"DIMENSION*" 600 PBX

(FORMERLY "DIMENSION" 400E PBX)

PREINSTALLATION AND PLANNING INFORMATION

CONTENTS PAGE

*Registered trademark of AT&T.

CONTENTS PAGE

CONTENTS PAGE

*Registered trademark of the Audichron Co.

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

*Registered service mark of AT&T.

CONTENTS PAGE

Figures

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

Tables

CONTENTS PAGE

1. GENERAL

1.01 This section provides information, instructions, and examples of completed worksheets for use in planning a new DIMENSION 600 (formerly DIMENSION 400E) PBX installation (Fig. 1) or in planning growth and rearrangement to an existing system.

1.02 The reasons for reissuing this section are listed below. Since this reissue is a general revision, no revision arrows have been used to denote significant changes.

(a) Remove peripheral uninterruptible power service (UPS).

(b) Modified 3A code call.

(c) Add latest Customer Administration Center System (CACS) cabinet.

(d) Add current system information.

(e) Provide information for Energy Communications Service Adjunct (ECSA).

(f) Add Packaged Metallic Facility Terminal Assemblies (PMFTA).

(g) Delete worksheets which are also supplied in the customer order document (COD) and worksheets which relate to CPFT which are now rated manufacture discontinued (MD).

Unless otherwise noted, the information contained in this BSP pertains to both DIMENSION 400E and DIMENSION 600 PBXs. Where differences exist between the two PBXs, separate coverage is provided.

1.03 The DIMENSION 600 PBX is similar to the DIMENSION 400E PBX. The basic differences are that the DIMENSION 600 PBX can be provided with an additional equipment cabinet (total of four), an additional time slot bus, and additional Feature Packages (FPs) 8, 11, and 12. Both PBXs can be provided with FP9, but only DIMENSION 400E PBX can be provided with FP7. Refer to Table A for a summary of system differences.

Completion of the administrative worksheets is the ultimate function of Business Services personnel. The worksheets should be arranged in the same sequence that the work is to be performed.

1.04 Worksheets for apparatus and/or equipment interconnections are provided for installation information. Appropriate worksheets should be arranged in the same sequence in which the work is to be performed.

1.05 A Mechanized Ordering Form (E-8124) may be used for initial and/or subsequent ordering for growth and rearrangement. 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

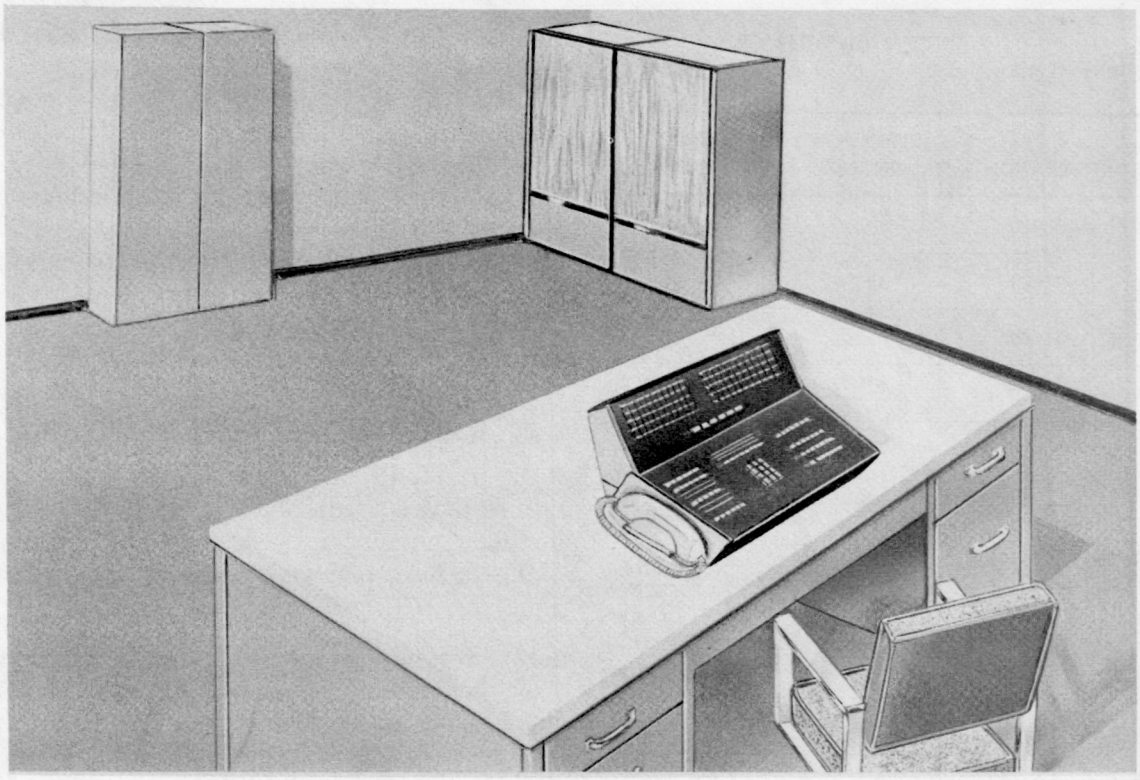


Fig. 1—Typical DIMENSION 400E/600 PBX System

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.

1.06 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 and the data arranged in the sequence in which the work is to be performed. Where the sequence is critical, it may be desirable to complete one worksheet per feature even though this requires more than one copy of worksheet per maintenance and administration panel (MAAP) PROC.

1.07 Last-minute customer orders may require that changes to translation data, such as class of service, numbering plan, hunting, trunk grouping, and other familiar customer-furnished data, be modified at the time of installation. Examples of filled-in worksheets are provided in Fig. 2 through 9.

1.08 Items such as some power equipment, connector cables, etc, may be shipped ahead of the cabinets to facilitate the installation. The following items should be available at the customer location before the actual installation begins:

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

TABLE A

SUMMARY OF SYSTEM DIFFERENCES

SYSTEM CONFIGURATION	"DIMENSION" 400E PBX	"DIMENSION" 600 PBX
1-Cabinet System	Yes	Yes
2-Cabinet System	Yes	Yes
3-Cabinet System	Yes	Yes
4-Cabinet System	No	Yes
Single Time Slot Bus (1672 ccs)	Yes	Yes
Dual Time Slot Bus (3672 ccs)	No	Yes
Feature Package 7	Yes	No
Feature Package 8	No	Yes
Feature Package 9	Yes	Yes
Feature Package 11	No	Yes
Feature Package 12	No	Yes

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

1.09 This section is based on the drawings listed in Part 8. 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.

2. HOW TO USE THE SECTION

2.01 When planning a new installation, the material in Parts 4 through 7 should be reviewed to ensure that all requirements for power, protection, auxiliary circuits, miscellaneous components, floor plan, etc, have been given adequate consideration.

2.02 System changes 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 for each feature.

A circuit pack is normally replaced with a circuit pack having either the same or later alpha suffix as printed on the carrier label. That is, an LC08 cannot be used if the label specifies LC08B. The LC08B, C, or later alpha-suffixed circuit packs are suitable replacement.

2.03 Refer to Parts 4 through 6 and consider all necessary areas such as cabling, auxiliary equipment, additional power and/or grounding, etc, that are required to provide the changes.

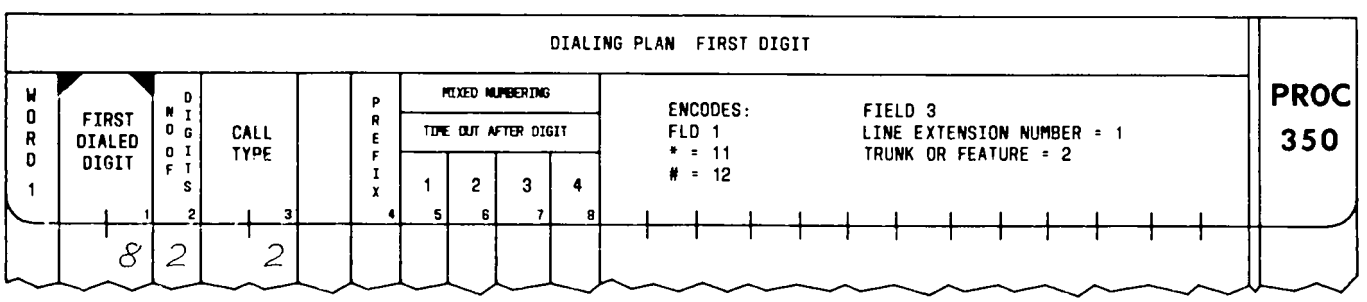


Fig. 2—PROC 350, WD 1, Worksheet

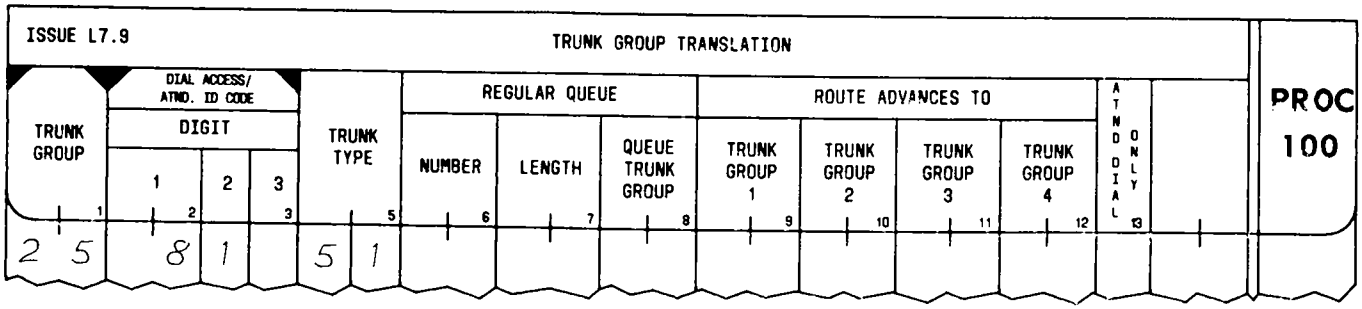


Fig. 3—PROC 100 Worksheet

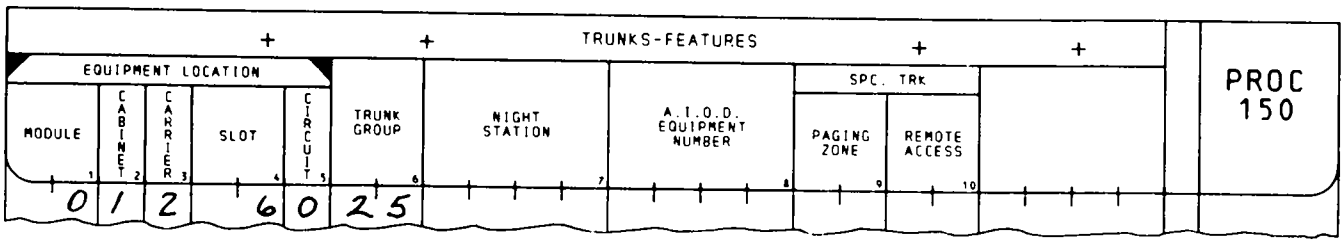


Fig. 4—PROC 150 Worksheet

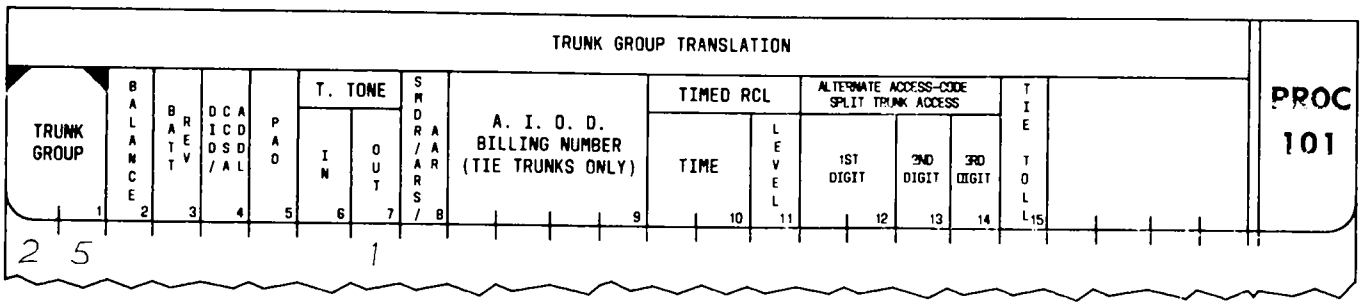


Fig. 5—PROC 101 Worksheet

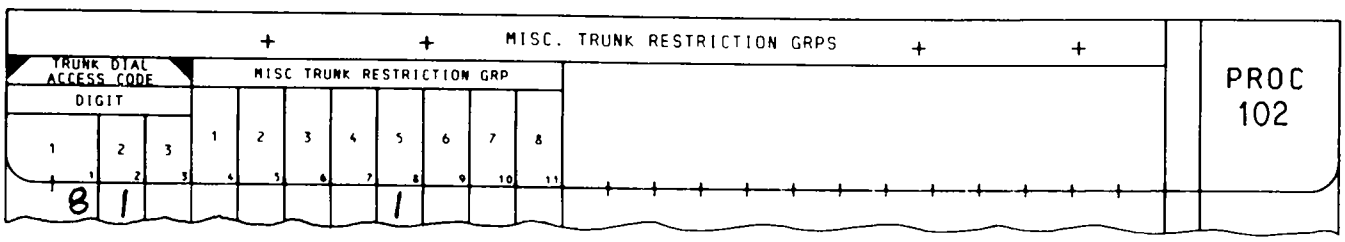


Fig. 6—PROC 102 Worksheet

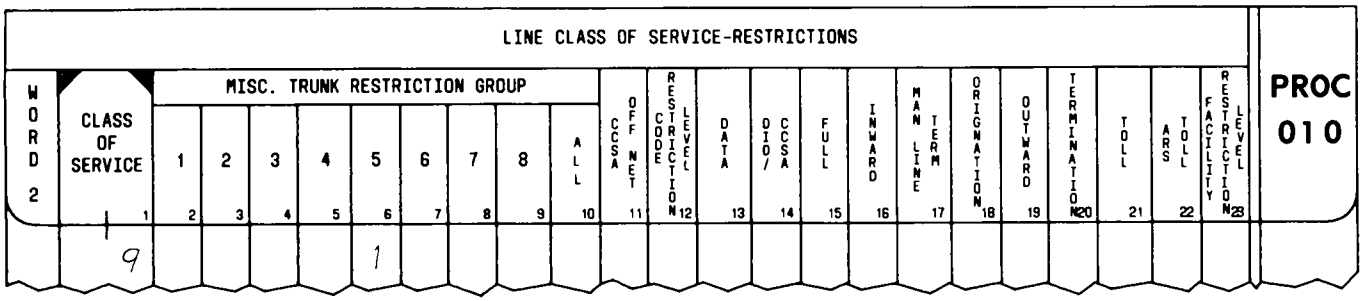


Fig. 7—PROC 010, WD 2, Worksheet

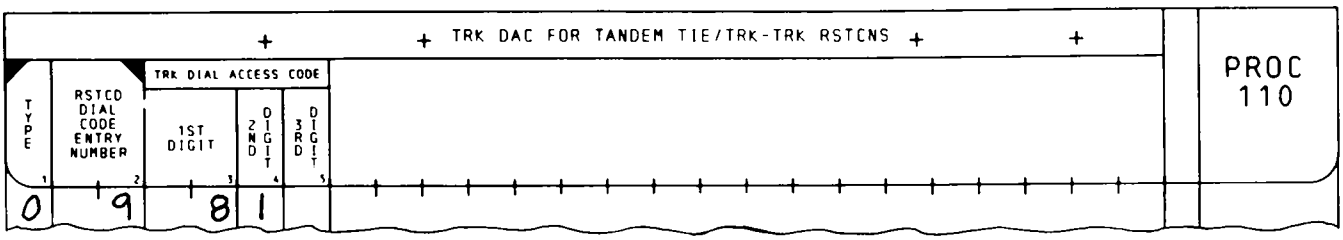


Fig. 8—PROC 110 Worksheet

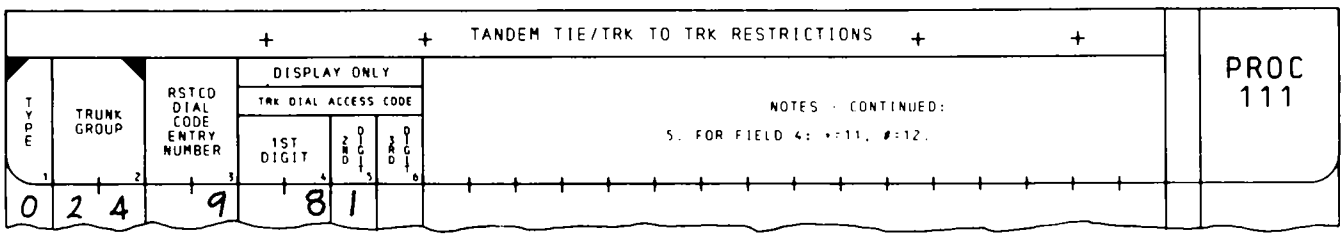


Fig. 9—PROC 111 Worksheet

2.04 The fill-in interconnection worksheets (Part 9) should be reproduced and completed as required.

2.05 The process involved in engineering a feature is provided in the explanations and example contained in Part 3. The example is designed to provide a guide to engineering any feature. Refer to Numerical Index (Section 554-000-100) for the Administration and Maintenance Manual for administration of features using the maintenance and administration panel (MAAP) procedures (PROCs).

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 feature presented in this part emphasizes both the hardware and software considerations necessary when administering the feature. The example is defined and administered to show as many functions as possible, but this feature is not intended to be representative of actual feature implementation.

RECORDED TELEPHONE DICTATION ACCESS (Example)

3.02 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.

3.03 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 dialing 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 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 conversion can be provided in the standard manner. It may be less costly to provide external equipment, if an auxiliary cabinet is installed, to allow carrier space for the circuit packs providing TOUCH-TONE dialing service.

3.04 The example defined in paragraph 3.03 makes the following worst case assumptions in explaining recorded telephone dictation access.

- Traffic requirements dictate additional registers required and external TOUCH-TONE dialing conversion should be provided.

- Recorded telephone dictation and TOUCH-TONE dialing conversion equipment is to be mounted in an auxiliary cabinet. (See Part 5.)

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

- J58827E-1, List 1, A and C; recorded telephone dictation trunk unit, wired per wiring options as described in Part 5. Other options required for this trunk are dependent on specific customer requirements which should be provided at the time of installation.

- J58827E-1, List 2, WB; recorded telephone dictation TOUCH-TONE dialing interface unit.

- J99289A-1, List 1, A and D; TOUCH-TONE calling receiver mounting shelf. This mounting shelf is arranged to accommodate two J59204CA (senior) TOUCH-TONE calling receiver units per J99289B-1.

- J99289B-1, List 1, SA and D; TOUCH-TONE calling receiver unit.

- LC13B auxiliary trunk circuit pack. (Provides two circuits.)

- J58879F-1, 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 ensure that a power supply and frequency generator are provided.)

- Miscellaneous connecting blocks and cables.

3.06 A typical example of interconnecting wiring for recorded telephone dictation is shown in Fig. 10. Information is furnished to show detailed wiring connections.

3.07 A list of administrative requirements for the auxiliary trunk used with the recorded telephone dictation access feature is as follows:

- Assigned to trunk group 25.

- Equipment location, module 0, cabinet 1, 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.

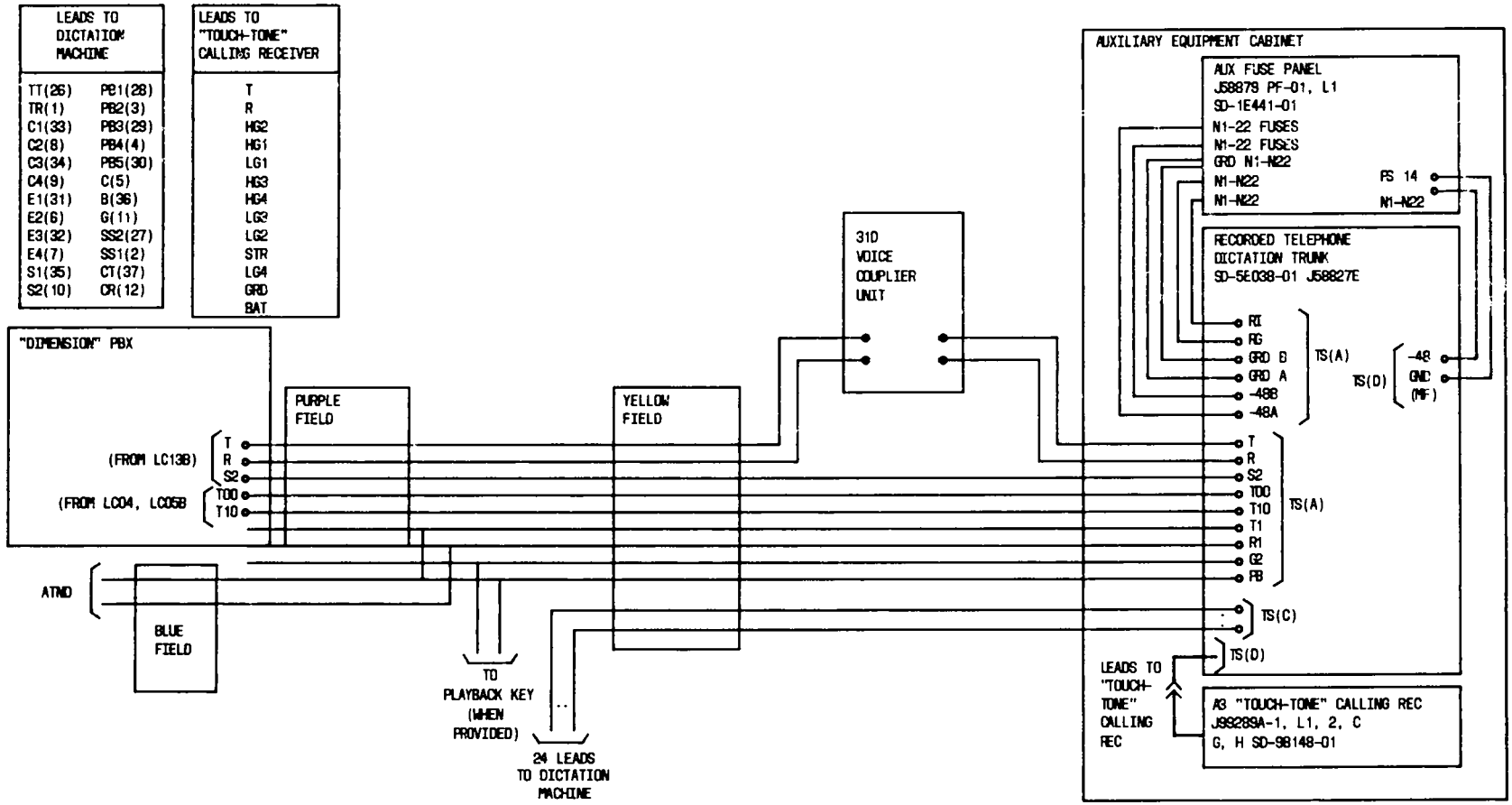


Fig. 10—Block Diagram of Recorded Telephone Dictation Trunk Connection

3.08 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 which is indicated by the 2 shown in FLD 3. If existing trunks or features are already assigned a dial access code of 8X, it would not be necessary to use this procedure. If a dial access code of 8X is used, stations may not be assigned with a first digit 8.

3.09 The PROC 100 worksheet (Fig. 3) shows that trunk group 25 contains trunk type 51 and assigned access code 81.

3.10 The PROC 150 worksheet (Fig. 4) shows that the LC13 circuit pack in module 0, cabinet 1, carrier 2, slot 06, circuit 0, is assigned to trunk group 25.

3.11 The PROC 101 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 dialing out compatibility by entering 1 in FLD 7. Normally, the DIMENSION PBX capability to convert TOUCH-TONE dialing pulses to rotary pulses would be employed, and FLD 7 would contain a zero (0) to indicate rotary outpulsing. All trunk types must be the same in each trunk group.

3.12 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 no station is restricted from accessing the dictation trunk, 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, 2, and 3, as required.

3.13 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 by entering a 1 in FLD 6 (miscellaneous trunk group 5). Other classes of service may also be restricted from using recorded telephone dictation access. Class-of-service 9 may allow or restrict features, as required in PROC 010, WD 1. The PROC 010, WD 1, is used to administer features (only) but not miscellaneous trunk groups. This procedure is not provided as a part of this example, but a new class of service may require entries in this procedure. If class-of-service 9 was not previously assigned, PROC 010 would require a fill-in worksheet. Since sequence is not critical in connection with class-of-service held assignments, separate sheets per feature are not required. If access to dial dictation is allowed to all stations, this procedure is not required.

3.14 When assigning a new class of service, use PROC 000, WD 1. A completed 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.

3.15 Worksheets for PROC 110 (Fig. 8) and PROC 111 (Fig. 9) are used for tandem tie trunk and trunk-to-trunk restrictions. Enter 0 for tandem tie restrictions and 1 for trunk-to-trunk restrictions. The example shows that the trunk group assigned dial access code 81 is also assigned restricted trunk 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. The CO-type trunks and dial repeating tie trunks are automatically denied access to recorded telephone dictation and associated equipment by call processing routines.

3.16 The example shows (via dial access code 81) 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 0 in FLD 1, the restricted dial code entry number in FLD 2, and the dial access code of recorded telephone dictation in FLDs 3, 4, and 5. Also, in PROC 111, enter 0 in FLD 1, 24 in FLD 2, and the restricted dial code entry number in FLD 3 which was entered in PROC 110. If the PBX has no tandem tie trunks or if the tandem tie trunks are not restricted from the feature, the PROCs are unaffected.

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

3.17 Software records are status memory words used to:

- Record the state of the associated physical trunk (if any)

- Record the identity and status of the facilities involved in a connection.

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

3.19 Trunk group 8 (outgoing trunk queue [OTQ] records) is an example of a trunk group software record that can be optionally assigned as a group of records to be used to record a list of extensions waiting for access to some other physical trunk group. This queuing trunk group must be defined in PROC 100, and the number of records in this group (length of queue) must be specified. Trunk groups 8 through 11 and 18 through 99 are optionally assigned at the factory or on site via the MAAP procedures.

3.20 Table B (DIMENSION 400E PBX) and Table C (DIMENSION 600 PBX) show the maximum number of lines, trunks, and other system parameters possible with memory sizes B, C, and D and generic programs. All maximums cannot be simultaneously attained.

4. INSTALLATION CONSIDERATIONS

PHYSICAL ARRANGEMENTS

4.01 The DIMENSION 400E and 600 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 (Fig. 11, 12, and 13). 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 types of carriers vary in accordance with customer requirements. The cabinets are shipped fully equipped from the factory and rollers are provided for ease of installation and maintenance. A cabinet lock is supplied which utilizes the 216C tool as a key. Front panels are available to blend with office decor and can be ordered in avocado, blue, gold, orange, red, teak, or walnut. A black front panel is available for customer modification for office decoration. The side panels are provided in a neutral (beige) color.

4.02 The DIMENSION 400E and 600 PBXs may consist of a 1-, 2-, or 3-cabinet system. The DIMENSION 600 PBX may also consist of a 4-cabinet system. Each system requires a control cabinet (Fig. 11). The 2-, 3-, or 4-cabinet systems associated with the 600 PBXs may be provided with a single or dual time slot bus. The 1-cabinet system in either the 400E or 600 PBX can be provided with only a single time slot bus. Each of the 1-cabinet systems can be configured for maximum lines or trunks through the appropriate choice of carriers. Refer to Table D for the maximum lines and trunks.

4.03 The ***2-cabinet system*** requires either a line cabinet (Fig. 12) or a module control cabinet (Fig. 13) in addition to the control cabinet. The system can be configured for maximum lines or for maximum trunks through the appropriate choice of cabinets. (See Table D.)

4.04 The ***3-cabinet system*** can also be configured for either a maximum line size or a maximum trunk size. Table D shows the cabinet arrangements required to provide the maximum lines and trunks for a 3-cabinet system with a single or dual time slot bus.

4.05 The ***4-cabinet system*** can also be ordered with a single or dual time slot bus. See Table D for the cabinet arrangements required to provide the maximum lines and trunks. The C-size memory is required for maximum lines or trunks.

4.06 The dual-bus configuration is optional for FP8, FP9, FP11, and FP12. Only the single bus configuration is available with FP7. Hardware and software changes are required for the activation of the second time slot bus. These changes cannot be administered by the MAAP. Systems may be ordered new with the second bus activated or may have the second bus activated through "blow-back" procedures. This requires sending a copy of the existing tape with up-to-date translations to Western Electric.

4.07 Additional hardware required for a dual-bus system consists of:

- A second module control and trunk port carrier.
- One second line/trunk central PAM amplifier (LC103B) and one link central PAM amplifier (LC104) for the second module control and trunk port carrier.

TABLE B

"DIMENSION" 400E PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)	
			B	C
Equipment	Cabinet	7	3	3
		9	3	3
	Modules	7	1	1
		9	1	1
	Line Carrier	7	12	12
		9	12	12
	Trunk Carrier	7	6	8
		9	6	8
System	Attendant Console	7	6	8
		9	9	10
	Attendant Console Switch Loop	7	36	48
	Attendant Console DSS Groups	7	18	18
		9	18	32
	Attendant Conference Circuits	7	2	2
		9	2	2
	ECTS Controllers	7	5	8
	ECTS Station Sets	7	325	500
	Custom Intercom Numbers	7	650	1000
	Station Lines	7	746	746
		9	746	746
	Speed Calling Number	7	800	1000

See Note at end of table.

TABLE B (Contd)

"DIMENSION" 400E PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)	
			B	C
System (Contd)	Calling Number Display (Note 2)	7	6	6
		9	9	11
	Long Distance Billing Journal Printers	7	9	14
		9	9	14
	Assignable Software Input/Output Data Channels (Note 3)	7	14	14
		9	14	14
	Peripheral Interface Circuit	9	12	18
	Remote Access Trunks	7	6	12
Traffic	Trunk Groups	7	99	99
		9	99	99
	Message Register Trunks	9	128	192
	OTQ SMDR Digit Records	7	84	87
	Physical Trunks	7	130	184
		9	130	311
	SMDR Records	7	76	105
	Dial Pulse and TOUCH-TONE Dialing Originating Register	7	24	31
		9	24	31
	Total Originating Register Records (Note 4)	7	32	41
		9	42	53
	Total Trunk Records (Note 5)	7	317	407
		9	317	407

See Notes at end of table.

TABLE B (Contd)

"DIMENSION" 400E PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)	
			B	C
Traffic (Contd)	Total Memory Circuit Packs (16K/64K words each) (Note 6)	7	8/2	9/3
		9	11/3	12/3
	Quantity of Memory Words Required	7	128K	144K
		9	176K	192K

Note 1: Maximum capacity is shown. Maximum quantities of both line and trunks cannot be provided in the same system.

Note 2: The maximum number of I/O channels (LC34B circuits) that can be assigned to the Calling Number Display feature is contingent upon the number of attendant consoles, ECTS controllers, one for SMDR, one for RMATS, and one for MAAP assigned.

Note 3: With 16K C memory, the I/O channels would be 14.

Note 4: Sum of consoles, attendant conferences, and station dial records.

Note 5: Sum of console switched loops physical trunk records, intercom records and queue lengths, ANI queue records, and total originating register records.

Note 6: 16K memory hardware has been discontinued.

- A second group PAM amplifier (LC102) must be provided for each line group control carrier and for each module control and trunk port carrier.

- One tone circuit (LC204) for the second line group control carrier (most likely located in the module control cabinet).

- Cables for connecting the second module control and trunk port carrier to each line group control carrier and to the control carrier and the module control and trunk port carrier in the control cabinet.

4.08 The dual-bus time slot configuration requires that the second cabinet for any system be a module control cabinet. The dual-bus time slot configuration increases the switching capacity from 1672 CCS to 3672 CCS.

4.09 Refer to Section 554-105-100 for detailed information concerning physical arrangement of carriers.

ENVIRONMENTAL REQUIREMENTS

A. Atmospheric and Temperature

4.10 Extreme conditions of temperature and humidity may have damaging effects on system equipment. Exposure to extreme temperature and/or humidity may degrade telephone service, not only at the time of exposure but also when a normal environment is restored. Table E outlines the equipment room environmental requirements for the system. The humidity design range chart (Fig. 14) is provided to indicate the safe ranges for the equipment. The use of the chart requires a hygrometer to measure wet and dry bulb temperatures and a psychocrometric

TABLE C

"DIMENSION" 600 PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)		
			B	C	D
Equipment	Cabinets	8 & 12	—	4	—
		9	4	4	—
		11	—	—	4
	Modules	8 & 12	—	1	—
		9	1	1	—
		11	—	—	1
	Line Carriers	8 & 12	—	18	—
		9	12	18	—
		11	—	—	18
	Trunk Carriers	8 & 12	—	9	—
		9	6	8	—
		11	—	—	9
System	Attendant Console (Note 2)	8 & 12	—	14	—
		9	9	15	—
		11	—	—	15
	Attendant Console Switched Loops	8 & 12	—	84	—
		9	54	90	—
		11	—	—	90
	Attendant Console DSS Groups	8 & 12	—	32	—
		9	18	32	—
		11	—	—	64

See Notes at end of table.

TABLE C (Contd)

"DIMENSION" 600 PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)		
			B	C	D
System (Contd)	Attendant Conference Circuits	8 & 12	—	6	—
		9	2	2	—
		11	—	—	6
	ECTS Controllers	8 & 12	—	8	—
		11	—	—	8
	ECTS Station Sets	8 & 12	—	500	—
		11	—	—	800
	Custom Intercom Numbers	8 & 12	—	1000	—
		11	—	—	1280
	Station Lines *Dual Bus	8 & 12	—	1020*	—
		9	716	1020*	—
		11	—	—	1020*
	Speed Calling Numbers	8 & 12	—	1000	—
		11	—	—	2000
	Calling Number Display (Note 3)	8 & 12	—	6	—
		9	9	11	—
		11	—	—	13
	Long Distance Billing Journal Printers	9	9	15	—
		11	—	—	15
	Assignable Software Input/Output Data Channels (Note 4)	8 & 12	—	28	—
		9	14	28	—
		11	—	—	36

See Notes at end of table.

TABLE C (Contd)

"DIMENSION" 600 PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)		
			B	C	D
System (Contd)	Peripheral Interface Circuits	9	12	18	—
		11	—	—	18
	Remote Access Trunks	8 & 12	—	30	—
		11	—	—	45
	Release Link Trunks (Outgoing)	8 & 12	—	16	—
		11	—	—	16
	Release Link Trunks (Incoming)	8 & 12	—	110	—
		11	—	—	110
Traffic	Trunk Groups	8 & 12	—	99	—
		9	99	99	—
		11	—	—	99
	Message Register Trunks	9	128	192	—
		11	—	—	192
	OTQ SMDR Digit Records	8 & 12	—	246	—
		11	—	—	382
	Assignable Trunk Records (Note 5)	8 & 12	—	563	—
		9	242	311	—
		11	—	—	993
	SMDR Records	8 & 12	—	298	—
		11	—	—	562
	Dial Pulse and TOUCH-TONE Originating Registers	8 & 12	—	62	—
		9	24	31	—
		11	—	—	120

See Notes at end of table.

TABLE C (Contd)

"DIMENSION" 600 PBX SYSTEM PARAMETERS

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION (NOTE 1)		
			B	C	D
Traffic (Contd)	Total Originating Register Records (Note 6)	8 & 12	—	82	—
		9	35	48	—
		11	—	—	141
	Total Trunk Records (Note 7)	8 & 12	—	736	—
		9	338	456	—
		11	—	—	1231
	Total Memory Circuit Packs (16K/64K Words Each)	8 & 12	—	16/4	—
		9	11/3	12/3	—
		11	—	—	NA/8
	Quantity of Memory Words Required	8 & 12	—	256K	—
		9	176K	192K	—
		11	—	—	512K

Note 1: Maximum capacity is shown. Maximum quantities of both line and trunks cannot be provided in the same system.

Note 2: Feature Package 8 PBXs that are equipped with deluxe queuing and interposition calling features reduce the maximum number of consoles shown in the table by two.

Note 3: The maximum number of I/O channels (LC34B circuits) that can be assigned to the Calling Number Display feature is contingent upon the number of attendant consoles, ECTS controllers, one for SMDR, one for RMATS, and one for MAAP assigned.

Note 4: With 16K C memory, the I/O channels would be 14.

Note 5: Assignable trunk records includes physical (hardware) trunks, intercom records, outgoing trunk queuing records.

Note 6: Sum of consoles, attandant conferences, and station dial records.

Note 7: Sum of console switched loops, assignable trunk records, ANI queue records, total originating register records, and one dummy Read address record.

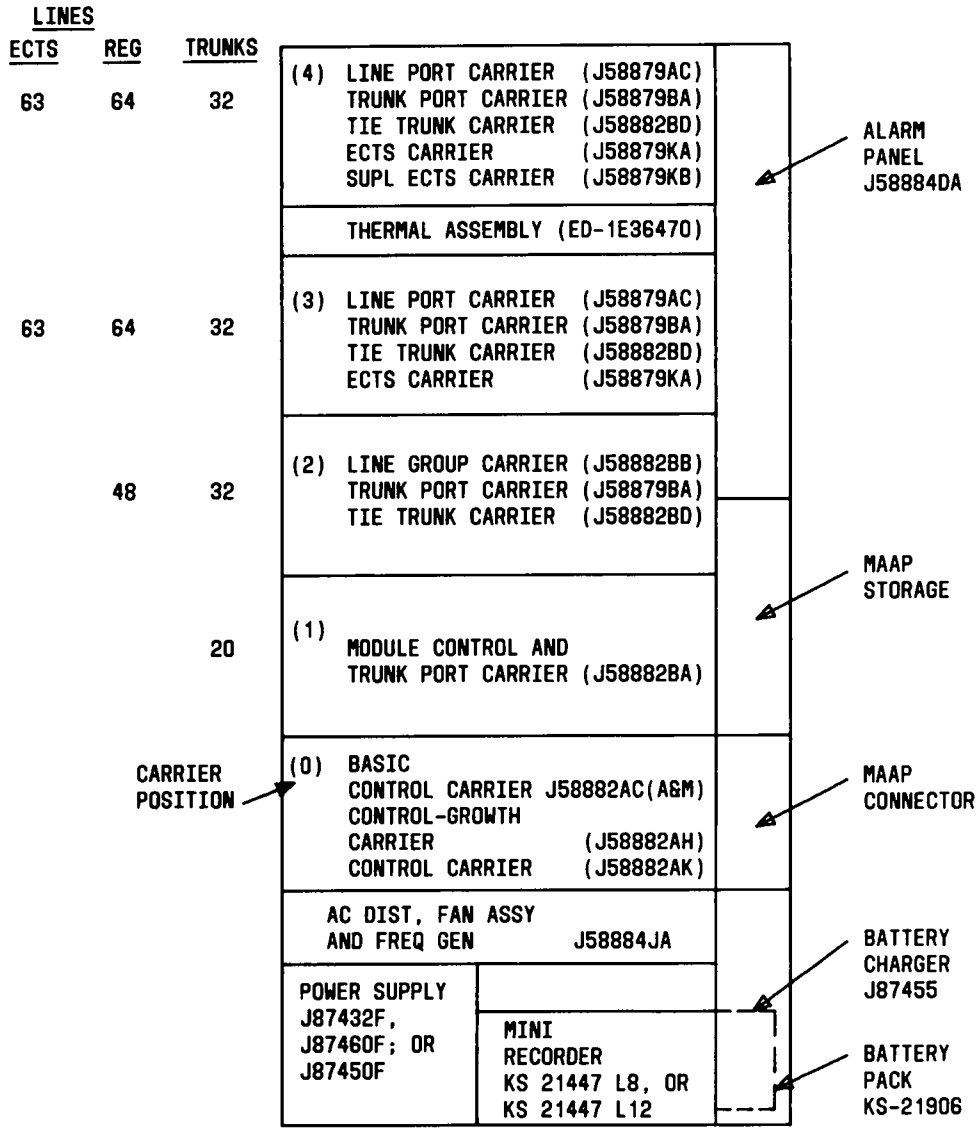


Fig. 11—DIMENSION PBX—Control Cabinet

table to determine the relative humidity from the difference in the two measurements. Typical and maximum heat dissipation for a fully equipped cabinet is given in Table F.

4.11 The requirements presented in Table E represent the extreme limits of the equipment operating ranges. These requirements should not be construed as being desirable working conditions for minimum maintenance. Installation in nondesirable areas (eg, areas outside the temperature range of 4.5°C to 35°C [40°F to 95°F] and outside the relative humidity range of 20 to 60 percent) will cause degradation of service and reduce system life.

4.12 The permissible extremes for storage and transportation environments are 66°C (150°F) with a minimum relative humidity of 15 percent and a low temperature of −40°C (−40°F) with the humidity uncontrolled. Large temperature excursions, shock, and vibration affect the tape cartridge and can cause read/write errors when operation begins. The tape cartridge should not be inserted in the transport during shipment but, instead, should be placed in a dust-free container such as a sealed plastic wrapper.

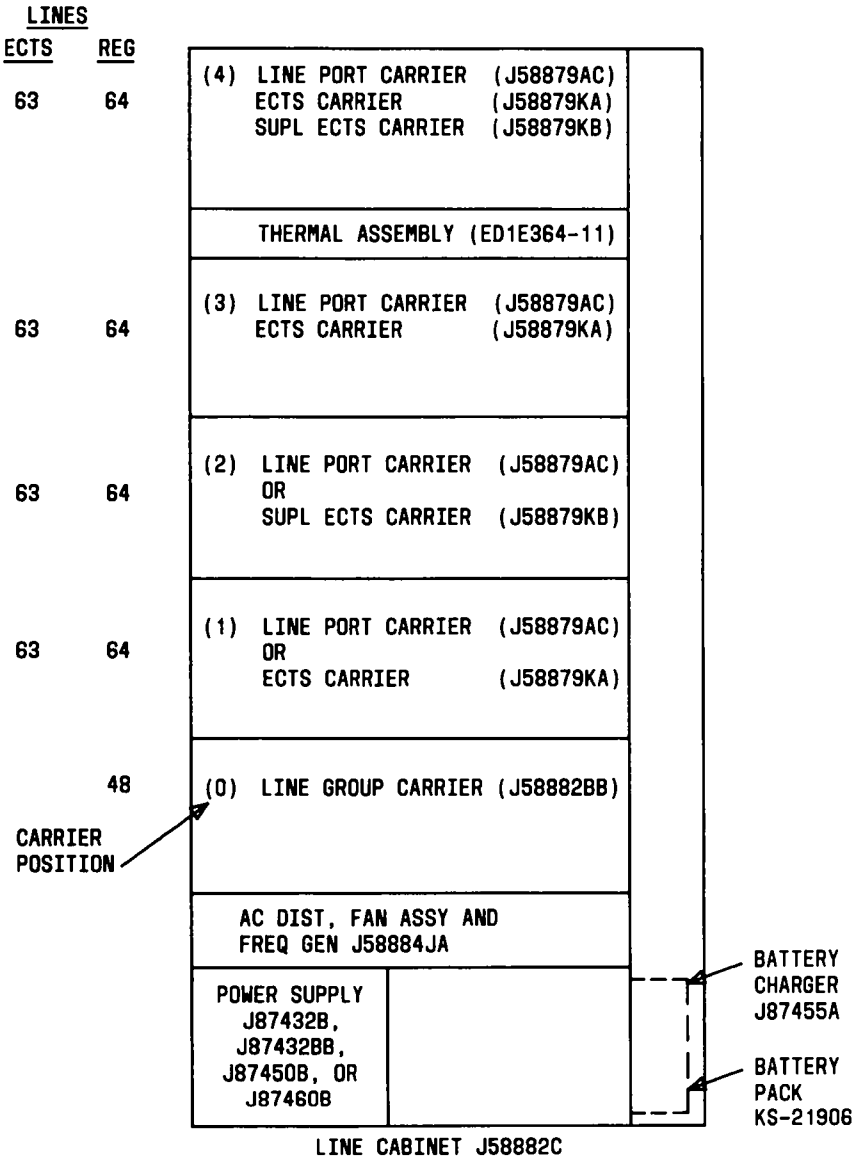


Fig. 12—DIMENSION PBX—Line Cabinet

4.13 The equipment should be installed in an air-conditioned area whenever possible. Fans will be required in each cabinet whenever:

- The equipment area is not air-conditioned and the ambient temperature can exceed 32°C (90°F).
- Filters are used.

4.14 Environments which are not recommended for installation because of potential temperature problems include:

(a) Rooms in which a major heat source (eg, boiler room, furnace room, manufacturing areas using hot processes) can affect the room ambient temperature significantly.

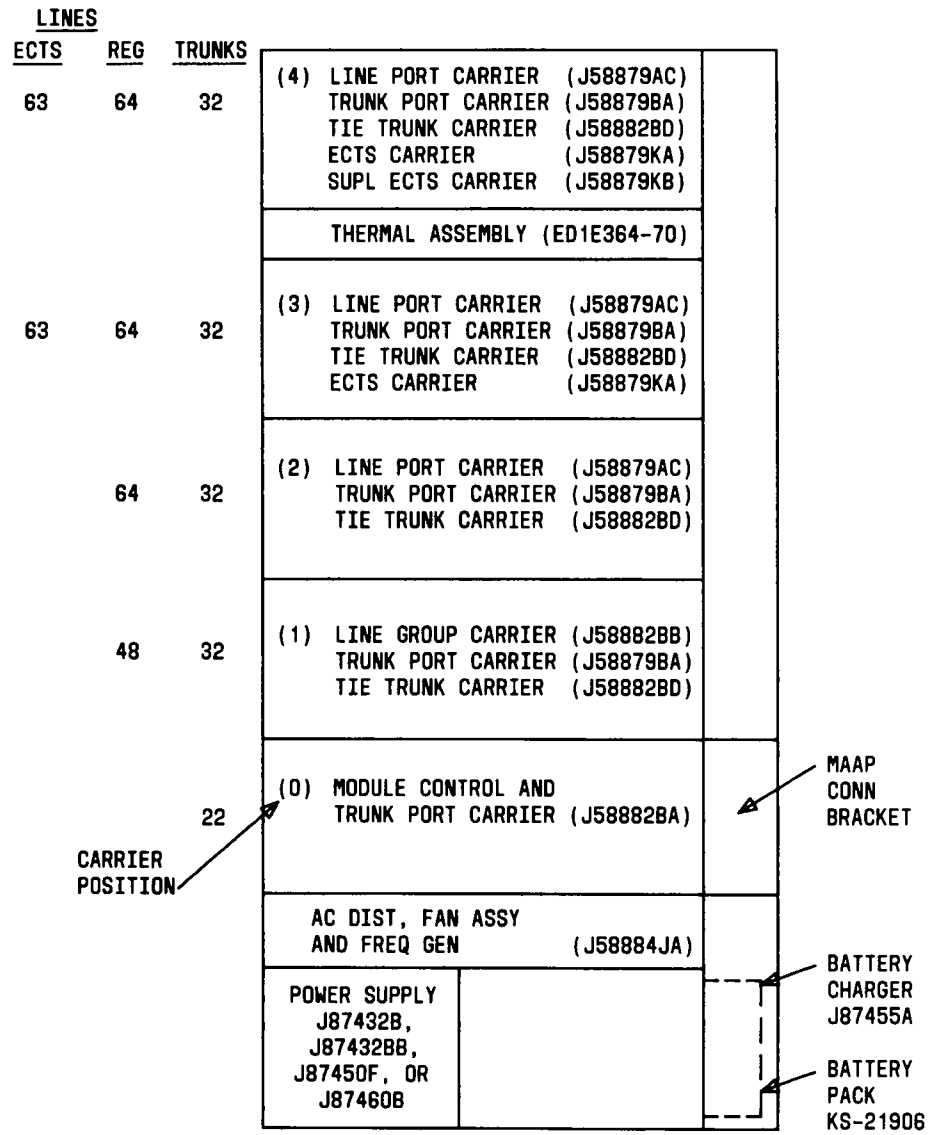


Fig. 13—DIMENSION PBX—Module Control Cabinet

(b) Areas in which the ambient temperatures can become excessive. Such areas include:

(1) Nonventilated rooms with less than 4.6 square meters (50 square feet) of floor space.

(2) Nonventilated rooms with two or more exterior walls which are frequently exposed to high temperatures.

4.15 To aid in determining air-conditioning requirements when space is allocated, total power dissipation of the DIMENSION 600 PBX cabinets is given in Table F. This power dissipation is sufficient to heat a small room above the maximum operating temperature of the equipment if air-conditioning or ventilation is not provided. The equipment engineer should analyze the room ventilation and/or air-conditioning system and ensure that requirements for each installation site are met.

TABLE D

LINE AND TRUNK ARRANGEMENT

SYSTEM CONFIGURATION			MAXIMUM LINES	MAXIMUM TRUNKS	CABINETS REQUIRED
CABINETS	TIME SLOT BUS	FOR MAXIMUM LINES OR TRUNKS			
1	Single	Lines	172	20	One Control
		Trunks	44	84	
2		Lines	472	20	One Control One Line
		Trunks	44	234	One Control One Module Control
	Dual	Lines	408	42	
		Trunks	44	234	
3	Single	Lines	776	20	One Control Two Lines
		Trunks	304	266	One Control One Module Control One Line
	Dual	Lines	712	42	
		Trunks	304	266	
4	Single	Lines	1000	20	One Control Three Lines
		Trunks	608	266	One Control One Module Control Two Lines
	Dual	Lines	1000	42	
		Trunks	608	266	

B. Filters

4.16 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.

TABLE E

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

*Temperature as indicated by an ordinary thermometer measured at a location 5 feet above the floor and 15 inches in front of a control cabinet.

- ***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 fans, 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.

4.17 The basic DIMENSION PBX equipment is primarily solid state electronics. However, 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, 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 should only be used in auxiliary equipment containing open contact relays. If fans are installed in this auxiliary equipment, they should not be operational when using the special PBX filtration system. In severely contaminated industrial environments, other DIMENSION PBX equipment may be affected. Gold fingers 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.

4.18 Filters will require periodic replacement as they become contaminated. The replacement interval will vary from a few weeks to a year or more, depending upon 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 to 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.

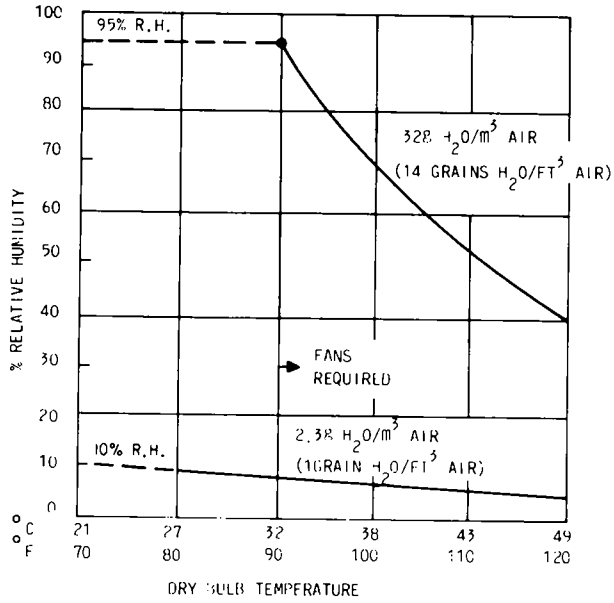


Fig. 14—Humidity Design Range

C. Transportation

In Transit

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

4.20 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 on-side shipment is used, installation personnel should carefully raise the cabinets to an upright position before unpacking.

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

4.22 The preferred modes of transportation are in order of preference—truck, rail, and air. Air transportation is known to subject the 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

4.23 It is preferable (when possible) that the system remain packaged in its crate until it is in the room in which it is to be located.

4.24 Forklifts and dollies are acceptable means of handling the crated system on customer premises. The pallet portion of the crate has been designed for this method of handling.

TABLE F

CABINET WEIGHT AND HEAT DISSIPATION

EQUIPMENT	FULLY EQUIPPED WEIGHT (LBS)	HEAT DISSIPATION IN WATTS	
		TYPICAL	MAXIMUM
Common Control Cabinet J58884A	700	770	1030
Line Cabinet J58882C	750	450	830
Module Control Cabinet J58882B	750	600	830

4.25 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.

D. Structural

Floor Loading

4.26 The minimum requirement found in any commercial floor loading codes is 23 kilograms per 0.09 square meter (50 pounds per square foot). The maximum weight of the DIMENSION PBX (5-carrier) cabinet is about 340 kilograms (750 pounds) (Table F). 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 kilograms per 0.09 square meter (50 pounds per square foot).

4.27 The auxiliary cabinet(s) must be job engineered. Floor loading may be determined by adding equipment unit weights to the cabinet weight of 123 kilograms (250 pounds). Heat dissipation must also be determined for equipment units installed.

4.28 The average floor load is found by summing 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 associated with the cabinets. The average floor load must not exceed the rated floor loading of the building.

Stability and Movement

4.29 When earthquake or disaster bracing is required by law, or when local telephone company engineers feel that it is necessary, such bracing can be provided. Areas in the continental United States in which study for the need for bracing may be desirable are shown in Fig. 15. The PBX can be braced by bolting the cabinets directly to the floor. Four insulating bolts and washers and four spacer assemblies are used in holes provided in the baseplate of the cabinet for this purpose. When the cabinet is bolted to the floor, maintenance access space must be provided behind the cabinet.

4.30 Whenever maintenance access space cannot be allocated behind the cabinets, an alternate method (for earthquake bracing) is recommended. This method requires the use of ED-1E362-70 to adapt the cabinets for rail mounting. This alternate method bolts a floor rail assembly ED-1E362-70, Group 4, to the floor and uses cabinet assembly J58879C, List 22. A restraining cable is furnished to be shipped into appropriate slots on the rail and rear of cabinet.

4.31 When the system is installed on any rough floor or carpeting, the floorplate and rollaway assembly will be placed on the floor surface and the cabinet on the plate assembly. This will protect the customer floor surface and aid maintenance personnel in moving the cabinet on its casters when necessary for reasons of access.

4.32 Care should be taken in moving the cabinet across deep pile carpets in order to prevent tipping. The cabinet casters have been placed so as to allow adequate force (about 45 kilograms [100 pounds]) to get 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 cabinet 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.

E. Electrical Fields

4.33 Power lines (feeders) dedicated to the PBX should be used to prevent the introduction of noise into the system. Separate branch circuits may be sufficient to serve this purpose.

4.34 Electromagnetic fields may cause noise to be introduced into the PBX. Care should be taken to avoid placing the system close to powerful radio or television transmitters. In these cases, the field strength must be measured using a standard field strength meter such as the Electric Field Sensor, Model EFS-1, manufactured by Instruments for Industry, Inc., or a tunable R70 meter from Electro-Metrics Company. If the reading (number obtained) is greater than unity, interference into the PBX is likely.

4.35 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 provided via the ED-1E403-01 electromagnetic interference (EMI) filter assemblies.

4.36 An EMI (Group 1) filter mounting assembly is equipped with 3 (but is capable of housing 10)

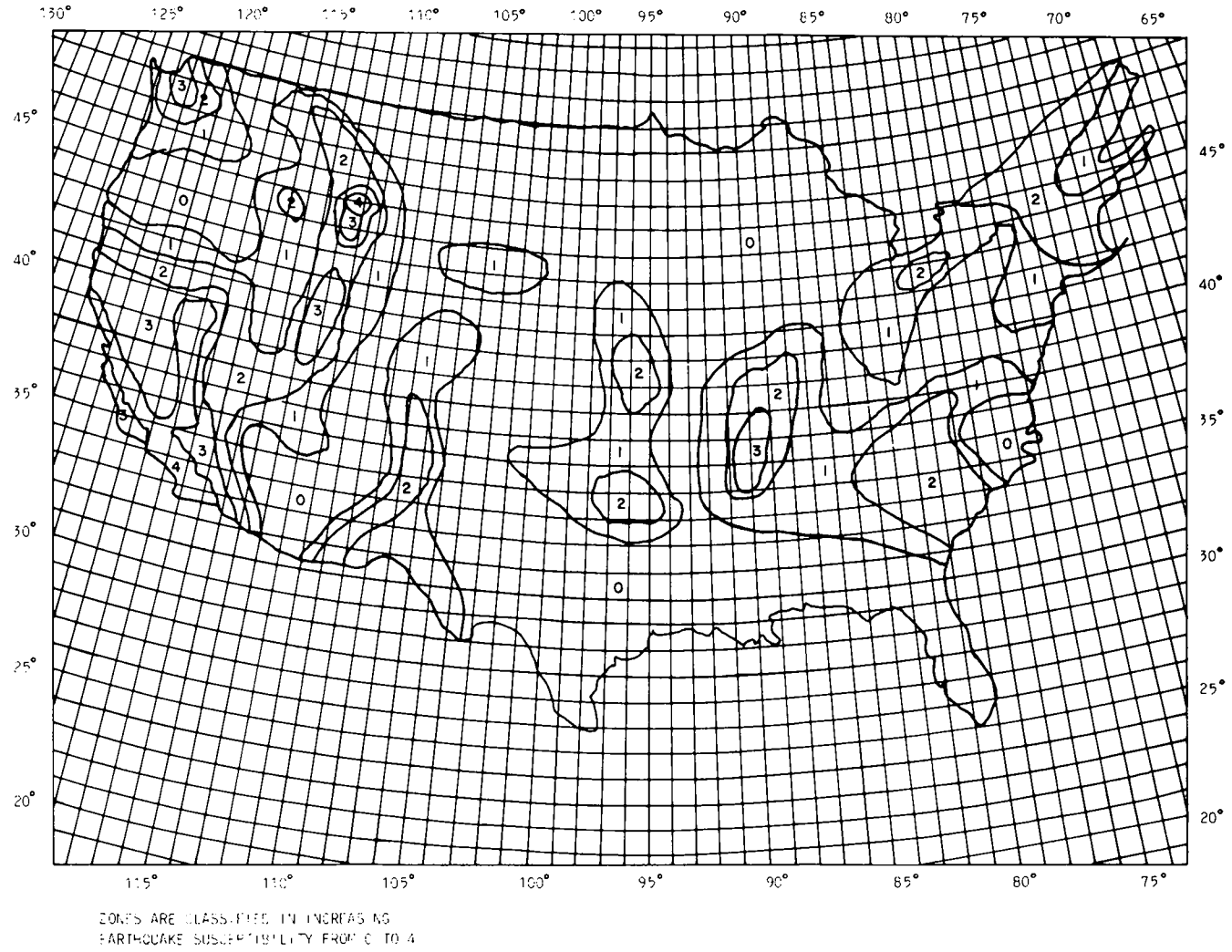


Fig. 15—Earthquake Environment (USA)

EMI filter assemblies. A Group 1 filter assembly consists of:

- One EMI filter mounting panel (L467392)
- Three EMI filter assemblies (L467394)
- Three connecting cables (ED-1E367-[ ], Group 935)
- One filter cover (L467393).

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

- One EMI filter assembly (L467394)
- One connecting cable (ED-1E367-[ ], Group 935.

A maximum of three Group 1 EMI filter assemblies are shown mounted on the rear panel of a DIMENSION PBX cabinet (Fig. 16). If the cabinet has not been modified, clearance holes will have to be drilled through the back cover, and mounting holes (for 10-32 screws) will have to be drilled and screws tapped into the cabinet frame.

4.38 One filter assembly (L467394) and one connecting cable (ED-1E367[ ], Group 935) accommodate one 25-pair trunk or line cable from the

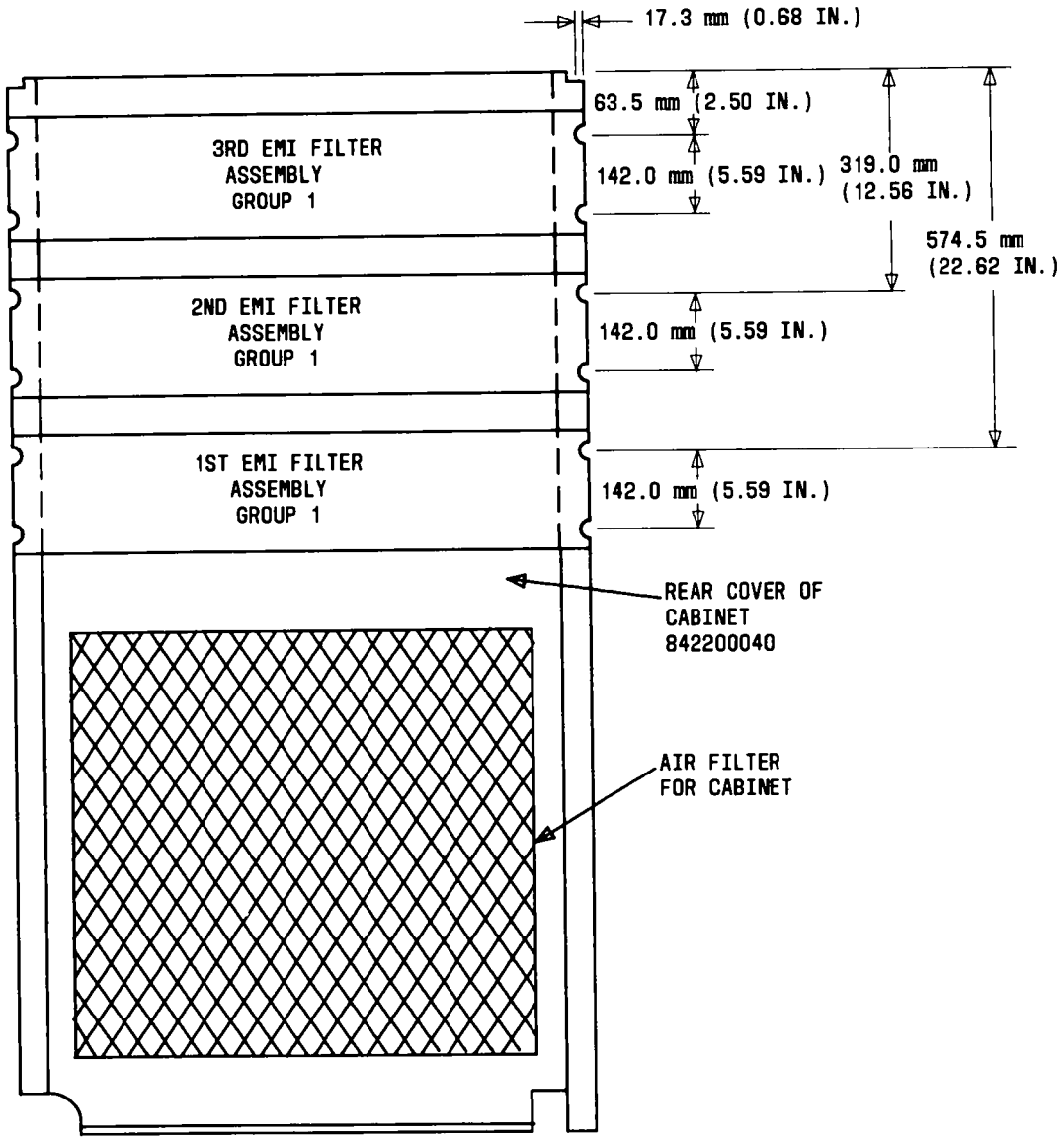


Fig. 16—EMI Filter Assemblies Mounted on Rear Panel of the DIMENSION PBX Cabinet

cross-connect field. Since cable pairs leaving the premises (such as trunks and off-premises 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 cable pairs may be required.

4.39 Properly measured field strength values of less than 0.05 volt per meter from a radio station antenna will not likely cause a problem. For measured values between 0.05 and 1.0, corrective measures may or may not be necessary. Generally, amplitude modulation (AM) radio stations are more likely to cause interference than frequency modulation (FM) stations (such as television). A building may also provide considerable shielding effect, reducing the interfering capability of the radiating station. Other possibly interfering radiators include industrial radio frequency (RF) heating equipment and welders.

4.40 The PBX may be subject to noise interference from motors (greater than one-fourth horsepower) having commutators if they are located in the same or adjacent room to the PBX. Small tools with Universal motors are generally not a problem if operated on separate power circuits. Motors without commutators, whether synchronous or asynchronous, generally do not cause interference into the system.

In order to preclude electrostatic noise in the system, the frame shall be well grounded as specified in this part. (See GROUNDING.) Maintenance personnel should touch the unpainted frame before working on the system to remove electrostatic charge from themselves and avoid charging the circuit board. Always attach authorized wrist grounding strap before working on system or handling circuit packs.

F. Acoustics

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

4.42 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). This is normally 90 dB. Therefore, the OSHA requirements for sound satisfy the environmental requirements for the system, and these must be met wherever the machine is placed. Refer to current OSHA requirements for acceptable levels.

G. Lighting

4.43 The light intensity level around the system cabinet should be sufficient to conform with OSHA standards to provide a comfortable amount of light for maintenance personnel to do the repair tasks required. To obtain accurate footcandle measurement, measure level in center aisle, 1524 mm (5 feet) above the floor, aiming meter upward. Light measurements can be made with a WESTON* Footcandle Meter, Model 614.

4.44 The lighting configuration in the system area should meet OSHA standards for minimum required lighting to allow maintenance personnel to perform their tasks. The light intensity level should be adequate from any of the directions necessary, ie, from the front or back of the cabinet.

*Registered trademark of Weston Instruments, Inc.

Standard 48 Vdc lights used by some maintenance personnel for lighting are not to be powered by the DIMENSION PBX 48-volt taps, either in the power supply or backplanes.

H. Security

4.45 The PBX cabinets have locks on the front doors. A 216C tool is used to operate these locks. This locking arrangement is to restrict access to the inside of the machine to authorized maintenance personnel only.

4.46 The rear panel is, in effect, locked when the back of the cabinet is against the wall since the wheel locks can be operated only when accessed through the front of the cabinet. Thus, the front panel must be opened to allow the cabinet to be moved away from the wall.

I. Insects and Rodents

4.47 The PBX cabinets are designed to seal off internal areas from insects and rodents. For this reason, the provided panels and doors should be in place at all times, particularly when such pests are known to exist in a particular location.

FEDERAL COMMUNICATIONS COMMISSION (FCC) REGISTRATION REQUIREMENTS

4.48 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 7.6 m (25 feet) long. However, 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 controlled access. A functional block diagram of the network interface for FCC registration

requirements is illustrated in Fig. 17. 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 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. An alternate connector (KS-16690, L1) can be used in place of the 66M3-50R. The alternate connector also supplies an RJ21X connecting jack. FCC registration also requires that the cross-connect field to be either 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.

4.49 To comply with FCC technical requirements, the maximum allowed loop resistance to be used serving circuit packs 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 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 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 circuit packs.

4.50 DIMENSION PBXs have a registration label affixed on the basic cabinet or the control carrier. Grandfathered PBXs do not have the registration label.

POWER, GROUNDING, AND PROTECTION

4.51 Prepare a sketch of the proposed installation similar to Fig. 18 or 19 to show the desired placement of the cabinets, cross-connect field, and the location of the customer-provided load center and power receptacles.

A. Power

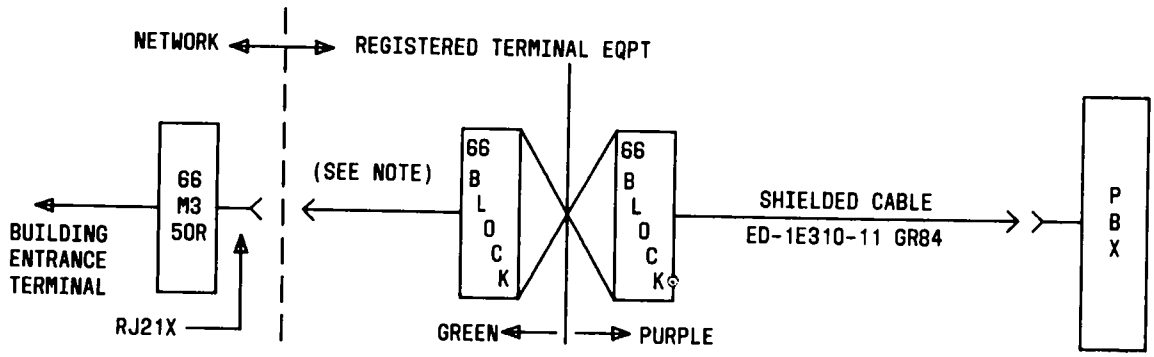
4.52 The commercial power provided to the system (with nonreserve power) should be capable of providing each cabinet with 120-Vac 20-ampere service. This service is adequate for any fully equipped system cabinet and is required only for rare traffic levels when all stations are off-hook and the utility outlets are in use. Each 20-ampere circuit should be protected by a 20-ampere thermal magnetic circuit breaker (ITE QP1-B020 typical, or approved equivalent).

4.53 The 2-cabinet installation with an auxiliary cabinet shown in Fig. 18 or the 3-cabinet system with an auxiliary cabinet shown in Fig. 19 could be powered from a 3-wire, single-phase, 120/240-Vac 40-ampere feeder. The 4-cabinet installation with an auxiliary cabinet shown in Fig. 20 can be powered from a 3-wire, single-phase, 120/240-Vac 60-ampere feeder. However, there is no phase restriction between cabinets. Therefore, the 120-Vac 20-ampere circuit required for each cabinet could be derived from either 1-phase or 3-phase mains.

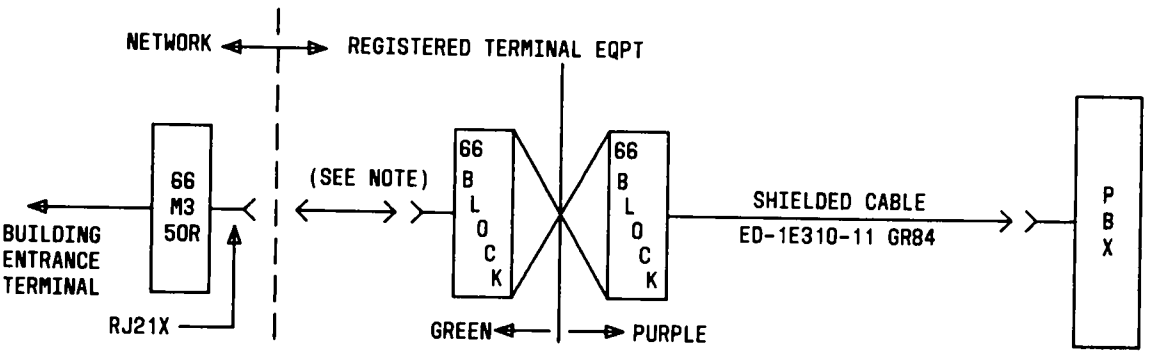
In order to maintain system integrity, a dedicated power feeder should be used. In lieu of this, separate branch circuits from a dedicated load center are sufficient to meet minimum requirements.

4.54 PBX rectifiers are capable of operating under a wide range of frequency or input voltage conditions, provided both conditions do not occur simultaneously. The operating ranges are 99V to 129V if the variation from 60 Hz is not greater than ±0.3 Hz, or 105V to 129V if the variation from 60 Hz is not greater than ±3.0 Hz.

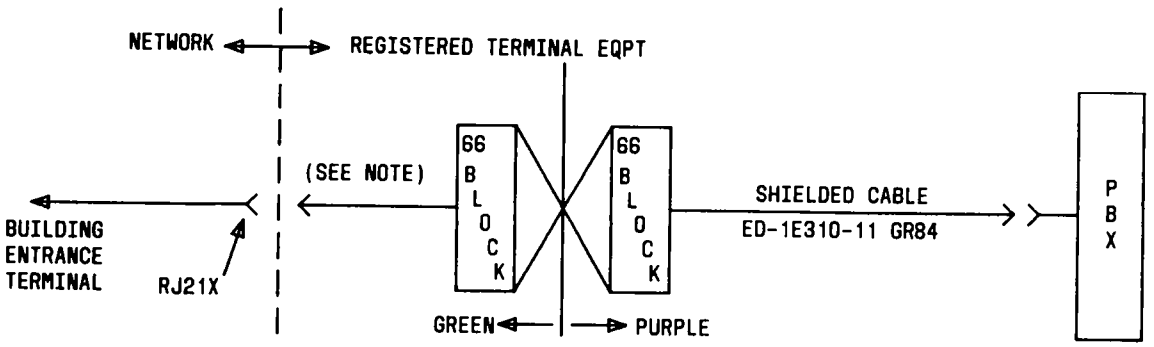
4.55 The ac distribution required for a typical DIMENSION PBX (consisting of but not limited to two or three cabinets) is shown in Fig. 21. The telephone company (Telco) engineer must arrange with the customer and an electrical contractor for the installation and wiring of an approved load center equipped with thermal magnetic circuit breakers, branch circuit wiring, and a wall-mounted receptacle



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 7620MM (25 FEET) PLUS ONE 7620MM (25-FOOT) REGISTERED EXTENDER.

Fig. 17—Typical FCC Registered Equipment Interconnections

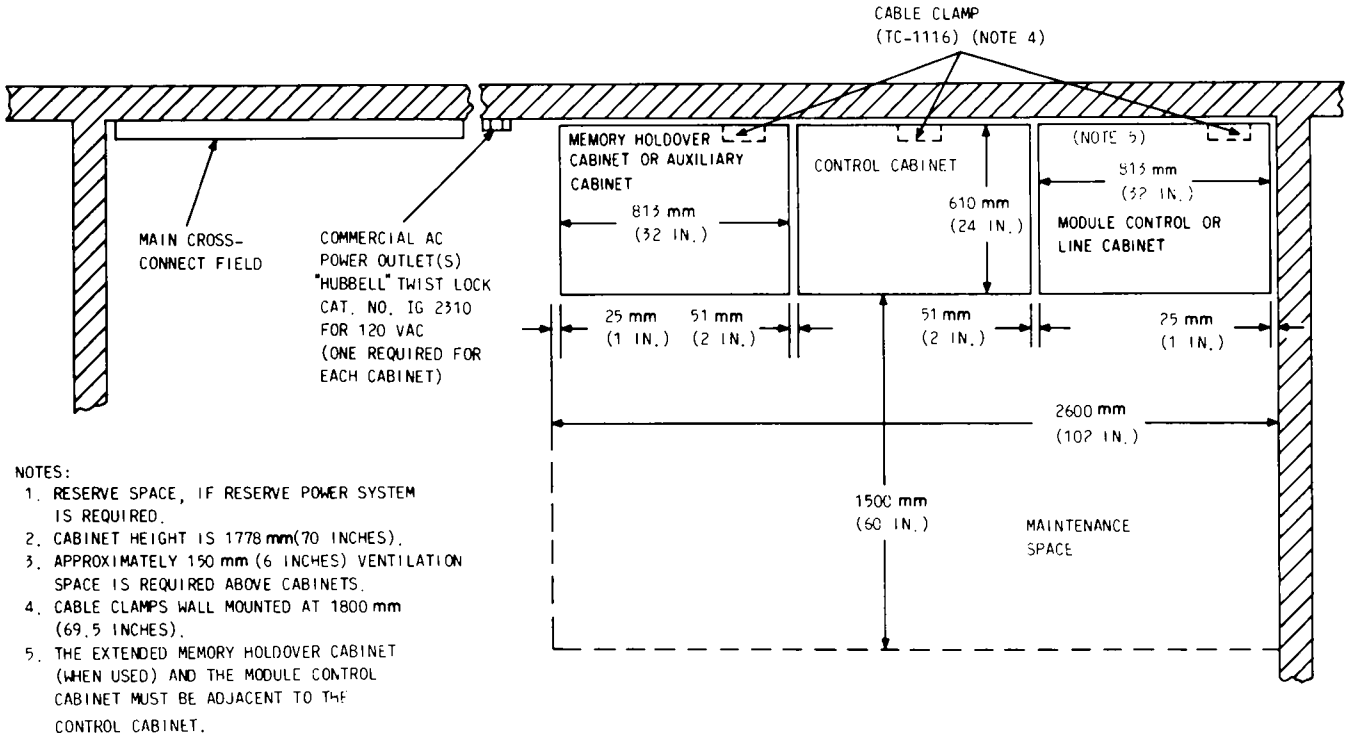


Fig. 18—DIMENSION PBX—Minimum Floor Space Requirements—2-Cabinet System

for each cabinet. One circuit breaker and one receptacle are required per cabinet. In all cases, ac wiring and equipment must comply with local codes.

