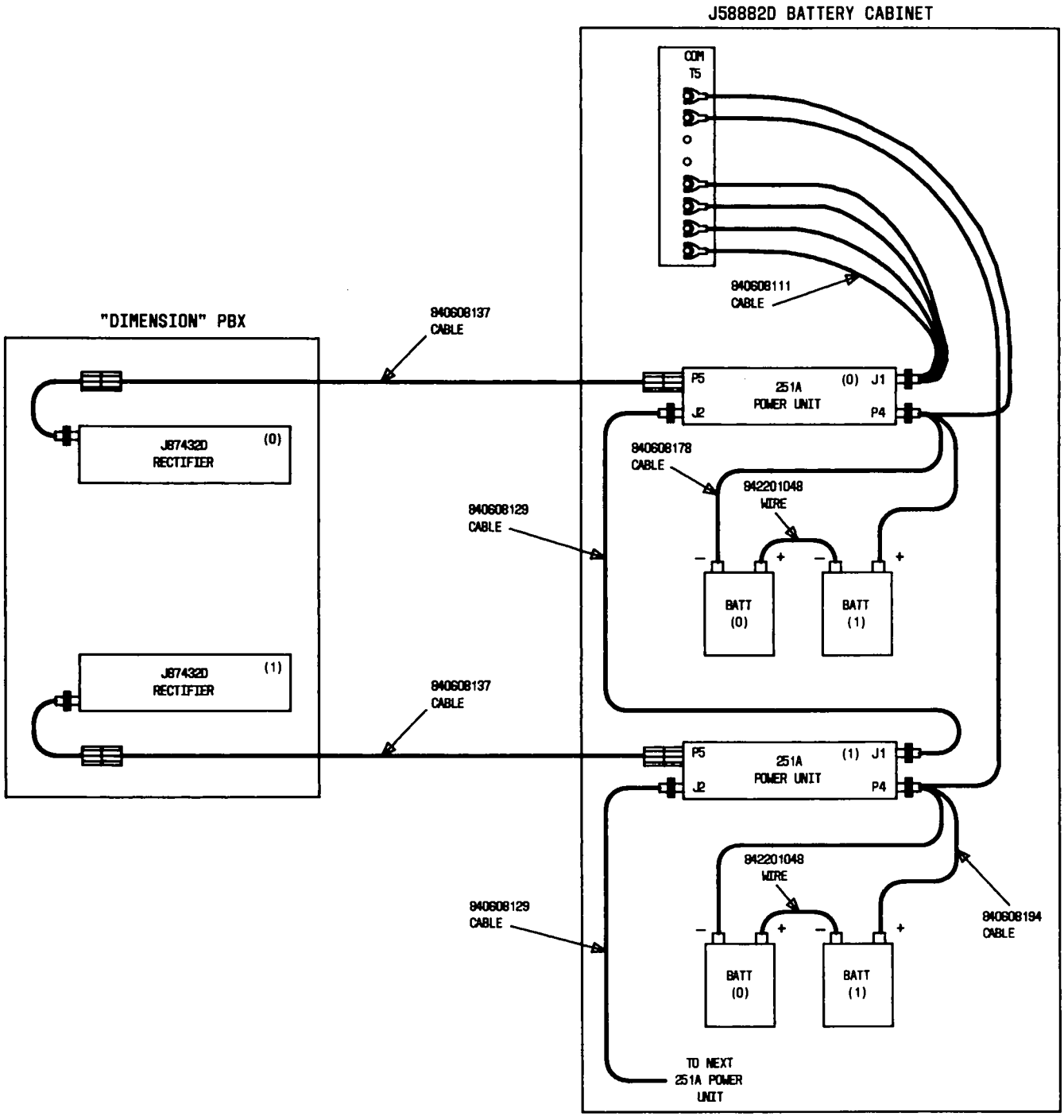


Fig. 36—Power Units and Rectifiers—Cabling

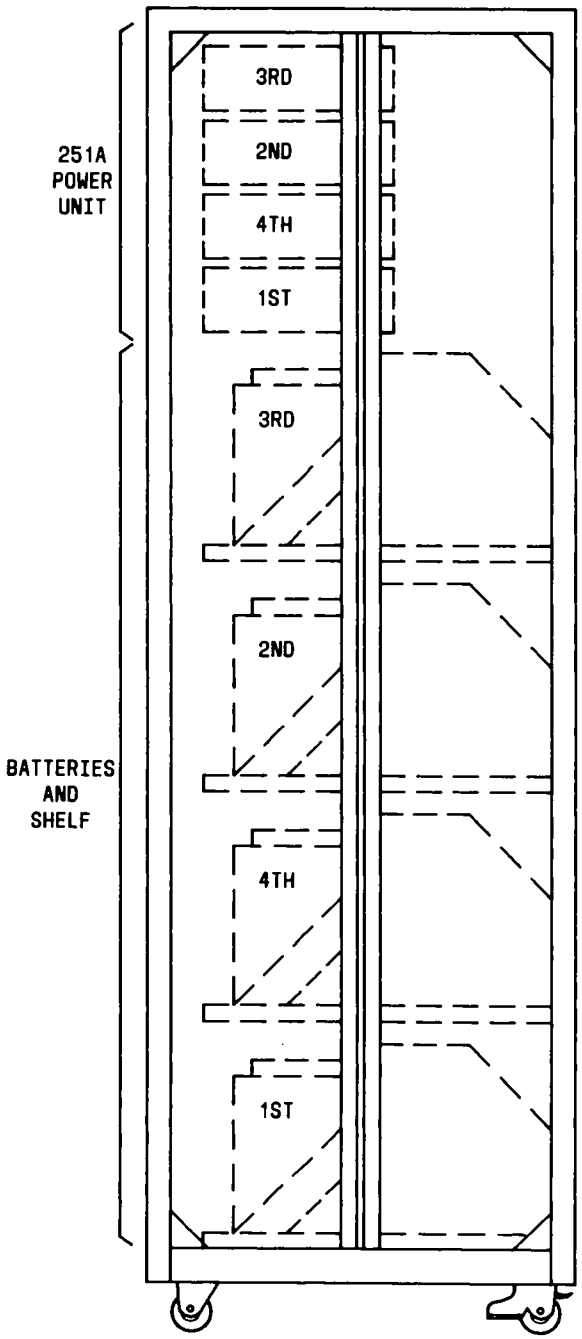


Fig. 37—Power Unit and Battery Shelf Mounting Positions

Note: The existing conduit or overhead ductwork must be insulated from incidental grounds, but not necessarily from the ac and dc protector cabinets.

4.140 The following installation parameters pertain to the DIMENSION 2000 PBX or Custom PBX ductwork with all cabling:

- Weight of the vertical cable duct is 91 kg (200 pounds) with all cables.
- Weight of the rear cable duct is 9 kg/linear 305 mm (20 pounds/linear foot) with all cables.
- Weight of the overhead cable rack is 27 kg/linear 305 mm (60 pounds/linear foot) with all cables.
- Cable length within a module must be less than 7.6m (25 feet).
- Lead length limitation on the connection between the ANI circuit in a common control cabinet and the module control and trunk carrier in a module control cabinet is 22.9m (75 feet).
- Control carrier to module control carrier data channel is limited to 45.7m (150 feet) coaxial or triaxial cable.
- Cabinet height is 1778 mm (70 inches) when mounted in place.
- Distance from floor to top of overhead cable rack is 2210 mm (87 inches).

B. Cabling

4.141 The intraconnecting cables between PBX circuits are connected to the lines, trunks, and consoles via KS-type plugs. These cables can then be cut down on the cross-connect field. Refer to ED-1E367 for a complete breakdown for all intracabinet cables and connectors.

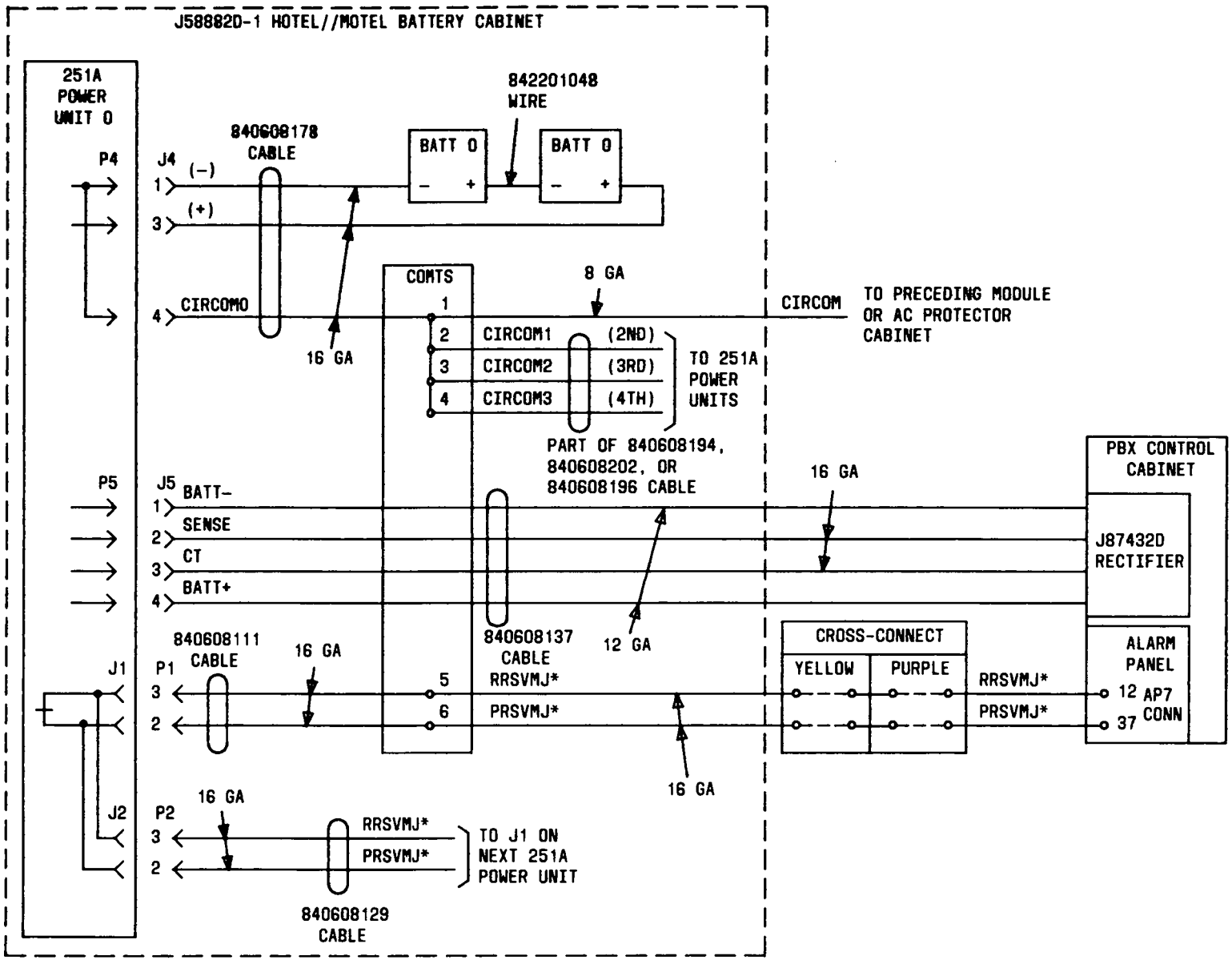


Fig. 38—Battery Cabinet Wiring Diagram

Do not remove spare coaxial terminals in the KS-19820 connectors.

4.142 The attendant console mounting cord is a 12-pair cable, 2.44m (8 feet) long, and can be plugged directly into the appropriate line group control carrier connector in the cabinet. In most cases, this cable length will not be practical for a DIMENSION 2000 PBX. When a longer double-ended cable is to be used, a B25A cable should be specified to connect the console to the cabinet. This method should be used only if cable length is critical. The connector is a 50-pin KS-16689, List 1. If a stub-ended cable is required to connect the console to the cross-connect field, an A25B cable should be specified. The console power, voice, and data are transmitted over a 12-pair cable for a range of 213m (700 feet). A 25-pair cable extends the maximum operating range to 305m (1000 feet) without the use of attendant console repeaters, by paralleling the power and ground conductors.

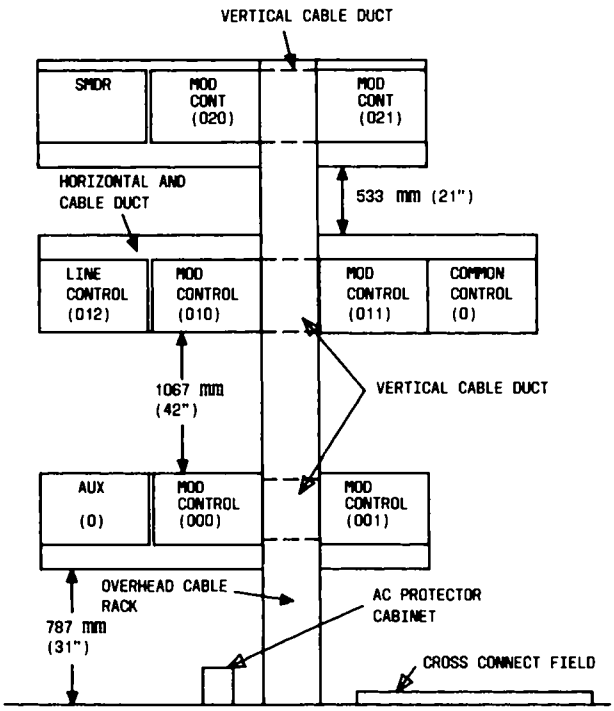
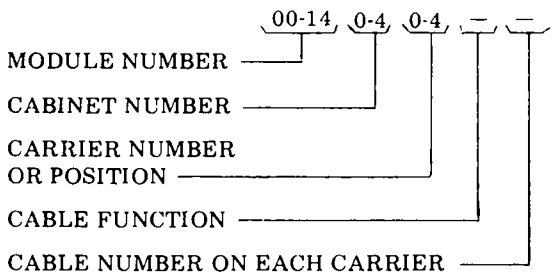
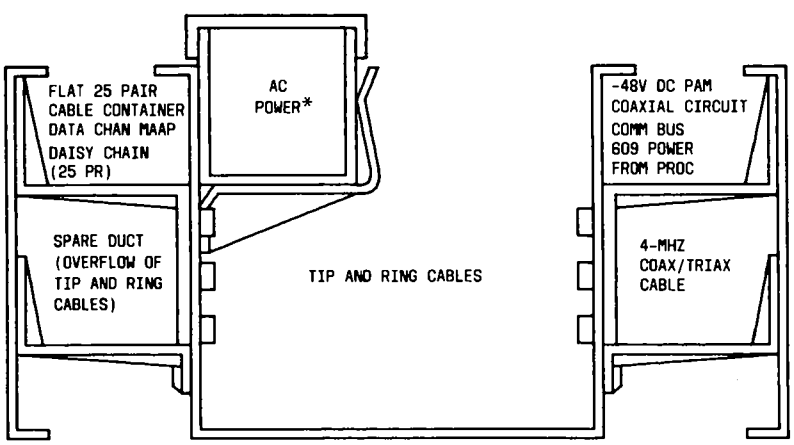


Fig. 39—Rollout Cabinet—Floor Plan

4.143 For connections from the cabinet to the cross-connect field, A25D cables should be specified. The cables and carrier connectors are designated by module, cabinet, carrier number, cable function, and cable number as follows:





* 64 mm X 64 mm (2.5" X 2.5") SQUARE D TYPE POWER CABLE DUCT OR CONDUIT

Fig. 40—Overhead Cable Ducts Showing Cable Placement

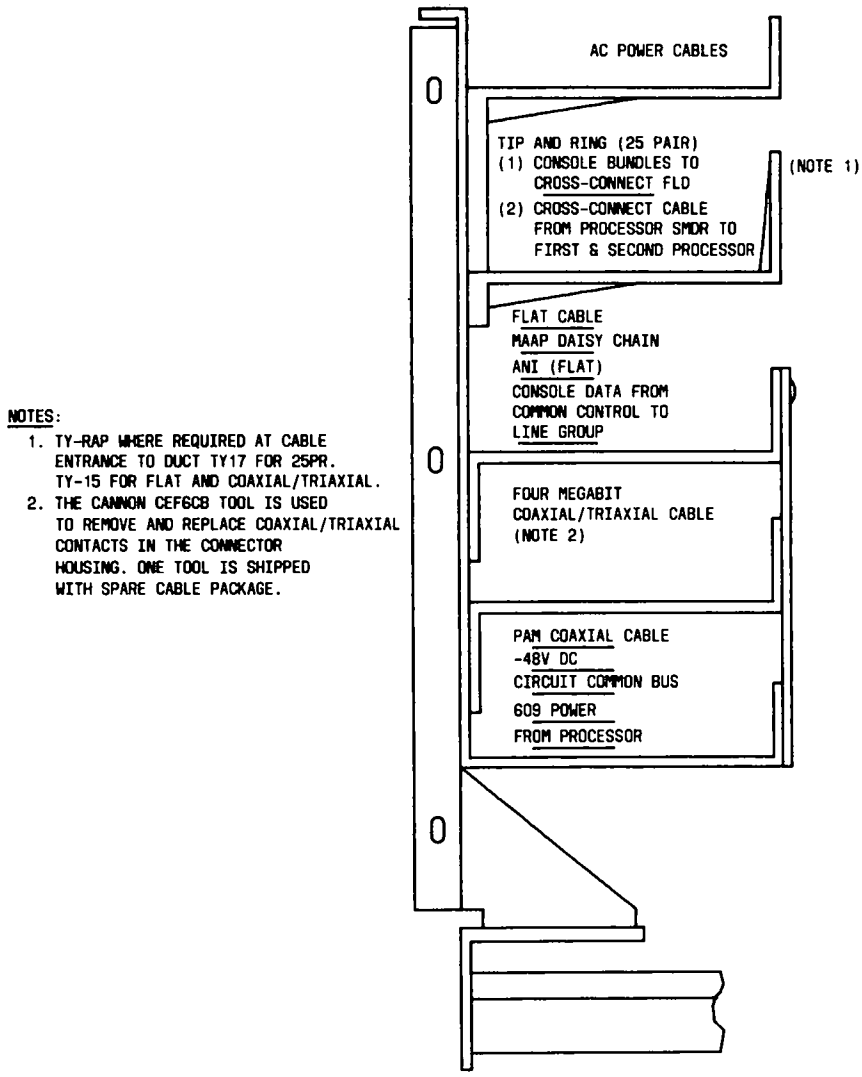


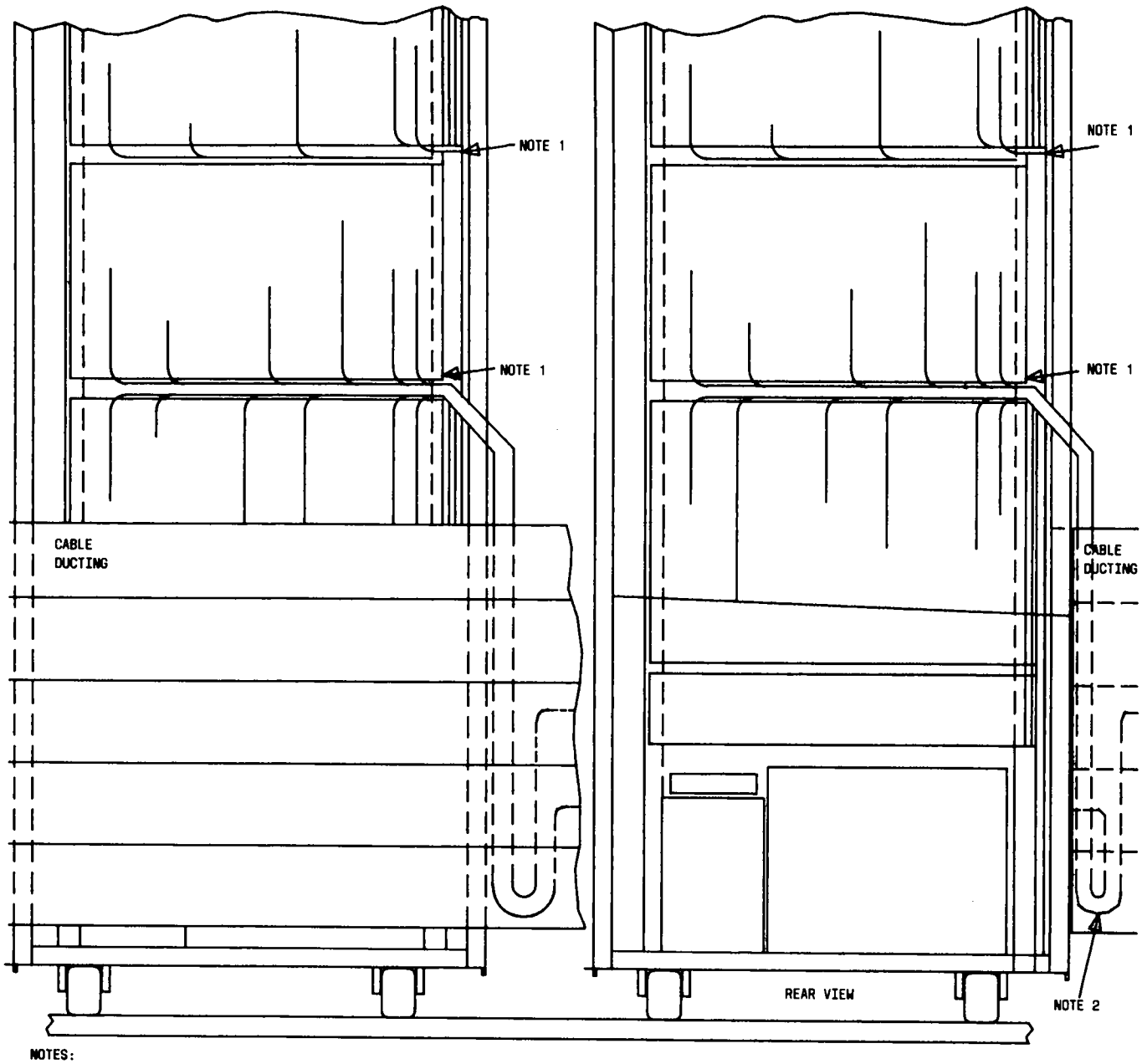
Fig. 41—Side View of Horizontal Cable Ducts

The cable function and the cable number on each carrier designation are described later in this paragraph. An example designation may be 0132LX01 which indicates module 01, cabinet 3, carrier position 2, line port carrier, and the first cable on the carrier.

(a) ***Carrier Number:*** Assigned sequentially for each carrier on a per-cabinet basis. The DIMENSION PBX can contain the following:

- Common Control Carriers in Control Cabinet J58882A (Basic J58882AC and Growth J58882AD)—Maximum one each per nonduplicated system and maximum two each per duplicated system. A second growth control carrier (J58882AG) may be used for larger 8K high-speed memories.

- Common Control Carriers in Control Cabinet J58882E (Control Growth J58882AH, ◗Distributed Communications System (DCS) Control and Data Communication J58882AK,◖ and Supplementary I/O J58882AJ)—Maximum one each per nonduplicated system and maximum of two each per duplicated system in two cabinets. A maximum of two control growth carriers



NOTES:
1. CABLE TIE FOR FLAT AND COAXIAL/TRIAXIAL CABLES.
2. CABLES ARE SHOWN TO THE SIDE OF THE CABINET TO ILLUSTRATE THE CABLE DRAPE. CABLES WILL ACTUALLY COME STRAIGHT BACK INTO THE DUCTS.

Fig. 42—Intercabinet Flat and Coaxial/Triaxial Cable Routing

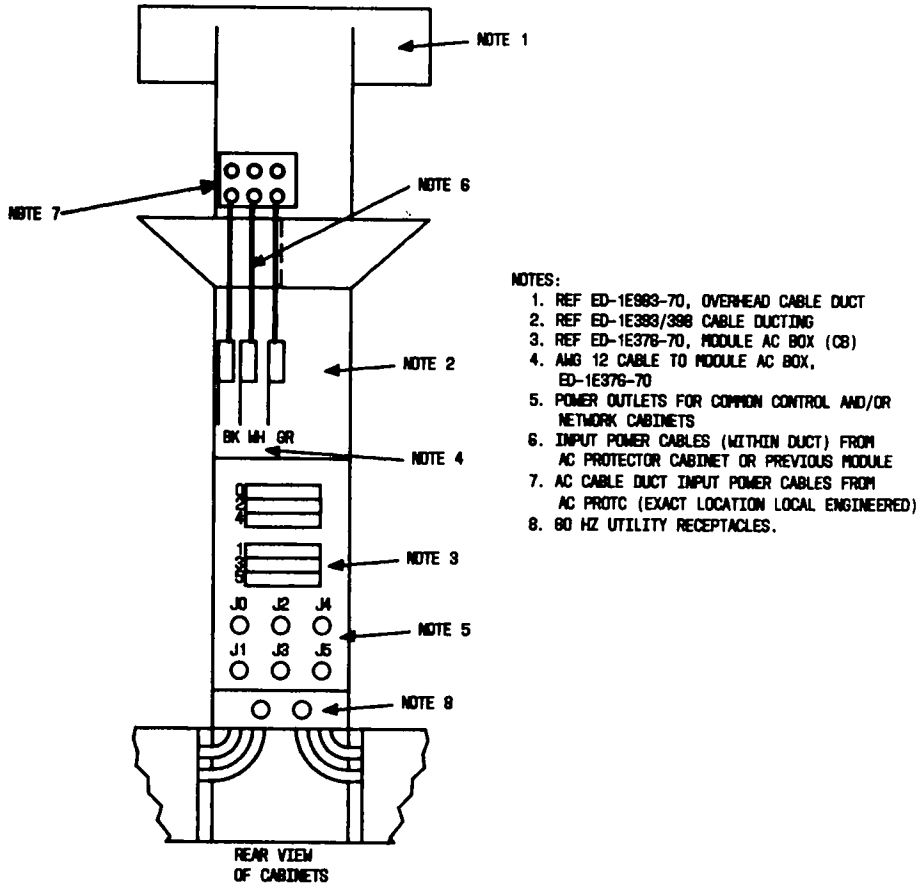


Fig. 43—Vertical AC Distribution Cable Routing

(J58882AH) per duplicated system in single cabinet. Each supplementary I/O carrier must be located directly above the associated control growth carrier.

- Line Group Control Carrier (J58882BB)—Maximum four per module.
- Line Port Carrier (J58879AC)—Maximum 15 per module.
- Module Control and Trunk Port Carrier (J58882BA)—Two per module.
- Trunk Port Carrier (J58879BA) (MD)—Maximum eight per module.
- Link Carrier (J58882BC)—Maximum four per module.
- ECTS Basic and Supplemental (Controller) Carriers (J58879KA and KB)—Maximum two each per module.
- Tie Trunk Carrier (J58882BD)—Maximum eight per module.

(b) ***Cable Function:*** Circuit designations on the backplanes associated with the cables and connectors are as follows:

- BX—Basic control carrier
- BX_A and GX_A—Control growth carrier
- GX—Growth control carrier
- JX—Supplementary I/O carrier
- KX—Basic ECTS control carrier
- KX—Supplemental ECTS control carrier

- LGX—Line group control carrier
- LKX—Link carrier
- LX—Line port carrier
- MX—Module control and trunk port carrier
- SX—Second growth control carrier
- TT—CO/tie trunk carrier
- TX—Trunk port carrier.

(c) ***Cable Number on Each Carrier:*** Number of the cable on a particular carrier is shown in Table J which provides connector information for intramodule connections on site.

(d) ***Cable Plan to the Cross-Connect Field:*** See Fig. 44 for the cable plan to the cross-connect field.

- LX01 through 03 on line port carriers
- BX01 and BX02 on basic control carrier
- BX01A, BX02A, GX01A, and GX02A on control growth carriers
- JX01 through 03 on supplementary I/O carriers
- LGX01 to 02 and 07 through 11 on line group control carriers
- TX01 through 04 on trunk carriers
- GX01 through 03 on growth control carriers
- MX01 through 03 on module control and trunk port carriers
- SX01 through 03 on second growth control carriers
- LKX1 through 8 on link carriers
- TT01 through 04 on CO/tie trunk carriers
- KX01 through 06 on basic ECTS control carriers
- KX07 through 12 on supplemental ECTS control carriers.

Destination of high-speed network data cables (GHS or BHS connectors) will be LG24 or LG27 in a line group cabinet or MC41 or MC42 in a module control cabinet.

(e) ***Coaxial/Triaxial Connections:*** Coaxial and triaxial cable connections between the control carriers and the network module cabinets are as follows:

- From basic control carrier—Table K
- From growth control carrier—Table L
- From second growth control carrier—Table M
- From control-growth carrier—Table N.

When a noise problem exists, coaxial cables should be replaced with triaxial cables. The triaxial cable includes a paddleboard connector which contains two terminals (leg 1 and leg 2), and a ground pigtail group 680. This ground pigtail must be connected to the tab on the side of the same carrier that the paddleboard plugs into. The tab on the side of the carrier is either MC42G/MC41G or LG27G/LG24G. A tab is provided for termination of the ground pigtail from 4MHz data cable as shown in Fig. 45.

CROSS-CONNECTIONS

A. Cross-Connect Field

4.144 Figure 46 shows a typical cross-connect field layout for a DIMENSION PBX. The size of the cross-connect field, or combined distributing frame (CDF), will vary depending on the size and options used (ie, the number of lines or if key or auxiliary equipment is used).

4.145 Colored 183-type backboards are used on the cross-connect field to identify the types of circuits to be terminated at the various positions. The recommended 66-type connecting blocks are identified with the system cables which terminate on the

TABLE J

INTRAMODULE CABLING PLAN

PLACE CABLE FROM					TO					SELECT CABLE FROM CABLE GROUP
CABINET (NOTE 1)		CARRIER (NOTE 2)			CABINET		CARRIER			
TYPE	NUMBER	TYPE	POSITION	CONN	TYPE	NUMBER	TYPE	POSITION	CONN	
COMMON CONTROL	0/0	BASIC CONTROL	0	BC06	COMMON CONTROL	1/0-1	BASIC CONTROL	1-0	BC06	206
			0	BC07				1-0	BC07	206
			0	BC09				1-0	BC11	201
			0	BC08	MODULE CONTROL	001	MODULE CONTROL AND TRUNK PORT	0	MC25	200
	1/0-1		1-0	BC08				0	MC24	200
	0/0		0	BC10		000		0	MC25	200
	1/0-1		1-0	BC10				0	MC24	200
MODULE CONTROL	000	LINE GROUP CONTROL	1	LG10		001		0	MC14	421
			1	LG26				0	MC31	301
		MODULE CONTROL AND TRUNK PORT	0	MC16			LINK (NOTE 3)	2, 3, OR 4	LO1	422,423,OR 424 RESP
			0	MC19			MODULE CONTROL AND TRUNK PORT	0	MC20	425
			0	MC21				0	MC22	201
			0	MC22				0	MC28	202
			0	MC36				0	MC34	202
	001	LINE GROUP CONTROL	1	LG08		000		0	MC07 (NOTE 4)	421
			1	LG13				0	MC14 (NOTE 5)	
								0	MC33 (NOTE 4)	301
								0	MC31 (NOTE 5)	
		MODULE CONTROL AND TRUNK PORT	0	MC10			LINK(NOTE 3)	2, 3, OR 4	LO3	422,423,OR 424 RESP
			0	MC36			MODULE CONTROL AND TRUNK PORT	0	MC34	202
			0	MC21				0	MC27	202
LINE	002	LINE GROUP CONTROL	0	LG08		001		0	MC11	400
			0	LG10				0	MC11	400
			0	LG26				0	MC32	200
			0	LG23		000		0	MC32	200
	003		0	LG08				0	MC13	400
			0	LG10		001		0	MC13	400
			0	LG26				0	MC30	200
			0	LG23		000		0	MC30	200
	004		0	LG08				0	MC07 (NOTE 4)	400
			0	LG10		001		0	MC07 (NOTE 4)	400
			0	LG26				0	MC33 (NOTE 4)	200
			0	LG23		000		0	MC33 (NOTE 4)	200

NOTES:

1. FOR COMMON CONTROL CABINETS, 1/0 = PROCESSOR 1 IN CABINET 0; FOR MODULE CONTROL OR LINE CABINETS, 001 = MODULE 00, CABINET 1.
2. WHEN CONTROL-GROWTH CARRIER IS PROVIDED, SUBSTITUTE FOR BASIC CONTROL CARRIER.
3. TO FIRST LINK CARRIER IN CABINET.
4. IF LINE CABINET 004 IS ADDED, LINE GROUP CONTROL CARRIER AND ALL LINES IN MODULE CONTROL CABINET 001 MUST BE MOVED TO ADDED CABINET (004).
5. MAKE THIS CONNECTION ONLY WHEN NETWORK MODULE CONSISTS OF FIVE CABINETS AND A J58882BB LINE GROUP CONTROL CARRIER IS TO BE USED IN CABINET 001 (A NONSTANDARD ARRANGEMENT).

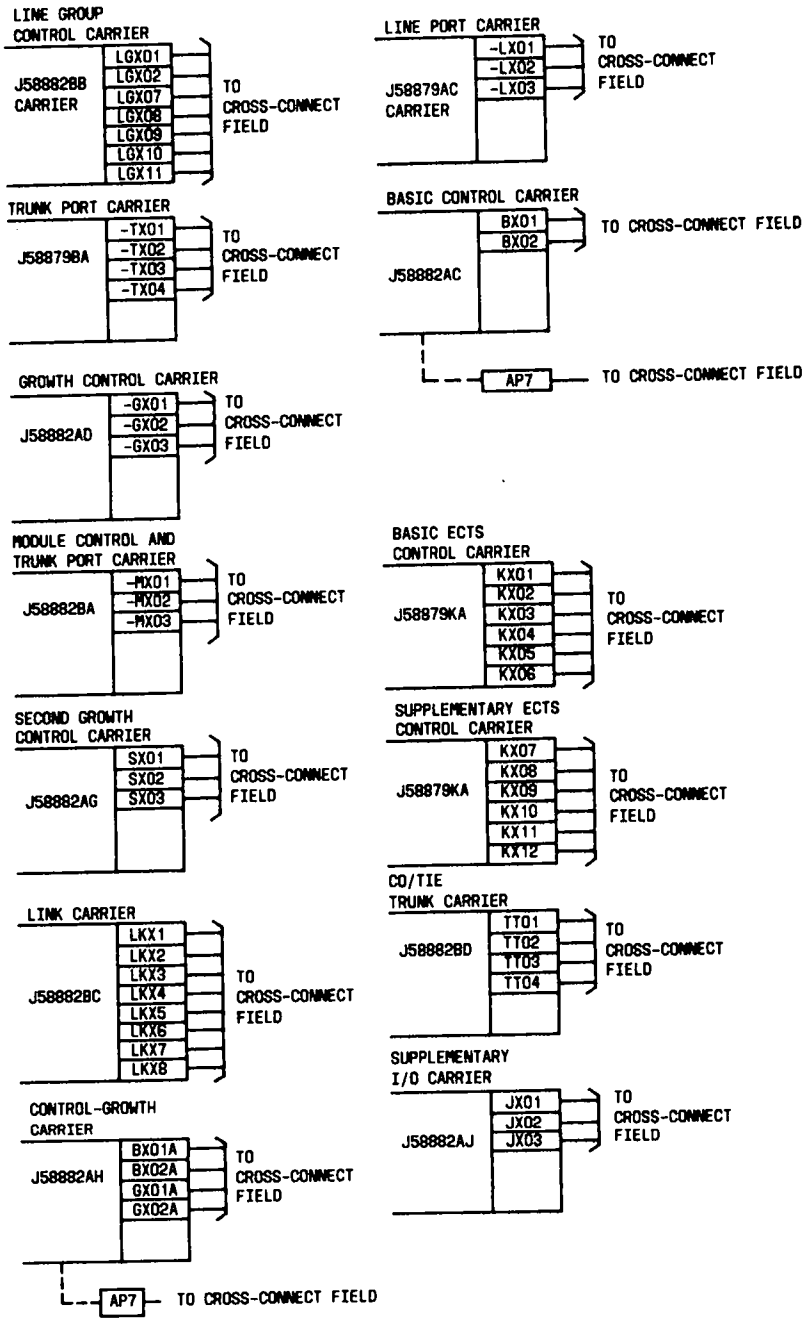


Fig. 44—Cabling Plan to Cross-Connect Field

TABLE K

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR BASIC CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
BASIC CONTROL CARRIER (J58882AA OR AC)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
BHS1	A2 A1	1 2	0	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
BHS2	A2 A1	1 2		4		
	A4 A3	1 2	1	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
BHS3	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	2	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
BHS4	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	3	0	MODULE CONTROL	MC42* MC41†

Note 1: Select cables from 600 group according to length required.

Note 2: Numbers are stamped on coaxial/triaxial cable legs.

* Connections for carrier installed in common control cabinet 0.

† Connections for carrier installed in common control cabinet 1.

TABLE L

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
GROWTH CONTROL CARRIER (J58882AB OR J58882AD)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS1	A2 A1	1 2	3	1	MODULE CONTROL	MC42* MC41†
	A4 A3	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		
GHS2	A2 A1	1 2	4	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
GHS3	A2 A1	1 2		4		
	A4 A3	1 2	5	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
GHS4	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	6	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
GHS5	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	7	0	MODULE CONTROL	MC42* MC41†

See notes and footnotes at end of table.

TABLE L (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
GROWTH CONTROL CARRIER (J58882AB OR J58882AD)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS6	A2 A1	1 2	7	1	MODULE CONTROL	MC42* MC41†
	A4 A3	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		
GHS7	A2 A1	1 2	8	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
GHS8	A2 A1	1 2		4		
	A4 A3	1 2	9	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
GHS9	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	10	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
GHS10	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	11	0	MODULE CONTROL	MC42* MC41†

See notes and footnotes at end of table.

TABLE L (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
GROWTH CONTROL CARRIER (J58882AB OR J58882AD)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS11	A2 A1	1 2	11	1	MODULE CONTROL	MC42* MC41†
	A4 A3	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		
GHS12	A2 A1	1 2	12	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
GHS13	A2 A1	1 2		4		
	A4 A3	1 2	13	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
GHS14	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	14	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
GHS15	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	15	0	MODULE CONTROL	MC42* MC41†

See notes and footnotes at end of table.

TABLE L (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
GROWTH CONTROL CARRIER (J58882AB OR J58882AD)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS16	A2 A1	1 2	15	1	MODULE CONTROL	MC42* MC41†
	A4 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		

Note 1: Select cables from 600 group according to length required.

Note 2: Numbers are stamped on coaxial/triaxial cable legs.

* Connections for carrier installed in common control cabinet 0.

† Connections for carrier installed in common control cabinet 1.

blocks. Backboard colors and type of circuits terminated are as follows:

BACKBOARD COLOR	CIRCUITS OR EQUIPMENT TERMINATED
Green	Central office trunk circuits
Blue	Station line circuits
Red	Key and ECTS equipment
Yellow	Miscellaneous circuits and equipment
Purple	PBX circuits and equipment
◗Orange	Network Interface.◖

4.146 White 187B1 or 196A backboards, having stand-off type distribution rings, are used to separate the fields into upper and lower sections and are intended for use when wiring and cross-connecting the various connecting blocks.

B. Emergency Transfer Circuit

4.147 Prewired 609-type panels may be used to provide connections to emergency transfer facilities. Up to ten (maximum) panels may be installed in the PBX system. Each panel contains apparatus for transferring ten stations to ten CO cable pairs during power failure or major alarm conditions. Refer to the DIMENSION PBX Ordering Form (E-8124) for a typical layout for ordering purposes. The panels should be mounted in the cross-connect field, as shown in Fig. 47, for ease of cross-connecting to the circuits. Table O is provided to be filled in with the line and trunk assignments for emergency transfer. Trunks with terminal balancing treatment and power failure transfer service shall be cross-connected to allow the terminal balancing networks to remain in the circuit after power failure transfer. The method of connecting trunks having 837-type networks is shown in Fig. 48. Figure 49 shows the methods of connecting trunks (without the 837-type networks) for power failure transfer. The emergency transfer circuit control leads are shown in Fig. 50.

TABLE M

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR SECOND GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
2ND GROWTH CONTROL CARRIER			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
SHS1	A2	1	16	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A1	2				
	A4	1		1		
	A3	2				
	A6	1		2	LINE GROUP CONTROL	LG27* LG24†
	A5	2				
	A8	1		3		
	A7	2				
SHS2	A2	1		4		
	A1	2				
	A4	1	17	0	MODULE CONTROL AND TRUNK PORT	MC42‡ MC41†
	A3	2				
	A6	1		1		
	A5	2				
	A8	1		2	LINE GROUP CONTROL	LG27* LG24†
	A7	2				
SHS3	A2	1		3		
	A1	2				
	A4	1		4		
	A3	2				
	A6	1	18	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A5	2				
	A8	1		1		
	A7	2				
SHS4	A2	1		2	LINE GROUP CONTROL	LG27* LG24†
	A1	2				
	A4	1		3		
	A3	2				
	A6	1		4		
	A5	2				
	A8	1	19	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A7	2				
SHS5	A2	1		1		
	A1	2				
	A4	1		2	LINE GROUP CONTROL	LG27* LG24†
	A3	2				
	A6	1		3		
	A5	2				
	A8	1		4		
	A7	2				

See notes and footnotes at end of table.

TABLE M (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR SECOND GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
2ND GROWTH CONTROL CARRIER			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
SHS6	A2 A1	1 2	20	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
SHS7	A2 A1	1 2		4		
	A4 A3	1 2	21	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
SHS8	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	22	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
SHS9	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	23	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
SHS10	A2 A1	1 2		1		
	A4 A3	1 2		2	MODULE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		

See notes and footnotes at end of table.

TABLE M (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR SECOND GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
2ND GROWTH CONTROL CARRIER			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
SHS11	A2 A1	1 2	24	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
SHS12	A2 A1	1 2		4		
	A4 A3	1 2	25	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
SHS13	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	26	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
SHS14	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	27	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
SHS15	A2 A1	1 2		1		
	A4 A3	1 2		2	MODULE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		

See notes and footnotes at end of table.

TABLE M (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR SECOND GROWTH CONTROL CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
2ND GROWTH CONTROL CARRIER			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
SHS16	A2 A1	1 2	28	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG27†
	A8 A7	1 2		3		

Note 1: Select cables from 600 group according to length required.

Note 2: Numbers are stamped on coaxial/triaxial cable legs.

* Connections for carrier installed in common control cabinet 0.

† Connections for carrier installed in common control cabinet 1.

4.148 Ground start for emergency transfer stations is provided by an AWG No. 6 conductor via the single-point ground to the 609-type emergency transfer panel. An AWG No. 14 conductor may be used if sufficient mechanical protection is provided for the conductor. This ground-start conductor runs through a relay contact in the 609-type panel to the ground start key. Ground start is provided for each PBX station set assigned for emergency transfer service and is not intended for equipment protection.

> ***Note:*** A Thomas & Betts Corp. lug (LUG-IT* 3531) is shipped loose with the 609-type panel to be used to terminate the ground wire (AWG No. 6 through No. 14).

4.149 A 609-type transfer panel can also be used for transferring an attendant console position for night service.

*Registered trademark of Thomas & Betts Corp.

4.150 During a power failure, the 609-type panel also extends a contact closure over a pair of leads to the central office make-busy circuit.

4.151 Prepare a sketch of the cross-connect fields similar to Fig. 47. Indicate the backboard, connecting blocks, and cables required for a particular installation. Refer to Sections 463-130-100 and 518-010-101 for detailed information on cross-connect fields installed on customer premises.

C. Cross-Connect Field Enclosures

4.152 The cross-connect field enclosure assembly may be required to satisfy FCC registration requirements (Fig. 51). It is available in three sizes as follows:

(1) 686 mm (27 inches) high, 432 mm (17 inches) wide, and 229 mm (9 inches) deep. The 686-mm (27-inch) high assembly is used to cover one standard 432- by 508-mm (17- by 20-inch) backboard and one 196A distribution ring. This size can be expanded horizontally and vertically as required.

TABLE N

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR CONTROL-GROWTH CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
BASIC CONTROL CARRIER (J58882AH)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
BHS1A	A2	1	0	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A1	2				
	A4	1		1		
	A3	2				
	A6	1		2	LINE GROUP CONTROL	LG27* LG24†
	A5	2				
	A8	1		3		
	A7	2				
BHS2A	A2	1		4		
	A1	2				
	A4	1	1	0	MODULE CONTROL AND TRUNK PORT	MC42‡ MC41†
	A3	2				
	A6	1		1		
	A5	2				
	A8	1		2	LINE GROUP CONTROL	LG27* LG24†
	A7	2				
BHS3A	A2	1		3		
	A1	2				
	A4	1		4		
	A3	2				
	A6	1	2	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A5	2				
	A8	1		1		
	A7	2				
BHS4A	A2	1		2	LINE GROUP CONTROL	LG27* LG24†
	A1	2				
	A4	1		3		
	A3	2				
	A6	1		4		
	A5	2				
GHS1A	A8	1	3	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A7	2				
	A2	1		1		
	A1	2				
	A4	1		2	LINE GROUP CONTROL	LG27* LG24†
	A3	2				
	A6	1		3		
	A5	2				
	A8	1		4		
	A7	2				

See notes and footnotes at end of table.

TABLE N (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR CONTROL-GROWTH CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
BASIC CONTROL CARRIER (J58882AH)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS2A	A2 A1	1 2	4	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A4 A3	1 2		1		
	A6 A5	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A8 A7	1 2		3		
GHS3A	A2 A1	1 2		4		
	A4 A3	1 2	5	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A6 A5	1 2		1		
	A8 A7	1 2		2	LINE GROUP CONTROL	LG27* LG24†
GHS4A	A2 A1	1 2		3		
	A4 A3	1 2		4		
	A6 A5	1 2	6	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A8 A7	1 2		1		
GHS5A	A2 A1	1 2		2	LINE GROUP CONTROL	LG27* LG24†
	A4 A3	1 2		3		
	A6 A5	1 2		4		
	A8 A7	1 2	7	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
GHS6A	A2 A1	1 2		1		
	A4 A3	1 2		2	MODULE GROUP CONTROL	LG27* LG24†
	A6 A5	1 2		3		
	A8 A7	1 2		4		

See notes and footnotes at end of table.

TABLE N (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR CONTROL-GROWTH CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
BASIC CONTROL CARRIER (J58882AH)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS7A	A2	1	8	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A1	2				
	A4	1		1		
	A3	2				
	A6	1		2	LINE GROUP CONTROL	LG27* LG24†
	A5	2				
	A8	1		3		
	A7	2				
GHS8A	A2	1		4		
	A1	2				
	A4	1	9	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A3	2				
	A6	1		1		
	A5	2				
	A8	1		2	LINE GROUP CONTROL	LG27* LG24†
	A7	2				
GHS9A	A2	1		3		
	A1	2				
	A4	1		4		
	A3	2				
	A6	1	10	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A5	2				
	A8	1		1		
	A7	2				
GHS10A	A2	1		2	LINE GROUP CONTROL	LG27* LG24†
	A1	2				
	A4	1		3		
	A3	2				
	A6	1		4		
	A5	2				
	A8	1	11	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A7	2				
GHS11A	A2	1		1		
	A1	2				
	A4	1		2	MODULE GROUP CONTROL	LG27* LG24†
	A3	2				
	A6	1		3		
	A5	2				
	A8	1		4		
	A7	2				

See notes and footnotes at end of table.

TABLE N (Contd)

COAXIAL/TRIAXIAL CABLE CONNECTIONS FOR CONTROL-GROWTH CARRIER

CONNECT COAXIAL/TRIAXIAL CABLES (NOTE 1)						
FROM			TO			
BASIC CONTROL CARRIER (J58882AH)			PBX EQUIPMENT			
CONN	CONN TERM.	CABLE LEG (NOTE 2)	MODULE	CABINET	CARRIER	CONN
GHS12A	A2	1	12	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A1	2				
	A4	1		1		
	A3	2				
	A6	1		2	LINE GROUP CONTROL	LG27* LG24†
	A5	2				
	A8	1		3		
	A7	2				
GHS13A	A2	1		4		
	A1	2				
	A4	1	13	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A3	2				
	A6	1		1		
	A5	2				
	A8	1		2	LINE GROUP CONTROL	LG27* LG24†
	A7	2				
GHS14A	A2	1		3		
	A1	2				
	A4	1		4		
	A3	2				
	A6	1	14	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A5	2				
	A8	1		1		
	A7	2				
GHS15A	A2	1		2	LINE GROUP CONTROL	LG27* LG24†
	A1	2				
	A4	1		3		
	A3	2				
	A6	1		4		
	A5	2				
	A8	1	15	0	MODULE CONTROL AND TRUNK PORT	MC42* MC41†
	A7	2				
GHS16A	A2	1		1		
	A1	2				
	A4	1		2	MODULE GROUP CONTROL	LG27* LG24†
	A3	2				
	A6	1		3		
	A5	2				
	A8	1		4		
	A7	2				

Note 1: Select cables from 600 group according to length required.

Note 2: Numbers are stamped on coaxial/triaxial cable legs.

* Connections for carrier installed in common control cabinet 0.

† Connections for carrier installed in common control cabinet 1.

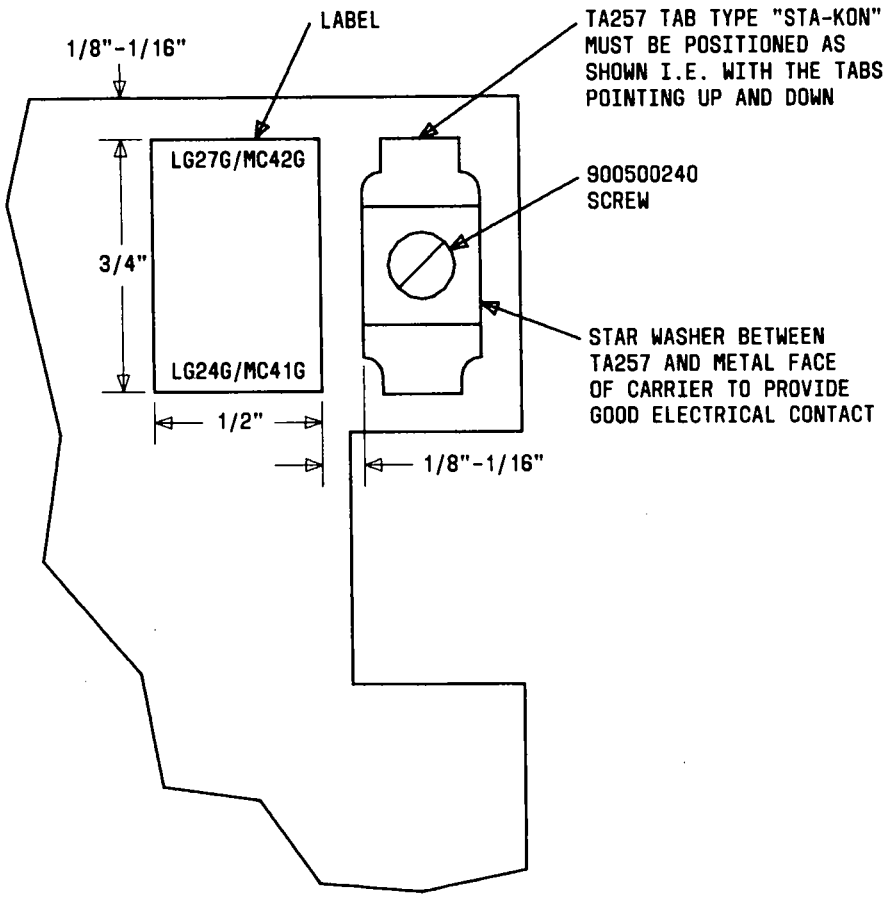


Fig. 45—Pigtail Connection to Carrier (Triaxial Cable)

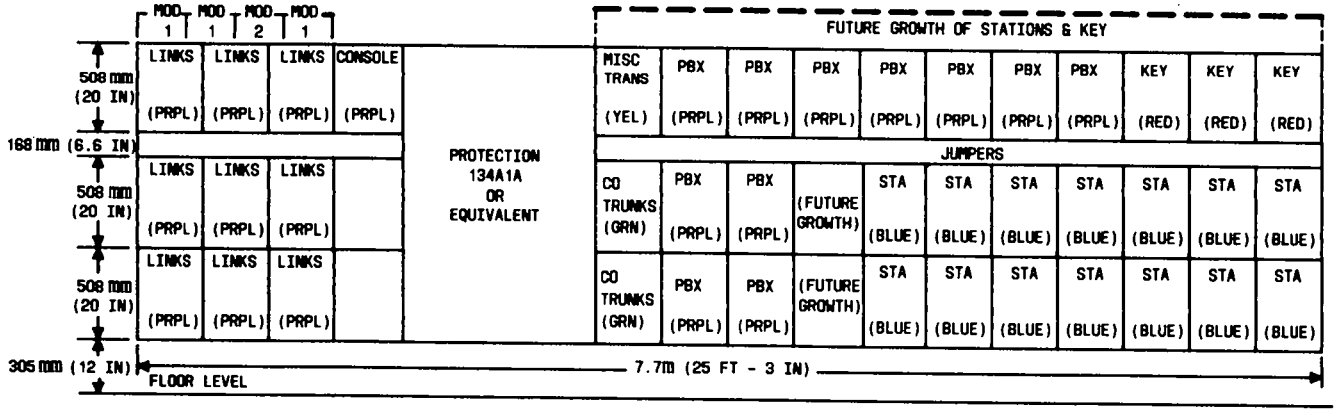


Fig. 46—Typical Cross-Connect Field

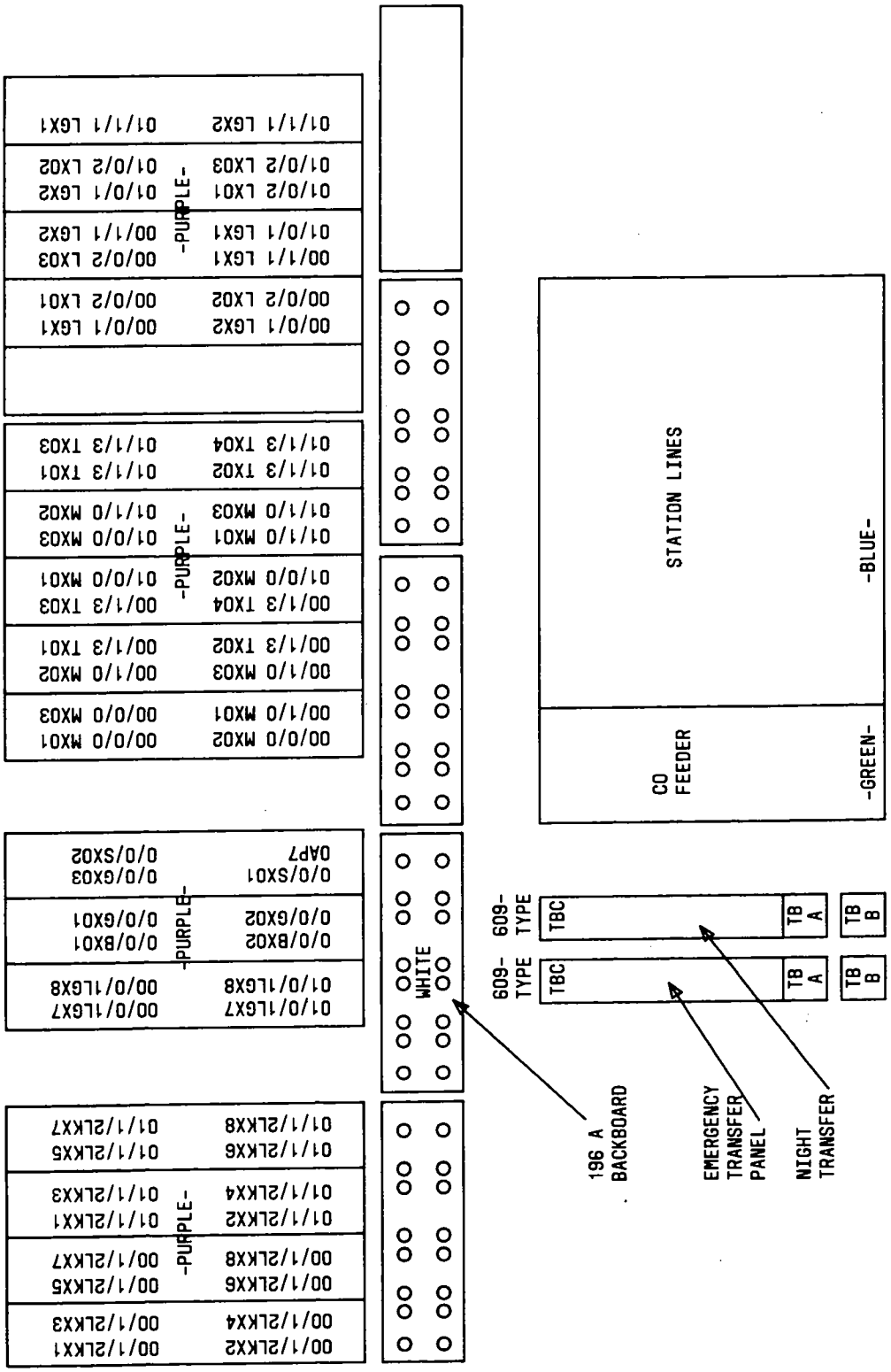


Fig. 47—Cross-Connect Field (Showing Backboards)

TABLE O

EMERGENCY TRANSFER CONNECTIONS WORKSHEET

FROM					TO TERM. BLOCK A OR B ON 609-TYPE UNIT (SEE NOTE)	EMER TRANSFER CONNECTIONS
LOCATION	BACKBOARD	CONN. BLK NO.	TERM. NO.	TERM. DESIG.		
From Station_____	Blue (Station EQPT)			T R Start	1 2 3	First or Sixth EMER Transfer CONN
From PBX Line CKT_____	Purple (PBX Lines)			T R	4 5	
From GRD Start CO TRK_____	Green (CO Trunks)			T R	6 7	
From PBX CO TRK CKT_____	Purple (PBX Trunks)			T R	8 9	
From Station_____	Blue (Station EQPT)			T R Start	11 12 13	Second or Seventh EMER Transfer CONN
From PBX Line CKT_____	Purple (PBX Lines)			T R	14 15	
From GRD Start CO TRK_____	Green (CO Trunks)			T R	16 17	
From PBX CO TRK CKT_____	Purple (PBX Trunks)			T R	18 19	
From Station_____	Blue (Station EQPT)			T R Start	21 22 23	Third or Eighth EMER Transfer CONN
From PBX Line CKT_____	Purple (PBX Lines)			T R	24 25	
From GRD Start CO TRK_____	Green (CO Trunks)			T R	26 27	
From PBX CO TRK CKT_____	Purple (PBX Trunks)			T R	28 29	

NOTE: The first through the fifth emergency transfer connections are connected to TBA on the panel and the sixth through the tenth are connected to TBB on the panel.

TABLE O (Contd)

EMERGENCY TRANSFER CONNECTIONS WORKSHEET

FROM					TO TERM. BLOCK A OR B ON 609-TYPE UNIT (SEE NOTE)	EMER TRANSFER CONNECTIONS
LOCATION	BACKBOARD	CONN. BLK NO.	TERM. NO.	TERM. DESIG.		
From Station____	Blue (Station EQPT)			T R Start	31 32 33	Fourth or Ninth EMER Transfer CONN
From PBX Line CKT____	Purple (PBX Lines)			T R	34 35	
From GRD Start CO TRK____	Green (CO Trunks)			T R	36 37	
From PBX CO TRK CKT____	Purple (PBX Trunks)			T R	38 39	
From Station____	Blue (Station EQPT)			T R Start	41 42 43	Fifth or Tenth EMER Transfer CONN
From PBX Line CKT____	Purple (PBX Lines)			T R	44 45	
From GRD Start CO TRK____	Green (CO Trunks)			T R	46 47	
From PBX CO TRK CKT____	Purple (PBX Trunks)			T R	48 49	
From AP7	Purple (Alarm Panel)		50	-48PX	2 TBC	
From AP7	Purple (Alarm Panel)		49	DGRD	1 TBC	
From Single Point Ground			APPR GRD	GSGRD	45 TBC	

NOTE: The first through the fifth emergency transfer connections are connected to TBA on the panel and the sixth through the tenth are connected to TBB on the panel.

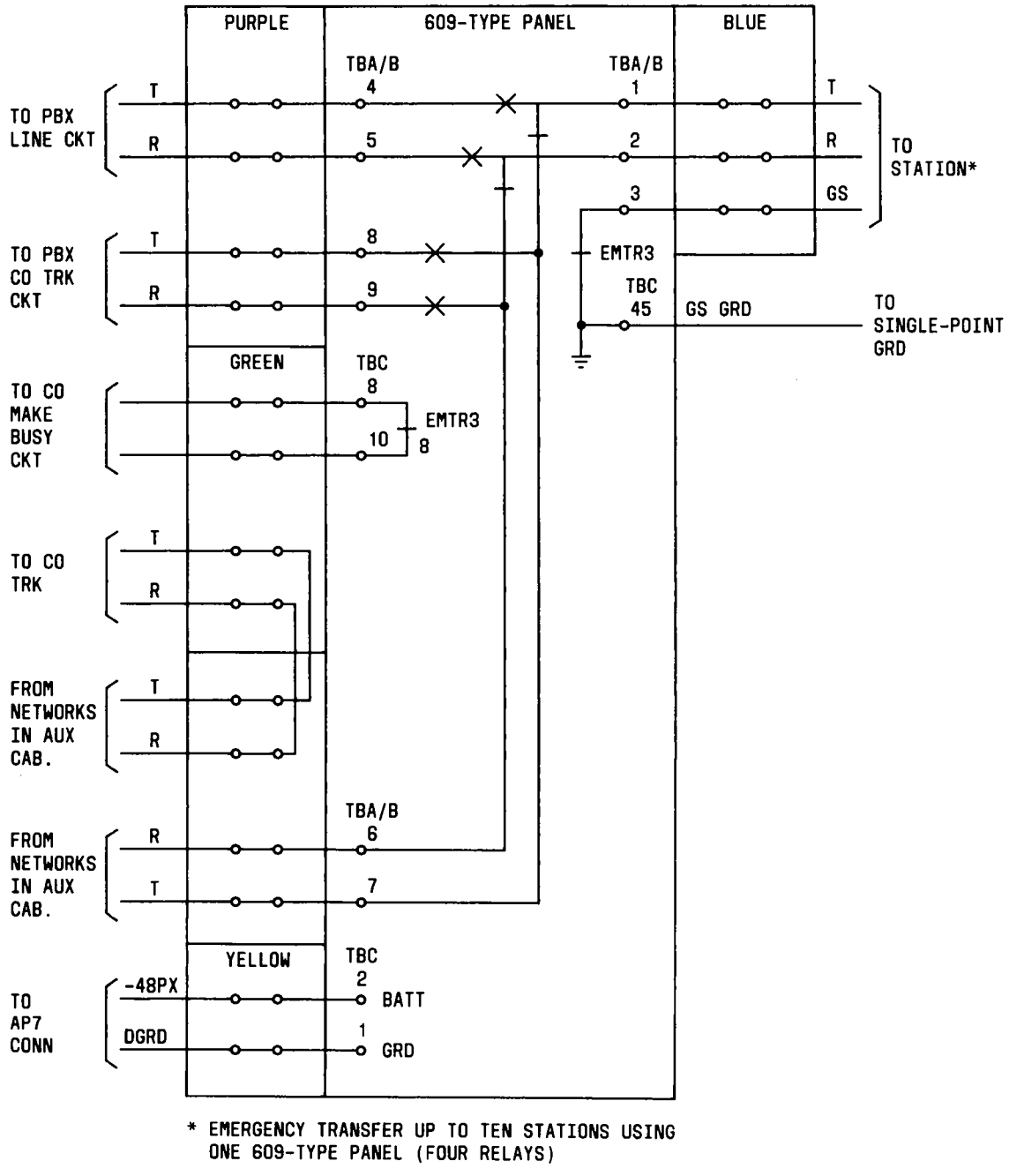


Fig. 48—Emergency Transfer of Trunks (Using 837-Type Networks)

(2) 1371 mm (54 inches) high, 432 mm (17 inches) wide, and 229 mm (9 inches) deep. The 1371-mm (54-inch) high assembly is used to cover two standard 432- by 508-mm (17- by 20-inch) backboards and two 196A distribution rings. This size can be expanded horizontally as required. A 609-type emergency transfer panel can be located in the vacant part of the field.

(3) 1930 mm (76 inches) high, 432 mm (17 inches) wide, and 229 mm (9 inches) deep. The 1930-mm (76-inch) high assembly is used to cover three standard 432- by 508-mm (17- by 20-inch) backboards and two 187B1 or three 196A distribution rings. The 102- by 203-mm (4- by 8-inch) (optional) 724A traffic measurement panel may also be located in the cross-connect field.

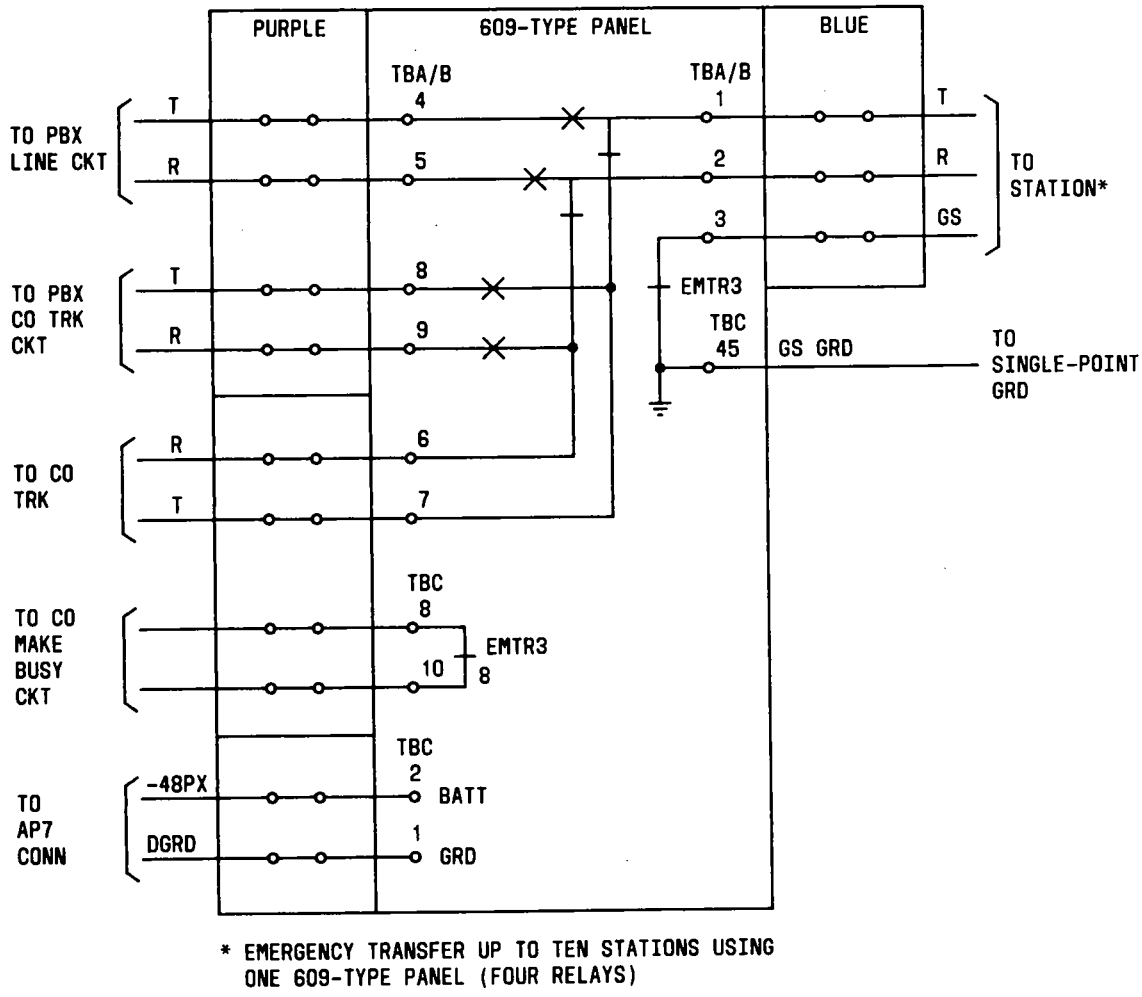


Fig. 49—Power Failure Transfer Circuit Using CO Trunks Without Terminal Balancing Equipment

4.153 The cross-connect field enclosures may be multipled horizontally as needed. The top and side panels will accommodate the additional depth of the 19.05-mm (3/4-inch) backboard on which the frame assembly is mounted. If the frame assembly is mounted directly on the wall (without the wooden backboard), group 4 assembly method (ED-1E322-70, -71, -72) of the door panel should be used. This compensates for the added depth due to the absence of the backboard.

4.154 Mount the cross-connect field enclosure assembly with the top approximately even with the top of the cabinets. The 1930-mm (76-inch) high enclosure assembly would normally be used where the cabinets are located some distance from the backboard enclosure assembly.

4.155 The installation of one ***1930-mm (76-inch)*** high cross-connect field enclosure (ED-1E322-70) to be mounted *on a wooden backboard* requires the following:

- One GR1 (group) consisting of the basic enclosure with door, brackets, and hardware

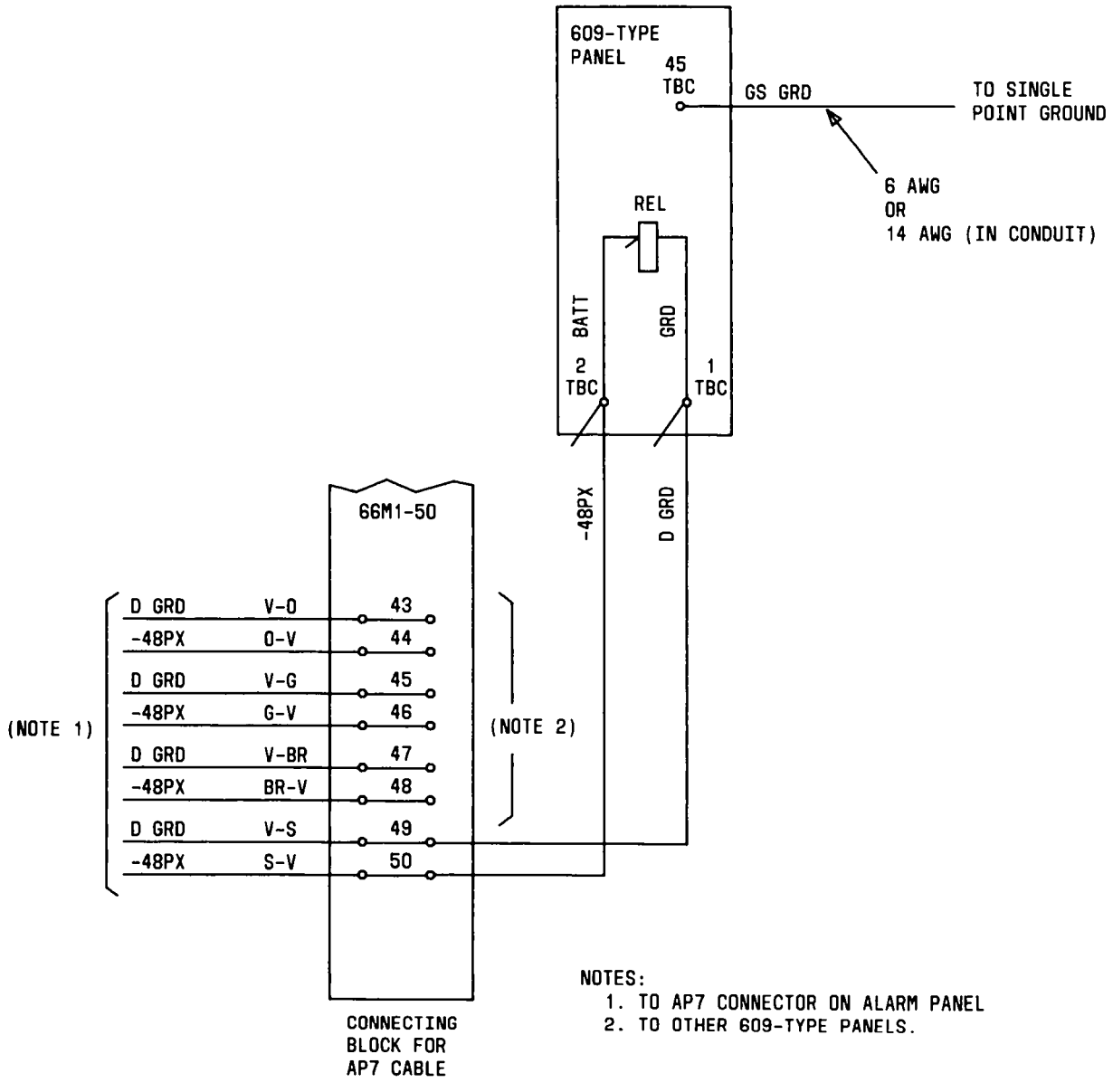


Fig. 50—Emergency Transfer Circuit Control Leads

- Two GR2 (groups), each consisting of one side panel and hardware

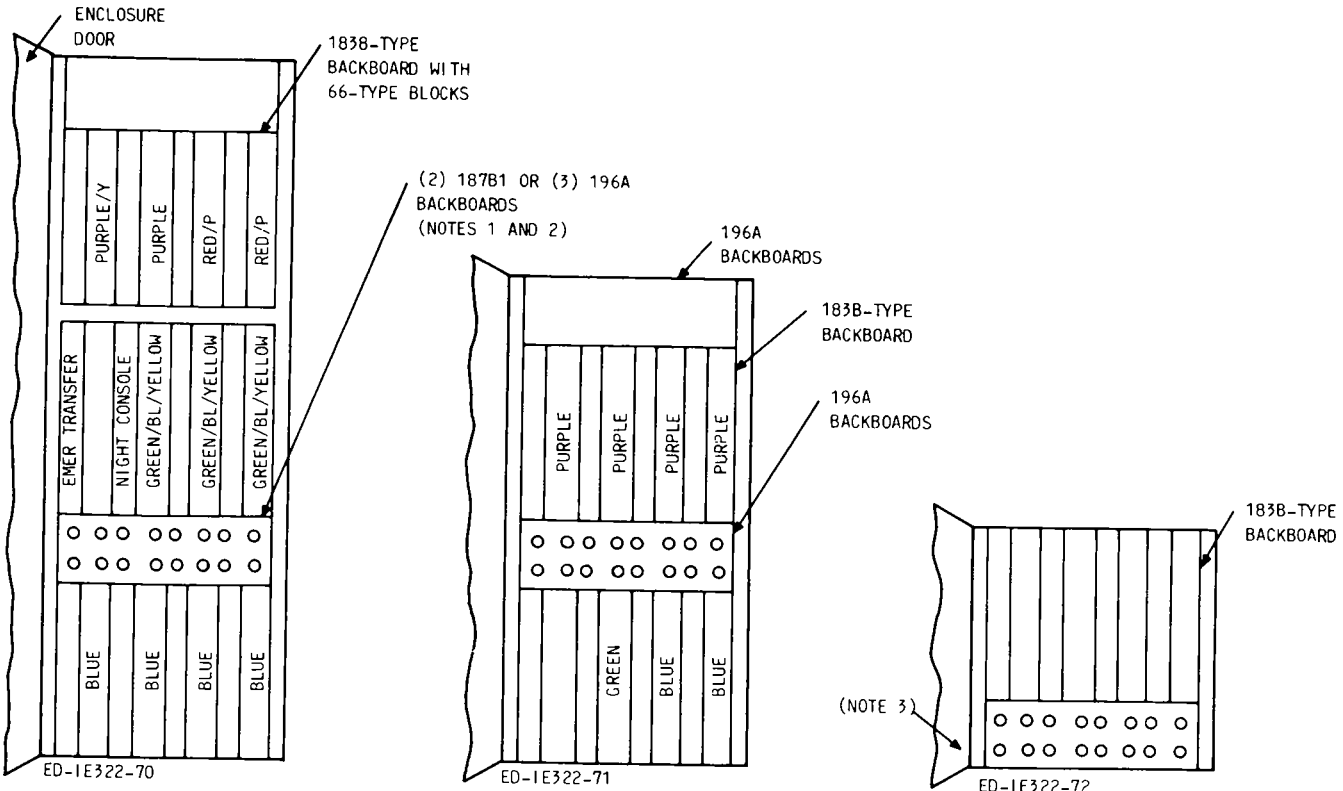
- Two GR3 (groups), each consisting of one top/bottom panel and hardware.

When more than one enclosure is used (joined), GR2 side panels are required only at the ends.

4.156 The installation of a ***1930-mm (76-inch)*** high cross-connect field enclosure (ED-1E322-70) to be mounted *flush on the wall* requires the following:

- One GR4 (group) consisting of the basic enclosure with door, brackets, and hardware

- Two GR2 (groups), each consisting of a side panel and hardware



ED-1E322-70
(432 mm [17 IN.] W
1930 mm [76. IN.] H
229 mm [9 IN.] D)
(432 mm [17 IN.] W
1872 mm [73.8 IN.] H
191 mm [7.5 IN.] D
INSIDE)

ED-1E322-71
(432 mm [17 IN.] W
1372 mm [54 IN.] H
229 mm [9 IN.] D)
(432 mm [17 IN.] W
1314 mm [51.75 IN.] H
191 mm [7.5 IN.] D
INSIDE)

ED-1E322-72
(432 mm [17 IN.] W
686 mm [27 IN.] H
229 mm [9 IN.] D)
(432 mm [17 IN.] W
629 mm [24.75 IN.] H
191 mm [7.5 IN.] D
INSIDE)

CODE (NOTE 4)	BACKBOARD COLOR	CIRCUITS OR EQUIPMENT TERMINATED
B2	GREEN	CENTRAL OFFICE TRUNK CIRCUITS
B1	BLUE	STATION LINE CIRCUITS
B3	RED	KEY AND ECTS EQUIPMENT
A5 OR B5	YELLOW	MISCELLANEOUS CIRCUITS AND EQUIPMENT
A4 OR B4	PURPLE	PBX CIRCUITS AND EQUIPMENT

NOTES:
1. PLYWOOD BACKBOARD MOUNTS FOR ALL SIZES (OPTIONAL).
2. BACKBOARD ARRANGEMENTS ARE FLEXIBLE. REFER TO 518-010-101 TYPICAL LAYOUTS.
3. CABLING IN THROUGH KNOCKOUTS IN SIDE AND BOTTOM.
4. "A" SIZE = 216 mm X 508 mm (8.5" X 20"), "B" SIZE 432 mm X 508 mm (17" X 20").

Fig. 51—Cross-Connect Field Enclosures

- Two GR3 (groups), each consisting of a top/bottom panel and hardware.

When more than one enclosure is used (joined), GR2 side panels are required only at the ends.

4.157 The installation of a ***1371-mm (54-inch)*** high cross-connect field enclosure (ED-1E322-71) to be mounted *on a wooden backboard* requires the following:

- One GR1 (group) consisting of basic enclosure with door, brackets, and hardware
- Two GR2 (groups), each consisting of one side panel and hardware
- Two GR3 (groups), each consisting of one top/bottom panel and hardware.

When more than one enclosure is used (joined), GR2 side panels are required only at the ends.

4.158 The installation of a ***1371-mm (54-inch)*** high cross-connect field enclosure (ED-1E322-71) to be mounted *flush on the wall* requires the following:

- One GR4 (group) consisting of basic enclosure with door, brackets, and hardware
- Two GR2 (groups), each consisting of one side panel and hardware
- Two GR3 (groups), each consisting of one top/bottom panel and hardware.

When more than one enclosure is used (joined), GR2 side panels are required only at the ends.

4.159 The installation of a ***686-mm (27-inch)*** high cross-connect field enclosure (ED-1E322-72) to be mounted *on a wooden backboard* requires the following:

- GR1 (group) consisting of the basic enclosure with door, brackets, and hardware
- Two GR2 (groups), each consisting of one side panel and hardware
- Two GR3 (groups), each consisting of a top/bottom panel with hardware.

When more than one enclosure is used (joined), GR2 side panels are required only at the ends.

4.160 The installation of a ***686-mm (27-inch)*** high cross-connect field enclosure (ED-1E322-72) to be mounted *flush on the wall* requires the following:

- One GR4 (group) consisting of a basic enclosure with door, brackets, and hardware
- Two GR2 (groups), each consisting of one side panel and hardware
- Two GR3 (groups), each consisting of one top/bottom panel and hardware.

When more than one enclosure is used (joined), GR2 side panels are required only at the ends.

4.161 The cross-connect field enclosures are designed to be located on customer premises and may house the following apparatus:

- 183-type backboards
- 184-type backboards
- 187B1 backboards
- 196A backboards
- 609-type emergency transfer panels
- 724A panel
- 620A (modular) key panels
- 624A (modular) key panels
- 641A (modular) key panels
- 642A (modular) key panels
- 720A panel
- 722A panel.

Backboard ordering information is shown in Table P.

D. Cross-Connect Worksheets

4.162 Computer-generated cross-connect tables are delivered from the factory prior to the delivery of the system. These tables should be completed and provided for installer use at the time of

TABLE P

BACKBOARD DESIGNATIONS

TYPE	COLOR	SIZE MM (IN.)	ORDERING CODE
183A4	Purple	216 X 508 (8.5 X 20)	101937902
183A5	Yellow	216 X 508 (8.5 X 20)	101986446
183B1	Blue	432 X 508 (17 X 20)	101412989
183B2	Green	432 X 508 (17 X 20)	101564631
183B3	Red	432 X 508 (17 X 20)	101937910
183B4	Purple	432 X 508 (17 X 20)	101937928
183B5	Yellow	432 X 508 (17 X 20)	101986453
187B1	White	432 X 168 (17 X 6.6)	101937944
196A	White	432 X 117 (17 X 4.6)	102581089

installation. Similar cross-connect worksheets are located at the end of this section for use when planning the system's initial or changed configuration.

Line Cross-Connections

4.163 Table Q shows a line port carrier cross-connect table for cables LX01, LX02, and LX03. Table R shows an example of a filled-in cross-connect worksheet for line port carriers. A typical line connected through the cross-connect field to the carrier is shown in Fig. 52.

4.164 Table S shows the line cross-connections for cables LGX01 and LGX02 associated with a line group control carrier. The figure also shows the cross-connections for tone plant A (LC04), tone plant B (LC05B), tone plant C (LC17B), tone circuits (LC204), and attendant interface (LC45B) circuits when occupying a line circuit slot in the carrier.

Trunk Cross-Connections

4.165 Table T shows a trunk port carrier cross-connection for cables TX01 through TX04. Figure 53 shows a typical connection of a CO trunk to the trunk carrier via the cross-connect field. ▶Table U and V show external and internal encodes, respectively.◀ Table W shows a filled-in example of a trunk port carrier cross-connect worksheet. When FCC registration is required, the CO trunks designed for CO type services (ie, CO trunks, FX, and WATS) shall be terminated on the 66M3-50R connecting blocks or RJ21X cable connector.

4.166 Table X shows module control and trunk port carrier cross-connections for cables MX01, MX02, and MX03.

4.167 Table Y shows tie trunk port carrier cross-connections for cables TT01 through TT04.

Link Cross-Connections

4.168 Link port carriers are required only when two or more modules are provided with the PBX system. Table Z shows link carrier cross-connections for cables LKX1 through LKX8. Table AA shows an example of a filled-in cross-connect worksheet for link port carriers. The fill-in information consists of equipment location and the connector block number and terminals on which the link circuit in the other module is terminated.

Control and Alarm Panel Cross-Connections

4.169 The control input/output (I/O) leads are extended to the cross-connect field via the basic control, control growth, supplementary I/O growth control, and the second growth control carriers. The control leads are extended over the dual-speed data channels provided by the LC34B circuit packs or the low-speed data channels provided by the LC366B circuit packs. The assignment of I/O leads to a particular device is not restricted by software or hardware. However, the order of preference is:

(1) Consoles

(2) Electronic controllers (ECTS)

(3) Displays

(4) Peripheral interface circuits.

♦TABLE Q♦

LINE PORT CARRIER CROSS-CONNECTIONS

A25D CONNECTOR CABLES TO LINE PORT CARRIER CONNECTORS									AT PURPLE BACKBOARD	
LX01			LX02			LX03			CUT LEADS DOWN ON	
LEAD DESIGNATIONS FOR CIRCUIT PACKS									LEAD COLOR	CONN BLK TERMINAL
SLOT	LC02/ LC03	LC567	SLOT	LC02/ LC03	LC567	SLOT	LC02/ LC03	LC567		
02	T(0)	T1(0)	08	T(0)		15	T(0)	T1(0)	W-BL	1
	R(0)	R1(0)		R(0)			R(0)	R1(0)	BL-W	2
	T(1)	T(0)		T(1)			T(1)	T(0)	W-O	3
	R(1)	R(0)		R(1)			R(1)	R(0)	O-W	4
	T(2)	T1(1)		T(2)			T(2)	T1(1)	W-G	5
	R(2)	R1(1)		R(2)			R(2)	R1(1)	G-W	6
	T(3)	T(1)		T(3)			T(3)	T(1)	W-BR	7
	R(3)	R(1)		R(3)			R(3)	R(1)	BR-W	8
03	T(0)		09	T(0)		16	T(0)		W-S	9
	R(0)			R(0)			R(0)		S-W	10
	T(1)			T(1)			T(1)		R-BL	11
	R(1)			R(1)			R(1)		BL-R	12
	T(2)			T(2)			T(2)		R-O	13
	R(2)			R(2)			R(2)		O-R	14
	T(3)			T(3)			T(3)		R-G	15
	R(3)			R(3)			R(3)		G-R	16
04	T(0)		11	T(0)	T1(0)	17	T(0)		R-BR	17
	R(0)			R(0)	R1(0)		R(0)		BR-R	18
	T(1)			T(1)	T(0)		T(1)		R-S	19
	R(1)			R(1)	R(0)		R(1)		S-R	20
	T(2)			T(2)	T1(1)		T(2)		BK-BL	21
	R(2)			R(2)	R1(1)		R(2)		BL-BK	22
	T(3)			T(3)	T(1)		T(3)		BK-O	23
	R(3)			R(3)	R(1)		R(3)		O-BK	24
05	T(0)		12	T(0)		18	T(0)		BK-G	25
	R(0)			R(0)			R(0)		G-BK	26
	T(1)			T(1)			T(1)		BK-BR	27
	R(1)			R(1)			R(1)		BR-BK	28
	T(2)			T(2)			T(2)		BK-S	29
	R(2)			R(2)			R(2)		S-BK	30
	T(3)			T(3)			T(3)		Y-BL	31
	R(3)			R(3)			R(3)		BL-Y	32
06	T(0)	T1(0)	13	T(0)					Y-O	33
	R(0)	R1(0)		R(0)					O-Y	34
	T(1)	T(0)		T(1)					Y-G	35
	R(1)	R(0)		R(1)					G-Y	36
	T(2)	T1(1)		T(2)					Y-BR	37
	R(2)	R1(1)		R(2)					BR-Y	38
	T(3)	T(1)		T(3)					Y-S	39
	R(3)	R(1)		R(3)					S-Y	40
07	T(0)		14	T(0)					V-BL	41
	R(0)			R(0)					BL-V	42
	T(1)			T(1)					V-O	43
	R(1)			R(1)					O-V	44
	T(2)			T(2)					V-G	45
	R(2)			R(2)					G-V	46
	T(3)			T(3)					V-BR	47
	R(3)			R(3)					BR-V	48
									V-S	49
									S-V	50

TABLE R

A FILLED-IN EXAMPLE OF LINE PORT CARRIER CROSS-CONNECTIONS

ORDER NUMBER XX-X-XXXX
CUSTOMER---XXXXXXXXXX

MOD00 CAB0 CARR3 CONNECTOR LX01				CONN CABLE COLOR CODE	CROSS-CONNECT	
					FROM	TO
CP SLOT NO.	CKT NO.	EXT NO.	LEAD DESIG		CONN BLK 0003LX01 (PURPLE)	CONN BLK (BLUE/RED)
02	0	4185	T	W-BL	1	BLK 1-9
			R	BL-W	2	10
	1	4186	T	W-O	3	11
			R	O-W	4	12
	2	4187	T	W-G	5	13
			R	G-W	6	14
	3	4188	T	W-BR	7	15
			R	BR-W	8	16
03	0	4291	T	W-S	9	25
			R	S-W	10	26
	1	4292	T	R-BL	11	27
			R	BL-R	12	28
	2	4293	T	R-O	13	29
			R	O-R	14	30
	3	4294	T	R-G	15	31
			R	G-R	16	32
04	0	4311	T	R-BR	17	BLK 2-41
			R	BR-R	18	42
	1	4312	T	R-S	19	43
			R	S-R	20	44
	2	4313	T	BK-BL	21	45
			R	BL-BK	22	46
	3	4314	T	BK-O	23	47
			R	O-BK	24	48
05	0	4465	T	BK-G	25	17
			R	G-BK	26	18
	1	4466	T	BK-BR	27	19
			R	BR-BK	28	20
	2	4467	T	BK-S	29	21
			R	S-BK	30	22
	3	4468	T	Y-BL	31	23
			R	BL-Y	32	24
06	0	4532	T	Y-O	33	BLK 3- 1
			R	O-Y	34	2
	1	4533	T	Y-G	35	3
			R	G-Y	36	4
	2	4534	T	Y-BR	37	5
			R	BR-Y	38	6
	3	4535	T	Y-S	39	7
			R	S-Y	40	8
07	0	4661	T	V-BL	41	33
			R	BL-V	42	34
	1	4662	T	V-O	43	35
			R	O-V	44	36
	2	4663	T	V-G	45	37
			R	G-V	46	38
	3	4664	T	V-BR	47	39
			R	BR-V	48	40
				V-S	49	
				S-V	50	

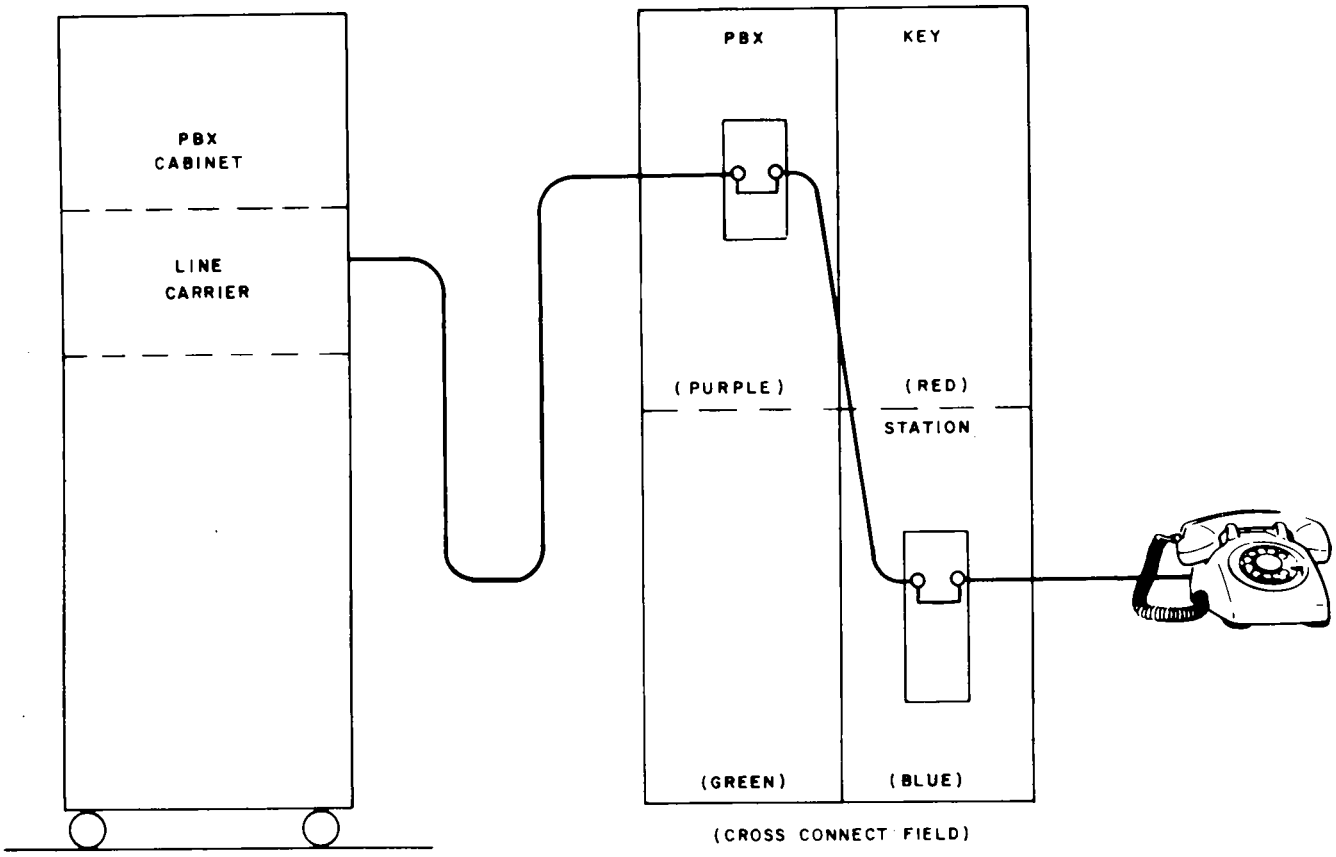


Fig. 52—Line to Carrier Connections Through the Cross-Connect Field

4.170 Tables AB through AF show control lead cross-connections for cables associated with the following carriers:

- Basic control carrier with cables BX01 and BX02 (Table AB)
- Control growth carrier with cables BX01A, BX02A, GX01A, and GX02A (Table AC)
- ▶Control and Data Communications carrier with cables BX01B, BX02B, GX01B, and GX02B (Table AD)◀
- Growth control and second growth control carriers with cables GX01, GX02, GX03, SX01, SX02, and SX03 (Table AE)
- Supplementary I/O carrier with cables JX01, JX02, and JX03 (Table AF).

4.171 Additional data channels are available on later versions of the basic control carrier when SMDR and NCOSS LSU features are not provided. When SMDR is not provided, data channel 02 (slot 31, circuit 0) becomes available via the BX02 connector (Table AB) when BXP07 is plugged into BX07 on the carrier. When NCOSS LSU is not provided, data channel 06 (slot 33, circuit 0) becomes available via BX02 when BXP09 is plugged into BX09. Data channel 03 (slot 31, circuit 1) is available for traffic studies via BX01 when the BX08 (MD) connector is not provided on the control carrier (Table AB). When BX08 is provided, data channel 03 becomes data channel 06 (slot 33, circuit 0).