The load center (ITE EQ4, or approved equivalent), ground bars (ITE GB-10), and HUBBELL* (IG-2310) receptacles should be installed by the customer prior to start of PBX installation.

Load Center

4.56 The customer-provided load center (circuit panel ITE EQ4, or approved equivalent) of appropriate current rating shall be equipped with 20-ampere, single-pole thermal magnetic circuit breakers (ITE QP1-B020 typical, or approved equivalent). Each circuit breaker is to protect one associated wall-mounted receptacle. A sufficient number of circuit breakers and receptacles shall be provided to accommodate all cabinets (one cabinet per receptacle). (See Fig. 21.)

*Registered trademark of Harvey Hubbell, Inc.

4.57 A 2-piece ground bar (ITE GB-10 typical, or approved equivalent) will be provided locally. The ground bar (Fig. 22) should be installed according to details given later in this Part under the heading, **B. Grounding**).

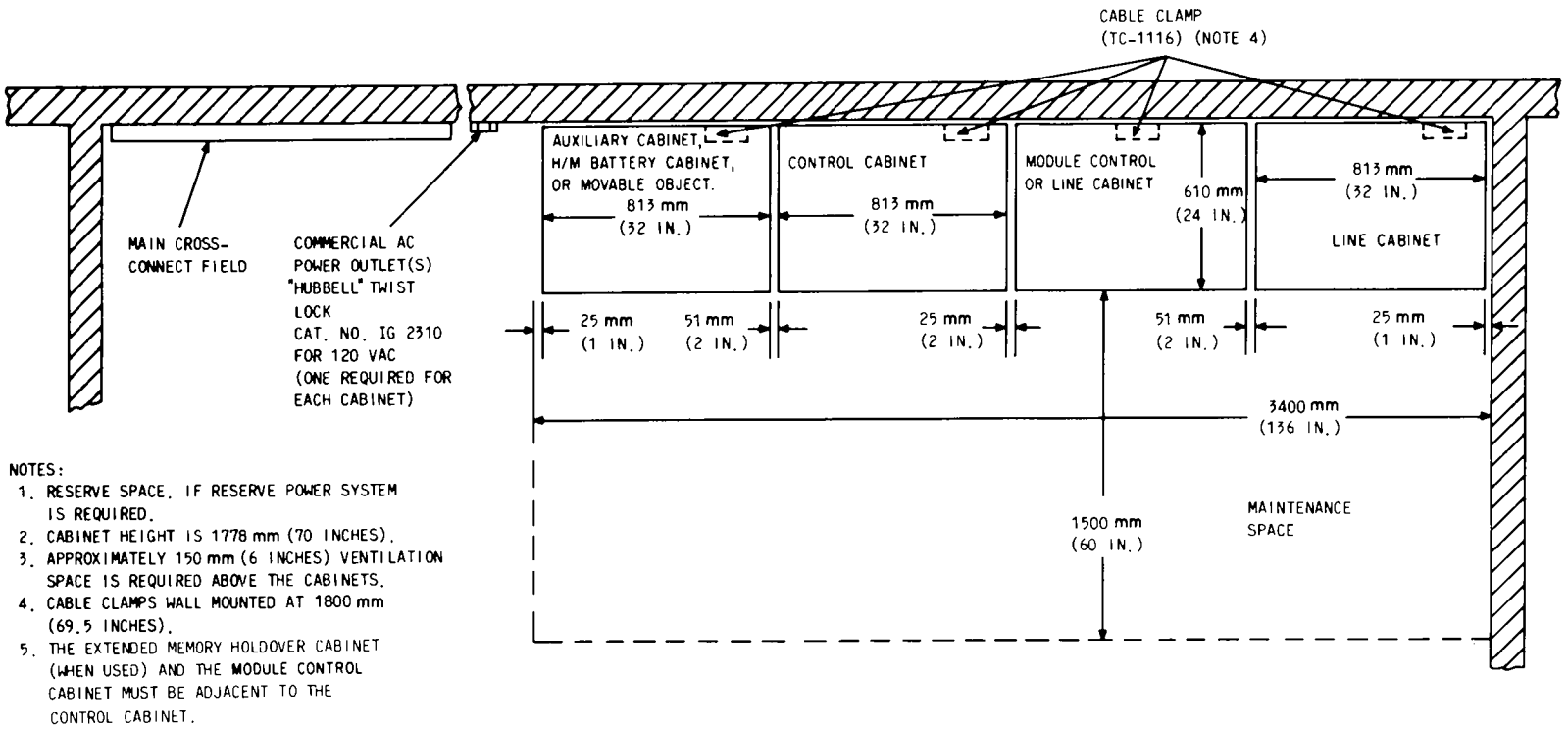
4.58 The National Electrical Code and most local codes require that the load center be grounded through an "equipment grounding conductor" which can be one, or a combination, of the following:

(1) A separate corrosion-resistant conductor (green wire)

(2) Rigid metal conduit

(3) Electrical metallic tubing.

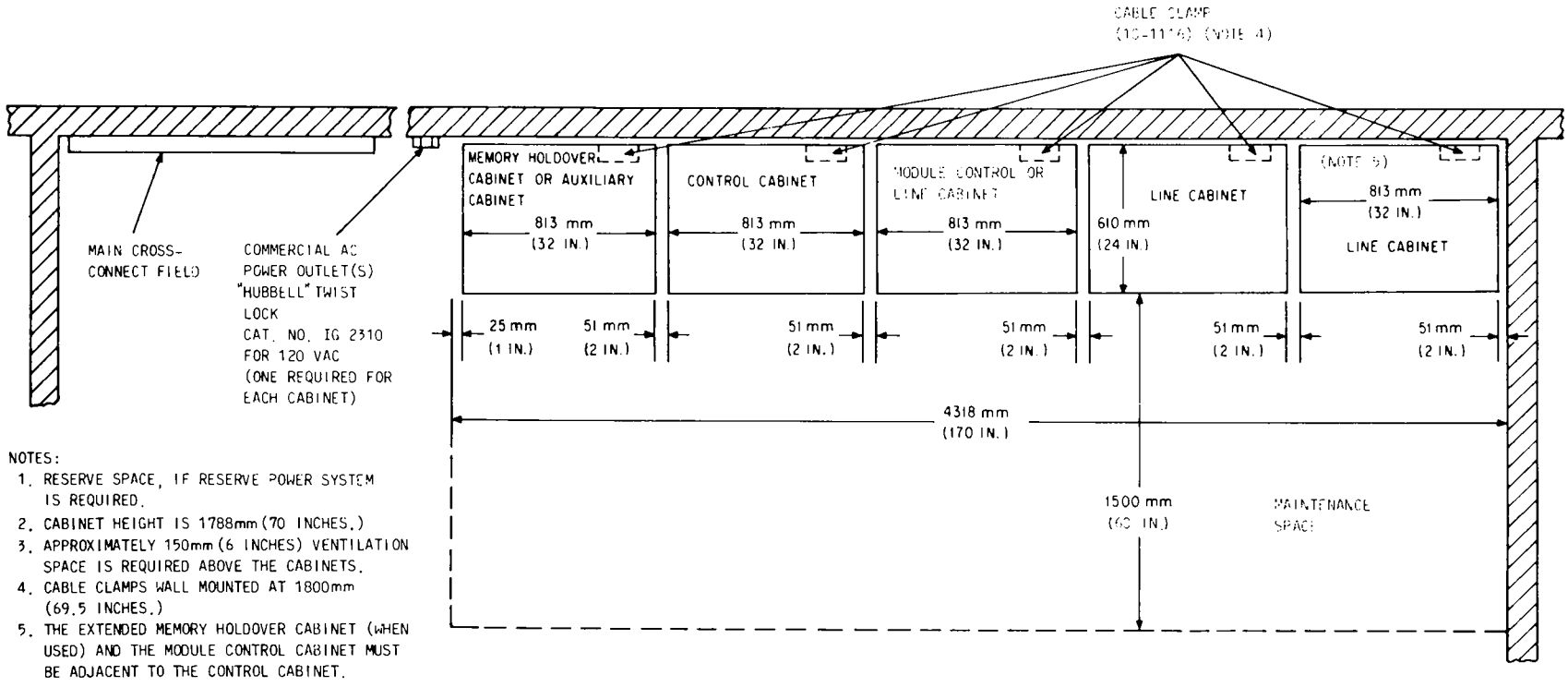
The presence of a separate green wire (between the load center and the ac service entrance), when provided in addition to the approved metallic conduit, contributes negligibly to the protection of the PBX against lightning surges. A separate green wire conductor is therefore not specified as an installation requirement but is recommended, if practical, in



NOTES:

1. RESERVE SPACE, IF RESERVE POWER SYSTEM IS REQUIRED.
2. CABINET HEIGHT IS 1778 mm (70 INCHES).
3. APPROXIMATELY 150 mm (6 INCHES) VENTILATION SPACE IS REQUIRED ABOVE THE CABINETS.
4. CABLE CLAMPS WALL MOUNTED AT 1800 mm (69.5 INCHES).
5. THE EXTENDED MEMORY HOLDOVER CABINET (WHEN USED) AND THE MODULE CONTROL CABINET MUST BE ADJACENT TO THE CONTROL CABINET.

Fig. 19—DIMENSION PBX—Minimum Floor Space Requirements—3-Cabinet System



NOTES:

1. RESERVE SPACE, IF RESERVE POWER SYSTEM IS REQUIRED.
2. CABINET HEIGHT IS 1788mm (70 INCHES.)
3. APPROXIMATELY 150mm (6 INCHES) VENTILATION SPACE IS REQUIRED ABOVE THE CABINETS.
4. CABLE CLAMPS WALL MOUNTED AT 1800mm (69.5 INCHES.)
5. THE EXTENDED MEMORY HOLDOVER CABINET (WHEN USED) AND THE MODULE CONTROL CABINET MUST BE ADJACENT TO THE CONTROL CABINET.

Fig. 20—DIMENSION PBX—Minimum Floor Space Requirements—4-Cabinet System

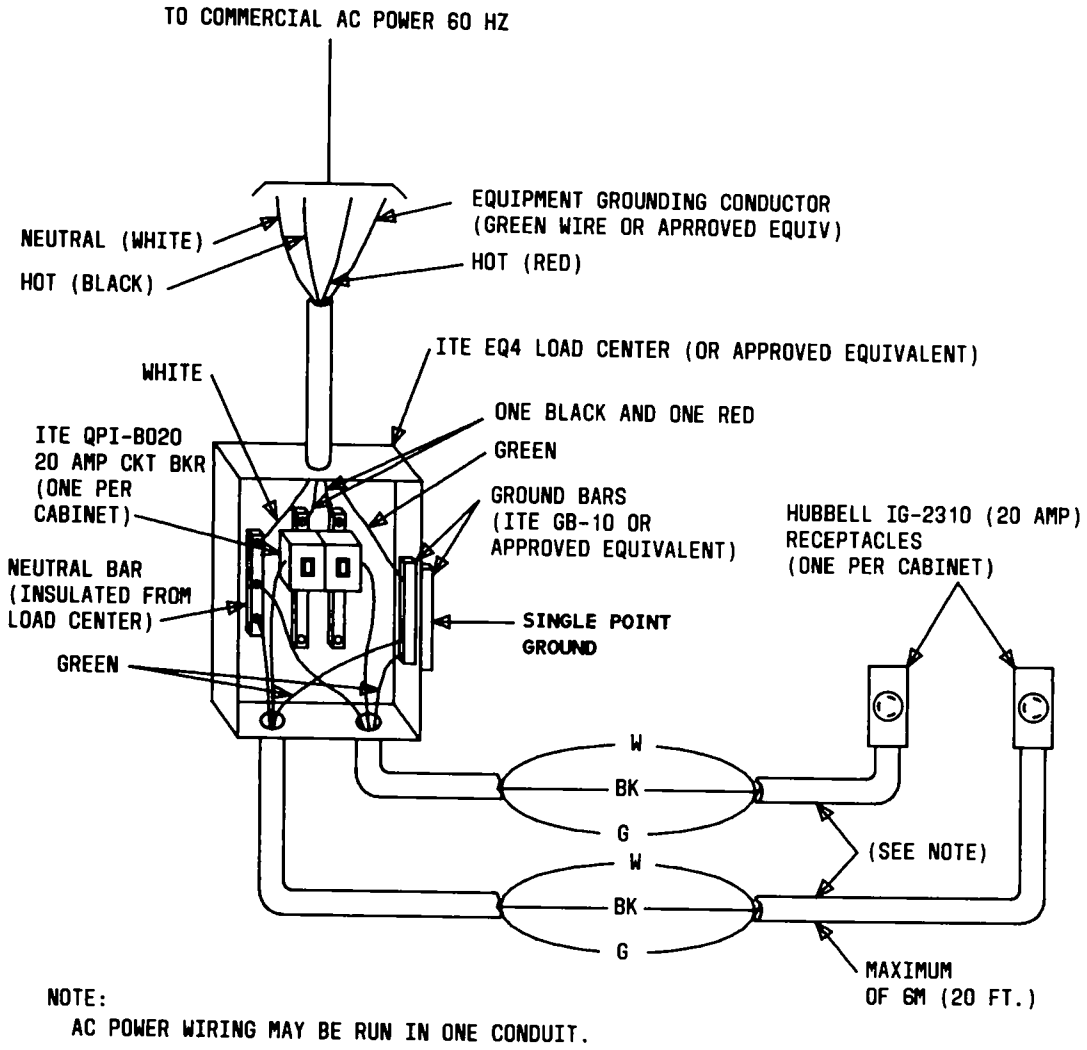


Fig. 21—Typical Load Center and Ground Bars

order to provide a more reliable equipment grounding conductor.

Power Receptacles

4.59 One HUBBELL* twist-lock power receptacle, Cat. No. IG-2310, may be ordered to be shipped with each cabinet for the power outlet installation. It may also be purchased locally by the telephone company, if desired. A power outlet must be provided behind each cabinet.

4.60 The ac wiring between the load center and wall-mounted receptacle should be kept as short as practical and should not exceed 6096 mm (20 feet) in length. A separate neutral wire (white) shall be run from the load center neutral bar (this is not the single-point ground) to each receptacle. The cabinet circuits shall be distributed evenly as possible over the feeder circuit.

The conduit, or other metallic enclosure, shall not be used to replace the green wire ground between the load center and the HUBBELL receptacles. A separate equipment ground wire (green wire) is required between the load center and each receptacle.

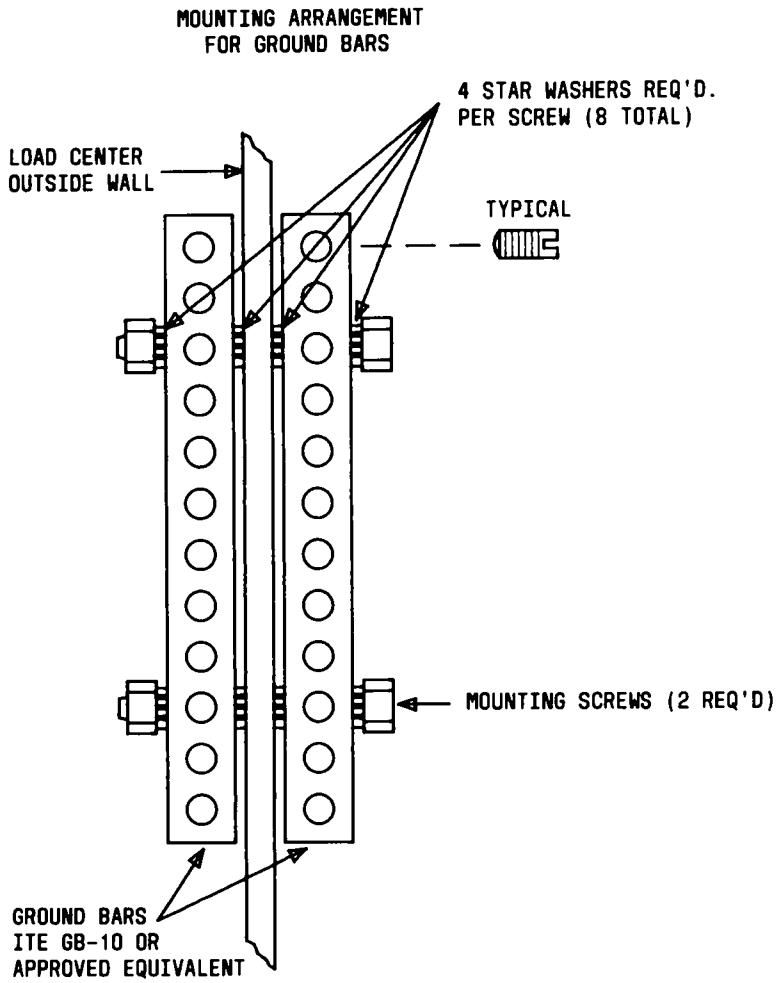


Fig. 22—Ground Bar for Load Center

4.61 Since the equipment ground for the wall-mounted ac receptacles should be connected through the green conductor only, receptacles that are designed to obtain equipment ground through the conduit (when mounted in a metallic junction box) should not be used in the PBX installation. The Hubbell IG-2310 (insulated ground) receptacle has its ground terminal insulated from its mounting hardware and has been specified for this purpose.

PBX AC Current Drain

4.62 ***The values given here for current drain should not be used either for design purposes or for specifying the electrical service required for the PBX.*** The values calculated from the information that follows are typical current drains (in amperes) at 120 Vac 60 Hz. These values should only be used to estimate the electrical power consumption of a given system at a given time since current drain varies with voltage, frequency, traffic, etc.

4.63 The ac current drain for the DIMENSION PBX is the sum of the current in all cabinets, including any auxiliary equipment such as station message detail recording (SMDR), customer premises facility terminal (CPFT) equipment, etc. The following example includes the three cabinets plus the auxiliary cabinet.

(a) ***Cabinet 00 AC Drain (in amperes)***

- No traffic drain = 1.7 + [0.3 × (line + trunk carrier quantity)].
- Medium traffic drain (6 ccs/line) = no traffic

drain + [0.4 × (line + trunk carrier quantity)].

- Heavy traffic drain (9 ccs/line) = no traffic drain + [0.6 × (line + trunk carrier quantity)].

(b) ***Cabinet 01 AC Drain (in amperes)***

- No traffic drain = 0.7 + [0.3 × (line + trunk carrier quantity)].
- Medium traffic drain (6 ccs/line) = no traffic drain + [0.4 × (line + trunk carrier quantity)].
- Heavy traffic drain (9 ccs/line) = no traffic drain + [0.6 × (line + trunk carrier quantity)].

(c) ***Cabinet 02 AC Drain (in amperes)***

- No traffic drain = 0.7 + (0.3 × line capacity quantity).
- Medium traffic drain (6 ccs/line) = no traffic drain + [0.4 × (line + trunk carrier quantity)].
- Heavy traffic drain (9 ccs/line) = no traffic drain + [0.6 × (line + trunk carrier quantity)].

(d) ***Auxiliary Cabinet AC Drain***

- One frequency generator = 0.5A.
- One interrupter = 0.2A.
- Fans (when running) = 0.3A.
- To find the ac current drain for circuits powered by the −48V rectifier (KS-22028, L1), multiply the −48 current drain by 0.5.
- No load current drain for rectifier (KS-22028, L1) = 0.8 ampere at −48V.

Carrier example: If one CPFT carrier uses 0.8 ampere at −48V, its equipment ac current drain is:

- 0.8 × 0.5 = 0.40 ampere at 120 Vac.

Auxiliary cabinet example: If the cabinet is equipped with three CPFT carriers and one −48V rectifier, the ac drain is calculated as follows:

- −48V current drain = 3 × 0.8 = 2.4 amperes.
- 120 Vac current drain = 2.4 × 0.5 = 1.2 amperes.
- −48V rectifier (no load) drain = 0.80 ampere.
- 120 Vac current drain for rectifier = 0.8 × 0.5 = 0.4 ampere.
- Total ac current drain for the auxiliary cabinet = 1.2 + 0.4 = 1.6 amperes.

B. Grounding

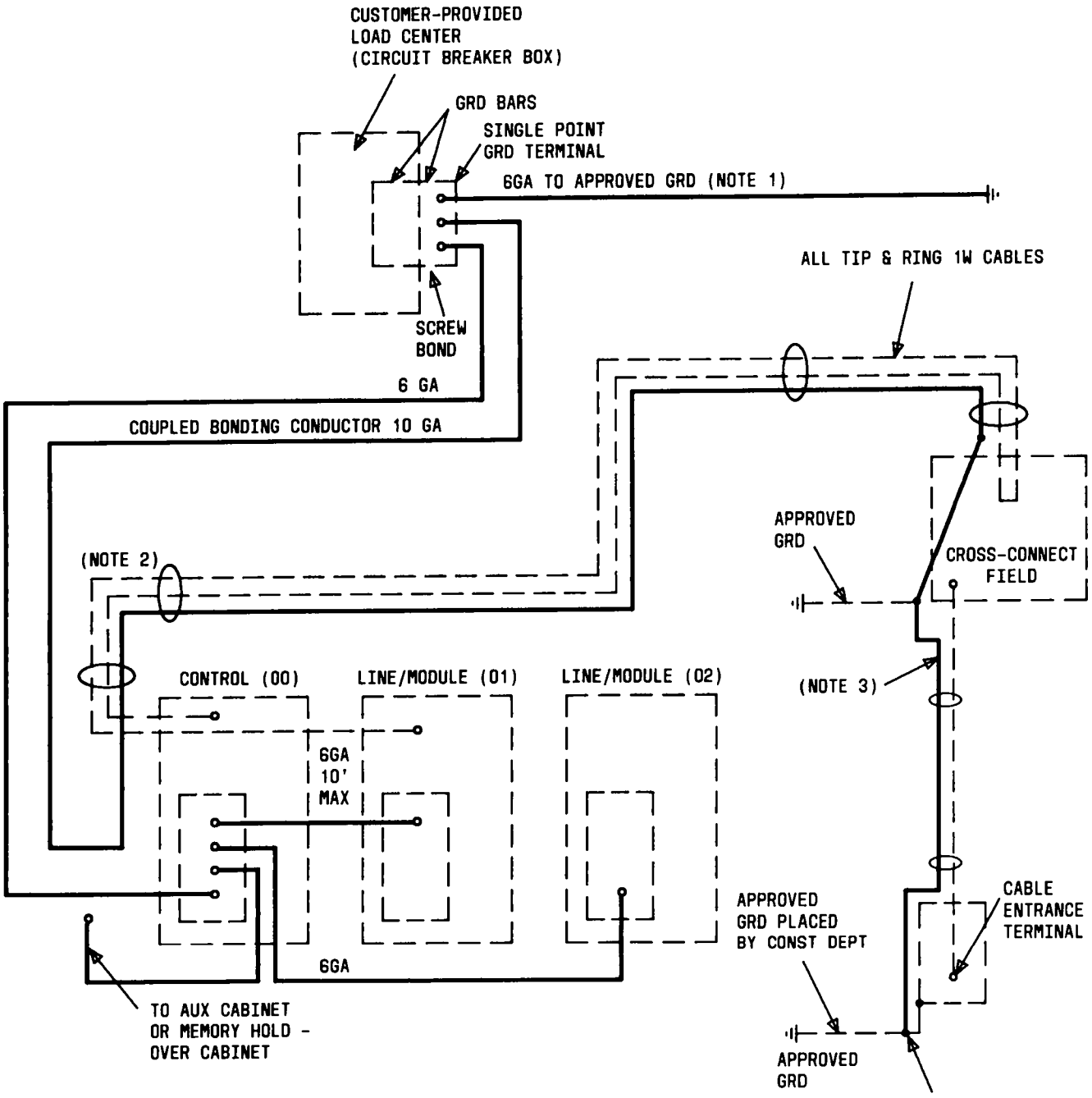
4.64 Grounding for the PBX cabinets is provided by the PBX single-point ground. The single-point ground is a sandwiched ground bar arrangement (Fig. 22) mounted on the side of the load center (Fig. 21 and 23). The load center (of appropriate current rating) should be installed by an approved electrical contractor in accordance with the National Electrical Code and local codes.

4.65 The ground bars (two ground bars) shall be mounted back-to-back on the side of the load center. They are to be held together by two screws in a sandwiched arrangement, with one part inside the load center cabinet and the other part outside. Star washers (which dig into the metal surface) shall be used between screwheads and ground bar, between nuts and ground bar, and between each ground bar and load center wall (two places per screw). These star washers are used to ensure a reliable electrical bond between the ground bar and load center. The part of the ground bar (single-point ground) inside the load center shall be used to terminate the green wire ground (equipment grounds). The neutral (circuit ground) shall not terminate on the single-point ground.

4.66 The part of the ground bar on the outside wall of the load center shall be used by the PBX installer for grounding the PBX. All of the following connections must be made to the single-point ground:

(a) A No. 6 AWG conductor to one of the following approved ground sources:

- A metallic cold water pipe (at least 12.7 mm [1/2 inch] diameter) that is electrically continuous through the water meter and extends at least 3048 mm (10 feet) in earth.



NOTES:

1. ALL HEAVY LINES (——) ARE GOUNDING AND BONDING CONDUCTORS TO BE RUN BY PERSONNEL INSTALLING PBX.
2. CABLE TIES LASHING ALL TIP & RING IW CABLES. (FROM THE PBX TO THE CROSS-CONNECT FIELD) TO THE 10 GA COUPLED BONDING CONDUCTOR.
3. COUPLED BONDING CONDUCTOR IS:
   - CONTINUOUS CABLE SHEATH
   - 6 GOOD CABLE PAIRS
   - 10 GA WIRE

Fig. 23—Grounding and Bonding Diagram for DIMENSION PBX

- The steel frame of a steel frame building which is electrically connected to the water pipe and the power source ground.

- The power source ground. This is the electrode to which the neutral wire of the electrical power service (entering the building) is grounded.

(b) A No. 6 AWG conductor to the ground bar in PBX cabinet 00.

(c) A coupled bonding conductor connecting the single-point ground to the approved floor ground in a high-rise building or to the protector ground terminal or building entrance cable ground located in the building entrance facility. (See paragraph 4.75).

Note: Construction personnel, installing riser cables or other cables in the building, have the responsibility to provide the coupled bonding conductor up to the closet or cross-connect field, and the PBX installers have the responsibility to extend the conductor to the single-point ground.

Ground isolation: Care should be exercised when implementing the grounding scheme. To preserve the integrity of the single-point ground arrangement, verify that neither the cabinet nor any framework 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.

4.67 The single-point ground (bar), mounted on the side of the load center, shall be tagged with Form E-3013B. This form requests that the Telco Repair Service be notified if connections are loose or if they must be removed.

4.68 The protector ground terminal shall be connected to an approved ground source closest to the protector. 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.

4.69 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.

4.70 When a data set is used with the PBX, the circuit ground of the data set must be isolated from the data set frame by opening the appropriate (screw) switch. For example, when the 113D data set is used for remote maintenance, administration, and traffic system (RMATS), apply option P (no common ground). Option P opens screw switch S1 in the data set. This isolation is necessary to ensure that lightning surges on the data set green wire ground are not transmitted to the PBX.

4.71 ***Emergency Transfer Panel:*** A ground conductor (No. 6 AWG) must be provided from the approved source ground, or from the PBX single-point ground, to the emergency transfer panel (609 type). A No. 14 AWG conductor may be used if sufficient mechanical protection (of the conductor) is provided. This ground conductor provides ground start for each station set having power failure transfer service and is not used for equipment protection.

C. Protection

Electrical Protection

4.72 Whenever the PBX is installed in an environment where it may be exposed to lightning surges or to ac power voltages (either by direct contact or by induction), refer to Section 876-300-100 to determine the exposure status of the PBX installation and for detailed protection requirements.

Protectors

4.73 Station protectors must be installed on all exposed building entrance cables serving the PBX. If off-premises stations are run in exposed plant, the tip and ring leads must also be protected by station protectors. Refer to Section 876-300-100 for further information.

TO MINIMIZE LIGHTNING SURGES AT THE PBX:

- ***Verify that all exposed T and R leads are protected.***

- ***If trunks or off-premises lines are added, check their exposure status.***
- ***Provide protection if outside plant or ac lines are exposed. No protection is required if only the building is exposed.***
- ***Always ground and bond PBX in the prescribed manner.***
- ***Verify that the cold water pipe system is bonded to the ac power service entrance ground.***
- ***Verify that the metallic shield of the building entrance cable is grounded and also bonded to the protector ground terminal.***

Sneak Current Protection

4.74 If the outside plant associated with the PBX is exposed to ac power voltages, sneak current protection is required on all trunk circuits. Sneak current protection is provided by heat coils, 4-type protector units, or 60-type fuses.

Coupled Bonding Conductor

4.75 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 building entrance cable 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) which enter the building from outside plant.

4.76 For methods of providing the coupled bonding conductor in high rise and in low wide buildings, see Section 876-300-100.

4.77 Figure 23 is an illustration of the grounding and bonding conductors to be placed by installation personnel.

RESERVE POWER

4.78 If reserve power is to be used with the system, it will consist of the following, as illustrated in Fig. 24:

- Customer-provided load center (or panel board ITE EQ6 typical, or approved equivalent) equipped with circuit breakers
- 105E power plant equipped with rectifiers
- DEPENDAC* inverter.

4.79 The −48 volts is to be supplied to the PBX cabinets (00, 01, 02, and 03) by the reserve power plant discharge circuit through a filter in the PBX cabinet power supply. The filter output terminals are already connected to the proper power distribution terminals and require no modification. With J87432F reserve power rectifiers, lead −48 RSV (A,B) is connected to the corresponding internal filter input terminal on the rectifier designated as terminal 1 on TB1. The associated ground lead GRD RSV (A,B) is connected to the corresponding cabinet ground block.

A. Auxiliary Circuits

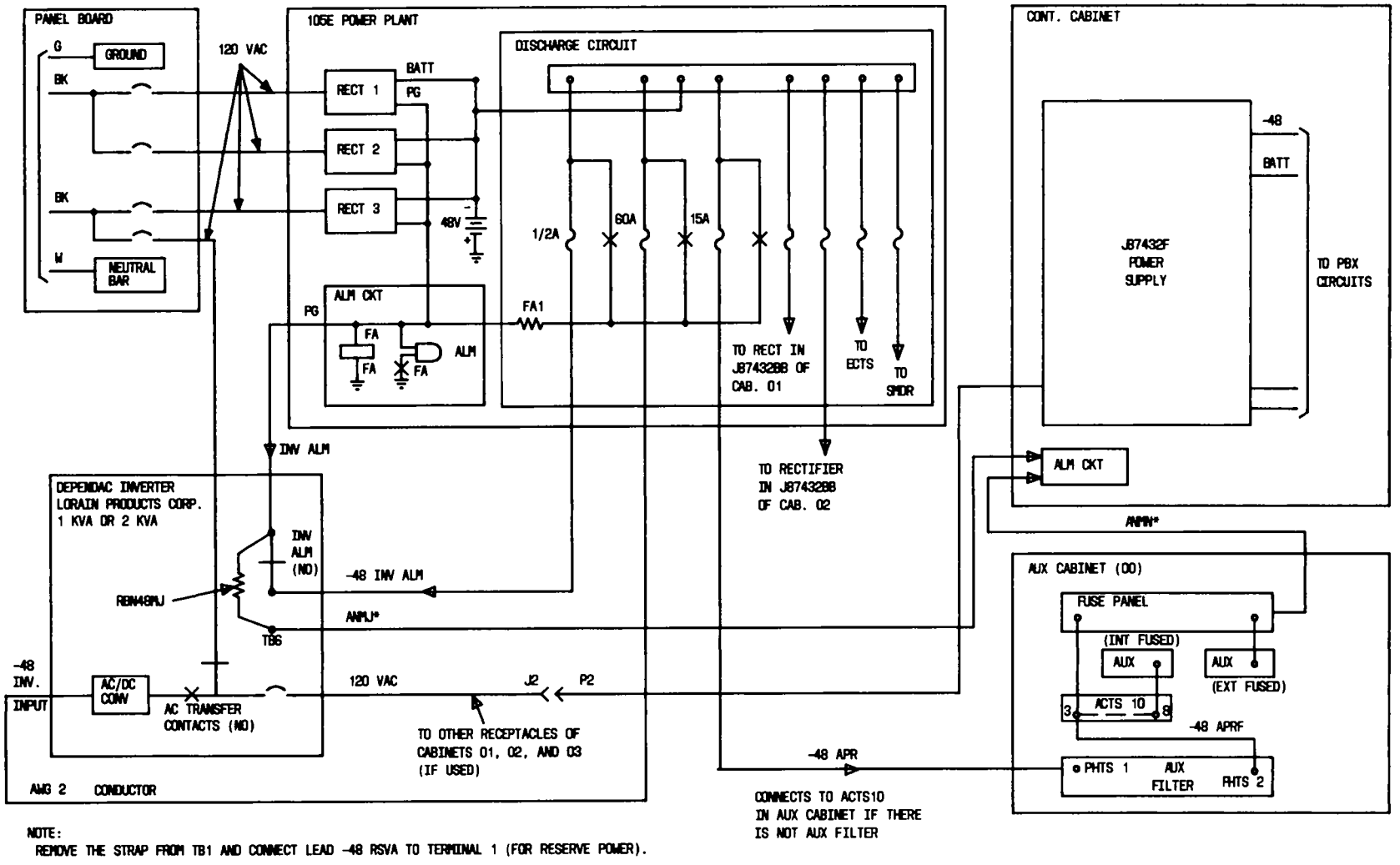
4.80 The −48 volts for auxiliary circuits is obtained from the 105E plant discharge circuit. The −48 volt rectifier in the auxiliary cabinet should not be used in systems with reserve power. Auxiliary circuits requiring talking-grade battery, ie, noise below 34 dBrn C (34 dB reference noise C-message weighting), require additional low-pass filtering of the 105E power plant discharge circuit output. The filter should be located close to the auxiliary circuit load. An example of a circuit requiring this filter is the loop signal repeater used as part of the customer premises facility terminal equipment.

4.81 The load center must be equipped with the following type thermal-magnetic circuit breakers (typical or approved equivalent):

- ITE QP1-B020 for each rectifier in the 105E plant
- ITE EE1-B040 for 2 kVA inverter. (See Note.)

Note: This is an E-type frame circuit breaker chosen to withstand inrush currents associated

*Registered trademark of Reliance Electric Co.



NOTE:
REMOVE THE STRAP FROM TB1 AND CONNECT LEAD -48 RSVA TO TERMINAL 1 (FOR RESERVE POWER).

Fig. 24—Reserve Power Circuitry for DIMENSION PBX

with the 2 kVA inverter and does not fit in the EQ6 load center. It should be mounted next to the load center. Use a NEMA-type enclosure (ITE-EE1), or order it with its enclosure as an assembly (ITE-EE1-B040-EE1).

4.82 The steady state input current values for various PBX units (120 Vac 60 Hz) are:

- One (105E power plant) rectifier = 8.0A. (Fig. 24 shows four rectifiers connected.)
- One (fully loaded) system cabinet 00 = 3.5A.
- One (fully loaded) system cabinet 01 or 02 = 3.0A.
- One ECTS power supply (207A) = 2.0A.
- One SMDR power supply (207B)—printer version (direct output = 0.7A; 9-track tape version = 1.75A).

4.83 The various 105E power plant options required to be implemented are:

- Wired for negative battery
- Without CEMF cell
- With alarm circuit
- With battery on PG lead to provide combined fuse and low voltage alarm on a single lead
- With rectifier PG lead multipled to originating discharge circuit FA1 alarm lead
- Without separation of discharge fuse alarms and control fuse alarms
- For normal continuous loads (without "A" option)
- Discharge ground insulated from framework
- With the rectifier wired for negative output (120 Vac/60 Hz) (ie, "+" terminal tied to battery discharge ground).

4.84 On reserve power installations, −48V direct current is provided to the inverter from the batteries via discharge fuses. Use 50A BUSS NON or equivalent fuse for a 1 kVA inverter and 60A BUSS FRN (slow blow) or equivalent fuse for a 2 kVA inverter.

B. Startup

4.85 Choice of inverter size is determined by the start-up current of the PBX ferroresonant power supplies. Use the 1 kVA inverter for total start-up current up to 11 amperes. Use the 2 kVA inverter for a total start-up circuit between 11 and 22 amperes. Use two inverters if start-up current exceeds 22 amperes. To calculate current:

- J58884A control cabinet—7.6A at startup
- J58882B module control cabinet—4.8A at startup
- J58882C line cabinet—4.8A at startup
- DIMENSION PBX ECTS—3.3A at startup
- SMDR—1.3A at startup.

These values are to be used only to specify the size of the DEPENDAC inverter.

4.86 The −48 Vdc drains (in amperes) used for calculating reserve power elements are shown in Table G. Drains for units using −48V direct current are listed under "idle" and "active increment" headings in the table. Idle value is the minimum drain when all circuits in the unit are inactive. Active increment is the increase when all circuits in the unit are in use. Unit drain for all other voltages is expressed in terms of the −48V direct current from the battery plant required to generate them. (These voltages include appropriate efficiencies and power factors associated with the inverter(s) and power supplies). These values are listed under "equivalent −48 Vdc drain." Only one equivalent −48 Vdc drain is listed per carrier (corresponding to a fully equipped carrier) to indicate the maximum loading of the inverter for that carrier.

4.87 Idle and active increment drains listed for J58879BA trunk carrier in Table G are the maximum values expected, corresponding to a carrier equipped with 32 tie trunks. When the actual trunk carrier configuration is known, the idle and active increment drains can be more closely determined by using Table H.

TABLE G

CURRENT DRAINS PER CARRIER, APPARATUS, ETC

GENERATOR AND FANS	−48V IDLE	−48V ACTIVE INCREMENT	J87432-TYPE RECTIFIER EQUIVALENT −48V DRAIN	J87460-TYPE RECTIFIER EQUIVALENT −48V DRAIN
Frequency (Ring) Generator	—	—	2.1A	0.5A
Fan Assembly	—	—	1.26A	2.26A
UNITS SERVED BY PBX POWER SUPPLIES	**−48V IDLE**	**−48V ACTIVE INCREMENT**	**EQUIVALENT −48V DRAIN**	
Control-Growth carrier	—	—	13.37A	9.36A
Control Carrier	—	—	11.4A	7.98A
Module Control carrier	0.04	3.2	2.2A	1.57A
Line Group Carrier	0.04	3.0	1.8A	1.26A
Line Carrier (64 Lines)	0.04	2.88	1.78A	1.25A
Trunk Carrier	0.01	3.20	2.13A	1.49A
Tape minirecorder, MAAP, Alarm Panel	0.03	0.3	0.91A	0.64A
One Attendant Console	0.05	0.2	—	NA
AUXILIARY EQUIPMENT	**−48V IDLE**	**−48V ACTIVE INCREMENT**	**EQUIVALENT −48V DRAIN**	
One Electronic TEL Controller (With 207A PWR Supply)	—	6.0	7.81A	
SMDR With 207B PWR Supply	—	—	1.66A	
SMDR Without 207B PWR Supply	0.75	—	—	
SMDR Printer (When Operating)	—	—	4.58A	NA
9-Track SMDR (Idle)	—	—	7.1A	
9-Track SMDR (Tape in Motion)	—	—	12.2A	
Customer Premises Facility Terminal (One Shelf)	0.6	0.2	—	
Other	—	—	(Note)	

Note: Divide unit (120V) input volt-amperes by 60 to obtain equivalent −48V current drain.

4.88 Idle and busy-hour battery drain levels may be determined as follows:

- Idle battery drain (total) = −48 Vdc idle drain + equivalent −48 Vdc drain.
- Busy-hour battery drain = derated −48 Vdc active increment + idle battery drain (total).
- Busy-hour increment for a line carrier having N active stations on a supplemental line carrier = 2.88 × N/64.

Note: The number of 100 ampere-hour battery strings can be determined from the idle and busy-hour battery drains calculated by following standard power engineering procedures. The number of 11- or 15-ampere rectifiers provided as part of the 105E power plant should be such that they can carry the full PBX load and also be able to replenish the batteries in the desired time interval.

UNINTERRUPTIBLE POWER SERVICE (UPS)

4.89 Uninterruptible power service (UPS) is available for use with the DIMENSION PBX

TABLE H

CURRENT DRAINS FOR VARIOUS CIRCUIT PACKS FOR CALCULATING TOTAL CURRENT DRAIN

CP NAME	CP CODE	AMPs PER CP	X	NO. OF CPs	=	−48V IDLE DRAIN
Dual DID TRK	LC09D	0.013	X		=	
Dual AUX TRK	LC13B	0.034	X		=	
AIOD Transmitter	LC32B	0.2	X	1*	=	
Network Buffer A	LC49C	0.012	X	1†	=	0.012
TT Receiver	LC54B	0.04	X		=	———
TT RCVR and REG CKT	LC10C	0.04	X		=	
Total −48V Idle Drain					=	
CP NAME	CP CODE	AMPs PER CP	X	NO. OF CPs	=	−48V ACTIVE INCREMENT
Dual DID TRK	LC09D	0.140	X		=	
Dual Tie TRK	LC11B	0.2	X		=	———
Total −48V ACT INCRE Drain					=	

Note: If a circuit pack is not listed, there is no drain for that circuit.

* Optional - One per PBX maximum.
† One always required per carrier.

(Fig. 25). The UPS provides power holdover to the PBX cabinets 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.***

4.90 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 48V at 5 ampere-hours (Ah). 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:

- One J87460F rectifier/converter power supply (installed in control cabinet)
- One J87460B rectifier/converter power supply (installed in each network cabinet)
- One J87455A battery charger and disconnect circuit (installed in cabinet with UPS power supply)

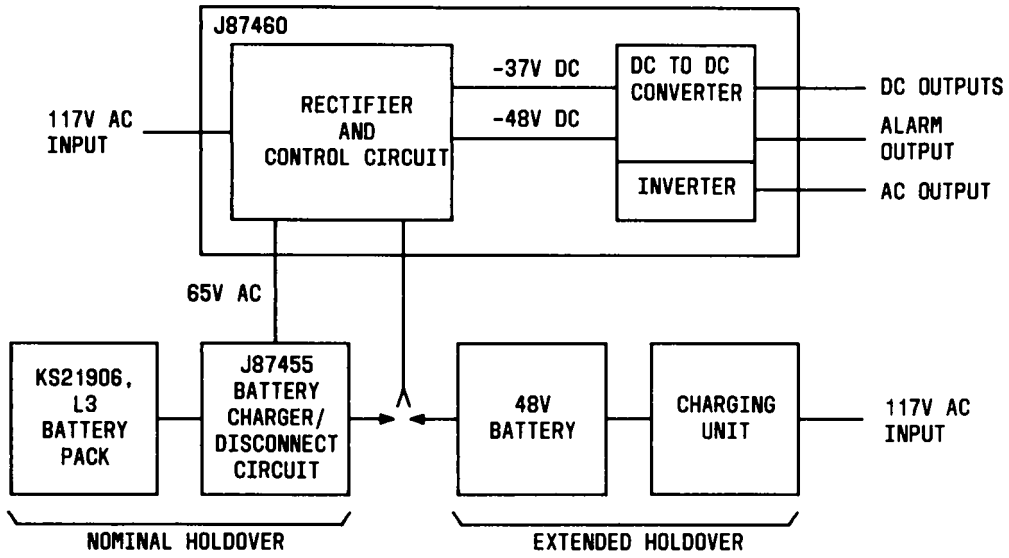


Fig. 25—Uninterruptible Power Service—Block Diagram

- One KS-21906, L3, battery pack (installed in cabinet with UPS power supply)
- One J58884JA, L13, L27, L2 power distribution and fan assembly equipped with a 124A ringing generator (installed in cabinet with UPS power supply).

4.91 The ***UPS extended holdover*** arrangement increases the holdover period to approximately 8 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 J87460F rectifier/converter power supply (installed in control cabinet)
- One J87460B rectifier/converter power supply (installed in each network cabinet)
- One J58884JA, L13, L27, 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).

CABLING

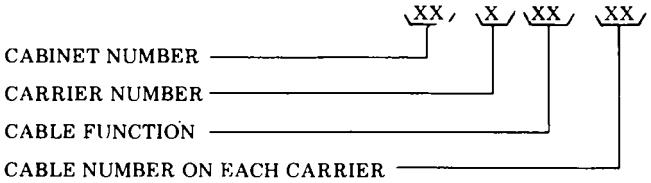
4.92 Circuits in the DIMENSION PBX cabinets are connected to the lines, trunks, console(s), etc, via connector cables using KS-type plugs. These cables are then cut down on the cross-connect field. They may be ordered via the Mechanized Ordering Form (E-8124). Some special cables (flat and shielded types) are used for high frequency data channels and carrier-to-carrier cabling.

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

4.93 The console mounting cord is a 12-pair cable, 2.44 m (8 feet) long, and can be plugged directly into the appropriate line group control carrier connector in the cabinet. If the console is to be located more than 2440 mm (8 feet) from the cabinet and a double-ended cable can be used, a B25A cable should be specified to connect the console to the cabinet. If a stub-ended cable is required to connect the console(s) to the cross-connect field, an A25B cable should be specified. The console power, voice, and data are provided over a 12-pair cable for a range of 213 m (700 feet). A 25-pair cable extends the maximum operating range to 305 m (1,000 feet). A console can be located 1524 m (5,000 feet) from the PBX if two

attendant console repeaters are used. If four attendant console repeaters are used, the console may be located 3353m (11,000 feet) from the PBX.

4.94 A25-D type cables should be specified for connections from the cabinet to the cross-connect field. Connectors for the cables and carriers are designated by cabinet carrier number, cable function, and cable number as follows:



(a) ***Carrier Number***—Assigned sequentially for each carrier in the cabinet. (See Fig. 11, 12, and 13.)

(b) The PBX may contain the following carriers:

- Basic control carrier (J58882AC [A&M]) or the control-growth carrier (J58882AH)—One required for each system.
- Line group control carrier (J58882BB)—One required for each system cabinet equipped with lines.
- Line port carrier (J58879AC)—For single bus systems, the maximum of 2, 6, 10, and 14 is allowed for the 1-, 2-, 3-, and 4-cabinet configurations respectively. For dual bus systems, the maximum of 5, 9, and 13 is allowed for the 2-, 3-, and 4-cabinet configurations.
- Module control and trunk port carrier (J58882BA)—Maximum of one is required for the single-bus, 1-cabinet configuration—two allowed (single bus) or required (dual bus) for each of the other system configurations.
- Trunk port carrier (J58879BA)—Maximum of three is allowed for the single bus, 1-cabinet configuration—seven allowed for each of the other system configurations.
- DIMENSION PBX ECTS basic and supplemental (controller) carriers (J58879KA and J58879KB)—Maximum of one each is allowed for the single-bus, 1-cabinet configuration—two each allowed for each of the other system configurations.
- Tie trunk carrier (J58882BD)—Maximum of three is allowed for the single-bus, 1-cabinet configuration—seven allowed for each of the other systems configurations.

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

- BX—Basic control carrier
- BX_A,GX_A—Control-growth carrier
- LGX—Line group control carrier
- MX—Module control and trunk port carrier
- TX—Trunk port carrier
- LX—Line (port) carrier
- TT—Tie trunk port carrier.

(d) ***Cable plan to the cross-connect field*** is shown in Fig. 26.

- LX01 through LX03 on line port carrier
- GX01A through 02A on control-growth carrier
- BX01A through 02A on control-growth carrier
- BX01 through 02 on basic control carrier
- LGX01 to 02 and 07 through 11 on line group control carriers
- TX01 through 04 on trunk port carrier
- MX01 through 03 on module control and trunk port carrier
- TT01 through 04 on tie trunk port carrier.

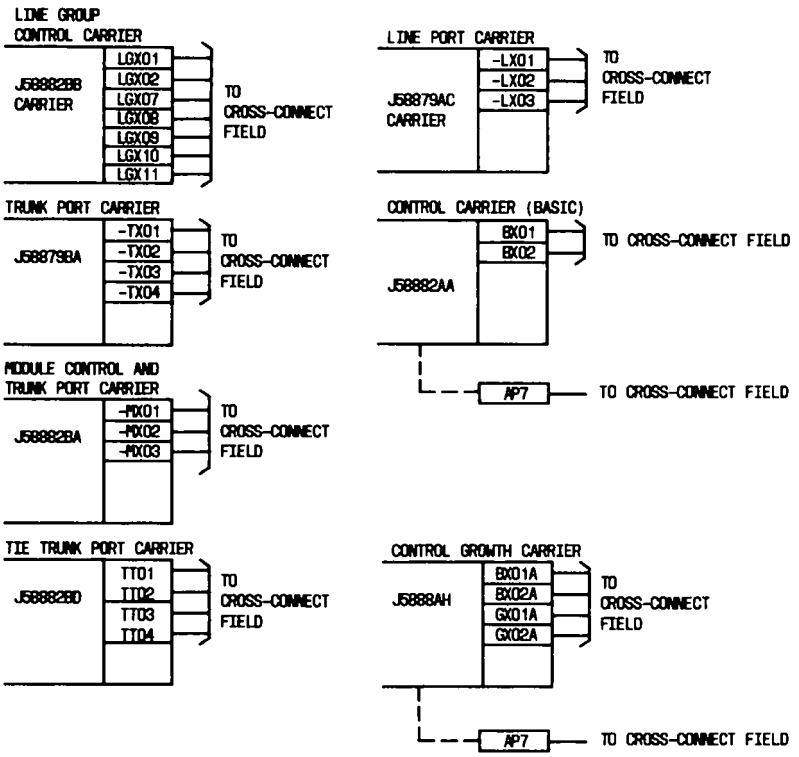


Fig. 26—Cable Plan to Cross-Connect Field

CROSS-CONNECTIONS

A. Cross-Connect Field

4.95 A typical cross-connect field layout for a DIMENSION PBX is shown in Fig. 27. The size of the cross-connect field will vary depending on the size and options used, ie, the number of lines or if key or auxiliary equipment is used.

4.96 Colored 183-type backboards are used on the cross-connect field to identify the type circuits to be terminated at the various positions. The recommended 66-type connecting blocks are identified with the system cables which terminate on the blocks. Backboard color and type of circuits terminated are as follows:

BACKBOARD COLOR	CIRCUITS OR EQUIPMENT TERMINATED
Green (183B2)	Central office trunk circuits
Blue (183B1)	Station line circuits
Red (183B3)	Key and DIMENSION PBX ECTS equipment
Yellow (183B5)	Miscellaneous circuits and equipment
Purple (183B4)	PBX circuits and equipment

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

B. Emergency Transfer

4.98 Prewired 609-type panels may be used to provide connections to emergency transfer facilities. A maximum of ten 609-type panels may be installed as part of the DIMENSION 600 PBX. Each

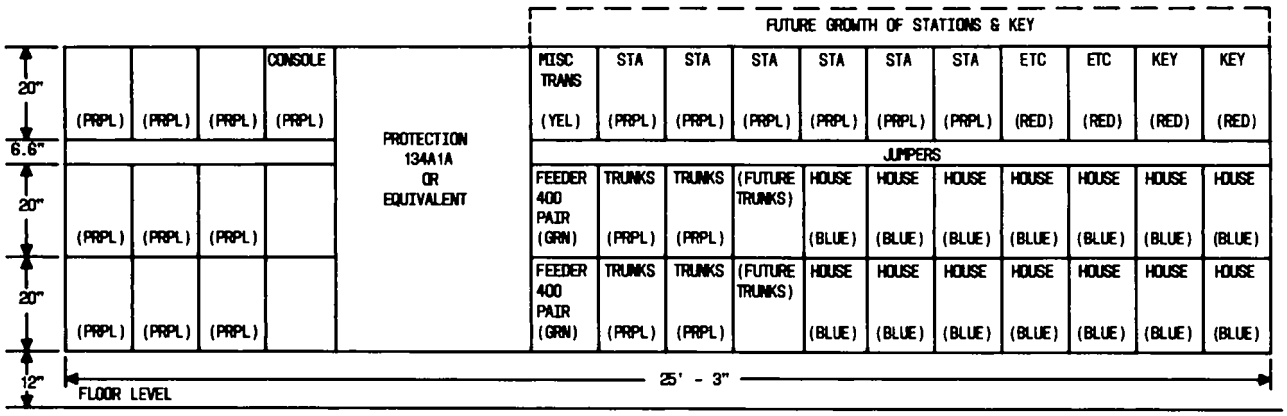


Fig. 27—Typical Cross-Connect Field

panel contains apparatus for transferring ten stations to ten CO cable pairs during power failure or major alarm conditions. The DIMENSION PBX ordering form (E-8124) provides a typical layout for ordering purposes. The 609-type panel should be mounted in the cross-connect field to facilitate cross-connecting the circuits (Fig. 28). Worksheet 1 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. 29. The method of connecting trunks (without the 837-type networks) for power failure transfer is shown in Fig. 30. Circuit control leads for emergency transfer are shown in Fig. 31.

4.99 A No. 6 AWG conductor connected to an approved ground source (eg, water pipe, building steel frame, or ac power ground) provides the ground start connection to the 609-type emergency transfer panel. A No. 14 AWG conductor may be used (instead of the No. 6 AWG) if sufficient mechanical protection to the conductor is provided. The ground start conductor runs through a relay contact in the 609-type panel to the ground start key. Ground start is provided each PBX station set assigned to emergency transfer service and is not intended as equipment protection ground.

Note: A Thomas and Betts Company lug ("Lug-It" No. 3531) is shipped (loose) with the 609 panel to be used to terminate the ground wire (No. 6 or No. 14 AWG). The ground lead to the 609-type panel should be insulated to prevent accidental shocking or inadvertent transfer. This lead should not be diverted for any other purpose.

4.100 A 609-type transfer panel may also be used for transferring an attendant console position to night service. 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.

4.101 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

4.102 The cross-connect field enclosure assembly (Fig. 32) may be required to satisfy FCC registration requirements. It is available in three sizes as follows:

(a) 432 mm (17 inches) wide, 686 mm (27 inches) high, and 229 mm (29 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.

(b) 432 mm (17 inches) wide, 1372 mm (54 inches) high, and 229 mm (9 inches) deep. The 1372-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

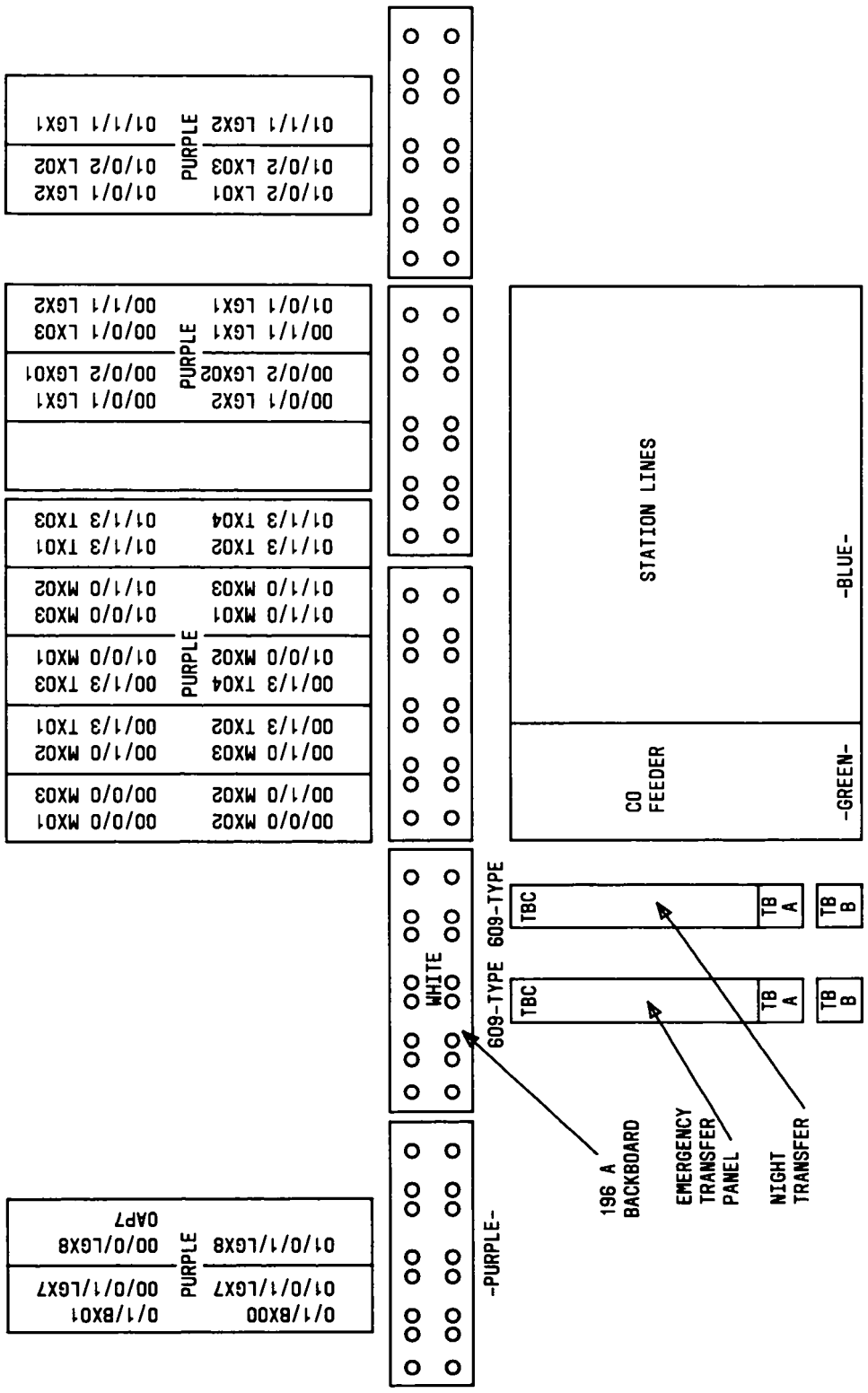


Fig. 28—Cross-Connect Field for a DIMENSION PBX (Showing Backboards)

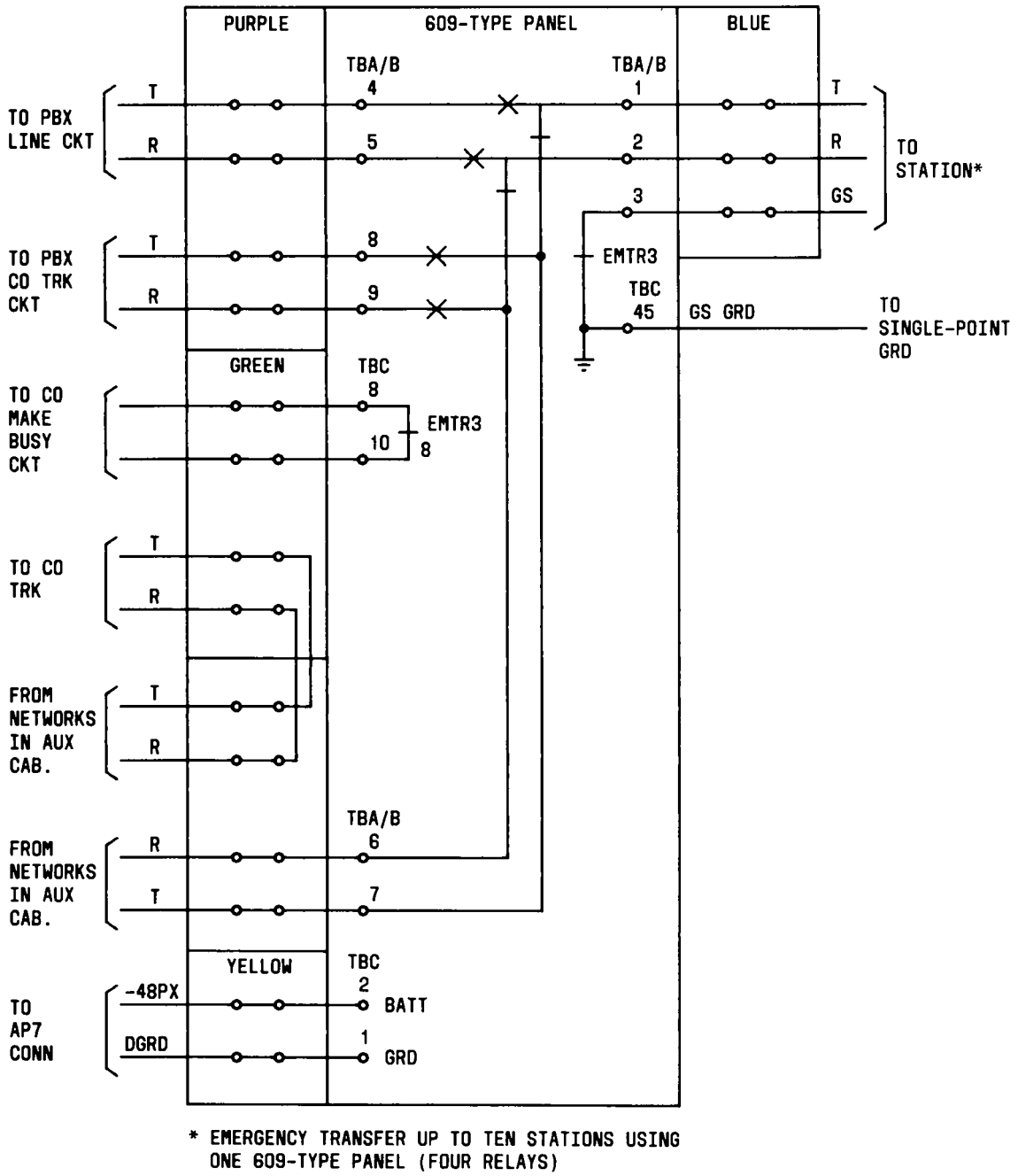


Fig. 29—Emergency Transfer of Trunks (Using 837-Type Networks) Allowing Networks to Remain in Circuit After Transfer

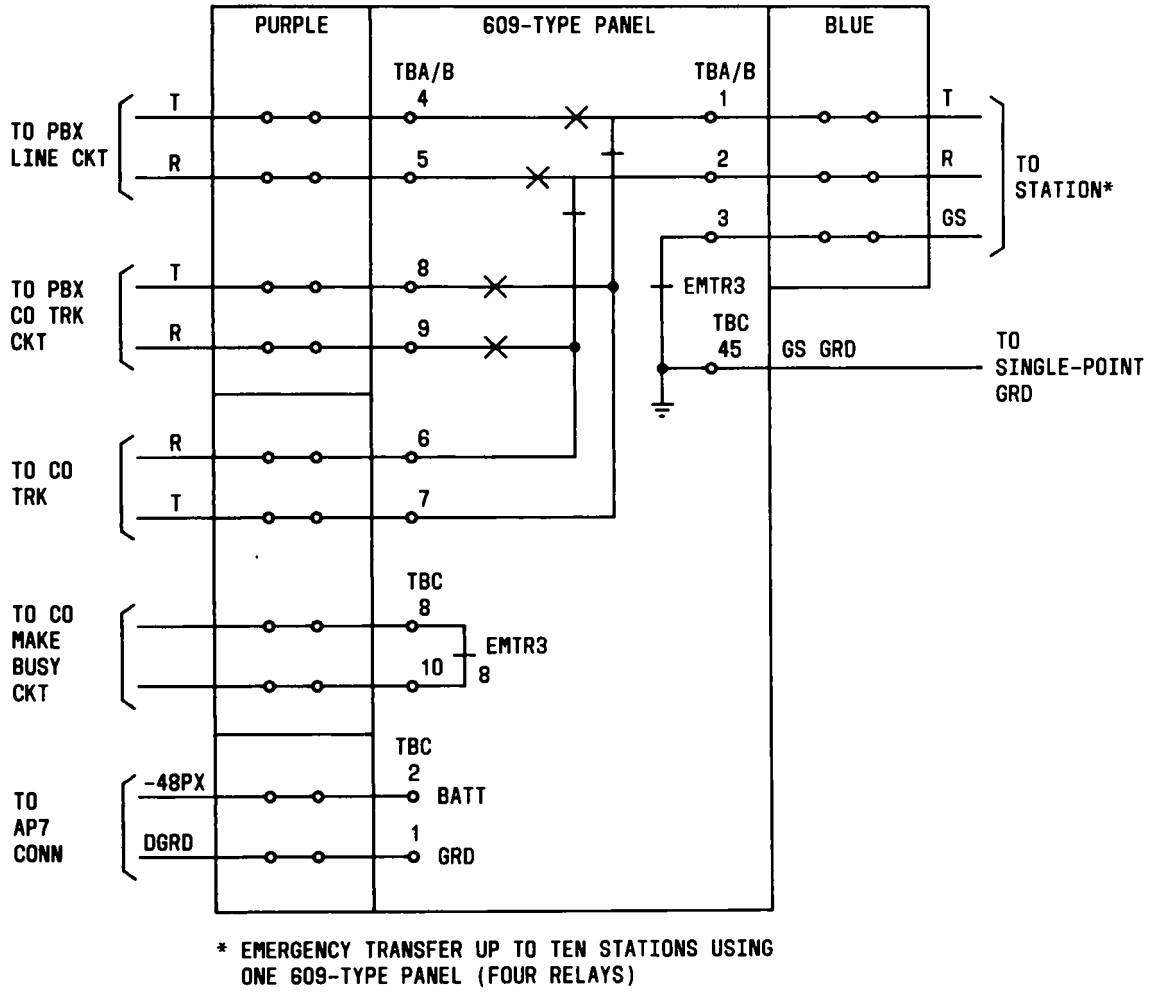


Fig. 30—Power Failure Transfer Circuit Using CO Trunks Without Terminal Balancing Equipment

size can be expanded horizontally as required. A 609-type emergency transfer panel can be located in the vacant part of the field.

(c) 432 mm (17 inches) wide, 1930 mm (76 inches) high, 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.

4.103 The cross-connect field enclosures may be multipled horizontally as needed. The top and side panels will accommodate the additional depth of the 19-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.

4.104 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.

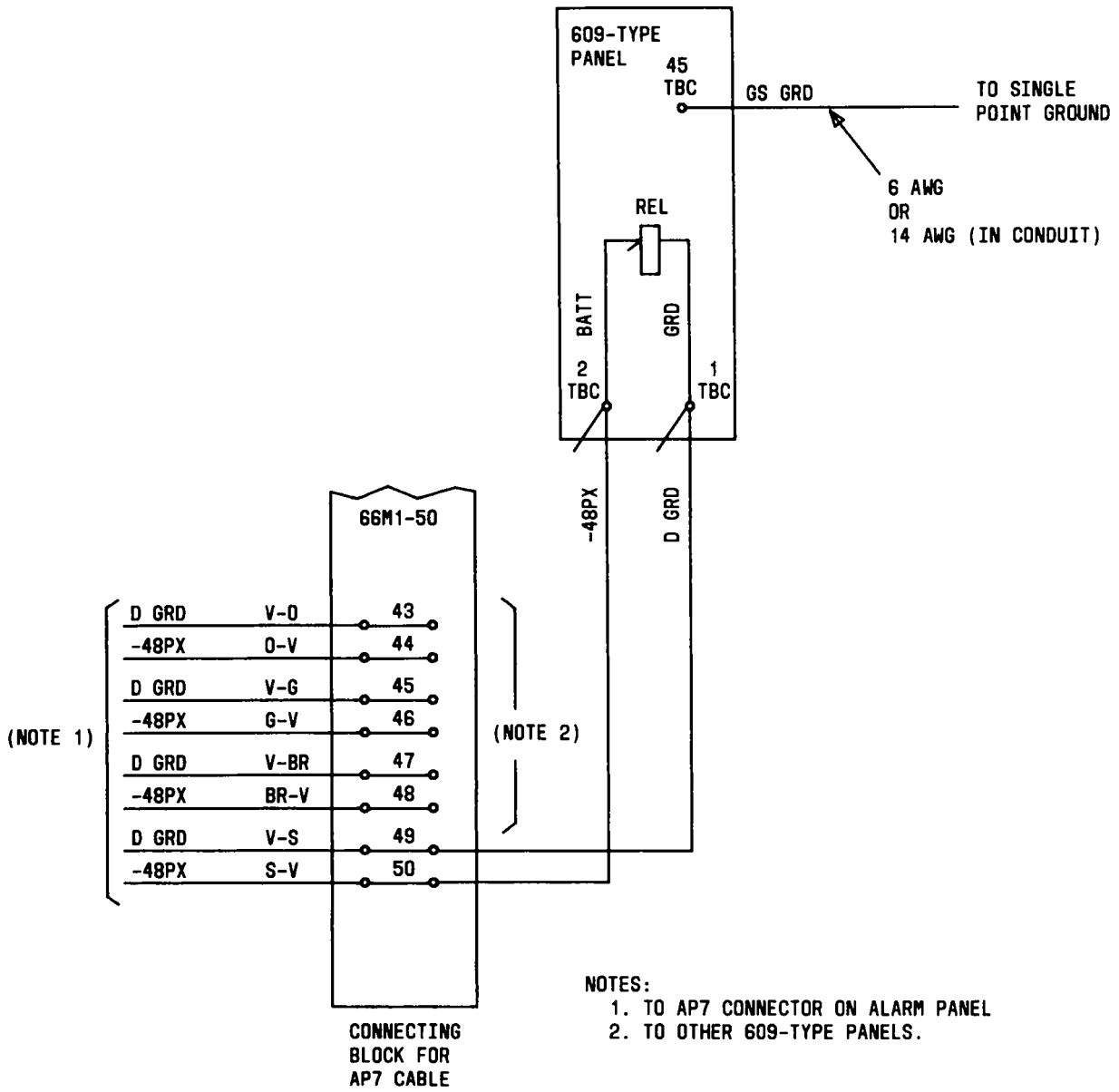


Fig. 31—Emergency Transfer Circuit Control Leads

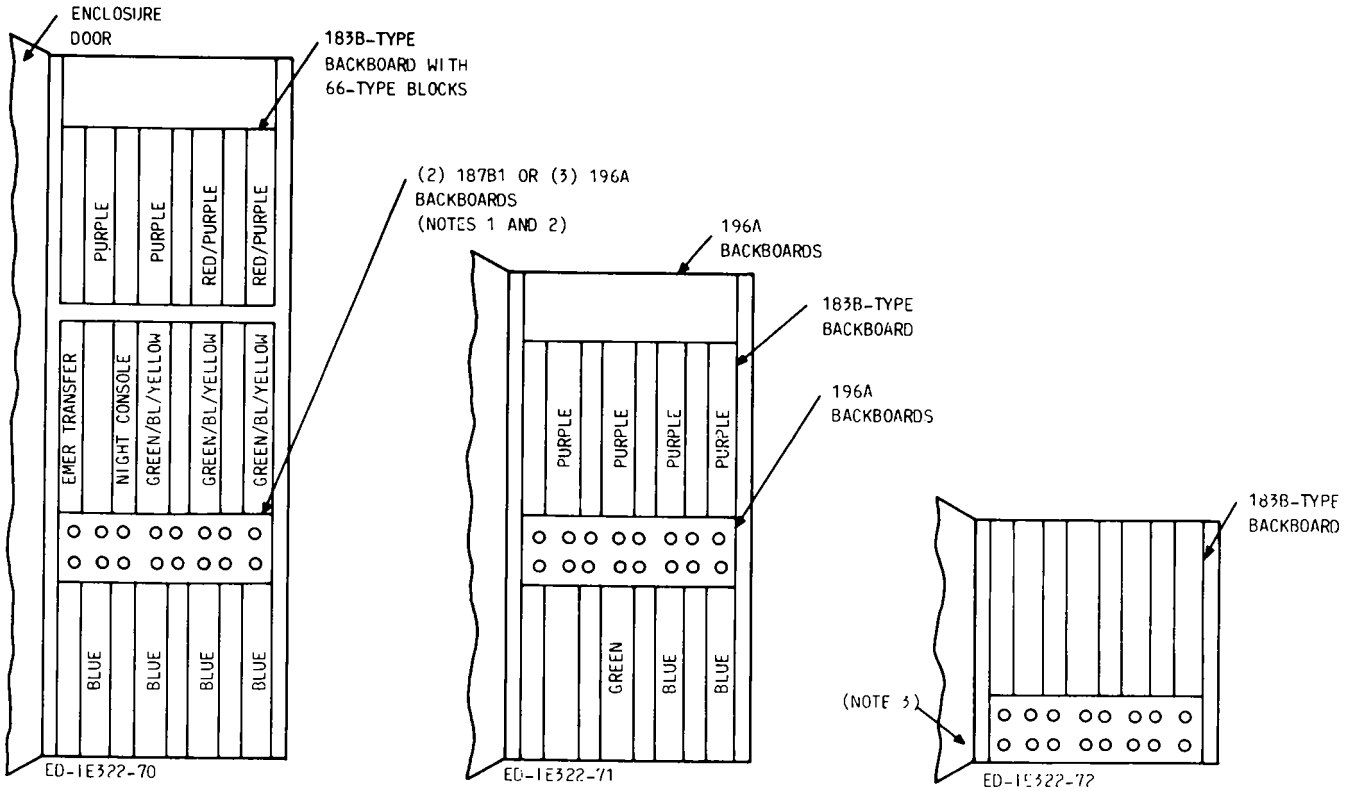
4.105 The installation of one ***1930-mm (76-inch)*** high cross-connect field enclosure (ED-1E322-70) to be mounted *on a wooden backboard* requires the following:

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

4.106 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 basic enclosure with door, brackets, and hardware



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 SECTION 518-010-101 FOR TYPICAL LAYOUTS.
3. CABLING IN THROUGH KNOCKOUTS IN SIDE AND BOTTOM.
4. "A" SIZE = 21.5 CM X 50.8 CM (8.5 IN. X 20 IN.) "B" SIZE = 43.2 CM X 50.8 CM (17 IN. X 20 IN.)

Fig. 32—Cross-Connect Field Enclosures

- Two GR2 (groups), each consisting of a side panel and hardware
- Two GR3 (groups), each consisting of a top/bottom panel and hardware.