4.172 Additional data channels are also available on later versions of the control growth carrier when SMDR and NCOSS LSU features are not provided. When SMDR is not provided, data channel 02 (slot 31/35B, circuit 0) becomes available via the

TABLE S

LINE GROUP CARRIER CROSS-CONNECTIONS

A25D CONNECTOR CABLES TO LINE GROUP CONTROL CARRIER CONNECTORS						AT PURPLE BACKBOARD	
LGX01*					LGX02*	CUT LEADS DOWN ON	
LEAD DESIGNATION FOR CIRCUIT PACKS						LEAD COLOR	CONN BLK TERMINALS
LC2B, LC3B	LC05B	LC204	LC17B	LC45	LC2B, LC3B		
T(0) †		TOO			T(0)	W-BL	1
R(0)					R(0)	BL-W	2
T(1)		T10 SLOT 5			T(1)	W-O	3
R(1) SLOT					R(1) SLOT	O-W	4
T(2) 05					T(2) 13	W-G	5
R(2)					R(2)	G-W	6
T(3)					T(3)	W-BR	7
R(3)					R(3)	BR-W	8
T(0)				T(0)	T(0)	W-S	9
R(0)				R(0)	R(0)	S-W	10
T(1)				T1(0)	T(1)	R-BL	11
R(1) SLOT				R1(0) SLOT	R(1) SLOT	BL-R	12
T(2) 07				T(1) 07	T(2) 14	R-O	13
R(2)				R(1)	R(2)	O-R	14
T(3)				T1(1)	T(3)	R-G	15
R(3)				R1(1)	R(3)	G-R	16
T(0)				T(0)	T(0)	R-BR	17
R(0)				R(0)	R(0)	BR-R	18
T(1)				T1(0)	T(1)	R-S	19
R(1) SLOT				R1(0) SLOT	R(1) SLOT	S-R	20
T(2) 08				T(1) 08	T(2) 15	BK-BL	21
R(2)				R(1)	R(2)	BL-BK	22
T(3)				T1(1)	T(3)	BK-O	23
R(3)				R1(1)	R(3)	O-BK	24
T(0)					T(0)	BK-G	25
R(0)					R(0)	G-BK	26
T(1)					T(1)	BK-BR	27
R(1) SLOT					R(1) SLOT	BR-BK	28
T(2) 09					T(2) 16	BK-S	29
R(2)					R(2)	S-BK	30
T(3)					T(3)	Y-BL	31
R(3)					R(3)	* BL-Y	32
T(0)					T(0)	Y-O	33
R(0)					R(0)	O-Y	34
T(1)			T1		T(1)	Y-G	35
R(1) SLOT			R1 SLOT		R(1) SLOT	G-Y	36
T(2) 10			T2 10		T(2) 17	Y-BR	37
R(2)			R2		R(2)	BR-Y	38
T(3)			T3		T(3)	Y-S	39
R(3)			R3		R(3)	S-Y	40
T(0)					T(0)	V-BL	41
R(0)					R(0)	BL-V	42
T(1)					T(1)	V-O	43
R(1) SLOT					R(1) SLOT	O-V	44
T(2) 12					T(2) 18	V-G	45
R(2)					R(2)	G-V	46
T(3)					T(3)	V-BR	47
R(3)					R(3)	BR-V	48
	T10 SLOT 6					V-S	49
						S-V	50

* LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT ARE NOT USED FOR CROSS-CONNECTIONS
† LEAD DESIGNATION BECOMES TOO WHEN LC4 IS USED IN SLOT 05

♦TABLE T♦

TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTING CABLE TO TRUNK PORT CARRIER CONNECTOR TX01								TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)								CUT LEADS DOWN ON	
	LC567	LC7	LC8D, LC9D	LC11B	LC13B	LC15	LC16B	LC361	LEAD COLOR	CONN BLK TERMINALS
02	T1(0)	T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)	W-BL	1
	R1(0)	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)	BL-W	2
	T(0)		T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)	W-O	3
	R(0)		R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)	O-W	4
	T1(1)			E(0)	CO(0)	CID-2	M(2)		W-G	5
	R1(1)			M(0)		CIG-2	MR(2)		G-W	6
	T(1)			T1(1)	T(1)	CID-3	M(3)		W-BR	7
	R(1)			R1(1)	R(1)	CIG-3	MR(3)		BR-W	8
				T(1)	AL1(1)	CID-4	M(4)		W-S	9
				R(1)	S2(1)	CIG-4	MR(4)		S-W	10
				E(1)	CO(1)	CID-5	M(5)		R-BL	11
				M(1)		CIG-5	MR(5)	T10	BL-R	12
						CID-6	M(6)		R-O	13
						CIG-6	MR(6)		O-R	14
						CID-7	M(7)		R-G	15
						CIG-7	MR(7)		G-R	16
03		T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)	R-BR	17
		R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)	BR-R	18
			T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)	R-S	19
			R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)	S-R	20
				E(0)	CO(0)	CID-2	M(2)		BK-BL	21
				M(0)		CIG-2	MR(2)		BL-BK	22
				T1(1)	T(1)	CID-3	M(3)		BK-O	23
				R1(1)	R(1)	CIG-3	MR(3)		O-BK	24
				T(1)	AL1(1)	CID-4	M(4)		BK-G	25
				R(1)	S2(1)	CIG-4	MR(4)		G-BK	26
				E(1)	CO(1)	CID-5	M(5)		BK-BR	27
				M(1)		CIG-5	MR(5)	T10	BR-BK	28
						CID-6	M(6)		BK-S	29
						CIG-6	MR(6)		S-BK	30
						CID-7	M(7)		Y-BL	31
						CIG-7	MR(7)		BL-Y	32
04		T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)	Y-O	33
		R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)	O-Y	34
			T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)	Y-G	35
			R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)	G-Y	36
				E(0)	CO(0)	CID-2	M(2)		Y-BR	37
				M(0)		CIG-2	MR(2)		BR-Y	38
				T1(1)	T(1)	CID-3	M(3)		Y-S	39
				R1(1)	R(1)	CIG-3	MR(3)		S-Y	40
				T(1)	AL1(1)	CID-4	M(4)		V-BL	41
				R(1)	S2(1)	CIG-4	MR(4)		BL-V	42
				E(1)	CO(1)	CID-5	M(5)		V-O	43
				M(1)		CIG-5	MR(5)	T10	O-V	44
						CID-6	M(6)		V-G	45
						CIG-6	MR(6)		G-V	46
						CID-7	M(7)		V-BR	47
						CIG-7	MR(7)		BR-V	48
									V-S	49
									S-V	50

NOTE:
LEADS NOT DESIGNATED ARE TERMINATED ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

▶TABLE T◀ (Contd)

TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTING CABLE TO TRUNK PORT CARRIER CONNECTOR TX01								TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)								CUT LEADS DOWN ON	
	LC567	LC7	LC8D, LC9D	LC11B	LC13B	LC15	LC16B	LC361	LEAD COLOR	CONN BLK TERMINALS
05		T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)	W-BL	1
		R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)	BL-W	2
			T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)	W-O	3
			R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)	O-W	4
				E(0)	CO(0)	CID-2	M(2)		W-G	5
				M(0)		CIG-2	MR(2)		G-W	6
				T1(1)	T(1)	CID-3	M(3)		W-BR	7
				R1(1)	R(1)	CIG-3	MR(3)		BR-W	8
				T(1)	AL1(1)	CID-4	M(4)		W-S	9
				R(1)	S2(1)	CIG-4	MR(4)		S-W	10
				E(1)	CO(1)	CID-5	M(5)		R-BL	11
				M(1)		CIG-5	MR(5)	T10	BL-R	12
						CID-6	M(6)		R-O	13
						CIG-6	MR(6)		O-R	14
						CID-7	M(7)		R-G	15
						CIG-7	MR(7)		G-R	16
06	T1(0)	T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)	R-BR	17
	R1(0)	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)	BR-R	18
	T(0)		T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)	R-S	19
	R(0)		R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)	S-R	20
	T1(1)			E(0)	CO(0)	CID-2	M(2)		BK-BL	21
	R1(1)			M(0)		CIG-2	MR(2)		BL-BK	22
	T(1)			T1(1)	T(1)	CID-3	M(3)		BK-O	23
	R(1)			R1(1)	R(1)	CIG-3	MR(3)		O-BK	24
				T(1)	AL1(1)	CID-4	M(4)		BK-G	25
				R(1)	S2(1)	CIG-4	MR(4)		G-BK	26
				E(1)	CO(1)	CID-5	M(5)		BK-BR	27
				M(1)		CIG-5	MR(5)	T10	BR-BK	28
						CID-6	M(6)		BK-S	29
						CIG-6	MR(6)		S-BK	30
						CID-7	M(7)		Y-BL	31
						CIG-7	MR(7)		BL-Y	32
07		T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)	Y-O	33
		R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)	O-Y	34
			T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)	Y-G	35
			R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)	G-Y	36
				E(0)	CO(0)	CID-2	M(2)		Y-BR	37
				M(0)		CIG-2	MR(2)		BR-Y	38
				T1(1)	T(1)	CID-3	M(3)		Y-S	39
				R1(1)	R(1)	CIG-3	MR(3)		S-Y	40
				T(1)	AL1(1)	CID-4	M(4)		V-BL	41
				R(1)	S2(1)	CIG-4	MR(4)		BL-V	42
				E(1)	CO(1)	CID-5	M(5)		V-O	43
				M(1)		CIG-5	MR(5)	T10	O-V	44
						CID-6	M(6)		V-G	45
						CIG-6	MR(6)		G-V	46
						CID-7	M(7)		V-BR	47
						CIG-7	MR(7)		BR-V	48
									V-S	49
									S-V	50

NOTE:
LEADS NOT DESIGNATED ARE TERMINATED ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

◆TABLE T◆ (Contd)

TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTING CABLE TO TRUNK PORT CARRIER CONNECTOR TX01								TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)								CUT LEADS DOWN ON	
	LC7	LC8D, LC9D	LC11B	LC13B	LC15	LC16B	LC361	LC567	LEAD COLOR	CONN BLK TERMINALS
08	T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)		W-BL	1
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)		BL-W	2
		T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)		W-O	3
		R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)		O-W	4
			E(0)	CO(0)	CID-2	M(2)			W-G	5
			M(0)		CIG-2	MR(2)			G-W	6
			T1(1)	T(1)	CID-3	M(3)			W-BR	7
			R1(1)	R(1)	CIG-3	MR(3)			BR-W	8
			T(1)	AL1(1)	CID-4	M(4)			W-S	9
			R(1)	S2(1)	CIG-4	MR(4)			S-W	10
			E(1)	CO(1)	CID-5	M(5)			R-BL	11
			M(1)		CIG-5	MR(5)	T10		BL-R	12
					CID-6	M(6)			R-O	13
					CIG-6	MR(6)			O-R	14
					CID-7	M(7)			R-G	15
					CIG-7	MR(7)			G-R	16
09	T	T(0)	T1(0)	T(0)	CID-0	M(0)	T(0)		R-BR	17
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)	R(0)		BR-R	18
		T(1)	T(0)	AL1(0)	CID-1	M(1)	T(1)		R-S	19
		R(1)	R(0)	S2(0)	CIG-1	MR(1)	R(1)		S-R	20
			E(0)	CO(0)	CID-2	M(2)			BK-BL	21
			M(0)		CIG-2	MR(2)			BL-BK	22
			T1(1)	T(1)	CID-3	M(3)			BK-O	23
			R1(1)	R(1)	CIG-3	MR(3)			O-BK	24
			T(1)	AL1(1)	CID-4	M(4)			BK-G	25
			R(1)	S2(1)	CIG-4	MR(4)			G-BK	26
			E(1)	CO(1)	CID-5	M(5)			BK-BR	27
			M(1)		CIG-5	MR(5)	T10		BR-BK	28
					CID-6	M(6)			BK-S	29
					CIG-6	MR(6)			S-BK	30
					CID-7	M(7)			Y-BL	31
					CIG-7	MR(7)			BL-Y	32
11	T		T(0)						Y-O	33
	R		R(0)						O-Y	34
			T(1)						Y-G	35
			R(1)						G-Y	36
12	T		T(0)						Y-BR	37
	R		R(0)						BR-Y	38
			T(1)						Y-S	39
			R(1)						S-Y	40
13	T		T(0)						V-BL	41
	R		R(0)						BL-V	42
			T(1)						V-O	43
			R(1)						O-V	44
									V-G	45
									G-V	46
									V-BR	47
									BR-V	48
									V-S	49
									S-V	50

NOTE:
LEADS NOT DESIGNATED ARE TERMINATED ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

◗TABLE T◖ (Contd)

TRUNK PORT CARRRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO TRUNK PORT CARRIER CONNECTOR TX04		TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)		CUT LEADS DOWN ON	
	LC7	LC8D, LC9D	LEAD COLOR	CONN BLK TERMINALS
14	T	T(0)	W-BL	1
	R	R(0)	BL-W	2
		T(1)	W-O	3
		R(1)	O-W	4
15	T	T(0)	W-G	5
	R	R(0)	G-W	6
		T(1)	W-BR	7
		R(1)	BR-W	8
16	T	T(0)	W-S	9
	R	R(0)	S-W	10
		T(1)	R-BL	11
		R(1)	BL-R	12
17	T	T(0)	R-O	13
	R	R(0)	O-R	14
		T(1)	R-G	15
		R(1)	G-R	16
18	T	T(0)	R-BR	17
	R	R(0)	BR-R	18
		T(1)	R-S	19
		R(1)	S-R	20
			BK-BL	21
			BL-BK	22
			BK-O	23
			O-BK	24
			BK-G	25
			G-BK	26
			BK-BR	27
			BR-BK	28
			BK-S	29
			S-BK	30
			Y-BL	31
			BL-Y	32
			Y-O	33
			O-Y	34
			Y-G	35
			G-Y	36
			Y-BR	37
			BR-Y	38
			Y-S	39
			S-Y	40
			V-BL	41
			BL-V	42
			V-O	43
			O-V	44
			V-G	45
			G-V	46
			V-BR	47
			BR-V	48
			V-S	49
			S-V	50

NOTE:
LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

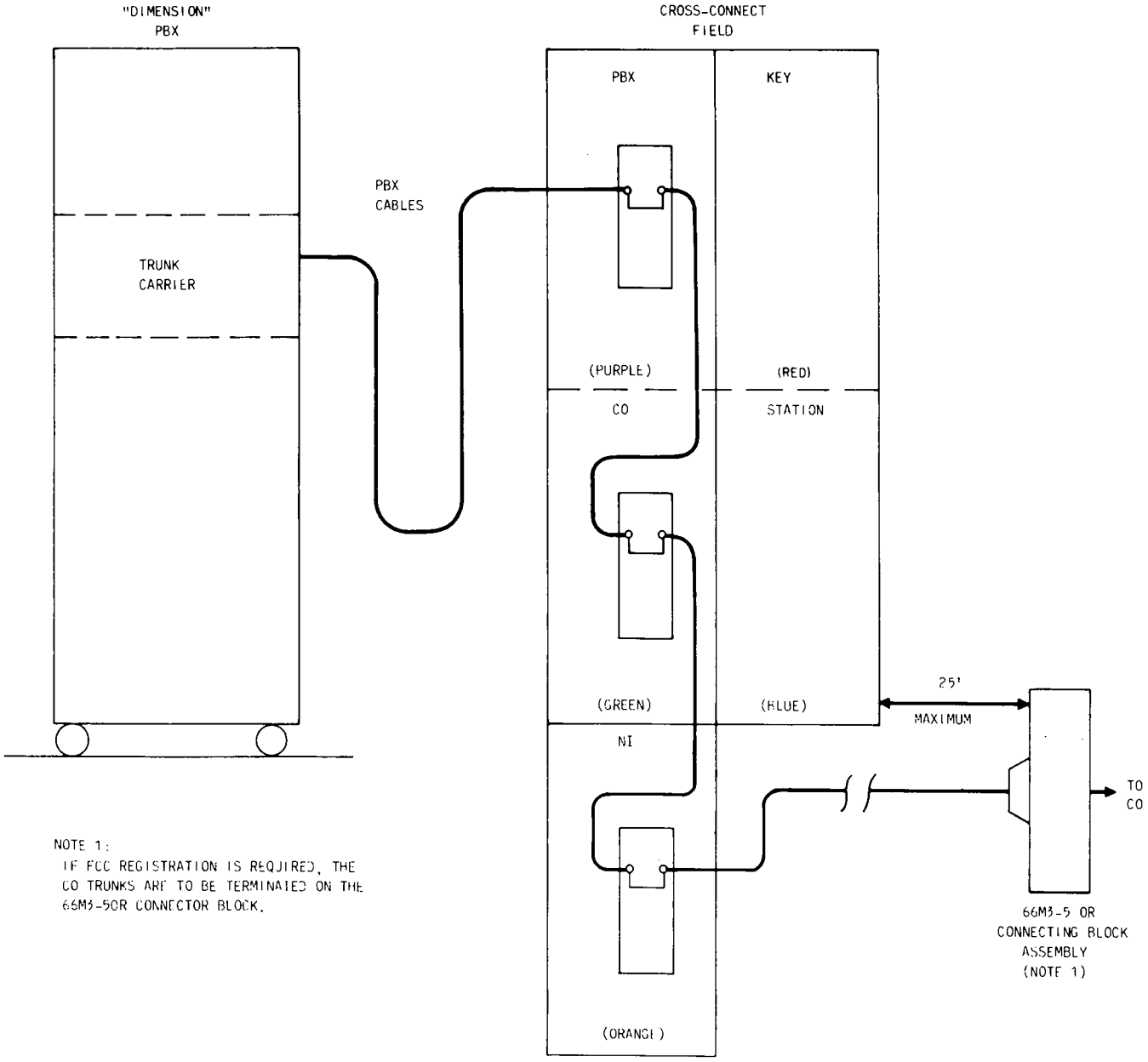


Fig. 53—CO Trunk Connected to Trunk Carrier

BX02A connector (Table AC) when BXP07A is plugged into BX07A on the carrier. When NCOSS LSU is not provided, data channel 06 (slot 33/37B, circuit 0) becomes available via BX02A when BXP09A is plugged into BX09A.

4.173 Table AG shows the control and alarm panel cross-connections for the AP7 cable connector. An alarm panel cross-connection worksheet for a CO alarm circuit is shown in Table AH.

E. Console Cross-Connect Worksheets

4.174 Several console arrangements may be provided in the PBX system:

- Attendant consoles
- Multiple consoles
- Night consoles
- Hotel/motel console/terminal.

TABLE U

EXTERNAL TRUNK CIRCUIT ENCODES AND CHARACTERISTICS

TRUNK ENCODE	TRUNK GROUP	CIRCUIT PACK	DIRECTION	CHARACTERISTICS												NOTES
				INCOMING					OUTGOING							
						SIGNALS GIVEN ON ORIGINATION					SIGNALS EXPECTED ON ORIGINATION					
				AUTO.	IMED START	DIAL TONE	WINK START	DELAY DIAL	AUTO	IMED START	GROUND START	DIAL TONE	WINK START	DELAY DIAL	TIME-OUT	
12	APLT	LC11B	2-Way					•				• and (• or •)			4-6 Sec	
13	APLT	LC11B	2-Way				•					• and (• or •)			4-6 Sec	
14	APLT	LC11B	2-Way					•				•				
15	APLT	LC11B	2-Way				•					•				
16	CO	LC08D	In	•												1
17	CO	LC08D	Out								•	•				2
18	CO	LC08D	Out								•	•				3
19	CO	LC08D	2-Way	•							•	•				1,2
20	CO	LC08D	2-Way	•							•	•				1,3
21	FX	LC08D	In	•												1
22	FX	LC08D	Out								•	•				2
23	FX	LC08D	Out								•	•				3
24	FX	LC08D	2-Way	•							•	•				1,2
25	FX	LC08D	2-Way	•							•	•				1,3
26	WATS	LC08D	In	•												1

See notes at end of table.

TABLE U (Contd)

EXTERNAL TRUNK CIRCUIT ENCODES AND CHARACTERISTICS

TRUNK ENCODE	TRUNK GROUP	CIRCUIT PACK	DIRECTION	CHARACTERISTICS												NOTES
				INCOMING					OUTGOING							
						SIGNALS GIVEN ON ORIGINATION					SIGNALS EXPECTED ON ORIGINATION					
				AUTO.	IMED START	DIAL TONE	WINK START	DELAY DIAL	AUTO	IMED START	GROUND START	DIAL TONE	WINK START	DELAY DIAL	TIME-OUT	
27	WATS	LC08D	Out								•	•				2
28	WATS	LC08D	Out								•	•				3
30	DID	LC09D	In		•											
31	DID	LC09D	In				•									
32	TIE	LC11B, LC361	In			•										4
33	TIE	LC11B, LC361	Out						•							4
34	TIE	LC11B	Out									•				
35	TIE	LC11B	In	•												1
36	TIE	LC11B	2-Way			•						•				
37	TIE	LC11B, LC361	2-Way			•			•							4
38	TIE	LC11B	2-Way	•								•				1
39	TIE	LC11B	2-Way	•					•							1
40	TIE	LC11B	In			•		•								
41	ETN	LC11B	2-Way				•					←	Any	→		5
42	ETN	LC11B	In				•									5

See notes at end of table.

TABLE U (Contd)

EXTERNAL TRUNK CIRCUIT ENCODES AND CHARACTERISTICS

TRUNK ENCODE	TRUNK GROUP	CIRCUIT PACK	DIRECTION	CHARACTERISTICS												NOTES
				INCOMING					OUTGOING							
						SIGNALS GIVEN ON ORIGINATION					SIGNALS EXPECTED ON ORIGINATION					
				AUTO.	IMED START	DIAL TONE	WINK START	DELAY DIAL	AUTO	IMED START	GROUND START	DIAL TONE	WINK START	DELAY DIAL	TIME-OUT	
43	ETN	LC11B	Out									←	Any	→	4-6 Sec	5
44	TIE	LC11B	2-Way			•		•				•				
45	TIE	LC11B	2-Way			•		•	•							
46	ETN	LC11B	2-Way			•						←	Any	→	4-6 Sec	5
47	ETN	LC11B	2-Way					•				←	Any	→	4-6 Sec	5
50	RA	LC08D	2-Way			•					•	•				6
57	CAS	LC11B	Out						•							7
60	TOLL TERM	LC08D	Out						•		•					8
64	RA(VSG)	LC07	2-Way			•					•	•				6,7
66	CAS	LC11B	In	•												7,9
70	M/S	LC11B	In		•											5
71	M/S	LC11B	Out							•						5
72	M/S	LC11B	2-Way		•					•						5
73	M/S	LC11B	In				•									5
74	M/S	LC11B	Out										•		10 Sec	5

See notes at end of table.

TABLE U (Contd)

EXTERNAL TRUNK CIRCUIT ENCODES AND CHARACTERISTICS

TRUNK ENCODE	TRUNK GROUP	CIRCUIT PACK	DIRECTION	CHARACTERISTICS												NOTES
				INCOMING					OUTGOING							
				AUTO.	IMED START	SIGNALS GIVEN ON ORIGINATION			AUTO	IMED START	SIGNALS EXPECTED ON ORIGINATION					
						DIAL TONE	WINK START	DELAY DIAL			GROUND START	DIAL TONE	WINK START	DELAY DIAL	TIME-OUT	
75	M/S	LC11B	2-Way				•						•		10 Sec	5
76	M/S	LC11B	In					•								5
77	M/S	LC11B	Out											•	4-6 Sec	5
78	M/S	LC11B	2-Way					•						•	4-6 Sec	5
85	CO, WATS	LC07	2-Way	•							•	•				1,7
86	CO, WATS	LC07	In	•												1,7

Notes:

1 — Automatic incoming trunks can route to:
- PBX attendant(s)
- CAS attendant(s)
- UCD/DDC groups
- ECTS personal CO line.

2 — Do not connect to a central office which gives PBX a party test signal.

3 — May be connected to a central office which gives a party test signal.

4 — LC361 is used for the Off-Premise Extension (OPX) or the Data Communication Access (DCA) port and may be assigned trunk types 32, 33, or 37 as appropriate.

5 — FP8 only.

6 — Remote access trunk groups are normally used as incoming only, but may be used 2-way for special cases.

7 — FP8, FP11, FP12 only.

8 — Audible ringback provided by the DIMENSION PBX.

9 — Incoming RLT routes to PBX attendant only.

TABLE V

INTERNAL TRUNK CIRCUIT ENCODES AND USAGE

TRUNK ENCODE	CIRCUIT PACK	TRUNK USAGE
2	LC10D	TOUCH-TONE Dialing Register
5	LC06B	6-Way Attendant Conference
6	LC13B	Special Queue
48		Internal Announcement Interface
49		External Announcement Interface
51	LC13B	Telephone Dictation
52	LC13B	Recorded Announcement
53		Code Calling
54	LC13B	Loudspeaker Paging
55	LC12	TOUCH-TONE Dialing Sender
56	LC15	Centralized Attendant Service (CAS) Lamp Interface
58	LC32B	Automatic Number Identification (ANI) Interface
59	LC16B	Station Message Register Interface
61	LC15	Uniform Call Distribution (UCD)
62	LC13B	Music Interface
63		Digit Collection
65	LC15	Contact Interface
67	LC13B	Audio
68	LC13B	UCD Recorded Annoucement
98	LC16B	Power Meter Interface
99	LC16B	Alarm Interface

TABLE W

A FILLED-IN EXAMPLE OF TYPICAL TRUNK PORT CARRIER CROSS-CONNECTIONS

ORDER NUMBER XX-XXXXX
CUSTOMER - - - XXXXXXXXXXXXXXXXXXXXXXXXXX

MOD 0 0 CAB 0 TRUNK CARRIER 1 CONNECTOR TX01 (NOTE)							CONN CABLE COLOR CODE	CROSS-CONNECT		
								FROM	TO	
CP SLOT NO.	CKT NO.	TRK TYPE	DIAL CODE	TRK GRP.	TRK NO.	LEAD DESIG		CONN BLK 0001TX01 (PURPLE)	CONN BLK (GN/YEL)	CO TRK NO.
02	0	19	9	20	1	T	W-BL	1	1	1
						R	BL-W	2	2	
	1	19	9	20	2	T	W-O	3	3	2
						R	O-W	4	4	
						SPARE	W-G	5		
							G-W	6		
							W-BR	7		
							BR-W	8		
							W-S	9		
							S-W	10		
							R-BL	11		
							BL-R	12		
							R-O	13		
							O-R	14		
							R-G	15		
							G-R	16		
03	0	16	–	18	1	T	R-BR	17	5	3
						R	BR-R	18	6	
	1	16	–	18	2	T	R-S	19	7	4
						R	S-R	20	8	
						SPARE	BK-BL	21		
							BL-BK	22		
							BK-O	23		
							O-BK	24		
							BK-G	25		
							G-BK	26		
							BK-BR	27		
							BR-BK	28		
							BK-S	29		
							S-BK	30		
							Y-BL	31		
							BL-Y	32		
04	0	17	9	19	1	T	Y-O	33	9	5
						R	O-Y	34	10	
	1	17	9	19	2	T	Y-G	35	11	6
						R	G-Y	36	12	
						SPARE	Y-BR	37		
							BR-Y	38		
							Y-S	39		
							S-Y	40		
							V-BL	41		
							BL-V	42		
							V-O	43		
							O-V	44		
							V-G	45		
							G-V	46		
							V-BR	47		
							BR-V	48		

NOTE: IF FCC REGISTRATION IS REQUIRED, THE CO TRUNKS SHALL BE TERMINATED ON THE 66M3-50R CONNECTING BLOCK.

TABLE X

MODULE CONTROL AND TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO MODULE CONTROL AND TRUNK PORT CARRIER CONNECTOR MX01								TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)								CUT LEADS DOWN ON	
	LC7	LC8C, LC9C	LC11B	LC13	LC15	LC16B	LC32B	LC36I	LEAD COLOR	CONN BLK TERMINALS
06	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	W-BL	1
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	BL-W	2
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	W-O	3
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	O-W	4
			E(0)	C0(0)	CID-2	M(2)			W-G	5
			M(0)		CIG-2	MR(2)			G-W	6
			T1(1)	T(1)	CID-3	M(3)			W-BR	7
			R1(1)	R(1)	CIG-3	MR(3)			BR-W	8
			T(1)	AL1(1)	CID-4	M(4)			W-S	9
			R(1)	S2(1)	CIG-4	MR(4)			S-W	10
			E(1)	C0(1)	CID-5	M(5)			R-BL	11
			M(1)		CIG-5	MR(5)		T10	BL-R	12
					CID-6	M(6)			R-O	13
					CIG-6	MR(6)			O-R	14
					CID-7	M(7)			R-G	15
					CIG-7	MR(7)			G-R	16
07	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	R-BR	17
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	BR-R	18
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	R-S	19
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	S-R	20
			E(0)	C0(0)	CID-2	M(2)			BK-BL	21
			M(0)		CIG-2	MR(2)			BL-BK	22
			T1(1)	T(1)	CID-3	M(3)			BK-O	23
			R1(1)	R(1)	CIG-3	MR(3)			O-BK	24
			T(1)	AL1(1)	CID-4	M(4)			BK-G	25
			R(1)	S2(1)	CIG-4	MR(4)			G-BK	26
			E(1)	C0(1)	CID-5	M(5)			BK-BR	27
			M(1)		CIG-5	MR(5)		T10	BR-BK	28
					CID-6	M(6)			BK-S	29
					CIG-6	MR(6)			S-BK	30
					CID-7	M(7)			Y-BL	31
					CIG-7	MR(7)			BL-Y	32
08	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	Y-O	33
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	O-Y	34
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	Y-G	35
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	G-Y	36
			E(0)	C0(0)	CID-2	M(2)			Y-BR	37
			M(0)		CIG-2	MR(2)			BR-Y	38
			T1(1)	T(1)	CID-3	M(3)			Y-S	39
			R1(1)	R(1)	CIG-3	MR(3)			S-Y	40
			T(1)	AL1(1)	CID-4	M(4)			V-BL	41
			R(1)	S2(1)	CIG-4	MR(4)			BL-V	42
			E(1)	C0(1)	CID-5	M(5)			V-O	43
			M(1)		CIG-5	MR(5)		T10	O-V	44
					CID-6	M(6)			V-G	45
					CIG-6	MR(6)			G-V	46
					CID-7	M(7)			V-BR	47
					CIG-7	MR(7)			BR-V	48
									V-S	49
									S-V	50

NOTE:
LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

TABLE X (Contd)

MODULE CONTROL AND TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO MODULE CONTROL AND TRUNK PORT CARRIER CONNECTOR MX02								TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)								CUT LEADS DOWN ON	
	LC7	LC8C, LC9C	LC11B	LC13	LC15	LC16B	LC32B	LC36I	LEAD COLOR	CONN BLK TERMINALS
10	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	W-BL	1
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	BL-W	2
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	W-O	3
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	O-W	4
			E(0)	CO(0)	CID-2	M(2)			W-G	5
			M(0)		CIG-2	MR(2)			G-W	6
			T1(1)	T(1)	CID-3	M(3)			W-BR	7
			R1(1)	R(1)	CIG-3	MR(3)			BR-W	8
			T(1)	AL1(1)	CID-4	M(4)			W-S	9
			R(1)	S2(1)	CIG-4	MR(4)			S-W	10
			E(1)	CO(1)	CID-5	M(5)			R-BL	11
			M(1)		CIG-5	MR(5)		T10	BL-R	12
					CID-6	M(6)			R-O	13
					CIG-6	MR(6)			O-R	14
					CID-7	M(7)			R-G	15
					CIG-7	MR(7)			G-R	16
12	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	R-BR	17
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	BR-R	18
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	R-S	19
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	S-R	20
			E(0)	CO(0)	CID-2	M(2)			BK-BL	21
			M(0)		CIG-2	MR(2)			BL-BK	22
			T1(1)	T(1)	CID-3	M(3)			BK-O	23
			R1(1)	R(1)	CIG-3	MR(3)			O-BK	24
			T(1)	AL1(1)	CID-4	M(4)			BK-G	25
			R(1)	S2(1)	CIG-4	MR(4)			G-BK	26
			E(1)	CO(1)	CID-5	M(5)			BK-BR	27
			M(1)		CIG-5	MR(5)		T10	BR-BK	28
					CID-6	M(6)			BK-S	29
					CIG-6	MR(6)			S-BK	30
					CID-7	M(7)			Y-BL	31
					CIG-7	MR(7)			BL-Y	32
15	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	Y-O	33
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	O-Y	34
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	Y-G	35
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	G-Y	36
			E(0)	CO(0)	CID-2	M(2)			Y-BR	37
			M(0)		CIG-2	MR(2)			BR-Y	38
			T1(1)	T(1)	CID-3	M(3)			Y-S	39
			R1(1)	R(1)	CIG-3	MR(3)			S-Y	40
			T(1)	AL1(1)	CID-4	M(4)			V-BL	41
			R(1)	S2(1)	CIG-4	MR(4)			BL-V	42
			E(1)	CO(1)	CID-5	M(5)			V-O	43
			M(1)		CIG-5	MR(5)		T10	O-V	44
					CID-6	M(6)			V-G	45
					CIG-6	MR(6)			G-V	46
					CID-7	M(7)			V-BR	47
					CIG-7	MR(7)			BR-V	48
									V-S	49
									S-V	50

NOTE:
LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

TABLE X (Contd)

MODULE CONTROL AND TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO MODULE CONTROL AND TRUNK PORT CARRIER CONNECTOR MX03								TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)								CUT LEADS DOWN ON	
	LC7	LC8C, LC9C	LC11B	LC13	LC15	LC16B	LC32B	LC36I	LEAD COLOR	CONN BLK TERMINALS
17	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	W-BL	1
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	BL-W	2
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	W-O	3
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	O-W	4
			E(0)	CO(0)	CID-2	M(2)			W-G	5
			M(0)		CIG-2	MR(2)			G-W	6
			T1(1)	T(1)	CID-3	M(3)			W-BR	7
			R1(1)	R(1)	CIG-3	MR(3)			BR-W	8
			T(1)	AL1(1)	CID-4	M(4)			W-S	9
			R(1)	S2(1)	CIG-4	MR(4)			S-W	10
			E(1)	CO(1)	CID-5	M(5)			R-BL	11
			M(1)		CIG-5	MR(5)		T10	BL-R	12
					CID-6	M(6)			R-O	13
					CIG-6	MR(6)			O-R	14
					CID-7	M(7)			R-G	15
					CIG-7	MR(7)			G-R	16
19	T	T(0)	T1(0)	T(0)	CID-0	M(0)		T(0)	R-BR	17
	R	R(0)	R1(0)	R(0)	CIG-0	MR(0)		R(0)	BR-R	18
		T(1)	T(0)	AL1(0)	CID-1	M(1)		T(1)	R-S	19
		R(1)	R(0)	S2(0)	CIG-1	MR(1)		R(1)	S-R	20
			E(0)	CO(0)	CID-2	M(2)			BK-BL	21
			M(0)		CIG-2	MR(2)			BL-BK	22
			T1(1)	T(1)	CID-3	M(3)			BK-O	23
			R1(1)	R(1)	CIG-3	MR(3)			O-BK	24
			T(1)	AL1(1)	CID-4	M(4)			BK-G	25
			R(1)	S2(1)	CIG-4	MR(4)			G-BK	26
			E(1)	CO(1)	CID-5	M(5)			BK-BR	27
			M(1)		CIG-5	MR(5)		T10	BR-BK	28
					CID-6	M(6)			BK-S	29
					CIG-6	MR(6)			S-BK	30
					CID-7	M(7)			Y-BL	31
					CIG-7	MR(7)			BL-Y	32
21	T	T(0)					T(0)		Y-O	33
	R	R(0)					R(0)		O-Y	34
		T(1)					T(1)		Y-G	35
		R(1)					R(1)		G-Y	36
23	T	T(0)							Y-BR	37
	R	R(0)							BR-Y	38
		T(1)							Y-S	39
		R(1)							S-Y	40
25	T	T(0)							V-BL	41
	R	R(0)							BL-V	42
		T(1)							V-O	43
		R(1)							O-V	44
									V-G	45
									G-V	46
									V-BR	47
									BR-V	48
									V-S	49
									S-V	50

NOTE:
LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

▶TABLE Y◀

TIE TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT01				TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)				CUT LEADS DOWN ON	
	LC567	LC8D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
02	T1(0)	T(0)	T1(0)	T(0)	W-BL	1
	R1(0)	R(0)	R1(0)	R(0)	BL-W	2
	T(0)	T(1)	T(0)	T(1)	W-O	3
	R(0)	R(1)	R(0)	R(1)	O-W	4
	T1(1)		E(0)		W-G	5
	R1(1)		M(0)		G-W	6
	T(1)		T1(1)		W-BR	7
	R(1)		R1(1)		BR-W	8
			T(1)		W-S	9
			R(1)		S-W	10
			E(1)		R-BL	11
			M(1)	T10	BL-R	12
03		T(0)	T1(0)	T(0)	R-O	13
		R(0)	R1(0)	R(0)	O-R	14
		T(1)	T(0)	T(1)	R-G	15
		R(1)	R(0)	R(1)	G-R	16
			E(0)		R-BR	17
			M(0)		BR-R	18
			T1(1)		R-S	19
			R1(1)		S-R	20
			T(1)		BK-BL	21
			R(1)		BL-BK	22
			E(1)		BK-O	23
			M(1)	T10	O-BK	24
04		T(0)	T1(0)	T(0)	BK-G	25
		R(0)	R1(0)	R(0)	G-BK	26
		T(1)	T(0)	T(1)	BK-BR	27
		R(1)	R(0)	R(1)	BR-BK	28
			E(0)		BK-S	29
			M(0)		S-BK	30
			T1(1)		Y-BL	31
			R1(1)		BL-Y	32
			T(1)		Y-O	33
			R(1)		O-Y	34
			E(1)		Y-G	35
			M(1)	T10	G-Y	36
05		T(0)	T1(0)	T(0)	Y-BR	37
		R(0)	R1(0)	R(0)	BR-Y	38
		T(1)	T(0)	T(1)	Y-S	39
		R(1)	R(0)	R(1)	S-Y	40
			E(0)		V-BL	41
			M(0)		BL-V	42
			T1(1)		V-O	43
			R1(1)		O-V	44
			T(1)		V-G	45
			R(1)		G-V	46
			E(1)		V-BR	47
			M(1)	T10	BR-V	48
					V-S	49
					S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT ARE NOT USED FOR CROSS-CONNECTIONS.

◗TABLE Y◖ (Contd)

TIE TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT02				TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)				CUT LEADS DOWN ON	
	LC567	LC8D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
06	T1(0)	T(0)	T1(0)	T(0)	W-BL	1
	R1(0)	R(0)	R1(0)	R(0)	BL-W	2
	T(0)	T(1)	T(0)	T(1)	W-O	3
	R(0)	R(1)	R(0)	R(1)	O-W	4
	T1(1)		E(0)		W-G	5
	R1(1)		M(0)		G-W	6
	T(1)		T1(1)		W-BR	7
	R(1)		R1(1)		BR-W	8
			T(1)		W-S	9
			R(1)		S-W	10
			E(1)		R-BL	11
			M(1)	T10	BL-R	12
07		T(0)	T1(0)	T(0)	R-O	13
		R(0)	R1(0)	R(0)	O-R	14
		T(1)	T(0)	T(1)	R-G	15
		R(1)	R(0)	R(1)	G-R	16
			E(0)		R-BR	17
			M(0)		BR-R	18
			T1(1)		R-S	19
			R1(1)		S-R	20
			T(1)		BK-BL	21
			R(1)		BL-BK	22
			E(1)		BK-O	23
			M(1)	T10	O-BK	24
08		T(0)	T1(0)	T(0)	BK-G	25
		R(0)	R1(0)	R(0)	G-BK	26
		T(1)	T(0)	T(1)	BK-BR	27
		R(1)	R(0)	R(1)	BR-BK	28
			E(0)		BK-S	29
			M(0)		S-BK	30
			T1(1)		Y-BL	31
			R1(1)		BL-Y	32
			T(1)		Y-O	33
			R(1)		O-Y	34
			E(1)		Y-G	35
			M(1)	T10	G-Y	36
09		T(0)	T1(0)	T(0)	Y-BR	37
		R(0)	R1(0)	R(0)	BR-Y	38
		T(1)	T(0)	T(1)	Y-S	39
		R(1)	R(0)	R(1)	S-Y	40
			E(0)		V-BL	41
			M(0)		BL-V	42
			T1(1)		V-O	43
			R1(1)		O-V	44
			T(1)		V-G	45
			R(1)		G-V	46
			E(1)		V-BR	47
			M(1)	T10	BR-V	48
					V-S	49
					S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT ARE NOT USED FOR CROSS-CONNECTIONS.

TABLE Y (Contd)

TIE TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT03				TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)				CUT LEADS DOWN ON	
	LC567	LC8D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
11	T1(0)	T(0)	T1(0)	T(0)	W-BL	1
	R1(0)	R(0)	R1(0)	R(0)	BL-W	2
	T(0)	T(1)	T(0)	T(1)	W-O	3
	R(0)	R(1)	R(0)	R(1)	O-W	4
	T1(1)		E(0)		W-G	5
	R1(1)		M(0)		G-W	6
	T(1)		T1(1)		W-BR	7
	R(1)		R1(1)		BR-W	8
			T(1)		W-S	9
			R(1)		S-W	10
			E(1)		R-BL	11
			M(1)	T10	BL-R	12
12		T(0)	T1(0)	T(0)	R-O	13
		R(0)	R1(0)	R(0)	O-R	14
		T(1)	T(0)	T(1)	R-G	15
		R(1)	R(0)	R(1)	G-R	16
			E(0)		R-BR	17
			M(0)		BR-R	18
			T1(1)		R-S	19
			R1(1)		S-R	20
			T(1)		BK-BL	21
			R(1)		BL-BK	22
			E(1)		BK-O	23
			M(1)	T10	O-BK	24
13		T(0)	T1(0)	T(0)	BK-G	25
		R(0)	R1(0)	R(0)	G-BK	26
		T(1)	T(0)	T(1)	BK-BR	27
		R(1)	R(0)	R(1)	BR-BK	28
			E(0)		BK-S	29
			M(0)		S-BK	30
			T1(1)		Y-BL	31
			R1(1)		BL-Y	32
			T(1)		Y-O	33
			R(1)		O-Y	34
			E(1)		Y-G	35
			M(1)	T10	G-Y	36
14		T(0)	T1(0)	T(0)	Y-BR	37
		R(0)	R1(0)	R(0)	BR-Y	38
		T(1)	T(0)	T(1)	Y-S	39
		R(1)	R(0)	R(1)	S-Y	40
			E(0)		V-BL	41
			M(0)		BL-V	42
			T1(1)		V-O	43
			R1(1)		O-V	44
			T(1)		V-G	45
			R(1)		G-V	46
			E(1)		V-BR	47
			M(1)	T10	BR-V	48
					V-S	49
					S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT ARE NOT USED FOR CROSS-CONNECTIONS.

◆TABLE Y◀ (Contd)

TIE TRUNK PORT CARRIER CROSS-CONNECTIONS

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT04				TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)				CUT LEADS DOWN ON	
	LC567	LC8D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
15	T1(0)	T(0)	T1(0)	T(0)	W-BL	1
	R1(0)	R(0)	R1(0)	R(0)	BL-W	2
	T(0)	T(1)	T(0)	T(1)	W-O	3
	R(0)	R(1)	R(0)	R(1)	O-W	4
	T1(1)		E(0)		W-G	5
	R1(1)		M(0)		G-W	6
	T(1)		T1(1)		W-BR	7
	R(1)		R1(1)		BR-W	8
			T(1)		W-S	9
			R(1)		S-W	10
			E(1)		R-BL	11
			M(1)	T10	BL-R	12
16		T(0)	T1(0)	T(0)	R-O	13
		R(0)	R1(0)	R(0)	O-R	14
		T(1)	T(0)	T(1)	R-G	15
		R(1)	R(0)	R(1)	G-R	16
			E(0)		R-BR	17
			M(0)		BR-R	18
			T1(1)		R-S	19
			R1(1)		S-R	20
			T(1)		BK-BL	21
			R(1)		BL-BK	22
			E(1)		BK-O	23
			M(1)	T10	O-BK	24
17		T(0)	T1(0)	T(0)	BK-G	25
		R(0)	R1(0)	R(0)	G-BK	26
		T(1)	T(0)	T(1)	BK-BR	27
		R(1)	R(0)	R(1)	BR-BK	28
			E(0)		BK-S	29
			M(0)		S-BK	30
			T1(1)		Y-BL	31
			R1(1)		BL-Y	32
			T(1)		Y-O	33
			R(1)		O-Y	34
			E(1)		Y-G	35
			M(1)	T10	G-Y	36
18		T(0)	T1(0)	T(0)	Y-BR	37
		R(0)	R1(0)	R(0)	BR-Y	38
		T(1)	T(0)	T(1)	Y-S	39
		R(1)	R(0)	R(1)	S-Y	40
			E(0)		V-BL	41
			M(0)		BL-V	42
			T1(1)		V-O	43
			R1(1)		O-V	44
			T(1)		V-G	45
			R(1)		G-V	46
			E(1)		V-BR	47
			M(1)	T10	BR-V	48
					V-S	49
					S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT ARE NOT USED FOR CROSS-CONNECTIONS.

TABLE Z

LINK CARRIER CROSS-CONNECTIONS

A250 CONNECTOR CABLES FROM LINK CARRIER CONNECTORS								TO PURPLE BACKBOARD	
LKX1	LKX2	LKX3	LKX4	LKX5	LKX6	LKX7	LKX8	CUT LEADS DOWN ON	
LEAD DESIGNATIONS FOR LC100 AND LC568 (NOTE)								LEAD COLOR	CONN BLK TERMINALS
T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	W-BL	1
R1(0)	R1(0)	R1(0)	F1(0)	R1(0)	R1(0)	R1(0)	R1(0)	BL-W	2
T(0)	T(0)	T(0)	T(0)	T(0)	T(0)	T(0)	T(0)	W-O	3
R(0)	R(0)	R(0)	R(0)	R(0)	R(0)	R(0)	R(0)	O-W	4
T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	W-G	5
R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	G-W	6
T(1)	T(1)	T(1)	T(1)	T(1)	T(1)	T(1)	T(1)	W-BR	7
R(1)	R(1)	R(1)	R(1)	R(1)	R(1)	R(1)	R(1)	BR-W	8
T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	W-S	9
R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	S-W	10
T(2)	T(2)	T(2)	T(2)	T(2)	T(2)	T(2)	T(2)	R-BL	11
R(2)	R(2)	R(2)	R(2)	R(2)	R(2)	R(2)	R(2)	BL-R	12
T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	R-O	13
R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	O-R	14
T(3)	T(3)	T(3)	T(3)	T(3)	T(3)	T(3)	T(3)	R-G	15
R(3)	R(3)	R(3)	R(3)	R(3)	R(3)	R(3)	R(3)	G-R	16
SLOT 4	SLOT 7	SLOT 11	SLOT 14	SLOT 17	SLOT 20	SLOT 24	SLOT 27	R-BR	17
T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	T1(0)	BR-R	18
R1(0)	R1(0)	R1(0)	R1(0)	R1(0)	R1(0)	R1(0)	R1(0)	R-S	19
T(0)	T(0)	T(0)	T(0)	T(0)	T(0)	T(0)	T(0)	S-R	20
R(0)	R(0)	R(0)	R(0)	R(0)	R(0)	R(0)	R(0)	BK-BL	21
T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	T1(1)	BL-BK	22
R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	R1(1)	BK-O	23
T(1)	T(1)	T(1)	T(1)	T(1)	T(1)	T(1)	T(1)	O-BK	24
R(1)	R(1)	R(1)	R(1)	R(1)	R(1)	R(1)	R(1)	BK-G	25
T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	T1(2)	G-BK	26
R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	R1(2)	BK-BR	27
T(2)	T(2)	T(2)	T(2)	T(2)	T(2)	T(2)	T(2)	BR-BK	28
R(2)	R(2)	R(2)	R(2)	R(2)	R(2)	R(2)	R(2)	BK-S	29
T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	T1(3)	S-BK	30
R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	R1(3)	Y-BL	31
T(3)	T(3)	T(3)	T(3)	T(3)	T(3)	T(3)	T(3)	BL-Y	32
R(3)	R(3)	R(3)	R(3)	R(3)	R(3)	R(3)	R(3)	Y-O	33
SLOT 5	SLOT 8	SLOT 12	SLOT 15	SLOT 18	SLOT 21	SLOT 25	SLOT 28	O-Y	34
T1(0)	T1(0)	T1(0)		T1(0)	T1(0)	T1(0)		Y-G	35
R1(0)	R1(0)	R1(0)		R1(0)	R1(0)	R1(0)		G-Y	36
T(0)	T(0)	T(0)		T(0)	T(0)	T(0)		Y-BR	37
R(0)	R(0)	R(0)		R(0)	R(0)	R(0)		BR-Y	38
T1(1)	T1(1)	T1(1)		T1(1)	T1(1)	T1(1)		Y-S	39
R1(1)	R1(1)	R1(1)		R1(1)	R1(1)	R1(1)		S-Y	40
T(1)	T(1)	T(1)		T(1)	T(1)	T(1)		V-BL	41
R(1)	R(1)	R(1)		R(1)	R(1)	R(1)		BL-V	42
T1(2)	T1(2)	T1(2)		T1(2)	T1(2)	T1(2)		V-O	43
R1(2)	R1(2)	R1(2)		R1(2)	R1(2)	R1(2)		O-V	44
T(2)	T(2)	T(2)		T(2)	T(2)	T(2)		V-G	45
R(2)	R(2)	R(2)		R(2)	R(2)	R(2)		G-V	46
T1(3)	T1(3)	T1(3)		T1(3)	T1(3)	T1(3)		V-BR	47
R1(3)	R1(3)	R1(3)		R1(3)	R1(3)	R1(3)		BR-V	48
T(3)	T(3)	T(3)		T(3)	T(3)	T(3)		V-S	49
R(3)	R(3)	R(3)		R(3)	R(3)	R(3)		S-V	50
SLOT 6	SLOT 10	SLOT 13		SLOT 19	SLOT 23	SLOT 26			

NOTE: LEADS NOT DESIGNATED ARE CUTDOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

TABLE AA

A FILLED-IN EXAMPLE OF A LINK PORT CARRIER CROSS-CONNECTIONS

MOD 0 CAB 0 LINK CARRIER 2 CONNECTOR LKX1 LC100			CONN CABLE COLOR CODE	CROSS-CONNECT										
				FROM	TO									
				CONN BLOCK 0002 — LKX1 (PURPLE)	CONN BLK (PURPLE)		CONN CABLE COLOR CODE	LEAD DESIG	EQUIPMENT LOCATION				
SLOT	CKT NO.	LEAD DESIG			TERM. NO.	BLK NO.			MOD	CAB	LINK CARR	SLOT	CKT NO.
04	0	T1	W-BL	1	17	0102 LKX2	R-BR	T1	01	0	2	08	0
		R1	BL-W	2	18		BR-R	R1					
		T	W-O	3	19		R-S	T					
		R	O-W	4	20		S-R	R					
	1	T1	W-G	5	21		BK-BL	T1					1
		R1	G-W	6	22		BL-BK	R1					
		T	W-BR	7	23		BK-O	T					
		R	BR-W	8	24		O-BK	R					
	2	T1	W-S	9	25		BK-G	T1					2
		R1	S-W	10	26		G-BK	R1					
		T	R-BL	11	27		BK-BR	T					
		R	BL-R	12	28		BR-BK	R					
	3	T1	R-O	13	29		BK-S	T1					3
		R1	O-R	14	30		S-BK	R1					
		T	R-G	15	31		Y-BL	T					
		R	G-R	16	32		BL-Y	R					
05	0	T1	R-BR	17	33	0203 LKX2	Y-O	T1	02	0	3	10	0
		R1	BR-R	18	34		O-Y	R1					
		T	R-S	19	35		Y-G	T					
		R	S-R	20	36		G-Y	R					
	1	T1	BK-BL	21	37		Y-BR	T1					1
		R1	BL-BK	22	38		BR-Y	R1					
		T	BK-O	23	39		Y-S	T					
		R	O-BK	24	40		S-Y	R					
	2	T1	BK-G	25	41		V-BL	T1					2
		R1	G-BK	26	42		BL-V	R1					
		T	BK-BR	27	43		V-O	T					
		R	BR-BK	28	44		O-V	R					
	3	T1	BK-S	29	45		V-G	T1					3
		R1	S-BK	30	46		G-V	R1					
		T	Y-BL	31	47		V-BR	T					
		R	BL-Y	32	48		BR-V	R					
06	0	T1	Y-O	33	1	0302 LKX1	W-BL	T1	03	0	2	04	0
		R1	O-Y	34	2		BL-W	R1					
		T	Y-G	35	3		W-O	T					
		R	G-Y	36	4		O-W	R					
	1	T1	Y-BR	37	5		W-G	T1					1
		R1	BR-Y	38	6		G-W	R1					
		T	Y-S	39	7		W-BR	T					
		R	S-Y	40	8		BR-W	R					
	2	T1	V-BL	41	9		W-S	T1					2
		R1	BL-Y	42	10		S-W	R1					
		T	V-O	43	11		R-BL	T					
		R	O-V	44	12		BL-R	R					
	3	T1	V-G	45	13		R-O	T1					3
		R1	G-V	46	14		O-R	R1					
		T	V-BR	47	15		R-G	T					
		R	BR-V	48	16		G-R	R					
		SPARE	V-S	49									
			S-V	50									

TABLE AB

BASIC CONTROL CARRIER CROSS-CONNECTIONS

A25D CONNECTOR CABLES FROM BASIC CONTROL CARRIER CONNECTORS (NOTE 1)				TO PURPLE BACKBOARD	
				CUT LEADS DOWN ON	
_ _ BX01		_ _ BX02			
LEAD DESIGNATION FOR LC348 (NOTE 2)				LEAD COLOR	CONN BLK TERMINALS
IOXB		IOXB		W-BL	1
IOXA	04	IOXA	16	BL-W	2
IORB		IORB		W-O	3
IORA	SLOT 32	IORA	SLOT 38	O-W	4
IOXB		IOXB		W-G	5
IOXA	05	IOXA	17	G-W	6
IORB		IORB		W-BR	7
IORA		IORA		BR-W	8
IOXB		IOXB	BXP07	W-S	9
IOXA	SLOT	IOXA	SLOT	S-W	10
IORB	03 31	IORB	02 31	R-BL	11
IORA	CKT 1	IORA	CKT 0	BL-R	12
IOXB	SLOT	IOXB	BXP09	R-O	13
IOXA	07 33	IOXA	06 SLOT	O-R	14
IORB	CKT 1	IORB	33	R-G	15
IORA		IORA	CKT 0	G-R	16
IOXB				R-BR	17
IOXA	08			BR-R	18
IORB				R-S	19
IORA	SLOT 34			S-R	20
IOXB				BK-BL	21
IOXA	09			BL-BK	22
IORB				BK-O	23
IORA				O-BK	24
IOXB				BK-G	25
IOXA	10			G-BK	26
IORB				BK-BR	27
IORA	SLOT 35			BR-BK	28
IOXB				BK-S	29
IOXA	11			S-BK	30
IORB				Y-BL	31
IORA				BL-Y	32
IOXB				Y-O	33
IOXA	12			O-Y	34
IORB				Y-G	35
IORA	SLOT 36			G-Y	36
IOXB				Y-BR	37
IOXA	13			BR-Y	38
IORB				Y-S	39
IORA				S-Y	40
IOXB				V-BL	41
IOXA	14			BL-V	42
IORB				V-O	43
IORA	SLOT 37			O-V	44
IOXB				V-G	45
IOXA	15			G-V	46
IORB				V-BR	47
IORA				BR-V	48
				V-S	49
				S-V	50

NOTES:
1. IF CONNECTORS BX01 OR BX02 ARE OCCUPIED BY A "Y" CABLE RUNNING TO ANOTHER BASIC CONTROL UNIT, PLUG A25D CONNECTOR LOCATED ON "Y" CABLE
2. LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

Attendant Console Cross-Connections

4.175 The faceplates for the large and small attendant consoles are shown in Fig. 54. The attendant console(s) may connect directly to the line group control carrier, or it may be connected using two different methods, via the cross-connect field as represented in Fig. 55 and 56. The method used may depend upon whether or not data channel length must be minimized. The two figures show that the following functions are required to connect a console to the PBX:

(1) The console cable must be cut down on a console connecting block in the purple field as shown in Table AI.

(2) The line group control carrier data channel connector cables (as required) must be cut down on their respective connecting blocks in the purple field as shown in Table AJ.

Note: The LGX07 connector cable is not required when data channel length must be minimized. The LGX08 through LGX11 cables are required based on number of consoles provided in the module (ie, first console, LGX08 is required; second console, LGX09, etc).

(3) The alarm panel cable AP7 must be cut down on the AP7 connecting block in the purple field as shown in Table AG.

(4) The data channel circuit must be selected from the possible carrier channels shown in Tables AB through AF. The cable associated with selected circuit must be cut down on a connecting block in the purple field.

(5) Cross-connections must be made between the console connecting block (blue) and the LGX08 connecting block (purple) as shown in Table AK.

(6) Cross-connections for the data channel and alarm leads must be made as shown in Table AL.

If a console(s) is to be added to a system which was initially installed without a console, J58882JA, Lists 3, 4, 5, and 14 must be provided.

◗TABLE AC◖

CONTROL GROWTH CARRIER CROSS-CONNECTIONS

A25D CONNECTOR CABLES FROM CONTROL-GROWTH CARRIER CONNECTORS				TO PURPLE BACKBOARD	
LEAD DESIGNATIONS FOR LC366B/LC34B (SEE NOTE)				CUT LEADS DOWN ON	
__BX01A	__BX02A	__GX01A	__GX02A	LEAD COLOR	CONN BLK TERMINALS
IOXB, IOXA, IORB, IORA — 0004 — SLOT 32/36B	IOXB, IOXA, IORB, IORA — 0016 — SLOT 34/38B	IOXB, IOXA, IORB, IORA — 0100 — SLOT 20/24G	IOXB, IOXA, IORB, IORA — 0112 — SLOT 22/26G	W-BL	1
IOXB, IOXA, IORB, IORA — 0005	IOXB, IOXA, IORB, IORA — 0017	IOXB, IOXA, IORB, IORA — 0101	IOXB, IOXA, IORB, IORA — 0113	BL-W	2
IOXB, IOXA, IORB, IORA — 0003 — SLOT 31/35B	IOXB, IOXA, IORB, IORA — 0002 — SLOT 31/35B	IOXB, IOXA, IORB, IORA — 0102 — SLOT 21/25G	IOXB, IOXA, IORB, IORA — 0114 — SLOT 23/27G	W-O	3
IOXB, IOXA, IORB, IORA — 0007 — SLOT 33/37B	IOXB, IOXA, IORB, IORA — 0006 — SLOT 33/37B	IOXB, IOXA, IORB, IORA — 0103	IOXB, IOXA, IORB, IORA — 0115	O-W	4
IOXB, IOXA, IORB, IORA — 0008 — SLOT 34/38B		IOXB, IOXA, IORB, IORA — 0104 — SLOT 22/26G		W-G	5
IOXB, IOXA, IORB, IORA — 0009		IOXB, IOXA, IORB, IORA — 0105		G-W	6
IOXB, IOXA, IORB, IORA — 0010 — SLOT 31/35B		IOXB, IOXA, IORB, IORA — 0106 — SLOT 23/27G		W-BR	7
IOXB, IOXA, IORB, IORA — 0011		IOXB, IOXA, IORB, IORA — 0107		BR-W	8
IOXB, IOXA, IORB, IORA — 0012 — SLOT 32/36B		IOXB, IOXA, IORB, IORA — 0108 — SLOT 20/24G		W-S	9
IOXB, IOXA, IORB, IORA — 0013		IOXB, IOXA, IORB, IORA — 0109		S-W	10
IOXB, IOXA, IORB, IORA — 0014 — SLOT 33/37B		IOXB, IOXA, IORB, IORA — 0110 — SLOT 21/35G		R-BL	11
IOXB, IOXA, IORB, IORA — 0015		IOXB, IOXA, IORB, IORA — 0111		BL-R	12
				R-O	13
				O-R	14
				R-G	15
				G-R	16
				R-BR	17
				BR-R	18
				R-S	19
				S-R	20
				BK-BL	21
				BL-BK	22
				BK-O	23
				O-BK	24
				BK-G	25
				G-BK	26
				BK-BR	27
				BR-BK	28
				BK-S	29
				S-BK	30
				Y-BL	31
				BL-Y	32
				Y-O	33
				O-Y	34
				Y-G	35
				G-Y	36
				Y-BR	37
				BR-Y	38
				Y-S	39
				S-Y	40
				V-BL	41
				BL-V	42
				V-O	43
				O-V	44
				V-G	45
				G-V	46
				V-BR	47
				BR-V	48
				V-S	49
				S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

Multiple Consoles

4.176 Installation of multiple consoles requires considerable planning in order to determine the allocation of LC34B or LC366B console interfaces. Numerous cross-connections may be required to tie the common control cabinet(s) to various consoles, the DIMENSION PBX electronic custom telephone service (ECTS), and hotel-motel displays. A multiple-console interconnection plan is shown in Fig. 57.

♦TABLE AD♦

CONTROL AND DATA COMMUNICATIONS CARRIER CROSS-CONNECTIONS

A25D CONNECTOR CABLES TO CONTROL AND DATA COMMUNICATIONS CARRIER CONNECTORS												TO PURPLE BACKBOARD	
LEAD DESIGNATIONS												CUT LEADS DOWN ON	
__BX01B			__BX02B			__GX01B			__GX02B			LEAD COLOR	CONN BLK TERMINALS
IOXB	0004	SLOT 25	IOXB	0016	SLOT 27	IOXB	0100	SLOT 28	IOXB	0112	SLOT 30	W-BL	1
IOXA			IOXA			IOXA			IOXA			BL-W	2
IORB			IORB			IORB			IORB			W-O	3
IORA			IORA			IORA			IORA			O-W	4
IOXB	0005		IOXB	0017		IOXB	0101		IOXB	0113		W-G	5
IOXA			IOXA			IOXA			IOXA			G-W	6
IORB			IORB			IORB			IORB			W-BR	7
IORA			IORA			IORA			IORA			BR-W	8
IOXB	0003	SLOT 24	IOXB	0002	BXP07B SLOT 24 CKT 0	IOXB	0102	SLOT 29				W-S	9
IOXA			IOXA			IOXA						S-W	10
IORB			IORB			IORB						R-BL	11
IORA			IORA			IORA						BL-R	12
IOXB	0007	SLOT 26	IOXB	0006	BXP0913 SLOT 26 CKT 0	IOXB	0103					R-O	13
IOXA			IOXA			IOXA						O-R	14
IORB			IORB			IORB						R-G	15
IORA			IORA			IORA						G-R	16
IOXB	0008	SLOT 27				IOXB	0104	SLOT 30				R-BR	17
IOXA						IOXA						BR-R	18
IORB						IORB						R-S	19
IORA						IORA						S-R	20
IOXB	0009					IOXB	0105					BK-BL	21
IOXA						IOXA						BL-BK	22
IORB						IORB						BK-O	23
IORA						IORA						O-BK	24
IOXB	0010	SLOT 24										BK-G	25
IOXA												G-BK	26
IORB												BK-BR	27
IORA												BR-BK	28
IOXB	0011											BK-S	29
IOXA												S-BK	30
IORB												Y-BL	31
IORA												BL-Y	32
IOXB	0012	SLOT 25				IOXB	0108	SLOT 28				Y-O	33
IOXA						IOXA						O-Y	34
IORB						IORB						Y-G	35
IORA						IORA						G-Y	36
IOXB	0013					IOXB	0109					Y-BR	37
IOXA						IOXA						BR-Y	38
IORB						IORB						Y-S	39
IORA						IORA						S-Y	40
IOXB	0014	SLOT 26				IOXB	0110	SLOT 29				V-BL	41
IOXA						IOXA						BL-V	42
IORB						IORB						V-O	43
IORA						IORA						O-V	44
IOXB	0015					IOXB	0111					V-G	45
IOXA						IOXA						G-V	46
IORB						IORB						V-BR	47
IORA						IORA						BR-V	48
												V-S	49
												S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

With this arrangement, a maximum of 21 consoles (DIMENSION 2000 PBX) or 40 consoles (DIMENSION Custom PBX) can be connected to the PBX via the cross-connect field. If it is not advantageous to use the cross-connect field, console connection can be made directly to the line group control carrier, as shown in Fig. 58. Table AM is a fill-in worksheet provided as a guide for installing multiple consoles.

Night Consoles

4.177 Night attendant consoles provide alternate consoles for use at night. To activate the night console(s), the attendant must operate the night switch (night console transfer switch) to the night position and disconnect the handset/headset from each daytime console. The night console functional block diagram and cross-connections are shown, respectively, in Fig. 59 and Table AN.

TABLE AE

GROWTH AND SECOND GROWTH CONTROL CARRIERS CROSS-CONNECTIONS

A25D CONNECTOR CABLES FROM GROWTH CONTROL AND SECOND GROWTH CONTROL CARRIERS CONNECTORS			TO PURPLE BACKBOARD	
LEAD DESIGNATION(S) FOR LC34B (SEE NOTE)			CUT LEADS DOWN ON	
-1GX01 OR -2SX01	-1GX02 OR -2SX01	-1GX03 OR -2SX03	LEAD COLOR	CONN BLK TERMINALS
IOXB	IOXB	IOXB	W-BL	1
IOXA 100	IOXA 112	IOXA 124	BL-W	2
IORB (200) SLOT 20	IORB (212) SLOT 26	IORB (224) SLOT 32	W-O	3
IORA	IORA	IORA	O-W	4
IOXB	IOXB	IOXB	W-G	5
IOXA 101	IOXA 113	IOXA 125	G-W	6
IORB (201)	IORB (213)	IORB (225)	W-BR	7
IORA	IORA	IORA	BR-W	8
IOXB	IOXB	IOXB	W-S	9
IOXA 102	IOXA 114	IOXA 126	S-W	10
IORB (202) SLOT 21	IORB (214) SLOT 27	IORB (226) SLOT 33	R-BL	11
IORA	IORA	IORA	BL-R	12
IOXB	IOXB	IOXB	R-O	13
IOXA 103	IOXA 115	IOXA 127	O-R	14
IORB (203)	IORB (215)	IORB (227)	R-G	15
IORA	IORA	IORA	G-R	16
IOXB	IOXB		R-BR	17
IOXA 104	IOXA 116		BR-R	18
IORB (204) SLOT 22	IORB (216) SLOT 28		R-S	19
IORA	IORA		S-R	20
IOXB	IOXB		BK-BL	21
IOXA 105	IOXA 117		BL-BK	22
IORB (205)	IORB (217)		BK-O	23
IORA	IORA		O-BK	24
IOXB	IOXB		BK-G	25
IOXA 106	IOXA 118		G-BK	26
IORB (206) SLOT 23	IORB (218) SLOT 29		BK-BR	27
IORA	IORA		BR-BK	28
IOXB	IOXB		BK-S	29
IOXA 107	IOXA 119		S-BK	30
IORB (207)	IORB (219)		Y-BL	31
IORA	IORA		BL-Y	32
IOXB	IOXB		Y-O	33
IOXA 108	IOXA 120		O-Y	34
IORB (208) SLOT 24	IORB (220) SLOT 30		Y-G	35
IORA	IORA		G-Y	36
IOXB	IOXB		Y-BR	37
IOXA 109	IOXA 121		BR-Y	38
IORB (209)	IORB (221)		Y-S	39
IORA	IORA		S-Y	40
IOXB	IOXB		V-BL	41
IOXA 110	IOXA 122		BL-V	42
IORB (210) SLOT 25	IORB (222) SLOT 31		V-O	43
IORA	IORA		O-V	44
IOXB	IOXB		V-G	45
IOXA 111	IOXA 123		G-V	46
IORB (211)	IORB (223)		V-BR	47
IORA	IORA		BR-V	48
			V-S	49
			S-V	50

NOTE: DATA CHANNEL DESIGNATIONS IN PARENTHESES ARE FOR SECOND GROWTH CONTROL CARRIER.
LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

TABLE AF

SUPPLEMENTARY I/O CARRIER CROSS-CONNECTIONS

A25D CONNECTOR CABLES FROM SUPPLEMENTARY I/O CARRIER CONNECTORS			TO PURPLE BACKBOARD	
LEAD DESIGNATIONS FOR LC366B/LC34B (SEE NOTE)			CUT LEADS DOWN ON	
-1JX01	-1JX02	-1JX03	LEAD COLOR	CONN BLK TERMINALS
IOXB	IOXB	IOXB	W-BL	1
IOXA	IOXA	IOXA	BL-W	2
IORB 0200	IORB 0212	IORB 0224	W-O	3
IORA	IORA	IORA	O-W	4
IOXB	IOXB	IOXB	W-G	5
IOXA 0201	IOXA 0213	IOXA 0225	G-W	6
IORB	IORB	IORB	W-BR	7
IORA SLOT 20/21	IORA SLOT 26/27	IORA SLOT 32/33	BR-W	8
IOXB	IOXB	IOXB	W-S	9
IOXA 0202	IOXA 0214	IOXA 0226	S-W	10
IORB	IORB	IORB	R-BL	11
IORA	IORA	IORA	BL-R	12
IOXB	IOXB	IOXB	R-O	13
IOXA 0203	IOXA 0215	IOXA 0227	O-R	14
IORB	IORB	IORB	R-G	15
IORA	IORA	IORA	G-R	16
IOXB	IOXB		R-BR	17
IOXA 0204	IOXA 0216		BR-R	18
IORB	IORB		R-S	19
IORA	IORA		S-R	20
IOXB	IOXB		BK-BL	21
IOXA 0205	IOXA 0217		BL-BK	22
IORB	IORB		BK-O	23
IORA SLOT 22/23	IORA SLOT 28/29		O-BK	24
IOXB	IOXB		BK-G	25
IOXA 0206	IOXA 0218		G-BK	26
IORB	IORB		BK-BR	27
IORA	IORA		BR-BK	28
IOXB	IOXB		BK-S	29
IOXA 0207	IOXA 0219		S-BK	30
IORB	IORB		Y-BL	31
IORA	IORA		BL-Y	32
IOXB	IOXB		Y-O	33
IOXA 0208	IOXA 0220		O-Y	34
IORB	IORB		Y-G	35
IORA	IORA		G-Y	36
IOXB	IOXB		Y-BR	37
IOXA 0209	IOXA 0221		BR-Y	38
IORB	IORB		Y-S	39
IORA SLOT 24/25	IORA SLOT 30/31		S-Y	40
IOXB	IOXB		V-BL	41
IOXA 0210	IOXA 0222		BL-V	42
IORB	IORB		V-O	43
IORA	IORA		O-V	44
IOXB	IOXB		V-G	45
IOXA 0211	IOXA 0223		G-V	46
IORB	IORB		V-BR	47
IORA	IORA		BR-V	48
			V-S	49
			S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS

TABLE AG

CONTROL AND ALARM PANEL CROSS-CONNECTIONS

A25D CONNECTOR CABLE FROM CONTROL AND ALARM PANEL CONNECTOR	TO PURPLE BACKBOARD		
	CUT LEADS DOWN ON		
AP7			
LEAD DESIGNATION (NOTE 1)	LEAD COLOR	CONN BLK TERMINALS	
MJR	W-BL	1	(NOTE 2)
MJ	BL-W	2	
MNR	W-O	3	
MN	O-W	4	
D GRD	W-G	5	
AMJ*	G-W	6	
D GRD	W-BR	7	
AMN*	BR-W	8	
	W-S	9	
	S-W	10	
	R-BL	11	
	BL-R	12	
	R-O	13	
	O-R	14	
	R-G	15	
	G-R	16	
	R-BR	17	
ARSVPR*	BR-R	18	
	R-S	19	
	S-R	20	
	BK-BL	21	
	BL-BK	22	
PRSVMJ*	BK-O	23	
	O-BK	24	
PRSVMN*	BK-G	25	
PRSVMN*	G-BK	26	
	BK-BR	27	
	BR-BK	28	
	BK-S	29	
	S-BK	30	
	Y-BL	31	
	BL-Y	32	
	Y-O	33	
	O-Y	34	
	Y-G	35	
	G-Y	36	
	Y-BR	37	
	BR-Y	38	
	Y-S	39	
	S-Y	40	
	V-BL	41	
	BL-V	42	
D GRD	V-O	43	
-48 PX	O-V	44	
D GRD	V-G	45	
-48 PX	G-V	46	
D GRD	V-BR	47	
-48 PX	BR-V	48	
D GRD	V-S	49	
-48 PX	S-V	50	

NOTES:
1. LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.
2. LEADS CONNECT TO CABLE PAIRS TO ALARM AT CO.

Hotel/Motel or Hospital Console/Terminal

4.178 The PBX hotel/motel (Fig. 60) and the hospital console/terminal each have a 4-digit alphanumeric field that is not provided on the other DIMENSION PBX consoles. Additional feature keys are provided as I/O terminals to access and control various hotel/motel or hospital management features such as automatic wakeup service, interface for long distance billing, message waiting, local call billing, room status, and journal printers. Since the message unit display is provided on each of the console/terminals, there is no requirement for a separate inquiry/display terminal. The console also performs all normal attendant functions. In smaller installations, the console/terminal can serve as PBX attendant console and front desk or admitting office terminal. Larger systems can use separate console/terminals to provide these functions. Consoles for use with FP9 or FP11 application must be the console/terminal AAK-03AF-03 (DSS/BLF) or AGK-03AF-03.

5. AUXILIARY EQUIPMENT ASSOCIATED WITH FEATURES

5.01 The following equipment is needed with FP8, Issue 3:

- LC500 (256K memory board)
- LC147B (Alarm Circuit)
- KS-21447, L12, Minirecorder
- J58882AK Carrier.

A Data Communications Interface Unit (DCIU) is needed in the J58882AK Carrier when the Applications Processor (AP) feature or the Distributed Communications System (DCS) feature is used.

5.02 Additional hardware and/or auxiliary equipment is required to implement certain optional features available with the DIMENSION PBX.

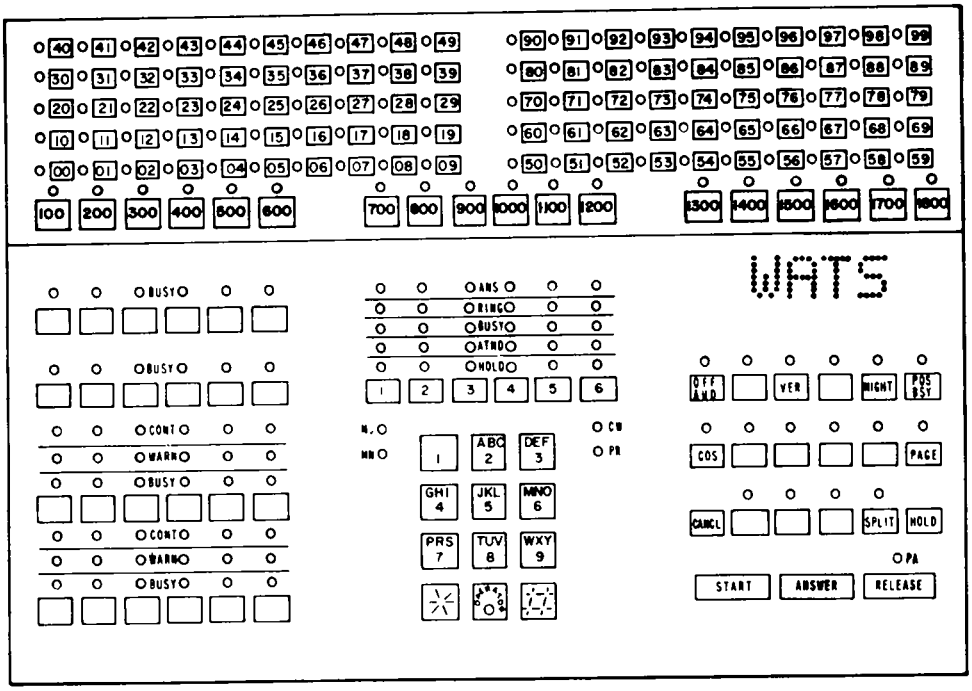
5.03 The optional features described are as follows:

- ◗Applications Processor◖
- Attendant Console Repeater
- Attendant Interface
- AUDICHRON Variable Announcement Unit (H9040)
- Automatic Call Distribution (ACD)
- Automatic Voice Network (AUTOVON) Interface Equipment
- ◗Call Management System (CMS)◖

TABLE AH

ALARM PANEL TO CO ALARM CROSS-CONNECTIONS

MOD_ _ CAB___ CONTROL AND ALARM PANEL ___ CONNECTOR___ AP7	CONN CABLE COLOR CODE	CROSS-CONNECT	
		FROM	TO
		CONN BLK CONSOLE __ AP7 (PURPLE)	CONN BLK (GREEN)
LEAD DESIGNATION		TERM.	TERM.
MJR MJ MNR MN	W-BL BL-W W-O O-W	1 2 3 4	



NOTE:
TRUNK GROUPS 20 THROUGH 23 ARE ASSIGNED TO ICI LAMPS 1,4,5 AND 6

TRUNK TYPE	LAMP	GRP
LDN	1	20
WATS	4	21
FX	5	22
TIE	6	23

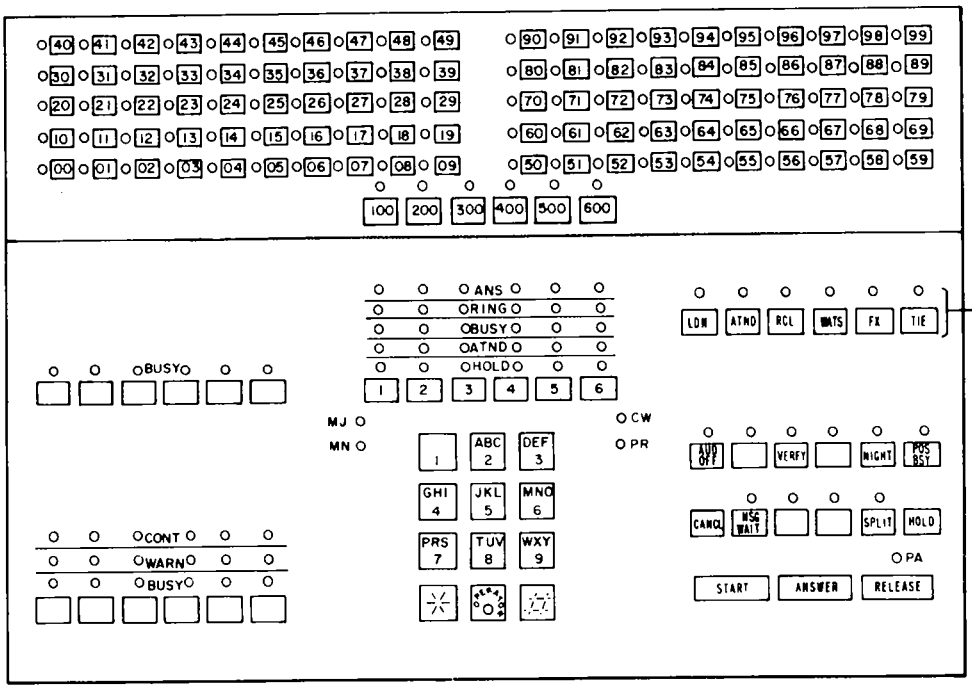
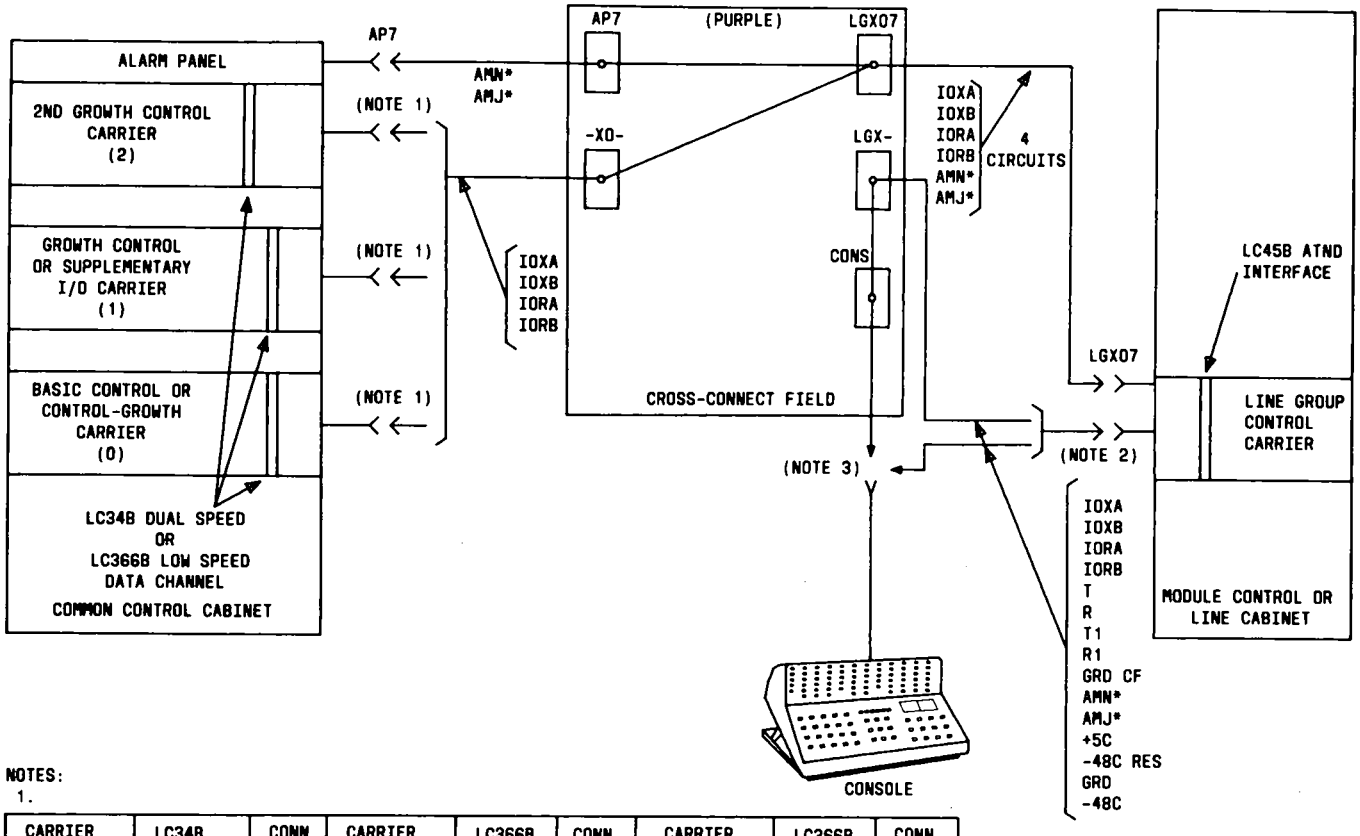


Fig. 54—Faceplates for Large and Small Consoles



NOTES:

1.

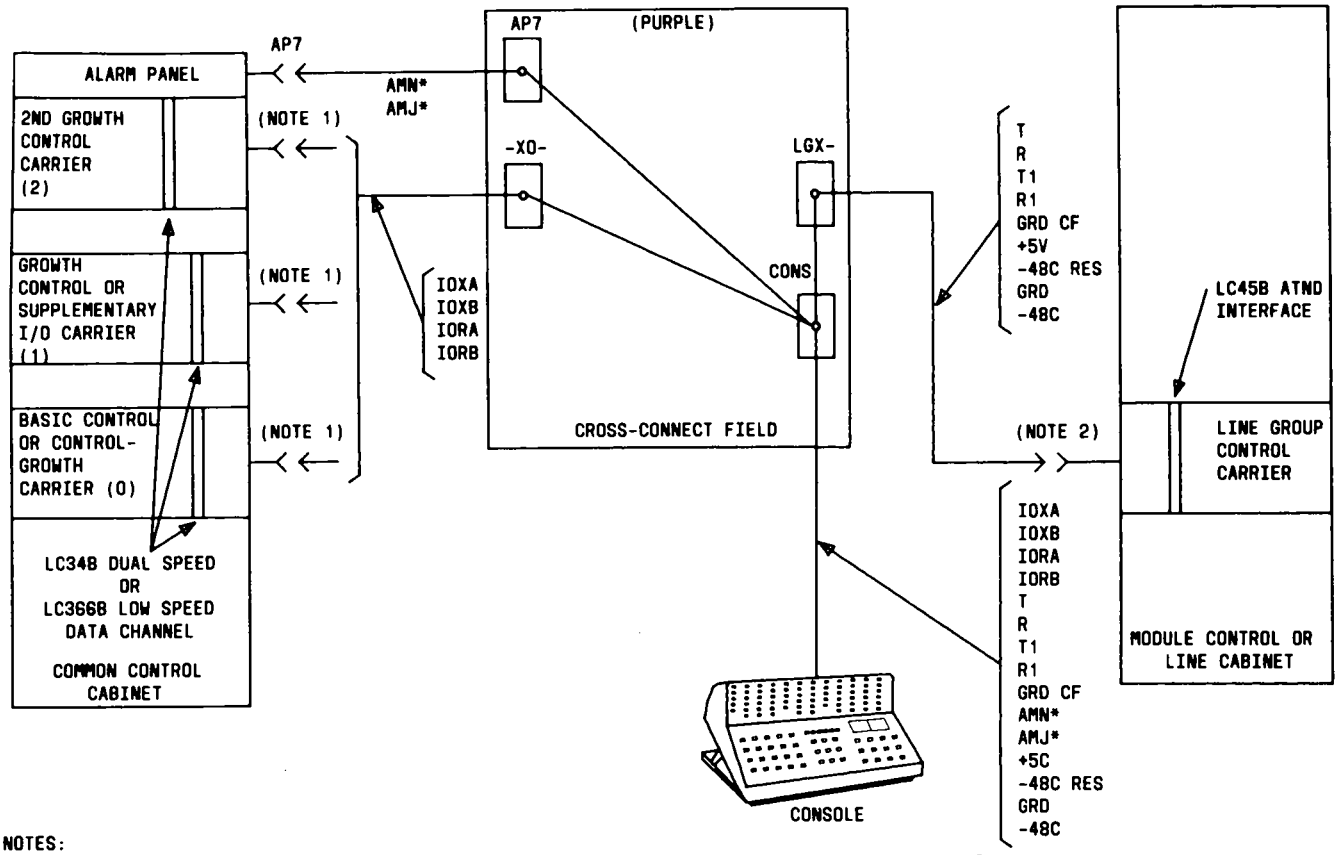
CARRIER TYPE	LC34B SLOT	CONN DESIG	CARRIER TYPE	LC366B SLOT	CONN DESIG	CARRIER TYPE	LC366B SLOT	CONN DESIG
BASIC	32-37	BX01	CONTROL-GROWTH	31/35	BX01A	SUPPLE-MENTARY I/O	20/21	JX01
	31,33,38	BX02		32/36			22/23	
GROWTH	20-25	GX01		33/37			24/25	
2ND GROWTH		SX01		34/38	BX02A		26/27	JX02
GROWTH	26-31	GX02		34/38	GX01A		28/29	
2ND GROWTH		SX02		20/24			30/31	
GROWTH	32,33	GX03		21/25			32/33	JX03
2ND GROWTH		SX03		22/26				
				23/27				
				22/26	GX02A			
				23/27				

2.

LGX07 IN	LC45B		CONN DESIG
	SLOT	CKT	
1ST CKT	07	0	LGX08
2ND CKT	07	1	LGX09
3RD CKT	08	0	LGX10
4TH CKT	08	1	LGX11

3. CONSOLE MAY CONNECT DIRECTLY TO A CONNECTOR (LGX08-LGX11) ON LINE GROUP CONTROL CARRIER.

Fig. 55—Attendant Console Connections When Data Channel Length Need NOT be Minimized



NOTES:

1.

CARRIER TYPE	LC34B SLOT	CONN DESIG	CARRIER TYPE	LC366B SLOT	CONN DESIG	CARRIER TYPE	LC366B SLOT	CONN DESIG
BASIC	32-37	BX01	CONTROL-GROWTH	31/35	BX01A	SUPPLE-MENTARY I/O	20/21	JX01
	31,33,38	BX02		32/36			22/23	
GROWTH	20-25	GX01		33/37			24/25	
2ND GROWTH		SX01		34/38			26/27	JX02
GROWTH	26-31	GX02		34/38	BX02A		28/29	
2ND GROWTH		SX02		20/24	GX01A		30/31	
GROWTH	32,33	GX03		21/25			32/33	JX03
2ND GROWTH		SX03		22/26				
				23/27				
				22/26	GX02A			
				23/27				

2.

LC45B		CONN DESIG
SLOT	CKT	
07	0	LGX08
07	1	LGX09
08	0	LGX10
08	1	LGX11

Fig. 56—Attendant Console Connections When Data Channel Length MUST be Minimized

- Calling Number Display to Station
- Centralized Station Message Detail Recording System
- Code Calling Access (Chime Paging)
- Code Calling Access (3A Code Call)
- Customer Administration Center System (CACS)
- Customer Administration Panel (CAP)

TABLE AI

ATTENDANT CONSOLE CROSS-CONNECTIONS

CONSOLE CABLE TERMINATIONS		
LEAD DESIGNATION	CONN CABLE COLOR CODE	CONSOLE-66M1-50 CONN BLOCK TERMINAL (PURPLE)
IOXAO (+ DATA IN)	W-BL	1
IOXBO (- DATA IN)	BL-W	2
IORAO (+ DATA OUT)	W-O	3
IORBO (- DATA OUT)	O-W	4
T (+ SPEECH IN)	W-G	5
R (- SPEECH IN)	G-W	6
T1 (+ SPEECH OUT)	W-BR	7
R1 (- SPEECH OUT)	BR-W	8
GRDCF	W-S	9
GRDCF	S-W	10
AMN (MINOR ALARM)	R-BL	11
AMJ (MAJOR ALARM)	BL-R	12
+5C1	R-O	13
-48C_ RES	O-R	14
GRD-48	R-G	15
-48C_	G-R	16
GRD-48	R-BR	17
-48C_	BR-R	18
GRD-48	R-S	19
-48C_	S-R	20
GRD-48	BK-BL	21
-48C_	BL-BK	22
GRD-48	BK-O	23
-48C_	O-BK	24
GRD-48	BK-G	25
-48C_	G-BK	26
GRD-48	BK-BR	27
-48C_	BR-BK	28
GRD-48	BK-S	29
-48C_	S-BK	30
GRD-48	Y-BL	31
-48C_	BL-Y	32
GRD-48	Y-O	33
-48C_	O-Y	34
GRD-48	Y-G	35
-48C_	G-Y	36
GRD-48	Y-BR	37
-48C_	BR-Y	38
GRD-48	Y-S	39
-48C_	S-Y	40
GRD-48	V-BL	41
-48C_	BL-V	42
GRD-48	V-O	43
-48C_	O-V	44
GRD-48	V-G	45
-48C_	G-V	46
GRD-48	V-BR	47
-48C_	BR-V	48
GRD-48	V-S	49
-48C_	S-V	50

- Customer Premises Facility Terminal (CPFT)
- Data Channel Repeater
- ◗Data Switching◖
- DIMENSION PBX Electronic Custom Telephone Service (ECTS)
- ◗Distributed Communications System (DCS)◖
- Energy Communication Service Feature
- Energy Communications Service Adjunct (ECSA)
- ◗Enhanced Uniform Call Distribution (EUCD)◖
- Force Administration Data System (FADS)
- Interface to Network Control Office Support System—Local Storage Unit (NCOSS—LSU)
- ◗Local Area Data Set (LADS)◖
- Loudspeaker Paging (Basic and Deluxe)
- Loudspeaker Paging With Chime Paging and Music Background
- ◗Malicious Call Tracing◖
- Music on Hold
- Packaged Metallic Facility Terminal Assemblies (PMFTA)
- Peripheral Interface Circuit (PIC)
- Radio Paging Access Equipment (J58824CD)
- Recorded Announcement Intercept Connection
- Recorded Telephone Dictation Trunk
- 44V4, 24V4 Repeaters
- Station Message Detail Recording (SMDR)
- System Status Indicator Display (30A8)

TABLE AJ

LINE GROUP CONTROL CARRIER CONSOLE DATA CHANNEL CROSS-CONNECTIONS

A25D CONNECTOR CABLE FROM LINE GROUP CONTROL CARRIER CONNECTORS					TO PURPLE BACKBOARD	
LEAD DESIGNATIONS					CUT LEADS DOWN ON	
					LEAD COLOR	CONN BLK TERMINALS
_ _ LGX07	_ _ LGX08	_ _ LGX09	_ _ LGX10	_ _ LGX11		
IOXAO	IOXAO	IOXAO	IOXAO	IOXAO	W-BL	1
IOXBO	IOXBO	IOXBO	IOXBO	IOXBO	BL-W	2
IORAO	IORAO	IORAO	IORAO	IORAO	W-O	3
IORBO	IORBO	IORBO	IORBO	IORBO	O-W	4
AMN*	T	T	T	T	W-G	5
AMJ*	R	R	R	R	G-W	6
IOXAO	T1	T1	T1	T1	W-BR	7
IOXBO	R1	R1	R1	R1	BR-W	8
IORAO	GRD CF	GRD CF	GRD CF	GRD CF	W-S	9
IORBO	GRD CF	GRD CF	GRD CF	GRD CF	S-W	10
AMN*	AMN*	AMN*	AMN*	AMN*	R-BL	11
AMJ*	AMJ*	AMJ*	AMJ*	AMJ*	BL-R	12
IOXAO	+5C	+5C	+5C	+5C	R-O	13
IOXBO	-48C_RES	-48C_RES	-48C_RES	-48C_RES	O-R	14
IORAO	GRD	GRD	GRD	GRD	R-G	15
IORBO	-48	-48	-48	-48	G-R	16
AMN*	GRD	GRD	GRD	GRD	R-BR	17
AMJ*	-48	-48	-48	-48	BR-R	18
IOXAO	GRD	GRD	GRD	GRD	R-S	19
IOXBO	-48	-48	-48	-48	S-R	20
IORAO	GRD	GRD	GRD	GRD	BK-BL	21
IORBO	-48	-48	-48	-48	BL-BK	22
AMN*	GRD	GRD	GRD	GRD	BK-O	23
AMJ*	-48	-48	-48	-48	O-BK	24
	GRD	GRD	GRD	GRD	BK-G	25
	-48	-48	-48	-48	G-BK	26
	GRD	GRD	GRD	GRD	BK-BR	27
	-48	-48	-48	-48	BR-BK	28
	GRD	GRD	GRD	GRD	BK-S	29
	-48	-48	-48	-48	S-BK	30
	GRD	GRD	GRD	GRD	Y-BL	31
	-48	-48	-48	-48	BL-Y	32
	GRD	GRD	GRD	GRD	Y-O	33
	-48	-48	-48	-48	O-Y	34
	GRD	GRD	GRD	GRD	Y-G	35
	-48	-48	-48	-48	G-Y	36
SPARE	GRD	GRD	GRD	GRD	Y-BR	37
	-48	-48	-48	-48	BR-Y	38
	GRD	GRD	GRD	GRD	Y-S	39
	-48	-48	-48	-48	S-Y	40
	GRD	GRD	GRD	GRD	V-BL	41
	-48	-48	-48	-48	BL-V	42
	GRD	GRD	GRD	GRD	V-O	43
	-48	-48	-48	-48	O-V	44
	GRD	GRD	GRD	GRD	V-G	45
	-48	-48	-48	-48	G-V	46
	GRD	GRD	GRD	GRD	V-BR	47
	-48	-48	-48	-48	BR-V	48
	GRD	GRD	GRD	GRD	V-S	49
	-48	-48	-48	-48	S-V	50

TABLE AK

CONSOLE CROSS-CONNECTIONS WORKSHEET

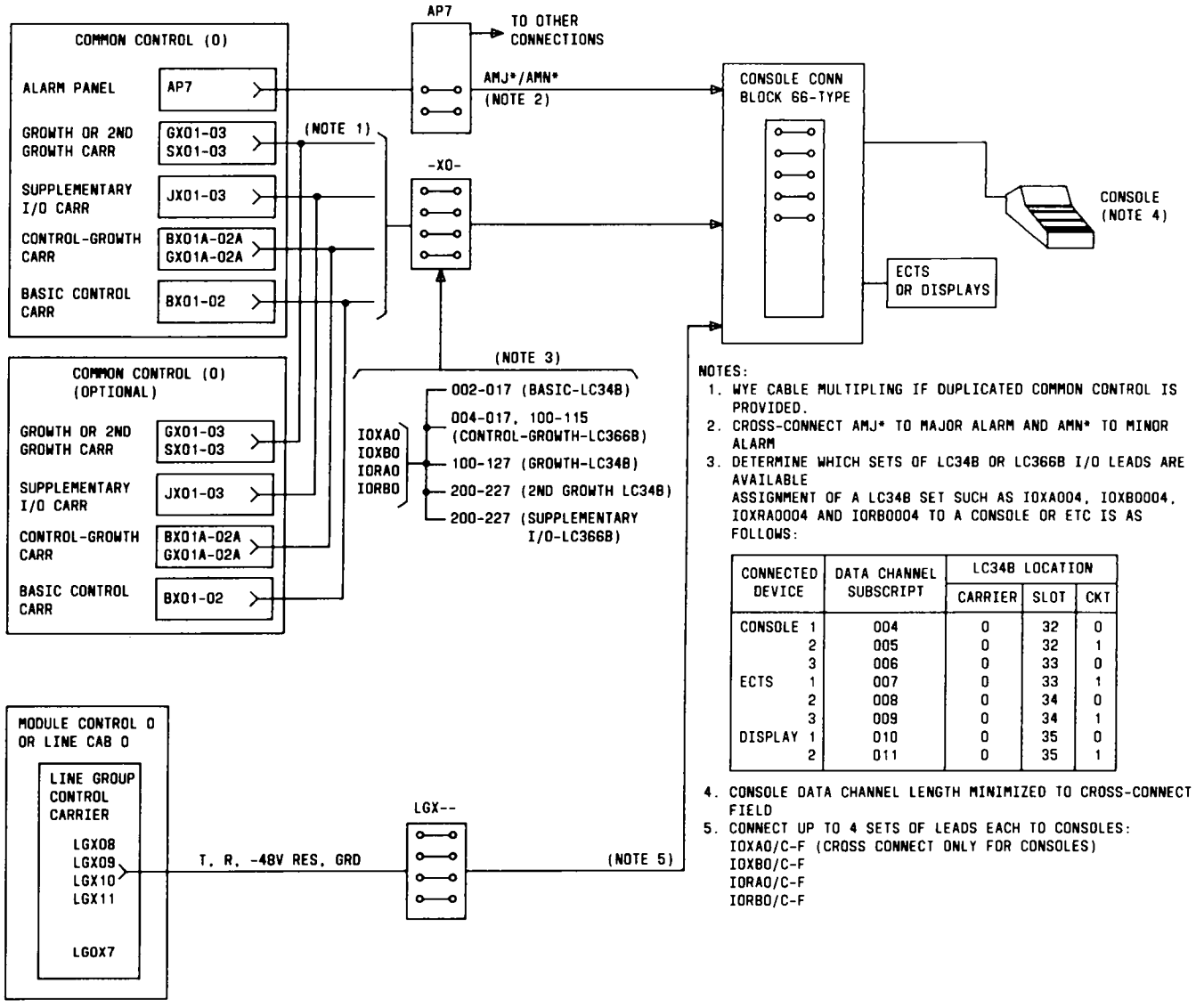
MOD_ _ CONSOLE NO.___ LEAD DESIGNATION	CONSOLE CABLE COLOR CODE	CROSS-CONNECT TO/FROM CONN BLK CONSOLE _____ (BLUE)	CROSS-CONNECT TO CONN BLK _ _ _ _ LGX_ _ (PURPLE)
IOXAO (+ DATA IN)	W-BL	1	1
IOXBO (- DATA IN)	BL-W	2	2
IORAO (+ DATA OUT)	W-O	3	3
IORBO (- DATA OUT)	O-W	4	4
T (+ SPEECH IN)	W-G	5	5
R (- SPEECH IN)	G-W	6	6
T1 (+ SPEECH OUT)	W-BR	7	7
R1 (- SPEECH OUT)	BR-W	8	8
GRDCF	W-S	9	9
GRDCF	S-W	10	10
AMN (MINOR ALARM)	R-BL	11	11
AMJ (MAJOR ALARM)	BL-R	12	12
+5C1	R-O	13	13
-48C_ RES	O-R	14	14
GRD-48	R-G	15	15
-48C_	G-R	16	16
GRD-48	R-BR	17	17
-48C_	BR-R	18	18
GRD-48	R-S	19	19
-48C_	S-R	20	20
GRD-48	BK-BL	21	21
-48C_	BL-BK	22	22
GRD-48	BK-O	23	23
-48C_	O-BK	24	24
GRD-48	BK-G	25	25
-48C_	G-BK	26	26
GRD-48	BK-BR	27	27
-48C_	BR-BK	28	28
GRD-48	BK-S	29	29
-48C_	S-BK	30	30
GRD-48	Y-BL	31	31
-48C_	BL-Y	32	32
GRD-48	Y-O	33	33
-48C_	O-Y	34	34
GRD-48	Y-G	35	35
-48C_	G-Y	36	36
GRD-48	Y-BR	37	37
-48C_	BR-Y	38	38
GRD-48	Y-S	39	39
-48C_	S-Y	40	40
GRD-48	V-BL	41	41
-48C_	BL-V	42	42
GRD-48	V-O	43	43
-48C_	O-V	44	44
GRD-48	V-G	45	45
-48C_	G-V	46	46
GRD-48	V-BR	47	47
-48C_	BR-V	48	48
GRD-48	V-S	49	49
-48C_	S-V	50	50

TABLE AL

CONSOLE DATA CHANNEL AND ALARM LEADS CROSS-CONNECTIONS WORKSHEET

FROM PBX MOD _ _ COMMON CONTROL CABINET ___		CROSS-CONNECT			
		TO/FROM		TO	
		CONN BLK _ _ _XO_	CONN BLK _AP7	WHEN DATA CHAN LENGTH NEED NOT BE MINIMIZED	WHEN DATA CHAN LENGTH MUST BE MINIMIZED
EQUIPMENT	LEAD DESIGNATION	(PURPLE)	(PURPLE)	CONN BLK _ _ _LGX07 (PURPLE)	CONN BLK _ _ _LGX_ _ (PURPLE)
LC34B IN _____ _____ CARRIER ____ SLOT _____ CIRCUIT _____	IOXB_ _ _ _			2	2
	IOXA_ _ _ _			1	1
	IORB_ _ _ _			4	4
	IORA_ _ _ _			3	3
ALARM PANEL	AMJ*		6	6	12
	AMN*		8	5	11

*This lead is active in a low state.



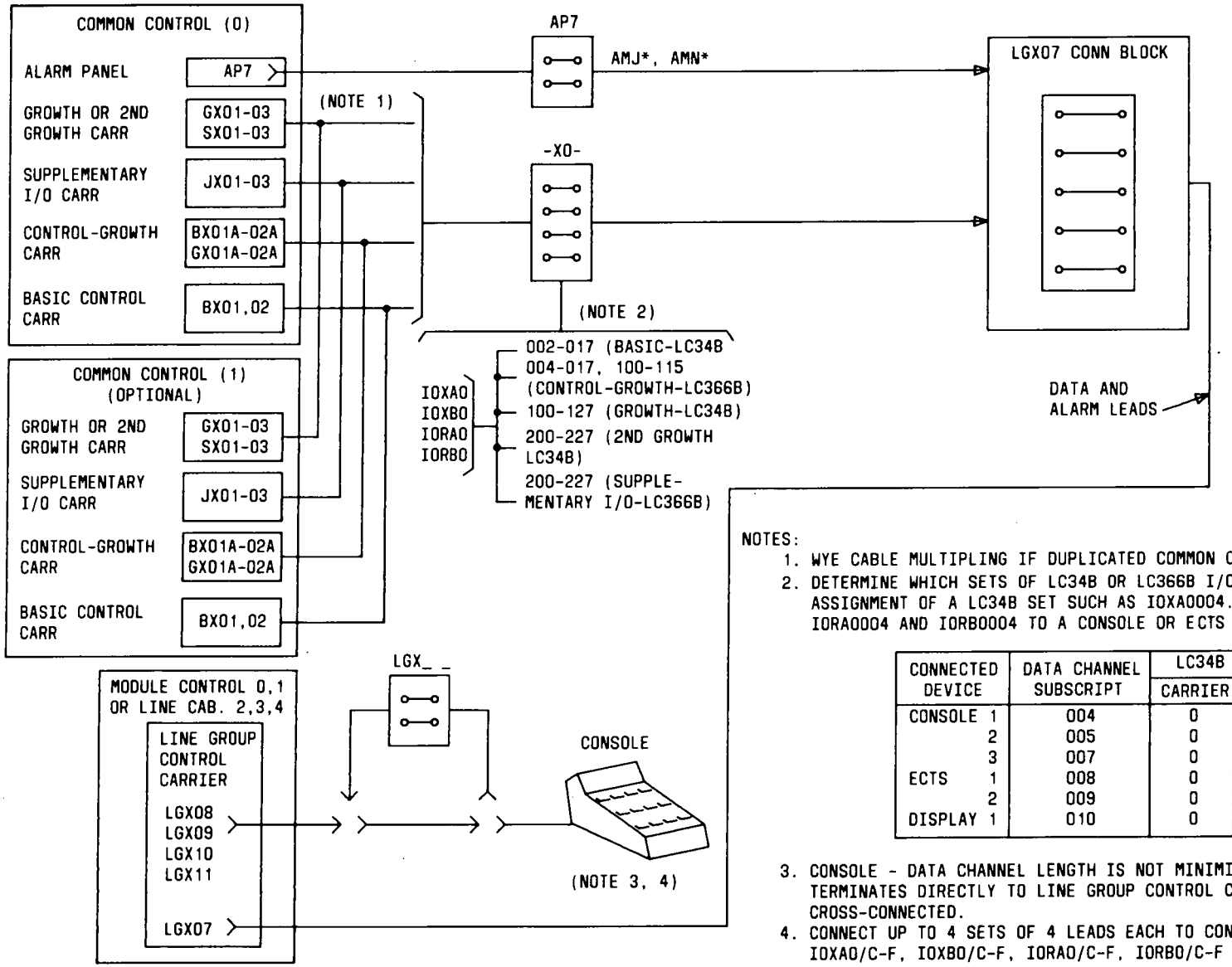
CONNECTED DEVICE	DATA CHANNEL SUBSCRIPT	LC34B LOCATION		
		CARRIER	SLOT	CKT
CONSOLE 1	004	0	32	0
2	005	0	32	1
3	006	0	33	0
ECTS 1	007	0	33	1
2	008	0	34	0
3	009	0	34	1
DISPLAY 1	010	0	35	0
2	011	0	35	1

Fig. 57—Console or ECTS Controller Connections—Cross-Connect Plan

- Time-of-Day Clock Battery Backup (J58882A1, List 9)
- Traffic Measurement/RMATS
- Trunk Answer From Any Station (TAAS)
- Uniform Call Distribution (UCD) Traffic Overflow Indicator
- Visually Impaired Attendant Service (VIAS).

5.04 A summary of auxiliary equipment associated with the features is compiled in Table AO. Several J58879F auxiliary cabinets (Fig. 61) may be required to accommodate the auxiliary equipment, depending upon customer requirements. The cabinets can be locally engineered in accordance with the power and grounding guidelines in Part 4.

5.05 Power for the equipment in the auxiliary cabinet (excluding ECTS controllers) is provided from the KS-22028 power supply. Power to the supply is provided from the ac outlet via the J58882JA ac powered distribution panel.