4.107 The installation of a ***1372-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.

4.108 The installation of a ***1372-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.

4.109 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.

4.110 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.

4.111 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
- 720A panel
- 722A panel
- 724A panel
- 620A (modular) key panels
- 624A (modular) key panels
- 641A (modular) key panels
- 642A (modular) key panels.

Backboard ordering information is shown in Table I.

D. Cross-Connect Tables

4.112 Computer-generated cross-connect tables are delivered from the factory prior to delivery of the system. These tables should be completed

TABLE I

BACKBOARD DESIGNATIONS

TYPE	COLOR	SIZE (")	ORDERING CODE
183A4	Purple	8.5 X 20	101937902
183A5	Yellow	8.5 X 20	101986446
183B1	Blue	17 X 20	101412989
183B2	Green	17 X 20	101564631
183B3	Red	17 X 20	101937910
183B4	Purple	17 X 20	101937928
183B5	Yellow	17 X 20	101986483
196A	White	17 X 4.6	102581089
187B1	White	17 X 6.6	101937944

and provided for installer use at the time of installation. Worksheets similar to the cross-connect tables are located at the end of this section for use when planning the system initial configuration. These worksheets should be retained for office records.

Line Cross-Connections

4.113 Connections from the line carrier to the cross-connect field are shown in Fig. 33. Table J is a filled-in example of a line port carrier cross-connect worksheet.

4.114 Figure 34 shows a line connected through the cross-connect field to the line carrier.

4.115 Connections from a typical line group control carrier giving the cabinet, carrier, slot, circuit pack connector, lead designation, color code, and cross-connect field terminal are shown in Fig. 35. Table K is a filled-in example of a line group control carrier cross-connect worksheet.

Trunk Cross-Connections

4.116 Connections from a typical trunk carrier to the cross-connect field are shown in Fig. 36.

A25D CONNECTOR CABLES TO LINE PORT CARRIER CONNECTORS								AT PURPLE BACKBOARD	
								CUT LEADS DOWN ON	
LX01		LX02		LX03				LEAD COLOR	CONN BLK TERMINAL
LEAD DESIGNATION FOR LC02B									
T(0)		T(0)		T(0)				W-BL	1
R(0)		R(0)		R(0)				BL-W	2
T(1)		T(1)		T(1)				W-O	3
R(1)	SLOT	R(1)	SLOT	R(1)	SLOT			O-W	4
T(2)	2	T(2)	8	T(2)	15			W-G	5
R(2)		R(2)		R(2)				G-W	6
T(3)		T(3)		T(3)				W-BR	7
R(3)		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)		T(1)		T(1)				R-BL	11
R(1)	SLOT	R(1)	SLOT	R(1)	SLOT			BL-R	12
T(2)	3	T(2)	9	T(2)	16			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
T(0)		T(0)		T(0)				R-BR	17
R(0)		R(0)		R(0)				BR-R	18
T(1)		T(1)		T(1)				R-S	19
R(1)	SLOT	R(1)	SLOT	R(1)	SLOT			S-R	20
T(2)	4	T(2)	11	T(2)	17			BK-BL	21
R(2)		R(2)		R(2)				BL-BK	22
T(3)		T(3)		T(3)				BK-O	23
R(3)		R(3)		R(3)				O-BK	24
T(0)		T(0)		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)	SLOT	R(1)	SLOT	R(1)	SLOT			BR-BK	28
T(2)	5	T(2)	12	T(2)	18			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
T(0)		T(0)						Y-O	33
R(0)		R(0)						O-Y	34
T(1)		T(1)						Y-G	35
R(1)	SLOT	R(1)	SLOT					G-Y	36
T(2)	6	T(2)	13					Y-BR	37
R(2)		R(2)						BR-Y	38
T(3)		T(3)						Y-S	39
R(3)		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)	7	T(2)	14					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

Fig. 33—Line Carrier Connections From Carrier to Cross-Connect Field

A typical trunk connection through the cross-connect field and to the trunk carrier is shown in Fig. 37. Figure 38 shows trunk port carrier cross-connections for

TABLE J

A FILLED-IN EXAMPLE OF A LINE PORT CARRIER CROSS-CONNECT WORKSHEET

LINE CARRIER __ CAB __ CONNECTOR LX01				CONN CABLE COLOR CODE	CROSS-CONNECT	
					FROM	TO
CP SLOT NO.	CKT NO.	EXT NO.	LEAD DESIG		__ LX01 CONN BLK (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

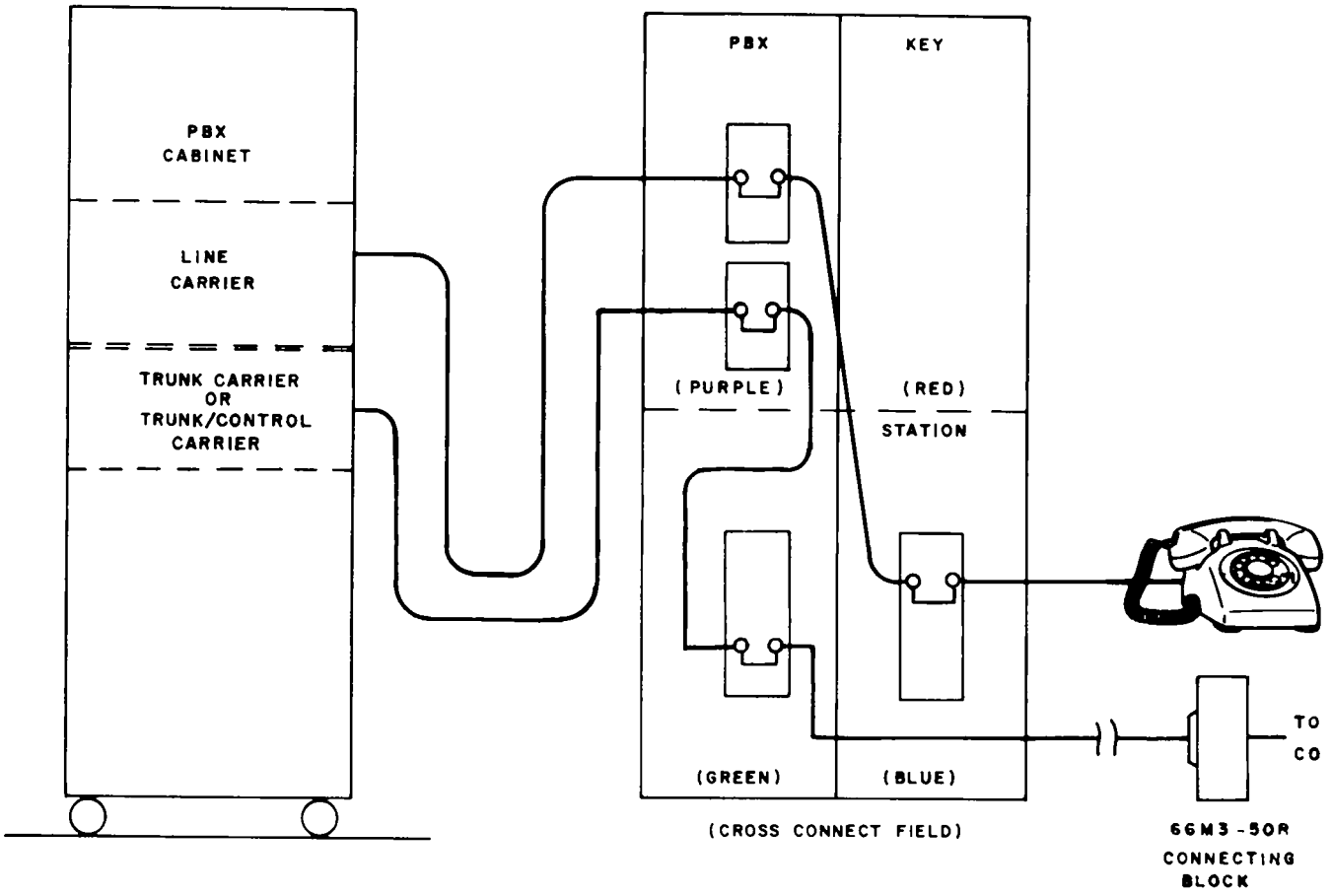


Fig. 34—Line to Carrier Through Cross-Connect Field

trunk circuits (LC08D, LC09D, LC11B, LC13B, LC15, LC16B, and LC361. Worksheets are required for each trunk carrier, one for each connector.

Trunk-type encodes and corresponding trunking characteristics are provided in Tables L and M. Detailed information for trunk circuit selection may be found in Part 7.

4.117 Connections for a typical tie trunk circuit to the cross-connect field are shown in Fig. 39 with other trunk circuits. Figure 40 shows the cross-connections for the module control carrier.

E. Control Cross-Connections

4.118 Cross-connections for the basic control carrier (J58882AC) are shown in Fig. 41. The connections show circuit 0 in slots 31 and 33 available for use as low-speed data ports via connector BX02. This is arranged by the use of a plug-ended cable connected to connector BX02. Connector plugs BXP07 and BXP09 on the end opposite BX02 may be connected to BX07 and BX09, respectively, to make these ports available for low-speed data transmission. If the system is equipped for station message detail recording (SMDR), plugs BXP07 and BXP09 must be disconnected from connectors BX07 and BX09. This allows port circuit 0 in slots 31 and 33 to be used for SMDR (high-speed data ports).

4.119 Cross-connections for the control-growth carrier (J58882AH) are shown in Fig. 42. The connections show circuit 0 in slot 31/35B and 33/37B available for use as low-speed data ports via connector BX02A. This is arranged by the use of a plug-ended cable connected to connector BX02A. Connector plugs BXP07A and BXP09A on the end opposite BX02A may be connected to BX07A and BX09A, respectively, to make these ports available for low-speed data transmission. If the system is equipped

A25D CONNECTOR CABLE TO LINE GROUP CONTROL CARRIER CONNECTORS (NOTE 1)									LEADS CUT DOWN ON	
LGX1			LGX2	LGX7	LGX8 (NOTE 2)	LGX9 (NOTE 2)	LGX10 (NOTE 2)	LGX11 (NOTE 2)	PURPLE BACKBOARD	
LEAD DESIGNATION FOR CIRCUIT PACK				LEAD DESIGNATION						
LC2B,LC3C	LC45B	LC17	LC2B,LC3C						LEAD COLOR	CONN BLK TERM.
TO *			T	IOXAO	IOXAO	IOXAO	IOXAO	IOXAO	W-BL	1
RO			R	IOXBO	IOXBO	IOXBO	IOXBO	IOXBO	BL-W	2
T1 SLOT			T SLOT	IORAO	IORAO	IORAO	IORAO	IORAO	W-O	3
R1			R	IORBO	IORBO	IORBO	IORBO	IORBO	O-W	4
TO			T	AMN	T	T	T	T	W-G	5
RO			R	AMJ	R	R	R	R	G-W	6
T1 5			T 13	IOXAO	T1	T1	T1	T1	W-BR	7
R1			R	IOXBO	R1	R1	R1	R1	BR-W	8
TO	TO		T	IORAO	GRD CF	GRD CF	GRD CF	GRD CF	W-S	9
RO	RO		R	IORBO	GRD CF	GRD CF	GRD CF	GRD CF	S-W	10
T1 SLOT	T1 SLOT		T SLOT	AMN	AMN	AMN	AMN	AMN	R-BL	11
R1	R1		R	AMJ	AMJ	AMJ	AMJ	AMJ	BL-R	12
TO	TO		T	IOXAO	+5C	+5C	+5C	+5C	R-O	13
RO	RO		R	IOXBO	-48	-48	-48	-48	O-R	14
T1 7	T1 7		T 14	IORAO	GRD	GRD	GRD	GRD	R-G	15
R1	R1		R	IORBO	-48	-48	-48	-48	G-R	16
TO	TO		T	LMN	GRD	GRD	GRD	GRD	R-BR	17
RO	RO		R	LMJ	-48	-48	-48	-48	BR-R	18
T1 SLOT	T1 SLOT		T SLOT	IOXAO	GRD	GRD	GRD	GRD	R-S	19
R1	R1		R	IOXBO	-48	-48	-48	-48	S-R	20
TO	TO		T	IORAO	GRD	GRD	GRD	GRD	BK-BL	21
RO	RO		R	IORBO	-48	-48	-48	-48	BL-BK	22
T1 8	T1 8		T 15	AMN	GRD	GRD	GRD	GRD	BK-O	23
R1	R1		R	AMJ	-48	-48	-48	-48	O-BK	24
TO			T		GRD	GRD	GRD	GRD	BK-G	25
RO			R		-48	-48	-48	-48	G-BK	26
T1 SLOT			T SLOT		GRD	GRD	GRD	GRD	BK-BR	27
R1			R		-48	-48	-48	-48	BR-BK	28
TO			T		GRD	GRD	GRD	GRD	BK-S	29
RO			R		-48	-48	-48	-48	S-BK	30
T1 9			T 16		GRD	GRD	GRD	GRD	Y-BL	31
R1			R		-48	-48	-48	-48	BL-Y	32
TO		T1 SLOT	T		GRD	GRD	GRD	GRD	Y-O	33
RO		R1 SLOT	R		-48	-48	-48	-48	O-Y	34
T1 SLOT		T2 SLOT	T SLOT		GRD	GRD	GRD	GRD	Y-G	35
R1		R2 SLOT	R		-48	-48	-48	-48	G-Y	36
TO		T3	T		GRD	GRD	GRD	GRD	Y-BR	37
RO		R3 10	R		-48	-48	-48	-48	BR-Y	38
T1 10			T 17		GRD	GRD	GRD	GRD	Y-S	39
R1			R		-48	-48	-48	-48	S-Y	40
TO			T		GRD	GRD	GRD	GRD	V-BL	41
RO			R		-48	-48	-48	-48	BL-V	42
T1 SLOT			T SLOT		GRD	GRD	GRD	GRD	V-O	43
R1			R		-48	-48	-48	-48	O-V	44
TO			T		GRD	GRD	GRD	GRD	V-G	45
RO			R		-48	-48	-48	-48	G-V	46
T1 12			T 18		GRD	GRD	GRD	GRD	V-BR	47
R1			R		-48	-48	-48	-48	BR-V	48
			-48 AUX		GRD	GRD	GRD	GRD	V-S	49
T10†			GRD -48		-48	-48	-48	-48	S-V	50

NOTE 1: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS, BUT ARE NOT USED FOR CROSS-CONNECTIONS
NOTE 2: LGX8, LGX9, LGX10 AND LGX11 MAY ALSO BE CONNECTED DIRECTLY TO A CONSOLE
* LEAD DESIGNATIONS BECOMES TOO WHEN LC4 IS USED IN SLOT 05 FOR RECORDED TELEPHONE DICTATION
† T10 IS USED FOR RECORDED TELEPHONE DICTATION ONLY

Fig. 35—Line Group Control Carrier Connections From Carrier to Cross-Connect Field

TABLE K

A FILLED-IN EXAMPLE OF A LINE GROUP CONTROL CARRIER CROSS-CONNECT WORKSHEET

LINE CARRIER __CAB__ CONNECTOR LGX 1				CONN CABLE COLOR CODE	CROSS-CONNECT	
					FROM	TO
CP SLOT NO.	CKT NO.	EXT NO.	LEAD DESIG		__LGX1 CONN BLK (PURPLE)	CONN/BLK (BLUE/RED)
05	0	2100	T	W-BL	1	BLK 3—17
			R	BL-W	2	18
	1	2101	T	W-O	3	19
			R	O-W	4	20
	2	2102	T	W-G	5	21
			R	G-W	6	22
	3	2103	T	W-BR	7	23
			R	BR-W	8	24
07	0	2104	T	W-S	9	33
			R	S-W	10	34
	1	2105	T	R-BL	11	35
			R	BL-R	12	36
	2	2106	T	R-O	13	37
			R	O-R	14	38
	3	2107	T	R-G	15	39
			R	G-R	16	40
08	0	2108	T	R-BR	17	BLK 5—25
			R	BR-R	18	26
	1	2109	T	R-S	19	27
			R	S-R	20	28
	2	2110	T	BK-BL	21	29
			R	BL-BK	22	30
	3	2111	T	BK-O	23	31
			R	O-BK	24	32

TRUNK CARRIER CROSS-CONNECTIONS
ORDER NUMBER XX-X-XXXXX
CUSTOMER --- XXXXXXXXXX

TRUNK CARRIER 00 CAB 0 CONNECTOR TX01 (SEE 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 00TX01 (PURPLE)	CONN BLK (G/YEL)	CO TRK NO.
02	0	19	9	20	1	T	W-BL	1	1	1
						R	BL-W	2	2	
							W-O	3		
							O-W	4		
							W-G	5		
							G-W	6		
	1	19	9	20	2	T	W-BR	7	3	2
						R	BR-W	8	4	
							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	
							BK-BL	21		
							BL-BK	22		
							BK-O	23		
							O-BK	24		
							BK-G	25		
						SPARE	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	
							Y-BR	37		
							BR-Y	38		
							Y-S	39		
							S-Y	40		
							V-BL	41		
						SPARE	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

Fig. 36—A Filled-In Example of Typical Trunk Port Carrier Cross-Connections

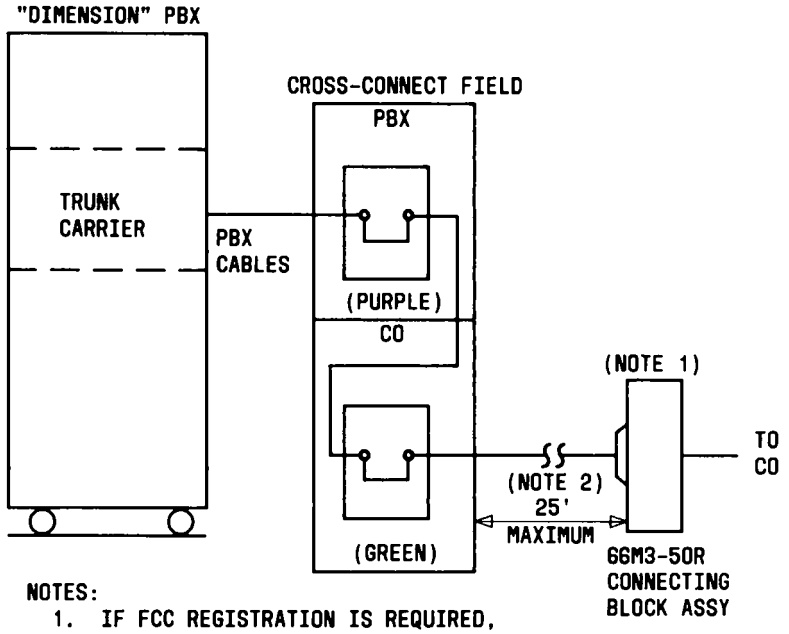


Fig. 37—CO Trunk Connected to Trunk Carrier

for station message detail recording (SMDR), plugs BXP07A and BXP09A must be disconnected from connectors BX07A and BX09A. This allows port circuit 0 in slots 31/35B and 33/37B to be used for SMDR (high-speed data ports).

F. Attendant Console Cross-Connections

4.120 The faceplates for the large and small attendant consoles are shown in Fig. 43. The attendant console(s) may be connected directly to the line group control carrier as shown in Fig. 44 when the length of the data leads (I0XA, I0XB, I0RA and I0RB) is not critical. If the length of the data leads must be minimized, the console may be connected so that the data leads go directly from the control carrier to the console via the cross-connect field as shown in Fig. 45. All data leads (I0XA, I0XB, I0RA, and I0RB) cross-connections must be made using twisted pair wiring.

4.121 Without the addition of console repeaters (with range extension), the console should be located not more than 305m (1,000 feet) from the PBX (using 24 AWG cable). With two console repeaters (one near the PBX and one near the console) providing range extension, the console may be located 1524m (5,000 feet) from the PBX. If two additional (intermediate) repeaters are added (a total of four), the console may be located a maximum of 3353m (11,000 feet) from the PBX. Connections to the attendant console are shown in Fig. 46. Repeaters and repeater connections are discussed in Part 5 of this section.

If a console(s) is to be added to a system which was initially installed without a console, J58884JA, L5, L6, L7, and L14 must be provided.

G. Multiple Consoles

4.122 Installation of multiple consoles requires considerable planning in order to determine the allocation of LC34B or LC366Bconsole interface circuit packs.

4.123 Numerous cross-connections may be required to tie the control cabinet to various

SLOT	A25D CONNECTING CABLE TO TRUNK PORT CARRIER CONNECTOR TXD1							TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)							CUT LEADS DOWN ON	
	LC7	LC8D, LC9D	LC11B	LC13B	LC15	LC16B	LC36I	LEAD COLOR	CONN BLK TERMINALS
02	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
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 CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

Fig. 38—Trunk Port Carrier Cross-Connections (Sheet 1 of 4)

SLOT	A25D CONNECTING CABLE TO TRUNK PORT CARRIER CONNECTOR TX02							TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)							OUT LEADS DOWN ON	
	LC7	LC8D, LC9D	LC11B	LC13B	LC15	LC16B	LC36J	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	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
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 CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

Fig. 38—Trunk Port Carrier Cross-Connections (Sheet 2 of 4)

SLOT	A25D CONNECTING CABLE TO TRUNK PORT CARRIER CONNECTOR TX03							TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (NOTE)							CUT LEADS DOWN ON	
	LC7	LC8D, LC9D	LC11B	LC13B	LC15	LC16B	LC36I	LEAD COLOR	COMN 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 CUT DOWN ON CONNECTING BLOCKS, BUT NOT USED FOR CROSS-CONNECTIONS.

Fig. 38—Trunk Port Carrier Cross-Connections (Sheet 3 of 4)

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. 38—Trunk Port Carrier Cross-Connections (Sheet 4 of 4)

TABLE L

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 L (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	→	4-6 Sec	5
42	ETN	LC11B	In				•									5

See notes at end of table.

TABLE L (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 L (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	
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 M

TRUNK ENCODES FOR SPECIAL TRUNKS AND INTERFACES HAVING TERMINATIONS INTERNAL TO THE "DIMENSION" PBX

TRUNK TYPE (ENCODE)	CIRCUIT PACK	TRUNK DESCRIPTION
0	—	Intercom
1	—	Dial Pulse Digit Register
2	LC10C	TOUCH-TONE Dialing Digit Register
3	—	Attendant Digit Register
4	—	Switched Loop
5	LC06B	6-Way Attendant Conference
6	—	General Purpose Queuing
48	—	Internal Announcement Interface
49	—	External Announcement Interface
51	LC13B	Telephone Dictation Interface
52	LC13B	Recorded Announcement Interface
53	—	Code Calling Interface
54	LC13B	Loudspeaker Paging Interface
55	LC12	TOUCH-TONE Dialing Sender
56	LC15	Centralized Attendant Service (CAS) Lamp Interface
58	LC32B	ANI Interface
59	LC16B	Station Message Register Interface
60	LC08D	Toll Terminal Trunk to Toll Switchboard
61	LC15	Uniform Call Distribution (UCD) Lamp Interface
62	LC13B	Music-On-Hold Interface
63	—	Hardware Digit Collection Trunk
65	LC15	Contact Interface
67	LC13B	Audio
68	LC13B	UCD Recorded Announcement
98	LC16B	Power Meter Interface
99	LC16B	Alarm Interface

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT01			TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)			CUT LEADS DOWN ON	
	LC8D	LC11B	LC36I	LEAD COLOR	CONN BLK TERMINALS
02	T(0)	T1(0)	T(0)	W-BL	1
	R(0)	R1(0)	R(0)	BL-W	2
	T(1)	T(0)	T(1)	W-O	3
	R(1)	R(0)	R(1)	O-W	4
		E(0)		W-G	5
		M(0)		G-W	6
		T1(1)		W-BR	7
		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.

Fig. 39—Tie Trunk Port Carrier Cross-Connections (Sheet 1 of 4)

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT02			TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)			CUT LEADS DOWN ON	
	LC8D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
06	T(0)	T1(0)	T(0)	W-BL	1
	R(0)	R1(0)	R(0)	BL-W	2
	T(1)	T(0)	T(1)	W-O	3
	R(1)	R(0)	R(1)	O-W	4
		E(0)		W-G	5
		M(0)		G-W	6
		T1(1)		W-BR	7
		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.

Fig. 39—Tie Trunk Port Carrier Cross-Connections (Sheet 2 of 4)

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT03			TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)			CUT LEADS DOWN ON	
	LC08D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
11	T(0)	T1(0)	T(0)	W-BL	1
	R(0)	R1(0)	R(0)	BL-W	2
	T(1)	T(0)	T(1)	W-O	3
	R(1)	R(0)	R(1)	O-W	4
		E(0)		W-G	5
		M(0)		G-W	6
		T1(1)		W-BR	7
		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.

Fig. 39—Tie Trunk Port Carrier Cross-Connections (Sheet 3 of 4)

SLOT	A25D CONNECTOR CABLE TO TIE TRUNK PORT CARRIER CONNECTOR TT04			TO PURPLE BACKBOARD	
	LEAD DESIGNATION (NOTE)			CUT LEADS DOWN ON	
	LC08D	LC11B	LC361	LEAD COLOR	CONN BLK TERMINALS
15	T(0)	T1(0)	T(0)	W-BL	1
	R(0)	R1(0)	R(0)	BL-W	2
	T(1)	T(0)	T(1)	W-O	3
	R(1)	R(0)	R(1)	O-W	4
		E(0)		W-G	5
		M(0)		G-W	6
		T1(1)		W-BR	7
		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.

Fig. 39—Tie Trunk Port Carrier Cross-Connections (Sheet 4 of 4)

SLOT	A25D CONNECTOR CABLE TO MODULE CONTROL AND TRUNK PORT CARRIER CONNECTOR MX01					TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (SEE NOTE)					CUT LEADS DOWN ON	
	LC06B	LC8D, LC9D	LC11B	LC13B	LC16B	LEAD COLOR	CONN BLK TERMINALS
06	T	T(0)	T1(0)	T(0)	M(0)	W-BL	1
	R	R(0)	R1(0)	R(0)		BL-W	2
		T(1)	T(0)	AL1(0)	M(1)	W-O	3
		R(1)	R(0)	S2(0)		O-W	4
			E(0)	CO(0)	M(2)	W-G	5
			M(0)			G-W	6
			T1(1)	T(1)	M(3)	W-BR	7
			R1(1)	R(1)		BR-W	8
			T(1)	AL1(1)	M(4)	W-S	9
			R(1)	S2(1)		S-W	10
			E(1)	CO(1)	M(5)	R-BL	11
			M(1)			BL-R	12
					M(6)	R-O	13
						O-R	14
					M(7)	R-G	15
						G-R	16
07	T	T(0)	T1(0)	T(0)	M(0)	R-BR	17
	R	R(0)	R(0)	R(0)		BR-R	18
		T(1)	T(0)	AL1(0)	M(1)	R-S	19
		R(1)	R(0)	S2(0)		S-R	20
			E(0)	CO(0)	M(2)	BK-BL	21
			M(0)			BL-BK	22
			T1(1)	T(1)	M(3)	BK-O	23
			R1(1)	R(1)		O-BK	24
			T(1)	AL1(1)	M(4)	BK-G	25
			R(1)	S2(1)		G-BK	26
			E(1)	CO(1)	M(5)	BK-BR	27
			M(1)			BR-BK	28
					M(6)	BK-S	29
						S-BK	30
					M(7)	Y-BL	31
						BL-Y	32
08	T	T(0)	T1(0)	T(0)	M(0)	Y-O	33
	R	R(0)	R1(0)	R(0)		O-Y	34
		T(1)	T(0)	AL1(0)	M(1)	Y-G	35
		R(1)	R(0)	S2(0)		G-Y	36
			E(0)	CO(0)	M(2)	Y-BR	37
			M(0)			BR-Y	38
			T1(1)	T(1)	M(3)	Y-S	39
			R1(1)	R(1)		S-Y	40
			T(1)	AL1(1)	M(4)	V-BL	41
			R(1)	S2(1)		BL-V	42
			E(1)	CO(1)	M(5)	V-O	43
			M(1)			O-V	44
					M(6)	V-G	45
						G-V	46
					M(7)	V-BR	47
						BR-V	48
						V-S	49
						S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS.

Fig. 40—Module Control and Trunk Port Carrier Cross-Connections (Sheet 1 of 3)

SLOT	A25D CONNECTOR CABLE TO MODULE CONTROL AND TRUNK PORT CARRIER CONNECTOR MX02					TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (SEE NOTE)					CUT LEADS DOWN ON	
	LC06B	LC8D, LC9D	LC11B	LC13B	LC16B	LEAD COLOR	CONN BLK TERMINALS
10	T	T(0)	T1(0)	T(0)	M(0)	W-BL	1
	R	R(0)	R1(0)	R(0)		BL-W	2
		T(1)	T(0)	AL1(0)	M(1)	W-O	3
		R(1)	R(0)	S2(0)		O-W	4
			E(0)	CO(0)	M(2)	W-G	5
			M(0)			G-W	6
			T1(1)	T(1)	M(3)	W-BR	7
			R1(1)	R(1)		BR-W	8
			T(1)	AL1(1)	M(4)	W-S	9
			R(1)	S2(1)		S-W	10
			E(1)	CO(1)	M(5)	R-BL	11
			M(1)			BL-R	12
					M(6)	R-O	13
						O-R	14
					M(7)	R-G	15
						G-R	16
12	T	T(0)	T1(0)	T(0)	M(0)	R-BR	17
	R	R(0)	R1(0)	R(0)		BR-R	18
		T(1)	T(0)	AL1(0)	M(1)	R-S	19
		R(1)	R(0)	S2(0)		S-R	20
			E(0)	CO(0)	M(2)	BK-BL	21
			M(0)			BL-BK	22
			T1(1)	T(1)	M(3)	BK-O	23
			R1(1)	R(1)		O-BK	24
			T(1)	AL1(1)	M(4)	BK-G	25
			R(1)	S2(1)		G-BK	26
			E(1)	CO(1)	M(5)	BK-BR	27
			M(1)			BR-BK	28
					M(6)	BK-S	29
						S-BK	30
					M(7)	Y-BL	31
						BL-Y	32
15	T	T(0)	T1(0)	T(0)	M(0)	Y-O	33
	R	R(0)	R1(0)	R(0)		O-Y	34
		T(1)	T(0)	AL1(0)	M(1)	Y-G	35
		R(1)	R(0)	S2(0)		G-Y	36
			E(0)	CO(0)	M(2)	Y-BR	37
			M(0)			BR-Y	38
			T1(1)	T(1)	M(3)	Y-S	39
			R1(1)	R(1)		S-Y	40
			T(1)	AL1(1)	M(4)	V-BL	41
			R(1)	S2(1)		BL-V	42
			E(1)	CO(1)	M(5)	V-O	43
			M(1)			O-V	44
					M(6)	V-G	45
						G-V	46
					M(7)	V-BR	47
						BR-V	48
						V-S	49
						S-V	50

NOTE: LEADS NOT DESIGNATED ARE CUT DOWN ON CONNECTING BLOCKS.

Fig. 40—Module Control and Trunk Port Carrier Cross-Connections (Sheet 2 of 3)

SLOT	A25D CONNECTOR CABLE TO MODULE CONTROL AND TRUNK PORT CARRIER CONNECTOR MX02					TO PURPLE BACKBOARD	
	LEAD DESIGNATION FOR CIRCUIT PACKS (SEE NOTE)					CUT LEADS DOWN ON	
	LC06B	LC8D, LC9D	LC11B	LC13B	LC16B	LEAD COLOR	CONN BLK TERMINALS
17	T	T(0)	T1(0)	T(0)	M(0)	W-BL	1
	R	R(0)	R1(0)	R(0)		BL-W	2
		T(1)	T(0)	AL1(0)	M(1)	W-O	3
		R(1)	R(0)	S2(0)		O-W	4
			E(0)	CO(0)	M(2)	W-G	5
			M(0)			G-W	6
			T1(1)	T(1)	M(3)	W-BR	7
			R1(1)	R(1)		BR-W	8
			T(1)	AL1(1)	M(4)	W-S	9
			R(1)	S2(1)		S-W	10
			E(1)	CO(1)	M(5)	R-BL	11
			M(1)			BL-R	12
					M(6)	R-O	13
						O-R	14
					M(7)	R-G	15
						G-R	16
19	T	T(0)	T1(0)	T(0)	M(0)	R-BR	17
	R	R(0)	R1(0)	R(0)		BR-R	18
		T(1)	T(0)	AL1(0)	M(1)	R-S	19
		R(1)	R(0)	S2(0)		S-R	20
			E(0)	CO(0)	M(2)	BK-BL	21
			M(0)			BL-BK	22
			T1(1)	T(1)	M(3)	BK-O	23
			R1(1)	R(1)		O-BK	24
			T(*)	AL1(1)	M(4)	BK-G	25
			R(1)	S2(1)		G-BK	26
			E(1)	CO(1)	M(5)	BK-BR	27
			M(*)			BR-BK	28
					M(6)	BK-S	29
						S-BK	30
					M(7)	Y-BL	31
						BL-Y	32
21	T	T(0)				Y-O	33
	R	R(0)				O-Y	34
		T(*)				Y-G	35
		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(*)				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.

Fig. 40—Module Control and Trunk Port Carrier Cross-Connections (Sheet 3 of 3)

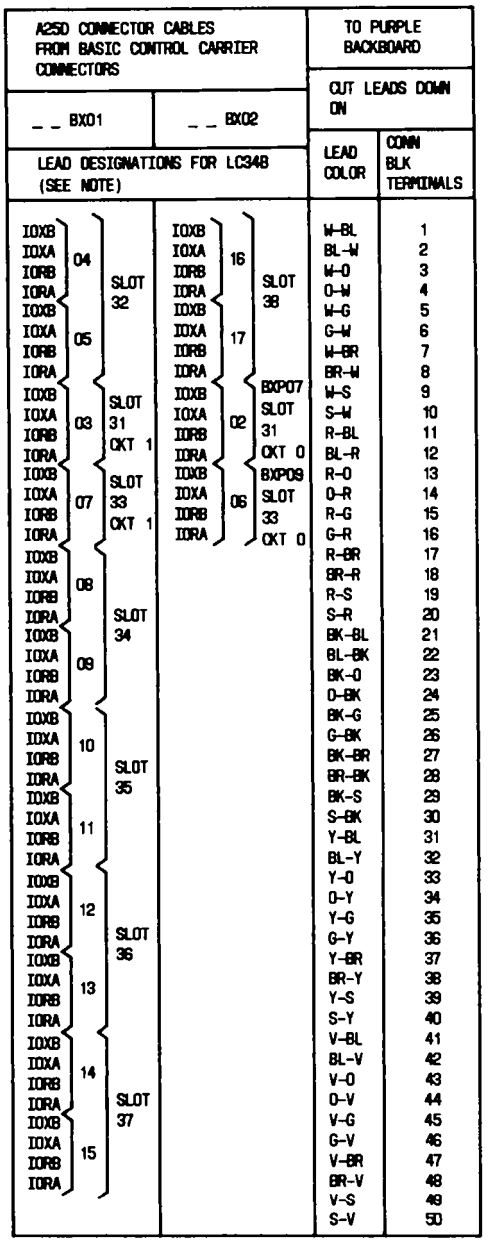


Fig. 41—Basic Control Carrier Cross-Connections

consoles. An interconnection plan for consoles, which are close enough to the control cabinet that the data channel lead lengths do not need to be minimized, is shown in Fig. 44. If desired, the console may be connected directly to the line group control carrier (in the module control or line cabinet) without going through the console connecting block and the __LG__ connecting block of the cross-connecting field.

4.124 When the console is far enough away from the control cabinet to require minimizing the data channel lead length, an interconnecting plan similar to Fig. 45 may be used. This wiring plan reduces the data channel (and alarm panel) lead lengths by the distance from the cross-connect field to the line group control carrier and back to the cross-connect field. With this wiring configuration, only the tip and ring leads and the −48 volt leads are cabled from the line group control carrier to the console.

H. Night Console Circuit

4.125 The night attendant console provides a specific console for night use. The night console is activated by the attendant (at the console equipped with the night console transfer switch) operating the transfer switch to the operate position and disconnecting the handset/headset from each (day) console. Cross-connections and a functional block diagram for night console transfer are shown in Fig. 47 and 48. Connections from the 609-type panel to the console connecting block are shown in Fig. 49.

5. AUXILIARY EQUIPMENT ASSOCIATED WITH FEATURES AND SERVICES

5.01 The auxiliary equipment is installed in one or more auxiliary cabinets (J58879F) and in other approved enclosures. The auxiliary cabinet and associated hardware are shown in Fig. 50.

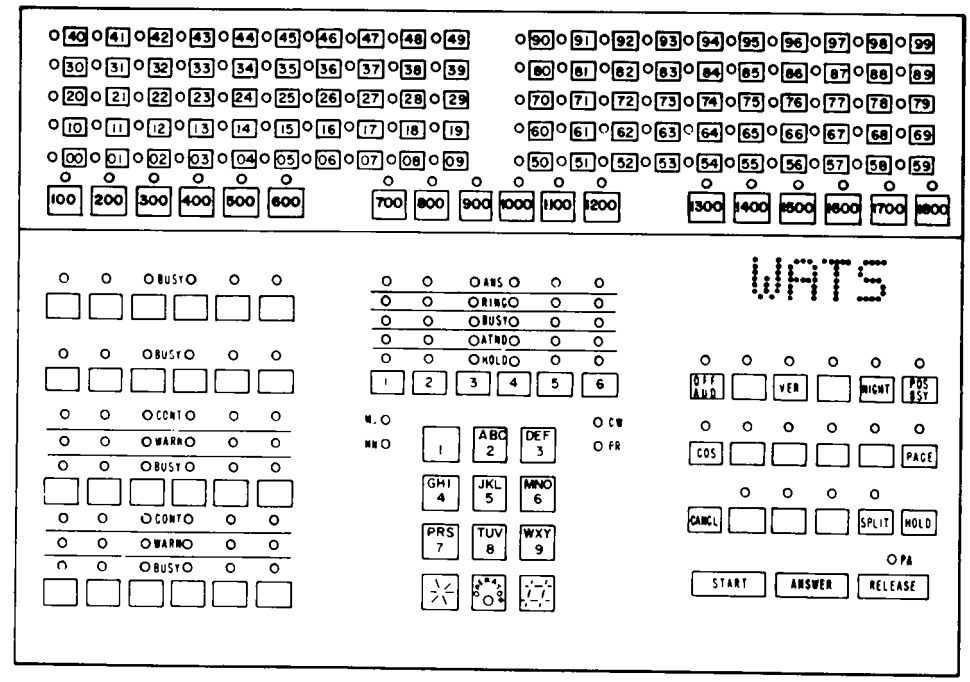
5.02 The auxiliary equipment described is as follows:

- Attendant Console Repeater Circuit
- AUDICHRON Variable Announcement (Unit H9040)
- Automatic Voice Network (AUTOVON) Interface Equipment
- Centralized Attendant Service (CAS)
- Centralized Station Message Detail Recording (CSMDR) System
- Code Calling Access (3A)
- Code Calling Access (Chime Paging)
- Customer Administration Center System (CACS)

A25D CONNECTOR CABLE FOR CONTROL-GROWTH CARRIER CONNECTORS				TO PURPLE BACKBOARD	
LEAD DESIGNATIONS FOR LC366B/LC34B (NOTE)				CUT LEADS DOWN ON	
--BX01A	--BX02A	--GX01A	--GX02A	LEAD COLOR	CONN BLK TERMINALS
IOXB, IOXA, IORB, IORA — 0004 — SLOT 32/36	IOXB, IOXA, IORB, IORA — 0016 — SLOT 34/38	IOXB, IOXA, IORB, IORA — 0100 — SLOT 20/24	IOXB, IOXA, IORB, IORA — 0112 — SLOT 22/26	W-BL	1
IOXB, IOXA, IORB, IORA — 0005 — SLOT 32/36	IOXB, IOXA, IORB, IORA — 0017 — SLOT 34/38	IOXB, IOXA, IORB, IORA — 0101 — SLOT 20/24	IOXB, IOXA, IORB, IORA — 0113 — SLOT 22/26	BL-W	2
				W-O	3
				O-W	4
				W-G	5
				G-W	6
				W-BR	7
				BR-W	8
	IOXB, IOXA, IORB, IORA — 0002 — SLOT 31/35B	IOXB, IOXA, IORB, IORA — 0102 — SLOT 21/25	IOXB, IOXA, IORB, IORA — 0114 — SLOT 23/27	W-S	9
				S-W	10
IOXB, IOXA, IORB, IORA — 0007 — SLOT 33/37				R-BL	11
				BL-R	12
				R-O	13
				O-R	14
				R-G	15
				G-R	16
IOXB, IOXA, IORB, IORA — 0008 — SLOT 34/38		IOXB, IOXA, IORB, IORA — 0103 — SLOT 21/25		R-BR	17
				BR-R	18
				R-S	19
				S-R	20
IOXB, IOXA, IORB, IORA — 0009 — SLOT 34/38				BK-BL	21
				BL-BK	22
				BK-O	23
				O-BK	24
				BK-G	25
				G-BK	26
		IOXB, IOXA, IORB, IORA — 0104 — SLOT 22/26		BK-BR	27
				BR-BK	28
				BK-S	29
				S-BK	30
IOXB, IOXA, IORB, IORA — 0010 — SLOT 31/35				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
		IOXB, IOXA, IORB, IORA — 0105 — SLOT 22/26		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
IOXB, IOXA, IORB, IORA — 0011 — SLOT 31/35					
		IOXB, IOXA, IORB, IORA — 0106 — SLOT 23/27			
IOXB, IOXA, IORB, IORA — 0012 — SLOT 32/36					
IOXB, IOXA, IORB, IORA — 0013 — SLOT 32/36					
		IOXB, IOXA, IORB, IORA — 0107 — SLOT 23/27			
		IOXB, IOXA, IORB, IORA — 0108 — SLOT 20/24			
IOXB, IOXA, IORB, IORA — 0014 — SLOT 33/37					
		IOXB, IOXA, IORB, IORA — 0109 — SLOT 20/24			
IOXB, IOXA, IORB, IORA — 0015 — SLOT 33/37					
		IOXB, IOXA, IORB, IORA — 0110 — SLOT 21/25			
		IOXB, IOXA, IORB, IORA — 0111 — SLOT 21/25			

NOTE:
LEADS NOT DESIGNATED ARE CUT DOWN OR CONNECTING BLOCKS BUT NOT USED PER CROSS-CONNECTIONS.

Fig. 42—Control-Growth Carrier Cross-Connections



NOTE:
TRUNK GROUPS 20 THROUGH 23 ARE ASSIGNED TO IC1 LAMPS 1,4,5 AND 6

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

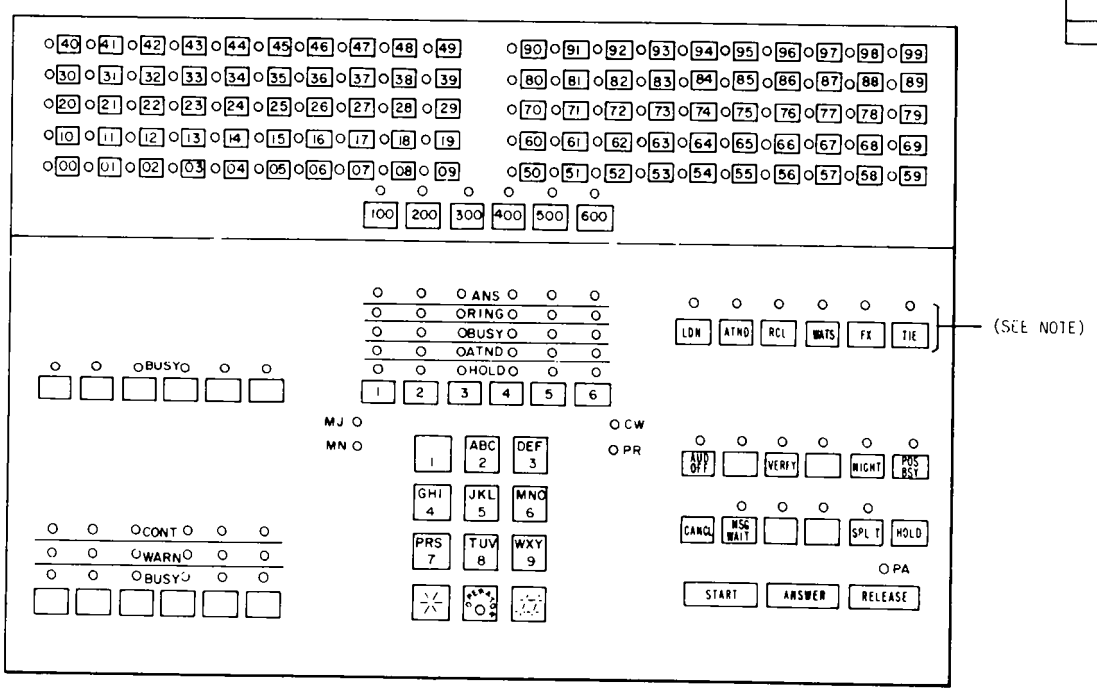
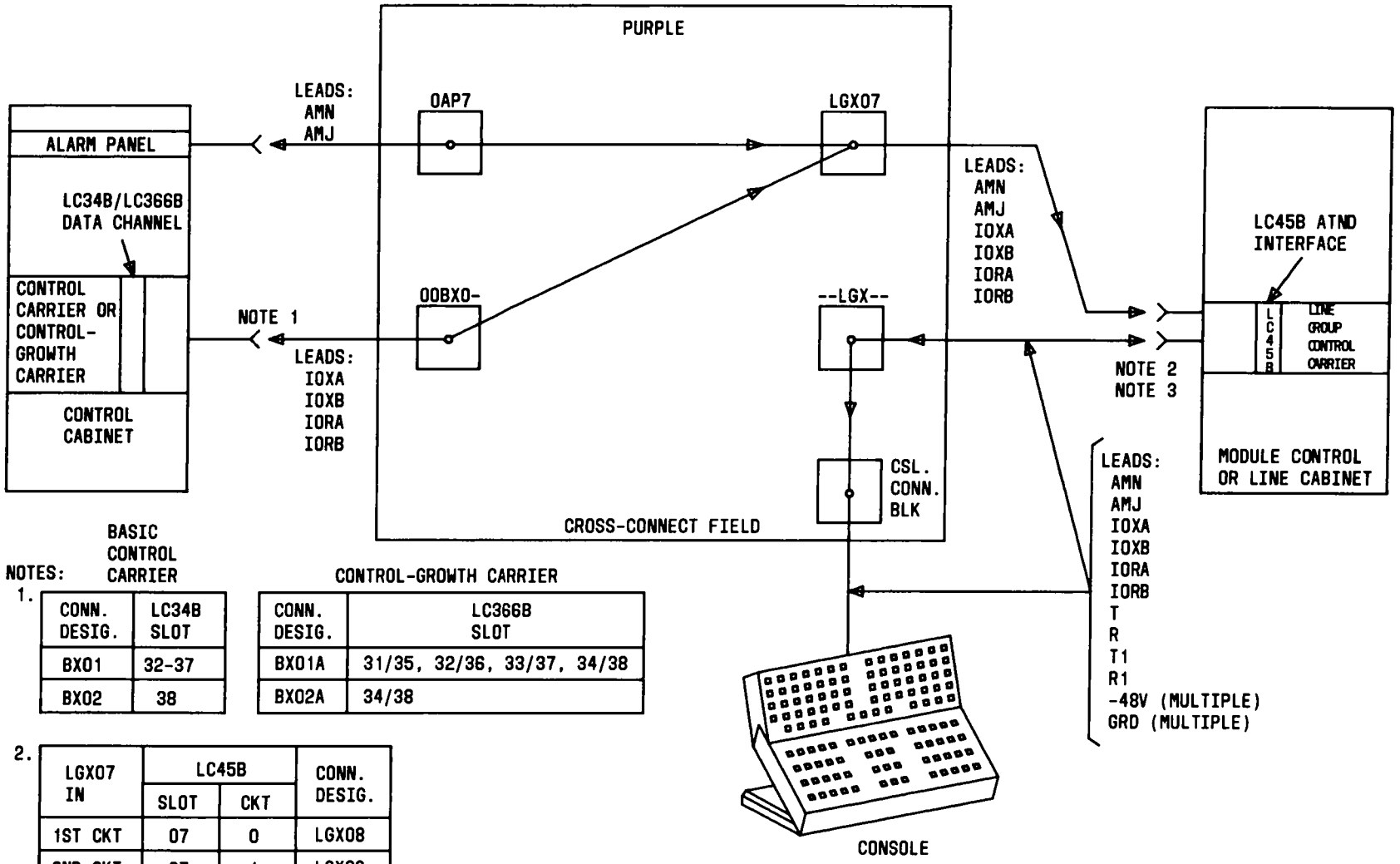


Fig. 43—Faceplates for Large and Small Consoles



NOTES:

1.

BASIC CONTROL CARRIER

CONN. DESIG.	LC34B SLOT
BX01	32-37
BX02	38

CONTROL-GROWTH CARRIER

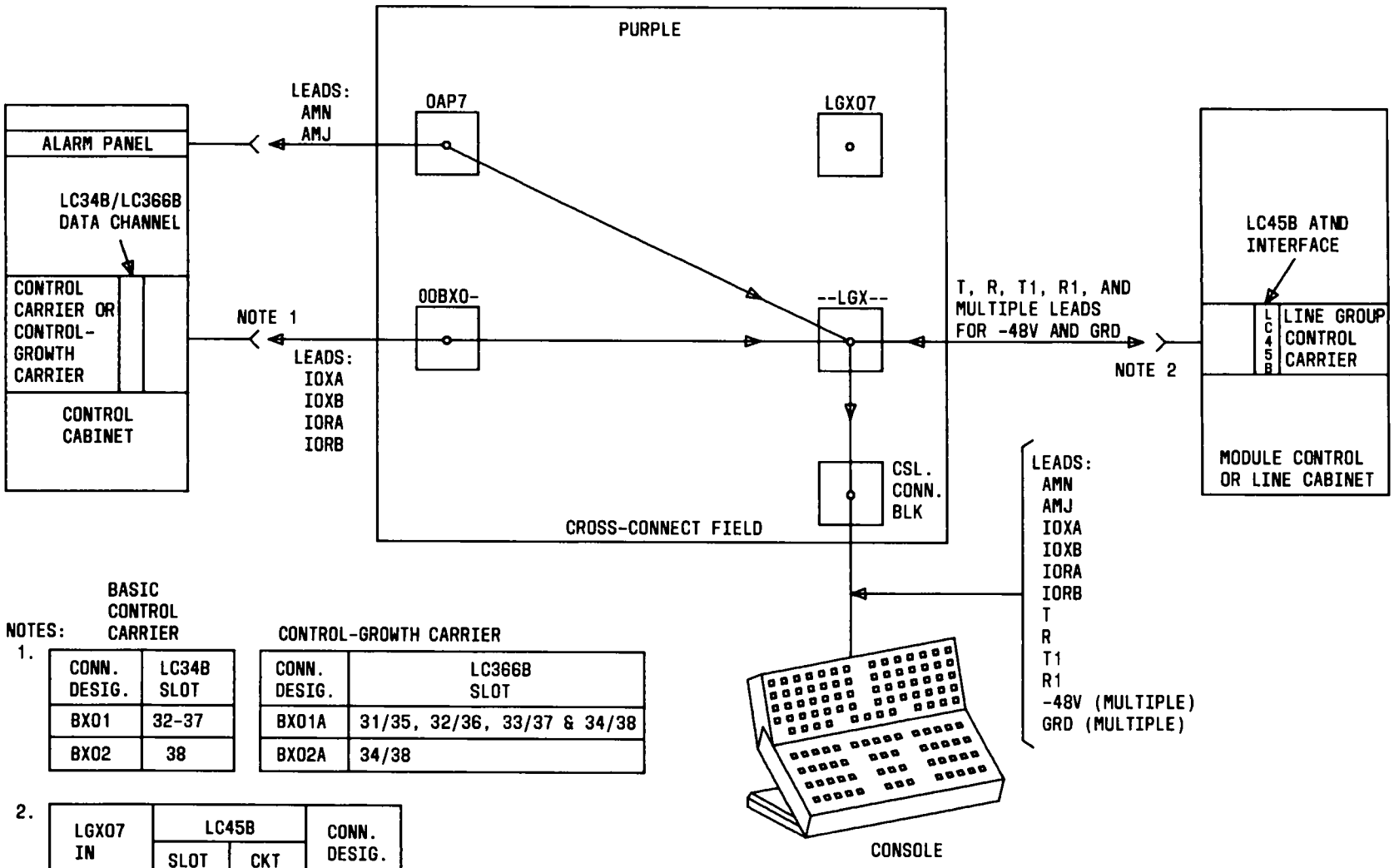
CONN. DESIG.	LC366B SLOT
BX01A	31/35, 32/36, 33/37, 34/38
BX02A	34/38

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. THE CONSOLE MAY BE CONNECTED DIRECTLY TO THE LINE GROUP CONTROL CARRIER

Fig. 44—Attendant Console Connected to PBX via the Cross-Connect Field (When Data Channel Lead Length NEED NOT BE Minimized)



NOTES:

1.

BASIC CONTROL CARRIER

CONN. DESIG.	LC34B SLOT
BX01	32-37
BX02	38

CONTROL-GROWTH CARRIER

CONN. DESIG.	LC366B SLOT
BX01A	31/35, 32/36, 33/37 & 34/38
BX02A	34/38

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

Fig. 45—Attendant Console Connected to PBX via the Cross-Connect Field (When Data Channel Lead Length MUST BE Minimized)

LEAD DESIGNATION	CONN CABLE COLOR CODE	66M11-50 CONN BLOCK TERMINAL
IOXAO (+ DATA IN)	W-BL	1
IOXBO (— DATA IN)	BL-W	2
IORAO (+ DATA OUT)	W-O	3
IORAO (— 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

Fig. 46—Attendant Console Cable Connections

- Customer Administration Panel (CAP)
- Customer Premises Facility Terminal (CPFT)
- Data Channel Repeater
- DIMENSION PBX Electronic Custom Telephone Service (ECTS)
- Energy Communication Service (ECS) Feature
- Energy Communication Service Adjunct (ECSA)
- Force Administration Data System (FADS)
- Loudspeaker Paging (Basic and Deluxe)
- Loudspeaker Paging With Chime Paging and Music Background
- Music on Hold
- Packaged Metallic Facility Terminal Assemblies (PMFTA)
- Peripheral Interface Circuit (J58882GA)
- Radio Paging Access
- Recorded Announcement Unit
- Recorded Telephone Dictation Trunk
- Remote Maintenance, Administration, and Traffic System (RMATS-1)
- 44V4 Repeater
- 24V4 Repeater
- Station Message Detail Recording (SMDR)
- System Status Indicator Display (30A8)
- Time-of-Day Clock Battery Backup (J58882A1, L9)
- Trunk Answer From Any Station (TAAS)

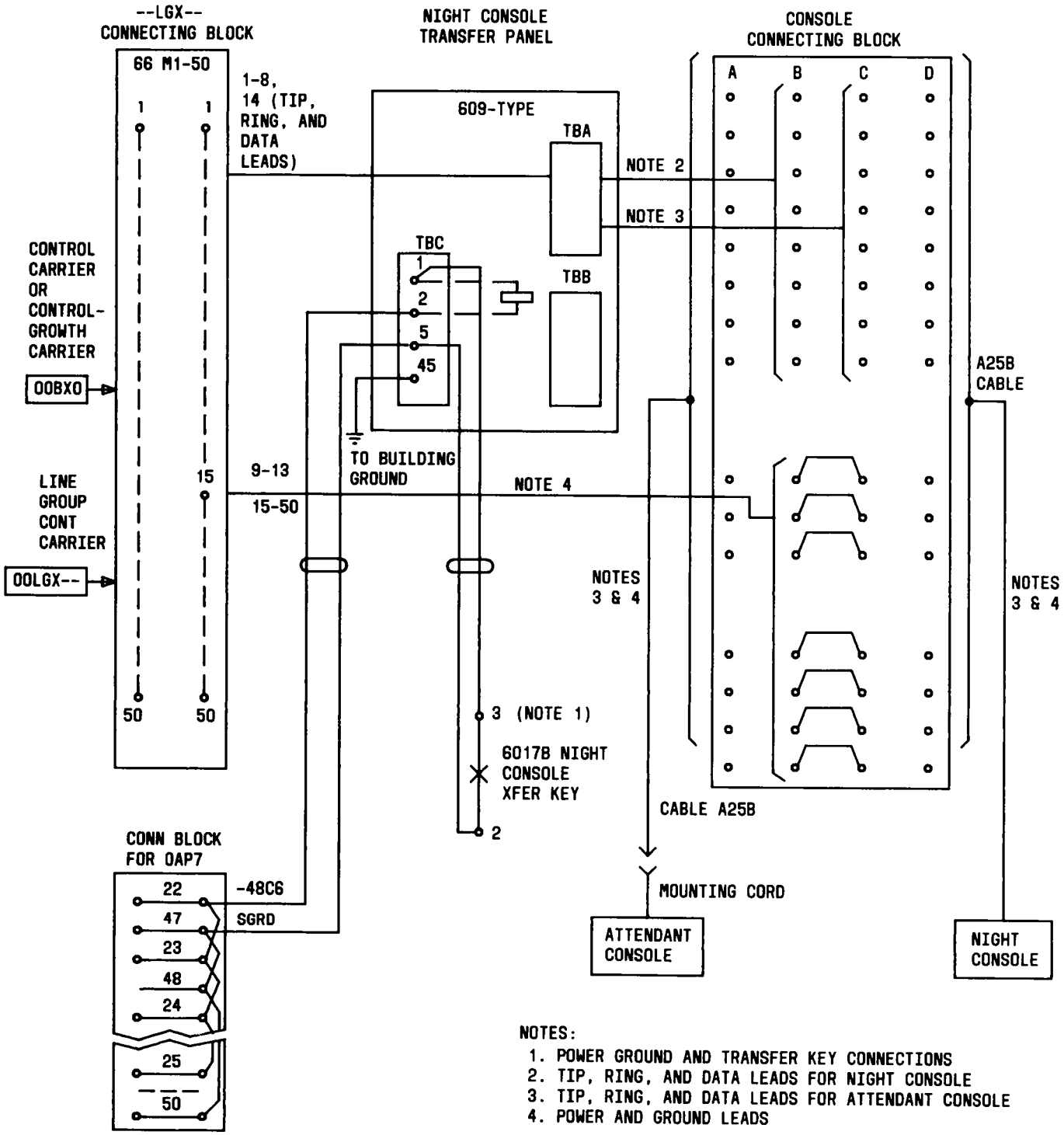


Fig. 47—Night Console Transfer Using 609-Type Panel

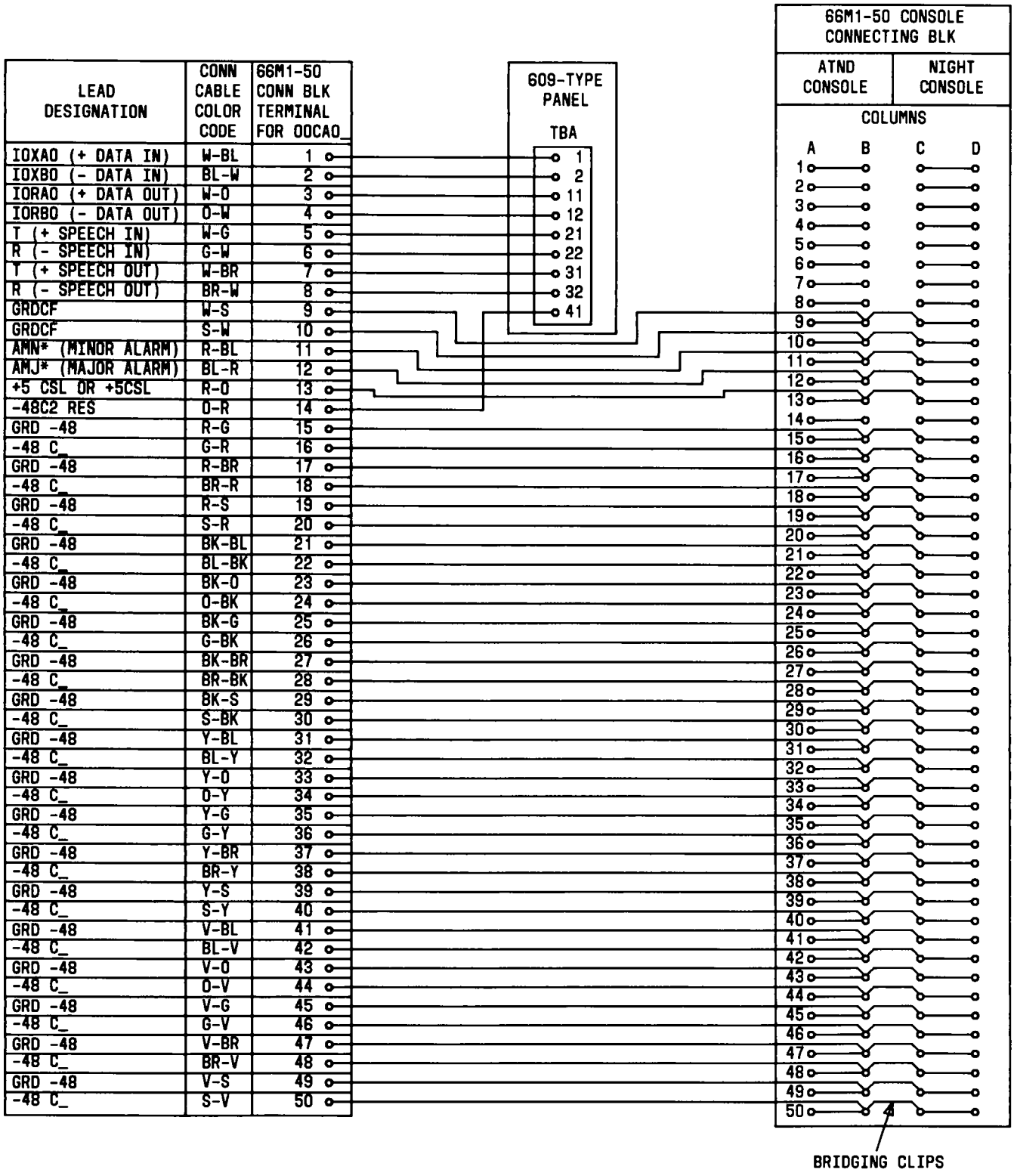


Fig. 48—Connections From LGX Connecting Block to 609-Type Panel and Console Connecting Block

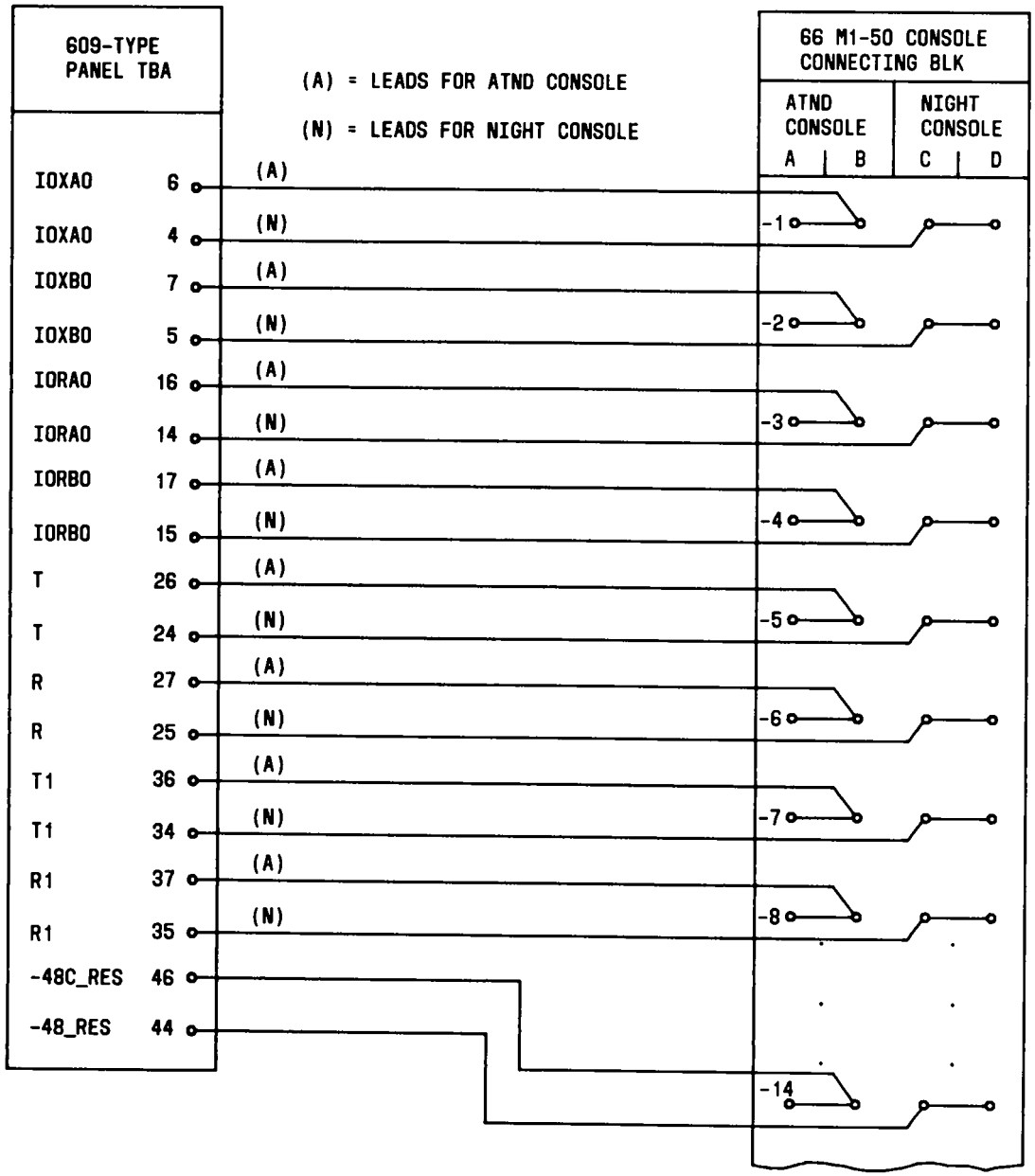


Fig. 49—Connections From 609-Type Panel to Console Connecting Block

- Uniform Call Distribution (UCD) Traffic Overflow Indicator

- Visually Impaired Attendant Service (VIAS).

5.03 A summary of auxiliary equipment is compiled in Table N. Several auxiliary cabinets may be required to accommodate the auxiliary equipment, depending upon customer requirements. This can be locally engineered in accordance with the power and grounding guidelines in Part 4.

5.04 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 J58884JA-1 ac power distribution panel.

ATTENDANT CONSOLE REPEATER CIRCUIT

5.05 The attendant console repeater circuit provides range extension and/or lightning protection for the PBX low-speed data channels. It is

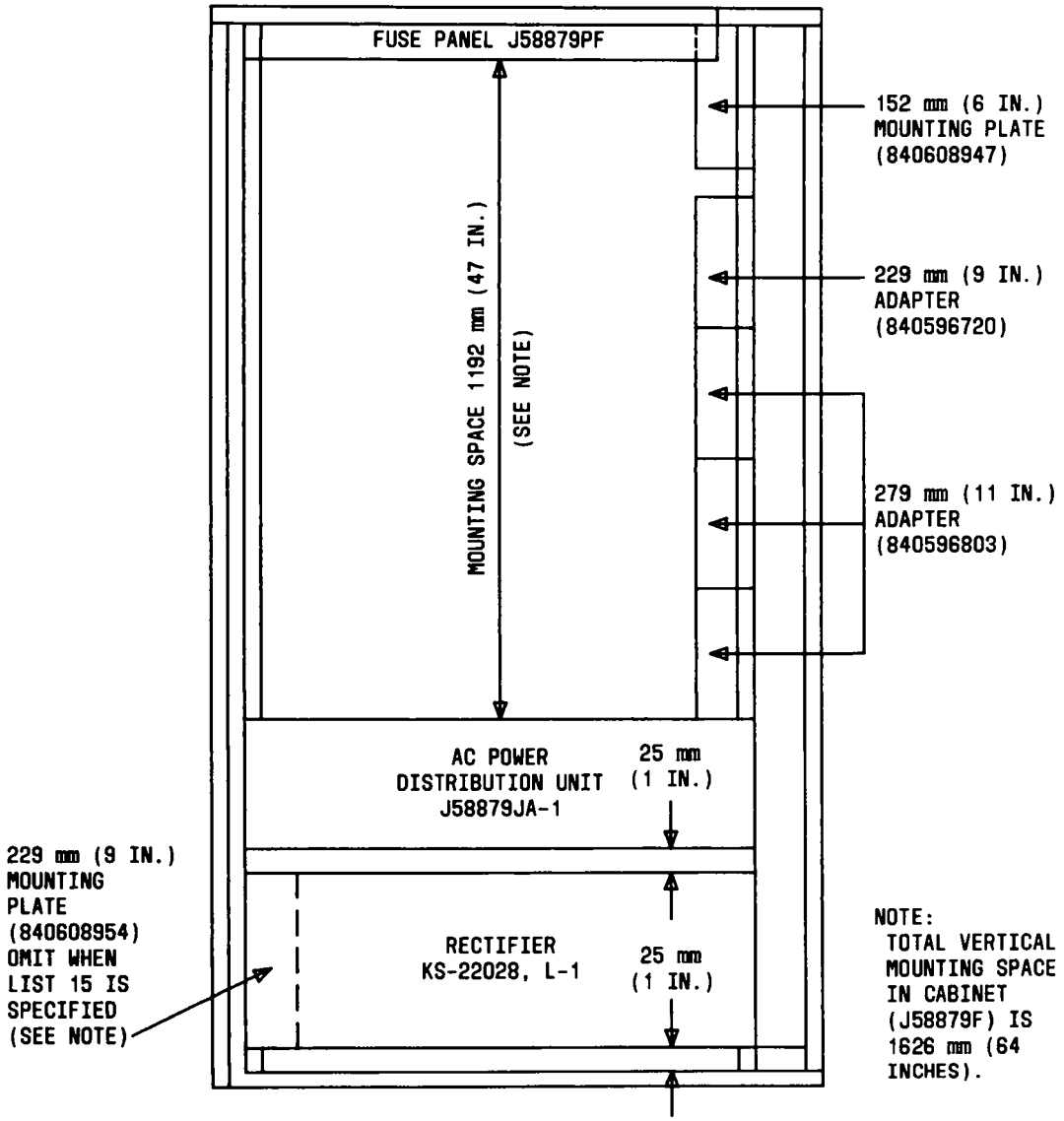


Fig. 50—Auxiliary Cabinet J58879F

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 the range extension is not required (ie, console is 305 m [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.

5.06 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.

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

A. Housing

5.08 The repeater circuitry is housed in a modified key service unit (Fig. 51) with a capacity for

TABLE N

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
1	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.
	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.
	J58879F-2, List 3(MD)	Equipment required in addition to Lists 1 and 2 to provide a –48 Vdc, 8-Amp power supply.
	J58879F-2, List 4(MD)	Equipment required in addition to Lists 1 and 2 when a filtered air supply is required.
	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.
	J58879F-2, List 6(MD)	Equipment required in addition to Lists 1 and 2 to provide a frequency generator unit.
	J58879F-2, List 7	Wiring and equipment required in addition to Lists 1, or 15 and 16 to provide 23 fuse positions (–48V) and ringing and interrupter terminal strips.
	J58879F-2, List 8(MD)	Equipment required in addition to List 6 to provide one frequency interrupter unit.
	J58879F-2, List 10(MD)	Equipment required in addition to List 1 to provide a standard perforated top.
	J58879F-2, List 11(MD)	Equipment required in addition to List 1 to provide a liquid spill-resistant top assembly.
	J58879F-2, List 12	Equipment required in addition to List 1 or 16 to provide one auxiliary circuit filter unit.
	J58879F-2, List 13(MD)	Equipment required in addition to List 1 when this cabinet is used in multiple cabinet lineups.
	J58879F-2, List 14(MD)	Equipment required in addition to Lists 1 and 2 to provide a –48 Vdc power supply.
	J58879F-2, List 15	Equipment required in addition to List 1 or 16 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 1 or 16 to provide an ac power distribution unit, arranged for 117-volt power source.

TABLE N (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
1 (Contd)	J58879F-2, List 18 (MD)	Equipment required in addition to Lists 16 and 17 when a filtered air supply is required.
	J58879F-2, List 19 (MD)	Equipment required in addition to Lists 1 and 2 to a –48 Vdc power supply.
	J58879F-2, List 20	Equipment required in addition to Lists 16 and 17 to provide a frequency generator unit.
	J58879F-2, List 21	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.
	J58879F-2, List 23 (MD)	Equipment required in addition to List 16 when this cabinet is used in multiple cabinet lineups.
	J58879F-2, List 24 (MD)	Equipment required in addition to List 16 provides ac power distribution with EMI filter, power cord.
	J58879F-2, List 25	Framework, assembly, wiring, and equipment for one basic cabinet with five carrier positions.
	J58879F-2, List 26	Equipment required in addition to List 25 to provide alternate method of providing earthquake bracing.
2	H400-107, List 1	Assembly, wiring, and equipment for one recorded announcement unit (KS-16765, Lists 2, 7, and 8).
3	J58827E-1, Lists 1 and 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.
4	J53050F-1, Lists 1 and 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.
5	J58824CD-1, List 2	Assembly, wiring and equipment required in addition to List 7 to repeat dialed digits to customer on a 2-out-of-7 lead basis.
	J58824CD-1, List 7	Assembly, wiring, and equipment for one interface unit for dial or TOUCH-TONE dialing signals.
	J58824CD-1, List 9	Assembly, wiring, and equipment for one applique unit required in addition to List 7 when TOUCH-TONE dialing signals are converted to dial pulses.
	J58824CD-1, List 12	Wiring and equipment required in addition to List 7 to provide called party access.

TABLE N (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
5 (Contd)	J58824CD-1, List 15	Assembly, wiring, and equipment for one applique unit required in addition to List 7 when TOUCH-TONE dialing signals are converted to dc signals on a 2-out-of-7 lead basis using type G1 receivers.
	J58824CD-1, List 16	Assembly, wiring, and equipment always required in addition to List 7 when used with the DIMENSION PBX system.
	J58824CD-1, List 17	Assembly, wiring, and equipment always required in addition to List 12 when used with the DIMENSION PBX system.
6	J99380A, List 1 (MD)	Assembly, wiring, and equipment for one single module shelf assembly equipped to accommodate up to 12 MFT transmission type plug-in units or up to 12 MFT loop extender (LSE) in any combinations.
	J99380A, List 4 (MD)	Wiring and equipment required in addition to List 1 to provide for installation of List 1 as either a single shelf arrangement or the top shelf in a multiple shelf arrangement in the DIMENSION PBX auxiliary cabinet.
	J99380A, List 5 (MD)	Wiring and equipment required in addition to List 1 to provide for installation of List 1 as an additional shelf in a multiple shelf arrangement in DIMENSION PBX auxiliary cabinet.
7	J99380B, List 1 (MD)	Assembly, wiring, and equipment required for one apparatus mounting panel equipped to accept up to twelve 837-type impedance compensating networks in any combination for mounting in auxiliary cabinet.
8	J99380D, List 1 (MD)	Assembly and equipment for one hinged "double depth" frame assembly suitable for mounting J99380A, B, and E shelf assembly in front and rear sections in various combinations.
9	J99380E, List 1 (MD)	Assembly, wiring, and equipment for one double module shelf assembly equipped to accommodate up to 6 MFT transmission type plug-in units and up to 6 MFT signal type plug-in units in dual mounting arrangements or up to 6 MFT transmission type plug-in units and up to 6 loop signal extender plug-in units in dual mounting arrangements.

TABLE N (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
9 (Contd)	J99380E, List 3 (MD)	Assembly, wiring, and equipment required in addition to List 1 to provide for installation of List 1 into a [J99380D, List 1 (MD)] double depth mounting frame.
	J99380E, List 4 (MD)	Wiring and equipment required in addition to List 1 to provide for installation of List 1 as either a single-shelf arrangement or the top shelf in a multiple shelf arrangement in the DIMENSION PBX auxiliary cabinet.
	J99380E, List 5 (MD)	Wiring and equipment required in additon to List 1 to provide for installation of List 1 as an additional shelf in a multiple shelf arrangement the DIMENSION PBX auxiliary cabinet.
10	J59204CA-1, List 1	Assembly, wiring, and equipment for type G1 TOUCH-TONE calling receiving circuit, wired for two receivers.
	HJ16	Input amplifier and channel detector for the G1 receiver.
	HJ17	Channel filter for G1 receiver.
11	J58879KA, List 1	Assembly, wiring, and equipment for one basic ECTS controller carrier.
	J58879KB, List 1	Assembly, wiring, and equipment for one supplemental ECTS controller carrier.
12	J58847Y, List 4	Assembly, wiring, and equipment for one link and electronic dial unit with fusing from PBX. Required with TOUCH-TONE dialing systems which interconnect to rotary dial paging equipment.
13	J98615AH, List 2, 2A	44V4A voice repeater equipped for 48 volt operation.
	J98615AH, List 3, 3B	44V4B data repeater equipped for 48 volt operation.
	J98615BJ, List 2	24V4C two-wire to four-wire repeater requiring 48 volt power.
	J98615BL, List 2	24V4D two-wire to four-wire repeater with loop-around repeater in the event of a power failure. 48 volt operation.
14	H9040, Group 1	Four phase recorder announcer for wake up service.
	H9040, Group 2	Equipment required in addition to Group 1 for remote record option.
	H9040, Group 3	Equipment required in addition to Group 1 to provide tape recorder option.
	H9040, Group 4	Equipment required in addition to Group 1 to provide battery backup.

TABLE N (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
15	402645352	Assembly, wiring, and equipment for one 600VA power supply unit required when UPS is provided.
	802649032	Assembly, wiring, and equipment for one KS-21906, List 8, battery pack required when UPS is provided.
	843146184	Assembly and equipment for one shelf unit required when UPS is required.
16	J58884JA-1, List 1	Assembly, wiring, and equipment for one ac power distribution unit for non-UPS service.
	J58884JA-1, List 2	Assembly, wiring, and equipment for one ac power distribution unit for use with UPS service in nonperipheral DIMENSION PBX cabinets (60 Hz only).
	J58884JA-1, List 3	Wiring and equipment required in addition to List 1 to provide one 120C frequency generator (Non-UPS service).
	J58884JA-1, List 4	Wiring and equipment required in addition to List 2 to provide one 124A frequency generator (UPS service).
	J58884JA-1, List 5	Wiring and equipment required in addition to List 1 or 2 to provide fans when required.
	J58884JA-1, List 6	Wiring and equipment required in addition to List 1 or 2 to provide a utility outlet when required.
	J58884JA-1, List 7	Wiring and equipment required in addition to List 1 or 2 provides fusing for consoles, minirecorder, emergency transfer.
	J58884JA-1, List 8	Wiring and equipment required in addition to List 1 or 2 provides fusing for consoles.
	J58884JA-1, List 9	Wiring and equipment required in addition to List 1 or 2 provides fusing for minirecorder.

one attendant console repeater circuit. The unit may be configured for use at either the PBX end or the console end. List 6 (circuit pack WJ5) is used only in the repeater at the PBX end, and List 4 (circuit pack WJ4) and List 7 (power supply unit 284B1) are used only in the repeater at the console end.

5.09 The 284B1 power unit provides power to an attendant console. The power unit is required whether the repeaters do or do not have range extension. It should be mounted or located near the console-end repeater and connected as shown in Fig. 52. Two power units are required at this repeater when

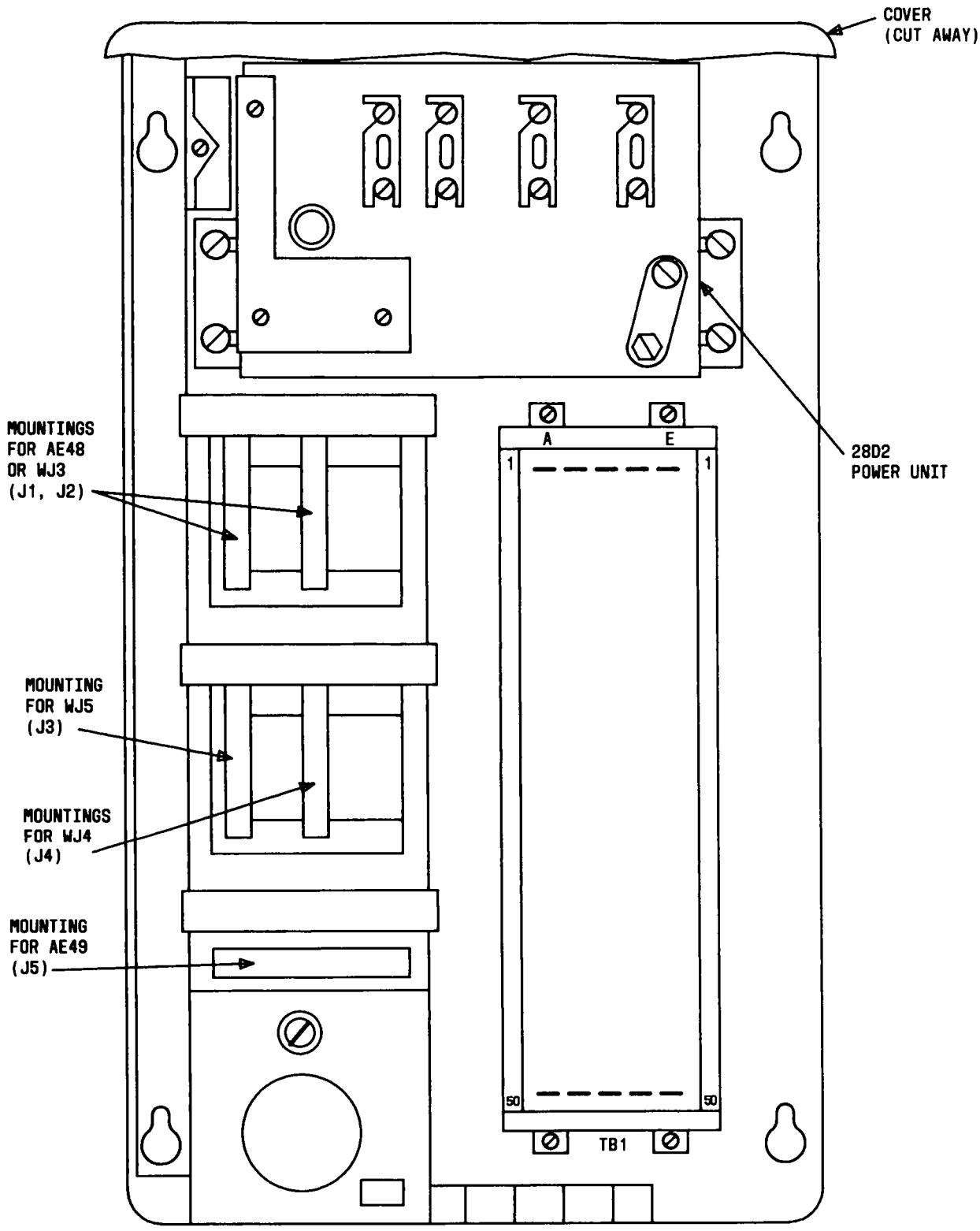


Fig. 51—Attendant Console Repeater Unit

range extension is provided (28D2 power unit within the repeater and 284B1 external to the repeater). These two supplies should be connected to the same 120-Vac circuit when both are used.

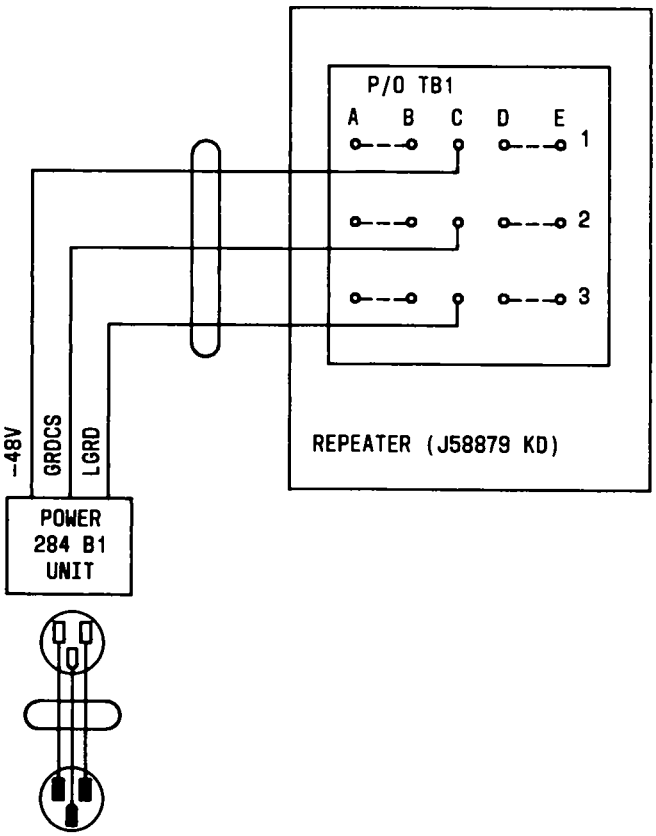


Fig. 52—Power Unit (284B1) Connections to Repeater

B. Mounting

5.10 The console repeater unit is designed to be wall-mounted near a 120-volt 60-Hz outlet. Power cords are available in four lengths (610, 1220, 1830, or 3660 mm [2, 4, 6, or 12 feet]—List A, B, C, or D, respectively).

C. Installation

Repeaters With Range Extension

5.11 When attendant console repeaters are used to extend the operating range for the attendant console, they are configured as shown in Fig. 53. The distance between repeaters providing range extension must not exceed 914m (3,000 feet) for 24-AWG cable. The distance between the PBX and the first repeater and between the console and the last repeater must not exceed 305m (1,000 feet) for 24-AWG cable. When using repeaters with range extension, the console can be located 1524m (5,000 feet) from the PBX for two repeaters or it may be located 3353m (11,000 feet) from the PBX when using two additional (intermediate) repeaters.

Repeaters Without Range Extension

5.12 When attendant console repeaters are used without range extension, they are configured as shown in Fig. 54. Where repeaters (not providing range extension) are used, the cable distance between the console and PBX must not exceed 305m (1000 feet) for 24 AWG cable.

5.13 Repeater circuits (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. All data pair cross-connections must be made using twisted pair.

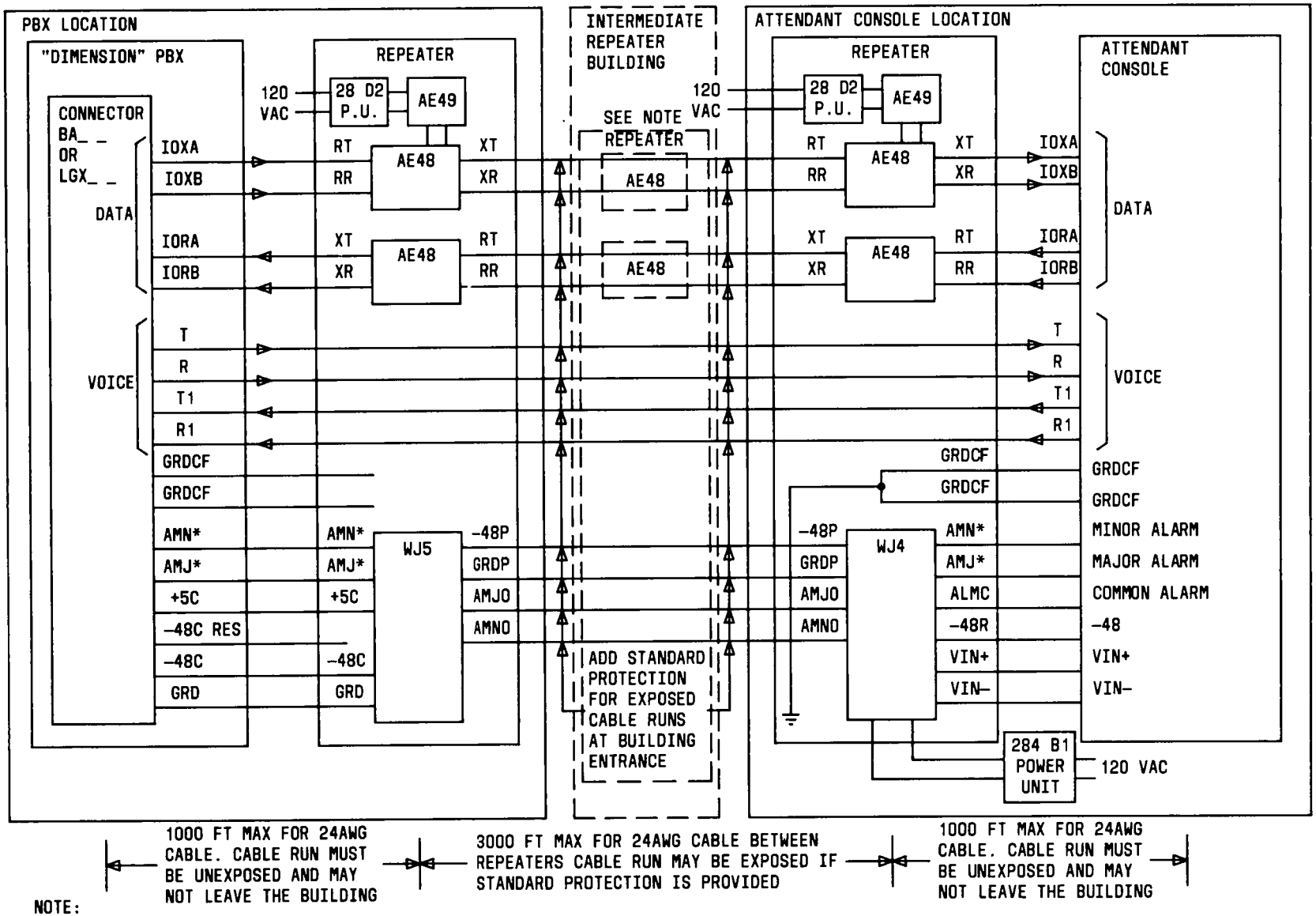
5.14 A 25-pair (24-AWG) cable is cut down in the standard manner at the input and output of each attendant console repeater. Worksheet 7 provides cross-connect information to be filled in at the time of installation and connections to be made at the input to the repeater.

5.15 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 Fig. 56. Cable connections from the second repeater (1E through 50E) to the console cable connector are also shown in Fig. 55.

"AUDICHRON" VARIABLE ANNOUNCEMENT (UNIT H9040)

5.16 The AUDICHRON (4-phase) Model H9040 recorder-announcer provides four channels of customer changeable message data using solid-state memory for message storage (Fig. 56). Message lengths of up to 14 seconds may be recorded on each channel. The recorded announcement system may be used as part of automatic wakeup service in lieu of circuit pack LC190. Two LC13B auxiliary trunk circuit packs are required.

5.17 A remote record unit is available for use with the HQD-614 recorder announcer. This unit provides a means of recording (or changing) the



NOTE:
TWO INTERMEDIATE REPEATERS CAN BE CASCADED BETWEEN THE PBX REPEATER AND THE CONSOLE REPEATER ALLOWING A TOTAL DISTANCE OF 11,000 FEET BETWEEN CONSOLE AND PBX. STRAPPING OPTION Z MUST BE WIRED ON THE INTERMEDIATE REPEATERS WHENEVER CASCADED REPEATERS ARE USED.

Fig. 53—Attendant Console Repeaters With Range Extension

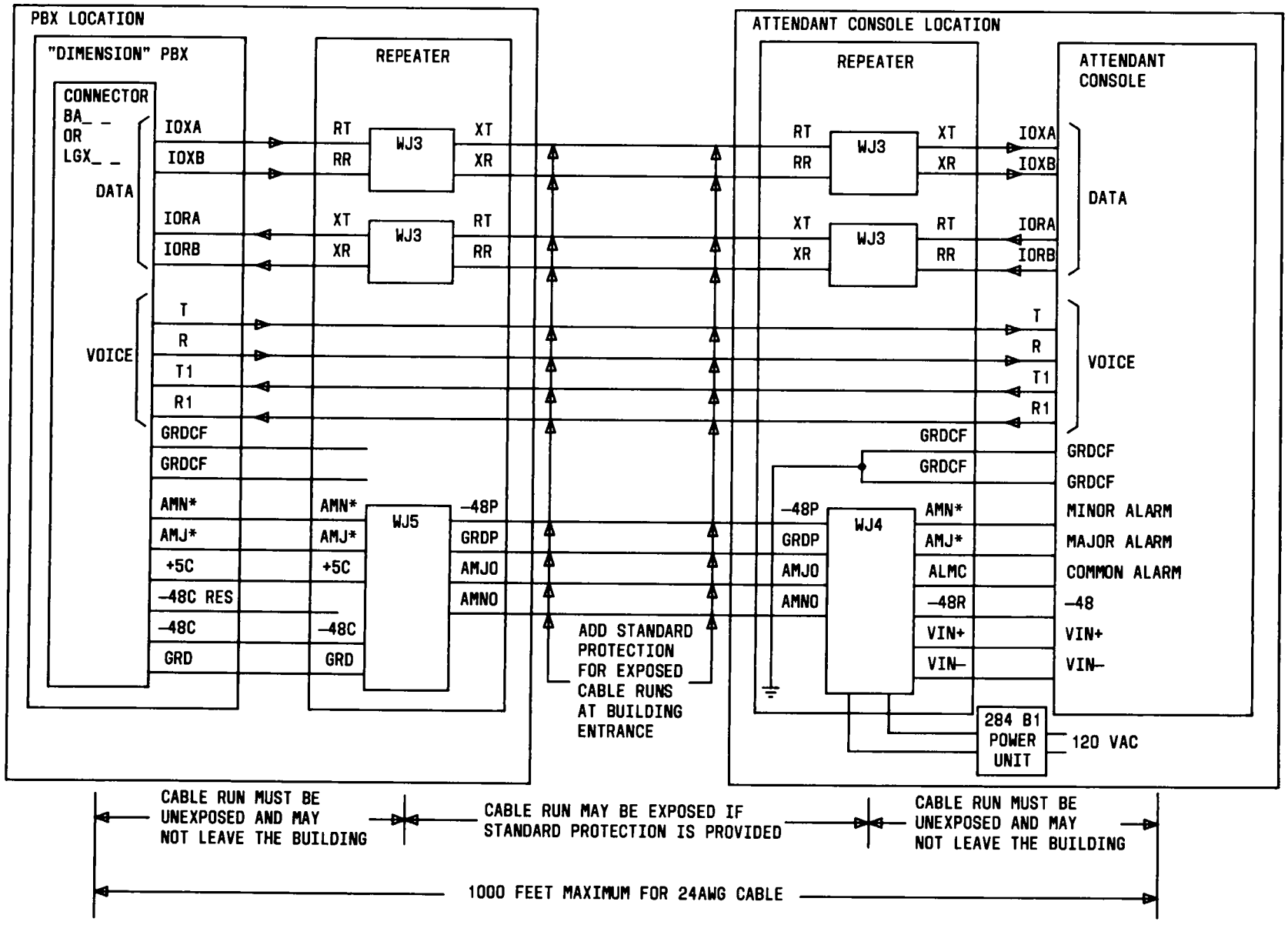


Fig. 54—Attendant Console Repeaters Without Range Extension for Off-Premises Consoles

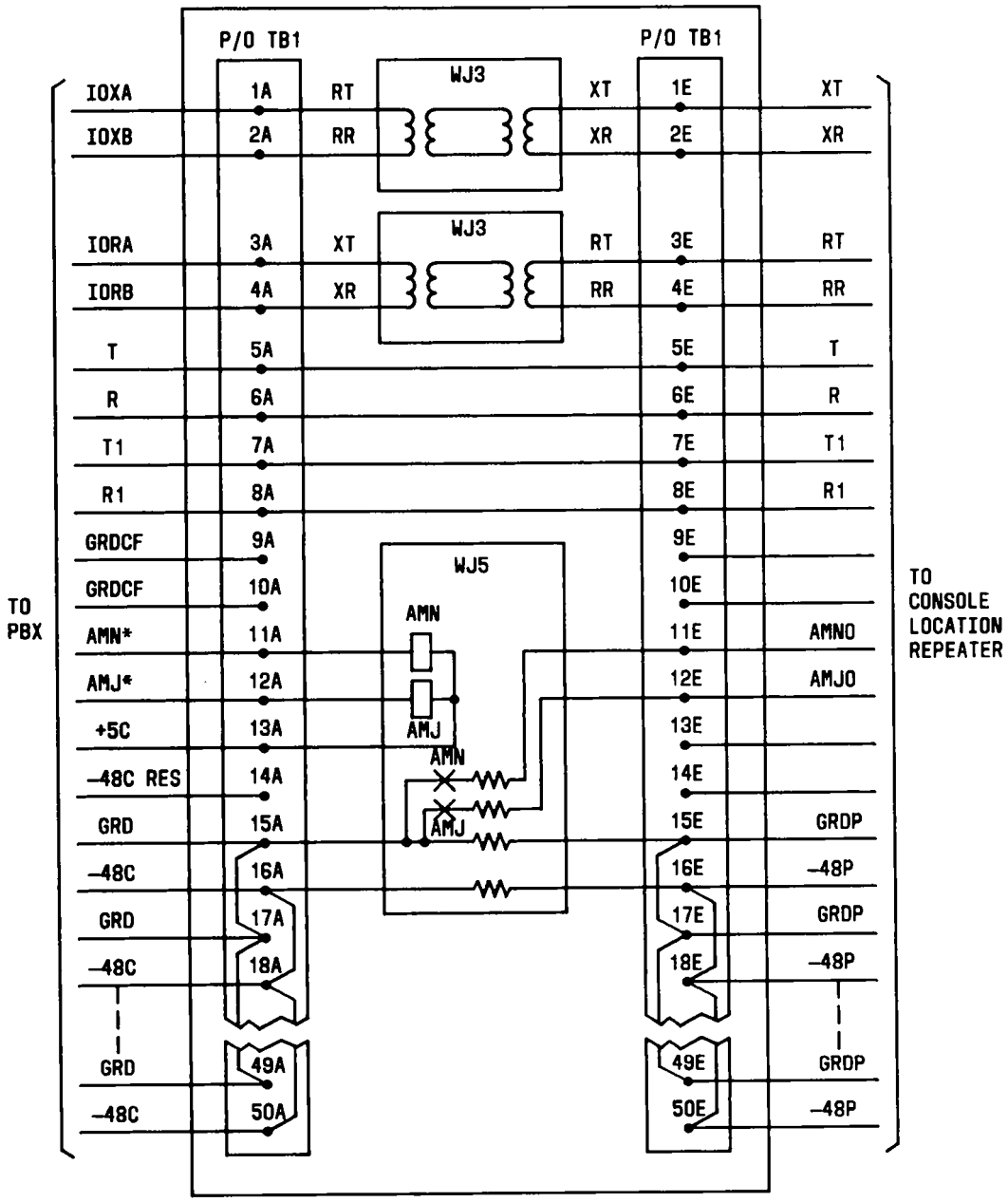


Fig. 55—Attendant Console Repeater Connections (Sheet 1 of 2)

wakeup announcement from the front desk or a similar location which is remote from the AUDICHRON HQD-614.

5.18 The HQD-614 recorder announcer unit can be mounted in the auxiliary cabinet. Connections from the HQD-614 unit to the cross-connect field are shown in Table O. The remote record unit is connected to the HQD-614 announcement unit via preconnected cables. A pin-to-pin extension cable may be used to extend the remote record unit up to 61 m (200 feet). Worksheet 8 is a fill-in worksheet to be used to provide cross-connection information at installation.

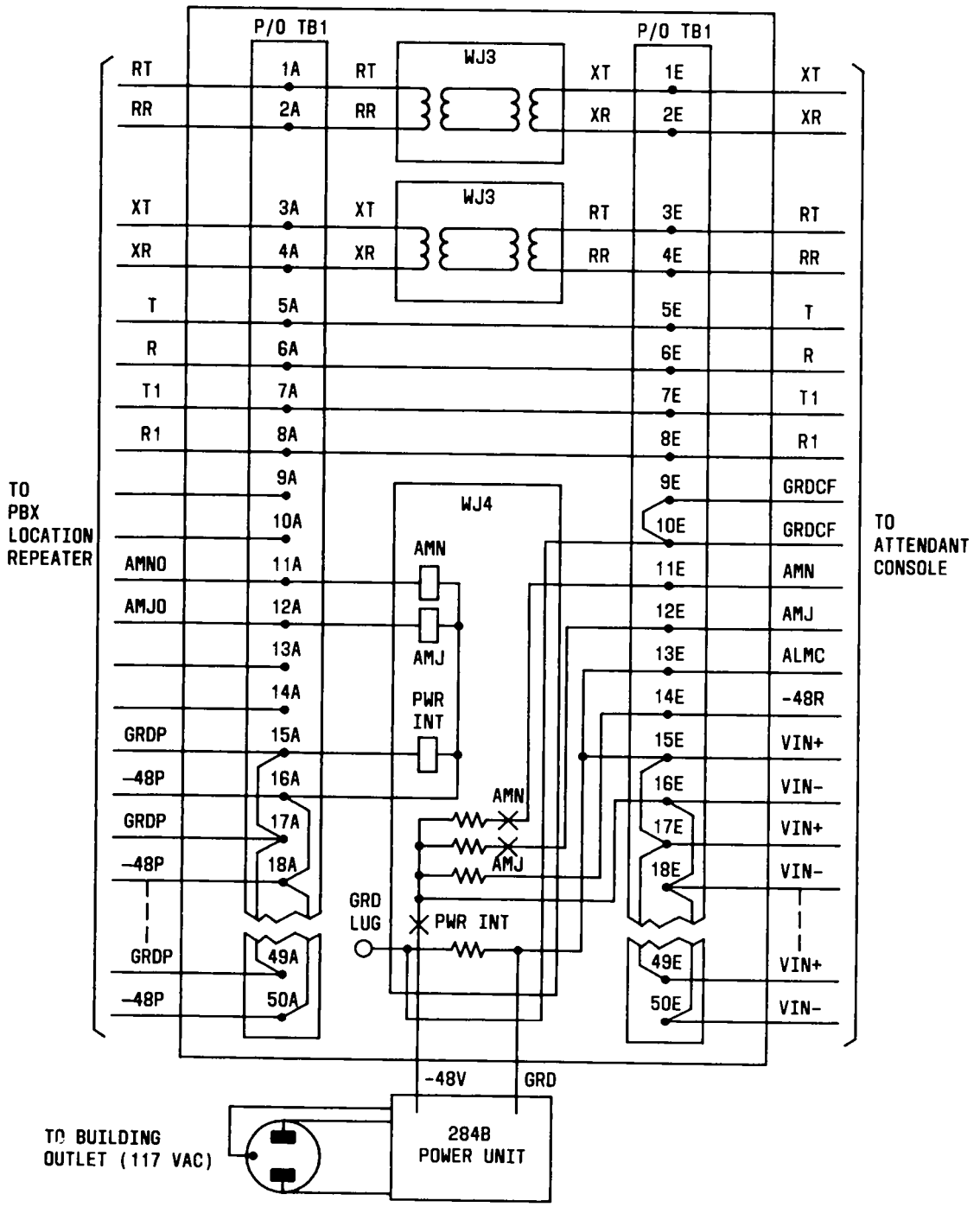


Fig. 55—Attendant Console Repeater Connections (Sheet 2 of 2)

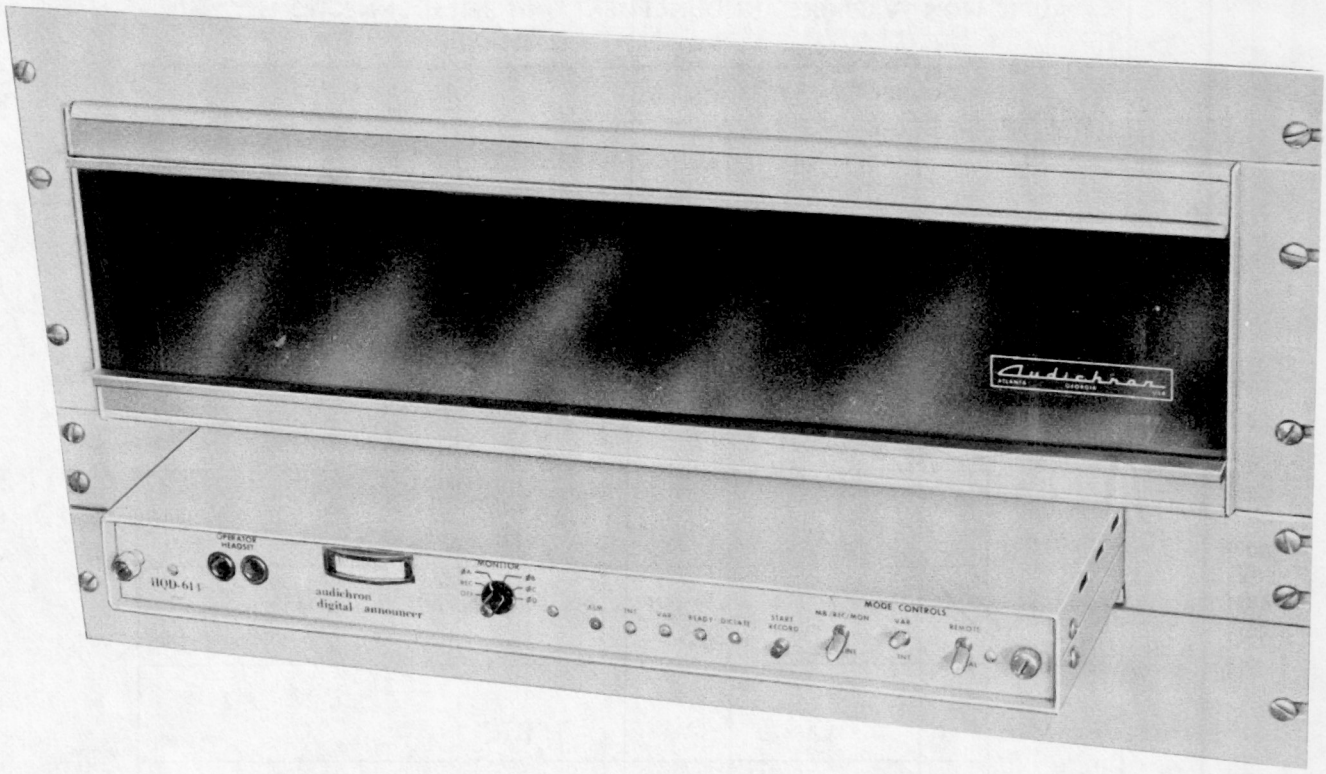


Fig. 56—AUDICHRON Recorder Announcer (H9040)

AUTOMATIC VOICE NETWORK (AUTOVON) SERVICE

5.19 The AUTOVON service via the PBX provides access to and from the world-wide U.S. Department of Defense private line communication AUTOVON network. Access lines (trunk circuits) to the AUTOVON network have console appearance at the selector 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. Routine only access lines appear on a single key per access line.

5.20 AUTOVON interface equipment (Fig. 57) 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. 58).
- One basic AUTOVON control and trunk carrier (J59216BA) minimum.
- One or more supplemental 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.

5.21 Detailed information on AUTOVON interface equipment is given in Section 554-010-135.

CENTRALIZED ATTENDANT SERVICE (CAS)

5.22 This feature (CAS) permits a PBX customer (having several locations, each served by a single PBX system or centrex) to concentrate the attendant services at a main location. Figure 59 illustrates a typical CAS arrangement. The main location and each branch location have different listed directory numbers (LDNs). The primary or main location (Fig. 60) is designated ***location 1.*** The CAS positions

TABLE O

AUDICHRON" VARIABLE ANNOUNCEMENT UNIT INTERCONNECTIONS

CONNECT CABLE FROM (NOTE)					TO "AUDICHRON" CONN BLK/TIE POINT
CIRCUIT PACK		TERMINAL	LEAD		
			COLOR	DESIG	TERMINAL
MULTIPHASE CP GEN		A	W-BL	CPØA	A
		B	BL-W	CPØB	B
		2	W-O	CPØC	C
		1	O-W	CPØD	D
SYSTEM ALARM		L	R-O	A	P
		N	O-R	B	R
PLAYBACK AMPLIFIER	ØA	HH	W-G	TT	E
		CC	G-W	RR	F
	ØB	JJ	W-BR	TT	H
		DD	BR-W	RR	J
	ØC	FF	W-S	TT	K
		AA	S-W	RR	L
	ØD	EE	R-BL	TT	M
		BB	BL-R	RR	N

Note: Insulate and store spare leads.

CONNECT IW CABLE FROM RECORDER/ ANNOUNCEMENT UNIT CONN BLK/TIE POINT				TO CONN BLOCK IN YELLOW FIELD
LC13R	DESIG	TERMINAL		TERMINAL
AL1	CPØA	A	TO TELCO	1
AL1	CPØB	B	CONTROL	2
AL1	CPØC	C	PULSE	3
AL1	CPØD	D	REQUIREMENTS	4
T	TT	E		5
R	RR	F		6
T	TT	H		7
R	RR	J	TO TELCO	8
T	TT	K	AUDIO	9
R	RR	L	REQUIREMENTS	10
T	TT	M		11
R	RR	N		12

* Multiphase CP generator terminals F, H, P, 6, and 12 are grounded.

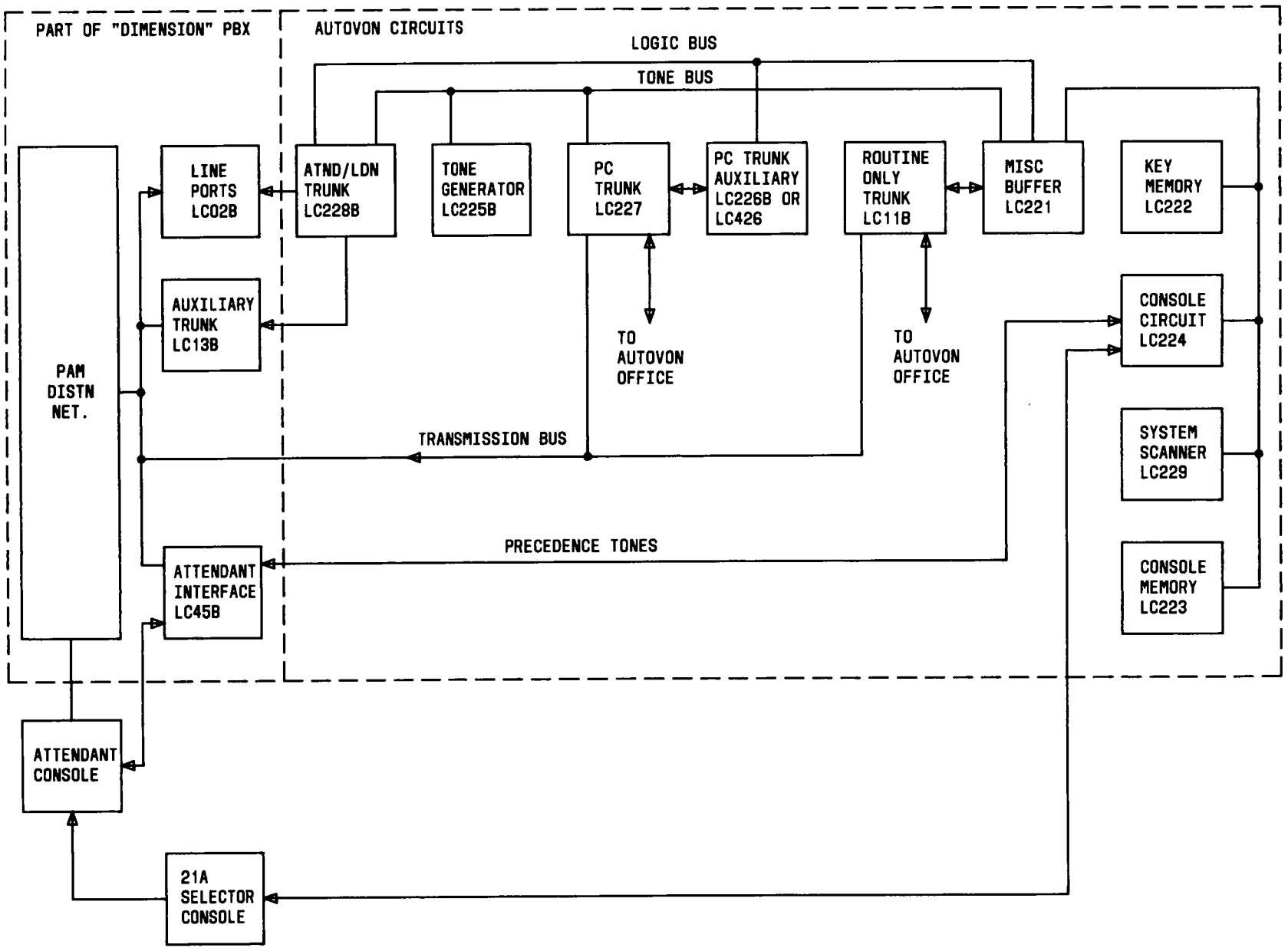


Fig. 57—AUTOVON System Block Diagram (Simplified)

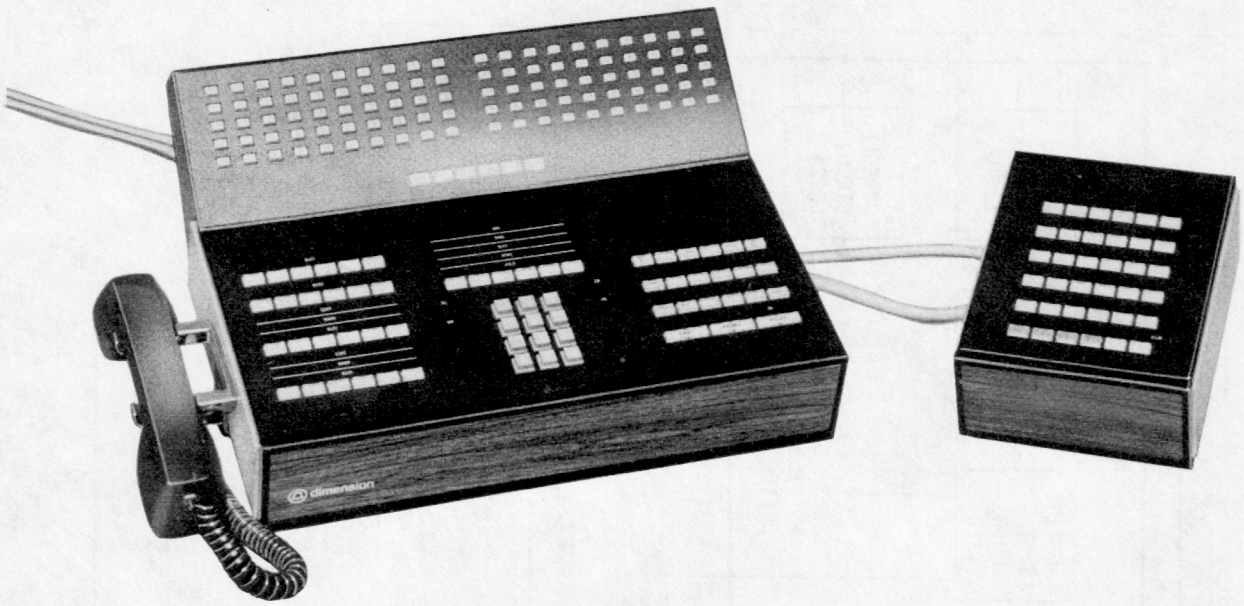


Fig. 58—AUTOVON Console Arrangement

for the branch PBX locations and the central system are concentrated at the main customer location.

5.23 The branch locations are individually connected via release link trunks (RLTs). The RLTs provide connections between switched loops (on attendant positions) and calls requiring attendant action to extend the calls to a remote CAS attendant who can answer and extend calls. When an RLT is seized (on an LDN call), it provides a temporary connecting link between the PBX and the call distribution system. This temporary connection provides the transmission path and returns the proper identification over the same RLT. When the attendant releases the call, these trunks are then available for other calls. When CAS is provided in the DIMENSION PBX, a maximum of 16 RLTs can be connected between each PBX branch location and the main PBX, and the main PBX can have a maximum of 110 RLTs. Each RLT is equivalent in call-handling capacity to a single attendant console at the PBX location.

5.24 The DIMENSION PBX uses a standard tie trunk (LC11B) to provide 4-wire DX or E&M signaling for RLT operation. Whenever the main PBX uses the 2B automatic call distributor or the 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 about CAS, refer to Section 981-012-100.

5.25 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.

*Trademark of AT&T.

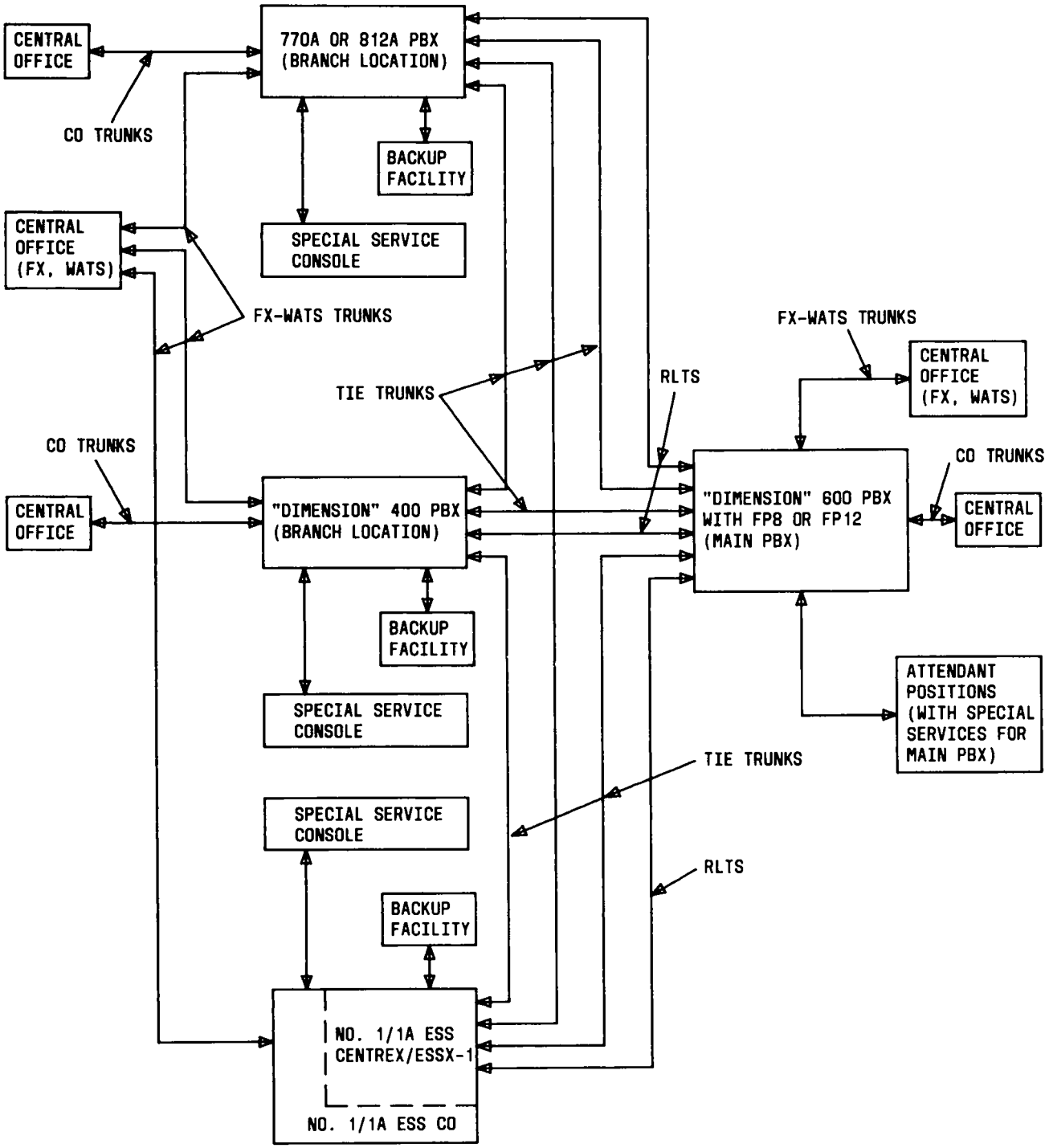


Fig. 59—CAS Arrangement Using DIMENSION PBX System—Block Diagram

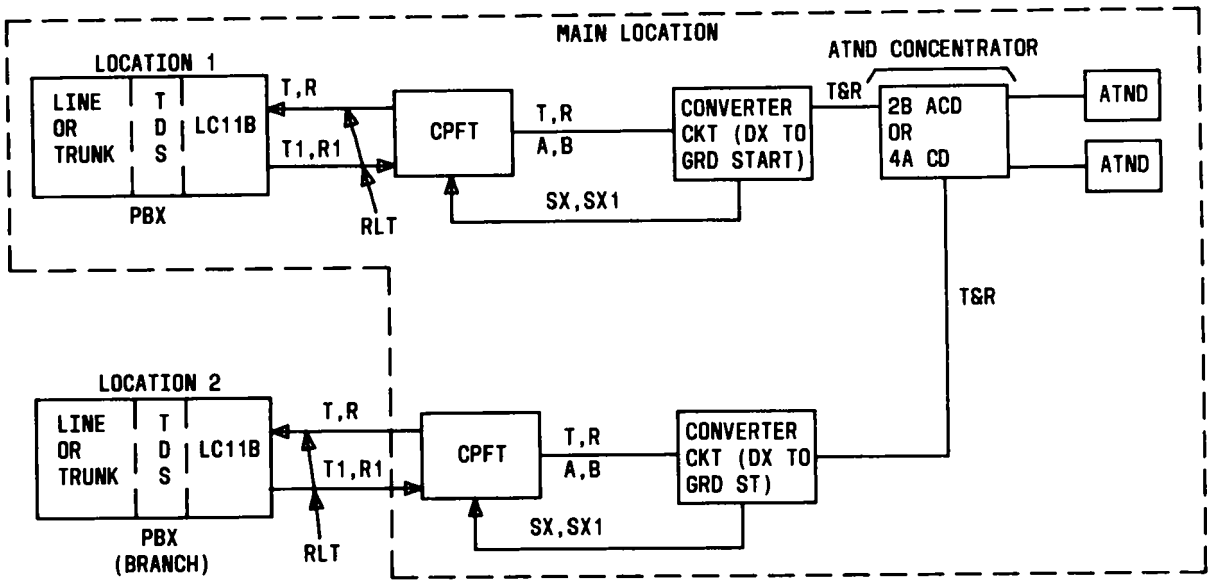


Fig. 60—CAS Arrangement With Repeaters

(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.

CENTRALIZED STATION MESSAGE DETAIL RECORDING (CSMDR) SYSTEM

5.26 The CSMDR system is available to collect station message detail recording (SMDR) data from several customers (Fig. 61). Centralized collection of SMDR data (from remote PBXs) is done by an automatic dialup polling arrangement over the customer or the DDD network. The polling schedule may be selected and/or changed by the customer, based on changing needs. A 94A local storage unit (LSU) is used to collect and store the SMDR data from the PBX (via a data channel). In response to periodic polling from the CSMDR system, the LSU records, formats, and transmits the collected data. The dedicated data channel in slot 31, circuit 0 (via BX07_) on the control carrier (basic control carrier or the control-growth carrier) is used to collect the data from the 94A LSU. This data channel must be optionally connected for fast-speed (833 kilobits per second) data transmission.

5.27 Connection to the data channel (at the PBX) is made via the BX07 or BX07A connector on the basic control or control-growth carrier respectively. A C2D cable provides the connection between the PBX and the LSU. It should not exceed 61 meters (200 feet) in length. Additional information pertaining to the 94A LSU may be found in Section 190-402-100.

CODE CALLING ACCESS (3A CODE CALL)

5.28 The 3A code call access is a standard feature in the 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.

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.

5.29 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

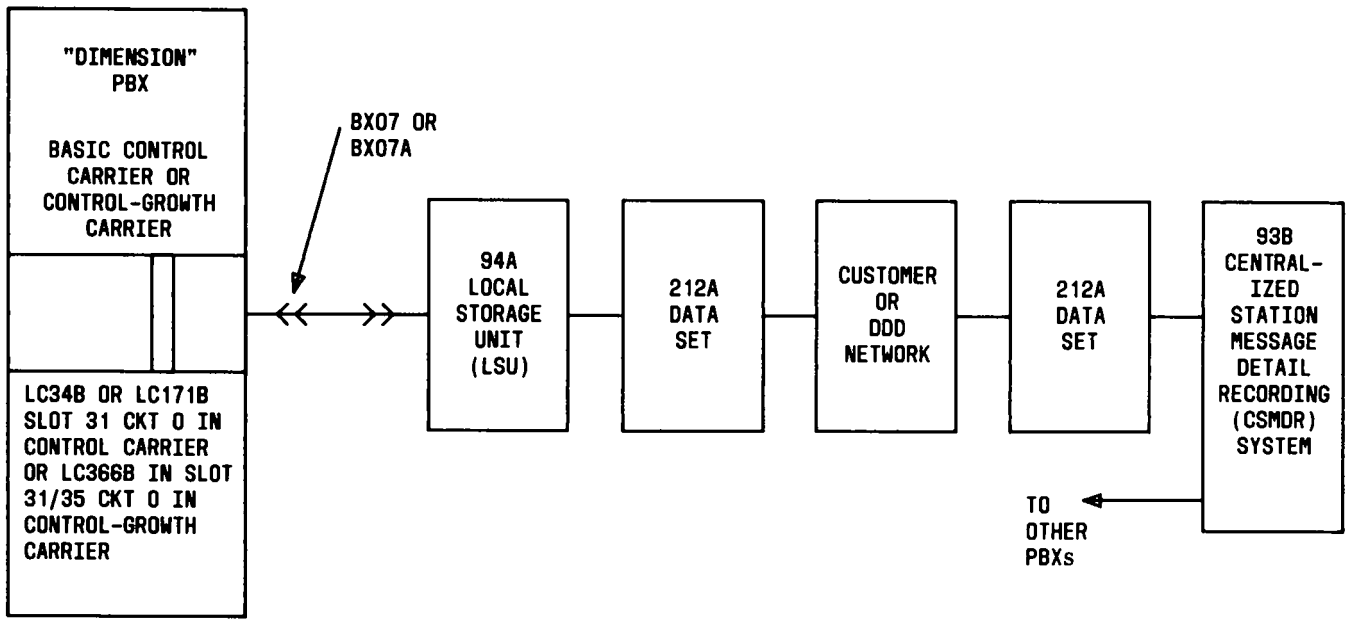


Fig. 61—A Typical Arrangement for Centralized Station Message Detail Recording System

- J59204, List 1, A and B—G1 TOUCH-TONE calling receiver unit.

5.30 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. 62). 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 the optional ports. Worksheet 9 is a fill-in worksheet to show the cross-connections of the incoming and answering ports of the 3A code call access feature.

5.31 When the optional ports are used, they are connected to a second terminal circuit as shown in Fig. 63. When the second terminal circuit is connected to the ports, the straps between pins 14 and 53, and pins 33 and 54, must be removed.

5.32 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 circuit packs HJ17 and 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-μF capacitor must be connected across leads T and R of the receiver.

CODE CALLING ACCESS (CHIME PAGING)

5.33 The chime paging feature allows attendants, stations 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.

5.34 Additional hardware is required when the chime paging feature is provided (Fig. 64). 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

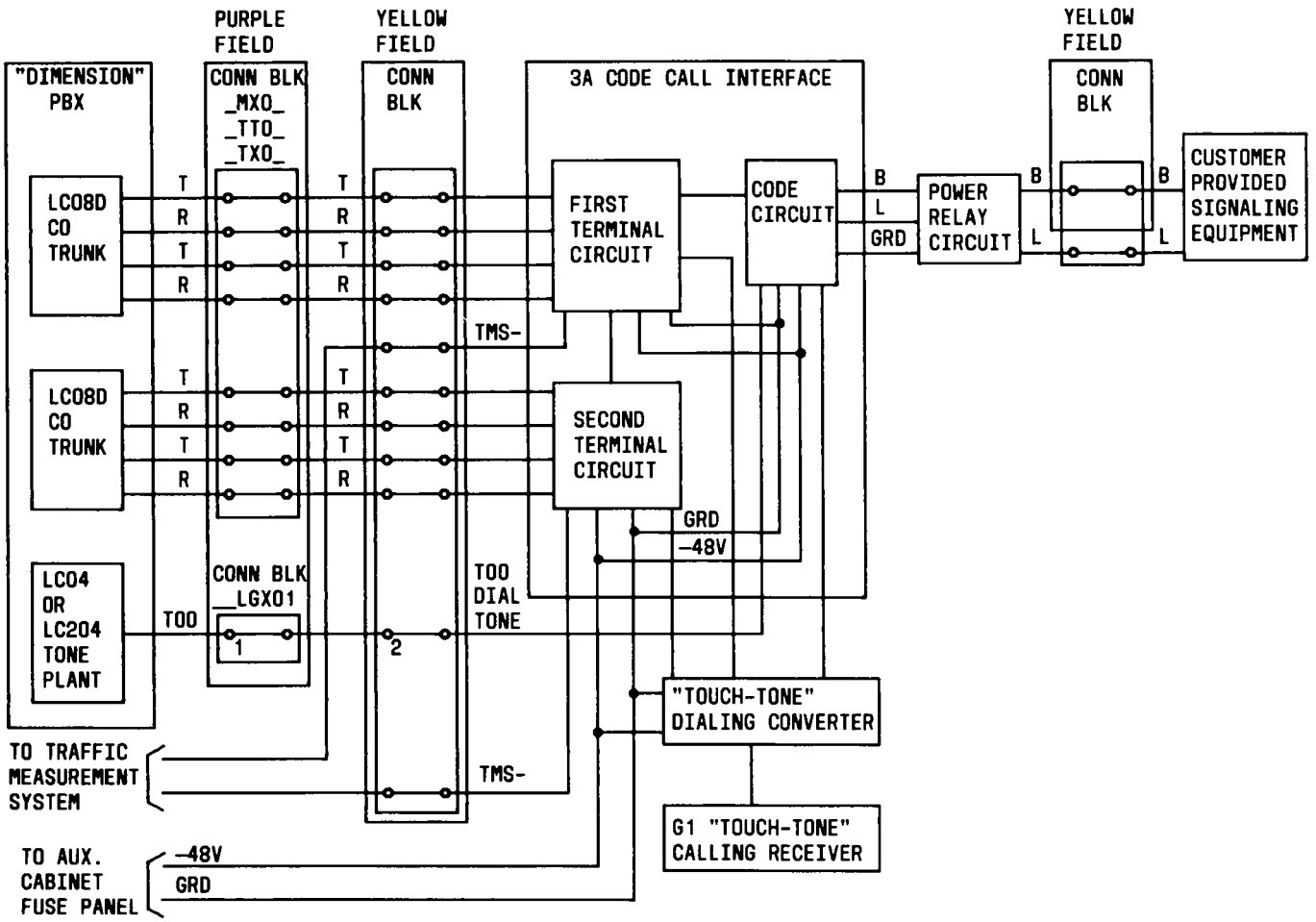


Fig. 62—General Connection Diagram for 3A Code Call Access

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.

5.35 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. Worksheet 10 is a fill-in worksheet for use with the chime paging feature.

CUSTOMER ADMINISTRATION CENTER SYSTEM (CACS)

5.36 The customer administration center system is a stored program-controlled system which uses the MC-3 processor. 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. 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 may

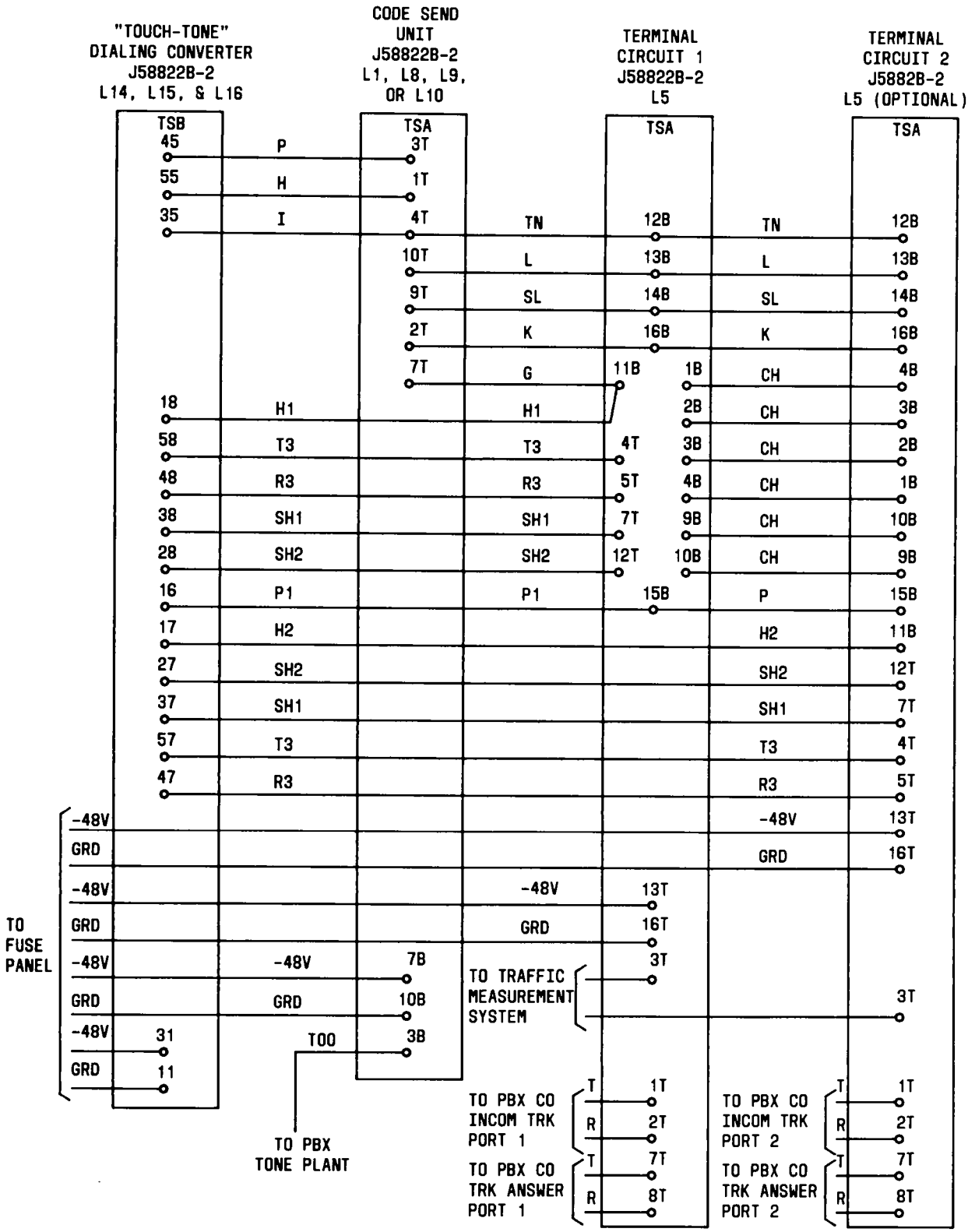


Fig. 63—Terminal Connections for 3A Code Call Access (Sheet 1 of 2)

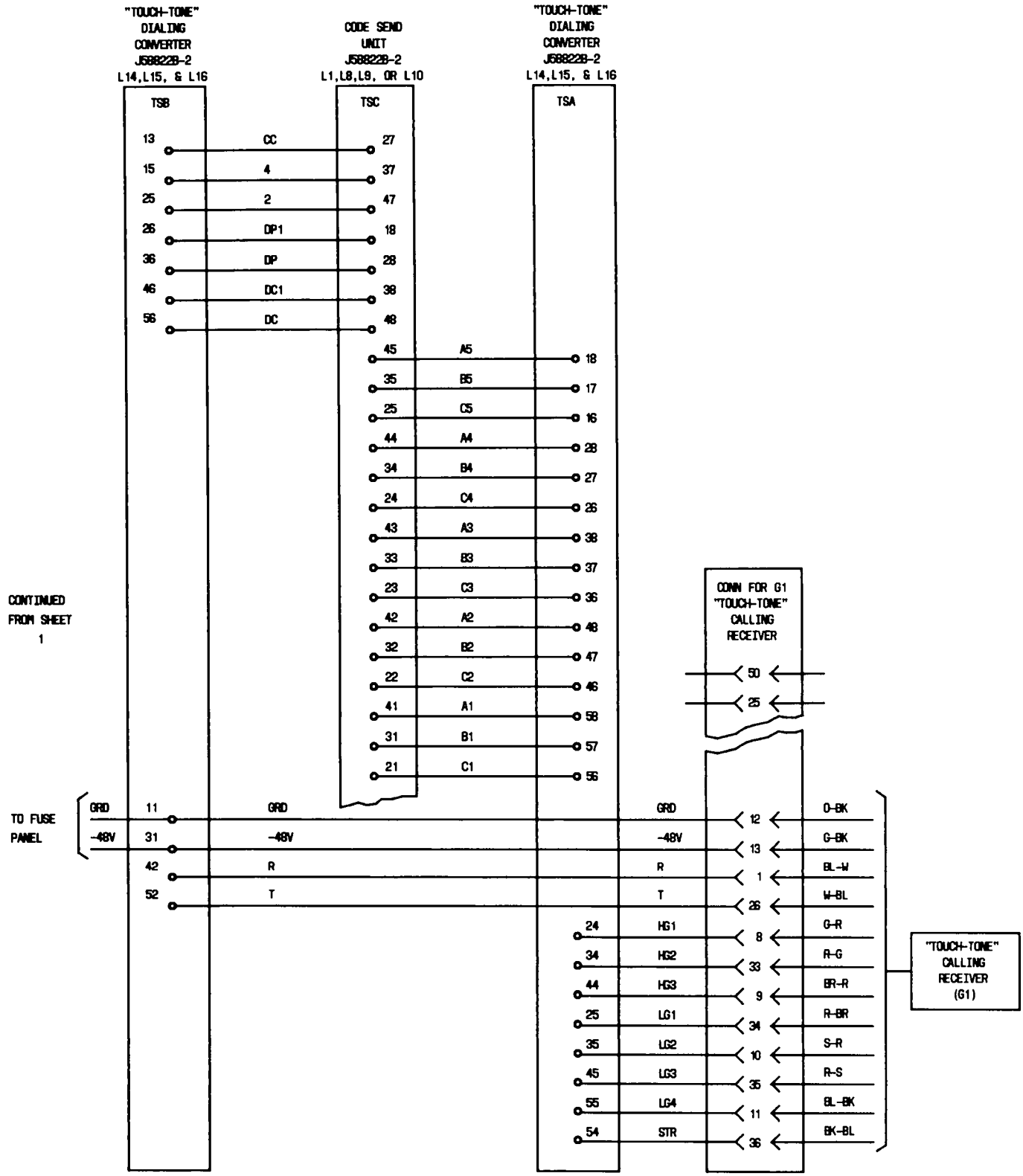


Fig. 63—Terminal Connections for 3A Code Call Access (Sheet 2 of 2)

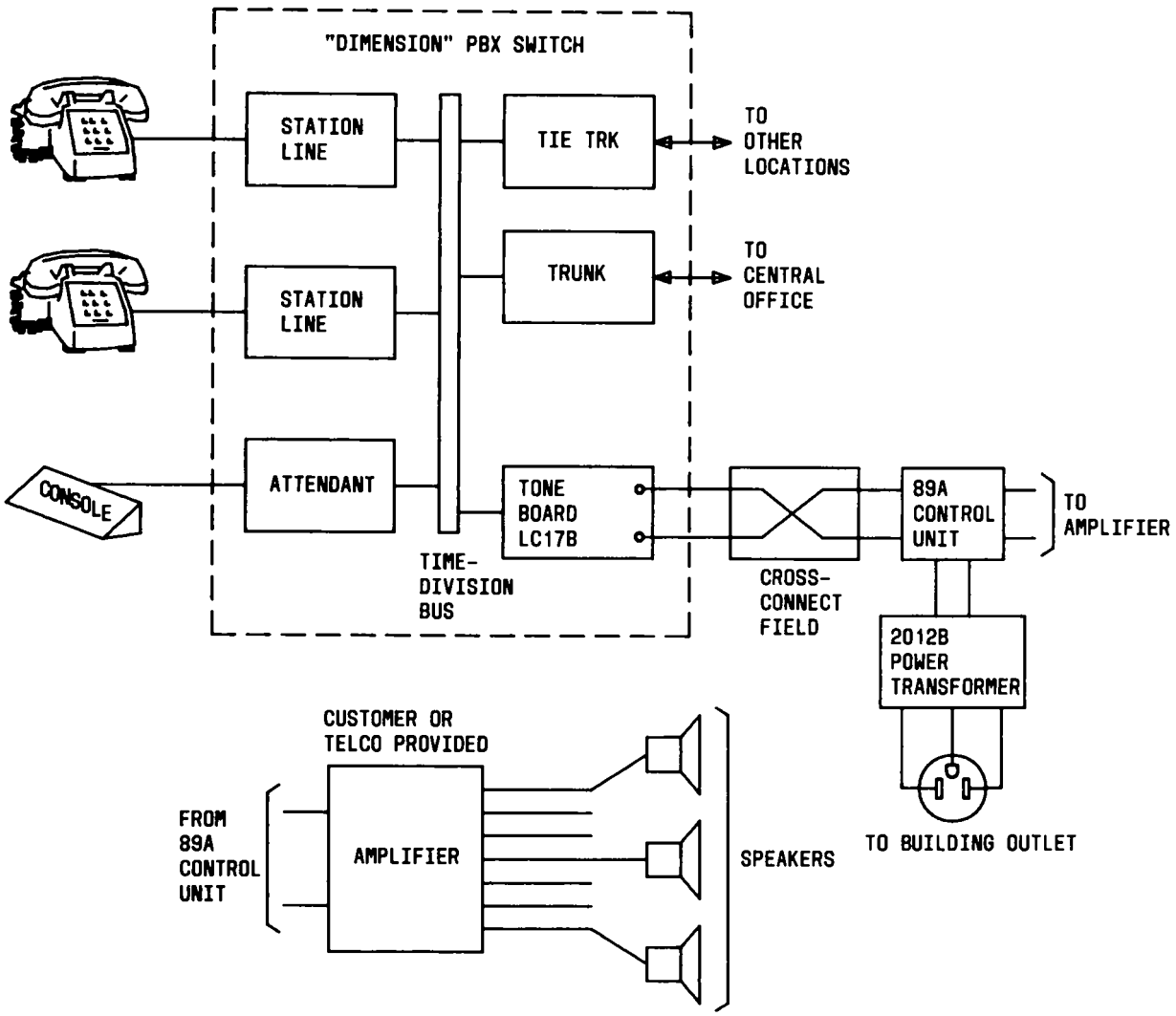


Fig. 64—Code Calling Equipment—Block Diagram

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. 65. The CACS interface required for a DIMENSION PBX includes the following:

- One 113D (or equivalent), L1 or L2, or equivalent data set
- One 47-type data mounting
- One LC171B circuit pack
- One LC172B circuit pack.

5.37 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. 66) available with door panel to match office decor. 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.

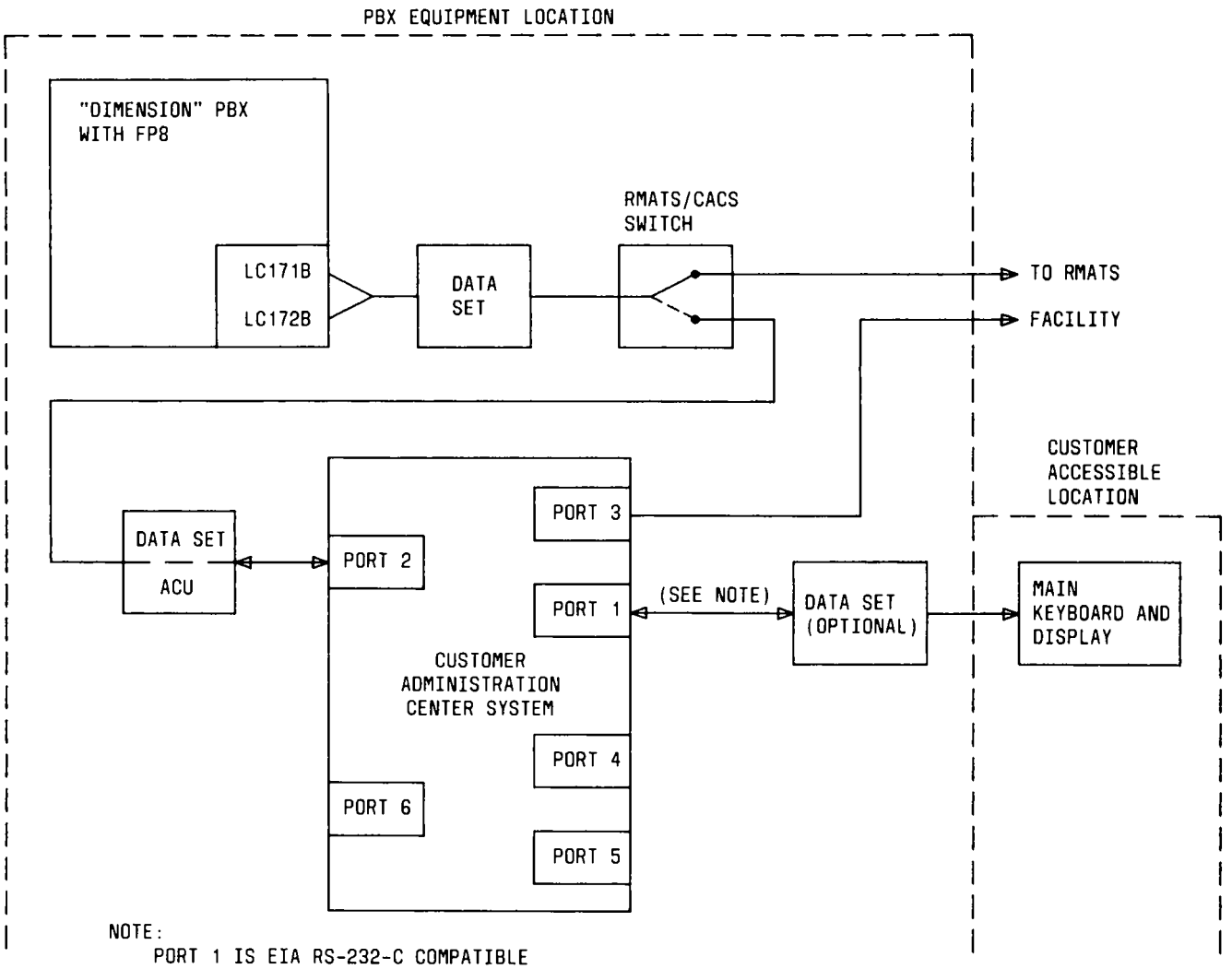


Fig. 65—Typical CACS Configuration

CUSTOMER ADMINISTRATION PANEL (CAP)

5.38 The CAP is a modified (optional) DIMENSION PBX maintenance and administration panel (MAAP) which enables the PBX customer to change station numbers and station user features such as 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 305 m (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. 67. 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 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.

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)

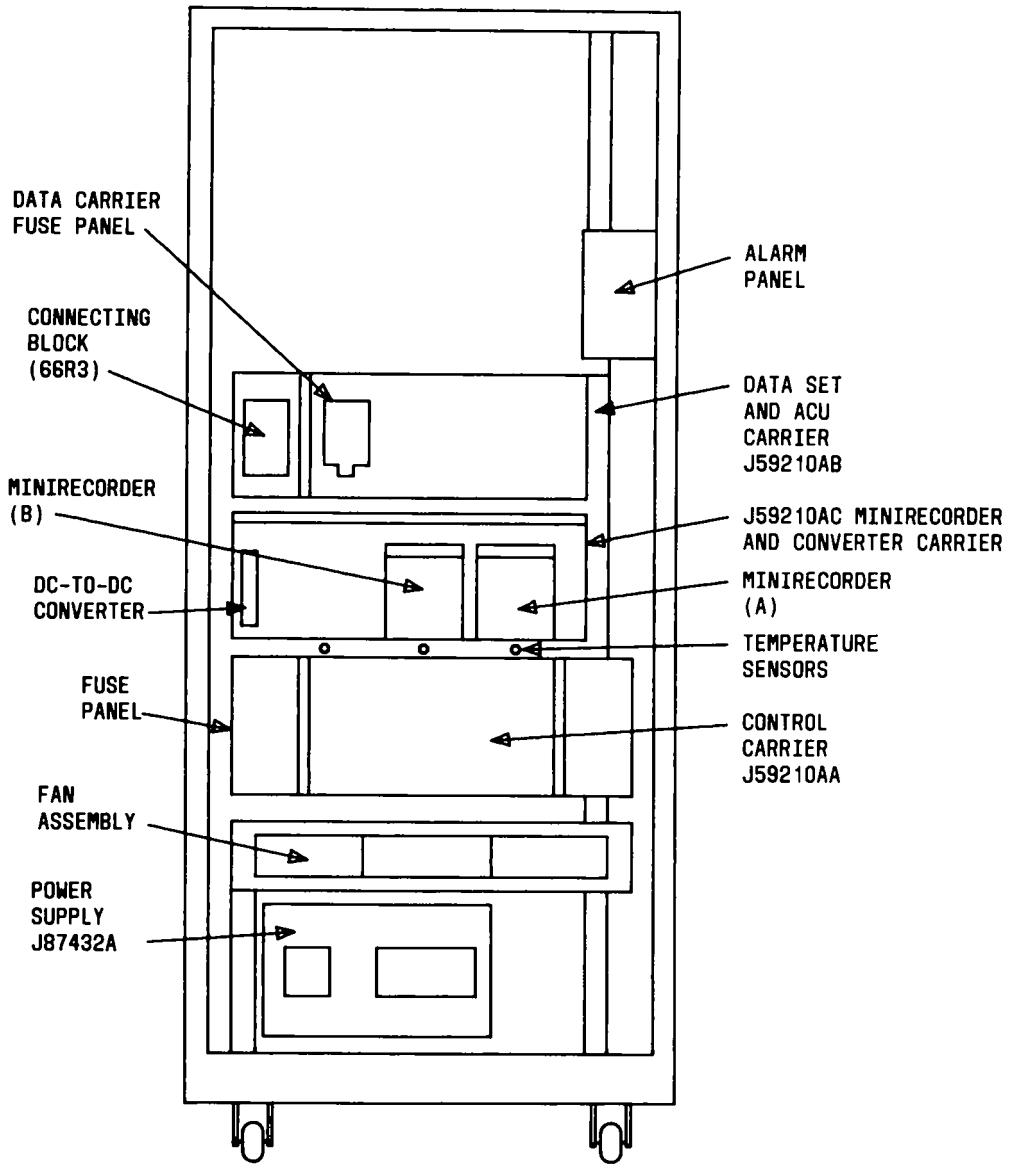


Fig. 66—CACS Cabinet

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. The CPFT equipment may be replaced with the packaged metallic facility terminal assembly (PMFTA) as outlined in this part.