NOTES:

1. WYE CABLE MULTIPLING IF DUPLICATED COMMON CONTROL IS PROVIDED.
2. DETERMINE WHICH SETS OF LC34B OR LC366B I/O LEADS ARE AVAILABLE. ASSIGNMENT OF A LC34B SET SUCH AS IOXA0004, IOXB0004, IORA0004 AND IORB0004 TO A CONSOLE OR ECTS IS AS FOLLOWS:

CONNECTED DEVICE	DATA CHANNEL SUBSCRIPT	LC34B LOCATION		
		CARRIER	SLOT	CKT
CONSOLE 1	004	0	32	0
2	005	0	32	1
3	007	0	33	1
ECTS 1	008	0	34	0
2	009	0	34	1
DISPLAY 1	010	0	35	0

3. CONSOLE - DATA CHANNEL LENGTH IS NOT MINIMIZED WHEN CONSOLE TERMINATES DIRECTLY TO LINE GROUP CONTROL CARRIER OR IS CROSS-CONNECTED.
4. CONNECT UP TO 4 SETS OF 4 LEADS EACH TO CONSOLES: IOXA0/C-F, IOXB0/C-F, IORA0/C-F, IORB0/C-F

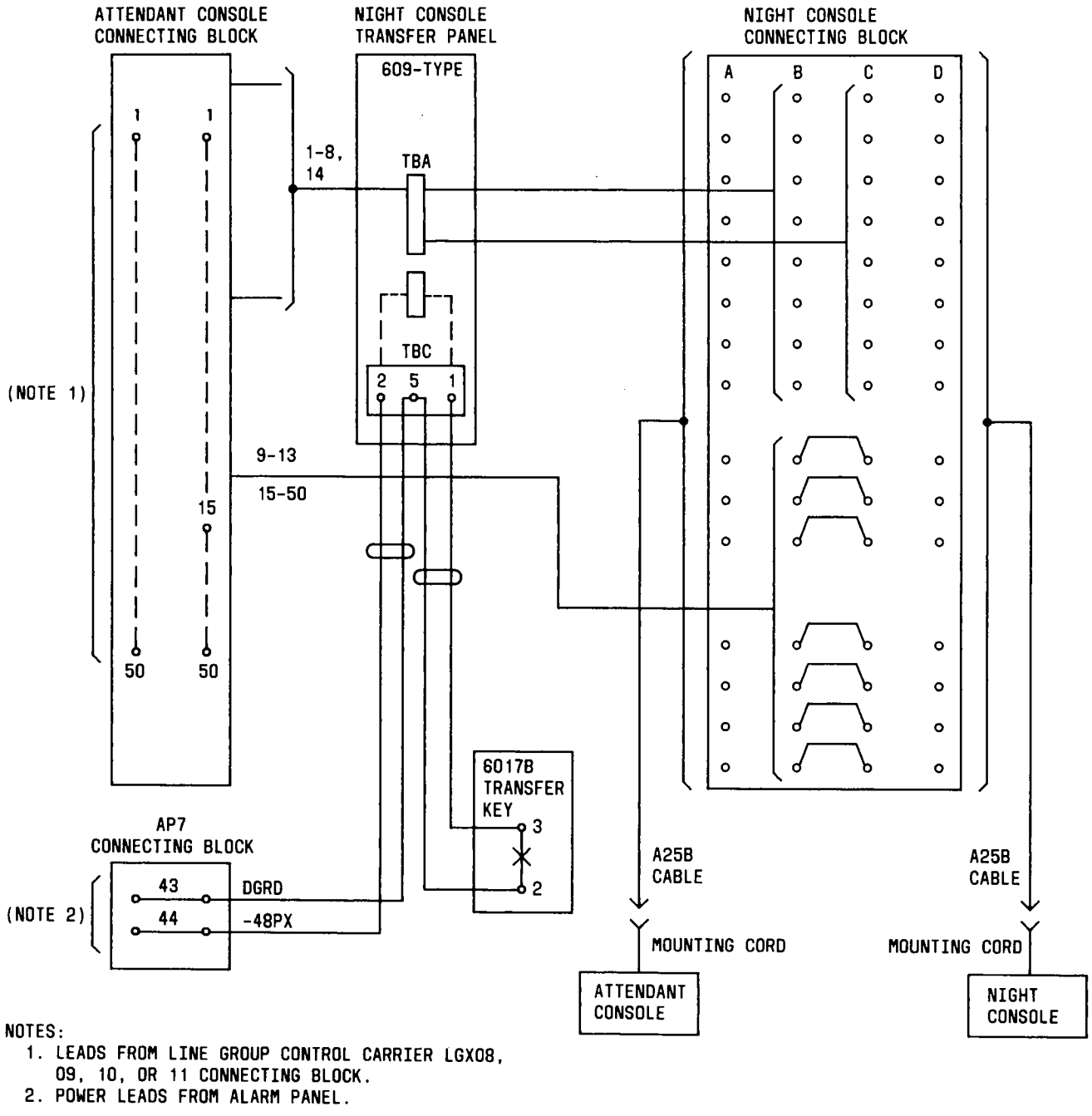
Fig. 58—Console Connections—Direct to PBX Carrier

TABLE AM

DATA CHANNELS TO MULTIPLE CONSOLES CROSS-CONNECTIONS WORKSHEET

FROM PBX MOD _ _ COMMON CONTROL CABINET ___			CROSS-CONNECT						
			TO/FROM		TO				
			CONN BLK _ _ _ XO_	CONN BLK _ AP7	WHEN DATA CHAN LENGTH NEED NOT BE MINIMIZED	WHEN DATA CHANNEL LENGTH MUST BE MINIMIZED			
						1ST CONSOLE	2ND CONSOLE	3RD CONSOLE	4TH CONSOLE
DATA CHAN	EQUIPMENT	LEAD DESIGNATION	(PURPLE)	(PURPLE)	CONN BLK _ _ _ LGX07 (PURPLE)	CONN BLK _ _ _ LGX08 (PURPLE)	CONN BLK _ _ _ LGX09 (PURPLE)	CONN BLK _ _ _ LGX10 (PURPLE)	CONN BLK _ _ _ LGX11 (PURPLE)
1ST	LC34B IN _____ _____ CARRIER _____ SLOT _____ CKT _____	IOXB_ _ _ _			2	2			
		IOXA_ _ _ _			1	1			
		IORB_ _ _ _			4	4			
		IORA_ _ _ _			3	3			
ALL CHAN	ALARM PANEL	AMJ*		6	6,12,18,24	6	12	18	24
		AMN*		8	5,11,17,23	5	11	17	23
2ND	LC34B IN _____ _____ CARRIER _____ SLOT _____ CKT _____	IOXB_ _ _ _			8		8		
		IOXA_ _ _ _			7		7		
		IORB_ _ _ _			10		10		
		IORA_ _ _ _			9		9		
3RD	LC34B IN _____ _____ CARRIER _____ SLOT _____ CKT _____	IOXB_ _ _ _			14			14	
		IOXA_ _ _ _			13			13	
		IORB_ _ _ _			16			16	
		IORA_ _ _ _			15			15	
4TH	LC34B IN _____ _____ CARRIER _____ SLOT _____ CKT _____	IOXB_ _ _ _			20				20
		IOXA_ _ _ _			19				19
		IORB_ _ _ _			22				22
		IORA_ _ _ _			21				21

*This lead is active in a low state.



NOTES:
1. LEADS FROM LINE GROUP CONTROL CARRIER LGX08, 09, 10, OR 11 CONNECTING BLOCK.
2. POWER LEADS FROM ALARM PANEL.

Fig. 59—Night Console Transfer—Block Diagram

TABLE AN

NIGHT CONSOLE CROSS-CONNECTIONS

FROM MOD_ _ CAB_ LINE GROUP CONTROL CARRIER__ / LEAD DESIG	CONN CABLE COLOR CODE	CROSS-CONNECT TO/FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO
		CONN BLK _ _ _ _LGX_ _ (PURPLE)	CONN BLK ATND CONSOLE NO.___ (BLUE) COLUMN		609-TYPE TRANSFER PANEL (YELLOW)		CONN BLK NIGHT CONSOLE NO.___ (BLUE) COLUMN		ATND CONSOLE NO.___	609-TYPE TRANSFER PANEL (YELLOW) TBA	CONN BLK NIGHT CONSOLE NO.___ (BLUE) COLUMN		NIGHT CONSOLE NO.___
			A	B	TBA	TBA	B†	A			C	D	
IOXAO_	W-BL	1	1	1	1	6	1	1		4	1	1	
IOXBO_	BL-W	2	2	2	2	7	2	2		5	2	2	
IORAO_	W-O	3	3	3	11	16	3	3		14	3	3	
IORBO_	O-W	4	4	4	12	17	4	4		15	4	4	
T_ _ _O_ _ _	W-G	5	5	5	21	26	5	5		24	5	5	
R_ _ _O_ _ _	G-W	6	6	6	22	27	6	6		25	6	6	
T1_ _ _O_ _ _	W-BR	7	7	7	31	36	7	7		34	7	7	
R1_ _ _O_ _ _	BR-W	8	8	8	32	37	8	8		35	8	8	
GRDCF	W-S	9	9	9			9	9	A25B CONN CABLE		9	9	A25B CONN CABLE
GRDCF	S-W	10	10	10			10	10			10	10	
AMN* (MINOR ALARM)	R-BL	11	11	11			11	11			11	11	
AMJ* (MAJOR ALARM)	BL-R	12	12	12			12	12			12	12	
+5C1	R-O	13	13	13			13	13			13	13	
-48C_ RES	O-R	14	14	14	41	46	14	14		44	14	14	
GRD-48	R-G	15	15	15			15	15			15	15	
-48C_	G-R	16	16	16			16	16			16	16	
GRD-48	R-BR	17	17	17			17	17			17	17	
-48C_	BR-R	18	18	18			18	18			18	18	
-48C_	BR-V	48	48	48			48	48			48	48	
GRD -48	V-S	49	49	49			49	49			49	49	
-48C_	S-V	50	50	50			50	50			50	50	

† BRIDGING CLIPS MUST BE INSTALLED ON COLUMNS B AND C ON TERMINALS 9 THROUGH 13 AND 15 THROUGH 50 ON THE NIGHT CONSOLE CONNECTING BLOCK.

▶APPLICATIONS PROCCESSOR (AP)

5.06 The AP provides new feature capabilities to a PBX, equipped with FP8, Issue 3. The AP is a multiprocessor that functions in either a stand-alone configuration for data processing or as a controller for intelligent peripheral devices. Special purpose applications software resident in the AP supports the following new PBX features provided via the AP:

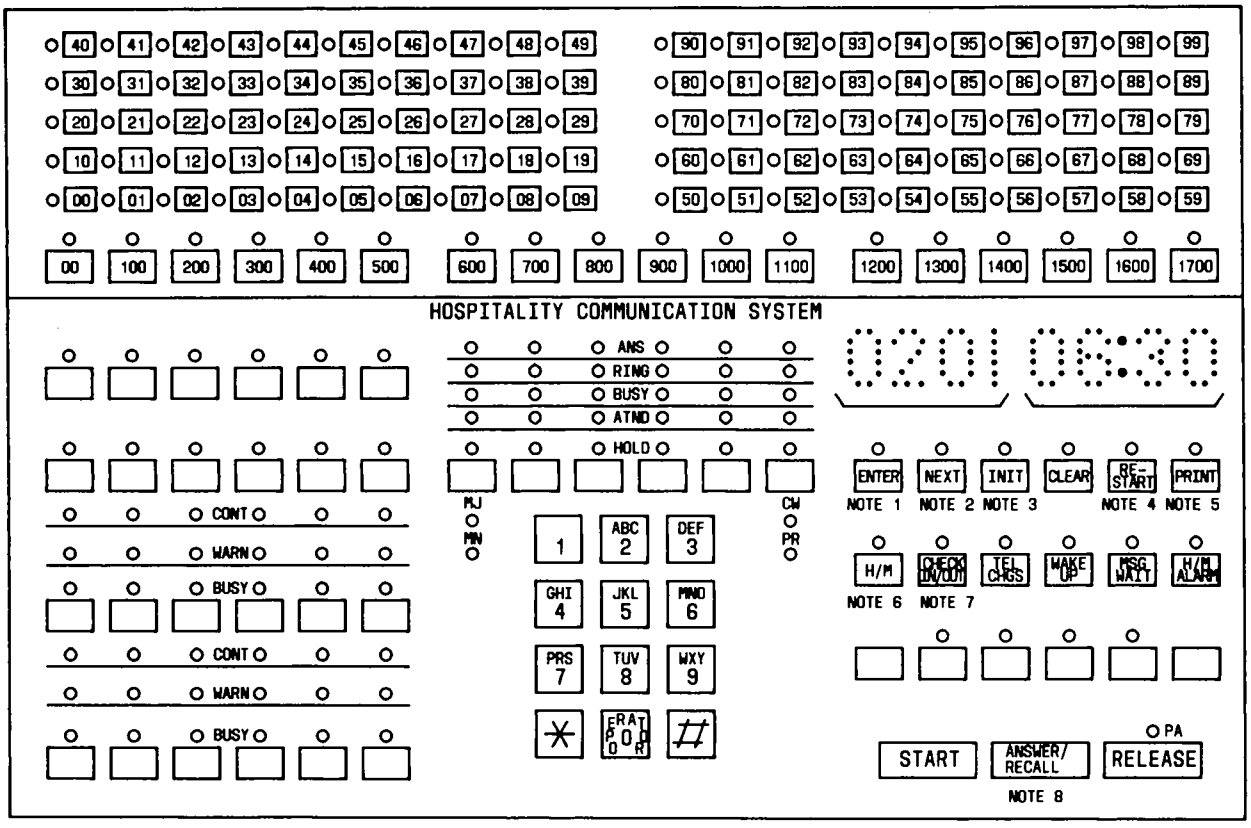
(a) Directory serice

(b) Message center service including:

- Call coverage
- Leave-word calling
- Automatic message waiting.

5.07 A brief description of each of the features is provided in the system Description, Section 554-111-100. Detailed descriptions and additional information on the features are provided in specific feature documents as listed in the Feature Document Reference Guide, Section 554-191-100.

5.08 A PBX equipped for AP features is shown in Fig. 62. The configuration consists of an AP with its associated terminals and printers, the PBX equipped with an enhanced FP8, and station and terminal equipment. Analog station sets which may include models 500, 2500, and/or Multibutton



o LAMP INDICATOR; INVISIBLE WHEN NOT ILLUMINATED

NOTES: CONTROL KEY	FUNCTION
1. ENTER	- CAUSE SYSTEM TO ACCEPT OR REJECT DATA SUCH AS ROOM NUMBER. OPERATION COMPLETES DATA ENTRY AND CONFIRMS IT BY ALPHANUMERIC DATA DISPLAY.
2. NEXT	- ADVANCE DISPLAY OR FUNCTION TO NEXT WORD OF DATA.
3. INIT	- STARTS AN ACTION INVOLVING DATA STORAGE OR ACTIVATION OF A FUNCTION SUCH AS CHECK IN OR MESSAGE WAITING.
4. RESTART	- RETURN TO H/M FUNCTION START.
5. PRINT	- INTERRUPT A PRINT OPERATION IN PROGRESS OR START NEW CONSOLE PRINTER OPERATION.
6. H/M	- INITIATE H/M FUNCTION MODE FOR CONSOLE/TERMINAL.
FEATURE KEY	
7. CHECK IN/OUT	- ACTIVATE CHECKIN/CHECKOUT FUNCTION BLF INDICATES READY ROOM STATUS.
8. ANS/RECALL	- PERFORMS THE FLASH FUNCTION.

Fig. 60—Console for Hotel/Motel Console/Terminal

Electronic Telephone (MET) sets are required at the PBX. The analog sets must be equipped with message waiting lamps.

5.09 The AP interfaces with the DIMENSION PBX via the Data Communications Interface Unit (DCIU). The DCIU is a carrier-mounted special purpose, high-speed data link capable of operating at speeds up to 19.2 kilobits per second (kbs). The AP to DIMENSION DCIU interface is provided by Electronic Industries Association (EIA) RS-449 compatible ports. Data modems are required at each end of the interface where the distance between units is greater than hardwiring connections permit. For more information on circuit packs needed for the operation of the DCIU, see Section 554-111-100 (System Description).

♦TABLE AO♦

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
	Auxiliary Cabinet, J58879F-2, List 1 (MD)	Framework, assembly, wiring, and equipment to provide 1626 mm (64 inches) of vertical mounting space for 584 mm (23-inch) wide auxiliary units.
	Auxiliary Cabinet, J58879F-2, List 2 (MD)	Equipment required in addition to List 1 to provide an ac power distribution unit, arranged for 60-Hz, 117 Vac power.
	Auxiliary Cabinet, J58879F-2, List 3 (MD) (Power Supply)	Equipment required in addition to Lists 1 and 2 to provide a –48 Vdc, 8-amp power supply. 203 mm (8-inch) vertical mounting space.
	Auxiliary Cabinet, J58879F-2, List 4 (MD) (Air Baffle)	Equipment required in addition to Lists 1 and 2 when a filtered air supply is required. 127 mm (5-inch) vertical mounting space.
	Auxiliary Cabinet, J58879F-2, List 5 (MD)	Apparatus and wiring required in addition to List 1 to provide a cable assembly when connectorized cable is used from the auxiliary cabinet to the cross-connect field.
	Auxiliary Cabinet, J58879F-2, List 6 (MD)	Equipment required in addition to Lists 1 and 2 to provide a frequency generator unit.
1	Auxiliary Cabinet, J58879F-2, List 7 (Fuse Panel)	Wiring and equipment required in addition to Lists 1, 15, 16, and 25 to provide 23 fuse positions (–48V) and ringing and interrupter terminal strips. 50.8 mm (2-inch) vertical mounting space required.
	Auxiliary Cabinet, J58879F-2, List 8 (MD)	Equipment required in addition to List 6 to provide one frequency interrupter unit.
	Auxiliary Cabinet, J58879F-2, List 10 (MD)	Equipment required in addition to List 1 to provide a standard perforated top.
	Auxiliary Cabinet, J58879F-2, List 11 (MD)	Equipment required in addition to List 1 to provide a liquid spill-resistant top assembly.
	Auxiliary Cabinet, J58879F-2, List 12	Equipment required in addition to List 1 16 and 25 to provide one auxiliary circuit filter unit. 203 mm (8-inch) vertical mounting space.
	Auxiliary Cabinet, J58879F-2, List 13 (MD)	Apparatus to provide a wall outlet and wall plate
	J58879F-2, List 14 (MD)	Apparatus to provide a wall outlet and wall plate
	J58879F-2, List 15	Equipment required in addition to List 1, 16, and 25 to provide a –48 Vdc power supply.
	J58879F-2, List 16 (MD)	Framework, assembly, wiring, and equipment to provide 1626 mm (64 inches) of vertical mounting space for 584 mm (23-inch) wide auxiliary units.
	J58879F-2, List 17 (MD)	Equipment required in addition to List 16 to provide an ac power distribution unit, arranged for 117-volt power source.
	J58879F-2, List 18 (MD)	Equipment required in addition to Lists 1, 16, and 17, and 24 when a filtered air supply is required.
	Auxiliary Cabinet, J58879F-2, List 19 (MD)	Equipment required in addition to Lists 1 and 2 to a –48 Vdc power supply. 203 mm (8-inch) vertical mounting space.
	J58879F-2, List 20	Equipment required in addition to List 16, 17 and 25, 24 to provide a frequency generator
	J58879F-2, List 21	Wiring and equipment required in addition to List 20 to provide one Frequency Interrupter Unit
	J58879F-2, List 22	Apparatus to provide a wall outlet and associated mounting hardware.

◆TABLE AO◆ (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
1 (Contd)	J58879F-2, List 23 (MD)	Equipment required in addition to List 16 when this cabinet is used in a multi-cabinet PBX line up.
	J58879F-2, List 24 (MD)	Equipment required in addition to List 16 to provide AC power distribution with EMI filter.
	J58879F-2, List 25	Framework, assembly, wiring and equipment for one basic cabinet with five carrier positions. Provides mounting space for ECTS carriers (J58879KA & J58879KB) and electromechanical equipment where required.
	J58879F-2, List 26	Equipment required in addition to List 25 when this cabinet is used in a multicabinet line up, or to provide an alternate method of providing earthquake bracing in other applications.
2	Recorded Announcement Unit, H-400-107, Lists 1 & 6, KS-16765	Requires J58879F, List 2, for 254 mm (10-inch) vertical mounting space.
	Recorded Announcement Unit, H-400-107, List 1	Same as KS-16765, Lists 2, 7, and 8, to include hardware for connectorization.
3	Recorded Announcement Amplifier, List 4	Required in addition to List 1 when KS-20449, List 1, amplifier is required.
4	Recorded Telephone Dictation Trunk Unit, J58827E-1, Lists 1 & 7	Assembly, wiring, and equipment for one recorded telephone dictation trunk unit. Provides a means of recording announcements and transmitting them to one or more trunks simultaneously.
5	Trunk Level Interconnecting Unit, J53050F-1, Lists 1 & 3	Assembly, wiring, and equipment for one automatic trunk level interconnecting circuit. Provides trunk level access to customer-provided equipment such as radio paging, dial dictation, etc.
6	Interface Unit, J58824CD-1, Lists 7, 9, 12, 15, 16, & 17	Assembly, wiring and equipment for one applique unit. Required when TOUCH-TONE service signals are converted to dc signals on a 2-of-7 lead basis using type G1 receivers or Type A3 TOUCH-TONE telephone receivers.
7*	J99380A-1, Lists 1 & 4, CPFT Assembly Hardware (MD)	Assembly, wiring, and equipment for one shelf assembly equipped to acommodate up to 12 MFT transmission type plug-in units.
	CPFT Mounting Panel, J99380B-1, List 1 (MD)	Assembly, wiring, and common equipment required for one apparatus mounting panel equipped to accept up to twelve 837-type units.
8*	CPFT Shelf Assembly, J99390C-1, List 1 (MD)	Assembly, wiring, and equipment required to install one shelf assembly to accommodate up to 14 KTU-type circuits.
	CPFT Double-Depth Shelf Frame, J99380D-1, List 1 (MD)	Assembly and wiring for one hinged double-depth frame assembly suitable for mounting J99380A, B, C, and E shelf assemblies.
	CPFT Shelf Assembly. J99380E-1, Lists 1 & 4 (MD)	Assembly, wiring, and equipment for one double module shelf assembly suitable for mounting up to a maximum of 12 MFT, LSE, or signal type plug in units.
9	Type A3 TOUCH-TONE Calling Receiver Shelf, J99289A-1, 1, 2, 6, G, H	Provides mounting space for two J99289B-1 receiver units.
10	Type A3 TOUCH-TONE Calling Receiver, J99289C-1, List 1, C 5A	Provides a connectorized cable to connect to the TOUCH-TONE calling receiver and interface trunk unit.
11	Type G1 TOUCH-TONE Calling Receiver J59204CA-1, List 1	Provides mounting space for up to two sets of G1 receivers. Each G1 receiver consists of HJ16, HJ17, and AE46 circuits.

* See footnote at end of table.

▶TABLE AO◀ (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
12	Input AMP HJ16	Input amplifier and channel detector for the G1 receiver.
	Channel Filter HJ17	Channel filter for G1 receiver.
13	Basic Electronic Telephone Controller Carrier, J58879KA, List 1	Assembly, wiring, and equipment for the basic ECTS carrier.
14	Supplemental Electronic Telephone Controller Carrier, J58879KB, List 1	Assembly, wiring, and equipment for the supplemental ECTS carrier.
15	Auxiliary Cabinet, J58879PH-1, List 12	Equipment required in addition to List 1 to provide one auxiliary circuit filter unit.
16	Radio Paging Dial Pulse Conversion, J58847Y, List 4	Assembly, wiring, and equipment for one link and electronic dial unit with fusing from KS-19642, List 6, rectifier. Required with TOUCH-TONE telephone systems which interconnect to rotary dial paging equipment.
17†	44V4A Repeater, J98615AH, List 2, 2A	Voice repeater equipped for 48-volt operation. Requires 50 mm (2-inch) vertical mounting space.
	44V4B Repeater, J98615AH, List 3, 3B	Data repeater equipped for 48-volt operation. Requires 50 mm (2-inch) vertical mounting space.
18†	24V4C Repeater, J98615BJ, List 2	Two-wire to four-wire repeater requiring 48 volts power.
	24V4D Repeater, J98615BL, List 2	48-Volt operated 2-wire to 4-wire repeater with loop-around repeater in the event of a power failure.
19	H-9040, Group 1	Four-phase recorder announcer for wake-up service.
	H-9040, Group 2	Equipment required in addition to Group 1 for remote record option.
	H-9040, Group 3	Equipment required in addition to Group 1 to provide tape recorder option.
	H-9040, Group 4	Equipment required in addition to Group 1 to provide battery backup for recorder/announcer.
20	13A Recorded Announcement Unit, J1C121A-1, List 1	8-Channel completely electronic digital recorder.

* In order to meet FCC requirments of physical and electrical separation of Network Channel Terminating Equipment (NCTE) from Customer Terminals, all CPFT arrangements which permit mounting and use of Metallic Facility Terminal (MFT) equipment within DIMENSION PBX arrangements are rated "MD". Therefore, MFT equipment should no longer be mounted in an auxiliary cabinet but rather should be physically located separate from the PBX and electrically located on the Network side of the RJ21X registration jack.

† Not to be installed in auxiliary cabinet with items 2 to 6, 9 to 16, 19, and 20.

5.10 The DCIU communicates with the PBX processor via the DCIU Interface Program (DIP) that resides in the processor. This program formats and generates an AP message and then enters the message in an appropriate Direct Memory Access (DMA) port. The ports are the interface between the processor and DCIU and are used only by the processor or DCIU when messages are entered on a port. The DCIU determines for which location the message is destined and assigns the proper DCIU/AP link and associated channel within the link. At the AP, a line controller and compatible RS-449 port provide the DCIU to AP interface.

5.11 In a DIMENSION 2000 PBX equipped with duplicated common control, the DCIU is also duplicated though the DCIU links are not. Figure 63 shows hardware connections for the AP.

5.12 A PBX equipped with an AP is administered remotely by RMATS and locally by the MAAP and CAP. The AP is administered locally through a model 500 Business Communications Terminal.◀

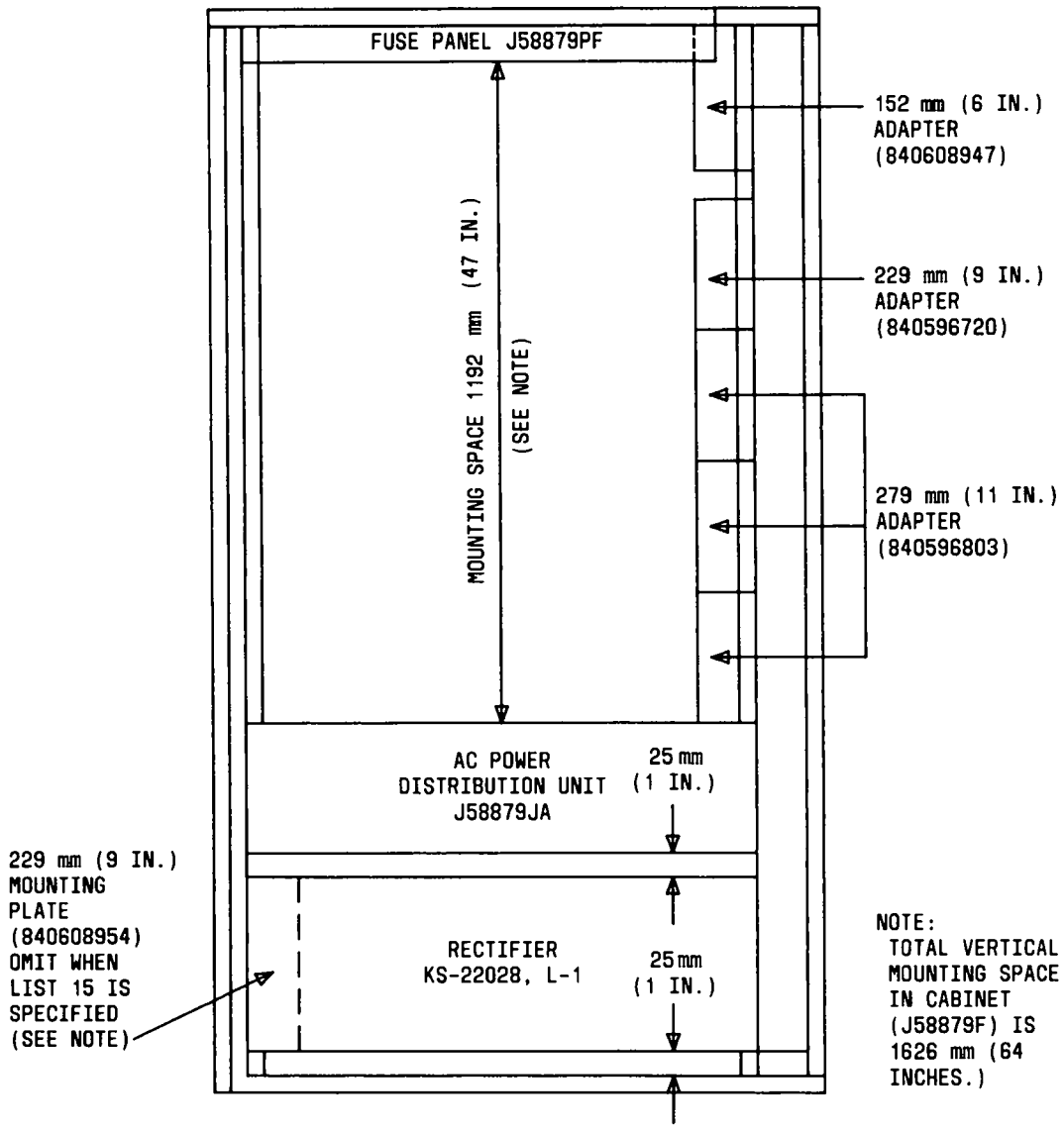


Fig. 61—Auxiliary Cabinet—J58879F

ATTENDANT CONSOLE REPEATER

5.13 The attendant console repeater circuit provides range extension and/or lightning protection for the DIMENSION PBX low-speed data channels as well as 48V and ground leads. It is connected in series with the data channel to repeat data pulses and to provide isolation between input and output pairs. The repeater may be used to provide range extension for a remote location. If range extension is not required (ie, console is 305m [1000 feet] or less from the PBX), two attendant console repeater units may be used to provide isolation between the PBX and the console due to exposed cable runs.

5.14 The repeater detects and reconstructs incoming modified biphase (bipolar) data pulses to eliminate any pulse attenuation or distortion as well as to increase data channel range.

5.15 The repeater circuit is designed to operate in unexposed environments without additional protection and in exposed environments with standard protection.

A. Physical Description

5.16 The repeater circuitry is housed in a modified key service unit (Fig. 64) with a capacity for one attendant console repeater circuit. The unit contains five connectors and the provision for mounting a small power supply. The connectors provide the interface for plug-in circuit packs which determine the

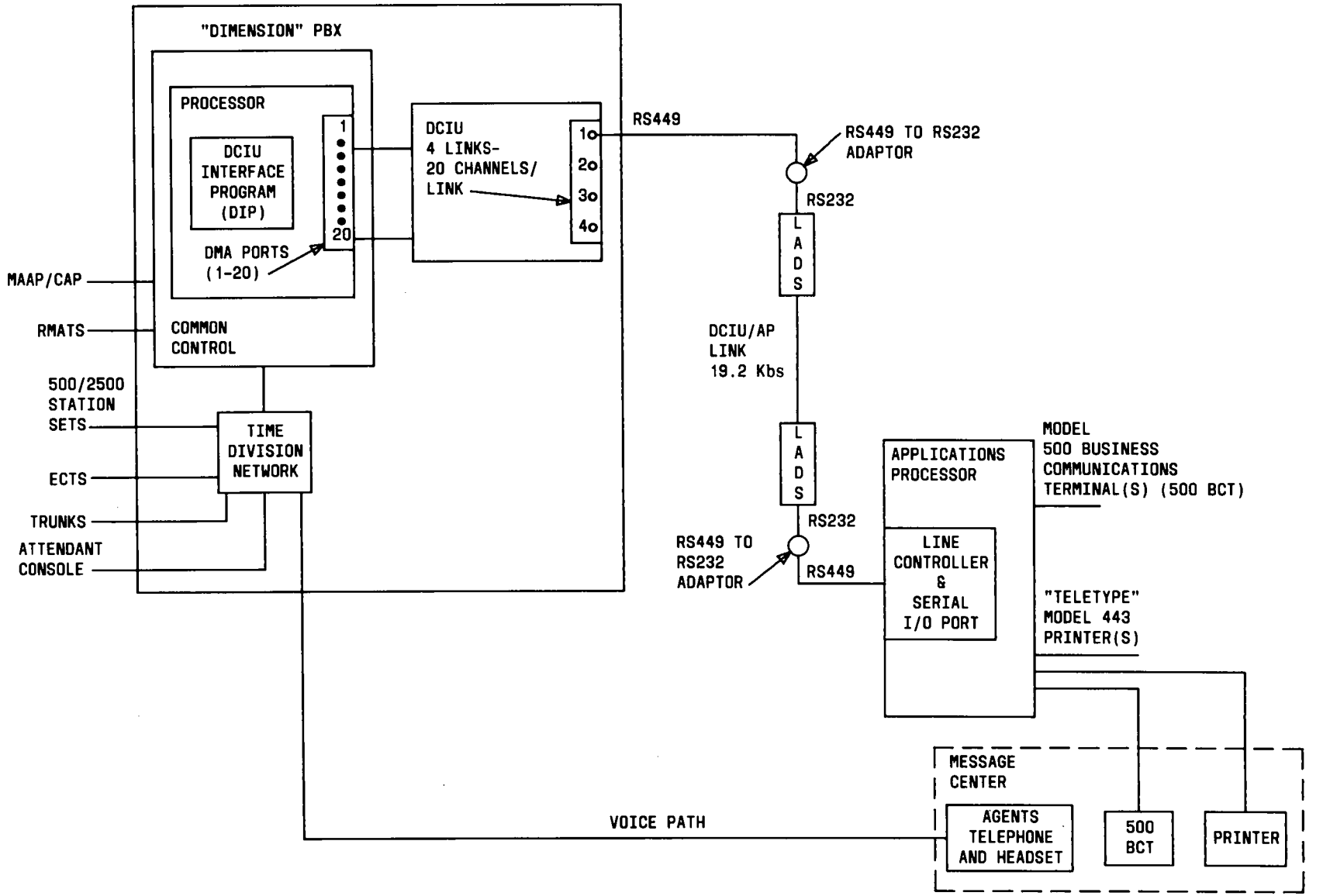
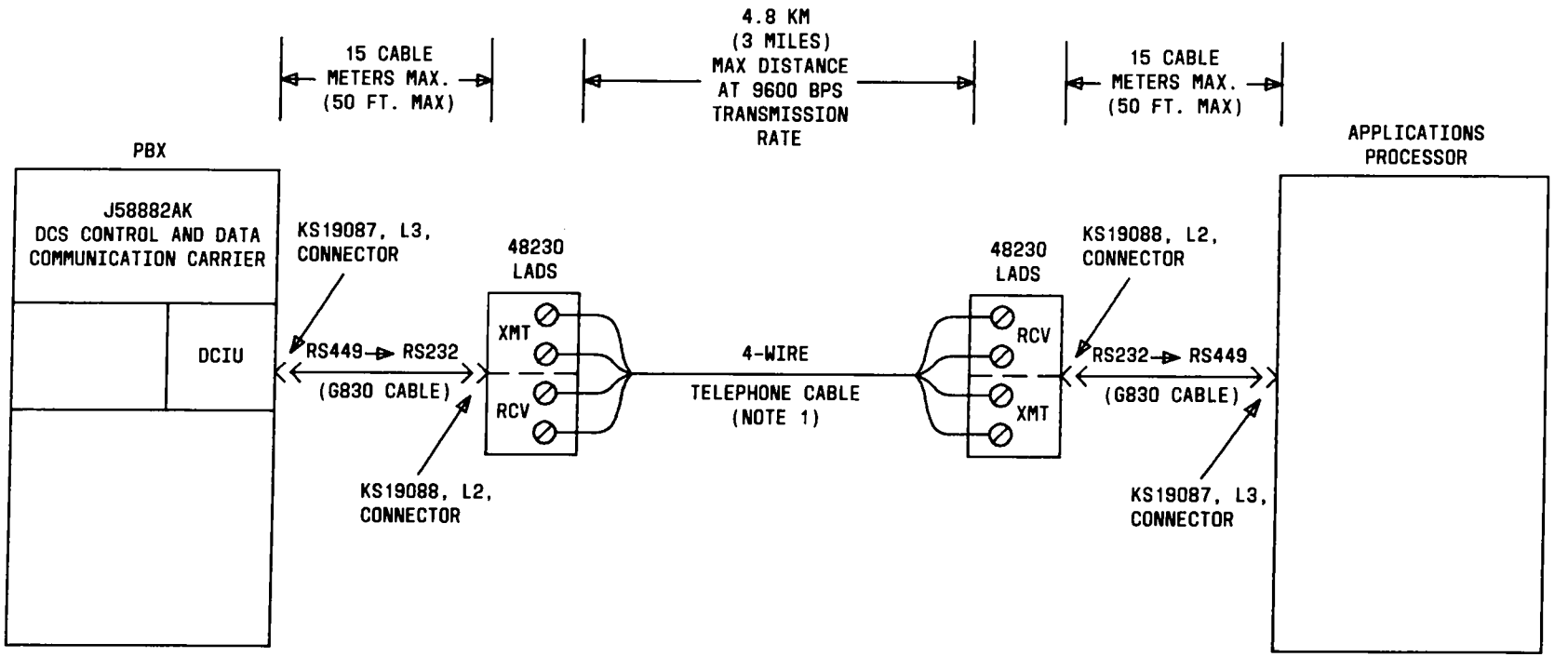


Fig. 62—Applications Processor Configuration



NOTE:
1. CONNECTION BETWEEN LADS CAN BE MADE THROUGH A CROSS-CONNECT FIELD.

Fig. 63—Applications Processor Interconnection

usage configuration of the circuit. The circuit may be configured for use at either the PBX end, the console end, or as a cascading repeater in-between.

5.17 The repeater housing is designed to be wall mounted and should be located near a 117-Vac 60-Hz outlet. The unit also provides a terminal board (TB1) to permit standard 25-pair cable, cut-down connections.

B. Repeater Arrangements

5.18 The console repeater circuits may require three separate arrangements. Two arrangements are always required—the PBX end and the console end (with or without range extension). The third is the cascading or intermediate configuration which is required to extend the distance between the PBX and the console an additional 914m (3,000 feet). A maximum of four repeaters may be used to extend the distance to 3353m (11,000 feet). The intermediate arrangement must be located in a housing providing the proper environmental protection. Table AP shows the circuit packs required and in which connector to provide the desired arrangement.

C. Repeaters With Range Extension

5.19 When attendant console repeaters are used to extend the operating range for the attendant console, they are configured as shown in Fig. 65. The distance between repeaters providing range extension must not exceed 914m (3000 feet) for 24-AWG cable. With the maximum of four repeater circuits in series, the range extension between the PBX-end repeater and the console-end repeater must not exceed 2743m (9000 feet) for 24-AWG cable. The distance between repeaters and the PBX or attendant console must not exceed 305m (1000 feet) for 24-AWG cable.

If the attendant console is located in a building separate from the PBX, attendant console repeaters are required.

D. Repeaters Without Range Extension

5.20 When attendant console repeaters are used without range extension, they are configured as shown in Fig. 66. When repeaters without range extension are provided, the distance between the PBX and the attendant console must not exceed 305m (1000 feet) for 24-AWG cable.

5.21 Repeater circuits (with and/or without range extension) contain protective circuitry for unexposed cable runs. Exposed cable runs require standard protection (such as carbon blocks) in addition to that provided by the repeaters.

5.22 A 25-pair cable is cut down in the standard manner at the input and output of each attendant console repeater. Table AQ provides for cross-connect information to be filled in at the time of installation and connections to be made at the input to the repeater.

5.23 Connections to be made at the output of the first repeater (1E through 50E) and at the input of the second repeater (1A through 50A) are shown in Table AQ. Cable connections from the second repeater (1E through 50E) to the console cable connector are also shown.

5.24 When required to extend the range an additional 914m (3000 feet), an intermediate repeater is inserted between the PBX-end repeater and the console-end repeater. Table AQ shows the connections required between two repeaters. The output of one repeater (terminals 1E through 50E) is connected to the input of the next repeater (terminals 1A through 50A). Repeat the connections shown for each intermediate repeater required (maximum of 2). Additional jumper connections are required on TB1 of each intermediate repeater provided (Table AR).

E. Power Units

5.25 The 284B1 power unit provides power to an off-premises attendant console via the console-end repeater. The power unit is required whether the repeaters have or do not have range extension. The unit should be located near the console-end repeater and connected as shown in Fig. 67.

5.26 The AE49 circuit pack and the 28D2 power unit are required for each repeater circuit providing range extension.

5.27 Power cords are available for each power unit in four lengths—610, 1219, 1829, or 3658 mm (2, 4, 6, or 12 feet, respectively).

At the console-end repeater, both power supplies must connect to the same 117-Vac 60-Hz source. The ground lug of the repeater must connect to an approved ground.

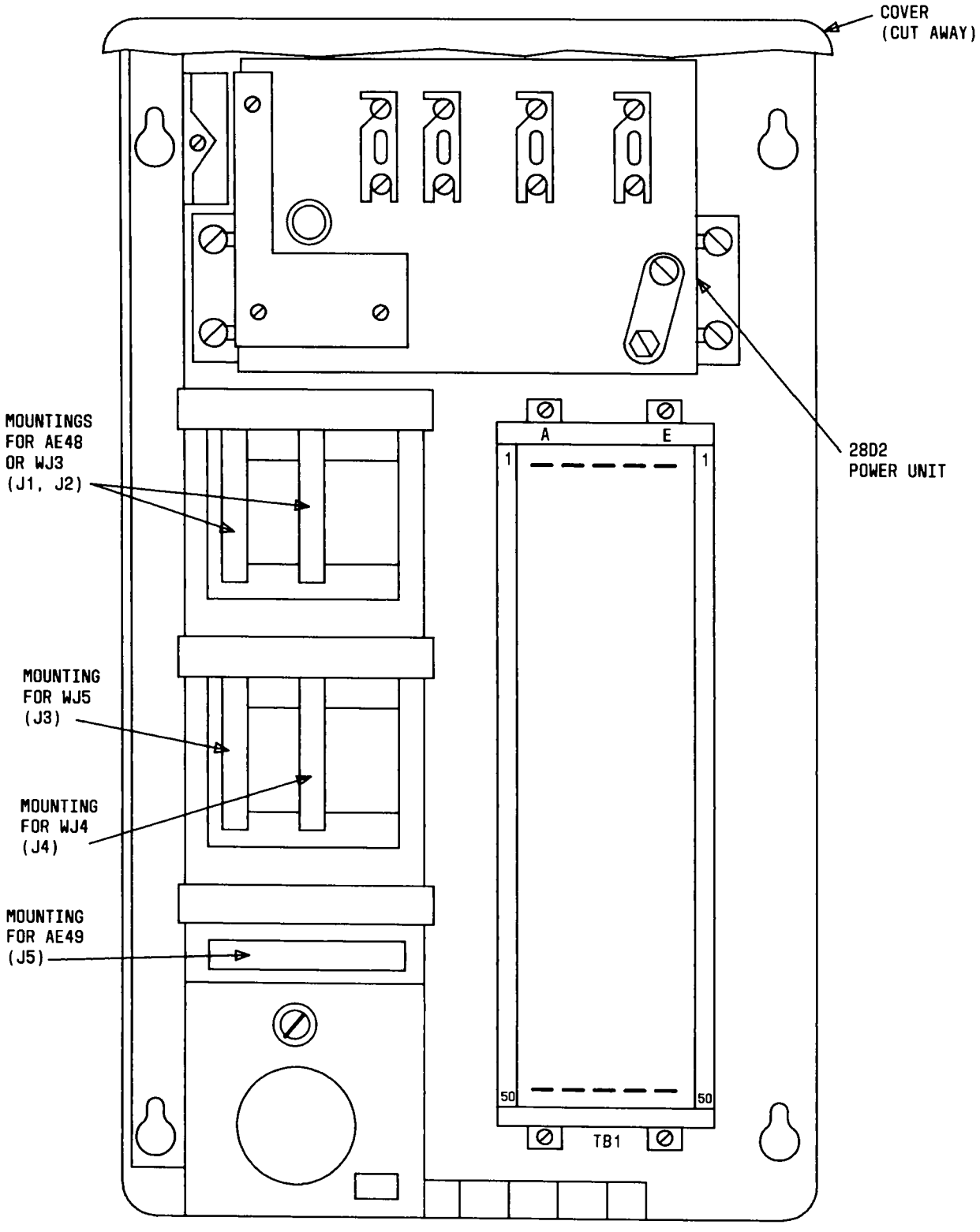


Fig. 64—Attendant Console Repeater Unit

TABLE AP

CONSOLE REPEATER ARRANGEMENTS

CONN	PBX END		INTERMEDIATE	CONSOLE END	
	WITH RANGE EXTENSION	WITHOUT RANGE EXTENSION	WITH RANGE EXTENSION	WITH RANGE EXTENSION	WITHOUT RANGE EXTENSION
J1 J2	AE48 (List 3)	WJ3 (List 4)	AE48 (List 3)	AE48 (List 3)	WJ3 (List 4)
J3	WJ5 (List 6)	WJ5 (List 6)			
J4				WJ4 (List 5)	WJ4 (List 5)
J5	AE49 (List 2)		AE49 (List 2)	AE49 (List 2)	

ATTENDANT INTERFACE

5.28 The LC45B attendant circuit provides the audio interface between the attendant console and the PBX. The unit connects the console 4-wire voice path to the time division bus of the PBX network. Each LC45B provides the audio transmission path for two attendant consoles.

"AUDICHRON*" VARIABLE ANNOUNCEMENT UNIT (H9040)

5.29 The AUDICHRON Model H9040, Group 8, is a 4-phase, single channel, digital recorder-announcer providing customer changeable message data (Fig. 68). The recorded announcement system may be used as part of automatic wakeup service instead of LC190. Announcements may be either locally recorded text of up to 14 seconds, or a 10-second prerecorded message via a cassette recorder. ▶(This method requires the use of an adapter, H9040, Group 9).◀ Full control of announcement unit, including recorded announcements, ▶is allowed from any TOUCH-TONE telephone, eliminating the need for a remote control telephone. The unit has a built-in security code to protect the wakeup message from accidental or malicious interference.◀ Battery backup, which will power the unit for 4 hours, is available for use during power outages. The unit can be mounted in the auxiliary cabinet. Rack extenders are provided for use if the announcement unit interferes with equipment in the cabinet. Connection information is provided on Table AS. Table AT is a fill-in worksheet for use with the AUDICHRON variable announcement unit.

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AUTOMATIC CALL DISTRIBUTION (ACD)

5.30 The ACD feature (Fig. 69) allows incoming CO, DID, FX, 800 Service, PBX stations, and tie trunk calls to be terminated directly to the most idle of a prearranged group of answering positions. The answering positions appear as standard stations to the PBX and can function in the normal manner to originate and receive calls directly. The answering position sets can be any standard telephone set; however, it is recommended that Electronic Custom Telephone Service (ECTS) sets be provided. A maximum of 512 answering positions can be used in the system.

5.31 The status of each answering position can be displayed on a 106B1-A display unit. The display unit is equipped with 20 columns of five light-emitting diodes (LEDs) each. Each answering position is assigned a single display column. The five status indications for each position are as follows:

- Position staffed
- Position handling an ACD call

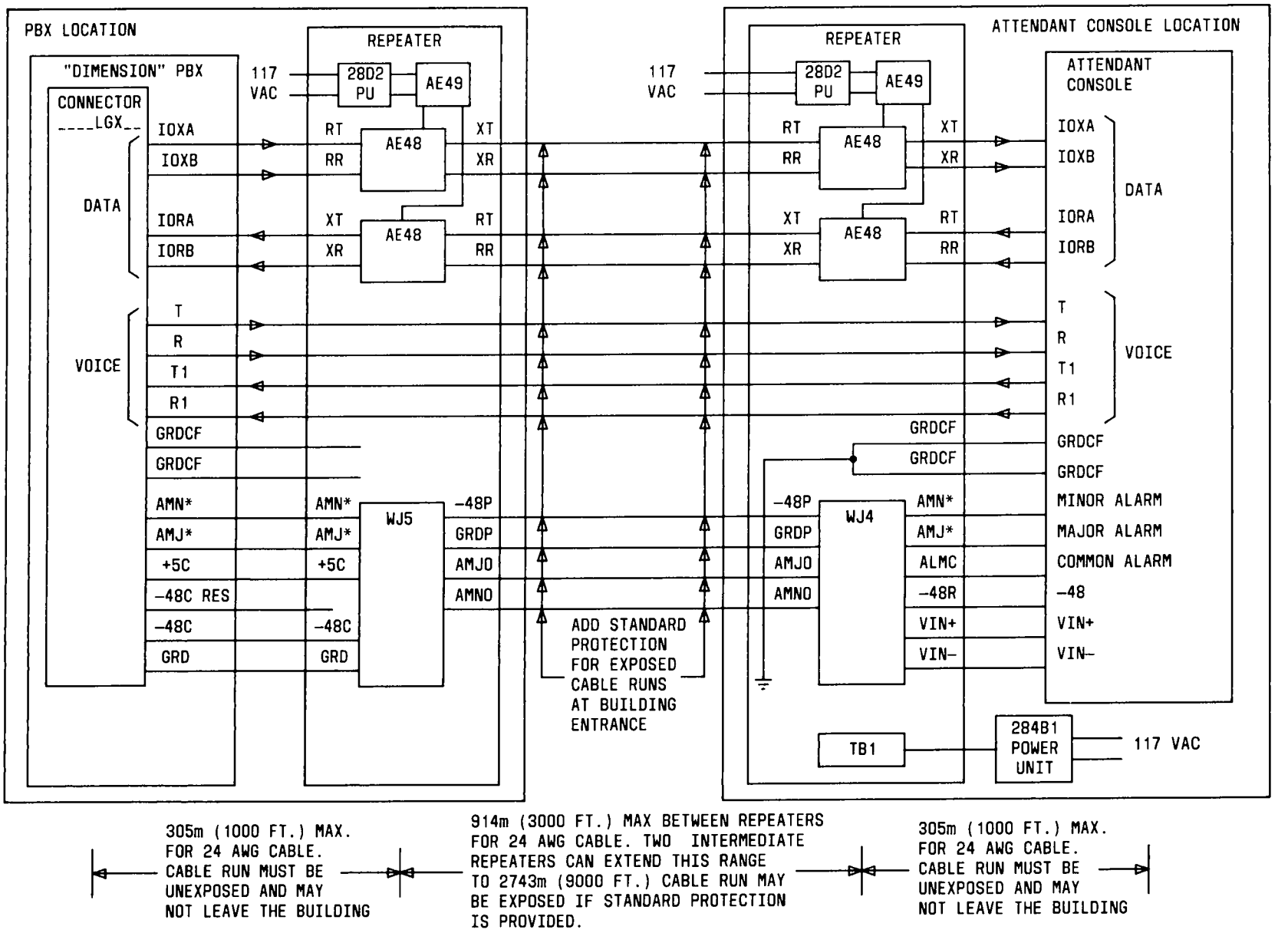


Fig. 65—Attendant Console Repeaters—With Range Extension

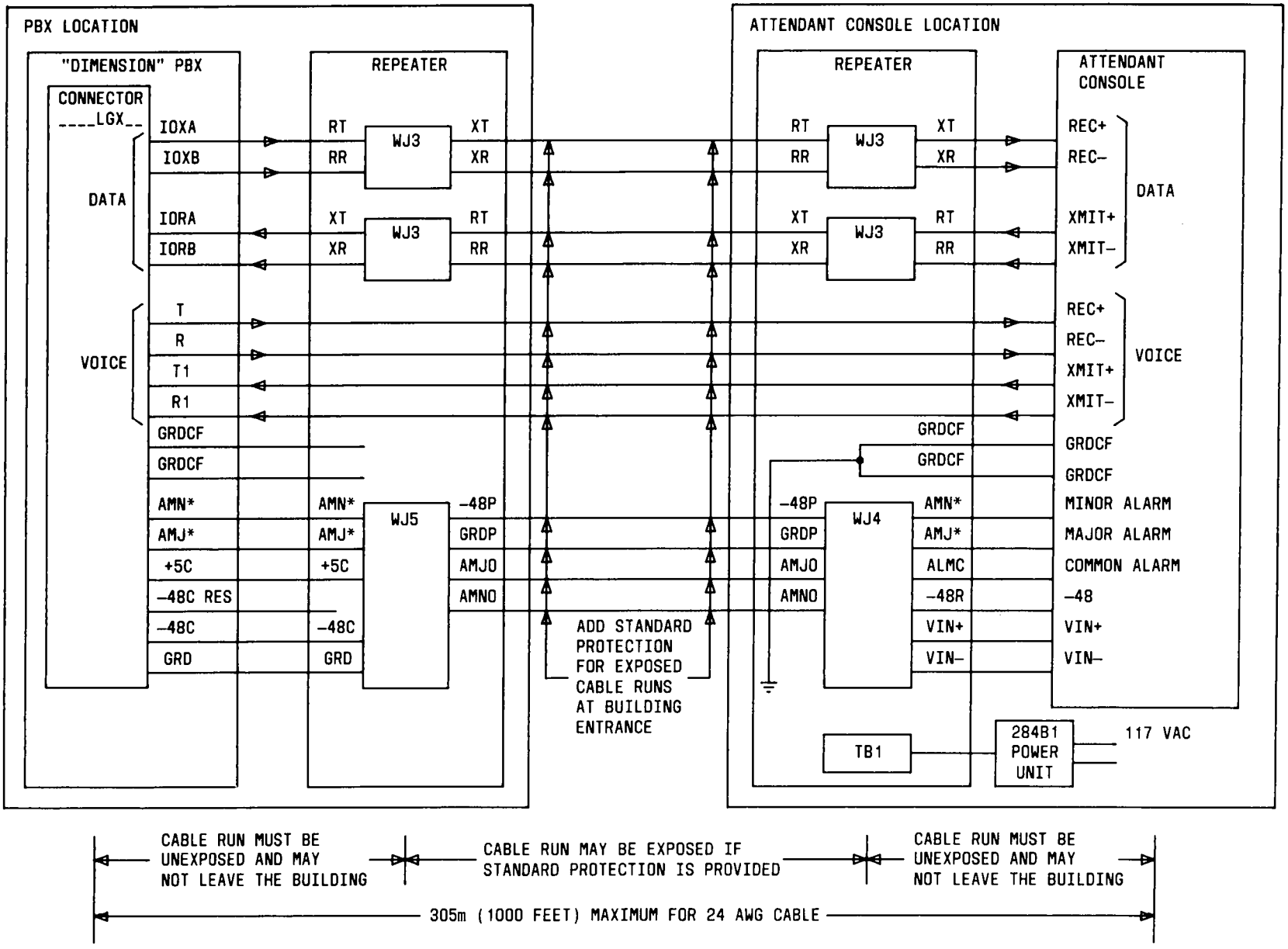


Fig. 66 —Attendant Console Repeaters—Without Range Extension

TABLE AQ

ATTENDANT CONSOLE REPEATER CROSS-CONNECTIONS WORKSHEET

MOD_ _ CAB_ CONN _ _ _ _ LGX_ _	CONN CABLE COLOR CODE	TO CROSS-CONNECT	FROM CROSS-CONNECT	TO REPEATER AT PBX END		FROM REPEATER AT PBX END	TO REPEATER AT CONSOLE END		FROM REPEATER AT CONSOLE END	TO CONSOLE	
		PURPLE	YELLOW (NOTE)	CONN BLK TB1		LEAD DESIG	CONN BLK TB1		LEAD DESIGNATION	CONN CABLE COLOR CODE	CONSOLE TERM NO.
IOXA0 (+ DATA IN)	W-BL	1		1A	1E	RT	1A	1E	IOXA0 (+ DATA IN)	W-BL	1
IOXB0 (- DATA IN)	BL-W	2		2A	2E	RR	2A	2E	IOXB0 (- DATA IN)	BL-W	2
IORA0 (+ DATA OUT)	W-O	3		3A	3E	XT	3A	3E	IORA0 (+ DATA IN)	W-O	3
IORB0 (- DATA OUT)	O-W	4		4A	4E	XR	4A	4E	IORB0 (- DATA IN)	O-W	4
T (+ SPEECH IN)	W-G	5		5A	5E	T	5A	5E	T (+ SPEECH IN)	W-G	5
R (- SPEECH IN)	G-W	6		6A	6E	R	6A	6E	R (- SPEECH IN)	G-W	6
T1 (+ SPEECH OUT)	W-BR	7		7A	7E	T1	7A	7E	T1 (+ SPEECH IN)	W-BR	7
R1 (- SPEECH OUT)	BR-W	8		8A	8E	R1	8A	8E	R1 (- SPEECH IN)	BR-W	8
GRDCF	W-S	9		9A	9E	GRDCF	9A	9E	GRDCF	W-S	9
GRDCF	S-W	10		10A	10E	GRDCF	10A	10E	GRDCF	S-W	10
AMN (MINOR ALARM)	R-BL	11		11A	11E	AMNO	11A	11E	AMN (MINOR ALARM)	R-BL	11
AMJ (MAJOR ALARM)	BL-R	12		12A	12E	AMJO	12A	12E	AMJ (MAJOR ALARM)	BL-R	12
+5C1	R-O	13		13A	13E		13A	13E	COMM ALARM	R-O	13
-48C_RES	O-R	14		14A	14E		14A	14E	-48C -17 REG	O-R	14
GRD-48	R-G	15		15A	15E	GRDP	15A	15E	GRDP	R-G	15
-48C_	G-R	16		16A	16E	-48P	16A	16E	-48	G-R	16
GRD-48	R-BR	17		17A	17E	GRDP	17A	17E	GRDP	R-BR	17
-48C_	BR-R	18		18A	18E	-48	18A	18E	-48	BR-R	18
GRD-48	R-S	19		19A	19E	GRDP	19A	19E	GRDP	R-S	19
-48C_	S-R	20		20A	20E	-48	20A	20E	-48	S-R	20
GRD-48	BK-BL	21		21A	21E	GRDP	21A	21E	GRDP	BK-BL	21
-48C_	BL-BK	22		22A	22E	-48	22A	22E	-48	BL-BK	22
GRD-48	BK-O	23		23A	23E	GRDP	23A	23E	GRDP	BK-O	23
-48C_	O-BK	24		24A	24E	-48	24A	24E	-48	O-BK	24
GRD-48	BK-G	25		25A	25E	GRDP	25A	25E	GRDP	BK-G	25
-48C_	G-BK	26		26A	26E	-48	26A	26E	-48	G-BK	26
GRD-48	BK-BR	27		27A	27E	GRDP	27A	27E	GRDP	BK-BR	27
-48C_	BR-BK	28		28A	28E	-48	28A	28E	-48	BR-BK	28
GRD-48	BK-S	29		29A	29E	GRDP	29A	29E	GRDP	BK-S	29
-48C_	S-BK	30		30A	30E	-48	30A	30E	-48	S-BK	30
GRD-48	Y-BL	31		31A	31E	GRDP	31A	31E	GRDP	Y-BL	31
-48C_	BL-Y	32		32A	32E	-48	32A	32E	-48	BL-Y	32
GRD-48	Y-O	33		33A	33E	GRDP	33A	33E	GRDP	Y-O	33
-48C_	O-Y	34		34A	34E	-48	34A	34E	-48	O-Y	34
GRD-48	Y-G	35		35A	35E	GRDP	35A	35E	GRDP	Y-G	35
-48C_	G-Y	36		36A	36E	-48	36A	36E	-48	G-Y	36
GRD-48	Y-BR	37		37A	37E	GRDP	37A	37E	GRDP	Y-BR	37
-48C_	BR-Y	38		38A	38E	-48	38A	38E	-48	BR-Y	38
GRD-48	Y-S	39		39A	39E	GRDP	39A	39E	GRDP	Y-S	39
-48C_	S-Y	40		40A	40E	-48	40A	40E	-48	S-Y	40
GRD-48	V-BL	41		41A	41E	GRDP	41A	41E	GRDP	V-BL	41
-48C_	BL-V	42		42A	42E	-48	42A	42E	-48	BL-V	42
GRD-48	V-O	43		43A	43E	GRDP	43A	43E	GRDP	V-O	43
-48C_	O-V	44		44A	44E	-48	44A	44E	-48	O-V	44
GRD-48	V-G	45		45A	45E	GRDP	45A	45E	GRDP	V-G	45
-48C_	G-V	46		46A	46E	-48	46A	46E	-48	G-V	46
GRD-48	V-BR	47		47A	47E	GRDP	47A	47E	GRDP	V-BR	47
-48C_	BR-V	48		48A	48E	-48	48A	48E	-48	BR-V	48
GRD-48	V-S	49		49A	49E	GRDP	49A	49E	GRDP	V-S	49
-48C_	S-V	50		50A	50E	-48	50A	50E	-48	S-V	50

NOTE: TO BE FILLED IN AT TIME OF INSTALLATION.

TABLE AR

INTERMEDIATE ATTENDANT CONSOLE JUMPER CONNECTIONS

INTERMEDIATE REPEATER NO. ___	CROSS-CONNECT	
	FROM	TO
	TB1	
LEAD DESIG	TERM.	TERM.
AMNO	11B	11D
AMJO	12B	12D
GRDP	15B	15D
–48	16B	16D
GRDP	17B	17D
–48	18B	18D
GRDP	19B	19D
–48	20B	20D
GRDP	21B	21D
–48	22B	22D
GRDP	23B	23D
–48	24B	24D
GRDP	25B	25D
–48	26B	26D
GRDP	27B	27D
–48	28B	28D
GRDP	29B	29D
–48	30B	30D
GRDP	31B	31D
–48	32B	32D
GRDP	33B	33D
–48	34B	34D
GRDP	35B	35D
–48	36B	36D
GRDP	37B	37D
–48	38B	38D
GRDP	39B	39D
–48	40B	40D
GRDP	41B	41D
–48	42B	42D
GRDP	43B	43D
–48	44B	44D
GRDP	45B	45D
–48	46B	46D
GRDP	47B	47D
–48	48B	48D
GRDP	49B	49D
–48	50B	50D

- Position busy via ***after work*** mode
- Position busy via ***auxiliary work*** mode
- Position engaged in non-ACD activity.

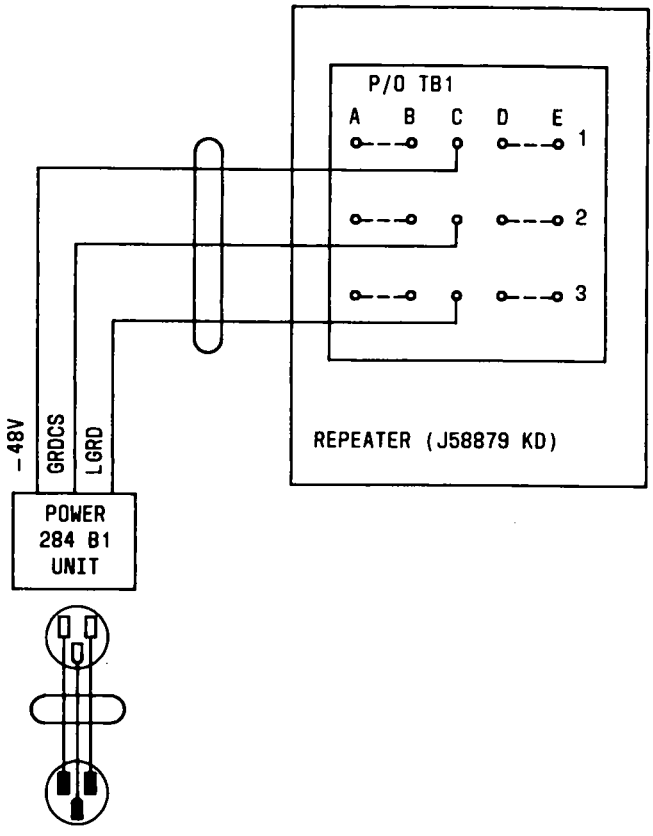


Fig. 67—284B1 Power Unit

5.32 An LC55 circuit pack must be installed in the ECTS controller to drive the lamps on the display. Each LC55 will drive the lamps for eight positions; therefore, two and one-half circuit packs (LC55) are required for each display. A total of 26 displays is required to provide status indications for the maximum 512 answering positions. Refer to Section 554-010-111 for the cross-connections required for the answering position sets. Figure 70 shows a typical cabling arrangement for the 106B1-A display unit.

5.33 The ACD system assigns each answering position to an ACD split or group. A maximum of 30 splits is offered in the system. ▶There are no restrictions placed on the maximum number of answering positions per split, as long as the total number of answering positions in the system does not exceed 512. Customer data such as busy-hour calls, operator average talk-time, operator average after-call work time, and objective average answer delay is used to determine the number of ACD answering positions per split.◀

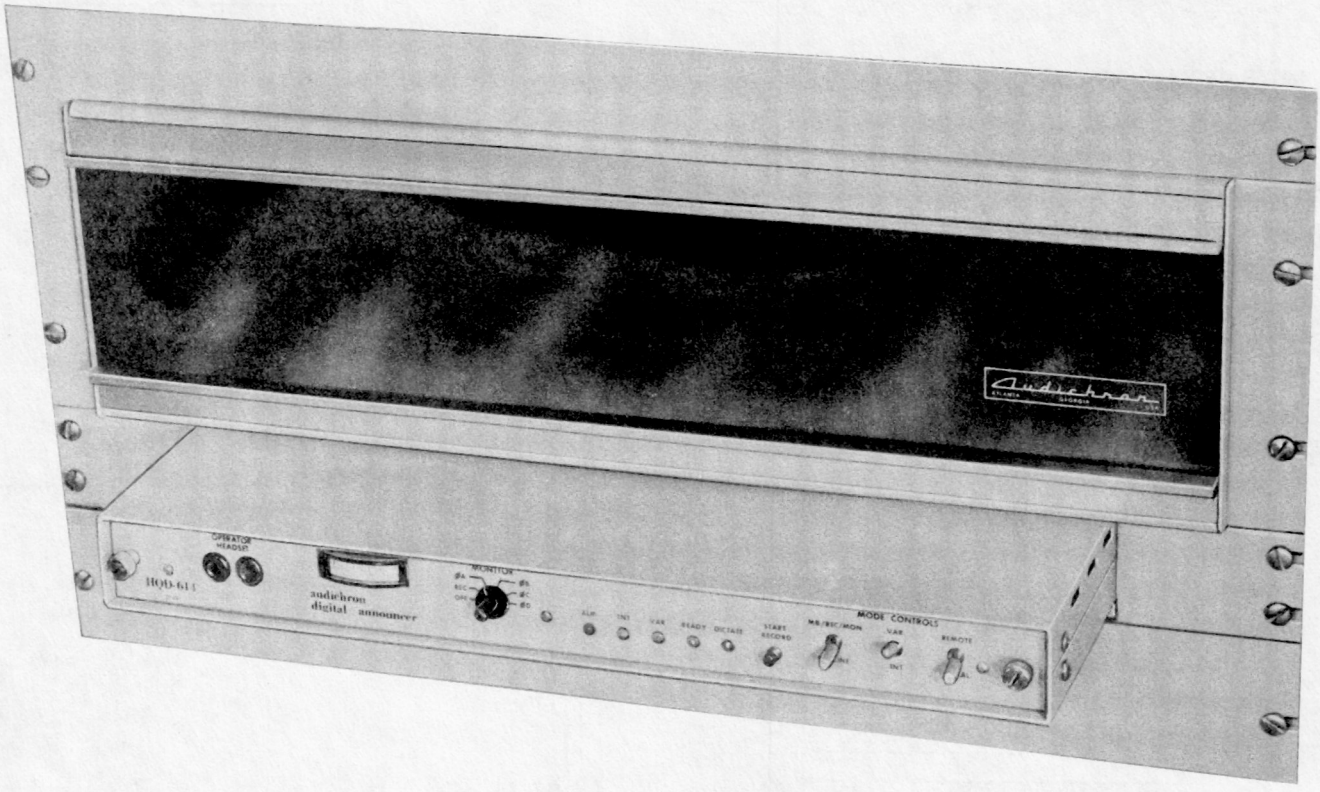


Fig. 68—AUDICHRON Recorder Announcer (H9040)

5.34 Incoming calls to an ACD split are first directed to a queue for that split. One lamp per split may be used to indicate when the number of calls in queue exceeds a predetermined number. The level of calls in queue that triggers the overflow lamp is administered via software and is customer adjustable from 1 to 31.

5.35 Priority queuing allows priority calls to be answered by the first available attendant, before other calls that have been waiting an equal or longer period of time. Priority queueing can be designated by digits sent, type of trunk, or overflow calls.

5.36 An LC15 circuit pack must be installed to drive the overflow lamps. Four LC15s would be required to drive (8 lamps each) the 30 maximum split-queue lamps. A convenient method of providing the overflow signal is via a "beehive" lamp (Fig. 71). One circuit is required per each ACD traffic overflow split. Selection of the lamp type and value of resistor R1 must be engineered based on loop range requirements. The M1-type lamp is for short-loop (25 ohm) range, and J1-type lamp is for long-loop (option XG= 2500 ohms, option 69 = 1500 ohms) range. Both M1- and J1-type lamps mount in 15-, 17-, or 18-type indicators. The RSP- in Fig. 71 is a J58879BA, List 15, or J58882BA, List 25, resistor assembly which must be provided when cable runs are exposed (option 69). The value of the contact protection resistor R1 is determined by loop-range impedance. Refer to Table AU for R1 values. A 185A contact protection network is also used with the 17B KTU. Install the 17B KTU at the lamp indicator location. The maximum loop range between the J1-type lamp and the ac power unit is 15 ohms. The required equipment per loop is listed in Table AV. A fill-in worksheet (Table AW) is provided for ACD traffic overload indicator short-loop connections and Table AX for indicator long-loop connections.

5.37 Another method of providing the split queue overflow signal is via a 30A8 system status indicator (SSI). (A description of the SSI is provided

TABLE AS

"AUDICHRON" VARIABLE ANNOUNCEMENT UNIT—INTERCONNECTIONS

INSTALL STRAPS FROM				TO
APPARATUS		TERMINAL	STRAP DESIG	
Recorder/Announcer		V	GRD	Ground Bus Bar on Cabinet Fuse Panel
		V		
Playback Amplifier	ØA	R	−48V	Fuseholders on Cabinet Fuse Panel
	ØB	R		
	ØC	R		
	ØD	R		
Control Pulse Interface and Monitor	ØA	J		
	ØB	J		
	ØC	J		
	ØD	J		
Recorder/ Announcer	With Battery Pack	A		
	Without Battery Pack	S		
System Alarm		E		

CONNECT IW FROM			TO/FROM CONN BLK (YELLOW)	TO/FROM CONN BLK (PURPLE)	TO MODULE CONTROL CABINET
APPARATUS	LEAD DESIG	PIN	TERMINAL	TERMINAL*	LC13
Control Pulse Interface and Monitor	CP-A	A	1	3	AL1
	CP-B	B	2	9	AL1
	CP-C	C	3	19	AL1
	CP-D	D	4	25	AL1
Playback Amplifier	TT-A	E	5	1	T
	RR-A	F	6	2	R
	TT-B	H	7	7	T
	RR-B	J	8	8	R
	TT-C	K	9	17	T
	RR-C	L	10	18	R
	TT-D	M	11	23	T
	RR-D	N	12	24	R
System Alarm	MJ-A	P	13		
	MJ-B	R	14		

*Typical terminals shown—LC13B circuits may appear on other terminals.

TABLE AT

"AUDICHRON" VARIABLE ANNOUNCEMENT UNIT CROSS-CONNECTIONS WORK-SHEET

MOD _ _ CAB___ TRUNK CARRIER _____			CROSS-CONNECT			
			FROM	TO	TO	
CONNECTOR _____			PURPLE BKBD	YELLOW BKBD	PBX AUXILIARY CAB.	
					RECORDER ANNOUNCER	
LC13B AUXILIARY TRUNK INTERFACE CIRCUIT			BLK ___	BLK ___	INSIDE WIRING	
SLOT	CIRCUIT	LEAD DESIG	TERM.	TERM.	LEAD DESIG	ENCLOSURE POSITION 1.11
–	0	T			TT-QA	E
		R			RR-QA	F
		AL1			CP-A	A
	1	T			TT-QB	H
		R			RR-QB	J
		AL1			CP-B	B
–	0	T			TT-QC	K
		R			RR-QC	L
		AL1			CP-C	C
	1	T			TT-QD	M
		R			RR-QD	N
		AL1			CP-D	D

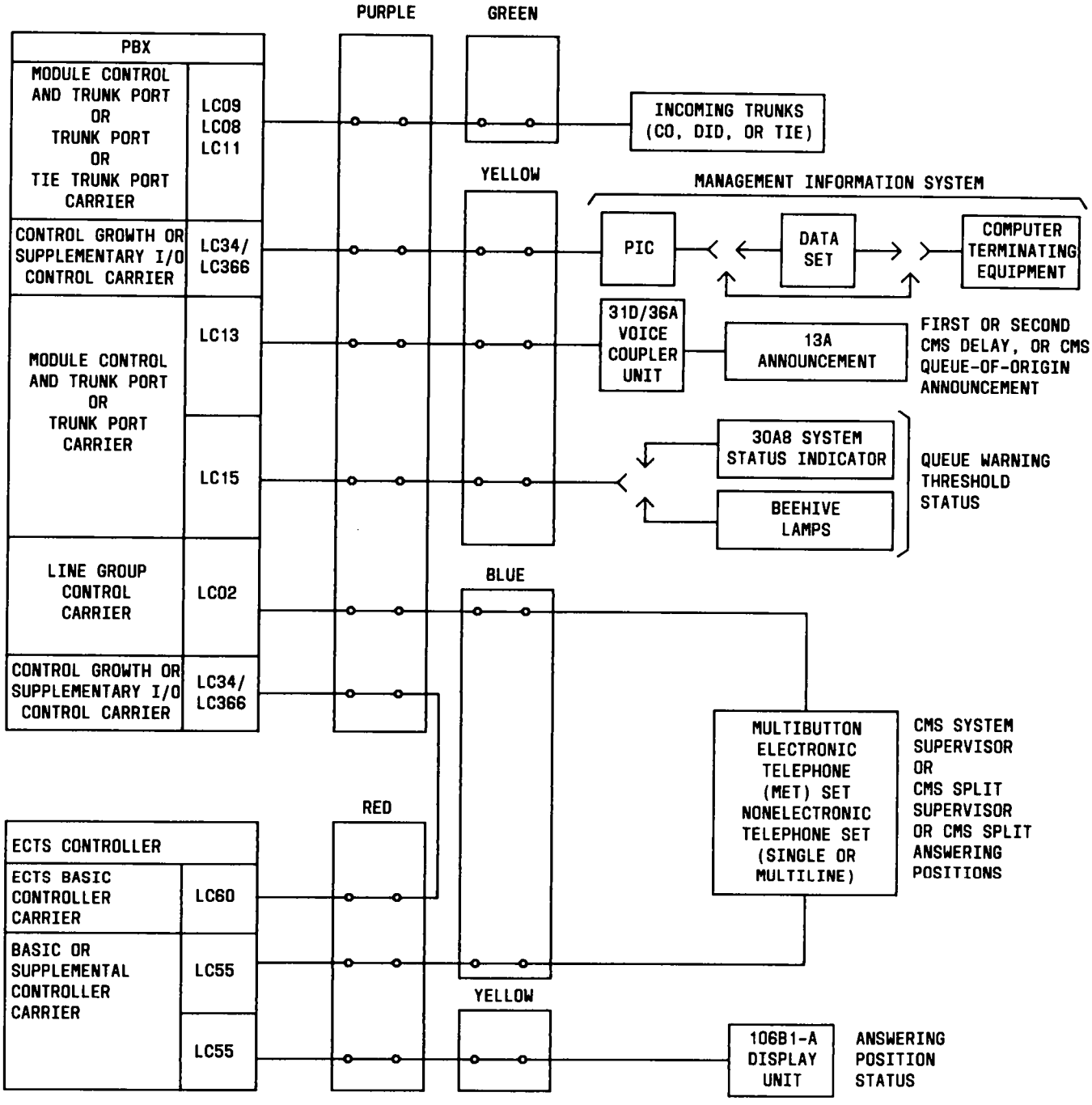


Fig. 69—Automatic Call Distribution (ACD)

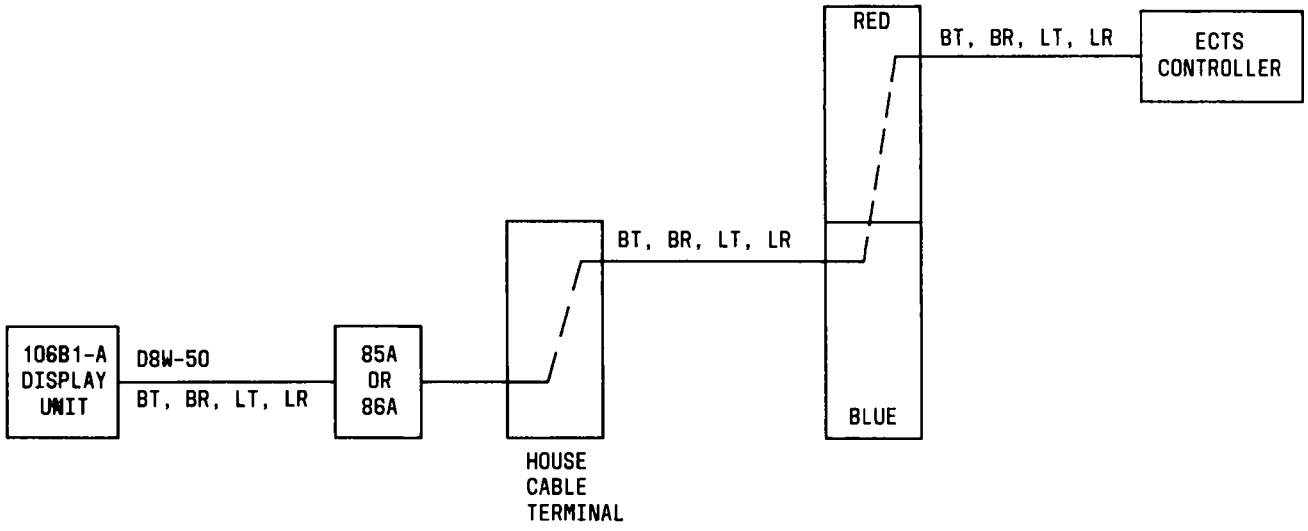


Fig. 70—Typical Cabling for 106B1-A Display Unit

in this Part 5.) Each SSI can provide the overflow indication for eight ACD split queues. Four SSIs would be required to provide the maximum of 30. Figure 72 shows the connections for the first and fourth SSI. Connections for the second and third SSI are similar to the connections for the first display. A worksheet for any SSI display is shown in Table AY.

5.38 A recorded announcement may be provided for each ACD split. The announcement is to inform the calling party that the call connection will be delayed. Music may be provided optionally to the calling party waiting in queue after the first delay announcement. A second "delay" announcement may be provided on a system basis to follow the first delay after a predetermined interval. A third announcement may be provided for ACD systems which overflow or forward callers from one queue to another. A third message provides the ***queue-of-origin announcement*** which informs the answering position of the queue number for which the call has been forwarded. ▶The fourth message provides the ***city-of-origin announcement*** which informs the answering position of the city from which the call has been forwarded.◀ The audible recall feature allows the call origin announcement to be repeated if necessary.

5.39 The ACD announcements are provided via 13A announcement units. Each 13A may be equipped with a maximum of eight channels. The following channels are required per each system:

- One channel per ACD split to provide the first delay message ▶(maximum of 30)◀
- One channel per ACD system to provide the second delay message ▶(one required)◀
- One channel per ACD split to provide the queue-of-origin message ▶(maximum of 30)◀
- ▶One channel per ACD trunk to provide the city-of-origin message (maximum of 81).◀

5.40 For maximum ACD systems which use all four messages, a total of 142 channels is required. Eighteen 13A announcement units would be necessary to provide the required channels. An LC13B auxiliary trunk circuit pack is required for each two channels. A maximum of 72 LC13Bs is required per ACD system. The LC13B circuit arrangement is provided in Part 6. Cross-connection information for 13A-recorded announcement unit is shown in Fig. 73. Table AZ is a fill-in worksheet to show the cross-connection information for the 13A-recorded announcement unit. Connections for the announcement unit and auxiliary trunk circuits are discussed further in this Part 5 (refer to Recorded Announcement Intercept Connection).

5.41 The automatic interflow feature in the ACD system provides the ability to automatically forward incoming ACD calls from the primary split to other ACD systems when all trunks are busy. The city-of-origin message should be provided to the terminating split. Automatic interflow should notify the ACD system supervisor that manual handling is

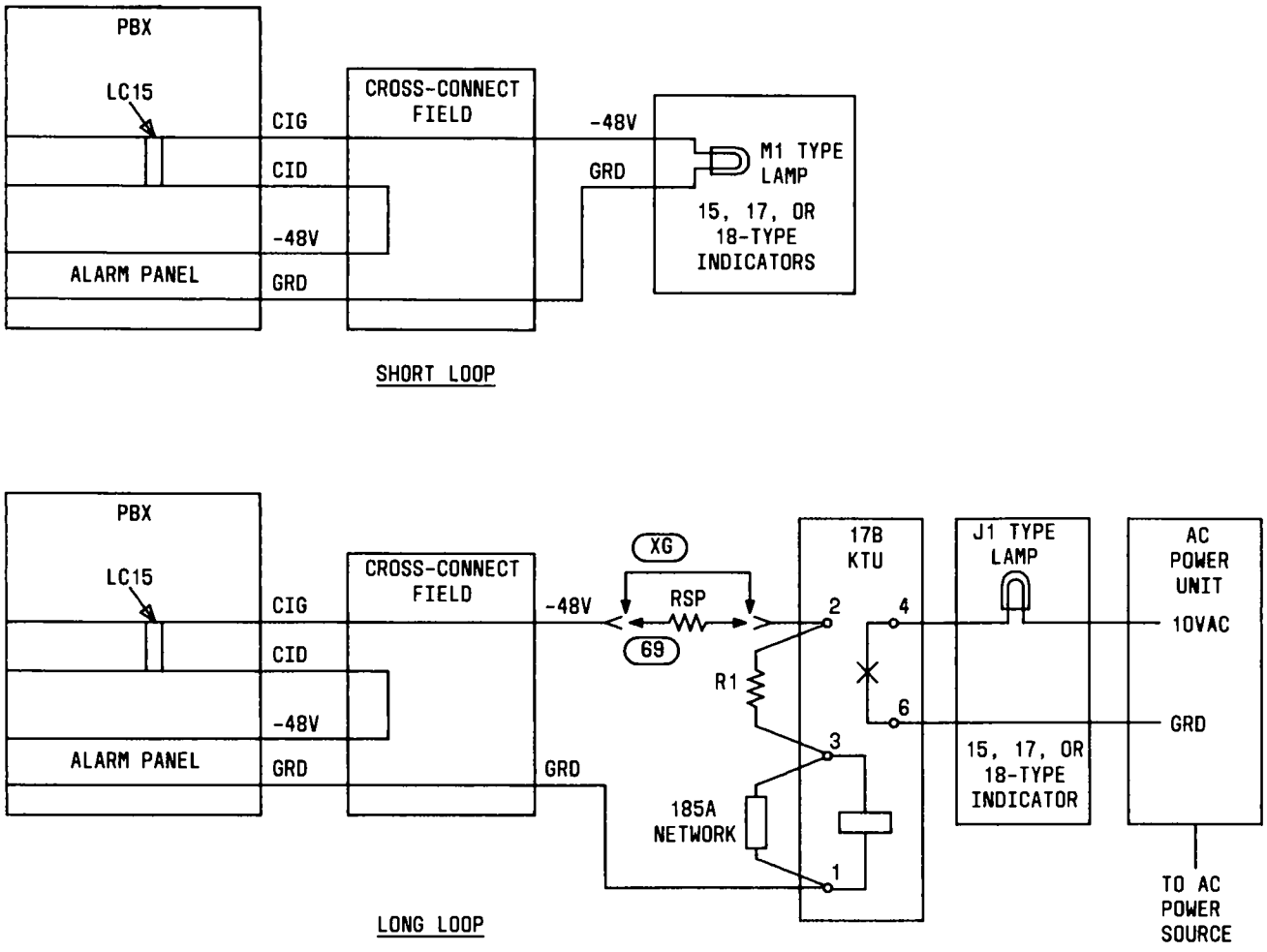
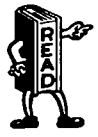


Fig. 71—ACD Traffic Overload Indicator

necessary when the remote ACD system already has queued calls in all splits. Initial out threshold should be customer-specified at installation. ◗When the ACD feature is used with a Management Information System (MIS), the total system is referred to as a Call Management System (CMS). Refer to CMS for more information.◖

AUTOMATIC VOICE NETWORK (AUTOVON) INTERFACE EQUIPMENT

5.42 The AUTOVON service via the DIMENSION 2000 and Custom PBXs provides access to and from the world-wide U.S. Department of Defense private line communication Automatic Voice Network (AUTOVON). Access lines (trunk circuits) to the AUTOVON network have console appearance on a DIMENSION PBX adjunct, the 21-type selector console. Each selector console contains a maximum of 30, 60, or 90 trunk keys with a status lamp provided for each key. Up to four 21-type selector consoles may be provided. A maximum of four AUTOVON trunks, one or two carriers, and associated cabling are also required. Refer to Section 554-010-135 for detailed information on this service.



This service can only be used with the 02-system (type-D) console.

Precedence capable access lines appear on two adjacent keys on the selector console, one key (R) for the routine port and one key (P) for the precedence port.

TABLE AU

VALUE OF KS-20289 RESISTOR R1 PER LOOP RANGE

LOOP RANGE (OHMS)	NONEXPOSED CABLE	EXPOSED CABLE
26	2.37K	1.33K
500	1.62K	619
1000	1.0K	0
1500	511	0
2000	0	0

Routine only access lines appear on a single key per access line.

5.43 The AUTOVON interface equipment (Fig. 74) required with the DIMENSION PBX to provide AUTOVON service follows:

- One selector console (minimum) type 21A, 21B, or 21C—each selector console must be associated with a main console (Fig. 75).
- One basic AUTOVON control and trunk carrier (J59216BA) minimum.
- One or more supplementary AUTOVON control and trunk carrier (J59216BB), as required, for additional capacity.
- One special AUTOVON control and trunk carrier (J59216BC), as required, if more than six consoles are equipped.
- LC11D, tie trunk circuit pack.

TABLE AV

EQUIPMENT REQUIRED PER LOOP FOR ACD/UCD TRAFFIC OVERLOAD INDICATOR

ARRANGEMENT	EQUIPMENT REQUIRED PER UCD GROUP
Short Loop 0-25 Ohms	One M1-Type Lamp One 15-, 17-, or 18-Type Indicator One LC15 Circuit Pack
Long Loop Nonexposed Cable 26-2500 Ohms	One J1-Type Lamp One 15-, 17-, or 18-Type Indicator One LC15 Circuit Pack One 17B KTU One 28A1 Power Unit One 185A Contact Protector Network One KS-20289 Type Resistor (R1)
Long Loop Exposed Cable 26-1500 Ohms	Same as Long-Loop Nonexposed Cable One J58882BA-L25 Resistor Assembly (RSP)

TABLE AW

CROSS-CONNECTIONS FOR ACD/UCD TRAFFIC OVERLOAD INDICATOR (SHORT LOOP) WORKSHEET

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT			
				TO/FROM	TO/FROM	TO/FROM	TO
				CONN BLK _ _ _ _ _ XO _ _	CONN BLK _ _ _ _ _ LGX02	CONN BLK ___	M1-TYPE LAMP
EQUIPMENT	CKT NO.			(PURPLE)		(YELLOW)	LEAD DESIG / TERM. NO.
LC15 CONTACT INTERFACE B MODULE _ _ CABINET ___ CARRIER ___ SLOT ___	1	CIG					-48V 1
		CID					
	2	CIG					-48V 2
		CID					
	3	CIG					-48V 3
		CID					
	4	CIG					-48V 4
		CID					
	5	CIG					-48V 5
		CID					
	6	CIG					-48V 6
		CID					
	7	CIG					-48V 7
		CID					
	8	CIG					-48V 8
		CID					
LINE GROUP CONTROL CARRIER		-48 AUX	V-S		49		
MODULE _ _ CABINET___ CARRIER___		GRD -48	S-V		50		GRD ALL

TABLE AX

CROSS-CONNECTIONS FOR ACD/UCD TRAFFIC OVERLOAD INDICATOR (LONG LOOP) WORKSHEET

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT								
				TO/FROM	TO/FROM	TO/FROM	TO			FROM	TO/FROM	TO
				CONN BLK _ _ _ _ _ XO _ (PURPLE)	CONN BLK _ _ _ _ L6X02 (PURPLE)	CONN BLK ___ (YELLOW)	17B KTU				J1-TYPE LAMP ON INDICATOR NO.	POWER UNIT
EQUIPMENT	CKT NO.						NO.	LEAD DESIG	TERM. NO.	TERM. NO.		
LC15 CONTACT INTERFACE B MODULE _ _ CABINET ___ CARRIER ___ SLOT ___	1	CIG					1ST	-48V	2	4	1	10VAC
		CID								6		GRD
	2	CIG					2ND	-48V	2	4	2	10VAC
		CID								6		GRD
	3	CIG					3RD	-48V	2	4	3	10VAC
		CID								6		GRD
	4	CIG					4TH	-48V	2	4	4	10VAC
		CID								6		GRD
	5	CIG					5TH	-48V	2	4	5	10VAC
		CID								6		GRD
	6	CIG					6TH	-48V	2	4	6	10VAC
		CID								6		GRD
	7	CIG					7TH	-48V	2	4	7	10VAC
		CID								6		GRD
	8	CIG					8TH	-48V	2	4	8	10VAC
		CID								6		GRD
LINE GROUP CONTROL CARRIER MOD_ _CAB_CARR_		-48V AUX	V-S		49							
		GRD -48V	S-V		50		ALL	GRD	1			

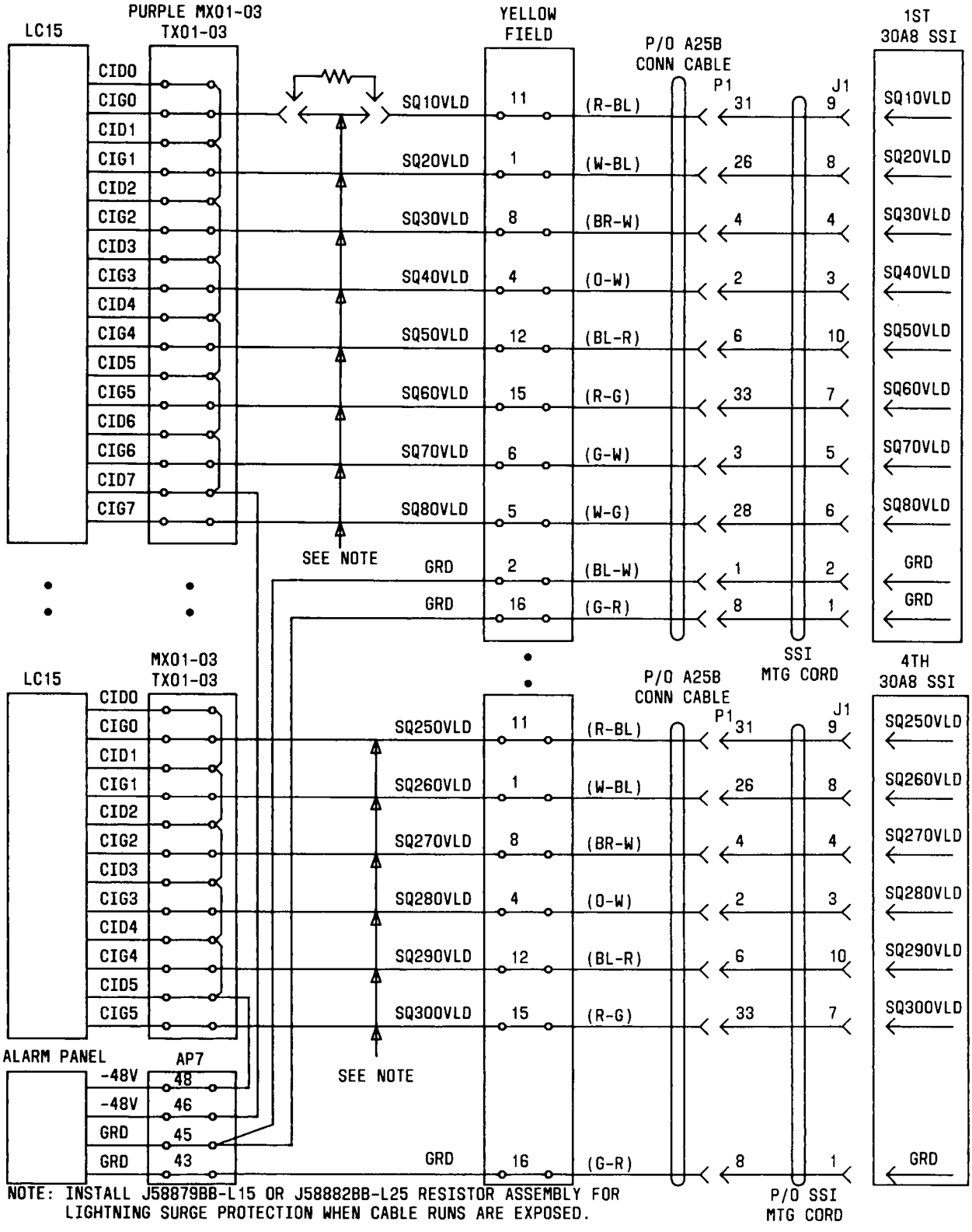


Fig. 72—30A8 System Status Indicator—ACD Split Queue Overload

TABLE AY

CROSS-CONNECTIONS FOR ADDITIONAL SYSTEM STATUS INDICATOR WORKSHEET

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT						
				TO/FROM	TO/FROM	TO/FROM	TO			
				CONN BLK	CONN BLK	CONN BLK	30A8 SSI NO. ___			
				_ _ _ _ _ XO _	_ _ _ _ _ LGX02	_ _	COLOR CODE A25B	MTG CORD		
EQUIPMENT	CKT NO.			(PURPLE)		(YELLOW)		LEAD DESIG (NOTE)	P1 CONN TERM.	
LC15 CONTACT INTERFACE B	1	CIG0				11	R-BL		31	
	2	CIG1				1	W-BL		26	
	3	CIG2				8	BR-W		4	
MODULE _ _	4	CIG3				4	O-W		2	
CABINET ___	5	CIG4				12	BL-R		6	
CARRIER ___	6	CIG5				15	R-G		33	
SLOT ___	7	CIG6				6	G-W		3	
	8	CIG7				5	W-G		28	
	1	CID0								
	2	CID1								
	3	CID2								
	4	CID3								
	5	CID4								
	6	CID5								
	7	CID6								
	8	CID7								
LINE GROUP CONTROL CARRIER MODULE _ _ CABINET_____ CARRIER_____		-48 AUX	V-S		49					
		GRD -48V	S-V		50	2	BL-W	GRD	1	
						16	G-R	GRD	8	

NOTE: LEAD DESIG = "SQ(1-30) OVRLD" WHEN DISPLAY INDICATES ACD SPLIT QUEUE OVERLOAD, OR "RL(1-114) BSY" WHEN DISPLAY MONITORS CAS RELEASE LINK TRUNKS.

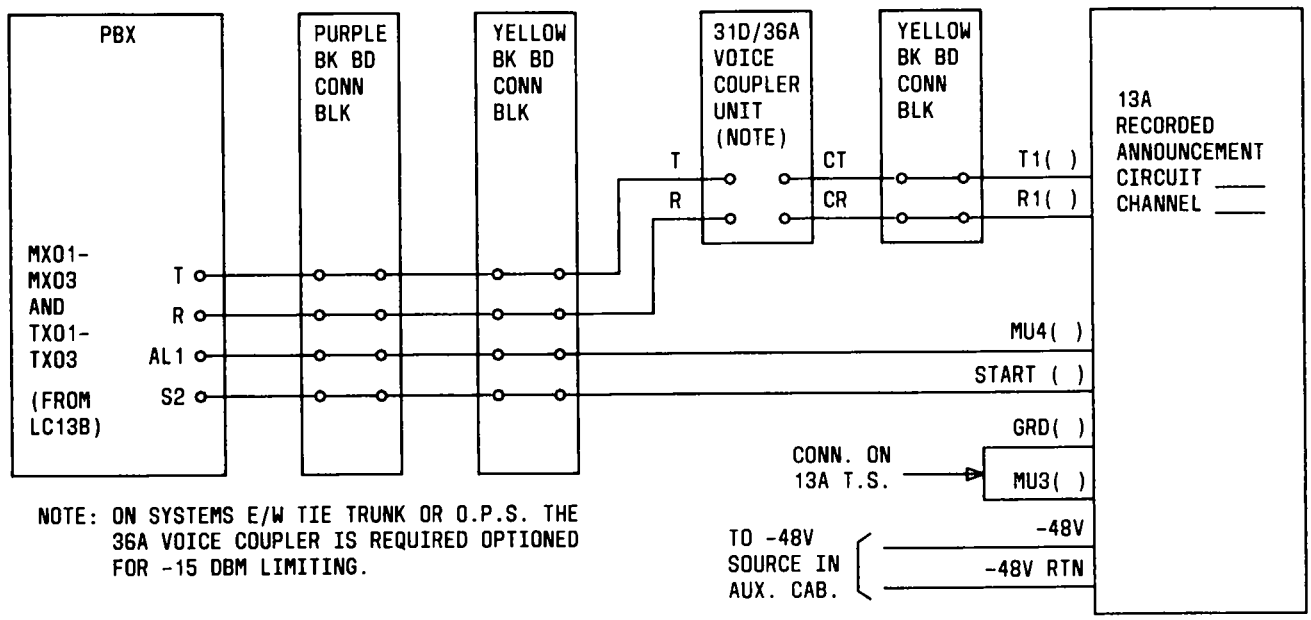


Fig. 73—Cross-Connection Information for 13A Recorded Announcement Unit

5.44 The PBX providing AUTOVON service must be equipped with the following features activated:

- Common control switching arrangement access
- Direct trunk group selection
- Trunk verification by customer
- Manual termination line service
- Miscellaneous trunk restriction
- Tie trunk access (automatic, 2-way).

5.45 The main console associated with the 21-type selector console must be one of the following electronic consoles:

- AAA-02AF-03-
- AAD-02AF-03-
- AAG-02AF-03-
- ADA-02AF-03-
- ADB-02AF-03-
- ADD-02AF-03-
- ADE-02AF-03-
- ADH-02AF-03-
- ADJ-02AF-03-
- AGA-02AF-03-
- AGB-02AF-03-
- AGD-02AF-03-
- AGE-02AF-03-
- AGF-02AF-03-
- AGH-02AF-03-.

CALL MANAGEMENT SYSTEM (CMS)

5.46 The ACD feature has two Management Information Systems (MIS) available for system management and control: the PRO 150 and PRO 500. A DIMENSION 200 PBX performing ACD and connected to either a PRO 150 or PRO 500 MIS is referred to as a Call Management System (CMS). The

TABLE AZ

CROSS-CONNECTIONS FOR 13A RECORDED ANNOUNCEMENT UNIT WORKSHEET

CAB__ CARR__ SLOT__ CIRCUIT__		CROSS-CONNECT					
		TO/FROM	TO/FROM	TO	FROM	TO/FROM	TO
LC13B		CONN BLK - - - - _XO_ (PURPLE)	CONN BLK _____ (YELLOW)	31D/36A VOICE COUPLER		CONN BLK ____ (YELLOW)	RECORDED ANNOUNCEMENT UNIT
LEAD DESIG	COLOR CODE			TERM.	TERM.		LEAD DESIG / TERM. NO.
T				1	3		T1( )
R				2	4		R1( )
AL1							GRD ( )
S2							MU3 ( )
				-48V IN AUX. CAB.			-48V
							-48V RTN

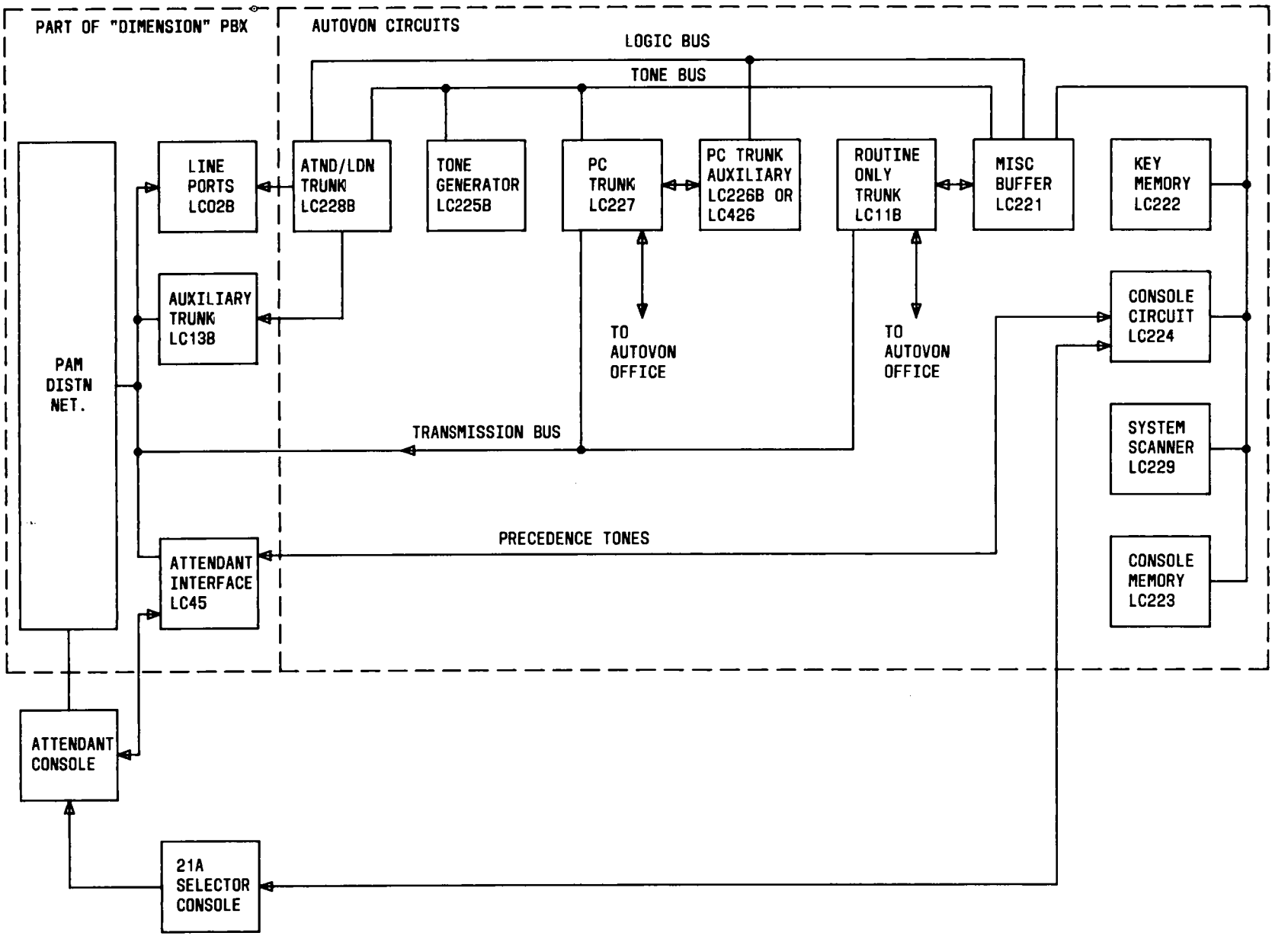


Fig. 74—AUTOVON System—Block Diagram (Simplified)

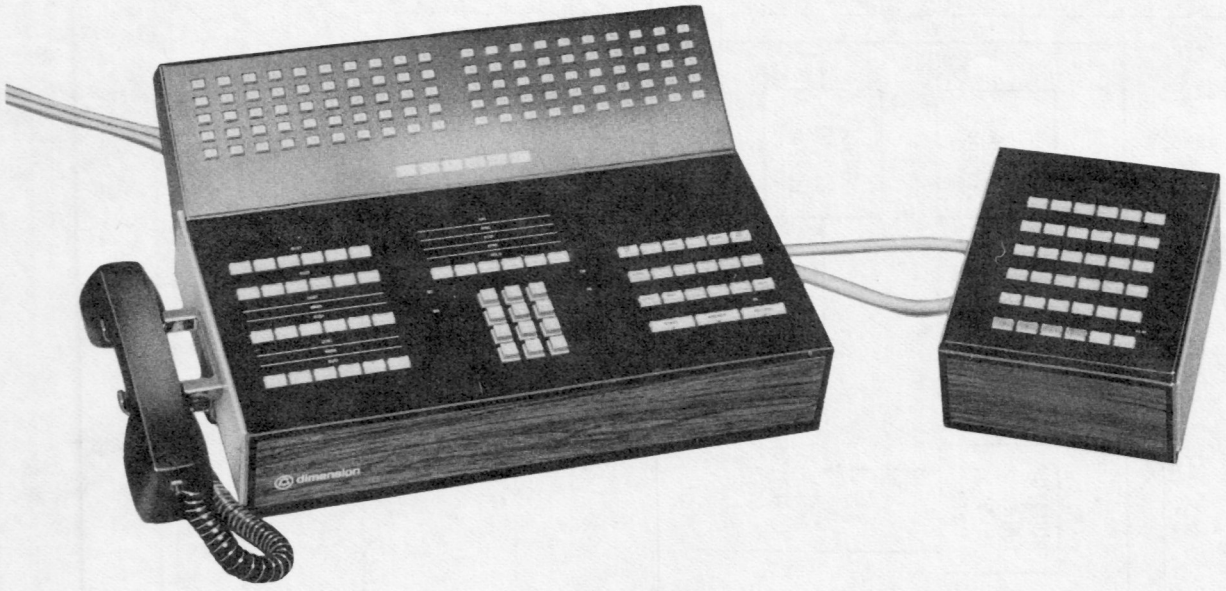


Fig. 75—AUTOVON Console Arrangement

PRO 150 uses a DEC PDP* 11V03 minicomputer and provides information on up to 150 agent positions. The PRO 500 uses a DEC PDP 1170 minicomputer and provides information for 150 or more agent positions. Both systems collect and store ACD operating information, issue reports, and accept commands to change ACD parameters and system configuration. Each event or state change associated with various report categories is logged in, in real time, by the PBX over a data link to the MIS where a full data base of system activity is maintained. Report options include: agent performance, split performance, trunk performance, reconfiguration, and forecasting requirements. The PRO 500 also provides exception reporting and report creation. Reports are available via CRT and/or line printer for both PRO 150 and PRO 500 systems.

5.47 The PRO 150 is intended for customers with small ACD applications, and substantial administrative (PBX) requirements. The PRO 500 is intended to serve larger ACD applications such as those with 100 or more agent positions. The PRO 150/500 is available only with Issue 2 of FP8. A Peripheral Interface Circuit (PIC) is used by the MIS to interface the PBX with the computing terminal equipment. Connections for the PIC are shown in the PIC coverage in this Part 5.

*Trademark of Digital Equipment Corp.

5.48 The optional feature agent log-in allows the agent to perform at a particular console without being permanently assigned to that position console. An access code (4-digit preferred) is required for receiving or transmitting calls, also for activating the console operation via headset jack-in. Long term absence (lunch break) should not require agent log-out and re-log. Failure to log-in, duplicate ID codes or log-in with an unassigned ID should be detected by means of PRO 500 or PRO 150 exception report. If PRO 500 or PRO 150 is temporarily down, the DIMENSION PBX must refresh call store by continuing to accept log-ins, store and forward to the PRO 500 or PRO 150 when it is operating again. The log-in code is not required for maintenance personnel. Figure 76 shows a typical CMS arrangement.

CALLING NUMBER DISPLAY TO STATION

5.49 Equipment is provided at the called station to display the number of the calling station within the PBX. The 102D1-A display unit and associated wall-mounted power equipment is shown on Fig. 77. A separate display unit is required for each station equipped with the calling number display to station feature. Depending on memory size, a maximum of 15 display units is allowed. Data channel repeaters may be used to extend the range between the PBX and the display to 3353m (11,000 feet). Data

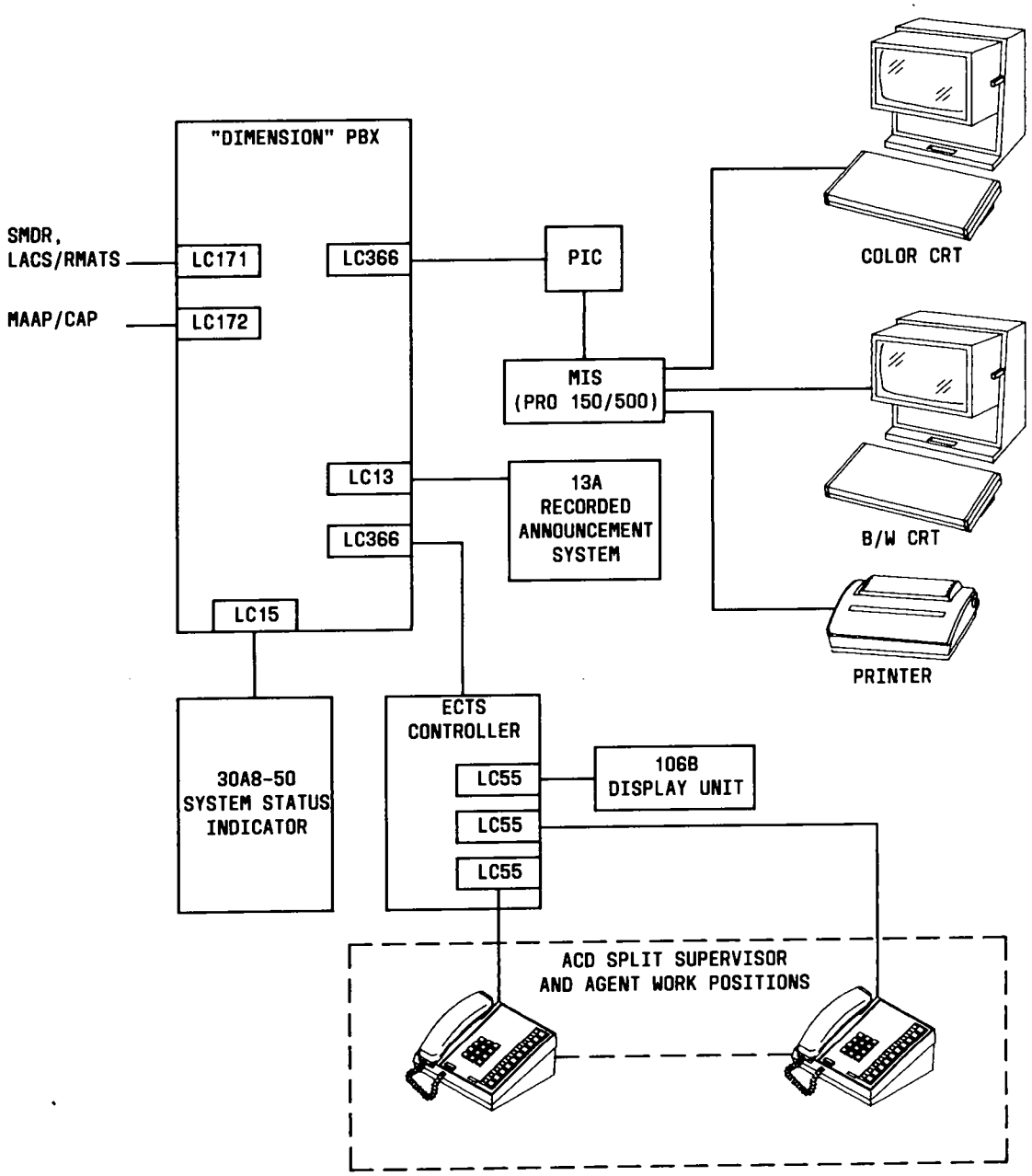
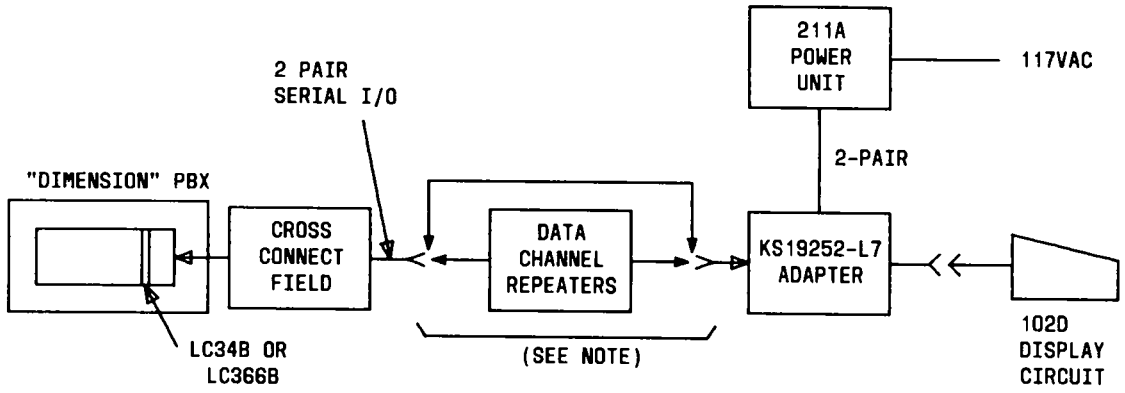


Fig. 76—Typical Call Management System Configuration

channel repeaters are covered later in this section. Ordering information for display and power units is shown in Table BB.

5.50 The KS-19252, L7, adapter is a wall-mounted unit. The adapter contains a connector for the display mounting cord plug and a terminal strip for connecting the 211A power unit and the PBX data channel. The display unit must be connected directly to the adapter using the mounting cord—cord extensions should not be used. Table BC is a fill-in worksheet for use with each calling number display unit. Refer to Tables AB through AF for available data channels.



NOTE:
MAXIMUM DISTANCE BETWEEN PBX AND DISPLAY UNIT; WITHOUT DATA CHANNEL REPEATERS-305M (1000 FEET), WITH DATA CHANNEL REPEATERS-3353M (11000 FEET).

Fig. 77—Calling Number Display to Station Arrangement

The display mounting cord must be connected to the adapter prior to connecting the 211A power unit to a 117-Vac power outlet.

5.51 The power supply (211A) cord of the display unit, and the optional repeater supply (28D2) power cord are powered directly from a commercial, 117-Vac 60-Hz outlet.

CENTRALIZED STATION MESSAGE DETAIL RECORDING (CSMDR) SYSTEM

5.52 A CSMDR system is available to collect station message detail recording (SMDR) data for multilocation customers (Fig. 78). The centralized collection from the remote PBXs is via an automatic dialup polling arrangement over the customer or the DDD network. The polling schedule may be customer-selected and/or changed based on current needs. At each remote location, a 94A Local Storage Unit (LSU) collects and stores the SMDR data from the PBX via a data channel. The LSU records, formats, and transmits the data in response to periodic polling by the CSMDR system. ⧫An Automatic Calling Unit (ACU) may be used to assist in polling.⧫ The dedicated data channel is physically located in slot 31, circuit 0, on the basic control or the control growth carrier. The channel must be optionally wired for fast-speed (833 kilobits per second) data. Connection is made to the channel via the BX07 or BX07A connector on the carrier. The connection between the PBX and the LSU is via a C2D or C2B cable and should not exceed 61m (200 feet). Additional information pertaining to the 94A LSU may be found in Sections 190-402-100, ⧫190-402-200, and 190-402-250.⧫.

CODE CALLING ACCESS (CHIME PAGING)

5.53 The chime paging feature allows attendants, station users, tie trunk users, and remote access users to dial an access code and a 2- or 3-digit called party code to activate an electronic chime signal corresponding to the called party code. The chime signal indicates that the calling party wishes to contact or alert the called party to some particular situation. The called party may connect to the calling party by dialing an answering code from any station within the PBX. The branch PBX with a centralized attendant service (CAS) network provides the capability for the CAS attendant to access code calling for both station and trunk calls.

5.54 Additional hardware is required when the chime paging feature is provided (Fig. 79). An LC17B tone plant C circuit pack provides the code calling tone generator. The circuit pack must be provided in a line group control carrier. An 89A control

TABLE BB

HOTEL/MOTEL DISPLAY AND POWER UNIT CODES

102D1-A DISPLAY UNITS: CALLING NUMBER DISPLAY		
CODE	HOUSING COLOR	FACEPLATE COLOR
102D1-A-3T	BLACK	TEAK
102D1-A-3W	BLACK	WALNUT
102D1-A-5OT	IVORY	TEAK
102D1-A-5OW	IVORY	WALNUT
102D1-A-58T	WHITE	TEAK
102D1-A-58W	WHITE	WALNUT
211A-TYPE POWER UNIT		
CODE	HOUSING COLOR	FACEPLATE COLOR
211A-100	BLACK & SILVER	AVOCADO
211A-108	BLACK & SILVER	TEAK
211A-109	BLACK & SILVER	WALNUT
211A-111	BLACK & SILVER	GOLD
211A-112	BLACK & SILVER	ORANGE
211A-114	BLACK & SILVER	RED
211A-115	BLACK & SILVER	BLUE

unit provides feature controls and protective isolation between the PBX and customer-provided paging equipment. The control unit has the following characteristics:

- Recognizes a circuit-busy condition
- Prevents customer busy from interrupting a page in progress
- Permits customer application of music or tones or a mix
- Provides optional click suppression
- Has 600- or 15,000-ohm tip and ring impedance
- Has screw terminal connections.

Refer to Section 463-332-130 for detailed information pertaining to the 89A control unit. A 2012B power transformer is capable of serving up to three 89A control units. A suitable 117-Vac power outlet must be provided for the transformer. Table BD is a fill-in worksheet for use with the chime paging feature.

CODE CALLING ACCESS (3A CODE CALL)

5.55 The 3A code call access is a standard feature in the DIMENSION PBX. The feature is an alternate method of providing chime paging. The feature functions similar to chime paging in that attendants, station users, tie trunk users, and remote access users can dial an access code and a 2- or 3-digit called party code to activate a coded signal corresponding to the called party code. The called party may connect to the calling party by dialing an answering code from any station within the PBX.

5.56 The following equipment is required to provide the 3A code call access feature:

- J58822B-2 (3A code call) equipment
- LC08D dual CO trunk circuit pack
- J59204, List 1, A and B—G1 TOUCH-TONE calling receiver.

Modifications are necessary to the 3A Code Call unit on a locally engineered basis and drawing L-466520 is available to assist in the modifications.

5.57 The 3A code call unit is a relay-selector operated unit which permits a PBX station user or attendant to reach a party on the premises served by the PBX. The unit may have two incoming ports and two answer ports. The four ports are connected to CO trunk circuits (LC08D) via the cross-connect field (Fig. 80). Only one incoming port and one answer port are required in a system. The second incoming and answer ports are optional and can be used where heavy traffic requires the use of optional ports. Table BE is a fill-in worksheet to show the cross-connections of the incoming and answering ports of the 3A code call access feature.

5.58 When the optional ports are used, the ports are connected to a second terminal circuit as shown in Fig. 81.

5.59 Since the G1 TOUCH-TONE calling receiver unit comes factory-wired with option W, the option must be removed when the 3A code call unit is connected. Option W consists of a wire strap between pins B6 and B28 located between CP HJ17 and CP HJ16 in the TOUCH-TONE calling receiver. The installer should clip and remove the strap. A 900-ohm, 1/2-watt resistor in series with a 2-μfd capacitor must be connected across leads T and R of the receiver.

TABLE BC

CALLING NUMBER DISPLAY CROSS-CONNECTIONS WORKSHEET

MOD _ _ CAB ___ CALLING NUMBER DISPLAY NO. ____			CROSS-CONNECT	
		TO/FROM	TO/FROM	TO
		CONN BLK _ _ _XO_ (PURPLE)	CONN BLK DISPLAY NO. ____ (YELLOW)	KS-19252, LIST 7, ADAPTER
DATA CHANNEL	LEAD DESIGNATION			STRIP TERM. NO.
LC34B IN _____ _____ CARRIER _____ SLOT _____ CIRCUIT _____	IOXB_ _ _ _			1
	IOXA_ _ _ _			2
	IORB_ _ _ _			3
	IORA_ _ _ _			4
			-S (G)	5
			+S (BK)	6
			-V (R)	7
			+V (W)	8

117VAC

211A
POWER
UNIT

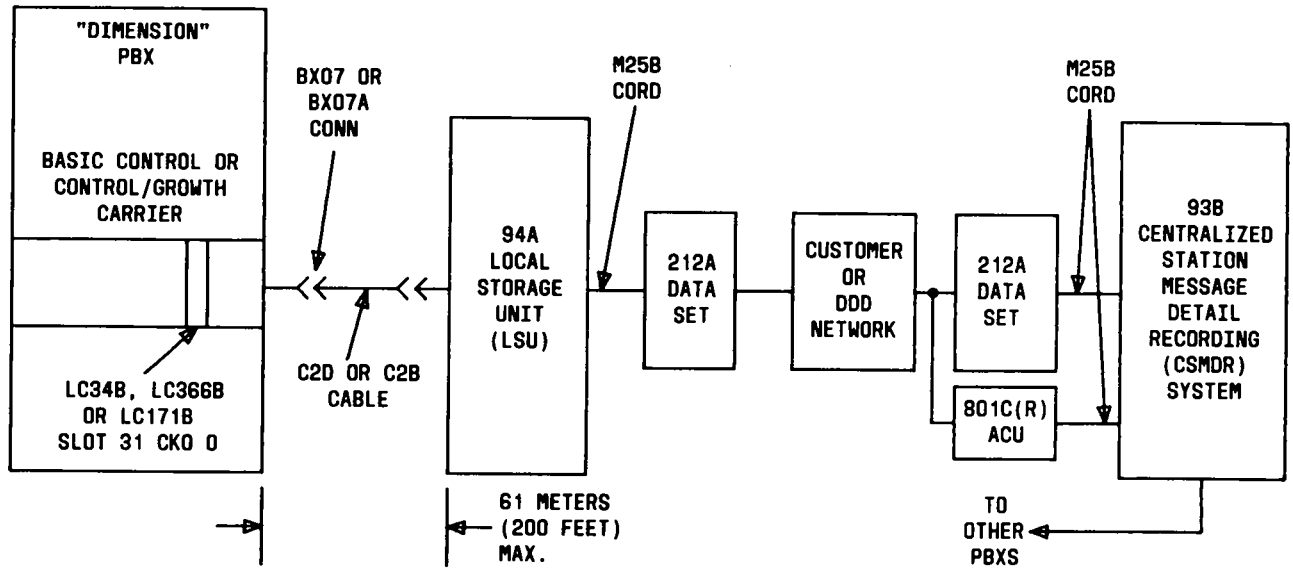


Fig. 78—Centralized Station Message Detail Recording System

CUSTOMER ADMINISTRATION CENTER SYSTEM (CACS)

5.60 The CACS is a stored program-controlled system which uses the MC-3 processor. The CACS design is based on the Remote Maintenance, Administration, and Traffic System (RMATS), except that it is installed on the customer premises rather than at a remote location. The CACS uses the same PBX port as RMATS with a switch selector in the PBX room. This enables the customer to add, change, or remove station user features, line extension numbers, class-of-service assignments, "hunt to" numbers, call pickup groups, hot-line numbers, etc. In addition, traffic data for dumps may be collected and stored, and circuit assurance tests can be performed. The CACS is accessed by an I/O terminal having a compatible format and transmission at 300, 1200, and 2400 baud rates. A typical CACS equipment configuration is shown in Fig. 82. The CACS interface required for a DIMENSION PBX includes the following:

- One 113D (or equivalent), List 1 or 2, or equivalent data set
- One 47-type data mounting
- One LC171B circuit pack (two for dual processor PBX)
- One LC172 circuit pack (two for dual processor PBX).

5.61 The CACS equipment is housed in a standard (800 mm [31-1/2 inches] wide, 610 mm [24 inches] deep, and 1765 mm [69-1/2 inches] high) DIMENSION PBX cabinet (Fig. 83) available with a matching door panel. The cabinet is shipped from the factory complete with all units, wiring, cabling, and circuit packs. The associated printer(s), data sets, and automatic calling unit are ordered separately. Information on power and grounding of CACS hardware is provided in Part 4 of this section. Refer to Sections 554-010-140 and 554-111-100 for additional information on CACS capability and application.

CUSTOMER ADMINISTRATION PANEL (CAP)

5.62 The CAP is a modified (optional) DIMENSION 2000 Maintenance and Administration Panel (MAAP) which enables the PBX customer to change station user features such as line extension number, network class of service, hot line, and network switching features. The CAP requires a 117-Vac 60-Hz receptacle and may be located up to 305m (1000 feet) from the PBX. An ON/OFF switch on the right side of the CAP activates the customer's unit and disables the MAAP channel via interface unit ED-1E397-70. The CAP functional block diagram is shown on Fig. 84. Single-ended A25C connector cables must be provided for connecting between the PBX and the interface unit, and between the interface unit and the CAP. The length of each cable is

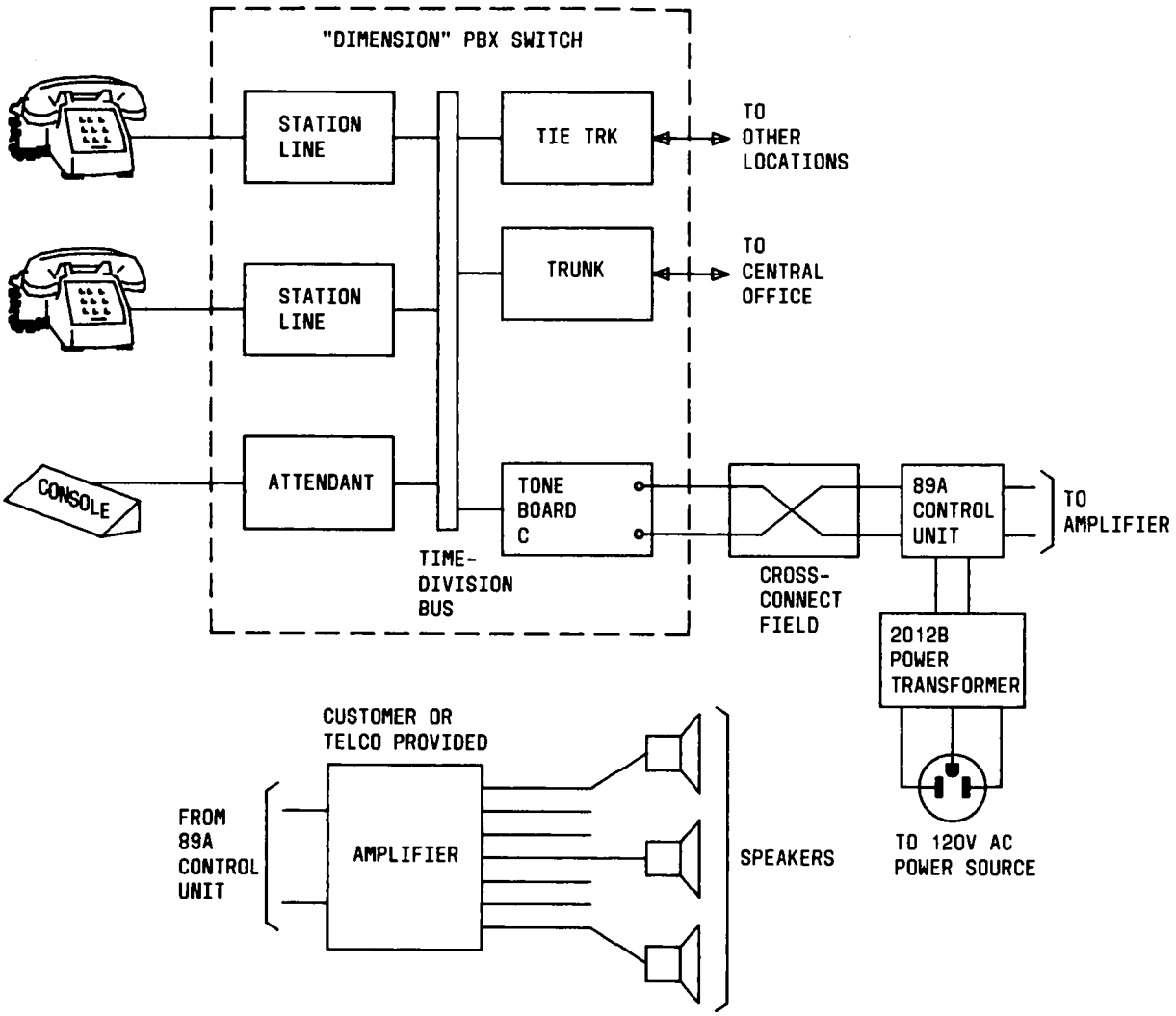


Fig. 79—Code Calling Equipment—Block Diagram

to be determined by the job requirements. The stub ends of each cable connecting to the PBX (AP5, AP6, and MAAP3) should be terminated in plug KS-16785, L8. The stub end of the cable connecting to the CAP (CAP1) should be terminated in plug KS-16690, L1. Refer to Section 554-010-141 for detailed information on CAP.

CUSTOMER PREMISES FACILITY TERMINAL (CPFT)

In order to meet FCC requirements of physical and electrical separation of Network Channel Terminating Equipment (NCTE) from customer terminals, all CPFT arrangements which permit mounting and use of Metallic Facility Terminal (MFT) equipment within DIMENSION PBX arrangements are rated "MD". Therefore, MFT equipment should no longer be mounted in an auxiliary cabinet, but should be physically located separately from the PBX and electrically located on the NETWORK side of the RJ21X registration jack. The CPFT equipment may be replaced with the Package Metallic Facility Terminal Assembly (PMFTA) as outlined in this part.

TABLE BD

CHIME PAGING CROSS-CONNECTIONS WORKSHEET

MOD _ _ CAB___ LINE GROUP CONTROL CARRIER _____		CROSS-CONNECT						
		TO/FROM	TO/FROM	TO	FROM	TO/FROM	TO	
		CONN BLK _ _ _ LGX01	CONN BLK (89A)	89A CONTROL UNIT		DEMARCATION CONNECTING BLK	PAGING EQUIPMENT	
LEAD DESIG FOR LC17B	COLOR CODE	(PURPLE)	(YELLOW)	SCREW TERM.	SCREW TERM.	TERM. NO.	LEAD DESIG	FUNCTION
T1	Y-G	35		BSY1	COS1		COS1	TO BUSY-OUT CONTROL FROM CUST EQPT
R1	G-Y	36		BSY2	COS2		COS2	
T2	Y-BR	37		PG1	CTS1		CTS1	TO EXTERNAL TONE SOURCE
R2	BR-Y	38		PG2	CTS2		CTS2	
T3	Y-S	39		T	CMS1		CMS1	TO EXTERNAL MUSIC SOURCE
R3	S-Y	40		R	CMS2		CMS2	
				AC1	CT		CT	TO AUDIO AMPLIFIER
					CR		CR	
				AC2	CBS1		CBS1	TO ENABLE CONTACTS ON CUST EQPT
					CBS2		CBS2	

117 VAC — 2012B TRANSFORMER

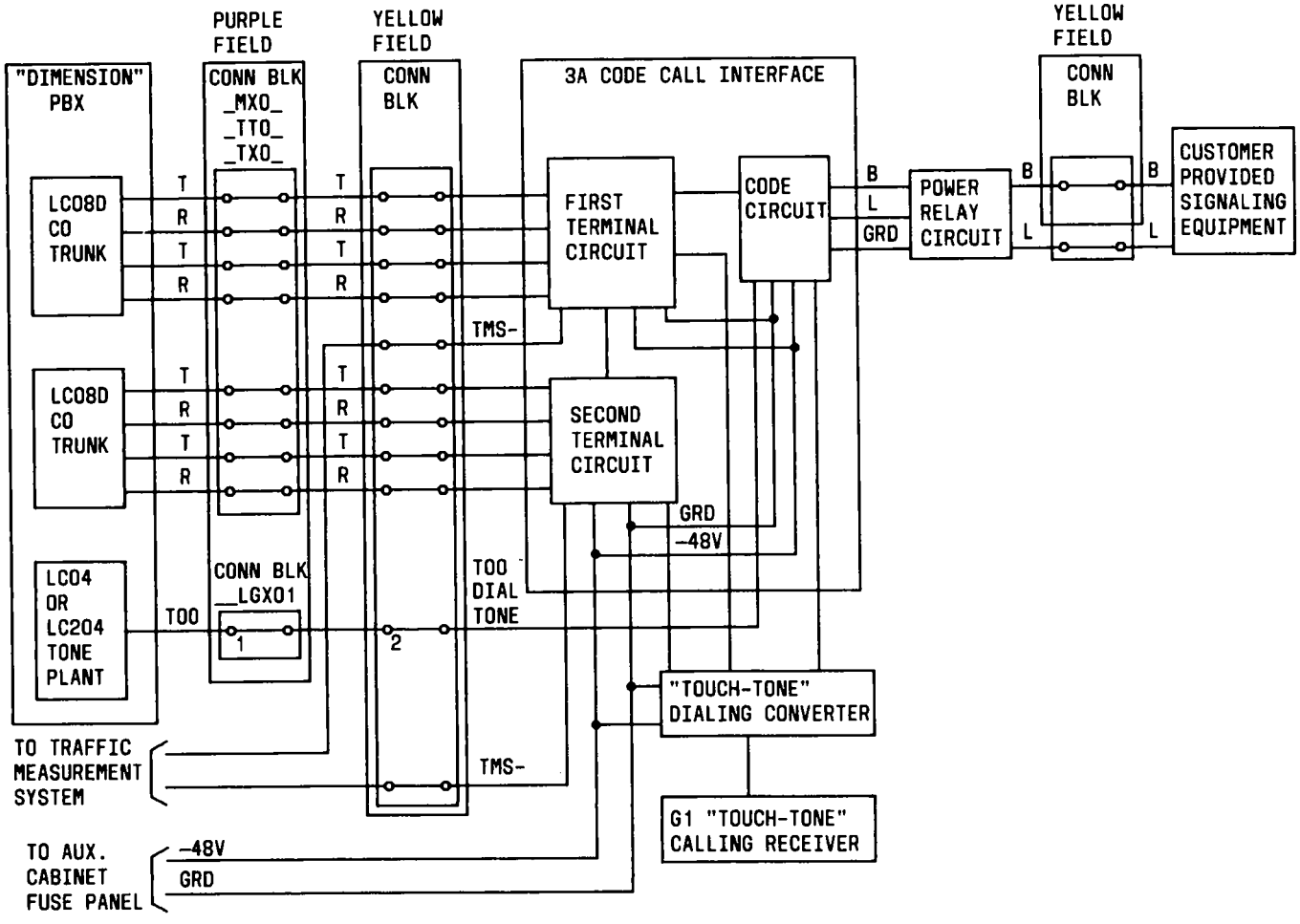


Fig. 80—General Connection Diagram for 3A Code Call Access

5.63 The CPFT equipment is available to provide transmission and signaling range extension for the system line and trunk circuits. The CPFT equipment consists of Metallic Facility Terminal (MFT) circuit packs and terminal balancing networks housed in connectorized shelves (carriers). The CPFT is a standard arrangement which supplies all of the transmission and signaling functions required to terminate either 2-wire or 4-wire metallic facilities. The CPFT equipment can be installed in any available carrier position of the system or a separate auxiliary cabinet. Sections 332-610-100, -200, and -500 contain detailed list information on CPFT equipment.

5.64 The CPFT family of equipment coded J99380(MD) is presently divided into eight basic components. These are further broken down by list numbers to provide the flexibility needed for various mounting arrangements that will be encountered. The following CPFT units are described:

- J99380A(MD)—Single module shelf

  J99380E(MD)—Double module shelf

- J99380B(MD)—Terminal balancing network

  J99380C(MD)—Terminal balancing network

- J99380D(MD)—Double-depth shelf assembly

- J99380AA, -AB, and -AC—Plug-in circuit packs

- J99380F or G—Shelf assembly for voice frequency circuits

TABLE BE

3A CODE CALL ACCESS CROSS-CONNECTIONS WORKSHEET

CROSS-CONNECT									
FROM			TO/FROM	TO/FROM	TO/FROM	TO 3A CODE CALL UNIT			
PBX		LEAD DESIG	CONN BLK _ _ _ _ _ _ 0 _	CONN BLK _ _ _ _ L6X01	CONN BLK	TERM. CKT 1	TERM. CKT 2	CODE SEND UNIT	"TOUCH-TONE" DIALING CONVERTER
EQUIPMENT			(PURPLE)		(YELLOW)	TSA	TSA	TSA	TSB
LC08D (PORT 1) MOD_ _ CAB___ CARR___ SLOT___	CKT 0	T				1T			
		R				2T			
	CKT 1	T				7T			
		R				8T			
LC08D (PORT 2) MOD_ _ CAB___ CARR___ SLOT___	CKT 0	T					1T		
		R					2T		
	CKT 1	T					7T		
		R					8T		
LC04 OR LC204 MOD_ _ CAB___ CARR___ SLOT 2		TOO		1				3B	
TRAFFIC MEASUREMENT SYSTEM		TMS				3T			
		TMS					3T		
FUSE PANEL		-48V				13T			
		GRD				16T			
		-48V					13T		
		GRD					16T		
		-48V						7B	
		GRD						10B	
		-48V							31
		GRD							11

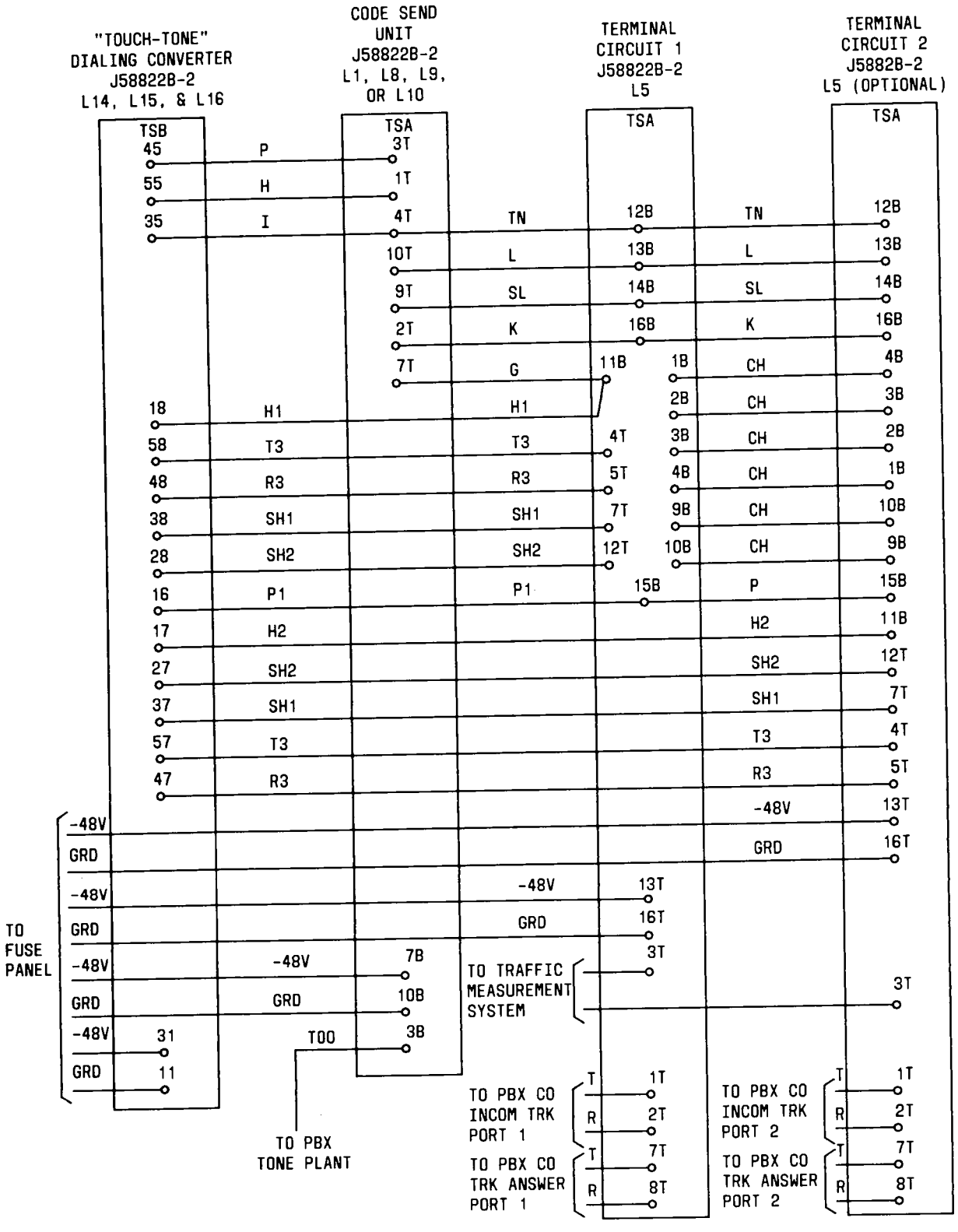


Fig. 81—Terminal Connections for 3A Code Call (Sheet 1 of 2)

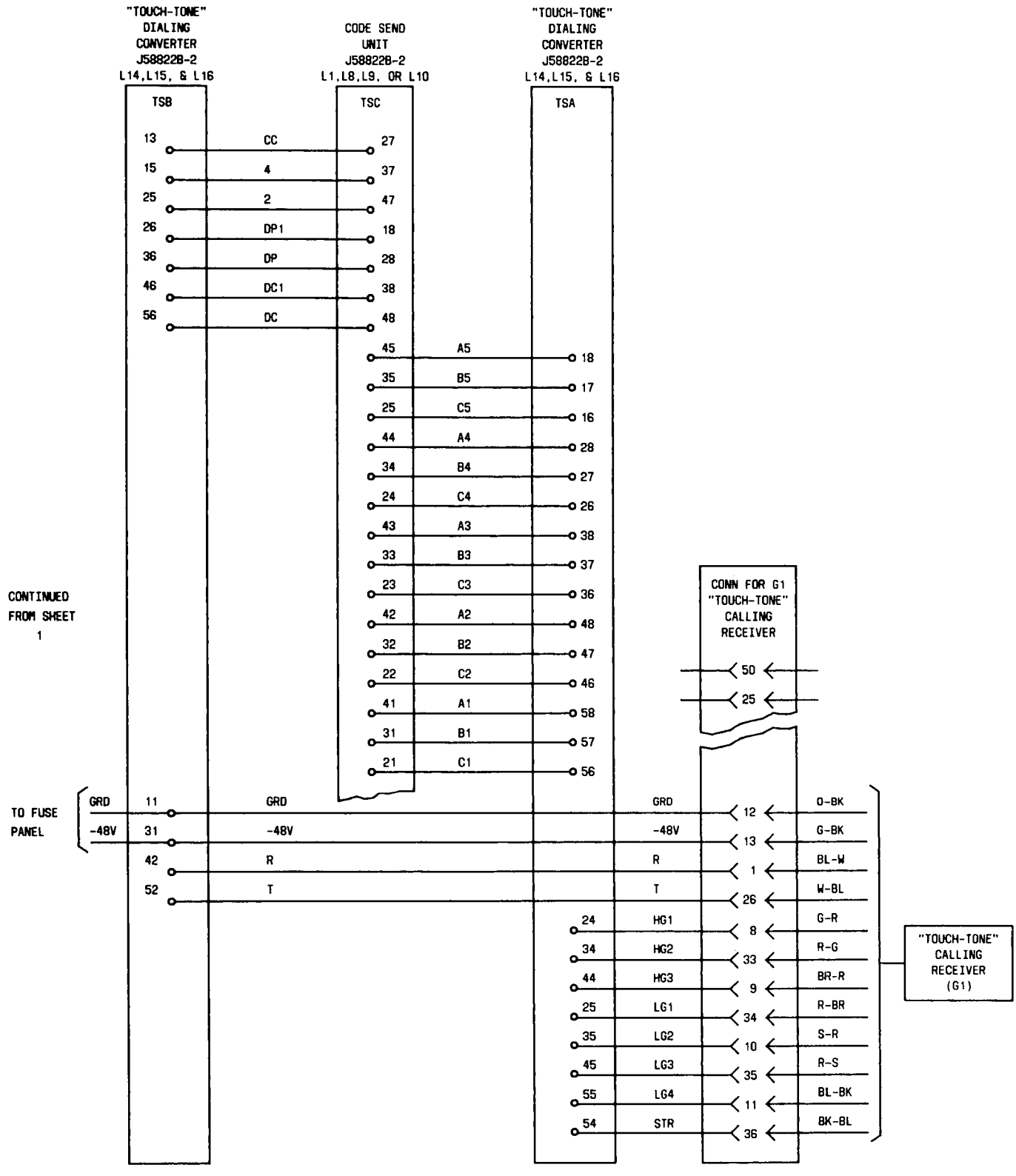


Fig. 81—Terminal Connections for 3A Code Call (Sheet 2 of 2)

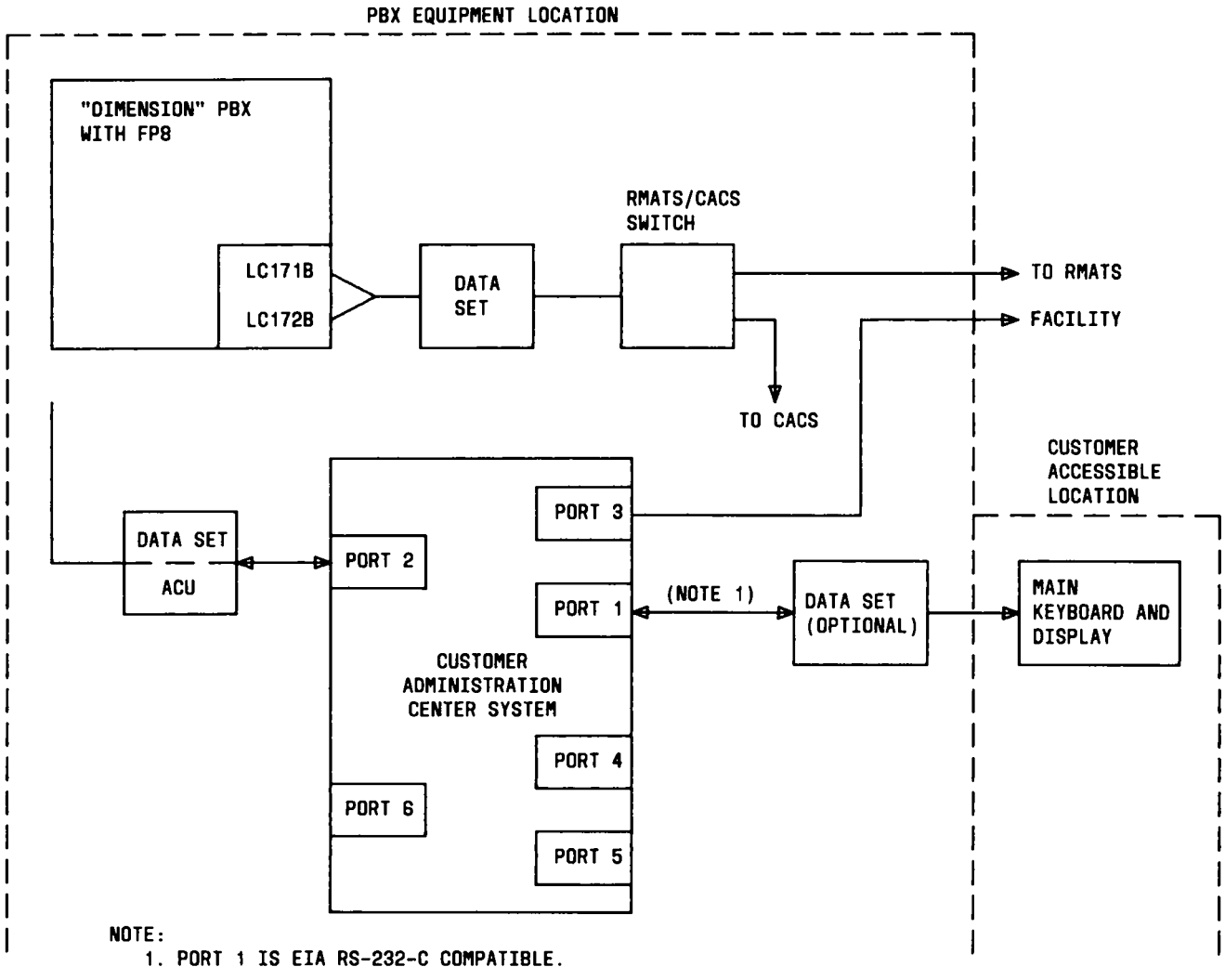
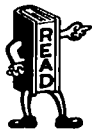


Fig. 82—Typical CACS Equipment Configuration

- J99380H or J(MD)—Power distribution and feature panel
- J99380K or L(MD)—Circuit pack carrier (CPC) for small CPFT installations
- J99380TB—Test extender.



When loop signaling repeater (LSR) units J99343AC and J99343AD are provided, the KS-19642, List 6, rectifier must be replaced by KS-19642, List 3.

5.65 The single module shelf [J99380A(MD)] is used when transmission only is required. A shelf which may be wired for use as a single module or double module shelf [J99380E(MD)] is shown in Fig. 85.

5.66 Interconnection information for the single module shelf and DIMENSION PBX is shown in Fig. 86.

5.67 When both transmission and signaling treatments are required, the double module shelf is used. The shelf in Fig. 85 can be used for the double arrangement when it is wired for this purpose. Interconnection information for the double module shelf and DIMENSION PBX is shown in Fig. 87.

5.68 The shelf and assembly for 837-type network [J99380B(MD)] is shown in Fig. 88. Interconnection information for the terminal balancing network panel [J99380B(MD)] and DIMENSION PBX is

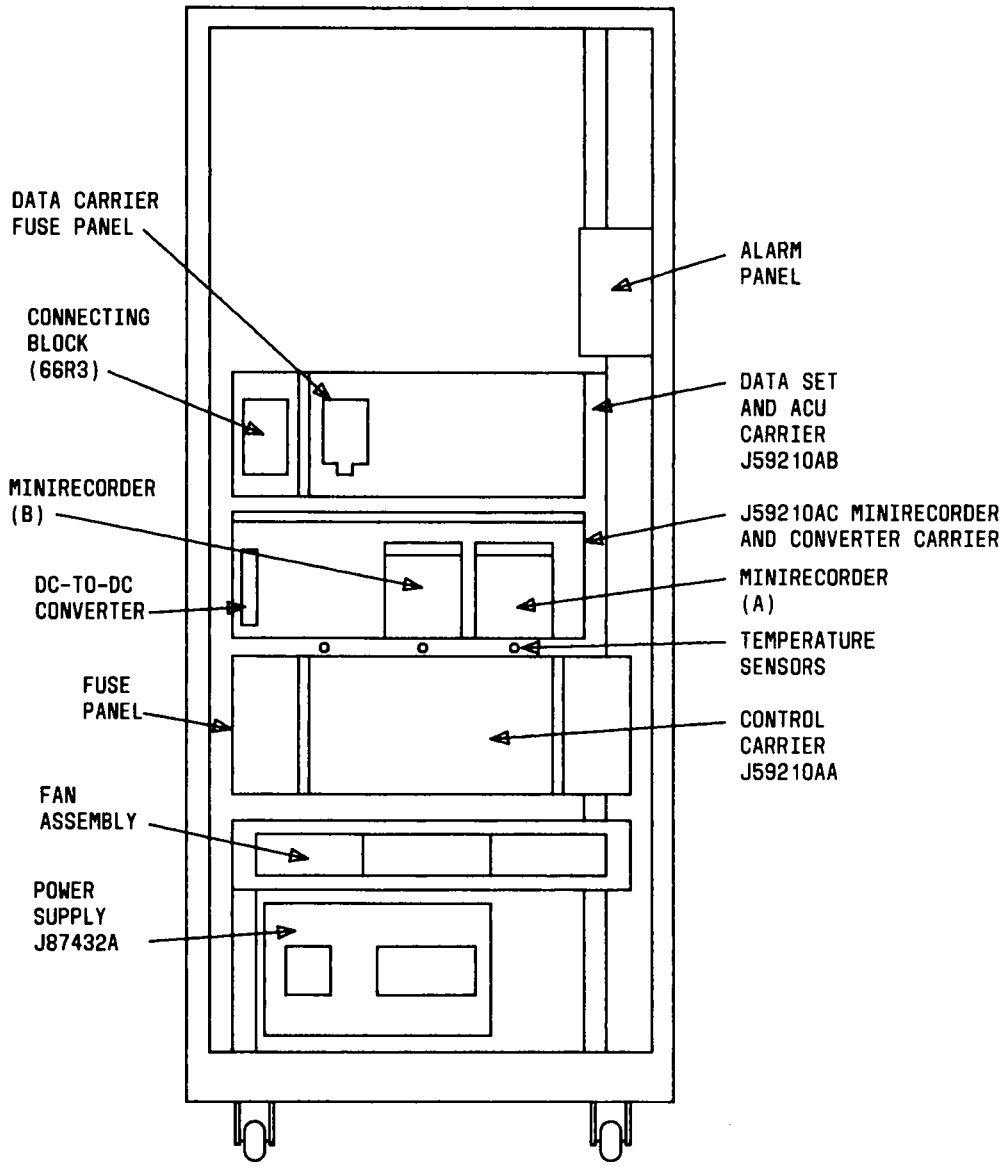


Fig. 83—CACS Cabinet

shown in Fig. 89. The network selected for a particular circuit is determined by the cable makeup of the circuit and the impedance of the PBX. The installer must wire from each network to the TS1 terminal strip on the shelf assembly. There are four dedicated terminals on the terminal strip for each network mounting slot. When a loaded 26-gauge (26H88) cable facility feeding a 600-ohm termination is provided, an 837G network, a 120T repeat coil, and a 535DK capacitor are required. This arrangement occupies two mounting slots, reducing the number of circuits to be balanced. Strapping is required at the cross-connect field for connecting the network and the repeat coil (Fig. 90).

5.69 The shelf assembly for 837-type networks [J99380C(MD)] is shown in Fig. 91. Interconnection information for the KTU-type shelf assembly for terminal balancing is shown in Fig. 92.

5.70 An illustration of the double-depth shelf assembly [J99380D(MD)] is shown in Fig. 93.

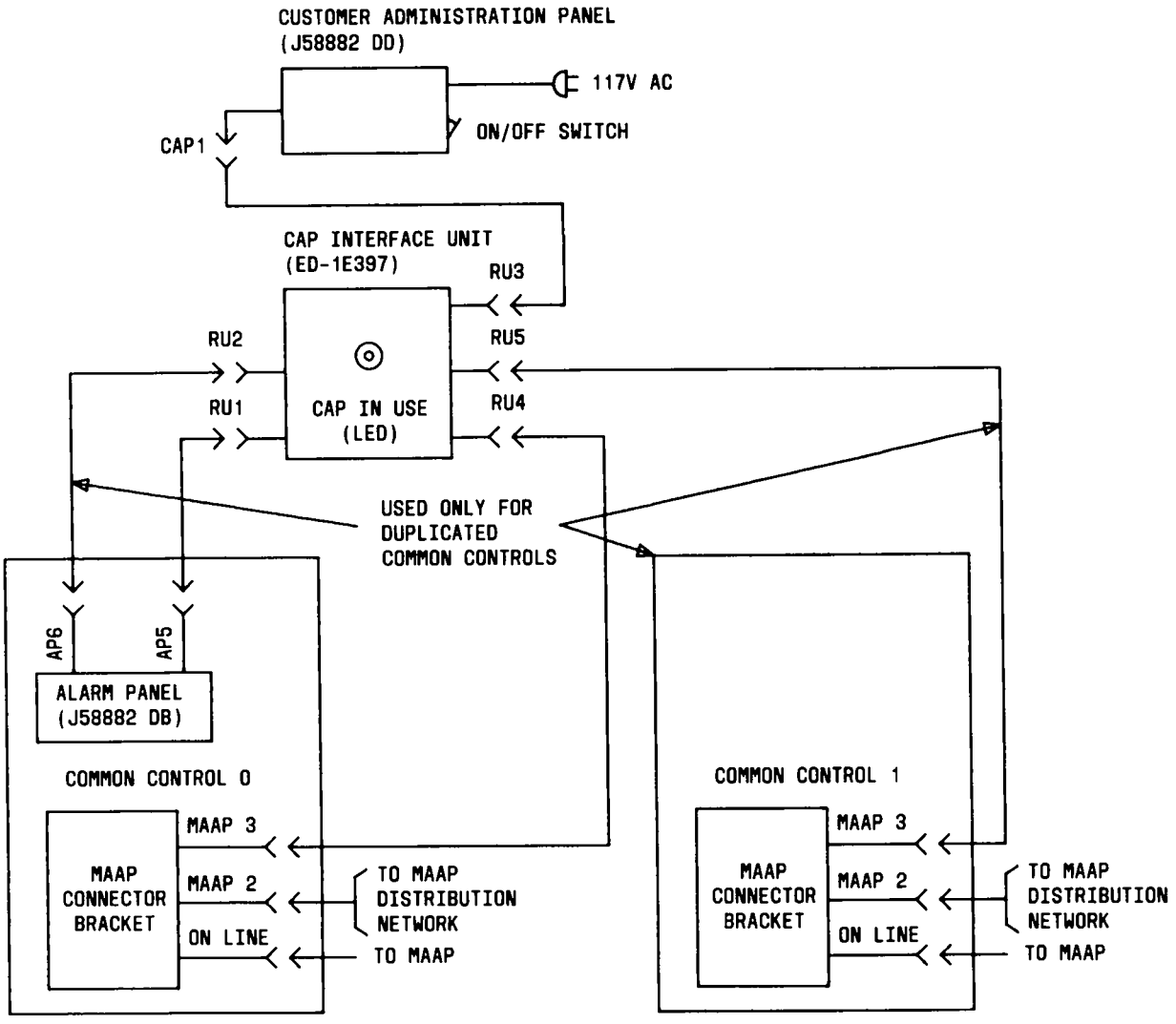


Fig. 84—Customer Administration Panel (CAP) Configuration

5.71 The test extender (J99380TA [Fig. 94] or J99380TB) may be required to allow access to the adjustments and test points when aligning and testing the MFT circuit packs in the CPFT installation.

5.72 The power distribution and feature panel [J99380J(MD),] voice frequency circuits (J99380F or -G), and the power distribution and feature panel [J99380H(MD)] are used for supplementary power distribution. They will probably not be required for most DIMENSION PBX installations.

5.73 A small CPFT arrangement [J99380K and L(MD)] for one to eight MFT circuits is available complete with power unit. A universal circuit pack carrier for two MFT plug-ins is provided. The carrier handles either two independent single MFT module circuits or one double MFT (TU-SU) module circuit. Up to four carriers can be multipled.

DATA CHANNEL REPEATER

5.74 The data channel repeater (J58879KC) is a self-contained unit that provides range extension and/or lightning protection for DIMENSION 2000 or Custom PBX low-speed data channels. It is connected in series with the data channel to repeat data pulses and to provide isolation between input and output pairs.

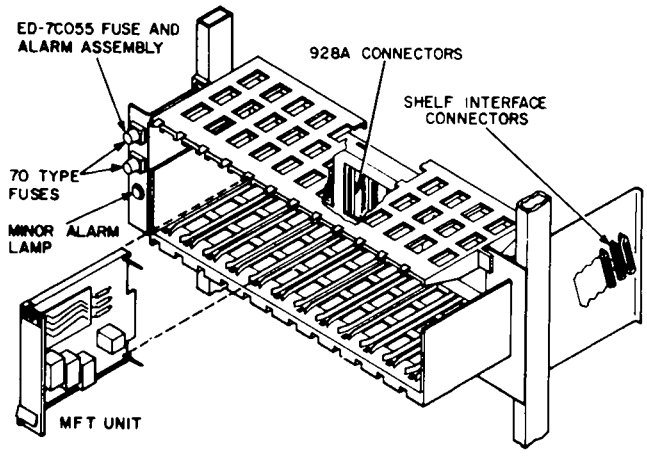


Fig. 85—Single Module Shelf [J99380A(MD)] or Double Module Shelf [J99380E(MD)]

5.75 The repeater detects and reconstructs incoming modified biphase (bipolar) data pulses to eliminate any pulse attenuation or distortion as well as to increase data channel range.

5.76 The repeater circuit is designed to operate in unexposed environments without additional protection or in exposed environments with standard 3-mil carbon block protection.

A. Physical Description

5.77 The repeater circuitry is housed in a modified key service unit (Fig. 95) with a capacity for two data channel repeater circuits. The unit contains five connectors and the provision for mounting a small power supply. The connectors provide the interface for plug-in circuit packs which determine the usage configuration of the circuit. The circuit may be configured for use as a single- or dual-channel repeater, with or without range extension.

5.78 The repeater housing is designed to be wall-mounted and should be located near a 117-Vac 60-Hz outlet. The unit also provides a terminal board (TB1) to permit standard 25-pair cable cut-down connections.

B. Repeater Arrangements

5.79 The data channel repeater circuits may require four separate arrangements. The two basic arrangements are single-channel and dual-channel, each of which can be with or without range extension. The maximum distance between a repeater and the PBX or peripheral device is 305m (1,000 feet). The maximum distance between two repeaters is 914m (3,000 feet). Up to four repeaters may be used to extend the distance to 3353m (11,000 feet). All repeaters must be located in suitable housing to provide proper environmental protection. Table BF shows the circuit packs required, and in which connector to provide the different arrangements.

Single-Channel Data Repeater With Range Extension

5.80 A single-channel repeater circuit (Fig. 96) providing range extension consists of the following:

- One J58879KC, List 1—Assembly, wiring, and equipment including a 28D2 power unit
- One J58879KC, List 2—Rectifier and timing reference circuit card (AE49)
- Two J58879KC, List 3—Unidirectional repeater circuit card (AE48).

Dual-Channel Data Repeater With Range Extension

5.81 A dual-channel repeater circuit (Fig. 97) providing range extension consists of the following:

- One J58879KC, List 1—Assembly, wiring, and equipment including a 28D2 power unit
- One J58879KC, List 2—Rectifier and timing reference circuit card (AE49)
- Four J58879KC, List 3—Unidirectional repeater circuit card (AE-48).

Data Channel Repeater for Lightning Protection Only

5.82 The single- and dual-channel data repeater circuits may be arranged for lightning protection only and ***without*** range extension (Fig. 96 and 97). The circuits consist of the following:

- Two (single-channel) or four (dual-channel) J58879KC, List 4—Data link, buffer circuit card (WJ3)
- One J58879KC, List 5—Assembly, wiring, and equipment excluding the 28D2 power unit.

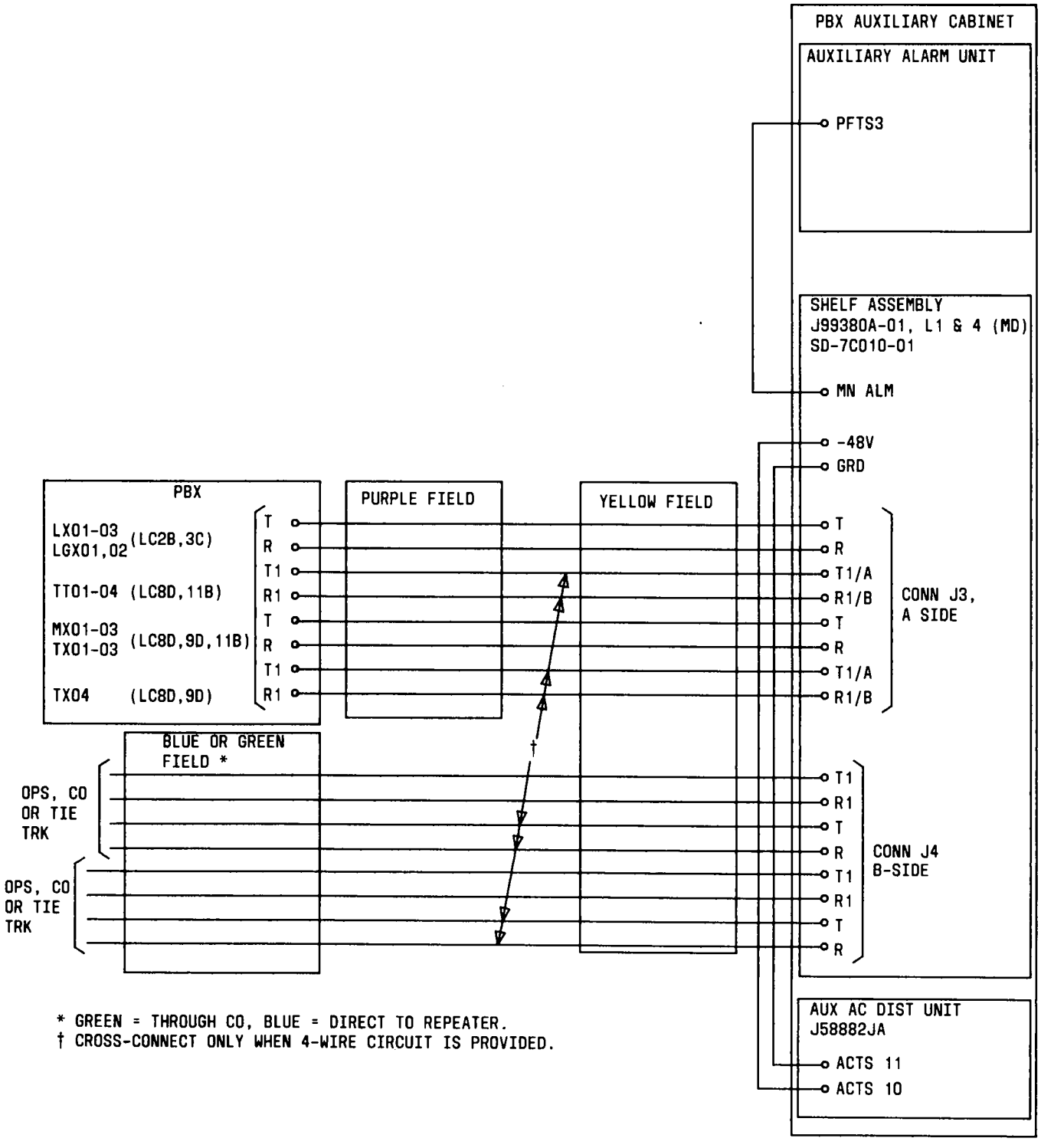


Fig. 86—Single Module MFT Shelf Assembly—PBX Interconnections

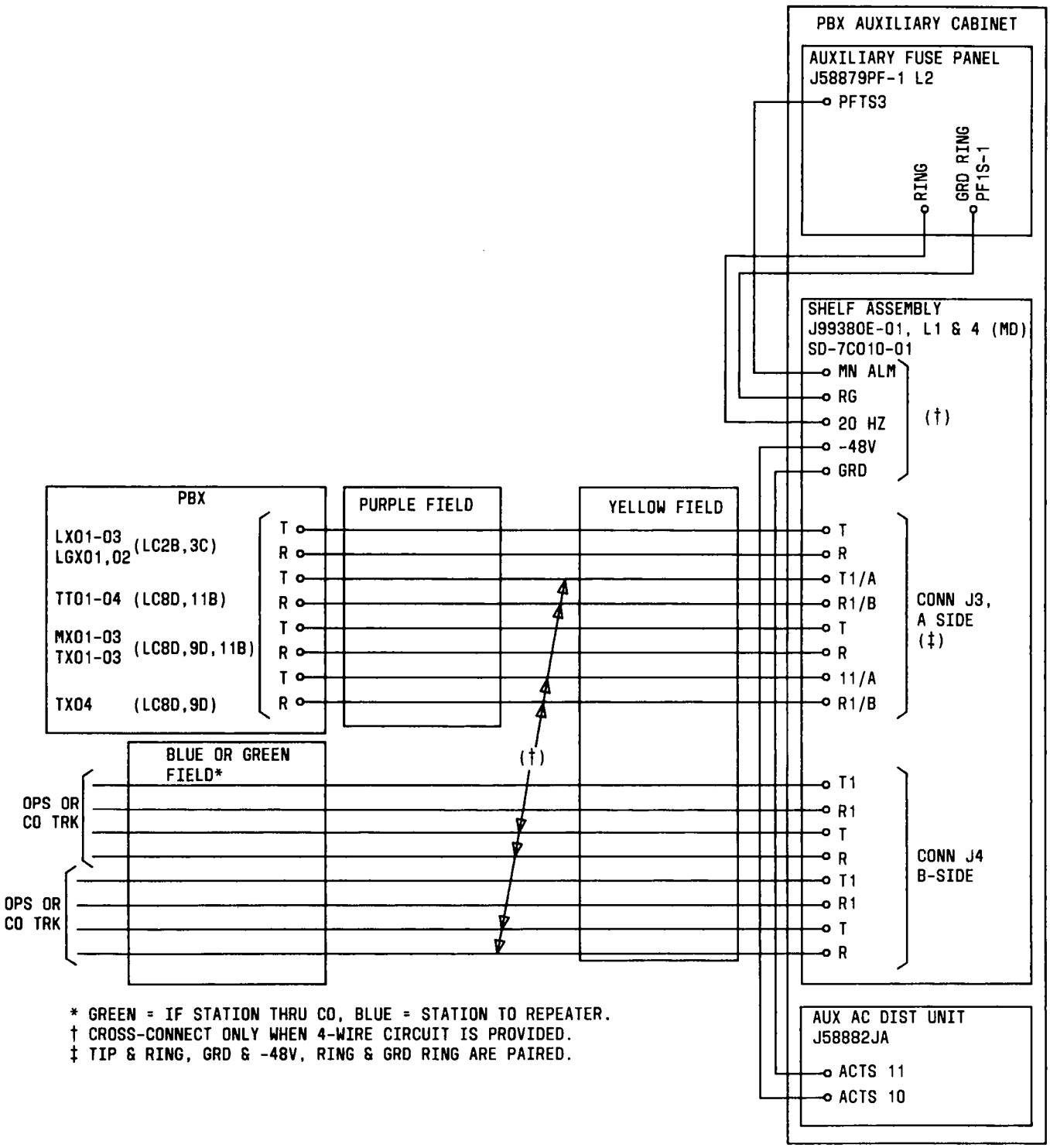


Fig. 87—Double Module MFT Shelf Assembly—PBX Interconnections

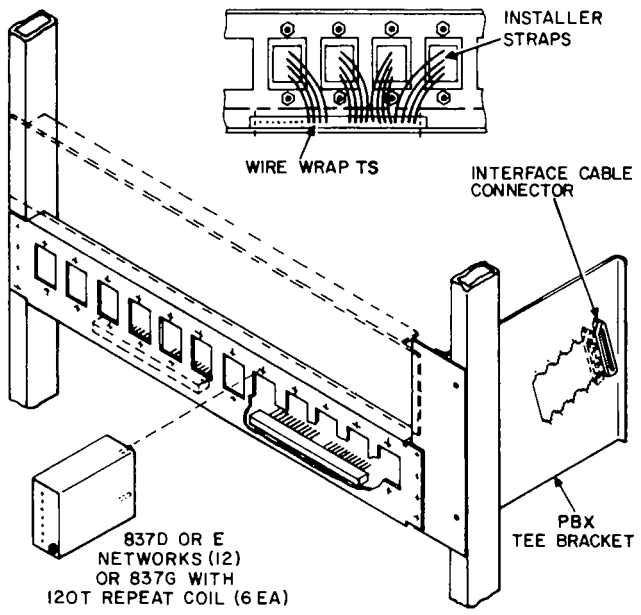


Fig. 88—Shelf Assembly for 837-Type Networks [J99380B(MD)]

C. Installation

5.83 The repeater connections and a typical application are discussed in the following paragraphs.

5.84 A functional diagram of a single-channel data repeater with or without range extension and with some internal wiring is shown in Fig. 96. The required connections with range extension consist of ac line input and data pair terminations to connecting block TB1. The ac line input connection (including 28D2 power unit and AE49 rectifier) is not required when the WJ3 circuit card is provided for lightning protection.

5.85 When operating in the PBX to peripheral data direction, the repeater input pair is connected to terminals 1A and 2A of TB1. The output pair appears on terminals 1B and 2B. This connection uses the circuit card (AE48 or WJ3) located in connector J1.

5.86 When operating in the peripheral to PBX data direction, the repeater input pair is connected to terminals 3B and 4B. The output pair is connected to terminals 3A and 4A. This connection uses the circuit card (AE48 or WJ3) located in connector J2.

5.87 The tip leads of the data pairs are connected to the odd-numbered terminals, and the ring leads of the data pairs are tied to even-numbered terminals.

5.88 Cabling to the PBX terminates on column A on TB1, and cabling to the peripheral side terminates on column B.

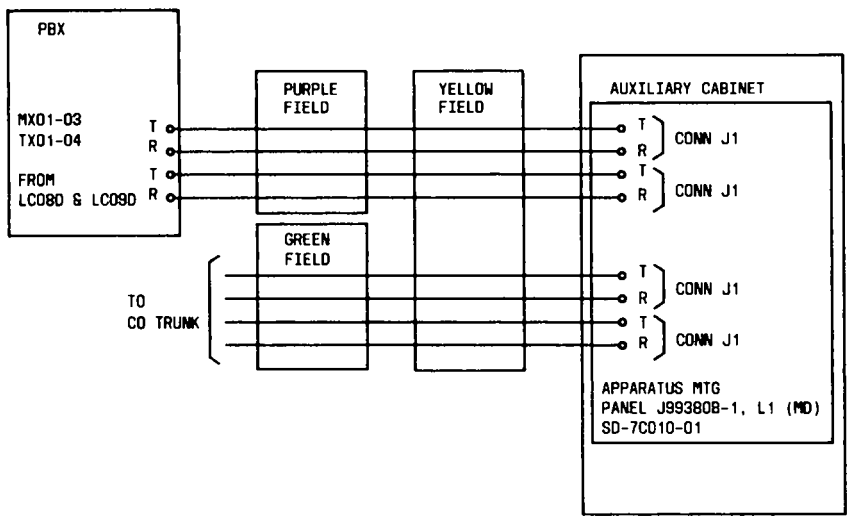


Fig. 89—Network Mounting Panel to PBX—Interconnections [J99380B(MD)]

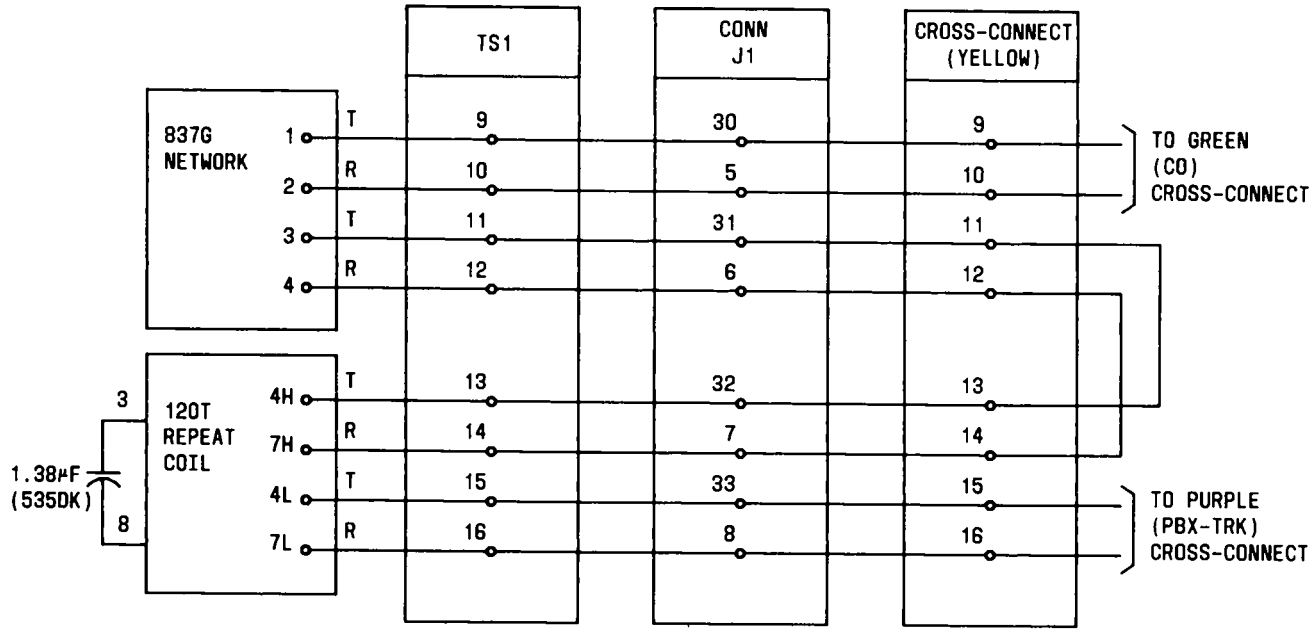


Fig. 90—Example of [J99380B(MD)] Cross-Connections

5.89 The connections for a dual-channel data repeater are shown in Fig. 97. The channel 1 connections are identical to the single-channel repeater connections. The channel 2 connections use the circuit cards in connectors J3 and J4 and are associated with terminal columns D and E on TB1. Tables AB through AF show the data channels available from the basic control, growth control, second growth control, control growth, and supplementary I/O carriers. Connections from the basic control carrier to the first repeater via the cross-connect field are given in fill-in worksheet (Table BG). Table BH provides a fill-in worksheet for data channel repeater connections from a growth control or second growth control carrier. Table BI provides a fill-in worksheet for data channel repeater connections from a control growth carrier. Table BJ provides a fill-in worksheet for data channel repeater connections from a supplementary I/O carrier. Connections from a repeater to a second repeater or to a peripheral device are given in fill-in worksheet (Table BK).

5.90 Range extension for the calling number display to station equipment is a typical repeater application. Two repeaters can be connected in series to connect the PBX to display equipment at a station located in a separate building up to 1524m (5,000 feet) away (Fig. 98). One repeater must be in the PBX building, and the other repeater in the remote station building. Within the same building, repeaters are required when the PBX-to-calling number display distance exceeds 305m (1,000 feet). Two intermediate repeaters can be installed between the two shown in Fig. 98. The additional repeaters can extend the maximum range between the PBX and the display to 3353m (11,000 feet). The intermediate repeaters must be installed in suitable housing providing the proper environmental protection.

5.91 Power for each data channel repeater is provided from a commercial 117-Vac 60-Hz outlet.

D. DIMENSION PBX Electronic Custom Telephone Service (ECTS) Range Extension

5.92 Range extension for the DIMENSION PBX ECTS Electronic Custom Telephone Service (ECTS) is another typical repeater application. The same tandem arrangement (including power requirements) used for the calling number display can be applied to the ECTS (Fig. 98). One repeater is used at the PBX location, another at the ECTS location, and a maximum of two in-between when required. The repeater-to-repeater links may be exposed if standard protection is provided.

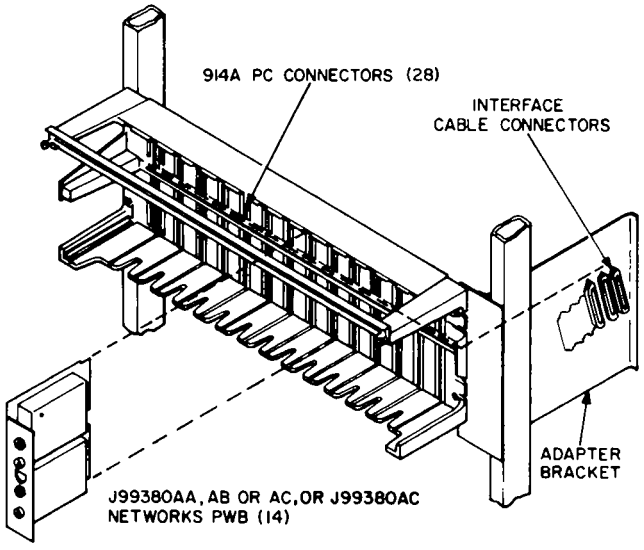


Fig. 91—Shelf Assembly for 837-Type Networks on PC Boards [J99380C(MD)]

Data Range

5.93 Data link range is a function of cable attenuation and receiver sensitivity. The repeater-to-repeater range is 914m (3000 feet) for No. 24 AWG cable. The PBX-to-repeater and repeater-to-DIMENSION PBX ECTS data links are limited to a 305-m (1000-foot) range due to receiver sensitivity.

5.94 The data range is limited by the cable attenuation and round trip propagation delay. The range for one direction of a data link may be estimated by the following formula.

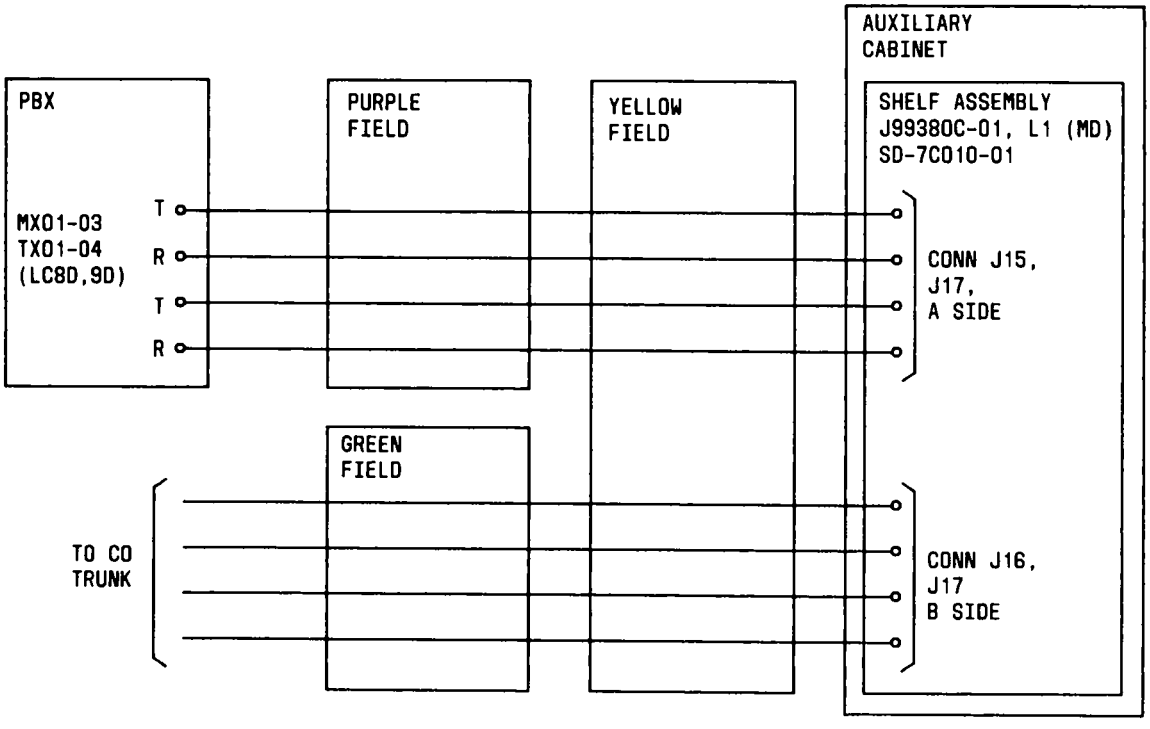


Fig. 92—KTU-Type Shelf Assembly for Impedance Matching Networks

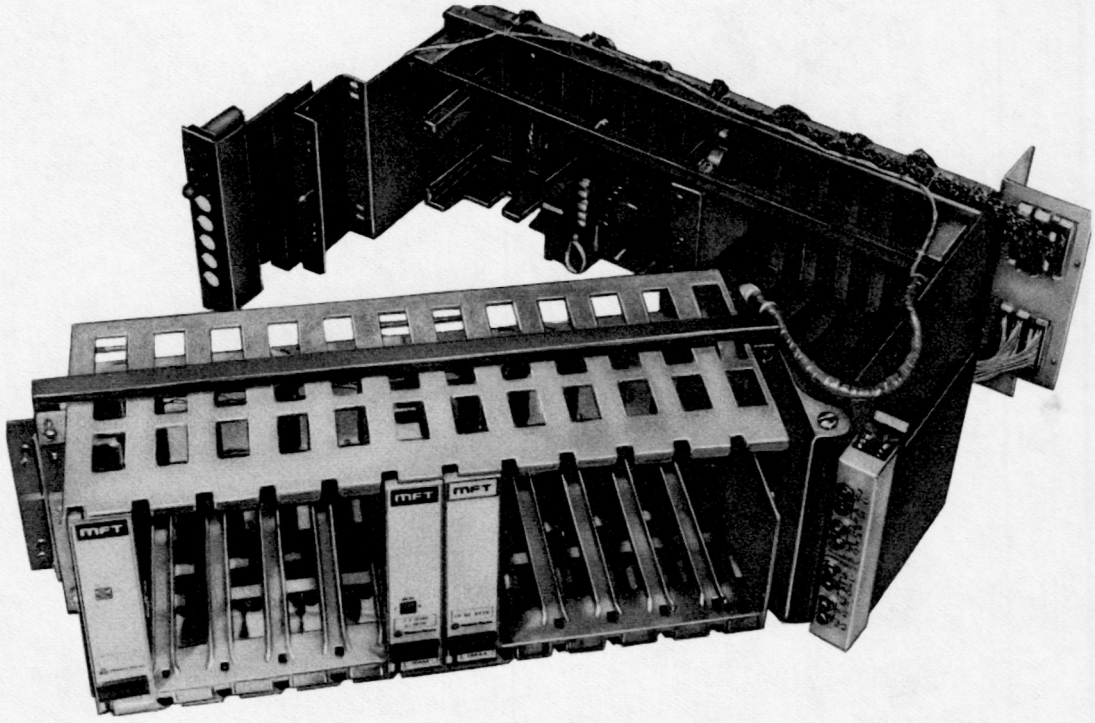


Fig. 93—Double-Depth Shelf Frame [J99380D(MD)] With Double Module Shelf [J99380E(MD)] in Front and Network Plug-In Shelf [J99380C(MD)] in Rear

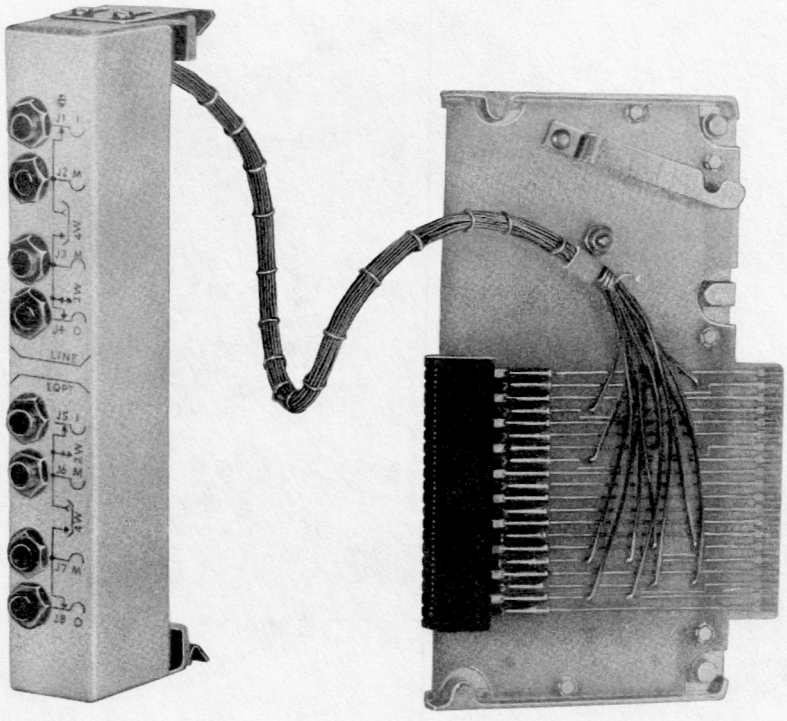


Fig. 94—Test Extender (J99380TA)

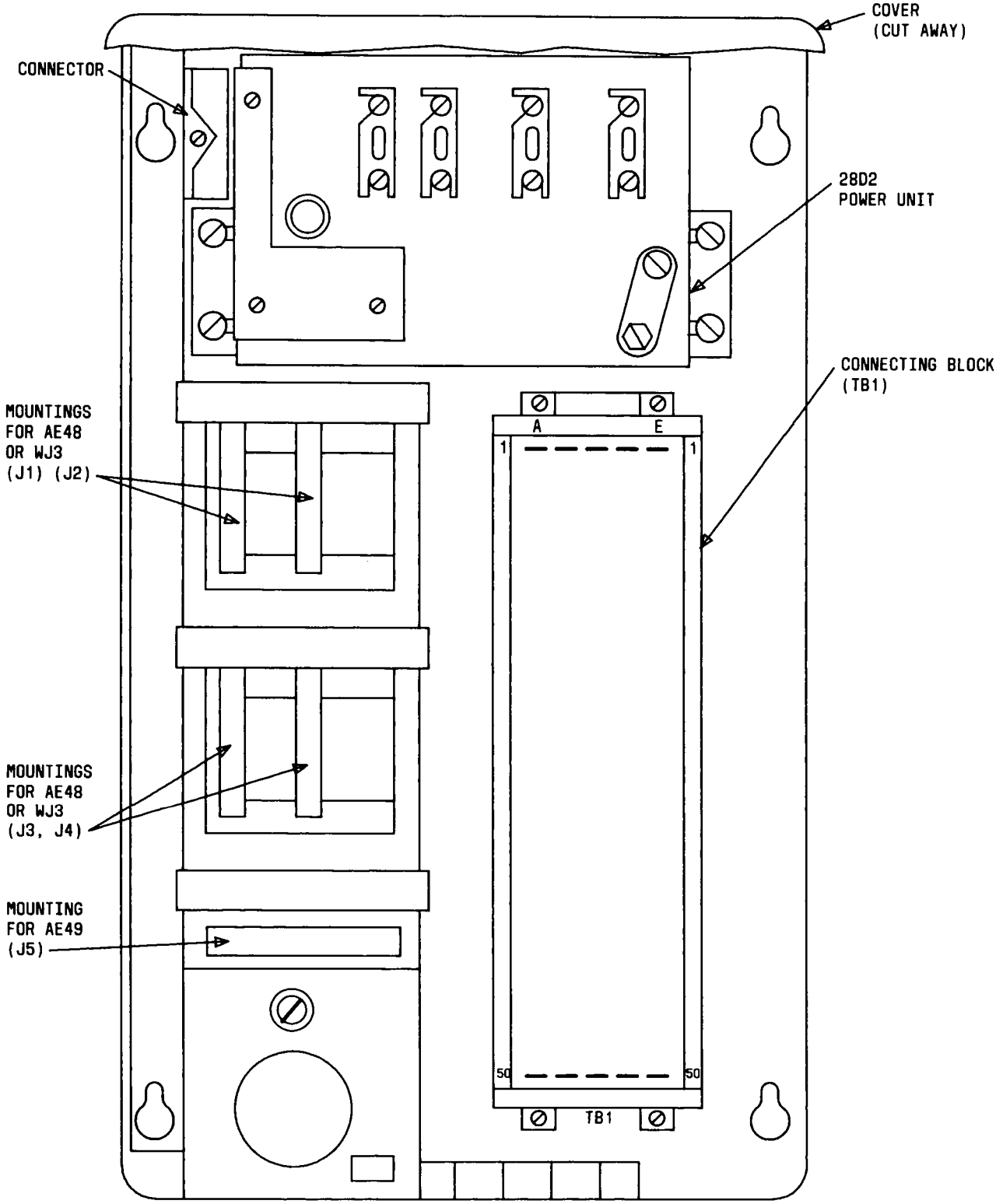
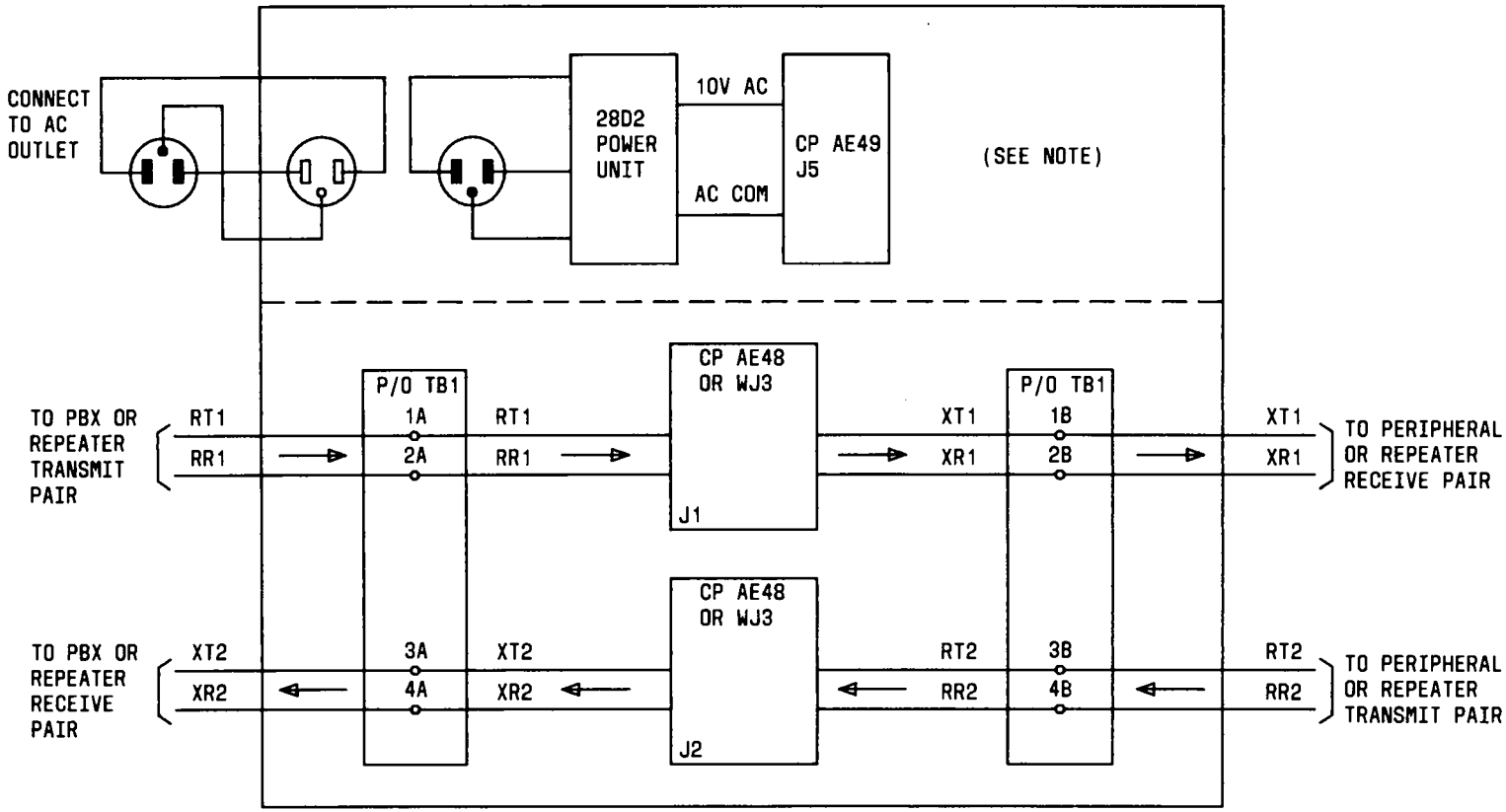


Fig. 95—Data Channel Repeater Unit (J58879KC)

TABLE BF

DATA CHANNEL REPEATER ARRANGEMENTS

REPEATER CONN	SINGLE CHANNEL		DUAL CHANNEL	
	WITH RANGE EXTENSION	WITHOUT RANGE EXTENSION	WITH RANGE EXTENSION	WITHOUT RANGE EXTENSION
J1 J2	AE48 (List 3)	WJ3 (List 4)	AE48 (List 3)	WJ3 (List 4)
J3 J4	—	—		
J5	AE49 (List 2)	—	AE49 (List 2)	—



NOTE:
THE POWER SUPPLY UNIT AND AE49 CIRCUIT PACK ARE NOT REQUIRED WHEN THE WJ3 CIRCUIT IS USED.

Fig. 96—Single-Channel Data Repeater With (AE48) or Without (WJ3) Range Extension

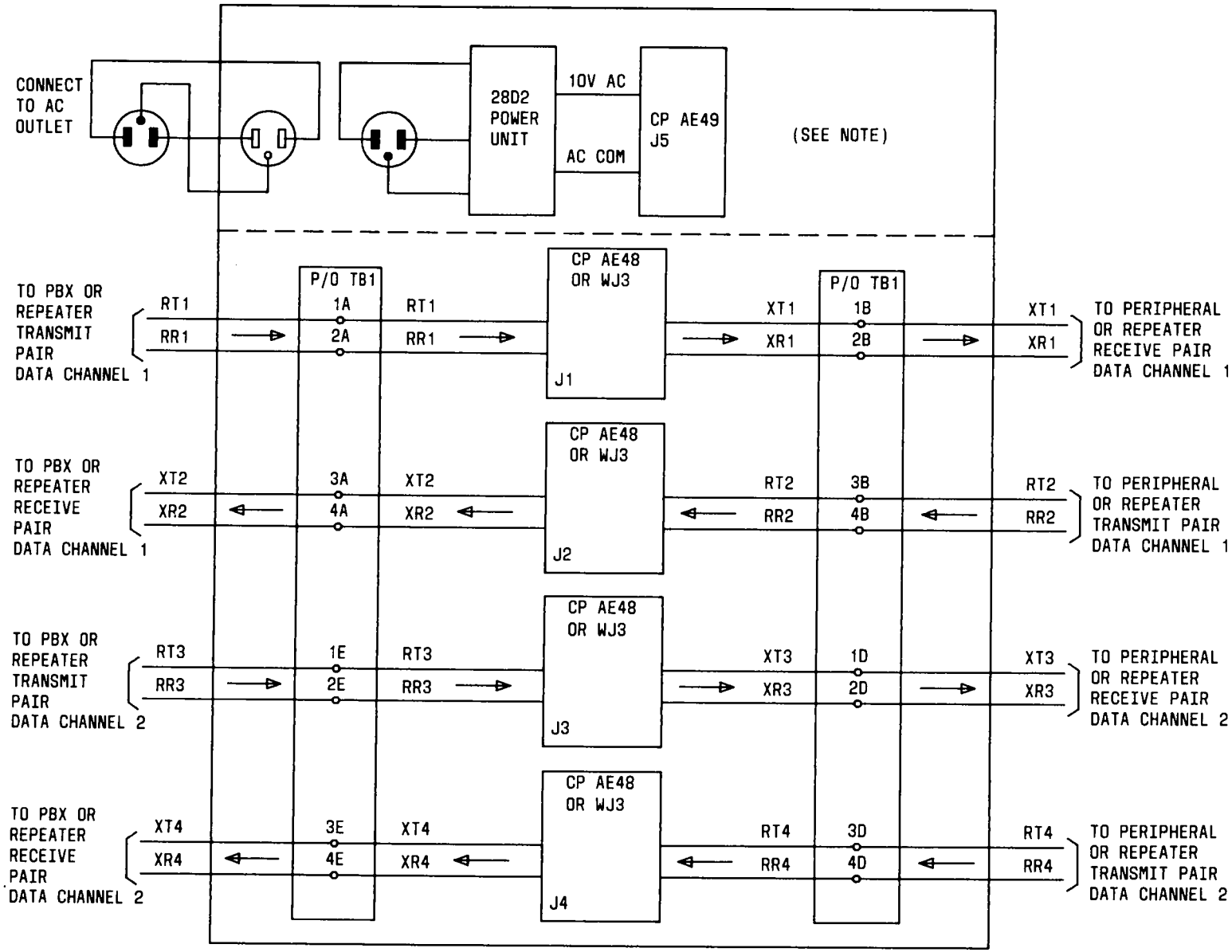


Fig. 97—Dual-Channel Data Repeater With (AE48) or Without (WJ3) Range Extension

TABLE BG

DATA CHANNEL REPEATER FROM BASIC CONTROL CARRIER CROSS-CONNECTIONS WORKSHEET

MOD_ _ CAB___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLK (PURPLE)	CONN BLK (YELLOW)	
BX01	32	0	IOXB0004	W-BL	1		
			IOXA0004	BL-W	2		
			IORB0004	W-O	3		
			IORA0004	O-W	4		
		1	IOXB0005	W-G	5		
			IOXA0005	G-W	6		
			IORB0005	W-BR	7		
			IORA0005	BR-W	8		
BX01	31*	1	IOXB0003	W-S	9		
			IOXA0003	S-W	10		
			IORB0003	R-BL	11		
			IORA0003	BL-R	12		
	33	1	IOXB0007	R-O	13		
			IOXA0007	O-R	14		
			IORB0007	R-G	15		
			IORA0007	G-R	16		
BX01	34	0	IOXB0008	R-BR	17		
			IOXA0008	BR-R	18		
			IORB0008	R-S	19		
			IORA0008	S-R	20		
		1	IOXB0009	BK-BL	21		
			IOXA0009	BL-BK	22		
			IORB0009	BK-O	23		
			IORA9009	• O-BK	24		

SEE FOOTNOTE AT END OF WORKSHEET.

TABLE BG (Contd)

DATA CHANNEL REPEATER FROM BASIC CONTROL CARRIER CROSS-CONNECTIONS WORKSHEET

MOD_ _ CAB___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLK (PURPLE)	CONN BLK (YELLOW)	
BX01	35	0	IOXB0010	BK-G	25		
			IOXA0010	G-BK	26		
			IORB0010	BK-BR	27		
			IORA0010	BR-BK	28		
		1	IOXB0011	BK-S	29		
			IOXA0011	S-BK	30		
			IORB0011	Y-BL	31		
			IORA0011	BL-Y	32		
BX01	36	0	IOXB0012	Y-O	33		
			IOXA0012	O-Y	34		
			IORB0012	Y-G	35		
			IORA0012	G-Y	36		
		1	IOXB0013	Y-BR	37		
			IOXA0013	BR-Y	38		
			IORB0013	Y-S	39		
			IORA0013	S-Y	40		
BX01	37	0	IOXB0014	V-BL	41		
			IOXA0014	BL-V	42		
			IORB0014	V-O	43		
			IORA0014	O-V	44		
		1	IOXB0015	V-G	45		
			IOXA0015	G-V	46		
			IORB0015	V-BR	47		
			IORA0015	BR-V	48		

TABLE BG (Contd)

DATA CHANNEL REPEATER FROM BASIC CONTROL CARRIER CROSS-CONNECTIONS WORKSHEET

MOD_ _ CAB___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLK (PURPLE)	CONN BLK (YELLOW)	
BX01	-	-	-	V-S	49		
			-	S-V	50		
BX02	38	0	IOXB0016	W-BL	1		
			IOXA0016	BL-W	2		
			IORB0016	W-O	3		
			IORA0016	O-W	4		
		1	IOXB0017	W-G	5		
			IOXA0017	G-W	6		
			IORB0017	W-BR	7		
			IORA0017	BR-W	8		
BX02	31 (BXP07)†	0	IOXB0002	W-S	9		
			IOXA0002	S-W	10		
			IORB0002	R-BL	11		
			IORA0002	BL-R	12		
	33 (BXP09)‡	0	IOXB0006	R-O	13		
			IOXA0006	O-R	14		
			IORB0006	R-G	15		
			IORA0006	G-R	16		

* WHEN BX08 (MD) CONNECTOR IS PROVIDED ON CONTROL CARRIER, SLOT 31, CIRCUIT 1, DATA CHANNEL 03 BECOMES SLOT 33, CIRCUIT 0, DATA CHANNEL 06.

† DATA CHANNEL 02 IS AVAILABLE ON LATER MODEL CARRIERS WHEN SMDR IS NOT PROVIDED AND BXP07 IS PLUGGED INTO BX07 ON THE CARRIER.