5.39 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 will supply all of the transmission and signaling functions required to terminate either a 2-wire or 4-wire metallic facility. Sections 332-610-100/-200/-500 and 332-910-180 contain detailed list information concerning CPFT equipment.

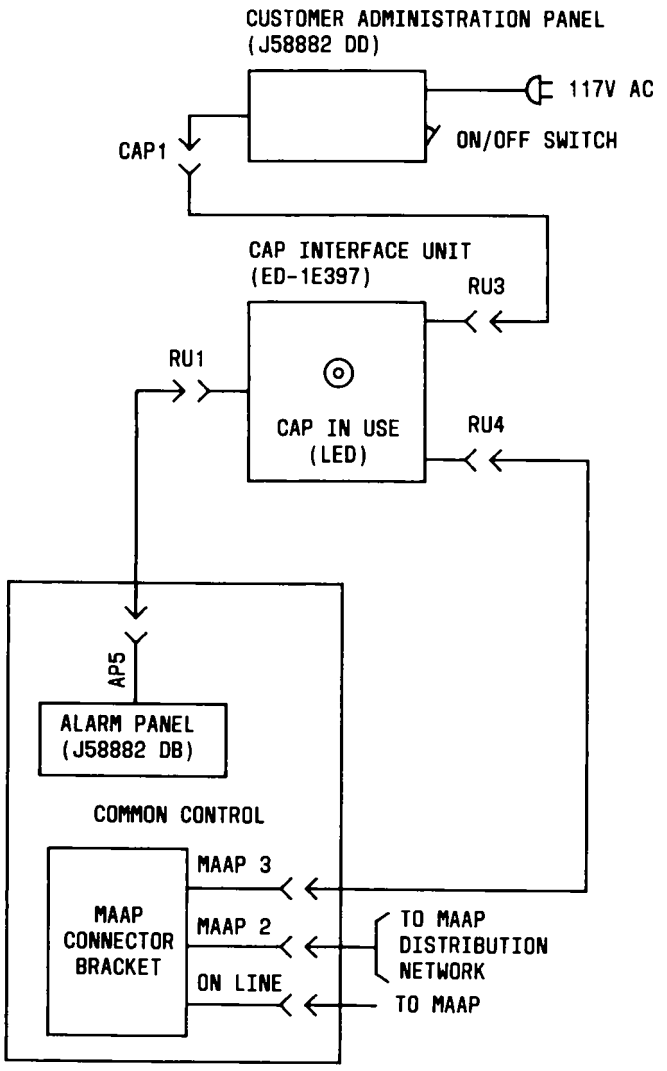


Fig. 67—Customer Administration Panel (CAP) Configuration

5.40 The CPFT family of equipment-coded J99380( ) is presently divided into *eight* basic components which are housed in modular shelves. 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) or J99380E (MD)—Single module shelf or double module shelf, respectively
- J99380B (MD) or J99380C (MD)—Terminal balancing network
- J99380D (MD)—Double-depth shelf assembly
- J99380TA (MD) or J99380TB (MD)—Test extender
- J99380AA (MD), J99380AB (MD), and J99380AC (MD)—Plug-in circuit packs
- J99380H (MD) or J99380J (MD)—Power distribution and feature panel
- J99380F or J99380G—Shelf assembly for voice frequency circuits
- J99380K (MD) or J99380L (MD)—Circuit pack carrier (CPC) for small CPFT installations.

5.41 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, J99380E (MD), is shown in Fig. 68.

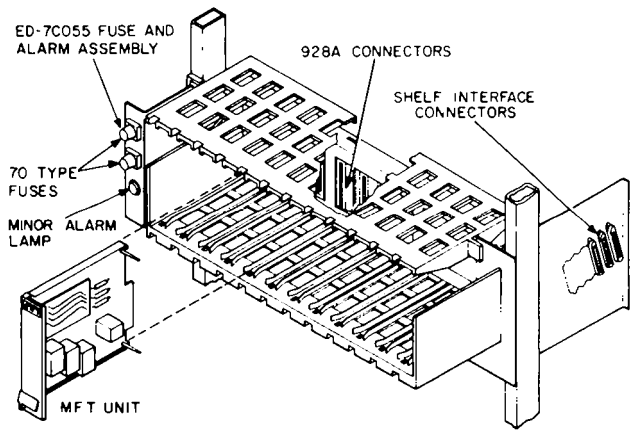


Fig. 68—Single Module Shelf [J99380A (MD)] or Double Module Shelf [J99380E (MD)]

5.42 Interconnection information for the single module shelf and PBX is shown in Fig. 69.

5.43 When both transmission and signaling treatment are required, the double module shelf is used. The shelf in Fig. 68 can be used for the double arrangement when it is wired for this purpose. Interconnection information for the double module shelf and PBX is shown in Fig. 70.

5.44 When 837G networks are used, one 120T repeating coil and one 535DK capacitor are mounted in the space adjacent to the network. Circuits consist of one 837G network and one 120T repeating coil. They have dedicated terminals on terminal strip 1 in groups of eight terminals (1-8), (9-16), etc.

5.45 The shelf assembly for 837-type network, J99380B (MD), is shown in Fig. 71. Interconnection information for the terminal balancing network panel, J99380B (MD), and PBX is shown in Fig. 72.

5.46 The shelf assembly for 837-type networks, J99380C (MD), is shown in Fig. 73. Interconnection information for the KTU-type shelf assembly for terminal balancing is shown in Fig. 74.

5.47 An illustration of the double-depth shelf assembly, J99380D (MD), is shown in Fig. 75.

5.48 The test extender, J99380TA (MD) (Fig. 76) or J99380TB (MD), may be required to allow access to the adjustments and test points when aligning

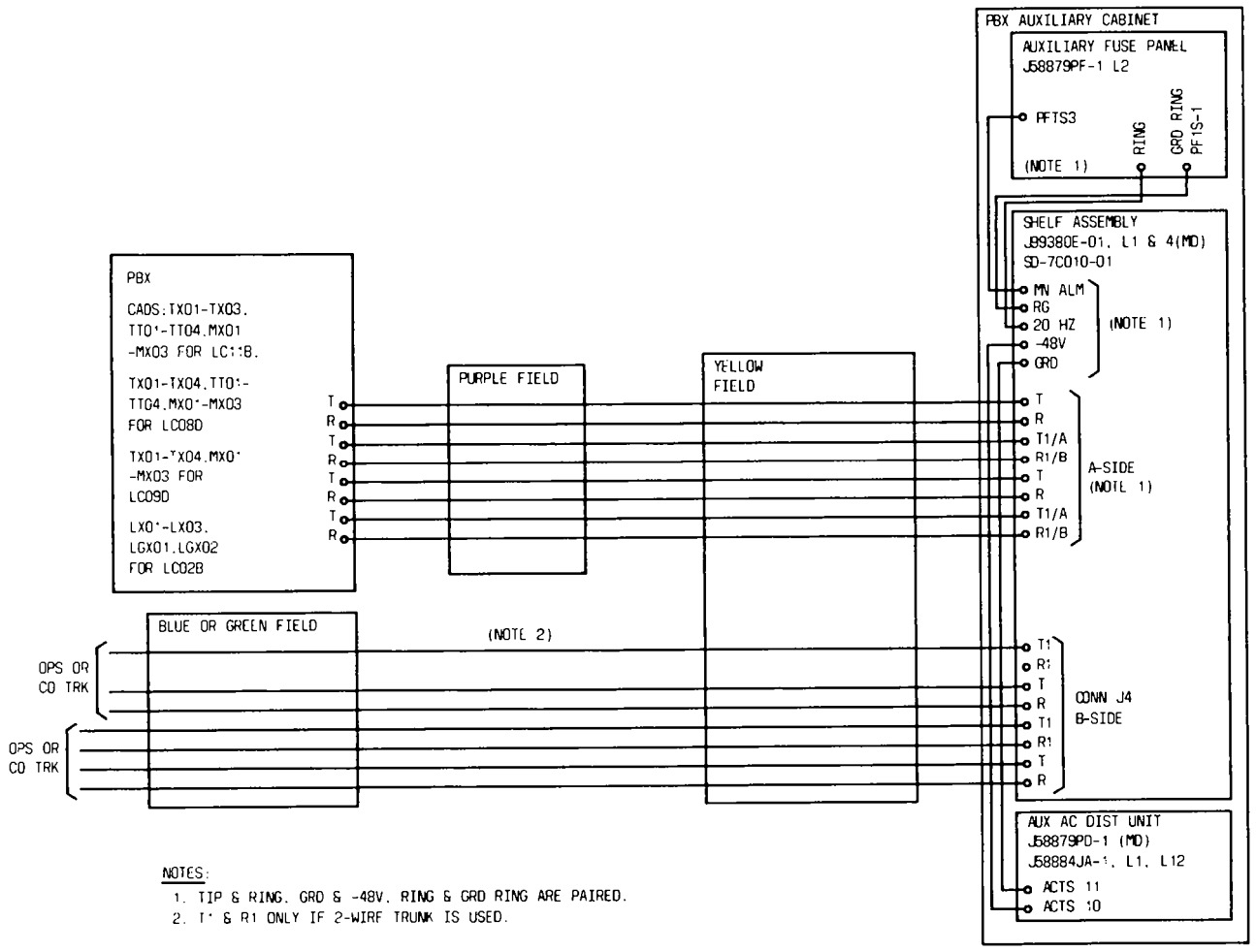


Fig. 69—Single Module MFT Shelf Assembly—PBX Interconnection [J99380A (MD)]

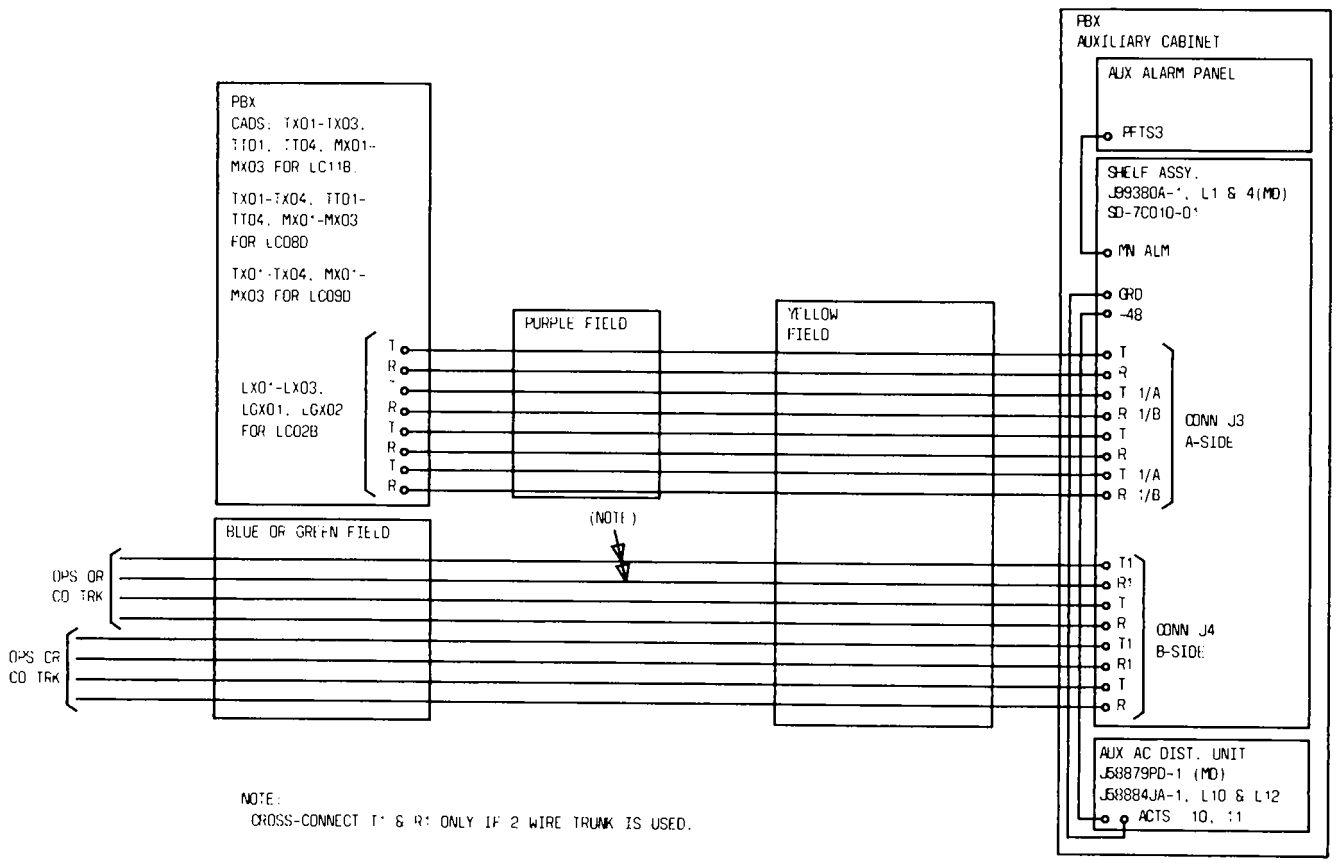


Fig. 70—Double Module MFT Shelf Assembly—PBX Interconnection [J99380E (MD)]

and testing the MFT circuit packs in the CPFT installation.

5.49 The power distribution and feature panel, J99380J (MD); voice frequency circuits, J99380F or J99380G; and the power distribution and feature panel, J99380H (MD), are used for supplemental power distribution. They will probably not be required for most PBX installations.

5.50 A small CPFT arrangement, J99380K (MD) and J99380L (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

5.51 The data channel repeater is a self-contained unit that provides range extension and/or lightning protection for 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.

5.52 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.

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

5.54 Typical applications for the data channel repeater are station message register, calling number display, and the DIMENSION PBX ECTS.

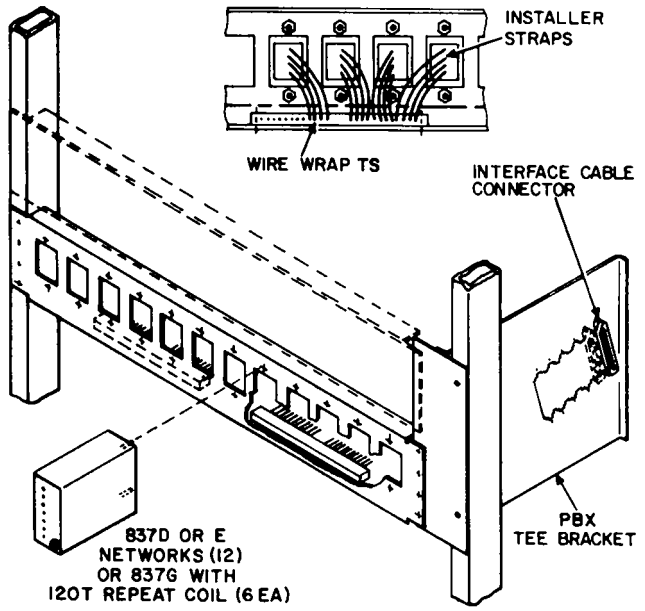


Fig. 71—Shelf Assembly for 837-Type Network [J99380B (MD)]

A. Housing and Mounting

5.55 The repeater circuitry is housed in a modified key service unit (Fig. 77) with a capacity for two data channel repeater circuits.

5.56 The unit is designed to be wall-mounted near a 120V 60-Hz outlet. Power cords are available in 610, 1220, 1830, or 3660 mm (2-, 4-, 6-, and 12-feet) lengths (J58879KC, Lists A, B, C, and D, respectively).

5.57 The input power (ac) cord to the 28D2 power unit plugs into the commercial (117 Vac) power outlet that would serve the 28D2 power unit.

B. Range Extension and Lightning Protection

5.58 A ***single-channel repeater with range extension*** (Fig. 78) consists of the following equipment:

- One J58879KC, List 1—Assembly, wiring, and equipment, including a 28D1 power supply unit
- One J58879KC, List 2—Rectifier and timing reference circuit card (AE-49)
- Two J58879KC, List 3—Unidirectional repeater circuit card (AE-48) for each repeater.

A maximum of four repeaters can be cascaded for the purpose of extending the distance between the PBX and peripheral to 3353 m (11,000 feet).

5.59 A ***dual channel repeater with range extension*** (Fig. 79) consists of the following equipment:

- One J58879KC, List 1—Assembly, wiring, and equipment

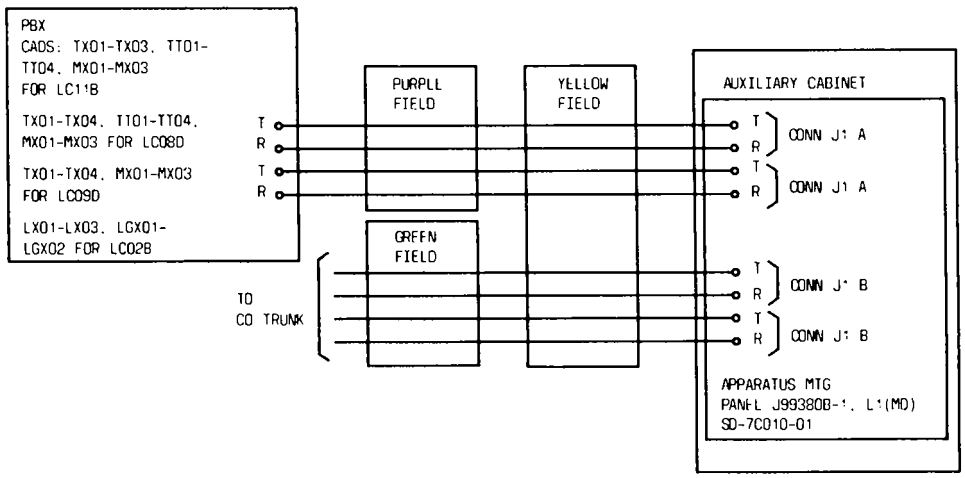


Fig. 72—Network Panel to PBX—Interconnections [J99380B (MD)]

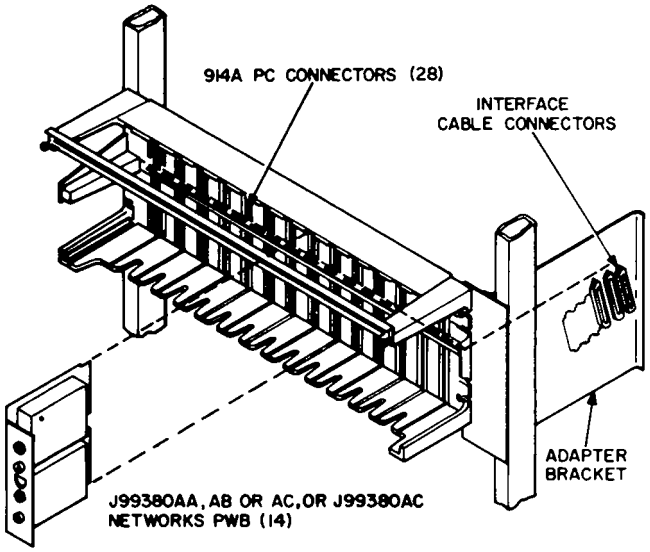


Fig. 73—Shelf Assembly for 837-Type Networks on PC Boards [J99380C (MD)]

- A 28D2 power supply unit
- One J58879KC, List 2—Rectifier and timing reference circuit card (AE-49)
- Four J558879KC, List 3—Unidirectional repeater circuit card (AE-48) for each repeater.

5.60 When the data channel repeater is used for ***lightning protection only*** (Fig. 78 and 79), the equipment required is as follows:

- J58879KC, List 4—Data link, buffer circuit card (WJ3)
- J58879KC, List 5—Assembly, wiring, and equipment, excluding the 28D2 power supply unit.

C. Installation

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

5.62 A block diagram of a single channel repeater with and without range extension with some internal wiring is shown in Fig. 78. The required connections consist of data pair terminations to connecting block TB1.

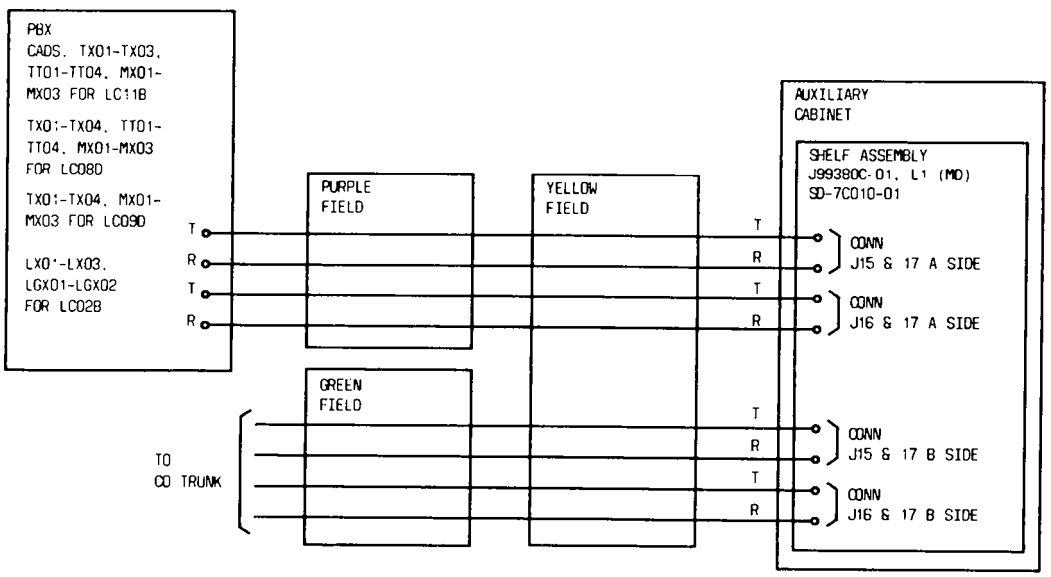


Fig. 74—KTU-Type Shelf Assembly for Impedance Matching Network [J99380C (MD)]

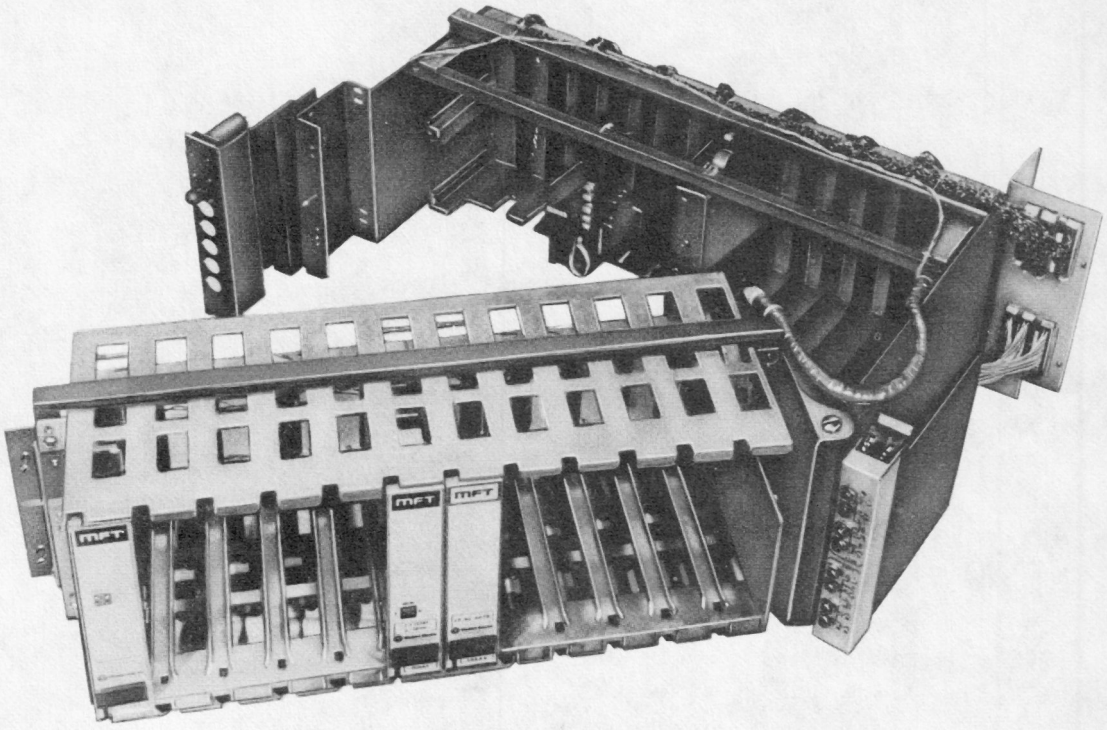


Fig. 75—Double-Depth Shelf Frame [J99380D (MD)] With a Double Module Shelf [J99380E (MD)] in Front and a Network Plug-In Shelf [J99380C (MD)] in Rear

5.63 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.

5.64 When operating in the peripheral to PBX data direction, the repeater input pair is connected to terminals 3B and 4B. The output pair is tied to terminals 3A and 4A.

5.65 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.

5.66 The equipment required for a dual channel repeater to an off-premises peripheral is shown in Fig. 80. The connections for the two data channels are provided in Fig. 79. The channel 1 connections are identical to the single repeater channel connections. The channel 2 repeater circuit cards in J3 and J4 are used in conjunction with rows D and E of terminal block 1.

D. Electronic Custom Telephone Service (ECTS) Range Extension

5.67 A typical repeater application is range extension for ECTS. Up to four repeaters can be connected in series with the PBX to a remote location (Fig. 81). One repeater is in the PBX building, the other repeater is in the remote building, with possibly two other intermediate repeaters between the two. The intermediate repeaters must be located in building(s). The repeater-to-repeater link may be exposed if standard protection is provided.

E. Data Range

5.68 The use of data channel repeaters and the standalone unit can extend the maximum distance between the PBX and the multibutton electronic telephone (MET) sets to 3658m (12,000 feet) as follows:

- 305m (1000 feet) between the PBX and one repeater

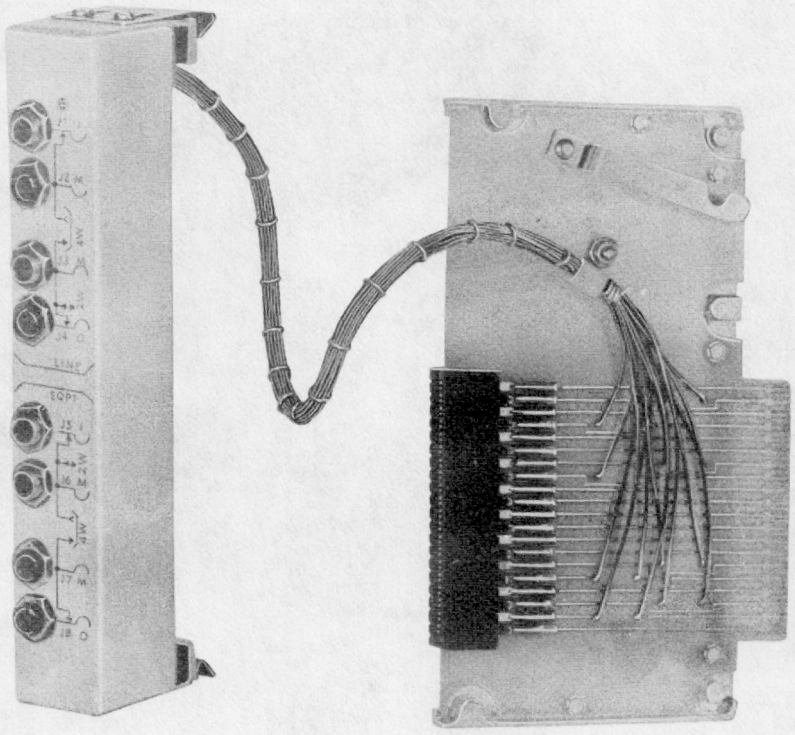


Fig. 76—Test Extender (J99380TA)

- 914m (3000 feet) between the first and second repeater
- 914m (3000 feet) between the second and third repeater
- 914m (3000 feet) between the third and fourth repeater
- 305m (1000 feet) between the fourth repeater and the standalone unit
- 305m (1000 feet) between the standalone unit and the MET set.

5.69 Worksheet 15 is to be used in providing cross-connection information on the data channel repeater and cascaded repeater connections from a basic control carrier. Worksheet 16 provides a fill-in worksheet for data channel repeater connections from a control-growth carrier. Connections from a repeater to a second repeater or to a peripheral device are given in fill-in Worksheet 17.

5.70 Data link range is a function of cable attenuation and receiver sensitivity. The repeater-to-repeater range is 914 m (3000 feet) for No. 24 AWG cable. The PBX-to-repeater and repeater to peripheral data link range is limited to 305 m (1000 feet) by receiver sensitivity.

5.71 The data range is limited by the cable attenuation and round trip propagation delay and may not exceed 3353 m (11,000 feet) from the PBX to the peripheral, regardless of cable wire gauge.

5.72 The range for one direction of a data link may be estimated by the following formula.

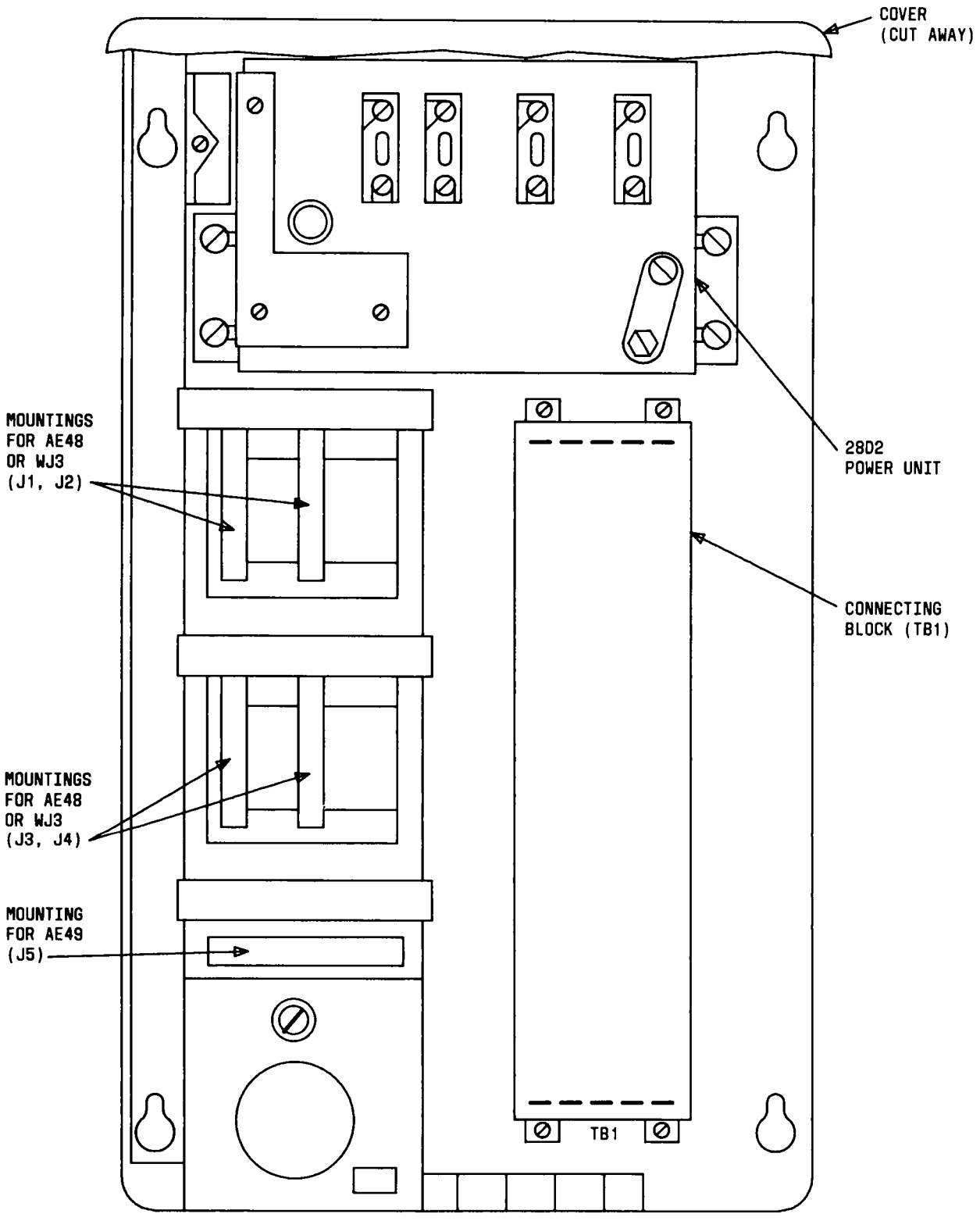
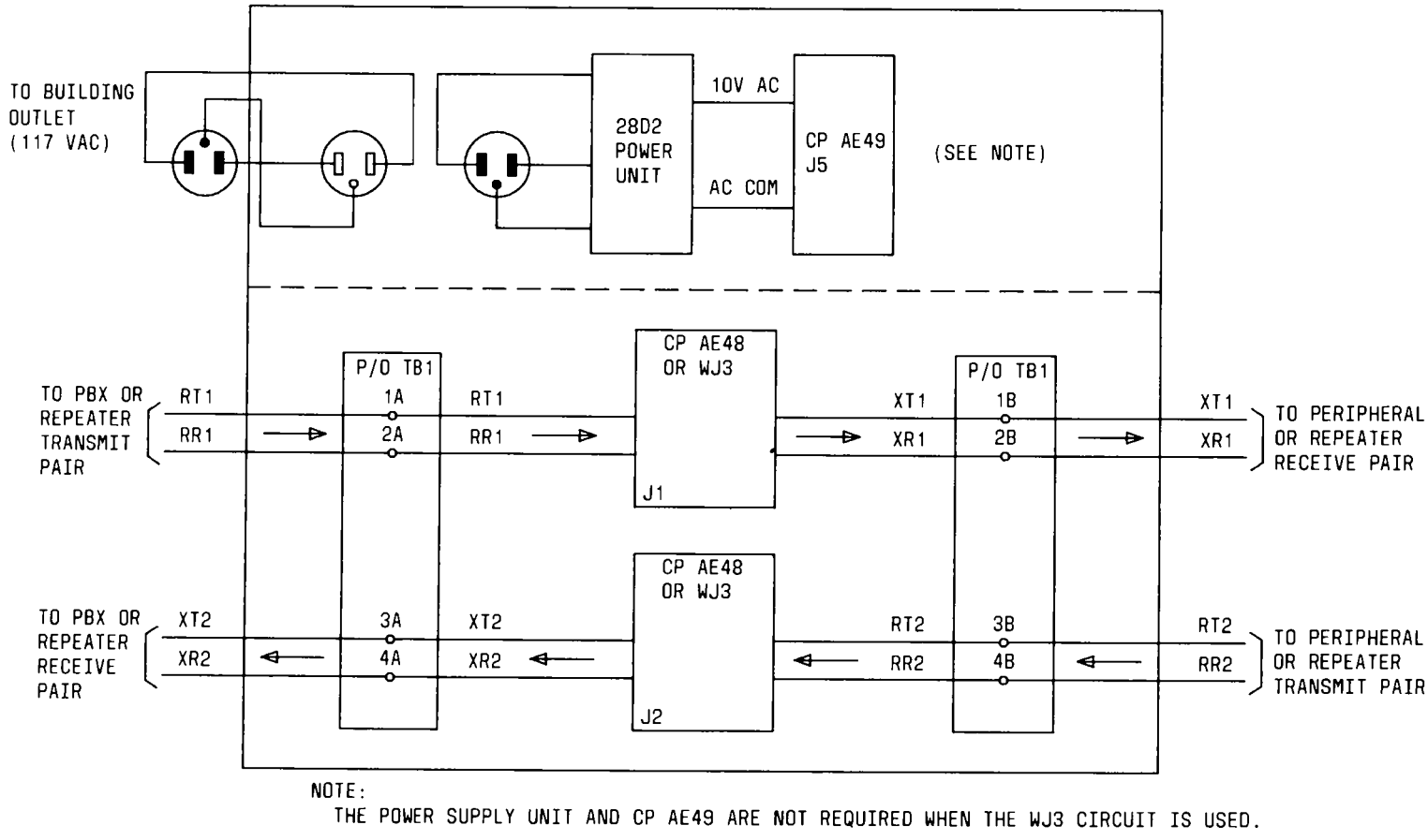
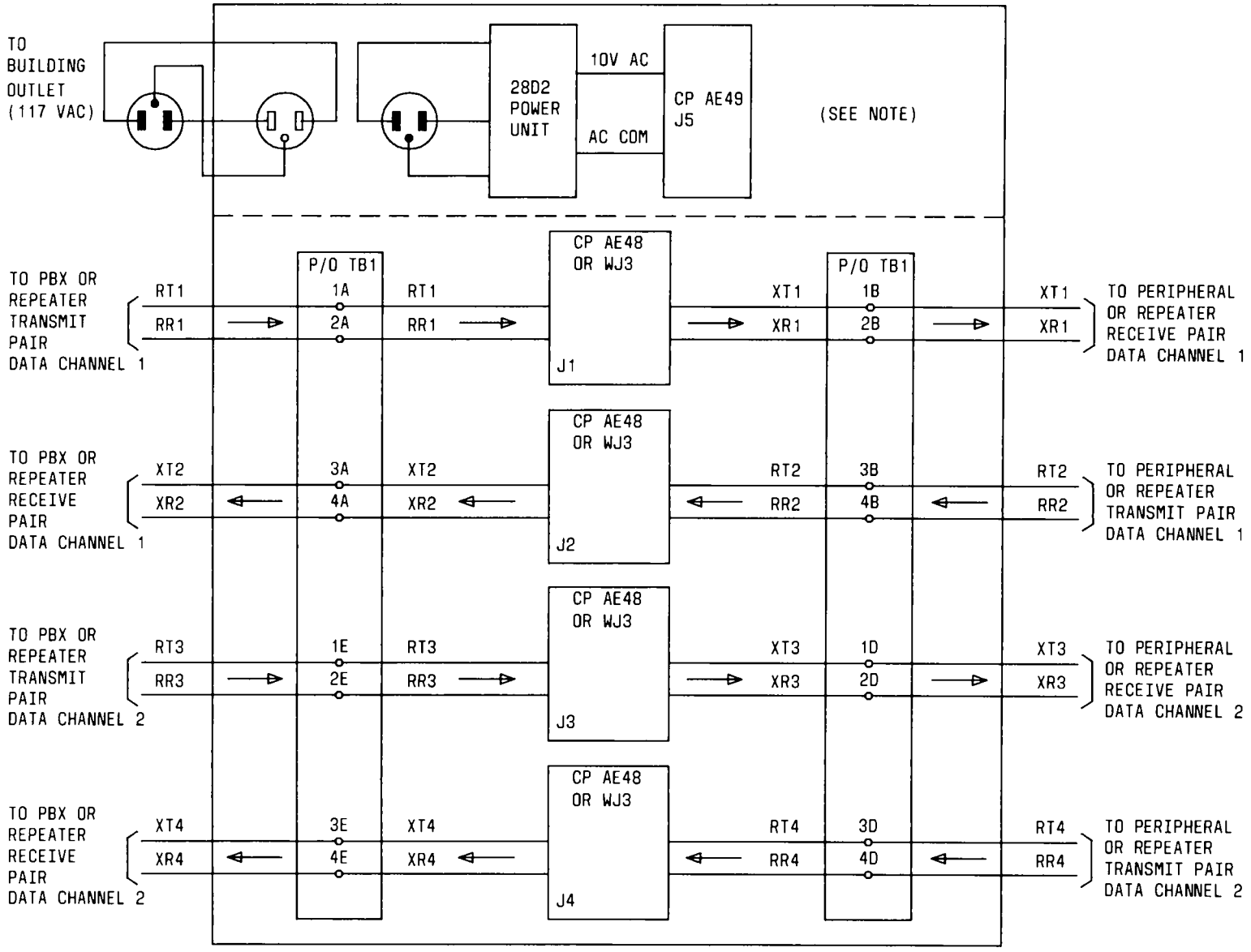


Fig. 77—Data Channel Repeater (J58879KC)



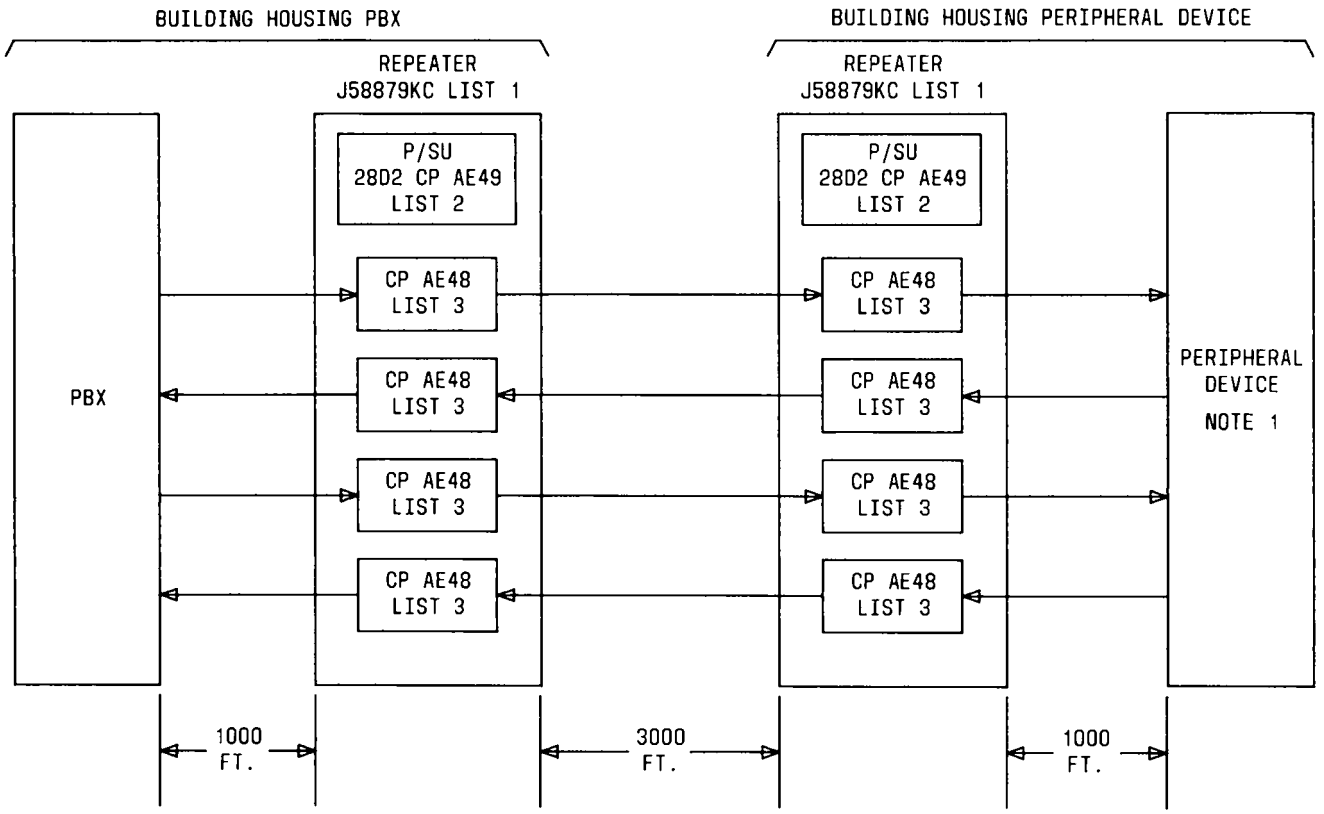
NOTE:
THE POWER SUPPLY UNIT AND CP AE49 ARE NOT REQUIRED WHEN THE WJ3 CIRCUIT IS USED.

Fig. 78—Single-Channel Repeater With Range Extension (AE-48) or Without Range Extension WJ-3



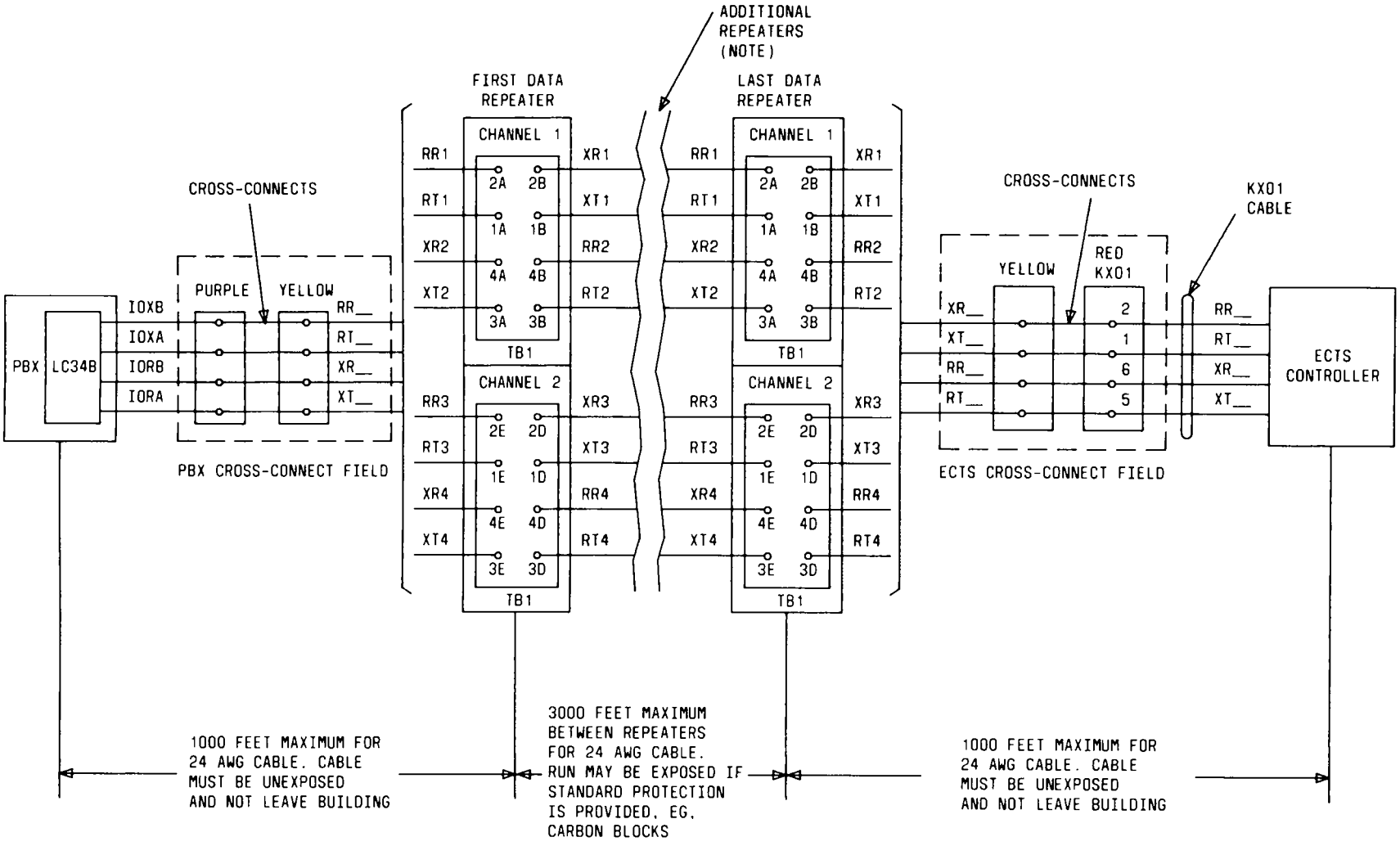
NOTE:
THE POWER SUPPLY UNIT AND CP AE49 ARE NOT REQUIRED WHEN THE WJ3 CIRCUIT CARD IS USED.

Fig. 79—Dual-Channel Repeaters With Range Extension (AE-48) or Without Range Extension (WJ-3)



NOTE:
1. WHEN THE PERIPHERAL DEVICE IS THE CONTROLLER FOR "DIMENSION" PBX ECTS, ELECTRONIC TELEPHONE (MET) SETS MAY BE LOCATED NOT MORE THAN 305M (1000 FEET) FROM THE CONTROLLER. THE CONTROLLER MAY BE LOCATED UP TO 3350M (11000 FT.) FROM THE PBX BY CASCADED REPEATERS.

Fig. 80—Dual Channel Repeaters for Off-Premises Use



NOTE: TWO INTERMEDIATE REPEATERS MAY BE PROVIDED TO EXTEND THE DATA CHANNEL RANGE TO A MAXIMUM OF 11,000 FEET. INTERMEDIATE REPEATERS MUST BE LOCATED IN BUILDING(S).

Fig. 81—Data Channel Repeater Connections to ECTS

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

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.

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

5.74 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 pack code and vintage.

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

5.76 The previously mentioned values can be substituted into the range formula below.

$$R = \frac{20 \text{ LOG } 10 \left(\frac{5.0}{0.7}\right)}{5.5/1000} = 3105 \text{ FEET}$$

The cable attenuation formula may be applied to individual cable runs between units. However, the total cable distance between the PBX and the peripheral device MUST NOT exceed 3353m (11,000 feet).

F. Propagation Delay

5.77 The maximum data range is limited in software by the time allowed for a data channel response. Range extension increases the data response due to repeater delay and cable propagation.

5.78 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.

5.79 In an application where four repeaters are used, a total of eight circuits are inserted in the loop for a total delay of 19.2 μs.

5.80 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 (DIMENSION PBX ECTS = 2 μs)
- Time for the PBX receiver to respond (1 μs).

5.81 The above application (employing four repeater circuits and a range of 1524 meters [5000 feet]—26.6 μs) requires the software to allow 122 μs for a data channel response.

"DIMENSION" PBX ELECTRONIC CUSTOM TELEPHONE SERVICE (ECTS)

5.82 The ECTS is provided by one or more ECTS controllers, the associated electronic telephone sets, and the wiring and terminals required for connection.

5.83 The ECTS controller is available in 2-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 supplemental 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 the ECTS controller capacity and requiring an additional ECTS controller. The supplemental carrier is powered by the basic carrier and must be mounted directly above the basic carrier. Both carriers are the same size as those used in the PBX permitting the ECTS controller to be mounted

in a vacant carrier position in a PBX cabinet. The electronic station sets must be located within 305m (1000 feet) of the ECTS controller.

5.84 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 supplemental, ECTS controller carrier is mounted. Use of the standalone ECTS controller effectively doubles the station data loop length by providing an additional 305m (1000 feet) of PBX cabling to the ECTS controller. The standalone can be 305m (1000 feet) from the PBX, and the station another 305m (1000 feet) from the standalone.

5.85 The standalone cabinet is compatible with the PBX cabinets in size and appearance except for 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.

5.86 Heat dissipation limits the number of ECTS carriers which may be mounted in a single PBX cabinet to two (one controller). A combination of one basic and one supplemental carrier may be mounted in the control and/or network cabinet. An auxiliary cabinet may contain two basic carriers and two supplemental carriers. The use of the standalone cabinet may be an advantage when station loop length, space considerations, or tie cable lengths are factors.

5.87 The ECTS can be directly accessed 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.

5.88 Figure 82 provides basic interconnection data for installation of ECTS carriers via the cross-connect field. Refer to Section 554-010-110 for additional detailed information.

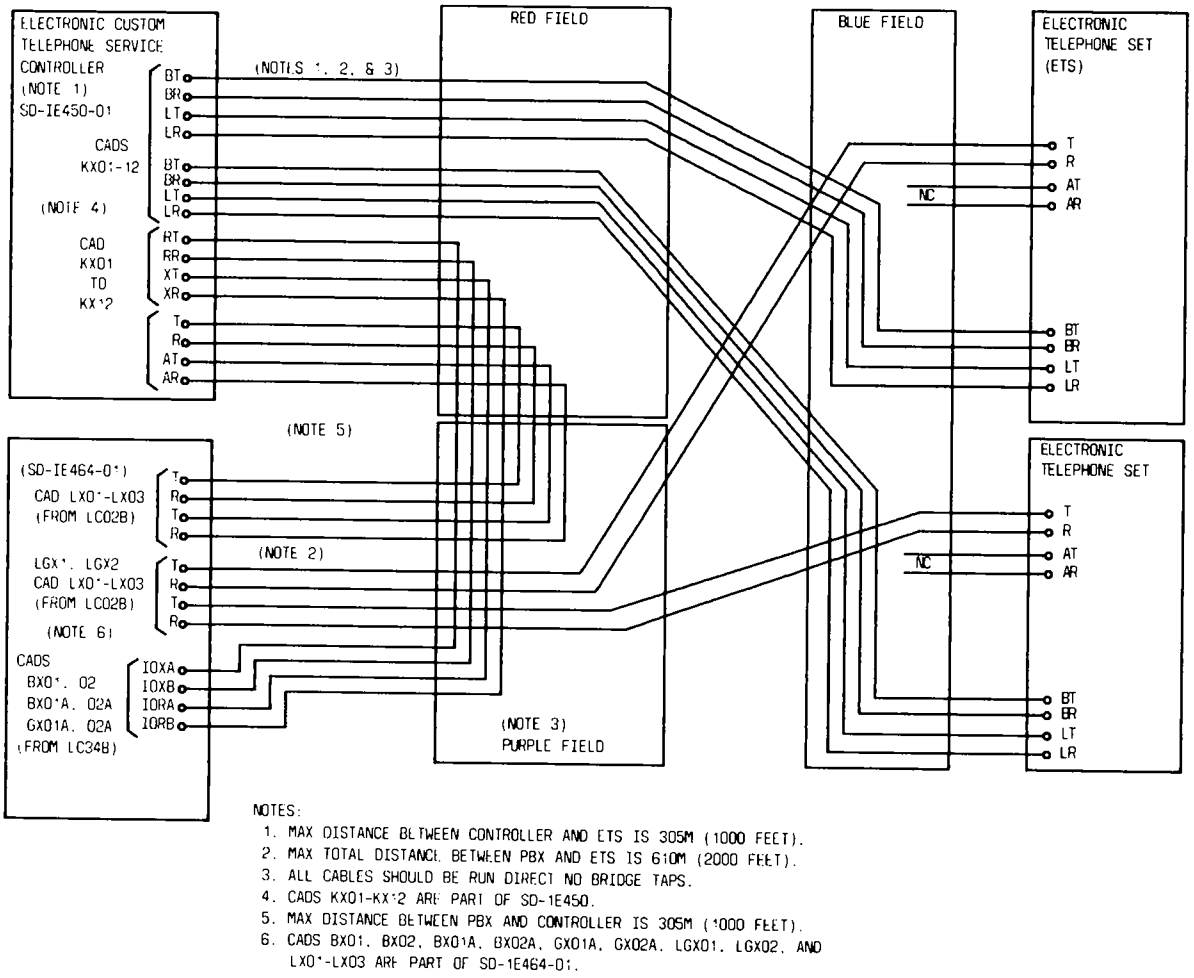
5.89 When power failure transfer is used with an ECTS station, the transmit data link from the PBX to the electronic controller must be routed through a 609-type emergency transfer panel. This will prevent phantomed power from being applied to an ECTS set after the tip and ring leads have been transferred 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.

5.90 The ECTS controller(s) must be installed in an auxiliary cabinet. Power for the electronic telephone controller (ETC) is provided from a commercial 120-volt 60-Hz outlet.

ENERGY COMMUNICATIONS SERVICE

5.91 The energy communications service (ECS) feature remotely controls various energy consuming devices on customer premises. This function includes heating, ventilating, and air-conditioning units in hotel/motel and/or hospital rooms. The console and output printer for ECS are shown in Fig. 83. The PBX processor provides for control of these power applications via an energy communications 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 ECSU is shown in Fig. 84. 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. An application diagram for an ECSU is shown in Fig. 85. In addition, the status of the appliance control relay is transmitted back to the PBX in response to a query signal. An LC16B circuit pack is required to interface the power meter to the PBX for peak demand load shedding and energy consumption demand monitoring. Each LC16B contains eight interface circuits. A separate interface circuit is required for each power meter monitored by ECS. This feature performs the following functions:

- Control of energy loads when the room is vacant
- Control of energy loads when the room is occupied
- Time-of-day control of individual loads
- Individual load cycling control



NOTES:
1. MAX DISTANCE BETWEEN CONTROLLER AND ETS IS 305M (1000 FEET).
2. MAX TOTAL DISTANCE BETWEEN PBX AND ETS IS 610M (2000 FEET).
3. ALL CABLES SHOULD BE RUN DIRECT NO BRIDGE TAPS.
4. CADS KX01-KX12 ARE PART OF SD-1E450.
5. MAX DISTANCE BETWEEN PBX AND CONTROLLER IS 305M (1000 FEET).
6. CADS BX01, BX02, BX01A, BX02A, GX01A, GX02A, LGX01, LGX02, AND LX01-LX03 ARE PART OF SD-1E464-01.

Fig. 82—DIMENSION PBX Electronic Custom Telephone Service—Interconnections

- Peak demand shedding of loads
- Monitoring of demand and energy consumption.

5.92 Table P contains a summary of ECS hardware applicable to this feature. Typical hardware applications are provided in Table Q. Data terminals for use with the peripheral interface unit (PIC) are given in Table R. The requirements and application for printers in the ECS feature are shown in Table S. A maximum of 2 amperes and 24 volts (ac or dc) can be switched by the ECSU. Refer to Section 554-010-103 for details of the ECSU.

ENERGY COMMUNICATIONS SERVICE ADJUNCT (ECSA)

5.93 The ECSA consists of a 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.

5.94 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 need for energy communications signaling units (ECSU) and corresponding hardware previously necessary to generate and pass tones to ECSUs over telephone 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

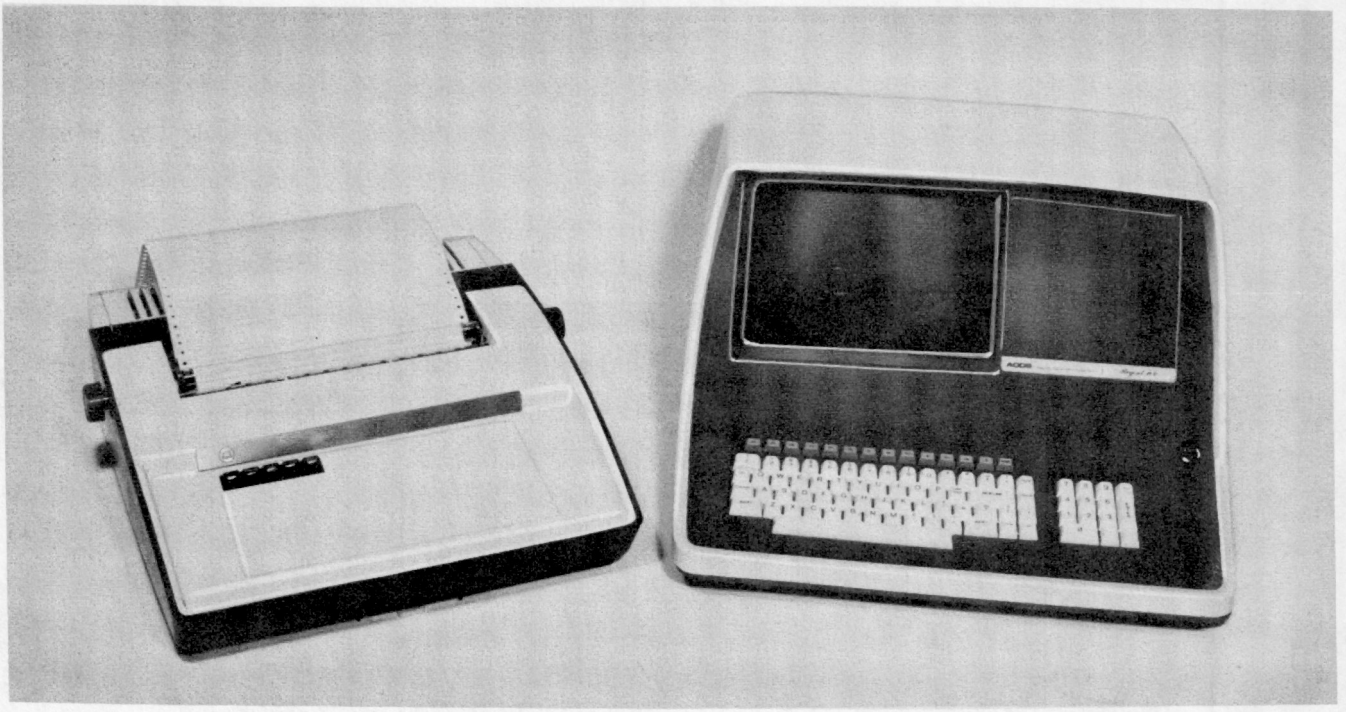


Fig. 83—Energy Communications Service Printer and Console

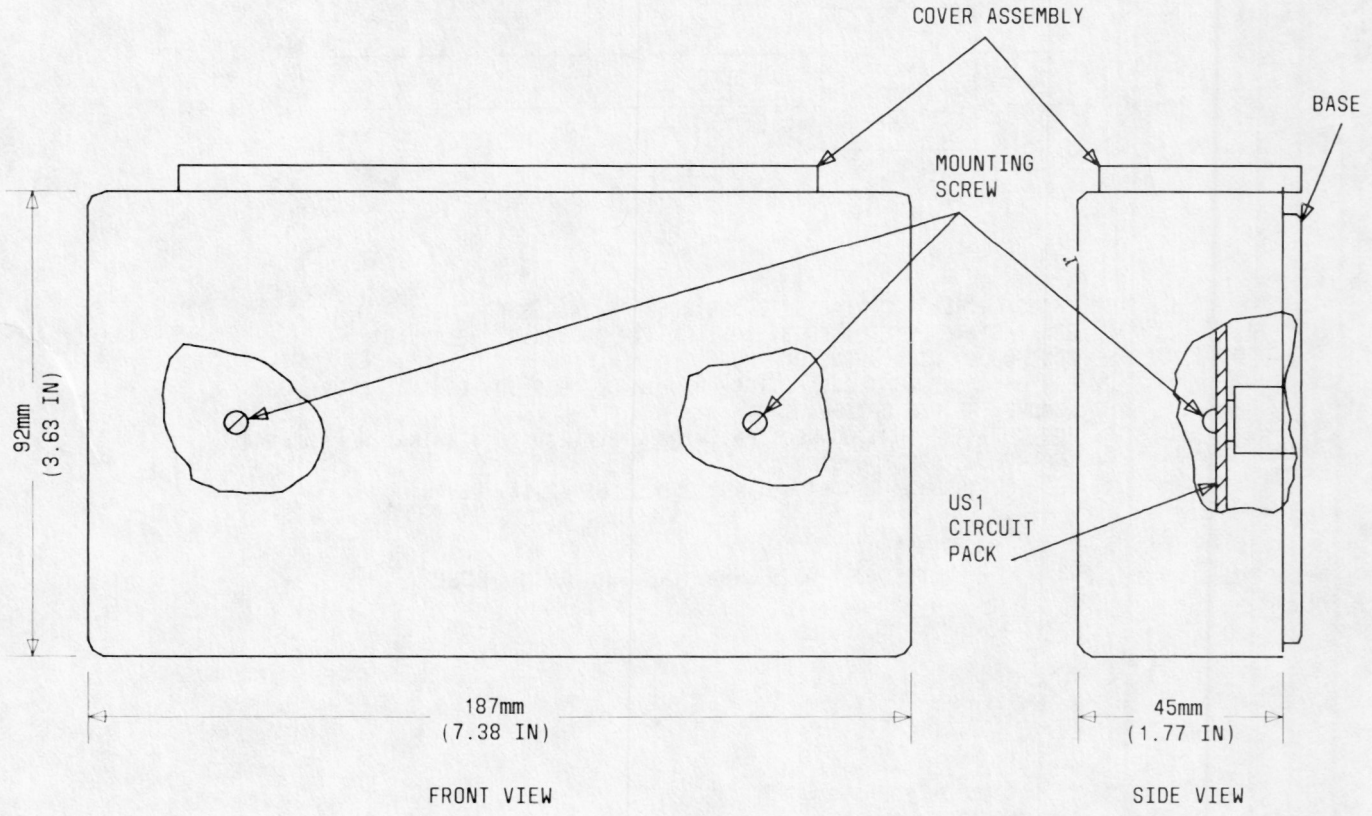
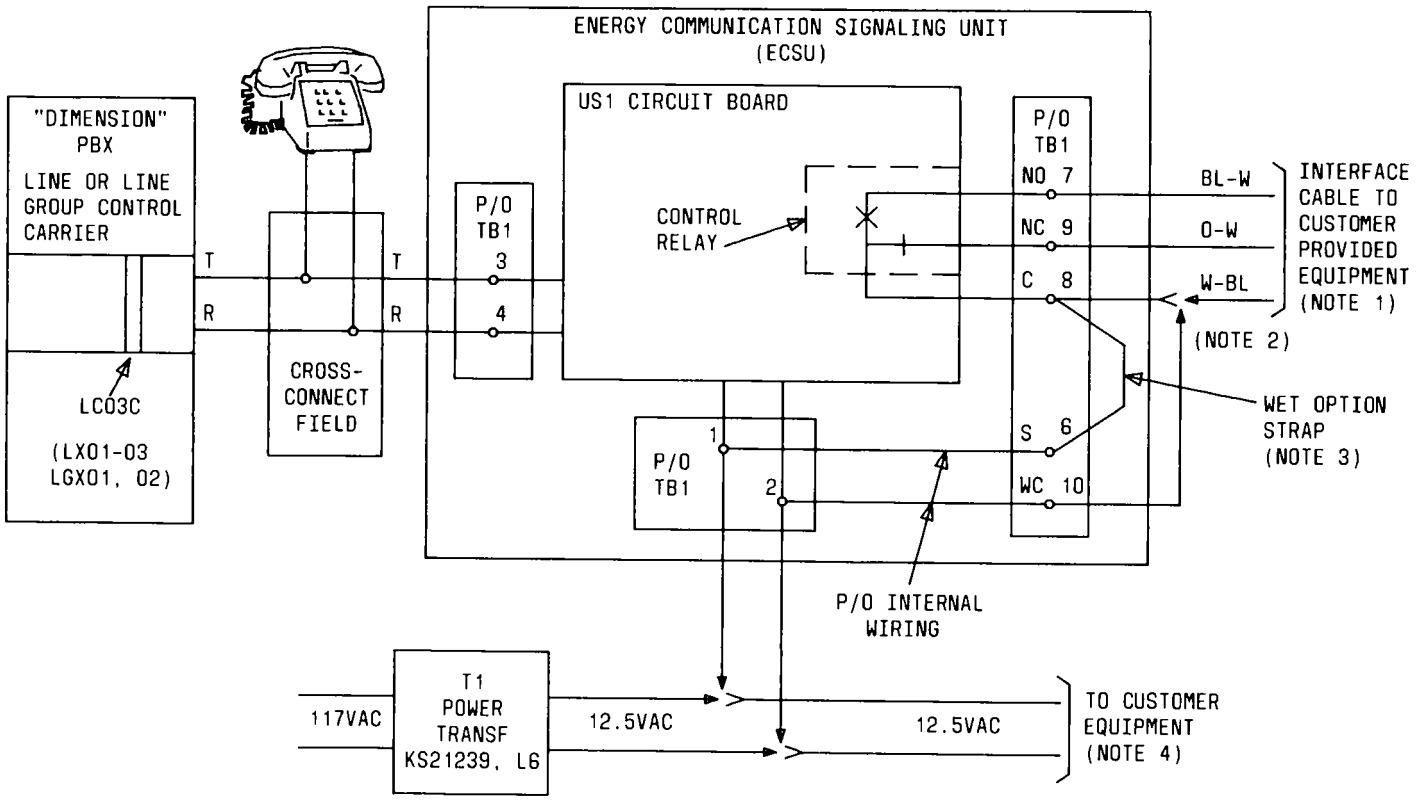


Fig. 84—The Energy Communications Signaling Unit (ECSU)



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. 85—Application Diagram for the ECSU

TABLE P

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	Module Control and Trunk Port Carrier	LC16 (B)	HVAC — 1 per 8 power inputs
J58879BA-2, L19	Trunk Port Carrier	—	Power Input for E/C
J58882GA, L1	Peripheral Interface Circuit (PIC)	HN9	1/HVAC CRT
	PIC Power Supply (part of L1 Unit)	HP2	1/HVAC Printer
Applied Digital Data Model ADDS "REGENT*" 100	CRT Terminal (ECS Console)	—	1 per system
TELETYPE† Model 4310 (Without Keyboard)	Printer (12" 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 Q

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 1)	JOURNAL PRINTER (NOTE 1)
Guest Room Vacant Control	Required	—	—	—	Required	Optional (Note 2)
Guest Room/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 1: Optionally required.

Note 2: This unit can be shared with other FP9 features or dedicated to energy communications.

TABLE R

DATA TERMINALS THAT CAN BE USED WITH PERIPHERAL INTERFACE CIRCUIT (J58882GA)

DESCRIPTION (NOTE)	SUPPLIER	SIZE	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	6-3/4" H X 12-1/2" W X 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	6-3/4" H X 12-1/2" W X 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	7-1/2" H X 13-1/2" W X 13-1/4" D	Wide Format 132 Columns Fanfold
CRT — ADDS-REGENT 100 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
830D Data Set	Western Electric	—	NA

Note: The VICTOR 5011 cannot be used for energy control. TELETYPE 4310 AAC data terminals should be used.

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 the adjunct operation. The MAAP procedures are limited to a minimal number, and interface to RMATS is separate from that of the host PBX.

5.95 Relative to feature package considerations, the ECSA is equipped with a program tape based on FP11 with generic wording. No call processing is provided.

5.96 Additional information concerning the ECSA can be found in descriptive Section 554-106-100 and preinstallation and planning Section 554-106-101.

FORCE ADMINISTRATION DATA SYSTEM (FADS)

5.97 Measured traffic data pertaining to uniform call distribution (UCD) groups may be displayed via the FADS display unit 102G1-A. The FADS display equipment includes:

- One 211A power unit
- One KS-19242, List 7 display adapter
- One LC34B or LC366B data channel circuit pack
- One (optional) ADDMASTER* printer (No. 9042-2).

*Registered trademark of Addmaster Corporation

TABLE S

HOTEL/MOTEL OR HOSPITAL FP9 AND FP11 PRINTER APPLICATIONS INCLUDING ENERGY COMMUNICATIONS SERVICE AND CIPMS FEATURES

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 S (Contd)

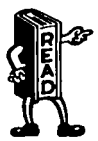
HOTEL/MOTEL OR HOSPITAL FP9 AND FP11 PRINTER APPLICATIONS INCLUDING ENERGY COMMUNICATIONS SERVICE AND CIPMS FEATURES

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 Discharge 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.

5.98 The KS-19252, List 7, adapter is a wall-mounted unit providing connections for:

- The display unit
- Printer mounting cord plug
- 211A power unit
- PBX data channel.

Refer to Fig. 86 for interconnection information. Worksheet 18 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 power unit to a 117-Vac power outlet.

LOUDSPEAKER PAGING (BASIC AND DELUXE)

5.99 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 key (for direct access) is provided for each of up to six zones or all zones within a customer complex. The 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 is available.

5.100 The equipment required for loudspeaker paging is as follows:

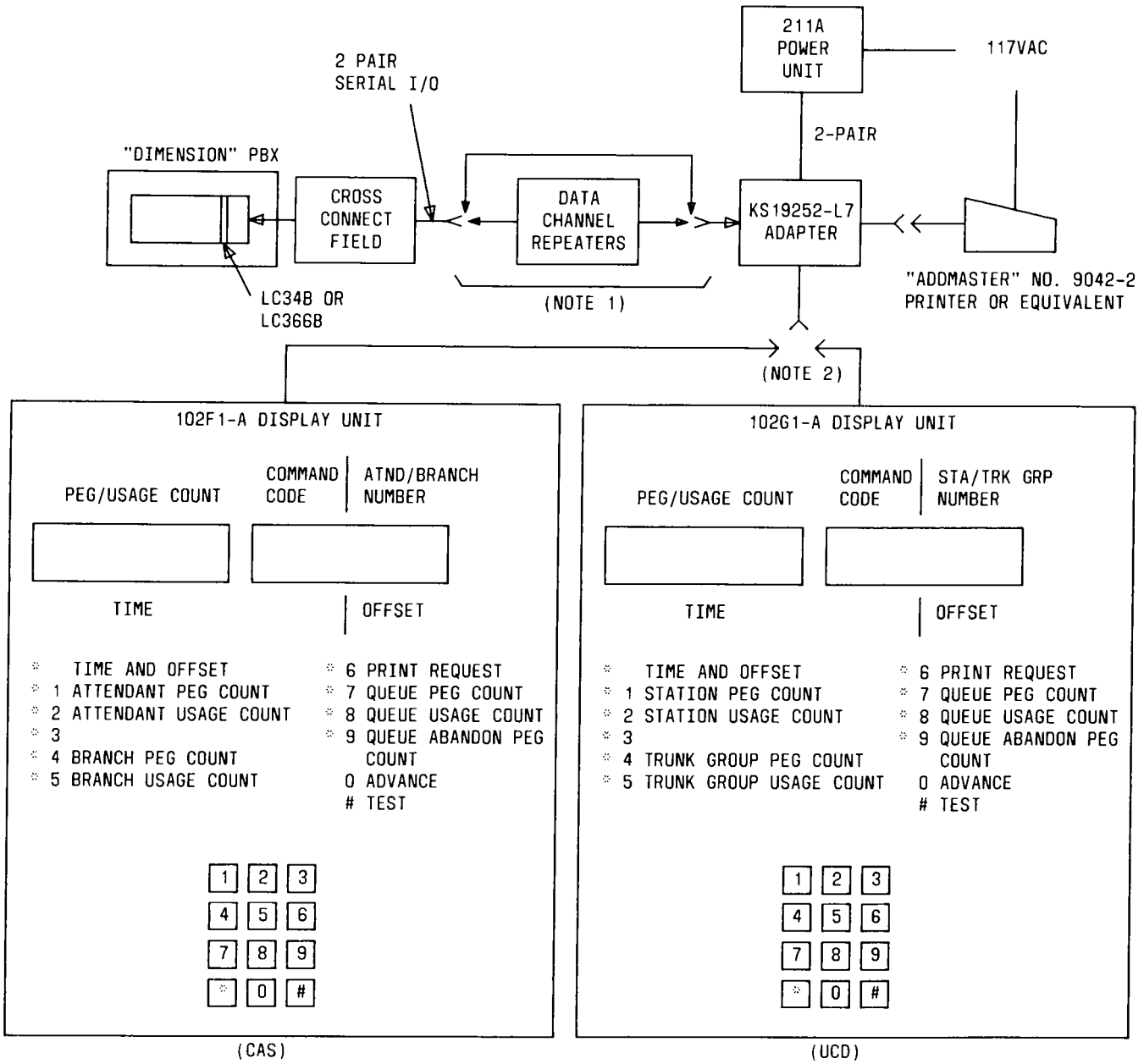
- LC13B auxiliary trunk interface circuit pack (two circuits per circuit pack; one circuit per paging zone)
- 89A control unit (one per paging zone)
- 2012B power transformer (one per three 89A control units).