‡ DATA CHANNEL 06 IS AVAILABLE ON LATER MODEL CARRIERS WHEN NCOSS LSU IS NOT PROVIDED AND BXP09 IS PLUGGED INTO BX09 ON THE CARRIER.

TABLE BH

DATA CHANNEL REPEATER FROM GROWTH CONTROL OR SECOND GROWTH CONTROL CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION (NOTE)		CONN BLOCK PURPLE	CONN BLOCK	
__1GX01 OR __2SX01	20	0	IOXB0100(200)	W-BL	1		
			IOXA0100(200)	BL-W	2		
			IORB0100(200)	W-O	3		
			IORA0100(200)	O-W	4		
		1	IOXB0101(201)	W-G	5		
			IOXA0101(201)	G-W	6		
			IORB0101(201)	W-BR	7		
			IORA0101(201)	BR-W	8		
	21	0	IOXB0102(202)	W-S	9		
			IOXA0102(202)	S-W	10		
			IORB0102(202)	R-BL	11		
			IORA0102(202)	BL-R	12		
		1	IOXB0103(203)	R-O	13		
			IOXA0103(203)	O-R	14		
			IORB0103(203)	R-G	15		
			IORA0103(203)	G-R	16		
	22	0	IOXB0104(204)	R-BR	17		
			IOXA0104(204)	BR-R	18		
			IORB0104(204)	R-S	19		
			IORA0104(204)	S-R	20		
		1	IOXB0105(205)	BK-BL	21		
			IOXA0105(205)	BL-BK	22		
			IORB0105(205)	BK-O	23		
			IORA0105(205)	O-BK	24		
	23	0	IOXB0106(206)	BK-G	25		
			IOXA0106(206)	G-BK	26		
			IORB0106(206)	BK-BR	27		
			IORA0106(206)	BR-BK	28		
		1	IOXB0107(207)	BK-S	29		
			IOXA0107(207)	S-BK	30		
			IORB0107(207)	Y-BL	31		
			IORA0107(207)	BL-Y	32		
	24	0	IOXB0108(208)	Y-O	33		
			IOXA0108(208)	O-Y	34		
			IORB0108(208)	Y-G	35		
			IORA0108(208)	G-Y	36		
		1	IOXB0109(209)	Y-BR	37		
			IOXA0109(209)	BR-Y	38		
			IORB0109(209)	Y-S	39		
			IORA0109(209)	S-Y	40		
	25	0	IOXB0110(210)	V-BL	41		
			IOXA0110(210)	BL-V	42		
			IORB0110(210)	V-O	43		
			IORA0110(210)	O-V	44		
		1	IOXB0111(211)	V-G	45		
			IOXA0111(211)	G-V	46		
			IORB0111(211)	V-BR	47		
			IORA0111(211)	BR-V	48		
				V-S	49		
				S-V	50		

NOTE: CHANNEL DESIGNATIONS IN PARENTHESES ARE FOR SECOND GROWTH CARRIER.

TABLE BH (Contd)

DATA CHANNEL REPEATER FROM GROWTH CONTROL OR SECOND GROWTH CONTROL CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION (NOTE)		CONN BLOCK PURPLE	CONN BLOCK	
__1GX02 OR __2SX02	26	0	IOXB0112(212)	W-BL	1		
			IOXA0112(212)	BL-W	2		
			IORB0112(212)	W-O	3		
			IORA0112(212)	O-W	4		
		1	IOXB0113(213)	W-G	5		
			IOXA0113(213)	G-W	6		
			IORB0113(213)	W-BR	7		
			IORA0113(213)	BR-W	8		
	27	0	IOXB0114(214)	W-S	9		
			IOXA0114(214)	S-W	10		
			IORB0114(214)	R-BL	11		
			IORA0114(214)	BL-R	12		
		1	IOXB0115(215)	R-O	13		
			IOXA0115(215)	O-R	14		
			IORB0115(215)	R-G	15		
			IORA0115(215)	G-R	16		
	28	0	IOXB0116(216)	R-BR	17		
			IOXA0116(216)	BR-R	18		
			IORB0116(216)	R-S	19		
			IORA0116(216)	S-R	20		
		1	IOXB0117(217)	BK-BL	21		
			IOXA0117(217)	BL-BK	22		
			IORB0117(217)	BK-O	23		
			IORA0117(217)	O-BK	24		
	29	0	IOXB0118(218)	BK-G	25		
			IOXA0118(218)	G-BK	26		
			IORB0118(218)	BK-BR	27		
			IORA0118(218)	BR-BK	28		
		1	IOXB0119(219)	BK-S	29		
			IOXA0119(219)	S-BK	30		
			IORB0119(219)	Y-BL	31		
			IORA0119(219)	BL-Y	32		
	30	0	IOXB0120(220)	Y-O	33		
			IOXA0120(220)	O-Y	34		
			IORB0120(220)	Y-G	35		
			IORA0120(220)	G-Y	36		
		1	IOXB0121(221)	Y-BR	37		
			IOXA0121(221)	BR-Y	38		
			IORB0121(221)	Y-S	39		
			IORA0121(221)	S-Y	40		
	31	0	IOXB0122(222)	V-BL	41		
			IOXA0122(222)	BL-V	42		
			IORB0122(222)	V-O	43		
			IORA0122(222)	O-V	44		
		1	IOXB0123(223)	V-G	45		
			IOXA0123(223)	G-V	46		
			IORB0123(223)	V-BR	47		
			IORA0123(223)	BR-V	48		
				V-S	49		
				S-V	50		

NOTE: DATA CHANNEL DESIGNATIONS IN PARENTHESES ARE FOR SECOND GROWTH CONTROL CARRIER.

TABLE BH (Contd)

DATA CHANNEL REPEATER FROM GROWTH CONTROL OR SECOND GROWTH CONTROL CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION (NOTE)		CONN BLOCK PURPLE	CONN BLOCK	
__1GX03 OR __2SX03	32	0	IOXB0124(224)	W-BL	1		
			IOXA0124(224)	BL-W	2		
			IORB0124(224)	W-O	3		
			IORA0124(224)	O-W	4		
		1	IOXB0125(225)	W-G	5		
			IOXA0125(225)	G-W	6		
			IORB0125(225)	W-BR	7		
			IORA0125(225)	BR-W	8		
	33	0	IOXB0126(226)	W-S	9		
			IOXA0126(226)	S-W	10		
			IORB0126(226)	R-BL	11		
			IORA0126(226)	BL-R	12		
		1	IOXB0127(227)	R-O	13		
			IOXA0127(227)	O-R	14		
			IORB0127(227)	R-G	15		
			IORA0127(227)	G-R	16		
				R-BR	17		
				BR-R	18		
				R-S	19		
				S-R	20		
				BK-BL	21		
				BL-BK	22		
				BK-O	23		
				O-BK	24		
				BK-G	25		
				G-BK	26		
				BK-BR	27		
				BR-BK	28		
				BK-S	29		
				S-BK	30		
				Y-BL	31		
				BL-Y	32		
				Y-O	33		
				O-Y	34		
				Y-G	35		
				G-Y	36		
				Y-BR	37		
				BR-Y	38		
				Y-S	39		
				S-Y	40		
				V-BL	41		
				BL-V	42		
				V-O	43		
				O-V	44		
				V-G	45		
				G-V	46		
				V-BR	47		
				BR-V	48		
				V-S	49		
				S-V	50		

NOTE: DATA CHANNEL DESIGNATIONS IN PARENTHESES ARE FOR SECOND GROWTH CONTROL CARRIER.

TABLE BI

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLOCK PURPLE	CONN BLOCK	
BX0TA	32/36	0	IOXB0004	W-BL	1		
			IOXA0004	BL-W	2		
			IORB0004	W-O	3		
			IORA0004	O-W	4		
		1	IOXB0005	W-G	5		
			IOXA0005	G-W	6		
			IORB0005	W-BR	7		
			IORA0005	BR-W	8		
				W-S	9		
				S-W	10		
				R-BL	11		
				BL-R	12		
	33/37	1	IOXB0007	R-O	13		
			IOXA0007	O-R	14		
			IORB0007	R-G	15		
			IORA0007	G-R	16		
	34/38	0	IOXB0008	R-BR	17		
			IOXA0008	BR-R	18		
			IORB0008	R-S	19		
			IORA0008	S-R	20		
		1	IOXB0009	BK-BL	21		
			IOXA0009	BL-BK	22		
			IORB0009	BK-O	23		
			IORA0009	O-BK	24		
	31/35	0	IOXB0010	BK-G	25		
			IOXA0010	G-BK	26		
			IORB0010	BK-BR	27		
			IORA0010	BR-BK	28		
		1	IOXB0011	BK-S	29		
			IOXA0011	S-BK	30		
			IORB0011	Y-BL	31		
			IORA0011	BL-Y	32		
	32/36	0	IOXB0012	Y-O	33		
			IOXA0012	O-Y	34		
			IORB0012	Y-G	35		
			IORA0012	G-Y	36		
		1	IOXB0013	Y-BR	37		
			IOXA0013	BR-Y	38		
			IORB0013	Y-S	39		
			IORA0013	S-Y	40		
	33/37	0	IOXB0014	V-BL	41		
			IOXA0014	BL-V	42		
			IORB0014	V-O	43		
			IORA0014	O-V	44		
		1	IOXB0015	V-G	45		
			IOXA0015	G-V	46		
			IORB0015	V-BR	47		
			IORA0015	BR-V	48		
				V-S	49		
				S-V	50		

TABLE BI (Contd)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLOCK PURPLE	CONN BLOCK	
BX02A	34/38	0	IOXB0016	W-BL	1		
			IOXA0016	BL-W	2		
			IORB0016	W-O	3		
			IORA0016	O-W	4		
		1	IOXB0017	W-G	5		
			IOXA0017	G-W	6		
			IORB0017	W-BR	7		
			IORA0017	BR-W	8		
				W-S	9		
				S-W	10		
				R-BL	11		
				BL-R	12		
				R-O	13		
				O-R	14		
				R-G	15		
				G-R	16		
				R-BR	17		
				BR-R	18		
				R-S	19		
				S-R	20		
				BK-BL	21		
				BL-BK	22		
				BK-O	23		
				O-BK	24		
				BK-G	25		
				G-BK	26		
				BK-BR	27		
				BR-BK	28		
				BK-S	29		
				S-BK	30		
				Y-BL	31		
				BL-Y	32		
				Y-O	33		
				O-Y	34		
				Y-G	35		
				G-Y	36		
				Y-BR	37		
				BR-Y	38		
				Y-S	39		
				S-Y	40		
				V-BL	41		
				BL-V	42		
				V-O	43		
				O-V	44		
				V-G	45		
				G-V	46		
				V-BR	47		
				BR-V	48		
				V-S	49		
				S-V	50		

TABLE BI (Contd)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLOCK PURPLE	CONN BLOCK	
GXOTA	20/24	0	IOXB0100	W-BL	1		
			IOXA0100	BL-W	2		
			IORB0100	W-O	3		
			IORA0100	O-W	4		
		1	IOXB0101	W-G	5		
			IOXA0101	G-W	6		
			IORB0101	W-BR	7		
			IORA0101	BR-W	8		
	21/25	0	IOXB0102	W-S	9		
			IOXA0102	S-W	10		
			IORB0102	R-BL	11		
			IORA0102	BL-R	12		
		1	IOXB0103	R-O	13		
			IOXA0103	O-R	14		
			IORB0103	R-G	15		
			IORA0103	G-R	16		
	22/26	0	IOXB0104	R-BR	17		
			IOXA0104	BR-R	18		
			IORB0104	R-S	19		
			IORA0104	S-R	20		
		1	IOXB0105	BK-BL	21		
			IOXA0105	BL-BK	22		
			IORB0105	BK-O	23		
			IORA0105	O-BK	24		
	23/27	0	IOXB0106	BK-G	25		
			IOXA0106	G-BK	26		
			IORB0106	BK-BR	27		
			IORA0106	BR-BK	28		
		1	IOXB0107	BK-S	29		
			IOXA0107	S-BK	30		
			IORB0107	Y-BL	31		
			IORA0107	BL-Y	32		
	20/24	0	IOXB0108	Y-O	33		
			IOXA0108	O-Y	34		
			IORB0108	Y-G	35		
			IORA0108	G-Y	36		
		1	IOXB0109	Y-BR	37		
			IOXA0109	BR-Y	38		
			IORB0109	Y-S	39		
			IORA0109	S-Y	40		
	21/25	0	IOXB0110	V-BL	41		
			IOXA0110	BL-V	42		
			IORB0110	V-O	43		
			IORA0110	O-V	44		
		1	IOXB0111	V-G	45		
			IOXA0111	G-V	46		
			IORB0111	V-BR	47		
			IORA0111	BR-V	48		
				V-S	49		
				S-V	50		

TABLE BI (Contd)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB ___ CARRIER ___				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION		CONN BLOCK PURPLE	CONN BLOCK	
GX02A	22/26	0	IOXB0112	W-BL	1		
			IOXA0112	BL-W	2		
			IORB0112	W-O	3		
			IORA0112	O-W	4		
		1	IOXB0113	W-G	5		
			IOXA0113	G-W	6		
			IORB0113	W-BR	7		
			IORA0113	BR-W	8		
	23/27	0	IOXB0114	W-S	9		
			IOXA0114	S-W	10		
			IORB0114	R-BL	11		
			IORA0114	BL-R	12		
		1	IOXB0115	R-O	13		
			IOXA0115	O-R	14		
			IORB0115	R-G	15		
			IORA0115	G-R	16		
				R-BR	17		
				BR-R	18		
				R-S	19		
				S-R	20		
				BK-BL	21		
				BL-BK	22		
				BK-O	23		
				O-BK	24		
				BK-G	25		
				G-BK	26		
				BK-BR	27		
				BR-BK	28		
				BK-S	29		
				S-BK	30		
				Y-BL	31		
				BL-Y	32		
				Y-O	33		
				O-Y	34		
				Y-G	35		
				G-Y	36		
				Y-BR	37		
				BR-Y	38		
				Y-S	39		
				S-Y	40		
				V-BL	41		
				BL-V	42		
				V-O	43		
				O-V	44		
				V-G	45		
				G-V	46		
				V-BR	47		
				BR-V	48		
				V-S	49		
				S-V	50		

TABLE BJ

DATA CHANNEL REPEATER FROM SUPPLEMENTARY I/O CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB __ CARRIER __				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION (NOTE)		CONN BLOCK PURPLE	CONN BLOCK	
- 1 JX01	20/21	0	IOXB0200	W-BL	1		
			IOXA0200	BL-W	2		
			IORB0200	W-O	3		
			IORA0200	O-W	4		
		1	IOXB0201	W-G	5		
			IOXA0201	G-W	6		
			IORB0201	W-BR	7		
			IORA0201	BR-W	8		
		0	IOXB0202	W-S	9		
			IOXA0202	S-W	10		
			IORB0202	R-BL	11		
			IORA0202	BL-R	12		
		1	IOXB0203	R-O	13		
			IOXA0203	O-R	14		
			IORB0203	R-G	15		
			IORA0203	G-R	16		
	22/23	0	IOXB0204	R-BR	17		
			IOXA0204	BR-R	18		
			IORB0204	R-S	19		
			IORA0204	S-R	20		
		1	IOXB0205	BK-BL	21		
			IOXA0205	BL-BK	22		
			IORB0205	BK-O	23		
			IORA0205	O-BK	24		
		0	IOXB0206	BK-G	25		
			IOXA0206	G-BK	26		
			IORB0206	BK-BR	27		
			IORA0206	BR-BK	28		
		1	IOXB0207	BK-S	29		
			IOXA0207	S-BK	30		
			IORB0207	Y-BL	31		
			IORA0207	BL-Y	32		
	24/25	0	IOXB0208	Y-O	33		
			IOXA0208	O-Y	34		
			IORB0208	Y-G	35		
			IORA0208	G-Y	36		
		1	IOXB0209	Y-BR	37		
			IOXA0209	BR-Y	38		
			IORB0209	Y-S	39		
			IORA0209	S-Y	40		
		0	IOXB0210	V-BL	41		
			IOXA0210	BL-V	42		
			IORB0210	V-O	43		
			IORA0210	O-V	44		
		1	IOXB0211	V-G	45		
			IOXA0211	G-V	46		
			IORB0211	V-BR	47		
			IORA0211	BR-V	48		
				V-S	49		
				S-V	50		

TABLE BJ (Contd)

DATA CHANNEL REPEATER FROM SUPPLEMENTARY I/O CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB __ CARRIER __				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION (NOTE)		CONN BLOCK PURPLE	CONN BLOCK	
- 1 JX02	26/27	0	IOXB0212	W-BL	1		
			IOXA0212	BL-W	2		
			IORB0212	W-O	3		
			IORA0212	O-W	4		
		1	IOXB0213	W-G	5		
			IOXA0213	G-W	6		
			IORB0213	W-BR	7		
			IORA0213	BR-W	8		
		0	IOXB0214	W-S	9		
			IOXA0214	S-W	10		
			IORB0214	R-BL	11		
			IORA0214	BL-R	12		
		1	IOXB0215	R-O	13		
			IOXA0215	O-R	14		
			IORB0215	R-G	15		
			IORA0215	G-R	16		
	28/29	0	IOXB0216	R-BR	17		
			IOXA0216	BR-R	18		
			IORB0216	R-S	19		
			IORA0216	S-R	20		
		1	IOXB0217	BK-BL	21		
			IOXA0217	BL-BK	22		
			IORB0217	BK-O	23		
			IORA0217	O-BK	24		
		0	IOXB0218	BK-G	25		
			IOXA0218	G-BK	26		
			IORB0218	BK-BR	27		
			IORA0218	BR-BK	28		
		1	IOXB0219	BK-S	29		
			IOXA0219	S-BK	30		
			IORB0219	Y-BL	31		
			IORA0219	BL-Y	32		
	30/31	0	IOXB0220	Y-O	33		
			IOXA0220	O-Y	34		
			IORB0220	Y-G	35		
			IORA0220	G-Y	36		
		1	IOXB0221	Y-BR	37		
			IOXA0221	BR-Y	38		
			IORB0221	Y-S	39		
			IORA0221	S-Y	40		
		0	IOXB0222	V-BL	41		
			IOXA0222	BL-V	42		
			IORB0222	V-O	43		
			IORA0222	O-V	44		
		1	IOXB0223	V-G	45		
			IOXA0223	G-V	46		
			IORB0223	V-BR	47		
			IORA0223	BR-V	48		
				V-S	49		
				S-V	50		

TABLE BJ (Contd)

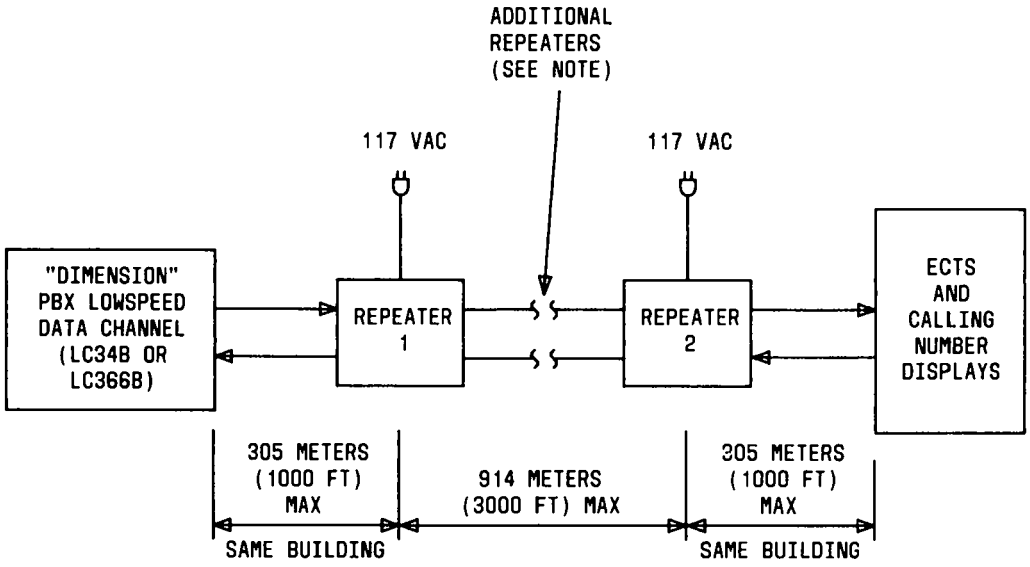
DATA CHANNEL REPEATER FROM SUPPLEMENTARY I/O CARRIER CROSS-CONNECTIONS WORKSHEET

MOD __ CAB __ CARRIER __				CONN CABLE COLOR CODE	CROSS-CONNECT		REPEATER TERMINALS
CONN. NO.	CP SLOT NO.	CKT NO.	LEAD DESIGNATION (NOTE)		CONN BLOCK PURPLE	CONN BLOCK	
- 1 JX03	32/33	0	IOXB0224	W-BL	1		
			IOXA0224	BL-W	2		
			IORB0224	W-O	3		
			IORA0224	O-W	4		
		1	IOXB0225	W-G	5		
			IOXA0225	G-W	6		
			IORB0225	W-BR	7		
			IORA0225	BR-W	8		
		0	IOXB0226	W-S	9		
			IOXA0226	S-W	10		
			IORB0226	R-BL	11		
			IORA0226	BL-R	12		
		1	IOXB0227	R-O	13		
			IOXA0227	O-R	14		
			IORB0227	R-G	15		
			IORA0227	G-R	16		
				R-BR	17		
				BR-R	18		
				R-S	19		
				S-R	20		
				BK-BL	21		
				BL-BK	22		
				BK-O	23		
				O-BK	24		
				BK-G	25		
				G-BK	26		
				BK-BR	27		
				BR-BK	28		
				BK-S	29		
				S-BK	30		
				Y-BL	31		
				BL-Y	32		
				Y-O	33		
				O-Y	34		
				Y-G	35		
				G-Y	36		
				Y-BR	37		
				BR-Y	38		
				Y-S	39		
				S-Y	40		
				V-BL	41		
				BL-V	42		
				V-O	43		
				O-V	44		
				V-G	45		
				G-V	46		
				V-BR	47		
				BR-V	48		
				V-S	49		
				S-V	50		

TABLE BK

CONNECTIONS FOR A DATA CHANNEL REPEATER FROM REPEATER TO REPEATER OR REPEATER TO PERIPHERAL DEVICE

MOD __ CAB ___ CARR ___		PBX LEADS FROM BXO __, GXO __, SXO __, OR FXO __ ON CROSS-CONNECT FIELD	1ST REPEATER		2ND, 3RD, OR 4TH REPEATER		LEAD DESIG	PERIPH TERM.
			TO PBX	TO SUCCEEDING REPEATER OR PERIPHERAL	TO PRECEDING REPEATER	TO SUCCEEDING REPEATER OR PERIPHERAL		
LC34B			TB1 TERM. NO.	TB1 TERM. NO.	TB1 TERM. NO.	TB1 TERM. NO.		
SLOT	CIRCUIT							
	0	IOXA_ _ _ _	1A	1B	1A	1B	XT1	
		IOXB_ _ _ _	2A	2B	2A	2B	XR1	
		IORA_ _ _ _	3A	3B	3A	3B	RT2	
		IORB_ _ _ _	4A	4B	4A	4B	RR2	
	1	IOXA_ _ _ _	1E	5B	1E	5B	XT3	
		IOXB_ _ _ _	2E	6B	2E	6B	XR3	
		IORA_ _ _ _	3E	7B	3E	7B	RT4	
		IORB_ _ _ _	4E	8B	4E	8B	RR4	



NOTE: TWO INTERMEDIATE REPEATERS CAN BE ADDED TO EXTEND THE TOTAL DISTANCE BETWEEN THE PBX AND PERIPHERAL DEVICE TO 3353 METERS (11,000 FEET)

Fig. 98—Typical Data Channel Repeater Application

$$R = \frac{20 \text{ LOG}_{10}\left(\frac{XL}{RS}\right)}{\alpha(\text{dB/UNIT LENGTH})}$$

Where:

XL = Transmit level of sender

RS = Receive sensitivity of receiver

α = Cable attenuation

Both directions must be measured to determine the data link range.

5.95 The transmit level is the magnitude of the transmitted biphase pulse. For the repeater, XL = 5 volts.

5.96 The receiver sensitivity is the minimum magnitude of biphase pulse required by the receiver circuit for detection. For the repeater, RS = 0.7 volt. For other circuits, the sensitivity depends upon the circuit card code and vintage.

5.97 The cable attenuation is a function of the cable type and temperature. For No. 24 AWG cable, α =5.5 dB per 305m (1000 feet).

5.98 The previously mentioned values can be substituted into the range formula as shown below:

$$R = \frac{20 \text{ LOG}_{10} \frac{5.0}{0.7}}{5.5/305 \text{ m (1000 FEET)}} = 947 \text{ m (3105 FEET)}$$

Note: The range formula computes cable attenuation as a function of conductor size. The formula may be applied to individual cable runs within a repeater installation. The 3353-m (11,000-foot) maximum range is limited by propagation delay which is not affected by conductor size. The range formula ***should not*** be used to extend the total data link range beyond 3353m (11,000 feet).

Propagation Delay

5.99 The maximum data range is limited in software by the time allowed for a data channel response. The maximum response time permitted by software is 160 μs, allowing four repeaters to be cascaded for a maximum range of 3353m (11,000 feet) using 24 AWG wire. Range extension increases the data response due to repeater delay and cable propagation. The maximum distance between repeaters may be changed by using different gauge twisted pair wire as follows:

AWG	DIST	PECENT CHG
26	2400	−20
24	3000	0
22	3600	+20
19	4800	+60

5.100 Each unidirectional repeater circuit (AE-48) has a 2.4 μs delay. In an application employing two repeaters, a total of four repeater circuits are inserted in the loop for a total delay of 9.6 μs.

5.101 Cable delay is approximately 1.7 μs per 305m (1,000 feet). In the previous application, when a 1524-m (5,000-foot) maximum range is used, the total cable length is 3048m (10,000 feet) resulting in a cable delay of 17 μs.

5.102 Additional elements in the data response time are:

- Time required to shift out the data (92 μs)
- Time required by the peripheral to respond to each bit (ECTS = 2 μs)
- Time for the PBX receiver to respond (1 μs).

5.103 The ECTS application using two data repeaters requires the software to allow 122 μs for a data channel response.

▶DATA SWITCHING

5.104 This feature, provided in FP8, Issue 3, allows the switching of synchronous and asynchronous data from and to data terminals and computer-type equipment via DIMENSION PBX at speeds up to 9600 bps. The data is in a digital format from the terminal, through the PBX and to the computer. The data signal is never converted from digital to analog. Data information remains digital end-to-end. Voice conversations remain analog, end-to-end.

5.105 Two versions of data switching are available: data switching level 1 and data switching

level 2. Level 1 is implemented on a retrofit basis with new hardware only and requires no new DIMENSION PBX software. Existing software translation changes via the maintenance and administration panel interface are required for level 1 data switching implementation. Two new hardware devices are required to provide data switching level 1. The data interface (LC566) replaces modems and is attached directly to terminals or computer ports. The data port circuit pack (LC567B) is internal to the PBX. Level 2 requires a software modification in addition to hardware including the Data Interface (DI), Data Port (DP), and Voice/Data Link (VDL) (LC568) circuit packs. The VDL is required only when data is to be switched between modules of a DIMENSION 2000 PBX. The VDL replaces existing voice link circuits, and is capable of switching either voice or data.

A. Level 1 Data Switching

5.106 A DIMENSION PBX equipped with level 1 data switching feature provides a customer with the ability to connect computer and/or terminals equipment to either the line or trunk side of the PBX. Level 1 data switching provides:

(a) Single module data switching between two stations and/or trunks.

(b) On-premises modemless data switching - full or half duplex, either synchronous or asynchronous, at speeds up to 9600 bps.

(c) Data "call setup" to a host computer or other terminal from a data terminal keyboard or ASCII asynchronous terminals. This capability is called terminal dialing and provides the ability to originate a data call from a terminal, using keyboard key operations to generate on/off hooks and digits for dialing.

(d) Visual call progress messages such as incoming call, dialed number is ringing, etc, are displayed or printed in the terminal.

(e) Data "call setup" by using a station and the Threeway Conference Transfer feature to connect a terminal to a host computer or another terminal.

(f) Electronic Industries Association (EIA) RS-366 interface for automatic calling unit dialing. This function provides computer port call originations or host computers and eliminates the need for an automatic calling unit.

*Registered service mark of AT&T.

5.107 ***Data Interface (DI):*** The DI is a locally powered unit requiring 110-volt ac input (approximately 15 watts). The DI is designed for three mounting arrangements:

(1) A single stand-alone unit for use at a terminal or modem. The DI can be desk-mounted like a data set.

(2) A multiple-desk-mounted unit that houses up to eight DIs.

(3) A rack-mounted arrangement that houses up to eight DIs. The rack mount is designed for DIMENSION PBX auxiliary cabinets or DATAPHONE* data communications service terminal cabinets.

The DI contains a number of option switches which are used to control data speed and format. It also contains buttons and indicators which are used during call setup and maintenance functions.

5.108 The DI provides a standard EIA RS-232C interface to customer-provided data equipment such as terminals, host computers, and voiceband modems. The DI interfaces the PBX over the DIMENSION PBX Data Link (DDL) which is a 4-wire, bipolar, fully synchronous digital communications link consisting of two tip and ring pairs. Figure 99 shows the DI connected by the DDL to the PBX through the cross-connect field. The DI provides four major functions:

(1) End-end control

(2) Data handling

(3) Clocks and timing generation

(4) DIMENSION PBX Data Link (DDL) interface.

5.109 ***Data Port (DP):*** The DP as shown in Fig. 100 is a carrier-mounted circuit pack (LC567B) which provides the interface between the DIMENSION PBX data link to the DI. The DP can be

used on either the line or trunk side of the PBX and can be placed in the following carriers and slots:

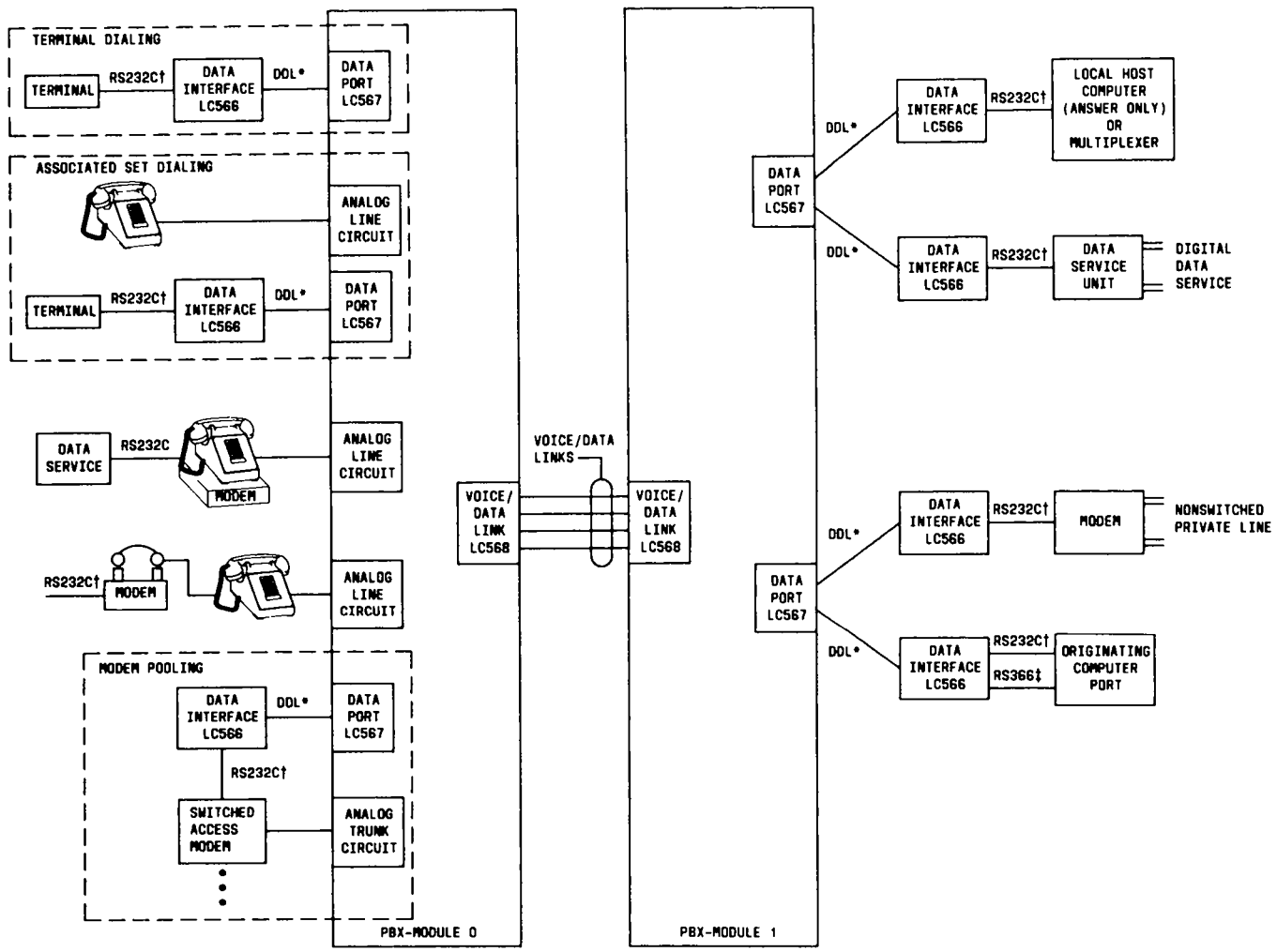
CARRIERS	SLOTS
J58879BA, Trunk Port	02, 06
J58879AC, Line Port	02, 06, 11, 15
J58882BD, Tie Trunk	02, 06, 11, 15.

The DP appears to the DIMENSION PBX software as the circuit it replaces, thus no software changes are required for a single-module PBX, equipped for level 1 switching.

B. Level 2 Data Switching

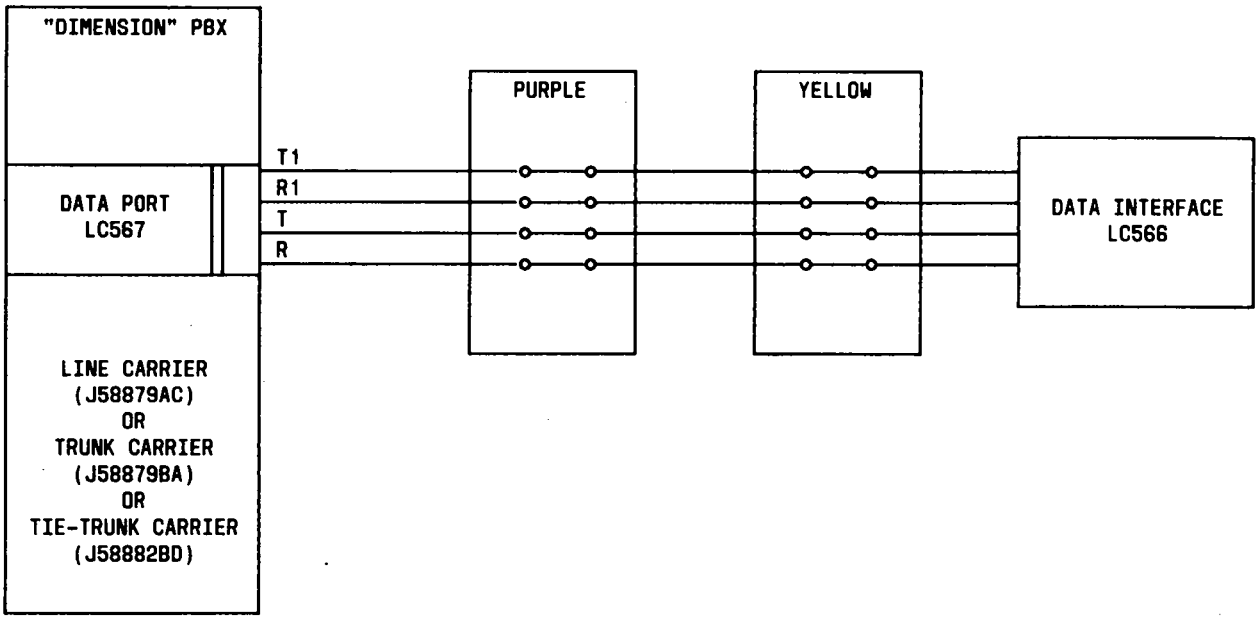
5.110 This feature includes all hardware and functions provided by level 1 data switching plus the following additional features:

(a) Multimodule data switching (ie, data switching between the different modules of a multimodule DIMENSION 2000 PBX).



* DIMENSION DATA LINK (DDL) - FOUR WIRE FULL DUPLEX DIGITAL COMMUNICATIONS LINK.
† ELECTRONIC INDUSTRIES ASSOCIATION (EIA) RS232C COMPATABLE INTERFACE.
‡ EIA RS366 COMPATABLE INTERFACE FOR COMPUTER PORT CALL ORIGINATION.

Fig. 99—Example of DIMENSION PBX Multimodule Level 2 Data Switching Configuration



NOTE:
1. THE FOLLOWING GUIDELINES CAN BE USED FOR DETERMINING DDL RANGE:

- 26-GAUGE CABLE -- APPROXIMATELY 4,850M (16000 FEET)
- 24-GAUGE CABLE -- APPROXIMATELY 6,400M (21000 FEET)
- 22-GAUGE CABLE -- APPROXIMATELY 8,500M (28000 FEET)
- 19-GAUGE CABLE -- APPROXIMATELY 12,800M (42000 FEET)

Fig. 100—Interconnection of Data Port and Data Interface

(b) Associated set dialing, which allows the origination of a data call from a station set that has administered software affiliation to a specific terminal. When the dial access code is used and the data port dialed answers, the connection is automatically transferred to its associated terminal when the originating station hangs up. The station set is then released to function as a normal station of the PBX.

(c) Modem pooling, which allows the selection of a specific type of modem without requiring that modems be dedicated to each terminal. Modems are modulator/demodulator devices which provide an interface with terminals and computer ports which convert digital signals to audio tones for data transmission over the voice network. Modems also convert received tones to digital signals for use by data processing equipment. For DIMENSION PBXs equipped for data switching, the modem is replaced by the DI for all local data switching. When DIs are used for local data switching, a DI to modem connection must be provided before going out over the public network. This is accomplished by switching the call through a modem pool. Significant software additions provided by FP8 supports the selection of the proper modem pool, the proper "call setup," and switching in the modem at the proper time.

(d) Data verification by station provides diagnostic capabilities to verify the status (busy or idle) of modem-pool members. It eliminates the need for service calls to determine the working condition of a modem-pool member.

(e) Enhanced Uniform Call Distribution (EUCD) performs the same functions as uniform call distribution except that the hunting pattern is either sequential or the next idle station in the hunting sequence. The EUCD determines which port of an on-premises computer or terminal group is selected on a dial-up basis.

For additional feature information on associated set dialing, modem pooling and data verification by station, refer to data switching level 2 Feature Document Section 554-191-279. Enhanced Uniform Call Distribution is covered in Feature Document Section 554-191-121.

5.111 ***Voice/Data Link:*** As shown in Fig. 99, the voice/data link (LC568) makes possible the switching of voice or data between PBX modules using the same link circuit. Separate circuit functions within the voice/data link circuit under control of the DIMENSION PBX software provides the capability to handle either voice or data. When level 2 data switching is provided between DIMENSION PBX modules, all link circuits between the modules must be voice/data link circuits.

5.112 To use the voice/data-link port in existing link carrier J58882BC, the backplane wiring must be modified. This modification is required to allow software commands to control the voice or data mode of the ports on the new voice/data-link circuit pack. The backplane wiring modification consists of a connecting a control lead from control circuit packs to each port circuit pack location. The modification includes wire-wrapping 22 leads into the backplane. The wire leads are shown in the following table.

Note: Connections for Link Carrier Modification for Voice/Data Link Port Usage.

CONNECTIONS (NOTE)			
FROM		TO	
SLOT	PIN	SLOTS	PIN
03	39	4, 5	53
03	89	6, 7, 8	53
03	90	10, 11, 12	53
03	91	13, 14, 15	53
16	39	17, 18	53
16	89	19, 20, 21	53
16	90	23, 24, 25	53
16	91	26, 27, 28	53

5.113 The modifications should be applied to the entire carrier even if the carrier is partially equipped with voice/data-link circuit packs.

5.114 ***Fusing Requirements:*** To use the data port (LC567B) in the trunk (J58879BA) and tie-trunk (J58882BD) carriers, the fuses used for +9 and −9 volt power distribution in the carrier must be changed from a 2-amp size to a 3-amp size (+9FAT2, +9FAT3, −9FAT2, and −9FAT3). This change should be made when using a carrier with the first data port. The fuse size designation is to be changed on the fuse blocks to indicate that the higher rating fuses should be used for future replacement.

5.115 When the voice/data-link port (LC568) is used in a link carrier (J58882BC), the fuses for the carrier power distribution are changed as follows:

- +5 volt distribution fuses for port boards (+5FK4, +5FK5, and +5FK6) are upgraded from 3 amps to 5 amps (green)
- −5 volt distribution fuses for port boards (−5FK3, −5FK4, and −5FK5) are upgraded from 1-1/3 amps to 2 amps (orange)
- +9 volt distribution fuses for port boards (+9FK3, +9FK4, and +9FK6) are upgraded from 2 amps to 3 amps (blue)
- −9 volt distribution fuses for port boards (−9FK4, −9FK5, and −9FK6) are upgraded from 2 amps to 3 amps (blue).

Fuse size designations should be changed on the fuse blocks to indicate the higher rating fuses to be used for future replacement.

5.116 ***Power Supply Requirements:*** Power supplies in existing carriers will remain the same for the use of LC567B and LC568 circuit packs.

"DIMENSION" PBX ELECTRONIC CUSTOM TELEPHONE SERVICE (ECTS)

5.117 The DIMENSION PBX ECTS is provided by one or more Electronic Custom Telephone Service controllers, the associated electronic telephone sets, and the wiring and terminals required for connection.

5.118 The ECTS controller is available in two (line capacity) sizes (63 and 126), and can be installed using two equipment mounting arrangements. A circuit pack carrier is the basic ECTS controller equipment module. Circuit packs plug into connectors located on the carrier. The basic ECTS controller carrier provides 63 ports for electronic telephone sets. When more telephone sets are required, a supplementary ECTS controller carrier, containing steering circuits for 63 additional station sets, may be used. When greater button usage is required, the memory capacity in the basic controller may be exceeded, thereby reducing ECTS controller capacity and requiring an additional ECTS controller. The supplementary carrier is powered by the basic carrier, and must be mounted directly above the basic carrier. Occupancy is limited to one controller in a module control or line cabinet in the designated carrier positions (Fig. 14 and 15). Two controllers can be installed in an auxiliary cabinet. ⏵The number of ECTS controllers allowed per system is limited by memory size and feature package in use. For more information, refer to Section 554-010-110.⏴ The electronic station sets must be located within 305m (1000 feet) of the ECTS controller.

5.119 Where mounting space or station loop (data) length considerations are exceeded, a second ECTS controller mounting option is available. This option is a standalone ECTS controller configuration which provides a separate equipment cabinet in which a basic, or basic and supplementary, ECTS controller carrier is mounted. Use of the standalone ECTS controller effectively doubles the station data loop length by providing an additional 305m (1,000 feet) of PBX cabling to the ECTS controller. The standalone can be 305m (1,000 feet) from the PBX, and the station another 305m (1,000 feet) from the standalone. When data channel repeaters are used, the standalone ECTS controller can be 3353m (11,000 feet) from the PBX which will yield a 3658-m (12,000-foot) potential station range.

5.120 The standalone cabinet is compatible with the PBX cabinets in appearance, holding only two carriers in height. Silent operation and panels offered in several optional decorator colors are features which make the cabinet suitable for use in a customer office environment.

5.121 The use of the standalone cabinet may be an advantage when station loop length, space consideration, or tie cable lengths are factors.

5.122 The ECTS can be directly accessed only by Multibutton Electronic Telephone (MET) sets which have the ability to communicate with the controller over a low-speed data link. Electronic telephones are available with 5, 10, 20, or 30 buttons for line and feature access. The buttons provide silent, low-travel movement for ease of operation. Each feature button has a green status indicator to indicate the state of the button and feature. The line buttons, used for electronic key station service, have a green status indicator and a red ***I-use*** indicator to indicate which button is in use or is to be used.

5.123 When power failure transfer is used with an ECTS station, the transmit data link from the PBX to the electronic telephone controller must be routed through 609-type emergency transfer panel. This will prevent phantomed power from being applied to an ECTS set after the tip and ring leads have been transferred to the central office. The removal of power from the ECTS set eliminates a noise problem and also meets an FCC registration requirement. Refer to Section 554-010-111 for additional information.

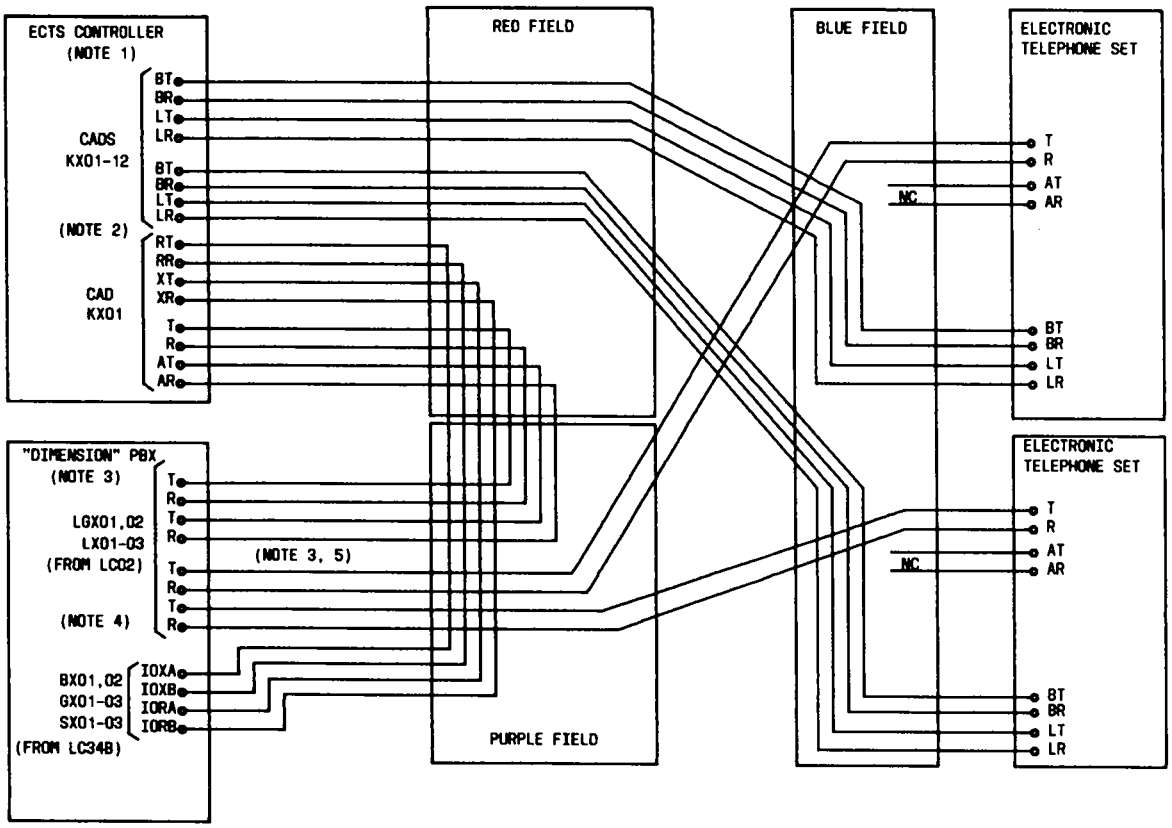
5.124 If the ECTS controller(s) are to be installed in an auxiliary cabinet. Power for the power supply (270A) is provided from a commercial 117-Vac 60-Hz outlet via the J58883JA unit.

5.125 Figure 101 provides basic interconnection data for installation of the ECTS via the cross-connect field. Refer to Sections 554-010-110 and 554-010-111 for additional detailed information.

DISTRIBUTED COMMUNICATIONS SYSTEM (DCS)

5.126 The DCS provides new feature capabilities to the PBXs, equipped with FP8, Issue 3. The DCS provides customers with the capability to have feature transparency between multiple DIMENSION PBX switches. Feature transparency is the ability to activate, administer, and utilize a feature between two or more PBX switches, and have the feature operate as if it were in the same switch. The switches can be located on the same premises, a campus arrangement, or in different locations distributed throughout a metropolitan area. In addition, customers that require more capacity than can be provided with a single PBX can now be provided with a system comprised of several PBXs that have feature transparency between them. This then enables customers to control their systems, basically, as a single entity.

5.127 ***Transparent Features:*** Each PBX equipped with DCS has available all of the



NOTES:
1. DISTANCE BETWEEN CONTROLLER AND ELECTRONIC TELEPHONE SET CANNOT EXCEED 305 METERS (1000) FEET
2. CADS KX01-KX12 ARE PART OF SD1E450-01
3. DISTANCE BETWEEN PBX AND CONTROLLER CANNOT EXCEED 305 METERS (1000) FEET, 3353 METERS (11,000) WITH REPEATER
4. CADS BX01, BX02, GX01-GX03, LGX01, LGX02, LX02-LX03, AND SX01-SX03 ARE PART OF SD1E480-01

Fig. 101—DIMENSION PBX Electronic Custom Telephone Service (ECTS)—Interconnections

features presently offered with FP8. In addition, DCS provides some degree of feature transparency between the PBXs for the following FP8 features:

- Alphanumeric display for attendant position
- Attendant control of trunk group access
- Automatic Callback Calling
- Automatic Circuit Assurance
- Busy verification of station lines
- Call Forwarding — All Calls, Busy and Don't Answer, Don't Answer
- Call Waiting-Attendant, Originating, Terminating
- Calling number display to attendant
- ▶Class-of-service display to attendant◀
- Direct trunk group selection
- Distinctive ringing

- ECTS Direct Station Selection (DSS)
- ECTS last extension called
- Five-digit dialing
- Inter-PBX call transfer
- Station-to-station calling
- Threeway Conference Transfer
- Trunk group busy indicators on attendant position
- Trunk group warning indicators on attendant position
- Trunk verification by customer.

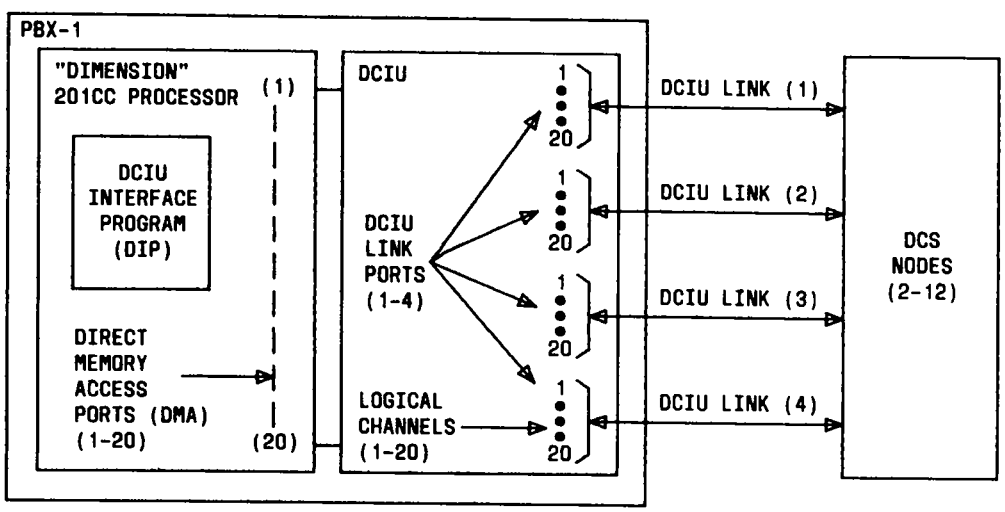
5.128 ***Data Communications Interface Unit (DCIU):*** Feature transparency is made possible between PBXs by the addition of a DCIU and an associated DCIU Interface Program (DIP) to each PBX. The DCIU makes possible the transfer of information between PBX processors. As shown on Fig. 102, the DCIU interfaces with the local PBX processor via one of 20 Direct Memory Access (DMA) ports under control of the DIP. The DIP translates DCIU instructions, generates and formats a DCS message with the appropriate feature or call information, and transmits the message by a DMA port to the DCIU.

5.129 Once the appropriate call or feature message reaches the DCIU, the DCIU determines which PBX (ie, DCS node) the message is destined for, assigns the proper DCIU link, and selects one of 20 logical channels within the link over which the message is to be transmitted. The links connects the various DCS nodes and are capable of handling information at speeds up to 9.6 kbs, depending on distances involved.

5.130 If duplicate common control is to be provided in a PBX equipped for DCS, the DCIU is also duplicated. When the DCIU is duplicated, the links between nodes are not. Figure 103 shows a duplicate DIMENSION PBX common control and duplicate DCIUs sharing common link circuits.

5.131 Typical connecting arrangements for DCIUs are shown in Fig. 104. A data modem that supports 9.6 kbs and provides protection is required on each end of the interface. The only exception to the use of modems is when all the following conditions are met.

- The PBXs are located in the same building.
- The same single-point ground is provided for the PBX.



NOTE:
1. NO MORE THAN FOUR DCIU LINKS ARE ASSIGNED EACH NODE AND NO MORE THAN TWELVE PBXs MAY BE ASSIGNED A DCS

Fig. 102—DCIU Interface

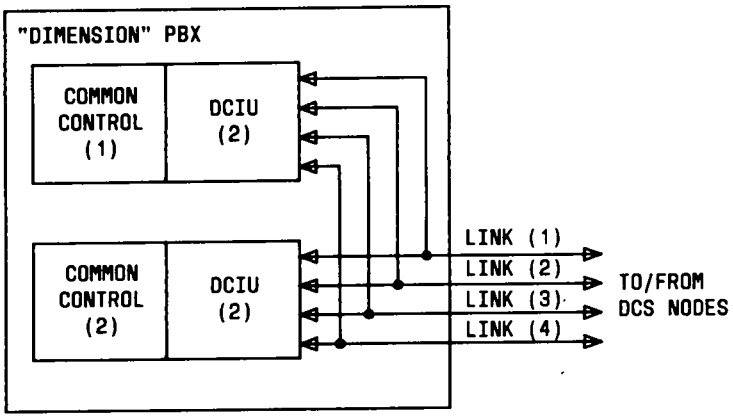


Fig. 103—Duplicated Control With DCS

- The cable distance between DCIUs is less than 610m (200 feet).

Hardware considerations for connecting arrangements of DCIUs are shown in Figures 105, 106, and 107.

5.132 ***DCS Architecture:*** A DCS is comprised of various PBXs connected together via DCIUs and associated links to provide feature transparency between the PBXs. Systems A, B, C, and D (Fig. 108) make up a DCS and are referred to as nodes. Communications between two DCIUs via an intermediate DCIU is referred to as a hop (ie, PBX-A to PBX-C via intermediate DCIU located in PBX-B).

5.133 An example of a DCS Electronic Tandem Network (ETN) configuration is shown in Fig. 109. Systems A, B and C make up a DCS and Systems F, G, and H make up another DCS. Feature transparency ***does not*** exist between the two DCSs. Tie trunks are required between DCS nodes to pass digit, signaling, and voice transmission. In the DCS configuration of DCS nodes F, G, and H, tie trunks are not needed between satellites G and H because communications between these locations is routed via main PBX F.

Immediate Start Tie Trunks CANNOT be used between DCS nodes. A trunk must be used that will insure that the destination is ready to receive data before transmitting of data begins.

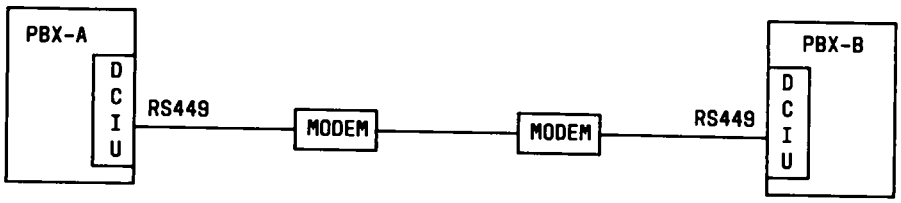
Trunk order between DCS nodes must be observed. For example, internal trunk group #1 in PBX A must be connected to internal trunk group #1 in PBX B to insure that software agrees with hardware.

5.134 Assignments of DCIU links at each DCS node are made in such a manner that all nodes can be physically connected with no more than one hop required to reach any combination of nodes. No more than four DCIU links are assigned to each node and no more than 12 PBXs can be assigned a DCS. The PBXs must be within a 30-mile radius.

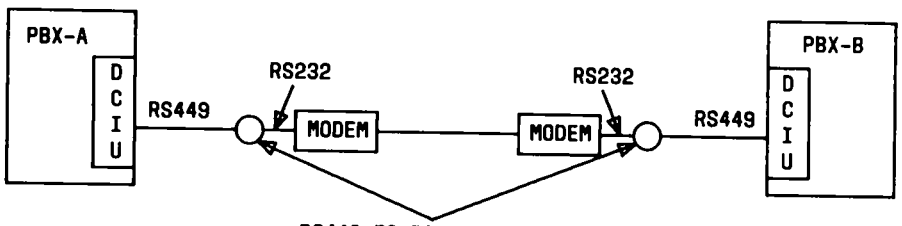
ENERGY COMMUNICATION SERVICE FEATURE

5.135 The Energy Communication Service (ECS) feature remotely controls various energy consuming devices on customer premises. This function includes heating, ventilating, and air-conditioning units in the motel rooms. The DIMENSION PBX processor provides for control of these power applications via an Energy Communication Signaling Unit (ECSU), each containing a contact closure to activate or deactivate a particular load upon command from the PBX software. No additional wiring is run to the room; the existing telephone tip and ring is used. An exception is that the tip and ring should ***not*** be assigned to an Electronic Custom Telephone Service (ECTS) station. The ECSU is shown in Fig. 110. It detects the presence or absence of a tone on the telephone line and the on-hook/off-hook state of the telephone set via tip and ring leads. An appliance relay is operated via the tone, thereby communicating control to the energy consuming device. In addition, the status of the appliance control relay is transmitted back to the PBX in response to a query signal.

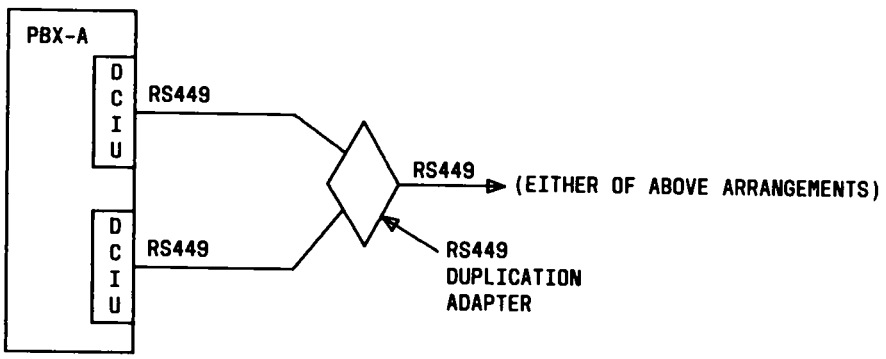
5.136 An LC16B circuit pack is required to interface the power meter to the PBX for peak



A - CONNECTING ARRANGEMENT WITH EIA RS449 COMPATIBLE MODEMS



B - CONNECTING ARRANGEMENT WITH EIA RS232 COMPATIBLE MODEMS



C - CONNECTING ARRANGEMENT FOR DUPLICATED DCIUs

Fig. 104—Configurations of DCS

demand load shedding and system status features. Each LC16B contains eight interface circuits. A separate interface circuit is required for each power meter monitored by ECS (Fig. 111). This feature performs the following functions:

- Control of guest room loads when the room is vacant
- Control of guest room loads when the room is occupied
- Time-of-day control of individual loads
- Individual load cycling control
- Peak demand shedding of loads
- Monitoring of demand and energy consumption.

A maximum of 25-volt amperes can be switched by the control box. Refer to Table BL for a summary of energy communication hardware applicable to this feature. Typical hardware applications are provided on Table BM. The software requirements for the energy communication interface is an operational part of the feature (FP9 and FP11). Refer to

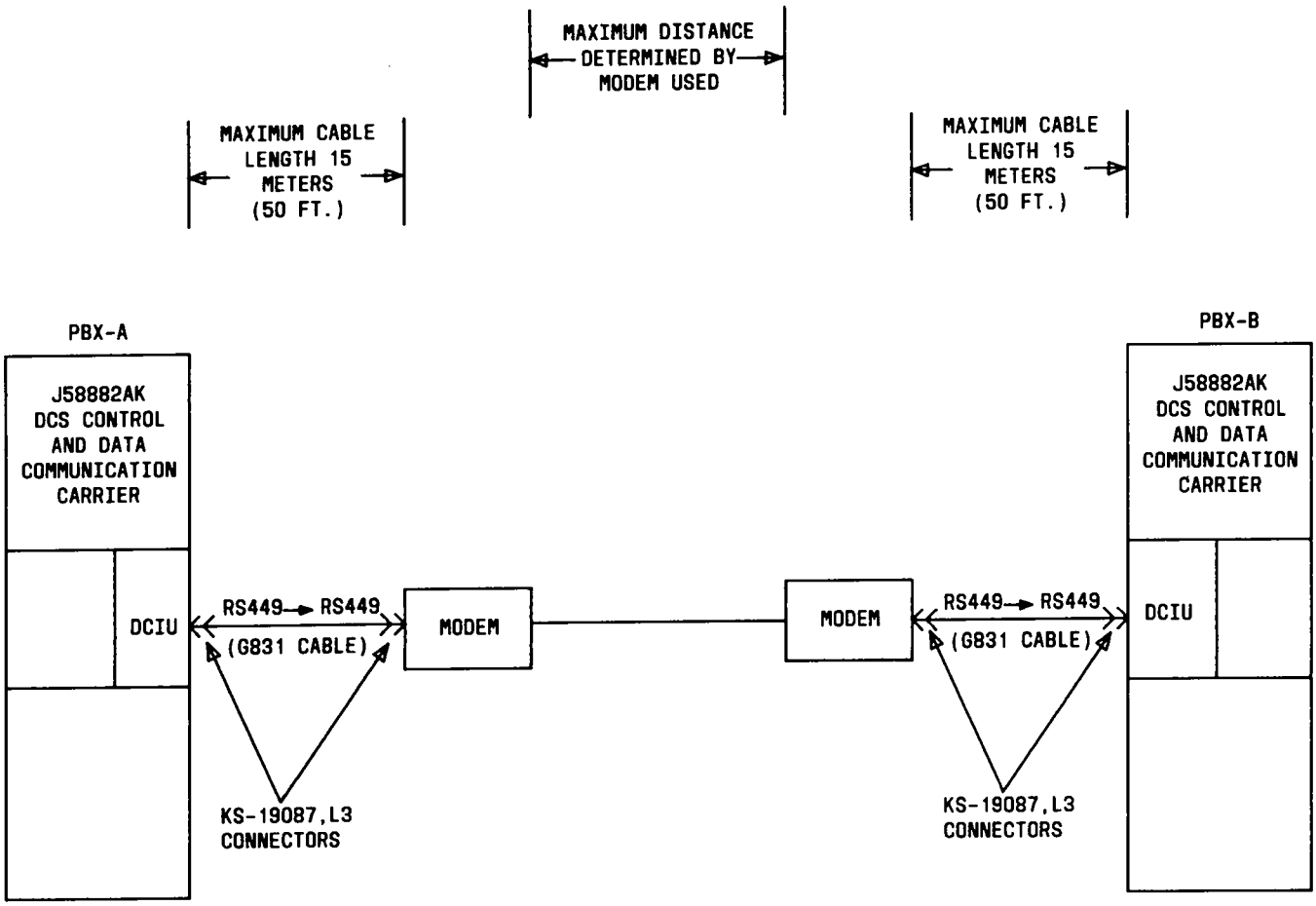


Fig. 105—Hardware Connections for DCS (RS449-RS449)

Section 554-010-103 for detailed information pertaining to the ECSU.

ENERGY COMMUNICATIONS SERVICE ADJUNCT (ECSA)

5.137 The ECSA consists of DIMENSION PBX cabinet-mounted processor(s), and associated equipment for power, alarms, and program tape. In addition, there is a unique energy carrier and three circuit packs developed for the adjunct. Using this configuration, the adjunct is a dedicated system for monitoring and controlling the energy consumed by customer equipment. Call processing is performed by the host PBX to which the adjunct is connected by way of alarm circuitry.

5.138 Important hardware considerations center around the use of the Energy Load Control Circuit LC562. It provides a normally open contact interface at the ECSA, thereby eliminating the use of Energy Communications Signaling Units (ECSU) and corresponding hardware necessary to generate and pass tones to them over phone lines. With the adjunct, it is necessary to provide dedicated wiring (and cross-connect field) from the LC562 contacts to the low voltage control circuitry for the energy consuming equipment. Due to the number of circuits per LC562 and number of circuit pack positions per energy carrier, the adjunct provides a higher load handling capability per cabinet than was possible using ECSUs and their supporting hardware. Other hardware considerations are that the use of CAP and attendant console are excluded from adjunct operation. The MAAP procedures are limited to a minimal number and interface to RMATS is separate from that of the host PBX.

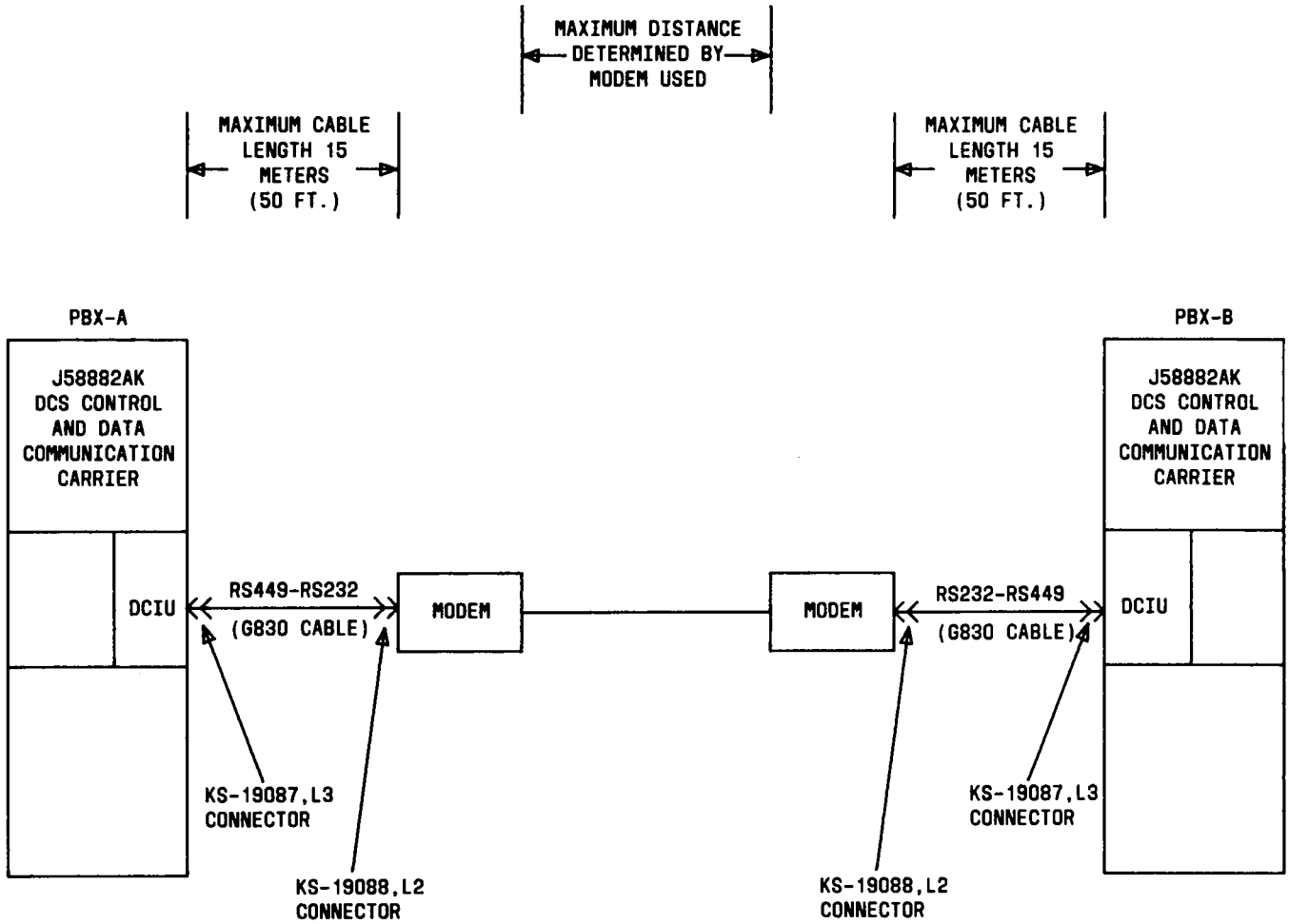


Fig. 106—Hardware Connections for DCS (RS449-RS232)

5.139 Relative to feature package considerations, the ECSA is equipped with a program tape based on FP11 with generic wording. No call processing is provided.

5.140 The ECSA has the capability to remotely control on- or off-premises loads. This is made possible by an LC601 remote controller circuit pack in the ECSA which is connected via a telephone line to a Master Remote Unit (MRU) located remotely for the ECSA. The LC601 multiplexes control signals for up to 64 remote loads and the MRU demultiplexes the control signals, and drives contact interface relays for each load controlled. Refer to Fig. 112.

5.141 Binary feedback is available on both the local remote application of this ECSA. This feedback relies on customer-provided sensors to provide an on or off (binary) state indication to sense point circuitry in the LC564 or MRU for on- or off-premises application, respectively. If the customer-provided sensor is used to provide an on/off indication of the load being controlled, the binary feedback display on the ECSA console can be a positive indication of proper system operation.

5.142 An optional interface power relay and common power supply are available for both local and remote application. This optional equipment provides an intermediate switching point between the low power ECSA contacts and the high power requirements of customer load control circuitry.

5.143 Additional information concerning the ECSA can be found in Descriptive Section 554-106-100 and Preinstallation and Planning Section 554-106-101.

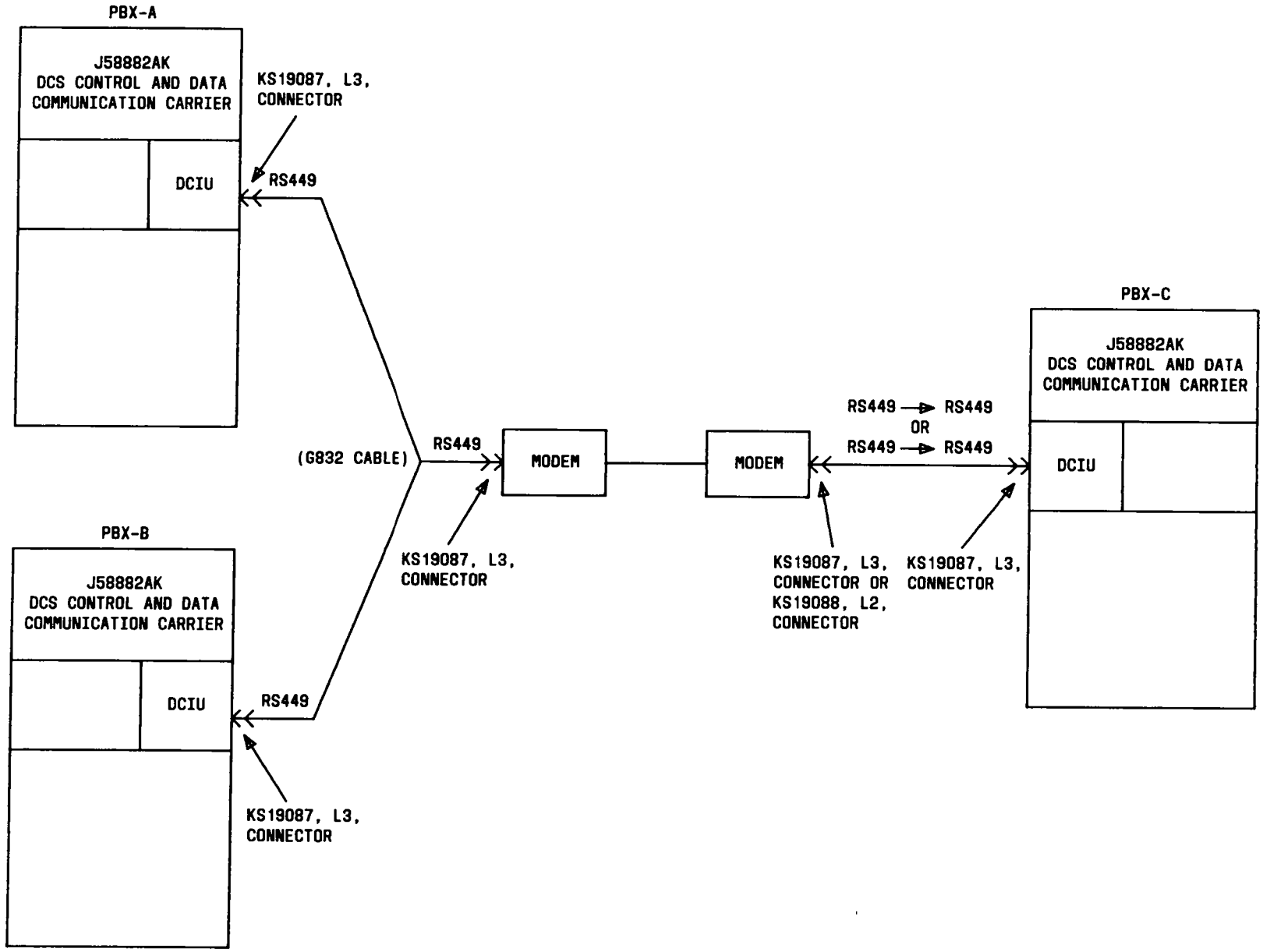


Fig. 107—Hardware Connections (Duplicated Control) for DCS

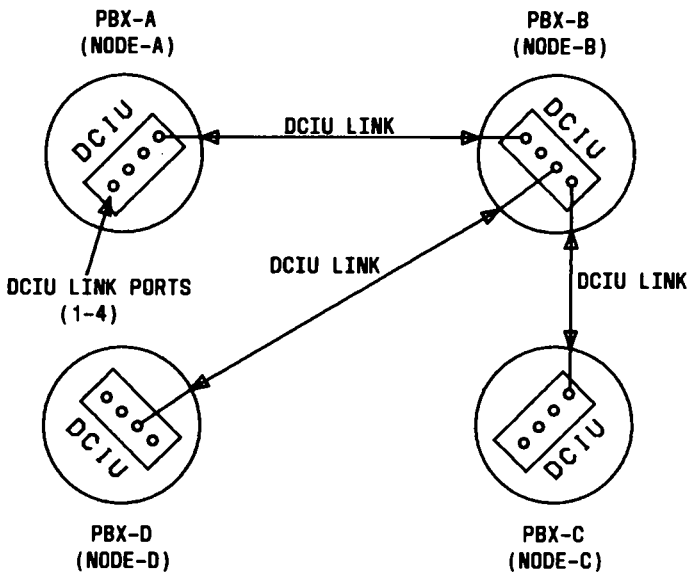
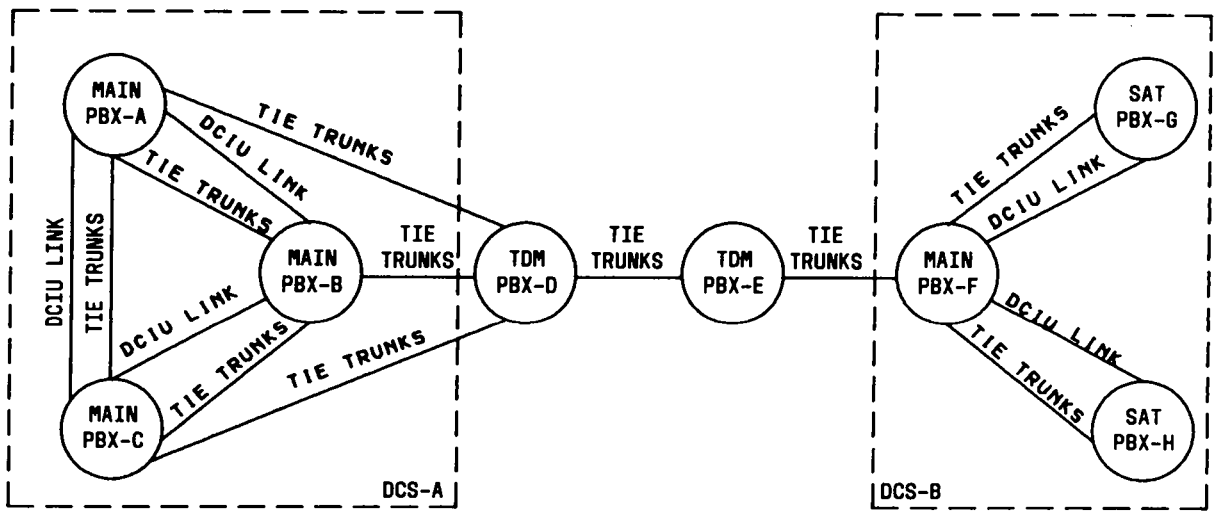


Fig. 108—Distributed Communications System (DCS)

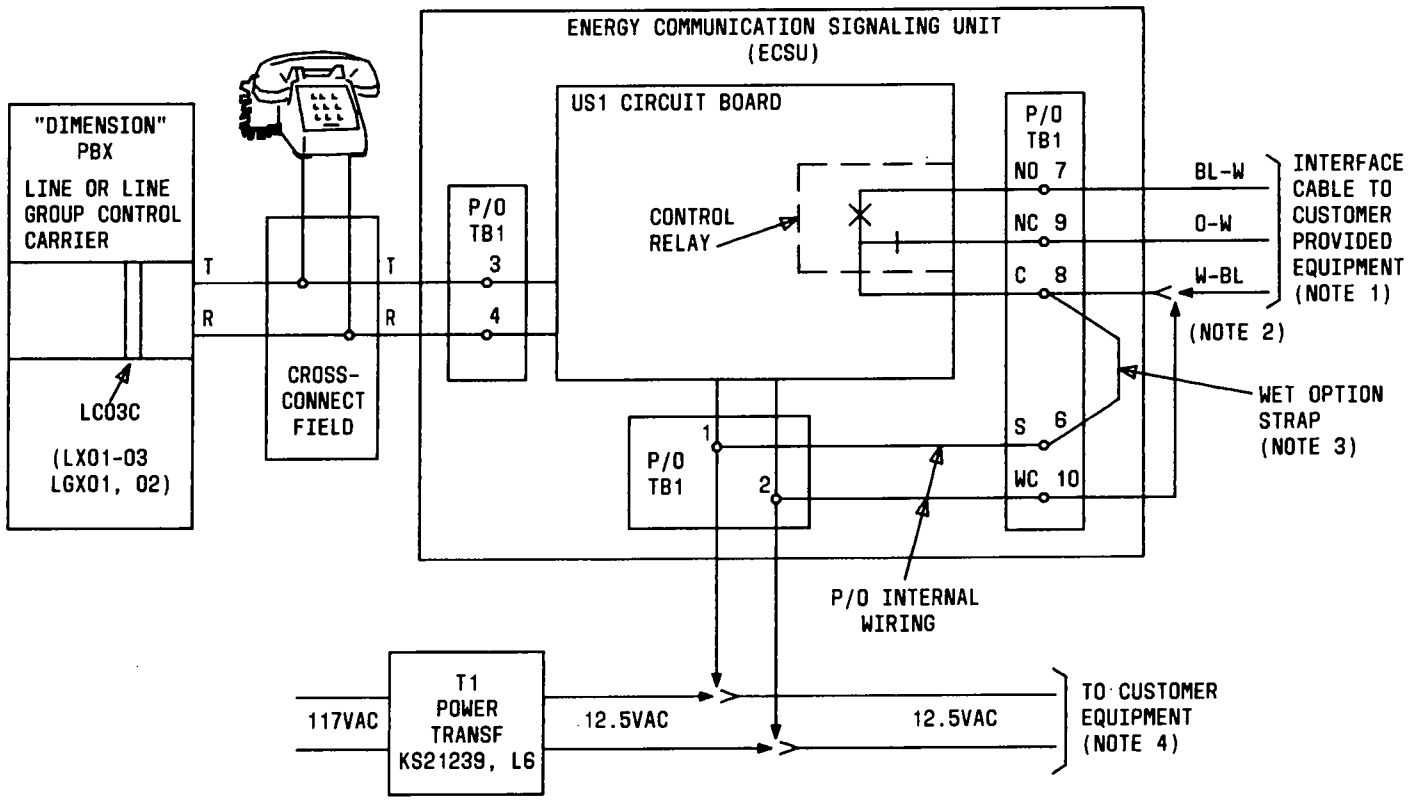


NOTE:
1. FEATURE TRANSPARENCY DOES NOT EXIST BETWEEN DCS-A AND DCS-B

Fig. 109—DCS Electronic Tandem Network (ETN)

ENHANCED UNIFORM CALL DISTRIBUTION (EUCD)

5.144 This feature, provided in Issue 3 of FP8, replaces the functions of Uniform Call Distribution (UCD) and Direct Department Calling (DDC) feature provided in Issue 1 of FP8/FP12. It is equivalent to the Automatic Call Distribution feature in FP8, Issue 2, except that the Management Information System (MIS) is not available. Refer to ACD, previously discussed, for more information.



NOTES:
1. TRANSFER RELAY CONTACTS TO CONTROL APPLIANCES FOR HEAT AND A/C. RELAY STATE DETERMINED BY TONE ON TIP AND RING. RELAY NOT CONTROLLED WITH PHONE OFF-HOOK.
2. FOR DRY-MAKE (DM) CONNECTION, WIRE W-BL LEAD TO TERMINAL C (8) AND REMOVE THE WET OPTION STRAP.
3. FOR WET-MAKE (WM) CONNECTION, WIRE W-BL LEAD TO TERMINAL WC (10) AND INSTALL WET OPTION STRAP.
4. THE VOLTAGE AT TERMINALS 1 AND 2 MUST BE 12.5± 1.5VAC.

Fig. 110—Energy Communication Signaling Unit

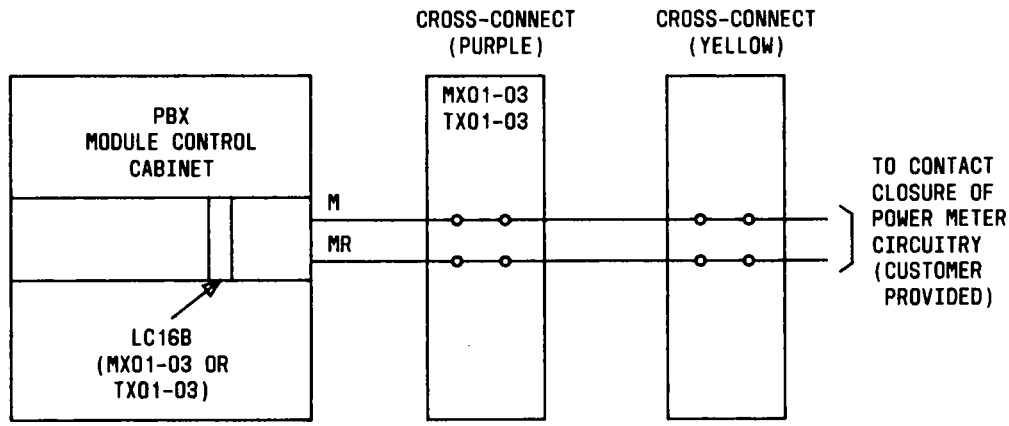


Fig. 111—Power Meter Interface Circuit

FORCE ADMINISTRATION DATA SYSTEM (FADS)

5.145 The Force Administration Data System feature provides for display of Centralized Attendant Service (CAS) and/or Uniform Call Distribution (UCD) traffic data. One or more FADS display terminals may be required to access the data. One terminal (102F1-A) is required for CAS traffic studies and a maximum of 12 terminals (102G1-A) may be provided for UCD traffic studies (one terminal per group). The FADS display equipment includes one 211A power unit, one KS-19242, List 7, display adapter, one LC34B or LC366B data channel, and the 102F1-A or 102G1-A display terminal. Optionally, an ADDMASTER* printer (No. 9042-2) may be used for hard-copy output of the FADS data.

5.146 The KS-19252, List 7, adapter is a wall-mounted unit. The adapter contains connections for the display and printer mounting cord plugs, and a terminal strip for connecting the 211A power unit, and the PBX data channel. Refer to Fig. 113 for interconnection information. Table BN is a fill-in worksheet for the connections of the FADS display unit.

The display unit mounting cord must be connected to the adapter prior to connecting the 211A to a 117-Vac power outlet.

*Registered trademark of the Addmaster Corp.

5.147 The supply (211A) power cord of the FADS unit, the power cord of the printer, and the supply (28D2) power cord of the repeater are powered directly from a commercial 117-Vac 60-Hz outlet.

INTERFACE TO NETWORK CONTROL OFFICE SUPPORT SYSTEM—LOCAL STORAGE UNIT (NCOSS—LSU)

5.148 A data port is available for FP8 PBXs which need to supply call records data to the Network Control Office Support System (NCOSS). The data is passed from the PBX to the Local Storage Unit (LSU) via a data channel on an I/O data channel (LC34B, LC366B, or LC171B). The LSU records, formats, and transmits the records to the NCOSS when polled by the NCOSS. The dedicated channel is physically located in slot 33, circuit 0, on the basic control and control growth carriers and must be optionally wired for fast-speed (833 kilobits per second) data. Connection is made to the channel via the BX09 connector on the carriers.

▶LOCAL AREA DATA SET (LADS)

5.149 The 48230 Local Area Data Set provides data transmission over unloaded, unconditioned telephone local loops at selectable rates of 2400, 4800, 7200, 9600, and 19,200 bits per second (bps). The LADS accommodate 4-wire full-duplex configurations, Fig. 114.

TABLE BL

ENERGY COMMUNICATIONS SERVICE (ECS HARDWARE)

CODE	DESCRIPTION	CONTAINS	APPLICATION
ED-1E387-31 (G4, G5)	Energy Communication Signaling Unit (ECSU)	US1 Circuit Board	1 per appliance or group of appliances under single control
	Transformer	KS-21239, L6 Pwr Sup	1 per ECSU (if used) — customer has option to provide transformer
J58882BA-2, L21 or J58879BA-2, L19	Module Control and Trunk Port Carrier or Trunk Port Carrier	LC16B	2 LC16B circuit packs per 16 power meter inputs — max.
J58882GA, L1	Peripheral Interface Circuit (PIC)	HN11	1/HVAC CRT
	PIC Power Supply (part of L1 Unit)	HP2	1/HVAC Printer
Applied Digital Data Model ADDS "REGENT*" 40	CRT Terminal (ECS Console)	—	1 per system
TELETYPE† Model 4310 (Without Keyboard)	Printer (305-mm [12-inch] wide paper)	Pin feed and end of paper sensor	Optional
AAK-03AF-03 or AGK-03AF-03	Console without DSS/BLF	MN7 (Lamp Control) MP2 (Alphanumeric Control)	Optional
	Console with DSS/BLF	TB1 (Alphanumeric Display) TC2 (Control & Speech) A2A (Backplane)	Optional

*Trademark of Applied Digital Data Systems Corporation

†Trademark of Teletype Corporation.

TABLE BM

ENERGY COMMUNICATIONS SERVICE—TYPICAL HARDWARE APPLICATIONS

FEATURE	HARDWARE					
	1 CONTROL UNIT/GUEST ROOM LOAD	1 CONTROL UNIT/ INDIVIDUAL LOAD	1 POWER METER INTERFACE/ POWER METER (1 PER SYSTEM)	1/CRT CONSOLE (1 PER SYSTEM)	HOTEL/MOTEL CONSOLE (NOTE)	JOURNAL PRINTER (NOTE)
Guestroom Vacant Control	Required	—	—	—	Required	Optional *
Guestroom/Load Cycling Control	Required	—	—	—	Required	Optional
Time-of-Day Control	—	Required	—	Required	—	Optional
Individual Load Cycle Control	—	Required	—	Required	—	Optional
Peak Demand Load Shedding Control	Optional	Optional	Required	Required	—	Optional
Energy Consumption Demand Monitoring	—	—	Required	—	Required	Required

Note: Optionally required.

* This unit can be shared with other FP9 features or dedicated to energy communications.

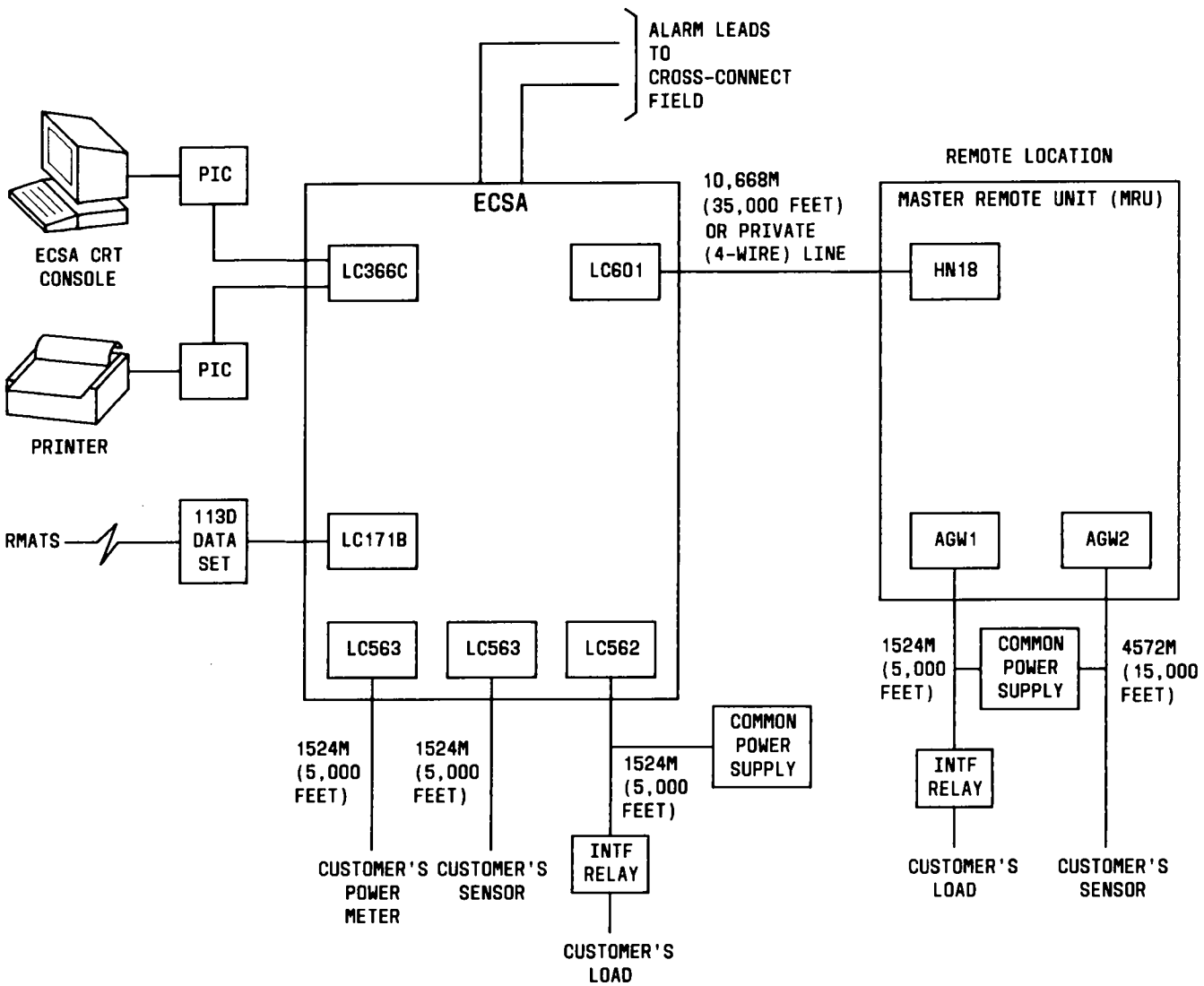
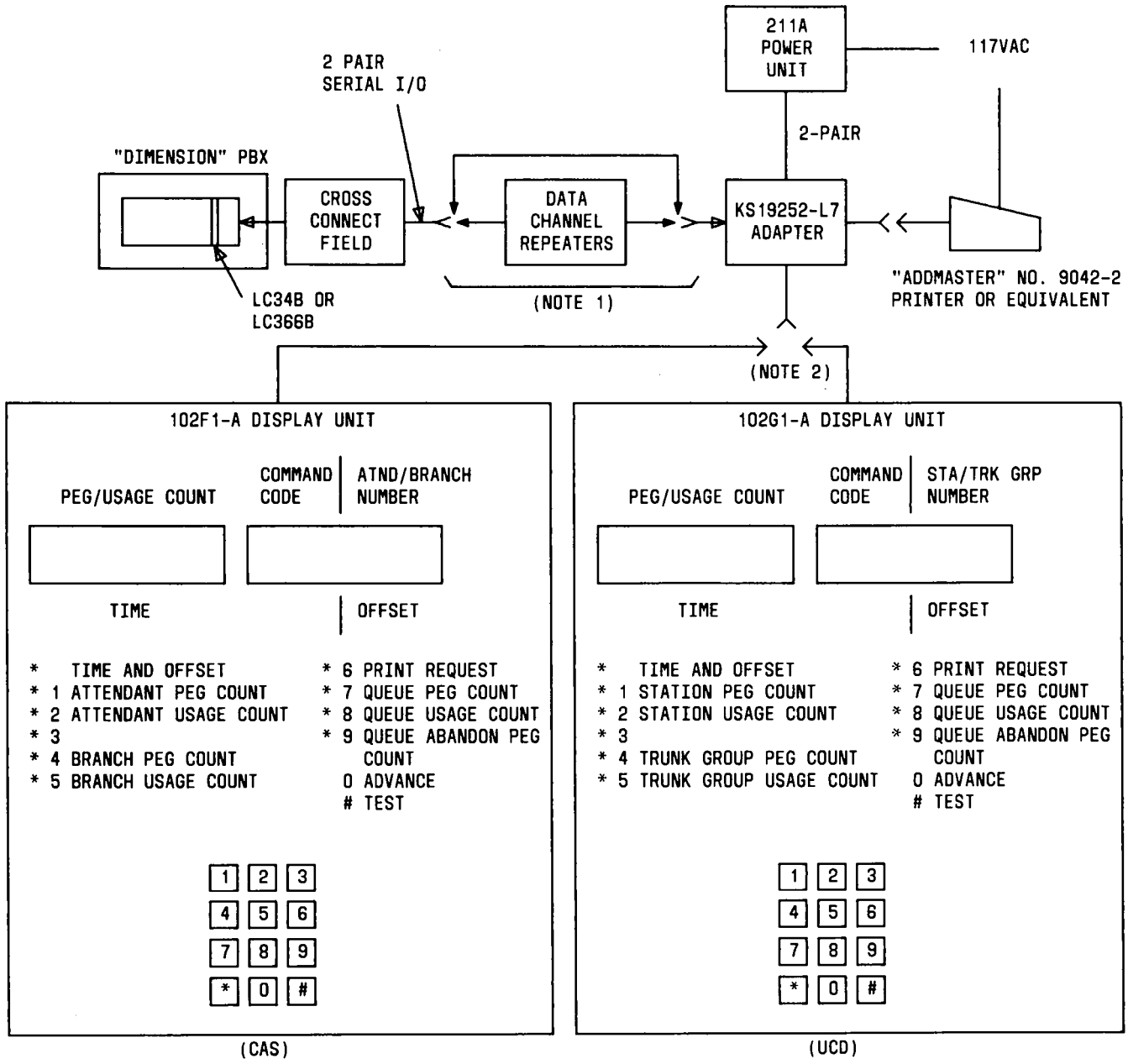


Fig. 112—Basic Block Diagram of Energy Communications Service Adjunct

5.150 Electrical connectors are located on the rear panel of the 48230 LADS as shown in Figure 115. These connectors consist of a 25-pin interface connector (J1) and a 5-screw terminal board (TB1). The female 25-pin interface connector carries input/output data, data rate clocks, and status and control signals between the LADS and data processing equipment. Terminal board TB1 has five screws for connecting the transmit and receive telephone lines. The transmit pair connects to terminals 4 and 5, and the receive pair connects to terminals 1 and 2. Terminal 3 is ground and is not used. For more detailed information, see Section 592-035-100, Local Area Data Set Description, and Section 592-035-200, Local Area Data Set Installation and Connections.

LOUDSPEAKER PAGING (BASIC AND DELUXE)

5.151 The Basic Loudspeaker Paging feature allows the attendant direct access and station users dial access to paging equipment for the purpose of Voice Paging. The Deluxe Loudspeaker Paging feature allows the attendant direct access and the attendant and station users dial access to the paging equipment for Voice Paging. The paging amplifiers and speakers may be either customer-owned or telephone-company provided. All voice paging facilities make use of the telephone transmitter as the microphone. A control signal for cutoff or override of background music is also provided. Optional arrangements are available to provide multizone paging where a separate access code and/or console



NOTES:

1. MAXIMUM DISTANCE BETWEEN PBX AND DISPLAY UNIT; WITHOUT DATA CHANNEL REPEATERS-305M (1000 FEET), WITH DATA CHANNEL REPEATERS-3353M (11000 FEET).
2. USE EXISTING MOUNTING CORDS ONLY. EXTENSIONS CORDS ARE NOT ALLOWED.

Fig. 113—Equipment Arrangement for FADS Display for CAS and UCD

TABLE BN

CROSS-CONNECTIONS FOR FORCE ADMINISTRATION DATA SYSTEM (FADS) WORKSHEET

PBX		CROSS-CONNECT		
		TO/FROM	TO/FROM	TO
		CONN BLK _ _ _XO_	CONN BLK ____	KS-19252, L7, ADAPTER
DATA CHANNEL	LEAD DESIGNATION	(PURPLE)	(YELLOW)	STRIP TERM. NO.
MOD _ _ CAB ___ CARR ___ SLOT _ _ CIRCUIT _____	IOXB_ _ _ _			1
	IOXA_ _ _ _			2
	IORB_ _ _ _			3
	IORA_ _ _ _			4
			-S (G)	5
			+S (BK)	6
			-V (R)	7
			+V (W)	8

117 VAC

211A POWER UNIT

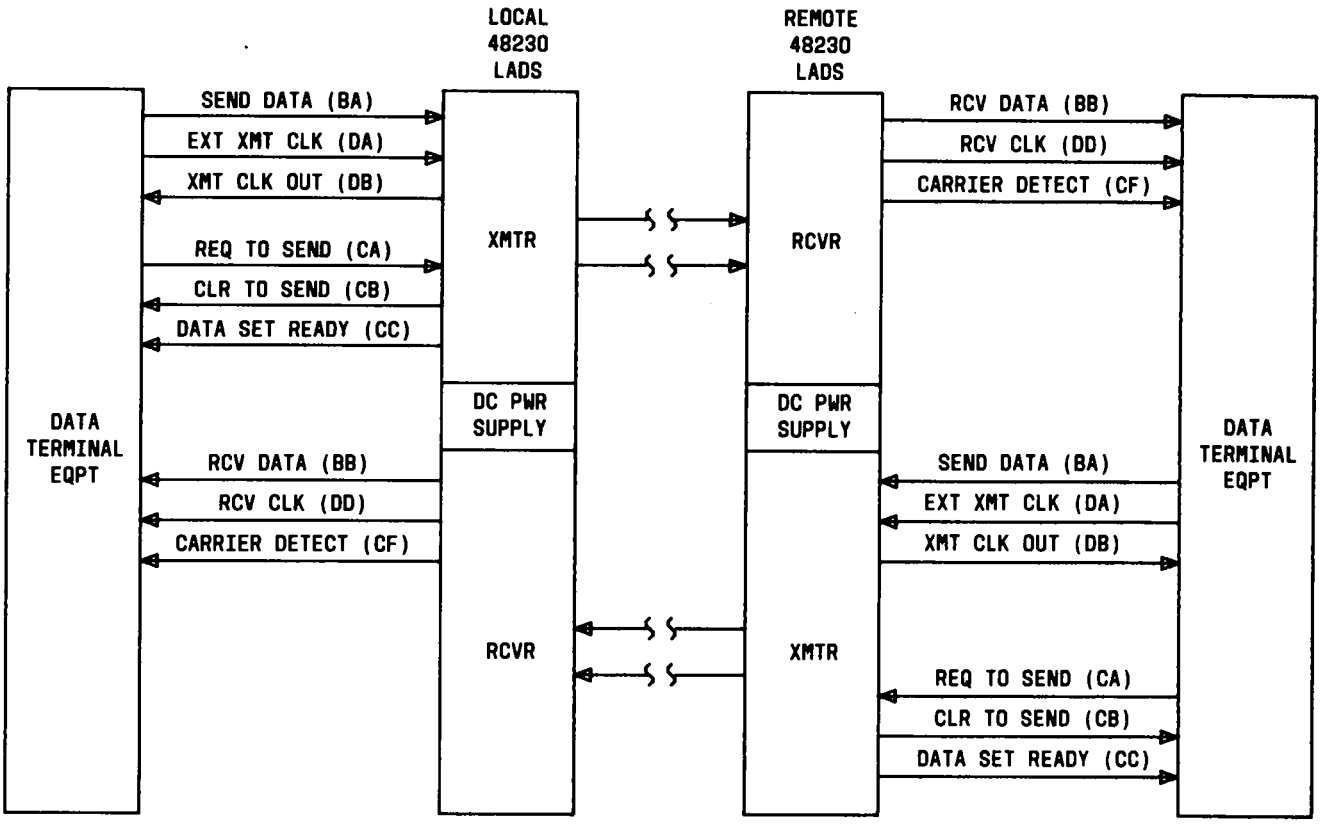


Fig. 114—Typical 4-Wire System Application for LADS

key (for direct access) is provided for each of up to six zones or all zones within a customer complex. The DIMENSION 2000 PBX is able to extend to 18 zones. Page answer capability (provided only with Deluxe Loudspeaker Paging) allows the paged party to be connected to the calling party by dialing an answer code from any station within the PBX. There are six zones (maximum) for direct access paging from the console buttons only. Five zones are available for all-zone paging unless a special assembly is engineered external to the PBX. A total of nine answer-back channels are available.

5.152 The equipment required for Loudspeaker Paging is listed as follows:

- LC13B auxiliary trunk interface circuit pack (two circuits per circuit pack; one circuit per paging zone)
- 89A control unit (one per paging zone)
- 2012B power transformer (one per three 89A control units).

5.153 The LC13B circuit pack furnishes an interface between the PBX and 89A control unit. The 2012B power transformer furnishes the 89A control unit with 12-volt power. The functions of the 89A control unit are as follows:

- Presents a balanced input to the paging trunk circuit (LC13B) and a balanced output to a paging system power amplifier
- Provides the user with circuitry for seizing the paging system or code call system (Chime Paging)
- Provides circuits for adding music and tones into a paging system
- Suppresses objectionable disconnect clicks on conclusion of voice page
- Equalizes loud and soft input voice signal
- Provides the user with capability to "busy out" the control unit

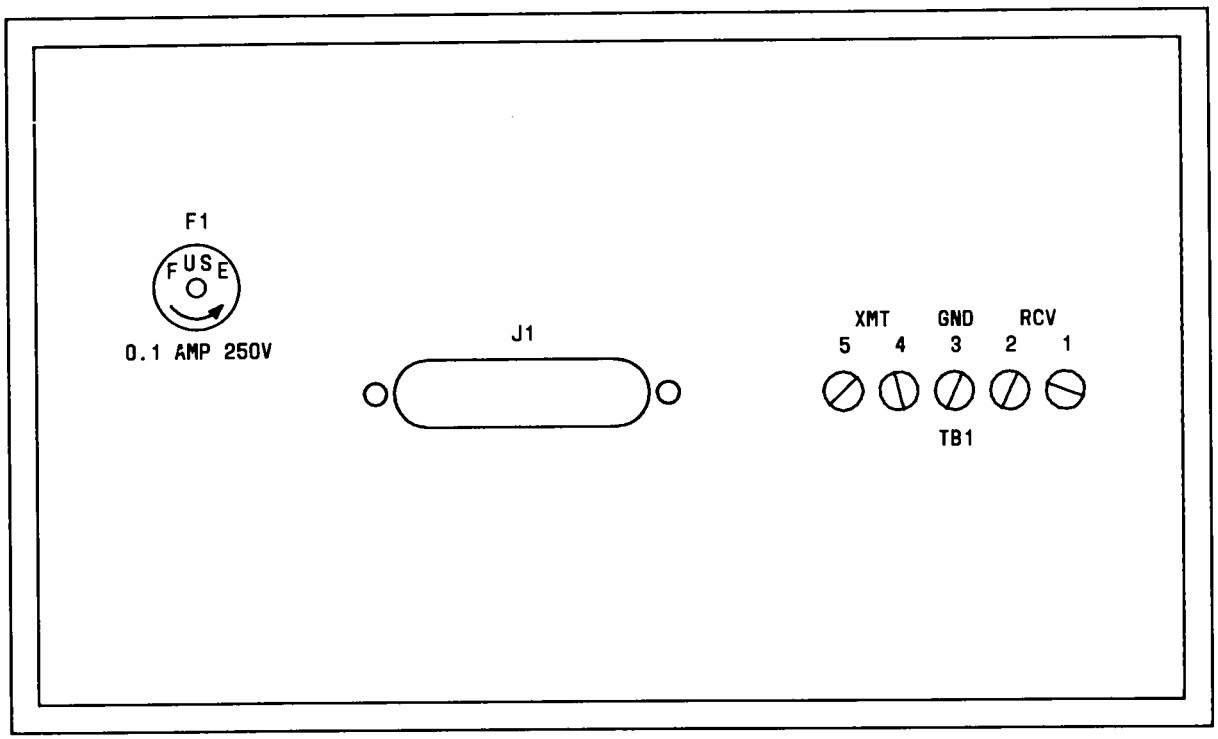


Fig. 115—Rear Panel Connections of 48230 LADS

- Provides supervision to the PBX indicating that the control unit has been seized or busied out

- Provides for option Z where a page-in-progress has priority over a busy-out signal.

5.154 The 89A control unit has an associated click suppression circuit that suppresses the disconnect click when the click is unpleasantly loud. If the circuit is not part of the main circuit board (installed at the factory), the circuit is supplied in a kit of parts (D180702). Electrical connections to the control unit are made through standoffs so that additional wires are not required when installing the kit. When click suppression is provided, the S2 screw switch must be opened by turning counterclockwise.

5.155 If several zones are to be used for paging (maximum of six), one 89A control unit must be installed for each zone. Wall mount the control unit near the cross-connect field. One circuit on the LC13B auxiliary circuit pack must be dedicated for each zone. Answer-back channels may also be assigned for each zone (deluxe paging only) which allows the paged party to be connected to the calling party.

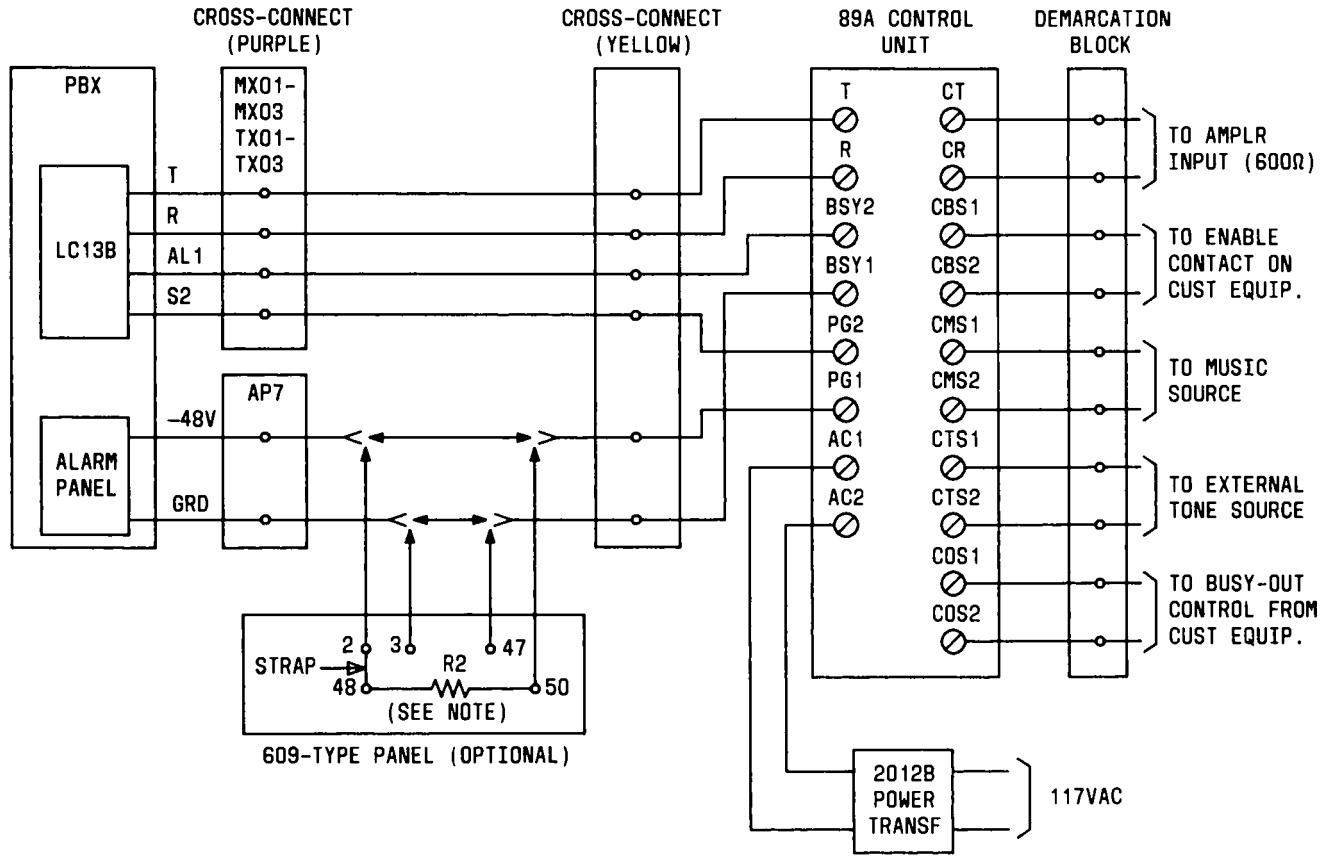
5.156 The answer-back channels for deluxe loudspeaker paging are always provided, regardless of the number of paging zones.

5.157 Power for the loudspeaker paging feature, and the power cord of the 2012B transformer associated with the 89A control unit are powered directly from a commercial 117-Vac 60-Hz outlet.

5.158 Up to three LC13B auxiliary circuit packs can be cross-connected to paging equipment which allows for the maximum of six paging zones. Connections for loudspeaker paging are illustrated in Fig. 116. Table BO is provided to be used in filling in cross-connection information for loudspeaker paging.

LOUDSPEAKER PAGING WITH CHIME PAGING AND MUSIC BACKGROUND

5.159 Loudspeaker paging can also be provided with chime paging and music background.



NOTE:
ADD STRAP AND R2 AS SHOWN (R2=2K OHMS, KS20289, L6C)

Fig. 116—Loudspeaker Paging Connections

The additional equipment required for this arrangement is as follows:

- LC17B tone plant C circuit pack
- 89A control unit.

5.160 Background music may be provided at all times when desired by the customer. The 89A control unit removes the music when either the loudspeaker paging or chime paging is selected. Only one paging selection may be made at any one time.

5.161 The power cord of the 2012B transformer associated with the 89A control unit is powered directly from a commercial 117-Vac 60-Hz outlet.

5.162 Connections for loudspeaker paging with chime paging and music background are illustrated in Fig. 117. Table BP is provided for cross-connection fill-in information for loudspeaker paging with chime paging and music background.

MALICIOUS CALL TRACING

5.163 The malicious call tracing allows the user to trace a call originating within the PBX system or beyond. The feature is to be used when a call is determined to be malicious (ie, obscene, a bomb threat, etc). ⧫This feature is available in FP8, Issue 2 and 3 only.⧫

5.164 After the feature has been activated from an ECTS set, a 500/2500 set, or an attendant console, all facilities associated with the call are

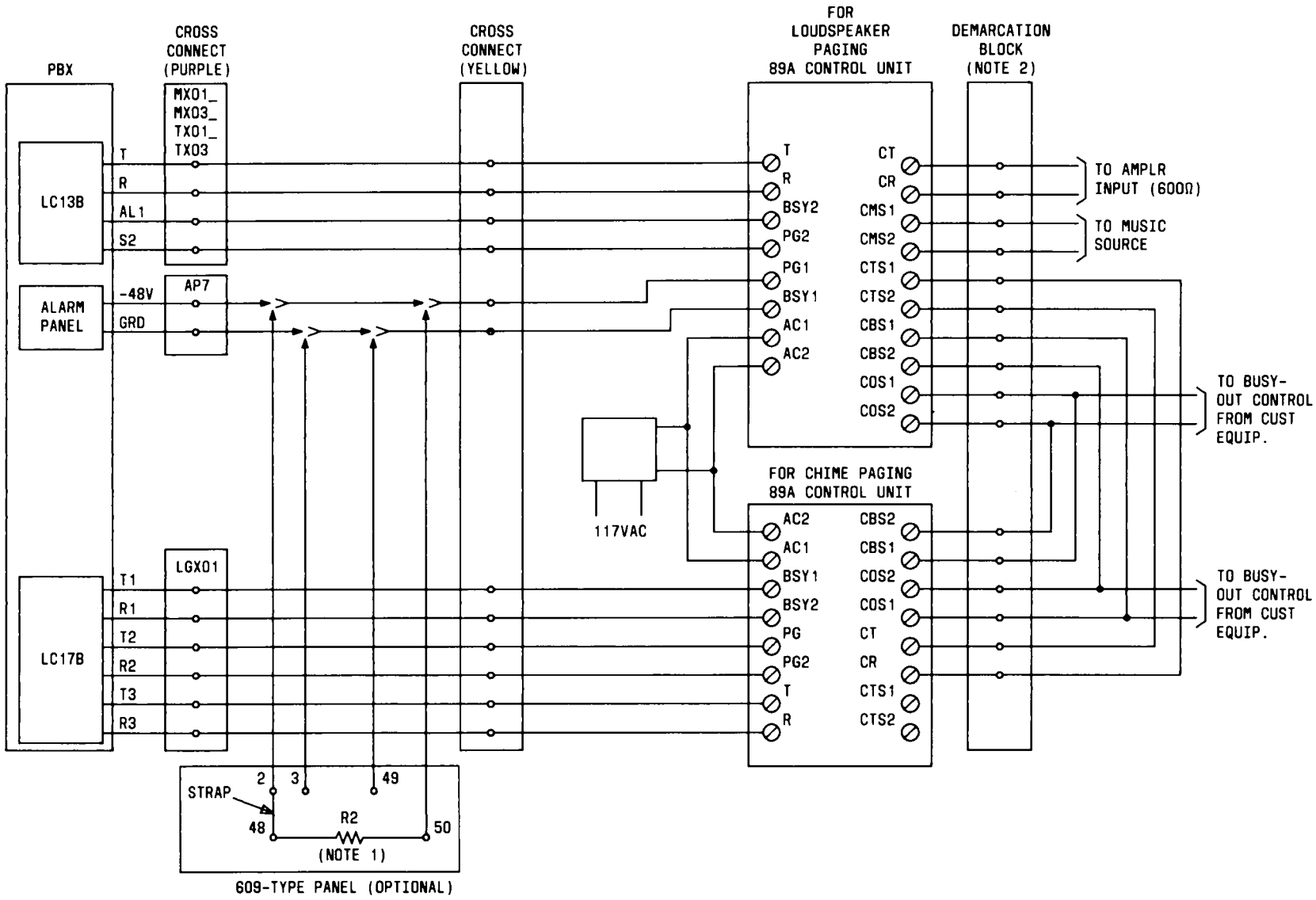
TABLE BO

CROSS-CONNECTIONS FOR LOUDSPEAKER PAGING—89A CONTROL UNIT WORK-SHEET

PBX		CROSS-CONNECT									
		FROM	TO	FROM	TO	TO	FROM	TO/FROM	TO	
		CONN BLK (PURPLE)	609-TYPE PANEL (SEE NOTE)		CONN BLK	89A CONTROL UNIT		DEMAR-CATION BLOCK	PAGING EQUIPMENT	
EQUIPMENT	LEAD DESIG	_ _ _ _ _XO_	AP7	TBC	(YELLOW)	SCREW TERM.	SCREW TERM.	TERM.	LEAD DESIG	FUNCTION
MODULE _ _ CABINET ___ CARRIER ___ LC13B SLOT ___ CIRCUIT ___	T					T	CT		CT	TO AUDIO AMPLIFIER
	R					R	CR		CR	
	AL1					BSY2	CBS1		CBS1	TO ENABLE CONTACT ON CUST EQPT
	S2					PG2	CBS2		CBS2	
ALARM PANEL	-48V			2	50	PG1	CMS1		CMS1	TO EXTERNAL MUSIC SOURCE
	GRD			3	47	BSY1	CMS2		CMS2	
						AC1	COS1		COS1	TO BUSY-OUT CONTROL FROM CUST EQPT
							COS2		COS2	
						AC2				

117 VAC — 2012B TRANSFORMER

NOTE: 609-TYPE PANEL IS OPTIONAL. CONNECT -48V AND GRD DIRECTLY TO YELLOW FIELD WHEN PANEL IS NOT PROVIDED.



NOTES:
1. ADD STRAP AND R2 AS SHOWN (R = 2K OHMS, KS20289, L6C)
2. CUSTOMER EQUIPMENT MUST ALWAYS BE ON.

Fig. 117—Loudspeaker Paging With Chime Paging and Background Music

TABLE BP

CROSS-CONNECTIONS FOR LOUDSPEAKER PAGING WITH CHIME PAGING AND BACKGROUND MUSIC—89A CONTROL UNIT WORKSHEET

PBX		CROSS-CONNECT													
		FROM			TO	FROM	TO	TO	FROM			TO/FROM	TO	
		CONN BLK (PURPLE)			609-TYPE PANEL (NOTE 1)		CONN BLK (YELLOW)	89A CONTROL UNIT FOR CHIME PAGING		89A CONTROL UNIT FOR LOUDSPEAKER PAGING AND MUSIC		DEMARCATION BLOCK (NOTE 2)	PAGING EQUIPMENT	
EQUIPMENT	LEAD DESIG	_ _ _ _ _ XO _	AP7	_ _ _ _ LGX01	TBC			SCREW TERM.	SCREW TERM.	SCREW TERM.	SCREW TERM.	TERM.	LEAD DESIG	FUNCTION
MODULE _ _ CABINET ___ CARRIER ___ LC13B SLOT ___ CIRCUIT ___	T									T	CT		CT	TO AMPLIFIER INPUT (600 OHMS)
	R									R	CR		CR	
	AL1									BSY2	CMS1		CMS1	TO EXTERNAL MUSIC SOURCE
	S2									PG2	CMS2		CMS2	
ALARM PANEL	-48V				2	50				PG1	CTS1			
	GRD				3	47				BSY1	CTS2			
MODULE _ _ CABINET ___ CARRIER ___ LC17B SLOT 10	T1			35				BSY1			CBS1		CBS1	TO BUSY-OUT CONTROL FROM CUSTOMER EQUIPMENT
	R1			36				BSY2			CBS2		CBS2	
	T2			37				PG1			COS1		COS1	
	R2			38				PG2			COS2		COS2	
	T3			39				T	CBS2					
	R3			40				R	CBS1					
									COS2					
									COS1					
									CT					
									CR					
117 VAC — 2012B TRNSF								AC1	AC1	AC1				
								AC2	AC2	AC2				

NOTES:
1. THE 609-TYPE PANEL IS OPTIONAL. CONNECT -48V AND GRD DIRECTLY TO YELLOW FIELD WHEN PANEL IS NOT PROVIDED.
2. STRAP TERMINALS SHOWN ON DEMARCATION BLOCK.

locked up except for the call station. Pertinent information about the connection is placed into a queue to be displayed to the attendant on request. The attendant controls the feature, gathers the needed information, and deactivates the feature.

5.165 A recorder, provided by the customer, is also connected to the time slot when the feature is activated. ▶An LC13B circuit pack is required to interface a suitable recorder with the time slot. See Part 6 for the switch positions for the LC13B for this feature.◀ If a third party is involved in the malicious call, the recorder cannot be put on the connection. Figure 118 shows the information for malicious call tracing recording cross-connections. An isolation unit must be installed on the tip and ring leads between the PBX cross-connect field and the peripheral equipment. Table BQ is a fill-in worksheet for use with the malicious call tracing recording cross-connections.

MUSIC ON HOLD

5.166 The music-on-hold feature provides customer-furnished music or some other audible indication to the held party during the hold period. The held call condition can be the result of attendant hold, call hold, or threeway conference transfer hold, or the hold associated with other similar features. The music source should be on at all times. A 31D voice coupler ▶(MD), to be replaced with the 36A voice coupler,◀ is used to couple the transmission of music or other audible sounds to the PBX via an auxiliary trunk circuit pack (LC13B) wired for 1-way-in reception. The coupler also provides protection of the tip and ring by limiting signal power from the music source. In addition, isolation is provided to the customer-provided equipment. The ▶36A◀ coupler dimensions are 102 mm (4 inches) long, 70 mm (2-3/4 inches) wide, 51 mm (2 inches) high, and should be wall-mounted near the termination field. Refer to CD- and SD-69613-01 for a more detailed description of the ▶36A◀ coupler. The 31B voice coupler is grandfathered per FCC rules and regulations and may be used if available. The music-on-hold interconnection is shown in Fig. 119. A fill-in worksheet for connection of music on hold is provided on Table BR. ▶Music on Hold/Module eliminates the need for link between modules that were needed before, by providing music for each module in the system.◀

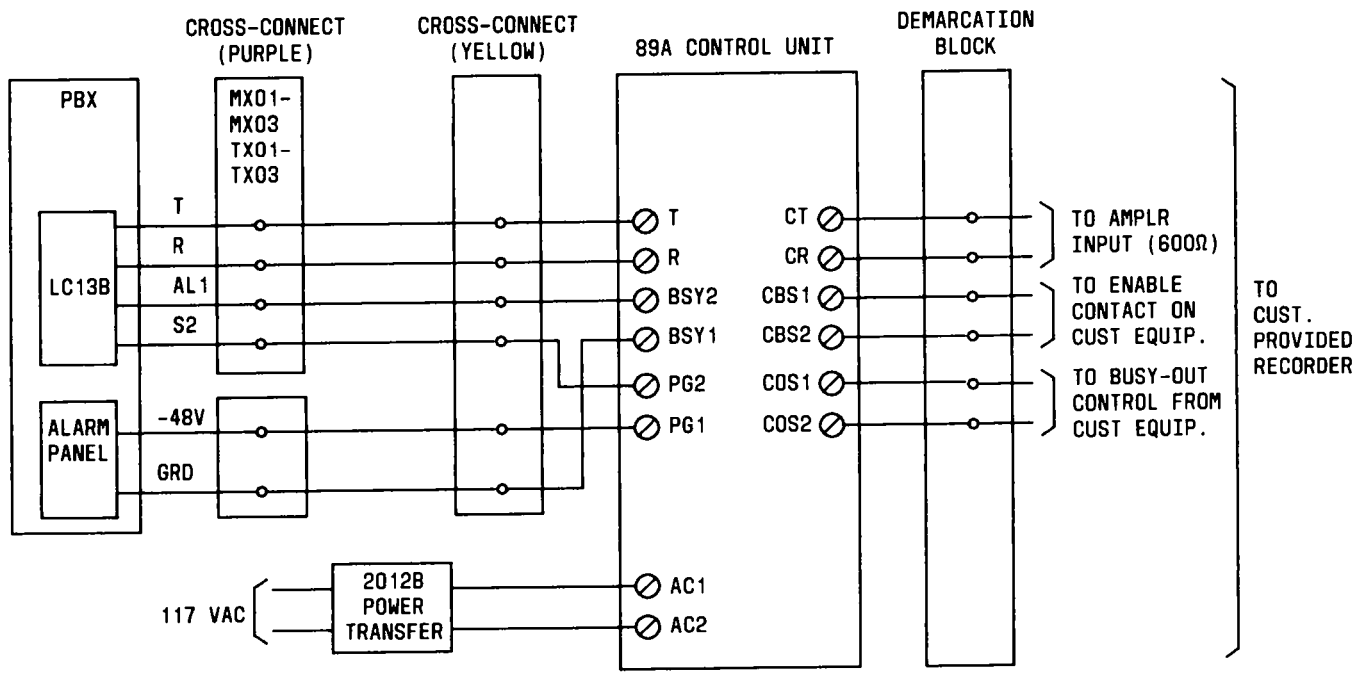


Fig. 118—Cross-Connection Information for Malicious Call Tracing Recording

TABLE BQ

CROSS-CONNECTIONS FOR MALICIOUS CALL TRACING RECORDING WORKSHEET

PBX		CROSS-CONNECT							
		FROM		TO	TO	FROM	TO/FROM	TO	
		CONN BLK (PURPLE)		CONN BLK	89A CONTROL UNIT		DEMAR-CATION BLOCK	APPROVED RECORDER	
EQUIPMENT	LEAD DESIG	_ _ _ _ _XO_	AP7	_____ (YELLOW)	SCREW TERM.	SCREW TERM.	TERM.	LEAD DESIG	FUNCTION
MODULE_ _ CABINET__ CARRIER__ LC13B SLOT__ CIRCUIT__	T				T	CT		CT	TO AUDIO AMPLIFIER
	R				R	CR		CR	
	AL1				BSY2	CBS1		CBS1	TO ENABLE CONTACT ON CUST EQUIP
	S2				PG2	CBS2		CBS2	
ALARM PANEL	-48V				PG1	COS1		COS1	TO BUSY-OUT CONTROL FROM CUST EQUIP
	GRD				BSY1	COS2		COS2	
117 VAC		2012B TRANSFORMER			AC1				
					AC2				

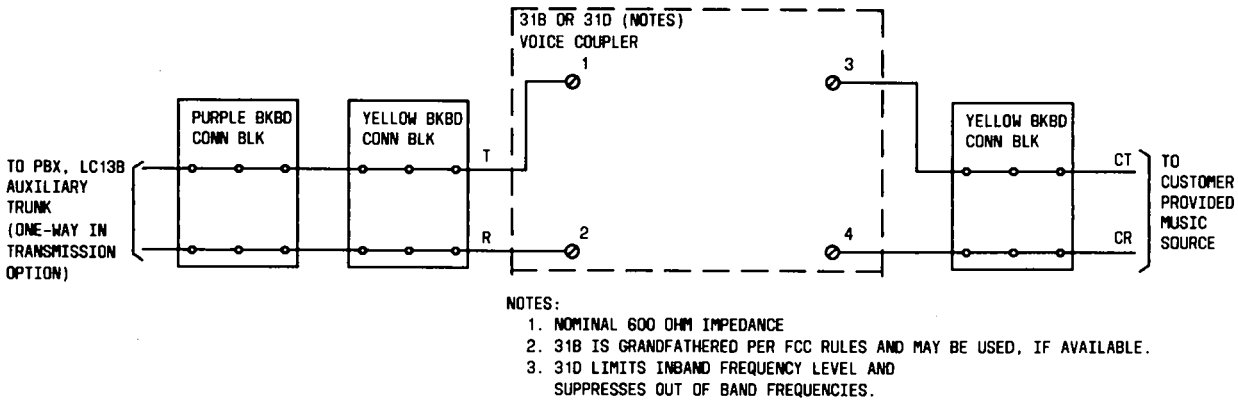


Fig. 119—Music-On-Hold Interface

PACKAGED METALLIC FACILITY TERMINAL ASSEMBLIES (PMFTA)

5.167 The PMFTA is a line of circuit pack mounting assemblies designed for small groups of metallic facility terminal (MFT) plug-ins. The PMFTA can be located at the network interface on a customer's premises or in a central office. The assemblies are self-contained arrangements including an associated power supply, interface terminal connectors, and installation data sheets. Typical cross-connection information for the packaged metallic facility terminal assemblies and DIMENSION PBX is shown in Fig. 120. Refer to Sections 332-610-101 and 332-610-102 for detailed information on the PMFTA.

Note: The PMFTA may be used in place of the CPFT equipment which is rated "MD".

PERIPHERAL INTERFACE CIRCUIT (PIC)

5.168 The PIC is a microprocessor-controlled, 2-way interface between a DIMENSION PBX and an I/O peripheral device. The PIC converts bipolar PBX signals to the EIA standard format, and converts data from the peripheral unit to data acceptable by the PBX. The unit contains a controller, a power supply, two 25-pin EIA serial data connectors, and an interface circuit. The PIC is required with FP9 and FP11 to provide a communication link between LC34B or LC366B circuit packs and commercial peripheral devices. The PIC functions as the interface for long distance billing, as the communications interface for property management system (CIPMS), and provides for connection of journal printers and the energy communication service (ECS) display unit to the DIMENSION PBX (Fig. 121). A single PIC unit is required for each peripheral device. The unit is mounted in a data set housing and requires the associated cord assemblies as shown. The various data terminals which can be used with the peripheral interface circuit are listed on Table BS. A summary of printer applications is provided on Table BT.

5.169 The following rules apply to printer use:

- Audit trail and demand print functions should not share the same printer.
- High activity audit print functions should not be shared in larger properties (capacity = one line per second, with a maximum of eight lines backed up).
- Any of three printer choices can be used for any of the print functions VICTOR* 5011, 5011-023, and TTY 4320). Energy communications service feature print functions will require the wide format TELETYPE† terminal, Model 4310.
- The VICTOR-Friction Drive-Narrow format printer uses less expensive paper and is suitable where accurate registration with formatted paper is not required.

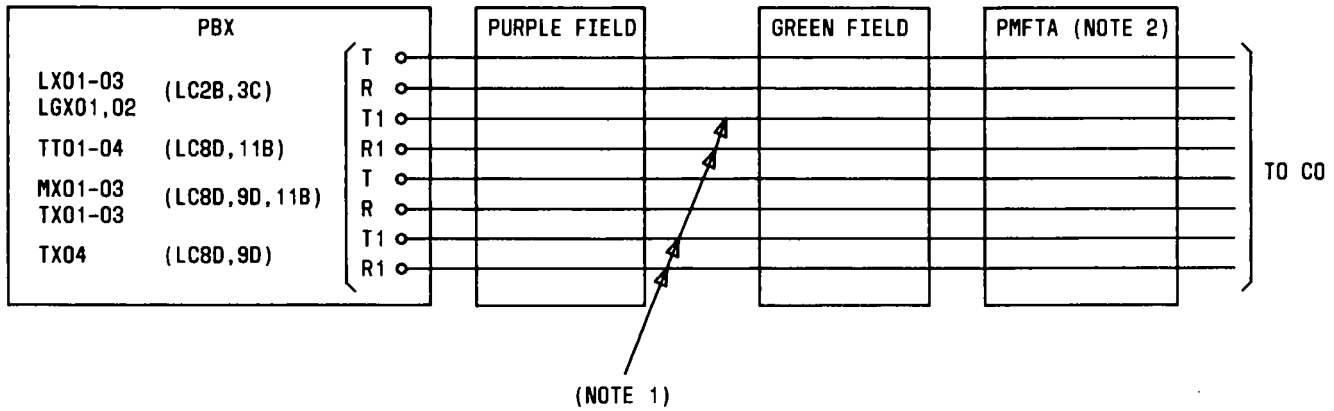
*Registered trademark of Victor Business Machines Co.

†Registered trademark of Teletype Corp.

TABLE BR

CROSS-CONNECTIONS FOR MUSIC-ON-HOLD WORKSHEET

MOD _ _ CAB ___ CARR ___ SLOT ___		CROSS-CONNECT					
		TO/FROM	TO/FROM	TO	FROM	TO/FROM	TO
LC13B		CONN BLK ___	CONN BLK ___	31D VOICE COUPLER		CONN BLK ___	CUSTOMER-PROVIDED MUSIC SOURCE
LEAD DESIG	COLOR CODE	(PURPLE)	(YELLOW)	SCREW TERM.	SCREW TERM.	(YELLOW)	LEAD DESIG
T				1	3		CT
R				2	4		CR



NOTES:
1. CROSS-CONNECT ONLY WHEN 4-WIRE CIRCUIT IS PROVIDED.
2. PMFTA CAN BE LOCATED AT THE NETWORK INTERFACE ON A CUSTOMER'S PREMISES OR IN A CENTRAL OFFICE.

Fig. 120—Typical Cross-Connection for PMFTA

5.170 The customer may select one of the following baud rates to match the associated peripheral device. The selection is made by operating the appropriate A4 switch position on the PIC unit. Only one A4 switch position (1 through 5) should be closed at any time. Refer to Section 554-010-102 for the location of and the procedures for operating the A4 baud-rate switch, and for additional information pertaining to the PIC.

SWITCH POSITION	BAUD RATE
1	9600
2	2400
3	1200
4	300
5	110

5.171 The power cords of the PIC unit and of one of the terminals listed in Table BS are powered directly from a commercial 117-Vac 60-Hz outlet.

5.172 When the PIC functions as an interface for long distance billing, a 108F data set must also be provided to interface the PBX with the traffic service position system (TSPS) Auto-Quote service. Refer to Table BU for optional switch settings that should be used on the 108F data set. An 830A data auxiliary set equipped with a 108D data set may also be used as the interface for long distance billing. Refer to Tables BV and BW for the optional switch settings required. A fill-in worksheet for the connections to a PIC unit is provided on Table BX.

RADIO PAGING ACCESS EQUIPMENT (J58824CD)

5.173 The radio paging access feature provides attendant and station users dial access to customer-owned radio paging equipment to selectively tone alert or voice page individuals carrying pocket radio receivers. The paging party may answer by dialing an answering code from a station within the PBX system.

5.174 The equipment required to furnish radio paging access is as follows:

- Two LC08D dual CO trunk circuit packs
- J58824CD interface trunk unit, Lists 7, 9, 12, 15, 16, and 17 (see Table BY)
- J59204CA-L1 TOUCH-TONE calling receiver (G1)
- J58847Y-L1 and L4 assembly, wiring, and equipment for one link and electronic dial unit

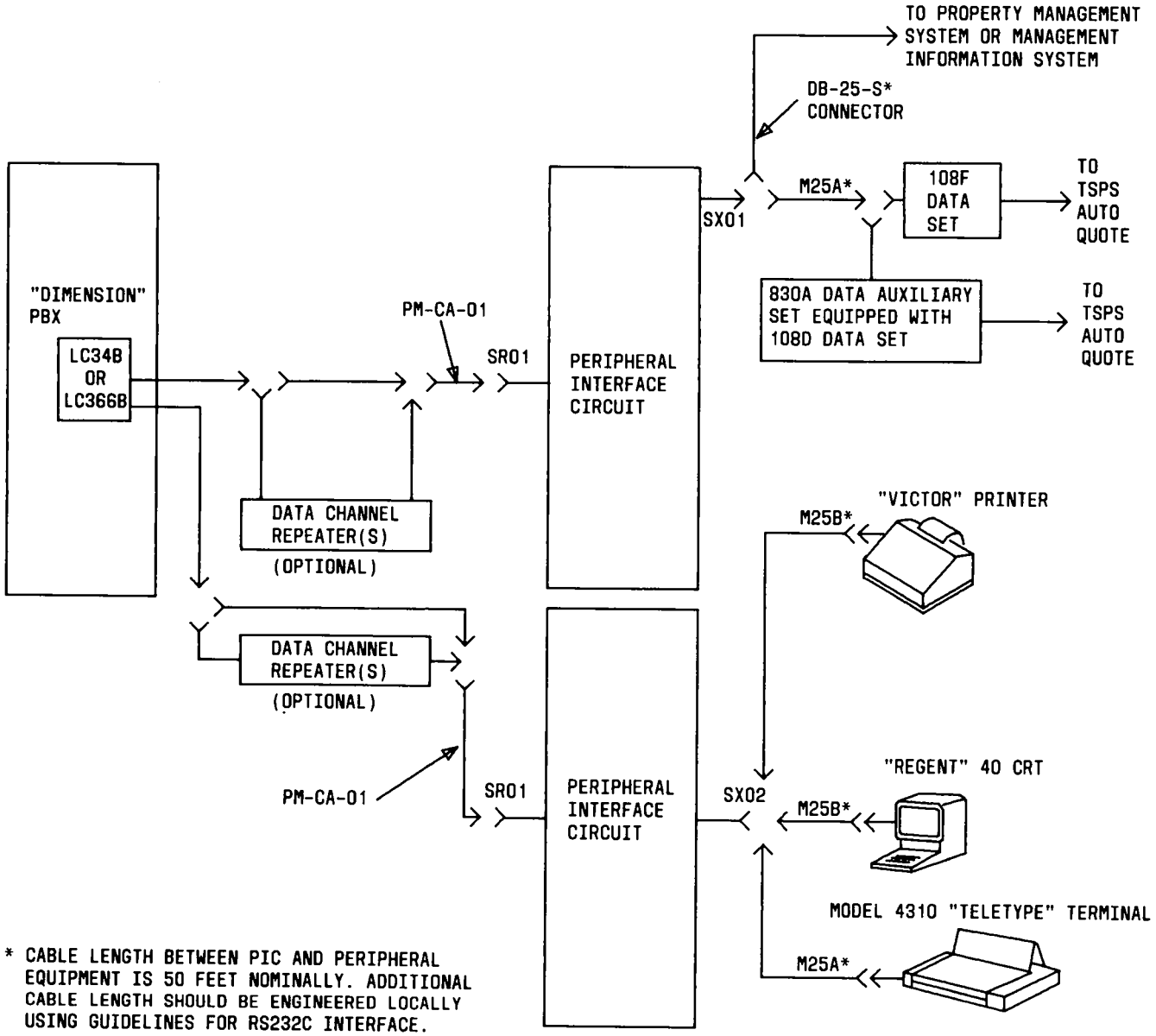


Fig. 121—Peripheral Interface Circuit Arrangement

- 31D voice coupler ▶(MD), to be replaced by 36A voice coupler◀ (not required when the interface trunk unit is wired for 1-way transmission).

The radio paging equipment units may be several combinations of J codes depending on the PBX service.

5.175 The interface trunk unit has two incoming ports and two answer ports. The four ports are connected to central office trunk circuits (LC08D) via the cross-connect field. The central office trunks connected to the incoming ports are encoded 1-way outgoing with TOUCH-TONE calling through dialing. The central office trunks connected to the answer ports are encoded 1-way outgoing TOUCH-TONE calling through dialing.

5.176 Connections to the customer-provided equipment are made via the cross-connect field.

TABLE BS

DATA TERMINALS THAT CAN BE USED WITH PERIPHERAL INTERFACE CIRCUIT (J58882GA)

DESCRIPTION (NOTE)	SUPPLIER	SIZE MM (IN.)	PAPER TYPE
VICTOR 5011-135 Friction-Feed Data Terminal With End of Paper Sensor	Victor Comptometer Corporation 3900 N. Rockwell St. Chicago, Illinois 60618 Phone: (321) 539-8200	171 (6-3/4) H X 318 (12-1/2) W X 394 (15-1/2) D	Narrow Format 34 Columns Roll
VICTOR 5011-463-135 Sprocket-Feed Data Terminal With End of Paper Sensor	Victor Comptometer Corporation 3900 N. Rockwell St. Chicago, Illinois 60618 Phone: (321) 539-8200	171 (6-3/4) H X 318 (12-1/2) W X 394 (15-1/2) D	Narrow Format 26 Columns Fanfold
TELETYPE Pin-Feed 4310 AAC Data Communication Terminal	TELETYPE Corporation 555 Touhy Ave. Skokie, Illinois 60076	191 (7-1/2) H X 343 (13-1/2) W X 333 (13-1/4) D	Wide Format 132 Columns Fanfold
CRT — ADDS-REGENT 40 Terminal With Standard Option Package	Applied Digital Data Systems Corporation 6000 E Evans Bldg. #2 Denver, Colorado 80222 Phone: (303) 756-3663	—	NA
108F Data Set	Western Electric	—	NA
830A Data Auxiliary Set Equipped With 108D Data Set	Western Electric	—	NA

Note: The VICTOR 5011 cannot be used for energy control. TELETYPE 4310 AAC data terminals should be used.

The tip and ring leads are connected from the yellow cross-connect field to the customer-provided equipment via a 36A voice coupler (required for FCC registration). The in-service feature of the interface trunk unit (on leads IS1 and IS2) is not functional in providing a busy condition to the DIMENSION PBX, but the IS1 and IS2 leads are still required for normal operation of the interface trunk. The recommended method of taking the interface trunk out of service is to use the attendant trunk group busy feature.

5.177 A functional diagram of the radio paging access connections is shown in Fig. 122. The interface trunk unit has been modified to allow for connections to the DIMENSION PBX. The tip and ring leads are coupled to the customer-provided equipment via a 36A voice coupler whenever 2-way transmission or 1-way receiving is provided.

5.178 Detailed wiring connections for radio paging access are illustrated in Fig. 123, 124, and 125. Figure 123 shows the connections from the DIMENSION PBX cross-connect field to the interface trunk unit terminal strips. Figure 124 illustrates the connections from the TOUCH-TONE calling receiver and the customer-provided equipment to the interface trunk unit and connections between the interface trunk unit terminal strips. Figure 125 illustrates the connections from the fuse panel to the interface trunk unit terminal strips and the connections for the Y, Z, or ZZ wiring option.

When the Z or ZZ option is used, a 31D voice coupler ♦(MD), to be replaced by 36A voice coupler,♦ must be connected to tip and ring between the interface trunk unit and the customer-provided equipment. The Y

TABLE BT

APPLICATION AND REQUIREMENTS FOR PRINTERS

PRINT FUNCTION	ASSOCIATED FEATURE(S)	PRINT FUNCT. OR PRINTER OPTIONAL FOR FEATURE	MUST PRINTER(S) BE DEDICATED	MIN. NO. PRINTER(S) NEEDED	MAX. NO. THAT CAN BE SPECIFIED	SHARING POSSIBILITIES	RECOMMENDED SHARING CONFIGURATION	RECOMMENDED PRINTER CHOICES			REMARKS
								VICTOR FRICTION	VICTOR SPROCKET	TTY	
AUDIT TRAIL 1. TSPS Audit	LD Billing	No	Yes	1	1				√	√	
2. Local Call Audit	LC Billing	Yes	No	1:2	1	Share with any other audit trail function(s) as appropriate considering the convenience of location and that the combined relative minimums should not exceed one.	<800 Rooms/beds, share these two functions >800 Rooms/beds, provide one per function.	√			
3. Wakeup Activity Audit	Auto Wakeup	Yes	No	1:2	1			√			
4. Maid Dial Audit	PMS Interface	Yes	No	1:4	1		Share with PMS backup printout	√			Generally should be located near housekeeper.
5. Backup Printer	FP9 & FP11 (Alternative)	Yes	No	1:4	1 per Primary Printer		Share with wakeup audit.	√			Would be specified as an alternative for all or most printers in case of malfunction of primary printer.
	PMS Interface	Yes	No		1		Share with maid dial audit.				
6. EC Change Audit	Energy Control	Yes	No	1:3	1		Provide one printer near EC CRT for all EC reports.			√ (Only)	Any TELETYPE printer can be specified by CRT operator.
7. EC Periodic Reports	Energy Control	Yes	No	1:3	1					√ (Only)	Any TELETYPE printer can be specified by CRT operator.

TABLE BT (Contd)

APPLICATION AND REQUIREMENTS FOR PRINTERS

PRINT FUNCTION	ASSOCIATED FEATURE(S)	PRINT FUNCT. OR PRINTER OPTIONAL FOR FEATURE	MUST PRINTER(S) BE DEDICATED	MIN. NO. PRINTER(S) NEEDED	MAX. NO. THAT CAN BE SPECIFIED	SHARING POSSIBILITIES	RECOMMENDED SHARING CONFIGURATION	RECOMMENDED PRINTER CHOICES			REMARKS
								VICTOR FRICTION	VICTOR SPROCKET	TTY	
DEMAND 1. Check-in/ Admitting Area Reports	Room/Bed Status	No	No	0	1 per Console	Any demand printer(s) be used, eg, cashier area).	Provide one printer for all check-in/admitting consoles.	√			Printer No. can be specified for printout (see item 3).
2. Cashier Checkout/ Discharge Reports	LC Billing	Generally No	No	1	1 per Console	Share printer among checkout/discharge consoles.	One per two checkout consoles.	√	√		Printout appears on printer assigned to console.
	LD Billing	Generally No	No								
	MSG Waiting	Yes	No								
3. Night Audit Reports	LC Billing	No	No	1	1 per Console	Any demand printer(s) can be used.	Use all check-in/admitting and checkout/discharge printer on a block report basis.		√		Printer to be used for a particular report can be specified by console operator.
	LC Billing	No	No								
4. Manager Reports	Room/Bed Status	No	No	0	1 per Console	Any demand printer can be used	<800 Rooms/beds, use check-in/admitting or checkout/discharge >800 Rooms, provide one printer and console for manager.	√	√		Printer No. can be specified for printout (see item 3). Can use wakeup audit printer for wakeup summary when no wakeup calling is occurring.
	Wakeup Summary	No	No								
	Billing	Yes	No								
5. Housekeeper Activity Reports	Room/Bed Status	No	Yes	1/2	1	Share with other housekeeper report	<800 Rooms/beds, share printer >800 Rooms/beds, don't share	√	√	√	Printer assigned to housekeeper line.
6. Housekeeper Status Reports	Room/Bed Status	No	Yes	1/2	1	Share with other housekeeper report		√	√	√	Printer assigned to housekeeper line.
7. PMS Checkout Printer	PMS Interface	Yes	No	1	1 per PMS Terminal	Share printers among PMS checkout/discharge terminals.	One per two PMS terminals.	√	√		Applies only when PBX doing LC or LD billing. PMS specifies printer. In checkout/discharge a message.
8 EC Demand Reports	Energy Control	Yes	No	1/3	1	Share with other EC printouts.	Provide 1 printer near CRT for all EC reports.			√ (Only)	Any TELETYPE printer can be specified by CRT operator.

TABLE BU

SWITCH SETTINGS ON 108F DATA SET FOR LONG DISTANCE BILLING

FUNCTION		SWITCH SETTING	
		OPEN	CLOSED
2-Wire Facility		S1-3	S1-4
Mark Hold		S1-2	S1-1
Clear to Send (CB) Internally Connected to Receive Supervision (RS)		S2-6	S2-5
Carrier Control Always ON in Data Mode		S2-4 S2-7	S2-2
No Remote Test Connection via J1		S2-1	—
No Local Copy in Test Mode		S2-3	—
Ground Wire (GRD) Connected Signal Ground (SG)		—	S4-B
No Resistor Bypass for Negative Voltage (-P) on J1		S4-A	—
		OPTION STRAP	
Receiver dB Gain Reduction	6	Strap E2 to E3	
	0	Strap E1 to E2	

option provides for transmission only to the radio paging equipment. The Z option provides for receiving only from the customer-owned and maintained equipment. The ZZ option provides for 2-way transmission.

5.179 Table BZ is provided as a fill-in worksheet for radio paging access connections.

RECORDED ANNOUNCEMENT INTERCEPT CONNECTION

5.180 Incoming calls are intercepted and routed to a recorded message which indicates to the caller the reason for the interception. The intercept treatment is provided as an alternative to attendant intercept for DID and CCSA calls only. Only one message can be given.

5.181 The equipment required for the recorded announcement intercept feature consists of the following:

- LC13B—Auxiliary trunk interface circuit pack
- KS-16765, List 2—Assembly, equipment, and wiring for one announcement set
- KS-16765, List 3—Recorder
- KS-16765, List 6—Amplifier
- KS-16765, List 7—Mounting bracket
- KS-16765, List 8—Connecting cord assembly

TABLE BV

SWITCH SETTINGS FOR 108D DATA SET FOR LONG DISTANCE BILLING

FUNCTION	SWITCH SETTINGS					
	SCREW SWITCH A		SCREW SWITCH C		SCREW SWITCH D	
	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED
2-Wire Facility, 26 Ga, Nonloaded High Capacity, 900 Ohms Loop Impedance at 1170 Hz	1-2 3-4	2-3	1-2 3-4	2-3	1-2 2-3	3-4

FUNCTION	SERIES 2 (108D)	SERIES 3 (108D)	
	SLIDE SWITCH	ROTARY SWITCH	FACEPLATE DESIG
Full-Duplex	S1-Closed	S1C-Down	DX-F
Mark Hold on TL	S2-Open	S1A-Up	TL-M
(N/A)	S3-Open	S1B-Up	RL-M

TABLE BW

SWITCH SETTINGS FOR 830A DATA AUXILIARY SET FOR LONG DISTANCE BILLING

FUNCTION	SWITCH SETTING	
	OPEN	CLOSED
No Copy in Test Mode	S1-1	—
Clear to Send (CB) Lead Connected to Receive Supervision (RS)	S1-2 S1-3	S1-4
No Carrier Squelch on Carrier Fail	S1-3 S1-5	—
Resistor in Series With —24 Volt Lead (-P, JZ-10) Condition	S2A	—
No Remote Operation of Test Relay via J2-18	S1-6	—
Frame Ground Connected to Signal Ground	—	S2B

TABLE BX

CROSS-CONNECTIONS FOR PERIPHERAL INTERFACE CIRCUIT WORKSHEET

LC34B		CROSS-CONNECT								
MODULE _ _ CABINET ___ CARRIER ___ SLOT ___ CIRCUIT ___		TO/FROM	TO/FROM	TO		FROM	TO		TO	
		CONN BLK _ _ _ _ _XO_ (PURPLE)	CONN BLK ___ (YELLOW)	PERIPHERAL INTERFACE CIRCUIT			108F DATA SET, OR 830A DATA AUX SET E/W 108D DATA SET, OR PROPERTY MGMT SYSTEM		VICTOR 5011 PRINTER, TELETYPEWRITER 4310, AAC PRINTER, OR ADDS-REGENT 40 CRT	
LEAD DESIG	COLOR CODE			SR01 CONN TERM.	SX01 CONN TERM.	SX02 CONN TERM.	LEAD DESIG	FUNCTION	LEAD DESIG	FUNCTION
IOXB				1	2		TXD	TRMTD DATA		
					3		RXD	RCVD DATA		
IOXA				2	4		RTS	REQUEST TO SEND		
IORB				3	6		DSR	DATA SET READY		
					7		SIGGRD	SIGNAL GROUND		
IORA				4	20		DTR	DATA TERM. READY		
						2			RXD	RCVD DATA
						3			TXD	TRMTD DATA
						5			DTR	DATA TERM. READY
						6			DTR	
						7			SIGGRD	SIGNAL GROUND
						8			DSR	DATA SET READY
						20			DSR	

TABLE BY

RADIO PAGING EQUIPMENT SUMMARY

STATION EQUIPMENT	RADIO PAGING EQUIPMENT REQUIRED	VERTICAL MOUNTING SPACE IN MM (IN.)
TOUCH-TONE Dialing With No Conversion	J58824CD-1, L7 & L16 J58824CD-1, L12 & L17	254 (10) 102 (4)
TOUCH-TONE Dialing to Dial Pulse Conversion	J58824CD-1, L7 & L16 J58824CD-1, L12 & L17 J58824CD-1, L9 J58847Y-1, L3 & L4	254 (10) 102 (4) 51 (2) 254 (10)
TOUCH-TONE Dialing to 2-out-of-7 Conversion	J58824CD-1, L7 & L16 J58824CD-1, L12 & L17 J58824CD-1, L15 J59204CA, G1	254 (10) 102 (4) 152 (6) 51 (2)

- 31D Voice coupler ▶(MD), to be replaced by 36A voice coupler.◀

Note: List 7 and List 8 are required when mounting the announcement set in the auxiliary cabinet.

5.182 The recorded announcement feature is provided with uniform call distribution (UCD) and direct department calling (DDC) features. With this arrangement, one-half of an LC13B circuit pack is required. When both recorded announcement with UCD/DDC and recorded announcement with DID/CCSA are provided in the same system, an announcement set must be provided to support each announcement requirement. ▶A maximum of two announcement sets can be provided. One for UCD/DDC and one for DID/CCSA.◀

5.183 Connections required between the PBX and the KS-16765 announcement set are made via the cross-connect field and the 36A voice coupler as shown in Fig. 126. Table CC is provided as a fill-in worksheet for recorded announcement intercept connections.

RECORDED TELEPHONE DICTATION TRUNK

5.184 The recorded telephone dictation trunk feature allows access to and control of customer-owned dictating equipment by station users within the system. The start and stop functions of the dictating equipment may be dial- or voice-controlled. The record playback, etc, functions are always dial-controlled.

5.185 The equipment required for recorded telephone dictation access is listed in Table CD. The recorded telephone dictation trunk is compatible with either the A3 or G1 TOUCH-TONE calling receivers. When the A3 receiver is used, the associated cable is connected to terminal strip (TS)D. When the G1 receiver is used, the cable connected to the receiver is connected to the telephone dictation equipment via a terminal plug that is shop-wired to TS(D). When 4x4 TOUCH-TONE calling operation (A3 receiver) is required, lead HG4 must be connected to TS(D). Figure 127 shows a block diagram of the wiring connections for recorded telephone dictation access.

5.186 Figure 128 shows detailed wiring connections at the terminal strips. Terminal strip C shows the ZP option provided by SD-5E038-01, Issue 3B or later. The capacitor provided by this option is coded as 542G. Other wiring options and required strappings are shown in Table CE. A 36A voice coupler must be provided for FCC registration as an interface for the tip and ring leads between the cross-connect field and the customer-provided equipment. Table CF is provided as a fill-in worksheet for the recorded telephone dictation trunk connections.

44V4 REPEATER

5.187 Table CG provides a fill-in worksheet for connection of a 44V4 repeater in the auxiliary cabinet. When a 44V4 repeater is used, DX signaling must be used. When −48V is used to power the

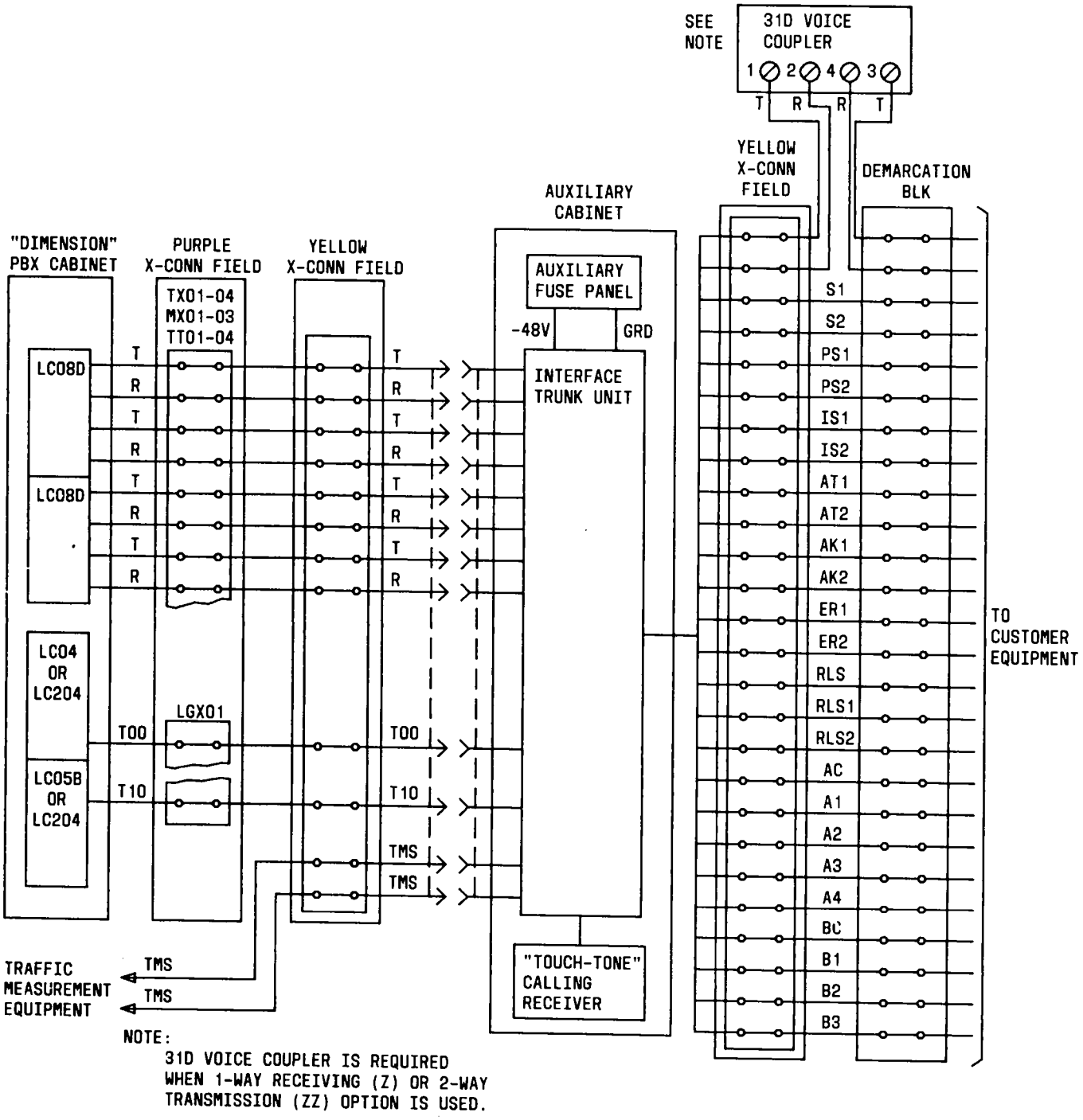


Fig. 122—Radio Paging Access Equipment—Functional Diagram

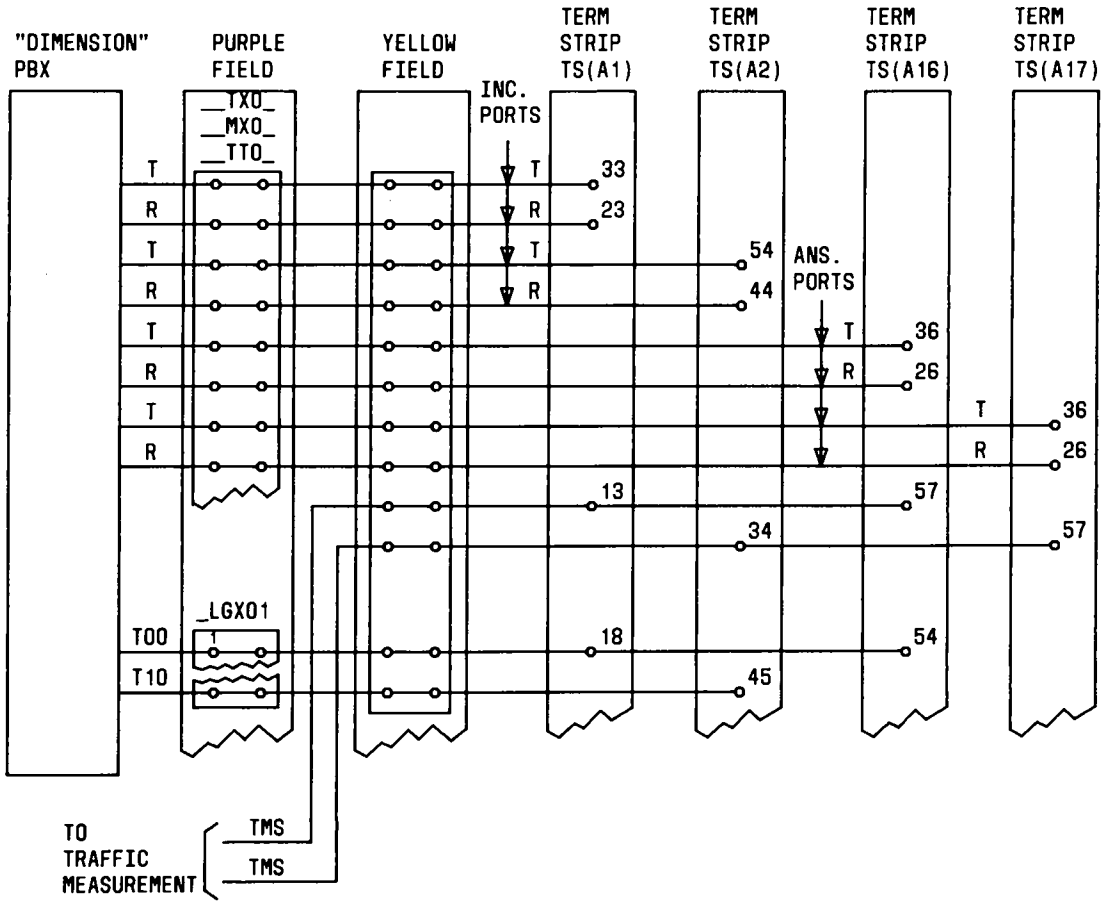


Fig. 123—Connections From DIMENSION PBX Cross-Connect Field to Radio Paging Interface Trunk Unit

repeater, a 1400-ohm resistor (228A) should be used between each −48V source and battery connection on the repeater. An example of 44V4 repeater connections is shown in Fig. 129.

24V4 REPEATER

5.188 The 24V4 repeater is designed to interface 900-ohm or 600-ohm 2-wire CO equipment using loaded or nonloaded cable. It consists of a mounting shelf which holds plug-in components and test jacks. If there is no metallic facility terminal (MFT) 2-wire repeater available, the operating company may wish to use the 24V4 repeater for voice and data transmission. Table CG may also be used as a fill-in worksheet for connections of the 24V4 repeater in the system auxiliary cabinet. An example of the 24V4 repeater connections is shown in Fig. 130.

5.189 Figure 131 shows a typical trunk connected to the trunk carrier via the auxiliary equipment (eg, 24V4 repeater). The auxiliary equipment may be the customer premises facility terminal (CPFT) equipment.

STATION MESSAGE DETAIL RECORDING (SMDR)

5.190 Data is passed from the DIMENSION PBX to the SMDR cabinet via a data channel on the fast/slow speed data I/O circuit pack LC34B, LC366B, or LC171B when RMATS is provided. The dedicated SMDR data channel (circuit 0) is physically located in slot 31 of the basic control or control growth carrier. The data rate is 833 kilobits per second with each transmission word consisting of 16

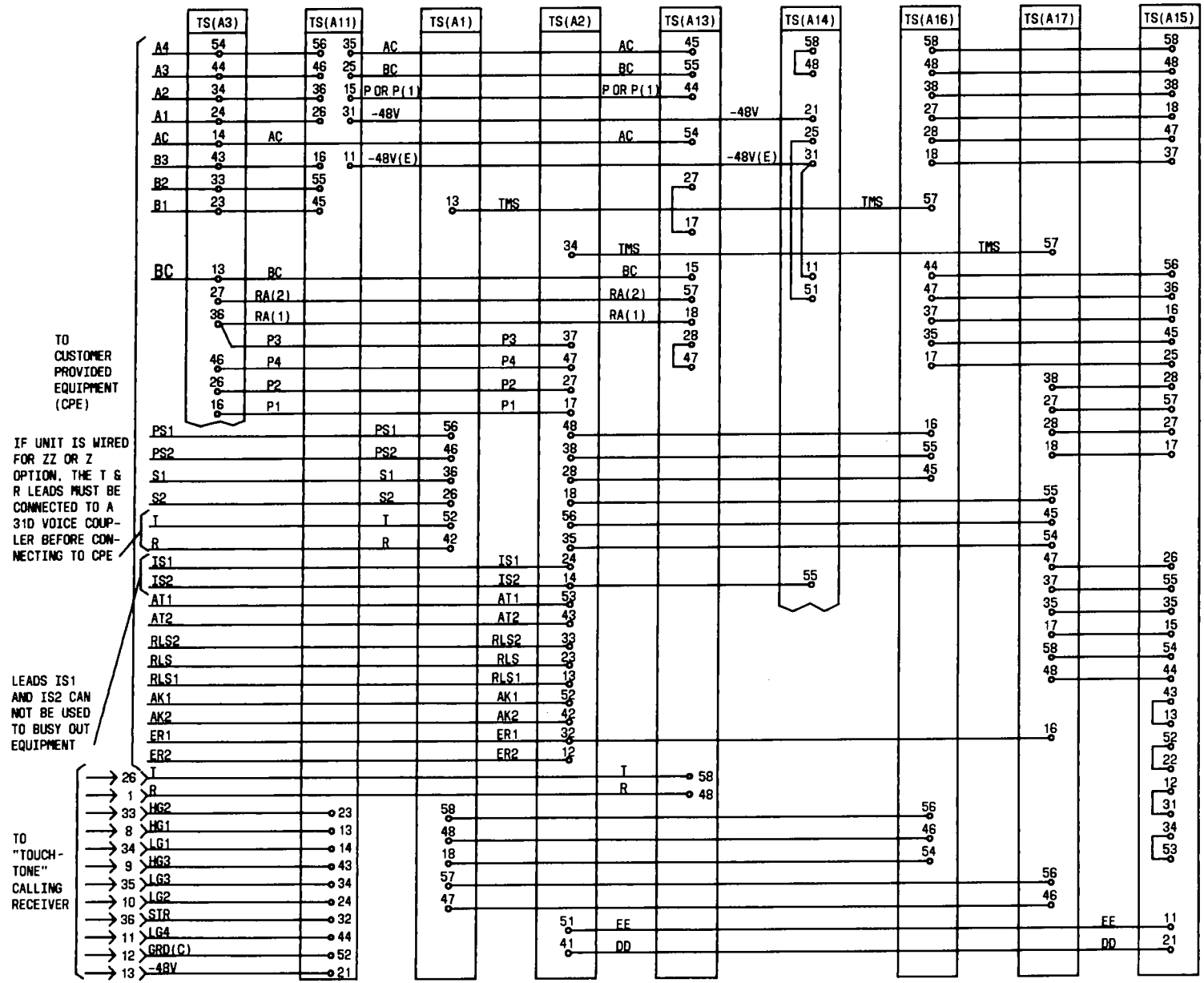
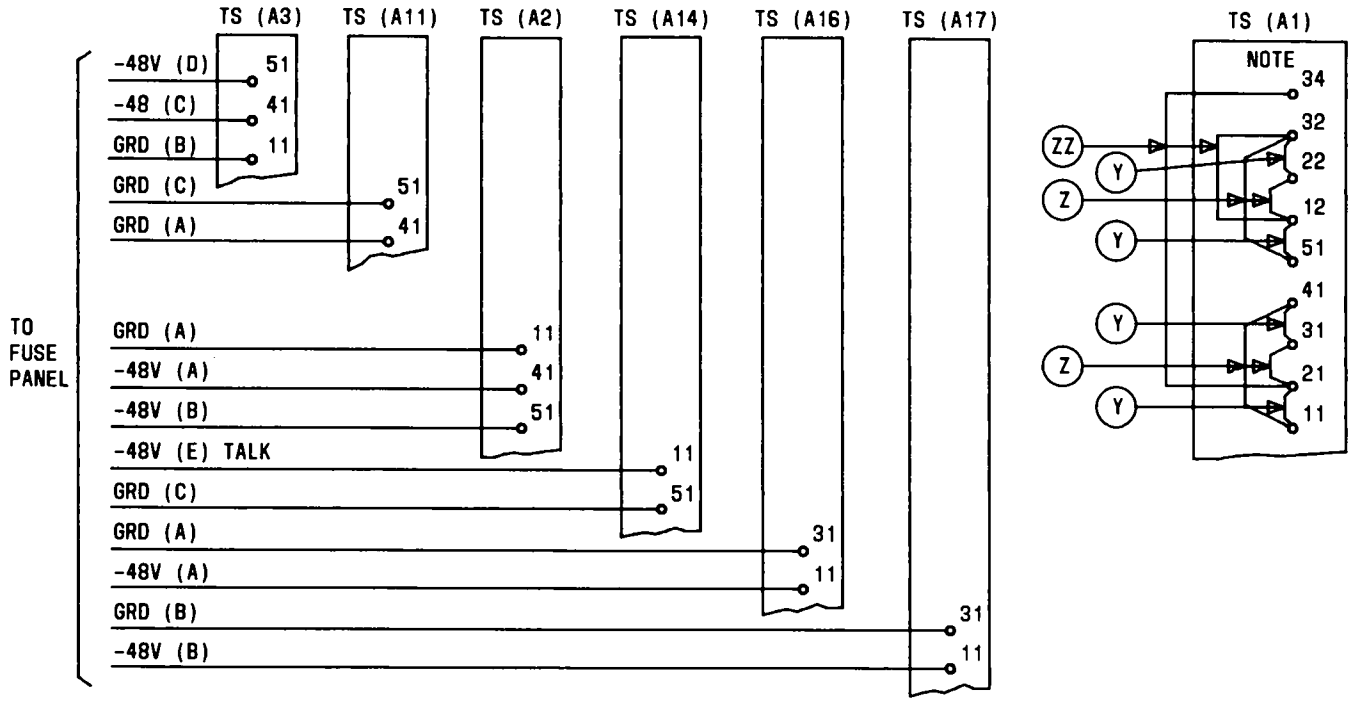


Fig. 124—Connections From TOUCH-TONE Calling Receiver and Customer-Provided Equipment to the Interface Trunk Unit



NOTE:
IF THE Z OR ZZ OPTION OF WIRING IS USED ON THE INTERFACE TRUNK CIRCUIT, THE 31D VOICE COUPLER MUST BE CONNECTED TO TIP AND RING BETWEEN THE CONNECTING BLOCK IN THE YELLOW FIELD AND THE DEMARCATION BLOCK. IF THE Y OPTION IS USED, THE 31D VOICE COUPLER IS NOT REQUIRED.

Fig. 125—Connections From the Fuse Panel to the Interface Trunk Unit for Radio Paging Access

data bits plus one odd parity bit. Station message detail recording provides a record of the PBX station (or attendant) identity, time the call is terminated, duration, and the trunk group used for outgoing and/or incoming calls. The call duration is measured from 10 seconds after the establishment of the connection in the customer system to the time when the trunk is disconnected. Therefore, busy signals, don't answer, and wrong number calls may also be recorded. For outgoing calls, the called number is recorded. Also, a station dialed account code or authorization code number may be recorded in addition to the calling number. Refer to Section 554-010-122 for detailed SMDR information. Optional wiring connections for SMDR are shown in Fig. 132. A detailed drawing of the SMDR interface with the 724A panel is shown in Fig. 133.

Note: The dedicated SMDR data channel, circuit 0 in slot 31, may be used as a standard data channel (fast or slow speed) when SMDR is not provided (does not apply to control growth carrier). The plug-ended cable (BXP07) must be plugged into connector BX07 on the basic control carrier. Connections are made to the channel via the BX02 connector on the cross-connect field.

5.191 System improvements require the (Type II) SMDR to:

- Record the authorization code
- Record the facility restriction level (FRL) for the call

TABLE BZ

CROSS-CONNECTIONS FOR RADIO PAGING ACCESS WORKSHEET

PBX			CROSS-CONNECT						
			TO/FROM		TO/FROM	TO			
EQUIPMENT		LEAD DESIG	CONN BLK _ _ _ _ _ _ O _ (PURPLE)	CONN BLK _ _ _ _ LGX01 (PURPLE)	CONN BLK —— (YELLOW)	TERMINAL STRIPS FOR INTERFACE TRUNK UNIT TS (A1)	TS (A2)	TS (A16)	TS (A17)
LC08D MOD _ _ CAB ___ CARR ___ SLOT ___	CKT 0	T				33			
		R				23			
	CKT 1	T					54		
		R					44		
LC08D MOD _ _ CAB ___ CARR ___ SLOT ___	CKT 0	T						36	
		R						26	
	CKT 1	T							36
		R							26
MOD _ _ CAB ___ LINE GROUP CONTROL CARR ___	LC04 SLOT 5	T00		1		18		54	
	LC05B SLOT 6	T10		50			45		
TRANSMISSION MEASURING SET			TMS			13		57	
			TMS				34		57

TABLE BZ (Contd)

CROSS-CONNECTIONS FOR RADIO PAGING ACCESS WORKSHEET

CROSS-CONNECT							
FROM				TO/FROM	TO	FROM	TO
INTERFACE TRUNK UNIT				CONN BLK — (YELLOW)	31D VOICE COUPLER		DEMARCATION BLK
LEAD DESIG	TS (A1)	TS (A2)	TS (A3)		TERM.	TERM.	
T	52				1	3	
R	42				2	4	
S1	36						
S2	26						
PS1	56						
PS2	46						
IS1		24					
IS2		14					
AT1		53					
AT2		43					
AK1		52					
AK2		42					
ER1		32					
ER2		12					
RLS		23					
RLS1		13					
RLS2		33					
AC			14				
A1			24				
A2			34				
A3			44				
A4			54				
BC			13				
B1			23				
B2			33				
B3			43				

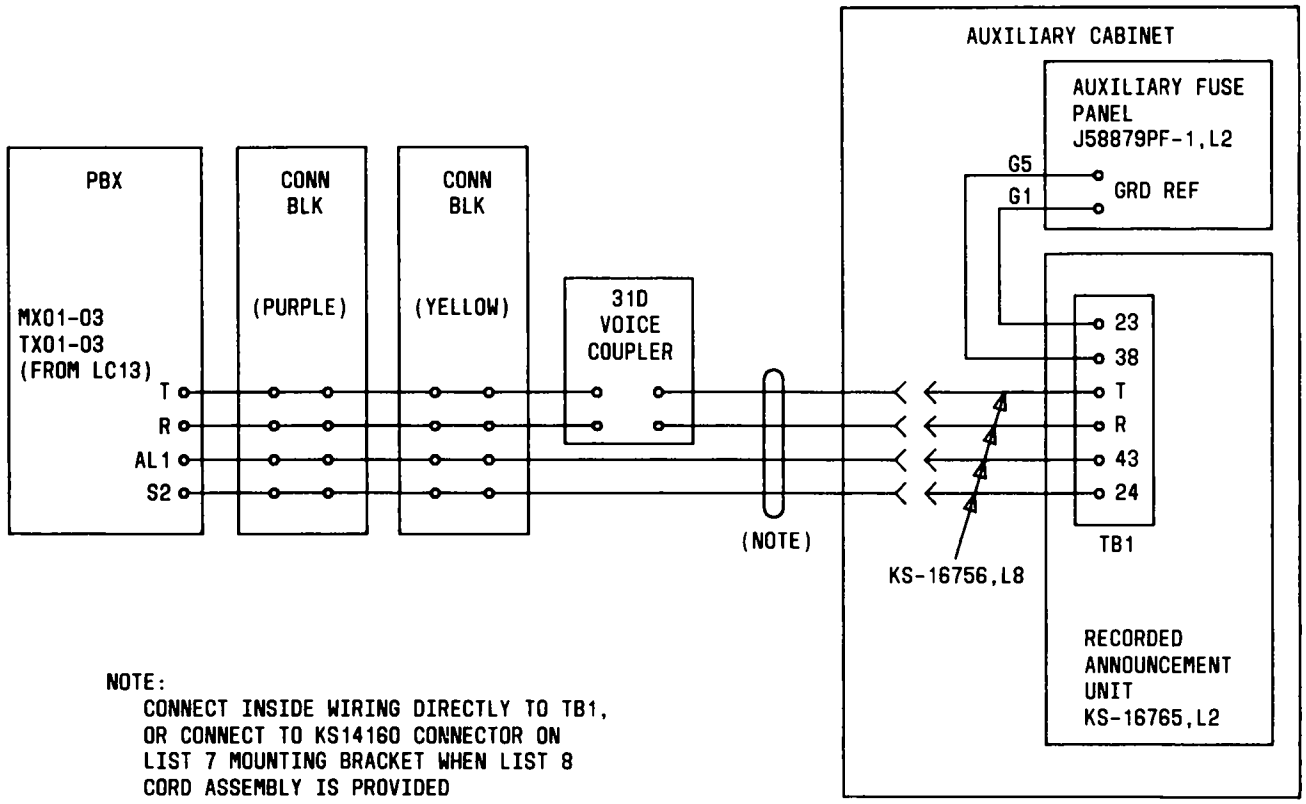


Fig. 126—Recorded Announcement Unit Connections

- Record the new ARS pattern and the time and number as dialed
- Dump the buffer at the calendar date change.

5.192 Refer to Fig. 134 for an illustration of the SMDR (Type II) panel layout, J59209AC-( ), List 2. This hardware is required as a result of system expansion. A basic SMDR system can be retrofitted to a Type II configuration.

5.193 Power for the SMDR supply (207B) power cord is provided from a commercial 117-Vac 60Hz outlet via the J59209JA, List 1 ac distribution unit.

SYSTEM STATUS INDICATOR DISPLAY (30A8)

5.194 A 30A8 system status indicator (SSI) is used in conjunction with the centralized attendant service (CAS), ◗Automatic Call Distribution (ACD), and Uniform Call Distribution (UCD)◖ features to provide a status monitoring capability. When the CAS feature is provided, incoming calls are routed to the CAS positions via release link trunks (RLTs). These short holding time connections from the unattended location to the centralized answering point can be monitored by using SSIs (Fig. 135). Three SSI display units are required to monitor the 16 outgoing RLTs at a branch PBX. The status of four RLTs is displayed on lamps 1 through 4 on the front panel of the first display. The remaining lamps on the first display indicate the control, overload, and major and minor alarms. Refer to Table CH for lamp status information for the three displays at the branch PBX. At the main CAS PBX, one SSI display is required for up to eight incoming RLTs per incoming RLT trunk group. With the maximum of 110 incoming RLTs, 14 SSIs would be required to monitor the trunks at the main PBX. The control station may test RLTs to make any trunk or RLT maintenance-busy. The control/station can receive RLT calls from the RLT queue in the same manner as the CAS attendant.

5.195 The LEDs and associated circuitry are contained on an RE2 circuit pack assembly

TABLE CC

CROSS-CONNECTIONS FOR RECORDED ANNOUNCEMENT UNIT WORKSHEET

MOD _ _ CAB ___ CARR ___ SLOT ___ CIRCUIT ___		CROSS-CONNECT					
		TO/FROM	TO/FROM	TO	FROM	TO	
LC13B		CONN BLK _ _ _ _ _ XO _ (PURPLE)	CONN BLK ___ (YELLOW)	31D VOICE COUPLER		RECORDED ANNOUNCEMENT UNIT	
LEAD DESIG	COLOR CODE			TERM.	TERM.	LEAD DESIG	TB1 TERM NO.
T				1	3	T	T
R				2	4	R	R
AL1						AL1	43
S2						ST	24
						G1	23
				AUXILIARY FUSE PANEL J58879PF-1,L2		G5	38

TABLE CD

RECORDED TELEPHONE DICTATION (RTD) EQUIPMENT—SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
1	RTD Units (Dial Dictation Machine)	Customer-provided equipment.
2	J58827E, L1, and 7 Trunk	Required for supervisory control of each customer-provided unit and must be mounted in 584 mm (23 in.) wide space in auxiliary cabinet. List A, 2 and 8 are required with TOUCH-TONE calling operation.
3	J58879PC-2, L4 (120A) Frequency Generator	Is provided as a separate ringing source for the attendant telephone set(s). If CPFT equipment is being provided, a separate 120A generator used for continuous ringing may be shared with the feature.
4	J58879PG, L1 Interrupter for Audible Ringing	Required for the attendant telephone sets whenever auxiliary cabinet is ordered via E-8124 questionnaire.
5	Fuse Panel	Fuses provided separately if the auxiliary cabinet is not specified.
6	Telephone Set (for RTD Attendant)	Provides dictation telephone set, as required per dictation unit.
7	TOUCH-TONE Dialing Circuit A. 10B and 54B, or 10C B. Senior Receiver: (1) J99289B-1, List 1, SA and D (A3) (2) J59204CA-1, L1 A, and B (G1)	If access to the dictation unit from a TOUCH-TONE dialing set is required, both traffic and cost considerations should be considered. The system will be traffic engineered for the appropriate number of TOUCH-TONE dialing circuits without dial dictation requirements. Since a TOUCH-TONE dialing register must be dedicated to each dictation connection for the duration of the connection, where the dictation units are busy frequently, it may be necessary to dedicate a TOUCH-TONE dialing circuit to each dictation trunk to prevent call blockage and dial tone delays. These dedicated circuits must be provided in addition to those specified for normal call processing. Since there may not be room for LC10B and LC54B or LC10C (replaces both LC10B and LC54B) circuit packs in existing carrier slots, it may be economical to order a separate senior receiver per dictation unit, rather than ordering carrier/cabinets as well as other auxiliary equipment. The number of senior receivers should be considered when ordering an auxiliary cabinet versus other apparatus mounting units.
8	LC13B Auxiliary Trunk Circuit	One LC13B provides two interface circuits for RTD or other auxiliary circuits. The LC13B provides the necessary isolation option, eliminating the need to order the isolation amplifier with the J58827E, L1 trunk.
9	31D Voice Coupler	One 31D voice coupler for coupling tip and ring leads per dictation machine provided. This coupler provides filtering and limiting required by the FCC Registration Rules, Part 68. The 31B voice coupler is grandfathered and may be used, if available.

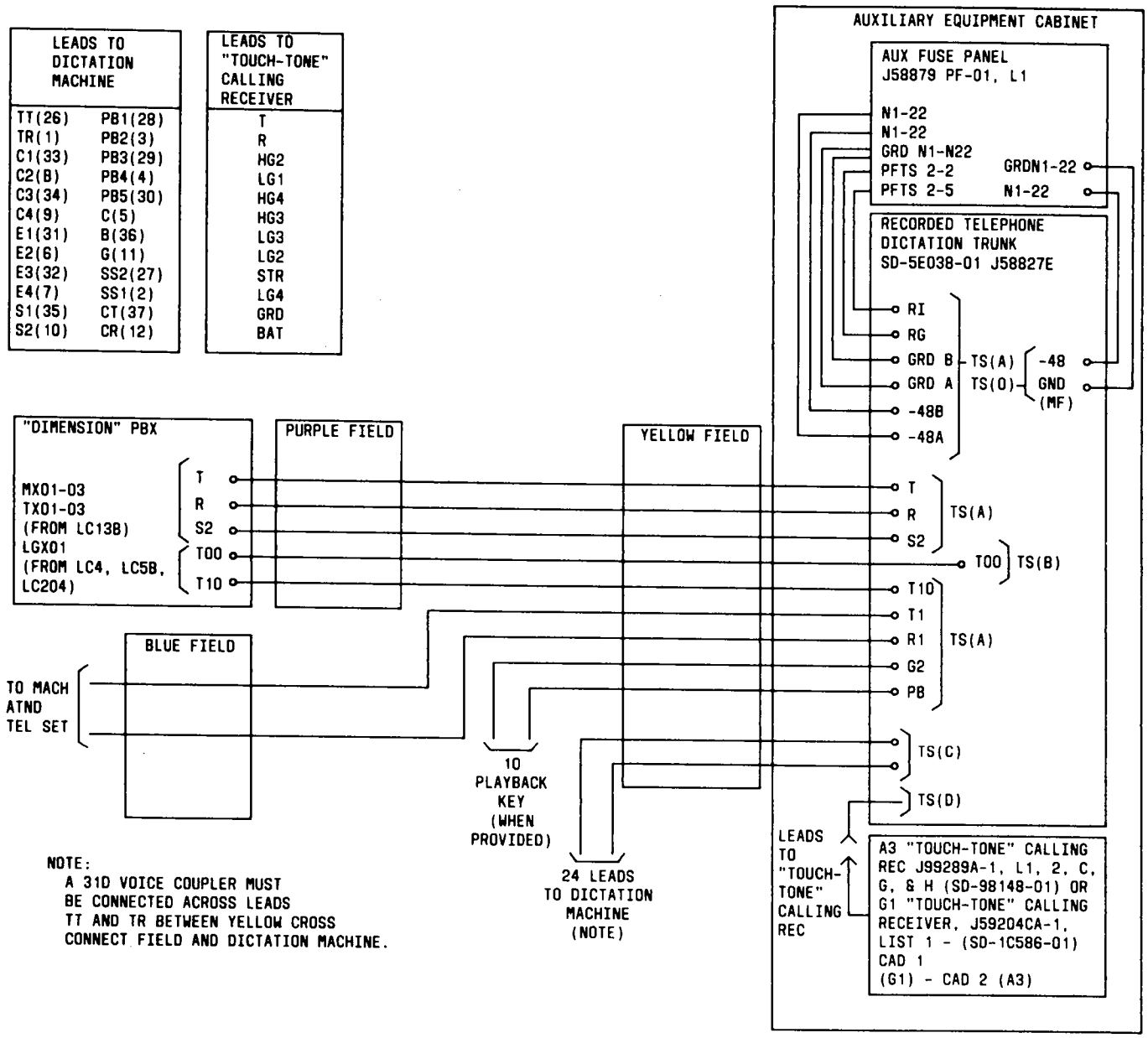


Fig. 127—Block Diagram of Recorded Telephone Dictation Trunk Connections

NOTES:
1. WHEN 4 X 4, "TOUCH-TONE" SERVICE IS REQUIRED LEAD HG4 IS CONNECTED FOR A3 RECEIVER.
2. CABLE IS INCLUDED ON THE G1 "TOUCH-TONE" CALLING RECEIVER AND CONNECTS VIA TERMINAL PLUG.
3. THESE ARE CONNECTIONS FOR A3 "TOUCH-TONE" CALLING RECEIVER.

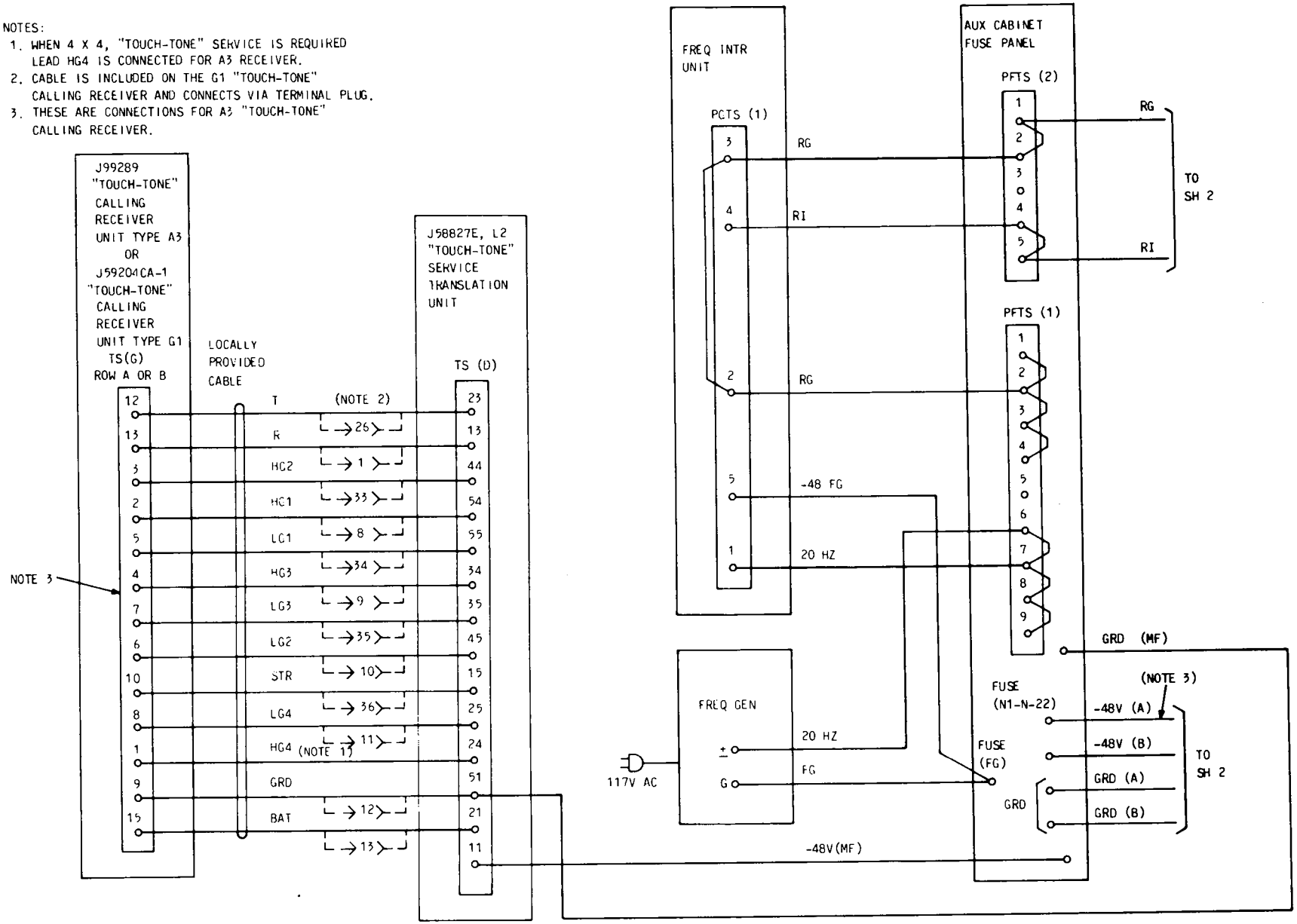
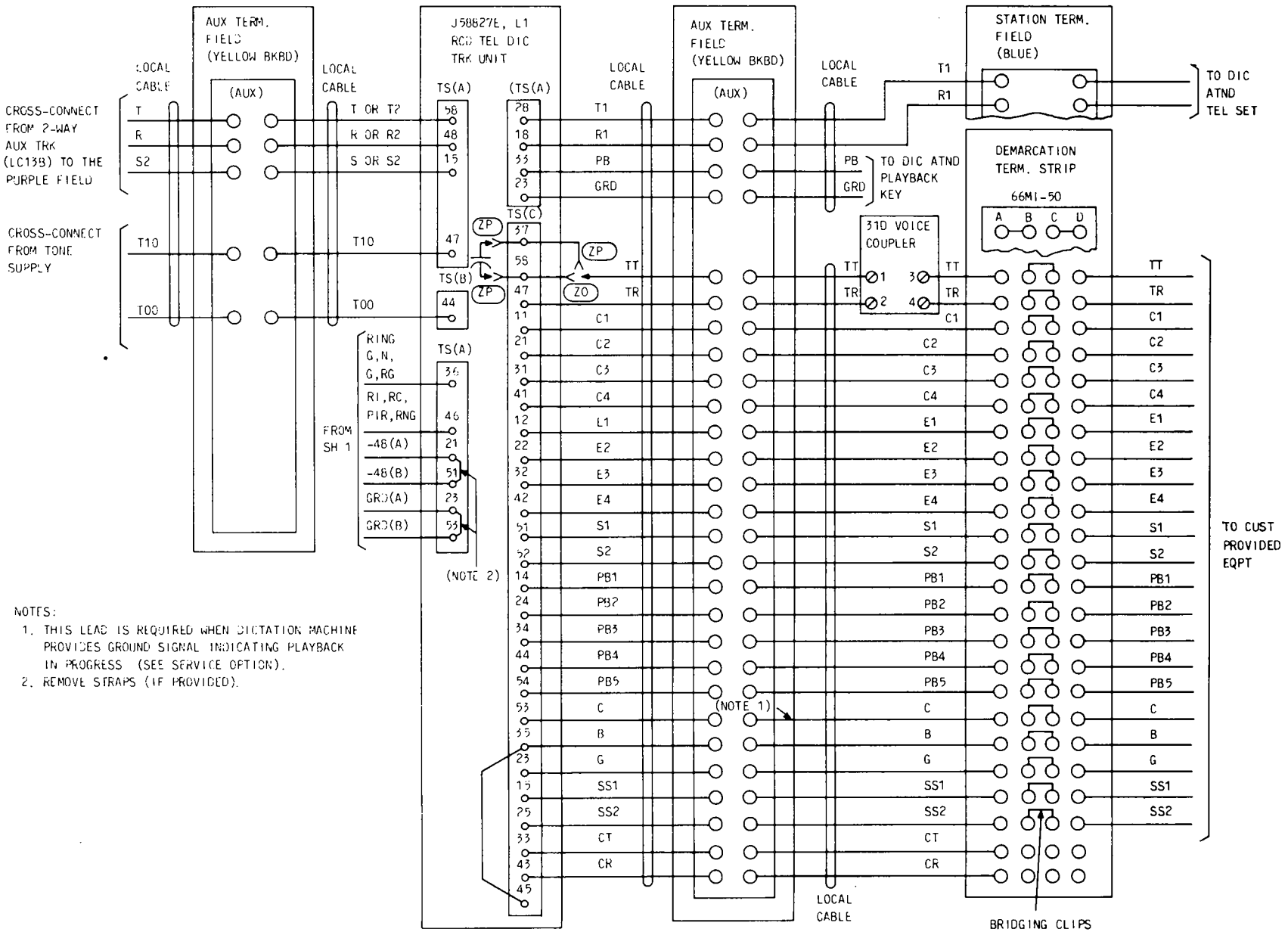


Fig. 128—Recorded Telephone Dictation Trunk Connections (Sheet 1 of 2)



NOTES:

1. THIS LEAD IS REQUIRED WHEN DICTATION MACHINE PROVIDES GROUND SIGNAL INDICATING PLAYBACK IN PROGRESS (SEE SERVICE OPTION).
2. REMOVE STRAPS (IF PROVIDED).

Fig. 128—Recorded Telephone Dictation Trunk Connections (Sheet 2 of 2)

TABLE CE

WIRING OPTIONS FOR RECORDED TELEPHONE DICTATION ACCESS

FEATURE OR OPTION DESCRIPTION				OPTION
Trunk Located at Switching System (DIMENSION PBX)				S
Not ESS No. 1 Centrex				ZJ
Loop Resistance to Attendant Telephone Set		Less than 300 ohms		ZL
		More than 300 ohms		ZM
TOUCH-TONE Dialing Operation		Required		ZC
		Not Required		ZB
Dictation Machine Start/Stop by	Dial 1*	TOUCH-TONE Calling Dial		M, W, ZG
		Rotary Dial		G, W
	Voice			M, V
Dictation Machine Unavailable to Record	Makes Trunk Busy and Signals Attendant			B
	Makes Trunk Busy			ZA
Playback Reduced by Dialing Digit 2	Yes			F
	No			E
To Increase Tone Levels From Dictation Machine (Ready to Dictate Tone, Ringing Tone, Dial Tone, Etc)				YC
Additional Machine Playback Features (Specify Only One)	Mach. Provides Playback Sig Dial 3 Extends Playback Dial 1 Ends Playback		No No Yes	R
	Mach. Provides Playback Sig Dial 3 Extends Playback Dial 1 Ends Playback		Yes Yes No	N
	Mach. Provides Playback Sig Dial 3 Extends Playback Dial 1 Ends Playback		Yes No Yes	Q
	Mach. Provides Playback Sig Dial 3 Extends Playback Dial 1 Ends Playback		Yes Yes Yes	A

* If both TOUCH-TONE dialing and rotary stations access this circuit, use options specified for TOUCH-TONE dialing operation.

OPTION	STRAPS REQUIRED ON J58827B		
	TS(A)	TS(B)	TS(C)
A		46-56	13-14
B	13-23	26-36	
E		45-55	
F		35-55 42-52	
G	46-56		
M	46-56		
N		28-38 46-56	13-14
Q		48-58	
R		48-58	53-54
S	35-45		
V		15-54 47-57 34-44 24-34 23-33	
W	11-21	18-57 37-47 17-27 34-44 33-43	
YC	†		
ZA	13-23		
ZB			48-58 28-38 18-57 47-57
ZC			18-28
ZG	47-57		
ZJ	24-34		17-27
ZL	NO STRAP REQUIRED		
ZM	25-55 14-24		

† To provide option YC, install .55μF capacitor from contact 5 of T key to contact 4M of B1 relay.

TABLE CF

CROSS-CONNECTIONS FOR RECORDED TELEPHONE DICTATION TRUNK UNIT WORKSHEET

PBX			CROSS-CONNECT					
			TO/FROM		TO/FROM	TO		
EQUIPMENT		LEAD DESIG	CONN BLK _ _ _ _ _ _ O _ (PURPLE)	CONN BLK _ _ _ _ LGX01	CONN BLK —— (YELLOW)	RECORDED TELEPHONE DICTATION TRUNK UNIT		
						LEAD DESIG	TS (A)	TS (B)
LC13B MOD _ _ CAB ___ CARR ___ SLOT ___	CKT ——	T		X		T	58	X
		R		X		R	48	X
		S2		X		S2	15	X
MOD _ _ CAB ___ LINE GROUP CONTROL CARR ___	LC04	T00		1		T00	X	44
	LC05B SLOT 6	T10		50		T10	47	X

TABLE CF (Contd)

CROSS-CONNECTIONS FOR RECORDED TELEPHONE DICTATION TRUNK UNIT WORKSHEET

RCD TEL DIC TRK UNIT LEAD DESIG	CROSS-CONNECT						
	FROM		TO/FROM	TO/FROM	TO	FROM	TO
	RECORDED TELEPHONE DICTATION TRUNK UNIT		CONN BLK ——	CONN BLK ——	31D VOICE COUPLER		DEMARCATION TERMINAL STRIP BLK __
	TS	TERM.	(YELLOW)	(BLUE)	TERM.	TERM.	TERM.
T1	A	28					*
R1	A	18					
PB	A	33					†
GRD	A	23					
TT	C	58 ‡			1	3	
TR	C	47			2	4	
C1	C	11					
C2	C	21					
C3	C	31					
C4	C	41					
E1	C	12					
E2	C	22					
E3	C	32					
E4	C	42					
S1	C	51					
S2	C	52					
PB1	C	14					
PB2	C	24					
PB3	C	34					
PB4	C	44					

* CONNECT T/R TO DICTATION ATTENDANT TELEPHONE SET.
† CONNECT TO DIAL ATTENDANT PLAYBACK KEY.
‡ TERMINAL 58 IS USED IF OPTION ZO IS USED. IF OPTION ZP IS TO BE USED, TERMINAL 37 SHOULD BE USED. REFER TO SD-5E038-01, ISSUE 3B.

TABLE CF (Contd)

CROSS-CONNECTIONS FOR RECORDED TELEPHONE DICTATION TRUNK UNIT WORKSHEET

RCD TEL DIC TRK UNIT LEAD DESIG	CROSS-CONNECT			
	FROM		TO/FROM	TO
	RECORDED TELEPHONE DICTATION TRUNK UNIT		CONN BLK ___ (YELLOW)	DEMARCATION TERMINAL STRIP BLK __
	TS	TERM.		TERM.
PB5	C	54		
C	C	53		
B	C	35		
G	C	23		
SS1	C	15		
SS2	C	25		
CT	C	33		
CR	C	43		

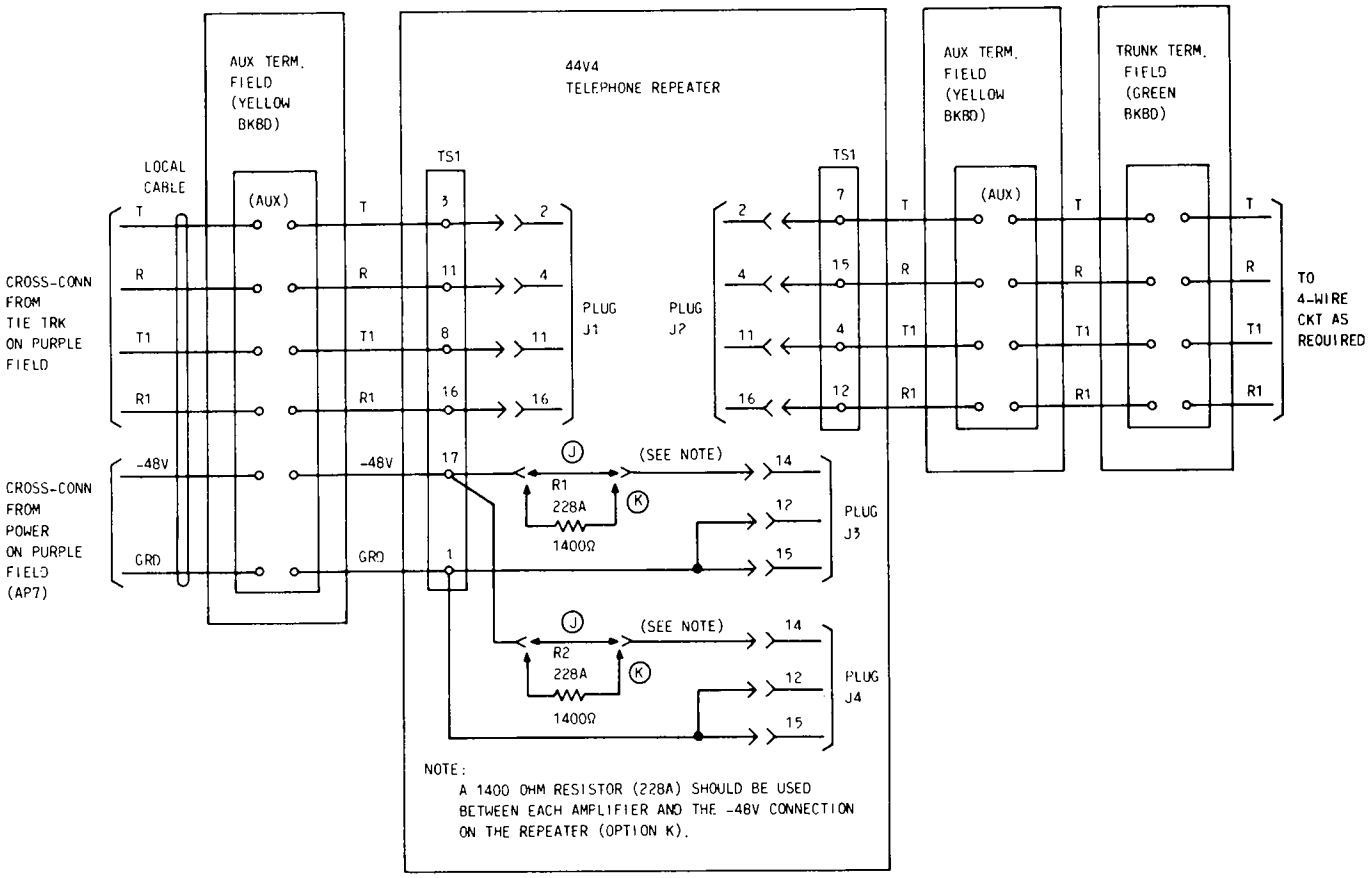


Fig. 129—44V4 Repeater Connections

(A-850273) within a plastic ivory (No. 115-50) or black (No. 115-03) housing, suitable for desk top or wall mounting with colored panels as shown in Table CI. The housing measures 165 mm (6-1/2 inches) wide, 133 mm (5-1/4 inches) deep, and 79 mm (3-1/8 inches) high. The SSI is equipped with a 2438-mm (8-foot) mounting cord terminated in an AMP connector at the set end and KS-16689, List 1, connector at the plug end. Figure 136 shows the connections for the RLTs, control, overload, and the alarms (CAS only) indications to the CAS system status indicator at the branch PBX. Figure 137 shows the optional wiring which allows for multiple alarm indications (eg, alarms to CO and CAS). Figure 138 shows the connections when the second and/or third SSI is required at the branch PBX. Figure 139 shows the connections for the first and fourteenth SSI at the main PBX. Connections for the SSIs in-between would be similar to the connections for the first display. Indications for control, overload, and major and minor alarms are not required at the main PBX. Access to the DIMENSION PBX is provided via an LC15 contact interface B. The multiple alarm connections require two 17B KTUs as shown in Fig. 138. A fill-in worksheet for the first display at a branch PBX with CAS or SSI alarms-only connections is shown in Table CJ. A worksheet for the first display at a branch PBX with multiple alarm connections to CO and CAS is shown in Table CK. A worksheet for the second or third display at a branch PBX and for any display at a main PBX is shown in Table AY.