5.101 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 signals.
- Provides the user with capability to "busy out" the control unit.
- 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.

5.102 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.

5.103 If several zones are to be used for paging (maximum of six), one 89A control unit must



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. 86—Equipment Arrangement for FADS Display for CAS and UCD

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) allowing the paged party to be connected to the calling party.

5.104 The answer-back channels for deluxe loudspeaker paging are always provided, regardless of the number of paging zones.

5.105 Up to three LC13B auxiliary circuit packs can be cross-connected to paging equipment allowing for the maximum of six paging zones. Connections for loudspeaker paging are illustrated in Fig. 87. Worksheet 19 is provided to be used in filling in cross-connection information for loudspeaker paging.

LOUDSPEAKER PAGING WITH CHIME PAGING AND MUSIC BACKGROUND

5.106 Loudspeaker paging can also be provided with chime paging and music background. The additional equipment required for this arrangement is as follows:

- LC17B tone plant C circuit pack
- 89A control unit.

5.107 Background music may be provided at all times when desired by 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.

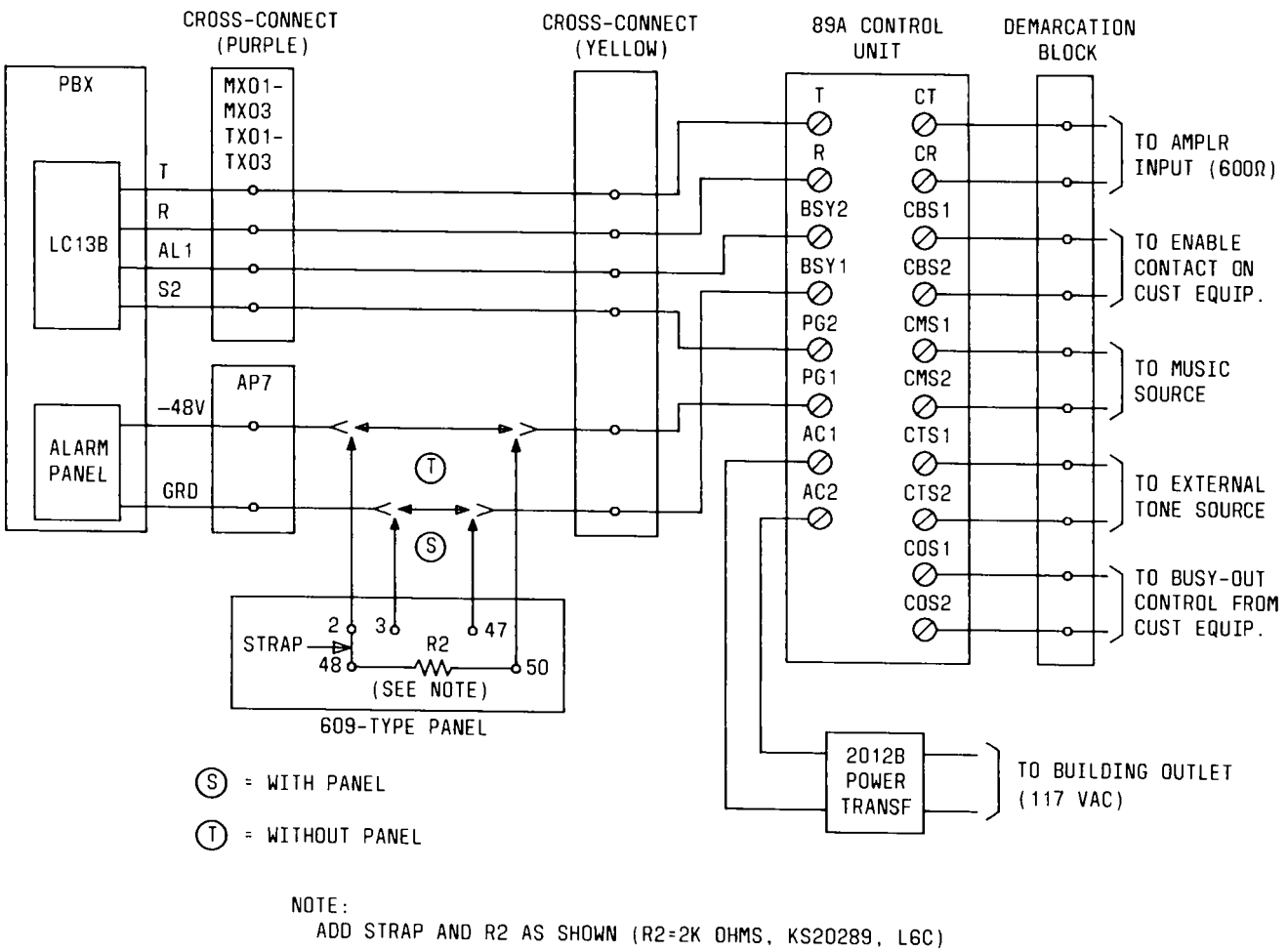


Fig. 87—Loudspeaker Paging Connections

5.108 Connections for loudspeaker paging with chime paging and music background are illustrated in Fig. 88. Worksheet 20 is provided for cross-connection fill-in information for loudspeaker paging with chime paging and music background.

5.109 Power to the 89A control unit for loudspeaker paging is provided from a commerical 117-Vac outlet.

MUSIC ON HOLD

5.110 The music-on-hold feature provides music or some other audible indication to the held party during the hold period. The 31D voice coupler is used for transmission of music via an auxiliary trunk circuit pack (LC13B), which provides 1-way reception for the music. 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. Maximum dc line current is 150 mA. The 31D coupler dimensions are 102 mm (4 inches) long by 70 mm (2-3/4 inches) wide by 51 mm (2 inches) high, and should be wall-mounted near the termination field. For more descriptive information on the 31D voice coupler, refer to CD- and SD-69613-01. 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. 89. Worksheet 21 is a fill-in worksheet to be used at time of installation.

PACKAGED METALLIC FACILITY TERMINAL ASSEMBLIES (PMFTA)

5.111 The PMFTA may be used in place of the CPFT equipments which are rated "MD." 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. A typical cross-connection information for the Packaged Metallic Facility Terminal Assemblies and DIMENSION PBX is shown in Fig. 90. Refer to Sections 332-610-101 and 332-610-102 for detailed informations on the PMFTA.

PERIPHERAL INTERFACE CIRCUIT (PIC)

5.112 The PIC is a standalone unit containing a controller which converts bipolar PBX signals into a form which can drive an input/output peripheral device. The unit also contains a power supply, two 25-pin EIA serial data connectors, and an interface circuit. The PIC is required with FP9 to provide a communication link between the LC366B or LC34B circuit pack in the PBX and a commercial peripheral device such as a printer, teletypewriter, TSPS Auto-Quote system for long distance billing, or the communications interface for property management system (CIPMS).

5.113 The unit is mounted in a data set housing (Fig. 91) and requires the associated cord assemblies as shown. The main terminal connections for SX01, SX02, and SR01 are provided in Fig. 92. The various data terminals which can be used with the peripheral interface circuit are listed in Table R. A summary of printer applications is provided in Table S. Worksheet 22 is a fill-in worksheet to be used to provide connections to a PIC unit.

5.114 Power to the PIC and associated equipment such as the TELETYPE* teleprinter VICTOR† printer, video terminal, and data set are provided from a commercial (ac) outlet.

5.115 The following rules apply to printer use:

(a) Audit trail and demand print functions should not share the same printer.

(b) 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).

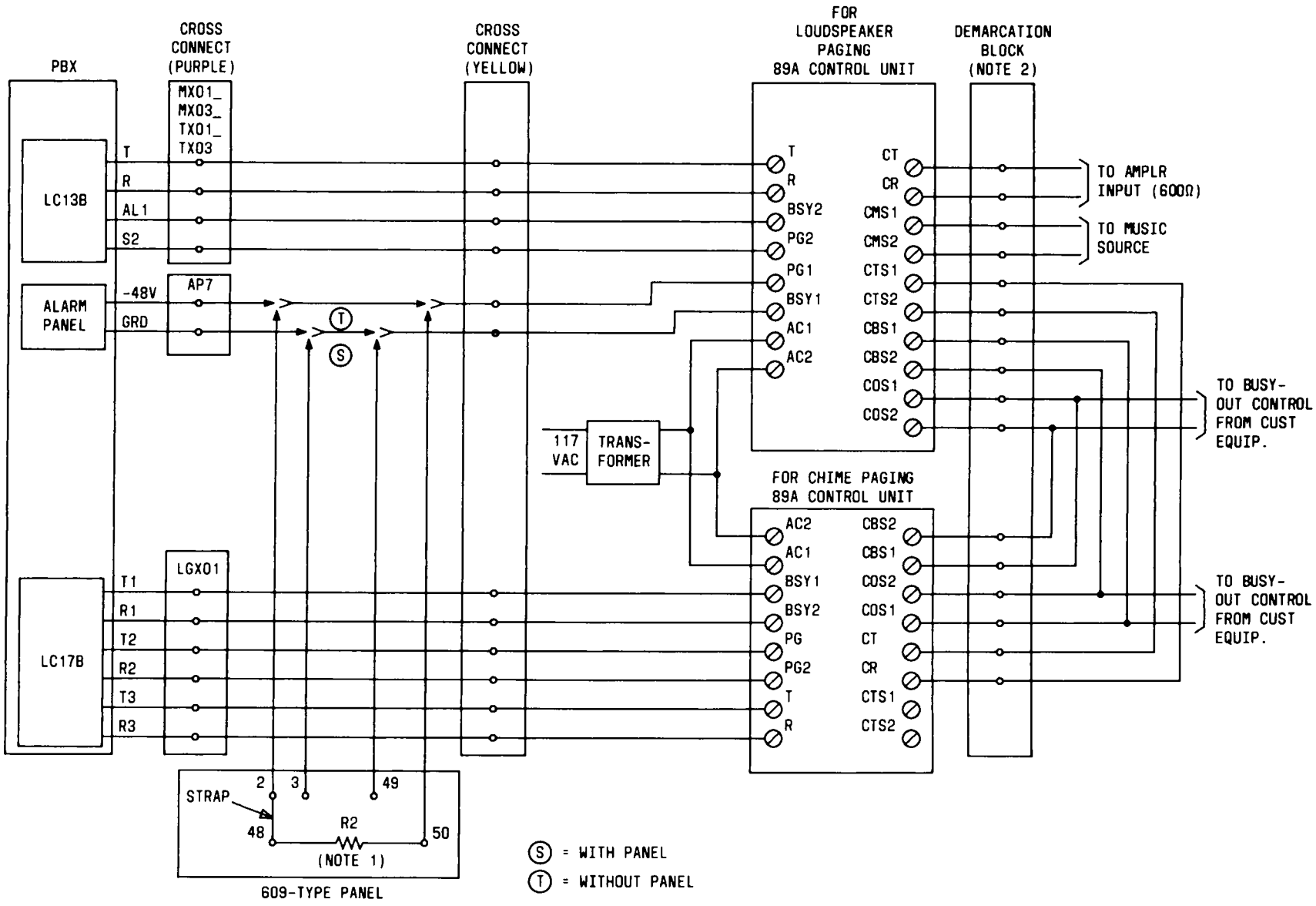
(c) Any of three printer choices can be used for any of the print functions (VICTOR 5011, 5011-023, and TTY 4320). Energy communications service print functions will require the wide format TELETYPE Model 4310 terminal.

(d) The VICTOR-Friction Drive-Narrow format printer uses less expensive paper and is suitable where accurate registration with formatted paper is not required.

(e) Cables for connecting printers to the PBX cabinet are available in lengths up to 305 meters (1000 feet). This distance (in cable feet) can be extended to 3353 meters (11,000 feet) by using a maximum of four data channel repeaters. An additional 15 meters (50 feet) may be added to this

*Registered trademark of Teletype Corp.

†Registered trademark of Victor United Inc.



NOTES:
1. ADD STRAP AND R2 AS SHOWN (R = 2K OHMS, KS20289, L6C)
2. CUSTOMER EQUIPMENT MUST ALWAYS BE ON.

Fig. 88—Loudspeaker Paging With Chime Paging and Background Music

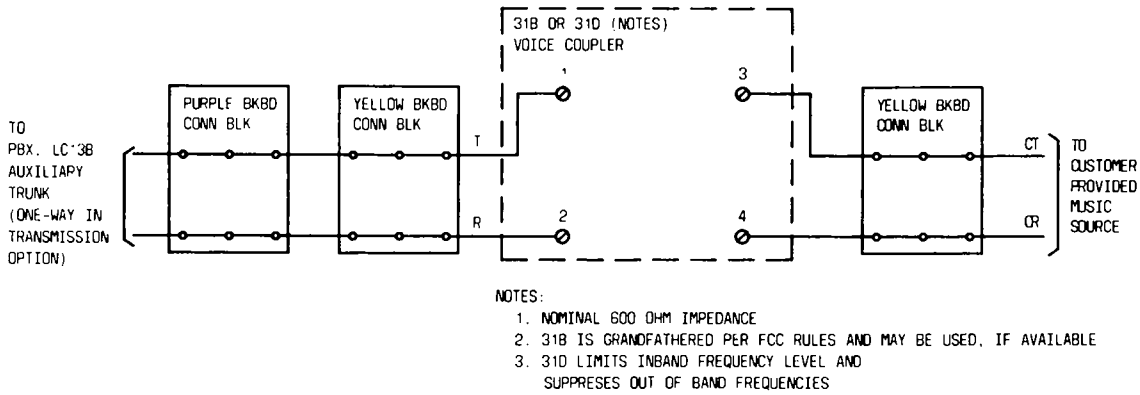
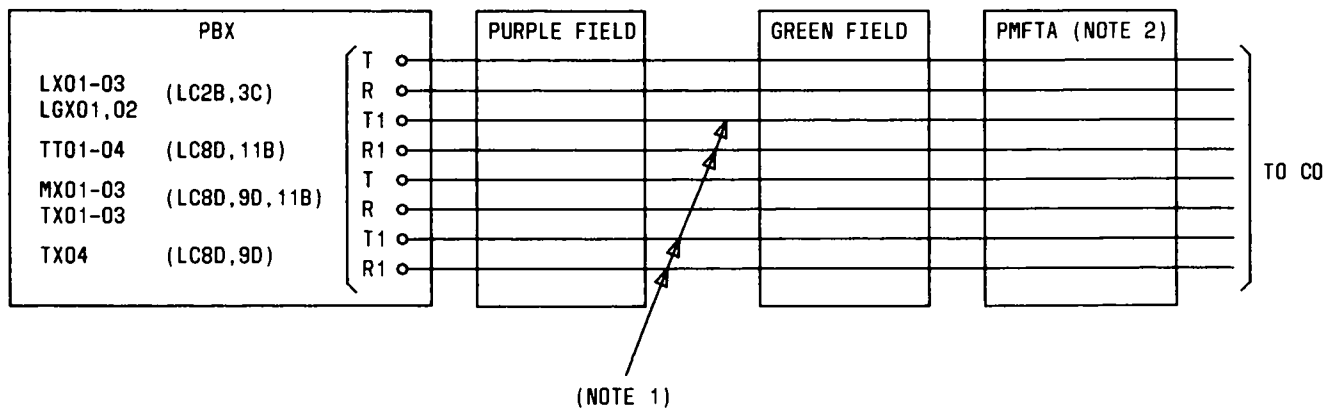


Fig. 89—Music-on-Hold Interface



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. 90—Packaged Metallic Facility Terminal Assemblies (PMFTA)

distance via the PIC unit at the end of the connecting cable.

RADIO PAGING ACCESS

5.116 The radio paging access feature provides attendant and station users dial access to customer-owned and maintained (COAM) radio paging equipment. The attendant or station user may 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.

5.117 The equipment required to provide radio paging access is as follows:

- Two LC08D dual CO trunk circuit packs
- J58824CD interface trunk unit (Lists 2, 7, 9, 10, 12, 16, and 17)
- J59204CA-L1 TOUCH-TONE calling receiver unit (G1)
- J58847Y, Lists 3 and 4 assembly, wiring, and electronic dial unit

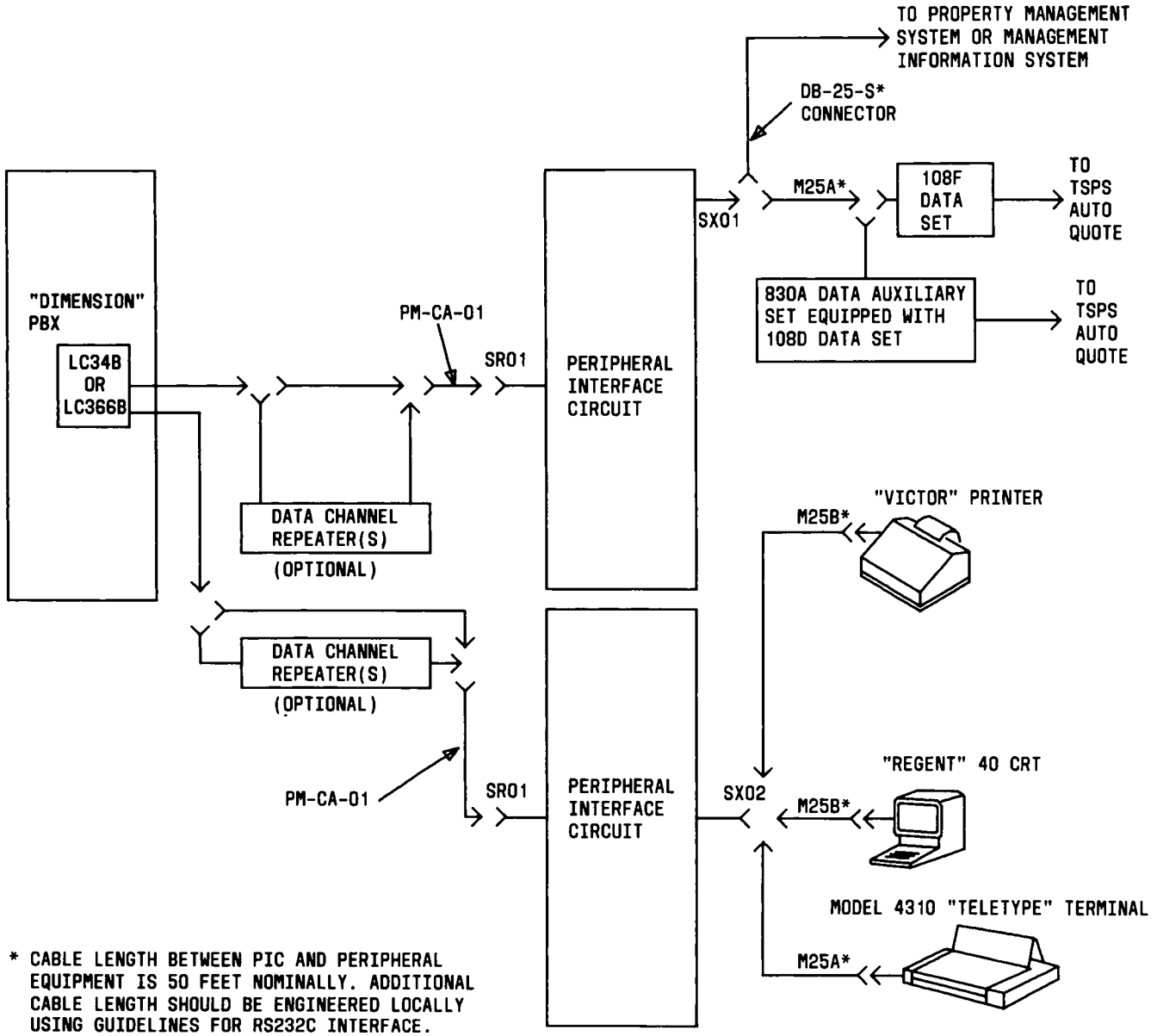


Fig. 91—Peripheral Interface Circuit (PIC) and Typical Connections

- 31D voice coupler (not required when interface trunk unit is wired for 1-way transmission).

The radio paging equipment units may be one of several combinations of J codes depending on PBX service.

5.118 The interface trunk unit has two incoming ports and two answering 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 to dial pulse conversion. The central office trunks connected to the answer ports are encoded 1-way outgoing with TOUCH-TONE service operation only.

5.119 Connections to the customer-owned and maintained (COAM) equipment are made via the cross-connect field and the 31D voice coupler

CONNECTOR	PIN	LEAD DESIG	DESTINATION
SR01 (CONN BURNDY SMS6R-1	1 2 3 4	IOXB IOXA IORB IORA	BX01, BX02, GX01, GX02 (LC34B, LC366B)
SX01 (PLUG KS-19087,L6)	1 2 3 4 5 6 7 8 20	— TXD RXD RTS — DSR SIG GRD DTR DTR	DATA SET 108F
SX02	1 2 3 4 5 6 7 8 20	— RXD TXD — DTR DTR SIG GRD DSR DSR	"VICTOR" 5011 PRINTER, "TELETYPE" 4310 ACC PRINTER, OR ADDS "REGENT" 100 CATHODE RAY TUBE

Fig. 92—Peripheral Connectors SX01, SX02, and SR01

unit. 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.

5.120 A functional diagram of the radio paging access connection is illustrated in Fig. 93. The interface trunk unit provides for several wiring options for various PBXs, but some modification has been made to the radio paging access unit to allow for connection to the DIMENSION PBX. The tip and ring leads are coupled to the customer-provided equipment via the 31D voice coupler unit whenever 2-way transmission is provided.

5.121 Detailed wiring connections for radio paging access are illustrated in Fig. 94, 95, and 96. Figure 94 illustrates the connections from the PBX cross-connect field to the interface trunk unit terminal strip. Figure 95 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 strip. Figure 96 illustrates the cross-connections from the fuse panel to the interface trunk unit terminal strip and the connections for the Z or ZZ wiring option.

When the Z or ZZ option is used, the 31D voice coupler must be the tip and ring leads between the interface trunk and the demarcation block. The Z option provides for receiving only from the COAM equipment. The ZZ option provides for 2-way transmission. Option Y provides for transmission only to the COAM equipment. The 31D voice coupler is not required to be connected to T and R leads when option Y is used.

5.122 Worksheet 23 is a fill-in worksheet for radio paging access connections.

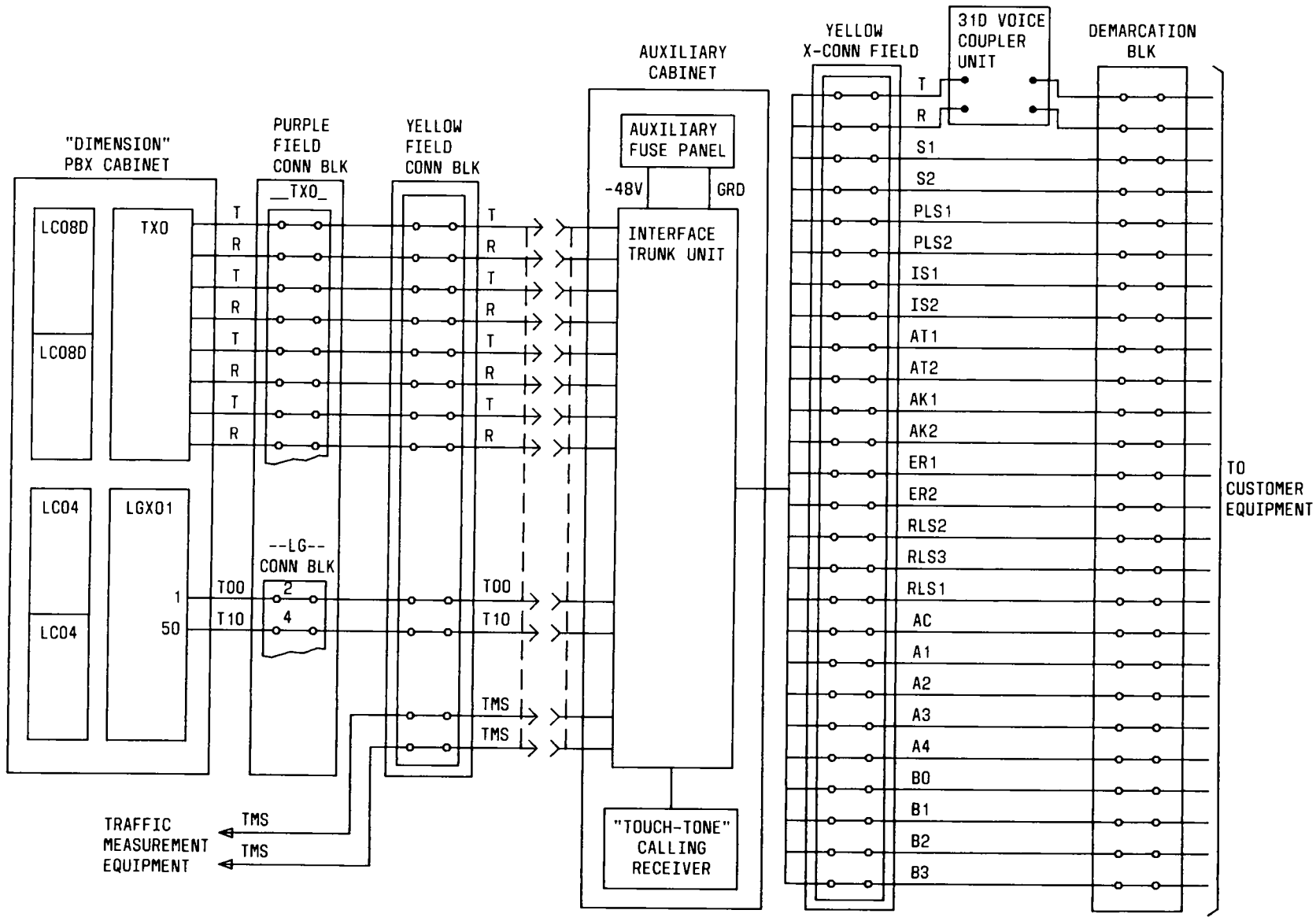


Fig. 93—Functional Diagram of Radio Paging Access Connections

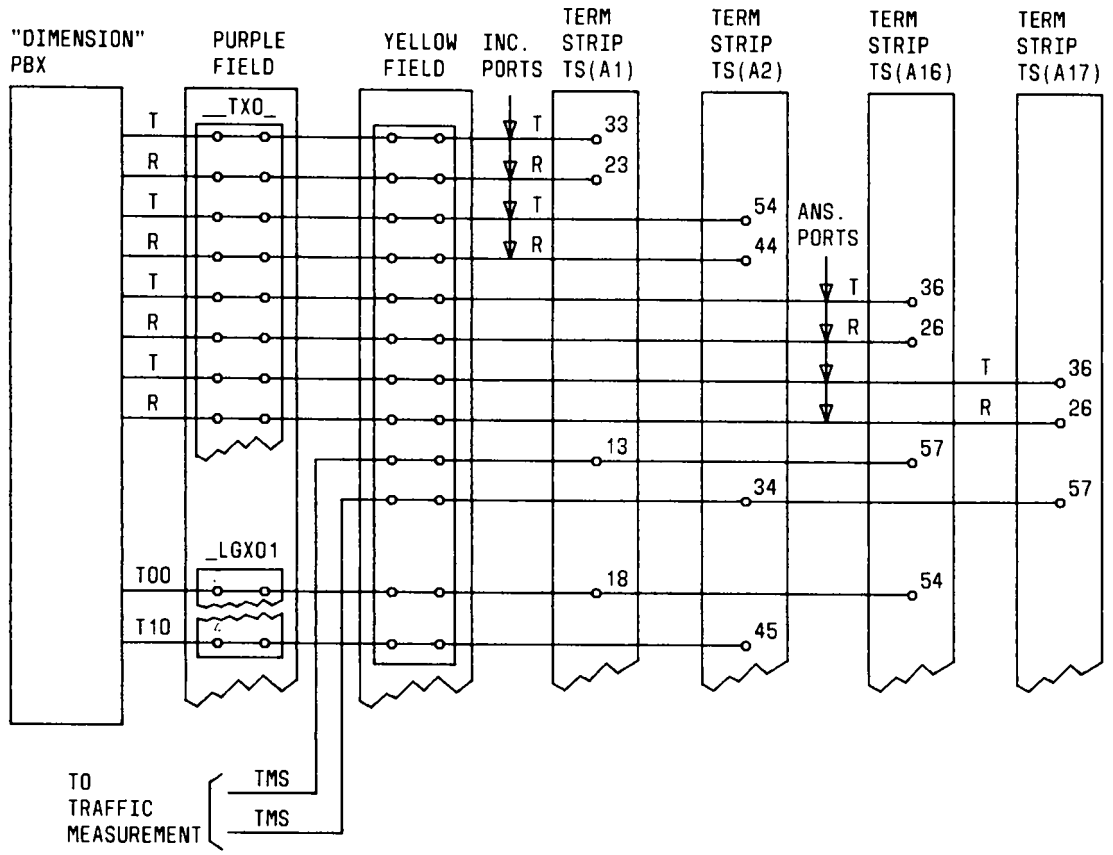


Fig. 94—Connections From DIMENSION PBX Cross-Connect Field to Radio Paging Interface Trunk Unit

RECORDED ANNOUNCEMENT UNIT

5.123 Incoming calls are intercepted and routed to a recorded message which indicates to the caller the reason for the interception. This intercept treatment is an alternative to attendant intercept or the intercept tone for DID and CCSA trunk calls. Only one message can be given.

5.124 The recorded announcement equipment consists of the following:

- LC13B—Auxiliary trunk interface circuit pack
- H400-107, List 1—Assembly, equipment, and cords for one announcement set.

5.125 An H400-107, List 4, is required in addition to List 1 when a KS-20449, List 1 amplifier is needed for the announcement set. Required hardware and connections from the PBX to the KS-16765 announcement set (via the 31D voice coupler unit) are shown in Fig. 97. Worksheet 24 is a fill-in worksheet to be used to provide cross-connection information for recorded announcement.

5.126 Whenever the fuse panel is not provided as part of the auxiliary cabinets, the ground leads from the announcement unit can be connected to spare terminals on the ACTS11 located on the ac power distribution unit.

RECORDED TELEPHONE DICTATION TRUNK

5.127 The recorded telephone dictation trunk allows access to and control of customer-owned dictation equipment (via the 31D voice coupler unit) by station users within the PBX system. The start

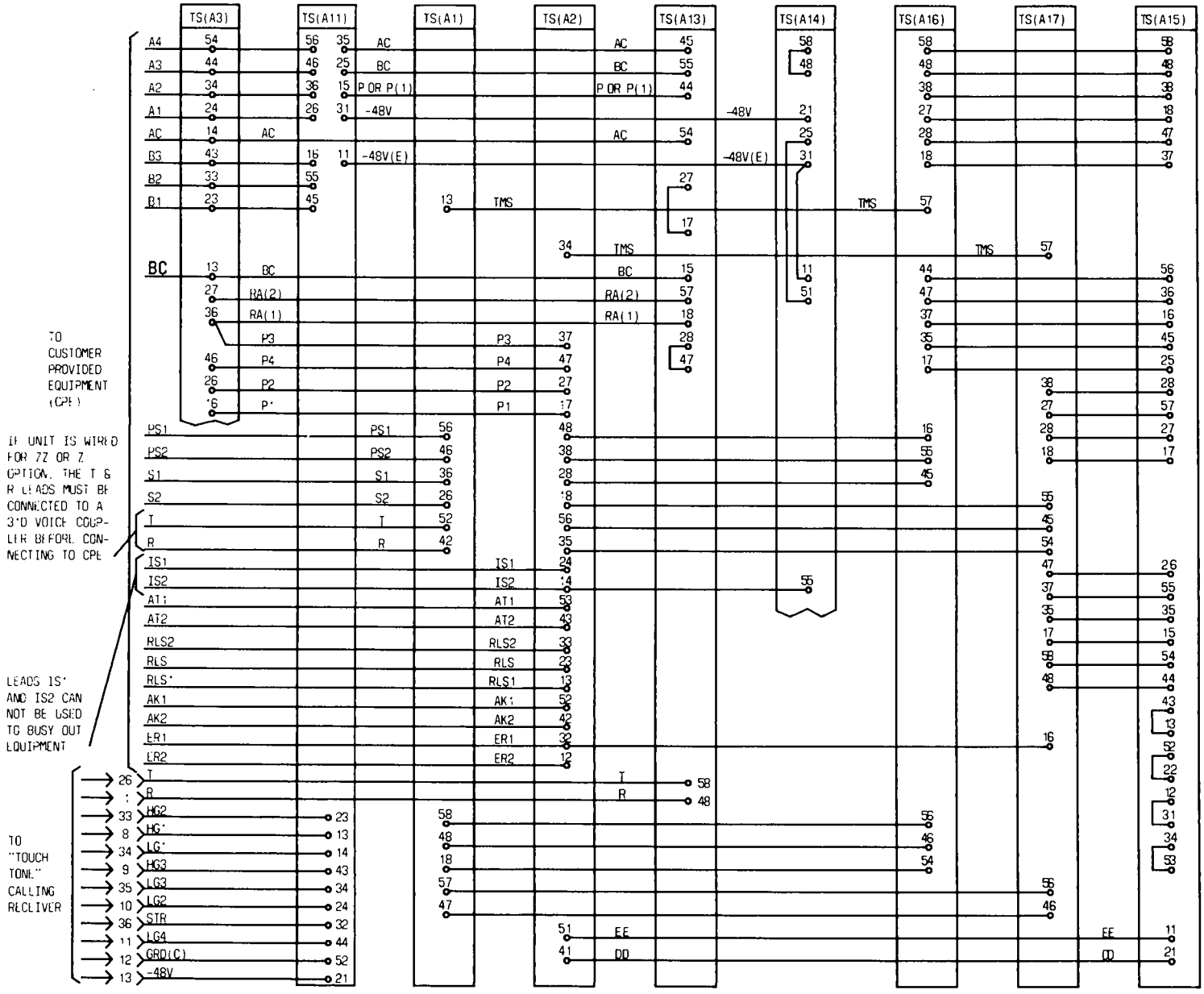
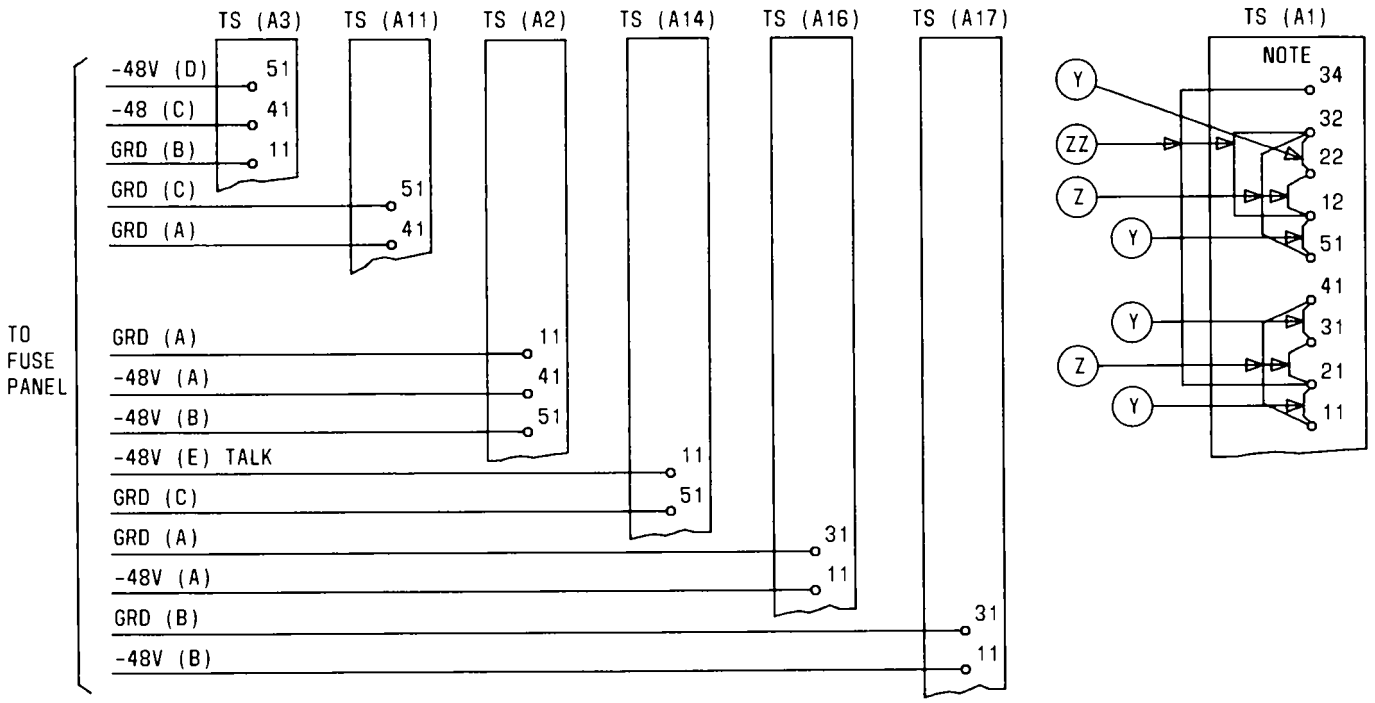


Fig. 95—Connections From the TOUCH-TONE Calling Receiver and the Customer-Provided Equipment to the Interface Trunk Unit Terminal Strips and Other Terminal Strip Connections



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. 96—Connections From the Fuse Panel to the Interface Trunk Unit for Radio Paging Access

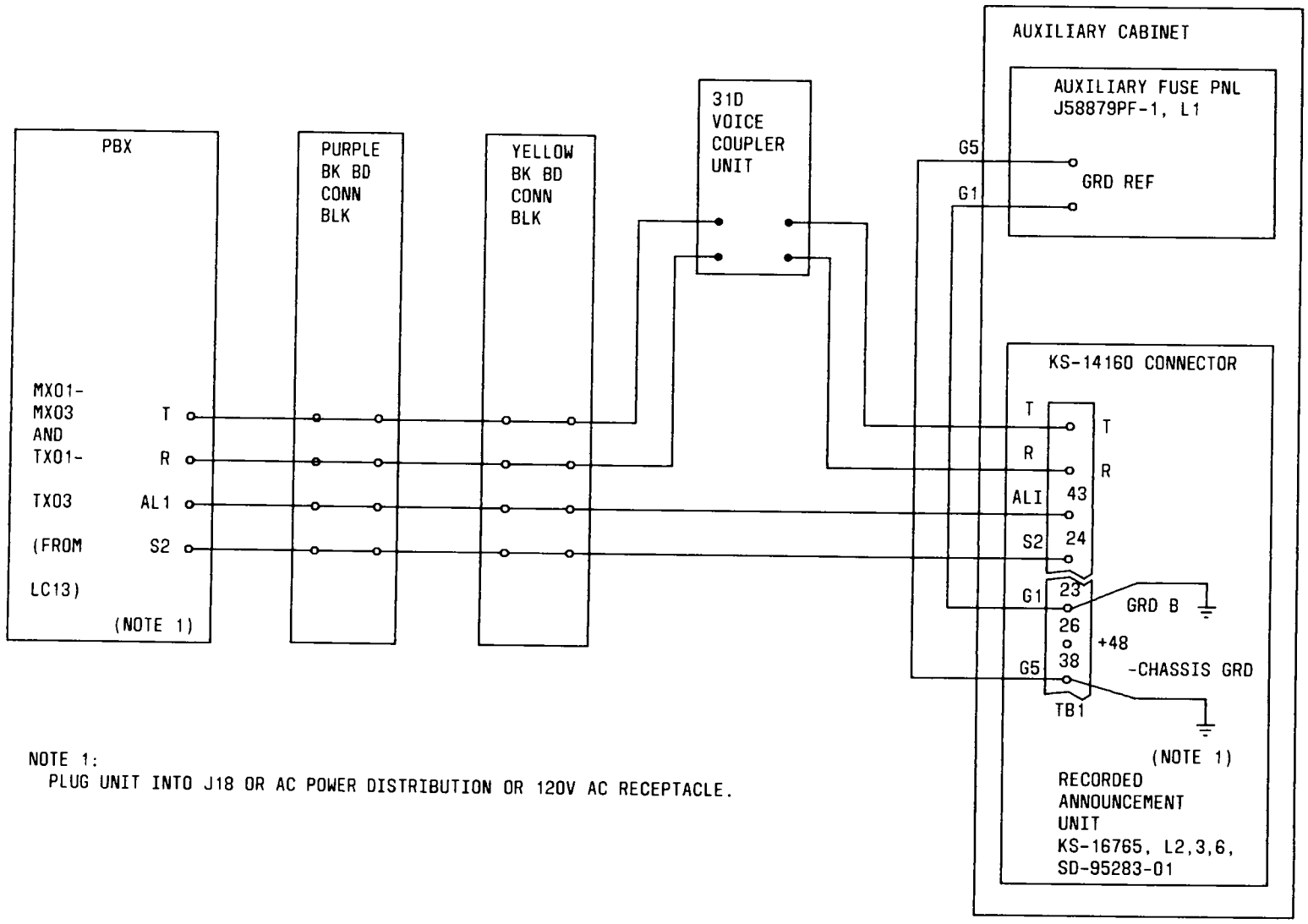
and stop functions of customer-owned telephone dictating equipment may be voice-controlled or dial-controlled. The record and playback functions are dial-controlled. Figure 98 is a block diagram illustrating recorded telephone dictation trunk connections.

5.128 The equipment required for recorded telephone dictation access is listed in Table T. The recorded telephone dictation trunk is compatible with the A3 or the G1 TOUCH-TONE calling receivers. If the A3 receiver is used, the associated cable is connected to terminal strip TS(D). If 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 4 by 4 TOUCH-TONE dialing operation (A3 receiver) is required, lead HG4 must be connected to terminal TS(D). Figure 99 illustrates the wiring connections for recorded telephone dictation access.

5.129 Whenever the TOUCH-TONE dialing capacity is exceeded, it may become necessary to mix TOUCH-TONE calling inputs and dial pulse inputs. If this occurs, two separate trunk groups and two access codes are required in order to access the telephone dictation trunk.

5.130 Wiring options for recorded telephone dictation access is given in Table U. Worksheet 25 is a fill-in worksheet to be used to provide cross-connection information at installation.

5.131 In Fig. 100, terminal strip C illustrates the ZP option which is provided by SD-5E038-01, Issue 3B or later. The capacitor provided by this option is coded as 542G. If straps are provided on TS(A)



NOTE 1:
PLUG UNIT INTO J18 OR AC POWER DISTRIBUTION OR 120V AC RECEPTACLE.

Fig. 97—Recorded Announcement Unit

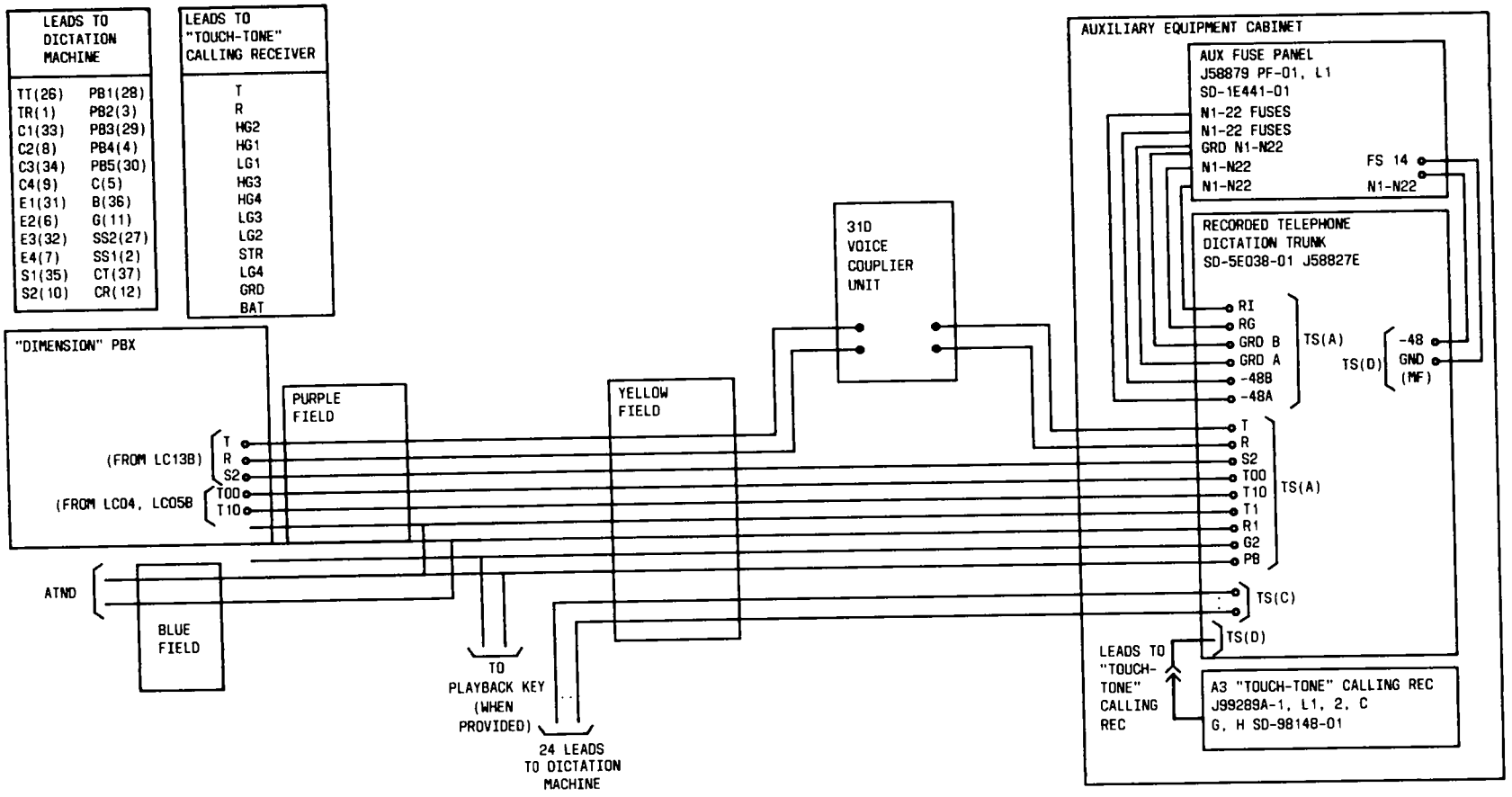


Fig. 98—Block Diagram of Recorded Telephone Dictation Trunk Connections

TABLE T

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.

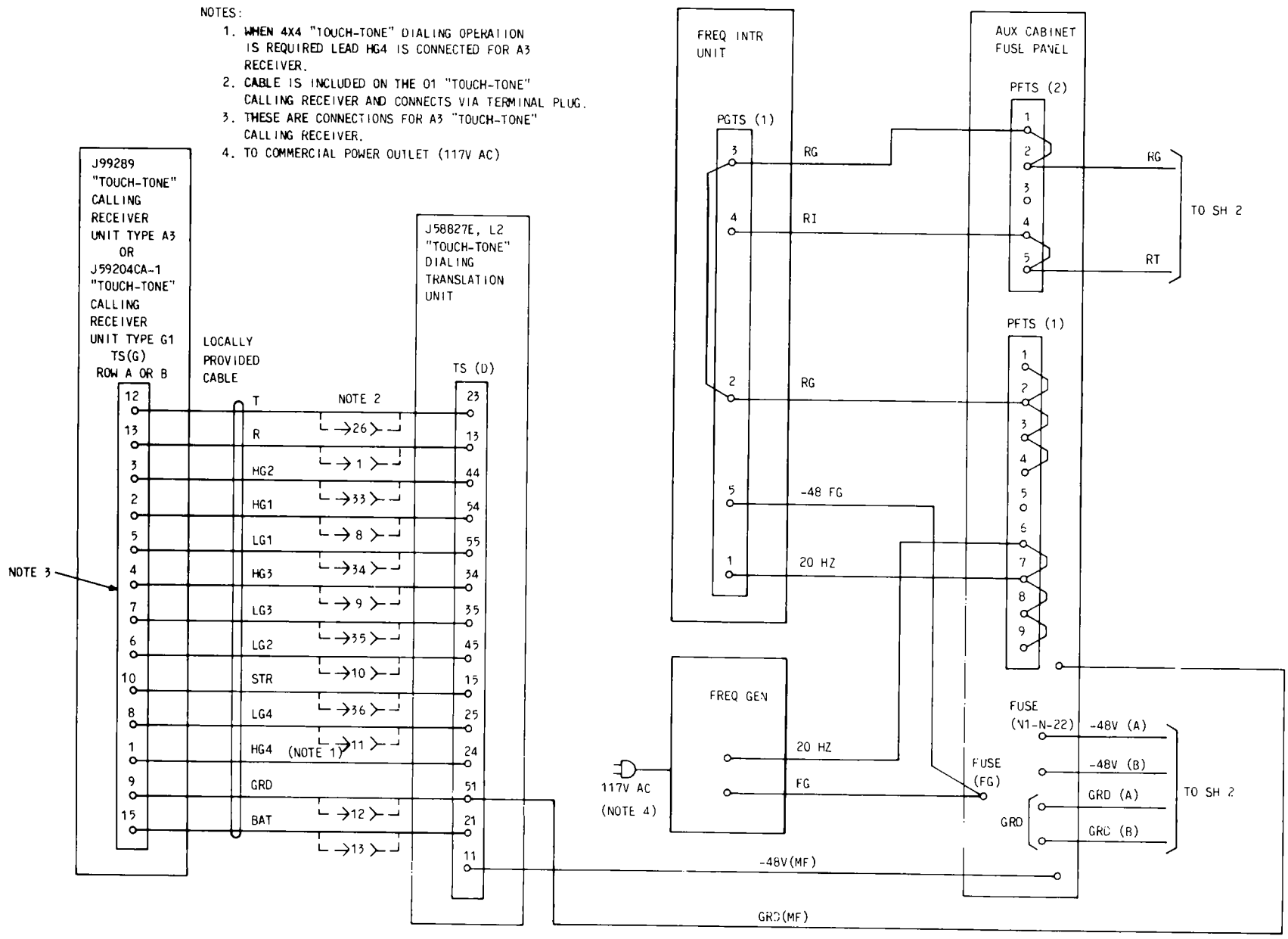
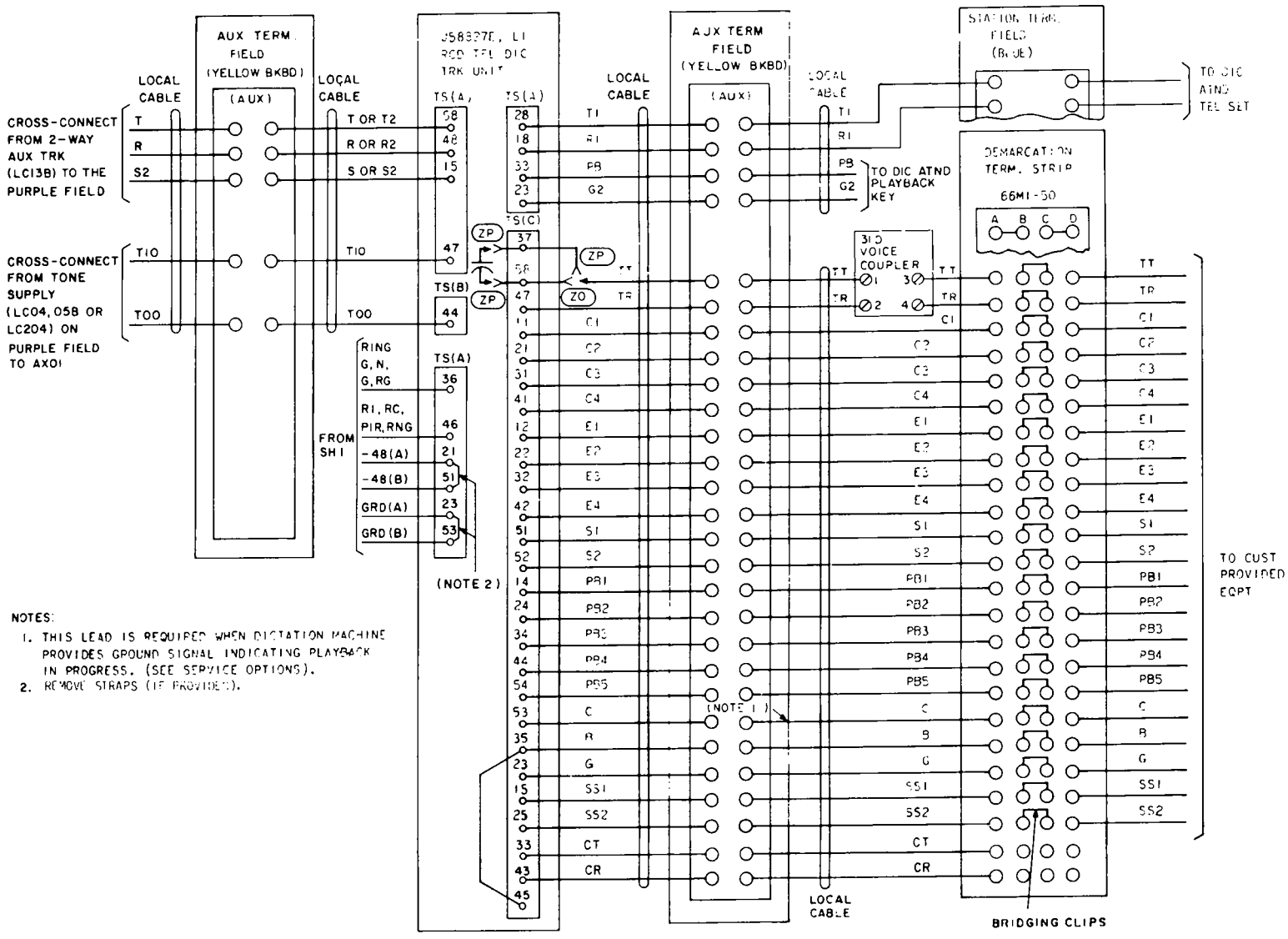


Fig. 99—Detailed Connections for Recorded Telephone Dictation Trunk (Sheet 1 of 2)



NOTES:

1. THIS LEAD IS REQUIRED WHEN DICTATION MACHINE PROVIDES GROUND SIGNAL INDICATING PLAYBACK IN PROGRESS. (SEE SERVICE OPTIONS).
2. REMOVE STRAPS (IF PROVIDED).

Fig. 99—Detailed Connections for Recorded Telephone Dictation Trunk (Sheet 2 of 2)

TABLE U

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.

between terminals 21-51 and between terminals 23-53, the straps must be removed.

REMOTE MAINTENANCE, ADMINISTRATION, AND TRAFFIC SYSTEM (RMATS-1)

5.132 The remote maintenance, administration, and traffic system 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.

5.133 All feature packages are compatible with RMATS-1. Traffic studies and structures may be flexibly administered in the PBX and automatically polled by the RMATS-1 central facility (Fig. 100).

5.134 In order to function with the RMATS-1 central facility, the 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. An LC171B and LC172B circuit pack must be installed in basic control carrier slots 31 and 30, respectively (replacing the LC34B circuit pack). Whenever the control-growth carrier is used, circuit packs LC171B and

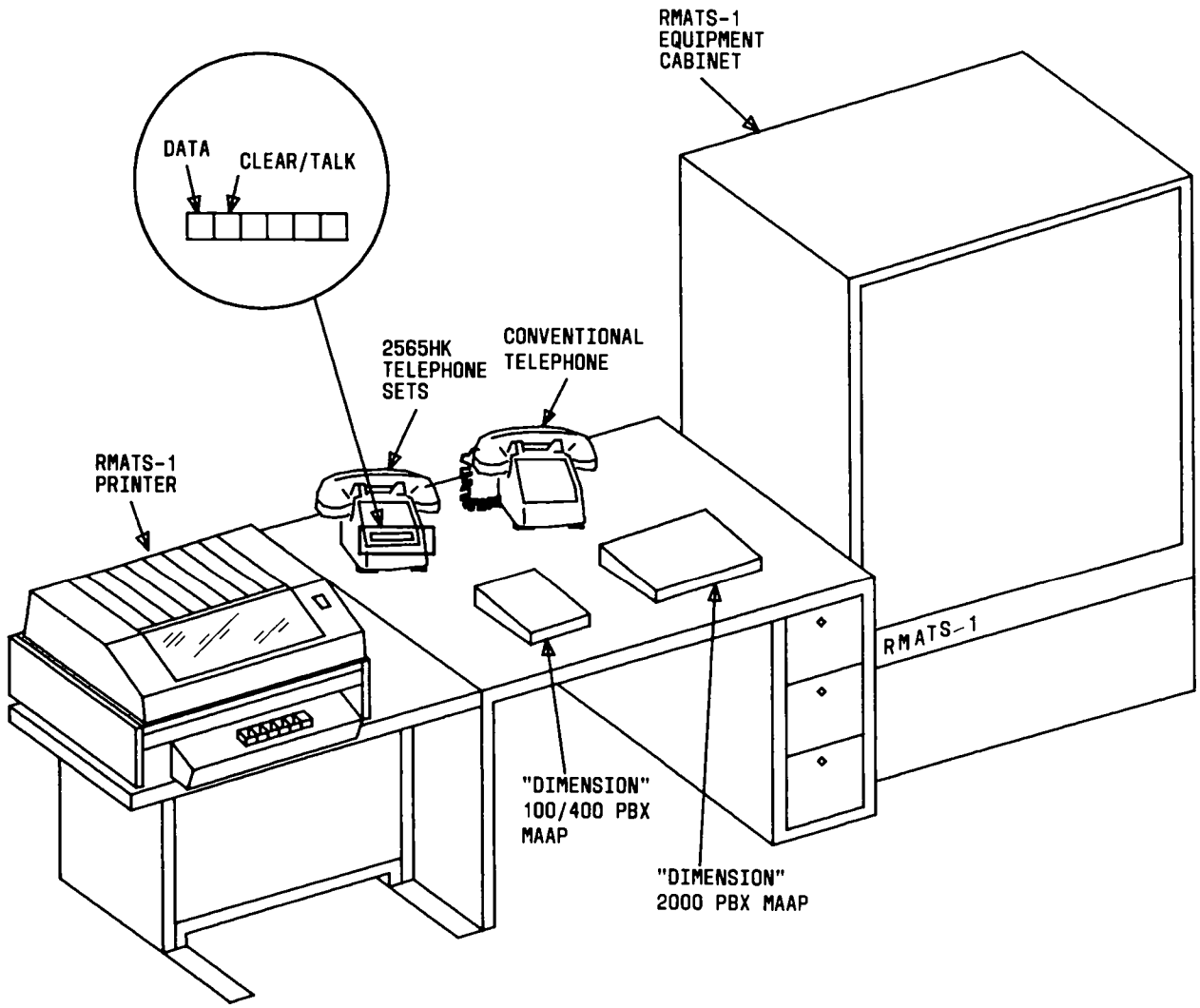


Fig. 100—RMATS-1 Equipment

LC172B must be installed in slots 31 and 31/35, respectively (replacing circuit pack LC366B). A DIP base containing strap wires is inserted into the DIP socket on LC171B to connect the circuits for 2400 baud data transmission (required for RMATS).

5.135 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.

5.136 The RMATS-1 interface equipment required for a DIMENSION PBX includes the following:

- One 113D or 113DR data set
- One 47-type data set mounting
- One LC171B circuit pack
- One LC172B circuit pack.

5.137 The data set and data mounting should be located no more than 46 cable meters (150 cable feet) from the PBX. The location should permit connection of the interface cable to the processor as well as 120-Vac 60-Hz power to the data set. RMATS interface equipment is shown in Fig. 101. For additional RMATS information, refer to Section 554-010-130.

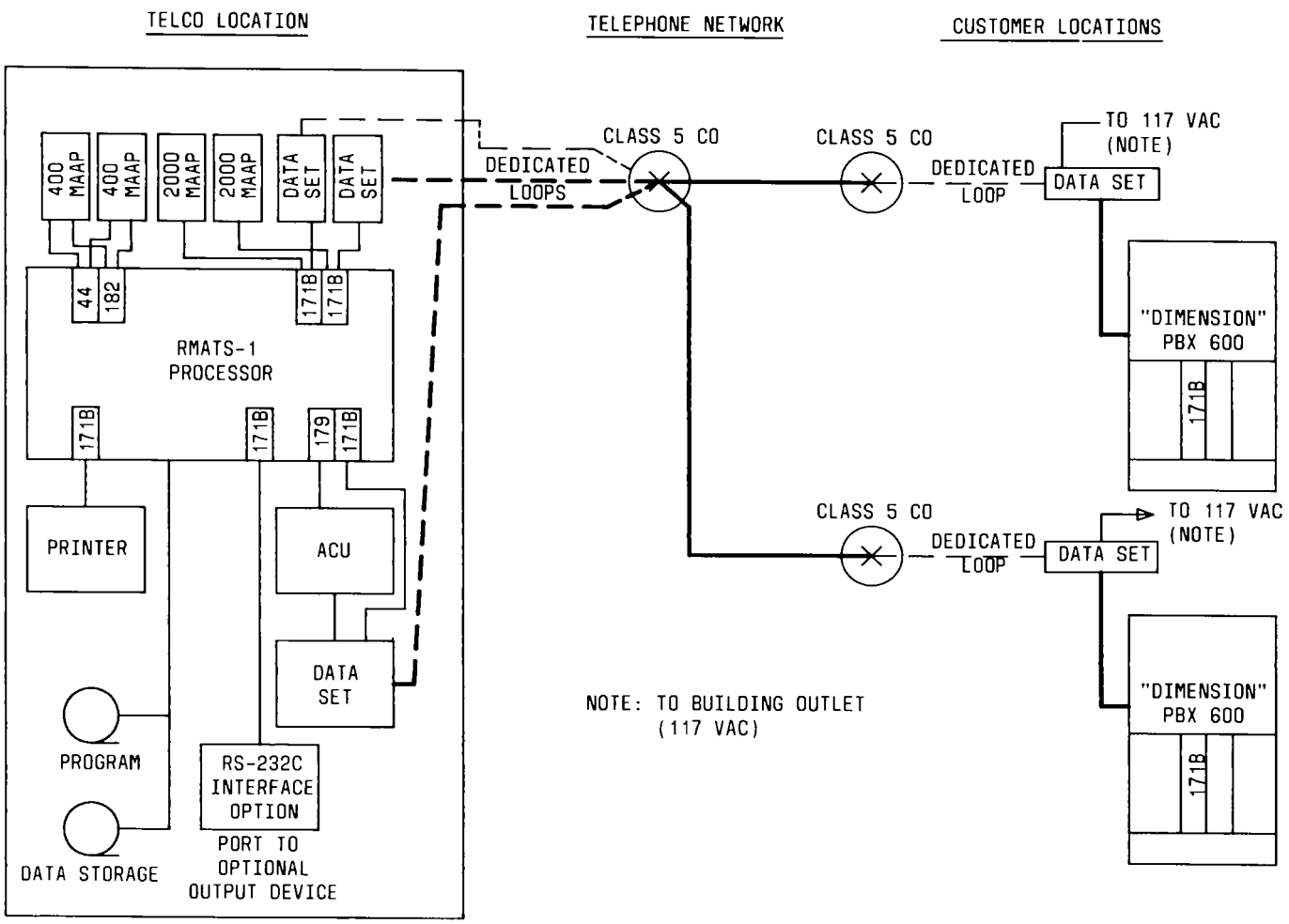


Fig. 101—RMATS-1 Functional Block Diagram

44V4 REPEATER

5.138 When a 44V4 repeater is used, DX signaling must be used. When −48V is used to power the 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. 102.

24V4 REPEATER

5.139 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. An example of the 24V4 repeater connections is shown in Fig. 103.

5.140 Figure 104 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. Worksheet 26 is to be used for connections of the 44V4 and 24V4 repeaters in the auxiliary cabinet.

STATION MESSAGE DETAIL RECORDING (SMDR)

5.141 Station message detail recording provides a record of the PBX station (or attendant) identity, starting time, 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 are also 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. Three optional wiring connections for SMDR are

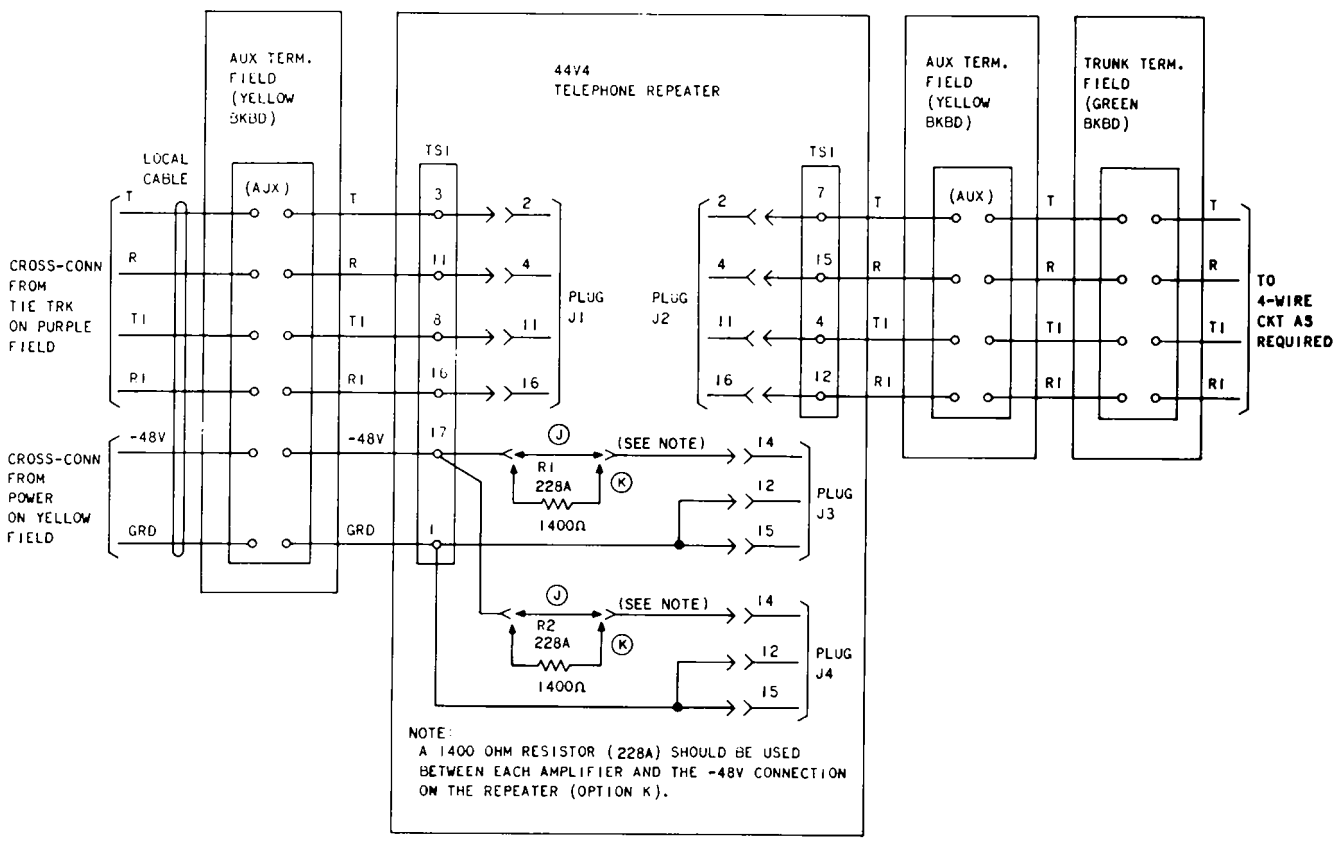


Fig. 102—44V4 Repeater—Connections

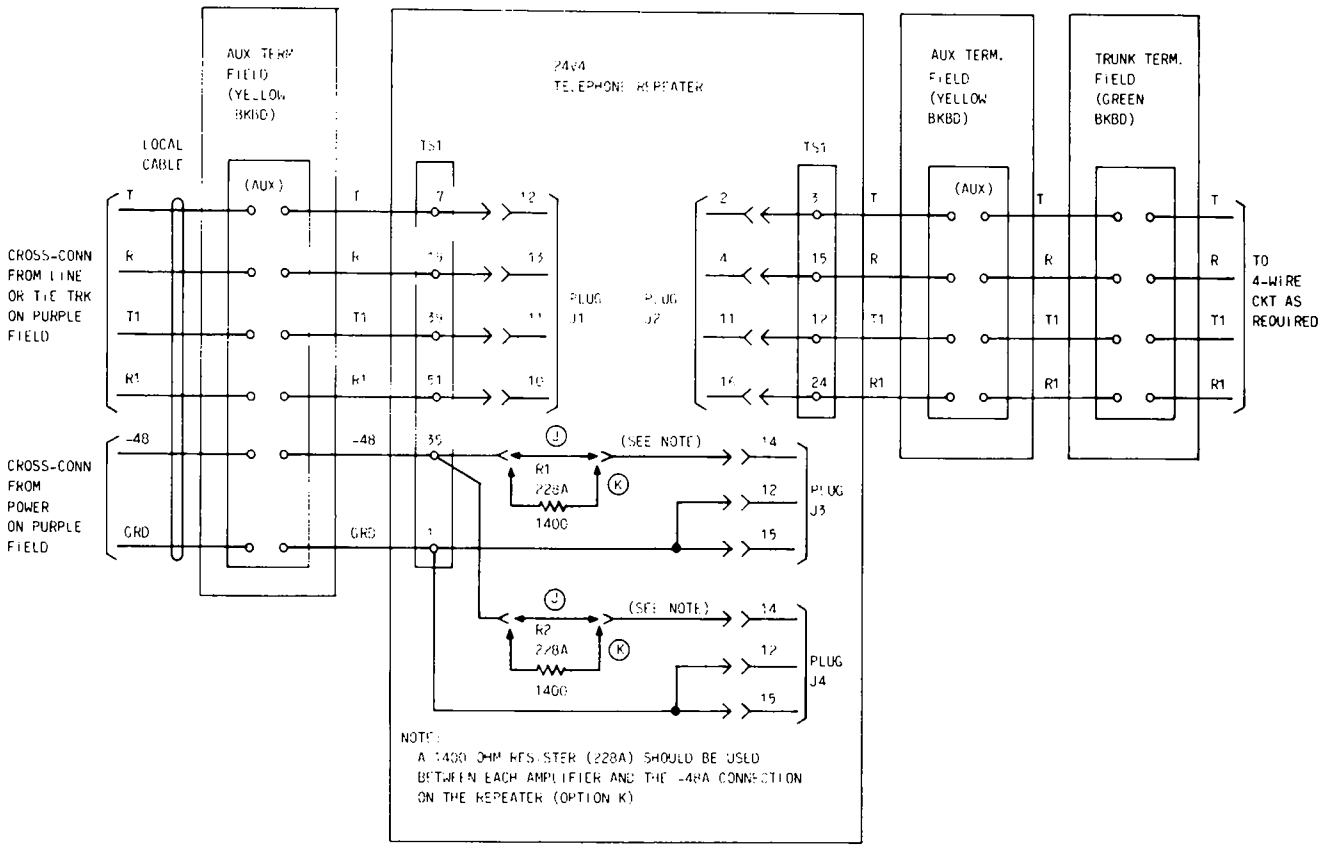


Fig. 103—24V4 Repeater—Connections

shown in Fig. 105. A detailed drawing of the SMDR interface of the 724A panel is shown in Fig. 106.

SYSTEM STATUS INDICATOR DISPLAY (30A8)

5.142 A 30A8 system status indicator (SSI) is used in conjunction with the centralized attendant service (CAS) feature 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. 107, Sheet 1). 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 V 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.

5.143 The LEDs and associated circuitry are contained on an RE2 circuit pack assembly (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 W. 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 a KS-16689, List 1 connector at the plug end. Sheet 2 of Fig. 107 shows the connections for the RLTs, control, overload, and the alarms (CAS only) indications to the CAS system status indicator

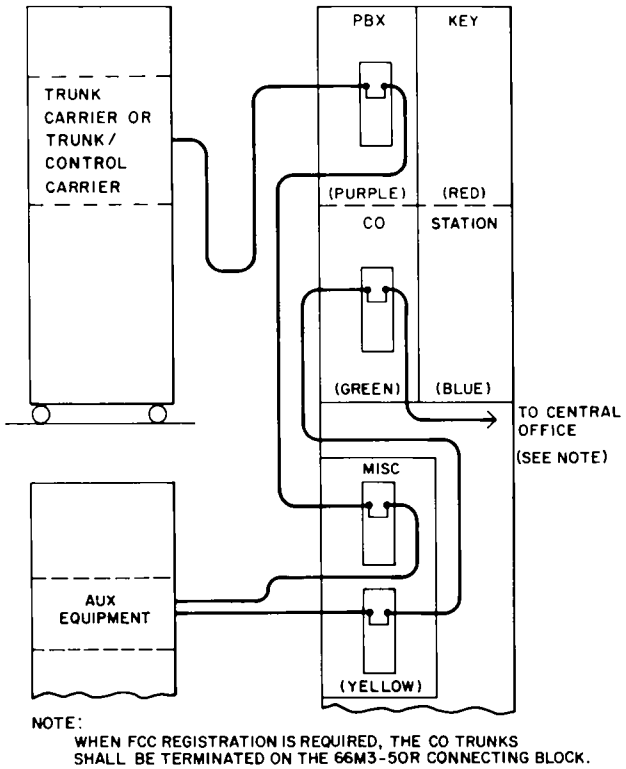


Fig. 104—CO Trunk Connected to Trunk Port Carrier via Auxiliary Equipment and Cross-Connect Field

at the branch PBX. Sheet 3 of Fig. 107 shows the optional wiring which allows for multiple alarm indications (eg, alarms to CO and CAS). Sheet 4 of Fig. 107 shows the connections when the second and/or third SSI is required at the branch PBX. Sheet 5 of Fig. 107 shows the connections for the 1st and 14th 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. 107, Sheet 3. A fill-in worksheet for the first display at a branch PBX with CAS or SSI alarms-only connections is shown in Worksheet 27. A worksheet for the first display at a branch PBX with multiple alarm connections to CO and CAS is shown in Worksheet 28. A worksheet to be filled in at installation for the second or third display at a branch PBX and/or for any display at a main PBX is shown in Worksheet 29.

5.144 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. 108). 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 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 a power transformer. Ordering information for housing color, faceplates, and rear panels is identical to the 30A8 SSI (see Table W). 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.

5.145 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.

5.146 Mounting cord terminations are shown in Fig. 108. Worksheet 30 is a fill-in worksheet for the LSI connections.

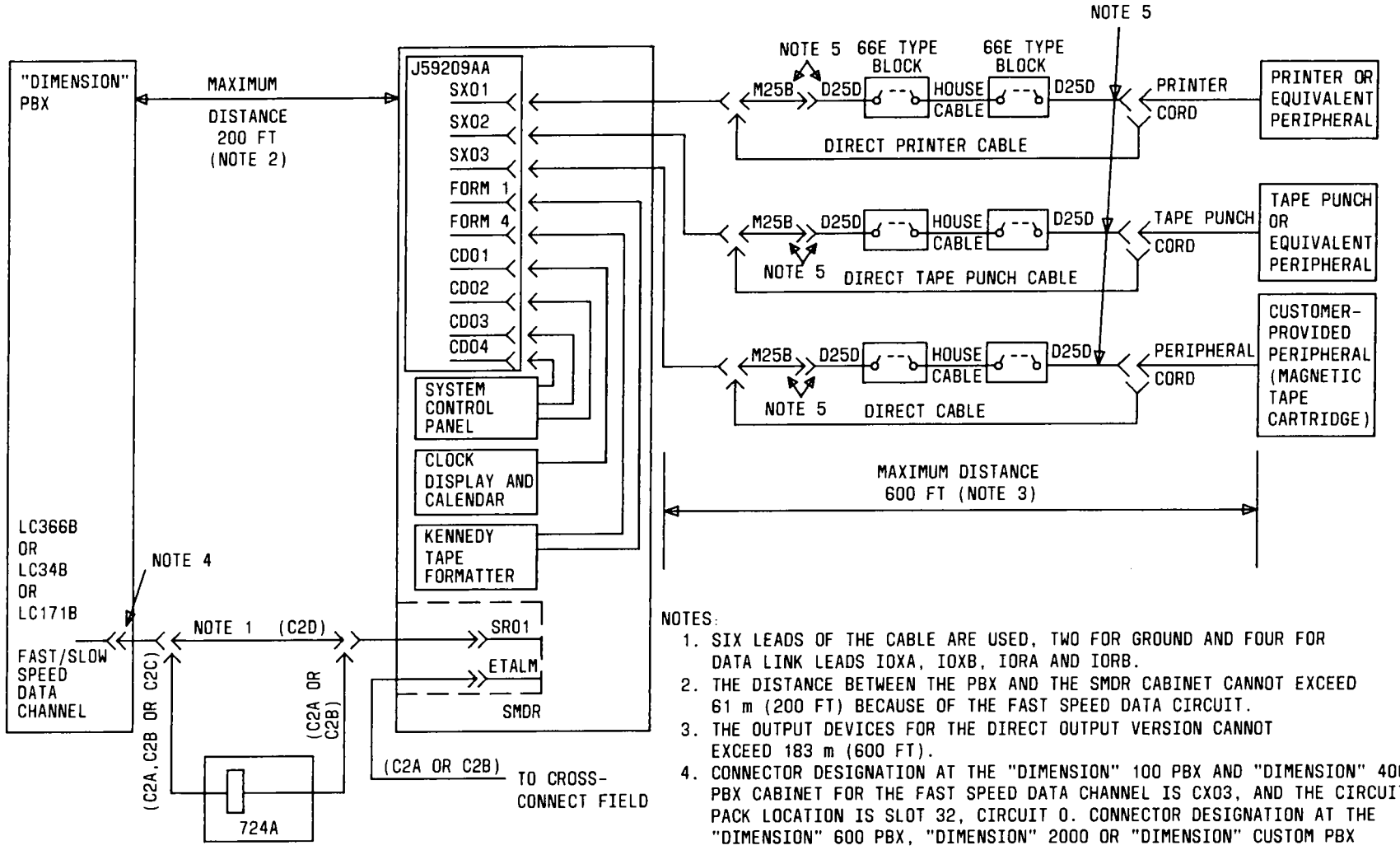
Danger: A possible shock hazard is present when plugging the power transformer into ac wall outlets having metal receptacle covers. Use ac outlets that have plastic receptacle covers or replace the metal covers with plastic covers.

TIME-OF-DAY CLOCK BATTERY BACKUP (J58882A1, LIST 9)

5.147 The battery backup is an optional unit provided as part of the common control cabinet to ensure the operation of the time-of-day clock synchronizer for use in the event of a commercial ac power loss. When this feature is provided, the KS-20390, List 7 battery pack is installed in the cabinet and connected via plug S2R-1 to the LC144 circuit pack in slot 32 of the basic control carrier or slot 32/36 of the control-growth carrier.

TRUNK ANSWER FROM ANY STATION (TAAS)

5.148 The TAAS feature routes all incoming calls (normally directed to the PBX attendant) to



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 61 m (200 FT) BECAUSE OF THE FAST SPEED DATA CIRCUIT.
3. THE OUTPUT DEVICES FOR THE DIRECT OUTPUT VERSION CANNOT EXCEED 183 m (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. 105—Wiring Schemes for SMDR Connections

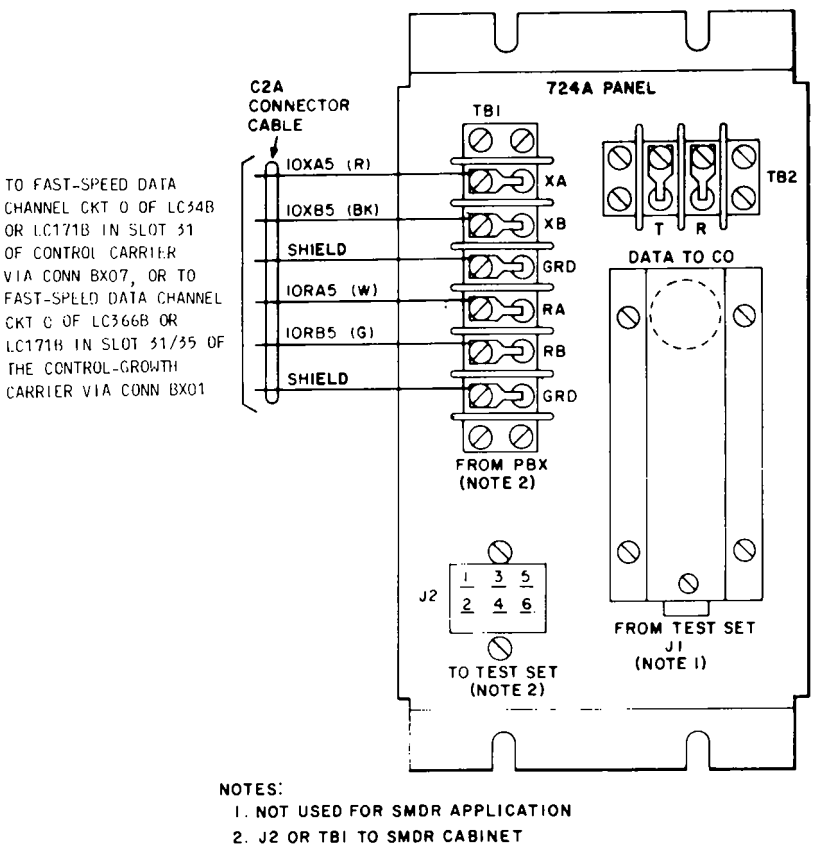


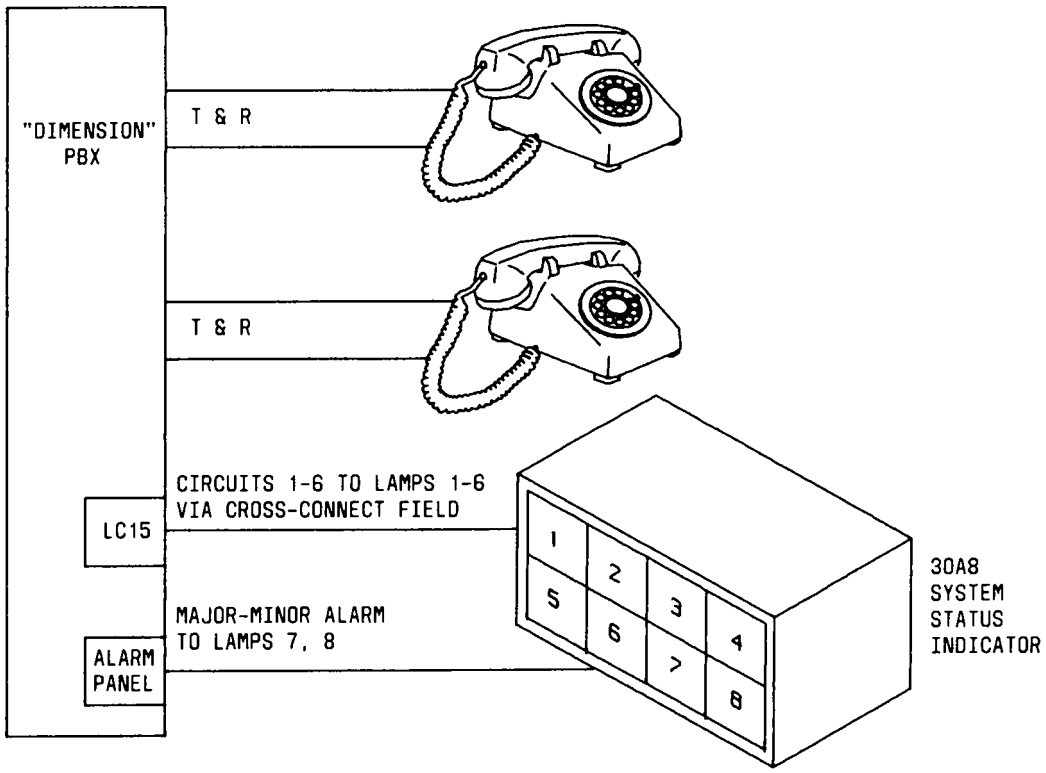
Fig. 106—SMDR Connections at 724A Panel

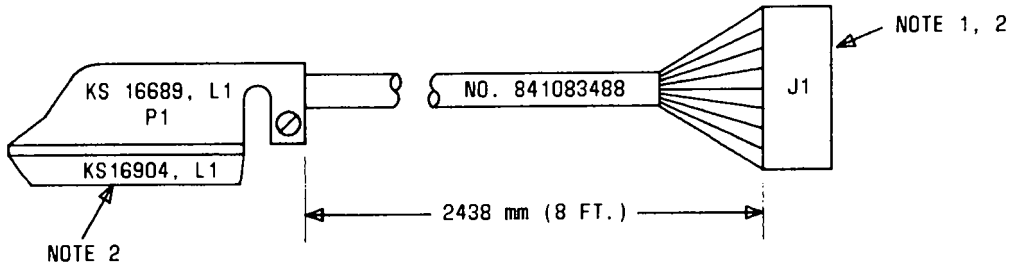
a common alerting signal (bell, chime, horn, lamp, or station line ringer) on customer premises when the night station is activated. These calls can then be answered by any station user in the PBX system who dials a special code from a nonrestricted station.

5.149 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); or, if the LC02B capacity is exceeded, an isolating circuit must be added. This is shown as option V in Fig. 109. When other than a high impedance ac-coupler ringer (such as C4A2) is used or the limits shown in Fig. 109 are exceeded, the slave relay configuration (413A KTU) should be used. Refer to Section 463-110-100 for information on alerting signal equipment, Section 518-215-400 for information on the 413A KTU, and Section 518-215-419 for information on the 642A panel. Worksheet 31 provides a fill-in worksheet, to be filled in at time of installation, for TAAS.

UNIFORM CALL DISTRIBUTION (UCD) TRAFFIC OVERFLOW INDICATOR

5.150 The UCD feature allows incoming CO, FX, INWATS, 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. 110). 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)





NOTES:
1. AMP CONNECTOR P/N 86487-2 AMP CONTACT P/N 86015-4 (AMP COMPANY, HARRISBURG, PA)
2. TO ADD ADDITIONAL GROUND LEADS TO CABLE ASSEMBLY, CONNECT WIRES ON TERMINALS NO. 1, 8, 34, 9, 35, 10, 36, 11, 37, 12, 38 AND 13 (P1) TO WIRES ON TERMINALS 1 AND 2 (J1)

Fig. 107—30A8 System Status Indicator (Sheet 1 of 5)

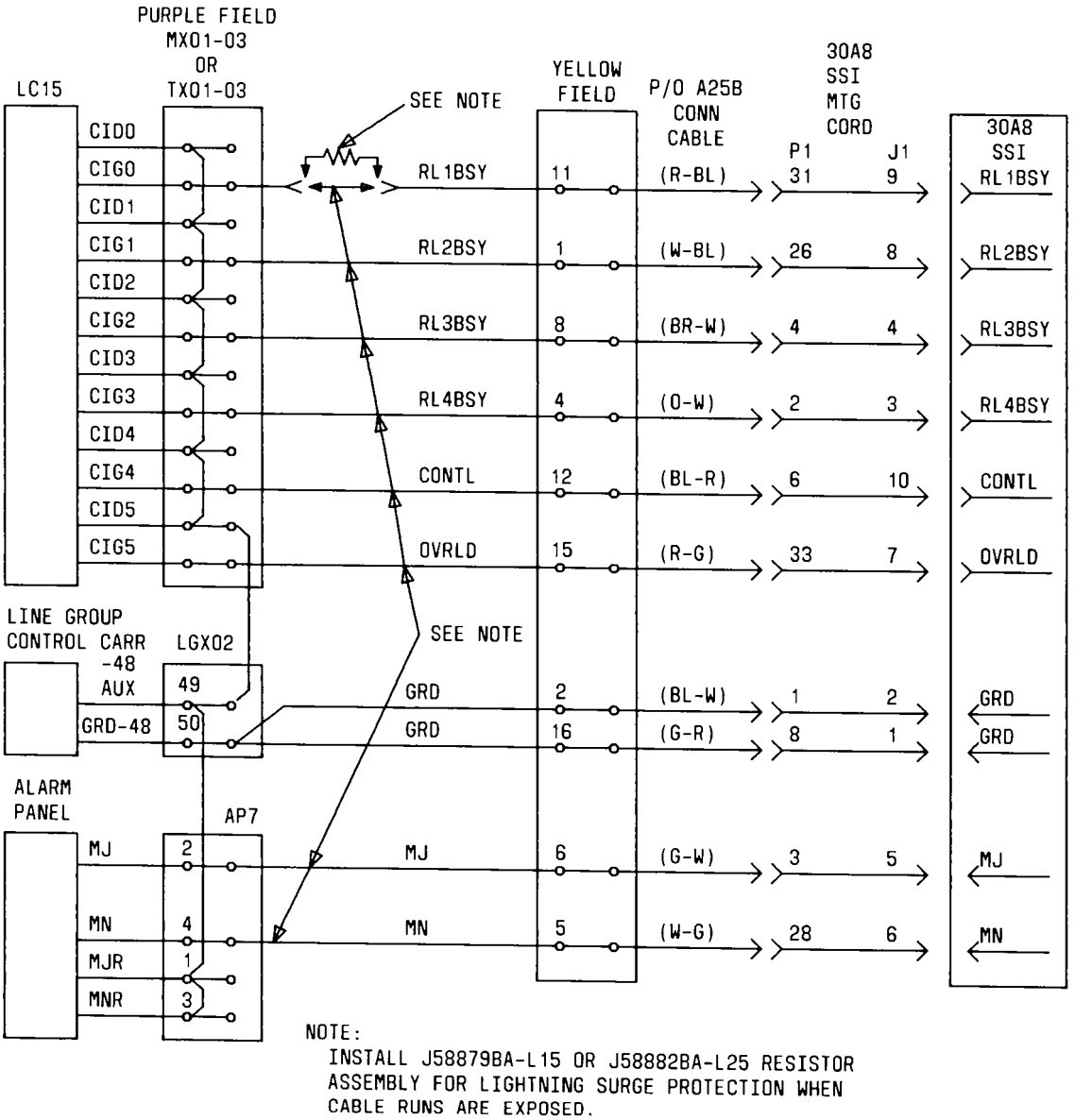


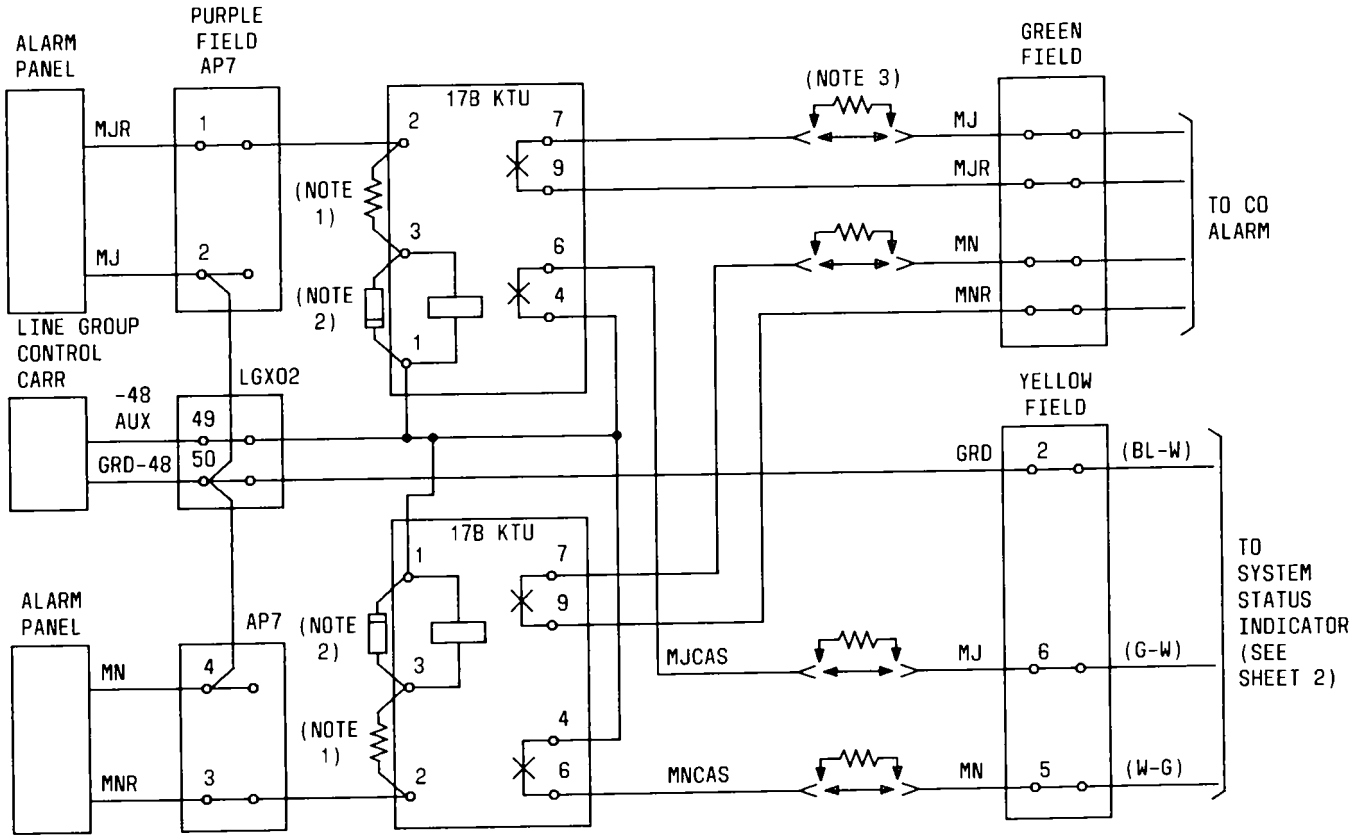
Fig. 107—30A8 System Status Indicator (Alarms to CAS Only) (Sheet 2 of 5)

range. Both M1 and J1 type lamps mount in 15-, 17-, or 18-type indicators. The RSP- in Fig. 110 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 X 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 Y. Worksheet 32 is provided for the UCD traffic overload indicator connections (short loop) and Worksheet 33 for indicator connections (long loop).

VISUALLY IMPAIRED ATTENDANT SERVICE

5.151 A visually impaired attendant can operate a specifically-configured D-type console (coded 02AF). The console equipment (Fig. 111) includes the following:

- A light sensitive probe (990A) to detect and identify active LEDs on the console



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. 107—30A8 System Status Indicator (Alarms to CO and CAS) (Sheet 3 of 5)

- A grooved faceplate (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.

5.152 The 2A translator adjunct is connected to the attendant console via the KS-16689 connector assembly in the console bus. 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 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, calls waiting and timed reminders, have been added to this service.

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

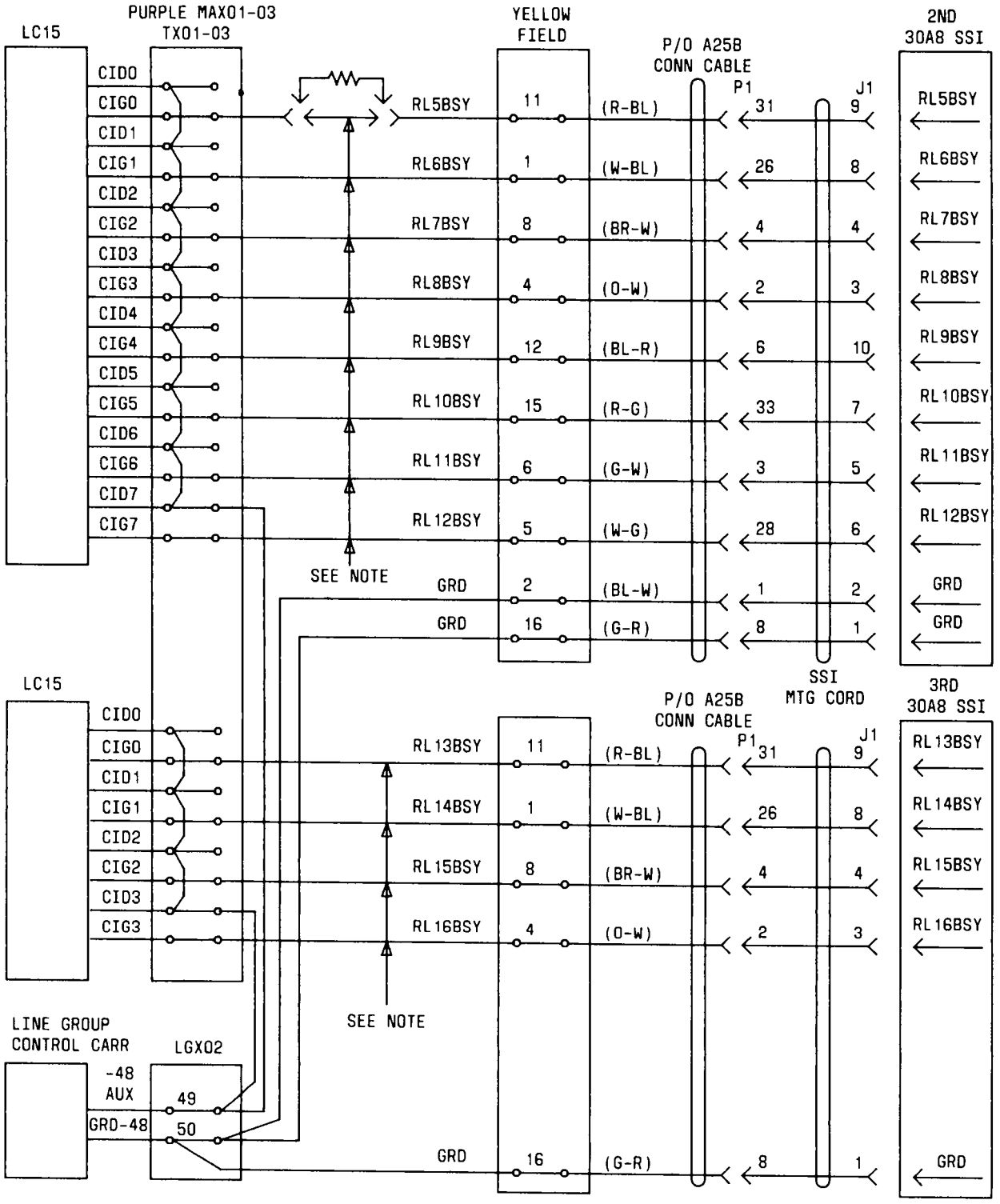


Fig. 107—30A8 System Status Indicator (Second and Third Display at Branch PBX) (Sheet 4 of 5)

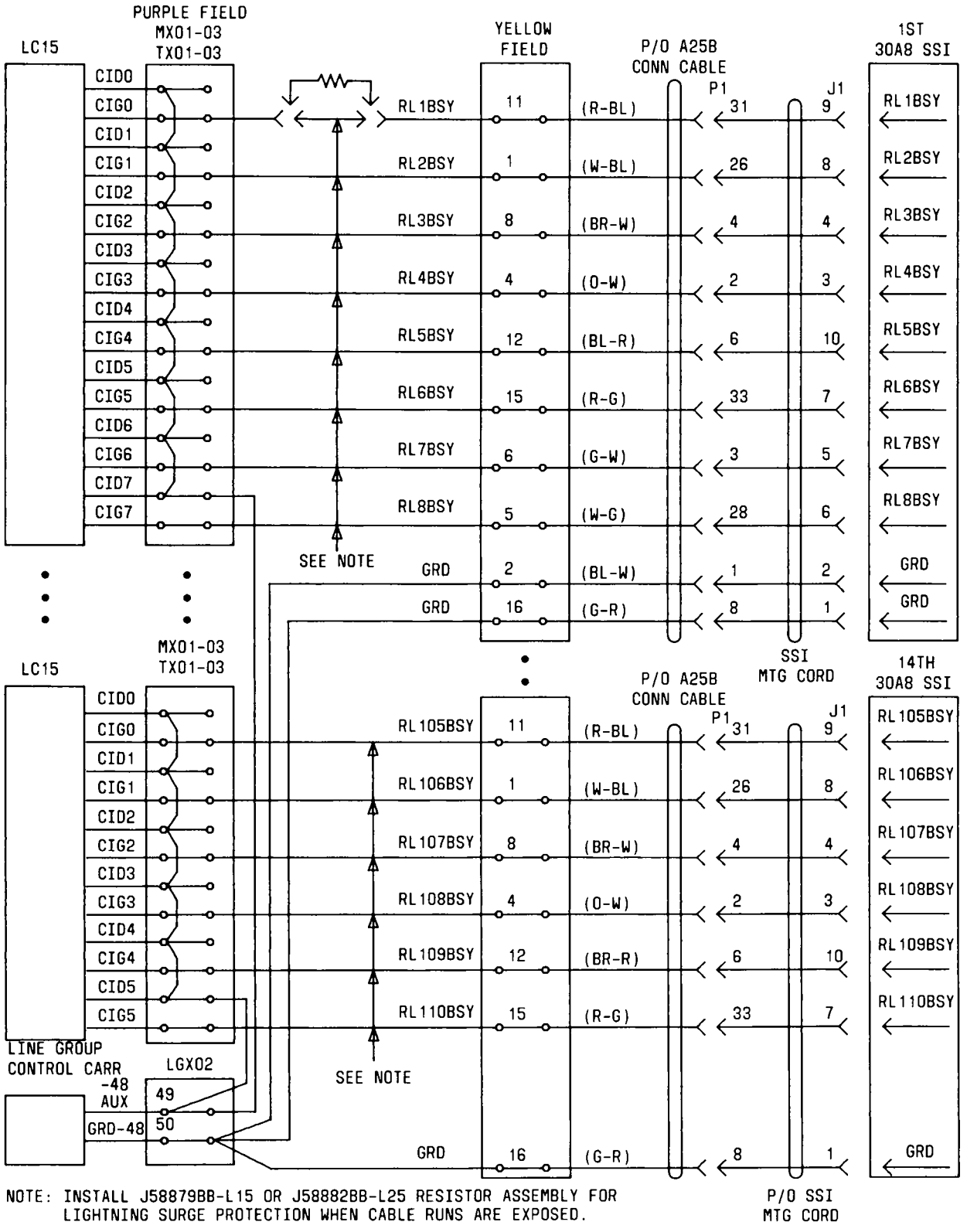


Fig. 107—30A8 System Status Indicator (1st and 14th Display at Main PBX) (Sheet 5 of 5)

TABLE V

30A8 LAMP STATUS INDICATION

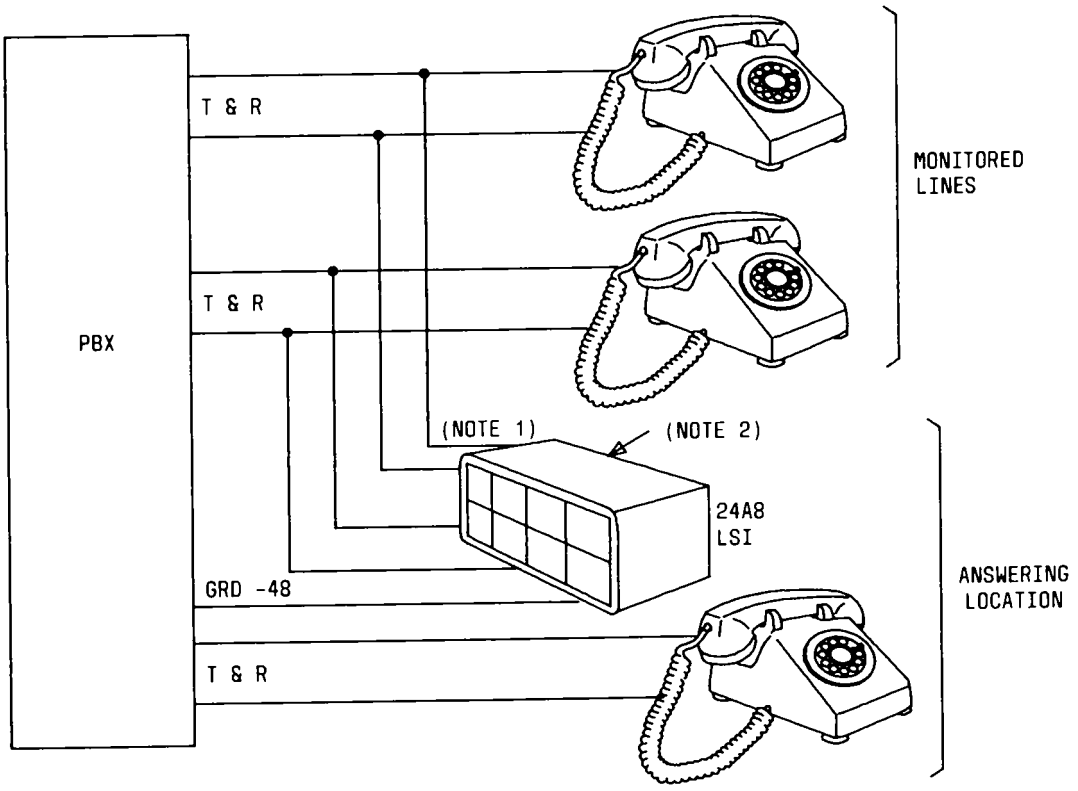
LAMP NO.	FUNCTION	STATUS INDICATION
1 2 3 4	RLT 1 RLT 2 RLT 3 RLT 4	Dark = Idle RLT/Backup Mode Steady = Busy RLT — seized both ends Wink (30 IPM) = Maintenance Busy
5	Control	Steady = Normal Blink = Backup Mode (Trunk Answer From Any Station)
6	Overload	Dark = Normal Steady = Queue Overload
7 8	Major Minor	Dark = Normal Steady = Alarm

TABLE W

PANEL COLORS OF 30A8 CAS SYSTEM STATUS INDICATOR

REAR PANELS		FACEPLATES	
COLOR	PART NO.	COLOR	PART NO.
Avocado	840597579	Black (Note)	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		

Note: Teak or walnut rear panel is used with black faceplate.



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. 108—24A8 Line Status Indicator

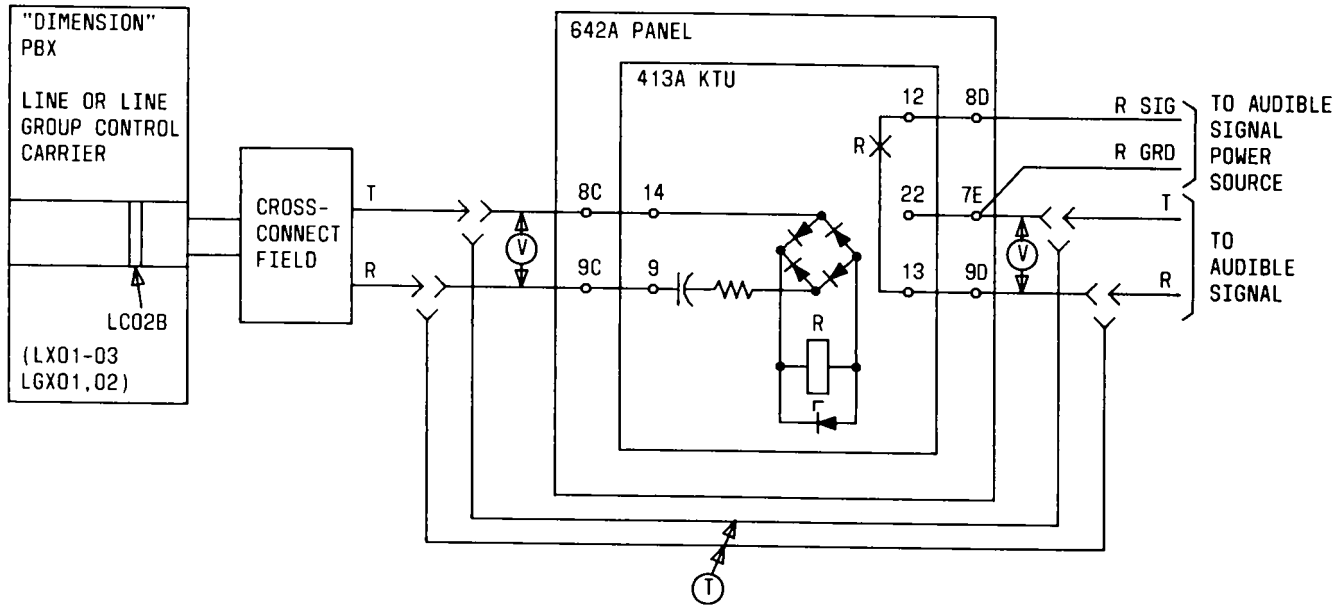
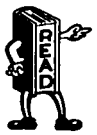


Fig. 109—TAAS Equipment Arrangement

the circuit pack locations in the various equipment cabinets (Fig. 11 through 13).

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.



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:

- ANI signal distribution circuit (LC32B)
- ANI transmitter circuit (LC31C)
- Attendant conference circuit (LC06B)
- Auxiliary trunk interface circuit (LC13B)
- Contact interface B circuit (LC15)
- Data control circuit (LC171B)
- Data transfer circuit (LC172B)
- Dual-speed serial data channel (LC34B)
- Dual-speed serial data channel (LC366B)
- I/O and memory control (LC133 and LC133B)
- Loop signaling interface trunk circuit (LC361)
- Message register and energy control power monitor interface circuit (LC16B)
- Message waiting line circuit (LC03C)
- Network clock (LC121B)
- Remote access trunk circuit (LC07)
- Signal distribution circuit (hotel/motel) (LC41B)
- Tie trunk circuits (LC11B)

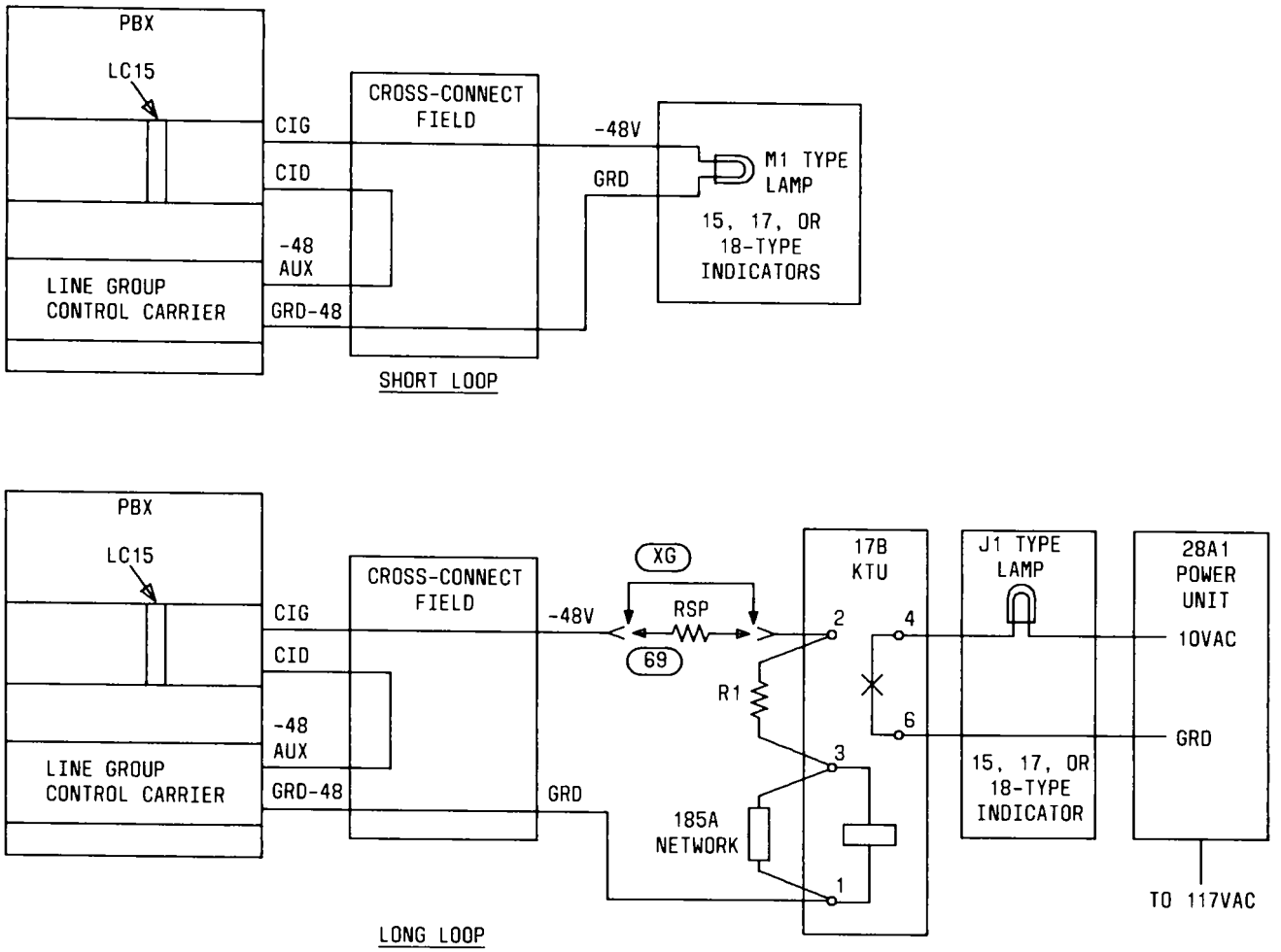


Fig. 110—UCD/DDC Traffic Overload Indicators

- Time-of-day clock (LC144)
- Tone plant C (LC17B)
- TOUCH-TONE dialing sender/dial tone detector (LC12)
- Transmission test line circuit (LC145)
- Voice announcement circuit (LC190).

A. ANI Signal Distribution Circuit (LC32B)

6.04 Each LC32B contains two automatic number identification (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.

B. ANI Transmitter Circuit (LC31C)

6.05 One LC31C is required per system and is located in the control 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 six attendant conference circuits and is located in the trunk port carrier and/or the module control and trunk port carrier.

TABLE X

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

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 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. Auxiliary Trunk Interface Circuit (LC13B)

6.07 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

TABLE Y

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)

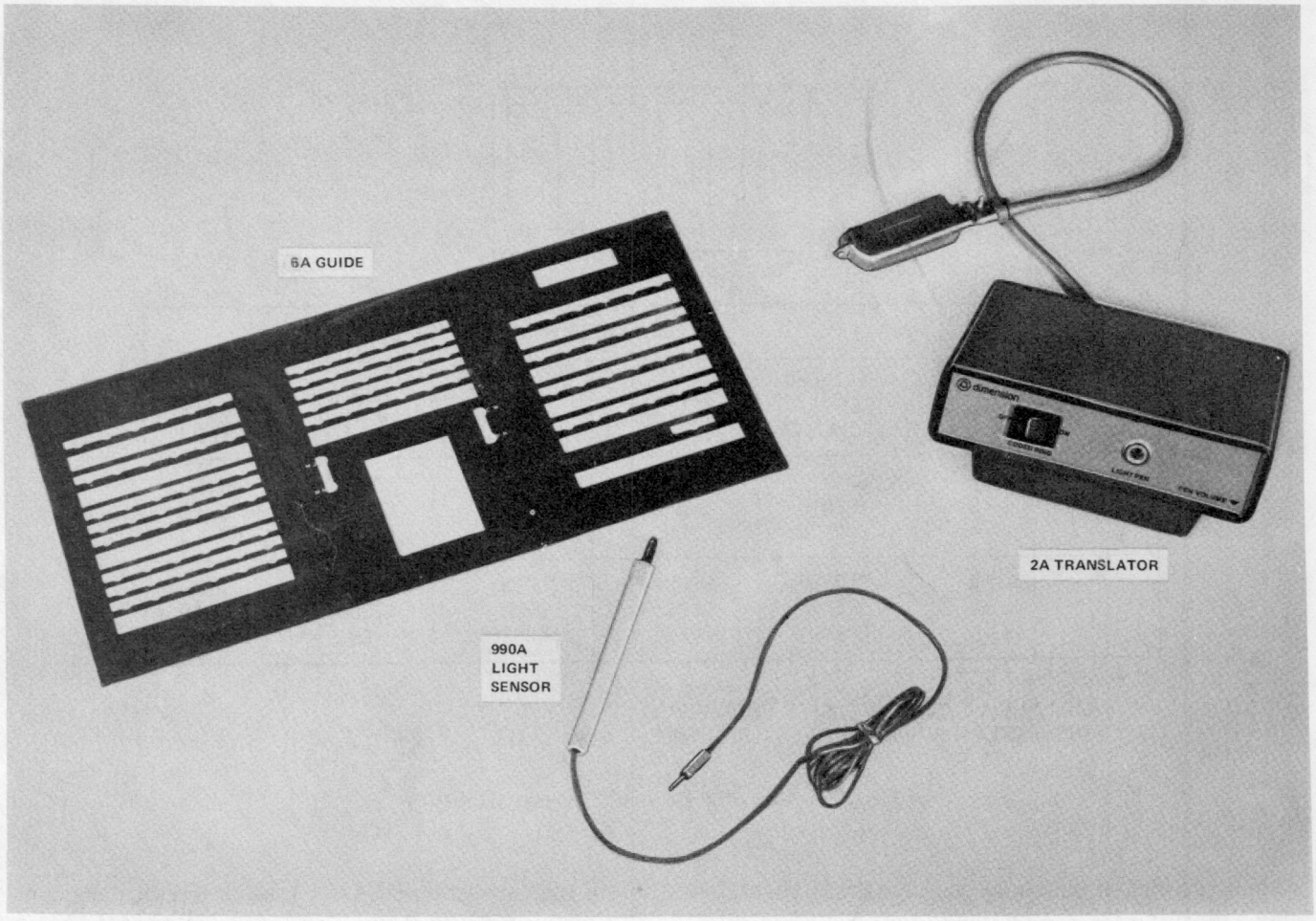


Fig. 111—Visually Impaired Attendant Service—Console Equipment

provide an interface with the following customer equipment:

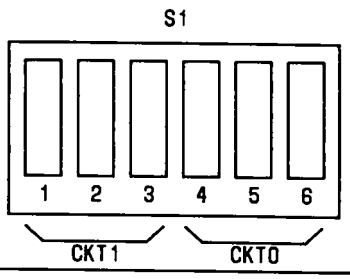
- Paging trunk circuits
- Recorded announcement circuits
- Recorded telephone dictation trunk circuits
- Music-on-hold access circuits
- Automatic wakeup service circuits.

6.08 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. 112.

E. Contact Interface B Circuit (LC15)

6.09 The contact interface B circuit (LC15) is used with FP8 or FP12 when the 30A8 system status indicator (SSI) is installed for the centralized attendant service (CAS) feature (Fig. 109). 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. The LC15 circuit permits visual monitoring of the CAS equipment via the SSI. Interconnection (via the cross-connect field) is shown in Fig. 107, Sheet 2.

6.10 When the uniform call distribution (UCD) feature and/or direct department calling (DDC) features are provided in addition to CAS, a



LC13B CIRCUIT NO.	LC13B SWITCH SECTION NO.	ASSOCIATED AUXILIARY CIRCUIT				
		RECORDED TELEPHONE DICTATION	RECORDED ANNOUNCEMENT	LOUDSPEAKER PAGING/ MALICIOUS CALL TRACE	MUSIC ON HOLD	AUTO WAKEUP SERVICE
0	6 5 4	OPEN OPEN CLOSED	OPEN CLOSED OPEN	CLOSED OPEN OPEN	OPEN CLOSED CLOSED	OPEN CLOSED OPEN
1	3 2 1	CLOSED OPEN OPEN	OPEN CLOSED OPEN	OPEN OPEN CLOSED	CLOSED CLOSED OPEN	OPEN CLOSED OPEN

NOTE:
SWITCH SECTIONS ARE CLOSED BY PRESSING THE ROCKER TOWARDS THE SECTION NUMBER

Fig. 112—Auxiliary Circuit Options (LC13B)

second L15 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.

6.11 Worksheets 27 through 29, 32, and 33 are fill-in worksheets for the LC15 circuit pack as used with CAS and UCD/DDC features.

F. Data Control Circuit (LC171B)

6.12 Circuit pack LC171B is used in conjunction with the remote maintenance, administration, and traffic system (RMATS). Each circuit pack contains two circuits, 0 and 1, and is installed in the basic control carrier slot 31, or in the control-growth carrier slot 31/35 in the space otherwise occupied by an LC34B circuit pack in the basic control carrier, or by an LC366B circuit pack in the control-growth carrier. One circuit (1) of the LC171B circuit pack connects to the external data set which communicates with the RMATS. The second circuit (0) is a typical high-speed link which functions similarly to an LC34B or LC366B channel. The LC171B circuit pack with speed control option blocks is shown in Fig. 113.

G. Data Transfer Circuit (LC172B)

6.13 Circuit pack LC172B is required for RMATS in conjunction with LC171B. This circuit provides a data channel between the processor and the maintenance and administration panel (MAAP). The LC172B circuit pack (Fig. 114) contains an option block to be set for the type PBX in which it is used. The block is shown set for option Y, required for the PBX.

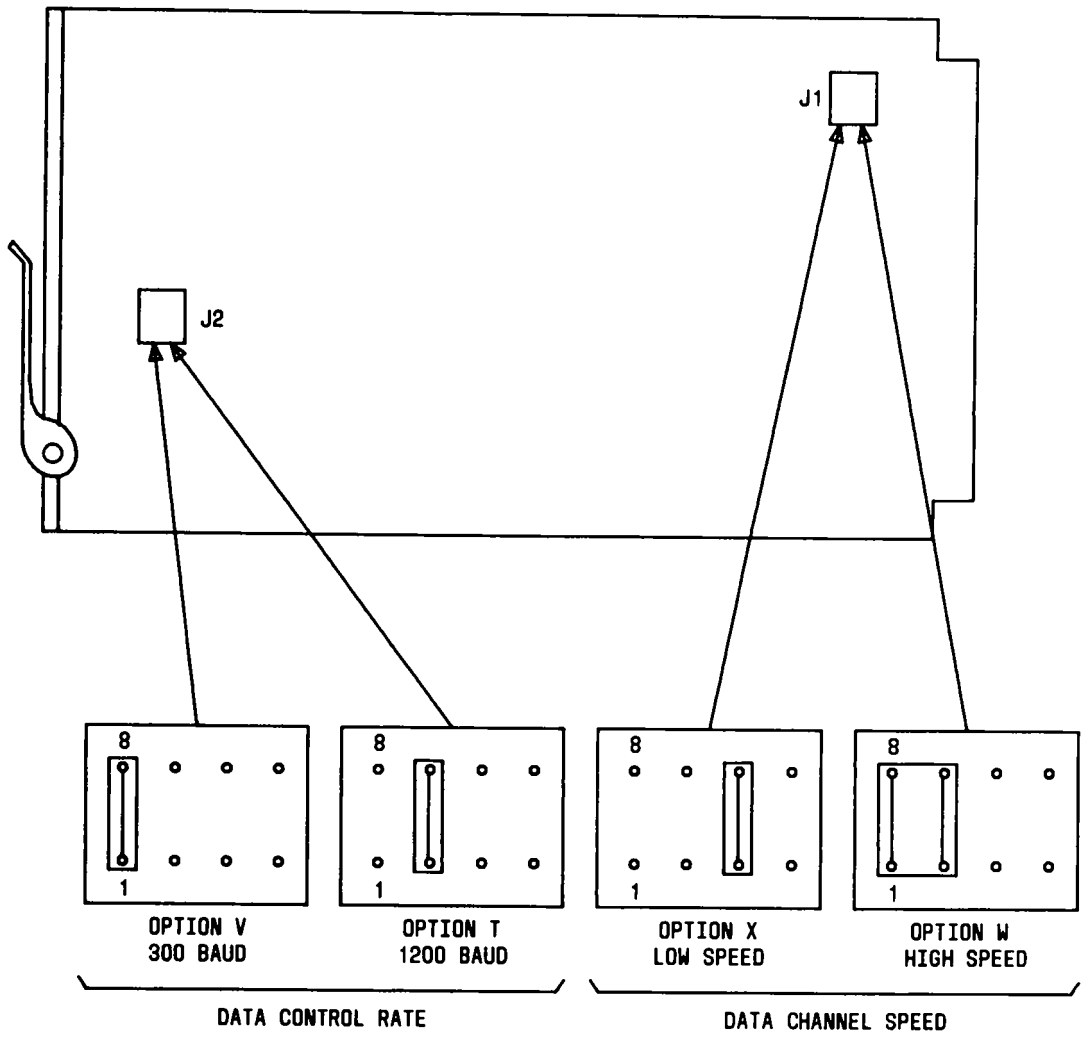


Fig. 113—Data Control Circuit (LC171B)—Block Diagram and Circuit Pack Options

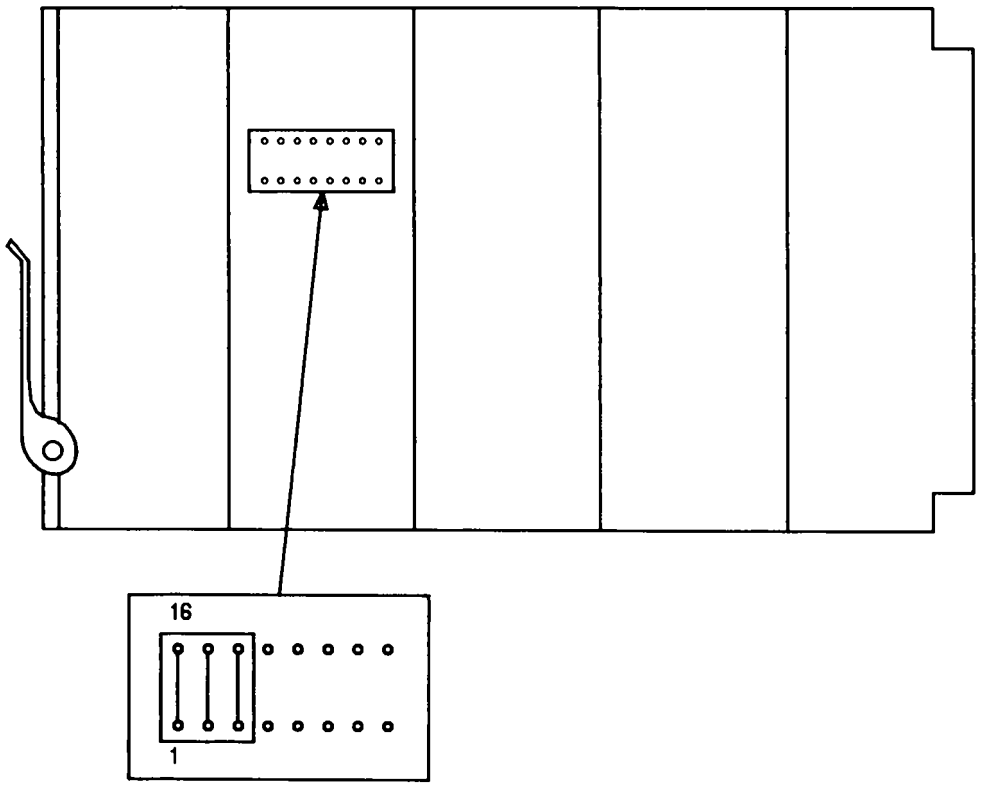
H. Dual-Speed Serial Data Channel Circuit (LC34B)

6.14 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.

6.15 In the basic control carrier, attendant console data channels (LC34B) should be assigned (used) sequentially beginning with slot 32. For example, circuits 0 and 1 of the 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 the MAAP is in use, circuit 0 of LC34B in slot 30 is used for the MAAP interface (a data channel connecting the processor with the MAAP). The LC34B circuits used for consoles must be arranged for slow-speed data transmission. The fast- and slow-speed data transmission options are illustrated in Fig. 115.

I. Dual-Speed Serial Data Channel (LC366B) (For Use in J58882AH Carrier Only)

6.16 Circuit pack LC366B contains four input/output serial data channels. One channel (circuit 0) is a dual-speed (185 or 833 kilobits per second)



NOTES:
1. BLOCK SET FOR OPTION Y (COMMON CONTROL 0 - REQUIRED FOR "DIMENSION" 600 PBX)

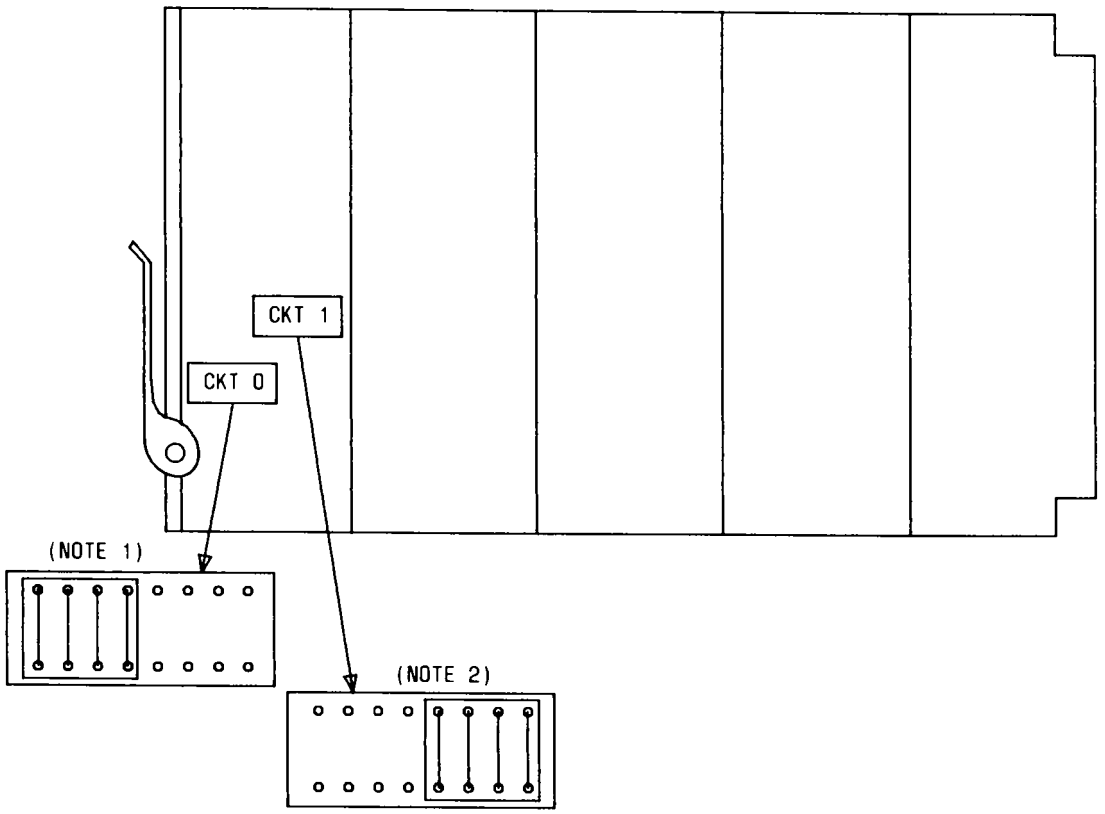
Fig. 114—LC172B Circuit Pack Showing Shorting Block Set for Option Y

channel. The three remaining channels can be used only for low-speed (185 kilobits per second) operation. Each LC366B circuit pack provides four data channels for use in the control-growth carrier. These channels are similar (used for the same purpose) to the two data channels provided in each LC34B circuit pack (used in the basic control carrier). This circuit pack (LC366B) is installed in the control-growth carrier slots—31/35, 32/36, 33/37, 34/38, 20/24, 21/25, 22/26, and 23/27. The low-speed/high-speed option for circuit 0 is selected via dual in-line package (DIP) socket J2 (Fig. 116). DIP socket J1 is used to select the type of DIMENSION PBX in which the LC366B is installed (eg, DIMENSION 600 PBX). All Systems configured with three or more attendant consoles assigned to one LC366 should have the LC366 replaced with an LC366B.

J. I/O and Memory Control Circuits (LC133 and LC133B)

6.17 The I/O and memory decoder circuit pack, LC133, contains a movable shorting block in a dual in-line package which provides options for the memory pack size used in the random access memory (RAM). The block shall be set in accordance with Fig. 117 (16K memory boards).

6.18 Circuit pack LC133B must be used with the control-growth carrier (J58882AH). The option block may be set in accordance with Fig. 118 (64K or 16K memory boards). If circuit pack LC133B is installed in the J58882AH carrier, the option block must be set for the 64K memory boards.



NOTES:
1. CIRCUIT 0 WITH DIP SOCKET OPTION BLOCK INSTALLED FOR FAST-SPEED OPERATION. (OPTION S)
2. CIRCUIT 1 WITH DIP SOCKET OPTION BLOCK INSTALLED FOR SLOW-SPEED OPERATION. (OPTION R)

Fig. 115—LC34B Circuit Pack Options

K. 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.

6.19 The loop signaling interface trunk circuit LC361 can be used to provide the interface between the PBX and the customer-provided computer equipment. The circuit can also be used for special off-premises extensions (OPX) where transmission loss is critical or must be minimized or where SMDR recording is desired.

6.20 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 in FP7, FP8, FP9, and FP12.

6.21 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 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

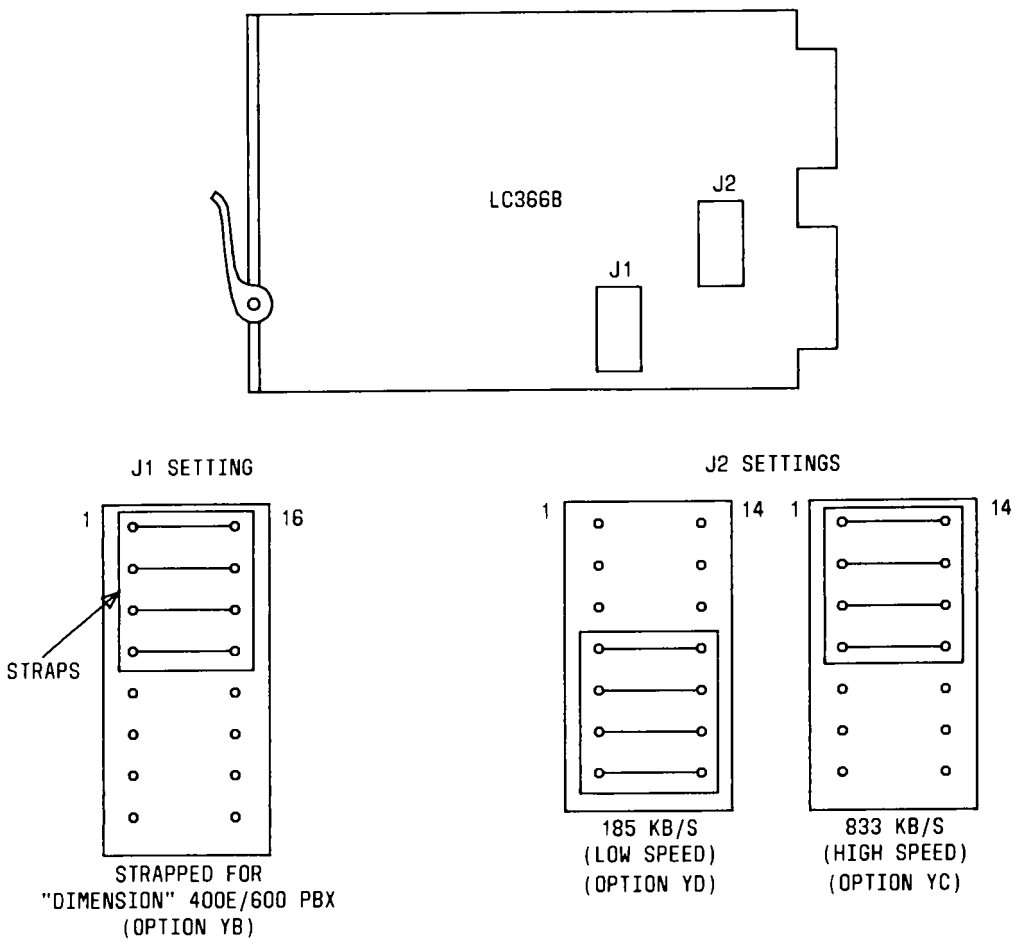


Fig. 116—LC366B Circuit Pack Options

plant B or the LC204 tone circuit via the cross-connect field (Fig. 119).

L. Message Register and Energy Control Power Monitor Interface Circuit (LC16B)

6.22 When the message register feature is required, 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.

6.23 When the LC16B is used for the energy communication feature, two circuit packs are sufficient to provide the maximum of 16 power meter interface circuits per carrier.

6.24 Each LC16B contains three 16-pin sockets which are used to establish various options (Fig. 120). 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.

M. Message Waiting Line Circuit (LC03C)

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 provision of the FCC Rules (Part 68).

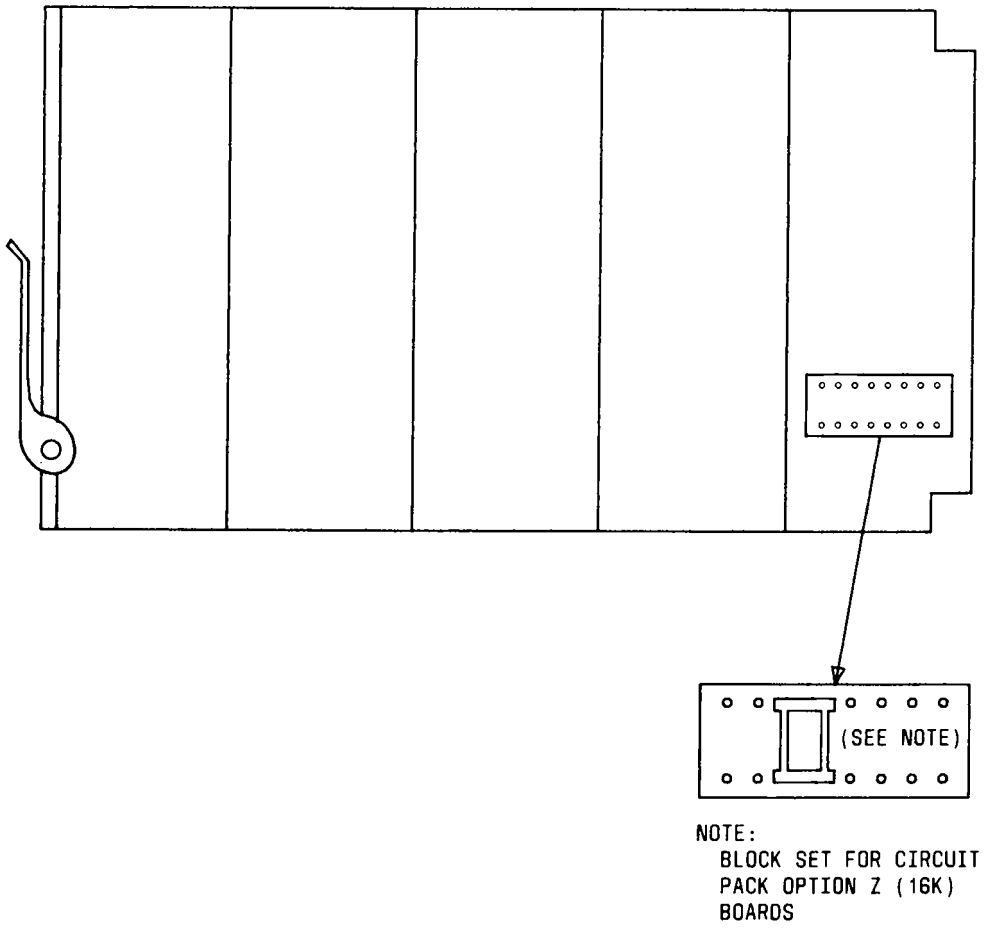


Fig. 117—Circuit Pack LC133 Showing Shorting Block Set for Option Z (16K Memory Boards)

6.25 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 LC02B 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.

N. Network Clock Circuit (LC121B)

6.26 The network clock circuit pack (LC121B) provides all functional timing for the PAM network on a 25-ms clock for tone plant B (LC05B). One LC121B is required in slot 27 for each module control and trunk port carrier.

6.27 The circuit pack contains a switchable circuit which must be generated based on the number of module control and trunk port carriers in the system. The optional switch settings are shown in Fig. 121.

O. Remote Access Trunk Circuit (LC07)

6.28 The LC07 circuit pack is required for the enhanced remote access (voice switched gain [VSG]) applications associated with FP8 and FP12. The circuit pack can be installed in any slot normally occupied by an LC08D in the module control carrier and the trunk port carrier. An automatic voice-controlled adjustable gain capability is provided via

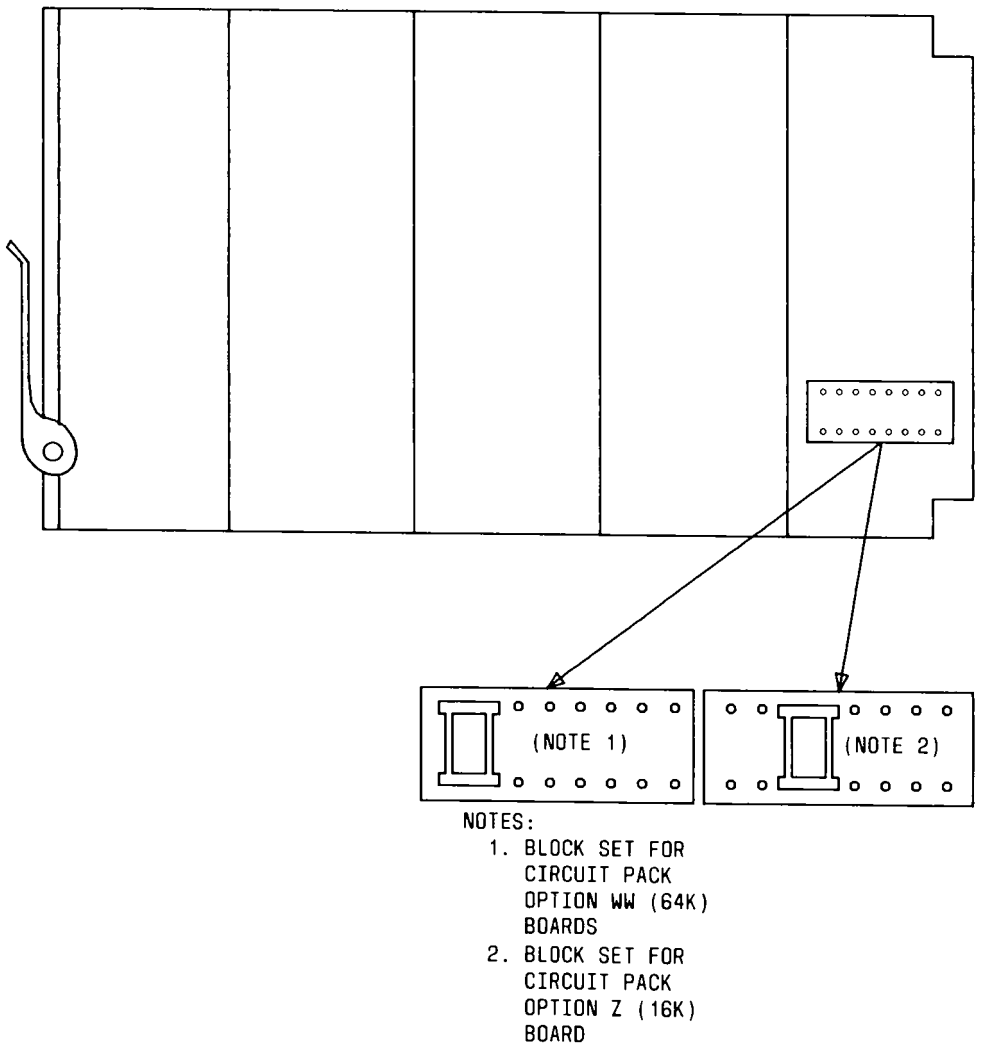


Fig. 118—Circuit Pack LC133B Showing Shorting Block Set for Option Z and/or Option WW

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.

6.29 The LC07 trunk should only be used on incoming trunk groups (ie, automatic remote access, INWATS, 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).

6.30 The gain required for a particular LC07 trunk is dependent upon the signal loss of the circuit. The gain is set via various combinations by four dB gain switches (Fig. 122). The gain should be set to a compromise value to cover all possible connections.

6.31 The LC07 inserts gain only when the signal level rises above −43 dBm, indicating the presence of a signal other than noise. 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. 122. Worksheet 34 is a fill-in worksheet for use with Fig. 122.

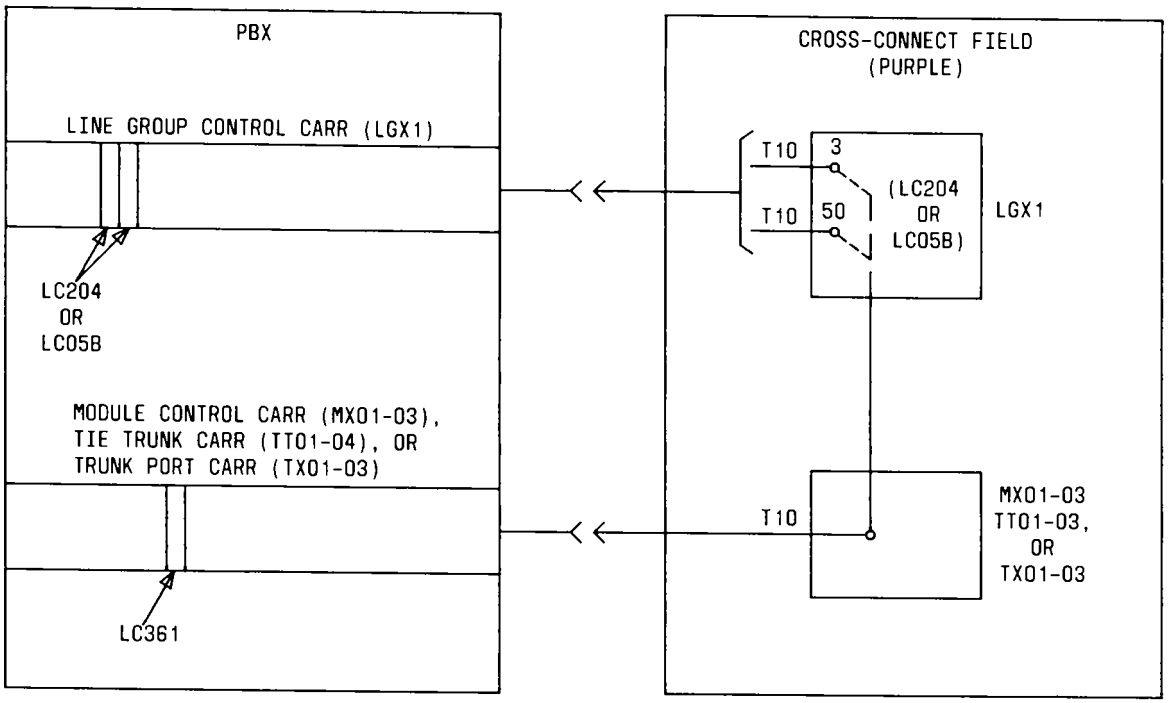


Fig. 119—Audible Tone Connections for LC361 Circuit Pack

P. Signal Distribution Circuit (Hotel/Motel) (LC41B)

6.32 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.

Q. Tie Trunk Circuit (LC11B)

6.33 The LC11B tie trunk circuit pack requires a physical change to provide various options. It 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.

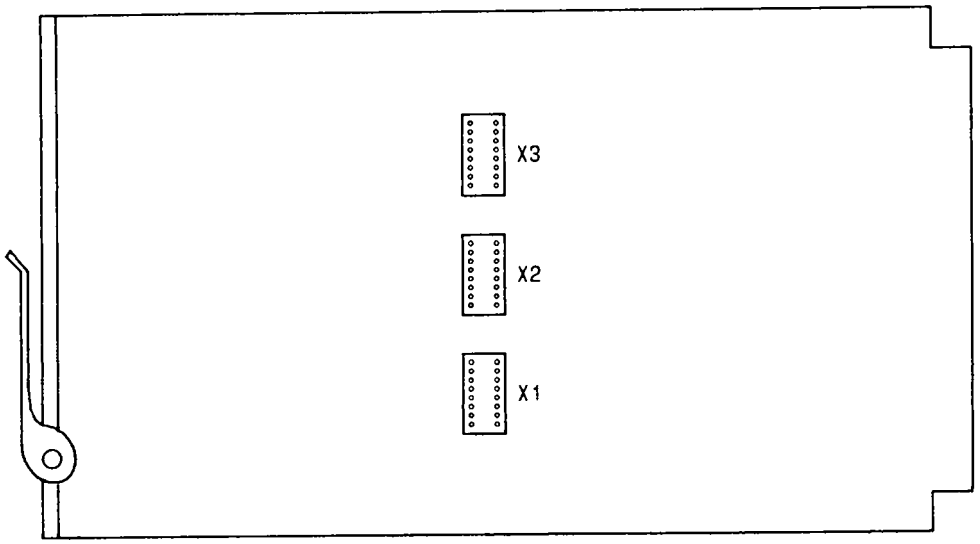
Warning: The option switches must never be operated while power is applied to the circuit.