5.196 Backup station lines associated with the CAS feature at a branch PBX can be monitored and observed for off-hook status, on-hook status, and ringing status, by the 24A8 line status indicator (LSI) (Fig. 140). The indicator bridges across the T and R leads of the monitored lines and provides a visual and audible indication of these lines at the LSI. Two LSIs (8 stations each) may be used to monitor the maximum of 16 backup stations. The LSI unit is equipped

TABLE CG

CROSS-CONNECTIONS FOR 24V4 OR 44V4 REPEATERS WORKSHEET

PBX		CROSS-CONNECT							
		TO/FROM	TO/FROM	TO		FROM		TO/FROM	TO
		CONN BLK ___	CONN BLK ___	REPEATER				CONN BLK ___	CONN BLK ___
EQUIPMENT	LEAD DESIG	(PURPLE)	(YELLOW)	24V4 TS1	44V4 TS1	24V4 TS1	44V4 TS1	(YELLOW)	(GREEN)
MOD __ CAB ___ CARR ___ SLOT ___ CIRCUIT ___ LC ___	T			7	3	3	7		
	R			19	11	15	15		
	T1			39	8	12	4		
	R1			51	16	24	12		
AUXILIARY FUSE PANEL J58879PF-1,L2	-48V			35	17				
	GRD			1	1				

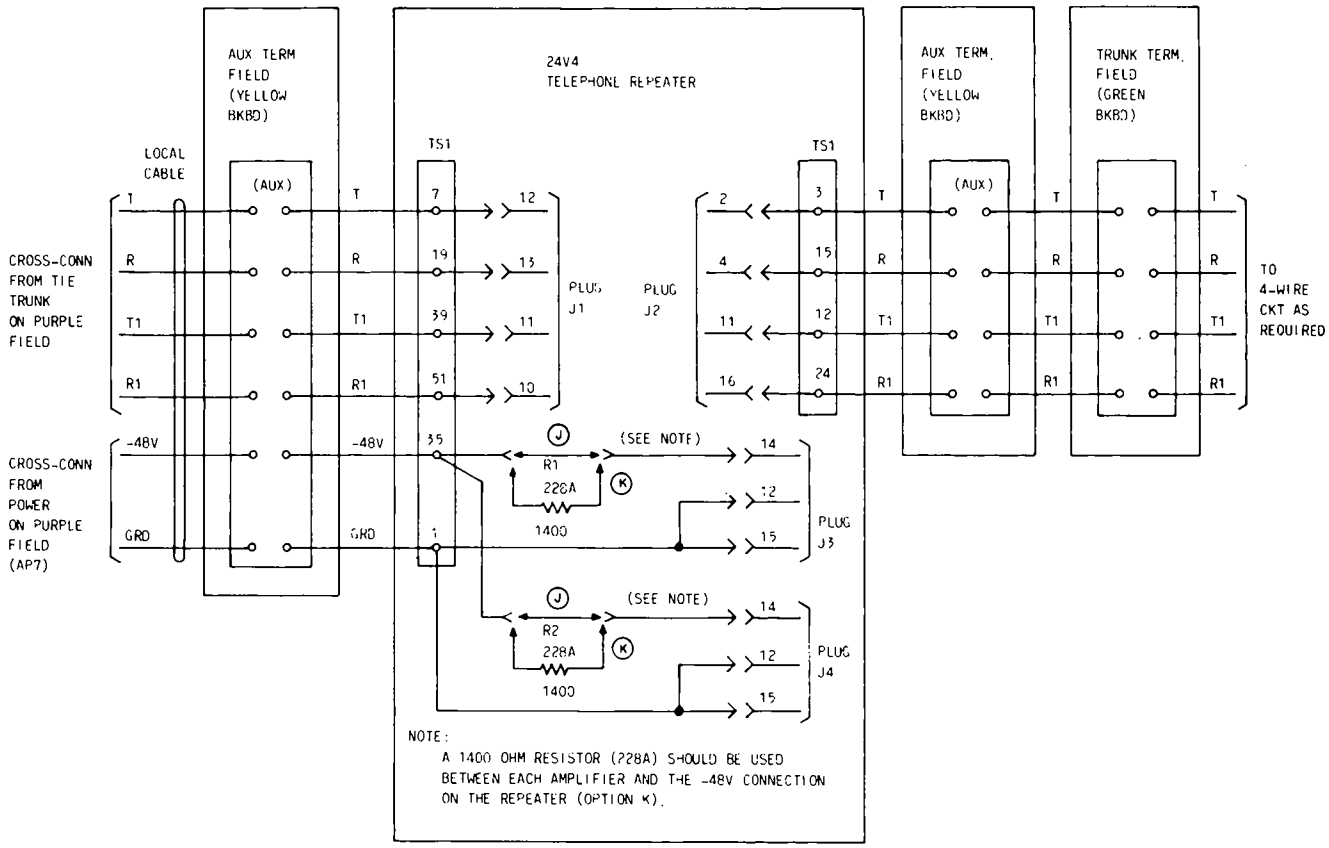


Fig. 130—24V4 Repeater Connections

with a 3048-mm (10-foot) port mounting cord terminated in a 25-pair Amphenol connector for connection to the monitored backup station lines and power transformer. Ordering information for housing color, faceplates, and rear panels is identical to the 30A8 SSI (see Table CI). The A25B connector cable to connect tips and rings of monitored lines must be ordered separately. The housing measurements are the same as the 30A8 SSI.

5.197 The monitored line status and line status indications are as follows:

- Station on-hook = LED is dark.
- Station ringing = LED flutters at 20 Hz and tone ringer sounds.
- Station off-hook = LED is steady.

Danger: A possible shock hazard is present when plugging the power transformer into ac wall outlets having metal receptacle cover.

5.198 Mounting cord terminations are shown in Fig. 140. Table CL is a fill-in worksheet for the LSI connections.

TIME-OF-DAY CLOCK BATTERY BACKUP (J58882A1, LIST 9)

5.199 The battery backup is an optional unit provided as part of the common control cabinet to insure the operation of the time-of-day clock synchronizer in case of a commercial ac power loss. When this feature is provided, the KS-20390, List 7 battery pack (part of J58882A1, List 9) is installed in the cabinet and connected via plug S2R-1 to the LC144 circuit pack in slot 32 of the basic control carrier.

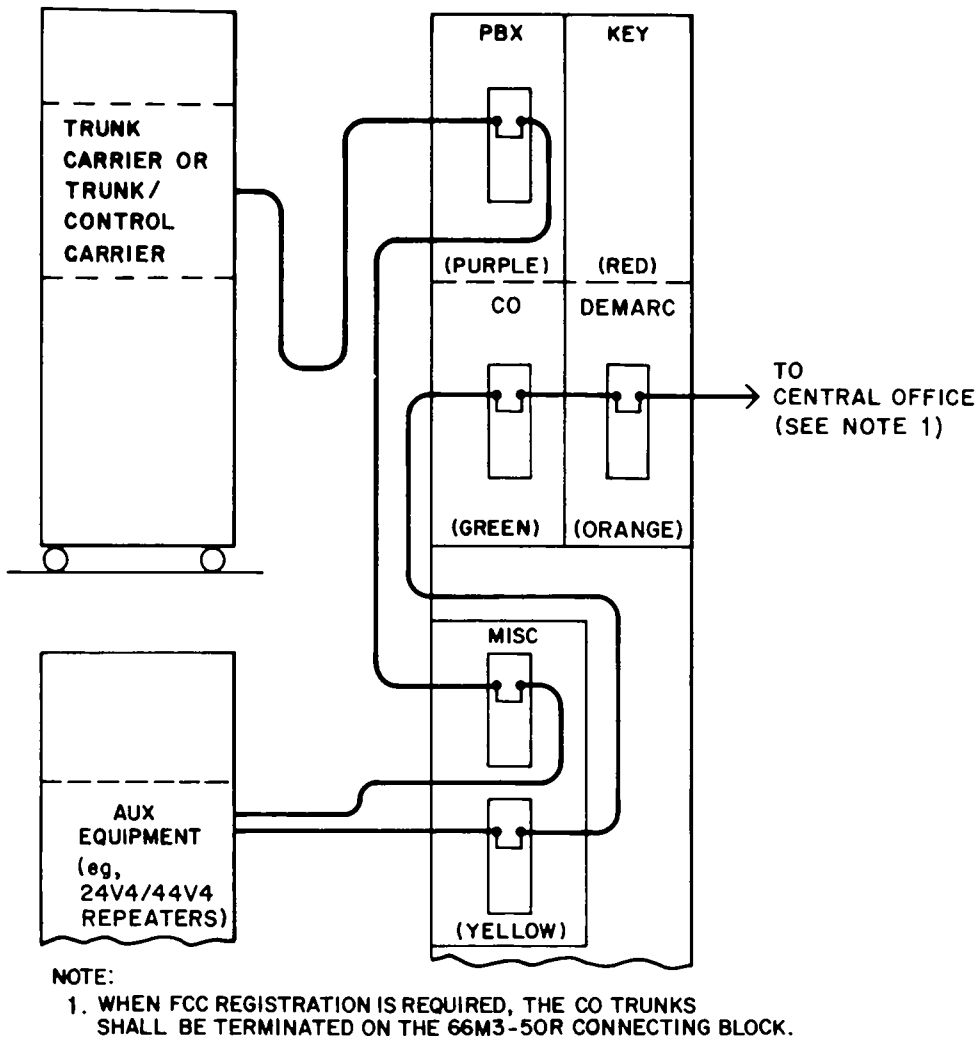


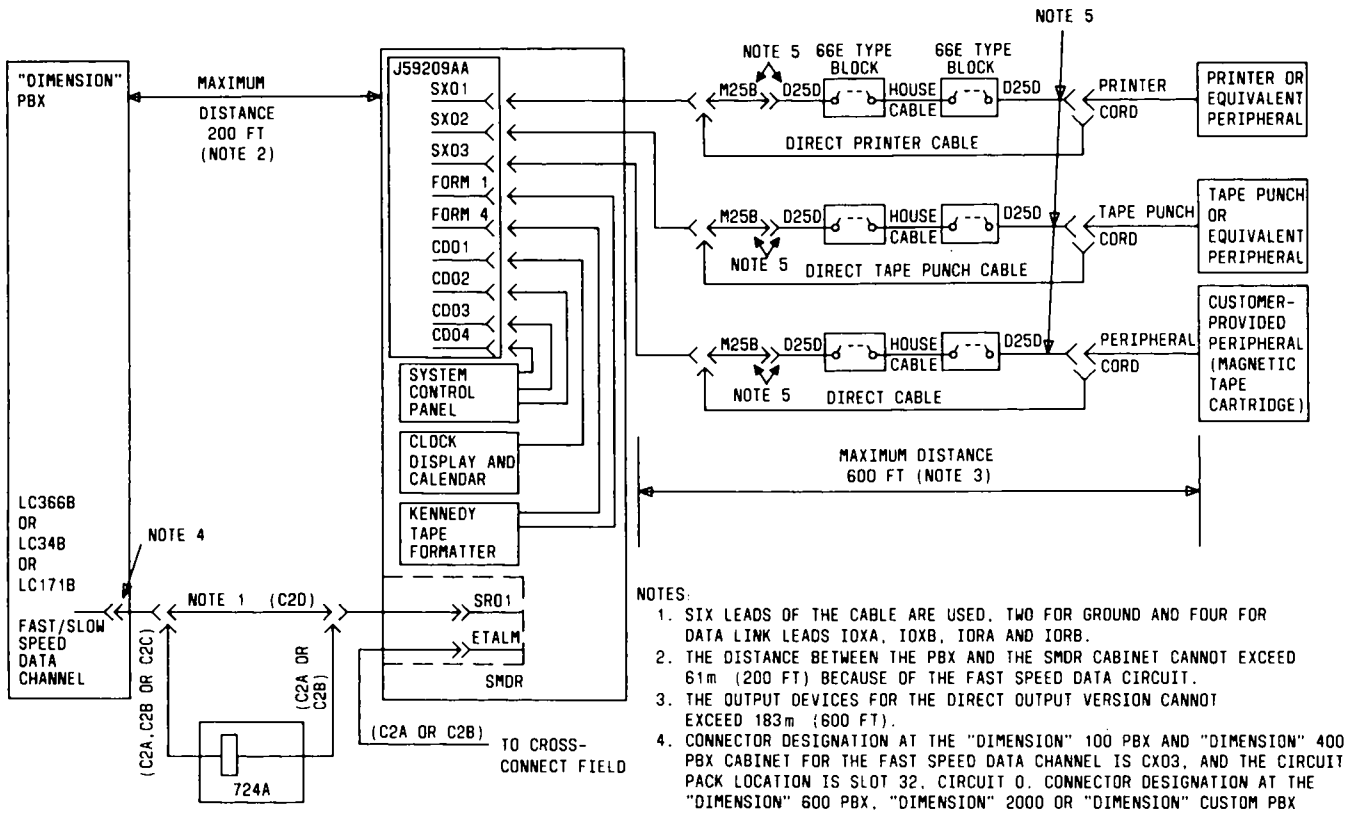
Fig. 131—CO Trunk Connected to Trunk Port Carrier Via Auxiliary Equipment and Cross-Connect Field

TRAFFIC MEASUREMENT/RMATS

5.200 The RMATS-1 is a system which provides remote access to the logic and memory of RMATS-1-equipped DIMENSION PBX systems. This capability allows certain maintenance, administrative, and traffic routines to be performed remotely.

5.201 All feature packages are compatible with the remote maintenance, administration, and traffic system (RMATS). Traffic studies and structures may be flexibly administered in the PBX and automatically polled by the RMATS-1 central facility.

5.202 In order to function with the RMATS-1 central facility, the DIMENSION 2000 or Custom PBX must be equipped with an LC171B circuit pack (with slow-speed option/300 baud) and one low-speed automatic answering data set. An optional telephone set may be used if voice communication over the data link is required. The LC171B (data control) and LC172B (data transfer) circuit packs must be installed (in place of LC34B) in the basic control carrier slots 31 and 30, respectively, or installed in the control-growth carrier slots 31/35 and 30 (Fig. 141). Option blocks on the LC171B allows the selection of data channel speeds and/or data control rates. An option block on the LC172B must be set,



NOTES:
1. SIX LEADS OF THE CABLE ARE USED, TWO FOR GROUND AND FOUR FOR DATA LINK LEADS IOXA, IOXB, IORA AND IORB.
2. THE DISTANCE BETWEEN THE PBX AND THE SMDR CABINET CANNOT EXCEED 61m (200 FT) BECAUSE OF THE FAST SPEED DATA CIRCUIT.
3. THE OUTPUT DEVICES FOR THE DIRECT OUTPUT VERSION CANNOT EXCEED 183m (600 FT).
4. CONNECTOR DESIGNATION AT THE "DIMENSION" 100 PBX AND "DIMENSION" 400 PBX CABINET FOR THE FAST SPEED DATA CHANNEL IS CX03, AND THE CIRCUIT PACK LOCATION IS SLOT 32, CIRCUIT 0. CONNECTOR DESIGNATION AT THE "DIMENSION" 600 PBX, "DIMENSION" 2000 OR "DIMENSION" CUSTOM PBX CONTROL CABINET FOR THE FAST SPEED DATA CHANNEL IS BX07, AND THE CIRCUIT PACK LOCATION IS SLOT 31, CIRCUIT 0.
5. THE LENGTH OF M25B IS 3048 mm (10 FT), D25D IS 1676 mm (5.5 FT). THE M25B CORD IS EQUIPPED WITH A KS-19088 L-2 MALE CONNECTOR ON EACH END. THE D25D CORD IS EQUIPPED WITH A KS-19087 L-2 FEMALE CONNECTOR AND A KS-16689 L-1 MALE PLUG.

Fig. 132—Wiring Schemes for SMDR Connections

depending on what processor the circuit pack is installed. Additional details on the circuit pack options are outlined in Part 6.

5.203 The data set associated with the RMATS feature is powered directly from a commercial 117-Vac 60-Hz outlet.

5.204 When non-RMATS polling is conducted with an Alston 820 poller, or equivalent, the PBX will dump raw data upon receipt of a break character. Any terminal that can send the break character can receive the raw data. Line feed and spacing control is provided by the PBX with the raw data. To provide the data, an LC34B must be installed in slot 31 of the basic control carrier. Circuit *1* of this location is dedicated to traffic measurements and is available via the BX08(MD) connector on the carrier. When the BX08 connector is not provided, the circuit is available via the BX01 connector at the cross-connect field. The optional DIP socket on the LC34B must be wired for fast-speed data transmission. (Refer to dual-speed data channel in Part 6.) Refer to Fig. 142 for the interconnections of the traffic measurement equipment.

Note: This polling arrangement is not available with the control growth carrier.

TRUNK ANSWER FROM ANY STATION (TAAS)

5.205 The TAAS feature routes all incoming calls normally directed to the PBX attendant to a common alerting signal (bell, chime, horn, lamp, or station line ringer) on customer premises when the night station is activated. These calls can then be answered by any station user in the system who dials a special code from a nonrestricted station.

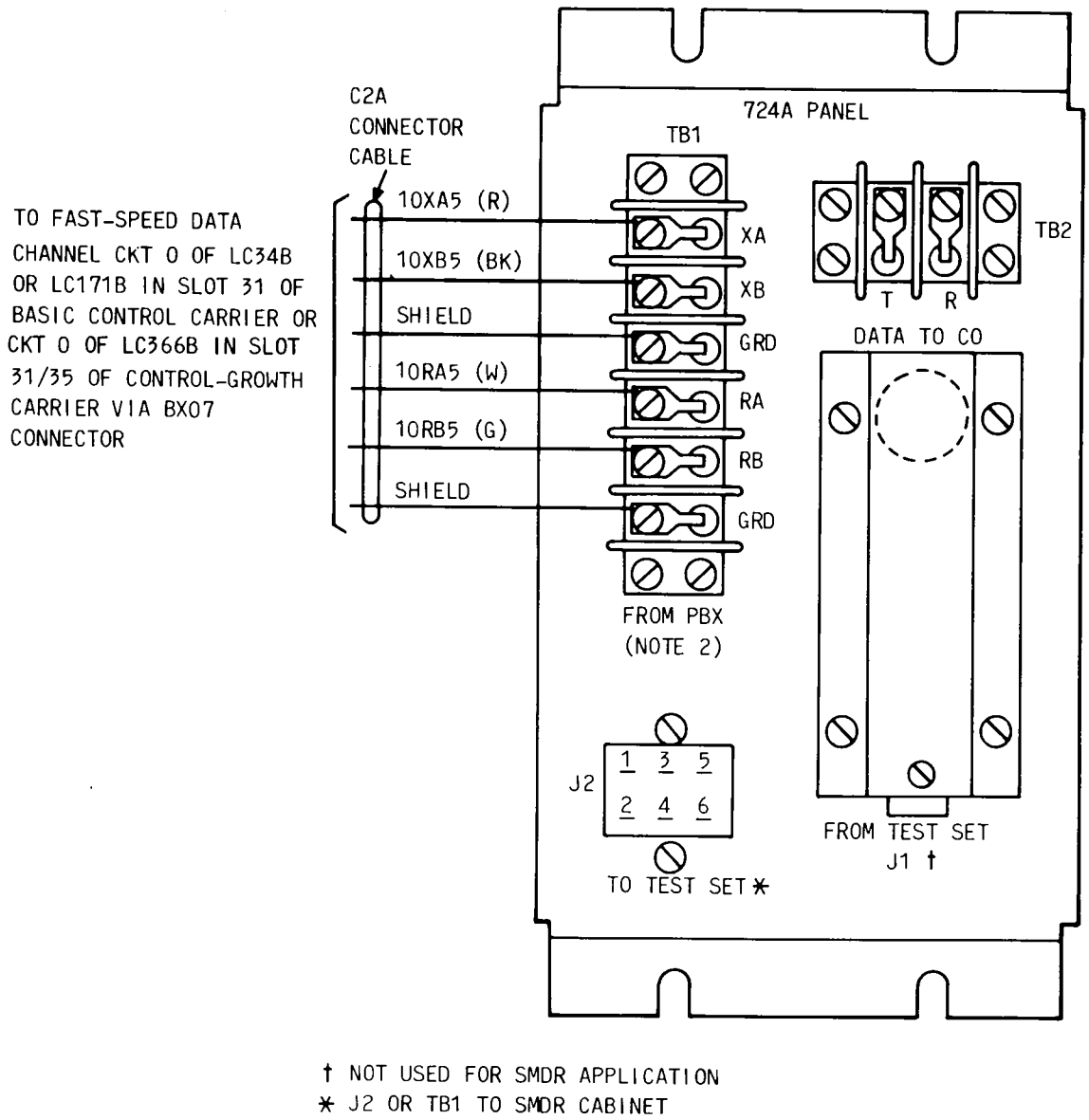
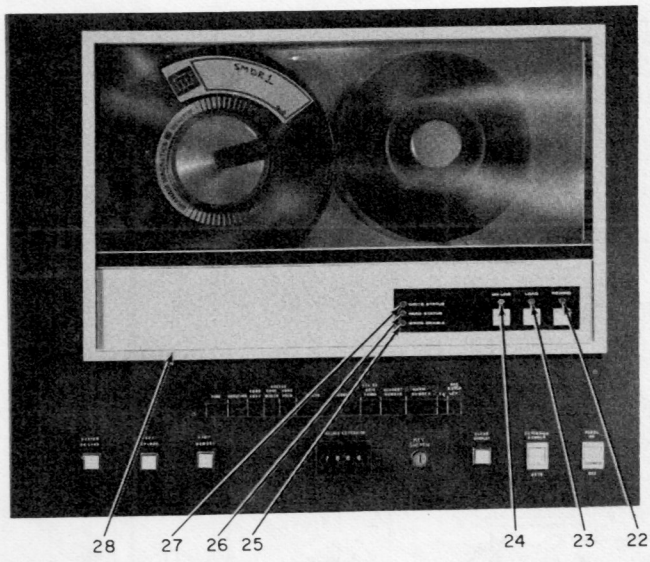


Fig. 133—DIMENSION PBX—SMDR Reconnections at the 724A Panel

5.206 A single line port on an LC02B circuit pack must be designated for the feature by the MAAP. The alerting signal may be connected directly to the line circuit tip and ring outputs (option T on Fig. 143); or, if the line circuit capacity of the LC02B is exceeded, an isolating circuit must be added. This is shown as option V on Fig. 143. When other than a high impedance ac-coupled night ringer such as C4A is used, or the limits of Table CM is exceeded, the slave relay configuration (413A KTU) should be used. Line circuit LC02B working limits determine the use of the V option (Fig. 143) using the 413A KTU for isolation.

Adding audible signals to the T and R leads after initial installation may cause the ringing limitation to be exceeded.

5.207 The 413A KTU plugs into one of the four connectors on the 642A panel. Connections to the 413A KTU are made via a connecting block quadrant



LEGEND:
22. REWIND BUTTON AND LAMP
23. LOAD BUTTON AND LAMP
24. ON LINE BUTTON AND LAMP
25. WRITE ENABLE LAMP
26. READ STATUS LAMP
27. WRITE STATUS LAMP
28. DUST COVER

Fig. 134—Type II SMDR System Control Panel

on the panel. The quadrant should correspond to the connector into which the 413A KTU is plugged. Refer to Section 463-110-100 for information on alerting signal equipment, Section 518-215-403 for information on the 413A KTU, and Section 518-215-419 for information on the 642A panel. A blank fill-in worksheet for TAAS connections is provided on Table CN.

UNIFORM CALL DISTRIBUTION (UCD) TRAFFIC OVERFLOW INDICATOR

5.208 The UCD feature allows incoming CO, FX, 800 Service, and PBX station calls to be terminated directly from the central office to the most idle of a prearranged group of stations without attendant assistance. Incoming calls to the UCD groups are first directed to a queue for that group. One lamp indication per group may be used when the number of calls in queue exceeds a predetermined number. The level of the calls in queue that trigger the overflow lamp is administered via software. An LC15 circuit pack can drive up to eight lamps. A convenient method of providing this signal is via a "beehive" lamp (Fig. 144). One circuit is required per each UCD traffic overload group. Selection of the type lamp and value of resistor R1 must be engineered based on loop range requirements. The M1 type lamp is for short-loop (25 ohm) range, and the J1 type lamp is for long-loop (option XG = 2500 ohms, option 69 = 1500 ohms) range. Both M1 and J1 type lamps mount in 15-, 17-, or 18-type indicators. The RSP- in Fig. 144 is a J58879BA-L15 or J58882BA-L25 resistor assembly which must be provided when cable runs are exposed (option 69). The value of the contact protection resistor R1 is determined by loop-range impedance. Refer to Table CO for R1 values. A 185A contact protection network is also used with the 17B KTU. Install the 17B KTU at the lamp indicator location. The maximum loop range between the J1-type lamp and the 28A1 power unit is 15 ohms. The required equipment per loop is listed in Table CP. A fill-in Table AW is provided for the UCD traffic overload indicator connections (short loop) and Table AX for indicator connections (long loop).

VISUALLY IMPAIRED ATTENDANT SERVICE (VIAS)

5.209 A visually-impaired attendant can operate a specifically-configured D-type console (coded 05AF and 02AF). The console includes the following (Fig. 145):

- A light-sensitive probe (990A) to detect and identify active LEDs on the console
- A grooved faceplate guide (6A) to facilitate the use of the probe
- A 2A translator console adjunct which provides coded ringing rates to identify the incoming call type (LDN, station, recall, etc). The translator also transmits an audio tone to the handset to identify an active LED as detected by the light probe.

5.210 The 2A translator adjunct is connected to the attendant console via the KS-16689 connector assembly in the console base. The translator monitors the six incoming call indicator (ICI) positions on the console and provides a logic output to control audible ringing in the attendant's headset. The six ring codes will inform the visually-impaired attendant which of the ICI lamps are active. If the console is alphanumeric, the ICI information will also appear in the alphanumeric field. Two other new tones, call waiting and timed reminders, have been added to this service.

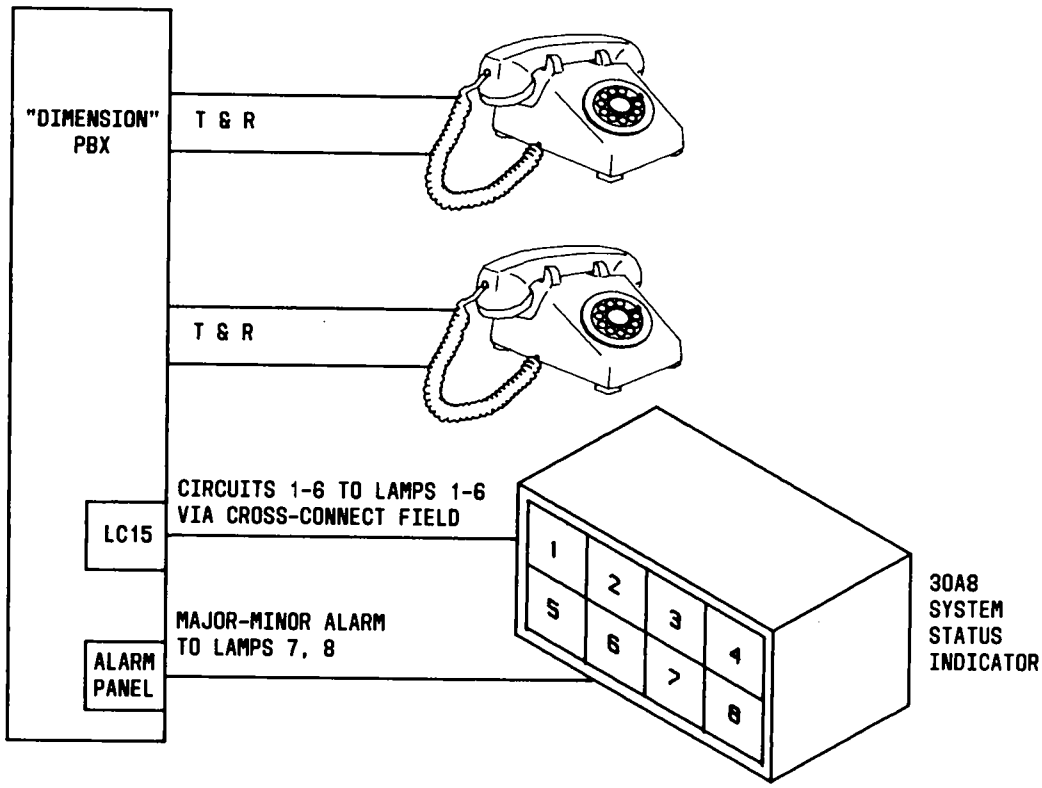


Fig. 135—30A8 System Status Indicator

▶VOICE STORE AND FORWARD (VSF) INTERFACE

5.211 This feature allows interface of the PBX with a computer having voice store and forward capabilities. These capabilities consist of the following:

- Ability to digitally record a calling party's message for intended recepient(s)
- Ability to alert the intended recepient(s) of a VSF message
- Ability to deliver the VSF message audibly to the intended recepient.

5.212 Figure 146 illustrates the Voice Store and Forward Interface. Voice paths from the PBX are via LCO2D circuit packs. A RJ415 jack is used as the interface point between PBX wiring from the LCO2D and the VSF equipment. The Customer Interface for Property Management System (CIPMS) feature is used as the mechanism by which a VSF subscriber is alerted concerning the presence of a message. The PIC shown can be no more than 300 meters (1000 feet) from the VSF equipment without range extension. A maximum of four range extensions of 750 meters (250 feet) each are permitted. The status inquiry time-out interval used for CIPMS between the PBX and VSF equipment is 6 minutes instead of the 10-second time-out used for the Property Management System Interface to the PBX.

5.213 Message Waiting and Station Message Waiting cannot be administered when the VSF Interface is administered. Therefore, the message waiting button on the attendant console is disabled. Also, in a hospitality environment having Energy Communications Service, VSF Message Waiting, indication has precedence over the Energy Communications Signaling Unit (ECSU) when both use the same station which has OCCUPIED status. If the status is VACANT, the ECSU has precedence.

5.214 The attendant console may be used to restrict incoming/outgoing, incoming, and station-to-station calls to the VSF equipment via controlled total, controlled termination, and controlled station-to-station restrictions, respectively.◀

TABLE CH

SYSTEM STATUS INDICATOR LAMP FUNCTIONS

	LAMP NUMBER	LAMP FUNCTION	LAMP STATUS
SSI #1	1	Status of RLT No. 1	Dark = Idle RLT
	2	Status of RLT No. 2	Steady = Busy RLT — seized at both ends, or associated backup station in use when in backup mode.
	3	Status of RLT No. 3	
	4	Status of RLT No. 4	30 IPM Wink = maintenance busy
	5	Indicates either normal or backup mode of operation for RLTs	Steady = Normal Operation 30 IPM Wink = Backup mode or TAAS
	6	Traffic Overload Indicator	Dark = OK Steady = Queue threshold exceeded
	7	Major Alarm	Dark = OK
	8	Minor Alarm	Steady = Alarm
SSI #2	9	Status of RLT No. 5	Dark = Idle RLT
	•	•	Steady = Busy RLT—seized at both ends, or associated backup station in use when in backup mode.
	•	•	
	•	•	30 IPM Wink = maintenance busy
	•	•	
	•	•	
	•	•	
	16	Status of RLT No. 12	
SSI #3	17	Status of RLT No. 13	Dark = Idle RLT or RLT in backup mode
	•	•	Steady = Busy RLT—seized at both ends, or associated backup station in use when in backup mode.
	•	•	
	20	Status of RLT No. 16	30 IPM Wink = maintenance busy
	21 •	Unused	Unused
	•		
	24		

TABLE CI

CROSS-CONNECTIONS FOR SYSTEM STATUS INDICATOR (SSI) WORKSHEET

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT				TO		
				TO/FROM	TO/FROM	TO/FROM	TO/FROM	TO		
				CONN BLK	CONN BLK	CONN BLK	CONN BLK	30A8 SSI NO.___		
				_ _ _ _ _ XO _	_ _ _ _ LGX02	_ _ _ _ AP7	___	COLOR CODE A25B	MTG CORD LEAD DESIG	MTG CORD P1 CONN TERM.
EQUIPMENT	CKT NO.			(PURPLE)			(YELLOW)			
LC15 CONTACT INTERFACE B	1	CIG0					11	R-BL	RL1 BSY	31
	2	CIG1					1	W-BL	RL2 BSY	26
	3	CIG2					8	BR-W	RL3 BSY	4
MODULE _ _	4	CIG3					4	O-W	RL4 BSY	2
CABINET ___	5	CIG4					12	BL-R	CONTL	6
	6	CIG5					15	R-G	OVRLD	33
CARRIER ___	1	CID0								
SLOT ___	2	CID1								
	3	CID2								
	4	CID3								
	5	CID4								
	6	CID5								
LINE GROUP CONTROL CARRIER		-48V	V-S		49					
MODULE___ CABINET___ CARRIER___		GRD	S-V		50					
							2	BL-W	GRD	1
							16	G-R	GRD	8
ALARM PANEL		MJ	BL-W			2	6	G-W	MJ	3
		MN	O-W			4	5	W-G	MN	28
		MJR	W-BL			1				
		MNR	W-O			3				

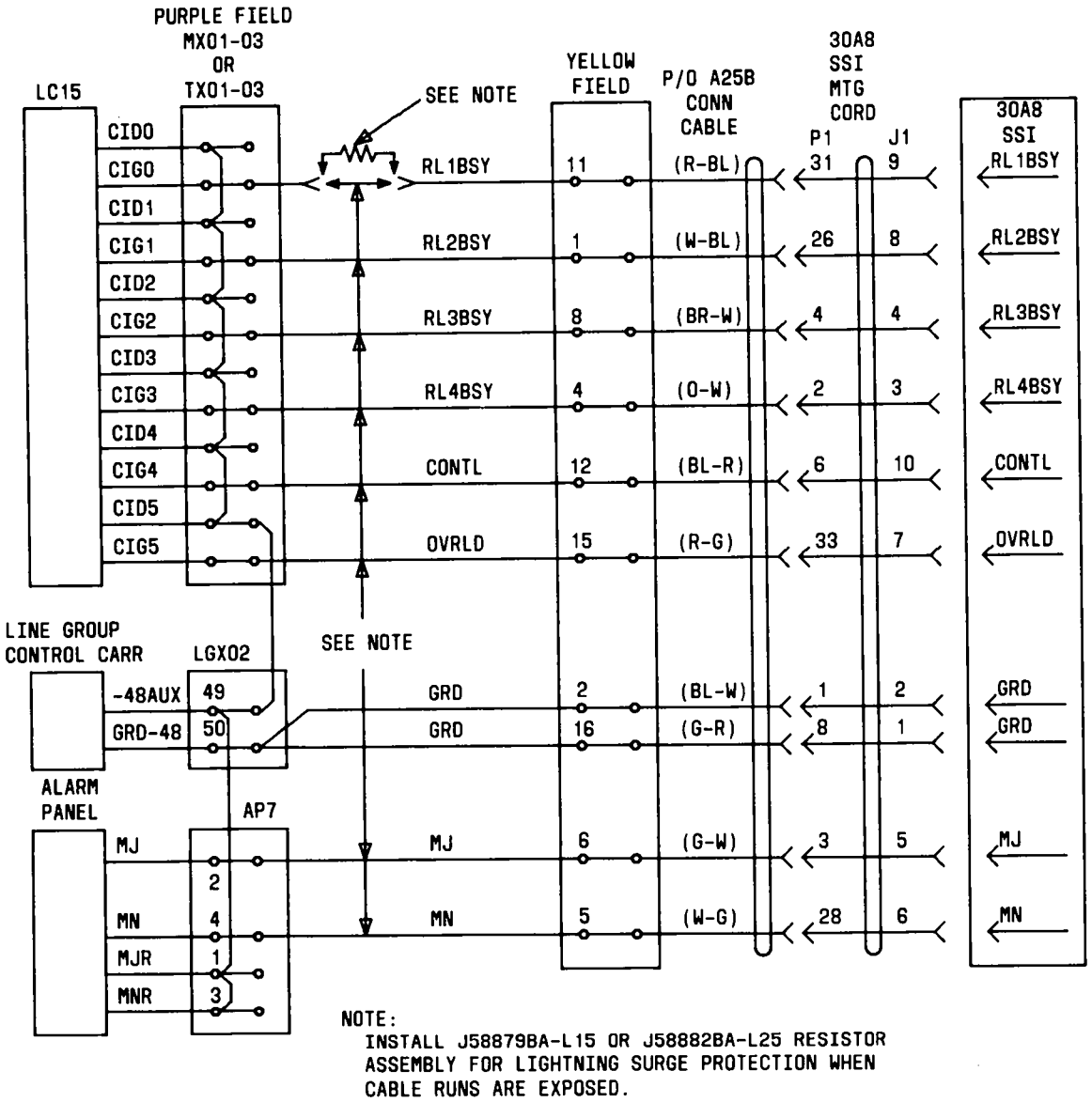


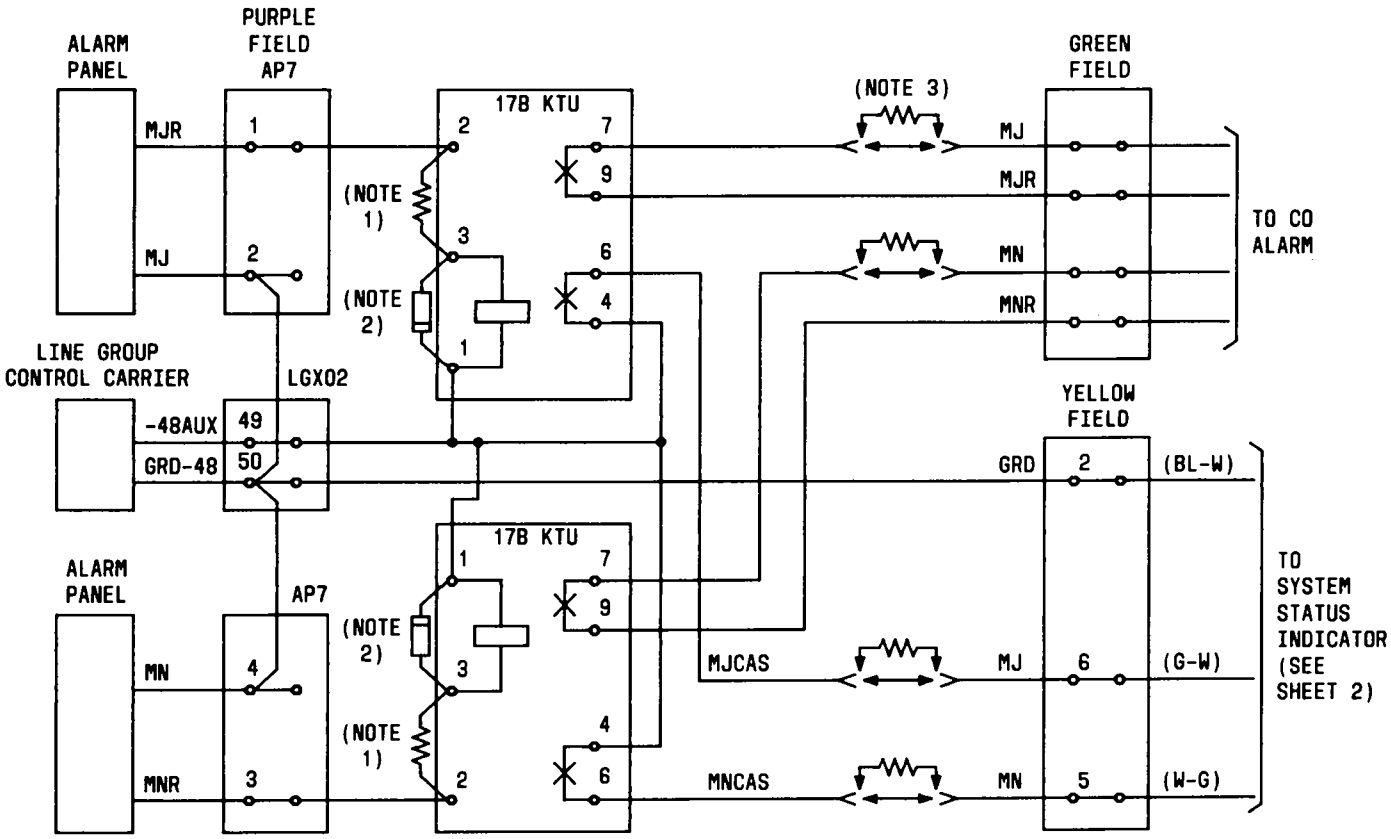
Fig. 136—30A8 System Status Indicator (Alarms to CAS Only)

6. STANDARD AND OPTIONAL COMPONENTS

CIRCUIT PACKS (STANDARD)

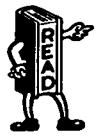
6.01 The PBX is shipped complete with circuit packs installed. However, engineering a DIMENSION PBX installation requires knowledge of the circuit pack locations in the various equipment cabinets (Fig. 10 through 16). The circuit pack location information is provided in Section 554-111-100.

6.02 Plug-in printed wiring boards contain the circuitry to control operation of the switching system. Special marking is used to designate circuit pack vintages which must be chosen for installation in specific systems. This marking is a lettered suffix forming a part of the circuit pack code number. When a circuit pack code specified includes a lettered suffix, only that circuit pack code (or a later version indicated by a higher lettered suffix) should be used.



NOTES:
1. INSTALL 2.37KΩ, 3W RESISTORS.
2. INSTALL 185A OR EQUIVALENT CONTACT PROTECTION NETWORKS.
3. INSTALL J58879BA-L15, OR J58882BA-L25 RESISTOR ASSEMBLY FOR LIGHTNING SURGE PROTECTION WHEN RUNS ARE EXPOSED.

Fig. 137—30A8 System Status Indicator (Alarms to CO and CAS)

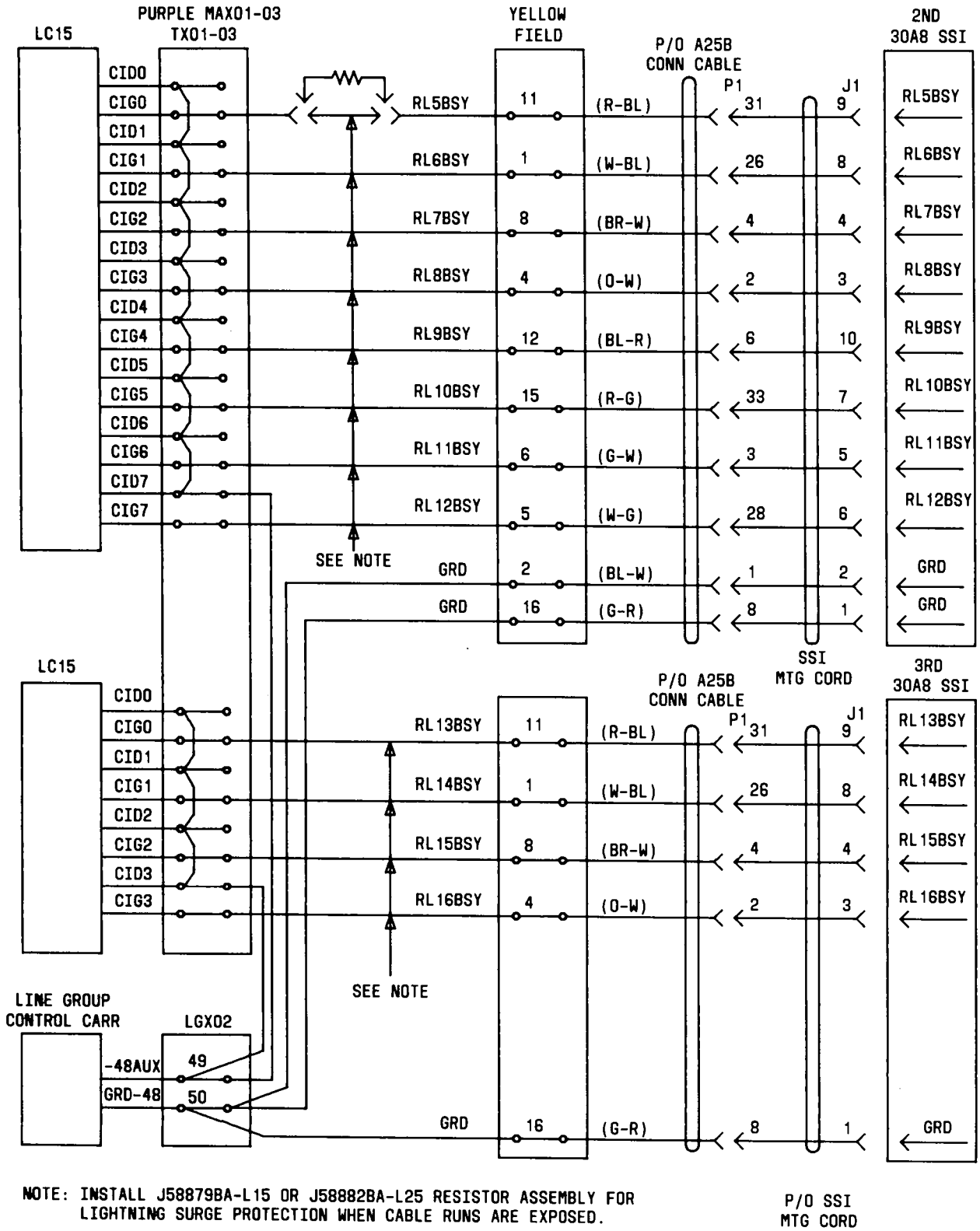


An LC31 circuit pack should not be used if an LC31B circuit pack is specified, but an LC31C can be used if either an LC31 or LC31B circuit pack is specified.

CIRCUIT PACKS (OPTIONAL)

6.03 In addition to the standard circuit packs required for normal system operation, certain of the following optional circuit packs may be required to implement various features:

- Automatic Number Identification (ANI) Signal Distribution Circuit (LC32B)
- ANI Transmitter Circuit (LC31C)
- Attendant Conference Circuit (LC06B)
- Attendant Interface (LC45 or LC45B)
- Auxiliary Trunk Interface Circuit (LC13B)
- Contact Interface B (LC15)
- Data Control (LC171B) and Data Transfer (LC172B) Circuits
- ⧫Data Interface Circuit (LC566)⧫
- ⧫Data Port Circuit (LC567)⧫



NOTE: INSTALL J58879BA-L15 OR J58882BA-L25 RESISTOR ASSEMBLY FOR LIGHTNING SURGE PROTECTION WHEN CABLE RUNS ARE EXPOSED.

Fig. 138—30A8 System Status Indicator (Second and Third Displays at Branch PBX)

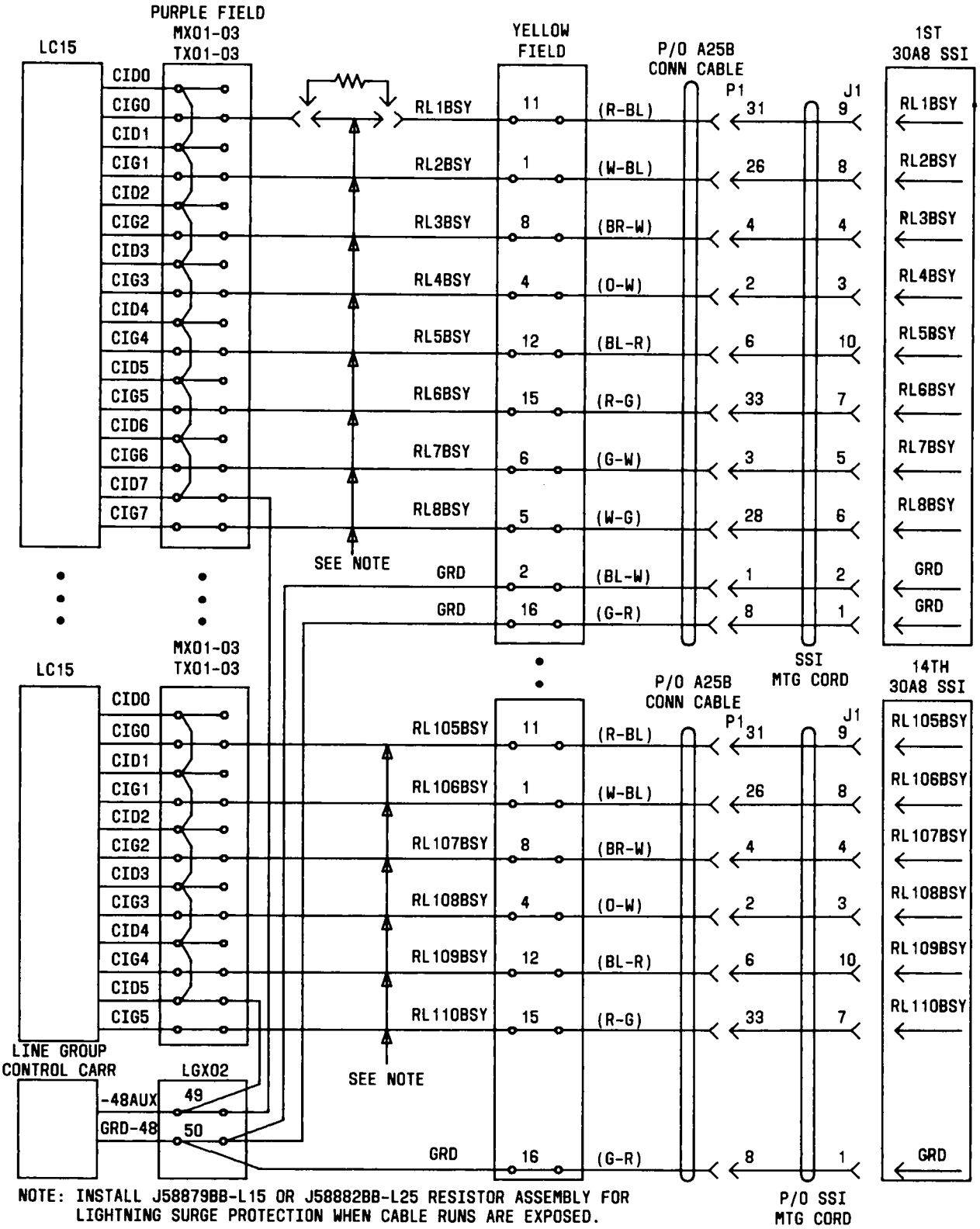


Fig. 139—30A8 System Status Indicator (First and Fourteenth Displays at Main PBX)

TABLE CJ

CROSS-CONNECTIONS FOR SYSTEM STATUS INDICATOR AND CO ALARMS WORKSHEET

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT												
				TO/FROM	TO/FROM	TO/FROM	TO		FROM		TO/FROM	TO/FROM	TO		TO	
															30A8 SSI NO.___	
				CONN BLK	CONN BLK	CONN BLK	1ST 17B KTU	2ND 17B KTU	1ST 17B KTU	2ND 17B KTU	CONN BLK	CONN BLK	CO ALARMS		MTG CORD	
EQUIPMENT	CKT NO.			_ XO _	LGX02 (PURPLE)	AP7					(GREEN)	(YELLOW)	LEAD DESIG	TERM.	COLOR CODE	LEAD DESIG	P1 CONN TERM.
LC15 CONTACT INTERFACE B	1	CIG0										11			R-BL	RL1 BSY	31
	2	CIG1										1			W-BL	RL2 BSY	26
	3	CIG2										8			BR-W	RL3 BSY	4
MODULE _ _	4	CIG3										4			O-W	RL4 BSY	2
CABINET ___	5	CIG4										12			BL-R	CONTL	6
	6	CIG5										15			R-G	OVRLD	33
CARRIER ___	1	CID0															
SLOT ___	2	CID1															
	3	CID2															
	4	CID3															
	5	CID4															
	6	CID5															
LINE GROUP CONTROL CARRIER		-48 AUX	V-S		49		1		7				MJ				
MODULE___							4		9				MJR				
CABINET___								1		7			MN				
CARRIER___								4		9			MNR				
		GRD -48	S-V		50							2			BL-W	GRD	1
												16			G-R	GRD	8
ALARM PANEL		MJR	W-BL			1	2		6			6			G-W	MJ	3
		MNR	W-O			3		2		6		5			W-G	MN	28
		MJ	BL-W			2											
		MN	O-W			4											

TABLE CK

PANEL COLORS OF 30A8 SYSTEM STATUS INDICATOR

REAR PANELS		FACEPLATES	
COLOR	PART NO.	COLOR	PART NO.
Avocado	840597579	Black *	840597652
Gold	840597587	Avocado	840597660
Orange	840597595	Gold	840597678
Brown	840597603	Orange	840597686
Red	840597611	Brown	840597694
Blue	840597629	Red	840597702
Teak	840597637	Blue	840597710
Walnut	840597645		

* Teak or walnut rear panel is used with black faceplate.

- Dual-Speed Serial Data Channel (LC34B and LC366B)
- I/O and Memory Control (LC133 or LC133B)
- Loop Signaling Interface Trunk Circuit (LC361)
- Message Register and Energy Control Power Monitor Interface Circuit (LC16B)
- Message Waiting Line Circuit (LC03B)
- Network Clock (LC121B)
- Remote Access Trunk Circuit (LC07) (MD)
- Signal Distribution Circuit (Hotel/Motel) (LC41B)
- Tie Trunk Circuit (LC11D)
- Time-of-Day Clock (LC144)
- Tone Plant C (LC17B)
- TOUCH-TONE Dialing Sender/Dial Tone Detector (LC12)
- Transmission Test Line Circuit Pack (LC145)
- Voice Announcement Circuit (LC190).
- ⧫Voice/Data Link Circuit (LC568).⧫

A. Automatic Number Identification (ANI) Signal Distribution Circuit (LC32B)

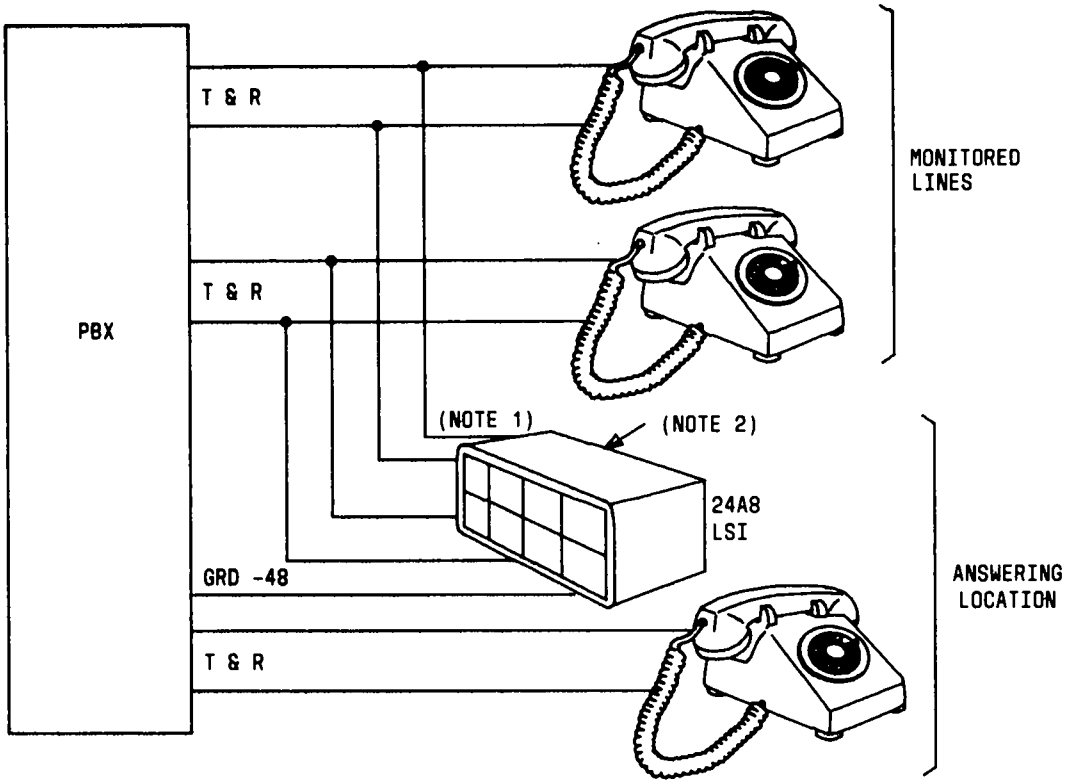
6.04 Each LC32B contains two ANI data channels. One LC32B is located in slot 21 of each module control and trunk port carrier, as required. The LC32B is associated with the automatic identified outward dialing (AIOD) feature. After a call is registered in the ANI control and register circuit (LC31C), the ANI data channel encodes the station identification and transmits it to the central office. The ANI data channel has a maximum range of 1025 ohms.

B. ANI Transmitter Circuit (LC31C)

6.05 One LC31C is required per system and is located in the basic control or control growth carrier. The LC31C provides the ANI control and register circuit. The circuit stores the identity of the calling DIMENSION PBX party until it is transmitted to the central office.

C. Attendant Conference Circuit (LC06B)

6.06 Each LC06B contains one attendant conference circuit and is located in the trunk port carrier and/or the module control and trunk port carrier. This circuit enables the attendant to establish a multiparty conference of up to six conferees in addition to the attendant. This circuit will accommodate a maximum of six stations or four stations and two trunk conferences by connecting lines or trunks to conference circuit ports. Separate time slots and



NOTES:

1. MOUNTING CORD (#840597322) HAS TWO SPADE LUGS TO TERMINATE ON KS-21239, L6 TRANSFORMER. DO NOT PLUG INTO 120 VAC RECEPTACLE HAVING A METAL COVER.

2.

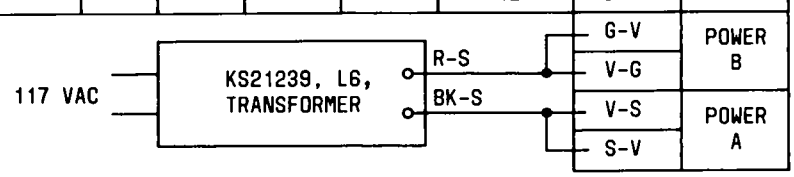
CORD TERMINATIONS		
COND COLOR	DESIG	A25B CONN CABLE
W-BL	T1	26
BL-W	R1	1
W-O	T2	27
O-W	R2	2
W-G	T3	28
G-W	R3	3
W-BR	T4	29
BR-W	R4	4
W-S	T5	30
S-W	R5	5
R-BL	T6	31
BL-R	R6	6
R-O	T7	32
O-R	R7	7
R-G	T8	33
G-R	R8	8
V-BL	GRD	46
BL-V	GRD	21

Fig. 140—24A8 Line Status Indicator

TABLE CL

CROSS-CONNECTIONS FOR LINE STATUS INDICATOR (LSI) WORKSHEET

PBX			COLOR CODE	CROSS-CONNECT				
				TO/FROM		TO/FROM	TO	
				CONN BLK (PURPLE)		CONN BLK ___	24A8 LSI MOUNTING CORD	
EQUIPMENT LC02B/LC03C	EXT NO.	LEAD DESIG		CONN	TERM.	(YELLOW)	COLOR CODE	DESIG
MOD_ _ CAB___ CARR___		T		_ XO _		1	W-BL	T1
SLOT___ CIRCUIT___		R				2	BL-W	R1
MOD_ _ CAB___ CARR___		T		_ XO _		3	W-O	T2
SLOT___ CIRCUIT___		R				4	O-W	R2
MOD_ _ CAB___ CARR___		T		_ XO _		5	W-G	T3
SLOT___ CIRCUIT___		R				6	G-W	R3
MOD_ _ CAB___ CARR___		T		_ XO _		7	W-BR	T4
SLOT___ CIRCUIT___		R				8	BR-W	R4
MOD_ _ CAB___ CARR___		T		_ XO _		9	W-S	T5
SLOT___ CIRCUIT___		R				10	S-W	R5
MOD_ _ CAB___ CARR___		T		_ XO _		11	R-BL	T6
SLOT___ CIRCUIT___		R				12	BL-R	R6
MOD_ _ CAB___ CARR___		T		_ XO _		13	R-O	T7
SLOT___ CIRCUIT___		R				14	O-R	R7
MOD_ _ CAB___ CARR___		T		_ XO _		15	R-G	T8
SLOT___ CIRCUIT___		R				16	G-R	R8
LINE GROUP CONTROL CARR MOD_ _ CAB___ CARR___		GRD -48	S-V	LGX02	50	41	V-BL	GRD
						42	BL-V	GRD



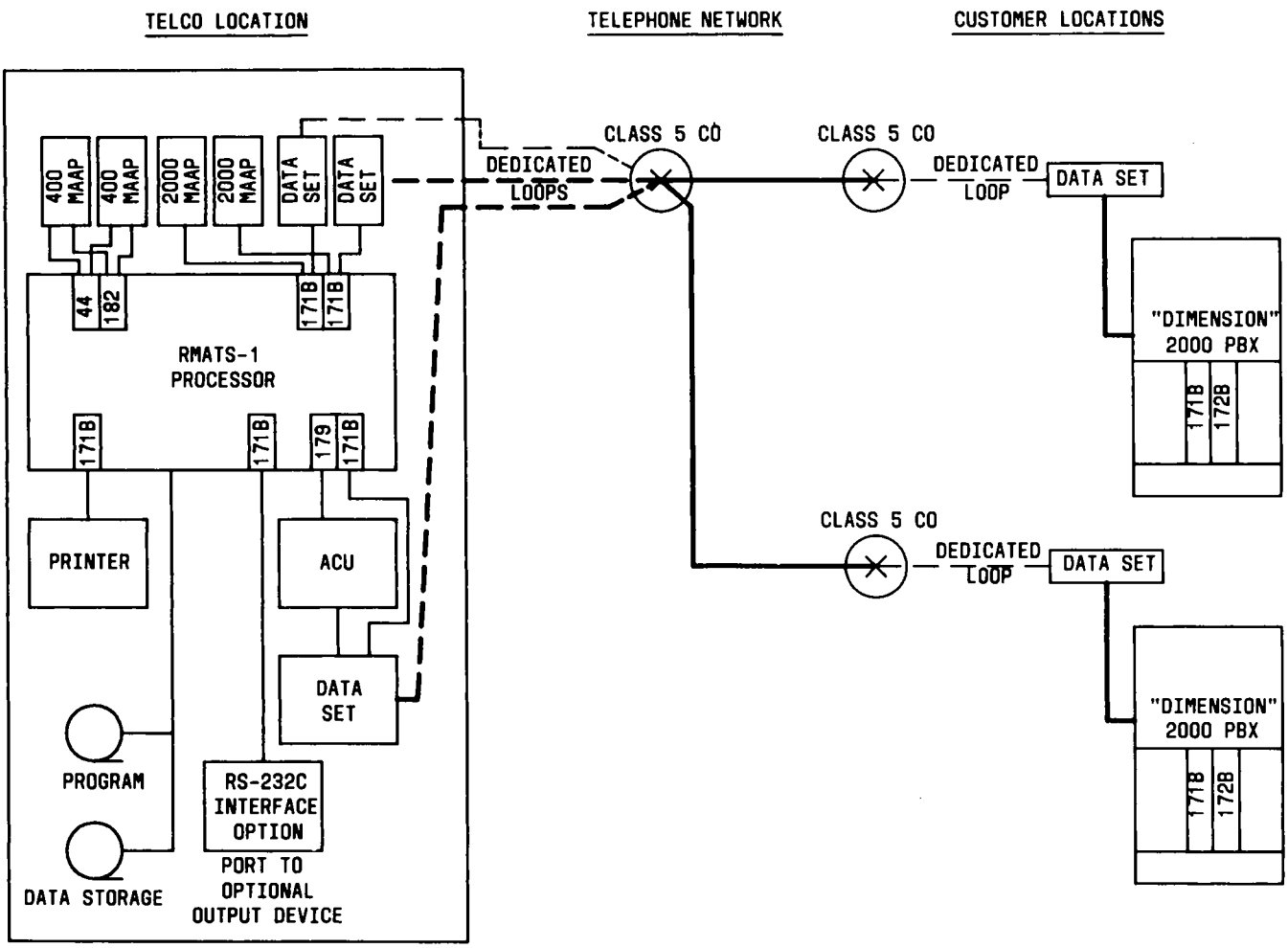


Fig. 141—RMATS—DIMENSION 2000 or Custom PBX—Hardware Interface

conference circuit ports are required for each party in conference. At each port, the conference circuit adds the signals received at all other ports to generate the return signal. Reflections created by the interfacing line and trunk circuit hybrids are canceled by inverting the phase of a selected set of port-to-port transmission paths.

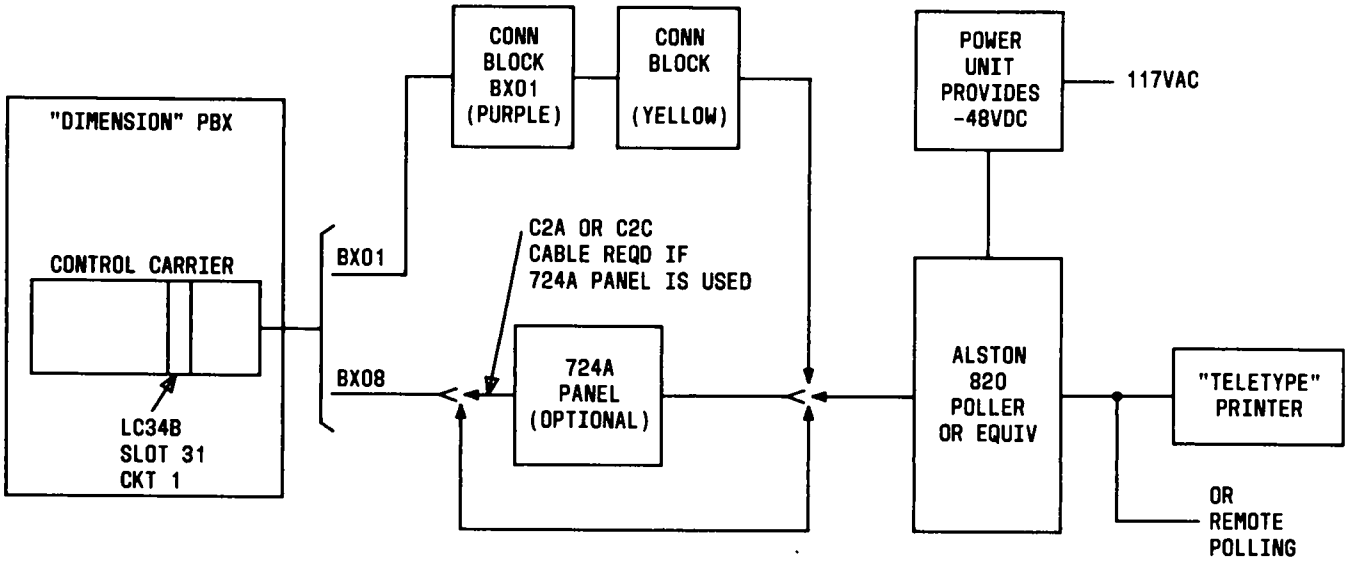
D. Attendant Interface (LC45 or LC45B)

6.07 The LC45 provides the voice path interface between an attendant console and the time division bus. Each LC45 contains two separate 4-wire transmission circuits and may be installed in slots 7 and 8 of a line group control carrier. The LC45B is introduced to reduce transmission noise in the attendant console circuit. The LC45B is used when the attendant console is equipped with a 478B plug containing no shunt register. An LC45 must be used when the attendant console is equipped with a 478A plug containing a shunt resistor.

E. Auxiliary Trunk Interface Circuit (LC13B)

6.08 Each LC13B contains two circuits, and each module control or trunk port carrier can accommodate up to eight LC13B circuit packs. The LC13B provides circuitry to cut through the talking path to customer-provided equipment and to ground the sleeve lead for controlling supervision between the connected equipment. The LC13B circuit packs provide an interface with the following customer equipment:

- Paging trunk circuits
- Recorded announcement circuits



NOTE:
WHEN BX08(MD) IS NOT PROVIDED, SLOT 31, CIRCUIT 1 IS AVAILABLE VIA BX01 ON THE CROSS-CONNECT FIELD

Fig. 142—Interconnections of Traffic Measurement Units

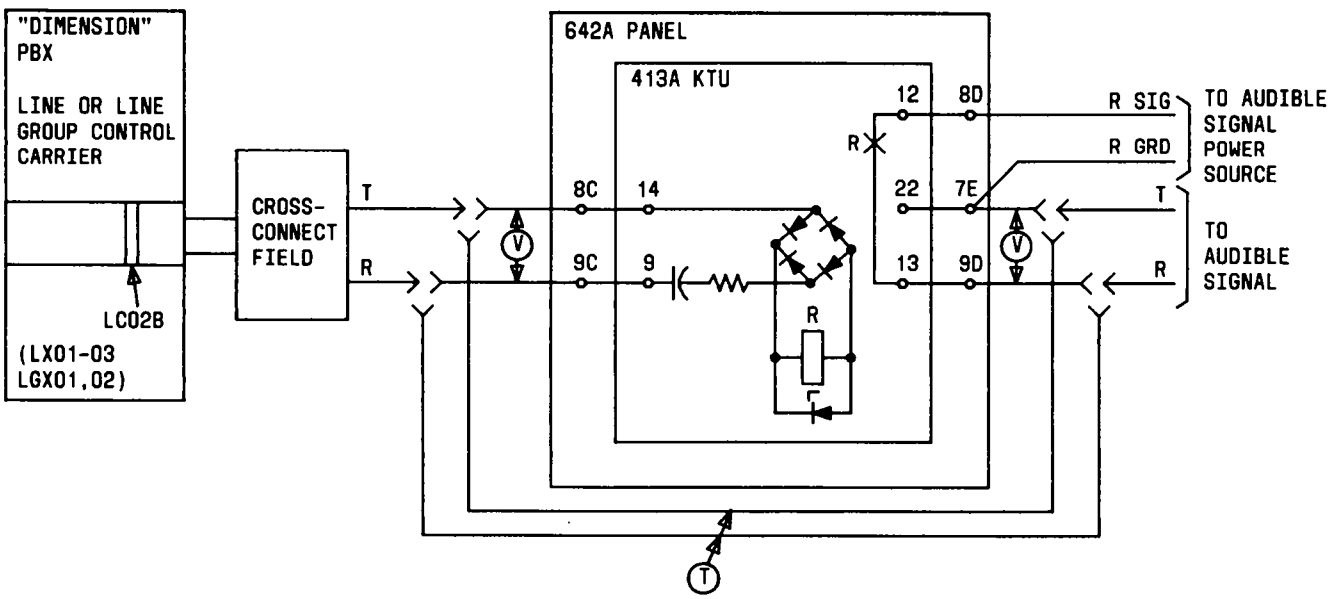


Fig. 143—Trunk Answer From Any Station (TAAS)—Equipment Arrangement

TABLE CM

MAXIMUM LOOP RESISTANCE ASSOCIATED WITH C4A-TYPE IMPEDANCE RINGERS

MAXIMUM NO. OF C4A-TYPE RINGERS PER LINE	MAXIMUM LOOP RESISTANCE EXCLUDING STATION APPARATUS
5	300 ohms
4	500 ohms
3	950 ohms
2	
1	

- Recorded telephone dictation trunk circuits
- Music on hold access circuits
- ♦Malicious Call Tracing♦
- Automatic wakeup service circuits.

6.09 The LC13B circuit pack contains a DIP switch (S1) to provide optional circuit arrangements for directional audio transmission and signaling. Switch position combinations for four features are shown in Fig. 147.

F. Contact Interface B (LC15)

6.10 The contact interface B circuit (LC15) is used when the 30A8 system status indicator (SSI) is installed for the centralized attendant service (CAS) feature (Fig. 135). One LC15 circuit pack containing eight circuits can be installed in slots 02 through 09 in the trunk port carrier. In the module control and trunk port carrier, LC15 may be located in slots 6, 7, 8, 10, 12, 15, 17, and 19. Six of the circuits are actually used, with major and minor alarms routed from the alarm panel, with the first SSI at the branch PBX. All eight circuits may be used with the other SSIs at the branch and main PBX locations. The LC15 circuit permits visual monitoring of the CAS equipment via the SSI. Interconnection (via the cross-connect field) is shown in Fig. 135. By using a 24A8 line status indicator (LSI) associated with an LC15, the busy, idle, and ringing status of each backup station line associated with the CAS feature can be monitored (Fig. 140).

6.11 When the uniform call distribution (UCD) feature and/or direct department calling (DDC) features are provided in addition to CAS, a second LC15 circuit pack may be required to furnish a queue warning indication. One lamp per UCD/DDC group may be used to indicate when the number of calls in the queue exceeds a predetermined number (traffic overload). This level (1 through 15) is administered in software. The overflow indication which is generated via a contact closure on LC15 triggers a "beehive" indicator lamp from a dc voltage source via the circuit pack. By using a 24A8 line status indicator (LSI), the busy, idle, and ringing status of each UCD/DDC line can be monitored. A maximum of 28 UCD/DDC groups can be administered with the UCD groups limited to 12. Four UCD groups containing 40 stations, and eight UCD groups and all DDC groups containing 24 stations are possible. However, only 15 UCD/DDC groups can be provided with queue warning indicator lamps.

G. Data Control (LC171B) and Data Transfer (LC172B) Circuits

6.12 The remote maintenance, administration, and traffic system (RMATS) and customer administration center system (CACS) require that LC171B and LC172B be installed in slots 31 and 30, respectively, of the basic control carrier or slots 31/35 and 30, respectively, of the control growth carrier. Circuit pack LC172B provides a data channel for the MAAP and also selection of processors via a software switch for RMATS. Separate data channels for RMATS and SMDR are furnished by LC171B. The RMATS/CACS is connected directly to the common control carrier via a connectorized cable. The LC171B circuit pack with speed control option blocks is shown in Fig. 148. When two processors are used, a software switch is made every 23 hours. If MAAP or RMATS/CACS activity is being performed at this time, the software will delay the switch to prevent data loss.

6.13 Circuit pack LC172B contains a movable shorting block in a dual in-line socket which provides an optional circuit arrangement depending upon the common control in which the circuit pack is installed. Refer to Fig. 149 for the shorting block arrangement on the LC172B circuit pack.

TABLE CN

CROSS-CONNECTIONS FOR TRUNK ANSWER FROM ANY STATION (TAAS) WORKSHEET

PBX		CROSS-CONNECT				
		TO/FROM	TO/FROM	TO	FROM	TO
		CONN BLK _ _ _ _ _ _ XO _	CONN BLK ___ (NOTE 1)	642A PANEL (E/W 413A KTU) (NOTE 2) CONNECTOR QUADRANT ____		AUDIBLE SIGNAL
LC02B LINE CIRCUIT	LEAD DESIG	(PURPLE)	(YELLOW)	QUAD ROW AND COLUMN	QUAD ROW AND COLUMN	
MODULE _ _ CABINET ___ CARRIER ___ SLOT ___ CIRCUIT ___	T			8C	7E	
	R			9C	9D	
AUDIBLE SIGNAL POWER SOURCE		R SIG		8D		
		RGRD		7E		

NOTES:
1. CONNECT T AND R DIRECTLY TO AUDIBLE SIGNAL WHEN RANGE OF LC02B IS NOT EXCEEDED
2. CONNECTOR QUADRANT MUST CORRESPOND TO PANEL CONNECTOR EQUIPPED WITH 413A KTU

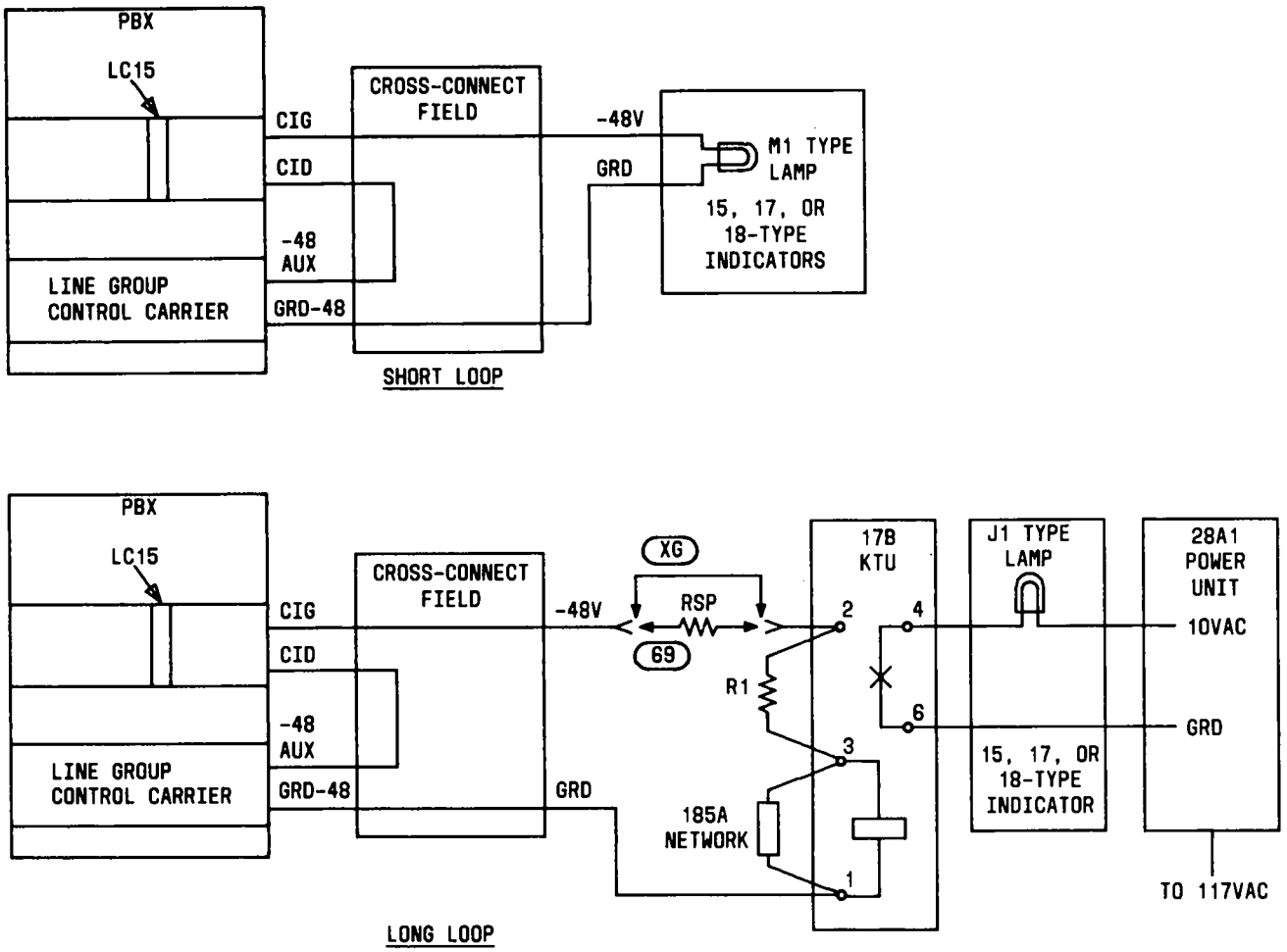


Fig. 144—UCD/DDC Traffic Overload Indicators

6.14 The RMATS-1/CACS interface equipment required for a DIMENSION PBX includes the following:

- One 113D/113DR, List 1 or List 2 data set
- One 47-type data mounting.

The data set and data mounting should be no more than 45.7 cable meters (150 cable feet) from the PBX. The location should permit connection of the interface cable to the processor as well as 117-Vac 60-Hz power for the data set. The RMATS/CACS switch selects the appropriate system.

H. ▶Data-Interface Circuit (LC566)

6.15 The data-interface circuit pack, LC566, contains one port circuit and converts RS-232C signals to a format suitable for data port transmission. This circuit pack also contains circuitry compatible with the RS-366, automatic calling unit (ACU) convention, and option switches to select the mode of operation.

6.16 The data-interface circuit pack can be mounted in three different configurations. Each of these mounting arrangements is locally powered using 110 volts ac, at approximately 15 watts. The three mounting units are:

- Stand-Alone Housing for Data-Interface, J58893

TABLE CO

VALUE OF KS-20289 RESISTOR R1 PER LOOP RANGE

LOOP RANGE (OHMS)	NONEXPOSED CABLE	EXPOSED CABLE
26	2.37K	1.33K
500	1.62K	619
1000	1.0K	0
1500	511	0
2000	0	0

- Stand-Alone Housing for Multimodule Data-Interface, J58893A
- Multi-Rack Mount for Data-Interface, J58892.

6.17 The data port circuit pack, LC567, contains two data port circuits and transfers the data-interface signals into a format that is compatible with the pulse amplitude modulation (PAM) network. This circuit pack can function in either the line or trunk mode and contains option switches for mode selection. The data port is the interfaced with the data-interface circuit via a 4-wire DIMENSION PBX data link (which consists of two tip and ring pairs). The data link provides sufficient band width to carry data signals at up to 9600 baud, and the control data necessary for internal system operation. Each data port contains synchronization circuitry, tone-detection circuitry, timing recovery circuitry, and buffer circuits. The LC566 is located within 50 feet of

TABLE CP

EQUIPMENT REQUIRED PER LOOP FOR UCD TRAFFIC OVERLOAD INDICATOR

ARRANGEMENT	EQUIPMENT REQUIRED PER UCD GROUP
Short Loop 0-25 Ohms	One M1-Type Lamp One 15-, 17-, or 18-Type Indicator One LC15 Circuit Pack
Long Loop Nonexposed Cable 26-2500 Ohms	One J1-Type Lamp One 15-, 17-, or 18-Type Indicator One LC15 Circuit Pack One 17B KTU One 28A1 Power Unit One 185A Contact Protector Network One KS-20289 Type Resistor (R1)
Long Loop Exposed Cable 26-1500 Ohms	Same as Long-Loop Nonexposed Cable One J58882BA-L25 Resistor Assembly (RSP)

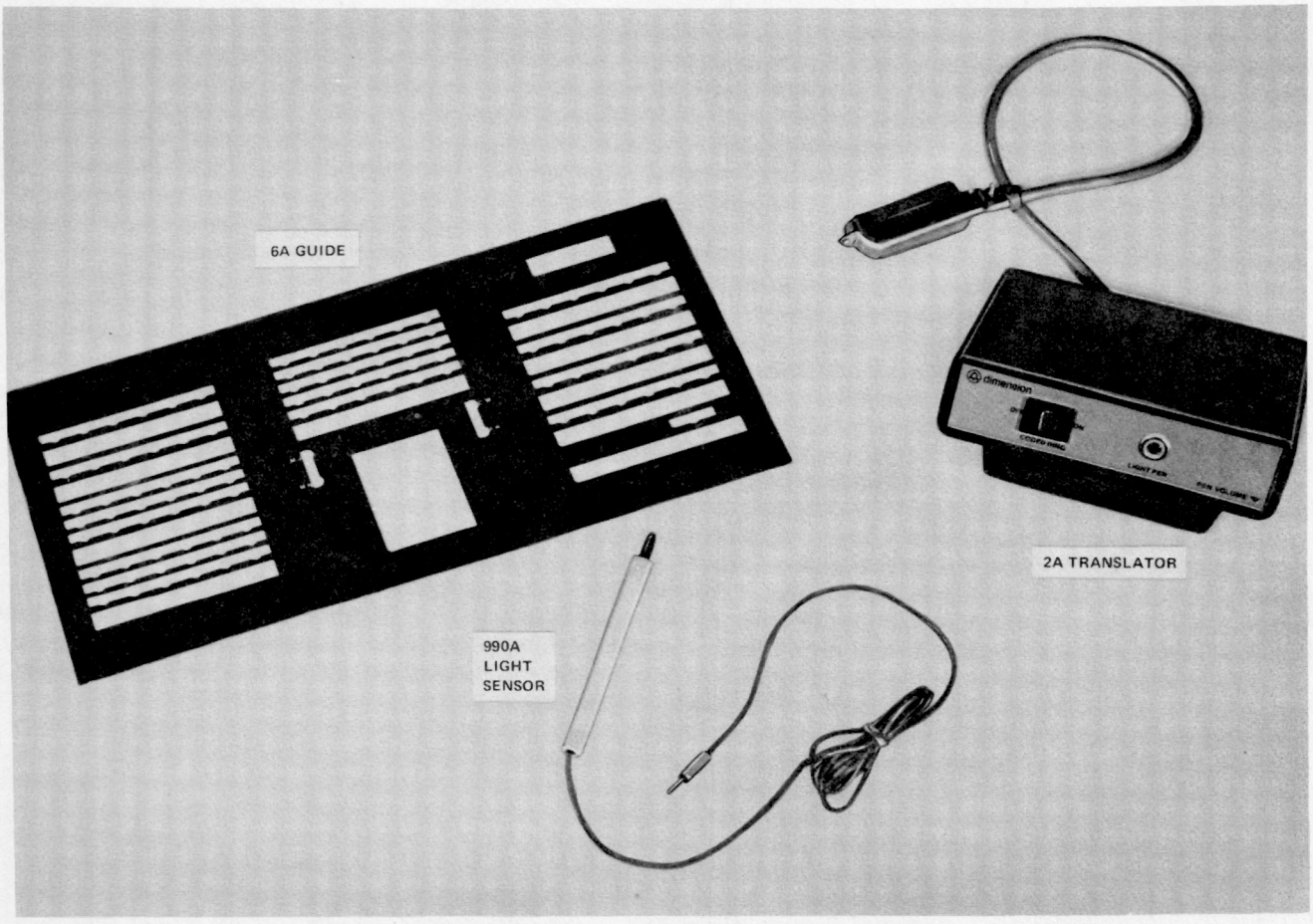


Fig. 145—Visually Impaired Attendant Service—Console Equipment

the customer terminal. There is one LC566 per terminal. For more information on the Data Interface Unit, see Section 554-010-155.◀

I. ▶Data Port Circuit (LC567)

6.18 The data-port circuit pack converts information from the data-interface circuit into a format that is compatible with the PAM network and visa versa. This circuit pack has two data ports and may be used in either a line or trunk carrier. The LC567 replaces the LC02 on the line side and the LC361 on the trunk side. When the data-port circuit is used in a line carrier, it takes on the characteristics of a rotary analog line. When it is used in a trunk carrier, it takes on the characteristics of an automatic-out, dial-repeating-in tie trunk. The line or trunk mode of the data port is set via option switches. The data port is the interface between the DIMENSION PBX and the 4-wire DIMENSION PBX data link. The data link supplies sufficient bandwidth to carry data at up to 9600 bits per second and to carry the data necessary for internal system operation. When a data-interface circuit is not used with a port or if power is lost at a data interface circuit that is connected to a port, the given data port is in an on-hook state.

6.19 Synchronization circuitry, tone-detector circuitry, timing recovery, and buffer circuits are incorporated in the data port.

6.20 One LC567 is required per terminal interface with the PBX. The line port carrier (J58879AC) may have a maximum of four LC567 circuit packs in dedicated slots 02, 06, 11, and 15. The trunk port carrier (J58879BA) may have a maximum

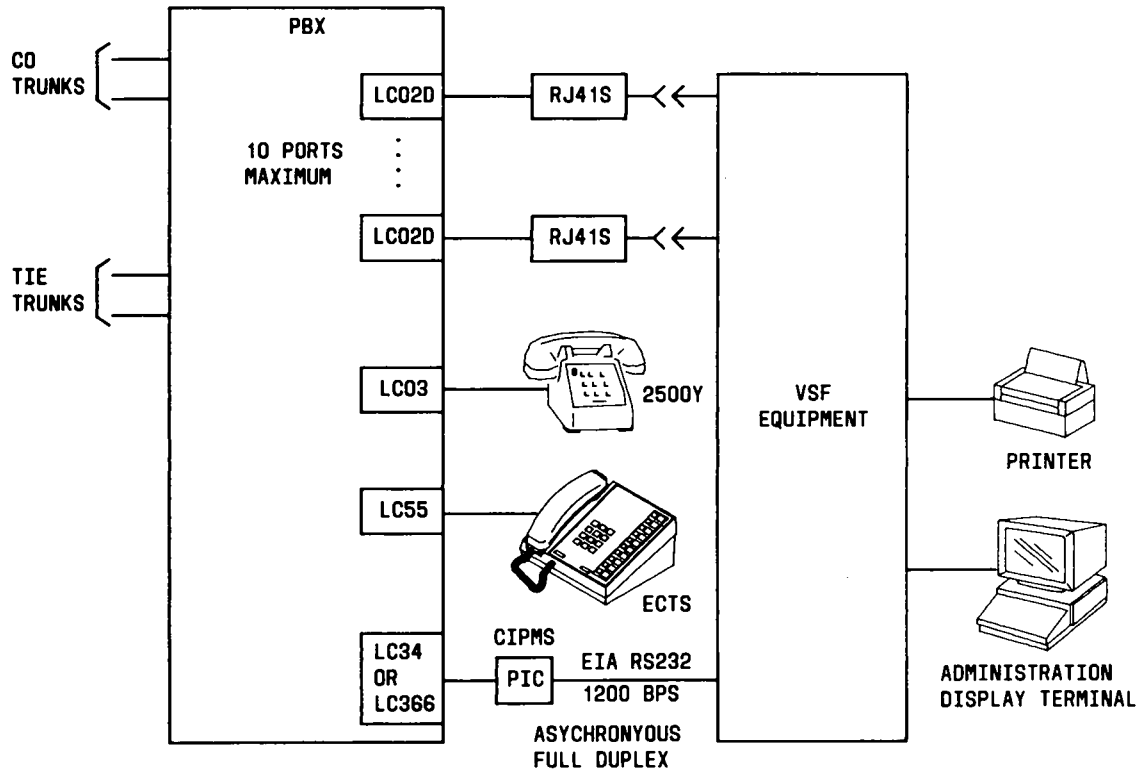


Fig. 146—Voice Store and Forward Interface

of two LC567 circuit packs in dedicated slots 02 and 06. The LC567 circuit pack is a Mother/Daughter board configuration which requires two slot positions, ie, an LC567 inserted in slot 02 will actually fill slots 02 and 03. Due to power limitations, the number of LC567s allowed in cabinets is limited as follows:

- Module Control Cabinet 12 max
- Line Cabinet 14 max.

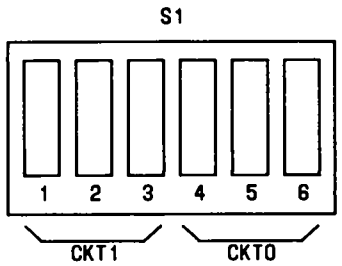
If an LC567 is provided in a Trunk Port Carrier J58879BA, there may not be any LC09 DID trunks on the same +5 volt fuse.

J. Dual-Speed Serial Data Channel (LC34B and LC366B)

LC34B Circuit Pack

6.21 The two dual-speed serial data channels of LC34B are designated circuits ***0*** and ***1***. However, these circuits are referenced as ***A*** and ***B*** on the circuit pack test point identification table located on the front panel. For example, circuit ***0*** is labeled ***A,*** and circuit ***1*** is labeled ***B***. Circuit 1 (B) of LC34B in the basic control carrier in slot 31 is dedicated to traffic measurements and must be arranged for slow-speed data transmission. Circuit 0 is for SMDR and should be set to fast speed. The RMATS circuit packs LC171B and LC172B may be used in these slots in place of LC34B.

6.22 Attendant console data channels (LC34B) should be used sequentially beginning with slot 32 of the basic control carrier and slot 20 of the growth control carrier. Up to a maximum of 76 data channels can be used in the DIMENSION 2000 and DIMENSION Custom PBXs. Circuits 0 and 1 of LC34B in slot 32 could be associated with consoles 1 and 2. Circuits 0 and 1 of LC34B in slot 33 could be associated with consoles 3 and 4 (when NCOSS LSU is not provided). When the MAAP is in use, circuit 0 of LC34B in slot 30 is used for the MAAP interface. All LC34B circuits used for consoles must be arranged for slow-speed data transmission. Figure 150 illustrates how to arrange the circuits for fast or slow data transmission. When the time-of-day clock



LC13B CIRCUIT NO.	LC13B SWITCH SECTION NO. (NOTE 1)	ASSOCIATED AUXILIARY CIRCUIT					
		RECORDED TELEPHONE DICTATION	RECORDED ANNOUNCEMENT	LOUDSPEAKER PAGING/ MALICIOUS CALL TRACE	MUSIC ON HOLD	AUTO WAKEUP SERVICE	MALICIOUS CALL TRACE
0	6 5 4	OPEN OPEN CLOSED	OPEN CLOSED OPEN	CLOSED OPEN OPEN	OPEN CLOSED CLOSED	OPEN CLOSED OPEN	CLOSED OPEN CLOSED
1	3 2 1	CLOSED OPEN OPEN	OPEN CLOSED OPEN	OPEN OPEN CLOSED	CLOSED CLOSED OPEN	OPEN CLOSED OPEN	CLOSED OPEN CLOSED

NOTE:
1. SWITCH SECTIONS ARE CLOSED BY PRESSING THE ROCKER TOWARDS THE SECTION NUMBER

Fig. 147—Auxiliary Circuit Options (LC13B)

(LC144) is provided (FP9 and FP11), it must appear in slot 32 of the basic control carrier.

LC366B Circuit Pack

6.23 LC366B circuit pack provides four I/O serial data channels—one dual speed and three low speed. Circuit ***0*** is the dual speed data channel and circuits ***1, 2,*** and ***3*** are the low speed data channels. The circuit packs can be installed in slots 31/35, 32/36, 33/37, 34/38, 20/24, 21/25, 22/26, and 23/27 in the control growth carrier and in slots 20/21, 22/23, 24/25, 26/27, 28/29, 30/31, and 32/33 in the supplementary I/O carrier. The J2 DIP option socket (Fig. 151) is used to select either the low speed (185 kilobits per second) or high speed (833 kilobits per second) for data channel ***0.*** The J1 DIP option socket is used to select the type of DIMENSION PBX system in which the LC366B is installed. In all systems configured with three or more attendant consoles assigned to one LC366, replace the LC366 with an LC366B.

6.24 Data channel restrictions similar to those for the LC34B in the basic control carrier also apply to the LC366B in the control growth carrier. For example, (1) circuit ***0*** of the LC366B in slot 30 is used for the MAAP interface, (2) circuit ***0*** in slot 31 is used for SMDR and should be set to fast speed, (3) time-of-day clock (LC144) must appear in slot 32 when provided, and (4) circuit ***0*** in slot 33 is dedicated to NCOSS and must be set to fast speed. When SMDR and NCOSS are not provided, the associated data channels (002 for SMDR and 006 for NCOSS) are available only via the BX07 and BX09 connectors, respectively.

K. I/O and Memory Control (LC133 or LC133B)

6.25 Circuit pack LC133 or LC133B contains a movable shorting block in a DIP which provides wiring options to change the memory address assignments for carrier selection and the memory pack size used in the random access memory (RAM). The shorting block shall be set in accordance with Fig. 152. The LC133B circuit pack is required ***only*** when the J58882AH control growth carrier is provided.

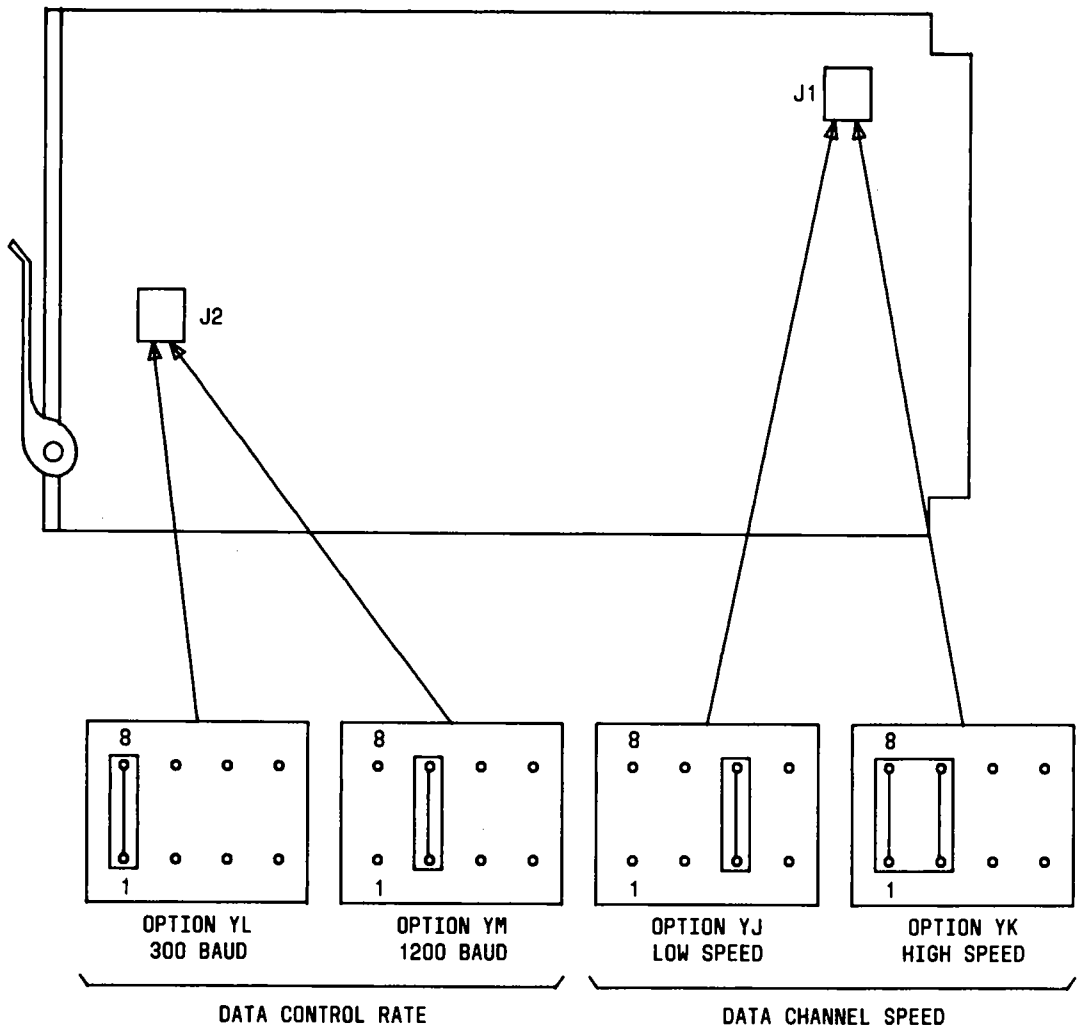


Fig. 148—LC171B Circuit Pack Options

L. Loop Signaling Interface Trunk Circuit (LC361)

Warning: When the cross-connect field is wired for an LC361 circuit pack, a connection is made to the T10 lead on the LC05B or LC204 tone circuits. After this connection is made, no other circuit board should be inserted into the same carrier slot because other boards will apply voltages that are hazardous to the LC05B or LC204 tone circuits.

6.26 The loop signaling interface trunk circuit LC361 can be used to provide the interface between the DIMENSION PBX and the customer-provided computer equipment. The circuit can also be used for special off-premise extensions (OPX) where transmission loss is critical or must be minimized or where SMDR recording is desired.

6.27 The LC361 circuit is associated with the data communications access feature and the off-premises station with call control feature. The two features are optionally provided.

6.28 The LC361 contains two circuits per circuit pack and can be installed in trunk-type carrier slots which normally accept the standard tie trunk circuits. The LC361 provides loop signaling similar to the LC02B line circuit; incoming seizures are generated by loop closures and outgoing seizures are generated by interrupted 20-Hz ringing. Ringing and

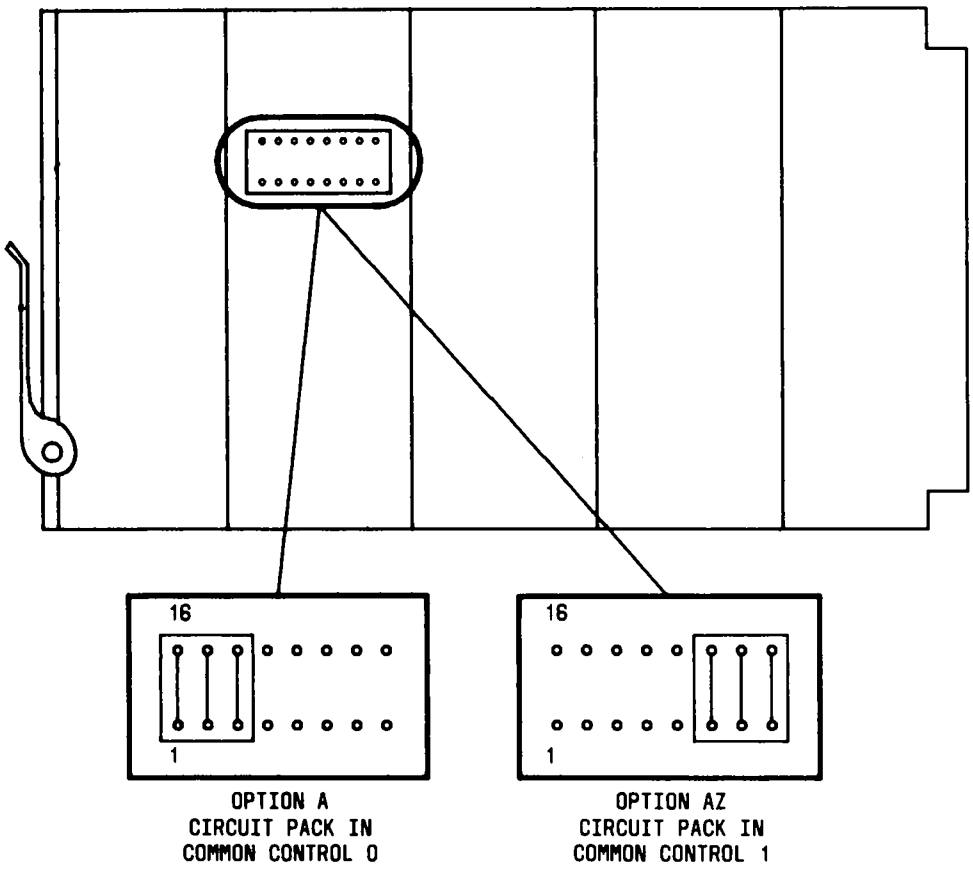


Fig. 149—LC172B Circuit Pack Options

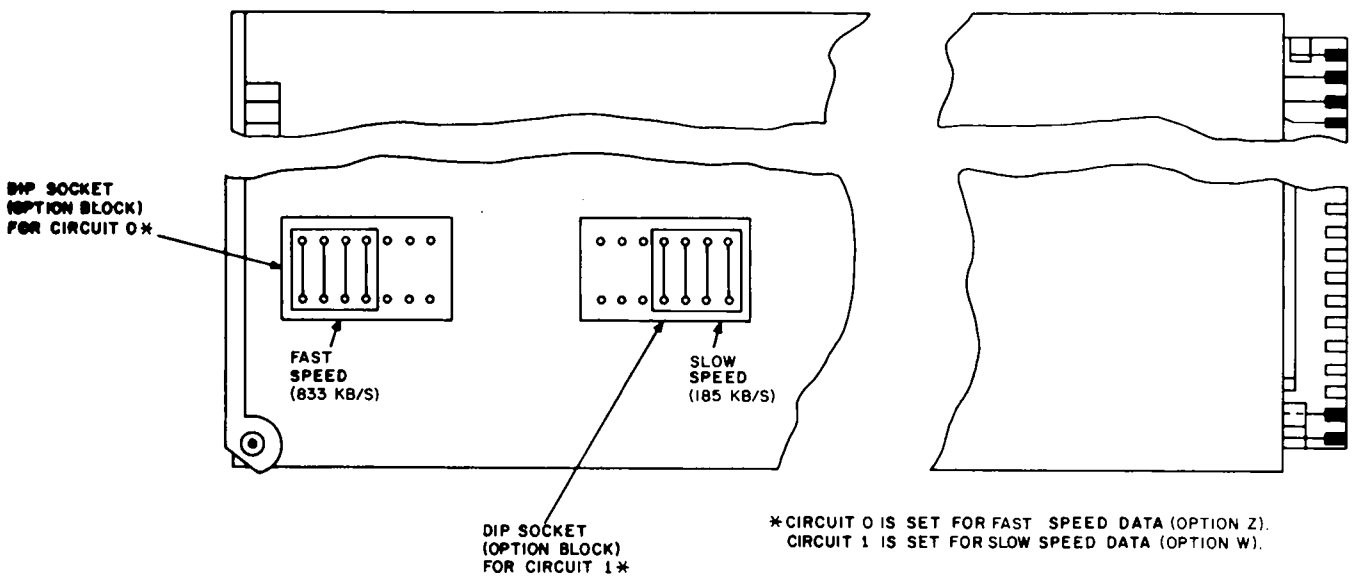


Fig. 150—LC34B Circuit Pack Options

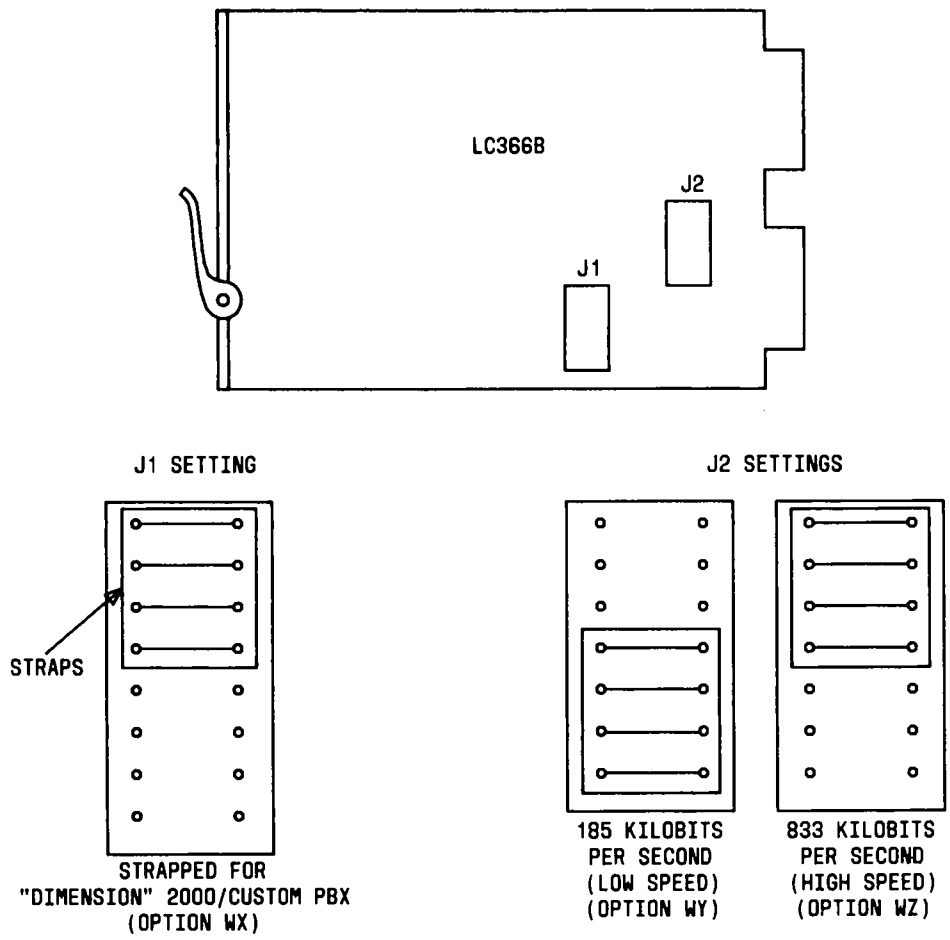


Fig. 151—LC366B Circuit Pack Options

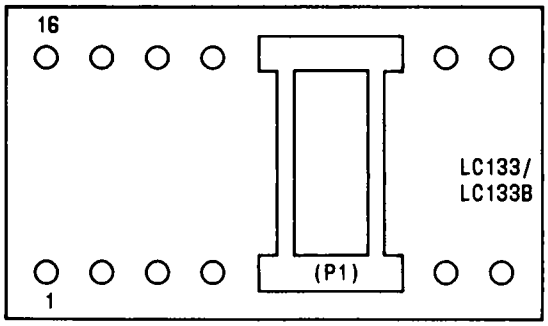
ringback control circuitry is provided on each LC361. Additional wiring is required to bring the 20-Hz ringing and ringback tone to the carrier slots. The 20-Hz ringing is obtained directly from the ringing generator via the carrier backplane wiring (refer to Detailed Change Sheet, DCS-1E480-42, for details). The audible ring tone is obtained from the LC05B tone plant B or the LC204 tone circuit via the cross-connect field (Fig. 153).

M. Message Register and Energy Control Power Monitor Interface Circuit (LC16B)

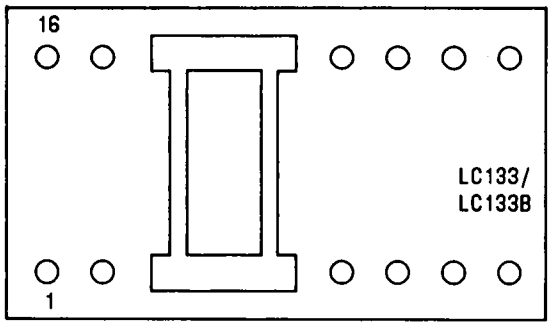
6.29 When the message register feature is optionally provided for the local call billing feature, the LC16B circuit pack can be installed in slots 2 through 9 on the trunk port carrier and in slots 6, 7, 8, 10, 12, 15, 17, and 19 on the module control and trunk port carrier. Up to four circuit packs can be used having eight circuits each. The circuit detects M-lead signals from the central office which in turn will increment the message unit total for the station lines which are connected to the associated trunk.

6.30 When the LC16B is used for the energy communication feature, two circuit packs are sufficient to provide the maximum of 16 power meter interfaces per carrier.

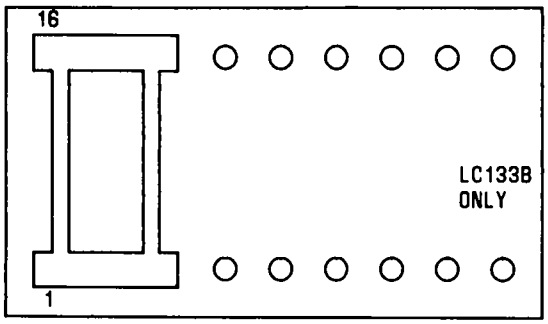
6.31 Each LC16B contains three 16-pin sockets which are used to establish various options (Fig. 154). The lower half (pins 1 through 4 and 13 through 16) of each socket is associated with circuits 0 through 3. The upper half is associated with circuits 4 through 7. Shorting blocks, which control four circuits each, are provided to set the options in each socket.



BLOCK SET FOR
OPTION S = 8192(8K)



BLOCK SET FOR
OPTION T = 16384(16K)



BLOCK SET FOR
OPTION WW = 65536 (64K)
(LC133B ONLY)

NOTES:
1. THE DIAGRAMS OF THE LC133/LC133B CIRCUIT PACK REPRESENT A DIP SOCKET LOCATED IN THE LOWER RIGHT CORNER OF THE COMPONENT SIDE. THE CONNECTOR IS ON THE RIGHT.
2. OPTIONS S, T, AND WW DEFINE THE MEMORY BOARD SIZE.
3. P1 IS AUGAT INC NO. 8136-475G4.

Fig. 152—LC133 and LC133B Options Via a Shorting Block

N. Message Waiting Line Circuit (LC03C)

6.32 The loop-start line interface (LC03C) is a line circuit for hotel/motel stations equipped with a message waiting lamp. Each LC03C contains four line circuits, and is installed in a line carrier as a replacement for an LC02C line circuit pack. When a message waiting lamp is required for a station, the circuit performs all LC02B functions and interfaces the message waiting lamp at each station.

Message waiting service is restricted to on-premises application. Off-premises message waiting service is not a standard feature offered with the DIMENSION PBX and is not registered under the private line service provisions of the FCC Rules (Part 68).

O. Network Clock (LC121B)

6.33 The LC121B provides all functional timing for circuits in each network module and a 25-ms clock for the LC05B circuit pack. One LC121B is required for each module control and trunk port carrier. Each LC121B contains a DIP switch which provides for optional control, allowing the network clock to be locked on-line. Normally, the switch section identified as 2 should be set in the operated position, allowing software control.

P. Remote Access Trunk Circuit (LC07) (MD)

6.34 The LC07 circuit pack is required for the remote access voice switched gain (VSG) applications associated with FP8 and FP12. The circuit pack can be installed in any slot normally occupied by

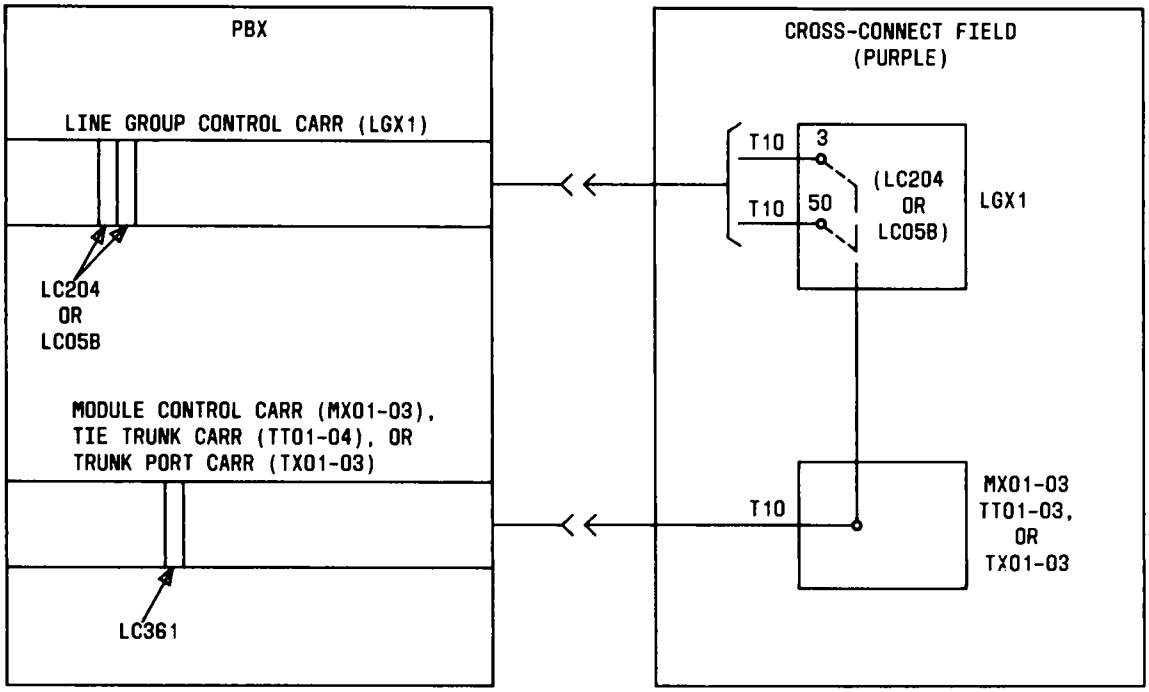


Fig. 153—Audible Tone Connections for LC361 Circuit Pack

an LC08D in the module control carrier and the trunk port carrier. The LC07 enables on- and off-network stations to remotely access special trunks (WATS, etc). An automatic voice-controlled adjustable gain capability is provided via the VSG circuit on the circuit pack. When enabled, a fixed gain is inserted in the transmission path switched bilaterally under voice control. The direction in which the gain is inserted is controlled by the strongest signal.

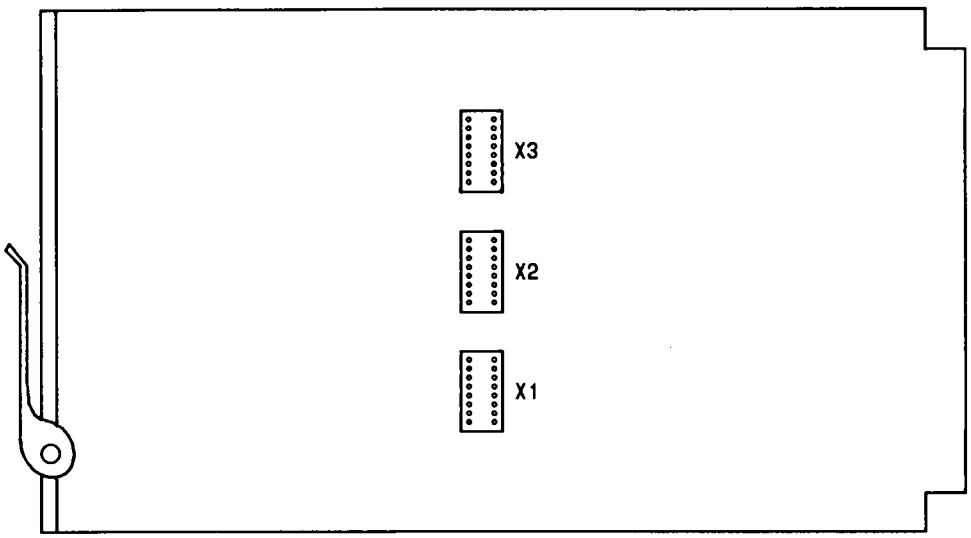
6.35 The VSG trunks should only be used on incoming trunk groups (ie, automatic remote access, 800 Service, or 2-way CO) for which the majority of calls will be extended to an outgoing facility. The incoming connection may be automatically or attendant extended to the desired facility (ie, 1-way out trunk, OUTWATS trunk, electronic tandem network [ETN] switch tie trunk, or a local PBX station).

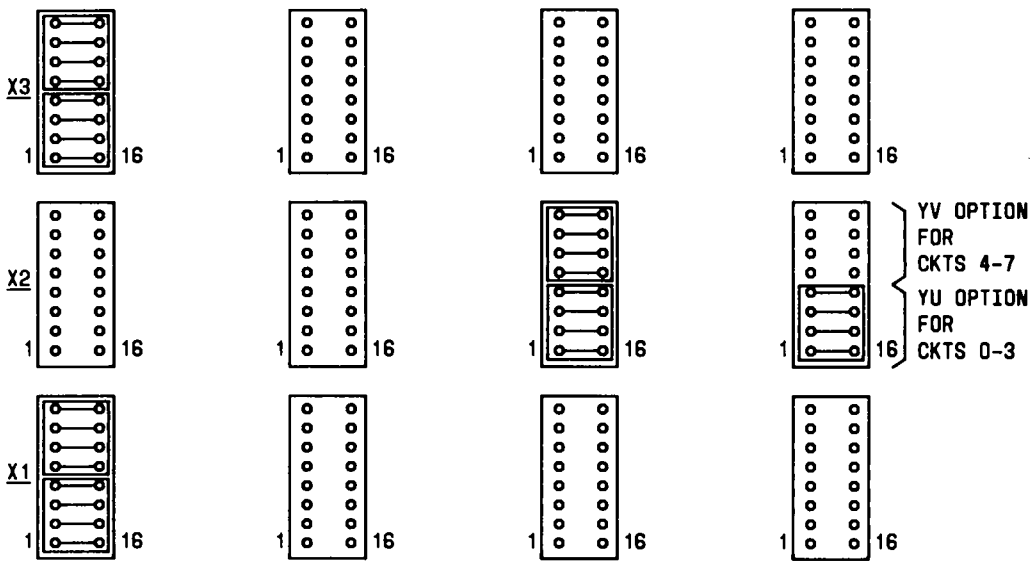
6.36 The gain required for a particular VSG unit is dependent upon the signal loss of the circuit. The gain is set via various combinations of four dB gain switches (Fig. 155). The setting is maintained for all connections and should be set to a compromise value to cover all possible connections.

6.37 The VSG unit inserts the gain only when the signal level rises above −43 dBm. This turn-on level can be changed to favor either side (CO or PBX) by placing a movable strap to different sensitivity pins shown in Fig. 155. Table CQ is a fill-in worksheet for use with Fig. 155.

Q. Signal Distribution Circuit (Hotel/Motel) (LC41B)

6.38 The LC41B provides the functions of LC49C and replaces LC49C in the line carrier (slot 10) or the line group control carrier (slot 11) when the message waiting feature is provided. It also provides the interrupted message waiting lamp voltage. A message waiting maintenance function is also provided by means of a scan point to monitor the output of the current detector circuit, thereby testing the neon lamps at the station sets. The interrupter circuit operates for 0.75 second on and 0.75 second off.





YW OPTION
ENERGY CONTROL
POWER METER
MONITOR OR
PERIPHERAL ALARM
INTERFACE
(SHORTING
BLOCKS ON X1
AND X3 ONLY)

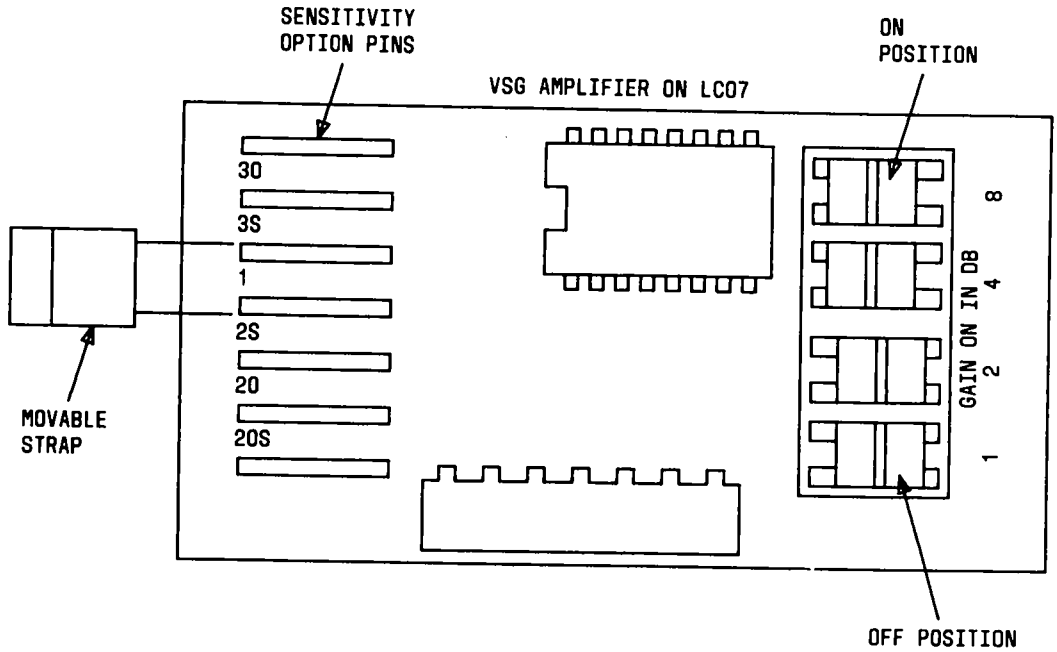
YV OPTION
MESSAGE UNITS
TWO WIRES
(REMOVE
SHORTING
BLOCKS ON
ALL SOCKETS)

YU OPTION
MESSAGE UNITS
SINGLE WIRE
(SHORTING
BLOCKS N
X2 ONLY)

YV AND YU
OPTIONS
APPLIED
INDEPENDENTLY
ON X2
(SEE NOTE)

NOTE:
THE TWO CIRCUIT GROUPS 0-3 AND 4-7 ON THE BOTTOM AND TOP HALVES, RESPECTIVELY, OF EACH SOCKET CAN BE OPTIONED TOGETHER OR INDEPENDENTLY

Fig. 154—LC16B Shorting Block Options



SENSITIVITY OPTIONS

WHEN DIFFERENCE IN LOSS (dB) BETWEEN CO AND PBX SIDE IS	OPTION (NOTE	CHANGE IN TURN-ON LEVEL (dB)		TYPICAL 1 KB/S TURN-ON LEVEL (dBm)	
		PBX SIDE	CO SIDE	PBX SIDE	CO SIDE
10 OR LESS	1	–	–	-43	-43
11 TO 16 (TO FAVOR CO SIDE)	2S	-1	+5	-42	-48
11 TO 16 (TO FAVOR PBX SIDE)	20	+5	-1	-48	-42
17 TO MORE (TO FAVOR CO SIDE)	3S	-2	+8	-41	-51
17 OR MORE (TO FAVOR PBX SIDE)	30	+8	-2	-51	-41
HIGH EQUAL LOSS ON BOTH SIDE	20S	+11	+11	-54	-54

NOTE: SELECT OPTION BY PLACING MOVABLE STRAP OVER PINS ON EACH SIDE OF OPTION

GAIN ADJUSTMENT

GAIN SWITCHES (DOT = ON)				TOTAL VSG GAIN (dB)
1 dB	2 dB	4 dB	8 dB	
•				1
	•			2
•	•			3
		•		4
•		•		5
	•	•		6
•	•	•		7
			•	8
•			•	9
	•		•	10
•	•		•	11
		•	•	12

Fig. 155—VSG Option Selections on LC07 (A&M) Circuit Pack

TABLE CQ

SENSITIVITY OPTIONS AND DB GAIN SETTINGS FOR VSG (LC07) WORKSHEET

SENSITIVITY OPTIONS	OPTION REQUIRED	TOTAL GAIN REQUIRED	dB SWITCHES	SWITCH SETTINGS	
				ON	OFF
1		_dB	1		
2S			2		
20					
3S			3		
30			4		
20S					

R. Tie Trunk Circuit (LC11B)

Warning: The circuit pack option switches must never be operated while power is applied to the circuit.

6.39 The DIMENSION PBX tie trunk circuits (LC11B) require a physical change to provide various options. The tie circuits provide a 4-wire transmission path, optional signaling, and the interface between the PBX and a distance communication link. The LC11B has a switchable 2-dB pad which is removed from the transmission path for a 2-dB gain when the trunk circuit is involved in a tandem connection.

6.40 The tie trunk circuit pack can be installed in slots 6, 7, 8, 10, 12, 15, 17, and 19 in a module control and trunk port carrier, in slots 2 through 9 in a trunk port carrier, and in slots 2 through 9 and 11 through 18 in a tie trunk carrier.

6.41 When the LC11B is used in a tandem mode, a maximum of 40 may be installed in any one module control cabinet. However, if other circuits requiring −48 volt power are supplied from the same cabinet, the entire power load must meet the following limitation.

> The number of LC11Bs, plus the number of LC09Ds divided by 3, plus the number LC02Bs divided by 4, plus the number of system status indicators divided by 2, plus the number of consoles divided by 2, plus the number of "beehive" lamps divided by 6, plus the number of key telephone units (17B KTUs) divided by 17, must be less than 41.

6.42 The LC11B has three option switches located on the circuit pack as shown in Fig. 156. One switch (SW1) is provided for each of the two circuits provided by the unit. The third option switch (SW2) is shared by the two circuits as shown. The optional settings for the LC11B include matching the signaling circuitry to the loop length, and settings for DX normal signaling, DX reverse signaling, and E&M (dial trunk) signaling. Table CR is a fill-in worksheet for use with Fig. 156.

S. Time-of-Day Clock (LC144)

6.43 This common control circuit pack provides an improved hardware clock recommended for billing accuracy. It is installed in slot 32 of the basic control or control growth carrier. The J58882A, List 9 battery backup provides power for the LC144 in the event of commercial power failure.

T. Tone Plant C (LC17B)

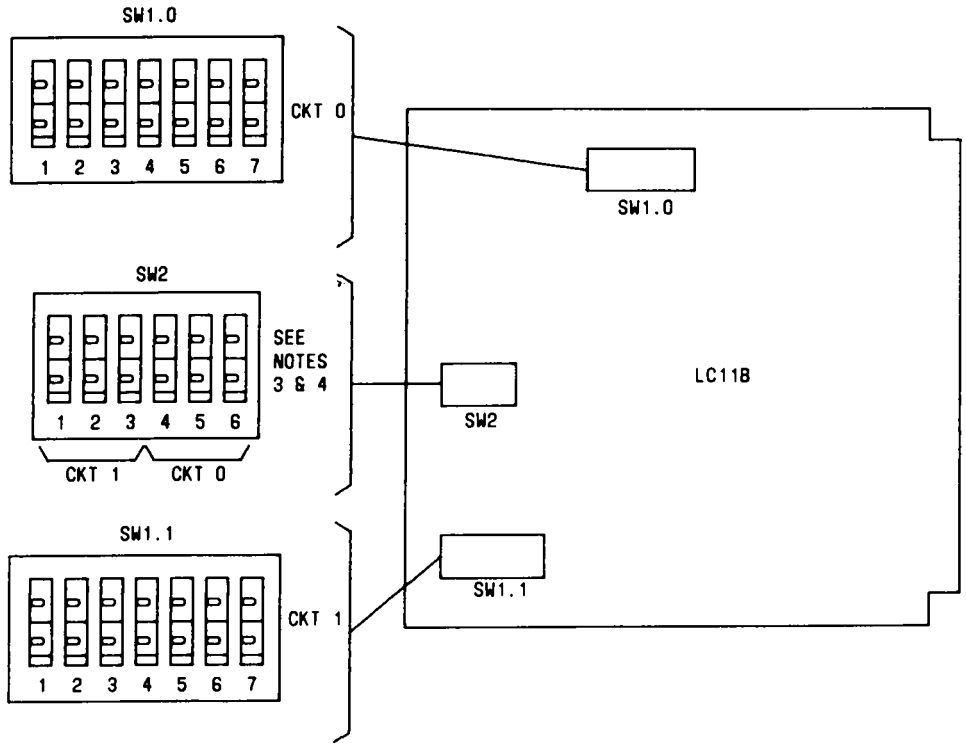
6.44 The code calling access generator located on tone plant C circuit pack (J58879AA, List 9) is used whenever a tone is needed for code calling access, or to provide LDN tones to the CAS attendant. This allows the PBX station line users, tie trunks, and attendants to dial activate an electronic chime corresponding to a dialed code. The called party is connected to the caller via an answering code from any station. The options for code calling electronic chime tone include 25 (2-digit) codes or 125 (3-digit) codes, with any combination of digits 1 through 5. The circuit generates a code tone at 892 Hz. Pulse timing is 500 milliseconds with 25-millisecond pulse intervals. Interdigital timing is 1.5 seconds, and intercycle timing is 4.5 seconds. When digits 6 through 9 or 0 are dialed, intercept tone is returned to the controller. Three cycles of coded signals are generated after feature activation. The CAS tones are 440 Hz and 480 Hz (mixed and discrete).

6.45 The LC17B circuit pack is installed in slot 10 of a line group control carrier J58882BB. The 89A control unit (SD-1E297-01) is used between the circuit pack and the customer-owned equipment. The 89A control unit provides tip and ring isolation and surge protection.

6.46 access to code calling from a tie trunk is allowed. The remote access to PBX feature is permitted to access code calling, if class of service allows. The CAS attendant can access code calling for stations and trunks. The feature does not allow access to conventional customer-provided code calling equipment. Refer to Part 5 for detailed information on connections.

U. TOUCH-TONE Dialing Sender/Dial Tone Detector (LC12)

6.47 The J58882BA, List 17 or J58879BA, List 17 TOUCH-TONE dialing sender (LC12) is a trunk-type circuit pack (installed in slots 02 through 09 of the trunk port carrier [J58879BA] or slots 06 through 08, 10, 12, 15, 17, and 19 of the module control and trunk port carrier [J58882BA]). The circuit pack contains two circuits which function independently



OPTIONS SWITCHES
(ALL SECTIONS SHOWN OPEN)

A (SEE NOTE 1)									
SWITCH 2 (SW2) SECTION	FUNC	LOOP LENGTH IN OHMS							
		0-350	351-950	951-1550	1551-2150	2151-2750	2751-3350	3351-3950	3951-4550
1	BAL1.1	C	O	C	O	C	O	C	O
2	BAL2.1	C	C	O	O	C	C	O	O
3	BAL3.1	C	C	C	C	O	O	O	O
4	BAL3.0	C	C	C	C	O	O	O	O
5	BAL2.0	C	C	O	O	C	C	O	O
6	BAL1.0	C	O	C	O	C	O	C	O

B (SEE NOTE 2)				
SWITCH 1 (SW1) SECTION CKT 0/1	FUNC	DX NORMAL	DX REVERSAL	E&M
1	EL	O	O	C
2	EM2	C	C	O
3	EM1	C	C	O
4	DXRV2	O	C	O
5	EM4	C	O	O
6	DXRV1	O	C	O
7	EM5	C	O	O

NOTES:
1. SWITCHES SHOWN IN A ARE USED FOR MATCHING THE SIGNALING CIRCUITRY TO THE LOOP LENGTH.
2. SWITCHES SHOWN IN B ARE USED FOR SELECTING DX OR E&M SIGNALING.
3. SWITCHES MUST BE SET PRIOR TO INSERTING THE CIRCUIT PACK INTO THE CARRIER.
4. SWITCH SECTIONS ARE CLOSED BY DEPRESSING THE ROCKER TOWARD THE SECTION NUMBER.

Fig. 156—LC11B Circuit Pack Switch Location and Switch Options

TABLE CR

OPTIONAL SWITCH SETTINGS FOR LC11B TIE TRUNK WORKSHEET

SWITCH	SECTION	FUNCTION	SETTING	
			CIRCUIT 0	CIRCUIT 1
SW1.0	1	EL		
	2	EM2		
	3	EM1		
	4	DXRV2		
	5	EM4		
	6	DXRV1		
	7	EM5		
SW1.1	1	EL		
	2	EM2		
	3	EM1		
	4	DXRV2		
	5	EM4		
	6	DXRV1		
	7	EM5		
SW2	1	BAL1		
	2	BAL2		
	3	BAL3		
	4	BAL3		
	5	BAL2		
	6	BAL1		

MODULE _ _ CABINET ___ CARRIER ___ SLOT ___

TIE TRUNK ___

as a TOUCH-TONE* telephone generator and as a dial-tone detector (350 Hz). TOUCH-TONE dialing digit generation is provided upon software command. A single or dual-frequency tone burst of 76-ms duration is provided for digit outpulsing or receiver reaction testing.

V. Transmission Test Line Circuit Pack (LC145)

6.48 The LC145 circuit pack furnishes an automatic capability for trunk testing. The unit permits installation tests, routine maintenance tests, and troubleshooting tests to be remotely performed on transmission (trunk) paths between central office locations and the PBX system. One LC145 is required per PBX system in slots 12 through 18 of the line group control carrier (J58882BB). These slots normally accommodate LC02B line circuit units. Therefore, when an LC145 is provided, the station telephone numbers available for customer usage are reduced by four. Each LC145 contains four port circuits. The first circuit generates a sequence of three precision tones. The second circuit acts as a receiver in performing 1-way, loop-around testing from the second to the first circuit. The third and fourth circuits are made to appear permanently on-hook so that the LC145 has the appearance of a standard line circuit (LC02B) with respect to call processing and maintenance programs.

6.49 The following guidelines should be utilized for installation of the LC145 circuit pack:

- The LC145 circuit pack should be installed in all systems that are arranged for common control switching arrangement (CCSA) service, DID service, enhanced private switching communications service (EPSCS), tandem tie trunks, and systems with seven or more 2-point private lines.

- The LC145 circuit pack should be installed in any system that is considered appropriate by operating company transmission and maintenance engineers.

W. Voice Announcement Circuit (LC190)

6.50 The LC190 provides a fixed (2-second) announcement for hotel/motel wakeup circuit. This trunk-type circuit pack is installed in the module control and trunk port carrier in any one of 11 unoccupied trunk circuit slots. Only one circuit pack per system is required. Automatic wakeup service requires either the nonalterable LC190 or an AUDICHRON variable announcement unit (H9040).

*Trademark of AT&T

X. ⧫Voice/Data Link Circuit (LC568)

6.51 The LC568 contains four ports per board and links modules of a multimodule PBX together to provide two separate link transmission formats. The signal format on the link is different for the voice and data modes. For the voice mode, the link signal is a band-limited audio signal. For the data mode, the digital signal received from one module's PAM bus is buffered and encoded for transmission over the link. Data coming from the link is received, decoded, and buffered for resynchronization with the second modules PAM bus.

6.52 The LC568 replaces the LC100 when Level 2 Data Switching is a feature. There can be a maximum of 22 circuit packs per link carrier.⧫

7. EQUIPMENT APPLICATION

TRUNK CIRCUIT-TYPE SELECTION

Note: The nominal loss through the DIMENSION PBX network is 5 dB for line-to-line connections. For 2-terminal connections involving a trunk, nominal loss is 0 to 0.5 dB if the trunk does not have a switchable pad or if it does and the pad is switched out. This applies to line-to-trunk and trunk-to-trunk connections. For connections involving trunks when the 2-dB switchable pad is switched in, the nominal insertion loss is 2.0 to 2.5 dB.

The DIMENSION PBX is compatible with all central offices except panel.

7.01 The DIMENSION PBX trunks are associated with (1) trunk groups which connect the PBX to a central office, another PBX, or another switching machine, or (2) trunk groups internal to the PBX such as loudspeaker paging, music interface, 6-way conference, recorded announcement, etc. The circuit packs used to provide the trunks are as follows:

- LC07—Remote access CO trunk (ground-start trunk interface)

- LC08D—Dual CO trunk circuit (ground-start trunk interface)
- LC09D—DID trunk circuit (high/low reverse battery trunk interface)
- LC11B—Tie trunk circuit (DX or E&M 4-wire interface)
- LC13B—Auxiliary trunk interface circuit.

The number of DIMENSION PBX trunks assigned to a trunk group should be limited to 99. It is possible to assign more, but the additional trunks cannot be tested via the trunk verification by customer (TVC) or the trunk verification by station (TVS) feature. When more than 99 trunks are required, two or more trunk groups should be administered with route advance from one to the other.

7.02 Dial pulsing is generated (regenerated) in the trunk circuit under software control, and TOUCH-TONE dialing is transmitted via the time division switch through the trunk transmission path to the central office. Tip and ring cannot be cut through the time division switch to achieve dc continuity.

7.03 Some characteristics of external trunks (Table U) vary with circuit design and are defined as follows:

(a) ***Incoming Trunk Design***

- ***AUTO:*** Indicates that the called PBX, without receiving dialed digits, will automatically complete the call directly to the PBX attendant, CAS attendant over outgoing release link trunks, or to a UCD/DDC group.
- ***IMED START:*** Indicates that the calling switching machine can begin outpulsing digits to the called PBX immediately upon origination without waiting for any start dial signal. ◗

Note: ◗Do not use IMED START between nodes of DCS.◖

(b) ***Called PBX Response to Incoming Call***

- ***DIAL TONE:*** Signals sent to calling switching machine to indicate that the called PBX is ready to receive dialed digits.
- ***WINK START:*** A momentary off-hook signal which lasts nominally ___ microseconds to indicate to the calling switching machine that the called PBX is ready to receive dialed digits.
- ***DELAY DIAL:*** A momentary off-hook signal which lasts nominally ___ microseconds to indicate to the calling switching machine that the called PBX is ready to receive dialed digits.

(c) ***Outgoing Trunk Design***

- ***AUTO:*** Indicates that the calling PBX, without sending any dialed digits, expects the called switching machine to automatically complete the call.
- ***IMED START:*** Indicates that the calling PBX starts outpulsing immediately upon trunk seizure without waiting for any start-dial signal from the called switching machine.

(d) ***Expected Start-Dial Signals From Called Switching Machine on Outgoing Calls***

- ***GROUND START:*** The calling PBX, on a call to a central office using an LC08 circuit pack, seizes the outgoing trunk by placing a ground on the trunk circuit ring lead. The central office recognizes the trunk seizure as a request for service and grounds the trunk circuit tip lead to indicate to the calling PBX that the central office is ready to receive digits. The central office eventually connects dial tone as well as a receiver on some other device to receive digits. Certain central offices perform a ***party test*** on calls from a PBX by momentarily opening the ground that was applied to the tip lead. The calling PBX must delay the recognition of the ground-start signal until the party test signal is complete. Separate trunks are required when the party test is performed (see trunk encodes 18, 20, 23, 25, and 28).

- ***DIAL TONE:*** Signals received by the calling PBX to indicate that dialing may be resumed on the outgoing call. Precise dial tone, when detected by a calling PBX associated with trunk encodes 41, 43, 46, or 47, indicates to the PBX that the other end is ready to receive digits.

- ***WINK START:*** A momentary off-hook signal detected by the calling PBX to indicate that the called end is ready to receive digits. The DIMENSION PBX recognizes a signal ▶that is received 100 to 150 milliseconds after seizure and persists for 140 to 290 milliseconds as a valid wink start signal.◀

- ***DELAY DIAL:*** A momentary off-hook signal detected by the calling PBX to indicate that the called end acknowledges the trunk seizure on the outgoing call. The off-hook signal prevents the calling PBX from outpulsing digits. When the called end is ready, an on-hook signal is sent to complete the delay dial signal. The DIMENSION PBX recognizes ▶a signal that is received 100 to 150 milliseconds after seizure and persists for 140 to 290 milliseconds as a valid delay dial signal.◀

Note: With certain trunk types (encodes 41, 43, 46, and 47), the calling PBX can outpulse digits when any one of the three signals (precise dial tone, wink start, or delay dial) is received from the called end.

- ***TIME-OUT:*** After a specified timed interval even though a start dial signal has not been received, the calling PBX can outpulse digits or establish a connection over which the calling party can dial through the PBX via TOUCH-TONE dialing.

A. Remote Access CO Trunk Circuits (LC07) (MD)

7.04 The remote access CO trunk circuit pack LC07 provides the means for inserting extra gain in a transmission path when total end-to-end losses are large enough to degrade the transmission quality. The gain is provided by a voice switched gain (VSG) element. The gain element is enabled by the PBX software. When enabled, a fixed gain is inserted in the transmission path and directionally switched by voice control. The direction of gain is controlled by the stronger voice signal. The VSG circuit should only be used on incoming groups for which the majority of calls will be extended outside the PBX via an outgoing (1-way or 2-way) facility.

7.05 The LC07 trunk circuit responds to signaling (ground-start) the same as the conventional LC08D trunk circuit. Only one VSG trunk circuit is provided on each LC07 circuit pack. The following VSG arrangements are available:

- 1-Way-In Remote Access With VSG (Automatic)

- 2-Way Attendant Completing In/DOD With VSG (CO)

- 1-Way-In Attendant Completing With VSG (800 Service).

B. CO Trunk Circuits (LC08D) Usage

7.06 The LC08D circuit pack is used as a ground-start interface for standard CO trunks and for other trunks or trunk-related features.

7.07 No wiring options are required for the following operating modes:

REGULAR CO TRUNKS

- 1-Way-In Attendant Completing
- 1-Way-Out DOD
- 1-Way-Out DOD With Party Test
- 2-Way Attendant Completing In/DOD
- 2-Way With Party Test.

REMOTE ACCESS CO TRUNKS

- 1-Way-In Remote Access (Automatic).

LOCAL LDN FOREIGN EXCHANGE

- 1-Way-In Attendant Completing
- 1-Way-Out DOD
- 1-Way-Out DOD With Party Test
- 2-Way Attendant Completing In/DOD
- 2-Way With Party Test.

WIDE AREA TELECOMMUNICATIONS SERVICE (WATS)

- 1-Way-In Attendant Completing
- 1-Way-Out DOD

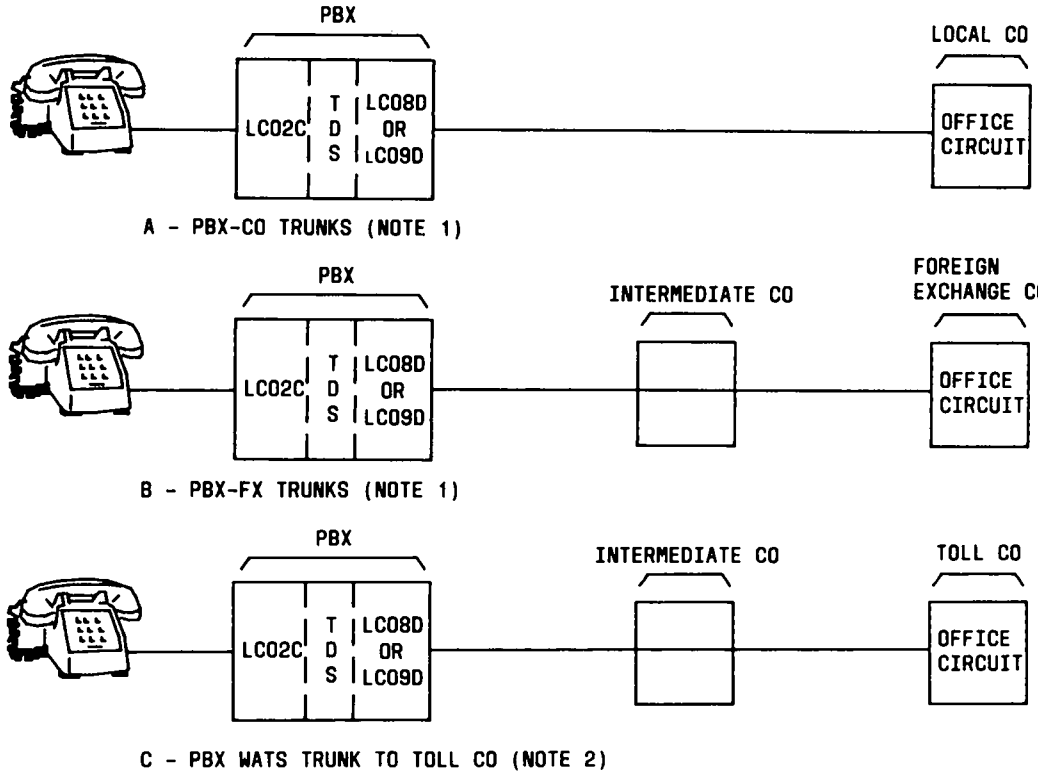
- 1-Way-Out DOD With Party Test
- 1-Way-In Automatic.

7.08 The party test mode is required with either speed-calling or hot-line features. Party test is required only when outpulsing must be delayed until a positive indication is received, signifying that trunk seizure at the central office has occurred and the central office is returning dial tone.

7.09 The trunk circuit employs a standard ground-start signal and transmission path from the central office to the PBX. Various configurations of the CO trunks are shown on Fig. 157. Two separate trunk circuits are provided on each physical circuit pack.

7.10 The LC08D trunk circuit sees an open tip lead and CO battery on the ring lead as an idle signal. A trunk seizure from the central office is indicated when it grounds the tip and applies battery to ring or vice versa. The battery and ground signals are detected by the trunk circuit and interpreted by software. The trunk circuit does not respond to loop closure or to standard ringing.

7.11 The central office sees an idle LC08D trunk as a high resistance between tip and ring shunted by a ringing bridge termination with −48V direct current on both tip and ring. Trunk circuit seizure by the PBX is generated by a closed loop and a grounded ring lead through 100 ohms.



NOTES:
1. PBX-CO AND PBX-FX TRUNKS CAN HAVE THE FOLLOWING MODES OF OPERATION:
   - ONE-WAY IN ATTENDANT COMPLETING
   - ONE-WAY OUT DOD
   - ONE-WAY OUT DOD WITH PARTY TEST
   - TWO-WAY ATTENDANT COMPLETING IN/DOD
   - TWO-WAY WITH PARTY TEST.

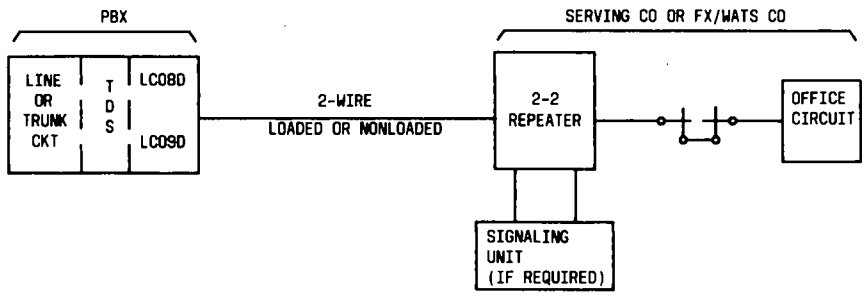
2. WATS TRUNKS CAN HAVE THE FOLLOWING MODES OF OPERATION:
   - ONE-WAY IN ATTENDANT COMPLETING
   - ONE-WAY OUT DOD
   - ONE-WAY OUT DOD WITH PARTY TEST
   - AUTOMATIC IN WATS.

Fig. 157—PBX-CO Trunk Combinations

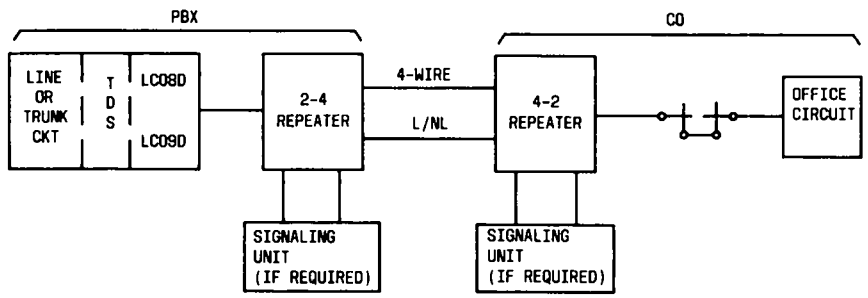
7.12 Figure 158 shows the CO trunk circuit interfacing with 2-wire or 2-4 wire repeaters and depicts the use of 2-wire repeaters to terminate 2-wire cable on a 2-wire switch. The repeater is on the CO side and provides a 900-ohm termination facing the 600-ohm output of the PBX. Figure 158(A) can also be applied to FX/WATS installations. For 4-wire PBX CO trunks, a 2- or 4-wire repeater is necessary at the PBX [Fig. 158(B)]. The 2-wire side has impedance set to 600 ohms. The 4-wire impedance can be 600 or 1200 ohms.

7.13 Terminal balance (Fig. 159) is required when PBX-CO trunks can be switched through to via-net-loss (VNL) tie trunks or CCSA lines.

7.14 Layout patterns for 2-wire FX/WATS are the same as for PBX central office. However, the choice of using either intermediate or terminal repeaters is available, as determined by design loss and crosstalk requirements.



A - 2-WIRE PBX-CO OR FX/WATS TRUNK WITH 22 REPEATER AT CO.



B - 4-WIRE PBX-CO TRUNK

Fig. 158—PBX-CO Trunks

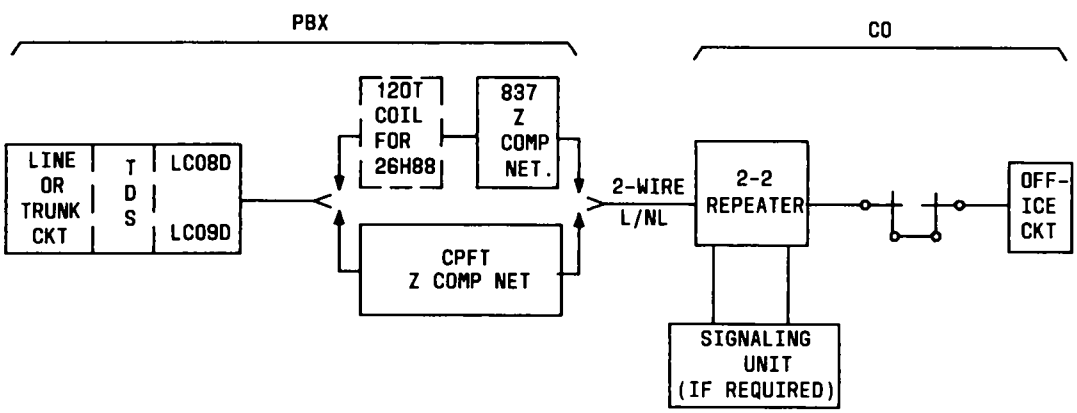


Fig. 159—2-Wire PBX to CO Trunk With Impedance Compensator

When a 2-way CO trunk is connected to a step-by-step system (eg, No. 1, 350A, 355A, 360A) outgoing information trunk circuit (SD-32170-01), an LC08D should be substituted for LC08 (MD). The LC08D corrects a fault condition occurring under short-loop facilities of less than 700 ohms towards a step-by-step type central office. This fault can cause the PBX calling party to revert to dial tone after dialing the outgoing trunk code.

7.15 ***Two-Port Originating Register for Outgoing CO Trunks:*** This feature provides the option of using a 2-port originating register (OR) on outgoing CO-type trunks arranged for TOUCH-TONE dialing to dial pulse conversion when the calling party is a TOUCH-TONE dialing station, attendant, or tie trunk. The 2-port OR is a special mode of operation of the standard TOUCH-TONE dialing receiver whereby the TOUCH-TONE calling party is on one port and the called facility on a second port. A talking path between ports one and two is normally maintained; however, when a TOUCH-TONE dialing signal is detected, this path is opened for the duration of the signal. Use of the 2-port OR for outgoing CO calls is administered via the MAAP. The number of TOUCH-TONE dialing receivers must be engineered accordingly to compensate for the fact that the attendant must now share in the use of the receivers. Prior to this fix, this conversion was accomplished without a TOUCH-TONE dialing receiver.

C. DID Trunk Circuits (LC09D)

7.16 The DID trunk circuit pack LC09D is also used as HI-LO reverse battery interface for other trunks and trunk-related features.

7.17 The direct inward dialing (DID) feature enables an incoming exchange call to terminate on a specific station line on the PBX. The LC09D circuit sees an open tip and ring from the central office as an idle signal. The circuit detects a low resistance loop closure as seizure from the central office. The circuit provides a momentary reversal of battery and ground on tip and ring as wink-start signal to the central office.

7.18 The DID trunk circuit operates in both immediate-start and wink-start modes to provide 1-way DID service or 2-way service on an automatic-out/dial repeating or automatic-in basis. It cannot be used as a 2-way DID/DOD interface or as a loop signal CCSA interface because dial pulses cannot be sent outgoing. The operating modes are software-controlled and do not involve wiring changes. For immediate-start, the DID trunk circuit receives dial pulses from the step-by-step central office. For wink-start, the DID trunk circuit sends a momentary battery reversal back to the common control central office which must be detected before dial pulsing is sent back to the PBX. Dial pulsing information reaches the PBX as loop pulsing with a maximum external circuit resistance range of 1500 ohms [Fig. 160(A)] or as battery and ground pulsing with a maximum resistance of 2450 ohms [Fig. 160(B)]. Answer supervision is sent to the central office as battery and ground reversal.

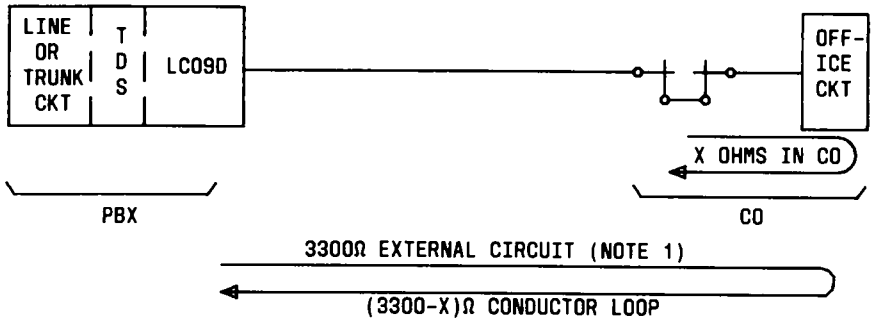
7.19 The signaling range for loop pulsing can be increased by the installation of a loop signaling extender at the PBX (Fig. 161).

D. Tie Trunk Circuits (LC11D) (DX or E&M 4-Wire Interface)

7.20 The LC11D tie trunk circuit operates in automatic or dial repeating modes with normal/reverse DX signaling and E&M leads, as well as a 4-wire voice transmission path. The following arrangements are available:

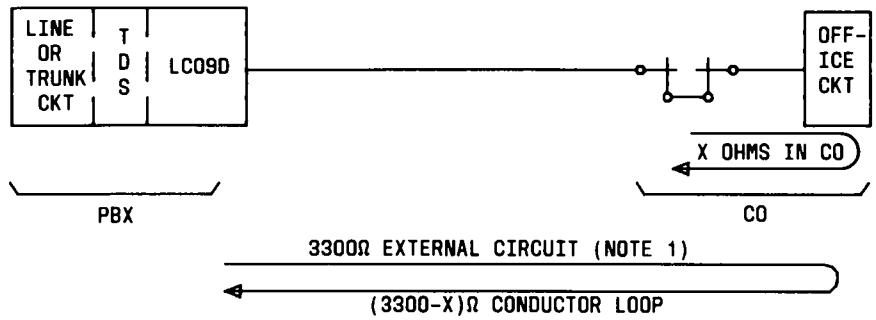
TIE TRUNKS

- 1-Way-In Dial Repeating
- 1-Way-Out Automatic
- 1-Way-Out Dial Repeating
- 1-Way-In Automatic
- 2-Way Dial Repeating Both Ways
- 2-Way Dial Repeating—In/Automatic-Out
- 2-Way Automatic-In/Dial Repeating-Out
- 2-Way Automatic Both Ways
- 1-Way-In Dial Repeating—Delay Dial
- 2-Way Dial Repeating—Delay Dial In
- 2-Way Dial Repeating Delay Dial-In/Automatic Out.



NOTE:
1. 3300 OHMS EXTERNAL CIRCUIT RESISTANCE TO THE LC09D DID TRUNK CIRCUIT CONSISTING OF CONDUCTOR LOOP RESISTANCE +CO INTERNAL RESISTANCE FOR LOOP PULSING, (GENERALLY 0 OHMS).

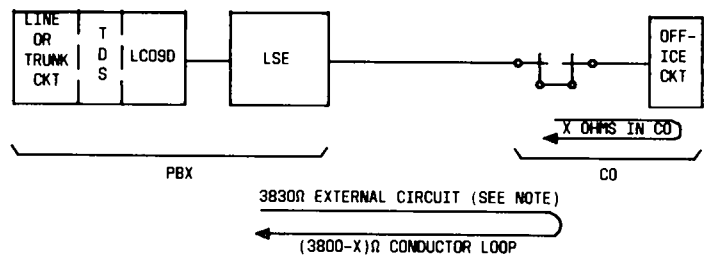
A - LOOP PULSING DID TRUNK RANGE



NOTE:
1. 3300 OHMS EXTERNAL CIRCUIT RESISTANCE TO THE LC09D TRUNK CIRCUIT CONSISTING OF CONDUCTOR LOOP RESISTANCE +CO INTERNAL RESISTANCE FOR BATTERY & GROUND PULSING (GENERALLY 430 OHMS).

B - BATTERY & GROUND PULSING DID TRUNK RANGE

Fig. 160—DID Trunk Range



NOTE: 3830 OHMS EXTERNAL CIRCUIT RESISTANCE TO THE LC09D TRUNK CIRCUITS CONSISTING OF CONDUCTOR LOOP RESISTANCE +30 OHMS LSE RESISTANCE +CO INTERNAL RESISTANCE. (FOR LOOP PULSING ONLY) CO INTERNAL RESISTANCE IS 0 FOR LOOP PULSING.

Fig. 161—LSE at a DIMENSION PBX in DID Trunk

ELECTRONIC TANDEM NETWORK TIE TRUNKS

- 2-Way Wink In/Delay Dial or Wink Out
- 1-Way-In Wink
- 1-Way-Out, Delay Dial or Wink
- 2-Way Dial Repeating In/Delay Dial or Wink Out
- 2-Way Dial Repeating Delay Dial In/Delay Dial or Wink Out.

ADVANCED PRIVATE LINE TERMINATION TIE TRUNKS

- 2-Way Delay Dial In/Out
- 2-Way Wink In/Delay Dial Out
- 2-Way Delay Dial In/Dial Tone Out
- 2-Way Wink In/Dial Tone Out.

CENTRALIZED ATTENDANT SERVICE TIE TRUNKS

- 1-Way Out, CAS Release Link Trunk
- 1-Way In, CAS Release Link Trunk.

MAIN/SATELLITE TIE TRUNKS

- 1-Way-In Immediate Start
- 1-Way-Out Immediate Start
- 2-Way Immediate Start Both Ways
- 1-Way-In Wink Start
- 1-Way-Out Wink Start
- 2-Way Wink Start Both Ways
- 1-Way-In Delay Dial
- 1-Way-Out Delay Dial
- 2-Way Delay Dial Both Ways.

7.21 Various tie trunk combinations are shown in Fig. 162. When tie trunks are used between two PBXs as shown, repeaters may not be required. Long tie trunks may require a 4-wire intermediate repeater in central offices through which the trunk passes (Fig. 163). A pad switching function on the LC11D is controlled by the class of the tie trunk and the connecting trunk.

7.22 The trunk circuit can be optioned on the circuit pack for standard DX or E&M signaling. DX signaling capability is completely contained within each circuit and is simplexed onto the 4-wire transmission path before leaving the unit. Means for reversing the simplex connection are also provided on the unit. If E&M signaling is provided, a separate pair of wires carry the E&M signals, and the 4-wire transmission path does not carry direct current. Two independent trunk interfaces are provided on one circuit pack, and the signaling method of one does not limit the signaling method of the other. The LC11D has a switchable 2-dB pad which is removed from the transmission path on certain trunk-to-trunk connections.

7.23 The LC11D circuit pack can also be used to provide DID service for centrex operation when DX or E&M signaling capabilities are required. In the DID application, the transmission pads will be permanently switched out via DID software. When a trunk circuit is optioned for DX signaling, all connections to that trunk are via the two tip and ring transmission pairs (4-wire). When the circuit is optioned for E&M signaling, connections to the trunk are via six wires: two tip and ring transmission pairs and a signaling pair—the E&M leads. The LC11D furnishes either the appropriate M-lead wink or no signal as in the case of SXS CO immediate start, and the DIMENSION PBX call progress tones will be returned to the calling party.

7.24 The (DX or E&M) interface circuit is divided functionally into three sections:

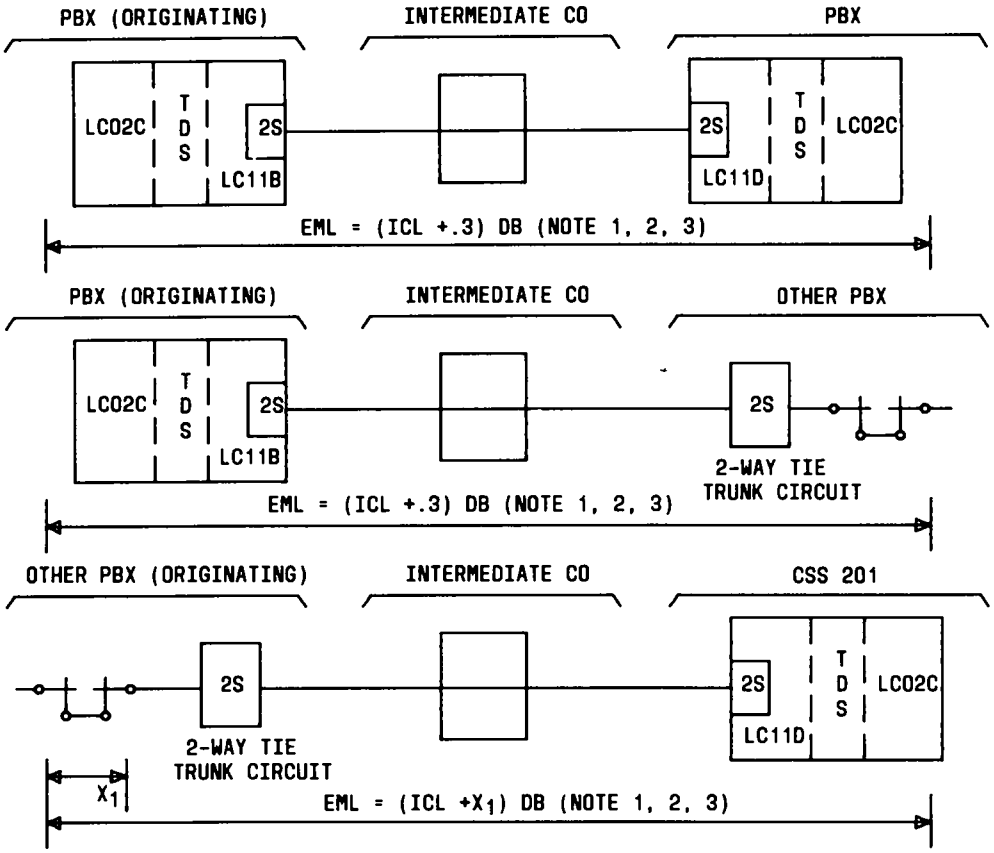
- Control or digital portion
- Signaling portion
- Voice transmission portion.

The digital portion interfaces with the network control circuit which performs control and time-slot functions via the even-port address. It also interfaces with the scanner/distributor circuit and the PAM network to furnish time-slot information. The DX or E&M signaling is performed in the signaling portion. The transmission section provides the 4-wire path and pad switching to the distant end.

7.25 Tie trunk signaling varies in accordance with the operating characteristics of the circuit. "Outgoing only" indicates that access can be gained only at the local PBX. "Incoming only" implies that only the distant PBX can gain access. A combination circuit can be seized from either connecting PBX, but the operation on each end may vary.

E. Auxiliary Trunk Interface Circuit (LC13B)

7.26 The auxiliary trunk circuit (LC13B) is associated with some of the internal trunk groups



NOTES:

1. EML = ESTIMATED MEASURED LOSS 1000 HZ ICL DESIGN OBJ[1]

TYPE	VNL[2]+2S+2S
SHORT HAUL	
LONG HAUL	

2. IF PAD SWITCHING IS NOT REQUIRED AT A PBX FOR ANY REASON AND IT HAS BEEN ASCERTAINED THAT THE PBX WILL NOT BECOME A TIE TRUNK TANDEM SWITCH IN FORESEEABLE FUTURE, THEN THE TIE TRUNK CIRCUIT CAN BE CLASSED AS "WITHOUT PAD" AND THE 2DB LOSS IT REPRESENTS ALLOCATED TO FACILITY LOSS.
3. ECHO SUPPRESSORS SHOULD BE USED WHEN THE VNL OF AN INDIVIDUAL TRUNK EXCEEDS 3.5DB, WHERE VNL = VNLF X LENGTH +0.4 +D WHERE D = 0.10 X (SUM OF ALL 1000 HZ. ROUND TRIP DELAYS OF DELAY EQUALIZERS).

Fig. 162—2-Wire PBX Tie Trunk

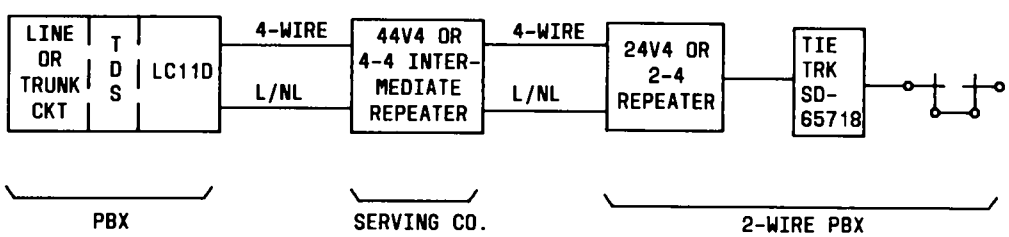


Fig. 163—4-Wire PBX Tie Trunk

(Table P) such as loudspeaker paging, music interface, recorded announcement, etc. Transmission to customer-owned peripheral equipment is accomplished by dry-loop seizure or by sleeve ground-start seizure from the auxiliary trunk. A ground on the sleeve lead which has been returned by the peripheral equipment will be detected by LC13B.

OFF-PREMISES STATIONS (OPS)

7.27 The LC02B line circuit transmits the 20-Hz ringing to off-premises stations associated with the PBX, and it detects loop signaling from the stations. Range to a station is limited to 950 ohms to ensure at least 24.4 mA at the telephone set. Range is reduced to 500 ohms if four ringers are required and 300 ohms for five ringers [Fig. 164(A)]. Figures 164 (B and C) through 167 show the LC02-type circuit pack and associated equipment making up various OPS arrangements. When loop signaling extender (LSE) is added, the external circuit resistance is extended to 1610 ohms for up to two ringers and 1500 ohms for three ringers [164(C)]. The LSE is limited to use with three ringers. Signaling ranges are based on a dc voltage level of −45 volts at the PBX, because the nominal −48 Vdc supply varies with loading at the other dc outputs. A method for determining the range when an LSE is used is provided in Section 332-910-180. Additional information on metallic facility terminal (MFT) plug-in units is provided in Section 851-300-130.

7.28 The dc signaling range of the station loops can also be increased by the installation of a loop signaling repeater/loop start only (LSR/LSO). It is recommended that a 22-intermediate repeater be used at the serving office for a 2-wire OPS installation [Fig. 167(A)]. Use of the 22-terminal repeater would result in an impedance mismatch. If more than one repeater is needed between the station and the central office, 4-wire facilities should be used. A typical 2- and 4-wire metallic facility installation is shown in Fig. 167(B). Different combinations of 2-4 wire MFT units can be used by specifying the appropriate 2-4 wire or 4-2 intermediate or terminal repeater at the 2-wire to 4-wire conversion points. When the MFT LSR is used, the range from the LSR to station is defined in SD-1C359-01.

7.29 Among the feature offered by the DIMENSION PBX are distinctive ringing and the "ring ping" signal of the call forwarding—all calls feature. This is a reminder that the feature is in effect. It consists of a single 100-ms burst of 20-Hz ringing sent to the station each time a call is forwarded. The three distinctive ringing signals are periodic:

Pattern 1: 1.2 seconds on

Pattern 1: 4.0 seconds off

Pattern 2: 0.4 second on
Pattern 2: 0.2 second off
Pattern 2: 0.6 second on
Pattern 2: 4.0 seconds off

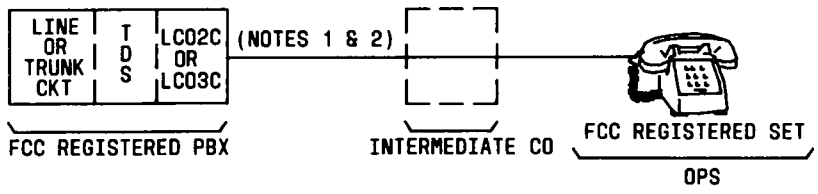
Pattern 3: 0.2 second on
Pattern 3: 0.1 second off
Pattern 3: 0.2 second on
Pattern 3: 0.1 second off
Pattern 3: 0.6 second on
Pattern 3: 4.0 seconds off.

All OPS lines are compatible with these features, including short range lines using voice frequency transmission facility with no signaling repeaters. Distinctive ringing can be transmitted over OPS line with one LSR; however, each burst of ringing will be shortened by 100 ms, and each silent interval will be increased by 100 ms. The "ring ping" will be blocked by the LSR. The LSE is transparent to both features. Single frequency (SF) type FS signaling unit or T-carrier with D-type FX channel units will pass pattern 1 distinctive ringing, but blocks patterns 2 and 3 and "ring ping."

7.30 When call pickup and call hold features are provided, the 24A_ line status indicator (LSI) can be used to monitor the status of PBX lines (Fig. 159). The 24A indicator bridges across the T and R leads of the stations to be monitored. The status of each line is displayed by a corresponding LED on the 24A_ panel. A maximum of four 24A_ LSIs can be bridged across the same station line. The indicator is provided in three versions for monitoring 8, 16, or 32 lines. The circuit operates with lines using −48V battery and conventional 90V, 20-Hz ringing superimposed on −48V direct current. The answering station at the 24A_ LSI is alerted when a monitored line is being rung. The answering station dials a call pickup code, and the PBX redirects the call to the answering station.

7.31 The following CPFT units are applicable to the OPS configurations:

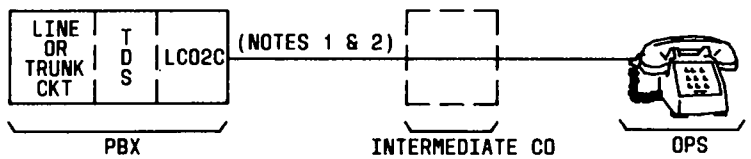
- J99343FD—DX or E&M to Ground Start (STA)—CPS20



NOTES:
1. MAXIMUM LOOP RESISTANCE = 950Ω PLUS REGISTERED STATION SET RESISTANCE.
2. THE MAXIMUM NUMBER OF C4A RINGERS PER LINE AND THE ASSOCIATED MAXIMUM ALLOWABLE LOOP RESISTANCE (EXCLUDING STATION SET) IS AS FOLLOWS:

RINGERS	ALLOWABLE LOOP RESISTANCE
1-3	950Ω
4	500Ω
5	300Ω.

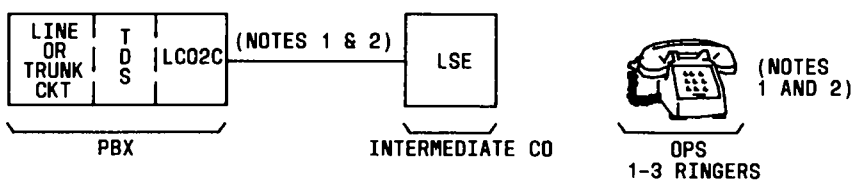
A - CIRCUITS USING CPS LC02B AND LC03C



NOTES:
1. MAXIMUM LOOP RESISTANCE IS 1250Ω INCLUDING TELEPHONE SET OR 1050 EXCLUDING TELEPHONE SET (VINTAGES OLDER THAN LC02C).
2. THE MAXIMUM NUMBER OF C4A TYPE RINGERS PER LINE AND THE ASSOCIATED MAXIMUM ALLOWABLE LOOP RESISTANCE (EXCLUDING STATION SET) IS AS FOLLOWS:

RINGERS	ALLOWABLE LOOP RESISTANCE
1-3	1050Ω
4	500Ω
5	300Ω.

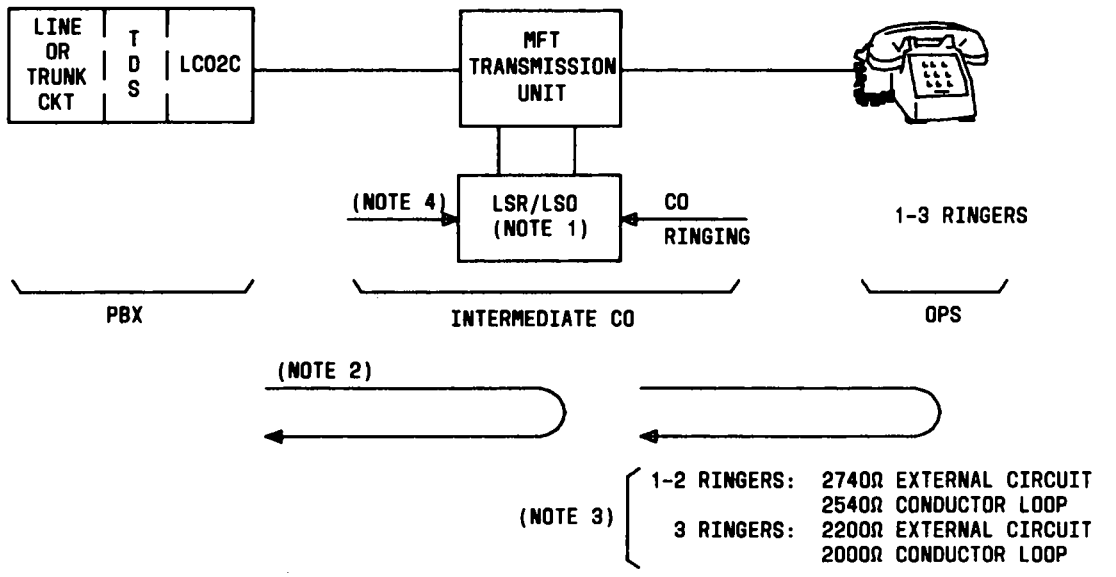
B - OPS SIGNALING RANGES 1-5 RINGERS, NO RANGE EXTENSION



NOTES:
1. 1-2 RINGERS: 1610Ω EXTERNAL CIRCUIT (LC2 = V1, V2, V5) OR 1725Ω (LC2 = V3, V4, V6, V7)
   (LSE I) 1410Ω CONDUCTOR LOOP + 200Ω TELEPHONE SET RESISTANCE
   1-2 RINGERS: 2040Ω EXTERNAL CIRCUIT (LC2 - V1, V2, V5) OR 2155Ω (LC2 = V3, V4, V6, V7)
   (LSE II).
2. 3 RINGERS: 1500Ω EXTERNAL CIRCUIT
   1300Ω CONDUCTOR LOOP + 200Ω TELEPHONE SET RESISTANCE.

C - LSE AT CO IN CPS LINE

Fig. 164—Off-Premises Stations



NOTES:
1. LSR/LSO = LOOP SIGNALING REPEATER - LOOP START ONLY.
2. 1335Ω EXTERNAL CIRCUIT RESISTANCE TO LC02B (V1, V2, V5) CIRCUIT CONSISTING OF 1205Ω CONDUCTOR LOOP RESISTANCE + 130Ω MFT (T.U. AND LSO) INTERNAL RESISTANCE AT INTERMEDIATE CO. 2010Ω EXTERNAL CIRCUIT RESISTANCE TO LC02B (V3, V4, V6, V7).
3. A) 2740Ω EXTERNAL CIRCUIT RESISTANCE TO MFT OF INTERMEDIATE CO CONSISTING OF 2540Ω CONDUCTOR LOOP RESISTANCE + 200Ω STATION SET RESISTANCE (BASED ON 23 MA STATION SET REQUIREMENT).
   B) 2200Ω EXTERNAL CIRCUIT RESISTANCE TO MFT AT INTERMEDIATE CO CONSISTING OF 2000Ω CONDUCTOR LOOP RESISTANCE + 200Ω STATION SET RESISTANCE (BASED ON RINGING RANGE LIMIT FOR THREE RINGERS).
4. NOTE 2 VALUES ARE FOR -45 VDC INPUT TO LSR, NOTE 3 VALUES ARE FOR -72 VDC INPUT.

Fig. 165—LSO at CO in OPS Line

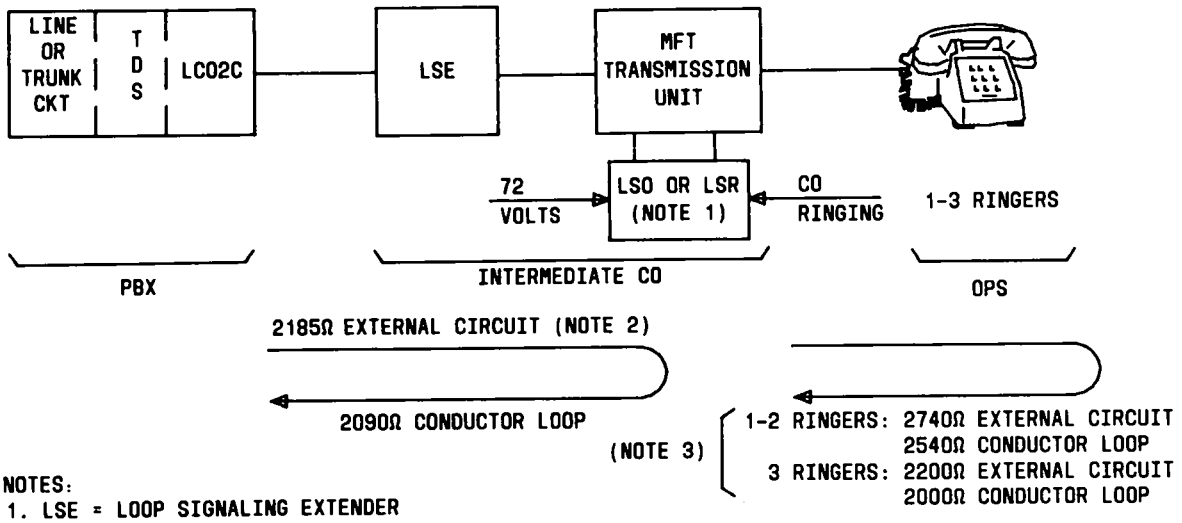
- J99343FC—Ground Start to DX or E&M (CO)—CPS19
- J99343FB—DX or E&M to Loop Start (STA)—CPS18
- J99343FP—Line Start to DX or E&M (CO)—CPS17
- J99345CD—Loop Signaling Extender II—CPS16
- J99343AD—Loop Signaling Repeater, Loop Start Only—CPS9
- J99343AC—Loop Signaling Repeater Unit—CPS8

7.32 The dc signaling range of the station loop can also be increased by using an LC361 as the PBX interface with an OPX instead of an LC02/LC02C. The LC361 can be used in special off-premises arrangements to eliminate using LSEs when the transmission loss is critical.

CENTRALIZED ATTENDANT SERVICE

7.33 The centralized attendant service (CAS) allows the PBX customer having several business locations served by a single PBX system or centrex to concentrate the attendant services at a main location. A typical CAS arrangement is shown in Fig. 168. The main location and each branch location have different listed directory numbers (LDNs). In Fig. 169 the primary location is designated location *1*. The PBX, central system, and associated CAS positions are concentrated at the main customer location.

7.34 Main and branch locations are individually connected via special release link trunks (RLTs). The release link trunk functions with the CAS to connect switched loops with calls requiring attendant action to a remote CAS attendant who can answer and extend the calls. When the RLT is seized on an LDN call, it provides a temporary connecting link between the PBX and a call distributing system. It provides the transmission path and returns the proper identification back over the same RLT. Once



NOTES:
1. LSE = LOOP SIGNALING EXTENDER

2. A) 2220Ω (LSE I) EXTERNAL CIRCUIT RESISTANCE TO LC02B (V1, V2, V5) CIRCUIT CONSISTING OF 2090Ω CONDUCTOR LOOP RESISTANCE + 130Ω MFT (T.U., LSO & LSE) INTERNAL RESISTANCE AT INTERMEDIATE CO.
   B) 3450Ω EXTERNAL RESISTANCE TO LC02B (V3, V4, V6, V7) CONSISTING OF 3320Ω CONDUCTOR LOOP RESISTANCE + 130Ω MFT RESISTANCE.
   C) 2485Ω (LSE II) EXTERNAL CIRCUIT RESISTANCE TO LC02B (V1, V2, V5) CIRCUIT CONSISTING OF 2355Ω CONDUCTOR LOOP RESISTANCE + 130Ω MFT RESISTANCE.

3. A) 2740Ω EXTERNAL CIRCUIT RESISTANCE TO MFT AT INTERMEDIATE CO CONSISTING OF 2540Ω CONDUCTOR LOOP RESISTANCE + 200Ω STATION SET RESISTANCE (BASED ON 23 MA STATION SET REQUIREMENT).
   B) 2200Ω EXTERNAL CIRCUIT RESISTANCE TO MFT AT INTERMEDIATE CO CONSISTING OF 2000Ω CONDUCTOR LOOP RESISTANCE + 200Ω STATION SET RESISTANCE (BASED ON RINGING RANGE LIMIT FOR THREE RINGERS).

Fig. 166—LSO and LSE at CO in OPS Line

the attendant releases the call, these trunks are then made available for other calls. When the CAS feature is provided in the DIMENSION 2000 or Custom PBX, a maximum of 16 RLTs can be connected between each branch PBX and the centralized answering point. Each RLT is equivalent in call-handling capability to a single attendant console at the PBX location.

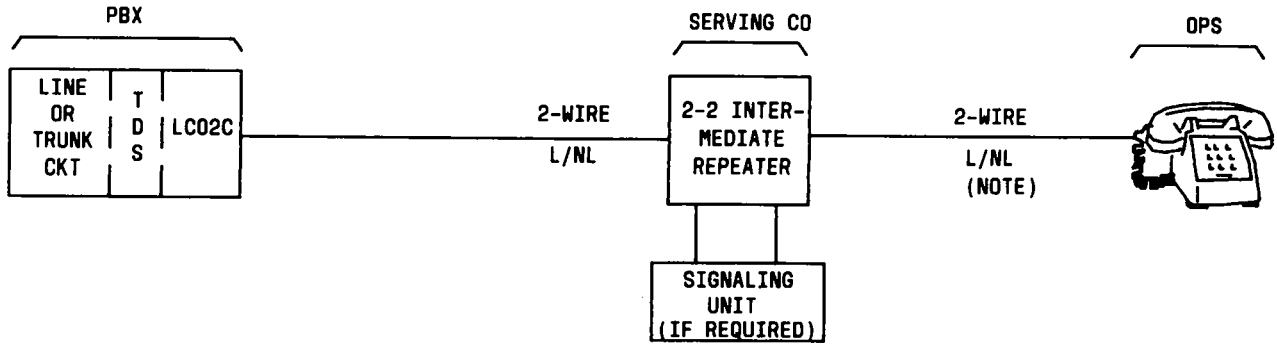
7.35 The DIMENSION PBX uses a standard tie trunk (LC11B) to provide 4-wire E&M or DX signaling for RLT operation. Whenever the main PBX uses the 2B automatic call distributor or 4A call distributor, a DX or E&M signaling-to-ground-start converter must be installed between the RLT and the main PBX. The converter (J99343FD, SD-1C359-01) is not required if the RLT is terminated at a No. 1 ESS. For more information on CAS, refer to Section 981-012-100.

7.36 Two RLT backup options are provided as follows:

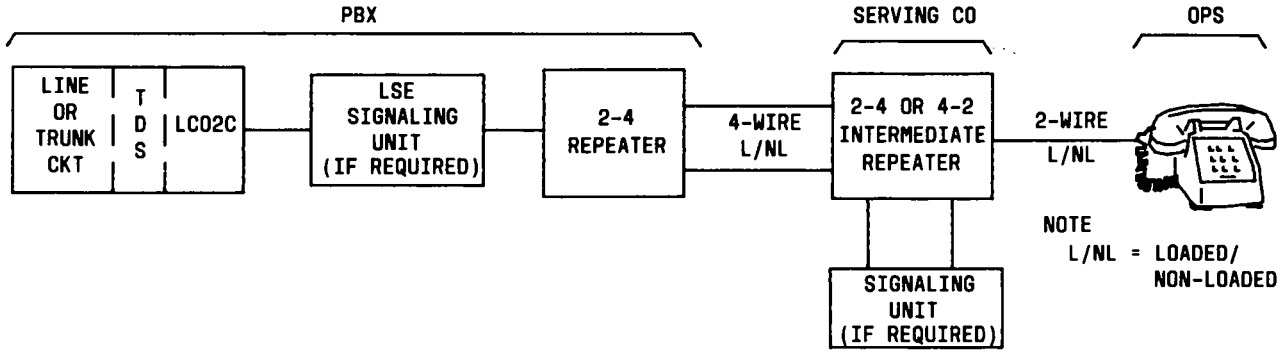
(a) ***Backup Control Telephone per RLT With a Lamp Panel:*** One backup nonkey set (control station set) is provided per RLT. These sets are equipped with a plug-in headset or a G15A handset, with modular cord and 478A adapters to supplement the existing headset and to allow the station user access to the handset prior to going off-hook. The control station can dial a code to transfer RLTs to backup facilities, dial-test RLTs and other trunks, and make any trunk or RLT maintenance-busy or unbusy. Recommended telephone sets for the backup function are 514BM, rotary dial, and the 2514BM, TOUCH-TONE telephone dial.

> ***Note:*** Lamp No. 5 on the 30A8 system status indicator provides a steady illumination for normal operation and blinks for backup mode of the RLTs.

(b) ***Trunk Answer From Any Station:*** The TAAS mode enables all RLT calls to be processed by the TAAS feature at the particular PBX. One call at a time will activate wall-mounted ringers at the branch PBX. These can be answered by any station. The answering station will use call transfer to extend the call to the desired station or trunk in the same manner as control stations.



A - 2-WIRE PBX-OPS LINE WITH 2-2 INTERMEDIATE REPEATER



B - COMBINED 2-WIRE/4-WIRE PBX-OPS LINE

Fig. 167—PBX OPS Line With Repeaters

8. GROWTH AND REARRANGEMENTS

8.01 For engineering information to aid in planning the addition of the following equipment to an existing DIMENSION 2000 or Custom PBX, refer to TOP Section 554-111-300.

All DIMENSION PBXs require LC02B, LC03C, LC09D, and LC49D circuit packs which contain additional protection from lightning surges and power crosses to meet FCC regulations.

- Line Cabinet (J58882C)
- Growth Control Carrier (J58882AD)
- Line Group Control Carrier (J58882BB)
- Line Port Carrier (J58879AC)
- Trunk Port Carrier (J58879BA)
- Tie Trunk Carrier (J58882BD)
- Link Carrier (J58882BC)
- Common Control Cabinet (J58882A)
- AC Power Distribution Unit (J58879PD-1)
- −48V Power Supply (KS-19642, List 6)
- Auxiliary Fuse Panel (J58879PF-1)
- Frequency Generator (J58879PC-1, List 1)
- Frequency Interrupter (J58879PC-1, List 3)
- Basic Control Carrier (J58882AC)—with high-speed memory
- Second Growth Control Carrier (J58882AG)—for 8K high-speed memory only.
- J58882 AK Carrier
- KS21447, L12, Minirecorder
- DCIU in AK Carrier when the PBX provides DCS or AP interface.

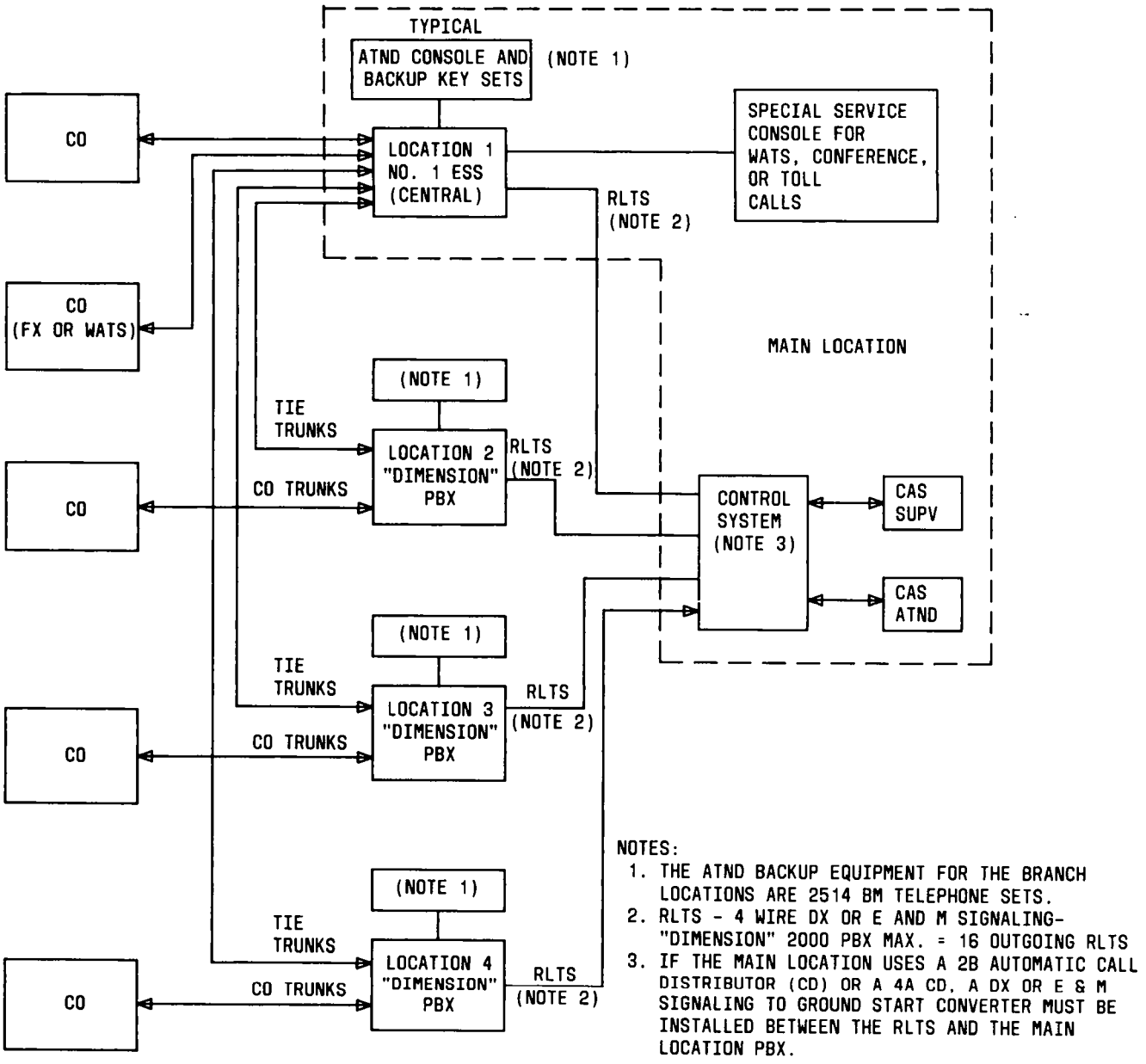


Fig. 168—CAS Arrangement Using DIMENSION PBX System—Block Diagram

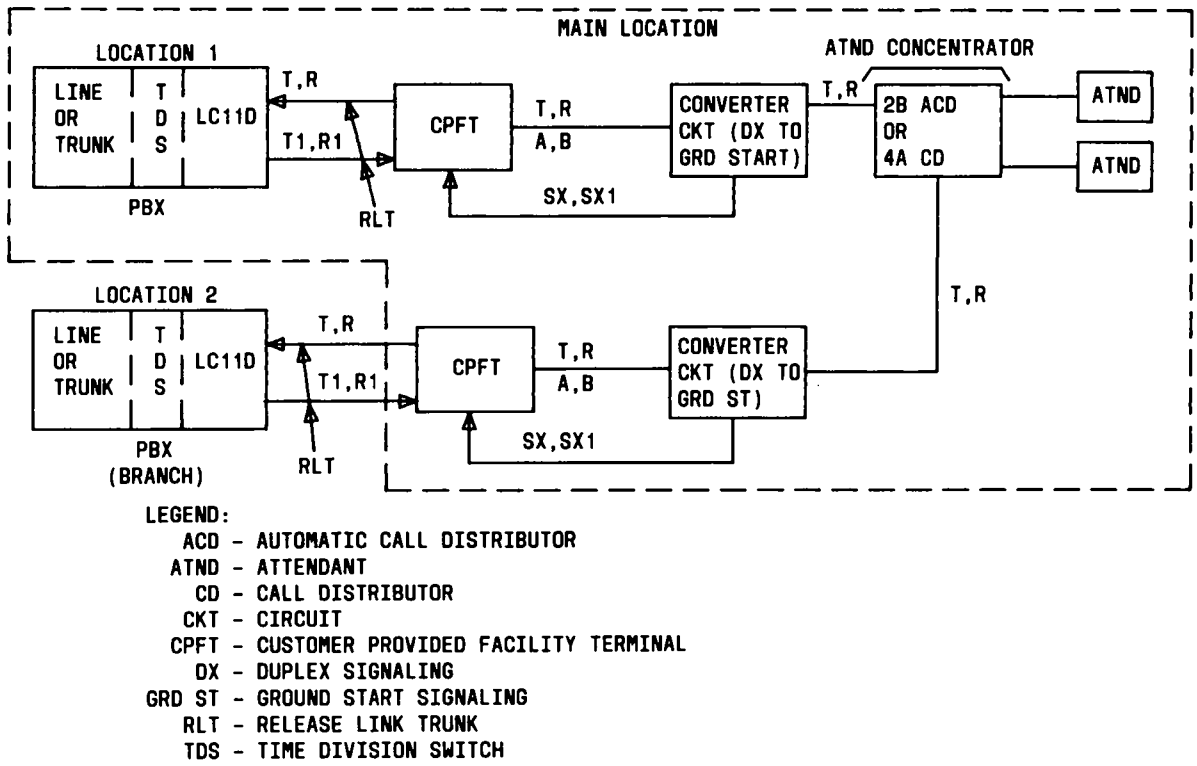
CONVERSION AND EXPANSION OF THE "DIMENSION" 2000 PBX

8.02 For engineering information to aid in the following expansions and conversions of the "DIMENSION" 2000 PBX, see the "DIMENSION" PBX System Expansion and Conversion Manual 500-308.

System Expansions and Conversions can include the following:

(a) System Expansions:

- Module Additions
- Duplicate Common Control Addition



LEGEND:
ACD - AUTOMATIC CALL DISTRIBUTOR
ATND - ATTENDANT
CD - CALL DISTRIBUTOR
CKT - CIRCUIT
CPFT - CUSTOMER PROVIDED FACILITY TERMINAL
DX - DUPLEX SIGNALING
GRD ST - GROUND START SIGNALING
RLT - RELEASE LINK TRUNK
TDS - TIME DIVISION SWITCH

Fig. 169—CAS Arrangement With Repeaters

- Second Growth Carrier Addition
- AUTOVON Addition
- Customer Administration Panel (CAP) Addition.

(b) System Conversions:

- Memory Configuration D to E Conversion
- FP7 to FP8 Conversion
- FP7 to FP9 Conversion
- 8K to 16K Memory Conversion
- SMDR I to SMDR II Conversion
- FP7 to FP12 Conversion
- FP7, FP8, FP9, FP12, to FP11 Conversion (2000/Custom)
- Uninterruptible Power Service Conversion
- FPxx to FP8, Issue 2, Conversion.◀

9. REFERENCES

9.01 The following sections are associated with the DIMENSION 2000 and Custom PBXs and, when available, may be used for additional information.

SECTION	TITLE
332-610-100	CPFT—General Description
332-610-200	CPFT—Installation
332-610-500	CPFT—Maintenance and Testing Information
332-910-180	MFT—General Applications Information
554-000-000	DIMENSION PBX Numerical Index (Refer to this index for TOP documents.)
554-000-100	DIMENSION PBX Miscellaneous Documentation Index (Refer to index for Administration and Maintenance Manual.)
554-010-100	DIMENSION PBX Attendant Console—Maintenance Support Information

SECTION	TITLE
554-010-101	DIMENSION Type PBXs—Auxiliary Circuits—Maintenance Support Information
554-010-110	DIMENSION PBX Electronic Custom Telephone Service—System Description
554-111-100	DIMENSION 2000 and Custom PBXs—System Description
554-111-105	DIMENSION 2000 and Custom PBXs—Call Processing—Maintenance Support Information
554-111-106	DIMENSION 2000 and Custom PBXs Scanner/Distributor and Network Control—Maintenance Support Information
554-111-107	DIMENSION 2000 and Custom PBXs—PAM Network and Port Circuits—Maintenance Support Information
554-111-108	DIMENSION 2000 and Custom PBXs—Central Processor—Maintenance Support Information
554-111-115	X-Ray Program Package—Operating Procedure—DIMENSION 2000 and Custom PBXs
554-112-100	DIMENSION 2000 and Custom PBXs—Software Operation—Maintenance Support Information
554-191-100	DIMENSION PBX Feature Document Reference Guide
809-002-100	PBX Equipment Space Requirements
809-659-160	111A Power Plant, 22 to 26, 44 to 50, or 44 to 52 volts 0 to 800 Amperes Positive or Negative Ground, Equipment Design Requirements—Power Systems
500-308	DIMENSION PBX System Expansion and Conversion Manual.◀

9.02 The following ***schematic diagrams (SDs)*** and associated ***circuit descriptions (CDs)*** are applicable and may be referred to when required.

SD-1C359-01, Issue 24B—Metallic Facility Terminal Circuit

SD-1E290-01, Issue 8—Emergency Transfer Circuit

SD-1E450-01, Issue 8—Electronic Telephone Controller

SD-1E480-01, Issue 42B—Systems Circuit CSS 201L

SD-1E481-01, Issue 7D—System AC and DC Power Distribution

SD-1E482-01, Issue 5B—MAAP

SD-1E483-01, Issue 13D—AC Distribution, Fan Assembly, and Frequency Generator Circuit

SD-66040-08—Tie Trunk Circuit

SD-69910-01, Issue 8AC—Attendant Console

SD-7C010-01, Issue 9B—Specification for Customer Premises Facility Terminal (CPFT).

9.03 The following ***J-drawings*** are associated with the DIMENSION 2000 and Custom PBXs and may be referred to for additional information:

J58879AC-2, Issue 20—Line Port Carrier

J58879BA-2, Issue 28—Trunk Port Carrier

J58879F-2, Issue 12—Auxiliary Cabinet

J58882A-1, Issue 36—Common Control Cabinet

J58882B-1, Issue 37—Module Control Cabinet

J58882C-1, Issue 33—Line Cabinet

J58882E-1, Issue 9—Common Control Cabinet

J58882AC-1, Issue 23—Basic Control Carrier With High-Speed Memory

J58882AD-1, Issue 11—Growth Control Carrier With High-Speed Memory

J58882AG-1, Issue 8—Second Growth Control Carrier

J58882AH-1, Issue 6—Control Growth Carrier

J58882AJ-1, Issue 3—Supplementary I/O Carrrier

J58882BA-3, Issue 12—Module Control and Trunk Port Carrier

J58882BB-3, Issue 11—Line Group Control Carrier

J588882BC-3, Issue 5—Link Carrier

J58882BD-1, Issue 13—Tie Trunk Carrier

J58882DA-1, Issue 5—Control and Alarm Panel (Unduplicated)

J58882DB-1, Issue 9—Control and Alarm Panel (Duplicated)

J58882DC-1, Issue 10—MAAP Panel

J58882JA-2, Issue 10—AC Distribution, Fan Assembly, and Frequency Distribution

J58882TA-1, Issue 9—Stored Tape Program Memory—System (KS-21439, List 1, is 92 meters [300 feet] and KS-21439, List 2, is 137 meters [450 feet])

J58882TB-1, Issue 13—X-Ray Program.

9.04 The following ***equipment drawings (EDs)*** are associated with the DIMENSION 2000 and Custom PBXs and may be referred to for additional information.

ED-1E300-01, Issue 9—Systems Equipment Information

ED-1E301-01, Issue 6—Environmental Requirements

ED-1E302-01, Issue 2—Interconnecting Requirements

ED-1E304-01, Issue 3—Printed Backplane Interconnection

ED-1E312-71, Issue 4—Circuit Pack Carrier Assembly

ED-1E314-70, Issue 11—Cabinet Structure

ED-1E315-70, Issue 14—Cabinet Doors and Covers

ED-1E321-70, Issue 10—Power and Ground Bus Bar Distribution

ED-1E360-70, Issue 5—DC Power Distribution Facilities

ED-1E361-70—AC Power Distribution Panel Assembly

ED-1E362-10, Issue 2—Floor Rail Assemblies

ED-1E364-70, Issue 11—Thermal Assembly Unit

ED-1E366-70, Issue 10—Cable Duct Assembly (MD)

ED-1E367-11, Issue 29—Cable Assemblies

ED-1E368-01, Issue 6—System AC Distribution Equipment

ED-1E374-01, Issue 3—System Arrangement and Installation Document

ED-1E375-71, Issue 1—AC Protector Cabinet

ED-1E375-72, Issue 1—DC Protector Cabinet

ED-1E376-70, Issue 4—Module AC Distribution Box

ED-1E393-70, Issue 2—Cable Duct Assembly

ED-1E394-01, Issue 5—Cable Duct Assembly

ED-1E398-70, Issue 3—Cable Duct Assembly DIMENSION 2000 and Custom PBXs