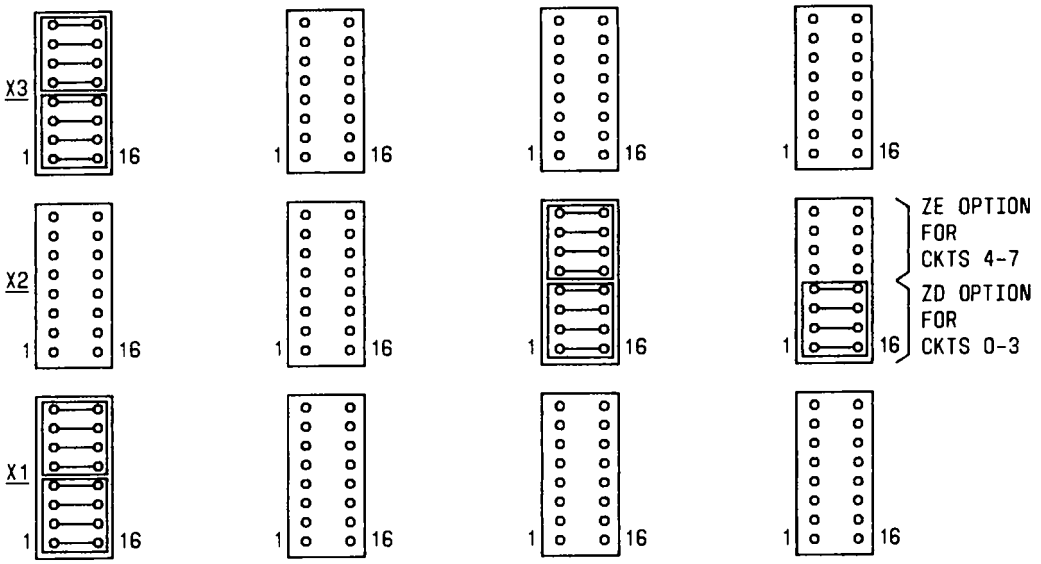
6.34 The LC11B has three option switches located on the circuit pack as shown in Fig. 123. One switch (SW1) is provided for each of the two circuits provided by the unit. The third option switch (SW2) is shared by the two circuits as shown. The optional settings for the LC11B also include matching the signaling circuitry to the loop length, settings for DX normal signaling, DX reverse signaling, and E&M (dial trunk) signaling. Worksheet 35 is a fill-in worksheet for use with Fig. 123.

6.35 The LC11B 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.

R. Time-of-Day Clock Circuit (LC144)

6.36 This common control circuit pack provides an improved hardware clock recommended for billing accuracy. It is installed in slot 32 of the basic control carrier or slot 32/36 of the control-growth carrier. The J58882A, List 9 battery backup provides power for the LC144 in the event of commercial power failure.





ZF OPTION
ENERGY CONTROL
POWER METER
MONITOR OR
PERIPHERAL ALARM
INTERFACE
(SHORTING
BLOCKS ON X1
AND X3 ONLY)

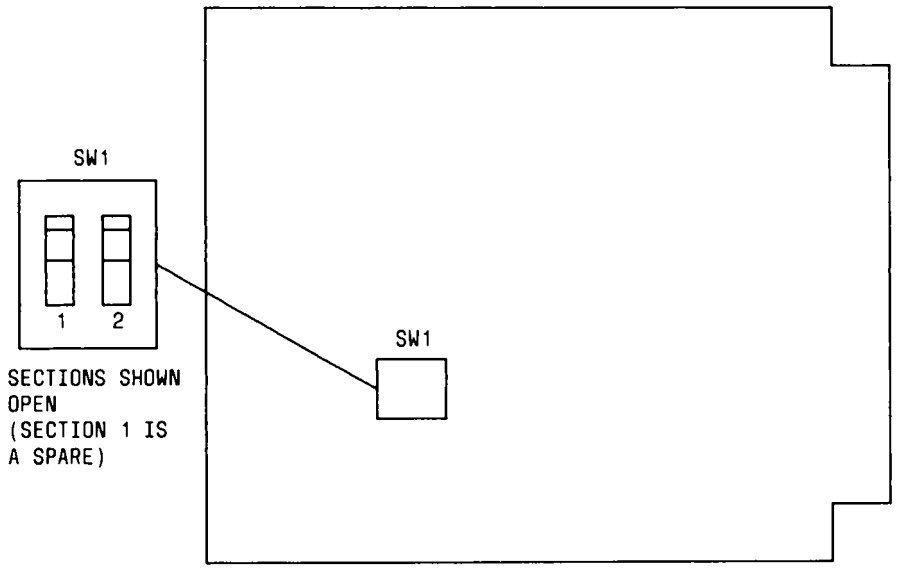
ZE OPTION
MESSAGE UNITS
TWO WIRES
(REMOVE
SHORTING
BLOCKS ON
ALL SOCKETS)

ZD OPTION
MESSAGE UNITS
SINGLE WIRE
(SHORTING
BLOCKS N
X2 ONLY)

ZE AND ZD
OPTIONS
APPLIED
INDENPENDENTLY
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. 120—LC16B Shorting Block Option



SW1 SECTION	OPTION	LOCATION OF MODULE CONTROL CARRIER(S)	
		IN CABINET 0 ONLY	IN CABINET 0 AND 1
2	ZB	OPEN	—
	ZC	—	CLOSED

Fig. 121—LC121B Circuit Pack Switch Location and Switch Options

S. Tone Plant C Circuit (LC17B)

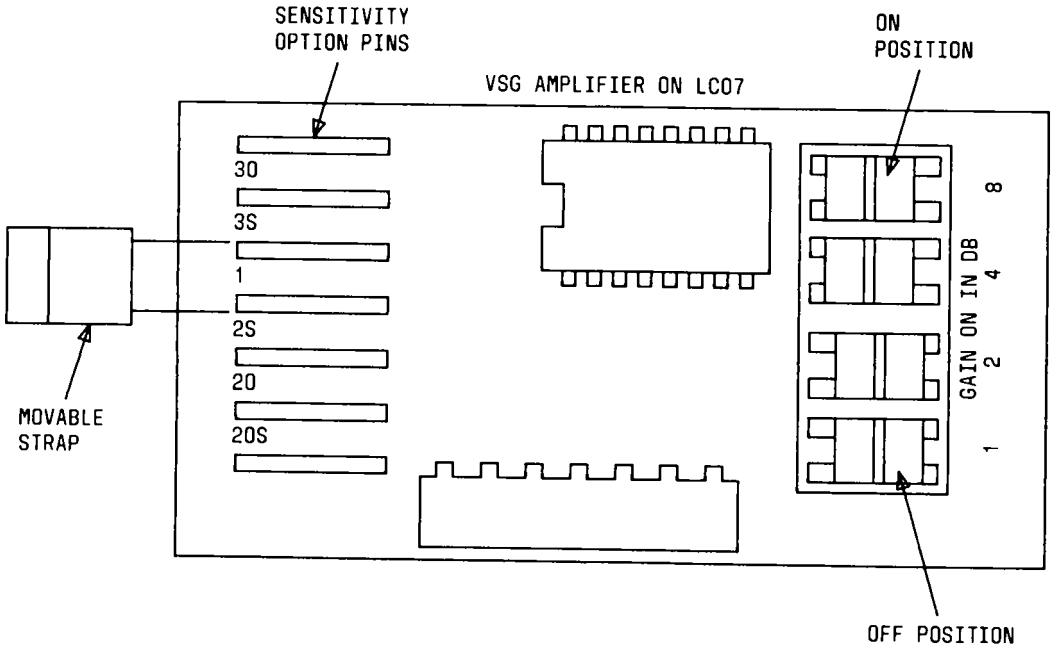
6.37 The code calling access generator located on tone plant C circuit pack (J58879AA, List 9) is used with FP8 and FP12 whenever a tone is needed for code calling access, or to provide LDN tones to the CAS attendant. This allows the PBX station line users, tie trunks, and attendants to dial activate 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 895 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).

6.38 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.

6.39 Dial 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 is allowed. 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.

T. TOUCH-TONE Dialing Sender/Dial Tone Detector (LC12)

6.40 The J58882BA, List 17, or J58879BA, List 17 TOUCH-TONE dialing sender (LC12), is a



SENSITIVITY OPTIONS

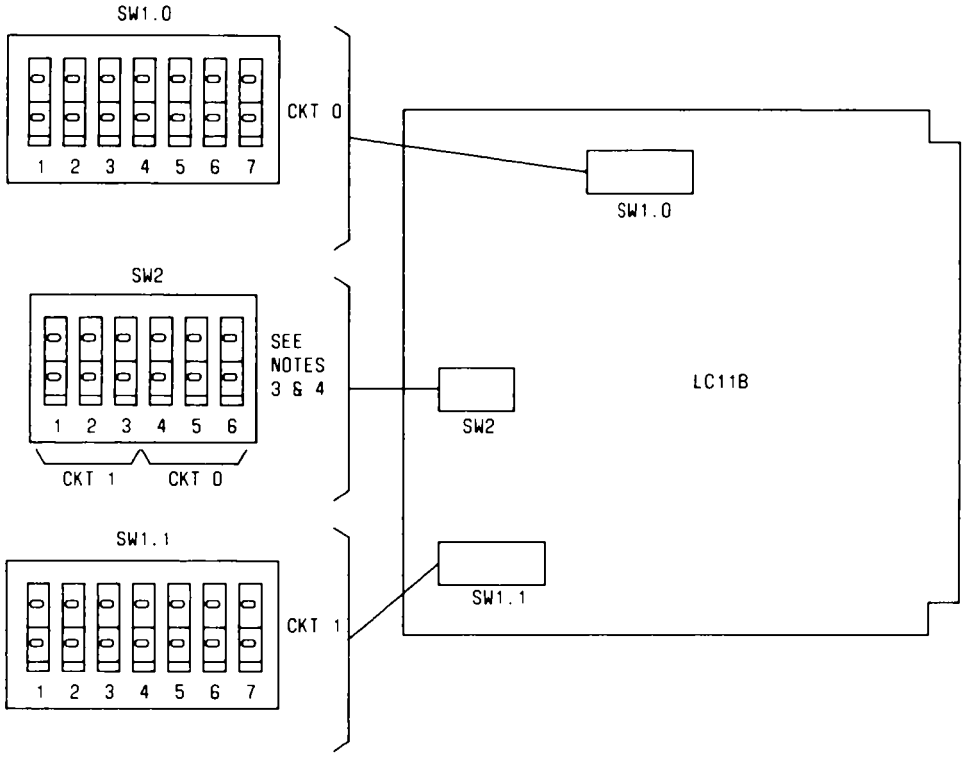
WHEN DIFFERENCE IN LOSS (dB) BETWEEN CO AND PBX SIDE IS	OPTION (NOTE	CHANGE IN TURN-ON LEVEL (dB)		TYPICAL 1 KB/S TURN-ON LEVEL (dBm)	
		PBX SIDE	CO SIDE	PBX SIDE	CO SIDE
10 OR LESS	1	–	–	-43	-43
11 TO 16 (TO FAVOR CO SIDE)	2S	-1	+5	-42	-48
11 TO 16 (TO FAVOR PBX SIDE)	20	+5	-1	-48	-42
17 TO MORE (TO 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. 122—VSG Option Selections on LC07 Circuit Pack



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.O	C	C	C	C	O	O	O	O
5	BAL2.O	C	C	O	O	C	C	O	O
6	BAL1.O	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. 123—LC11B Circuit Pack Switch Location and Switch Options

trunk-type circuit pack (installed in slots 02 through 09 of the trunk port carrier [J588879BA] or slots 06 through 08, 10, 12, 15, 17, and 19 of the module control and trunk port carrier [J58882BA]). The circuit pack is required for the electronic tandem switching (ETS) function in FP8 and FP12 and contains two separate circuits containing precision dial tone detectors (350 Hz). TOUCH-TONE dialing digit generation is also provided upon software command. A single or dual-frequency tone burst of 76-ms duration is provided for digit outpulsing or receiver reaction testing.

U. Transmission Test Line Circuit Pack (LC145)

6.41 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 perfomed 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.

6.42 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.

V. Voice Announcement Circuit (LC190)

6.43 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).

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 uses external trunks and internal trunks. External trunks connect the PBX to a local central office, foreign central office, another PBX, etc. Internal trunks provide trunking services internal to the PBX—eg, recorded telephone dictation, music on hold, message register, power monitoring, TOUCH-TONE dialing sender, etc.

The maximum number of trunks in a trunk group should be limited to 99. This allows the trunk verification by customer (TVC) and trunk verification by station (TVS) features to verify all trunks in each group. If more than 99 trunks are needed in a group, two or more trunk groups should be set up for use with route advance from one to another.

EXTERNAL TRUNK CIRCUITS

7.02 The external trunk circuit types used in the DIMENSION 600 PBX are as follows:

- LC07—Special CO and WATS trunk with voice switched gain

- LC08D—Dual CO trunk circuit
- LC09D—DID trunk circuit
- LC11B—4-Wire dial repeating tie trunk
- LC361—Loop signaling interface.

A. Special CO and WATS Trunk (LC07)

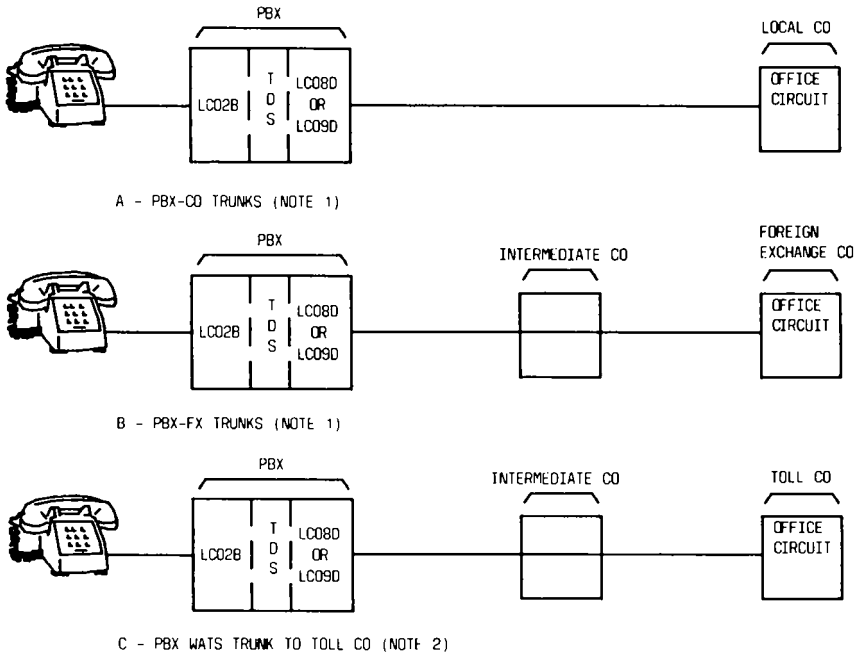
7.03 Trunk circuit LC07 is used to provide remote access (RA) with voice switched gain (VSG). The RA trunk groups are used to connect the PBX to the local central office for the purpose of completing remote access calls. The RA trunk groups can be arranged with or without VSG. Circuit pack LC07 may be used for WATS trunks requiring voice switched gain.

B. Dual (Ground Start) Trunk Circuit (LC08D)

7.04 The CO trunk groups (using LC08D circuit packs) are used to connect the PBX to the local CO. They provide a ground-start interface for other trunks and trunk-related features.

7.05 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. 124. Two separate trunk circuits are provided on each physical circuit pack.

7.06 The 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



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. 124—PBX-CO Trunk Combinations

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.

7.07 The central office sees an idle trunk as a high resistane between tip and ring shunted by a ringing bridge termination with −48 Vdc 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.

7.08 Figure 127 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 125(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. 125[B]). The 2-wire side has impedance set to 600 ohms. The 4-wire circuit impedance can be 600 or 1200 ohms.

7.09 Terminal balance (Fig. 126) is required when PBX-CO trunks are switched through to via-net-loss (VNL) tie trunks or CCSA lines.

7.10 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.

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), LC08B, C, or D should be substituted for LC08(MD).

7.11 ***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 calling 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

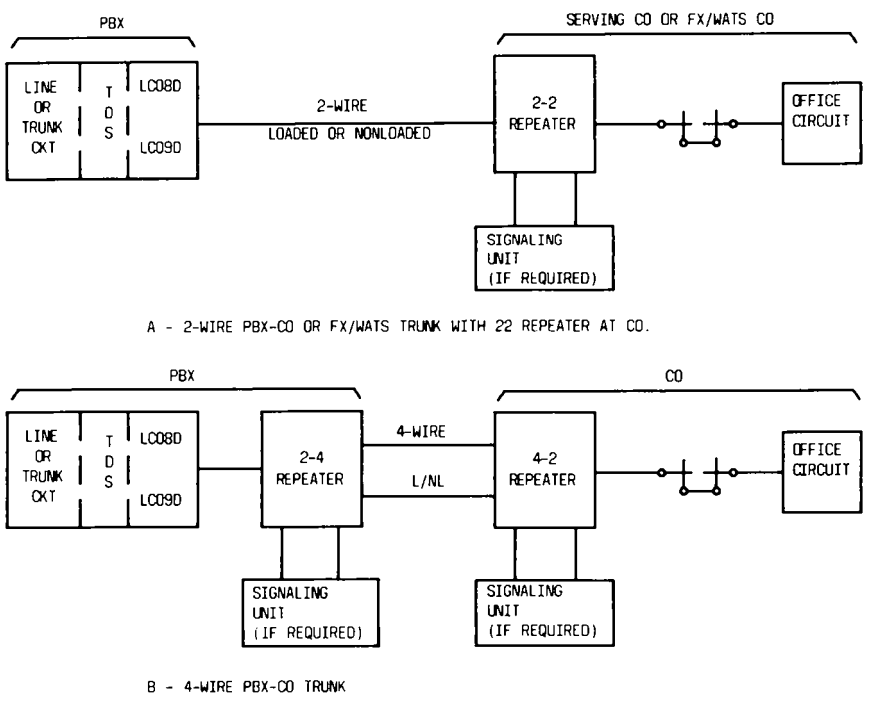


Fig. 125—PBX-CO Trunks

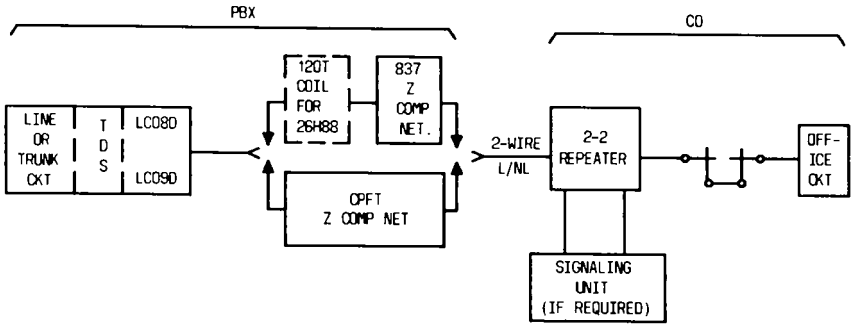


Fig. 126—2-Wire PBX-CO Trunk With Impedance Compensator

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.

7.12 ***Foreign Exchange (FX) Trunks (LC08D):*** The foreign exchange trunk groups are used to connect the PBX to a central office other than the home office of the trunk group.

7.13 ***Wide Area Telecommunications Service (WATS) (LC08D):*** The WATS trunk groups are used to connect the PBX to a WATS serving office for OUTWATS dialing or for INWATS calls.

C. DID Trunk Circuit (LC09D)

7.14 The direct inward dialing (DID) feature enables an incoming exchange call to terminate on a specific station line on the PBX. The LC09D circuit pack 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 a wink-start signal to the central office.

7.15 The DID trunk circuit pack (LC09D) 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. It is used as HI-LO reverse battery interface for other trunks and trunk-related features.

7.16 All 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. 127[A]) or as a battery and ground pulsing with maximum resistance of 2450 ohms (Fig. 127[B]). Answer supervision is sent to the central office as battery and ground reversal.

7.17 The signaling range for loop pulsing can be increased by the installation of a loop signaling extender at the PBX (Fig. 128).

D. Tie Trunk Circuit (LC11B) (DX or E&M 4-Wire Interface)

7.18 The LC11B 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:

- 1-Way-In Dial Repeating
- 1-Way-Out Automatic
- 1-Way-Out Dial Repeating
- 1-Way-In Automatic
- 2-Way Dial Repeating Both Ways

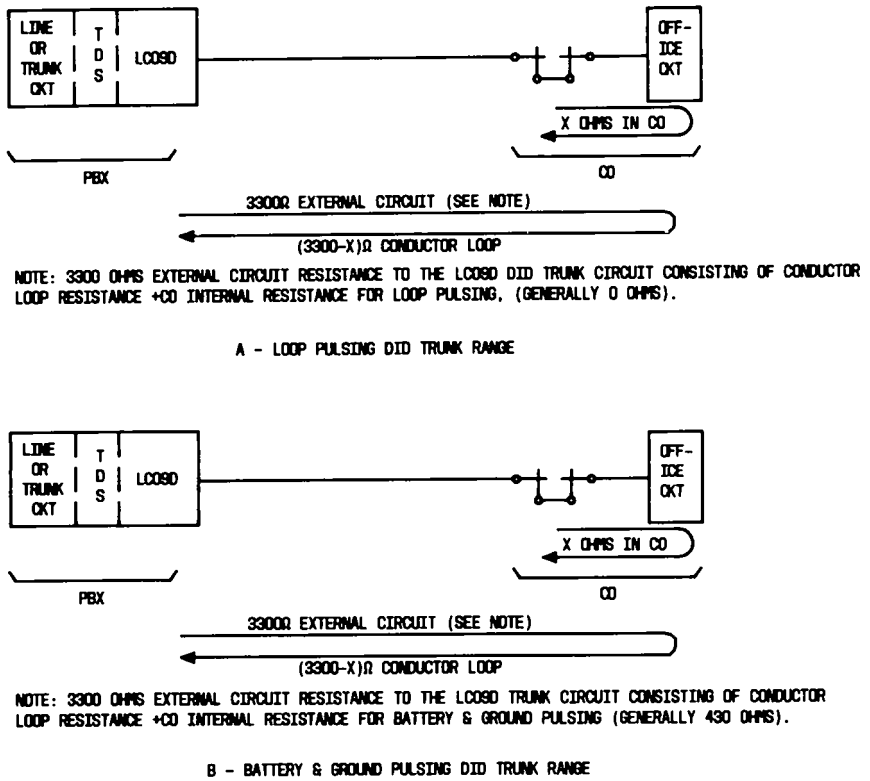


Fig. 127—DID Trunk Range

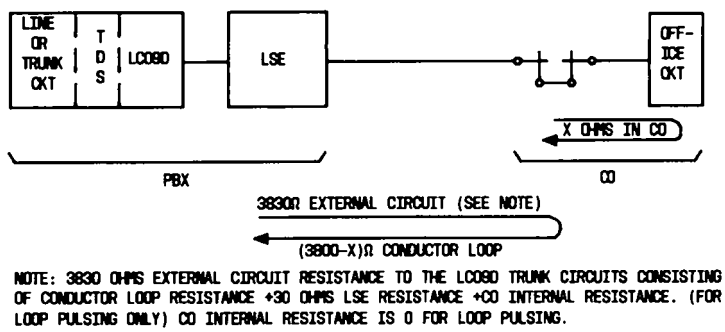


Fig. 128—LSE at DIMENSION PBX in DID Trunks

- 2-Way Dial Repeating-In/Automatic-Out
- 2-Way Automatic-In/Dial Repeating-Out
- 2-Way Automatic In/Out
- 1-Way-In Dial Repeating—Delay Dial
- 2-Way Dial Repeating—Delay Dial
- 2-Way Dial Repeating In/Automatic-Out-Delay Dial-In.

7.19 CCSA access is available with the following operational characteristics:

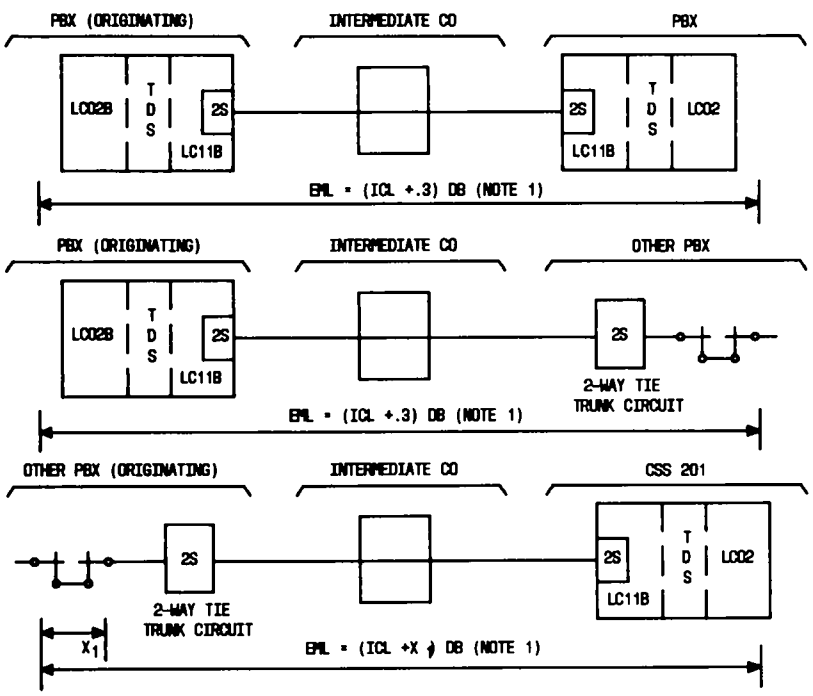
- 2-Way Dial In/Out
- 2-Way Wink-In/Delay Dial-Out

- 2-Way Dial Tone-Out/Delay Dial-In
- 2-Way Dial Tone-Out/Wink-In.

7.20 Various combinations are shown in Fig. 129. When the LC11B is 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. A pad switching function on the LC11B is controlled by the class of the tie trunk and its connecting trunk (Fig. 130).

7.21 The circuit can be optioned on the circuit pack for standard DX or E&M signaling. DX signaling capability is completely contained within the LC11B and is simplexed onto the 4-wire transmission path before leaving the LC11B. Means for reversing the simplex connection are also provided on the LC11B. 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 transmission path gain for the LC11B is automatically increased by 2 dB when an incoming call is made to a tie trunk to establish a tandem trunk connection.

7.22 The LC11B 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 2-dB transmission gain will be permanently switched in via DID software.



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 FORSEEABLE 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. 129—2-Wire PBX Tie Trunks

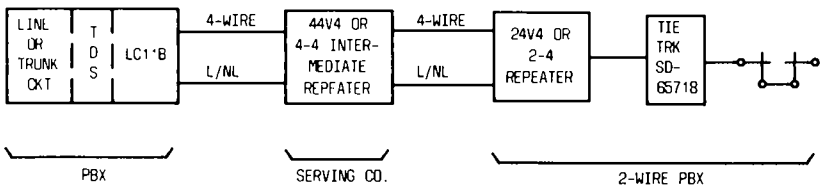


Fig. 130—4-Wire PBX Tie Trunks

When a trunk circuit on LC11B is optioned for DX signaling, all connections to that trunk are via the two tip and ring transmission pairs (4-wire). When it is optioned for E&M signaling, connections to the trunk are via six wires—two tip and ring transmission pairs and a 2-wire signaling path (the E&M leads). The LC11B furnishes either the appropriate M-lead wink or no signal, as in the case of step-by-step (SXS) CO immediate start, and the DIMENSION PBX call progress tones will be returned to the calling party.

7.23 The (DX or E&M) interface circuit is divided functionally into three sections:

- Control or digital portion
- Signaling portion
- Voice transmission portion.

The digital section 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 section. The transmission section provides the 4-wire path and gain switching to the distant end.

7.24 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. The following trunk circuit arrangements are shown with their signaling characteristics:

- 2-Way Dial Repeating-Out/Automatic-In
- 1-Way Dial Repeating or Automatic-Out
- 2-Way Dial Repeating-In/Automatic-Out
- 1-Way Dial Repeating or Automatic-In
- 2-Way Dial Repeating
- 2-Way Automatic.

Centralized Attendant Service (CAS) (LC11B)

7.25 CAS permits multilocation PBX customers (served by separate PBXs) to concentrate the attendant positions at a single location. The single location is called the "main" location. The other location (usually without attendants) is called the "branch" location. Attendant-seeking calls at the branch locations are routed to a main location attendant over release link trunks (RLTs). The RLTs provide short holding time connections for CAS calls. The attendant extends the call (back) over the same RLT to the branch location and then releases the RLT which is then available for a new CAS call.

Main/Satellite (MS) Trunks (LC11B)

7.26 The main/satellite feature permits a customer with multilocation PBXs to concentrate the attendant positions at one location (the main). Unattended locations are referred to as satellites. Stations at the "main" and/or the "satellite" may call each other without intervening dial tone. This trunking service is provided via the LC11B tie trunk circuit pack.

Advanced Private Line Termination (APLT) (LC11B)

7.27 The APLT feature provides the PBX user access to all services of the associated private network. This feature can function (without modification) as either an enhanced private switching communication service (EPSCS) network or a common control switching arrangement (CCSA) network.

Trunk circuits (LC11B) used for APLT are physically the same as those used as tie trunks. Trunk signaling used by APLT is compatible with EPSCS and the CCSA.

Electronic Tandem Network (ETN) (LC11B)

7.28 An ETN consists of two or more electronic tandem switches. Some of the ETN features using the LC11B trunk circuits are:

(a) Automatic circuit assurance.

(b) Automatic route selection—deluxe

- With time-of-day routing
- With controlled alternate facility restriction level.

(c) Uniform numbering

- With automatic alternate routing
- Automatic overflow to DDD.

E. 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 pack should be inserted into the same carrier slot because other boards will apply voltages that are hazardous to the LC05B or LC204 tone circuits.

7.29 The loop signaling interface trunk circuit LC361 can be used to provide the interface between the DIMENSION PBX and customer-provided computer equipment. The circuit can also be used for special off-premises extensions (OPX) where transmission loss is critical or must be minimized or where SMDR recording is desired.

7.30 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 in FP8.

7.31 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. It provides loop signaling similar to the LC02 line circuit; incoming seizures are generated by loop closures and outgoing seizures are generated by interrupted 20-Hz ringing. Ringing and 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 (tones circuit) via the cross-connect field.

INTERNAL TRUNK CIRCUITS

7.32 The internal trunk circuit types used in the DIMENSION 600 PBX are as follows:

- LC06B—Attendant conference circuit
- LC10C—TOUCH-TONE dialing digit register-receiver
- LC12—TOUCH-TONE dialing sender
- LC13B—Auxiliary trunk interface circuit
- LC15—CAS lamp interface circuit
- LC16B—Message register and energy control power monitor interface circuit.

A. Attendant Conference Circuit (LC06B)

7.33 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 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.

B. TOUCH-TONE Dialing Digit Register-Receiver (LC10C)

7.34 The register circuit of LC10C provides an interface between the receiver of the LC10C and the time division network. The number of register and receiver circuits required is determined by the number of TOUCH-TONE calling stations and the expected traffic. The TOUCH-TONE dialing circuits are required when remote access to a PBX service feature is provided. The circuits are also required when 1-way outgoing or 2-way dial repeating tie trunks are provided to distant PBXs which are not equipped to receive TOUCH-TONE dialing signaling. The DID trunks may be assigned a class of service which permits the use of TOUCH-TONE dialing receivers. Originating registers are assigned by software as records for processing dialed digits. The attendant register records do not require TOUCH-TONE dialing receivers. The total number of originating registers (ORs), including the ORs assigned to the TOUCH-TONE dialing registers, varies per traffic requirements.

C. TOUCH-TONE Dialing Sender (LC12)

7.35 A TOUCH-TONE dialing sender circuit is provided by each sender circuit pack (LC12). The sender circuits are provided as needed to carry the digit outpulsing traffic on calls requiring senderized operation. The sender circuit pack may be located in the trunk port carrier or the module control and trunk port carrier. The TOUCH-TONE dialing sender circuit is normally connected to a trunk for the purpose of outpulsing TOUCH-TONE dialing digits to the central office or to a remote PBX.

D. Auxiliary Trunk Interface Circuit (LC13B)

7.36 The auxiliary trunk circuit is used with such features as recorded telephone dictation and loudspeaker paging. Transmission to customer-owned peripheral equipment is accomplished by dry-loop seizure or by the 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.

E. CAS Lamp Interface Circuit (LC15)

7.37 The contact circuit pack is used to drive the system status indicator associated with the centralized attendant service (CAS) feature and the traffic overflow indicator associated with the uniform call distribution (UCD) feature.

F. Message Register and Energy Control Power Monitor Interface Circuit (LC16B)

7.38 The LC16B circuit pack may be installed in slots 2 through 9 of the trunk port carrier and in slots 6, 7, 8, 10, 12, 15, 17, and 19 of the module control and trunk port carrier. Up to four circuit packs can be installed, providing eight circuits each. This circuit pack is required for message register service as an optional method of providing local call billing for the hotel/motel feature. The LC16B is also required for the power monitoring function of energy communication service.

CHARACTERISTICS OF EXTERNAL TRUNKS

7.39 Trunk circuits (circuit packs) used for each of the trunking services are listed in Table L along with other trunking characteristics—eg, incoming, immediate start, etc.

7.40 An explanation of the characteristics of trunks providing ***incoming calls*** follows:

- ***AUTO***—An incoming call from a trunk having a bullet (•) in this column will not send dialed digits. The receiving PBX is expected to complete the call directly to either the PBX attendant, the CAS attendant, over outgoing release link trunks (RLTs), to a uniform call distribution (UCD) group, or to a direct department calling (DDC) group.

- ***IMMEDIATE START***—Indicates that the distant switching machine may begin outpulsing digits to the PBX immediately upon origination without waiting for a start dial signal.

- ***DIAL TONE***—Indicates to a PBX user or to a PBX (capable of detecting precise dial tone) that the PBX is ready to receive dialed digits.

- ***WINK START***—Provides a momentary off-hook signal (on-hook to off-hook to on-hook) which lasts nominally 200 ms and indicates to the originating switching machine that the PBX is ready to receive dialed digits.

- ***DELAY DIAL***—Indicates to the originating switching machine that the PBX is ready

to receive dialed digits. The delay signal is a momentary off-hook signal followed by a delayed on-hook signal. The delay can be from 200 ms to several seconds.

7.41 Characteristics of trunks providing ***outgoing calls*** are as follows:

- ***AUTO***—Indicates that the originating PBX expects the switching machine at the distant end to complete the call without any digits being sent to the receiving PBX.

- ***IMMEDIATE START***—Indicates that the PBX starts outpulsing immediately (after a delay of approximately 100 ms) upon trunk seizure, without waiting for any start dial signal.

- ***GROUND START***—To place a call to the central office using an LC08D circuit pack, the PBX seizes the trunk by placing a ground condition on the trunk circuit "ring" lead. The central office recognizes this as a request for service and eventually attaches dial tone as well as a receiver or some device to receive digits. This grounds the "tip" lead which indicates to the PBX that the central office is ready to receive digits. Some central offices perform a "party test" on calls from the PBX. This party test is normally used to determine which party is originating on a call from a 2-party line. These central offices do not deem it important to distinguish between calls from "ground start PBXs" and 2-party lines. The party test is applied to both types of calls. This party test signal momentarily opens the ground that was just applied to the "tip" lead. Consequently, the PBX software must delay its recognition of the ground start signal until after the party test signal is complete. This ability within the PBX software requires separate trunk types—eg, 18, 20, 23, 25, and 28.

- ***DIAL TONE***—Dial tone is an indication to the calling party that dialing may begin or resume. Precise dial tone, when detected by the software associated with trunk types 41, 43, 46, or 47, indicates to the PBX that the other end is ready to receive digits.

- ***WINK START***—Indicates to the PBX that the other end is ready to receive digits. The DIMENSION PBX recognizes a signal as short as 40 ms or as long as 10 seconds as a valid wink start.

- ***DELAY DIAL***—Indicates that the other end has acknowledged the trunk seizure sent by the PBX. This off-hook delays the PBX from outpulsing digits. When the other end is ready to receive digits, it sends an on-hook, completing the delay dial signal. The DIMENSION PBX recognizes a signal as short as 40 ms or as long as 10 seconds as a valid delay dial signal.

7.42 Certain trunk types (41, 43, 46, and 47) are called "universal" in that if any one of the last three signals is received (precise dial tone, wink start, or delay dial), the PBX will ***outpulse*** digits.

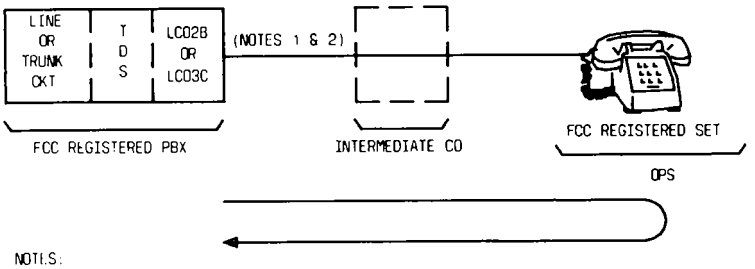
- ***TIME-OUT***—Certain trunk types allow outpulsing or establishing a talking connection for the purpose of allowing the calling party to dial through the PBX (via TOUCH-TONE dialing) even if no-start dial signal is received (after a suitable time-out interval shown in this column).

7.43 Dial pulsing is generated (regenerated) in the trunk circuit under software control, and TOUCH-TONE calling 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.

OFF-PREMISES STATIONS

7.44 The off-premises stations (OPS) feature is provided by connection arrangements as illustrated in Fig. 131 through 134. The LC02B line circuit pack used with OPS is illustrated in Fig. 131. Figures 131 through 134 illustrate the LC02 circuit pack used with OPS. The LC02B is used for the purpose of meeting FCC registration requirements, but performs the same functions as the LC02.

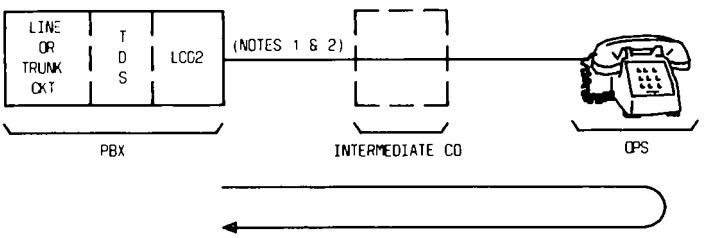
7.45 The LC02B line circuit transmits the 20-Hz ringing to stations associated with the PBX, and it detects loop signaling. Range to a station is limited to 840 ohms to ensure at least 23 mA at the telephone set. Range is reduced to 500 ohms if four ringers are required and 300 ohms for five ringers (Fig. 131[B]). When a loop signaling extender (LSE)



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

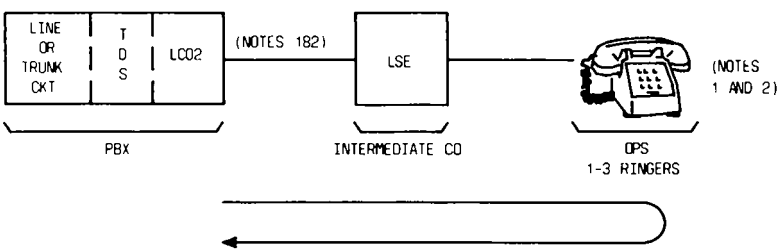
A - CIRCUITS USING CPS LC02B AND LC03C



NOTES:
1. MAXIMUM LOOP RESISTANCE IS 1250Ω INCLUDING TELEPHONE SET OR 1050 EXCLUDING TELEPHONE SET (VINTAGES OLDER THAN LC02B).
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

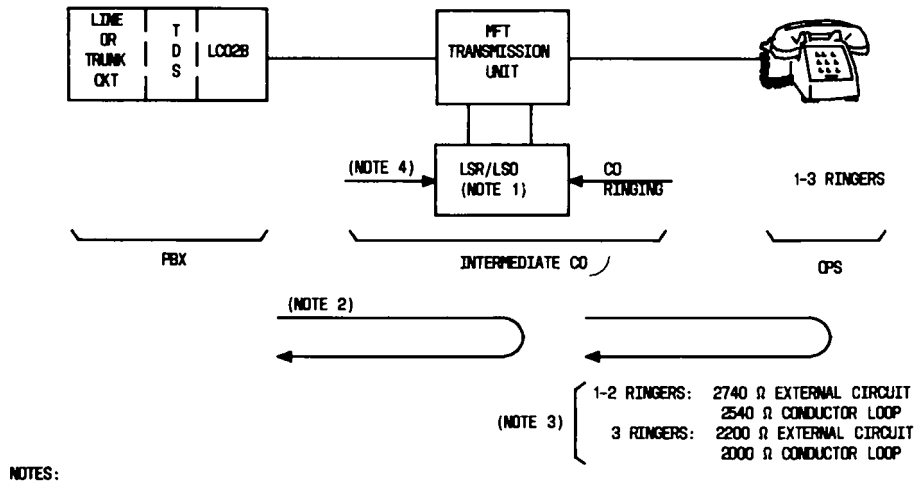
B - OPS SIGNALING RANGES 1-5 RINGERS, NO RANGE EXTENSION



NOTES:
1. 1-2 RINGERS: 1610 Ω EXTERNAL CIRCUIT (LC2 = V1, V2, V5) OR 1725Ω (LC2 = V3, V4, V6, V7)
(LSE I) 1410 Ω 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: 1500 Ω EXTERNAL CIRCUIT
1300 Ω CONDUCTOR LOOP +200Ω TELEPHONE SET RESISTANCE

C - LSE AT CO IN CPS LINE

Fig. 131—Off-Premises Stations



NOTES:
1. LSR/LSO = LOOP SIGNALING REPEATER - LOOP START ONLY
2. 1335 Ω EXTERNAL CIRCUIT RESISTANCE TO LC02B (V1, V2, V5) CIRCUIT CONSISTING OF 1205 Ω CONDUCTOR LOOP RESISTANCE +130 Ω MFT (T.U. AND LSO) INTERNAL RESISTANCE AT INTERMEDIATE CO. 2010 Ω EXTERNAL CIRCUIT RESISTANCE TO LC02B (V3, V4, V6, V7)
3. A) 2740 Ω EXTERNAL CIRCUIT RESISTANCE TO MFT OF INTERMEDIATE CO CONSISTING OF 2540 Ω CONDUCTOR LOOP RESISTANCE +200-OHM STATION SET RESISTANCE (BASED ON 23 MA STATION SET REQUIREMENT).
   B) 2200 Ω EXTERNAL CIRCUIT RESISTANCE TO MFT AT INTERMEDIATE CO CONSISTING OF 2000 Ω CONDUCTOR LOOP RESISTANCE +200-OHM STATION SET RESISTANCE (BASED ON RINGING RANGE LIMIT FOR THREE RINGERS).
4. NOTE 2 VALUES ARE FOR -45VDC INPUT TO LSR, NOTE 3 VALUES ARE FOR -72VDC INPUT.

Fig. 132—LSO at CO in OPS Line

is added (Fig. 131), the external circuit resistance is extended to 1610 ohms for up to two ringers and 1500 ohms for three ringers. 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.

7.46 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 2-2 intermediate repeater be used at the serving office for a 2-wire OPS installation (Fig. 132 and 133). Use of the 2-2 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. Typical 2- and 4-wire metallic facility installations are shown on Fig. 134. 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.

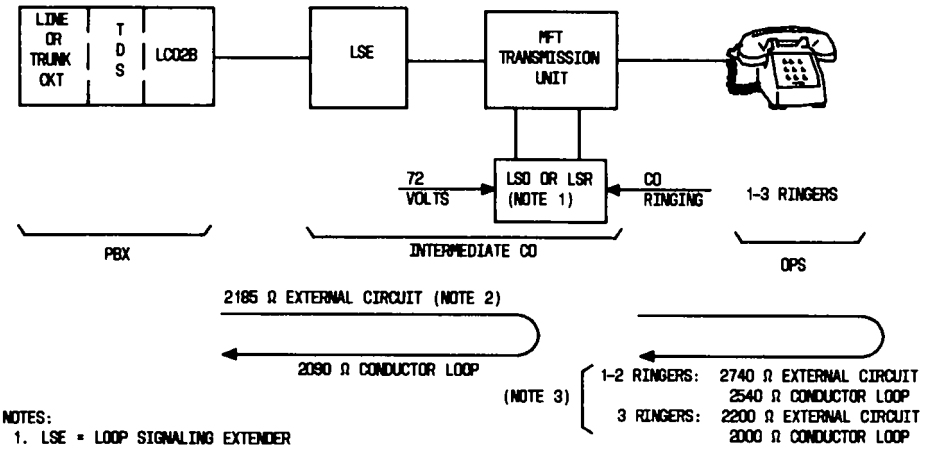
7.47 Among the features offered by the PBX are distinctive ringing and the "ring ping" signal of the call forwarding—all calls feature. This is a reminder that the feature is in effect. It consists of a single 100-ms burst of 20-Hz ringing sent to the station each time a call is forwarded. The three distinctive ringing signals are periodic:

(1) ***Pattern 1***

- 1.2 seconds on; 4 seconds off

(2) ***Pattern 2***

- 0.4 second on
- 0.2 second off
- 0.6 second on
- 4.0 seconds off



NOTES:

1. LSE = LOOP SIGNALING EXTENDER
2. A) 2220 Ω (LSE I) EXTERNAL CIRCUIT RESISTANCE TO LC02B (V1, V2, V5) CIRCUIT CONSISTING OF 2090 Ω CONDUCTOR LOOP RESISTANCE +130 Ω MFT (T.U., LSO & LSE) INTERNAL RESISTANCE AT INTERMEDIATE CO.
   B) 3450 Ω EXTERNAL RESISTANCE TO LC02B (V3, V4, V6, V7) CONSISTING OF 3320 Ω CONDUCTOR LOOP RESISTANCE +130 Ω MFT RESISTANCE.
   C) 2485 Ω (LSE II) EXTERNAL CIRCUIT RESISTANCE TO LC02B (V1, V2, V5) CIRCUIT CONSISTING OF 2355 Ω CONDUCTOR LOOP RESISTANCE +130 Ω MFT RESISTANCE.
3. A) 2740 Ω EXTERNAL CIRCUIT RESISTANCE TO MFT AT INTERMEDIATE CO CONSISTING OF 2540 Ω CONDUCTOR LOOP RESISTANCE +200-Ω STATION SET RESISTANCE (BASED ON 23 MA STATION SET REQUIREMENT).
   B) 2200 Ω EXTERNAL CIRCUIT RESISTANCE TO MFT AT INTERMEDIATE CO CONSISTING OF 2000 Ω CONDUCTOR LOOP RESISTANCE +200-Ω STATION SET RESISTANCE (BASED ON RINGING RANGE LIMIT FOR THREE RINGERS).

Fig. 133—LSO and LSE at CO in OPS Line

(3) ***Pattern 3***

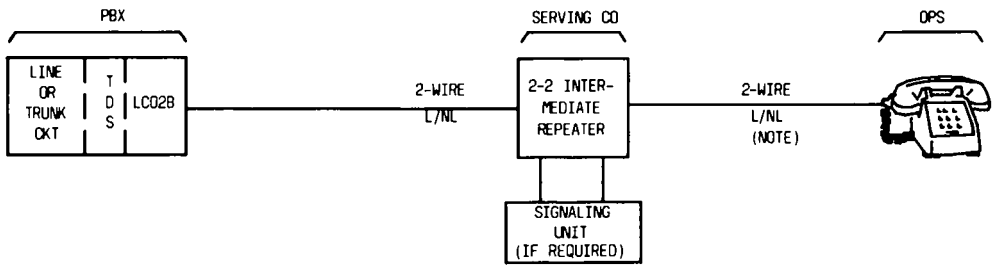
- 0.2 second on
- 0.1 second off
- 0.2 second on
- 0.1 second off
- 0.6 second on
- 4.0 seconds off.

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 block patterns 2 and 3 and "ring ping."

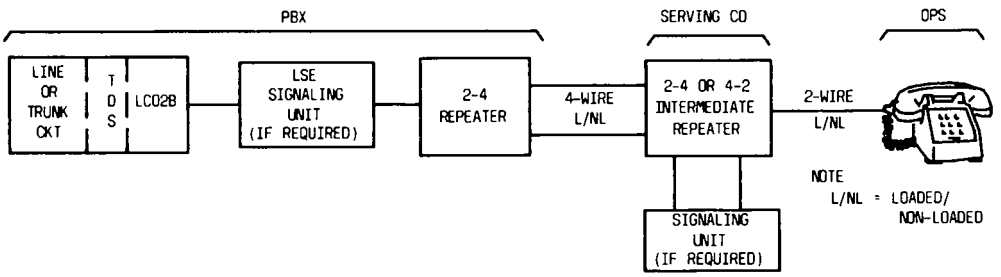
8. REFERENCES

8.01 The following ***sections*** are associated with the PBX and, when available, may be used for additional information:

SECTION	TITLE
332-610-100	Customer Premises Facility Terminal Equipment—General Description
332-610-200	CPFT—Installation
332-610-500	CPFT—Maintenance and Testing Information
332-910-180	MFT—General Applications Information
463-210-101	24A-Type Line Status Indicator—Identification and Installation
463-332-130	89A Control Unit



A - 2-WIRE PBX-OPS LINE WITH 2-2 INTERMEDIATE REPEATER



B - COMBINED 2-WIRE/4-WIRE PBX-OPS LINE

Fig. 134—PBX-OPX Line With Repeater

SECTION	TITLE
518-010-101	Centralized Key Telephone Installations
554-000-000	DIMENSION PBX Numerical Index (Refer to this index for TOP Documents)
554-000-100	DIMENSION PBX Miscellaneous Documentation Index (refer to this index for Administration and Maintenance Manuals)
554-010-100	DIMENSION PBX Attendant Console—General Description
554-010-101	DIMENSION Type PBXs—Input/Output, Interface, and Auxiliary Circuits—Maintenance Support Information
554-010-102	Peripheral Interface Circuit
554-010-103	DIMENSION PBX Energy Communication Signaling Unit
554-010-104	DIMENSION PBX—Attendant Console—Maintenance Support Information
554-010-110	DIMENSION PBX Electronic Custom Telephone Service—System Description
554-010-122	DIMENSION PBX—Station Message Detail Recording
554-010-123	DIMENSION PBX—Station Message Detail Recording—Maintenance Support
554-010-130	DIMENSION PBX—Remote Maintenance, Administration, and Traffic System (RMATS-1)—Description and Operation
554-010-135	DIMENSION 400 and 2000/Custom PBXs—AUTOVON Service

SECTION	TITLE
554-010-141	DIMENSION PBX—Customer Administration Panel
554-105-100	DIMENSION 600 PBX (Formerly DIMENSION 400E PBX)—System Description
554-105-106	DIMENSION 600 PBX (Formerly DIMENSION 400E PBX)—Scanner/Distributor and Network Control—Maintenance Support Information
554-105-107	DIMENSION 600 PBX (Formerly DIMENSION 400E PBX)—PAM Network and Port Circuits—Maintenance Support Information
554-105-108	DIMENSION 600 PBX—(Formerly DIMENSION 400E PBX)—Central Processor—Maintenance Support Information
554-105-115	DIMENSION 600 PBX (Formerly DIMENSION 400E PBX)—X-Ray Program Package—Operating Procedure
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
876-300-100	Electrical Protection—Station and PBX
981-012-100	Centralized Attendant Service (CAS)—General Description Information

8.02 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 7B—Emergency Transfer Circuit

SD-1E450-01, Issue 8—Electronic Telephone Controller

SD-1E464-01, Issue 10B—201SE System Circuits

SD-1E469-01, Issue 2B—System AC and DC Power and Ground Distribution

SD-1E482-01, Issue 4AC—MAAP

SD-1E483-01, Issue 10B—DIMENSION 600 PBX—AC Distribution, Fan Assembly, and Frequency Generator

SD-1C586-01, Issue 1—TOUCH-TONE Calling Receiving Circuit Type G1

SD-66040-08—Tie Trunk Circuit

SD-69910-01, Issue 1—Attendant Console

SD-7C0101, Issue 1—Specification for Customer Premises Facility Terminal (CPFT)

8.03 The following ***J-drawings*** are associated with the PBX and may be referred to for additional information:

J58879AC, Issue 20—Line Port Carrier

J58879BA-2, Issue 28—Trunk Port Carrier

J58879F-2, Issue 12—Auxiliary Cabinet

J58879KA, Issue ( )—ECTS Carrier

J58879KB, Issue ( )—Supplemental ECTS Carrier

J58882B-1, Issue 35—Module Control Cabinet

J58882C-1, Issue 11—Line Cabinet

J58882E, Issue 1—Common Control Cabinet

J58882AC, Issue 18—Basic Control Carrier

J58882AH, Issue 1—Control-Growth Carrier

J58882BA, Issue 25—Module Control and Trunk Port Carrier

J58882BB, Issue 17—Line Group Control Carrier

J58882BD, Issue 9—Tie Trunk Carrier

J58884A-1, Issue 8—Control Cabinet

J58882DC-1, Issue 1—MAAP

J58884JA, Issue 6—AC Distribution, Fan Assembly, and Frequency Generator

J58882TA-1, Issue 1—Stored Tape Program Memory—System

J58882TB-1, Issue 4—X-Ray Program

8.04 The following ***equipment drawings (EDs)*** are associated with the PBX and may be referred to for additional information:

ED-1E301-01, Issue 5—Environmental Requirements

ED-1E302-01, Issue 5—Interconnecting Requirements

ED-1E304-01, Issue 2—Printed Backplane Interconnection

ED-1E312-71, Issue 3—Circuit Pack Carrier Assembly

ED-1E314-70, Issue 7—Cabinet Structure

ED-1E315-70, Issue 8—Cabinet Doors and Covers

ED-1E321-70, Issue 5—Power and Ground Bus Bar Distribution

ED-1E360-70, Issue 3—DC Power Distribution Facilities

ED-1E361-70—AC Power Distribution Panel Assembly

ED-1E362-10, Issue 2—Floor Rail Assemblies

ED-1E364-70, Issue 3—Thermal Assembly Unit

ED-1E366-70, Issue 3—Cable Duct Assembly

ED-1E367-11, Issue 5—Cable Assemblies

ED-1E368-01, Issue 2—System AC Distribution Equipment

ED-1E375-70, Issue 1—AC/DC Protector Cabinet

ED-1E376-70, Issue 1—Module AC Distribution Box

9. FILL-IN WORKSHEETS

The following worksheets should be reproduced locally and the originals kept with the section for use in planning future changes.

Worksheet 1 — Emergency Transfer Connections

Worksheet 2 — Attendant Console Repeater Connections

Worksheet 3 — AUDICHRON Variable Announcement Unit Connections

Worksheet 4 — 3A Code Call Access Cross-Connections

Worksheet 5 — Chime Paging Cross-Connections

Worksheet 6 — Data Channel Repeater From Basic Control Carrier Cross-Connections

Worksheet 7 — Data Channel Repeater From Control-Growth Carrier Cross-Connections

Worksheet 8 — Connections for a Data Channel Repeater to Repeater or to Peripheral Device

Worksheet 9 — Cross-Connections for Force Administration Data System (FADS)

Worksheet 10 — Cross-Connections for Loudspeaker Paging—89A Control Unit

Worksheet 11 — Cross-Connections for Loudspeaker Paging With Chime Paging and Background Music — 89A Control Unit

Worksheet 12 — Music-on-Hold Cross-Connections

Worksheet 13 — Peripheral Interface Circuit Connections

Worksheet 14 — Radio Paging Access Connections

Worksheet 15 — Recorded Announcement Cross-Connections

Worksheet 16 — Recorded Telephone Dictation Trunk Unit Cross-Connections

Worksheet 17 — Auxiliary Field Cross-Connections for 44V4 and 24V4 Repeaters

Worksheet 18 — Cross-Connections for System Status Indicator (SSI)

Worksheet 19 — Cross-Connections for System Status Indicator and CO Alarms

Worksheet 20 — Cross-Connections for Additional System Status Indicator

Worksheet 21 — Cross-Connections for Line Status Indicator (LSI)

Worksheet 22 — Trunk Answer From Any Station (TAAS) Cross-Connections

Worksheet 23 — Cross-Connections for UCD Traffic Overload Indicator (Short Loop)

Worksheet 24 — Cross-Connections for UCD Traffic Overload Indicator (Long Loop)

Worksheet 25 — VSG Option and dB Switches — Gain Setting

Worksheet 26 — LC11B Tie Trunk Switch Options

WORKSHEET 1
(SHEET 1 OF 2)
EMERGENCY TRANSFER CONNECTIONS

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.

WORKSHEET 1
(SHEET 2 OF 2)
EMERGENCY TRANSFER CONNECTIONS

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.

WORKSHEET 2
ATTENDANT CONSOLE REPEATER CROSS-CONNECTIONS

MOD_ _ CAB_ CONN _ _ _ _ LGX_ _	CONN CABLE COLOR CODE	TO / FROM CROSS-CONNECT		TO / FROM REPEATER AT PBX END			TO / FROM REPEATER AT CONSOLE END			TO	
		PURPLE	YELLOW (NOTE)	CONN BLK TB1		LEAD DESIG	CONN BLK TB1		LEAD DESIGNATION	CONN CABLE COLOR CODE	CONSOLE TERM NO.
IOXAO (+ DATA IN)	W-BL	1		1A	1E	RT	1A	1E	IOXAO (+ DATA IN)	W-BL	1
IOXBO (- DATA IN)	BL-W	2		2A	2E	RR	2A	2E	IOXBO (- DATA IN)	BL-W	2
IORAO (+ DATA OUT)	W-O	3		3A	3E	XT	3A	3E	IORAO (+ DATA IN)	W-O	3
IORBO (- DATA OUT)	O-W	4		4A	4E	XR	4A	4E	IORBO (- 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.

WORKSHEET 3

"AUDICHRON" VARIABLE ANNOUNCEMENT UNIT CONNECTIONS

CONNECT CABLE FROM					"AUDICHRON" CONN BLK/TIE POINT	YELLOW CONN BLOCK	PURPLE CONN BLOCK
CIRCUIT PACK		TERM.	LEAD				
			COLOR	DESIG	TERMINAL	TERMINAL	TERMINAL
MULTIPHASE CP GENERATOR		A B 2 1	W-BL BL-W W-O O-W	CPØA CPØB CPØC CPØD	A B C D	1 2 3 4	
SYSTEM ALARM		L N	R-O O-R	A B	P R	5 6	
PLAYBACK AMPLIFIER	ØA	HH CC	W-G G-W	TT RR	E F	7 8	
	ØB	JJ DD	W-BR BR-W	TT RR	H J	9 10	
	ØC	FF AA	W-S S-W	TT RR	K L	11 12	
	ØD	EE BB	R-BL BL-R	TT RR	M N	13 14	

WORKSHEET 4

3A CODE CALL ACCESS CROSS-CONNECTIONS

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) CAB___ CARR___ SLOT___	CKT 0	T				1T			
		R				2T			
	CKT 1	T				7T			
		R				8T			
LC08D (PORT 2) CAB___ CARR___ SLOT___	CKT 0	T					1T		
		R					2T		
	CKT 1	T					7T		
		R					8T		
LC04 OR LC204 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

WORKSHEET 5

CHIME PAGING CROSS-CONNECTIONS

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 60 HZ — 2012B TRANSFORMER

WORKSHEET 6

(SHEET 1 OF 3)

DATA CHANNEL REPEATER FROM BASIC CONTROL CARRIER CROSS-CONNECTIONS

CAB 0 CARRIER 0				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 SHEET 3.

WORKSHEET 6

(SHEET 2 OF 3)

DATA CHANNEL REPEATER FROM BASIC CONTROL CARRIER CROSS-CONNECTIONS

CAB 0 CARRIER 0				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		

WORKSHEET 6

(SHEET 3 OF 3)

DATA CHANNEL REPEATER FROM BASIC CONTROL CARRIER CROSS-CONNECTIONS

CAB 0 CARRIER 0				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.

WORKSHEET 7

(SHEET 1 OF 4)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS

CAB 0	CARRIER 0			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		

WORKSHEET 7

(SHEET 2 OF 4)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS

CAB 0 CARRIER 0				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		

WORKSHEET 7

(SHEET 3 OF 4)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER CROSS-CONNECTIONS

CAB 0 CARRIER 0				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		

WORKSHEET 7

(SHEET 4 OF 4)

DATA CHANNEL REPEATER FROM CONTROL-GROWTH CARRIER
CROSS-CONNECTIONS

CAB 0 CARRIER 0				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		

WORKSHEET 8

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

CAB 0 CARR 0 LC34B		PBX LEADS FROM BX0 __ OR GX0 __ 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		
SLOT	CIRCUIT		TB1 TERM. NO.	TB1 TERM. NO.	TB1 TERM. NO.	TB1 TERM. NO.		
	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	

WORKSHEET 9

CROSS-CONNECTIONS FOR FORCE ADMINISTRATION DATA SYSTEM (FADS)

PBX		CROSS-CONNECT		
		TO/FROM	TO/FROM	TO
		CONN BLK _ _ _XO_ (PURPLE)	CONN BLK ____ (YELLOW)	KS-19252, L7 ADAPTER
DATA CHANNEL	LEAD DESIGNATION			STRIP TERM. NO.
CAB ___ CARR ___ SLOT _ _ CIRCUIT _____	IOXB_ _ _ _			1
	IOXA_ _ _ _			2
	IORB_ _ _ _			3
	IORA_ _ _ _			4

CONNECT FROM 211A POWER UNIT		KS-19252, L7 ADAPTER
LEAD DESIGNATION	MOUNTING CORD COLOR CODE	STRIP TERM. NO.
-S	G	5
+S	BK	6
-V	R	7
+V	W	8

WORKSHEET 10

CROSS-CONNECTIONS FOR LOUDSPEAKER PAGING--89A CONTROL UNIT

PBX		CROSS-CONNECT									
		FROM		TO	FROM	TO	TO	FROM	TO/FROM	TO	
		CONN BLK (PURPLE)		609-TYPE PANEL (SEE NOTE)		CONN BLK (YELLOW)	89A CONTROL UNIT		DEMAR-CATION BLOCK	PAGING EQUIPMENT	
EQUIPMENT	LEAD DESIG	- - - - _XO_	AP7	TBC			SCREW TERM.	SCREW TERM.	TERM.	LEAD DESIG	FUNCTION
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.

WORKSHEET 11

CROSS-CONNECTIONS FOR LOUDSPEAKER PAGING WITH CHIME PAGING AND BACKGROUND MUSIC--89A CONTROL UNIT

PBX		CROSS-CONNECT													
		TO/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	
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				
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.

WORKSHEET 12

MUSIC-ON-HOLD CROSS-CONNECTIONS

LC13B LEAD DESIG	LEAD COLOR CODE	PURPLE BKBD CONN BLOCK _ _TXO_	YELLOW BKBD CONN BLOCK	31B OR 31D VOICE COUPLER (SEE NOTE)		YELLOW BKBD CONN BLOCK	CUSTOMER-PROVIDED MUSIC SOURCE
				PBX SIDE	CPE SIDE		
T				1	3		CT
R				2	4		CR

AUXILIARY TRUNK_____ CARRIER_____
SLOT_____ CIRCUIT_____

NOTE: 31B VOICE COUPLER IS GRANDFATHERED PER FCC RULES AND MAY BE USED IF AVAILABLE.

WORKSHEET 13

PERIPHERAL INTERFACE CIRCUIT CONNECTIONS

SLOT_ _	LEAD DESIG	00BX0_ CONN BLK TERM.	PIC CONN CABLE	
LC34B OR LC366B CKT NO.			COLOR CODE	LEAD DESIG
	10XB00_ _		W-BL	10XB
	10XA00_ _		BL-W	10XA
	10RB00_ _		W-O	10RB
	10RA00_ _		O-W	10RA

WORKSHEET 14

(SHEET 1 OF 2)

RADIO PAGING ACCESS CONNECTIONS

CROSS-CONNECT					CROSS-CONNECT				
FROM			TO / FROM		TO / FROM	TO			
PBX LEAD DESIG FOR		OTHER LEADS	PURPLE BKBD CONN BLK TERM.		YELLOW BKBD CONN BLK TERM.	TERMINAL STRIPS FOR INTERFACE TRUNK UNIT			
TX0___	LGX01		__TX0_	LGX01		TS(A1)	TS(A2)	TS(A16)	TS(A17)
T	—	—		—					
R	—	—		—					
T	—	—		—					
R	—	—		—					
T	—	—		—					
R	—	—		—					
T	—	—							
R	—	—		-					
—	T00	—		2		18	—	54	—
—	T10	—		4		—	45	—	
		TMS				13	-	57	—
		TMS					34		57

CO TRUNK_____ CARRIER_____

SLOT_____ CIRCUIT_____

WORKSHEET 14

(SHEET 2 OF 2)

RADIO PAGING ACCESS CONNECTIONS

CROSS-CONNECT						
FROM				TO / FROM	TO / FROM	TO DEMARCATION BLOCK
INTERFACE TRUNK UNIT				YELLOW BKBD CONN BLK___	31B/31D VOICE COUPLER	
LEAD DESIG	TS(A1)	TS(A2)	TS(A3)			
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			

WORKSHEET 15

CROSS-CONNECTIONS FOR RECORDED ANNOUNCEMENT UNIT

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
						G5	38

AUXILIARY FUSE PANEL J58879PF-1,L2

WORKSHEET 16

(SHEET 1 OF 3)

CROSS-CONNECTIONS FOR RECORDED TELEPHONE DICTATION TRUNK UNIT

PBX			CROSS-CONNECT					
			TO/FROM		TO/FROM	TO		
EQUIPMENT		LEAD DESIG	CONN BLK _ _ _ _ _ _ 0 _ (PURPLE)	CONN BLK _ _ _ _ LGX01	CONN BLK —— (YELLOW)	RECORDED TELEPHONE DICTATION TRUNK UNIT		
						LEAD DESIG	TS (A)	TS (B)
LC13B CAB ___ CARR ___ SLOT ___	CKT ___	T				T	58	
		R				R	48	
		S2				S2	15	
CAB ___ LINE GROUP CONTROL CARR ___	LC04	T00		1		T00		44
	LC05B SLOT 6	T10		50		T10	47	

WORKSHEET 16

(SHEET 2 OF 3)

CROSS-CONNECTIONS FOR RECORDED TELEPHONE DICTATION TRUNK UNIT

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					(NOTE 1)
R1	A	18					
PB	A	33					(NOTE 2)
GRD	A	23					
TT	C	58 (NOTE 3)			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					

NOTES:

SEE SHEET 3

WORKSHEET 16

(SHEET 3 OF 3)

CROSS-CONNECTIONS FOR RECORDED TELEPHONE DICTATION TRUNK UNIT

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		

NOTES:
1. CONNECT T/R TO DICTATION ATTENDANT TELEPHONE SET.
2. CONNECT TO DIAL ATTENDANT PLAYBACK KEY.
3. 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.

WORKSHEET 17

CROSS-CONNECTIONS FOR 24V4 OR 44V4 REPEATERS

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)
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	X		35	17				
	GRD	X		1	1				

WORKSHEET 18

CROSS-CONNECTIONS FOR SYSTEM STATUS INDICATOR (SSI)

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT						
				TO/FROM	TO/FROM	TO/FROM	TO/FROM	TO		
				CONN BLK	CONN BLK	CONN BLK	CONN BLK	30A8 SSI NO.___		
				_ _ _ _ _ XO _	_ _ _ _ _ LGX02	_ _ _ _ _ AP7	___		MTG CORD	
EQUIPMENT	CKT NO.			(PURPLE)			(YELLOW)	COLOR CODE A25B	LEAD DESIG	P1 CONN TERM.
LC15 CONTACT INTERFACE B	1	CIG					11	R-BL	RL1 BSY	
	2	CIG					1	W-BL	RL2 BSY	
	3	CIG					8	BR-W	RL3 BSY	
	4	CIG					4	O-W	RL4 BSY	
CABINET ___	5	CIG					12	BL-R	CONTL	
	6	CIG					15	R-G	OVRLD	
CARRIER ___	1	CID								
SLOT ___	2	CID								
	3	CID								
	4	CID								
	5	CID								
	6	CID								
LINE GROUP CONTROL CARRIER CABINET _____ CARRIER _____		-48 AUX	V-S		49			2	BL-W	GRD	
		GRD -48	S-V		50			16	G-R	GRD	
ALARM PANEL		MJ	BL-W			2		6	G-W	MJ	
		MN	O-W			4		5	W-G	MN	
		MJR	W-BL			1					
		MNR	W-O			3					

WORKSHEET 19

CROSS-CONNECTIONS FOR SYSTEM STATUS INDICATOR AND CO ALARMS

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT												
				TO/FROM	TO/FROM	TO/FROM	TO		FROM		TO/FROM	TO/FROM	TO		TO	
				CONN BLK	CONN BLK	CONN BLK	1ST 17B KTU	2ND 17B KTU	1ST 17B KTU	2ND 17B KTU	CONN BLK	CONN BLK	CO ALARMS		30A8 SSI	
				_ XO _	LGX02	AP7										
EQUIPMENT	CKT NO.			(PURPLE)							(GREEN)	(YELLOW)	LEAD DESIG	TERM.	COLOR CODE	LEAD DESIG	TERM.
LC15 CONTACT INTERFACE B	1	CIG										11			R-BL	RL1 BSY	
	2	CIG										1			W-BL	RL2 BSY	
	3	CIG										8			BR-W	RL3 BSY	
	4	CIG										4			O-W	RL4 BSY	
CABINET ___	5	CIG										12			BL-R	CONTL	
CARRIER ___	6	CIG										15			R-G	OVRLD	
SLOT ___	1	CID															
	2	CID															
	3	CID															
	4	CID															
	5	CID															
	6	CID															
LINE GROUP CONTROL CARRIER CABINET _____ CARRIER _____		-48 AUX	V-S		49		1	7					MJ				
							4	9					MJR				
							1	7					MN				
							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											

WORKSHEET 20

CROSS-CONNECTIONS FOR ADDITIONAL SYSTEM STATUS INDICATOR

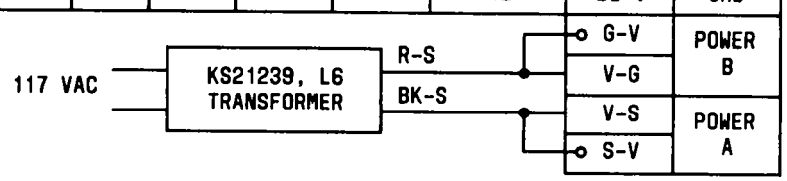
PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT					
				TO/FROM	TO/FROM	TO/FROM	TO		
				CONN BLK	CONN BLK	CONN BLK	30A8 SSI NO. ___		
				_ XO _	LGX02		COLOR CODE A25B	MTG CORD	
EQUIPMENT	CKT NO.			(PURPLE)		(YELLOW)		LEAD DESIG (NOTE)	P1 CONN TERM.
LC15 CONTACT INTERFACE B	1	CIG0				11	R-BL		31
	2	CIG1	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

NOTE: LEAD DESIG = "SQ(1-30) OVRLD" WHEN DISPLAY INDICATES CMS SPLIT QUEUE OVERLOAD, OR "RL(1-114) BS4" WHEN DISPLAY MONITORS CAS RELEASE LINK TRUNKS.

WORKSHEET 21

CROSS-CONNECTIONS FOR LINE STATUS INDICATOR (LSI)

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
CAB___ CARR___		T		_ XO _		1	W-BL	T1
SLOT___ CIRCUIT___		R				2	BL-W	R1
CAB___ CARR___		T		_ XO _		3	W-O	T2
SLOT___ CIRCUIT___		R				4	O-W	R2
CAB___ CARR___		T		_ XO _		5	W-G	T3
SLOT___ CIRCUIT___		R				6	G-W	R3
CAB___ CARR___		T		_ XO _		7	W-BR	T4
SLOT___ CIRCUIT___		R				8	BR-W	R4
CAB___ CARR___		T		_ XO _		9	W-S	T5
SLOT___ CIRCUIT___		R				10	S-W	R5
CAB___ CARR___		T		_ XO _		11	R-BL	T6
SLOT___ CIRCUIT___		R				12	BL-R	R6
CAB___ CARR___		T		_ XO _		13	R-O	T7
SLOT___ CIRCUIT___		R				14	O-R	R7
CAB___ CARR___		T		_ XO _		15	R-G	T8
SLOT___ CIRCUIT___		R				16	G-R	R8
LINE GROUP CONTROL CARRIER CAB._____ CARR _____		GRD -48	S-V	LGX02	50	41	V-BL	GRD
						42	BL-V	GRD



WORKSHEET 22

CROSS-CONNECTIONS FOR TRUNK ANSWER FROM ANY STATION (TAAS)

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	
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

WORKSHEET 23

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

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

WORKSHEET 24

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

PBX		LEAD DESIG	COLOR CODE	CROSS-CONNECT								
				TO/FROM	TO/FROM	TO/FROM	TO			FROM	TO/FROM	TO
				CONN BLK _ _ _ _ _ XO _	CONN BLK _ _ _ _ _ LGX02	CONN BLK ___	17B KTU				J1-TYPE LAMP ON INDICATOR NO.	28A1 POWER UNIT TERM.
EQUIPMENT	CKT NO.			(PURPLE)		(YELLOW)	NO.	LEAD DESIG	TERM. NO.	TERM. NO.		
LC15 CONTACT INTERFACE B	1	CIG					1ST	-48V	2	4	1	10VAC
		CID								6		GRD
	2	CIG					2ND	-48V	2	4	2	10VAC
		CID								6		GRD
CABINET ___	3	CIG					3RD	-48V	2	4	3	10VAC
		CID								6		GRD
CARRIER ___	4	CIG					4TH	-48V	2	4	4	10VAC
SLOT ___		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 CABINET _____ CARRIER _____		-48 AUX	V-S		49							
		GRD -48	S-V		50		ALL	GRD	1			

WORKSHEET 25

VSG OPTION AND dB SWITCHES--GAIN SETTING

SENSITIVITY OPTIONS	OPTION REQUIRED	TOTAL GAIN REQUIRED	dB SWITCHES	SWITCH SETTINGS	
				ON	OFF
1			1		
2S					
20			2		
3S		_dB			
30			3		
20S			4		

WORKSHEET 26

LC11B TIE TRUNK SWITCH OPTIONS

SWITCH	DESIGNATION	SETTING	
		OPEN	CLOSED
SW1 CKT 0	(1) EL		
	(2) EM2		
	(3) EM1		
	(4) DXRV2		
	(5) EM4		
	(6) DXRV1		
	(7) EM5		
SW1 CKT 1	(1) EL		
	(2) EM2		
	(3) EM1		
	(4) DXRV2		
	(5) EM4		
	(6) DXRV1		
	(7) EM5		
SW2 CKT 1	(1) BAL1		
	(2) BAL2		
	(3) BAL3		
SW2 CKT 0	(4) BAL3		
	(5) BAL2		
	(6) BAL1		

TIE TRUNK_____ CARRIER_____

SLOT_____ CIRCUIT_____